G-2 2019 Surface Fault Rupture Hazard Evaluation Report

SURFACE FAULT RUPTURE HAZARD EVALUATION REPORT

HOLLYWOOD TRACT, BLOCK 21, FR1 LOT 2 [APN 5546004029]
6334 W YUCCA STREET and 1770 N IVAR AVENUE

AND RECOMMENDATIONS FOR 50-FOOT SETBACK REMOVAL AT

HOLLYWOOD TRACT, BLOCK 21, LOT 3 [APN 5546004006] AND CENTRAL HOLLYWOOD TRACT NO. 2, FR6 [APN 5546030034]
1760 AND 1764 N IVAR AVENUE AND 1720, 1722, AND 1734 N VINE STREET,
LOS ANGELES, CALIFORNIA

Submitted to

City of Los Angeles

Prepared for

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July 19, 2019

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July 19, 2019
Project No. LA1301A

Attention: Edgar Khalatian

SUBJECT: **Surface Fault Rupture Hazard Evaluation Report**
Hollywood Tract, Block 21, FR1 Lot 2 [APN 5546004029]
6334 W Yucca Street and 1770 N Ivar Avenue, Los Angeles, California
and **Recommendations for 50-foot setback removal at**
Hollywood Tract, Block 21, Lot 3 [APN 5546004006] and Central Hollywood Tract No. 2 FR6 [APN 5546030034]
1760 and 1764 N Ivar Avenue and 1720, 1722, and 1724 N Vine Street, Los Angeles, California

Dear Mr. Khalatian:

Group Delta Consultants is pleased to submit this Surface Fault Rupture Hazard Investigation report for the properties located at 6334 W Yucca Street and 1770 N Ivar Avenue, in the Hollywood District of the City of Los Angeles (Site 1). Accompanying this report is a recommendation to remove 50-foot building setback zones previously established at properties located at 1760 and 1764 N Ivar Avenue (Site 2) and 1720, 1722, and 1724 N Vine Street (Site 3); associated with Alquist-Priolo Earthquake Fault Zone (APEFZ) investigations (GDC, 2015). The scope of work was conducted in general accordance with our proposal dated September 12, 2016.

Our findings indicate evidence of fault inactivity in at least the last 120,000 years below Site 1. Under the regulation of the Alquist-Priolo Act and the guidelines presented in Special Publication 42 (Rev. 2018), Note 49 (CGS, 2002), and City of Los Angeles P/BC 2017-129; the potential for surface fault rupture hazard below Site 1 is considered low and should not impact redevelopment of the site. However, a conditional buildability zone is recommended within the northern 25 feet of Site 1 due to investigation limitations.

Additionally, setback zones were established in the previous GDC 2015 report were a result due to the lack of data at neighboring properties, including Site 1 and 1718 Vine Street at the time of the 2015 report. These findings support the recommendation to remove the 50-foot setback zone previously established for Site 2 under LADBS Approval Letter Log #87496R. Lastly, Group Delta fault investigation findings at 1718 Vine Street (2016) LADBS Approval Letter Log #94232 support the recommendation to remove the 50-foot setback zone previously established for Site 3 LADBS Approval Letter Log #87496R.

We appreciate the opportunity to provide geotechnical services for your project. If you have any questions pertaining to this report, or if we can be of further service, please do not hesitate to contact us.

Sincerely,

GROUP DELTA CONSULTANTS, INC.

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LOS ANGELES, CALIFORNIA

1.0 INTRODUCTION

The project site, at 6334 W Yucca Street and 1770 N Ivar Avenue, Los Angeles, California (Site 1), is under consideration for redevelopment. The location of Site 1 is shown in Figure 1. To assist in planning for redevelopment, we performed a surface fault rupture evaluation at the site according to the guidelines presented in Special Publication 42 (CGS, Rev. 2018), Note 49 (CGS, 2002), and City of Los Angeles P/BC 2017-129. The California Geological Survey (CGS) mapped segments of the Hollywood fault along the north side of Yucca Street and through the parking lot south of Site 1, as shown in Figure 2. Evaluation of the activity and location of the Hollywood fault by the CGS prompted the State to identify an Alquist-Priolo Earthquake Fault Zone (APEFZ) (CGS, 2014b). This report presents the findings of a site-specific fault investigation performed at 6334 Yucca Street, Los Angeles, California (Site 1); and, addresses two previously established 50-foot building setback zones associated with APEFZ areas at properties located at 1760 and 1764 N. Ivar Avenue (Site 2) and 1720, 1722, and 1724 N. Vine Street (Site 3), shown in Figure 2 and Figure 3 Project Site Plan.

1.1 PURPOSE

The Alquist-Priolo Act is intended to mitigate the potential hazard of surface fault rupture for human occupancy structures by: 1) establishing the Holocene age criteria to differentiate what is considered a more potentially hazardous earthquake fault (*Holocene-active faults*); 2) establishing a requirement for the state to identify the location of Holocene-active faults and establish zones of required investigation for new development around the Holocene-active faults (APEFZ); 3) restrict buildability on the trace of Holocene-active faults within the APEFZ; and 4) empower local governing agencies to enforce the regulation (California Public Resources Code, Div. 2. Ch. 7.5, Sections 2621-2630 and California Code of Regulations, Title 14, Div. 2, Section 3601). In response, the CGS continues to release updated fault maps, including Earthquake Zones Required for Investigation Maps (EZRIM) which delineate APEFZ and the City of Los Angeles has supplemented these maps with Preliminary Fault Rupture Study Areas (PFRSA). In addition, the CGS and City of Los Angeles have provided guidelines for fault investigations within the APEFZ and PFRSA (CGS, Special Publication 42 and Note 49; and City of Los Angeles P/BC 2017-129).

This fault investigation was performed with the same intent, to mitigate the potential hazard of surface fault rupture for redevelopment at the site. Within an APEFZ, there is a presumed increased potential hazard for surface fault rupture (CGS, 2002). However, potential hazard greatly reduces when habitable structures are not constructed directly on a fault which exhibits evidence of previous rupture in Holocene time (*Holocene-active Fault*). This mitigation is based on the principal methodology that a fault that has not ruptured in the last 11,700 years (*Holocene time*), has a lower rupture frequency and therefore, may have a lower potential for future ruptures (CGS, 2018). Furthermore, the potential hazard is reduced even more if the structure is set back from Holocene-active faults, if found to be present. A typical setback from a fault found Holocene-active is 50 feet, however, that distance should depend on the characteristics of the specific fault zone. The setback from an active fault can be increased or decreased based on the data found during an investigation. Future planned redevelopment of the site may include structures of human occupancy. The scope of work was designed within the limitations of an urban investigation to identify and evaluate if Holocene-*active faulting* is present below the site to assure no new buildings planned for human occupancy are constructed on a potentially hazardous earthquake fault as defined by the *California Code of Regulation.*

1.2 SITE CONDITIONS

The project site is located in a densely populated and developed area in the City of Los Angeles. Site 1 is located on the southeast corner of Yucca Street and Ivar Avenue, as illustrated in Figures 1 and 3. It is occupied by a single-story building and paved parking lot. Several underground utilities cross the parking lot. Yucca Street, associated sidewalks and street parking borders Site 1 to the north. Ivar Avenue, associated sidewalks and street parking borders Site 1 to the west. A multi-story building with subterranean levels borders the property line to the east. An open parking lot at Site 2 borders Site 1 to the south (Figure 3). A retaining wall extends along the eastern portion of the southern property line of Site 1, between Site 1 and Site 2. The retaining wall ranges in height from 4 feet to 8 feet, west to east. Site 2 is bordered on the south and east by open parking lot. Ivar Avenue borders Site 2 on the west. Site 3 is about 475 feet south of Yucca Street and occupied by an open parking lot. A restaurant building borders Site 3 to the south. Vine Street, associated "Walk of Fame" and street parking borders Site 3 to the west. A wall and subterranean level borders Site 3 to the east and an open parking lot borders Site 3 to the north.

Most of the natural topography is obscured by street, commercial, and residential developments. The topography gently slopes down to the south across Site 1 and down to the southeast across Site 2 and Site 3. Investigation of subsurface data indicates that some minor cutting was involved in the development of these sites. No significant fill, unassociated with underground utilities and structures were encountered.

2.0 SCOPE OF WORK

The current investigation for surface fault rupture evaluation was performed at Site 1 to determine the buildability of Site 1 and Site 2 in an APEFZ. Fault investigations were previously performed at Site 3 (GDC, 2015) and supplemented by fault investigations performed for the southern adjacent lot, 1718 Vine Street in 2017 (GDC, 2017). Our recommendations for buildability of Site 3 are provided herein. The scope of work for our evaluation was devised with the consideration of the regulatory guidelines presented in in Special Publication 42 (Rev. 2018), Note 49 (CGS, 2002), and City of Los Angeles P/BC 2017-129. Our scope of work included the following:

- Field Exploration:
  - Planning and Coordination for field exploration;
  - Obtaining appropriate permits and traffic control plans;
  - Review of previous exploration data at Site 2;
  - Sampling and logging continuous core borings
  - Performing Cone Penetration Testing
  - Excavation of 3 trenches (FT-1, FT-2 and FT-3);
  - Soil Stratigraphic evaluation by Dr. Thomas Rockwell PhD;
  - Review fault trench exposures with reviewing agencies (State and City);
  - Review fault trench exposures by 3rd party reviewers (ECI), and
  - Backfill and pavement repair;
- Data evaluation and analysis:
  - Analysis and interpretation of CPT data;
  - Detail review and correlation of continuous cores;
  - Evaluation, photographic documentation and logging of trenches
  - Evaluation of local stratigraphy, sedimentary environment, and depositional history;
  - Development of the subsurface profile and correlation with adjacent properties; and
- Preparation of a surface fault rupture evaluation report presenting our findings and recommendations.

3.0 BACKGROUND

The Hollywood fault trends east, from Beverly Hills to the Los Angeles River, at the base of the Hollywood Hills of the Santa Monica Mountains. It is part of an active tectonic system along the southern boundary of the Transverse Ranges geomorphic province (Dolan, 2001). The infered active faulting is interpreted at the surface from steepened slopes and scarps in alluvial fan topographic expressions along the base of the Santa Monica Mountains and Hollywood Hills locally (Dolan, 1997). Subsurface investigations within the fault zone found evidence for the presence of both pre-Holocene active and Holocene-active faults (CGS, 2014a and 2014b). Observed orientations and relative motion of the faults encountered within the zone vary somewhat. However, interpreted Holocene-active faulting was typically recognized with measurable south side down offsets within alluvium and bedrock across a steep north dipping structure. Along with significant bedrock displacement, the Hollywood fault zone is known to also form a groundwater barrier, where groundwater steps down tens of feet to the south. Thick, distinctive brecciated zones, slickened sides, shears, and tilted beds also characterize the zone of faulting (CGS, 2014a).

In the site area, the Hollywood fault is mapped as two separate strands, as illustrated on Figure 2 (CGS, 2014a). The strands generally trend east-west, sub-parallel to each other. The geomorphic evidence for the interpretation of these active strands include a steepened south facing ridge directly north of Site 1 and a less well-defined slope break south of the site.

Evidence for the presence of these strands west of Site 1 is constrained by a subsurface investigation along Cahuenga Boulevard, which included a transect of widely spaced borings performed by Converse Consultants et. al in 1984 for Metro, and evaluated for potential surface fault rupture, (*Figure 2a* of Crook and Proctor, 1992; and *Figure 4* of Dolan, 1997). Crook Proctor (1992) interpreted several fault strands stepping south from Franklin Avenue with the main fault south of Yucca Street. A fault breccia zone over 10 feet thick was logged within this fault zone. The most northern strand of faulting projects north of Yucca Street. Here, the faulting is interpreted from a 30-foot drop to the south in groundwater elevation between two borings drilled along Las Palmas. Dolan evaluated the same data and found no evidence for faulting north of Yucca Street along section, however he concurs with the main fault located south of Yucca Street. Because of the wide spacing of borings, the location of the main faulting is not well constrained, however, offset within the bedrock surface is significant, in excess of 25 feet as illustrated by Dolan (1997) and; Crook and Proctor (1992). In the Supplemental FER 253 (CGS, 2014b) the CGS re-evaluated the Converse Consultant boring logs and interpretations. The CGS findings indicated the location of the Hollywood fault is identified by displacement in alluvial deposits as well as the bedrock surface contact. The fault is illustrated in cross section as a steeply, north-dipping feature, with south-side down displacement.

Since the release of the Preliminary Earthquake Zone Map in January 2014, surface fault evaluations have been performed by Group Delta near the site, including Site 2, Site 3 and 1718 Vine Street, shown in Figure 3. These investigations included several closely spaced CPTs and core transects as well as fault trench excavations across the current APEFZ (GDC, 2016, 2015a). Pre-Holocene faulting was observed in older alluvial deposits and bedrock. However, where Holocene and late Pleistocene sediments were encountered during explorations, they were found unbroken and the faults terminated below the lower contacts. Other neighboring investigations performed by GDC (2018, 2015b, & 2014), including 6305 W. Yucca Street (LOG #105039), north of Site 1, and the northeast (LOG #85580-02) and southeast (LOGs #85579 & #87930) corners of Yucca Street and Argyle Avenue also concluded no Holocene-active faults were present. At 6305 W. Yucca Street, a trench was explored to bedrock depth and found no evidence of faulting within the paleo bedrock surface and overlying older alluvial and colluvial soils. At the northeast and southeast corners of Yucca Street and Argyle Avenue, faults observed within older alluvium were determined to be a result of Pleistocene folding along the Hollywood Anticline and evaluated shown to have been in-active during the Holocene, hence, to be non-active faults by the APEFZ fault activity guidelines.

4.0 SEISMICITY

Within the Greater Los Angeles area, earthquakes are frequent and the site could experience strong seismic shaking from an large event on any of several nearby active faults. Recent major historical earthquakes near the site include the 1971 San Fernando magnitude (M) 6.6 earthquake, the 1992 Landers M7.3 earthquake, the 1994 Northridge M6.7 earthquake, and the 1999 Hector Mine M7.1 earthquake.

The Hollywood fault is estimated to be capable of a M6.5 earthquake (SCEC, 2013), however, it has not been a source of significant seismic activity in historical time. The United States Geological Survey (USGS) Earthquake Catalog indicates a few small magnitude earthquakes were sourced in the fault zone, however, this micro-seismicity has not been directly attributed to the Hollywood fault (USGS 2016). Surface fault rupture data on this fault suggests the most recent surface rupture likely occurred between 7,000 and 9,500 years ago (Dolan, 2000).

5.0 GEOLOGIC CONDITIONS

The project site is located within the southern boundary of the Transverse Ranges geomorphic province. This boundary is structurally characterized by a complex zone of reverse, oblique, and strike-slip faulting along a series of west and northeast trending active faults that accommodate the westward translation of the Transverse Ranges (Dolan et al., 1997). These faults locally include the Santa Monica, Hollywood, and Raymond fault system (Dolan et al.,, 1997). The Santa Monica Mountains have been uplifted north of this fault zone relative to the Los Angeles Basin to the south due to Miocene extensional tectonics and subsequent compressional tectonics (Wright, 1991). Mesozoic granitic and Tertiary sedimentary rocks are exposed at the surface within the mountains. Cyclic Quaternary sea level rise and fall has resulted in several episodic deeply eroded canyons and subsequent fill, with modern fan deposition at the base of the mountains. Recent Holocene alluvial deposition is concentrated within the canyons and southward extending drainages. The project site with respect to regional geology is presented on Figure 4 from Hoots and Kew (1931) and Figure 5 from Dibblee and Ehrenspeck (1991).

The project site is situated on an alluvial fan margin, near the toe of a fingering, south extending foothill. Here, at the southern base of the Santa Monica Mountains, canyons cut through Tertiary sedimentary rock of the Topanga Formation (Tt) and open southward forming alluvial fans. Regional mapping indicates Pleistocene alluvial deposits underlie the Site, Figure 4 and 5 (Hoots and Kew, 1931; Dibblee, 1991).

Dibblee mapped a bedrock fault at the nose of the south-sloping ridge, about 1,000 feet north from Site 1; Figure 5. The fault trends east-west, parallel to Franklin Avenue. Dolan (1997) correlates this bedrock fault with his Franklin Avenue strand and projects the trace west across the canyon. Hoots and Kew identified a similar bedrock fault at the nose of this ridge; however, the bedrock exposed at the surface of this ridge is mapped south of Franklin Avenue, parallel and near Yucca Street, about 160 feet north of Site 1, as shown on Figure 4. Modelo Formation (also called Monterey Formation) is mapped on the south side of the fault.

6.0 FIELD INVESTIGATION

Field investigations for potential surface fault rupture hazard evaluation are designed to observe geologic evidence of Holocene-active faulting. Fault trenching is the most reliable method for subsurface investigation for fault activity evaluation. Transects of closely spaced cone penetration tests (CPTs), correlated with continuous boring cores, are useful to evaluate the potential for the presence of faults in certain sedimentary environments (CGS, 2002). The CPTs provide a continuous vertical record of material engineering properties while the continuous core sampling provides geologic material profiles. Together they can be utilized to interpret a continuous stratigraphic profile below the site. However, where the stratigraphic profile is found irregular and/or non-continuous, trenching may be required to determine the nature of the irregularity.

Typically, exploration is oriented perpendicular to the fault zone to capture the greatest measure of stratigraphic displacement. Exploration is generally extended at least 50 feet linearly outside of the planned new development area, perpendicular to the mapped fault zone to capture any Holocene-active faulting within 50 feet of potential new structures and to satisfy City of LA guidelines.

6.1 Current Investigation

We evaluated the accessible areas for exploration at Site 1 for the field exploration extending south into Site 2 and north into Yucca Street, Figure 6. Trenching across structures and major roadways such as Yucca Street is impractical and difficult to get permitted in the City of Los Angeles. The stratigraphy observed in prior exploration near Site 1 (GDC, 2016a and b; GDC, 2015a), including CPT and core borings at Site 2 and Site 3, indicate well developed continuous pre-Holocene alluvial stratigraphy which may correlate between exploration locations.

6.1.1 Phase 1

The initial phase of investigation included a transect of closely spaced CPTs and core borings. The location of this transect, A-A’, is shown on Figure 6. In addition, supplemental CPT’s and core borings were performed on Site 1 to extend data of previously investigated GDC transect O-O’ to overlap the southern portion of the property. Existing structures and buried concrete limited the additional exploration locations to within 37 feet northwest of GDC-2015 B-12. The location of the extended O-O’ line (OE-OE’) is also shown on Figure 6. The CPT’s were performed along the transect at closely spaced intervals, within 25 horizontal feet, in open and accessible areas. Core boring locations were selected to capture stratigraphic behavior and changes along sections and provide geologic calibration of the CPT signatures. CPT’s were pushed to about 60 feet depth or refusal. Borings were drilled up to 55 feet depth and continuous core samples were collected to the depths explored. Core run lengths varied depending on the material and recovery rate. Upon completion of explorations, the boring and CPT relative vertical locations were surveyed with manometer to the nearest tenth of an inch and relative horizontal locations were surveyed with a measuring wheel to the nearest inch. All exploration elevations were calculated relative to the estimated elevation of B-1, which was estimated from Navigatela 2006 survey data to be 408 feet in elevation. As the purpose of the CPT/boring transect was to look for stratigraphic irregularities, relative elevations between the probes are adequate to the purpose. A more detailed discussion of sampling and log method is presented in Appendix A along with logs of the cores and CPT results.

6.1.2 Phase 2 – Fault Trenching

After completion of the transect investigation, the data collected were determined to be insufficient to fully evaluate the presence or lack of faulting below the site. A second phase of investigation was then performed which included fault trenching. Three fault trenches were excavated in selected locations (FT-1, FT-2 and FT-3) as shown on Figure 6. Fault trench FT-1 extends north-south for approximately 125 feet with depths of 9 to 15 feet. Two additional shallow trenches were excavated (FT-2 and FT-3) that were 39 feet and 23 feet long, respectively, averaging depths of 4 to 5 feet.

Trench evaluation and documentation involved scraping the side walls, locally surveying station markers every 5 feet, placement of horizontal level lines, field logging at a scale of 1”=5’, and photographing the excavation. All three trenches were logged by Dr. Miles Kenney and reviewed by Jim Sanders. Both the east and west sides were logged to provide more opportunity to determine fault activity and constrain fault strikes/locations across the site. Paleoseismic specialist Dr. Thomas Rockwell was subcontracted to review the trenches for stratigraphic and structural age determination, his letter report is presented in Appendix C. Geological representatives from the City of Los Angeles Department of Building and Safety as well as the CGS and a third-party review performed by Earth Consultants International (ECI) were present to observe presentation of the trench exposures conducted by Group Delta representatives. A separate letter report and soil profile age evaluation was performed by ECI and presented in Appendix D of this report.

Following the completion of fault trench documentation and review, the trenches were backfilled with engineered fill and pavements were repaired. Documentation of the fill placement testing and observations is presented in Appendix B.

7.0 STRATIGRAPHY AND GROUNDWATER

Exploration at Site 1 and Site 2 encountered older alluvium (**Qoal**), overlying the basalt flow member of the Topanga Formation (**Tvb**). The **Qoal** was subdivided into upper debris flow deposits (**Qodf**) and lower fluvial deposits (**Qofl**) on the trench logs. In addition, the trenching exposed a well-developed soil profile, partially preserved near the surface, below the existing fill and pavements (**af**) that currently cover the site. Cross sections A-A' and OE-OE' illustrate the CPT and core data that are presented in Figure 7. Logs of this stratigraphy encountered in fault trenches (FT-1, FT-2, and FT-3) are presented in Plates 1 and 2. A brief description of these units is presented below.

7.1 Artificial Fill (af)

Artificial fill was generally encountered in the upper 2 feet below Site 1 and Site 2 along trenching. The fill is composed primarily of re-worked native soils but also contains asphalt and concrete and other man made (anthropogenic) items. Isolated deeper fill was encountered in borings to depths of 11 feet (Figure 7), likely related to subsurface utilities.

7.2 Soil Profile Horizons (Bt1, Bt2/k, Bt3, BC)

A partially preserved soil profile, developed within the shallow alluvial units, underlies the fill and pavements, as observed in trenches, FT-1, FT-2, and FT-3 (Plate 1 and 2). The most complete section of the soil profile was observed in FT-3 as illustrated in Figure 8, Soil Profile Photographic Section. The secondary characteristics of the soil processes, and specifically those related to the development of the argillic (Bt) and carbonate (Btk) soil horizons, have sufficiently matured such that they overprint all original stratigraphic structures, such as bedding, in the original older alluvial parent deposits. Argillic horizon, **Bt1,** which represents the upper most soil horizon exposed during trenching, was observed in isolated areas along FT-1W and along a good portion of FT-1E from Station 15 to 60. It was also observed in FT-3. The top most soil horizons are not preserved and have likely been regraded into the fill at the site or cut away. The reddened color and strong ped structure of the **Bt1 horizon** distinguishes it from lower soil horizons **Bt2** and **Bt2k**. The lower part of the argillic horizon, **Bt2,** was observed in all trenches. In some locations along FT-1, FT-2, and FT-3, a secondary carbonate has developed as ped face linings and nodular structure within the upper **Bt2k** horizon. A less well-developed soil horizon, **Bt3**, was observed in isolated areas within FT-1W at Station 80 (Plate 1) and a partially developed soil in alluvial layers, **BC** horizon was observed in FT-3 as illustrated in photos (Plate 2). A more detailed discussion of the soil profile was performed by Dr. Thomas Rockwell and is presented in Appendix C.

7.3 Older Alluvium (Qoal)

The **Qoal** includes all pre-Holocene alluvial fan deposits encountered below the site. These materials are composed primarily of sediments eroded from the Topanga Formation exposed in the mountains to the north of the site (Figure 5). As observed in core along A-A' and OE-OE' (Figure 7), the **Qoal** includes moderately well bedded alluvial layers interbedded with internally massive debris flows and coarse fluvial gravels. Contacts dip gently down to the southeast and are generally erosional; although fining upward gradation is observed within the upper fluvial sequences. Gravels are typically rounded and range in size from small gravel to boulder size. Some of the rounded gravels are likely re-worked rounded gravels from a conglomerate member of the Topanga Formation exposed within the hills to the north (Figure 5). The matrix is typically silty to clayey sand, fine- to coarse-grained and reddish brown 2.5YR to 7.5YR in color. Iron oxide staining is developed throughout. Due to the depositional environment and degree of weathering observed within the layers, the **Qoal** is interpreted to be Middle Pleistocene in age. As observed in fault trenches FT-1, FT-2 and FT-3, unit **Qoal** has at least two distinct depositional episodes, **Qodf** and **Qofl** (Plate 1 and 2). These subunits are described below.

Debris Flow (Qodf)

Qoal subunit **Qodf** (a debris flow) is encountered within the upper five feet of FT-1 from the northern most section of trench at Station 0 and exits south near Station 75/80. It was also observed in the upper 5 feet of supplemental trenches FT-2 and FT-3. It is distinguished by a generally silty sand matrix- supported sedimentary structure and a basal gravel. There are well developed secondary Bt lams and iron oxidation developed throughout the subunit. The color is reddish brown 2.5YR. The lower contact with **Qofl** is moderately sharp and is an apparent unconformity between the subunits. Bedding generally dips 6 to 10 degrees to the southeast.

Fluvial Deposit (Qofl)

Qoal subunit **Qofl** is encountered unconformably underlying **Qodf** in FT-1 and FT-2 and extends at least to the depth of trenching (Plate 1 and 2). It is distinguished by a generally well bedded structure with internal gradational sequencing. The gradational sequencing is layered 6-inches to about 4 feet in thickness. Most members of unit Qofl are well sorted. A distinct conglomerate layer was exposed within the lower 10 feet of FT-1. It is thickest in the north end, measuring up to 3 feet in thickness near Station 3 and thinning to less than a foot down dip to the south along the trench. The clasts are floating in a silty to clayey sand matrix. The size ranges from gravel to boulder, they are rounded, and some are partially grussified. There is notably a weak secondary carbonate coating on the gravels and grains. There are well developed secondary Bt lams and iron oxidation development throughout the subunit (Qofl). The color is reddish brown 2.5YR. Bedding generally dips 6 to 10 degrees to the southeast.

7.4 Topanga Formation basalt member (Tvb)

Bedrock material of the Tertiary age Topanga formation was encountered underlying the **Qoal** deposits at Site 1 and Site 2, from about 30 to 45 feet below ground surface. The bedrock consists of a basaltic member (**Tvb**) that is highly fractured and weathered. The closest mapped bedrock outcrop of **Tvb** is approximately 0.6 miles to the west and north of the site (Figure 5). As observed in boring core along Cross Section A-A' and OE-OE' (Figure 7), unit **Tvb** consists of fine-grained basalt flows exhibiting a high fracture/joint density and secondary weathering and mineralization within the joints. A thin colluvial unit of weathered basalt clasts in a clay matrix is preserved along the upper unconformable contact with the overlying Quaternary **Qoal**.

7.5 Groundwater

Ground water was encountered perched within the bedrock at 48 feet in boring B-1 (GDC, 2015). Borings drilled at Site 2 (GDC, 2015; B-12 and B-11) and Site 3 (GDC, 2015; B-12 and B-13) did not encounter groundwater to depths of at least 60 feet below ground surface.

7.6 Stratigraphic Age Evaluation

The age of the stratigraphy encountered in fault trenches FT-1, FT-2, and FT-3 was evaluated by paleoseismic and soil profile specialist, Dr. Thomas Rockwell. His evaluation is detailed in a letter presented in Appendix C. In brief summary, Dr. Rockwell evaluated the soil profile exposed in FT-1, FT-2, and FT-3 to evaluate the age of pedogenic development of soil horizons (Bt1, Bt2/k, and Bt lams (BClams)) and the underlying alluvium depositional age (Qoal-subdivided Qodf and Qofl). His evaluation estimates the soil horizon (Bt1 and Bt2) profile to represent at least 200,000 years of development, and the calcic development in Bt2, (Bt2k) is an overprint from the drier last interglacial period, estimated to be at least 120,000-130,000-years ago. Lastly, he estimates the alluvial (Qodf and Qofl) depositional period to be associated with a sea level highstand at least 200,000 years ago if not longer, a mid-late Pleistocene age deposition.

A separate evaluation of the stratigraphy encountered in the fault trenches was performed by ECI and presented in Appendix D of this report. ECI's evaluation included a complete stratigraphic age determination which had similar concluding age estimates as Dr. Rockwell, which place the alluvial depositional age to likely be mid Pleistocene and the upper soil development to have taken at least 100,00 and 145,000 years and likely 200,000 years.

8.0 FAULTING

As stand-alone data, the CPT and core boring data (presented in Figure 7), were determined to be insufficient to fully evaluate the potential for faulting below Site 1. While the Tvb bedrock surface contact below Site 1 appears relatively unfaulted; to the north and south of Site 1, between borings B-1 and B-2 (in Yucca Street) and between borings B-7 and B-8; and B-13 and B-12 (in Site 2), the bedrock surface slope becomes inconsistent as illustrated in cross sections A-A' and OE-OE' (Figure 7). In addition, the Qoal stratigraphic continuity above the bedrock is indeterminate of faulting, as not enough consistent continuity can be established with the data set. Our evaluation of faulting below Site 1 is therefore predominately based on data observed in the fault trenches, FT-1, FT-2, and FT-3 (Plate 1 and 2).

As observed within the fault trenches FT-1, FT-2, and FT-3, there is no Holocene-active faulting below Site 1 and Site 2. A series of small pre-Holocene, Pleistocene faults cross below Site 1 and Site 2, as illustrated on Plates 1 and 2. Within the series, ten faulted zones were identified within Pleistocene age Qoal stratigraphic subunits Qodf and Qofl. These zones were logged and labelled F1 through F10, north to south along trench FT-1 (Plates 1 and 2), and all the zones were observed to terminate in Pleistocene sedimentation, as illustrated in Figure 9.1. The Pleistocene faulting series consistently dips steeply to the north with apparent down to the north dip-slip. Trench wall exposures of apparent vertical down to the north separations (displacement) were measured between 1-inch to 12-inches. However, bedding thickness inconsistencies across the faults indicate a more dominant strike-slip offset component. Based on the northwest trend of the steeply dipping faults, southeastward general dip of the sediments, and down to the north apparent vertical separation, left-lateral strike slip faulting likely occurred across nearly all the faults identified. The offset layers were observed across relatively clean and tight fractures. There was a notable lack of gouge or secondary mineralization. Orientation of fault strike ranges between N60°-75°E.

Pleistocene fault zones F1, F2, F4-F9 terminate in Pleistocene age Qodf deposits and/or are "over printed" by pedogenic development of the 200,000 year old Bt2 soil horizon, as illustrated in Plates 1 and 2, and Figure 9.1. Pleistocene fault zones F3 and F10 included fault traces that offset the lower Bt2 horizon contact. However, subsequent soil development observed in upper soil horizons Bt2k and Bt1 were not offset by the faulting and pedogenic processes in the upper Bt1 and Bt2k soil horizons had grossly obscured the upper extent of the fracture planes. All trenches were reviewed by the City of Los Angeles Department of Building and Safety Geological reviewer, CGS representatives, and evaluated by Dr. Thomas Rockwell and ECI third party reviewer Eldon Gath. All parties came to the same conclusion, that the faulting observed in the trenches is pre-Holocene and there is strong evidence of to preclude Holocene-fault inactivity.

Correlation of the buried bedrock (Tvb) surface encountered in core boring B-7 to B-8 along section A-A' and B-12 to B-13 along section OE-OE' (Figure 7) with observations of faulting in FT-1 (Figure 9.2) indicate Pleistocene fault F-10 may have significantly offset the buried bedrock surface, with vertical displacements of about 10 feet and 30 feet, respectively. Correlation of the buried bedrock (Tvb) surface encountered in core borings B-2 through B-7 (Figure 7) indicates the buried bedrock surface is not significantly offset by the Pleistocene-age faults F-1 through F-9. Furthermore, apparent correlation of fluvial layers observed in FT-1, B-4, with B-2 north of Site 1, as illustrated in Figure 10, also suggest no significant faulting has offset the Qoal and buried Tvb surface, within at least ~25 feet north of Site 1. If any faulting has occurred within this "grayed zone" shown in Figure 10, it is likely to be similar to the minor Pleistocene faults observed in the trenches excavated for this investigation. North of B-2 (between B-2 and B-1), lack of continuity between Qoal stratigraphy and the buried Tvb surface may be evidence of more significant faulting. However, this apparent discontinuity may be a result any number of geological depositional processes, including but not limited to erosion, or channeling. Therefore, the data north of B-2 is considered indeterminant of fault activity at this time.

8.1 8.1 History of Faulting

Our findings indicate evidence of fault inactivity in at least the last 120,000 years below Site 1 and Site 2, as exposed in fault trenches excavated across the site. Prior to 120,000 years ago, there is evidence of at least three episodes of pre-Holocene, Pleistocene fault rupture below Site 1 and Site 2. Including:

1) pre-Holocene faulting following deposition of Qofl, terminating before or during the initiation of Qodf subunit deposition;
2) pre-Holocene faulting after deposition of Qofl and Qodf, terminating prior to the 200,000 year old gross soil development capping Qodf; and
3) pre-Holocene faulting after deposition of Qofl and Qodf and initiation of soil horizon Bt2 development; terminating prior to the 120,000 year old secondary calcic development within the soil horizon.

The evaluation of the age of most recent faulting exposed within FT-1, FT-2, and FT-3 was performed by paleoseismic specialist, Dr. Thomas Rockwell. His evaluation and findings are presented in Appendix C. In brief summary his evaluation estimates the faulting observed in the trenches is at least pre-Holocene in age and likely inactive over the last 120,000 years.

9.0 CONCLUSIONS AND RECOMMENDATIONS

The Hollywood fault is established by regulatory agencies and some scientific publications as a significant Holocene-active fault with measurable offset in bedrock contacts and alluvial stratigraphy. Significant seismicity should be anticipated at the site in the event of an earthquake on the Hollywood fault or nearby regional faults. However, fault investigations throughout this localized Hollywood area have encountered evidence of Holocene-fault inactivity (GDC, 2015, 2016).

Fault trenching at Site 1 and Site 2 exposed un-faulted pre-Holocene soil horizons estimated to be at least 120,000 and 200,000 years old. A series of minor pre-Holocene faults exposed within the trenches below the soil horizons exhibited possibly three episodes of Pleistocene left-lateral strike-slip rupture, most of which does not appear to significantly offset the buried bedrock surface below.

The fault trenching extended from 1-foot south of the north property line of Site 1, south across Site 1 and Site 2 as shown in Plate 1. Due to developments north of Site 1, including city sidewalks and Right of Way, trenching was not feasible and a transect of CPT's and core borings were performed to extend the fault investigation north 50 feet of Site 1. Evaluation of the core data in correlation with fault trench data demonstrate similar stratigraphic conditions at least ~25 feet north of the Site 1 northern property line. Data ~25 feet north to 50 feet north of Site 1 is considered indeterminant of fault activity at this time.

The potential hazard of surface fault rupture at Site 1 is considered low according to the evaluation guidelines presented in Special Publication 42 (2018), Note 42, and City of Los Angeles P/BC 2017-129. We recommend new development within the APEFZ at Site 1 and Site 2 not be restricted, as shown in Figure 11. However, without further investigation within the undetermined 'red zone' (Figure 10), any future planned new buildings which encroach within the northern 25 feet of Site 1 should be developed with consideration of undetermined fault activity at least 25 feet north outside of the Site 1 property line. New buildings constructed may require special reinforcements and foundations. The zone of recommended conditional redevelopment is illustrated in Figure 11. The limits of the zone are controlled by 1) the inconclusive data of this investigation 25 feet north of Site 1 and 2) the orientation of the Hollywood fault trace as mapped by CGS FER 256 (Figure 2), as this possible fault trace exhibits geomorphologic evidence of potential Holocene-activity.

Setback zones established in a previous GDC 2015 report were a result of lack of data at neighboring properties, including Site 1 and 1718 Vine Street at the time of the 2015 report. Evidence of no Holocene-active faults below Site 1 and Site 2, presented in this report, supersedes the previously recommended setback zone at Site 2 (GDC, 2015; report Approval Log # 87496R). As such, we recommend the Site 2 building setback be removed, as illustrated in Figure 11, and redevelopment not be restricted under APEFZ regulation. Additionally, evidence of no Holocene- active faults below 1718 Vine Street, presented in GDC 2016 report, supersedes the previously recommended setback zone at Site 3 (GDC, 2015; report Approval Log #94232). As such, we also recommend the Site 3 building setback be removed, as illustrated in Figure 11 and redevelopment not be restricted under APEFZ regulation.

Lastly, in recognition of the limitations of surface fault rupture evaluations performed at a site with limited access, a certified engineering geologist should observe and document all excavations for new development, once construction has begun.

10.0 LIMITATIONS

This report was performed in accordance with generally accepted engineering and geologic principles and practice. The professional engineering and geologic work and judgments presented in this report meet the standard of care of our profession at this time. No other warranty, expressed or implied, is made. This report has been prepared for Mayer Brown and their consultants. It may not contain sufficient information for other parties or other purposes and should not be used for other projects or other purposes without review and approval by GDC.

11.0 REFERENCES

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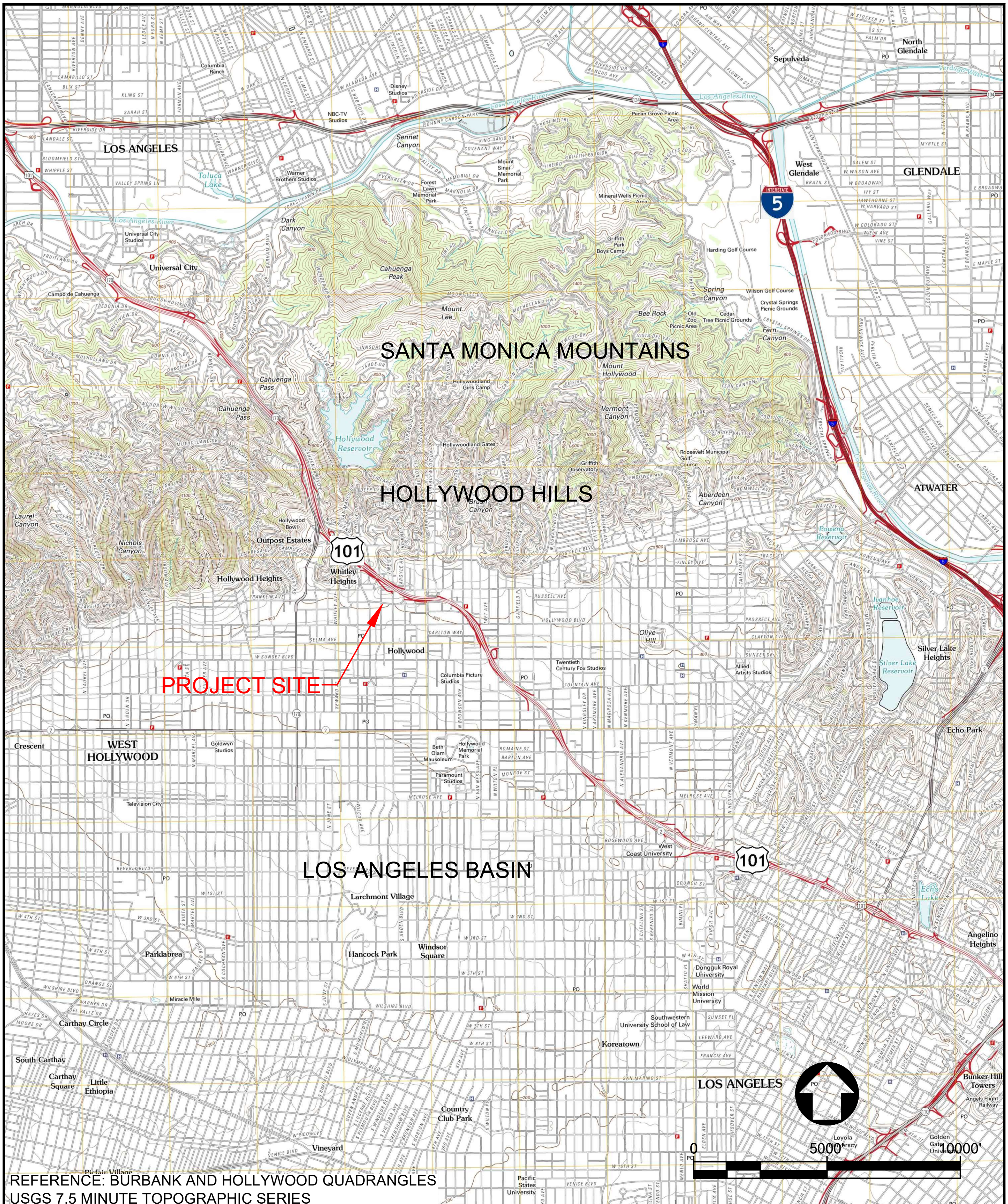

DATE: 07/15/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	SITE LOCATION	PROJECT NUMBER: LA-1301A
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: -		6334 YUCCA STREET	SCALE: AS SHOWN
FINAL	REVIEWED BY: MR		LOS ANGELES, CALIFORNIA	FIGURE NUMBER: 1

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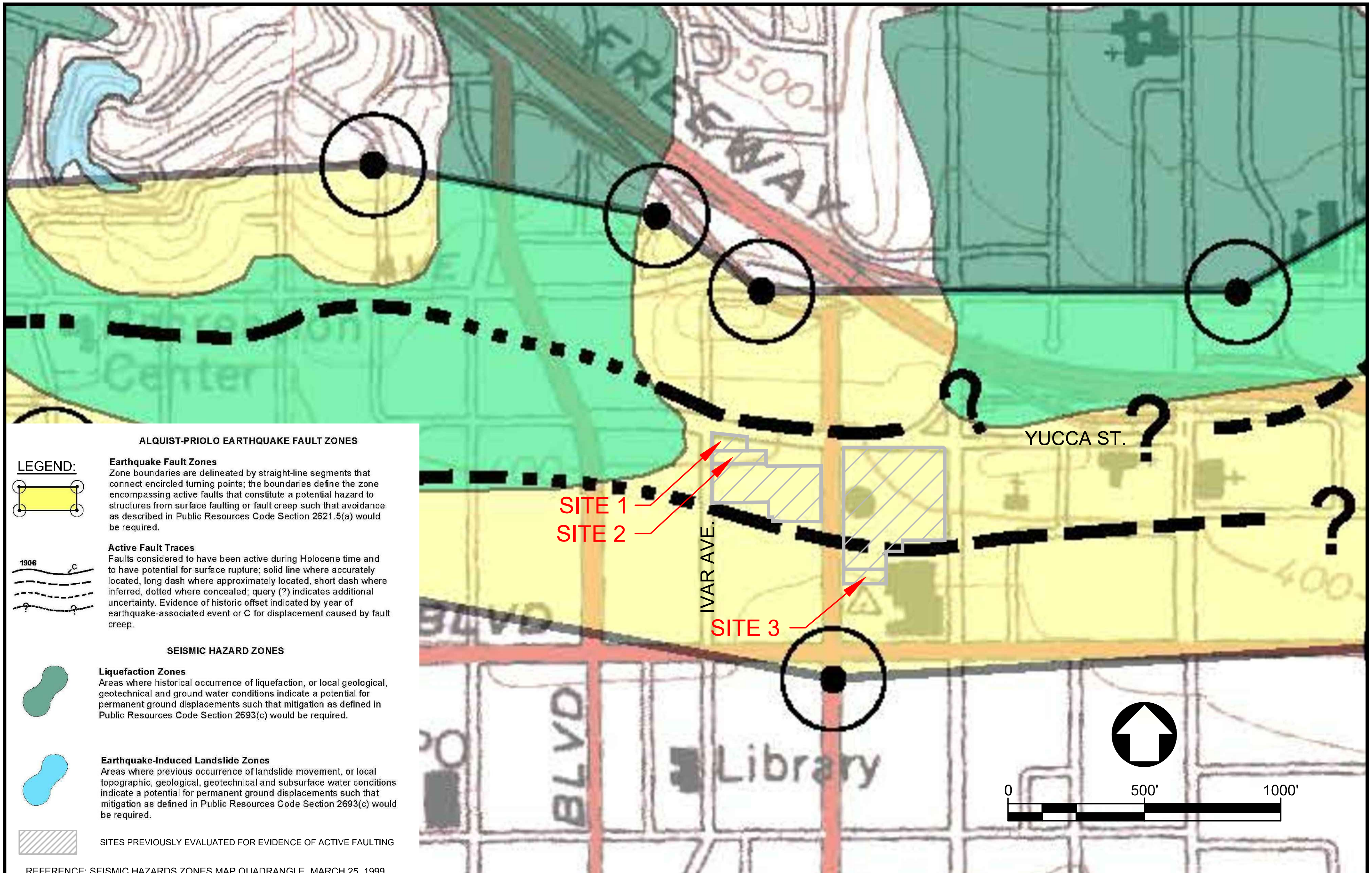

DATE: 07/15/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	EARTHQUAKE ZONES OF REQUIRED INVESTIGATION	PROJECT NUMBER: LA-1301A
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: -		6334 YUCCA STREET LOS ANGELES, CALIFORNIA	SCALE: AS SHOWN
FINAL	REVIEWED BY: MR			FIGURE NUMBER: 2

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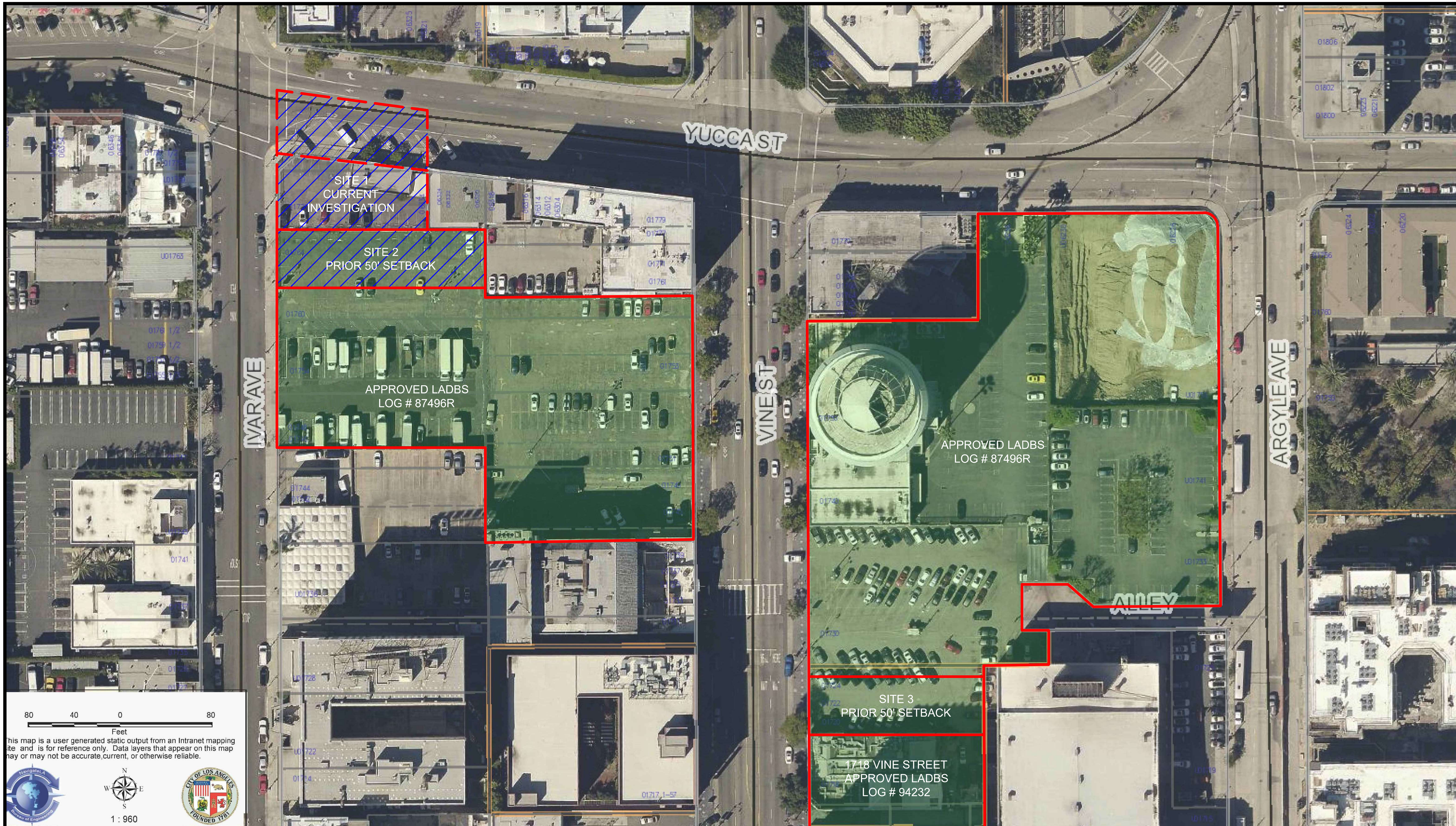

REFERENCE: NAVIGATE LA

SITES PREVIOUSLY CLEARED OF ACTIVE FAULTING (GDC, 2015 AND 2016)

CURRENT INVESTIGATION

DATE: 07/15/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC	PROJECT SITE MAP
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: -	370 Amapola Ave. Suite 212 Torrance, CA. 90501	6334 YUCCA STREET LOS ANGELES, CALIFORNIA
FINAL	REVIEWED BY: MR		

PROJECT NUMBER: LA-1301A
SCALE: AS SHOWN
FIGURE NUMBER: 3

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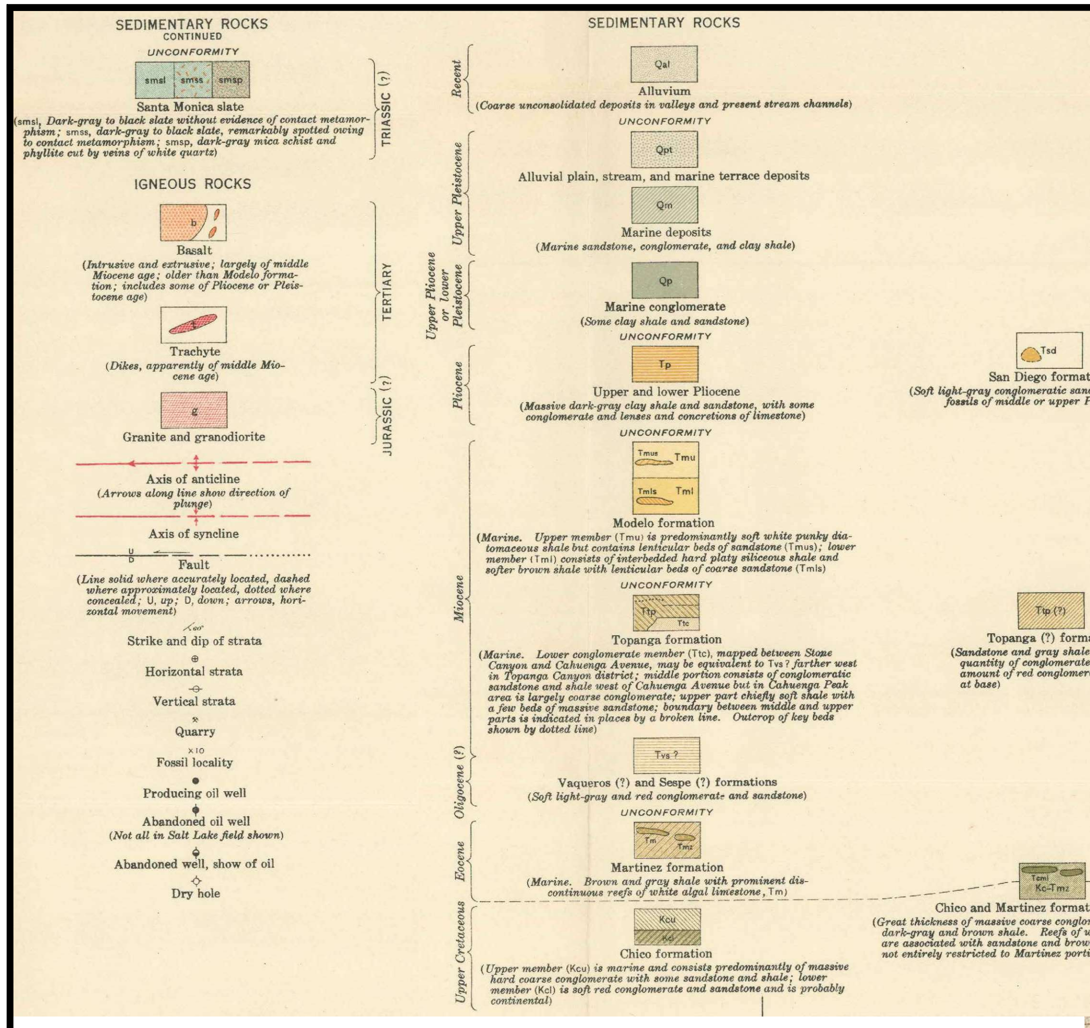

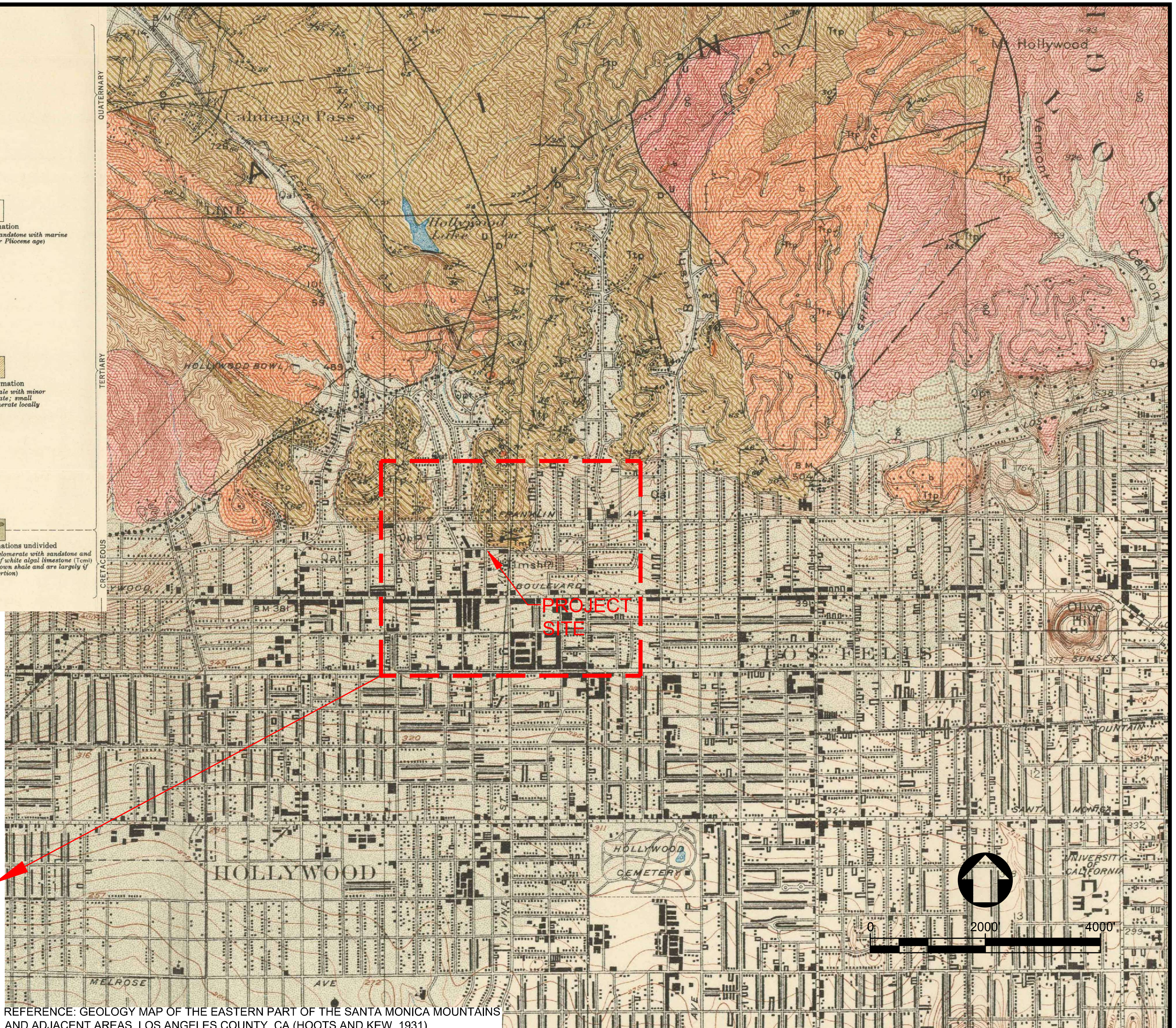

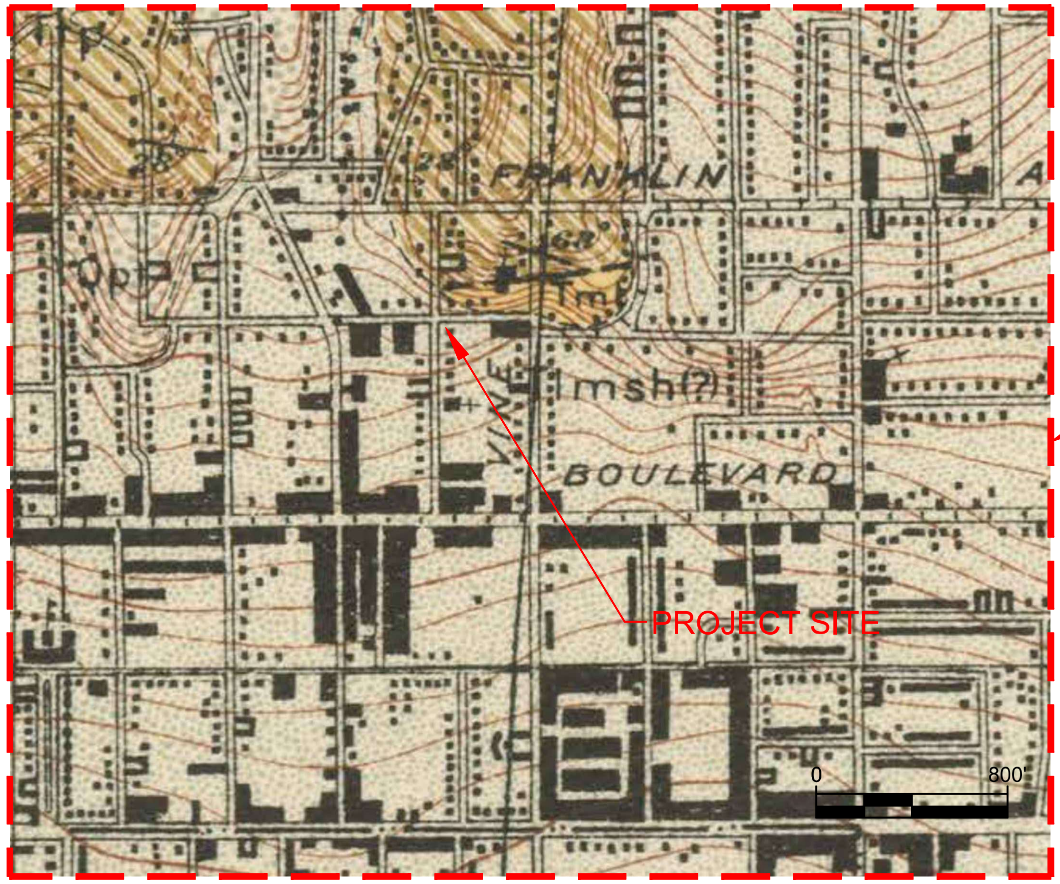

REFERENCE: GEOLOGY MAP OF THE EASTERN PART OF THE SANTA MONICA MOUNTAINS AND ADJACENT AREAS, LOS ANGELES COUNTY, CA (HOOTS AND KEW, 1931)

DATE: 07/15/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	HISTORICAL TOPOGRAPHIC-GEOLOGIC MAP HOOTS & KEW 1931
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: -		6334 YUCCA STREET LOS ANGELES, CALIFORNIA
FINAL	REVIEWED BY: MR		

PROJECT NUMBER: LA-1301A
SCALE: AS SHOWN
FIGURE NUMBER: 4

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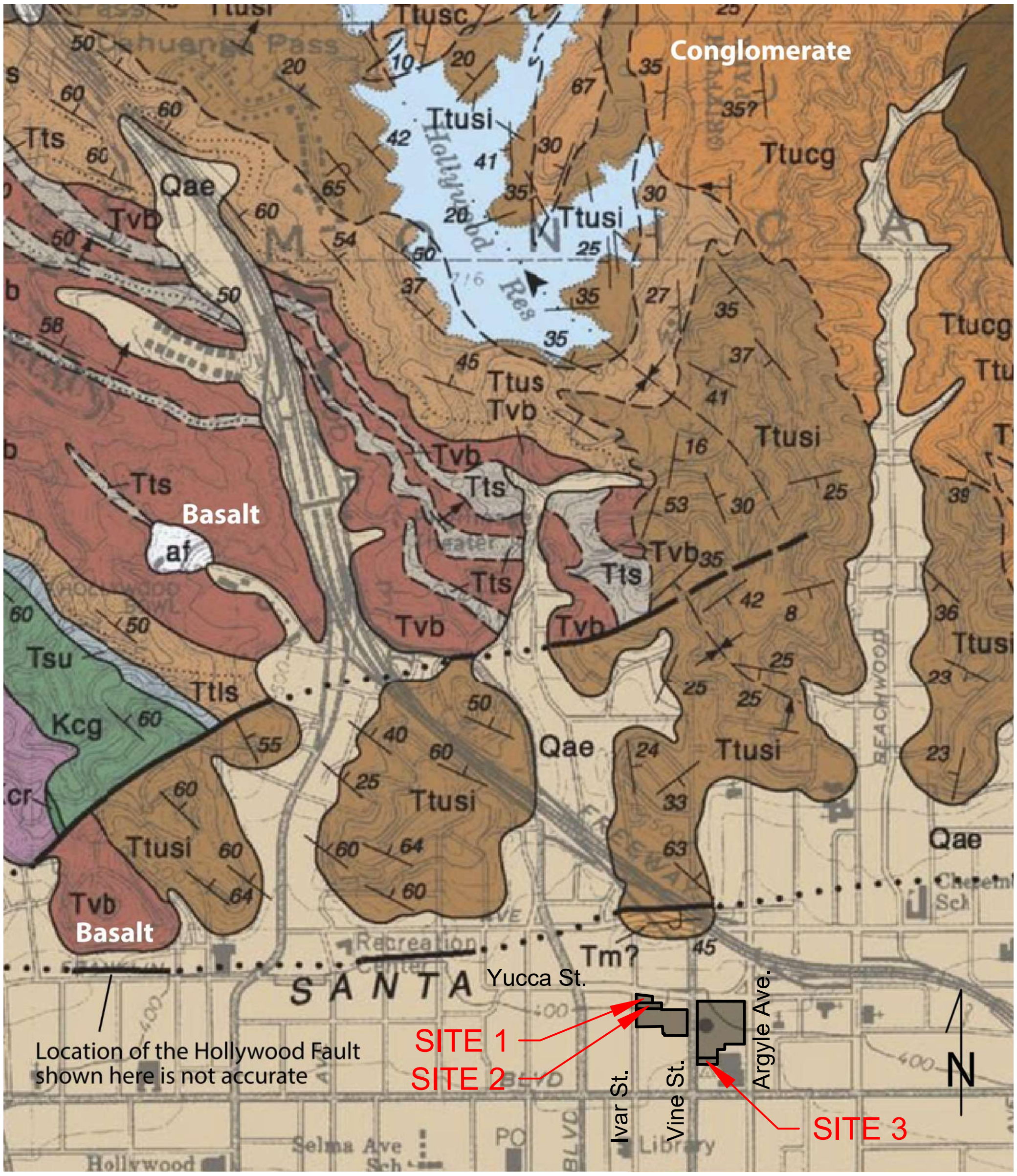

LEGEND

Tvb	Tertiary volcanic basalts
Ttusi	Tertiary Topanga Formation - Gray micaceous clay shale or claystone member
Ttucg	Tertiary Topanga Formation - Cahunga Conglomerate member

0 2000' 4000'

DATE: 07/15/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	GEOLOGY MAP DIBBLEE & EHRENSPECK 1991	PROJECT NUMBER: LA-1301A
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: -		6334 YUCCA STREET LOS ANGELES, CALIFORNIA	SCALE: AS SHOWN
FINAL				FIGURE NUMBER: 5

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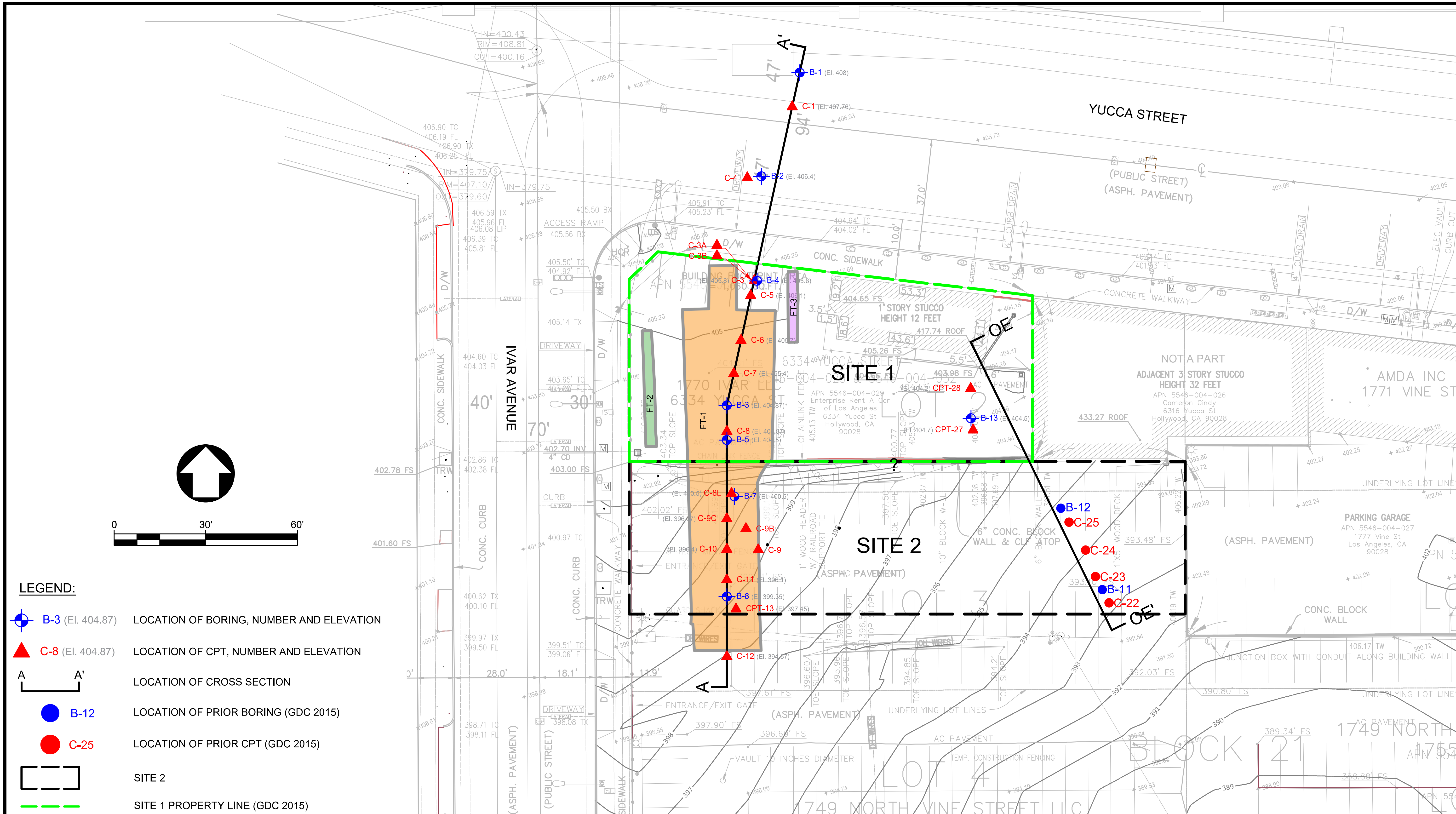

LEGEND:

B-3 (El. 404.87)	LOCATION OF BORING, NUMBER AND ELEVATION
C-8 (El. 404.87)	LOCATION OF CPT, NUMBER AND ELEVATION
A — A'	LOCATION OF CROSS SECTION
B-12	LOCATION OF PRIOR BORING (GDC 2015)
C-25	LOCATION OF PRIOR CPT (GDC 2015)
(black dashed box)	SITE 2
(green dashed line)	SITE 1 PROPERTY LINE (GDC 2015)
FT-1	LOCATION OF EXPLORATORY FAULT TRENCH WITH DESIGNATION NUMBER

REFERENCE: BASE MAP PREPARED BY PSOMAS, DATED JUNE 6, 2017; EXPLORATION ELEVATIONS SURVEYED RELATIVE ESTIMATED El. 408 AT B-1 FROM NAVIGATE LA 2006 SURVEY DATA

DATE: 07/15/2019	DRAWN BY: JMT	GROUP DELTA	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	SITE EXPLORATION MAP	PROJECT NUMBER: LA1301A
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: MS			6334 YUCCA STREET LOS ANGELES, CALIFORNIA	SCALE: AS SHOWN
FINAL					FIGURE NUMBER: 6

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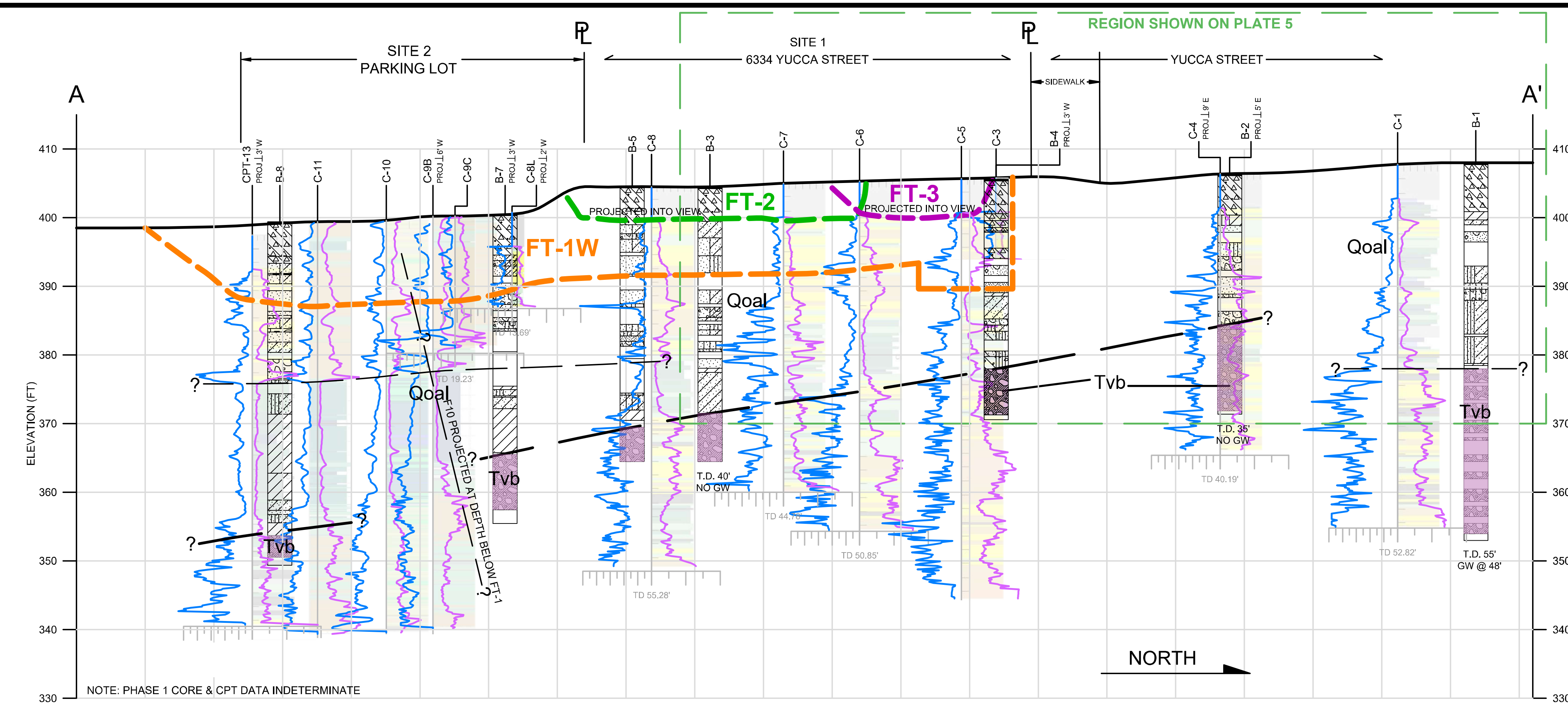

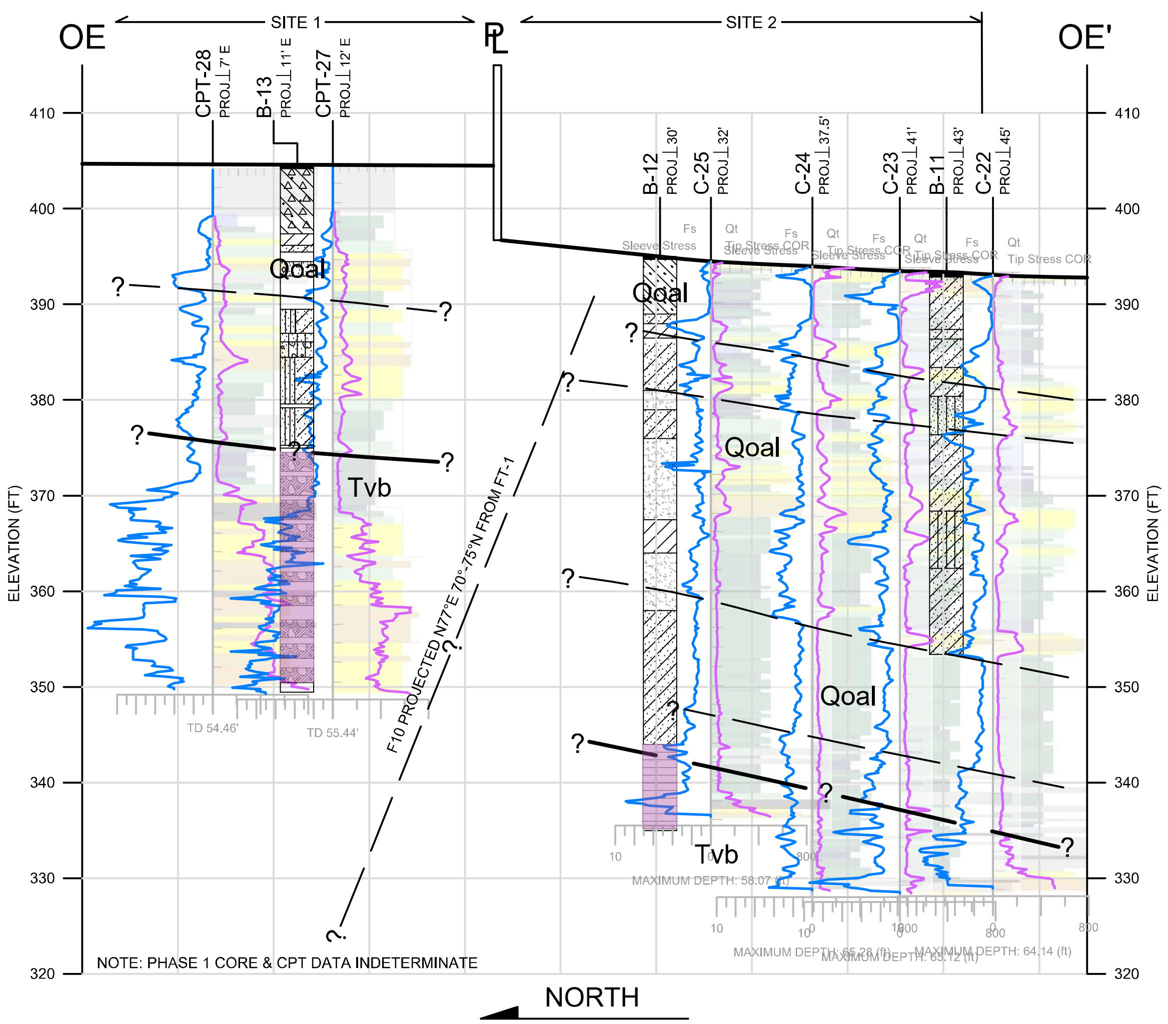

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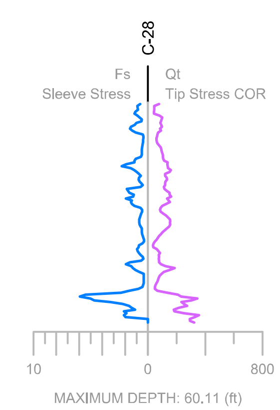
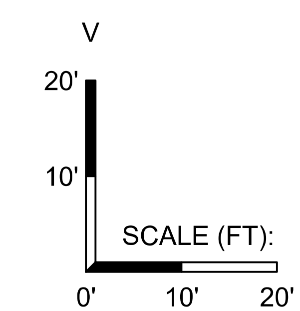


KEY:

af	ARTIFICIAL FILL
Qoal	OLDER ALLUVIAL DEPOSITS
Tvb	TOPANGA FORMATION - BASALT
——— ———	APPROXIMATE GEOLOGIC UNIT CONTACT, QUERIED WHERE UNCONFINED
— —?— —	STRATIGRAPHIC LAYER CONTACTS
— — — —?	INTERPRETED F10 FAULT PROJECTION



DATE: 07/16/2019	DRAWN BY: MK/JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	PROFILE A-A' AND OE-OE'	PROJECT NUMBER: LA-1301A
REVIEWED BY: JS,MR	PREPARED BY: MS,MK		6334 YUCCA STREET LOS ANGELES, CALIFORNIA	SCALE: AS SHOWN
FINAL				FIGURE NUMBER: 7

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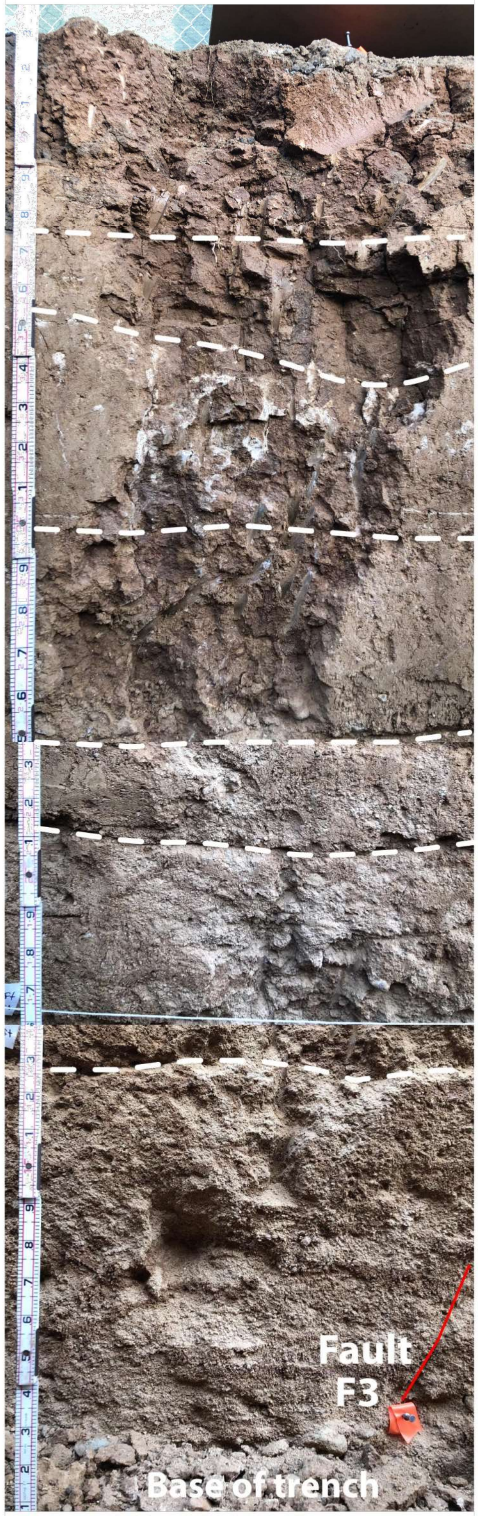
Trench FT-3E Station 5



Surface

Bt1

Bt2 (upper)

Bt2k

Bt2 (upper)

Bt2/BC

BC/Qodf with Bt-lams

Qodf with Bt-lams

Minimum age estimate for soil profile development is 200,000 years (Rockwell Consulting, 2018)

DATE: 07/15/2019	DRAWN BY: MDK & JMT	GROUP DELTA CONSULTANTS, INC	SOIL PROFILE PHOTOGRAPHIC SECTION TRENCH FT-3E STATION 5	PROJECT NUMBER: LA-1301A
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: -	370 Amapola Ave. Suite 212 Torrance, CA. 90501	6334 YUCCA STREET LOS ANGELES, CALIFORNIA	SCALE: NOT TO SCALE
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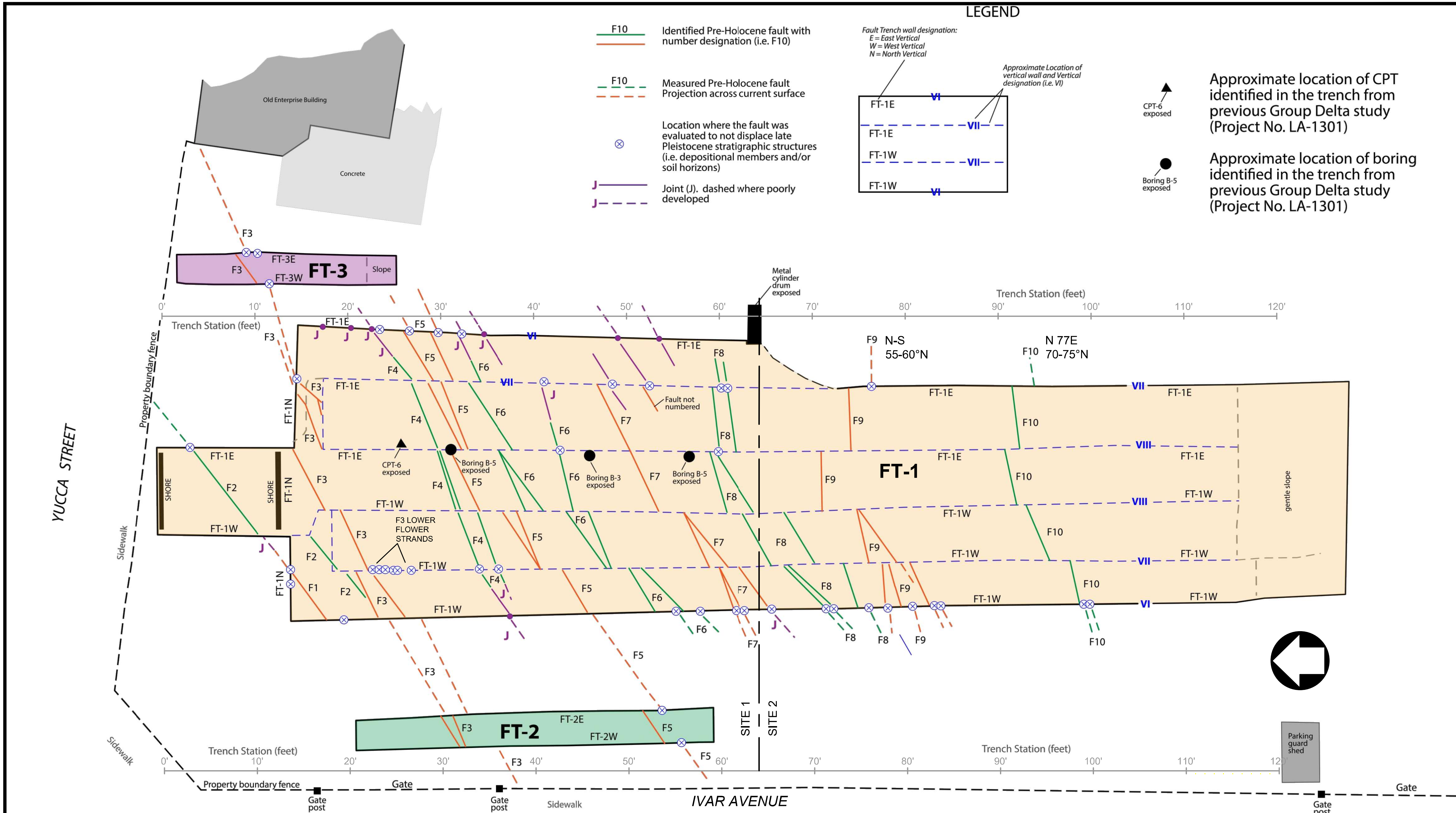

NOTE: ALL TRENCHES REVIEWED BY CITY OF LA GEOLOGICAL REVIEWER AND CGS GEOLOGICAL REPRESENTATIVES

DATE: 07/18/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	FT-1, FT-2 & FT-3 TRENCH PLAN VIEW MAP
REVIEWED BY: JS,MR	PREPARED BY: MS,MK		6334 YUCCA STREET LOS ANGELES, CALIFORNIA
FINAL			

PROJECT NUMBER:	LA-1301A
SCALE:	AS SHOWN
FIGURE NUMBER:	9.1

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LEGEND:

- B-3 (El. 404.87) — LOCATION OF BORING, NUMBER AND ELEVATION
- C-8 (El. 404.87) — LOCATION OF CPT, NUMBER AND ELEVATION
- A — A' — LOCATION OF CROSS SECTION
- B-12 — LOCATION OF PRIOR BORING (GDC 2015)
- C-25 — LOCATION OF PRIOR CPT (GDC 2015)
- SITE 2
- SITE 1 PROPERTY LINE (GDC 2015)
- FT-1 — LOCATION OF EXPLORATORY FAULT TRENCH WITH DESIGNATION NUMBER
- . . . . . . ? — F10 BURIED PROJECTION TO OE-OE'
- F10 — Identified Pre-Holocene fault with number designation (i.e. F10)
- F10 (dashed) — Measured Pre-Holocene fault Projection across current surface
- ⊗ — Location where the fault was evaluated to not displace late Pleistocene stratigraphic structures (i.e. depositional members and/or soil horizons)
- J — Joint (J). dashed where poorly developed

Fault Trench wall designation:
E = East Vertical
W = West Vertical
N = North Vertical

Approximate Location of vertical wall and Vertical designation (i.e. VI)

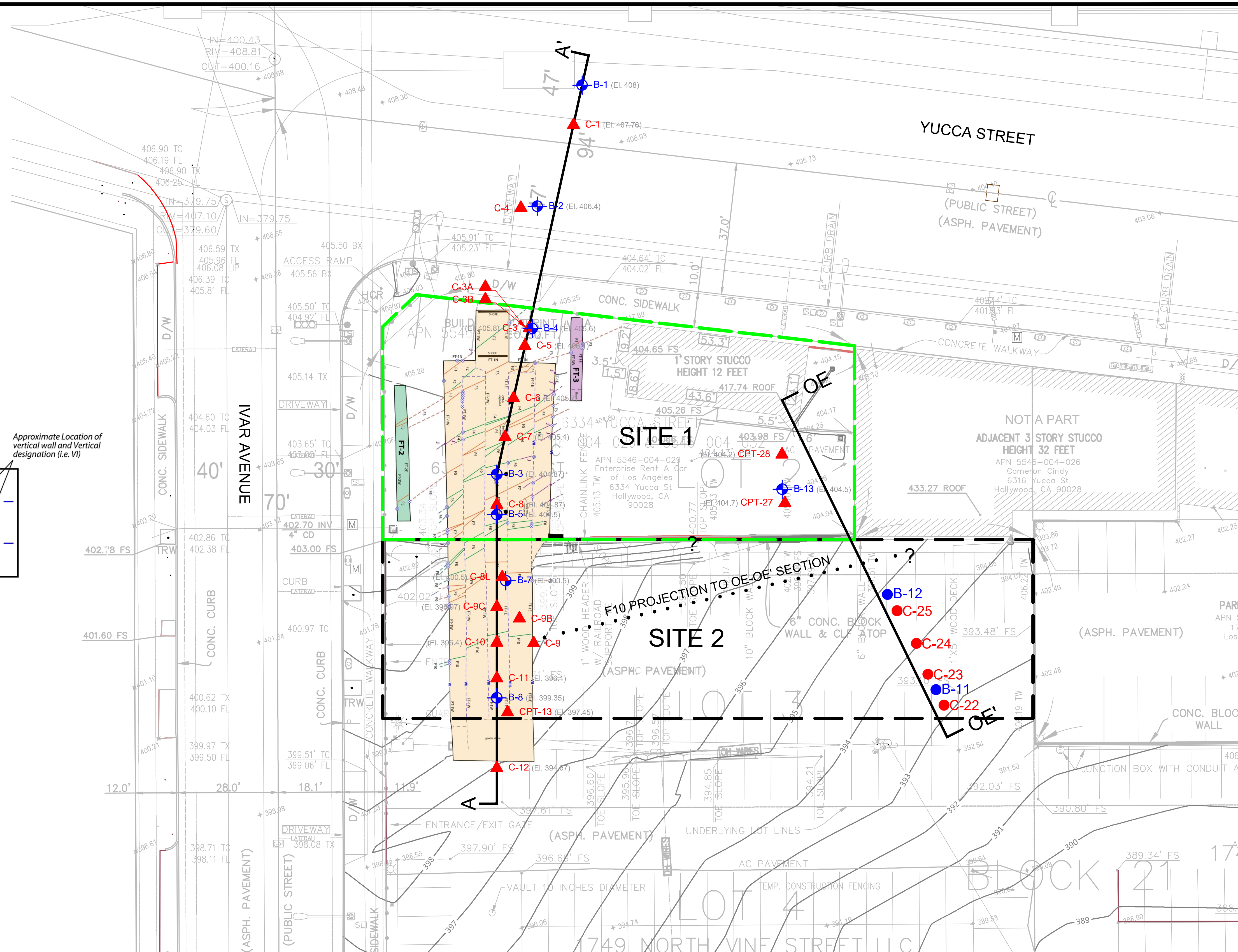
FT-1E VI
FT-1E VII
FT-1W VII
FT-1W VI

CPT-6 exposed — Approximate location of CPT identified in the trench from previous Group Delta study (Project No. LA-1301)

Boring B-5 exposed — Approximate location of boring identified in the trench from previous Group Delta study (Project No. LA-1301)

0 30' 60'

REFERENCE: BASE MAP PREPARED BY PSOMAS, DATED JUNE 6, 2017; EXPLORATION ELEVATIONS SURVEYED RELATIVE ESTIMATED El. 408 AT B-1 FROM NAVIGATE LA 2006 SURVEY DATA



DATE: 07/18/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	TRENCH DATA SITE PLAN VIEW	PROJECT NUMBER: LA1301A
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: MS		6334 YUCCA STREET LOS ANGELES, CALIFORNIA	SCALE: AS SHOWN
FINAL	-			FIGURE NUMBER: 9.2

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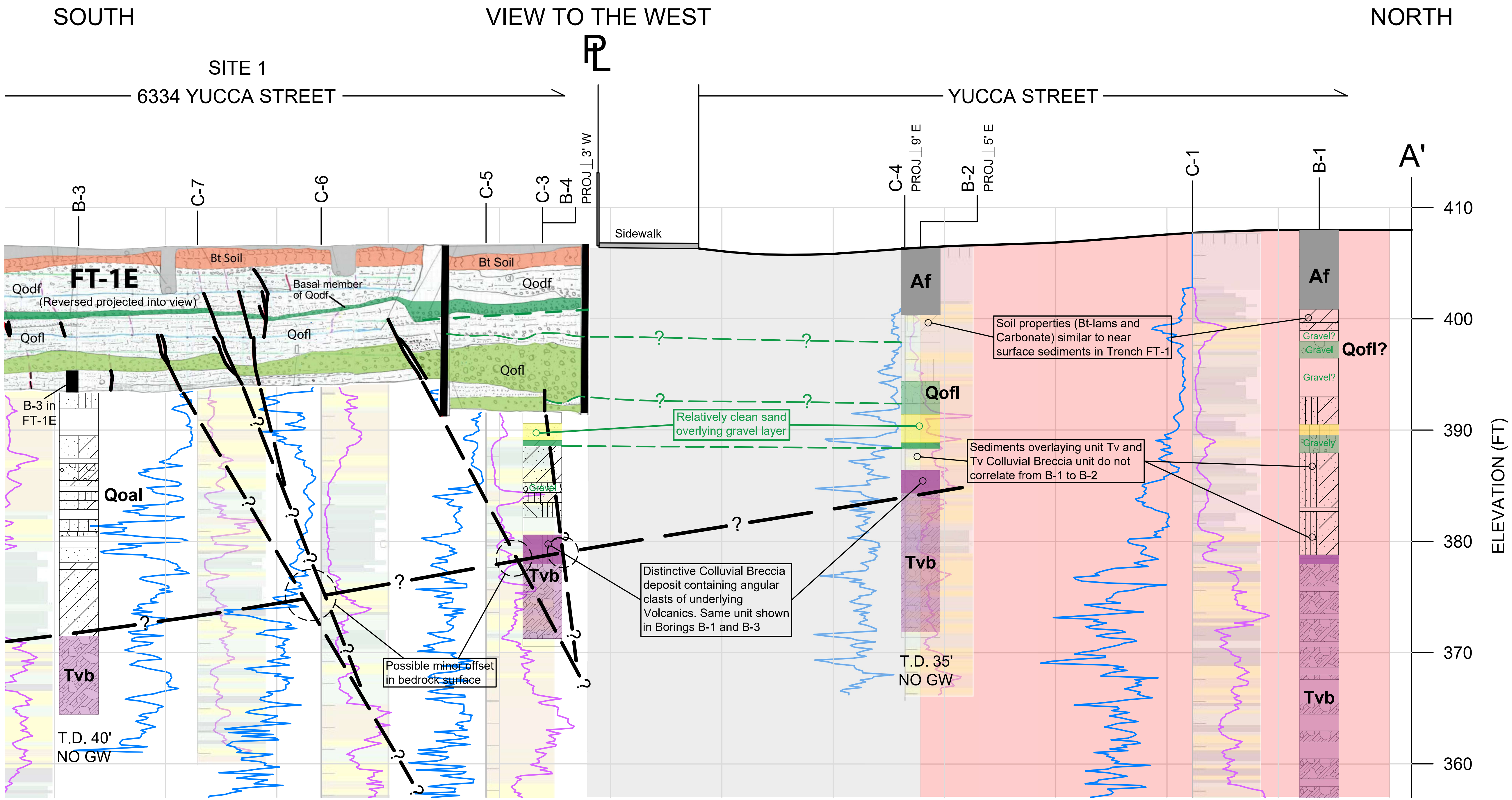


LEGEND FOR PROFILES A-A'
(CURRENT STUDY)

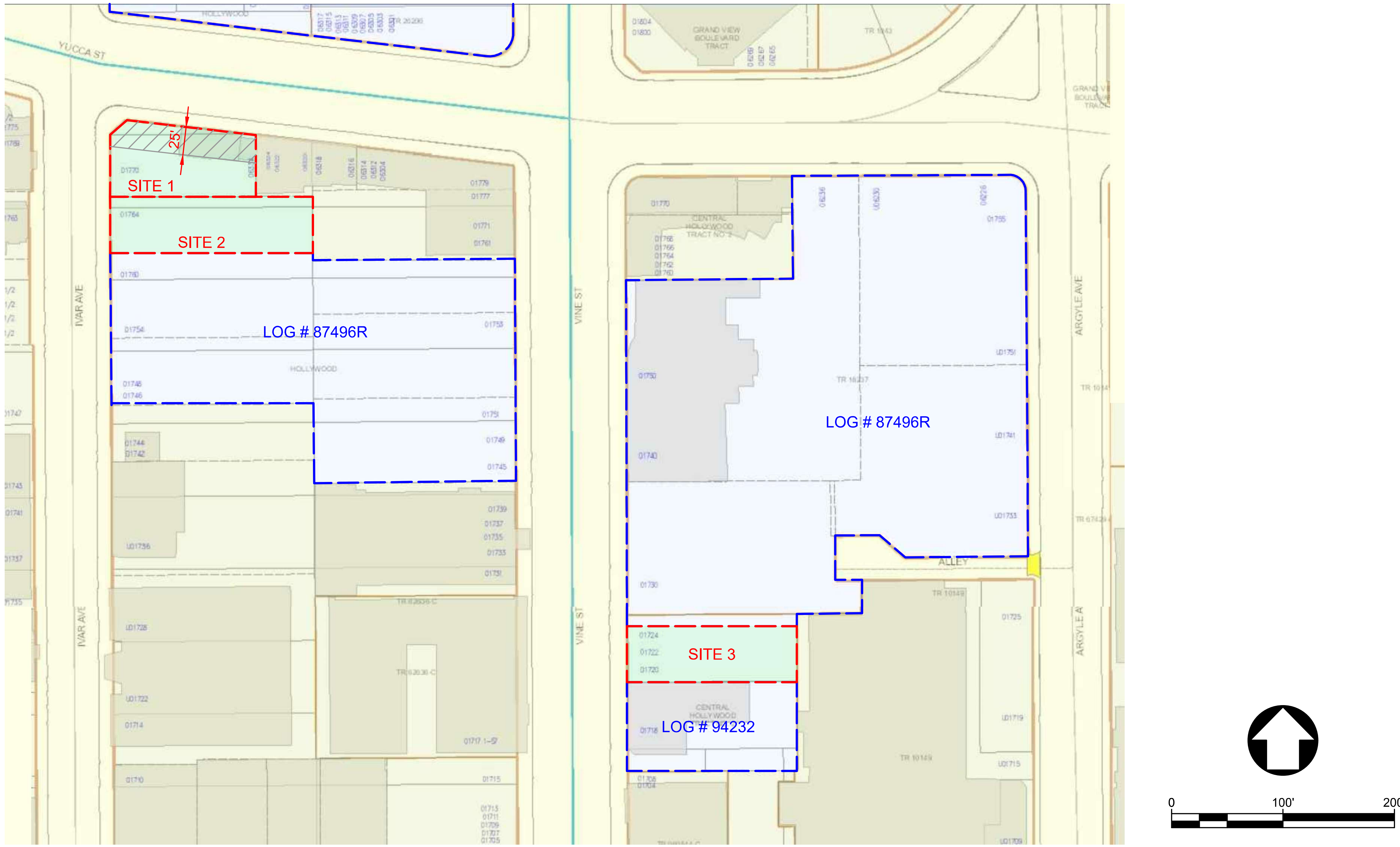
Qoal	QUATERNARY OLDER ALLUVIUM
Qodf	QUATERNARY OLDER DEBRIS FLOW
Qofl	QUATERNARY OLDER FLUVIAL DEPOSITS (MEMBER OF Qoal IN GDC 2015 REPORT)
Tvb	TOPANGA FORMATION
(dashed line)	TERTIARY GEOLOGIC CONTACT BASED ON THE EVALUATION OF CPT AND BORING DATA
(bold dashed line)	APPROXIMATE LOCATION OF EVALUATED PRE-HOLOCENE FAULT SUB TRENCH PROJECTION LOOSELY INTERPRETED

ZONE LIKELY CONTAINING PRE-HOLOCENE FAULTS SIMILAR TO OBSERVATIONS IN TRENCHES

UNDETERMINED ZONE; INCONCLUSIVE DATA

DATE: 07/15/2019	DRAWN BY: MK/JMT	GROUP DELTA CONSULTANTS, INC	PROFILE A-A' NORTH END EXPANDED	PROJECT NUMBER: LA-1301A
REVIEWED BY: MS,JS,MR	PREPARED BY: MK	370 Amapola Ave. Suite 212 Torrance, CA. 90501	6334 YUCCA STREET LOS ANGELES, CALIFORNIA	SCALE: AS SHOWN
FINAL				FIGURE NUMBER: 10

N:\Projects\1300-1399\LA-1301A 6334 Yucca St Fault Trench\Dwg\LA-1301A Figure 7_10.dwg, 7/15/2019 7:19:02 AM, DWG To PDF.pc3



REFERENCE: BASE MAP FROM NAVIGATE LA, LAND BASE DATA PARCELS, ACCESS 8/8/18

LEGEND:

- AP EARTHQUAKE FAULT ZONE UNDETERMINED FOR REDEVELOPMENT
- EARTHQUAKE FAULT ZONE RECOMMENDED TO BE CLEARED FOR REDEVELOPMENT
- PROJECT SITE BOUNDARY
- EARTHQUAKE FAULT ZONE RECOMMENDED FOR CONDITIONAL REDEVELOPMENT
- EARTHQUAKE FAULT ZONE PREVIOUSLY APPROVED FOR REDEVELOPMENT

DATE: 07/15/2019	DRAWN BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	RECOMMENDATION PLAN	PROJECT NUMBER: LA-1301A
REVIEWED BY: MS,JS,MK,MR	APPROVED BY: -		HOLLYWOOD CENTER 6334 YUCCA STREET AND VINE STREET, LOS ANGELES, CALIFORNIA	SCALE: AS SHOWN
FINAL				FIGURE NUMBER: 11

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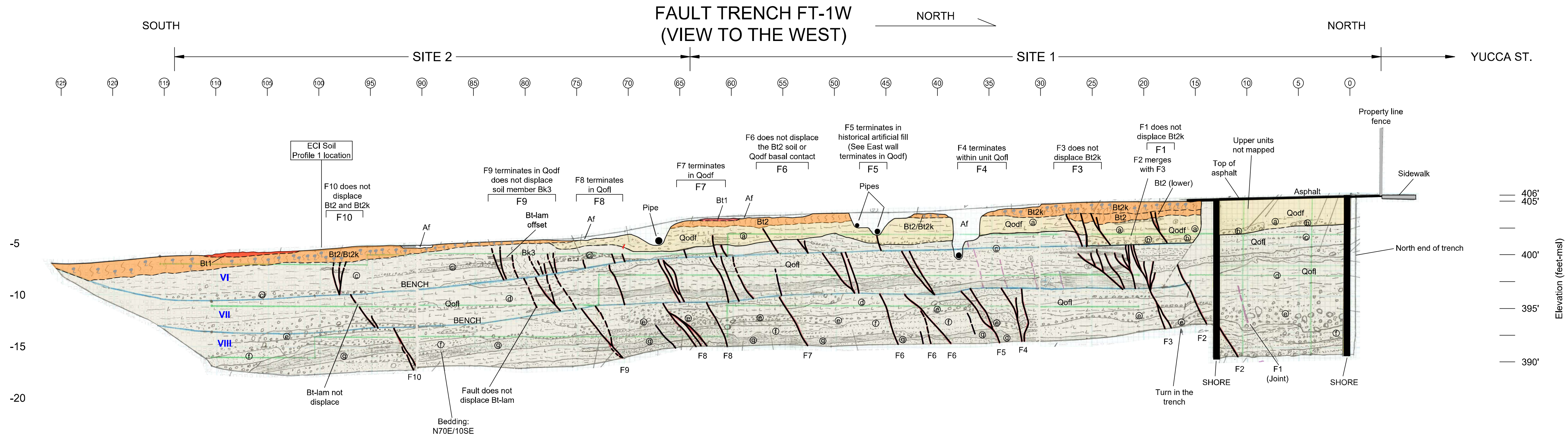

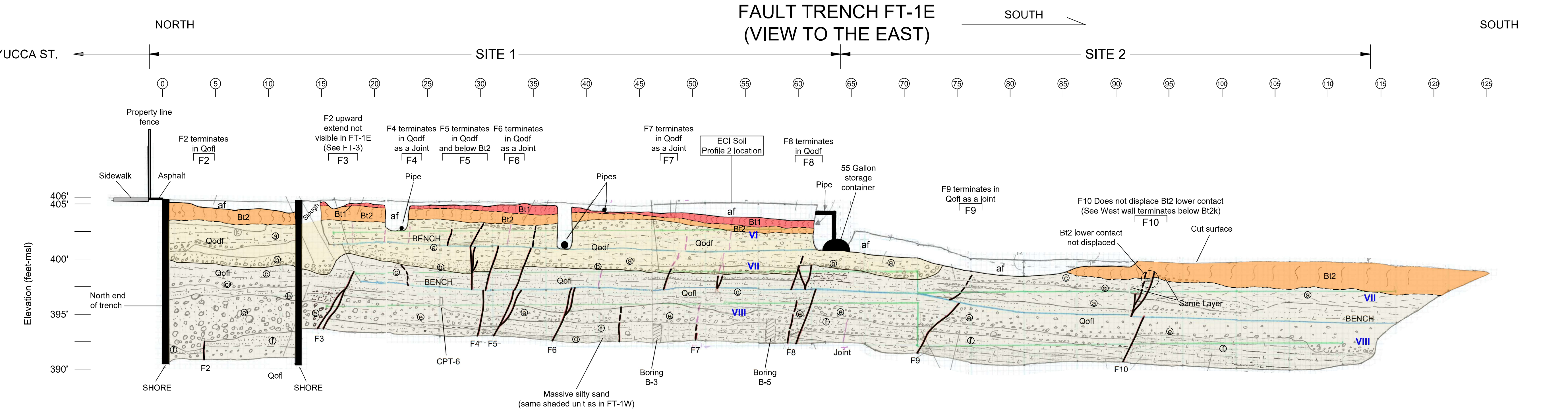

Units

af	Artificial Fill – Silty to Clayey Sand, reddish brown, fine to very coarse grained, some gravel and trace cobbles
Bt1	Upper soil horizon - Sandy-Clayey Silt, moist, massive fine to medium grained, soil development
Bt2-Bt2K	Lower soil horizon - massive fine to medium grained, sandy silt with soil development, Bt2k soil horizon has developed secondary carbonate stringers and nodules
Bt3	Lower soil horizon - less well developed, observed in isolated areas.
BC	Mineral Horizon
Qodf	Old Debris Flow Deposit – Matrix supported sands with lesser interfingering channel deposits
a	Silty Sand - dark reddish brown (2.5YR 3/3), massive, secondary Bt lam development throughout, gradational upper and lower contacts, trace fine to coarse gravels, some grussified.
b	Basel gravel layer – reddish brown (2.5YR 4/4m), clayey to silty sand with gravel, subrounded to rounded, grussified granitic clasts, moderately sharp lower contact
Qofl	Old Fluvial Deposits – Moderately to well bedded sands and silty sands with interfingering channel deposits
c	Sand and Silty Sand - reddish brown (2.5YR 4/4), slightly clayey, coarse to very coarse-grained sand, trace gravel and cobbles, moderately to well bedded, secondary Bt lam development throughout, sharp upper contact, ci – interfingering gravel layers, basal gravel to deposition sequence
d	Silty to Clayey Sand – reddish brown (2.5YR 4/4), moderately well bedded (1.5 to 8" thick), some thin interbedded sand lenses, secondary Bt lam development throughout, lower contact with conglomerate is narrowly gradational
e	Conglomerate - reddish brown (2.5YR 4/4), silty sand matrix, scattered boulders up to 1.5' in dia., rounded cobbles, 2-6" in dia. common, moderately to well-rounded gravel, weakly coated with secondary carbonate
f	Sand - reddish brown (5YR 4/4), minor silt, medium to coarse grained, scattered small gravel, well bedded, Bt lams throughout
g	Silty Sand - massive

Symbols

- Pre-Holocene Fault, dashed where plane becomes indistinct
- Joint
- Secondary Bt Lam Development within the layer
- Geologic Unit Contact, sharp where solid, gradational where dashed
- Krotovina
- Pedogenic Development
- Secondary Carbonate
- VII Trench Bench Vertical Designation
- Location of Trench Bench
- Location of Level Line

SCALE (FT): V 5' 2.5' H 0' 2.5' 5'

NOTE: ALL TRENCHES REVIEWED BY CITY OF LA GEOLOGICAL REVIEWER AND CGS GEOLOGICAL REPRESENTATIVE

DATE: 07/18/2019	DRAFTED BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	TRENCH LOGS FT-1W AND FT-1E 6334 YUCCA STREET LOS ANGELES, CALIFORNIA
REVIEWED BY: MS,JS,MR	PREPARED BY: MK		PROJECT NUMBER: LA-1301A
FINAL			SCALE: AS SHOWN
			PLATE NUMBER: 1

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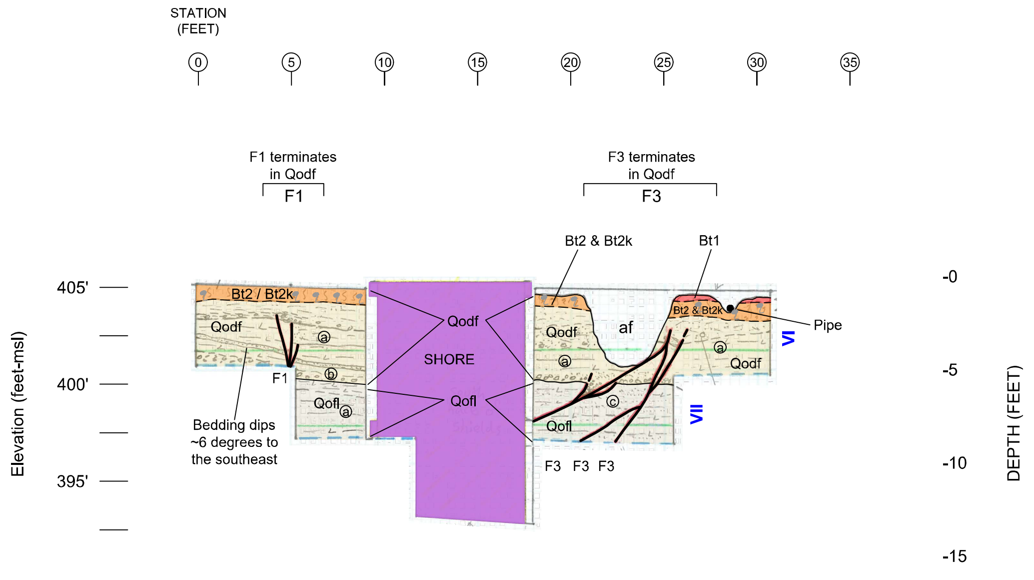
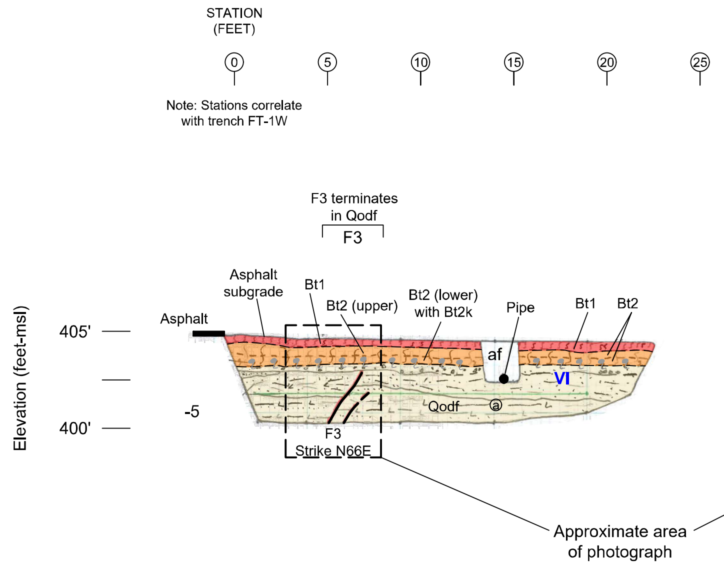
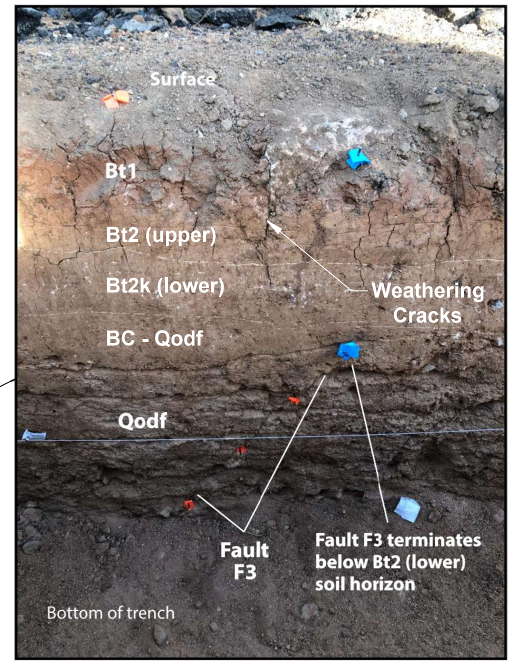
FAULT TRENCH FT-1N
(VIEW TO THE NORTH)

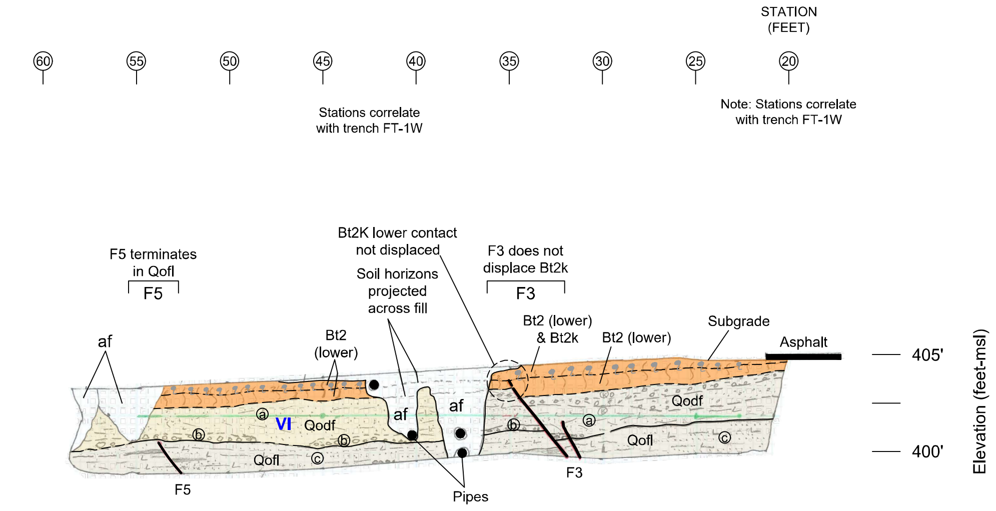


FAULT TRENCH FT-3E
(VIEW TO THE EAST)

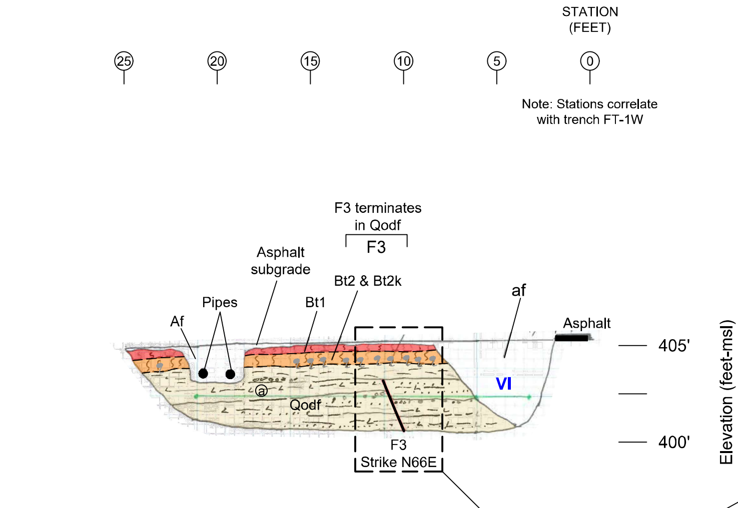




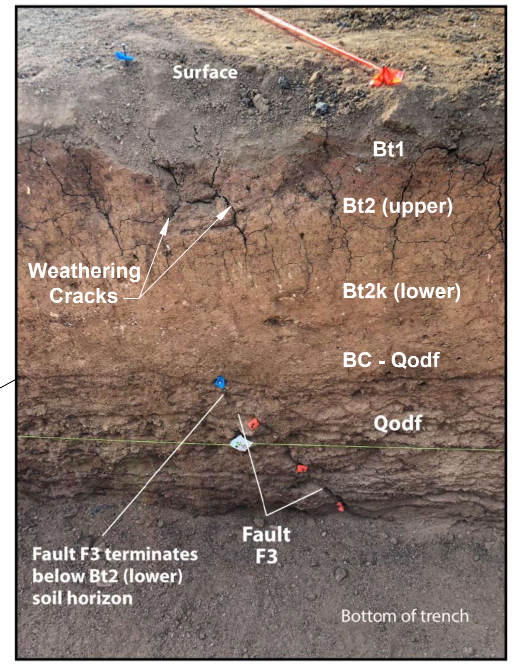
FAULT TRENCH FT-2W
(VIEW TO THE WEST)



FAULT TRENCH FT-3W
(VIEW TO THE WEST)



Note: Dr. Thomas Rockwell performed a composite soil profile description in FT-3



Units

af — Artificial Fill – Silty to Clayey Sand, reddish brown, fine to very coarse grained, some gravel and trace cobbles

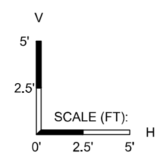
Bt1 — Upper soil horizon - Sandy-Clayey Silt, moist, massive fine to medium grained, soil development
Bt2-Bt2K — Lower soil horizon - massive fine to medium grained, sandy silt with soil development, Bt2k soil horizon has developed secondary carbonate stringers and nodules
Bt3 — Lower soil horizon - less well developed, observed in isolated areas.
BC — Mineral Horizon

Qodf — Old Debris Flow Deposit – Matrix supported sands with lesser interfingering channel deposits
a — Silty Sand - dark reddish brown (2.5YR 3/3), massive, secondary Bt lam development throughout, gradational upper and lower contacts, trace fine to coarse gravels, some grussified.
b — Basel gravel layer – reddish brown (2.5YR 4/4m), clayey to silty sand with gravel, subrounded to rounded, grussified granitic clasts, moderately sharp lower contact

Qofl — Old Fluvial Deposits – Moderately to well bedded sands and silty sands with interfingering channel deposits
c — Sand and Silty Sand - reddish brown (2.5YR 4/4), slightly clayey, coarse to very coarse-grained sand, trace gravel and cobbles, moderately to well bedded, secondary Bt lam development throughout, sharp upper contact, ci – interfingering gravel layers, basal gravel to deposition sequence
d — Silty to Clayey Sand – reddish brown (2.5YR 4/4), moderately well bedded (1.5 to 8" thick), some thin interbedded sand lenses, secondary Bt lam development throughout, lower contact with conglomerate is narrowly gradational
e — Conglomerate - reddish brown (2.5YR 4/4), silty sand matrix, scattered boulders up to 1.5' in dia., rounded cobbles, 2-6" in dia. common, moderately to well-rounded gravel, weakly coated with secondary carbonate
f — Sand - reddish brown (5YR 4/4), minor silt, medium to coarse grained, scattered small gravel, well bedded, Bt lams throughout
g — Silty Sand - massive

Symbols

- Pre-Holocene Fault, dashed where plane becomes indistinct
- Joint
- Secondary Bt Lam Development within the layer
- Geologic Unit Contact, sharp where solid, gradational where dashed
- Krotovina
- Pedogenic Development
- Secondary Carbonate
- VI — Trench Bench Vertical Designation
- Location of Trench Bench
- Location of Level Line



NOTE: ALL TRENCHES REVIEWED BY CITY OF LA GEOLOGICAL REVIEWER AND CGS GEOLOGICAL REPRESENTATIVE

DATE: 07/15/2019	DRAFTED BY: JMT	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	TRENCH LOGS FT-1N, FT-2W, FT-3E AND FT-3W 6334 YUCCA STREET LOS ANGELES, CALIFORNIA
REVIEWED BY: MS,JS,MR	PREPARED BY: MK		PROJECT NUMBER: LA-1301A
FINAL			SCALE: AS SHOWN
			PLATE NUMBER: 2

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Appendix A
Field Investigation

APPENDIX A
FIELD INVESTIGATION

A.1 Drilling and Sampling

Drilling, Logging, and Soil Classification

The borings were drilled at two phases on August 1 and 2, 2017, January 3, 4, and 5, 2018; by Gregg Drilling and 2R Drilling (GDC's subcontractors) using CME 75 hollow stem auger rigs. Borings were explored up to 55 feet depth. Samples were collected at 5-foot to 2-foot lengths, 3-inch diameter, continuous soil core barrel. The core barrel collects relatively intact subsurface material as the auger is advanced. The auger is advanced at most 5 feet in one run and runs are shortened to maximize recovery.

Our field geologist recorded recovered soil samples, measured groundwater levels where possible, maintained detailed records of the borings, and visually classified the soils in accordance with the Unified Soil Classification System. The samples were wrapped and boxed for transportation to GDC laboratory. The cores are stored in the laboratory where GDC's certified engineering geologist performed a detailed reviewed the samples. Where 100% core recovery is obtained, the degree of accuracy is to the nearest tenth of a foot. When recovery is less than 100%, the vertical record of core assumes the loss is from the bottom of the sample. However, some of the length loss may be due to consolidation within the sampler. When recovery is much less than 100%, the vertical control error is estimated to be 6-inches to 24-inches.

Borehole Abandonment

At the completion of boring, groundwater is measured and the boring is abandoned by backfilling with soil cuttings and cement or bentonite grout. The paved surface is patched with cold mix asphalt concrete/quick set concrete. Notes describing the borehole abandonment are presented on the boring log records.

A.2 Cone Penetration Tests

CPT Soundings

Gregg Drilling and Kehoe Testing and Engineering (a GDC's subcontractor), performed the CPT soundings as part of our field exploration program. The CPTs were conducted in accordance with ASTM D 5778 using a 30-ton electronic piezocone penetrometer as well as a Geoprobe 540M limited access rig. The test consists of hydraulically pushing a penetrometer into subsurface soils at a slow, steady rate. The pentrometer has a concoidal point, a cylindrical friction sleeve, and a piezo-element located behind the conical point. Soil engineering parameters are electronically measured and recorded continuously. The parameters include soil bearing resistance at the cone tip (qc), soil frictional resistance along the cylindrical friction sleeve (fs), and pore water pressure directly behind the cone tip (U). These measured values are correlated with qc, fs, and U to interpret the soil type and geotechnical conditions.

At the end of each sounding the apparent groundwater depth and cave-in depth were measured using a weighted tape and the CPT hole was abandoned by grouting with bentonite. Paved surfaces were patched with cold mix asphalt concrete/quick set concrete.

A.3 List of Attachments

Current Investigation	Prior Investigations (GDC, 2015)
Boring Records	O-O' Boring Records B-11 and B-12
CPT Records and Interpretations	O-O' CPT Records C-22 thru C-25

Current Investigation

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-1

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
Intersection of Yucca St and Ivar	8/1/17	M. Sutherland	1 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	55

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	Gregg Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	408

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt approximately 3 in thick				
	405								**Artificial Fill (af)** **CLAYEY SAND (SC) to Poorly Graded SAND with CLAY (SP-SC)** ; Dark Yellowish Brown; moist; fine SAND.				
5		1	1	80					@6.8': some concrete debris. @7'; sharp 45 degree contact				
	400								**Old Alluvium (Qoal)** **SANDY CLAY (CL)**; Strong Brown (7.5YR 5/8); moist; some fine to coarse SAND; irregular iron oxide staining; irregular calcium carbonate rich veins; @7.7': interbedded SAND layers 1 to 2 inches thick; fine to medium SAND; some coarse SAND.				
10		2	2	30					**CLAYEY SAND (SC)**; Strong Brown (7.5YR 5/6); moist; fine SAND; some medium to coarse SAND. @9' to 10': No Recovery.				
	395								**Poorly Graded SAND with Gravel (SP)** Channel deposits thinly layered SP-SM; fine to coarse SAND; angular to subangular GRAVELS, very weathered, trace clay. @10.6': Sample collected B-1. @11': Some fine SAND infill irregular (possible roots; possible liquefaction). @11.5' to 15': No recovery.				
15		3	3	100					Paleosol **SILTY to CLAYEY SAND (SM-SC)**; Strong Brown (7.5YR 5/8); moist; some fine SAND. (strong ped development, secondary clay); COBBLE at upper contact.				
	390	4		100					**SILTY SAND**; abundant dark brown coarse SAND size; angular; some secondary clay films. @18.4': Brown Yellow (10YR 6/8); angular basalt clasts; some rounded granitic; coarse gravel.				

GDC_ROCK_CORE_ENG_LA LA-1301.GPJ ROCK2.GDT 6/3/19

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	**B-1**

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
Intersection of Yucca St and Ivar	8/1/17	M. Sutherland	2 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	55

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	Gregg Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	408

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		5	4	120					Paleosol **CLAYEY SAND to SILTY SAND (SC-SM)** Strong Brown (7.5YR 5/8); moist; strong ped development; fine grained; trace fine to coarse gravel.				
	385	6		100					@23': 1" thick; olive gray clayey zone with manganese stained fractured surfaces along fine gravel size small clods.				
25		7	5	100					@24.9' to 25.3': Silty less clay **SILTY SAND (SM)** siltier with depth; calcium carbonate rich zone.				
									@27': trace basalt fragments and granitic.				
	380	8		80									
									@29.2': Colluvium - **CLAY (CL)**; Brown to Dark Brown (7.5YR 4/4); moist; few basalt fragments, ped development continued.				
30		9	6	80					@29.5' to 30': No Recovery.				
									Topanga Formation Volcanics (Tvb) chaotic angular basalt fragments in weathered matrix of punky, clay and heavily oxidize SILT.				
									@32.5' to 32.5': No recovery.				
	375	10		80									
									@34.5' to 35': No Recovery.				
35		11	7	80									
									@37' to 37.5': No Recovery.				
	370	12		72									
									@39.3' to 40': No Recovery.				

GROUP DELTA CONSULTANTS

GROUP DELTA CONSULTANTS, INC.

370 Amapola Ave., Suite 212

Torrance, CA 90501

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-1	
SITE LOCATION Intersection of Yucca St and Ivar	**DATE(S) DRILLED** 8/1/17	**LOGGED BY** M. Sutherland	**SHEET NO.** 3 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 55
DRILL RIG TYPE CME 75	**DRILLED BY** Gregg Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 408	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		13	8	16					**(Tvb, continued.)**				
									@40.4' to 42.5': No Recovery.				
	365	14		40									
									@43.5' to 45': No Recovery.				
45		15	9	40									
									@46' to 47.5': No Recovery.				
	360	16		72									
									@49.3' to 50': No Recovery.				
50		17	10	60									
									@51.5' to 52.5': No Recovery.				
	355	18		60									
									@54' to 55': No Recovery.				
55													
	350								Boring terminated at 55 feet bgs. Groundwater was encountered at 48 feet bgs. Backfilled with soil cuttings and patched with quick set concrete and black dye.				

GDC_ROCK_CORE_ENG_LA LA-1301.GPJ ROCK2.GDT 6/3/19

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370 Amapola Ave., Suite 212
Torrance, CA 90501

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-2 c

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-2	
SITE LOCATION Intersection of Yucca St and Ivar	**DATE(S) DRILLED** 8/2/17	**LOGGED BY** M. Sutherland	**SHEET NO.** 1 of 2
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 35
DRILL RIG TYPE CME 75	**DRILLED BY** Gregg Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 406.4	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt approximately 5 in thick				
	405								**Artificial Fill (af)** **Poorly Graded SAND with CLAY**; Dark Yellow Brown; moist; fine to coarse SAND.				
5		1	1	50					@5.1': concrete debris.				
	400								**Old Alluvium (Qoal)**; Channel Deposits. **CLAYEY SILT**; Strong Brown (7.5YR 5/8); moist; irregular iron oxide staining; slightly calcium carbonate rich.				
		2	1	40					**Poorly-graded SAND (SP)**; fine to coarse grain; trace coarse GRAVEL and COBBLE.				
									@8.5' to 10': No recovery.				
10		3	2	100					**Poorly Graded SAND with SILT**; fine to coarse grain; thin intermediate sorted layers; few fine GRAVEL layers (<1" to 1"); very strong weathered secondary clay development.				
	395												
		4	2	60					@12'; **SAND with COBBLE and GRAVEL (SP-SG)**; Fine to medium SAND with GRAVEL and COBBLE; few coarse SAND layers; weathered gravels; some secondary clay development.				
									@14' to 15': No Recovery.				
15		5	3	92					**Poorly Graded SAND**; Strong Brown (7.5YR 5/6); fine to coarse SAND; few fine GRAVEL; rounded; granitic; heavily oxidized gravel (Topanga Formation); secondary clay coating.				
	390												
		6	3	48					@17.5'; coarser GRAVEL and cobbles; weathred sandstones.				
									@18' - 20': No Recovery.				

GDC_ROCK_CORE_ENG_LA LA-1301.GPJ ROCK2.GDT 6/3/19

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** **B-2**	
SITE LOCATION Intersection of Yucca St and Ivar	**DATE(S) DRILLED** 8/2/17	**LOGGED BY** M. Sutherland	**SHEET NO.** 2 of 2
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 35
DRILL RIG TYPE CME 75	**DRILLED BY** Gregg Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 406.4	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	385	7	4	75					@20': **COBBLE and GRAVEL with SAND (GP-SP)*(continued)***; mix of sandstone and granitics. @20.9': Colluvium - **Poorly Graded GRAVEL with CLAY (GC)** layer; (4" thick); Olive Gray Brown.				
		8	4	67					@22': cobble or boulder. (Drill to 22.5').				
									Topanga Formation Volcanics (Tvb) Basalt; extremely weathered; chaotic angular basalt fragments, punky clay and oxidize SILT and SAND matrix.				
25	380	9	5	100									
		10	5	100									
30	375	11	6	100									
		12	6	80									
									@34.5' to 35': No recovery.				
35	370								Boring terminated at 35 feet bgs. Groundwater was not encountered Backfilled with soil cuttings and patched with quick set concrete and black dye.				

GROUP DELTA CONSULTANTS, INC.
370 Amapola Ave., Suite 212
Torrance, CA 90501

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-3

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
6334 Yucca Street	8/1/17	M. Sutherland	1 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	40

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	Gregg Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	404.5

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt approximately 3 in thick				
	400								**Artificial Fill (af)** **Poorly Graded SAND with CLAY (SP-SC)** 7.5YR 5/6 Strong Brown; moist; fine to medium SAND; few fine to coarse GRAVEL.				
5		1	1	100					**Old Alluvium (Qoal)** **CLAYEY SAND (SC)** Strong Brown (7.5YR 5/6); moist; fine to coarse grain; trace fine GRAVEL.				
	395								Channel Deposits **Poorly Graded SAND with CLAY (SP-SC)** Strong Brown (7.5YR 5/6); moist; fine SAND; few medium to coarse SAND. @7.4': thinly layered (<1" to 2" thick) fine to medium SAND; few fine GRAVEL layers; subhorizontal.				
10		2	2	50					**Poorly Graded SAND with SILT (SP-SM)** thinly bedded; Strong Brown (7.5YR 5/6); moist.				
	390								@12.5' to 15': No Recovery.				
15		3	3	80					**Poorly Graded Sand with Clay (SP-SC)** strong brown (7.5YR 5/6), moist, weathered grains, some secondary clay				
									@17' to 17.5': No Recovery.				
		4	3	80					@18.5': Cobble encountered; granitic, friable, broken up during sampling.				
	385								Paleosol **CLAYEY SAND (SC)** Yellow Red (5YR 4/6); erosional upper contact.				

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-3

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
6334 Yucca Street	8/1/17	M. Sutherland	2 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	40

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	Gregg Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	404.5

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		5	4	64				@19.5': No Recovery.				
								Poorly Graded SAND with SILT (SP-SM); Light Yellow Brown (10YR 6/4); fine to coarse SAND; 15 degree apparent dip, erosion lower contact.				
								Poorly Graded SAND with CLAY (SP-SC); Dark Yellow Brown (10YR 6/4); fine SAND.				
		6	4	60				@21.6' to 22.5': No Recovery.				
								SILTY SAND (SM) fine SAND; some CLAY; coarsening with depth.				
	380							@23.6': Cobbles and GRAVEL; granitic.				
								@24' to 25': No Recovery.				
25		7	5	100				**Poorly Graded SAND (SP)**; fine to coarse SAND.				
								Paleosol **SANDY lean CLAY (CL)**; Strong Brown (7.5YR 5/6), healed desiccation fractures, few gravel.				
		8	5	100				**CLAYEY SAND (SC)**; Dark Brown; (7.5YR 4/4); fine grained; some scattered gravels; subangular; basalt; poor platy ped development.				
								@27.6': COBBLE.				
	375											
30		9	6	120								
								@31.5': GRAVEL (3" thick); angular slate.				
		10	6	80				@32.6': irregular, erosional contact.				
								<u>**Topanga Formation Volcanics (Tvb)**</u>				
								@33': angular fragmented basalt, chaotically assembled in a weathered matrix of clay and silt.				
	370											
35		11	7	80								
		12	7	80								
	365											

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING	SHEET NO.
Enterprise Site, Yucca St & Ivar	LA-1301	B-3	3 of 3

SITE LOCATION	6334 Yucca Street
DATE(S) DRILLED	8/1/17
LOGGED BY	M. Sutherland
DRILLING METHOD	Continuous Soil Core 3" Diameter
DRILL BIT SIZE/TYPE	8.25 in
CHECKED BY	M. Sutherland
TOTAL DEPTH DRILLED (feet)	40
DRILL RIG TYPE	CME 75
DRILLED BY	Gregg Drilling
INCLINATION FROM VERTICAL/BEARING	0º None
APPARENT GROUNDWATER DEPTH	None encountered
APPROXIMATE PILE TOP ELEVATION (feet)	404.5
COMMENTS	
BOREHOLE BACKFILL	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Boring terminated at 40 feet bgs. Groundwater was not encountered Backfilled with soil cuttings and patched with cold patch.				
	360												
45													
	355												
50													
	350												
55													
	345												

GDC_ROCK_CORE_ENG_LA LA-1301.GPJ ROCK2.GDT 6/3/19

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-4 c

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301		**BORING** B-4
SITE LOCATION 6334 Yucca Street	**DATE(S) DRILLED** 1/5/18	**LOGGED BY** M. Sutherland	**SHEET NO.** 1 of 2
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 35
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 405	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt Concrete approximately 2.5 in. thick.				Hand Auger to 5 ft.
									Artificial Fill (af) **CLAYEY SAND(SC)** moist; strong brown [7.5YR 4/6]; some fine to coarse SAND; medium plasticity.				
5	400	1	1	54					@5': Few fne to medium, angular to subangular GRAVEL; fine to coarse SAND. @6: Few Cobbles and Gravel, subrounded. asphalt fragments. @7.5': Little fine to medium SAND. @7.7' to 10': No Recovery (Difficult drilling, presence of GRAVEL and COBBLES).				
10	395	2	2	60					@10': **CLAYEY SAND (SC)** Strong Brown [7.5YR 4/6]; fine to medium SAND; little coarse GRAVEL. @10.5': Old Root Decomposed. @10.9: Asphlat fragments. @11.3': Cobbles greater than 2 in. in size. @11.5' to 12.5': No Recovery.				
		2	2	60					@12.5': **Old Alluvium (Qoal)** Channel Deposits **Poorly-graded SAND with GRAVEL (SP)** Strong Brown [7.5YR 4/6]; Few fine to medium, subangular to subrounded GRAVEL (Granitic). @14' to 15': No Recovery.				
15	390	3	3	86					@15': moist to Wet. @15.6: Fine to Medium SAND. @16': Fine to coarse SAND; little fine to coarse, subangular to rounded GRAVEL. @16.5': **SANDY lean CLAY (CL)** some fine to medium SAND; trace manganese flecks. Sample B-4@16.65'-16.85' collected @16.8': Fine SAND bed of 2 in. thick; scoured lower contact; inclined ~40° @17': **CLAYEY SAND (SC)** fine SAND; thickly bedded; dark brown [7.5YR 4/4].				
	385												

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FIGURE A-5 a

LOG OF CORE BORING

LOG OF CORE BORING	**PROJECT NAME** Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-4
SITE LOCATION 6334 Yucca Street	**DATE(S) DRILLED** 1/5/18	**LOGGED BY** M. Sutherland	**SHEET NO.** 2 of 2
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 35
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 405	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		4	4	68					@18.6' to 19': Two horizontal thin beds; trace manganese @20': ***CLAYEY SAND (SC) (continued).*** @20.3': **Poorly-graded GRAVEL with SAND (GP)** layer of fine to medium SAND; fine to coarse, subrounded GRAVEL (Quartzite and Granitics). @21.1': **COBBLE (quartzite)** @21.2': **CLAYEY SAND to SILTY SAND (SC-SM)** fine fragments of angular GRAVEL; Dark Brown [7.5YR 3/3]; strong ped development. @22.1': Transitioning to **SANDY SILTY CLAY (CL-ML)**; slight iron oxide staining. @23.4': No Recovery.				
25	380	5	5	100					@25': Colluvium - **SILTY CLAY (CL-ML)** moist; dark yellowish brown [10YR 6/6]; few subangular to angular GRAVEL; low plasticity. @25.8' - 27.6': **SILTY CLAY with GRAVEL (CL-ML)** little fine subangular to angular GRAVEL; secondary CLAY around GRAVELS; colluvium. @27.6': **<u>Topanga Formation Volcanics (Tvb)</u>** Basalt; moist; yellowish brown [10YR 8/6]; angular fragmented Basalt; weathered CLAY matrix; sorrounding edges of gravel discolored; some fine to medium SAND; scoured upper contact.				
30	375	6	6	80					@34.3'- 35': No Recovery.				
35	370								Boring terminated at 35 ft. bgs. No Groundwater was encountered. Backfilled with soil cuttings and repaired with Asphalt.				
	365												

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FIGURE A-5 b

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-5

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
6334 Yucca Street	1/4/18	M. Sutherland	1 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	40

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	2R Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	404.5

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt approximately 1.5 in. thick. No base material.				
									Artificial Fill (af) **CLAYEY SAND (SC)** moist; orangish brown; fine to medium SAND; some fines; little GRAVEL.				
	400												
5		1	1	86					@5.4': 1 in. thick darker brown.				
									@5.5': **Old Alluvium (Qoal)** **Poorly-graded SAND with CLAY (SP-SC)** moist; Strong Brown [7.5YR 4-6]; mostly fine to medium SAND; few fines; trace fine angular GRAVEL; clay coating of gravel				
									@6.8': **Poorly-graded SAND with CLAY and GRAVEL (SP-SC)**; mostly fine SAND; few coarse angular GRAVEL.				
	395								Below 7.6': **Poorly graded SAND with CLAY (SP-SC)** mostly fine to coarse SAND; some fines; few fine to medium angular GRAVEL.				
10		2	2	64					@9.5': No Recovery.				
									Poorly Graded SAND (SP)				
									@12.7': **Poorly-graded SAND with CLAY (SP-SC)** mostly fine SAND.				
									@12.9': No Recovery.				
	390												
15		3	3	50					@15': **Poorly-graded SAND (SP)** fine to medium SAND; thinly bedded dipping at 22°; moist; yellowish brown [10YR 5/6]; inerbedded clayey layers are reddish brown [5YR 4/4]; gravel layers and subrounded to subangular fine GRAVEL.				
									@16.5'; Fine to coarse SAND.				
									@17': **Poorly-graded GRAVEL (GP)** 6 in. thick zone; up to 3 in. GRAVEL; moist; fine to medium SAND between subangular to rounded GRAVEL.				
									@17.5': No Recovery.				
	385												

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LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-5	
SITE LOCATION 6334 Yucca Street	**DATE(S) DRILLED** 1/4/18	**LOGGED BY** M. Sutherland	**SHEET NO.** 2 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 40
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 404.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		4	4	64					@20': Quartzite cobble at top **SILTY SAND (SM)** Fine to coarse, subrounded to angular GRAVEL; quartzite. @20.3': Few fine to medium GRAVEL; some ped development. @21' TO 21.5': **SILTY to CLAYEY SAND (SM-SC)** moist; fine SAND; some fines; strong ped development. @21.7: **Poorly-graded SAND (SP)** dry to moist; light yellowish brown [10YR 6/4]. @22.5': **Poorly-graded GRAVEL with SAND (GP)** fine to coarse GRAVEL; COBBLES up to 4.5 in; some fine to coarse SAND (Quartzite and Granite).				
	380												
25		5		0					@23.2' to 30': No Recovery. @25': No Recovery; difficult drilling through COBBLES.				
	375												
30		6	6	80					@30': **Poorly-graded GRAVEL with SAND (GP)** 4 in. in size. @30.3': Paleosol **SITLY to CLAYEY SAND (SM-SC)** moist; fine to medium SAND; Strong Brown [7.5YR 4/6]; few fine to medium GRAVEL; low plasticity; strong ped development. @32.5': Colluvium - **Silty Clay to Lean CLAY (CL)** colluvium transitioning into basalt below; up to 4 in. in size basalt fragment; angular; weathered; CLAY matrix with fine to coarse SAND. @34' to 35': No Recovery.				
	370												
35		7	7	100					@35': ': **Topanga Formation Volcanics (Tvb)** Basalt, chaotic assemblage of angular basalt fragments, weathered matrix of clay and silt.				
	365												

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FIGURE A-6 b

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-5	
SITE LOCATION 6334 Yucca Street	**DATE(S) DRILLED** 1/4/18	**LOGGED BY** M. Sutherland	**SHEET NO.** 3 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 40
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 404.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Boring terminated at 40 ft. bgs. No Groundwater was encountered. Backfilled with soil cuttings and cold patch.				
	360												
45													
	355												
50													
	350												
55													
	345												

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THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF THE ACTUAL CONDITIONS ENCOUNTERED.

FIGURE A-6 c

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-7

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
1764 N Ivar Ave	1/3/18	M. Sutherland	1 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	45

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	2R Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	400.5

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	400								Asphalt 2 in. thick. No Base Layer.				
									Artificial FIll (Af) **>CLAYEY SAND (SC)** moist; reddish brown [5YR 4/4]; mostly fine to medium SAND; some fines; medium plasticity. @0.5': Few fine to coarse GRAVEL (Quartzite fragments).				
5	395	1	1	72					@5.8': Asphalt fragments; coarser grained; less fines.				
									@5.9': **Old Alluvium (Qoal)** Channel Deposits **Poorly-graded SAND with CLAY (SP-SC)**; moist; mostly fine to medium SAND; few fines; trace GRAVEL; Strong Brown [7.5YR 5/6]. @6.7': Poorly Graded Sand with Gravely layer (8-10 in. thick), fine grained layer; near horizontal contacts; Brownish Yellow [10YR 6/6] from 7'.				
									@9': cobbles and gravel encountered No Recovery.				
10	390	2	2	80					@10': **Poorly-graded SAND (SP)**; fine to medium, thin intermediate layers with Poorly-graded SAND with CLAY (SP-SC); dark red [2.5YR 3/6]; few angular to subangular, fine to medium GRAVEL.				
									@11.6': **Poorly-graded GRAVEL with SAND (GP)**; subangular to subrounded; fine to coarse GRAVEL; little SAND; few COBBLES.				
									@13.1': **CLAYEY SAND (SC)** Brown to Strong Brown [7.5YR 4/4]; mostly fine to coarse SAND; some fines; trace decomposed rootlets. @13.3' to 13.5': Sample B-7 collected.				
									@14': No Recovery.				
15	385	3	3	100					@15': **Poorly-graded GRAVELLY SAND (SP)**; fine to medium, subrounded to angular GRAVEL.				
									@15.6': **Poorly-graded SAND with SILT and GRAVEL (SP-SM)**; Yellow brown [10YR 5/6]; wet shoe; possible perched groundwater. @16.2': **Poorly-graded GRAVELLY SAND (SP)**; 1 to 2 in. thick layer.				
									@16.6-17': **Poorly-graded GRAVEL with SAND (GP-SP)**				
									@17' to 20': No Recovery. Difficult drilling through GRAVEL and COBBLES.				

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-7	
SITE LOCATION 1764 N Ivar Ave	**DATE(S) DRILLED** 1/3/18	**LOGGED BY** M. Sutherland	**SHEET NO.** 2 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 45
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 400.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	380	4		0					@20': No Recovery (GRAVEL and COBBLES).				
25	375	5	5	100					@25': **Lean CLAY (CL)**				
									@25.5': **CLAYEY to SILTY SAND (SC-SM)**dark reddish brown [5YR 3/4]; moist; fine SAND; coasening with depth; Strong ped development.				
									@26.4': **Poorly-graded SAND with CLAY (SP-SC)**				
									@26.6': **CLAYEY SAND (SC) to SANDY CLAY (CL)** Indistinct contacts; Strong ped development.				
									@28.3': Transitioning to **Lean Clay (CL)**				
									@29.4': Few rootlets.				
30	370		6										
									@33.4': Trace of maganese flecks.				
									@34.4' to 34.6: Some SAND.				
35	365	6	7	72					@34.7': **Lean CLAY (CL)** colluvium.				
									@35.5': **Topanga Formation Volcanics (Tvb)** angular Basalt fragments; chaotically assembled in weathered CLAY and silt matrix; very weathered.				

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LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-7	
SITE LOCATION 1764 N Ivar Ave	**DATE(S) DRILLED** 1/3/18	**LOGGED BY** M. Sutherland	**SHEET NO.** 3 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 45
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 400.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	360	7	8	60					@41.8'; Saturated; few fines.				
									@43 to 45'; No Recovery.				
45	355								Boring terminated at 45 feet bgs. Groundwater was encountered at 42 feet bgs. Backfilled with soil cuttings and cold patch.				
50	350												
55	345												

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FIGURE A-8 c

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-8

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
1764 N Ivar Ave	1/4/2017	M. Sutherland	1 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	50

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	2R Drilling	0º None

APPARENT GROUNDWATER DEPTH: None encountered

APPROXIMATE PILE TOP ELEVATION (feet): 399.35

COMMENTS:

BOREHOLE BACKFILL: Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt 1 in. thick. No Base layer.				
	395								**Artificial Fill (af)** @0.1': **CLAYEY SAND (SC)** Strong Brown [7.5YR 4/6]; moist; mostly fine to medium SAND; some fines; few medium subangular GRAVEL.				
5		1	1	80					@5.9': Asphalt fragments.				
									Old Alluvium (Qoal) @6' to 7.5': **Poorly-graded SAND with CLAY (SP-SC)** Strong Brown [7.5YR; 4/6]; moist; fine to medium SAND; thinly bedded; 1 in. clayier darker beds.				
									@7.5': 2 to 3 in. of fine to coarse subangular GRAVEL.				
	390								@7.7' to 8.8': **Poorly-graded SAND with CLAY (SP-SC)**; fine to coarse SAND.				
									@9': No Recovery.				
10		2	2	100					@10': **Poorly-graded SAND (SP)** Fine to medium; thin intermediate layers of Poorly-graded SAND with CLAY (SP-SC); dark reddish [2.5YR 3/6].				
									@11.9': Fine to coarse, subangular to subrounded GRAVEL and COBBLES (Granitic).				
		3		100					@12' to 13': No Recovery. drill through cobbles and gravel				
	385								@13.6': **Poorly-graded GRAVEL (GP)** with a CLAY matrix; Reddish Brown [2.5YR 4/3]; subrounded Granitics, Quartizite and angular Basalts (remnant Paleosol).				
15		4	3	80					@14': **Poorly-graded SAND with CLAY (SP-SC)** Contact dipping 33°; moist; Strong Brown [7.5YR 4/6]; fine to medium SAND.				
									@15.5': **GRAVEL and COBBLE** Particle Size > 5 in.				
									@16' to 17.5': **Poorly-graded SAND (SP)** gradiational; thinly bedded.				
	380								@17.5': **CLAYEY SAND (SC)** Strong Brown [7.5YR 4/6]; moist; some fine GRAVEL; secondary CLAY films coating grains and GRAVEL; contact Dipping 22° from horizontal.				

GROUP DELTA CONSULTANTS

GROUP DELTA CONSULTANTS, INC.
370 Amapola Ave., Suite 212
Torrance, CA 90501

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-8

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
1764 N Ivar Ave	1/4/2017	M. Sutherland	2 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	50

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	2R Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	399.35

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		5	4	72					@19': No Recovery. @20': **Poorly-grade GRAVEL (GP)**; mosly subangular to rounded GRAVEL (Granitie); some fine to coarse SAND; some subrounded COBBLES up to 3in. @21.8' to 22.8': **Poorly-graded SAND (SP)**; moist; Strong Brown; fine to coarse SAND; few fine to medium, subangular to subrounded GRAVEL; Secondary CLAY around GRAVEL. @22.8' to 23': COBBLE up to 3 in. @23': Paleosol **SILTY to CLAYEY SAND (SM-SC)**; moist; Strong Brown; little fine, subangular GRAVEL; ped development.				
	375												
25		6	5	100					@23.5': No Recovery. @25': Few fine to medium SAND; trace manganese flecks; trace fine, angular GRAVEL. @28': Transitioning to **SANDY lean CLAY (CL)**				
	370												
30		7	6	100					@30': Strong Brown [7.5YR 4/6]. @30.5': Strong granular ped development. @34'; Gravels up to 1 in.				
	365												
35		8	7	100					@35': fine to medium SAND; few fine to medium, subangular to subrounded GRAVEL. @36.6': Gleying; ped devolpment; Strong Brown [10YR 5/3]. Below 36.6': Yellowish Brown [10YR 5/6].				
	360												

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** B-8	
SITE LOCATION 1764 N Ivar Ave	**DATE(S) DRILLED** 1/4/2017	**LOGGED BY** M. Sutherland	**SHEET NO.** 3 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 399.35	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		9	8	100					@40' to 40.5': ***SANDY lean CLAY (CL) (continued.)*** More consolidated.				
									@40.5' TO 42': **CLAYEY SAND (SC)** fine to medium SAND; some CLAY.				
									@42' to 42.6': **Poorly-graded SAND (SP)** moist; fine to medium SAND; perched water.				
									@42.6': **CLAYEY to SILTY SAND (SC-SM)** fine to medium SAND; few fine to medium GRAVEL; motling present; low plasticity.				
	355								@43.8': **SANDY CLAY (CL)** moist.				
45		10	9	76					@45': Fragments of Basalt; colluvium.				
									@45.7': **Topanga Formation Volcanics (Tvb)** Angular fragmented Basalt; chaotically assembled in a weathered CLAY matrix.				
	350								@48.8' to 50': No Recovery.				
50									Boring terminated at 50 ft. bgs. Perched groundwater was encountered at 42 ft. bgs. Backfilled with soil cuttings and cold patch.				
	345												
55													
	340												

GDC_ROCK_CORE_ENG_LA LA-1301.GPJ ROCK2.GDT 6/3/19

LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** **B-13**	
SITE LOCATION 6334 Yucca St	**DATE(S) DRILLED** 1/3/2017	**LOGGED BY** M. Sutherland	**SHEET NO.** 1 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 404.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt 2 in. thick. No Base layer.				
									Artificial FIll (Af) @0.2': **CLAYEY SAND (SC)** moist; dark brown; mostly fine to medium SAND; some fines; few fine to medium, angular GRAVEL; trace brick.				
	400												
5		1		100									
									@7': Decayed organics and rootlets (old top soil horizon).				
									@7.7': **Old Alluvium (Qoal)** Bt horizon - **Lean CLAY (CL)** yellow red [5YR 4/6]; moist				
	395								@9.1': **CLAYEY SAND (SC)** @9.6': Sharp contact with CLAY.				
10		2	2	100									
									@11.1' to 11.5': **Poorly-graded SAND (SP)** Strong Brown [7.5YR 5/8]; fine to medium SAND; few coarse GRAVEL.				
									@11.5' to 13.4': **Lean CLAY (CL)**				
									@13.4' to 13.6': SAND layer.				
									@13.6' to 15': **Lean CLAY**				
	390												
15		3	3	100									
									@15.5': **Poorly-graded SAND with CLAY (SP-SC)** Strong Brown [7.5YR 4/6]; few to little fines; few fine, angular GRAVEL with secondary weathering CLAY.				
	385												

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LOG OF CORE BORING

PROJECT NAME Enterprise Site, Yucca St & Ivar	**PROJECT NUMBER** LA-1301	**BORING** **B-13**	
SITE LOCATION 6334 Yucca St	**DATE(S) DRILLED** 1/3/2017	**LOGGED BY** M. Sutherland	**SHEET NO.** 2 of 3
DRILLING METHOD Continuous Soil Core 3" Diameter	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 50
DRILL RIG TYPE CME 75	**DRILLED BY** 2R Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 404.5	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		4	4	80					@20': ***Poorly-graded SAND with CLAY (SP-SC) (continued).***				
									@20.5': **Poorly-graded SAND (SP)**; Strong Brown [7.5YR 5/5]; fine to medium SAND, transition to finer-grained CLAYEY SAND (SC).				
									@21.7': **Lean CLAY (CL)** Strong Brown [7.5YR 5/5]; little fine to medium SAND; few fine to medium, subangular GRAVEL; few subrounded COBBLES.				
									@22.4' to 22.6': SAND layer.				
	380								@23.4' to 23.6': Bed of Well-graded SAND; fine to coarse.				
									@23.6' to 24': **CLAYEY SAND (SC)**				
25		5	5	100					@24' to 25': No Recovery.				
									@25': Fine to coarse, subangular GRAVELS (Granitic).				
									@27.5': Some fines; trace manganese flecks.				
	375												
30		6	6	100					@30': No COBBLES; fine, subangular GRAVEL.				
									@32.8': **Poorly-graded GRAVEL Layer (GP)**; coarse, subrounded GRAVEL (Granitic).				
									@33.4': **Poorly-graded GRAVEL Layer (GP)**; coarse, subrounded GRAVEL (Granitic).				
	370								@34'; **Well-graded SAND (SW) Layer**; fine to coarse SAND (Granitic).				
35		7	7	100					@35' to 40'; Reddish Brown [5YR 4/4]; trace decomposed ORGANICS.				
	365								@39.3': CLAY bed 1 in. thick darker.				

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
Enterprise Site, Yucca St & Ivar	LA-1301	B-13

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
6334 Yucca St	1/3/2017	M. Sutherland	3 of 3

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Continuous Soil Core 3" Diameter	8.25 in	M. Sutherland	50

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 75	2R Drilling	0º None

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	404.5

COMMENTS	BOREHOLE BACKFILL
	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		8	8	100					@39.4': colluvium, subrounded Basalt fragments.				
									@40.4': ': **Topanga Formation Volcanics (Tvb)** angular fragmented basalt; chaorically assembled within weathered clay matrix; Reddish Brown (5YR 4/4).				
	360								@44' to 45': No Recovery.				
45		9	9	70					@45': Moist. @45.9': Saturated; fine to coarse, angular fragment Basalt up to 3 in.				
	355								@48.5' to 50': No Recovery.				
50			1						Boring terminated at 50 feet bgs. Groundwater was encountered at 45.9 feet bgs. Backfilled with soil cuttings.				
55	350												
	345												

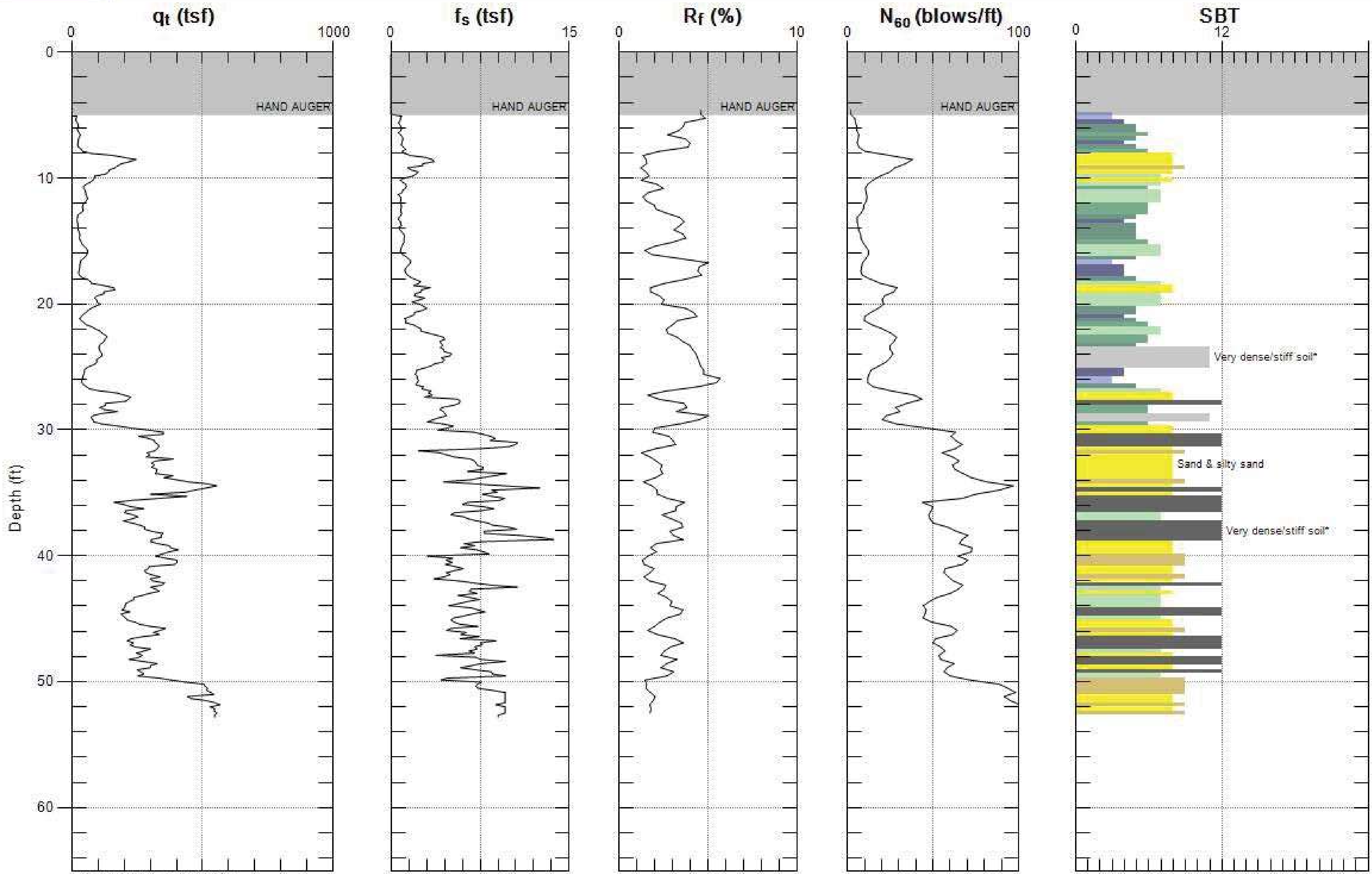
GDC_ROCK_CORE_ENG_LA LA-1301.GPJ ROCK2.GDT 6/3/19

GREGG

GROUP DELTA

Site: ENTERPRISE
Sounding: C-1

Engineer: M.SUTHERLAND
Date: 8/1/2017 02:02



Max. Depth: 52.822 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

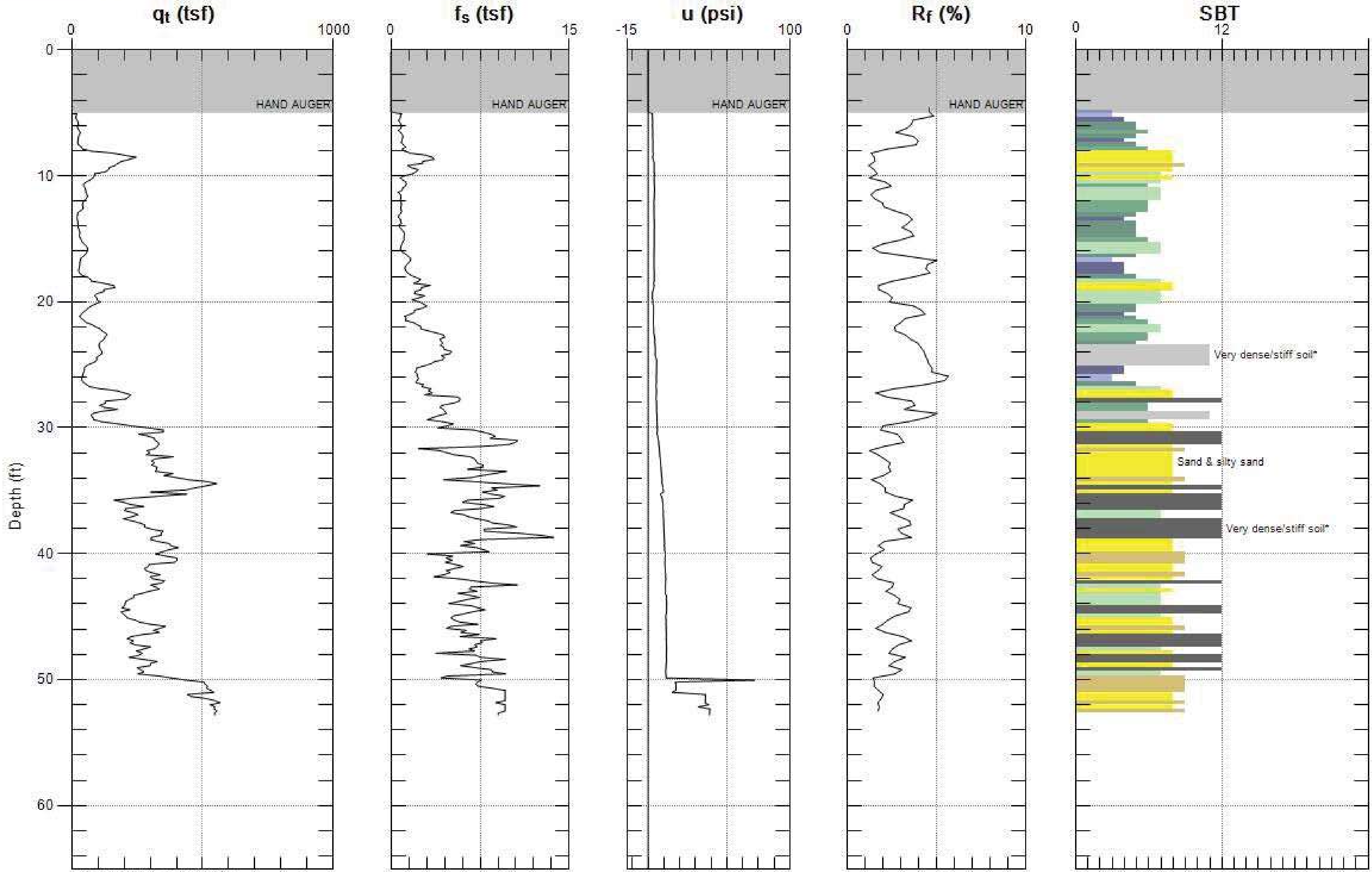
GREGG GROUP DELTA

Site: ENTERPRISE

Sounding: C-1

Engineer: M.SUTHERLAND

Date: 8/1/2017 02:02



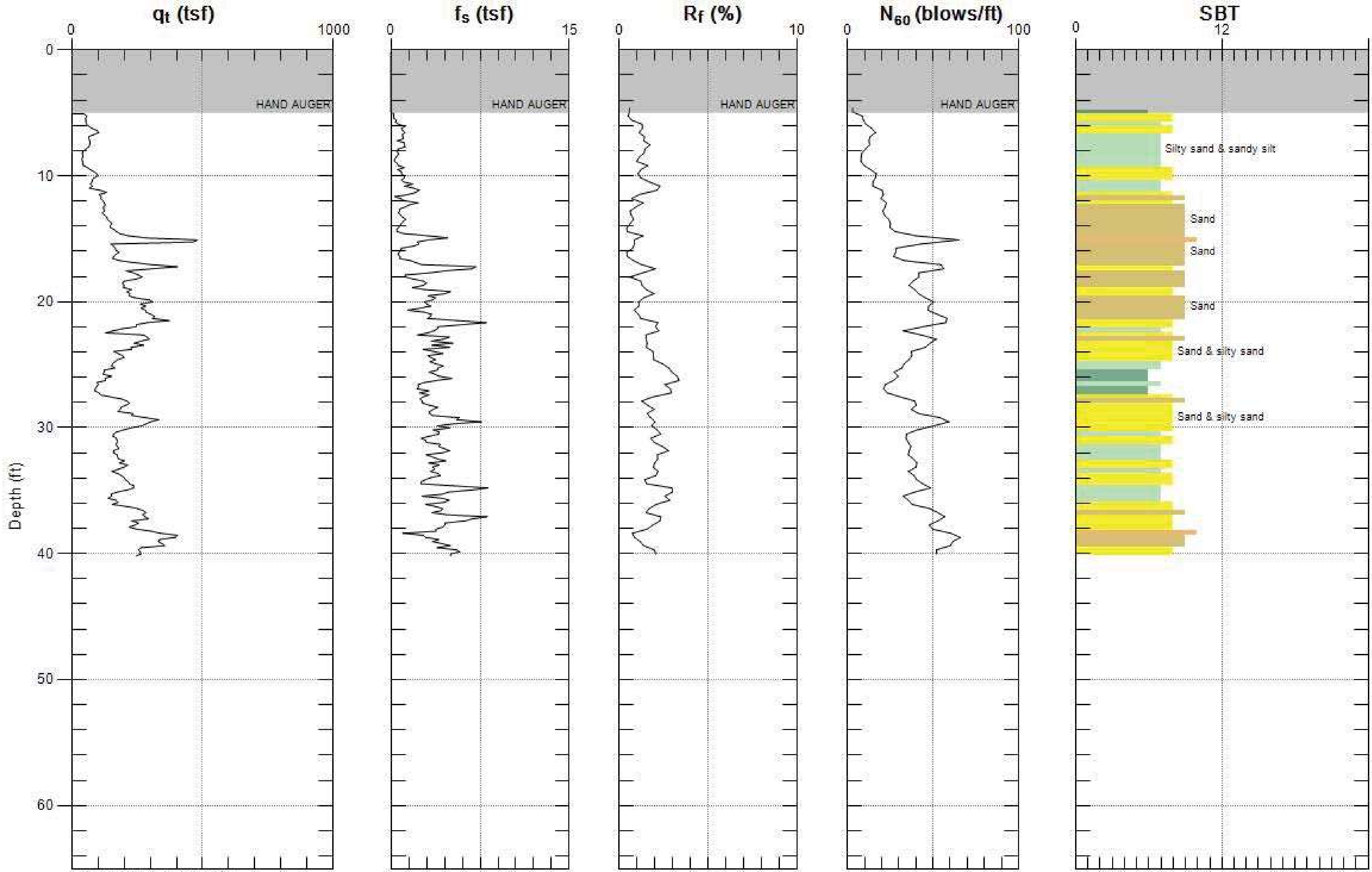
Max. Depth: 52.822 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GROUP DELTA**

Site: ENTERPRISE
Sounding: C-4

Engineer: M.SUTHERLAND
Date: 8/2/2017 09:04



Max. Depth: 40.190 (ft)
Avg. Interval: 0.328 (ft)

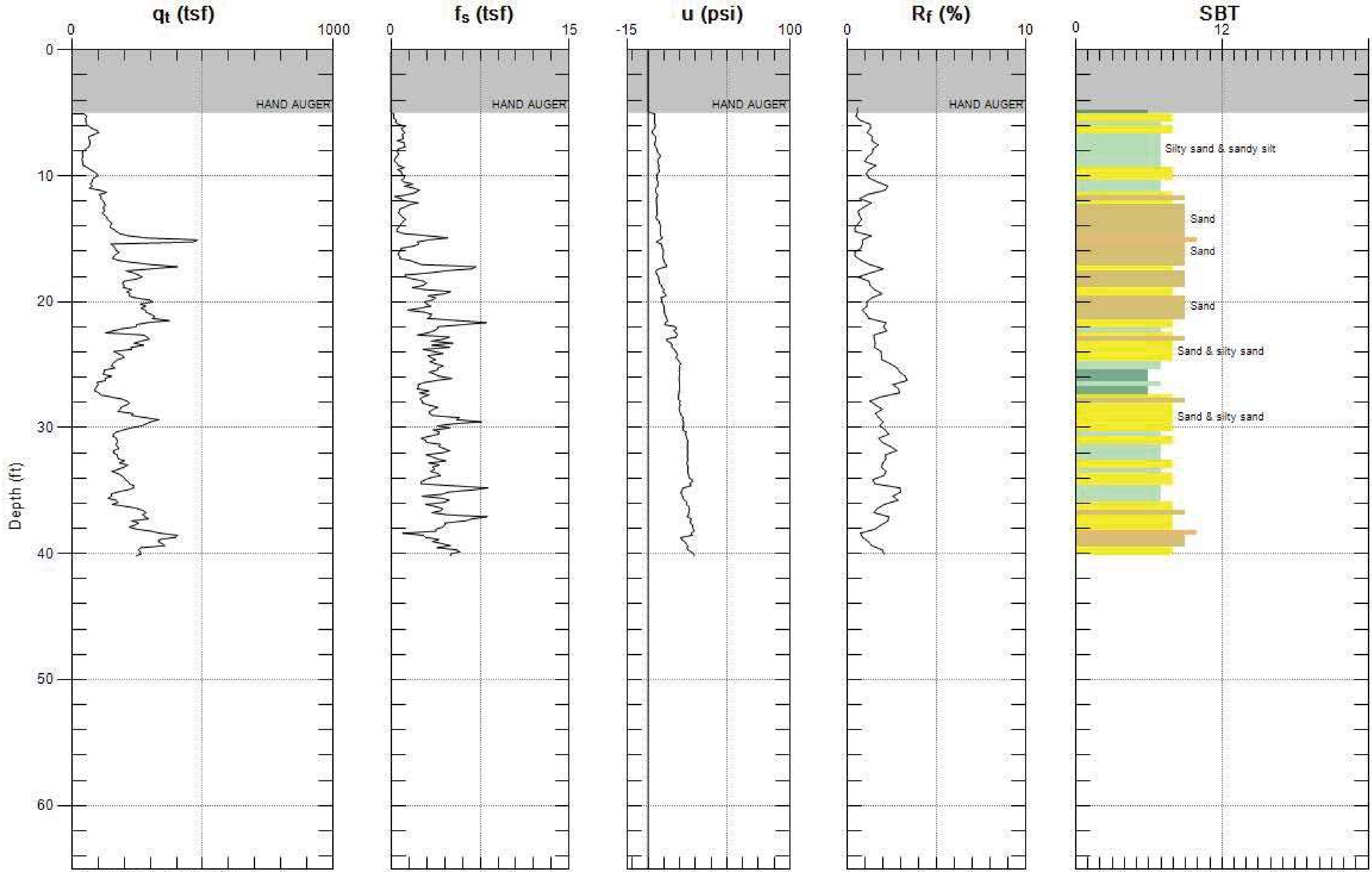
SBT: Soil Behavior Type (Robertson 1990)

GREGG

GROUP DELTA

Site: ENTERPRISE
Sounding: C-4

Engineer: M.SUTHERLAND
Date: 8/2/2017 09:04



Max. Depth: 40.190 (ft)
Avg. Interval: 0.328 (ft)

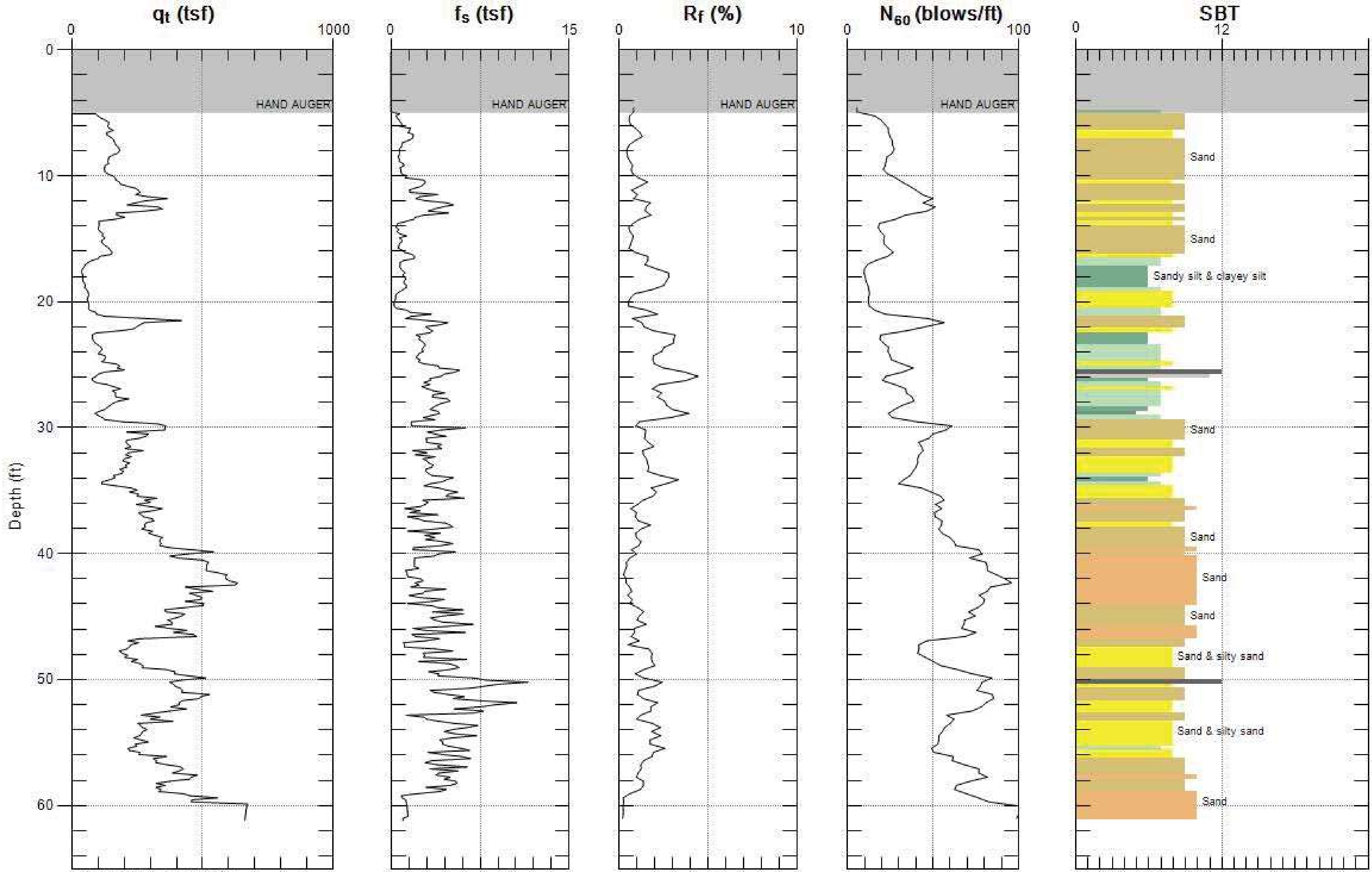
SBT: Soil Behavior Type (Robertson 1990)

GREGG

GROUP DELTA

Site: ENTERPRISE
Sounding: C-5

Engineer: M.SUTHERLAND
Date: 8/1/2017 09:06



Max. Depth: 61.188 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

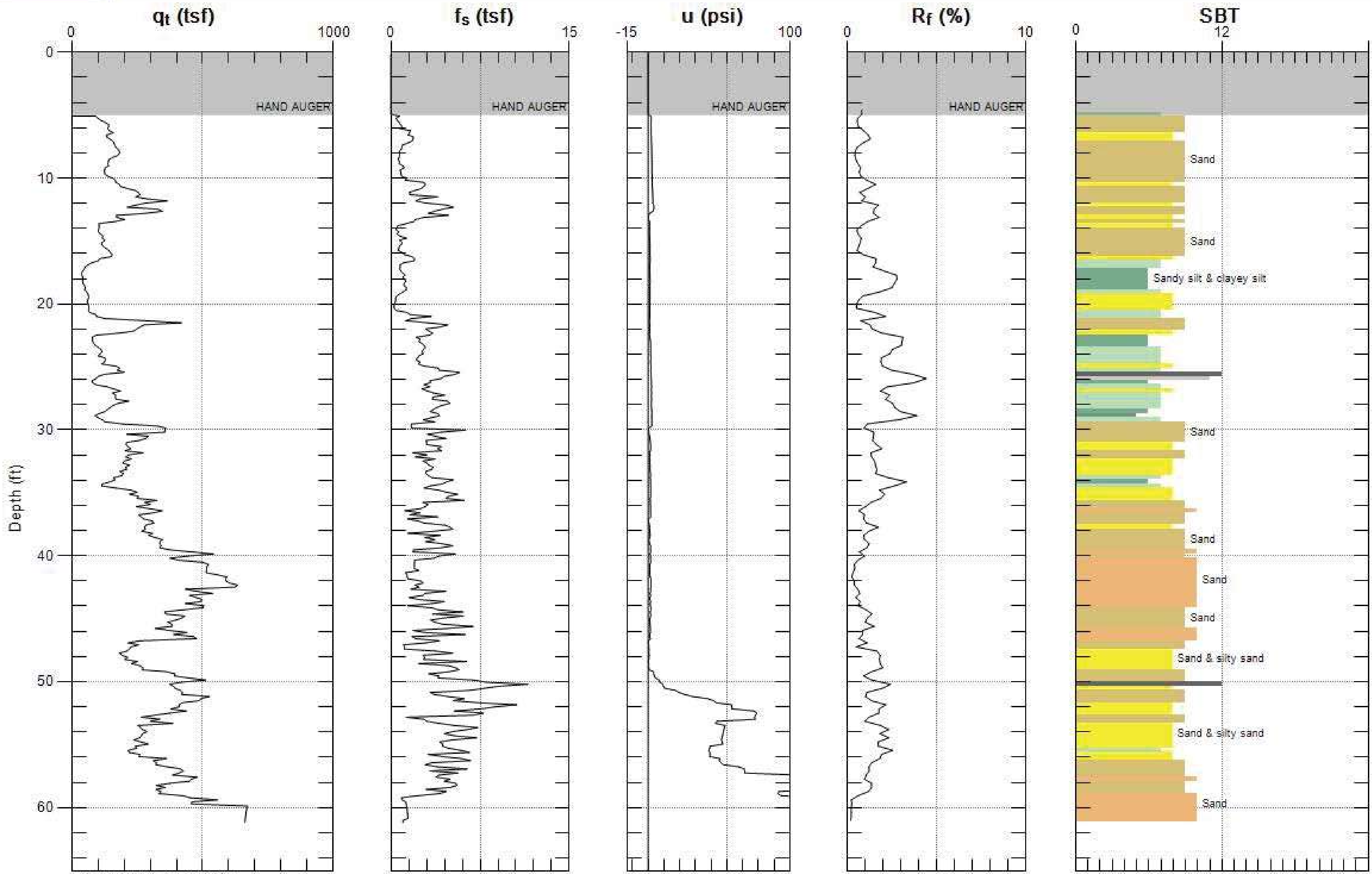
GREGG **GROUP DELTA**

Site: ENTERPRISE

Sounding: C-5

Engineer: M.SUTHERLAND

Date: 8/1/2017 09:06



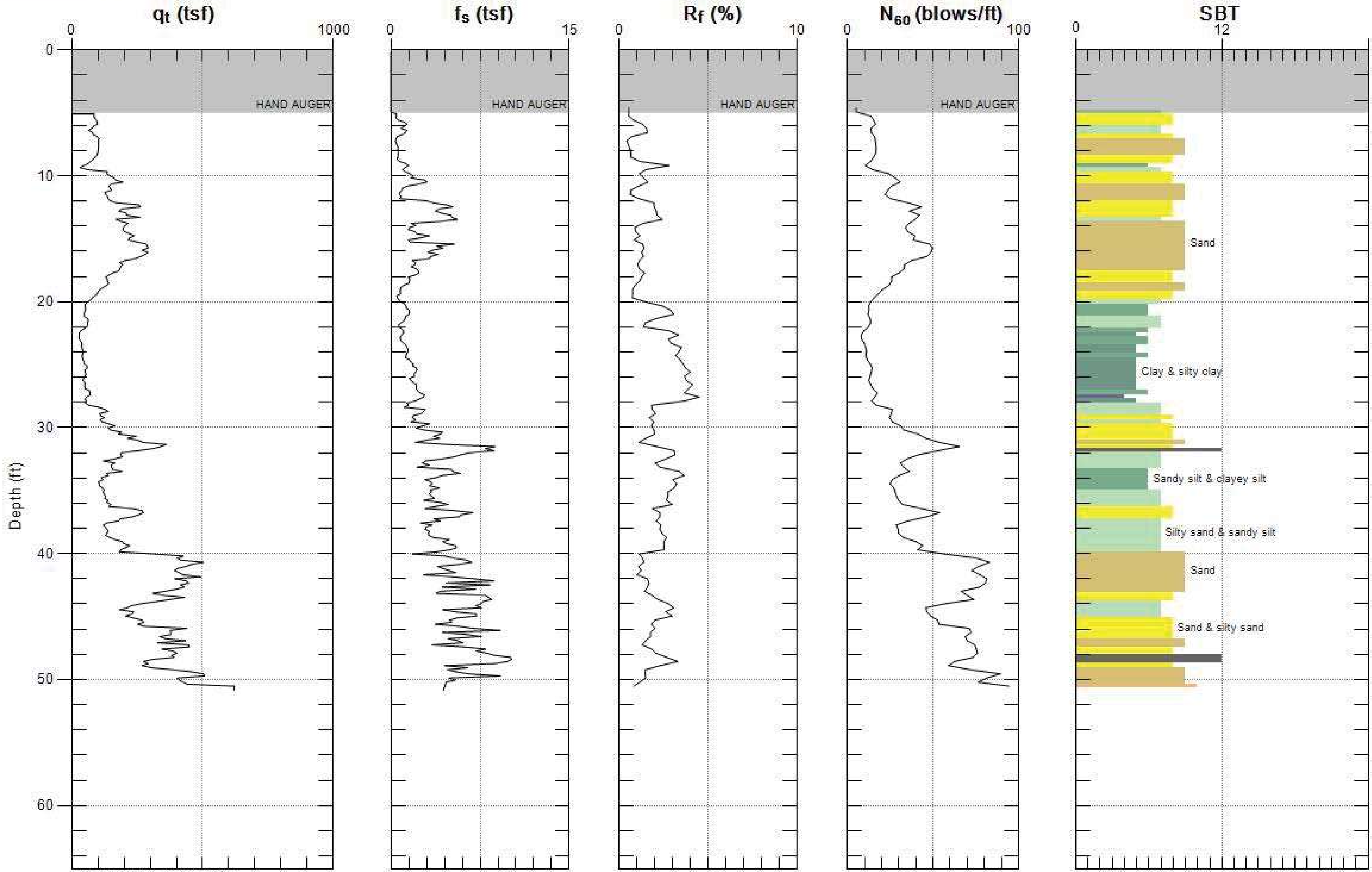
Max. Depth: 61.188 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GROUP DELTA**

Site: ENTERPRISE
Sounding: C-6

Engineer: M.SUTHERLAND
Date: 8/1/2017 10:43



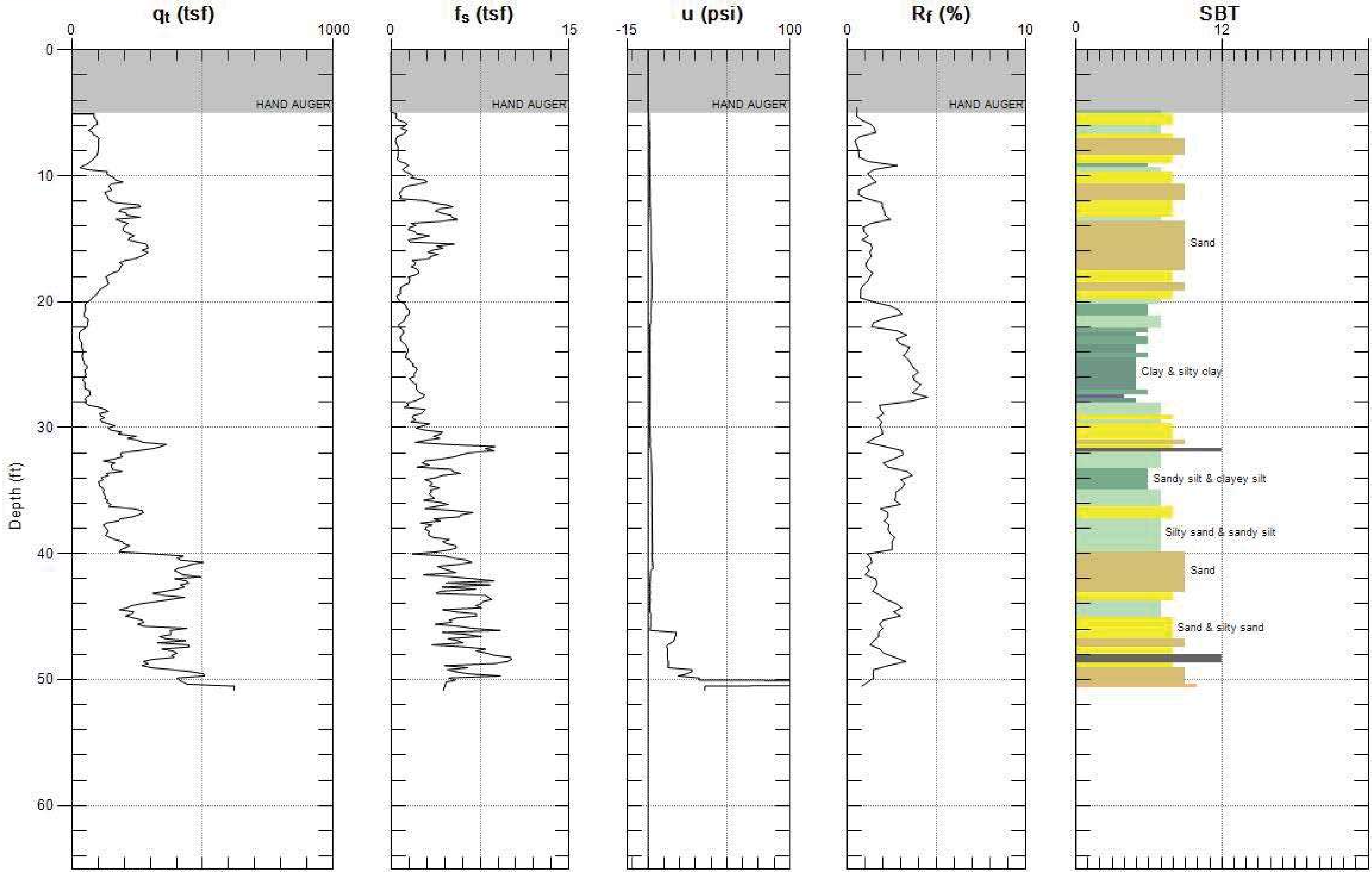
Max. Depth: 50.853 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: ENTERPRISE
Sounding: C-6

Engineer: M.SUTHERLAND
Date: 8/1/2017 10:43



Max. Depth: 50.853 (ft)
Avg. Interval: 0.328 (ft)

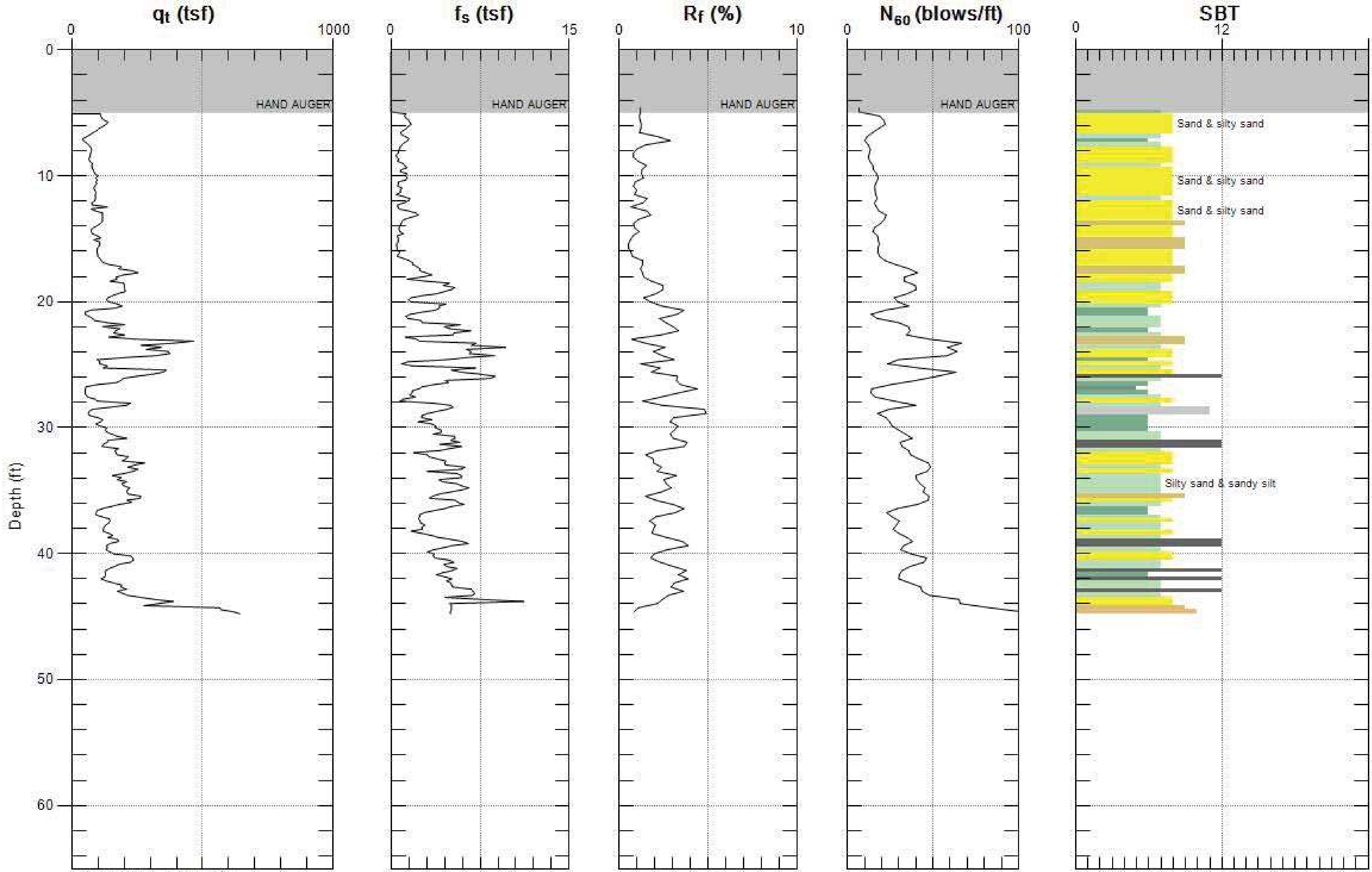
SBT: Soil Behavior Type (Robertson 1990)

GREGG

GROUP DELTA

Site: ENTERPRISE
Sounding: C-7

Engineer: M.SUTHERLAND
Date: 8/1/2017 12:21



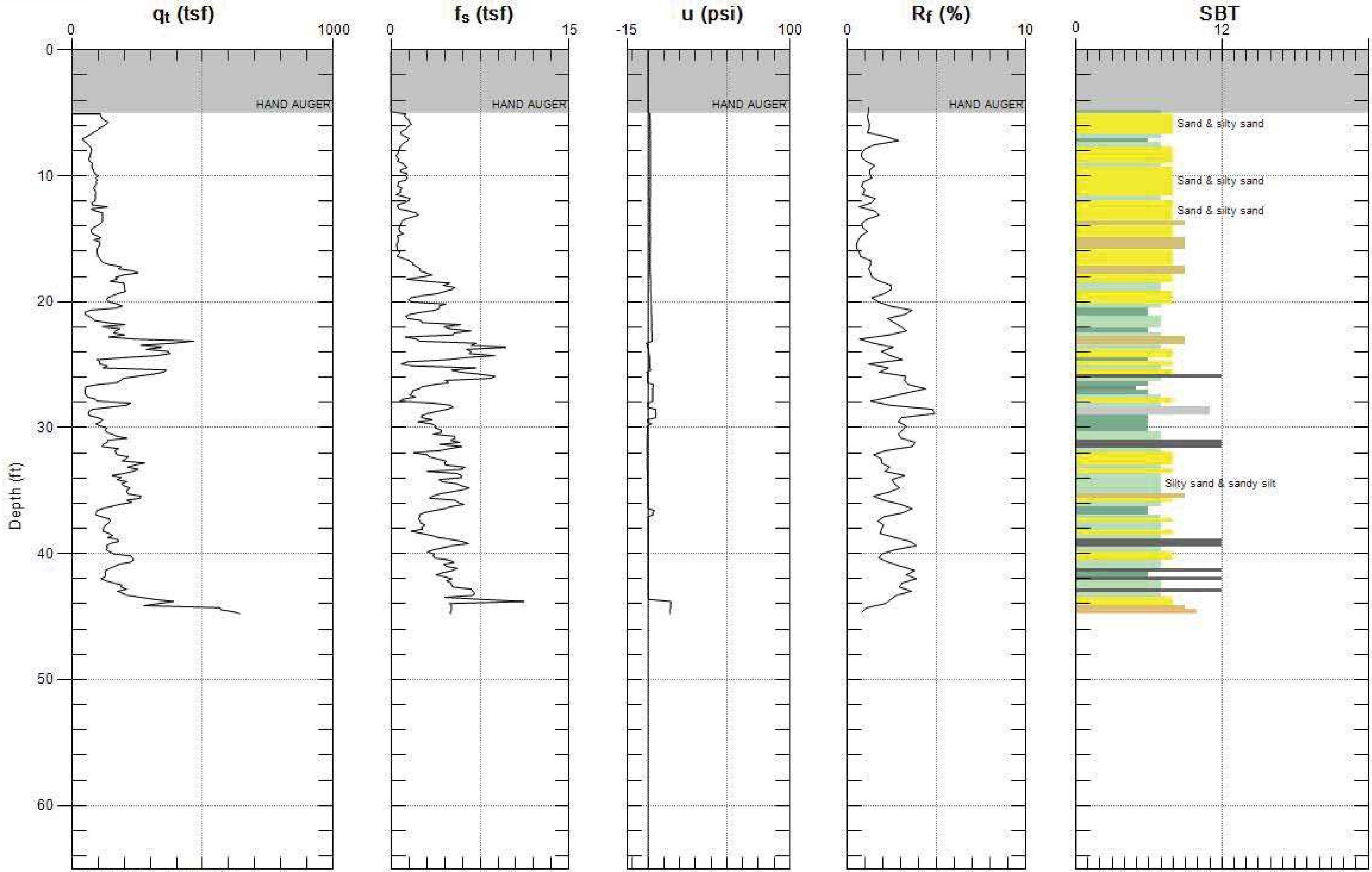
Max. Depth: 44.783 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GROUP DELTA**

Site: ENTERPRISE
Sounding: C-7

Engineer: M.SUTHERLAND
Date: 8/1/2017 12:21



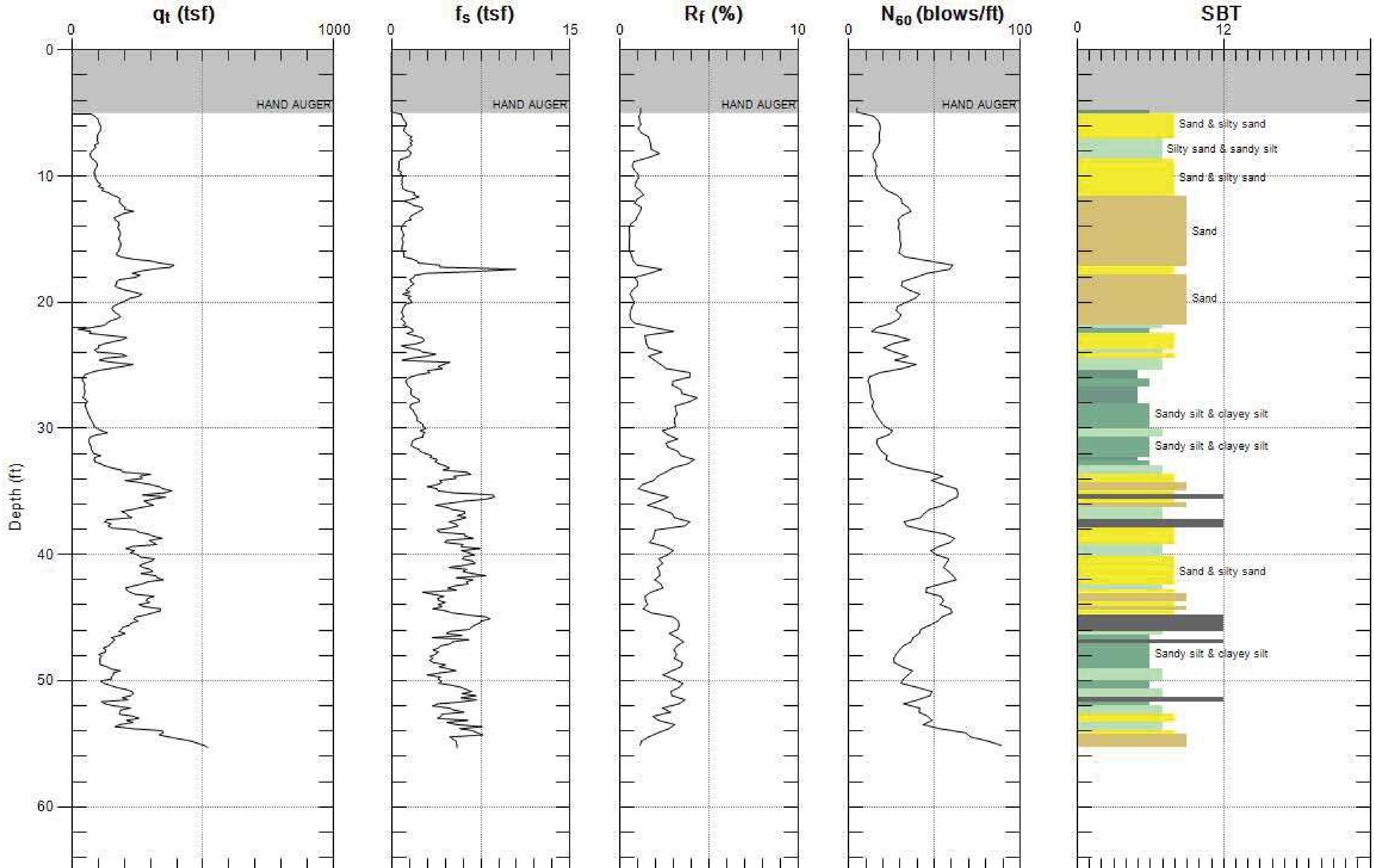
Max. Depth: 44.783 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GROUP DELTA**

Site: ENTERPRISE
Sounding: C-8

Engineer: M.SUTHERLAND
Date: 8/2/2017 10:11



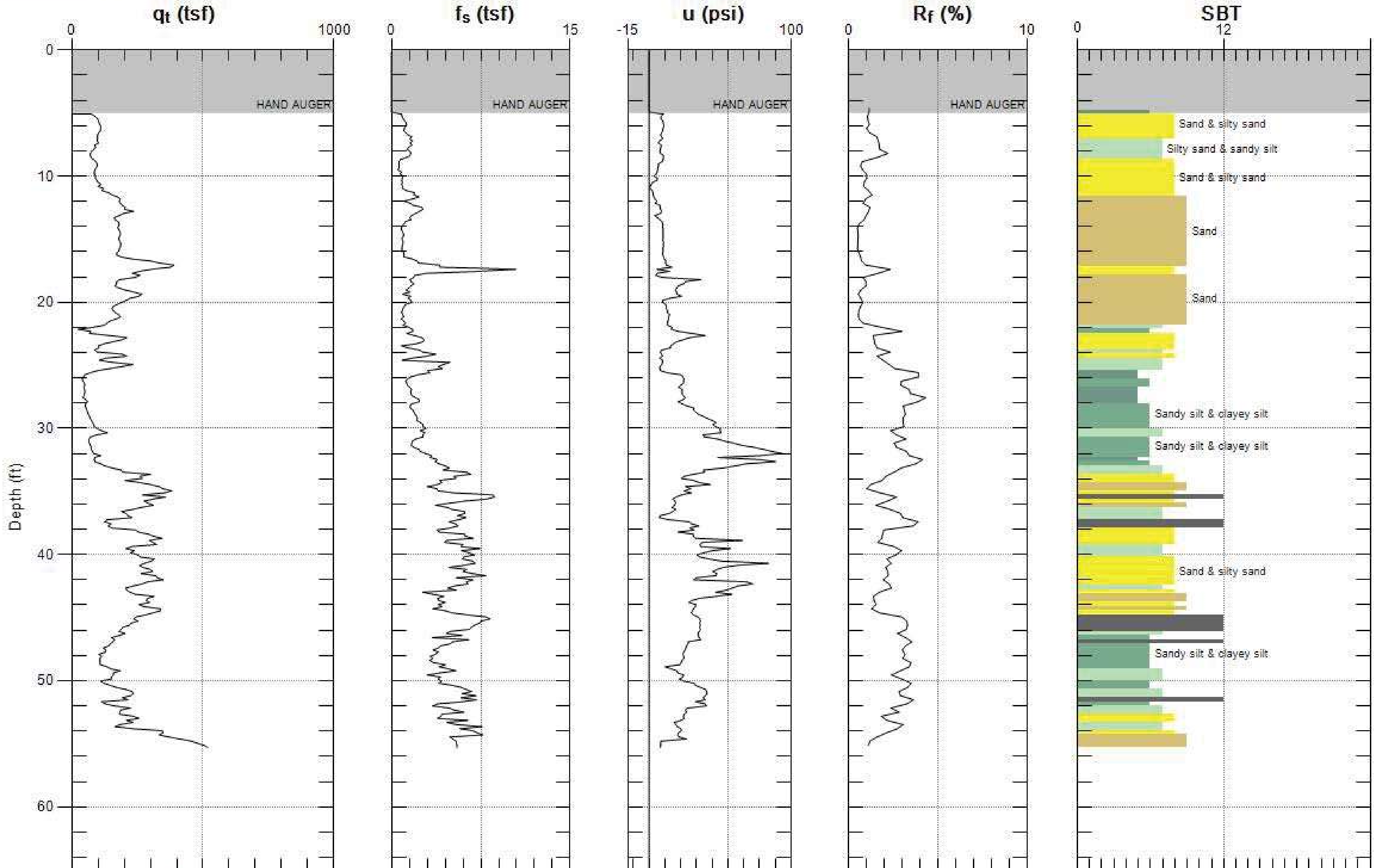
Max. Depth: 55.282 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **GROUP DELTA**

Site: ENTERPRISE
Sounding: C-8

Engineer: M.SUTHERLAND
Date: 8/2/2017 10:11



Max. Depth: 55.282 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

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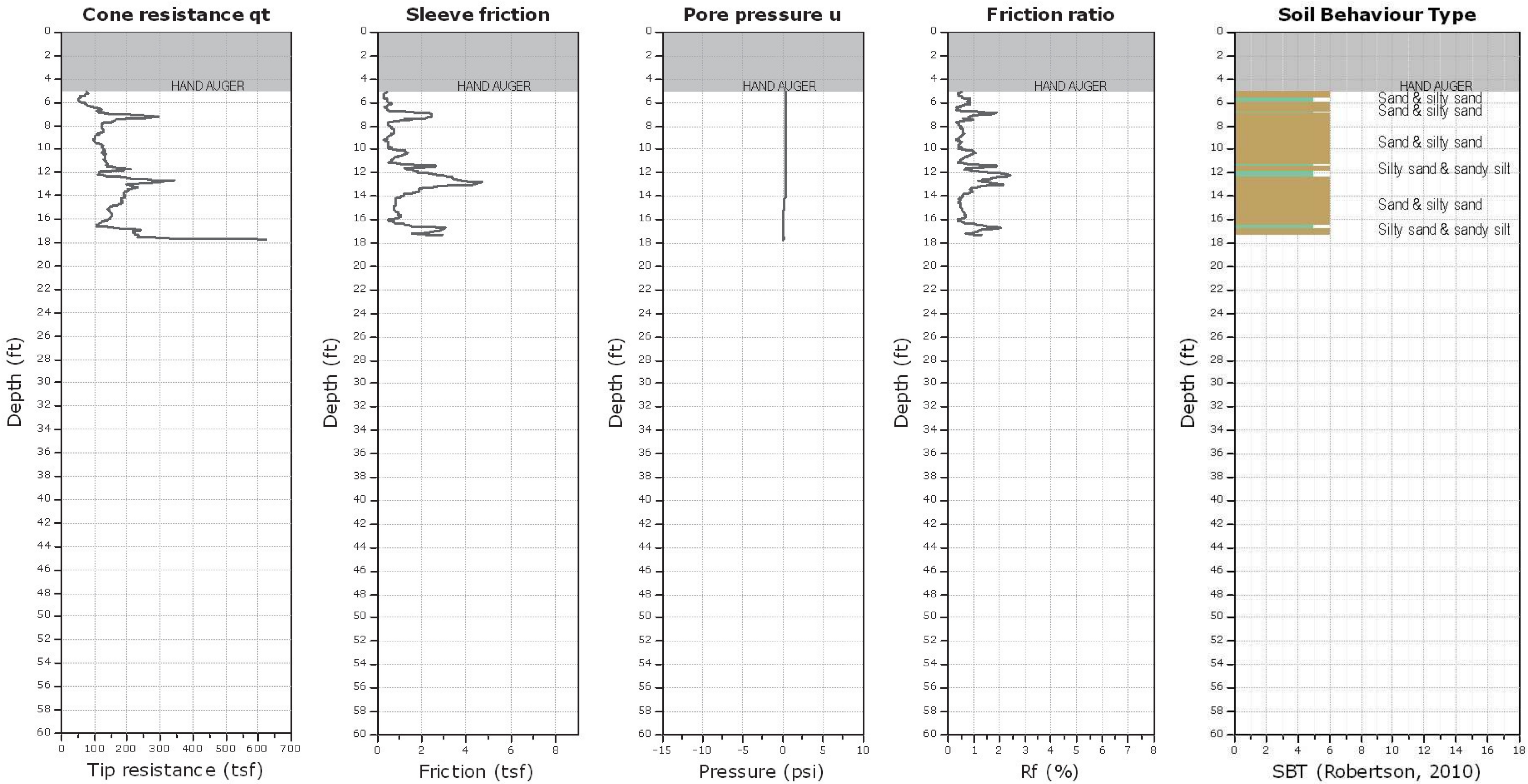
rich@kehoetesting.com
www.kehoetesting.com

Project: **Group Delta Consultants, Inc.**
Location: **1770 Ivar Ave Santa Monica, CA**

C-9 (was CPT-1)
Total depth: 17.73 ft, Date: 9/14/2017
Cone Type: Vertek



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Project file: C:\GroupDeltaSMonica9-17\Plot Data\Plots w-ha.cpt

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www.kehoetesting.com

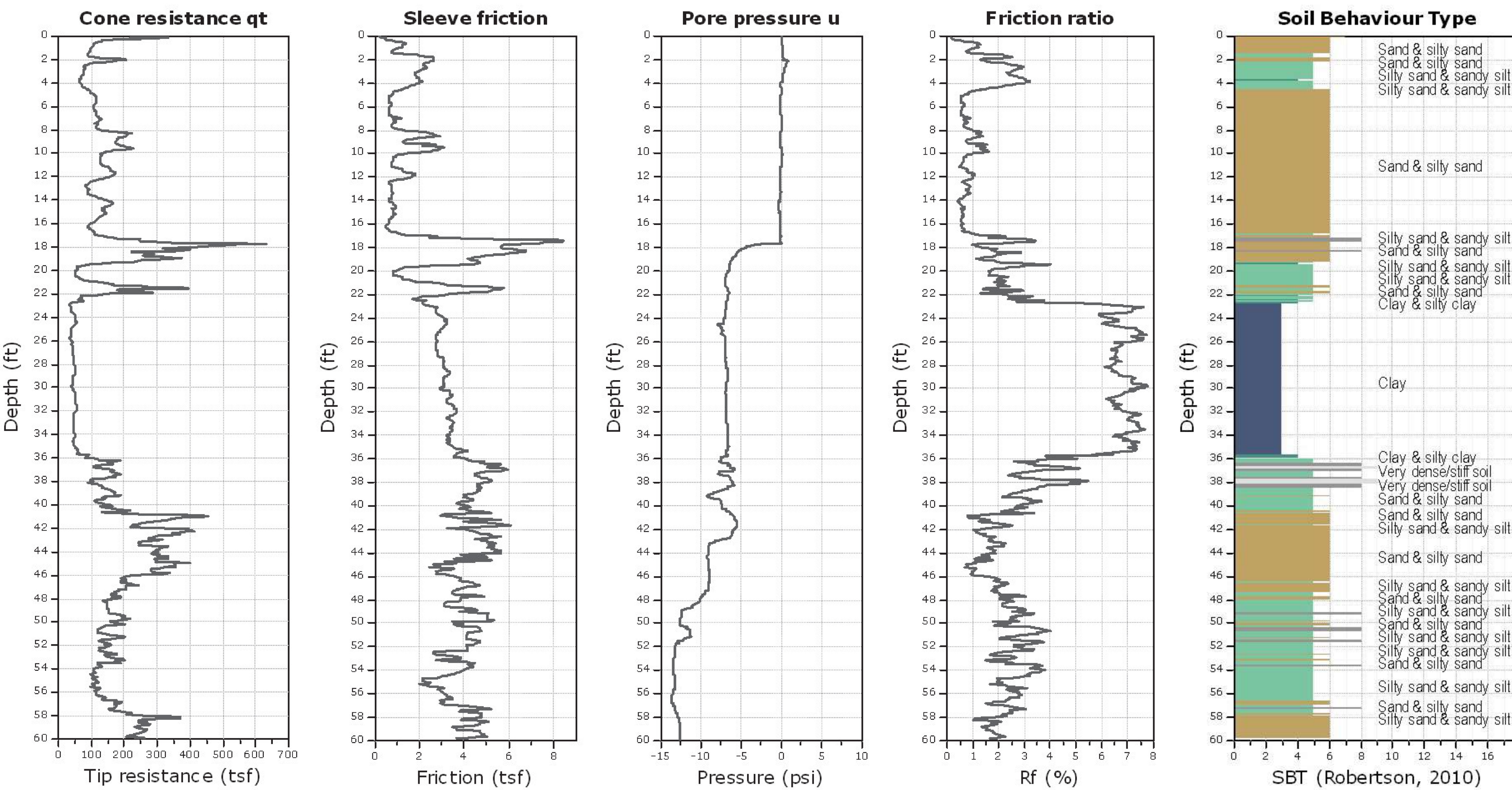
Project: Group Delta Consultants, Inc.

Location: 1770 Ivar Ave Santa Monica, CA

C-9B (was CPT-1B)

Total depth: 60.18 ft, Date: 9/14/2017

Cone Type: Vertek



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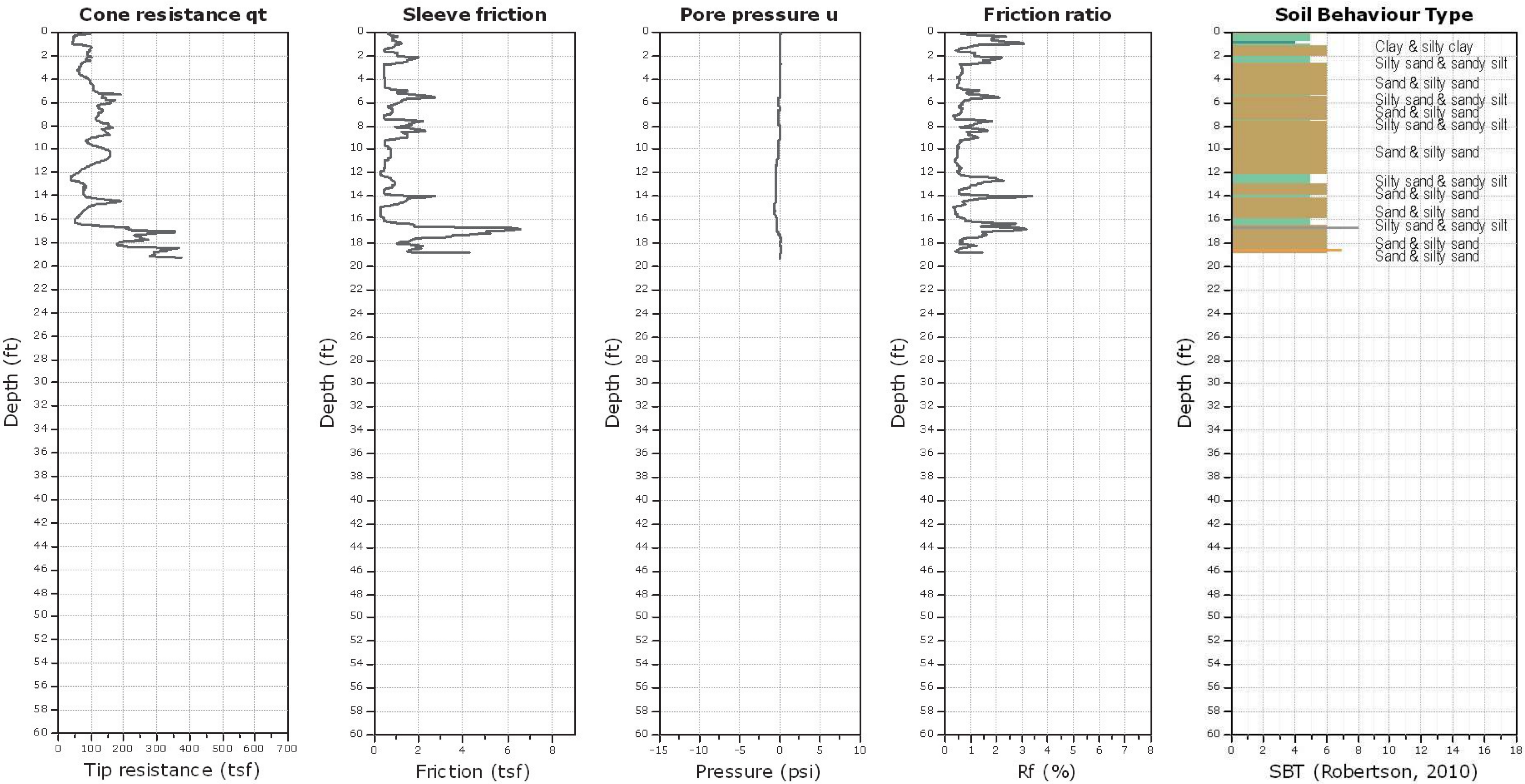
Project: **Group Delta Consultants, Inc.**
Location: **1770 Ivar Ave Santa Monica, CA**

C-9C (was CPT-1C)
Total depth: 19.23 ft, Date: 9/14/2017
Cone Type: Vertek



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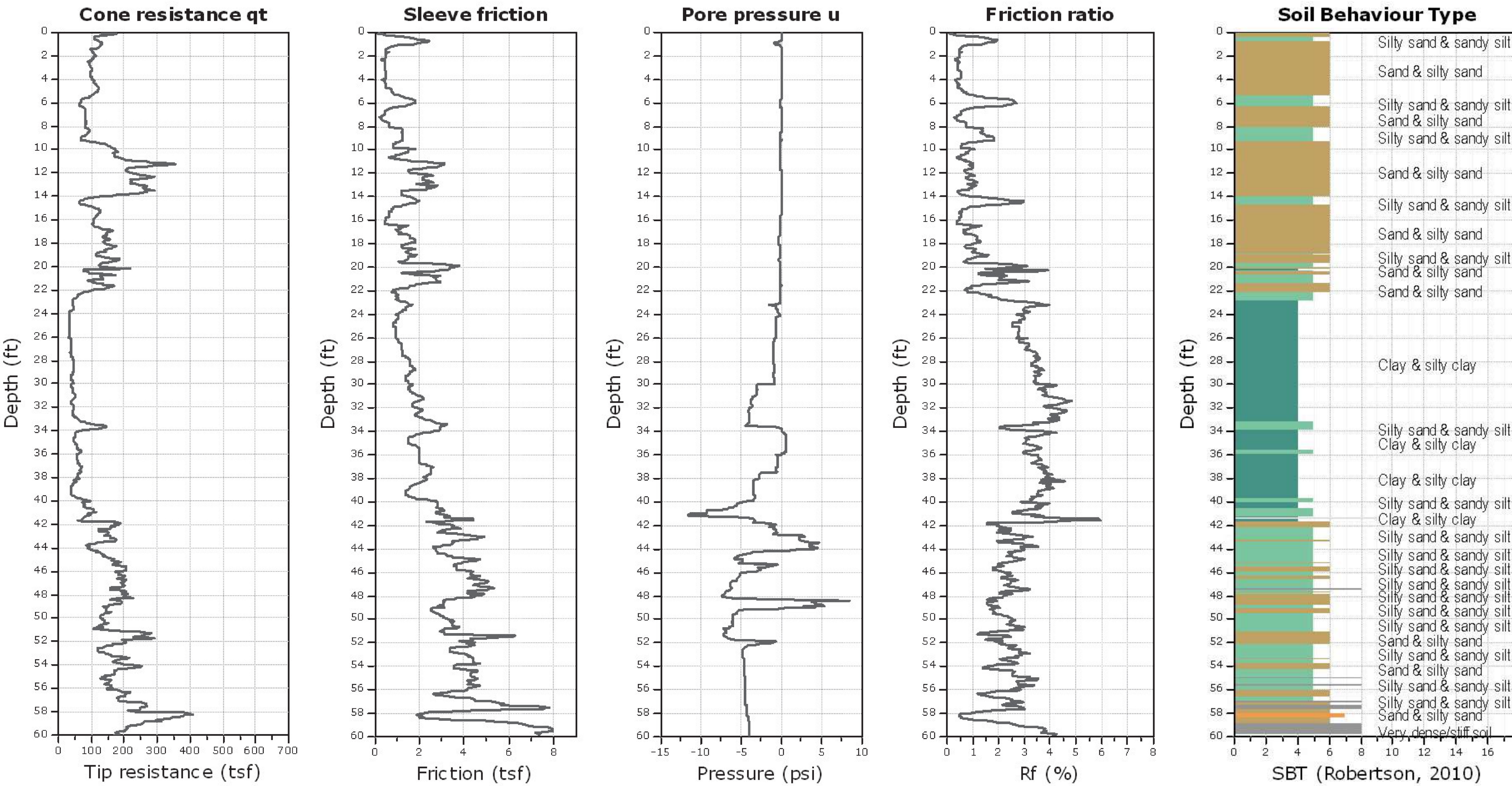
www.kehoetesting.com

Project: Group Delta Consultants, Inc.
Location: 1770 Ivar Ave Santa Monica, CA

CPT-2
Total depth: 60.17 ft, Date: 9/14/2017
Cone Type: Vertek



Kehoe Testing and Engineering
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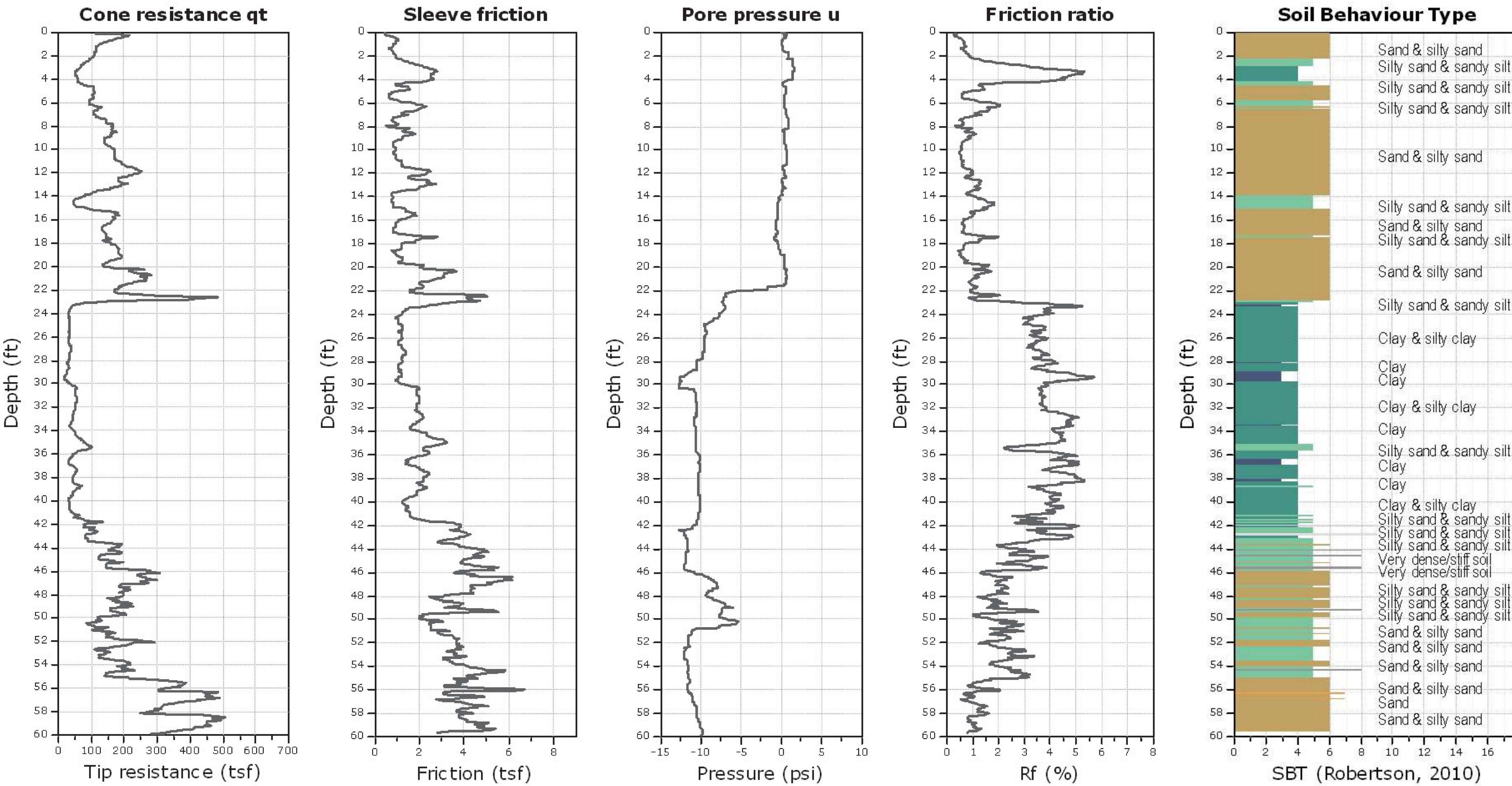
www.kehoetesting.com

Project: **Group Delta Consultants, Inc.**
Location: **1770 Ivar Ave Santa Monica, CA**

C-11 (was CPT-3)
Total depth: 59.97 ft, Date: 9/14/2017
Cone Type: Vertek



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Kehoe Testing and Engineering
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www.kehoetesting.com

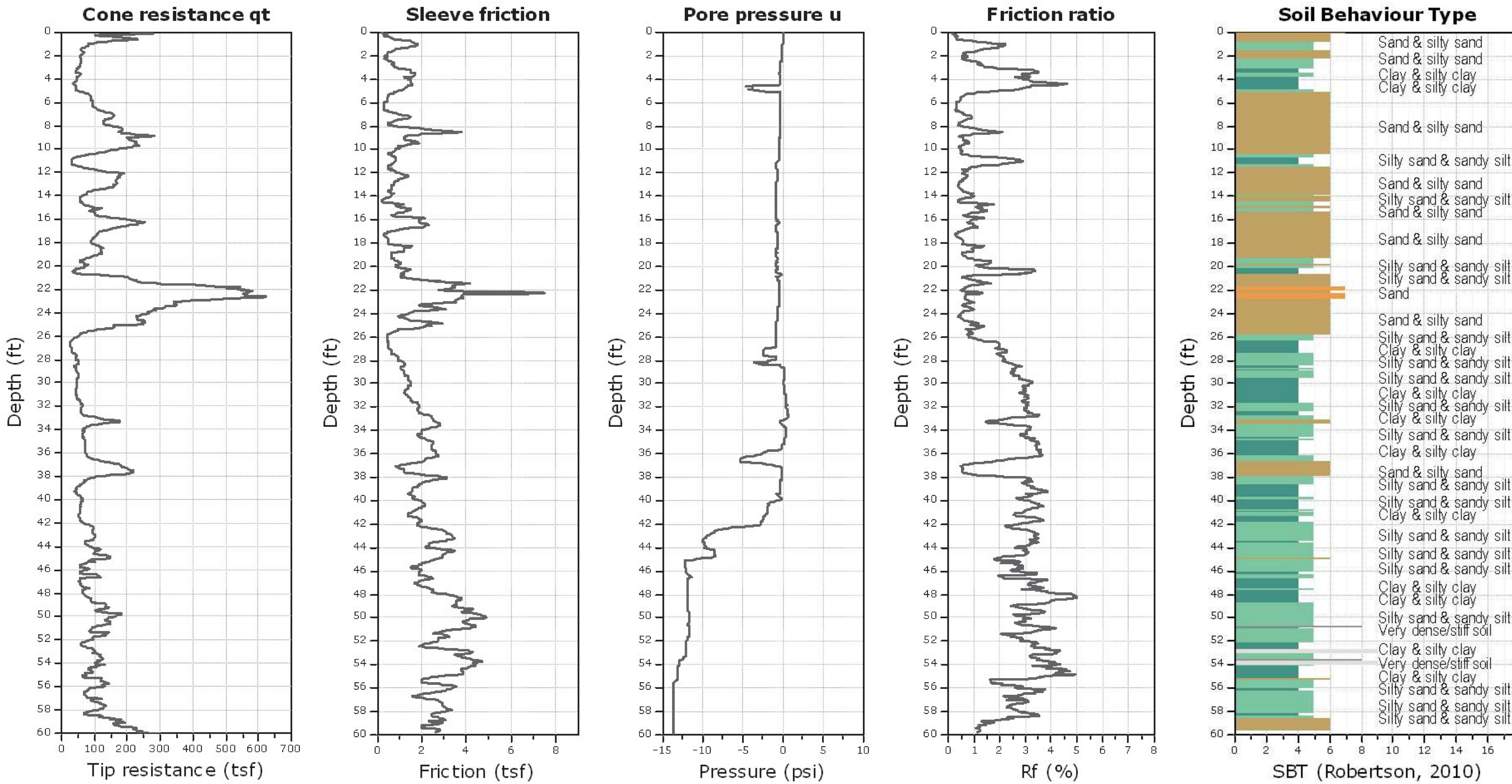
Project: Group Delta Consultants, Inc.

Location: 1770 Ivar Ave Santa Monica, CA

C-12 (was CPT-4)

Total depth: 60.11 ft, Date: 9/14/2017

Cone Type: Vertek



Prior Investigation (GDC, 2015)
O-O' Line Boring Logs B-11 and B-12
O-O' Line CPT Record C-22 through C-25

LOG OF CORE BORING

PROJECT NAME	West Millennium Site
PROJECT NUMBER	LA-1191B
BORING	B-11
SITE LOCATION	1720-1750 N. Vine St.
DATE(S) DRILLED	2/9/2015
LOGGED BY	Terry Otis
SHEET NO.	1 of 3
DRILLING METHOD	Hollow Stem Auger
DRILL BIT SIZE/TYPE	8 in
CHECKED BY	Steve Kolthoff
TOTAL DEPTH DRILLED (feet)	40
DRILL RIG TYPE	CME 85
DRILLED BY	ABC Drilling
INCLINATION FROM VERTICAL/BEARING	0
APPARENT GROUNDWATER DEPTH	None encountered
APPROXIMATE PILE TOP ELEVATION (feet)	395
COMMENTS	
BOREHOLE BACKFILL	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
0	395								Asphalt, approximately 6-inches thick				
									Artificial Fill (Qaf)				
5	390	1	1	30/30									
									OLDER ALLUVIUM (Qoal)				
									Clayey SAND 5YR 3/2 (dark reddish brown); moist; mostly fine SAND; trace medium to coarse SAND; trace fine GRAVEL; trace red weathered weathered basalt fragments.				
		2		30/30					**Clayey SAND to sandy CLAY** 5YR 4/4 (reddish brown); moist; mostly fine SAND; trace medium and coarse SAND; trace fine GRAVEL; trace red weathered basalt fragments.				
10	385	3	2	28/30					**Clayey SAND** 7.5YR 3/4 (dark reddish brown); moist; mostly fine SAND; trace medium to coarse SAND; trace fine GRAVEL; trace red weathered weathered basalt fragments.				
		4		23/30					**Silty SAND** 7.5YR 4/6 (strong brown); moist; mostly fine SAND; trace medium and coarse SAND; trace fine GRAVEL.				
15	380	5	3	26/30					@ 16': trace red weathered basalt fragments.				
		6		28/30					**Clayey SAND** 7.5YR 4/6 (strong brown); moist; mostly fine to medium SAND; trace coarse SAND; trace fine GRAVEL; trace red weathered basalt fragments. @ 18': increase in clay content; mostly fine SAND; trace medium to coarse SAND; trace fine GRAVEL.				
20	375												

GDC_ROCK_CORE_ENG_LA LA-1191B SOIL CORES B-1 - B-12.GPJ ROCK2.GDT 6/3/19

LOG OF CORE BORING

PROJECT NAME West Millennium Site	**PROJECT NUMBER** LA-1191B	**BORING** **B-11**	
SITE LOCATION 1720-1750 N. Vine St.	**DATE(S) DRILLED** 2/9/2015	**LOGGED BY** Terry Otis	**SHEET NO.** 2 of 3
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 8 in	**CHECKED BY** Steve Kolthoff	**TOTAL DEPTH DRILLED (feet)** 40
DRILL RIG TYPE CME 85	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 395	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		7	4	33/30									
		8		20/30					@ 21': trace red weathered basalt fragments; trace black carbon fragments. @ 22.5': increase in sand content; mostly fine SAND; with trace medium to coarse SAND; trace fine GRAVEL.				
25	370	9	5	27/30					**Silty Clayey SAND**7.5YR 4/6 (strong brown); moist; mostly fine SAND; little medium SAND; trace coarse SAND; trace fine GRAVEL. @ 26': trace medium to coarse SAND; trace fine gravel; trace carbon fragments. @ 27': trace red weathered basalt fragments.				
		10		21/30					@ 29.5': mostly fine to medium SAND; trace coarse SAND; trace fine GRAVEL.				
30	365	11	6	31/30					**Clayey SAND**7.5YR 4/4 (strong brown); moist; mostly fine SAND; few medium SAND; trace coarse SAND; trace fine GRAVEL.				
		12		36/30									
35	360	13	7	36/30									
		14		21/30					@ 39': Wet; groundwater encountered during drilling.				
	355												

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Torrance, CA 90501

FIGURE b

LOG OF CORE BORING

PROJECT NAME West Millennium Site	**PROJECT NUMBER** LA-1191B	**BORING** B-11	
SITE LOCATION 1720-1750 N. Vine St.	**DATE(S) DRILLED** 2/9/2015	**LOGGED BY** Terry Otis	**SHEET NO.** 3 of 3
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 8 in	**CHECKED BY** Steve Kolthoff	**TOTAL DEPTH DRILLED (feet)** 40
DRILL RIG TYPE CME 85	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 395	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Total depth = 40 feet below ground surface. Groundwater encountered during drilling at approximately 39 feet below ground surface. Backfilled with soil cuttings and patched with cold patch.				
45	350												
50	345												
55	340												
	335												

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
West Millennium Site	LA-1191B	B-12

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
1720-1750 N. Vine St.	2/5/2015	Eguene Lewis	1 of 4

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Hollow Stem Auger	8 in	Steve Kolthoff	60

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 85	ABC Drilling	0

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	396

COMMENTS	BOREHOLE BACKFILL

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	395								Asphalt approximately 3 inches thick				
									Artificial Fill (Qaf)				
		1	1	1.4/2.5									
5	390	2		1.7/2.5					**OLDER ALLUVIUM (Qoal)**				
									Clayey SAND 7.5YR 5/6 (strong brown); moist; mostly fine to medium SAND; trace coarse SAND.				
									Sandy CLAY 7.5YR 5/6 (strong brown); moist; mostly fine SAND.				
		3		1.9/2.5					**Clayey SAND** 7.5YR 4/4 (brown); moist; mostly fine to medium SAND; trace coarse SAND; trace fine GRAVEL.				
10	385	4		2.1/2.5									
		5		3.0/2.5					**Silty SAND** 7.5YR 4/4 (brown); moist; mostly fine to medium SAND; trace coarse SAND.				
15	380	6	2	2.5/2.5					**Clayey SAND** 7.5YR 4/4 (brown); moist; mostly fine to medium SAND; trace coarse SAND.				
		7		2.1/2.5					**Silty SAND** 7.5YR 4/4 (brown); moist; mostly fine SAND; trace medium SAND and fine GRAVEL.				

GDC_ROCK_CORE_ENG_LA LA-1191B SOIL CORES B-1 - B-12.GPJ ROCK2.GDT 6/3/19

LOG OF CORE BORING	PROJECT NAME West Millennium Site	PROJECT NUMBER LA-1191B	BORING B-12
SITE LOCATION 1720-1750 N. Vine St.	DATE(S) DRILLED 2/5/2015	LOGGED BY Eguene Lewis	SHEET NO. 2 of 4
DRILLING METHOD Hollow Stem Auger	DRILL BIT SIZE/TYPE 8 in	CHECKED BY Steve Kolthoff	TOTAL DEPTH DRILLED (feet) 60
DRILL RIG TYPE CME 85	DRILLED BY ABC Drilling	INCLINATION FROM VERTICAL/BEARING 0	
APPARENT GROUNDWATER DEPTH None encountered		APPROXIMATE PILE TOP ELEVATION (feet) 396	
COMMENTS		BOREHOLE BACKFILL	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
			3										
	375	8		2.3/2.5									
									@ 22': mostly fine to medium SAND.				
		9		2.4/2.5					@ 23.5': mostly fine SAND				
25													
	370	10		2.5/2.5									
									Mud Flow (Qm) **Clayey SAND** 7.5YR 4/4 (brown); moist; mostly fine SAND; trace fine GRAVEL.				
		11		3.0/2.5									
30			4										
	365	12		2.3/2.5					**Old Alluvium (Qoal)** **Silty SAND** 7.5 YR 4/6 (strong brown); moist; mostly fine SAND with few medium SAND; trace fine GRAVEL.				
		13		2.3/2.5									
35													
	360	14		2.4/2.5									
									Sandy CLAY 7.5YR 4/6 (strong brown); moist; mostly fine to medium SAND; trace coarse SAND; trace fine GRAVEL.				
		15	5	4.5/5.0									

LOG OF CORE BORING

PROJECT NAME West Millennium Site	**PROJECT NUMBER** LA-1191B	**BORING** B-12	
SITE LOCATION 1720-1750 N. Vine St.	**DATE(S) DRILLED** 2/5/2015	**LOGGED BY** Eguene Lewis	**SHEET NO.** 3 of 4
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 8 in	**CHECKED BY** Steve Kolthoff	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE CME 85	**DRILLED BY** ABC Drilling	**INCLINATION FROM VERTICAL/BEARING** 0	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 396	
COMMENTS		**BOREHOLE BACKFILL**	

DEPTH (ft)	ELEVATION (ft)	RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	355												
		16		2.3/2.5									
45	350	17		2.5/2.5									
			6										
		18		2.5/2.5									
50	345	19		2.3/2.5					**Topanga Formation (Tt)** **Silty SAND** 7.5YR 4/4 (brown); moist to wet; mostly fine to medium SAND; few fine to coarse GRAVEL, interbedded conglomerate and silt stone.				
		20		2.3/2.5									
55	340	21	7	2.5/2.5									
		22		1.5/1.5									

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FIGURE c

LOG OF CORE BORING

PROJECT NAME	PROJECT NUMBER	BORING
West Millennium Site	LA-1191B	B-12

SITE LOCATION	DATE(S) DRILLED	LOGGED BY	SHEET NO.
1720-1750 N. Vine St.	2/5/2015	Eguene Lewis	4 of 4

DRILLING METHOD	DRILL BIT SIZE/TYPE	CHECKED BY	TOTAL DEPTH DRILLED (feet)
Hollow Stem Auger	8 in	Steve Kolthoff	60

DRILL RIG TYPE	DRILLED BY	INCLINATION FROM VERTICAL/BEARING
CME 85	ABC Drilling	0

APPARENT GROUNDWATER DEPTH	APPROXIMATE PILE TOP ELEVATION (feet)
None encountered	396

COMMENTS	BOREHOLE BACKFILL

DEPTH (ft)	ELEVATION (ft)	ROCK CORE						LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
		RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER						
	335								Total depth = 60 feet below ground surface. Ground water encountered at approximately 50 ft during drilling Backfilled with soil cuttings and patched with cold patch.				
65													
	330												
70													
	325												
75													
	320												

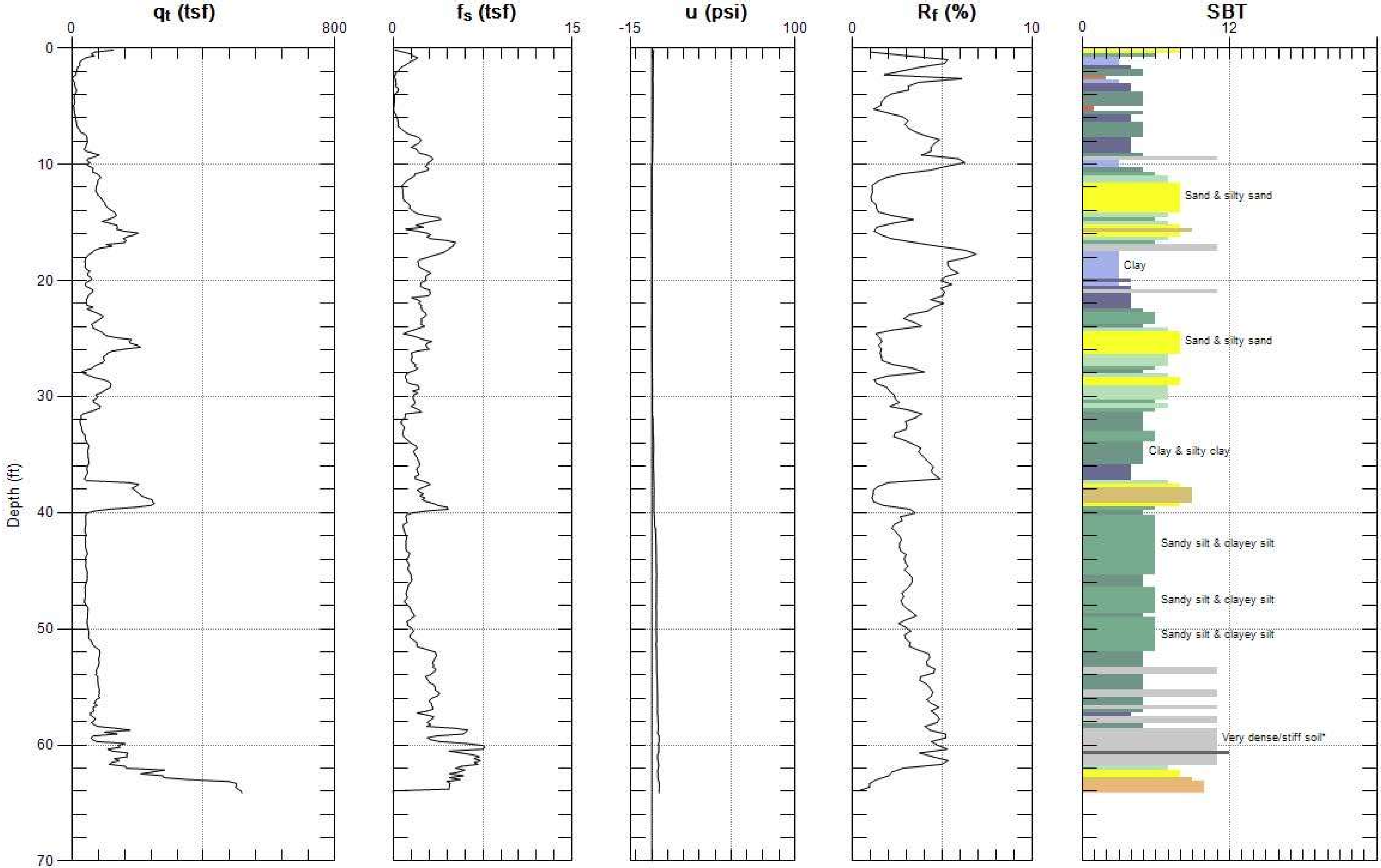
GDC_ROCK_CORE_ENG_LA LA-1191B SOIL CORES B-1 - B-12.GPJ ROCK2.GDT 6/3/19

GREGG

GROUP DELTA

Site: HOLLYWOOD MILLENNIUM Engineer: E.HOLLIDAY

Sounding: C-22 Date: 6/7/2012 10:12



Max. Depth: 64.140 (ft)
Avg. Interval: 0.328 (ft)

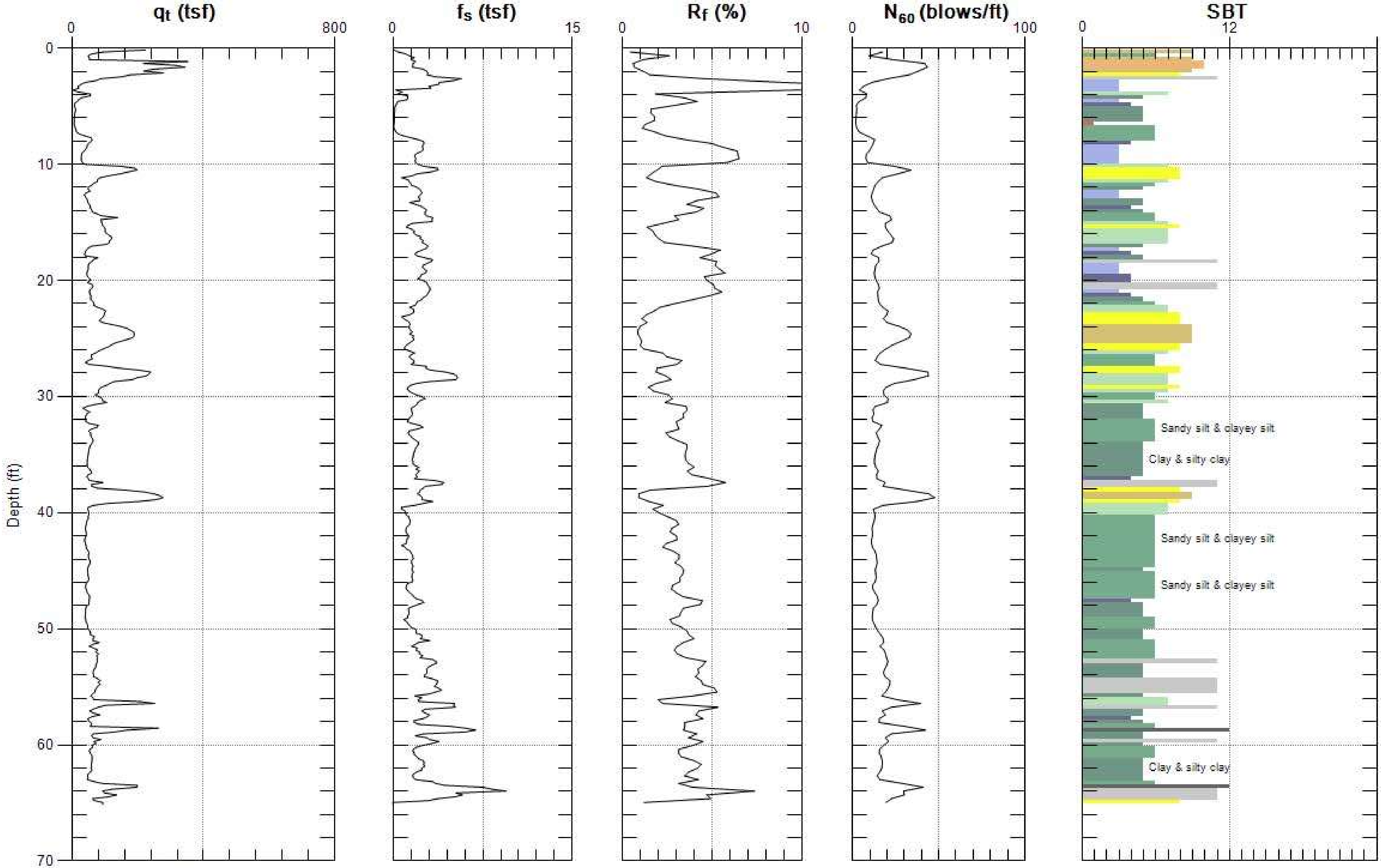
SBT: Soil Behavior Type (Robertson 1990)

GREGG

GROUP DELTA

Site: HOLLYWOOD MILLENNIUM Engineer: E.HOLLIDAY

Sounding: C-23 Date: 6/7/2012 10:40



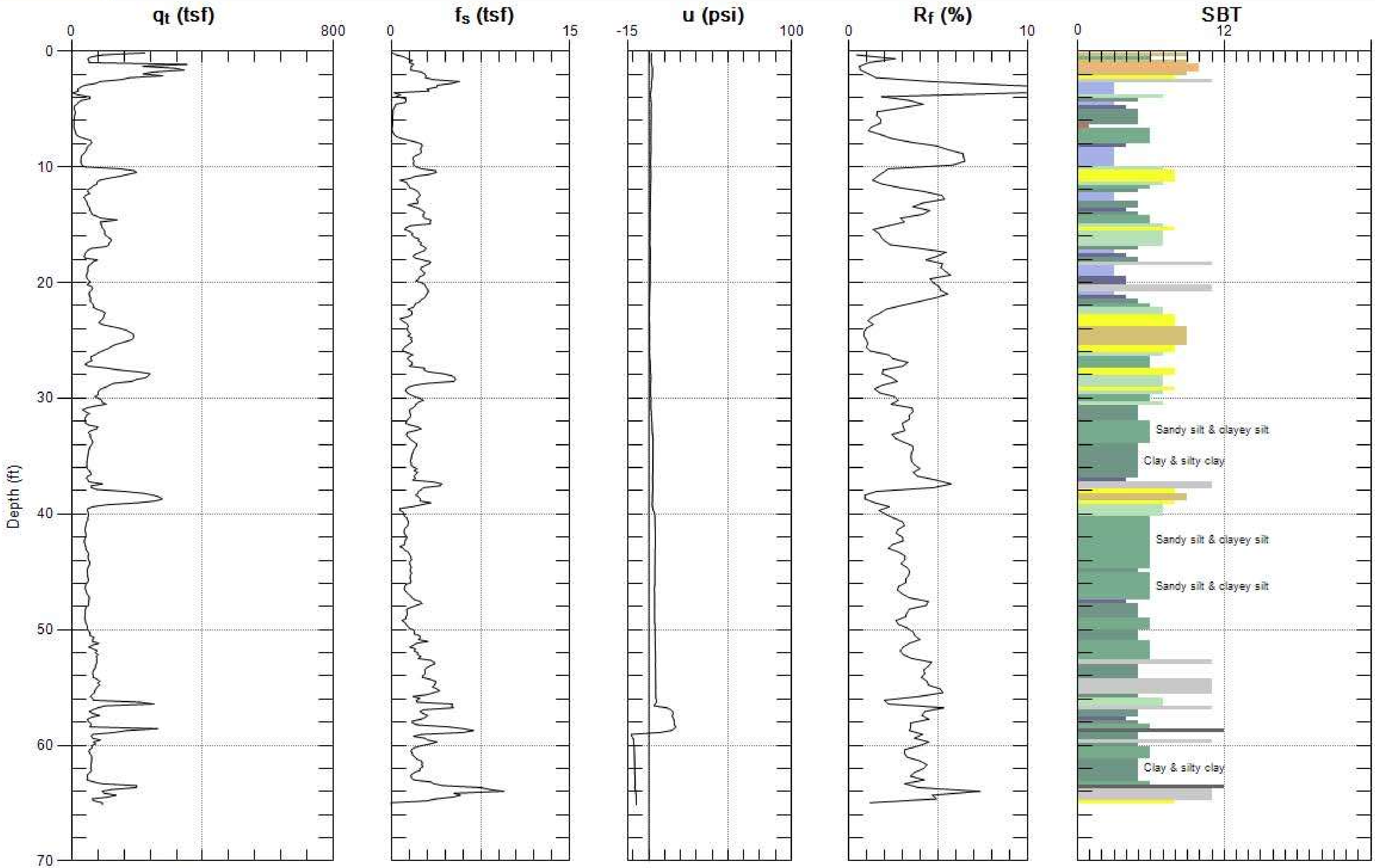
Max. Depth: 65.125 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

GROUP DELTA

Site: HOLLYWOOD MILLENNIUM Engineer: E.HOLLIDAY
Sounding: C-23 Date: 6/7/2012 10:40



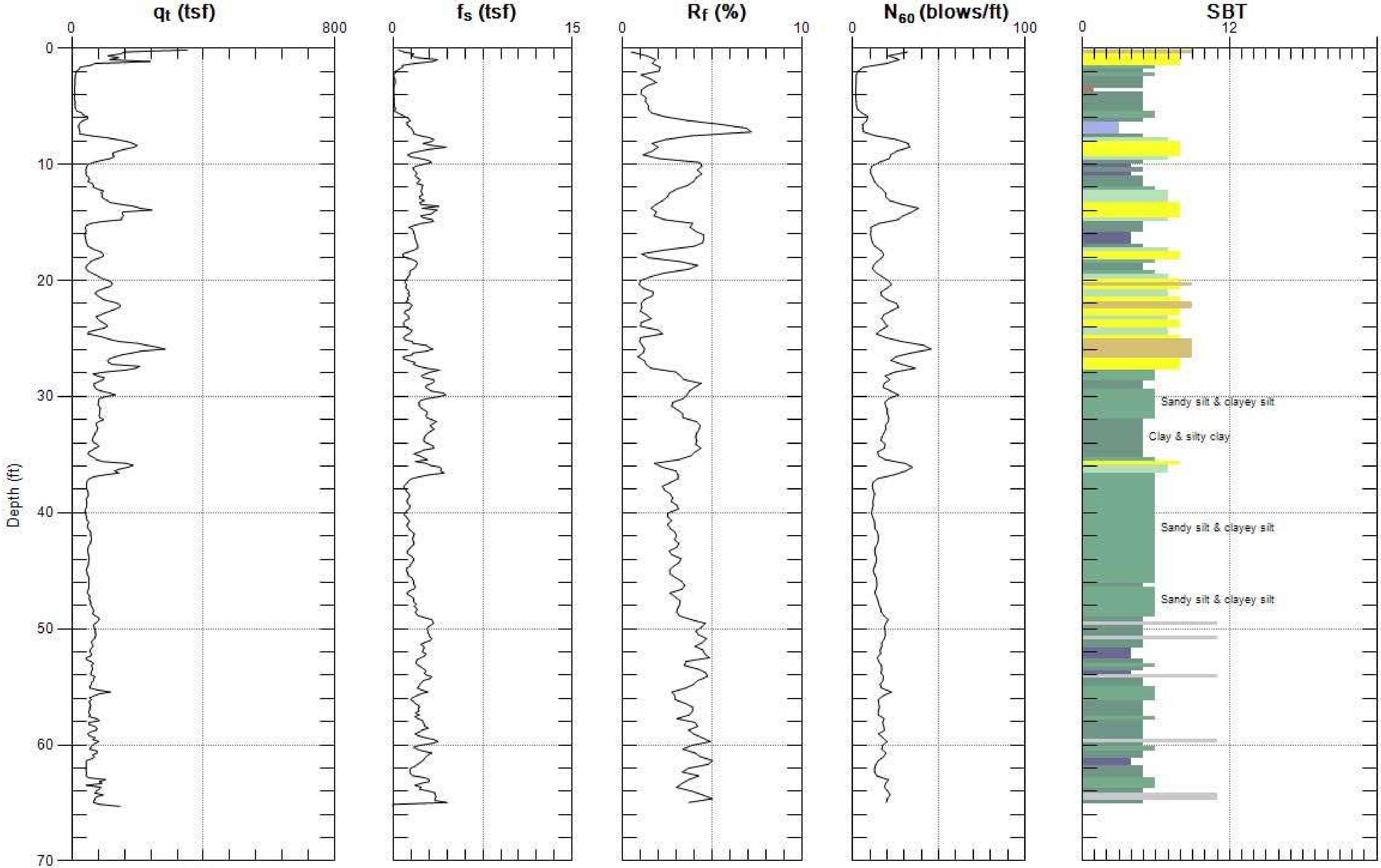
Max. Depth: 65.125 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: HOLLYWOOD MILLENNIUM Engineer: E.HOLLIDAY

Sounding: C-24 Date: 6/7/2012 11:15



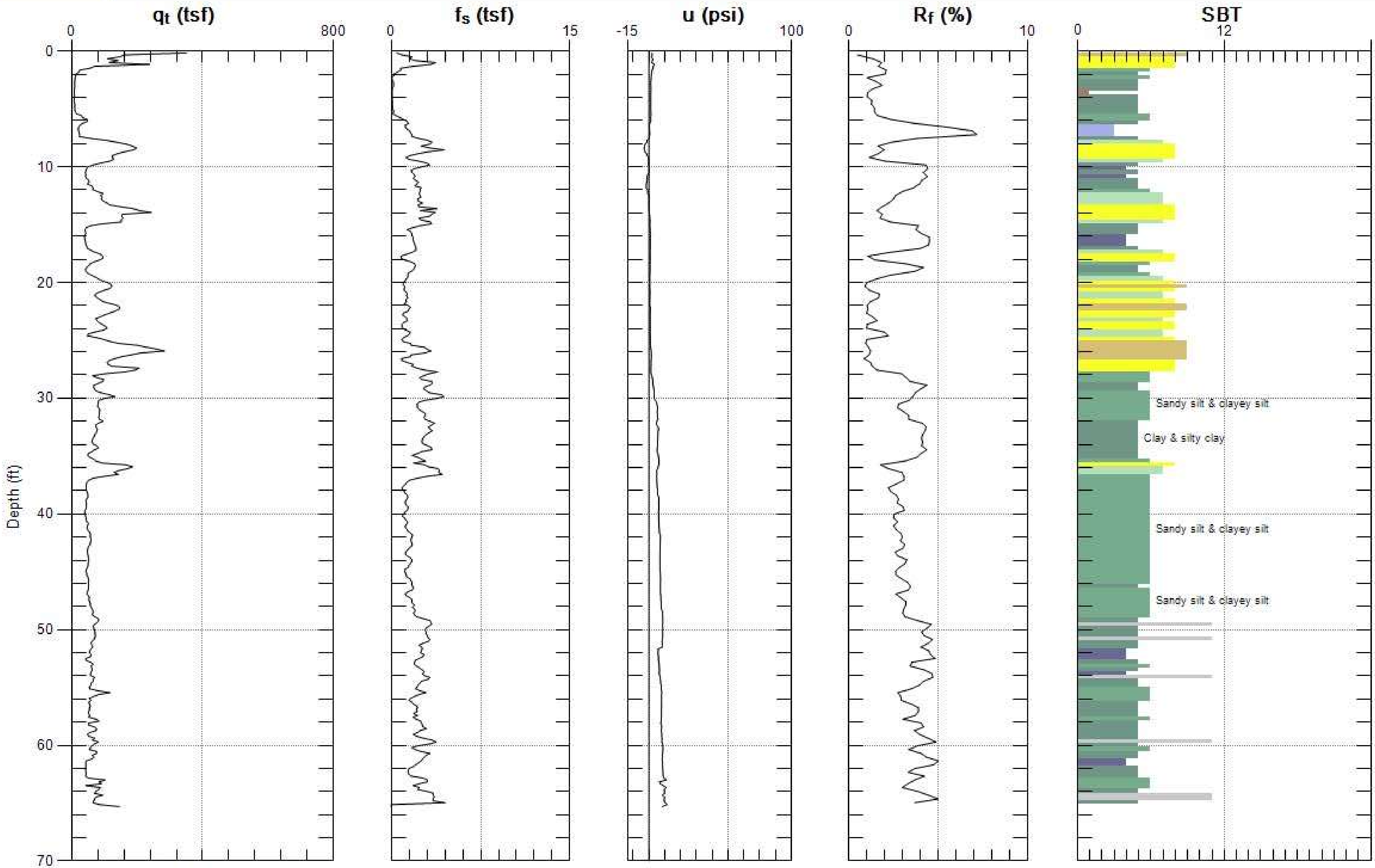
Max. Depth: 65.289 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: HOLLYWOOD MILLENNIUM Engineer: E.HOLLIDAY

Sounding: C-24 Date: 6/7/2012 11:15



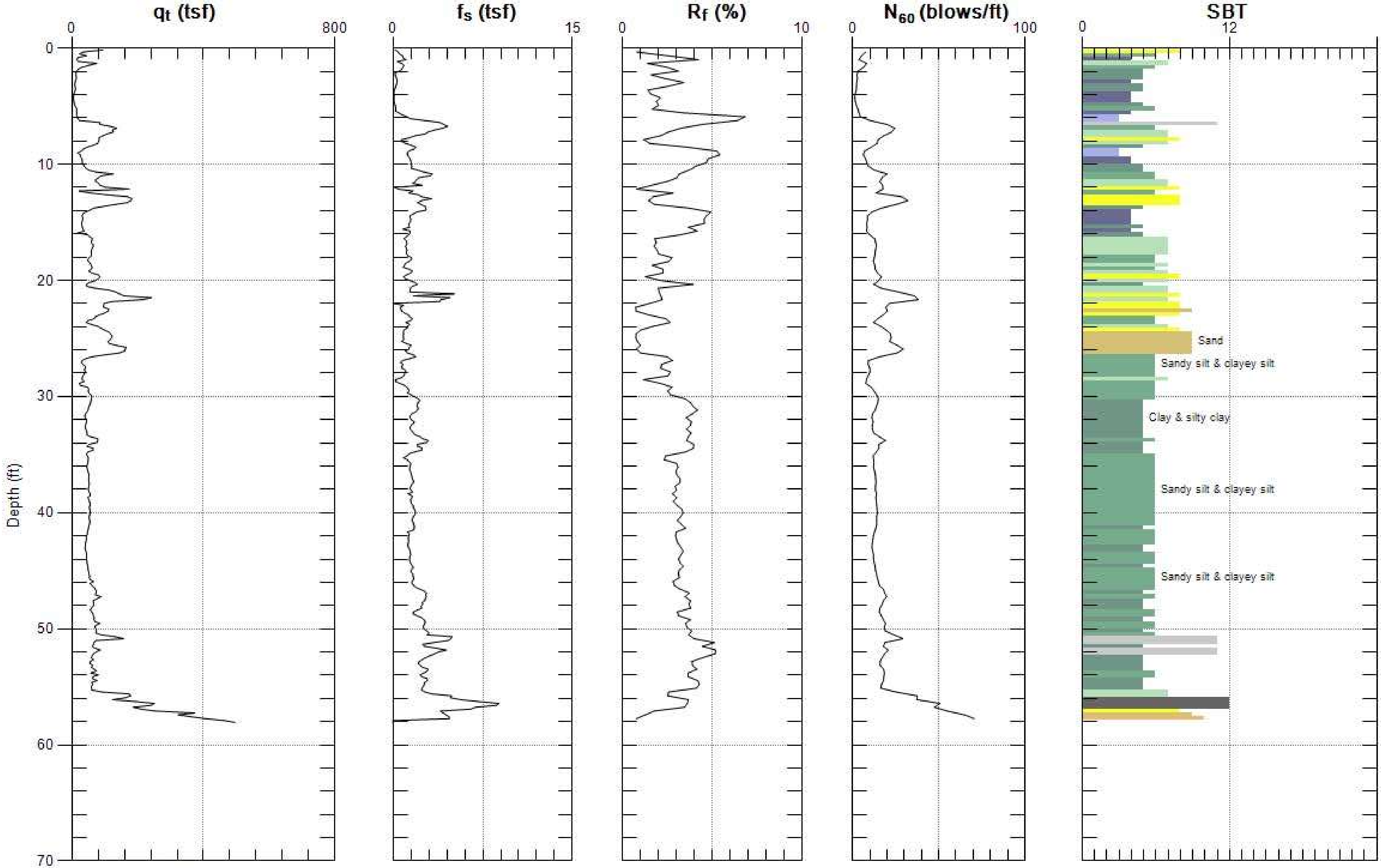
Max. Depth: 65.289 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: HOLLYWOOD MILLENNIUM Engineer: E.HOLLIDAY

Sounding: C-25 Date: 6/7/2012 11:39



Max. Depth: 58.071 (ft)
Avg. Interval: 0.328 (ft)

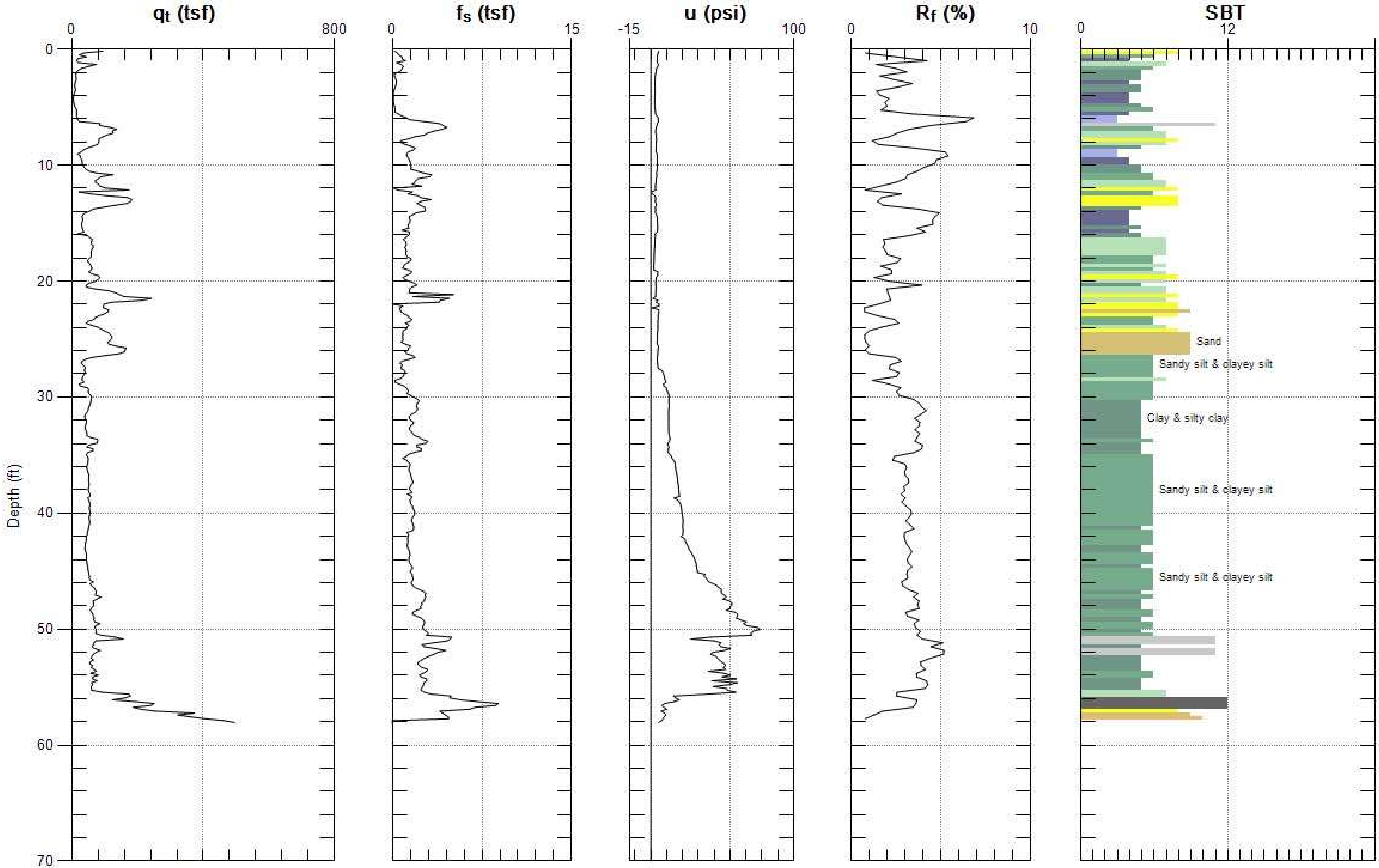
SBT: Soil Behavior Type (Robertson 1990)

GREGG

GROUP DELTA

Site: HOLLYWOOD MILLENNIUM Engineer: E.HOLLIDAY

Sounding: C-25 Date: 6/7/2012 11:39



Max. Depth: 58.071 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Appendix B
Trench Backfill

Table I
Maximum Dry Density / Optimum Moisture Content Test Results

Soil Type		Description	Optimum Moisture (%)	Maximum Dry Density (pcf)	Test Method
SO-5238	B	BROWN SILTY SAND	11.3	124.0	
SO-5228	B	DK BROWN CLAYEY SAND	8.1	129.9	
NA	NA	VULCAN SUN VALLEY PG-64-10 300807	NA	150.0	
SO-5228	B	DB CLAYEY SAND	9.5	128.2	

Table II
Summary of Field Density Test Results

TEST DATE	TEST NO.		LOCATION	ELEV. (FT.)	MOIST (%)	UNIT DRY WEIGHT	RELATIVE COMP. (%)	RELATIVE COMP. STD (%)	SOIL TYPE	PASS or FAIL
11/9/2018	1		Fault Trench 6334 Yucca St	-11.0	9.2	122.4	95	90	B	PASS
11/9/2018	2		Fault Trench 6334 Yucca St	-10.5	11.1	123.4	96	90	B	PASS
11/9/2018	3		Fault Trench 6334 Yucca St	-10	12.3	119.1	93	90	B	PASS
11/9/2018	4		Fault Trench 6334 Yucca St	-8	10.4	117.6	91	90	B	PASS
11/9/2018	5		Fault Trench 6334 Yucca St	-9	13.1	120.8	94	90	B	PASS
11/9/2018	6		Fault Trench 6334 Yucca St	-6	9.4	125.3	98	90	B	PASS
11/9/2018	7		Fault Trench 6334 Yucca St	-7.5	10.6	118.9	93	90	B	PASS
11/14/2018	8		Fault Trench 6334 Yucca St	-8.5	12.7	113.6	92	90	B	PASS
11/14/2018	9		Fault Trench 6334 Yucca St	-6	11.1	115.7	93	90	B	PASS
11/14/2018	10		Fault Trench 6334 Yucca St	-4	11.6	121.5	98	90	B	PASS
11/14/2018	11		Fault Trench 6334 Yucca St	-4.5	8.7	124.8	96	90	B	PASS
11/14/2018	12		Fault Trench 6334 Yucca St	-2	9.3	126.3	97	90	B	PASS
11/14/2018	13		Fault Trench 6334 Yucca St	-2.5	10.2	120.1	92	90	B	PASS
11/14/2018	14		Fault Trench 6334 Yucca St	SG	7.6	122.2	94	90	B	PASS
11/14/2018	15		Fault Trench 6334 Yucca St	SG	10.0	125.7	97	90	B	PASS
11/14/2018	16		Fault Trench 6334 Yucca St	SG	9.3	123.8	95	90	B	PASS
11/21/2018	17		Fault Trench 6334 Yucca St	SG	9.9	126.6	97	90	B	PASS
11/21/2018	18		Fault Trench 6334 Yucca St	SG	NA	146.7	98	95	ASPH	PASS
11/21/2018	19		Fault Trench 6334 Yucca St	SG	NA	145.7	97	95	ASPH	PASS
11/21/2018	20		Fault Trench 6334 Yucca St	SG	NA	144.3	96	95	ASPH	PASS
11/21/2018	21		Fault Trench 6334 Yucca St	SG	NA	144.9	97	95	ASPH	PASS
11/21/2018	22		Fault Trench 6334 Yucca St	SG	NA	148.2	99	95	ASPH	PASS
11/21/2018	23		Fault Trench 6334 Yucca St	SG	NA	147.5	98	95	ASPH	PASS
11/21/2018	24		Fault Trench 6334 Yucca St	SG	NA	150.4	101	95	ASPH	PASS

SC = Sand Cone
N = Nuclear Gauge

Note: Elevations Estimated From Subterranean Level Finish Grade

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STANDARD TEST METHOD FOR MOISTURE - DENSITY RELATIONSHIP (ASTM D1557)

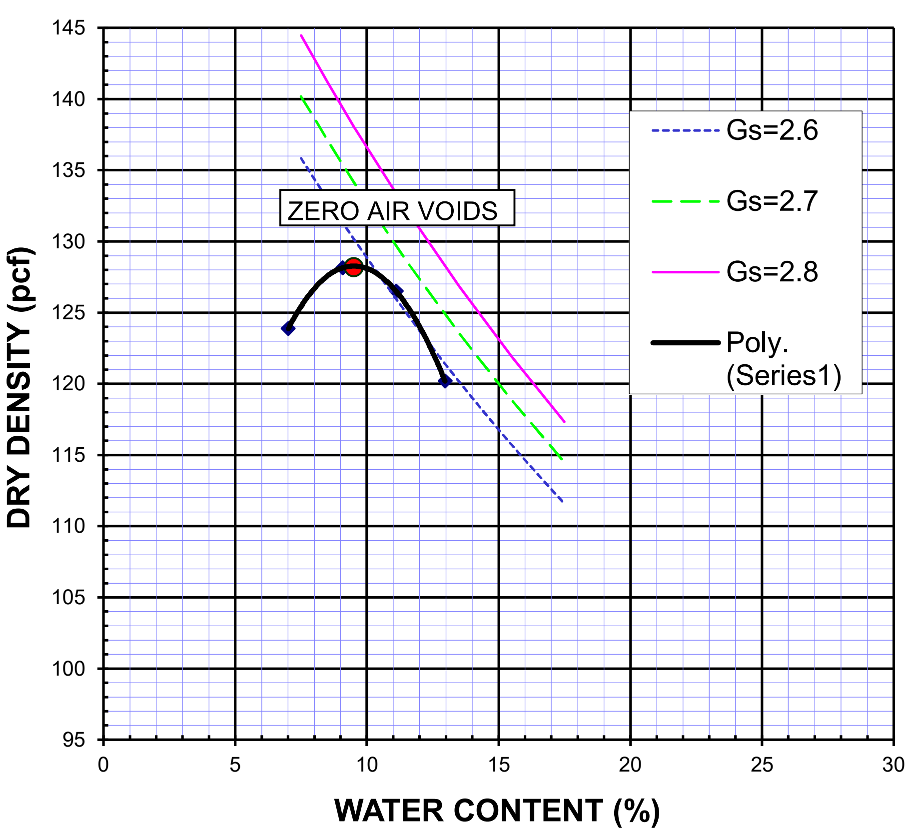
REV. 1, DATED 1/31/15

PROJECT: Hollywood Trench
SAMPLE ID: SO-5228
PROJECT NO.: LA-1301A
DATE: October 29, 2018
TESTED BY: Benito Palma
CHECKED BY:
SAMPLE DESCRIPTION: #1 FT-1 Sta.0 to 0+15 0 to 10' North End / Dark Brown Clayey Sand.

A) WATER ADDED	0	52	104	52			milliliters
B) MOLD TARE WEIGHT	1958.0	1958.0	1958.0	1958.0			grams
C) WEIGHT OF WET SOIL AND MOLD	4085.9	4074.5	3965.0	4013.7			grams
D) WET SOIL WEIGHT (C - B)	2127.9	2116.5	2007.0	2055.7			grams
E) WET DENSITY (D / V)	140.5	139.8	132.6	135.8			pcf
F) DRY DENSITY (E / [(L/100) + 1])	126.5	128.2	123.9	120.2			pcf

G) TARE WEIGHT	150.0	145.8	143.6	231.1			grams
H) WEIGHT OF WET SOIL AND TARE	1361.0	1395.0	1410.0	1681.0			grams
I) WEIGHT OF DRY SOIL AND TARE	1239.9	1291.0	1327.0	1514.6			grams
J) WEIGHT OF WATER (H - I)	121.1	104.0	83.0	166.4			grams
K) DRY WEIGHT OF SOIL (I - G)	1089.9	1145.2	1183.4	1283.5			grams
L) MOISTURE CONTENT (J / K * 100)	11.1	9.1	7.0	13.0			percent

4 inch: V= 15.14 pcf/gm
6 inch: V= 33.98 pcf/gm



B	METHOD USED (A,B or C)

4 inch	MOLD USED
15.14	MOLD VOLUME CORRECTION
-3/8"	SIEVE NUMBER
4.7%	PERCENT RETAINED

WITH ROCK CORRECTION

	MAXIMUM DENSITY [PCF]
	OPTIMUM MOISTURE [%]

WITHOUT ROCK CORRECTION

128.2	**MAXIMUM DENSITY [PCF]**
9.5	**OPTIMUM MOISTURE [%]**

Page ___ of ___

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ANAHEIM, CA 92806

STANDARD TEST METHOD FOR MOISTURE - DENSITY RELATIONSHIP (ASTM D1557)

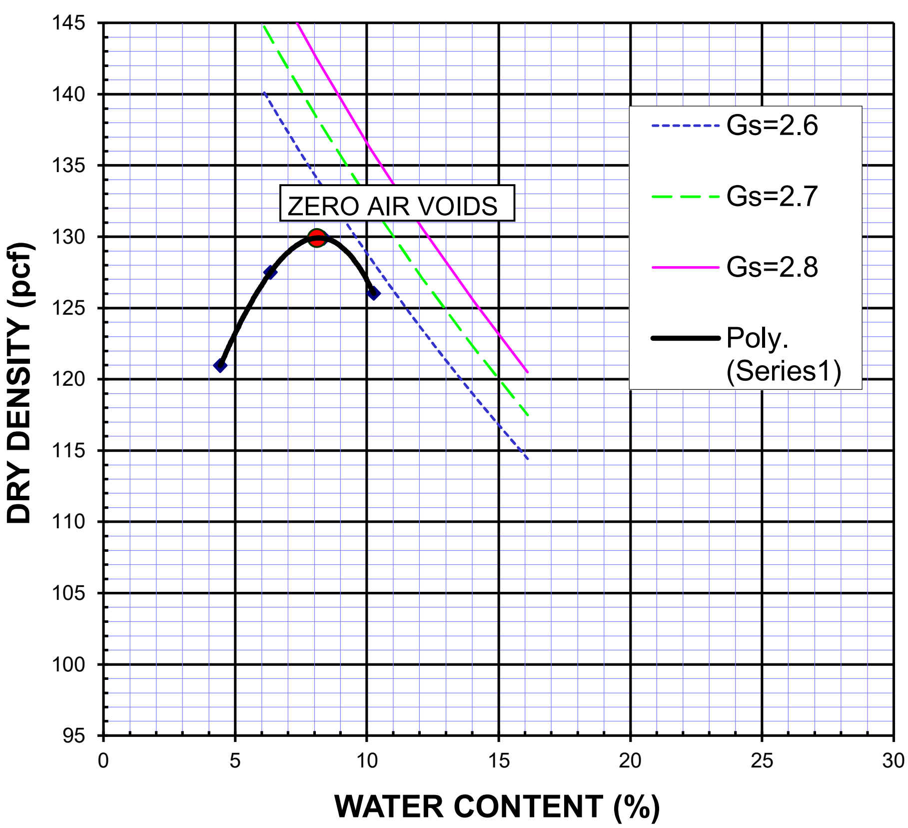
REV. 1, DATED 1/31/15

PROJECT: Hollywood Trench
SAMPLE ID: SO-5228
PROJECT NO.: LA-1301A
DATE: October 29, 2018
TESTED BY: Benito Palma
CHECKED BY:
SAMPLE DESCRIPTION: #2 FT-1 Sta. 0+15 To 0 + 50 Middle - 0 To 15' Deep / Dark Brown Clayey Sand.

A) WATER ADDED	0	-52	+52	-104			milliliters
B) MOLD TARE WEIGHT	1958.0	1958.0	1958.0	1958.0			grams
C) WEIGHT OF WET SOIL AND MOLD	4089.0	4010.6	4061.6	3870.7			grams
D) WET SOIL WEIGHT (C - B)	2131.0	2052.6	2103.6	1912.7			grams
E) WET DENSITY (D / V)	140.8	135.6	138.9	126.3			pcf
F) DRY DENSITY (E / [(L/100) + 1])	129.9	127.5	126.0	121.0			pcf

G) TARE WEIGHT	149.0	230.2	225.8	133.1			grams
H) WEIGHT OF WET SOIL AND TARE	1342.0	1647.0	1376.0	1610.0			grams
I) WEIGHT OF DRY SOIL AND TARE	1250.0	1562.6	1269.0	1547.3			grams
J) WEIGHT OF WATER (H - I)	92.0	84.4	107.0	62.7			grams
K) DRY WEIGHT OF SOIL (I - G)	1101.0	1332.4	1043.2	1414.2			grams
L) MOISTURE CONTENT (J / K * 100)	8.4	6.3	10.3	4.4			percent

4 inch: V= 15.14 pcf/gm
6 inch: V= 33.98 pcf/gm



B	METHOD USED (A,B or C)

4 inch	MOLD USED
15.14	MOLD VOLUME CORRECTION
-3/8"	SIEVE NUMBER
3.6%	PERCENT RETAINED

WITH ROCK CORRECTION

	MAXIMUM DENSITY [PCF]
	OPTIMUM MOISTURE [%]

WITHOUT ROCK CORRECTION

129.9	**MAXIMUM DENSITY [PCF]**
8.1	**OPTIMUM MOISTURE [%]**

GROUP DELTA CONSULTANTS, INC
ENGINEERS AND GEOLOGISTS
1320 S. SIMPSON CIRCLE
ANAHEIM, CA 92806

STANDARD TEST METHOD FOR MOISTURE - DENSITY RELATIONSHIP (ASTM D1557)

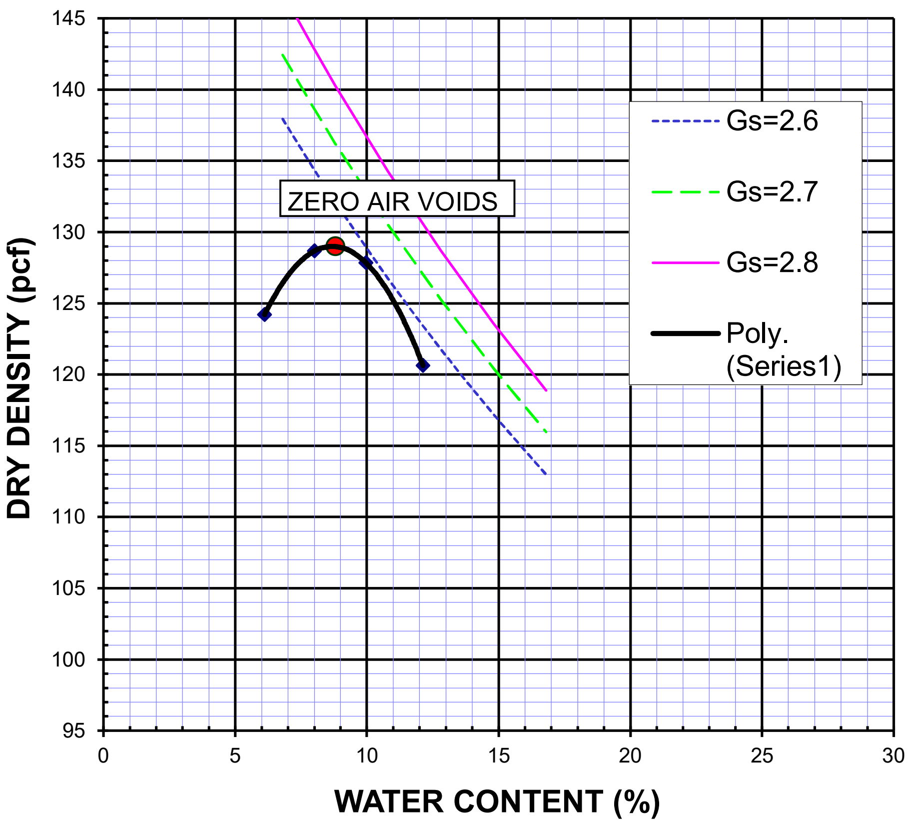
REV. 1, DATED 1/31/15

PROJECT: Hollywood Trench
SAMPLE ID: SO-5228
PROJECT NO.: LA-1301A
DATE: October 30, 2018
TESTED BY: Benito Palma
CHECKED BY:
SAMPLE DESCRIPTION: #3 FT-1 Sta. 0+50 To 1 + 100 South End - 0 To 15' Deep / Dark Brown Clayey Sand.

A) WATER ADDED	0	-52	+52	-104			milliliters
B) MOLD TARE WEIGHT	1958.0	1958.0	1958.0	1958.0			grams
C) WEIGHT OF WET SOIL AND MOLD	4062.2	3953.6	4086.3	4005.9			grams
D) WET SOIL WEIGHT (C - B)	2104.2	1995.6	2128.3	2047.9			grams
E) WET DENSITY (D / V)	139.0	131.8	140.6	135.3			pcf
F) DRY DENSITY (E / [(L/100) + 1])	128.7	124.2	127.8	120.6			pcf

G) TARE WEIGHT	234.6	144.3	146.1	147.5			grams
H) WEIGHT OF WET SOIL AND TARE	1610.0	1411.0	1305.0	1303.0			grams
I) WEIGHT OF DRY SOIL AND TARE	1508.0	1338.0	1200.0	1178.0			grams
J) WEIGHT OF WATER (H - I)	102.0	73.0	105.0	125.0			grams
K) DRY WEIGHT OF SOIL (I - G)	1273.4	1193.7	1053.9	1030.5			grams
L) MOISTURE CONTENT (J / K * 100)	8.0	6.1	10.0	12.1			percent

4 inch: V= 15.14 pcf/gm
6 inch: V= 33.98 pcf/gm



B	METHOD USED (A,B or C)

4 inch	MOLD USED
15.14	MOLD VOLUME CORRECTION
-3/8"	SIEVE NUMBER
3.7%	PERCENT RETAINED

WITH ROCK CORRECTION

	MAXIMUM DENSITY [PCF]
	OPTIMUM MOISTURE [%]

WITHOUT ROCK CORRECTION

129.0	**MAXIMUM DENSITY [PCF]**
8.8	**OPTIMUM MOISTURE [%]**

GROUP DELTA CONSULTANTS, INC
ENGINEERS AND GEOLOGISTS
1320 S. SIMPSON CIRCLE
ANAHEIM, CA 92806

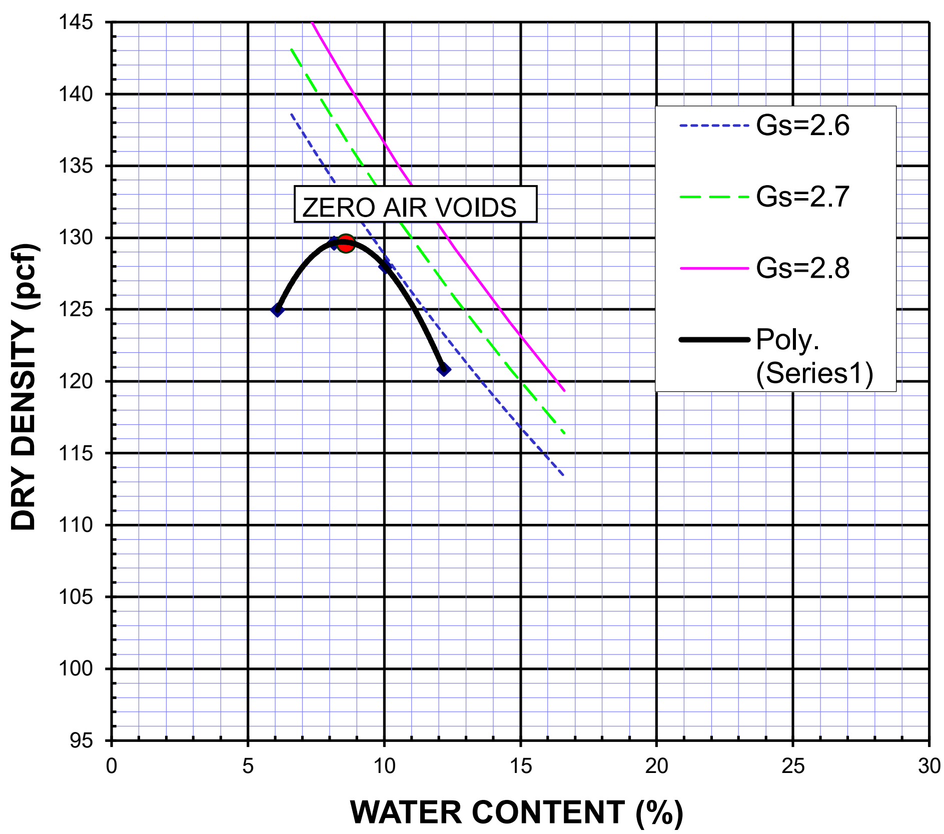
STANDARD TEST METHOD FOR MOISTURE - DENSITY RELATIONSHIP (ASTM D1557)

REV. 1, DATED 1/31/15

PROJECT: Hollywood Trench
SAMPLE ID: SO-5228
PROJECT NO.: LA-1301A
DATE: October 31, 2018
TESTED BY: Benito Palma
CHECKED BY:
SAMPLE DESCRIPTION: #4 FT-1 0 To 1+25 All Mixed / Dark Brown Clayey Sand.

A) WATER ADDED	0	+52	-52	+104			milliliters
B) MOLD TARE WEIGHT	1958.0	1958.0	1958.0	1958.0			grams
C) WEIGHT OF WET SOIL AND MOLD	4080.8	4090.0	3965.0	4010.4			grams
D) WET SOIL WEIGHT (C - B)	2122.8	2132.0	2007.0	2052.4			grams
E) WET DENSITY (D / V)	140.2	140.8	132.6	135.6			pcf
F) DRY DENSITY (E / [(L/100) + 1])	129.6	128.0	125.0	120.8			pcf

G) TARE WEIGHT	146.2	235.8	150.0	145.8			grams
H) WEIGHT OF WET SOIL AND TARE	1453.0	1489.0	1511.0	1536.0			grams
I) WEIGHT OF DRY SOIL AND TARE	1354.3	1374.6	1433.0	1385.0			grams
J) WEIGHT OF WATER (H - I)	98.7	114.4	78.0	151.0			grams
K) DRY WEIGHT OF SOIL (I - G)	1208.1	1138.8	1283.0	1239.2			grams
L) MOISTURE CONTENT (J / K * 100)	8.2	10.0	6.1	12.2			percent



4 inch: V= 15.14 pcf/gm
6 inch: V= 33.98 pcf/gm

B	METHOD USED (A,B or C)

4 inch	MOLD USED
15.14	MOLD VOLUME CORRECTION (V)
-3/8"	SIEVE NUMBER
7.5%	PERCENT RETAINED

WITH ROCK CORRECTION

130.8	**MAXIMUM DENSITY [PCF]**
8.0	**OPTIMUM MOISTURE [%]**

WITHOUT ROCK CORRECTION

129.6	**MAXIMUM DENSITY [PCF]**
8.6	**OPTIMUM MOISTURE [%]**

GROUP DELTA CONSULTANTS, INC
ENGINEERS AND GEOLOGISTS
1320 S. SIMPSON CIRCLE
ANAHEIM, CA 92806

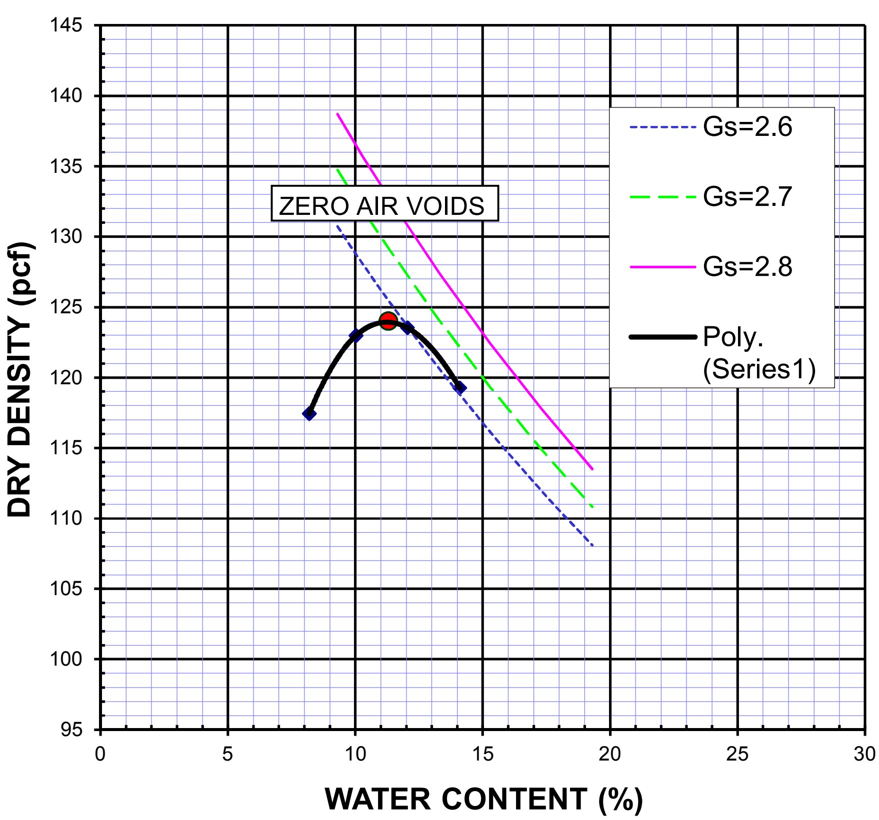
STANDARD TEST METHOD FOR MOISTURE - DENSITY RELATIONSHIP (ASTM D1557)

REV. 1, DATED 1/31/15

PROJECT: Hollywood Trench
SAMPLE ID: SO5238
PROJECT NO.: LA-1301A
DATE: November 12, 2018
TESTED BY: Benito Palma
CHECKED BY: Llanet G.
SAMPLE DESCRIPTION: #5 FT-1 Sta. 0 to 15' / Brown Sandy Clay

A) WATER ADDED	-156	-104	-52	0			milliliters
B) MOLD TARE WEIGHT	1957.0	1957.0	1957.0	1957.0			grams
C) WEIGHT OF WET SOIL AND MOLD	3880.7	4005.5	4052.4	4017.0			grams
D) WET SOIL WEIGHT (C - B)	1923.7	2048.5	2095.4	2060.0			grams
E) WET DENSITY (D / V)	127.1	135.3	138.4	136.1			pcf
F) DRY DENSITY (E / [(L/100) + 1])	117.4	123.0	123.5	119.3			pcf

G) TARE WEIGHT	230.2	235.9	149.0	235.5			grams
H) WEIGHT OF WET SOIL AND TARE	2315.0	2221.0	2410.0	2170.0			grams
I) WEIGHT OF DRY SOIL AND TARE	2157.0	2040.0	2167.0	1931.0			grams
J) WEIGHT OF WATER (H - I)	158.0	181.0	243.0	239.0			grams
K) DRY WEIGHT OF SOIL (I - G)	1926.8	1804.1	2018.0	1695.5			grams
L) MOISTURE CONTENT (J / K * 100)	8.2	10.0	12.0	14.1			percent



4 inch: V= 15.14 pcf/gm
6 inch: V= 33.98 pcf/gm

B	METHOD USED (A,B or C)

4 inch	MOLD USED
15.14	MOLD VOLUME CORRECTION
3/8"	SIEVE NUMBER
2.8%	PERCENT RETAINED

WITH ROCK CORRECTION

	MAXIMUM DENSITY [PCF]
	OPTIMUM MOISTURE [%]

WITHOUT ROCK CORRECTION

124.0	**MAXIMUM DENSITY [PCF]**
11.3	**OPTIMUM MOISTURE [%]**

Appendix C
Age Evaluation

ROCKWELL CONSULTING
4560 PANORAMA DRIVE
LA MESA, CA 91941
TROCKWELL@ SDSU.EDU

Decemb r 13, 2018

Group Delta Consultan
Attn: Miles Kenney, Mike Reader
370 Amapol Avenue, Suite 212
Torrance, CA 90501

Subject: Investigat on for the potential for active faulting at 6334 Yucca St., Los Angel , California: Group Delta Projec # LA130

Dear Dr. Kenney and Mr. Reader:

This letter report primarily addresses the ages of alluvial deposit expos d in the excavated fault trenches for the project site at 6334 Yucca Street in Los Angele , CA, along with an assessmen of the interaction between the expos d faults and the preserv d soil. One representativ soil profile was selected in trench FT-3 to characterize the soil stratigraphy at the site, as the upper part of the solum had been graded off in all three trenches but was best preserved in trench FT-3. A detailed description of the profile is attached. It is this soil profile descrip on, along with additional observation , tha form the basis for my interpretation of the ages of stratigraphic units and activity of faults that underlie the site.

The primary purpose of my involvemen with the project is to make assessment on the age of alluvium at the site to assess whether the site is impact d by active faulting. This report is intend d to complement the fault evaluation condu d by Group Delta, with the purpo of assessing the soil ages at this site to provide age control for the alluvi that is interpreted to be present beneath the site; it is not the primary report for the evaluation of on-site faulting.

Generaliz d Stratigraphy Exposed in the Trenches

The stratigraphy expos d in the trenches can be grouped into two primary stratigraph units capped by a well-developed soil, which is developed through both units, where not remov d by previous grading. The upper unit is finer-grained than the lower unit and is matrix-suppor d, which argues for primarily a debris flow origin to this deposit; howev r som fluvial members similar to the underlying unit are present. The lower unit is bedded well-sorted sand with some gravel layers and is interpreted as of fluvia origin.

These units are exposed in all three trenches, and other than exhibiting minor offset across severa exposed faults, can be mapped continuously below the site. However, the overlying debris flow unit does "pinch-out" toward the south in trench FT-1 but the described soil profiles herein occur near the current surface in all trenches.

The overall morphology of this area reflects a southward-flo ng drainage system that feeds a bajada of alluvial fans that flank the southern margin of the Hollywood Hills. The deposits exposed in the three trenches are consistent with an alluvi fan environmen dominated by fluvia processes with occasional deposition of debris flow deposits.

Soil Characteristi

Soil, in the context of this study, is the weathering profile that develops at Earth's surface over time (Birkeland, 1984; Rockwell, 2000). The expression of a weathering profile is effected by many parameters, includ ng the characteristics of the parent material, the climatic conditions that prevailed during the period of development along with the associat d vegetation that was dominant, the amou of surfac slope and aspect that may affect surface stability, and the length of time that a stable surfac has been exposed to weathering (Johnson et al., 1990; Rockwell, 2000). In this study, the parent material for the debris flow and fluvial alluvium of the upper and lower deposits, respectively, is likely derived from the Hollywood Hills via the drainage located just to the west of the proje site.

Cappi g Soil – The site alluvium is capped by a well-develop d soil profile. The upper portion of the soil developed into the upper debris flow deposit (upper unit) has been removed, presumably during grading of the site (Table 1). The A horizon is completely gone, although there is an artificial fill (Af) layer with historical debris immediately below a capping layer of asphalt. The Af layer of redistributed topsoil and debris locally overlies an argillic (Bt_1) horizon, which has been partially removed at the description site in trench FT-3 and in portions of the east face of trench FT-1, and directly overlies the lower part of the argillic horizon (Bt_2) in the west face of trench FT-1. Much of the soil profile appears to have been removed in trench FT-2, arguing that the original topography at the site rose towards the west. As the soil appears to be preserved best in trench FT-3, which is where the soil was describ d. It is assumed that the capping soil was similar throughou the site based on the continuity of the underlying alluvial deposits.

The soil appears to be a single genetic profile as there are no obvious buried soils exposed in the upper 4 m of section, although it is possible that a weakly-developed buried soil could be obscured and overprinted by the well-develop d surface soil. The main (upper) argill horizon (Bt_1) is reddened with 2.5-5YR hues, a clay texture, and strong angular blocky to prismatic structure. Only about 20 cm of the Bt1 is preserved and it is not known how much of this horizon was graded off early in the site's history, so this is considered a minimum thickness. Clay film development is continuous and thick on ped faces and as grain bridges, and were likely continuous within pores which are now collapsed from site grading. A 25 cm-thick Bt_2k horizon (lower part of the argillic hor on) is preserved that has an average moist color of 7.5YR 4/4, a sandy clay loam texture and strong, angular blocky structure. Of note is the presence of secondary calcium carbonate superposed on this horizon, as discuss d further below. A dispers d Bt (BC_{lam}) horizon is presen below the argill horizon and extends to the base of trench FT1. Dispersed Bt horizons, which are typical in well-sorted sandy deposits, show accumulatio of secondary translocated clay in semi-continuou bands that common y do not follow stratigraphic contacts. In the case of the soil at this site, they are slightly reddened (7.5YR 5/6 dry color) bands about 2-3 cm in thickness and spaced about 5-10 cm apart with sandy textur d matrix (10YR 5/4 dry color) between the bands that have very little to no secondary clay. Based on these properties, this soil likely classifies as a Palexeralf (Soil Survey Staff, 2014).

The Maximu Horizon Index (Harden, 1982; Rockwell, 1983, 2000) is calculated to be 0.84, assuming that the parent material was sandy loam for the upper deposit and gravelly silty sand for the lower deposit, both with an initial color in the 10YR hue range. The Soil Development Index (SDI) for the upper 350 cm of the soil profile is calculated to be 140, which is a minimu value as the uppermost portion of the profile is truncated. Hence, the SDI value for the entire profile likely exceeded 150.

Soil profiles develop d in similar alluvial deposit and under similar climatic conditions in Ventura basin yield SDI values that average about 162 for deposits that date to the last intergla period (~100 ka), and about 190 for deposits that have age estimated at 160-200 ka; soils older than 200 ka have SDI values up to 226 (Rockwell, 1983). Dated soils developed in the San Joaquin Valley near Merced (Harden, 1982) yield SDI values that range from 100 to 190 for soils develop d in lower Riverbank alluvi with an estimated age of about 250 ka, whereas the Turlock Lak soil profiles, at about 600 ka in age, yield SDI values in the 150-170 range. Only the Plioce China Hat soil profiles have SDI value that exceed 200, although it is likely that the soil in Los Angeles basin develop more rapidly than interior California soils because of the influence of proximity to the coast (Johnson et al., 1990; Rockwell, 2000). In summary, the stre h of the soil profile developed in the alluvium at the site argues for at least a last interglacial age for the alluvium at the site.

An additional soil observat on argues for an older age for the site deposits. A stage II calcic horizon is superposed on the lower part of the argill horizon. The carbonate, which is interpreted to be of Aeolian origin (Reheis et al., 1995), is preserved as patchy to continuou coatin on ped faces over the second ry translocat d clay in trench FT-1, and similar coatings with 1 cm nodules in trench FT-3. Argillic horizons typically form at the average storm wetting depth while calcic horizons form at the average season wetting depth (Birkeland, 1984; McFadd n and Tinsley, 1985). Superposition of second ry calciu carbonate on an argillic horizon implies tha the soil experience a significant dry climate phase follow ng much of the development of the argillic horizon. The Holoce soils in the Hollywood Hills area do not have second ry calcium carbonate, indica ng that the present climate is sufficiently moist to flush carbonate from the system. The only time in the past 150,000 years during which the LA Basin climate was dryer than today occur d during the last interglacial period about 120,000 years ago (Huesser, 1978; 2000). Based on this observat on, the simple conclu on is that much of the soil development at the site described earlier occurred prior to the last interglacial period, follo d by accumulation of secondary carbonate during the last interglacia period.

A second, lower stage II calcic (Bk) horizon was exposed in "th shaft" at the north end of trench FT-1 (shored portion of the trench from station 0 to 13 feet) at a depth of about 5 m. This Bk horizon exhibi continuous coatin of second ry calciu carbonate on clasts in a gravelly unit. There are two plausib interpretatio associated with the carbonate exposed at this site. Th first is that the lower carbonate represents accumulation during the same period of soil development during which the surfac soil formed. The second interpretation is that this is calciu carbonate that accumulated higher in the section during the dry climatic phase during the last interglacial, and was then leached down to this level during the wetter climate phase between the last interglacial and the curren y dry Holoce climate.

Site Topography and Implication for the Age of Alluvial Deposition

One additional piece of information is important in defining the age of alluvial deposition at the project site, and that is consideration of incision during periods of sea level lower ng. Sea level dropped 120-130 meters during the late Pleistocene when ice was locked up on the continents (Shackl on and Opdyke, 1973), which forced major drainages to incise their courses and grade to thi new base level. Numerous studies throughout the LA Basin and Hollywood Hills have found thick late Pleistocene to Holocene fill sequences in front of the larg r canyon showing that these drainages incis d during MIS 2 to grade to a lower base level. The amount of incision is partly dependent on the size of drainage are but the salien issue is that deposition at the level of the project site mos likely occurred during an interglacial period when the drainage were not incised, and deposit on during the glacial periods was likely limited to the areas of incision. Consider ng this, the most likely age of the alluvi underlying the project site correlates to MIS 7 or an older sea level highstand. Based on this line of reasoning, the minimu age for the site alluvi is about 200+/-20 ka (MIS 7).

Summary Interpretation of the Site Soi Age

Th remnants of the soil profile preserved at the site argues for an age that significantly predates the last interglacial period, and based on the topographic position of the site, mostly likely dates to MIS 7 or older. As the upper part of the soi profile was removed during early grading, and the strongest aspects of soil development typically are present at the top of the B horizon, I consider an age estimate of 200 ka to be a minimum.

Aspects of the Project Site Soil that Bear on Fault Activity

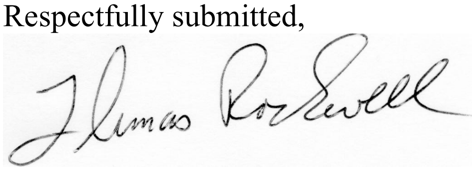
Two direct observations argue again fault activi y during the late Pleistocene and Holocene. First, the original trench, FT-1, exposed severa minor faults that display d small (few inches to a foot) vertical separations of stratigraphic contacts. Most of these small faults were capped by the argill horizon of the capping soil, demonstrating inactivity in the Holoce and late Pleistocene. Howev r, the argillic horizon of the capping soil was graded out over the most significant-appea ng fault in trench FT-1 mak ng interpretati of activi y less certain. Hence, two additional trenches, FT-2 and FT-3, were excava d parallel to trench T1 to search for a more comple soil section. Trench FT-3 exposed a sufficiently preserved argill horizon across the most significant fault (i.e. displaces the relative y youngest geologi structure), and the soil is completely developed acros the top of the main fault zone and is not offset. This demonstrate a complete lack of activi y in the late Pleistocene and Holocene.

A second observation confirms the interpretation of fault inactivity and sugges that the exposed faults have not moved in the past 120 ka. The second ry calciu carbonate that is superposed on the Bt_2 horizon ignore the presence of all fault strands. It has been my experience that fault activi y provides open pathway for the downward movement of soi water and clay translocat on, and if carbonates are present in the soil, the downward movement of carbonate that results in lin ng the fault surface with secondary carbonate. The secondary carbonate appea to have developed across the faults and is not offset, nor is there any indica on of second ry carbonate lining the fault surfac . This comple lack of expression of carbonate in the fault zone argues that there has been no fault activity since deposit on of the secondary carbonate during MIS 5 time. If correc , then these faults have not been active in the late Quaternary.

The above observations that the soil, where preserved, is develop d across the top of all exposed faults in at least one of the trench argues strong y that this group of faults are pre-Holocen and are therefore not a constraint to site development. The additional observation that the last interglacial carbonate accumulation completely ignore the presence of the faults argue that none of these faults have been active in the late Quaternary.

Thank you for the opportunity to assist you on this project, and I look forward to continued assistance in the future.

Respectfully submitted,



Thoma Rockwell, PhD, PG

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Soil Survey Staff, 2014, Keys to Soil Taxon y, 12th Edition. U.S. Dept. of Agriculture, Washington D.C., 360 p.

Table 1. Soil Description in trench T3 at 6334 Yucca Street, Hollywood Fault, Los Angeles, California

The site was previously graded and the entire upper part of the soil profile was removed. The soil appears better preserved in the eastern part of the study area, so the representative soil profile was described in trench T3. Not clear how much of the upper Bt is missing.

Horizon	Depth (cm)	Description
Af	0-15	Locally derived artificial fill. Contains chunks of A and Bt horizon, along with asphalt and metal.
Bt1	15-35	5YR 4/4m, 4/6d; sandy clay texture; strong, coarse angular blocky structure to prismatic structure; extremely hard dry consistence; continuous, thick clay films on ped faces and in matrix (2.5YR 4/6d), pores are destroyed by grading but presumably were lined with clay; clear, smooth boundary to:
Bt2k	35-60	7.5YR 4/4m, 4/6d; sandy clay loam texture; strong, coarse subangular blocky to angular blocky structure; extremely hard dry consistence; many, thick clay films on ped faces and in pores (where preserved), common, moderately thick clay films bridging grains; Stage II secondary calcium carbonate as ped linings and 1 cm scattered nodules; violently reactive to 10% HCl; clear to gradual boundary to:
BC_{lam}	60-300+	7.5-10YR 4/4m (7.5YR 5/6d (lams) and 10YR 5/4d (matrix)); sandy loam texture; weak to moderate, medium subangular blocky structure; slightly hard to hard dry consistence; many thin to moderately thick clay films bridging grains and in pores in 2-3 cm-thick clay lams spaced at 5-10 cm;
Bk		A stage II Bk horizon with continuous clast coatings of secondary calcium carbonate was noted at about 5 m depth in “the shaft”. This may be the carbonate leached out of the Bt2k during MIS 2.

Appendix D
Letter Report by ECI

Project No. 3812
July 18, 2019

To: **Mayer Brown**
350 South Grand Avenue, 25th Floor
Los Angeles, CA 90071

Attention: **Mr. Edgar Khalatian**

Subject: **Independent Review of the Group Delta fault investigation for the 6334 W Yucca Street and 1770 N Ivar Avenue properties, Los Angeles, California**

Dear Sirs:

At your authorization, I have conducted an independent review of the Group Delta Consultants fault investigation at the corner of Ivar and Yucca (6334 W Yucca Street and 1770 N Ivar Avenue) in the Hollywood area of Los Angeles, California. In summary, the Group Delta investigation has provided new and persuasive data that there are no Holocene-age active faults underlying the site, and with a high degree of confidence, none within at least 25 feet north of the northern property line. None of the minor faults observed are younger than a minimum age of 120,000 years, and more likely closer to 200,000 years old, and none pose a development hazard.

My work consisted of a site review of the trench (FT-1) excavation including discussions with Dr. Miles Kenney who was leading the study for Group Delta. I collected soil samples for an independent assessment of the sediment ages exposed in the trench based on soil profile development algorithms completed by others at ECI. The results of the soils analysis are included in a separate appendix to this letter. I also visited the site to review the two supplemental trench excavations (FT-2 and FT-3) and was present during the site visits of the City of Los Angeles geologist (Dan Schneidereit) and California Geological Survey geologist (Brian Olson). Following the trench reviews, I also reviewed several of the core boring samples along with Miles Kenney and Michelle Sutherland of Group Delta at their office, discussed various interpretations of the data, and reviewed Group Delta's draft report. This letter summarizes my observations, interpretations and potential implications of the investigation data.

The primary trench (FT-1) exposed a series of small faults, all trending similarly NE-SW, all dipping similarly to the NW, and all having similar down-to-the-north separations. The faults were very clearly expressed in the sandy alluvial sediment due to both the well

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stratified nature of the sediments and due to their offset of multiple secondary pedogenic features within the sediments known as Bt lamellae. Although the two-dimensional expression was of vertical separation, the faults also demonstrated stratigraphic differences across the faults that were indicative of an undetermined strike slip component.

Overlying the alluvial deposits across most of the northern part of the trench was a distinctive debris flow unit. Although the basal contact showed indications of scour, the unit itself was conformable with the dips of the underlying fluvial units. The debris flow unit pinched out about mid trench. Capping both the debris flow unit and the alluvial units south of the where the debris flow deposits pinched out, was a well-developed relict soil displaying strong reddening (to 5YR) and significant pedogenic clay accumulation. The soil is described more fully in an attached appendix. The uppermost part of the soil had been stripped by construction at the site; indeed, Bt peds were still clearly recognizable where incorporated into the overlying fill deposits. The soil as preserved and described is a thin remnant of the original relict soil that had originally capped the alluvial deposits. Based on Soil Profile Development indicators, we calculate that this capping soil is a minimum of 100,000-150,000 years old. However, this is clearly a minimum age, as only a thin section of the bottom part of the argillic section remained. The actual age of the soil is probably closer to 200,000 years, and the alluvial deposits at the bottom of the trench could be as old as 470,000 years. The importance of the near-surface soil is that it also capped all of the faults that were present in FT-1, with one exception that will be discussed in more detail later.

As mentioned, the faults were clearly visible, but were also clearly minor features exhibiting only one to twelve inches of maximum separation. Some faults were overlain by alluvial sediments deposited after the fault last moved, and some broke through to the bottom of the surface soil without offsetting the basal soil horizon. As this soil may be about 200,000 years old, the faults are even older. One exception to that statement was a fault (F3) that displaced a portion of the lowermost part of the Bt2 soil horizon downwards, forming a negative flower structure (graben). The total vertical displacements were up to 3 inches on one part of the flower, less on the other. But this flowering upwards is indicative of a past surface-rupturing event as faults cannot readily bifurcate at depth due to the confining pressures. Given that it displaced the basal part of the Bt2 soil horizon, this fault was potentially younger than the other faults. Unfortunately, within FT-1's exposure, the upper parts of the capping soil directly above the key fault/soil location had been removed by prior site grading.

Two supplementary trenches, FT-2 and FT-3, were excavated to better resolve the question of recency on this single F3 fault. FT-2 was not helpful due to even more removal of the soil, but FT-3 exposed a more complete preserved section of the soil profile in which the pedogenic development had overprinted the upward extension of fault F-3. The obvious conclusions are: 1) that the last surface-rupturing event on this fault occurred early in the formation of the relict soil, 2) it was a minor event, and 3) the ~200,000 years of subsequent soil development both obscures the prior fault traces through pedogenic processes and provides a solid temporal date to the cessation of activity on these faults. A laterally continuous calcium carbonate horizon (horizon Bt2k in the appendix) characterized by coatings on ped faces and nodular infill of pores clearly superimposed onto/within the already well-developed Bt horizon, was unaffected by any of the faults, including the youngest fault F3. If fault F3, or fractures associated with the last fault-rupturing event, had occurred shortly before or after the carbonate development in the soil, the carbonate would have preferentially coated the fault or fracture faces. However, the carbonate-rich horizon extended unbroken across all of the faults, unaffected, confirming that prior soil development had fully obscured any remnant fault traces well before the carbonate-forming time interval. As this carbonate section was likely deposited during the last major interglacial, about 120,000 years ago, all of the faults are even older. Thus, this 120,000-year carbonate-age could be considered as the absolute minimum age for the fault F3 displacement.

Trench FT-1 extended to within a few inches of the northern property limits of the site. If there is a Holocene-age active Hollywood fault, it must lie north of the site because this and several previous studies have shown it does not lie to the south, at least to the extent of the previous Millennium investigations. However, the lack of even a <200,000-year old fracture within brittle granular alluvial deposits calls into question the proximal location of such a fault to the north as well. Assuming even minimal values for recurrence (of 10,000 years) or displacement (1 meter/event), this would mean that more than twenty M6.5+ earthquakes would have shaken these sediments since they were deposited, presumably by a fault located only 10s of feet away. And yet, no fractures are observed in these brittle units within the last 120,000 to 200,000 years.

Figure 7 of the Group Delta report shows a geologic transect compiled from CPT and boring logs drilled N-S across the site. Approximately 25 feet below the bottom of FT-1, the transect shows the correlation of a gently south-dipping erosional surface cut into the top of a body of basalt that is part of the Miocene-age Topanga Formation. Capping this surface is a colluvial weathering horizon that is in turn overlain by the alluvial deposits observed in FT-1. This erosional surface, which likely corresponds to the 500,000- to 900,000-year old marine regression platform reported at depth under West Hollywood, continues at least to boring B-2, 25 feet north of the site's northern property line. Figure 10 expands this northern zone, showing that boring B-1, about 35 feet north of boring B-2, continuity of the Qoal / Tvb contact is disrupted, but only by a maximum of about 15 feet vertical. Even if the Hollywood fault is pure strike slip, the 10-degree dip of the surface would permit only about 100 feet of lateral offset of a potentially 500,000-year feature. These observations are not consistent with the magnitude of offsets proposed for the Hollywood fault.

The near-perfect correlation of the buried Qoal / Tvb contact under the area investigated by trench FT-1 appears to suggest that the faults observed within the older alluvial (Qoal) deposits do not extend to depth, but may instead terminate at that contact. If the faults do penetrate and displace the contact, the north-side-down fault displacement observed in the trenches is difficult to reconcile with the southerly dip of the contact, a dip that is concordant with the dip of the alluvial stratigraphy. If the faults do terminate at the bedrock interface, as seems supported by the data, then it calls into question whether these faults are really faults, or are instead soft-sediment indicators of paleoseismic events that occurred on the Hollywood fault more than 200,000 years ago. If so, and because they have not been re-broken in the last 120,000-200,000 years, it again questions the Holocene-age assumption of the Hollywood fault.

In summary, the Group Delta investigation has provided new and persuasive data that there are no Holocene-age active faults underlying the site, and with a high degree of confidence, none within at least 25 feet north of the northern property line. None of the faults observed are younger than at least 120,000 years and more likely closer to at least 200,000 years. In my opinion, the study goes even farther and casts significant doubt on the very presence of a Holocene-age active Hollywood fault trending east-west down Yucca Avenue, as previously assumed.

Thank you for the opportunity to assist you on this very interesting project. If you have any questions, or desire additional information, please do not hesitate to contact me.

Respectfully submitted,

EARTH CONSULTANTS INTERNATIONAL, INC.

Eldon Gath, CEG 1292

Attachment: Soil Stratigraphic Study

Distribution: (1) Addressee

Soil Stratigraphic Study to Estimate the Age of the Sediments Exposed in Fault Trenches Excavated at 1770 Ivar Avenue, in Los Angeles

SUMMARY

At your request, Earth Consultants Internationa Inc. (ECI) provi d independent third-par y geological revie services during the fault trenching study conducted by Group Delta Consultants Inc. (Group Delta) at th 1770 Ivar Avenue site. The purpo of their overall site investigatio was to determi e whether or not the northernmost porti of the property is underlain by active faults associated with the Hollywood fault zone. As part of these services we described and analyzed the soils exposed in thei trenc s to independently estimate the age of the exposed deposits. Group Delta had simultaneously retained Dr. Thomas Rockwell in a similar role. Please refer to the Group Delta repor for a geologic description of the study area, the log of the trenc s showi g where the soil pr files were collected, and the findings regar ng the activ y of the faults exposed in the trenches.

To independen y estim e the age of the sediments exposed in the trenches, we colle ed dozens of soil samples from two separate profi s in trenc FT-1 and one soil sample colle ed from the uppermos pedogenic horizon in trench FT-3. Each of the e soil samples were described using soil-stratigraphic (pedogenic) nomenclature. We then compared these soil descriptio s to those of other soils in the south n California region that have been dated to estimate the amount of time that th near-surface soils and each of the underlying burie soils were expos to soil-forming processes at the surface, prior to burial. Our analy s indicate that the trunc ed soils at the surface are Pleis ocene in age, and that the overa section, to the botto of the trench, represents several hundreds of thousands of years of alternating geological deposition weathering, and erosional events. Specifically, by summi g the estimated amount of time it took for each soil to form we obtained age estimates for the 12-foot-th section exposed in trenc FT-1 that range from 100,000 (minimum) for the surface soil to 250,000 to 500,00 (rounded) years at the bottom of the trench.

BACKGROUND

Of primary importance in fault trenching studies conducted in accordance with California's Alquist-Priolo Earthquake Fault Zoning Act (CGS, 2018) is to conf that trenches are excavated to sufficient depth to expose Pleistocene-aged deposits. If sediments more than 11,700 years old are exposed in an excavation emplaced so as to intercept the mapped or inferred fault(s), and the sediments are observed to be unbroken, then one can conclude that the study area is not underlain by near-surface active faults. The pre ise of this approach is that fa lts that have moved in the past 11,70 years are considered to have a higher probability of moving again in the futu e than fault that have not moved in the past tens to hundreds of thousands of years. To determi e whether or not the trenches excavated for this study were deep enoug to expose Pleistocene-aged deposits, we described the sediments and soils observed therein and then used soil-age dating tech ques to estim e the age of the sediments that these soils developed in.

The term soil as used herein refers to a natural body consisting of layers (refe ed to as horizons) of miner and/or organic material that are different from the underlying geologic material in their "morphologica physical, chemica and mineralogical properties and their biological characterist " (Birkeland, 1984) These differences are the resul of weather ng and the effects of five main soil-forming fac rs: parent mater l, climate, slop or topography organisms, and time (Jenn 1941). Time is an important factor because the longer a geologic deposit is exposed to the effects of weathering and soi formation, the better developed the soil characteris cs typically become. We take advantage of this factor when using soils to estimate th age of geological deposits.

Soil development occurs on stable geomorphic surfaces (a stable surface is one that is not being impacted by deposition or erosion). Soil development typically start to occur as soon as a surface stops being eroded or depos ed on. In some environments such as an alluvial plain or alluvial fan, it is common to find several weakly to moderately well-deve oped buried soils that rest one upon the other sometimes separated by unaltered or only slightly altered sediments (the parent material). The soi s represent periods of sub-aerial weathering and soil formation that occurred in between periods of alluvial erosion and deposition In these environme ts, the age of the underlying primary deposits is best estimated by summing the age of the individual overlying burie soils. Soil age estimates provide a minimum age for the deposits that th soils for into, especially in depositional environments where short periods of soil formation occur in between erosional and deposition events.

Furthermore, portions of soil horizons and sometimes even entire soil horizons may be removed (truncated) from the area by ero durin floods or mudflow scour, furth r limiting the reliabilit of soils as indicators of the age of the geological deposits that the soils formed into. Nevertheless, if thes limitations are recognized and take into account, soils developed in active fluvi or alluvial fan environment can provide useful information. In areas where suita e datable materials such as charcoal, are not available, or where the age of the sediments extends beyond the useful range of radiocarbon dating, soil-age estimations are particularly usefu

SCOPE of WORK and METHODOLOGY

Three trenches (referred to as FT-1, FT-2 and FT-3) we e excavated parallel to one another with a north south orientation across the western side of the property at 6334 Yucca Street and 1770 Ivar Avenue for the purpo of determining wheth r or not the site is underlain by active faults associated with the Holly ood fault system. Trenches FT-2 and FT-3 were excavated on eit side of the longes trenc FT-1, with FT-2 located to the west, and FT-3 to the east. The trenches were cleaned and logged by Dr. Miles Kenney and personnel from Group Delta and revie by Dr. Thomas Rockwell. Dr. Kenney and Dr. Rockwell were retained by Group Delta for this project. Earth Consultants International, Inc. (ECI) was retained by MCAF Vine LLC to provide an independe t assessment of the age of the sediments and faults exposed therein.

ECI personnel colle ed and described two soil profi es in FT-1, at stations 99′ (Profile 1) and 53′ (Profile 2), and one soil samp e was collected and desc bed from FT-3 at station 3′. The soils were descr bed us ng a combination of the characteristics and nomenclature established by the Soil Survey Sta (1975 1992), Birk and (198 1999) and the National Soil Survey Cente (2012 Characteris cs that we recorded include textu e (grain size distribution structure (whether the soil mass breaks into distinctive peds, or is singl grained), the amount, distribution and thickness of translocated clay forming films or stains on the soil ped faces and clasts, and in between sand grains (call bridges), the looseness or induration of the soil peds, and the stickin ss and plasticity of the wet soil. Wher calcium carbonate filaments, coati s and nodules were observed, we described those as well in terms of abundance and size. Finally, the sharp ss and relie characterist cs of the contact between horizons we e also noted. Colors of the soil horizons were recorded by comparing the color of the matrix and clay films both in the dry and wet states to color chips in a Munsell Soil Color Chart. Complete soil descriptions are included at the end of this repor

The approximate age of each of the soils was then calculated by compa ng the characteri cs of each soil to the characterist cs of other soils in the region developed in similar parent materials that have been dated using both absolute and relative dating methods. To do this, we calculated the soil's Soil Developmen Index (SDI) using the descriptions made and follo ng the procedure developed by Harden (1982). We also calculated the Maxim Horizon Index (MHI) using Ponti's (1985) methodology

The soil development indices that are used to estimate the amount of time that a geologic unit was exposed to soil forming processes requ e that the soil characteristics be compared to the characterist s of the actual or presumed parent material. Essentially, the characterist cs of the parent material are "subtracted" from the characteri cs of the soil to develop an empirical estimate of the length of time that a geologic deposit has been subjected to the effects of weathering and soil formation. For this analysis, we used two parent materials, one for the mudflow deposits, and another for the alluvial deposits The mudflow parent material we used consists of sandy loam with 10YR hues, moderate fine to mediu subangular blocky soil structure breaking to single grained, soft to loose consistency whe dry, very friable to loose consistency when moist, and slightly sticky and slightly plastic consistency when wet. The alluvium parent material considered consists of sand to loamy sand, 10YR hues, weak fine subangular blocky soil structure breaking to single-grained soft to loose when dry, very friable to loos when moist, and non-sticky and non-plastic when wet. Both parent materials have no clay films.

Both SDI and MHI values have been shown to be useful relat ve indicator of soil age, with older better developed soils having higher SDI and MHI values (Harden, 1982; Rockwell et al., 1984; Rockwell et al., 1990; Bornyasz and Rockwell, 1997). To estimate the ages of the soils that were the subject of this stu y, we used the chronofunct s presented in the Appendix in Dolan et al. (1997). These chronofunctio are in turn based on th chronosequences of the Ventu a Basin by Rockwell (198 and Rockwell et al. (1985), the Merced Valley by Harden (1982), and the Cajon Pass by McFadden and Weldo (1987). Both non-normal zed and normalized SDI values are presented for each soil. Non-normalized SDI values are calculated using the thickness of each individual soil horizon as observed in the field. Normalized SDI values are calculated by assum ng that each soil analyzed is 200 cm thick. Estim es of the amount of time it took for each soil to develop are calculated using the normalized SDI values, as the soil regressions presented in the literature are typically based on normalized soil thickness s of 200 cm. This allows us to compare "apples to apples." This is usually done by making the bottom horizon in a given soil as thick as necessary to make the overall soil 200 cm thick. In this study, to par y compensate for the fact that many of the soi s des bed were significantly truncated by erosion pri to buria we "thickened" the uppermost BC horizons, rathe than the deepest horizons, to achieve the 200-cm thickness required. For age estimation purposes, we calculated the length of time that each debris flow and alluvial deposit was likely exposed to soil forming processe prio to burial, and then summed these age estimates to obtain an age estim e for the entire profile expose in trench FT-1.

GENERALIZED SOIL DESCRIPTIONS and AGE ESTIMATES for INDIVIDUAL SOILS

In the northern approximate 75 feet of the site, at and near the ground surfa , the trenc s exposed mudfl deposits with a thickness of between about 3 and 5 feet. Below these deposits, and in the southern portion of trench FT-1 from the ground surface down, the trenc s exposed well-sorte deposits consisting of bedded sand, grave y sand and sandy gravel interpreted to have been deposited by fluvial processes. The total th ckness of the fluvi l deposits exposed and described in FT-1 is about 12 feet. Soil Profi e 2 was described in the section of FT-1 that exposed pedogenically altered mudfl sediments, whereas Soil Profi e 1 was described farth sou h in the trenc where the fluvial sediments were observed (Figure 1). Thus, stratigraphicall , Profi 2 is above Profile 1, and the two profiles combined create one comprehensive profile that allo ed us to estimate the age of the entire sequence exposed in the trench. Tren FT-3 exposed a more complete uppermost argil c soil horizon capping the mudfl w sequence. We incorporated this horizon into our overall descriptions and used its characteristic to help us estimate the age of the soil that developed on the mudflow deposits. These soils (Figu 1) are described further below in stratigra c order, from top to bottom, with abbreviated descriptions provided in Table 1. For the complete descriptions of each profile, refer to the Appendix.

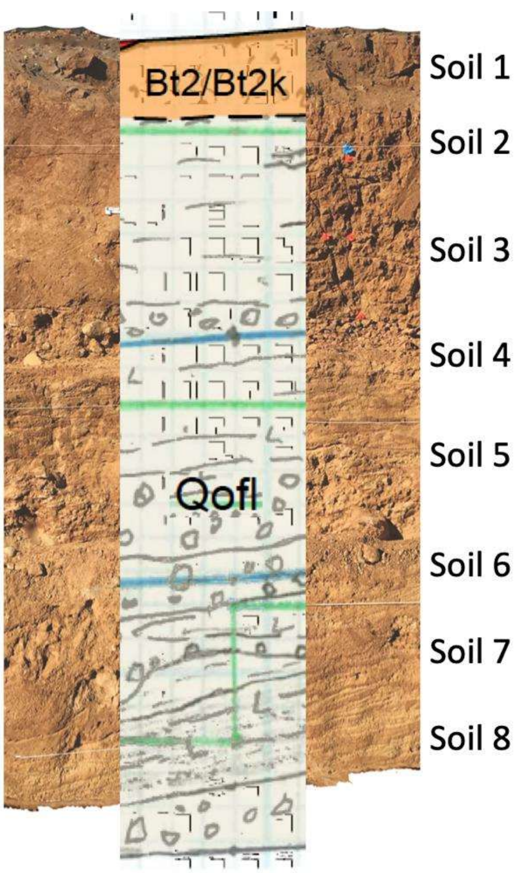

Figure 1: Simplified illustration of trench FT-1, west wall, Station 100, showing the graphic trench log super posed on the trenc mosaic image, and correlated with th eight soil horizons that were broken out and described belo

Table 1: Abbreviated Soil Descriptions

Horizon	Thickness (cm)	Texture	Color (Munsell Soil Chart)		Structure	Consistency				Clay Films
			Moist	Dry		Dry	Moist	Wet	Wet	
Soil Profile 2 (FT-1) and Upper Horizon in FT-3										
Af	39.6	SL	7.5YR 3/4	7.5YR 5/4	2f-mabk	vh	fi	ss	ps	none
Bt1 (T3)	33.5	SC	5YR 4/4, 2.5YR 3/3 cf	5YR 4/4, 2.5YR 4/4 cf	3cabk	Vh-eh	Fi	Vs	Vp	3mk+1kpf, 1mkbr, 3-4n+2mk-kcl, 3mk-kclpo
Bt1 (T1)	9.1	SCL	7.5YR 4/4	5YR 4/4, 5-7.5YR 4/4 cf	3m-cabk	vh-eh	fi	s	vp	3n+1mkpf, 2nkbr, 1npo, 3n+2mkcl, 3n-mkclpo
Bt2	15.2	SC	5YR 4/4, 5YR 4/3 cf	5YR 4/6, 5YR 4/4 cf	3f-mabk	vh	fr-fi	vs	vp	3n+1mkpf, 1nbr, 2npo, 3ncl, 3n+1mkclpo
Bt3	18.3	SC	5YR 4/4	7.5YR 4/6, 5YR 4/4 cf	3f-mabk	vh	fr-fi	s	vp	2-3n+v1mkpf, 2nbr, 1-v1npo, 2-3ncl, 3n+2mkclpo
2Bt4	54.9	SCL (top) SCL-SL	5YR 4/3 to 3/4, 5YR 4/4-3/3 cf	5YR 4/4, 5YR 4/3-3/3 cf	3msbk (top) 3f-msbk	h-vh	fr	s	p-ps	1-2n+1mkpf, 1-2nbr, 2-3n+1mkcl, 2-3nclpo
Soil Profile 1 (FT-1)										
2Bt4	27.4	SC	2.5YR 4/4	5YR 4/4, 2.5YR 4/4 cf	3cabk	eh	fi	vs	vp	1-2n-mkpf, 2n-mkbr, 3-4mk-kclpo, 3n-mkcl
2Btk	13.7	SCL	5YR 4/4	5YR 4/4	3f-msbk	vh	fi-vfi	s	p	1npf, 1nbr, 2n-mkcl, 2n+v1mk-kclpo
3Bt5	6.1	SL	5YR 4/4-4/3	5YR 4/4	3f-msbk	h	fr-fi	ss-s	ps-p	1n-mkpf, 1nbr, 2ncl, v1-1mkclpo
4Bt6	16.9	SCL	5YR 4/4	5YR 5/4, 5YR 4/4 cf	3f-msbk	h	fr-fi	ss	p	2n-mkpf, v1-1ncl, v1-1mkclpo
4Bt7	7.6	SCL	5YR 4/4	5YR 5/4, 5YR 4/4 cf	2f-msbk	h-vh	fi	ss	p	1-2n-mkpf, 1ncl, 1mkclpo
5Btlam1	10.7	SCL	7.5YR 4/4, 5YR 3/4	7.5YR 5/6, 5YR 4/4	2f-msbk	fr-h	fr	ss	p	1npf, 2ncl
5Btlam2	36.6	SL-SCL	5YR 4/4	7.5YR 5-6/4, 5YR 4/4	2m-csbk	sh-h	fi	ss-s	ps-p	1npf
5BC1	9.1	LS	7.5YR 4/4, 5YR 4/4 cf	7.5YR 5/4-6, 7.5YR 4/4 cf	2f-msbk	sh	fr-sfi	so	po-ps	1npf, 1nbr, v1-1ncl
5BC2	12.2	vgSL	5YR 4/4, 5YR ¾ cf	5YR 5/4, 5YR 4/4 cf	2m-csbk	sh-h	fi	so	po-ps	2n-mkcl, 1mkclpo
6BClam1	42.7	S-LS	7.5YR 4/4, 5YR 3/4	7.5YR 5/4-6, 5YR 4/4	m -> sg + 2cabk	sh-h	vfr - fr	so	po	1npf, 1nbr, 2ncl
6BC3	39.1	vgLS	7.5-5YR 4/4, 5YR ¾ cf	7.5YR 5/4, 7.5-5YR 4/4 cf	1m-csbk ->sg	sh-h	fr	so	po	2ncl, 1nclpo
7BClam2	47.2	LS	5YR 4/4, 5YR 3/4	7.5YR 4/6, 5YR 4/4	1fsbk -> sg	lo-h	lo-fi	so-ss	po	v1nbr, 1n-mkcl
7BC4	9.2	LS	5YR 4/4	7.5YR 4/4	1fsbk -> sg	lo-h	lo-fr	ss	po	1ncl, 2mkclpo
8BClam3	57.9	LS	5YR 3/3, 5YR 3/4	5YR 4/3, 5YR 4/4	2m-csbk+ sg	lo-sh	lo-fi	ss	po	1npf
8C	30.5	LS-S	7.5YR 4/6 - 5YR 3/4	7.5YR 5/4 - 5YR 4/4	1fsbk -> sg	lo-sh	lo-fr	so	po	none

ABBREVIATIONS:

TEXTURE: S = sand; LS = loamy sand; SL = sandy loam; L = loam; SCL = sandy clay loam; SC = sandy clay; CL = clay loam; Si = silt; SiL = silt loam; SiCL = silty clay loam; SiC = silty clay; C = clay. **STRUCTURE**: -> = breaking to, **Grade**: 1 = weak; 2 = moderate, 3 = strong. **Class**: 1f = very fine, f = fine, m = medium, c = coarse; vc = very coarse. **Type:** m = massive; sg = single-grained; gr = granular, cr = crumb, abk = angular blocky, sbk = subangular blocky, pr = prismatic. **CONSISTENCY**: **Dry**: lo = loose, so = soft, sh = slightly hard, h = hard, vh = very hard, eh = extremely hard. **Moist**: lo = loose, vfr = very friable, fr = friable, sfi = slightly firm, fi = firm, vfi = very firm, efi = extremely firm. **Wet**: ns = non-sticky, ss = slightly sticky, s= sticky, vs = very sticky; np = non-plastic, sp = slightly plastic, p = plastic, vp = very plastic. **CLAY FILMS (cf): Abundance:** v1 = very few, 1 = few, 2 = common, 3 = many, 4 = continuous. **Thickness**: vn = very thin, n = thin, mk = moderately thick, k = thicK. **Location**: st = stains, cl = on clasts; clpo = on clast pockets, po = in pores, br = forming bridges between grains, pf = on ped faces.

The mudfl section at the top of the sequence (as described in Profi e 2 and the sample from FT-3) is characterized by poorly sorted, matrix-supporte sediments with few to commo fine pores The soil that developed in this unit is trunc ed at the top possi y as a resul of grading to level the original ground sur and construct the existing parking lot. No A soil horizon remained, but in th area of Profile 2, this soil was capped by an approximately 1.3-foot-thick layer of artificial fill. The artificial fill was described as consisting of reworked sandy loam mixed with fragments of the underlying argillic soil horiz . The underlying argillic (Bt) soil section is compr sed by three sub-horizons referred to as Bt1, Bt2 and Bt3. These have sandy clay to sandy clay loam texture, brown to red sh brown (7.5YR to 5YR hues) strong angular blocky soil structure, common to many thin and few moderately thick clay films on ped faces and bridging grains, and many thin to moderately thick clay films coating clasts and in clast pockets.

The alluvial sediments described primarily in Profi e 1 were deposited over a relatively long period of time by several flood ng episodes, with the contact between flood event typically defined by a laye of grave cobbles or boulders that we refer to as a "stonelin " Soil form on occur ed in between these depositiona episodes as indicated by the argil c soil horizons present in the secti . The uppermost porti of every soil was removed by erosi pri r to being burie by new alluvium; as a result, no A soil horizons remained. Furthermore, most soils also lost part or all of their argillic (Bt) horizons; the horizons preserved include sections with argil c lamel ae (referred to as Bt lamellae or Bt lams), and BC horiz s, some als with less well-developed Bt lams (BC_{lams}). Given that the better-deve oped soil horiz s that are typically used to estimate the age of a soil were not prese t, all age estimates provided here are based on th characteris s of the deeper soil horizons that remained, which mean that the age estimates developed for this study are minimum values. Overall, eight geological deposits were recognized and evaluated for this repor : one mudfl deposit and seven separate alluvial packages. In the descriptions provided, the geological layer are differentia ed by a numbered prefix, count ng from the top down, with the numeral for the uppermost unit (1) omitted. Each of the soils interpreted in the composite section that includes the sample from FT-3 and Soil Profiles 1 and 2, are descr bed furth r below. Age estimates for each soil and the entire seque ce are summarized in Table 2.

Soil 1 [Deve oped in Mudflow Deposits]

This soil was observed in the north n hal of trench FT-1 and in trenches FT-2 and FT-3. The soil is best represented by the combination of the upper argillic soil sampl from trench FT-3, and the argillic soil horizons observed in Profi e 2 of FT-1. Overall, the mudlow package has three argillic sub-horizons (Bt1/Bt2/Bt3). Texturally these horizons consi of sandy clay to sandy clay loam. The matrix of these sub-horizon has 5YR to 7.5YR color with clay films ranging between 2.5YR and 5-7.5YR Soil structure is strong fine to coarse angular blocky, and clay films occur on ped faces, bridging grain in pores, on clast and lining clas pockets. The bette developed clay films observed in this soil were observed in the uppermost sub-horizon in FT-3, and consisted of many moderately thick and few thick clay films on ped faces, few moderately thick clay films bridging gra s, many to continuous thin and common moderately thick to thick clay films coatings clasts, and many moderately thick to thick clay films lining clast pockets. The underlying sub-horizons had clay films ranging from few to many and thin to moderately thick.

The characteristics of the better-developed Bt1 in FT-3 yielded a Mean Horizon Index (MHI) value of 0.482. Combined, the three argil c horizons forming this uppermost soil have a non-normalized Soil Development Index (SDI) of 28.08, and a norma zed SDI value of 92.79. The non-normal zed value is computed using the thicknesses of the argillic horizons as measured in the field, in the area where the soil profiles were described (combined these horizons had a thickness of 67 cm, or 2.2 feet). Using soil age regressions presented in Dolan et al., (1997), the MHI value yiel s a mean age estimate for this soil of about 34,000 years, and a maximum age of 98,00 years. The normalize SDI value yields a mean age estimate for this soil of 32,000 years, and a maximum age estim e of 99,000 years. Given the significant reddening of the soil and thickness and abundance of the clay films, we prefer the maximum age estimates of nearly 100,000 years.

Soils 2 through 8 [Deve oped in Fluvial Deposits]

Soil 2: As mentioned above, the alluv l section observed in trenc FT11 included seven separate truncated soil secti s. The uppermost soil developed in alluvial deposits was observed at and near the ground surface in Soil Profile 1, and at the botto of Soil Profile 2. The only horizons preserved from this soil include an argillic (Bt) and a calcic (Btk) horiz n (for a 2Bt4/2Btk profile). Texturall these soils were described as sandy clay loam to sandy clay, with the Bt2 horizon in Profile 2 grading down to sandy loam. Moist and dry colors of both the matrix and the clay films are in the 5YR to 2.5YR range, and the soil structure varies from strong angular blocky to subangular blocky. Clay films in the Bt horizon were described as few to many thin and few moderately thick on ped faces common thin to moderately thick bridging grains, common to many th n and few moderately thick coating clasts, and many to continuous thin to thick lining clast pockets. In the calci (Btk) horiz the clay films are few thin on ped faces, common thin to moderately thick coating clasts, and common thin and few thick linin clast pockets. Calcium carbonate occurs in vertical veins 1 to 1-½ inches long and ¼ inch thick, and as small nodules.

The Bt horizon in Profile 1 yielded an MHI value of 0.607, and the soil yielded non-normalized and normalized SDI values of 31.32 and 94.85, respectively. The MHI value indicates a median age of 68,000 years and a maximum age of 188,000 years. The normalized SDI value resolves into a median age of about 34,000 years, and a maximum age of 102,000 years. These are estim es of the amount of time that this soil was exposed at the surface to soil-formi processes. The averages of these values are 51,000 and 145,000 years for the mean and maximum estimates, respectively. As with the soil developed in the mudflow deposits, the significant reddening (5YR to 2.5YR) and abundance and thick ss of the clay films all indicate that this soil has bee exposed to soil-formin processes for a long perio of time. Thus, the maximum age estimate of about 145,00 years is thoug to better represent the true age of the soil.

Soil 3: Only a very thin (6 cm; 2.4 inches) section remains of the second alluvial deposit (from top to bottom) observed and described in Profile 1. Pedogenic alteration of this alluvial package is evidenced in the accumulation of clay in an otherwise coarse-grained section. The clay forms few thin to moderately thick films on ped faces, few thin films bridging grains, common thin films coating clasts, and very few to few moderately thick films lining clast pockets. Even though the textu is described as coarse sandy loam, the clay gives enough strength to the material to have a strong subangular blocky structure, hard consi ency when dry, and slightly sticky to sticky and slightly plastic to plastic consisten y when wet. This 3Bt5 horizon has 5YR colors both in the dry and moist states, scatt ed gravel, and common to many pinhole-si pores.

The calculated MHI value for this horizon is 0.414, and its non-normalized and normalized SDI values are 2.53 and 82.79, respectiv The MHI value yields mean and maximum estimates of soil formation for this soil of 23,000 and 69,00 years, respectively, whereas the normalized SDI value returns mean and max m estimates of soil formation of 28,000 and 85,000 yea respectively. The averages of these values are 26,000 (mean) and 77,000 (maximum) years (rounded to the neare 1,000). Given that this depos is buried by the overlying soil, its age is best estimated by adding the estim ed age of the overlying soil (145,000 years) to the numbers above. Thus, the mean and maximum age estimates for this soil are 171,000 and 222,000 years respectively.

Soi 4: The third soil developed in alluvial deposits has a truncated 4Bt6/4Bt7 profile, with a combined thickness of 0.8 fee (24 cm). Both of these horizons have a sandy clay loam texture, and 5YR colors when dry and moist The upper argil c horizon (4Bt6) has strong subangular blocky structure and common thin to moderate y thick clay films on ped faces, very few to fe thin clay films coating cl sts, and ver few to few moderatel thi clay films lining clast pockets. The deeper argillic hor zon (4Bt7 has common thin to moderately thick clay films on ped faces few thin films coating clasts, and few moderately thick films lining clast pockets. Both horizons have fine calcium carbonate nodules, with their concentration decreasing downward.

The calculated MHI for the sligh y better-developed upper argillic horizon is 0.433. The non-norma zed and normalized SDI values fo this truncated soil are 10.48 and 86.46, respectively. The MHI value yields mean and maxim estimates of length of soil formation for this soil of 26,000 and 76,000 yea respectively The normalized SDI value yields estimates of length of soil formation of about 29,000 and 90,000 years, respectively. Addi g the averages of these estim es to the age of the overl ng section results in age estimates for this soil ranging from about 199,000 (mean to 305,000 (maximum) years.

Soil 5: The fourth soil developed in the alluv l deposits exposed in trenc FT-1, in the area of Soil Profi e 1, was significantly trunc ed so that only the typically deeper Bt_{lam} and BC horizons are preserved ($5Bt_{lam1}$/$5Bt_{lam2}$/5BC1/5BC2). The combined thickness of these horizons is 68.6 cm (2.25 feet). This is a coarsening-downwa d sequence grading from sandy clay loam at the top to very grave y to cobbly sandy loam at the bottom. Pedogenic clay accumulated in distinct laye s or lamellae where the form fe thin films on ped faces and common thin films coati clasts. The matrix typically has 7.5YR color when dry and moist whereas the clay films are red with 5YR colors.

The MHI value for the uppermost $5Bt_{lam1}$ horizon is 0.37, and the non-normal zed and normalized SDI values for the entire sequence are 29.24 and 65.97. The MHI value yields age estimates of between 18,000 (mean and 56,000 (maximum years for the length of time that this soil was exposed to soil forming processes The norma zed SDI value indicates simil estim es of soil forma on of between 21,000 (mean) and 66,000 (maximum) years Adding the averages of these numbe to the age of the overlying sequence provides an estimate of the age of the sediments that these soils developed in. These age estimates range from 220,000 (mean) to 371,000 (maximum) years

Soil 6: As with the soil above, the upperm st secti of the fifth soil developed in the alluv l deposits exposed in trench FT-1 was significant y truncated by erosion before being buried by th overlyin floo deposits. The remaining horiz s ($6BC_{lam1}$/6BC3) show only minor amounts of pedogenic development concentrated in Bt lamellae that are 1 to 2 inches thick and spaced about 2 to 3 inches apart, and clay coat ngs on clasts and in clast pockets in the deeper horizon. The lamellae have few to common thin clay films on ped faces bridg ng grains and coat ng clasts, and moder e to weak subangular blocky soil structure The matri has massiv breaking to single-gra ned soil structure. The colors of the sand to loamy sand matrix are primarily in the 7.5YR range, whereas the clay films in the lamellae have 5YR colors. The bottom section of this depos includes a high concentration of gravel and cobbles, with cobbles up to 6 inches in diameter.

The MHI value calculated fo the $6BC_{lam1}$ horizon is 0.193, and the non-normal zed and normalized SDI values are 14.15 and 37.10, respectively. The MHI value yields mean and maximum estimates of length of soil formation of about 7,000 and 22,000 years. The normalized SDI value returns mean and maxim estimates of 13,000 and 42,000 years. Since the uppermost section of this soil is no long available for us to descr be and analyze, we cannot deter ne wheth the MHI- or SDI-derived age estimates are most representative of the actual lengt of time this soil was exposed at the surface. Thus, we have averaged the est es yielded by the two different methods, and use those averages to estim e the age of this soil. The averages of these estimates are 10,000 and 32,000 years, and the age for this depos is estimated at between 230,000 (mean) and 403,000 (maximum) years

Soil 7: The sixth soil interpreted to have developed in alluvial sediments (and seventh soil ove described in trench FT-1) is similar to the tru ed soil above, except that the sediments are slightly finer-grain The remnant $7BC_{lam2}$/7BC4 horizons have a loamy fine to coa e sand texture with gravel, pebbles and cobbl s to 3 inches in diameter. The matrix has 7.5YR colors when dry and 5YR colors when moist, whereas the lamellae have 5YR colors when both dry and moist Quart-rich clasts are slightly weathered (Stage II), and granitic clasts are substantially weathered (Stage III) using McFadden et al.'s (1982) weatherin stages criteria. Clay films in the lamellae are very few thin bridging grai s and few thin to moderately thick coati clasts. Clay films in the deeper horizon are few thin coating clasts and common moderately thick lining clast pockets.

The $7BC_{lam2}$ horizon has a MHI value of 0.216, and the two horizons com ed have non-normalized and norma zed SDI values of 12.15 and 43.21, respectively. The MHI value resolves into mean and maximum estimates of soil formation of 8,000 and 24,00 years, respectively. The normalized SDI value yields higher estimates of length of time exposed to soil forming factors of about 15,00 (mean) and 46,000 (maximum) years. Following the same argument regarding the lack of data from which we can determine which methods yields the most appropria e age estimate for this soil, we have averaged these resul s and calculated an age for this deposit of between about 242,000 (mean) and 438,00 years).

Soil 8: The deepest soil observed in trench FT-1 has an $8BC_{lam3}$/8C profile, loamy sand to sand text , and predominantly 5YR colors. The matri has weak fine subangular blocky to single-grained structure, and the lamellae in the upper horizon have moder e mediu to coarse suban lar blocky structure. The Bt lamellae are ½ to 1 inch thick and have few thin clay films on ped faces.

The $8BC_{lam3}$ horizon has a MHI value of 0.209, while the two horizons combined have non-normalize and norma zed SDI values of 17.21 and 40.56. The MHI value yields an estimate of length of soil formation at th ground surface of 7,000 (mean) and 24,00 (maximum) years. The norma zed SDI value yields length of soil forma on estimates of 14,000 (mean and 44,000 (maximum) years. Averaging the MHI- and SDI-derived estimates and adding to the age estimate fo the overlying sequence yields an estimated age for the entire soil secti exposed in Soil Profile 1 of between 253,000 (mean) and 472,00 (maximum) years.

Alternati Interpreta on for Section Comprised of Soils 4 throu h 8

Given the lack of preserved argillic horizons in a large portion of Soil Profile 1, we have to consider the possibility that these sediments we e deposited by a series of flood events that occurred fairly close in time, with soil formation first occurring only afte the sediments of Soil 4 were deposited. In that case, the overall thickness of the 4Bt6/4Bt7/5Bt$_{lam1}$/5Bt$_{lam2}$/5BC1/5BC2/6 $_{lam1}$/6BC3/7BC$_{lam}$ /7BC4/8BC$_{lam3}$/8C profi e would have been at least 318.6 cm (10 45 feet), recognizin that the A soil horizon and the uppermost section of the argillic (Bt) horizon were removed by erosion. A soil this thick that inclu es Bt lamellae at significant depth indicates a wet clima duri soil formation, with the Bt lamellae defining the depth of the wetting front. If this interpretation is correct, then the approximate minimum age of the sediments in Soil Profile 1 is calculated by adding the age of the section represente by Soils 2 and 3 to the estim ed length of soil formation computed for the sediments below from soil horizon 4Bt3 down to the bottom of the trench.

The MHI fo this possible alternative Soil 4, is 0.433, based on horizon 4Bt6, which is the bette developed soil horizon in this profile. The non-normalized SDI value for this soil profile is 70.92, and the norma zed SDI value is 47.22. The norma zed SD value is smaller than the non-norma zed value because the lowermost 118.6 cm of this soil have to be ignored in the SDI calculation. The MHI value resul s in mean and maxim estim es of soil formation of 26,000 and 76,000 years. The norma zed SDI value yields estimates of 16,000 (mean) and 49,000 (maximum) years of exposure to soil-forming processes. Using the averages of these values and adding them to the age est es for the overl ng soils this alternative interpretation yields age estim es fo the sediments at the botto of the trench in the area of Soil Profi e 1 that range from about 192,00 (mean) to 285,000 (maximu) years, still well into the Pleistocene.

SUMMARY of AGE ESTIMATES

Based on our review of the sediments observed in the trenches we conclude tha the geological surface upon which this portion of the site is located has been geomorphically stable for a length of time that allowed for soil formation to dominate. The site is underlain by mudfl and alluvial deposits, with the mudfl sediments occur ng at the surface near the northern end of the site, and alluvial deposits occur ng below the mudflow depos s in the northern half, and at the surface farther south. This change in style of deposition suggests a significan change in the climate for the area at some point in the geologic past. After the mudfl sediments were deposited, soil formation began in earnest, and has continued for many tens of thousand of years, and through several glaci l and interglaci l cycles. As a result, th characteris s of the near-surface soils developed in both sediment types inclu e significant reddening and accumulation of pedogenic clay in the form of clay films Our minimum age estimates for these soils range from about 100,000 years for the surface soil developed in the mudflow sediments observed in FT-3 and the northern half of FT-1, to about 145,000 years for the same soil developed in the alluvia sediments observed in Soil Profi e 1 at station 99′ in FT-1. These dates suggest that this soil began to develop during Marine Isotope Stage (MIS) 7 at about 200,000 years ago. These results confirm that the trenches excavated fo this study were of sufficient depth to expose Pleistocene (>11, 00 year old) sediments, with Pleistocene aged sediments exposed direc y below the ground surface, and thus within the uppermost bench of all three trenches that were excavated fo this study.

To obtain age estimates for the entire sedimentary section descr bed in Soil Profi e 1 we considered two possible alternatives. In the first scenario every abrupt contact between sedimentary packages defined by a ma ked contrast in grain size or a stoneline was considered to represent a depositional hiatus sufficient long to allow for soil formation. We used the characteris cs of the remnant horizons in each presumed soil to estim e the leng h of time that each soil was exposed to soil-formin processes. This interpretation requi s that most of the argil c horizons tha presumably formed on each of these soils were subsequently removed by erosion before being buried by the overl ng deposit. As a resul , the age estimates derived for each interpreted soil and the age of the overall section, are minimum values. Following this approach, the age of the entire section descr bed in T1 is estimated to range in age between 253,000 and 472,000 years The first of these dates approximately correlates with MIS 8, wherea the older date more closely correlates with MIS 14.

The second interpretation considers the possibility that the sediments in the bottom 10.45 feet of Soil Profi e 1 were depos ed by a serie of flood events that occurred fairly close in time, with no hiatuses tha allowed for soil formation After the sediments that compr e Soil 4 were deposited the clima c or landform conditions changed, and soil formation began. The soil that developed was then par y eroded away before being buried by sediments that were then modified by pedogenic processes (Soil 3). This sequence repeated itself one to tw more times (Soils 2 and 1). The combined age of the entir secti takin into consideratio the amount of time it took for soils 1 through 4 to form, ranges from 192,000 to 285,000 years. These ages approximately correlate with MIS 7 and 9, respectively, and would imply very rap deposition of the alluvial deposits prio to the surface stabilization about 200,000 years ago.

In either case, the minim age estimate for the surface soils is approximatel 145,000 years, but with a prefe ed age of about 200,000 years to correlate with the MIS 7 clima c period. The sediments upon which this soil formed range in age from 200,000 to 285,000 years, or potentially as old as almost 500,000 years in age by the botto of the trench.

Table 2: Age Estimates for the Soils Exposed in Trenches FT-3 and FT-1 Using the Maximum Horizon Index (MHI) and Soil Development Index (SDI) Methods

	Mean Horizon Index (MHI)			Soil Development Index (SDI)			Age of Section	
Soil	**Value**	**Mean Length of Soil Formation (years)**	**Maximum Length of Soil Formation (years)**	**Value (Normalized to 200 cm)**	**Mean Length of Soil Formation (years)**	**Maximum Length of Soil Formation (years)**	**Average Age**	**Maximum Age**
Soil 1 (Bt1/Bt2/Bt3)	0.482	34,000	98,000	92.79	33,000	99,000	34,000	**99,000**
Soil 2 (2Bt4/2Btk)	0.607	68,000	188,000	94.85	34,000	102,000	51,000	**145,000**
Soil 3 (3Bt5)	0.414	23,000	69,000	82.79	28,000	85,000	171,000*	222,000*
Soil 4 (4Bt6/4Bt7)	0.433	26,000	76,000	86.46	29,000	90,000	199,000	305,000
Soil 5 ($5Bt_{lam11}$/$5Bt_{lam2}$/5BC1/5BC2)	0.370	18,000	56,000	65.97	21,000	66,000	220,000	371,000
Soil 6 ($6BC_{lam11}$/6BC3)	0.193	7,000	22,000	37.10	13,000	42,000	230,000	403,000
Soil 7 ($7BC_{lam22}$/7BC4)	0.216	8,000	24,000	43.21	15,000	46,000	242,000	438,000
Soil 8 ($8BC_{lam33}$/8C)	0.209	7,000	24,000	40.56	14,000	44,000	253,000	472,000
Alternate Interpretation for Soil 4 (4Bt6/4Bt7/$5Bt_{lam1}$/$5Bt_{lam2}$/5BC1/5BC2/$6BC_{lam}$/6BC3/$7BC_{lam2}$/7BC4/$8BC_{lam3}$/8C)	0.433	26,000	76,000	47.22	16,000	49,000	192,000	285,000

Age estimates have been rounded to nearest 1,000. Preferred age estimates are shown in **bold.**

*These age estimates (and all ages below, for the deeper soils) were calculated using our preferred age estimate for the soil above (145,000 years) as the starting point for both the median [(145k+ average (23k+28K)] and maximum [(145k+ average (69k + 85k)] ages.

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APPENDIX – Soil Descriptions

Location	Depth (ft)	Geologic Unit	Horizon	Description
Profile 2, FT-1 (@ Station 53 East Wall)	0 - 1.3	Af	Fill	**SANDY LOAM**; brown (7.5YR 5/4) when dry, dark brown (7.5YR 3/4) when moist; moderate fine to medium angular blocky soil structure; very hard when dry, firm when moist, slightly sticky and slightly plastic when wet; very dense; broken peds of Bt1 incorporated into fill; scattered gravel; common to many pores; abrupt lower boundary truncating the soil horizon below.
FT-3 (at Station 3)	0 - 1.1	Qmf	Bt1	**SANDY CLAY**; reddish brown (5YR 4/4) with reddish brown (2.5YR 4/4) clay films when dry, reddish brown (5YR 4/4) with dark reddish brown (2.5YR 3/3) clay films when moist; strong coarse angular blocky soil structure; very hard to extremely hard when dry, firm when moist, very sticky and very plastic when wet; many moderately thick and few thick clay films on ped faces, few moderately thick clay films bridging grains, many to continuous thin and common moderately thick to thick clay films coating clasts, many moderately thick to thick clay films lining clast pockets; abrupt smooth lower boundary. [Truncated remnant of Bt horizon]
Profile 2, FT-1 (at Station 53, on East Wall)	1.3 - 1.6	Qmf	Bt1	**SANDY CLAY LOAM**; reddish brown (5YR 4/4) with reddish brown to brown (5-7.5YR 4/4) clay films when dry, brown (7.5YR 4/4) when moist; strong medium to coarse angular blocky soil structure; very hard to extremely hard when dry, firm when moist, sticky and very plastic when wet; many thin and few moderately thick clay films on ped faces, common thin clay films bridging grains, few thin clay films in pores, many thin and common moderately thick clay films coating clasts, many thin to moderately thick clay films lining clast pockets; fine- to coarse-grained sand; common fine pores; clear lower boundary. [Soil horizon disturbed by fill placement on top]
	1.6 - 2.1	Qmf	Bt2	**SANDY CLAY**; yellowish red (5YR 4/6) with reddish brown (5YR 4/4) clay films when dry, reddish brown (5YR 4/4) with reddish brown (5YR 4/3) clay films when moist; strong fine to medium angular blocky soil structure; very hard when dry, friable to firm when moist, very sticky and very plastic when wet; many thin and few moderately thick clay films on ped faces; few thin clay films bridging grains, common thin clay films in pores, many thin clay films coating clasts, many thin and few moderately thick clay films lining clast pockets; fine to coarse sand grains; common fine pores; clear wavy lower boundary.
	2.1 - 2.7	Qmf	Bt3	**SANDY CLAY**; strong brown (7.5YR 4/6) with reddish brown (5YR 4/4) clay films when dry, brown (5YR 4/4) when moist; strong fine to medium angular blocky soil structure; very hard when dry, friable to firm when moist, sticky and very plastic when wet; common to many thin and very few moderately thick clay films on ped faces, common thin clay films bridging grains, very few to few thin clay films in pores; common to many thin clay films coating clasts, many thin and common moderately thick clay films lining

Location	Depth (ft)	Geologic Unit	Horizon	Description
				clast pockets; scattered fine gravel and 1- to 3-inch-in-diameter angular to rounded cobbles; fine- to coarse-grained sand; common silt-lined root pores; abrupt lower boundary.
	2.7 - 4.5	Qal	2Bt4	**SANDY CLAY LOAM** grading down to **SANDY CLAY LOAM** to **SANDY LOAM**; reddish brown (5YR 4/4) with reddish brown to dark reddish brown (5YR 4/3 to 5YR 3/3) clay films when dry, reddish brown to dark reddish brown (5YR 4/3 to 5YR 3/4) with reddish brown to dark reddish brown (5YR 4/4 to 5YR 3/3) clay films when moist; strong medium subangular blocky grading down to strong fine to medium subangular blocky soil structure; hard to very hard when dry, friable when moist, sticky and plastic to slightly plastic when wet; few thin clay films on ped faces and bridging grains, many thin and few moderately thick clay films coating clasts, common thin clay films in clast pockets at top, grading down to few moderately thick and common thin clay films on ped faces, common thin clay films bridging grains, common thin and few moderately thick clay films coating clasts, many thin clay films lining clast pockets; scattered gravels ≤¾ inch in diameter, common coarse sand grains; few fine pores; lower boundary not observed (at bottom of bench).

Location	Depth (ft)	Geologic Unit	Horizon	Description
Profile 1, FT-1 (at Station 99, on West Wall)	0 - 0.9	Qal	2Bt4	**SANDY CLAY**; reddish brown (5YR 4/4) with reddish brown (2.5YR 4/4) clay films when dry, reddish brown (2.5YR 4/4) when moist; strong coarse angular blocky soil structure; extremely hard when dry, firm when moist, very sticky and very plastic when wet; few thin to moderately thick clay films on ped faces, common thin to moderately thick clay films bridging grains, many thin to moderately thick clay films coating clasts, continuous moderately thick to thick clay films lining clast pockets; fine- to coarse-grained sand, locally in lenses, few scattered fine gravel; few fine pores; clear to gradual wavy lower boundary. [Upper part is truncated]
	0.9 - 1.35	Qal	2Btk	**SANDY CLAY LOAM**; reddish brown (5YR 4/4) when dry, reddish brown (5YR 4/4) when moist; strong fine to medium subangular blocky soil structure; very hard when dry, firm to very firm when moist, sticky and plastic when wet; few thin clay films on ped faces and bridging grains, common thin to moderately thick clay films coating clasts, common thin and very few thick clay films lining clast pockets; Stage 1 calcium carbonate with mostly vertical carbonate veins that are 1-1 ½ inches long by ¼ inches thick, few small nodules; abrupt wavy lower boundary.
	1.35 - 1.55	Qal2	3Bt5	Coarse **SANDY LOAM**; reddish brown (5YR 4/4) when dry, reddish brown (5YR 4/4-4/3) when moist; strong fine to medium subangular blocky soil structure; hard when dry, friable to firm when moist, slightly sticky to sticky and slightly plastic to plastic when wet; few thin to moderately thick clay films on

				ped faces, few thin clay films bridging grains, common thin clay films coating clasts, very few to few moderately thick clay films lining clast pockets; very few scattered clasts or gravels; common to many pinhole-sized to fine pores; abrupt lower boundary.
	1.55 - 2.10	Qal3	4Bt6	**SANDY CLAY LOAM**; reddish brown (5YR 5/4) with reddish brown (5YR 4/4) clay films when dry, reddish brown (5YR 4/4) when moist; strong fine to medium subangular blocky soil structure; hard when dry, friable to firm when moist, slightly sticky and plastic when wet; common thin to moderately thick clay films on ped faces, very few to few thin clay films coating clasts, very few to few moderately thick clay films lining clast pockets; common small calcium carbonate nodules; very few clasts; few fine to pinhole-sized pores; clear lower boundary.
	2.10 - 2.35	Qal3	4Bt7	**SANDY CLAY LOAM**; reddish brown (5YR 5/4) with reddish brown (5YR 4/4) clay films when dry, reddish brown (5YR 4/4) when moist; moderate fine to medium subangular blocky soil structure; hard to very hard when dry, firm when moist, slightly sticky and plastic when wet; common thin to moderately thick clay films on ped faces, few thin clay films coating clasts, few moderately thick clay films lining clast pockets; very few fine carbonate nodules; common fine pores; abrupt to clear lower boundary.
	2.35 - 2.70	Qal4	$5Bt_{lam1}$	**SANDY CLAY LOAM** matrix with **SANDY CLAY LOAM** Bt lamellae. **Matrix**: strong brown (7.5YR 5/6) when dry, brown (7.5YR 4/4) when moist; moderate fine subangular blocky soil structure; hard when dry, friable when moist, slightly sticky and plastic when wet; few thin clay films on ped faces; clear lower boundary. **Lamellae**: reddish brown (5YR 4/4) when dry, dark reddish brown (5YR 3/4) when moist; moderate medium subangular blocky soil structure; hard when dry, friable when moist, slightly sticky and plastic when wet; common thin clay films coating clasts.
	2.7 - 3.9	Qal4	$5Bt_{lam2}$	**SANDY LOAM** matrix with **SANDY CLAY LOAM** Bt lamellae ≤ 3 inches thick**.** **Matrix:** brown to light brown (7.5YR 5-6/4) when dry, reddish brown (5YR 4/4) when moist; moderate medium to coarse subangular blocky soil structure; slightly hard when dry, firm when moist, slightly sticky and slightly plastic when wet; common calcium carbonate coatings on ped faces; many fine pores; clear lower boundary. **Lamellae:** reddish brown (5YR 4/4) when dry, reddish brown (5YR 4/4) when moist; hard when dry, firm when moist, sticky and plastic when wet; few thin clay films on ped faces; few carbonate stringers; many fine pores.
	3.9 - 4.2	Qal4	5BC1	**LOAMY** fine to coarse **SAND**; brown to strong brown (7.5YR 5/4-6) with brown (7.5YR 4/4) clay films when dry, brown (7.5YR 4/4) with reddish brown (5YR 4/4) clay films when moist; moderate fine to medium subangular blocky soil structure; slightly hard and fragic when dry, friable to slightly firm when moist, non-sticky and non-plastic to slightly plastic when wet; few thin clay films on ped faces, few thin

				clay films bridging grains, very few to few thin clay films coating clasts; few to common scattered fine gravels; more clay-rich and darker zones locally; clear lower boundary.
	4.2 - 4.6	Qal4	5BC2	VERY GRAVELLY to COBBLY **SANDY LOAM**; reddish brown (5YR 5/4) with reddish brown (5YR 4/4) clay films when dry, reddish brown (5YR 4/4) with dark reddish brown (5YR 3/4) clay films when moist; moderate medium to coarse subangular blocky soil structure; slightly hard to hard when dry, firm when moist, non-sticky and non-plastic to slightly plastic when wet; common thin to moderately thick clay films coating clasts, few moderately thick clay films lining clast pockets; subrounded 1- to 3-inch-sized cobbles weathered to Stage 2; many fine pores; abrupt to clear wavy lower boundary.
	4.6 - 6.0	Qal5	$6BC_{lam1}$	Fine to medium **SAND** to **LOAMY SAND** matrix with **LOAMY SAND** Bt lamellae 1 to 2 inches thick and spaced ±2 to 3 inches apart. **Matrix:** brown to strong brown (7.5YR 5/4-6) when dry, brown (7.5YR 4/4) when moist; massive breaking to single-grained; slightly hard and fragic when dry, very friable when moist, non-sticky and non-plastic when wet; few scattered coarse sand grains and fine gravels; abrupt wavy lower boundary. **Lamellae:** reddish brown (5YR 4/4) when dry, dark reddish brown (5YR 3/4) when moist; moderate coarse subangular blocky soil structure; hard when dry, friable when moist, non-sticky and non-plastic when wet; few thin clay films on ped faces, few thin clay films bridging grains, common thin clay films coating clasts; few fine gravels.
	6.0 - 7.25	Qal5	6BC3	VERY to EXTREMELY GRAVELLY and COBBLY **LOAMY SAND**; brown (7.5YR 5/4) with brown to reddish brown (7.5-5YR 4/4) clay films when dry, brown (7.5-5YR 4/4) with dark reddish brown (5YR 3/4) clay films when moist; weak medium to coarse subangular blocky soil structure breaking to single-grained; slightly hard to hard and fragic when dry, friable when moist, non-sticky and non-plastic when wet; common thin clay films coating clasts, few thin clay films lining clast pockets; subrounded to subangular gravels and cobbles, smaller cobbles more angular than larger ones; abrupt to clear wavy lower boundary locally defined by cobbles up to 6 inches in diameter.
	7.25 - 8.8	Qal6	$7BC_{lam2}$	**LOAMY** fine to coarse **SAND** matrix with **LOAMY SAND** Bt lamellae up to 1 inch thick and spaced ±2 inches apart. **Matrix**: strong brown (7.5YR 4/6) when dry, reddish brown (5YR 4/4) when moist; weak fine subangular blocky soil structure breaking to single-grained; slightly hard and fragic when dry, friable when moist, slightly sticky and non-plastic when wet; with fine gravel and subangular cobbles up to 3 inches in diameter; granitic clasts weathered to Stage III, quartz-rich clasts weathered to Stage II; clear wavy lower boundary, locally defined by a stoneline. **Lamellae**: reddish brown (5YR 4/4) when dry, dark reddish brown (5YR 3/4) when moist; weak fine subangular blocky soil structure; slightly hard to hard when dry, friable to firm when moist, slightly sticky

				and non-plastic when wet; very few thin clay films bridging grains, few thin to moderately thick clay films coating clasts.
	8.8 - 9.1	Qal6	7BC3	**LOAMY** fine to coarse **SAND**; brown (7.5YR 4/4) when dry, reddish brown (5YR 4/4) when moist; weak fine subangular blocky soil structure breaking to single grained; loose to hard and fragic when dry, loose to friable when moist, slightly sticky and non-plastic when wet; few thin clay films coating clasts, common moderately thick clay films in clast pockets; scattered fine gravel to ½ inch in size, subangular to subrounded pebbles up to 1½ inches in diameter; abrupt to clear wavy lower boundary locally defined by a stoneline.
	9.1 - 11.0	Qal7	$8BC_{lam3}$	**LOAMY** fine to coarse **SAND** matrix with **LOAMY SAND** Bt lamellae ½ to 1 inch thick. **Matrix**: reddish brown (5YR 4/3) when dry, dark reddish brown (5YR 3/3) when moist; single-grained; loose when dry and when moist, slightly sticky and non-plastic when wet; clear wavy lower boundary. **Lamellae**: reddish brown (5YR 4/4) when dry, dark reddish brown (5YR 3/4) when moist; moderate medium to coarse subangular blocky soil structure; slightly hard and fragic when dry, friable to firm when moist, slightly sticky and non-plastic when wet; few thin clay films on ped faces.
	11.0 - 12±	Qal7	8C	**LOAMY SAND** to **SAND**; brown (7.5YR 5/4) to reddish brown (5YR 4/4) when dry, strong brown (7.5YR 4/6) to dark reddish brown (5YR 3/4) when moist; weak fine subangular blocky soil structure breaking to single-grained; loose to slightly hard when dry, loose to friable when moist; non-sticky and non-plastic when wet; few cobbles and fine gravels; lower boundary not observed (bottom of trench).

.

Appendix E
Approval Letters

CITY OF LOS ANGELES
CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

RAYMOND S. CHAN, C.E., S.E.
GENERAL MANAGER

FRANK BUSH
EXECUTIVE OFFICER

GEOLOGY REPORT APPROVAL LETTER

July 7, 2015

LOG # 87496R
SOILS/GEOLOGY FILE - 2
AP

Millennium Hollywood Development, LLC
1680 N. Vine Street
Los Angeles, CA 90028

TRACT: 18237 / Hollywood
BLOCK: – / 21
LOT(S): 1 and 2 (arbs 2-4) / 3-5 and 21 (arbs 1&2)
LOCATION: 1731-1741 Argyle Ave, 1720-1750 N Vine St, 1746-1764 N IvarAve & 1749 N Vine St

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Geologic Response Report	3425	06/03/2015	Earth Consultants International
Oversized Doc(s).	` `	` `	` `
Geologic Response Letter	LA-1191 A	05/17/2015	Group Delta
Third Party Review	3425	03/09/2015	Earth Consultants International
Geology Report	LA-1191 A	03/06/2015	` `
Oversized Doc(s).	` `	` `	` `

PREVIOIUS REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Dept. Approval Letter	77007-01	01/31/2013	LADBS
Geology/Soils Report	700019502	12/03/2012	Langan
Fault Investigation Report		11/30/2012	` `
Dept. Correction Letter	77007	05/23/2015	LADBS
Soils Report	700019501	11/22/2011	Langan

The Grading Division of the Department of Building and Safety has reviewed the referenced reports that present a fault activity investigation at 1731-1741 Argyle Ave., 1720-1750 N. Vine St., 1746-1754 N. Ivar Ave. and 1749 N. Vine St. for the future devolvement of the property (Millennium project). The site contains two non-contiguous portions; one east of Vine Street and the other on the west. The site is currently occupied mostly by parking lots and some offices, including the CapitaRecords building. The site is located within an Official Earthquake Fault Zone that was established (November 6, 2014) by the California Geological Survey (CGS) for the Hollywood fault (on the USGS 7.5 minute Hollywood Quadrangle). The current reports are considered "stand alone" and do not rely on data from theprevious reports prepared by Langan.

The fault investigation conducted by Group Delta (GDC) concluded that no active (Holocene) faults are known to be present beneath the site.

This investigation included the following:

1. A large exploration trench, about 30 to 80 feet wide 12 to 35 feet deep and approximately 278 feet long, located on the eastern side of the site and extended into the property to the north (6230 Yucca Street).

2. Several transects of CPT soundings and continuous core borings, which included a total of 78 CPTs and 35 continuous core borings.

3. Data from fault investigations adjacent and nearby projects by GDC were incorporated in this investigation including another trench, entirely on 6230 Yucca Street site, about 60 feet wide, 130 feet long and 25 to 30 feet deep.

4. A detailed soil stratigraphic/pedological analysis to estimate the age of the soil horizons encountered in the trenches in the eastern part of the site, as well as in two of the continuous cores on the western part of the site by Dr. Roy Shlemon (a well-known expert in soil stratigraphy, age-dating ofsoils and assessment of geologic hazards).

In addition, Earth Consultants International (ECI), a company well experienced with fault investigations, provided a "Third Party Review" of the GDC report (Appendix E of the report).

Both the western and eastern portions of the Millennium site are underlain by alluvial deposits, which are divided into three general units (see Figure5 of the report). These units include an upper sandy alluvium that is geologically young (Holocene in age: about 11,000 years old orless); a Pleistocene deposit (about 35,000 to 60,000 years old), referred to as "mudflow"; and, an older Pleistocene deposit, referred to as "older alluvium" (about 200,000 years or older). Bedrock was found below the alluvium in some of the borings.

The investigation documents ancient faulting and folding of Pleistocene older alluvium (about 200,000 years or older). Beneath the northern part of the site, the older alluvium is tilted, dipping southward. Investigations by GDC on nearby and adjacent sites indicate that the geologic structure forms a broad anticline with an axis trending roughly along Yucca Street. The older alluvium on the south side of the site is relatively horizontal and does not appear to be folded. GDC infers that an inactive fault is located between the folded and non-folded older alluvium, where the subsurface data show discontinuous bedding. The inactive fault traverses the site in an approximately east-west trend (see Plate 1 and Figure 8 of the report), roughly along the trend of the "Yucca Strand" as mapped by the California Geological Survey on the January 8, 2014 Preliminary Alquist-Priolo Earthquake Fault Zone map. The inactive fault projects eastward towards a suspected fault scarp on the north side of Carlos Avenue that is likely related.

The "older alluvium" and inactive fault are buried by Pleistocene "mudflow" and Holocene alluvial deposits. The "mudflow" deposits (judged to be at least 35,000 years old) were observed to be continuously overlying the inactive fault at the continuous core/CPT transects. In addition, the inactive fault projects beneath the exploratory trench at the eastern part of the site, where the "mudflow" Pleistocene deposits were observed to be undisturbed.

Two minor anomalies were noted in transect M-M'. The first anomaly is at the location of CPT-29. The second is just north of CPT-29 which was judged to be a possible inactive fault by ECI. As a result, LADBS requested GDC to re-evaluate their data at this southern locality.

Subsequently, both GDC and ECI produced response reports that address the possible anomalous data from the CPT/Continuous Core Boring transects (GDC report dated 05/17/2015 and ECI report dated 06/03/2015). The reports acknowledge inaccurate locations of CPTs shown in the original report (GDC

03/06/2015). The CPTs and borings were surveyed and the transects were refined accordingly, except for Transect M-M', which had since been re-graded and paved, and therefore the survey of its CPT locations was not possible. The data from CPT-29 in transect M-M' (the first anomaly) are inconsistent relative to data from adjoining CPTs and the elevation is reportedly ambiguous, and issue was thoroughly addressed in the ECI report.

The second anomaly consists of a minor inferred fault identified by ECI north of CPT-29 located within the older alluvium and lower part of the "mudflow" unit. This inferred fault does not displace the upper part of the "mudflow", which indicates that it would not have been active in the last 80,000 years (based on ECI's age estimate).

Based on the site exploration and analysis described above, no active (Holocene) faults are known to be present beneath the site. GDC, Dr. Roy Shlemon, and ECI concluded that there are no active faults at the site and that the main inferred inactive fault is estimated to be about 150,000 years old or older. *Note: The State of California Aquist-Priolo Earthquake Fault Zoning Act precludes construction of structures for human occupancy on "active" faults (those that have ruptured within about 11,000 years).*

Since exploration did not extend beyond the property boundary, GDC recommends two setback zones where buildings cannot be constructed at the site; one at the northern edge of the western property and another at the southern part of the eastern property. Construction of buildings within these setback zones will be considered if additional geologic exploration is conducted and the areas are found to be free from active faults.

The referenced report is acceptable, provided the following conditions are complied with during site development:

1. During construction, the project engineering geologist shall observe and log in detail the proposed basement excavation where the natural alluvial soils are exposed. The project engineering geologist shall post a notice on the job site for the City Grading Inspector/Geologist and the Contractor stating that the excavation (or portion thereof) has been observed and documented and meets the conditions of the report. No fill or lagging shall be placed until the LADBS geologist has verified the documentation. If evidence of active faulting is observed, the Grading Division shall be notified immediately. (Code Section 91.7009)

2. A supplemental report that summarizes the geologist's observations (including photographs and logs of excavations) shall be submitted to the Grading Division of the Department upon completion of the excavations.

3. Prior to issuance of any permit, a soil engineering report shall be submitted to the Grading Division to provide design recommendations for the proposed grading/construction.

DANIEL C. SCHNEIDEREIT
Engineering Geologist I

DCS/dcs
Log No. 87496R
213-482-0480

cc: Group Delta, Project Consultant
Earth Consultants International
LA District Office

CITY OF LOS ANGELES
CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

FRANK BUSH
GENERAL MANAGER

GEOLOGY AND SOILS REPORT APPROVAL LETTER

August 23, 2016

LOG # 94232
SOILS/GEOLOGY FILE - 2
AP

CitizenM LA Hollywood Properties, LLC
79 Madison Avenue, 3rd Floor
New York, NY 10016

TRACT:	Central Hollywood Tract No. 2 (MR 6-144)
LOT(S):	FR5, PT3 (Arb 2), FR1 (Arb 2), FR2 (Arb 2)
LOCATION:	1718 N. Vine Street

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE(S) OF DOCUMENT	PREPARED BY
Geology Report	LA-1289	07/28/2016	Group Delta
Soils Report	"	"	"

The Grading Division of the Department of Building and Safety has reviewed the referenced reports that provide a fault investigation and a geotechnical feasibility evaluation for a proposed hotel. According to the reports, the proposed hotel will have 14 stories above grade and 3 levels of subterranean parking. The site is currently occupied by a 2-story restaurant building and parking areas.

The property is located within an Official Alquist-Priolo Earthquake Fault Zone that was established (November 6, 2014) by the California Geological Survey for the Hollywood fault. The fault investigation (the referenced geology report) by Group Delta included transects of CPT soundings and continuous core borings. On the east side of the property, an exploratory transect connected with a previous fault evaluation transect on the property to the north, which extended exploration 50 feet north of the site. Because of the existing building south of the site, another transect was conducted west of the site in Vine Street. This transect extended exploration 50 feet south of the site. The investigation documented continuous unbroken Holocene and Pleistocene stratigraphy across and 50 feet beyond the property. No restrictions relative to potential surface fault rupture are recommended for this project.

The geotechnical feasibility report (the referenced soils report) addressed other potential geologic hazards per CEQA guidelines and concluded that the proposed development is feasible relative to hazards such as liquefaction and seismic settlement, subsidence, etc. General recommendations for shoring and retaining walls were provided. However, it was acknowledged that a design-level geotechnical investigation is required prior to final design and application for building permits.

The referenced reports are acceptable, provided the following conditions are complied with during site development:

1. The project engineering geologist shall observe all basement excavations to verify that the conclusions of the current fault investigation are correct and that no fault trace or evidence of ground deformation are exposed in the over-excavation. A supplemental report that summarizes the geologist's observations shall be submitted to the Grading Division of the Department of Building and Safety upon completion of the over excavations. If evidence of faulting is observed, the Grading Division shall be notified and a site meeting scheduled.

2. Prior to issuance of grading/building permits, a design-level geotechnical/soils report shall be submitted to the Grading Division to provide recommendation specific to the proposed development.

DANIEL C. SCHNEIDEREIT
Engineering Geologist II

YING LIU
Geotechnical Engineer I

DCS/YL:dcs/yl
Log No. 94232
213-482-0480

cc: Armbruster Goldsmith & Delvac LLP, Applicant
Group Delta, Project Consultant
LA District Office

CITY OF LOS ANGELES
CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

FRANK M. BUSH
GENERAL MANAGER
SUPERINTENDENT OF BUILDING

OSAMA YOUNAN, P.E.
EXECUTIVE OFFICER

GEOLOGY REPORT APPROVAL LETTER

August 9, 2019

LOG # 109310
SOILS/GEOLOGY FILE - 2
AP

1770 Ivar LLC; 1749 N Vine St LLC; 1720 N Vine St LLC
1995 Broadway, 3rd Floor
New York, New York 10023

TRACT:	Hollywood (MR 28-59/60) / Central Hollywood Tract No. 2 (MP 6-144)
BLOCK:	21 / ---
LOT(S):	FR 2, 3 / FR 6
LOCATION:	1770 N. Ivar Ave. (6334 W St), 1760-1764 Ivar Ave. / 1720-1724 N Vine St.

CURRENT REFERENCE REPORT/LETTER(S)	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Geology Report	LA1301A	07/19/2019	Group Delta
Oversized Doc(s).	"	"	"

PREVIOUS REFERENCE REPORT/LETTER(S)	REPORT No.	DATE OF DOCUMENT	PREPARED BY
Dept. Approval Letter	87496	07/07/2015	LADBS
Geologic Response Report	3425	06/03/2015	Earth Consultants International
Geologic Response Letter	LA-1191 A	05/17/2015	Group Delta
Third Party Review	3425	03/09/2015	Earth Consultants International
Geology Report	LA-1191 A	03/06/2015	Group Delta

The Grading Division of the Department of Building and Safety has reviewed the referenced report that provides a fault rupture hazard evaluation for a proposed mixed development project, which is located within the Official Alquist-Priolo Earthquake Fault Zone that was established by the California Geological Survey for the Hollywood fault in November 2014. The report provides additional data to a previous investigation that was approved by the Department in a letter dated 07/07/2015, Log #87496.

The primary focus of the report was for an additional parcel to the northwestern part of the proposed development at 1770 N. Ivar Avenue (aka 6334 W. Yucca Street). The first phase of exploration consisted of a transect of 16 cone penetrometer test soundings (CPTs), up to 60 feet deep and 7 continuous core borings, up to 55 feet deep, which extended into Yucca Street to the north and parcel to the south at 1760 and 1764 Ivar Avenue. Later exploration included three trenches, with the main trench about 120 feet long and about 12 feet deep.

The report included two attached reports by third parties. The first is by Rockwell Consulting, which provides expertise regarding soil profile descriptions and age-dating. The second is an independent review of Group Delta's findings by Earth Consultants International, a company that specializes in fault investigations.

The results of the investigation indicate there is a presence of ancient (pre-Holocene) faulting, with a series of minor northeast-trending, steeply north-dipping faults that are interpreted to display left-lateral strike-slip rupture. Un-faulted soil horizons estimated to be at least 120,000 to 200,000 years old indicate that the fault system encountered are not active.

Based on the findings of the investigation, the consultants recommend to remove the 50-ft. wide restricted use zone previously recommended for the northwest edge of the project site (1760-1764 Ivar Avenue). The previously recommended 50-ft. wide setback for the southeasterly (address) is also recommended to be removed, based on an approved fault investigation by the same consultant on the adjacent property 1718 Vine Street (report dated 07/28/2016, Dept. approval letter dated Log #94232).

Because the current investigation was not able to preclude possible active faulting beyond 25 feet north of the 1770 Ivar site within Yucca Street, the consultants recommend an area of "special reinforcements and foundations" for that portion of the project (see page 13 and figure 11 of the report).

The referenced report is acceptable, provided the following conditions are complied with during site development:

(Note: Numbers in parenthesis ( ) refer to applicable sections of the 2017 City of LA Building Code. P/BC numbers refer the applicable Information Bulletin. Information Bulletins can be accessed on the internet at LADBS.ORG.)

1. The project engineering geologist shall observe all final removal excavations to verify that the conclusions of the current fault investigation are correct and that no Holocene fault trace or evidence of active fault-related ground deformation are exposed in the over-excavation. A supplemental report that summarizes the geologist's observations shall be submitted to the Grading Division of the Department upon completion of the over excavations. If evidence of faulting that might be active is observed, the Grading Division shall be notified and a site meeting scheduled.

2. Prior to issuance of grading/building permits, a design-level geotechnical/soils engineering report shall be submitted to the Grading Division to provide recommendations specific to the proposed development.

3. Once the proposed development in the special reinforced foundation area is known, and prior to approval of the final geotechnical/soils engineering report referred to above, the project engineering geologist shall provide a supplemental report that provides a potential displacement values that the reinforced foundations shall be designed for (P/BC 2017-129).

DANIEL C. SCHNEIDEREIT
Engineering Geologist II

Log No. 109310
213-482-0480

cc: Group Delta, Project Consultant
LA District Office