Appendix E

Geology and Soils Appendix

Appendix E.1

Geotechnical Investigation

Updated Geotechnical Feasibility Report
Proposed High-Rise Hotel Development

1718 Vine Street
Hollywood District
Los Angeles, California

For CitizenM LA Hollywood Properties, LLC

July 28, 2016
GDC Project No. LA-1289

GROUP DELTA

CitizenM Hotels LA Hollywood Properties, LLC
79 Madison Avenue
New York, New York 10016

July 28, 2016
GDC Project No. LA-1289

Attention: Mr. Ernest Lee

Subject: Updated Geotechnical Feasibility Report
Proposed Mid-Rise Hotel Development
1718 Vine Street, Hollywood District, Los Angeles, California

Dear Mr. Lee,

Group Delta Consultants (GDC) is pleased to submit this updated geotechnical feasibility report for the proposed high-rise hotel development planned at 1718 Vine Street in the Hollywood neighborhood of Los Angeles, California. Our scope of work was conducted in general accordance with our proposal dated April 27, 2016, which was authorized on May 20, 2016.

We appreciate the opportunity to provide geotechnical services for this significant 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

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GEOTECHNICAL FEASIBILITY REPORT
PROPOSED HIGH-RISE HOTEL DEVELOPMENT
1718 VINE STREET
LOS ANGELES, CALIFORNIA

1.0 INTRODUCTION

1.1 Background

This report was prepared to document a geotechnical feasibility assessment for a proposed high-rise hotel development and to provide preliminary geotechnical recommendations for planning purposes. The project site is a rectangular lot approximately 12,240 sf in size, and is located at 1718 Vine Street in the Hollywood neighborhood of Los Angeles, California. A Vicinity Map is presented in Figure 1.

1.2 Project Description

The existing commercial restaurant building that currently occupies the site will be demolished and a new hotel building will be constructed. The proposed hotel will consist of 14 stories above grade over 3 levels of subterranean parking. The subsurface parking will occupy the entire rectangular lot including the 15-foot wide easement area to the south. The easement at the surface will remain open space, as illustrated in Figure 2 Site Plan and Exploration Map.

1.3 Purposes and Scope of Work

The purposes of this report are to address the primary geotechnical issues affecting the project and to provide preliminary geotechnical recommendations for project planning. The recommendations were developed based on review of the conceptual drawings for the proposed development and subsurface data collected from our fault investigation conducted for the site (GDC, 2016). Our scope of work included the following:

- Evaluation of potential geologic hazards for the project including reviews of the available data for the project, previous subsurface data and conceptual plans, published geologic maps and reports pertaining to the area, as well as review of the information collected during our field exploration program.
- Assess Geologic Hazards identified in state and local CEQA guidelines.
- Evaluation of anticipated ground motion in accordance with the 2013 California Building Code (CBC)

- Perform analyses to provide preliminary recommendations for excavation, shoring, foundation design, floor slab support, basement walls, and resistance to lateral loads, and construction-related issues.

- Performance of limited laboratory tests to evaluate preliminary characteristics of the soils encountered.

- Preparation of this report.

1.4 Previous Reports

We previously performed a Fault Activity Investigation for a different project at the site immediately adjacent to the north property line of the site (Millennium Site) and presented the results in a report dated March 6, 2015. The report was reviewed and approved by the Grading Division of the City of Los Angeles in a Geology Report Approval Letter dated July 7, 2015. The results of the fault activity investigation for the neighboring property to the north indicate that no active faults are present beneath the Millennium Site. A copy of the City's Geology Report Approval Letter for the Millennium Site is provided in Appendix C.

2.0 SUBSURFACE FIELD INVESTIGATION

GDC performed a field investigation on May 23 and 24, and June 1, 2016. The field investigation consisted of the following:

- Two (2) hollow-stem-auger (HSA) borings advanced to a depth of 65 feet each; and

- Three (3) Cone Penetration Tests (CPTs) advanced to depths of approximately 65 feet each.

Our exploration locations are shown on Figure 2, Site Plan and Exploration Map. CPT C-3 had to be moved 2 feet north of its initial proposed location due to a concrete obstruction encountered approximately 2 feet below ground surface.

The explorations were performed under the observation of a GDC field geologist, who maintained logs of the soil encountered, classified the material, and assisted in obtaining soil samples. Bulk samples of near-surface soil were collected at shallow depths. A continuous soil core was collected for each boring. Boring logs and CPT logs are provided in Appendix A.

Select samples were collected near proposed subgrade for corrosivity testing. Results of the corrosivity testing are presented in Appendix B.

3.0 SITE CONDITIONS

3.1 Surface Conditions

The site is located in a well-developed urbanized area of Los Angeles. It is a relatively level rectangular lot, measuring 80 feet by 153 feet in size. An existing two-story restaurant building occupies the majority of the site. There is a narrow concrete-paved access easement along the southern boundary of the site and a parking/delivery area in the back (east side) of the lot. The site is bound by a parking lot to the north, Vine Street to the west, a commercial building to the east, and a mixed-use building to the south. Retaining walls are present along the east and southern boundary of the site. Elevation drops about 8 feet, from Elevation 385 feet onsite to 377 feet in the southeast easement area, according to the Site Survey provided by Gensler for the property, shown in Figure 2.1.

3.2 Subsurface Conditions

Artificial fill materials up to about 6 feet thick were encountered in the rear parking area along the east portion of the site. Deeper fill associated with the retaining walls along the east and west boundaries of the site and the restaurant interceptors is anticipated locally. The fill material consists of clayey sand and poorly graded sand with silt. Underlying the fill material is variably interbedded loose silty sand, poorly graded sand with clay, and few thin layers of stiff silty clay to depth of about 22 feet. At about 22 feet depth the native material is massive clayey sand and sandy clay. At a depth of about 53 feet the material becomes dense and hard to the maximum depth explored onsite, 65 feet. Figures 3.1 and 3.2 illustrate the subsurface profile at the site.

3.3 Groundwater

The site is located within the Hollywood Groundwater subbasin of the Los Angeles County Coastal Plain Basin. The subbasin can be 660 feet in depth and contains three water bearing units, the Fernando Formation, Lakewood Formation, and upper alluvial soils. The main potable groundwater aquifer is sourced from the deep Fernando Formation; however, some groundwater can seasonally perch within the shallow alluvium (MWD, 2007). Soil borings were drilled to a maximum depth of 65 feet (about Elevation 320 feet) below the ground surface during our field investigation and groundwater was not encountered to the depths explored. The Seismic Hazard Zone Report for the Hollywood Quadrangle (CGS, 1999) indicates that the historically highest groundwater level in the site area is deeper than 50 feet, which is below the hotel's proposed subterranean bottom floor elevation, planned at a depth of 35 feet below ground surface. However, shallower perched groundwater may be present seasonally following rains and could be encountered during basement excavation.

4.0 GEOLOGICAL HAZARD EVALUATION

4.1 Geologic Setting

Regionally, the site is located within the seismically active Los Angeles Basin area of southern California. The basin underwent transtensional stresses with subsidence between north-west and east-west trending fault systems and began opening up over 7 million years ago (Wright, 1991). Today, the basin is undergoing transpresssional stress bound by surrounding uplifting thrust blocks including the Santa Monica-Hollywood-Raymond fault system locally (Dolan, 1995). Internally, the basin is filled with sedimentation thousands of feet thick, structurally influenced by thrusting fault blocks and strike-slip faults dividing the basin into northwest trending valleys and ridges (Wright, 1991).

Locally, the site is near the northern boundary of the Los Angeles Basin, within the Hollywood Fault zone. An alluvial fan slopes gently southward across the site. Several south-draining canyons in the Santa Monica Mountains, including Cahuenga, Beachwood, and Brush canyons, sourced the alluvial fan deposits. The location of the site with respect to the geological features described above is presented in the Regional Geology Map, Figure 4.

4.2 Local Seismicity

The site is located within the seismically active area of southern California and there is a high potential for the site to experience strong ground shaking from local and regional faults. These hazards and their potential impact can be mitigated with proper seismic design. The intensity of ground shaking is highly dependent upon the distance of the fault to the site, the magnitude of the earthquake, and the underlying soil conditions. A discussion of the significant seismic sources near the site is presented below.

The site in relation to regional seismic faults and significant historical earthquake epicenters is presented in Figure 5, Regional Fault and Seismicity Map. A fault that is considered to be seismically active is one that has ruptured in the last approximate 11,000 years (Holocene). Significant seismically active faults nearest to the site include the Hollywood, Upper Elysian Park, Puente Hills, Newport-Inglewood, Verdugo, and Sierra Madre faults.

The closest significant fault to the site is the Hollywood Fault. The current published CGS map shows the nearest trace of the Hollywood Fault approximately 100 feet north of the site, as shown in Figure 6. The actual location of the Hollywood Fault in this area is uncertain; however, the site is within the Alquist-Priolo Earthquake Fault Zone (AP Zone) for the Hollywood Fault which requires site-specific fault investigations to be performed in connection with any proposed development. The Hollywood Fault trends east-west over 10 miles in length and is considered a segment within the Santa Monica-Hollywood-Raymond Fault Zone which extends over 30 miles across the southern limb of the Santa Monica Mountains. The Hollywood Fault is a reverse strike-slip fault that is estimated to be capable of a potential maximum magnitude Mw 6.7 earthquake (USGS, 2016a).

The Upper Elysian Park and Puente Hills faults are estimated to be within 2 and 3 miles east and south of the site respectively, trending northwest and dipping northeast. Both faults are considered blind thrust faults. Blind thrust faults have the potential for surface deflection or folding during earthquakes. A potential magnitude Mw 6.7 earthquake is estimated for these two blind thrust faults (USGS, 2016a). The Newport-Inglewood Fault zone trends northwest over 40 miles in length and is located about 5.6 miles east of the site. It is a right lateral strike-slip fault that is estimated to be capable of a potential magnitude Mw 7.5 earthquake (USGS, 2016a). The Verdugo Fault trends northwest over 13 miles in length and is located about 6.1 miles east of the site. It is a reverse fault that is estimated to be capable of a potential maximum magnitude Mw 6.9 earthquake (USGS, 2016a). The Sierra Madre Fault trends northwest over 47 miles in length and is located about 10.6 miles northeast of the site. It is a reverse fault that is estimated to be capable of a potential maximum magnitude Mw 7.3 earthquake (USGS, 2016a).

Local historical earthquakes recorded regionally near the site from 1918 to present include 101 recorded events with magnitudes greater than Mw 5.0. Of the 101 events, 12 were Mw 6.0 and greater (USGS, 2016b). Significant historical earthquakes epicentered nearest to the site include ruptures along the Elsinore, Newport-Inglewood, Raymond, and Northridge faults. Two historical earthquakes in 1987 were estimated to be epicentered along the Elsinore Fault zone with magnitudes 5.3 and 5.9 located near Rosemead. In 1933 an estimated magnitude 6.4 earthquake ruptured along the Newport-Inglewood Fault zone near Newport Beach. In 1988 an estimated magnitude 5.0 earthquake ruptured along the Raymond Fault zone near Pasadena. In 1994 an estimated magnitude 6.7 earthquake ruptured along the Northridge Blind Thrust Fault, near Northridge and reportedly triggered lesser ruptures on nearby faults.

4.3 Surface Fault Rupture

Preliminary surface fault rupture potential at the site was evaluated based on review of current Earthquake Fault Zones Map for the Hollywood Quadrangle (CGS, 2014), Quaternary Fault Google Earth Data Files (USGS, 2016a), and review of fault investigation work performed by GDC within the site vicinity (GDC, 2015 all). Prior fault evaluations performed in the site vicinity indicate no active faulting within 50 feet north of the project site (see City of Los Angeles Geology Report Approval Letter presented in Appendix C). No known active faults are currently mapped crossing the site or projecting towards the site; however, the site is within an AP Zone for the Hollywood Fault, as shown in Figure 6 Earthquake Zone Map (CGS, 2014). Accordingly, a site specific surface fault rupture evaluation was performed for the site (GDC, 2016). Results of the evaluation found evidence of unfaulted Holocene and Pleistocene deposits below the site and concluded the potential for surface fault rupture hazard at the site to be low and therefore, should not impact zoning for redevelopment at the site according to the guidelines presented in Note 49 (CGS, 2002) and P/BC 2014-129 (LADBS, 2015).

4.4 Seismic Ground Motion Values

Design ground motion parameters were developed in accordance with the 2013 California Building Code. The site coordinates used in our seismic hazard analysis are: -118.326359 (Longitude) and 34.102266 (Latitude). Site Class D, corresponding to a “Stiff Soil” profile was assumed at the site.

The seismic design parameters were calculated using the USGS Ground Motion Parameter Calculator (Version 5.1.0), are summarized in Table 1. The peak ground acceleration adjusted for site class is 0.654g.

Table 1: Seismic Ground Motion Values

Latitude: 34.102266 Longitude: -118.326359

Site Class	D
Seismic Design Category	D
Mapped MCE Spectral Response Acceleration at Short Period (S_S)	2.531g
Mapped MCE Spectral Response Acceleration at Period of 1 Second (S_1)	0.947g
Site Coefficient, F_a	1.0
Site Coefficient, F_v	1.5
Adjusted MCE Spectral Response Acceleration at Short Period (S_{MS})	2.531g
Adjusted MCE Spectral Response Acceleration at Period of 1 Second (S_{M1})	1.420g
Design Earthquake Spectral Response Acceleration at Short Period (S_{DS})	1.687g
Design Earthquake Spectral Response Acceleration at Period of 1 Second (S_{D1})	0.947g
Peak Ground Acceleration Adjusted for Site Class (PGA_M)	0.986g

As described in section 4.2, numerous faults exist in the area. However, by designing the project with current building code requirements, potential seismic ground motion impacts will be considered and mitigated.

4.5 Liquefaction and Seismic Settlement

Liquefaction involves sudden loss in strength of a saturated, cohesionless soil caused by the build-up of pore water pressure during cyclic loading, such as that produced by an earthquake. This increase in pore water pressure can temporarily transform the soil into a fluid mass, resulting in differential settlements and ground deformations. Typically, liquefaction occurs in areas where there are loose soils and the depth to groundwater is less than 50 feet from the surface. Seismic shaking can also cause ground settlement without liquefaction occurring, including settlement of dry sands above the water table.

According to the City of Los Angeles General Plan Safety Element the site is within an area susceptible to liquefaction, indicating groundwater is less than 30 feet below ground surface (1996). However, according to the State of California Seismic Hazards Zone Map (CDMG, 1999), the site is not located within the State Earthquake Induced Liquefaction Seismic Hazard Zone for the Hollywood Quadrangle, 1999. Additionally, the historical high ground water is reported to be over 80 feet below the ground surface (CGS, 1998). Moreover, groundwater was not encountered in the borings advanced during the field investigation described in Section 2 above, up to a depth of 65 feet below ground surface. Therefore, the potential for liquefaction at the site is considered low.

Seismic shaking can also cause soil compaction and ground settlement without liquefaction occurring, including settlement of dry sands above the water table. The likelihood of seismic compaction was evaluated using CPT data. The results indicate that seismic compaction of less than ¼ inch could potentially occur below the proposed structure. Therefore, the possibility of significant seismic compaction is considered to be low.

4.6 Landslides

Based on the review of USGS topographic maps, City and State seismic hazard maps, and the landslide inventory maps (CGS online), the project site and surrounding area are relatively flat and not mapped within any state or city landslide area. Local topographic relief slopes gently to the south as shown on Figure 1. There are no significant slopes that can present a landslide hazard at or near the site; therefore, landslides are not considered a hazard at the site.

4.7 Other Geologic Hazards Considered

4.7.1 Flooding, Seiche, Tsunami, and Inundation

Flooding, seiche, tsuanami and inundation potential at the site were evaluated through review of site relative topographic positioning, nearby sources of large bodies of water, and maps provided by City of Los Angeles General Plan Safety Element (1996) and FEMA (2008). The site is located on a broad alluvial plain gently sloping to the south, immediately south of the Santa Monica Mountains, shown in Figure 1.

Flooding

The City of Los Angeles General Plan Safety Element Exhibit F indicates the site is not within a 500-year flood plain area. FEMA National Flood Hazard Layer maps indicate the site is in an area outside the 0.2% Annual Chance Floodplain, Zone X (FEMA, 2008). Considering the southward gradient and the surrounding roadways and developed drainage, as well as the FEMA information, the potential for flooding to be a hazard at the site is considered low.

Tsunami

The site is located over 12 miles east from the nearest coastline at Elevation 385 feet. The City of Los Angeles General Plan Safety Element (1996) indicates the site is not within an area considered to have a Tsunami Hazard. Therefore, tsunami is not considered a hazard at the site.

Seiche and Inundation

The closest body of water to the site is the Hollywood Reservoir which is just over 1 mile north and topographically uphill from the site, as shown in Figure 1. The City of Los Angeles General Plan Safety Element (1996) indicates the site is within an inundation zone related to the Hollywood Reservoir. The Hollywood Reservoir was created with the construction of the Mulholland Dam. Breach of the dam by seiche or failure of the dam has the potential to impact the site. According to the City of Los Angeles General Plan, dams and reservoirs are monitored during storms, and measures are instituted in the event of potential overflow. These measures apply to facilities within the City's borders and facilities owned and operated by the City within other jurisdictions. Appropriate measures to be implemented in the event of potential overflow are specific to each dam and are based on the risk level associated with the dam. The City determines the risk of each dam that would impact the City based on the age and design of the dam, the holding capacity, as well as the density of existing and planned development within the inundation area.

Dam safety regulations are the primary means of reducing damage or injury due to inundation occurring from dam failure. The California Division of Safety of Dams regulates the siting, design, construction, and periodic review of all dams in the State. It is unknown when the last seismic safety evaluation was performed for the reservoir. The dam has survived recent earthquakes in the vicinity, including the 1994 Northridge Mw 6.7 earthquake epicentered about 13 miles northwest of the reservoir.

The Los Angeles Department of Water and Power (LADWP), operates the dam and mitigates the potential for over flow and seiche hazard through control of water levels and dam wall height. Records indicate some improvements to the Mulholland Dam global stability were implemented following the 1928 catastrophic failure of the St. Francis Dam. In addition, the water storage was lowered in the Hollywood Reservoir to approximately half of the storage capacity of the original intended design. The City's Local Hazard Mitigation Plan, which was adopted in July 2011, provides a list of existing programs, proposed activities and specific projects that may assist the City of Los Angeles in reducing risk and preventing loss of life and property damage from natural and human-caused hazards, including dam failure. The Hazard Mitigation Plan evaluation of dam failure vulnerability classifies dam failure as a moderate risk rating. Considering these risk reduction projects, potential for inundation is low.

4.7.2 Soil Stability

Soil stability was evaluated through review of site conditions, proposed plan, and preliminary subsurface data.

Settlement/Collapse

In general, a stiff clayey sand and sandy clay was encountered at the planned subgrade depth of about 35 feet. CPT data indicates there is a low potential for compressibility and collapse is not considered an issue. During a design-level geotechnical evaluation, the degree of settlement beneath the foundations will be evaluated and appropriate subgrade preparation and foundation recommendations will be developed. Therefore, impacts relating to settlement collapse are considered less than significant.

Sedimentation and Erosion

The proposed project plans include a high-rise structure and paved surfaces which will occupy the entire lot. No ground soils would be exposed following completion of the project and therefore there is no future sedimentation and erosion hazard. Erodible soils will be exposed during excavation activities required for construction. However, potential erosion will be managed with best management practices (BMPs) and other applicable regulatory requirements during construction. Therefore, sedimentation and erosion impacts are considered less than significant.

Subsidence

Subsidence may have occurred in the Hollywood area north of the Salt Lake Oil field during the 1950's through the 1970's from withdrawal of groundwater (USGS, 1976). Today, the potential for ground subsidence in the area of this project is not known to be present, and no large-scale extraction of groundwater, gas, oil, or geothermal energy would occur under the Project. Therefore, no impacts from ground subsidence are expected to occur in this area.

Expansive and Corrosive Soils

Preliminary findings indicate the onsite soils have a low expansion potential, however clayey layers may have a low to moderate expansion potential. Potential hazards of expansive soils can be addressed in the final design-level geotechnical report and minimized with remedial grading, and are therefore considered to be a less than significant impact to the project.

A select sample from one of the cores was collected at the site and tested for corrosion. The testing indicated that sulfate and chloride concentrations were less than 100 parts per million (ppm), indicating that reaction potential with concrete and metals is low. The soil resistivity measured 1,210 to 2,012 ohm-cm which indicates the soil is potentially corrosive to ferrous metals. If corrosion sensitive improvements are installed, a corrosion engineer should be retained to identify appropriate protection measures, such as protective coatings, that would reduce the potential impacts of corrosivity to a less than significant level.

4.7.3 Naturally Occurring Hazardous Elements

Naturally occurring hazardous elements within subsurface materials can include asbestos, radon, and oil and methane gas. CGS Map Sheet 59, showing known sites with naturally occurring asbestos indicates there is a low potential for naturally occurring asbestos to be at the site (USGS, 2011) and therefore asbestos risks are less than significant. The California Geological Survey Special Radon Potential Zone Map indicates the site is within a zone designated as having a moderate potential for indoor radon levels above 4 picocuries per liter (CGS, 2005). Four picocuries per liter is recommended to be an action level for radon reduction by the U.S. Environmental Protection Agency. Prior to construction, the project site should be tested for radon, and if required, the implementation of appropriate radon mitigation will reduce potential impacts of radon to less than significant. Review of the City of Los Angeles Methane Zone Map and General Plan Safety Element Exhibit E indicates the site is outside the mapped methane zone and major oil drilling areas boundaries (2004 and 1996). Therefore, the potential for occurrence of naturally occurring oil and or methane gases onsite is considered low.

5.0 DISCUSSION AND RECOMMENDATIONS

5.1 General

Based on a review of existing subsurface information and the conceptual plans, it is our opinion that the proposed project is feasible from a geotechnical standpoint. Following proper site development grading, the proposed construction can be supported on conventional spread footings or mat foundations founded in undisturbed natural soils. Preliminary geotechnical recommendations for design planning are discussed in the following sections. A design-level geotechnical report will be required to develop geotechnical recommendations for final design, including drilling and sampling geotechnical borings, performing laboratory testing to confirm engineering parameters, and for detailed engineering analyses.

5.2 Demolition

Prior to the start of earthwork, the existing building and improvements on the site will require demolition and removal, including the existing foundations, slabs, pavements, walls and utilities. It should be anticipated that the remnants of previous construction could be encountered anywhere on the site. The civil engineer should identify the presence and location of all existing utilities on and adjacent to the site. Precautions will be required to remove, relocate or protect existing utilities, as appropriate.

5.3 Temporary Excavation and Shoring

Excavation for the basement will be made to a depth of approximately 35 feet below existing grade. The excavation will be made primarily in an upper sand unit (Qs) consisting of silty sand, clayey sand and Mud flow (Qm) deposits consisting of sandy clay and clayey sand. We anticipate that the excavation can be readily accomplished using conventional heavy construction equipment.

The sides of the excavation for the basement will require shoring consisting of soldier pile and tie-back anchors or internal bracing to protect adjacent buildings and streets and improvements. The groundwater table was not found during prior adjacent explorations or during the field exploration described in Section 2 above. However, perched water could be encountered during excavation at the site. Any such encountered groundwater would be discharged in compliance with all applicable regulations.

The basement excavation is within the foundation influence zone of adjacent structures and improvements. Therefore, surcharge pressures should be considered for design of shoring and basement walls.

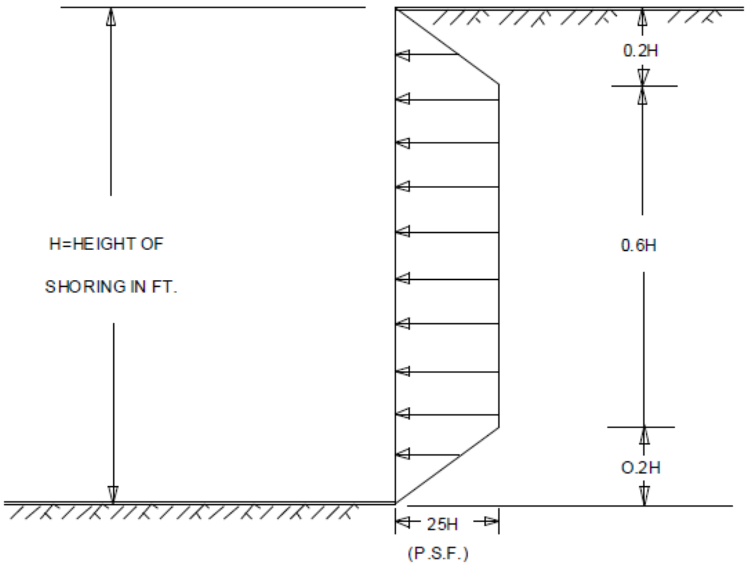
Restrained temporary shoring, consisting of soldier piles and tied-back anchors or internal bracing will be required to support the walls of the excavation. The shoring will likely involve soldier piles spaced at about 8 feet on center. For the deep excavation, two levels of tied-back anchors / internal bracing will be required. Slurry should be used to backfill any voids behind lagging. The contractor will be responsible for the design of the shoring. The shoring designer should verify the depth and location of the existing utilities to select the appropriate tieback depth and inclination. City approval will be required to install anchors under streets, and the anchors will need to be de-tensioned when no longer needed. If anchors are to be installed under private property to the north, east, and south, permission will also be required from the property owners.

If the excavation is exposed during periods of rainfall, provisions for collection of the runoff should be made. All surface drainage should be controlled and prevented from running down into the excavation. Ponding water should not be allowed within the excavation. Any collected water should be pumped out. Soils softened by wetting should be removed and backfilled as directed by the geotechnical engineer.

All excavation slopes and shoring systems should meet minimum requirements of the Occupational Safety and Health Administration (OSHA) Standards. Maintaining safe and stable slopes on excavations is the responsibility of the contractor and will depend on the nature of the soils and groundwater conditions encountered and his method of excavation. Excavations during construction should be carried out in such a manner that failure or ground movement will not occur. The short-term stability of excavation depends on many factors, including slope angle, engineering characteristics of the subsurface materials, height of the excavation, and length of time the excavation remains unsupported and exposed to equipment vibrations, rainfall, and desiccation. The contractor should perform any additional studies deemed necessary to supplement the information contained in this report for the purpose of planning and executing his excavation plan. Recommendations regarding sloped temporary excavations and shoring are provided in the sections below.

5.3.1 Shoring Design

For the design of temporary tied-back or braced shoring, we recommend the use of a trapezoidal distribution of earth pressure. For preliminary design, the pressure distribution, for the case where the grade is level behind the shoring, is illustrated in the following diagram with the maximum pressure equal to 25H in pounds per square foot, where H is the height of the shoring in feet.



The recommended earth pressure provided above is a preliminary value. The final earth pressure for design of soldier piles and anchors will be provided during the design-level geotechnical investigation. Surcharge loads from equipment or stockpiled material should be kept behind the top of the temporary excavations a horizontal distance of at least twice the depth of the excavation, or the shoring should be designed for the additional pressure. Foundation and traffic loads from adjacent areas should also be added to the lateral earth pressures. If traffic loading can occur near the top of the shoring, the design height of the shoring should be increased by 2 feet to account for the traffic surcharge. Surface drainage should be controlled and prevented from running down the temporary excavations or down the face of the shoring. Ponding water should not be allowed within the excavation.

Resistance to lateral loading of the shoring piles may be provided by passive pressure of the native soils below the bottom of the excavation. The allowable passive pressure of the native soils may be taken as the pressure developed from an equivalent fluid weight of 300 pounds per cubic foot (pcf). To account for the rounded shape of the soldier piles, when calculating the passive pressure on individual piles, the equivalent fluid pressure may be multiplied by a factor of 2.

The tieback contractor should select the design bond stress, drill hole diameter, and length of bonded zone in order to provide the design capacity specified by the structural engineers. All tiebacks should be load tested in accordance with the City of Los Angeles requirements.

5.3.2 Shoring Monitoring

A survey-monitoring program should be implemented to monitor shoring displacements during construction. In addition, prior to the start of construction, nearby improvements should also be surveyed and photographs and/or video taken to document baseline conditions. The deflection at the top of the shoring should be limited to a maximum of 1 inch, or a maximum of 1/4-inch if a structure or utility is located nearby. If the deflection of the shoring exceeds these criteria, or if distress or settlement is noted adjacent to the top of shoring, the excavation should be stopped and an evaluation should be performed by the structural and geotechnical engineers and any appropriate corrective measures taken, as deemed necessary. The shoring should be monitored once a week until the excavation reaches full depth and further movement has stopped.

5.4 Foundations

5.4.1 Bearing Value

Following proper site development grading/excavation, the proposed structure may be supported on conventional spread footings or mat foundation supported on undisturbed soils. For preliminary design, footings may be designed for an allowable dead-plus-live load pressure of 5,000 psf. The allowable bearing pressure may be increased by one-third when considering temporary loads associated with wind and seismic loading. Alternatively, the proposed structure may be supported on mat foundations. The final bearing capacity and modulus of subgrade reaction for a mat should be based on an evaluation of settlement performance during the design-level geotechnical investigation, considering the actual foundation loading.

Footing excavations should be observed by the project geotechnical engineer before placement of concrete to verify that the foundation conditions meet the requirements of the geotechnical report. The project geotechnical engineer may perform compaction tests, probing, or use other methods, to verify that the foundations will be supported in competent soils. If disturbed, wet, or otherwise unsuitable soils are encountered, or if water saturates the soils, the soils shall be excavated or stabilized as recommended by the project geotechnical engineer.

5.4.2 Settlement

The anticipated structural loads are not currently known. The settlement performance for the proposed building will be evaluated for footings and mats during the design-level geotechnical investigation. In general, the maximum allowable total settlement is 1.5 inches if the structure is supported on spread footings and 4 inches if the structure is supported on a mat foundation.

5.4.3 Lateral Capacity

Resistance to lateral loads can be provided by friction developed between the bottom of footings and the supporting soil, and by the passive soil pressure developed on the face of the footing. For preliminary design purposes, an allowable passive fluid pressure of 300 pcf and a coefficient of friction of 0.4 may be used for lateral sliding resistance of footings

5.5 Floor Slab

The basement floor slab may be placed on a properly prepared subgrade. To reduce the potential for moisture transmission through slabs where moisture sensitive covering will be installed, we recommend that a vapor retarder shall be used. In accordance with ACI 302.2R-06, the material must comply with the requirements of ASTM E 1745, "Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs," and have a permeance of less than 0.01 perms per ASTM E96. The installation of the moisture barrier should comply with ASTM E 1643-09. Reference is made to ACI 302.2R, Section 7.2 concerning whether to place 2 inches of sand over the barrier. The design of floor slabs for the expansion potential of the supporting soils or bedrock will be evaluated during the design-level investigation.

5.6 Expansive Soil

Based on the field exploration, the existing near-surface sandy soils encountered have a very low expansion potential; therefore, soil expansion is not a concern in structural design. The clayey soils at depth of planned subgrade are estimated to have a low to moderate expansion potential and will need to be considered during design. If expansive clays are present within the proposed retaining walls and or subgrades, they should be removed and replaced with granular non-expansive soil.

5.6 Soil Corrosivity

Representative samples of the material encountered near the planned subgrade were tested to evaluate corrosion characteristics. The results indicate the test samples had a pH of 6.89 and 8.02; a water-soluble sulfate content of <0.01% by weight, and a soluble chloride content of <0.01%, respectively. The sulfate results indicate that sulfate exposure is classified as negligible.

The tested samples were also found to have a minimum measure electrical resistivity of between 1,310 to 2,012 Ohm-cm. The following correlation can generally be used between electrical resistivity and corrosion potential:

Elect. Resistivity (Ohm-cm)	Corrosion Potential
less than 1,000	Severe
1,000-2,000	Corrosive
2,000-10,000	Moderate
Greater than 10,000	Mild

On the basis of the laboratory testing, the test samples are classified as potentially corrosive to buried metals. If corrosion sensitive improvements are installed, a corrosion engineer should be retained to identify appropriate protection, such as the use of protective coatings to minimize the potential hazard of corrosion to the project.

5.7 Seismic Considerations

The seismic design parameters in accordance with 2014 Los Angeles Building Code should be used for seismic design.

The seismic design parameters were calculated using the USGS Seismic Design Maps Web Application (http://earthquake.usgs.gov/designmaps/us/application.php). The site coordinates used are:

Latitude:	34.1023	Longitude:	-118.3263

Site Class D is preliminarily assumed for the site. The mapped and design spectral acceleration parameters, i.e., S_S, S_1 and S_{DS}, S_{D1}, are provided below.

Mapped

S_s = 2.53g S_1 = 0.95 g

Design

S_{DS} = 1.69g S_{D1} = 0.95g

5.8 Basement Walls

As required by the 2014 LABC, braced basement walls must be designed to resist at-rest earth pressures. Accordingly, for the case where the grade is level behind the walls, a triangular distribution of lateral earth pressure equivalent to that developed by a fluid with a density of 60 pounds per cubic foot can be used for design. This earth pressure assumes that all walls are constructed with a properly designed drainage system to prevent buildup of hydrostatic pressures behind the wall. Any surcharge loadings occurring as a result of heavy crane loads, stockpiled materials or traffic should be added to this pressure. The recommended pressure should also be confirmed during the design-level geotechnical investigation and should consider the presence of expansive soils, which could require the use of higher design earth pressures.

Basement walls should also be designed for seismic earth pressure. The basement walls should be designed to resist an active earth pressure combined with a seismic increment of lateral active earth pressure. For preliminary design, the seismic earth pressure was evaluated in accordance with procedures from the NCHRP Report 611 (NCHRP, 2008). We have used a horizontal seismic coefficient of 0.34g corresponding to half of peak acceleration calculating by $S_{DS}/2.5$. The equivalent seismic earth pressure may be taken as the pressure developed from an equivalent fluid weight of 25 pcf. The recommended value should be confirmed in the design geotechnical report.

6.0 LIMITATIONS

This consultation was performed in accordance with generally accepted Geotechnical Engineering principles and practice. The professional engineering 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 CitizenM Hotels, and their design 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.

The recommendations contained in this report are preliminary, and based on conceptual plans for the project. This report is not sufficient to obtain a building permit. A design-level geotechnical report is required before final design plans can be developed.

7.0 REFERENCES

Bryant, William A. and Hart, Earl W., 2007, Special Publication 42, Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, Interim Revision 2007.

California Geological Survey, 1998, Seismic Hazard Zone Report for the Hollywood 7.5-Minute Quadrangle, Los Angeles County, California, Seismic Hazard Zone Report 026, Plate 1.2.

California Geological Survey, 1999, State of California Seismic Hazard Zones Map, Hollywood Quadrangle, Los Angeles County, California, March 25, 1999.

California Geological Survey, 2002, Guidelines for Evaluating the Hazard of Surface Fault Rupture, Note 49.

California Geological Survey, 2005, Radon Potential Zone Map for Southern Los Angeles County, California, January 2005.

California Geological Survey, 2010a, Geologic Compilation of Quaternary Surficial Deposits in Southern California, Los Angeles 30’ X 60’ Quadrangle, July 2010.

California Geological Survey, 2014, Earthquake Fault Zones, Official Map, November 6, 2014.

California Geological Survey, 2015, Landslide Inventory, http://maps.conservation.ca.gov/cgs/lsi/, accessed June 13, 2016.

City of Los Angeles, 1996, Safety Element of the Los Angeles City General Plan, August 8, 1996, adopted November 26, 1996.

City of Los Angeles, 2004, Methane Zone Map, March, 31, 2004.

City of Los Angeles, “Geology Report Correction Letter,” Log #85579, Tentative Tract Map 10149, Lot 1 and 3; 1756 and 1760 Argyle Avenue, dated September 17, 2014.

City of Los Angeles, “Geology Report Approval Letter,” Log #85579-01, Tentative Tract Map 10149, Lot 1 and 3; 1756 and 1760 Argyle Avenue, dated February 20, 2015.

City of Los Angeles Department of Building and Safety, 2015, Surface Fault Rupture Hazard Investigations, LABC 1803.5.11 P/BC 2014-129, effective 07-28-2015.

City of Los Angeles, NavigateLA.cityla.org, accessed June, 2016.

Dolan, James F., et al., 2001, Active Faults in the Los Angeles Metropolitan Region, Southern California Earthquake Center.

FEMA, 2008, FEMA National Flood Hazard Layer (Official), Panel 06039C1605F, effective September 26, 2008.

Group Delta Consultants, Inc., 2015a, “Fault Activity Investigation for Yucca-Argyle Apartments, Champion Site, 1756 and 1760 Argyle Avenue, Los Angeles, California,” dated September 7, 2014.

Group Delta Consultants, Inc., 2015b, “Response to City of Los Angeles Geology Correction Letter #85579, 1756 and 1760 Argyle Avenue, Los Angeles, California,” dated February 12, 2015.

Group Delta Consultants, Inc., 2015c, Fault Activity Investigation, East and West Millennium Sites, 1733-1741 Argyle Avenue; 6236 and 6334 West Yucca Street; 1720-1730, 1740, 1745-1760, and1762-1770 N. Vine Street; 1746, 1748-1754, 1760, and 1764 N. Ivar Avenue, Hollywood Area, City of Los Angeles, California, Project No. LA-1191A, March 6, 2015.

Group Delta Consultants, 2016, Surface Fault Rupture Evaluation Report, Central Hollywood Tract No. 2, Lots 1, 2, 3, and 5, 1718 Vine Street, Los Angeles, California, GDC Project No. LA-1289, July 18, 2016.

Los Angeles Tall Buildings Structural Design Council, 2014, “An Alternative Procedure for Seismic Analysis and Design of Tall Buildings Located in the Los Angeles Region, 2014 Edition”.

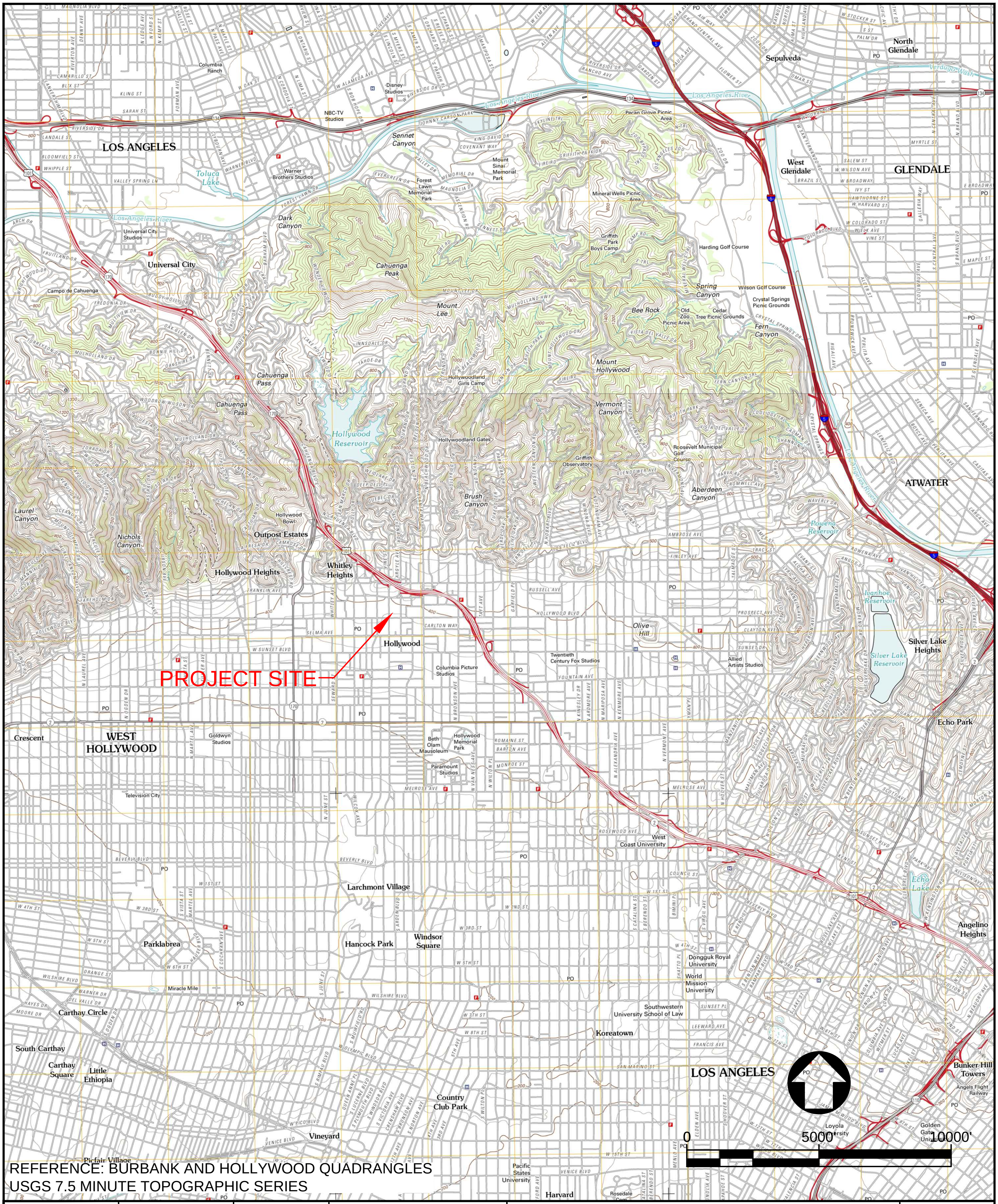
United States Geological Survey and California Geological Survey, 2011, Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California, USGS Open-File Report 2011-1188, CGS Map Sheet 59.

United States Geological Survey, 2012, US Topo Hollywood Quadrangle 7.5-Minute Series, Los Angeles County, California.

United States Geological Survey, 2016a, Quaternary Faults in Google Earth, online data files http://earthquake.usgs.gov/hazards/qfaults/google.php, last modified April 06, 2016.

United States Geological Survey, 2016b, Search Earthquake Archives, http://earthquake.usgs.gov/earthquakes/search/, last updated April 08, 2016 23:45:09 UTC.

FIGURES



REFERENCE: BURBANK AND HOLLYWOOD QUADRANGLES
USGS 7.5 MINUTE TOPOGRAPHIC SERIES

DATE: 7/11/2016
DRAWN BY: JMT
REVIEW: JB
APPROVED BY: -
PREPARED BY: MS

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SITE VICINITY MAP

CitizenM HOTELS
1718 VINE ST., LOS ANGELES, CALIFORNIA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 1

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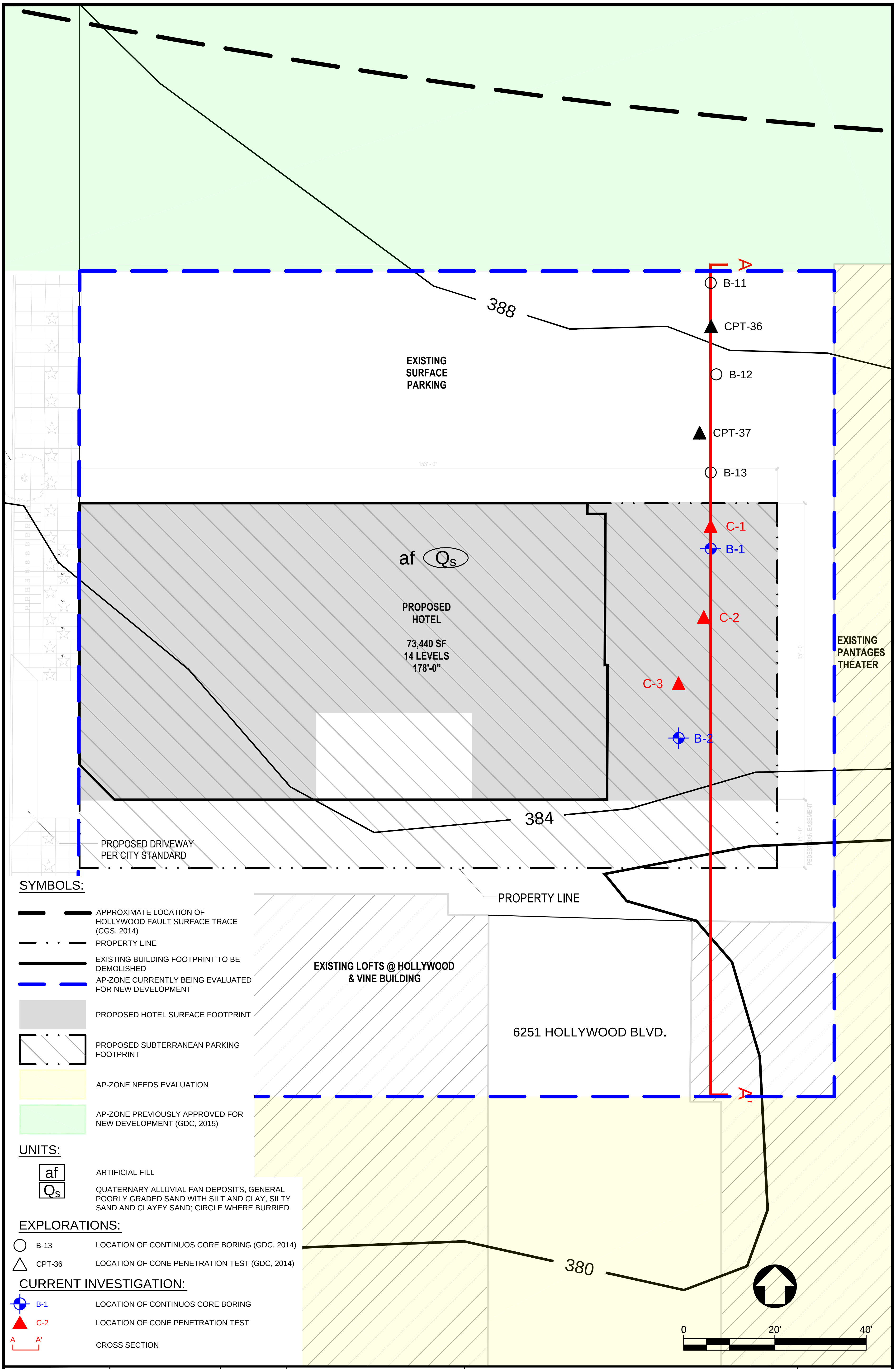

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PREPARED BY: MS

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SITE PLAN AND EXPLORATION MAP

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PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 2

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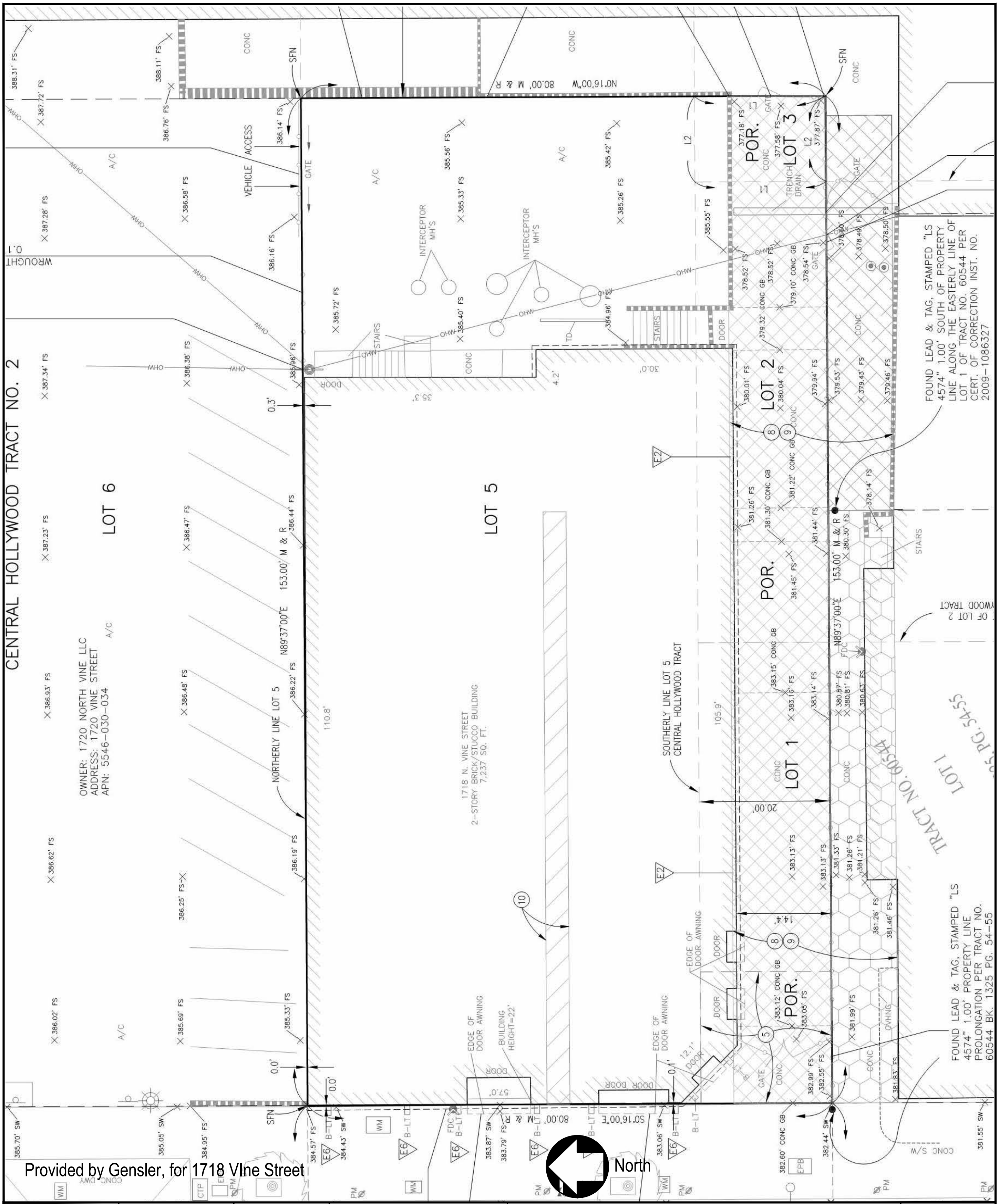

Provided by Gensler, for 1718 VIne Street

7/11/2016 MS

REVIEW:

APPROVED BY: -

PREPARED BY: MS

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SITE SURVEY

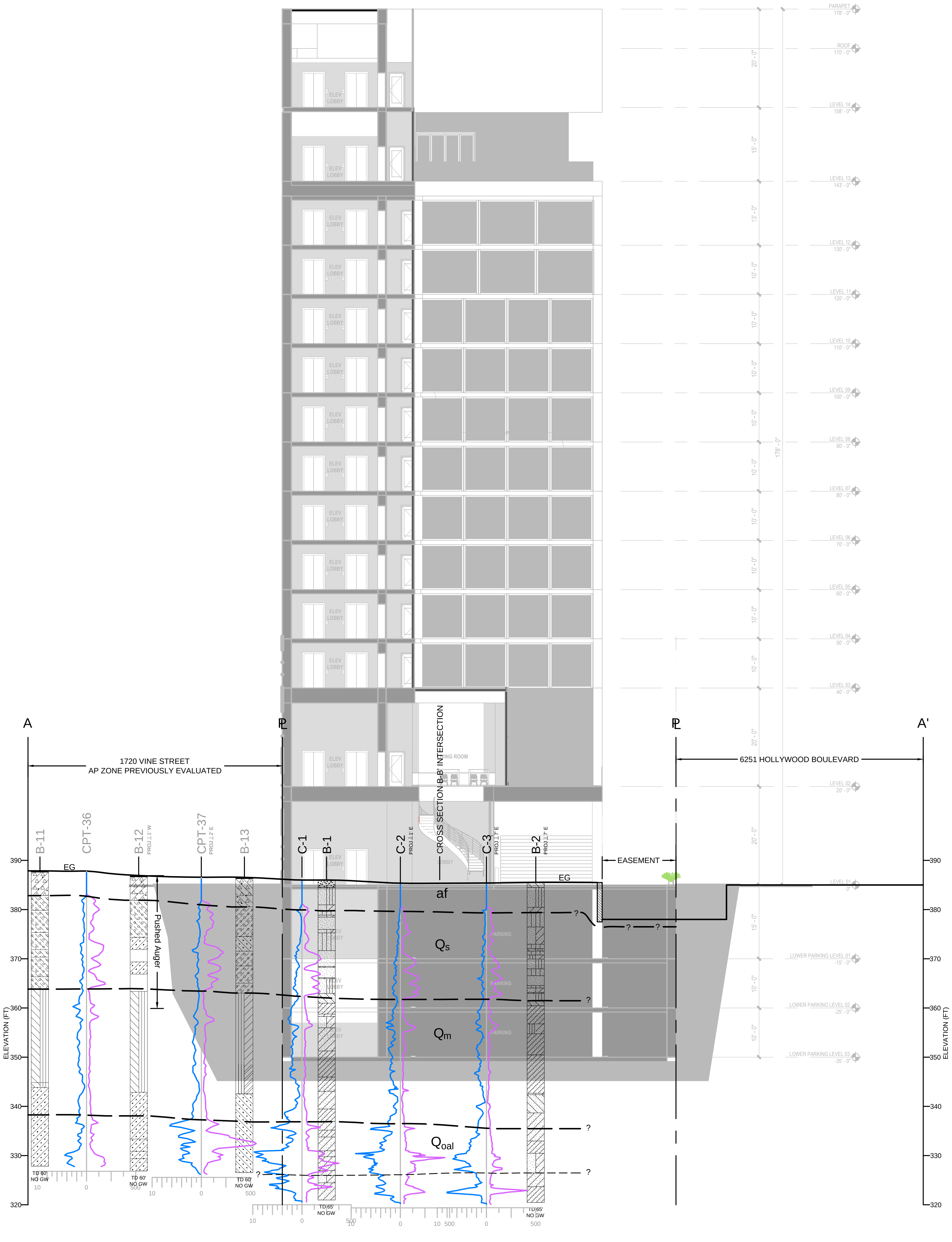
CitizenM HOTELS

1718 VINE ST., LOS ANGELES, CALIFORNIA

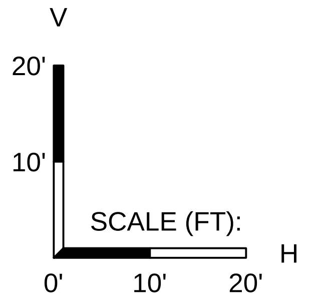
LA-1289

SCALE: 1"~20'

FIGURE NUMBER: 2.1



af	ARTIFICIAL FILL
Q_s	YOUNGER ALLUVIAL FAN DEPOSITS, LOOSE POORLY GRADED SANDS WITH SILT, FEW INTERBEDDED SILTS AND CLAYS
Q_m	MUD FLOWS, POROUS CLAYEY SAND AND SANDY CLAY
Q_{oal}	OLDER ALLUVIAL FAN DEPOSITS, CONSOLIDATED CLAYEY SAND AND SANDY CLAY
— — ?	APPROXIMATE GEOLOGIC UNIT CONTACT, QUERIED WHERE NOT CONFINED



REFERENCE: CONCEPTUAL PLANS PREPARED BY GENSLER, RECEIVED 5/27/16
NOTE: SEE APPENDIX A FOR STICK LOG AND CPT LOG DETAIL

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PREPARED BY: MS

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CROSS SECTION A-A'

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1718 VINE ST., LOS ANGELES, CA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 3.1

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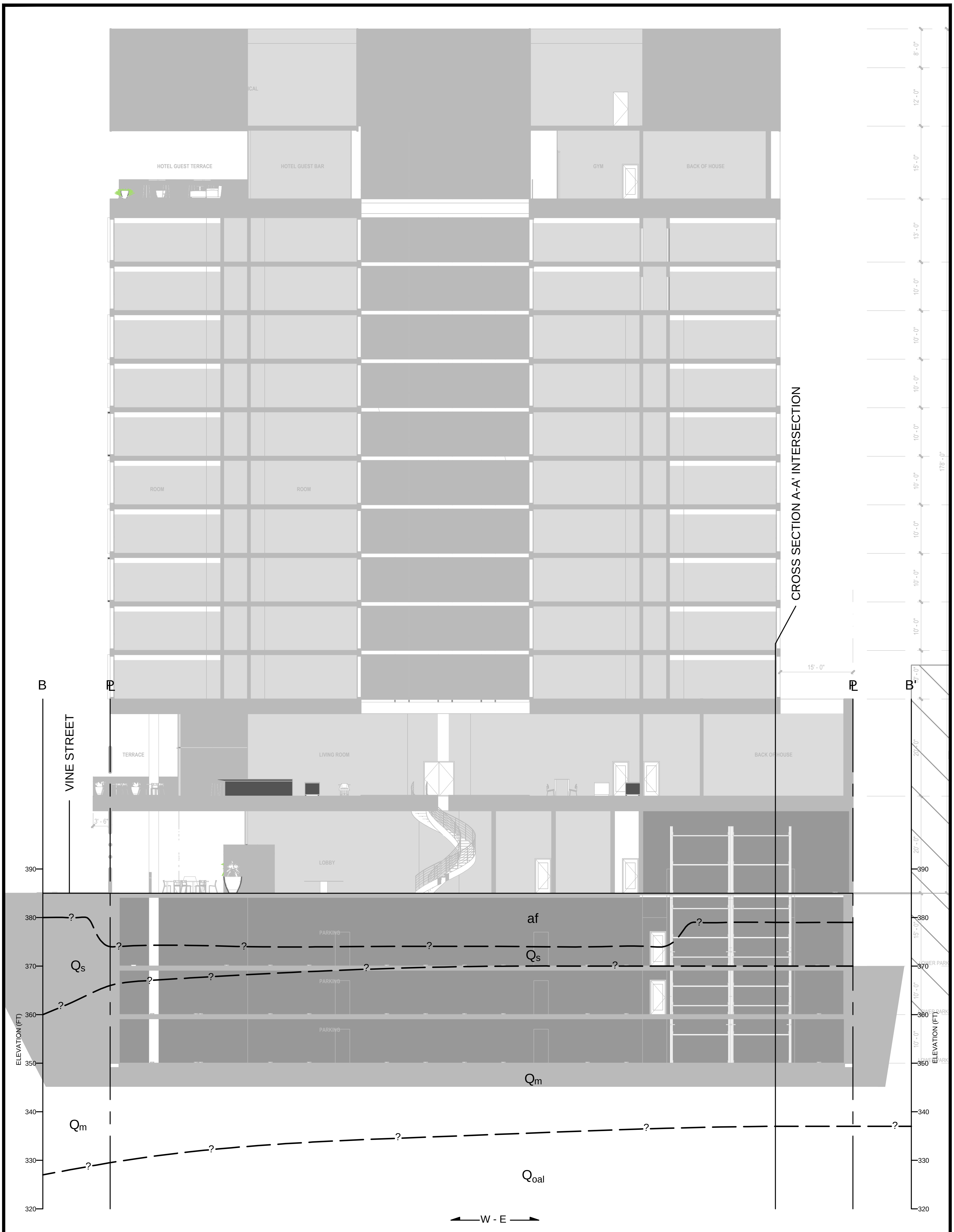
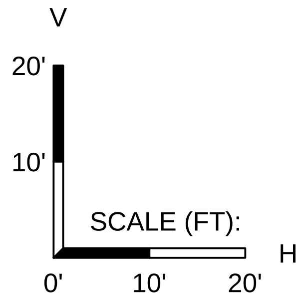


af	ARTIFICIAL FILL
Q_s	YOUNGER ALLUVIAL FAN DEPOSITS, LOOSE POORLY GRADED SANDS WITH SILT, FEW INTERBEDDED SILTS AND CLAYS
Q_m	MUD FLOWS, POROUS CLAYEY SAND AND SANDY CLAY
Q_{oal}	OLDER ALLUVIAL FAN DEPOSITS, CONSOLIDATED CLAYEY SAND AND SANDY CLAY
— — ?	APPROXIMATE GEOLOGIC UNIT CONTACT, QUERIED WHERE NOT CONFINED



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NOTE: SEE APPENDIX A FOR STICK LOG AND CPT LOG DETAIL

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REVIEW: JB	APPROVED BY: -		CitizenM HOTELS 1718 VINE ST., LOS ANGELES, CA
PREPARED BY: MS			

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 3.2

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MAP UNITS

Late Holocene (Surficial Deposits)

af	**Artificial Fill** - deposits of fill resulting from human construction, mining, or quarrying activities; includes engineered fill for buildings, roads, dams, airport runways, harbor facilities, and waste landfills
Qf	**Alluvial Fan Deposits** - unconsolidated boulders, cobbles, gravel, sand, and silt recently deposited where a river or stream issues from a confined valley or canyon; sediment typically deposited in a fan-shaped cone; gravelly sediment generally more dominant than sandy sediment

Holocene to Late Pleistocene (Surficial Deposits)

Qyf	**Young Alluvial Fan Deposits** - unconsolidated to slightly consolidated, undissected to slightly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon
Qya	**Young Alluvial Valley Deposits -** unconsolidated to slightly consolidated, undissected to slightly dissected clay, silt, sand, and gravel along stream valleys and alluvial flats of larger rivers

Late to Middle Pleistocene (Surficial Deposits)

Qof	**Old Alluvial Fan Deposits** - slightly to moderately consolidated, moderately dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon
Qol	**Old Lacustrine, Playa, and Estuarine (Paralic) Deposits** - slightly to moderately consolidated, moderately dissected fine-grained sand, silt, mud, and clay from lake, playa, and estuarine deposits of various types

Middle to Early Pleistocene (Surficial Deposits)

Qvof	**Very Old Alluvial Fan Deposits -** moderately to well-consolidated, highly dissected boulder, cobble, gravel, sand, and silt deposits issued from a confined valley or canyon

Tertiary (Bedrock)

Tss	**Coarse-grained Tertiary age formations** - primarily sandstone and conglomerate
Tsh	**Fine-grained Tertiary age formations** - includes fine-grained sandstone, siltstone, mudstone, shale, siliceous and calcareous sediments
Tv	**Tertiary age formations of volcanic origin**

Mesozoic and Older (Bedrock)

Kss	**Coarse-grained Cretaceous age formations of sedimentary origin**
Ksh	**Fine-grained Cretaceous age formations of sedimentary origin**
pKm	**Cretaceous and pre-Cretaceous metamorphic formations of sedimentary and volcanic origin**
gr	**Granitic and other intrusive crystalline rocks of all ages**

SYMBOL EXPLANATION

[For geologic line symbols: lines are solid where location is accurate, long-dashed where location is approximate, short-dashed where location is inferred, dotted where location is concealed. Queries added where identity or existence may be questionable.]

Contacts

Contact

Reference contact -- Used to delineate geologic units that were mapped as separate units on the original source map, but are consolidated on this map.

Fault -- Includes strike-slip, normal, reverse, oblique, and unspecified slip

Lineament

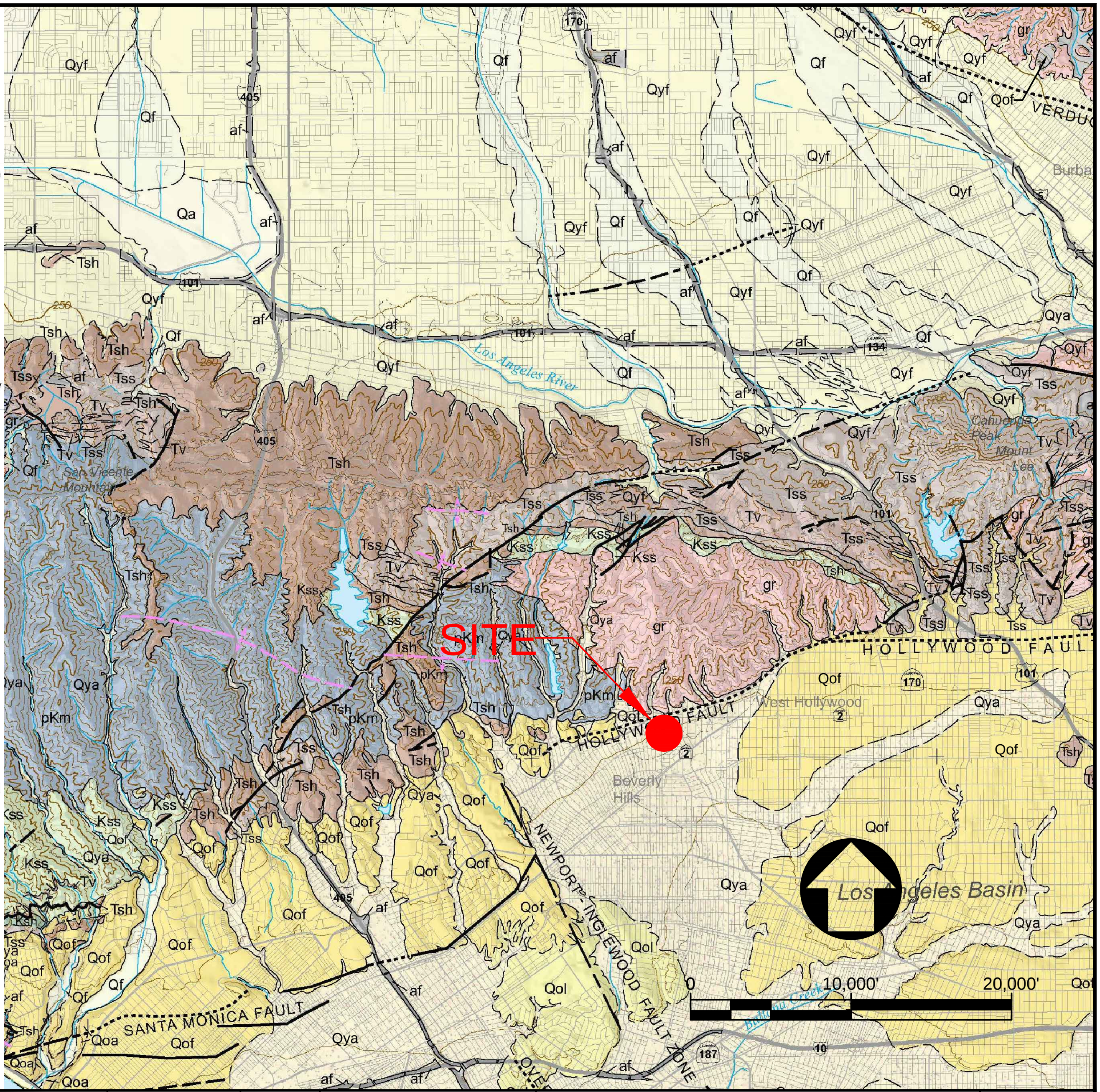
Folds -- Showing direction of plunge where appropriate

Anticline

Stream

Road

REFERENCE: CGS, 2010a



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PREPARED BY: MS			

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REGIONAL GEOLOGY MAP

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1718 VINE ST., LOS ANGELES, CALIFORNIA

PROJECT NUMBER: LA-1289

SCALE: AS SHOWN

FIGURE NUMBER: 4

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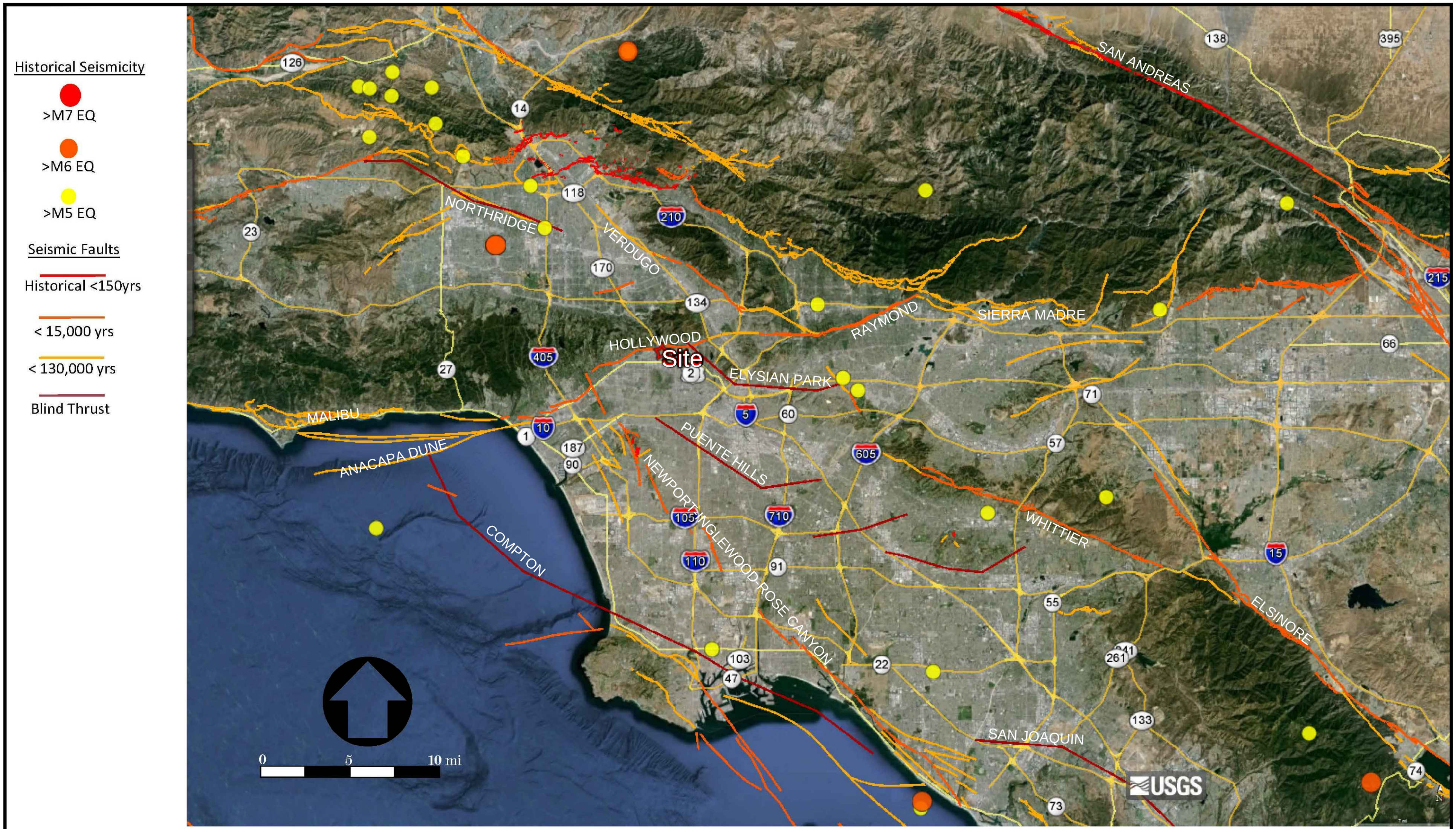

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DRAWN BY: JMT
REVIEW: JB
PROJECT MANAGER: -
PREPARED BY: MS

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REGIONAL FAULT AND
SEISMICITY MAP

CitizenM HOTELS
1718 VINE ST., LOS ANGELES, CALIFORNIA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
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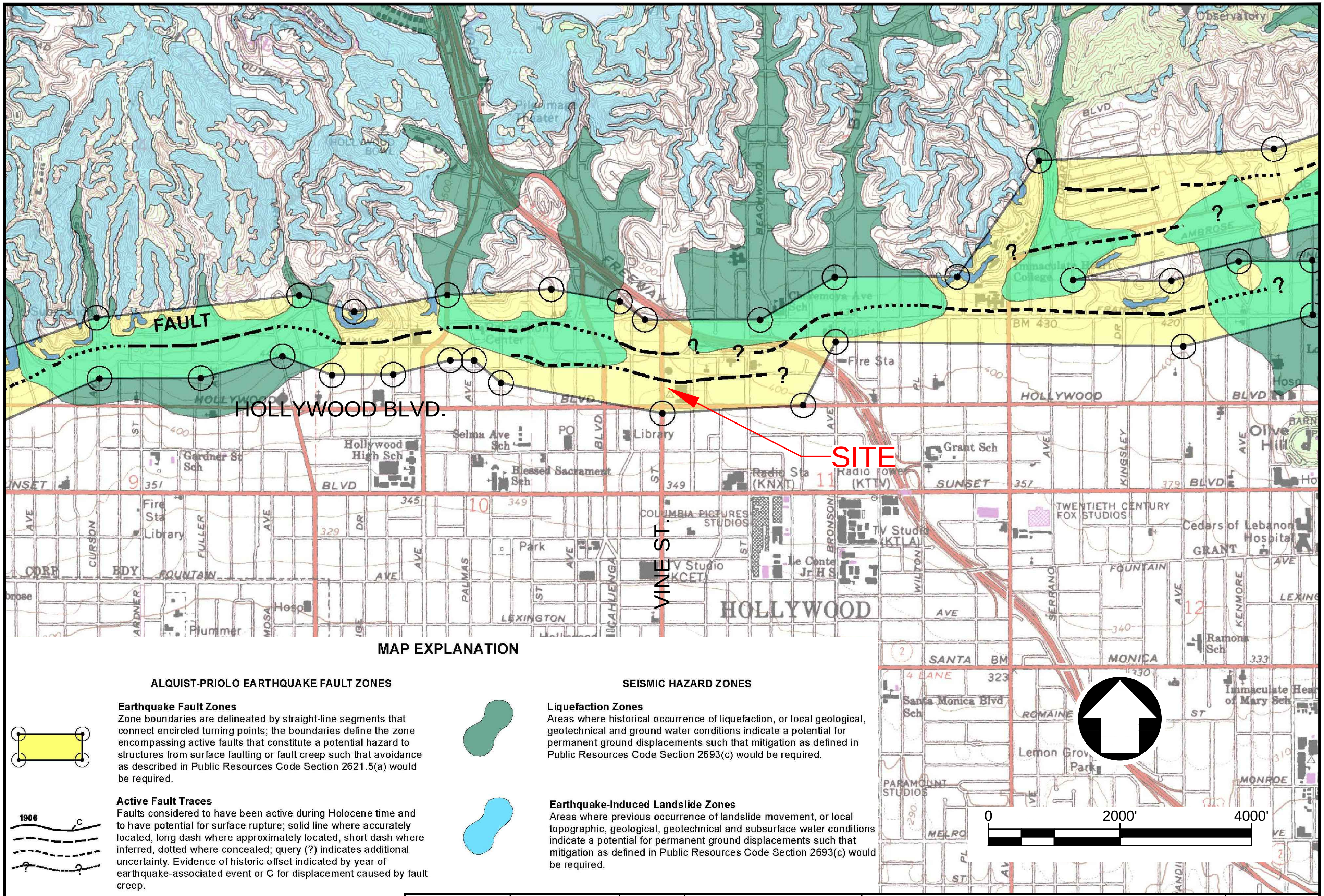

MAP EXPLANATION

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

🟨 **Earthquake Fault Zones**
Zone boundaries are delineated by straight-line segments that connect encircled turning points; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

1906 C
Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

🟩 **Liquefaction Zones**
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

🟦 **Earthquake-Induced Landslide Zones**
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Reference: *CGS, EARTHQUAKE ZONES OF REQUIRED INVESTIGATION, HOLLYWOOD QUADRANGLE, EARTHQUAKE FAULT ZONES, 2014, SEISMIC HAZARD ZONES, 1999.*

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EARTHQUAKE HAZARD ZONES MAP

CitizenM HOTELS
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PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 6

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Appendix A
Field Investigation

APPENDIX A
FIELD INVESTIGATION

A.1 Introduction

Group Delta Consultants (GDC) performed an updated geotechnical feasibility study to determine the significant geotechnical conditions that may impact proposed development at the site at 1718 Vine Street, Los Angeles, California.

A.2 Drilling and Sampling

Drilling, Logging, and Soil Classification

The borings were drilled by Gregg Drilling (a GDC's subcontractor) using continuous soil core techniques. Borings were explored to 65 feet depth. Our field geologist measured the 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. A boring log legend is presented in FiguresA-1a. The boring/rock coring records are presented in Figures A-2a through A-6c.

Sampling

Borings were sampled continuously with variable core run lengths depending on the recovery rate. Cores were drilled using a hollow stem auger dry coring method with an 8.25-inch diameter bit. The core was typically logged to a degree of accuracy to the nearest half foot. Where 100% core recovery was obtained, the degree of accuracy is closer to the nearest tenth of a foot.

Borehole Abandonment

At the completion of borings, the borings were abandoned by backfilling with soil cuttings. A hammer was used to compact the backfill. The paved surfaces were patched with cold mix asphalt concrete/quick set concrete to match the existing surface condition. Notes describing the borehole abandonment are presented on the boring log records.

A.3 Cone Penetration Tests

CPT Soundings

Gregg Drilling (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. 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 type and geotechnical properties of soils being penetrated using published.

The CPT data in a graphical form and accompanying data interpretation are presented in Figures A-7i through A-10b. 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 to match the existing surface condition.

A.5 List of Attached Figures

The following figures are attached:

List of Figures

Figures A-1a	Boring Log Legend
Figures A-2a through A-4d	Boring Records This Investigation
Figure R_A-4a through R_A-6c	Prior Investigation Revised (GDC, 2015)
Figures A-7i through A-10b	Interpretation and CPT Records

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly graded GRAVEL Poorly graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND
GP-GC	Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly graded SAND Poorly graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL
SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic / Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

WATER LEVEL SYMBOLS

- ▽ First Water Level Reading (during drilling)
- ▼ Static Water Level Reading (after drilling, date)

PARTICLE SIZE

Descriptor		Size (in)
Boulder		> 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		< 1/300

Ref.: Caltrans Soil and Rock Logging Classification, and Presentation Manual (2010)

GROUP DELTA

GROUP DELTA CONSULTANTS, INC.
GEOTECHNICAL ENGINEERS
AND GEOLOGISTS

FIGURE NUMBER
A-1A

PROJECT NAME
Franklin Ave Fault Study

PROJECT NUMBER
LA1274

BORING RECORD LEGEND #1

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study
PROJECT NUMBER LA-1289
BORING B-1
SITE LOCATION 1718 Vine Street
DATE(S) DRILLED 5/23/2016
LOGGED BY K. Neill
SHEET NO. 1 of 4
DRILLING METHOD Continuous Soil Core
DRILL BIT SIZE/TYPE 8.25 in
CHECKED BY M. Sutherland
TOTAL DEPTH DRILLED (feet) 65
DRILL RIG TYPE Marl M-10
DRILLED BY Gregg Drilling
INCLINATION FROM VERTICAL/BEARING 0º None
APPARENT GROUNDWATER DEPTH None encountered
APPROXIMATE TOP ELEVATION (feet) 385.8
COMMENTS
BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE: RUN NO.	SOIL CORE: BOX NO.	SOIL CORE: RECOVERY, %	SOIL CORE: FRAC. FREQ.	SOIL CORE: R.Q.D., %	SOIL CORE: FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	385								**Artificial Fill (af)** **CLAYEY SAND,** 10YR 3/3 Dark Brown, moist, dense, fine SAND, few medium to coarse SAND, medium plasticity, medium dry strength, no dilatency.				
									Poorly Graded SAND with SILT, 10YR 5/8 Yellowish Brown, moist, loose, fine SAND, few medium to coarse SAND, rounded to subrounded.				
5	380	1	1	100					**Poorly Graded SAND with CLAY,** 10YR 4/3 Brown, moist, fine SAND, few medium SAND, trace fine GRAVEL, angular.				
		2	1	100					**Younger Alluvial Fan Deposits (Qs)** **SILTY SAND,** 10YR 5/8 Yellowish Brown, moist, fine to medium SAND, some coarse SAND, trace fine GRAVEL, subangular, porous.				
									Poorly Graded SAND with CLAY (Possible Paleosol), 10YR 4/6 Dark Yellowish Brown, moist, dense, fine SAND, few medium SAND, few mica grains.				
10	375	3	2	100					**Poorly Graded SAND,** 10YR 5/6 Dark Yellowish Brown, moist, fine SAND, some medium to coarse SAND, few fine to coarse GRAVEL, subrounded to subangular, quartz rich, porous. @8.6': Coarse GRAVEL, angular, up to 2.5" in diameter.				
		4	2	100					**Poorly Graded SAND with CLAY (Paleosol),** 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, some medium SAND.				
15	370	5	3	93					**SILTY SAND,** 10YR 5/6 Yellowish Brown, moist, fine SAND, some fines, trace medium to coarse SAND, subangular, sandier with depth. @12.5': **SILTY CLAY** (2-4" thick layer), 10YR 4/4 Dark Yellowish Brown, moist, trace SAND, medium plasticity, no dilatency. @13.5': **Poorly Graded SAND,** iron oxide staining. @13.9': **SILTY CLAY** (2-4" thick layer), 10YR 4/4 Dark Yellowish Brown, moist, trace SAND, medium plasticity, medium dilatency.				
		6	3	97					**Poorly Graded SAND,** 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, some medium SAND, few coarse SAND, few fine GRAVEL, angular, porous. @15.0': 10YR 5/6 Yellowish Brown, fine to medium SAND, trace coarse SAND and fine GRAVEL, subrounded to subangular, quartize and granitic clasts, iron oxide staining.				

GDC_SOIL_CORE_ENG_LA LA-1289 VINE ST - FAULT STUDY - REVISED.GPJ ROCK2.GDT 7/15/16

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study

PROJECT NUMBER LA-1289

BORING B-1

SITE LOCATION 1718 Vine Street

DATE(S) DRILLED 5/23/2016

LOGGED BY K. Neill

SHEET NO. 2 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 65

DRILL RIG TYPE Marl M-10

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

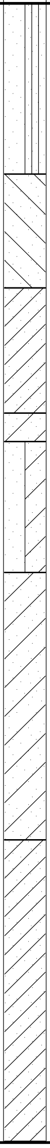
APPROXIMATE TOP ELEVATION (feet) 385.8

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE RUN NO.	SOIL CORE BOX NO.	SOIL CORE RECOVERY, %	SOIL CORE FRAC. FREQ.	SOIL CORE R.Q.D., %	SOIL CORE FRACTURE DRAWING/ NUMBER	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	365	7	4	100							
		8	4	100							
25	360	9	5	100							
		10	5	100							
30	355	11	6	100							
		12	6	100							
35	350	13	7	100							
		14	7	83							

LITHOLOGY



MATERIAL DESCRIPTION

CLAYEY SAND / SILTY SAND, (1-2" thick layer).

Poorly Graded SAND, 10YR 4/6 Dark Yellowish Brown, moist, fine to medium SAND, trace coarse SAND, few fine GRAVEL, subrounded to subangular, iron oxide staining.

CLAYEY SAND, 10YR 3/4 Dark Yellowish Brown, moist, fine SAND, low plasticity.

Poorly Graded SAND with SILT, 10YR 4/6 Dark Yellowish Brown, moist, fine to medium SAND, trace coarse SAND and fine GRAVEL, subangular to subrounded.

@21.5': **CLAYEY SAND (Paleosol)** (2" thick layer).

Lean CLAY with SAND, 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, trace coarse SAND, medium plasticity, no dilatency, iron oxide staining, massive.

SANDY lean CLAY, 7.5YR 4/6 Strong Brown, moist, stiff, fine SAND, medium plasticity, no dilatency, rootlets, trace iron oxide clasts, massive.

CLAYEY SAND, fine SAND.

Poorly Graded SAND with CLAY / Poorly Graded SAND with SILT, moist, fine to medium SAND, trace coarse SAND and fine to coarse GRAVEL, massive.

Younger Mud Flows (Qym)

CLAYEY SAND, 10YR 3/4 Dark Yellowish Brown, moist, dense, fine SAND, trace medium to coarse SAND and fine GRAVEL, low plasticity, no dilatency, rootlets, iron oxide staining, massive.

SANDY lean CLAY, 7.5YR 4/4 Brown, moist, fine SAND, few medium to coarse SAND and fine to coarse GRAVEL, subangular to angular, iron oxide staining, rootlets, manganese oxide staining, massive.

@37.5': Siltier with depth.

@38.5': Coarse GRAVEL, granitic, angular, up to 2" in size.

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FIGURE A-2 b

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study

PROJECT NUMBER LA-1289

BORING B-1

SITE LOCATION 1718 Vine Street

DATE(S) DRILLED 5/23/2016

LOGGED BY K. Neill

SHEET NO. 3 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 65

DRILL RIG TYPE Marl M-10

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 385.8

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE RUN NO.	SOIL CORE BOX NO.	SOIL CORE RECOVERY, %	SOIL CORE FRAC. FREQ.	SOIL CORE R.Q.D., %	SOIL CORE FRACTURE DRAWING/ NUMBER	LITHOLOGY	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	345	15	8	100								
		16	8	90								
45	340	17	9	100								
		18	9	64								
50	335	19	10	100								
		20	10	77								
55	330	21	11	93								
		22	11	100								

MATERIAL DESCRIPTION

SANDY lean CLAY, 7.5YR 4/4 Brown, moist, fine SAND, few medium to coarse SAND and fine to coarse GRAVEL, subangular to angular, iron and manganese oxide staining. Transitional erosional lower contact.

Mud Flows (Qm)

CLAYEY SAND, 7.5YR 3/4 Dark Brown, moist, fine SAND, few medium SAND, rootlets, iron oxide and manganese oxide staining, trace fine GRAVEL, angular, porous.

@46.5': Transitional reworked erosional zone.

SANDY lean CLAY, 10YR 4/6 Dark Yellowish Brown, stiff, moist, fine SAND, trace medium SAND and fine to coarse GRAVEL.

@47.1': Quartizite clast, 2" in diameter.

@47.5': 7.5YR 4/6 Strong Brown with some gleying streaks, moist, fine to coarse SAND, manganese and iron oxide stain, mottling, tight platy ped.

@49.0': **(Paleosol).**

@49.1-50.0': No recovery.

CLAYEY SAND, 7.5YR 4/4 Brown, moist, fine SAND, some fines, few medium to coarse SAND, mottling, platy ped, gleying streaks.

Older Alluvial Fan Deposits Mud Flows (Qoal)

SANDY lean CLAY, 7.5YR 4/4 Brown, moist, stiff, fine to medium SAND, coarsens with depth, trace coarse SAND and fine GRAVEL, mottled, iron oxide staining.

CLAYEY SAND, 7.5YR 3/3 Dark Brown, moist, fine to medium SAND, few coarse SAND.

CLAYEY SAND, 7.5YR 3/3 Dark Brown, moist, fine to medium SAND, little fines, few coarse SAND.

@56.2': Gradational contact (narrow)

CLAYEY SAND, 7.5YR 4/6 Strong Brown, moist, fine SAND, few medium to coarse SAND and fine GRAVEL, subangular, coarsens with depth to 59 ft.

CLAYEY SAND, 7.5YR 4/6 Strong Brown, moist, fine to medium SAND, few coarse SAND, iron oxide

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FIGURE A-2 c

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study

PROJECT NUMBER LA-1289

BORING B-1

SITE LOCATION 1718 Vine Street

DATE(S) DRILLED 5/23/2016

LOGGED BY K. Neill

SHEET NO. 4 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 65

DRILL RIG TYPE Marl M-10

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 385.8

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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
	325	23	12	73					staining, mottling. **Poorly Graded SAND with CLAY,** transitioning contact, iron oxide staining and gray mottling.				
		24	12	100					**CLAYEY SAND,** 7.5YR 4/6 Strong Brown, moist, fine to medium SAND, manganese oxide staining, platy ped development upper ~6".				
65	320								Total depth = 65 feet below ground surface. Hand auger upper 5 feet. Groundwater not encountered during drilling. Backfilled with soil cuttings, tamped and patched with cold patch. Surface Elevation calculated from manometer survey data and reference B-13 Elevation 386.45 feet.				
70	315												
75	310												

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FIGURE A-2 d

LOG OF CORE BORING

PROJECT NAME
Vine Street Fault Study

PROJECT NUMBER
LA-1289

BORING
B-2

SITE LOCATION
1718 Vine Street

DATE(S) DRILLED
5/24/2016

LOGGED BY
K. Neill

SHEET NO.
1 of 4

DRILLING METHOD
Continuous Soil Core

DRILL BIT SIZE/TYPE
8.25 in

CHECKED BY
M. Sutherland

TOTAL DEPTH DRILLED (feet)
65

DRILL RIG TYPE
Marl M-10

DRILLED BY
Gregg Drilling

INCLINATION FROM VERTICAL/BEARING
0º None

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE TOP ELEVATION (feet)
385.4

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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						
	385								<u>**Artificial Fill (Af)**</u> **Lean CLAY with SAND,** 10YR 2/2 Very Dark Brown, moist, medium stiff, trace fine to medium SAND, trace concrete debris, medium plasticity, medium dry strength, low toughness, no dilatency. **Poorly Graded SAND with SILT,** 10YR 3/4 Dark Yellowish Brown, moist, loose, fine to medium SAND, little coarse SAND, few fine GRAVEL.				
5	380	1	1	93					**CLAYEY SAND,** 10YR 2/2 Very Dark Brown, moist, dense, fine to medium SAND, little fines, few coarse SAND. <u>**Younger Alluvial Fan Deposits (Qs)**</u> **SILTY SAND,** 10YR 5/6 Yellowish Brown, moist, fine to medium SAND, some coarse SAND, some fine GRAVEL, subangular, porous.				
		2	1	97					@9.0': Erosional contact, coarse GRAVEL up to 2.5 in diameter.				
10	375	3	2	100					**Poorly Graded SAND with CLAY (Possible Paleosol),** 10YR 3/4 Dark Yellowish Brown, moist, dense, fine to medium SAND, some coarse SAND, trace fine GRAVEL, subangular, porous. @10.0': 10YR 5/6 Yellowish Brown, moist, trace coarse SAND and fine GRAVEL, subrounded. Interbedded **CLAYEY SAND** layers (3 to 6" thick), 10YR 3/4 Dark Yellowish Brown.				
		4	2	100					**SILTY SAND,** moist, fine SAND. **SANDY SILTY CLAY,** 10YR 3/4 Dark Yellowish Brown, fine SAND, little fines. **SILTY SAND,** fine to medium SAND.				
15	370	5	3	100					**SILTY CLAY,** 10YR 3/4 Dark Yellowish Brown, moist, medium stiff, trace fine SAND. **Poorly Graded SAND with SILT,** 10YR 5/6 Yellowish Brown, moist, fine to coarse SAND, coarsens with depth, porous. @17.0 - 17.5': Fine to coarse quartzite and granite clasts, subangular.				
		6	3	100					**SILTY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine SAND, trace medium SAND. @18.9': Coarse GRAVEL. **Poorly Graded SAND,** 10YR 5/6 Yellowish Brown,				

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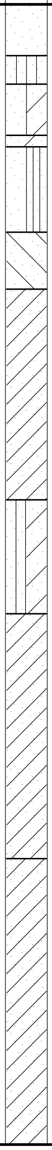
FIGURE A-3 a

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study	**PROJECT NUMBER** LA-1289		**BORING** **B-2**
SITE LOCATION 1718 Vine Street	**DATE(S) DRILLED** 5/24/2016	**LOGGED BY** K. Neill	**SHEET NO.** 2 of 4
DRILLING METHOD Continuous Soil Core	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 65
DRILL RIG TYPE Marl M-10	**DRILLED BY** Gregg Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE TOP ELEVATION (feet)** 385.4	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	SOIL CORE RUN NO.	BOX NO.	RECOVERY, %	FRAC. FREQ.	R.Q.D., %	FRACTURE DRAWING/ NUMBER	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	365	7	4	100							
		8	4	100							
25	360	9	5	100							
		10	5	100							
30	355	11	6	100							
		12	6	100							
35	350	13	7	100							
		14	7	100							

LITHOLOGY



MATERIAL DESCRIPTION

moist, fine to coarse SAND, few fine to coarse GRAVEL.

SITLY SAND, 10YR 4/6 Dark Yellowish Brown, moist, fine SAND, trace medium SAND.
@21.2': **Poorly Graded SAND with CLAY to CLAYEY SAND (Paleosol),** (2" thick layer).

Poorly Graded SAND with CLAY, 10YR 5/4 Yellowish Brown, fine to coarse SAND, few coarse GRAVEL, few fine GRAVEL.

@22.3': Erosional contact.
CLAYEY SAND, 7.5YR 4/6 Strong Brown, moist, fine SAND, mottled.

Poorly Graded SAND with SILT, 10YR 4/6 Dark Yellowish Brown, moist, fine to coarse SAND.

Lean CLAY with SAND, 7.5YR 4/6 Strong Brown, moist, few fine SAND, medium plasticity, no dilatency, massive, porous.

SANDY lean CLAY, 7.5YR 4/4 Strong Brown, moist, fine to medium SAND, few coarse SAND, few fine GRAVEL, fines increase with depth, massive, porous.
@26.2': Coarse GRAVEL.
@28.6 - 28.7': Gradational contact (narrow)

Poorly Graded SAND with CLAY / SILTY SAND, 7.5YR 4/4 Brown, moist, fine SAND, few medium SAND, little fines, trace mica grains, massive, porous.

Younger Mud Flows (Qym)
SANDY lean CLAY, 7.5YR 4/4 Brown, moist, stiff, fine SAND, medium plasticity, massive, appears slightly porous.

SANDY lean CLAY (paleosol), 7.5YR 3/3 Dark Brown, moist, fine SAND, few medium SAND, few fine GRAVEL, iron oxide staining, massive, appears porous.

@37.5': Increase in rootlets and iron oxide stained clasts.

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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-3 b

LOG OF CORE BORING

PROJECT NAME
Vine Street Fault Study

PROJECT NUMBER
LA-1289

BORING
B-2

SITE LOCATION
1718 Vine Street

DATE(S) DRILLED
5/24/2016

LOGGED BY
K. Neill

SHEET NO.
3 of 4

DRILLING METHOD
Continuous Soil Core

DRILL BIT SIZE/TYPE
8.25 in

CHECKED BY
M. Sutherland

TOTAL DEPTH DRILLED (feet)
65

DRILL RIG TYPE
Marl M-10

DRILLED BY
Gregg Drilling

INCLINATION FROM VERTICAL/BEARING
0º None

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE TOP ELEVATION (feet)
385.4

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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
	345	15	8	100									
		16	8	100					@42.3': **CLAYEY SAND.** **Poorly Graded SAND with CLAY,** 7.5YR 4/4 Brown, moist, loose, fine to coarse SAND, few GRAVEL. Abrupt erosional lower contact. **Mud Flows (Qm)** **Lean CLAY with SAND,** 7.5YR 3/2 Dark Brown, moist, fine SAND, few medium SAND, mottling, iron oxide staining, rootlets, trace GRAVEL, massive.				
45	340	17	9	100									
		18	9	100					**CLAYEY SAND,** 7.5YR 2.5/3 Very Dark Brown, moist, fine SAND, few medium SAND, few fine GRAVEL, mottled, iron oxide and managnese staining, CLAY films.				
50	335	19	10	100					@50.0 - 52.0': **(Paleosol).** **CLAYEY SAND,** 5YR 4/4 Reddish Brown with gleying, moist, fine SAND, iron oxide staining and gray mottling, few fine GRAVEL, coarsens with depth to 52 ft. **Older Alluvial Fan Deposits Mudflows (Qoal)**				
		20	10	100					@52.0': **Poorly Graded SAND with CLAY,** fine to coarse SAND. **SANDY lean CLAY,** fine to coarse SAND, few fine GRAVEL, massive.				
55	330	21	11	100					**Poorly Graded SAND with CLAY,** 7.5YR 3/4 Dark Brown, moist, loose, fine to medium SAND, some coarse SAND, few fine GRAVEL, iron oxide staining, trace GRAVEL at depth, massive to gradational.				
		22	11	100					@59.0': Transitional contact, weathered zone, iron oxide staining and gray mottling.				

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FIGURE A-3 c

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study

PROJECT NUMBER LA-1289

BORING **B-2**

SITE LOCATION 1718 Vine Street

DATE(S) DRILLED 5/24/2016

LOGGED BY K. Neill

SHEET NO. 4 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 65

DRILL RIG TYPE Marl M-10

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 385.4

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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
	325	23	12	100				▨	**CLAYEY SAND to Poorly Graded SAND with CLAY,** 7.5 3/3 Dark Brown, moist, fine SAND, trace fine GRAVEL, trace medium SAND, manganese staining, massive.				
								▨	**SANDY lean CLAY,** 7.5YR 3/4 Dark Brown, moist, fine SAND, few medium SAND, few fine GRAVEL, mottling, micaceous, massive.				
		24	12	100									
65	320								Total depth = 65 feet below ground surface. Hand auger upper 5 feet. Relocate baring 2 feet North due to concrete at 2 feet depth. Groundwater not encountered during drilling. Backfilled with soil cuttings, tamped and patched with cold patch. Surface Elevation calculated from manometer survey data and reference B-13 Elevation 386.45 feet.				
70	315												
75	310												

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FIGURE A-3 d

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-11**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 1 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 387.86

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

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						
									Asphalt at surface. Hand augered to 5 feet bgs.				
									ARTIFICIAL FILL (Qaf)				
	385								**Sandy SILT** dark brown, moist, fine to medium sand.				
5			1						**UPPER SAND UNIT (Qs)**				
									Silty SAND 10YR 5/6 (yellowish brown); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL				
	380												
									SAND with SILT 10YR 6/6 (brownish yellow); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL				
10			2										
	375								**Silty SAND** 10YR 4/6 (dark yellowish brown); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL @ 14.5': sand becomes coarser				
15			3										
									SAND with SILT 10YR 5/6 (yellowish brown); moist, fine to medium SAND; few coarse SAND and fine GRAVEL, trace coarse GRAVEL				
	370								**Silty SAND** 10YR 5/6 (yellowish brown); moist; fine to medium SAND, few coarse SAND; trace fine GRAVEL @ 19': gravel becomes coarser				
20			4						@ 20': 10YR 4/4 (dark yellowish brown); sand becomes finer. @ 21': 10YR 5/6 (yellowish brown); sand becomes coarser				
	365								**SAND with SILT** 10YR 5/6 (yellowish brown); moist; fine to medium SAND; few coarse SAND; trace fine GRAVEL				

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FIGURE R_A-4 a

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-11**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 2 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 387.86

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

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						
			5										
	360												
30			6						**MUD FLOWS (Qm)**				
									Sandy CLAY 7.5YR 4/4 (brown) to 5YR 4/4 (reddish brown); moist; fine SAND; trace fine GRAVEL				
	355												
35			7						**Clayey SAND to sandy CLAY** 7.5YR 4/6 (strong brown); moist; fine SAND; few medium SAND, trace coarse SAND and fine GRAVEL				
	350												
									@ 38': 7.5YR 4/4 (brown)				
40			8						@ 40': 7.5YR 5/4 (brown)				
	345												
									Clayey SAND to sandy CLAY 7.5YR 3/2 (dark brown); moist; fine SAND; few medium SAND, trace coarse SAND and fine GRAVEL				
45			9										
	340												
									(PALEO HORIZON)				

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FIGURE R_A-4 b

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-11**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 3 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 387.86

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
			10					▨	Color change to 7.5YR 3/2 (dark brown); 7.5YR 4/4 (brown) and 7.5 YR 5/1 (gray) **OLDER ALLUVIUM (Qoal)** **Clayey SAND**				
	335							▨					
55			11					▨					
									Clayey SAND7.5YR 4/6 (strong brown); moist; fine SAND; few medium SAND; trace coarse SAND and fine GRAVEL				
	330												
60									Total Depth: 60 feet below ground surface.				
	325												
65													
	320												
70													
	315												

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FIGURE R_A-4 c

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-12**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 1 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

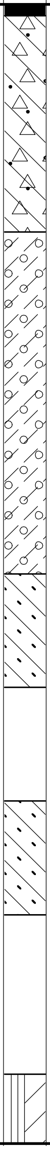
INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.9

COMMENTS

BOREHOLE BACKFILL Soil Cuttings



DEPTH (ft)	ELEVATION (ft)	ROCK CORE RUN NO.	ROCK CORE BOX NO.	ROCK CORE RECOVERY, %	ROCK CORE FRAC. FREQ.	ROCK CORE R.Q.D., %	ROCK CORE FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
									Asphalt at surface. Hand augered to 5 feet bgs. **ARTIFICIAL FILL (Qaf)**				
	385								**Sandy SILT** dark brown, moist, fine to medium sand.				
5			1						**UPPER SAND UNIT (Qs)**				
	380								**Silty SAND** 10YR 5/6 (yellowish brown); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL				
10			2										
	375								@ 12': very soft drilling				
									Clayey SAND 10YR 4/4 to 4/6 (dark yellowish brown); moist; fine to coarse SAND; trace coarse sand and fine GRAVEL				
15			3						No Recovery contact inferred using CPT data.				
	370												
									Clayey SAND 10YR 4/4 to 4/6 (dark yellowish brown); moist, dense, mostly fine to medium SAND, few coarse SAND and GRAVEL, micas.				
20			4						No Recovery contact inferred using CPT data.				
	365												
									Silty SAND 7.5YR 4/4 (brown), moist, medium dense, fine to medium SAND, trace coarse SAND, fine GRAVEL and coarse GRAVEL.				

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FIGURE R_A-5 a

LOG OF CORE BORING

PROJECT NAME
Millenium Trench W Argyle Ave

PROJECT NUMBER
LA-1191A

BORING
B-12

SITE LOCATION
Capitol Parking Lot

DATE(S) DRILLED
8/12/2014

LOGGED BY
TO

SHEET NO.
2 of 3

DRILLING METHOD
Hollow Stem Auger

DRILL BIT SIZE/TYPE
8"

CHECKED BY
SK

TOTAL DEPTH DRILLED (feet)
60

DRILL RIG TYPE
Marl M-12

DRILLED BY
Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING
0 Degrees

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE PILE TOP ELEVATION (feet)
386.9

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

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						
			5						Drilling becomes harder				
	360												
30			6						**MUD FLOWS (Qm)** CPT data used to place Qm contact				
	355												
									Silty SAND 7.5YR 4/4 (brown), moist, dense, mostly fine to medium SAND.				
35			7										
	350												
									Clayey SAND 10YR 4/6 (dark yellowish brown); moist, fine SAND; trace coarse SAND and fine GRAVEL				
									Sandy CLAY moist; fine SAND; trace medium and coarse SAND, and fine GRAVEL				
40			8										
	345												
									Sandy CLAY 5YR 4/3 (reddish brown), moist; fine SAND; trace medium and coarse SAND, and fine GRAVEL				
45			9										
	340												

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FIGURE R_A-5 b

LOG OF CORE BORING

PROJECT NAME
Millenium Trench W Argyle Ave

PROJECT NUMBER
LA-1191A

BORING
B-12

SITE LOCATION
Capitol Parking Lot

DATE(S) DRILLED
8/12/2014

LOGGED BY
TO

SHEET NO.
3 of 3

DRILLING METHOD
Hollow Stem Auger

DRILL BIT SIZE/TYPE
8"

CHECKED BY
SK

TOTAL DEPTH DRILLED (feet)
60

DRILL RIG TYPE
Marl M-12

DRILLED BY
Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING
0 Degrees

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE PILE TOP ELEVATION (feet)
386.9

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	ROCK CORE: BOX NO.	ROCK CORE: RECOVERY, %	ROCK CORE: FRAC. FREQ.	ROCK CORE: R.Q.D., %	ROCK CORE: FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	335		10						**(PALEO HORIZON)** **OLDER ALLUVIUM (Qoal)** **Clayey SAND** 10YR 4/6 (dark yellowish brown) and 10YR 5/2 (grayish brown); moist; fine to medium SAND; trace coarse and fine GRAVEL				
55			11						**Sandy CLAY** 10YR 4/6 and 10YR 5/2 (mottled); moist; fine SAND; trace fine GRAVEL				
	330								**Clayey SAND** 10YR 4/4 (dark yellowish brown); moist; fine SAND				
									Silty SAND 10YR 5/6 (yellowish brown); moist; fine SAND; trace fine GRAVEL				
60									Total Depth: 60 feet below ground surface.				
	325												
65													
	320												
70													
	315												

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FIGURE R_A-5 c

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING B-13

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 1 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.45

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

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						
									Asphalt at surface. Hand augered to 5 feet bgs.				
	385								**ARTIFICIAL FILL (Qaf)** **Sandy SILT** dark brown, moist, fine to medium sand.				
5			1										
									UPPER SAND UNIT (Qs) **Silty SAND** 10YR 5/8 (yellowish brown); moist; mostly fine to medium SAND; trace coarse SAND and fine GRAVEL				
	380												
10			2										
	375												
									Clayey SAND 10YR 4/4 (dark yellowish brown); moist; mostly fine SAND; few medium SAND; trace coarse SAND and GRAVEL				
15			3						**SAND with SILT** 10YR 5/6 (yellowish brown); moist; mostly fine to medium SAND; few coarse SAND; trace fine GRAVEL				
	370												
									Silty SAND 10YR 4/4 (dark yellowish brown); moist; mostly fine SAND; few medium SAND; trace fine GRAVEL				
20			4										
	365								**SAND with SILT** 10YR 4/6 (dark yellowish brown); moist; mostly fine to medium SAND; few coarse SAND; trace GRAVEL; occasional silty sand lenses				
									Clayey SAND 7.5YR 4/4 (brown); moist; mostly fine SAND; few medium SAND; trace coarse and fine GRAVEL				

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FIGURE R_A-6 a

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-13**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 2 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.45

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

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						
			5										
	360												
									Clayey SAND7.5YR 4/4 (brown); moist; mostly fine to medium SAND; trace coarse SAND and fine GRAVEL				
30			6						<u>**MUD FLOWS (Qm)**</u> CPT signature used to identify contact				
	355												
35			7										
	350												
									Sandy CLAY7.5YR 3/4 (dark brown) interbedded 5YR 4/4 (reddish brown); moist; mostly fine SAND; some medium SAND; few coarse SAND; trace fine to coarse GRAVEL				
40			8										
	345												
									Sandy CLAY5YR 3/3 (dark reddish brown), moist; mostly fine SAND; some medium SAND; few coarse SAND; trace GRAVEL				
45			9										
	340												

GDC_ROCK_CORE_ENG_LA 2016-07-11 LA-1191 BORING LOGS B-1 TO B-13 - REVISED.GPJ ROCK2.GDT 7/11/16

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FIGURE R_A-6 b

LOG OF CORE BORING

PROJECT NAME
Millenium Trench W Argyle Ave

PROJECT NUMBER
LA-1191A

BORING
B-13

SITE LOCATION
Capitol Parking Lot

DATE(S) DRILLED
8/12/2014

LOGGED BY
TO

SHEET NO.
3 of 3

DRILLING METHOD
Hollow Stem Auger

DRILL BIT SIZE/TYPE
8"

CHECKED BY
SK

TOTAL DEPTH DRILLED (feet)
60

DRILL RIG TYPE
Marl M-12

DRILLED BY
Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING
0 Degrees

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE PILE TOP ELEVATION (feet)
386.45

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

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						
			10										
	335								**(Paleo Horizon)** **OLDER ALLUVIUM (Qoal)** **Sandy CLAY to Clayey SAND**7.5YR 4/4 (brown) interbedded 7.5YR 5/1 (gray); moist; mostly fine SAND; trace medium to coarse SAND; trace fine GRAVEL; mottled				
55			11										
	330												
60													
	325								Total Depth: 60 feet below ground surface.				
65													
	320												
70													
	315												

GDC_ROCK_CORE_ENG_LA 2016-07-11 LA-1191 BORING LOGS B-1 TO B-13 - REVISED.GPJ ROCK2.GDT 7/11/16

GROUP DELTA CONSULTANTS, INC.
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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 R_A-6 c

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

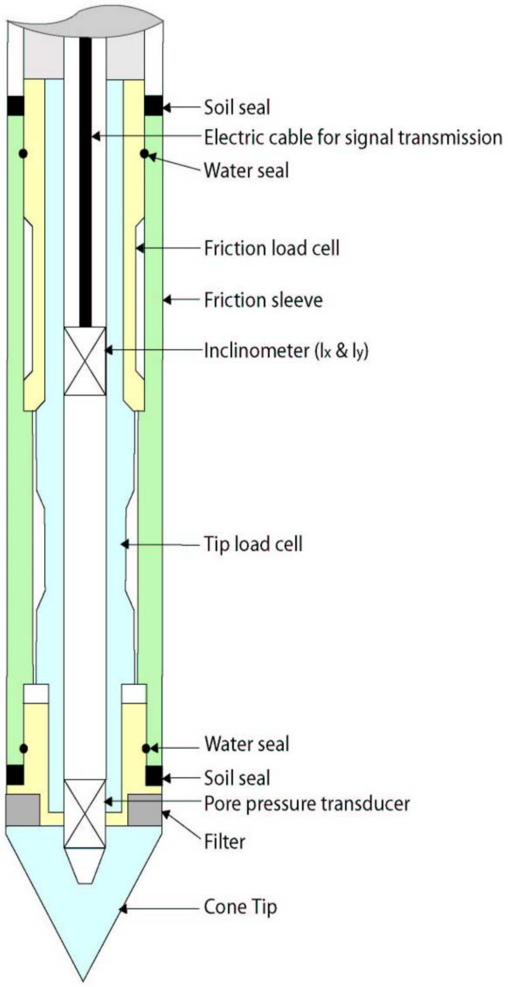


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

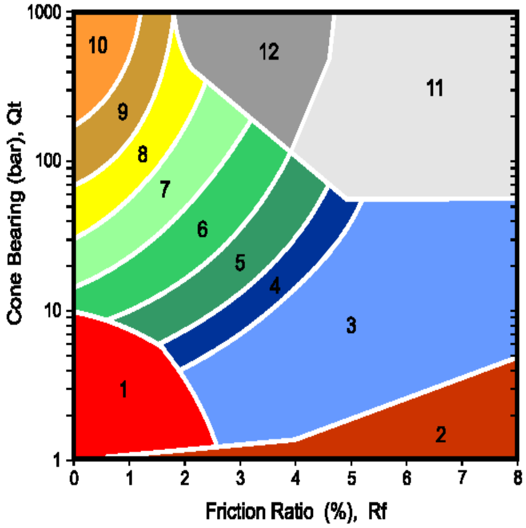
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE		SBT	
1		🟥	Sensitive, fine grained
2		🟫	Organic materials
3		🟦	Clay
4		🟦	Silty clay to clay
5		🟩	Clayey silt to silty clay
6		🟩	Sandy silt to clayey silt
7		🟩	Silty sand to sandy silt
8		🟨	Sand to silty sand
9		🟫	Sand
10		🟧	Gravely sand to sand
11		⬜	Very stiff fine grained*
12		⬛	Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

1. Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
2. Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
3. Elevation of ground surface (ft or m)
4. Depth to water table, z_w (ft or m) – input required
5. Net area ratio for cone, a (default to 0.80)
6. Relative Density constant, C_{Dr} (default to 350)
7. Young's modulus number for sands, α (default to 5)
8. Small strain shear modulus number
    a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
    b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
9. Undrained shear strength cone factor for clays, N_{kt} (default to 15)
10. Over Consolidation ratio number, k_{ocr} (default to 0.3)
11. Unit weight of water, (default to γ_w = 62.4 lb/ft^3 or 9.81 kN/m^3)

Column

1. Depth, z, (m) – CPT data is collected in meters
2. Depth (ft)
3. Cone resistance, q_c (tsf or MPa)
4. Sleeve resistance, f_s (tsf or MPa)
5. Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u_2)
6. Other – any additional data
7. Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u\,(1-a)$

8	Friction Ratio, R_f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m^3)	based on SBT, see note
11	Total overburden stress, σ_v (tsf)	$\sigma_{vo} = \sigma z$
12	In-situ pore pressure, u_o (tsf)	$u_o = \gamma_w (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q_{t1}	$Q_{t1}= (q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F_r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B_q	$B_q = u – u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT_n	see note
18	SBT_n Index, I_c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with I_c)	see note
20	Estimated permeability, k_{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N_{60}, blows/ft	see note
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note
23	Estimated Relative Density, D_r, (%)	see note
24	Estimated Friction Angle, ϕ', (degrees)	see note
25	Estimated Young's modulus, E_s (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s_u (tsf)	see note
28	Estimated Undrained strength ratio	s_u/σ_v'
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

1 Soil Behavior Type (non-normalized), SBT (Lunne et al., 1997 and table below)

2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)

3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)

4 SBT_n Index, I_c $I_c = ((3.47 – \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$

5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

$Q_{tn} = ((q_t - \sigma_{vo})/pa)\ (pa/(\sigma'_{vo})^n$ and recalculate I_c, then iterate:

When $I_c < 1.64$, n = 0.5 (clean sand)
When $I_c > 3.30$, n = 1.0 (clays)
When $1.64 < I_c < 3.30$, $n = (I_c – 1.64)0.3 + 0.5$
Iterate until the change in n, $\Delta n < 0.01$

6 Estimated permeability, k_{SBT} based on Normalized SBT_n (Lunne et al., 1997 and table below)

7 Equivalent SPT N_{60}, blows/ft Lunne et al. (1997)

$$\frac{(q_t/p_a)}{N_{60}} = 8.5\left(1-\frac{I_c}{4.6}\right)$$

8 Equivalent SPT $(N_1)_{60}$ blows/ft $(N_1)_{60} = N_{60}\, C_N$,
where $C_N = (pa/\sigma'_{vo})^{0.5}$

9 Relative Density, D_r, (%) $D_r^2 = Q_{tn} / C_{Dr}$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

10 Friction Angle, ϕ', (degrees) $$\tan\phi' = \frac{1}{2.68}\left[\log\left(\frac{q_c}{\sigma'_{vo}}\right)+0.29\right]$$
Only SBT_n 5, 6, 7 & 8 *Show'N/A' in zones 1, 2, 3, 4 & 9*

11 Young's modulus, E_s $E_s = \alpha\, q_t$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

12 Small strain shear modulus, Go
a. $G_o = S_G\,(q_t\ \sigma'_{vo}\ pa)^{1/3}$ *For SBT_n 5, 6, 7*
b. $G_o = C_G\, q_t$ *For SBT_n 1, 2, 3& 4*
Show 'N/A' in zones 8 & 9

13 Undrained shear strength, s_u $s_u = (q_t - \sigma_{vo}) / N_{kt}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

14 Over Consolidation ratio, OCR $OCR = k_{ocr}\, Q_{t1}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones		**SBT_n Zones**	
1	sensitive fine grained	1	sensitive fine grained
2	organic soil	2	organic soil
3	clay	3	clay
4	clay & silty clay	4	clay & silty clay
5	clay & silty clay		
6	sandy silt & clayey silt		

7	silty sand & sandy silt	5	silty sand & sandy silt
8	sand & silty sand	6	sand & silty sand
9	sand		
10	sand	7	sand
11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

*heavily overconsolidated and/or cemented

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print ‘clays & silty clays’)

Estimated Permeability (see Lunne et al., 1997)

SBT_n	Permeability (ft/sec)	(m/sec)
1	$3x\ 10^{-8}$	$1x\ 10^{-8}$
2	$3x\ 10^{-7}$	$1x\ 10^{-7}$
3	$1x\ 10^{-9}$	$3x\ 10^{-10}$
4	$3x\ 10^{-8}$	$1x\ 10^{-8}$
5	$3x\ 10^{-6}$	$1x\ 10^{-6}$
6	$3x\ 10^{-4}$	$1x\ 10^{-4}$
7	$3x\ 10^{-2}$	$1x\ 10^{-2}$
8	$3x\ 10^{-6}$	$1x\ 10^{-6}$
9	$1x\ 10^{-8}$	$3x\ 10^{-9}$

Estimated Unit Weight (see Lunne et al., 1997)

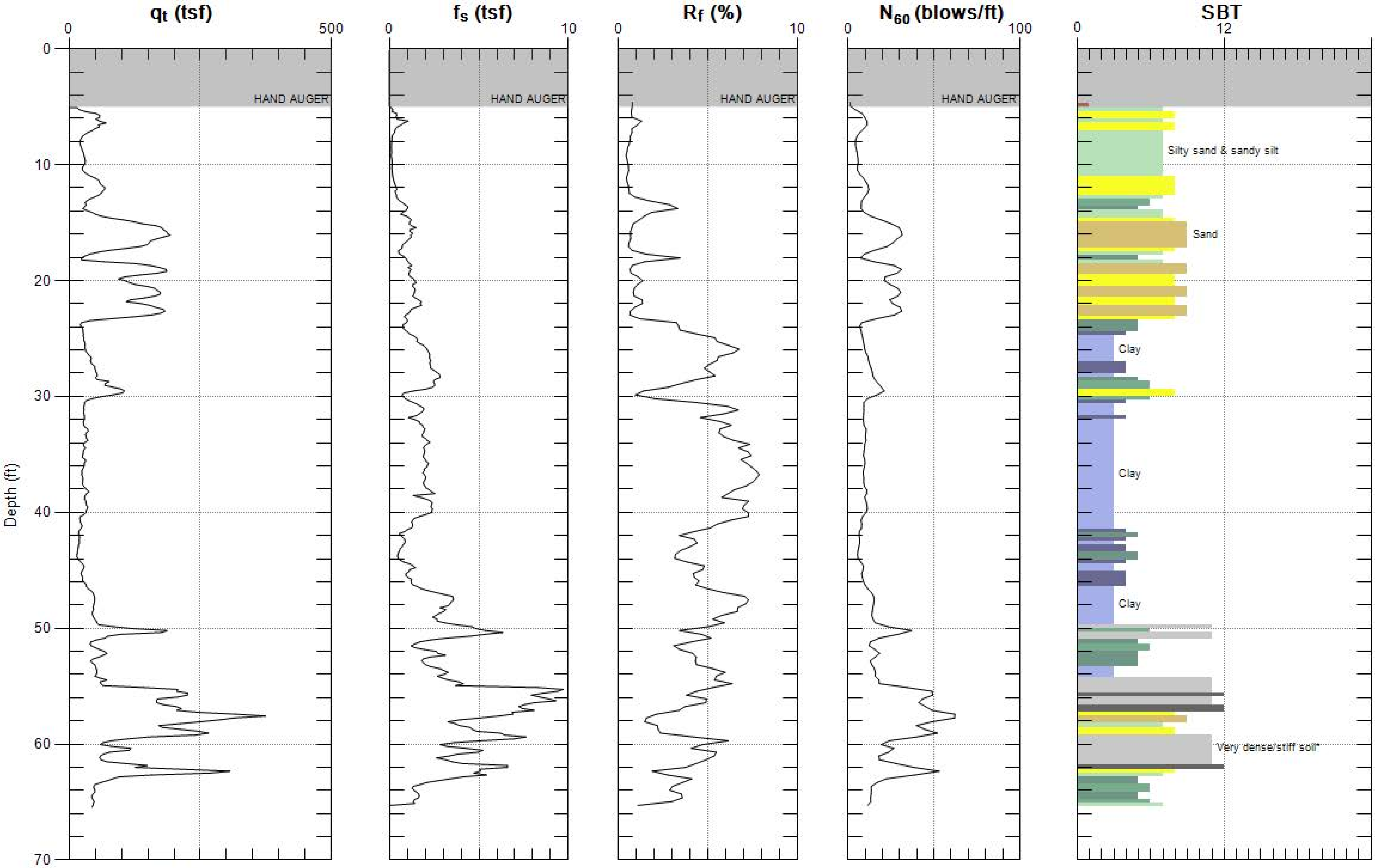
SBT	Approximate Unit Weight (lb/ft^3)	(kN/m^3)
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0

Figure A-8a

GROUP DELTA

Site: 1718 VINE ST.
Sounding: C -1

Engineer: M.SUTHERLAND
Date: 6/1/2016 08:07



Max. Depth: 65.453 (ft)
Avg. Interval: 0.328 (ft)

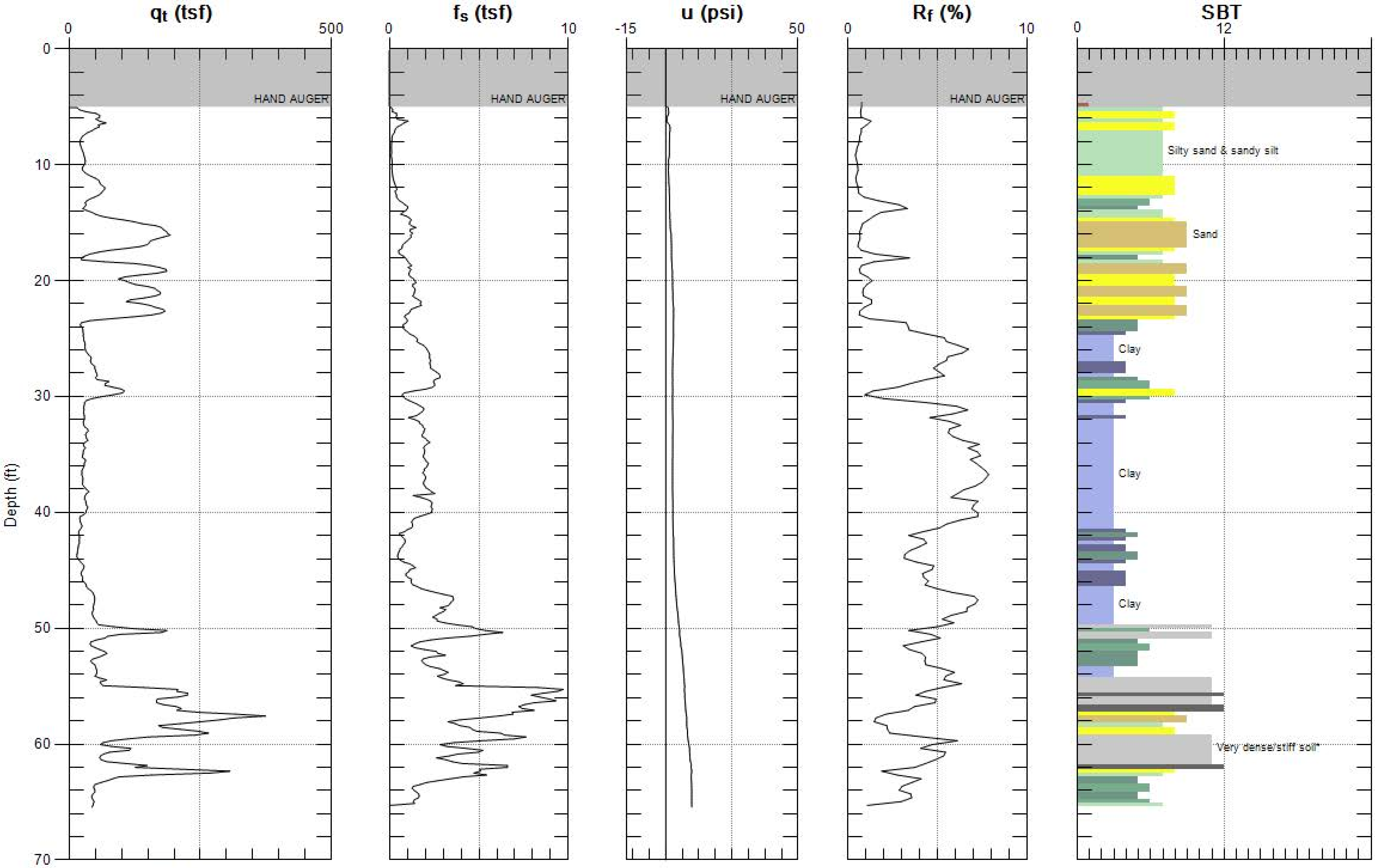
SBT: Soil Behavior Type (Robertson 1990)

Figure A-8b

GREGG **GROUP DELTA**

Site: 1718 VINE ST.
Sounding: C -1

Engineer: M.SUTHERLAND
Date: 6/1/2016 08:07



Max. Depth: 65.453 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Figure A-9a

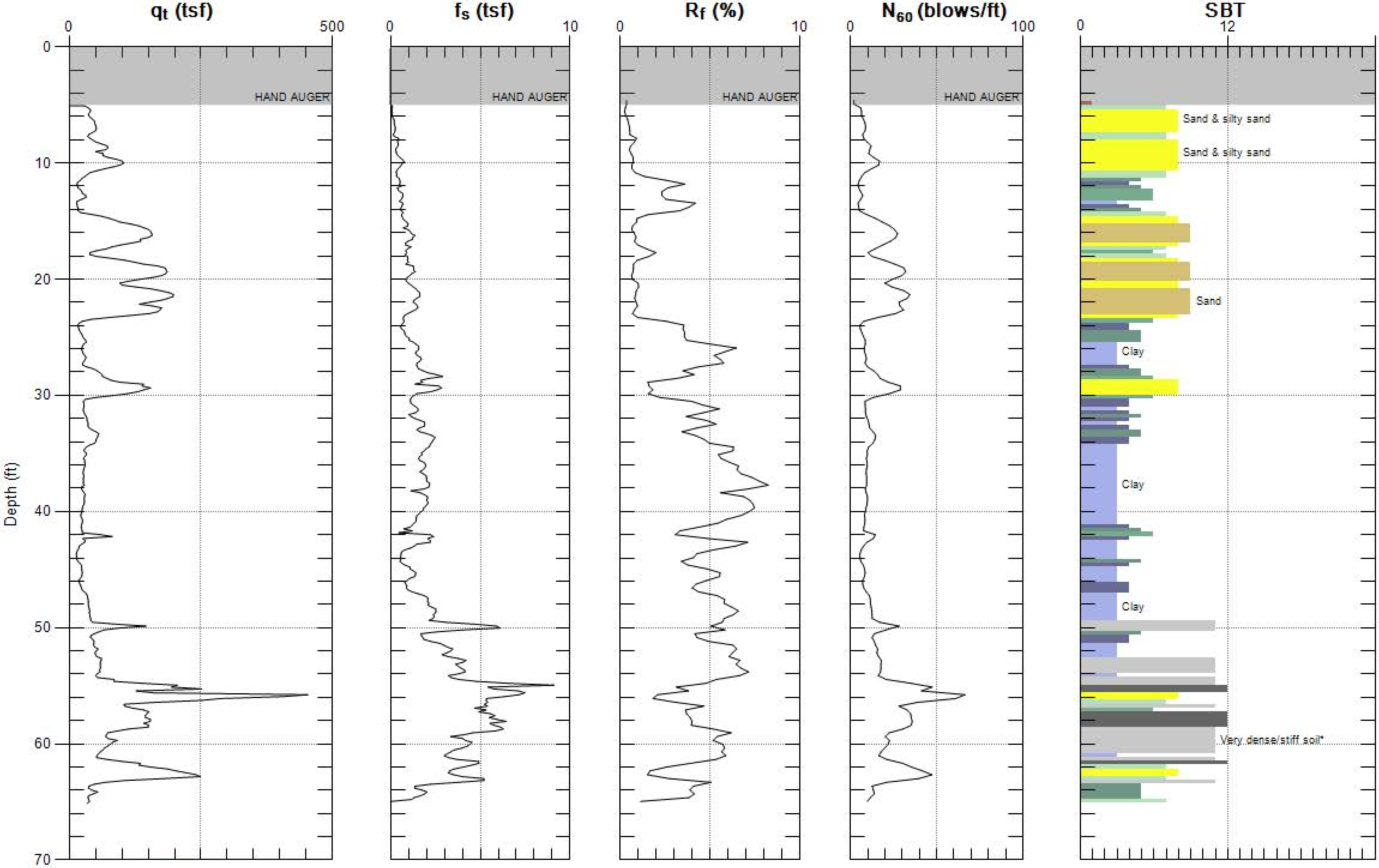
GROUP DELTA

Site: 1718 VINE ST.

Sounding: C -2

Engineer: M.SUTHERLAND

Date: 6/1/2016 09:00



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

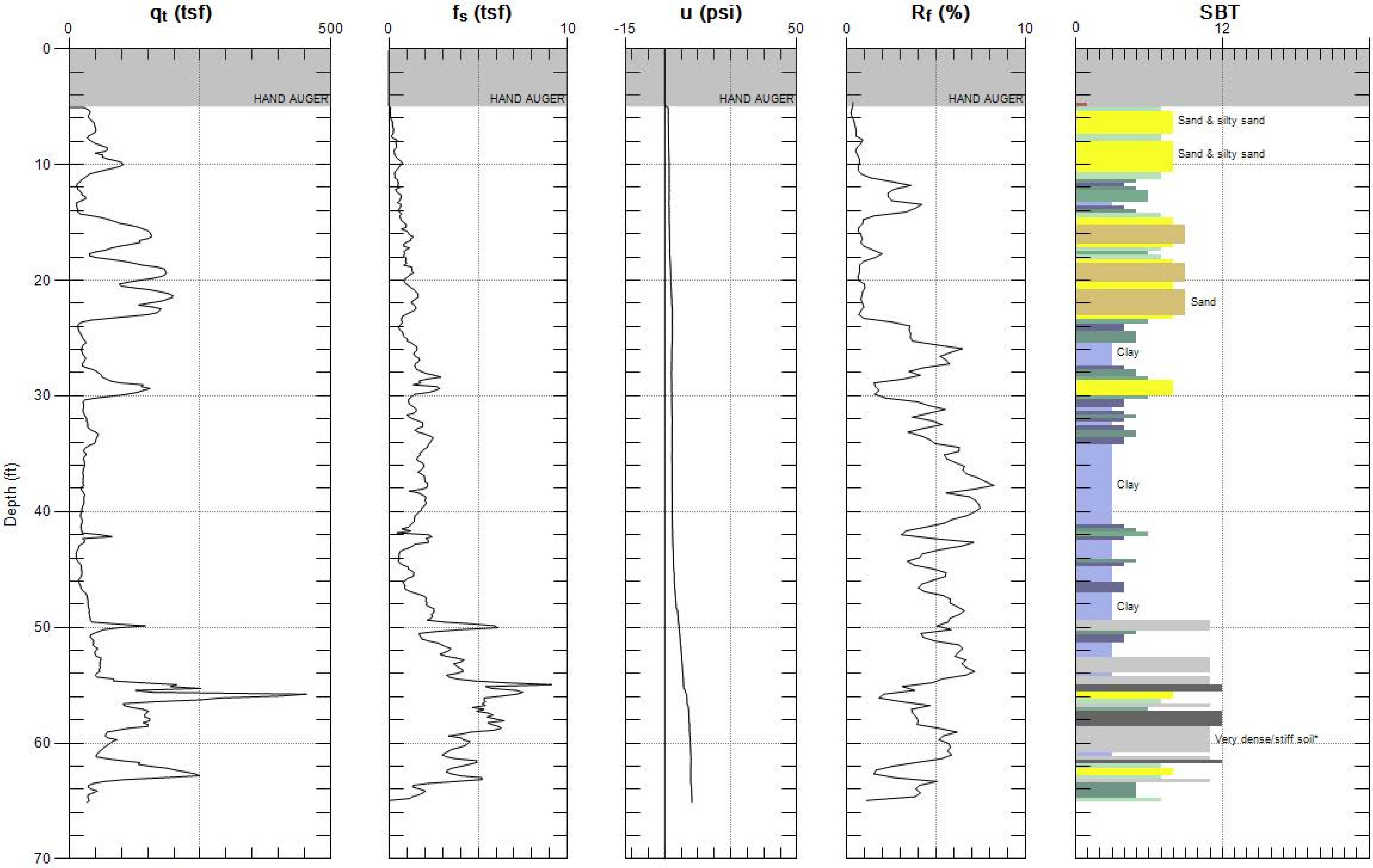
SBT: Soil Behavior Type (Robertson 1990)

Figure A-9b

GROUP DELTA

Site: 1718 VINE ST.
Sounding: C -2

Engineer: M.SUTHERLAND
Date: 6/1/2016 09:00



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

SBT: Soil Behavior Type (Robertson 1990)

Figure A-10a

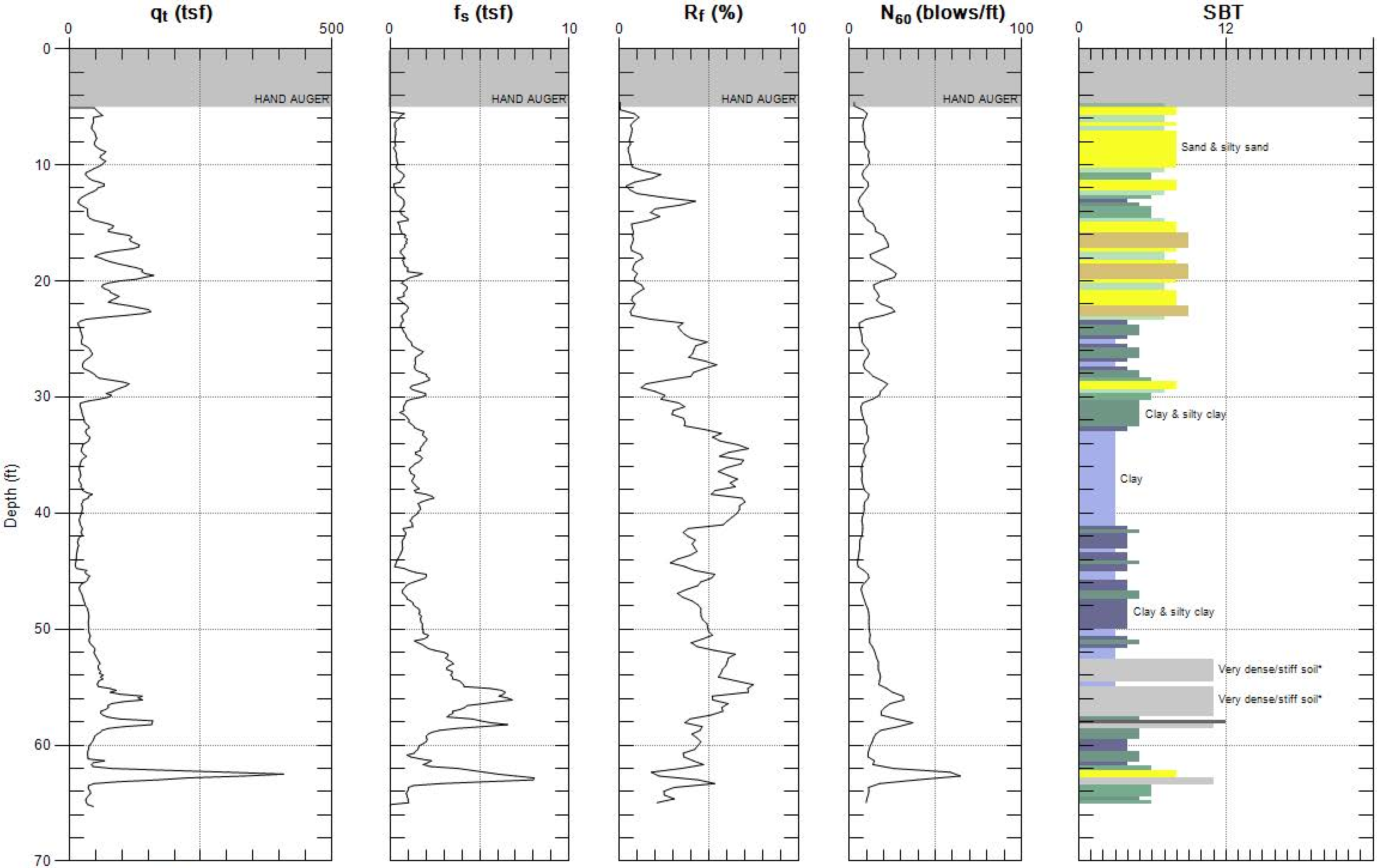
GROUP DELTA

Site: 1718 VINE ST.

Sounding: C -3

Engineer: M.SUTHERLAND

Date: 6/1/2016 10:10



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

SBT: Soil Behavior Type (Robertson 1990)

Figure A-10b

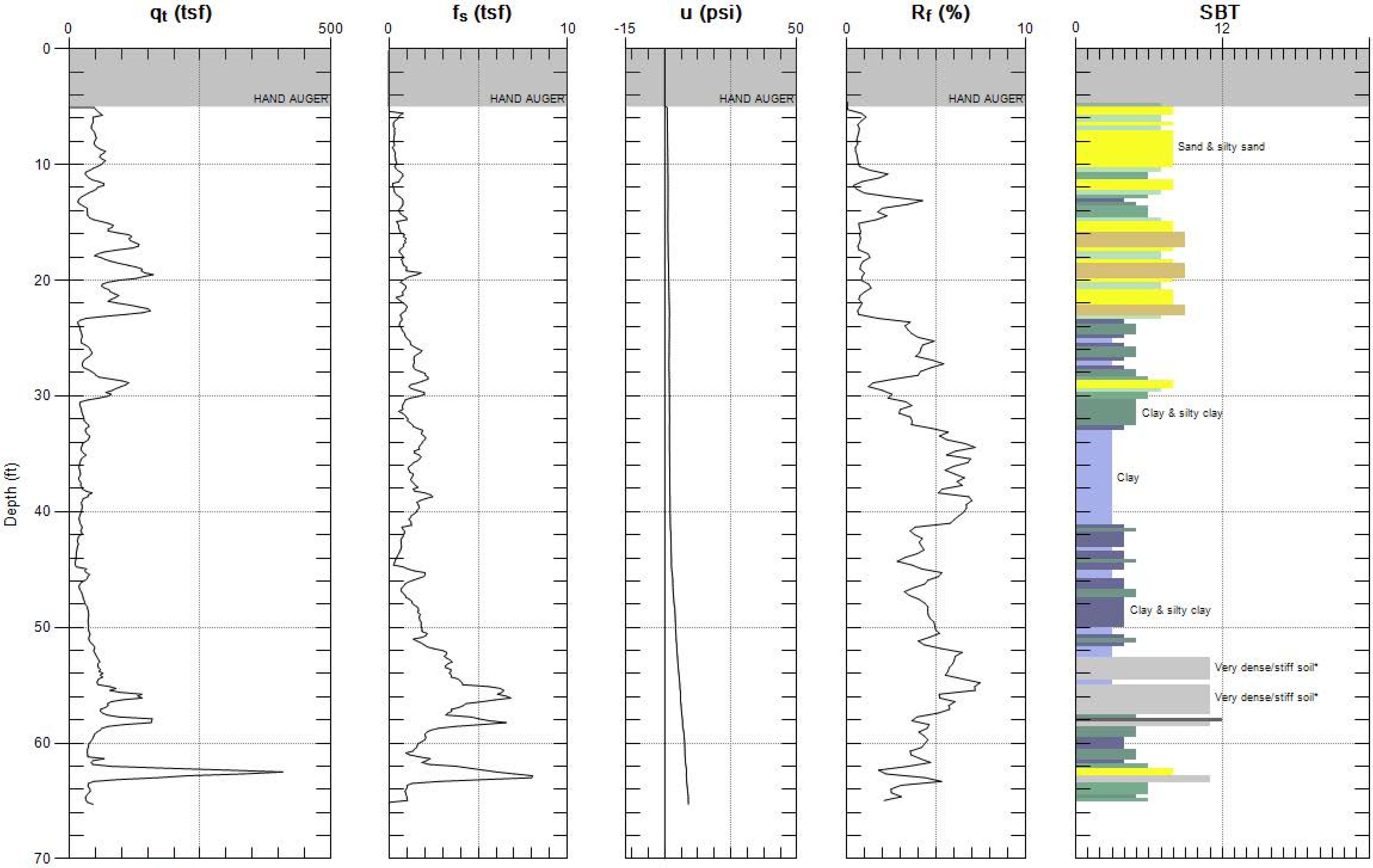
GREGG **GROUP DELTA**

Site: 1718 VINE ST.

Sounding: C -3

Engineer: M.SUTHERLAND

Date: 6/1/2016 10:10



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

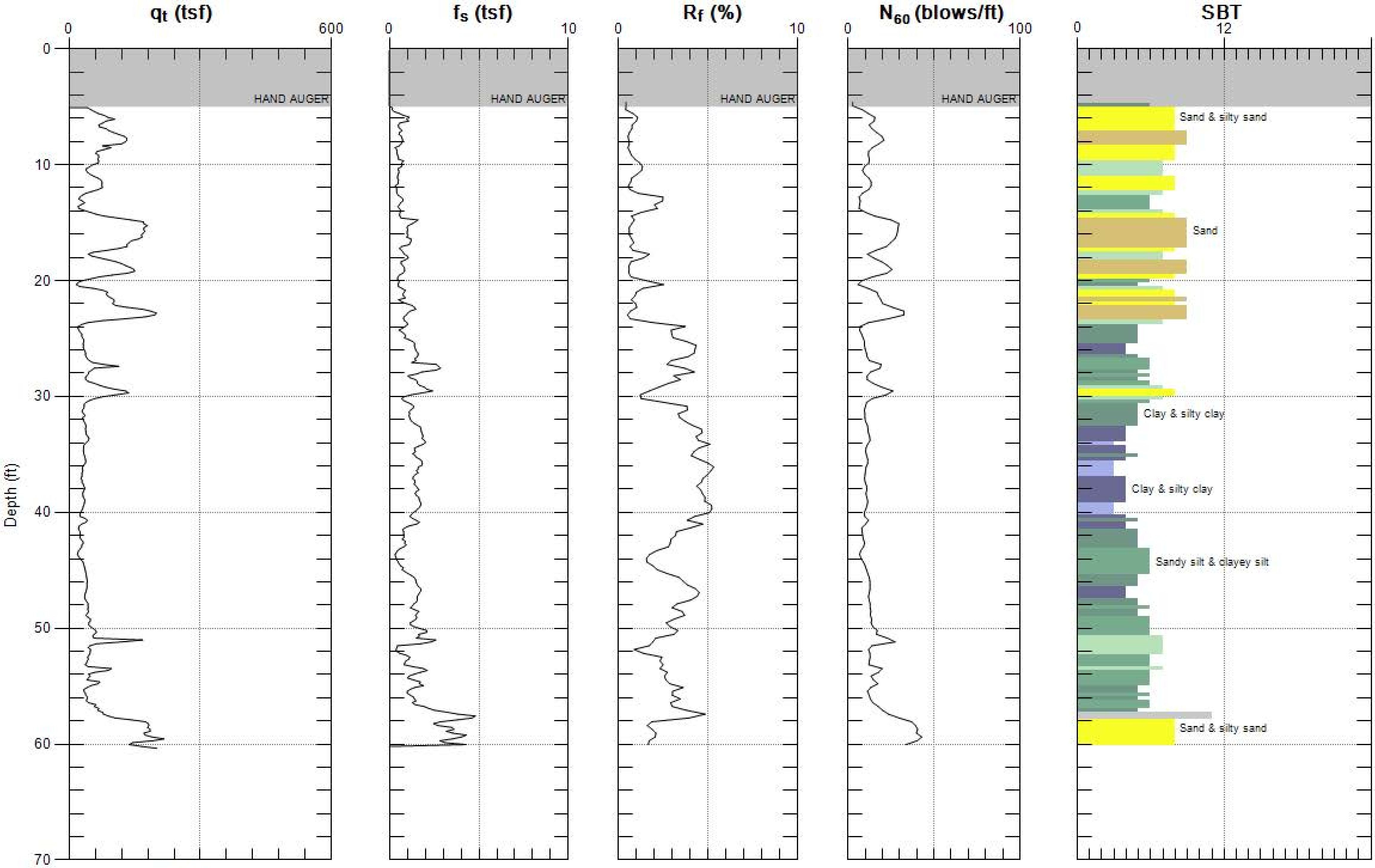
SBT: Soil Behavior Type (Robertson 1990)

Figure A-11a

GROUP DELTA

Site: PARKING LOT S
Sounding: CPT-36

Engineer: S.KOLTHOFF
Date: 8/14/2014 08:43



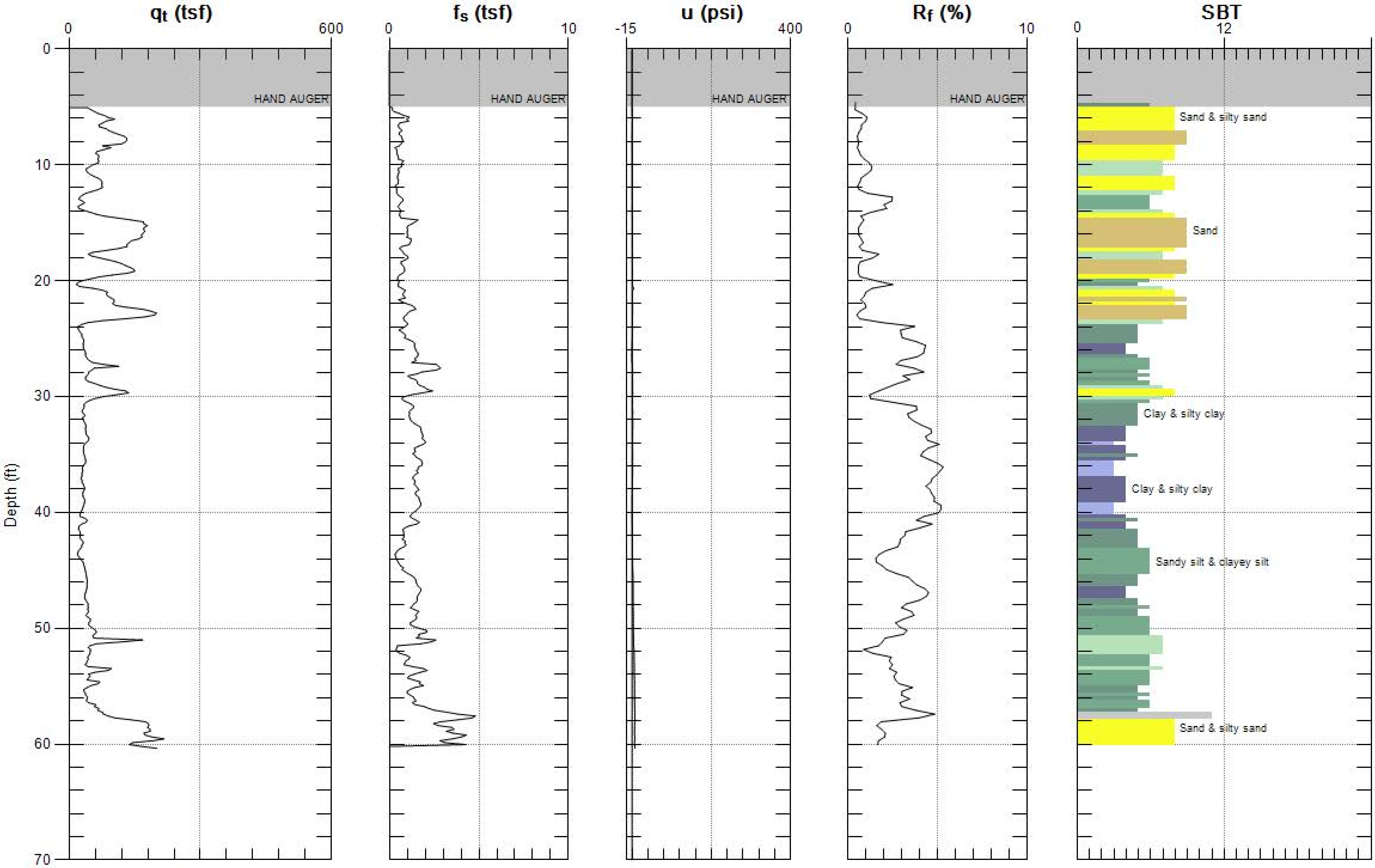
Max. Depth: 60.367 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: PARKING LOT S
Sounding: CPT-36

Engineer: S.KOLTHOFF
Date: 8/14/2014 08:43



Max. Depth: 60.367 (ft)
Avg. Interval: 0.328 (ft)

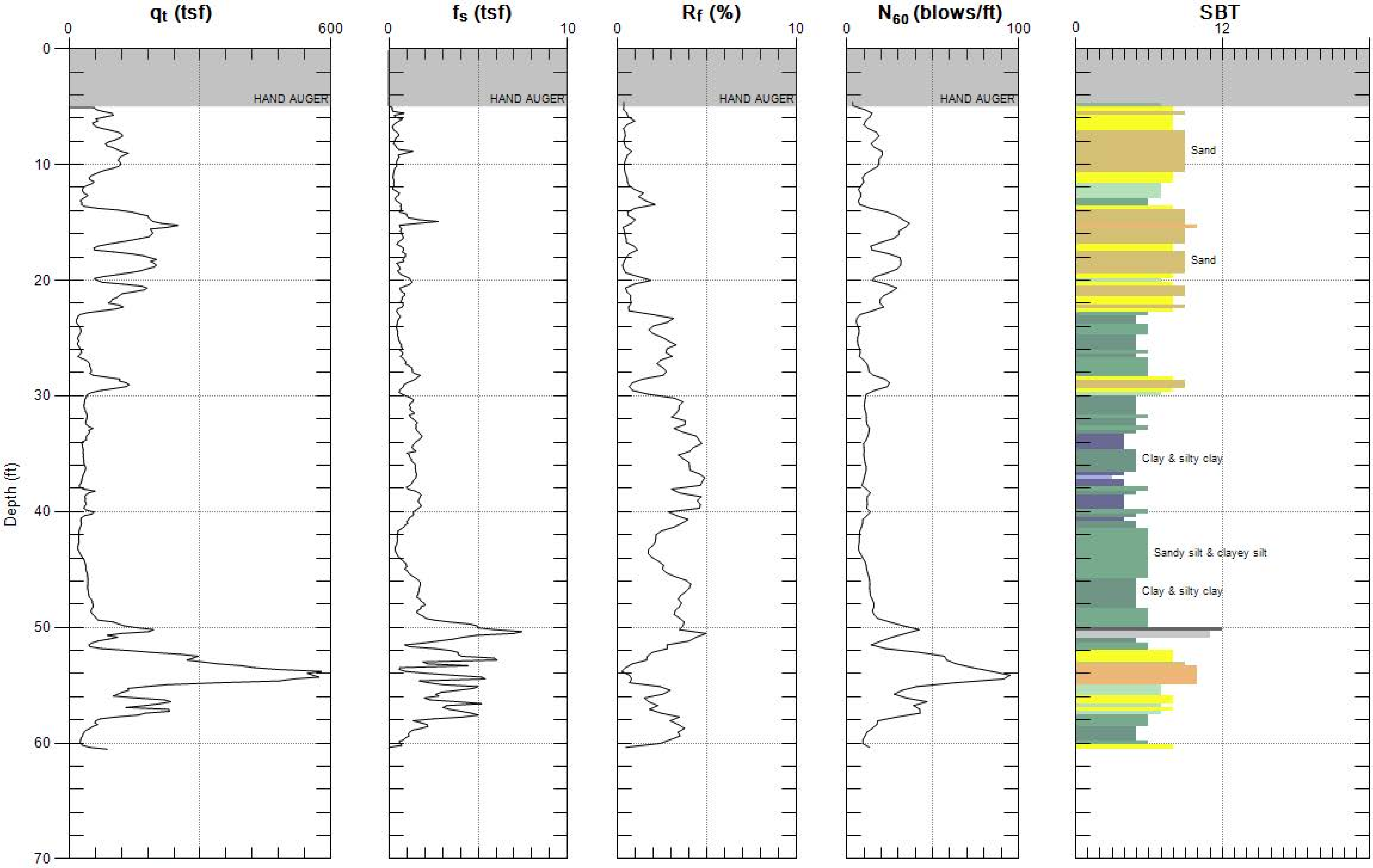
SBT: Soil Behavior Type (Robertson 1990)

Figure A-12a

GREGG **GROUP DELTA**

Site: PARKING LOT S
Sounding: CPT-37

Engineer: S.KOLTHOFF
Date: 8/14/2014 07:45



Max. Depth: 60.531 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Figure A-12b

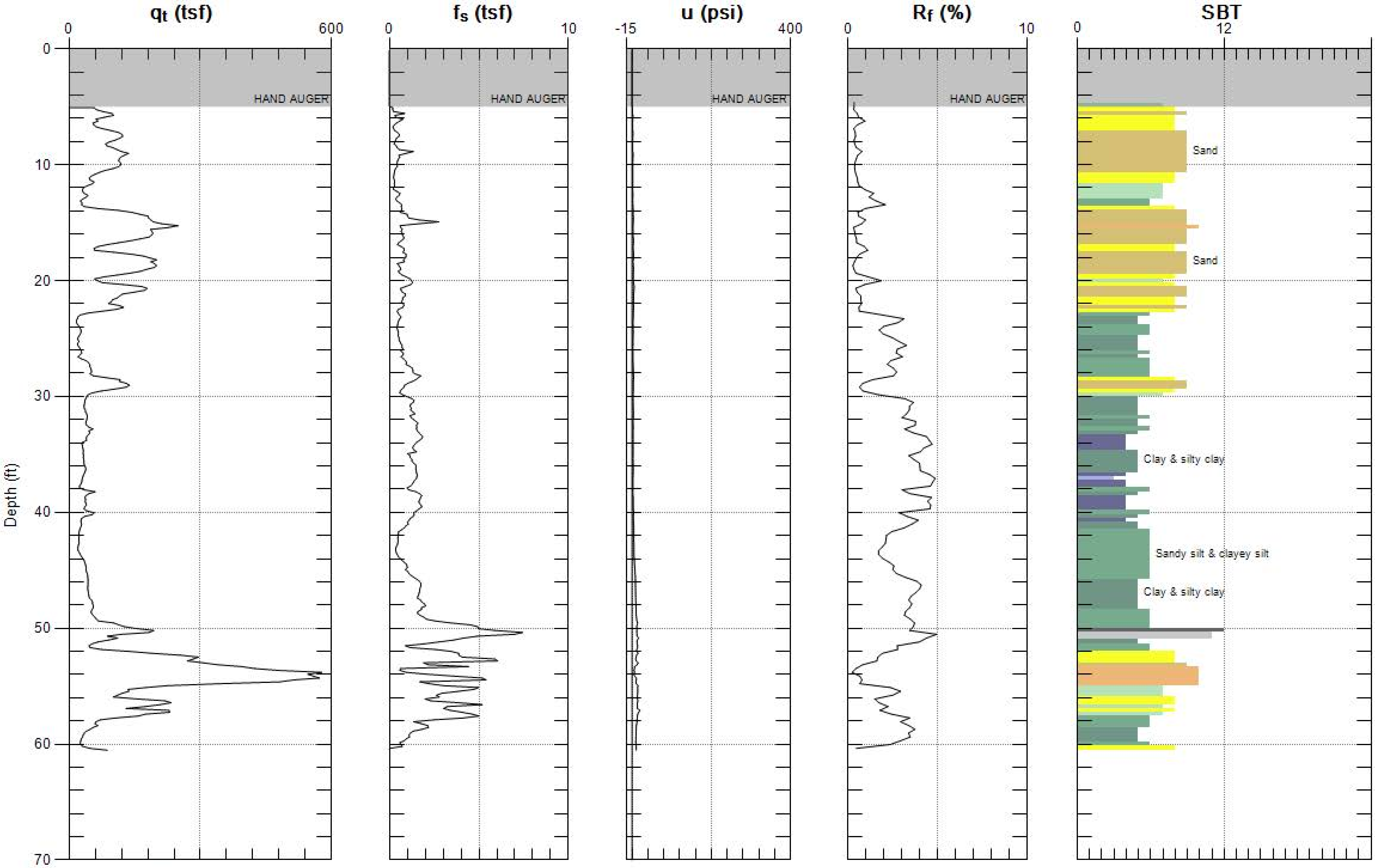
GROUP DELTA

Site: PARKING LOT S

Sounding: CPT-37

Engineer: S.KOLTHOFF

Date: 8/14/2014 07:45



Max. Depth: 60.531 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Appendix B

Laboratory Testing

APPENDIX B
LABORATORY TESTING

B.1 General

The laboratory testing was performed using appropriate American Society for Testing and Materials (ASTM) standards and Caltrans Test Methods (CTM).

Bulk samples collected during the field exploration were sealed in the field to reduce moisture loss. The samples of earth materials were then transported to the laboratory for further examination and testing. Tests were performed on selected samples as an aid in classifying the earth materials and to evaluate their physical properties. Laboratory testing for this investigation included:

- Soil Classification: USCS (ASTM D 2487) and Visual Manual (ASTM D 2488);
- Soil Corrosivity:
  - pH (CTM 643);
  - Water-Soluble Sulfate (ASTM D 516);
  - Water-Soluble Chloride (Ion-Specific Probe, ASTM D 512);
  - Minimum Electrical Resistivity (CTM 643)

A summary of laboratory test results is presented in Table B-1. A brief description of the laboratory testing program and test results is presented below.

B.2 Soil Classification

Soil samples recovered from subsurface explorations were logged and classified in accordance with Caltrans "Soil and Rock Logging, Classification, and Presentation Manual, 2010." The subsurface soils were visually and manually classified in the field in accordance with the Unified Soil Classification System (USCS) following ASTM D 2488; soil classifications were modified as necessary based on testing in the laboratory in accordance with ASTM D 2487. The details of the soil classification system and boring records showing the classifications are presented in Appendix A.

B.3 Soil Corrosivity

Tests were performed to evaluate corrosion potential of selected soil samples on concrete and ferrous metals. Corrosivity testing included minimum electrical resistivity and soil pH (CTM 643), water-soluble chlorides (ASTM D 512), and water-soluble sulfates (ASTM D 516). The test results are presented in Table B-1.

B.4 List of Attached Table and Figures

The following table and figures are attached:

List of Table

Table B-1 Summary of Laboratory Test Results

Table B-1: Summary of Laboratory Test Results

Boring No.	Sample Depth (ft)	Sample Type	USCS	Moisture Content (%)	Dry Density (pcf)	Grain Size			Atterberg Limits			Expansion	Corrosion				Compression Indices		Void Ratio	Direct Shear				Triaxial Consolidated-Undrained		Unconfined Compression Strength (psi)
						Gravel (%)	Sand (%)	Fines (%)	LL (%)	PL (%)	PI (%)		pH	Sulfate (ppm)	Chloride (ppm)	Minimum Resistivity (ohm cm)	C_c	C_r		Peak Cohesion (psf)	Peak Friction Angle (degrees)	Ultimate Cohesion (psf)	Ultimate Friction Angle (degrees)	Cohesion (psf)	Friction Angle (degrees)	
B-1	5	Bulk	SC										6.89	< 100	< 100	2012										
	35	Bulk	CL										8.02	< 100	< 100	1310										

CORROSIVITY TEST RESULTS
(ASTM D516, CTM 643)

SAMPLE	Ph	RESISTIVITY (OHM-CM)	SULFATE CONTENT (%)	CHLORIDE CONTENT (%)
B-1 @ 5' / SO.4031	*6.89*	*2,012*	*< 0.01*	*< 0.01*
B-1 @ 35' / SO.4031	*8.02*	*1,310*	*< 0.01*	*< 0.01*

CORROSIVITY PARAMETERS

SULFATE CONTENT (%)	SULFATE EXPOSURE	CEMENT TYPE
0.00 to 0.10	Negligible	--
0.10 to 0.20	Moderate	II, IP(MS), IS(MS)
0.20 to 2.00	Severe	V
Above 2.00	Very Severe	V plus pozzolan

SOIL RESISTIVITY (OHM-CM)	GENERAL DEGREE OF CORROSIVITY TO FERROUS METALS
0 to 1,000	Very Corrosive
1,000 to 2,000	Corrosive
2,000 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
Above 10,000	Slightly Corrosive

CHLORIDE (CI) CONTENT (%)	GENERAL DEGREE OF CORROSIVITY TO METALS
0.00 to 0.03	Negligible
0.03 to 0.15	Corrosive
Above 0.15	Severely Corrosive

GROUP DELTA

GROUP DELTA CONSULTANTS
1320 South Simpson Circle
Anaheim, CA 92806
(714) 660-7500 office
(714) 660-7550 fax

Project Name: ***CitizenM Hotel - Vine Street***
Project Number: ***LA-1289***
Laboratory Number: ***SO.4031***
Sample Number: ***B-1 @ 5' / B-1 @ 35'***
Report Date: ***6/15/2016***

Appendix C

Geology Approval Letter for the Millennium Site

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

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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 of soils 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 or less); 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

Appendix E.2

Fault Investigation

SURFACE FAULT RUPTURE EVALUATION REPORT
CENTRAL HOLLYWOOD TRACT, NO. 2, LOTS 1, 2, 3, and 5
1718 VINE STREET
LOS ANGELES, CALIFORNIA

For CitizenM Hotels
79 Madison Avenue
New York, New York 10016

July 28, 2016
GDC Project No. LA-1289

GROUP DELTA

CitizenM Hotels
79 Madison Avenue
New York, New York 10016

July 28, 2016
GDC Project No. LA-1289

Attention: Mr. Ernest Lee

Subject: Surface Fault Rupture Evaluation Report
Central Hollywood Tract NO. 2, Lots 1, 2, 3, and 5
1718 Vine Street Los Angeles, California

Dear Mr. Lee:

Group Delta Consultants (GDC) is pleased to submit this Surface Fault Rupture Evaluation report for the property located at 1718 Vine Street, in the Hollywood District of the City of Los Angeles. Our scope of work was conducted in general accordance with our proposal dated April 19, 2016 (rev.4/27).

Our findings indicate evidence of unfaulted, continuous Holocene and Pleistocene-age alluvial deposits at the Site and 50 feet north and 50 feet south of the Site. Under the regulation of the Alquist-Priolo Act Special Publication 42 (Bryant and Hart, 2007) and the guidelines presented in Note 49 (CGS, 2002), and P/BC 2014-129 (LADBS, 2015) the potential for surface fault rupture hazard at the Site is considered low and should not impact redevelopment of the Site.

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

MICHAEL DAVID READER
No. GE 2259
Exp. 3-31-18

Michael D. Reader, P.E., GE
CEO, Principal Engineer

MICHELLE ALLISON SUTHERLAND
No. EG2577
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Michelle A. Sutherland, CEG
Senior Engineering Geologist

Distribution: electronic copy via email (citizeneric@citizenm.com)
1 wet signed copy, 2 color copies, and 1 electronic copy on disc
ATTN: Todd Nelson
Armbruster Goldsmith & Delvac LLP
12100 Wilshire Blvd., Suite 1600, Los Angeles, CA 90025

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APPENDICES

Appendix A Field Investigation
Appendix B City of Los Angeles Geology Report Approval Letter

EXECUTIVE SUMMARY

The project site, located at 1718 N. Vine Street in the City of Los Angeles, is located within a designated Alquist-Priolo Earthquake Fault Zone due to the site's proximity to the Hollywood Fault, as mapped by the California Geological Survey. The site is proposed to be redeveloped with a new 14-story hotel project, with three levels of subterranean parking. Due to the site's location within an Alquist-Priolo Earthquake Fault Zone, a surface fault rupture hazard investigation is required to be performed, in accordance with the regulations of the Alquist-Priolo Act, the guidelines of the California Geological Survey, and the requirements of the Los Angeles Department of Building and Safety. The contents of this report satisfy these requirements.

Group Delta Consultants previously performed a surface fault rupture hazard evaluation for the property to the north of the project site, in connection with the proposed Millennium project. This evaluation, which has been approved by the Department of Building and Safety, concluded that no active faults exist beneath that property. For the current report, Group Delta performed multiple borings and cone penetration tests across the project site, as well as within an area 50 feet to the south of the site. Based on this exploration and associated analysis, as well as the fault investigation performed for property to the north, Group Delta has concluded that there are no active faults present below the project site, or located within a 50-foot area north and south of the project site.

In consideration of these findings, as well as the standard of investigation required by the California Geological Survey and the City of Los Angeles, the potential for surface fault rupture hazards at the project site is considered to be low, and should not impact the proposed development of the site.

SURFACE FAULT RUPTURE EVALUATION
1718 VINE STREET, LOS ANGELES, CALIFORNIA

1.0 INTRODUCTION

The Site, 1718 Vine Street, Los Angeles, California is under consideration for redevelopment. The location of the Site is shown in Figure 1. A high-rise hotel building with 3-levels of subterranean parking is planned for the redevelopment of the Site. To assist in planning for redevelopment we performed a surface fault rupture evaluation at the Site. The California Geologic Survey (CGS) mapped a segment of the Hollywood fault trending west-northwest, about 100 feet north of the Site, 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 (AP Zone) along the fault vicinity (CGS, 2014b). This report presents our investigation and findings for surface fault rupture at the Site under the regulations of the Alquist-Priolo Act and guidelines of Special Publication 42 (Bryant and Hart, 2007), Note 49 (CGS, 2002), and Information Bulletin BC 2014-129 (Surface Fault Rupture Hazard Investigations) (LADBS, 2015).

2.0 SCOPE OF WORK

Our scope of work included the following:

- Background research and review of the local geology pertaining to deposition and seismicity:
  - Review of published CGS, United States Geological Survey (USGS), City of Los Angeles, and other geologic maps, published papers, and reports presenting pertinent geologic data in the Site area;
  - A review of topographic maps and a site reconnaissance;
  - Review of available geotechnical/geologic reports of investigations conducted on and near the Site, including boring logs and groundwater level data;
- Field Exploration:
  - Planning and Coordination for field exploration;
  - Performing two transects of closely spaced cone penetration tests (CPT’s) and continuous cores;
- Data evaluation and analysis:
  - Analysis and interpretation of CPT data;
  - Logging and correlation of continuous cores;
  - Evaluation of stratigraphy, sedimentary environment, and depositional history at the Site;
  - Development of the subsurface profile; and
- Preparation of a surface fault rupture evaluation report presenting our data and findings.

3.0 BACKGROUND

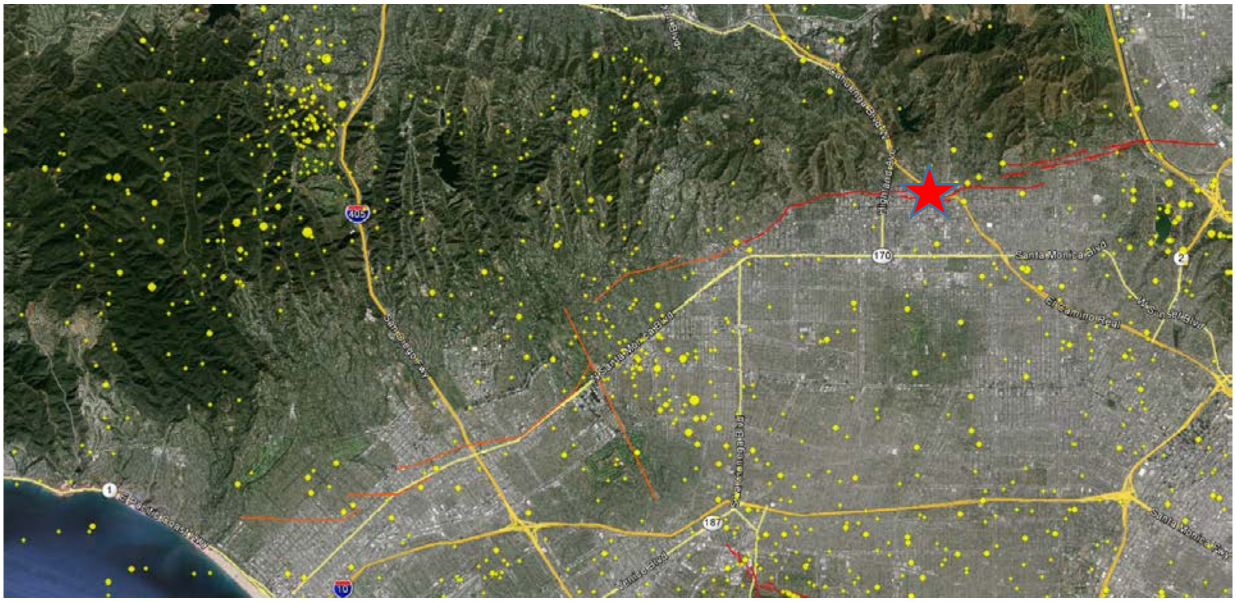
The Hollywood Fault trends west, from Beverly Hills to the Los Angeles River, at the base of the southern limb of the Santa Monica Mountains. It is part of an active tectonic system along the southern boundary of the Transverse Ranges geomorphic province (Dolan, 2001). The faulting is conveyed at the surface through steepened slopes and breaks in alluvial fan topographic expressions (Dolan, 1997). Subsurface investigations within the fault zone found both non-active and active faulting (CGS, 2014a and 2014b). Observed orientations and relative motion of the faults encountered within the zone vary. Active faulting was typically recognized with measurable south side down offsets within alluvium and bedrock across a steep north dipping structure. Along with significant offsets, the fault is documented to act as a groundwater barrier, where groundwater steps down to the south on the order of 10's of feet. Thick, distinctive brecciated zones, slickened sides, shears, and tilted beds also characterize the zone of faulting (CGS, 2014a).

The location of the Hollywood fault is mapped as segmented-overlapping-strands, as illustrated on Figure 2 (CGS, 2014a). Locally, there are two strands mapped trending east-west, north of the Site. Evidence for these strands is based on detailed geomorphic interpretation and available subsurface data (CGS, 2014b). Geomorphic interpretation of the Site area indicates the active fault zone is to the north of the Site along Carlos Avenue. Subsurface exploration data, including closely spaced CPTs, cores, and trenches were performed across the north neighboring properties to the Site, as shown in Figure 2. Directly north of the Site's property line, there is a transect of closely spaced explorations which indicate there is no active faulting within 50 feet of the project Site (LADBS, 2015).

3.1 Seismicity

Within the Greater Los Angeles area, faulting is very common and the Site could experience strong seismic shaking. Recent major historic earthquakes near the Site include the 1971 San Fernando moment magnitude (Mw) 6.6 earthquake, the 1992 Landers Mw 7.3 earthquake, the 1994 Northridge Mw 6.7 earthquake, and the 1999 Hector Mine Mw 7.1 earthquake.

The Hollywood fault is estimated to be capable of a 6.7 Mw earthquake. However, it has not been a source of significant seismic activity in historical time. The USGS Earthquake Catalog indicates a few small magnitude earthquakes in the fault zone as illustrated below; however, the seismicity has not been directly attributed to the Hollywood fault (USGS 2016). Surface rupture data on this fault indicates the most recent surface rupture is likely between 7,000 to 9,500 years ago (Dolan, 2000).



Note: Yellow dots represent recent earthquake epicenter location and magnitude the red lineaments represent the mapped Hollywood fault, and the orange lineaments represent the Santa Monica fault and Newport Inglewood lineament (USGS, 2014).

4.0 SITE CONDITIONS

The Site is located in a densely populated and developed area in the City of Los Angeles. It is situated east of Vine Street, about 150 north of Hollywood Boulevard, shown on Figure 1. Directly south of the Site is a mixed use multi-level building and associated parking (6251 Hollywood Boulevard). East of the Site is the Pantages Theatre. North of the Site is a public parking lot, 1720 Vine Street. A two story restaurant building occupies the Site. There is paved open space in the back of the Site utilized for parking and storage. A paved easement shared with the Pantages Theatre runs along the south boundary of the Site. The easement descends about 8 feet near the east boundary, to the Pantages subterranean level.

Most of the natural topography is obscured by street, commercial, and residential developments. Generally, topography descends gently to the south, shown in Figure 1. Elevation across the Site also slopes down to the south, from Elevation 385 feet to 377 feet (ALTA Survey).

5.0 GEOLOGIC CONDITIONS

The Site is located within the southern boundary of the Transverse Ranges geomorphic province. This boundary is structurally characterized by reverse, oblique, and strike-slip movement along a series of west and northwest trending active faults accommodating west rotation of the Transverse Ranges (Dolan, 1997). These faults include the Santa Monica, Hollywood, and Raymond fault system locally (Dolan, 1997). The Santa Monica Mountains have been uplifted north of this fault zone relative to the Los Angeles Basin to the south. Mesozoic granitic and Tertiary sedimentary rocks are exposed at the surface within the mountains. Canyons within the sedimentary rock have been steeply incised. Quaternary alluvial deposits blanket the canyon floors and fan out at the base of the mountains (Hoots and Kew, 1931). The Site with respect to regional geology is presented on Figure 3.

The Site is situated on an alluvial fan, proximal to two south-draining source canyons at the base of the Santa Monica Mountains. The canyons incise Tertiary sedimentary rock of the Topanga Formation (Tt) and open up into alluvial fans just north of the site. Regional mapping indicates Pleistocene alluvial deposits blanket the Site (Hoots and Kew, 1931; Dibblee, 1991). However, locally, subsurface investigations indicate a Holocene sand deposit (Qs) generally 20 to 25 feet in thickness blankets the area (GDC, 2015). Underlying the sand deposit (Qs) is Pleistocene Mud Flow (Qm), which is estimated to span the Stage 5 interglaciation depositional period of time. The Qm unit thickness varies due to overlapping drainage patterns at the foot of the Santa Monica Mountains in the area. An older alluvial fan deposit (Qoal) underlies (Qm) and is estimated to be pre-Stage 6 interglaciation deposition. The age of these deposits was determined previously during paleoseismic evaluations (GDC, 2015).

7.0 FIELD INVESTIGATION

Field investigations for fault evaluation are designed to observe expressions of active faulting. When faulting is not exposed at the surface, a subsurface investigation is needed to observe evidence of active faulting within stratigraphy. Fault trenching is the most reliable method for subsurface investigation for active fault evaluation. When trenching is not feasible, transects of closely spaced cone penetration tests (CPT's), correlated with continuous cores, may be used to evaluate the potential for surface fault rupture in certain sedimentary environments (CGS, 2002 and LADBS, 2015). The CPTs provide a continuous vertical record of material engineering properties while the continuous core sampling provides geologic stratigraphic data. Together they can be utilized to interpret a stratigraphic profile below the Site.

We evaluated the accessible areas of the Site and a 50-foot perimeter south for the field exploration, see Figure 4. The eastern portion of the Site is open space, however due to the narrowness of the area, the active adjacent developments, and the depth to pre-Holocene deposition, trenching was not considered feasible. The eastern portion of the Site is accessible to drilling and CPT equipment, which allows a transect of closely spaced explorations to be performed. Within alluvial fan environments, deposition stratigraphy is often complex and not considered linearly relatable; however, prior investigations in the Site vicinity (as described below) indicate sheet flow depositional episodes are preserved, which can be correlated across explorations.

7.1 Prior Investigations

Prior fault investigations have been performed by GDC in the local Site vicinity. The investigation locations are shown in Figure 2 and include the parking lot adjacent the north boundary of the Site, 1720 Vine Street (GDC, 2015). A transect of closely spaced explorations was performed across the parking lot, trending north from outside the north boundary of the Site, shown in Figure 4. The explorations included continuous core borings and CPTs. The data indicated that within the alluvial fan stratigraphy, there are unfaulted, distinctive, Pleistocene mud flows blanketing an incised older alluvial fan surface. The older alluvial fan was incised during what is estimated to be Stage 6 glaciation period (GDC, 2015). Subsequent mud flows were then deposited what is estimated to be Stage 3 through Stage 5 interglacial periods. A Holocene alluvial sand deposit of about 25 feet thick, overlies the mud flows to the present ground surface.

7.2 Current Investigation

Our field investigation for the Site and an area 50 feet south utilized the method of CPT and core transects to collect data for evaluation of evidence for active faulting at the Site. The location of exploration transects is illustrated in Figure 4. The transect stretches across the Site oriented near perpendicular to the mapped fault trace to intersect all potential breaks in stratigraphy across the Site. Prior investigations performed by GDC (2015) (as described above) were used to extend the evaluation north 50 feet from the northern property line. Exploration along Vine Street was used to extend the evaluation south 50 feet from the Site's southern property line. Existing structures, sidewalks, and utilities were considered inaccessible areas.

For the onsite exploration, the core borings were drilled first to evaluate the geologic stratigraphic profile underneath the site and compare with prior GDC (2015) investigation findings. CPT's were then performed near boring locations to correlate units with CPT signatures and provide a vertical control of the contacts. Lastly, CPT's were performed between boring locations to evaluate the nature of the unit contact structure. For the offsite exploration performed along Vine Street, the CPT's were performed first, along a linear transect of closely spaced exploration (less than 25 feet where accessible) to evaluate the continuation of relatable stratigraphy. Core borings were then located to correlate CPT signatures with previously identified geologic units.

CPT's and borings were explored to maximum depth of 75 feet. Continuous core samples were collected at the boring locations to the depths explored. Core run lengths varied depending on the material and recovery rate. A more detailed discussion of sampling and log method is presented in Appendix A along with logs of the cores and CPT results.

7.3 Stratigraphy

The explorations are located within an alluvial fan, outside the main drainage path of the source canyons, and relatively proximal-medial to the mouth of the canyons. The ridge separating the source canyons slopes up to the north and bedrock of the Topanga Formation (Ttp) is exposed at the surface several hundred feet north of the Site. Bedrock of the Modelo Formation (Tm) underlies the site at depth (GDC, 2015). Surficial deposits, below the Site, include artificial fill over alluvial fan sediments, including younger alluvial fan deposits (Qs), mud flows (Qym and Qm), and older alluvial fan deposits (Qoal). A discussion of these geologic units, the nature of their contacts, and estimated age of deposition is presented below. An illustration of the correlated stratigraphy below the Site is presented in Figure 5.1 Profile A-A' and Figure 5.2 Profile 1-1', and a stratigraphic column based on the subsurface profile at LA-1289 B-1 and LA-1290 B-2 is presented in Figure6.

Artificial Fill (af)

Artificial fill materials (af) blanket the Site to depth of about 5 feet. Within the building subgrade we anticipate shallower fill depths and within the underground utility and retaining wall areas we anticipate deeper fills. The material generally consists of silty sand and clayey sand with variable amounts of gravel.

Young Alluvial Fan Deposits (Qs)

The younger alluvial fan deposits (Qs) are considered compatible with the locally named Argyle Sands (GDC 2015) which are considered to be deposited within the last 10,000 years (GDC, 2015 and ECI, 2015). Generally, the deposit consists of loose fine to medium grained sand, lesser amounts of silt, clay, and fine gravel and few interbedded thin clayey layers. The color is 10YR dark yellowish brown to yellowish brown. Along profiles A-A' and 1-1' it is about 30 feet thick. The unit uncomfortably overlies mud flow deposits below. A coarsening downward alluvial sequence has partially eroded the paleo surface of the mudflows below. This erosional contact marks the bottom of the Qs unit.

Younger Mud Flows (Qym)

The younger mud flows (Qym) unit was not identified in prior reports in the local vicinity; it is estimated to be late Pleistocene deposition due to its stratigraphic location and apparent sedimentation rate. The unit is identified by a distinct material change at depth of approximately 30 feet. The material change is identifiable in borings and CPT signatures. The younger mud flows are generally massive with subtle gradational changes and poor consolidation. They consist of sandy clays and clayey sands, sequentially deposited during multiple mud flow events. The color is 7.5YR yellowish brown to strong brown.

Mud Flow (Qm)

The Mud Flow unit is considered compatible with the locally named Mud Flow and it is considered at least Pleistocene age deposition with an estimated 40,000 years of soil development (GDC, 2015; ECI, 2015). This Mud Flow unit is distinct from the younger mud flows (Qym) above at about 42.5 to 45 feet depth in core borings. The color becomes 7.5YR dark to very dark brown, likely due to the increase and intensity of manganese oxide and iron oxide staining creating a blotchy color texture. Old rootlets and filled rootcasts are found throughout the layer. The massive mud flow texture becomes blocky with platy like ped development and waxy argillic faces. Pedogenic characteristics observed classify this layer as a possible paleo Bt soil horizon.

This layer is about 5 feet in thickness. The upper contact is erosional, abruptly in LA-1289 B-1, and reworked into the upper unit transitioning over a few inches to feet in other cores. The lower contact is erosional with reworked scoured transition over a few inches to a foot.

Older Alluvial Fan Deposits (Qoal)

The top of the alluvial fan deposit is identified by a residual layer. The layer is distinct by its lighter brown and gleyed coloring, increase intensity of tight platy ped development, and moderate induration. There is an abundance of trace decomposed rootlets. In core LA-1290 B-4 and B-2, healed desiccation cracks were observed within this layer. The cracks are vertical, discontinuous both laterally and vertically, and healed with a dark brown clay. Pedogenic characteristics observed classify this layer as a possible Btg-soil horizon.

The fan deposits below the Btg-soil horizon contrast with the mud flows in consistency and color, consisting of consolidated, clayey sand, sandy clay, and sand with clay, 7.5YR dark brown and 5YR reddish brown in color. The sand is fine to medium-grained. Structurally, the deposit is massive with subtle gradation. The grains are weathered with scratchable surfaces and clay films. A paleosol was observed in Borings LA-1290 B-2 and B-4 at about 65 feet. It was identified by a distinct upper erosional contact, abrupt material consistency change from coarser grained above to a clayey material with platy ped development.

7.4 Groundwater

Groundwater was not encountered during the current investigation to maximum depths explored of 75 feet. Prior explorations within the northern portion of the study area did not encounter groundwater to maximum depth explored of about 75 feet.

8.0 INTERPRETATION

Our interpretation is based on historical topography and geology presented in Figure 3, exploration data presented in Figure 4 and Appendix A, and background data discussed in this report. An illustration of our interpretation is presented in Figure 5.1 and Figure 5.2. A discussion is presented below.

Correlation of alluvial sediments encountered in core borings and prior borings with CPT signatures illustrates a continuous and unbroken Holocene to late Pleistocene-age alluvial fan deposition. Four distinctive units were evaluated for their continuity and age of deposition. These units include Qs, Qym, Qm, and Qoal. The age determination of units Qs, Qm, and Qoal were largely based on correlation with prior work in the local area (GDC, 2015; ECI, 2015).

The Qs unit is considered compatible with the locally named Argyle Sands deposit which is considered to be deposited during the last 10,000 years in response to the last sea level rise. Four contacts in Profile A-A’ and six in Profile 1-1’ were correlated across CPT signature breaks distinguishing likely continuous stratigraphy within the Qs unit. The layers between the contacts exhibit reasonably[1] similar material CPT signature and thickness laterally along sections

[1] Reasonably is defined by the lateral and vertical gradational nature of typical alluvial fan deposition.

The Qym unit is considered older than the Qs unit due to its stratigraphic position. There is a distinct change in deposition rate during the period Qym was deposited, which is evident in its relatively massive and poorly-sorted, texture compared to Qs. Because no significant soil development was observed in core between the two units or within the younger mud flow unit, it is estimated to be deposition no older than the last interglaciation period about 22,000 ago. It should be noted that in a high energy depositional environment, like an alluvial fan, often paleosols are eroded away. Correlation of contacts within the Qym unit was less distinct due the massive texture of the mud flows and the erosional nature of a high energy deposits. Two contacts in Profile A-A’ and four in Profile 1-1’ were correlated across CPT signature breaks distinguishing likely continuous stratigraphy within the Qym unit. The contacts were not distinct in core sample due to the nature of subtle gradational contacts within the mud flows. The layers between the contacts exhibit reasonably similar material CPT signature and thickness laterally along sections.

The Qm unit is considered compatible with the locally named Mud Flow deposit which exhibits an estimated 40,000 year duration of soil development and is considered to be deposited during the significant period of sea level rise of Stage 5 interglaciation (80,000-120,000 years ago). The upper contact with the Qym unit is erosional and generally slopes gently to the south. Through the understanding of the paleo climate changes and previous observations in trenches north of the Site (GDC, 2015) it is speculated that the paleo surface of the Mud Flow horizon is largely not preserved due to incisement during the last glaciation period, Stage 2 about 22,000 years ago. The material and thickness is laterally consistent across borings and CPTs within the Site. The lower contact is also erosional.

The Qoal unit is considered older than the Mud Flow unit (Qm) due to its stratigraphic position and apparent increased consolidation. The top of the Qoal is identified by a Btg soil horizon that exhibits pedogenic characteristics of a paleo surface that was exposed for a significant period of time. This soil horizon is estimated to be compatible with the Stage 6 Glaciation period during which sedimentation rates significantly declined. The surface is up to four feet in thickness, however, it has been largely eroded away to only a few feet or inches in thickness as observed in core. The bottom of the layer is linearly gently sloping to the south across the property. It is observed in all cores and easily distinguished in CPT signature in Profile A-A’ and less distinctive in CPT signature in Profile 1-1’. In Profile 1-1’ the Btg soil horizon continuity was largely based on core observation. The upper contact of the layer is erosional and irregular in Profile 1-1’. The lateral continuity between observations in the borings is confined by laterally continuous layers within the Qoal below.

The Qoal is estimated to be compatible with pre-Stage 6 Glaciation deposition, which is at least 200,000 years ago. Two contacts in Profile A-A’ and five contacts in Profile 1-1’ were correlated near horizontally across distinct material change in borings and CPT signatures revealing continuous stratigraphy within the Qoal unit. The layers between the contacts exhibit reasonably similar material CPT signature and thickness laterally along sections.

9.0 CONCLUSIONS AND RECOMMENDATIONS

The Hollywood fault is established as a significant 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 a nearby regional faults. Distinct topographic relief at the base of the foothills north of the Site have been mapped as probably surface expression of the Hollywood Fault.. The historical topographic base map from 1923-1925 USGS illustrates a reasonably linear south trending deposition across the Site, shown on Regional Geology Map, Figure 4. Subsurface data demonstrates evidence for continuous and unfaulted Holocene and Pleistocene stratigraphy below the Site, as illustrated on Figure 5.1 and Figure 5.2. Therefore, under the regulations presented in Special Publication 42 (Bryant and Hart, 2007) and guidelines presented in Note 49 (CGS, 2002) and P/BC 2014-129 (LADBS, 2015), the potential for surface fault rupture hazard at the Site is considered low and should not impact zoning for redevelopment at the Site.

Lastly, in recognition of the limitations of surface fault rupture evaluations performed within a site with limited access, a certified engineering geologist should observe and document all excavations for new development on the Site.

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 CitizenM Hotels, 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 WORK CITED

Bryant, William A. and Hart, Earl W., 2007, Special Publication 42, Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, Interim Revision 2007.

California Geological Survey, 2014a, Fault Evaluation Report FER 253 Supplement No. 1, The Hollywood Fault in the Hollywood 7.5' Quadrangle, Los Angeles County, California by Hernandez, J., November 5, 2014.

California Geological Survey, 2014b, Fault Evaluation Report FER 253, The Hollywood Fault in the Hollywood 7.5' Quadrangle, Los Angeles County, California, by Hernandez, J. and Treiman, J., February 14, 2014.

California Geological Survey, 2002, Guidelines for Evaluating the Hazard of Surface Fault Rupture, Note 49.

City of Los Angeles, NavigateLA.lacity.org, accessed June, 2016.

City of Los Angeles Department of Building and Safety, 2015, Surface Fault Rupture Hazard Investigations, BC 2014-129, effective 07-28-2015.

Crook, R., Jr., and Proctor, R. J., 1992, The Santa Monica and Hollywood Faults and the Southern Boundary of the Transverse Ranges province, in Engineering Geology Practice in Southern California, B. Pipkin and R. Proctor (Editors, Star Publishing Company, Belmont California.

Dibblee, T.W. and Ehrenspeck, H.E., ed., 1991, Geologic map of the Hollywood and Burbank (south 1/2) quadrangles, Los Angeles, California: Dibblee Geological Foundation, Map DF-30, scale, 1:24000.

Dolan, James, et al., 2001, Active Faults in the Los Angeles Metropolitan Region, Southern California Earthquake Center Group C.

Dolan, James, F., Stevens, Donavan, and Rockwell, Thomas K., 2000, Paleoseismologic Evidence for an Early to Mid-Holocene Age of the Most Recent Surface Rupture on the Hollywood Fault, Los Angeles, California, Bulletin of the Seismological Society of America, 90, 2, pp. 334-344, April 2000.

Dolan, J. F., Sieh, K. E., Rockwell, T. K., Guptil, P., and Miller, G., 1997, Active Tectonics, Paleoseismology, and Seismic Hazards of the Hollywood Fault, Northern Los Angeles Basin, California," Geological Society of America Bulletin, Vol. 109, No. 12.

Earth Consultants International, 2015, Third Party Review of Group Delta Consultants' Fault Activity Investigation Report for the Millennium East Project, 1741 Argyle Avenue Between Hollywood Boulevard and Yucca Street, Hollywood Area, City of Los Angeles, California, GDC Project No. LA-1191 A.

Group Delta Consultants, Inc., 2015, Fault Activity Investigation, East and West Millennium Sites 1733-1741 Argyle Avenue; 6236 and 6334 West Yucca Street; 1720-1730, 1740, 1745-1760, and 1762-1770 N. Vine Street; 1746, 1748-1754, 1760, and 1764 N. Ivar Avenue, Hollywood Area, City of Los Angeles, California, GDC Project no. 1191 A (March 6, 2015).

Group Delta Consultants, Inc., 2014a, Fault Activity Investigation, 1800 Argyle Avenue, NE Corner of Yucca Street and Argyle Avenue, Hollywood Area, City of Los Angeles, CA, GDC Project no. LA-1175 A (November 10, 2014) supersedes 9-7-14 report.

Group Delta Consultants, Inc., 2014b, Fault Activity Investigation, 6230 Yucca Street, Hollywood Area, City of Los Angeles, CA, GDC Project no. LA-1161 A (October 24, 2014) supersedes 9-3-14 report.

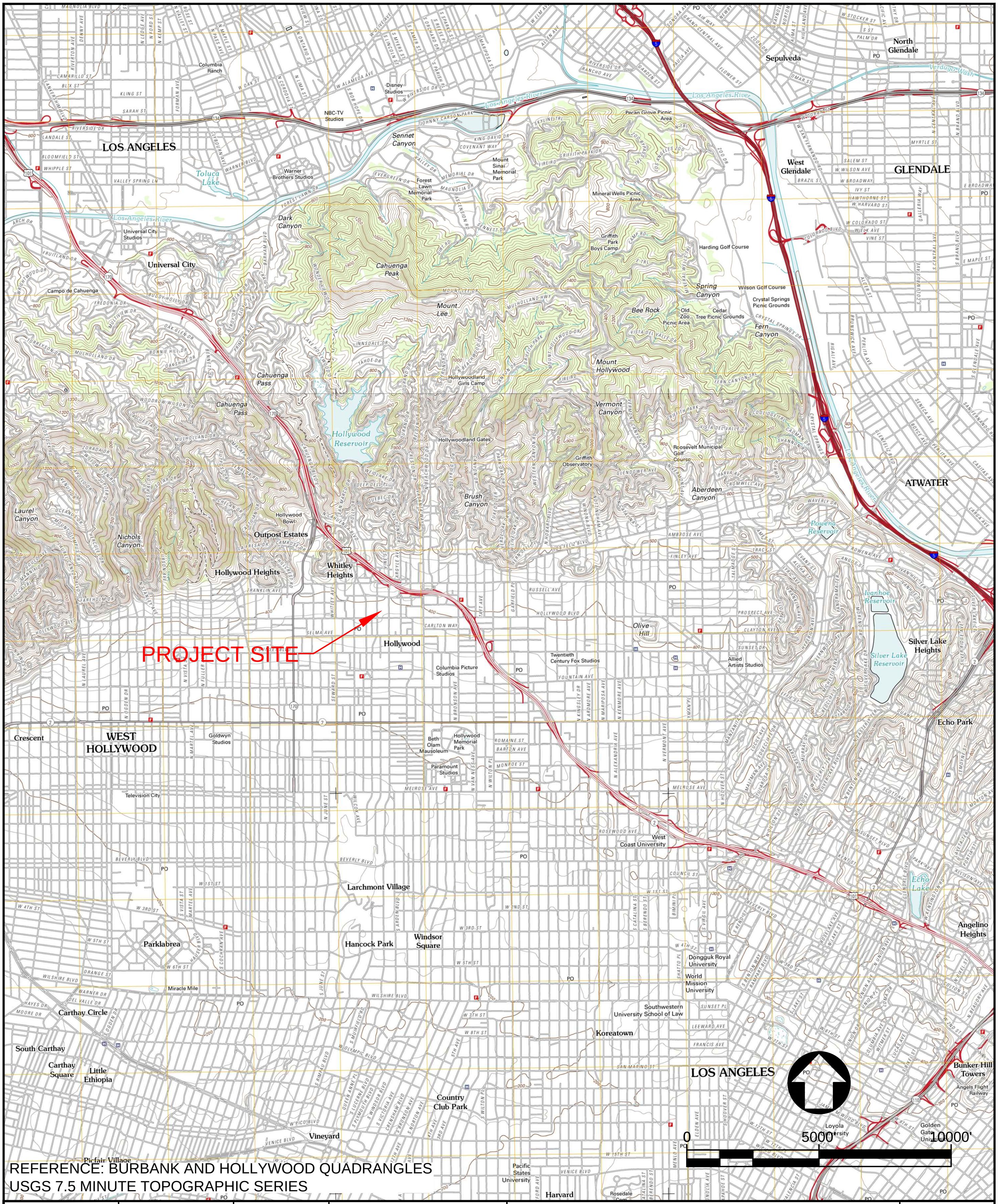
Group Delta Consultants, Inc., 2014c, Fault Activity Investigation, Yucca-Argyle Apartments, Champion Site, 1756 and 1760 Argyle Avenue, Hollywood Area, City of Los Angeles, CA, (Supersedes Previous Version 9/3/14) GDC Project no. LA-1183 A.

Hoots, H. W. and Kew, W. S. W., 1930, Geologic Map of the Eastern Part of the Santa Monica Mountains and Adjacent Areas, Los Angeles County, California, U.S. Geological Survey Professional Paper 165, Plate 16.

Martinison, Douglas G., Nicklas G. Pisias, James D. Hays, John Imbrie, Theodore C. Moore, Jr., and Nicholas J. Shackleton, 1987, Age Dating and the Orbital Theory of the Ice Ages: Development of a High-Resolution 0 to 300,000-Year Chronostratigraphy, Quaternary Research 27, 1-29.

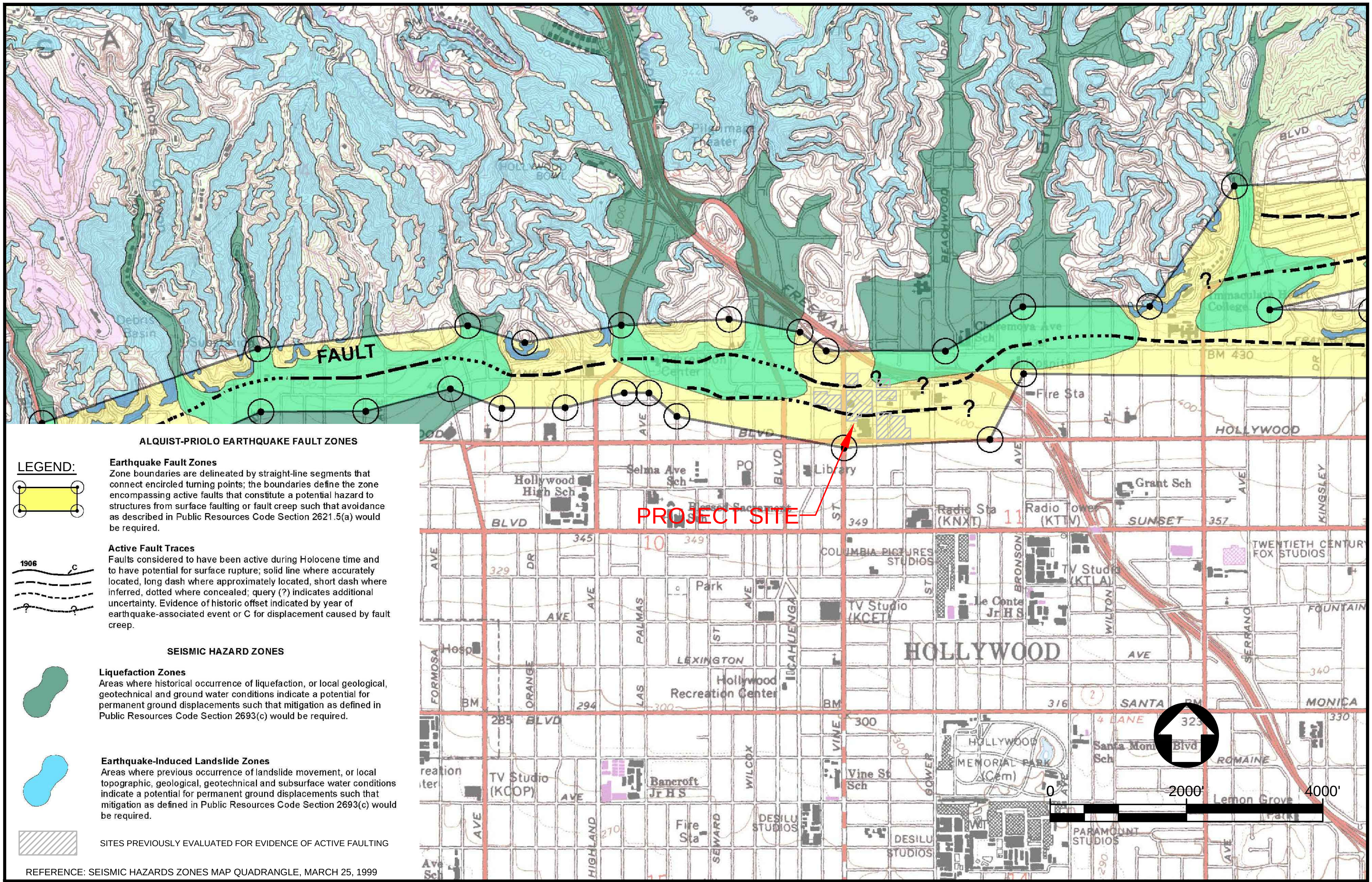
Reading, H. G., 1996, Sedimentary Environments: Processes, Facies, and Stratigraphy, Blackwell Publishing, Third Addition, Chapter 3.

United States Geological Survey (USGS), 2016, Earthquake Archives Online Data, earthquake.usgs.gov/earthquakes/, accessed April 04, 2016.



REFERENCE: BURBANK AND HOLLYWOOD QUADRANGLES
USGS 7.5 MINUTE TOPOGRAPHIC SERIES

DATE: 7/28/2016	DRAWN BY: JMT	GROUP DELTA	GROUP DELTA CONSULTANTS, INC 370 Amapola Ave. Suite 212 Torrance, CA. 90501	SITE VICINITY MAP	PROJECT NUMBER: LA-1289
REVIEW: MR -	APPROVED BY: MS -			VINE ST. & HOLLYWOOD BLVD.	SCALE: AS SHOWN
PREPARED BY: MS	FINAL			LOS ANGELES, CALIFORNIA	FIGURE NUMBER: 1



ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

LEGEND:

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments that connect encircled turning points; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

1906 C

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred, dotted where concealed; query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

▨ SITES PREVIOUSLY EVALUATED FOR EVIDENCE OF ACTIVE FAULTING

REFERENCE: SEISMIC HAZARDS ZONES MAP QUADRANGLE, MARCH 25, 1999

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APPROVED BY: MS
PREPARED BY: MS
FINAL

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Torrance, CA. 90501

ZONES OF REQUIRED INVISTIGATION MAP

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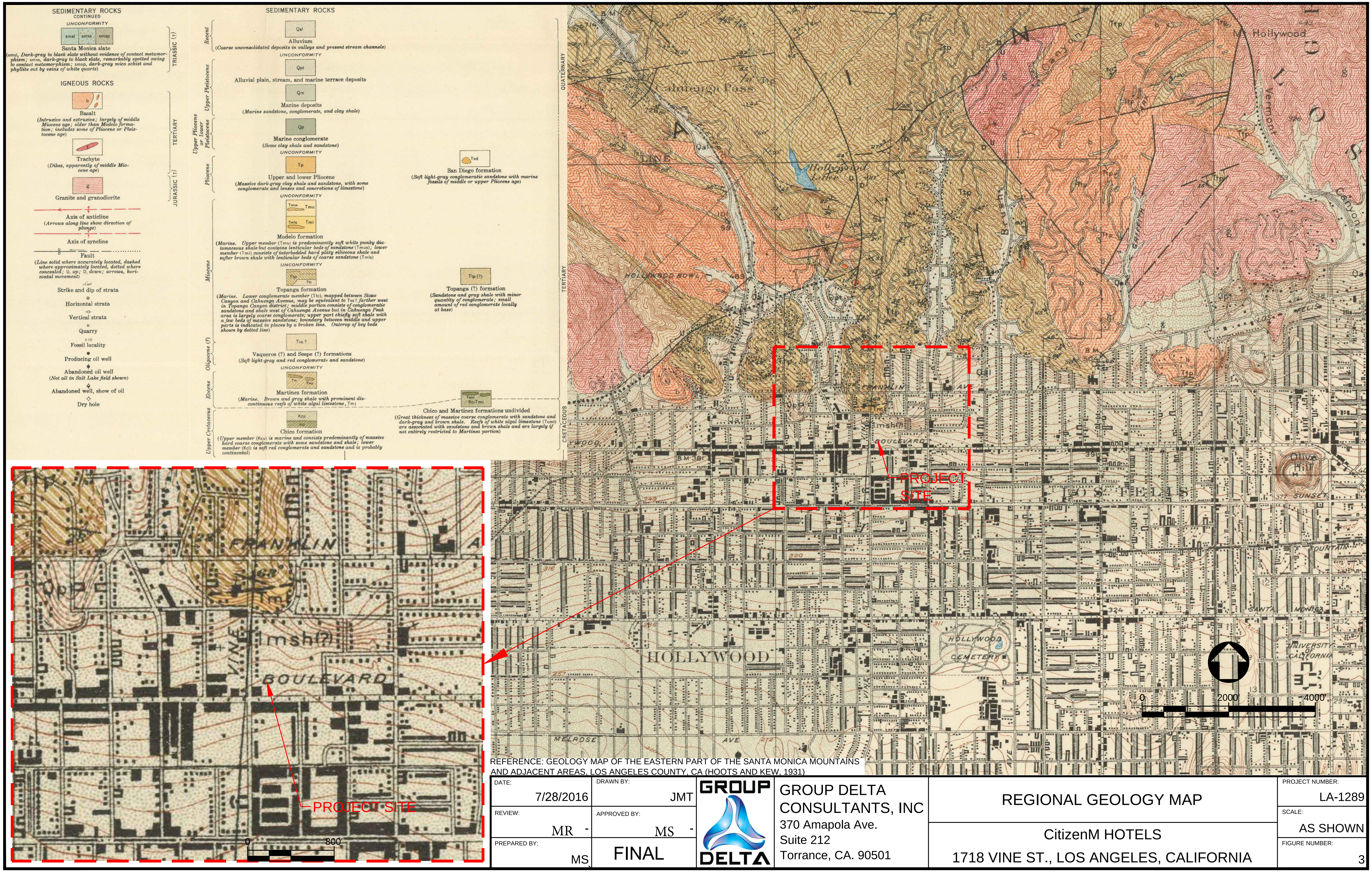
1718 VINE ST., LOS ANGELES, CALIFORNIA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 2



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

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MR -

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MS -

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Torrance, CA. 90501

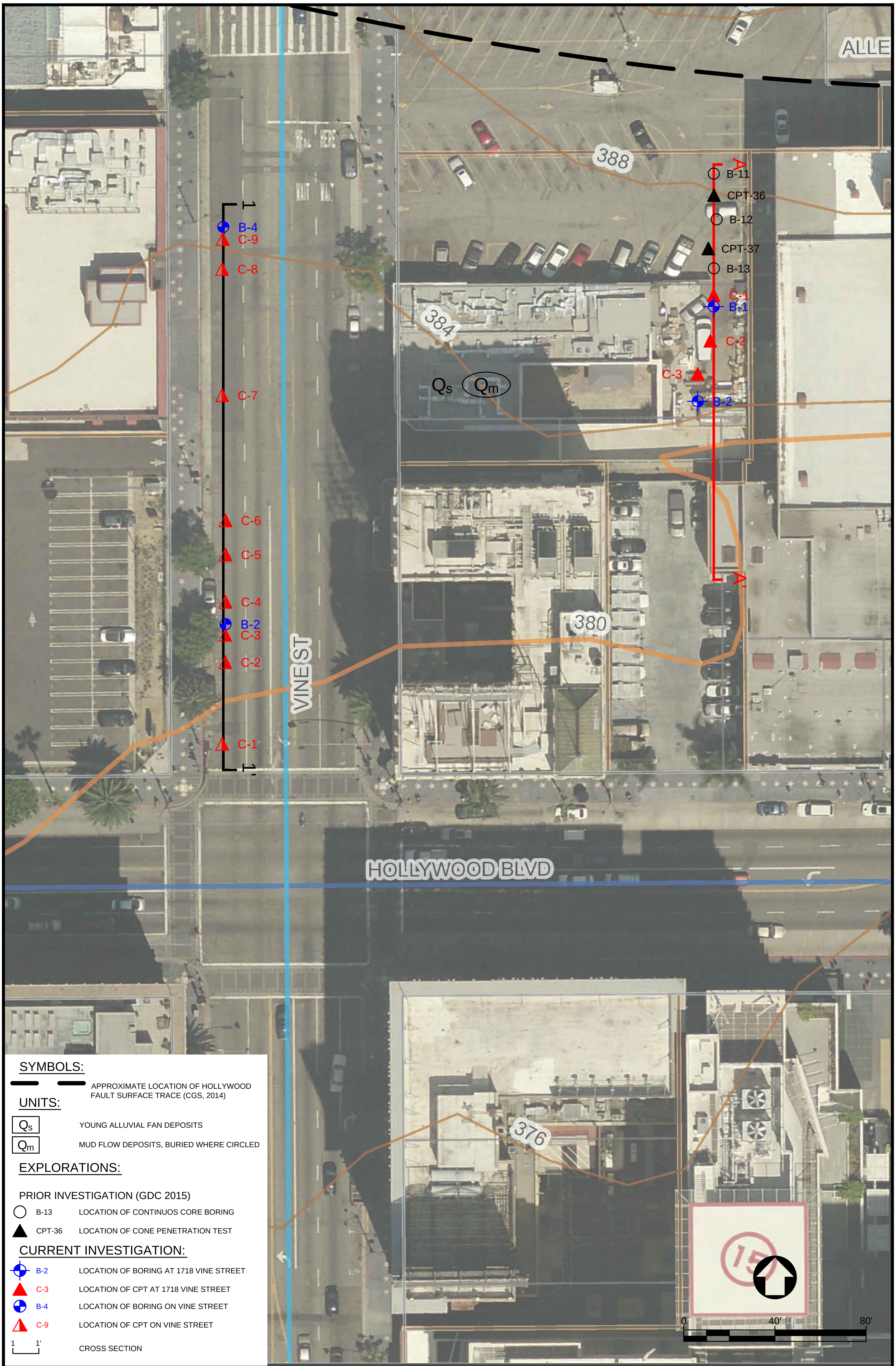
REGIONAL GEOLOGY MAP

CitizenM HOTELS
1718 VINE ST., LOS ANGELES, CALIFORNIA

PROJECT NUMBER:
LA-1289

SCALE:
AS SHOWN

FIGURE NUMBER:
3



SYMBOLS:

▬ ▬ APPROXIMATE LOCATION OF HOLLYWOOD FAULT SURFACE TRACE (CGS, 2014)

UNITS:

Qs	YOUNG ALLUVIAL FAN DEPOSITS
Qm	MUD FLOW DEPOSITS, BURIED WHERE CIRCLED

EXPLORATIONS:

PRIOR INVESTIGATION (GDC 2015)

○	B-13	LOCATION OF CONTINUOS CORE BORING
▲	CPT-36	LOCATION OF CONE PENETRATION TEST

CURRENT INVESTIGATION:

⊕	B-2	LOCATION OF BORING AT 1718 VINE STREET
▲	C-3	LOCATION OF CPT AT 1718 VINE STREET
◕	B-4	LOCATION OF BORING ON VINE STREET
△	C-9	LOCATION OF CPT ON VINE STREET
1 └─┘ 1'		CROSS SECTION

DATE: 7/28/2016
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EXPLORATION PLAN

CitizenM HOTELS
1718 VINE ST., LOS ANGELES, CA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 4

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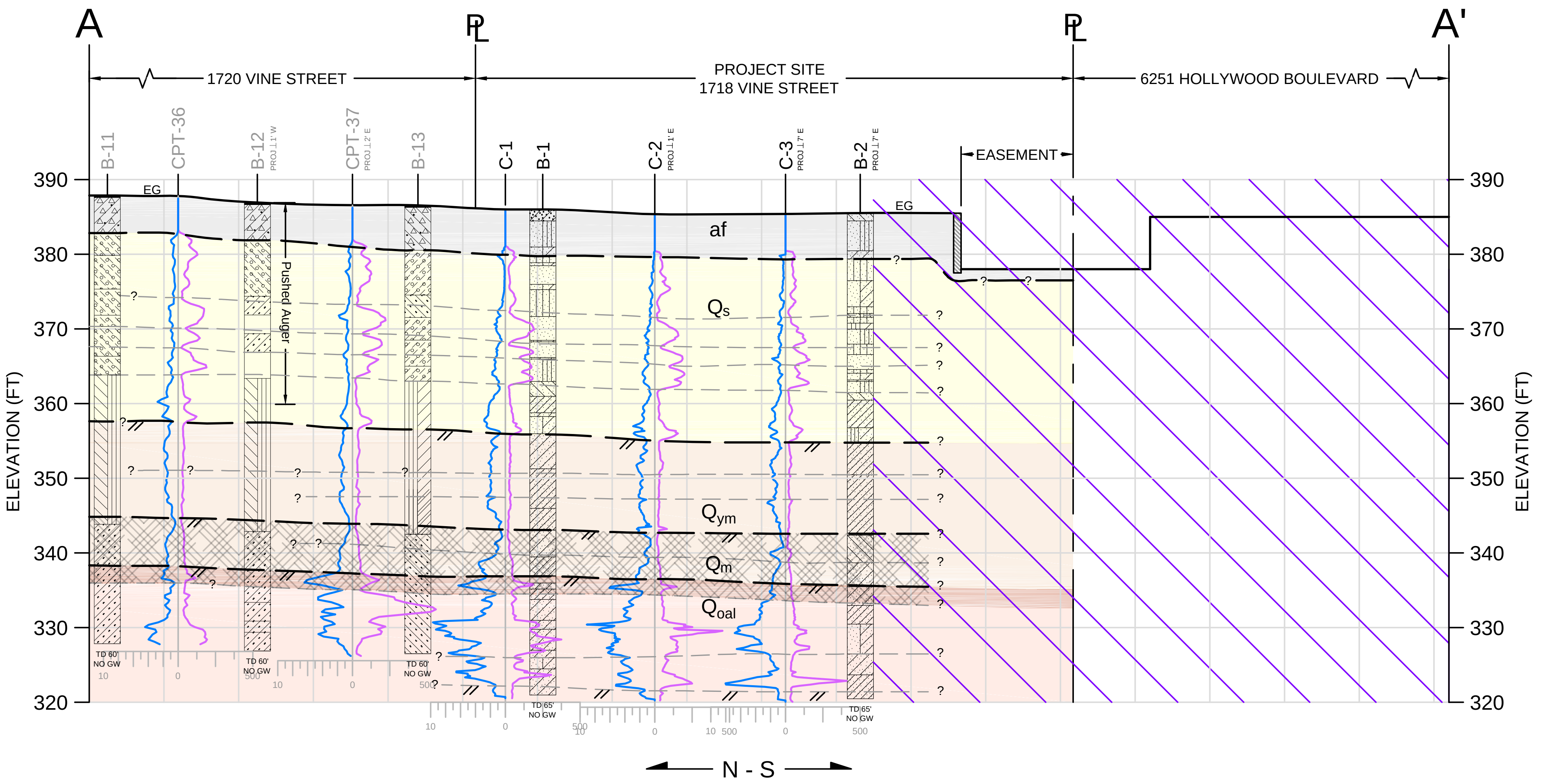

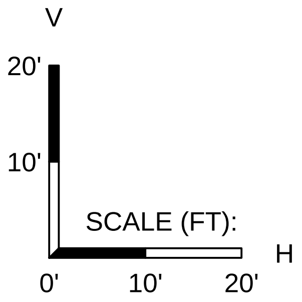

LEGEND:

- SYMBOLS -

EG	EXISTING GRADE
B-13	BORING PRIOR INVESTIGATION (GDC, 2015)
CPT-37	CPT PRIOR INVESTIGATION (GDC, 2015)
B-1	BORING (LA-1289)
C-1	CONE PENETRATION TEST (LA-1289)
// — —	APPROXIMATE GEOLOGIC UNIT CONTACT, (HASH SYMBOL REPRESENTS POSSIBLE PALEOSOL), QUERIED WHERE POORLY CONFINED TO UNCONFINED
// - - -	APPROXIMATE GEOLOGIC SUBUNIT CONTACT, (HASH SYMBOL REPRESENTS POSSIBLE PALEOSOL), QUERIED WHERE POORLY CONFINED TO UNCONFINED
▨	PROFILE PRESENTED IN FIGURE 5.2

- UNITS -

HOLOCENE

af	ARTIFICIAL FILL
Q_s	YOUNG ALLUVIAL FAN DEPOSITS - POORLY GRADED SAND WITH VARIABLE CLAY AND SILT, FEW GRAVEL, DISTINCTIVE INTERBEDDED THIN FINE GRAINED LAYERING (10 YR)

PLEISTOCENE

Q_{ym}	YOUNGER MUD FLOWS - DISTINCTIVE COLOR SHIFT TO 7.5 YR, SANDY CLAY
Q_m	MUD FLOW - VERY DARK BROWN TO DARK BROWN 7.5YR, PLATY PED DEVELOPMENT WITH ARGILLIC FACES (t)
B_{tg}	Btg - SOIL HORIZON - GLEYED MOTTLING (g), SLIGHTLY INDURATED, WELL DEVELOPED PLATY PED STRUCTURE WITH ARGILLIC FACES (t), REMNANT ROOTLETS
Q_{oal}	OLDER ALLUVIAL FAN DEPOSITS - DISTINCTIVE UPPER CONTACT, COLOR SHIFT TO STRONG 7.5YR AND 5YR, CONSOLIDATED CLAYEY SAND

NOTE: SEE APPENDIX A FOR STICK LOG AND CPT LOG DETAIL

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PREPARED BY: MS
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CROSS SECTION A-A'

CitizenM HOTELS
1718 VINE STREET, LOS ANGELES, CA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 5.1

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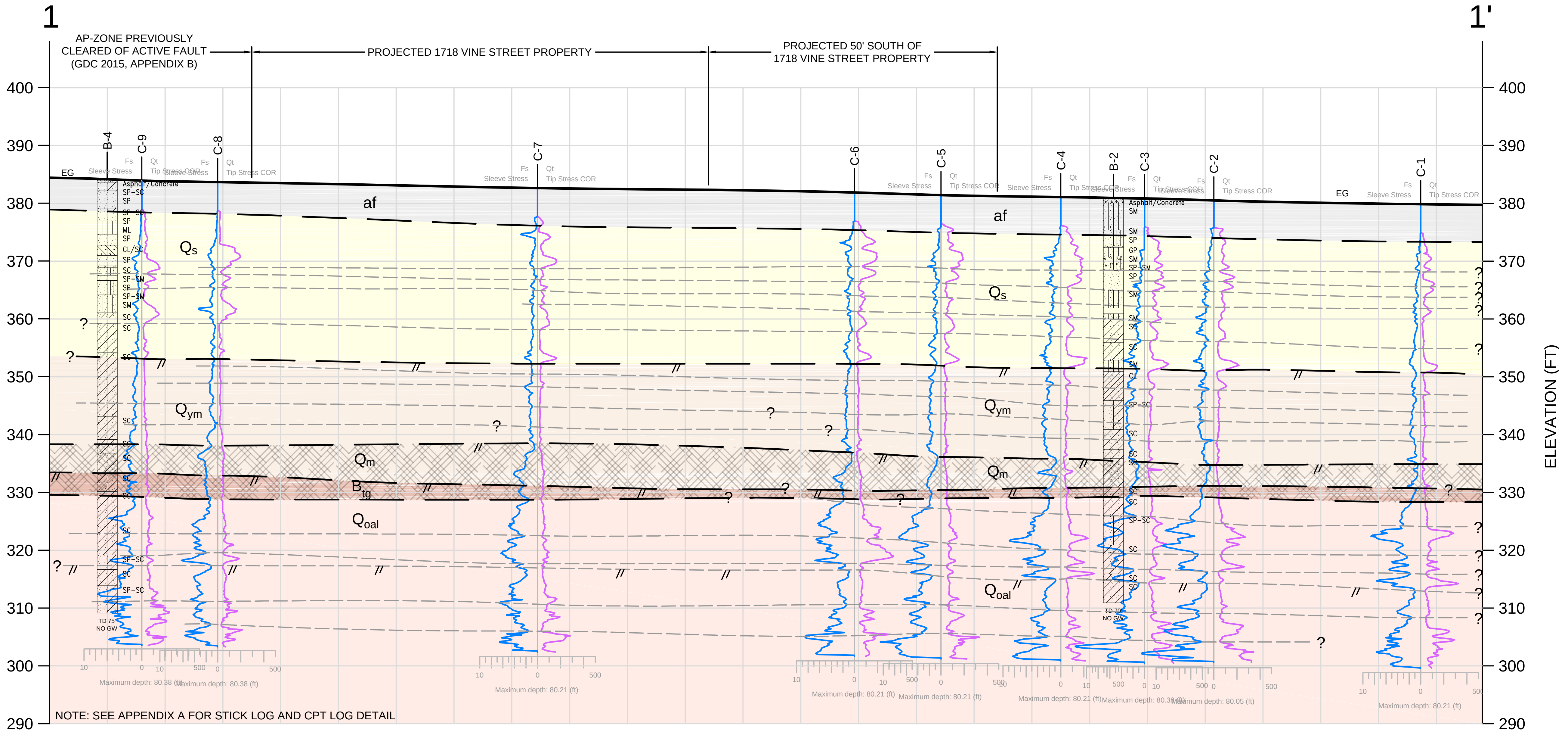

NOTE: SEE APPENDIX A FOR STICK LOG AND CPT LOG DETAIL

← N - S →

LEGEND:

- SYMBOLS -

EG	EXISTING GRADE
B-4	BORING LOCATION (LA-1290)
C-9	CONE PENETRATION TEST LOCATION (LA-1290)
// ——	APPROXIMATE GEOLOGIC UNIT CONTACT, (HASH SYMBOL REPRESENTS POSSIBLE PALEOSOL), QUERIED WHERE POORLY CONFINED TO UNCONFINED
// — — —	APPROXIMATE GEOLOGIC SUBUNIT CONTACT, (HASH SYMBOL REPRESENTS IDENTIFIED CONTINUOUS PALEOSOLS), QUERIED WHERE POORLY CONFINED TO UNCONFINED

V

20'

10'

SCALE (FT):

H

0' 10' 20'

- UNITS -

HOLOCENE

af	ARTIFICIAL FILL
Q_s	YOUNG ALLUVIAL FAN DEPOSITS - POORLY GRADED SAND WITH VARIABLE CLAY AND SILT, FEW GRAVEL, DISTINCTIVE INTERBEDDED THIN FINE GRAINED LAYERING (10 YR)

PLEISTOCENE

Q_{ym}	YOUNGER MUD FLOWS - DISTINCTIVE COLOR SHIFT TO 7.5 YR, SANDY CLAY
Q_m	MUD FLOW - VERY DARK BROWN TO DARK BROWN 7.5YR, PLATY PED DEVELOPMENT WITH ARGILLIC FACES
B_{tg}	Btg - SOIL HORIZON - GLEYED MOTTLING (g), SLIGHTLY INDURATED, WELL DEVELOPED PLATY PED STRUCTURE WITH SOME ARGILLIC FACES (t), REMNANT ROOTLETS, HEALED DESICCATION CRACKS WITH DARK CLAY
Q_{oal}	OLDER ALLUVIAL FAN DEPOSITS - DISTINCTIVE UPPER CONTACT, COLOR SHIFT TO STRONG 7.5YR AND 5YR, CONSOLIDATED CLAYEY SAND

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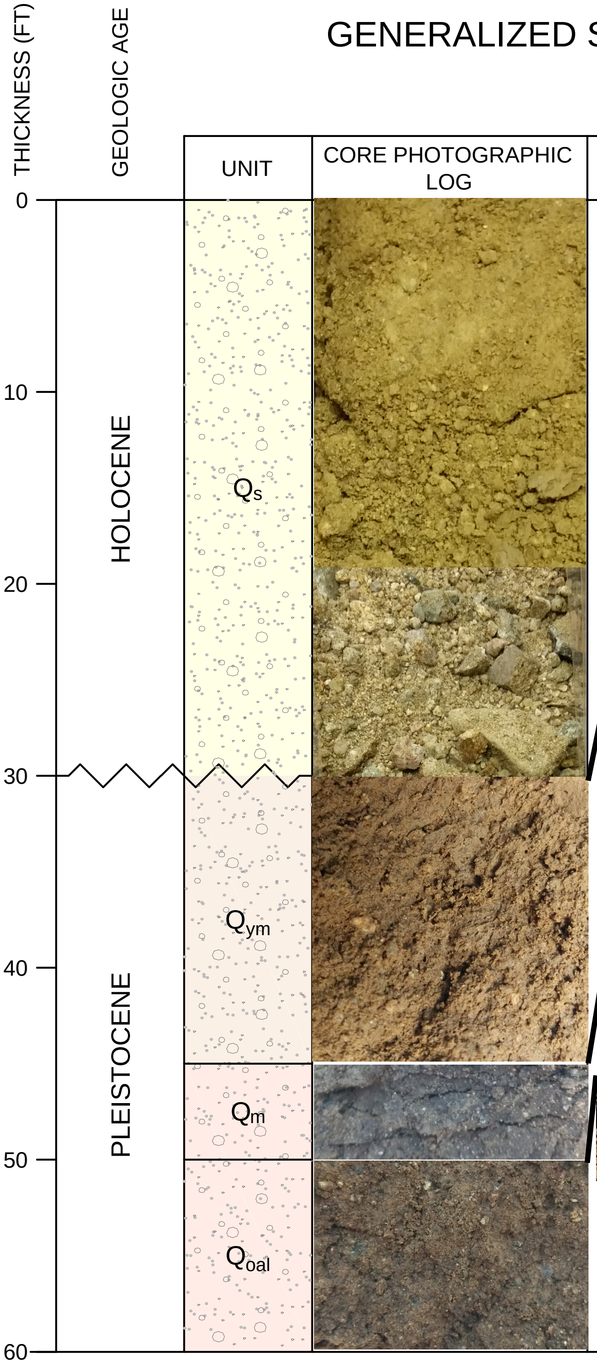
CROSS SECTION 1-1'

1718 VINE STREET
LOS ANGELES, CALIFORNIA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 5.2

N:\Projects\1200-1299\LA-1290 Apple Retail-Vine St & Hollywood Blvd\05 Drawings and Figures\LA-1290 Fig 4_Exploration Plan-Fig 5-5.2_CS 1-1'.dwg, 7/15/2016 3:23:56 PM, josemiguelt

GENERALIZED STRATIGRAPHIC SECTION



Artifical Fill (af) in upper 5 to 6 feet

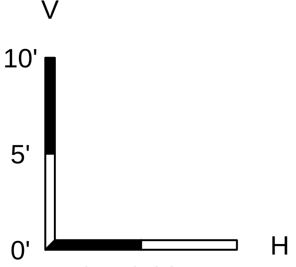
YOUNGER ALLUVIAL FAN DEPOSITS (Qs)
(PHOTOS LA-1290 B-2 @ 10 & 13FT), 10YR DARK YELLOWISH BROWN TO YELLOWISH BROWN. SILTY FINE TO MEDIUM SAND SOME COARSE, FEW INTERBEDDED THIN CLAYEY LAYERS AND GRAVELLY LAYERS, FEW SCATTERED FINE GRAVEL, ANGULAR TO SUBROUNDED, SOME IRON OXIDE STAINING

YOUNGER MUD FLOWS (Q_{ym})
(PHOTO LA-1290 B-2 @ 38FT), 10YR DARK YELLOWISH BROWN TO 7.5YR STRONG BROWN TO BROWN, SANDY CLAY AND CLAYEY SAND, FINE TO MEDIUM, SOME COARSE, IRON OXIDE STAINING, MASSIVE

MUD FLOWS (Q_m)
(PHOTO LA-1290 B-2 @ 47FT), 7.5YR DARK BROWN TO VERY DARK BROWN, CLAYEY SAND AND SANDY CLAY, SOME FINE TO COARSE SAND, FEW FINE GRAVEL, ANGULAR TO SUBANGULAR, MASSIVE, INTENSE MANGANESE AND IRON OXIDE STAINING, TRACE ROOTLETS

PALEOSOL
(LA-1289 B-1 @ 46.5 FT), MOTTLED 10YR DARK YELLOWISH BROWN AND GLEYING, SANDY CLAY, DISTINCT PLATY PED DEVELOPMENT, ROOTLETS

OLDER ALLUVIAL FAN DEPOSITS
(PHOTO LA-1290 B-2 @ 60FT), 7.5YR STRONG BROWN. CONSOLIDATED CLAYEY SAND, FINE TO COARSE SAND, SCATTERED FINE GRAVEL, SUBANGULAR, MASSIVE, CLAY FILMS



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DATE: 7/28/2016
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PREPARED BY: MS

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STRATIGRAPHIC SECTION
MODELED AFTER LA-1290 B2

CitizenM HOTELS
1718 VINE ST., LOS ANGELES, CALIFORNIA

PROJECT NUMBER: LA-1289
SCALE: AS SHOWN
FIGURE NUMBER: 6

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Appendix A
Field Investigation

APPENDIX A
FIELD INVESTIGATION

A.1 Introduction

Group Delta Consultants (GDC) performed an updated geotechnical feasibility study to determine the significant geotechnical conditions that may impact proposed development at the site at 1718 Vine Street, Los Angeles, California.

A.2 Drilling and Sampling

Drilling, Logging, and Soil Classification

The borings were drilled by Gregg Drilling (GDC's subcontractor) using continuous soil core techniques. Borings were explored to 75 feet depth. Our field geologist measured the 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 review of the samples. A boring log legend is presented in FiguresA-1a. The boring/rock coring records are presented in Figures A-2a through A-6c.

Sampling

Borings were sampled continuously with variable core run lengths depending on the recovery rate. Cores were drilled using a hollow stem auger dry coring method with an 8.25-inch diameter bit. The core was typically logged to a degree of accuracy to the nearest foot. Where 100% core recovery was obtained, the degree of accuracy is closer to the nearest tenth of a foot.

Borehole Abandonment

At the completion of borings, the borings were abandoned by backfilling with soil cuttings. A hammer was used to compact the backfill. The paved surfaces were patched with cold mix asphalt concrete/quick set concrete to match the existing surface condition. Notes describing the borehole abandonment are presented on the boring log records.

A.3 Cone Penetration Tests

CPT Soundings

Gregg Drilling (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. 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 type and geotechnical properties of soils being penetrated using published.

The CPT data in a graphical form and accompanying data interpretation are presented below. At the end of each sounding the CPT hole was abandoned by grouting with bentonite. Paved surfaces were patched with cold mix asphalt concrete/quick set concrete to match the existing surface condition.

A.5 List of Attached Figures

The following figures are attached:

List of Figures

Boring Log Legend
Boring Records
Interpretation and CPT Records

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly graded GRAVEL Poorly graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND
GP-GC	Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GRAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly graded SAND Poorly graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL
SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)
SM	SILTY SAND SILTY SAND with GRAVEL
SC	CLAYEY SAND CLAYEY SAND with GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES and BOULDERS BOULDERS

Graphic / Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
OH	ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

WATER LEVEL SYMBOLS

▽ First Water Level Reading (during drilling)

▼ Static Water Level Reading (after drilling, date)

PARTICLE SIZE

Descriptor		Size (in)
Boulder		> 12
Cobble		3 - 12
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay		< 1/300

Ref.: Caltrans Soil and Rock Logging Classification, and Presentation Manual (2010)

GROUP DELTA

GROUP DELTA CONSULTANTS, INC.
GEOTECHNICAL ENGINEERS
AND GEOLOGISTS

FIGURE NUMBER
A-1A

PROJECT NAME
Franklin Ave Fault Study

PROJECT NUMBER
LA1274

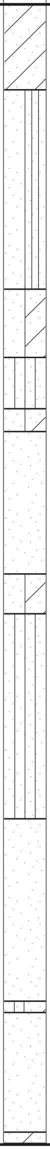
BORING RECORD LEGEND #1

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study
PROJECT NUMBER LA-1289
BORING B-1
SITE LOCATION 1718 Vine Street
DATE(S) DRILLED 5/23/2016
LOGGED BY K. Neill
SHEET NO. 1 of 4
DRILLING METHOD Continuous Soil Core
DRILL BIT SIZE/TYPE 8.25 in
CHECKED BY M. Sutherland
TOTAL DEPTH DRILLED (feet) 65
DRILL RIG TYPE Marl M-10
DRILLED BY Gregg Drilling
INCLINATION FROM VERTICAL/BEARING 0º None
APPARENT GROUNDWATER DEPTH None encountered
APPROXIMATE TOP ELEVATION (feet) 385.8
COMMENTS
BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE RUN NO.	SOIL CORE BOX NO.	SOIL CORE RECOVERY, %	SOIL CORE FRAC. FREQ.	SOIL CORE R.Q.D., %	SOIL CORE FRACTURE DRAWING/ NUMBER
	385						
5		1	1	100			
	380						
		2	1	100			
10		3	2	100			
	375						
		4	2	100			
15		5	3	93			
	370						
		6	3	97			

LITHOLOGY



MATERIAL DESCRIPTION | PACKER TESTS | LABORATORY TESTS | DRILL RATE, FEET/HOUR | FIELD NOTES

Artificial Fill (af)
CLAYEY SAND, 10YR 3/3 Dark Brown, moist, dense, fine SAND, few medium to coarse SAND, medium plasticity, medium dry strength, no dilatency.

Poorly Graded SAND with SILT, 10YR 5/8 Yellowish Brown, moist, loose, fine SAND, few medium to coarse SAND, rounded to subrounded.

Poorly Graded SAND with CLAY, 10YR 4/3 Brown, moist, fine SAND, few medium SAND, trace fine GRAVEL, angular.

Younger Alluvial Fan Deposits (Qs)
SILTY SAND, 10YR 5/8 Yellowish Brown, moist, fine to medium SAND, some coarse SAND, trace fine GRAVEL, subangular, porous.

Poorly Graded SAND with CLAY (Possible Paleosol), 10YR 4/6 Dark Yellowish Brown, moist, dense, fine SAND, few medium SAND, few mica grains.

Poorly Graded SAND, 10YR 5/6 Dark Yellowish Brown, moist, fine SAND, some medium to coarse SAND, few fine to coarse GRAVEL, subrounded to subangular, quartz rich, porous.
@8.6': Coarse GRAVEL, angular, up to 2.5" in diameter.

Poorly Graded SAND with CLAY (Paleosol), 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, some medium SAND.

SILTY SAND, 10YR 5/6 Yellowish Brown, moist, fine SAND, some fines, trace medium to coarse SAND, subangular, sandier with depth.
@12.5': **SILTY CLAY** (2-4" thick layer), 10YR 4/4 Dark Yellowish Brown, moist, trace SAND, medium plasticity, no dilatency.
@13.5': **Poorly Graded SAND,** iron oxide staining.
@13.9': **SILTY CLAY** (2-4" thick layer), 10YR 4/4 Dark Yellowish Brown, moist, trace SAND, medium plasticity, medium dilatency.

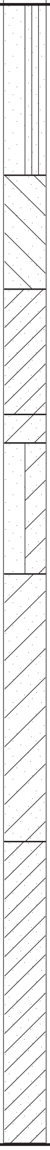
Poorly Graded SAND, 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, some medium SAND, few coarse SAND, few fine GRAVEL, angular, porous.
@15.0': 10YR 5/6 Yellowish Brown, fine to medium SAND, trace coarse SAND and fine GRAVEL, subrounded to subangular, quartize and granitic clasts, iron oxide staining.

GDC_SOIL_CORE_ENG_LA LA-1289 VINE ST - FAULT STUDY - REVISED.GPJ ROCK2.GDT 7/15/16

FIGURE A-2 a

LOG OF CORE BORING

PROJECT NAME	Vine Street Fault Study
PROJECT NUMBER	LA-1289
BORING	B-1
SITE LOCATION	1718 Vine Street
DATE(S) DRILLED	5/23/2016
LOGGED BY	K. Neill
SHEET NO.	2 of 4
DRILLING METHOD	Continuous Soil Core
DRILL BIT SIZE/TYPE	8.25 in
CHECKED BY	M. Sutherland
TOTAL DEPTH DRILLED (feet)	65
DRILL RIG TYPE	Marl M-10
DRILLED BY	Gregg Drilling
INCLINATION FROM VERTICAL/BEARING	0º None
APPARENT GROUNDWATER DEPTH	None encountered
APPROXIMATE TOP ELEVATION (feet)	385.8
COMMENTS	
BOREHOLE BACKFILL	Soil Cuttings



DEPTH (ft)	ELEVATION (ft)	SOIL 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
	365	7	4	100					**CLAYEY SAND / SILTY SAND,**(1-2" thick layer). **Poorly Graded SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine to medium SAND, trace coarse SAND, few fine GRAVEL, subrounded to subangular, iron oxide staining. **CLAYEY SAND,** 10YR 3/4 Dark Yellowish Brown, moist, fine SAND, low plasticity.				
		8	4	100					**Poorly Graded SAND with SILT,**10YR 4/6 Dark Yellowish Brown, moist, fine to medium SAND, trace coarse SAND and fine GRAVEL, subangular to subrounded. @21.5': **CLAYEY SAND (Paleosol)**(2" thick layer).				
25	360	9	5	100					**Lean CLAY with SAND,** 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, trace coarse SAND, medium plasticity, no dilatency, iron oxide staining, massive. **SANDY lean CLAY,** 7.5YR 4/6 Strong Brown, moist, stiff, fine SAND, medium plasticity, no dilatency, rootlets, trace iron oxide clasts, massive.				
		10	5	100					**CLAYEY SAND,** fine SAND. **Poorly Graded SAND with CLAY / Poorly Graded SAND with SILT,** moist, fine to medium SAND, trace coarse SAND and fine to coarse GRAVEL, massive.				
30	355	11	6	100					**Younger Mud Flows (Qym)** **CLAYEY SAND,** 10YR 3/4 Dark Yellowish Brown, moist, dense, fine SAND, trace medium to coarse SAND and fine GRAVEL, low plasticity, no dilatency, rootlets, iron oxide staining, massive.				
		12	6	100									
35	350	13	7	100					**SANDY lean CLAY,** 7.5YR 4/4 Brown, moist, fine SAND, few medium to coarse SAND and fine to coarse GRAVEL, subangular to angular, iron oxide staining, rootlets, manganese oxide staining, massive.				
		14	7	83					@37.5': Siltier with depth. @38.5': Coarse GRAVEL, granitic, angular, up to 2" in size.				

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FIGURE A-2 b

LOG OF CORE BORING

PROJECT NAME
Vine Street Fault Study

PROJECT NUMBER
LA-1289

BORING
B-1

SITE LOCATION
1718 Vine Street

DATE(S) DRILLED
5/23/2016

LOGGED BY
K. Neill

SHEET NO.
3 of 4

DRILLING METHOD
Continuous Soil Core

DRILL BIT SIZE/TYPE
8.25 in

CHECKED BY
M. Sutherland

TOTAL DEPTH DRILLED (feet)
65

DRILL RIG TYPE
Marl M-10

DRILLED BY
Gregg Drilling

INCLINATION FROM VERTICAL/BEARING
0º None

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE TOP ELEVATION (feet)
385.8

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE RUN NO.	SOIL CORE BOX NO.	SOIL CORE RECOVERY, %	SOIL CORE FRAC. FREQ.	SOIL CORE R.Q.D., %	SOIL CORE FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	345	15	8	100					**SANDY lean CLAY,** 7.5YR 4/4 Brown, moist, fine SAND, few medium to coarse SAND and fine to coarse GRAVEL, subangular to angular, iron and manganese oxide staining. Transitional erosional lower contact.				
		16	8	90					<u>**Mud Flows (Qm)**</u> **CLAYEY SAND,** 7.5YR 3/4 Dark Brown, moist, fine SAND, few medium SAND, rootlets, iron oxide and manganese oxide staining, trace fine GRAVEL, angular, porous.				
45	340	17	9	100					@46.5': Transitional reworked erosional zone. **SANDY lean CLAY,** 10YR 4/6 Dark Yellowish Brown, stiff, moist, fine SAND, trace medium SAND and fine to coarse GRAVEL. @47.1': Quartizite clast, 2" in diameter. @47.5': 7.5YR 4/6 Strong Brown with some gleying streaks, moist, fine to coarse SAND, manganese and iron oxide stain, mottling, tight platy ped.				
		18	9	64									
50	335	19	10	100					@49.0': **(Paleosol).** @49.1-50.0': No recovery. **CLAYEY SAND,** 7.5YR 4/4 Brown, moist, fine SAND, some fines, few medium to coarse SAND, mottling, platy ped, gleying streaks.				
		20	10	77					<u>**Older Alluvial Fan Deposits Mud Flows (Qoal)**</u> **SANDY lean CLAY,** 7.5YR 4/4 Brown, moist, stiff, fine to medium SAND, coarsens with depth, trace coarse SAND and fine GRAVEL, mottled, iron oxide staining. **CLAYEY SAND,** 7.5YR 3/3 Dark Brown, moist, fine to medium SAND, few coarse SAND.				
55	330	21	11	93					**CLAYEY SAND,** 7.5YR 3/3 Dark Brown, moist, fine to medium SAND, little fines, few coarse SAND. @56.2': Gradational contact (narrow) **CLAYEY SAND,** 7.5YR 4/6 Strong Brown, moist, fine SAND, few medium to coarse SAND and fine GRAVEL, subangular, coarsens with depth to 59 ft.				
		22	11	100					**CLAYEY SAND,** 7.5YR 4/6 Strong Brown, moist, fine to medium SAND, few coarse SAND, iron oxide				

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study

PROJECT NUMBER LA-1289

BORING B-1

SITE LOCATION 1718 Vine Street

DATE(S) DRILLED 5/23/2016

LOGGED BY K. Neill

SHEET NO. 4 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 65

DRILL RIG TYPE Marl M-10

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 385.8

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE: RUN NO.	SOIL CORE: BOX NO.	SOIL CORE: RECOVERY, %	SOIL CORE: FRAC. FREQ.	SOIL CORE: R.Q.D., %	SOIL CORE: FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	325	23	12	73					staining, mottling. **Poorly Graded SAND with CLAY,** transitioning contact, iron oxide staining and gray mottling. **CLAYEY SAND,** 7.5YR 4/6 Strong Brown, moist, fine to medium SAND, manganese oxide staining, platy ped development upper ~6".				
		24	12	100									
65	320								Total depth = 65 feet below ground surface. Hand auger upper 5 feet. Groundwater not encountered during drilling. Backfilled with soil cuttings, tamped and patched with cold patch. Surface Elevation calculated from manometer survey data and reference B-13 Elevation 386.45 feet.				
70	315												
75	310												

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FIGURE A-2 d

LOG OF CORE BORING	**PROJECT NAME** Vine Street Fault Study	**PROJECT NUMBER** LA-1289	**BORING** **B-2**
SITE LOCATION 1718 Vine Street	**DATE(S) DRILLED** 5/24/2016	**LOGGED BY** K. Neill	**SHEET NO.** 1 of 4
DRILLING METHOD Continuous Soil Core	**DRILL BIT SIZE/TYPE** 8.25 in	**CHECKED BY** M. Sutherland	**TOTAL DEPTH DRILLED (feet)** 65
DRILL RIG TYPE Marl M-10	**DRILLED BY** Gregg Drilling	**INCLINATION FROM VERTICAL/BEARING** 0º None	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE TOP ELEVATION (feet)** 385.4	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	SOIL 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								<u>**Artificial Fill (Af)**</u> **Lean CLAY with SAND,** 10YR 2/2 Very Dark Brown, moist, medium stiff, trace fine to medium SAND, trace concrete debris, medium plasticity, medium dry strength, low toughness, no dilatency.				
									Poorly Graded SAND with SILT, 10YR 3/4 Dark Yellowish Brown, moist, loose, fine to medium SAND, little coarse SAND, few fine GRAVEL.				
5	380	1	1	93					**CLAYEY SAND,** 10YR 2/2 Very Dark Brown, moist, dense, fine to medium SAND, little fines, few coarse SAND.				
									<u>**Younger Alluvial Fan Deposits (Qs)**</u> **SILTY SAND,** 10YR 5/6 Yellowish Brown, moist, fine to medium SAND, some coarse SAND, some fine GRAVEL, subangular, porous.				
		2	1	97					@9.0': Erosional contact, coarse GRAVEL up to 2.5 in diameter.				
10	375	3	2	100					**Poorly Graded SAND with CLAY (Possible Paleosol),** 10YR 3/4 Dark Yellowish Brown, moist, dense, fine to medium SAND, some coarse SAND, trace fine GRAVEL, subangular, porous. @10.0': 10YR 5/6 Yellowish Brown, moist, trace coarse SAND and fine GRAVEL, subrounded. Interbedded **CLAYEY SAND** layers (3 to 6" thick), 10YR 3/4 Dark Yellowish Brown.				
		4	2	100					**SILTY SAND,** moist, fine SAND.				
									SANDY SILTY CLAY, 10YR 3/4 Dark Yellowish Brown, fine SAND, little fines.				
									SILTY SAND, fine to medium SAND.				
15	370	5	3	100					**SILTY CLAY,** 10YR 3/4 Dark Yellowish Brown, moist, medium stiff, trace fine SAND.				
									Poorly Graded SAND with SILT, 10YR 5/6 Yellowish Brown, moist, fine to coarse SAND, coarsens with depth, porous. @17.0 - 17.5': Fine to coarse quartzite and granite clasts, subangular.				
		6	3	100					**SILTY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine SAND, trace medium SAND. @18.9': Coarse GRAVEL.				
									Poorly Graded SAND, 10YR 5/6 Yellowish Brown,				

GDC_SOIL_CORE_ENG_LA LA-1289 VINE ST - FAULT STUDY - REVISED.GPJ ROCK2.GDT 7/15/16

FIGURE A-3 a

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study

PROJECT NUMBER LA-1289

BORING B-2

SITE LOCATION 1718 Vine Street

DATE(S) DRILLED 5/24/2016

LOGGED BY K. Neill

SHEET NO. 2 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 65

DRILL RIG TYPE Marl M-10

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 385.4

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE RUN NO.	SOIL CORE BOX NO.	SOIL CORE RECOVERY, %	SOIL CORE FRAC. FREQ.	SOIL CORE R.Q.D., %	SOIL CORE FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	365	7	4	100					moist, fine to coarse SAND, few fine to coarse GRAVEL. **SITLY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine SAND, trace medium SAND. @21.2': **Poorly Graded SAND with CLAY to CLAYEY SAND (Paleosol),** (2" thick layer).				
		8	4	100					**Poorly Graded SAND with CLAY,** 10YR 5/4 Yellowish Brown, fine to coarse SAND, few coarse GRAVEL, few fine GRAVEL. @22.3': Erosional contact. **CLAYEY SAND,** 7.5YR 4/6 Strong Brown, moist, fine SAND, mottled.				
25	360	9	5	100					**Poorly Graded SAND with SILT,** 10YR 4/6 Dark Yellowish Brown, moist, fine to coarse SAND. **Lean CLAY with SAND,** 7.5YR 4/6 Strong Brown, moist, few fine SAND, medium plasticity, no dilatency, massive, porous.				
		10	5	100					**SANDY lean CLAY,** 7.5YR 4/4 Strong Brown, moist, fine to medium SAND, few coarse SAND, few fine GRAVEL, fines increase with depth, massive, porous. @26.2': Coarse GRAVEL. @28.6 - 28.7': Gradational contact (narrow) **Poorly Graded SAND with CLAY / SILTY SAND,** 7.5YR 4/4 Brown, moist, fine SAND, few medium SAND, little fines, trace mica grains, massive, porous.				
30	355	11	6	100					<u>**Younger Mud Flows (Qym)**</u> **SANDY lean CLAY,** 7.5YR 4/4 Brown, moist, stiff, fine SAND, medium plasticity, massive, appears slightly porous.				
		12	6	100									
35	350	13	7	100					**SANDY lean CLAY (paleosol),** 7.5YR 3/3 Dark Brown, moist, fine SAND, few medium SAND, few fine GRAVEL, iron oxide staining, massive, appears porous.				
		14	7	100					@37.5': Increase in rootlets and iron oxide stained clasts.				

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FIGURE A-3 b

LOG OF CORE BORING

PROJECT NAME Vine Street Fault Study

PROJECT NUMBER LA-1289

BORING B-2

SITE LOCATION 1718 Vine Street

DATE(S) DRILLED 5/24/2016

LOGGED BY K. Neill

SHEET NO. 3 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 65

DRILL RIG TYPE Marl M-10

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 385.4

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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						
	345	15	8	100					@42.3': **CLAYEY SAND.**				
		16	8	100					**Poorly Graded SAND with CLAY,** 7.5YR 4/4 Brown, moist, loose, fine to coarse SAND, few GRAVEL. Abrupt erosional lower contact. **Mud Flows (Qm)** **Lean CLAY with SAND,** 7.5YR 3/2 Dark Brown, moist, fine SAND, few medium SAND, mottling, iron oxide staining, rootlets, trace GRAVEL, massive.				
45	340	17	9	100					**CLAYEY SAND,** 7.5YR 2.5/3 Very Dark Brown, moist, fine SAND, few medium SAND, few fine GRAVEL, mottled, iron oxide and managnese staining, CLAY films.				
		18	9	100									
50	335	19	10	100					@50.0 - 52.0': **(Paleosol).** **CLAYEY SAND,** 5YR 4/4 Reddish Brown with gleying, moist, fine SAND, iron oxide staining and gray mottling, few fine GRAVEL, coarsens with depth to 52 ft. **Older Alluvial Fan Deposits Mudflows (Qoal)**				
		20	10	100					@52.0': **Poorly Graded SAND with CLAY,** fine to coarse SAND. **SANDY lean CLAY,** fine to coarse SAND, few fine GRAVEL, massive.				
55	330	21	11	100					**Poorly Graded SAND with CLAY,** 7.5YR 3/4 Dark Brown, moist, loose, fine to medium SAND, some coarse SAND, few fine GRAVEL, iron oxide staining, trace GRAVEL at depth, massive to gradational.				
		22	11	100					@59.0': Transitional contact, weathered zone, iron oxide staining and gray mottling.				

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FIGURE A-3 c

LOG OF CORE BORING

PROJECT NAME
Vine Street Fault Study

PROJECT NUMBER
LA-1289

BORING
B-2

SITE LOCATION
1718 Vine Street

DATE(S) DRILLED
5/24/2016

LOGGED BY
K. Neill

SHEET NO.
4 of 4

DRILLING METHOD
Continuous Soil Core

DRILL BIT SIZE/TYPE
8.25 in

CHECKED BY
M. Sutherland

TOTAL DEPTH DRILLED (feet)
65

DRILL RIG TYPE
Marl M-10

DRILLED BY
Gregg Drilling

INCLINATION FROM VERTICAL/BEARING
0º None

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE TOP ELEVATION (feet)
385.4

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL CORE RUN NO.	SOIL CORE BOX NO.	SOIL CORE RECOVERY, %	SOIL CORE FRAC. FREQ.	SOIL CORE R.Q.D., %	SOIL CORE FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
	325	23	12	100				▨	**CLAYEY SAND to Poorly Graded SAND with CLAY,** 7.5 3/3 Dark Brown, moist, fine SAND, trace fine GRAVEL, trace medium SAND, manganese staining, massive.				
								▨	**SANDY lean CLAY,** 7.5YR 3/4 Dark Brown, moist, fine SAND, few medium SAND, few fine GRAVEL, mottling, micaceous, massive.				
		24	12	100				▨					
65	320								Total depth = 65 feet below ground surface. Hand auger upper 5 feet. Relocate baring 2 feet North due to concrete at 2 feet depth. Groundwater not encountered during drilling. Backfilled with soil cuttings, tamped and patched with cold patch. Surface Elevation calculated from manometer survey data and reference B-13 Elevation 386.45 feet.				
70	315												
75	310												

LOG OF CORE BORING

PROJECT NAME Franklin Ave. Fault Study

PROJECT NUMBER LA-1290

BORING B-2

SITE LOCATION Vine St. & Hollywood Blvd., Los Angeles, CA

DATE(S) DRILLED 6/22/2016

LOGGED BY K. Neill

SHEET NO. 1 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 70

DRILL RIG TYPE Hollow Stem Auger

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 380.6

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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
	380								Asphalt approximately 2 inch thick. Concrete approximately 6 inch thick. **Artificial Fill (af)** **SILTY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine SAND, little fines, few medium and coarse SAND. Homogenious to 5ft, no bedding observed in cutting fragments.				
5	375	1	1	100					**SILTY SAND,** 10YR 3/3 Dark Brown, moist, fine SAND, little fines, few medium SAND and fine GRAVEL, roots. **Younger Alluvial Fan Deposits (Qs)** **Poorly Graded SAND with SILT,** 10YR 5/4 Yellowish Brown, moist, fine SAND, few fines and medium and coarse SAND, coarsens with depth to few coarse SAND.				
		2		100					Gradational contact to 8.3 ft. Coarse GRAVEL, subangular to angular. @8.5': Erosional contact.				
10	370	3	2	100					**SILTY SAND,** 10YR 5/6 Yellowish Brown, moist, fine SAND, few medium SAND, trace coarse SAND and fine GRAVEL, micaceous. **Poorly Graded SAND with SILT and GRAVEL,** 10YR 4/6 Dark Yellowish Brown, fine to medium SAND, fines increasing with depth, few coarse SAND and fine GRAVEL, subrounded to subangular, micaceous, iron oxide staining.				
		4		100					**Poorly Graded SAND,** 10YR 5/4 Yellowish Brown, moist, fine to medium SAND, some coarse SAND, few fine to coarse GRAVEL, quartzite, granitic, iron oxide staining, subangular to subround, micaceous.				
15	365	5	3	83					@15.9': Erosional contact. **SILTY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine SAND, fines increasing with depth, trace medium SAND, roots and rootlets. @19.0-20.0': No recovery.				

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Torrance, CA 90501

LOG OF CORE BORING

PROJECT NAME Franklin Ave. Fault Study

PROJECT NUMBER LA-1290

BORING B-2

SITE LOCATION Vine St. & Hollywood Blvd., Los Angeles, CA

DATE(S) DRILLED 6/22/2016

LOGGED BY K. Neill

SHEET NO. 2 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 70

DRILL RIG TYPE Hollow Stem Auger

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 380.6

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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	6	4	100				▥ ▨	**SILTY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine SAND, few medium SAND, trace coarse SAND and fine GRAVEL, increase in rootlets. **CLAYEY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, dense, fine SAND, some fines, few medium SAND, trace coarse SAND and fine GRAVEL, increase in rootlets. @25.0': Coarse GRAVEL clast.				
25	355	7	5	100				▨	**CLAYEY SAND,** 10YR 3/6 Dark Yellowish Brown, moist, fine SAND, few medium SAND and fine GRAVELS, subangular, micaceous.				
								▥	@28.0': Gradational contact - color change. **SILTY SAND,** 10YR 4/6 Dark Yellowish Brown, moist, few medium to coarse SAND and fine GRAVEL, subrounded, micaceous, iron oxide staining.				
30	350	8	6	100				▨	@30.0': Erosional contact. **Younger Mud Flows (Qym)** **SANDY CLAY,** 10YR 4/4 Dark Yellowish Brown, moist, dense, fine SAND, few to little fines, few medium and coarse SAND, iron oxide staining on grains, grussification, micaceous, rootlets, slight coarsening with depth.				
35	345	9	7	100				▨	**Poorly Graded SAND with CLAY,** increase in iron oxide staining, increase in grussification, roots present in sample, increased fines.				

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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-3 b

LOG OF CORE BORING

PROJECT NAME	Franklin Ave. Fault Study
PROJECT NUMBER	LA-1290
BORING	**B-2**
SITE LOCATION	Vine St. & Hollywood Blvd., Los Angeles, CA
DATE(S) DRILLED	6/22/2016
LOGGED BY	K. Neill
SHEET NO.	3 of 4
DRILLING METHOD	Continuous Soil Core
DRILL BIT SIZE/TYPE	8.25 in
CHECKED BY	M. Sutherland
TOTAL DEPTH DRILLED (feet)	70
DRILL RIG TYPE	Hollow Stem Auger
DRILLED BY	Gregg Drilling
INCLINATION FROM VERTICAL/BEARING	0º None
APPARENT GROUNDWATER DEPTH	None encountered
APPROXIMATE TOP ELEVATION (feet)	380.6
COMMENTS	
BOREHOLE BACKFILL	Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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						
	340	10	8	100					**CLAYEY SAND,** 7.5YR 5/6 Strong Brown, moist, fine SAND, few medium to coarse SAND and fine GRAVEL, subangular, iron oxide staining, grussification, trace manganese staining.				
									CLAYEY SAND, 7.5YR 5/6 Strong Brown, moist, fine SAND, few medium to coarse SAND and fine GRAVEL, iron oxide staining. Transitional reworked erosional zone to 45 ft.				
45	335	11	9	100					@45.0': Transitional reworked erosional contact. **Mud Flows (Qm)** **CLAYEY SAND (Paleosol),**7.5YR 2.5/3 Very Dark Brown, moist, stiff, fine SAND, little to some fines, few coarse SAND, intense iron oxide and manganese oxide staining, platy ped development, argillic facies.				
50	330	12	10	100					**CLAYEY SAND (Paleosol),**7.5YR 4/3 Brown with gleying, moist, consolidated, tight platy ped development, fine SAND, little fines, trace medium SAND, manganese and iron oxide staining. @50.3-51.7': Vertical fracture (desiccation cracks) well healed with dark brown CLAY, discontinuous above and below.				
									Older Alluvium (Qoal) **CLAYEY SAND,** 7.5YR 3/4 Dark Brown, moist, consolidated, fine SAND, little fines, few medium SAND, trace coarse SAND and fine GRAVEL, angular, manganese and iron oxide staining.				
55	325	13	11	100					**Poorly Graded SAND and CLAY,** 7.5YR 3/4 Dark Brown, moist, consolidated, fineSAND, little fines and medium SAND, few coarse SAND and fine to coarse GRAVEL, subangular, manganese and iron oxide staining.				

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FIGURE A-3 c

LOG OF CORE BORING

PROJECT NAME
Franklin Ave. Fault Study

PROJECT NUMBER
LA-1290

BORING
B-2

SITE LOCATION
Vine St. & Hollywood Blvd., Los Angeles, CA

DATE(S) DRILLED
6/22/2016

LOGGED BY
K. Neill

SHEET NO.
4 of 4

DRILLING METHOD
Continuous Soil Core

DRILL BIT SIZE/TYPE
8.25 in

CHECKED BY
M. Sutherland

TOTAL DEPTH DRILLED (feet)
70

DRILL RIG TYPE
Hollow Stem Auger

DRILLED BY
Gregg Drilling

INCLINATION FROM VERTICAL/BEARING
0º None

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE TOP ELEVATION (feet)
380.6

COMMENTS

BOREHOLE BACKFILL
Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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						
	320	14	12	100					@60.0': Preserved desiccated. **CLAYEY SAND,** 7.5YR 4/6 Strong Brown, moist, consolidated, fine SAND, few medium to coarse SAND, trace GRAVEL. @60.0-64.0': Coarsens with depth. @60.0-65.0': Iron oxide staining on clast, micaceous. @64.0': Increase in fines, decrease in medium SAND, manganese oxide staining.				
65	315	15	13	100					**CLAYEY SAND (Paleosol),** 7.5YR 4/6 Strong Brown, moist, fine to medium SAND, little fines, few coarse SAND and fine GRAVEL, mottling, iron oxide staining. @66.0': Gradational contact. **CLAYEY SAND,** 7.5YR 3/4 Dark Brown, moist, fine SAND, little fines, few medium to coarse SAND and fine GRAVEL, subrounded to subangular, mottling, manganese and iron oxide staining.				
70	310								Total depth = 70 feet below ground surface. Groundwater not encountered during drilling. Backfilled with soil cuttings and patched with cold patch.				
75	305												

FIGURE A-3 d

LOG OF CORE BORING

PROJECT NAME Franklin Ave. Fault Study

PROJECT NUMBER LA-1290

BORING **B-4**

SITE LOCATION Vine St. & Hollywood Blvd., Los Angeles, CA

DATE(S) DRILLED 6/21/2016

LOGGED BY K. Neill

SHEET NO. 1 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 75

DRILL RIG TYPE Hollow Stem Auger

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 384.3

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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
									Asphalt approximately 2 inch thick.				
									Concrete approximately 4 inch thick.				
									Artificial Fill (af) **Poorly Graded SAND with CLAY,** 10YR 3/2 Very Dark Grayish Brown, moist, fine to medium SAND, few fines and fine GRAVEL, asphalt debris.				
	380								**Poorly Graded SAND,** 10YR 4/6 Dark Yellowish Brown, moist, fine to medium SAND, few coarse SAND.				
5		1	1	100					**Poorly Graded SAND with CLAY,** 10YR 3/4 Dark Yellowish Brown, moist, fine SAND, few medium SAND and fines, iron oxide staining.				
		2		100					**Younger Alluvial Fan Deposits (Qs)** **Poorly Graded SAND,** 10YR 4/6 Strong Brown, moist, loose, fine SAND, little medium SAND, micaceous. @7.2': Gradational contact.				
	375	3		83					**SILT with SAND,** 10YR 4/4 Brown, moist, few fine SAND. @8.0-9.5': 10YR 5/4 Brown, fine SAND. @8.4': GRAVEL, 1 inch thick.				
10		4	2	89					@9.5': Erosional contact. **Poorly Graded SAND,** 10YR 3/4 Dark Brown, moist, fine to medium SAND, few coarse SAND. @11.2-11.4': Little fine to coarse GRAVEL.				
		5		100					@11.4': Gradational contact. **SANDY CLAY to CLAYEY SAND,** 10YR 5/6 Yellowish Brown, moist, few to little fine SAND.				
		6		100									
	370	7		100					**Poorly Graded SAND,** 10YR 4/6 Dark Yellowish Brown, fine SAND, little medium SAND, few coarse SAND and fine GRAVEL, micaceous, coarsening with depth.				
15		8	3	100					**CLAYEY SAND,** 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, little fines, few medium SAND. Erosional contact.				
									Poorly Graded SAND with SILT, 10YR 4/4 Dark Yellowish Brown to 10YR 5/8 Yellowish Brown, moist, fine SAND, few medium SAND and fine to coarse GRAVEL, grusification, micaceous.				
	365	9		87					@16.6-20.0': Gradational contact. **Poorly Graded SAND,** 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, few medium to coarse SAND, trace fine GRAVEL, micaceous.				
									Poorly Graded SAND with SILT, 10YR 4/4 Dark				

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FIGURE A-4 a

LOG OF CORE BORING

PROJECT NAME Franklin Ave. Fault Study

PROJECT NUMBER LA-1290

BORING B-4

SITE LOCATION Vine St. & Hollywood Blvd., Los Angeles, CA

DATE(S) DRILLED 6/21/2016

LOGGED BY K. Neill

SHEET NO. 2 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 75

DRILL RIG TYPE Hollow Stem Auger

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 384.3

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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
		10	4	74					Yellowish Brown, moist, fine SAND, little fines, trace medium SAND and fine GRAVEL, subrounded. @19.0': Increase in fines. **SILTY SAND,** 10YR 3/4 Dark Yellowish Brown, moist, fine to medium SAND, little fines, few coarse SAND and fine to coarse GRAVEL, subrounded, grussification, micaceous. @23.1': Gradational contact. **CLAYEY SAND,** 10YR 3/6 Dark Yellowish Brown, moist, few medium to coarse SAND, trace fine GRAVEL, SAND increase with depth.				
	360								@24.0-25.0': No recovery.				
25		11	5	100					**CLAYEY SAND,** 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, little fines, few medium SAND, trace fine GRAVEL, grades to SANDY CLAY. @28.1-28.6': SILTY SAND grading into CLAYEY SAND with GRAVEL contact, 10YR 4/4 Dark Yellowish Brown, fine SAND. @29.2-29.3': Coarse to fine GRAVEL.				
	355												
30		12	6	100					**Younger Mud Flows (Qym)** **CLAYEY SAND,** 10YR 4/4 Dark Yellowish Brown, moist, fine SAND, little fines, few medium to coarse SAND, trace fine GRAVEL, subrounded, iron oxide staining, massive.				
	350												
35		13	7	100					@35.0': **SANDY CLAY to CLAYEY SAND,** 7.5YR 4/6 Strong Brown, some fines, few medium SAND and fine GRAVEL, trace coarse GRAVEL, subangular.				
	345												

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FIGURE A-4 b

LOG OF CORE BORING

PROJECT NAME Franklin Ave. Fault Study

PROJECT NUMBER LA-1290

BORING **B-4**

SITE LOCATION Vine St. & Hollywood Blvd., Los Angeles, CA

DATE(S) DRILLED 6/21/2016

LOGGED BY K. Neill

SHEET NO. 3 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 75

DRILL RIG TYPE Hollow Stem Auger

DRILLED BY Gregg Drilling

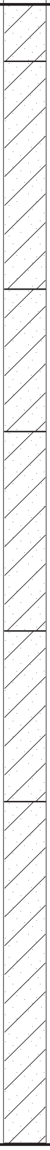
INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 384.3

COMMENTS

BOREHOLE BACKFILL Soil Cuttings



DEPTH (ft)	ELEVATION (ft)	SOIL CORE 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
		14	8	100				@39.8': Few medium SAND and fine GRAVEL, angular, grussification, iron oxide staining.				
	340							@41.0': Erosional contact. **CLAYEY SAND,** 7.5YR 3/2 Dark Brown, moist, consolidated, fine SAND, some fines, few medium to coarse SAND, iron oxide and manganese staining. @41.0-42.5': Grades to CLAYIER. @44.0': Increase manganese oxide staining. Reworked erosional transitional contact.				
45		15	9	100				**Mud Flows (Qm)** **CLAYEY SAND,** 7.5YR 3/2 Dark Brown, moist, consolidated, fine SAND, little fines, trace medium SAND and fine GRAVEL, iron and manganese oxide staining.				
	335							@47.5-48.0': Erosional upper contact. 7.5YR 4/4 Brown, irregular. **CLAYEY SAND,** 7.5YR 3/4 Dark Brown, moist, consolidated, platy ped, fine SAND, few medium to coarse SAND and fine GRAVEL, concentrated manganese and iron oxide staining.				
50		16	10	100								
								@51.0': **(Paleosol),** transitional zone. **SANDY CLAY to CLAYEY SAND,** 7.5YR 4/3 Brown with gleying, consolidated, tight platy ped, vertical fractures (desiccation cracks) discontinuous, healed with Dark Brown CLAY.				
	330							**Older Alluvium (Qoal)** **(Paleosol),** 2 to 3 inch thick, Dark Brown, CLAYEY, rootlets. **CLAYEY SAND,** 7.5YR 3/2 Dark Brown, moist, consolidated, fine SAND, some fines, few medium SAND, trace coarse SAND and fine GRAVEL, subrounded, iron oxide and manganese staining.				
55		17	11	100								
	325											

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FIGURE A-4 c

LOG OF CORE BORING

PROJECT NAME Franklin Ave. Fault Study

PROJECT NUMBER LA-1290

BORING B-4

SITE LOCATION Vine St. & Hollywood Blvd., Los Angeles, CA

DATE(S) DRILLED 6/21/2016

LOGGED BY K. Neill

SHEET NO. 4 of 4

DRILLING METHOD Continuous Soil Core

DRILL BIT SIZE/TYPE 8.25 in

CHECKED BY M. Sutherland

TOTAL DEPTH DRILLED (feet) 75

DRILL RIG TYPE Hollow Stem Auger

DRILLED BY Gregg Drilling

INCLINATION FROM VERTICAL/BEARING 0º None

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE TOP ELEVATION (feet) 384.3

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	SOIL 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
	320	18	12	100					**CLAYEY SAND,**7.5YR 4/4 Brown, moist, dense, fine SAND, little fines, few medium SAND, trace coarse SAND and fine GRAVEL, subangular, micaceous, iron oxide staining. @61.7': Less weathered below, slight coarsening downward, less CLAY.				
65		19	13	100					**Poorly Graded SAND with CLAY,** 7.5YR 4/6 Strong Brown, moist, loose, fine SAND, little fines, few medium to coarse SAND.				
	315								@67.5': Erosional contact. Mottling at contact. **CLAYEY SAND (Paleosol),** 7.5YR 4/6 Strong Brown, moist, dense, fine SAND, some fines, few medium to coarse SAND, trace fine GRAVEL, iron oxide and manganese staining.				
70	310	20	14	100					**Poorly Graded SAND with CLAY,** 7.5YR 4/6 Strong Brown, moist, loose, fine SAND, little fines, few medium SAND, trace coarse SAND and fine GRAVEL, subrounded, massive. Total depth = 75 feet below ground surface. Groundwater not encountered during drilling. Backfilled with soil cuttings and patched with cold patch.				
75	305												

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LOG OF CORE BORING

PROJECT NAME
Millenium Trench W Argyle Ave

PROJECT NUMBER
LA-1191A

BORING
B-11

SITE LOCATION
Capitol Parking Lot

DATE(S) DRILLED
8/12/2014

LOGGED BY
TO

SHEET NO.
1 of 3

DRILLING METHOD
Hollow Stem Auger

DRILL BIT SIZE/TYPE
8"

CHECKED BY
SK

TOTAL DEPTH DRILLED (feet)
60

DRILL RIG TYPE
Marl M-12

DRILLED BY
Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING
0 Degrees

APPARENT GROUNDWATER DEPTH
None encountered

APPROXIMATE PILE TOP ELEVATION (feet)
387.86

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
									Asphalt at surface. Hand augered to 5 feet bgs. **ARTIFICIAL FILL (Qaf)**				
	385								**Sandy SILT** dark brown, moist, fine to medium sand.				
5			1						**UPPER SAND UNIT (Qs)** **Silty SAND** 10YR 5/6 (yellowish brown); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL				
	380								**SAND with SILT** 10YR 6/6 (brownish yellow); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL				
10			2										
	375								**Silty SAND** 10YR 4/6 (dark yellowish brown); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL @ 14.5': sand becomes coarser				
15			3										
	370								**SAND with SILT** 10YR 5/6 (yellowish brown); moist, fine to medium SAND; few coarse SAND and fine GRAVEL, trace coarse GRAVEL **Silty SAND** 10YR 5/6 (yellowish brown); moist; fine to medium SAND, few coarse SAND; trace fine GRAVEL @ 19': gravel becomes coarser				
20			4						@ 20': 10YR 4/4 (dark yellowish brown); sand becomes finer. @ 21': 10YR 5/6 (yellowish brown); sand becomes coarser				
	365								**SAND with SILT** 10YR 5/6 (yellowish brown); moist; fine to medium SAND; few coarse SAND; trace fine GRAVEL				

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-11**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 2 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 387.86

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										
	360												
30			6						<u>**MUD FLOWS (Qm)**</u> **Sandy CLAY**7.5YR 4/4 (brown) to 5YR 4/4 (reddish brown); moist; fine SAND; trace fine GRAVEL				
	355												
35			7						**Clayey SAND to sandy CLAY**7.5YR 4/6 (strong brown); moist; fine SAND; few medium SAND, trace coarse SAND and fine GRAVEL				
	350								@ 38': 7.5YR 4/4 (brown)				
40			8						@ 40': 7.5YR 5/4 (brown)				
	345								**Clayey SAND to sandy CLAY**7.5YR 3/2 (dark brown); moist; fine SAND; few medium SAND, trace coarse SAND and fine GRAVEL				
45			9										
	340								**(PALEO HORIZON)**				

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FIGURE R_A-4 b

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave	**PROJECT NUMBER** LA-1191A	**BORING** **B-11**	
SITE LOCATION Capitol Parking Lot	**DATE(S) DRILLED** 8/12/2014	**LOGGED BY** TO	**SHEET NO.** 3 of 3
DRILLING METHOD Hollow Stem Auger	**DRILL BIT SIZE/TYPE** 8"	**CHECKED BY** SK	**TOTAL DEPTH DRILLED (feet)** 60
DRILL RIG TYPE Marl M-12	**DRILLED BY** Gregg In-Situ Drilling	**INCLINATION FROM VERTICAL/BEARING** 0 Degrees	
APPARENT GROUNDWATER DEPTH None encountered		**APPROXIMATE PILE TOP ELEVATION (feet)** 387.86	
COMMENTS		**BOREHOLE BACKFILL** Soil Cuttings	

DEPTH (ft)	ELEVATION (ft)	ROCK CORE: RUN NO.	ROCK CORE: BOX NO.	ROCK CORE: RECOVERY, %	ROCK CORE: FRAC. FREQ.	ROCK CORE: R.Q.D., %	ROCK CORE: FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
			10						Color change to 7.5YR 3/2 (dark brown); 7.5YR 4/4 (brown) and 7.5 YR 5/1 (gray) **OLDER ALLUVIUM (Qoal)** **Clayey SAND**				
	335												
55			11										
									Clayey SAND7.5YR 4/6 (strong brown); moist; fine SAND; few medium SAND; trace coarse SAND and fine GRAVEL				
	330												
60									Total Depth: 60 feet below ground surface.				
	325												
65													
	320												
70													
	315												

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FIGURE R_A-4 c

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING B-12

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 1 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.9

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								Asphalt at surface. Hand augered to 5 feet bgs. **ARTIFICIAL FILL (Qaf)** **Sandy SILT** dark brown, moist, fine to medium sand.				
5	380		1						**UPPER SAND UNIT (Qs)** **Silty SAND** 10YR 5/6 (yellowish brown); moist; fine to medium SAND; trace coarse SAND and fine GRAVEL				
10	375		2						@ 12': very soft drilling				
									Clayey SAND 10YR 4/4 to 4/6 (dark yellowish brown); moist; fine to coarse SAND; trace coarse sand and fine GRAVEL				
15	370		3						No Recovery contact inferred using CPT data.				
									Clayey SAND 10YR 4/4 to 4/6 (dark yellowish brown); moist, dense, mostly fine to medium SAND, few coarse SAND and GRAVEL, micas.				
20	365		4						No Recovery contact inferred using CPT data.				
									Silty SAND 7.5YR 4/4 (brown), moist, medium dense, fine to medium SAND, trace coarse SAND, fine GRAVEL and coarse GRAVEL.				

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FIGURE R_A-5 a

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING B-12

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 2 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.9

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

DEPTH (ft)	ELEVATION (ft)	ROCK CORE RUN NO.	ROCK CORE BOX NO.	ROCK CORE RECOVERY, %	ROCK CORE FRAC. FREQ.	ROCK CORE R.Q.D., %	ROCK CORE FRACTURE DRAWING/ NUMBER	LITHOLOGY	MATERIAL DESCRIPTION	PACKER TESTS	LABORATORY TESTS	DRILL RATE, FEET/HOUR	FIELD NOTES
			5						Drilling becomes harder				
	360												
30			6						**MUD FLOWS (Qm)** CPT data used to place Qm contact **Silty SAND** 7.5YR 4/4 (brown), moist, dense, mostly fine to medium SAND.				
	355												
35			7										
	350								**Clayey SAND** 10YR 4/6 (dark yellowish brown); moist, fine SAND; trace coarse SAND and fine GRAVEL **Sandy CLAY** moist; fine SAND; trace medium and coarse SAND, and fine GRAVEL				
40			8										
	345												
									Sandy CLAY 5YR 4/3 (reddish brown), moist; fine SAND; trace medium and coarse SAND, and fine GRAVEL				
45			9										
	340												

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FIGURE R_A-5 b

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING B-12

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 3 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.9

COMMENTS

BOREHOLE BACKFILL Soil Cuttings

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						
			10										
	335								**(PALEO HORIZON)**				
									OLDER ALLUVIUM (Qoal)				
									Clayey SAND 10YR 4/6 (dark yellowish brown) and 10YR 5/2 (grayish brown); moist; fine to medium SAND; trace coarse and fine GRAVEL				
55			11						**Sandy CLAY** 10YR 4/6 and 10YR 5/2 (mottled); moist; fine SAND; trace fine GRAVEL				
	330								**Clayey SAND** 10YR 4/4 (dark yellowish brown); moist; fine SAND				
									Silty SAND 10YR 5/6 (yellowish brown); moist; fine SAND; trace fine GRAVEL				
60													
									Total Depth: 60 feet below ground surface.				
	325												
65													
	320												
70													
	315												

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FIGURE R_A-5 c

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-13**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 1 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

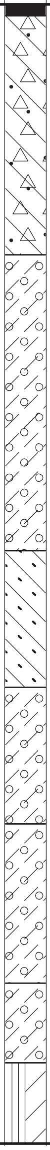
INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.45

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
									Asphalt at surface. Hand augered to 5 feet bgs.				
	385								**ARTIFICIAL FILL (Qaf)** **Sandy SILT** dark brown, moist, fine to medium sand.				
5			1										
	380								**UPPER SAND UNIT (Qs)** **Silty SAND** 10YR 5/8 (yellowish brown); moist; mostly fine to medium SAND; trace coarse SAND and fine GRAVEL				
10			2										
	375												
									Clayey SAND 10YR 4/4 (dark yellowish brown); moist; mostly fine SAND; few medium SAND; trace coarse SAND and GRAVEL				
15			3						**SAND with SILT** 10YR 5/6 (yellowish brown); moist; mostly fine to medium SAND; few coarse SAND; trace fine GRAVEL				
	370												
									Silty SAND 10YR 4/4 (dark yellowish brown); moist; mostly fine SAND; few medium SAND; trace fine GRAVEL				
20			4										
	365								**SAND with SILT** 10YR 4/6 (dark yellowish brown); moist; mostly fine to medium SAND; few coarse SAND; trace GRAVEL; occasional silty sand lenses				
									Clayey SAND 7.5YR 4/4 (brown); moist; mostly fine SAND; few medium SAND; trace coarse and fine GRAVEL				

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FIGURE R_A-6 a

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-13**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 2 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

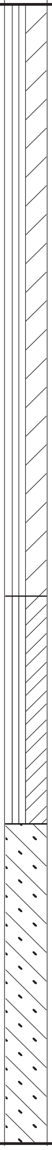
INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.45

COMMENTS

BOREHOLE BACKFILL Soil Cuttings



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						
			5										
	360												
									Clayey SAND7.5YR 4/4 (brown); moist; mostly fine to medium SAND; trace coarse SAND and fine GRAVEL				
30			6										
									MUD FLOWS (Qm) CPT signature used to identify contact				
	355												
35			7										
	350												
									Sandy CLAY7.5YR 3/4 (dark brown) interbedded 5YR 4/4 (reddish brown); moist; mostly fine SAND; some medium SAND; few coarse SAND; trace fine to coarse GRAVEL				
40			8										
	345												
									Sandy CLAY5YR 3/3 (dark reddish brown), moist; mostly fine SAND; some medium SAND; few coarse SAND; trace GRAVEL				
45			9										
	340												

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FIGURE R_A-6 b

LOG OF CORE BORING

PROJECT NAME Millenium Trench W Argyle Ave

PROJECT NUMBER LA-1191A

BORING **B-13**

SITE LOCATION Capitol Parking Lot

DATE(S) DRILLED 8/12/2014

LOGGED BY TO

SHEET NO. 3 of 3

DRILLING METHOD Hollow Stem Auger

DRILL BIT SIZE/TYPE 8"

CHECKED BY SK

TOTAL DEPTH DRILLED (feet) 60

DRILL RIG TYPE Marl M-12

DRILLED BY Gregg In-Situ Drilling

INCLINATION FROM VERTICAL/BEARING 0 Degrees

APPARENT GROUNDWATER DEPTH None encountered

APPROXIMATE PILE TOP ELEVATION (feet) 386.45

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
			10										
	335								**(Paleo Horizon)** **OLDER ALLUVIUM (Qoal)** **Sandy CLAY to Clayey SAND**7.5YR 4/4 (brown) interbedded 7.5YR 5/1 (gray); moist; mostly fine SAND; trace medium to coarse SAND; trace fine GRAVEL; mottled				
55			11										
	330												
60													
	325								Total Depth: 60 feet below ground surface.				
65													
	320												
70													
	315												

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.

Cone Penetration Testing Procedure (CPT)

Gregg Drilling carries out all Cone Penetration Tests (CPT) using an integrated electronic cone system, *Figure CPT*.

The cone takes measurements of tip resistance (q_c), sleeve resistance (f_s), and penetration pore water pressure (u_2). Measurements are taken at either 2.5 or 5 cm intervals during penetration to provide a nearly continuous profile. CPT data reduction and basic interpretation is performed in real time facilitating on-site decision making. The above mentioned parameters are stored electronically for further analysis and reference. All CPT soundings are performed in accordance with revised ASTM standards (D 5778-12).

The 5mm thick porous plastic filter element is located directly behind the cone tip in the u_2 location. A new saturated filter element is used on each sounding to measure both penetration pore pressures as well as measurements during a dissipation test (*PPDT*). Prior to each test, the filter element is fully saturated with oil under vacuum pressure to improve accuracy.

When the sounding is completed, the test hole is backfilled according to client specifications. If grouting is used, the procedure generally consists of pushing a hollow tremie pipe with a "knock out" plug to the termination depth of the CPT hole. Grout is then pumped under pressure as the tremie pipe is pulled from the hole. Disruption or further contamination to the site is therefore minimized.

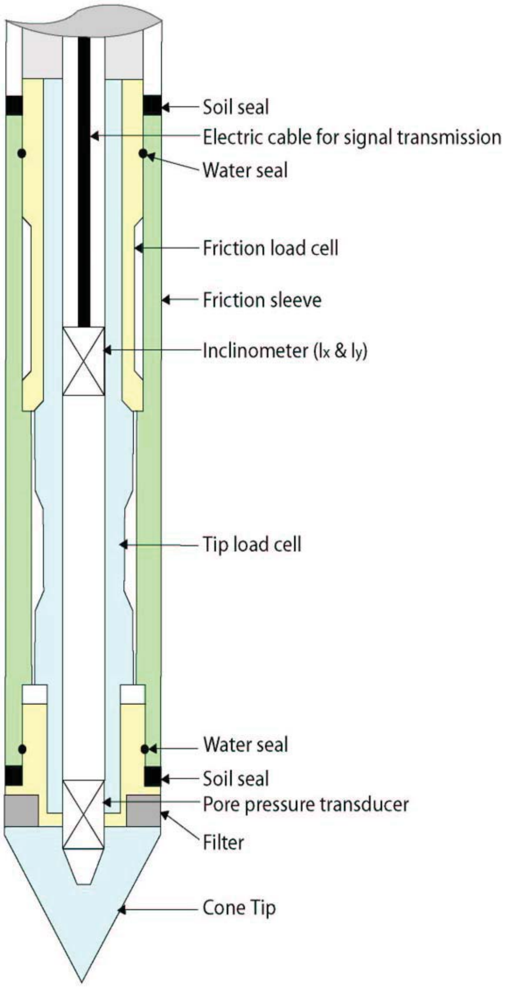


Figure CPT

Gregg 15cm^2 Standard Cone Specifications

Dimensions	
Cone base area	15 cm^2
Sleeve surface area	225 cm^2
Cone net area ratio	0.80
Specifications	
Cone load cell	
Full scale range	180 kN (20 tons)
Overload capacity	150%
Full scale tip stress	120 MPa (1,200 tsf)
Repeatability	120 kPa (1.2 tsf)
Sleeve load cell	
Full scale range	31 kN (3.5 tons)
Overload capacity	150%
Full scale sleeve stress	1,400 kPa (15 tsf)
Repeatability	1.4 kPa (0.015 tsf)
Pore pressure transducer	
Full scale range	7,000 kPa (1,000 psi)
Overload capacity	150%
Repeatability	7 kPa (1 psi)

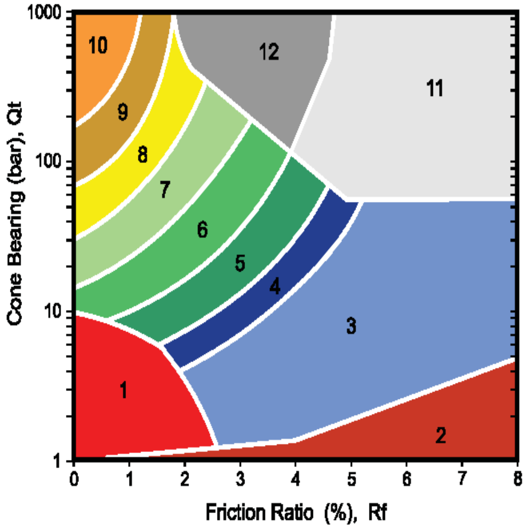
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

Cone Penetration Test Data & Interpretation

The Cone Penetration Test (CPT) data collected are presented in graphical and electronic form in the report. The plots include interpreted Soil Behavior Type (SBT) based on the charts described by Robertson (1990). Typical plots display SBT based on the non-normalized charts of Robertson et al (1986). For CPT soundings deeper than 30m, we recommend the use of the normalized charts of Robertson (1990) which can be displayed as SBTn, upon request. The report also includes spreadsheet output of computer calculations of basic interpretation in terms of SBT and SBTn and various geotechnical parameters using current published correlations based on the comprehensive review by Lunne, Robertson and Powell (1997), as well as recent updates by Professor Robertson (Guide to Cone Penetration Testing, 2015). The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg Drilling & Testing Inc. does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software. Some interpretation methods require input of the groundwater level to calculate vertical effective stress. An estimate of the in-situ groundwater level has been made based on field observations and/or CPT results, but should be verified by the user.

A summary of locations and depths is available in Table 1. Note that all penetration depths referenced in the data are with respect to the existing ground surface.

Note that it is not always possible to clearly identify a soil type based solely on q_t, f_s, and u_2. In these situations, experience, judgment, and an assessment of the pore pressure dissipation data should be used to infer the correct soil behavior type.



ZONE		SBT
1		🟥 Sensitive, fine grained
2		🟫 Organic materials
3		🟦 Clay
4		🟦 Silty clay to clay
5		🟩 Clayey silt to silty clay
6		🟩 Sandy silt to clayey silt
7		🟨 Silty sand to sandy silt
8		🟨 Sand to silty sand
9		🟫 Sand
10		🟧 Gravely sand to sand
11		⬜ Very stiff fine grained*
12		⬛ Sand to clayey sand*

*over consolidated or cemented

Figure SBT (After Robertson et al., 1986) – Note: Colors may vary slightly compared to plots

Cone Penetration Test (CPT) Interpretation

Gregg uses a proprietary CPT interpretation and plotting software. The software takes the CPT data and performs basic interpretation in terms of soil behavior type (SBT) and various geotechnical parameters using current published empirical correlations based on the comprehensive review by Lunne, Robertson and Powell (1997). The interpretation is presented in tabular format using MS Excel. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed. Gregg does not warranty the correctness or the applicability of any of the geotechnical parameters interpreted by the software and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used in the software.

The following provides a summary of the methods used for the interpretation. Many of the empirical correlations to estimate geotechnical parameters have constants that have a range of values depending on soil type, geologic origin and other factors. The software uses 'default' values that have been selected to provide, in general, conservatively low estimates of the various geotechnical parameters.

Input:

1 Units for display (Imperial or metric) (atm. pressure, p_a = 0.96 tsf or 0.1 MPa)
2 Depth interval to average results (ft or m). Data are collected at either 0.02 or 0.05m and can be averaged every 1, 3 or 5 intervals.
3 Elevation of ground surface (ft or m)
4 Depth to water table, z_w (ft or m) – input required
5 Net area ratio for cone, a (default to 0.80)
6 Relative Density constant, C_{Dr} (default to 350)
7 Young's modulus number for sands, α (default to 5)
8 Small strain shear modulus number
  a. for sands, S_G (default to 180 for SBT_n 5, 6, 7)
  b. for clays, C_G (default to 50 for SBT_n 1, 2, 3 & 4)
9 Undrained shear strength cone factor for clays, N_{kt} (default to 15)
10 Over Consolidation ratio number, k_{ocr} (default to 0.3)
11 Unit weight of water, (default to $\gamma_w = 62.4\ lb/ft^3$ or $9.81\ kN/m^3$)

Column

1 Depth, z, (m) – CPT data is collected in meters
2 Depth (ft)
3 Cone resistance, q_c (tsf or MPa)
4 Sleeve resistance, f_s (tsf or MPa)
5 Penetration pore pressure, u (psi or MPa), measured behind the cone (i.e. u_2)
6 Other – any additional data
7 Total cone resistance, q_t (tsf or MPa) $q_t = q_c + u\,(1\text{-}a)$

8	Friction Ratio, R_f (%)	$R_f = (f_s/q_t) \times 100\%$
9	Soil Behavior Type (non-normalized), SBT	see note
10	Unit weight, γ (pcf or kN/m^3)	based on SBT, see note
11	Total overburden stress, σ_v (tsf)	$\sigma_{vo} = \sigma\ z$
12	In-situ pore pressure, u_o (tsf)	$u_o = \gamma_w\ (z - z_w)$
13	Effective overburden stress, σ'_{vo} (tsf)	$\sigma'_{vo} = \sigma_{vo} - u_o$
14	Normalized cone resistance, Q_{t1}	$Q_{t1}= (q_t - \sigma_{vo}) / \sigma'_{vo}$
15	Normalized friction ratio, F_r (%)	$F_r = f_s / (q_t - \sigma_{vo}) \times 100\%$
16	Normalized Pore Pressure ratio, B_q	$B_q = u – u_o / (q_t - \sigma_{vo})$
17	Soil Behavior Type (normalized), SBT_n	see note
18	SBT_n Index, I_c	see note
19	Normalized Cone resistance, Q_{tn} (n varies with I_c)	see note
20	Estimated permeability, k_{SBT} (cm/sec or ft/sec)	see note
21	Equivalent SPT N_{60}, blows/ft	see note
22	Equivalent SPT $(N_1)_{60}$ blows/ft	see note
23	Estimated Relative Density, D_r, (%)	see note
24	Estimated Friction Angle, ϕ', (degrees)	see note
25	Estimated Young's modulus, E_s (tsf)	see note
26	Estimated small strain Shear modulus, Go (tsf)	see note
27	Estimated Undrained shear strength, s_u (tsf)	see note
28	Estimated Undrained strength ratio	s_u/σ_v'
29	Estimated Over Consolidation ratio, OCR	see note

Notes:

1 Soil Behavior Type (non-normalized), SBT (Lunne et al., 1997 and table below)

2 Unit weight, γ either constant at 119 pcf or based on Non-normalized SBT (Lunne et al., 1997 and table below)

3 Soil Behavior Type (Normalized), SBT_n Lunne et al. (1997)

4 SBT_n Index, I_c $I_c = ((3.47 – \log Q_{t1})^2 + (\log F_r + 1.22)^2)^{0.5}$

5 Normalized Cone resistance, Q_{tn} (n varies with Ic)

$Q_{tn} = ((q_t - \sigma_{vo})/pa)\ (pa/(\sigma'_{vo})^n$ and recalculate I_c, then iterate:

When $I_c < 1.64$, $n = 0.5$ (clean sand)
When $I_c > 3.30$, $n = 1.0$ (clays)
When $1.64 < I_c < 3.30$, $n = (I_c – 1.64)0.3 + 0.5$
Iterate until the change in n, $\Delta n < 0.01$

6 Estimated permeability, k_{SBT} based on Normalized SBT_n (Lunne et al., 1997 and table below)

7 Equivalent SPT N_{60}, blows/ft Lunne et al. (1997)

$$\frac{(q_t/p_a)}{N_{60}} = 8.5\left(1 - \frac{I_c}{4.6}\right)$$

8 Equivalent SPT $(N_1)_{60}$ blows/ft $(N_1)_{60} = N_{60}\, C_{N,}$
where $C_N = (pa/\sigma'_{vo})^{0.5}$

9 Relative Density, D_r, (%) $D_r^2 = Q_{tn} / C_{Dr}$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

10 Friction Angle, ϕ', (degrees) $\tan\phi' = \frac{1}{2.68}\left[\log\left(\frac{q_c}{\sigma'_{vo}}\right) + 0.29\right]$

Only SBT_n 5, 6, 7 & 8 *Show'N/A' in zones 1, 2, 3, 4 & 9*

11 Young's modulus, E_s $E_s = \alpha\, q_t$
Only SBT_n 5, 6, 7 & 8 *Show 'N/A' in zones 1, 2, 3, 4 & 9*

12 Small strain shear modulus, Go
a. $G_o = S_G\,(q_t\ \sigma'_{vo}\ pa)^{1/3}$ *For SBT_n 5, 6, 7*
b. $G_o = C_G\, q_t$ *For SBT_n 1, 2, 3& 4*
Show 'N/A' in zones 8 & 9

13 Undrained shear strength, s_u $s_u = (q_t - \sigma_{vo}) / N_{kt}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

14 Over Consolidation ratio, OCR $OCR = k_{ocr}\, Q_{t1}$
Only SBT_n 1, 2, 3, 4 & 9 *Show 'N/A' in zones 5, 6, 7 & 8*

The following updated and simplified SBT descriptions have been used in the software:

SBT Zones		**SBT_n Zones**	
1	sensitive fine grained	1	sensitive fine grained
2	organic soil	2	organic soil
3	clay	3	clay
4	clay & silty clay	4	clay & silty clay
5	clay & silty clay		
6	sandy silt & clayey silt		

7	silty sand & sandy silt	5	silty sand & sandy silt
8	sand & silty sand	6	sand & silty sand
9	sand		
10	sand	7	sand
11	very dense/stiff soil*	8	very dense/stiff soil*
12	very dense/stiff soil*	9	very dense/stiff soil*

*heavily overconsolidated and/or cemented

Track when soils fall with zones of same description and print that description (i.e. if soils fall only within SBT zones 4 & 5, print ‘clays & silty clays’)

Estimated Permeability (see Lunne et al., 1997)

SBT$_n$	Permeability (ft/sec)	(m/sec)
1	3x 10^{-8}	1x 10^{-8}
2	3x 10^{-7}	1x 10^{-7}
3	1x 10^{-9}	3x 10^{-10}
4	3x 10^{-8}	1x 10^{-8}
5	3x 10^{-6}	1x 10^{-6}
6	3x 10^{-4}	1x 10^{-4}
7	3x 10^{-2}	1x 10^{-2}
8	3x 10^{-6}	1x 10^{-6}
9	1x 10^{-8}	3x 10^{-9}

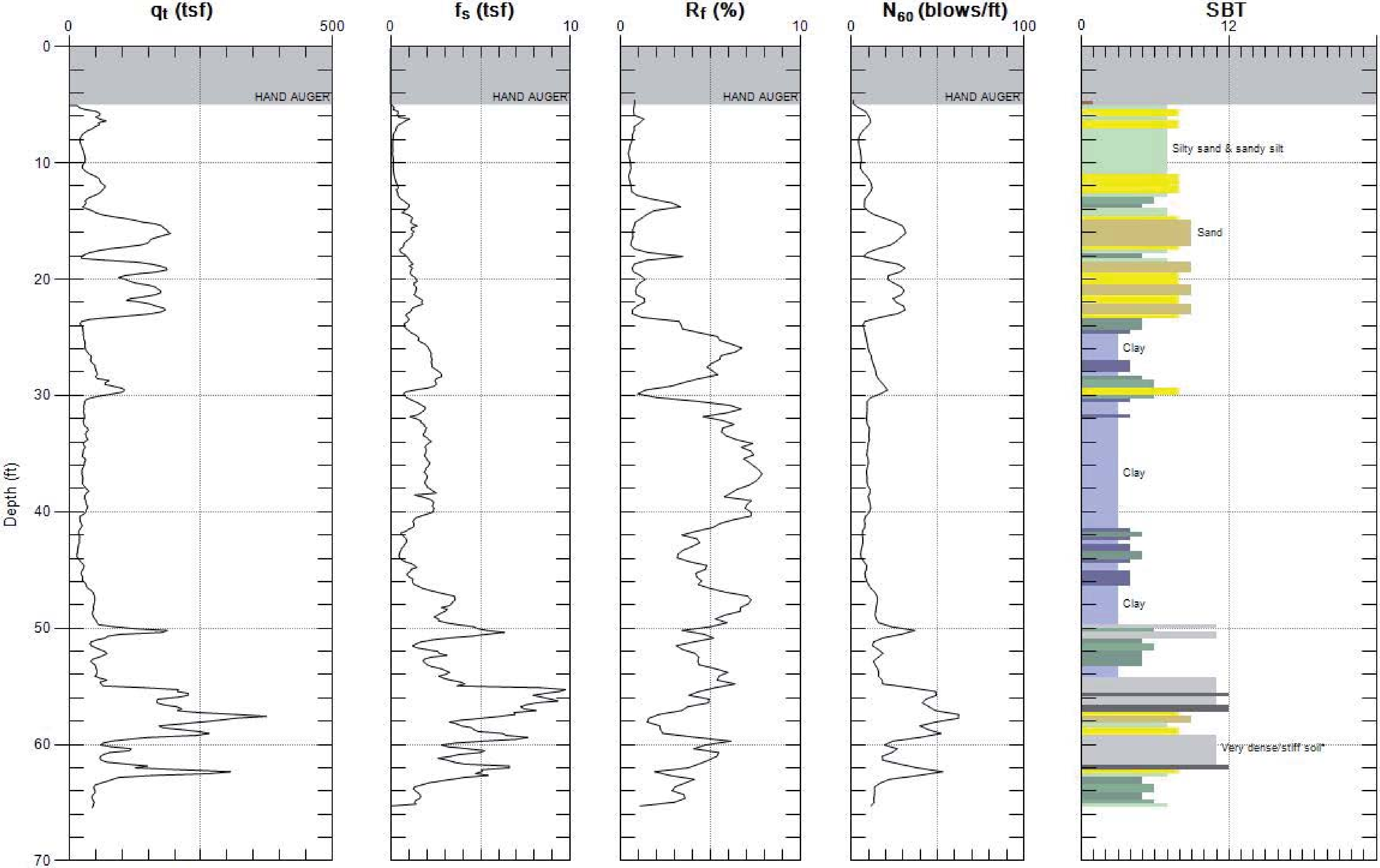
Estimated Unit Weight (see Lunne et al., 1997)

SBT	Approximate Unit Weight (lb/ft^3)	(kN/m^3)
1	111.4	17.5
2	79.6	12.5
3	111.4	17.5
4	114.6	18.0
5	114.6	18.0
6	114.6	18.0
7	117.8	18.5
8	120.9	19.0
9	124.1	19.5
10	127.3	20.0
11	130.5	20.5
12	120.9	19.0

GREGG **GROUP DELTA**

Site: 1718 VINE ST.
Sounding: C -1

Engineer: M.SUTHERLAND
Date: 6/1/2016 08:07



Max. Depth: 65.453 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

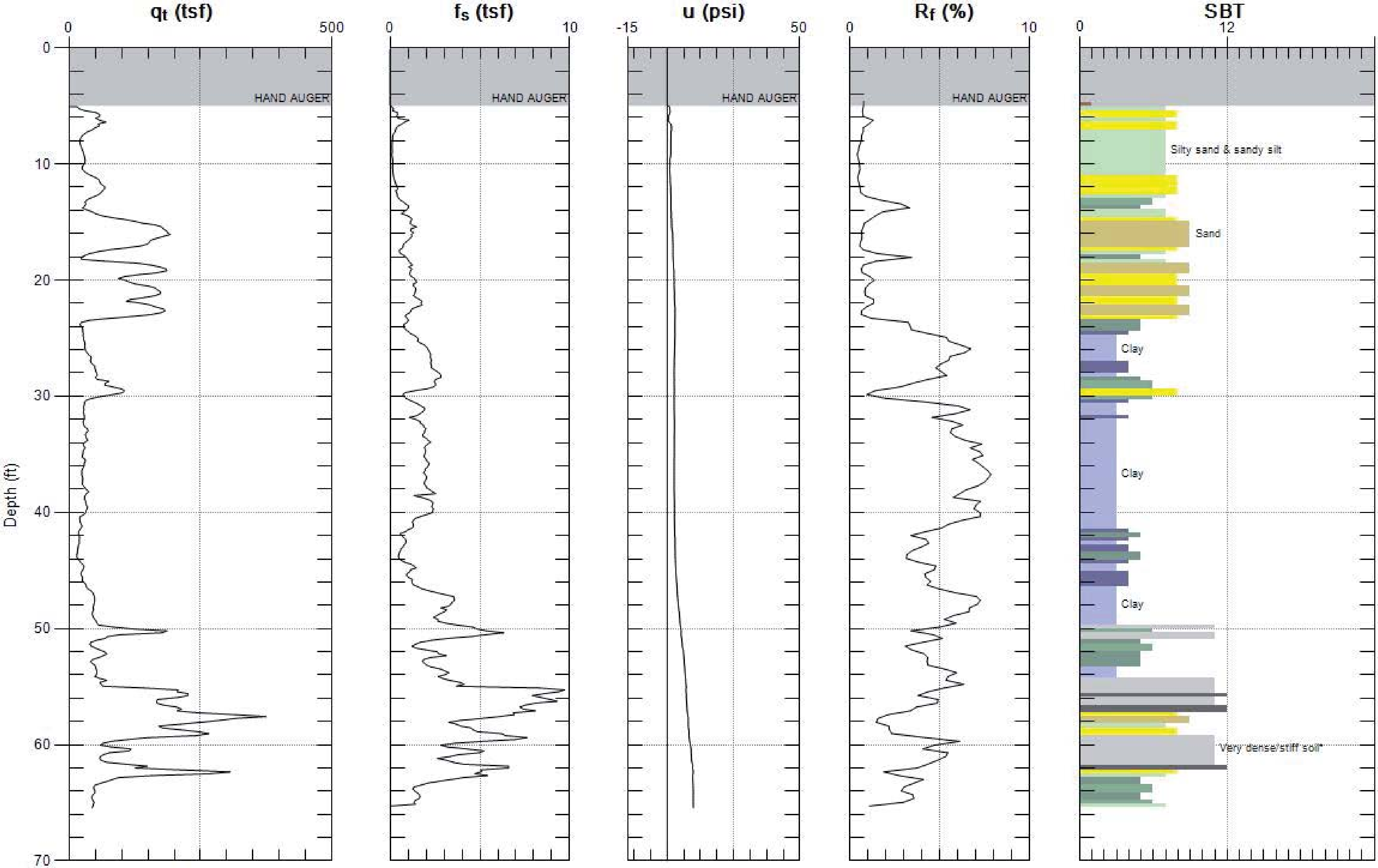
Figure A-8b

GREGG

GROUP DELTA

Site: 1718 VINE ST.
Sounding: C -1

Engineer: M.SUTHERLAND
Date: 6/1/2016 08:07



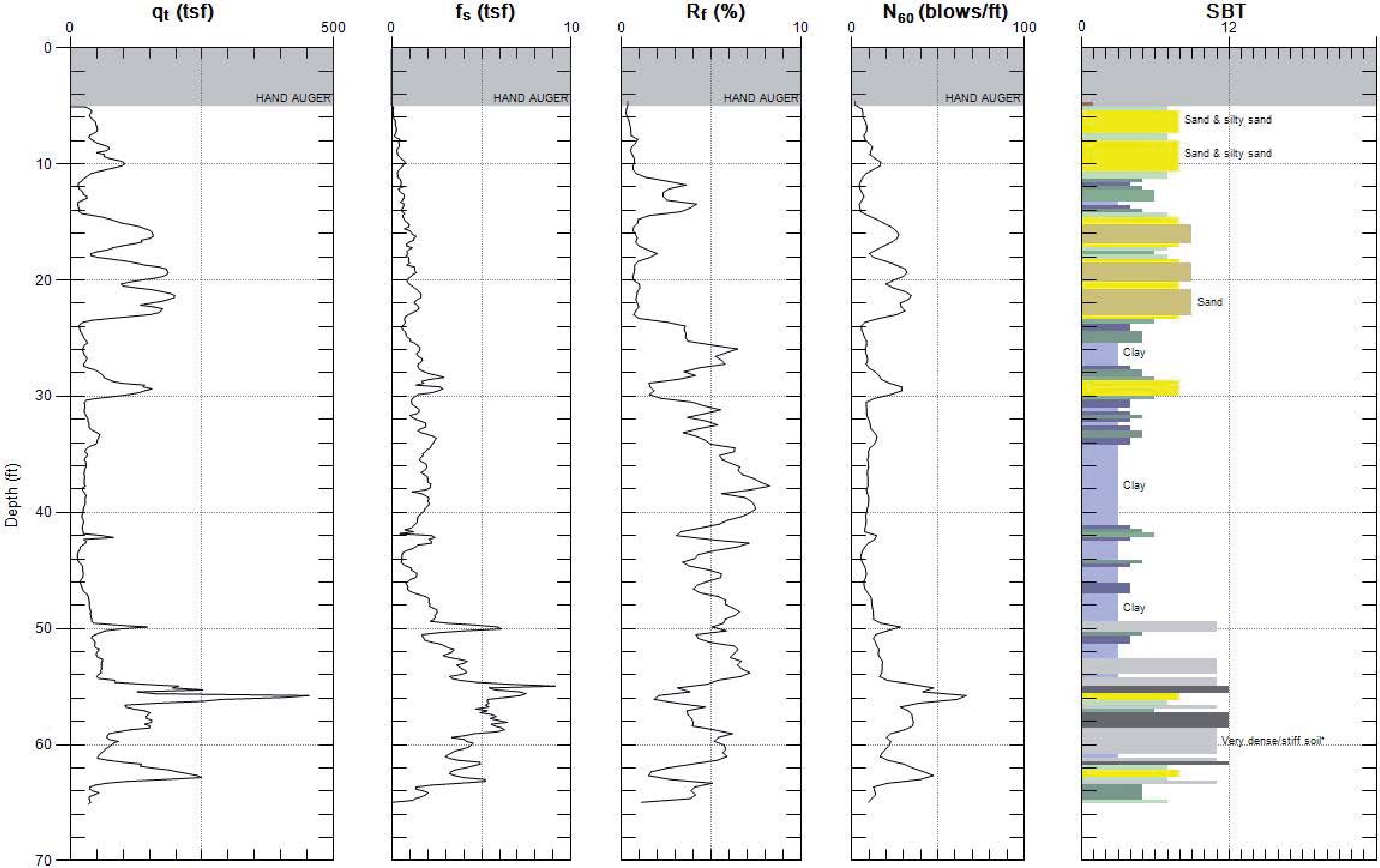
Max. Depth: 65.453 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: 1718 VINE ST.
Sounding: C -2

Engineer: M.SUTHERLAND
Date: 6/1/2016 09:00



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

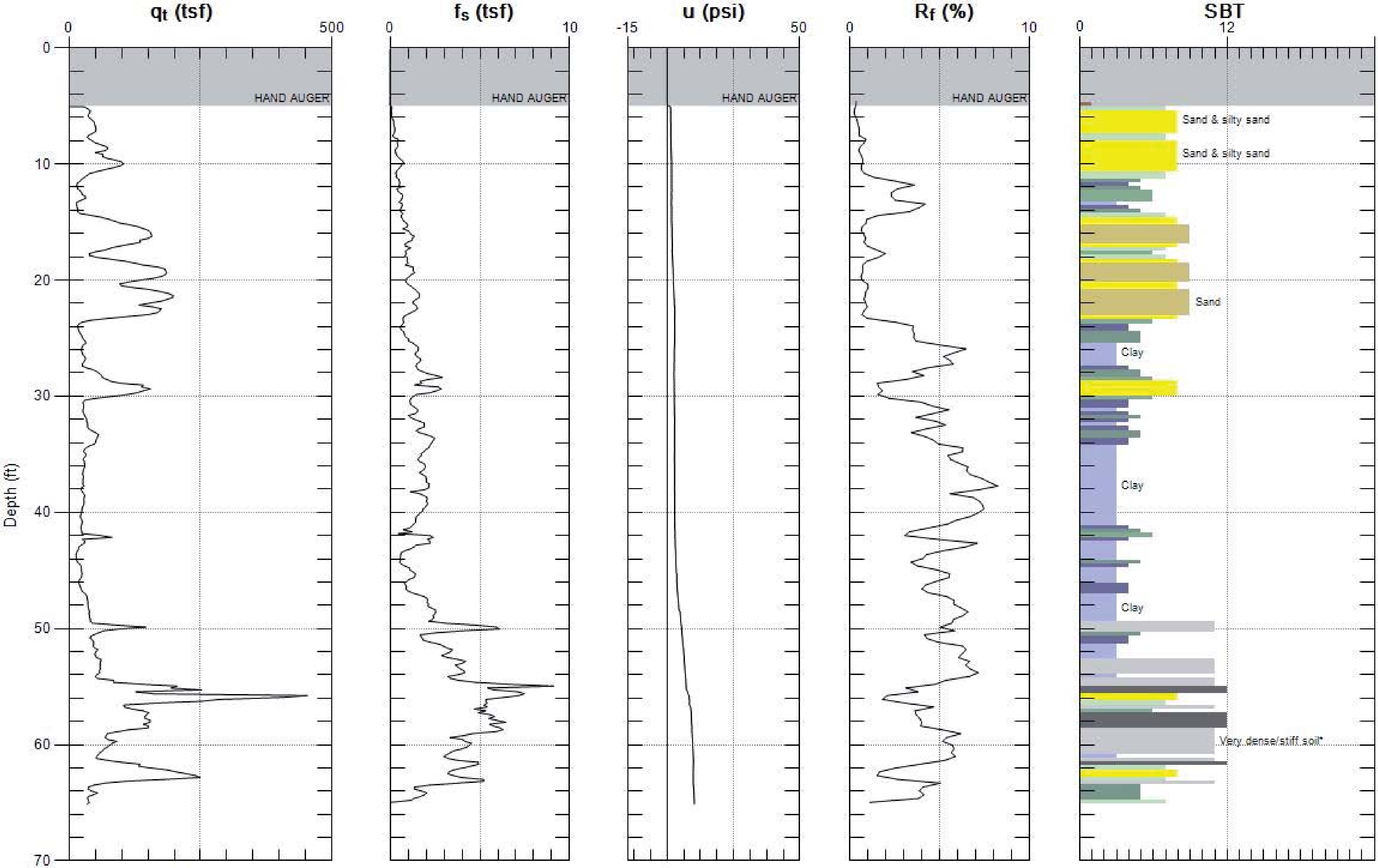
SBT: Soil Behavior Type (Robertson 1990)

Figure A-9b

GROUP DELTA

Site: 1718 VINE ST.
Sounding: C -2

Engineer: M.SUTHERLAND
Date: 6/1/2016 09:00



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

SBT: Soil Behavior Type (Robertson 1990)

Figure A-10a

GREGG

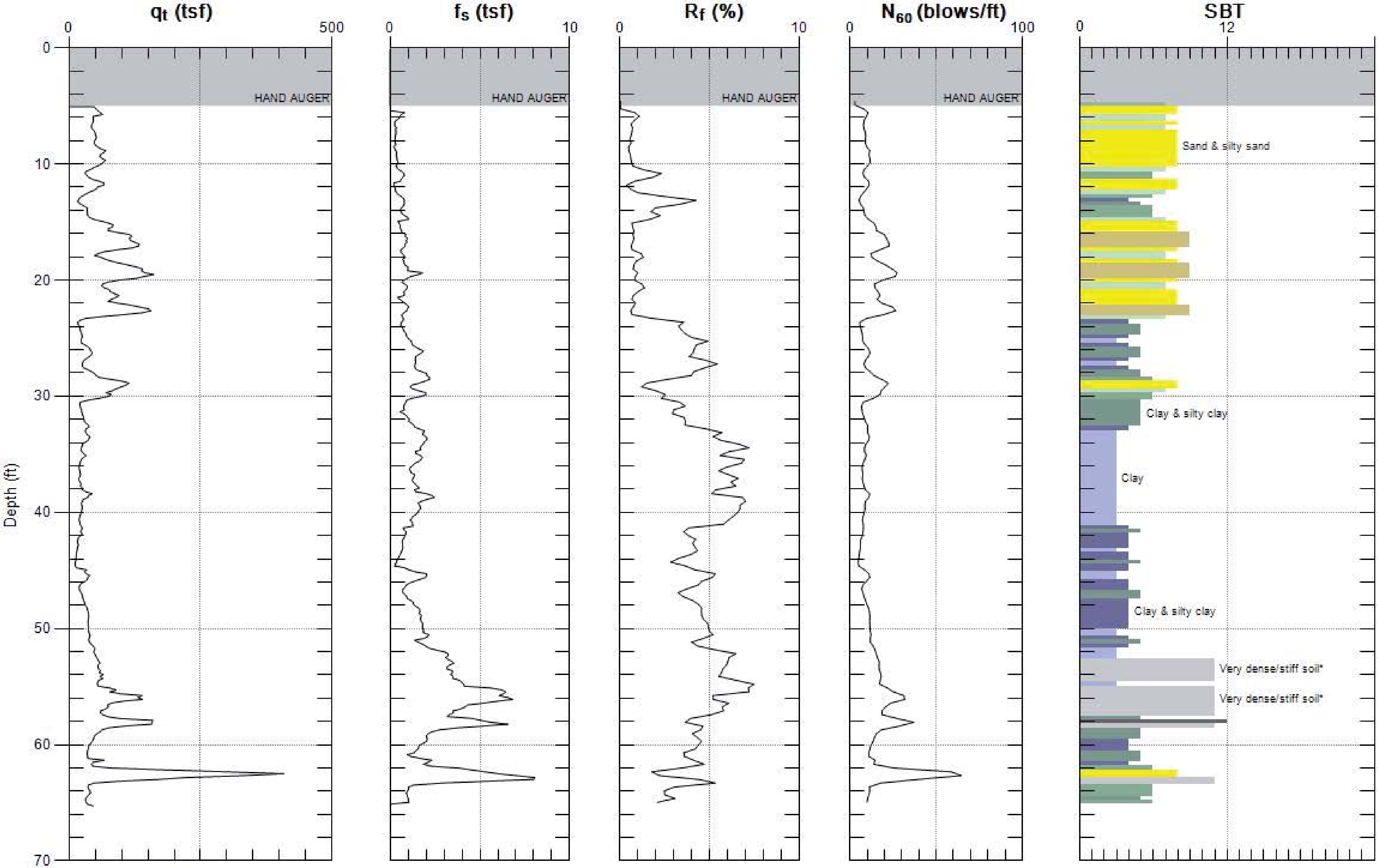
GROUP DELTA

Site: 1718 VINE ST.

Sounding: C -3

Engineer: M.SUTHERLAND

Date: 6/1/2016 10:10



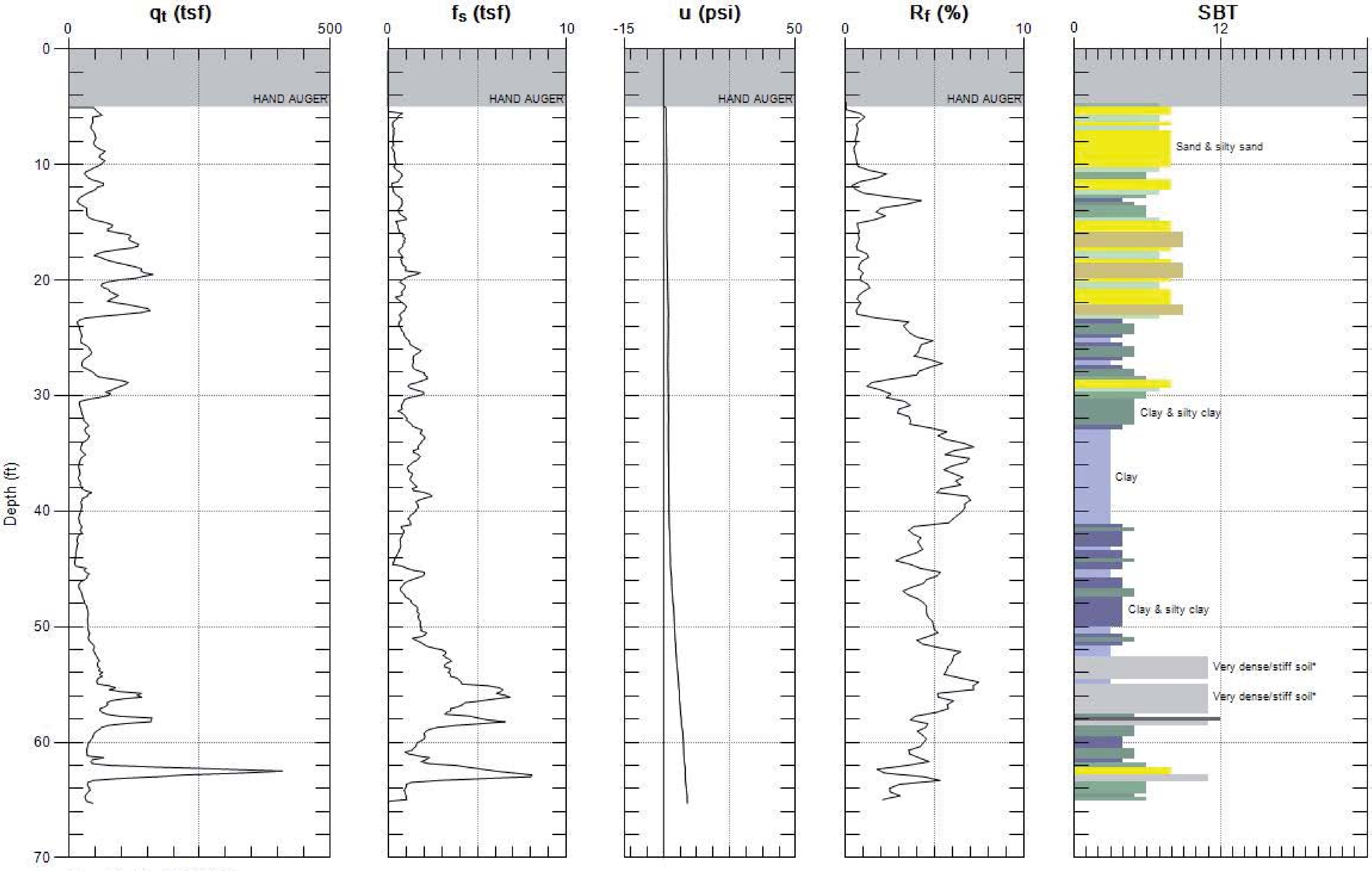
Max. Depth: 65.289 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: 1718 VINE ST.
Sounding: C -3

Engineer: M.SUTHERLAND
Date: 6/1/2016 10:10



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

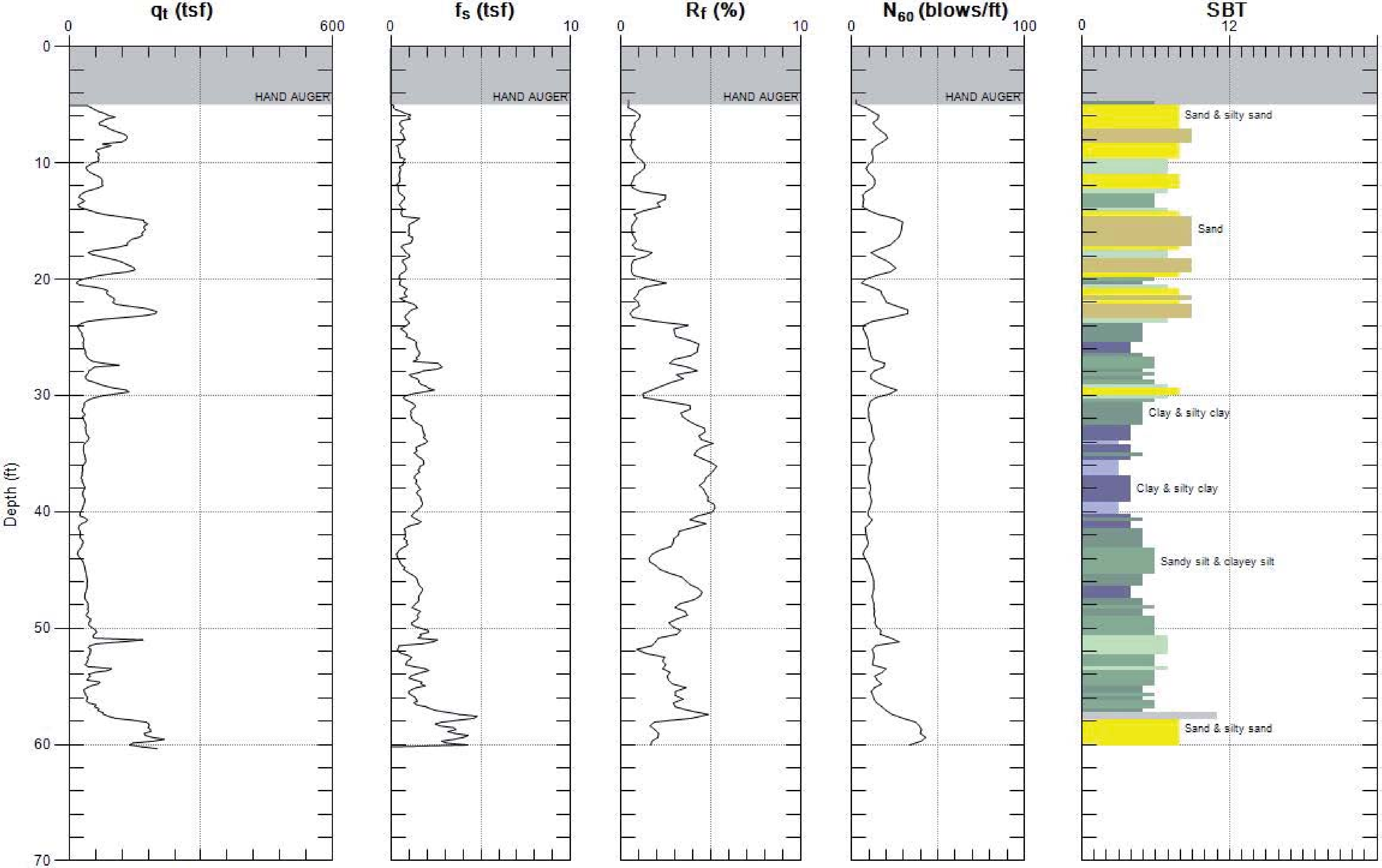
SBT: Soil Behavior Type (Robertson 1990)

Figure A-11a

GREGG **GROUP DELTA**

Site: **PARKING LOT S**
Sounding: CPT-36

Engineer: **S.KOLTHOFF**
Date: **8/14/2014 08:43**



Max. Depth: 60.367 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Figure A-11b

GREGG

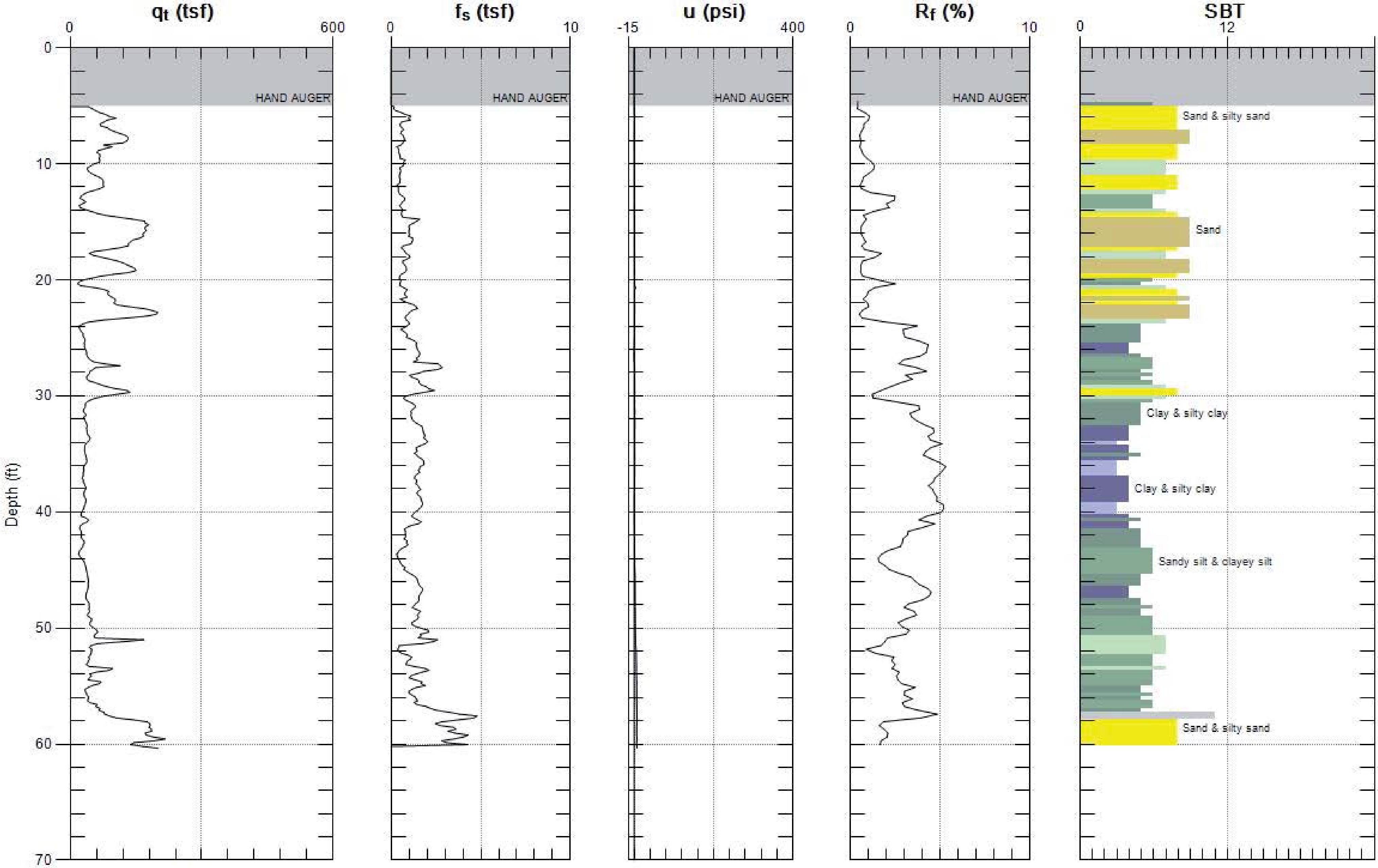
GROUP DELTA

Site: PARKING LOT S

Sounding: CPT-36

Engineer: S.KOLTHOFF

Date: 8/14/2014 08:43



Max. Depth: 60.367 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

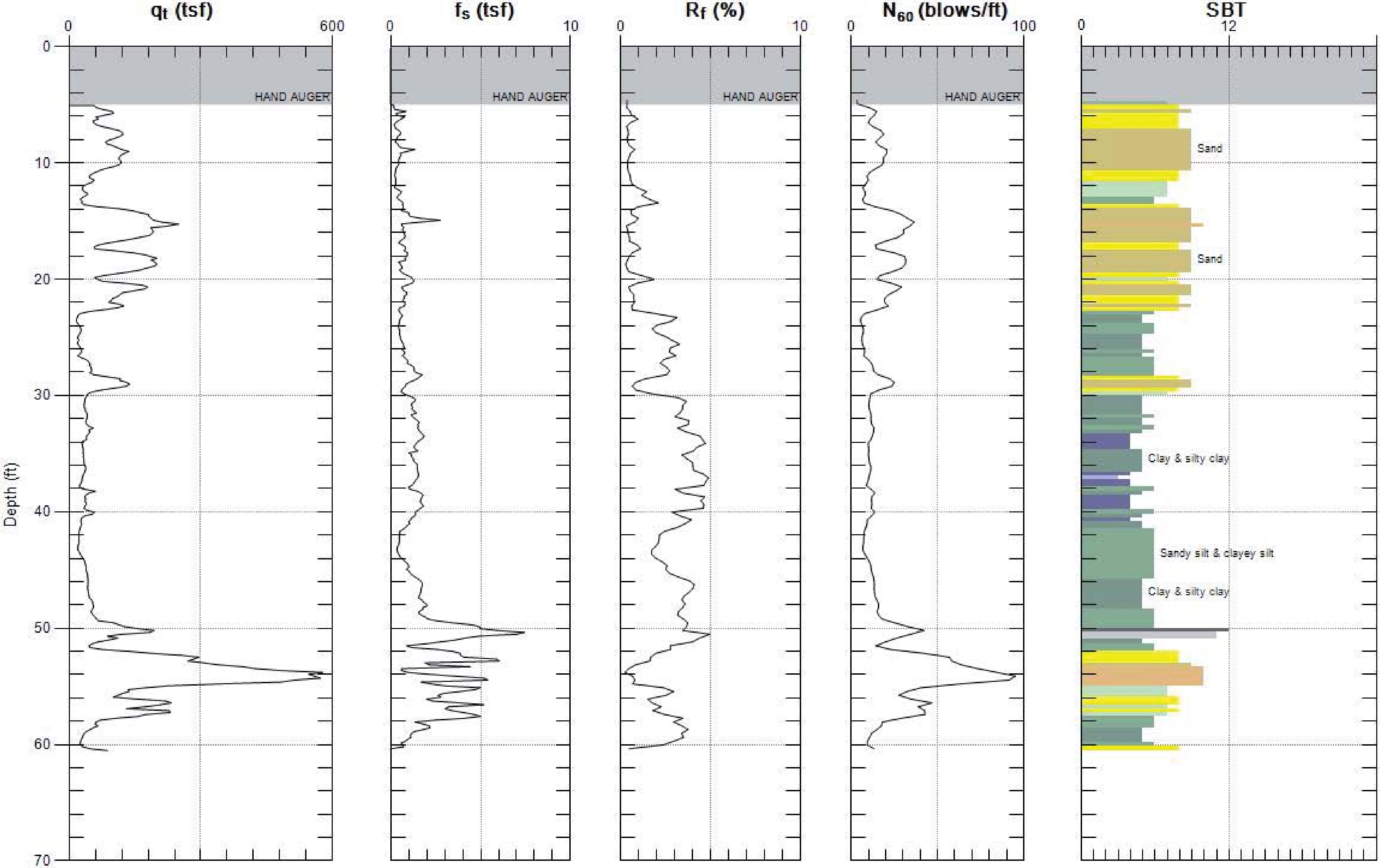
GROUP DELTA

Site: PARKING LOT S

Sounding: CPT-37

Engineer: S.KOLTHOFF

Date: 8/14/2014 07:45

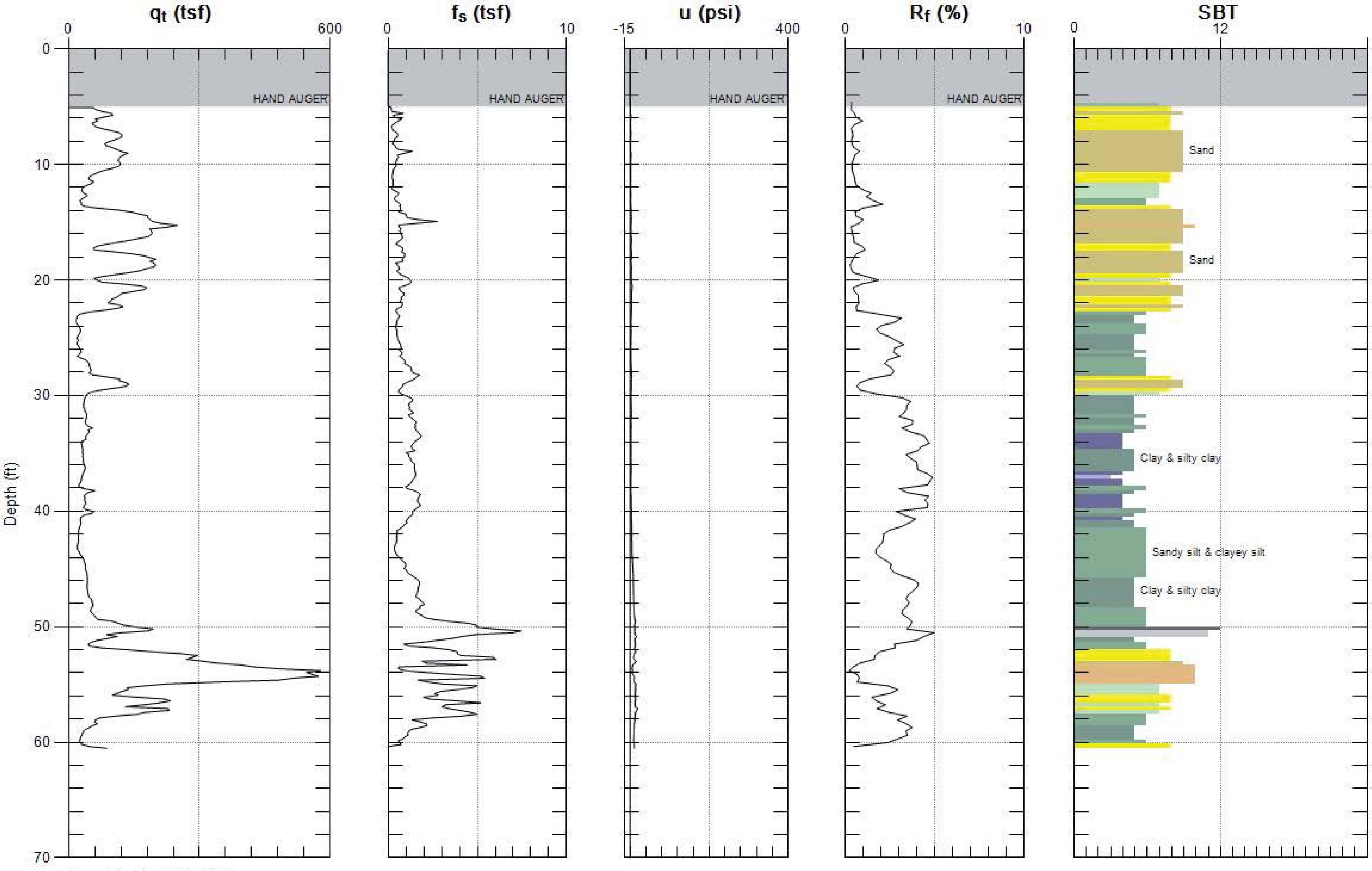


Max. Depth: 60.531 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GROUP DELTA

Site: PARKING LOT S
Sounding: CPT-37
Engineer: S.KOLTHOFF
Date: 8/14/2014 07:45



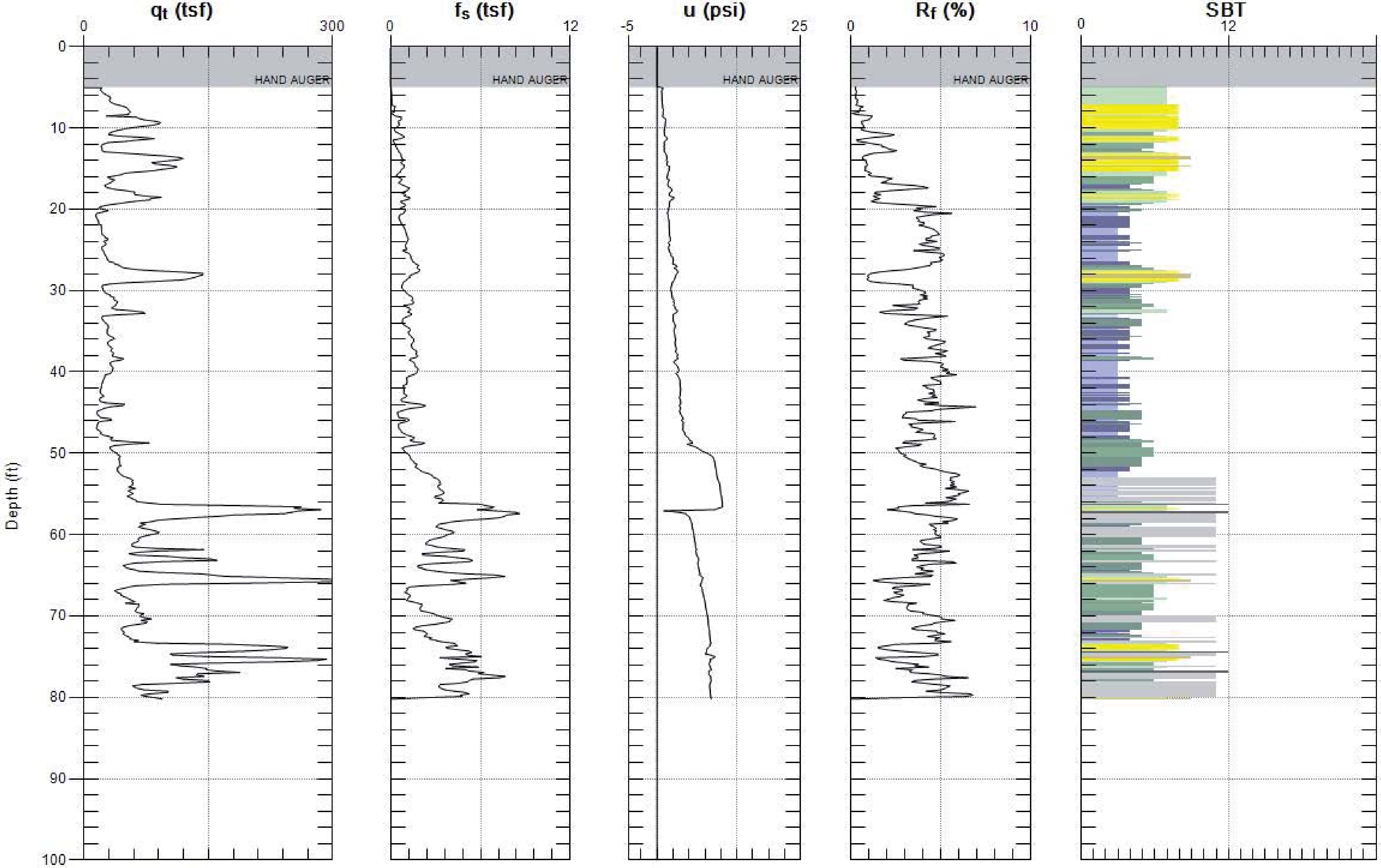
Max. Depth: 60.531 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **DELTA GROUP**

Site: VINE STREET PART 1
Sounding: C-1

Engineer: M. SUTHERLAND
Date: 6/23/2016 10:38



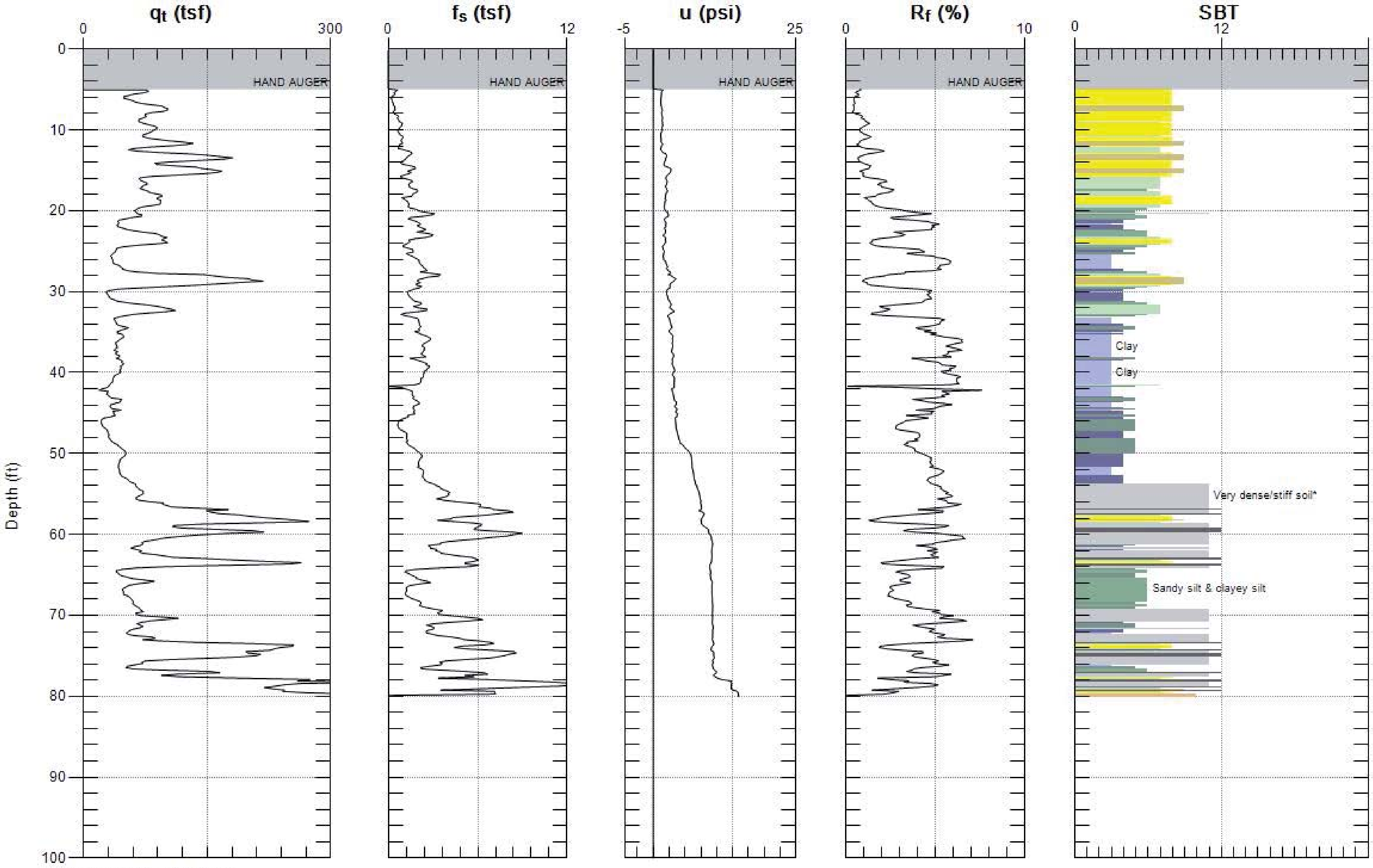
Max. Depth: 80.217 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

DELTA GROUP

Site: VINE STREET PART 1
Sounding: C-2

Engineer: M. SUTHERLAND
Date: 6/23/2016 09:45



Max. Depth: 80.052 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

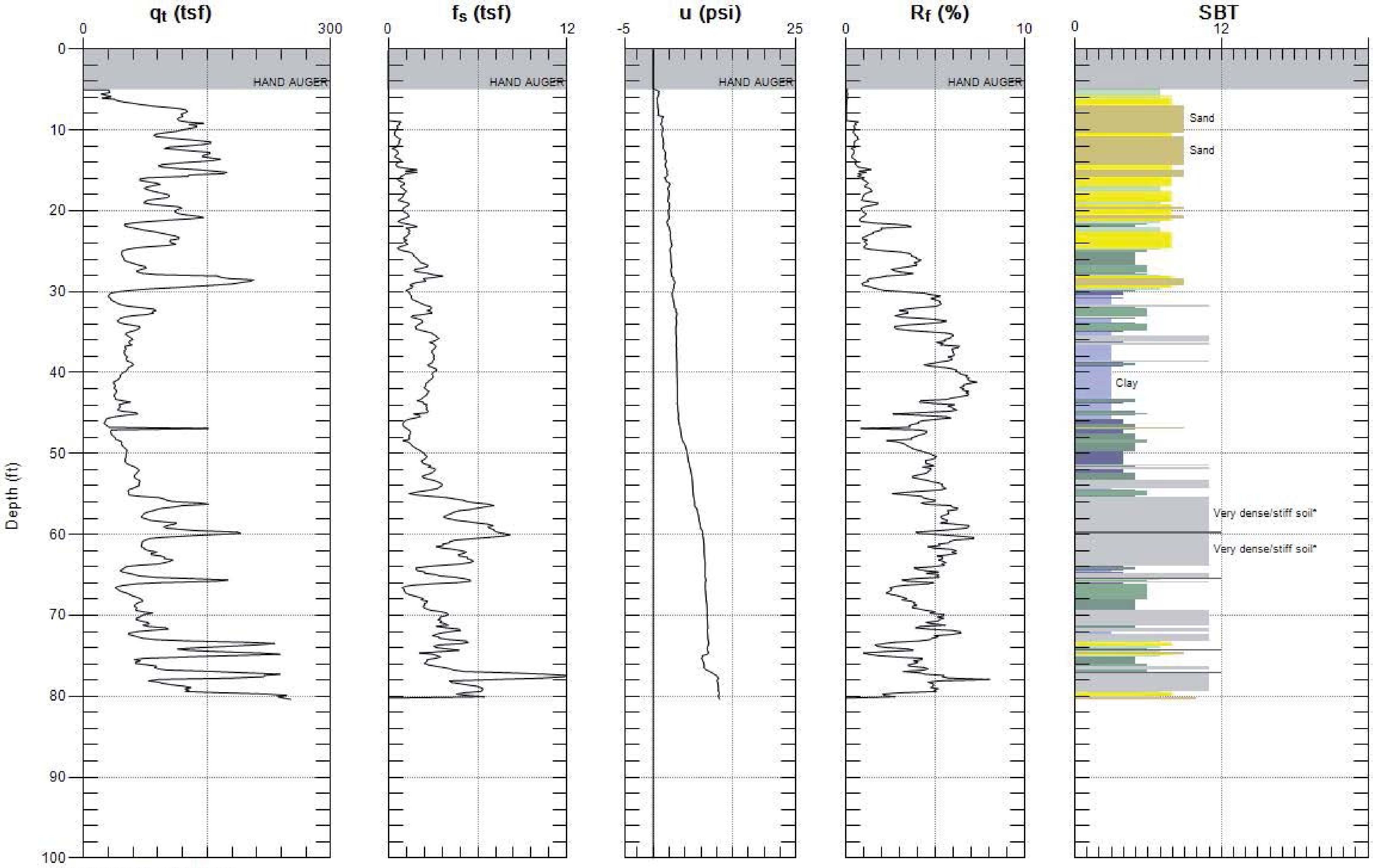
DELTA GROUP

Site: VINE STREET PART 1

Sounding: C-3

Engineer: M. SUTHERLAND

Date: 6/21/2016 01:35



Max. Depth: 80.381 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

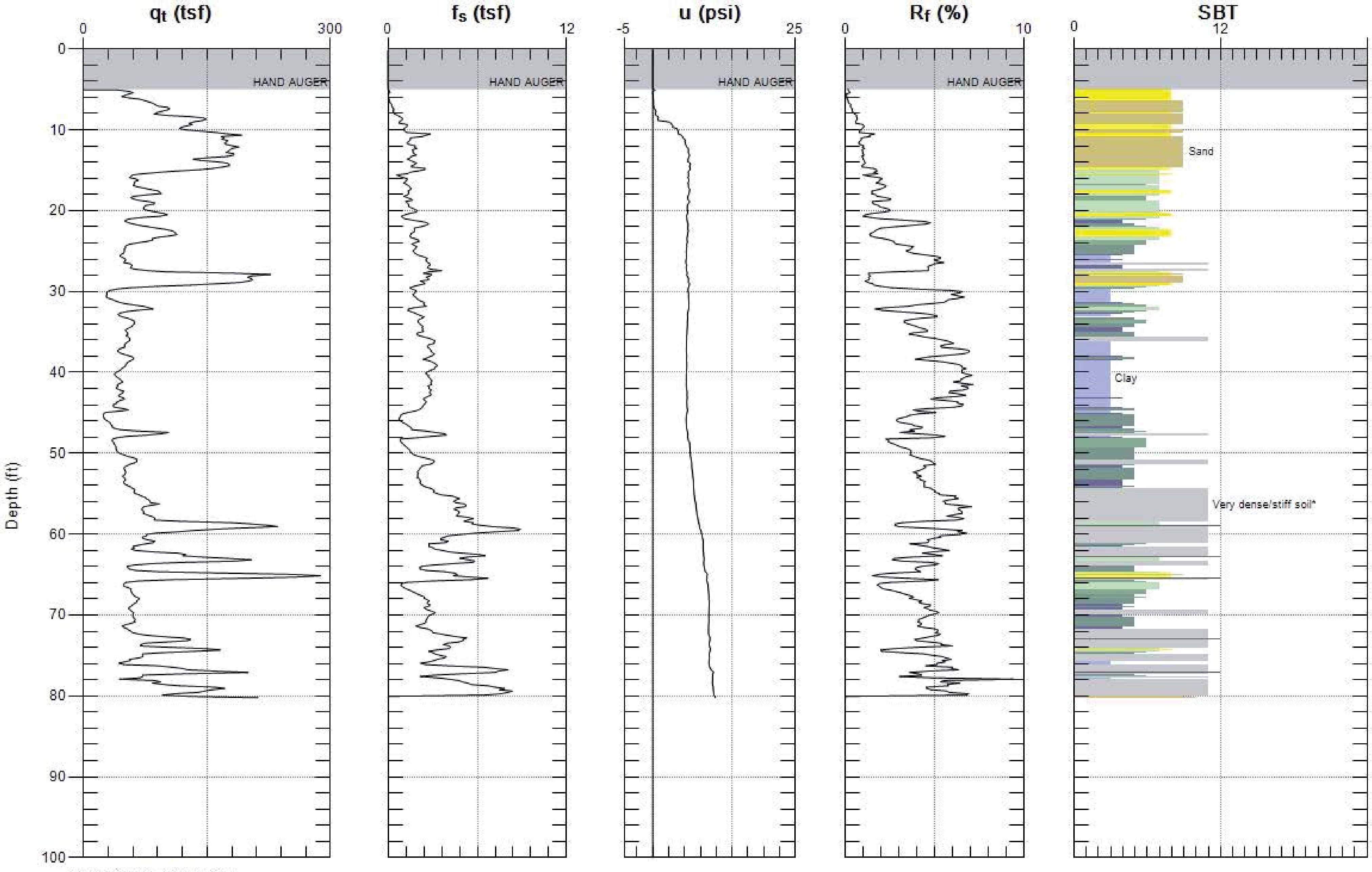
DELTA GROUP

Site: VINE STREET PART 1

Sounding: C-4

Engineer: M. SUTHERLAND

Date: 6/21/2016 12:04



Max. Depth: 80.217 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

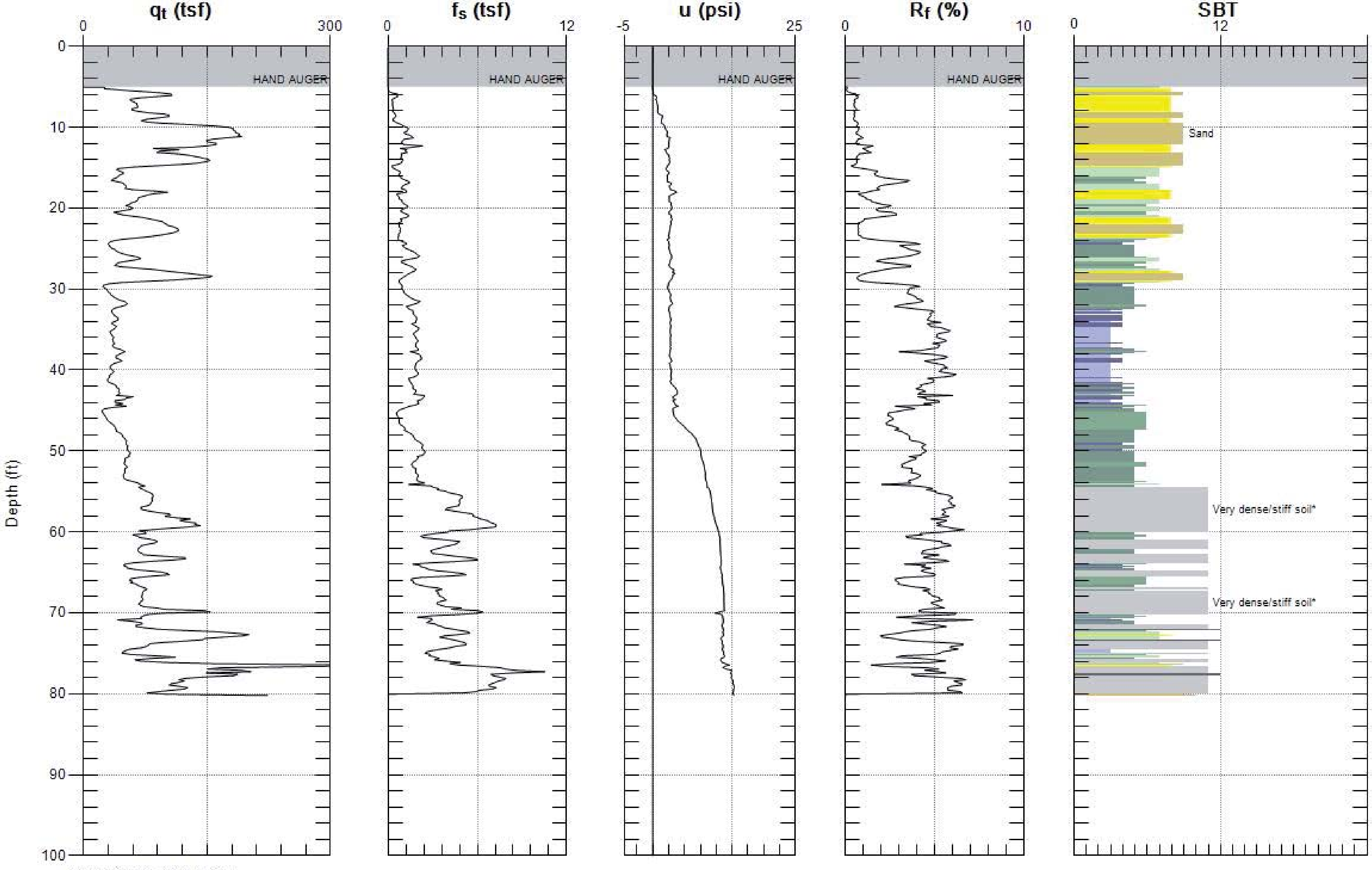
DELTA GROUP

Site: VINE STREET PART 1

Sounding: C-5

Engineer: M. SUTHERLAND

Date: 6/21/2016 10:59



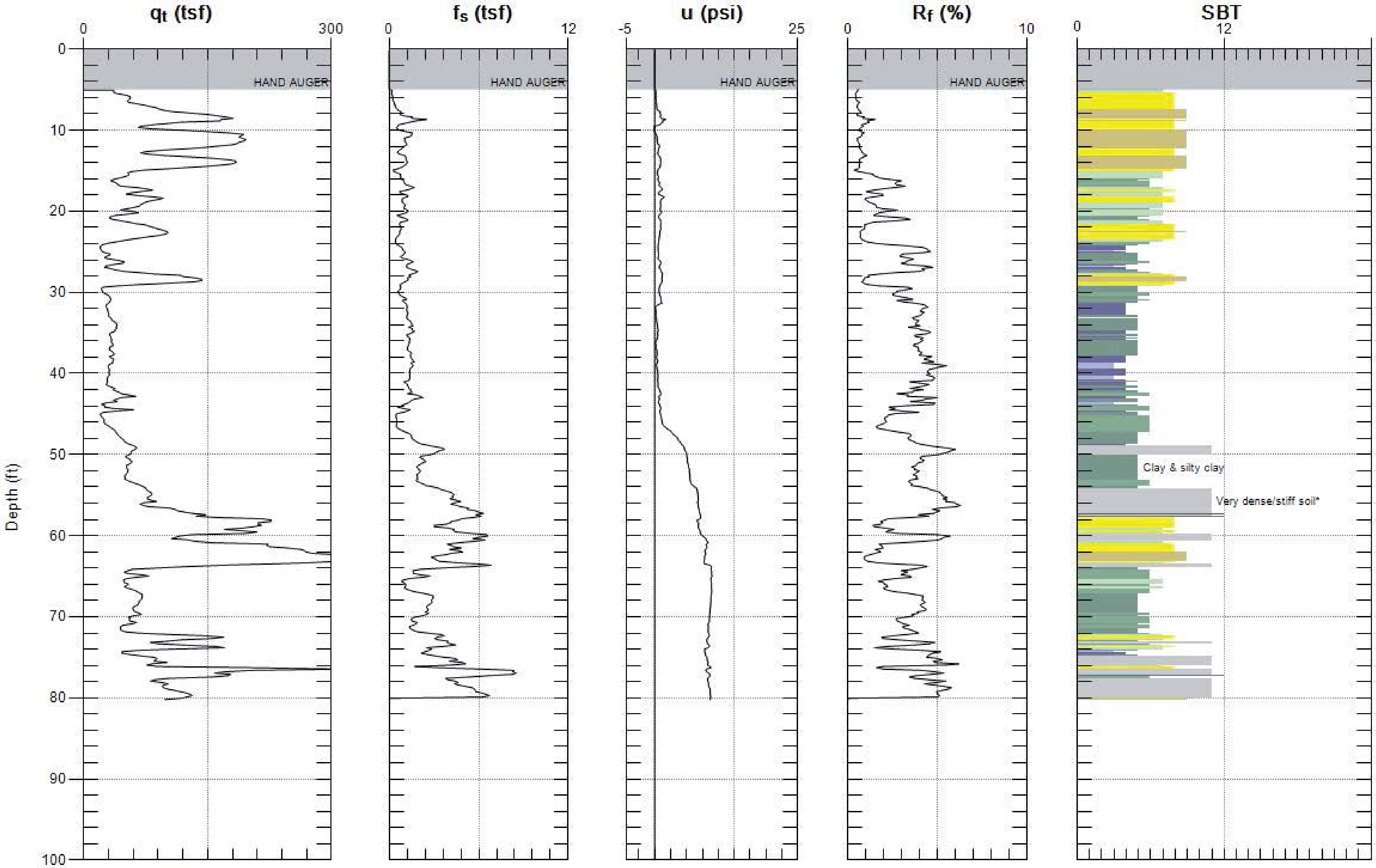
Max. Depth: 80.217 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

DELTA GROUP

Site: VINE STREET PART 1
Sounding: C-6

Engineer: M. SUTHERLAND
Date: 6/21/2016 09:59



Max. Depth: 80.217 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

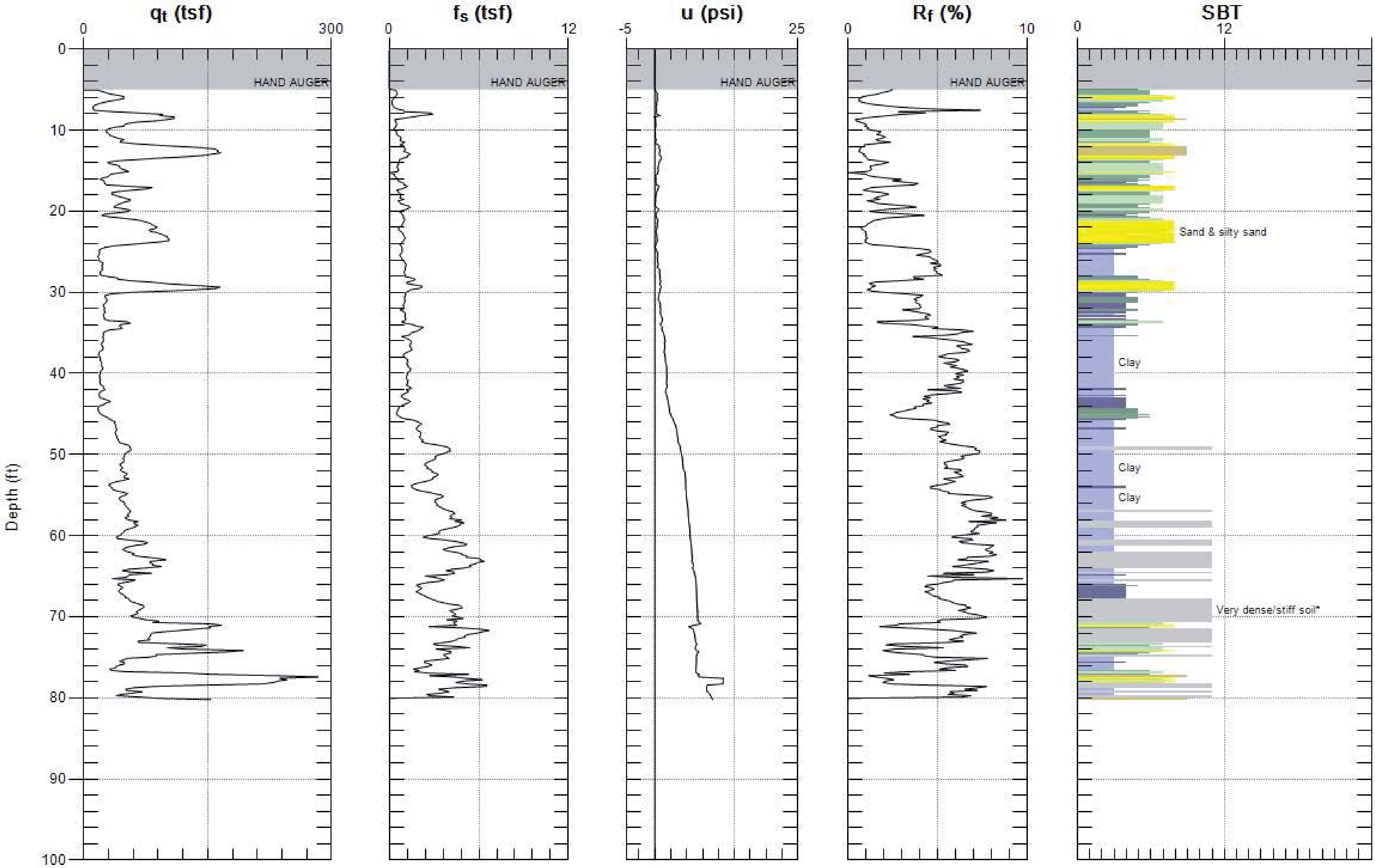
DELTA GROUP

Site: VINE STREET PART 1

Sounding: C-7

Engineer: M. SUTHERLAND

Date: 6/22/2016 09:58



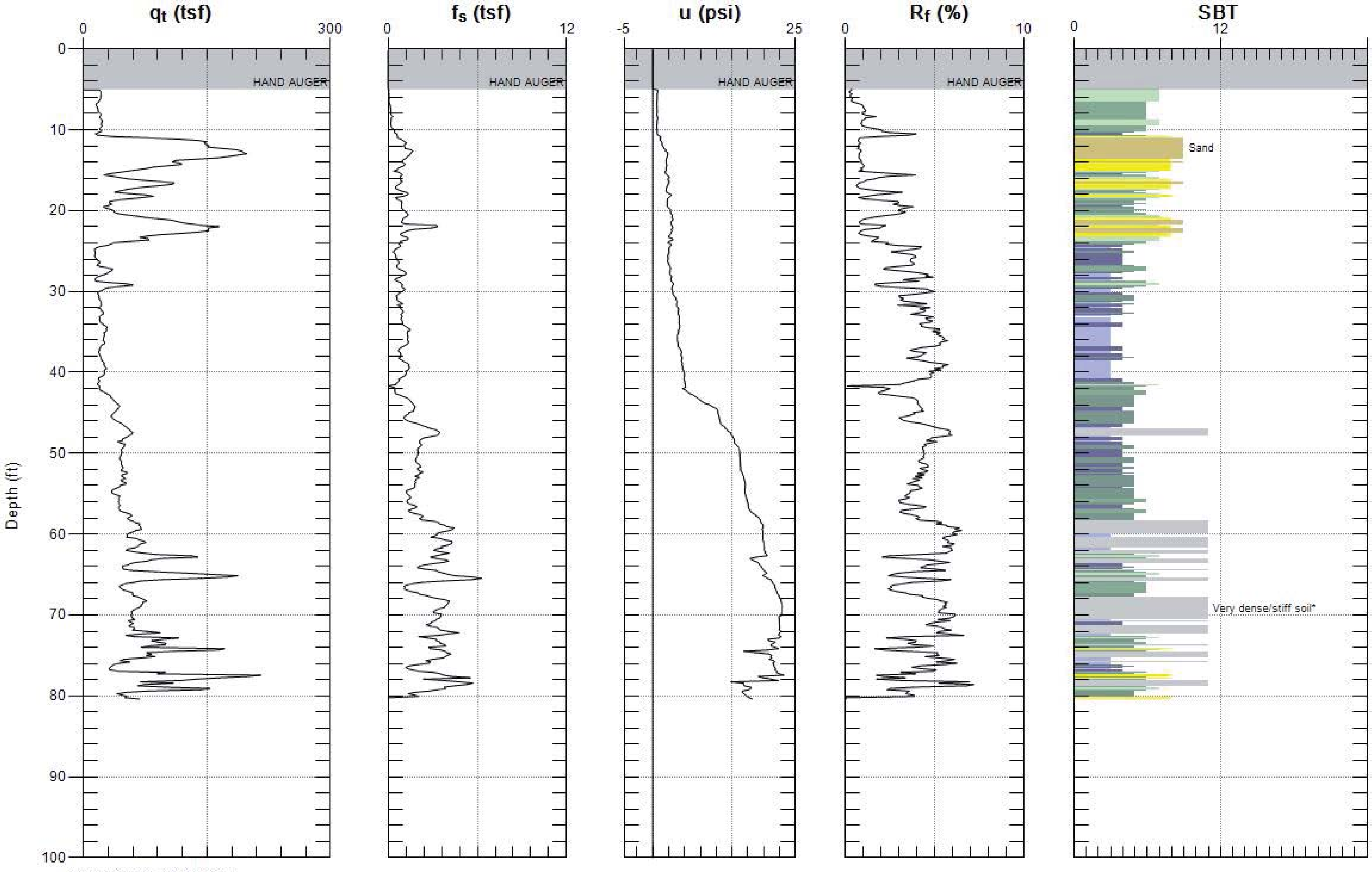
Max. Depth: 80.217 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **DELTA GROUP**

Site: VINE STREET PART 1
Sounding: C-8

Engineer: M. SUTHERLAND
Date: 6/22/2016 10:46



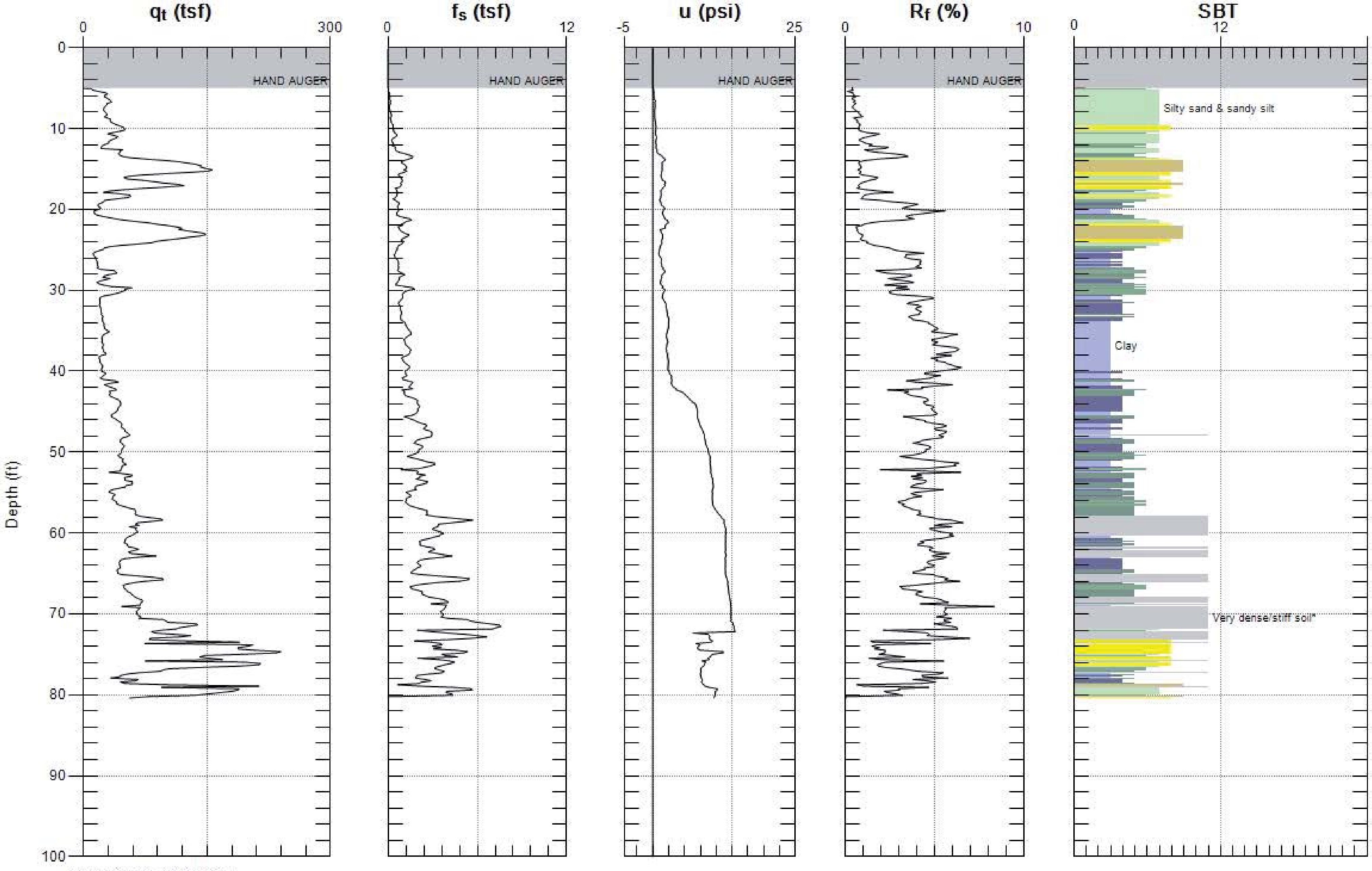
Max. Depth: 80.381 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **DELTA GROUP**

Site: VINE STREET PART 1 **Engineer: M. SUTHERLAND**

Sounding: C-9 **Date: 6/22/2016 12:19**



Max. Depth: 80.381 (ft)
Avg. Interval: 0.164 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Appendix B

Geology Approval Letter

BOARD OF
BUILDING AND SAFETY COMMISSIONERS

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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

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

Appendix E.3

Supplemental Geotechnical Recommendations

GROUP DELTA

CitizenM Hotels LA Hollywood Properties, LLC
79 Madison Avenue
New York, New York 10016

July 21, 2017
GDC Project No. LA-1289

Attention: Mr. Scott Bastiani

Subject: Supplemental Geotechnical Recommendations
For the Revised Conceptual Design
Proposed Mid-Rise Hotel Development
1718 Vine Street, Hollywood District, Los Angeles, California

Dear Mr. Bastiani,

This letter presents our supplemental geotechnical recommendations for the subject project based on the revised conceptual design dated July 20, 2017. We previously performed a preliminary geotechnical investigation for the project and presented the results in a report dated July 28, 2016. Recommendations provide in this letter supplement those in the July 28, 2016 report.

The proposed hotel will consist of 13 stories above grade over 3 levels of subterranean parking. The subsurface parking will occupy the entire rectangular lot including the 15-foot wide easement area to the south. The bottom of floor elevation will be about 45 feet below the adjacent grade.

Two (2) hollow-stem-auger (HSA) borings advanced to a depth of 65 feet each and three (3) Cone Penetration Tests (CPTs) advanced to depths of approximately 65 feet each per performed in our geotechnical preliminary geotechnical investigation. We have reviewed the existing available data and we recommend that the recommendations provided in the July 28, 2016 report remain valid. No additional investigation is necessary for the entitlement purpose. However, additional geotechnical investigation will be needed and a design-level geotechnical report is required before final design plans can be developed.

Our professional services have been performed using the degree of care and skill ordinarily exercised under similar circumstances, by reputable engineers practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional opinions included in this letter.

If you have any questions pertaining to this letter, or if we can be of further service, please do not hesitate to contact us.

Sincerely,
Group Delta Consultants

REGISTERED PROFESSIONAL ENGINEER
ETHAN TSAI
GE 3004
EXP. 12/31/17
GEOTECHNICAL
STATE OF CALIFORNIA

Ethan Tsai, G.E.
Associate Engineer

Distribution: Addressee via email citizenscott@citizenm.com
Cc: Todd Nelson todd@agd-landuse.com

GROUP DELTA

CitizenM Hotels LA Hollywood Properties, LLC
79 Madison Avenue
New York, New York 10016

March 28, 2018
GDC Project No. LA-1289

Attention: Mr. Scott Bastiani

Subject: Supplemental Geotechnical Recommendations
For the Revised Conceptual Design
Proposed Mid-Rise Hotel Development EIR Preparation
1718 Vine Street, Hollywood District, Los Angeles, California

Dear Mr. Bastiani,

This letter presents our supplemental geotechnical recommendations for the subject project based on the revised conceptual design dated February 1, 2018. We previously performed a preliminary geotechnical investigation for the project Environmental Impact Report (EIR) preparation and presented the results in a report dated July 28, 2016. Recommendations provide in this letter supplement those in the July 28, 2016 report.

The proposed hotel will consist of 14 stories above grade over 5 levels of subterranean parking. The subsurface parking will occupy the entire rectangular lot including the 15-foot wide adjacent grade.

Two (2) hollow-stem-auger (HSA) borings advanced to a depth of 65 feet each and three (3) Cone Penetration Tests (CPTs) advanced to depths of approximately 65 feet each per performed in our geotechnical preliminary geotechnical investigation. We have reviewed the existing available data and we recommend that the recommendations provided in the July 28, 2016 report remain valid. No additional investigation is necessary for the entitlement purpose. However, additional geotechnical investigation will be needed and a design-level geotechnical report is required before final design plans can be developed.

Our professional services have been performed using the degree of care and skill ordinarily exercised under similar circumstances, by reputable engineers practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional opinions included in this letter.

If you have any questions pertaining to this letter, or if we can be of further service, please do not hesitate to contact us.

Sincerely,
Group Delta Consultants

REGISTERED PROFESSIONAL ENGINEER
ETHAN TSAI
GE 3004
Exp 12/31/19
GEOTECHNICAL
STATE OF CALIFORNIA

Ethan Tsai, G.E.
Associate Engineer

Distribution: Addressee via email citizenscott@citizenm.com
Cc: Todd Nelson todd@agd-landuse.com

Appendix E.4

LADBS Approval Letter

CITY OF LOS ANGELES
CALIFORNIA

BOARD OF
BUILDING AND SAFETY
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GEORGE HOVAGUIMIAN
JAVIER NUNEZ

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

Appendix E.5

Paleontological Memo

NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology Section
Telephone: (213) 763-3325
Fax: (213) 746-7431
e-mail: smcleod@nhm.org

16 June 2016

Eyestone Environmental
6701 Center Drive West, Suite 900
Los Angeles, California 90045

Attn: Stephanie Eyestone-Jones, President

re: Paleontological resources for the proposed citizenM Hollywood & Vine Project, in the City of Los Angeles, Los Angeles County, project area

Dear Stephanie:

I have conducted a thorough check of our paleontology collection records for the locality and specimen data for the proposed citizenM Hollywood & Vine Project, in the City of Los Angeles, Los Angeles County, project area as outlined on the portion of the Hollywood USGS topographic quadrangle map that Jacqueline De La Rocha sent to me via e-mail on 3 June 2016. We have no vertebrate fossil localities that lie directly within the proposed project area, but we do have localities nearby from the same sedimentary deposits that occur within the proposed project area.

Surface deposits throughout the entire proposed project area consist of soil on top of older Quaternary Alluvium, derived as alluvial fan deposits from the Hollywood Hills immediately to the north. The uppermost layers of these deposits in this area typically do not contain significant fossil vertebrate remains. East of the proposed project area east of the Hollywood Freeway (Highway 101), however, we have four vertebrate fossil localities, LACM 6297-6300, collected from these late Pleistocene deposits at depths between 47 and 80 feet below the surface along Hollywood Boulevard between the Hollywood Freeway (Highway 101) and Western Avenue during excavations for the Metrorail Red Line tunnels and stations. Fossil specimens of horse, *Equus*, bison, *Bison*, camel, *Camelops*, and mastodon, *Mammut americanum,* were recovered from these localities.

Further afield, especially to the south-southwest near the Rancho La Brea asphalt deposits in the Hancock Park region, fossil vertebrates have been recovered at shallower depths. Our closest vertebrate fossil locality in these older Quaternary sediments at shallow depth though is LACM 5845, southeast of the proposed project area near the intersection of Western Avenue and Council Street, that produced a specimen of fossil mastodon, Mammutidae, at a depth of only 5-6 feet below the surface. To the southeast of the proposed project area, east-northeast of locality LACM 5845 at about the intersection of Madison Avenue and Middlebury Street, our vertebrate fossil locality LACM 3250 produced a fossil specimen of mammoth, *Mammuthus*, at a depth of about eight feet below street level. To the southwest of the proposed project area, near the intersection of Sierra Bonita Avenue and Oakwood Avenue, our vertebrate fossil locality LACM 3371 produced specimens of fossil bison, *Bison antiquus*, at a depth of 12 feet below the surface.

Very shallow excavations in the older Quaternary Alluvium exposed throughout the proposed project area are unlikely to uncover significant vertebrate fossils. Deeper excavations that extend down into older deposits, however, however, may well encounter significant vertebrate fossil remains. Any substantial excavations in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils collected should be placed in an accredited scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice