



Appendix D-1

Geotechnical Investigation Report



**GEOTECHNICAL INVESTIGATION REPORT
PROPOSED RESIDENTIAL DEVELOPMENT
1515 WALNUT AVENUE
CITY OF ROSEMEAD, CALIFORNIA**

Prepared for **LEWIS MANAGEMENT CORPORATION**
1156 NORTH MOUNTAIN AVENUE
UPLAND, CALIFORNIA 91786

Prepared by **LEIGHTON CONSULTING, INC.**
2600 MICHELSON DRIVE, SUITE 400
IRVINE, CALIFORNIA 92612

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Lewis Management Corporation
1156 North Mountain Avenue
Upland, California 91786

Attention: Mr. Glen Crosby
Vice President, Regional Planned Communities

**Subject: Geotechnical Investigation Report
Proposed Residential Development
1515 Walnut Avenue
City of Rosemead, California**

Per your request and authorization, Leighton Consulting, Inc. (Leighton) is pleased to present this geotechnical exploration report for the proposed residential development, located at 1515 Walnut Avenue in the City of Rosemead, California. Review of the development concept plan *Rosemead Condos 1515 Walnut Grove Ave*, by Kimley Horn and Associates, dated April 4, 2025 indicates the overall 9± acre site is proposed for 191 tandem 3-story multifamily units with garages and uncovered parking, play fields and pool and spa. No subterranean structures are currently planned.

Based on our exploration, the proposed project is considered feasible from a geotechnical standpoint. Geotechnical recommendations with respect to site grading and foundation design are presented in this report.

We appreciate this opportunity to be of service. If you have any questions or if we can be of further service, please contact the undersigned.

Respectfully submitted,

LEIGHTON CONSULTING, INC.



Joe Roe, PG, CEG
Sr. Principal, Geologist
1 949.681.4263
jroe@verdantas.com



Luis Perez-Milicua, PE
Associate Engineer
1 909.527.8777
Lperez-milicua@verdantas.com



Distribution: (1) Addressee

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1.0 INTRODUCTION

1.1 Site Description and Proposed Development

The site is currently occupied by a 4-story office building on the east and an associated parking lot on the west. Drive aisles on the property are present to the north, south and east. Walnut Grove Avenue is present to the east, residential development to west and commercial office development to the north and south. Review of historical aerial imagery indicates the site was vacant in 1948. A small creek drained east west across the center of the property. Between 1948 and 1980 the site remained mostly vacant, although several small structures appear present in the north portion of the site. By 1987, the existing office building had been constructed.

Based on review of the plan *Walnut Grove Conceptual Site Plan*, prepared by Woodley Architectural Group Nc., dated April 23, 2025, Scale 1"=40', we understand the 9.28 acre site is planned (*subject to change*) for 191 Type V, 3-story residential units with garages, play field and pool and spa all at grade. Access to the development will be provided along the east side at two locations fronting Walnut Grove Avenue. Ancillary improvements to include drainage, utility infrastructure, hardscape, landscape drive aisles and uncovered parking areas. No formal grading or structural plans were available for review at this time.

1.2 Purpose and Scope of Exploration

The purpose of our geotechnical study is to provide site-specific information regarding potential geotechnical constraints, subsurface soil stratigraphy, and groundwater conditions that underlie the site. This data will be used to provide preliminary geotechnical recommendations for design of foundations, floor slab, parking lot pavement, and earthwork construction. The project is located within an area mapped by the State of California as being susceptible to liquefaction (El Monte Quadrangle), which includes an Alquist Priolo fault Hazard Assessment Zone (AP Zone) requiring fault studies to be provided. *A fault hazard study has been prepared under sperate cover (Leighton 2024a). Applicable geotechnical exploration data from the fault study was used in preparation of this report. Fault hazard report met with approval from the City (ECI, 2024).*

The scope of our geotechnical exploration included the following tasks:

- **Background Review** – A background review of readily available, relevant geotechnical and geological literature pertinent to the project site (See *References*). Prior to the field exploration, the locations of our exploratory hollow stem auger borings and Cone Penetration Test (CPT) soundings were marked and Underground Service Alert (USA) notified for utility clearance.
- **Field Exploration** – Our field exploration was performed on April 22 and 23, 2024 and included advancement of four (4) hollow-stem auger borings (designated LB-1 through LB-4), drilled to depths between 30 to 50 feet below existing ground surface (bgs). The logs of these borings are presented in Appendix A, *Field Exploration Logs*. In addition, forty-eight (48) cone penetrometer test (CPT) soundings (designated CPT-1 through CPT-48) were advanced to an approximate depth of 50 feet bgs (Leighton, 2024a). The CPTs were located along a northeast to roughly east-west oriented transect roughly perpendicular to the average strike of the inferred location of Whittier Fault Zone (approximately N39°W to N47°W) at this location.

Both bulk and relatively undisturbed drive samples were obtained from the hollow stem auger borings during drilling and delivered to our laboratory for geotechnical testing. Relatively undisturbed samples were collected at vertical intervals of 2.5 to 5 feet using a Modified California Ring sampler conducted in accordance with ASTM Test Method D 3550. Standard Penetration Tests (SPT) were also performed within the hollow-stem auger test borings in accordance with ASTM Test Method D 1586. The samplers were driven for a total penetration of 18 inches, unless encountering practical refusal, using a 140-pound automatic hammer falling freely for 30 inches. The number of blows per 6 inches of penetration was recorded on the boring logs.

The borings were logged in the field by a geologist from our technical staff under the direct supervision of a Certified Engineering Geologist (CEG). Each soil sample collected was reviewed and described in accordance with the Unified Soil Classification System (USCS) ASTM D2487 standards. The samples were sealed and packaged for transportation to our laboratory in Irvine, California. After completion of drilling, the borings were backfilled with soils generated during the exploration. The boring and CPT logs are presented in Appendix A, *Field Exploration Logs*. The approximate locations of the explorations are shown on Figure 2, *Exploration Location Map*.

- **Shear Wave Velocity** - Shear wave velocities were profiled at 5-foot intervals to a depth of 40 feet bgs in CPT-4 (Figure 2) to estimate average S-wave velocities of the upper 30 meters (V_{s30}). The average shear wave velocity recorded onsite is approximately 1,028 feet per second (ft/sec). Assuming similar readings from the last readings projected to a depth of 100 feet, the average shear wave in the top 100 feet would be 1,003 ft/sec. The shear wave velocity report is included in Appendix A. Based on collected velocities and in accordance with the 2022 California Building Code, the soils at this site are classified as Seismic Site Class D.
- **Laboratory Testing** –Geotechnical laboratory tests were conducted on selected bulk and undisturbed soil samples obtained from our borings and fault trenches. This laboratory testing program was designed to evaluate geotechnical (physical) characteristics of site soil. A description of geotechnical laboratory test-procedures and results are presented in Appendix B, *Laboratory Test Results*. The following laboratory tests were performed:
 - In-situ Moisture Content and Dry Density (ASTM D2216 and ASTM D2937);
 - Percent Passing No. 200 Sieve (ASTM D 1140);
 - Expansion Index (ASTM D 4829);
 - Atterberg Limits (ASTM D 4318)
 - Modified Proctor Compaction (ASTM D1557)
 - Direct Shear (ASTM D3080);
 - R-Value Testing (DOT CA 301); and
 - Corrosion and Resistivity Testing (sulfate, chloride and pH), DOT CA Test 417, 422 and 643

Results of moisture and density determinations are presented within the boring logs, see Appendix A. The results of laboratory testing are presented in Appendix B.

- **Percolation Testing** – In-situ percolation testing was performed in general accordance with the falling head method described in the County of Los Angeles Department of Public Works (LACDPW) *Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration* document (LACDPW, 2014). During our exploration, Borings LB-1 and LB-2 were converted for use as a temporary percolation test wells upon completion of drilling and sampling.

The test boring locations are depicted on Figure 2. Refer to the discussion presented in Section 2.4 and the infiltration test data provided in Appendix C – *Percolation Test Results*.

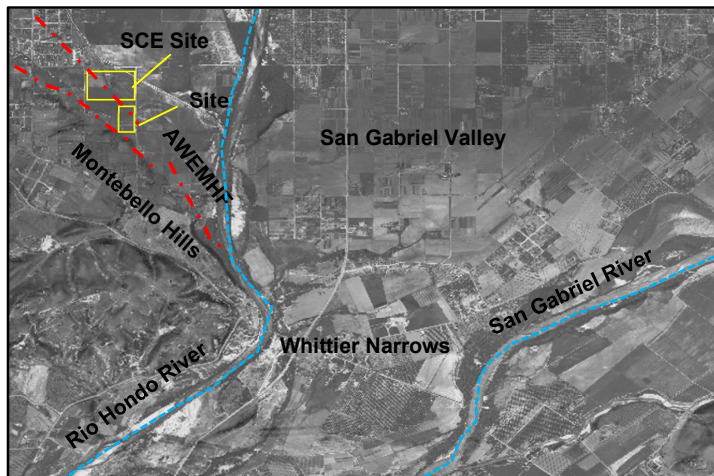
- *Engineering Analysis* – Geotechnical analysis was performed on the collected data to develop conclusions and preliminary recommendations for design and construction presented in this report.
- *Report Preparation* - This geotechnical report presents our findings, conclusions, and preliminary recommendations.

It should be noted that the recommendations in this report are subject to the limitations presented in Section 6.0. An information sheet prepared by GBA (the Geoprofessional Business Association) is also included at the rear of the text. We recommend that all individuals using this report read the limitations along with the attached document.

2.0 GEOTECHNICAL FINDINGS

2.1 Geologic Setting

The proposed development lies within the western portion of the San Gabriel Valley, an east-trending, sediment-filled structural trough adjacent to the southern flank of the San Gabriel Mountains. The San Gabriel Valley is an almost enclosed basin drained by the Rio Hondo and San Gabriel Rivers and begins approximately at San Gabriel Canyon Road in Azusa and extends south to Whittier Narrows, a low point between the Puente Hills and Montebello Hills, which forms the southern boundary of the San Gabriel Valley. Sediments within the Valley include about 6000 feet of marine and non-marine sedimentary rocks of Quaternary age (Yerkes, et al 1965).



The Montebello Hills lie at the southern boundary of the site and are characterized as an east-west band of low hills within the oil producing Los Angeles basin. These elevated areas are separated by Whittier Narrows, a gap through which the Rio Hondo and San Gabriel rivers pass through. The Rio Hondo

River lies less than a ½ mile east of the site. Published geologic maps indicate the site is underlain by Quaternary age young alluvial fan deposits (Dibblee, 1999; Yerkes and Campbell, 2005; Figure 3, *Regional Geology Map*). These deposits typically consist of varying amounts of silt, sand, and gravel layers (Yerkes et al, 1965), see Figure 3.

The Regional Index Map above is based on 1938 aerial imagery, showing the approximate mapped fault location (red dashes), the Walmart Property (larger yellow box) where the Alhambra Wash fault was first investigated, and the Subject Property (smaller yellow box), location for this investigation. Fault trace is approximate (USGS, 2017).

2.1.1 Geologic Structure

The tectonic regime of Miocene extensional system in southern California and the site area was very different from the compressional regime active today. Major changes relate to a transition of the North American tectonic plate boundary from subduction to a translational style of motion. This change resulted in formation of the San Andreas Fault system. Since middle- to late-Miocene time over the past 16 million years, the site area was subjected to first extensional and then compressional forces (Bjorklund, 2003). The north-south oriented extensional forces were active between 14 and 8 million years ago producing large depositional grabens and local volcanism. Miocene and older rocks were uplifted along the Whittier Fault by as much as 4.5 kilometers since cessation of extension at about 7 to 8 million years ago and the onset of north south crustal compression associated with the San Andreas transform fault system, which, produced about 50 kilometers of shortening across the Los Angeles Basin (Bjorkland, 2003).

In the mid to late Miocene under the extensional regime, the Proto-Whittier Fault began development as a normal fault with a right lateral component. Over the past 8 million years during the Plio-Pleistocene in this area of the Los Angeles Basin, the stress regime changed and the overall motion changed to that of convergence allowing the right lateral strike slip faults of the Peninsular Ranges (San Andreas, Newport Inglewood, San Jacinto Whittier-Elsinore) and the east-west trending left lateral oblique slip faults of the Western Transverse ranges (Santa Monica, Hollywood, Raymond and Sierra Madre) and related faults to mature.

Whittier Fault: The Whittier fault is the northwestward extension of the Elsinore fault-Glen Ivy Segment. The Whittier fault is considered a strike slip fault along most of its length with a component of vertical thrust, is approximately 40 km (25 miles) long, and extends from the Whittier Narrows section of the San Gabriel River southeastward to the Santa Ana River where it is concealed beneath the alluvium. The Whittier fault separates the Montebello Hills on the south from the alluvial floodplain of the Rio Hondo and San Gabriel Rivers north of the fault. In the area of the Santa Ana River, based on offset of stream terrace deposits (Gath, 1992 and 1995; Rockwell et al., 1988 and 1990), the Whittier fault is considered to have a slip rate of approximately 2 to 3 mm/year. The estimated maximum earthquake to occur along the Whittier fault segment is 6.8 Mw (Petersen et al., 1996).

2.2 Subsurface Soil Conditions

As encountered within our exploratory borings and from fault trench logging (Leighton 2024a), in general, the site is underlain at the surface by undocumented artificial fill deposits, below which are in-situ alluvial fan deposits of Quaternary age ranging from Holocene to Pleistocene age mudflows and fluvial deposits further defined as overbank or floodplain to main channel deposits of coarse sands and gravels.

Artificial Fill, undocumented: (Afu) - The artificial fill soil forms a mantle ranging from 6 to 7 feet thick on average thickening to approximately 14 feet locally at northeast end of Fault Trench FT-2 (Leighton 2024a). This material is characterized as dark grey to black, moist Sandy Clay (CL) and Clayey Sand (SC), abundant fine to coarse gravels, various manmade debris (wood, asphalt, brick), material varies by lift. The fill may be absent or thicker in unexplored areas of the property and under the building footprint. Most fill appears locally derived from onsite material. However, in Fault Trench FT-2 a small deposit of fill appears to be derived from the 1938 flood. *For purposes of this report, all fill, with exception of documented and tested fault trench backfill (Appendix F), encountered onsite and anticipated in future explorations is considered undocumented and unsuitable for support of new improvements in its current condition.*

Holocene to Pleistocene Age Alluvial Fan Deposits: (Qa to Qoa) – Holocene age alluvial fan deposits consisting of debris/mudflows to overbank deposits with channels.

Debris Flow/Mudflow: Sandy Clay with gravel, strong brown, fine sand, fine subrounded granitic/metagranitic gravels, scattered coarse gravels, overall massive, chaotic assemblage, clay films, translocated clay bridging grains, significant decrease in gravel and sand content and size with depth. Many vertical features (up to 12-inches+ long) filled with yellow-brown silt to very fine sand, potential root casts.

Overbank Deposits: Silty Clay (ML-CL) with sand, greenish grey, blocky structure, well-developed soil, clay films on pediment faces, significant organic content, desiccation cracks when dry.

Channel Deposits: Laminated to thinly bedded Sand (SP to SP-SMg), orangish brown, predominantly fine sand, cross bedded, scattered fine gravels. Thin thalweg lenses of fine to coarse sand, some with fine subrounded gravels. Heavy iron oxide staining, translocated clay, few black-stained beds, appear charred.

Descriptions of encountered subsurface soils are presented in our boring logs (Appendix A). Pertinent engineering properties of these soils are described in the subsections below.

2.2.1 Expansive Soil

Expansion Index (EI) testing of representative bulk samples collected from boring LB-1 within the upper 5 feet and from a stockpile of soil from Trench FT-2 indicates an expansion index (EI) of 15 and 30, respectively, corresponding to a very low to low potential for expansion. Given the clayey nature of the near surface soils expansion potential is anticipated to vary, and for purposes of this report, the expansion properties of the soil below within the foundation zone should be considered as low (EI=21 to 50). Additional testing of soils upon completion of grading should be performed to confirm the results of the initial testing. Geotechnical laboratory testing results are presented in Appendix B.

2.2.2 Soil Corrosivity

Corrosion: In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor for ferrous corrosivity.

Based on findings of studies presented in the American Society for Testing and Materials (ASTM) STP 1013 titled “Effects of Soil Characteristics on Corrosion” (February, 1989), an approximate relationship between soil resistivity and soil corrosiveness was developed as shown in Table 1A below.

Table 1A - Soil Corrosivity as a Function of Resistivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very severe corrosion
900 to 2,300	Severely corrosive
2,300 to 5,000	Moderately corrosive
5,000 to 10,000	Mildly corrosive
10,000 to >100,000	Very mildly corrosive

Sulfate Exposure: Sulfate ions in the soil can lower the soil resistivity and can be highly aggressive to Portland cement concrete by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. A potentially high sulfate content could also cause corrosion of reinforcing steel in concrete. Section 1904A of the 2022 California Building Code (CBC) defers to the American Concrete Institute's (ACI's) ACI 318 for concrete durability requirements. Table 19.3.1.1 of ACI 318 lists "*Exposure categories and classes*," including sulfate exposure as follows:

Table 1B - Sulfate Concentration and Exposure

Soluble Sulfate in Water (parts-per-million)	Water-Soluble Sulfate (SO ₄) in soil (percentage by weight)	ACI 318-14 Sulfate Class
0-150	0.00 - 0.10	S0 (negligible)
150-1,500	0.10 - 0.20	S1 (moderate*)
1,500-10,000	0.20 - 2.00	S2 (severe)
>10,000	>2.00	S3 (very severe)

*or seawater

A representative composite, near surface (0-5 feet) bulk soil sample collected from LB-2 and stockpile from fault trench FT-2 (Figure 2) were tested to evaluate corrosion potential. The chemical analysis test results for the onsite soil from our geotechnical exploration are included in Appendix B of this report and are summarized below.

Table 2 - Corrosivity Test Results

Test Parameter	Test Results	
	LB-2 0-5'/FT-2 Stockpile	General Classification of Hazard
Water-Soluble Sulfate-SO ₄ in Soil (ppm)	148/82	Negligible sulfate exposure to buried concrete
Water-Soluble Chloride in Soil (ppm)	100/40	Non-corrosive to buried concrete (per Caltrans Specifications)
pH	8.11/8.20	Mildly alkaline
Minimum Resistivity (saturated, ohm-cm)	2,200/2,199	Severely to Moderately Corrosive to buried ferrous pipes

Additional corrosion testing is recommended upon completion of grading to confirm the sulfate concentrations in support of foundation design.

2.2.3 Collapse/Compressibility Potential

Although not available at this time, the structural loads for the planned anticipated wood-framed residential development are anticipated to be relatively light. Laboratory test results of representative soil samples collected from the site suggest the onsite soils exhibit low compressibility characteristics within the anticipated static load range of similar structures. The hydroconsolidation potential of the site soil is also considered low.

2.3 Groundwater

Groundwater was encountered during our field exploration in Boring LB-1 located in the southeastern portion of the project site at approximately 41 feet bgs (Figure 2). Based on the currently proposed residential development scheme, groundwater is not expected to pose a constraint during construction.

According to groundwater information obtained through the California Geological Survey (CGS) and presented in the Seismic Hazard Zone Report for the El Monte Quadrangle (CGS, 1998), the historically shallowest groundwater depth in the vicinity of the project site is approximately 20 feet bgs. However, based on review of the Seismic Hazard Zone Report (CGS, 1998), the historically shallowest groundwater levels were based primarily from the groundwater levels between 1904 and 1944. The groundwater levels to the north of the Whittier Narrows area (in the vicinity of the project site) between 1960 and 1997 are indicated to be generally 30 to 50 feet deeper than they were in the first half of the century (CGS, 1998). Based on review of groundwater level data available from the Main San Gabriel Basin Watermaster between 1996 and 2000, the groundwater levels at the site were greater than 40 feet bgs between this time period. Based on our review and field conditions, a groundwater depth of 40 feet was considered in the analyses for the site.

2.4 Percolation Testing Results

Borings LB-1 and LB-2 (Figure 2) were converted to temporary percolation test wells upon completion of drilling and sampling. The test was performed between depths of 20 to 30 feet bgs in both borings. The infiltration rate was calculated by dividing the rate of discharge by the infiltration surface area, or flow area. The

volume of discharge was calculated by adding the total volume of water that dropped within the PVC pipe and within the annulus, and incorporating a porosity reduction factor to account for the material installed in the annulus. The flow area was based on the average water height within the slotted pipe section of the test well.

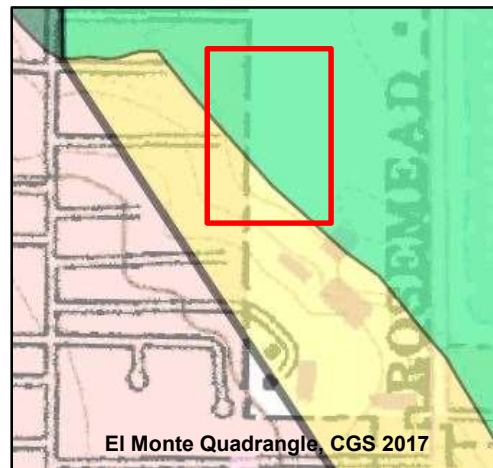
Based on the methodology, the calculated infiltration rate (at this location and within this vertical zone) was approximately 0.27 inches/hour in one location (without application of any reduction factor of safety) and negligible in the other. After applying the appropriate reduction factors, the design infiltration rate would be less than the infiltration rate of 0.3 inch per hour for direct infiltration per the current County's standard. Therefore, direct infiltration within the test zone (i.e., 20 to 30 feet below ground surface) is not feasible and not recommended. Infiltration test data is provided in Appendix C, *Percolation Test Results*.

3.0 GEOLOGIC/SEISMIC HAZARDS

Potential geologic and seismic hazards in southern California generally include surface faulting, seismic shaking, landslides, liquefaction, seismically-induced settlement, lateral spreading, seismically-induced landslides, seiches and flooding. The following sections discuss these hazards and their potential impact(s) at the project site.

3.1 Surface Fault Rupture

The California Geological Survey (CGS, 1991) established earthquake fault zones which encompass this site, see inset photo to right showing approximate site boundary. Seismic hazards mapped by the State requiring investigations prior to development permits are earthquake fault and liquefaction hazard zones (yellow and green shaded areas). Fault zones interpreted along the Whittier system were based on review of aerial photographs and observation of lineaments combined with



topographic escarpments thought to be a result of faulting. Fault investigations have been performed by others (Gath *et al.*, 1994; SCE, 1999; Hushmand and Associates, 2002, and PML, 2008) on properties north of this site to determine if lineaments and topographic irregularities are caused by active faulting along one or more strands of the Whittier fault. As a result of several of these investigations (Gath *et al.*, 1994 and Hushmand and Associates 2002), setbacks from active Holocene-age strands were recommended and established.

Our review of available in-house literature indicates that active faults have been mapped across the site, and the site is located within a designated Alquist-Priolo Earthquake Fault Zone (CGS, 1991c; Figure 5, *Historical Seismicity and Regional Faulting Map*). Therefore, a surface fault rupture hazard evaluation was prepared under separate cover (Leighton, 2024a), see Figure 2 for exploration data conducted in support of the fault study.

Based on the results of the fault hazard study (Leighton, 2024a), it is our opinion that the subject site is free of Holocene-active faults per the current State definition and no setbacks are required. However, due to utility conflicts in the field, the

extreme southwest and northeast corners of the site could not be evaluated during this exploration. Because these areas cannot be confirmed as free of Holocene active faulting, 15-foot no build zones from the limits of exploration should be considered in planning and design. These zones may be allowable for construction should additional exploration(s) or excavation during construction show these areas are free of Holocene active faulting.

3.2 Seismicity and Ground Shaking

Based on current understanding of local faulting, the principal seismic hazard that could affect the site is ground shaking resulting from an earthquake occurring along several major active or potentially active faults in southern California. The project should be designed in accordance with applicable current building codes and standards utilizing appropriate seismic design parameters intended to reduce seismic risk as defined by California Geological Survey (CGS) Chapter 2 of Special Publication 117A (CGS, 2008). The following are seismic design parameters for new structures based on the 2022 California Building Code (CBC). The map-based seismic parameters presented were obtained from United States Geological Survey in accordance with American Society of Civil Engineers (ASCE) Publication ASCE 7-16 and the 2022 CBC, Chapter 16A.

We assume that the proposed buildings will have a period of 0.5 second or less. As such, Site Class F is not required, and Site Class may be determined in accordance with ASCE 7-16 Section 20.3. If the building period is greater than 0.5 second, site class should be reevaluated.

Based on our evaluation of subsurface data, we have selected Site Class D. A summary of Site Class evaluation is included in Appendix D.

Table 3 - 2022 CBC Seismic Design Parameters

2022CBC Parameters (CBC or ASCE 7-16 reference)	Value 2022 CBC
Site Latitude and Longitude (degrees): 34.0472, -118.0830	
Site Class Definition (1613.2.2, ASCE 7-16 Ch 20)	D**
Mapped Spectral Response Acceleration at 0.2s Period (1613.2.1), S_s	1.905 g
Mapped Spectral Response Acceleration at 1s Period (161A.2.1), S_1	0.685 g
Short Period Site Coefficient at 0.2s Period ($T1613.2.3(1)$), F_a	1.000
Long Period Site Coefficient at 1s Period ($T1613.2.3(2)$), F_v	1.700*
Adjusted Spectral Response Acceleration at 0.2s Period (1613.2.3), S_{MS}	1.905 g
Adjusted Spectral Response Acceleration at 1s Period (1613.2.3), S_{M1}	1.165* g
Design Spectral Response Acceleration at 0.2s Period (1613.2.4), S_{DS}	1.270 g
Design Spectral Response Acceleration at 1s Period (1613.2.4), S_{D1}	0.776* g
Mapped MCE_G peak ground acceleration (11.8.3.2, Fig 22-9 to 13), PGA	0.822 g
Site Coefficient for Mapped MCE_G PGA (11.8.3.2), F_{PGA}	1.100
Peak Ground Acceleration, mod w/ site effects (1803A.5.12; 11.8.3.2), PGA_M	0.904 g

* See Section 11.4.8 of ASCE 7-16. A site-specific ground motion hazard analysis in accordance with Section 21.2 of ASCE 7-16 is required for this site. **Per Supplement 3 to ASCE 7-16, a site-specific ground motion hazard analysis is not required where the value of the parameters SM_1 and SD_1 in the table are increased by 50%.**

** Site Class D, and all of the resulting parameters in this table, may only be used for structures without seismic isolation or seismic damping systems.

Based on ASCE 7-16 Equation 11.8-1, the F_{PGA} is 1.1, the PGA is 0.822g, and the PGA_M is 0.904g. As an added check, PGA and hazard deaggregation were also estimated using the United States Geological Survey's (USGS) 2008 Interactive Deaggregations utility. The results of this analysis indicate that the predominant modal earthquake has a PGA of 0.84g with a magnitude of approximately 6.5 (M_w) at a distance on the order of 6.5 kilometers for the Maximum Considered Earthquake (2% probability of exceedance in 50 years); 2/3 of this value is 0.56g. Deaggregation results are included in Appendix D.

3.3 Secondary Seismic Hazards

In general, potential secondary seismic hazards affecting property development in southern California, could include soil liquefaction, seismically-induced settlement, seismically-induced landsliding, and earthquake induced flooding. These potential secondary seismic hazards are discussed below.

3.3.1 Liquefaction Potential

Liquefaction is the loss of soil strength or stiffness due to increasing pore-water pressure during severe ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine- to medium-grained, cohesionless soils.

As shown on the State of California Seismic Hazard Zones Map for the El Monte Quadrangle (CGS, 1999), this site is located within an area that has been identified by the State of California as being potentially susceptible to liquefaction (Figure 5, *Seismic Hazard Map*).

The site is predominately underlain by sands with interbedded silts and clays. Based on analysis of the data from CPT's (Appendix A and D) using the peak ground acceleration of 0.91g and an assumed groundwater depth of 40 feet, and the procedures by Tokimatsu and Seed (1986), some small liquefiable layers were identified at depths below 40 feet. However, the liquefaction potential index is low and the potentially liquefiable layers were identified at depths where surface manifestations of liquefaction at the ground surface is not a concern. The potential for liquefaction and surface manifestations at this site is considered low. Results of our liquefaction analysis is included in Appendix D.

3.3.2 Seismically-Induced Settlement

Seismically-induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). These settlements occur primarily within loose to moderately dense sandy soil due to reduction in volume during and shortly after an earthquake event

We have performed analyses to estimate the potential for seismically induced settlement, using the method of Tokimatsu and Seed, and based on *Recommended Procedures For Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Liquefaction Hazard in California*, Martin and Lew (1999) for the boring data, and procedures by Robertson for the CPT data. Based on our analysis, and after our recommendations for building overexcavation and recompaction is accomplished, up to approximately 3.2 inches of potential total seismic settlement is estimated within the building footprint based on the data from the hollow-stem auger borings, and up to 1 inch based on data from the CPTs. The hollow-stem auger boring seismic settlement analysis is considered to be conservative due to the lack of continuous data reading; therefore, we estimate seismic settlement at this site based on the CPT sounding data which results in a potential seismic settlement of 1 inch. Results of our seismic settlement analysis is presented in Appendix D.

If the potential differential settlement is estimated as half of the total seismic settlement over a horizontal distance of 30 feet, this would result in a maximum 0.5 inch differential settlement in 30 feet, or angular distortion of 0.0014L. This would be within the tolerance of *Other Multistory Structures* (wood-framed) for *Risk Category I or II*. The structural engineer should determine Structure Type and Risk Category and evaluate whether the differential settlement estimates described above are tolerable. A copy of ASCE 7-16 Table 12.13-3 is provided as follows for reference.

Table 12.13-3 Differential Settlement Threshold

Structure Type	Risk Category		
	I or II	III	IV
Single-story structures with concrete or masonry wall systems	0.0075L	0.005L	0.002L
Other single-story structures	0.015L	0.010L	0.002L
Multistory structures with concrete or masonry wall systems	0.005L	0.003L	0.002L
Other multistory structures	0.010L	0.006L	0.002L

3.3.3 Seismically-Induced Landslides

Significant slopes are not located on or near the site. Based on the State of California Seismic Hazard Zones Map for the El Monte Quadrangle (CGS, 1999), the site is not located within an area that has been identified by the State of California as being potentially susceptible to seismically-induced landslides (Figure 5, *Seismic Hazard Map*).

3.4 Flooding Hazards

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map (FEMA, 2008), the site is not located within a flood zone (Figure 6, *Flood Hazard Map*).

4.0 DESIGN RECOMMENDATIONS

The following recommendations have been developed based on the exhibited engineering properties of the onsite soils and their anticipated behavior during and after construction. Recommendations are specifically provided for design of foundations, seismic design considerations, floor slabs, retaining structures, paving, and grading. The proposed residential structures may be supported on post tension foundation systems established on engineered fill. Leighton should review the grading plan, foundation plans and specifications when they are available to verify that the recommendations presented in this report have been properly interpreted and incorporated.

4.1 Earthwork

Project earthwork is expected to include complete demolition/removal of the existing building, surface pavements, landscaping, utilities and complete overexcavation and recompaction of any remaining undocumented fill soils below new improvement footprints as described in the following subsections.

4.1.1 Site Preparation

Prior to construction, areas of proposed residential development should be cleared of any existing improvements (demolition of structures, concrete pads and asphalt) and properly disposed of offsite. Efforts should be made to locate, remove and/or reroute any existing utility lines where interfering with proposed remedial grading. Any resulting cavities should be properly backfilled and compacted. After the areas are cleared, the soils should be carefully observed to confirm that all potentially unsuitable deposits have been removed.

An average of approximately 7 feet and up to 14 feet of undocumented fill was encountered. Undocumented fill is considered to be unsuitable to support new structures and therefore must be excavated and replaced within proposed building pad areas. For the proposed building structure, we recommend that existing undocumented fill be completely overexcavated; existing soils be overexcavated to a minimum depth of 7 feet below existing grade, with removals extending deeper to remove undocumented fill if encountered.

4.1.2 Earthwork Observation and Testing

Leighton should observe and test all grading and earthwork, to check that the site is properly prepared, the selected fill materials are satisfactory, and that placement and compaction of fills has been performed in accordance with our recommendations and the project specifications. Sufficient notification to us prior to earthwork is essential. Project plans and specifications should incorporate recommendations contained in the text of this report.

Variations in site conditions are possible and may be encountered during construction. To confirm correlation between soil data obtained during our field and laboratory testing and actual subsurface conditions encountered during construction, and to observe conformance with approved plans and specifications, it is essential that the geotechnical engineer of record be retained to perform continuous or intermittent review during earthwork, excavation and foundation construction phases.

4.1.3 Fill Placement and Compaction

Onsite soils free of organics, debris and oversized material (greater-than 6 inches in largest dimension) are suitable for use as compacted structural fill. All fill soil should be placed in thin, loose lifts, moisture-conditioned, as necessary, to 2 percent above optimum moisture content and compacted to a minimum 92% relative compaction as determined by ASTM D 1557 standard test method (modified Proctor compaction curve) within building footprints. Aggregate base for pavement sections should be compacted to a minimum of 95% relative compaction. At least the upper 12 inches of the exposed soils in roadways and access drives, parking lots and (concrete – paver) flatwork areas, should be compacted to at least 95 percent relative compaction based on ASTM Test Method D 1557.

Fill Materials: The onsite soils, less any deleterious material or organic matter, can be used in required fills. Cobbles or slaty clasts larger than 6 inches in largest diameter should not be used in the fill. Any required imported material should consist of relatively non-expansive soils with a very low Expansion Index ($EI < 20$). All proposed imported materials should be approved by the geotechnical engineer of record prior to being placed at the site.

Surface Drainage: Water should not be allowed to pond or accumulate anywhere except in detention basins. Pad drainage should be designed to collect and direct surface water away from structures to approved drainage facilities. Hardscape drains should be installed and drain to storm water disposal systems. Drainage patterns approved at the time of fine grading should be maintained throughout the life of proposed structures. Irrigation and/or percolation should not be allowed for at least 10 feet horizontally around buildings.

4.1.4 Reuse of Concrete and Asphalt in Fill Pulverized demolition concrete free of rebar and other materials and demolished asphalt pavement can be pulverized to particles no-larger-than ($\leq$) 3-inches and mixed with site soils for use in compacted fill. Blended pulverized concrete and asphalt should be mixed with at least 25% soils by weight. Such materials must be free of and segregated from any hazardous materials and/or organic material of any kind.

4.1.5 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations, and other excavations should be performed in accordance with project plans, specifications and all State of California Occupational Safety and Health Administration (CalOSHA) requirements.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the slope, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundations should be properly shored to maintain support of these structures.

Temporary excavations should be treated in accordance with CalOSHA excavation regulations. The sides of excavations should be shored or sloped accordingly. CalOSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a $\frac{3}{4}$:1 (horizontal:vertical) slope for Type A soils, 1:1 for Type B soils, and $1\frac{1}{2}$:1 for Type C soils.

The onsite soils within the proposed structural depths generally conform to CalOSHA Type C soils. CalOSHA regulations are applicable in areas with no restriction of surrounding ground deformations. Shoring should be

designed for areas with deformation restrictions. The soil type should be verified or revised based on geotechnical observation and testing during construction, as soil classifications may vary over short horizontal distances. Heavy construction loads, such as those resulting from stockpiles and heavy machinery, should be kept a minimum distance equivalent to the excavation height or 5 feet, whichever is greater, from the excavation unless the excavation is shored and these surcharges are considered in the design of the shoring system.

4.1.6 Trench Backfill

Pipeline trenches should be backfilled with compacted fill in accordance with this report, and applicable *Standard Specifications For Public Works Construction* (Greenbook), current edition standards. Backfill in and above the pipe zone should be as follows:

- **Pipe Zone:** Any proposed pipe should be placed on properly placed bedding materials. Pipe bedding should extend to a depth in accordance to the pipe manufacturer's specification. The pipe bedding should extend to least 1 foot over the top of the conduit. The bedding material may consist of compacted free-draining sand, gravel, or crushed rock. If sand is used, the sand should have a sand equivalent greater than 30. As an alternate, the pipe bedding zone can be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, conforming to Section 201-6 of the current edition of the *Standard Specifications for Public Works Construction* (Greenbook). CLSM bedding should be placed to 1 foot over the top of the conduit, and vibrated. CLSM should not be jetted.
- **Over Pipe Zone:** Above the pipe zone, trenches can be backfilled with excavated on-site soils free of debris, organic and oversized material larger than 3 inches in largest dimension. As an option, the whole trench can be backfilled with one-sack CLSM, the same as presented above for the pipe bedding zone. Native soil backfill over the pipe-bedding zone should be placed in thin lifts, moisture conditioned, as necessary, and mechanically compacted using a minimum standard of 92% relative compaction relative to the ASTM D 1557 laboratory maximum dry density within building footprints. The upper 12-inches under hardscape,

parking, paver etc. should be compacted to 95% relative compaction. Backfill above the pipe zone should **not** be jetted. In any case, the backfill above the pipe zone (bedding) should be observed and tested by Leighton.

4.1.7 Corrosion Protection Measures

Water-soluble sulfates in the soil can react adversely with concrete. As referenced in the 2022 California Building Code (CBC), Section 1904A, concrete subject to exposure to sulfates shall comply with requirements set forth in ACI 318. Based on laboratory testing results (Appendix B) of the onsite soils from subsurface explorations, concrete structures in contact with the onsite soil will likely have “negligible” exposure (Exposure Class S0) to water-soluble sulfates in the soil. Therefore, common Type II Portland cement may be used for concrete construction in contact with site soils. Subgrade soil should be tested for water-soluble sulfate content prior to final design of the concrete structures once grading is complete. Import fill soil should be geotechnically tested for corrosivity and sulfate attack before imported to the site. Further testing of imported soils should include analytical testing for chemicals of concern prior to import and acceptance.

Based on corrosivity test results, the onsite soil is considered moderately corrosive to ferrous metals. Therefore, ferrous pipe buried in moist to wet site earth materials should be avoided by using high-density polyethylene (HDPE), polyvinyl chloride (PVC) and/or other non-ferrous pipe when possible. Ferrous pipe can also be protected by polyethylene bags, tap or coatings, di-electric fittings or other means to separate the pipe from on-site soils.

4.1.8 Shallow Foundation Systems

Onsite soils exposed at pad grade for proposed building structures are anticipated to exhibit “low” expansive potential. Based on the proposed development and encountered soil conditions, we recommend that the proposed structures be constructed using stiffened post-tension foundation system designed in accordance with the California Building Code (CBC). Overexcavation and recompaction of the footing subgrade soil should be performed as detailed in Section 4.1.1. Post-tension foundation recommendations are provided in the following section.

4.2 **Shallow Foundations**

Onsite soils exposed at pad grade for proposed building structures are anticipated to exhibit “low” expansive potential. Based on the proposed development and encountered soil conditions, we recommend that the proposed structures be constructed using stiffened post-tension foundation system designed in accordance with the California Building Code (CBC). Overexcavation and recompaction of the footing subgrade soil should be performed as described in the previous section. Post-tension foundation recommendations are provided in the following sections.

4.2.1 **Post Tension Foundation Design Parameters**

Post-tensioned foundations should be designed by a qualified structural engineer in accordance with the 2022 CBC using the minimum geotechnical parameters provided below for soils with a “low” expansion potential. While we do not expect this value to change, expansion index (EI) should be confirmed upon completion of grading.

Table 4 - Post-Tension Foundation Design Parameters

Post-tensioned Foundation Design Recommendations		
Edge Moisture Variation, e_m	Center Lift	9.0 feet
	Edge Lift	5.0 feet
Differential Swell Y_m	Center Lift	0.5 inch
	Edge Lift	0.7 inch
Modulus of Subgrade Reaction		150 pci

The recommended slab design parameters are based on the Post-Tensioning Institute Design of Post-Tensioned Slabs-on Ground, 3rd Edition with 2008 supplement (PTI DC10.1-08). The structural engineer should also design the post-tensioned slabs with adequate stiffness to minimize potential cracking in the slabs.

To provide more uniform moisture in the subgrade, the top 18 inches of the prepared subgrade should be pre-saturated to a minimum 2% above optimum moisture prior to placement of concrete.

The Post-Tensioning Institute (PTI) has recommended the following guidelines:

- Initial landscaping should be done on all sides adjacent to the foundation. Positive drainage away from the foundation should be implemented and maintained.
- Irrigation watering should be done in a uniform manner as equally as possible on all sides of the foundation to maintain constant soil moisture content. Ponding of irrigation or rainfall water adjacent to the foundation slab can cause differential soil moisture levels potentially leading to differential movements.
- Planting trees closer to the structure than a distance equal to one-half the mature height of the tree could allow the root system to enter under the foundation. The root system could alter the soil moisture content within the soil and cause soil shrinkage, which may lead to differential movements of the foundation. A landscape architect should be consulted and made aware of these recommendations.

4.2.2 Minimum Embedment of Width

The exterior perimeter footings should have a minimum embedment of 18 inches, with a minimum width of 12 inches for strip footings and 24 inches for isolated footings. Interior footings may have a minimum embedment of 12 inches below grade.

4.2.3 Allowable Bearing

An allowable bearing pressure of 2,000 pounds-per-square-foot (psf) may be used for the proposed building. This allowable bearing pressures are for total dead load and sustained live loads. Footing reinforcement should be designed by the structural engineer.

4.2.4 Lateral Load Resistance

Soil resistance available to withstand lateral loads on a shallow foundation is a function of the frictional resistance along the base of the footing and the passive resistance that may develop as the face of the structure tends to move into the soil. The frictional resistance between the base of the

foundation and the subgrade soil may be computed using an allowable coefficient of friction of 0.30. The passive resistance may be computed using an allowable (factor of safety of 1.5 applied) equivalent fluid pressure of 220 pounds per cubic foot (pcf), assuming there is constant contact between the footing and undisturbed soil. Friction and passive pressure may be combined without reduction, provided it is acceptable that the footings move laterally sufficiently to develop passive pressure (approximately ¼ inch); otherwise, friction alone should be assumed.

4.2.5 Increase in Bearing and Friction – Short Duration Loads

For the case of short term loading (seismic and wind loading), an increase of 1/3 would apply to the bearing pressure and friction values. The ultimate bearing pressure is assumed to be roughly three times the allowable bearing pressure. However, this ultimate pressure only considers structural failure/collapse (life safety) and not structural damage or significant cosmetic damage. Excessive settlement is anticipated to occur well before the ultimate bearing pressure is attained.

4.2.6 Settlement Estimates

The recommended overexcavation, relative compaction and allowable bearing pressure are based on a total allowable, post construction settlement of 1 inch. Differential settlement due to static loading is estimated at approximately ½ inch over a horizontal distance of 30 feet between or along similarly loaded footings. Since settlement is a function of footing sustained load, size and contact bearing pressure, differential settlement can be expected between adjacent columns or walls where a large differential loading condition exists.

Differential seismically induced settlement was estimated to be less than ½ inch over a horizontal distance of 30 feet.

4.3 Slab-On-Grade

Concrete slabs-on-grade should be designed by the structural engineer in accordance with 2022 CBC requirements for soils with a low expansion potential.

More stringent requirements may be required by the structural engineer and/or architect; however, slabs-on-grade should have the following minimum recommended components:

- **Subgrade:** The near-surface soils are characterized as sandy clay to clayey sand, are low expansive and will shrink and swell with changes in the moisture content. Slab-on-grade subgrade soil should be moisture conditioned to 2% over optimum moisture content, to a minimum depth of 18 inches within building footprints and compacted to 92% of the modified proctor (ASTM D 1557) laboratory maximum density prior to placing either a moisture barrier, steel and/or concrete. *Expansion testing should be performed upon completion of grading to verify expansive properties of onsite soil.*
- **Moisture Barrier:** A moisture barrier consisting of at least 15-mil-thick Stego-wrap vapor barriers (see: http://www.stegoindustries.com/products/stego_wrap_vapor_barrier.php), or equivalent, should then be placed below slabs where moisture-sensitive floor coverings or equipment will be placed.
- **Reinforced Concrete:** A conventionally reinforced concrete slab-on-grade with a thickness of at least 5 inches within the building footprint and 5-inches for exterior SOG be placed in pedestrian areas without heavy loads. Reinforcing steel should be designed by the structural engineer, but as a minimum should be No. 3 rebar placed at 18 inches on-center, each direction (perpendicularly), mid-depth in the slab. A modulus of subgrade reaction (k) as a linear spring constant, of 75 pounds-per-square-inch per inch deflection (pci) can be used for design of heavily loaded slabs-on-grade, assuming a linear response up to deflections on the order of $\frac{3}{4}$ inch.

Minor cracking of concrete after curing due to expansion, drying and shrinkage is normal and will occur. However, cracking is often aggravated by a high water-to-cement ratio, high concrete temperature at the time of placement, small nominal aggregate size, and rapid moisture loss due to hot, dry, and/or windy weather conditions during placement and curing. Cracking due to temperature and moisture fluctuations can also be expected. The use of low-slump concrete or low water/cement ratios can reduce the potential for shrinkage cracking.

4.4 **Lateral Earth Pressures**

Recommended lateral earth pressures are provided as equivalent fluid unit weights, in psf/ft. or pcf. These values do not contain an appreciable factor of safety, so the structural engineer should apply the applicable factors of safety and/or load factors during design.

On-site soils may be suitable to be used as retaining wall backfill due to its low expansion potential (Appendix B), however, field and laboratory verification are recommended before use. Site soils can be variable in composition and expansive characteristics, See Section 2.2. Should site soil be desired for reuse behind retaining walls the material should be tested to ensure Expansion potential is less than 20 ($EI < 20$). Recommended lateral earth pressures for retaining walls backfilled with sandy soils with drained conditions as shown on Figure 7 are as follows:

Table 5 - Retaining Wall Design Earth Pressures

Retaining Wall Condition (Level Backfill)	Equivalent Fluid Pressure (pounds-per-cubic-foot)*
Active (cantilever)	45
At-Rest (braced)	65
Passive Resistance (compacted fill)	220
Seismic Increment (add to active pressure)	38

*Only for level and drained properly compacted backfill

Walls that are free to rotate or deflect may be designed using active earth pressure. For walls that are fixed against rotation, the at-rest pressure should be used. For seismic condition, the pressure should be distributed as an inverted triangular distribution and the dynamic thrust should be applied at a height of 0.6H above the base of the wall.

Retaining Wall Surcharges: In addition to the above lateral forces due to retained earth, surcharge due to above grade loads on the wall backfill, such as existing building foundations, should be considered in design of retaining walls.

Vertical surcharge loads behind a retaining wall on or in backfill within a 1:1 (horizontal:vertical) plane projection up and out from the retaining wall toe, should be considered as lateral and vertical surcharge. Unrestrained (cantilever) retaining walls should be designed to resist one-third of these surcharge loads applied as a uniform horizontal pressure on the wall. Braced walls should also be designed to resist an additional uniform horizontal-pressure equivalent to one-half of uniform vertical surcharge loads. Consideration should be given to underpinning existing structures to remain in this zone, to reduce surcharge loads on the wall and to reduce the potential for inducing damaging settlement within these existing buildings, due to soil movement within the wall influence zone.

In areas where autos and pickup trucks will drive, we suggest assuming a uniform vertical surcharge of 300 psf, which would result in active and at-rest horizontal surcharges of 100 psf and 150 psf, respectively. This should be doubled in areas of heavy construction traffic (such as concrete trucks, heavy equipment delivery-trucks, etc.). If crane outrigger loads or other point load sources are applied as wall surcharge, this will require additional analyses based on load source and location relative to the wall.

4.4.1 Sliding and Overturning Total depth of retained earth for design of walls and for uplift resistance, should be measured as the vertical height of the stem below the ground surface at the wall face for stem design, or measured at the heel of the footing for overturning and sliding. A soil unit weight of 120 pcf may be assumed for calculating the actual weight of the soil over the wall footing, if drained, or 60 pcf if submerged, for properly compacted backfill.

4.4.2 Drainage

Adequate drainage may be provided by a subdrain system positioned behind the walls. Typically, this system consists of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with pervious backfill material described in Section 300-3.5.2 of the Standard Specifications for Public Works Construction (Green Book), current edition. This pervious backfill should extend at least 2 feet out from the wall and to within 2 feet of the outside finished grade.

This pervious backfill and pipe should be wrapped in filter fabric, such as Mirafi 140N or equivalent, placed as described in Section 300-8.1 of the Standard Specifications for Public Works Construction (Green Book). The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or Enkadrain drainage geocomposites, or similar, may be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill, particularly where horizontal space is limited adjacent to shoring (where walls are cast against shoring). These drainage panels should be connected to the perforated drainpipe at the base of the wall

4.5 Pavement Design

To provide support for paving, the subgrade soils should be prepared as recommended in Section 4.1, Grading. Compaction of the subgrade, including trench backfills, to at least 92 to 95 percent as recommended and achieving a firm, hard and unyielding surface will be important for paving support. The upper 12-inches of pavement subgrade should be compacted to 95% relative compaction. The preparation of the paving area subgrade should be performed immediately prior to placement of the base course. Proper drainage of the paved areas should be provided since this will reduce moisture infiltration into the subgrade and increase the life of the paving.

4.5.1 Base Course

The base course for both asphalt concrete and Portland Cement Concrete paving should meet the specifications for Class 2 Aggregate Base as defined in Section 26 of the latest edition of the State of California, Department of Transportation, and Standard Specifications. Alternatively, the base course could meet the specifications for untreated base as defined in Section 200-2 of the latest edition of *Standard Specifications for Public Works Construction* (Greenbook). Crushed Miscellaneous Base (CMB) may be used for the base course provided the geotechnical consultant evaluates and tests it before delivery to the site.

4.5.2 Asphalt Concrete

The required asphalt paving and base thicknesses will depend on the expected wheel loads and volume of traffic (Traffic Index or TI). Assuming that the paving subgrade will consist of the onsite or comparable soils with an R-value of at least 50 (see test result in Appendix B) compacted to at least 92 percent relative compaction based on ASTM Test Method D 1557 below 12-inches and 95% relative compaction in the upper 12 inches, the minimum recommended paving thicknesses are presented in the following table:

Table 6 – Flexible Pavement Design

Traffic Index	Asphalt Concrete (inches)	Base Course (inches)
5	3.0	4.0
6	3.5	4.0
7	4.0	4.5

The asphalt paving sections were determined using the Caltrans design method. We can determine the recommended paving and base course thicknesses for other Traffic Indices if required. Clays were identified in some of the borings additional R Value testing should be performed during grading or near completion to confirm the sections presented above.

4.5.3 Portland Cement Concrete Paving

Portland Cement Concrete (PCC) paving and walks supported on clayey onsite soils should be underlain by at least 18 inches of engineered fill consisting of relatively non-expansive ($El < 30$) soils. We have assumed that such a subgrade will have an R-value of at least 50, which will need to be verified during grading. Onsite soils are anticipated to have an $El=15$ to 30, therefore, we expect that relatively non-expansive ($El<30$) may not need to be imported for PCC paving.

PCC paving sections were determined in accordance with procedures developed by the Portland Cement Association. Concrete paving sections for a range of Traffic Indices are presented in the table below.

We have assumed that the PCC will have a compressive strength (f'_c) of at least 4,000 pounds per square inch (psi).

Table 7 – Rigid Pavement Design

Traffic Index	Portland Cement Concrete (inches)
5	5.0
7	6.5

The paving should be provided with expansion joints at regular intervals no more than 15 feet in each direction. Load transfer devices, such as dowels or keys, are recommended at joints in the paving to reduce possible offsets. The paving sections in the above table have been developed based on the strength of unreinforced concrete. Steel reinforcing may be added to the paving to reduce cracking and to prolong the life of the paving.

4.6 Excavations

Based on our field observations, caving of cohesionless strata and loose fill soils will likely be encountered in unshored excavations. To protect workers entering excavations, excavations should be performed in accordance with OSHA and Cal-OSHA requirements, and the current edition of the California Construction Safety Orders, see:

<http://www.dir.ca.gov/title8/sb4a6.html>

Contractors should be advised that fill soils should be considered Type C soils as defined in the California Construction Safety Orders. As indicated in Table B-1 of Article 6, Section 1541.1, Appendix B, of the California Construction Safety Orders, excavations less-than (<) 20 feet deep within Type C soils should be sloped back no steeper than 1½:1 (horizontal:vertical), where workers are to enter the excavation. This may be impractical near adjacent existing utilities and structures; so shoring may be required depending on trench depth and locations. Stiff undisturbed native clays will stand steeper.

During construction, soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and Leighton Consulting, Inc. should be maintained to facilitate construction while providing safe excavations.

4.7 Geotechnical Services During Construction

Our geotechnical recommendations are contingent upon Leighton providing geotechnical observation and testing services during earthwork and foundation construction. There is a potential for encountering deeper undocumented fill, underground obstructions or otherwise unacceptable existing soils between or beyond our boring locations.

We are unaware of any existing fill placement documentation for this site with the exception of the fault trench backfill (Appendix F). Therefore, inconsistent existing fill materials may be encountered during construction, possibly requiring revised geotechnical recommendations.

Our geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. Leighton should review site grading and foundation plans when available, to comment further on geotechnical aspects of this project and check to see general conformance of final project plans to recommendations presented in this report.

Leighton should be retained to provide geotechnical observation and testing during excavation and all phases of earthwork. Our conclusions and recommendations should be reviewed and verified by us during construction and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- During all excavation,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction,
- During pavement subgrade and base preparation, and/or
- If and when any unusual geotechnical conditions are encountered.

5.0 LIMITATIONS

This report was prepared using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. The findings, conclusion, and recommendations included in this report are considered preliminary and are subject to verification. We do not make any warranty, either expressed or implied.

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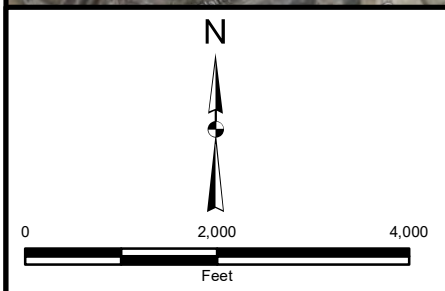
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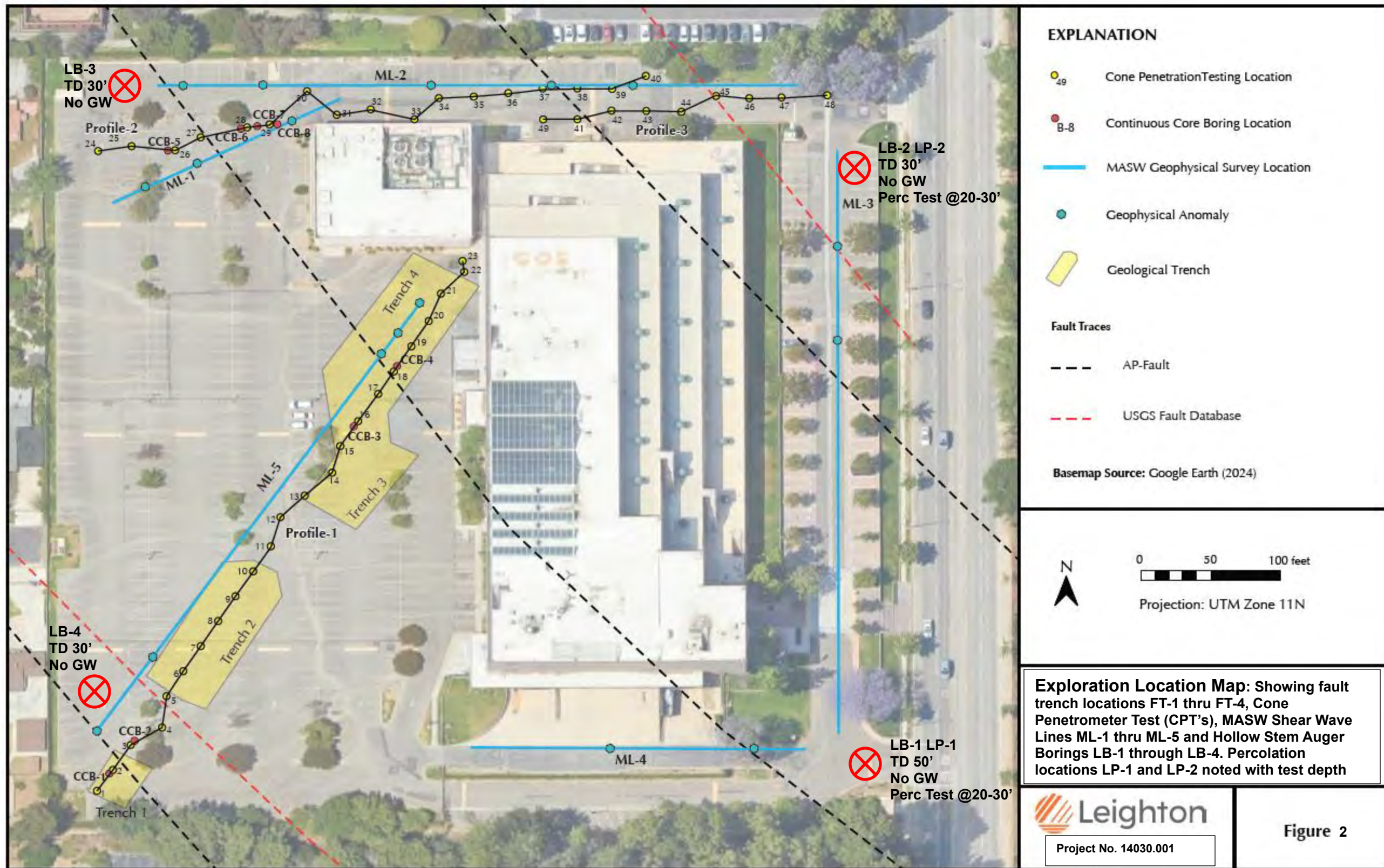
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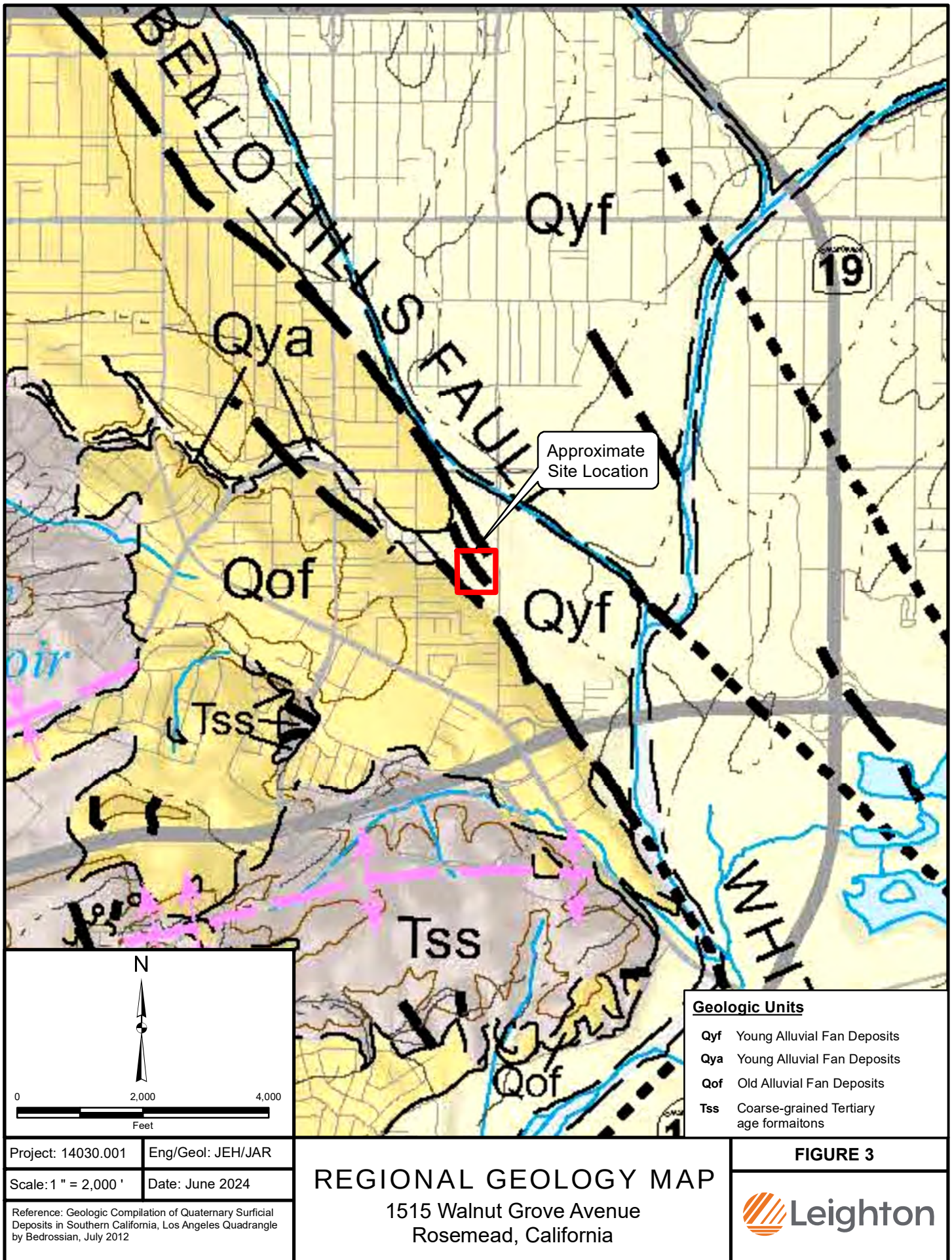
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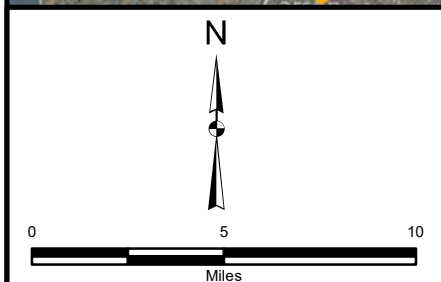
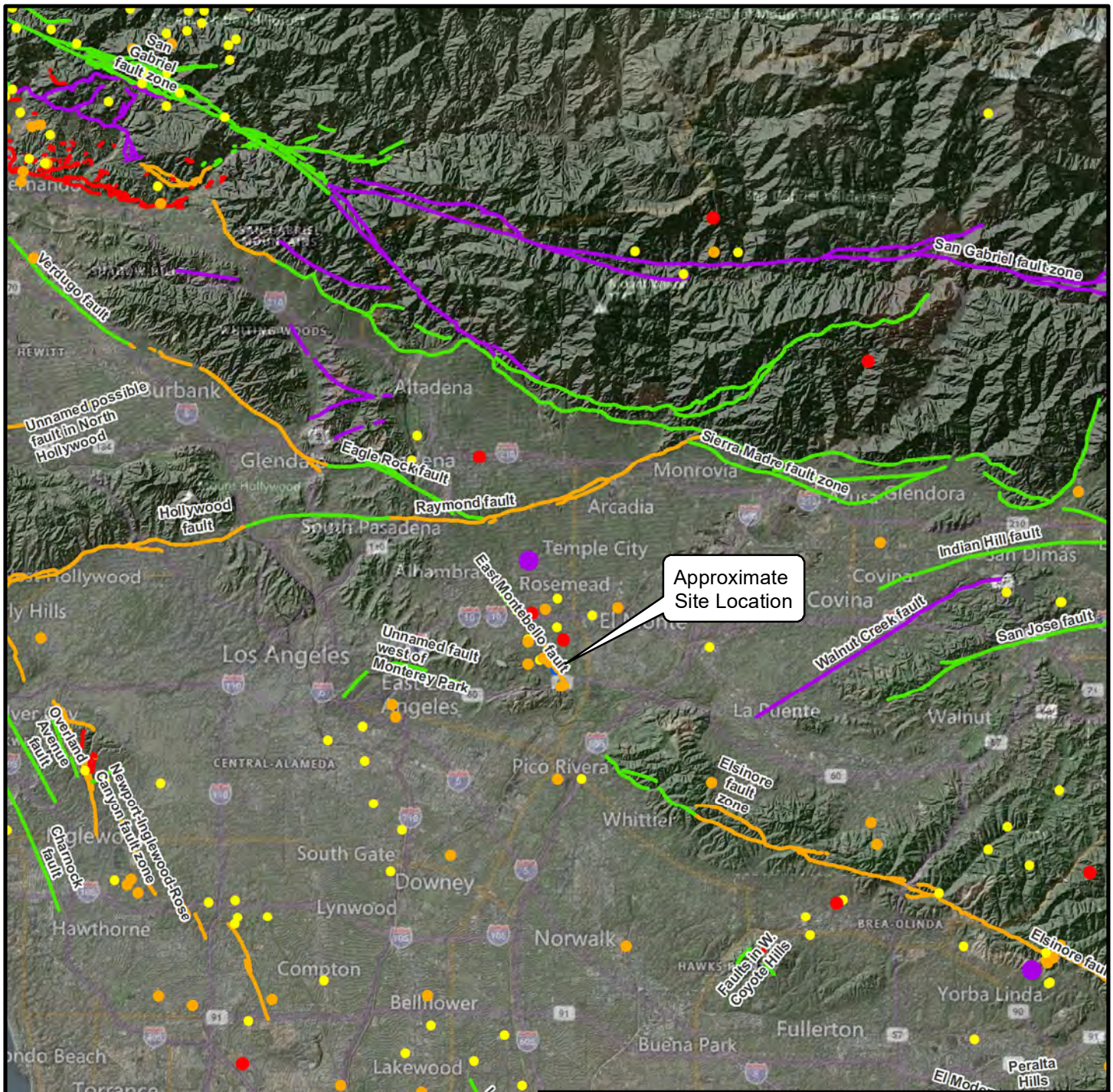
FIGURES



Project: 14030.001	Eng/Geol: JEJ/JAR	SITE LOCATION MAP 1515 Walnut Grove Avenue Rosemead, California	FIGURE 1
Scale: 1" = 2,000'	Date: June 2024		
Reference: © 2024 Microsoft Corporation © 2024 Maxar ©CNES (2024) Distribution Airbus			







LEGEND	
Fault activity	Historical Earthquakes ($\geq M3.5$)
Recency of Movement	
— Historic (<200 years)	● 3.5 - 3.99
— Holocene (<11,700 years)	● 4.0 - 4.99
— Late Quaternary (last 700,000 years)	● 5.0 - 5.99
— Quaternary (<1.6M years)	● 6.0 - 6.99

Project: 14030.001	Eng/Geol: JEH/JAR
Scale: 1" = 5 miles	Date: June 2024
Basemap Reference: © 2024 Microsoft Corporation Earthstar Geographics SIO © 2024 TomTom Seismicity Data Reference: maps.conservation.ca.gov	

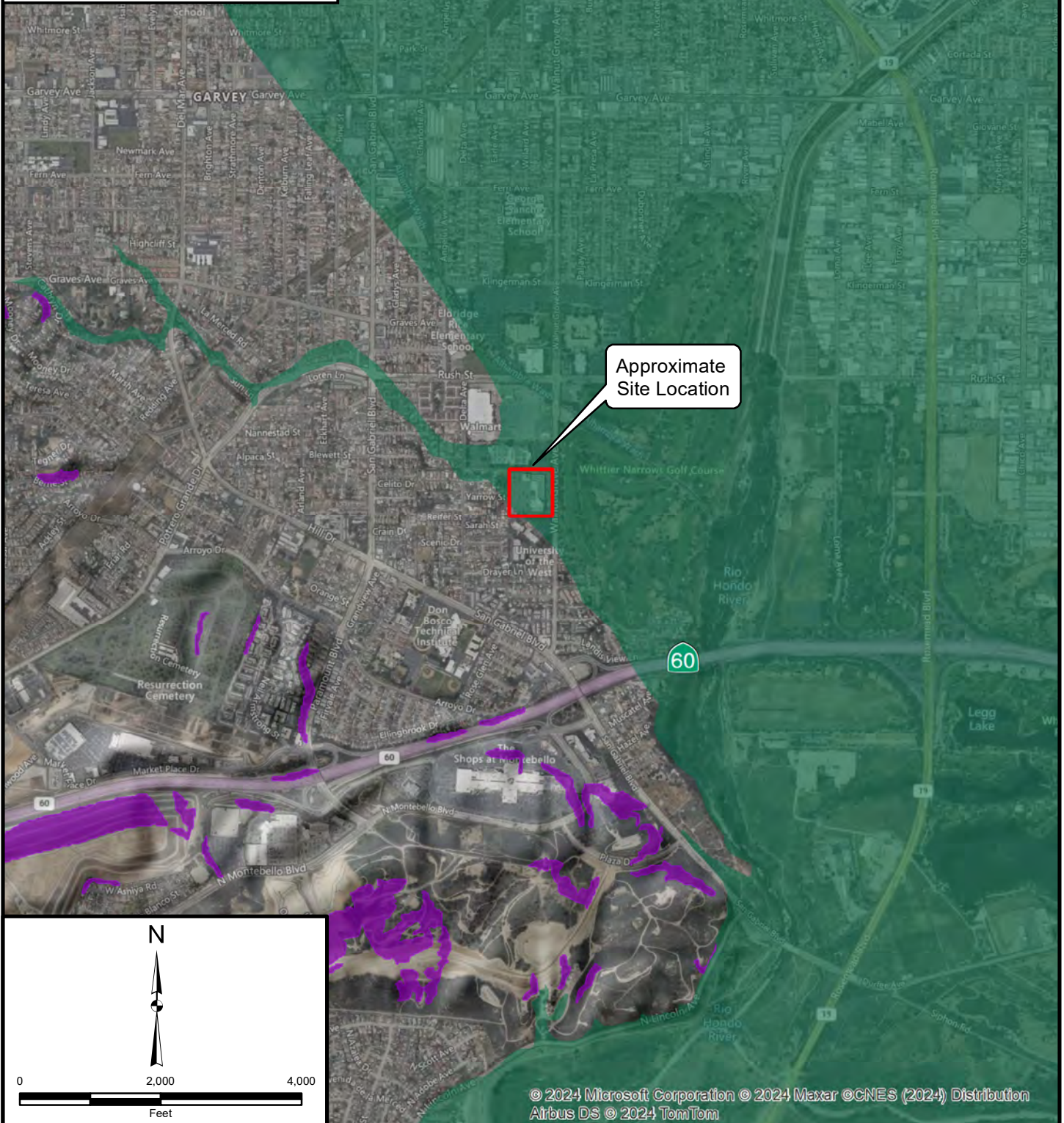
**REGIONAL FAULT AND
HISTORIC SEISMICITY MAP**
 1515 Walnut Grove Avenue
 Rosemead, California

FIGURE 4

Leighton

LEGEND

-  Landslide Hazard Zones
-  Liquefaction Hazard Zones



Project: 14030.001 Eng/Geol: JEJ/JAR

Scale: 1" = 2,000' Date: June 2024

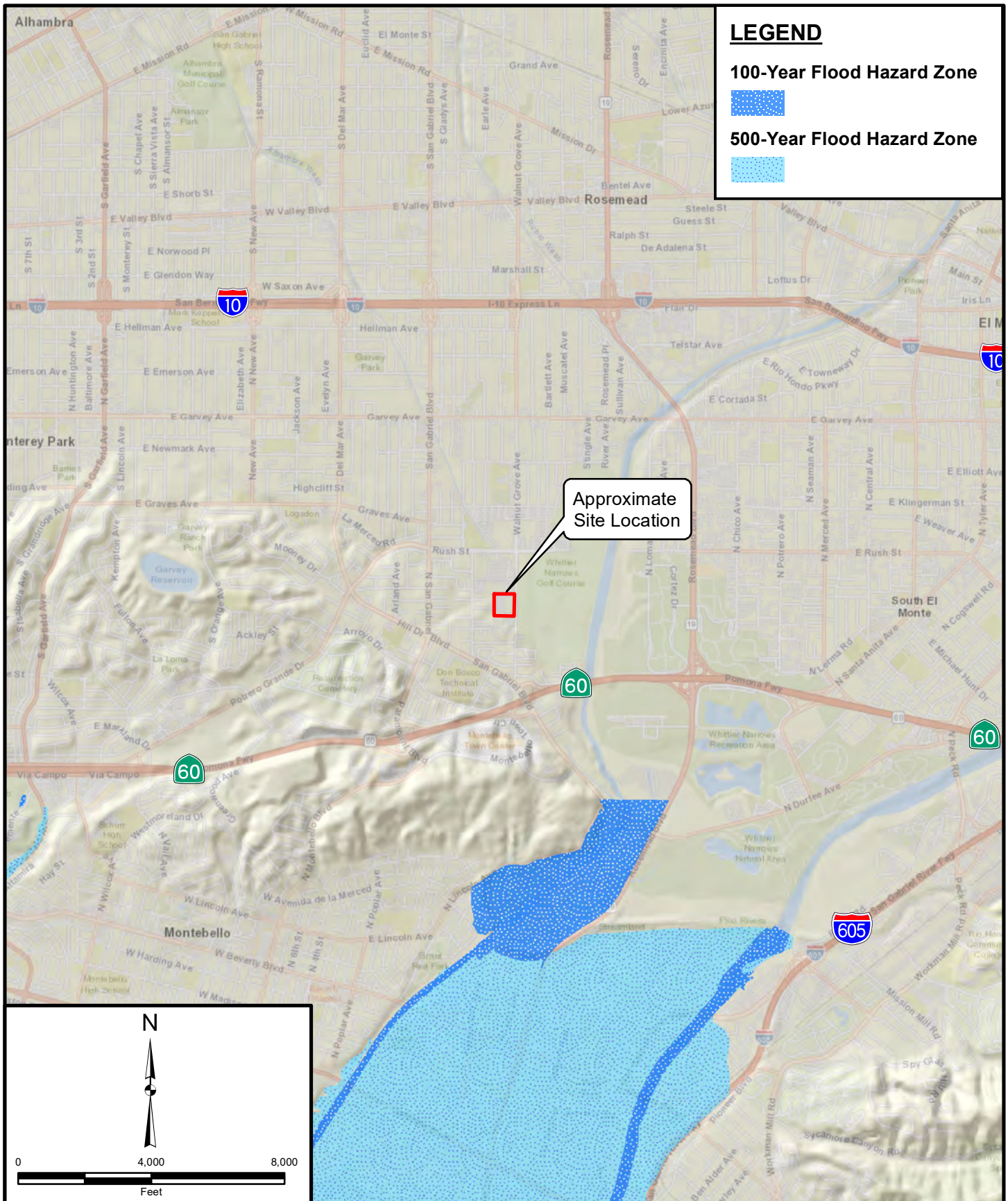
Reference: FH22 C, San Bernardino N

SEISMIC HAZARD MAP

1515 Walnut Grove Avenue
Rosemead, California

FIGURE 5





LEGEND

100-Year Flood Hazard Zone



500-Year Flood Hazard Zone



Approximate
Site Location

Project: 14030.001	Eng/Geol: JEH/JAR
Scale: 1" = 4,000'	Date: June 2024
Reference: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENTAL, P, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community FEMA (http://www.fema.gov/index.shtm), DWR (http://www.dwr.ca.gov)	

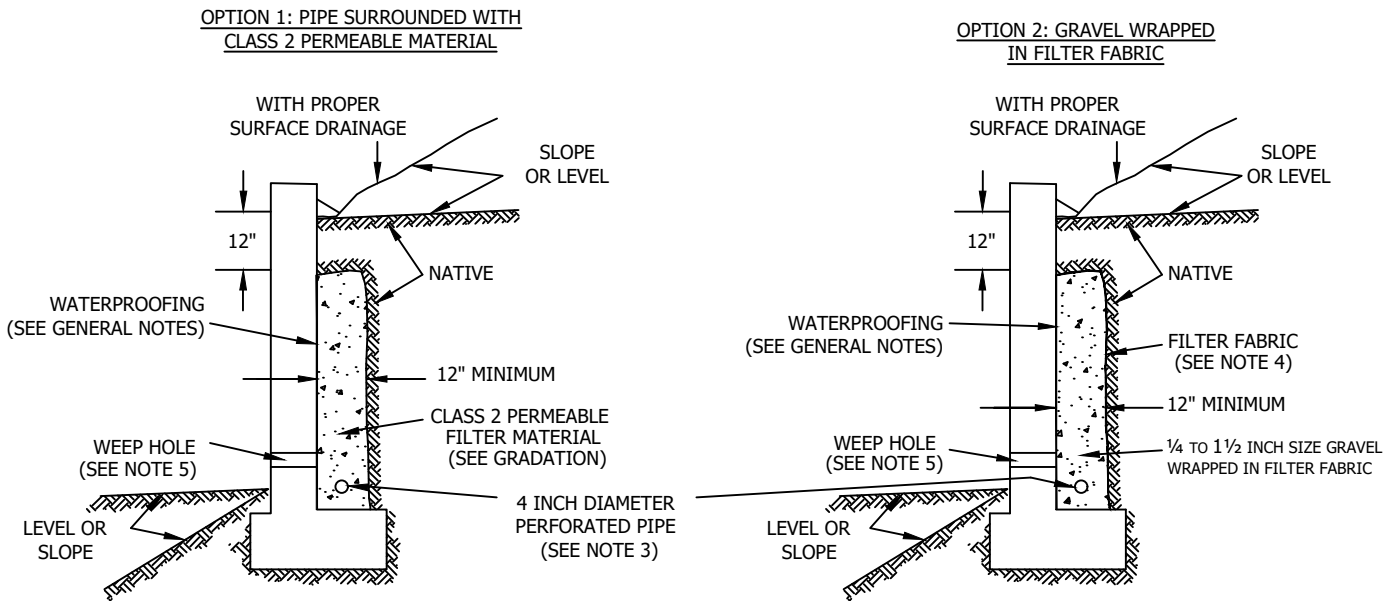
FLOOD HAZARD ZONE MAP

1515 Walnut Grove Avenue
Rosemead, California

FIGURE 6



SUBDRAIN OPTIONS AND BACKFILL WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤ 50



Class 2 Filter Permeable Material Gradation
Per Caltrans Specifications

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

GENERAL NOTES:

- * Waterproofing should be provided where moisture nuisance problem through the wall is undesirable.
- * Water proofing of the walls is not under purview of the geotechnical engineer
- * All drains should have a gradient of 1 percent minimum
- * Outlet portion of the subdrain should have a 4-inch diameter solid pipe discharged into a suitable disposal area designed by the project engineer. The subdrain pipe should be accessible for maintenance (rodding)
- * Other subdrain backfill options are subject to the review by the geotechnical engineer and modification of design parameters.

Notes:

- 1) Sand should have a sand equivalent of 30 or greater and may be densified by water jetting.
- 2) 1 Cu. ft. per ft. of 1/4- to 1 1/2-inch size gravel wrapped in filter fabric
- 3) Pipe type should be ASTM D1527 Acrylonitrile Butadiene Styrene (ABS) SDR35 or ASTM D1785 Polyvinyl Chloride plastic (PVC), Schedule 40, Armco A2000 PVC, or approved equivalent. Pipe should be installed with perforations down. Perforations should be 3/8 inch in diameter placed at the ends of a 120-degree arc in two rows at 3-inch on center (staggered)
- 4) Filter fabric should be Mirafi 140NC or approved equivalent.
- 5) Weephole should be 3-inch minimum diameter and provided at 10-foot maximum intervals. If exposure is permitted, weepholes should be located 12 inches above finished grade. If exposure is not permitted such as for a wall adjacent to a sidewalk/curb, a pipe under the sidewalk to be discharged through the curb face or equivalent should be provided. For a basement-type wall, a proper subdrain outlet system should be provided.
- 6) Retaining wall plans should be reviewed and approved by the geotechnical engineer.
- 7) Walls over six feet in height are subject to a special review by the geotechnical engineer and modifications to the above requirements.

**RETAINING WALL BACKFILL AND SUBDRAIN DETAIL
FOR WALLS 6 FEET OR LESS IN HEIGHT**
WHEN NATIVE MATERIAL HAS EXPANSION INDEX OF ≤ 50

APPENDIX A

FIELD EXPLORATION LOGS

GEOTECHNICAL BORING LOG LB-1

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 230'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
230	0	N S		B-1				CL	@Surface: 5-inch Asphalt over 10-inch Base Artificial fill, undocumented (Afu) @1.25': CLAY, dark brown, moist, few fine sand, medium plasticity	MD, RV
225	5			R-1	4 5 9	112	17		@5': Clayey SAND, stiff, dark brown, moist, few gravels, medium plasticity, slightly oxidized.	EI
				R-2	4 7 10	116	15	CL	Quaternary Alluvium (Qa) @7': CLAY, stiff, dark brown, moist, some medium to coarse gravels, few coarse sand, few silt, low to medium plasticity.	
220	10			R-3	3 4 7	109	19		@10': CLAY, stiff, dark to light brown, moist, fine sand, few medium gravel, low to medium plasticity, FeO oxidation, few cobbles, 66% fines (lab)	-200, AL
215	15			S-1	3 5 7				@15': CLAY, very stiff, dark to light brow, moist, fine to medium sand, low to medium plasticity, slight MnO oxidation.	
210	20			R-4	4 11 17	115	15	sML	@20': Sandy SILT, very stiff, light brown to orange brown, moist, heavy FeO oxidation, few cobbles, subangular to subrounded gravels, fine sand, slight Mn oxidation.	
205	25			S-2	4 7 11				@25': Sandy SILT, very stiff, light brown, fine sand, FeO oxidation veins, slightly micaceous.	
200	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

GEOTECHNICAL BORING LOG LB-1

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 230'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
200	30			R-5	16 37 50/6"	107	2	SW	@30': Silty SAND, very dense, yellowish brown to tan, moist, fine to coarse sand, trace cobbles, few silt, subrounded to subangular cobbles.	
195	35			S-3	13 23 43			SM	@35': Silty SAND, very dense, orange brown, moist, fine to medium sand, some subrounded to subangular gravel, FeO oxidation, slightly micaceous, slight MnO oxidation, friable.	
190	40			R-6	31 50/3"			SW-GW	@40': Gravelly SAND, very dense, tan to light brown, very moist, medium to coarse sand, subrounded to subangular gravel, friable, slightly micaceous, some silt. @40.8': Groundwater encountered.	
185	45			S-4	50 50/5"				@45': Gravelly SAND, very dense, tan to light brown, wet, medium to coarse sand, some silt, subrounded to subangular gravel, few cobbles, slightly micaceous.	
180	50			R-7	18 50/4"			sML	@50': Sandy SILT, hard, light brown, very moist, fine to medium sand, micaceous, subrounded to subangular gravel, FeO oxidation.	
175	55								Total Depth 50.83 feet bgs Groundwater encountered during drilling to 40.8 feet. Backfilled boring to 30 feet bgs with soil cuttings and installed temporary percolation well using 2-inch diameter PVC pipe. Solid pipe from 0-20 feet and 0.020-inch slotted pipe from 20-30 feet. No. 3 Monterey SAND placed in annulus from 19-30 feet. Upon completion of testing, pipe was removed and boring was backfilled with soil cuttings. Surface patched with cold-mix asphalt.	
170	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

GEOTECHNICAL BORING LOG LB-2

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 229'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
	0			B-1				CL-ML	@Surface: 5-inch Asphalt over 7-inch Base Artificial fill, undocumented (Afu) @1': sandy CLAY, dark brown, moist, some medium to coarse sand, subrounded to subangular gravels and cobbles.	
225	5			R-1	2 3 7	116	15	CL	@5': CLAY, medium stiff to stiff, dark brown, moist, some medium to coarse sand, few rootlets, low plasticity, some silt, 98.9% fines (lab)	CR, -200, AL
220				R-2	5 10 12	115	14	ML	Quaternary Alluvium (Qa) @7': SILT, hard, light brown, moist, few fine to medium sand, some clay.	
215	10			R-3	2 2 5	110	19	CL	@10': CLAY with sand, medium stiff, dark brown, moist, some medium to coarse sand, micaceous, medium plasticity, slight FeO oxidation.	DS
210	15			S-1	push 1 2				@15': CLAY, soft to medium stiff, light brown, moist, some fine to medium sand, FeO oxidation, some silt, low to medium plasticity.	
205	20			R-4	4 8 12	109	18	CL-ML	@20': SILT, very stiff, light brown, moist, MnO and FeO oxidation, few fine to medium sand, few subrounded to subangular gravels, slightly micaceous.	
200	25			S-2	2 9 16			SW-GW ML	@25': Gravelly SAND, dense, light brown, moist, some silt, FeO oxidation, medium to coarse sand, subrounded to subangular gravel. @26': Gravelly SAND, light brown, medium to coarse sand, subrounded to subangular gravel. @27': SILT, stiff, light to dark brown, moist, high FeO and MnO oxidation, low plasticity, some clay, few gravels, micaceous.	
30										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

GEOTECHNICAL BORING LOG LB-2

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 229'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
	30			R-5	8 7 8	110	17		@30': CLAY with gravel, yellowish brown (lab description)	
195	35								Total Depth 31.5 feet bgs No groundwater encountered during drilling. Installed temporary percolation well using 2-inch diameter PVC pipe. Solid pipe from 0-20 feet and 0.020-inch slotted pipe from 20-30 feet. No. 3 Monterey SAND placed in annulus from 19-30 feet. Upon completion of testing, pipe was removed and boring was backfilled with soil cuttings. Surface patched with cold-mix asphalt.	
190	40									
185	45									
180	50									
175	55									
170	60									
SAMPLE TYPES: B BULK SAMPLE C CORE SAMPLE G GRAB SAMPLE R RING SAMPLE S SPLIT SPOON SAMPLE T TUBE SAMPLE TYPE OF TESTS: -200 % FINES PASSING AL ATTERBERG LIMITS CN CONSOLIDATION CO COLLAPSE CR CORROSION CU UNDRAINED TRIAXIAL DS DIRECT SHEAR EI EXPANSION INDEX H HYDROMETER MD MAXIMUM DENSITY PP POCKET PENETROMETER RV R VALUE SA SIEVE ANALYSIS SE SAND EQUIVALENT SG SPECIFIC GRAVITY UC UNCONFINED COMPRESSIVE STRENGTH										

verdantas

GEOTECHNICAL BORING LOG LB-3

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 235'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
235	0	N S		B-1				CL-ML	@Surface: 5-inch Asphalt over Subgrade (No Base) Artificial fill, undocumented (Afu) @0.5': Clayey SILT, dark brown, moist, fine to medium sand, rootlets, few subrounded to subangular gravel.	
230	5			R-1	11 17 24	119	11	ML	@5': SILT with sand, hard, dark brown, moist, fine to medium sand, rootlets, few subrounded to subangular gravel.	
				R-2	5 9 10	106	24	CL-ML	Quaternary Alluvium (Qa) @7': SILT, very stiff, light to dark brown, moist, fine to medium sand, few gravels, slightly MnO oxidation, glaying.	
225	10			R-3	3 9 13	106	18	sCL	@10': CLAY with sand, very stiff, brown to orangish brown, moist, medium to coarse sand, few gravels, slightly micaceous, some silt, MnO oxidation.	
220	15			S-1	2 2 4			CL-ML	@15': Sandy CLAY, medium stiff to stiff, light brown to orange brown, moist, MnO oxidation pockets, some subrounded to subangular gravel, glaying, dark brown pockets of oxidation, fine sand, slightly micaceous, 62.8% fines (lab)	-200
215	20			R-4	3 6 12	121	11		@20': SILT with sand, stiff to very stiff, dark brown to gray, moist, large pockets of MnO oxidation, dark brown/reddish FeO oxidation, fine to medium sand, low to medium plasticity.	
210	25			S-2	2 2 4			ML	@25': SILT, medium stiff to stiff, brown to gray, moist, orange FeO oxidation throughout, MnO oxidation, micaceous, some fine sand lenses.	
205	30									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

GEOTECHNICAL BORING LOG LB-3

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 235'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
205	30			R-5	5 9 26	117	13	CL-ML	@30': Sandy SILT, very stiff to stiff, light brown to gray moist, thin bands of FeO oxidation, fine to medium sand pockets, slightly micaceous, some clay. Total Depth 31.5 feet bgs No groundwater encountered during drilling. Backfilled boring with soil cuttings and surface patched with cold-mix asphalt.	
200	35									
195	40									
190	45									
185	50									
180	55									
175	60									

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

DS DIRECT SHEAR
 EI EXPANSION INDEX
 H HYDROMETER
 MD MAXIMUM DENSITY
 PP POCKET PENETROMETER
 RV R VALUE

SA SIEVE ANALYSIS
 SE SAND EQUIVALENT
 SG SPECIFIC GRAVITY
 UC UNCONFINED COMPRESSIVE STRENGTH

verdantas

GEOTECHNICAL BORING LOG LB-4

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 238'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION <i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	Type of Tests
0	0	N S							@Surface: 5-inch Asphalt over 4.5-inch Base	
235				B-1				ML	Artificial fill, undocumented (Afu) @0.8': SILT, brown, moist, fine to medium sand, few subrounded to subangular gravels, micaceous, some clay pockets, FeO staining.	
5				R-1	8 18 21		10	SM	@5': Silty SAND, dense, brown, moist, fine to medium sand, some subrounded to subangular gravels.	
230				R-2	7 11 13	119	13	CL-ML	Quaternary Alluvium (Qa) @7': Sandy CLAY, very stiff, brown, moist, micaceous, slight FeO oxidation, few subrounded to subangular gravels, few MnO staining.	
10				R-3	7 11 16	117	14		@10': Clayey SILT, very stiff, brown, moist, fine to medium sand, slightly micaceous, few subrounded gravels.	
225				S-1	4 6 9			CL	@15': CLAY, very stiff, brown to light brown, moist, fine sand, MnO oxidation throughout, low plasticity.	
220				R-4	11 25 32	120	12	ML	@20': Sandy SILT, hard, brown to orange brown, moist, high FeO oxidation, fine to medium sand, few subrounded to subangular gravel, slightly micaceous.	
215				S-2	9 17 20				@25': SILT, hard, orangish brown, moist, high FeO oxidation, few clays.	
210										
30										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
 CN CONSOLIDATION
 CO COLLAPSE
 CR CORROSION
 CU UNDRAINED TRIAXIAL

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verdantas

GEOTECHNICAL BORING LOG LB-4

Project No. 14030.001
 Project Lewis Rosemead Condos
 Drilling Co. Martini Drilling Inc.
 Drilling Method Hollow Stem Auger - 140lb - Autohammer - 30" Drop
 Location See Figure 2 - Exploration Location Map

Date Drilled 4-22-24
 Logged By MKD
 Hole Diameter 8"
 Ground Elevation 238'
 Sampled By MKD

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							<i>This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.</i>	
30				R-5	11 12 30			CL-ML	@30': Clayey SILT, very stiff, brown to gray, moist, FeO and MnO oxidation, fine sand, slightly micaceous.	
205									Total Depth 31.5 feet bgs No groundwater encountered during drilling. Backfilled boring with soil cuttings and surface patched with cold-mix asphalt.	
35										
200										
40										
195										
45										
190										
50										
185										
55										
180										
60										

SAMPLE TYPES:

B BULK SAMPLE
 C CORE SAMPLE
 G GRAB SAMPLE
 R RING SAMPLE
 S SPLIT SPOON SAMPLE
 T TUBE SAMPLE

TYPE OF TESTS:

-200 % FINES PASSING
 AL ATTERBERG LIMITS
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verdantas

SUMMARY OF CONE PENETRATION TEST DATA

Project:

**Lewis Rosemead Fault Investigation
1515 Walnut Grove Avenue
Rosemead, CA
January 29 – February 2, 2024**

Prepared for:

**Mr. Joe Roe
Leighton Consulting
2600 Michelson Drive, Ste 400
Irvine, CA 92612
Office (800) 253-4567 / Fax (949) 250-1114**

Prepared by:



KEHOE TESTING & ENGINEERING

5415 Industrial Drive
Huntington Beach, CA 92649-1518
Office (714) 901-7270 / Fax (714) 901-7289
www.kehoetesting.com

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- 2. SUMMARY OF FIELD WORK**
- 3. FIELD EQUIPMENT & PROCEDURES**
- 4. CONE PENETRATION TEST DATA & INTERPRETATION**

APPENDIX

- CPT Plots
- CPT Classification/Soil Behavior Chart
- Summary of Shear Wave Velocities
- Pore Pressure Dissipation Graphs
- CPT Data Files (sent via email)

SUMMARY OF CONE PENETRATION TEST DATA

1. INTRODUCTION

This report presents the results of a Cone Penetration Test (CPT) program carried out for the Lewis Rosemead Fault Investigation project located at 1515 Walnut Grove in Rosemead, California. The work was performed by Kehoe Testing & Engineering (KTE) on January 29 – February 2, 2024. The scope of work was performed as directed by Leighton Consulting personnel.

2. SUMMARY OF FIELD WORK

The fieldwork consisted of performing CPT soundings at 49 locations to determine the soil lithology. A summary is provided in **TABLE 2.1**.

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-1	42	Refusal
CPT-2	40	Refusal
CPT-3	41	Refusal
CPT-4	40	Refusal
CPT-5	40	Refusal
CPT-6	40	Refusal
CPT-7	39	Refusal
CPT-8	40	Refusal
CPT-9	40	Refusal
CPT-10	39	Refusal
CPT-11	38	Refusal
CPT-12	39	Refusal
CPT-13	39	Refusal
CPT-14	40	Refusal
CPT-15	39	Refusal
CPT-16	39	Refusal
CPT-17	39	Refusal
CPT-18	41	Refusal
CPT-19	40	Refusal
CPT-20	41	Refusal
CPT-21	43	Refusal

LOCATION	DEPTH OF CPT (ft)	COMMENTS/NOTES:
CPT-22	50	
CPT-23	50	
CPT-24	47	Refusal
CPT-25	46	Refusal
CPT-26	50	
CPT-27	50	
CPT-28	50	
CPT-29	44	Refusal
CPT-30	50	
CPT-31	50	
CPT-32	43	Refusal
CPT-33	50	
CPT-34	43	Refusal
CPT-35	50	
CPT-36	44	Refusal
CPT-37	44	Refusal
CPT-38	44	Refusal
CPT-39	45	Refusal
CPT-40	50	
CPT-41	50	
CPT-42	45	Refusal
CPT-43	45	Refusal
CPT-44	46	Refusal
CPT-45	49	Refusal
CPT-46	50	
CPT-47	50	
CPT-48	50	
CPT-49	44	Refusal

TABLE 2.1 - Summary of CPT Soundings

3. FIELD EQUIPMENT & PROCEDURES

The CPT soundings were carried out by **KTE** using an integrated electronic cone system manufactured by Vertek. The CPT soundings were performed in accordance with ASTM standards (D5778). The cone penetrometers were pushed using a 30-ton CPT rig. The cone used during the program was a 15 cm² cone with a cone net area ratio of 0.83. The following parameters were recorded at approximately 2.5 cm depth intervals:

- Cone Resistance (qc)
- Sleeve Friction (fs)
- Dynamic Pore Pressure (u)
- Inclination
- Penetration Speed
- Pore Pressure Dissipation (at selected depths)

At location CPT-10, shear wave measurements were obtained at various depths. The shear wave is generated using an air-actuated hammer, which is located inside the front jack of the CPT rig. The cone has a triaxial geophone, which recorded the shear wave signal generated by the air hammer.

The above parameters were recorded and viewed in real time using a laptop computer. Data is stored at the KTE office for up to 2 years for future analysis and reference. A complete set of baseline readings was taken prior to each sounding to determine temperature shifts and any zero load offsets. Monitoring base line readings ensures that the cone electronics are operating properly.

4. CONE PENETRATION TEST DATA & INTERPRETATION

The Cone Penetration Test data is presented in graphical form in the attached Appendix. These plots were generated using the CPeT-IT program. Penetration depths are referenced to ground surface. The soil behavior type on the CPT plots is derived from the attached CPT SBT plot (Robertson, "Interpretation of Cone Penetration Test...", 2009) and presents major soil lithologic changes. The stratigraphic interpretation is based on relationships between cone resistance (q_c), sleeve friction (f_s), and penetration pore pressure (u). The friction ratio (R_f), which is sleeve friction divided by cone resistance, is a calculated parameter that is used along with cone resistance to infer soil behavior type. Generally, cohesive soils (clays) have high friction ratios, low cone resistance and generate excess pore water pressures. Cohesionless soils (sands) have lower friction ratios, high cone bearing and generate little (or negative) excess pore water pressures.

The CPT data files have also been provided. These files can be imported in CPeT-IT (software by GeoLogismiki) and other programs to calculate various geotechnical parameters.

It should be noted that it is not always possible to clearly identify a soil type based on q_c , f_s and u . In these situations, experience, judgement and an assessment of the pore pressure data should be used to infer the soil behavior type.

If you have any questions regarding this information, please do not hesitate to call our office at (714) 901-7270.

Sincerely,

KEHOE TESTING & ENGINEERING



Steven P. Kehoe
President

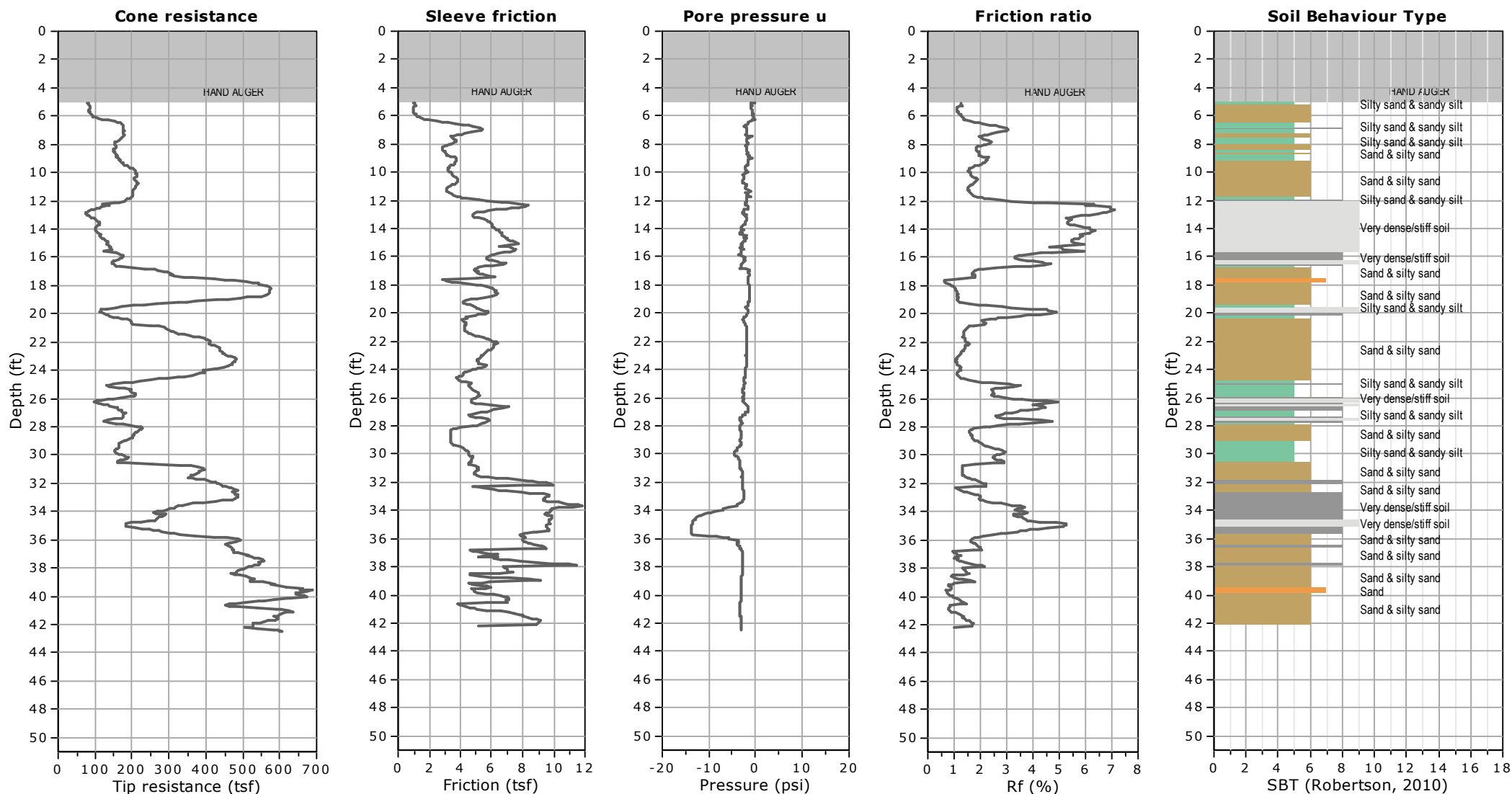
APPENDIX



Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-1

Total depth: 42.52 ft, Date: 1/29/2024

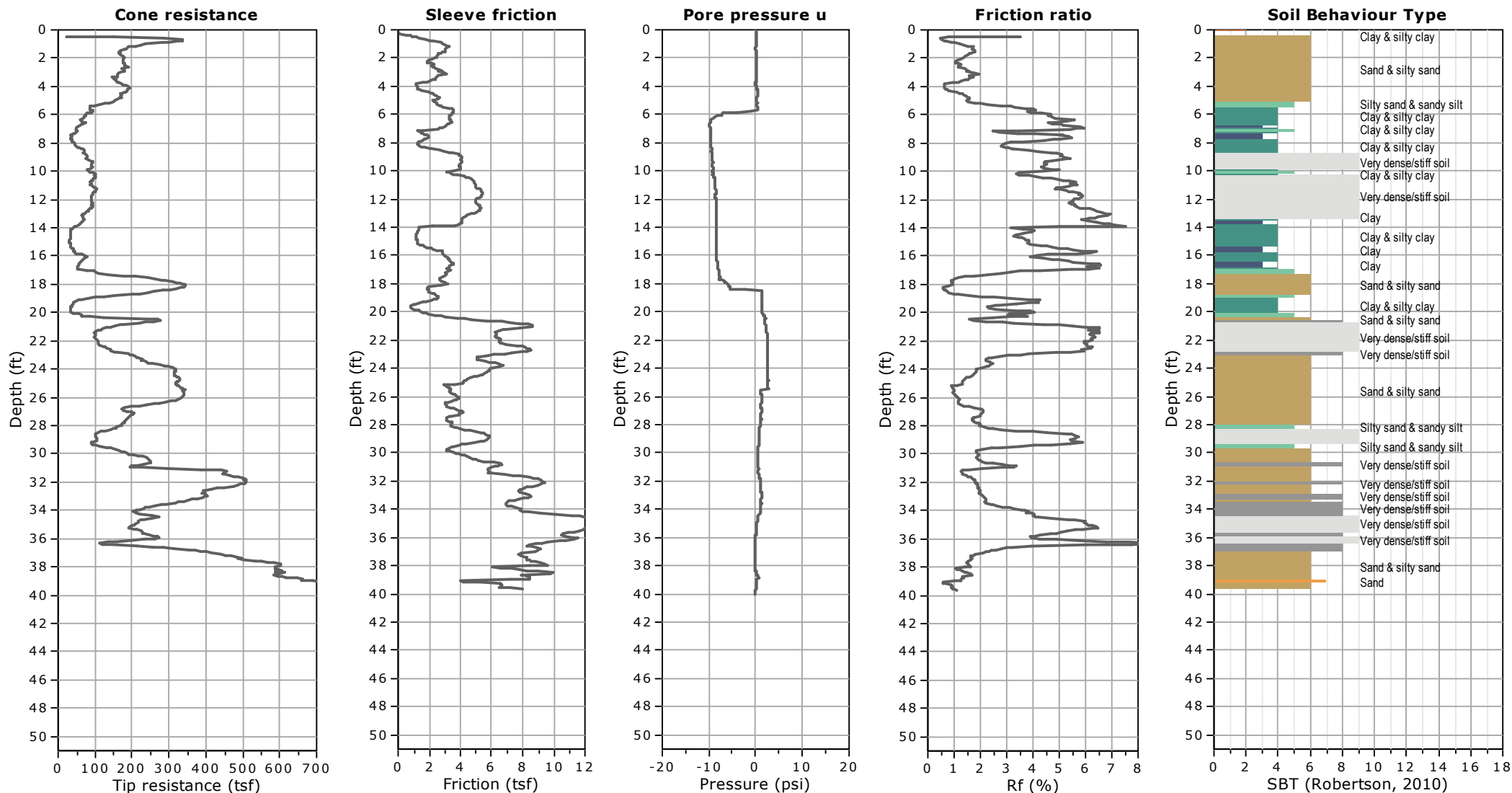




Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-2

Total depth: 40.04 ft, Date: 1/29/2024

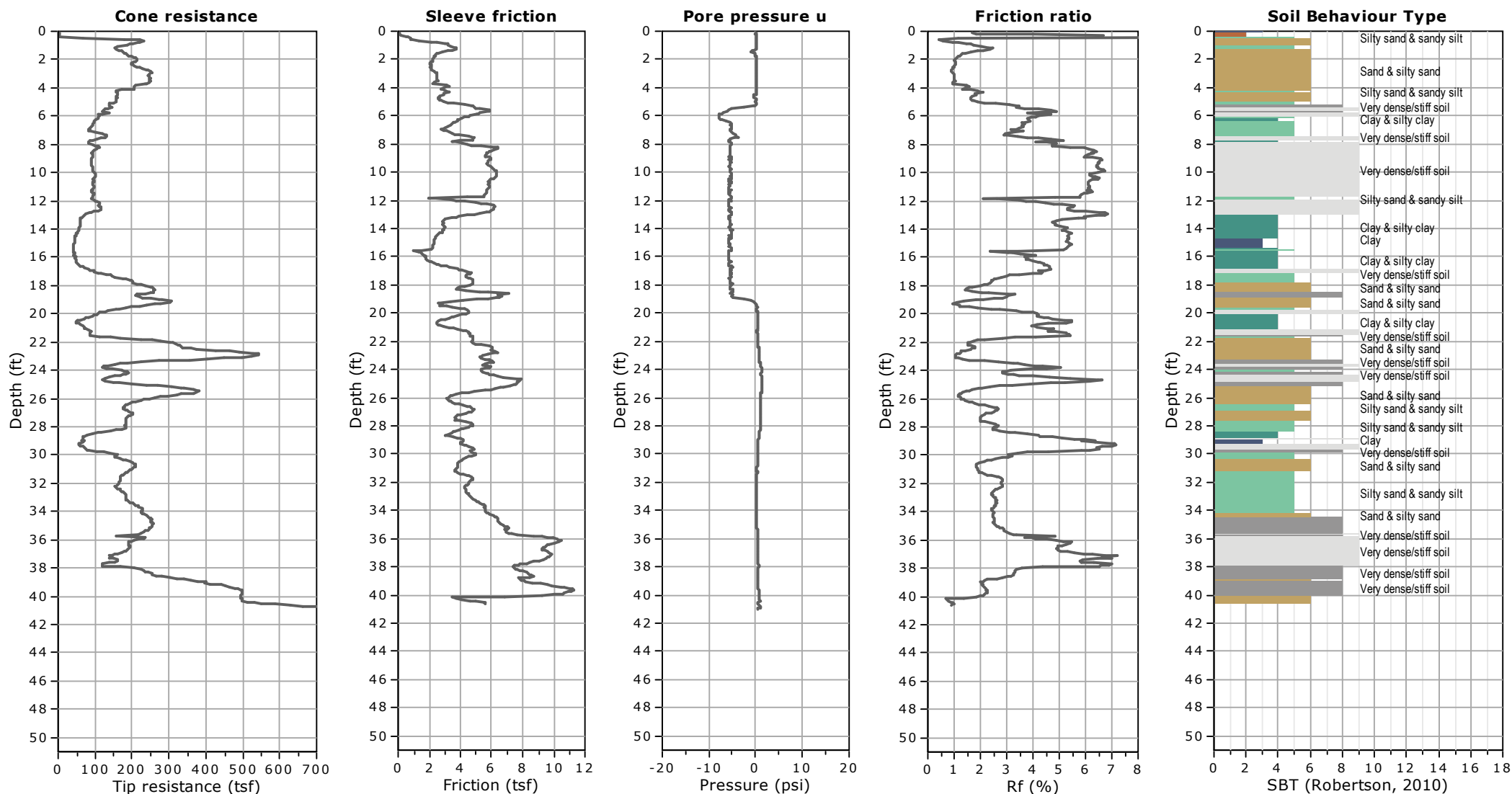


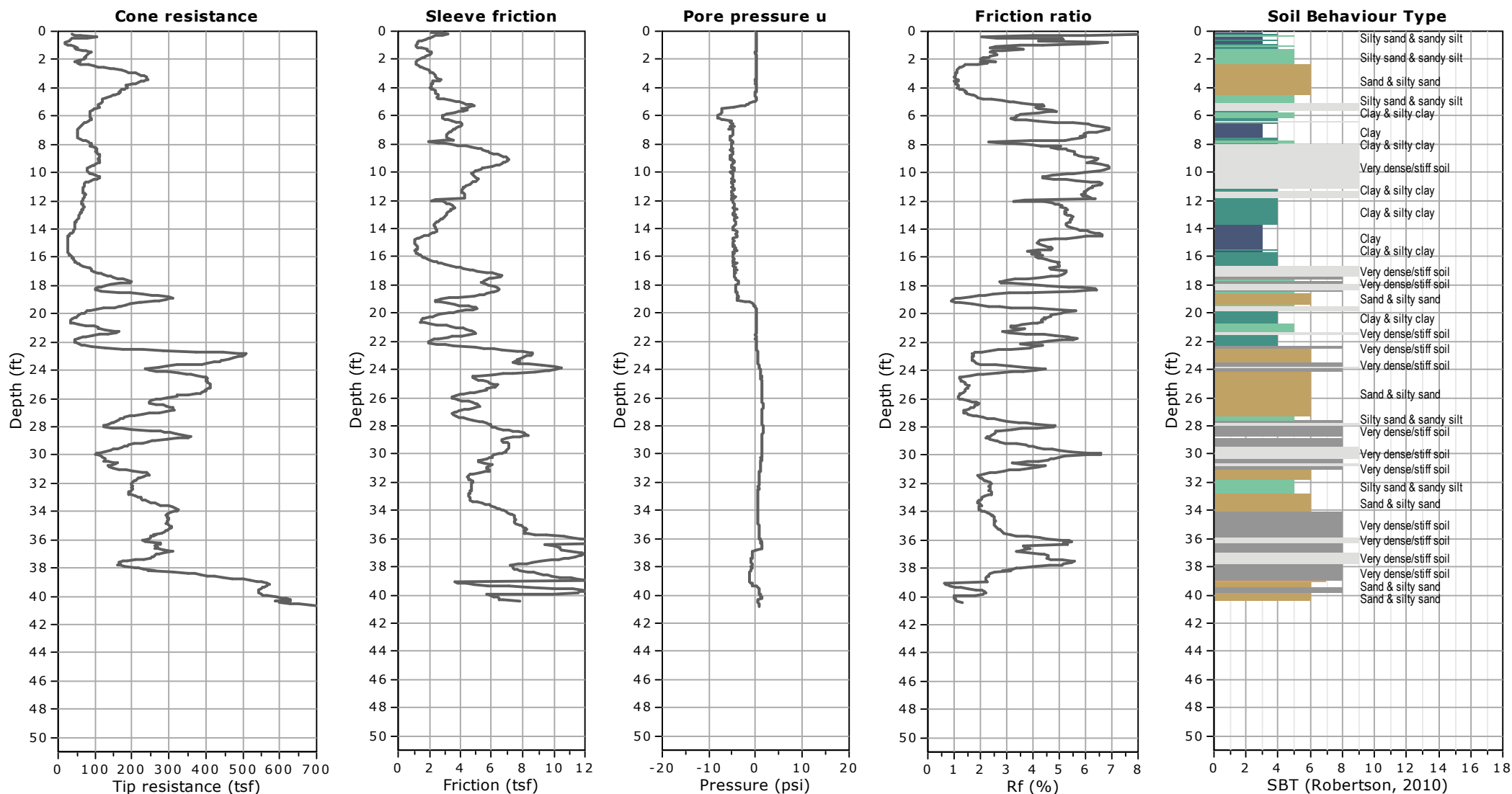


Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-3

Total depth: 41.02 ft, Date: 1/29/2024



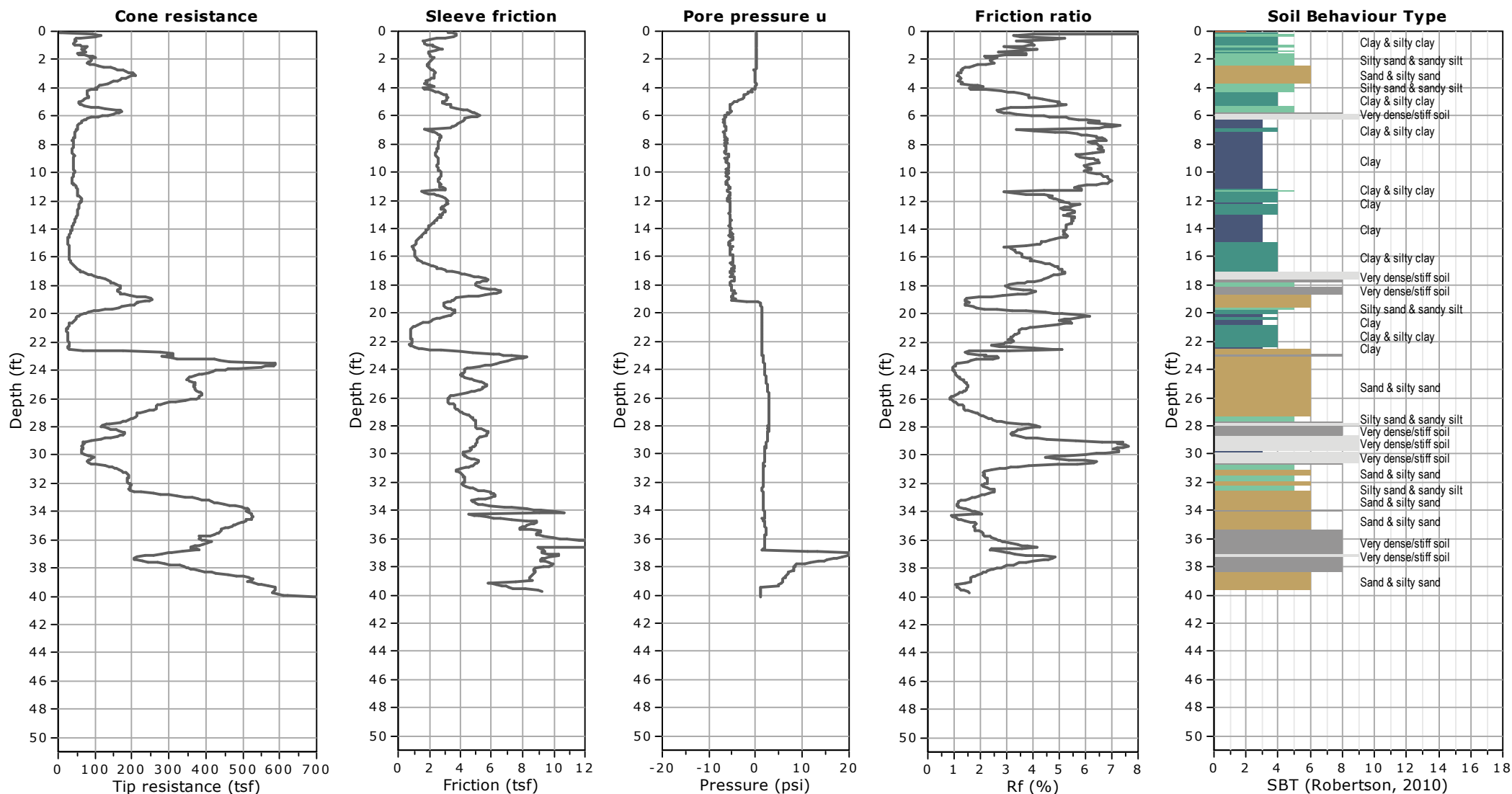




Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-5

Total depth: 40.11 ft, Date: 1/29/2024

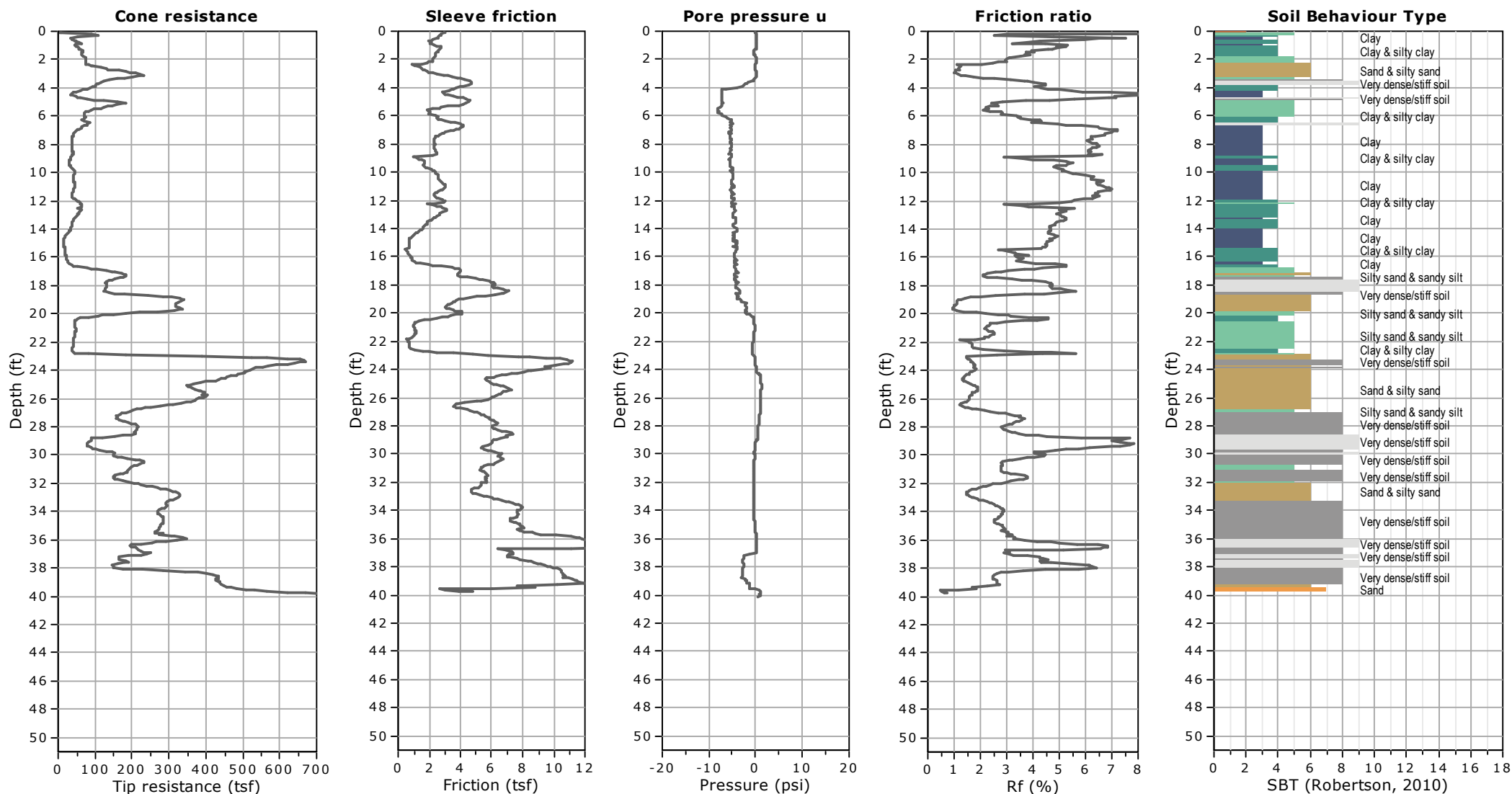




Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-6

Total depth: 40.17 ft, Date: 1/29/2024

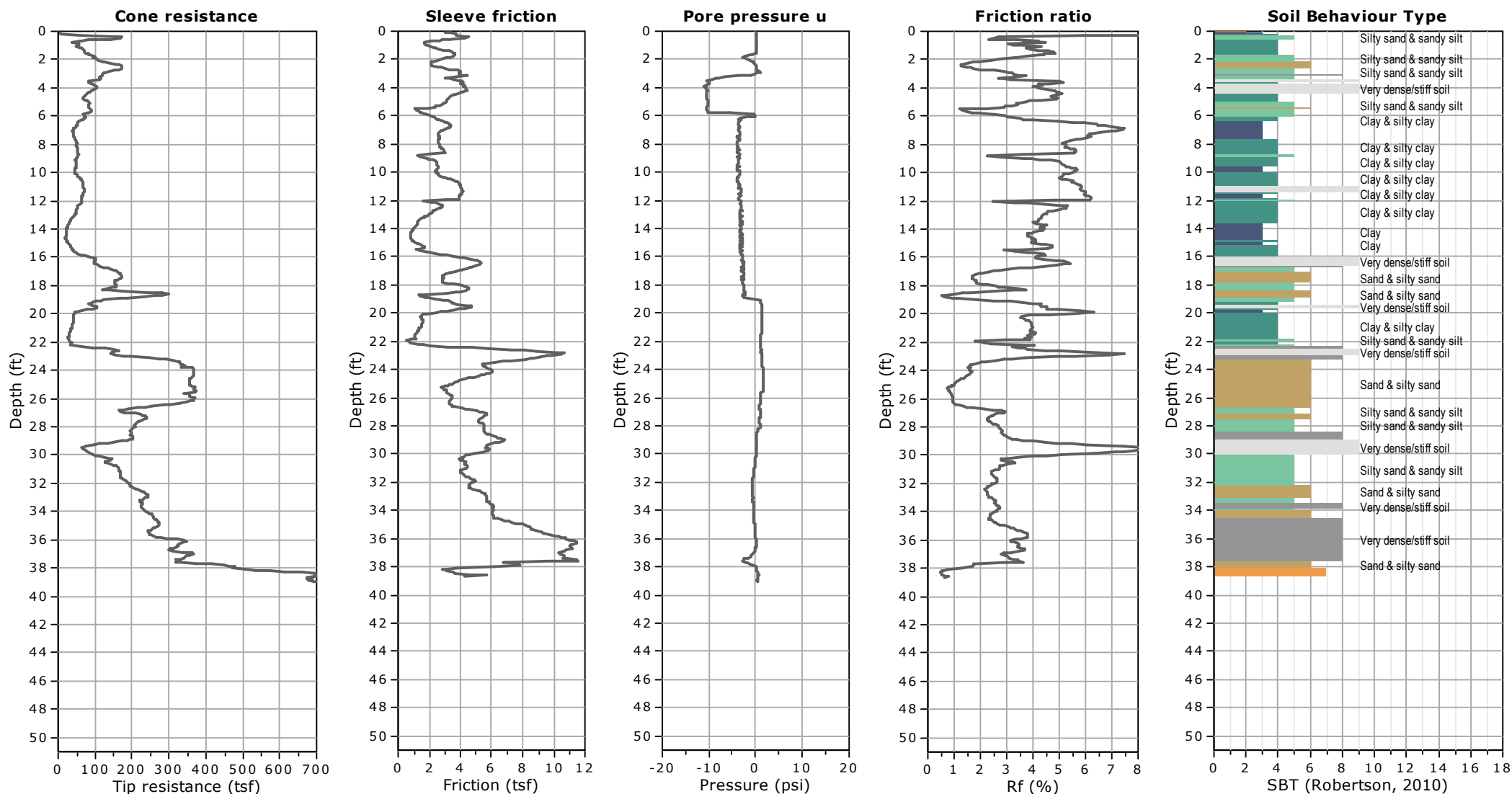


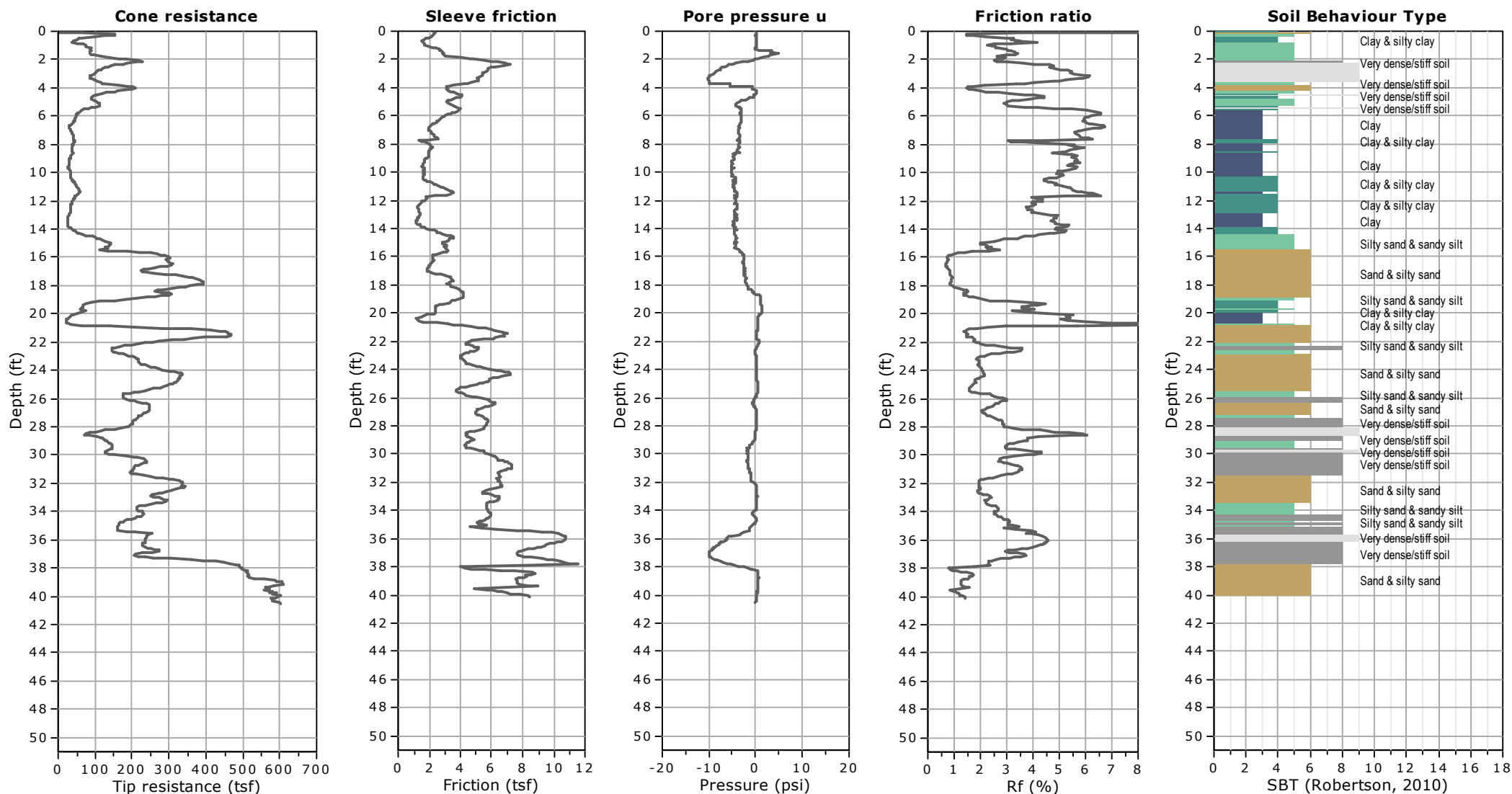


Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-7

Total depth: 39.05 ft, Date: 1/29/2024



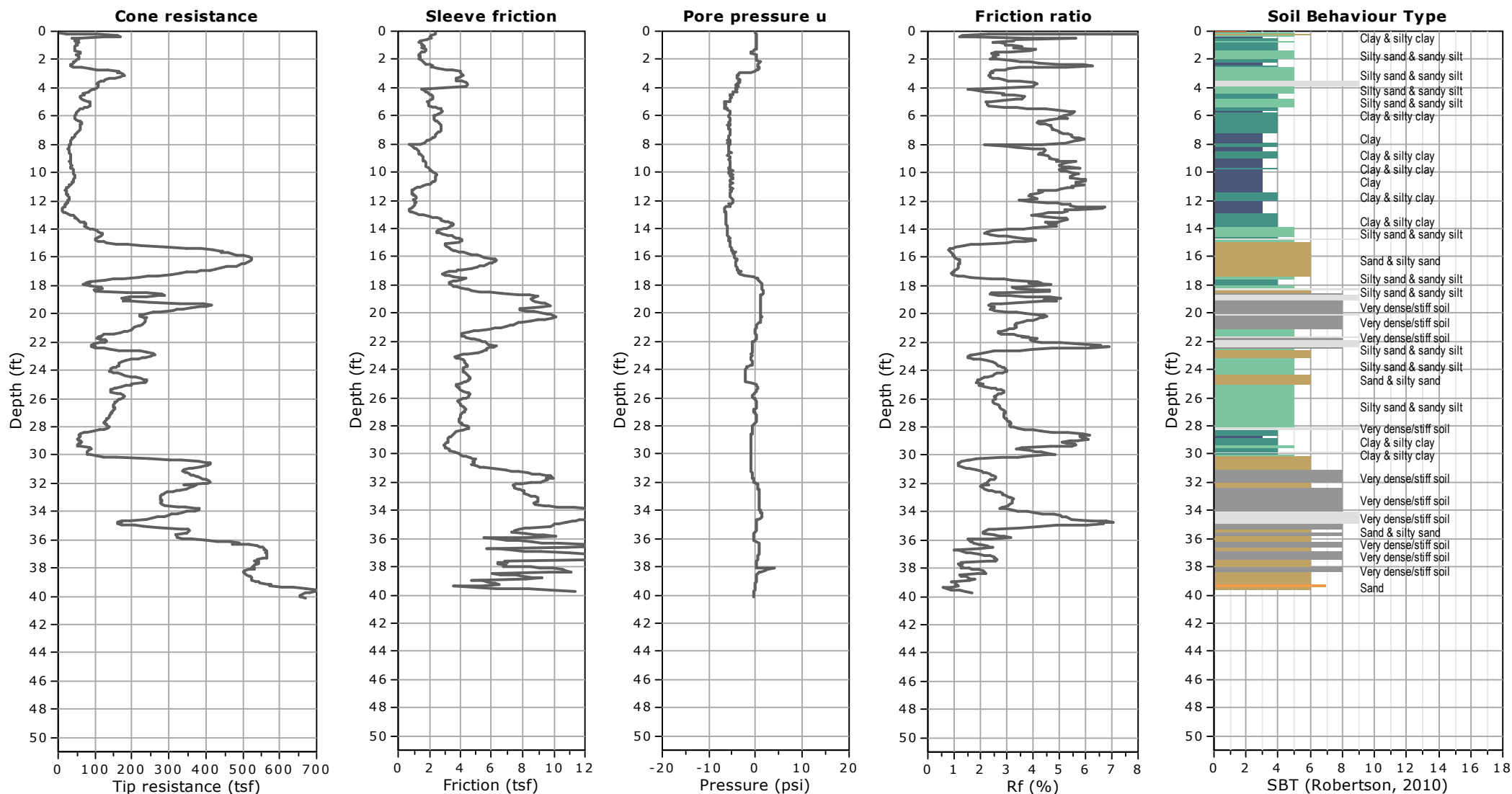


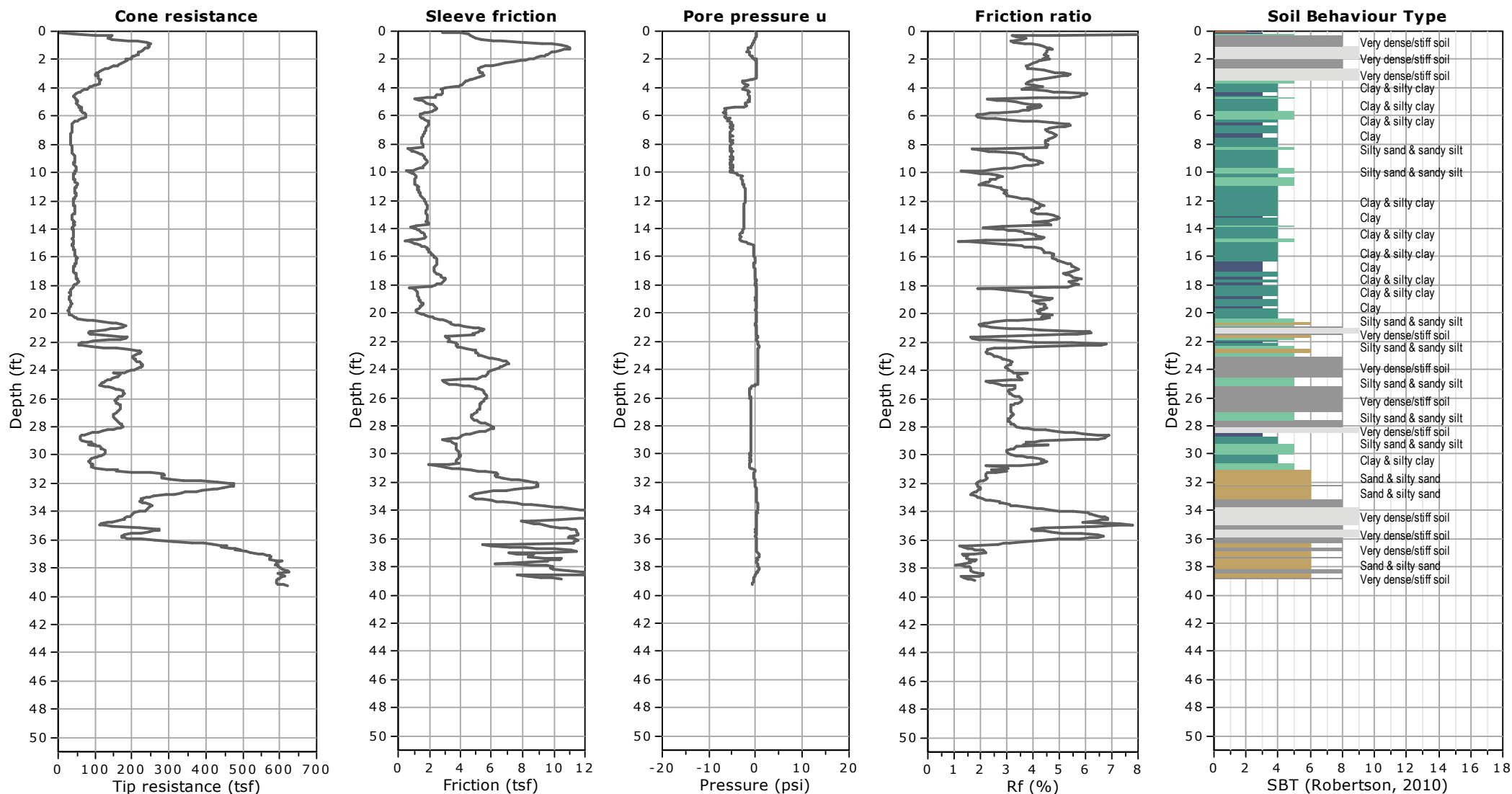


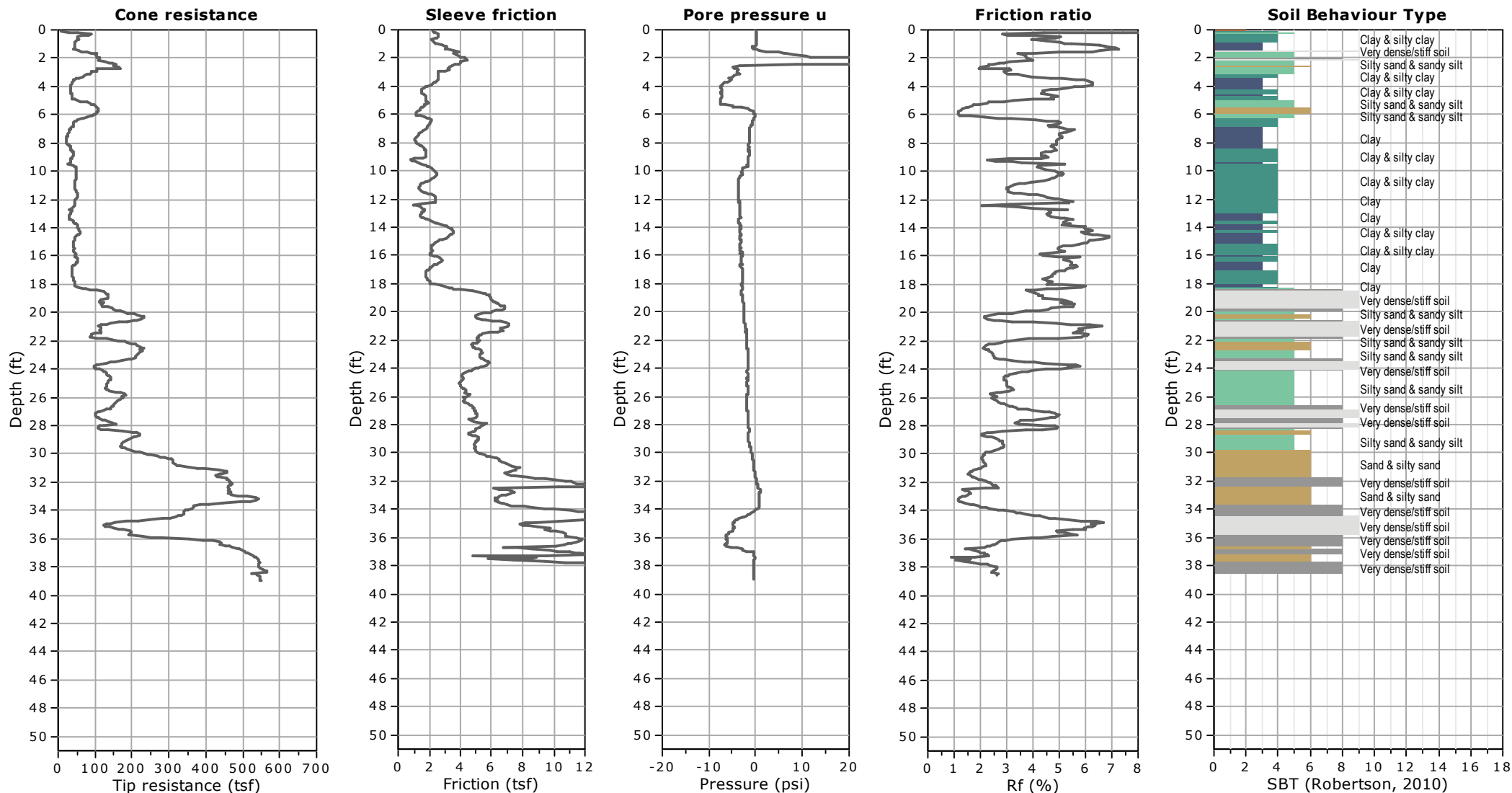
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Location: 1515 Walnut Grove Ave, Rosemead, CA

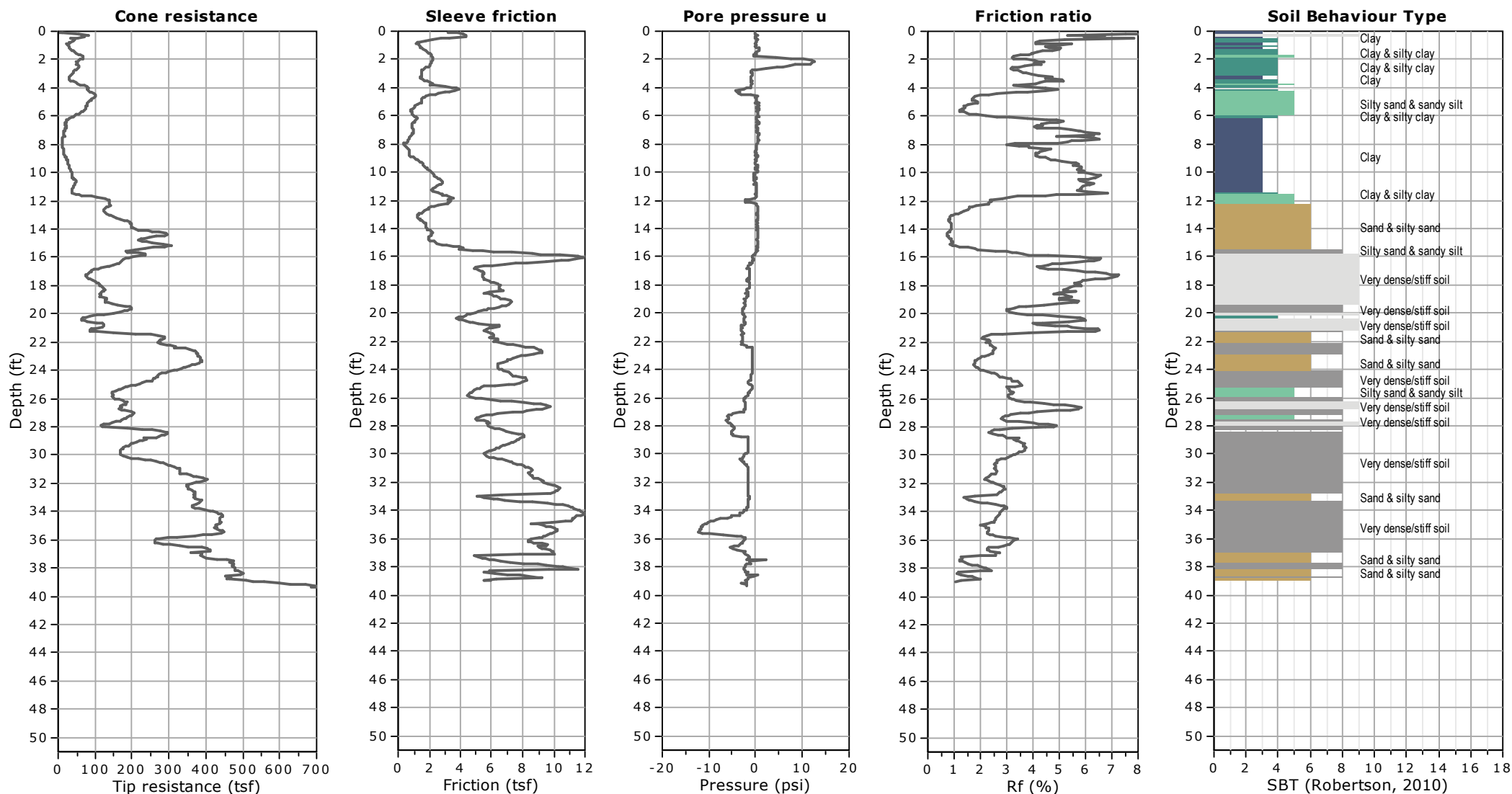
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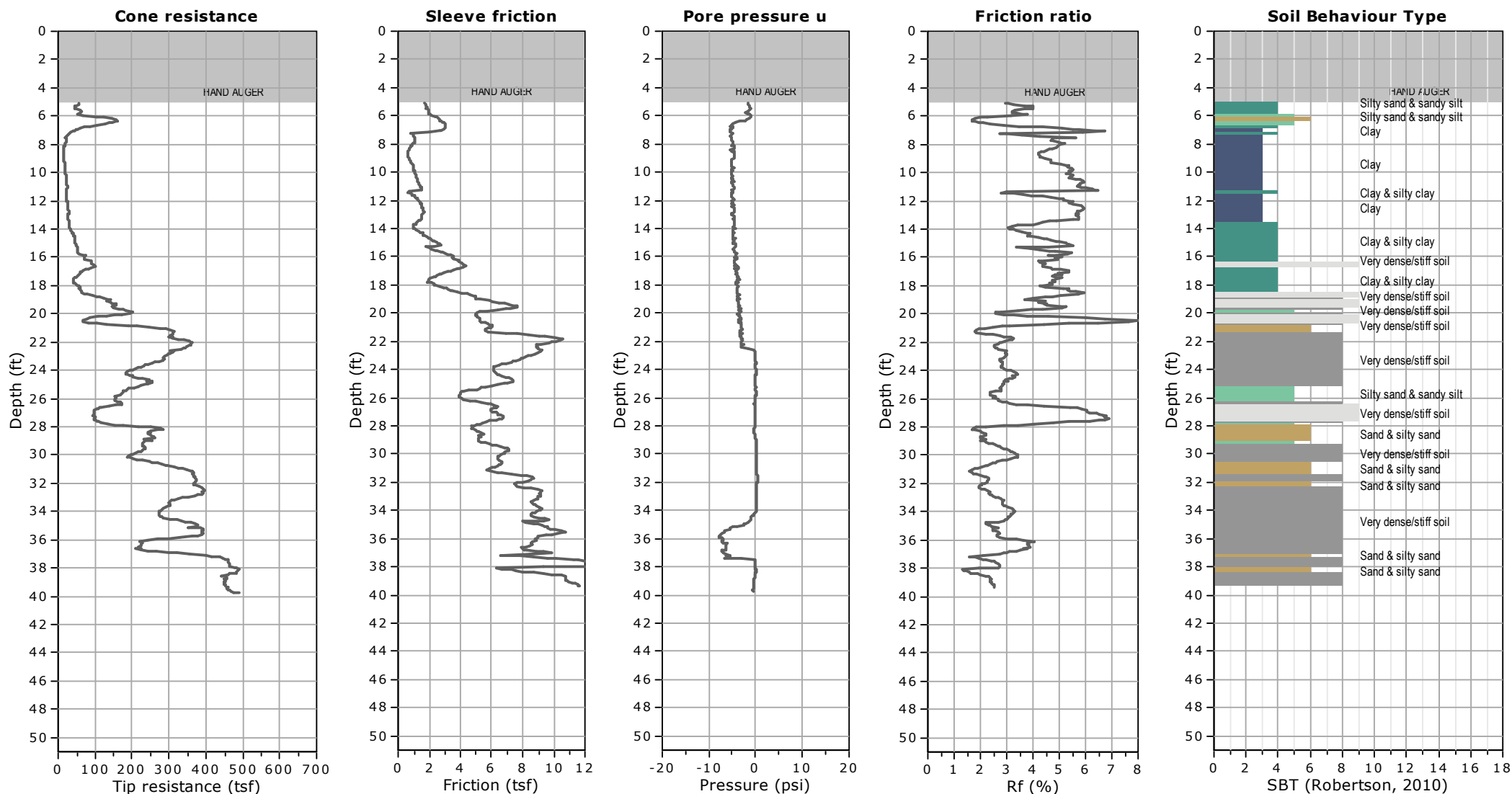
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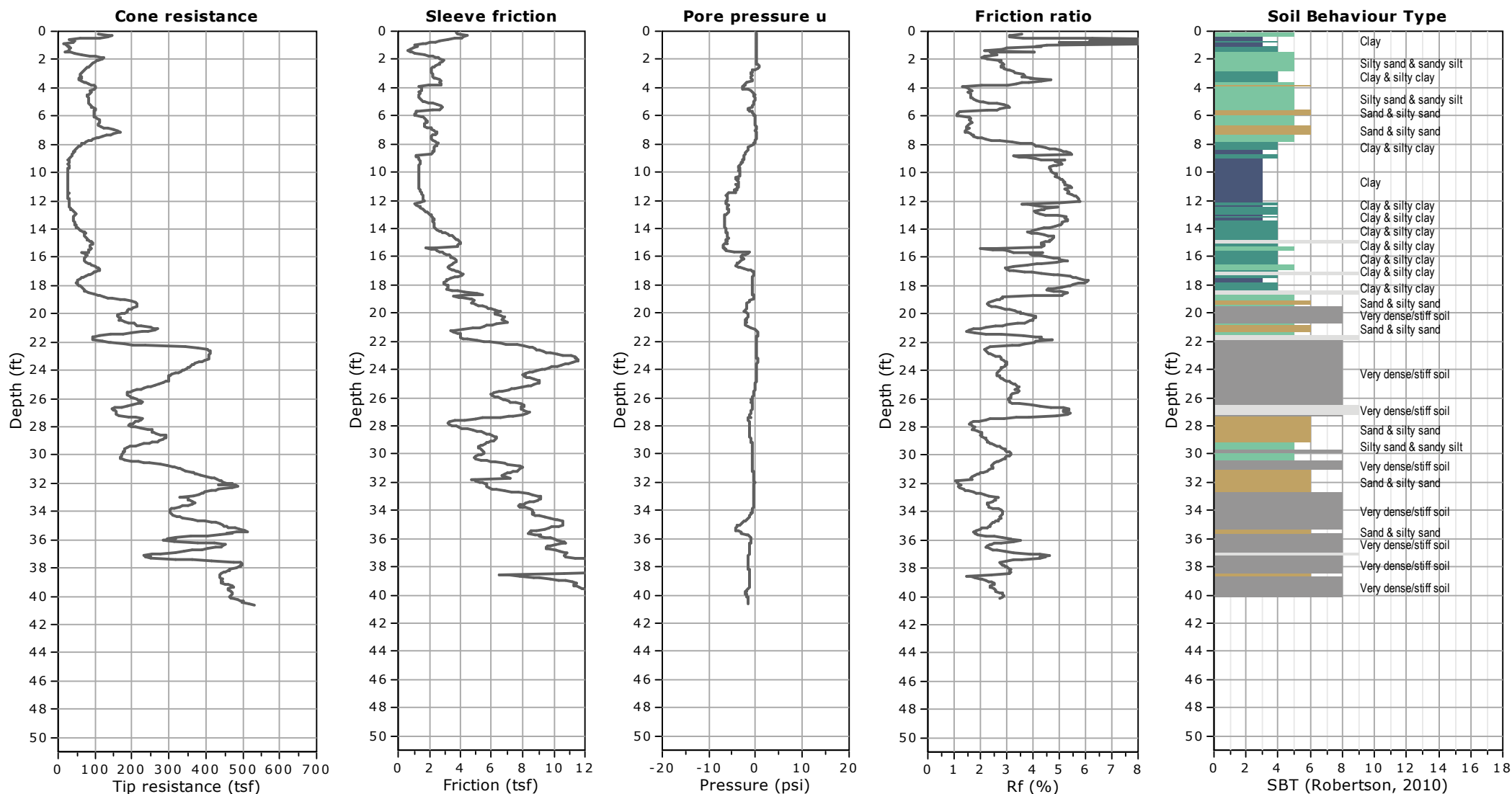










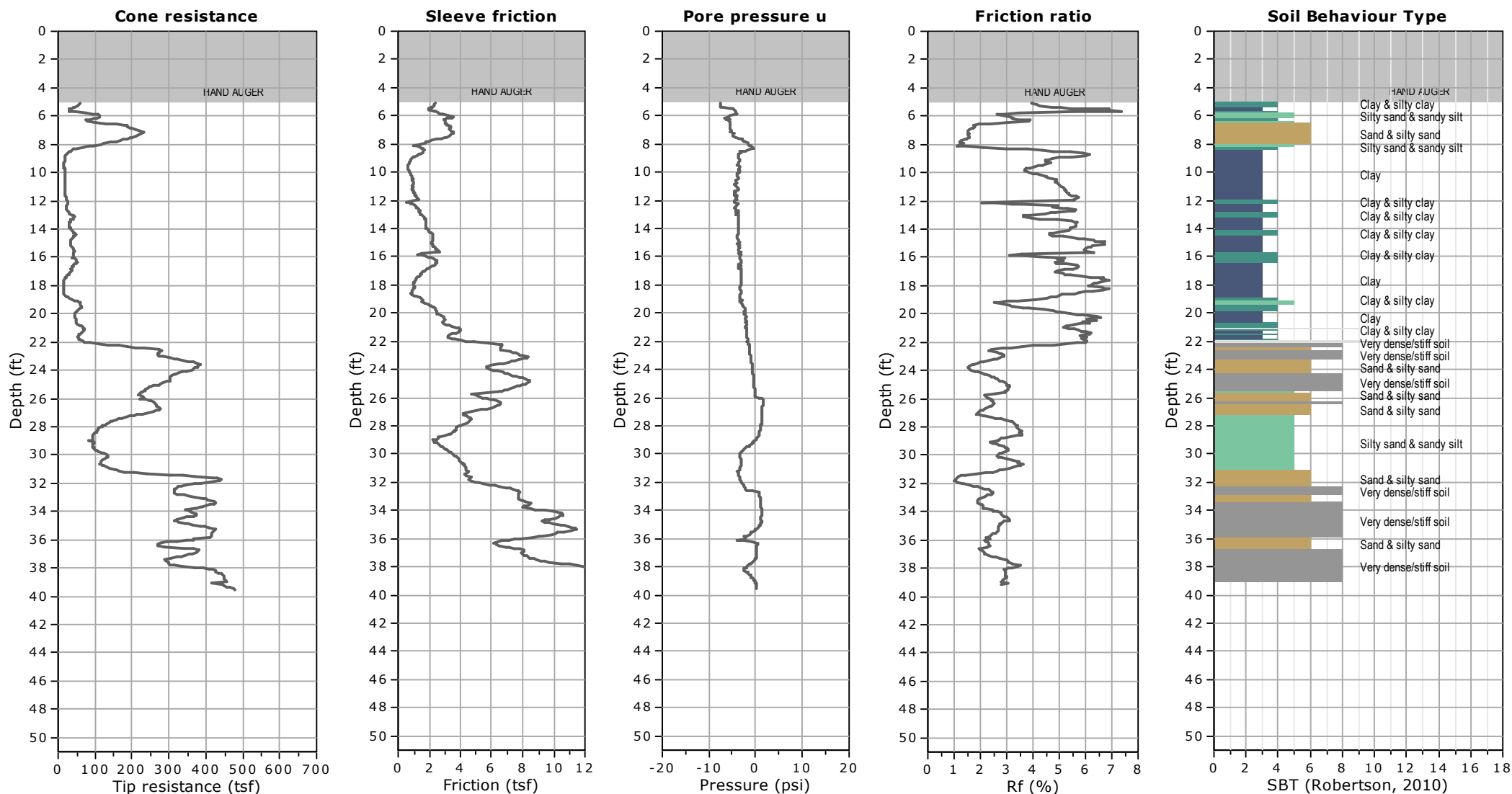


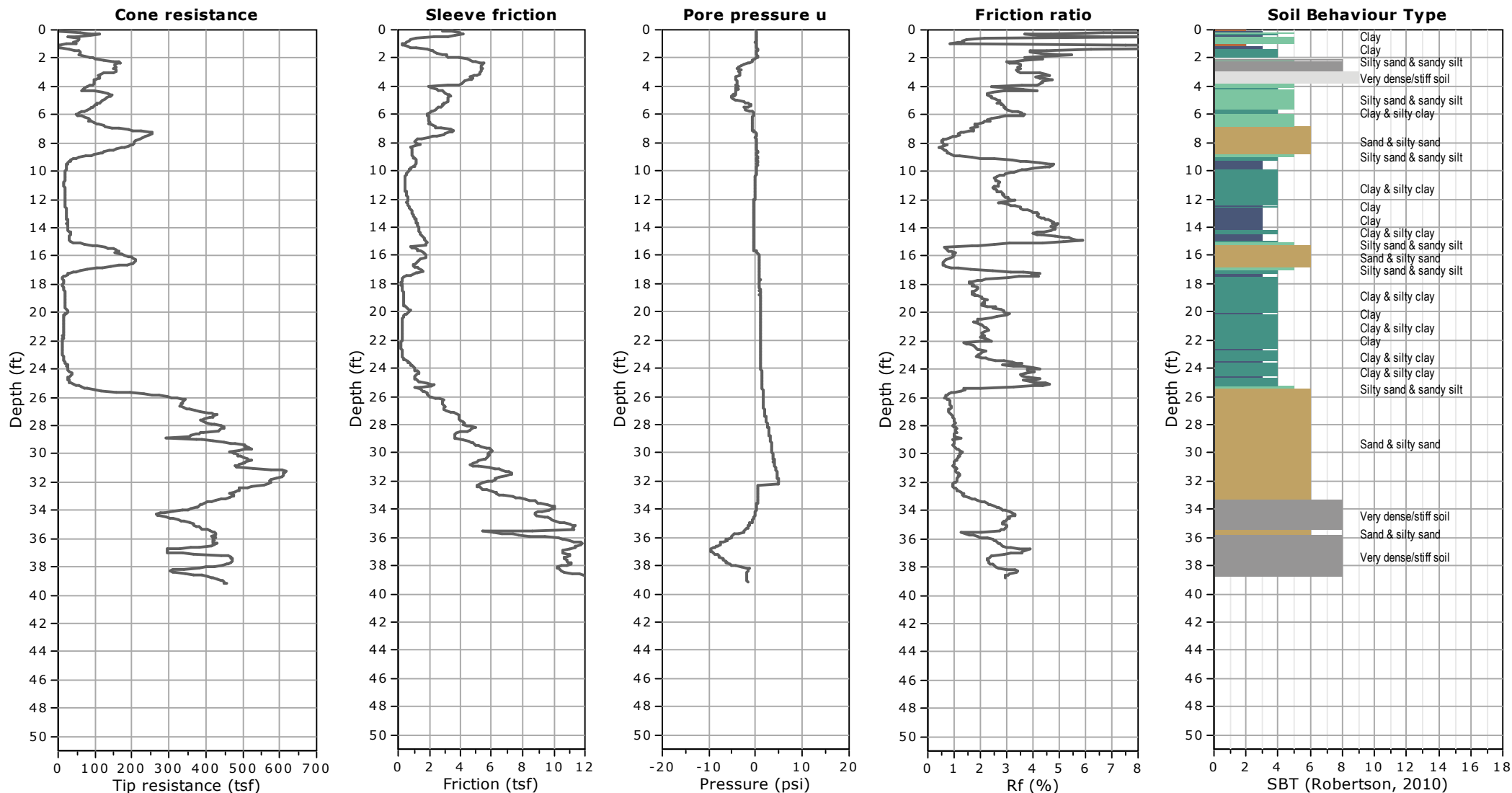


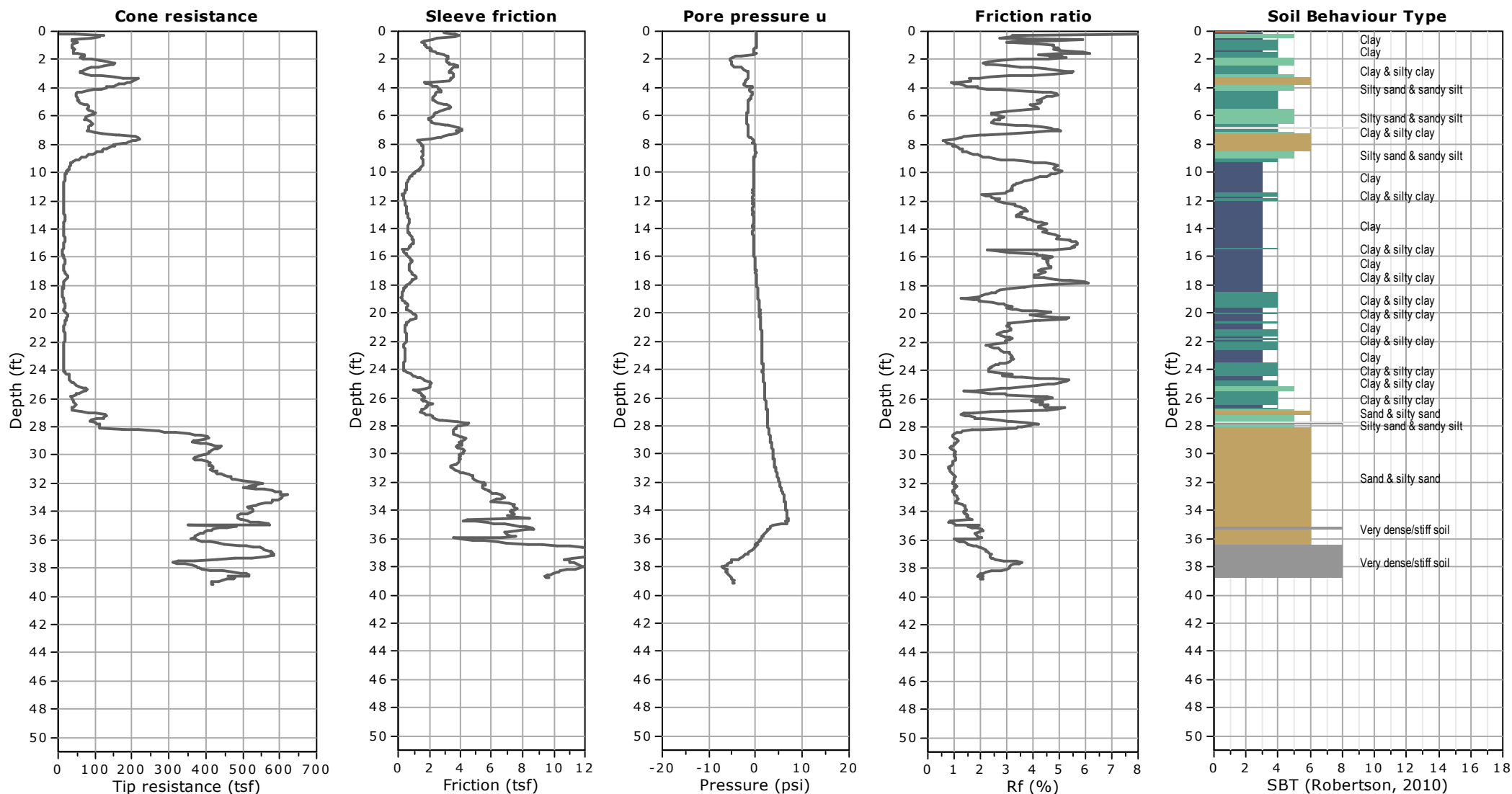
Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

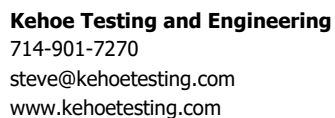
CPT-15

Total depth: 39.51 ft, Date: 1/30/2024



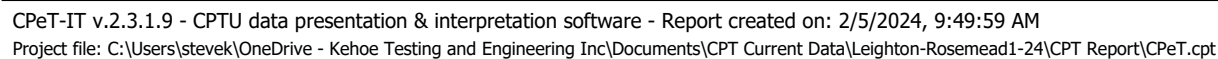


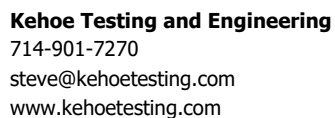




CPT-18

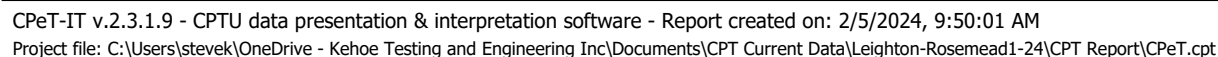
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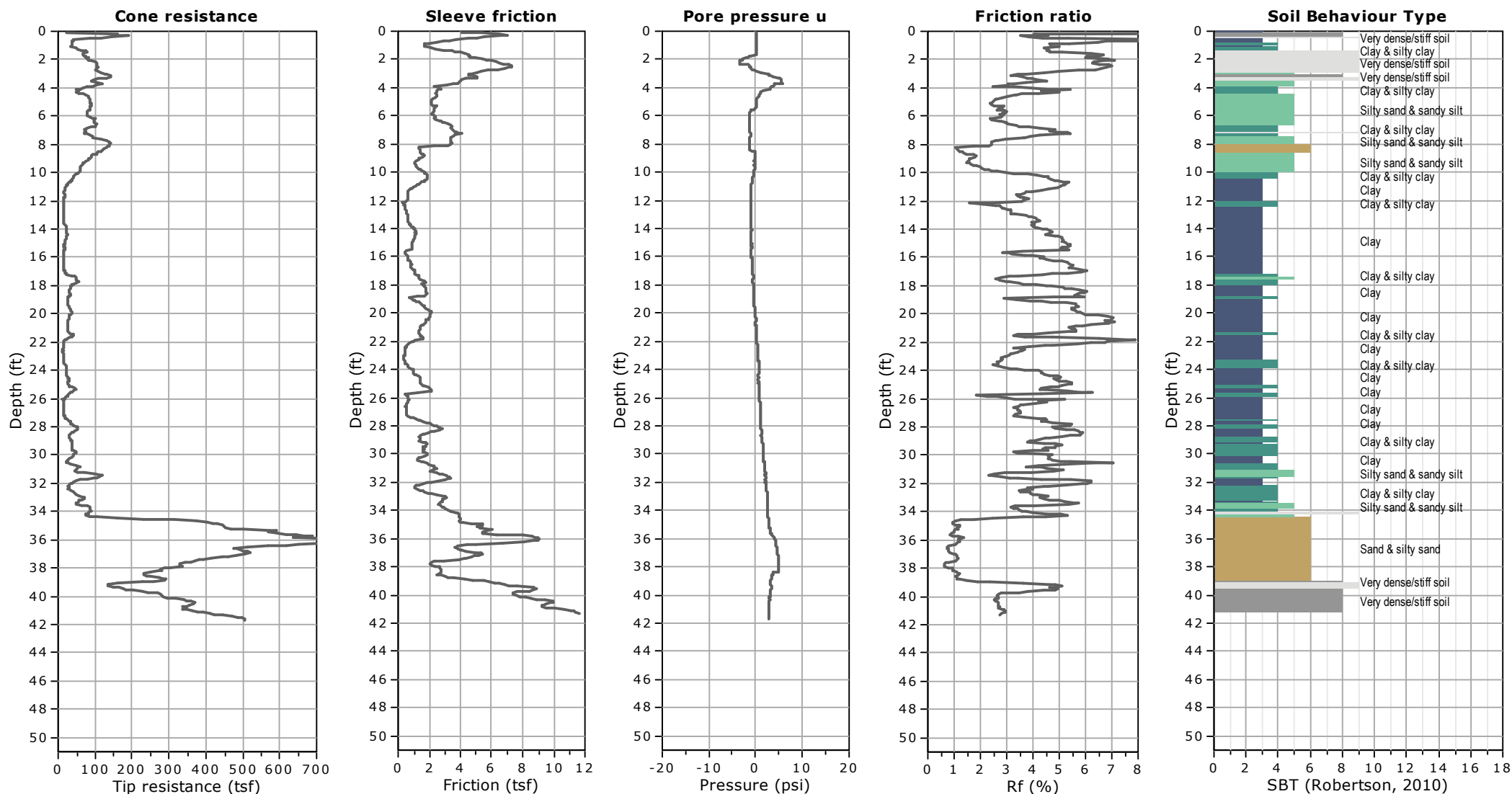


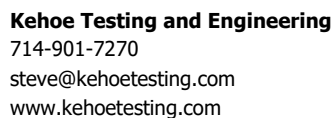


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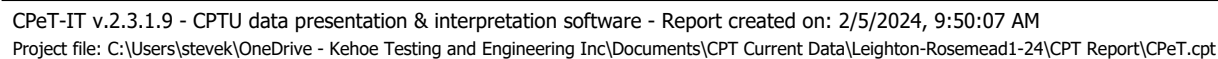
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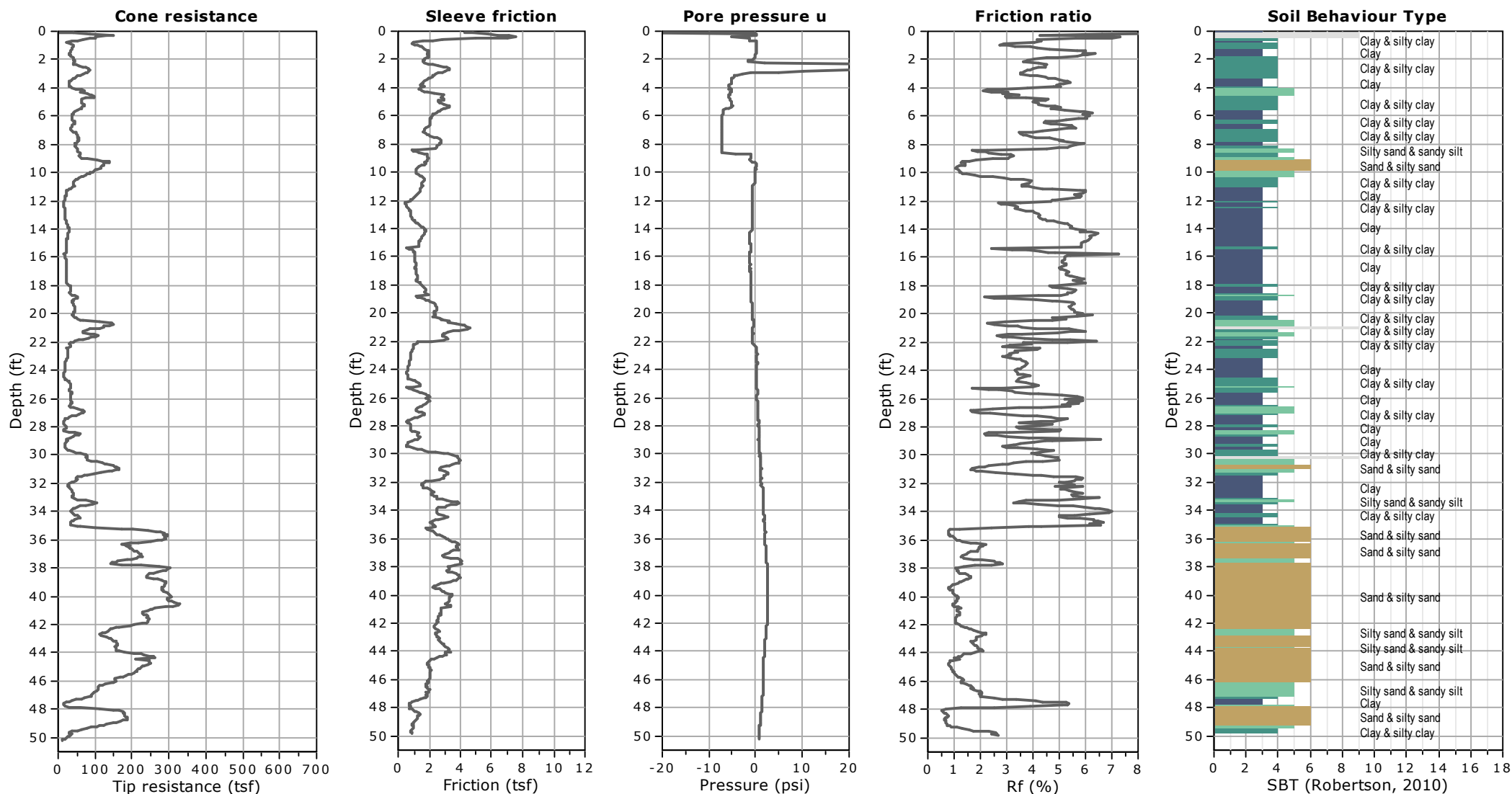


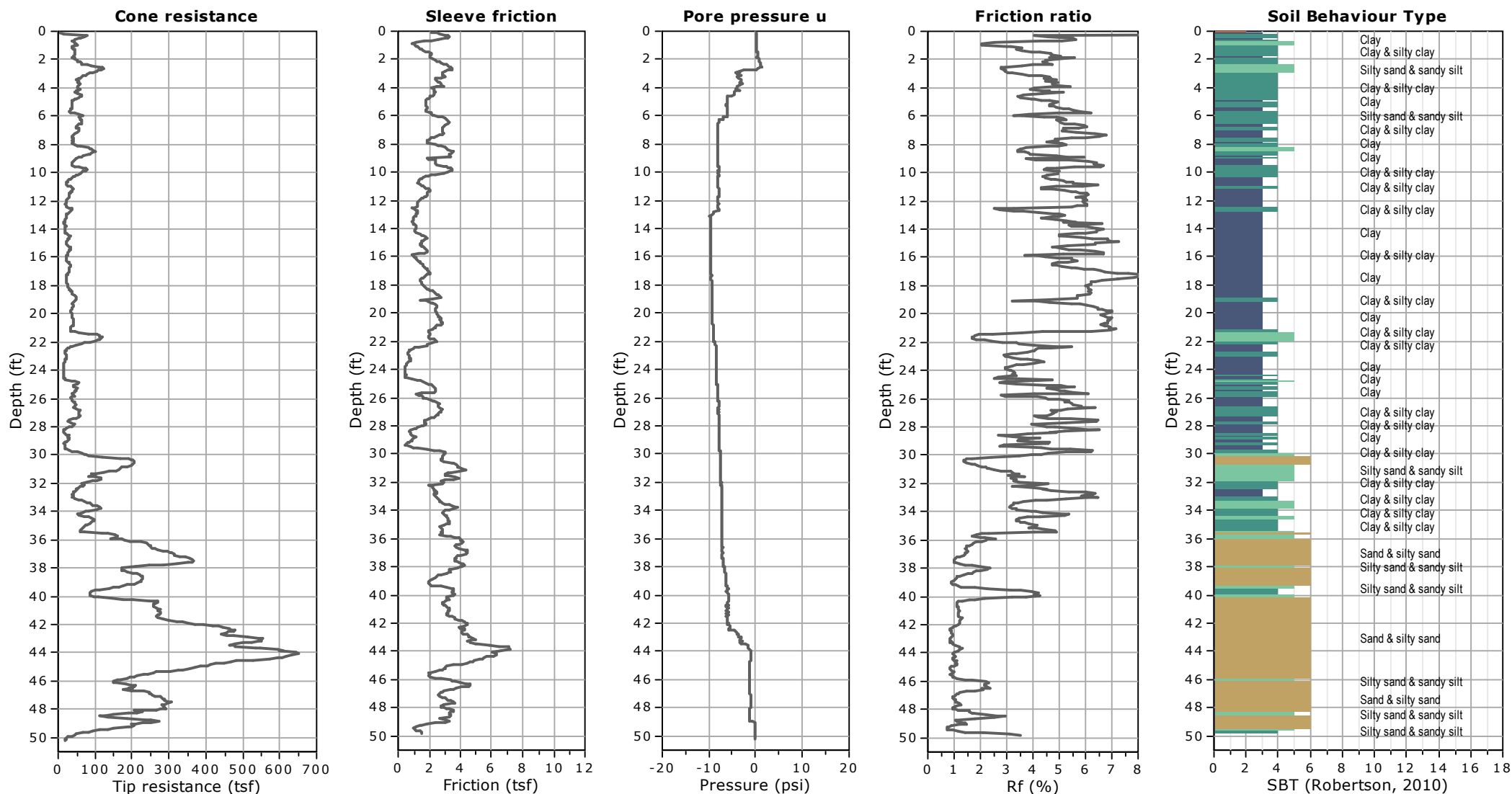


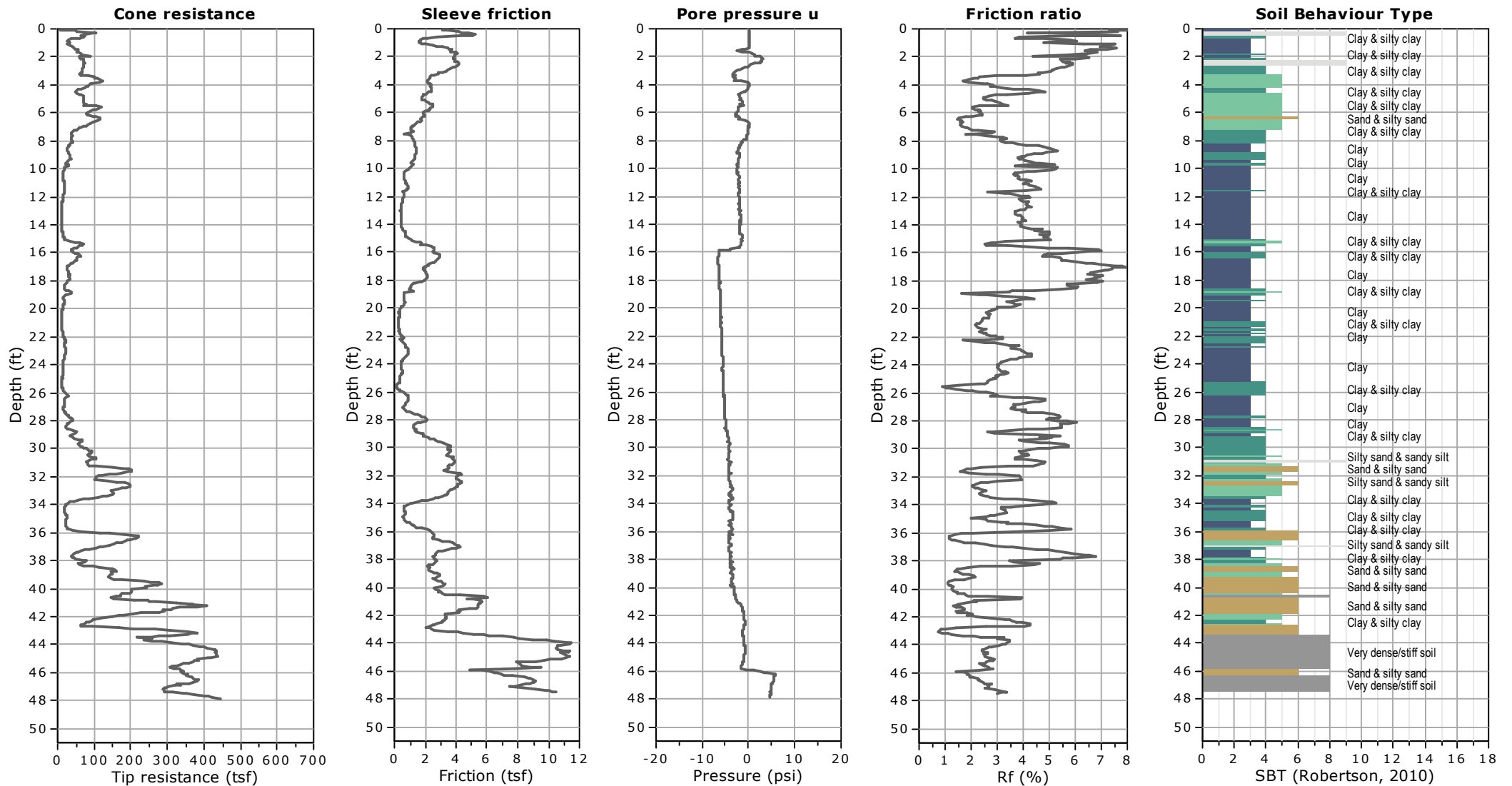


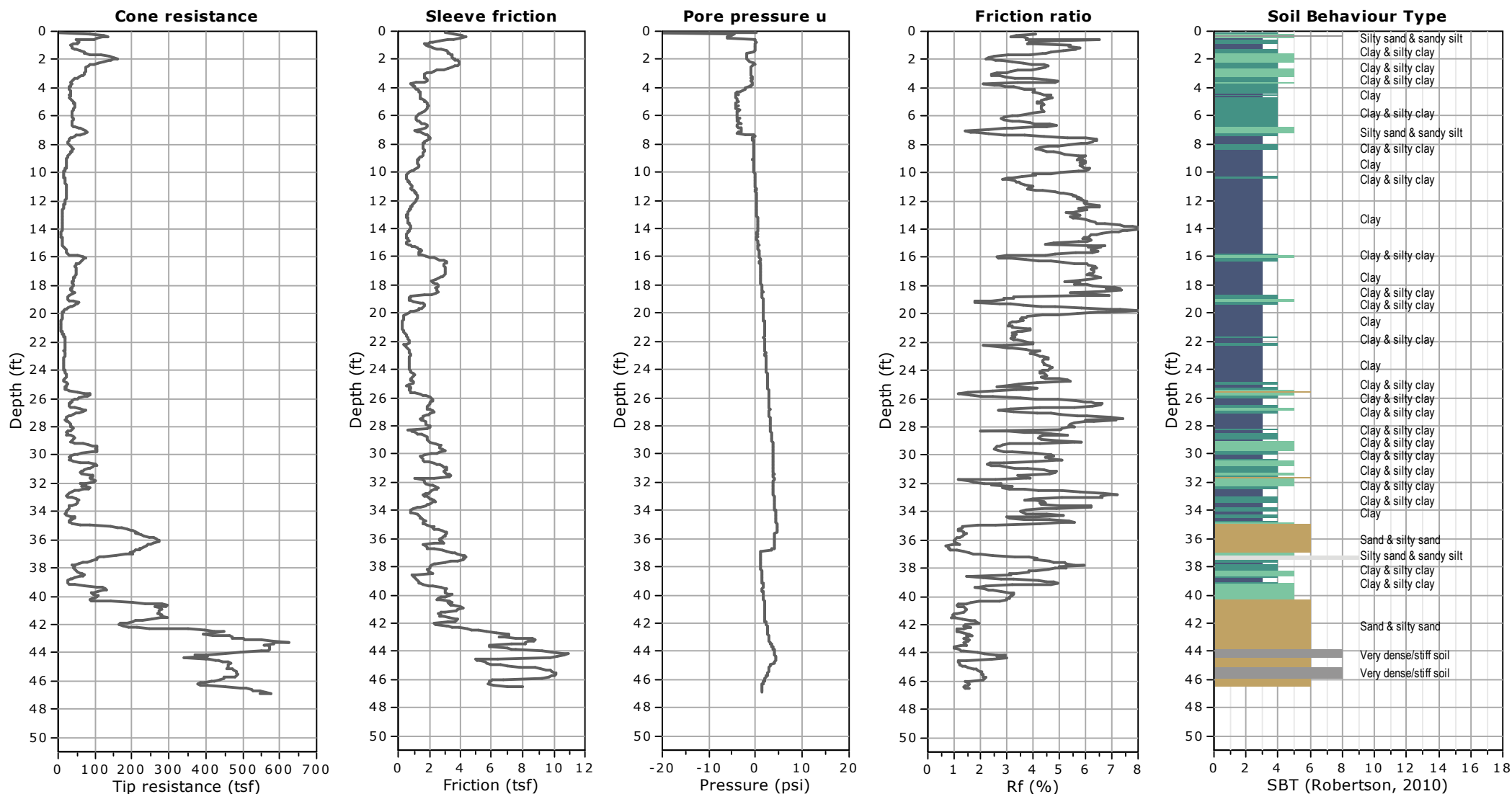
CPT-21
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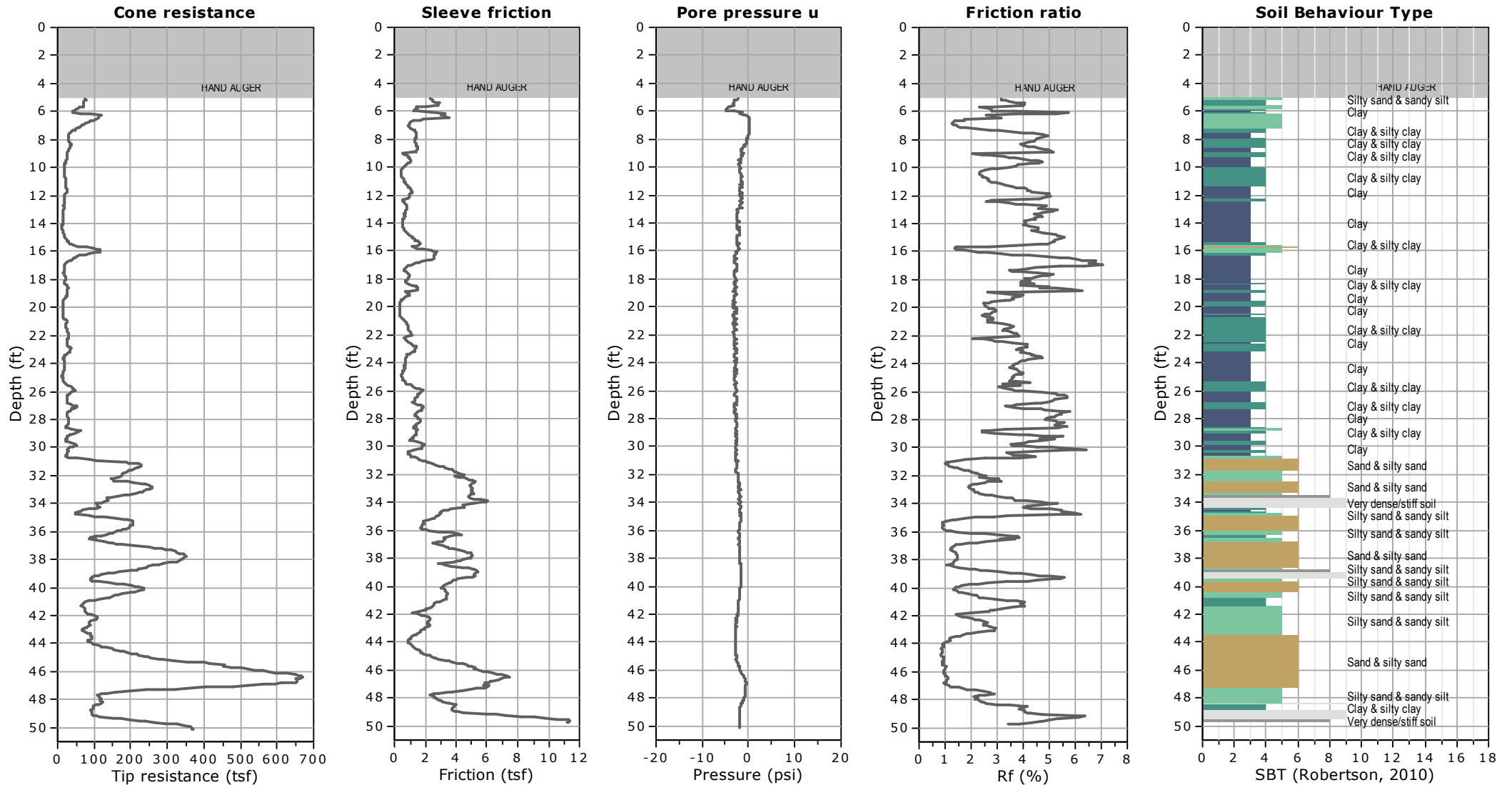


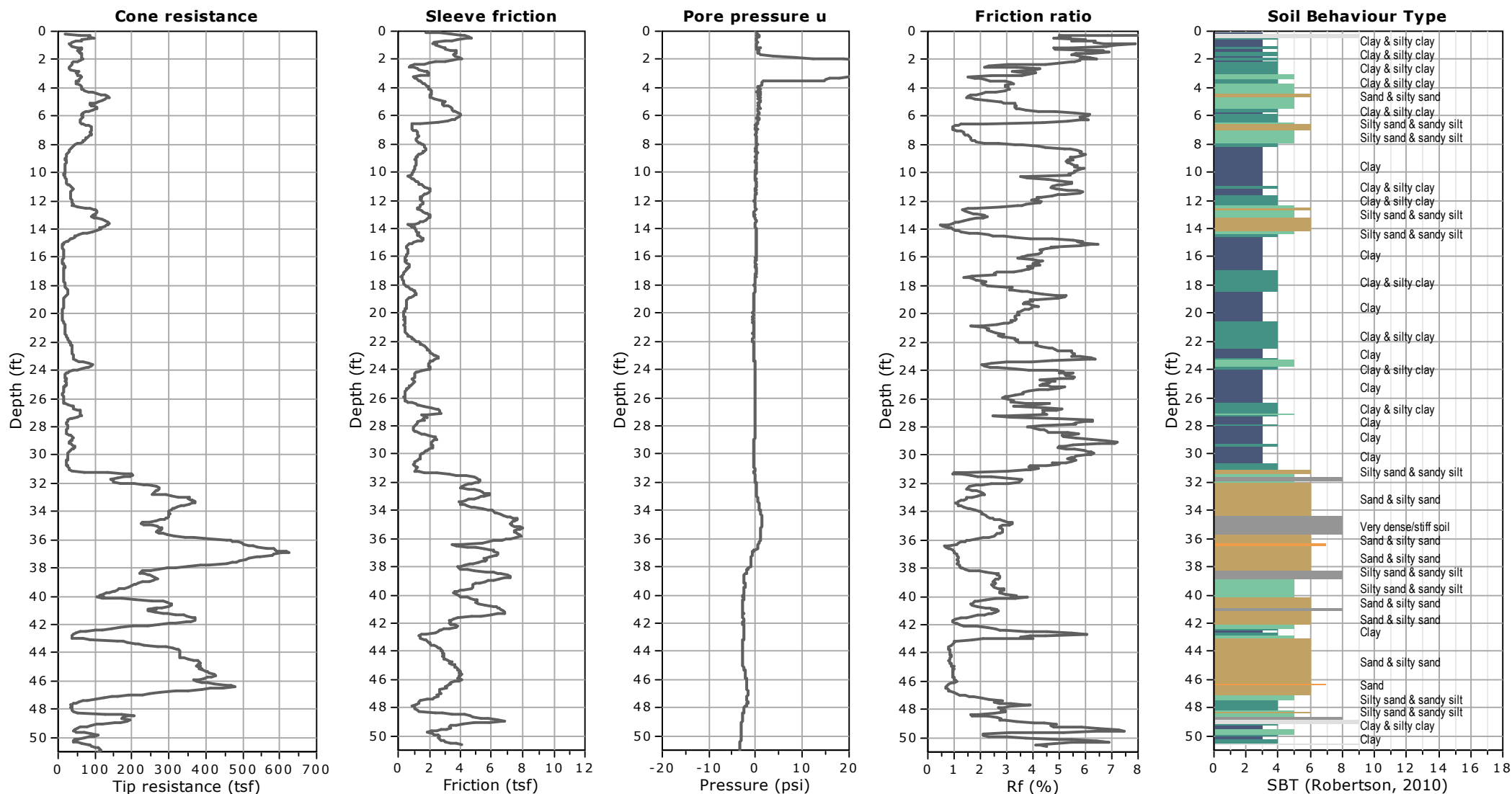


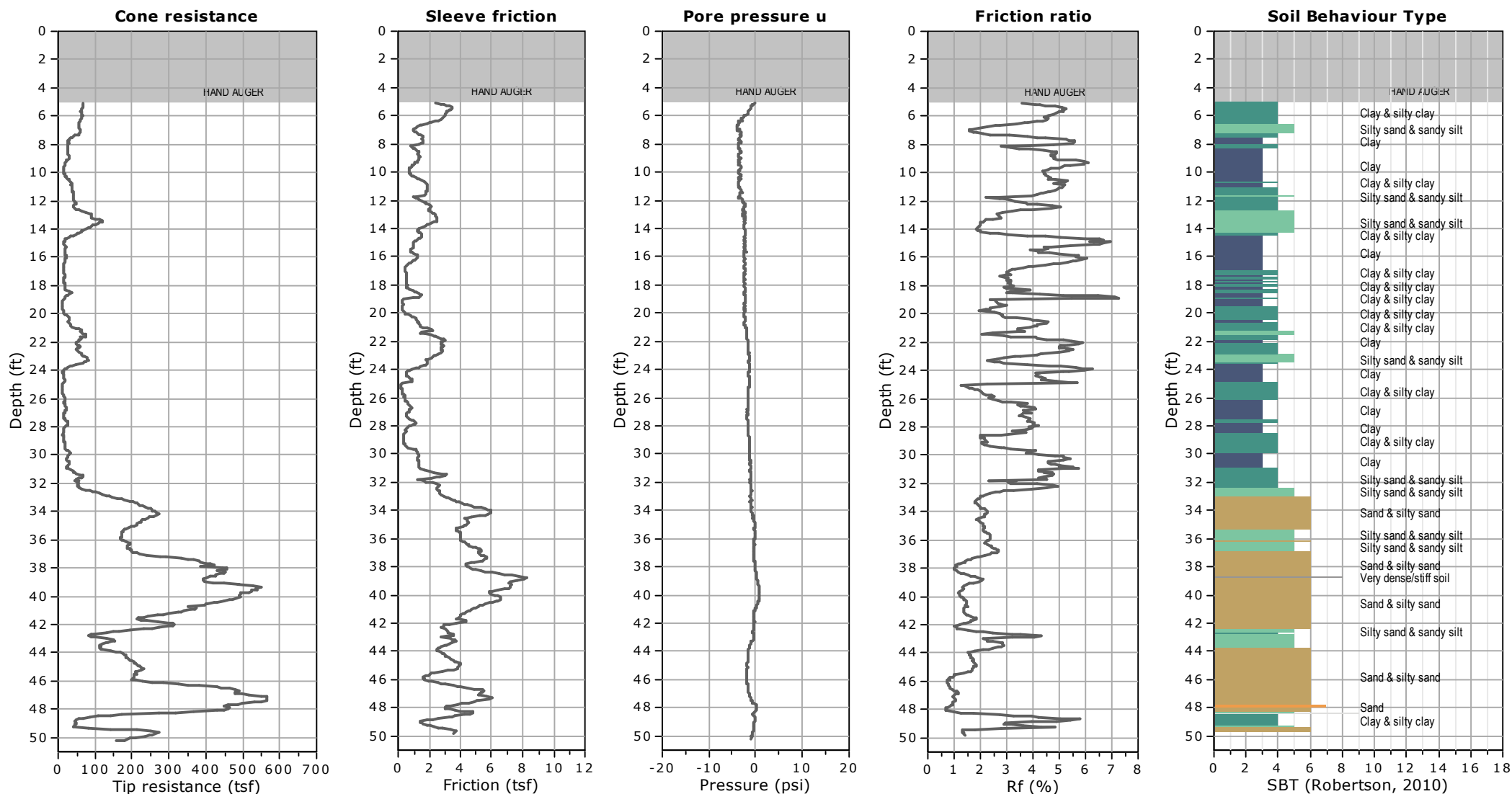


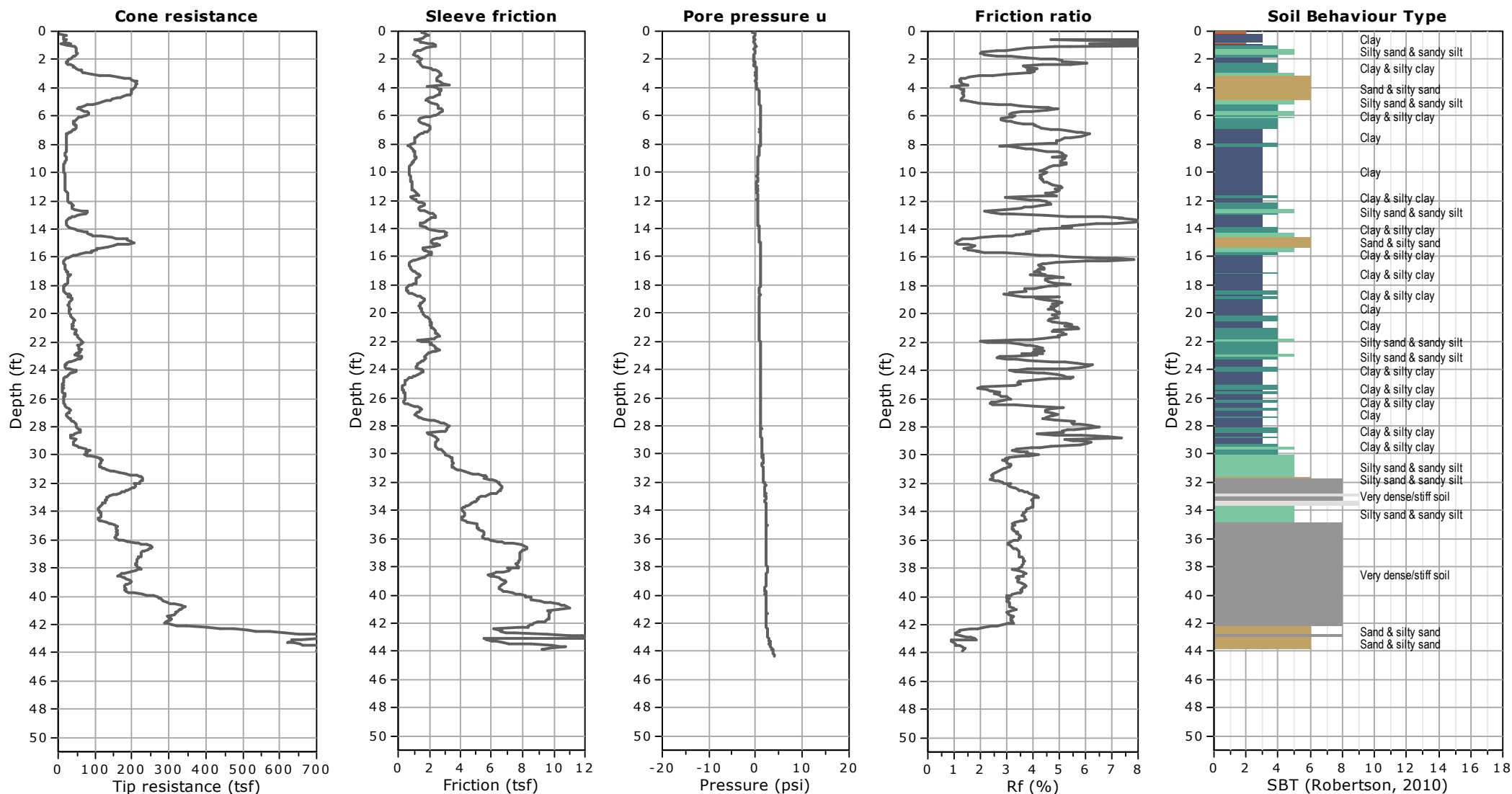










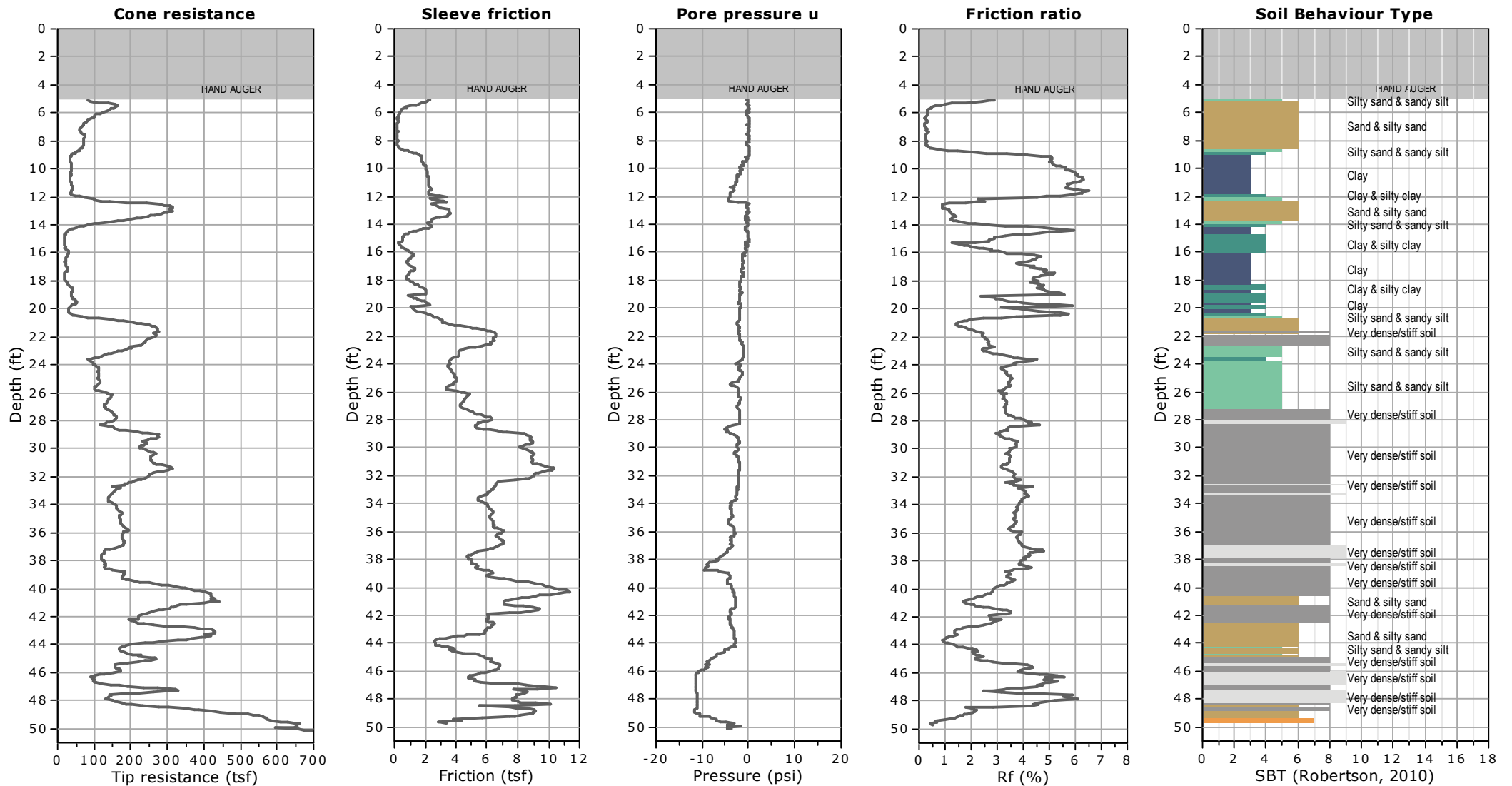


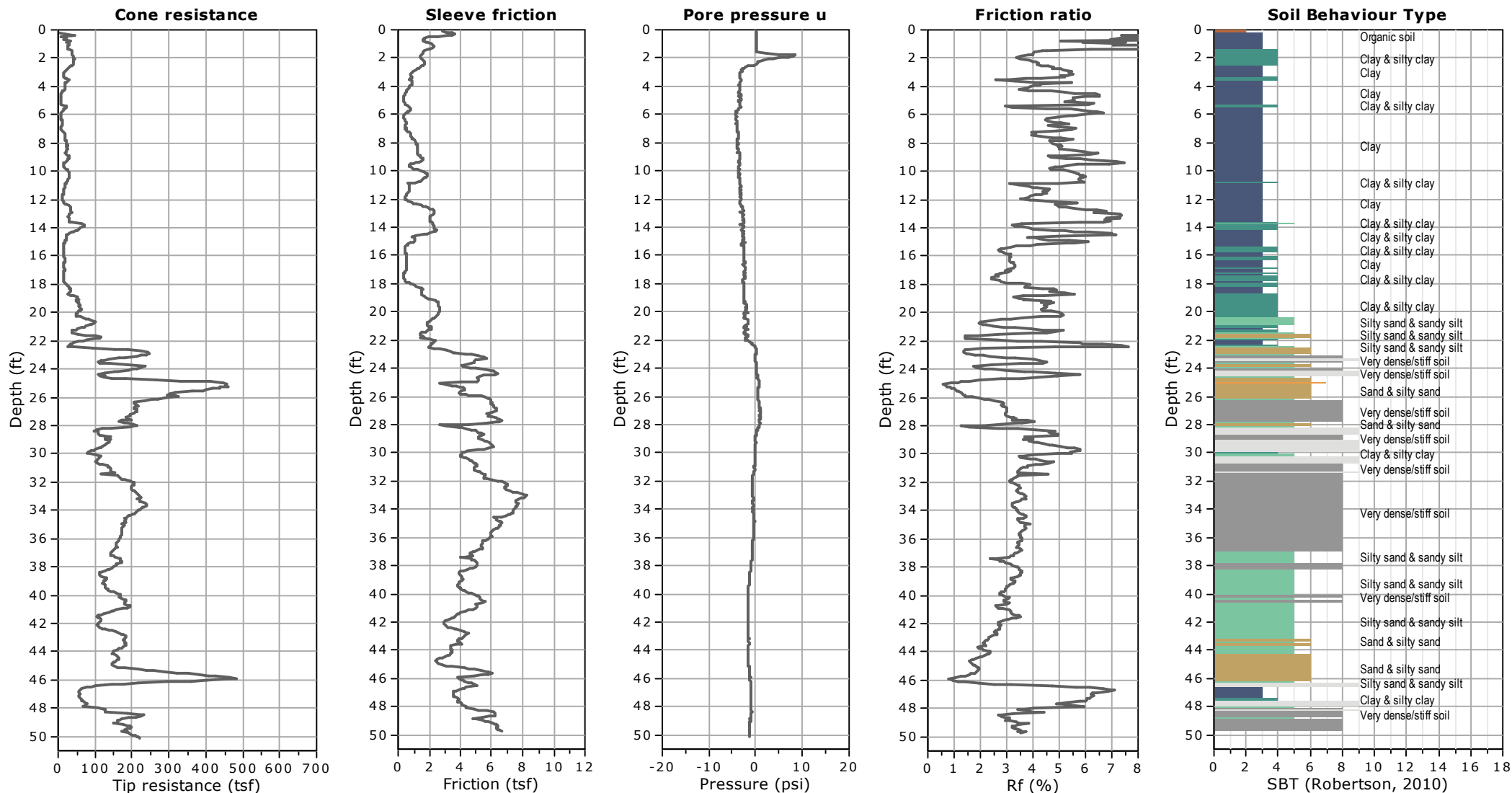


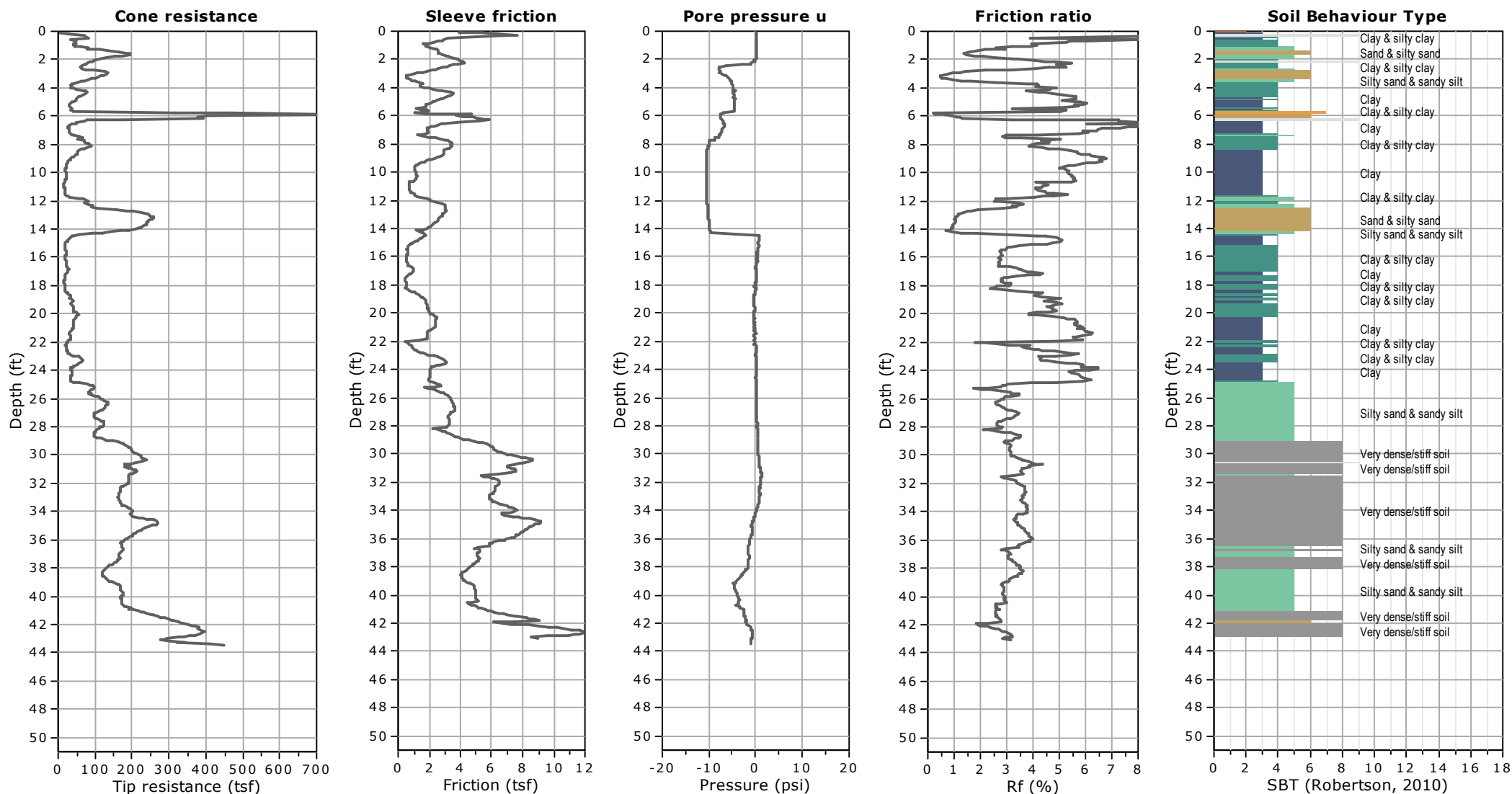
Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-30

Total depth: 50.14 ft, Date: 2/2/2024





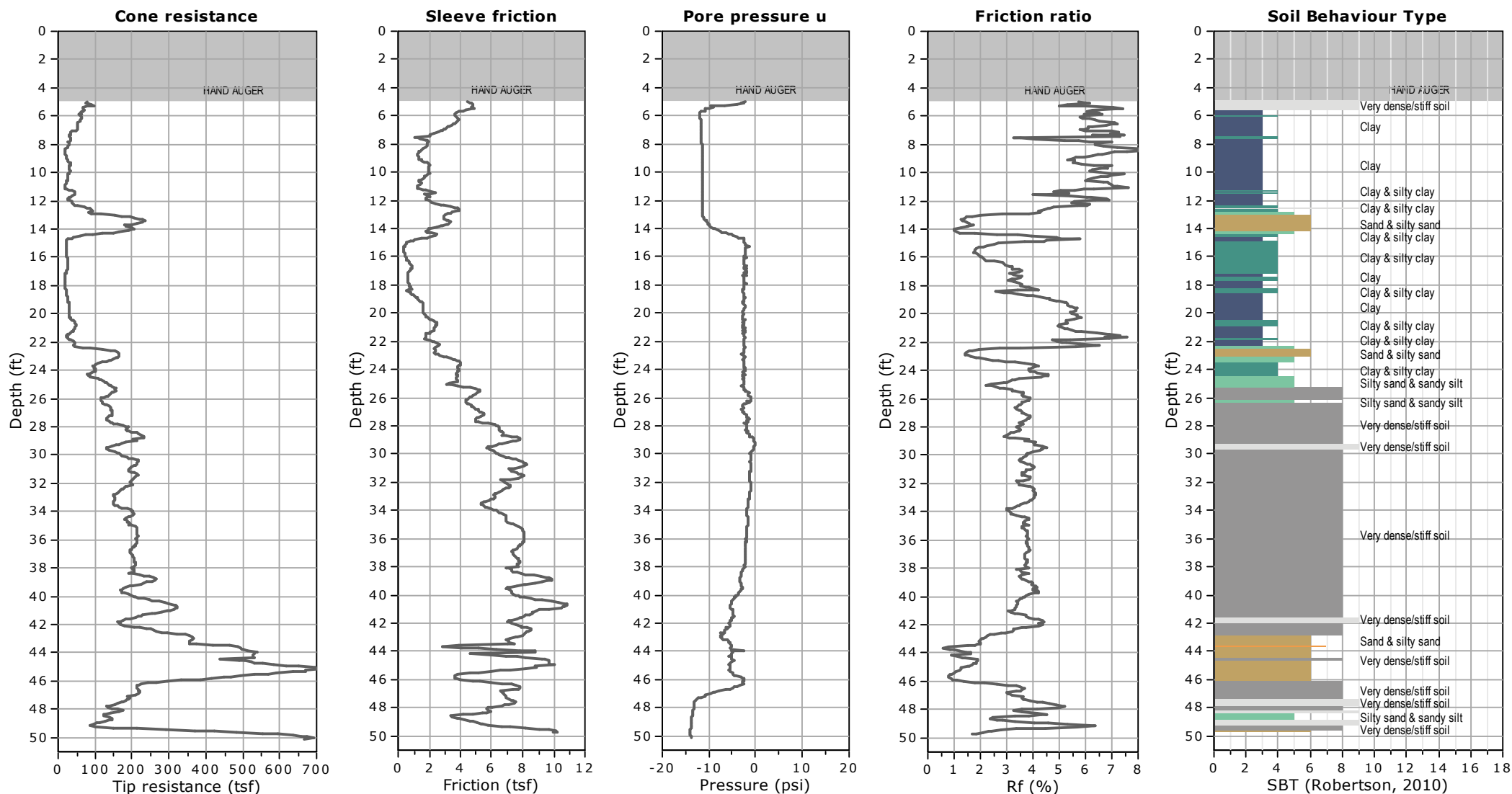


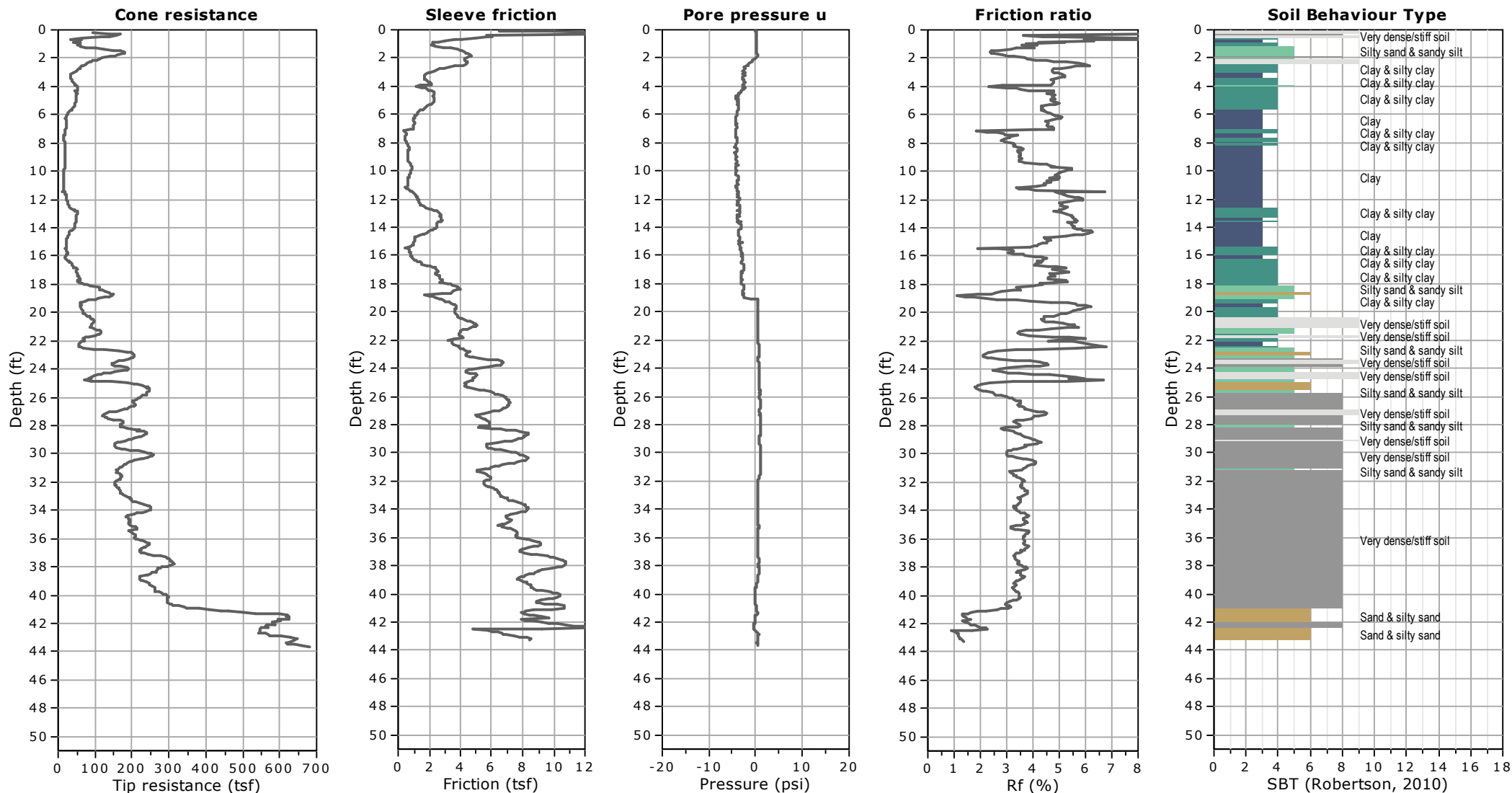


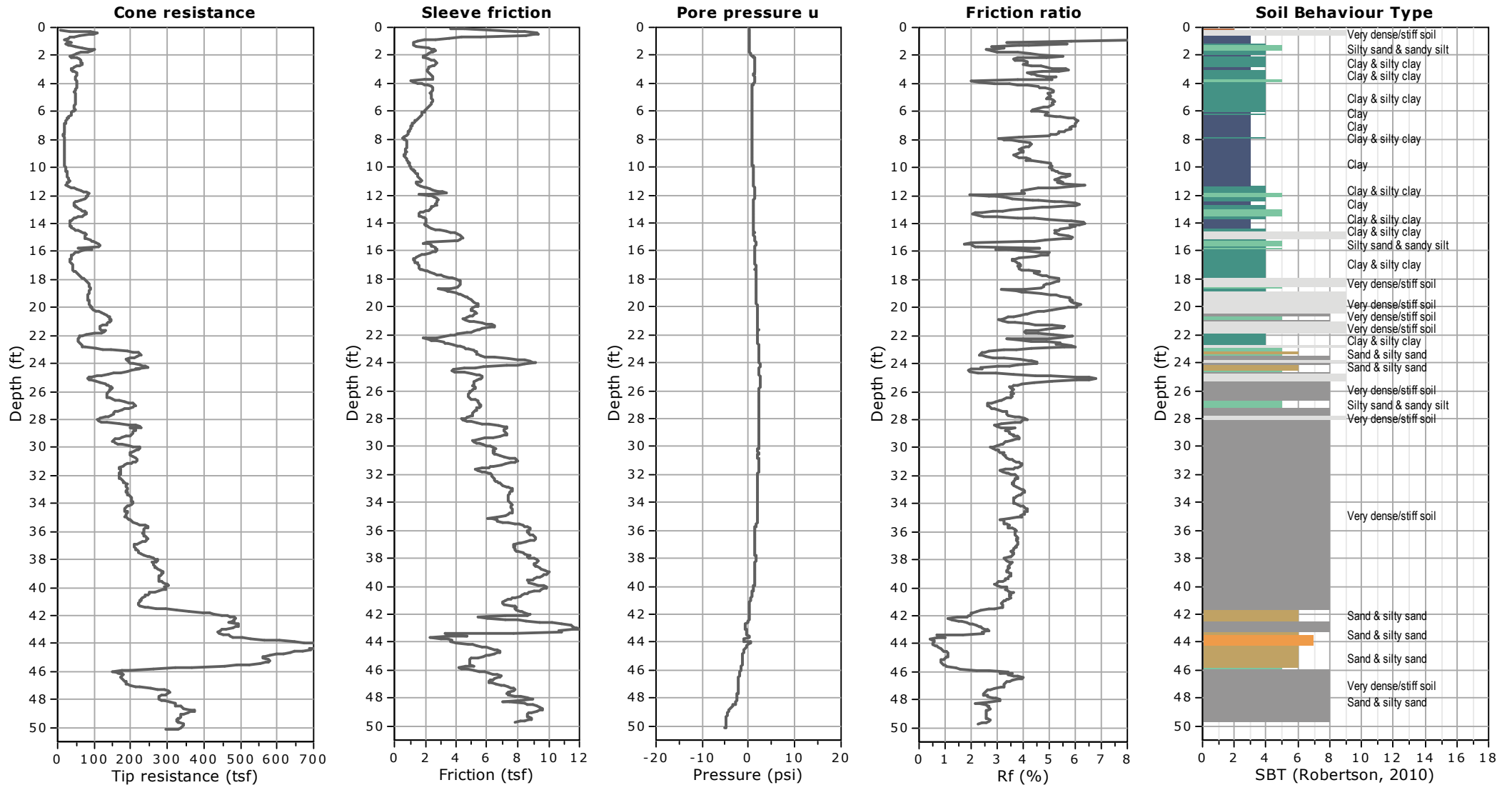
Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

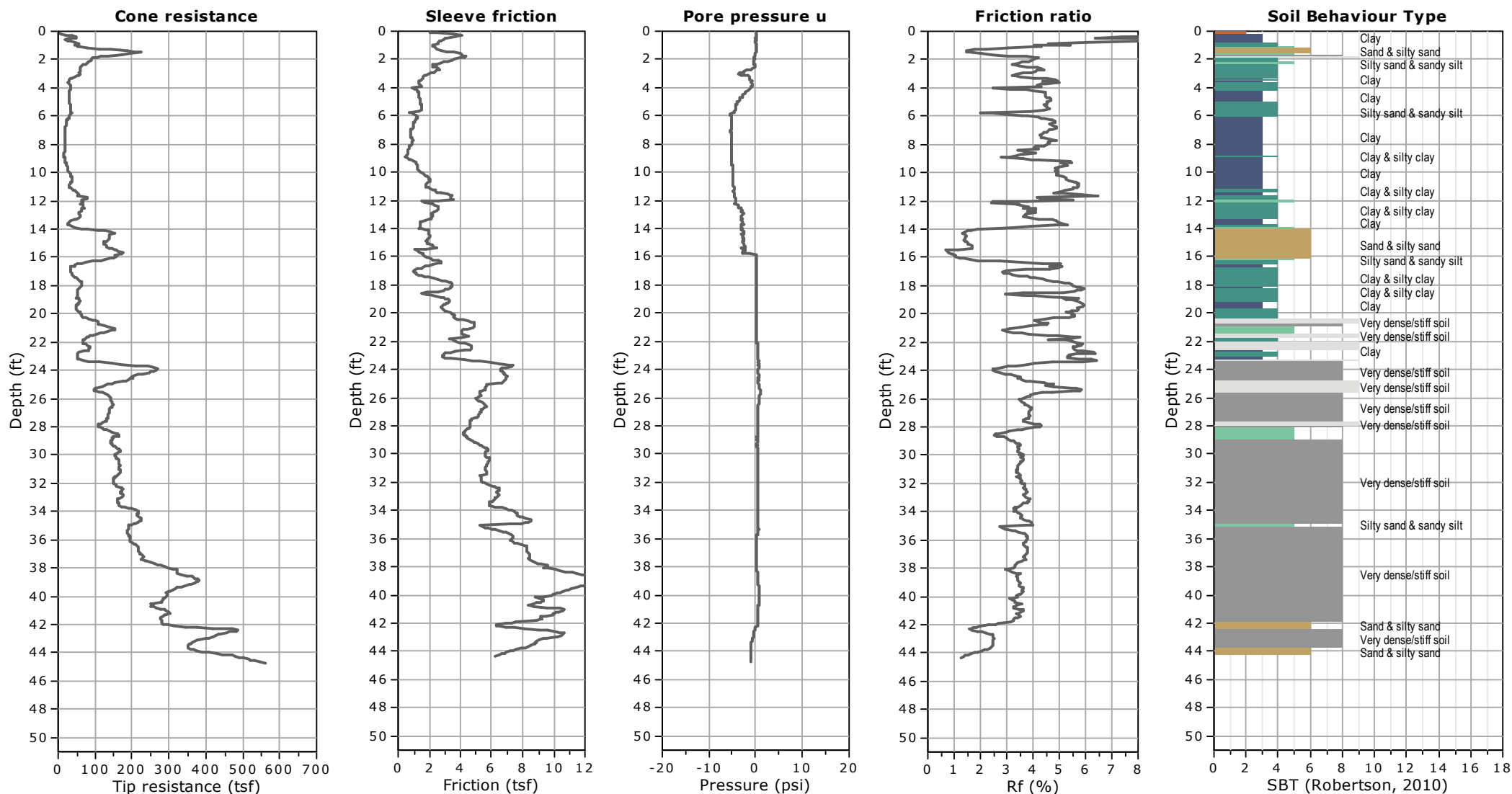
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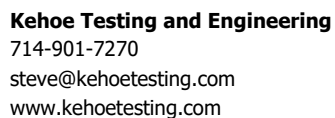
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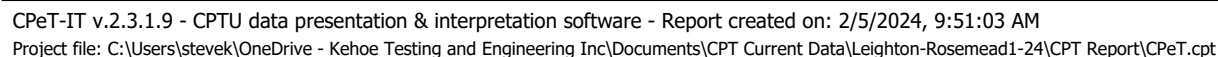


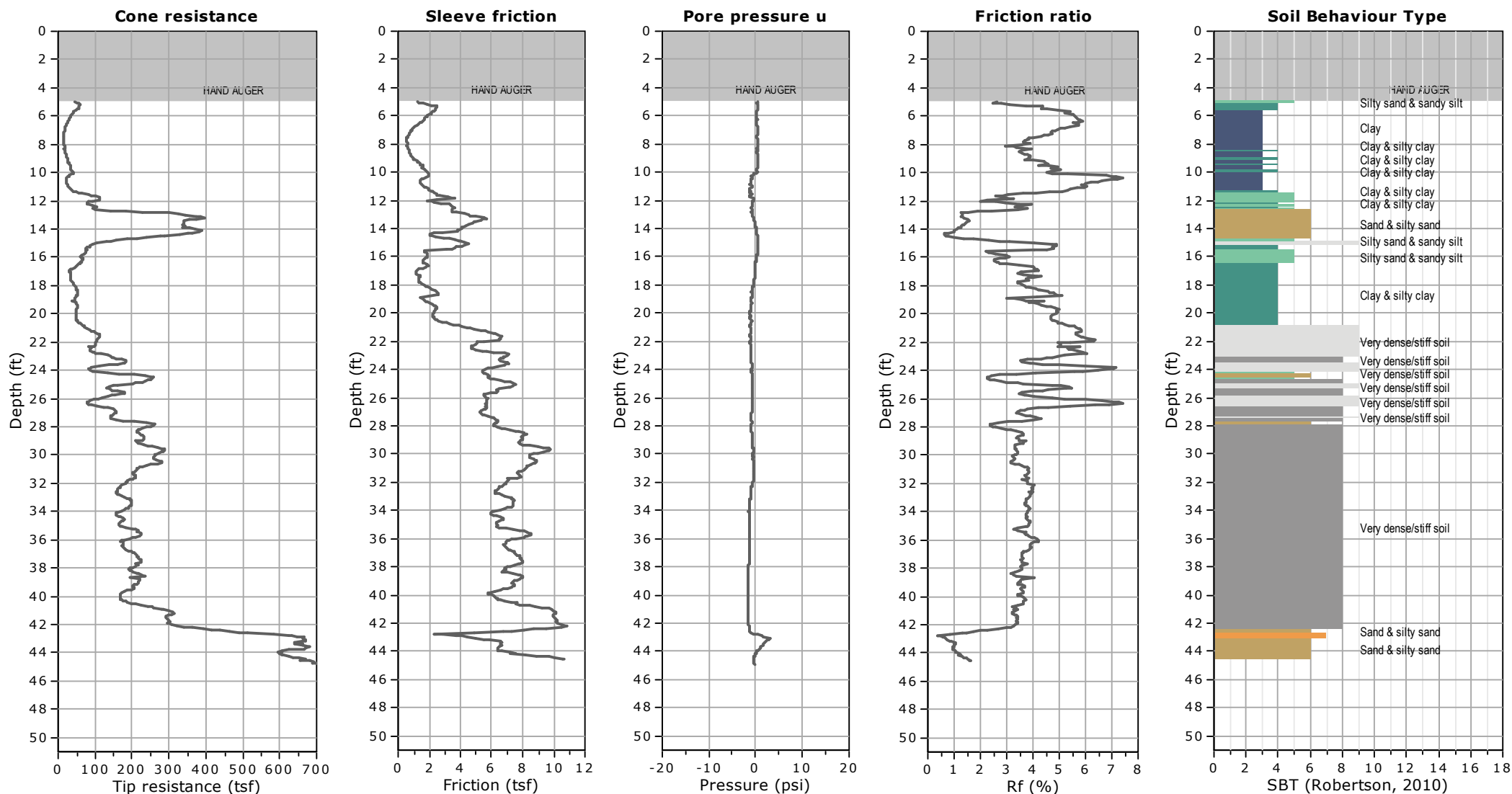


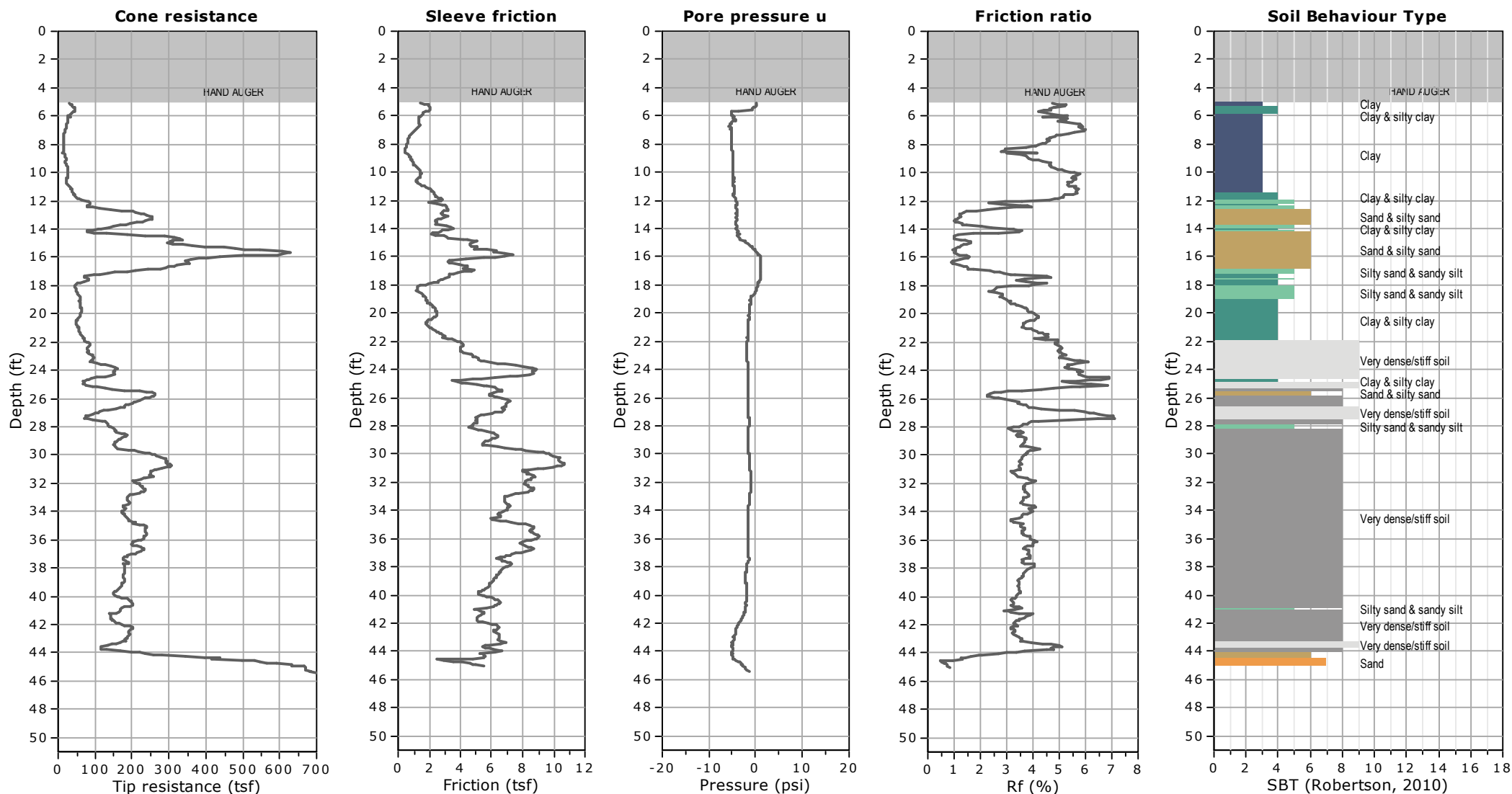


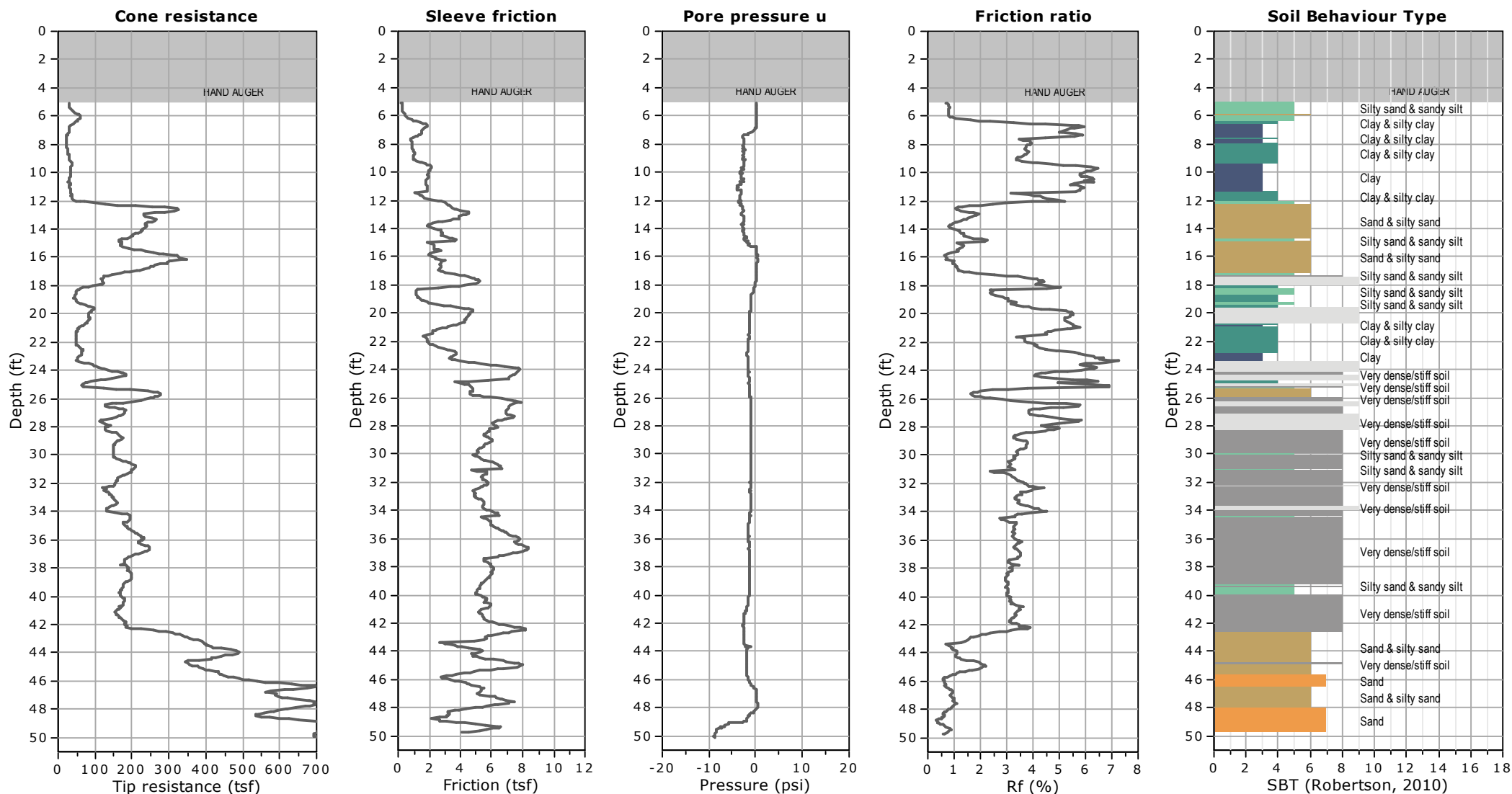
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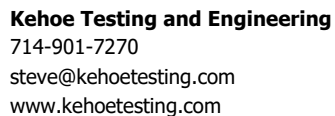
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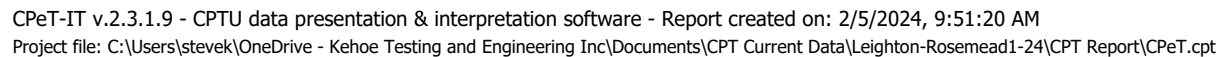






CPT-41

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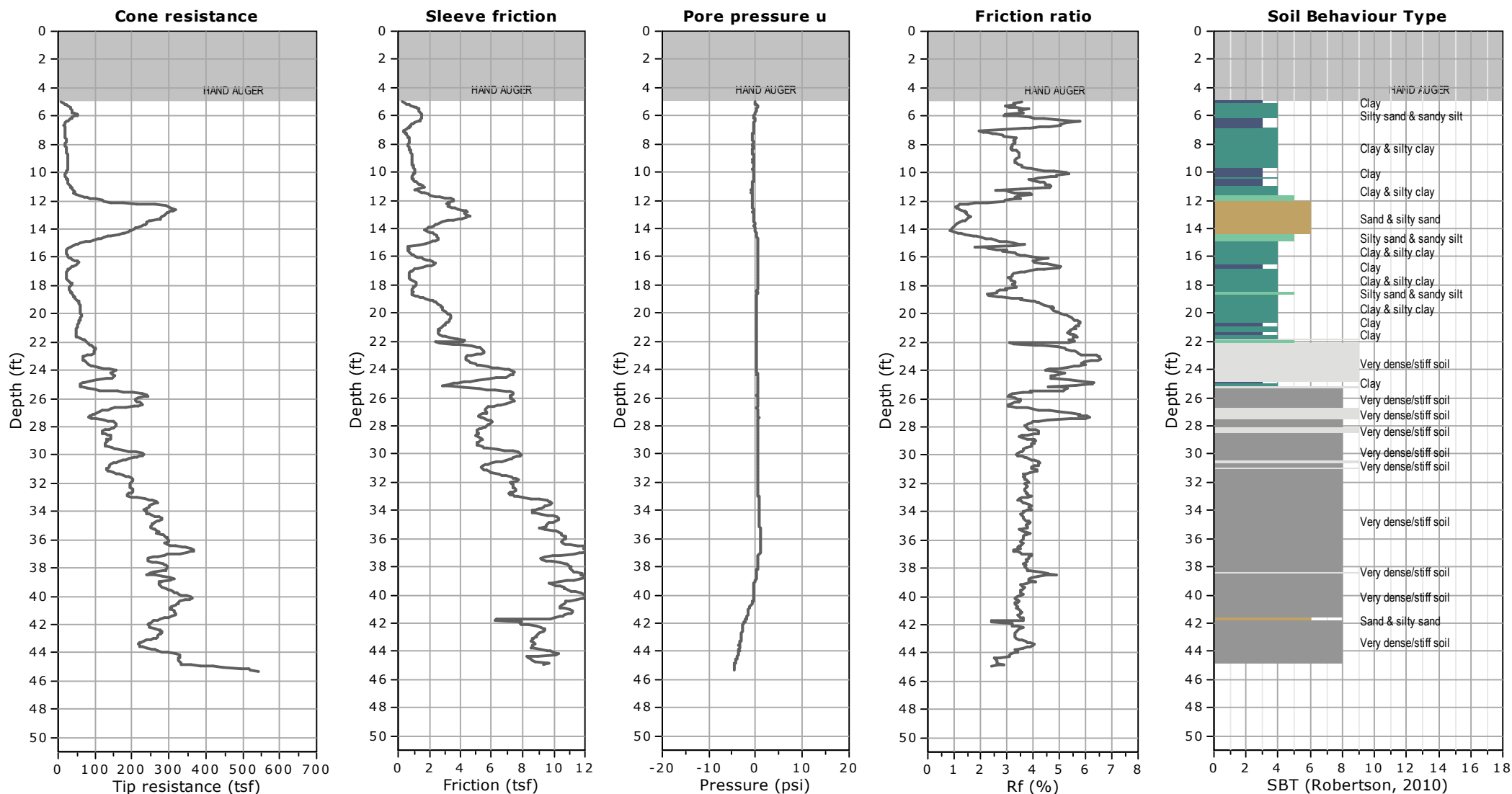


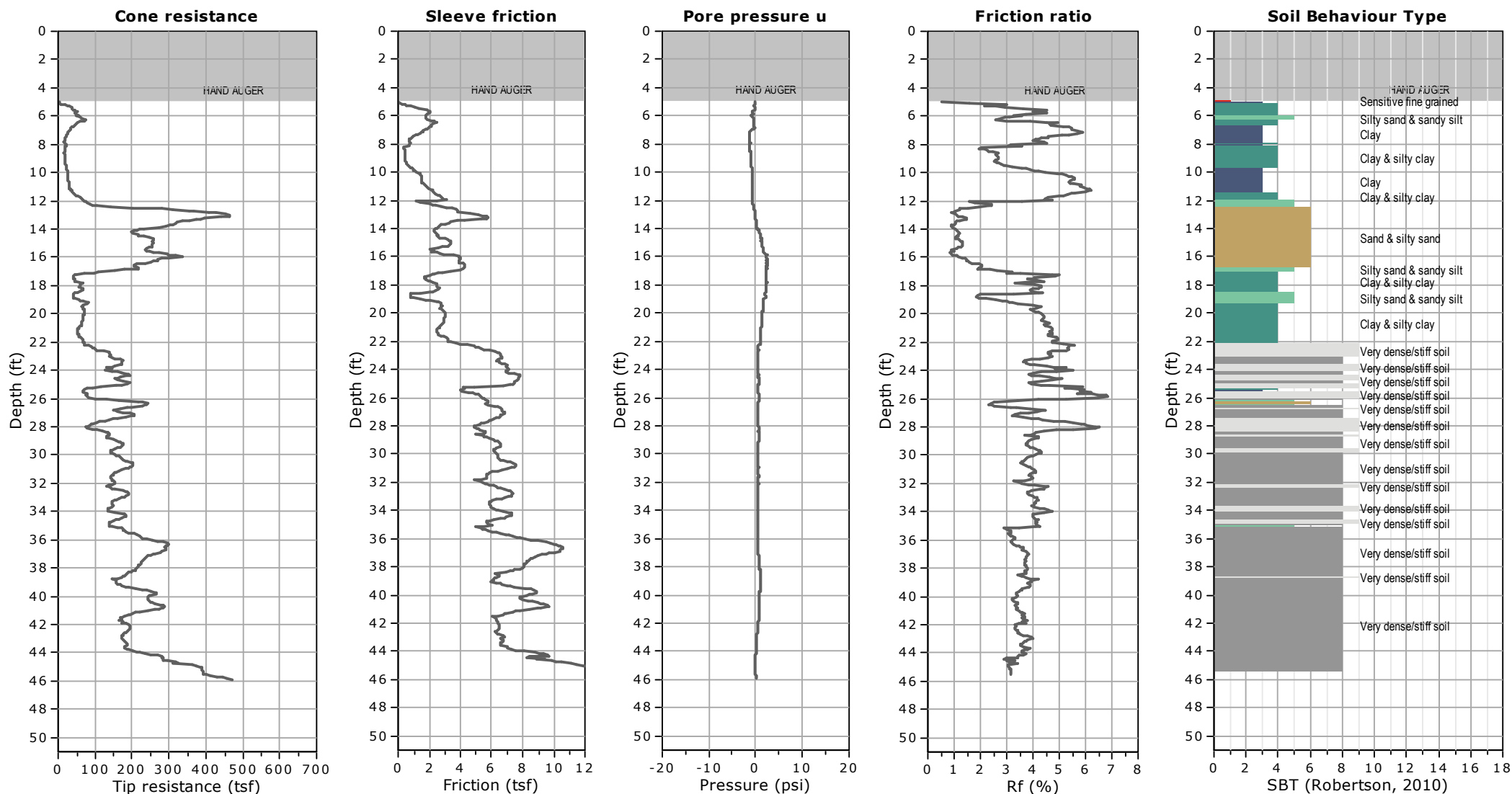


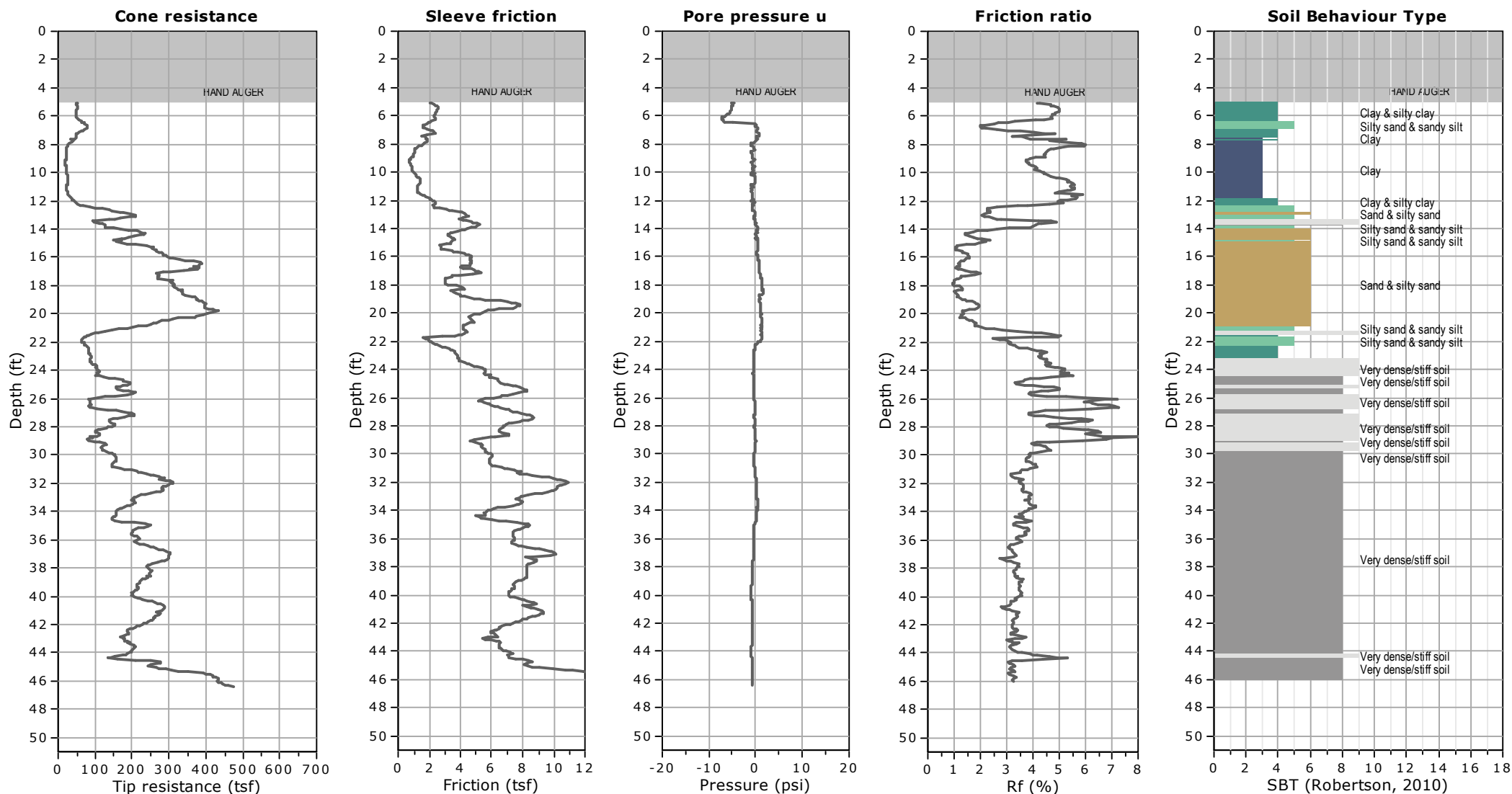
Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-42

Total depth: 45.28 ft, Date: 2/2/2024





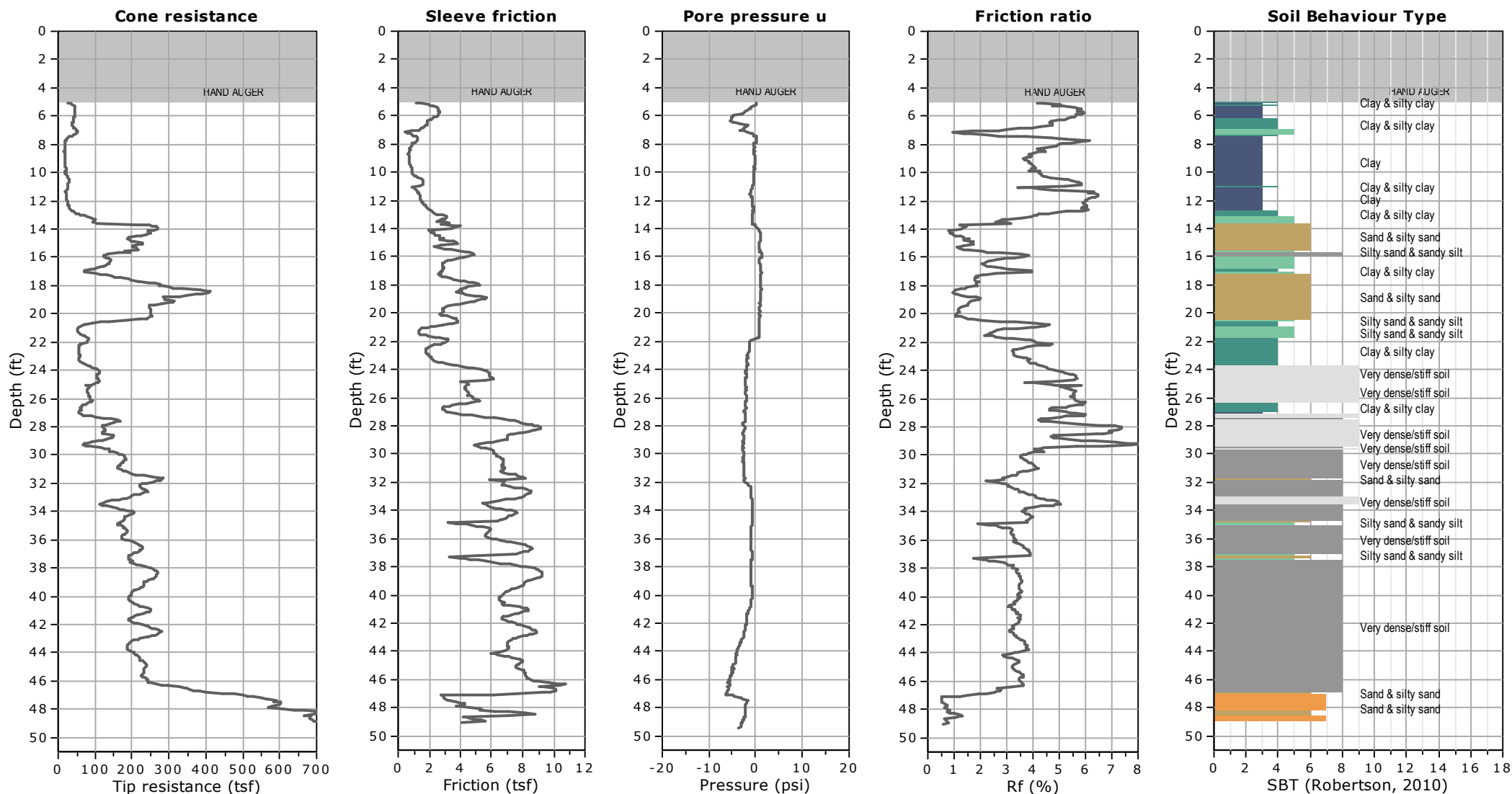


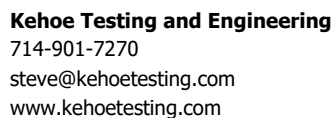


Project: Leighton Consulting / Lewis Rosemead Fault Investigation
Location: 1515 Walnut Grove Ave, Rosemead, CA

CPT-45

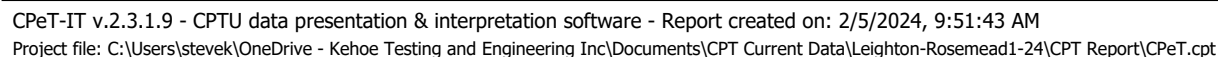
Total depth: 49.41 ft, Date: 2/2/2024

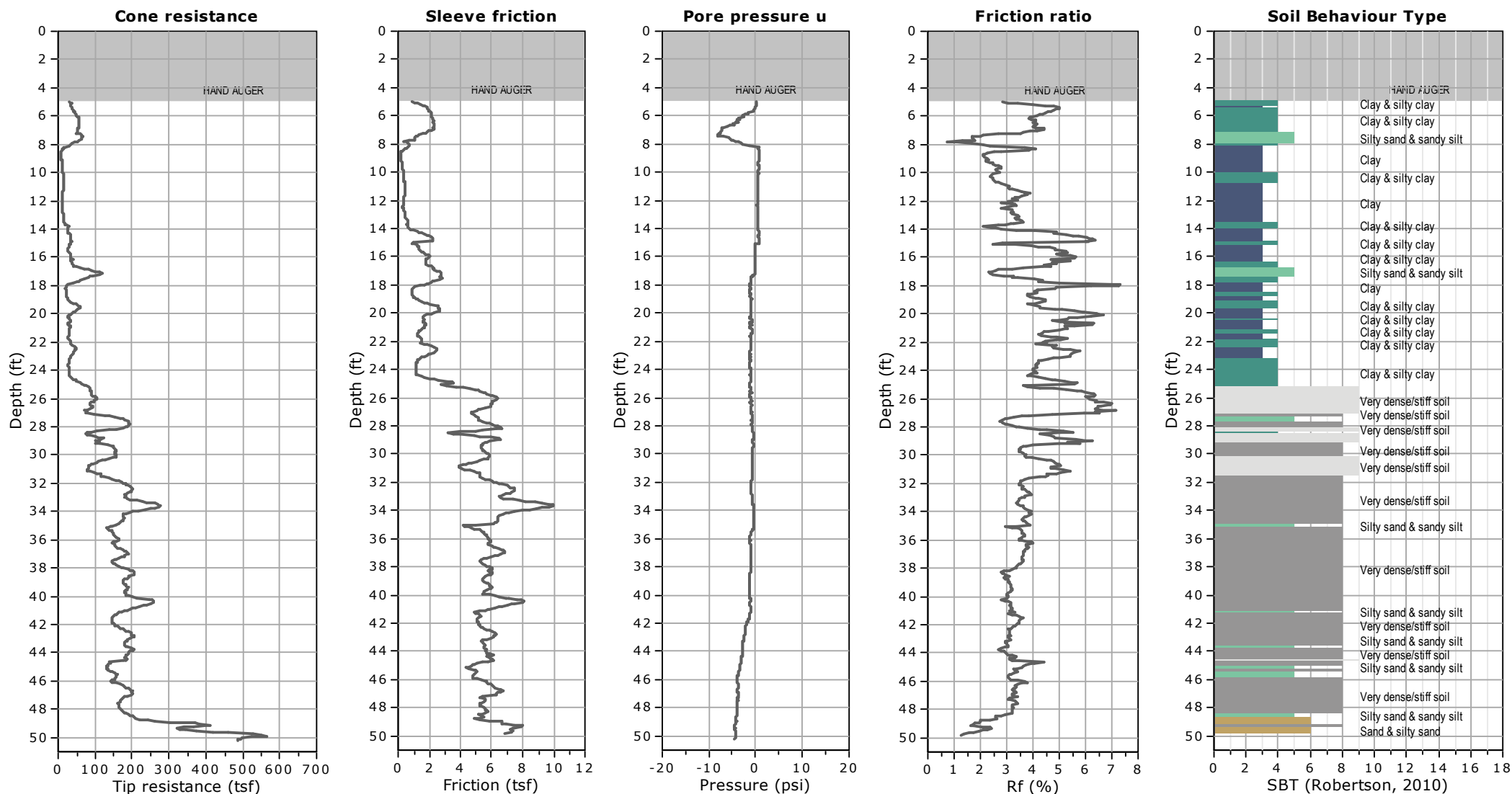


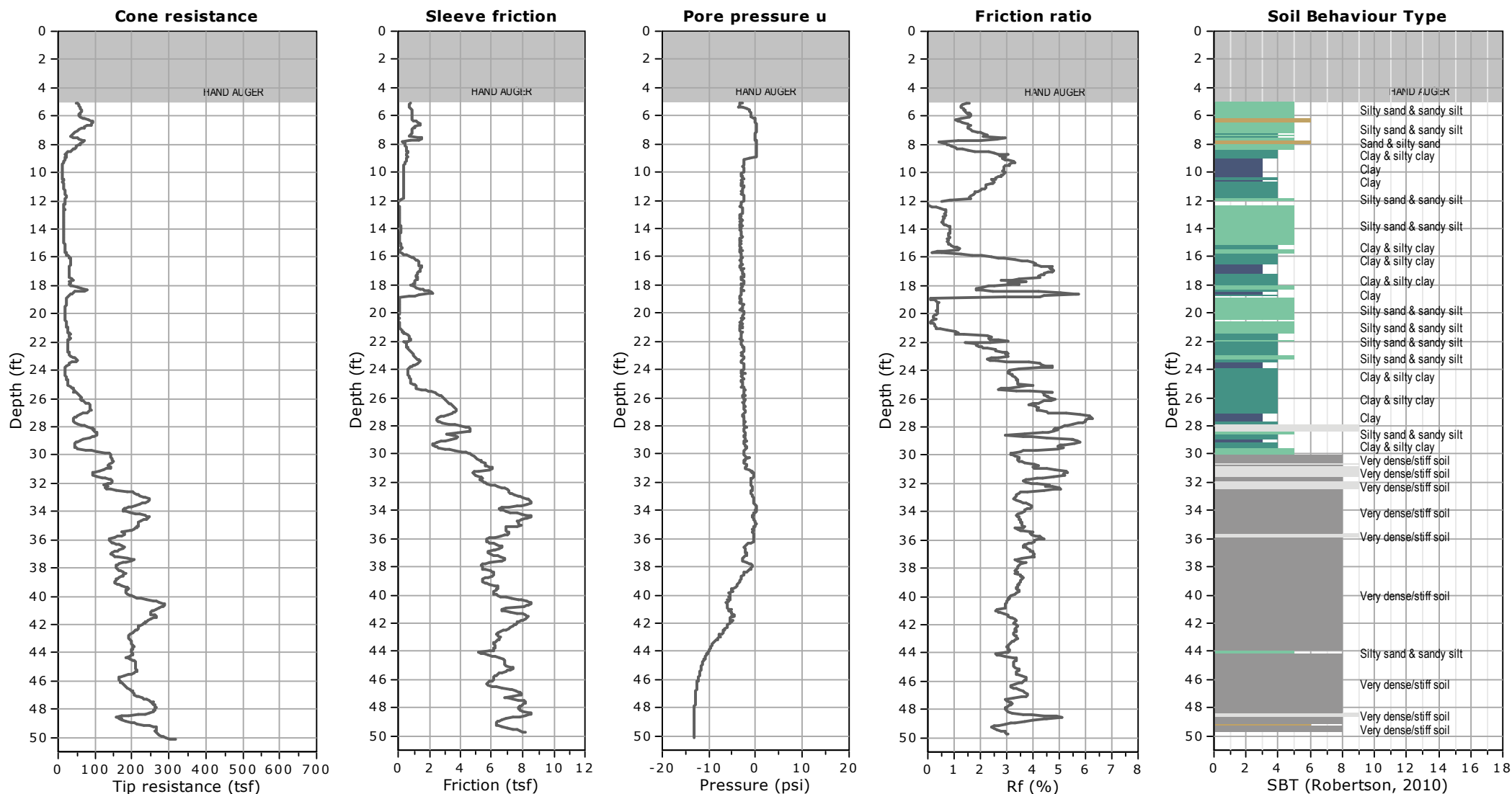


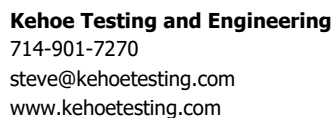
CPT-46

Total depth: 50.14 ft, Date: 2/2/2024

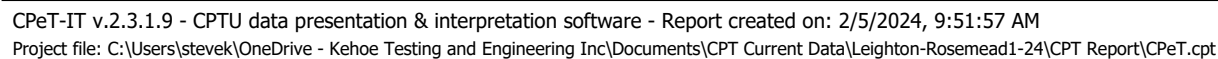


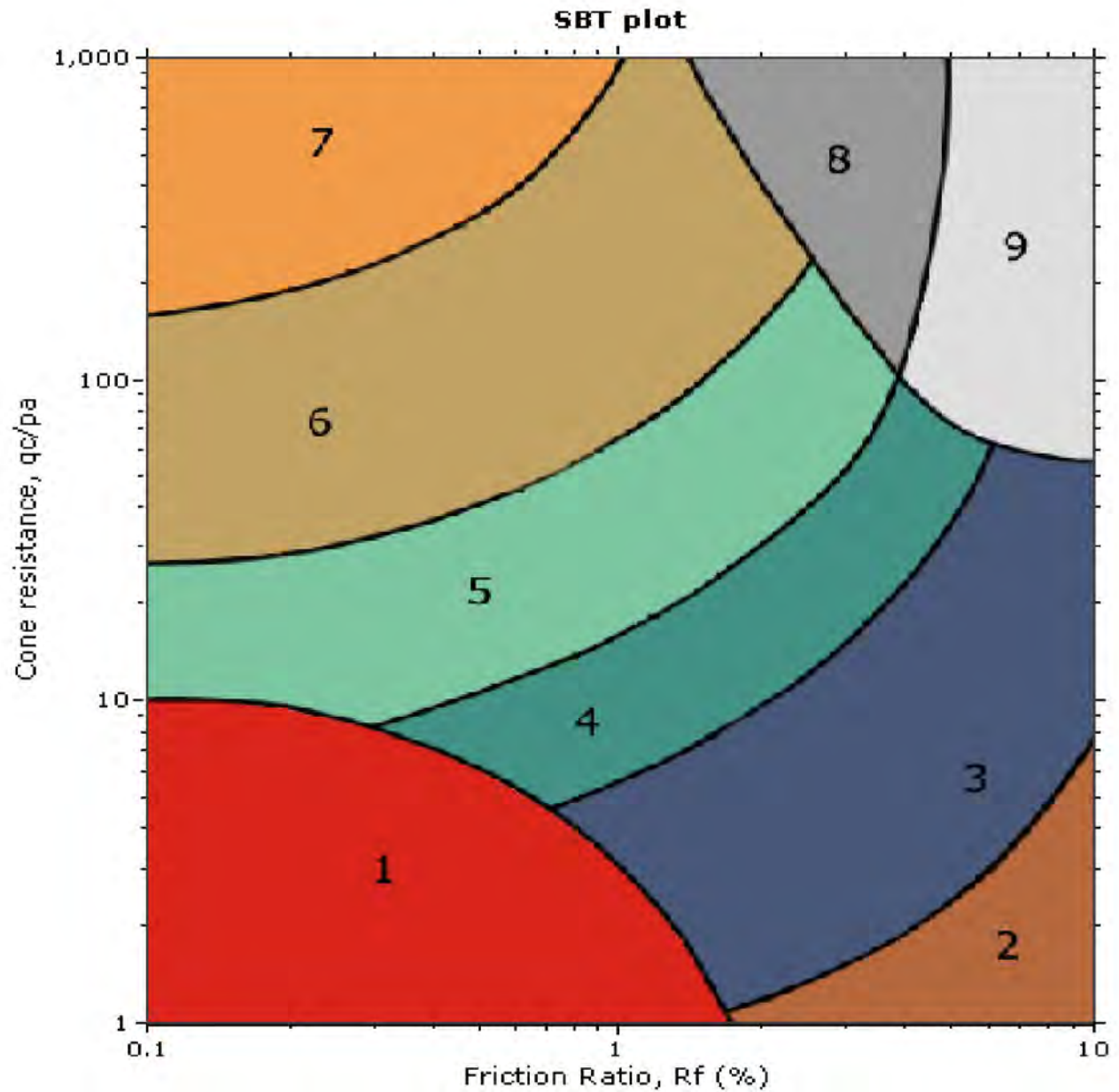






CPT-49
Total depth: 44.49 ft, Date: 2/2/2024





SBT legend

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

Leighton & Associates
 Lewis Rosemead Fault Investigation
 Rosemead, CA

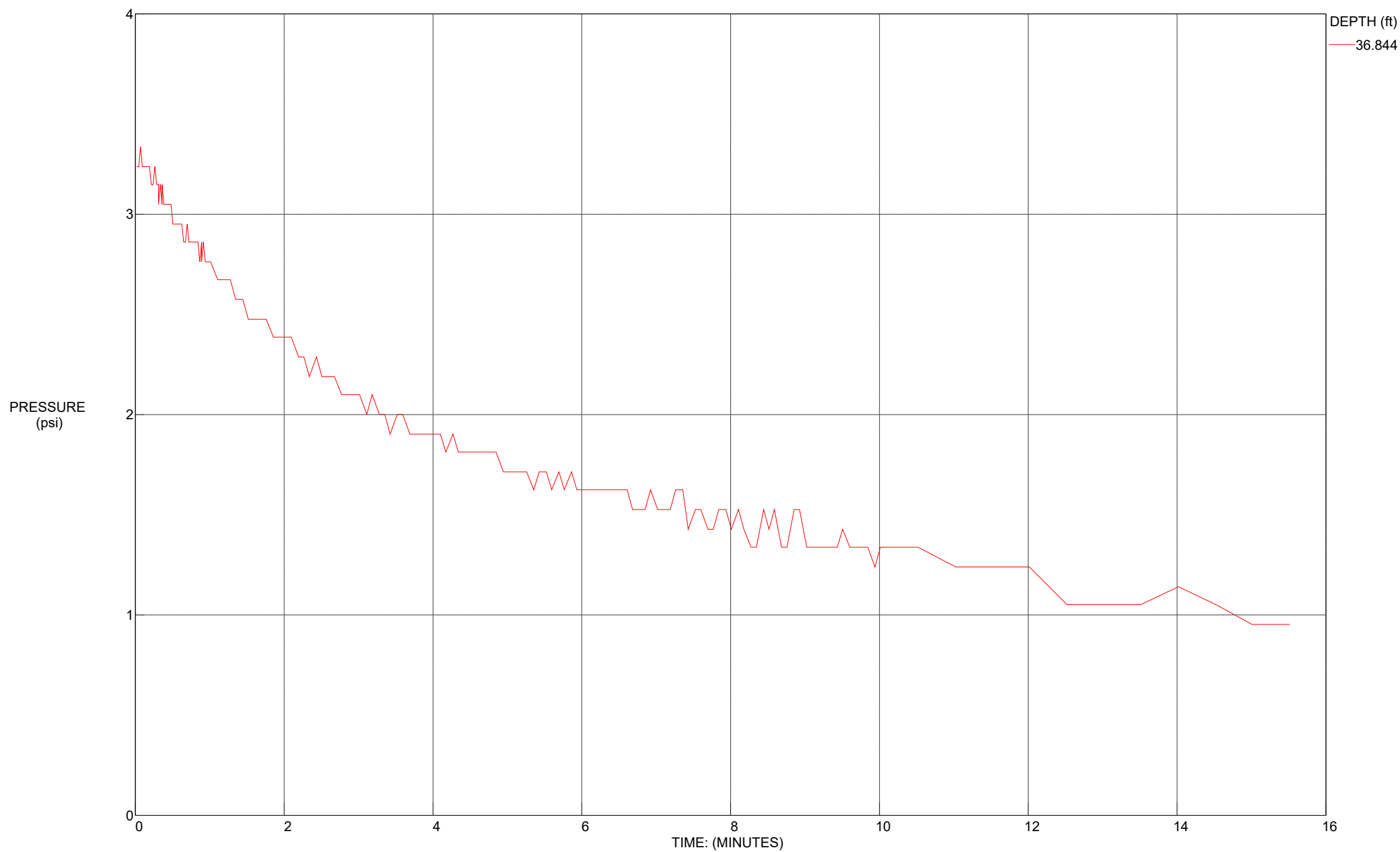
CPT Shear Wave Measurements

Location	Tip Depth (ft)	Geophone Depth (ft)	Travel Distance (ft)	S-Wave Arrival (msec)	S-Wave Velocity from Surface (ft/sec)	Interval S-Wave Velocity (ft/sec)
CPT-10	5.02	4.02	4.49	3.18	1412	
	10.01	9.01	9.23	10.18	907	677
	14.99	13.99	14.13	15.72	899	885
	20.05	19.05	19.15	19.90	963	1202
	25.03	24.03	24.11	24.40	988	1102
	30.02	29.02	29.09	29.00	1003	1082
	35.01	34.01	34.07	33.08	1030	1221

Shear Wave Source Offset - 2 ft

S-Wave Velocity from Surface = Travel Distance/S-Wave Arrival
 Interval S-Wave Velocity = (Travel Dist2-Travel Dist1)/(Time2-Time1)

TEST ID: CPT-25



APPENDIX B

LABORATORY TEST RESULTS



**TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS**

Project Name: Lewis/Rosemead Condos Tested By : K. Jumig Date: 03/29/24
Project No. : 14030.001 Checked By: A. Santos Date: 04/03/24

Boring No.	Backfill, Stockpile T2			
Sample No.	03-28-24, #2			
Sample Depth (ft)	N/A			
Soil Identification:	Grayish brown s(CL)			
Wet Weight of Soil + Container (g)	0.00			
Dry Weight of Soil + Container (g)	0.00			
Weight of Container (g)	1.00			
Moisture Content (%)	0.00			
Weight of Soaked Soil (g)	100.14			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	405			
Crucible No.	305			
Furnace Temperature (°C)	860			
Time In / Time Out	9:00/9:45			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	60.8691			
Wt. of Crucible (g)	60.8671			
Wt. of Residue (g) (A)	0.0020			
PPM of Sulfate (A) x 41150	82.30			
PPM of Sulfate, Dry Weight Basis	82			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30			
ml of AgNO ₃ Soln. Used in Titration (C)	0.6			
PPM of Chloride (C -0.2) * 100 * 30 / B	40			
PPM of Chloride, Dry Wt. Basis	40			

pH TEST, DOT California Test 643

pH Value	8.20			
Temperature °C	20.1			



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name: Lewis/Rosemead Condos
Project No. : 14030.001
Boring No.: Backfill, Stockpile T2
Sample No. : 03-28-24, #2

Tested By : K. Jumig Date: 04/01/24
Checked By: A. Santos Date: 04/03/24
Depth (ft.) : N/A

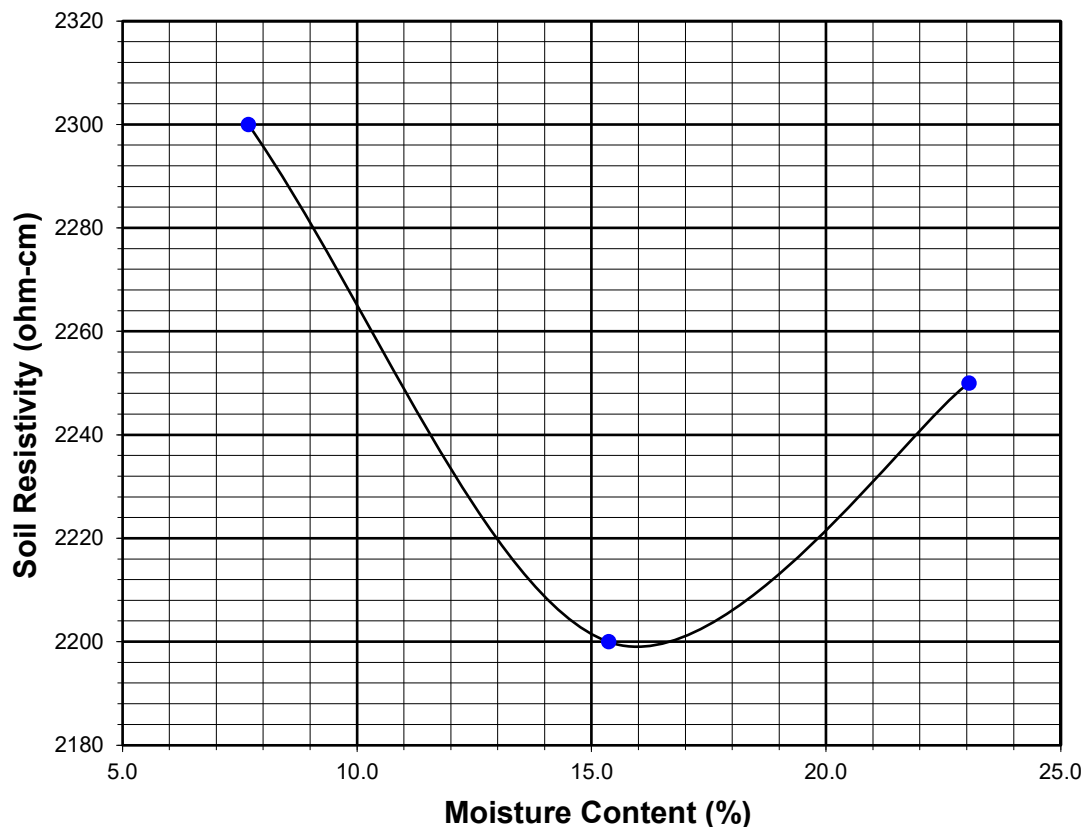
Soil Identification:* Grayish brown s(CL)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	10	7.68	2300	2300
2	20	15.36	2200	2200
3	30	23.05	2250	2250
4				
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	0.00
Dry Wt. of Soil + Cont. (g)	0.00
Wt. of Container (g)	1.00
Container No.	
Initial Soil Wt. (g) (Wt)	130.18
Box Constant	1.000
$MC = (((1 + MC_i / 100) \times (W_a / W_t + 1)) - 1) \times 100$	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
2199	16.0	82	40	8.20	20.1





**TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS**

Project Name: Lewis/Rosemead Condos SCE Parcel Tested By : G. Berdy Date: 05/09/24
Project No. : CLC.0014030001 Checked By: J. Ward Date: 06/06/24

Boring No.	LB-2			
Sample No.	R-1			
Sample Depth (ft)	5.0			
Soil Identification:	Very dark brown s(CL)			
Wet Weight of Soil + Container (g)	0.00			
Dry Weight of Soil + Container (g)	0.00			
Weight of Container (g)	1.00			
Moisture Content (%)	0.00			
Weight of Soaked Soil (g)	100.16			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	405			
Crucible No.	304			
Furnace Temperature (°C)	860			
Time In / Time Out	6:15/7:00			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	65.4361			
Wt. of Crucible (g)	65.4325			
Wt. of Residue (g) (A)	0.0036			
PPM of Sulfate (A) x 41150	148.14			
PPM of Sulfate, Dry Weight Basis	148			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	15			
ml of AgNO ₃ Soln. Used in Titration (C)	0.7			
PPM of Chloride (C - 0.2) * 100 * 30 / B	100			
PPM of Chloride, Dry Wt. Basis	100			

pH TEST, DOT California Test 643

pH Value	8.11			
Temperature °C	22.5			



SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name: Lewis/Rosemead Condos SCE Parcel

Tested By : G. Berdy Date: 05/10/24

Project No. : CLC.0014030001

Checked By: J. Ward Date: 06/06/24

Boring No.: LB-2

Depth (ft.) : 5.0

Sample No. : R-1

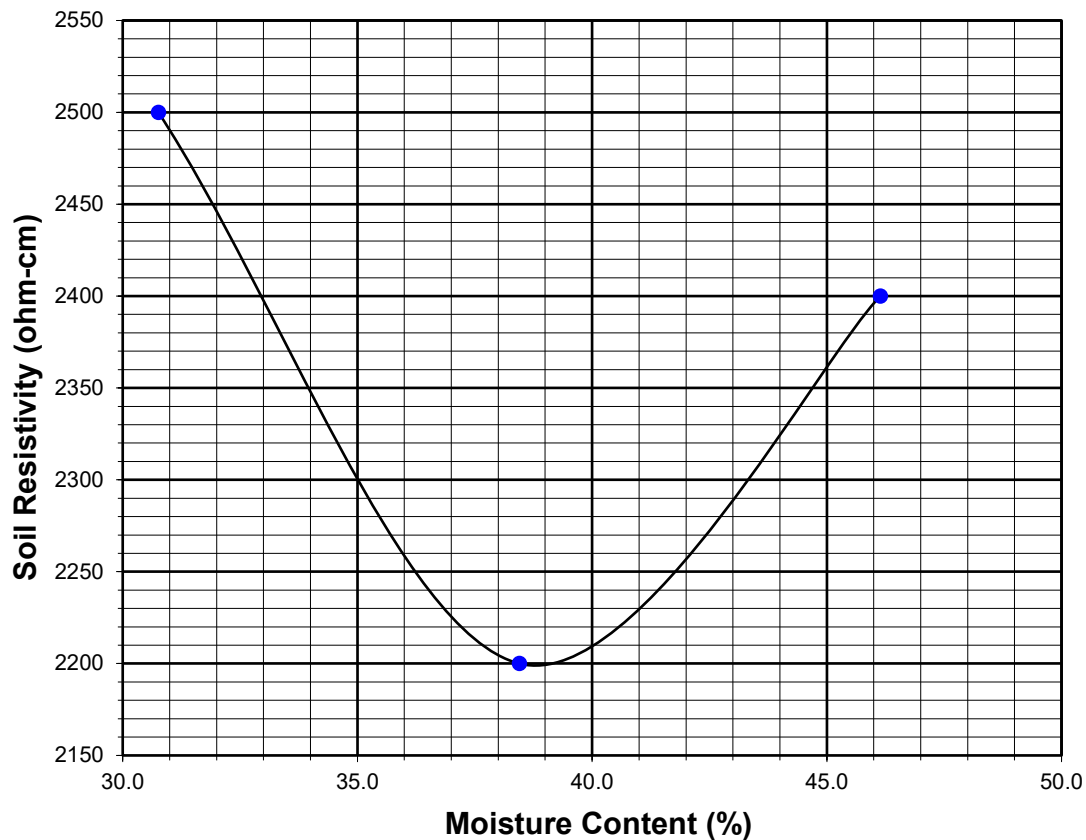
Soil Identification:* Very dark brown s(CL)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	40	30.76	2500	2500
2	50	38.45	2200	2200
3	60	46.14	2400	2400
4				
5				

Moisture Content (%) (Mci)	0.00
Wet Wt. of Soil + Cont. (g)	0.00
Dry Wt. of Soil + Cont. (g)	0.00
Wt. of Container (g)	1.00
Container No.	
Initial Soil Wt. (g) (Wt)	130.04
Box Constant	1.000
$MC = (((1 + Mci/100) \times (Wa/Wt + 1)) - 1) \times 100$	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
2200	38.8	148	100	8.11	22.5



DIRECT SHEAR TEST

Consolidated Undrained

Project Name: [Lewis/Rosemead Condos SCE Parcel](#) Tested By: [G. Bathala](#) Date: [05/07/24](#)
 Project No.: [CLC.0014030001](#) Checked By: [J. Ward](#) Date: [06/06/24](#)
 Boring No.: [LB-2](#) Sample Type: [Ring](#)
 Sample No.: [R-3](#) Depth (ft.): [10.0](#)
 Soil Identification: [Dark brown lean clay with sand \(CL\)s](#)

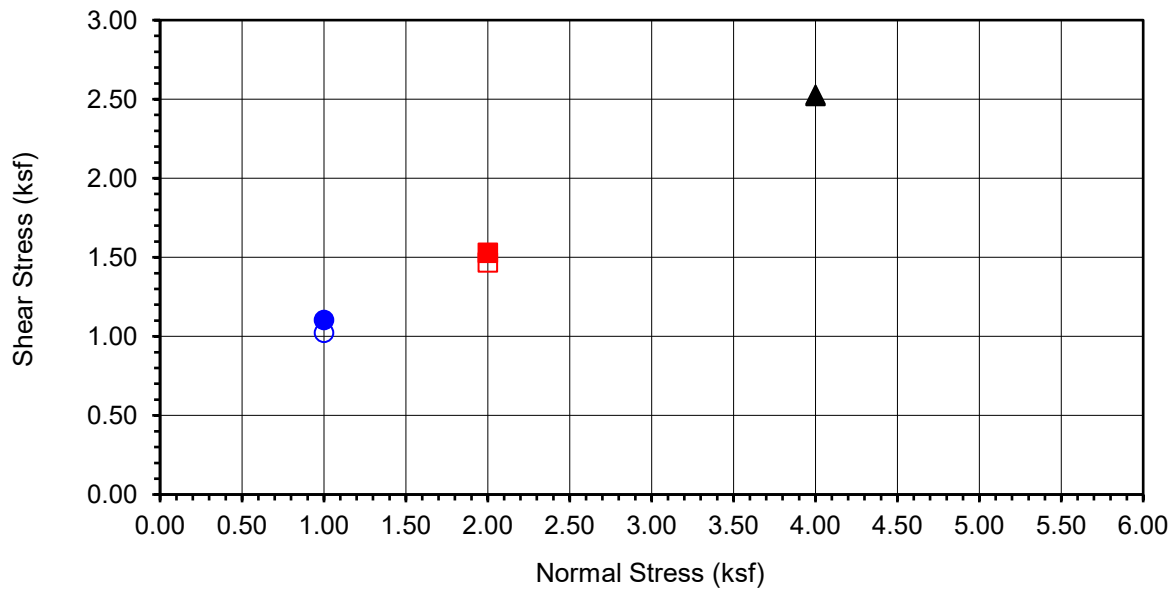
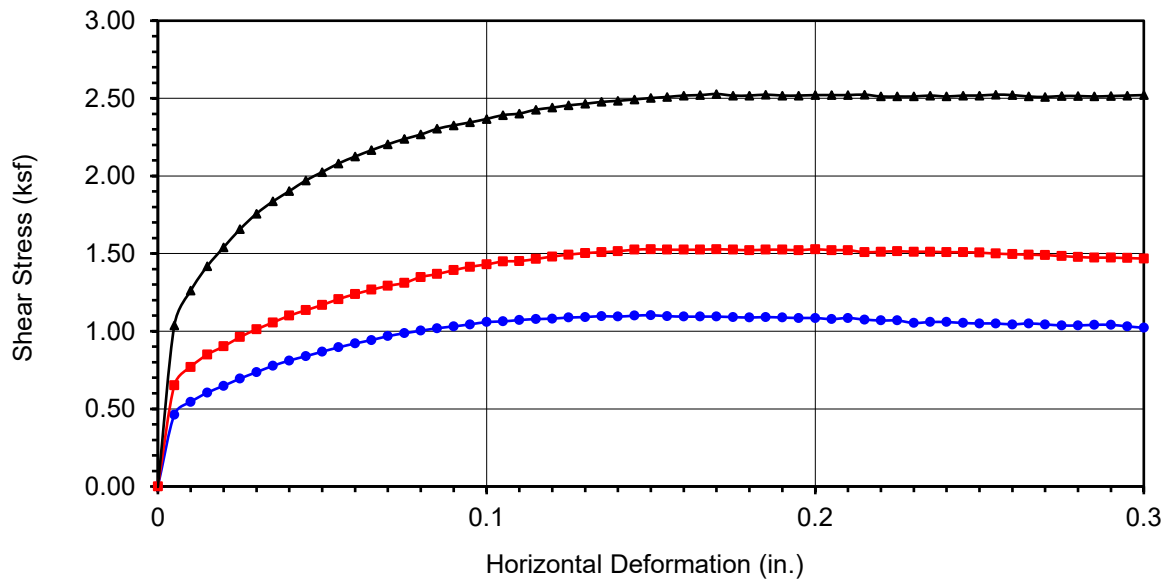
Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	202.46	203.38	205.32
Weight of Ring(gm):	44.73	45.57	45.14

Before Shearing

Weight of Wet Sample+Cont.(gm):	208.62	208.62	208.62
Weight of Dry Sample+Cont.(gm):	184.40	184.40	184.40
Weight of Container(gm):	55.47	55.47	55.47
Vertical Rdg.(in): Initial	0.2781	0.2206	0.2662
Vertical Rdg.(in): Final	0.2961	0.2568	0.3122

After Shearing

Weight of Wet Sample+Cont.(gm):	194.41	219.67	222.07
Weight of Dry Sample+Cont.(gm):	171.06	195.28	199.87
Weight of Container(gm):	39.92	65.80	67.12
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43



Boring No.	LB-2
Sample No.	R-3
Depth (ft)	10
<u>Sample Type:</u>	
Ring	
<u>Soil Identification:</u>	
Dark brown lean clay with sand (CL)s	

Normal Stress (kip/ft ²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft ²)	● 1.103	■ 1.528	▲ 2.528
Shear Stress @ End of Test (ksf)	○ 1.022	□ 1.468	△ 2.521
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	18.79	18.79	18.79
Dry Density (pcf)	110.4	110.5	112.1
Saturation (%)	96.4	96.5	100.8
Soil Height Before Shearing (in.)	0.9820	0.9638	0.9540
Final Moisture Content (%)	17.8	18.8	16.7



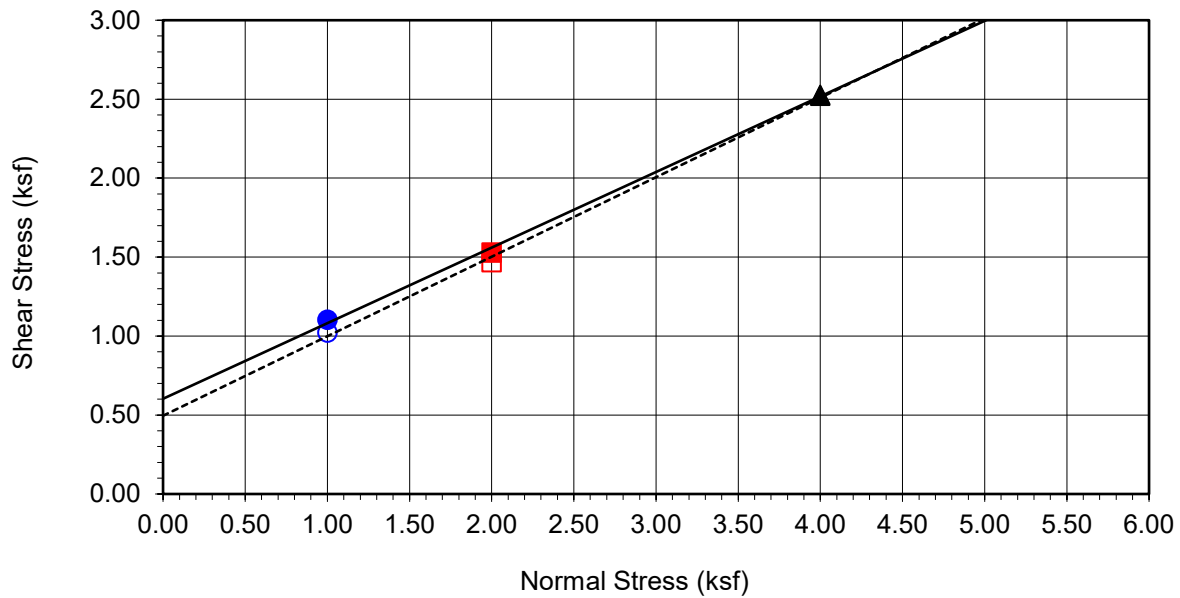
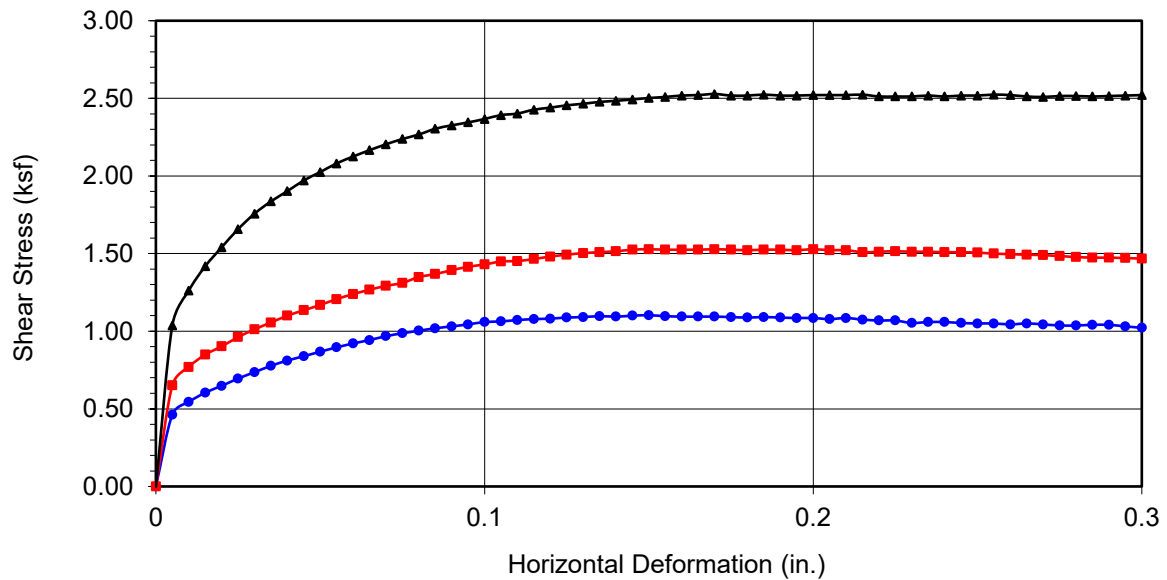
DIRECT SHEAR TEST RESULTS

Consolidated Undrained

Project No.: CLC.0014030001

Lewis/Rosemead Condos SCE Parcel

05-24



Boring No.	LB-2	
Sample No.	R-3	
Depth (ft)	10	
<u>Sample Type:</u>	Ring	
<u>Soil Identification:</u>		
Dark brown lean clay with sand (CL)s		
<u>Strength Parameters</u>		
	C (psf)	ϕ (°)
Peak	603	26
Ultimate	496	27

Normal Stress (kip/ft ²)	1.000	2.000	4.000
Peak Shear Stress (kip/ft ²)	● 1.103	■ 1.528	▲ 2.528
Shear Stress @ End of Test (ksf)	○ 1.022	□ 1.468	△ 2.521
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	18.79	18.79	18.79
Dry Density (pcf)	110.4	110.5	112.1
Saturation (%)	96.4	96.5	100.8
Soil Height Before Shearing (in.)	0.9820	0.9638	0.9540
Final Moisture Content (%)	17.8	18.8	16.7



DIRECT SHEAR TEST RESULTS

Consolidated Undrained

Project No.: CLC.0014030001

Lewis/Rosemead Condos SCE Parcel

05-24



EXPANSION INDEX of SOILS
ASTM D 4829

Project Name: Lewis/Rosemead Condos Tested By: J. Domingo Date: 03/29/24
Project No.: 14030.001 Checked By: A. Santos Date: 04/03/24
Boring No.: Backfill, Stockpile T2 Depth (ft.): N/A
Sample No.: 03-28-24, #1
Soil Identification: Grayish brown sandy lean clay s(CL)

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0290
Wt. Comp. Soil + Mold (g)	608.90	458.17
Wt. of Mold (g)	187.70	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	0	0
Wet Wt. of Soil + Cont. (g)	847.50	645.87
Dry Wt. of Soil + Cont. (g)	786.20	578.37
Wt. of Container (g)	0.00	187.70
Moisture Content (%)	7.80	17.28
Wet Density (pcf)	127.1	134.3
Dry Density (pcf)	117.9	114.5
Void Ratio	0.430	0.472
Total Porosity	0.301	0.321
Pore Volume (cc)	62.3	68.3
Degree of Saturation (%) [S _{meas}]	48.9	98.8

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
03/29/24	13:48	1.0	0	0.4375
03/29/24	13:58	1.0	10	0.4365
Add Distilled Water to the Specimen				
03/29/24	15:18	1.0	80	0.4610
04/01/24	7:20	1.0	3922	0.4665
04/01/24	8:44	1.0	4006	0.4665

Expansion Index (EI _{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	30
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EXPANSION INDEX of SOILS
ASTM D 4829

Project Name: Lewis/Rosemead Condos SCE Parcel Tested By: GEB/ACS Date: 05/09/24
Project No.: CLC.0014030001 Checked By: J. Ward Date: 06/05/24
Boring No.: LB-1 Depth (ft.): 5.0
Sample No.: R-1
Soil Identification: Very dark brown clayey sand (SC)

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0140
Wt. Comp. Soil + Mold (g)	594.80	440.75
Wt. of Mold (g)	191.30	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	0	0
Wet Wt. of Soil + Cont. (g)	815.20	632.05
Dry Wt. of Soil + Cont. (g)	746.50	560.81
Wt. of Container (g)	0.00	191.30
Moisture Content (%)	9.20	19.28
Wet Density (pcf)	121.7	131.1
Dry Density (pcf)	111.5	109.9
Void Ratio	0.513	0.534
Total Porosity	0.339	0.348
Pore Volume (cc)	70.1	73.0
Degree of Saturation (%) [S meas]	48.5	97.5

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
05/09/24	7:17	1.0	0	0.4600
05/09/24	7:27	1.0	10	0.4590
Add Distilled Water to the Specimen				
05/09/24	8:34	1.0	67	0.4705
05/10/24	8:00	1.0	1473	0.4740
05/10/24	9:00	1.0	1533	0.4740

Expansion Index (EI _{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	15
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Boring No.	LB-1	LB-1	LB-1	LB-1	LB-1	LB-2	LB-2	LB-2
Sample No.	R-1	R-2	R-3	R-4	R-5	R-1	R-2	R-3
Depth (ft.)	5.0	7.0	10.0	20.0	30.0	5.0	7.0	10.0
Sample Type	Ring	Ring	Ring	Ring	Ring	Ring	Ring	Ring
Soil Identification	Very dark brown clayey sand (SC)	Dark brown lean clay (CL)	Dark yellowish brown sandy lean clay s(CL)	Yellowish brown sandy silt s(ML)	Light yellowish brown silty sand (SM), partially disturbed	Very dark brown sandy lean clay s(CL)	Yellowish brown sandy silt s(ML)	Dark brown lean clay with sand (CL)s
Pocket Penetrometer (tons/ft ²)	3.25	3.50	2.25	>4.50	N/A	4.00	>4.50	1.25/1.50
Weight Soil + Rings / Tube (g)	1216.2	1030.7	1000.0	1014.7	706.9	1229.0	1213.9	1209.6
Weight of Rings / Tube (g)	266.4	222.0	222.0	222.0	177.6	266.4	266.4	266.4
Average Length (in.)	6.00	5.00	5.00	5.00	4.00	6.00	6.00	6.00
Average Diameter (in.)	2.415	2.415	2.415	2.415	2.415	2.415	2.415	2.415
Wet. Wt. of Soil + Cont. (g)	1187.9	488.0	1195.5	519.5	416.5	1249.9	347.3	208.6
Dry Wt. of Soil + Cont. (g)	1045.5	427.9	1042.4	458.2	407.5	1119.7	309.4	184.4
Weight of Container (g)	231.4	39.5	243.6	38.6	39.0	223.5	39.6	55.5
Container No.								
Wet Density	132	135	129	132	110	133	131	131
Moisture Content (%)	17	15	19	15	2	15	14	19
Dry Density (pcf)	112	116	109	115	107	117	115	110
Degree of Saturation (%)	94	93	94	85	12	88	82	95
 MOISTURE & DENSITY of SOILS ASTM D 2216 & ASTM D 2937					Project Name: <u>Lewis/Rosemead Condos SCE Parcel</u>			
					Project No.: <u>CLC.0014030001</u>			
					Tested By: <u>KJ/GB</u>		Date: <u>05/08/24</u>	

Boring No.	LB-2	LB-2	LB-3	LB-3	LB-3	LB-3	LB-3	LB-4
Sample No.	R-4	R-5	R-1	R-2	R-3	R-4	R-5	R-1
Depth (ft.)	20.0	30.0	5.0	7.0	10.0	20.0	30.0	5.0
Sample Type	Ring	Ring	Ring	Ring	Ring	Ring	Ring	Ring
Soil Identification	Yellowish brown silt (ML)	Yellowish brown lean clay with gravel (CL)g	Dark brown silt with sand (ML)s, partially disturbed	Yellowish brown silt (ML)	Dark brown lean clay with sand (CL)s	Dark yellowish brown silt with sand (ML)s	Dark yellowish brown sandy silt s(ML)	Dark yellowish brown silty sand (SM), disturbed
Pocket Penetrometer (tons/ft ²)	>4.50	2.25	>4.50	3.00	3.00	>4.50	>4.50	
Weight Soil + Rings / Tube (g)	990.9	994.0	610.3	1010.4	976.9	1236.5	1222.2	
Weight of Rings / Tube (g)	222.0	222.0	133.2	222.0	222.0	266.4	266.4	
Average Length (in.)	5.00	5.00	3.00	5.00	5.00	6.00	6.00	
Average Diameter (in.)	2.415	2.415	2.415	2.415	2.415	2.415	2.415	
Wet. Wt. of Soil + Cont. (g)	458.5	411.4	476.3	402.9	467.9	372.5	368.3	403.4
Dry Wt. of Soil + Cont. (g)	395.5	358.1	433.2	333.5	402.5	338.9	330.6	369.8
Weight of Container (g)	38.9	38.9	38.9	39.0	38.7	38.5	38.9	39.6
Container No.								
Wet Density	128	128	132	131	126	134	132	
Moisture Content (%)	18	17	11	24	18	11	13	10
Dry Density (pcf)	109	110	119	106	106	121	117	
Degree of Saturation (%)	87	85	71	108	83	77	80	
		MOISTURE & DENSITY of SOILS ASTM D 2216 & ASTM D 2937			Project Name: <u>Lewis/Rosemead Condos SCE Parcel</u>			
					Project No.: <u>CLC.0014030001</u>			
					Tested By: <u>K. Jumig</u> Date: <u>05/09/24</u>			

Boring No.	LB-4	LB-4	LB-4					
Sample No.	R-2	R-3	R-4					
Depth (ft.)	7.0	10.0	20.0					
Sample Type	Ring	Ring	Ring					
Soil Identification	Brown sandy lean clay s(CL), partially disturbed	Dark yellowish brown silt with sand (ML)s	Yellowish brown sandy silt s(ML)					
Pocket Penetrometer (tons/ft ²)	>4.50	>4.50	>4.50					
Weight Soil + Rings / Tube (g)	822.0	1225.8	1034.5					
Weight of Rings / Tube (g)	177.6	266.4	222.0					
Average Length (in.)	4.00	6.00	5.00					
Average Diameter (in.)	2.415	2.415	2.415					
Wet. Wt. of Soil + Cont. (g)	336.4	360.8	435.3					
Dry Wt. of Soil + Cont. (g)	302.8	321.4	392.5					
Weight of Container (g)	39.5	39.0	39.3					
Container No.								
Wet Density	134	133	135					
Moisture Content (%)	13	14	12					
Dry Density (pcf)	119	117	121					
Degree of Saturation (%)	82	85	82					
				Project Name: <u>Lewis/Rosemead Condos SCE Parcel</u>				
				Project No.: <u>CLC.0014030001</u>				
				Tested By: <u>K. Jumig</u> Date: <u>05/09/24</u>				
MOISTURE & DENSITY of SOILS ASTM D 2216 & ASTM D 2937								



MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name: Lewis/Rosemead Condos

Tested By: PM/NP

Date: 03/28/24

Project No.: 14030.001

Checked By: J. Ward

Date: 04/02/24

Locaton: Backfill, Stockpile T2

Depth (ft.): N/A

Sample No.: 03-28-24, #1

Soil Identification: Grayish brown sandy lean clay s(CL)

Preparation Method:

☒ Moist
☐ Dry

☒ Mechanical Ram
☐ Manual Ram

Mold Volume (ft³)

0.03320

Ram Weight = 10 lb.; Drop = 18 in.

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3690	3818	3864	3856		
Weight of Mold (g)	1808	1808	1808	1808		
Net Weight of Soil (g)	1882	2010	2056	2048		
Wet Weight of Soil + Cont. (g)	868.6	883.4	1041.3	817.5		
Dry Weight of Soil + Cont. (g)	828.3	824.5	951.2	735.0		
Weight of Container (g)	73.5	77.2	88.6	76.3		
Moisture Content (%)	5.34	7.88	10.45	12.52		
Wet Density (pcf)	125.0	133.5	136.5	136.0		
Dry Density (pcf)	118.6	123.7	123.6	120.9		

Maximum Dry Density (pcf)

124.3

Optimum Moisture Content (%)

9.1

PROCEDURE USED

☒ Procedure A

Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if + #4 is 20% or less

☐ Procedure B

Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + #4 is >20% and + 3/8 in. is 20% or less

☐ Procedure C

Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if + 3/8 in. is >20% and + 3/4 in. is <30%

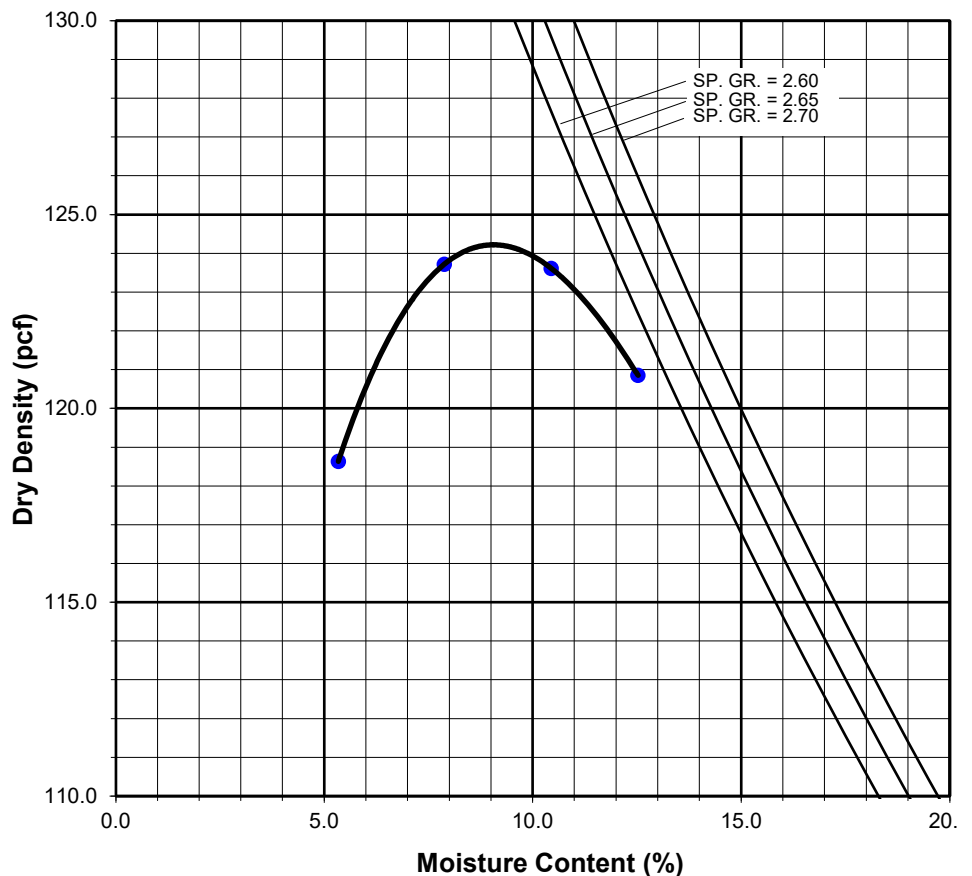
Particle-Size Distribution:

4:44:52

GR:SA:FI

Atterberg Limits:

LL, PL, PI





MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name: Lewis/Rosemead Condos

Tested By: N. Peterson

Date: 03/29/24

Project No.: 14030.001

Checked By: J. Ward

Date: 04/02/24

Locaton: Backfill, Stockpile T2

Depth (ft.): N/A

Sample No.: 03-28-24, #2

Soil Identification: Grayish brown sandy lean clay s(CL)

Preparation Method:

☒

Moist

Dry

☒

Mechanical Ram

Manual Ram

Mold Volume (ft³)

0.03320

Ram Weight = 10 lb.; Drop = 18 in.

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3591	3722	3843	3858		
Weight of Mold (g)	1808	1808	1808	1808		
Net Weight of Soil (g)	1783	1914	2035	2050		
Wet Weight of Soil + Cont. (g)	758.0	701.7	832.7	872.7		
Dry Weight of Soil + Cont. (g)	738.2	669.2	777.0	800.4		
Weight of Container (g)	78.0	74.8	77.0	77.0		
Moisture Content (%)	3.00	5.47	7.96	9.99		
Wet Density (pcf)	118.4	127.1	135.1	136.1		
Dry Density (pcf)	114.9	120.5	125.2	123.8		

Maximum Dry Density (pcf)

125.5

Optimum Moisture Content (%)

8.6

PROCEDURE USED

☒ Procedure A

Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if + #4 is 20% or less

☐ Procedure B

Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + #4 is >20% and +3/8 in. is 20% or less

☐ Procedure C

Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +3/4 in. is <30%

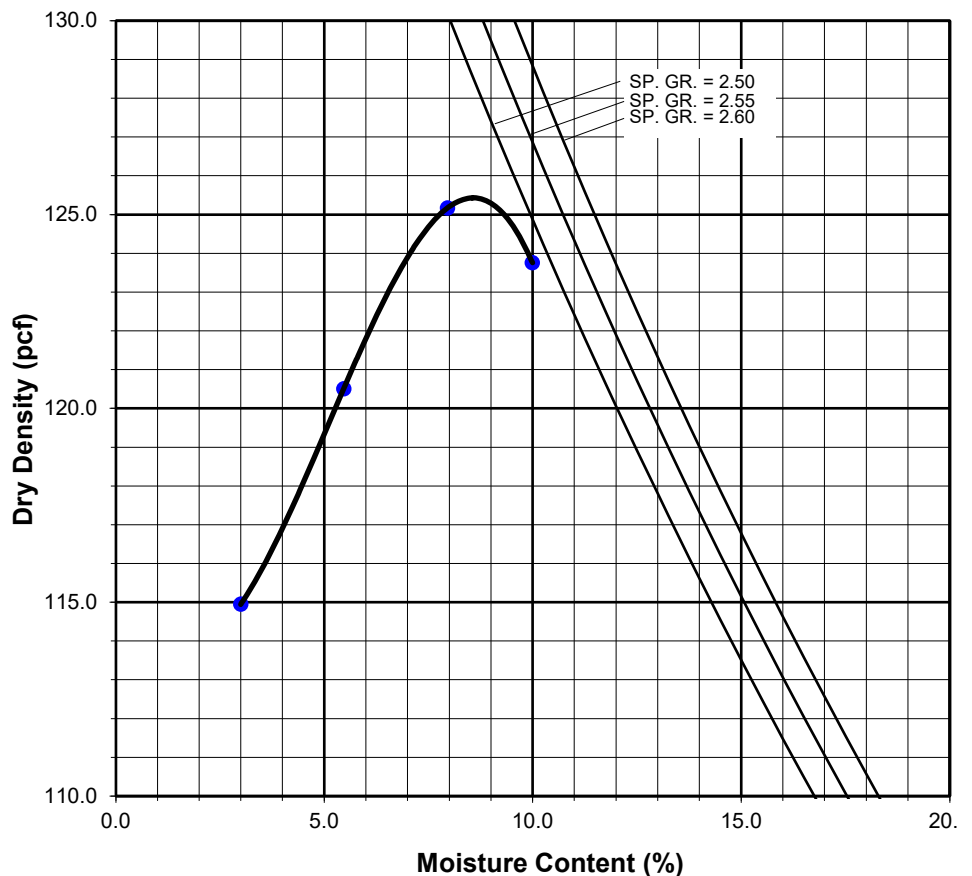
Particle-Size Distribution:

3:45:52

GR:SA:FI

Atterberg Limits:

LL, PL, PI





MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Project Name: Lewis/Rosemead Condos SCE Parcel Tested By: N. Peterson Date: 05/09/24
Project No.: CLC.0014030001 Checked By: A. Santos Date: 05/15/24
Boring No.: LB-1 Depth (ft.): 0-5
Sample No.: B-1
Soil Identification: Very dark brown clayey sand (SC)

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	☒	Moist	Scalp Fraction (%)	Rammer Weight (lb.) =	10.0
		Dry	#3/4	Height of Drop (in.) =	18.0
Compaction Method	☒	Mechanical Ram	#3/8		
		Manual Ram	#4	Mold Volume (ft ³)	0.03320

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3801	3865	3860			
Weight of Mold (g)	1808	1808	1808			
Net Weight of Soil (g)	1993	2057	2052			
Wet Weight of Soil + Cont. (g)	783.7	650.9	799.0			
Dry Weight of Soil + Cont. (g)	742.9	605.3	726.4			
Weight of Container (g)	77.2	88.6	77.0			
Moisture Content (%)	6.13	8.83	11.18			
Wet Density (pcf)	132.3	136.6	136.3			
Dry Density (pcf)	124.7	125.5	122.6			

Maximum Dry Density (pcf) **125.8**
Corrected Dry Density (pcf) **127.4**

Optimum Moisture Content (%) **8.0**
Corrected Moisture Content (%) **7.7**

☒ **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if + #4 is 20% or less

☐ **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if + #4 is >20% and +3/8 in. is 20% or less

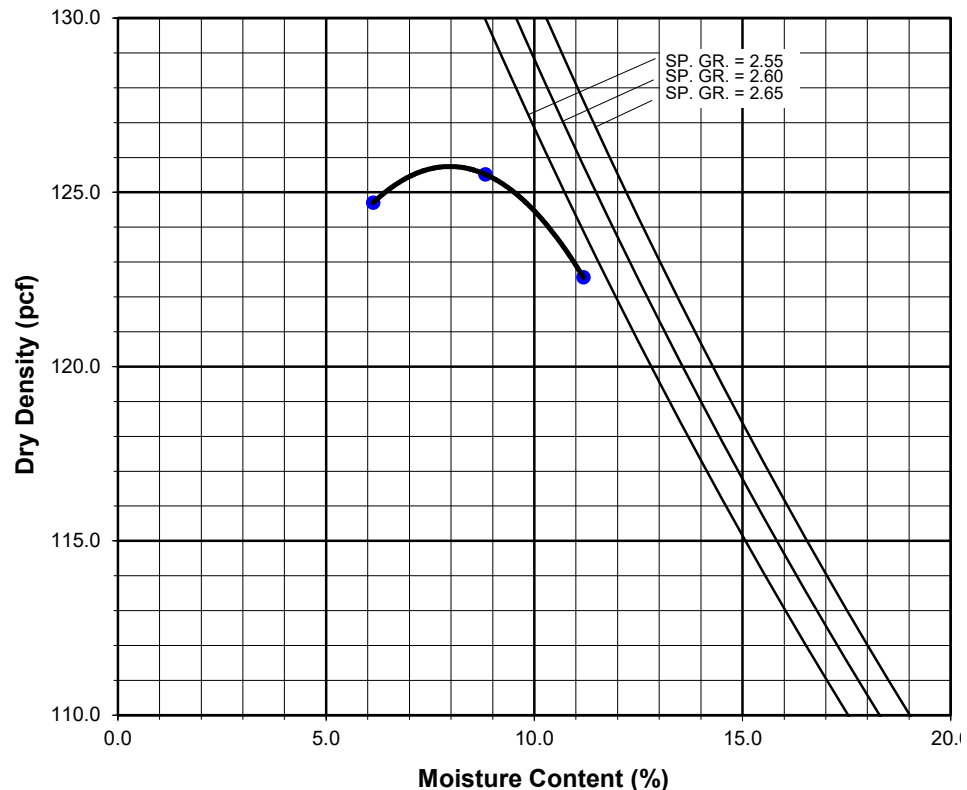
☐ **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +3/4 in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL, PL, PI



Boring No.	Backfill, Stockpile T2	Backfill, Stockpile T2						
Sample No.	03-28-24, #1	03-28-24, #2						
Depth (ft.)	N/A	N/A						
Sample Type	Bulk	Bulk						
Soil Identification	Grayish brown sandy lean clay, s(CL)	Grayish brown sandy lean clay, s(CL)						
No Moisture Correction; ASTM D 1140 modified to include splitting the sample on the #4 sieve								
Total Sample Dry Weight Determination								
Dry Weight of Soil + Container (g)	4086.90	874.30						
Weight of Container (g)	231.90	76.30						
Dry Weight of Soil (g)	3855.00	798.00						
Sample Dry Weight Determination, Retained on Sieve #4								
Dry Weight of Sample + Cont. (g)	226.80	102.40						
Weight of Container (g)	70.50	76.70						
Weight of Dry Sample (g)	156.30	25.70						
Sample Dry Weight Determination, Passing Sieve #4								
Dry Weight of Sample + Cont. (g)	605.80	503.40						
Weight of Container (g)	109.80	76.30						
Weight of Dry Sample (g)	496.00	427.10						
After Wash								
Method (A or B)	B	B						
Dry Weight of Sample + Cont. (g)	335.90	274.80						
Weight of Container (g)	109.80	76.30						
Weight of Dry Sample (g)	226.10	198.50						
% Passing No. 4 Sieve	95.9	96.8						
% Retained No. 4 Sieve	4.1	3.2						
% Passing No. 200 Sieve	52.2	51.8						
			PERCENT PASSING No. 200 SIEVE ASTM D 1140		Project Name: <u>Lewis/Rosemead Condos</u> Project No.: <u>14030.001</u> Tested By: <u>KJ/JD</u> Date: <u>03/29/24</u>			

Boring No.	LB-1	LB-3						
Sample No.	R-3	S-1						
Depth (ft.)	10	15						
Sample Type	Ring	SPT						
Soil Identification	Dark yellowish brown sandy lean clay s(CL)	Strong brown sandy lean clay s(CL)						
Moisture Correction								
Wet Weight of Soil + Container (g)	0.0	0.0						
Dry Weight of Soil + Container (g)	0.0	0.0						
Weight of Container (g)	1.0	1.0						
Moisture Content (%)	0.0	0.0						
Sample Dry Weight Determination								
Weight of Sample + Container (g)	907.2	991.6						
Weight of Container (g)	243.6	234.4						
Weight of Dry Sample (g)	663.6	757.2						
Container No.:								
After Wash								
Method (A or B)	B	B						
Dry Weight of Sample + Cont. (g)	469.0	516.4						
Weight of Container (g)	243.6	234.4						
Dry Weight of Sample (g)	225.4	282.0						
% Passing No. 200 Sieve	66.0	62.8						
% Retained No. 200 Sieve	34.0	37.2						
	PERCENT PASSING No. 200 SIEVE ASTM D 1140				Project Name: <u>Lewis/Rosemead Condos SCE Parcel</u>			
					Project No.: <u>14030.001</u>			
					Tested By: <u>K. Jumig</u> Date: <u>05/08/24</u>			

Boring No.	LB-2							
Sample No.	R-1							
Depth (ft.)	5.0							
Sample Type	Ring							
Soil Identification	Very dark brown sandy lean clay s(CL)							
No Moisture Correction; ASTM D 1140 modified to include splitting the sample on the # 4 sieve								
Total Sample Dry Weight Determination								
Dry Weight of Soil + Container (g)	1119.7							
Weight of Container (g)	223.5							
Dry Weight of Soil (g)	896.2							
Sample Dry Weight Determination, Retained on Sieve # 4								
Dry Weight of Sample + Cont. (g)	70.3							
Weight of Container (g)	60.3							
Weight of Dry Sample (g)	10.0							
Sample Dry Weight Determination, Passing Sieve # 4								
Dry Weight of Sample + Cont. (g)	608.3							
Weight of Container (g)	108.0							
Weight of Dry Sample (g)	500.3							
After Wash								
Method (A or B)	B							
Dry Weight of Sample + Cont. (g)	347.3							
Weight of Container (g)	108.0							
Weight of Dry Sample (g)	239.3							
% Passing No. 4 Sieve	98.9							
% Retained No. 4 Sieve	1.1							
% Passing No. 200 Sieve	51.6							
		PERCENT PASSING No. 200 SIEVE ASTM D 1140			Project Name: <u>Lewis/Rosemead Condos SCE Parcel</u>			
					Project No.: <u>CLC.0014030001</u>			
					Tested By: <u>K. Jumig</u>		Date: <u>05/08/24</u>	



ATTERBERG LIMITS ASTM D 4318

Project Name: Lewis/Rosemead Condos SCE Parcel Tested By: J. Domingo Date: 05/09/24
Project No. : CLC.0014030001 Input By: G. Bathala Date: 05/13/24
Boring No.: LB-1 Checked By: J. Ward
Sample No.: R-3 Depth (ft.) 10.0
Soil Identification: Dark yellowish brown sandy lean clay s(CL)

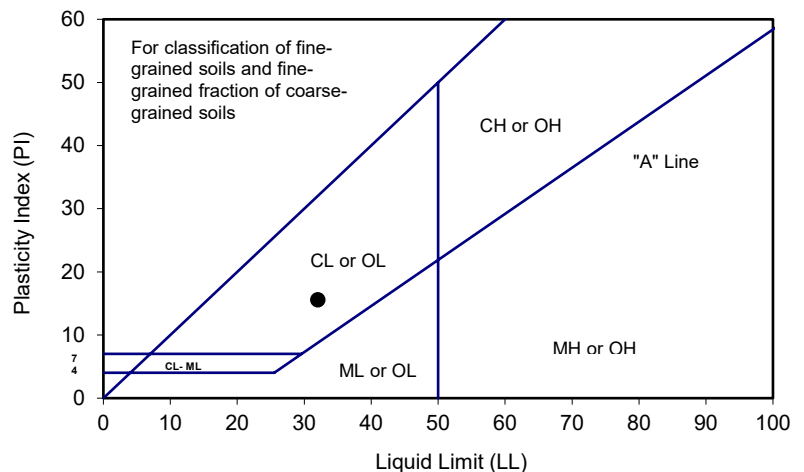
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			29	21	15	
Wet Wt. of Soil + Cont. (g)	9.35	9.34	22.58	23.48	23.10	
Dry Wt. of Soil + Cont. (g)	8.19	8.16	17.37	17.93	17.51	
Wt. of Container (g)	1.03	1.05	1.06	1.06	1.07	
Moisture Content (%) [Wn]	16.20	16.60	31.94	32.90	34.00	

Liquid Limit	32
Plastic Limit	16
Plasticity Index	16
Classification	CL

PI at "A" - Line = $0.73(LL-20)$ 8.76

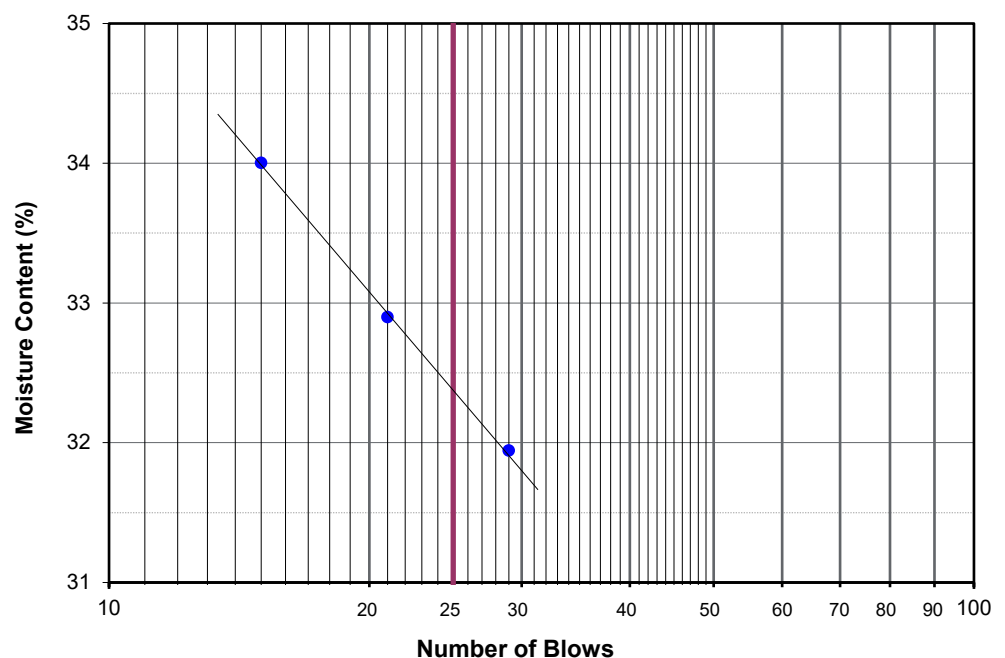
One - Point Liquid Limit Calculation

$$LL = Wn(N/25)^{0.12}$$



PROCEDURES USED

- ☐ Wet Preparation
Multipoint - Wet
- ☒ Dry Preparation
Multipoint - Dry
- ☒ Procedure A
Multipoint Test
- ☐ Procedure B
One-point Test





ATTERBERG LIMITS ASTM D 4318

Project Name: Lewis/Rosemead Condos SCE Parcel Tested By: J. Domingo Date: 05/09/24
Project No. : CLC.0014030001 Input By: G. Bathala Date: 05/13/24
Boring No.: LB-2 Checked By: J. Ward
Sample No.: R-1 Depth (ft.) 5.0
Soil Identification: Very dark brown sandy lean clay s(CL)

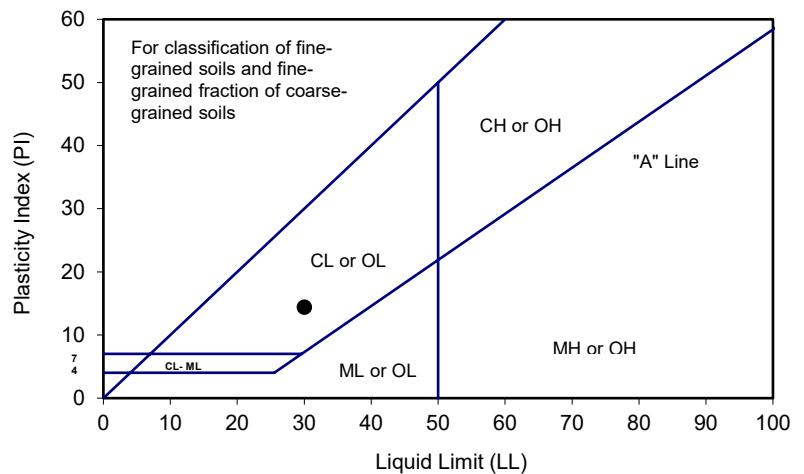
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			30	22	16	
Wet Wt. of Soil + Cont. (g)	10.01	9.91	23.43	23.65	23.17	
Dry Wt. of Soil + Cont. (g)	8.78	8.73	18.39	18.40	17.85	
Wt. of Container (g)	1.03	1.00	1.03	1.03	1.11	
Moisture Content (%) [Wn]	15.87	15.27	29.03	30.22	31.78	

Liquid Limit	30
Plastic Limit	16
Plasticity Index	14
Classification	CL

PI at "A" - Line = $0.73(LL-20)$ 7.3

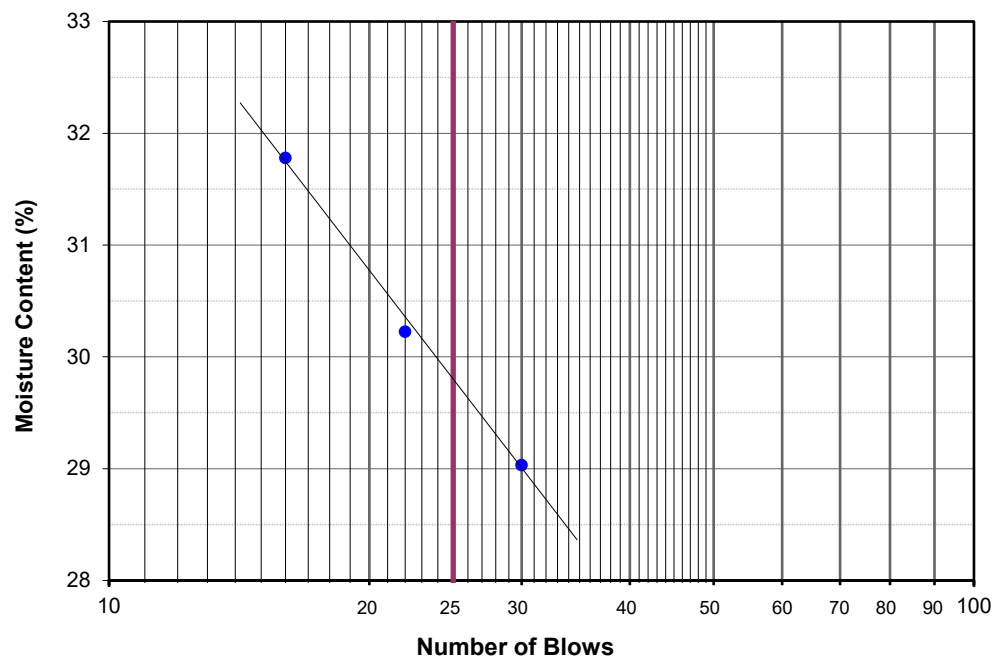
One - Point Liquid Limit Calculation

$$LL = Wn(N/25)^{0.12}$$



PROCEDURES USED

- ☐ Wet Preparation
Multipoint - Wet
- ☒ Dry Preparation
Multipoint - Dry
- ☒ Procedure A
Multipoint Test
- ☐ Procedure B
One-point Test





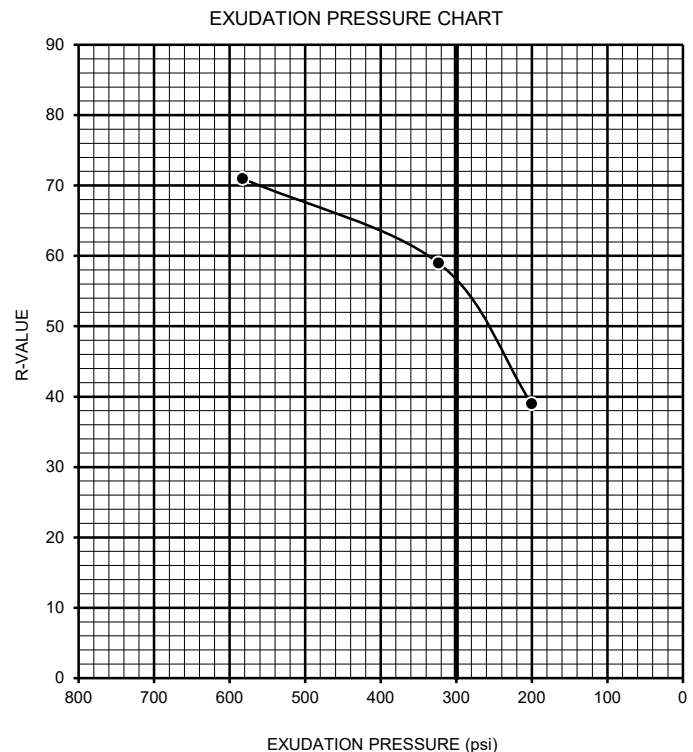
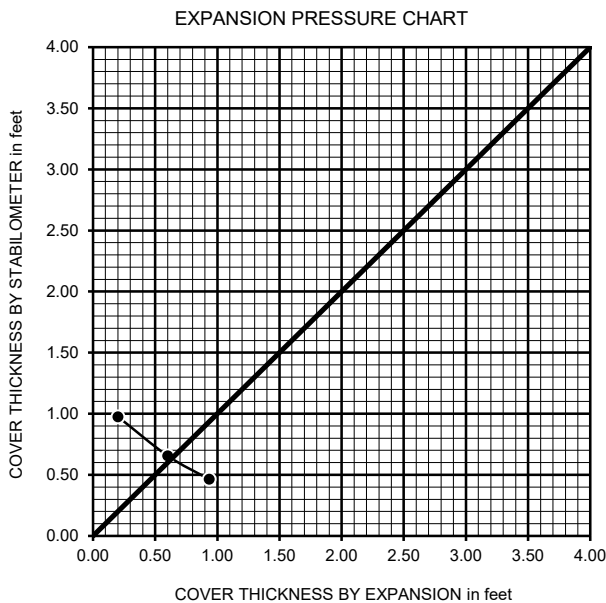
R-VALUE TEST RESULTS

DOT CA Test 301

PROJECT NAME: Lewis/Rosemead Condos SCE Parcel PROJECT NUMBER: CLC.0014030001
BORING NUMBER: LB-1 DEPTH (FT.): 0-5
SAMPLE NUMBER: B-1 TECHNICIAN: O. Figueroa
SAMPLE DESCRIPTION: Very dark brown clayey sand (SC) DATE COMPLETED: 5/15/2024

TEST SPECIMEN	a	b	c
MOISTURE AT COMPACTION %	9.1	10.0	11.0
HEIGHT OF SAMPLE, Inches	2.45	2.46	2.50
DRY DENSITY, pcf	126.9	126.0	125.0
COMPACTOR PRESSURE, psi	275	200	80
EXUDATION PRESSURE, psi	583	324	200
EXPANSION, Inches x 10 ^{exp-4}	28	18	6
STABILITY Ph 2,000 lbs (160 psi)	28	41	67
TURNS DISPLACEMENT	4.80	5.00	5.45
R-VALUE UNCORRECTED	71	59	39
R-VALUE CORRECTED	71	59	39

DESIGN CALCULATION DATA	a	b	c
GRAVEL EQUIVALENT FACTOR	1.0	1.0	1.0
TRAFFIC INDEX	5.0	5.0	5.0
STABILOMETER THICKNESS, ft.	0.46	0.66	0.98
EXPANSION PRESSURE THICKNESS, ft.	0.93	0.60	0.20



R-VALUE BY EXPANSION: 61
R-VALUE BY EXUDATION: 57
EQUILIBRIUM R-VALUE: 57

APPENDIX C

PERCOLATION TEST RESULTS

Boring Percolation Test Data Sheet

Project Number:	14030.0010000000	Test Hole Number:	LB-1
Project Name:	Lewis Rosemead Condos	Date Excavated:	4/22/2024
Earth Description:	Alluvium	Date Tested:	4/23/2024
Liquid Description:	Tap water	Depth of boring (ft):	30
Tested By:	MKD	Radius of boring (in):	4
Time Interval Standard		Radius of casing (in):	1
Start Time for Pre-Soak:	4/22/2024	Length of slotted of casing (ft):	5
Start Time for Standard:	4/23/2024	Porosity of Annulus Material, n :	0.35
Standard Time Interval		Bentonite Plug at Bottom:	No
Between Readings, mins:	30		

Field Percolation Data - Falling Head Test

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_o/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
1	9:43	12	20.00	120.0	31.2	1.15
	9:55		22.60	88.8		
2	9:55	10	22.60	88.8	18.1	1.04
	10:05		24.11	70.7		
3	10:05	10	24.11	70.7	15.4	1.11
	10:15		25.39	55.3		
4	10:23	30	20.01	119.9	62.9	1.09
	10:53		25.25	57.0		
5	10:57	30	20.01	119.9	64.4	1.12
	11:27		25.38	55.4		
6	11:44	30	20.01	119.9	61.3	1.05
	12:14		25.12	58.6		
7	12:22	30	20.01	119.9	61.3	1.05
	12:52		25.12	58.6		
8	1:00	30	20.02	119.8	63.5	1.10
	1:30		25.31	56.3		

Measured Infiltration Rate, I (Average of Last 3 Readings) = 1.07 in./hr.

Design Infiltration Rate

Reduction Factor from Test Procedure, RF_t = 1

Reduction Factor for Site Variability, # of Tests and Investigation, RF_v = 2

Reduction Factor for Long Term Siltation, Plugging and Maintenance, RF_t = 1

Reduction Factor, $RF = RF_t + RF_v + RF_s$ = 4

Design Infiltration Rate = Measured Infiltration Rate / Reduction Factor (RF) = 0.27 in./hr.

Boring Percolation Test Data Sheet

Project Number:	14030.0010000000	Test Hole Number:	LB-2
Project Name:	Lewis Rosemead Condos	Date Excavated:	4/22/2024
Earth Description:	Alluvium	Date Tested:	4/23/2024
Liquid Description:	Tap water	Depth of boring (ft):	30
Tested By:	MKD	Radius of boring (in):	4
Time Interval Standard		Radius of casing (in):	1
Start Time for Pre-Soak:	4/22/2024	Length of slotted of casing (ft):	5
Start Time for Standard:	4/23/2024	Porosity of Annulus Material, n:	0.35
Standard Time Interval		Bentonite Plug at Bottom:	No
Between Readings, mins:	30		

Field Percolation Data - Falling Head Test

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (ft.)	Initial/Final Water Height, H_o/H_f (in.)	Total Water Drop, Δd (in.)	Infiltration Rate (in./hr.)
1	8:14	30	21.00	108.0	10.8	0.16
	8:44		21.90	97.2		
2	8:47	30	20.90	109.2	8.5	0.12
	9:17		21.61	100.7		
3	9:19	30	20.05	119.4	13.9	0.19
	9:49		21.21	105.5		
4	9:54	30	20.09	118.9	19.9	0.28
	10:24		21.75	99.0		
5	10:29	30	20.02	119.8	10.7	0.14
	10:59		20.91	109.1		
6	11:02	30	20.01	119.9	12.0	0.16
	11:32		21.01	107.9		
7	11:41	30	20.01	119.9	12.0	0.16
	11:11		21.01	107.9		

Measured Infiltration Rate, I (Average of Last 3 Readings) = **0.16** in./hr.

Design Infiltration Rate

Reduction Factor from Test Procedure, RF_t =	1
Reduction Factor for Site Variability, # of Tests and Investigation, RF_v =	2
Reduction Factor for Long Term Siltation, Plugging and Maintenance, RF_t =	1
Reduction Factor, $RF = RF_t + RF_v + RF_s$ =	4

Design Infiltration Rate = Measured Infiltration Rate / Reduction Factor (RF) = **0.04** in./hr.

APPENDIX D

SEISMIC ANALYSIS



Latitude, Longitude: 34.0472, -118.083



Date	6/13/2024, 2:35:51 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.905	MCE_R ground motion. (for 0.2 second period)
S_1	0.685	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.905	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.27	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.822	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.904	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
S_{sRT}	1.905	Probabilistic risk-targeted ground motion. (0.2 second)
S_{sUH}	2.129	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S_{sD}	2.408	Factored deterministic acceleration value. (0.2 second)
S_{1RT}	0.685	Probabilistic risk-targeted ground motion. (1.0 second)
S_{1UH}	0.766	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S_{1D}	0.754	Factored deterministic acceleration value. (1.0 second)
$PGAd$	0.969	Factored deterministic acceleration value. (Peak Ground Acceleration)
PGA_{UH}	0.822	Uniform-hazard (2% probability of exceedance in 50 years) Peak Ground Acceleration
C_{RS}	0.895	Mapped value of the risk coefficient at short periods
C_{R1}	0.895	Mapped value of the risk coefficient at a period of 1 s
C_V	1.481	Vertical coefficient

DISCLAIMER

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Company	Leighton & Associates, Inc.
Project Number	14030.001
Project Name	Lewis Rosemead Condos
Project Location	1515 Walnut Avenue, Rosemead, CA
Date of Field Data	1/31/2024
Survey Method	CPT Shear Wave Measurement
Exploration Location	CPT-10

SITE CLASS DETERMINATION WITH SHEAR WAVE VELOCITY

Average Shear Wave Calculation (Vs)			
Depth (ft)	Thickness, di (ft)	Shear Wave Velocity, Vs (ft/sec)	di/Vs
0 to 5	5.0	1,412.0	0.004
5 to 10	5.0	907.0	0.006
10 to 15	5.0	899.0	0.006
15 to 20	5.0	963.0	0.005
20 to 25	5.0	988.0	0.005
25 to 30	5.0	1,003.0	0.005
30 to 35	5.0	1,030.0	0.005
35 to 100	65.0	1,000.0	0.065
	100.0		0.100

Average Shear Wave Vs **1002.9 ft/sec**
(in top 100')

Site Class Definitions (ASCE 7-16)		
Site Class	Soil Profile Name	Shear Wave Velocity, Vs, ft/sec
A	Hard Rock	$V_s > 5,000$
B	Rock	$2,500 < V_s < 5,000$
C	Very dense soil and soft rock	$1,200 < V_s < 2,500$
D	Stiff soil profile	$600 < V_s < 1,200$
E	Soft soil profile	$V_s < 600$

Site Class **D**

Unified Hazard Tool



Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the [U.S. Seismic Design Maps web tools](#) (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new [USGS Earthquake Hazard Toolbox](#) for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

^ Input

Edition

Dynamic: Conterminous U.S. 2014 (u...

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

34.0472

Time Horizon

Return period in years

2475

Longitude

Decimal degrees, negative values for western longitudes

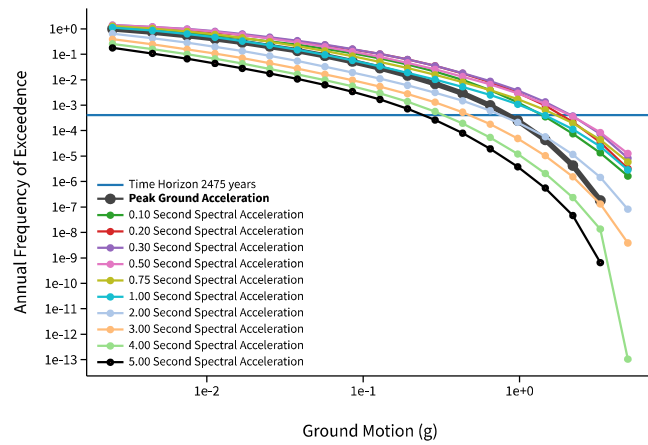
-118.083

Site Class

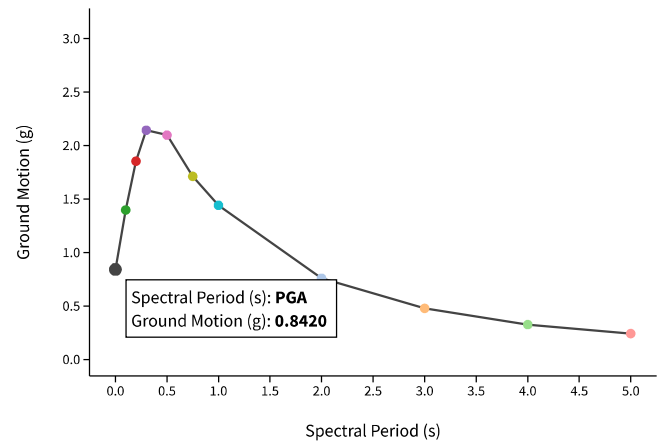
259 m/s (Site class D)

^ Hazard Curve

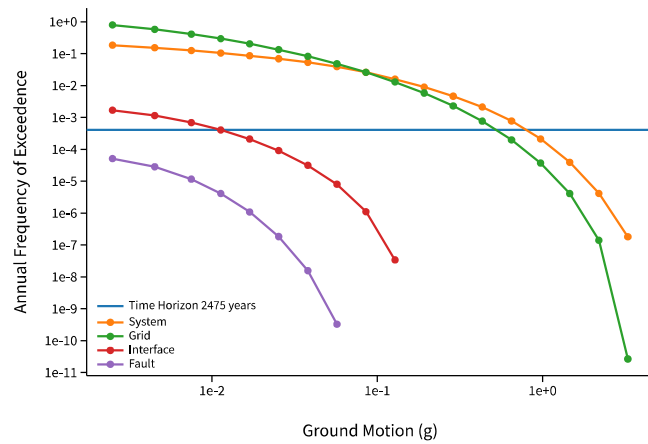
Hazard Curves



Uniform Hazard Response Spectrum



Component Curves for Peak Ground Acceleration

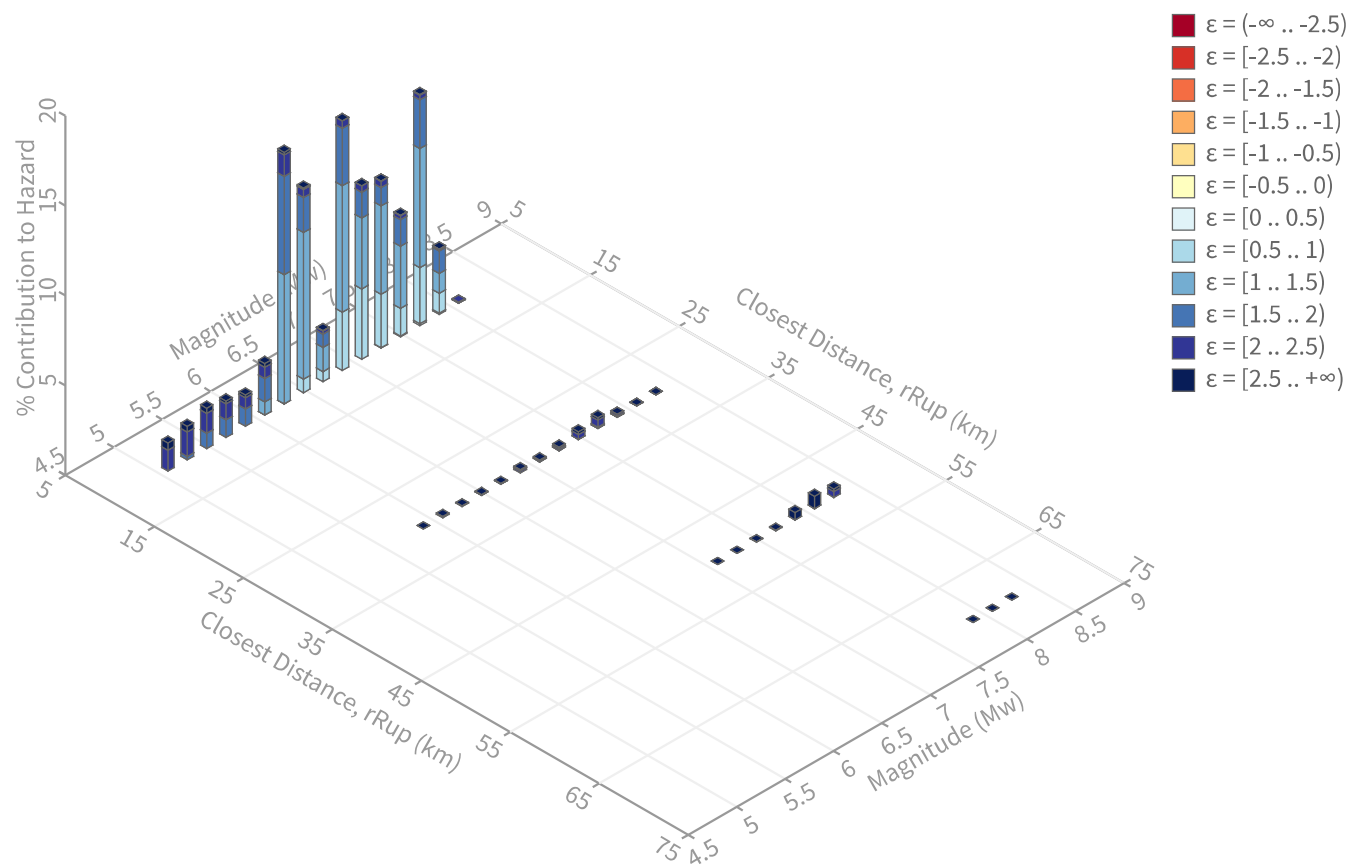


[View Raw Data](#)

^ Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr⁻¹
PGA ground motion: 0.84199343 g

Recovered targets

Return period: 2933.5569 yrs
Exceedance rate: 0.00034088311 yr⁻¹

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.06 %

Mean (over all sources)

m: 6.88
r: 10.11 km
ε₀: 1.44 σ

Mode (largest m-r bin)

m: 6.31
r: 6.67 km
ε₀: 1.55 σ
Contribution: 13.99 %

Mode (largest m-r-ε₀ bin)

m: 6.52
r: 6.58 km
ε₀: 1.27 σ
Contribution: 8.16 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

- ε0:** [-∞ .. -2.5)
- ε1:** [-2.5 .. -2.0)
- ε2:** [-2.0 .. -1.5)
- ε3:** [-1.5 .. -1.0)
- ε4:** [-1.0 .. -0.5)
- ε5:** [-0.5 .. 0.0)
- ε6:** [0.0 .. 0.5)
- ε7:** [0.5 .. 1.0)
- ε8:** [1.0 .. 1.5)
- ε9:** [1.5 .. 2.0)
- ε10:** [2.0 .. 2.5)
- ε11:** [2.5 .. +∞]

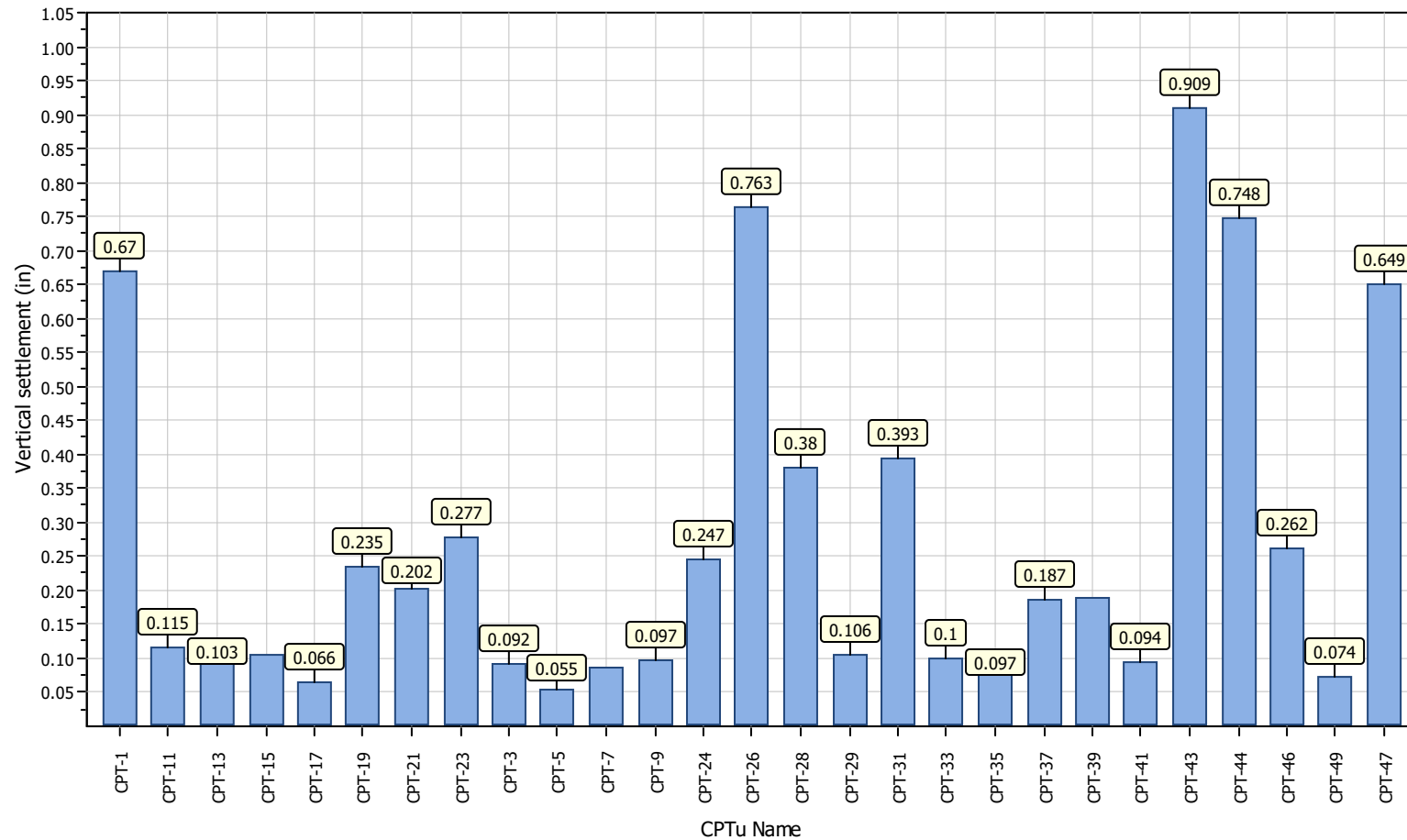
Deaggregation Contributors

Source Set	Source	Type	r	m	ϵ_0	lon	lat	az	%
UC33brAvg_FM31		System							43.17
	Elysian Park (Upper) [0]		5.51	6.48	1.36	118.097°W	34.077°N	338.93	12.17
	Whittier alt 1 [7]		6.50	6.74	1.44	118.046°W	33.999°N	147.70	6.40
	Raymond [1]		9.31	7.22	1.55	118.103°W	34.128°N	348.32	4.58
	Puente Hills [2]		9.39	7.31	0.95	118.113°W	33.963°N	196.68	4.48
	Compton [1]		16.63	7.22	1.29	118.247°W	33.801°N	208.99	3.18
	Elysian Park (Upper) [1]		9.36	7.18	1.15	118.169°W	34.072°N	289.61	3.02
	Compton [2]		16.73	7.52	1.32	118.286°W	33.817°N	216.22	1.60
	Sierra Madre [3]		15.50	7.74	1.74	118.061°W	34.185°N	7.38	1.30
UC33brAvg_FM32		System							41.45
	Elysian Park (Upper) [0]		5.51	7.05	1.13	118.097°W	34.077°N	338.93	10.65
	Puente Hills (Santa Fe Springs) [0]		9.31	6.95	1.02	118.043°W	33.945°N	162.03	5.52
	Whittier alt 2 [6]		6.57	7.04	1.21	118.046°W	33.998°N	148.24	5.12
	Raymond [1]		9.31	7.22	1.55	118.103°W	34.128°N	348.32	4.85
	Compton [1]		16.63	7.29	1.26	118.247°W	33.801°N	208.99	3.45
	Puente Hills (LA) [0]		6.24	7.17	0.83	118.116°W	33.990°N	206.00	2.72
	Puente Hills (Coyote Hills) [1]		10.55	7.26	1.12	118.044°W	33.915°N	166.42	2.70
	Compton [2]		16.73	7.49	1.32	118.286°W	33.817°N	216.22	1.38
	Sierra Madre [3]		15.50	7.77	1.73	118.061°W	34.185°N	7.38	1.24
UC33brAvg_FM32 (opt)		Grid							7.93
	PointSourceFinite: -118.083, 34.097		7.36	5.70	1.81	118.083°W	34.097°N	0.00	1.30
	PointSourceFinite: -118.083, 34.097		7.36	5.70	1.81	118.083°W	34.097°N	0.00	1.30
	PointSourceFinite: -118.083, 34.106		8.00	5.72	1.90	118.083°W	34.106°N	0.00	1.07
	PointSourceFinite: -118.083, 34.106		8.00	5.72	1.90	118.083°W	34.106°N	0.00	1.07
UC33brAvg_FM31 (opt)		Grid							7.46
	PointSourceFinite: -118.083, 34.097		7.40	5.68	1.83	118.083°W	34.097°N	0.00	1.33
	PointSourceFinite: -118.083, 34.097		7.40	5.68	1.83	118.083°W	34.097°N	0.00	1.33

Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

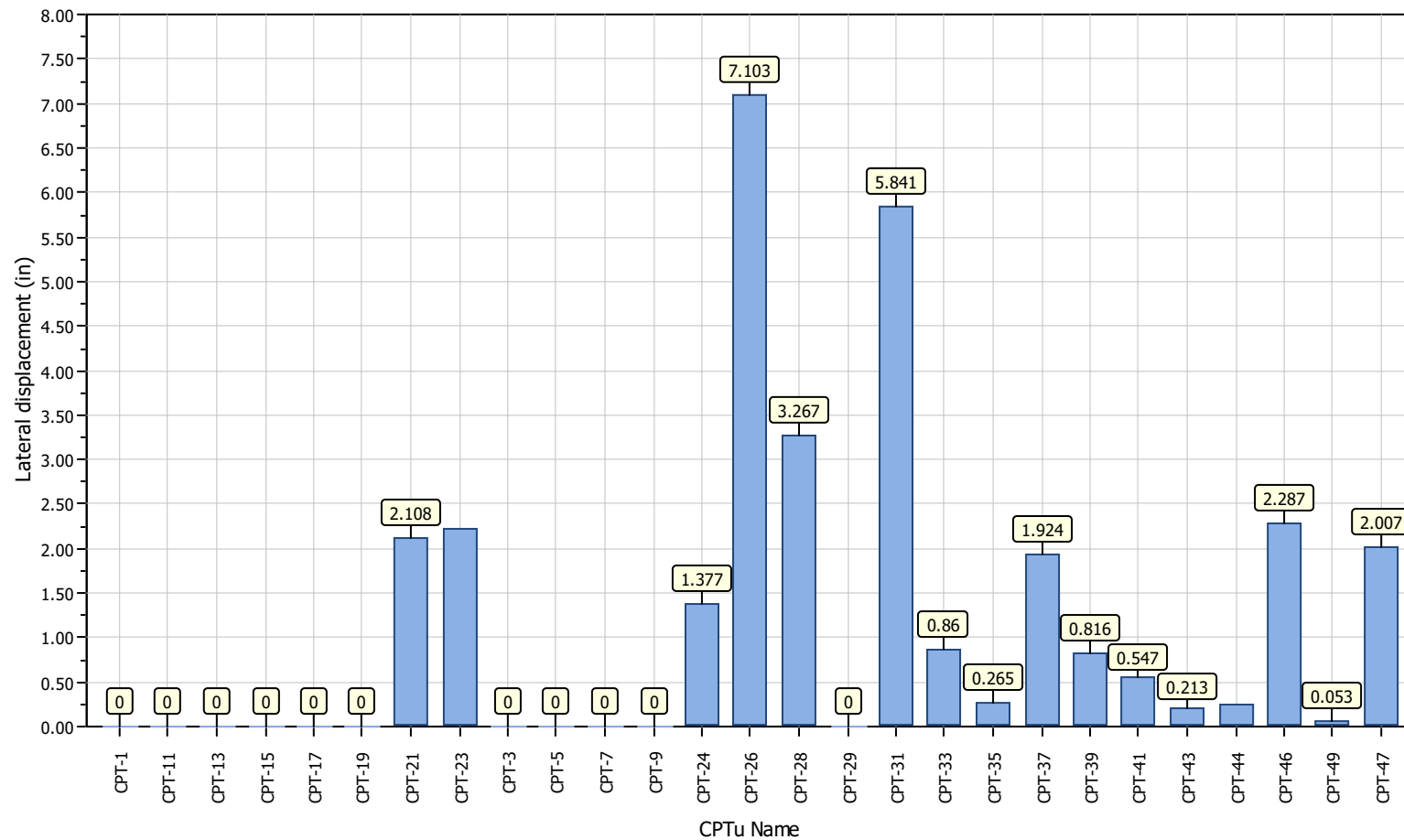
Overall vertical settlements report



Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

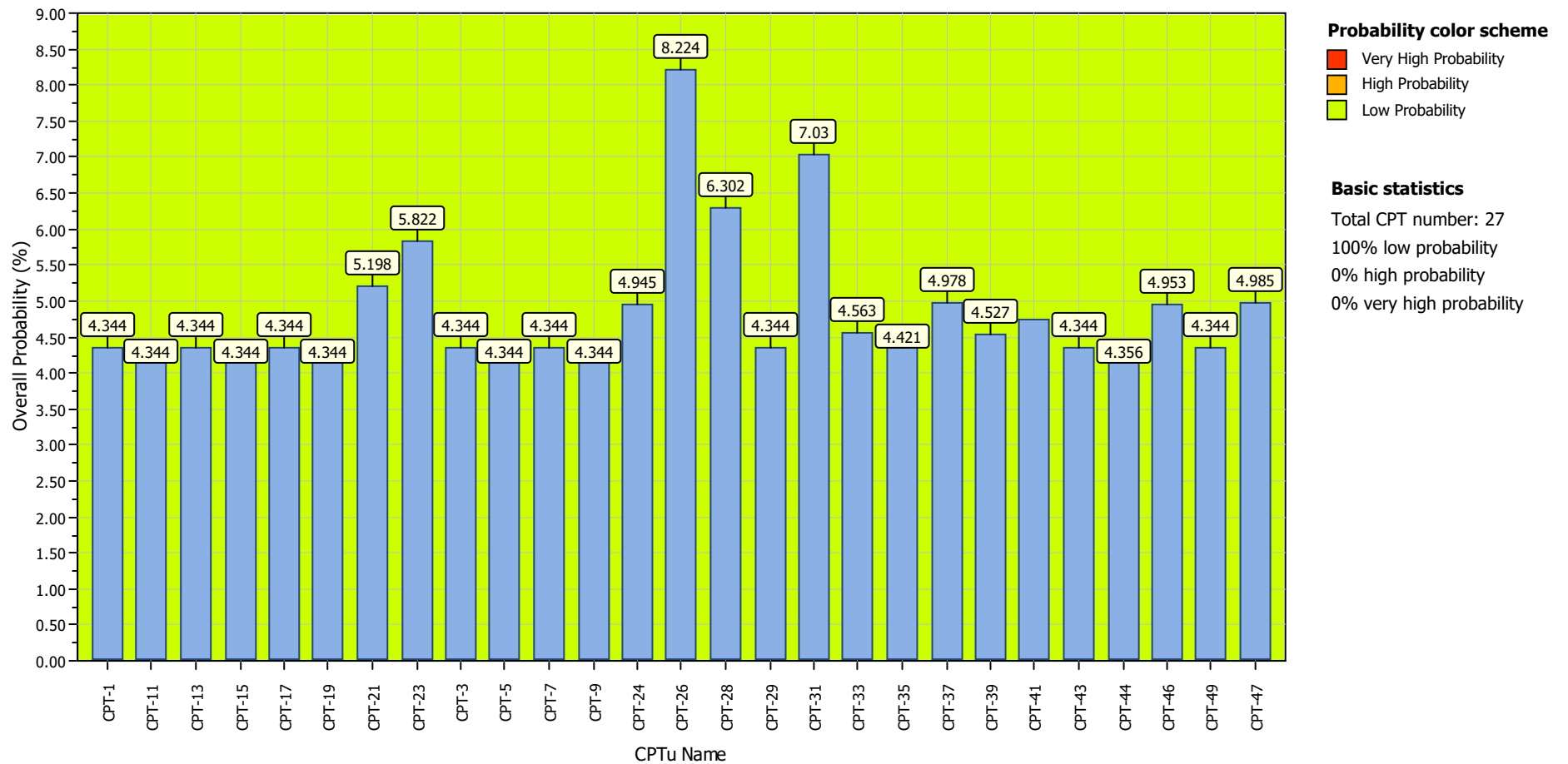
Overall lateral displacements report



Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

Overall Probability for Liquefaction report



LIQUEFACTION ANALYSIS REPORT

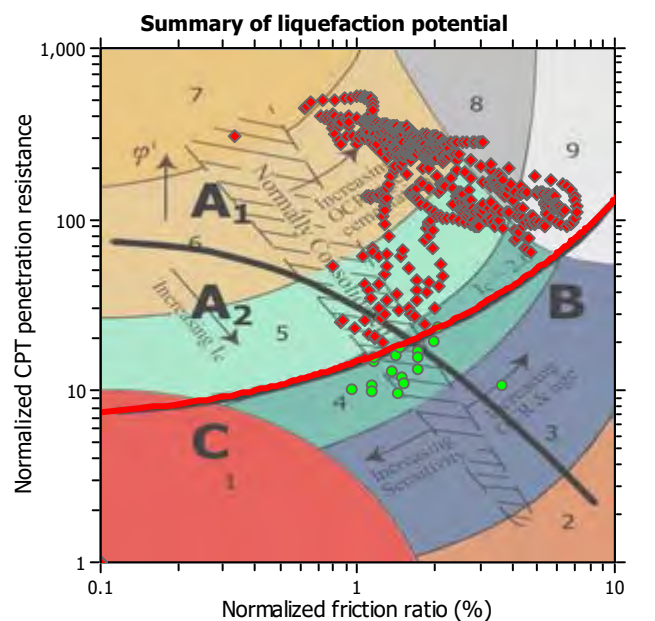
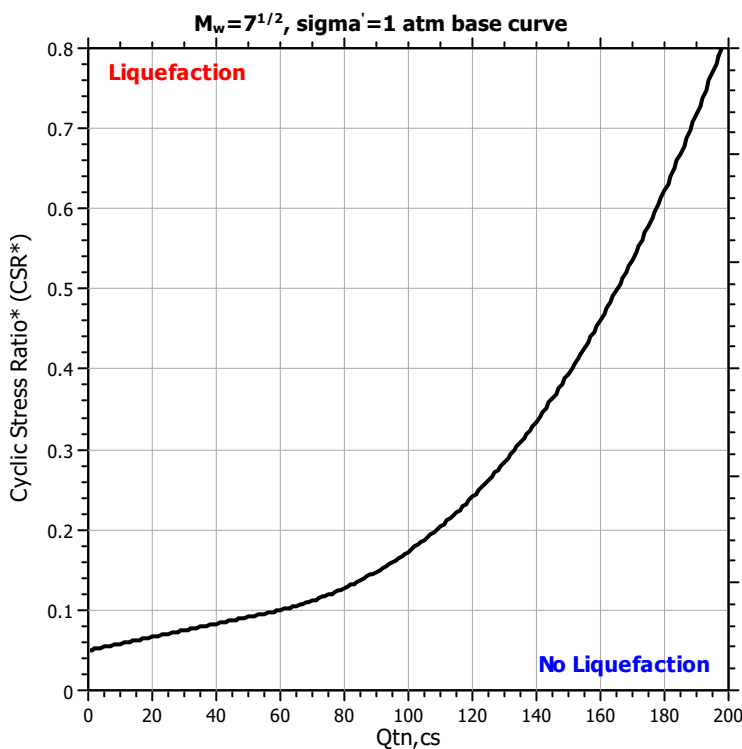
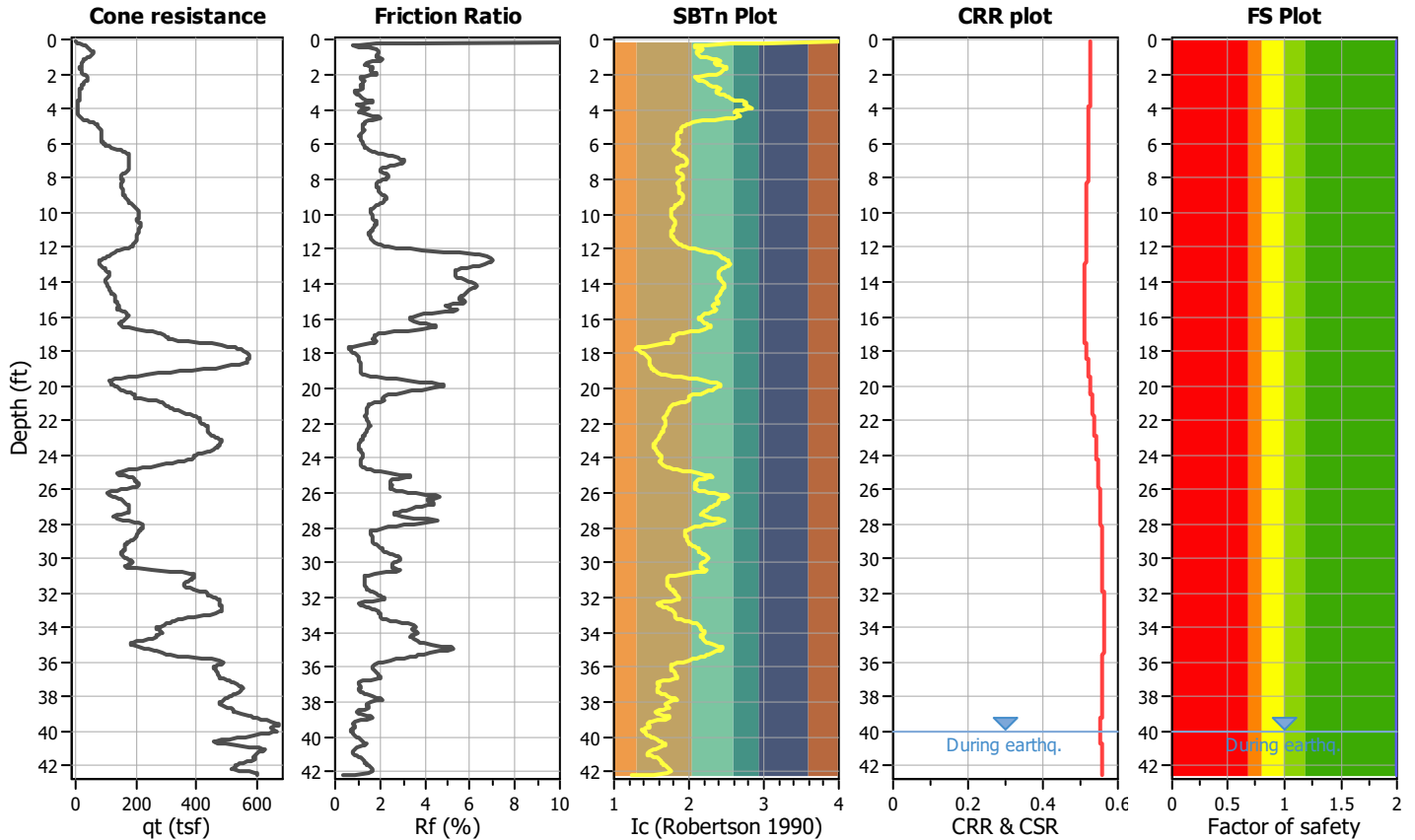
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

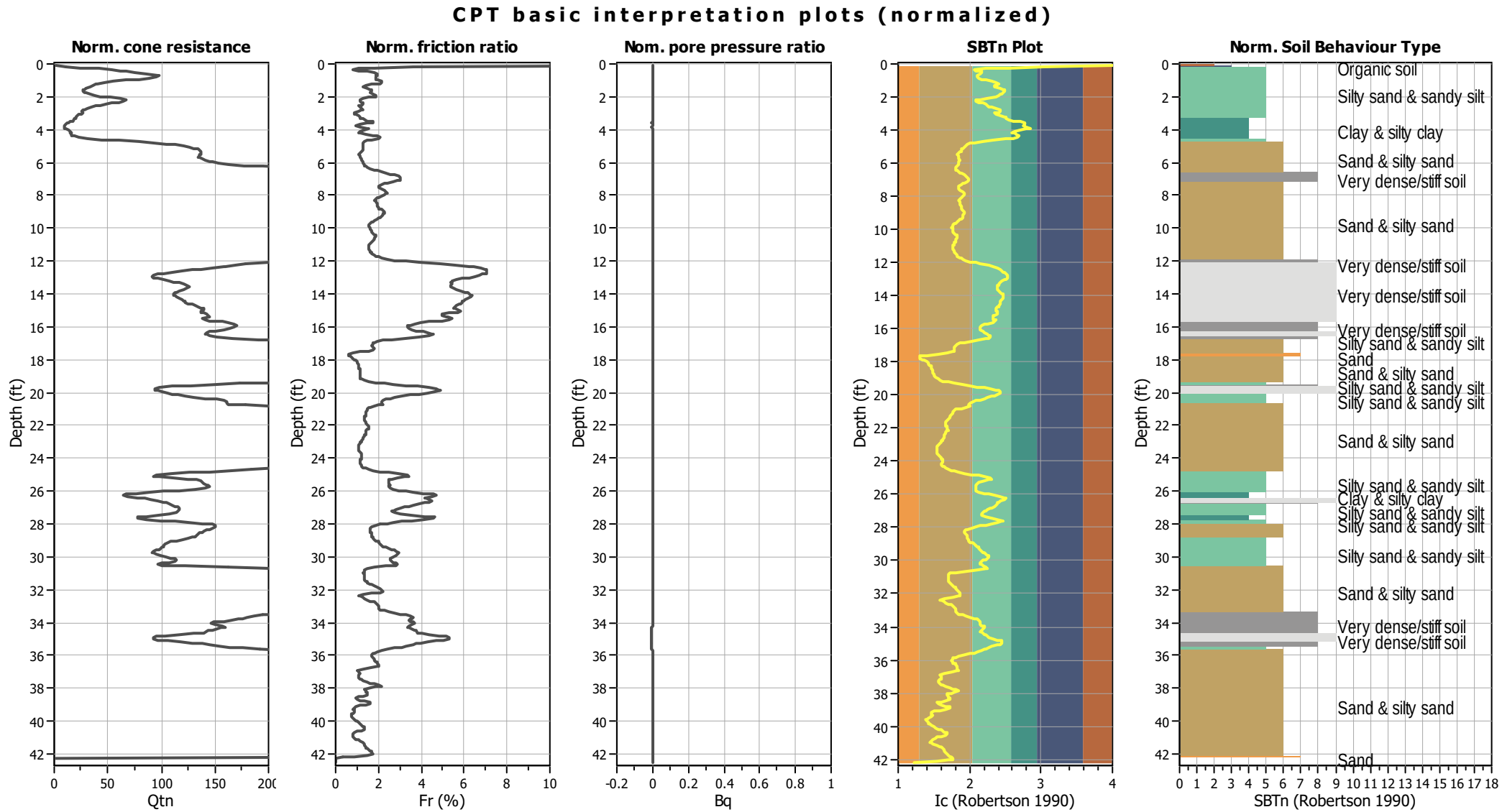
CPT file : CPT-1

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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

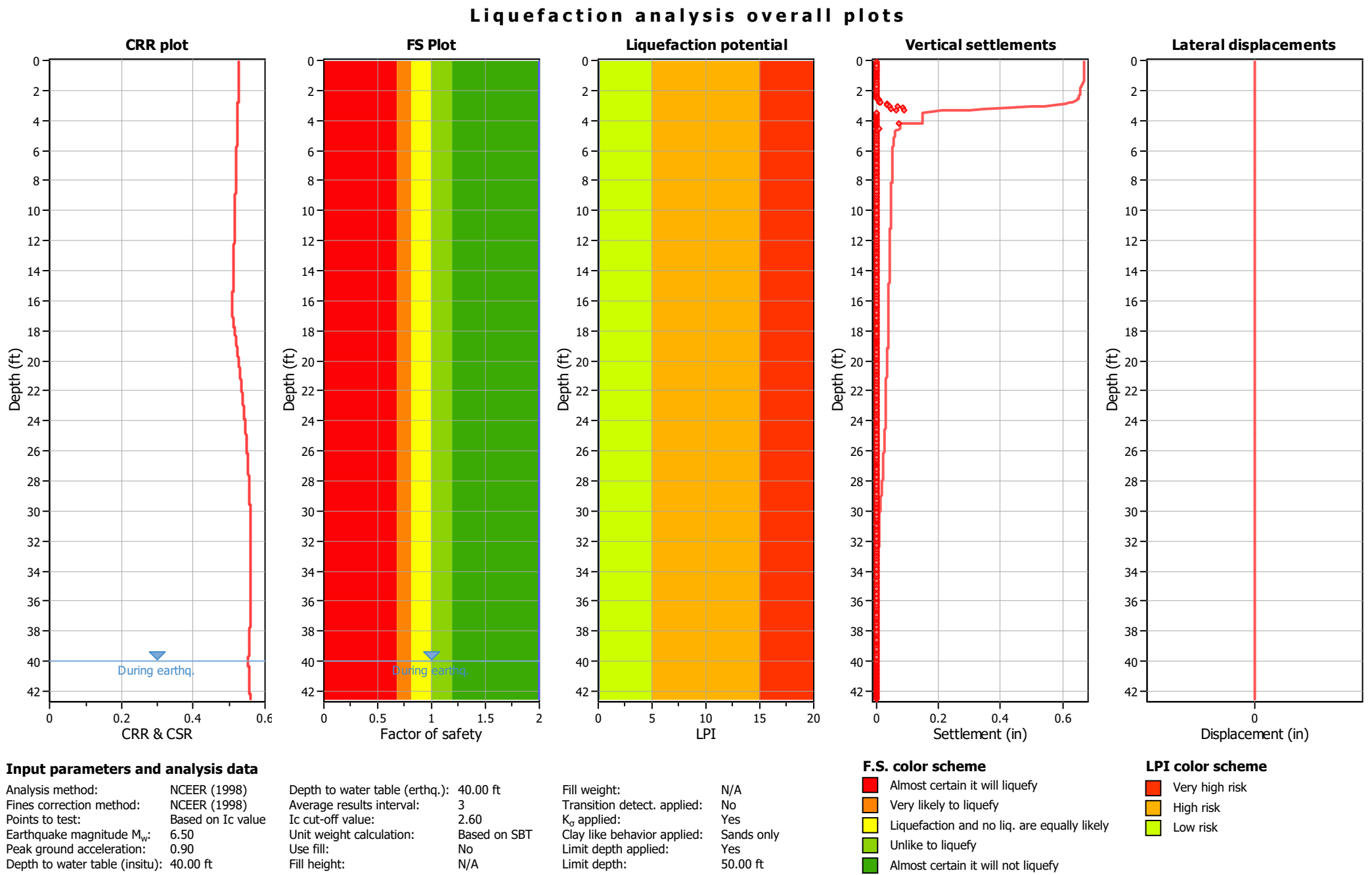


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 ₀ applied:	Yes
Earthquake magnitude M _w :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

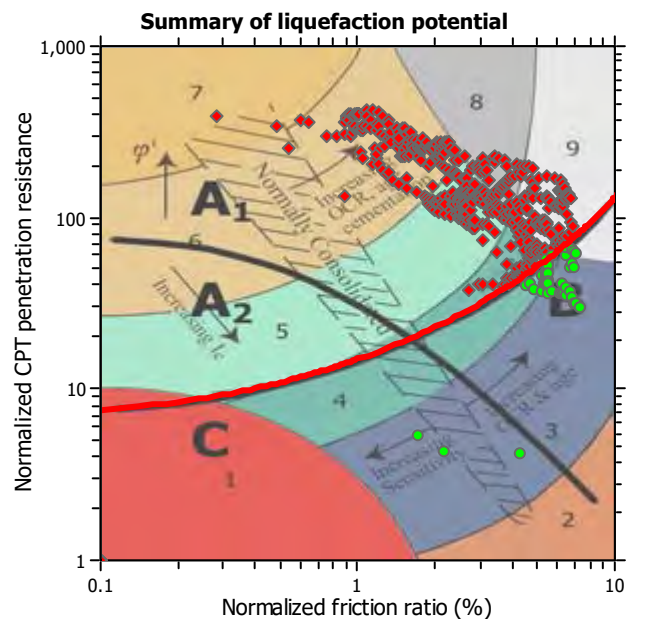
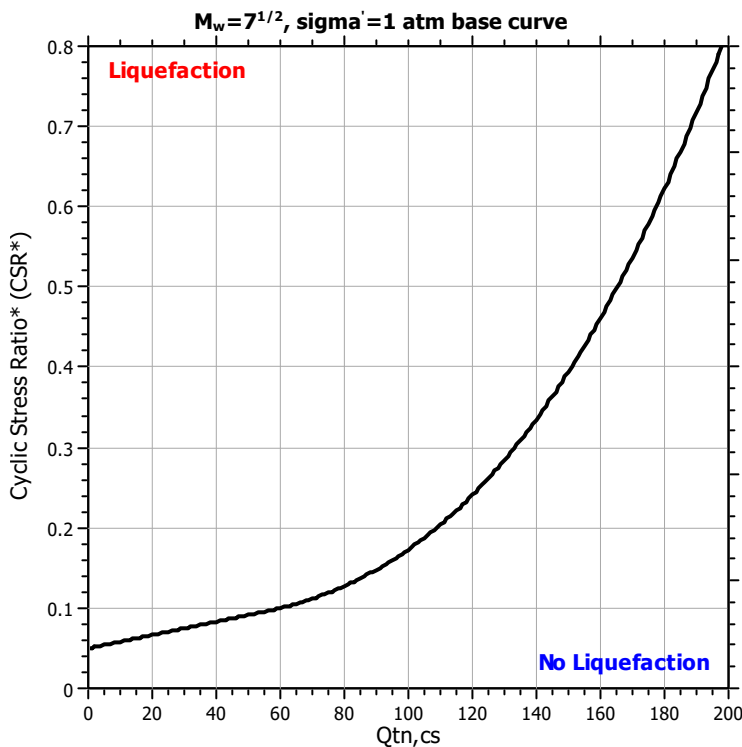
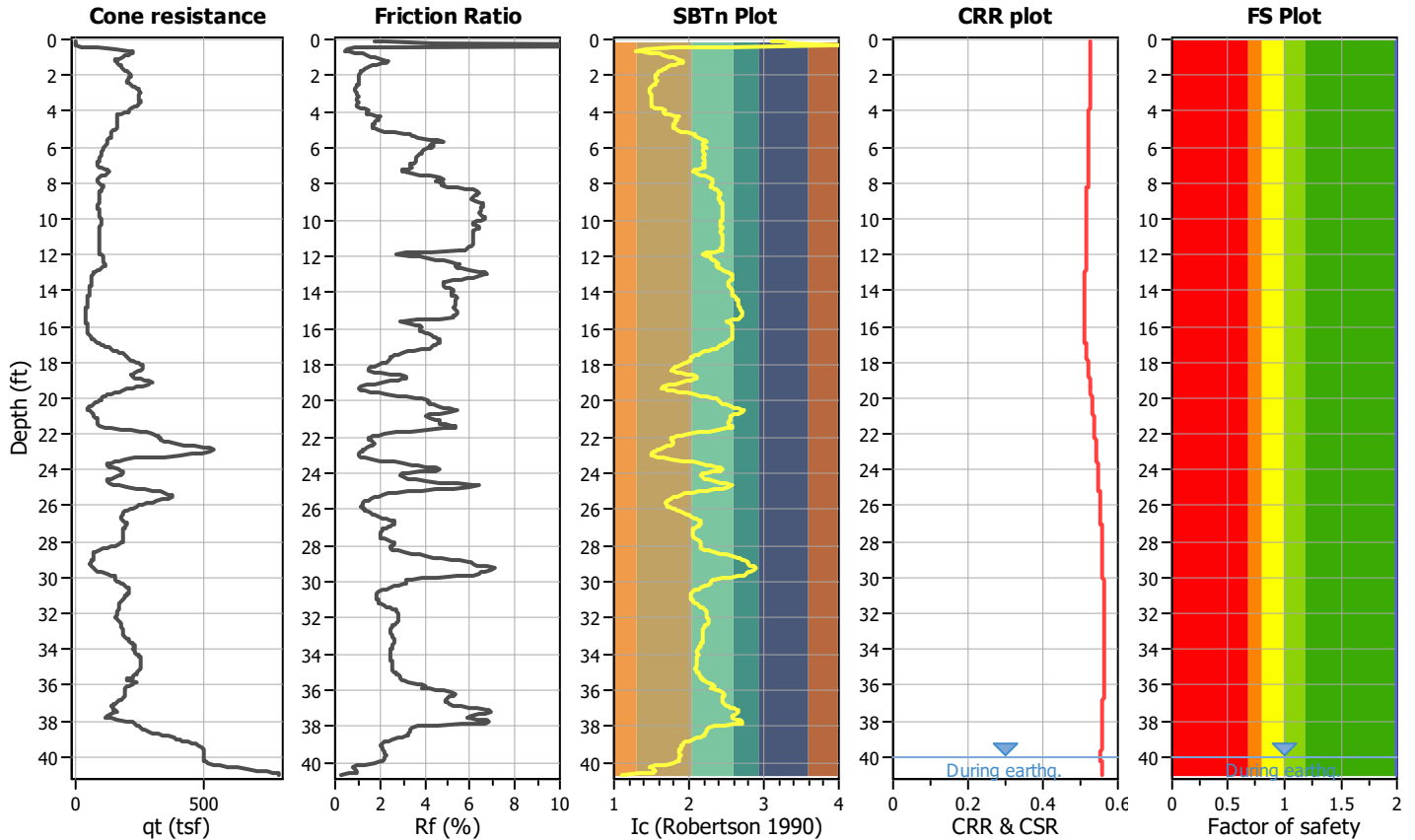
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

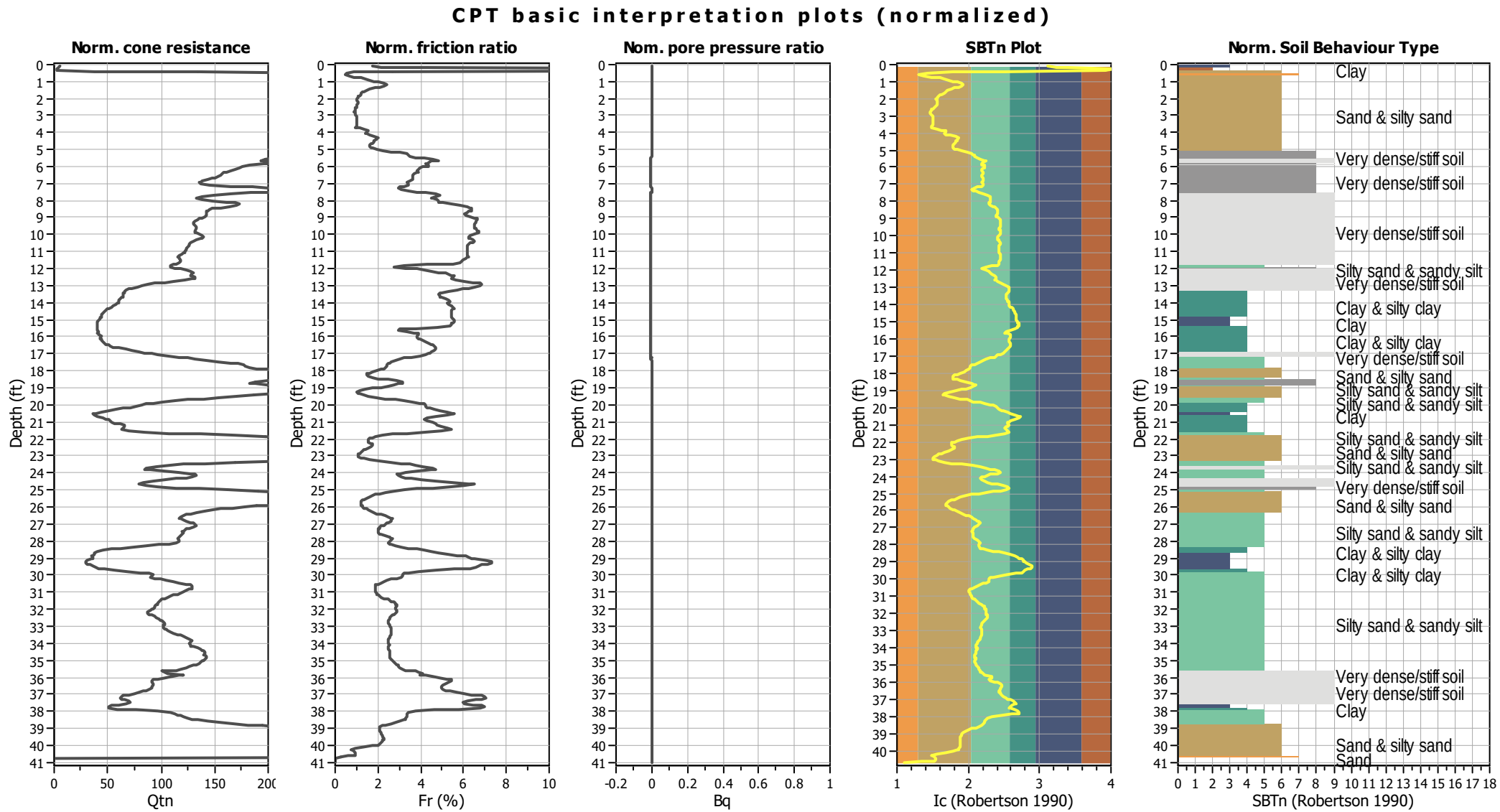
CPT file : CPT-3

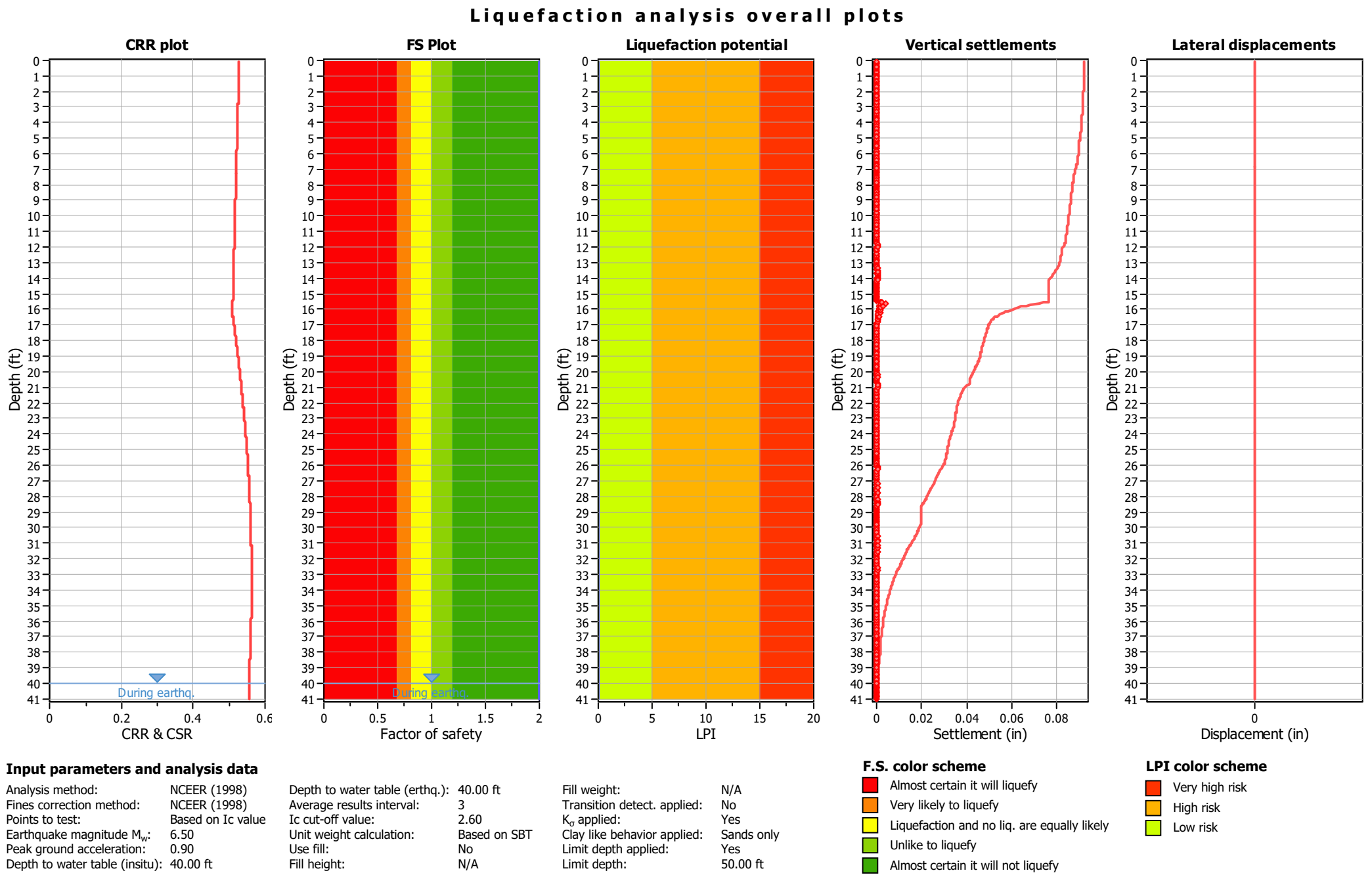
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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





LIQUEFACTION ANALYSIS REPORT

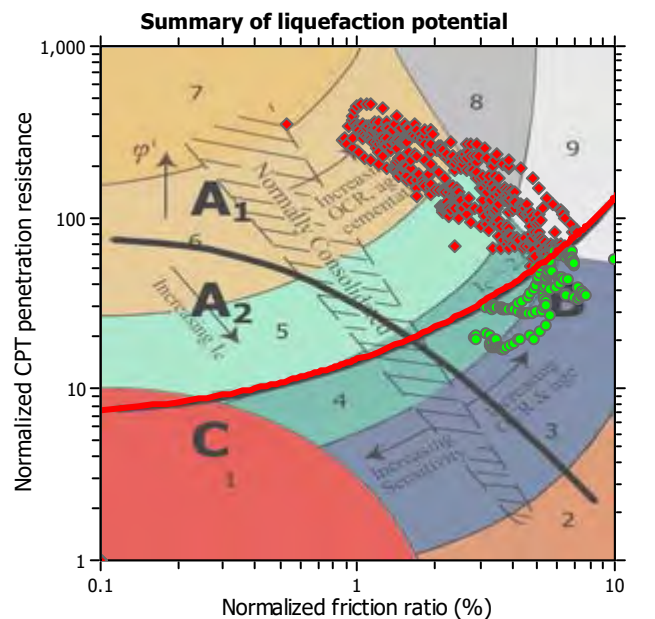
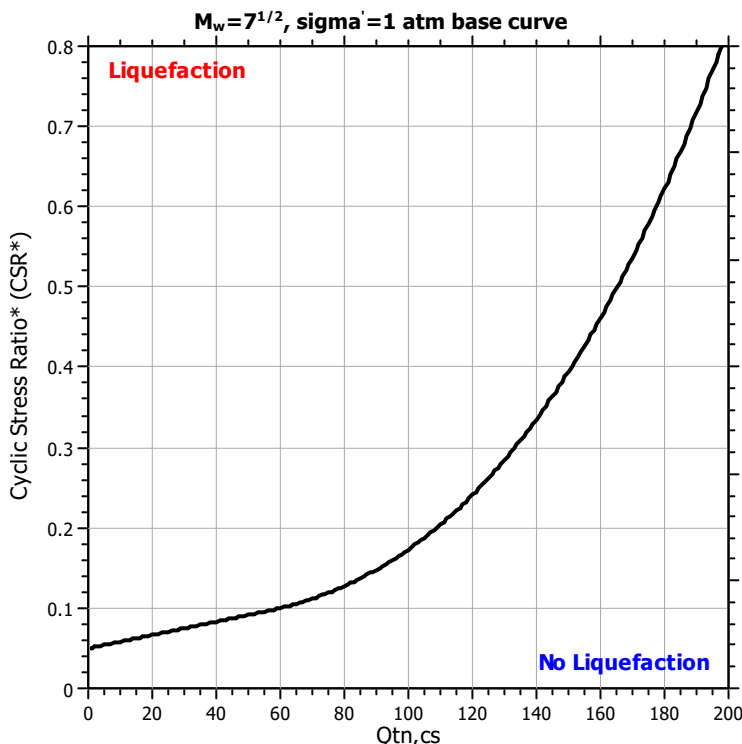
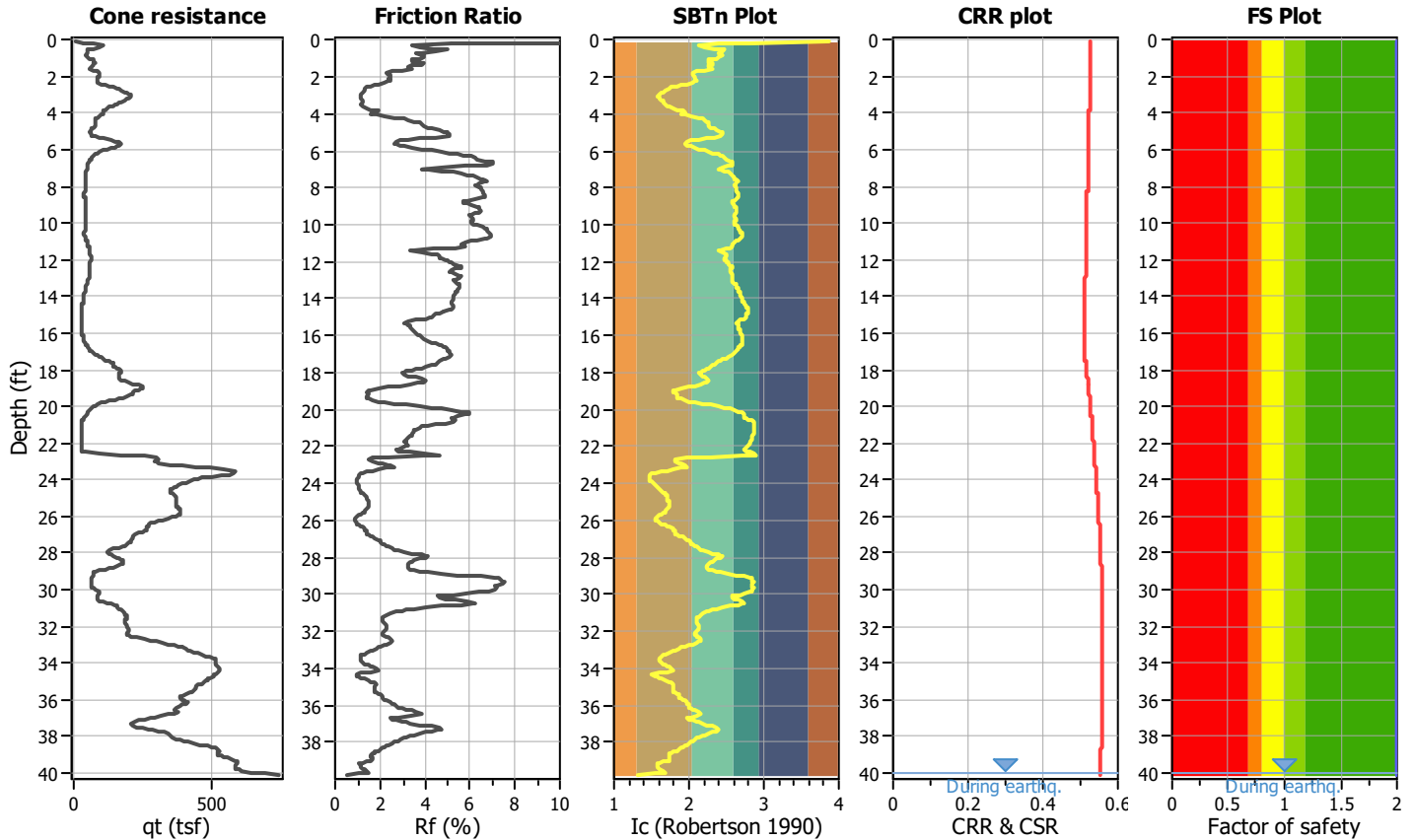
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

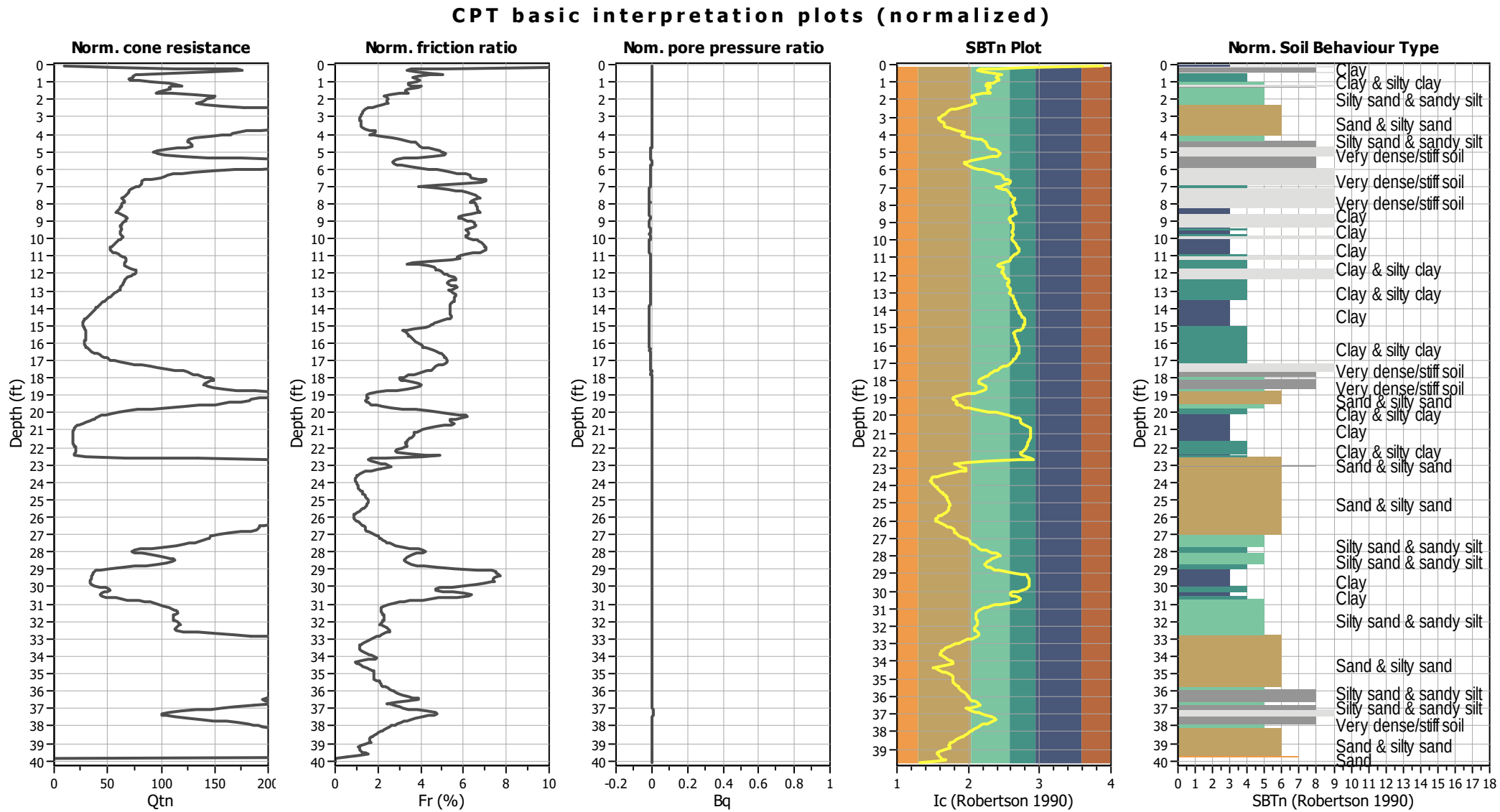
CPT file : CPT-5

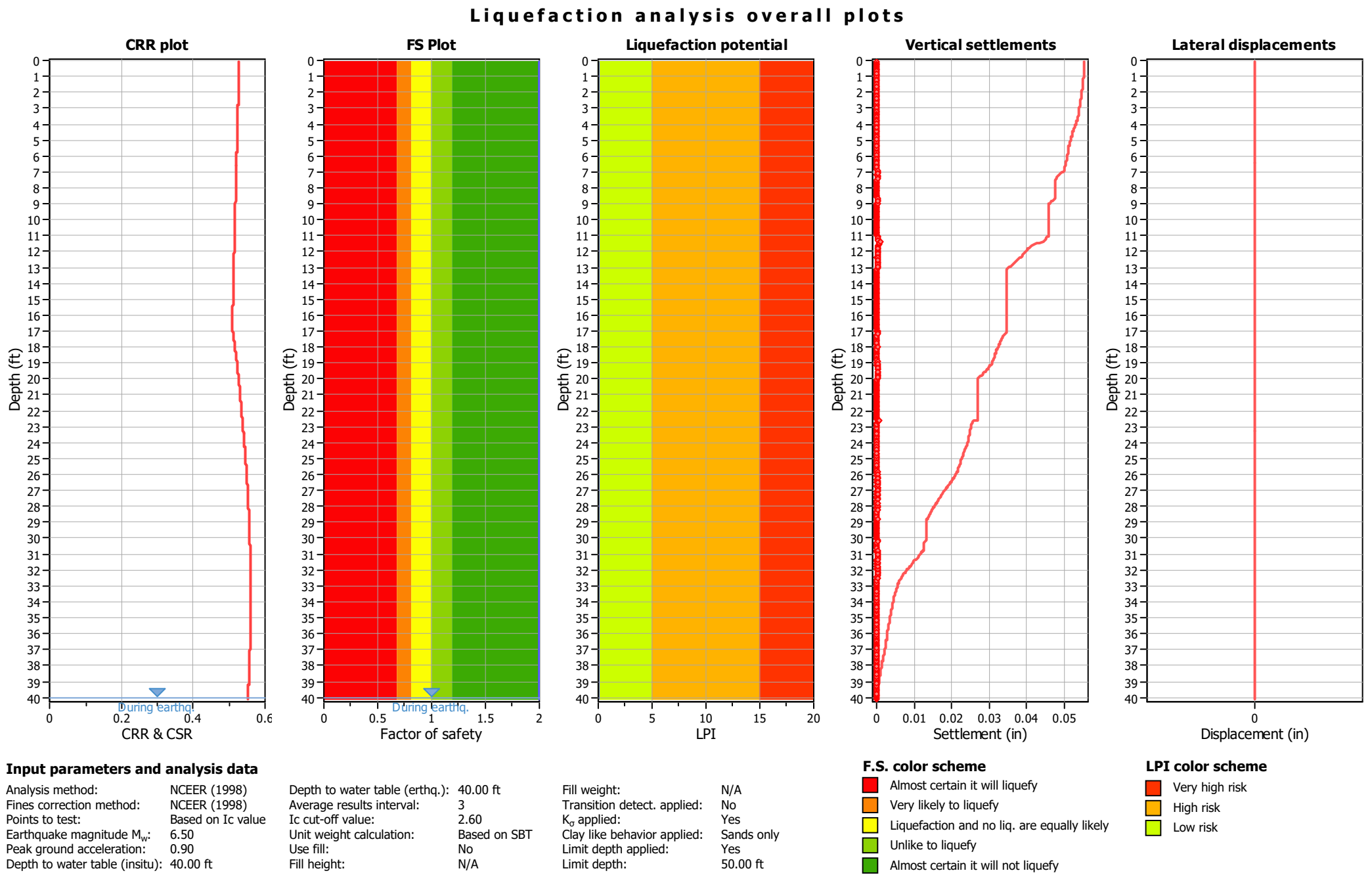
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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





LIQUEFACTION ANALYSIS REPORT

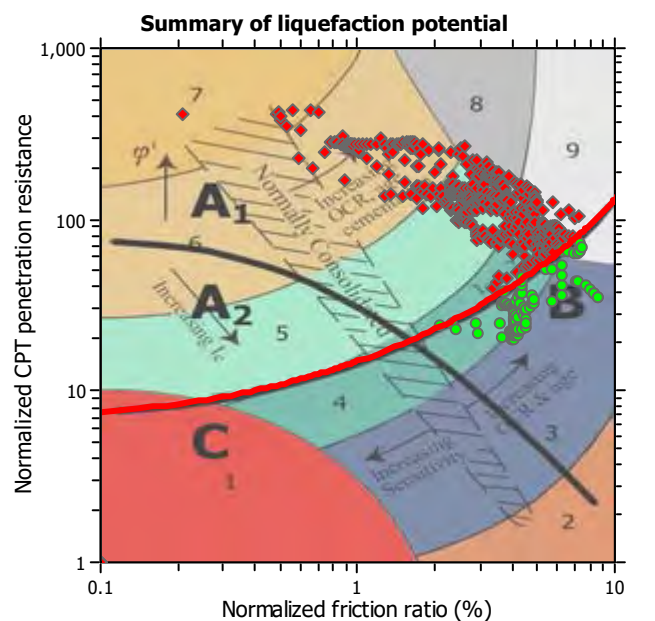
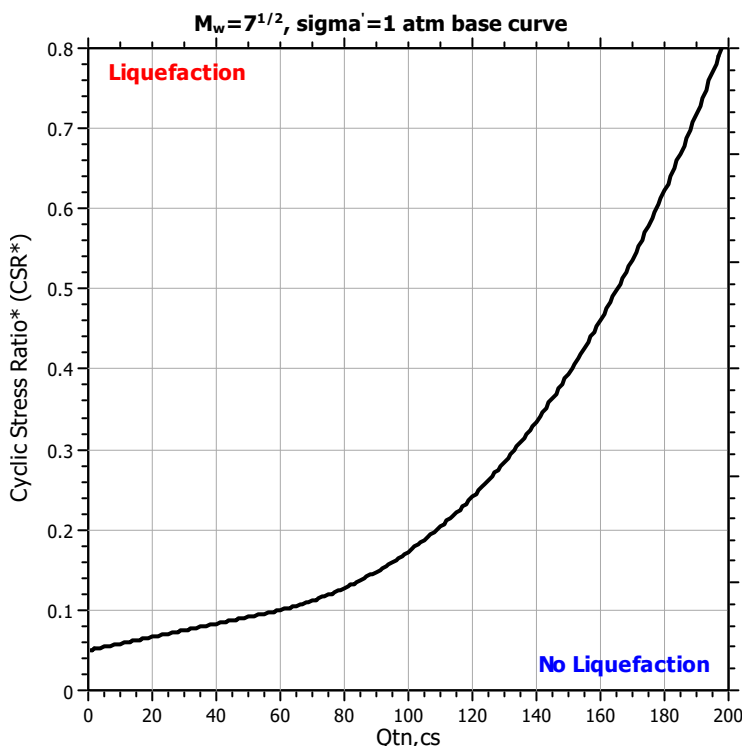
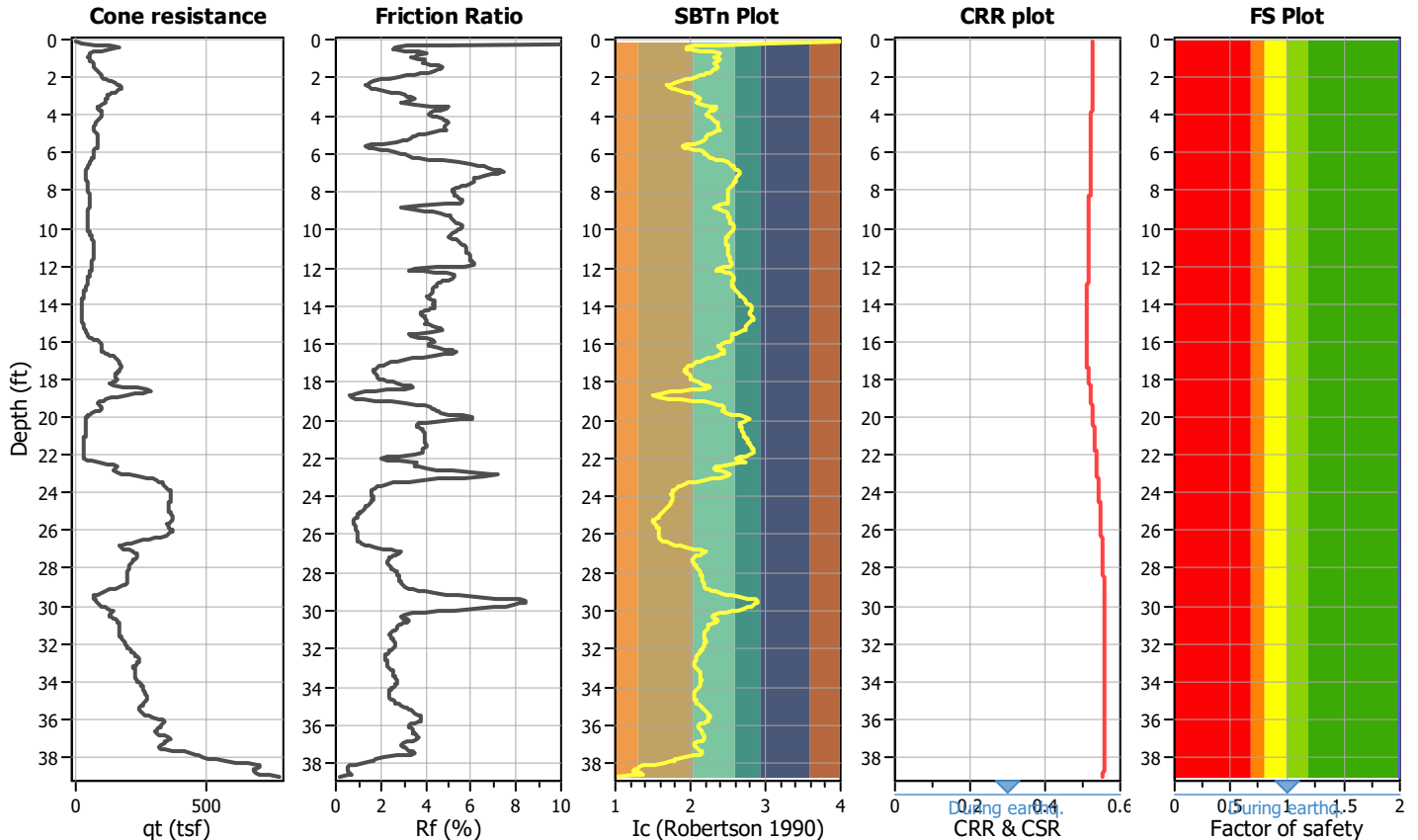
Project title : 14030.001 Lewis Rosemead Condos

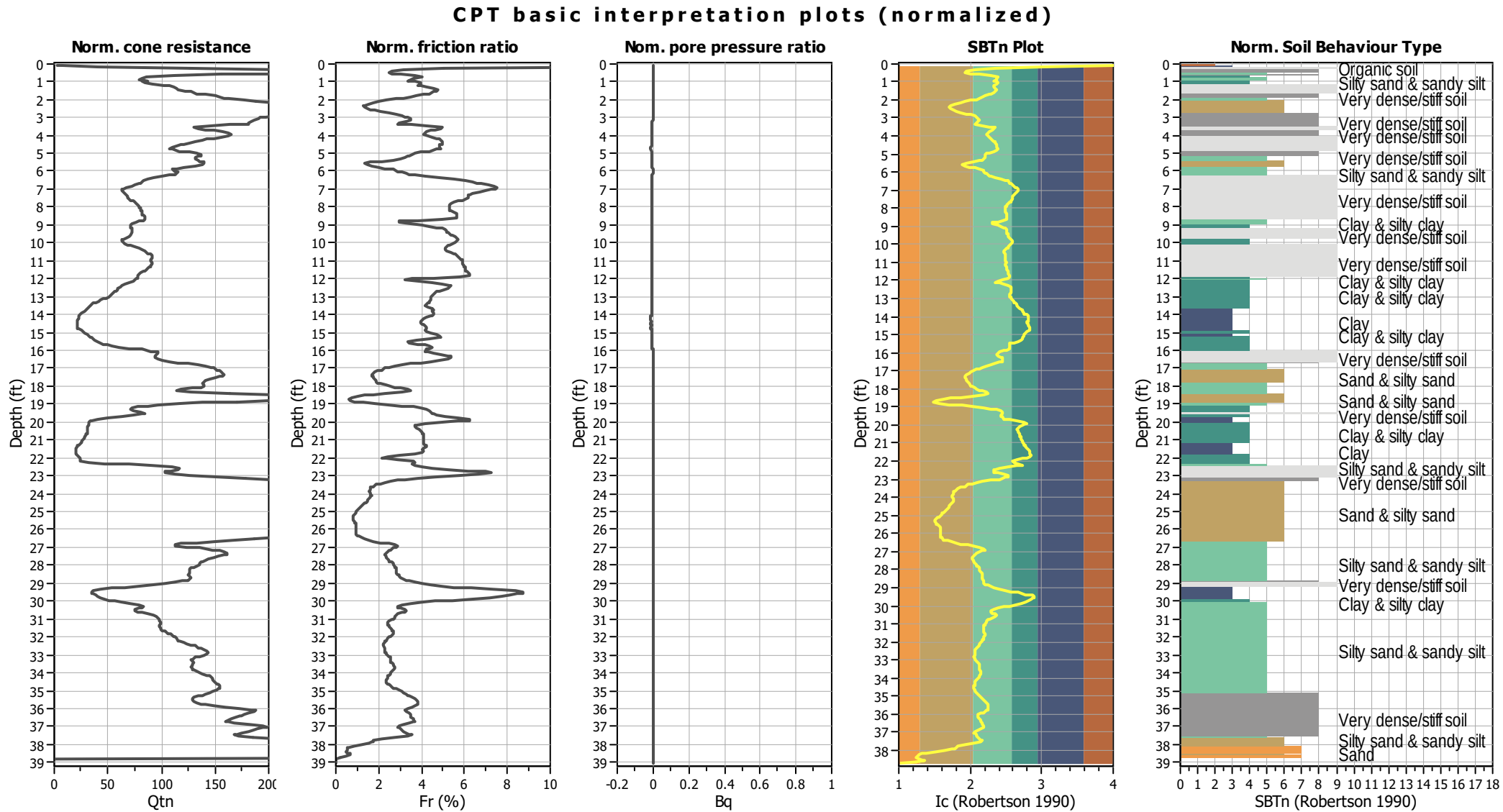
Location : Rosemead CA

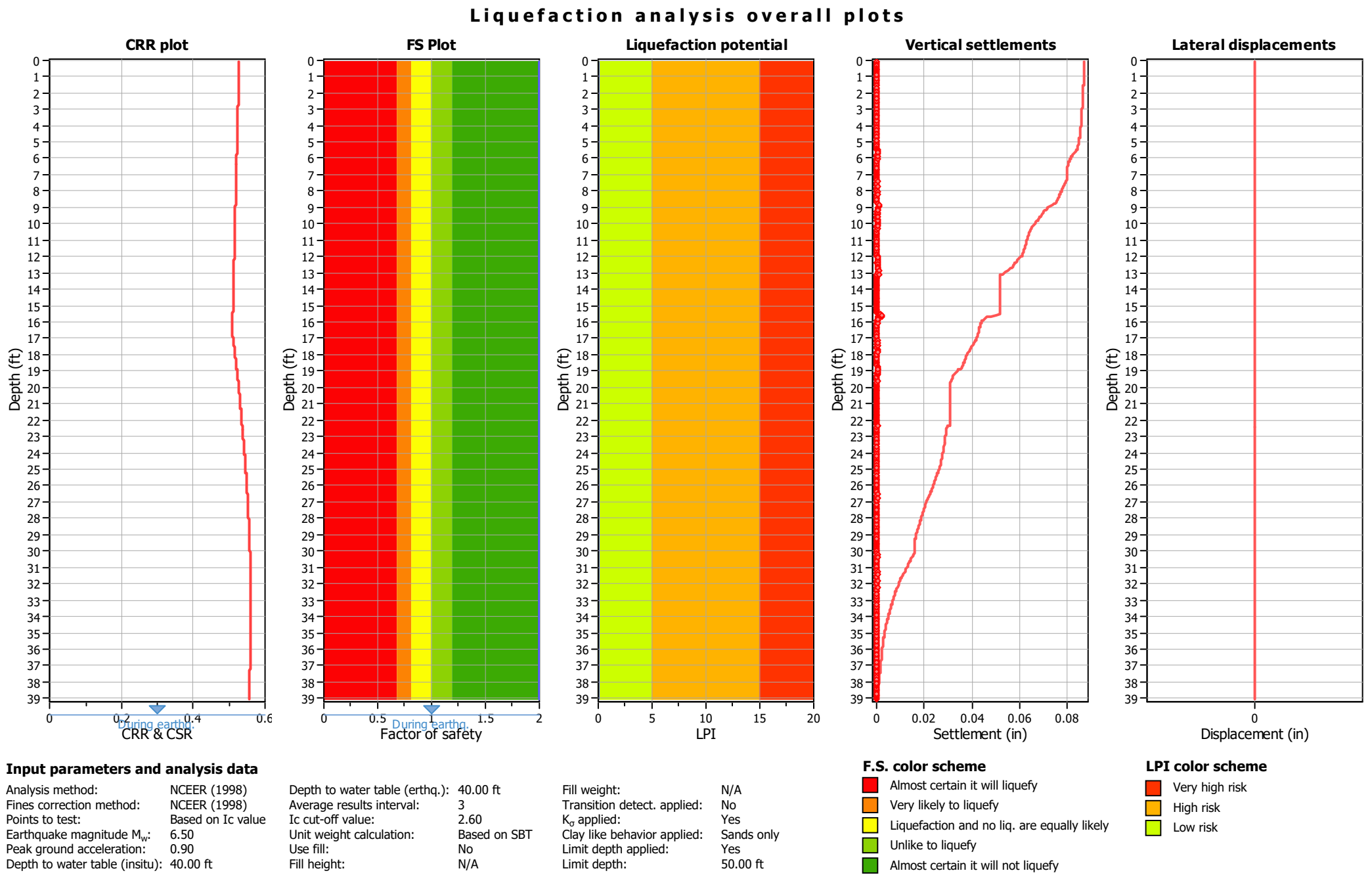
CPT file : CPT-7

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based







LIQUEFACTION ANALYSIS REPORT

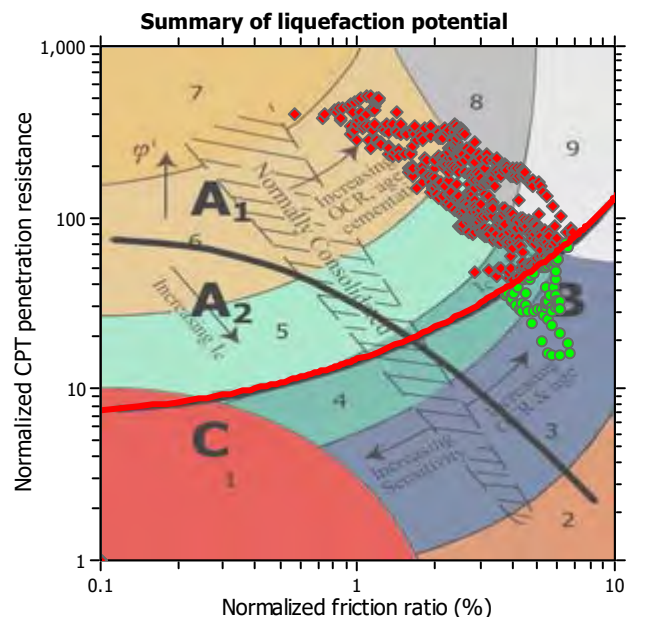
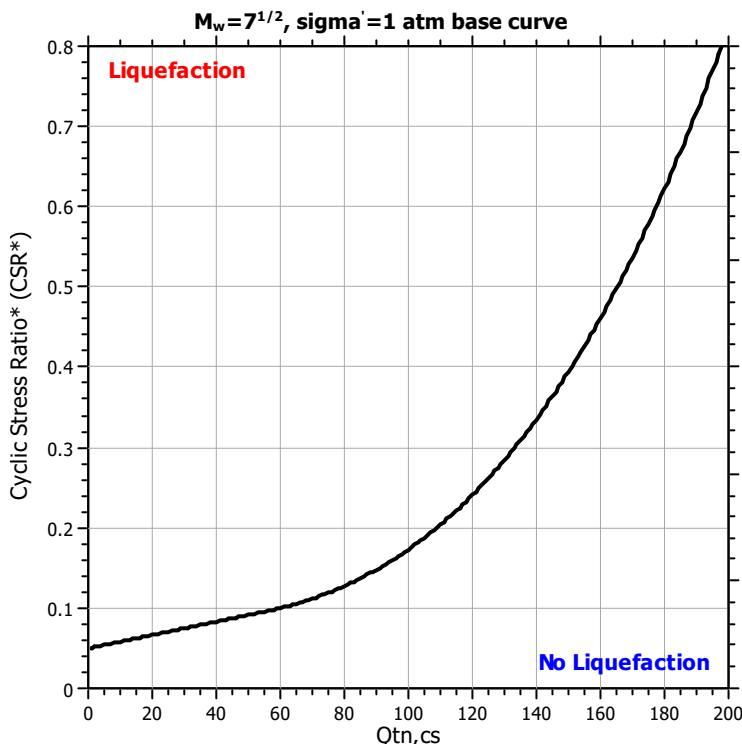
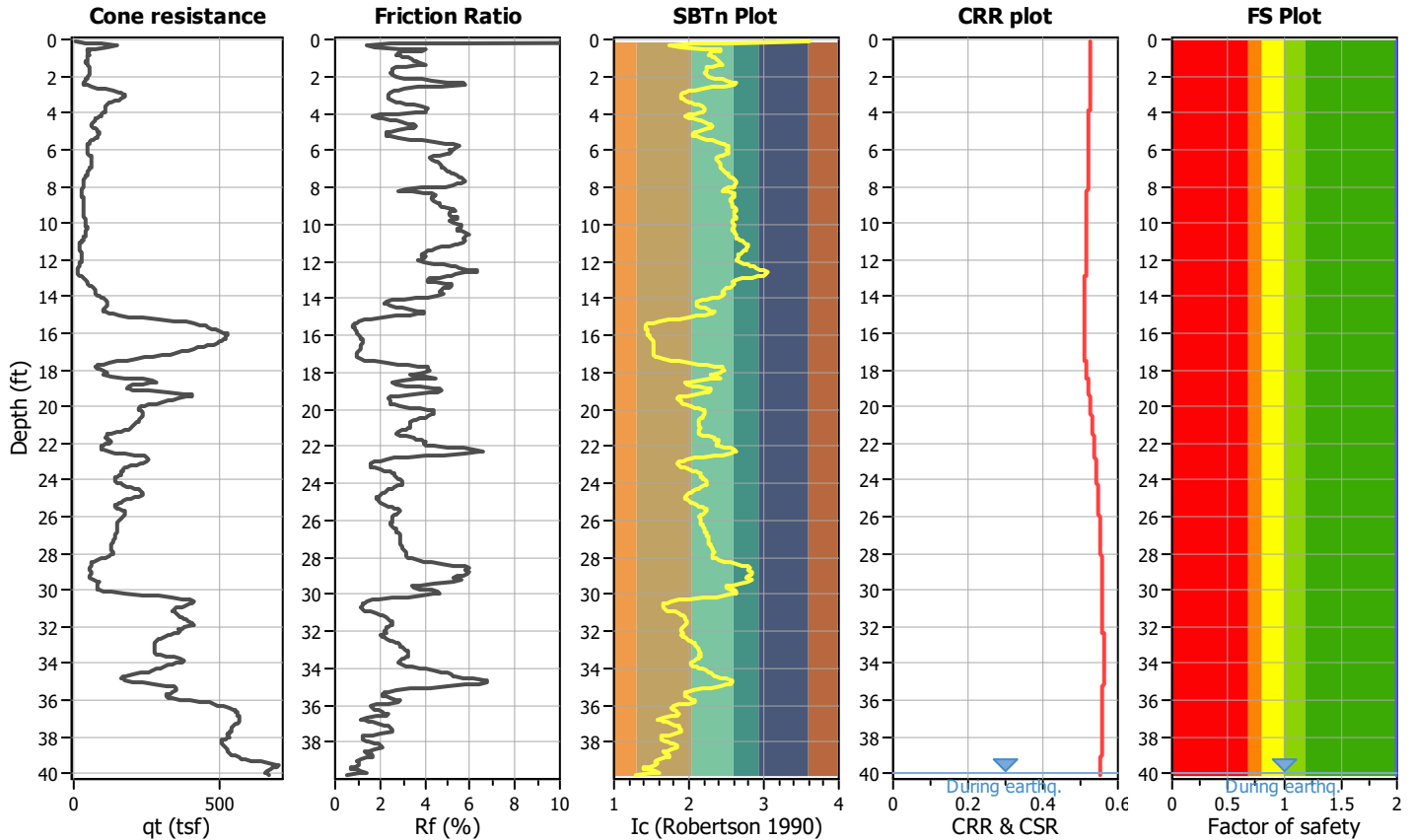
Project title : 14030.001 Lewis Rosemead Condos

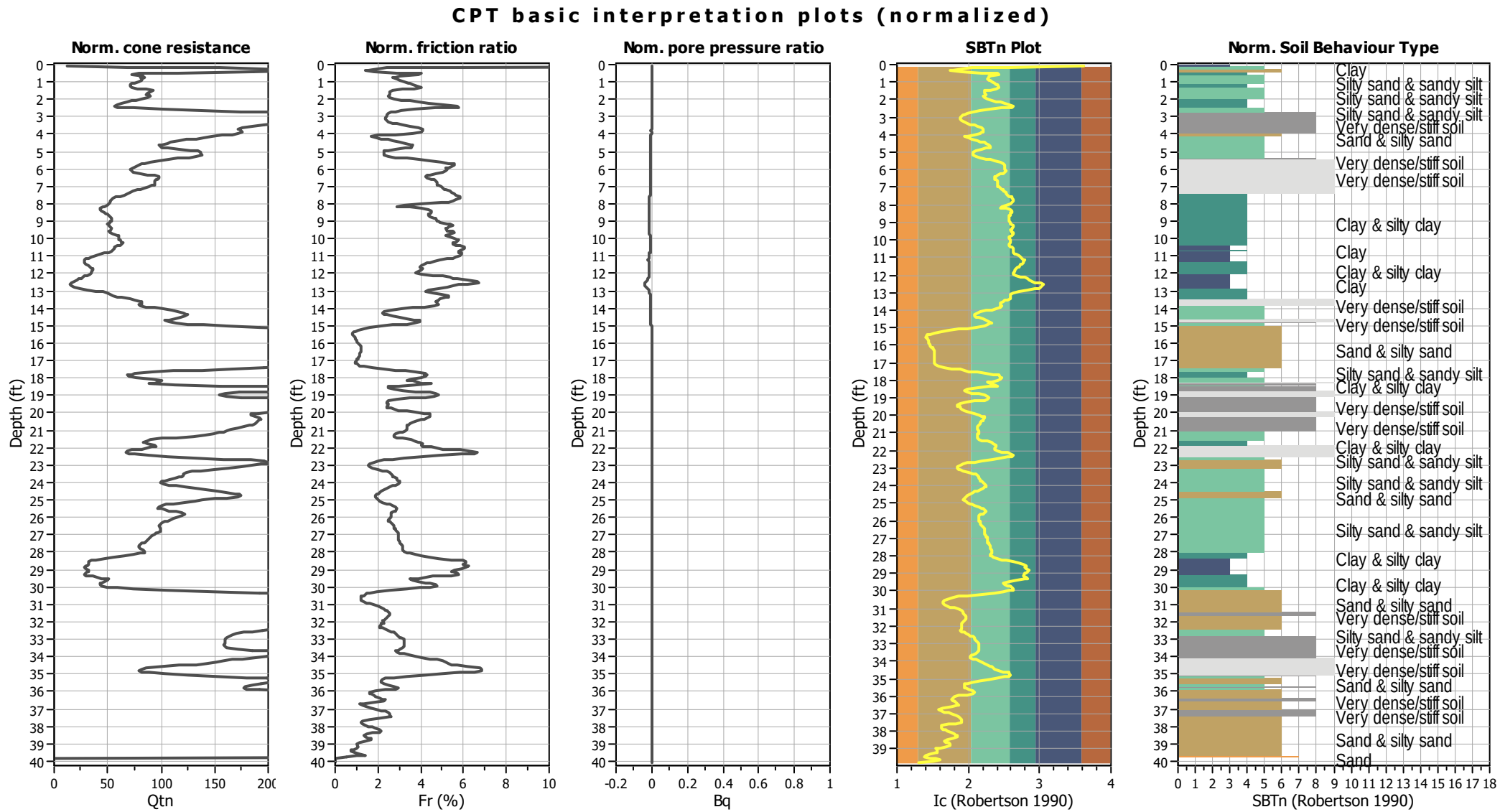
Location : Rosemead CA

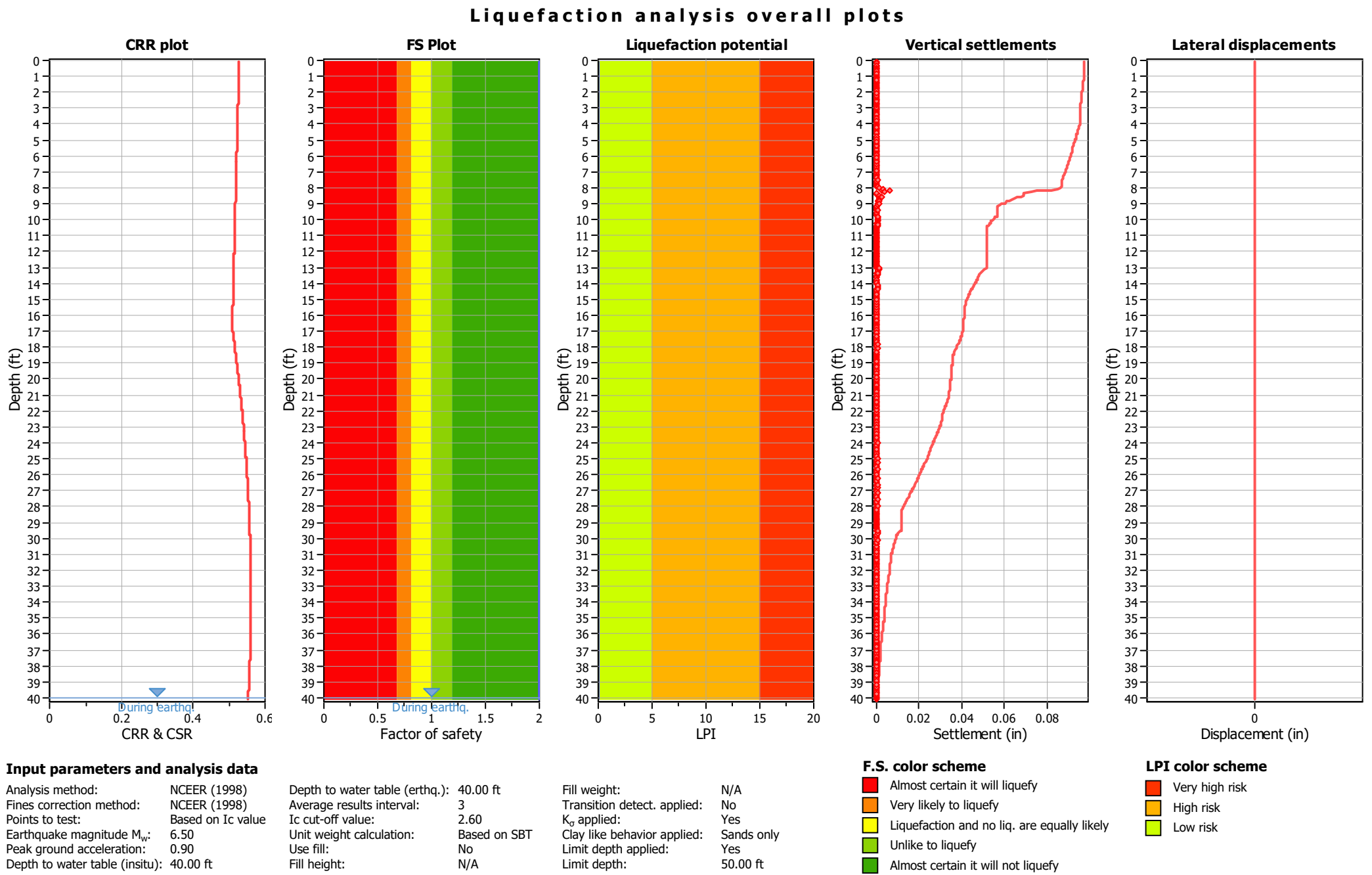
CPT file : CPT-9

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based







LIQUEFACTION ANALYSIS REPORT

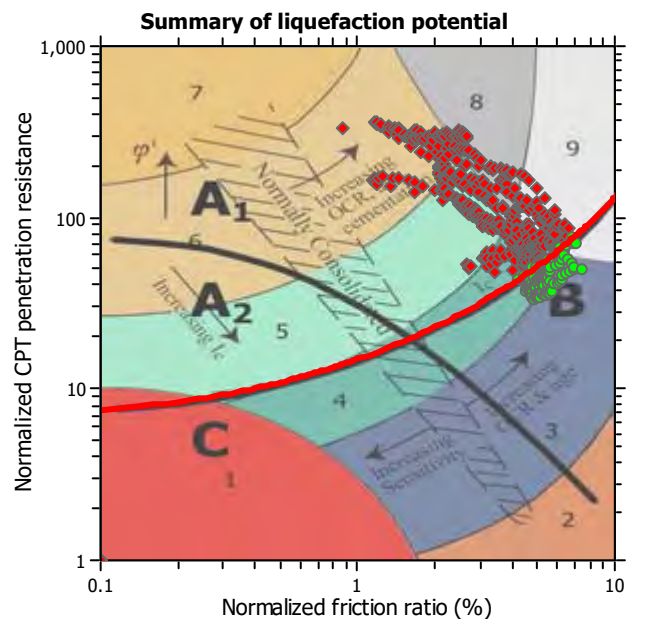
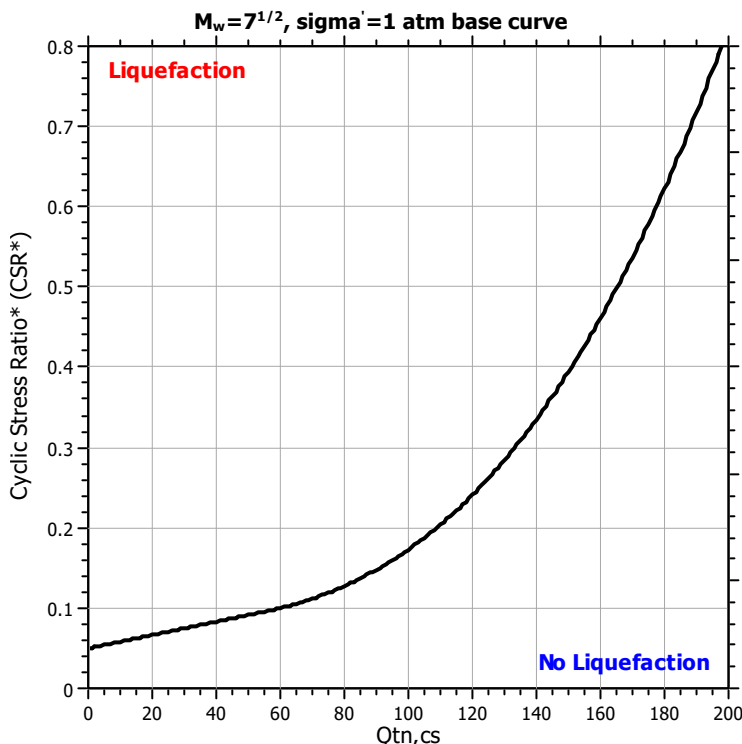
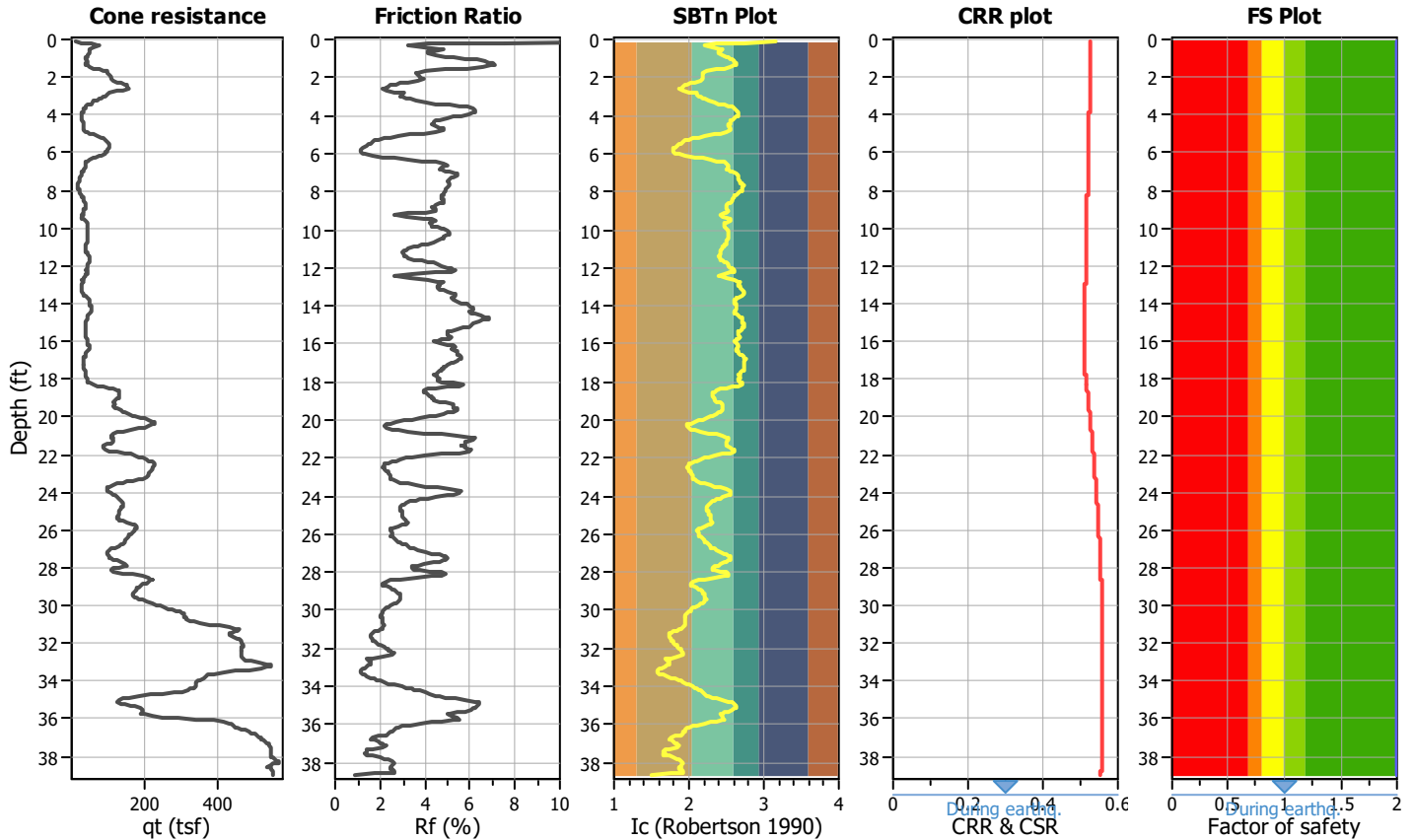
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

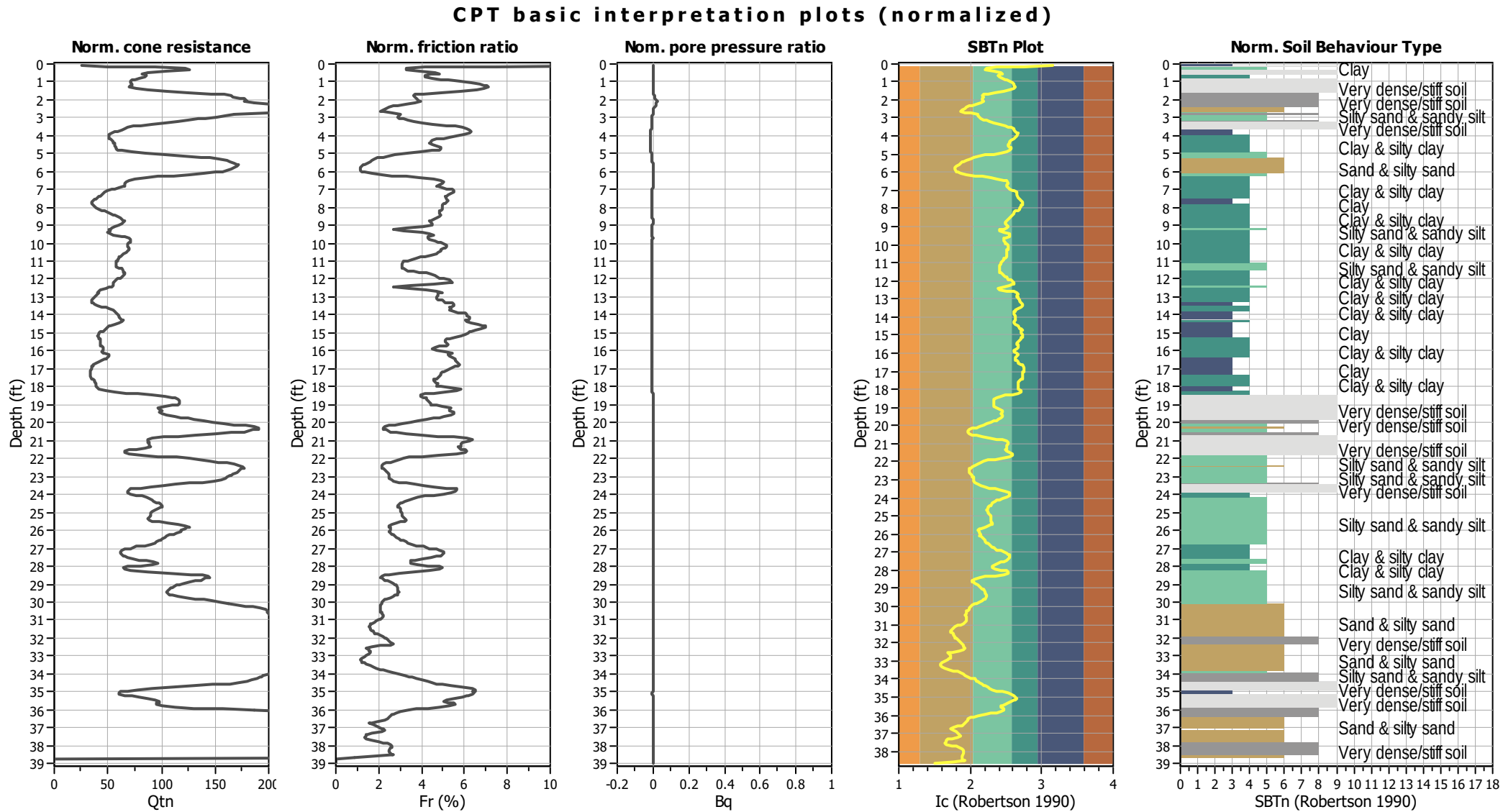
CPT file : CPT-11

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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

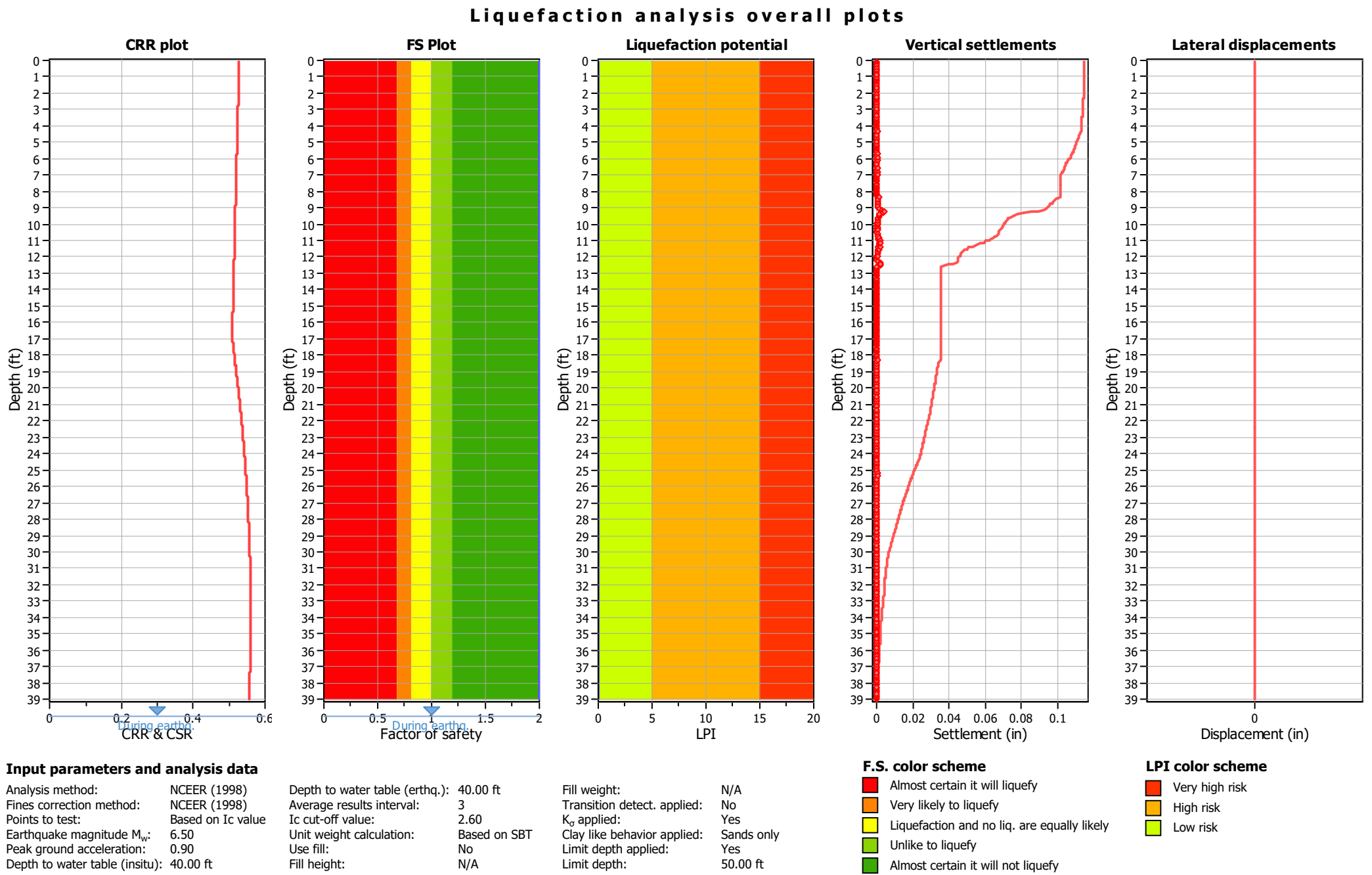


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 ₀ applied:	Yes
Earthquake magnitude M _w :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

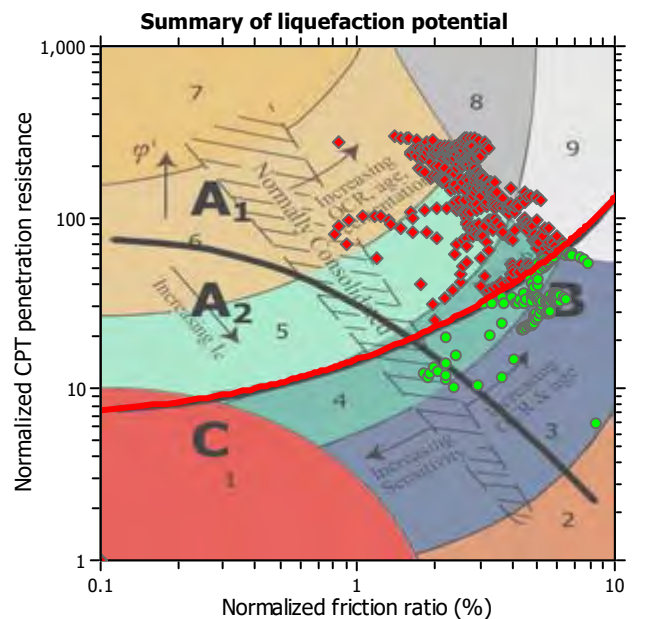
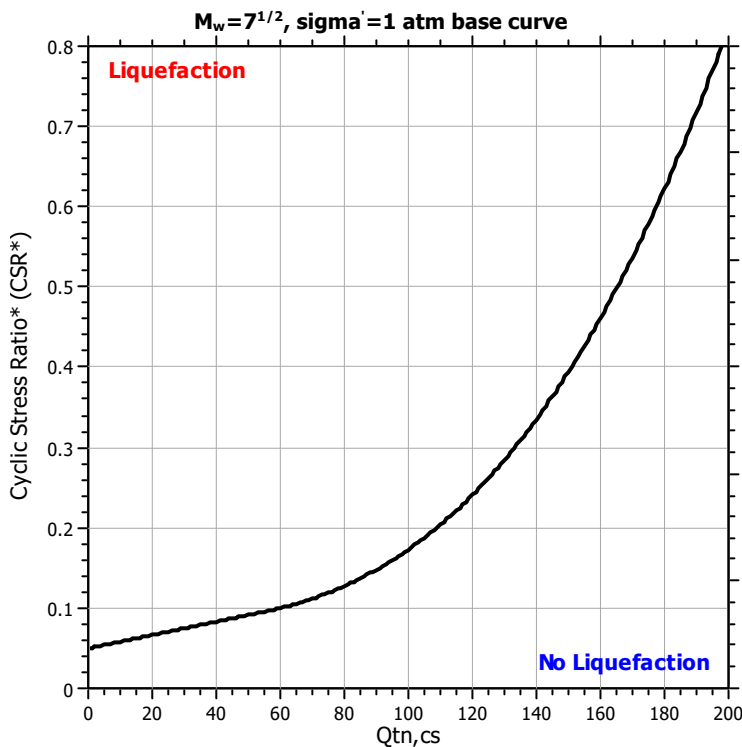
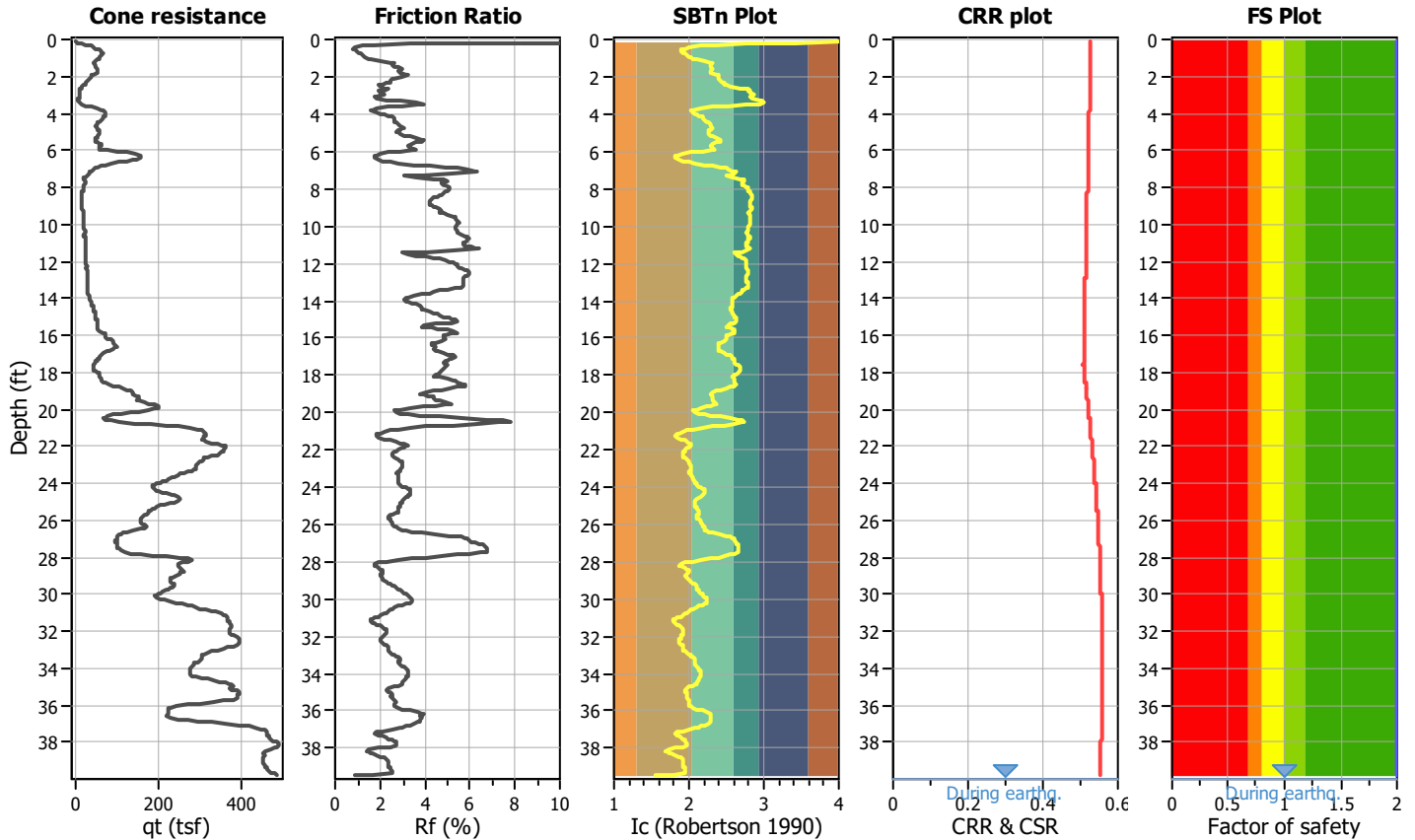
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

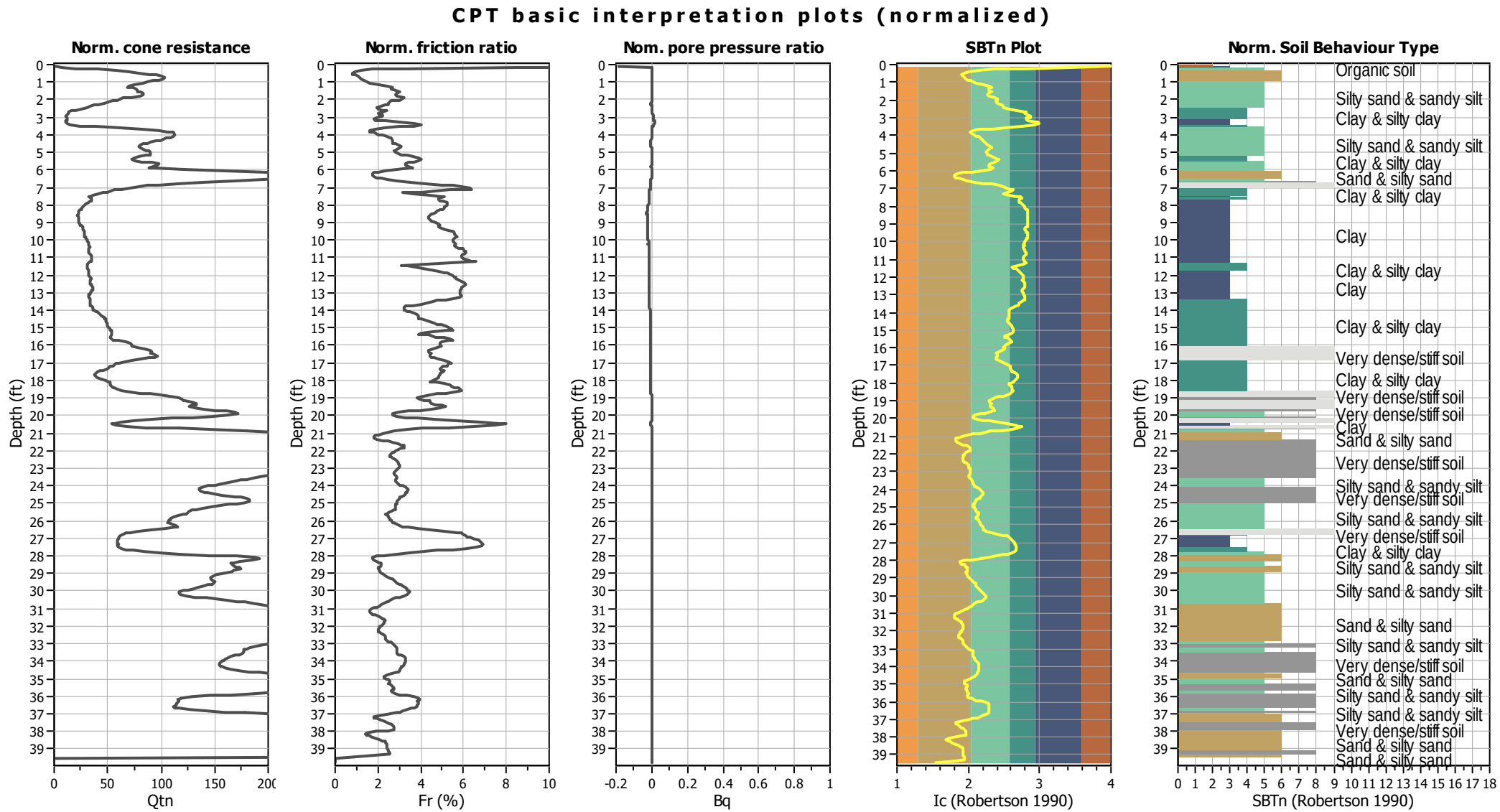
CPT file : CPT-13

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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

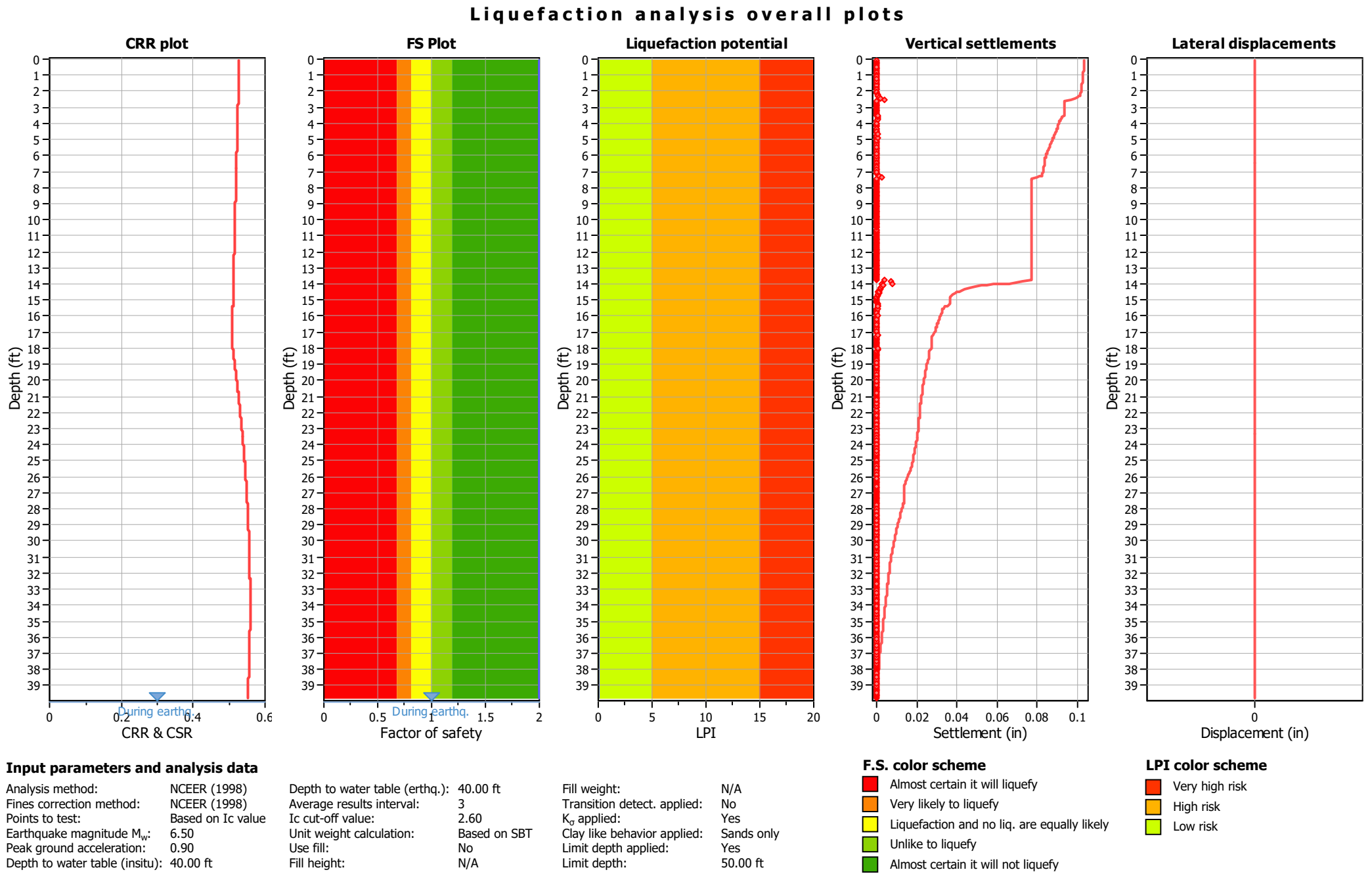


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

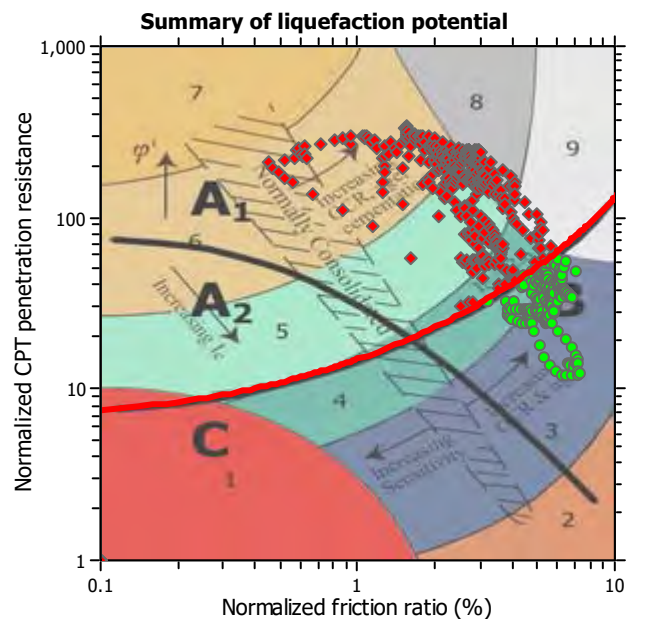
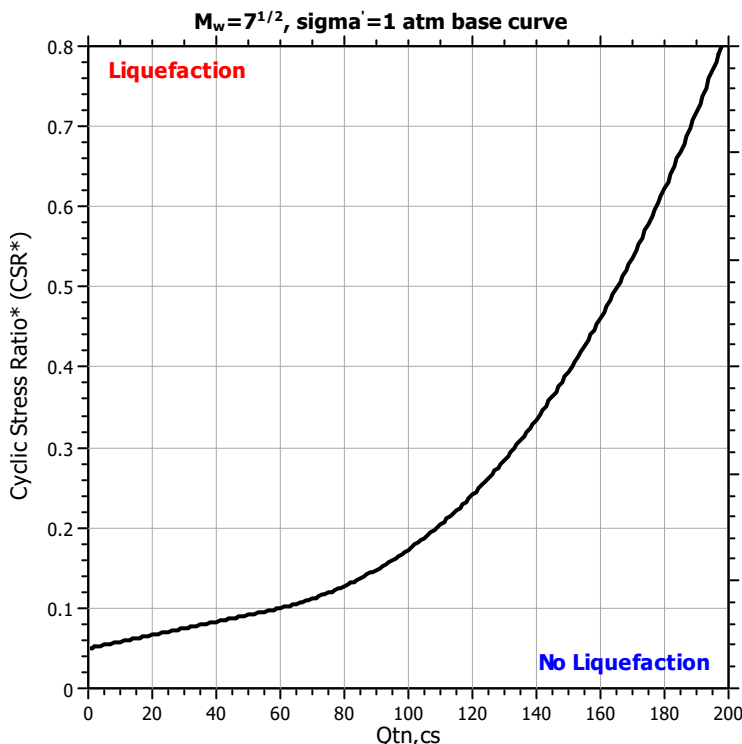
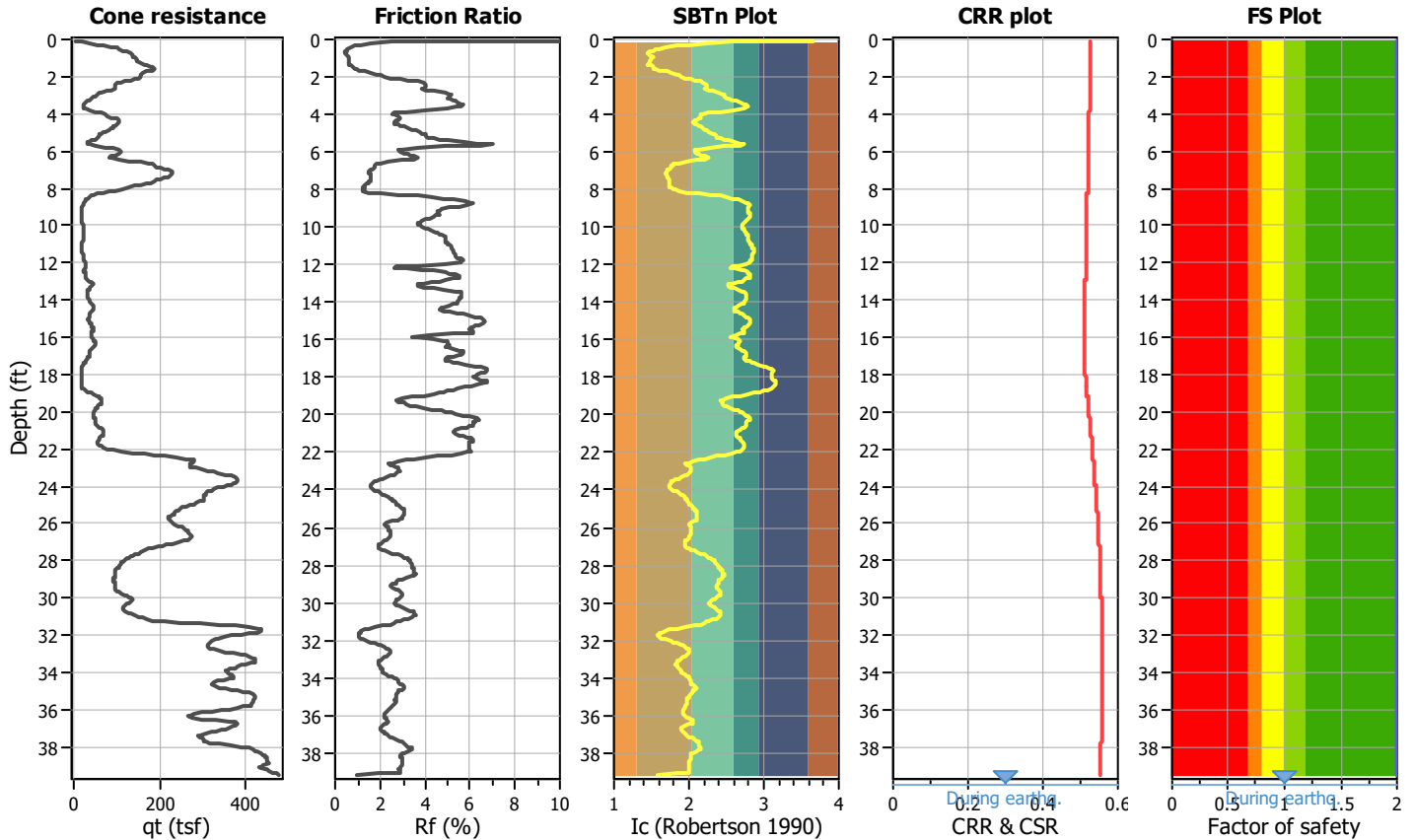
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

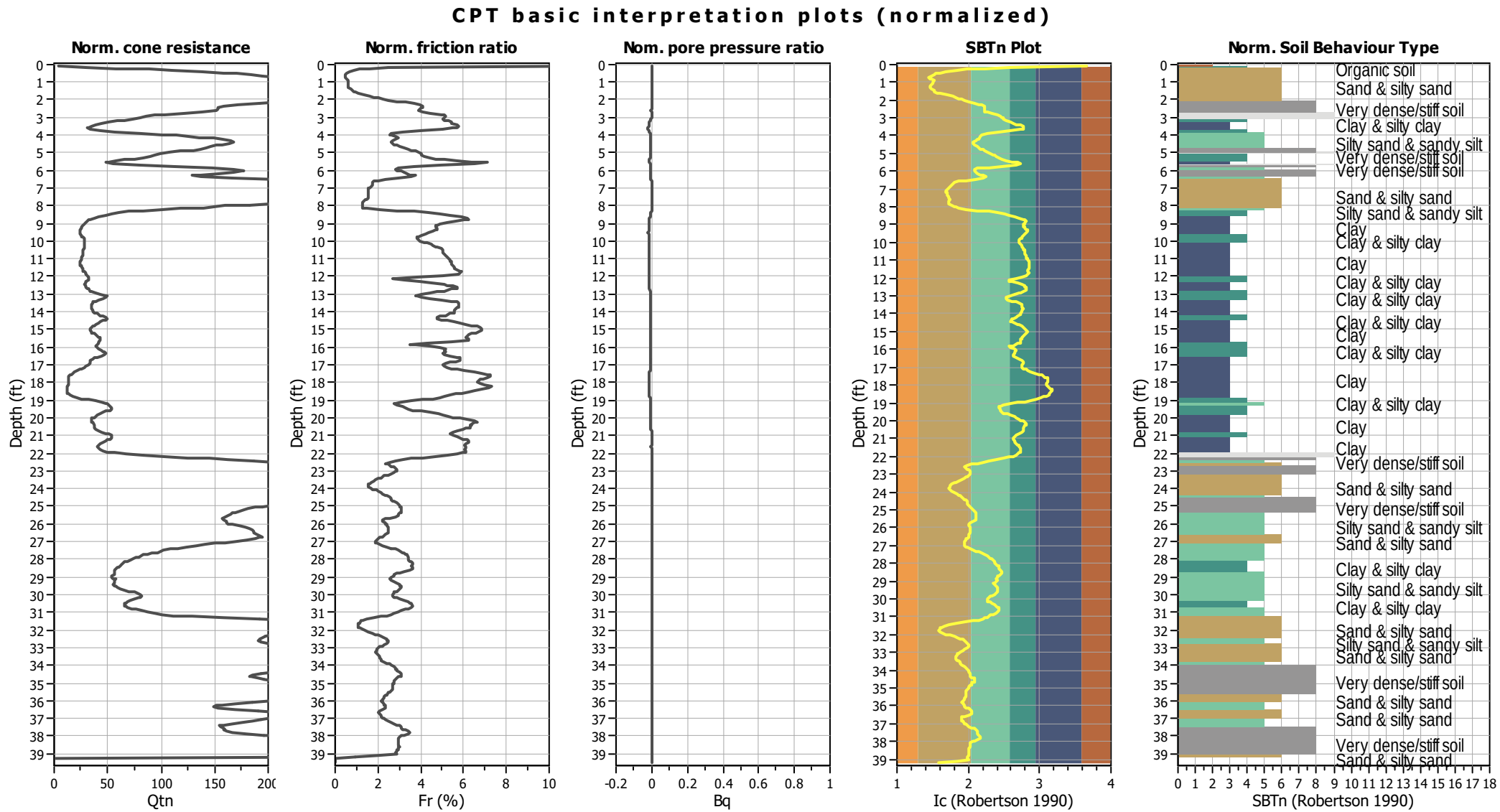
CPT file : CPT-15

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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

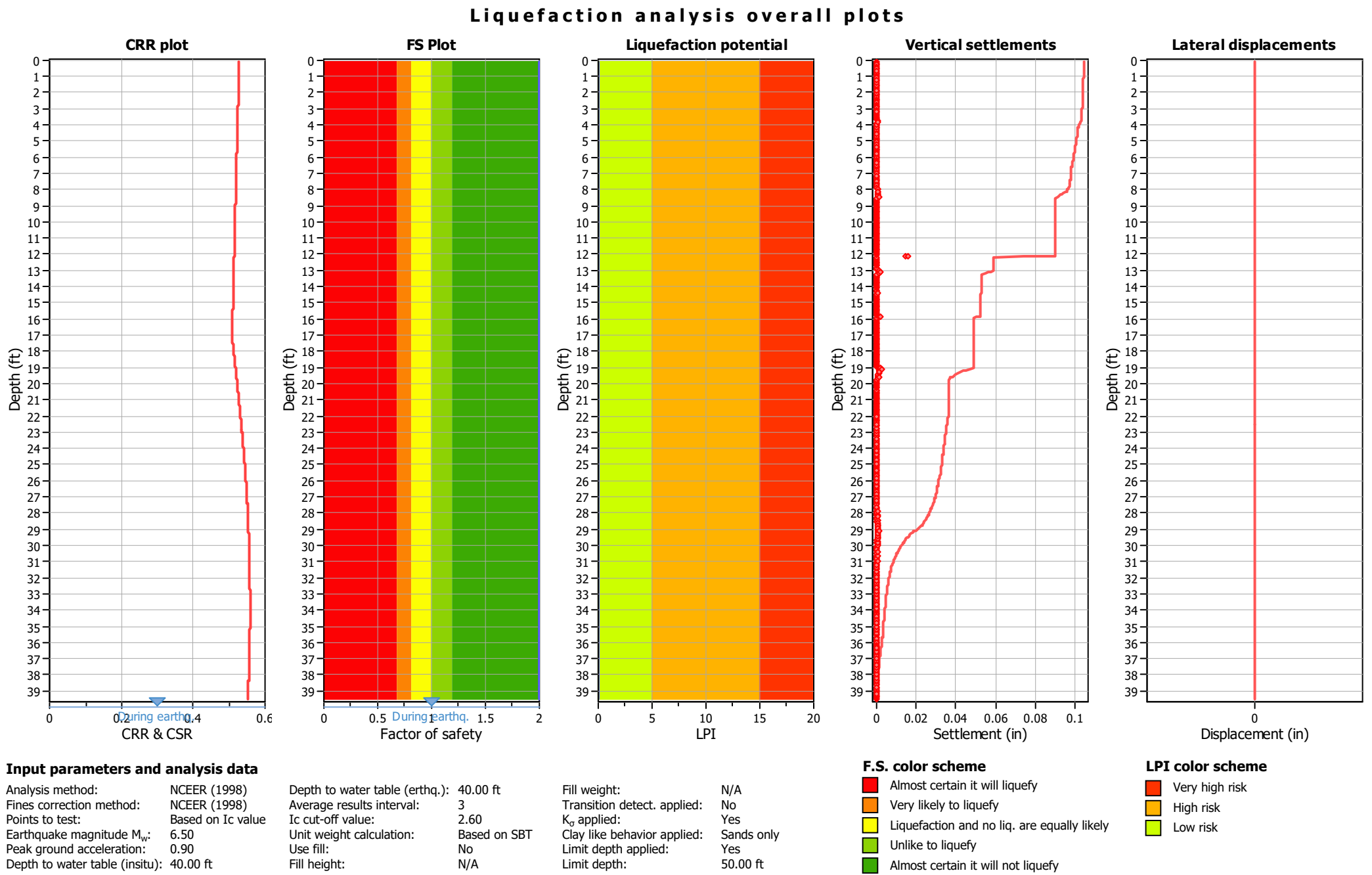


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

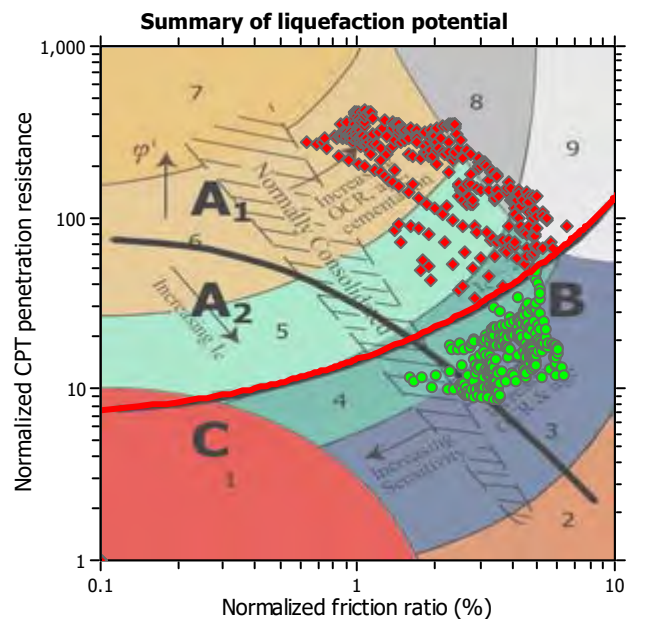
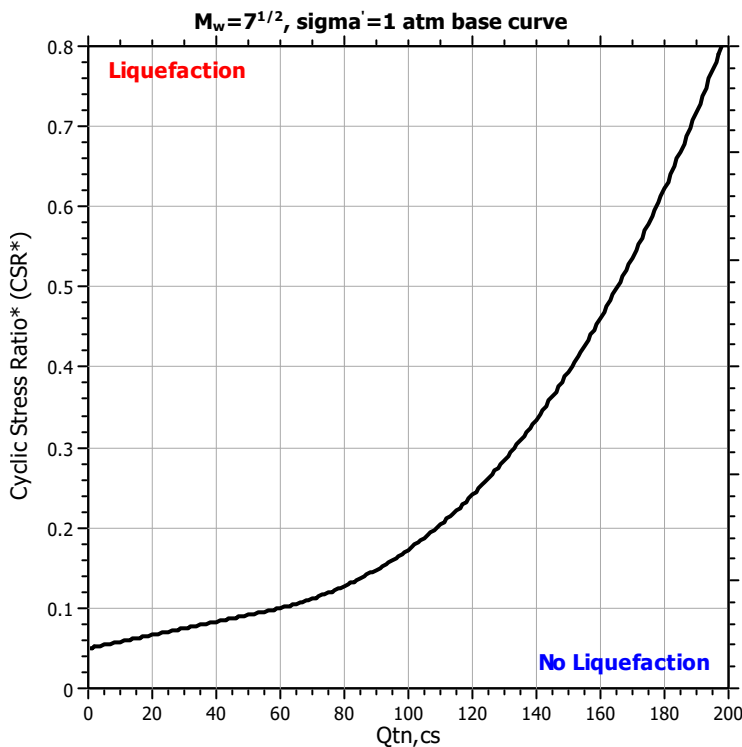
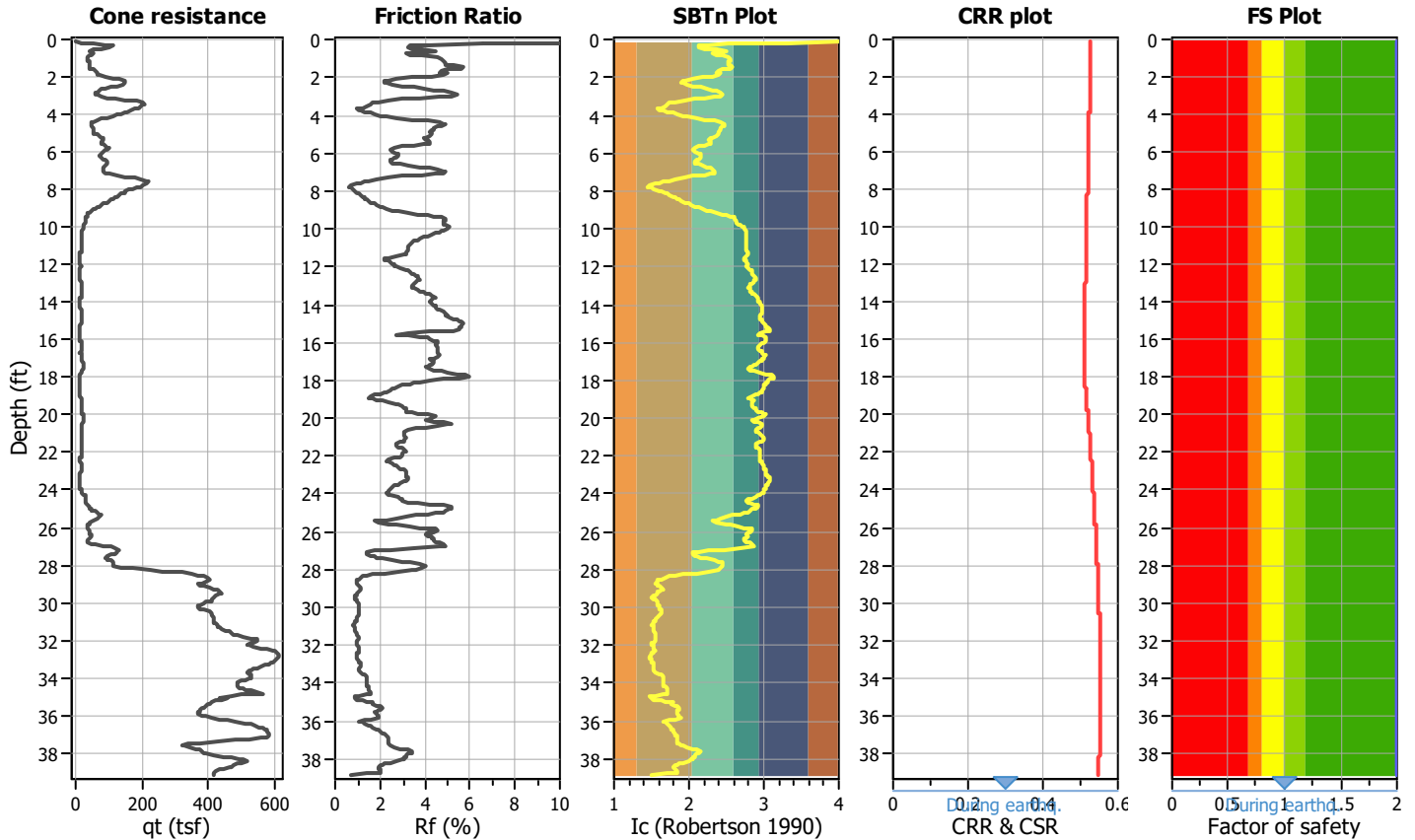
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

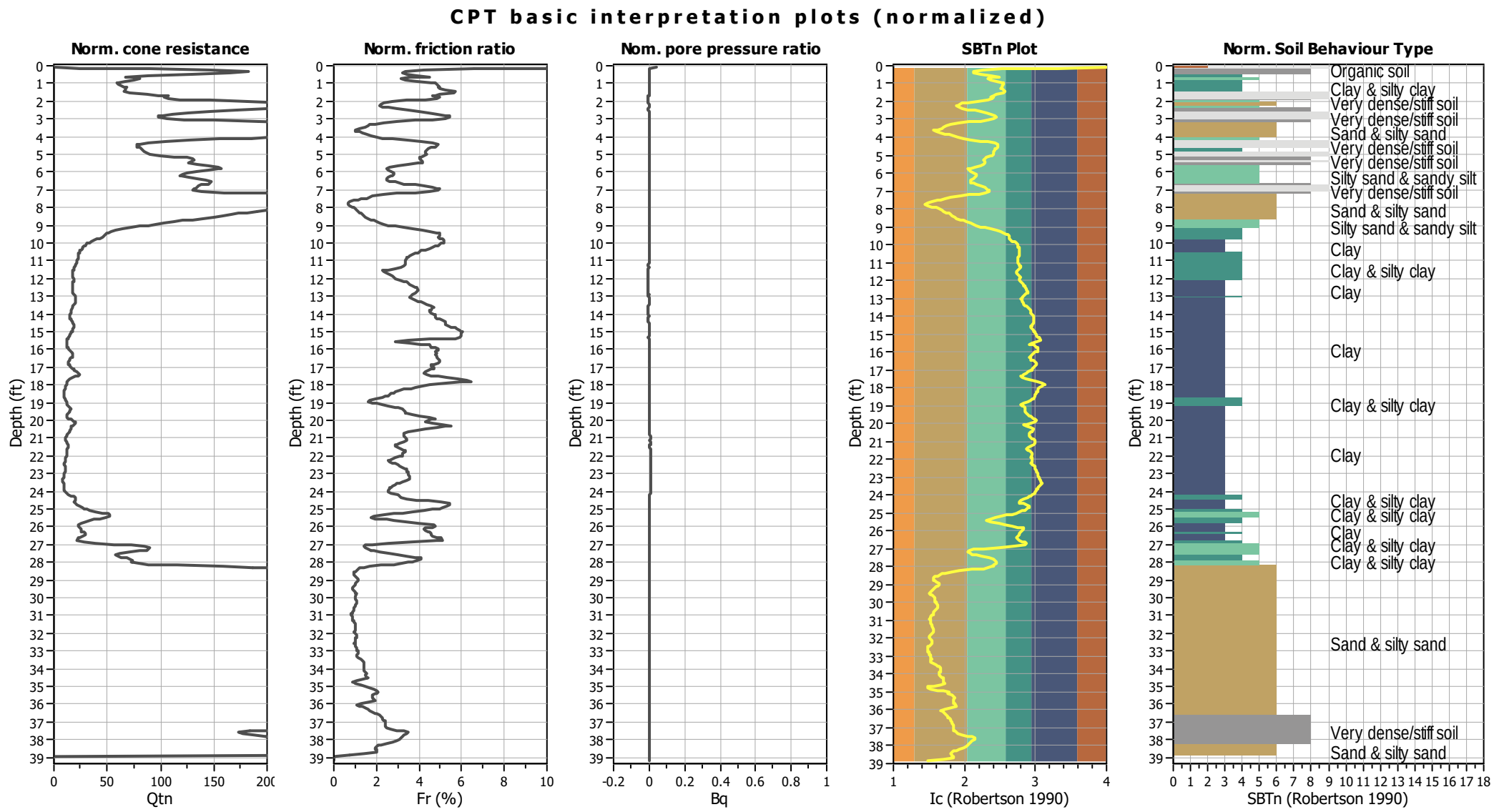
CPT file : CPT-17

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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

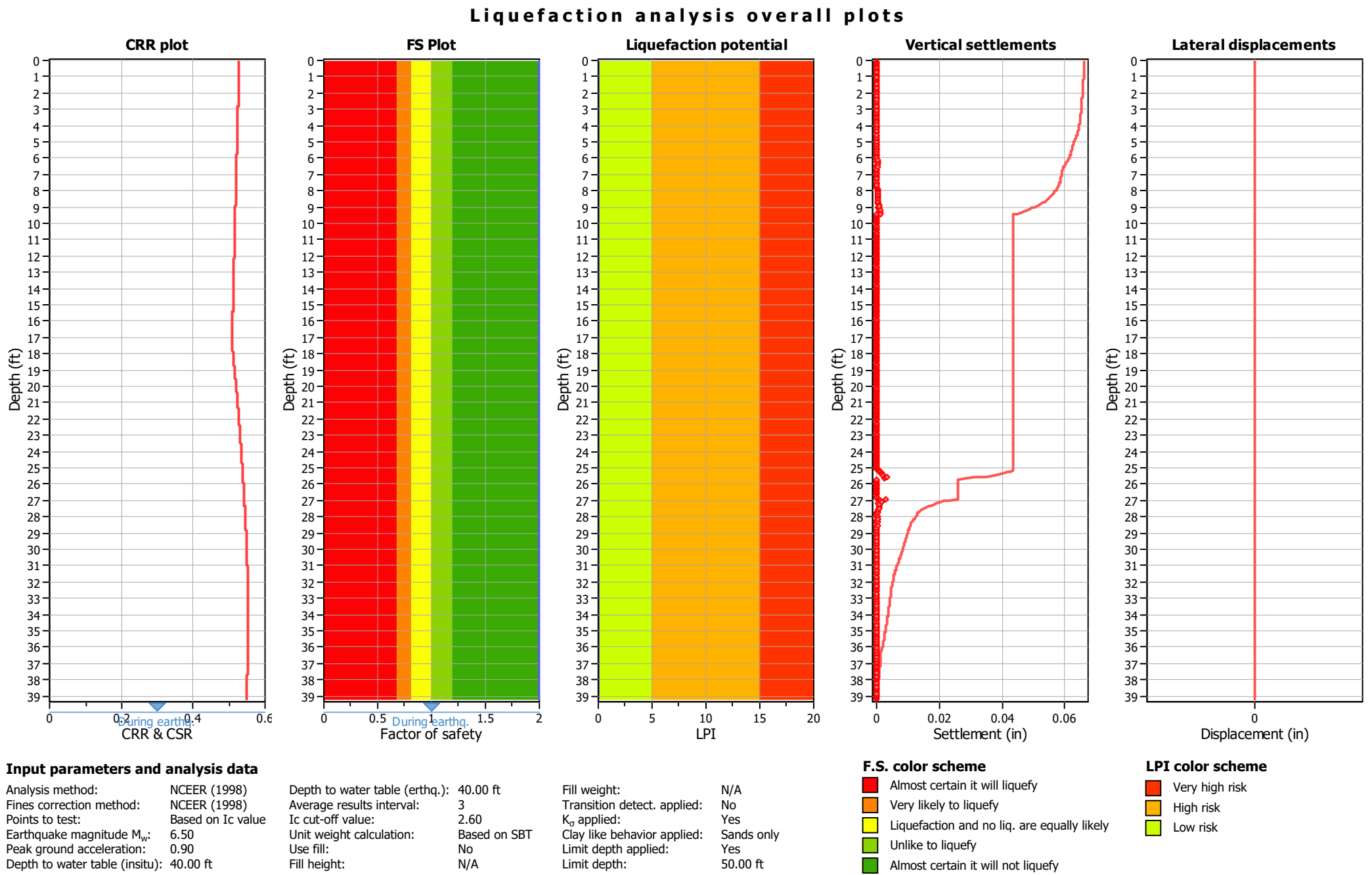


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

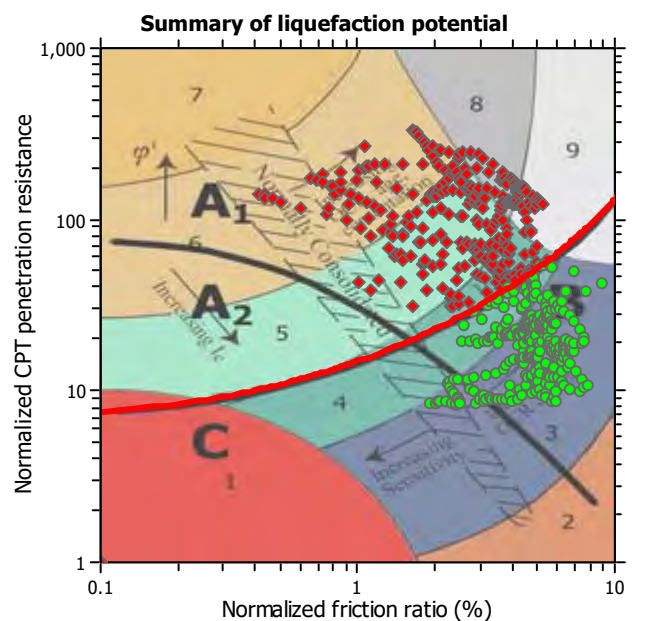
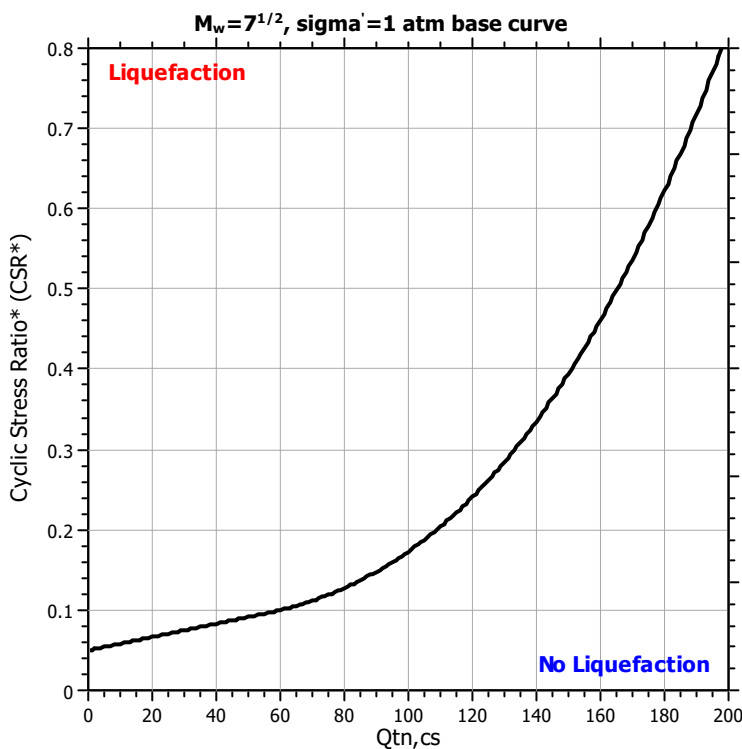
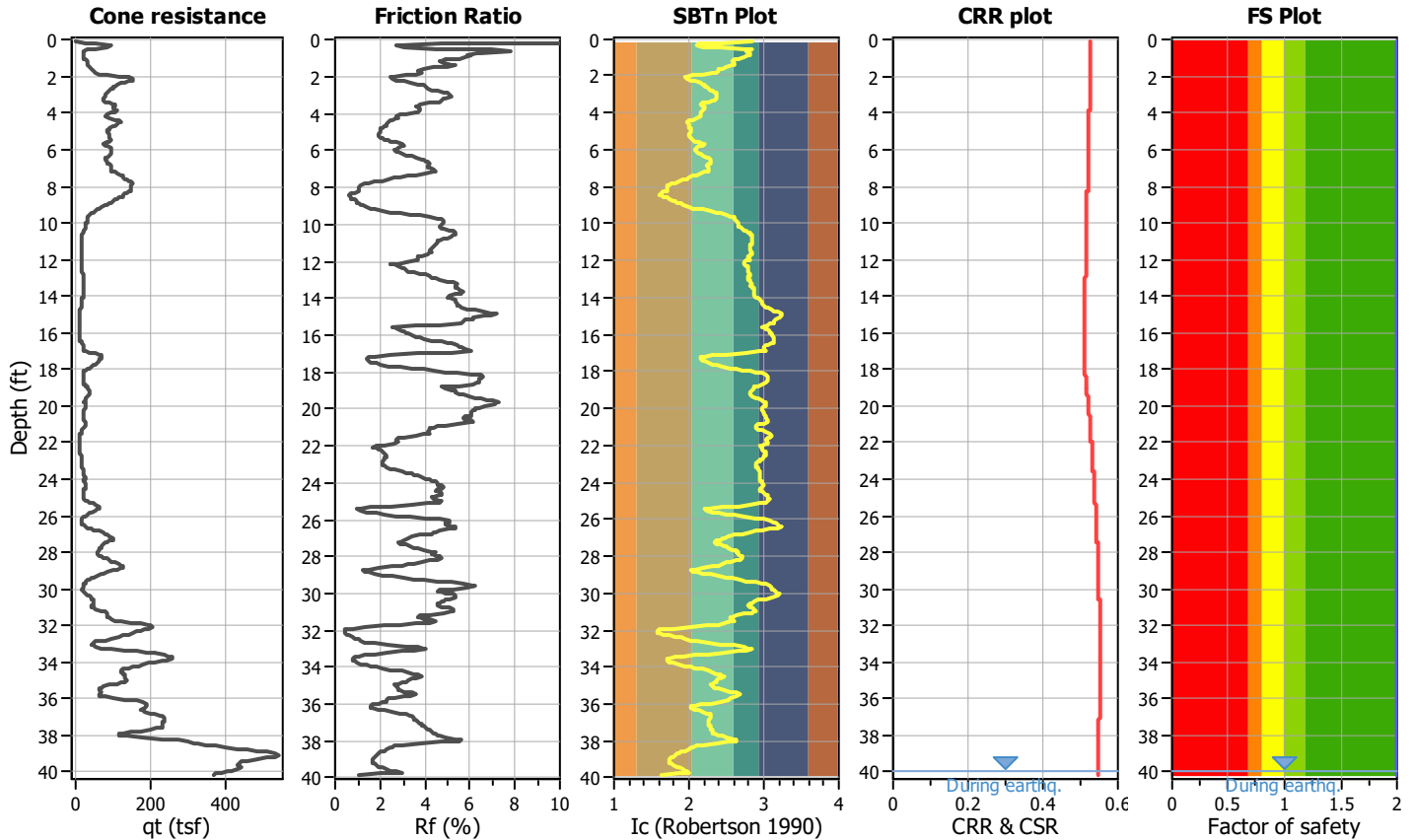
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

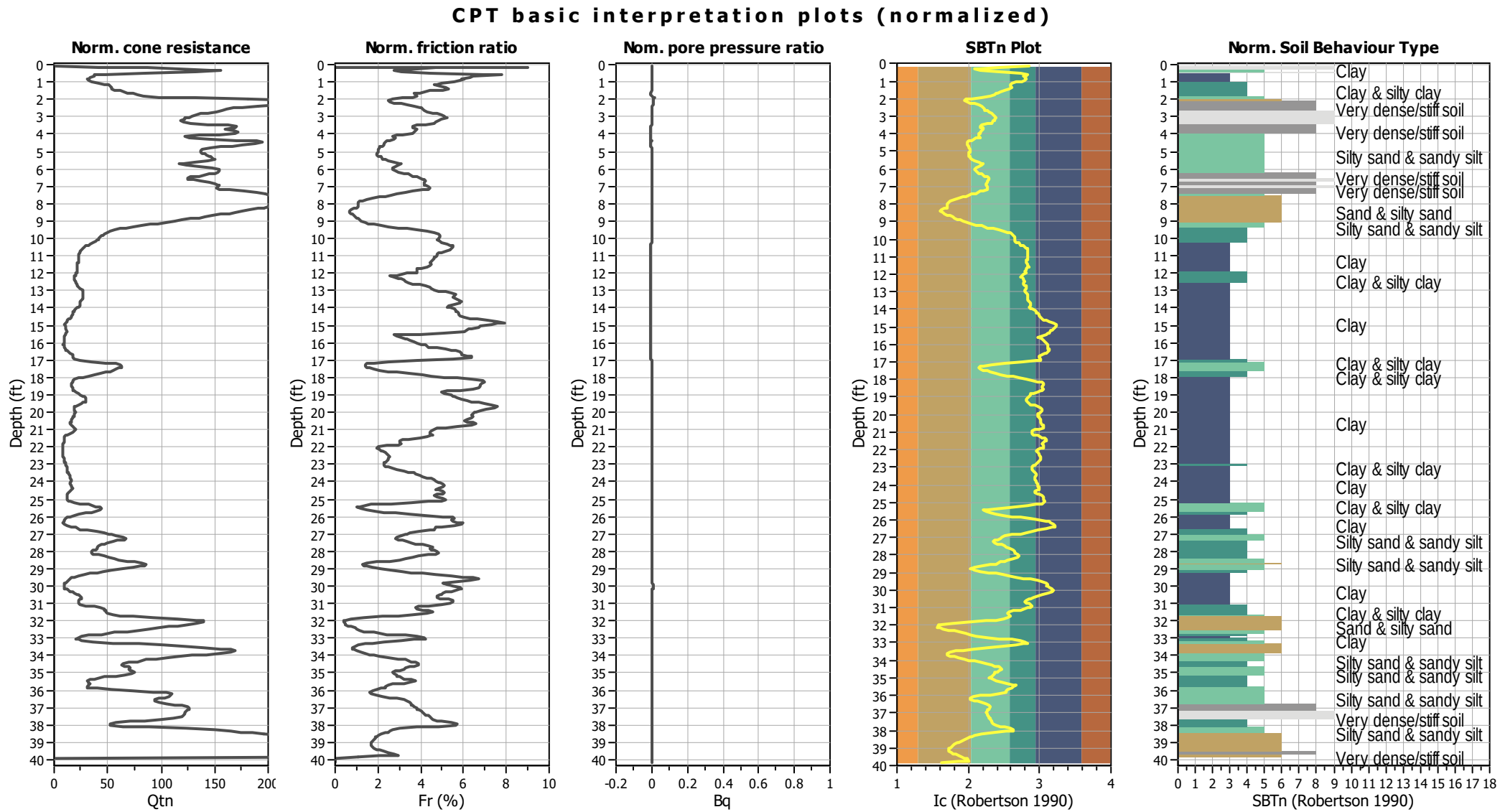
CPT file : CPT-19

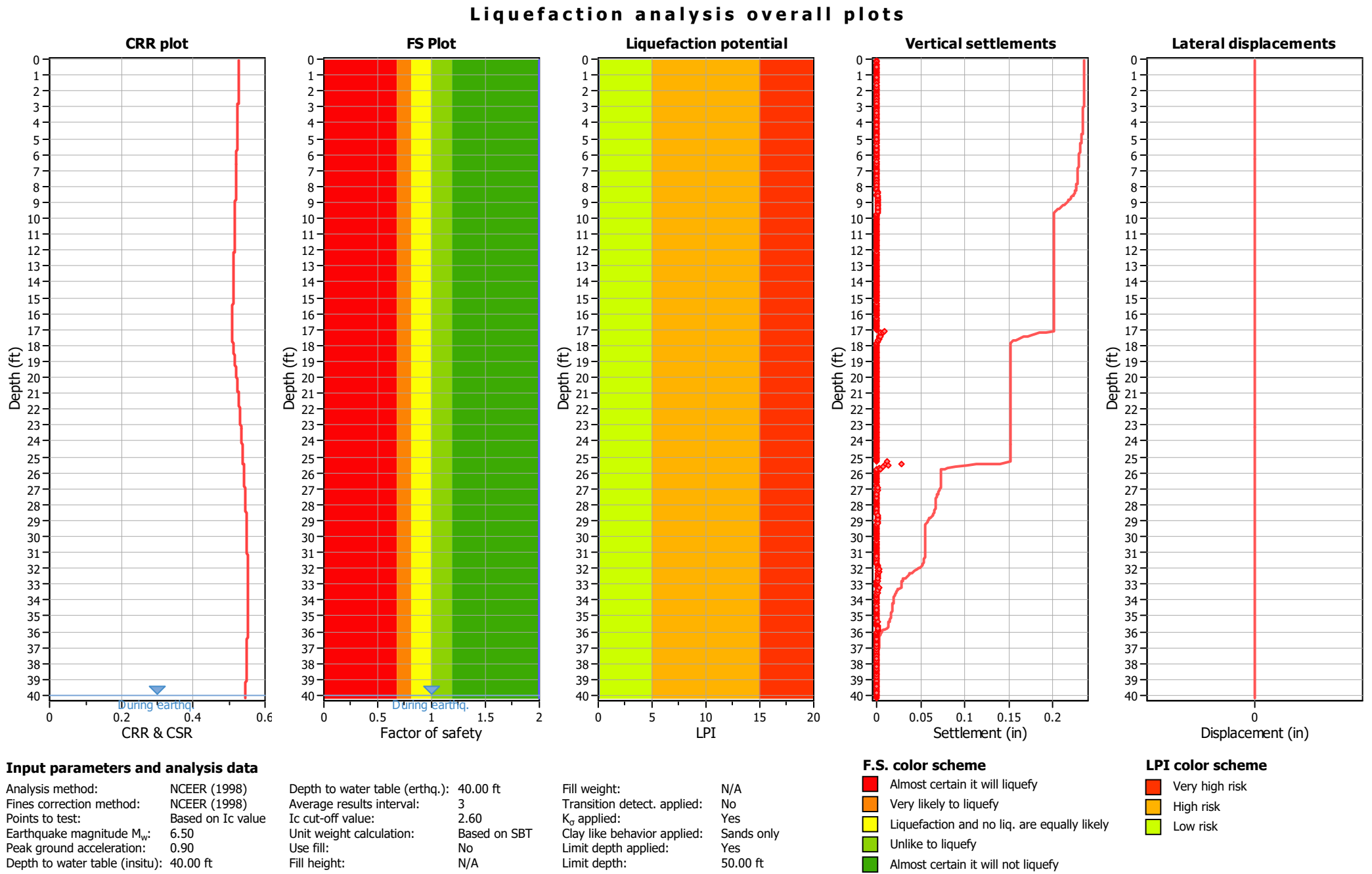
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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





LIQUEFACTION ANALYSIS REPORT

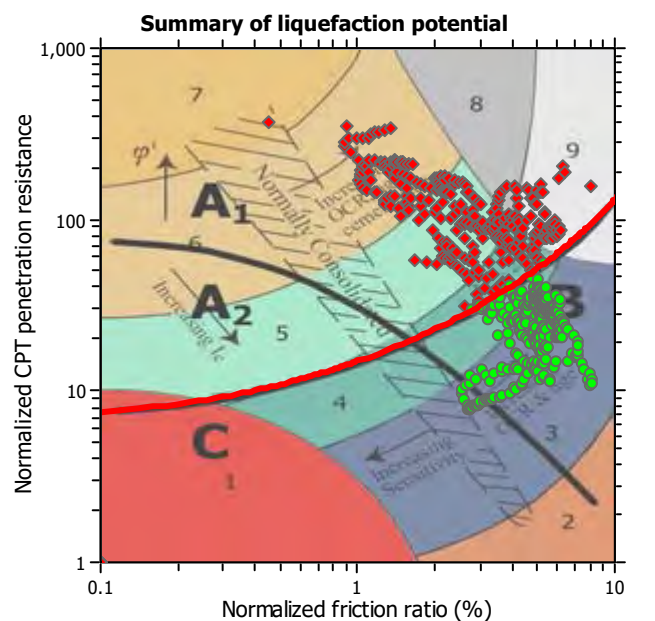
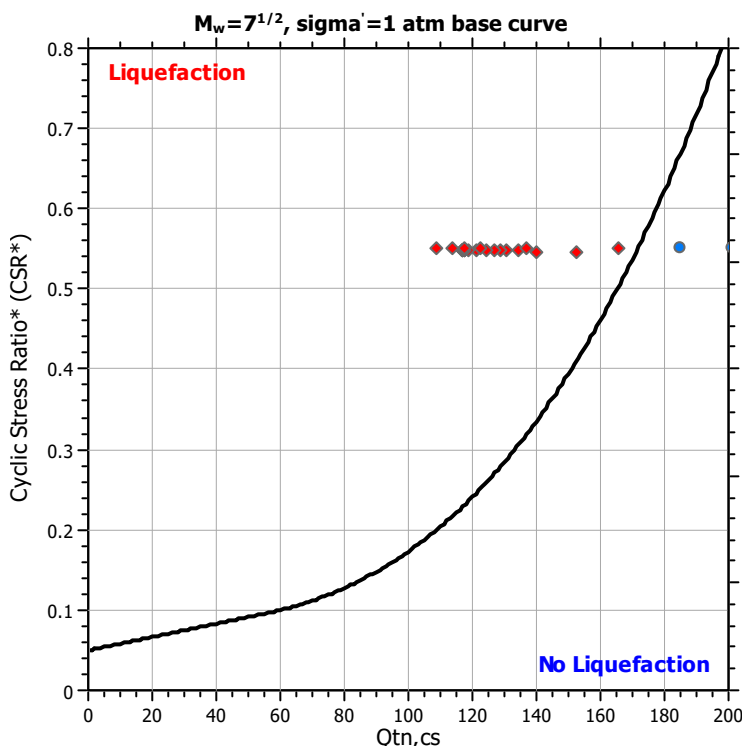
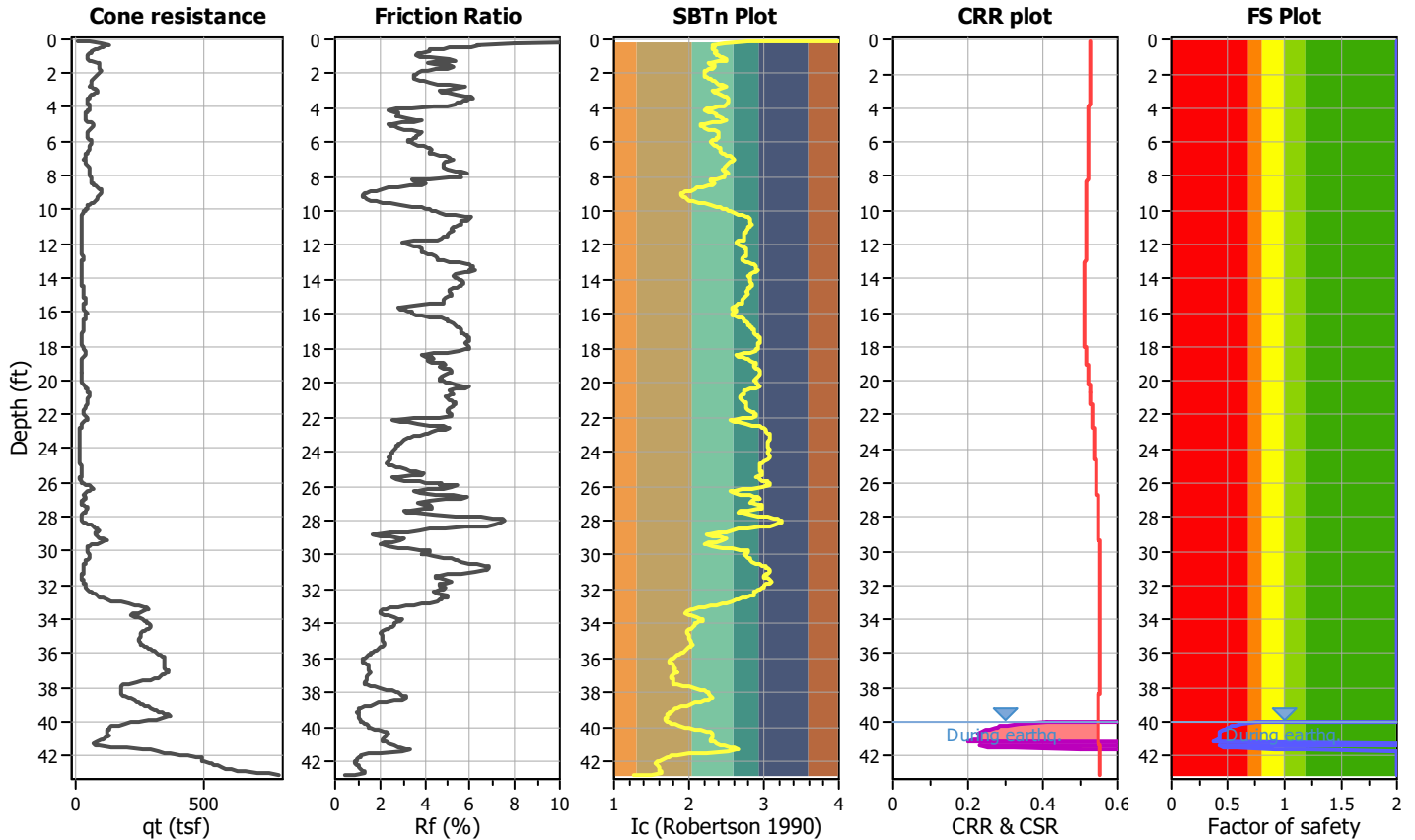
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

CPT file : CPT-21

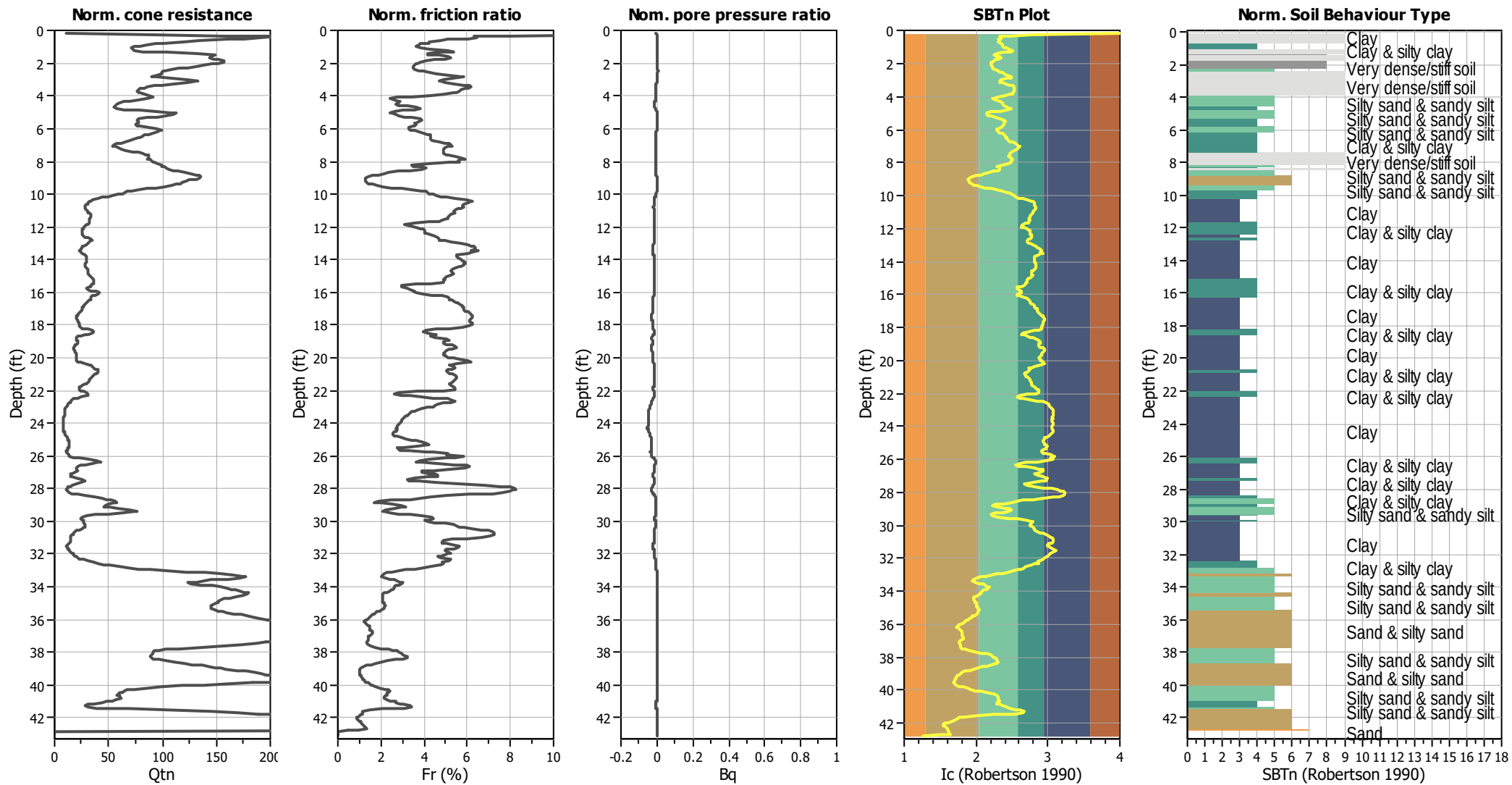
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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 (normalized)

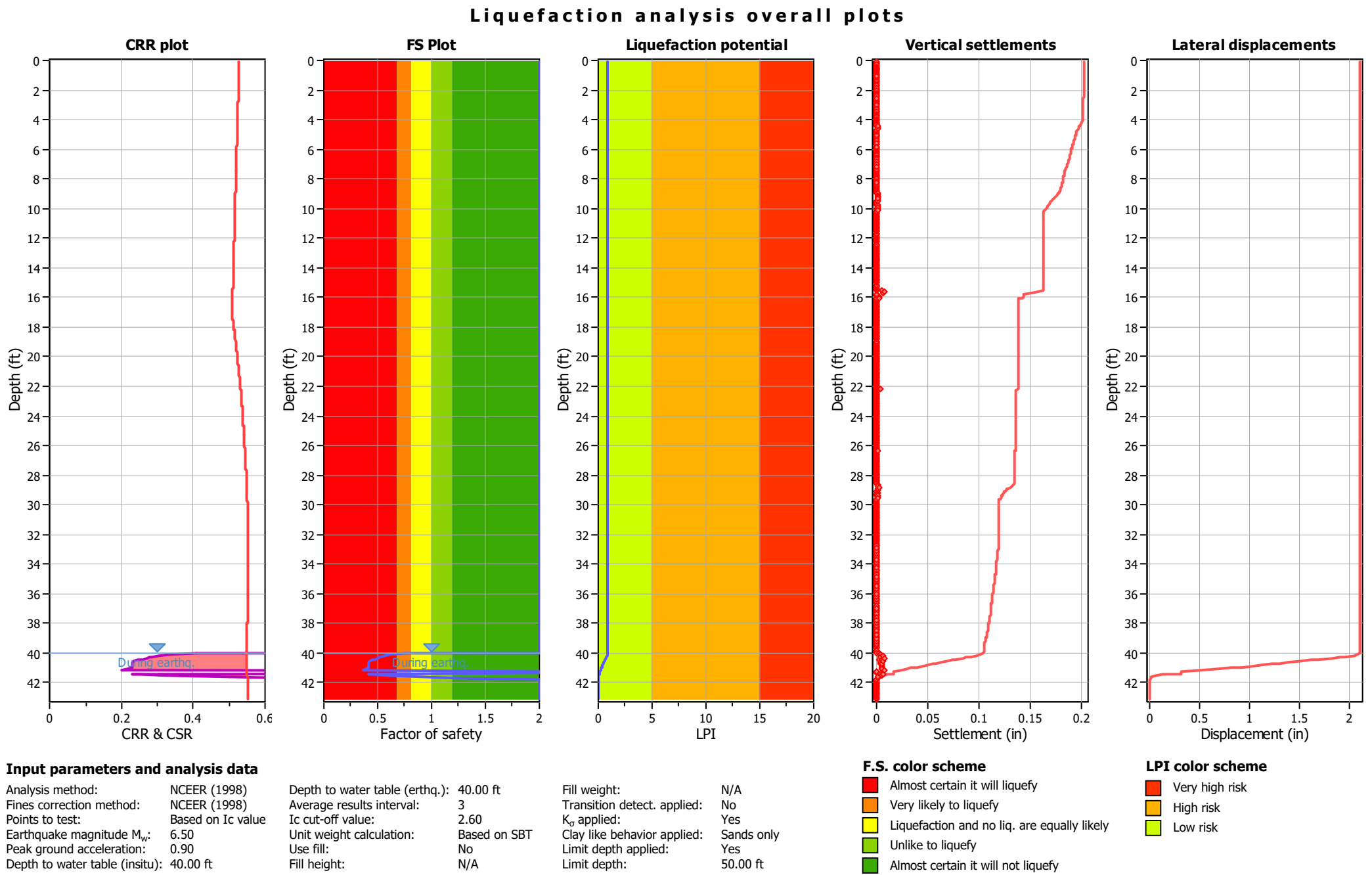


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 ₀ applied:	Yes
Earthquake magnitude M _w :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

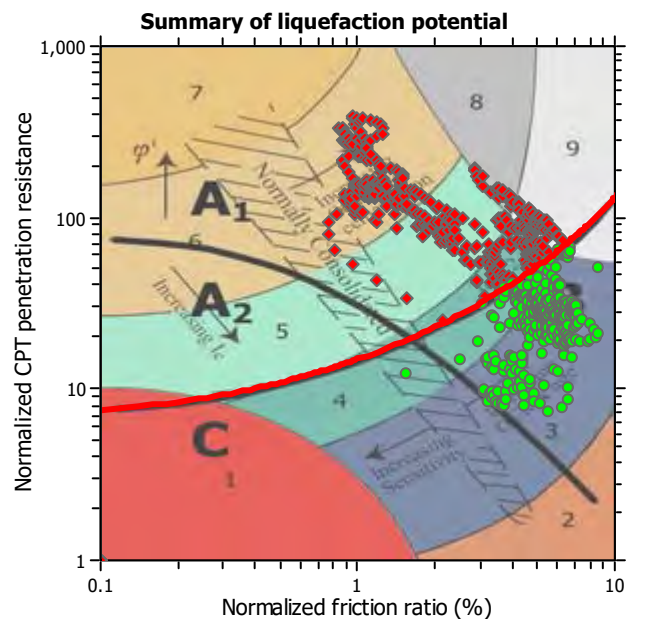
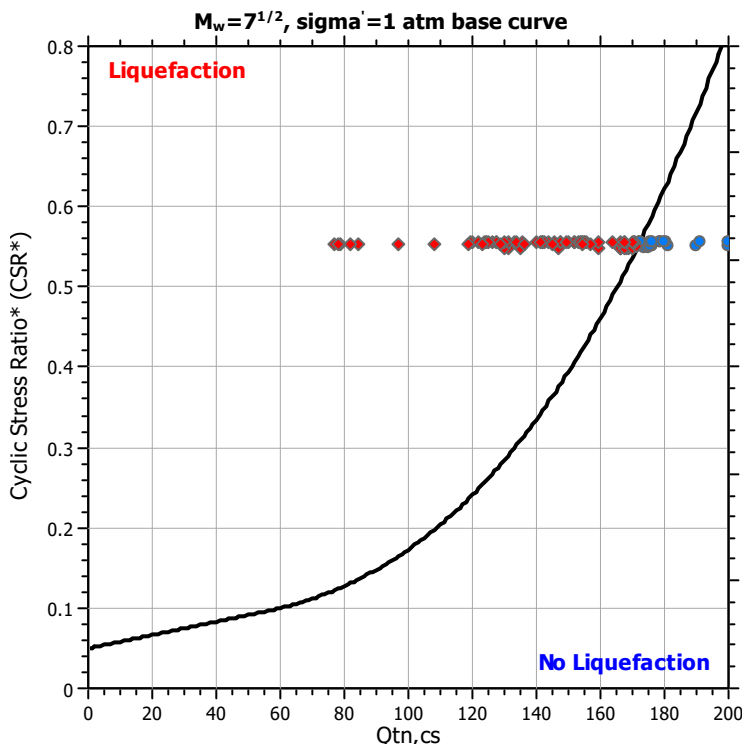
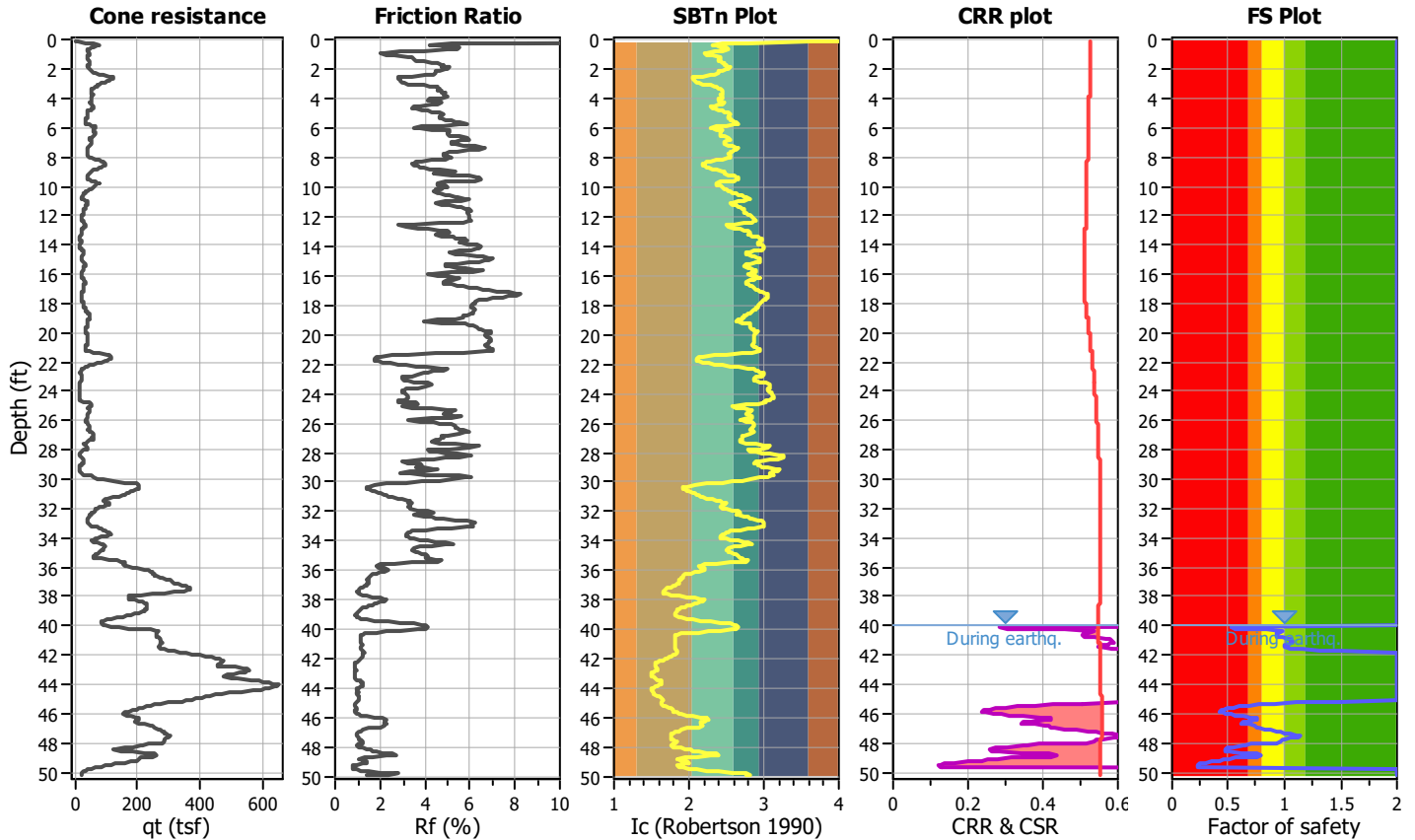
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

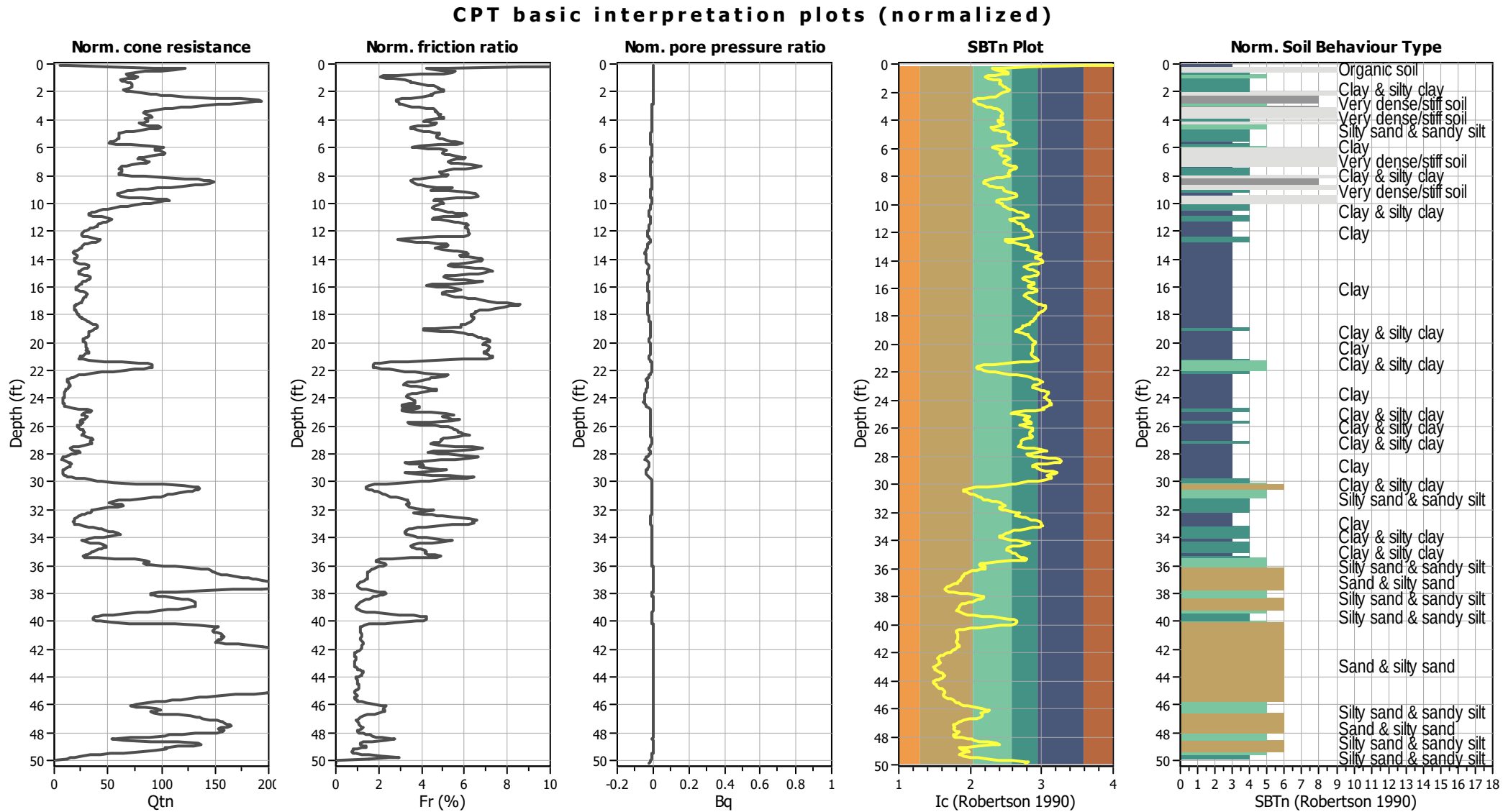
CPT file : CPT-23

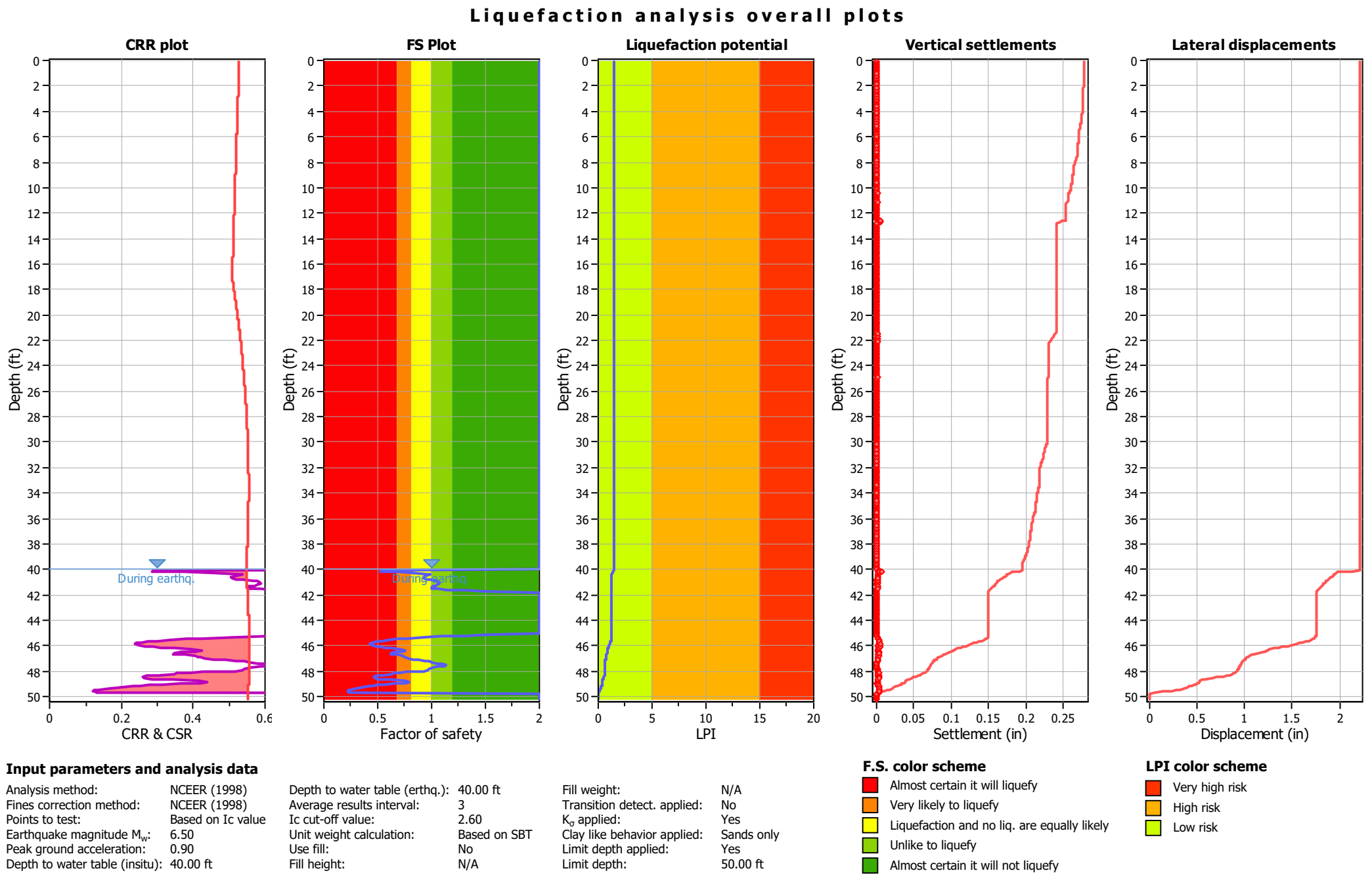
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 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 :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes		



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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





LIQUEFACTION ANALYSIS REPORT

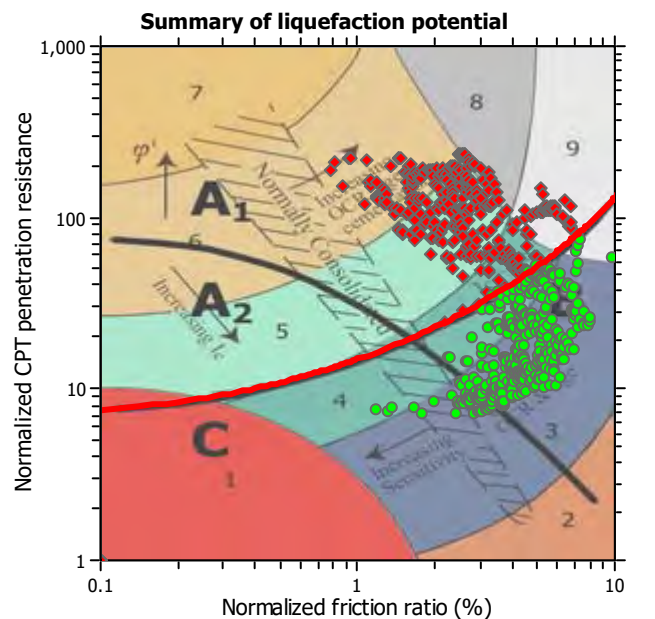
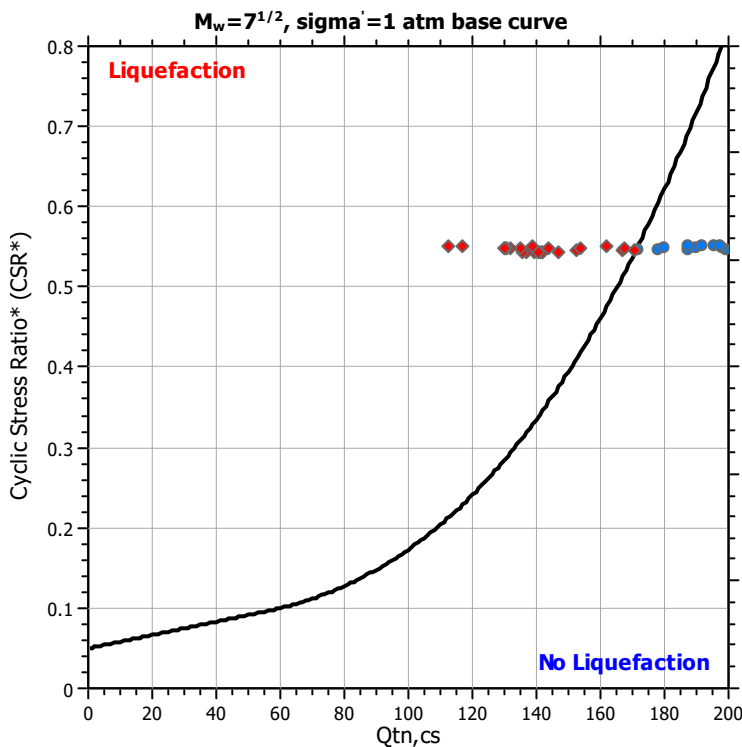
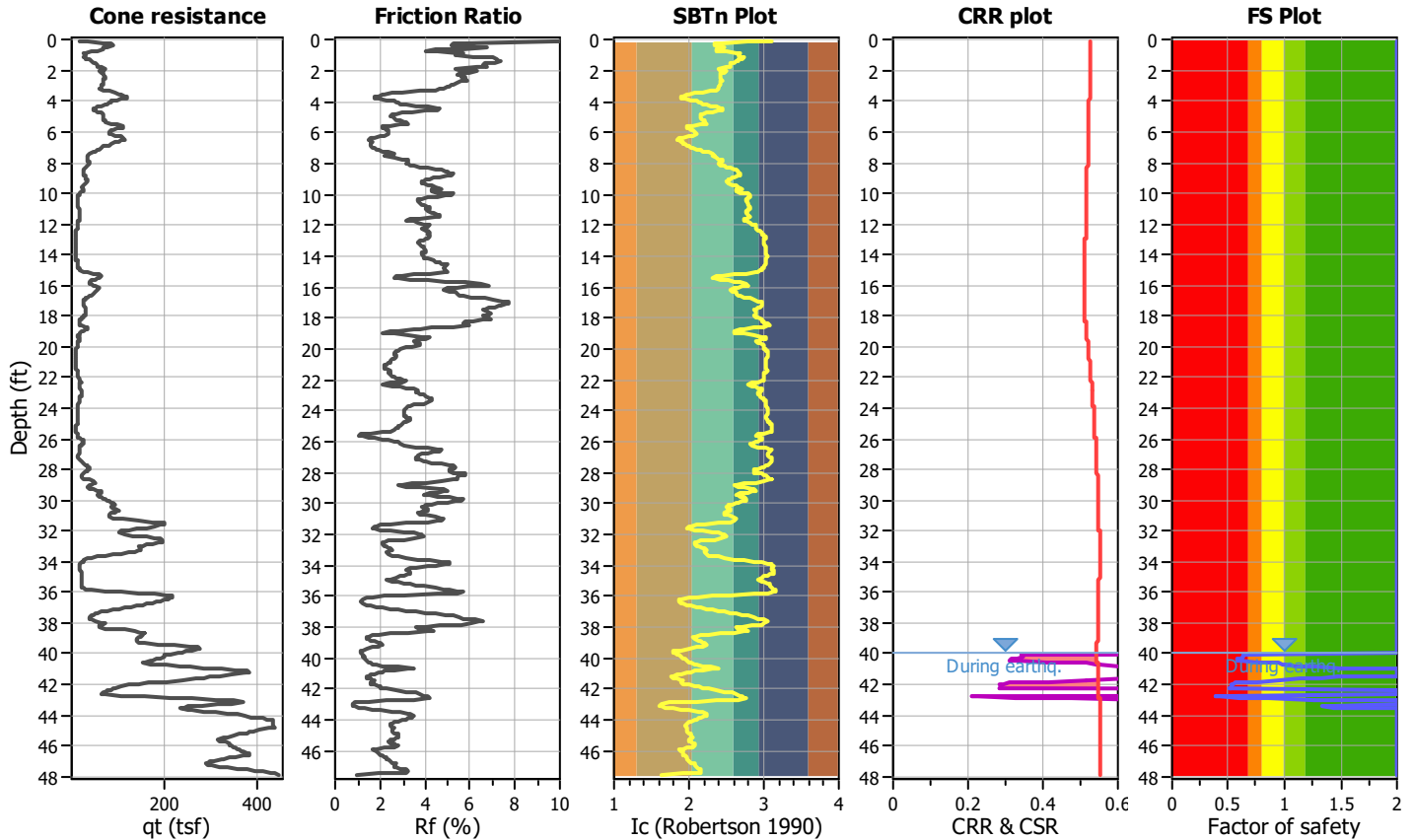
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

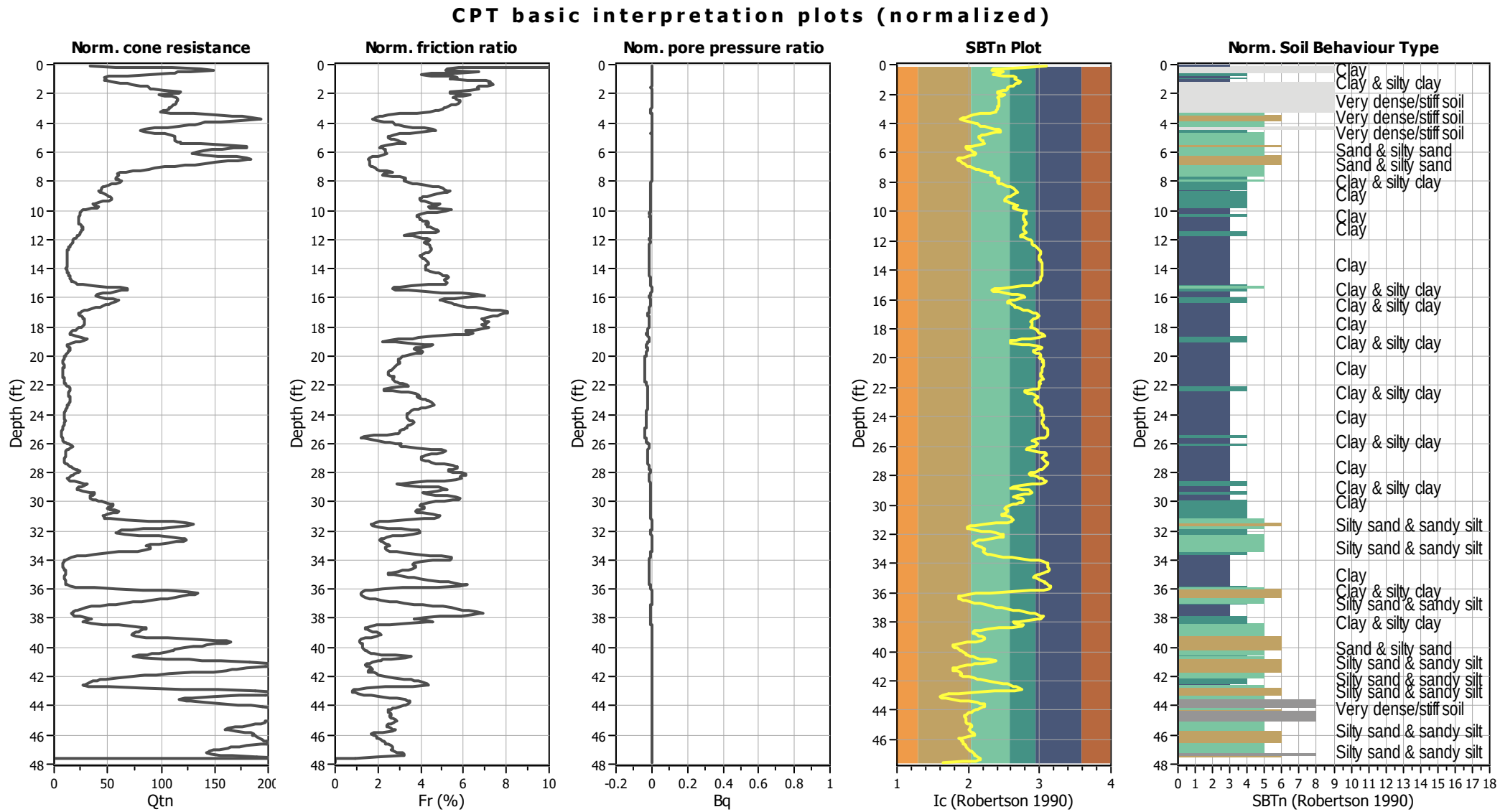
CPT file : CPT-24

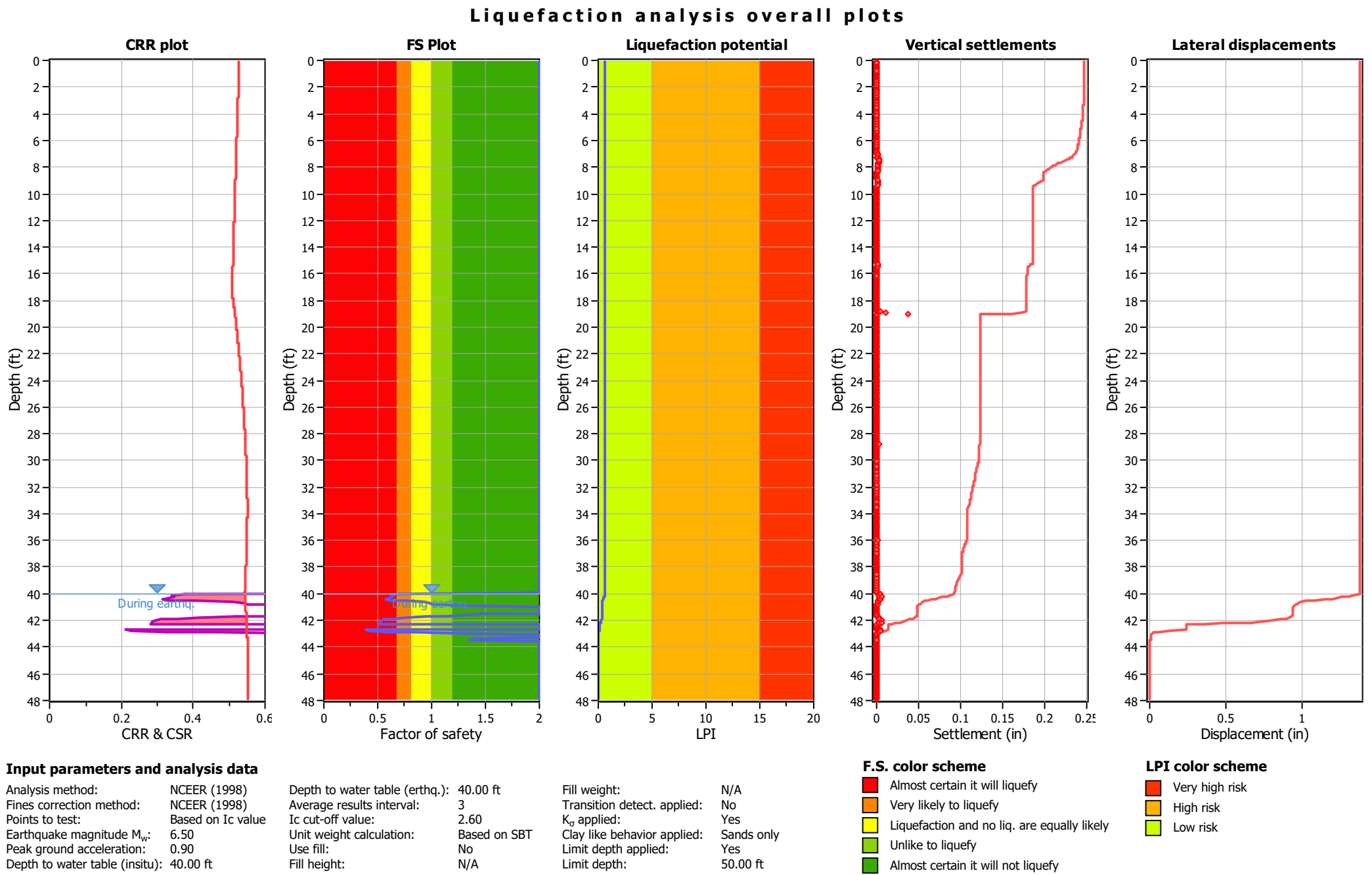
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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





LIQUEFACTION ANALYSIS REPORT

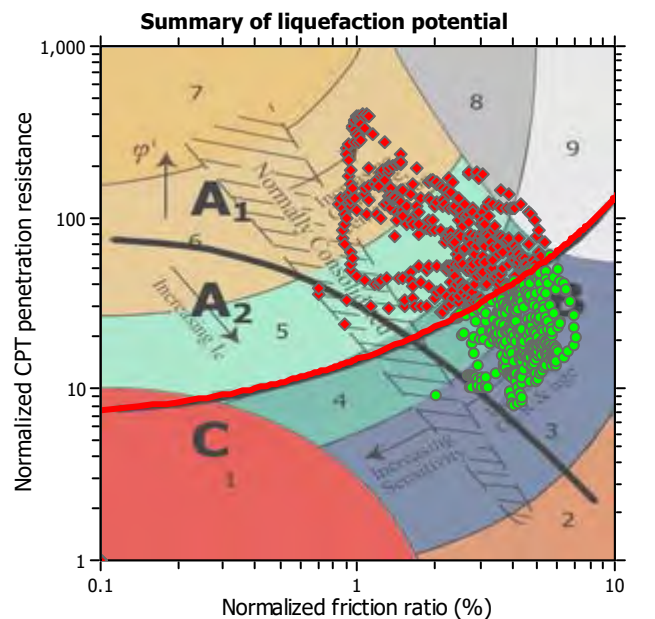
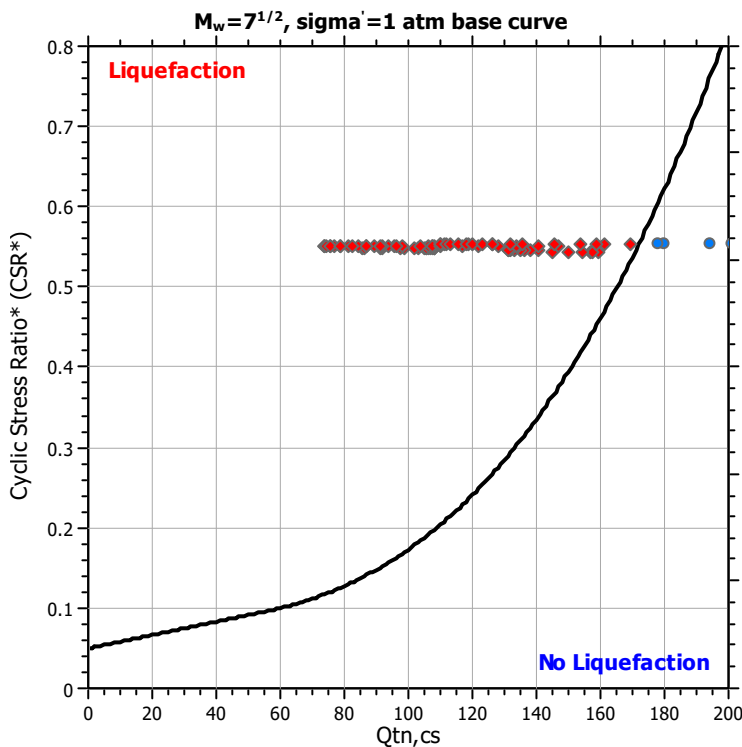
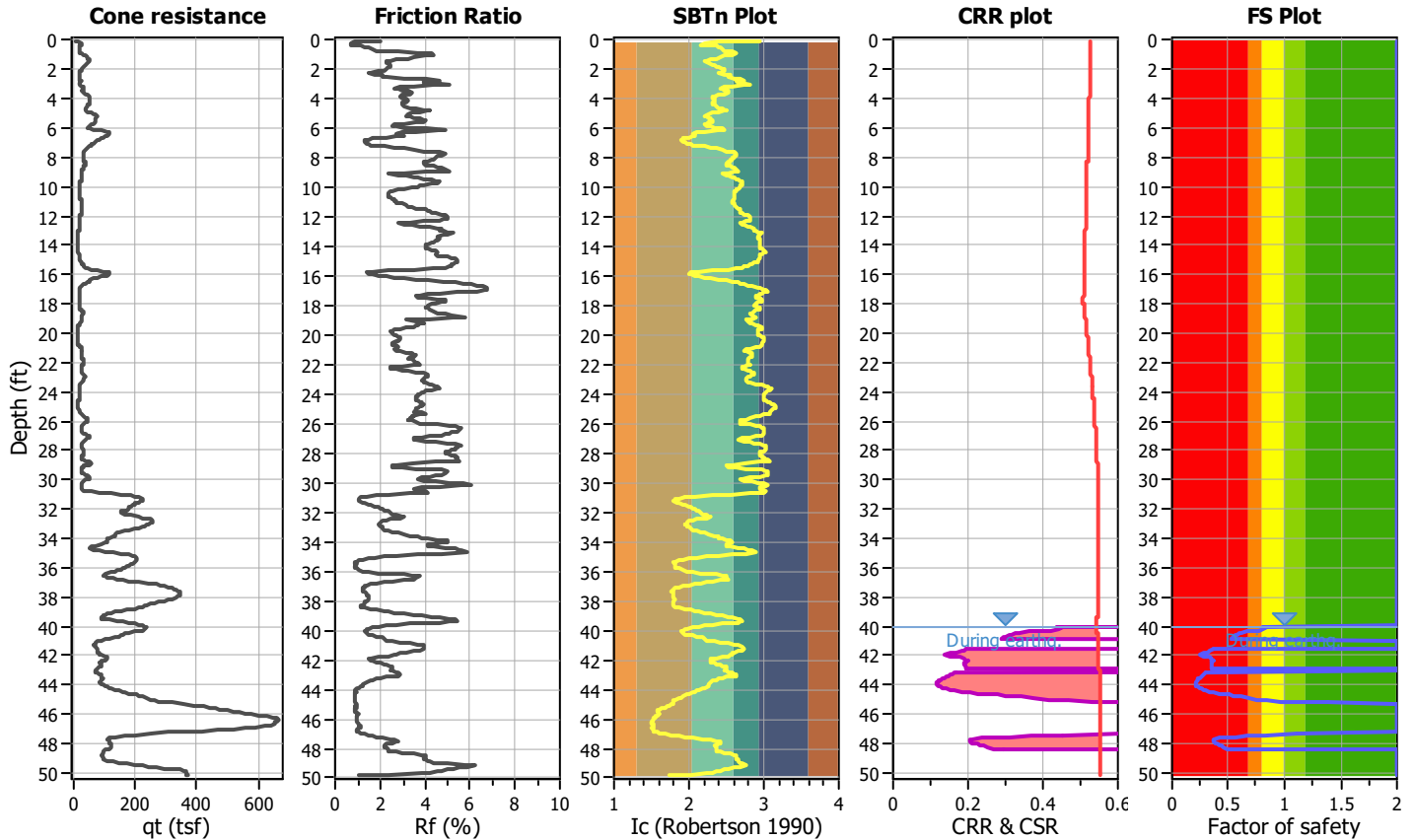
Project title : 14030.001 Lewis Rosemead Condos

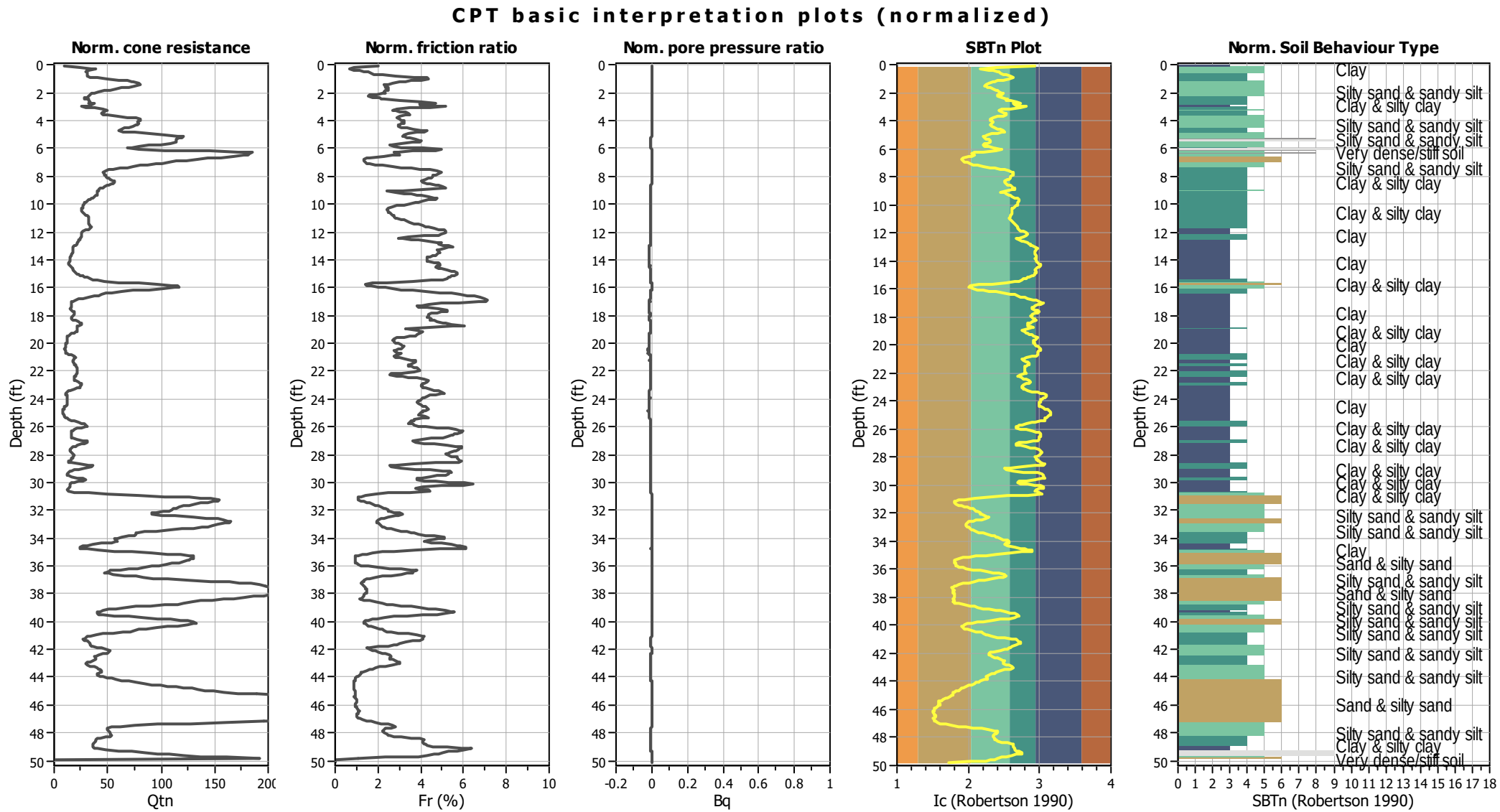
Location : Rosemead CA

CPT file : CPT-26

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



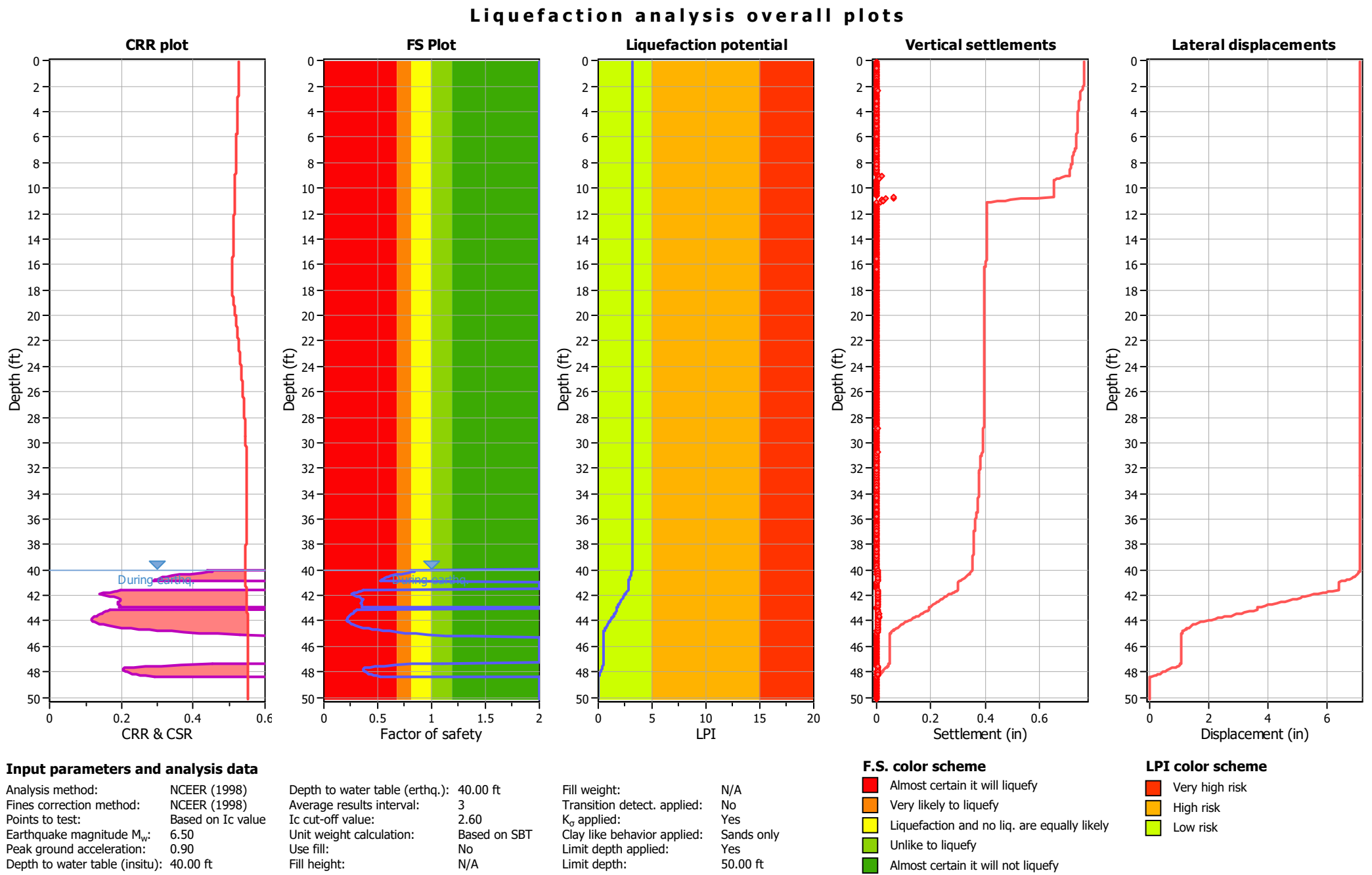


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

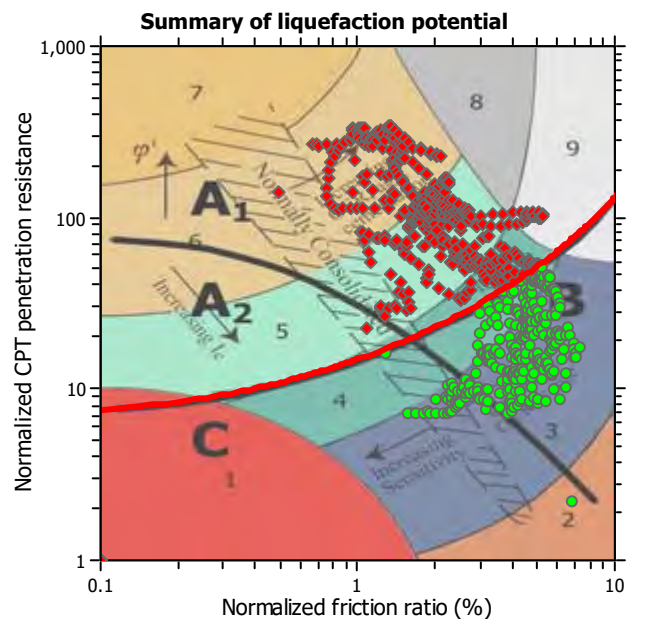
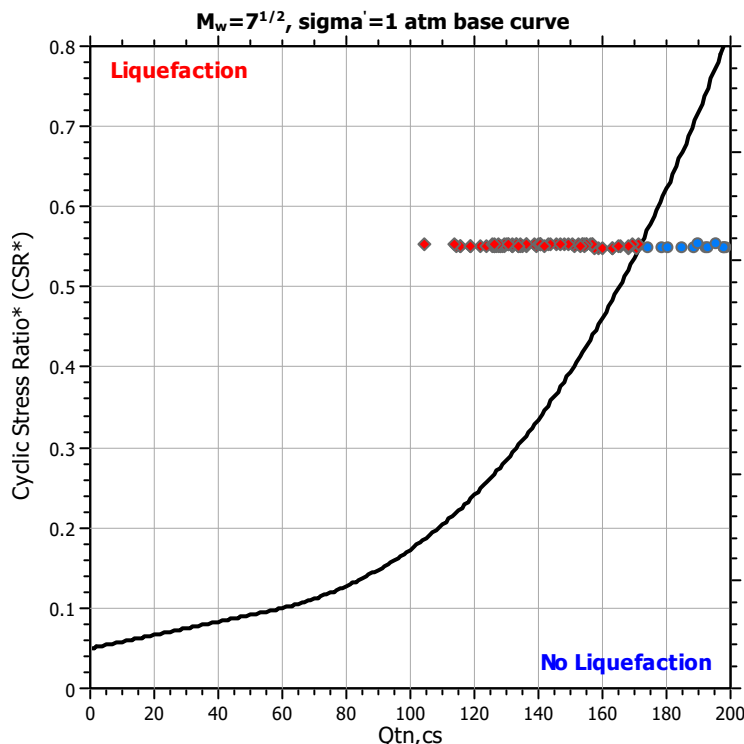
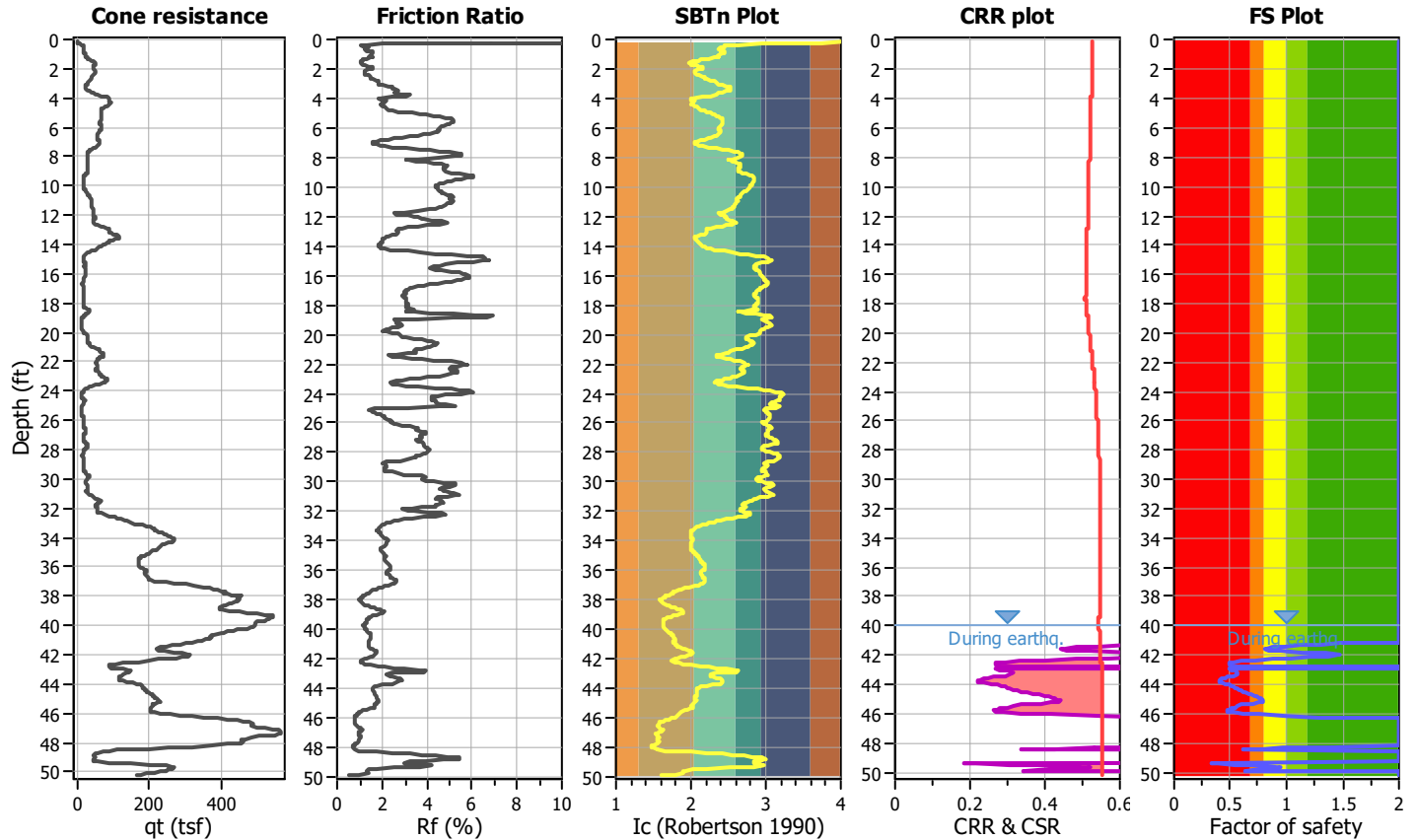
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

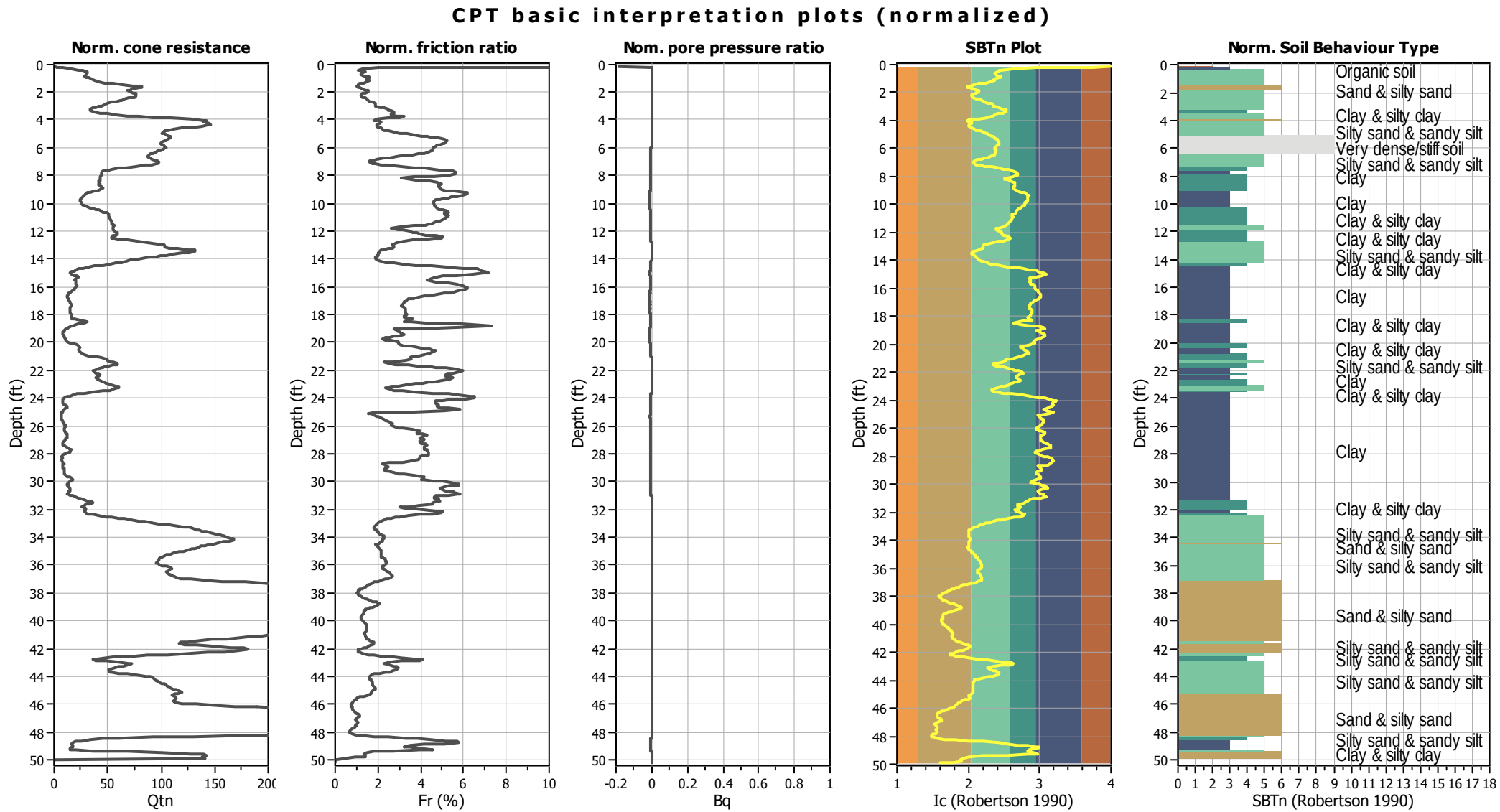
CPT file : CPT-28

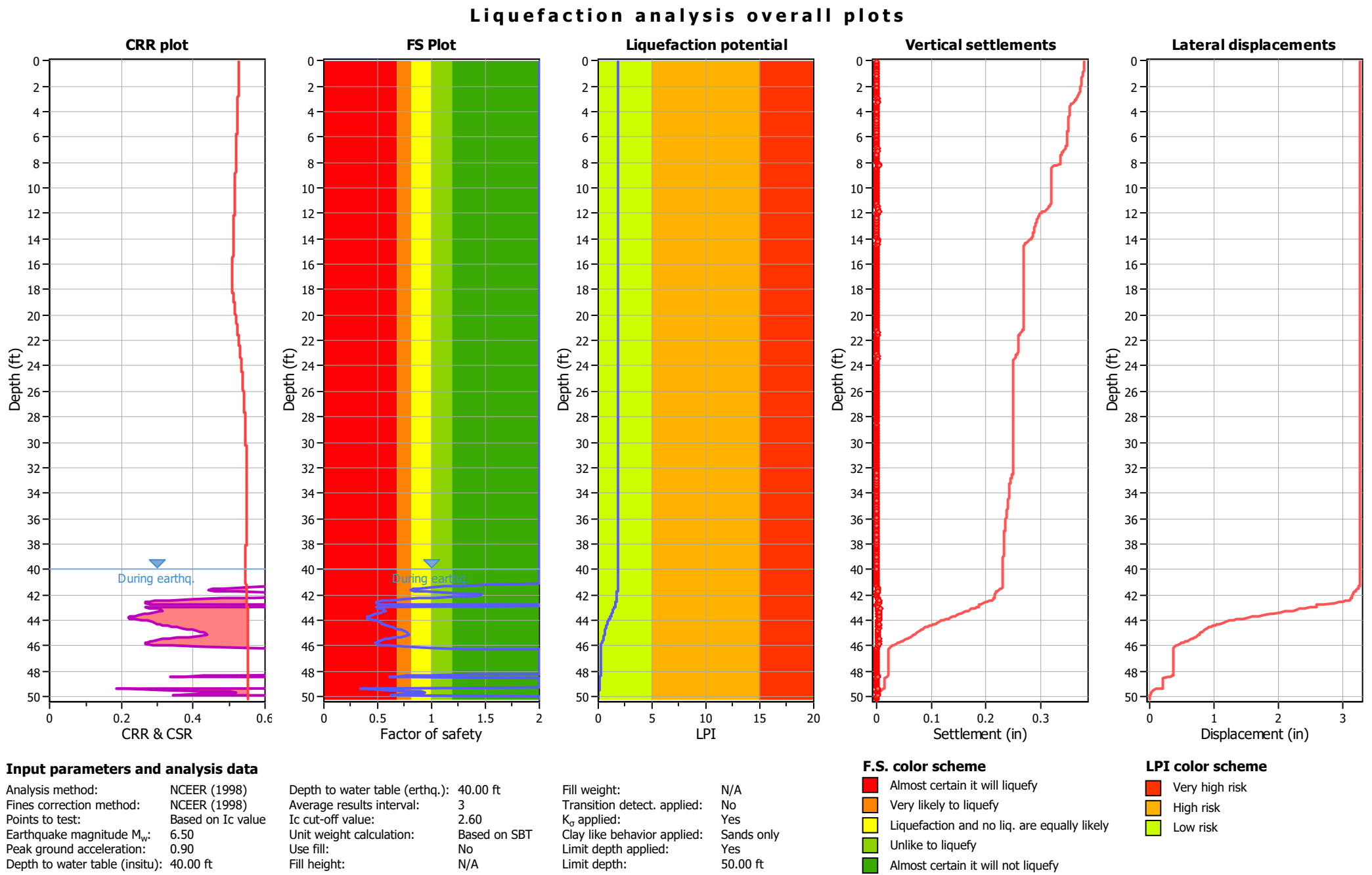
Input parameters and analysis data

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Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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





LIQUEFACTION ANALYSIS REPORT

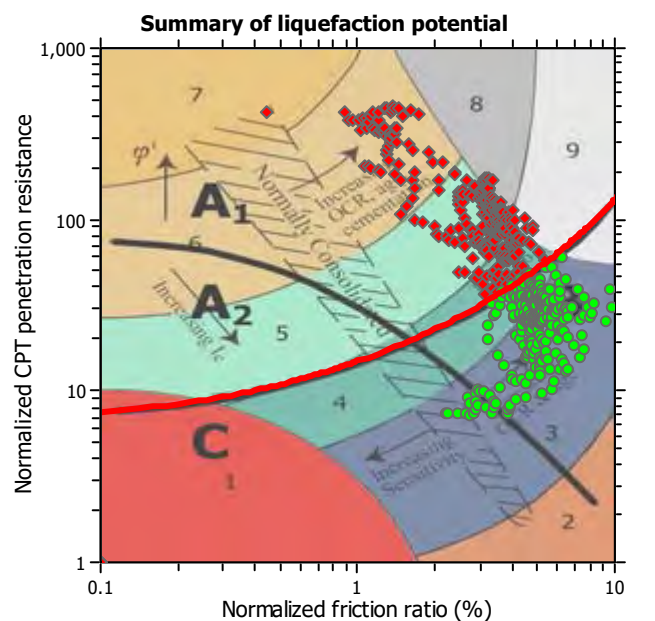
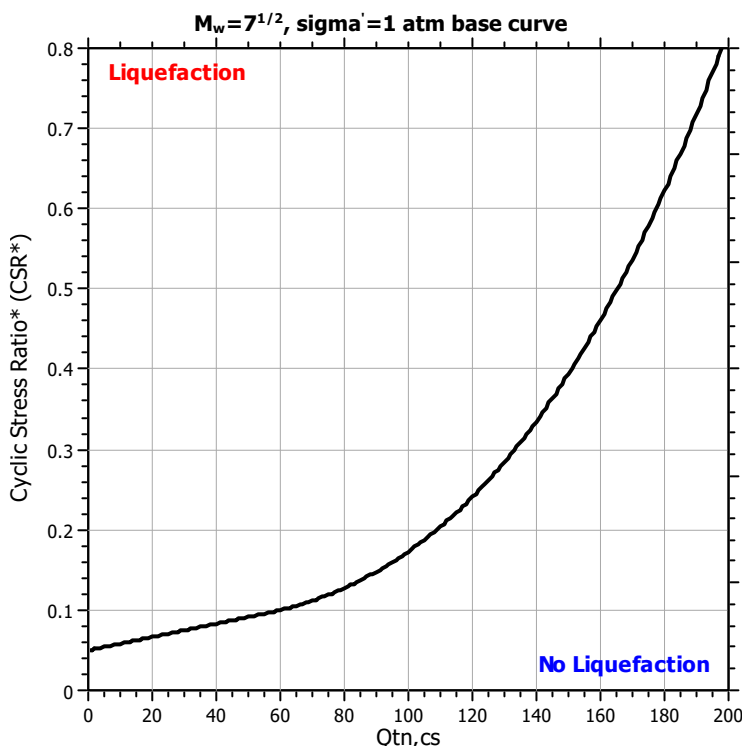
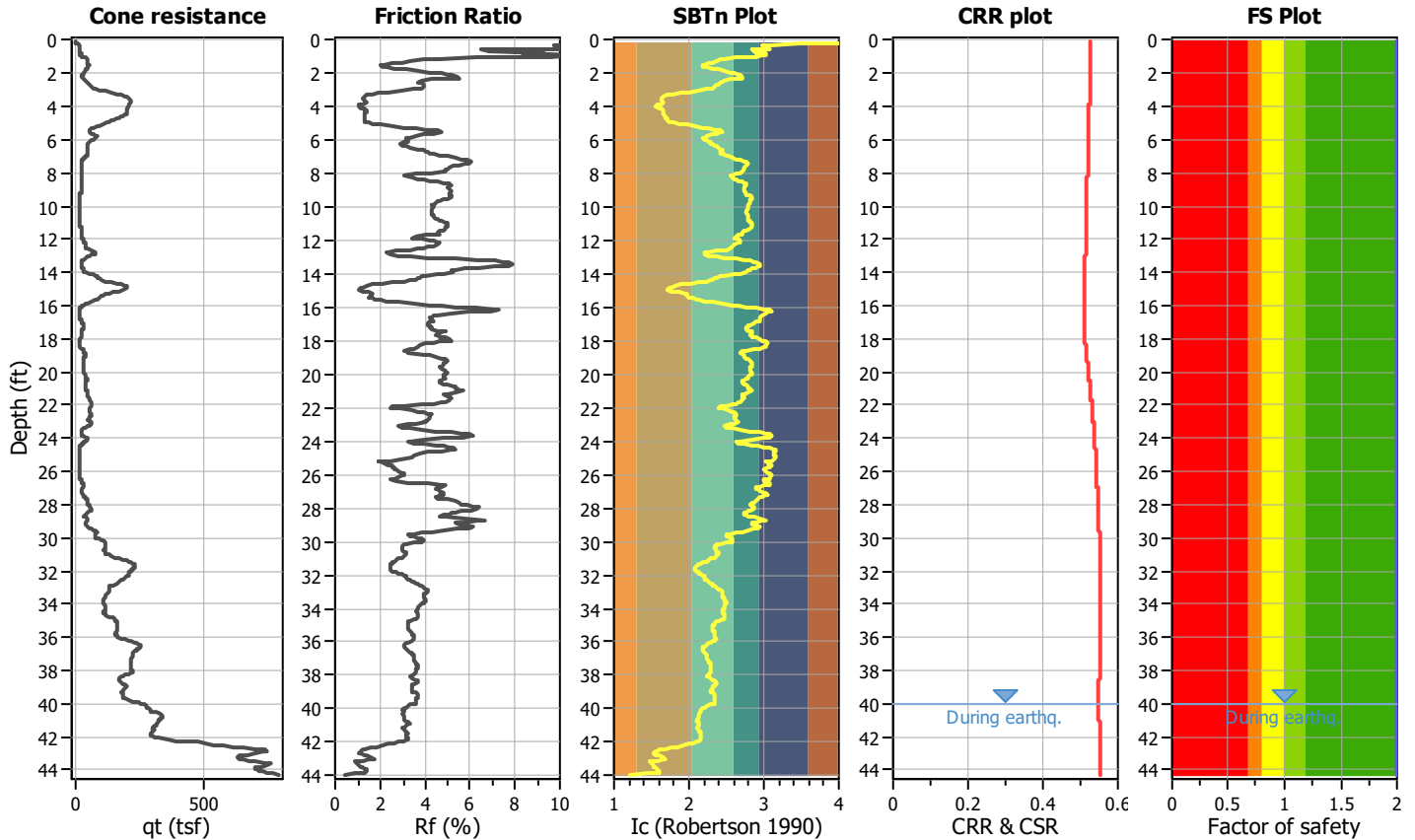
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

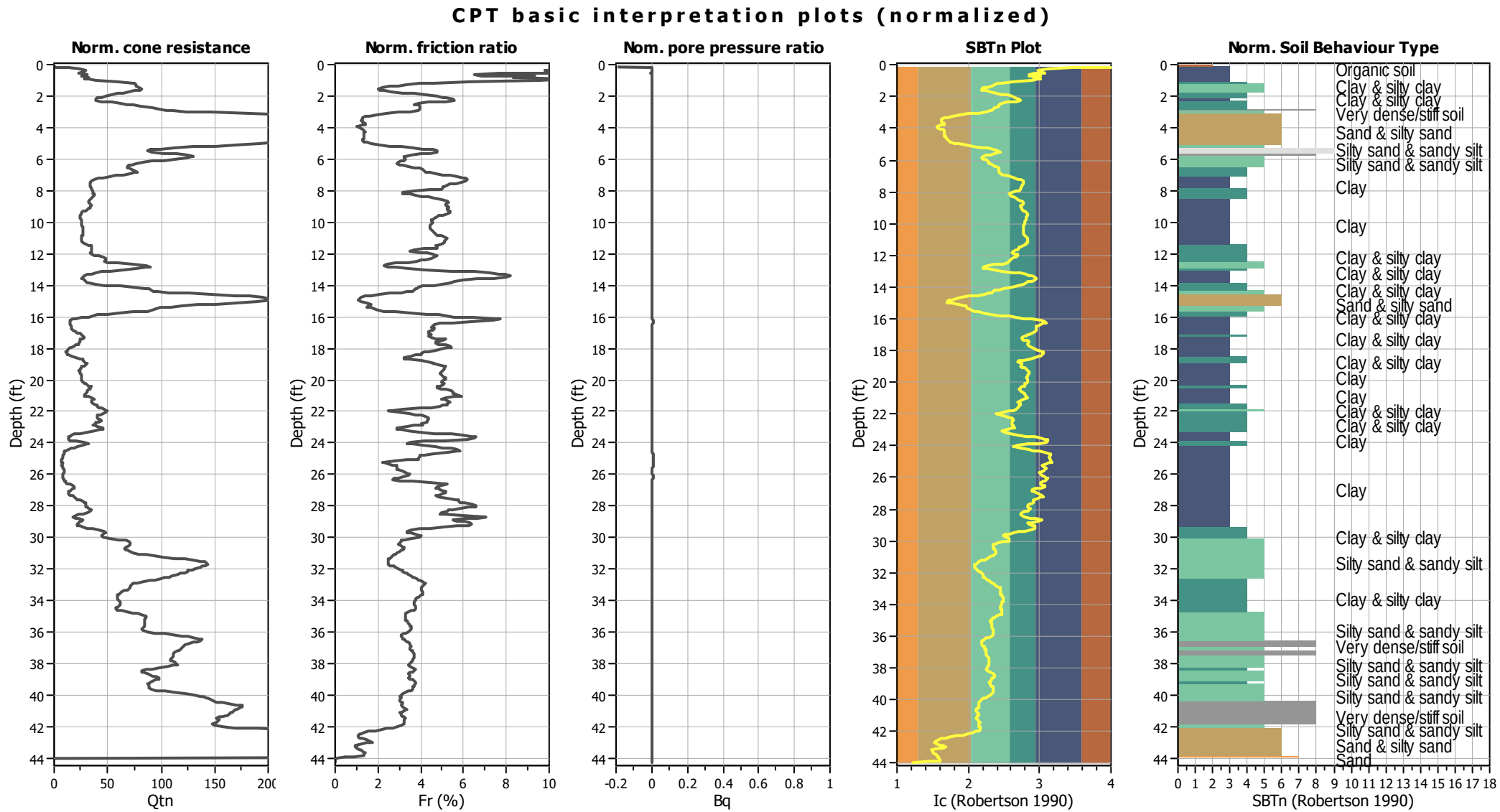
CPT file : CPT-29

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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

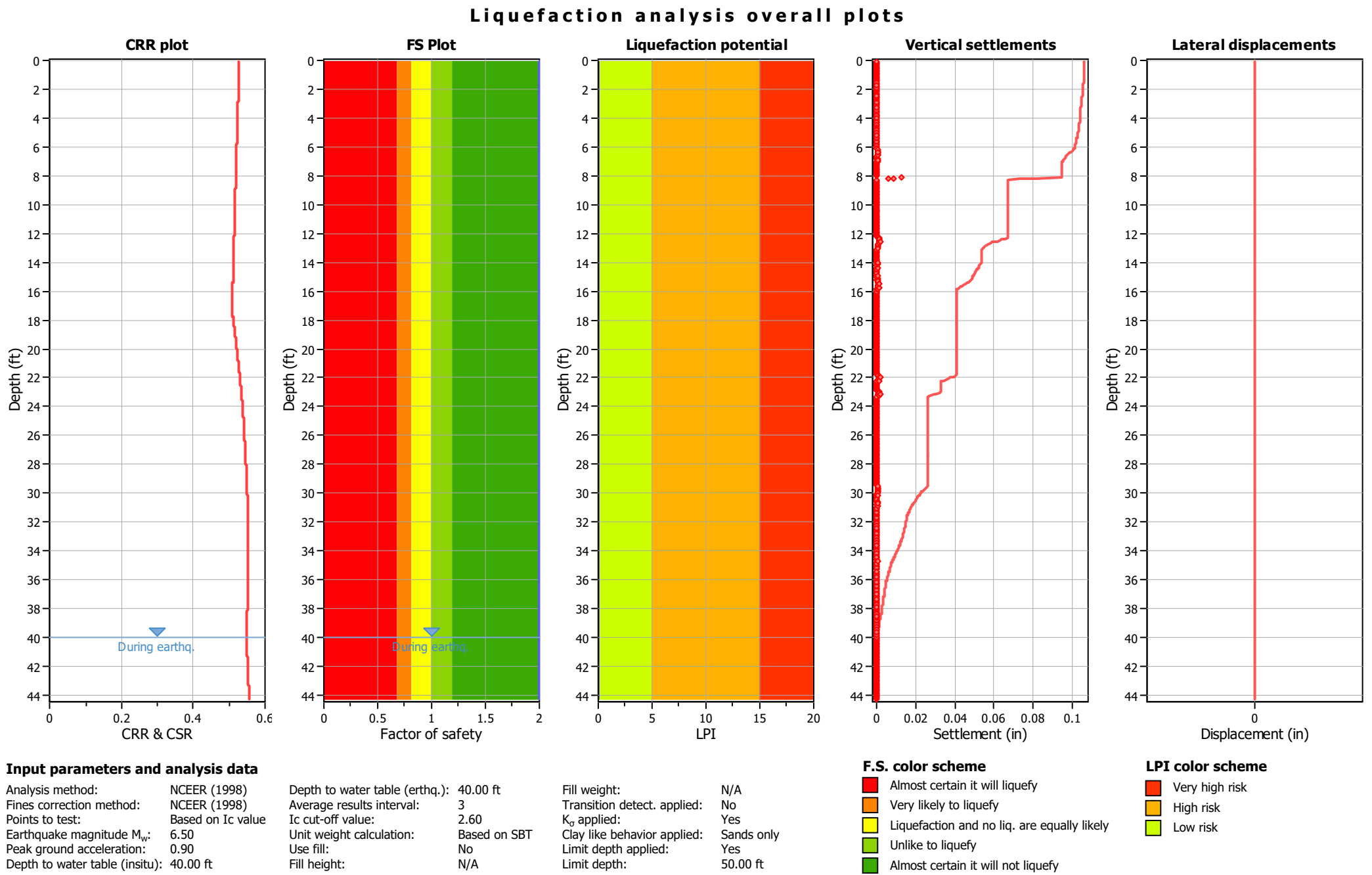


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

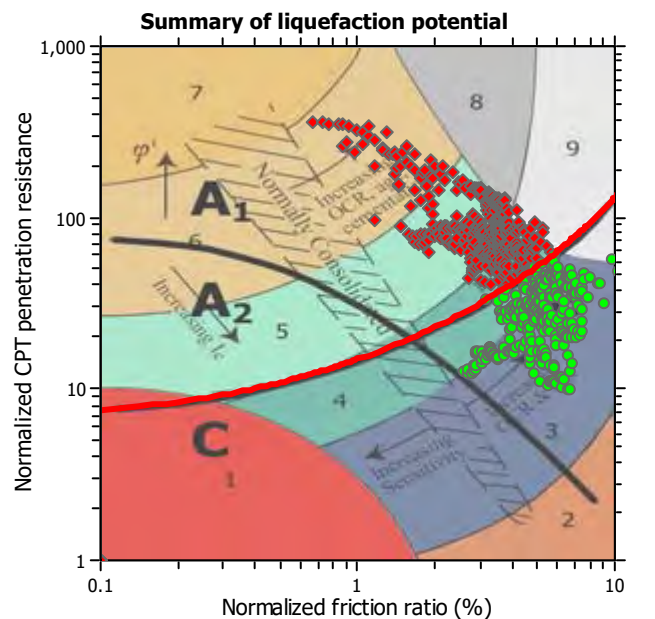
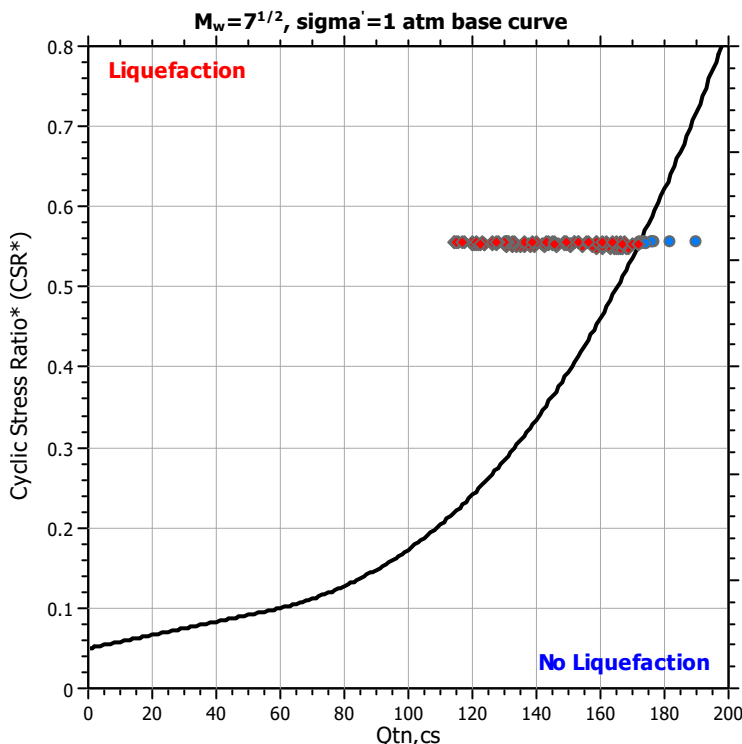
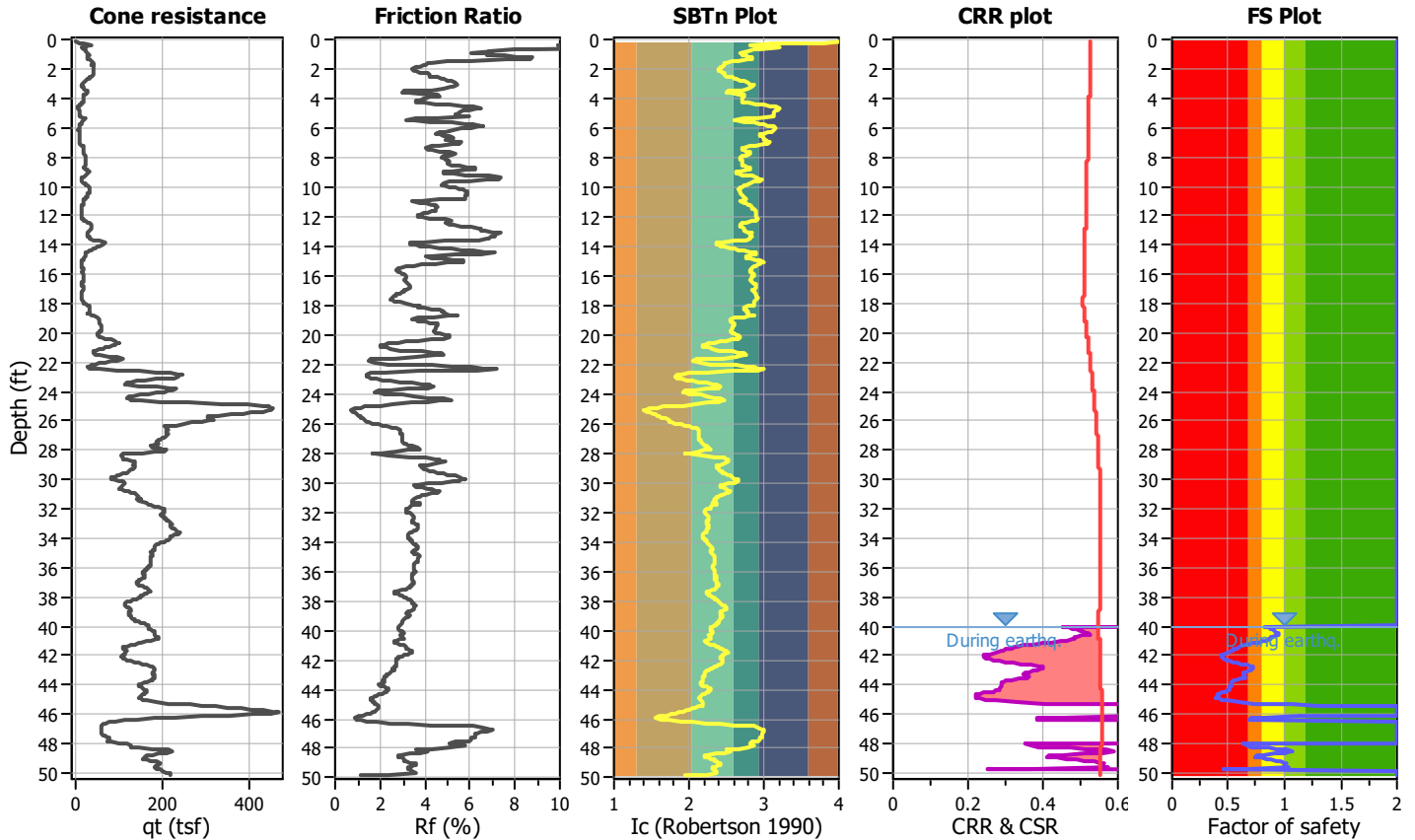
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

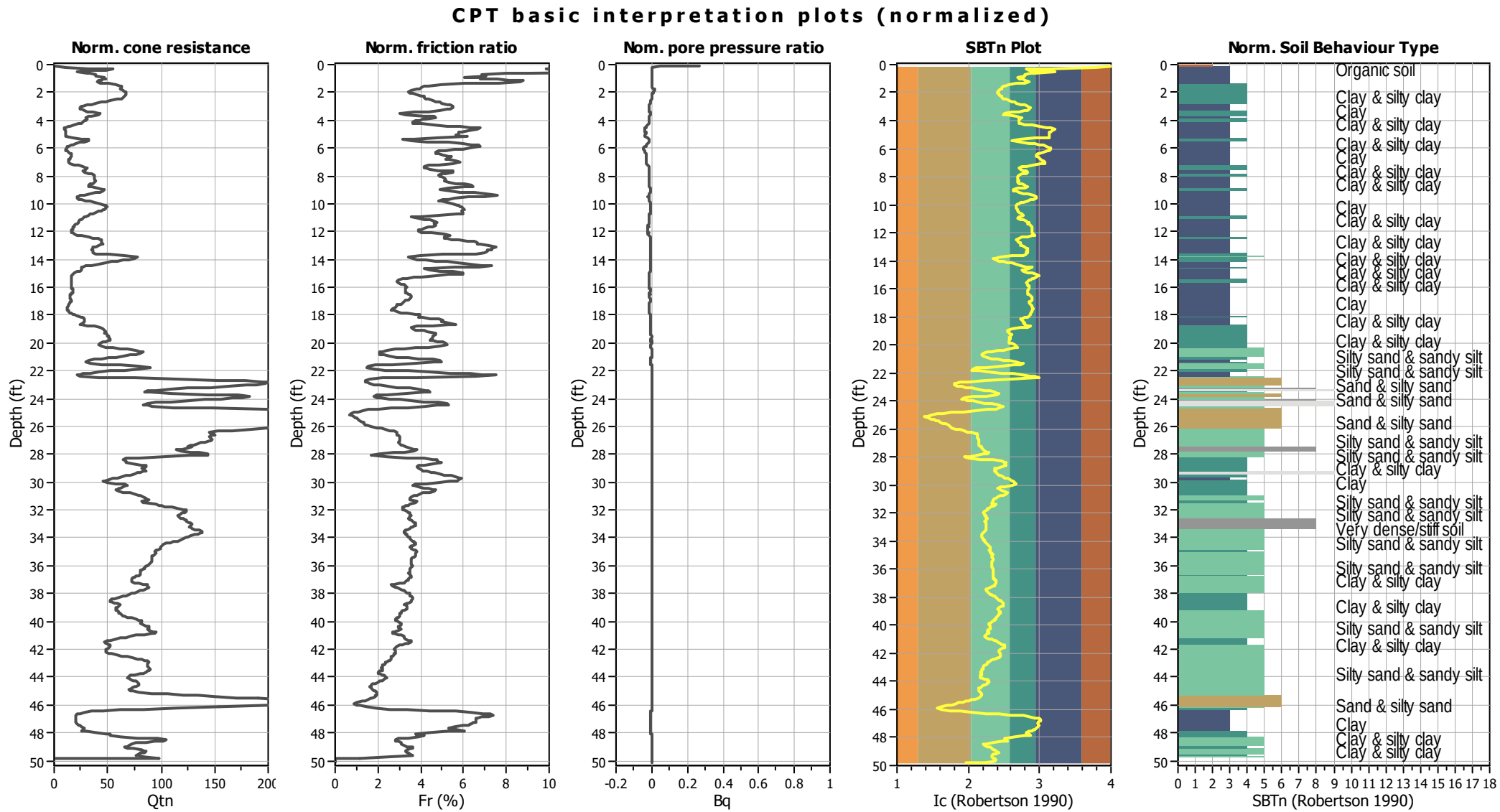
CPT file : CPT-31

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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

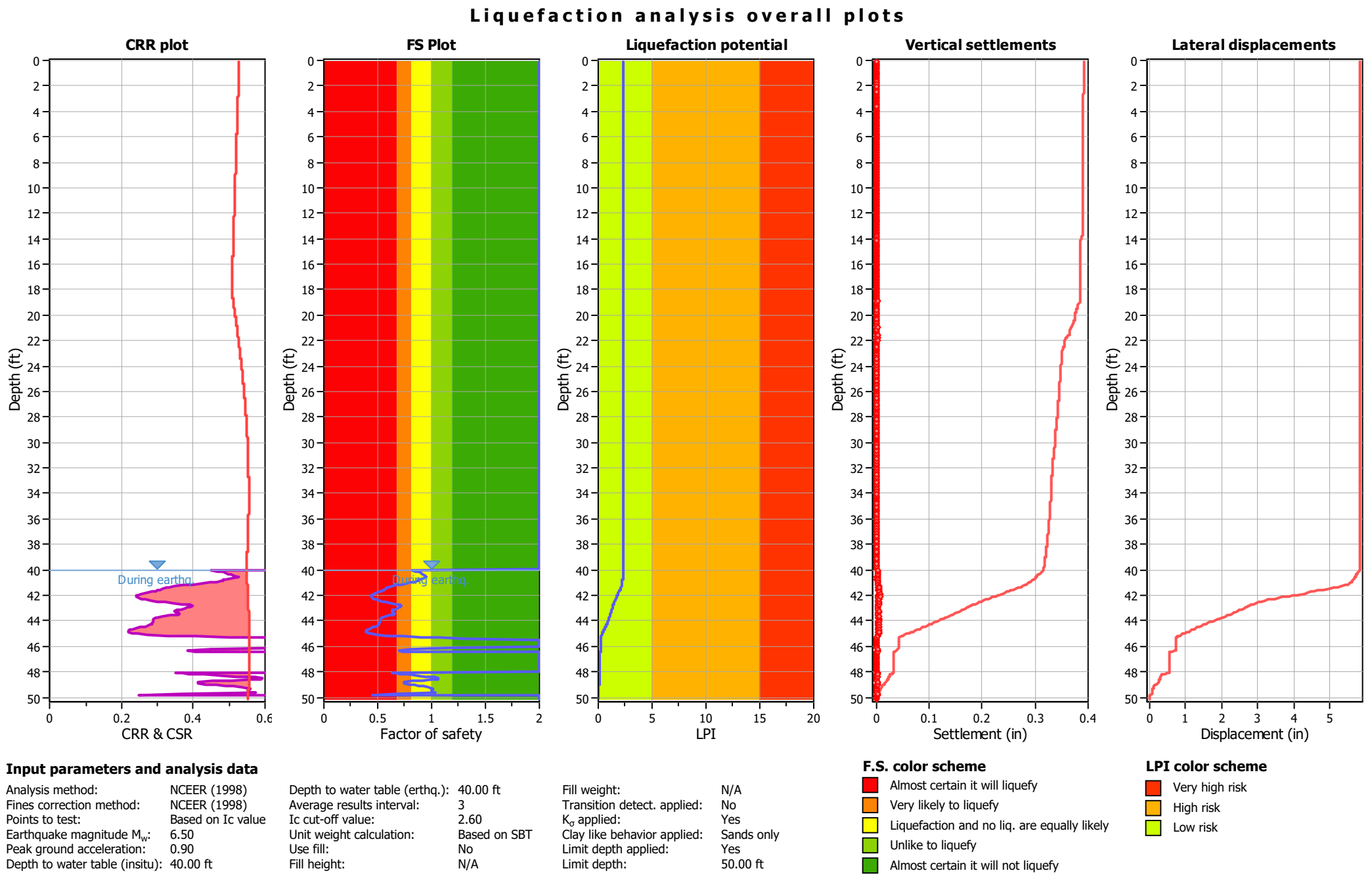


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

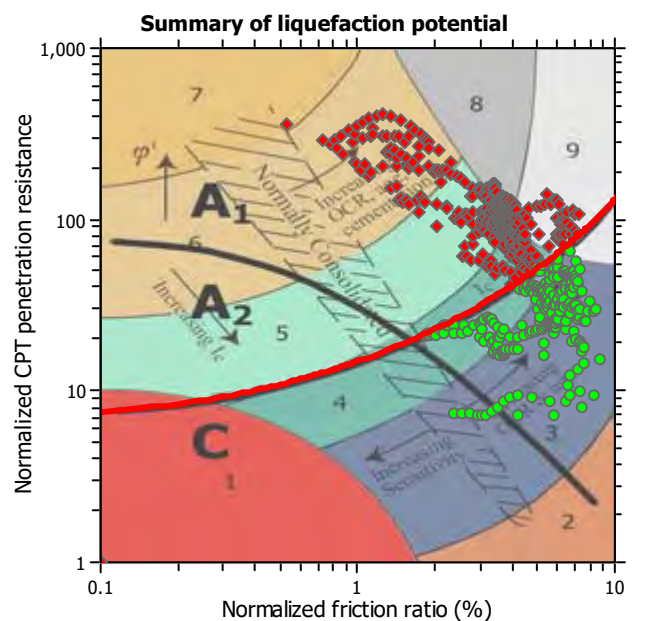
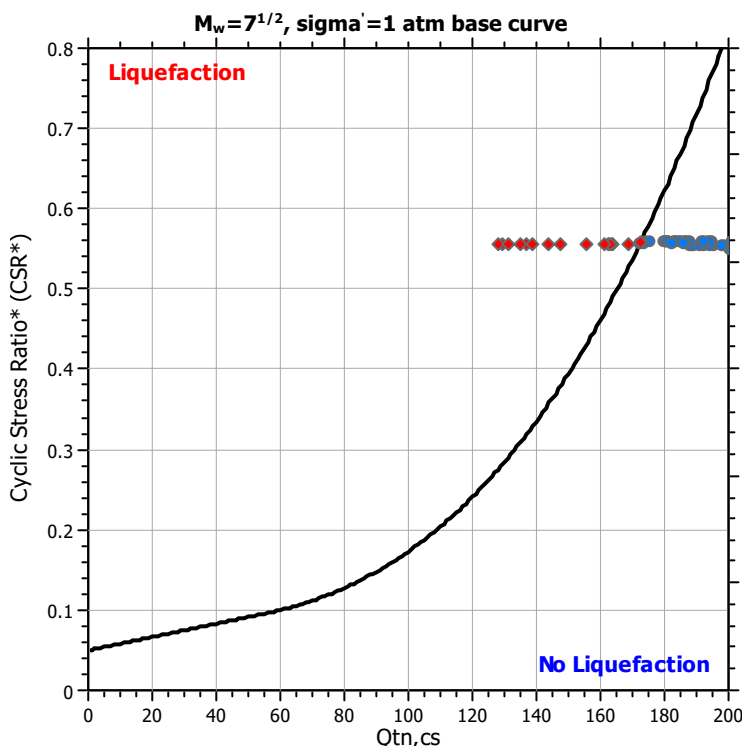
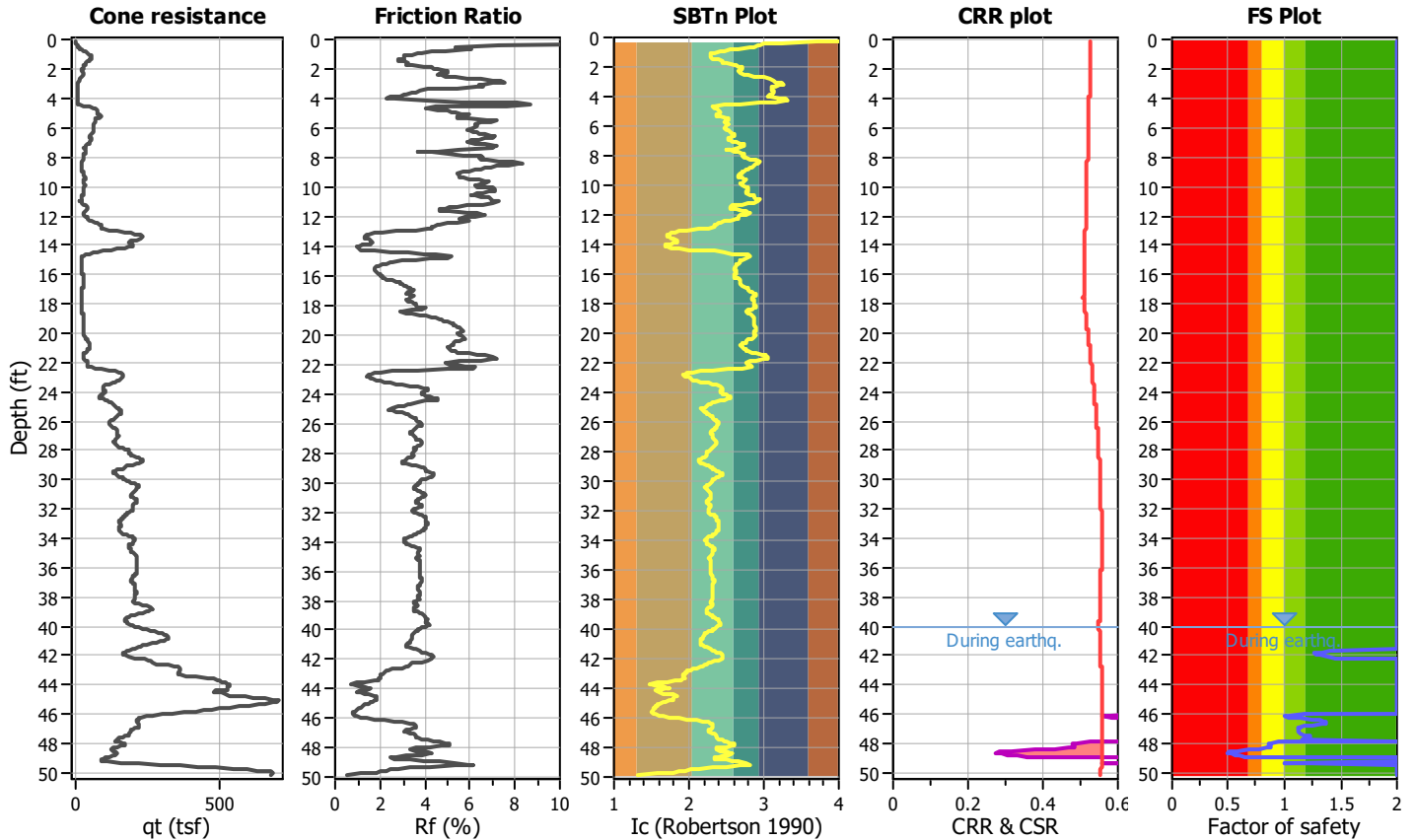
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

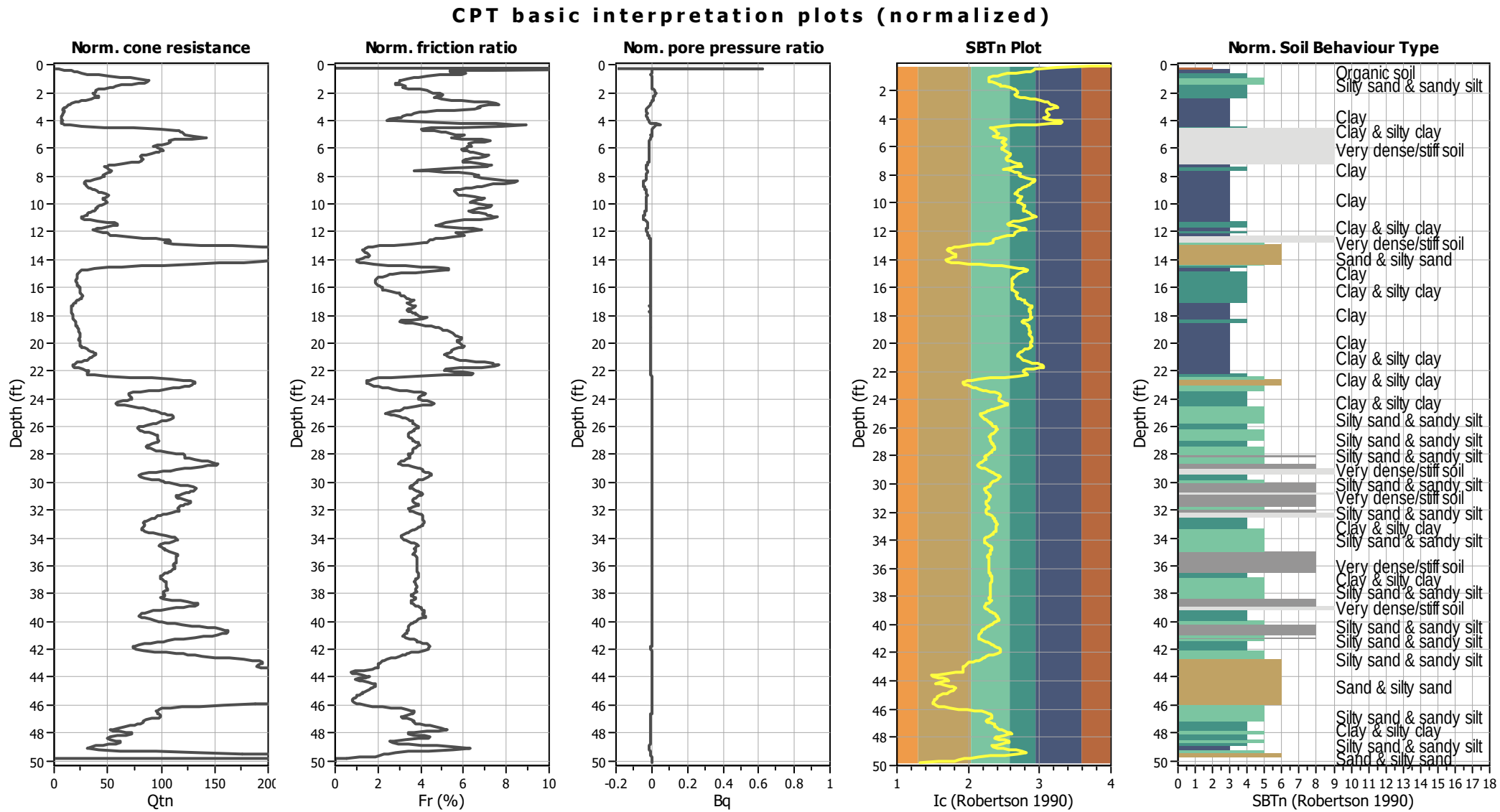
CPT file : CPT-33

Input parameters and analysis data

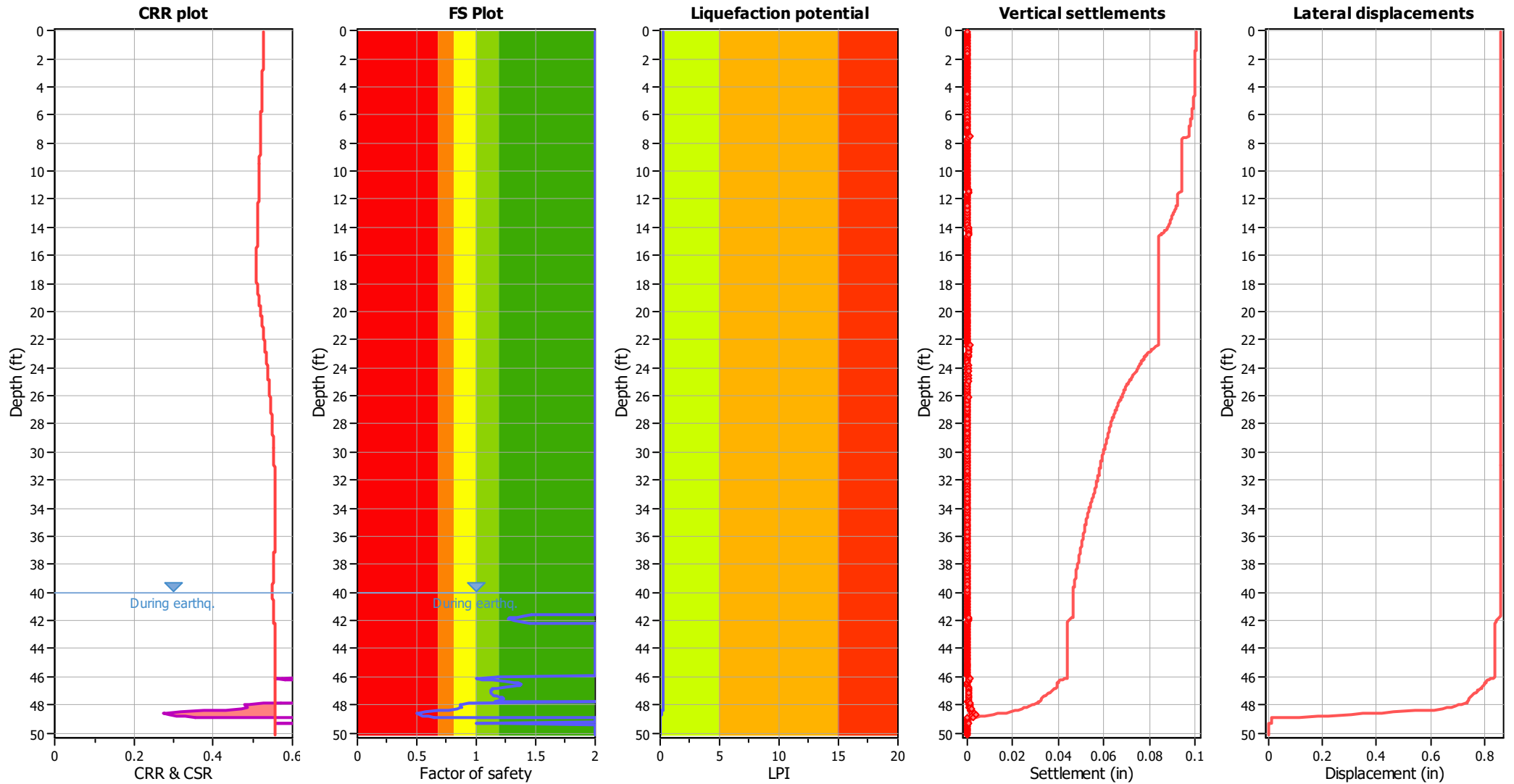
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Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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



Liquefaction analysis overall plots



Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (earthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

F.S. color scheme

Red	Almost certain it will liquefy
Orange	Very likely to liquefy
Yellow	Liquefaction and no liq. are equally likely
Light Green	Unlike to liquefy
Dark Green	Almost certain it will not liquefy

LPI color scheme

Red	Very high risk
Orange	High risk
Yellow	Low risk

LIQUEFACTION ANALYSIS REPORT

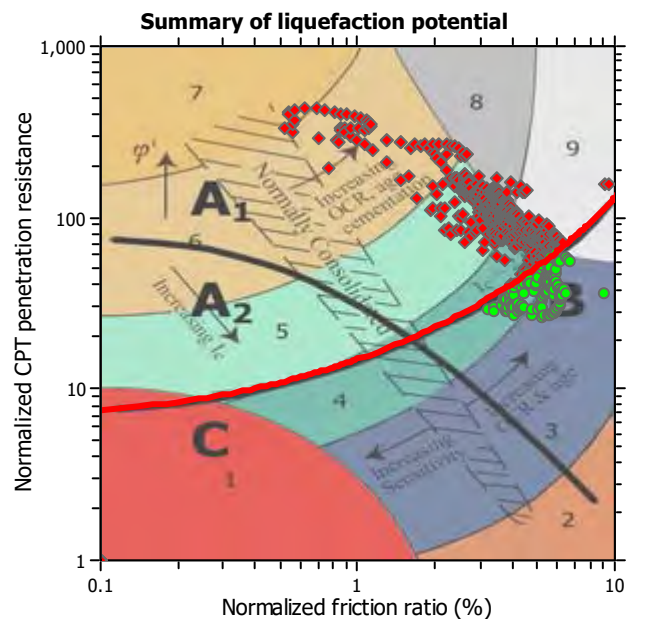
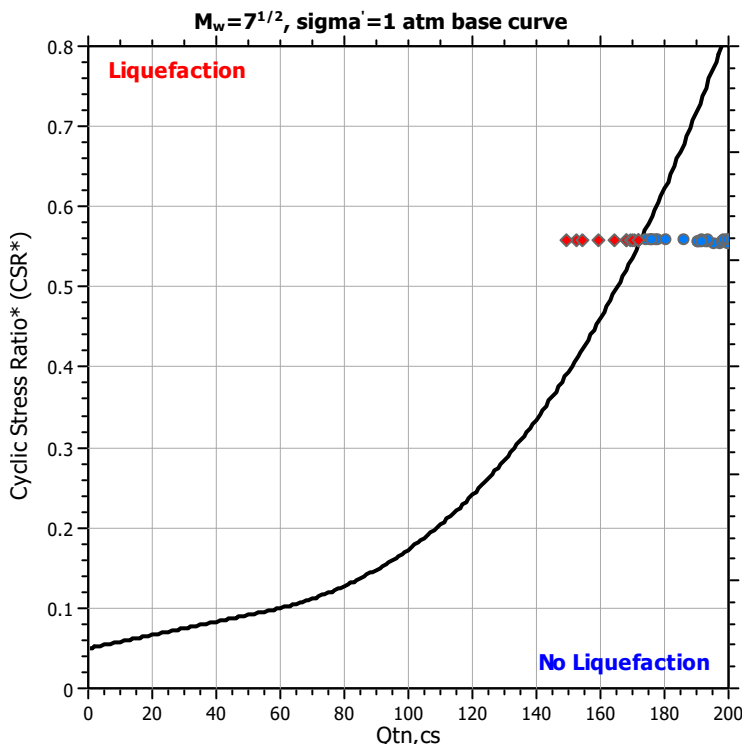
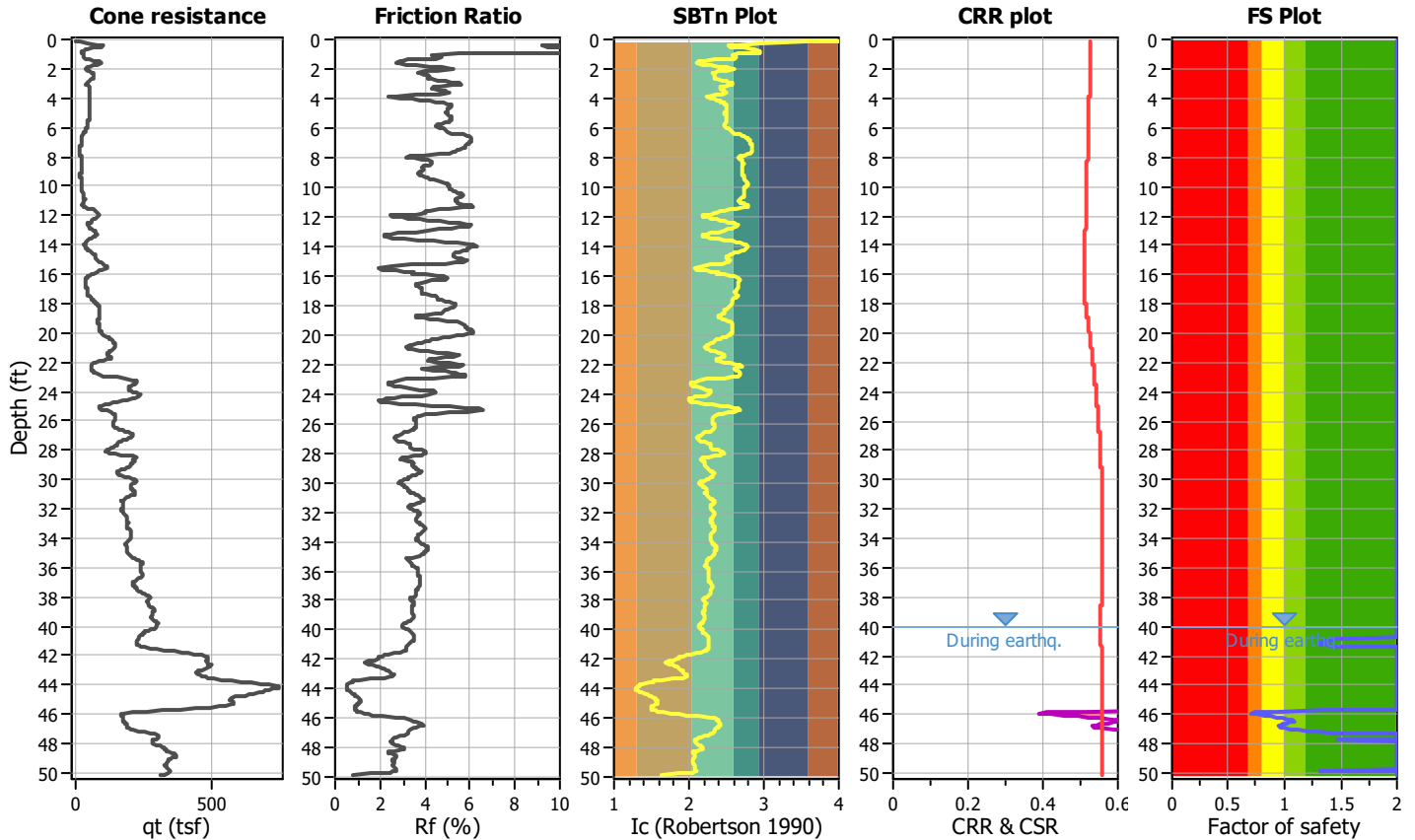
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

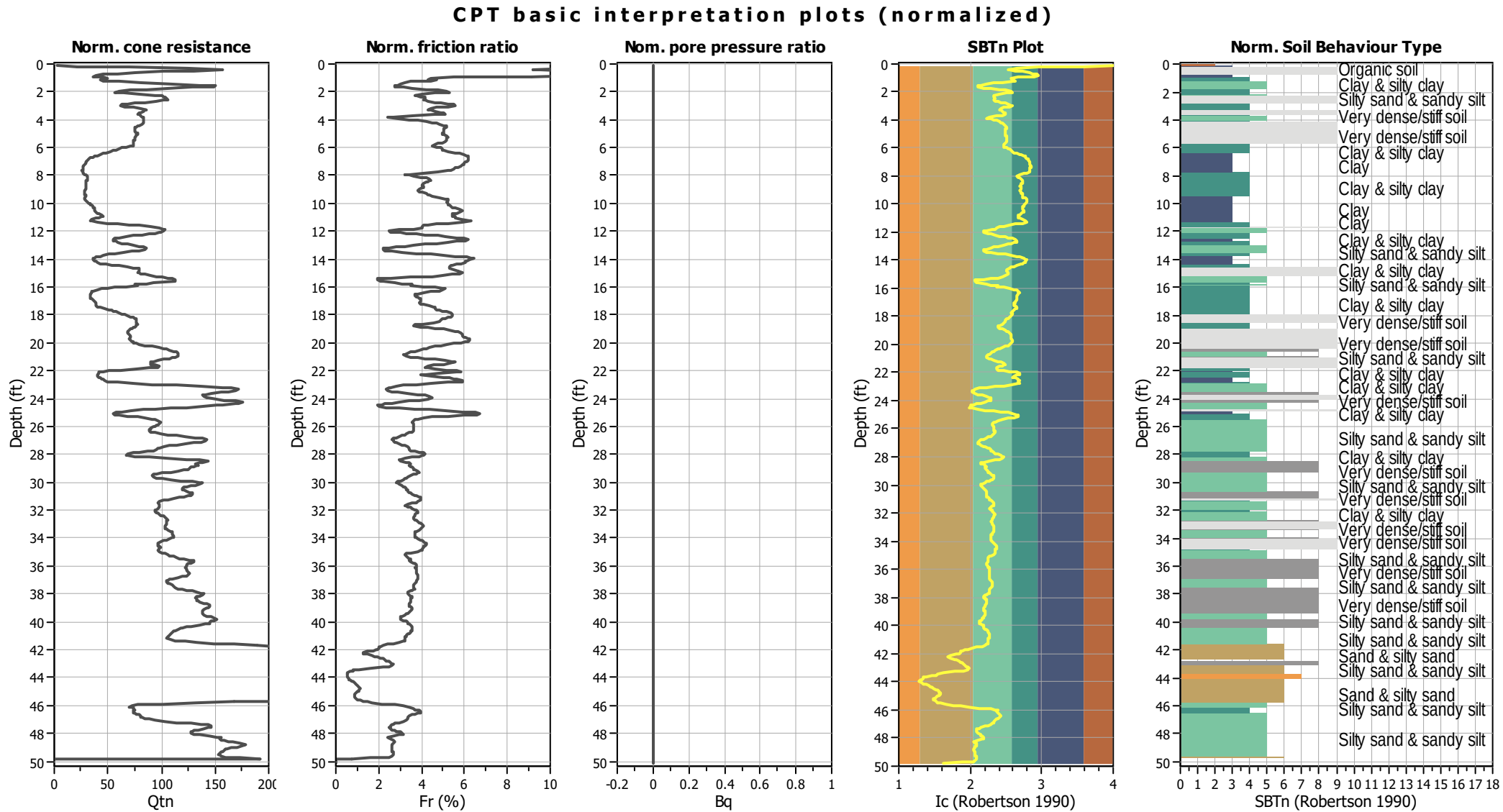
CPT file : CPT-35

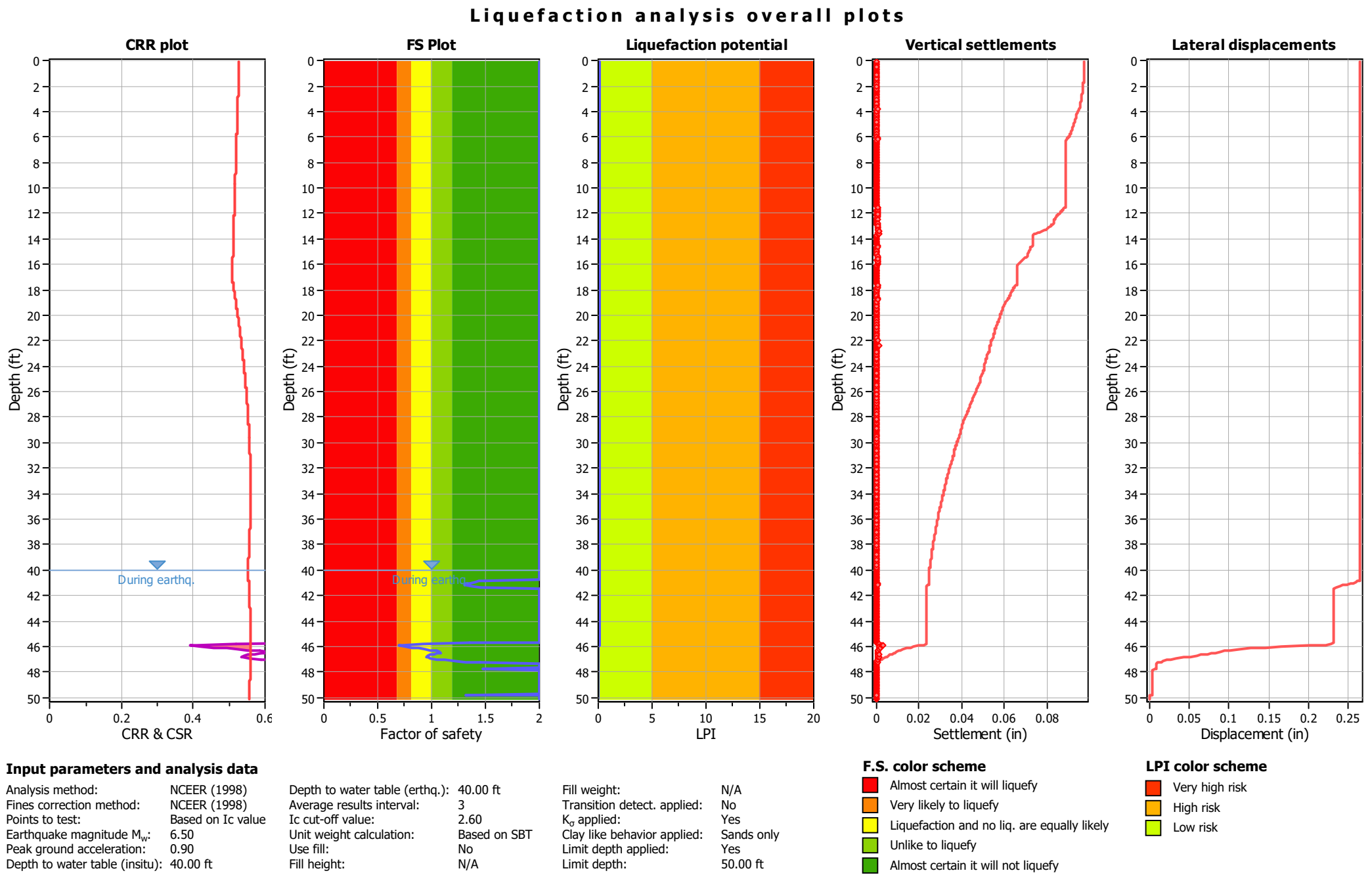
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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





LIQUEFACTION ANALYSIS REPORT

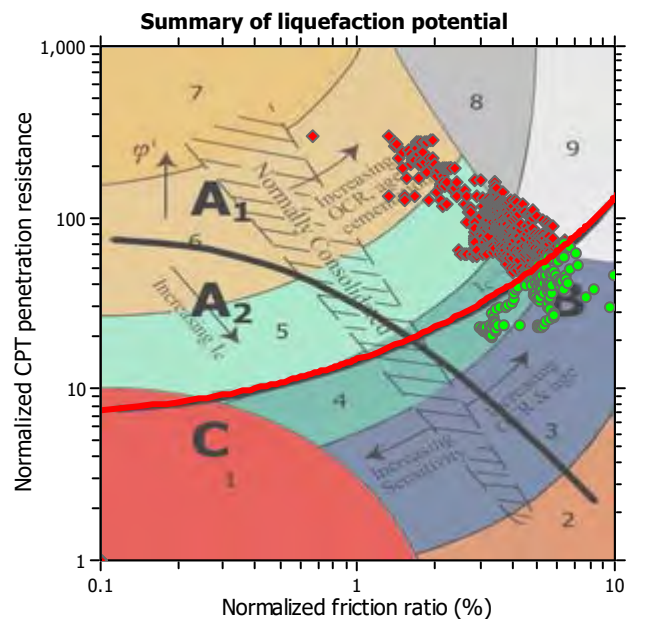
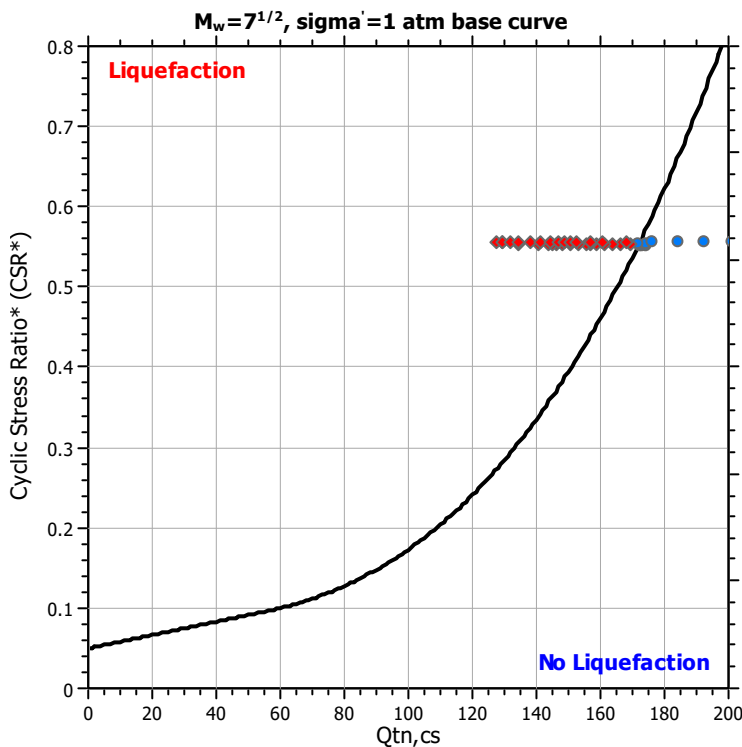
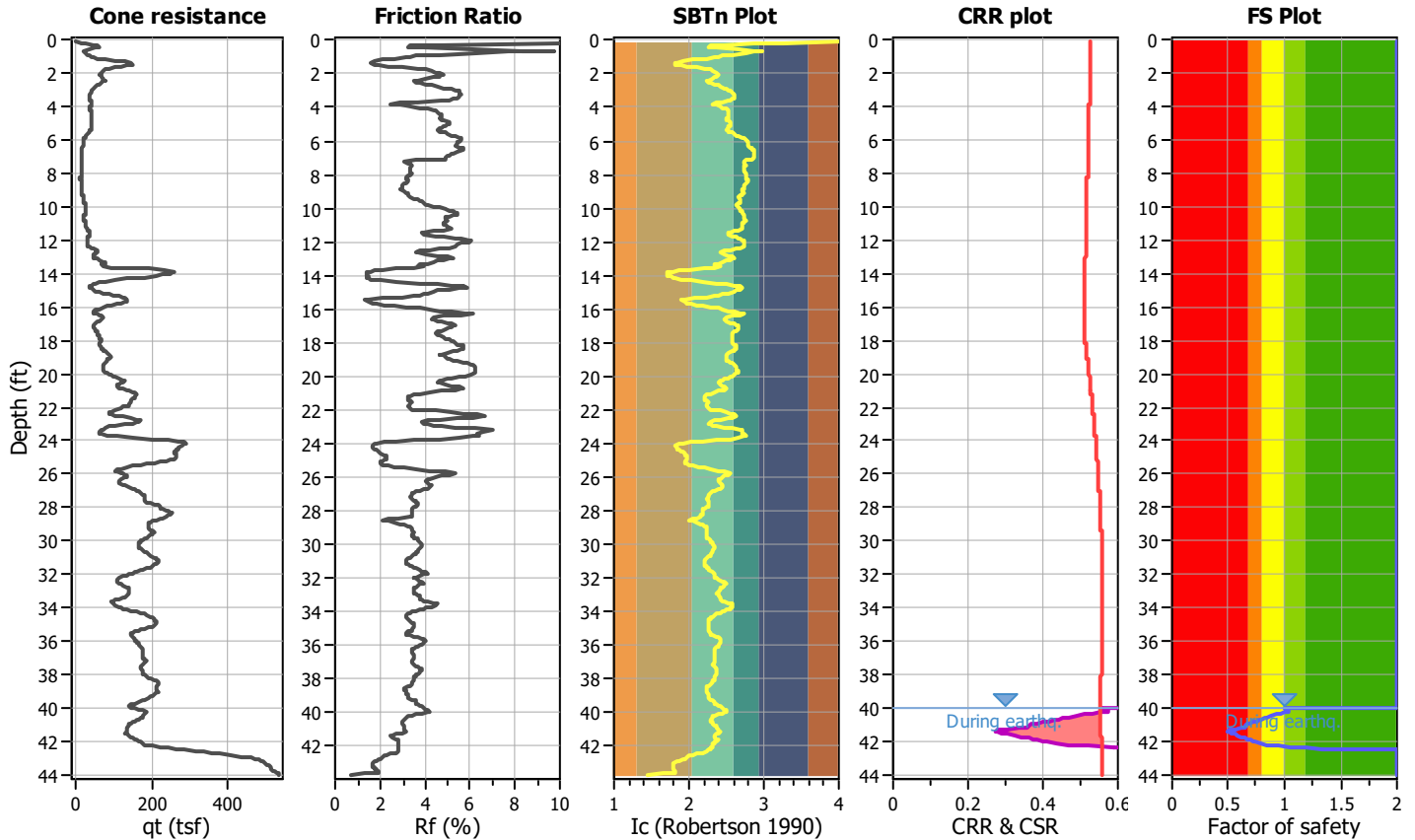
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

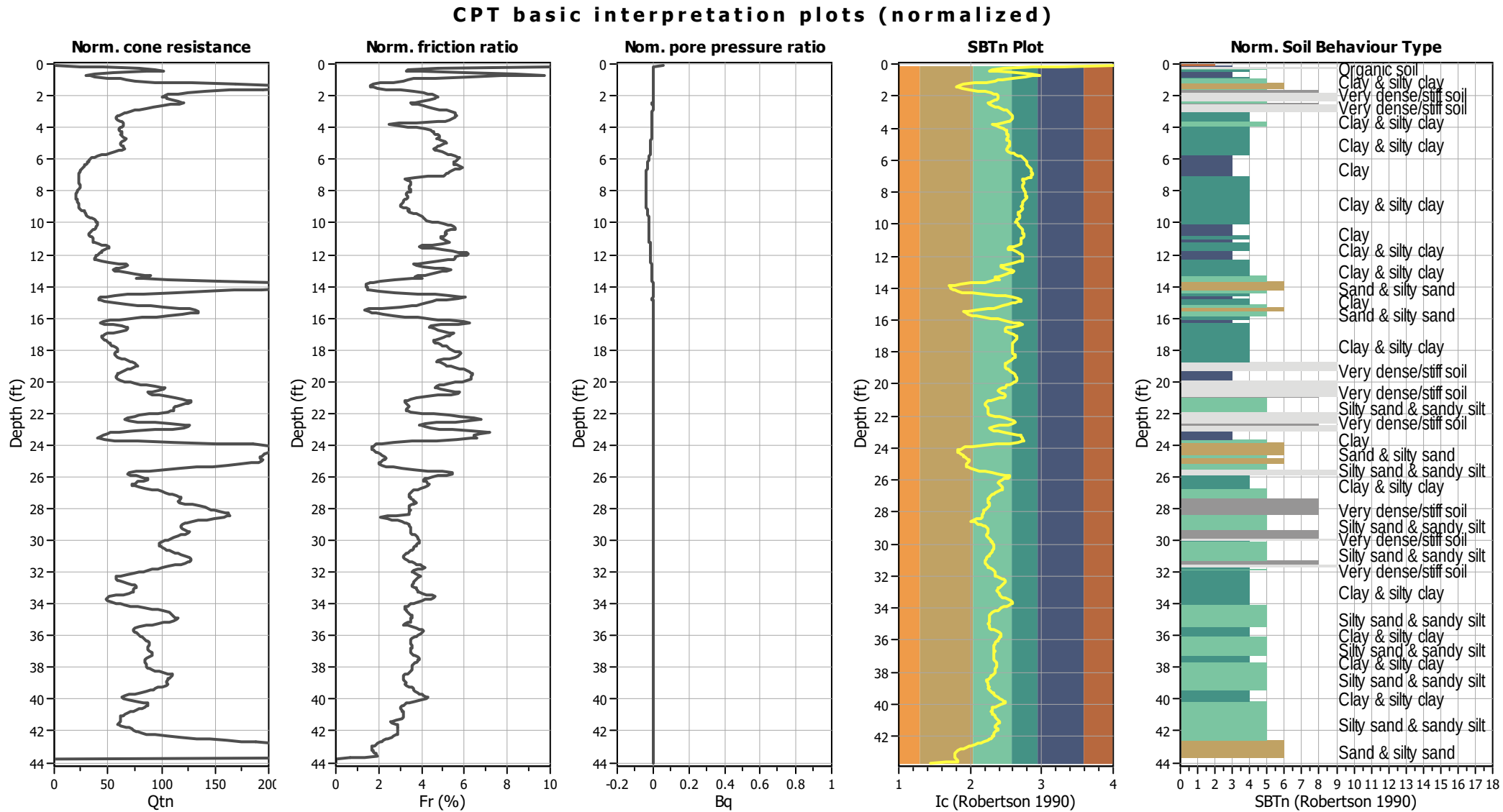
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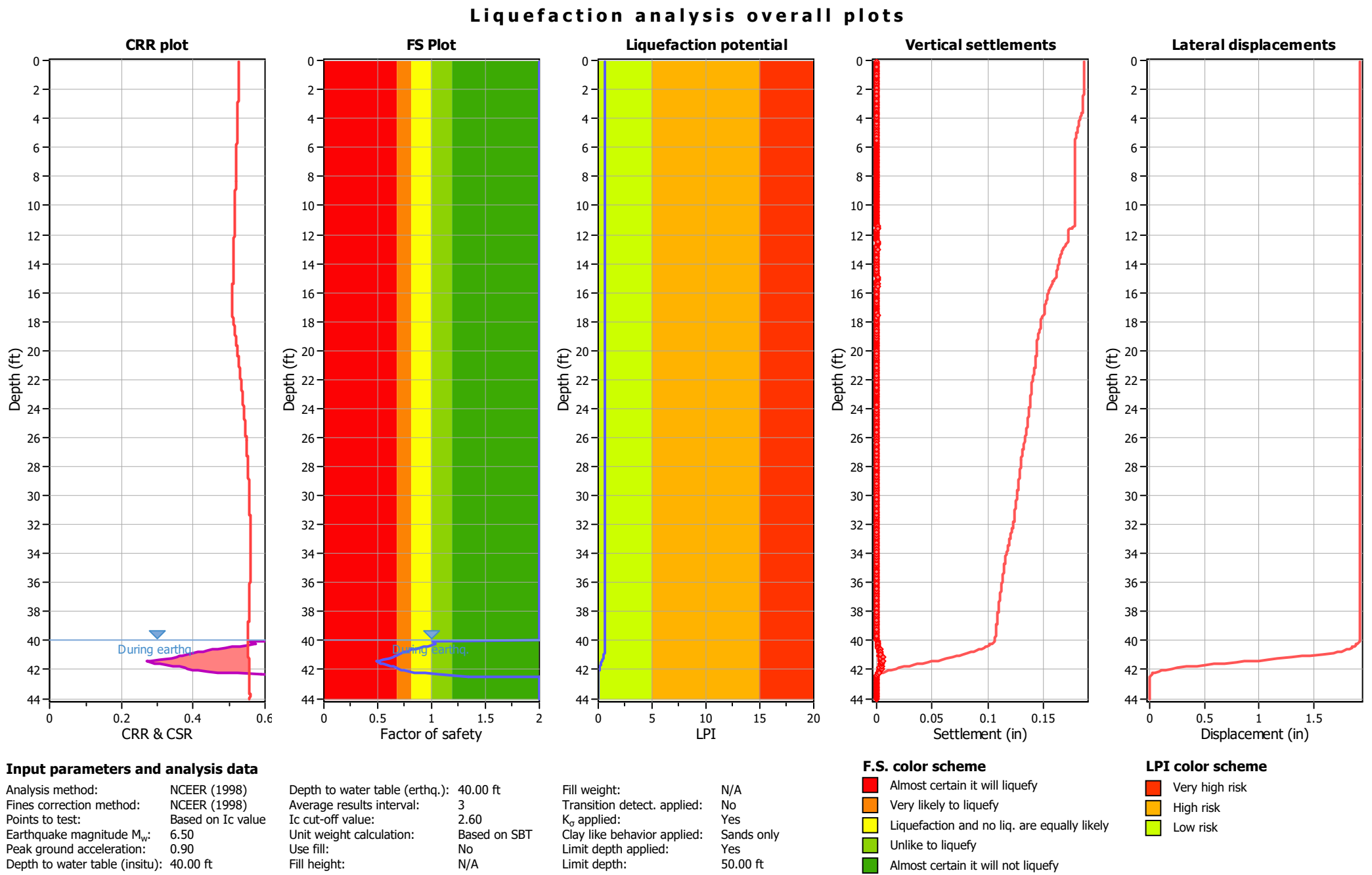
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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





LIQUEFACTION ANALYSIS REPORT

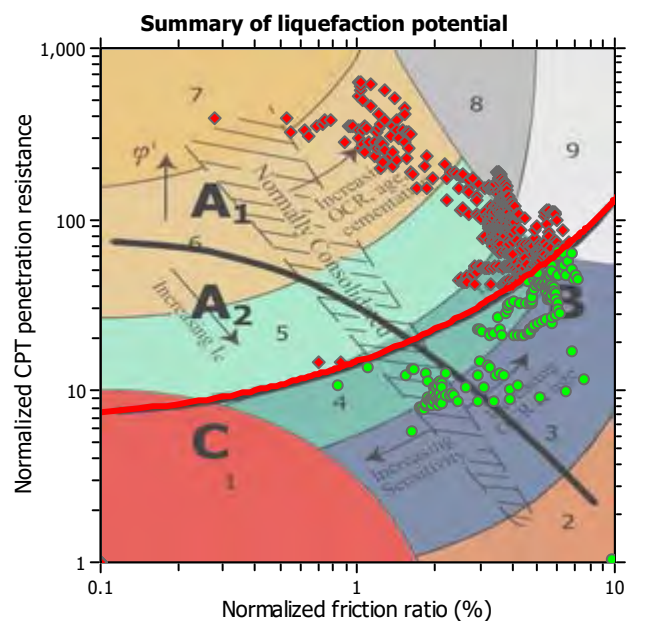
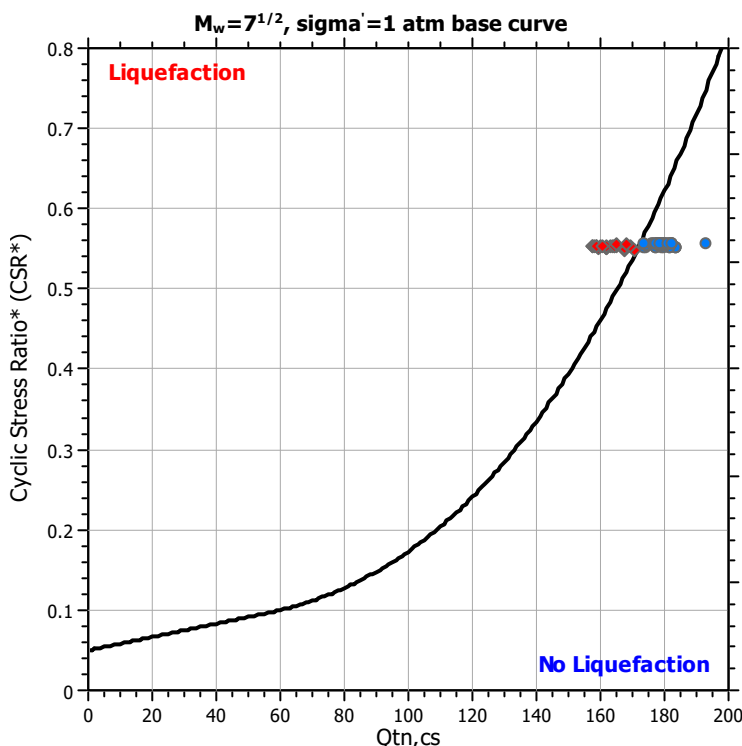
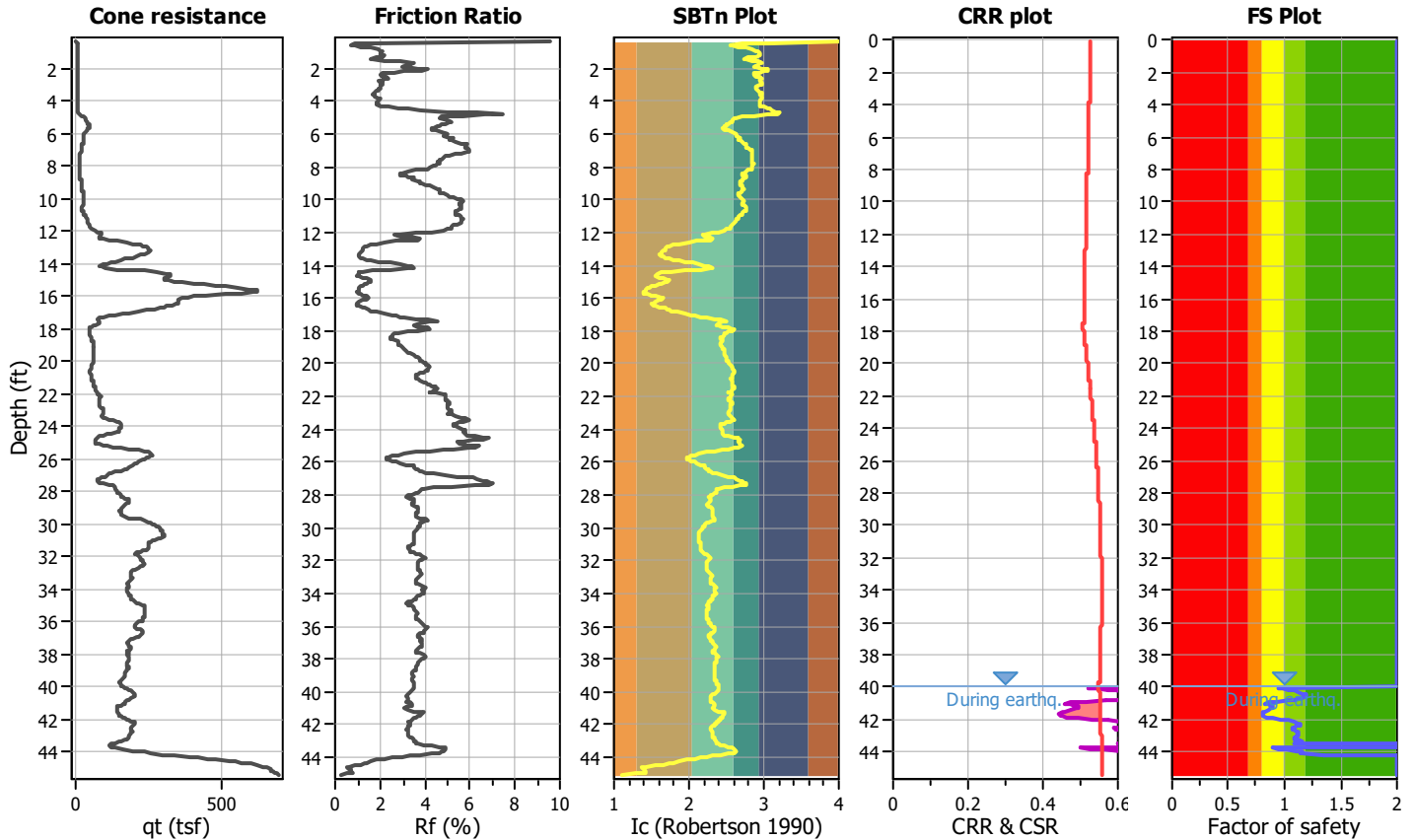
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

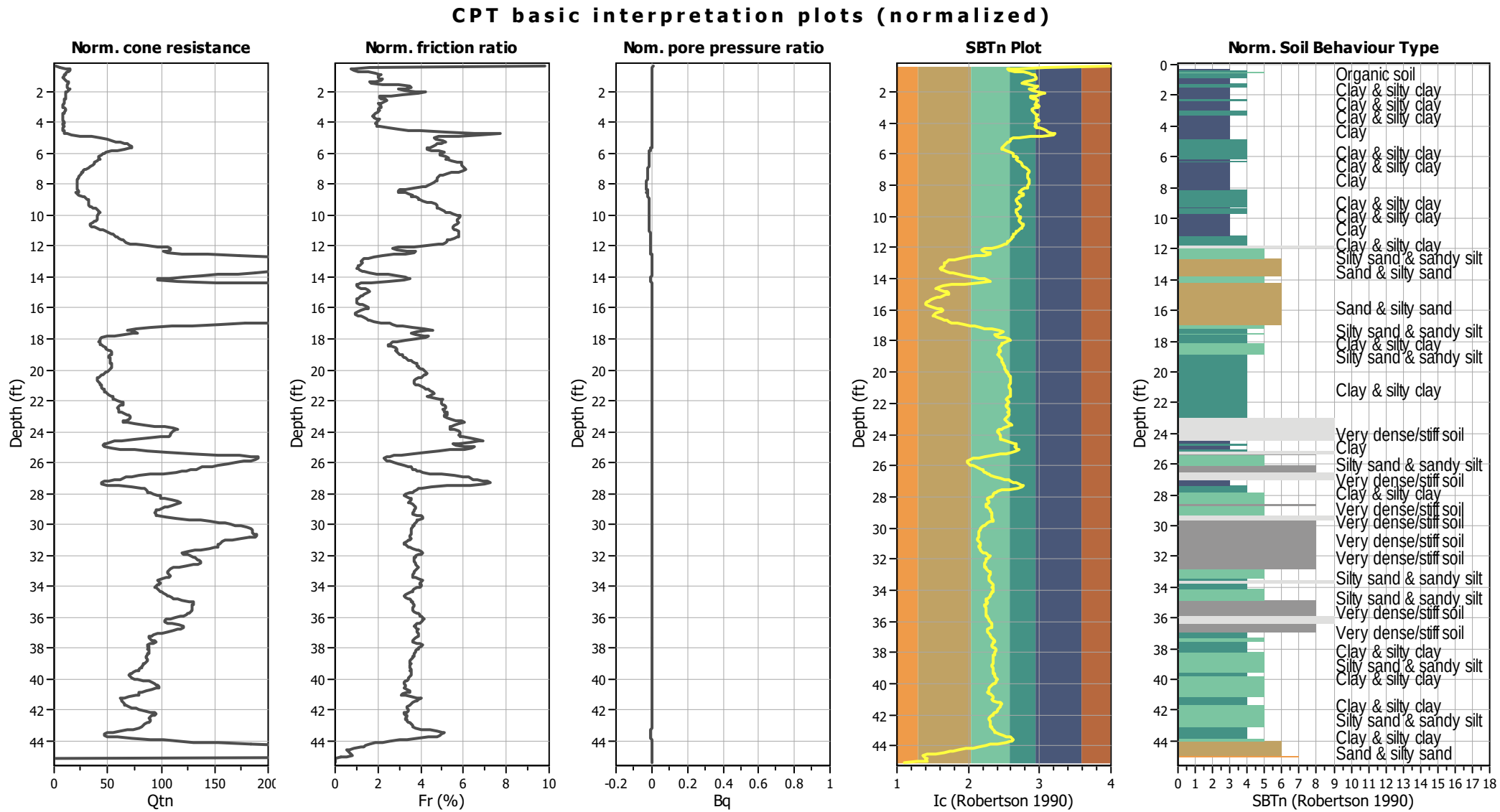
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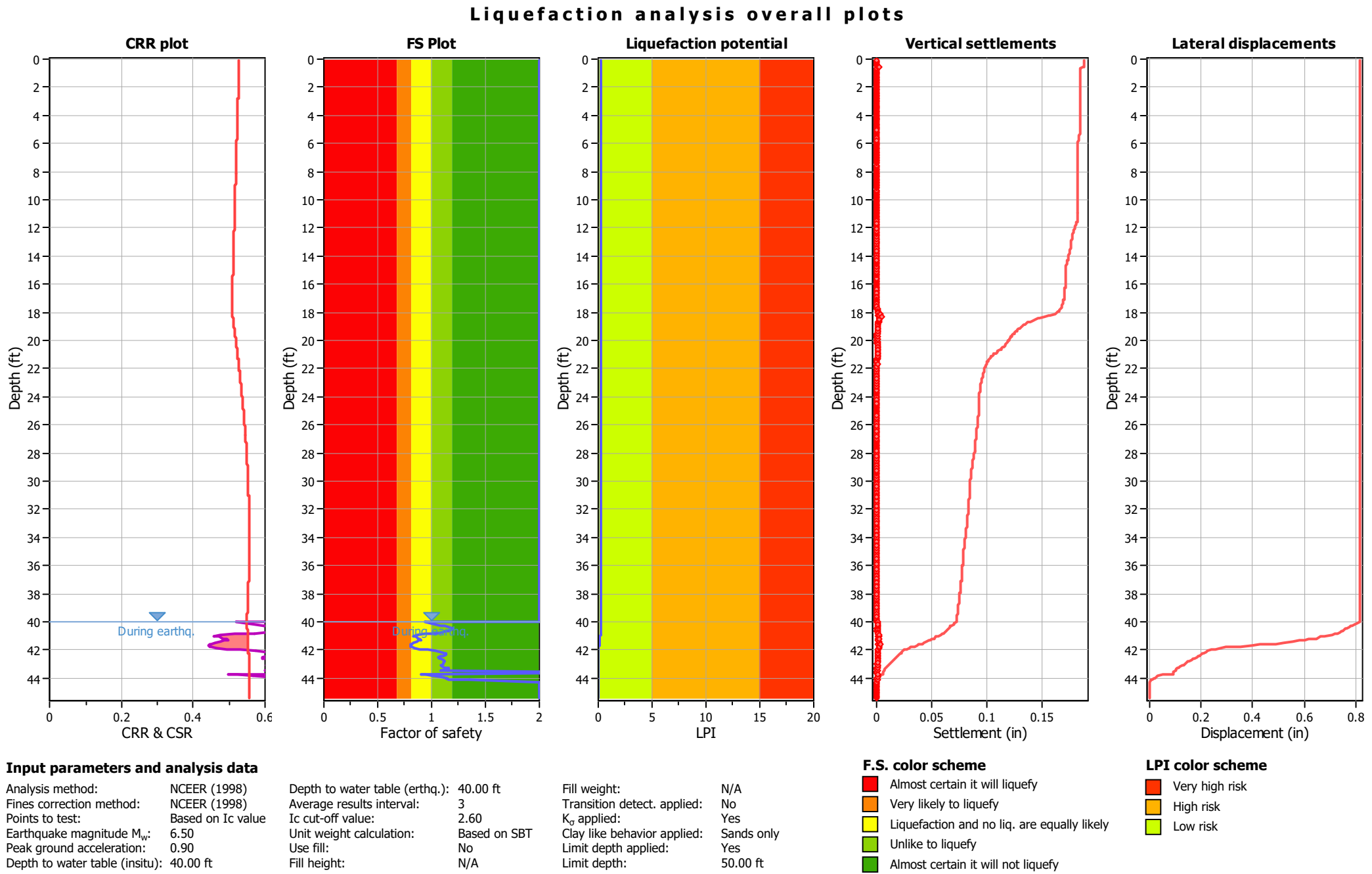
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone B: Liquefaction and post-earthquake strength loss possible depending on soil plasticity, brittleness/sensitivity, strain to peak undrained strength and ground geometry





LIQUEFACTION ANALYSIS REPORT

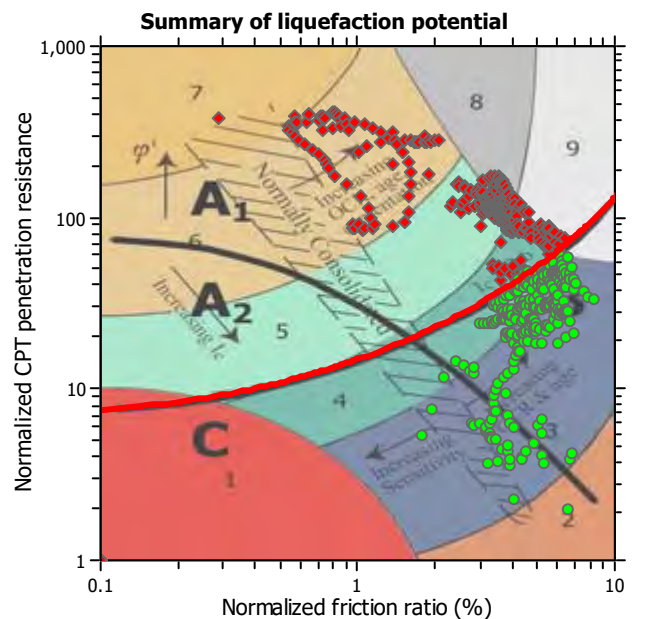
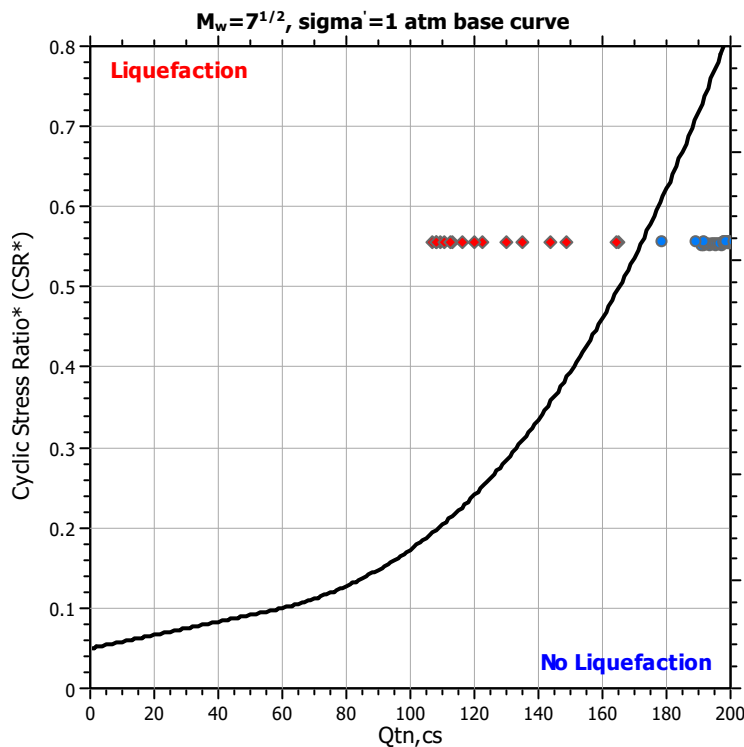
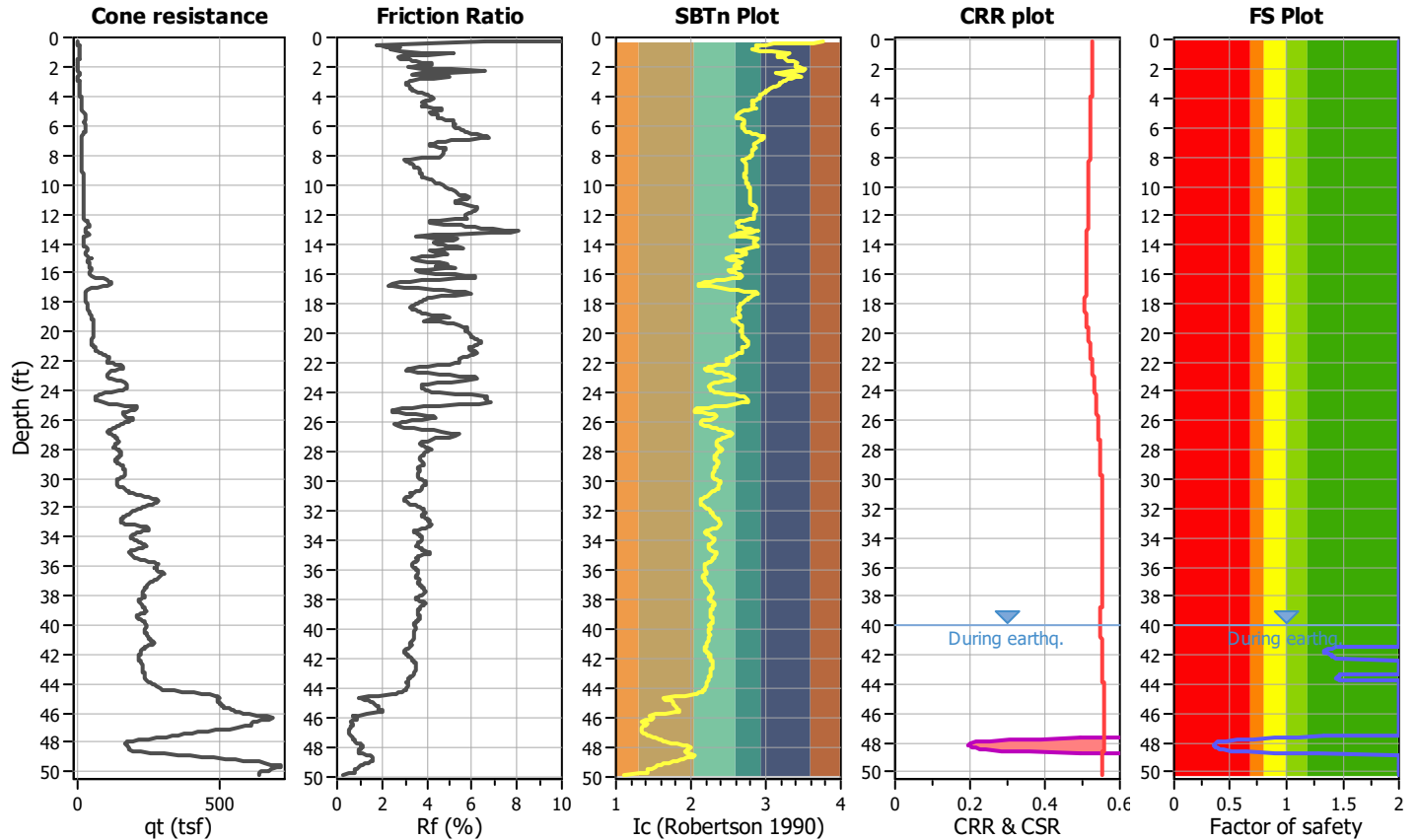
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

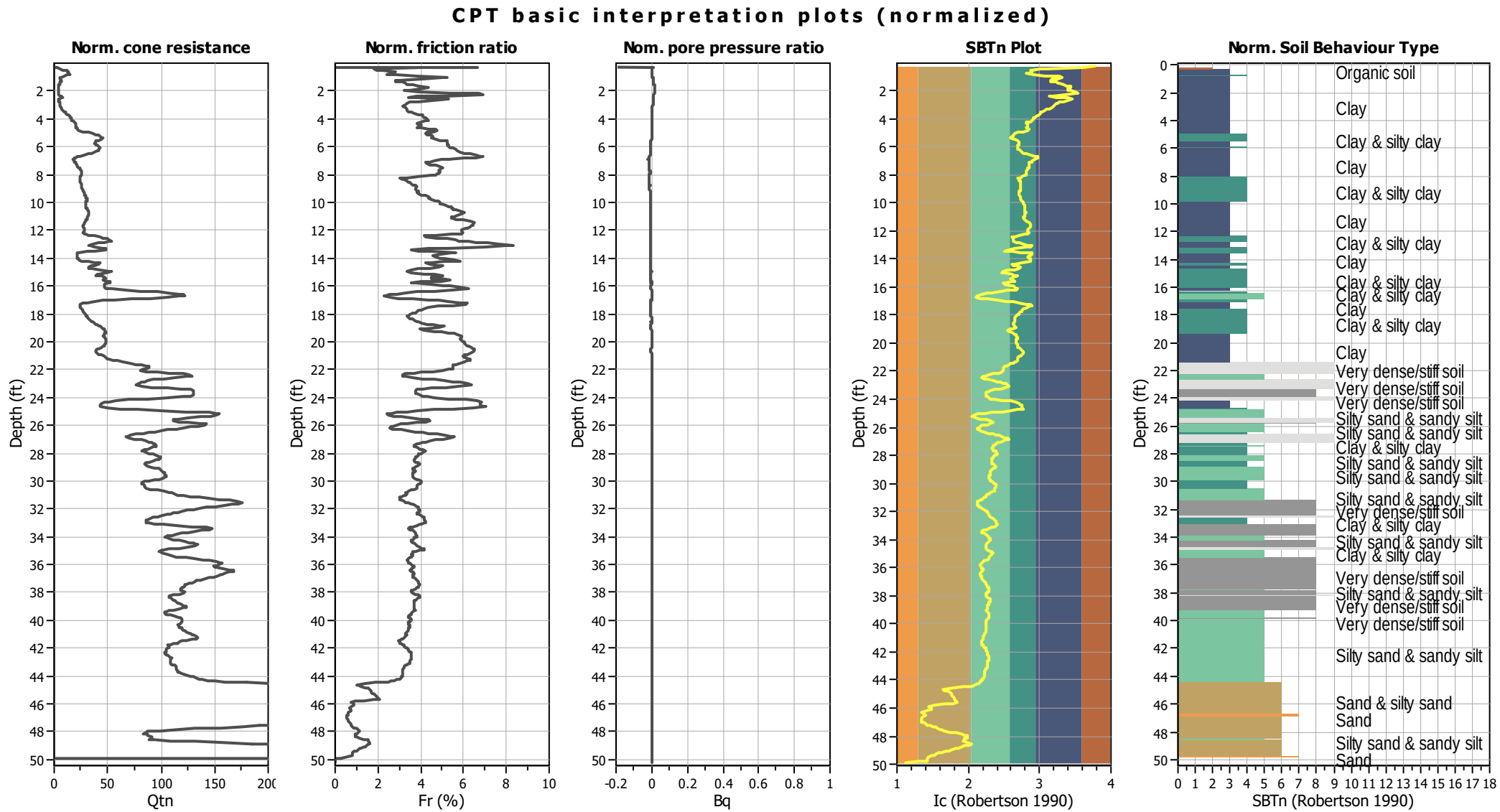
CPT file : CPT-41

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior applied:	Sands only
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 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 :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	MSF method:	Method based
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes		



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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

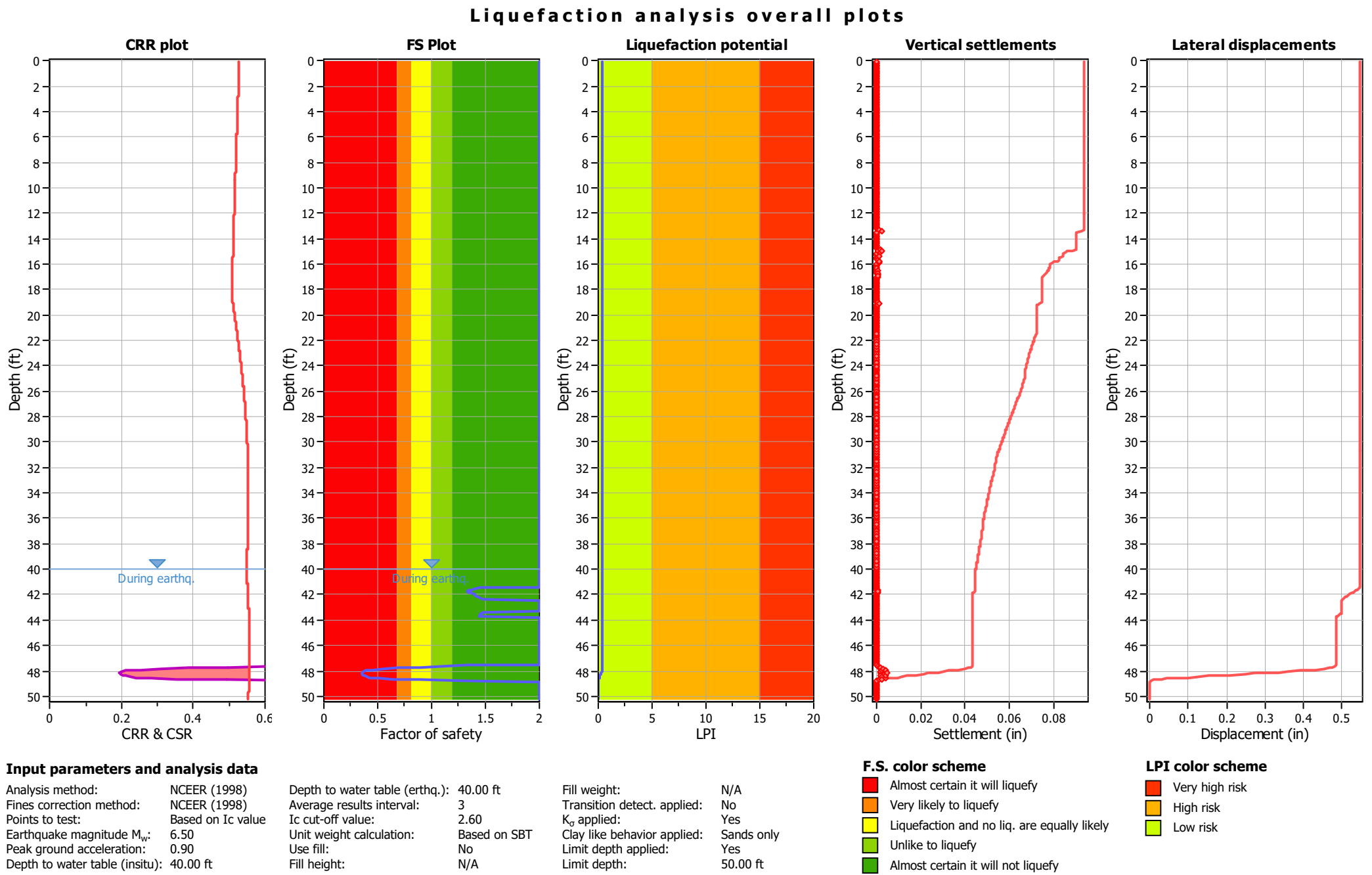


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

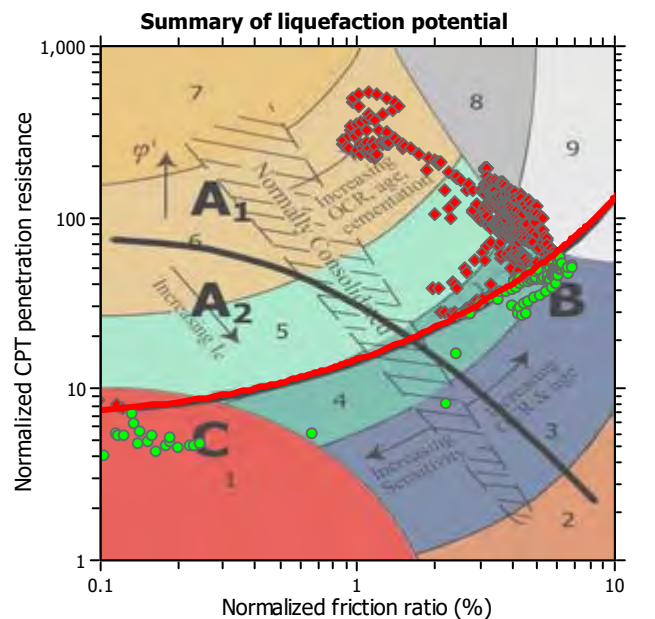
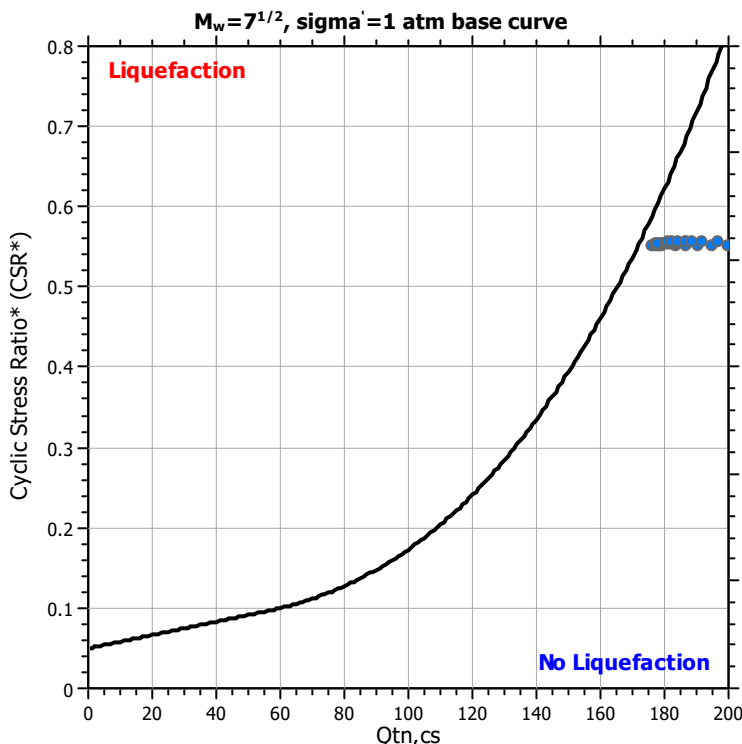
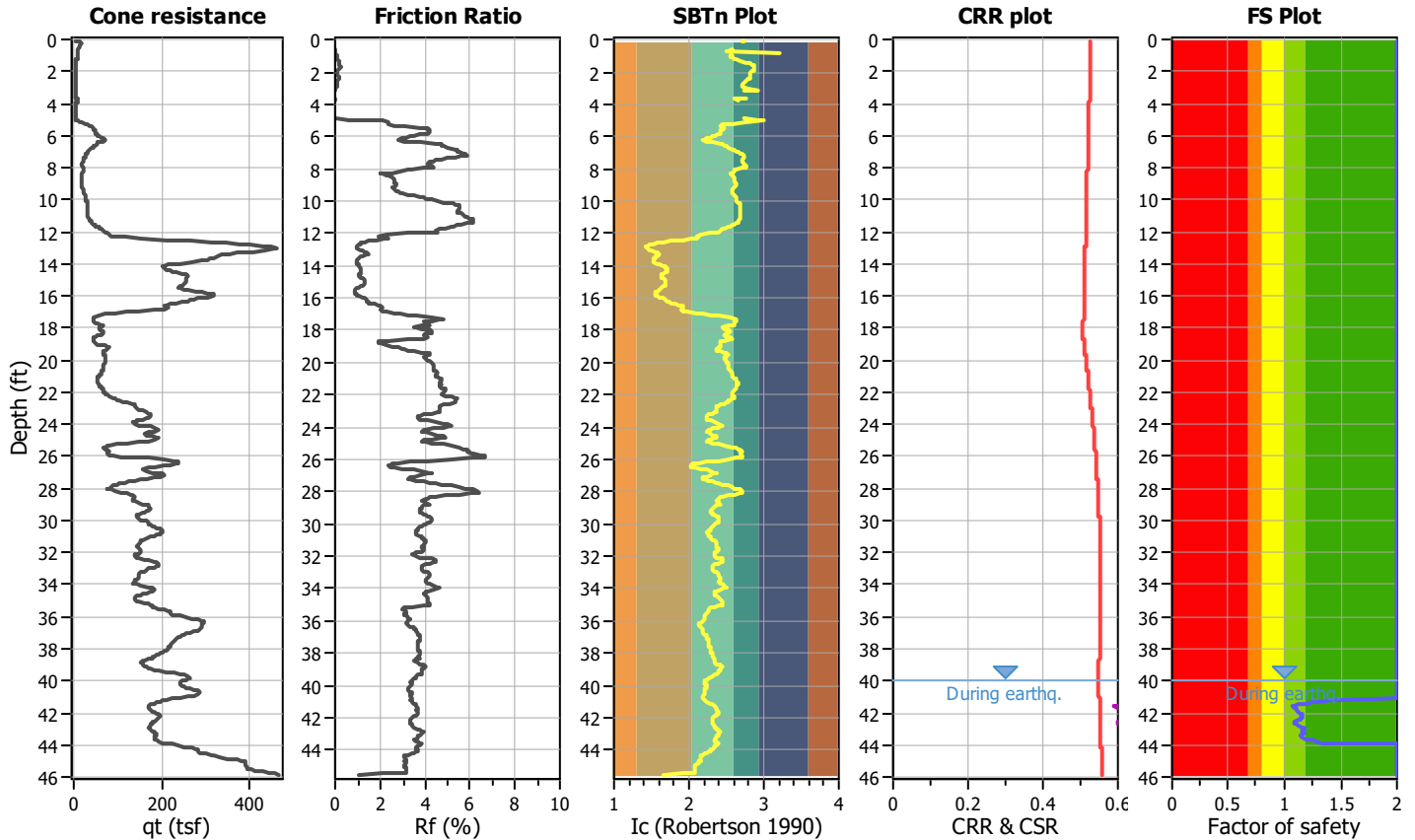
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

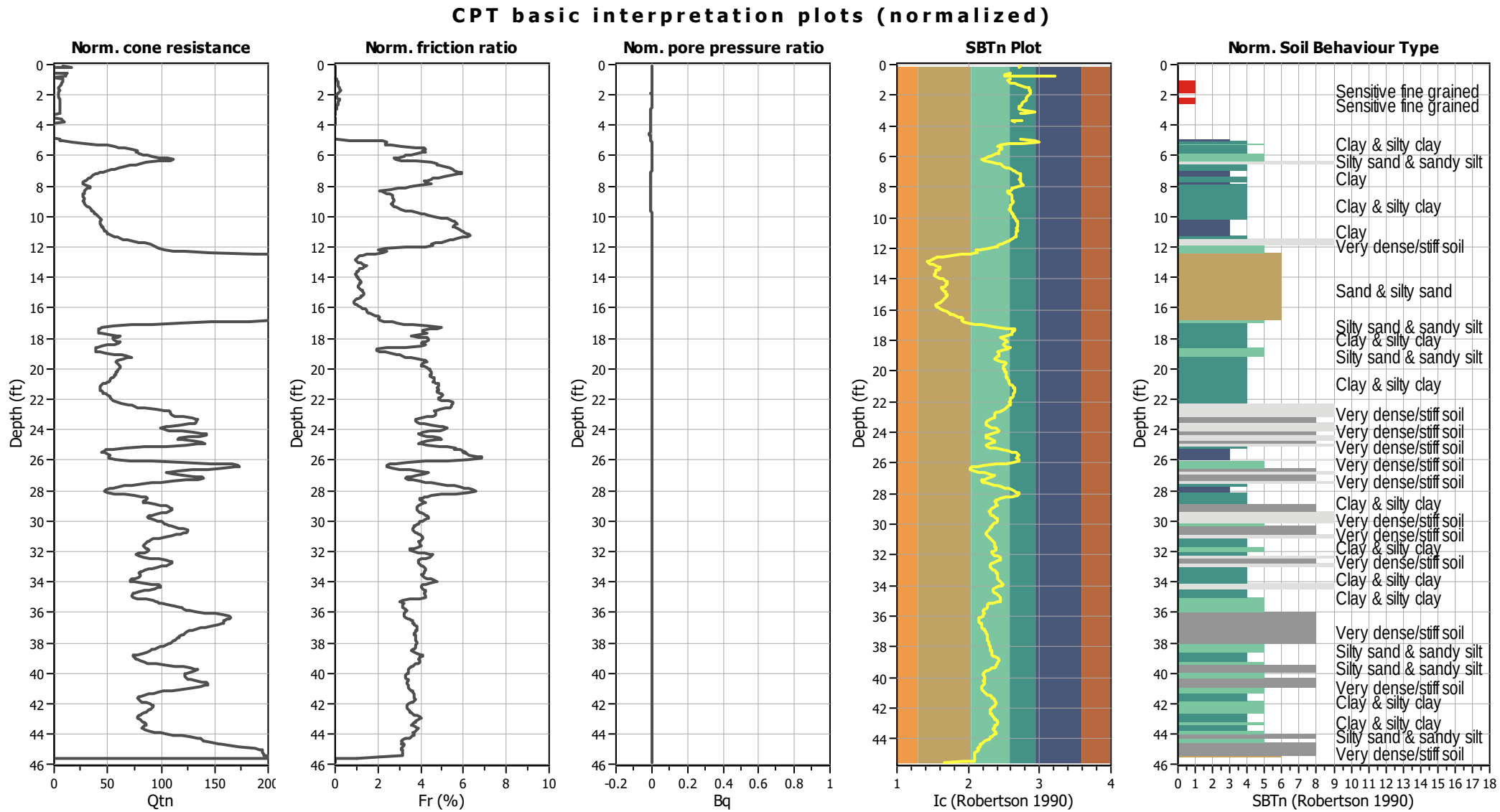
CPT file : CPT-43

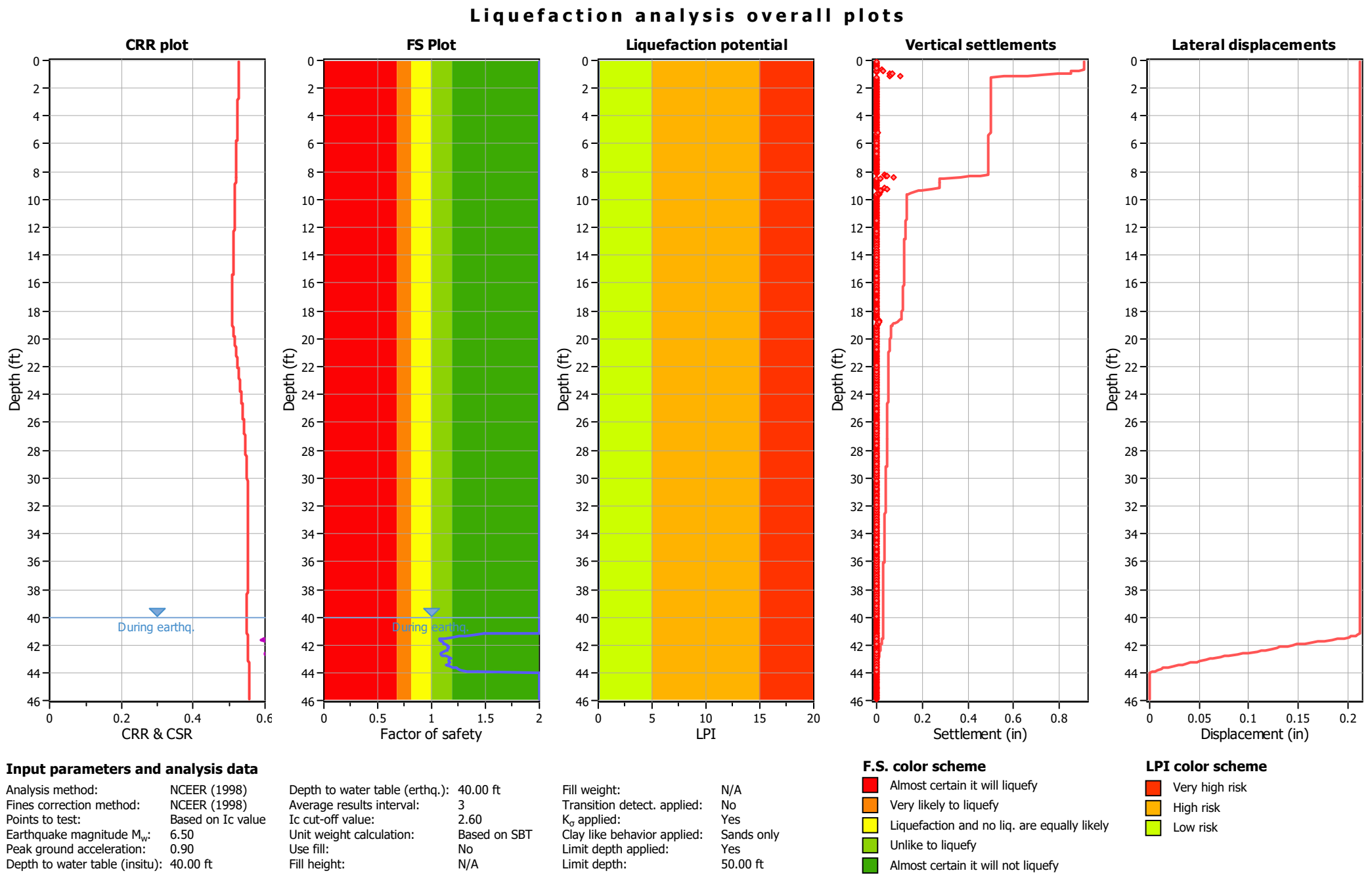
Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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





LIQUEFACTION ANALYSIS REPORT

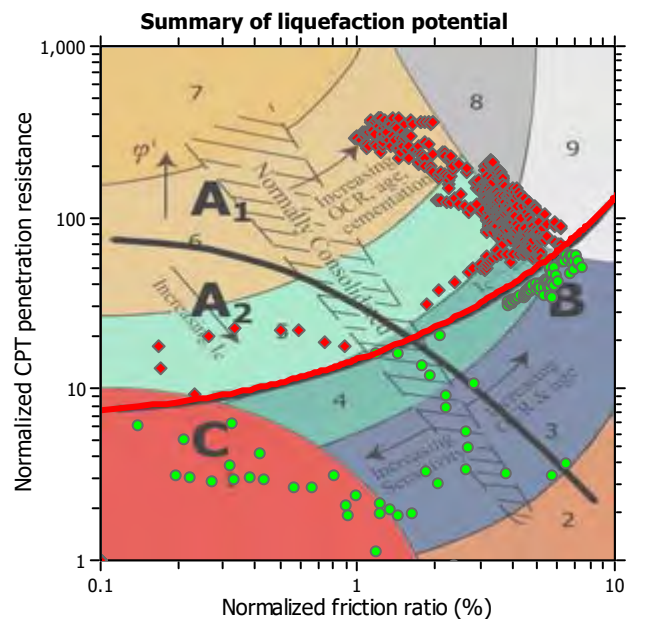
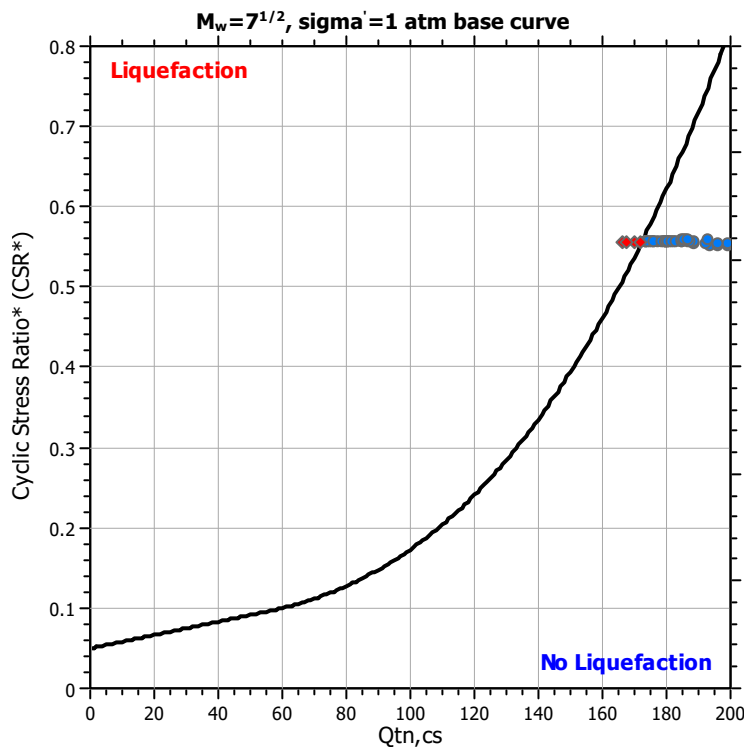
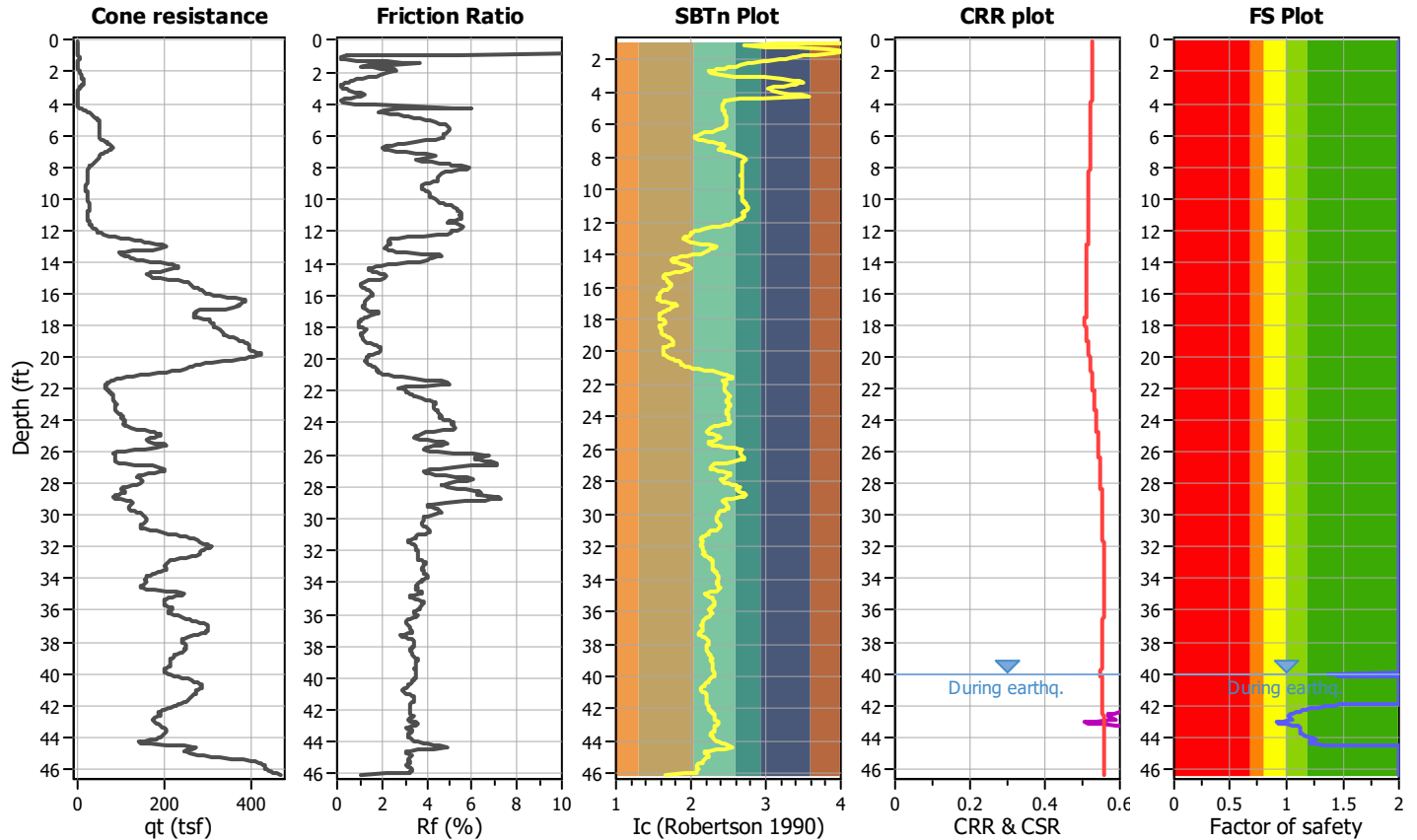
Project title : 14030.001 Lewis Rosemead Condos

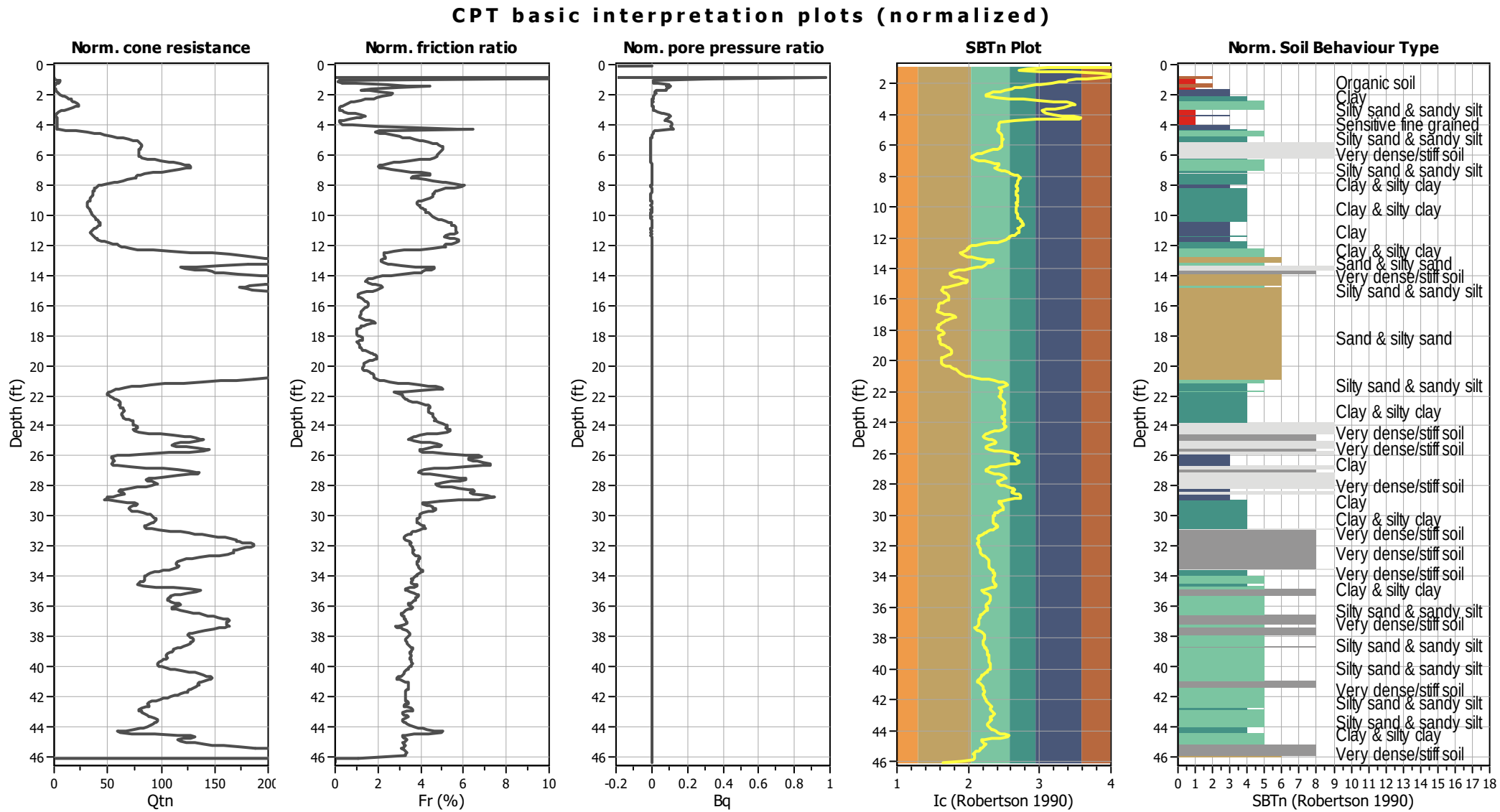
Location : Rosemead CA

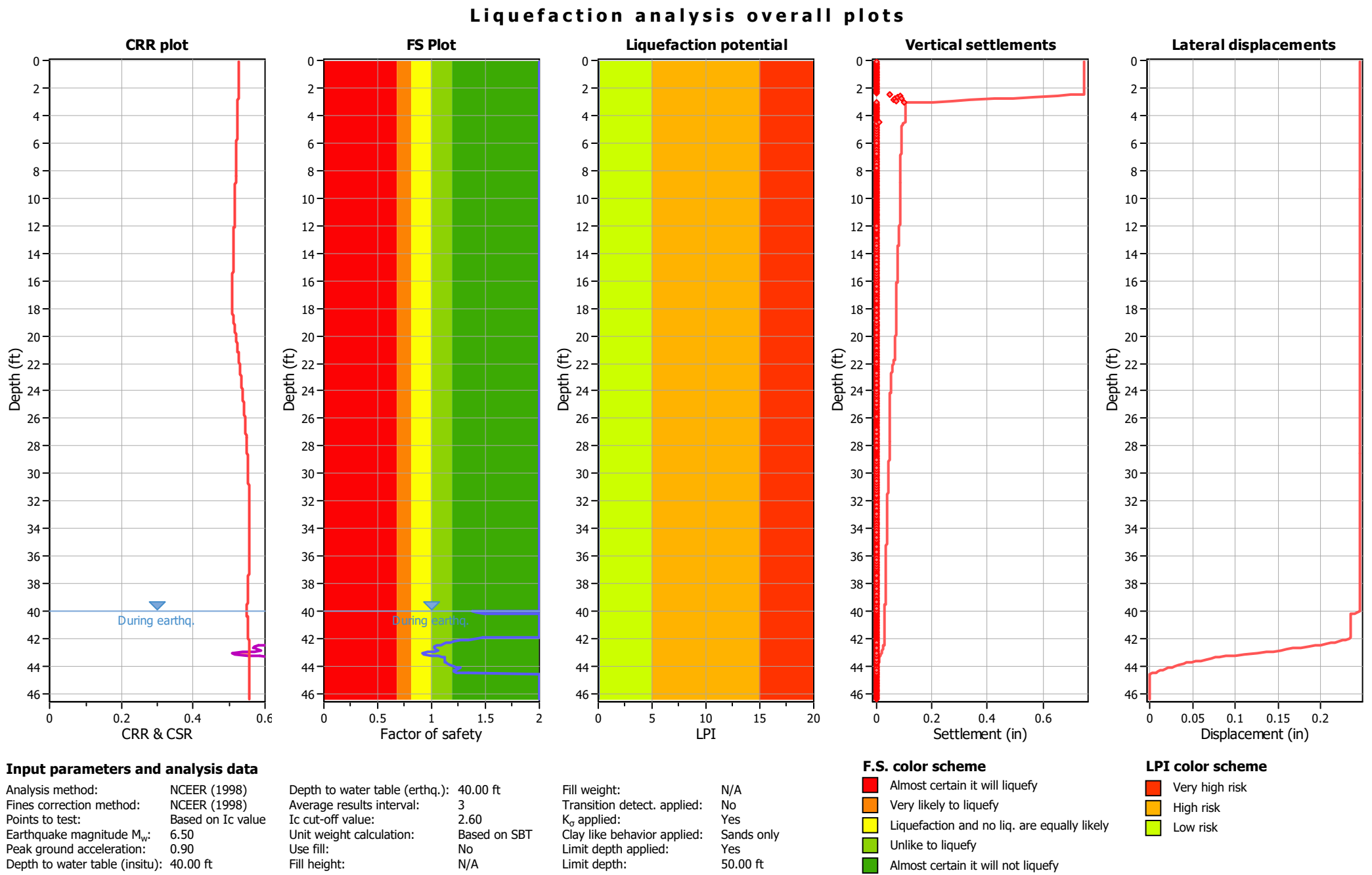
CPT file : CPT-44

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based







LIQUEFACTION ANALYSIS REPORT

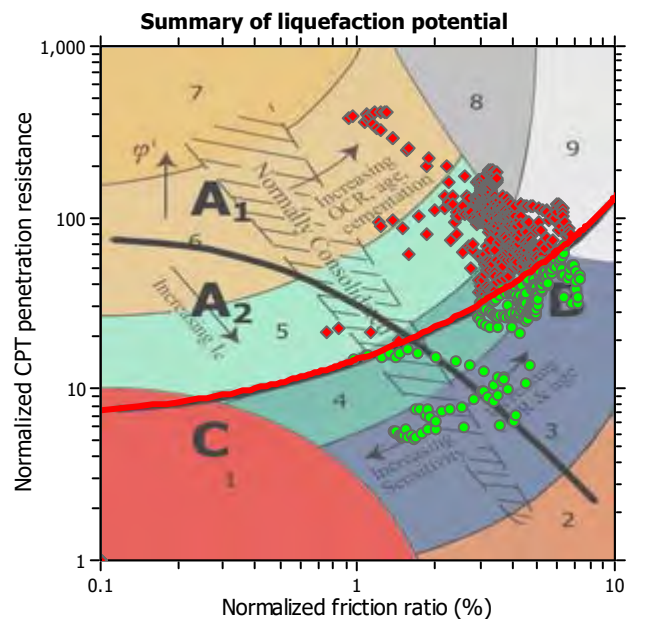
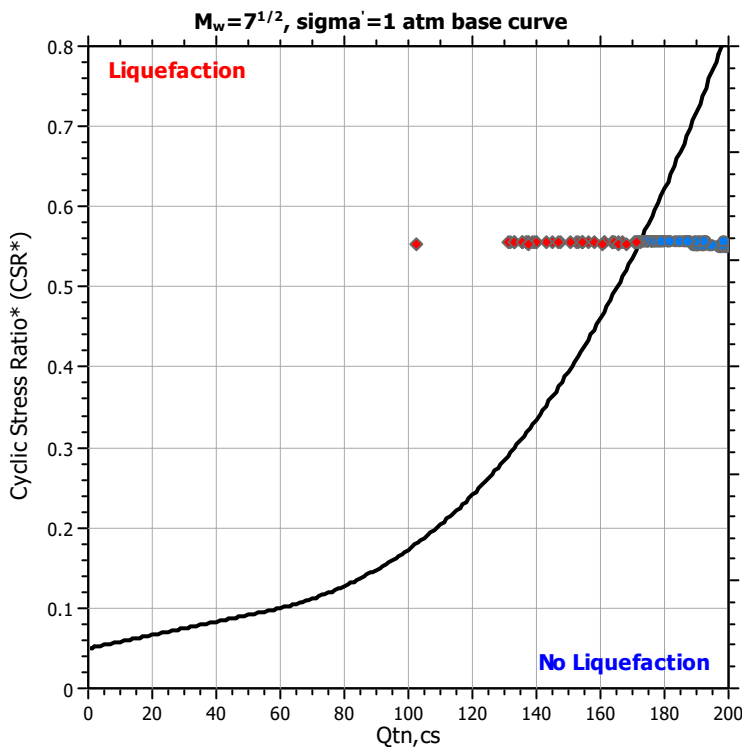
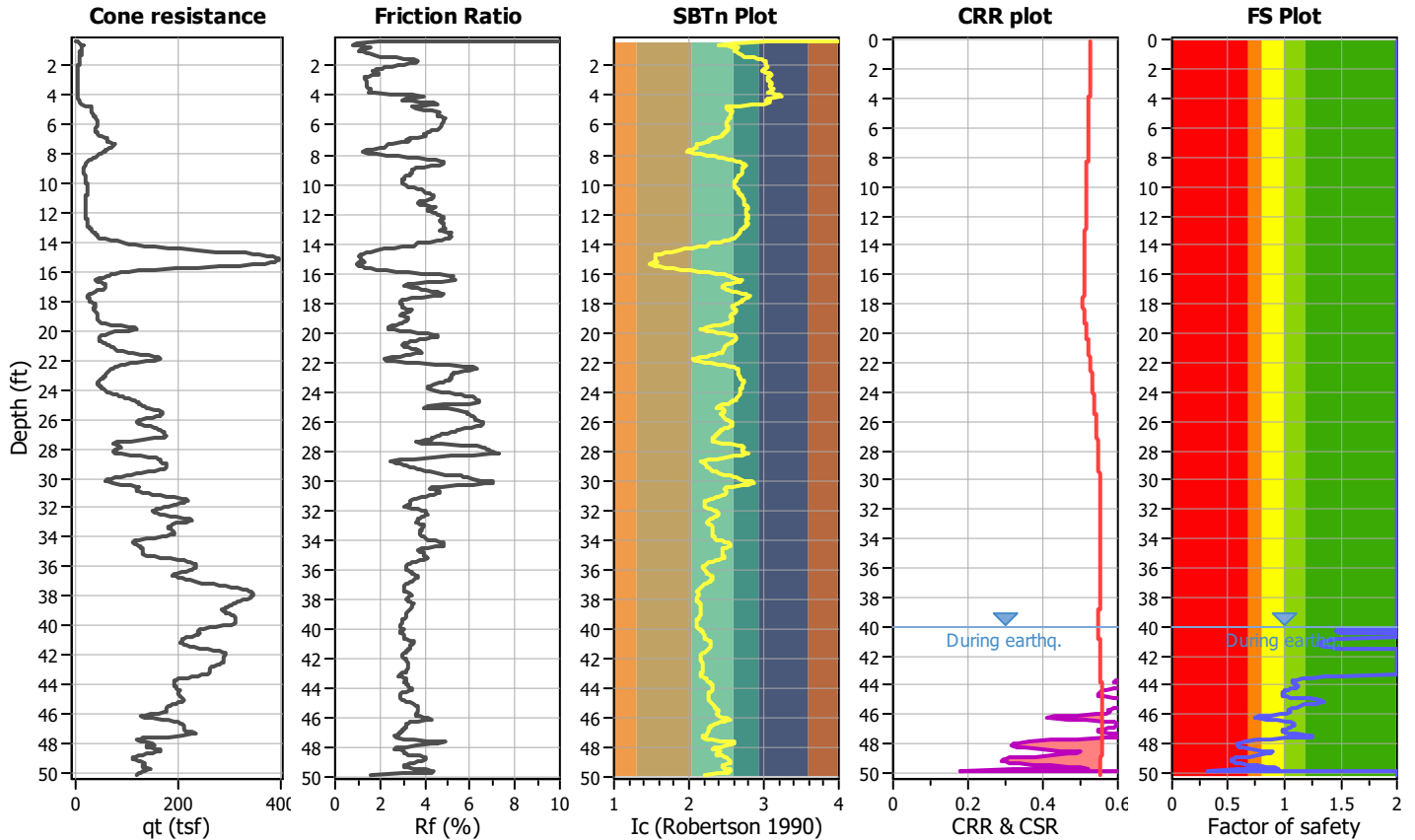
Project title : 14030.001 Lewis Rosemead Condos

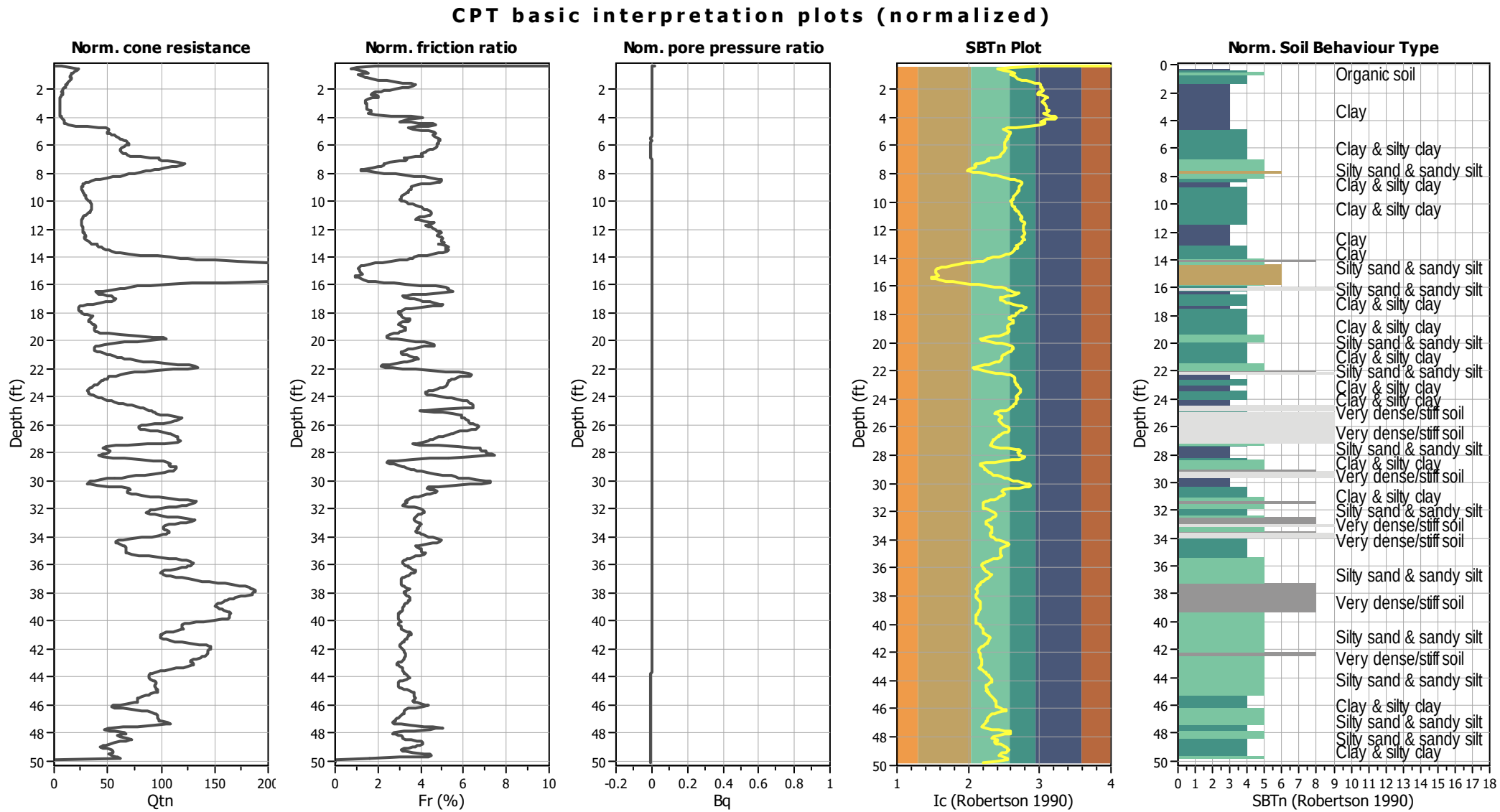
Location : Rosemead CA

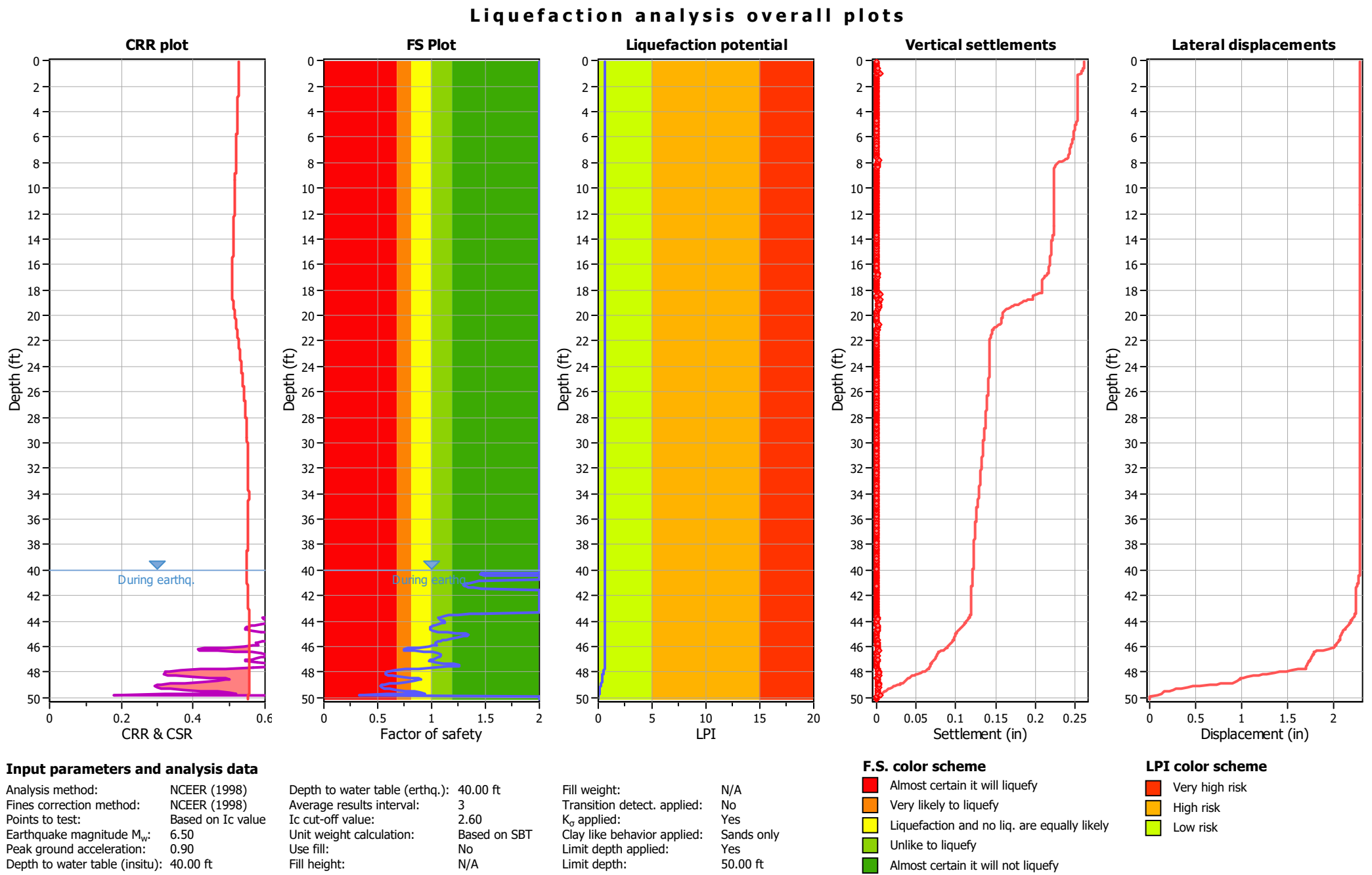
CPT file : CPT-46

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based







LIQUEFACTION ANALYSIS REPORT

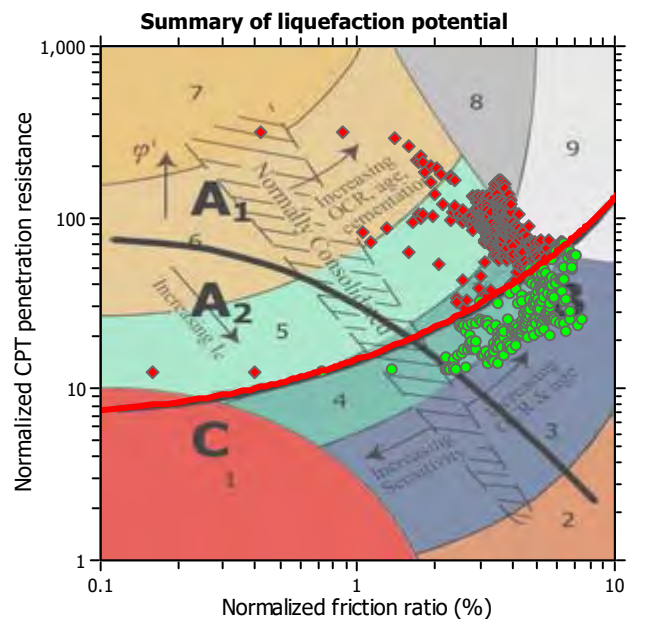
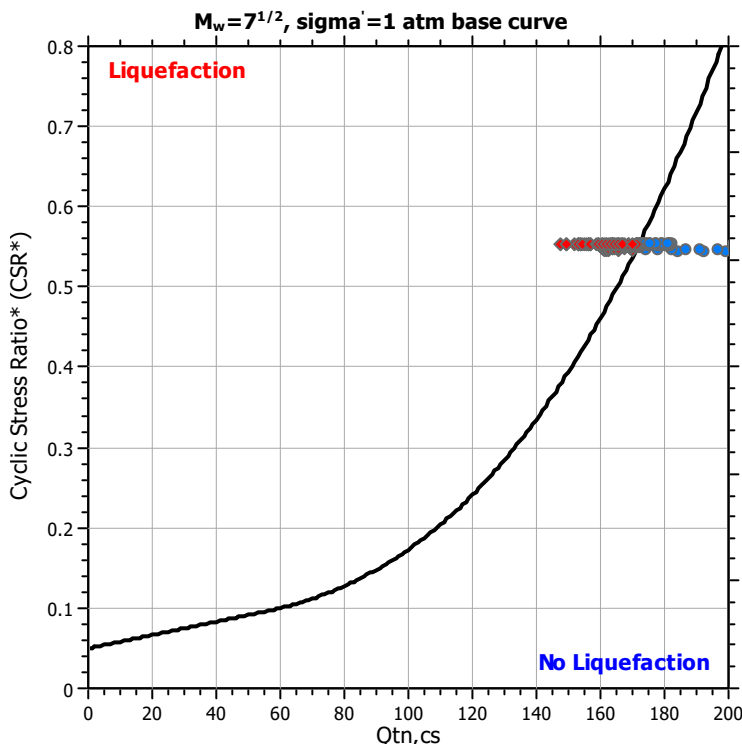
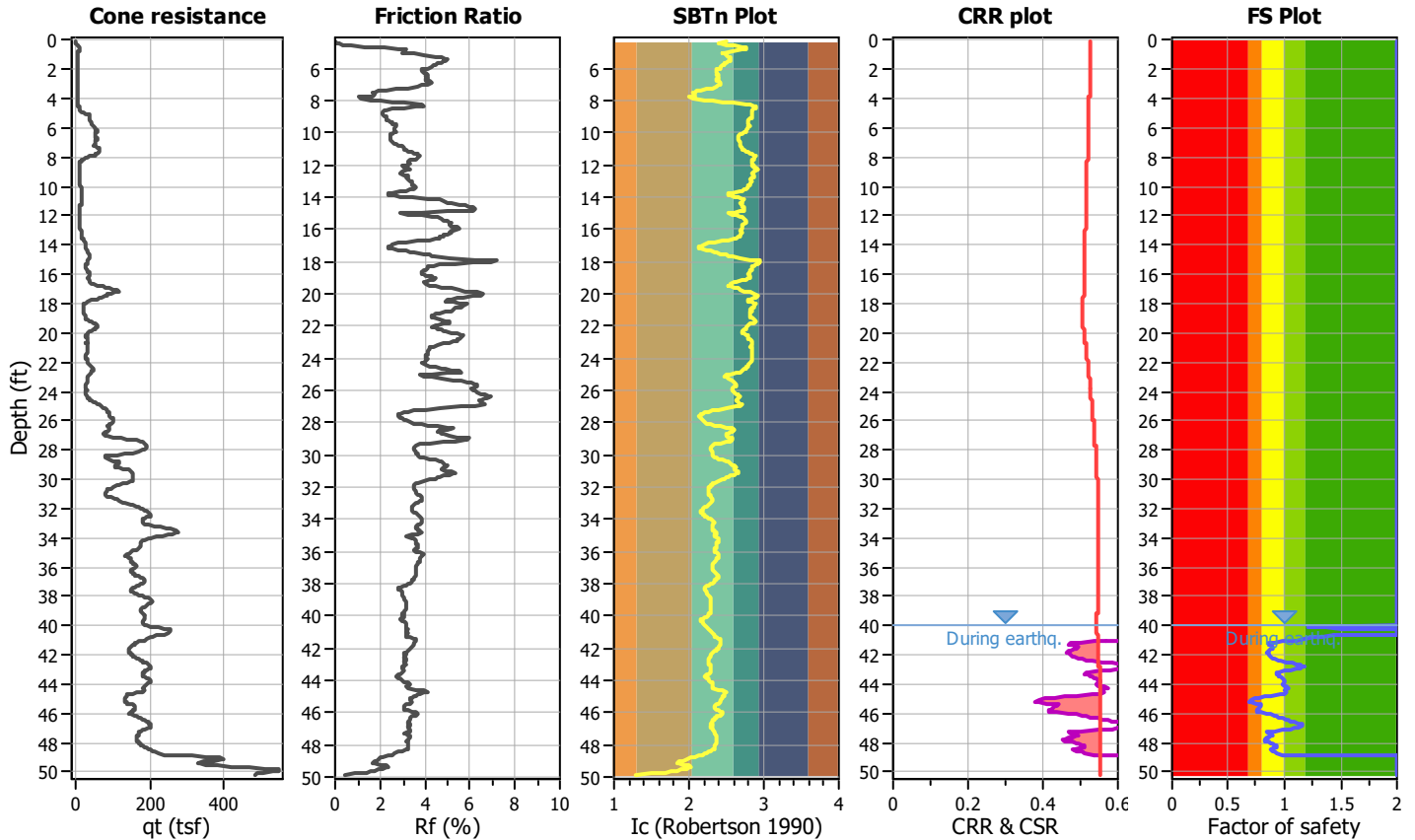
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

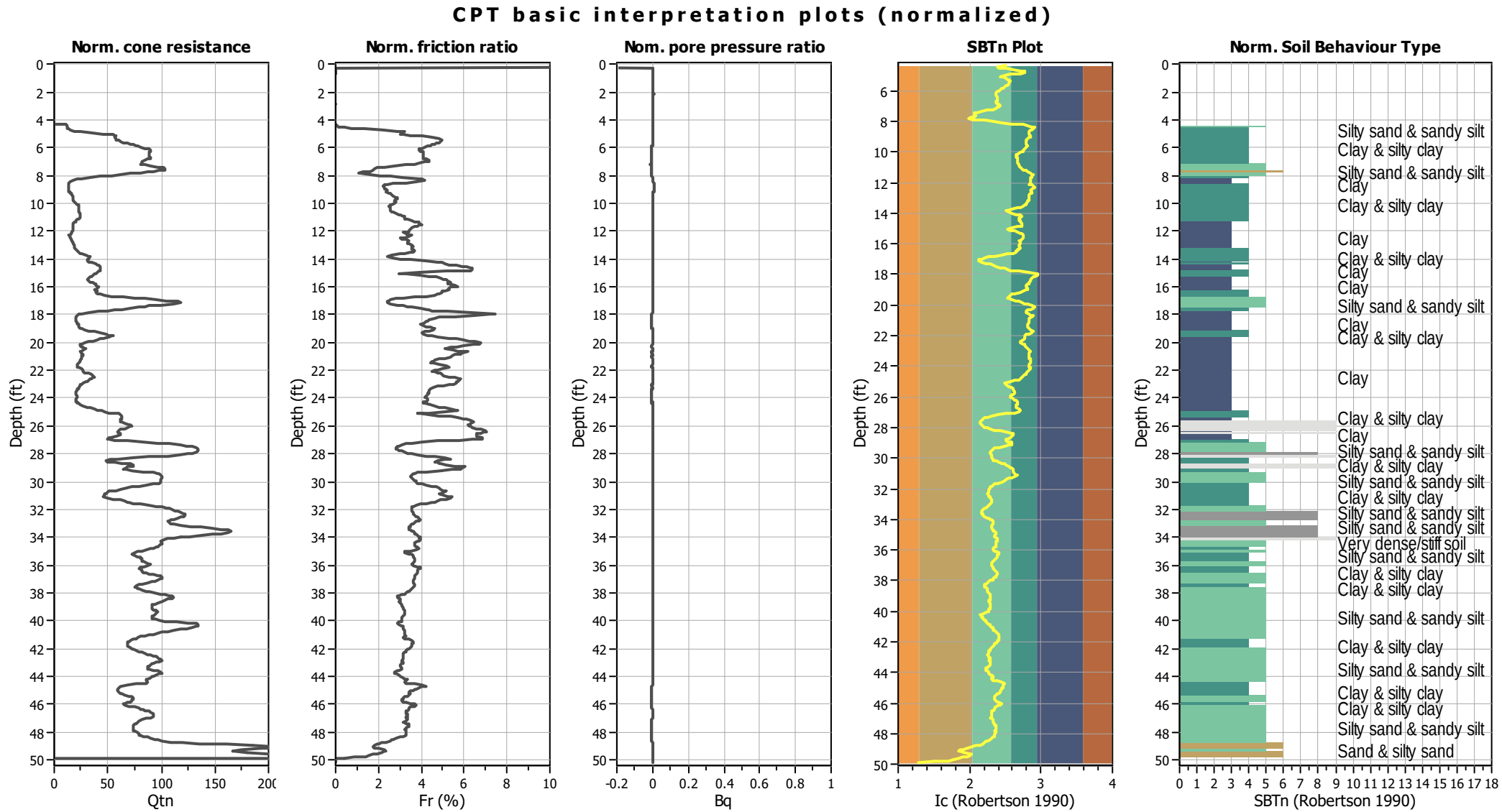
CPT file : CPT-47

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A₁: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A₂: 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

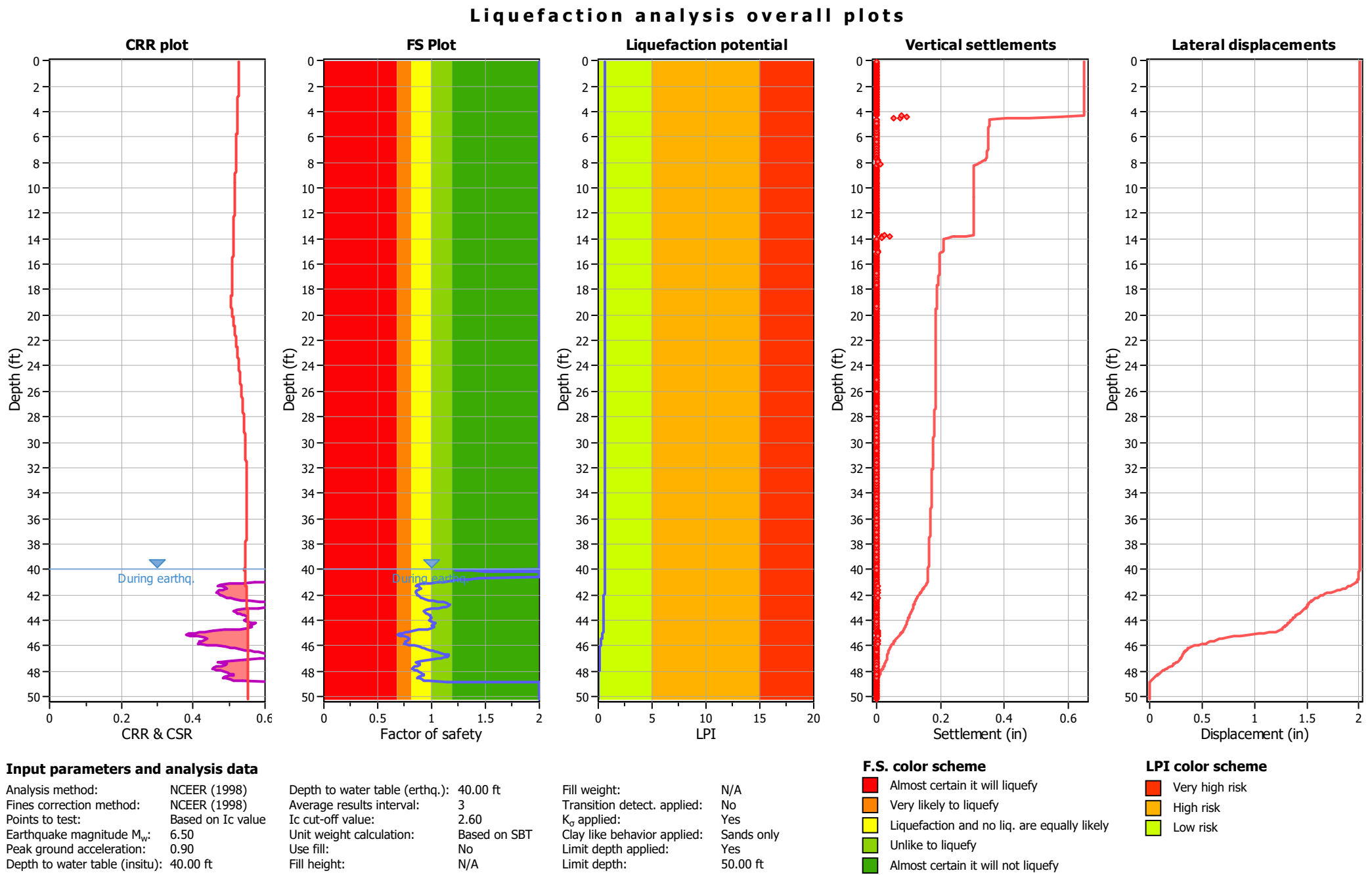


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



LIQUEFACTION ANALYSIS REPORT

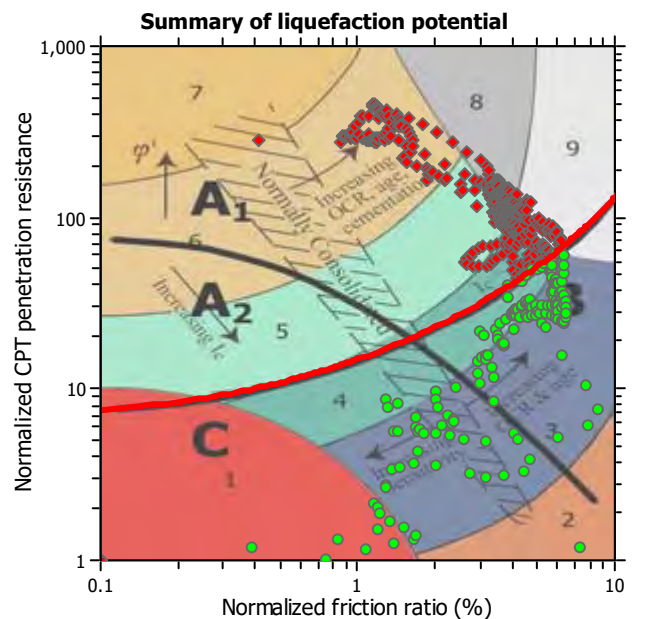
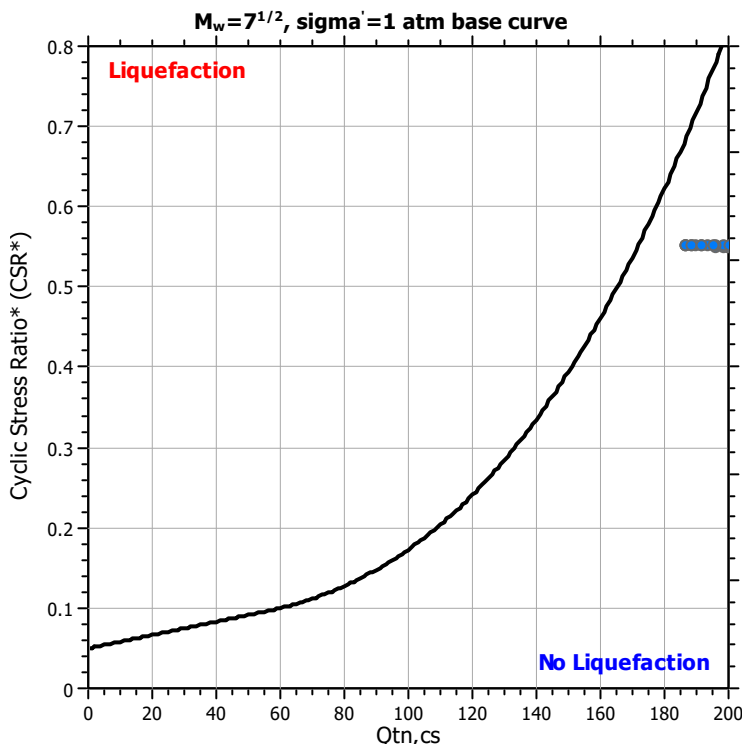
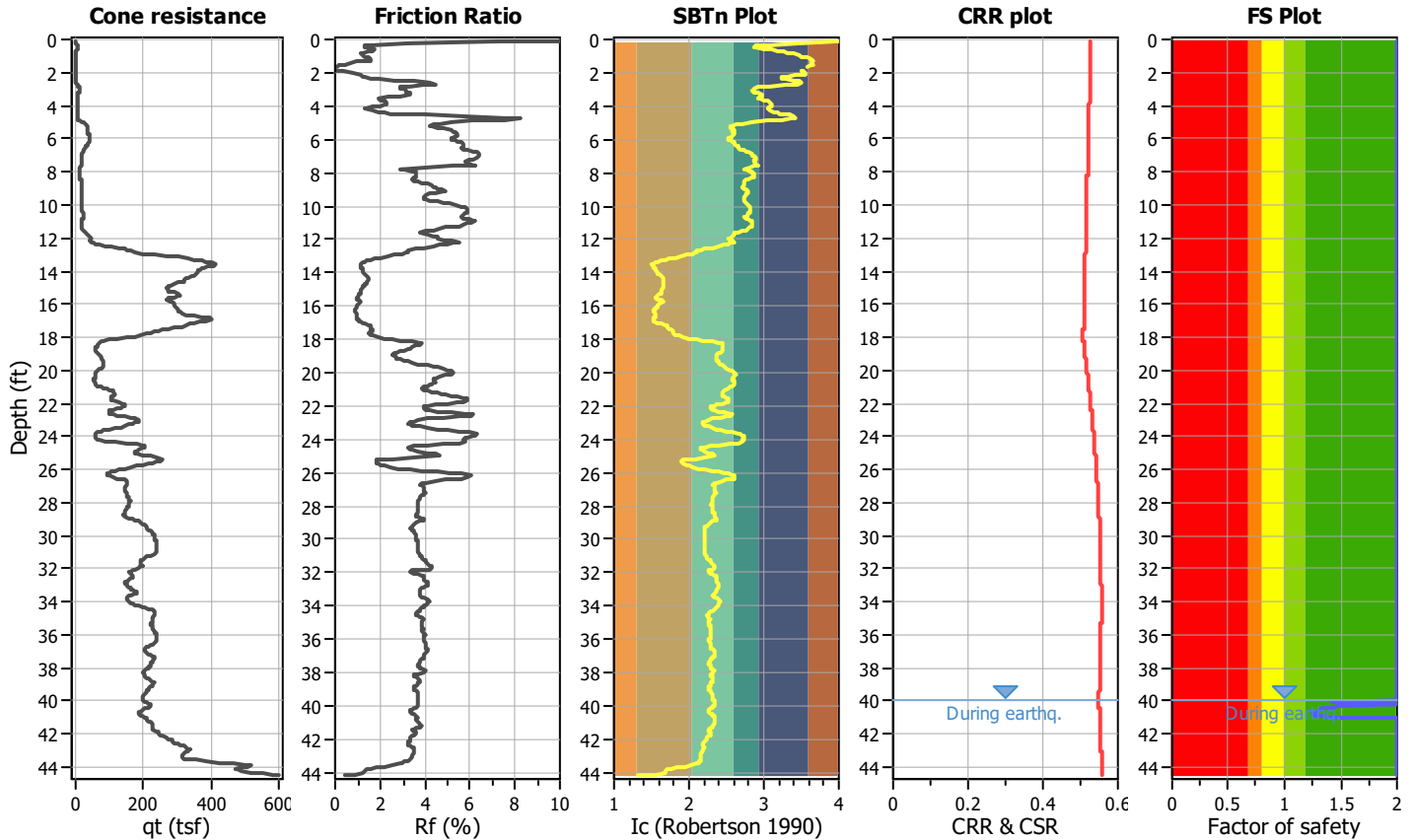
Project title : 14030.001 Lewis Rosemead Condos

Location : Rosemead CA

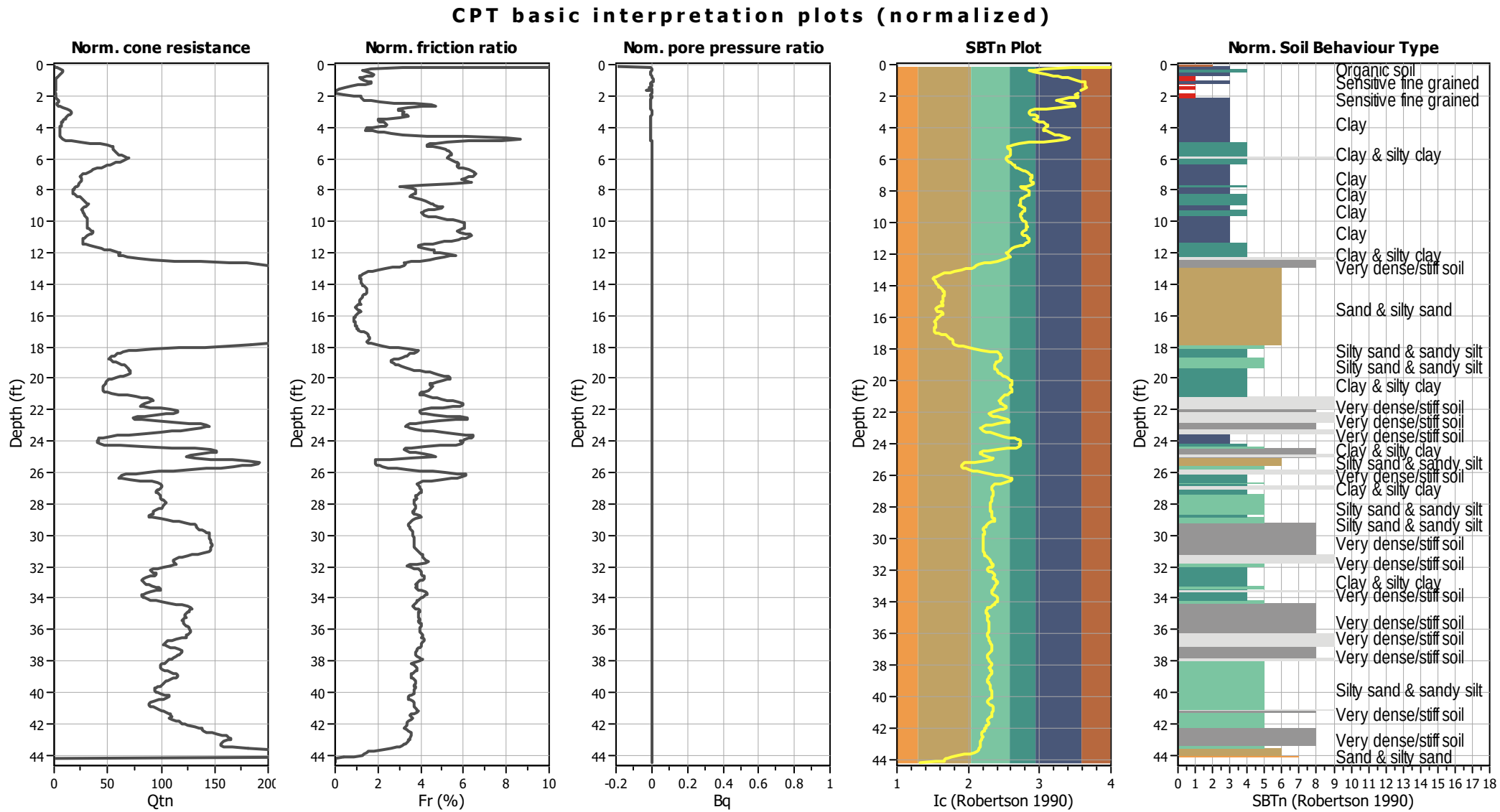
CPT file : CPT-49

Input parameters and analysis data

Analysis method:	NCEER (1998)	G.W.T. (in-situ):	40.00 ft	Use fill:	No	Clay like behavior	
Fines correction method:	NCEER (1998)	G.W.T. (earthq.):	40.00 ft	Fill height:	N/A	applied:	Sands only
Points to test:	Based on Ic value	Average results interval:	3	Fill weight:	N/A	Limit depth applied:	Yes
Earthquake magnitude M_w :	6.50	Ic cut-off value:	2.60	Trans. detect. applied:	No	Limit depth:	50.00 ft
Peak ground acceleration:	0.90	Unit weight calculation:	Based on SBT	K_0 applied:	Yes	MSF method:	Method based



Zone A1: Cyclic liquefaction likely depending on size and duration of cyclic loading
 Zone A2: 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

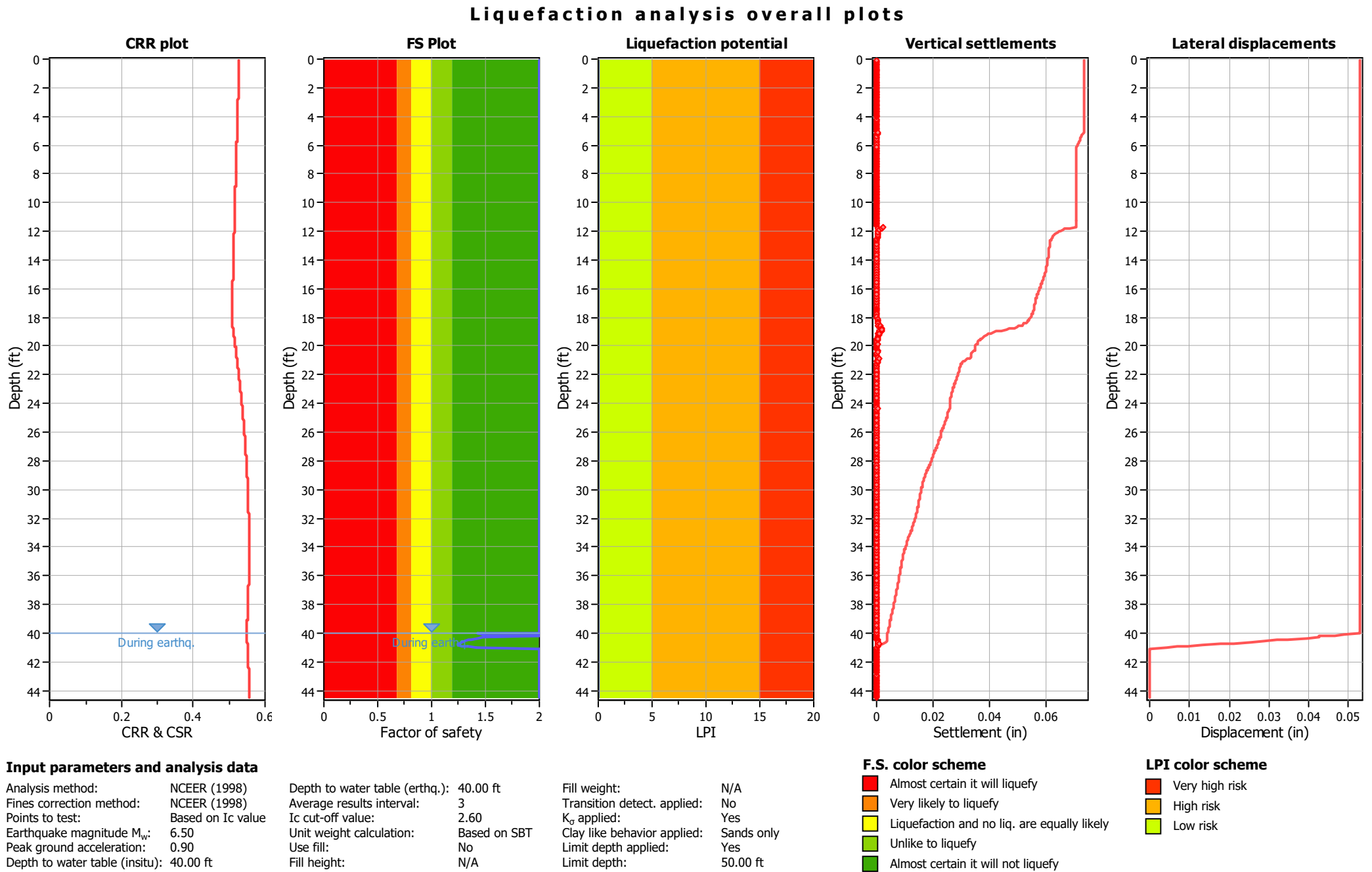


Input parameters and analysis data

Analysis method:	NCEER (1998)	Depth to water table (erthq.):	40.00 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 ₀ applied:	Yes
Earthquake magnitude M _w :	6.50	Unit weight calculation:	Based on SBT	Clay like behavior applied:	Sands only
Peak ground acceleration:	0.90	Use fill:	No	Limit depth applied:	Yes
Depth to water table (insitu):	40.00 ft	Fill height:	N/A	Limit depth:	50.00 ft

SBTn legend

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



Leighton

Jun 2024

General Parameters:

$a_{\max} = 0.90g$
 $M_W = 6.5$
 MSF eq: 1
 $MSF = 1.44$
 Hammer Efficiency = 84
 $C_E = 1.40$
 $C_B = 1$
 C_S for SPT? TRUE
 Unlined, but room for liner
 Rod Stickup (feet) = 3
 Ring sample correction = 0.65

Summary of Liquefaction Susceptibility Analysis: SPT Method

Leighton

Liquefaction Method: Youd and Idriss (2001). Seismic Settlement Method: Tokimatsu and Seed (1987) and Martin and Lew (1999).

Project: Lewis Rosemead Condos

Project No.: 14030

Boring No.	Approx. Layer Depth (ft)	Approx Layer Thickness (ft)	Plasticity ("n"=non susc. to liq.)	Estimated Fines Cont (%)	γ_t (pcf)	N_m or B (blows/ft)	Sampler Type (enter 2 if mod CA Ring)	C_s	N_m (corrected for C_s and ring->SPT) (blows/ft)	Exist σ_{vo}' (psf)	$(N_1)_{60}$	$(N_1)_{60CS}$	CRR _{7.5} (assume CLEAN SAND)	CRR _{7.5} (w/o Plasticity Crit)	CRR _{7.5}	Design σ_{vo}' (psf)	CSR _{7.5}	CSR _M	Liquefaction Factor of Safety	Seismic Sett. of Layer (in.)	Cummulative Seismic Settlement (in.)
LB-1	8.0 to 8.8	0.8		66	120	17	2	1	11.1	900	18.9	27.6	0.202	0.357	0.357	900	0.58	0.40	NonLiq	0.04	1.5
LB-1	8.8 to 12.5	3.8		66	120	11	2	1	7.2	1200	11.2	18.5	0.124	0.197	0.197	1200	0.57	0.40	NonLiq	0.56	1.4
LB-1	12.5 to 17.5	5.0		66	120	12	1	1.18	14.2	1800	18.2	26.8	0.194	0.333	0.333	1800	0.57	0.39	NonLiq	0.33	0.9
LB-1	17.5 to 22.5	5.0		60	120	28	2	1	18.2	2400	22.6	32.1	0.250	>Range	>Range	2400	0.56	0.39	NonLiq	0.22	0.5
LB-1	22.5 to 27.5	5.0		60	120	18	1	1.25	22.5	3000	24.9	34.9	0.291	>Range	>Range	3000	0.55	0.38	NonLiq	0.27	0.3
LB-1	27.5 to 32.5	5.0		20	120	87	2	1	56.6	3600	60.3	68.7	>Range	>Range	>Range	3600	0.55	0.38	NonLiq	0.02	0.1
LB-1	32.5 to 37.5	5.0		20	120	66	1	1.3	85.8	4200	84.7	95.0	>Range	>Range	>Range	4200	0.52	0.36	NonLiq	0.02	0.0
LB-1	37.5 to 40.0	2.5		10	120	100	2	1	65.0	4800	60.0	62.2	>Range	>Range	>Range	4800	0.50	0.35	NonLiq	0.01	0.0
LB-1	40.0 to 42.5	2.5		10	120	100	2	1	65.0	4800	60.0	62.2	>Range	>Range	>Range	4800	0.50	0.35	NonLiq	0.00	0.0
LB-1	42.5 to 47.5	5.0		10	120	100	1	1.3	130.0	5088	116.6	120.0	>Range	>Range	>Range	5088	0.50	0.35	NonLiq	0.00	0.0
LB-1	47.5 to 52.0	4.5		40	120	100	2	1	65.0	5376	56.7	73.1	>Range	>Range	>Range	5376	0.50	0.35	NonLiq	0.00	0.0
LB-2	0 to 6.3	6.3	OX	99	120	50	1	1.3	65.0	600	116.0	144.2	>Range	>Range	>Range	600	0.58	0.40	NonLiq	0.00	3.2
LB-2	6.3 to 8.0	1.8	OX	70	120	50	1	1.3	65.0	900	110.9	138.1	>Range	>Range	>Range	900	0.58	0.40	NonLiq	0.00	3.2
LB-2	8.0 to 8.8	0.8		70	120	22	2	1	14.3	900	24.4	34.3	0.280	>Range	>Range	900	0.58	0.40	NonLiq	0.02	3.2
LB-2	8.8 to 12.5	3.8		70	120	7	2	1	4.6	1200	7.1	13.6	0.089	0.146	0.146	1200	0.57	0.40	NonLiq	0.88	3.2
LB-2	12.5 to 17.5	5.0		70	120	3	1	1.1	3.3	1800	4.2	10.1	0.066	0.114	0.114	1800	0.57	0.39	NonLiq	1.17	2.3
LB-2	17.5 to 22.5	5.0		70	120	20	2	1	13.0	2400	16.1	24.4	0.172	0.280	0.280	2400	0.56	0.39	NonLiq	0.47	1.2
LB-2	22.5 to 27.5	5.0		20	120	25	1	1.3	32.5	3000	36.1	42.5	>Range	>Range	>Range	3000	0.55	0.38	NonLiq	0.08	0.7
LB-2	27.5 to 32.0	4.5		70	120	15	2	1	9.8	3600	10.4	17.5	0.117	0.186	0.186	3600	0.55	0.38	NonLiq	0.63	0.6

Boring No.	Approx. Layer Depth	Approx Layer Thickness	Plasticity ("n"=non susc. to liq.)	Estimated Fines Cont	γ_t	N_m or B	Sampler Type (enter 2 if mod CA Ring)	C_s	N_m (corrected for C_s and ring->SPT)	Exist σ_{vo}'	$(N_1)_{80}$	$(N_1)_{60CS}$	CRR _{7.5} (assume CLEAN SAND)	CRR _{7.5} (w/o Plasticity Crit)	CRR _{7.5}	Design σ_{vo}'	CSR _{7.5}	CSR _M	Liquefaction Factor of Safety	Seismic Sett. of Layer (in.)	Cummulative Seismic Settlement (in.)
	(ft)	(ft)		(%)	(pcf)	(blows/ft)			(blows/ft)	(psf)						(psf)					
LB-3	0 to 6.3	6.3	OX	70	120	50	1	1.3	65.0	600	116.0	144.2	>Range	>Range	>Range	600	0.58	0.40	NonLiq	0.00	2.6
LB-3	6.3 to 8.0	1.8	OX	70	120	50	1	1.3	65.0	900	110.9	138.1	>Range	>Range	>Range	900	0.58	0.40	NonLiq	0.00	2.6
LB-3	8.0 to 8.8	0.8		70	120	19	2	1	12.4	900	21.1	30.3	0.229	>Range	>Range	900	0.58	0.40	NonLiq	0.02	2.6
LB-3	8.8 to 12.5	3.8		70	120	22	2	1	14.3	1200	22.4	31.9	0.249	>Range	>Range	1200	0.57	0.40	NonLiq	0.15	2.6
LB-3	12.5 to 17.5	5.0		62	120	6	1	1.1	6.6	1800	8.5	15.2	0.100	0.162	0.162	1800	0.57	0.39	NonLiq	0.68	2.5
LB-3	17.5 to 22.5	5.0		70	120	18	2	1	11.7	2400	14.5	22.4	0.155	0.248	0.248	2400	0.56	0.39	NonLiq	0.48	1.8
LB-3	22.5 to 27.5	5.0		70	120	6	1	1.1	6.6	3000	7.3	13.8	0.090	0.148	0.148	3000	0.55	0.38	NonLiq	1.17	1.3
LB-3	27.5 to 32.0	4.5		70	120	35	2	1	22.8	3600	24.3	34.1	0.278	>Range	>Range	3600	0.55	0.38	NonLiq	0.13	0.1
LB-4	0 to 6.3	6.3	OX	30	120	50	1	1.3	65.0	600	116.0	138.6	>Range	>Range	>Range	600	0.58	0.40	NonLiq	0.00	0.5
LB-4	6.3 to 8.0	1.8	OX	70	120	50	1	1.3	65.0	900	110.9	138.1	>Range	>Range	>Range	900	0.58	0.40	NonLiq	0.00	0.5
LB-4	8.0 to 8.8	0.8		70	120	24	2	1	15.6	900	26.6	36.9	0.328	>Range	>Range	900	0.58	0.40	NonLiq	0.02	0.5
LB-4	8.8 to 12.5	3.8		70	120	27	2	1	17.6	1200	27.5	38.1	0.355	>Range	>Range	1200	0.57	0.40	NonLiq	0.12	0.4
LB-4	12.5 to 17.5	5.0		70	120	15	1	1.24	18.6	1800	23.8	33.5	0.270	>Range	>Range	1800	0.57	0.39	NonLiq	0.13	0.3
LB-4	17.5 to 22.5	5.0		70	120	57	2	1	37.1	2400	46.0	60.2	>Range	>Range	>Range	2400	0.56	0.39	NonLiq	0.03	0.2
LB-4	22.5 to 27.5	5.0		70	120	37	1	1.3	48.1	3000	53.4	69.0	>Range	>Range	>Range	3000	0.55	0.38	NonLiq	0.04	0.2
LB-4	27.5 to 32.0	4.5		70	120	42	2	1	27.3	3600	29.1	39.9	0.415	>Range	>Range	3600	0.55	0.38	NonLiq	0.11	0.1

APPENDIX E

GENERAL EARTHWORK AND GRADING
RECOMMENDATIONS

APPENDIX E

LEIGHTON CONSULTING, INC. EARTHWORK AND GRADING GUIDE SPECIFICATIONS

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E - 1 . 0 G E N E R A L

E-1.1 Intent

These Earthwork and Grading Guide Specifications are for grading and earthwork shown on the current, approved grading plan(s) and/or indicated in the Leighton Consulting, Inc. geotechnical report(s). These Guide Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the project-specific recommendations in the geotechnical report shall supersede these Guide Specifications. Leighton Consulting, Inc. shall provide geotechnical observation and testing during earthwork and grading. Based on these observations and tests, Leighton Consulting, Inc. may provide new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

E-1.2 Role of Leighton Consulting, Inc.

Prior to commencement of earthwork and grading, Leighton Consulting, Inc. shall meet with the earthwork contractor to review the earthwork contractor's work plan, to schedule sufficient personnel to perform the appropriate level of observation, mapping and compaction testing. During earthwork and grading, Leighton Consulting, Inc. shall observe, map, and document subsurface exposures to verify geotechnical design assumptions. If observed conditions are found to be significantly different than the interpreted assumptions during the design phase, Leighton Consulting, Inc. shall inform the owner, recommend appropriate changes in design to accommodate these observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include (1) natural ground after clearing to receiving fill but before fill is placed, (2) bottoms of all "remedial removal" areas, (3) all key bottoms, and (4) benches made on sloping ground to receive fill.

Leighton Consulting, Inc. shall observe moisture-conditioning and processing of the subgrade and fill materials, and perform relative compaction testing of fill to determine the attained relative compaction. Leighton Consulting, Inc. shall provide *Daily Field Reports* to the owner and the Contractor on a routine and frequent basis.

E-1.3 The Earthwork Contractor

The earthwork contractor (Contractor) shall be qualified, experienced and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Guide

Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing grading and backfilling in accordance with the current, approved plans and specifications.

The Contractor shall inform the owner and Leighton Consulting, Inc. of changes in work schedules at least one working day in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that Leighton Consulting, Inc. is aware of all grading operations.

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

E - 2 . 0 P R E P A R A T I O N O F A R E A S T O B E F I L L E D

E-2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies and Leighton Consulting, Inc.. Care should be taken not to encroach upon or otherwise damage native and/or historic trees designated by the Owner or appropriate agencies to remain. Pavements, flatwork or other construction should not extend under the “drip line” of designated trees to remain.

Leighton Consulting, Inc. shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 3 percent of organic materials (by dry weight: ASTM D 2974). Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area. As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that

are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

E-2.2 Processing

Existing ground that has been declared satisfactory for support of fill, by Leighton Consulting, Inc., shall be scarified to a minimum depth of 6 inches (15 cm). Existing ground that is not satisfactory shall be over-excavated as specified in the following Section E-2.3. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

E-2.3 Overexcavation

In addition to removals and over-excavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be over-excavated to competent ground as evaluated by Leighton Consulting, Inc. during grading. All undocumented fill soils under proposed structure footprints should be excavated

E-2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), (>20 percent grade) the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet (4.5 m) wide and at least 2 feet (0.6 m) deep, into competent material as evaluated by Leighton Consulting, Inc.. Other benches shall be excavated a minimum height of 4 feet (1.2 m) into competent material or as otherwise recommended by Leighton Consulting, Inc.. Fill placed on ground sloping flatter than 5:1 (horizontal to vertical units), (<20 percent grade) shall also be benched or otherwise over-excavated to provide a flat subgrade for the fill.

E-2.5 Evaluation/Acceptance of Fill Areas

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

E - 3 . 0 F I L L M A T E R I A L

E-3.1 Fill Quality

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

E-3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 6 inches (15 cm), shall not be buried or placed in fill unless location, materials and placement methods are specifically accepted by Leighton Consulting, Inc.. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 feet (3 m) measured vertically from finish grade, or within 2 feet (0.61 m) of future utilities or underground construction.

E-3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section E-3.1, and be free of hazardous materials (“contaminants”) and rock larger than 3-inches (8 cm) in largest dimension. All import soils shall have an Expansion Index (EI) of 20 or less and a sulfate content no greater than ($\leq$) 500 parts-per-million (ppm). A representative sample of a potential import source shall be given to Leighton Consulting, Inc. at least four full working days before importing begins, so that suitability of this import material can be determined and appropriate tests performed.

E - 4 . 0 F I L L P L A C E M E N T A N D C O M P A C T I O N

E-4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill, as described in Section E-2.0, above, in near-horizontal layers not exceeding 8 inches (20 cm) in loose thickness. Leighton Consulting, Inc. may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers, and only if the building officials with the appropriate jurisdiction approve. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

E-4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM) Test Method D 1557.

E-4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, each layer shall be uniformly compacted to not-less-than ($\geq$) 90 percent of the maximum dry density as determined by ASTM Test Method D 1557. In some cases, structural fill may be specified (see project-specific geotechnical report) to be uniformly compacted to at least ($\geq$) 95 percent of the ASTM D 1557 modified Proctor laboratory maximum dry density. For fills thicker than ($>$) 15 feet (4.5 m), the portion of fill deeper than 15 feet below proposed finish grade shall be compacted to 95 percent of the ASTM D 1557 laboratory maximum density. Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

E-4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by back rolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet (1 to 1.2 m) in fill elevation, or by other methods producing satisfactory results acceptable to Leighton Consulting, Inc.. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of the ASTM D 1557 laboratory maximum density.

E-4.5 Compaction Testing

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

E-4.6 Compaction Test Locations

Leighton Consulting, Inc. shall document the approximate elevation and horizontal coordinates of each density test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that Leighton

Consulting, Inc. can determine the test locations with sufficient accuracy. Adequate grade stakes shall be provided.

E - 5 . 0 E X C A V A T I O N

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

E - 6 . 0 T R E N C H B A C K F I L L S

E-6.1 **Safety**

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations. Work should be performed in accordance with Article 6 of the *California Construction Safety Orders*, 2009 Edition or more current (see also: <http://www.dir.ca.gov/title8/sb4a6.html>).

E-6.2 **Bedding and Backfill**

All utility trench bedding and backfill shall be performed in accordance with applicable provisions of the 2018 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Bedding material shall have a Sand Equivalent greater than 30 (SE>30). Bedding shall be placed to 1-foot (0.3 m) over the top of the conduit, and densified by jetting in areas of granular soils, if allowed by the permitting agency. Otherwise, the pipe-bedding zone should be backfilled with Controlled Low Strength Material (CLSM) consisting of at least one sack of Portland cement per cubic-yard of sand, and conforming to Section 201-6 of the 2018 Edition of the *Standard Specifications for Public Works Construction* (Green Book). Backfill over the bedding zone shall be placed and densified mechanically to a minimum of 90 percent of relative compaction (ASTM D 1557) from 1 foot (0.3 m) above the top of the conduit to the surface. Backfill above the pipe zone shall **not** be jetted. Jetting of the bedding around the conduits shall be observed by Leighton Consulting, Inc. and backfill above the pipe zone (bedding) shall be observed and tested by Leighton Consulting, Inc..

E-6.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to Leighton Consulting, Inc. that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method, and only if the building officials with the appropriate jurisdiction approve.

APPENDIX **F**

**FIELD DENSITY TEST FOR FAULT
TRENCH BACKFILL**

Soil Nuclear Gauge

Report Date: 06/25/2025
Test Method: ASTM D 6938

Client:

Lewis Management Corp.
1156 N. Mountain Avenue
Upland, CA 91786

Project:

14030.001
Lewis/Rosemead Condos SCE Parcel/HSP
1515 Walnut Grove
Rosemead, CA

Test Results															
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	In Place Wet Density (pcf)	Probe Depth (in)	Percent Compaction	Min/Max Comp. (%)	Optimum Moisture Tolerance (%)	Remark
1		04/02/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.9	114.8	128.5	8	92	90 / 100	0 / 3	DP/MP
2		04/02/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.6	111.3	124.2	8	90	90 / 100	0 / 3	DP/MP
3		04/02/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.9	114.5	128.1	8	92	90 / 100	0 / 3	DP/MP
4		04/02/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	10.8	115.0	127.4	8	93	90 / 100	0 / 3	DP/MP
5		04/02/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	12.1	118.3	132.6	8	95	90 / 100	0 / 3	DP/MP
6		04/02/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.8	116.2	129.9	8	93	90 / 100	0 / 3	DP/MP
7		04/03/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	12.0	115.4	129.2	8	93	90 / 100	0 / 3	DP/MP
8		04/03/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.6	113.8	127.0	8	92	90 / 100	0 / 3	DP/MP
Test Information															
Test #	Test Location			Elevation	Reference		Gauge Specs Make / Model / SN / Calibrated			Gauge Standardization Density Standard/Moisture Standard			Field Technician		
1	Compacted Fill (CF): Northern portion of T2 pit				SG-20'		CPN / MC3-Elite / 31122 / 04/12/2023			3604 / 966			Kendall, Guy		

Soil Nuclear Gauge

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Rosemead, CA

2	Compacted Fill (CF): Northern portion of T2 pit		SG-18'	CPN / MC3-Elite / 31122 / 04/12/2023	3604 / 966	Kendall, Guy
3	Compacted Fill (CF): Northern portion of T2 pit		SG-16'	CPN / MC3-Elite / 31122 / 04/12/2023	3604 / 966	Kendall, Guy
4	Compacted Fill (CF): Northern portion of T2 pit		SG-14'	CPN / MC3-Elite / 31122 / 04/12/2023	3604 / 966	Kendall, Guy
5	Compacted Fill (CF): Northern portion of T2 pit		SG-12'	CPN / MC3-Elite / 31122 / 04/12/2023	3604 / 966	Kendall, Guy
6	Compacted Fill (CF): Northern portion of T2 pit		SG-10"	CPN / MC3-Elite / 31122 / 04/12/2023	3604 / 966	Kendall, Guy
7	Compacted Fill (CF): Middle portion of pit/trench T2		SG-19'	CPN / MC3-Elite / 31122 / 04/12/2023	3622 / 947	Kendall, Guy
8	Compacted Fill (CF): Middle portion of pit/trench T2		SG-17'	CPN / MC3-Elite / 31122 / 04/12/2023	3622 / 947	Kendall, Guy
Remarks		Comments				
DP/MP: Density Pass / Moisture Pass		Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.				

Soil Nuclear Gauge

Report Date: 06/25/2025
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1515 Walnut Grove
Rosemead, CA

Test Results															
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	In Place Wet Density (pcf)	Probe Depth (in)	Percent Compaction	Min/Max Comp. (%)	Optimum Moisture Tolerance (%)	Remark
9		04/03/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	12.1	117.7	131.9	8	95	90 / 100	0 / 3	DP/MP
10		04/03/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.9	111.4	124.7	8	90	90 / 100	0 / 3	DP/MP
11		04/04/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.5	113.6	126.7	8	91	90 / 100	0 / 3	DP/MP
12		04/04/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	14.8	114.9	131.9	8	92	90 / 100	NA	DP
13		04/04/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	15.4	114.9	132.6	8	92	90 / 100	NA	DP
14		04/04/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	15.0	112.0	128.8	8	90	90 / 100	NA	DP
15		04/04/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	14.7	114.5	131.3	8	92	90 / 100	NA	DP
16		04/04/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	14.8	113.0	129.7	8	91	90 / 100	NA	DP
Test Information															
Test #	Test Location			Elevation	Reference		Gauge Specs Make / Model / SN / Calibrated			Gauge Standardization Density Standard/Moisture Standard			Field Technician		
9	Compacted Fill (CF): Middle portion of pit/trench T2				SG-14'		CPN / MC3-Elite / 31122 / 04/12/2023			3622 / 947			Kendall, Guy		

Soil Nuclear Gauge

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10	Compacted Fill (CF): Middle portion of pit/trench T2		SG-11'	CPN / MC3-Elite / 31122 / 04/12/2023	3622 / 947	Kendall, Guy
11	Compacted Fill (CF): Pit/trench T2 north 22°	-5.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22623 / 8100	Crawford, Eric
12	Compacted Fill (CF): Pit/trench T2 north 22°	-5.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22623 / 8100	Crawford, Eric
13	Compacted Fill (CF): Pit/trench T2 north 22°	-3.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22623 / 8100	Crawford, Eric
14	Compacted Fill (CF): Pit/trench T1 ctr.	-11.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22623 / 8100	Crawford, Eric
15	Compacted Fill (CF): Pit/trench T1 ctr.	-10.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22623 / 8100	Crawford, Eric
16	Compacted Fill (CF): Pit/trench T1 ctr.	-8.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22623 / 8100	Crawford, Eric
Remarks		Comments				
DP/MP: Density Pass / Moisture Pass		Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.				
DP: Density Pass						



Leighton and Associates, Inc.

Irvine Office
2600 Michelson Dr, Suite 400
Irvine, CA 92612
Phone: (949) 250-1421 | Fax: (949) 250-1114

Soil Nuclear Gauge

Report Date: 06/25/2025
Test Method: ASTM D 6938

Client:

Lewis Management Corp.
1156 N. Mountain Avenue
Upland, CA 91786

Project:

14030.001
Lewis/Rosemead Condos SCE Parcel/HSP
1515 Walnut Grove
Rosemead, CA

Test Results															
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	In Place Wet Density (pcf)	Probe Depth (in)	Percent Compaction	Min/Max Comp. (%)	Optimum Moisture Tolerance (%)	Remark
17		04/08/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	13.4	113.4	128.6	8	91	90 / 100	NA	DP
18		04/09/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	14.6	113.1	129.6	8	91	90 / 100	NA	DP
19		04/10/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	11.0	112.4	124.8	8	90	90 / 100	NA	DP
20		04/23/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	14.5	113.5	130.0	8	91	90 / 100	NA	DP
21		04/23/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	15.6	113.8	131.6	8	92	90 / 100	NA	DP
22		04/23/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	16.7	114.9	134.1	8	92	90 / 100	NA	DP
23		04/23/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	14.9	113.1	129.9	8	91	90 / 100	NA	DP
24		04/23/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	17.1	111.5	130.6	8	90	90 / 100	NA	DP
Test Information															
Test #	Test Location			Elevation	Reference	Gauge Specs Make / Model / SN / Calibrated			Gauge Standardization Density Standard/Moisture Standard			Field Technician			
17	Compacted Fill (CF): Pit/trench T1 south end			-15.0	Existing Grade	CPN / MC1-DRP / MD60308225 / 09/14/2023			32059 / 10697			Crawford, Eric			

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18	Compacted Fill (CF): Pit/trench T1 south end	-12.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22560 / 8084	Crawford, Eric
19	Compacted Fill (CF): Pit/trench T1 south end	-10.0	Existing Grade	CPN / MC3 / M370308650 / 09/01/2023	22560 / 8084	Crawford, Eric
20	Compacted Fill (CF): Exploretory pit T1 southwest corner of site		SG -13'	CPN / MC1-Elite / 31081 / 02/15/2024	3788 / 961	Guevara, Anthony
21	Compacted Fill (CF): Exploretory pit T1 southwest corner of site		SG -10'	CPN / MC1-Elite / 31081 / 02/15/2024	3788 / 961	Guevara, Anthony
22	Compacted Fill (CF): Exploretory pit T1 southwest corner of site		SG -7'	CPN / MC1-Elite / 31081 / 02/15/2024	3788 / 961	Guevara, Anthony
23	Compacted Fill (CF): Exploretory pit T1 southwest corner of site		SG -4'	CPN / MC1-Elite / 31081 / 02/15/2024	3788 / 961	Guevara, Anthony
24	Compacted Fill (CF): Exploretory pit T1 southwest corner of site		SG -2'	CPN / MC1-Elite / 31081 / 02/15/2024	3788 / 961	Guevara, Anthony
Remarks		Comments				
DP: Density Pass		Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.				



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1515 Walnut Grove
Rosemead, CA

Test Results															
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	In Place Wet Density (pcf)	Probe Depth (in)	Percent Compaction	Min/Max Comp. (%)	Optimum Moisture Tolerance (%)	Remark
25		04/23/24	03-28-24, #1, Backfill, Stockpile T2	A	CL	9.1	124.3	15.9	113.1	131.1	8	91	90 / 100	NA	DP
26		05/02/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	10.6	122.0	134.9	8	97	90 / 100	0 / 3	DP/MP
27		05/02/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	11.6	117.0	130.6	8	93	90 / 100	0 / 3	DP/MP
28		05/02/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	10.8	119.5	132.4	8	95	90 / 100	0 / 3	DP/MP
29		05/02/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	11.2	120.0	133.4	8	96	90 / 100	0 / 3	DP/MP
30		05/02/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	11.4	118.4	131.9	8	94	90 / 100	0 / 3	DP/MP
31		05/03/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	11.2	119.8	133.2	8	95	90 / 100	0 / 3	DP/MP
32		05/03/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	10.9	121.8	135.1	8	97	90 / 100	NA	DP
Test Information															
Test #	Test Location			Elevation	Reference		Gauge Specs Make / Model / SN / Calibrated			Gauge Standardization Density Standard/Moisture Standard			Field Technician		
25	Compacted Fill (CF): Exploretory pit T1 southwest corner of site				SG		CPN / MC1-Elite / 31081 / 02/15/2024			3788 / 961			Guevara, Anthony		

Soil Nuclear Gauge

Report Date: 06/25/2025
Test Method: ASTM D 6938

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26	Compacted Fill (CF): South ramp part of trench		SG-13.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3996 / 1085	Conell, Richard
27	Compacted Fill (CF): Southern ramp of trench T3		SG-15.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3996 / 1085	Conell, Richard
28	Compacted Fill (CF): Most Northern part of T3		SG-17.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3996 / 1085	Conell, Richard
29	Compacted Fill (CF): Most Northern part of T3		SG-19.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3996 / 1085	Conell, Richard
30	Compacted Fill (CF): Most Northern part of T3		SG-19.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3996 / 1085	Conell, Richard
31	Compacted Fill (CF): North corner of T3		SG-13.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3953 / 1070	Conell, Richard
32	Compacted Fill (CF): Middle of T3		SG-13.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3953 / 1070	Conell, Richard
Remarks			Comments			
DP: Density Pass			Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.			
DP/MP: Density Pass / Moisture Pass						



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Test Results															
Test #	Retest Of	Test Date	Proctor ID	Method	Soil Classification	Optimum Moisture (%)	Maximum Dry Density (pcf)	In Place Moisture (%)	In Place Dry Density (pcf)	In Place Wet Density (pcf)	Probe Depth (in)	Percent Compaction	Min/Max Comp. (%)	Optimum Moisture Tolerance (%)	Remark
33		05/06/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	11.3	119.0	132.5	8	95	90 / 100	0 / 3	DP/MP
34		05/06/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	11.4	115.9	129.1	8	92	90 / 100	NA	DP
35		05/07/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	11.5	121.1	135.0	8	96	90 / 100	NA	DP
36		05/07/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	13.1	117.6	133.0	8	94	90 / 100	NA	DP
37		05/07/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	10.5	121.1	133.8	8	96	90 / 100	NA	DP
38		05/08/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	10.6	122.9	135.9	8	98	90 / 100	NA	DP
39		05/09/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	12.3	119.8	134.5	8	95	90 / 100	NA	DP
40		05/09/24	03-28-24, #2, Backfill, Stockpile T2	A	CL	8.6	125.5	10.6	120.6	133.4	8	96	90 / 100	NA	DP
Test Information															
Test #	Test Location			Elevation	Reference		Gauge Specs Make / Model / SN / Calibrated			Gauge Standardization Density Standard/Moisture Standard			Field Technician		
33	Compacted Fill (CF): North section of T3				SG-11.5'		CPN / MC1-Elite / 31191 / 08/01/2023			3938 / 1057			Conell, Richard		

Soil Nuclear Gauge

Report Date: 06/25/2025
Test Method: ASTM D 6938

Client:

Lewis Management Corp.
1156 N. Mountain Avenue
Upland, CA 91786

Project:

14030.001
Lewis/Rosemead Condos SCE Parcel/HSP
1515 Walnut Grove
Rosemead, CA

34	Compacted Fill (CF): South section of T3		SG-11.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3938 / 1057	Conell, Richard
35	Compacted Fill (CF): Middle section of T3		SG-9.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3939 / 1086	Conell, Richard
36	Compacted Fill (CF): Middle section of T3		SG-9.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3939 / 1086	Conell, Richard
37	Compacted Fill (CF): Northeast section of T3		SG-11.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3939 / 1086	Conell, Richard
38	Compacted Fill (CF): Middle section of T3		SG-9.5'	CPN / MC1-Elite / 31191 / 08/01/2023	3990 / 1069	Conell, Richard
39	Compacted Fill (CF): Northern section of T3		SG-8.0'	CPN / MC1-Elite / 31191 / 08/01/2023	3928 / 1069	Conell, Richard
40	Compacted Fill (CF): Northwest section of T3		SG-8.0'	CPN / MC1-Elite / 31191 / 08/01/2023	3928 / 1069	Conell, Richard
Remarks			Comments			
DP/MP: Density Pass / Moisture Pass			Tests are "Direct Transmission" (Method A) unless probe depth is noted as "Backscatter". Gauge calibration data on file with the testing agency.			
DP: Density Pass						