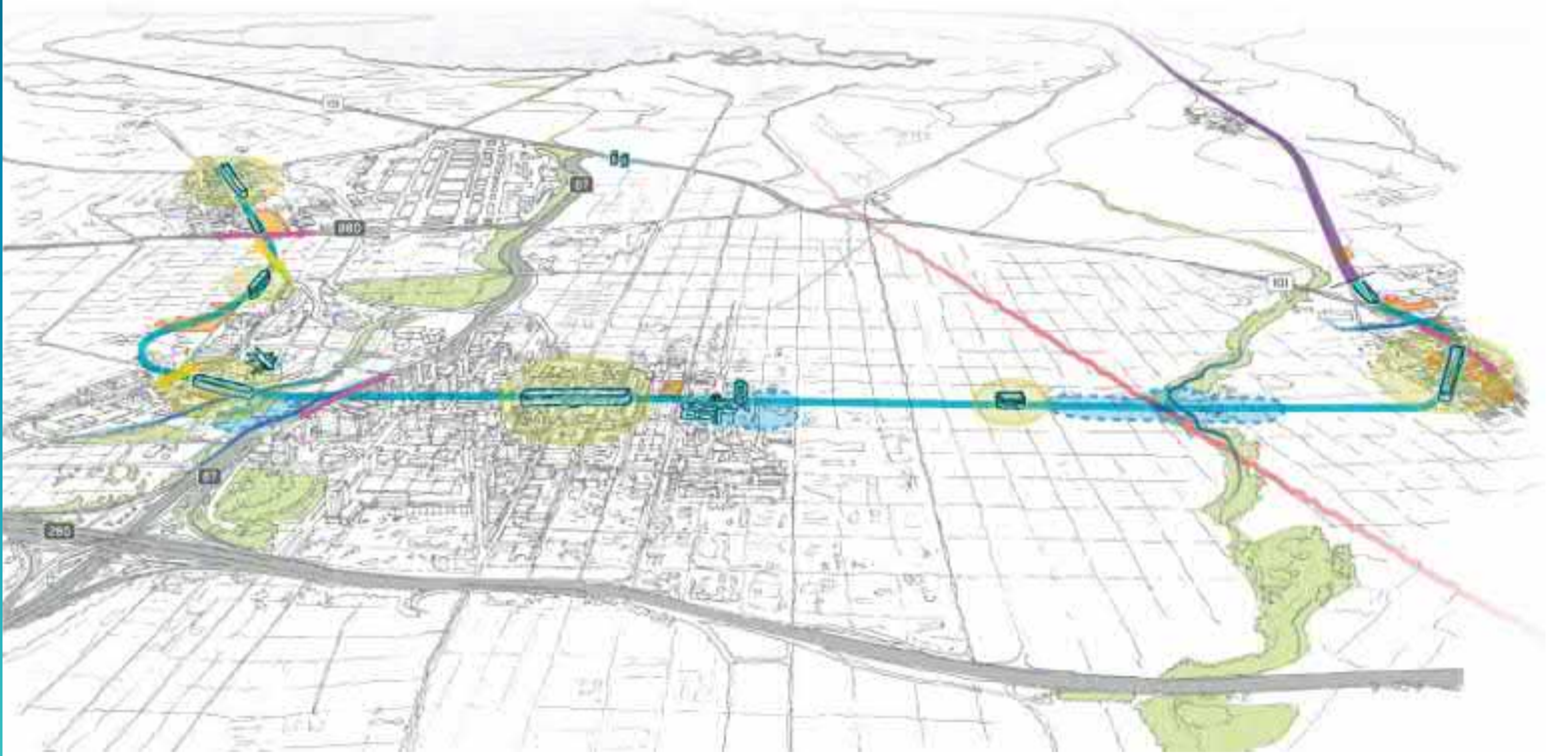
VTA's BART Silicon Valley Phase II Extension Project

General Engineering Consulting Services



Geotechnical Data Report Volume I

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WONG ENGINEERING

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SVRT Tunnel Segment GDR Volume VI (2005)
Geotechnical Report – Yards & Shops Segment (2006)
Geotechnical Report Supplement – Yards & Shops Segment (2008)
Central Area Guideway GDR – Engineering Design Investigation (2008)
Central Area Guideway Coyote Creek Geotechnical Investigation Report (2010)

Abbreviations

ASTM	ASTM International (formerly American Society for Testing and Materials)
BART	Bay Area Rapid Transit
bgs	below ground surface
BH	borehole
BSVII	BART Silicon Valley Phase II Extension
Caltrans	California Department of Transportation
CE&G	Cal Engineering & Geology
CPT	cone penetration test
DTSJ	Downtown San José Station
El.	Elevation
EPA	Environmental Protection Agency
GDR	Geotechnical Data Report
GI	geotechnical investigation
M	Magnitude
MC	Modified California
mi	mile or miles
MMW	Mott MacDonald/PGH Wong Joint Venture
MSL	above Mean Sea Level
mV	millivolts
NAD83	1983 North American Datum
NAVD88	1988 North American Vertical Datum
NYMF	Newhall Yard and Maintenance Facility
pcf	pounds per cubic foot
PMT	pressuremeter testing
PPDT	pore pressure dissipation tests
ppm	parts per million
psf	pounds per square foot
P-S logging	P- and S-wave suspension velocity logging
PTE	Permission to Enter
RTC	Rolling Traffic Control
R-value	resistance value

SP	standpipe piezometer
SPT	standard penetration test
TXCD	triaxial consolidated drained
TXCU	triaxial consolidated undrained
TXUU	triaxial unconsolidated undrained
USCS	Unified Soil Classification System
USGS	United States Geological Survey
VTA	Santa Clara Valley Transportation Authority
VWP	vibrating wire piezometer

Executive Summary

The BART Silicon Valley Phase II Extension (BSVII) project is a six-mile extension of the Bay Area Rapid Transit (BART) system from Berryessa Station in San José to Santa Clara. Comprising at-grade, open-cut, and tunnel tracks, the extension includes four new stations (one above-grade and three below-grade), two emergency stops, and a BART vehicle storage and maintenance facility. Appurtenant facilities such as transit-oriented development and parking structures are also planned.

The Santa Clara Valley Transportation Authority (VTA) has contracted Mott MacDonald/PGH Wong Joint Venture (MMW) to complete geotechnical engineering services and support preliminary design of the BSVII tunnel and stations. This Geotechnical Data Report (GDR) includes two volumes of geotechnical data. Volume I comprises factual geotechnical data collected from geotechnical investigations completed by MMW between 2019 and 2020 and by the HNTB/WSP Joint Venture from 2018 to 2019. Volume II comprises GDRs published by the HMM/Bechtel Joint Venture in 2005 and 2008, and reports by others containing data procured by VTA. The purpose of this GDR is to present the geotechnical and hydrogeological data for use by VTA in design-build contracts in the BART Silicon Valley Program.

The 2018-2020 geotechnical investigation program was planned to supplement the available historical geotechnical data, given the change in tunnel size and station configurations at the time. Geotechnical investigations were performed in accordance with local permitting agency regulations, project Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report, and general conformance with the Caltrans soil logging manual (Caltrans 2010).

The HNTB/WSP geotechnical investigations occurred between October 2018 and April 2019 and included 20 rotary-wash boreholes and 4 cone penetration tests (CPTs). Standpipe piezometers were installed on two of the drilled boreholes. Boreholes were typically sampled at 5-foot intervals from the ground surface to full depth of the boreholes.

MMW conducted geotechnical investigations between July 2019 and October 2020, completing 29 rotary-wash boreholes for geotechnical sampling and downhole testing and 5 boreholes for pressuremeter tests. In general, boreholes were sampled continuously (1-foot spacing between samples) from 5 feet above the proposed tunnel crown to 5 feet below the proposed tunnel invert using driven standard penetration test (SPT) samplers, driven California Modified samplers, driven Dames & Moore U-Type samplers, pushed Dames & Moore Piston samplers, pushed Shelby tube samplers, and Pitcher Barrel samplers. Sampling was performed at 5-foot to 10-foot intervals at depths above and below the tunnel alignment. At the completion of drilling, vibrating wire piezometers were installed in 24 boreholes to monitor seasonal groundwater fluctuations.

In situ testing was performed during the exploration program including SPTs, TEXAM pressuremeter, and geophysical testing including P-S wave logging and noise and vibration

testing. Pocket penetrometer and field torvane tests were completed in the field on select soil samples.

Laboratory testing was performed on representative soil samples to obtain index and engineering properties. Geotechnical index testing included moisture content, No. 200 sieve wash, hydrometer, grain-size analysis, unit weight, specific gravity, and Atterberg limits tests. Laboratory testing for engineering properties included triaxial undrained and drained, consolidation, abrasion, and corrosion test methods. Soil and groundwater corrosivity were tested for by resistivity, pH, sulfate content, and chloride content methods. HNTB/WSP completed abrasion testing on soil samples from the tunnel horizon, and MMW completed resistance value (R-value) testing on soil samples taken from the near surface at the future Newhall Yard and Maintenance Facility, and East Emergency Stop.

1 Introduction

This volume of the Geotechnical Data Report (GDR) provides factual data obtained during various phases of geotechnical investigation (GI) carried out during the period 2018 to 2020 to inform the design and construction of the BART Silicon Valley Program.

1.1 Project Overview

The BART Silicon Valley Phase II Extension (BSVII) project will extend the Bay Area Rapid Transit (BART) system approximately six miles from the Silicon Valley Berryessa Extension (Phase I of the Program) into the cities of San José and Santa Clara.

The BSVII guideway will descend from the elevated Berryessa Station into an approximately five-mile-long single bore tunnel, curving below US-101, aligning in an east-west direction under Santa Clara Street and traveling through downtown San José, curving northwest below Stockton Avenue, and transitioning back to grade just north of I-880. The final approximately one mile of guideway will remain at-grade to reach the end of the line at Santa Clara Station.

The track alignment will be in a side-by-side configuration from the east and west ends of the project and transition to a stacked over/under configuration as it approaches downtown San José. Along the proposed alignment, the ground surface elevation ranges from 70 to 95 feet (NAVD88). The ground surface at the western end of the alignment is generally lower than that at the eastern end.

The project includes four stations:

- 28th Street/Little Portugal Station: A cut-and-cover, side platform underground station that will serve East San José.
- Downtown San José Station: A stacked platform station, with the platforms located in the single bore tunnel and the station entrance, back-of-house and ventilation/egress facilities located in off-street cut-and-cover headhouses. The station serves San José’s central business district.
- Diridon Station: A stacked platform station, with the platforms located in the single bore tunnel and the station entrance, back-of-house and ventilation/egress facilities located in off-street cut-and-cover headhouses. The station serves the western end of downtown San José and connects to San José’s intermodal transit hub.
- Santa Clara Station: An at-grade, center platform station located at the terminus of the BSVII extension.

Two emergency stops will be constructed along the alignment:

- East Emergency Stop: A cut-and-cover shaft housing fan plants and emergency egress, with in-tunnel enhanced walkways and universal crossovers at Santa Clara Street and 13th Street in East San José.

- West Emergency Stop: A cut-and-cover shaft housing fan plants and emergency egress, with in-tunnel enhanced walkways and diamond crossover at Stockton Avenue and Schiele Avenue in West San José.

Additionally, a number of adits will be required to connect the tunnel to stations and emergency stops.

The Newhall Yard and Maintenance Facility will be at the west end of the alignment near Santa Clara Station.

The project alignment is shown in Figure 1 and Figure 2. The key project features are described in detail in Table 1-1, from east to west.

Table 1-1. Summary of Track Alignment and Main Structural Features

Location	*Approximate Station (ft)	Description
East Portal	556+50 to 575+00	The track alignment begins at grade on a Union Pacific Railroad (UPRR) above Mabury Road in-between Lenfest Road and East Taylor Street. The track descends towards the bored tunnel section.
East Portal to 28th Street/Little Portugal Station	575+00 to 599+70	Bored tunnel section starting from the intersection of Las Plumas Avenue and N Marburg Way, running parallel to US-101 South until McKee Rd. The tunnel proceeds due south at McKee Rd, crossing 101 South and entering the 28th Street/Little Portugal station.
28th Street/Little Portugal Station	599+70 to 606+70	Cut-and cover station excavation bounded by N 28th Street, N 30th St, 5 Wounds Lane, and E Saint James St.
28th Street/Little Portugal Station to East Emergency Stop	606+70 to 651+00	The tunnel proceeds south curving west as it approaches East Santa Clara Street. The tunnel runs southwest underneath E Santa Clara Street beginning at N 25th St.
Silver Creek Fault Zone	627+50	The alignment crosses a zone identified by HNTB/WSP as having potential for fault rupture associated with movement on the Silver Creek Fault on E Santa Clara St between N 22nd St and N 23rd St.
East Emergency Stop	651+00 to 659+00	Ventilation shaft structure located northwest of E Santa Clara Street and N 13th Street intersection.
East Emergency Stop to Downtown San José Station	659+00 to 697+80	Bored tunnel section running beneath E Santa Clara Street from N 12th St to N 2nd St.
Downtown San José Station	697+860 to 704+860	Cut-and-cover station head house excavated north of Santa Clara Street between N 2nd St and Market St. This station comprises three appurtenant cut-and-cover structures including the main headhouse, a secondary entrance, and a ventilation structure.

Location	*Approximate Station (ft)	Description
Downtown San José Station to Diridon Station	704+80 to 733+10	Section of bored tunnel running underneath Santa Clara Street, which bends west after passing beneath the CA-87 overcrossing, the Guadalupe River Bridge, and Los Gatos Creek Bridge.
Diridon Station	733+10 to 740+10	Cut-and-cover station head house excavated south of Santa Clara Street, in the area currently occupied by a car park opposite the SAP Center.
Diridon Station to West Emergency Stop	740+10 to 778+20	Section of tunnel initially running in east-west direction underneath The Alameda before curving to the north through the intersection of N Morrison St and W Julian St and aligning with Stockton Ave in the northwest direction at Pershing Ave.
West Emergency Stop	778+20 to 786+80	Cut-and-cover ventilation shaft excavated adjacent to Stockton Avenue and Schiele Avenue intersection
West Emergency Stop to West Portal	786+80 to 825+00	Section of bored tunnel running northwest beneath Stockton Avenue, and then curving west northwest parallel to the Caltrain tracks at W. Hedding Street.
West Portal	825+00 to 839+50	The track alignment continues parallel to the Caltrain tracks and daylights after the I-880 overcrossing.
West Portal to Santa Clara Station	839+50 to 853+00	At grade section running northwest through Newhall Yard and Maintenance Facility, south of Avaya Stadium.
Santa Clara Station	853+00 to 873+48	At grade station concluding the proposed project alignment located adjacent to the Brokaw Rd cul-de-sac and Caltrain tracks.
Newhall Yard and Maintenance Facility	825+00 to 864+00	Area adjacent to the track at the West Portal and at-grade section where a new BART car maintenance and storage facility will be located.

* Approximate stationing reported in the table is based on the Geotechnical Plan and Profile (See Drawings).

1.2 Purpose and Scope

The purposes of this Geotechnical Data Report include the following:

- Present factual geotechnical data collected from the investigations conducted from 2018 to 2020.
- Provide factual geotechnical data to support the design efforts for the tunnel alignment and station configuration, for both preliminary engineering and detailed engineering efforts.
- Provide factual geotechnical information for the design-builder to assess the lateral and vertical variability in subsurface soil conditions.
- Provide factual hydrogeological information for the design-builder to assess the depth, seasonal, and spatial variability of groundwater levels.

- Provide GI data to supplement the data collected in the period 2003-2008 to accommodate for changes to the project configuration (primarily the deepening of the tunnel profile, the deepening of excavations required for the stations and emergency stops and the variation in tunnel alignment).

Prior to the latest GI, a review of the available information from historical ground investigations was performed. Limited or no groundwater data, geophysical data, pressuremeter testing data, stratigraphic data, and laboratory testing data was available at the depth of the proposed works as planned at the time the GI was specified. A summary of the reports reviewed is presented in Section 2.1. Based on the review, a supplementary field investigation program was developed. Modifications to the original program were implemented at various times to accommodate changes in project configuration.

The GI program discussed in this GDR began in October 2018 with the investigation performed by HNTB/WSP Joint Venture, the VTA's then program manager, and Parikh Engineering Consultants. Mott MacDonald/Wong Engineering Joint Venture (MMW), as VTA's general engineering consultant, continued the GI program in July 2019 to completion in October 2020.

The scope of the GI program included exploratory boreholes; in situ testing (pressuremeter testing, slug testing, downhole geophysical logging and noise/vibration testing); vibrating-wire piezometer installations; water level datalogger installations; manual water-level measurements; and laboratory testing (including classification, strength, compressibility, and corrosivity of the materials encountered).

1.3 Report Organization

This GDR provides data collected from several sources and under several contracts. It is presented by VTA for use by design-build contracts in the BART Silicon Valley Program. The contractual entities, the data use, and the reliance on those data are presented in Table 1-2 below.

Table 1-2. Report Organization and Data Reliance

Data Collected	Organization	GDR Volume	Reliance
GI data 2019-2020	MMW	I	Factual
GI data 2018-2019	HNTB/WSP	I	Factual
Groundwater Monitoring Data 2001-2010	HMM/Bechtel JV, others	I	Factual
GI data 2003-2010	HMM/Bechtel JV, others	II	Factual

Factual implies that these are data collected by the respective organization that VTA represents as factual and reliable at the time and location of their collection.

This report constitutes Volume I of the GDR and is organized as follows:

Executive Summary
Section 1: Introduction of the project including project description, report purpose and organization and limitations
Section 2: Summary of sources of available data and information
Section 3: Project settings through regional and local geology, faulting, hydrogeology, historical and present evidences of land subsidence, and presence of gas within the ground
Section 4: GI program and details of the field operations
Section 5: Laboratory testing program and the results of these tests
Section 6: References

1.4 Limitations

This document has been prepared in connection with the BSVII project and may not be relied upon or used on any other project or under any differing circumstances or applications on the BSVII project without an independent check being carried out as to its applicability to the project or differing circumstances or application and the prior written authorization of MMW or HNTB/WSP with respect to the data gathered and presented by either joint venture. MMW and HNTB/WSP accept no responsibility or liability for the consequence of this document being used for a purpose other than the purposes and circumstances for which it was commissioned.

Volume I of the GDR presents factual data gathered during geotechnical investigations carried out by MMW (and where applicable, its subconsultant, Parikh Consultants, Inc.) between July 2019 and December 2020.

For completeness, Volume I of the GDR also includes data gathered by HNTB/WSP and Parikh as their subconsultant during their 2018-2019 ground investigations, as this information is not included in any other GDR. MMW is not responsible for the correctness, accuracy, or quality of the data collected by HNTB/WSP. In some instances, MMW completed supplemental laboratory testing on samples for classification purposes, resulting in revisions to some stratigraphic classifications. These test results and the revised borehole logs were provided to HNTB/WSP and Parikh for their technical review and concurrence prior to publication herein.

Historical geotechnical data were obtained from multiple sources (refer to Volume II of the GDR). MMW is not responsible for the correctness, accuracy, or quality of this referenced historical data.

The geotechnical data presented in this GDR are intended only for the purposes, site location, and project described in this report. It is possible that future exploration or groundwater monitoring efforts will be required to address changes to or refine design of key features of the project during design development.

The interpretation of the geotechnical data, excluding standard calculations required to present the data (e.g., slug tests), is outside the scope of this GDR and will be covered by other design documents. MMW is not responsible for interpretations, professional opinions, or advice given by others with regard to any geotechnical data presented in this report.

Sampling and testing of soil and groundwater for environmental site characterization (hazardous materials) was not performed as part of the ground investigation, as this is outside the scope of the investigations described herein.

2 Available Data and Information

2.1 Project Sources

- Draft Geotechnical Exploration Findings and Recommendations Report – Volume II: Tunnel and Underground Stations Segment (URS 2003)
- Silicon Valley Rapid Transit Project (SVRT)– Geotechnical Data Report – Tunnel Segment (HMM/Bechtel 2005a)
- SVRT – Hydrogeology Report – Tunnel Segment (HMM/Bechtel 2005b)
- SVRT – Geotechnical Report – Yards & Shops Segment (ENGEO 2006)
- SVRT – Central Area Guideway – Geotechnical Data Report – Phase Two Engineering Design Investigation (HMM/Bechtel 2008a)
- SVRT – Central Area Guideway – Pumping Test Data Report (HMM/Bechtel 2008b)
- SVRT – Central Area Guideway – Hydrogeology Report (HMM/Bechtel 2008c)
- SVRT – Geotechnical Report Supplement – Yards & Shops Segment (ENGEO 2008)
- Central Area Guideway Coyote Creek – Geotechnical Investigation Report (HMM/Bechtel 2010)
- Draft Fault Displacement Hazard Considerations for the North Silver Creek Fault for BART to Silicon Valley, Phase II, San José, CA (HNTB/WSP 2020)

2.2 Information from Other Sources

Published geological and hydrogeological information have been consulted during the scoping of the ground investigation and during the preparation of this report. These include:

- Geologic maps
- Geologic and fault reports
- Hydrogeological maps
- Valley Water hydrological reports and reports regarding regional subsidence and heave (Valley Water 2019, 2020)
- Project-specific GI data and data from other projects carried out in the vicinity of the proposed project alignment (URS 2003)

Detailed references for the sources of information listed above are included in Section 6 of this report.

3 Geological and Hydrogeological Setting

3.1 Regional and Local Surficial Geology

The BSVII project is located in the Coast Range Geomorphic Province of California, more specifically, the Santa Clara Valley, which is bounded by the San Francisco Bay (Bay) to the north, the Diablo Mountain Range to the east and the Santa Cruz Mountains to the west. The valley floor is covered by alluvial fan, flood plain, levee, and terrace deposits and active stream channel and terrace deposits (Figure 3) with marine estuary deposits along the Bay margins (Wentworth et al 1999, Helley et al 1994, Wagner et al 1991).

As described in other BSVII project documents (HMM/Bechtel 2005a and 2008b), the BSVII tunnel alignment is located primarily within Holocene- and Pleistocene-age (less than 2.6 million years old) alluvial (water-bearing sedimentary) deposits. Figure 4 is a surficial geologic map of the central portion of the Santa Clara Valley showing the varied alluvial deposits located in the San José area (modified from Wentworth et al 1999).

The alluvial deposits expected to be encountered within the upper 300 feet of the ground surface (including the BSVII tunnel, stations, emergency stops, and adits) consist of a sequence of interbedded coarse- and fine-grained soils.

3.2 Seismic Setting

The BSVII project is in an active seismic region and alluvial deposits within the project area have a potential for earthquake induced liquefaction. The Santa Clara Valley is bounded by the San Andreas fault, approximately 11 miles (mi) to the west-southwest, and the Hayward and Calaveras faults, approximately 3.4 and 6.4 mi, respectively, to the east-northeast, as shown in Figure 6. Each of these historic active faults has produced large damaging earthquakes (> Magnitude [M] 5) in the past. The margins of the Santa Clara Valley are also flanked by zones of Holocene and Quaternary faults including the Berrocal fault zone, Monte Vista-Shannon, Cascade, Stanford and San José faults to the west and southwest (Jachens et al 2017; Jachens et al 2002; and Wentworth et al 2010). A map showing the alignment relative to identified liquefaction hazard zones (modified from Witter et al 2006) is included in Figure 5.

The three primary active fault sources with the greatest contribution to the ground motion shaking hazard of the BSVII project as identified in the Uniform California Earthquake Rupture Forecast, Version 3, are the San Andreas, Hayward, and Calaveras faults (Field et al 2013, 2014 and 2015) (Figure 6). Table 3-1 lists historical ground ruptures on several fault zones close to the BSVII project area along with the largest associated historic earthquakes along the ground ruptures.

Table 3-1. Historical Ground Ruptures and Faults Near BSVII Project Area

Fault Zone Ground Ruptures	Approximate Distance (miles)	Largest Historical Earthquakes[1] (year, magnitude)
Hayward	3.4	1868, 6.8 M; 1891, 6.1 M
Calaveras	6.4	1858, 6.1 M; 1911, 6.2 M; 1984, 6.2 M
Monte Vista-Shannon-Cascade	6.4	1865, 6.5 M
San Andreas-Unknown[2]	11	1838, 6.8 M; 1989, 6.9 M[2]

[1] From the Historic Earthquake Online Database, CA Department of Conservation, CA Geological Survey, https://maps.conservation.ca.gov/cgs/historicearthquakes/

[2] Unknown fault associated with the 1989 Loma Prieta earthquake

Based upon prior studies (Jachens et al 2017 and 2002; and Wentworth et al 2010) and an ongoing fault study by VTA, there is one fault source that crosses the eastern half of the project, the Silver Creek fault zone (shown on Figure 6). This fault zone crosses the tunnel alignment, along Santa Clara Street, between approximately South 19th Street and South 25th Street. Data and information related to the Silver Creek Fault can be found in the report titled “Fault Displacement Hazard Considerations for the North Silver Creek Fault” (HNTB/WSP JV 2020). The study includes a subsurface investigation of the Silver Creek Fault during late 2019 and early 2020. According to this report, two magnitude 6 (6.0 M) earthquakes in 1903 may have been caused by movement on the Silver Creek Fault, however the location and magnitude of the earthquakes was determined from anecdotal accounts of ground shaking and damage, in lieu of scientific earthquake instruments (HNTB/WSP JV 2020). Refer to the HNTB/WSP JV report for more information on the Silver Creek Fault.

3.3 Hydrogeology

3.3.1 Hydrostratigraphy

The hydrostratigraphy along the BSVII project is extensively discussed in the HMM/Bechtel (2008c) hydrogeology report. In addition, the stratigraphic subdivisions of these hydrologic units (HMM/Bechtel 2008c) are presented in detail by Wentworth et al (2015). A summary of the hydrostratigraphy as described in these references, which includes some high-level interpretation of available data, is presented in this section.

In general, five groundwater zones or layers (from the ground surface downward) can be identified, though not necessarily present everywhere along the alignment:

Surface Aquifer. Composed of artificial fill, clays and silts, with buried lenses and/or channels of sand and/or fine gravel. The coarse-grained lenses and/or channels are most common near the Downtown San José Station, Guadalupe River and Los Gatos Creek. This layer extends from the ground surface to an approximate depth of 25 feet below ground surface (bgs) across the BVSII project area.

Confining Layer. Composed of clays and silts, with intermittent buried braided channels of sand and/or gravel. The buried channels are most common near the Downtown San José Station, Guadalupe River and Los Gatos Creek. This layer varies in thickness from about 25 to 55 feet and extends from approximately 25 feet bgs to an approximate depth of 50 to 80 feet at the station locations.

Upper Aquifer. Consists of silty sand, sand, gravelly sand, and sandy gravel. It includes broadly deposited, intersecting and coalescing channels of varying thickness and differing permeability. The top of this unit varies from approximately 50 to 80 feet bgs, thickness varies from 30 to 70 feet, and bottom depth ranges between 80 to 150 feet bgs.

Major Aquitard. Composed of clays and silts, but can include channel deposits of sand, silty sand and gravel. The top of this unit varies from approximately 80 to 150 feet bgs (approximately 110 to 150 feet at the station locations), thickness varies from 100 to 120 feet and bottom depth ranges between 200 to 250 feet bgs.

Lower Aquifer. The zone of major groundwater withdrawals in the valley, consisting of broadly deposited sand and gravel zones with interlayered clay and silt. The top of this unit varies from approximately 200 to 250 feet bgs and the thickness may be about 800 feet or more.

3.3.2 Groundwater Measurements in Upper and Lower Aquifers

Valley Water (formerly the Santa Clara Valley Water District) is the designated groundwater management entity for Santa Clara County under the California State-wide Groundwater Elevation Monitoring program. During 2019, Valley Water collected groundwater level measurements from 222 wells and evaluated water levels from an additional 115 wells measured by water retailers primarily from the Lower aquifer, referred to by Valley Water as the “Principal Aquifer” in their 2019 Annual Groundwater Report. Historical and recent groundwater level data and contour maps for the Lower aquifer are documented in Valley Water’s Annual Groundwater Report (2019), Groundwater Condition Report (2020a), and Historical Groundwater Elevation Data web page (2020b).

Valley Water manages an aquifer recharge program along the eastern and western margins of the Santa Clara Valley that helps establish adequate pressures in the Lower aquifer, which sustains artesian, subartesian[1], and upward-gradient groundwater conditions in both the Lower and Upper aquifers. These conditions establish a general northwest, upward groundwater gradient (flow) toward the bay minimizing saltwater intrusion into the Lower aquifer. Artesian conditions in the confined areas of the Santa Clara Valley create hydrostatic pressures in the Upper and Lower aquifers that can be and are measured by piezometers or observed in open standpipe wells, typically as upward gradients in wells or pressurized well-heads.

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[1] Artesian pressures are defined herein as conditions leading to groundwater or groundwater pressure (head) rising above ground surface elevation in an aquifer. This condition can include surface flow of groundwater. Subartesian pressures are pressures corresponding to water head higher than top of aquifer elevation but not rising above ground surface.

Groundwater levels in the Upper and Lower aquifers along and near the BVSII project, specifically along Santa Clara Street, have varied historically. The Upper aquifer has not been widely monitored by Valley Water. MMW collected groundwater data from the Upper aquifer at various locations along the alignment, which is presented in Figure 14. Groundwater levels in the Lower aquifer were at an elevation (El.) of 90 feet above mean sea level (MSL), near the ground surface, between 1914 and 1916. By 1934, these groundwater levels had dropped to El. 0 to 10 feet above MSL along Santa Clara Street. Between 1960 and 1966, groundwater levels in the Lower aquifer decreased significantly to near El. -220 feet. Except for two drought periods between 1984 and 1988 and 2013 and 2016, these groundwater levels have been recovering since 1966. By the Spring of 2019, Lower aquifer groundwater levels in historical Index Well "Martha" (well ID 07S01E16C006, located near Coyote Creek and I-280) had recovered to near El. 20 to 25 feet above MSL near Santa Clara Street (Valley Water, 2019).

Valley Water (2019) groundwater elevation contour maps for the Lower Aquifer for both Spring and Fall of 2019 are presented in Figure 7 and Figure 8, respectively. This and other historical data show that seasonal groundwater fluctuations, specifically in the Lower Aquifer, peak in the Spring and decline through the Fall due to increased pumping, decreasing precipitation, and engineered recharge. According to Valley Water (2019), artesian and subartesian conditions can occur in the central Santa Clara Valley and during 2019, a number of wells had groundwater with substantial artesian pressure.

3.4 Land Subsidence

Valley Water monitors land subsidence in the central Santa Clara Valley in three ways:

- At 141 surface benchmarks along three cross-valley land surface level circuits
- At two deep well extensometers
- By interpreting groundwater levels at ten index wells

These data are compared against threshold values established by Valley Water to reduce the risk of permanent land subsidence. According to Valley Water (2019), from 1915 to 1969, significant land subsidence occurred in the central Santa Clara Valley due to high groundwater withdrawal primarily for agriculture purposes. Analysis of compaction/subsidence data collected from Valley Water extensometers indicates that nearly all ground compaction due to groundwater withdrawal occurs at depths between about 200 and 1,000 feet (Poland et al 1982). Figure 9 shows the cumulative land subsidence at Martha well near downtown San José. The results indicate 13 feet of permanent land subsidence near downtown San José with measurements as recent as 2020.

Permanent land subsidence was significantly diminished in 1970 through comprehensive water management programs implemented by Valley Water. These programs have resulted in the return of groundwater levels to above subsidence-inducing thresholds.

Elastic (non-permanent) subsidence and recovery occurs annually in response to seasonal pumping and recharge as indicated by satellite studies and extensometer measurements (Valley Water, 2019). To avoid resumption of inelastic (permanent) subsidence, Valley Water applied a tolerable subsidence rate of 0.01 feet/year for ten index wells in the central Santa Clara Valley to determine threshold groundwater levels above which groundwater must be maintained to ensure a low risk of land subsidence.

During 2019, ground subsidence in the central Santa Clara Valley ("Santa Clara Plain" in Valley Water 2019) was determined to be an average net uplift of 0.03 feet/year.

3.5 Potential Presence of Gases and Temporary Discharges of Groundwater

Historically, during GIs carried out in the project area, there is anecdotal evidence of air or other gases, that are trapped/dissolved in groundwater, escaping during drilling of some boreholes.

The Tunnel Segment GDR (HMM/Bechtel 2005), states that boreholes appeared

> to be releasing gas during auger drilling […] based on a hissing sound heard within the hollow stem [auger] upon penetrating the Upper Aquifer. […] Temporary discharges of ground water occurred at five CPT locations and one borehole during the geotechnical investigation for preliminary engineering." and "the discharges ranged from 3 to 65 minutes in duration. […] The discharges occurred when all of the CPTs and BH-19 were in the process of penetrating into the confined Upper Aquifer.

The Central Area Guideway Pumping Test Data Report (HMM/Bechtel 2008b), states

> The most significant release of subsurface gases, […] resulted in a temporary discharge of groundwater during installation of monitoring well MW-3D and replacement well MW-3D(r) […] vigorous bubbling heard inside drill casing […] water flow occurred through riser pipe to a height of ~20 feet above ground surface, with a cumulative volume of ~400 gallons. […] vigorous bubbling heard inside drill casing at 55 feet depth. […] During drilling and well installation, total discharge was ~800 gallons.

In addition, the Pumping Test Data Report notes that gas bubbles or gas meter readings were observed during drilling, well installation, or well development at a total of 20 boreholes.

During 2019, these phenomena were recounted to MMW by drilling staff who recalled observing them during the drilling of these historical boreholes and CPTs (Pitcher Services, personal communication 2019).

Although MMW GI did not encounter any clear and conclusive evidence of presence of gases within the groundwater, bubbling or discharge was noted at three standpipe piezometers in May 2020. At these locations, field staff measured the groundwater level at 5-minute intervals until a stable water level reading was recorded. Table 3-2 presents a summary of the standpipe piezometers where bubbling was observed.

Table 3-2. Standpipe Piezometers with Observed Bubbling

Well ID	Date Observed	Location	Well Screen		Comments
			Top Depth (ft)	Bottom Depth (ft)	
MW-2A	5/6/2020	28th Street / Little Portugal Station	127	137	Air pressure release upon opening locking well cap. No groundwater discharge.
MW-2B	5/6/2020	28th Street / Little Portugal Station	100	110	Air pressure release upon opening locking well cap. ½-gallon groundwater discharge.
MW-2E	5/21/2020	28th Street / Little Portugal Station	110	120	Bubbles observed in groundwater during pumping (Well Development).

4 Field Investigation Program

4.1 Introduction

The program of the GI discussed in this GDR consists of two rounds of field geotechnical investigation.

- The initial investigation was carried out by HNTB/WSP with Parikh as subconsultant from October 2018 to April 2019. This investigation included 20 exploratory boreholes and 4 cone penetration tests (CPTs). The results of this investigation are presented in this report for completeness, as they are not discussed in any previous GDR.
- Subsequently, the field investigation effort was handed off to MMW with Parikh as subconsultant, who continued field exploration between July 2019 and October 2020. This investigation program included 29 exploratory boreholes, vibration testing, downhole geophysical logging and pressuremeter testing, slug testing and groundwater sampling of selected standpipe piezometers, and vibrating wire piezometers (VWP) installation in boreholes.

A brief summary of these two investigation programs is presented in Table 4-1. The MMW geotechnical investigation was performed in general conformance with the documents listed in Section 4.1.3.

A map of the exploration boreholes drilled during the HNTB/WSP and MMW geotechnical investigations is presented on Figure 10.

Table 4-1. Summary of Geotechnical Investigations from October 2018 to October 2020

Group	Exploration	Borehole Identification
HNTB/WSP	20 boreholes[1] 4 CPTs[3]	BH-108 to BH-143[2] CPT-184 to CPT-187
MMW	29 boreholes[4]	BH-150 to BH-180

[1] Boreholes BH-110, BH-111, BH-118, BH-119, BH-120, and BH-126 through BH-136 were skipped.

[2] BH-142 and BH-143 are standpipe piezometers.

[3] Cone Penetration Tests CPT-180, CPT-181, CPT-182, CPT-183, and CPT-188 through CPT-205 were skipped.

[4] Boreholes BH-170 and BH-172 were skipped due to access restrictions.

4.1.1 Purpose

Following a review of the existing ground investigation data, a ground investigation was scoped to supplement the historical data and allow the characterization of the subsurface soil, groundwater, and seismic conditions along the BSVII alignment for the project configuration.

4.1.2 Organization of Team

The geotechnical field team consisted of subcontracted geotechnical engineering, drilling, and specialty testing and other firms, as provided in Table 4-2. Subcontractors included Parikh

Consultants, Pitcher Services, Statewide Traffic Control, NorCal Geophysical Consultants, ATS Consulting, and Inspection Services, Inc.

Table 4-2. Field Investigation Team Roles

Company	Role
ATS Consulting (ATS)	Downhole Accelerometer, Loadcell, and Geophone Testing
Cal Engineering & Geology (CE&G)	Field Logging, Instrumentation, Groundwater Data Collection
Gregg Drilling LLC	SPT Hammer Energy Calibration, Well Development, Slug Testing
Integrated Waste Management	Drum Disposal
Inspection Services, Inc. (ISI)	Geotechnical Lab Testing
CERCO Analytical	Corrosion Testing
Cooper Testing Laboratory	Geotechnical Lab Testing
Locus Technologies	Environmental Soil and Groundwater Sampling (directly engaged by VTA)
Mott MacDonald	Planning, Scheduling, Project Restrictions, Technical Oversight, Monitoring, Field Logging, Pressuremeter Testing, Well Development, Groundwater Sampling, Slug Testing, Instrumentation, Groundwater Data Collection
NorCal Geophysical Consultants/Terracon	Downhole Geophysical Logging
Parikh Consultants	Technical Oversight, Field Logging, Lab Testing
Pitcher Services LLC	Drilling, Pressuremeter Testing, Hammer Calibration
Statewide Traffic Control	Traffic Control Plan and Implementation

4.1.3 Field Manuals and Permit Documentation

References for field personnel included the following:

- Soil and Rock: Logging, Classification, and Presentation Manual (Caltrans 2010)
- City of San José Encroachment permit, Tow-Away permit, Lane Closure permit
- Traffic control plan
- Health and Safety Plan BART Silicon Valley Phase II Geotechnical Investigation.

4.1.4 Project Permits and Regulatory Compliance

Prior to site mobilization, MMW contacted the appropriate local jurisdictions to determine permitting requirements and fees for geotechnical drilling, well construction, borehole abandonment, and water level readings. Encroachment permits, tow-away permits and lane closure permits were obtained from the following agencies as needed for all fieldwork completed:

- City of San José Department of Public Works, Development Services Division
- City of San José Department of Transportation
- Valley Water

When required by regulations, an experienced traffic management subcontractor was retained by Parikh Consultants to provide traffic delineation for drilling operations and water level readings. For work sites located within 100 feet of an intersection, an off-duty uniformed traffic control officer was retained by Parikh Consultants in addition to the traffic management subcontractor. Furthermore, where applicable all the investigation works were carried out within the working hours agreed with the City of San José Department of Transportation to minimize any disruption to traffic.

At sites located on private property, Permission to Enter (PTE) was obtained from the property owners and tenants. MMW notified property owners and tenants at least 7 days in advance to coordinate fieldwork in a manner that was least likely to interfere with business operations.

All intrusive investigations were carried out in compliance with the project Supplemental Environmental Impact Statement/Subsequent Environmental Impact Report (SEIS/SEIR). A summary of the relevant mitigation measures taken are listed in Appendix A.

At locations where access restrictions were encountered, boreholes were relocated where possible or removed from the investigation. Gaps in the numbering scheme correspond to the exploratory boreholes removed from the scheme for this reason.

4.2 Borehole Drilling Program

4.2.1 Overview

The borehole drilling program conducted by HNTB/WSP commenced in October 2018 and included 20 boreholes and four cone penetration tests (CPTs). The MMW borehole drilling program commenced on July 15, 2019 and was completed on October 26, 2020. A total of 29 boreholes were completed in MMW's GI as of October 26, 2020.

Borehole locations drilled during the MMW investigation were chosen to achieve a data collection that—when including HNTB/WSP and historical data—extended a minimum of one tunnel diameter below invert at approximately 1,000-foot spacing, and within 125 feet of the tunnel centerline. This yielded a data set within 100 feet of the proposed mined tunnel volume.

At the locations of stations, emergency stops, and associated adits and at locations where supplemental data were needed, borehole locations were spaced at about 200 to 500 feet. A summary of all boreholes drilled between October 2018 and October 2020 is presented in Table 4-3. The locations of these boreholes are shown on Figure 10 (comprising 11 sheets). Additionally, the locations of available geotechnical data (including the historical borehole) are presented in Figure 11 (comprising 11 sheets). Geotechnical plan and profile views of select, available geotechnical boreholes are presented in the Drawings.

Table 4-3. Summary of Exploratory Boreholes from October 2018 through October 2020

Borehole ID	Date Drilled	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Total Depth (ft)	Continuous Sampling[1] Depth (ft bgs)	Tunnel Zone[2] (ft bgs)		In Situ Testing			
							Invert	Crown	ATS[3]	VWP[4]	PS[5]	PMT[6]
BH-108	11/27/2018	1,955,111.1	6,164,157.1	86.94	141.0		93	45				
BH-109	04/11/2019	1,954,660.2	6,164,648.4	94.38	153.0		104	56				
BH-112	12/05/2018	1,952,430.7	6,164,748.1	88.92	156.5		106	58				
BH-113	12/12/2018	1,951,954.9	6,164,296.3	90.13	161.5		110	62				
BH-114	12/17/2018	1,951,348.5	6,163,597.6	91.49	166.5		114	66				
BH-115	12/20/2018	1,950,855.9	6,162,732.1	95.06	176.5		121	73				
BH-116	01/16/2019	1,949,991.7	6,160,933.3	80.56	166.9		112	64				
BH-117	10/24/2018	1,949,408.2	6,160,266.5	81.08	163.0		110	62				
BH-121	01/23/2019	1,947,880.6	6,156,898.0	87.19	146.5		97	49				
BH-122	11/7/2018	1,946,771.8	6,155,412.7	81.38	156.5		112	64				
BH-123	10/31/2018	1,946,618.7	6,155,215.5	85.06	156.5		113	65				
BH-124	11/13/2018	1,946,481.7	6,154,978.7	86.28	156.6		109	61				
BH-125	11/16/2018	1,946,414.3	6,154,679.9	87.59	155.5		106	58				
BH-137	11/30/2018	1,949,225.9	6,151,112.1	81.74	155.5		126	78				
BH-138	01/04/2019	1,949,887.4	6,150,551.9	79.89	151.5		121	73				
BH-139	01/09/2019	1,950,684.3	6,149,891.1	76.29	146.5		115	67				
BH-140	11/20/2018	1,951,348.1	6,149,290.5	71.53	141.5		107	59				
BH-141	01/11/2019	1,951,929.0	6,148,085.8	68.83	117.0		75	27				
BH-142 (SP-1)[7]	01/17/2019	1,948,234.5	6,156,861.6	85.61	101.5		96	48				
BH-143 (SP-2)[7]	01/25/2019	1,948,886.3	6,158,032.2	79.32	100.0		94	46				
BH-150	07/19/2019	1,947,944.0	6,157,099.6	87.14	253.0	80 – 140	98	50		✓		✓
BH-151	07/26/2019	1,947,821.0	6,157,081.3	87.51	273.5	80 – 130	98	50	✓	✓	✓	
BH-152	08/02/2019	1,946,271.3	6,154,224.1	86.59	275.0	68 – 130	101	53		✓	✓	
BH-153	08/09/2019	1,946,168.5	6,154,065.7	88.80	251.5	68 – 130	102	54		✓		
BH-154	08/16/2019	1,952,701.7	6,164,836.0	89.31	225.0	68 – 130	106	58	✓	✓	✓	
BH-155	08/29/2019	1,953,417.9	6,164,862.8	87.67	215.0	60 – 130	102	54		✓		
BH-156	08/23/2019	1,953,640.9	6,164,591.3	88.17	275.5	65 – 138	102	54		✓	✓	
BH-157	10/24/2019	1,948,522.7	6,158,579.1	79.84	201.5	70 – 130	98	50				
BH-158	10/08/2019	1,949,055.5	6,159,642.4	81.67	201.5	72 – 140	109	61	✓	✓		✓
BH-159	11/07/2019	1,955,261.9	6,164,342.0	87.53	212.0	50 – 110	95	47	✓	✓		✓
BH-160	11/27/2019	1,946,961.6	6,156,135.0	82.79	206.5	65 – 130	105	57		✓		
BH-161	10/30/2019	1,946,303.8	6,154,108.7	86.88	251.5	70 – 130	100	52				✓
BH-162	12/09/2019	1,946,275.3	6,153,549.0	84.09	220.5	65 – 135	94	46				
BH-163	12/17/2019	1,946,385.7	6,153,183.6	87.75	216.5	70 – 135	102	54	✓	✓		
BH-164	10/15/2019	1,952,858.1	6,164,718.6	88.63	232.0	60 – 140	105	57		✓		✓
BH-165	11/19/2019	1,956,022.4	6,163,246.7	86.01	176.5	20 – 80	55	7		✓	✓	
BH-166	01/10/2020	1,947,127.4	6,152,114.8	86.58	215.9	71 – 135	117	69	✓	✓		
BH-167	04/10/2020	1,946,661.4	6,152,533.8	93.25	220.5	30 – 135	117	69				
BH-168	06/19/2020	1,947,476.9	6,152,114.4	84.54	202.5	60 – 120	119	71		✓		
BH-169	01/23/2020	1,948,258.8	6,152,070.0	79.99	252.0	70 – 135	122	74	✓	✓		

Borehole ID	Date Drilled	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Total Depth (ft)	Continuous Sampling[1] Depth (ft bgs)	Tunnel Zone[2] (ft bgs)		In Situ Testing			
							Invert	Crown	ATS[3]	VWP[4]	PS[5]	PMT[6]
BH-171	01/31/2020	1,950,237.9	6,150,233.3	76.98	227.0	65 – 130	117	69		✓		
BH-173	02/10/2020	1,951,887.9	6,148,847.6	67.63	201.5	5 – 102	97	49		✓		
BH-174	01/14/2020	1,950,367.2	6,161,916.7	85.50	99.0		114	66	✓			
BH-175	04/01/2020	1,946,370.7	6,152,911.0	89.61	182.5	30 – 130	108	60		✓		
BH-176	04/20/2020	1,952,544.5	6,147,277.2	65.35	265.0		At grade			✓		
BH-177	04/24/2020	1,954,420.2	6,144,531.6	64.39	265.0		At grade			✓		
BH-178	04/30/2020	1,953,176.3	6,146,431.7	62.43	215.0		At grade			✓	✓	
BH-179	10/26/2020	1,950,048.3	6,160,894.6	80.71	265.0		112	64		✓	✓	
BH-180	07/06/2020	1,949,024.4	6,151,220.0	81.78	265.0		126	78		✓	✓	

Northing, easting, and total depth values are rounded to nearest tenth (0.1) of a foot.
Elevation values rounded to the nearest hundredth (0.01) of a foot.
Continuous sampling and tunnel zone values are rounded to the nearest foot.

[1] Continuous sampling entailed collecting samples with a maximum of 1-foot spacing between samples. A sample was not taken at vibration test depths. Continuous sampling depths were primarily within the tunnel zone. Where an abundance or gap in data existed, the continuous sampling depth was adjusted accordingly.
[2] Approximate tunnel geometry for alignment option C in November 2020.
[3] Downhole accelerometer testing and/or loadcell testing
[4] Vibrating wire piezometer(s) installed
[5] Downhole P- and S-wave suspension velocity logging
[6] Pressuremeter testing was performed in a separate borehole drilled adjacent to the original borehole location
[7] Standpipe piezometer

Note: Borehole numbers BH-110, BH-111, BH-118 through BH-120, BH-126 through BH-136, BH-170 and BH-172 were skipped due to access issues. Borehole numbers BH-144 through BH-149 were not used. MMW GI began with borehole BH-150.

4.2.2 Drill Rig and Hammer Types

Drilling was performed using rotary-wash methods with truck-mounted rigs and drilling mud (bentonite) as the circulating fluid. Boreholes were drilled with a Failing 1500 drill rig. Separate boreholes were drilled for pressuremeter testing adjacent to the original boreholes with a Fraste Multidrill XL drill rig. The Failing 1500 and Fraste Multidrill XL are typical rig types commonly used for rotary wash drilling.

The drill rigs utilized an Automatic Trip Hammer system to advance split-spoon samplers. Pitcher Services LLC calibrated the efficiency of the standard 140-lb automatic hammer while drilling borehole BH-169. AW-size (1.75-inch outside diameter) drill rods were used during drilling and sampling operations. Hammer calibration certificates are included in Appendix A.

4.2.3 Sampling Methods and Equipment

4.2.3.1 Sampler Types

Seven types of samplers were used: 4 driven thick-walled samplers (standard penetration test, Standard California, Modified California and Dames & Moore U-Type), 2 pushed thin-wall samplers (Dames & Moore Piston and Shelby Tube), and 1 rotated thin-walled sampler (Pitcher Barrel). The list of the sampler types used is provided in Table 4-4. A bulk sample was also collected from the upper 5 feet in selected boreholes for expansion testing.

Table 4-4. Summary of Soil Sampler Types

Sampler Type	Outside Diameter (in)	Inside Diameter (in)	Sample Length (in)
Standard Penetration Test	2	1.5	18
Standard California	2.5	2	18
Modified California	3	2.375	18
Dames & Moore U-Type	3.25	2.375	12
Dames & Moore Piston	2.5	2.375	18
Shelby Tube	3	2.875	30
Pitcher Barrel	3	2.875	30

The split-spoon sampler utilized for the standard penetration test (ASTM D1586) has an outside diameter of 2 inches and an inside diameter of 1½ inches. An interior liner was not used. standard penetration test (SPT) samples were used to collect standard penetration resistance data of coarse-grained materials such as sand or gravel.

The split-spoon sampler utilized for the Standard California (SC) sampler (ASTM D3550) has an outside diameter of 2½ inches and an inside diameter of 2 inches. The SC sampler was seldomly used.

The split-spoon sampler utilized for the Modified California (MC) sampler (ASTM D3550) has an outside diameter of 3 inches and an inside diameter of 2 ½ inches. The sampler is loaded with three 6-inch tall stainless-steel liners with a 2 $^{7}/_{16}$-inch inside diameter. Sample liners collected were packaged with plastic caps and electrical tape to prevent moisture loss. The MC sampler was used in fine grained materials such as silt and clay where field staff determined that the Piston or Shelby Tube sampler would have had poor recovery.

The split-spoon sampler utilized for the Dames & Moore U-Type sampler (ASTM D3550) has an outside diameter of 3 ¼ inches and an inside diameter of 2 ½ inches. The sampler is loaded with twelve 1-inch tall rings with a 2 $^{7}/_{16}$-inch inside diameter. Rings collected were wrapped in a plastic bag and placed in 6-inch tall plastic tubes. The U-Type sampler was used primarily to recover loose to dense granular material. The built-in catching mechanism recovers less disturbed samples than the SPT and MC samplers with a sand catcher attachment.

The thin-walled Dames & Moore Piston sampler (ASTM D1587) consists of a 20-inch long, 2 $^{7}/_{16}$-inch inside diameter brass tube that is hydraulically pushed by the drill rig. The sampler was used to obtain undisturbed samples of soft to very stiff fine-grained soils such as clays and silts. For each push, the standard length of advancement was 18 inches. The Modified California or Pitcher Barrel sampler was used instead of the Piston sampler when the soil was too hard, or when field staff anticipated interbedded gravel / gravel caving.

The thin-walled Shelby Tube sampler (ASTM D1587) consists of a 30-inch-long, 2⅞-inch inner diameter mild steel tube that is hydraulically pushed by the drill rig. The sampler was used to obtain relatively undisturbed samples of soft to very stiff fine-grained soils such as clays and silts. For each push, the standard length of advancement was 30 inches. The Shelby Tube sampler was used primarily as a backup when the Piston sampler was damaged.

The thin-walled Pitcher Barrel sampler (ASTM D1587) consists of double-tube core-barrels. The inner barrel is a Shelby tube, which is affixed to a spring-loaded sampler head that extends and retracts relative to the cutting bit on the outer barrel. The outer barrel is rotated at about 100 to 200 rpm to remove material from around the inner barrel. The inner barrel is hydraulically pushed alongside the outer barrel to retrieve the soil sample. The Pitcher Barrel sampler was utilized to obtain relatively undisturbed samples in hard fine-grained soils, and granular soils with clay.

The type of sampler used is indicated on the borehole logs included in Appendix A.

4.2.3.2 Sampling Interval

Different sampling intervals were adopted during the different rounds of GIs.

During the HNTB/WSP GI, boreholes were typically sampled at 5-foot intervals from the ground surface to full depth of the boreholes.

In general, boreholes drilled during MMW's GI were sampled continuously (1-foot spacing in-between samples) from 5 feet above the proposed tunnel crown to 5 feet below the proposed tunnel invert at the time. At depths above and below the tunnel alignment, sampling was performed at 5-foot to 10-foot intervals. At station and emergency stop locations, sampling was performed at 5-foot intervals.

The sampling interval during MMW's GI was occasionally changed by the field engineer for two reasons: 1) to collect samples at intermediate intervals due to no recovery of a previous sample and 2) to speed up drilling to accommodate time constraints from the encroachment permit and in situ tests.

The depth of each sample taken during borehole drilling is indicated in the borehole logs reported in Appendix A of this report.

4.2.4 Field Index Tests

In addition to visual observations of soil strength, field index tests using handheld instruments (pocket torvane and pocket penetrometer) were performed on cohesive samples. Field index tests were performed in between the middle and bottom liner recovered from Modified California samplers as well as at the bottom of Piston, Shelby Tube, and Pitcher Barrel samples. When cohesive material was recovered in a U-Type sampler, field index tests were performed on any exposed ring.

The estimated unconfined shear strength and undrained shear strength from pocket penetrometer and pocket torvane tests, respectively, are presented in the Field Tests column on each borehole log in Appendix A Intrusive Investigations. These values have been derived using handheld instruments and therefore should be considered as index tests.

Results from pocket torvane and pocket penetrometer were used to gauge the consistency of the soil on the field borehole log.

4.2.5 Borehole Water Level Measurements

When feasible, water levels were measured down the borehole on the first day of drilling. The field engineer typically directed Pitcher Services LLC personnel to excavate the first 5 to 6 feet of the borehole with a hand auger or solid flight auger to clear the borehole for utilities and to locate shallow water levels. At boreholes where granular soil layers hindered dry drilling or there were time constraints for in situ tests, first day water level readings from the borehole were not taken.

Water levels down the borehole were measured on every subsequent day of drilling by measuring the level of the drill fluid in the borehole at the beginning of the day. The water levels from these field readings are based on the assumption that the drilling fluid reached equilibrium with the natural groundwater level overnight. Water level readings from drilling fluid should not be used for design.

Water data from standpipe piezometers and vibrating wire piezometers are discussed in Section 4.10.

4.2.6 Sample Handling

Samples were preserved and transported in accordance with ASTM D4220 guidelines. SPT samples were collected and retained in re-sealable plastic bags. Modified California, Dames &

Moore Piston, Shelby Tube, and Pitcher Barrel samples were collected in tubes and sealed with plastic caps and electrical tape. Dames & Moore U-Type sample rings were wrapped in plastic then placed in a plastic tube with caps.

Soil samples were handled in general accordance with ASTM D4220. Samples were transported from the field to the Parikh laboratory at the end of each day. At the Parikh laboratory, samples were reviewed and assigned for laboratory testing. Samples not tested were transported to a nearby climate-controlled storage facility.

4.2.7 Borehole Completion and Abandonment

Prior to completion of each borehole, Parikh's field geologist or Pitcher Services LLC's field driller notified Valley Water representatives for inspection of the grouting procedures. All boreholes that were not selected for instrumentation during MMW's geotechnical investigation were backfilled with a cement grout mix of approximately 30 gallons of water and 8 47-lb bags of cement (Type II-IV). An EMCO A0721-101 Monitoring Well Manhole was installed at boreholes located on City of San José streets. Boreholes that were not instrumented during HNTB/WSP's geotechnical investigation were subsequently remediated by pavement restoration in accordance with City of San José permit requirements. Surface completions at boreholes located on private property included cement and an asphalt concrete cold patch.

All investigation derived waste was collected in 55-gallon drums and transported to the BSVII Geotech staging area at 64 N Market Street in San José for short-term storage. Integrated Waste Management characterized, labeled, and disposed of the drums in accordance with applicable regulatory requirements.

4.2.8 Borehole Log Organization and Presentation

Borehole logs were prepared for 49 boreholes completed during HNTB/WSP's and MMW's GI between October 2018 and October 2020. A terms and symbols key is included prior to the borehole logs in Appendix A. The key sheet summarizes the soil descriptions classified in general accordance with ASTM D2488 standards and supplemented with the Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).

A joint effort was made by the field engineers from Parikh, Cal Engineering & Geology Inc. and Mott MacDonald to package the recovered soil samples and record the soil conditions encountered as the boreholes were drilled. At depths where a sample was not collected, the field engineers estimated soil descriptions based on the soil cuttings recovered from rotary wash drilling, rig behavior, and the drillers comments. Driller comments included changes in drill rig chatter (gravel and sand content encountered by the drill bit at depth) and changes in pulldown pressure (hydraulic pressure at the drill head interpreted as consistency, density, cementation, and cohesion of soils encountered by the drill bit at depth). Field index tests (Section 4.2.4), groundwater level measurements (Section 4.2.5), and other observations such as drilling fluid loss were also recorded on the field borehole log.

A note on fluid loss recorded during drilling the MMW GI boreholes and corresponding driller's comments is reported in the borehole logs in Appendix A. A summary of the instances when fluid loss was observed is reported in Table 4-5. Fluid loss is also similarly reported in other documents, see GDR Volume II.

Table 4-5. Summary of Fluid Loss

Borehole ID	Depth (ft)	USCS	Comment[1]
BH-150	86 – 88	GP	fluid loss
BH-157	75	SP-SM	fluid loss
BH-158	56 – 65	GW-GM	rig chatter continuous fluid loss
BH-158	133	SP	fluid loss
BH-158	160 – 165	GP-GM	fluid loss
BH-161	31 – 40	SW-SM	fluid loss
BH-161	60 – 70	SP	fluid loss
BH-161	82 – 83	GP-GM	fluid loss
BH-166	103 – 113	SM	fluid loss
BH-167	47 – 68	SM	continuous fluid loss; 1000-gallons total
BH-169	219	SM	150-gallons fluid loss
BH-171	154	GP	rig chatter; fluid loss
BH-171	208	GP-GM	fluid loss
BH-175	168	SC	fluid loss
BH-175	177	SM	rig chatter; fluid loss
BH-180	159	SW-SM	fluid loss

[1] Small quantities of fluid loss typically occurred during drilling in granular layers. Fluid loss comments presented above indicate that a minimum of 25-gallons of fluid loss were observed. The Pitcher Services mud tub has a 100-gallon capacity.

Upon completion of each borehole, the information recorded on the field borehole log was reviewed by MMW for quality assurance. The reviewed field data and laboratory test results were then entered and stored in the geotechnical database program gINT. Borehole logs created with gINT are included in Appendix A.

4.2.9 Standard Penetration Test

The SPT measures of the resistance of the soil during sampling using a split-spoon sampler (ASTM D1586). The standard penetration resistance of the soil is defined as the number of blows (N) required to drive the sampler 12 inches with a 140-pound hammer falling from a height of 30 inches.

The number of blows required to advance the split-spoon sampler was recorded for each 6-inch interval by the field engineer. In accordance with ASTM D1586, sampling was halted if the total number of blows exceeded 100, the number of blows exceeded 50 in any 6-inch interval, or if the sampler was not advanced as a result of 10 consecutive blows. The distance driven for each of these refusal conditions was recorded on the borehole log with the blow counts.

The blow counts presented on the borehole logs in Appendix A are a sum of the blows from the two final 6-inch intervals. The blow counts for the first 6-inch interval are not presented on the borehole logs unless the total drive of the sampler was 12 inches or less.

The Modified California and Dames & Moore U-Type samplers (Sampler Types) were also driven to collect samples. The uncorrected blow counts using Modified California and Dames & Moore U-Type samplers were also recorded and are presented on the borehole logs. The reported N-values on the borehole logs have not been corrected for sampler size, hammer energy, overburden pressure, or field procedures.

The profile of SPT N-values measured for historical and 2018-2020 GIs are presented in Figure 12 for the underground stations and tunnel zone. The values shown have not been corrected for energy and field procedures; however, the N-values were corrected for sampler size. the Standard California, Modified California, and Dames & Moore U-type blow counts presented in Figure 12 have been corrected for sampler size using a factor of 0.77, 0.64, and 0.44, respectively.

4.2.10 Standard Penetration Test Energy Calibration

Standard penetration test hammer energy calibration testing was performed by Gregg Drilling on the Failing 1500 drill rig while drilling BH-169 on January 17 and January 20, 2020.

Gregg Drilling personnel collected measurements and data using a standard penetration test Analyzer. Two strain gauges were mounted on a 2-foot section of the drill rods to measure the force applied, while two piezoresistive accelerometers were bolted on the same drill rod to measure acceleration. The gauges were mounted approximately 6 inches from the top of the drill rod. Hammer energy tests were performed in accordance with ASTM D4633.

The complete report for the standard penetration test hammer energy calibration is attached in Appendix A. The output for each recorded impact of the hammer included the following:

- Blow count in blows per foot
- Maximum drill rod force
- Maximum drill rod velocity
- Maximum transferred energy
- Blows per minute
- Energy transferred (percentage)

Data from these calibrations indicate an average measured energy transfer of 76% for the automatic hammer on the Failing 1500 drill rig.

4.2.11 Air and Vapor Monitoring

As previously mentioned in Section 3.5, a significant release of subsurface gases resulted in a temporary discharge of groundwater during historical explorations at MW-3D, MW-3D(r), BH-

19, and CPT-30. These four locations displayed methane readings of up to 1,200 ppm and groundwater discharge of up to 800 gallons. Borehole BH-179, which is located within an 800-foot radius of these four locations, was selected for air and vapor monitoring to measure the potential release of aquifer gases.

A model QRAE 3 four-gas confined space detector was rented from EnviroTech Services, Inc., located in Martinez, California. Prior to drilling, the gas monitor was placed adjacent to the drill rig and mud tub and programmed to collect readings at a 1-minute interval. Additional, during the retrieval of each soil sample, MMW staff manually checked the gas monitor to verify safe working conditions. The meter included sensors to measure concentrations of O_2, LEL, CO, H_2S, SO_2, and HCN to a resolution of 0.1%, 1%, 1 ppm, 1 ppm, 0.1 ppm, and 1 ppm, respectively. A summary table of the gas monitor readings downloaded at the end of each day of drilling at BH-179 is presented in Table 4-6:

Table 4-6. Gas Monitor Readings at BH-179

Date	Depth Drilled (ft)	O_2 % max	O_2 % min
10/19/20	0 – 91.5	25.7	19.8
10/20/20	91.5 – 162	23.1	18.4
10/21/20	162 – 180	23	18.3
10/22/20	180 – 222	23	18.3
10/23/20	222 – 265	20.9	18.2

Note: The concentration of LEL/CO/H_2S/SO_2/HCN observed was below the reporting limit of the gas monitor. A hydrocarbon odor was observed from the soil samples at 13.5 feet to 24 feet bgs despite null gas monitor readings.

All gas meter readings collected from BH-179 are presented in Figure A-1 in Appendix A. Additional data from historical air and vapor monitoring is shown in Volume II.

4.3 Cone Penetration Testing Program

Cone penetration tests (CPTs) are continuous in situ tests that record geotechnical data through a piezocone. The piezocone consists of a conical pointed penetrometer that measures vertical ground penetration resistance on the tip of the piezocone, and a cylindrical sleeve that measures frictional resistance on the side of the piezocone. The use of a piezocone allows simultaneous measurement of the pore water pressure at depth during the advancement of the piezocone. Field parameters from the penetrometer are measured and recorded electronically. Geotechnical parameters such as soil type and thickness, unit weight and estimated relative density, friction angle and Young's Modulus may be evaluated from the recorded field parameters using published correlations.

Gregg Drilling completed a total of four CPTs on October 23 and 24, 2018, under the supervision of HNTB/WSP. Gregg Drilling performed standard CPT soundings at each location (CPT-184 through CPT-187) and pore pressure dissipation tests (PPDT) at three of four location (CPT-184 through CPT-186). CPTs were performed following ASTM International test method D5778. CPTs were advanced to a depth of 20 feet below the (then designed) tunnel invert depth (elevation) or until refusal (600 to 700 tons per square foot tip pressure), which ranged from between 91 and 150 feet bgs.

4.3.1 Equipment

The following equipment was utilized in conducting the CPT soundings and PPDT:

- Concrete core drill
- A self-contained truck-mounted CPT rig
- Support truck

The CPTs were performed using a 20-ton capacity truck-mounted rig with a self-contained power supply unit. The rig was equipped with a hydraulic loading system to level the platform to ensure test verticality. The dead weight of the rig provided the reaction weight necessary for advancing the piezocone. The piezocones used were 1.75 inches in diameter with a projected base area of 2.3 square inches. The cone sleeve friction area was 35 square inches. Piezocones were equipped with a 5-millimeter-thick porous plastic filter behind the cone tip that measured dynamic pore pressure as the piezocone advanced. Additional dimensions and specifications for the piezocone and pore pressure transducer are presented in the CPT report located in Appendix A.

4.3.2 Procedures

4.3.2.1 Cone Penetration Testing

Gregg Drilling performed CPT soundings in accordance with ASTM D5778. Concrete coring was used to remove the pavement. Hand auger methods were used to clear the top 5 feet in case unidentified or unknown utilities were present.

Once cleared for utilities, the hole was backfilled with the hand-augered cuttings, and the CPT rig was positioned over the hole. The piezocone was advanced at a constant rate of about 1 inch (2.5 cm) per second using hydraulic pressure and the weight of the CPT rig. An electronic data acquisition system was used to record measurements of cone tip resistance, sleeve friction, pore pressure, and inclination at about 1- to 2-inch intervals. The upper 5 feet of disturbed soil are not included in the results and have been shaded grey accordingly on the CPT logs.

CPT soundings were performed to depths of about 20 feet below the (then designed) tunnel invert depth (elevation) or until refusal was encountered. After completion of each CPT, dummy rods were inserted in the hole to provide a conduit for backfill using a cement-bentonite grout mix. Surface completion consisted of rapid setting concrete. Grout mix and grouting procedures were completed in accordance with Valley Water regulations.

4.3.2.2 Pore Pressure Dissipation Testing

Pore pressure dissipation tests were conducted in accordance with ASTM D5778 by using a standard CPT piezocone by stopping the cone penetration at a given depth and measuring the reduction of the porewater pressure over time. The rate of dissipation measured depends upon the flow and consolidation characteristics of the soil (coefficient of consolidation), which in turn depend on the compressibility and permeability of the soil.

The measurements of the dissipation tests are included in Appendix B of this report.

4.3.3 Locations

The four CPTs were completed at about 200 foot spacing along the project alignment on West Santa Clara Street, centered around the Guadalupe River. A map of the CPT sounding locations is presented in Figure 10. A summary of the CPT and PPDT locations is provided in Table 4-7.

Table 4-7. CPT and PPDT Location Summary

CPT ID	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Total Depth (ft)	PPDT[1] Depth (ft)
CPT-184	1,946,617.3	6,155,213.3	85.15	90.9	39.5, 66.9, 91.2
CPT-185	1,946,479.5	6,154,974.2	86.36	117.5	43.6, 74.6
CPT-186	1,946,418.3	6,154,805.2	87.14	150.1	43.7, 74.9, 123.1
CPT-187	1,946,414.1	6,154,686.9	87.54	96.6	

All values except for elevation rounded to the nearest tenth (0.1) of a foot.

[1] Pore Pressure Dissipation Test

4.3.4 Measurements

Plots of the tip resistance and friction ratio of CPTs completed during the 2018 to 2020 GIs are shown in color on the Geotechnical Plan and Profile (See Drawings). Historical (prior to 2018) CPT plots displayed on the Drawings are shown in black and gray.

Additionally, CPT logs are provided in Appendix A. The CPT logs include cone resistance, sleeve friction, pore pressure, friction ratio, and estimated soil behavior type. Pore pressure dissipation data from this investigation are not available and have been omitted from this report.

A CPT report provided by Gregg Drilling is included in Appendix A. The report includes some interpretation of the measurements. MMW does not assume any liability for the correctness of the parameters provided in Gregg's report nor for any use of these parameters in any design or review.

4.4 Noise and Vibration Testing

ATS performed noise and vibration testing in eight boreholes during the 2019-2020 GI. The detailed procedure and measurements of the testing are provided by others in a separate vibration testing report.

4.4.1 Field Procedures

Field procedures for noise and vibration testing are documented in the noise and vibration testing report.

4.4.2 Frequency of Testing

Noise and vibration testing was performed at eight boreholes at depths varying from 70 feet to 110 feet bgs. A total of 21 tests were performed. The target depths of these tests were selected to obtain data within the vertical envelope of the tunnel alignment, with three tests at each location: crown level, 10 and 20 feet below crown level respectively.

4.5 Pressuremeter Testing

MMW staff and Pitcher Services completed pressuremeter testing in selected boreholes in cohesive soils. The pressuremeter test is an in-situ stress-strain test performed against the wall of a borehole using a cylindrical probe that expands radially. The pressuremeter consists of a probe, a control unit, and tubing used to connect the two. A TEXAM pressuremeter and N-size 70-millimeter-long probe was utilized for the 2019 pressuremeter testing campaign.

4.5.1 Field Procedures

Pressuremeter testing boreholes were rotary wash drilled by Pitcher Services using a Fraste Multidrill XL drill rig. The testing was performed in a separate borehole 5 feet within of the previously drilled and sampled borehole at selected locations. A 5-inch diameter steel casing was driven to about 10 feet bgs to prevent caving from the upper soil layers, which could damage the probe membrane during deflation and retrieval.

To conduct a pressuremeter test, Pitcher drilled a 3-inch diameter pilot hole using a 2 ⅞-inch tri-cone drill bit to form an 8-foot test zone. A 2-foot-long probe was used. The first pressuremeter test was conducted in the bottom 3 feet of the test zone. Upon completion of the first test, the probe was raised 3 feet and the second test was conducted. In some cases, depending on the soil conditions and the test-compatible soil layer thickness, a 5-foot test zone was drilled in lieu of 8 feet to perform one test only.

Pitcher Service LLC personnel performed the equipment saturations and calibrations and executed the test in accordance with the manufacturer’s instructions (Roctest 2017). Water was utilized as the pressure source for the tests to inflate the probe membrane. Three electronic sensors within the center of the instrument registered displacement data during testing. Pitcher Services personnel manually controlled the water volume to inflate/deflate the probe membrane and periodically recorded pressure and displacement readings.

4.5.2 Frequency of Testing

A total of 47 pressuremeter tests were performed at boreholes BH-150, BH-158, BH-159, BH-161 and BH-164 at depths varying from 46 feet to 172 feet bgs, as described in Table 4-8. The target depths of these tests were selected to evaluate the in-situ shear strength, lateral stress, and elastic modulus of specific soil horizons near planned BSVII project structures.

Table 4-8. Summary of Pressuremeter Tests

Borehole Number	Northing NAD83 (ft)[1]	Easting NAD83 (ft)[1]	Elevation NAVD88 (ft)	Depth of Test (ft)[2]
BH-150	1,947,944.0	6,157,099.6	87.14	73, 83, 93, 98, 113, 118, 123, 128, 131, 136, 139,
BH-158	1,949,055.5	6,159,642.4	81.67	53, 126, 129, 147, 150,
BH-159	1,955,261.9	6,164,342.0	87.53	46, 48, 69, 75, 93, 96, 103, 106, 113, 169, 172,
BH-161	1,946,303.8	6,154,108.7	86.88	75, 93, 107, 120, 124, 129, 134, 139, 142, 152
BH-164	1,952,858.1	6,164,718.6	88.63	50, 53, 58, 99, 102, 105.5, 138, 143, 146

[1] Values rounded to the nearest tenth (0.1) of a foot.
[2] Values rounded to the nearest foot.

4.5.3 Measurements

Pressuremeter test measurements are presented in Appendix B. The data presented include also some interpretation of the data obtained with the TEXAM software. MMW does not assume any liability for the correctness of the parameters obtained using the TEXAM software nor for any use of these parameters in any design. The pressuremeter test depths are also presented on the gINT borehole logs in Appendix A.

The pressuremeter equipment had difficulties obtaining reliable data at boreholes BH-150, BH-158, and BH-159 due to thick sand and gravel layers damaging the probe membrane. The proposed pressuremeter test depths were too deep to drive casing to provide protection for the test probe considering time constraints from the schedule and permits.

4.6 Downhole Geophysical Logging

Downhole shear wave velocity measurements were completed in selected boreholes using the downhole suspension logging method. Logging was performed by NorCal Geophysical Consultants. A summary report prepared by NorCal is included in Appendix B.

PS-wave (pressure waves are longitudinal, or compression waves and shear waves are transverse or sideways waves) logging provides high-resolution measurements (typically spaces at intervals of about 1.5 feet) for the determination of in situ compression and shear wave velocities in deep uncased boreholes.

The test data provides detailed information regarding the variation of velocities with depth and can accurately differentiate interfaces between layers.

4.6.1 Field Procedures

Downhole seismic surveys were performed in accordance with ASTM D5753 and ASTM D7400 using a method suspension system manufactured by Robertson GeoLogging.

The system consists of a 7-meter probe, containing a mechanical dipole source and two in-line motion detecting hydrophones spaced 1 meter apart, suspended by a cable. The armored conductor cable serves to both support the probe and convey the data to and from a recording/control device at the surface. The probe is lowered into the borehole to a specified depth, where the source generates a pressure wave in the borehole fluid. The pressure wave is converted to seismic waves (P and S) at the borehole wall. Along the wall at each receiver location, the P and S waves are converted back to pressure waves in the fluid and are received by the geophones, which send the data to the recorder at the surface.

Boreholes selected for PS-wave logging were drilled 15 feet beyond the target depth to provide a “rat hole” to accommodate the logging probe. Measurements were performed in an open hole, below the depth of surface casing.

4.6.2 Frequency of Testing

Downhole geophysical PS-wave logging was performed after completion of drilling of ten boreholes: BH-151, BH-152, BH-154, BH-156, BH-165, BH-176, BH-177, BH-178, BH-179 and BH-180 at depths varying from 10 feet to 260 feet bgs. Shear wave velocity data can be utilized to evaluate the stiffness and seismic design parameters for structures.

Depths of these boreholes range from 176.5 to 275.6 feet. Measurements were recorded in 2-foot (0.60-meter) intervals. Table 4-9 summarizes PS-wave logging test locations and depths.

Table 4-9. Summary of P-S Logging

Borehole Number	Northing NAD83 (ft)[1]	Easting NAD83 (ft)[1]	Elevation NAVD88 (ft)	Depth Interval Logged	
				Top Depth (ft)	Bottom Depth (ft)
BH-151	1,947,821.0	6,157,081.3	87.51	39	245
BH-152	1,946,271.3	6,154,224.1	86.59	34	260
BH-154	1,952,701.7	6,164,836.0	89.31	20	212
BH-156	1,953,641.0	6,164,591.3	88.17	20	261
BH-165	1,956,022.4	6,163,246.7	86.01	13	152
BH-176	1,952,544.5	6,147,277.2	65.35	15	243
BH-177	1,954,420.2	6,144,531.6	64.39	15	251
BH-178	1,953,176.3	6,146,431.7	62.43	10	204
BH-179	1,950,048.3	6,160,894.6	80.71	10	252
BH-180	1,949,024.4	6,151,220.0	81.78	40	252

[1] Values rounded to the nearest tenth (0.1) of a foot.

4.6.3 Measurements

The shear wave velocity records obtained during P-S logging testing are presented in Appendix B. A graphical profile of measured shear wave velocities for these boreholes is presented in Figure 13.

4.7 Standpipe Piezometers

Two standpipe piezometers were installed in January 2019 by HNTB/WSP in boreholes BH-142 and BH-143. During piezometer installation, the depths of the piezometer end cap, sand filter, bentonite seal, grout, and the slotted screen were recorded. Piezometer installation records are included in the Borehole Logs in Appendix A and summarized in Table 4-10.

Table 4-10. Standpipe Piezometer Installation Specifications

Well ID	Date Built	Northing, NAD83 (ft)[1]	Easting, NAD83 (ft)[1]	Elevation, NAVD88 (ft)	Well Screen[2]		Sand Pack[3]	
					Top Depth (ft)	Bottom Depth (ft)	Top Depth (ft)	Bottom Depth (ft)
BH-142 (SP-1)	1/17/2019	1,948,234.5	6,156,861.6	85.61	80	95	77	101.5
BH-143 (SP-2)	1/25/2019	1,948,886.2	6,158,032.2	79.32	80	90	77	93

[1] Values rounded to the nearest tenth (0.1) of a foot.

[2] 2-inch-inner-diameter Schedule 40 PVC with 0.020-inch slotted screen.

[3] No. 3 Monterey sand.

4.7.1 Field Procedures

Standpipe piezometers were constructed in accordance with Valley Water standards and guidelines.

- Borehole was drilled to target depth, and then filled with No. 3 sand to desired depth of piezometer bottom cap.
- A 2-inch-inner-diameter Schedule 40 PVC casing with 10-foot length of 0.020-inch slotted screen was installed at the proposed screen depth.
- Borehole was backfilled with No. 3 filter sand to, at minimum, 2 feet above and below the screened section of the PVC casing.
- Bentonite pellet seal was placed with a minimum 1-foot coverage over sand pack.
- Remaining section of the borehole was backfilled with cement grout to ground surface.
- Traffic-rated well box was installed flush with ground surface.

A weighted tape was used to verify the sand and bentonite pellet depths periodically during construction. Monitoring well box surface completion complied with City of San José requirements. BH-142 was instrumented with water level dataloggers. The procedure for water level datalogger installation, and frequency of readings is detailed in Section 4.9.

4.7.2 Measurements

Groundwater data collection procedures and measurements are discussed in Section 4.10. A series of groundwater data plots are provided in Figure 14.

4.8 Vibrating Wire Piezometers

Vibrating wire piezometers (VWPs) are instruments for long-term monitoring of pore water pressures for engineering work such as retaining walls, excavations, and tunnels. A vibrating wire piezometer consists of a tensioned steel wire that is clamped to both ends of a hollow cylindrical body, which is encased in a protective steel housing. Each VWP is calibrated so that a pressure applied to the diaphragm directly correlates to an exact amount of tension in the wire. When a readout box is connected to the VWP, an electro-magnetic coil vibrates the wire at its natural frequency. The frequency signal generated is transmitted back to the readout box at the ground surface. Frequency readings obtained are converted with applicable calibration factors to the pore water pressure at the depth of the VWP.

4.8.1 Field Procedures

Slope Indicator Standard VWPs (50, 100, and 250 psi capacity) were installed within boreholes at specific depths by MMW and Parikh Consultants with the assistance of Pitcher Services. The capacity of each VWP installed was selected based on the proposed installation depth and anticipated pressure applied during grouting. The calibration sheets for VWPs installed are provided in Appendix C.

Prior to installation, an in-house acceptance test was completed on each VWP. Acceptance tests were performed in accordance with the Slope Indicator VW-Piezometer Manual (2013). VWPs that did not pass the acceptance test were returned to Slope Indicator for recalibration. Piezometer filters were detached and saturated in a bucket of water for a minimum of 24 hours in anticipation of installation.

Upon completion of drilling, sampling, and geophysical testing, the borehole was flushed to remove slough that settled overnight. The saturated VWP and piezometer filter were assembled underwater to prevent infusion of additional air bubbles. The assembled VWPs were attached to a 1-inch diameter PVC pipe at predetermined depths and lowered into the drilling fluid-filled open borehole. The VWPs were then tremie-grouted in place with a bentonite-cement grout mix. After grouting, a 14-inch traffic-rated box with 15/16-inch bolts was installed at each borehole location. Exposed VWP cabling was wrapped with electrical tape to reduce corrosion and moisture damage.

Pre-installation, post-installation, and post-grout readings were taken for each VWP by Parikh Consultants or MMW field staff for quality assurance. Selected VWPs were instrumented with dataloggers. The VWPs selected or datalogger installation, procedure for datalogger installation, and frequency of readings is detailed in Section 4.9.

4.8.2 Locations

Sixty-two (62) VWPs were installed in 24 selected boreholes at:

- Approximately 1,000 foot spacing along the alignment
- Cut-and-cover structures (portals, stations, and emergency stops)

- Locations to supplement data in historical observation wells and VWPs

The installation depths of the VWPs were selected to obtain readings estimating the vertical and horizontal hydraulic gradient, and the design water pressure distribution within the Confining Layer, Upper Aquifer, and Major Aquitard. VWPs were typically installed within granular layers so that relatively quick responses in piezometric levels could be observed. A summary of the VWP installations is listed in Table 4-11.

Table 4-11. Vibrating Wire Piezometer Installation Details

Borehole ID	Elevation NAVD88 (ft)	VWP Installation Depth (ft)[1] Soil Classification (USCS)							
BH-150	87.14	30	50	80	100	116	143	170	194
		CL	CL	GC	CL	SM	CH	SM	SP
BH-151	87.51								192
									GC
BH-152	86.59		67	90	110				
			SP	SM	GP				
BH-153	88.80		65	94		131	156	176	
			SM	GP		SP	SM	SM	
BH-154	89.31		78			117	146	161	
			GP			GP	SP	GP	
BH-155	87.67		79		110	131			180
			CH		GP-GM	SP			CH
BH-156	88.17		72		101	128	144		
			CL		SC	SP	SP-SM		
BH-158	81.67		78						
			GW-GM						
BH-159	87.53			82					
				CL					
BH-160	82.79		63		115				
			SP		GP				
BH-163	87.75			94					
				GP					
BH-164	88.63		70	95		125		160	
			SW-SM	CL		SW-SM		SP	
BH-165	86.01	38	72						
		CL	CL-ML						
BH-166	86.58				105				
					SM				
BH-168	84.54		48						
			SW-SM						
BH-169	79.99				103				
					SP				
BH-171	76.98				100				
					SP-SM				

Borehole ID	Elevation NAVD88 (ft)	VWP Installation Depth (ft)[1] Soil Classification (USCS)							
BH-173	67.63		70						
			SM						
BH-175	89.61	48							
		SP							
BH-176	65.35	31	58						
		ML	GP-GM						
BH-177	64.39	32							
		GM							
BH-178	62.43	29							
		GM							
BH-179	80.71	28	61	92	105	120	150	170	200
		ML	SP	CL	GM	SC	CL	SW-SM	SC
BH-180	81.78	20	47		115			161	
		ML	SW-SM		SM			SW-SM	

[1] Values rounded to the nearest foot.

4.8.3 Measurements

Groundwater data collection procedures and measurements are discussed in Section 4.10. A series of groundwater data plots are provided in Figure 14.

4.9 Dataloggers

Dataloggers are self-contained electronic devices that automatically monitor and record environmental parameters at preprogramed time intervals. Two types of dataloggers were installed at selected monitoring wells to collect groundwater level data.

- Water Level Datalogger
- VWP Datalogger

A total of 1 barometric datalogger, 23 water level dataloggers and 32 VWP dataloggers were installed at selected monitoring wells along the alignment. A summary of the dataloggers installed is provided in Table 4-12.

4.9.1 Field Procedures

4.9.1.1 Water Level Datalogger

Solinst model 3001 water level dataloggers of 10-, 20-, and 30-meter capacity were used to instrument standpipe piezometer wells. The dataloggers contain a pressure sensor, temperature detector, 10-year lithium battery, and internal memory storage housing up to 150,000 readings.

Prior to installation, MMW reviewed historical groundwater level measurements at the proposed installation location. The length of Kevlar rope attached to each datalogger was a minimum of 5 feet greater than the deepest historical groundwater level reading. The Kevlar rope was measured, cut, and attached to the dataloggers in-office.

A 2-inch diameter locking well cap assembly was installed at each standpipe piezometer. At locations where the standpipe piezometer casing was 4 inches in diameter, a 4-inch to 2-inch converter cap was also installed. Dataloggers were lowered into the observation wells and suspended by the Kevlar rope, which was attached to the well cap assembly. The depth of the datalogger pressure sensor bgs was recorded during installation. The groundwater level was measured with a water level meter and compared to the first datalogger reading for quality assurance.

$$Depth_{GW} = Depth_{sensor} - (Pressure\ Reading_{ft\ H_2 0} - Barometric\ Pressure_{ft\ H_2 O})$$

A barometric datalogger was installed in MW-6H, in central downtown San José, to collect hourly barometric pressure readings for barometric correction. Data collection was completed using an optical reader to USB connection, and the Levelogger 4.4.0 software.

4.9.1.2 VWP Datalogger

Three types of Slope Indicator VWP dataloggers were installed within traffic-rated monitoring well boxes to automatically collect data from the VWPs.

- Single Channel Datalogger (“Minilogger”)
- 4-Channel Datalogger
- 8-Channel Datalogger

The type of datalogger installed was selected based on the number of VWPs installed within the borehole. VWP dataloggers are housed in an IP68 water resistant enclosure. The dataloggers contain 5-pin channels, a temperature sensor, a 9-year lithium battery, and internal memory storage storing up to 63,648 readings.

Prior to installation, each VWP datalogger was preprogramed with the anticipated reading interval, VWP sensor IDs, VWP installation depths, and VWP calibration factors. Manual VWP readings were recorded with a handheld readout box for comparison to initial datalogger readings for quality assurance.

Each VWP sensor cable was routed through the datalogger cable glands and connected to a 5-pin channel. For dataloggers with more than one VWP connection, the VWPs were connected to the channel numbers in order of increasing VWP installation depth.

Two 14-gram silica desiccant packets capable of absorbing a total of 4.2 grams of moisture were placed within each datalogger housing. The silica packets were replaced as needed by MMW staff during each data collection. Dataloggers were placed within a 0.008-inch-thick resealable plastic bag for additional waterproofing. The joint at which the VWP sensor cables exited the resealable bag was taped with electrical tape. At historical monitoring wells, new gaskets were installed to further improve waterproofing of the monitoring well box.

4.9.2 Frequency of Readings

All dataloggers were programmed to take hourly readings. Datalogger data was downloaded by MMW or CE&G staff on a quarterly basis.

4.9.3 Locations

Dataloggers were installed primarily at stations, emergency stops, and portals to provide continuous seasonal groundwater level data for future design. Dataloggers were also installed at approximately 500-foot spacing along the tunnel alignment where VWPs were available. A summary of the datalogger installation locations is presented in Table 4-12.

Table 4-12. Datalogger Installation Locations

Well ID	Datalogger Type	Screen / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
BH-165	4-channel	38, 72	East Portal	
ST-01	Water Level	68 – 73	East Portal	PTE
BH-159	1-channel	82	East Portal to 28th St. Station	
BH-058	1-channel	31	28th St. / Little Portugal Station	
BH-063	4-channel	81	28th St. / Little Portugal Station	PTE
BH-154	4-channel	78, 117, 146, 161	28th St. / Little Portugal Station	
BH-155	4-channel	79, 110, 131, 180	28th St. / Little Portugal Station	PTE
BH-156	4-channel	72, 101, 128, 144	28th St. / Little Portugal Station	PTE
BH-164	4-channel	70, 95, 125, 160	28th St. / Little Portugal Station	
MW-2F	Water Level	105 – 125	28th St. / Little Portugal Station	PTE
MW-2G	Water Level	63 – 73	28th St. / Little Portugal Station	PTE
NB-13A	4-channel	40, 70	28th St. / Little Portugal Station	
NW-01	Water Level	70 – 80	28th St. / Little Portugal Station	
MW-3C	Water Level	68 – 78	28th St. Station to East Emergency Stop	PTE
PZ-3C	1-channel	59	East Emergency Stop	RTC
BH-179	8-channel	28, 61, 92, 105, 120, 150, 170, 200	East Emergency Stop	PTE
BH-158	1-channel	78	East Emergency Stop to DTSJ Station	
BH-068	4-channel	30, 80, 160	DTSJ Station	
BH-142	Water Level	85 – 95	DTSJ Station	
BH-150	8-channel	30, 50, 80, 101, 116, 143, 170, 194	DTSJ Station	
BH-151	1-channel	192	DTSJ Station	
MW-5A	Water Level	115 – 125	DTSJ Station	
MW-5B	Water Level	83 – 93	DTSJ Station	RTC
MW-5C	Water Level	111 – 121	DTSJ Station	RTC
PZ-4A	4-channel	64, 109, 151	DTSJ Station	RTC
PZ-5A	4-channel	64, 104, 144	DTSJ Station	
ST-08	Water Level	76 – 86	DTSJ Station	

Well ID	Datalogger Type	Screen / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
NW-05	Water Level	80 – 90	DTSJ Station to Diridon Station	RTC
BH-160	4-channel	63, 115	DTSJ Station to Diridon Station	
BH-152	4-channel	67, 90, 110	Diridon Station	
BH-153	4-channel, 1-channel	65, 94, 131, 156, 176	Diridon Station	
MW-6B	Water Level	110 – 120	Diridon Station	RTC
MW-6D	Water Level	76 – 86	Diridon Station	
MW-6E	Water Level	120 – 130	Diridon Station	
MW-6G	Water Level	125 – 135	Diridon Station	
MW-6H	Water Level, Barometric Pressure	108 – 118	Diridon Station	
MW-6J	Water Level	103 – 113	Diridon Station	
MW-6K	Water Level	150 – 160	Diridon Station	
MW-6L	Water Level	34 – 44	Diridon Station	
NW-06	Water Level	90 – 100	Diridon Station	
PZ-6D	4-channel	60, 105, 138	Diridon Station	
ST-10	Water Level	68 – 73	Diridon Station	
BH-163	1-channel	94	Diridon Station to West Emergency Stop	
BH-175	1-channel	48	Diridon Station to West Emergency Stop	
BH-037	4-channel	21, 61	Diridon Station to West Emergency Stop	
BH-166	1-channel	105	Diridon Station to West Emergency Stop	
BH-169	1-channel	103	Diridon Station to West Emergency Stop	
BH-180	4-channel	20, 47, 115, 161	West Emergency Stop	
BH-171	1-channel	100	West Emergency Stop to West Portal	
BH-173	1-channel	70	West Emergency Stop to West Portal	
ST-13	Water Level	21 – 31	West Portal	
MW-8F	Water Level	52 – 62	West Portal	
BH-176	4-channel	31, 58	West Portal / NYMF	
BH-177	1-channel	32	Santa Clara Station	PTE

[1] Screen depths and VWP installation depths rounded to the nearest foot.

[2] Precise location of all monitoring wells is provided in Figure 11.

[3] PTE – Permission to Enter required for access to private property; RTC – Rolling Traffic Control and Police Escort required for access.

4.9.4 Measurements

Groundwater data collection measurements are discussed in Section 4.10. A series of groundwater data plots are provided in Figure 14.

4.10 Water Level Measurements

Groundwater level data was collected by MMW and CE&G staff. A summary of the monitoring wells read is presented in Table 4-13.

Table 4-13. Number of Monitoring Wells Read

Well Type	Historical Wells[1]	2018-2020 GI Wells
Standpipe Piezometer	44	2
Vibrating Wire Piezometer	24	24

Note: Number of monitoring wells initially selected. Several wells were removed from quarterly groundwater data collection due to access restrictions and/or muck.

[1] Includes historical slug test wells and pumping test wells.

4.10.1 Field Procedures

Prior to the groundwater data collection efforts, MMW obtained the required permits, permission to enter, and traffic control subcontractor as discussed in Section 4.1.4.

Monitoring wells at selected locations were instrumented with a water level datalogger or VWP datalogger. Readings were downloaded directly to a laptop from the dataloggers using the following connection cables and software:

Water Level Datalogger

- Levelogger Software (version 4.4.0)
- Optical Reader to USB

Single Channel Datalogger (“Minilogger”)

- Logger Manager Software
- USB-RS232 Adapter

4-Channel Datalogger and 8-Channel Datalogger

- Logger Manager Software
- USB 2.0

At locations not instrumented with a datalogger, a Solinst model 101 water level meter and a Slope Indicator VW data recorder were used to manually read standpipe piezometers and VWPs, respectively. The procedure for reading standpipe piezometers when bubbling or discharge was observed is presented in Section 3.5.

At least two personnel were deployed during groundwater data collection to ensure safety in high traffic areas and to perform maintenance, such as gasket replacement.

4.10.2 Locations

MMW reviewed locations of all accessible monitoring wells prior to groundwater data collection. MMW and CE&G staff performed an initial site visit to locate missing monitoring wells with a metal detector. Apart from wells that were not located, paved over, or inaccessible, all available monitoring wells (including monitoring wells from earlier investigation efforts in 2004 – 2008) adjacent to the alignment were manually read or instrumented with a datalogger. The locations of monitoring wells instrumented with a datalogger is presented in Table 4-12. A summary of the manual reading locations is provided in Table 4-14.

Table 4-14. Manual Water Level Reading Locations

Well ID	Screen Depth / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
TW-2A	130 – 150	28th St. / Little Portugal Station	
PZ-2A	70, 122, 160	28th St. / Little Portugal Station	
MW-2A	127 – 137	28th St. / Little Portugal Station	
MW-2B	100 – 110	28th St. / Little Portugal Station	
MW-2C	98 – 108	28th St. / Little Portugal Station	
MW-2D	126 – 136	28th St. / Little Portugal Station	
PZ-2B	78, 116, 152	28th St. / Little Portugal Station	
ST-02	78 – 88	28th St. / Little Portugal Station	PTE
MW-2H	105 – 115	28th St. / Little Portugal Station	PTE
PZ-2D	51, 96, 137	28th St. / Little Portugal Station	PTE
TW-2B	108 – 128	28th St. / Little Portugal Station	
MW-2E	110 – 120	28th St. / Little Portugal Station	
BH-015	30, 90	28th St. Station to East Emergency Stop	
TW-5A	78 – 93	DTSJ Station	
NB-17	45, 70	DTSJ Station	
MW-6C	150 – 160	Diridon Station	RTC
PZ-6E	74, 94, 137	Diridon Station	RTC
TW-6A	72 – 87	Diridon Station	
PZ-6K	59, 79, 141	Diridon Station	
BH-074	30	Diridon Station	
BH-076	105	Diridon Station	
PZ-6J	60, 92, 133	Diridon Station	
TW-6B	106 – 116	Diridon Station	
ST-11	80 – 85	Diridon Station	
BH-168	48	Diridon Station to West Emergency Stop	
BH-041	20, 40	Diridon Station to West Emergency Stop	RTC

Well ID	Screen Depth / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
BH-080	47	West Emergency Stop to West Portal	RTC
BH-047	20, 40	West Emergency Stop to West Portal	
TW-8A	55 – 75	West Portal	
PZ-8A	32, 86, 130	West Portal	
MW-8A	53 – 63	West Portal	
MW-8B	97 – 107	West Portal	
Y&S BH-008[4]	9 – 39	NYMF	
BH-178	29	NYMF	

[1] Screen depths and VWP installation depths are rounded to the nearest foot.

[2] Precise location of all monitoring wells is provided in Figure 11.

[3] PTE – Permission to Enter required for access to private property; RTC – Rolling Traffic Control and Police Escort required for access.

[4] Yards & Shops (Y&S) also known as, Newhall Yard and Maintenance Facility (NYMF).

4.10.3 Frequency of Readings

All dataloggers were programmed to collect hourly readings. Groundwater level data collection including manual readings and downloading of datalogger readings was completed on a quarterly basis. Quarterly monitoring of water levels should continue for a minimum of one additional year to complete an annual cycle of consistent readings for the contractor to rely on. The data from future quarterly monitoring will be submitted as an addendum to this report. The purpose of this monitoring is to help in understanding long-term groundwater behavior.

4.10.4 Measurements

Groundwater level data collected by the following sources for VTA was compiled by MMW and presented in a series of data plots provided in Figure 14.

- URS Corporation – 2001 to 2004
- Geomatrix Consultants – 2004 to 2005
- Parikh Consultants – 2005 to 2010
- Parikh Consultants – 2018
- MMW and CE&G – 2019 to 2020

Water temperature measurements were also obtained during the water level readings. These measurements are presented in Figure 15.

4.11 Slug Testing

Slug testing is an in situ single-well test method that measures the well response to an instantaneous change in head. The well response can typically be categorized into three (3) types.

Overdamped – characterized by the water level returning to the static level in approximately an exponential manner following the instantaneous change in water level.

Critically Damped – characterized by the water level responding in a transitional range between underdamped and overdamped following the change in water level.

Underdamped – characterized by the water level oscillating about the static water level following the sudden change in water level.

The hydraulic properties of an aquifer can be estimated from the slug test results utilizing analytical procedures corresponding to the appropriate well response type (ASTM D4104, D5785, D5881, D5912).

It should be recognized that slug tests have significant limitations for assessing the hydraulic conductivity of the soil formations. Due to the small volume of the aquifer tested, the data is representative of only the formation within the immediate vicinity of the well, and the test results may be governed by a volume of soil disturbed during drilling and development operations. Multi-well aquifer testing conducted during earlier phases of the project test a greater volume of the aquifers and may yield more reliable results. Historical aquifer testing data and results is located in Volume II and within the following reports.

- SVRT – Geotechnical Data Report – Tunnel Segment (HMM/Bechtel 2005a)
- SVRT – Hydrogeology Report – Tunnel Segment (HMM/Bechtel 2005b)
- SVRT – Central Area Guideway – Pumping Test Data Report (HMM/Bechtel 2008b)
- SVRT – Central Area Guideway – Hydrogeology Report (HMM/Bechtel 2008c)

MMW completed a total of 72 slug tests at 7 historical observation wells in May 2020 within 28th Street/Little Portugal Station, Downtown San José Station, Diridon Station, and West Portal areas. Two slug test locations planned at 28th Street/Little Portugal Station and the East Portal were deleted due to private property restrictions.

4.11.1 Field Procedures

Prior to slug testing, observation wells were developed (ASTM D5521) by Gregg Drilling by alternating bailing, surging, and pumping to remove fines from the screen and filter pack. Observation wells were developed until static turbidity readings were recorded over a 5-minute interval, or three well volumes were removed.

All slug tests were completed by MMW with the assistance of Gregg Drilling. The field procedures for slug testing followed the guidelines outlined in ASTM D4044. A mechanical slug was utilized to generate the sudden change in water level. The mechanical slug was provided by Gregg Drilling and consisted of a long metal bar filled with sand. Two slugs with different dimensions (Table 4-15) were used due to varying observation well sizes.

Table 4-15. Mechanical Slug Dimensions

Well Diameter (in)	Slug Diameter (in)	Slug Length (ft)	Slug Volume (ft^3)	Anticipated Change in Head (ft)
2	1.5	10.65	0.13	5.99
4	3	10	0.49	5.63

An In-Situ Inc. model Level TROLL 700 datalogger and model Baro TROLL 500 datalogger were used to monitor the change in head and barometric pressure, respectively. Prior to lowering the slug, the Level TROLL 700 was suspended in the observation well with Kevlar rope at a depth approximately 1 foot lower than the proposed bottom depth of the mechanical slug. The Baro TROLL 500 was situated in the shade adjacent to the well. Each datalogger was programmed to collect measurements at the shortest available interval (250 milliseconds and 1-minute intervals, respectively).

The test was performed by lowering the slug into the observation well 6 inches, at maximum, below the measured groundwater level. Once the water level in the well returned to static levels, the slug was removed in a swift motion to reduce turbulence generated and prevent water from dripping back into the well. After the slug was removed, the water level was allowed to recover to a minimum of 95% of the initial displacement before beginning the next test.

4.11.2 Locations

A total of 72 slug tests were completed at 7 historical observation wells. A summary of the observation wells tested is presented in Table 4-16. The locations of each standpipe piezometer tested are shown in Figure 11.

Table 4-16. Summary of Slug Test Locations

Well ID	Elevation, NAVD88 (ft)	Location	Number of Tests	Casing Diameter (in)	Well Screen	
					Top Depth (ft)	Bottom Depth (ft)
MW-2E	88.24	28th St. / Little Portugal Station	10	2	110	120
MW-5A	87.57	DTSJ Station	8	2	115	125
ST-08	87.66	DTSJ Station	10	4	76.3	86.3
MW-6H	89.27	Diridon Station	10	2	108	118
MW-6L[1]	90.12	Diridon Station	15	2	34	44
ST-10	88.76	Diridon Station	9	4	68	73
ST-13	68.00	West Portal	10	4	23	31

[1] Water level datalogger was suspended within screen depth during the first 10 tests at MW-6L. Datalogger was reinstalled at 33 feet bgs and five additional tests were completed.

4.11.3 Measurements

As mentioned in Section 1.4, standard interpretations were completed to present the slug test data. The interpretations consisted primarily of selecting the test start and end time, as well as calculating the ratio of change in head. Slug test results are presented in Figure 16. Groundwater levels at MW-2E, ST-08, and ST-13 recovered to 90% of initial displacement within 2 seconds of beginning the test. Due to the rapid rate of recovery, slug test data at these locations may be disturbed by turbulence.

5 Laboratory Testing

5.1 Overview and Basis of Testing

A laboratory testing program was performed to provide information for the physical and engineering characterization of the soil and groundwater sampled during the field works.

Testing was performed by the following laboratories:

- Parikh Engineering Consultants, Inc., soil testing
- Inspection Services, Inc., soil testing
- CERCO Analytical, Inc., corrosivity and groundwater chemistry testing
- Cooper Testing Laboratory, Inc., soil testing
- SINTEF Byggforsk, soil abrasion testing

5.2 Soil Testing Program

Soil testing was performed in accordance with the ASTM standard methods reported in Table 5-1 on the next page.

Table 5-1. Summary of Soil Laboratory Testing Program

Test Type		Standard	No. Tests Assigned (MMW)	No. Tests Assigned (HNTB/WSP)
Unit Weight		ASTM D7263	156	14
Moisture Content		ASTM D2216	189	55
Specific Gravity		ASTM D854	7	4
Sieve Analysis		ASTM D6913	83	46
Sieve and Hydrometer		ASTM D7928	40	13
Fines Content		ASTM D1140	80	0
Atterberg Limits		ASTM D4318	272	33
Consolidation		ASTM D2345	51	3
Unconsolidated Undrained Triaxial Tests (TXUU)		ASTM D2850	10	1
Consolidated Undrained Triaxial Tests (TXCU)		ASTM D4767	37	4
Consolidated Drained Triaxial Tests (TXCD)		ASTM D7181	4	-
Abrasion testing		SINTEF	-	7
USCS classification		ASTM D2487	1507	578
Visual classification		ASTM D2488	1507	578
Corrosion Testing		Soil[1]	20	8
		Groundwater[2]	8	-
R-Value Testing		C-301[3]	3	-

[1] Soil corrosivity analysis including ASTM G57, ASTM D1498, ASTM D4327, ASTM D4658M, and ASTM D4972.

[2] Groundwater corrosivity analysis including SM 2320B, SM 2340B, SM 2540C, SM 2550B, SM 4500-H*B, Langlier Index SI, and Ryznar Index RSI ("SM" Standard Methods for the Examination of Water and Wastewater).

[3] C-301, California Test Method 301 by Caltrans.

5.2.1 Laboratory Visual-Manual Classification

Laboratory visual-manual classification of soils in accordance with ASTM D2487 and ASTM D2488 was completed on all soil samples to backcheck field borehole logs for quality assurance. The material descriptions presented on the borehole logs use the classification groups and symbols proposed in the USCS classification system and the Caltrans Logging Manual (2010).

The number of samples collected from the 2018 to 2020 GI and subsequently checked for laboratory visual-manual classification is summarized in Table 5-2.

Table 5-2. Number of Soil Samples Classified

Sample Type	Number of Samples Classified	Number of Samples No Recovery
Grab	8	-
Bulk	22	-
Standard Penetration Test	535	15
Modified California	673	12
Standard California	89	4
Dames & More U-Type	315	26
Dames & Moore Piston	230	12
Shelby Tube	19	-
Pitcher Barrel	194	4

5.2.2 Index Properties

Index property testing was performed to provide soils classification and to derive information that can be used to assess the variability of the soils, to inform the design soil stratigraphy profile, and to determine the design engineering behavior of the soils.

Soil index properties testing included:

- Unit weight, in accordance to ASTM D7263
- Moisture content, in accordance with ASTM D2216
- Specific gravity, in accordance with ASTM D854
- Sieve analysis, in accordance with ASTM D6913
- Sieve and hydrometer analysis, in accordance with ASTM D7928
- Fine content analysis, in accordance with ASTM D1140
- Atterberg limits (Liquid Limit, Plastic Limit, Plasticity Index) in accordance with ASTM D4318

The profiles of dry and total densities as well as moisture content and Atterberg limits are presented in Figure 17 and Figure 18, respectively, for underground stations and tunnel zone. Additionally, Figure 19 presents the results of the Atterberg limits PI and LL for the entire project. The data presented include historical and 2018-2020 lab test results.

The results of the index properties testing are summarized in Table 5-3.

Table 5-3. Summary of Index Property Testing Results

Test Type	Number of Tests[1]	Range of Values[2]	Mean Value	Standard Deviation
Dry Unit Weight	322	78 to 133 pcf	103 pcf	10 pcf
Moisture Content	402	5 to 41%	22%	6%
Specific Gravity	11	2.630 to 2.772	2.710	0.038
Fine Content	250	1 to 100%	43%	32%
Liquid Limit	306	NP to 81%	38%	11%
Plastic Limit	306	NP to 35%	21%	3%
Plasticity Index	306	NP to 50%	18%	9%

[1] Number of tests for moisture content and dry unit weight include results received from consolidation and triaxial tests. Number of tests for fine content includes results from sieve and hydrometer testing.

[2] NP = Non-Plastic, these tests were excluded from the estimate of mean value and standard deviation.

The results of sieve and hydrometer tests for stations, emergency stops, portals, and the tunnel zone are shown in Figure 20.

5.2.3 Direct Shear Testing

Direct simple shear testing in accordance with ASTM D6528 was requested on selected samples to inform the derivation of the design strength parameters. However, the grain sizes of the samples, for which direct shear testing was requested exceeded 0.75 inches; therefore, these tests were abandoned and effectively no test was completed.

Historical data presented in Volume II of this GDR includes direct shear and direct simple shear testing results.

5.2.4 Abrasion Testing

Soil Abrasion Test (SAT) was carried out on seven samples during the HNTB/WSP GI to verify the abrasiveness of the soil.

The tests were carried out in accordance with NTNU/SINTEF proprietary Soil Abrasion Test procedure (Jakobsen et al 2013). Preparation of specimens involved sieving to remove particles greater than 4.0 millimeters (No. 5 sieve). Specimens were then placed on a rotating steel disk, with a suction and feeding assembly that recirculates the soil at approximately 80 grams per minute to a 10-kilogram cutter ring steel apparatus.

Results from SAT indicate the soils ability to induce wear on the cutting steel ring apparatus. Test results are summarized in Table 5-4.

Table 5-4. Summary of Soil Abrasion Test Results

Test Type	Number of Tests	Range of Values (weight loss in mg)	Mean Value	Standard Deviation
Soil Abrasion Test	7	4.5 to 11.0	8.07	2.03

5.2.5 Consolidation Testing

Consolidation testing was performed to inform the derivation of the design stiffness parameters for cohesive soils.

A total of 53 consolidation tests were performed on undisturbed samples in accordance with ASTM D2345.

5.2.6 Unconsolidated Undrained Triaxial Compression Testing

Triaxial unconsolidated undrained compression (TXUU) tests were performed to inform the derivation of the design soil strength parameters.

A total of 17 TXUU tests were performed on undisturbed samples in accordance with ASTM D2850.

The results of the tests are summarized in the Table 5-5.

Table 5-5. Summary of Unconsolidated Undrained Triaxial Tests Results

Test Type	Number of Tests	Maximum Deviator Stress (psf)	Mean Value (psf)	Standard Deviation (psf)
TXUU	17	8,805	3,775	1,875

5.2.7 Consolidated Undrained Triaxial Compression Testing

Triaxial consolidated undrained compression (TXCU) tests were performed to inform the derivation of the design soil strength parameters.

A total of 41 staged TXCU tests were performed on undisturbed samples in accordance with ASTM D4767.

5.2.8 Consolidated Drained Triaxial Compression Testing

Triaxial consolidated drained compression (TXCD) tests were performed to inform the derivation of the design soil strength parameters.

A total of four staged TXCD tests were performed on undisturbed soil samples in accordance with ASTM D7181.

5.3 Corrosion Testing

5.3.1 Soil Corrosivity

A total of 27 soil samples were tested for corrosivity to evaluate the corrosion potential for buried iron, steel, mortar coated steel and reinforced concrete structures. Cooper Testing Laboratory, Inc. completed tests for pH, minimum resistivity, chlorides and sulfates on seven samples collected during the 2018–2019 GI. CERCO Analytical completed tests for reduction potential, pH, conductivity, minimum resistivity, chlorides, and sulfates on 20 samples from the

2019–2020 GI. Soil corrosivity testing was performed in accordance with the ASTM standards presented in Table 5-6.

Table 5-6. Summary of Soil Corrosion Testing Results

Test Type	ASTM	Number of Tests	Range of Values	Mean Value	Standard Deviation
Redox (mV)	ASTM D1498	20	130 to 370	255	49
pH	ASTM D4972, ASTM G51	27	4.7 to 8.6	8	1
Conductivity (umhos/cm)	ASTM D1125M	20	110 to 210	160	50
Resistivity (ohms-cm)	ASTM G57	27	350 to 11,000	2,220	2,026
Chloride (ppm)	ASTM D4327	27	7 to 170	42	49
Sulfate (ppm)	ASTM D4327	27	17 to 910	191	222

For structural elements, Caltrans Corrosion Guidelines (2003) consider a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken from the project site.

- Resistivity is 1,000 ohm-cm or less.
- Chloride concentration is 500 parts per million or greater.
- Sulfate concentration is 2,000 parts per million or greater.
- pH is 5.5 or less.

5.3.2 Groundwater Corrosivity

Two indexes are useful for predicting the potential for corrosion or scale formation of water:

Langlier Saturation Index – Predicts the scaling of water based on the calcium carbonate equilibrium values. If the pH of water is below the calculated pH, the Langlier Index is negative, indicating that the water will dissolve calcium carbonate and that it will be corrosive, particularly if dissolved oxygen is present. If the actual pH of water is higher than the calculated pH, the Langlier Index is positive, indicating that scaling will likely occur.

Ryznar Stability Index – Predicts the tendency for scaling and corrosion. Widely used to predict the reaction of metal in saturated subsurface conditions. Water is corrosive if the index is higher than 7, and incrusting if it is lower than 7.

Standpipe piezometers selected for groundwater sampling were developed at a minimum one day prior to sampling. Groundwater sampling was conducted by Locus Technologies. Samples were retained in 125 mL and 500 mL containers and preserved in an ice chest until delivery to

CERCO Analytical for groundwater chemistry tests. The results of the eight groundwater chemistry tests completed are provided in Table 5-7.

Table 5-7. Summary of Groundwater Corrosion Testing Results

Test Type	Alkalinity (mg/L)	pH	CaCO3 (mg/L)	Total Dissolved Solids (mg/L)	Langlier Index SI	Ryznar Index SI
Borehole ID	**Ref. No. SM 2320B**	**Ref. No. SM 4500 H*B**	**Ref. No. SM 2340B**	**Ref. No. SM 2540C**		
MW-2E	390	7.71	270	780	0.807	6.226
MW-6L	430	7.22	320	740	1.161	5.778
MW-5A	370	7.61	300	620	0.971	5.858
ST-8	87	9.68	70	220	0.02	8
ST-10	190	7.32	130	360	0.142	7.276
MW-6H	200	7.47	140	380	0.562	7.026
ST-13	330	7.19	310	660	0.556	6.518
MW-8A	270	7.37	210	490	0.211	7.088

5.4 Resistance Value Testing

Resistance testing was performed on three bulk samples to obtain information regarding the soil stiffness via determination of their resistance to deformation (R-value). The tests were performed following the procedure described in the ASTM D2844 and the California Test 301 method from Caltrans. The R-value results at 300 psi exudation pressure are presented in Table 5-8.

Table 5-8. Summary of Resistance Value Testing

Borehole ID	Depth (ft)	R-Value
BH-176	2.5	5
BH-178	2.5	6
BH-179	3.0	11

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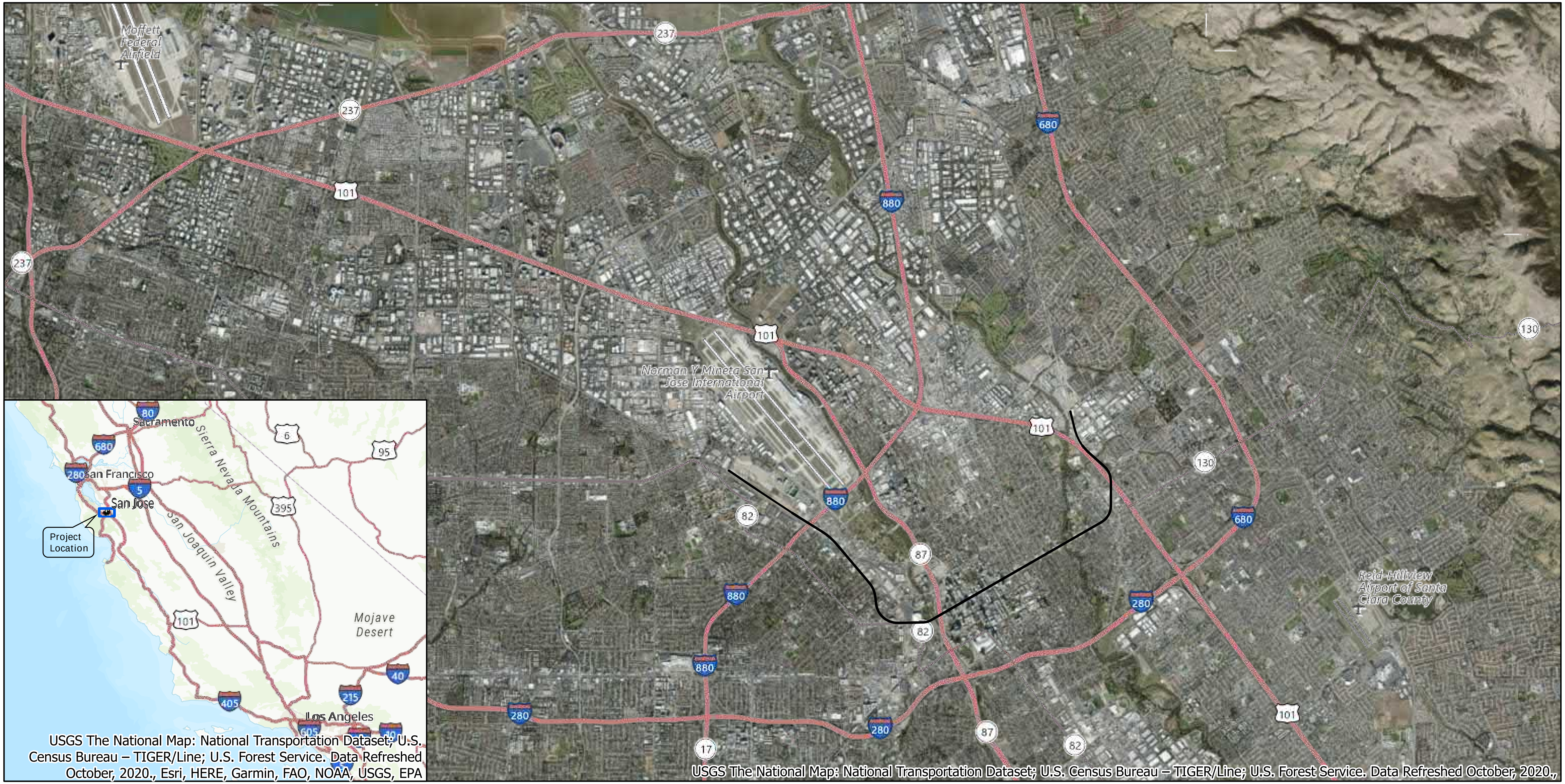

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USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.,

Project Location Map and Site Vicinity

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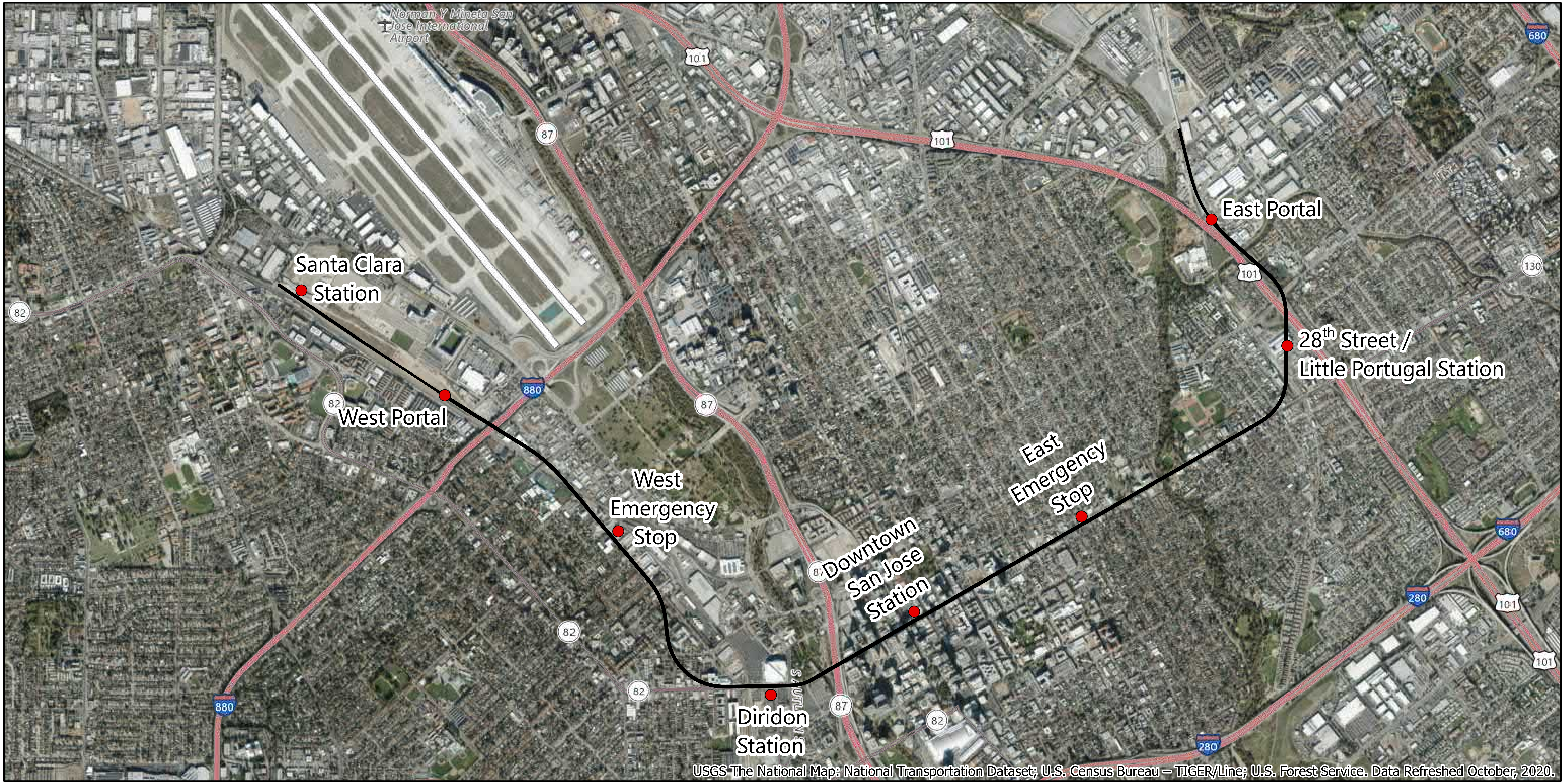
Figure 1



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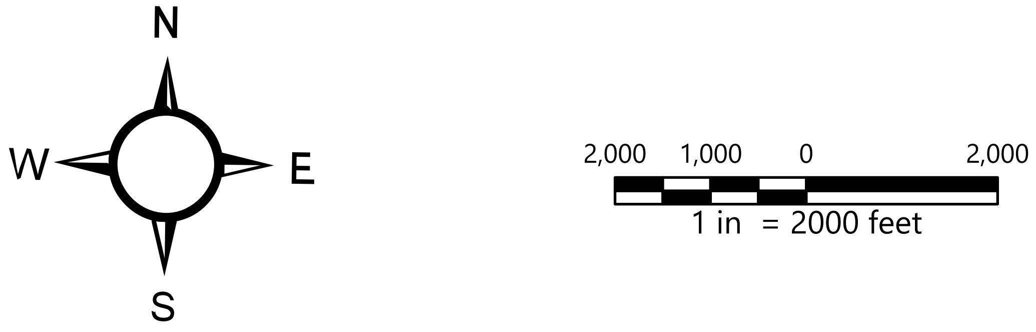

— BSVII Alignment

Overview of Alignment

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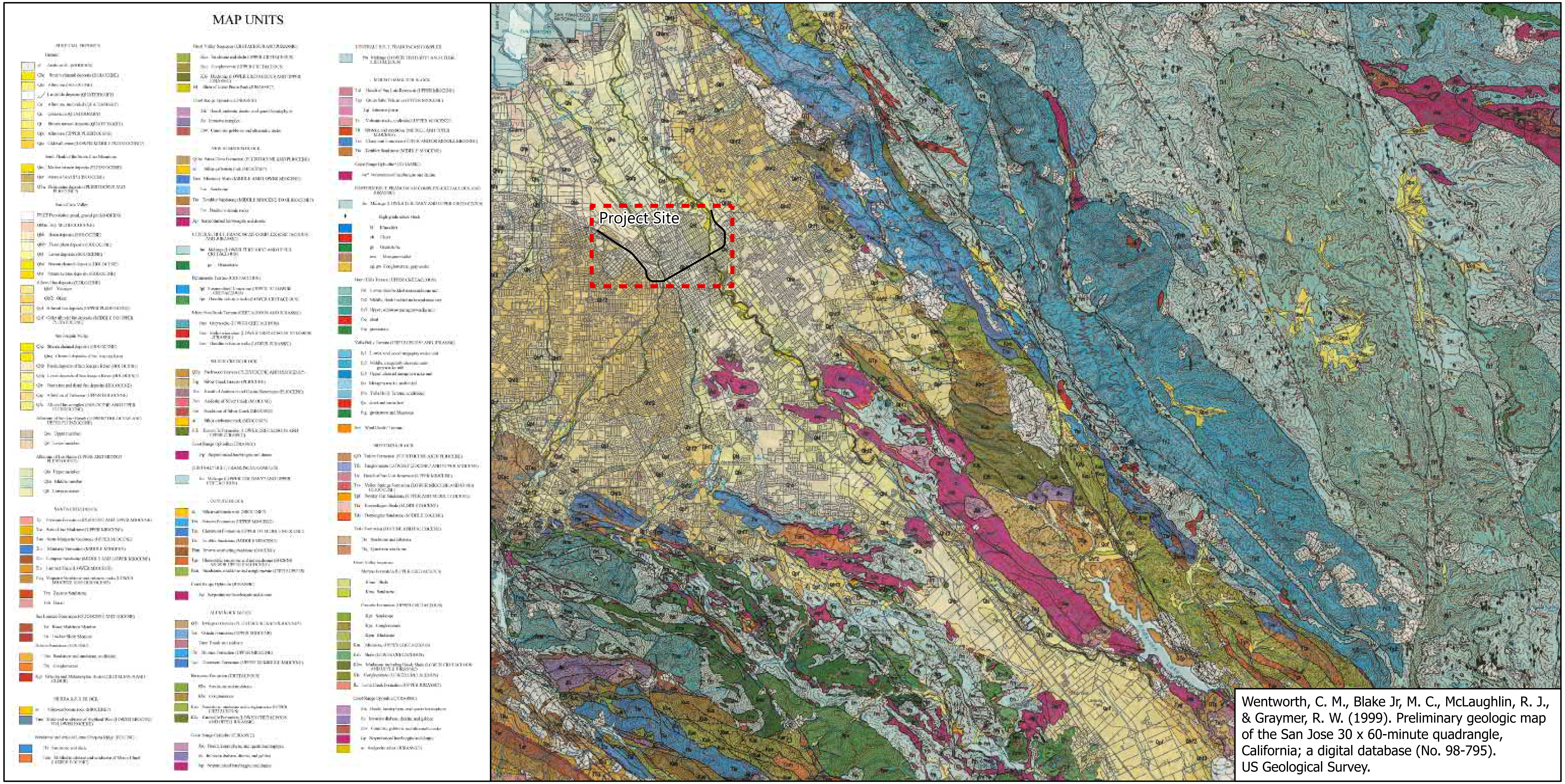
Figure 2



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1 in = 3 miles

— BSVII Alignment

Geologic Map of Site Vicinity

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Figure 3

MAP UNITS

Santa Clara Valley

🟧	Qhbm - Bay Mud (HOLOCENE)
🟨	Qhb - Basin deposits (HOLOCENE)
🟨	Qhfp - Flood plain deposits (HOLOCENE)
🟨	Qhl - Levee deposits (HOLOCENE)
🟨	Qht - Stream terrace deposits (HOLOCENE)

Alluvial fan deposits (HOLOCENE)

🟨	Qhf1 - Younger Alluvial fan deposits
🟨	Qhf2 - Older Alluvial fan deposits
🟨	Qpf - Alluvial fan deposits (UPPER PLEISTOCENE)

COYOTE BLOCK

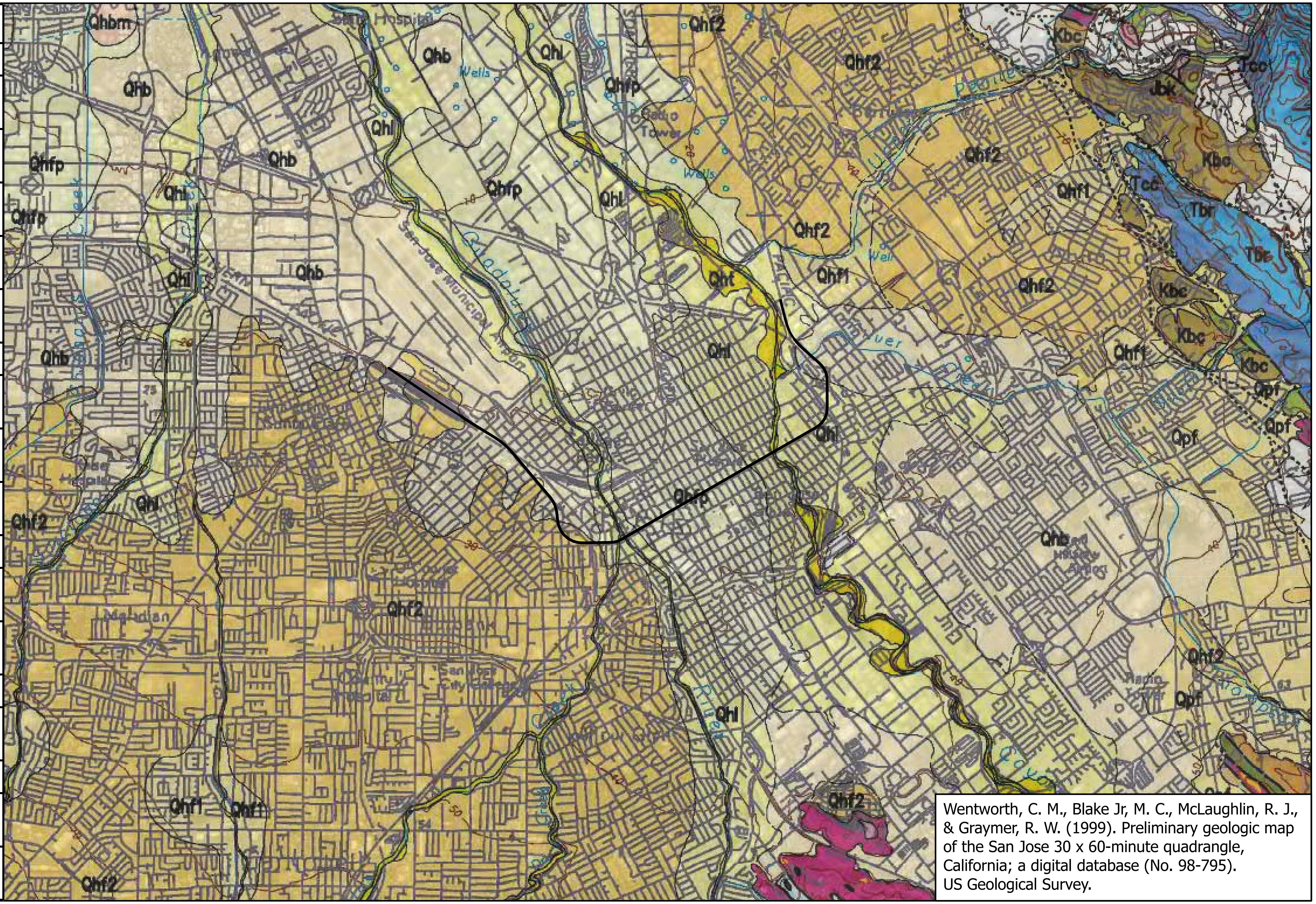
🟦	Tbr - Briones Formation (UPPER MIOCENE)
🟦	Tcc - Claremont Formation (UPPER TO MIDDLE MIOCENE)

Berryessa Formation (CRETACEOUS)

🟫	Kbc - Conglomerate

Coast Range Ophiolite (JURASSIC)

🟪	Jbk - Basalt, keratophyre, and quartz keratophyre
🟥	Jsp - Serpentinized harzburgite and dunite



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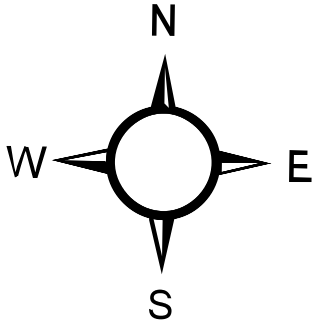

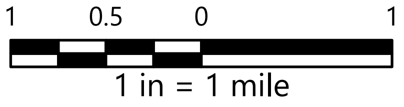

— BSVII Alignment

Geologic Map of Project Site

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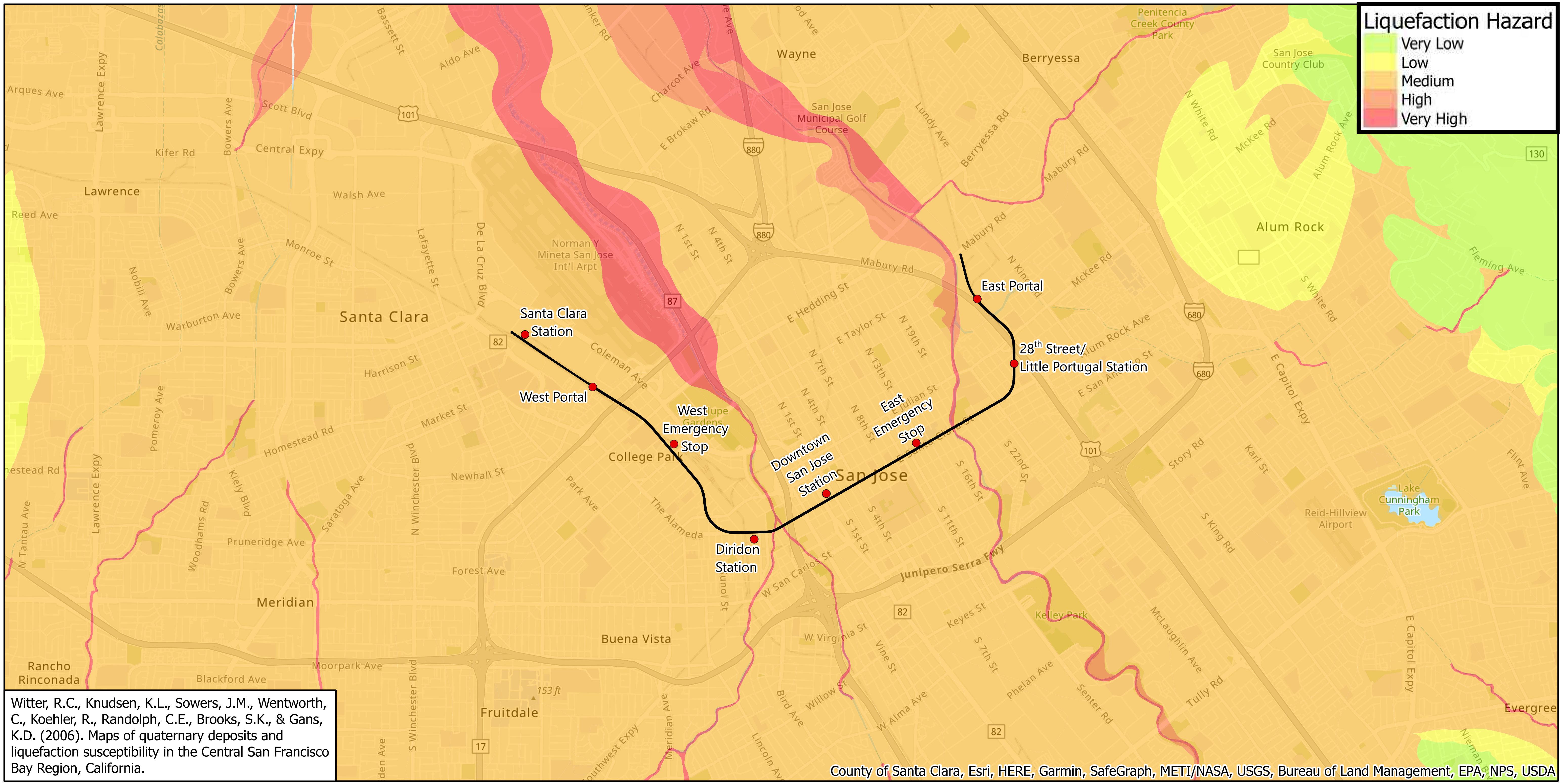
Figure 4



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Liquefaction Hazard at Project Site

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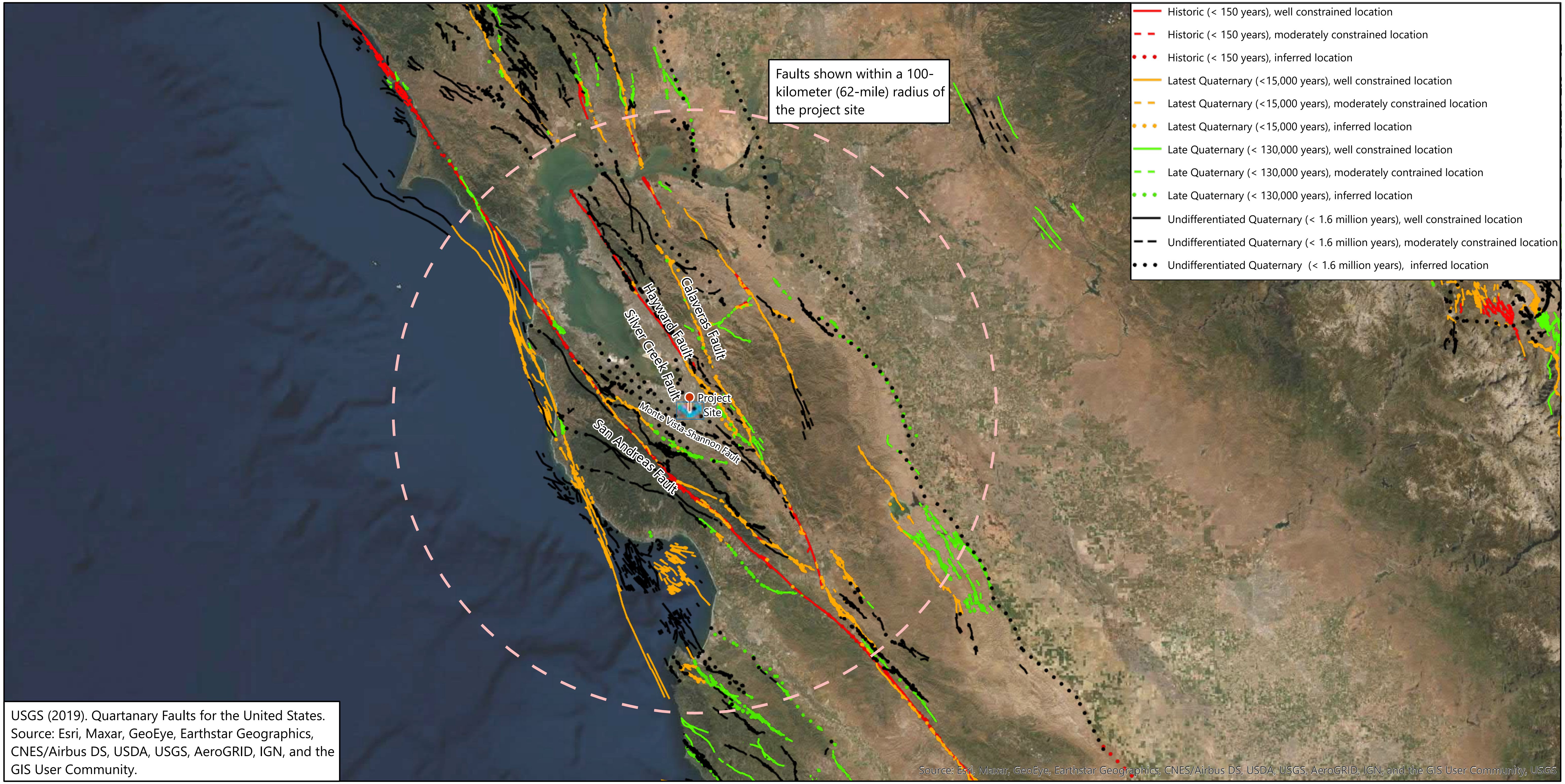
Figure 5



USGS (2019). Quartanary Faults for the United States.
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

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20 10 0 20
1 in = 20 miles

BSVII Alignment

Mapped Faults in Vicinity of Study Area

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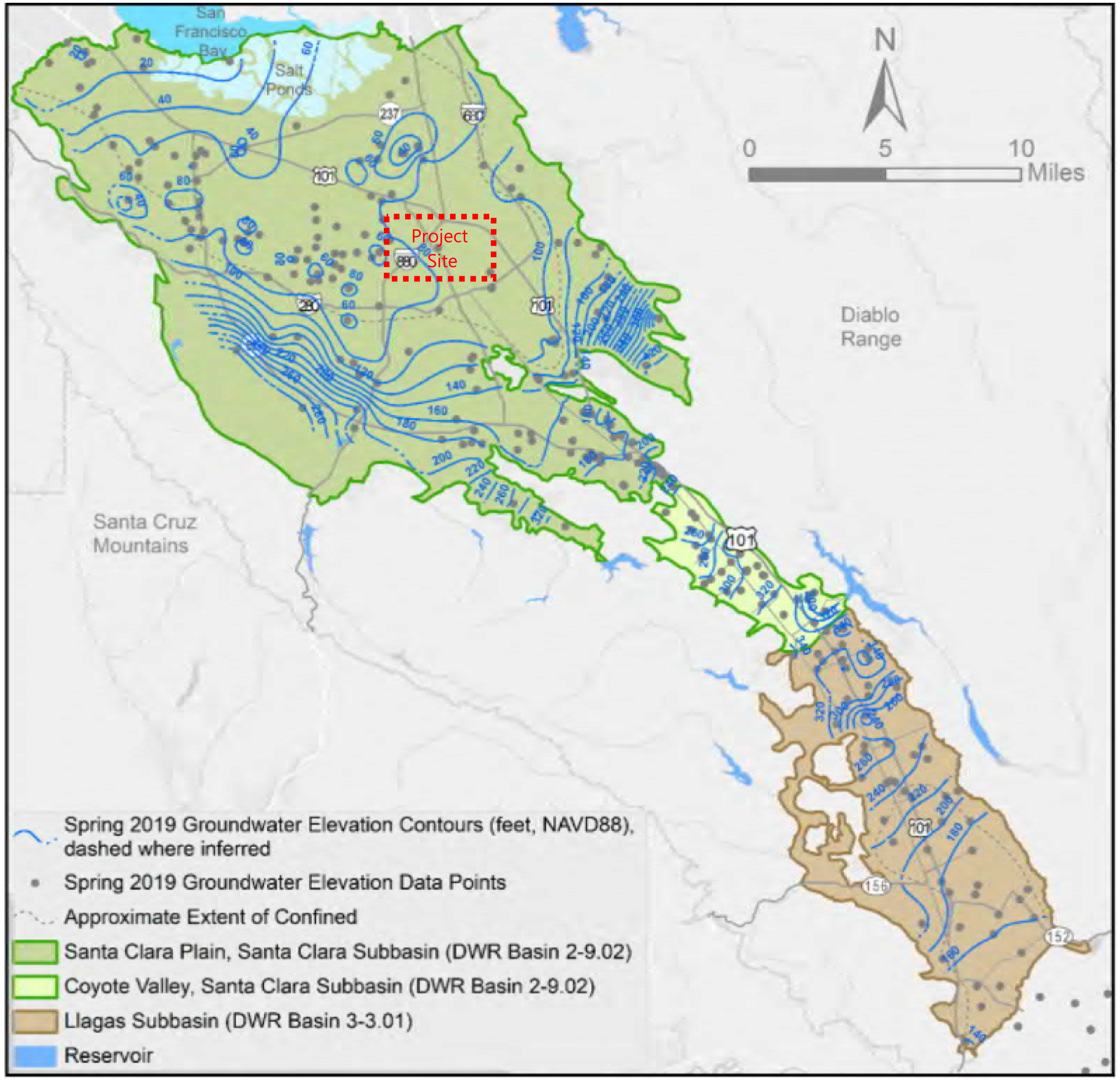
Figure 6



Note:

1. Map from Valley Water 2019 Annual Groundwater Report.

Spring 2019 Groundwater Elevation Contours in Lower Aquifer

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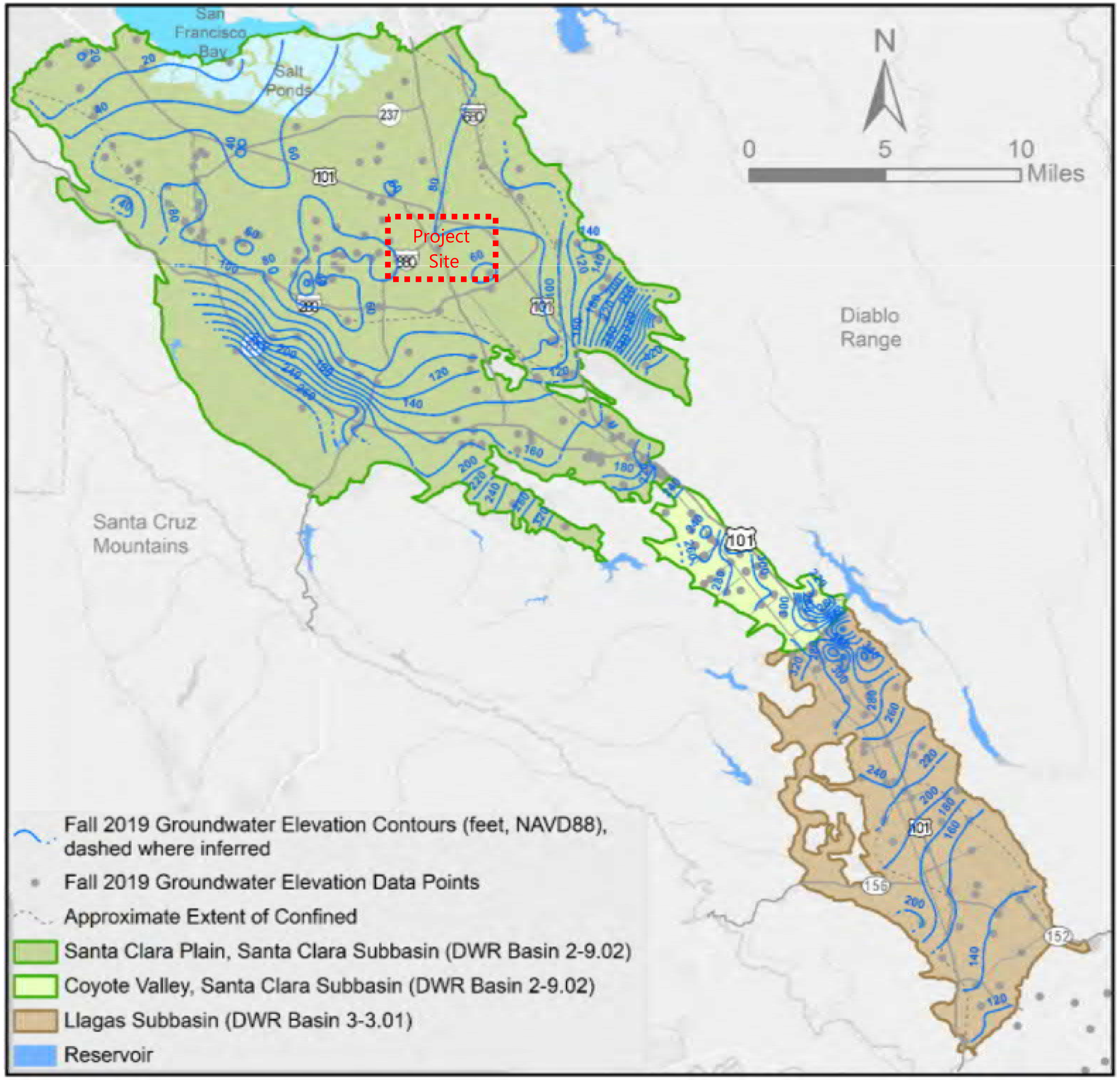
Figure 7



Note:

1. Map from Valley Water 2019 Annual Groundwater Report.

Fall 2019 Groundwater Elevation Contours in Lower Aquifer

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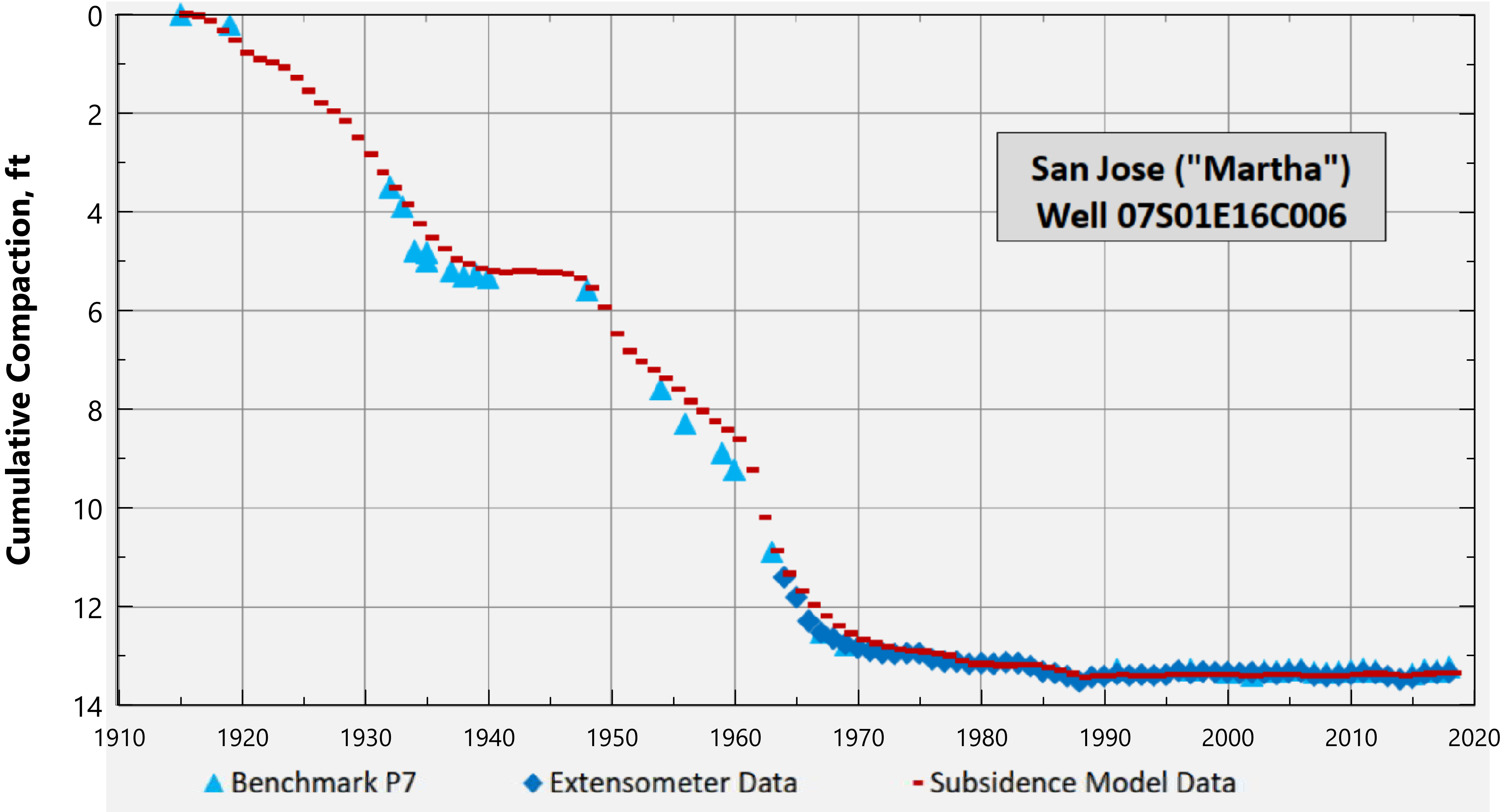
Figure 8



Note:

1. Graph from Valley Water 2019 Annual Groundwater Report, cumulative compaction at extensometers.

Land Subsidence Near Downtown San Jose

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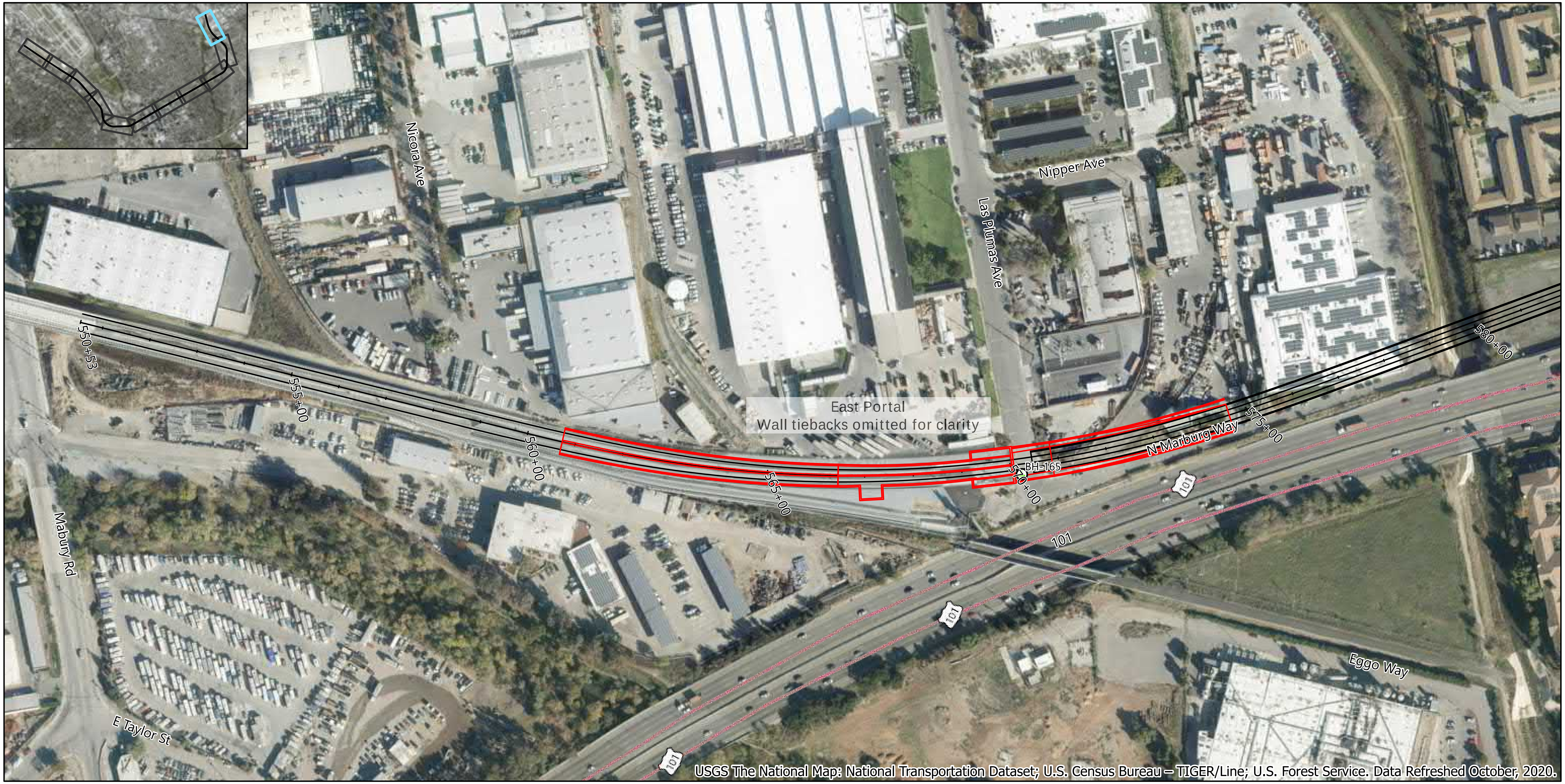
Figure 9



USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.

200 100 0 200

1 in = 200 feet

- ✚ Borehole, BH (2018-2020)
- ▲ Cone Penetration Test, CPT (2018-2020)
- ● Accessible Standpipe Piezometer (2018-2020)
- ● Accessible Vibrating Wire Piezometer (2018-2020)
- ☰ BSVII Track Alignment
- ☐ BSVII Tunnel Alignment
- 🟥 BSVII Cut-and-Cover Structures

Map of 2018 to 2020 Exploration Locations

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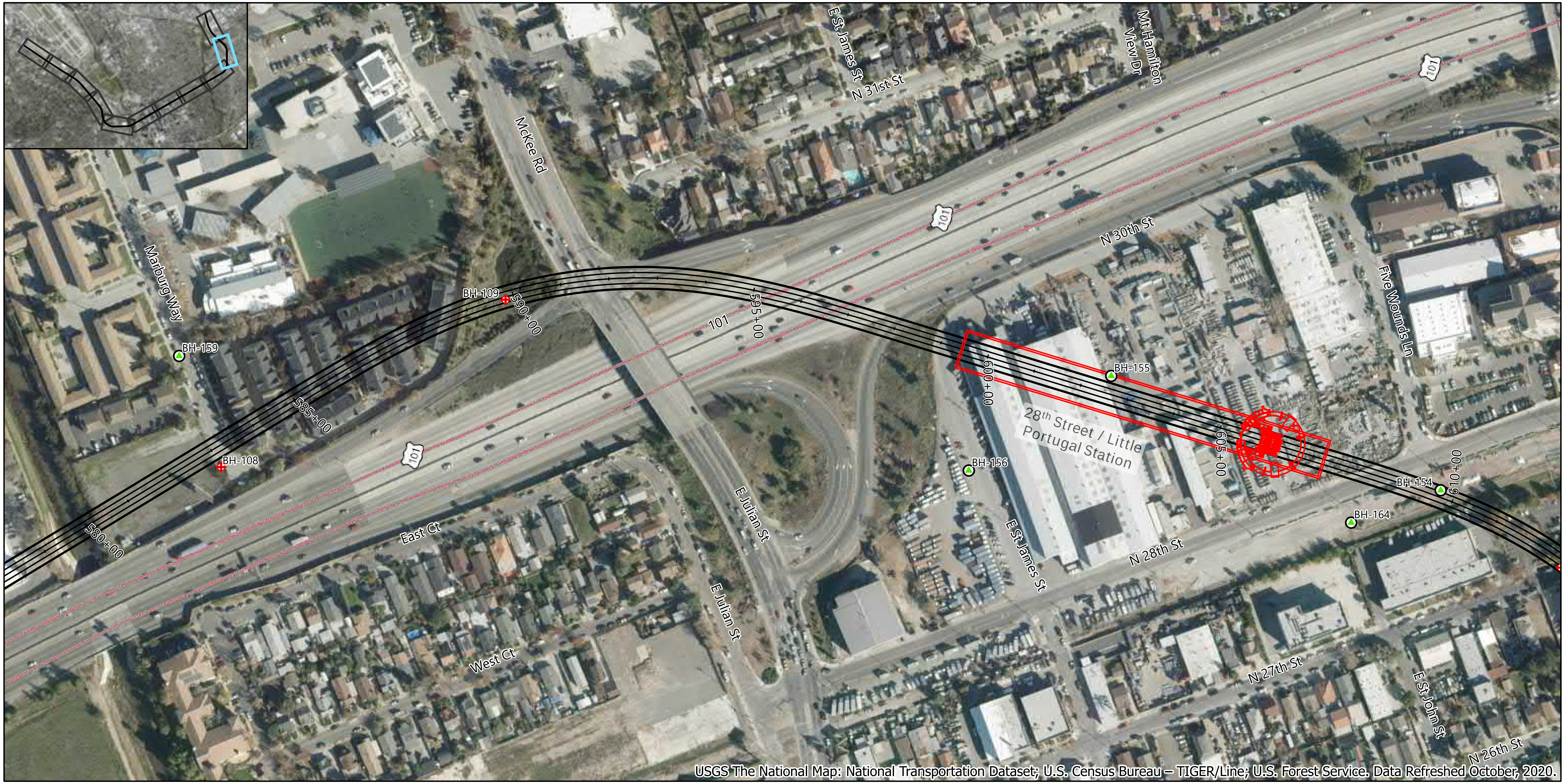
Figure 10.1



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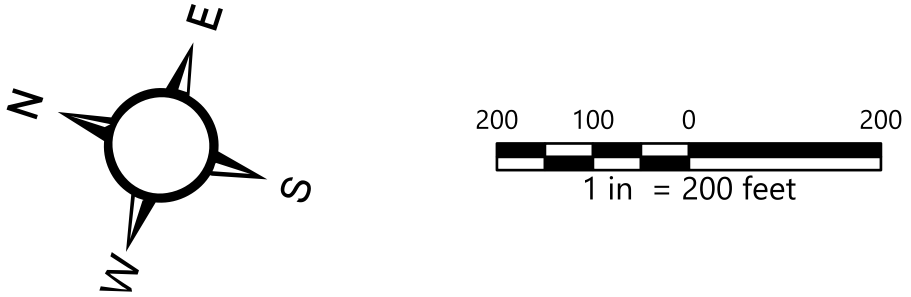

✚	Borehole, BH (2018-2020)
▲	Cone Penetration Test, CPT (2018-2020)
◬	Accessible Standpipe Piezometer (2018-2020)
◉	Accessible Vibrating Wire Piezometer (2018-2020)
☰	BSVII Track Alignment
☐	BSVII Tunnel Alignment
🟥	BSVII Cut-and-Cover Structures

Map of 2018 to 2020 Exploration Locations

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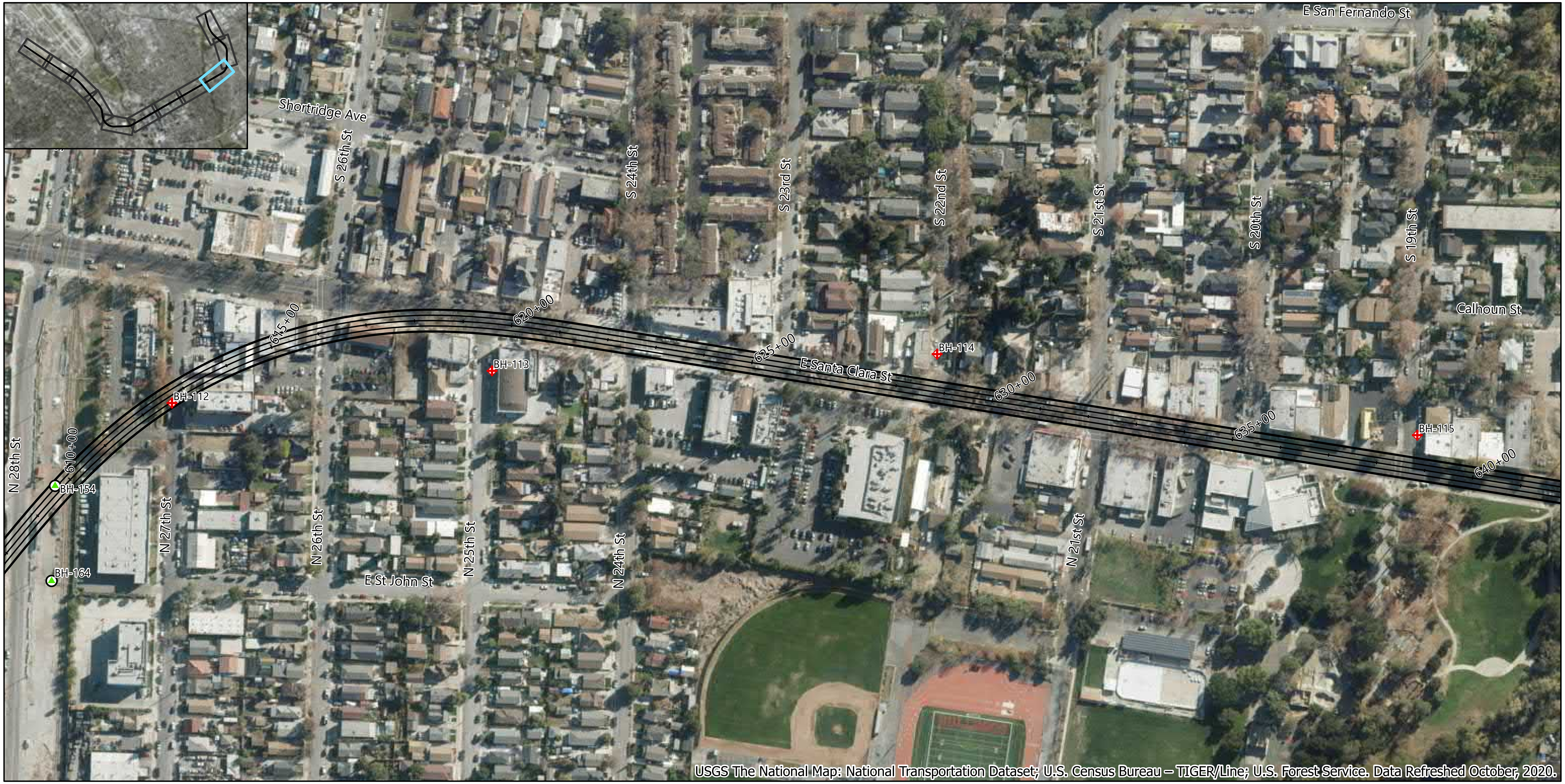
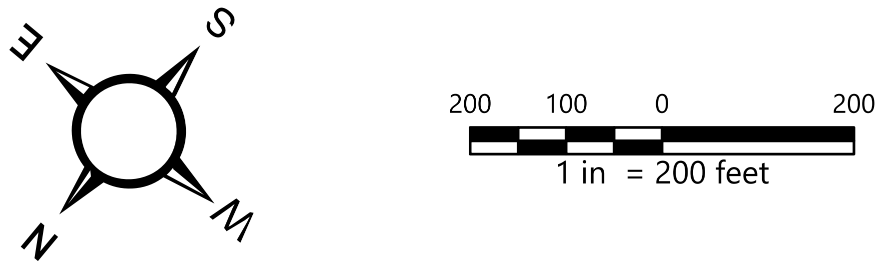
Figure 10.2



USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.



✚ Borehole, BH (2018-2020)
▲ Cone Penetration Test, CPT (2018-2020)
● Accessible Standpipe Piezometer (2018-2020)
● Accessible Vibrating Wire Piezometer (2018-2020)

BSVII Track Alignment
☐ BSVII Tunnel Alignment
🟥 BSVII Cut-and-Cover Structures

Map of 2018 to 2020 Exploration Locations

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Figure 10.3

USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.

- ✚ Borehole, BH (2018-2020)
- ▲ Cone Penetration Test, CPT (2018-2020)
- ● Accessible Standpipe Piezometer (2018-2020)
- ● Accessible Vibrating Wire Piezometer (2018-2020)
- ☰ BSVII Track Alignment
- ☐ BSVII Tunnel Alignment
- 🟥 BSVII Cut-and-Cover Structures

Map of 2018 to 2020 Exploration Locations

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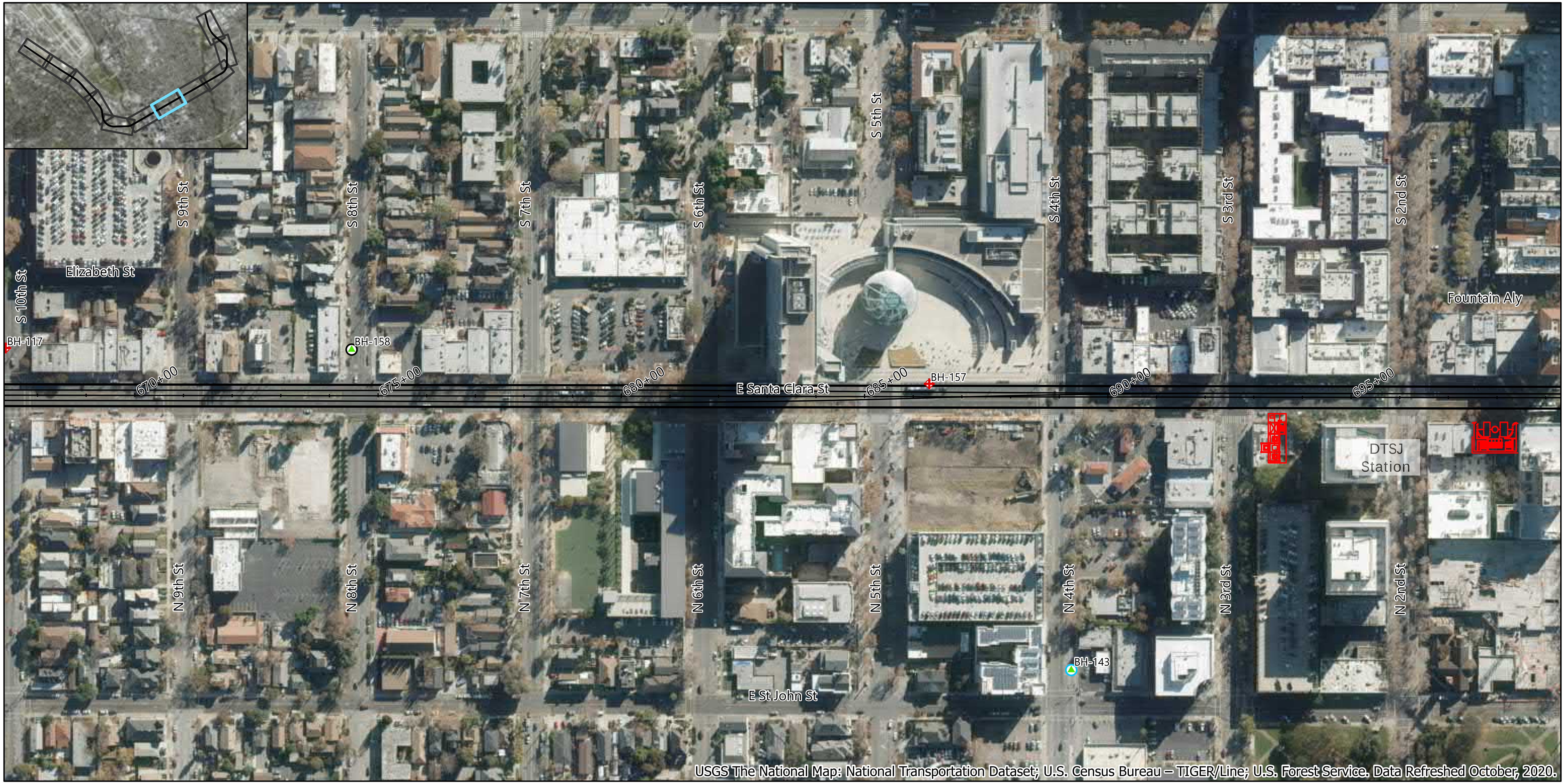
San Jose, California

Dec 2020

Figure 10.4



USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.

S
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W
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200 100 0 200
1 in = 200 feet

✚	Borehole, BH (2018-2020)
▲	Cone Penetration Test, CPT (2018-2020)
●	Accessible Standpipe Piezometer (2018-2020)
●	Accessible Vibrating Wire Piezometer (2018-2020)
☰	BSVII Track Alignment
☐	BSVII Tunnel Alignment
🟥	BSVII Cut-and-Cover Structures

Map of 2018 to 2020 Exploration Locations

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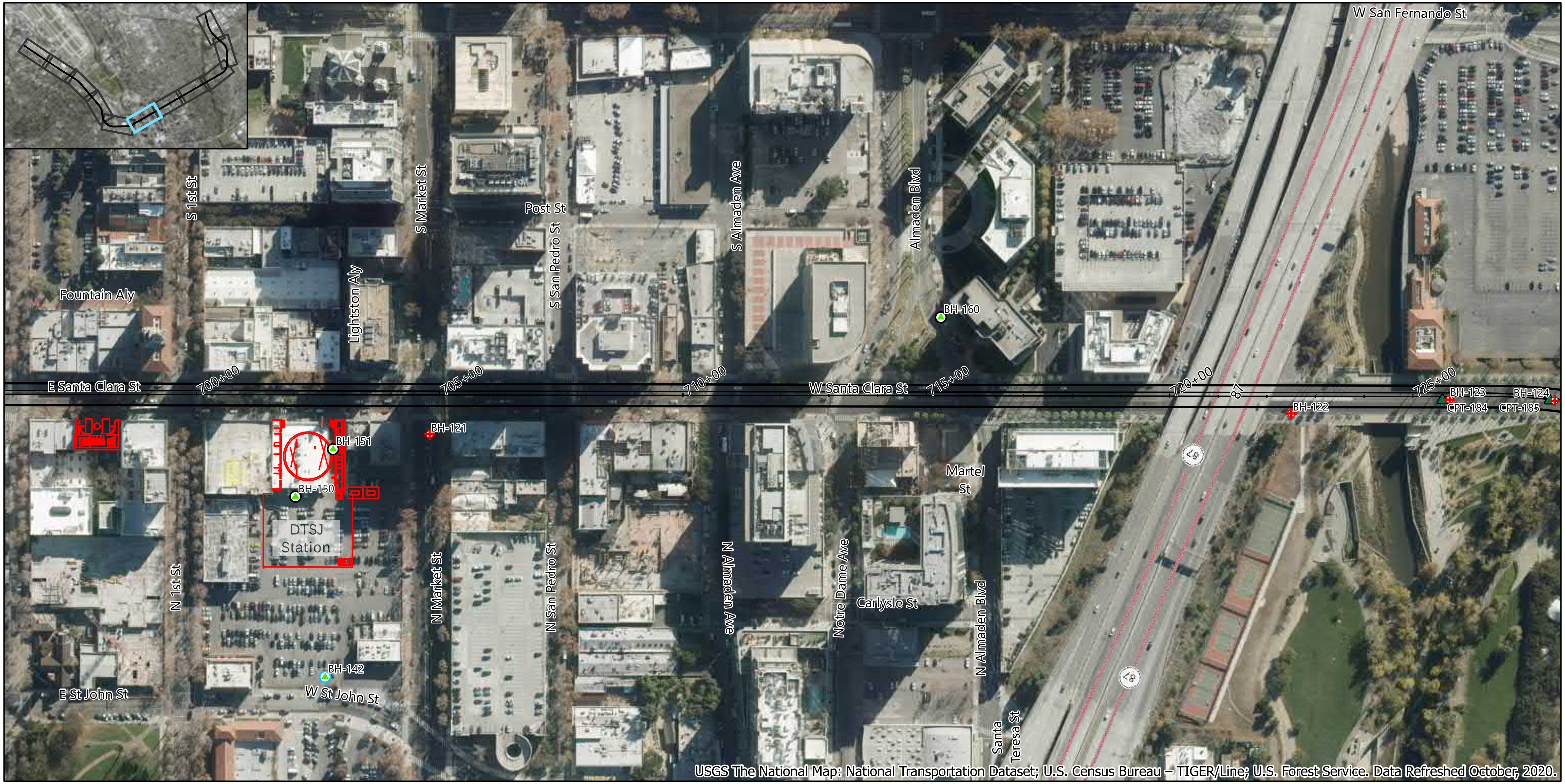
Figure 10.5



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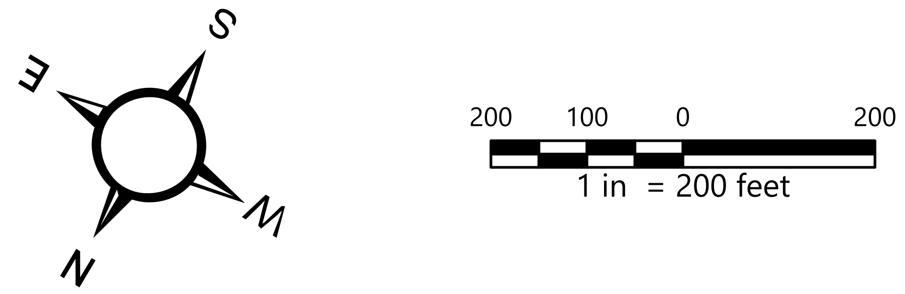

- ✚ Borehole, BH (2018-2020)
- ▲ Cone Penetration Test, CPT (2018-2020)
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Map of 2018 to 2020 Exploration Locations

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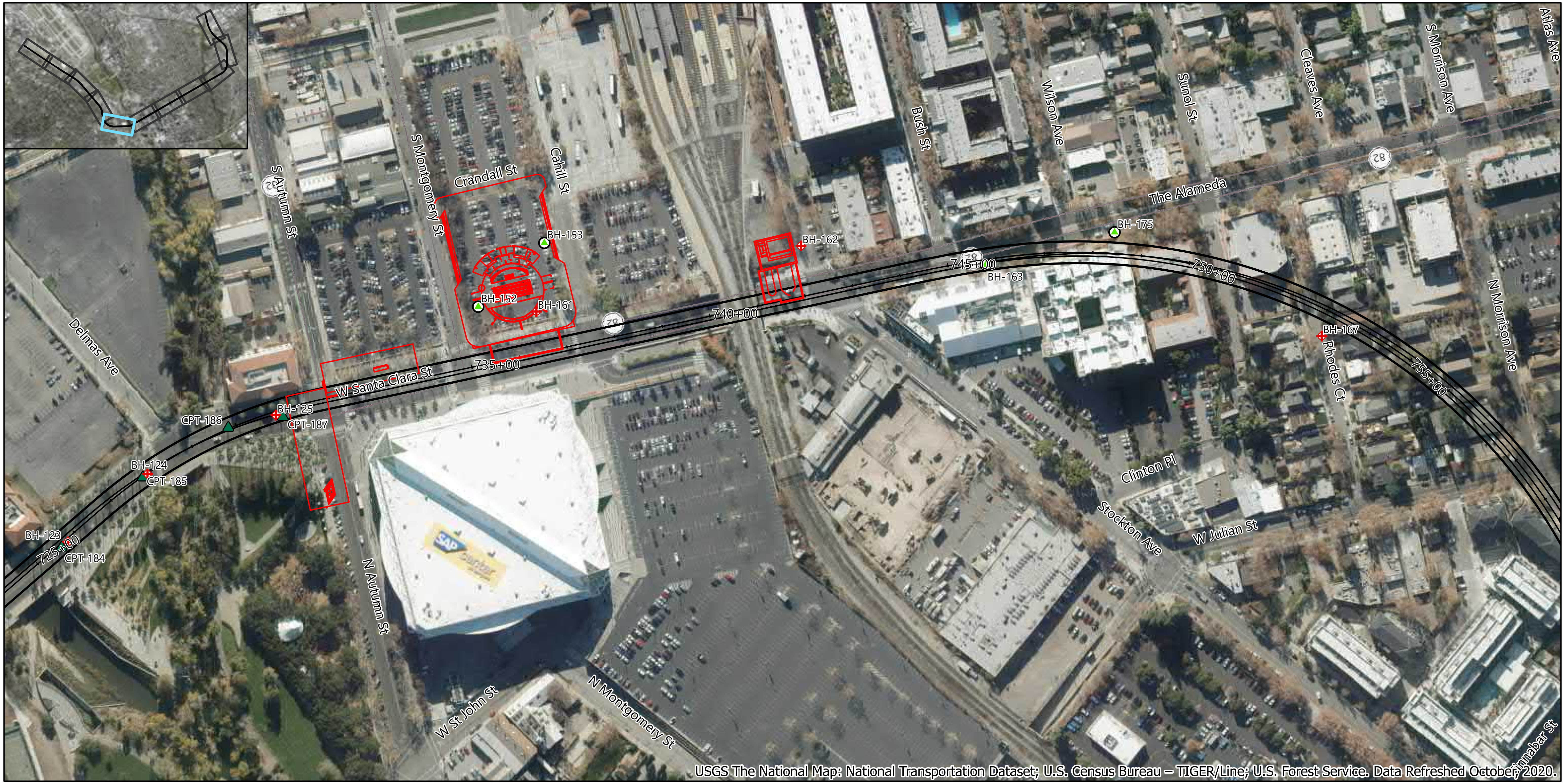
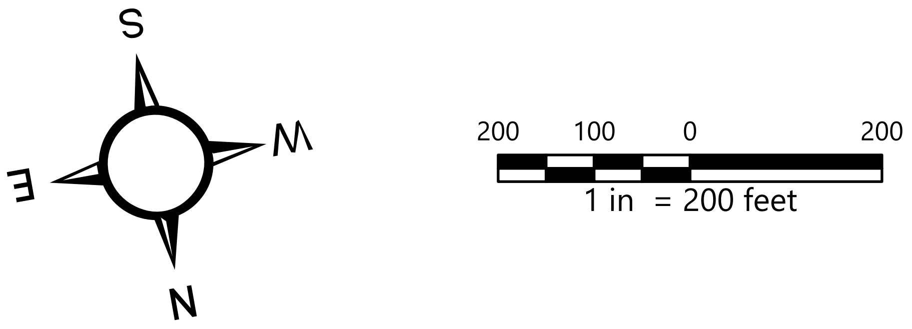
Figure 10.6



USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.



- ✚ Borehole, BH (2018-2020)
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Map of 2018 to 2020 Exploration Locations

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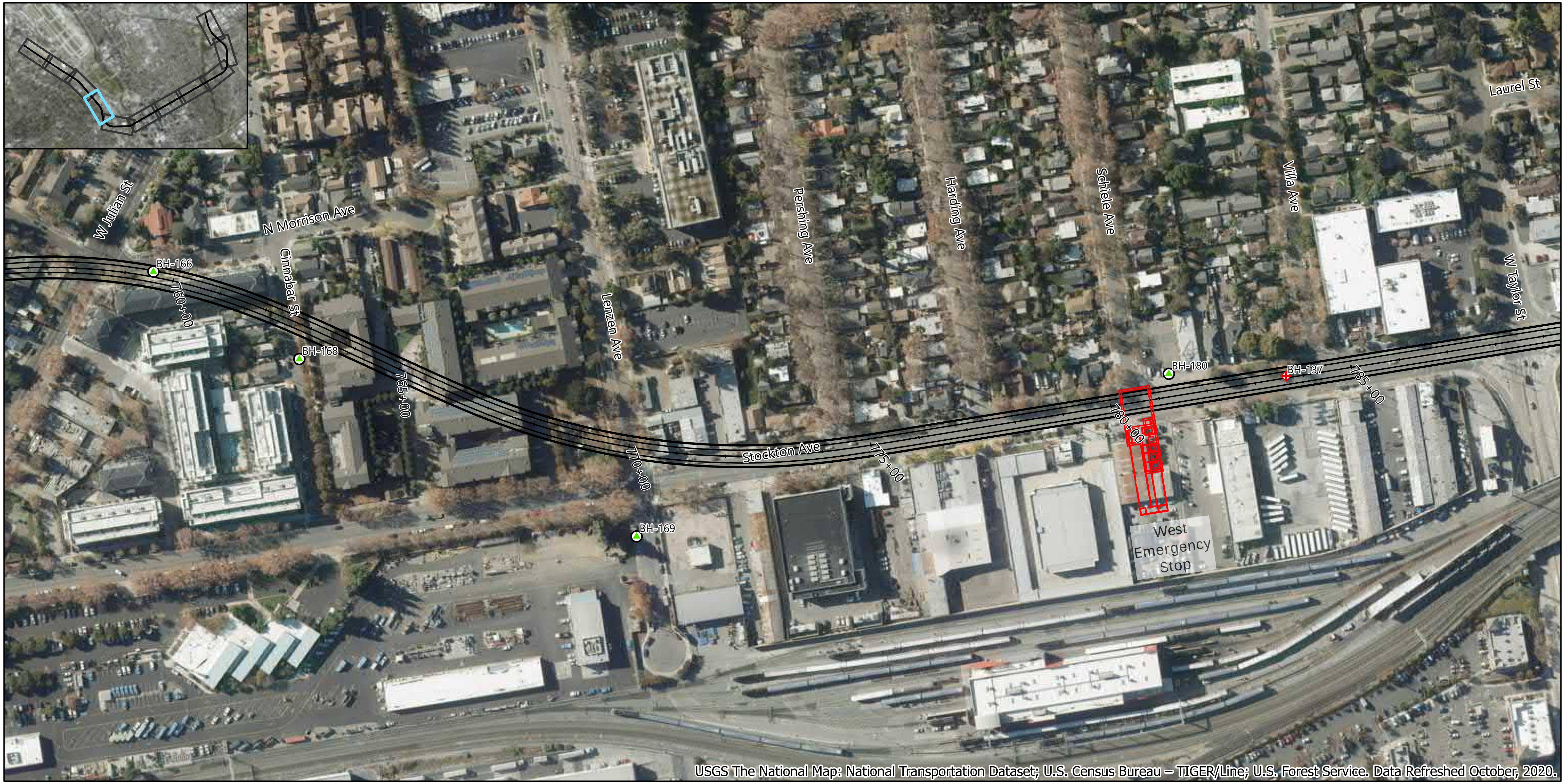
Figure 10.7



USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.

200 100 0 200

1 in = 200 feet

- ✚ Borehole, BH (2018-2020)
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Map of 2018 to 2020 Exploration Locations

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Figure 10.8

USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.

200 100 0 200
1 in = 200 feet

✚ Borehole, BH (2018-2020)
▲ Cone Penetration Test, CPT (2018-2020)
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● Accessible Vibrating Wire Piezometer (2018-2020)
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☐ BSVII Tunnel Alignment
☐ BSVII Cut-and-Cover Structures

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Figure 10.9

USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.

200 100 0 200

1 in = 200 feet

- ✚ Borehole, BH (2018-2020)
- ▲ Cone Penetration Test, CPT (2018-2020)
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Map of 2018 to 2020 Exploration Locations

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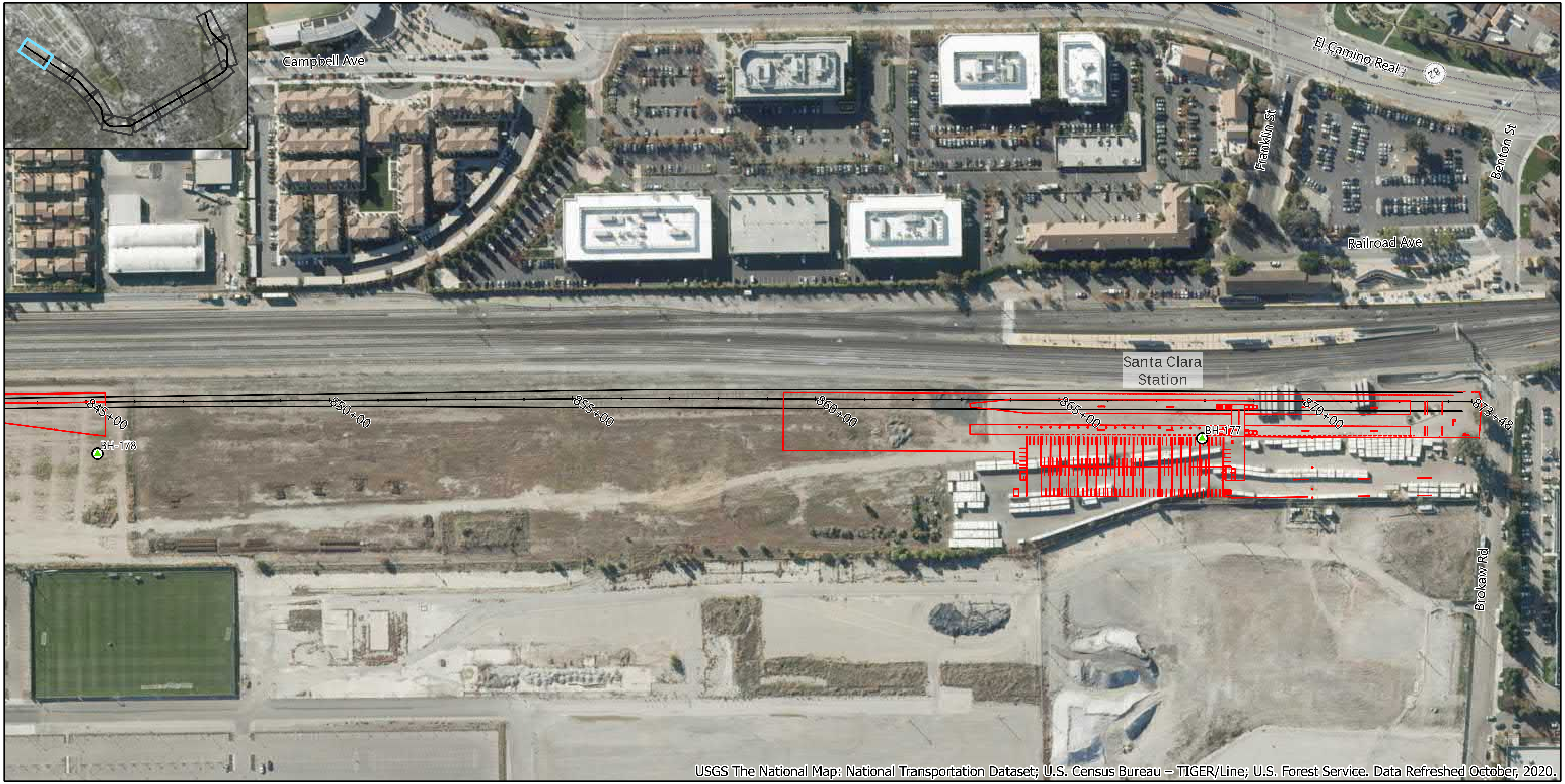
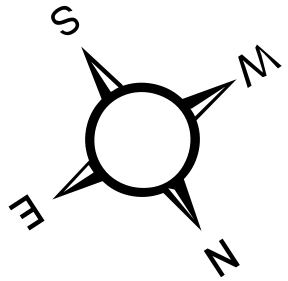
Figure 10.10



USGS The National Map: National Transportation Dataset; U.S. Census Bureau – TIGER/Line; U.S. Forest Service. Data Refreshed October, 2020.



200 100 0 200

1 in = 200 feet

- ✚ Borehole, BH (2018-2020)
- ▲ Cone Penetration Test, CPT (2018-2020)
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Map of 2018 to 2020 Exploration Locations

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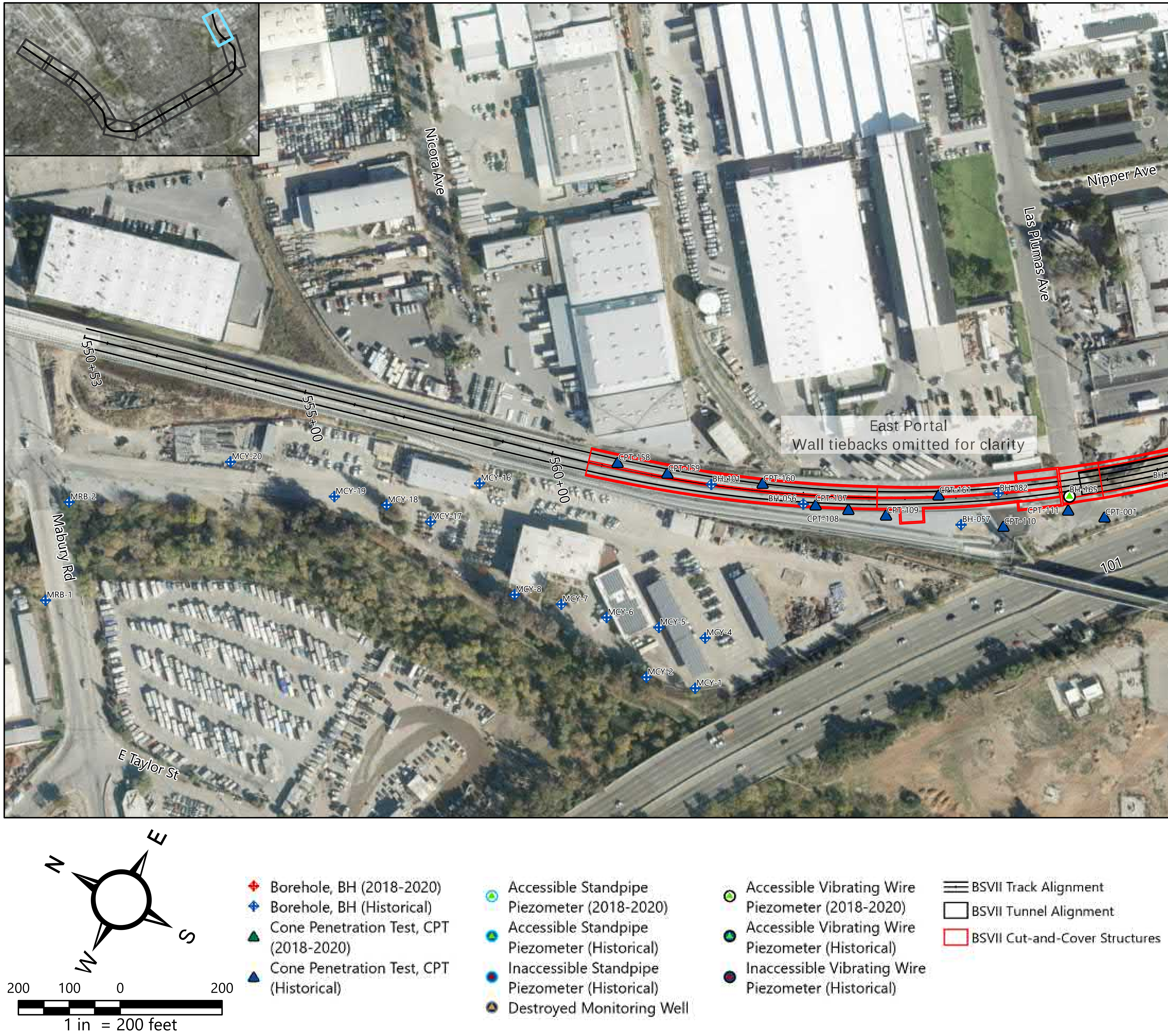
Figure 10.11



Available Geotechnical Data Including Previous Investigations

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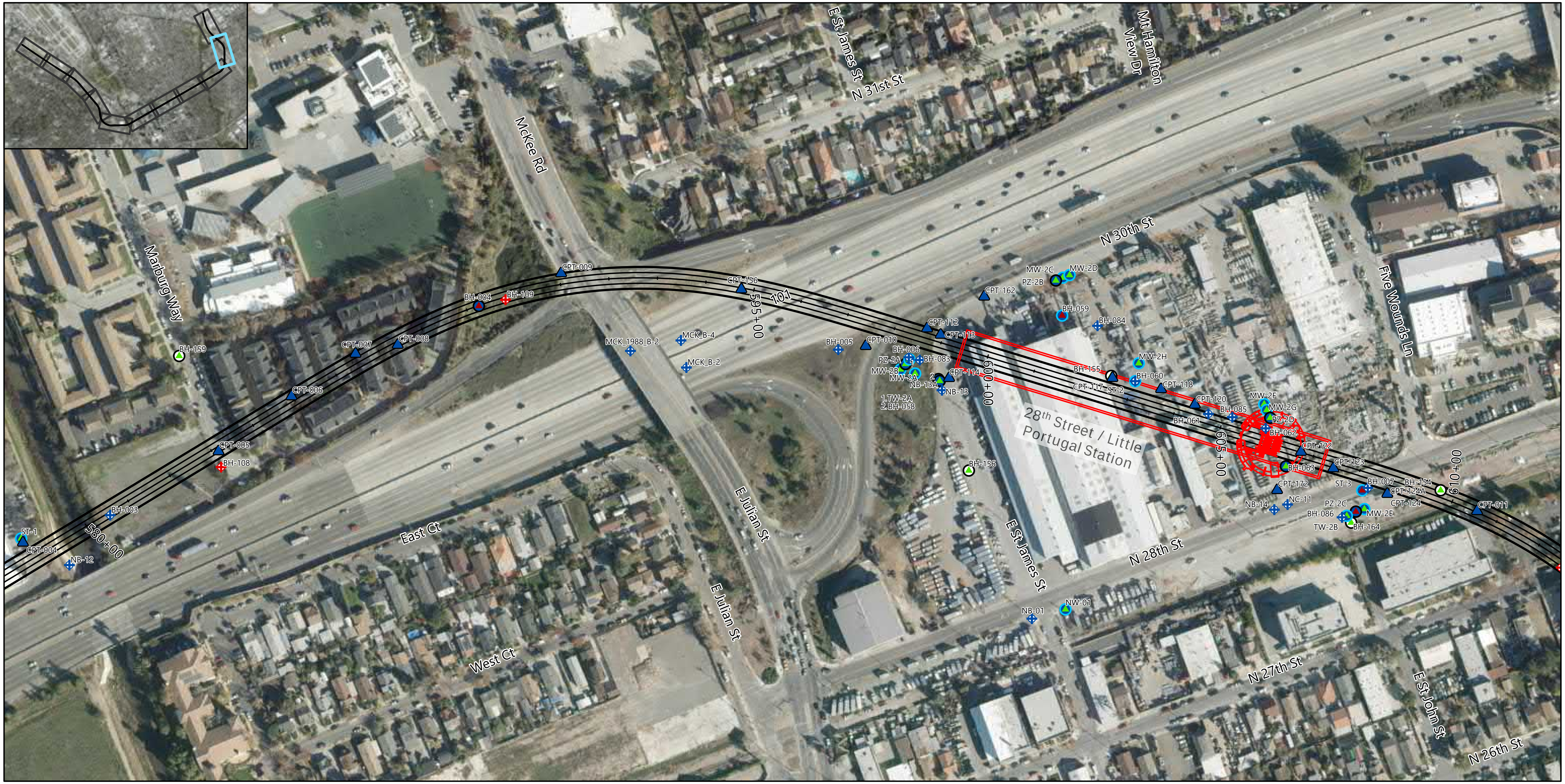
Figure 11.1



Available Geotechnical Data
Including Previous Investigations

Dec 2020

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Figure 11.2

Available Geotechnical Data
Including Previous Investigations

Dec 2020

BART Silicon Valley Phase II Extension Project
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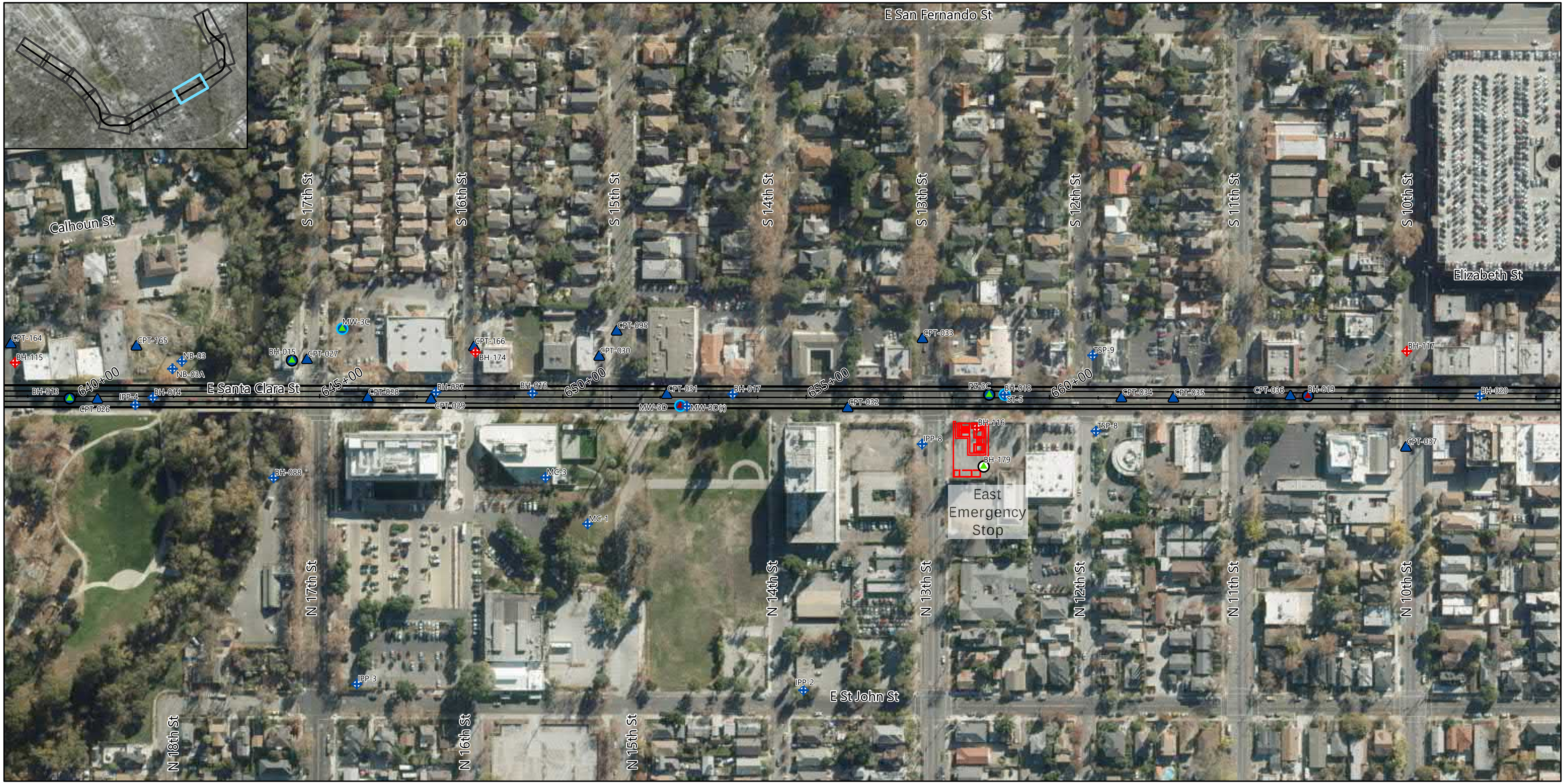
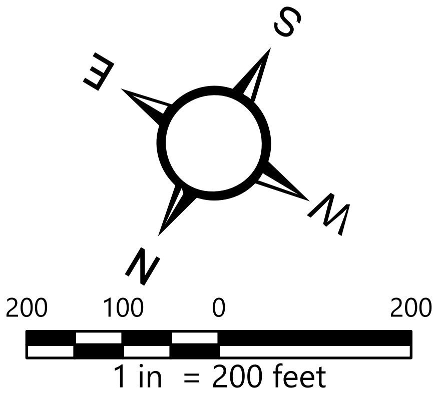
Santa Clara Valley Transportation Authority
San Jose, California

Figure 11.3





- Borehole, BH (2018-2020)
- Borehole, BH (Historical)
- Cone Penetration Test, CPT (2018-2020)
- Cone Penetration Test, CPT (Historical)
- Accessible Standpipe Piezometer (2018-2020)
- Accessible Standpipe Piezometer (Historical)
- Inaccessible Standpipe Piezometer (Historical)
- Destroyed Monitoring Well
- Accessible Vibrating Wire Piezometer (2018-2020)
- Accessible Vibrating Wire Piezometer (Historical)
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- BSVII Tunnel Alignment
- BSVII Cut-and-Cover Structures

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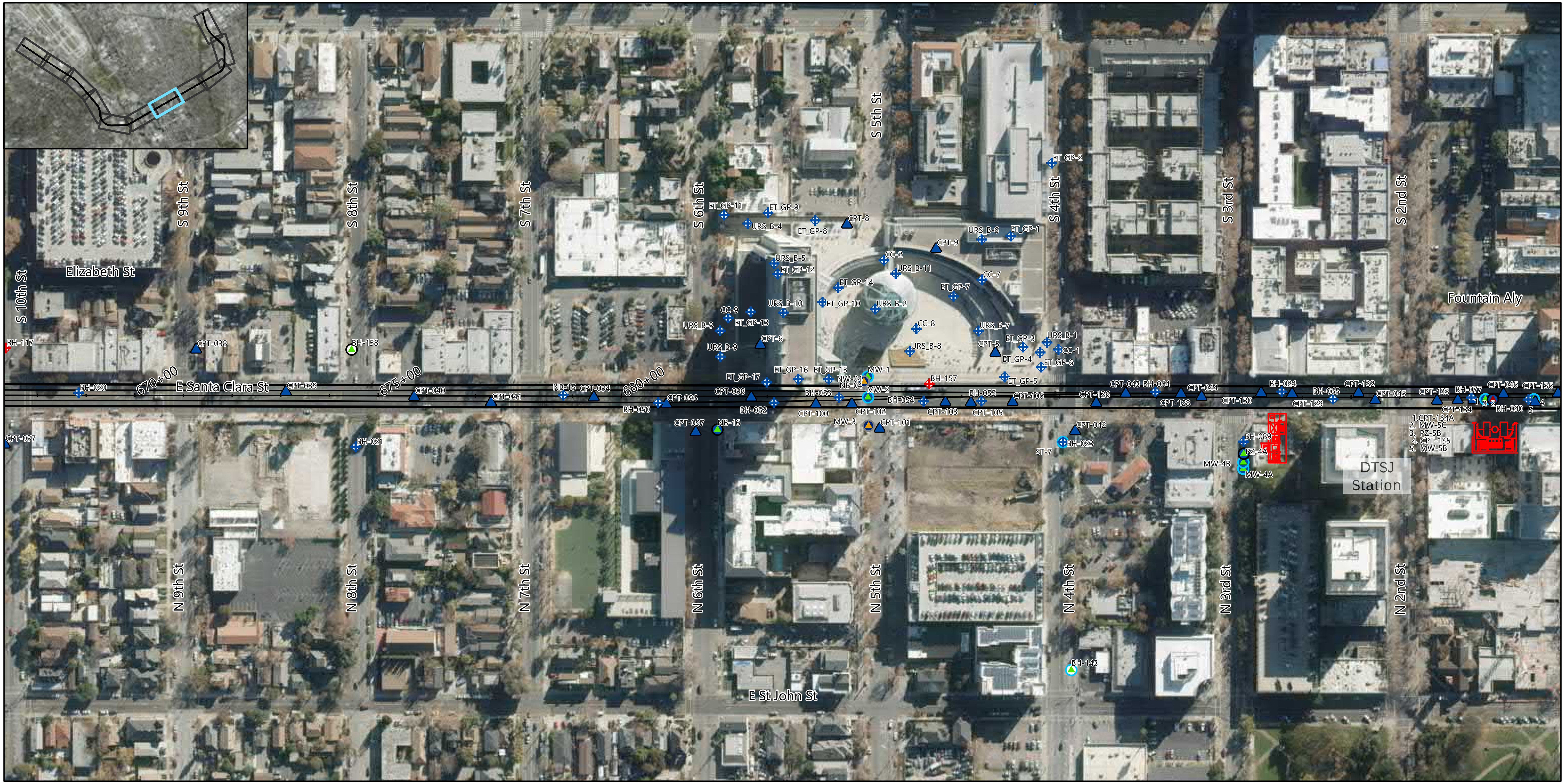
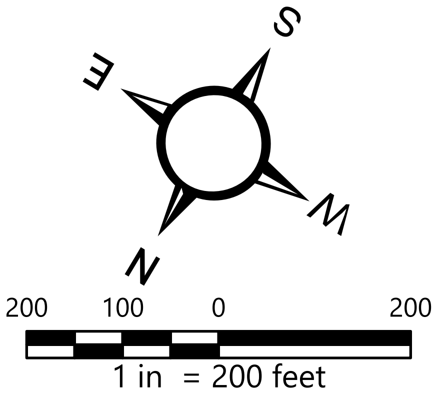
Figure 11.4





- ✚ Borehole, BH (2018-2020)
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Including Previous Investigations

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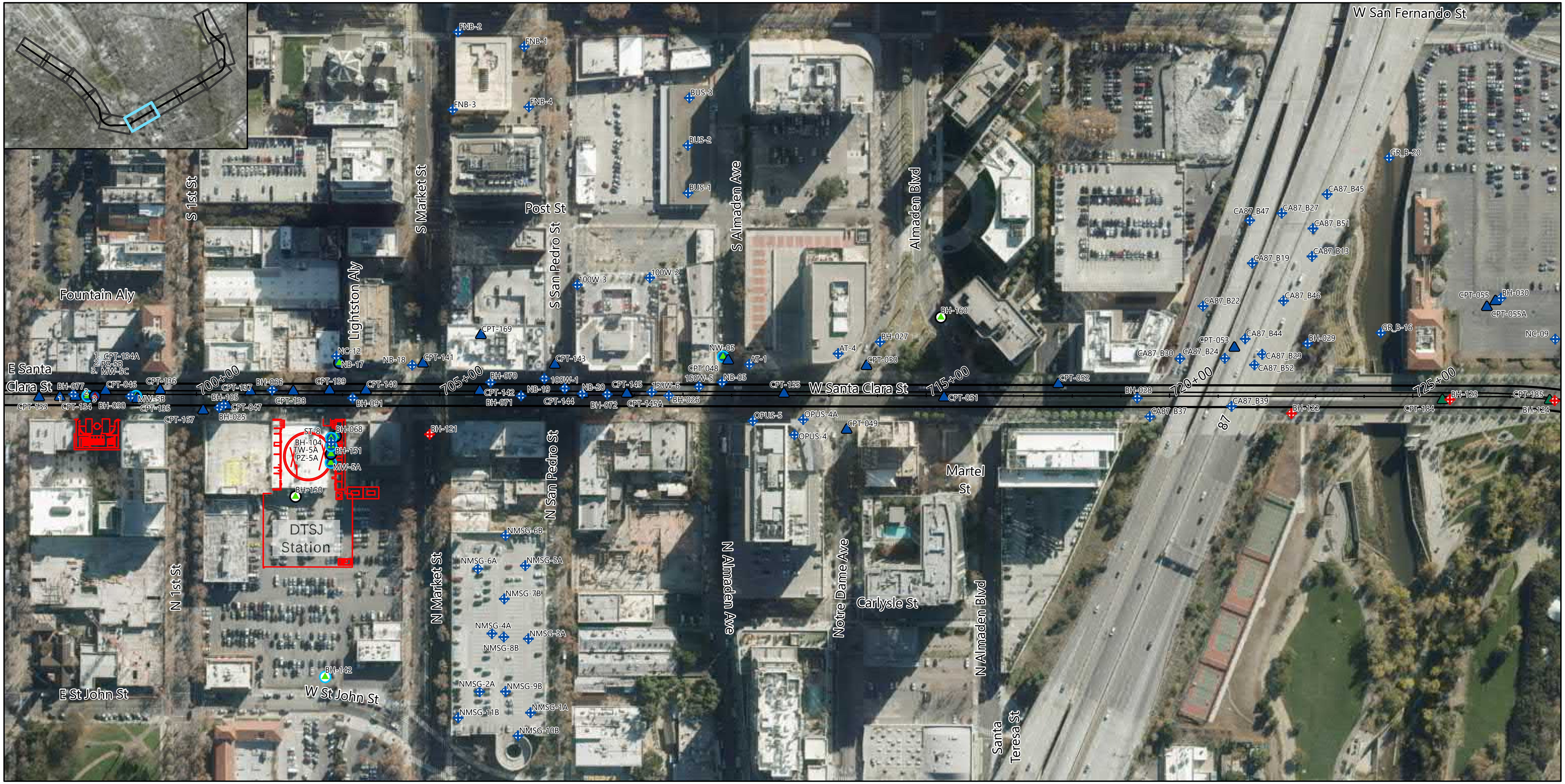
Figure 11.5



S
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200 100 0 200

1 in = 200 feet

- ✚ Borehole, BH (2018-2020)
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Available Geotechnical Data Including Previous Investigations

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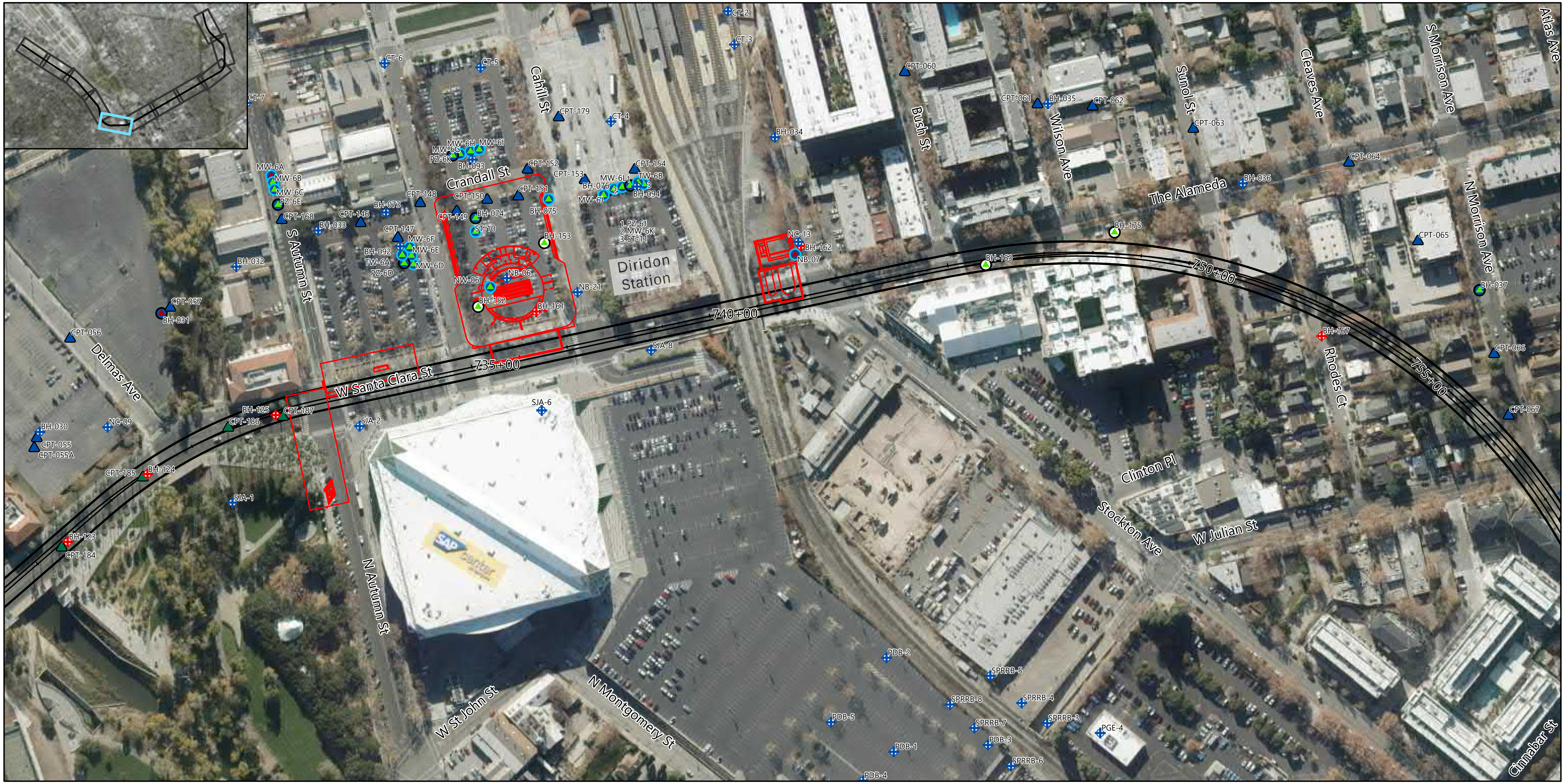
Figure 11.6



S
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Available Geotechnical Data Including Previous Investigations

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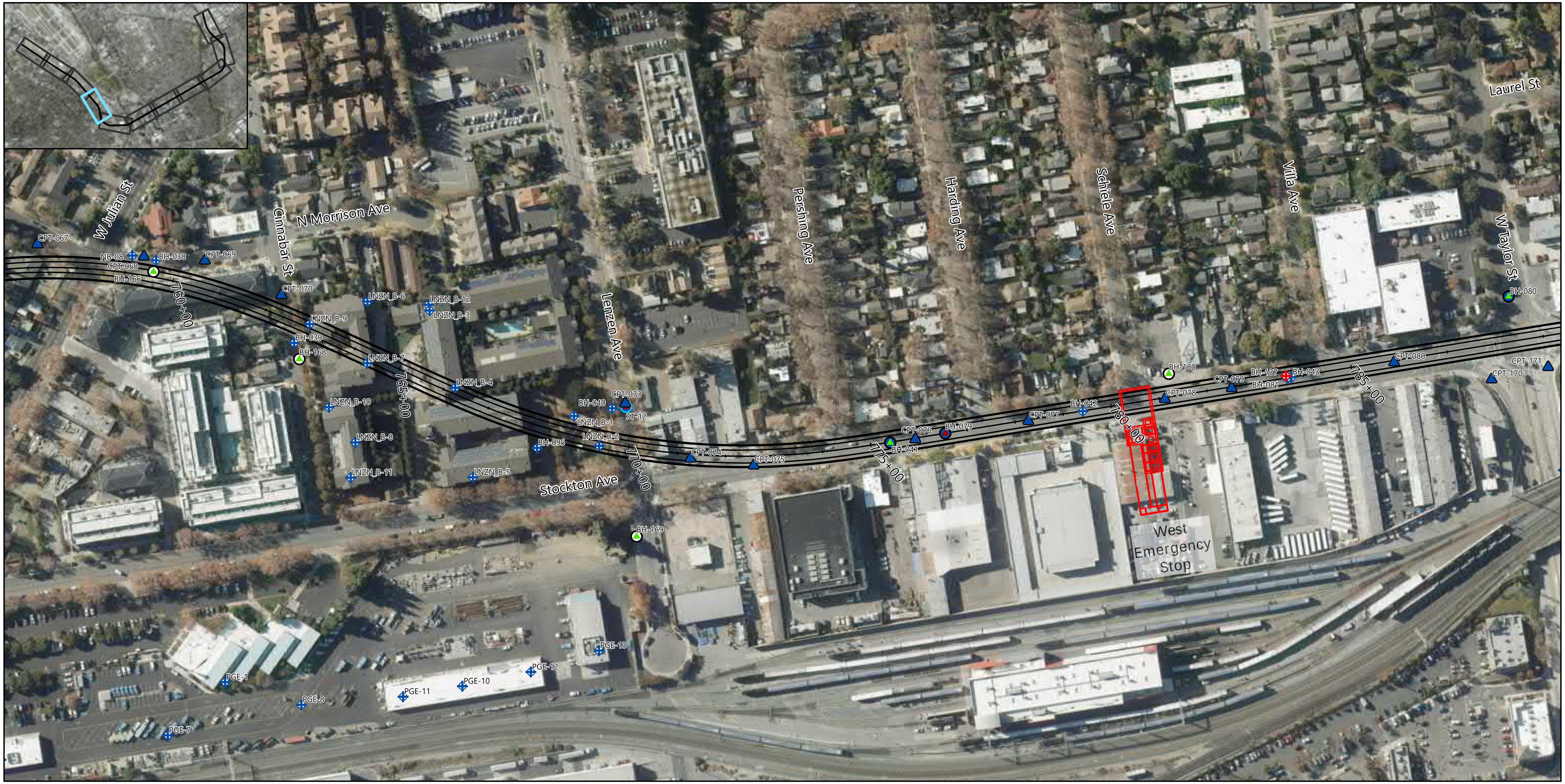
Figure 11.7



S W N E

200 100 0 200

1 in = 200 feet

- ✚ Borehole, BH (2018-2020)
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Available Geotechnical Data Including Previous Investigations

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Figure 11.8

S W E N

200 100 0 200

1 in = 200 feet

- Borehole, BH (2018-2020)
- Borehole, BH (Historical)
- Cone Penetration Test, CPT (2018-2020)
- Cone Penetration Test, CPT (Historical)
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Available Geotechnical Data Including Previous Investigations

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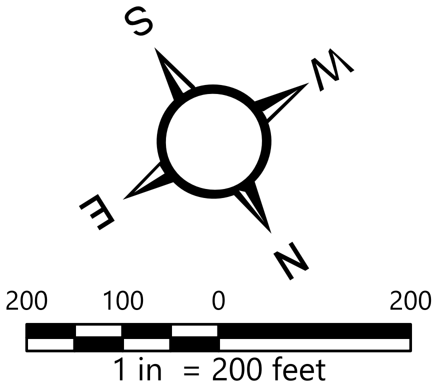
Figure 11.9



- ✚ Borehole, BH (2018-2020)
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Available Geotechnical Data
Including Previous Investigations

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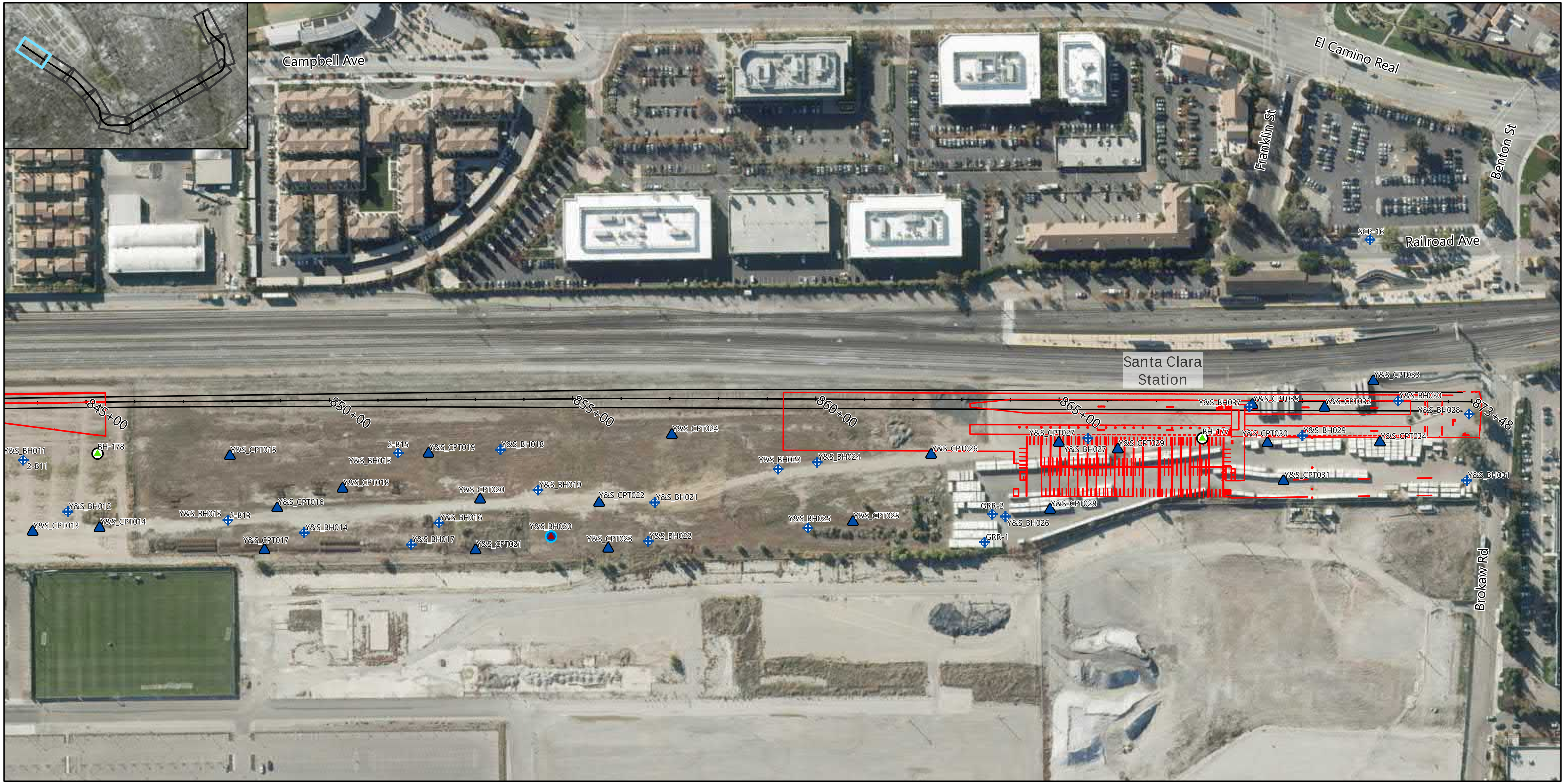
Figure 11.10



Available Geotechnical Data
Including Previous Investigations

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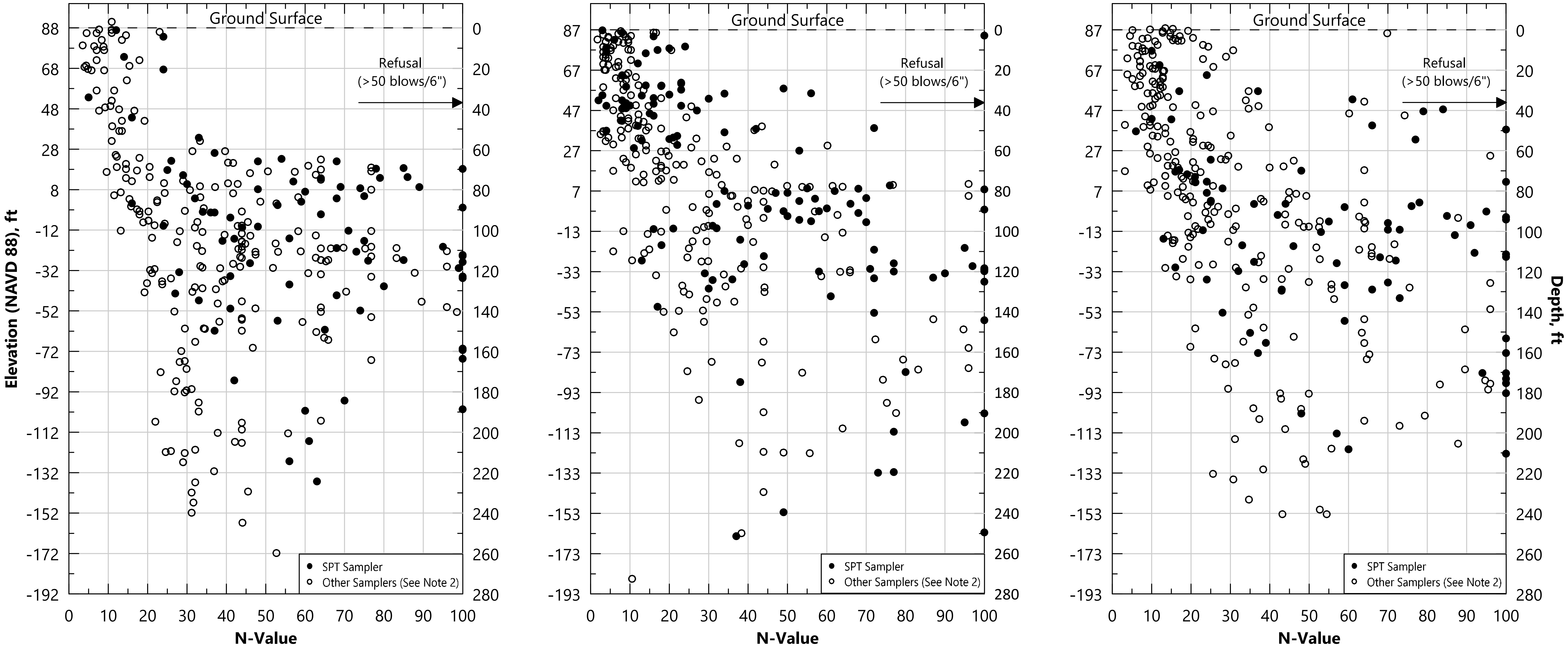
Figure 11.11



28th St/Little Portugal Station

DTSJ Station

Diridon Station

Notes:

1. DTSJ Station: Downtown San Jose Station.
2. Ground surface elevation line represents the average surface elevation at each station.
3. N-values have not been corrected for energy and field procedures; however, the Standard California, Modified California, and Dames & Moore U-type blow counts have been corrected for sampler size using an area ratio factor of 0.77, 0.64, and 0.44 respectively.

N-Values - Underground Stations

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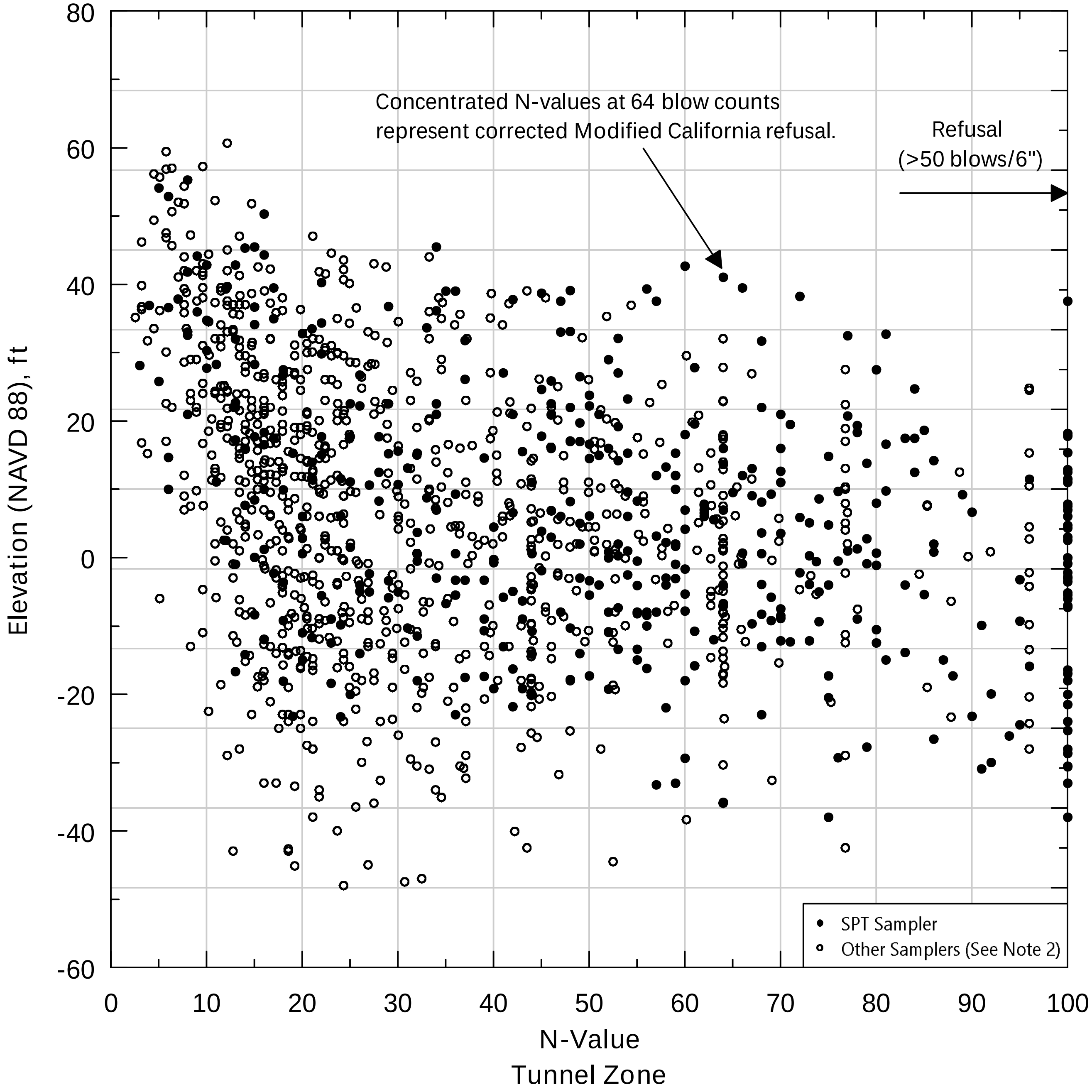
Figure 12.1



Notes:

1. Figure includes data from 5 feet above the tunnel crown to 5 feet below the tunnel invert.
2. N-values have not been corrected for energy and field procedures; however, the Standard California, Modified California, and Dames & Moore U-type blow counts have been corrected for sampler size using an area ratio factor of 0.77, 0.64, and 0.44 respectively.

N-Values - Tunnel Zone

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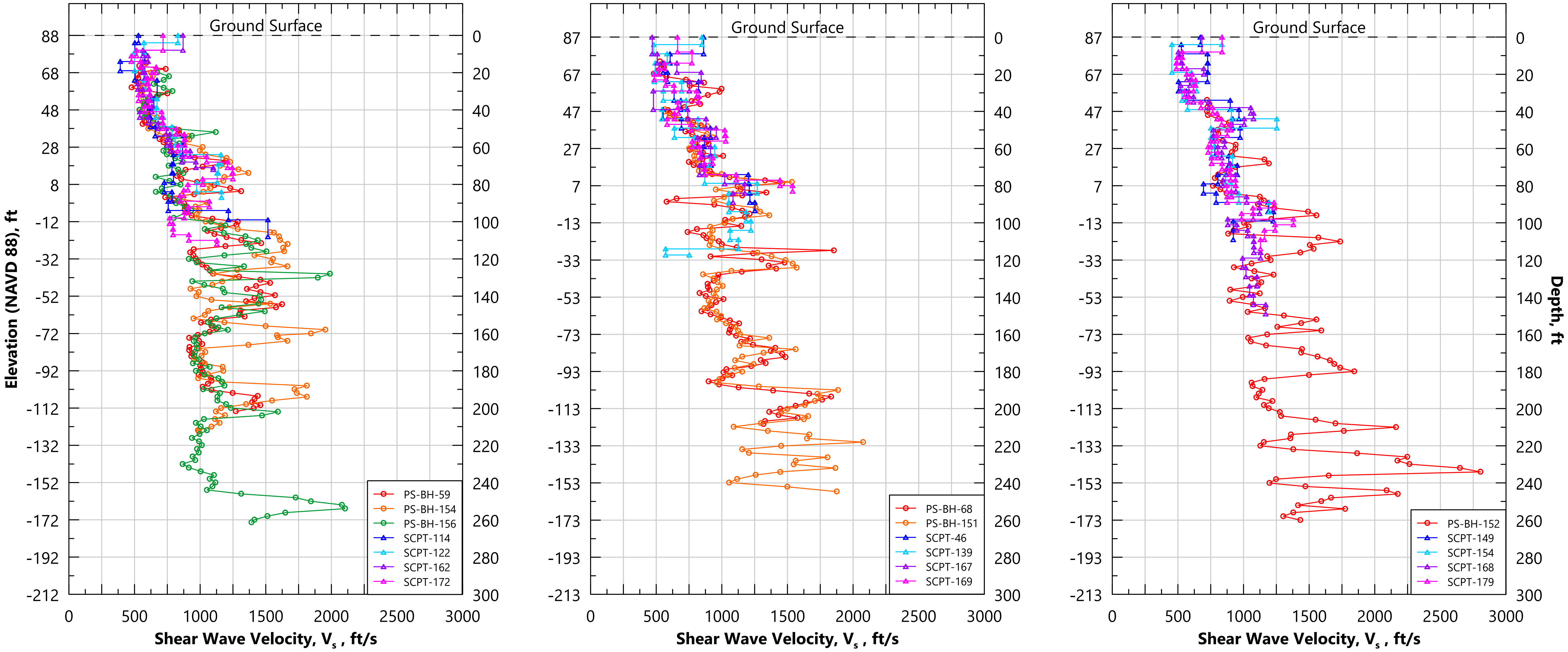
Figure 12.2



28th St./Little Portugal Station **DTSJ Station** **Diridon Station**

Notes:

1. Ground surface elevation line represents the average surface elevation at each station.
2. PS: Suspension P (Compression) - S (Shear) Logging; SCPT: Seismic Cone Penetration Test.
3. DTSJ: Downtown San Jose.

Shear Wave Velocity Profile - Underground Stations

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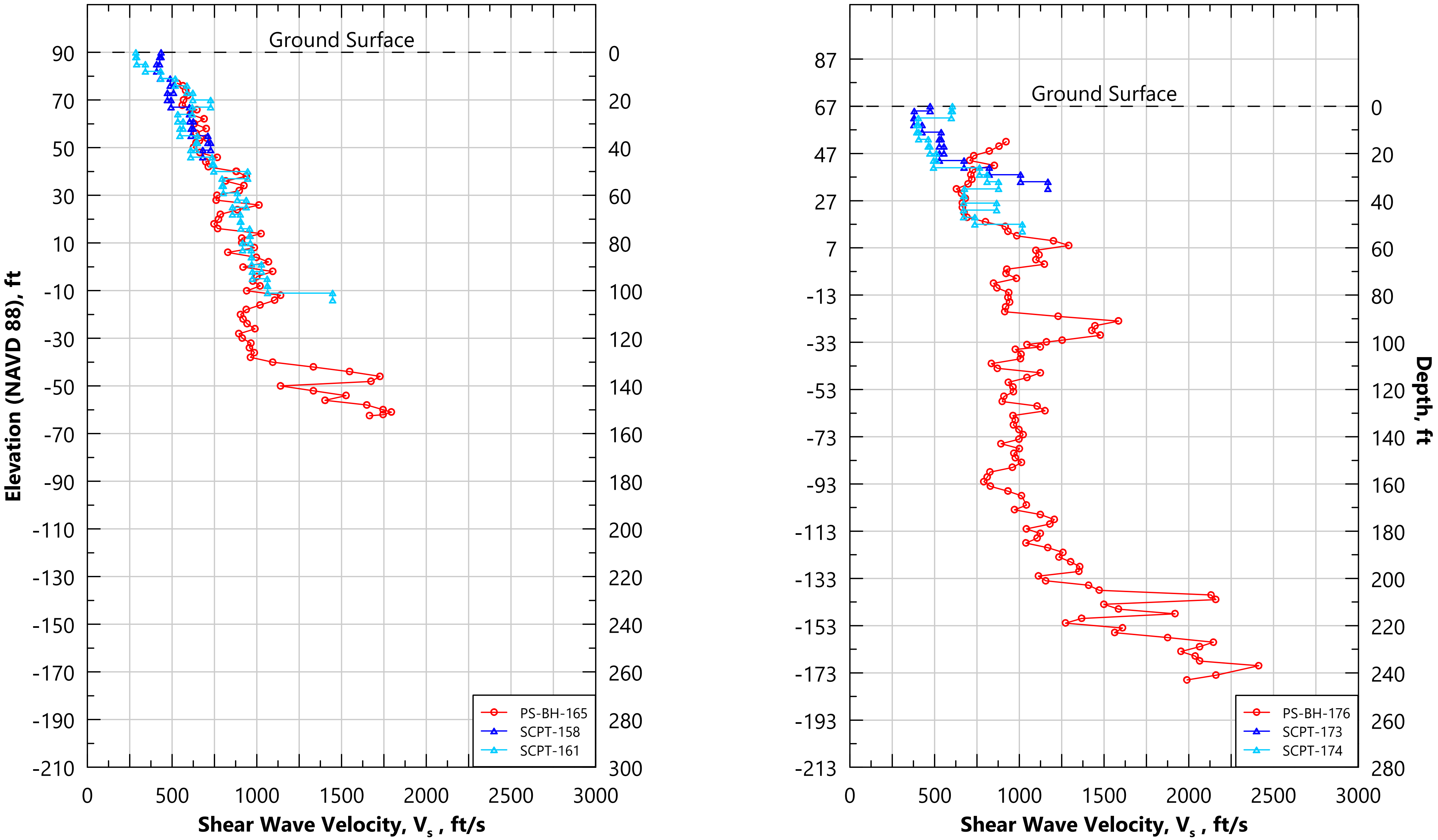
Figure 13.1



East Portal

West Portal

Notes:

1. Ground surface elevation line represents the average surface elevation at each portal.
2. PS: Suspension P (Compression) - S (Shear) Logging; SCPT: Seismic Cone Penetration Test.

Shear Wave Velocity Profile - Portals

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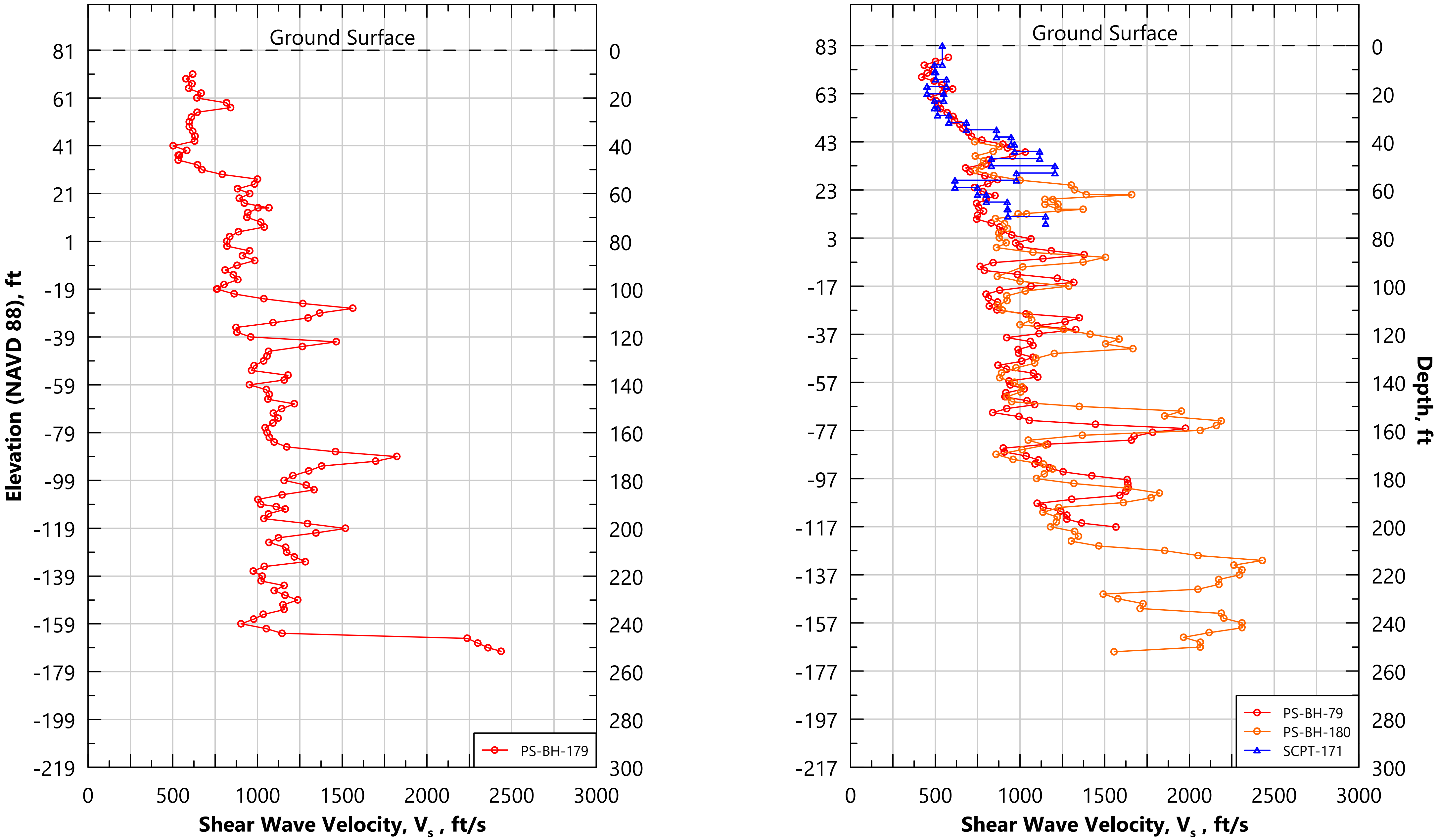
Figure 13.2



East Emergency Stop

West Emergency Stop

Notes:

1. Ground surface elevation line represents the average surface elevation at each emergency stop.
2. PS: Suspension P (Compression) - S (Shear) Logging; SCPT: Seismic Cone Penetration Test.

Shear Wave Velocity Profile - Emergency Stops

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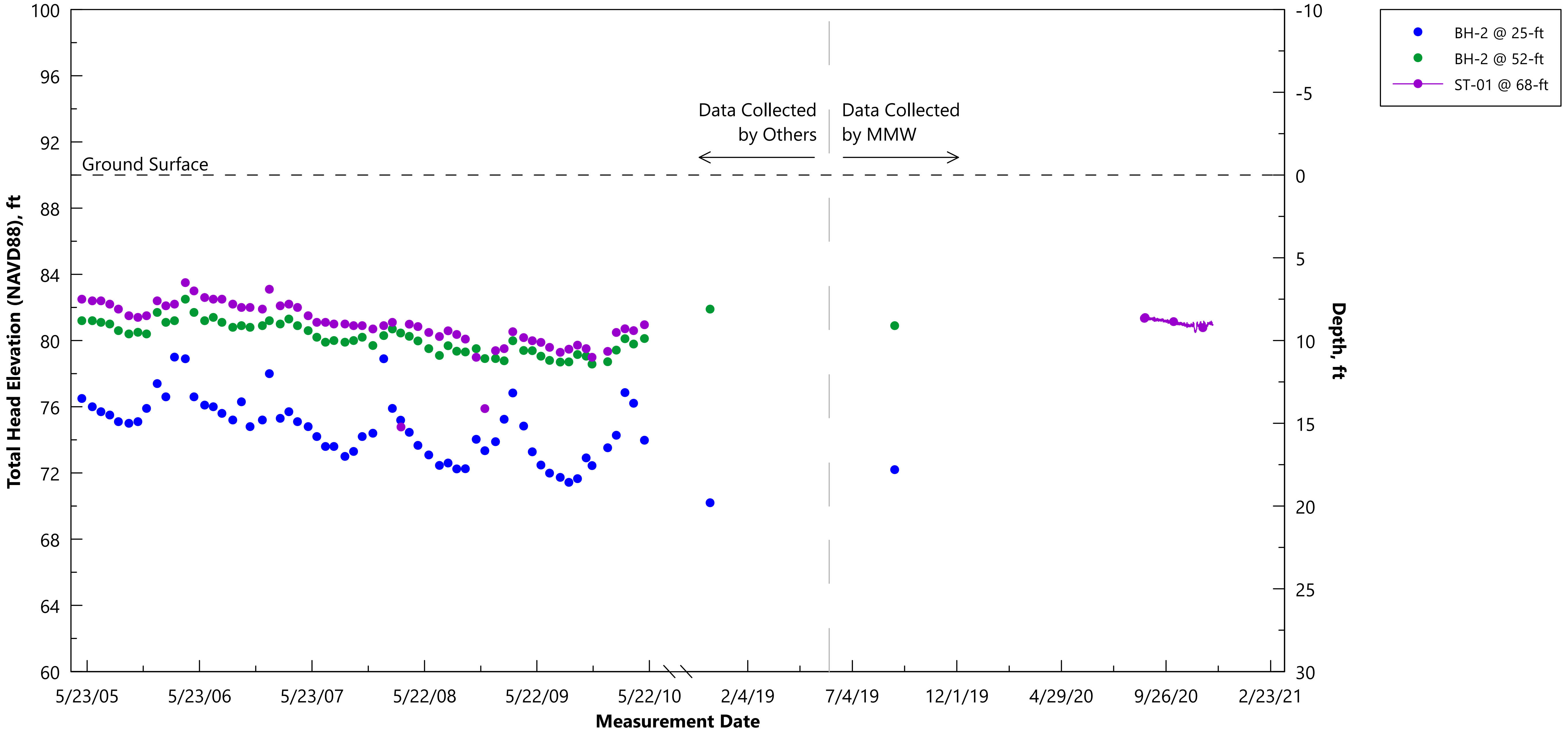
Figure 13.3



Notes

1. Ground surface elevation line represents the average elevation for the East Portal.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.

Groundwater Elevation Historical Boreholes - East Portal

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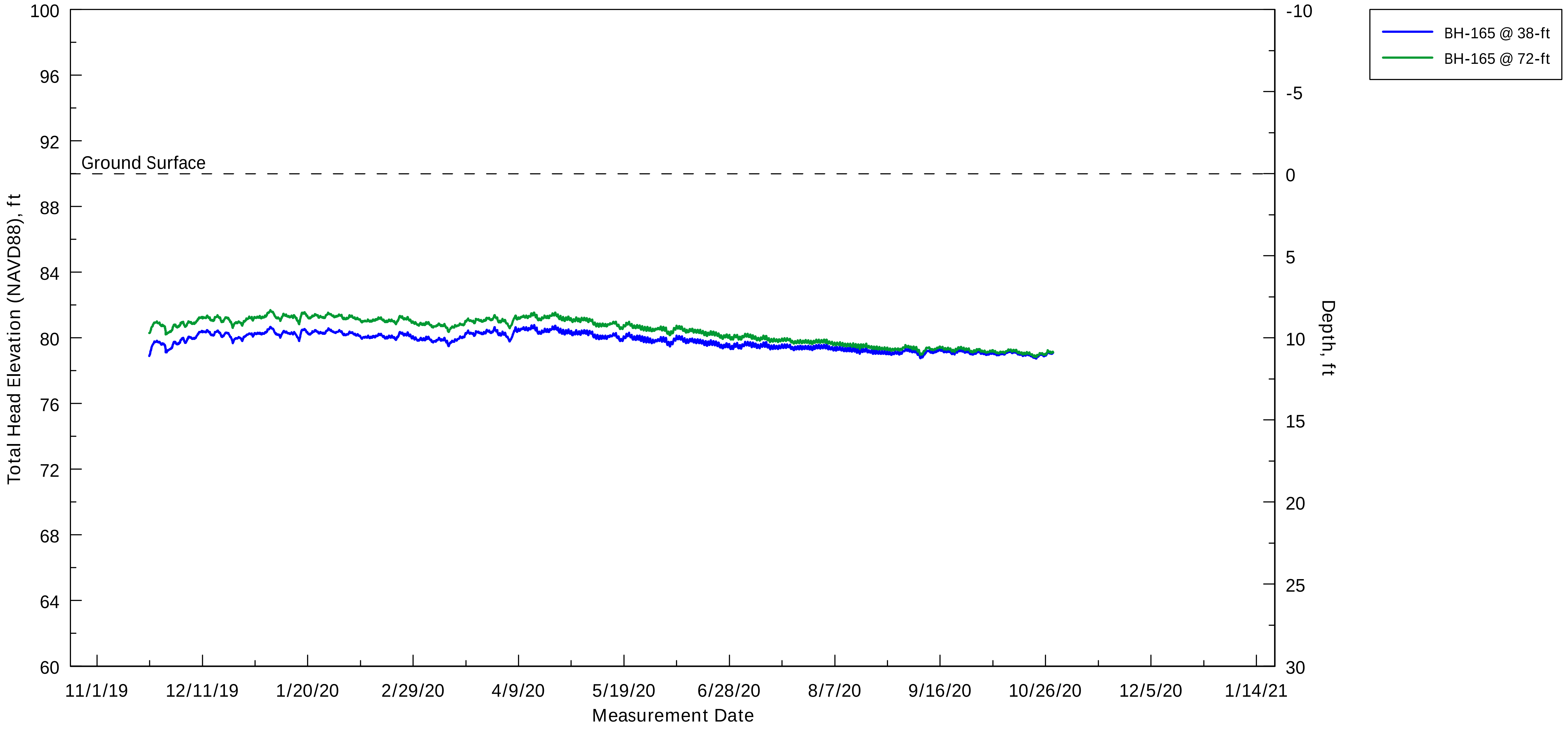
Figure 14.1



Notes

1. Ground surface elevation line represents the average elevation for the East Portal.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes - East Portal

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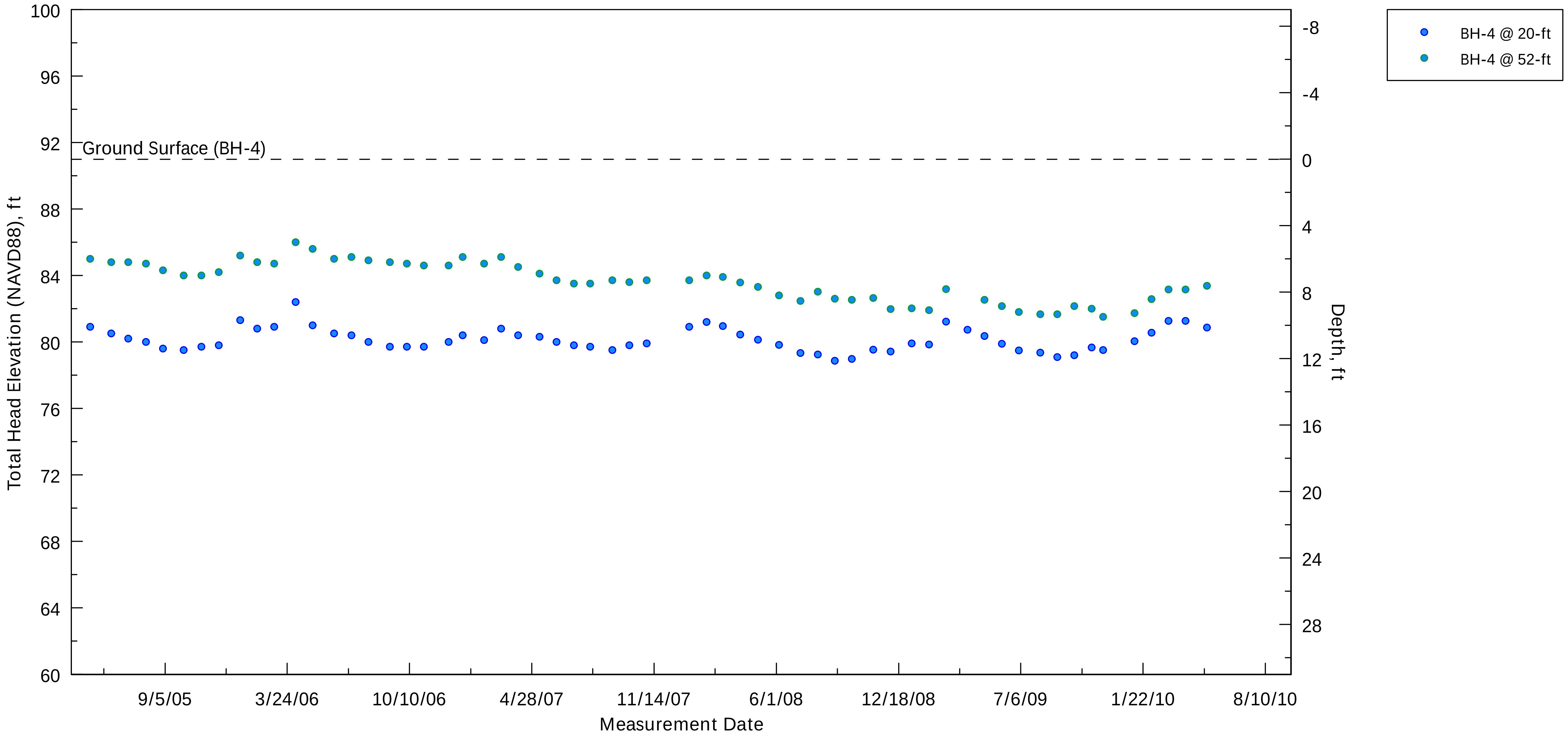
Figure 14.2



Notes

1. BH-4 is not accessible. Groundwater data presented was collected by others.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation Historical Boreholes -
East Portal to 28th Street / Little Portugal Station

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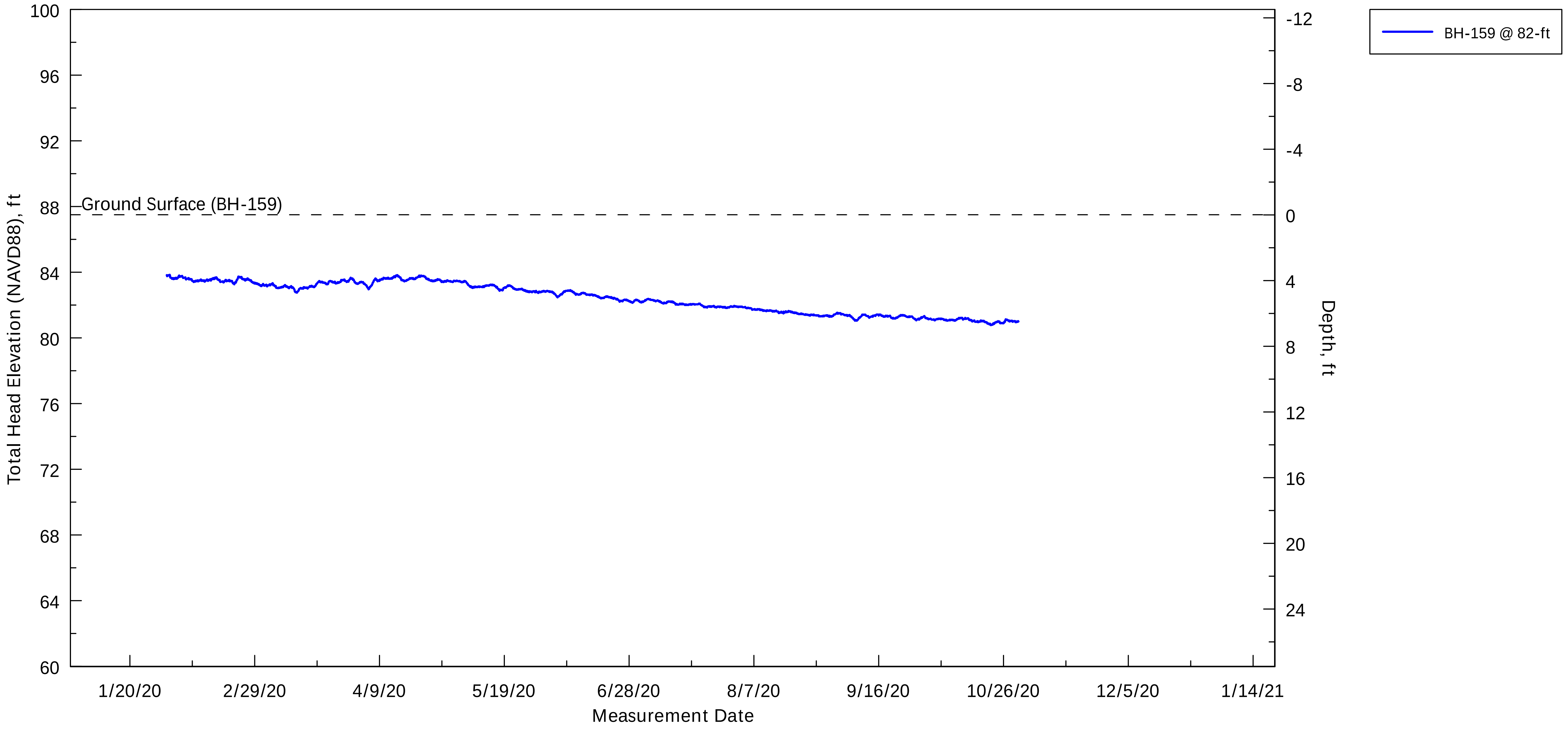
Figure 14.3



Notes

1. The depth for the plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes -
East Portal to 28th Street / Little Portugal Station

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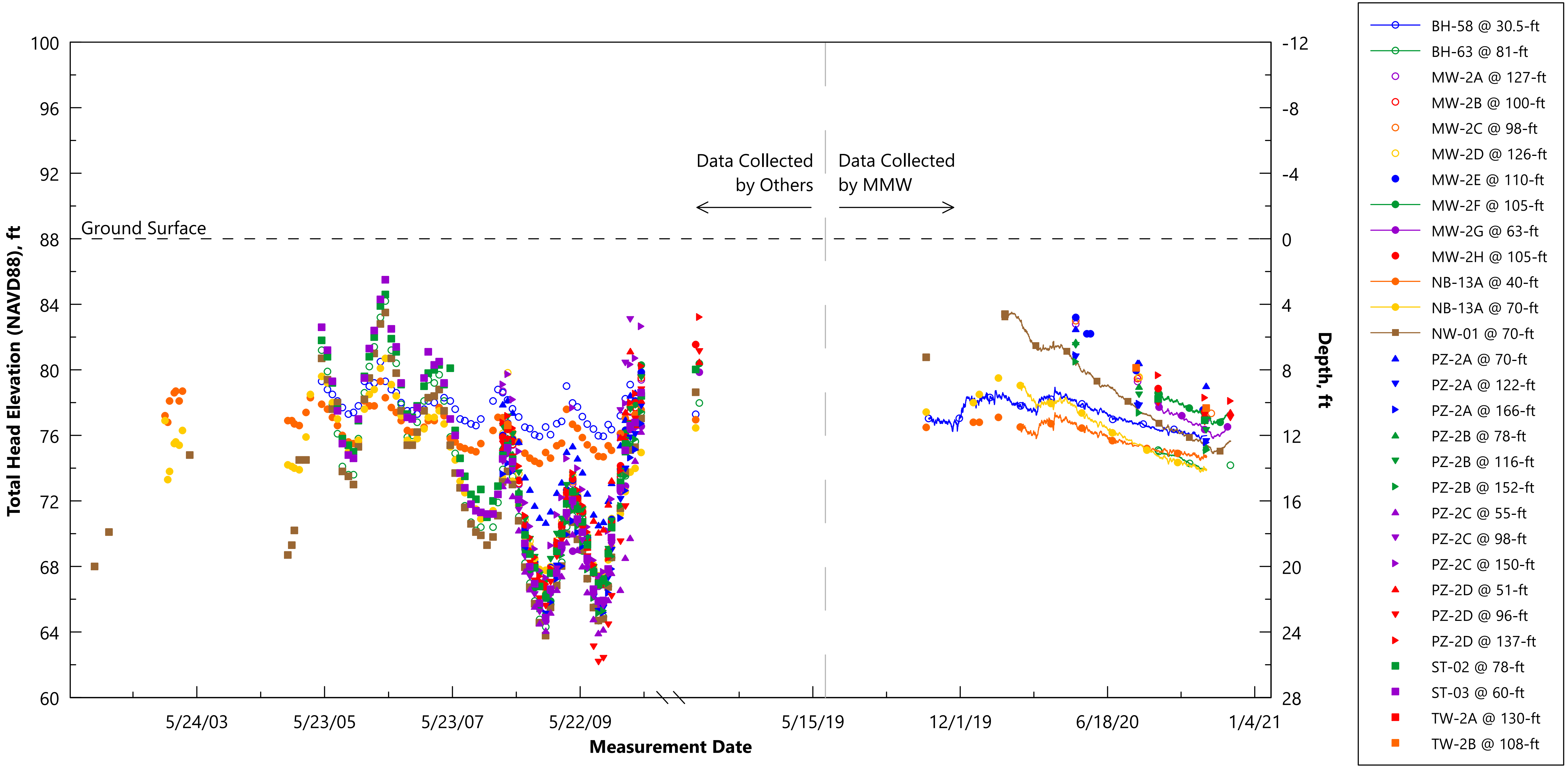
Figure 14.4



Notes

1. Ground surface elevation line represents the average elevation for 28th Street / Little Portugal Station.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.

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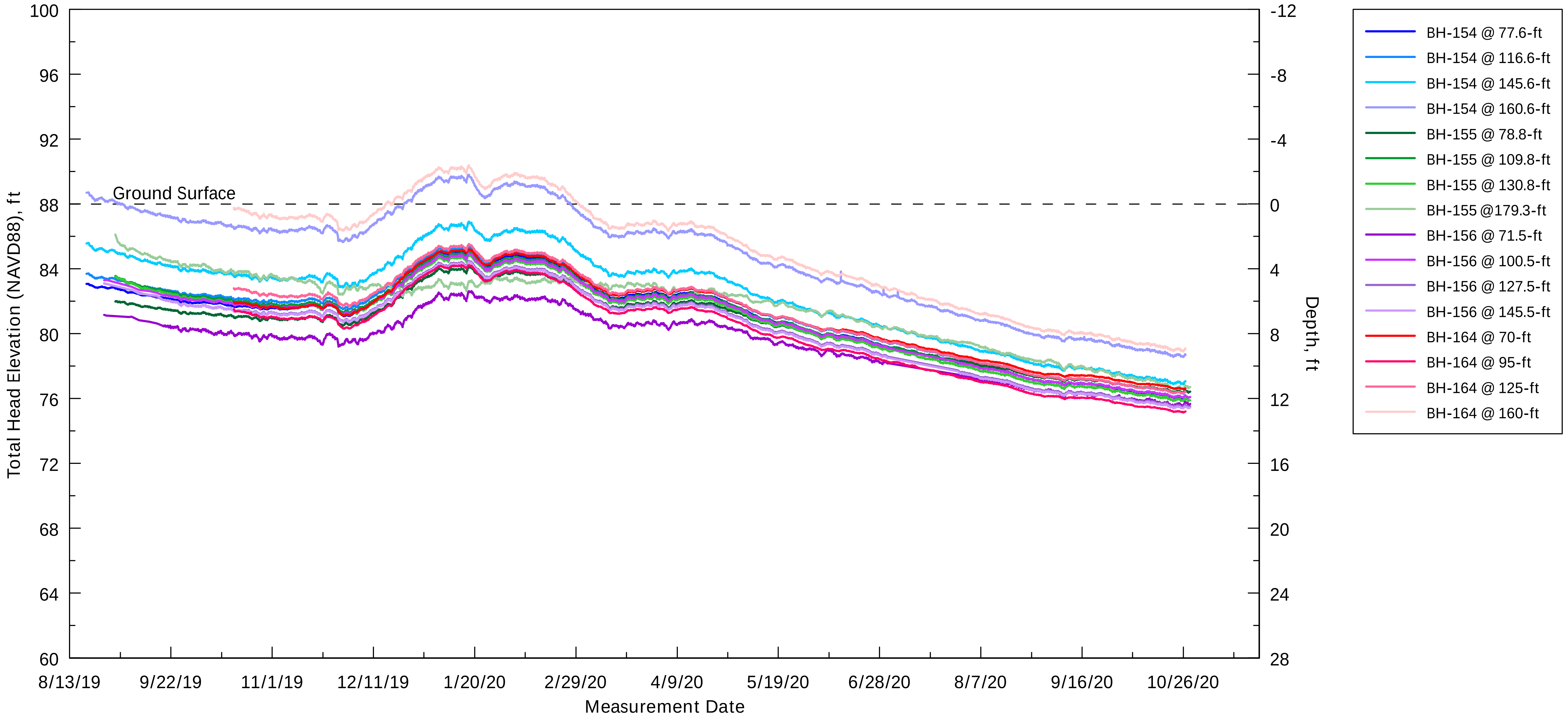
Figure 14.5



Notes

1. Ground surface elevation line represents average elevation at 28th Street / Little Portugal Station.
2. BH-154 and BH-164 present an artesian condition at lower depths (approximately below 150 feet).
3. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes -
28th Street / Little Portugal Station

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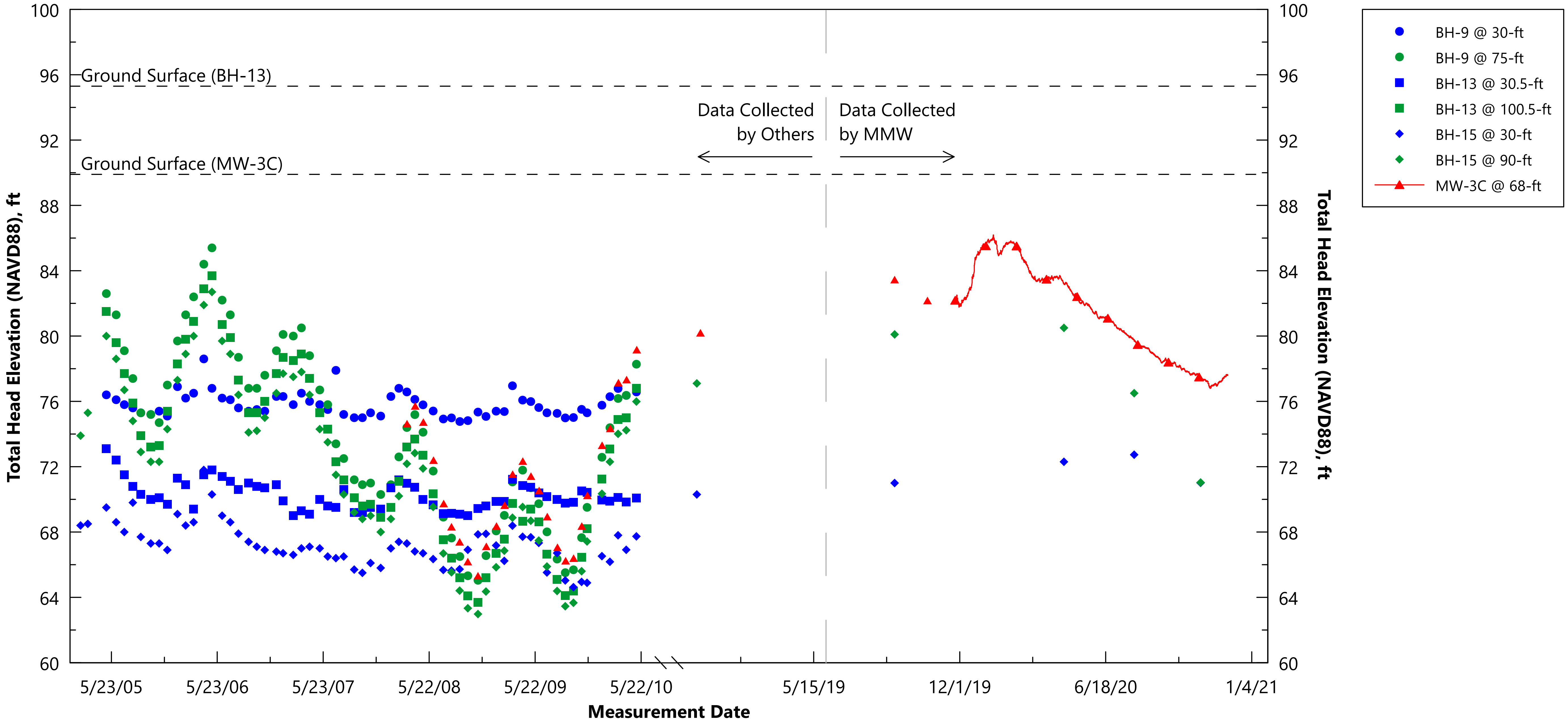
Figure 14.6



Notes

1. Ground surface elevation lines are presented for the lowest and highest monitoring well locations.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
5. No 2019-2020 boreholes were drilled from 28th Street / Little Portugal Station to East Emergency Stop. A figure is not included.

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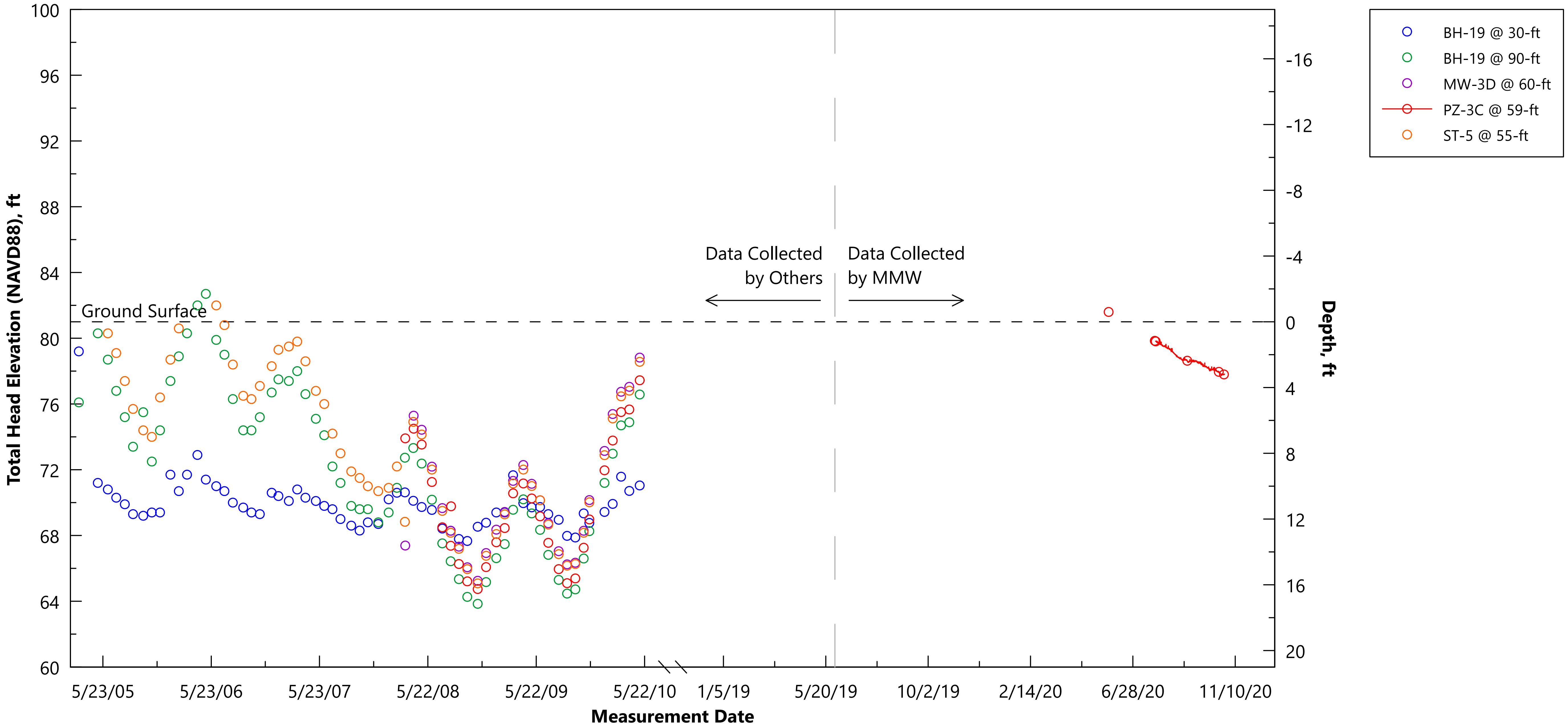
Figure 14.7

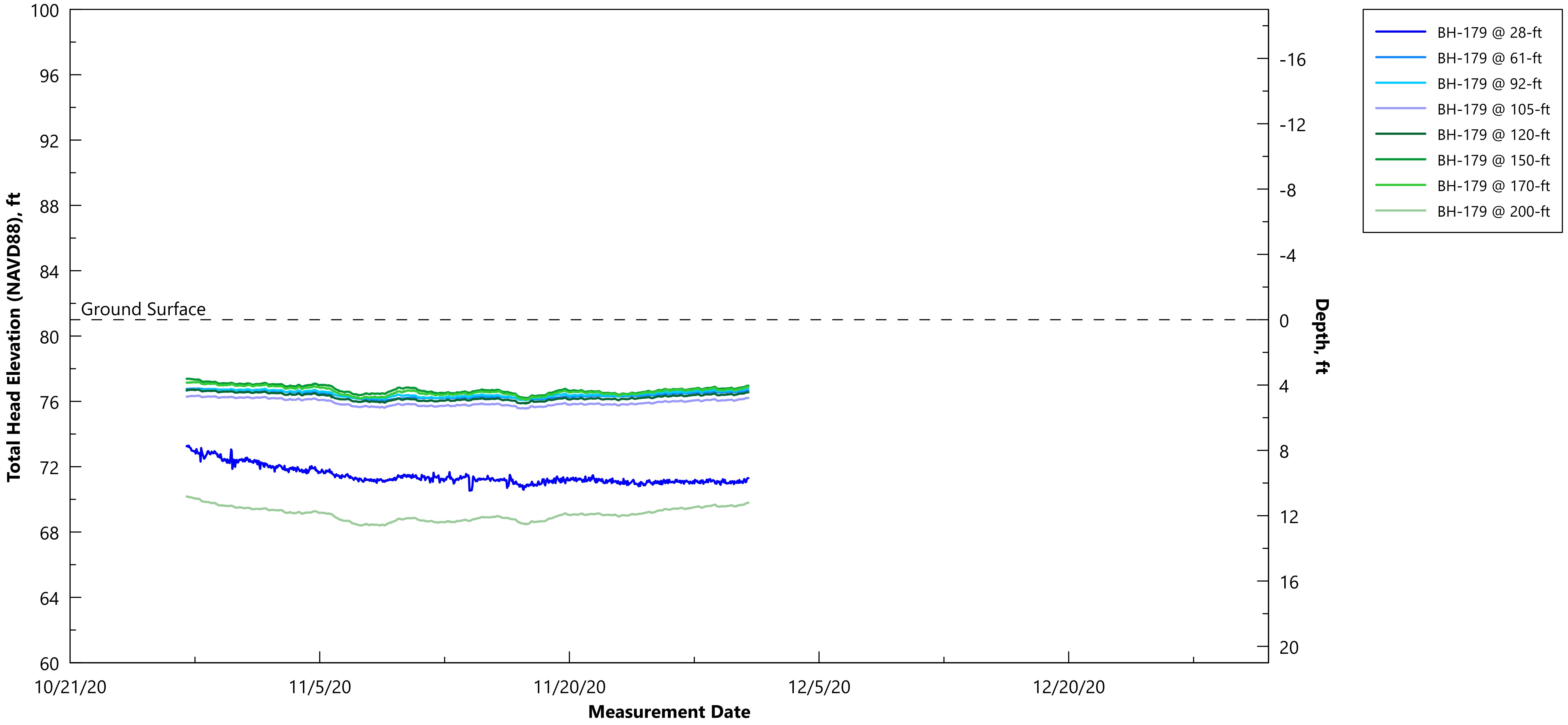


Notes

1. Ground surface elevation line represents the average elevation at the East Emergency Stop.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
5. The BH-19, ST-5, and PZ-3C plots present an artesian condition at shallow depths (above 90 feet).
6. MW-3D was abandoned shortly after initial construction in Oct 2007. The data presented above was collected from MW-3D(r), which was constructed as a replacement in Nov 2007. MW-3D(r) is currently inaccessible.

Groundwater Elevation Historical Boreholes - East Emergency Stop

Figure 14.8



Notes

1. Ground surface elevation line represents the average elevation at the East Emergency Stop.

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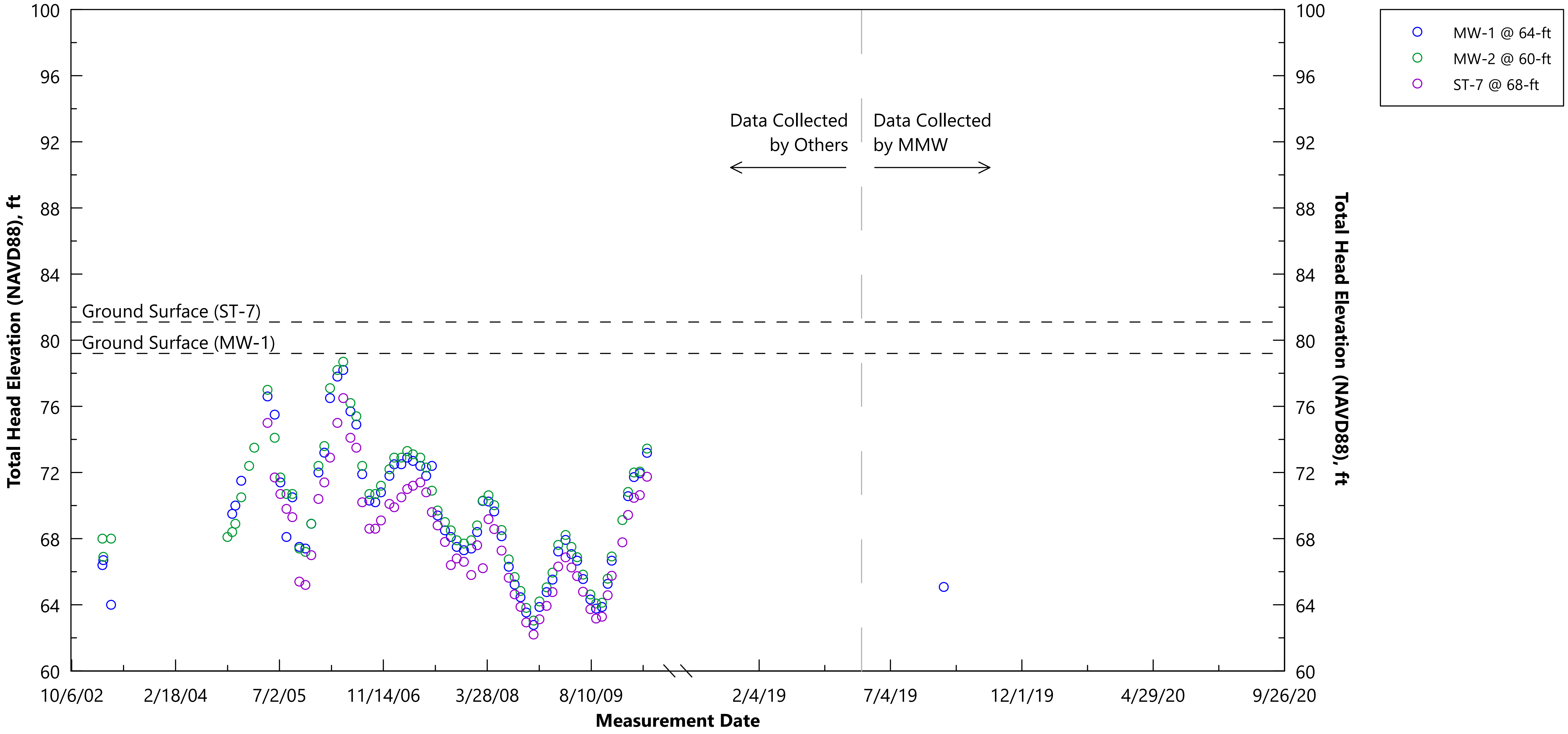
Figure 14.9



Notes

1. DTSJ Station: Downtown San Jose Station.
2. Ground surface elevation lines are presented for the lowest and highest monitoring well locations.
3. An axis break exists because no measurements were taken between 2011 and 2017.
4. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer.
5. MMW did not continue groundwater data collection at MW-1, MW-2, and ST-7 due to access restrictions and/or muck.

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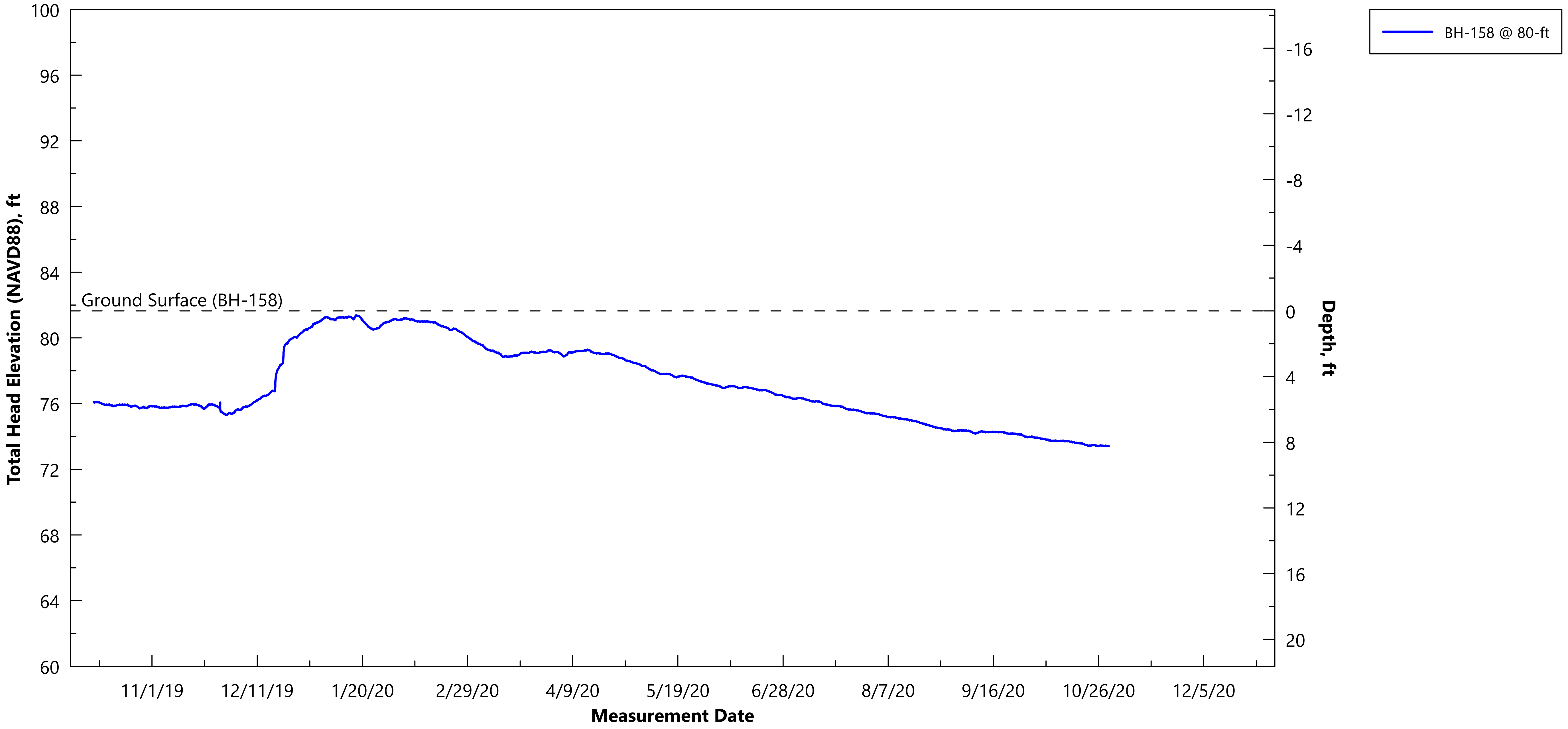
Figure 14.10



Notes

1. DTSJ Station: Downtown San Jose Station.
2. The depth for the plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes - East Emergency Stop to DTSJ Station

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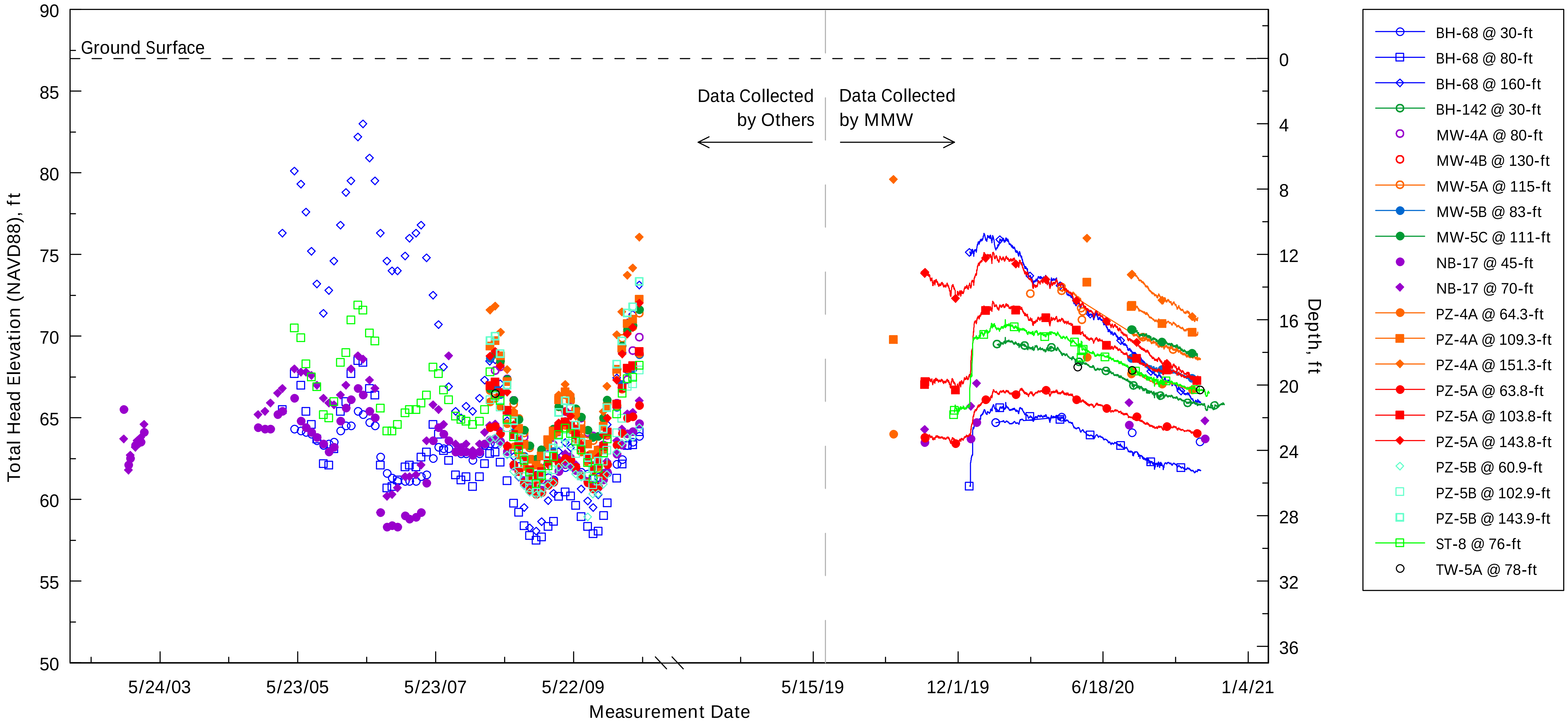
Figure 14.11



Notes

1. Ground surface elevation line represents the average elevation of Downtown San Jose Station.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
5. BH-142 is a standpipe piezometer constructed by WSP/HNTB in 2019.

Groundwater Elevation Historical Boreholes - DTSJ Station

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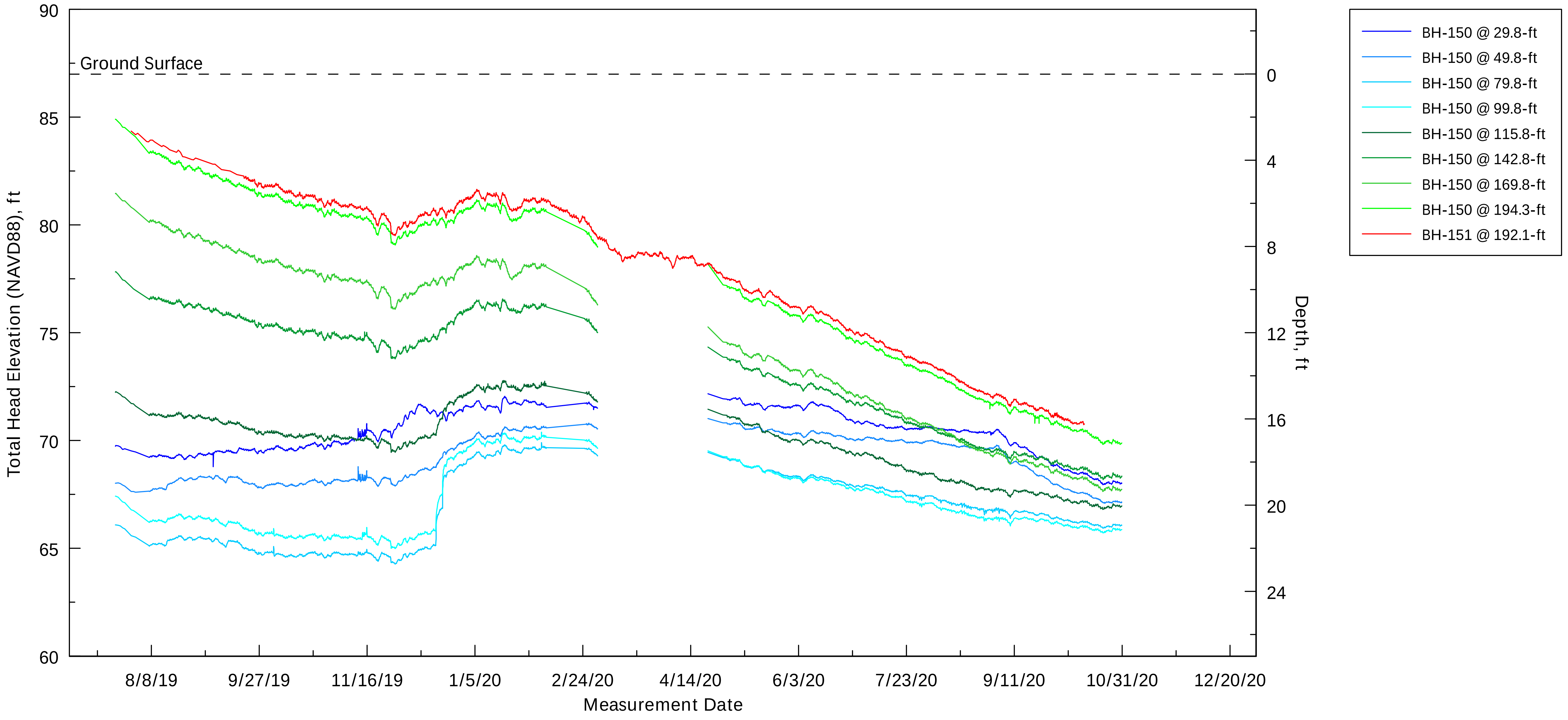
Figure 14.12



Notes

1. Ground surface elevation line represents the average elevation of Downtown San Jose Station.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
3. The datalogger at BH-150 was removed from March 1, 2020 to April 29, 2020 for repair.

Groundwater Elevation 2019-2020 Boreholes -
DTSJ Station

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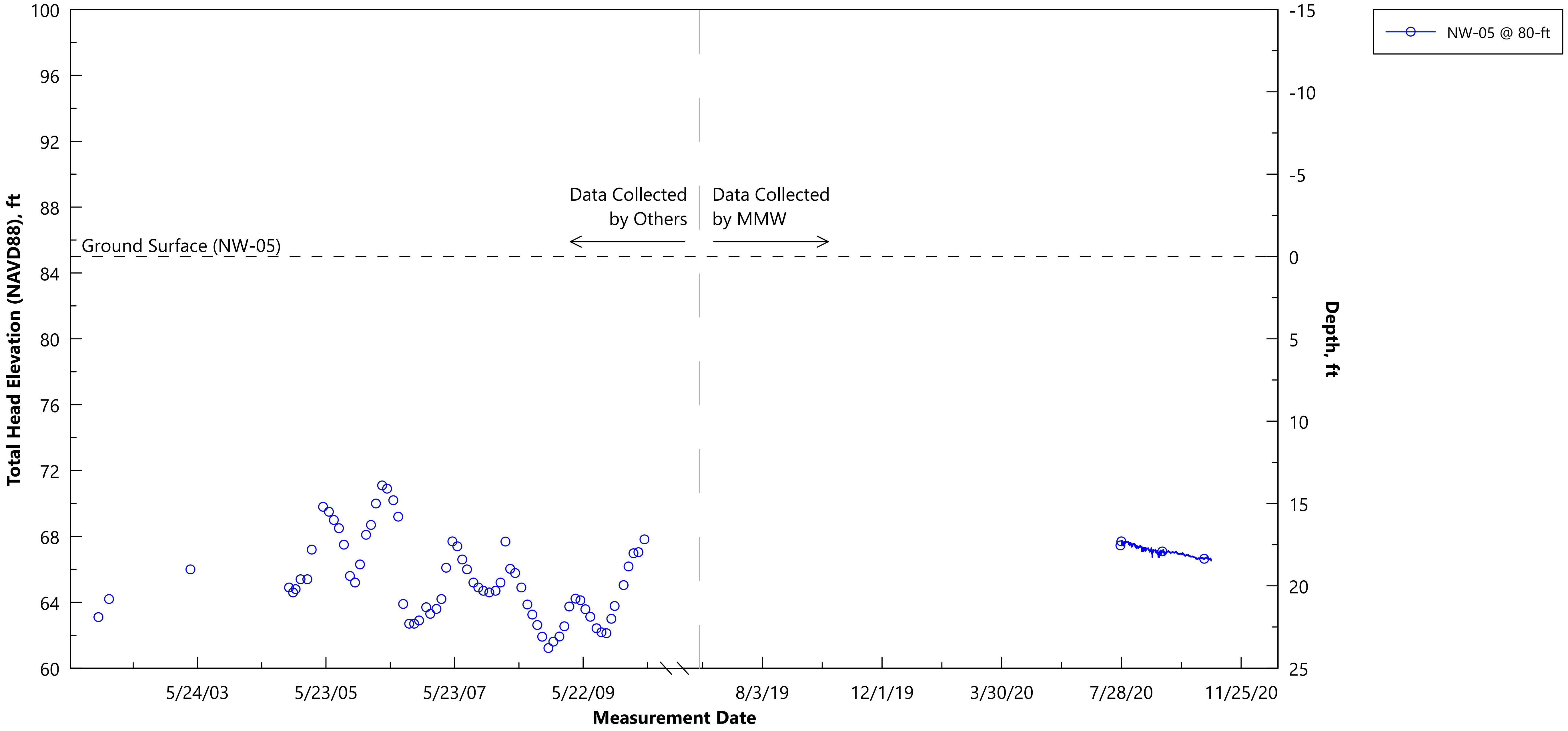
Figure 14.13



Notes

1. DTSJ Station: Downtown San Jose Station.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for the plot shown in the legend correlates to the top of screen depth of the standpipe piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.

Groundwater Elevation Historical Boreholes - DTSJ Station to Diridon Station

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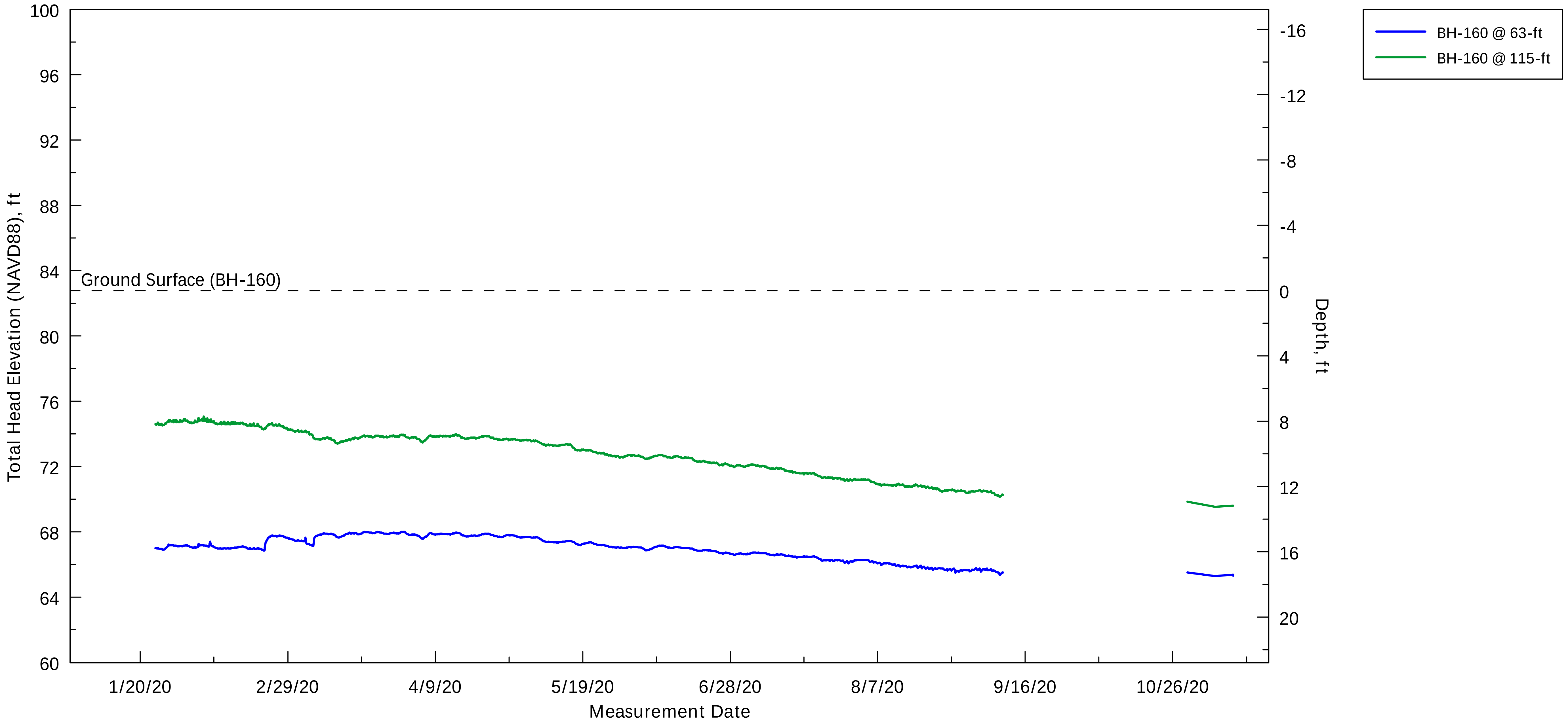
Figure 14.14



Notes

1. DTSJ Station: Downtown San Jose Station.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
3. The datalogger at BH-160 malfunctioned and stopped reading from September 9, 2020 to October 29, 2020.

Groundwater Elevation 2019-2020 Boreholes - DTSJ Station to Diridon Station

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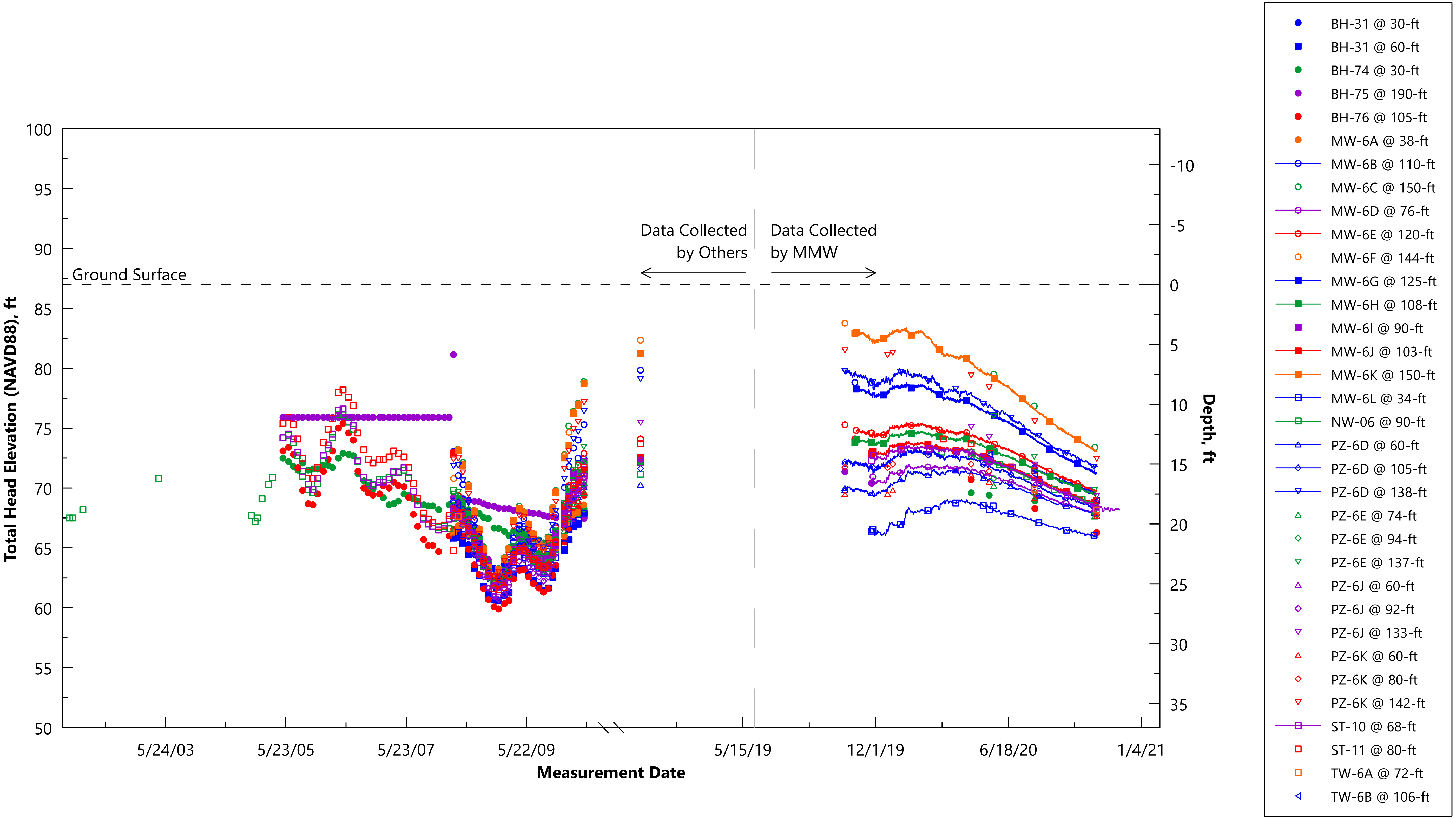
Figure 14.15



Notes

1. Ground surface elevation line represents the average elevation at Diridon Station.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
5. Groundwater level readings at BH-75 appear unreliable. Standpipe piezometer may be damaged or mucked.

Groundwater Elevation Historical Boreholes - Diridon Station

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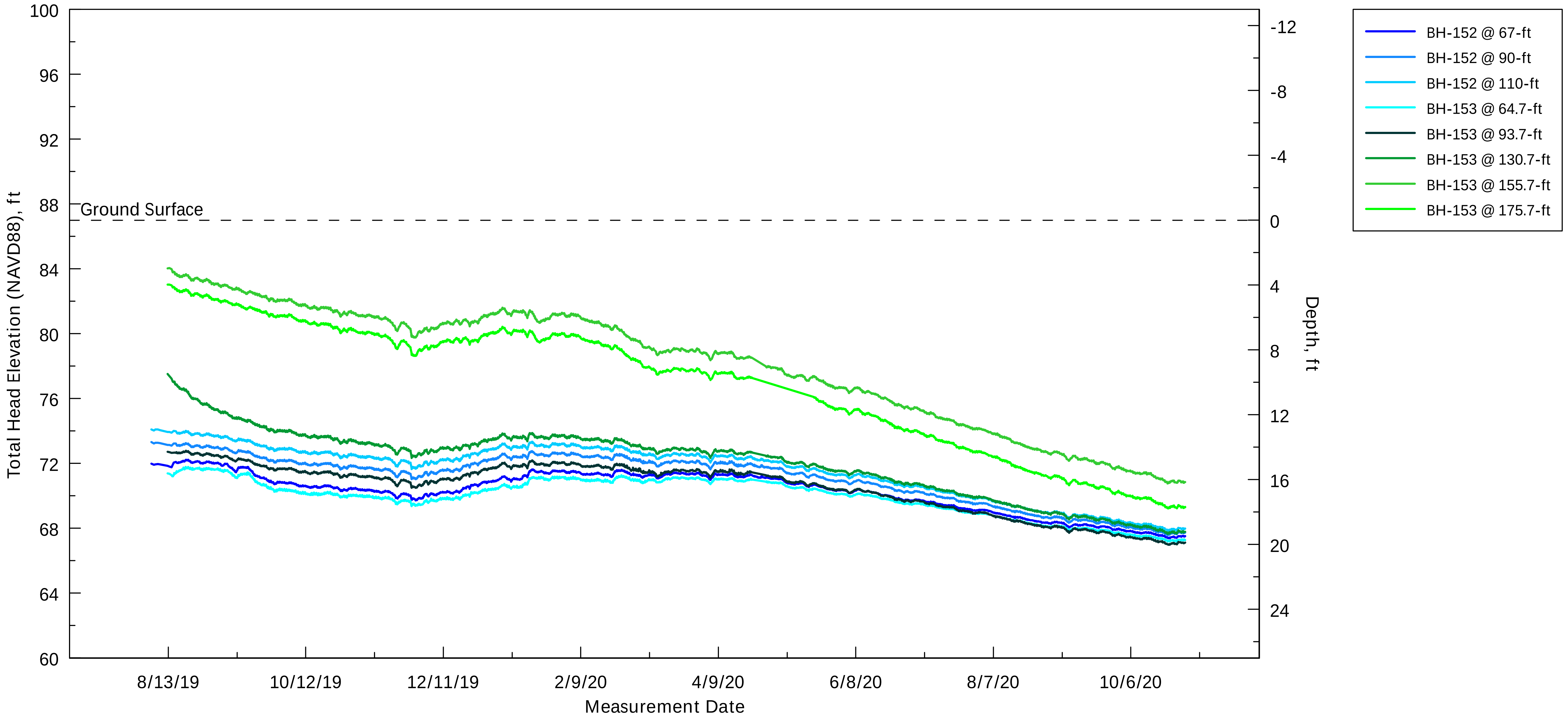
Figure 14.16



Notes

1. Ground surface elevation line represents the average elevation at Diridon Station.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes - Diridon Station

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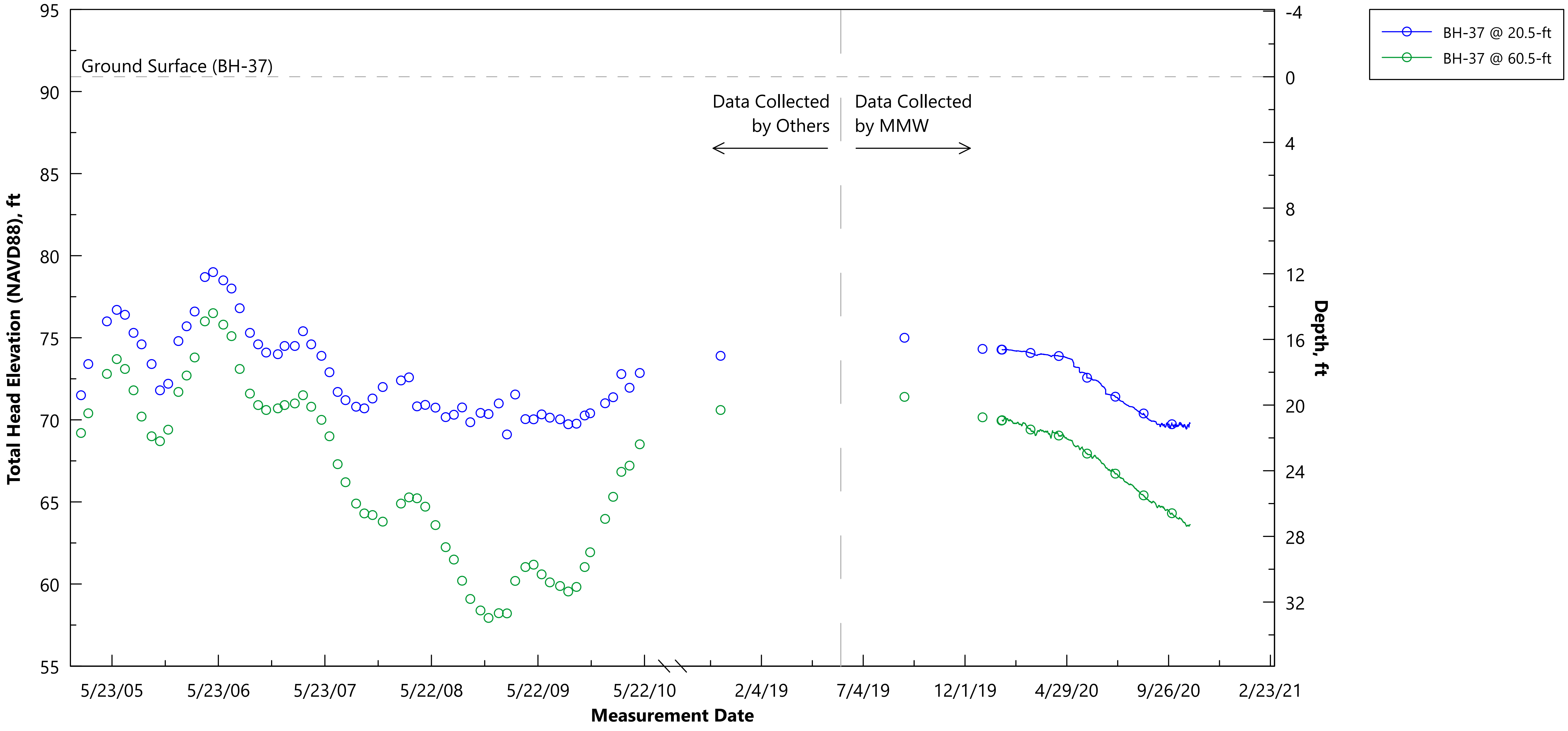
Figure 14.17



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
3. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.

Groundwater Elevation Historical Boreholes - Diridon Station to West Emergency Stop

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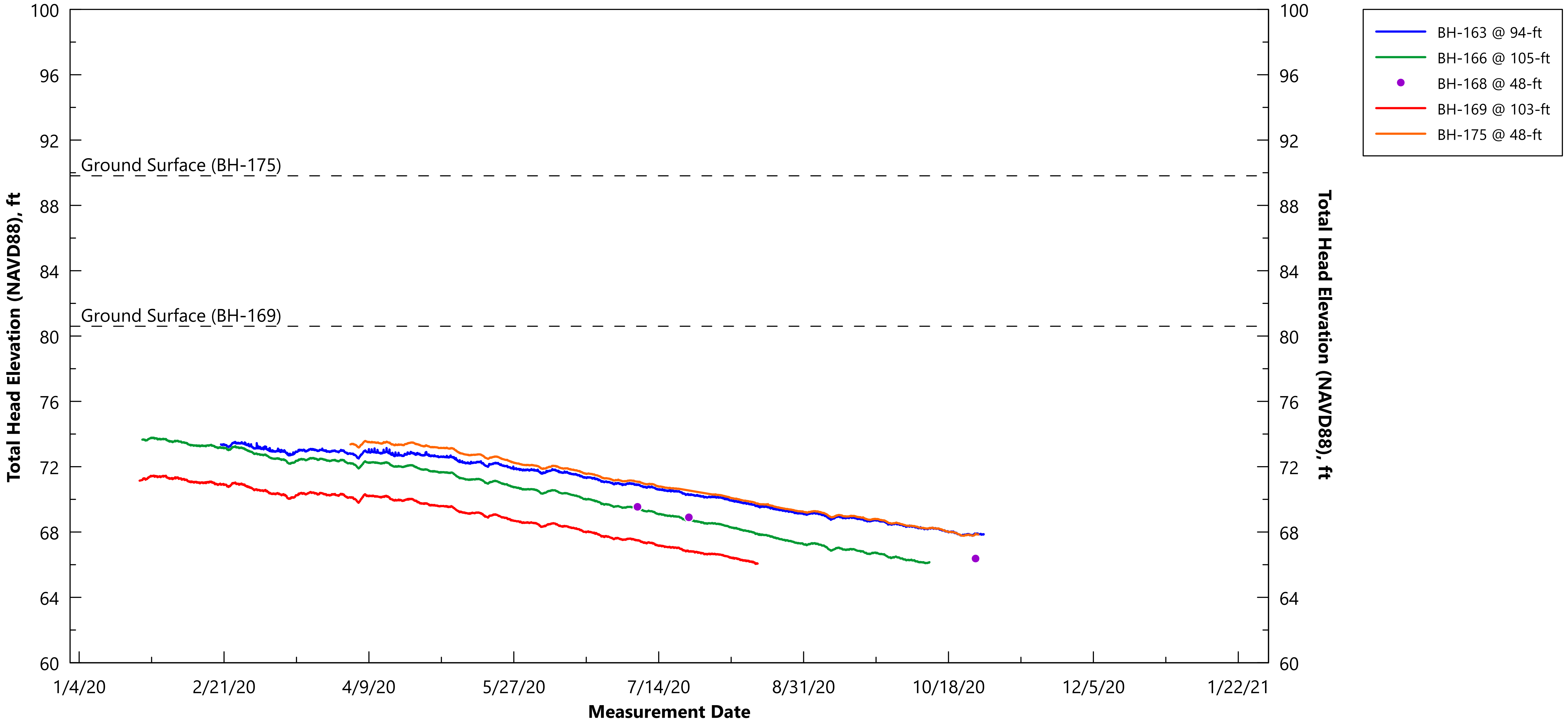
Figure 14.18



Notes

1. Ground surface elevation lines are presented for the lowest and highest monitoring well locations.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes -
Diridon Station to West Emergency Stop

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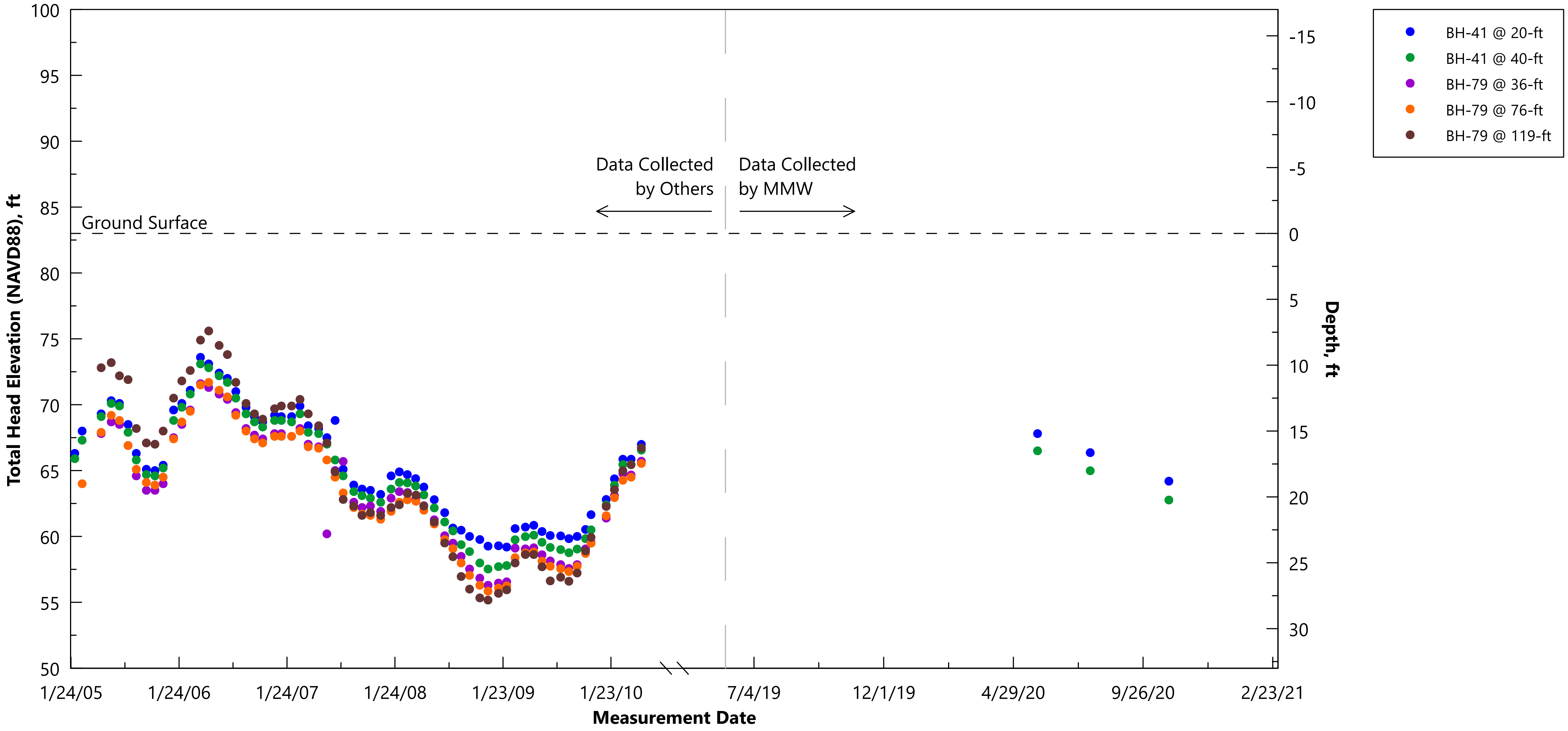
Figure 14.19



Notes

1. Ground surface elevation line represents the average elevation at West Emergency Stop.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the installation depth for a vibrating wire piezometer.
4. BH-79 has been paved over and is no longer accessible.

Groundwater Elevation Historical Boreholes - West Emergency Stop

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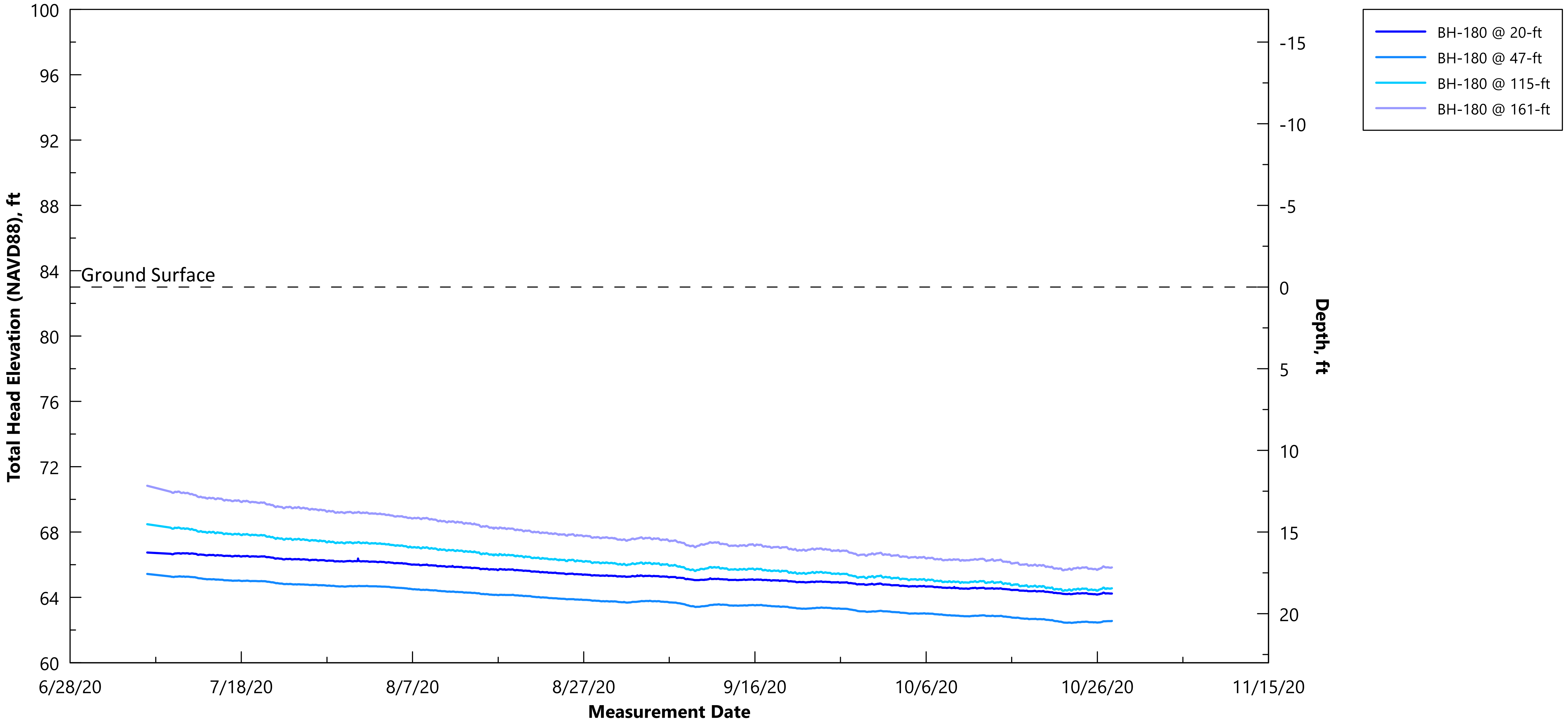
Figure 14.20



Notes

1. Ground surface elevation line represents the average elevation at the West Emergency Stop.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes - West Emergency Stop

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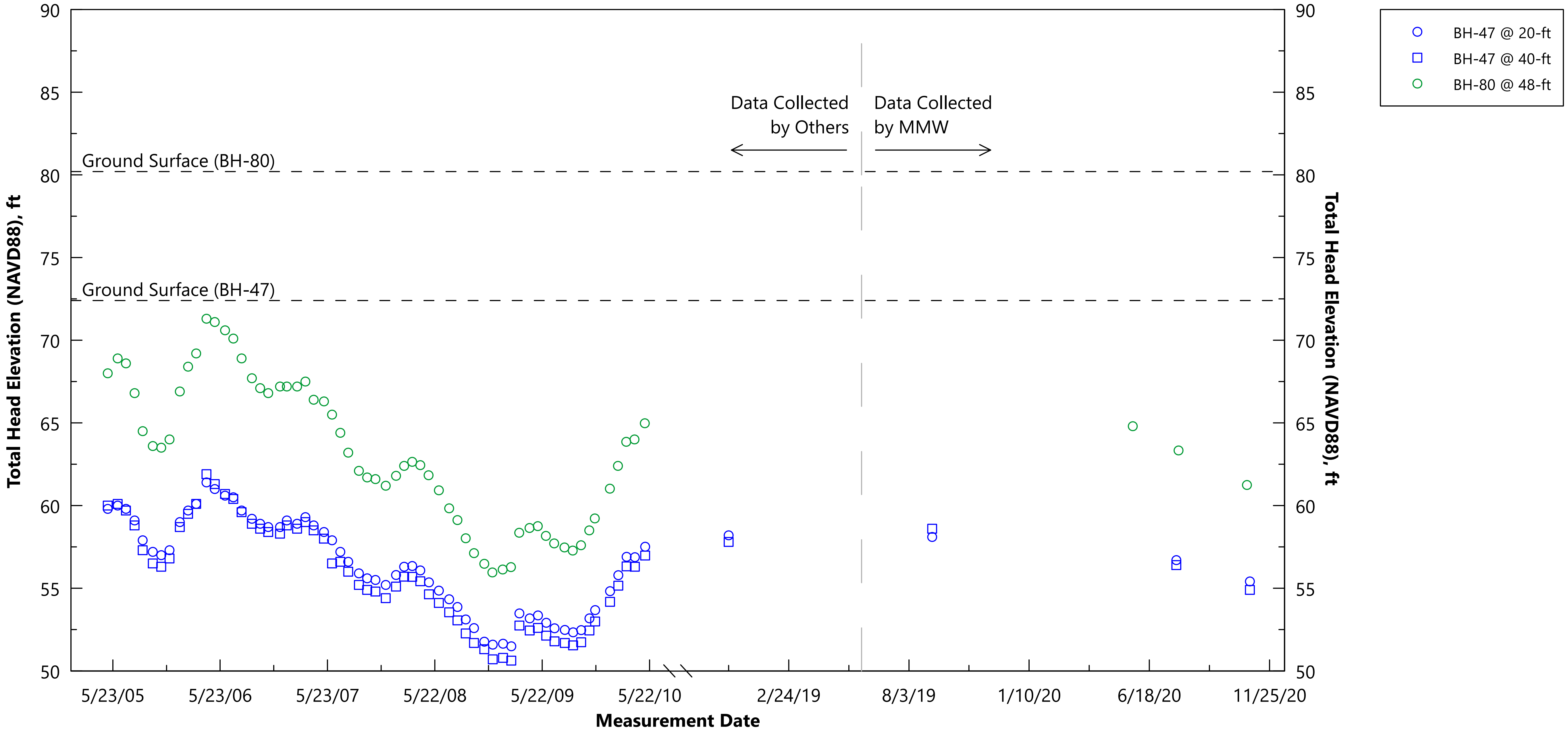
Figure 14.21



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation Historical Boreholes - West Emergency Stop to West Portal

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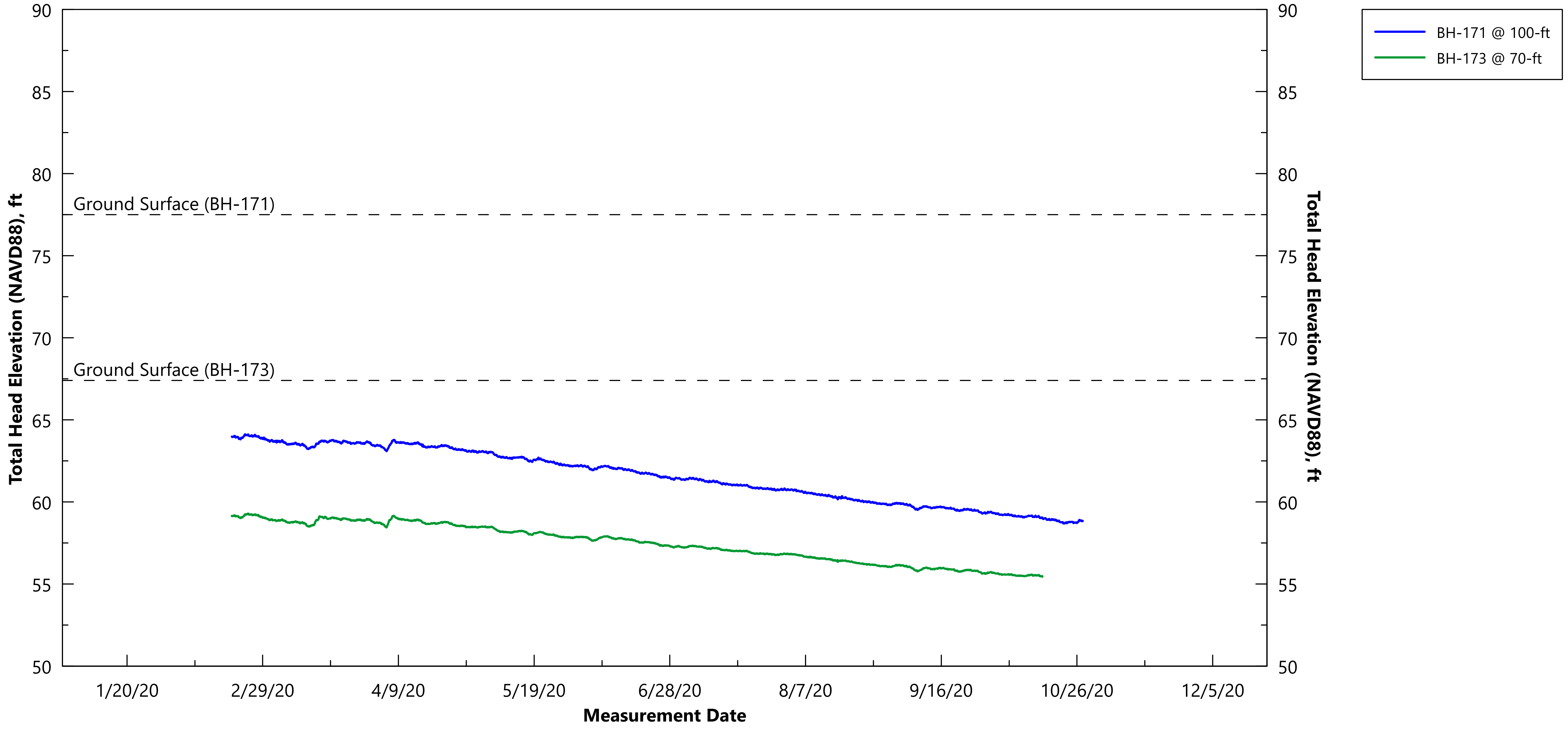
Figure 14.22



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Elevation 2019-2020 Boreholes - West Emergency Stop to West Portal

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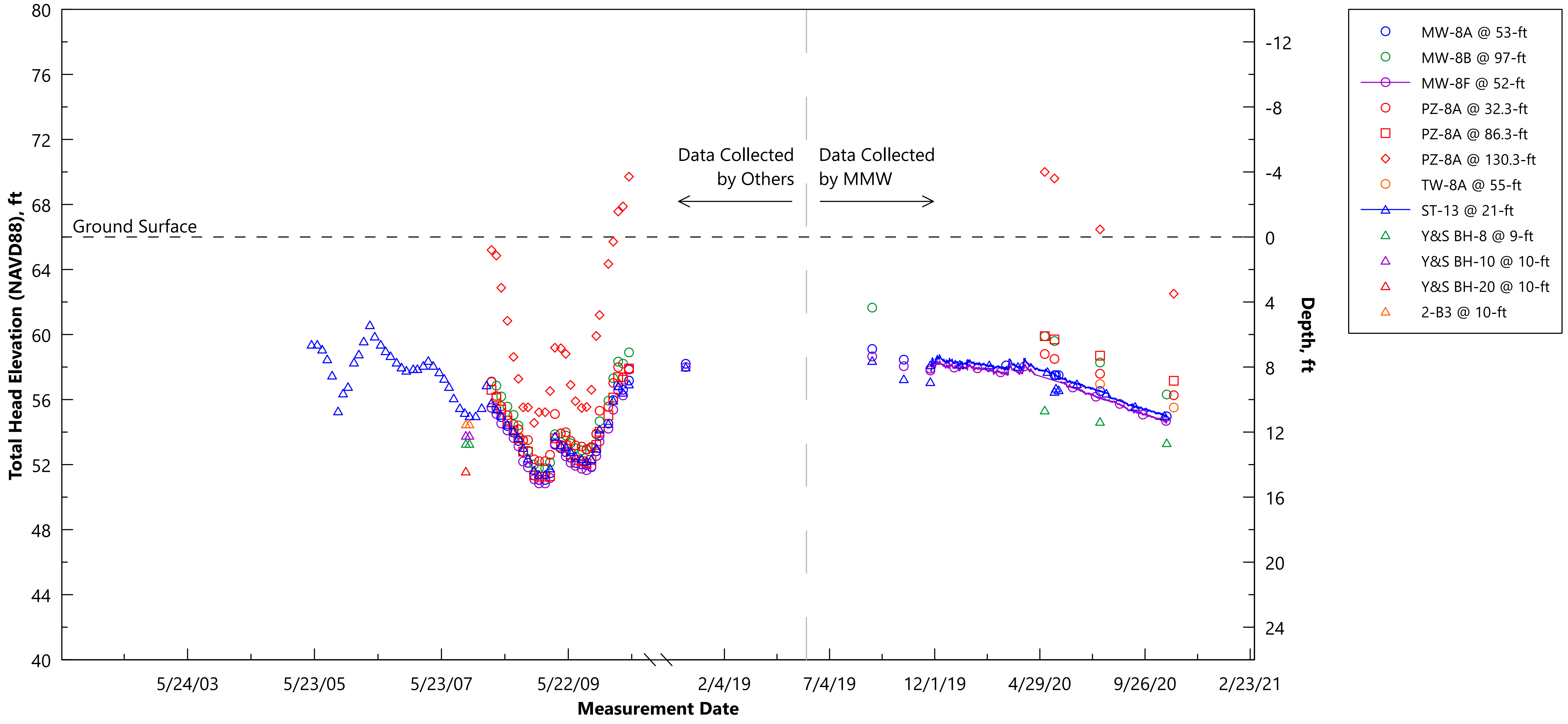
Figure 14.23



Notes

1. Ground surface elevation line represents the average elevation at West Portal, Newhall Yard and Maintenance Facility, and Santa Clara Station.
2. An axis break exists because no measurements were taken between 2011 and 2017.
3. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
4. Plots containing a symbol represent manual groundwater readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
5. PZ-8A presents an artesian condition at lower depths (approximately below 130 feet).

Groundwater Elevation Historical Boreholes - West Portal, NYMF, and Santa Clara Station

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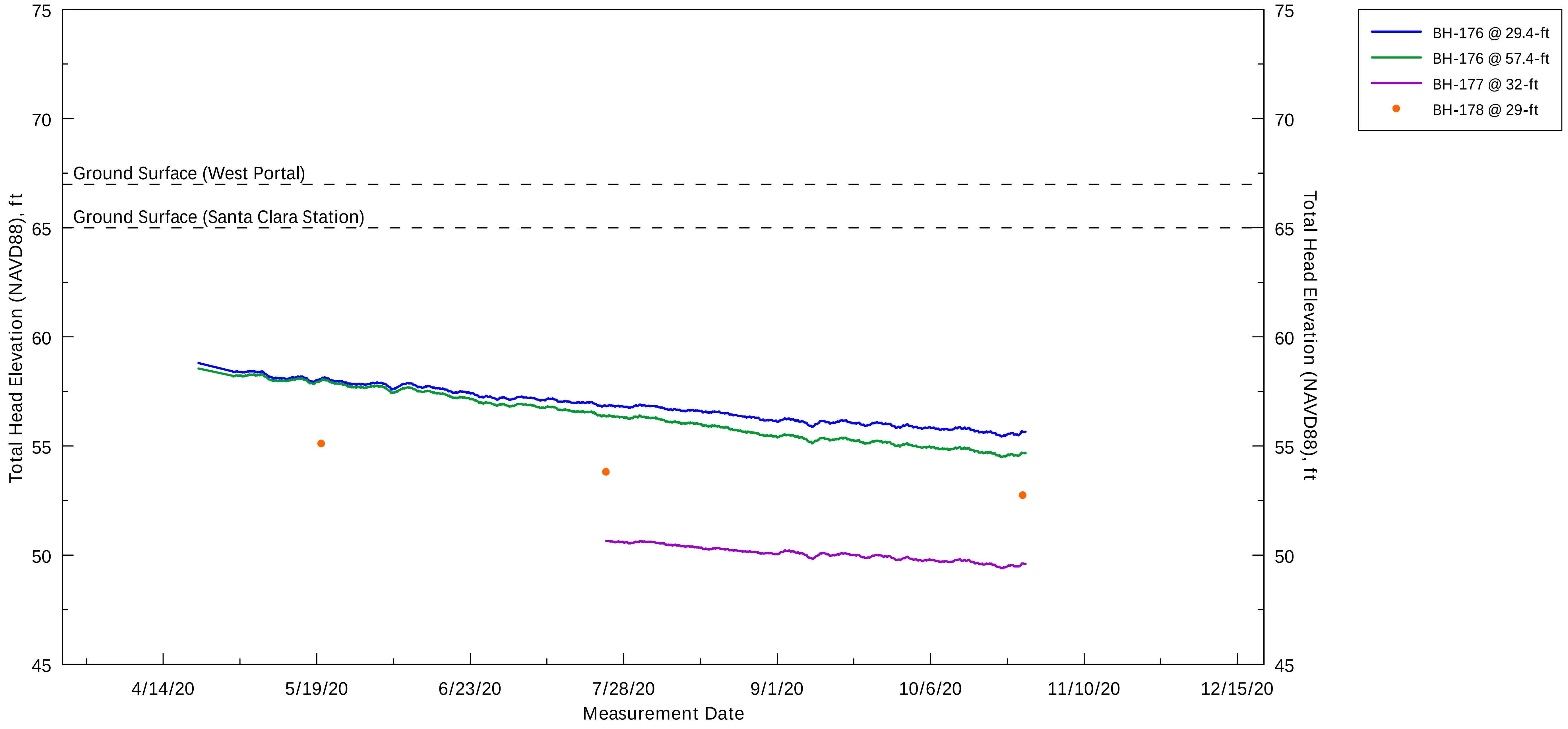
Figure 14.24



Notes

1. Ground surface elevation lines represent the average elevation at West Portal and Santa Clara Station.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
3. BH-176, BH-178, and BH-177 are located at West Portal, Newhall Yard and Maintenance Facility, and Santa Clara Station, respectively.

Groundwater Elevation 2019-2020 Boreholes -
West Portal, NYMF, and Santa Clara Station

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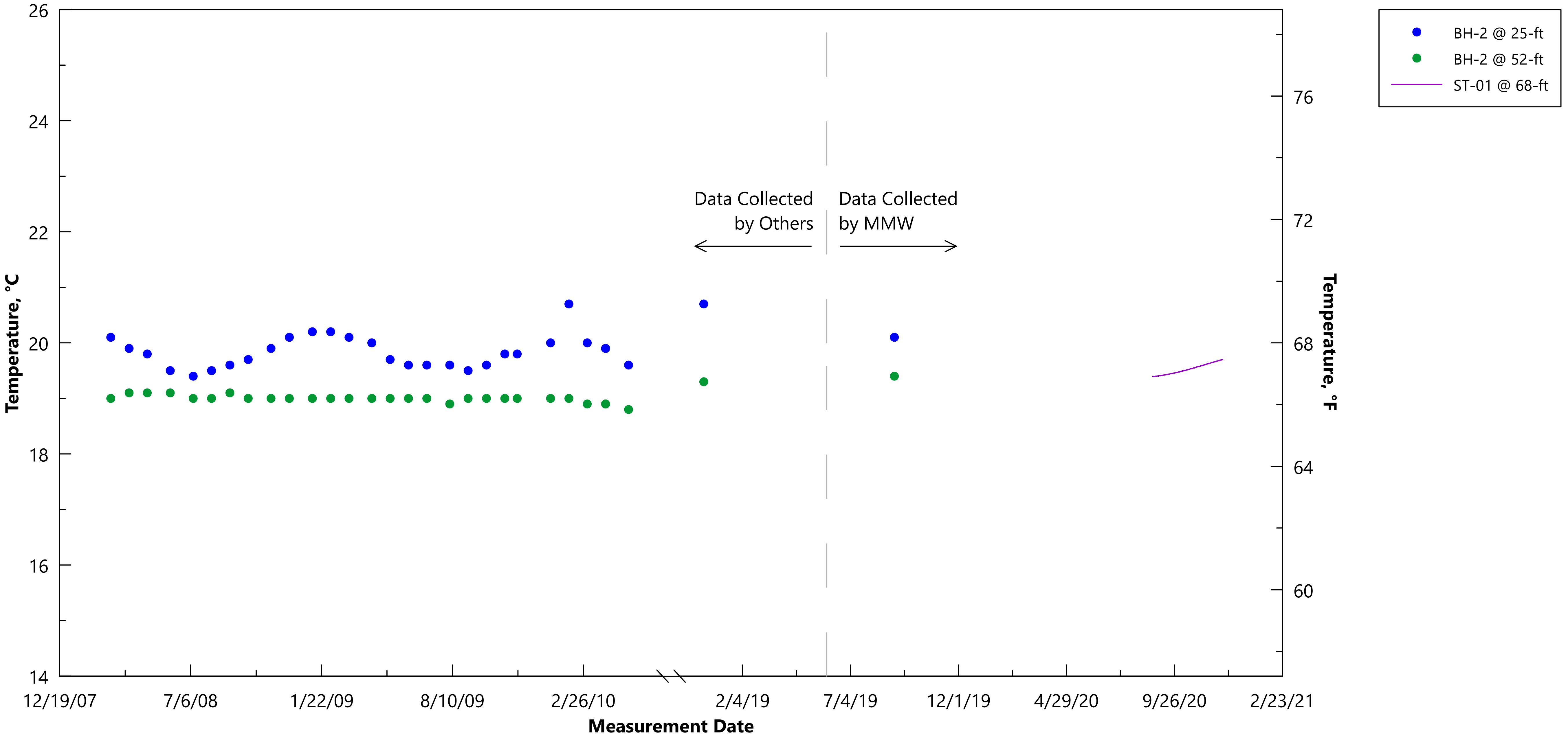
Figure 14.25



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.

Groundwater Temperature Historical Boreholes - East Portal

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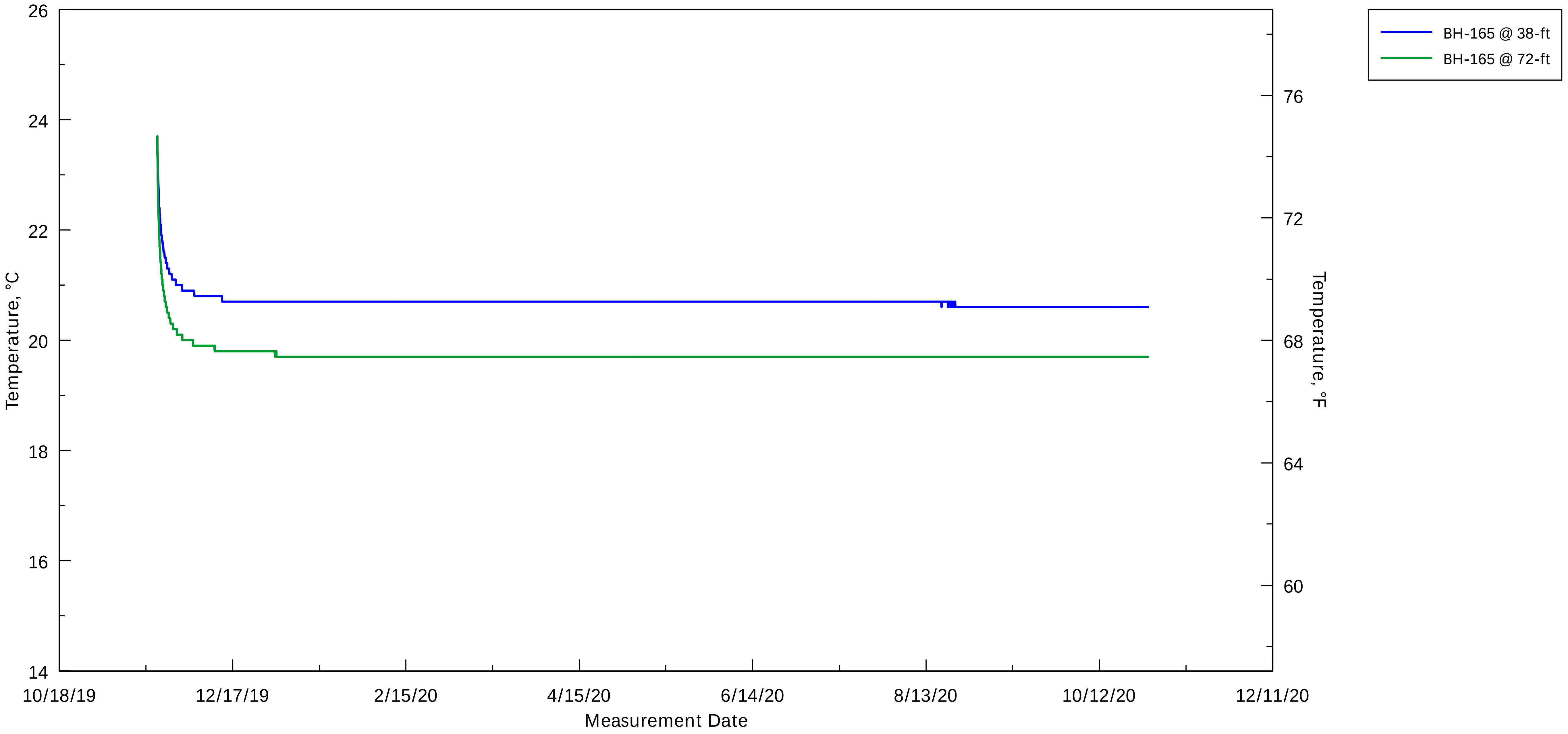
Figure 15.1



Notes
1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes - East Portal

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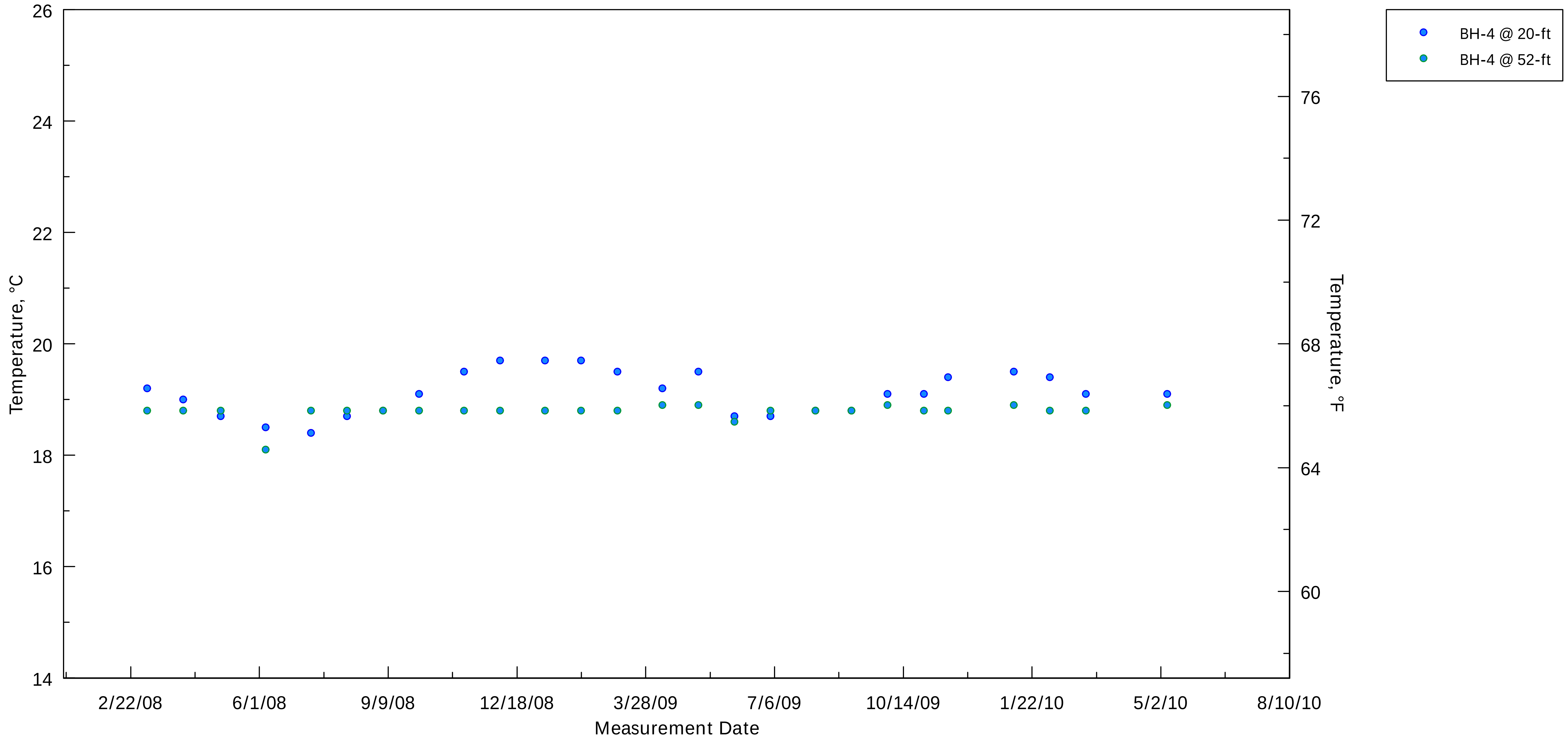
Figure 15.2



Notes

1. BH-4 is not accessible. Temperature data presented was collected by others.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Temperature Historical Boreholes -
East Portal to 28th Street / Little Portugal Station

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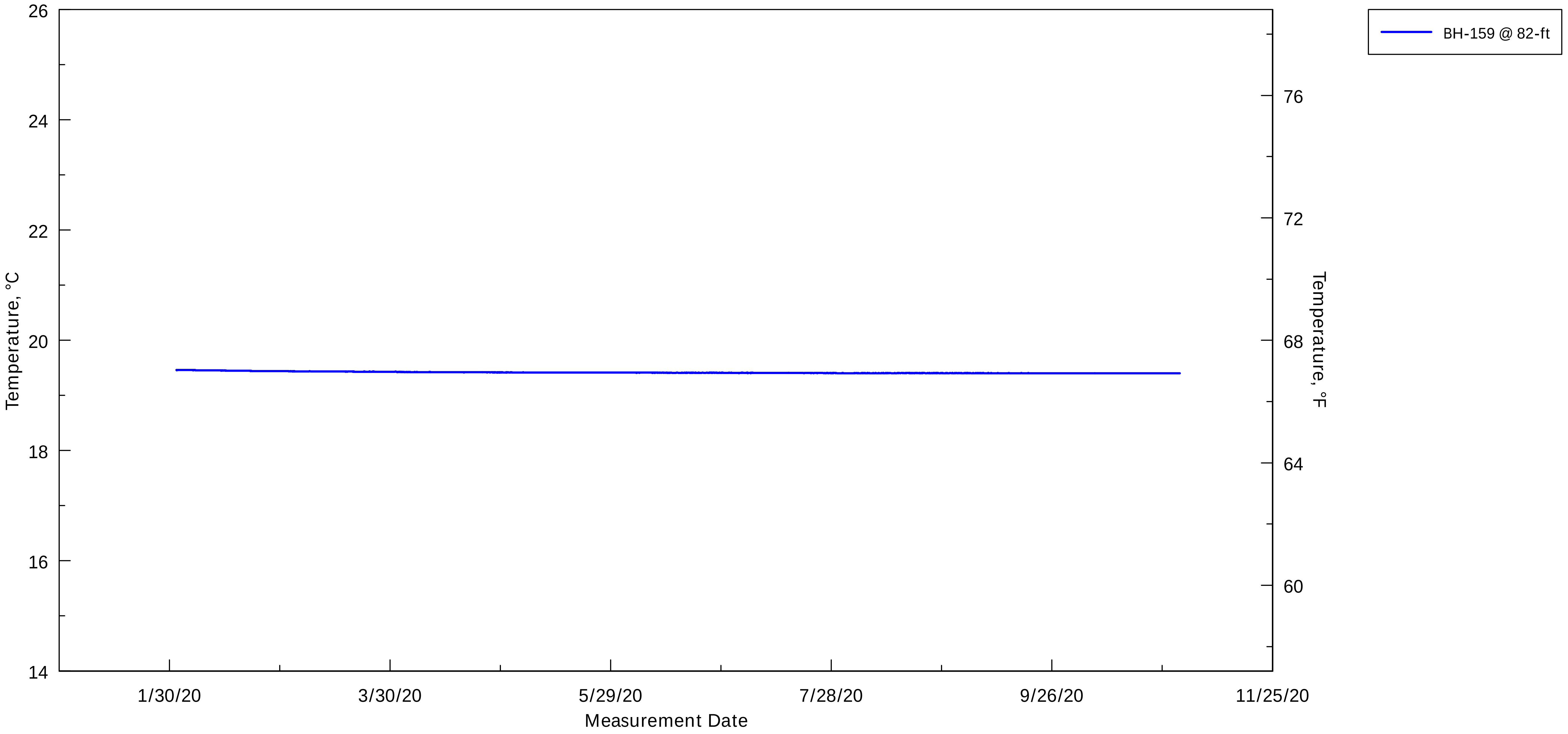
Figure 15.3



Notes
1. The depth for the plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes -
East Portal to 28th Street / Little Portugal Station

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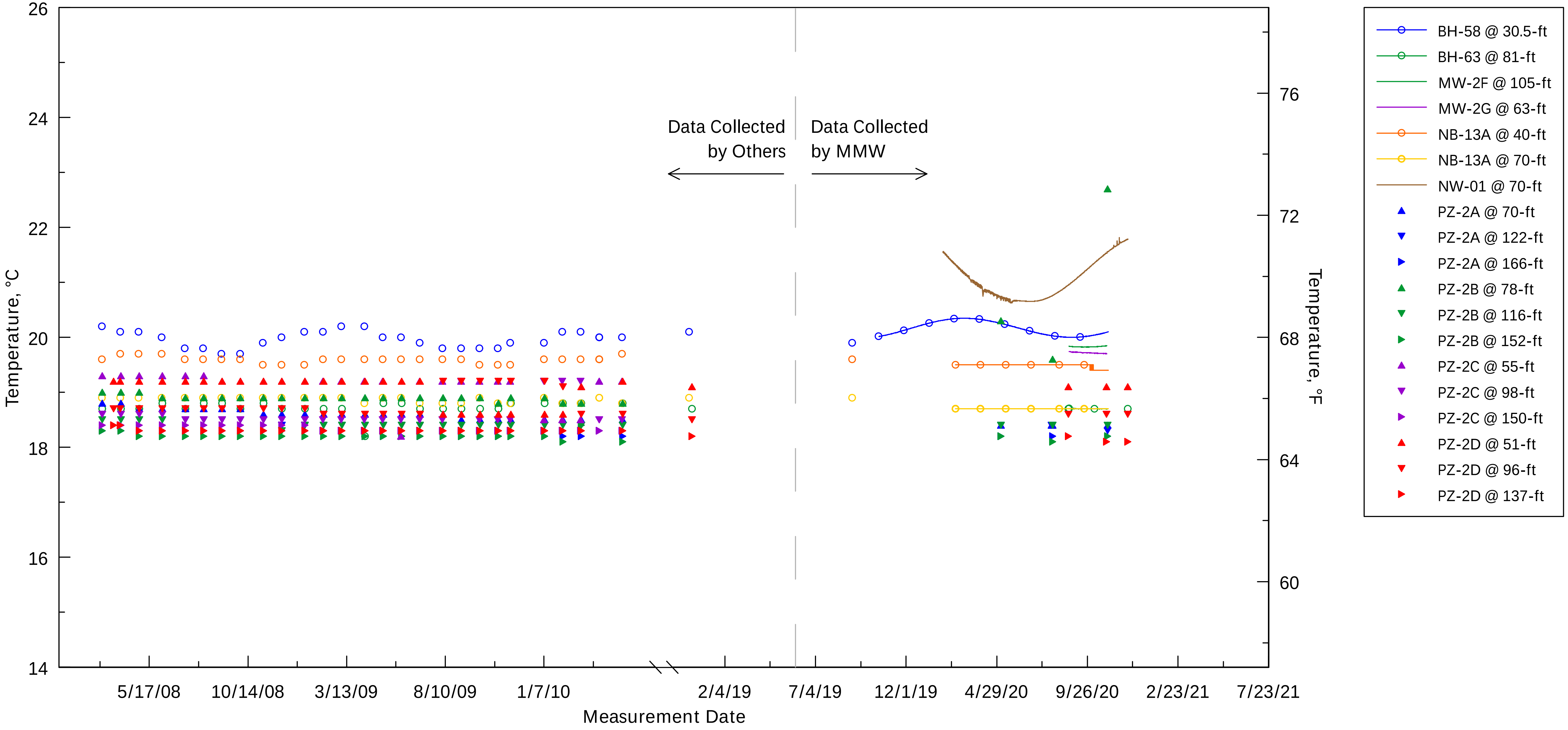
Figure 15.4



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
3. Plots containing a symbol represent manual temperature readings.
   Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
4. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature. Water level dataloggers collect temperature data to three (3) decimal points, resulting in smoother plots.

Groundwater Temperature Historical Boreholes -
28th Street / Little Portugal Station

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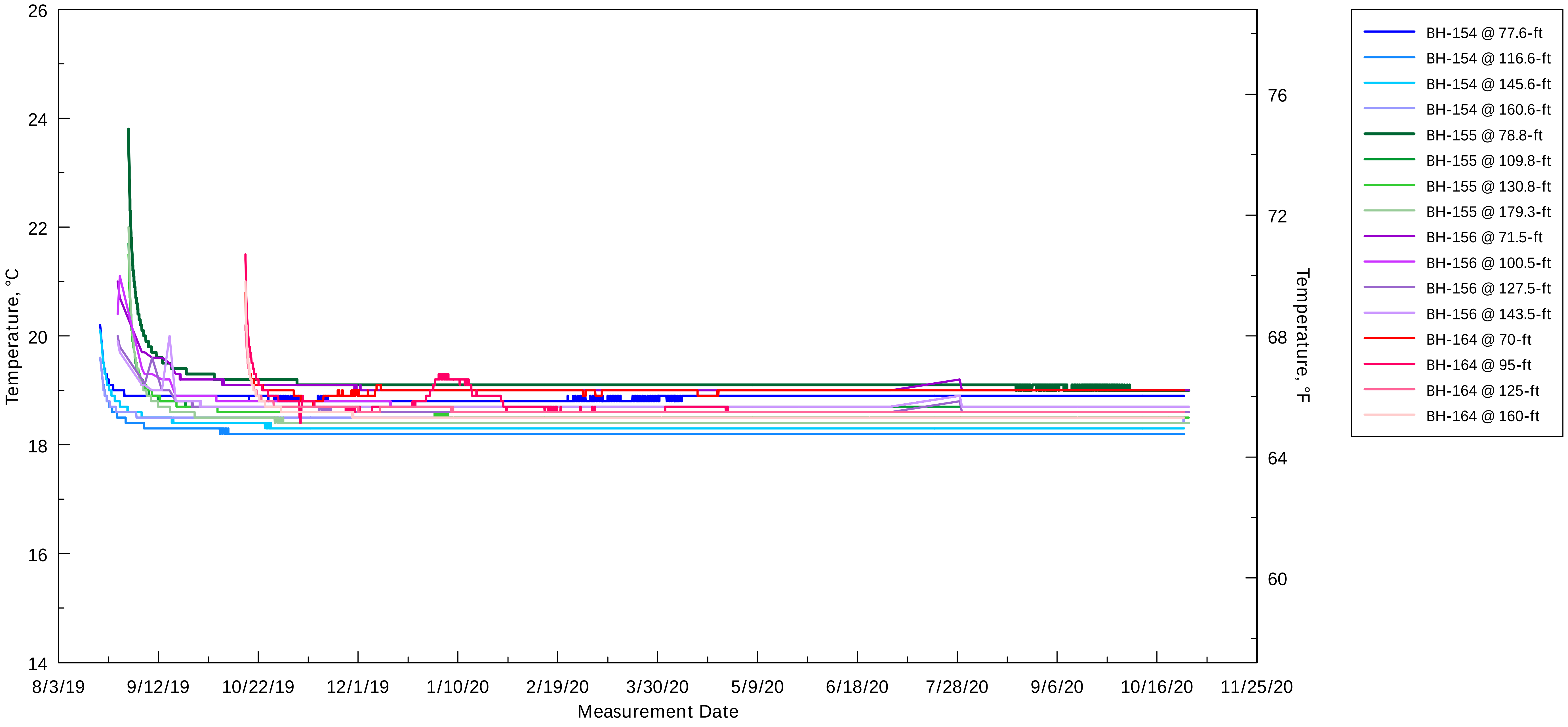
Figure 15.5



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes -
28th Street / Little Portugal Station

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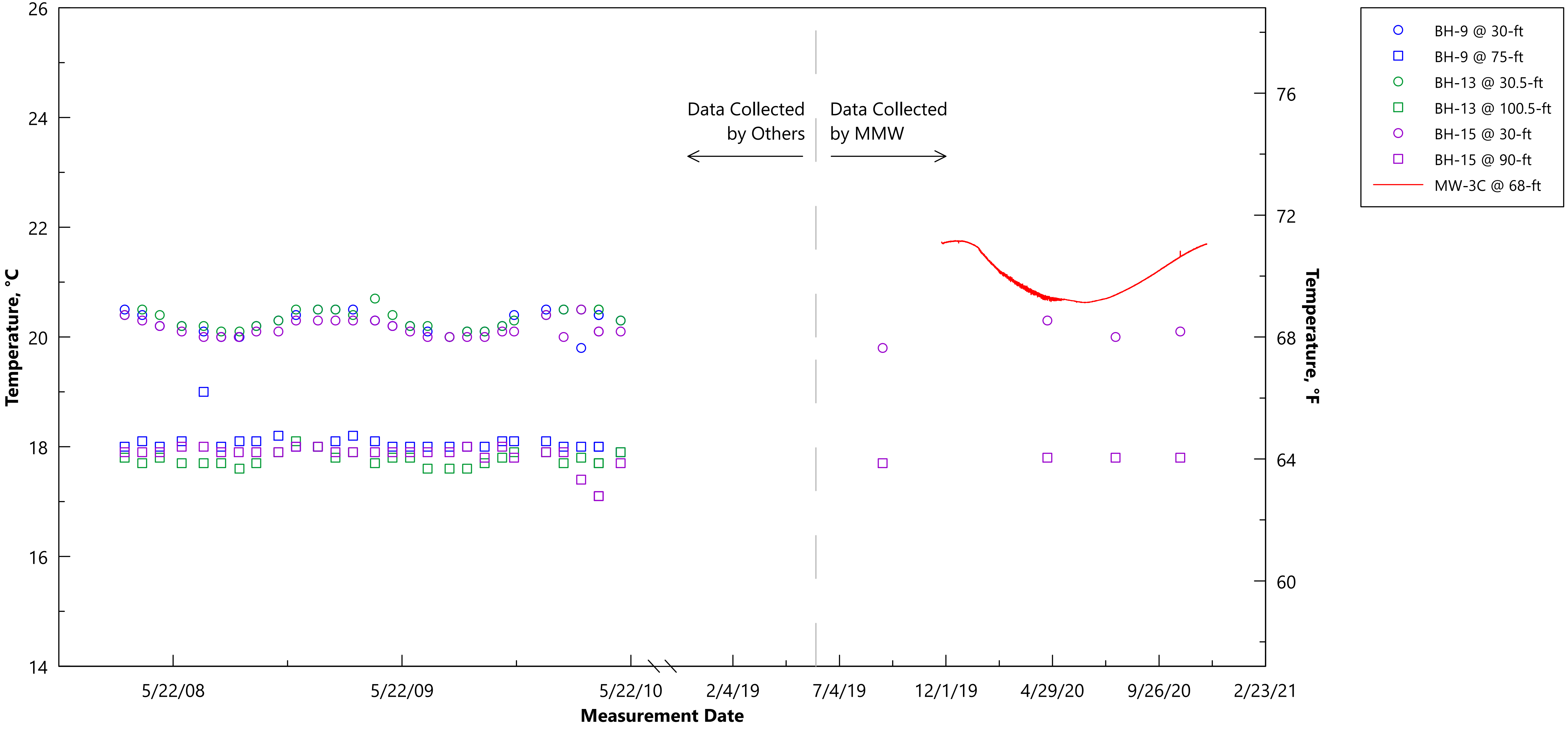
Figure 15.6



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
3. No 2019-2020 boreholes were drilled from 28th Street / Little Portugal Station to East Emergency Stop. A figure is not included.

Groundwater Temperature Historical Boreholes - 28th St. / Little Portugal Station to East Emergency Stop

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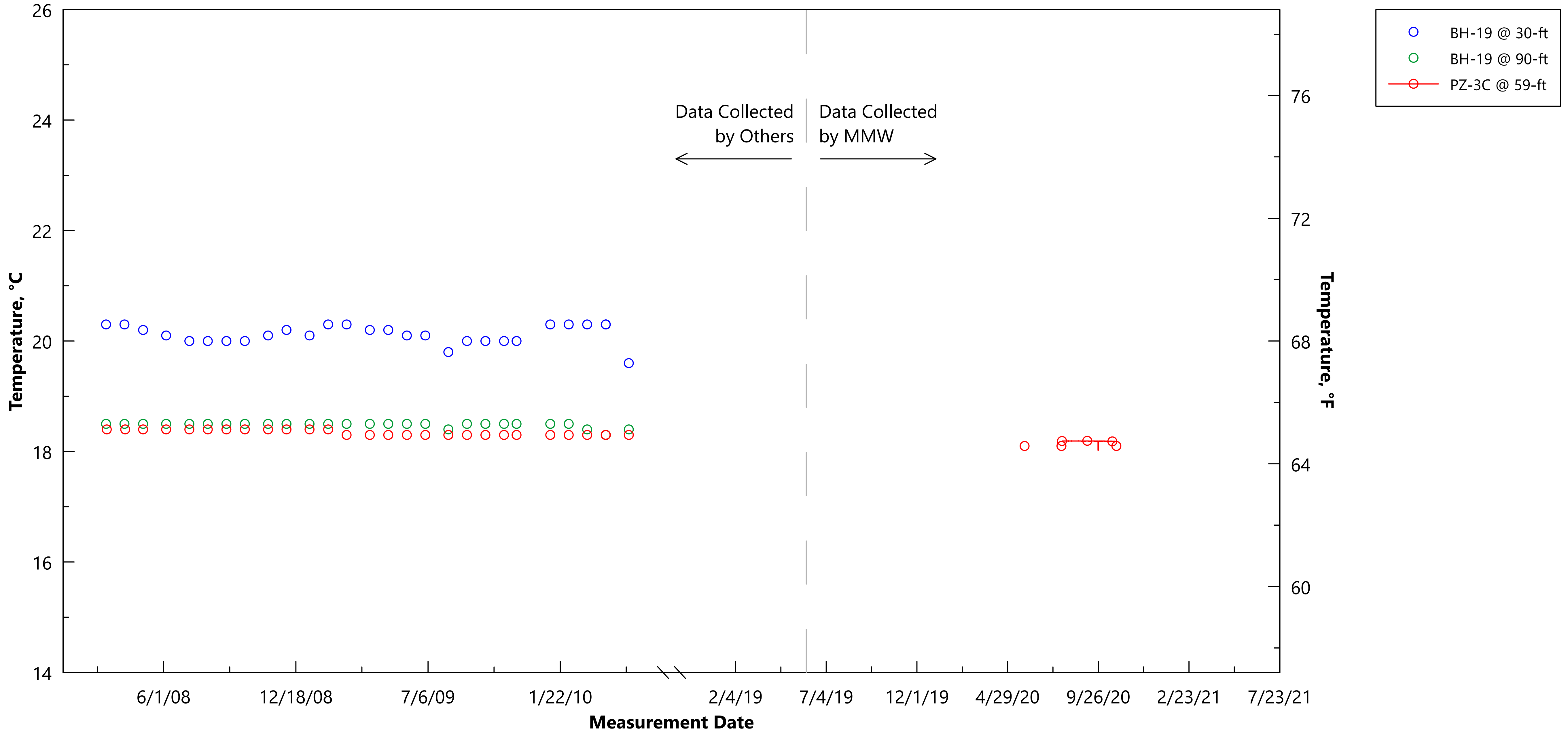
Figure 15.7



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
3. Plots containing a symbol represent manual temperature readings.
   Plots containing both a symbol and a line represent hourly readings collected by a datalogger.

Groundwater Temperature Historical Boreholes -
East Emergency Stop

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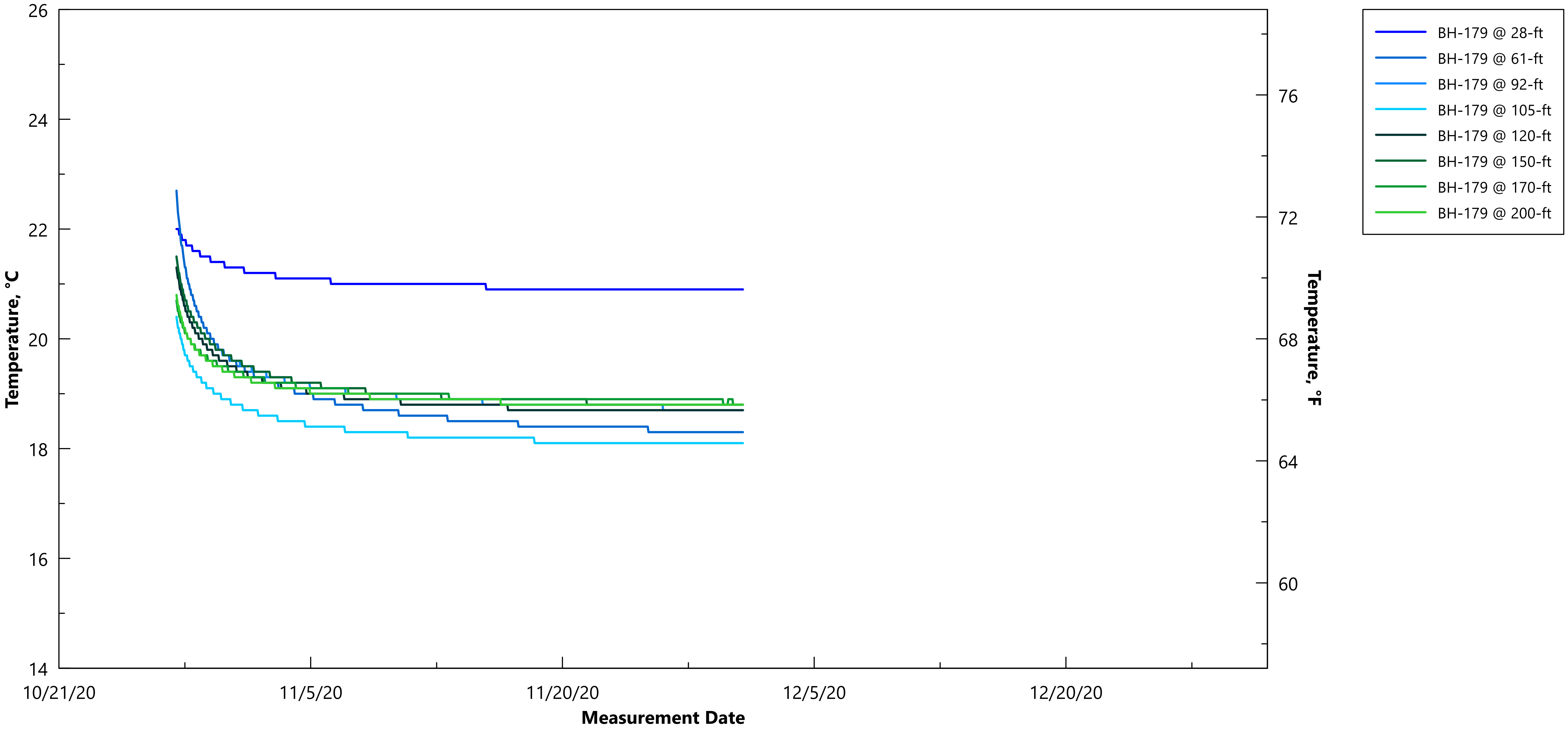
Figure 15.8



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes - East Emergency Stop

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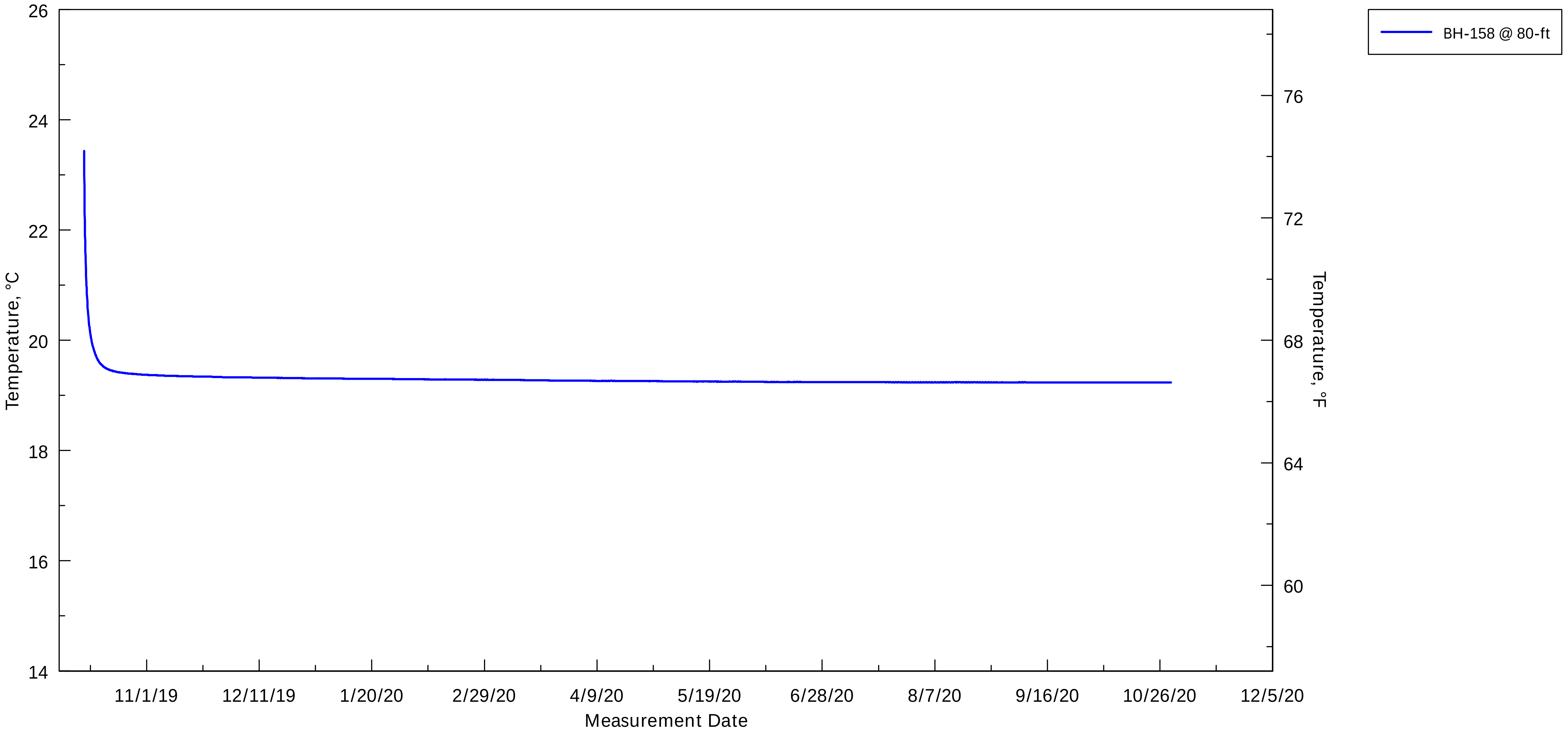
Figure 15.9

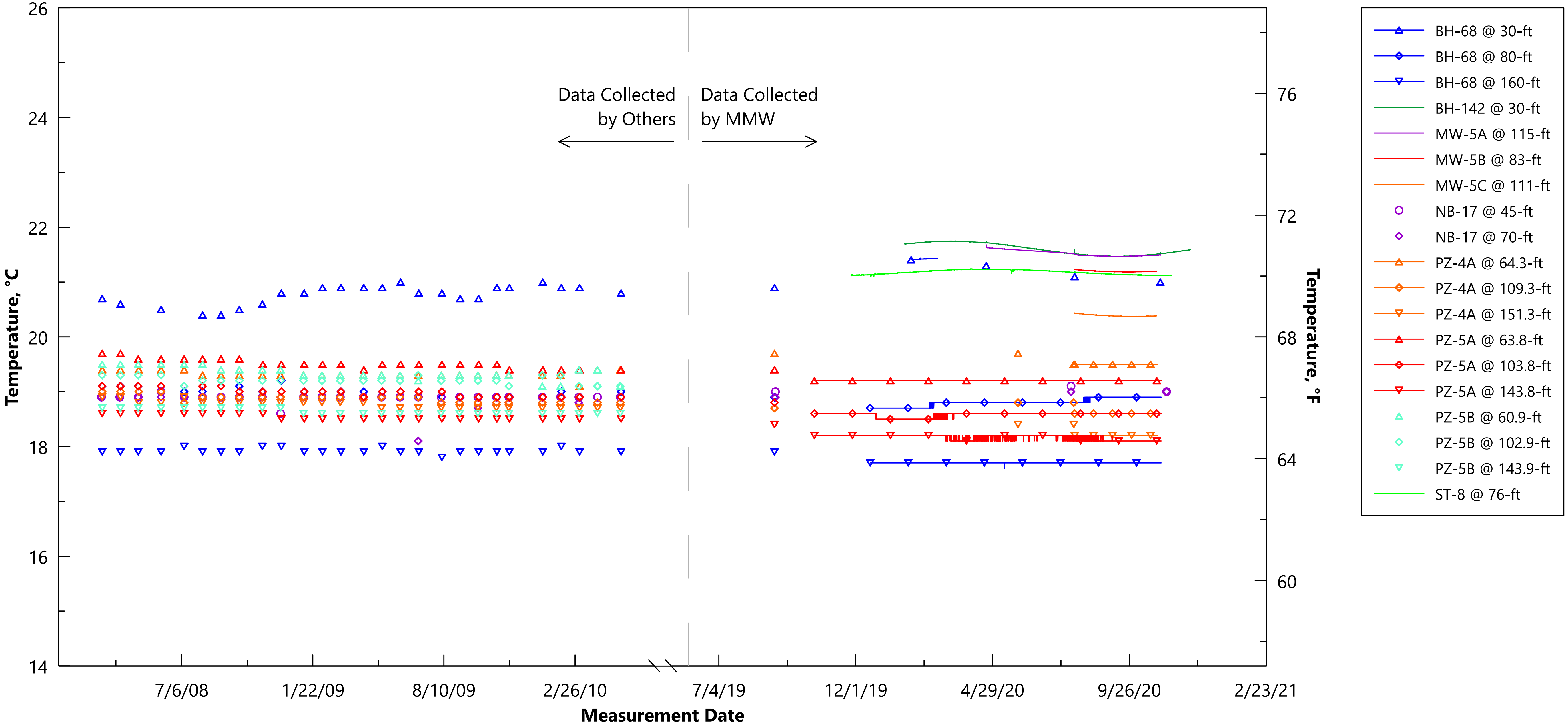


Notes

1. The depth for the plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. There are no temperature readings from historical boreholes from the East Emergency Stop to DTSJ Station. A figure is not included.
4. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes -
East Emergency Stop to DTSJ Station

Figure 15.10



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
3. Plots containing a symbol represent manual temperature readings.
   Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
4. BH-142 is a standpipe piezometer constructed by WSP/HNTB in 2019.
5. The single channel datalogger at BH-68 @ 30-ft was removed in Feburary 2020 and reinstalled at BH-175 in April 2020.
6. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots.
   Water level dataloggers collect temperature data to three (3) decimal points, resulting in smoother plots.

Groundwater Temperature Historical Boreholes - DTSJ Station

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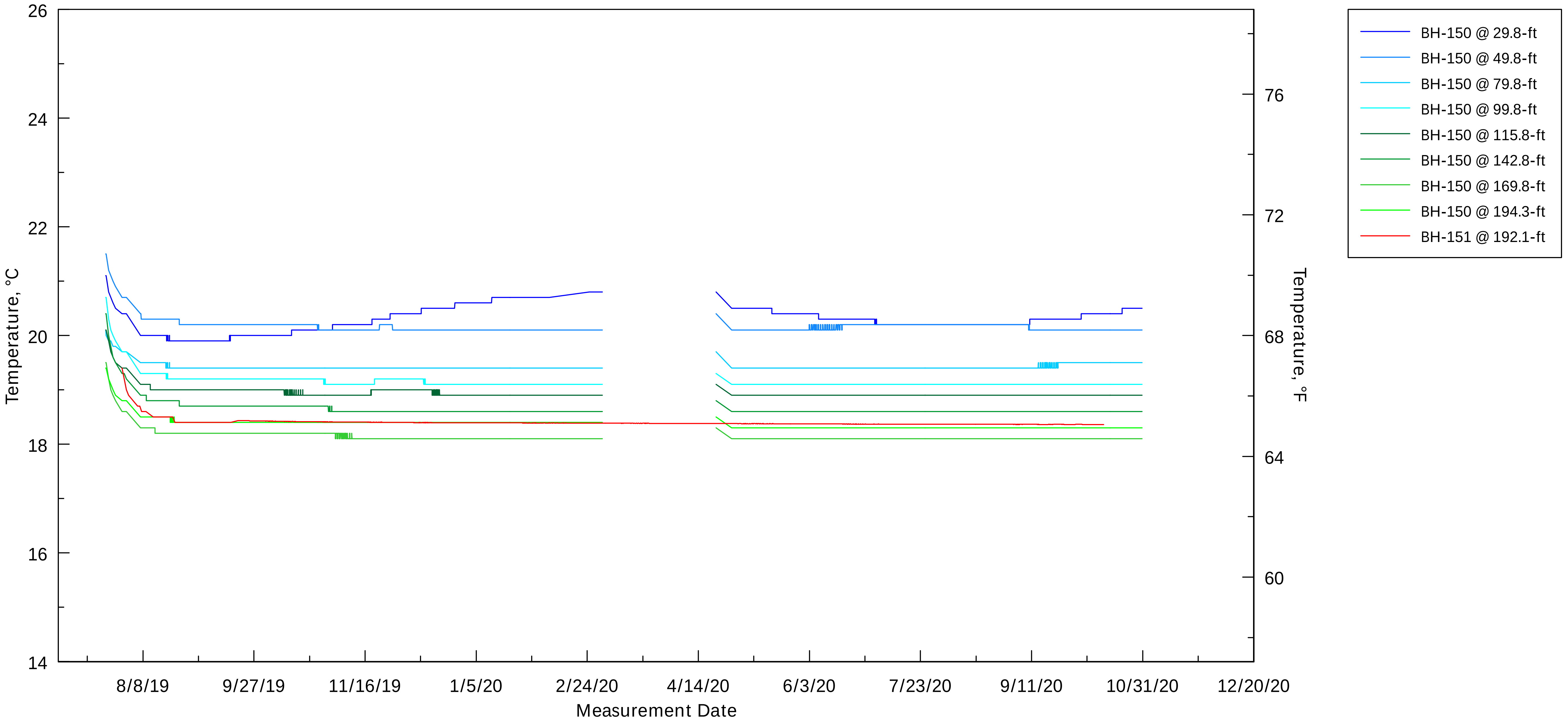
San Jose, California

Figure 15.11



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. The datalogger at BH-150 was removed from March 1, 2020 to April 29, 2020 for repair.
4. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes - DTSJ Station

Dec 2020

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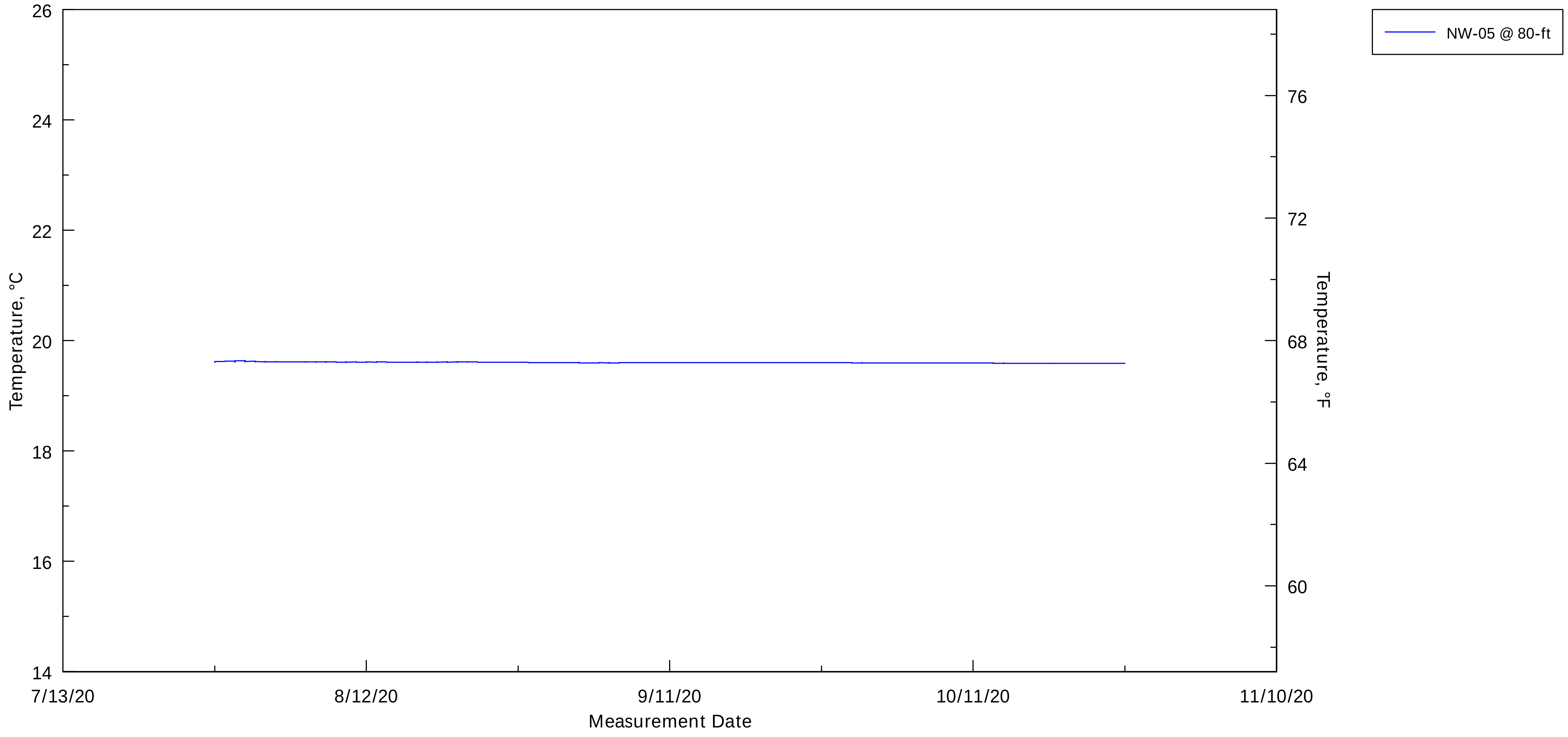
Figure 15.12



Notes

1. The depth for the plot shown in the legend correlates to the top of screen depth of the standpipe piezometer.

Groundwater Temperature Historical Boreholes -
DTSJ Station to Diridon Station

BART Silicon Valley Phase II Extension Project
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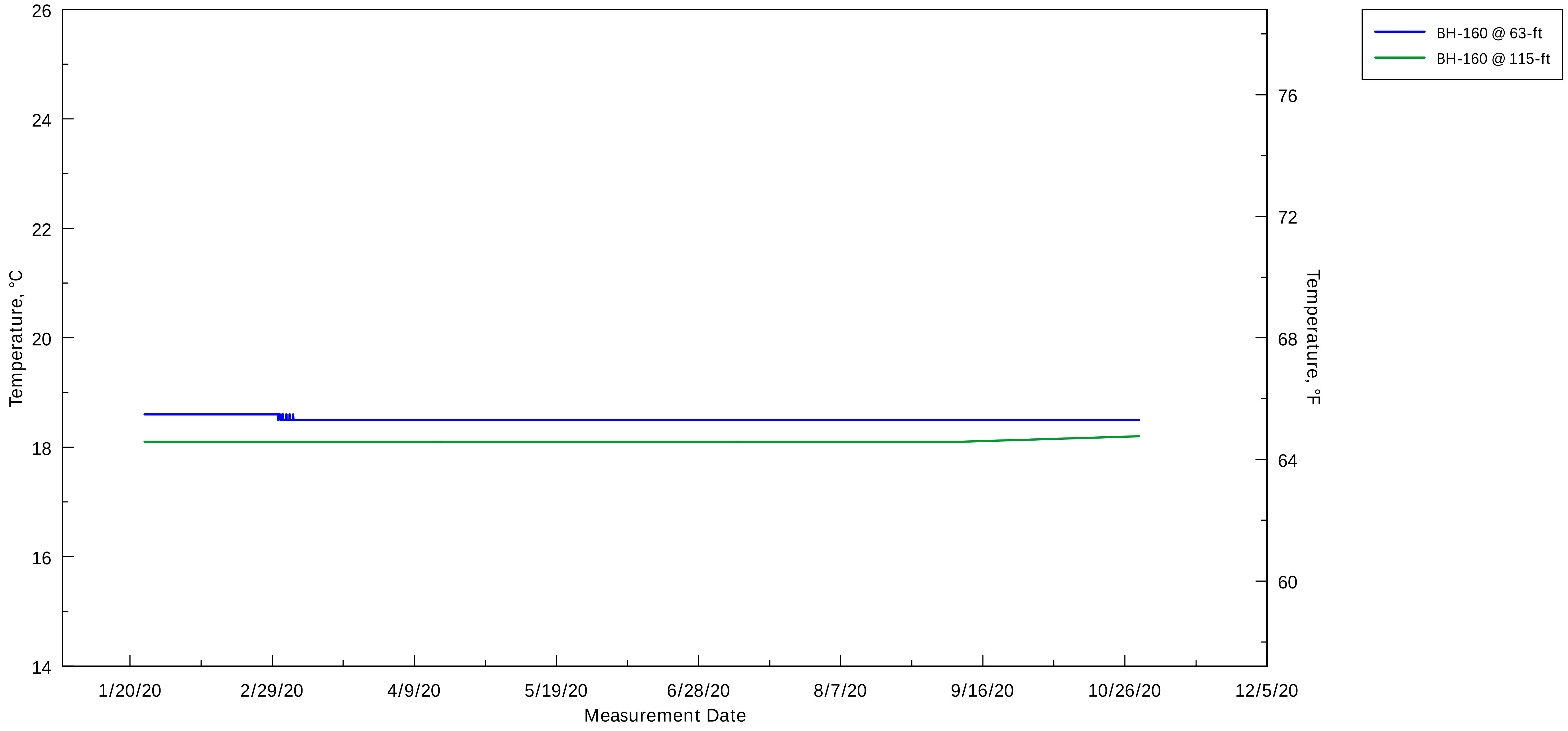
San Jose, California

Dec 2020

Figure 15.13



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes -
DTSJ Station to Diridon Station

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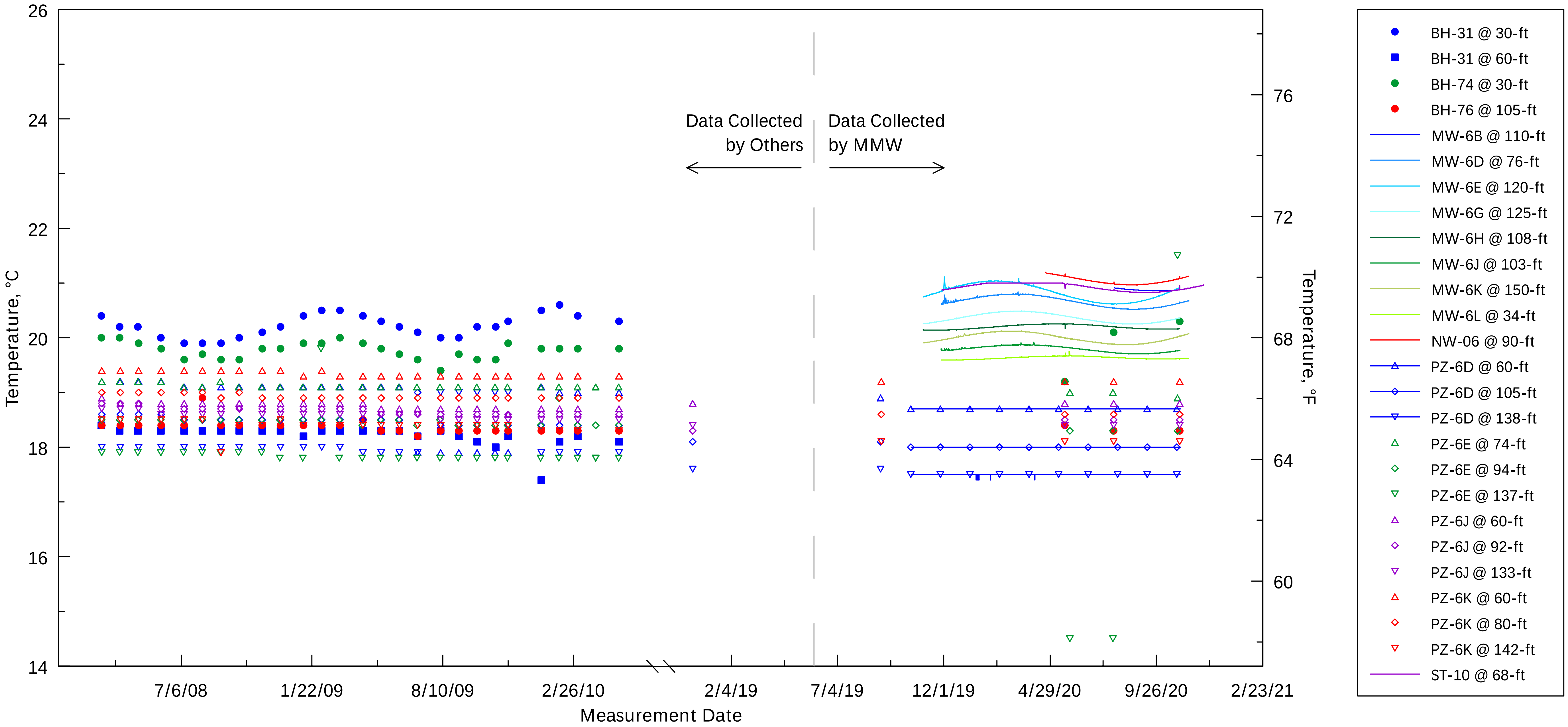
Dec 2020

Figure 15.14



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.
3. Plots containing a symbol represent manual temperature readings. Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
4. Temperature readings at PZ-6E @ 137-ft appear unreliable. VWP internal thermometer may be damaged.
5. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature Historical Boreholes - Diridon Station

Dec 2020

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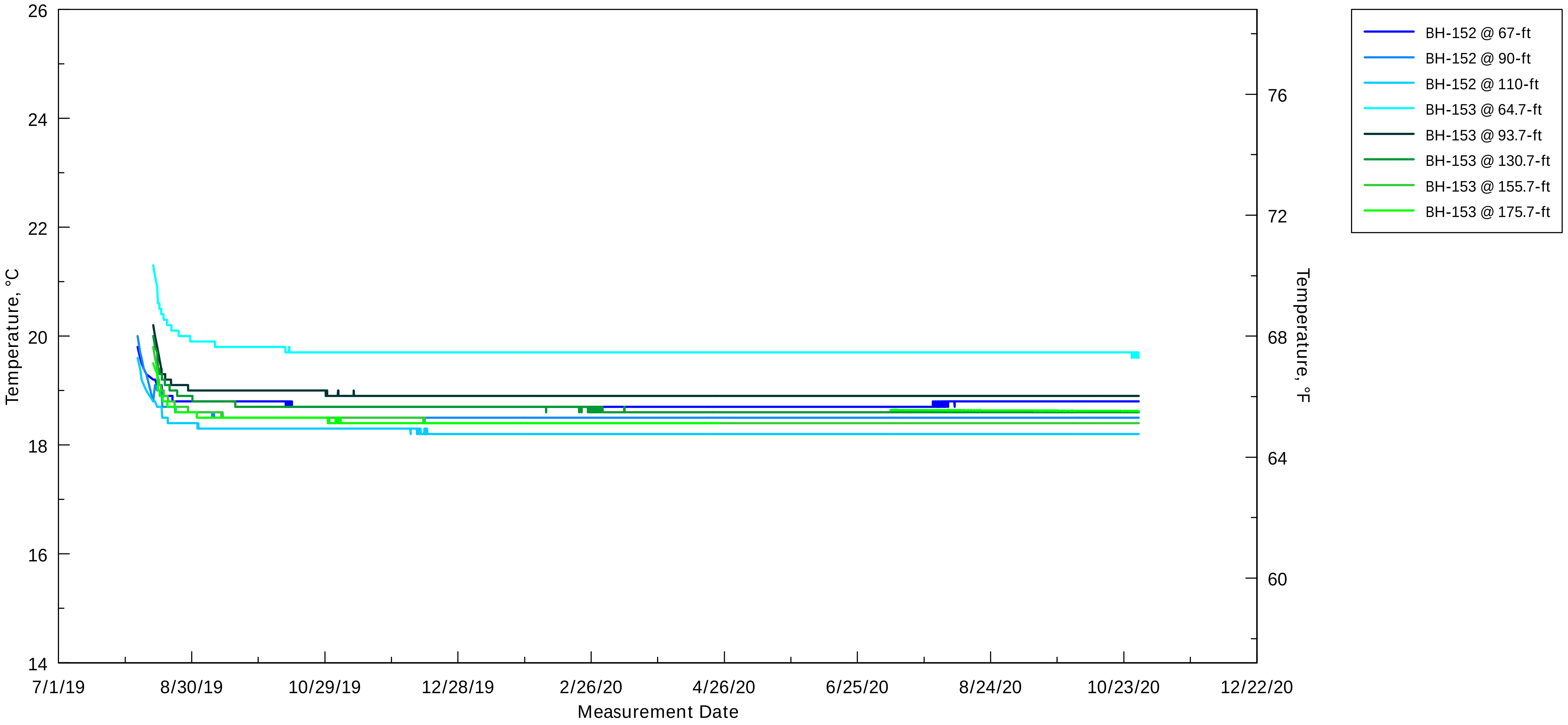
Figure 15.15



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes - Diridon Station

Dec 2020

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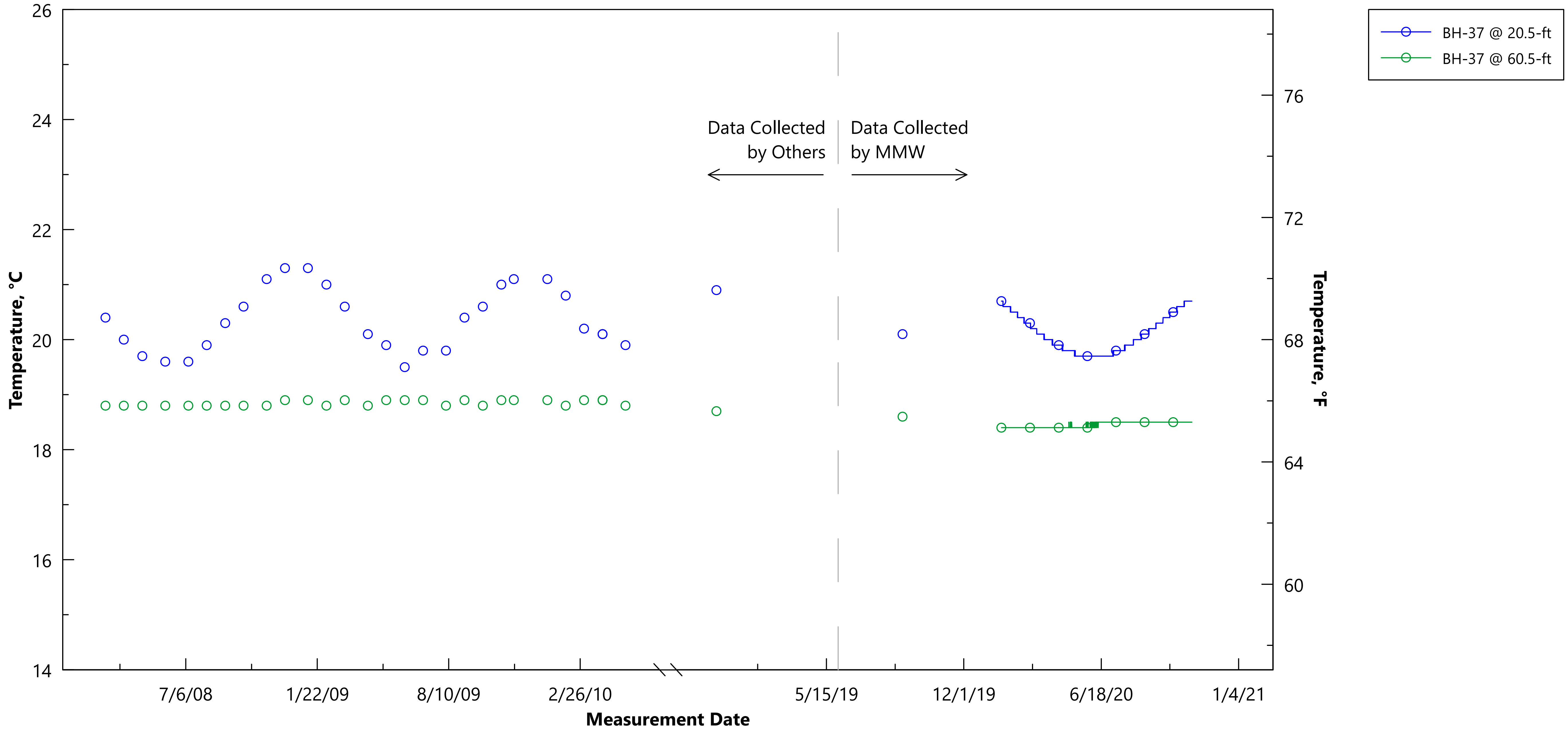
Figure 15.16



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
3. Plots containing a symbol represent manual temperature readings.
   Plots containing both a symbol and a line represent hourly readings collected by a datalogger.
4. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots.
   The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature Historical Boreholes - Diridon Station to West Emergency Stop

Dec 2020

BART Silicon Valley Phase II Extension Project
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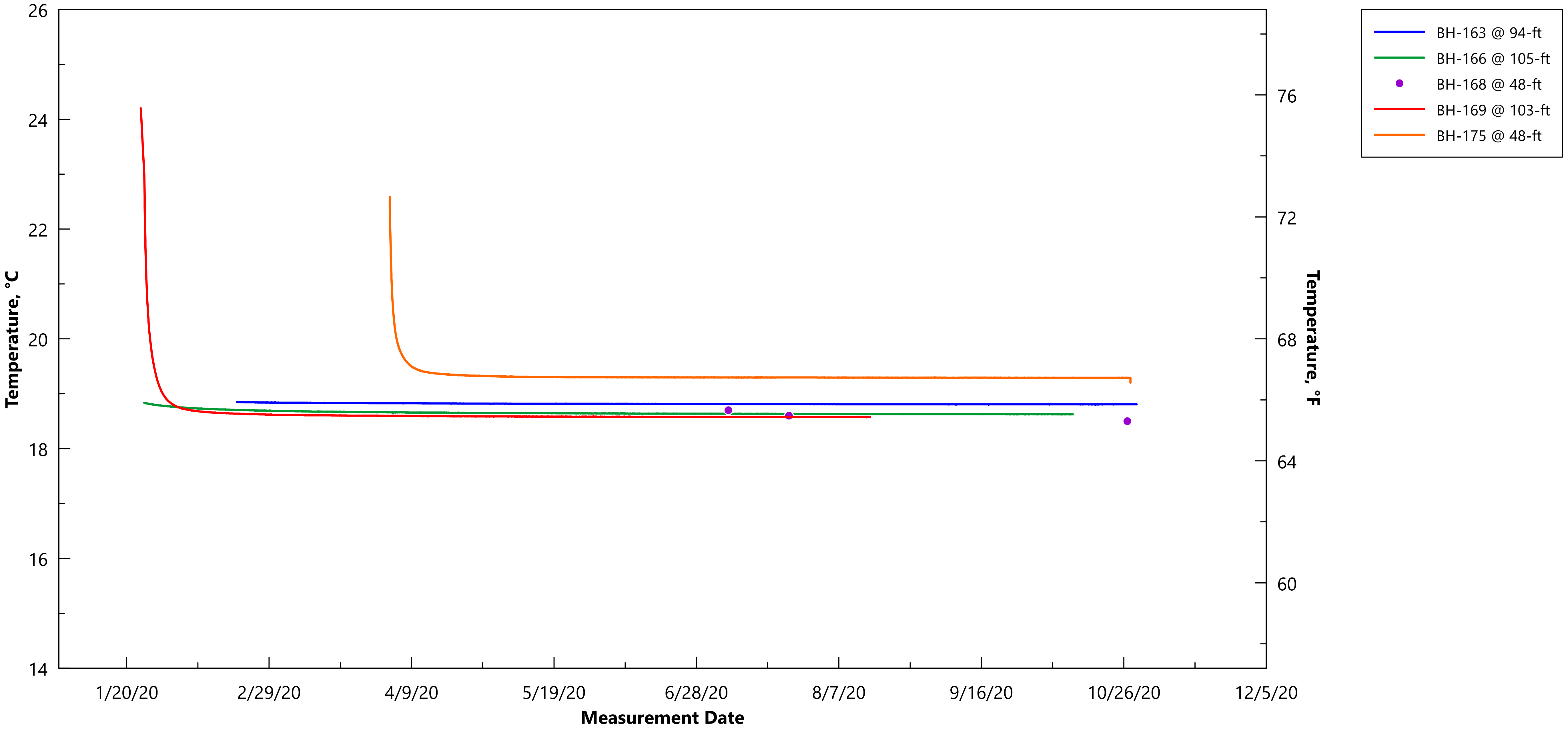
Figure 15.17



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes - Diridon Station to West Emergency Stop

Dec 2020

BART Silicon Valley Phase II Extension Project
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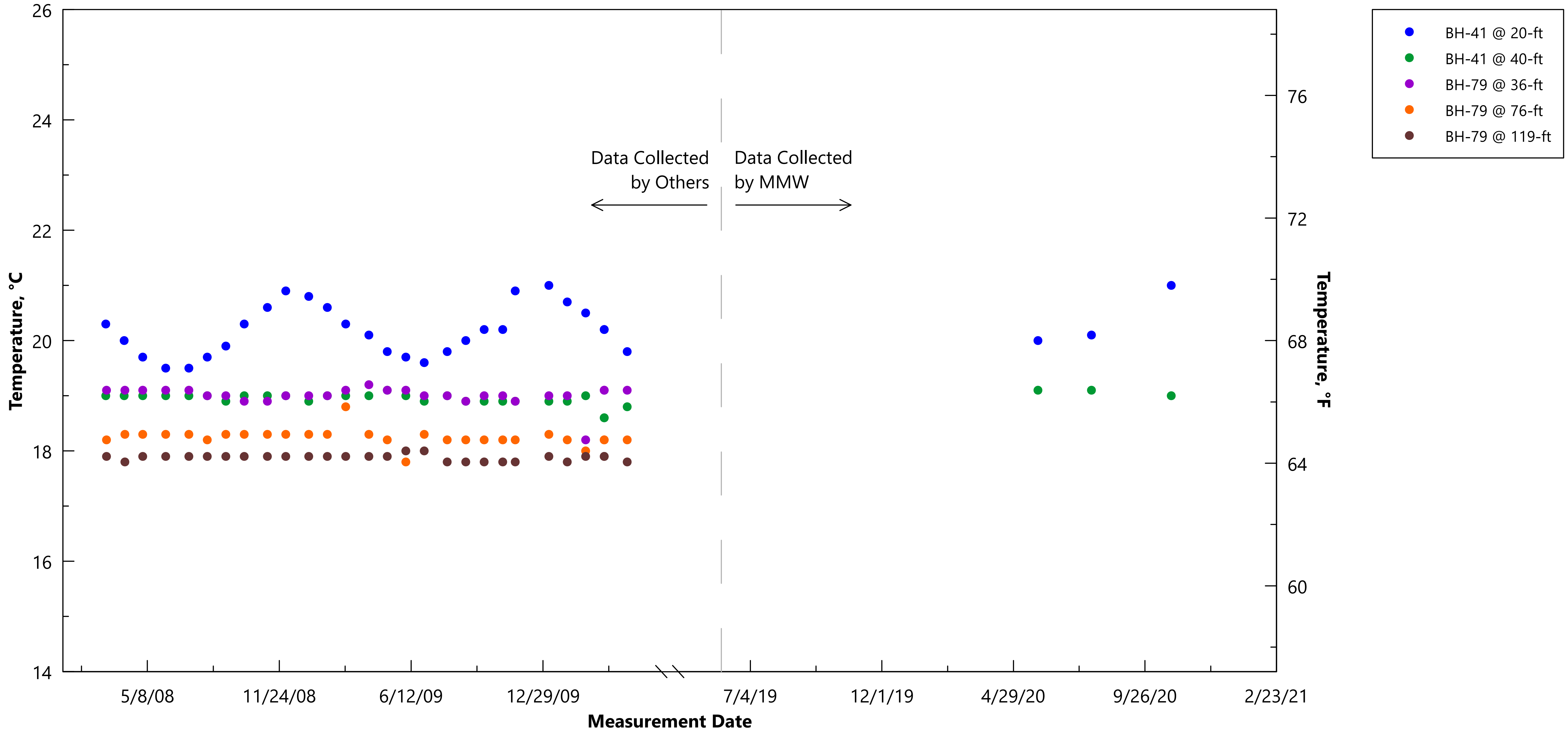
Figure 15.18



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the installation depth for a vibrating wire piezometer.
3. BH-79 has been paved over and is no longer accessible.

Groundwater Temperature Historical Boreholes - West Emergency Stop

BART Silicon Valley Phase II Extension Project
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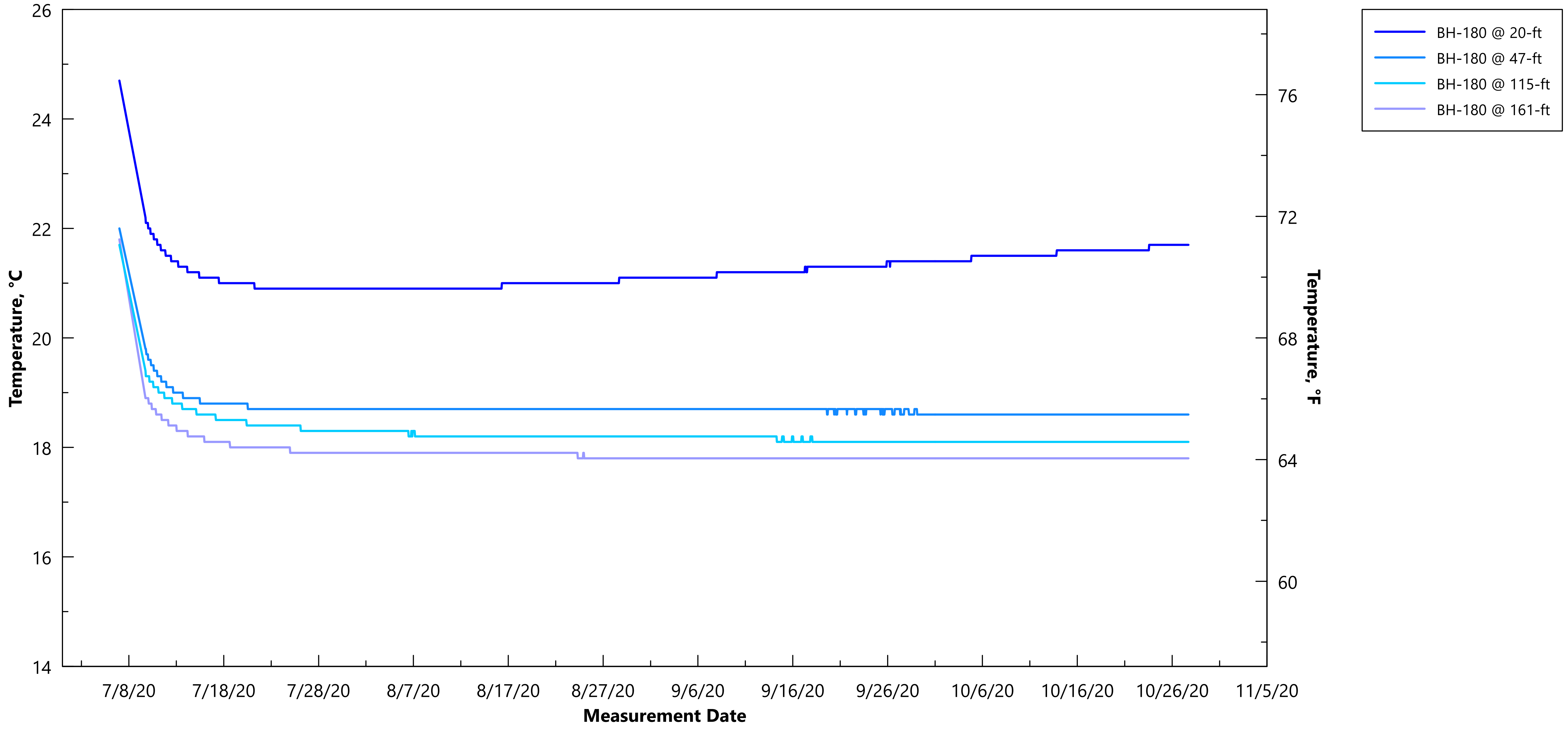
Figure 15.19



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes - West Emergency Stop

BART Silicon Valley Phase II Extension Project
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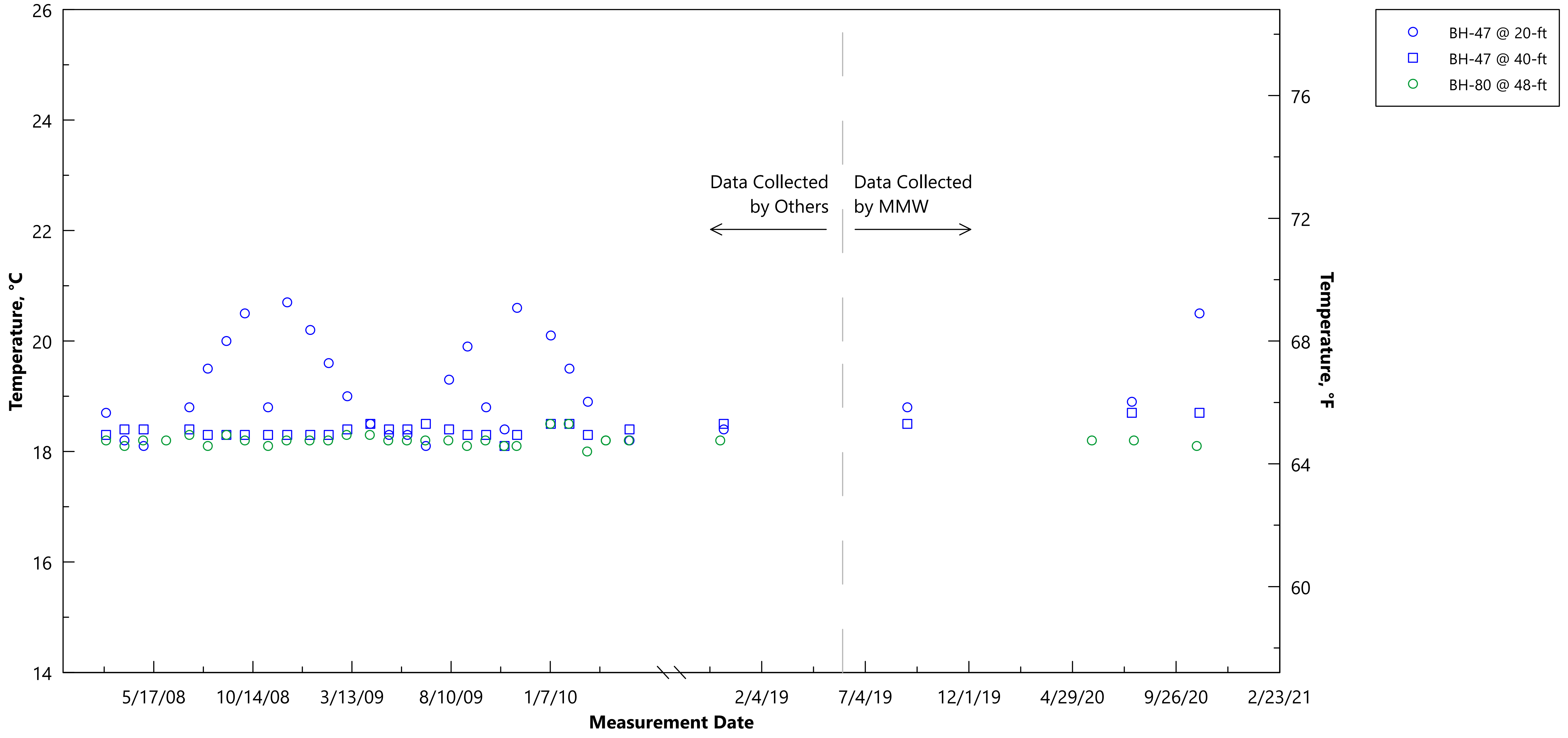
Figure 15.20



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.

Groundwater Temperature Historical Boreholes - West Emergency Stop to West Portal

Dec 2020

BART Silicon Valley Phase II Extension Project
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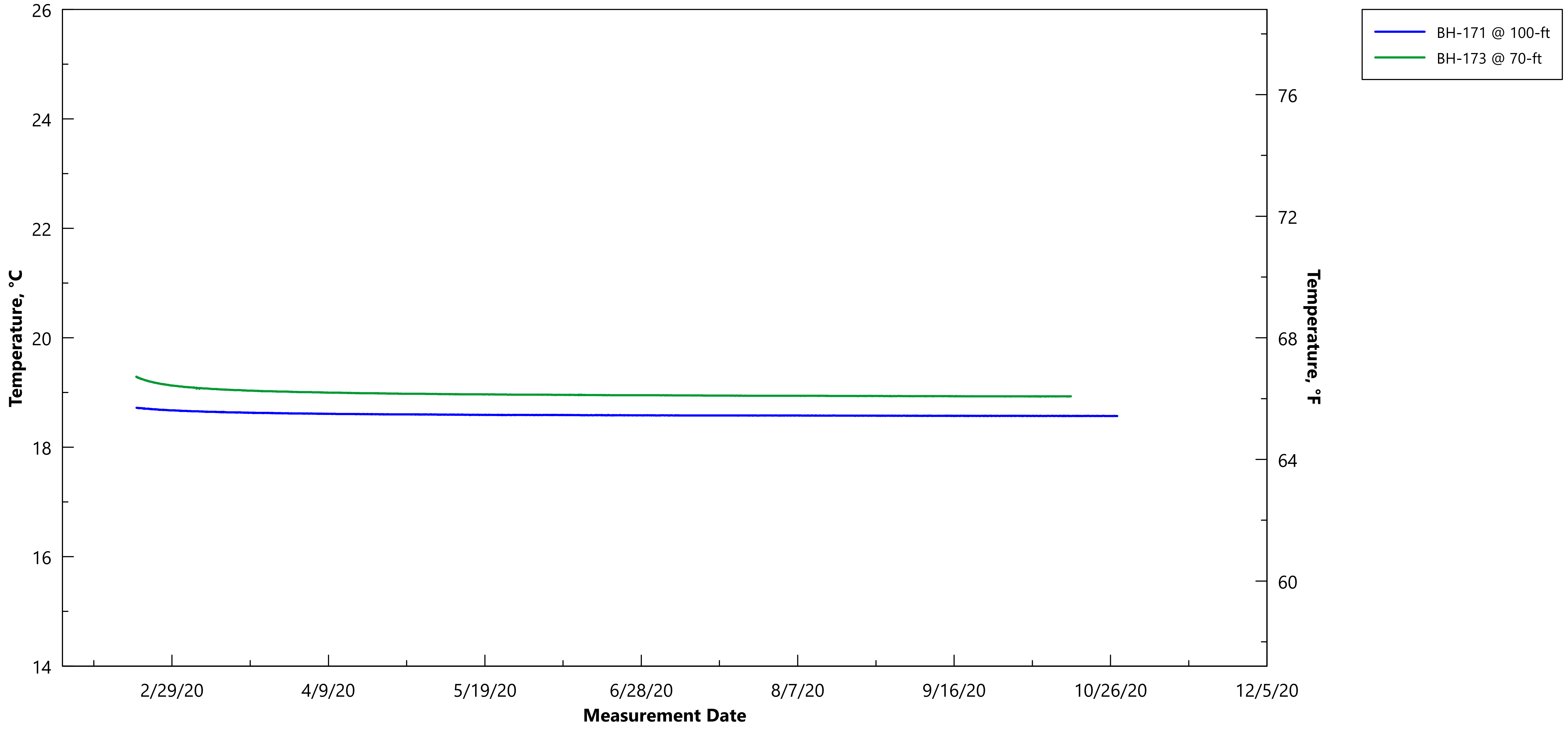
Figure 15.21



Notes

1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes - West Emergency Stop to West Portal

BART Silicon Valley Phase II Extension Project
Dec 2020
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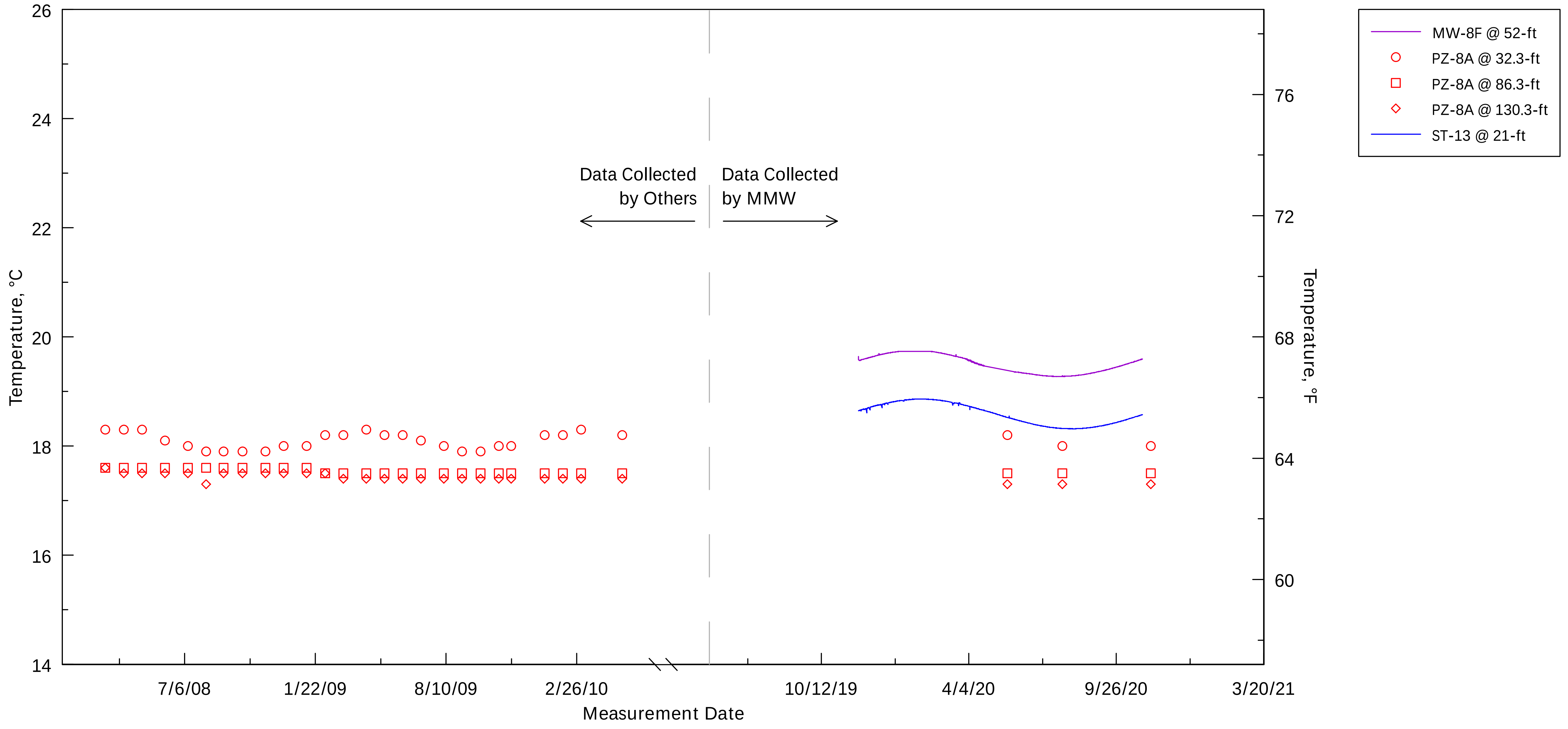
San Jose, California

Figure 15.22



Notes

1. An axis break exists because no measurements were taken between 2011 and 2017.
2. The depth for each plot shown in the legend correlates to the top of screen depth for a standpipe piezometer, or the installation depth for a vibrating wire piezometer.

Groundwater Temperature Historical Boreholes -
West Portal, NYMF, and Santa Clara Station

Dec 2020

BART Silicon Valley Phase II Extension Project
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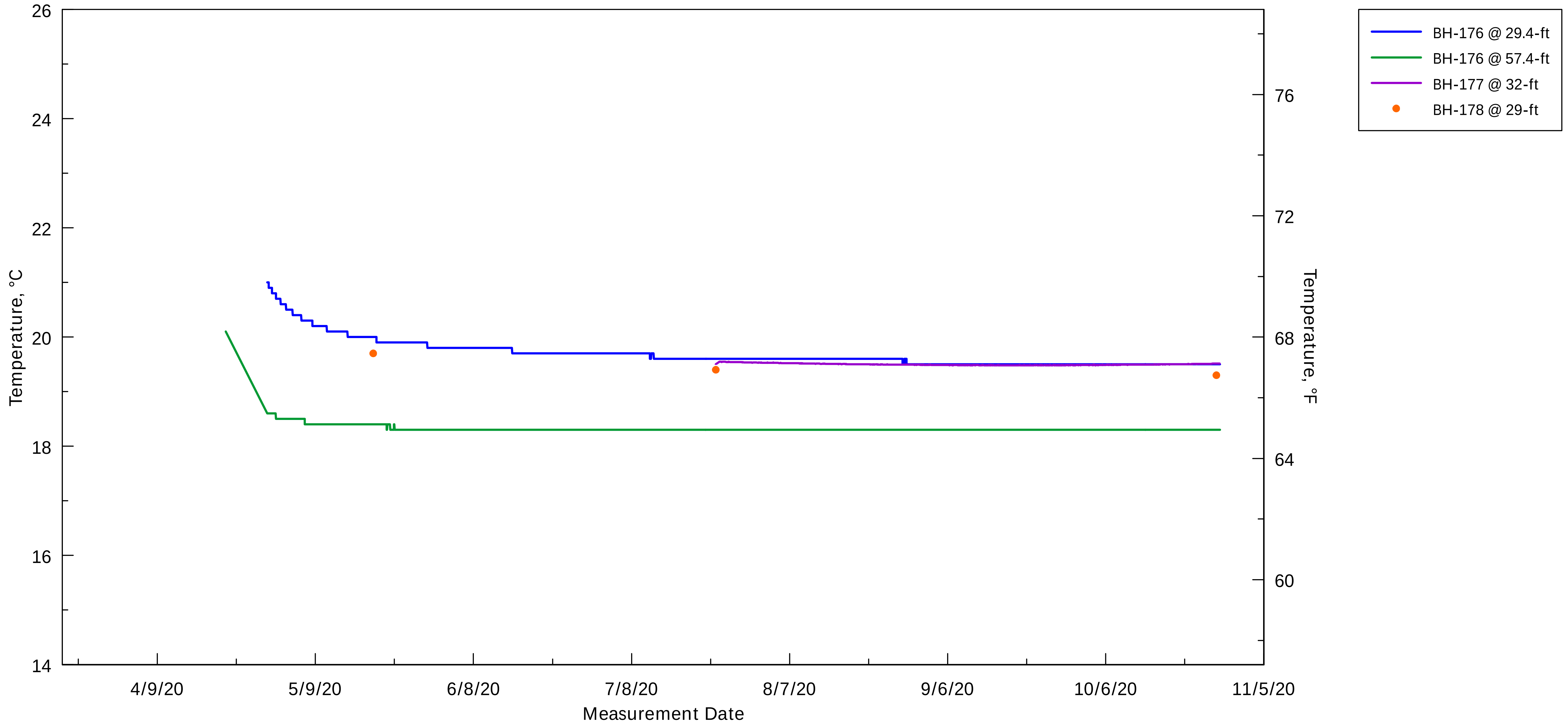
Figure 15.23



Notes

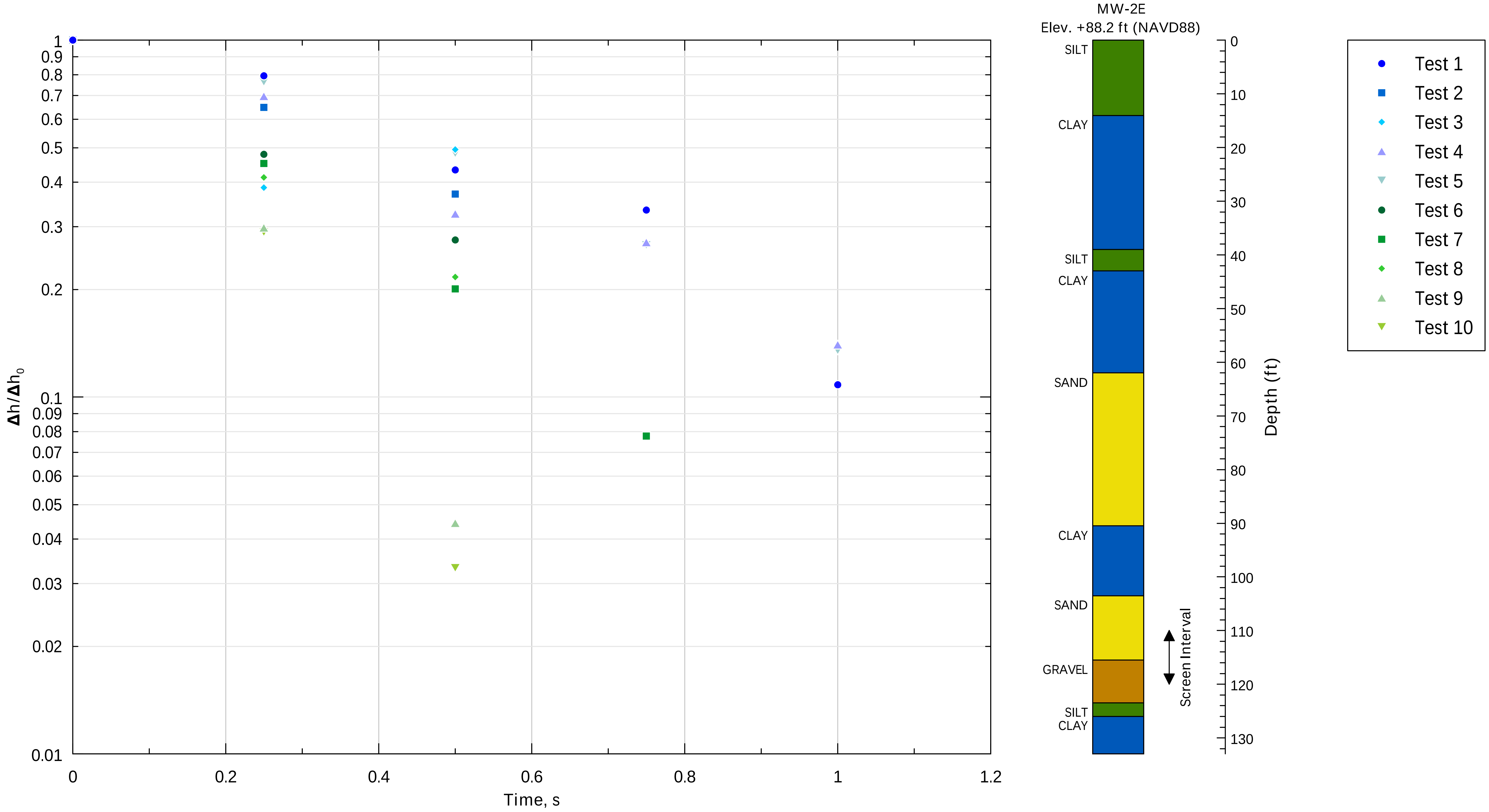
1. The depth for each plot shown in the legend correlates to the installation depth of a vibrating wire piezometer.
2. Temperatures during the first few weeks of data collection are influenced by heat generated from grout curing.
3. BH-176, BH-178, and BH-177 are located at West Portal, NYMF, and Santa Clara Station, respectively.
4. VWP dataloggers and readout boxes collect temperature readings to one decimal place, resulting in stepwise and noisy plots. The data is correctly presented and represents small fluctuations in temperature.

Groundwater Temperature 2019-2020 Boreholes -
West Portal, NYMF, and Santa Clara Station

BART Silicon Valley Phase II Extension Project
Geotechnical Data Report
Santa Clara Valley Transportation Authority
San Jose, California

Dec 2020

Figure 15.24



Notes:

1. $\triangle h/\triangle h_0$ is the ratio of the change in head versus the initial change in head.
2. The soil profile has been simplified into major soil components. The borehole log for MW-2E is presented in Appendix F of Volume II.

MW-2E Slug Test - 28th Street / Little Portugal Station

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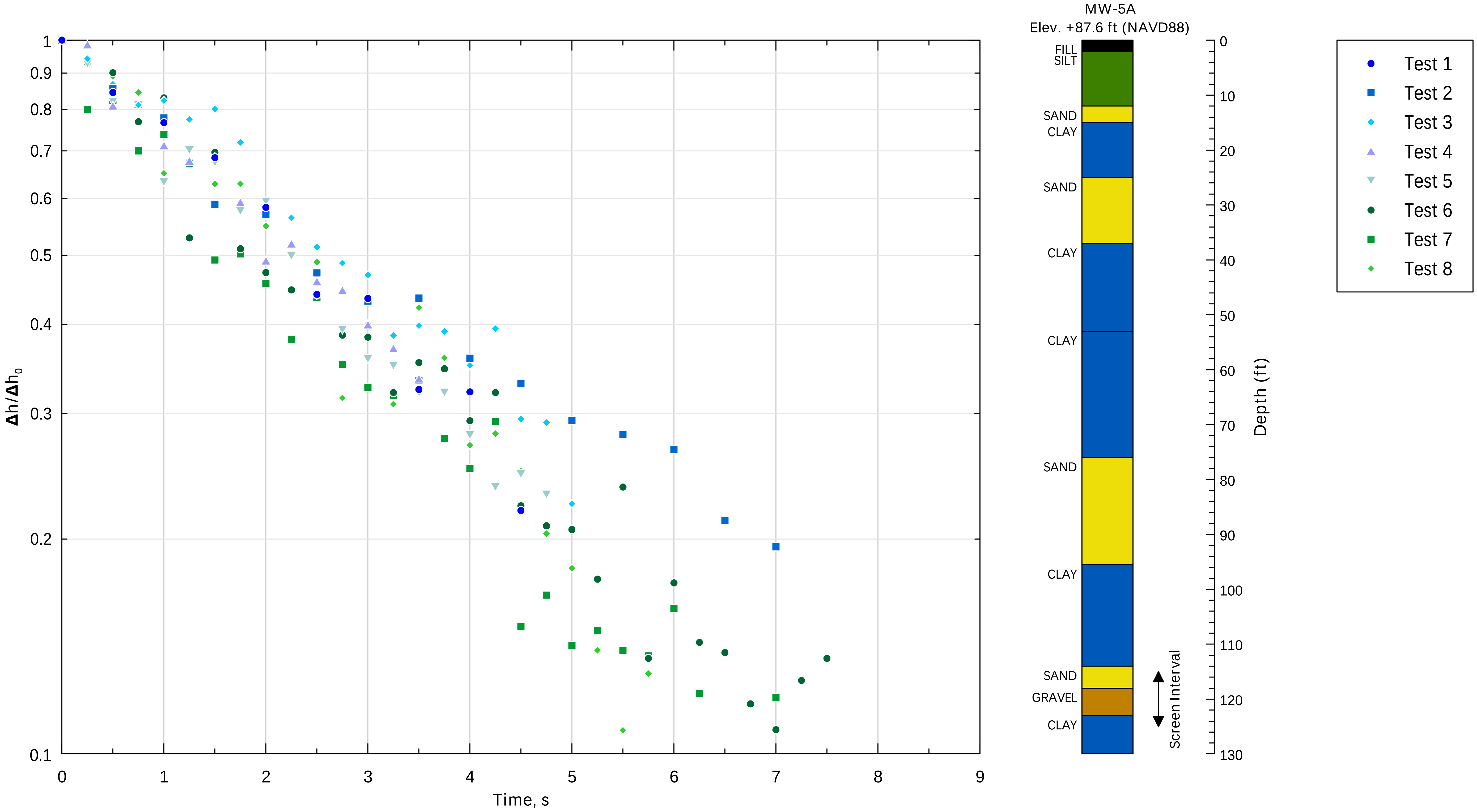
Figure 16.1



Notes:

1. $\triangle h/\triangle h_0$ is the ratio of the change in head versus the initial change in head.
2. The soil profile has been simplified into major soil components. The borehole log for MW-5A is presented in Appendix F of Volume II.
3. DTSJ Station: Downtown San Jose Station.

MW-5A Slug Test - DTSJ Station

Dec 2020

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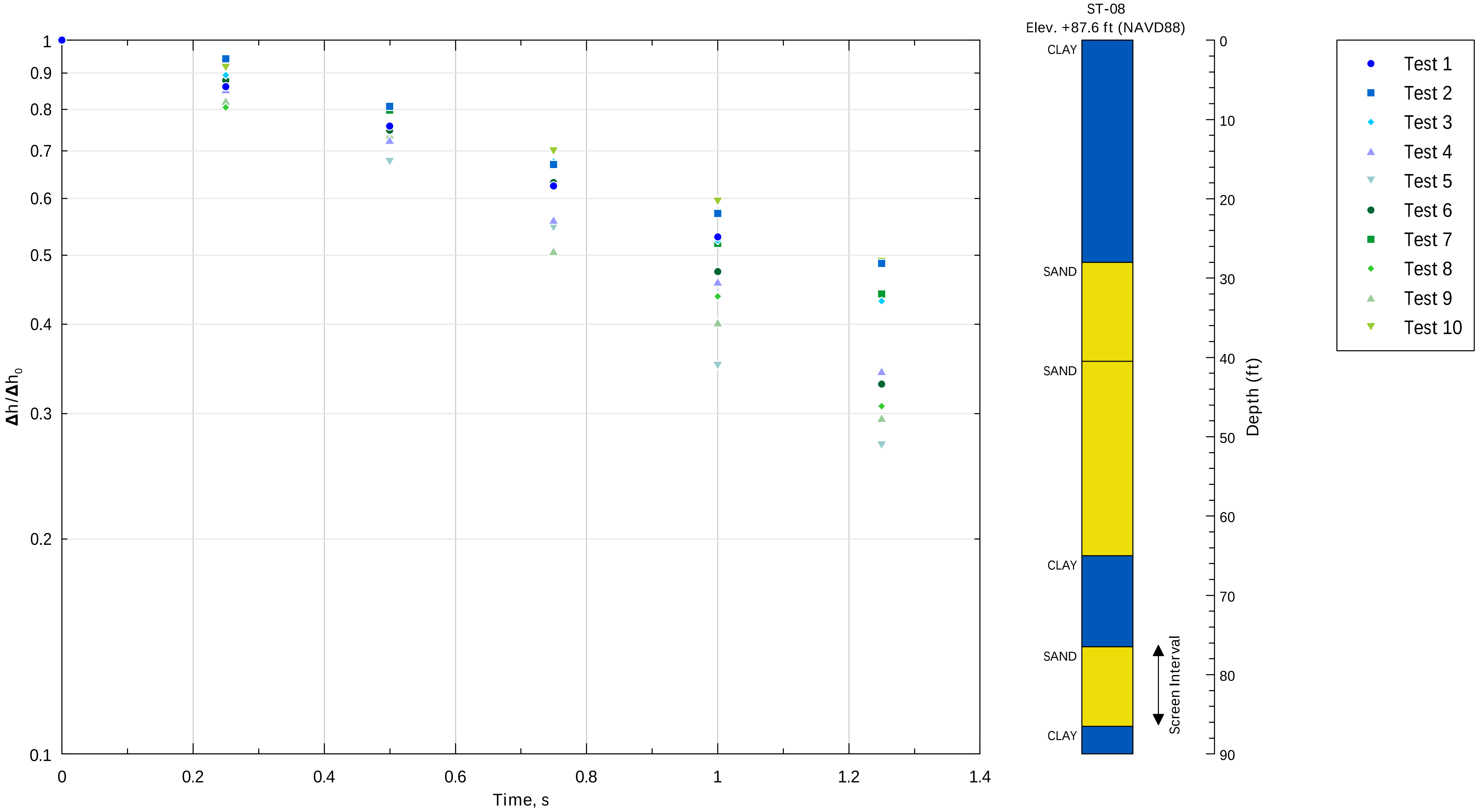
Figure 16.2



Notes:

1. $\triangle h/\triangle h_0$ is the ratio of the change in head versus the initial change in head.
2. The soil profile has been simplified into major soil components. The borehole log for ST-08 is presented in Appendix F of Volume II.
3. DTSJ Station: Downtown San Jose Station.

ST-08 Slug Test - DTSJ Station

Dec 2020

BART Silicon Valley Phase II Extension Project
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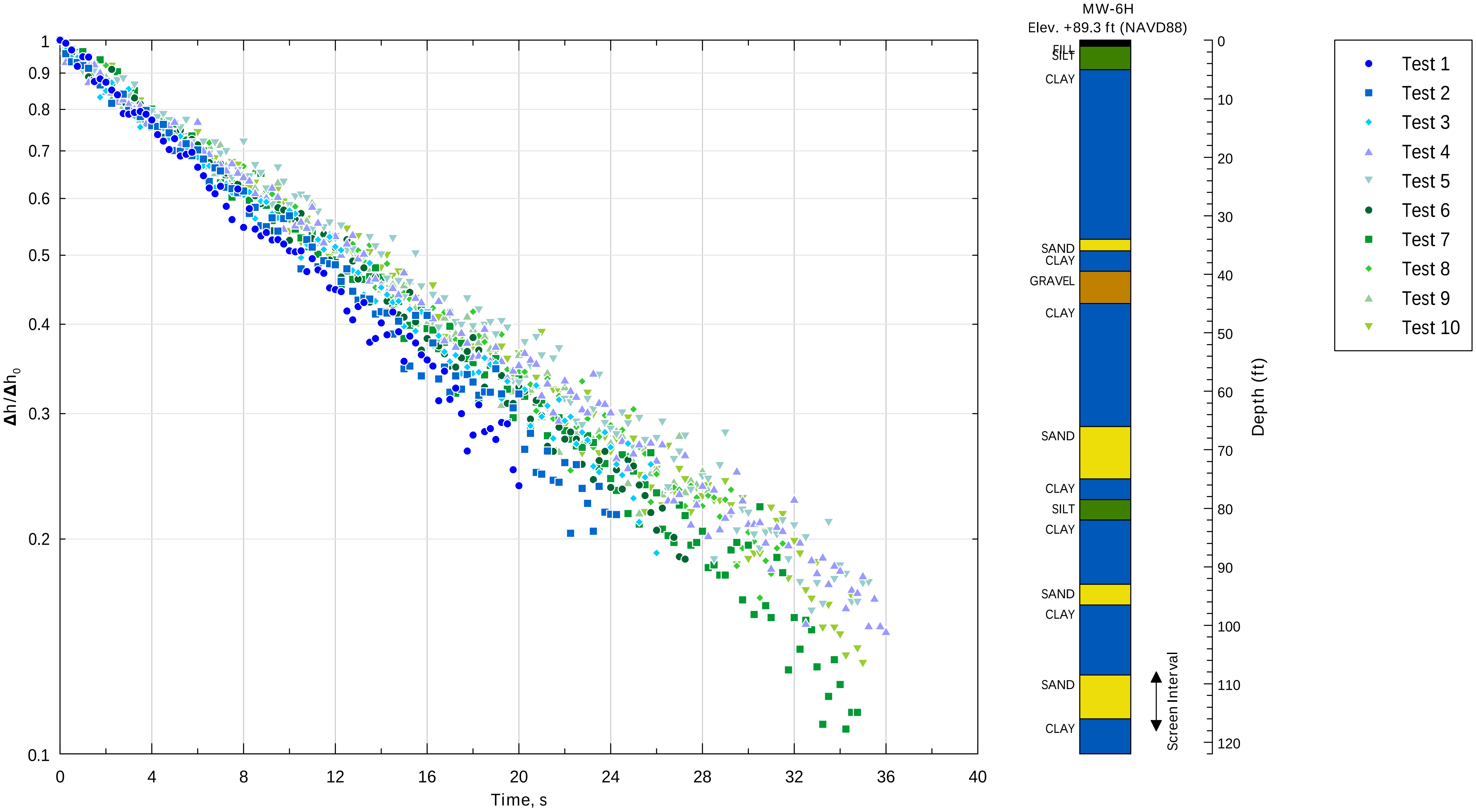
Figure 16.3



Notes:

1. $\triangle h/\triangle h_0$ is the ratio of the change in head versus the initial change in head.
2. The soil profile has been simplified into major soil components. The borehole log for MW-6H is presented in Appendix F of Volume II.

MW-6H Slug Test - Diridon Station

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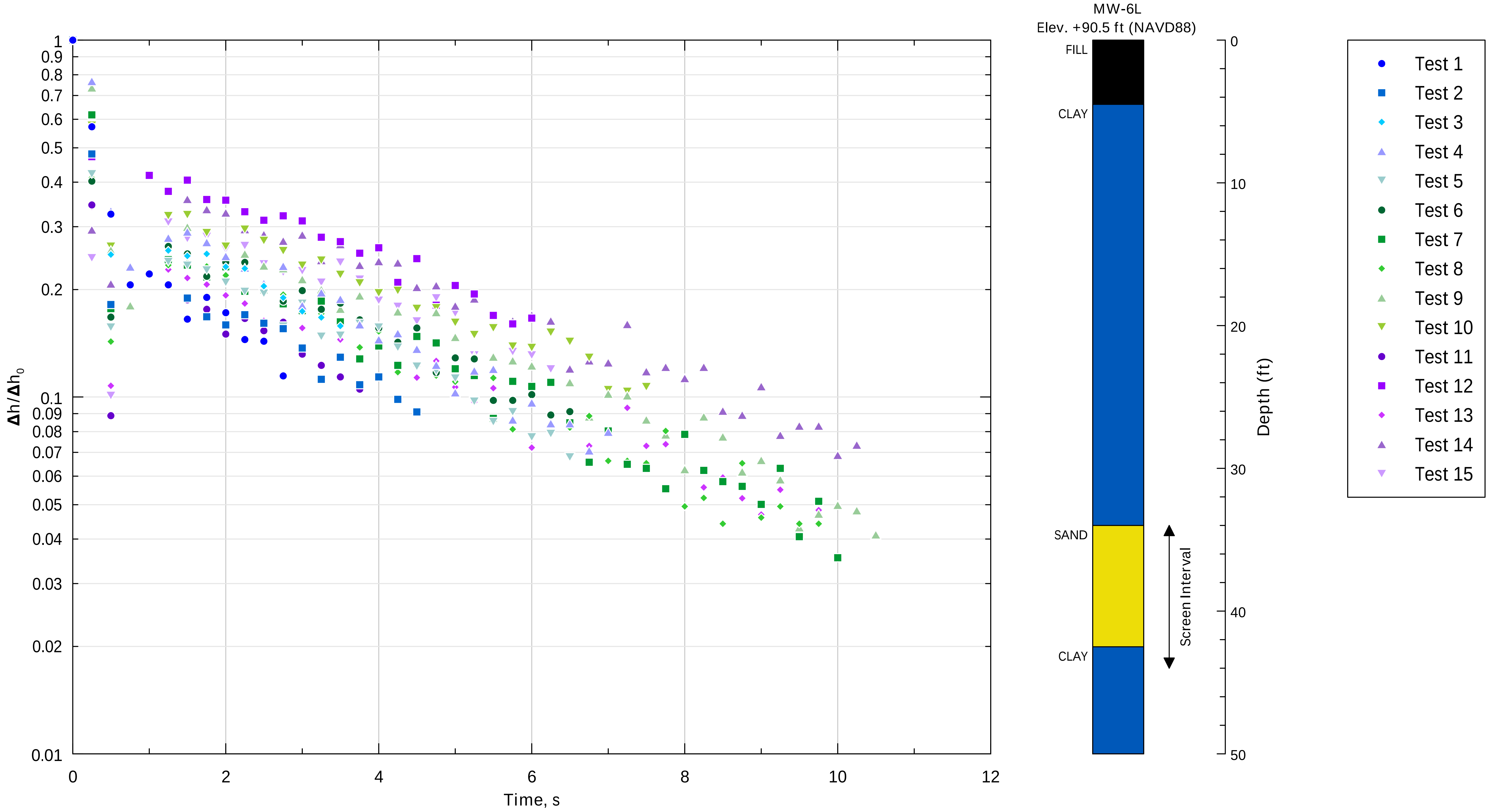
Figure 16.4



Notes:

1. △h/△h$_0$ is the ratio of the change in head versus the initial change in head.
2. The soil profile has been simplified into major soil components. The borehole log for MW-6L is presented in Appendix F of Volume II.

MW-6L Slug Test - Diridon Station

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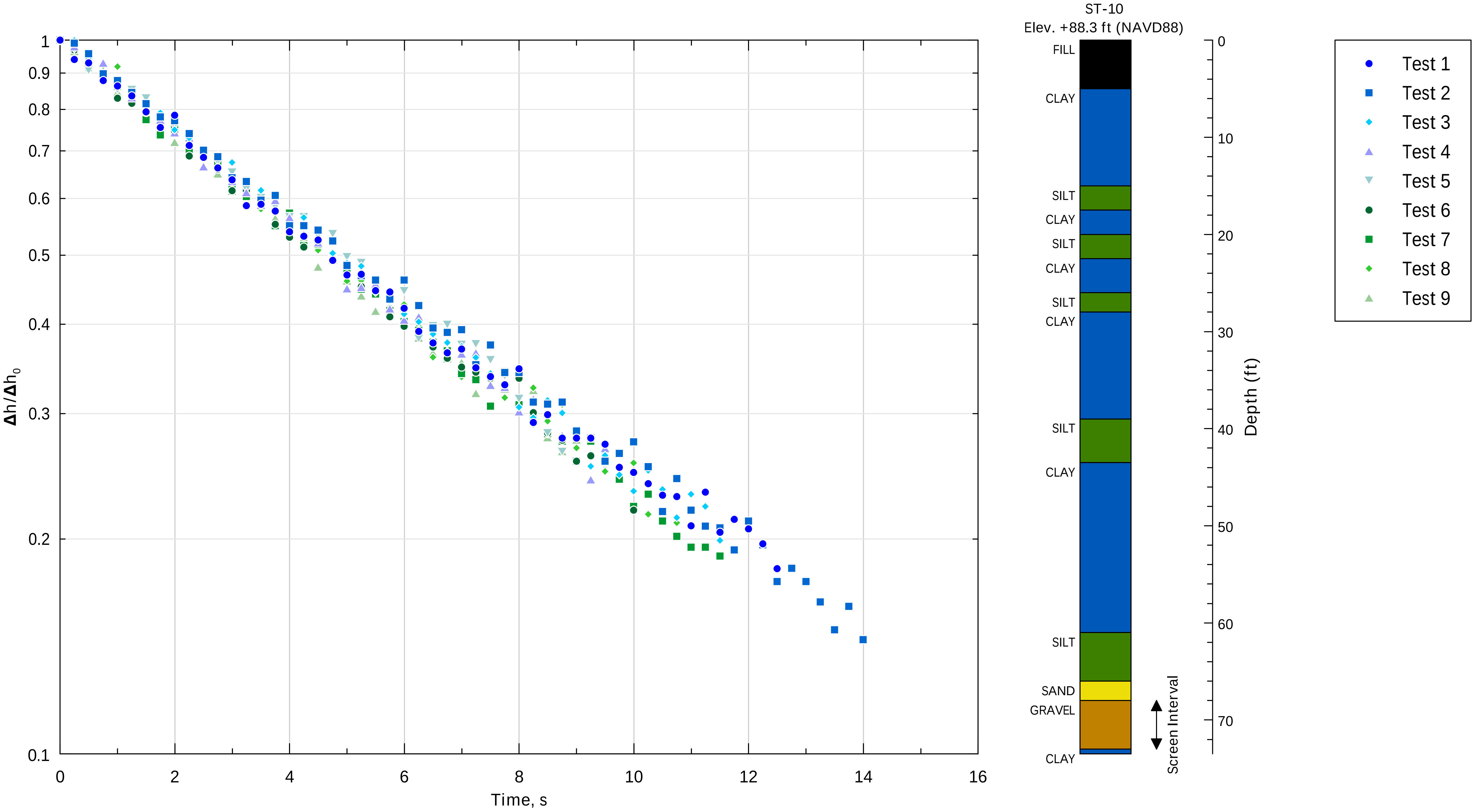
Figure 16.5



Notes:

1. $\triangle h/\triangle h_0$ is the ratio of the change in head versus the initial change in head.
2. The soil profile has been simplified into major soil components. The borehole log for ST-10 is presented in Appendix F of Volume II.

ST-10 Slug Test - Diridon Station

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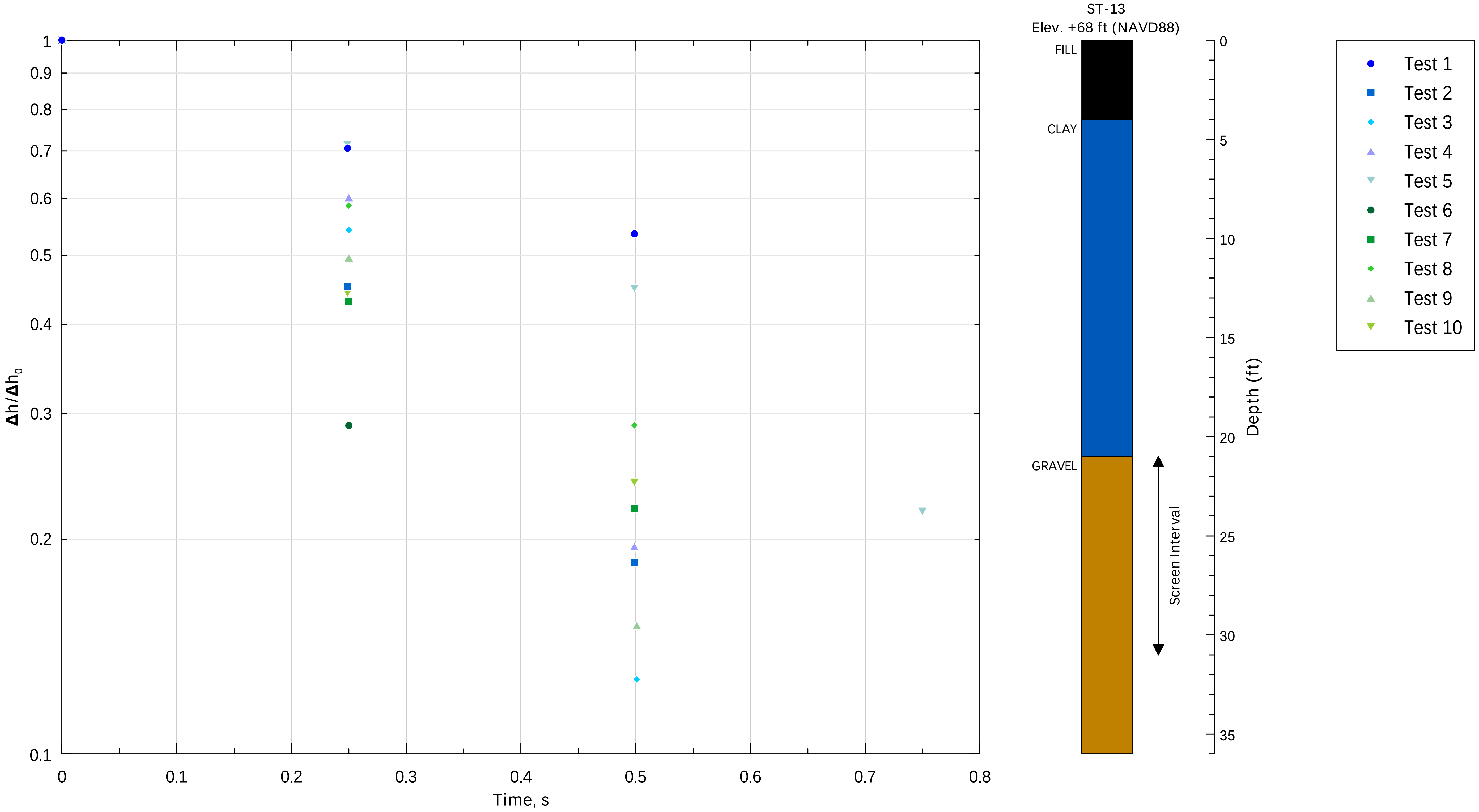
Figure 16.6



Notes:

1. $\triangle h/\triangle h_0$ is the ratio of the change in head versus the initial change in head.
2. The soil profile has been simplified into major soil components. The borehole log for ST-13 is presented in Appendix F of Volume II.

ST-13 Slug Test - West Portal

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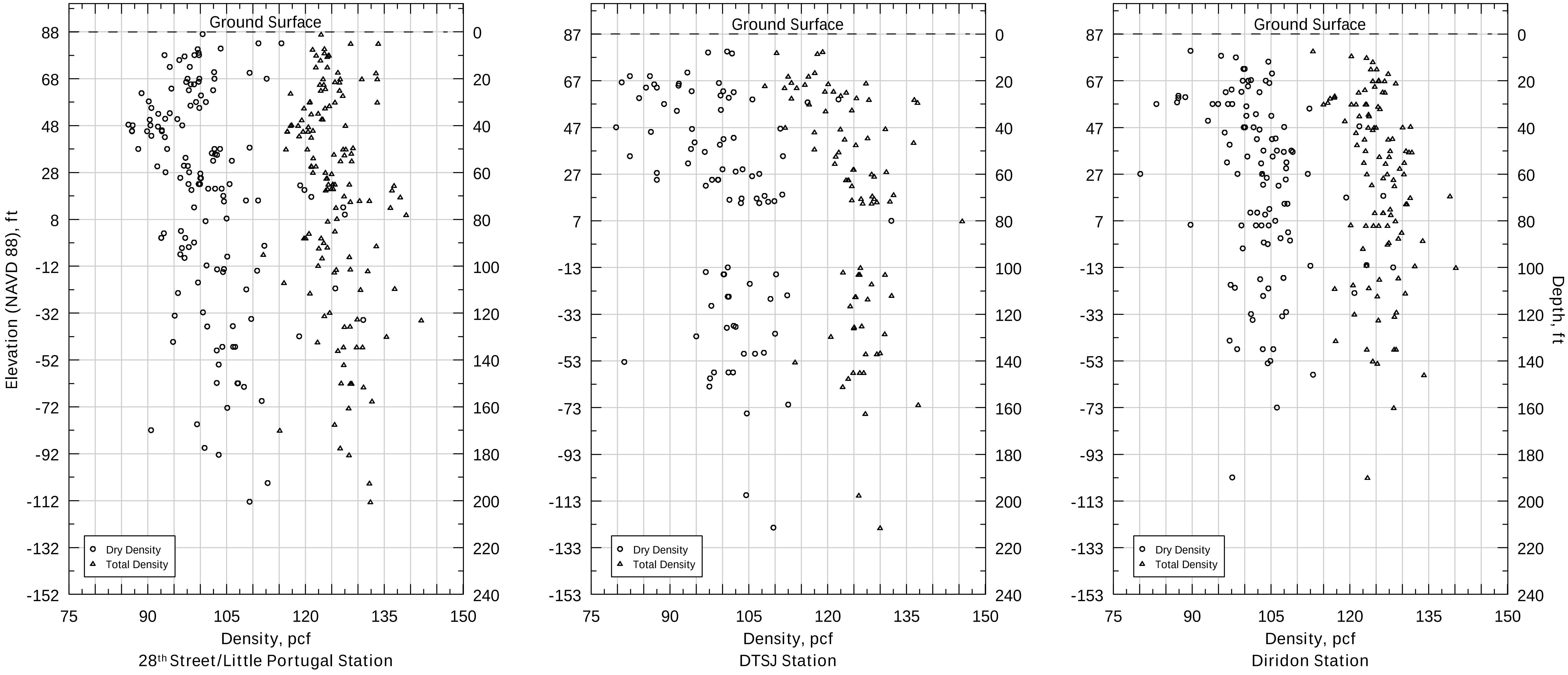
Figure 16.7



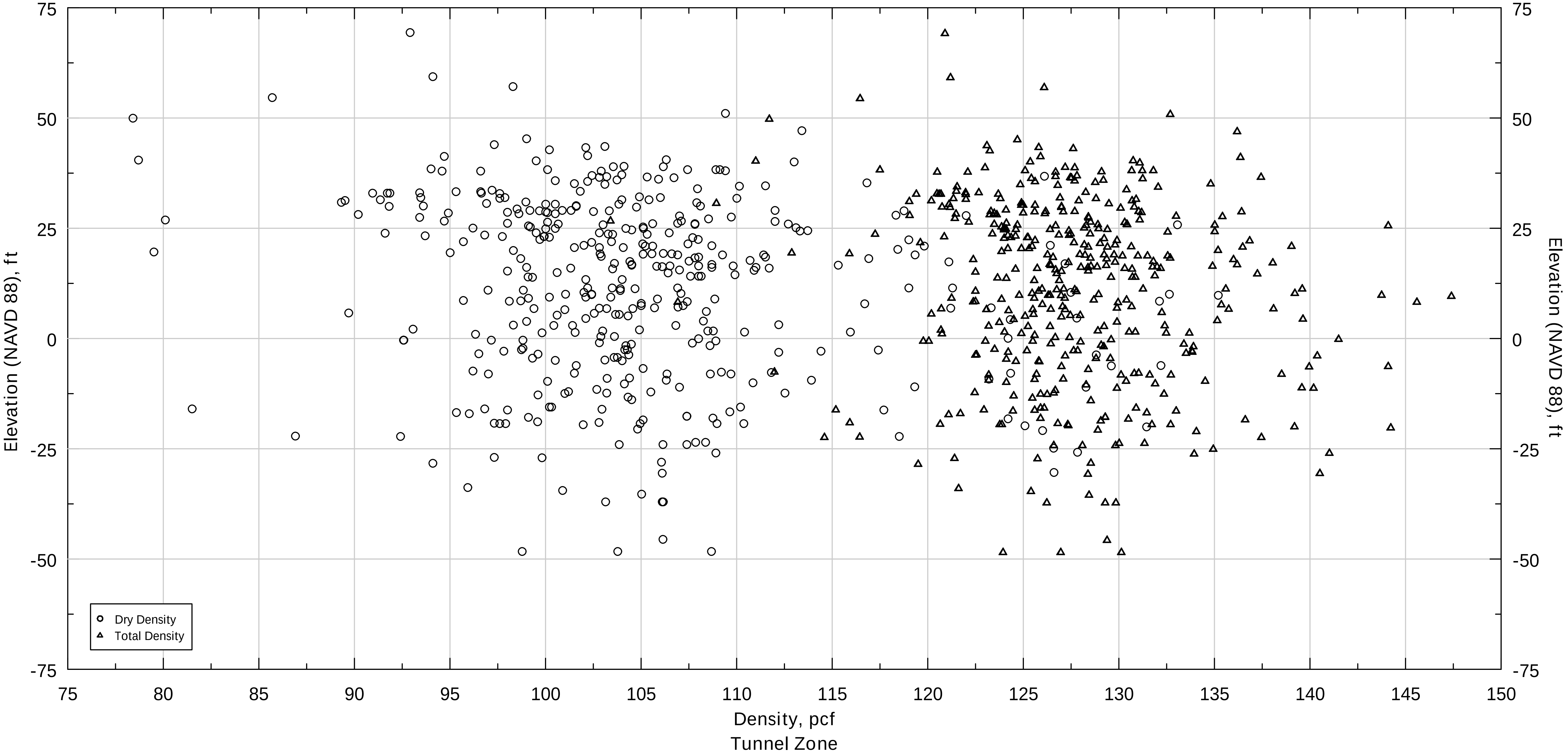
Notes

1. Ground surface elevation line represents the average surface elevation at each station.
2. DTSJ: Downtown San Jose.

Dry and Total Densities - Underground Stations

BART Silicon Valley Phase II Extension Project
Dec 2020 Geotechnical Data Report
Santa Clara Valley Transportation Authority
San Jose, California

Figure 17.1



Notes

1. Figure includes data from 5 feet above the tunnel crown to 5 feet below the tunnel invert.

Dry and Total Densities - Tunnel Zone

BART Silicon Valley Phase II Extension Project
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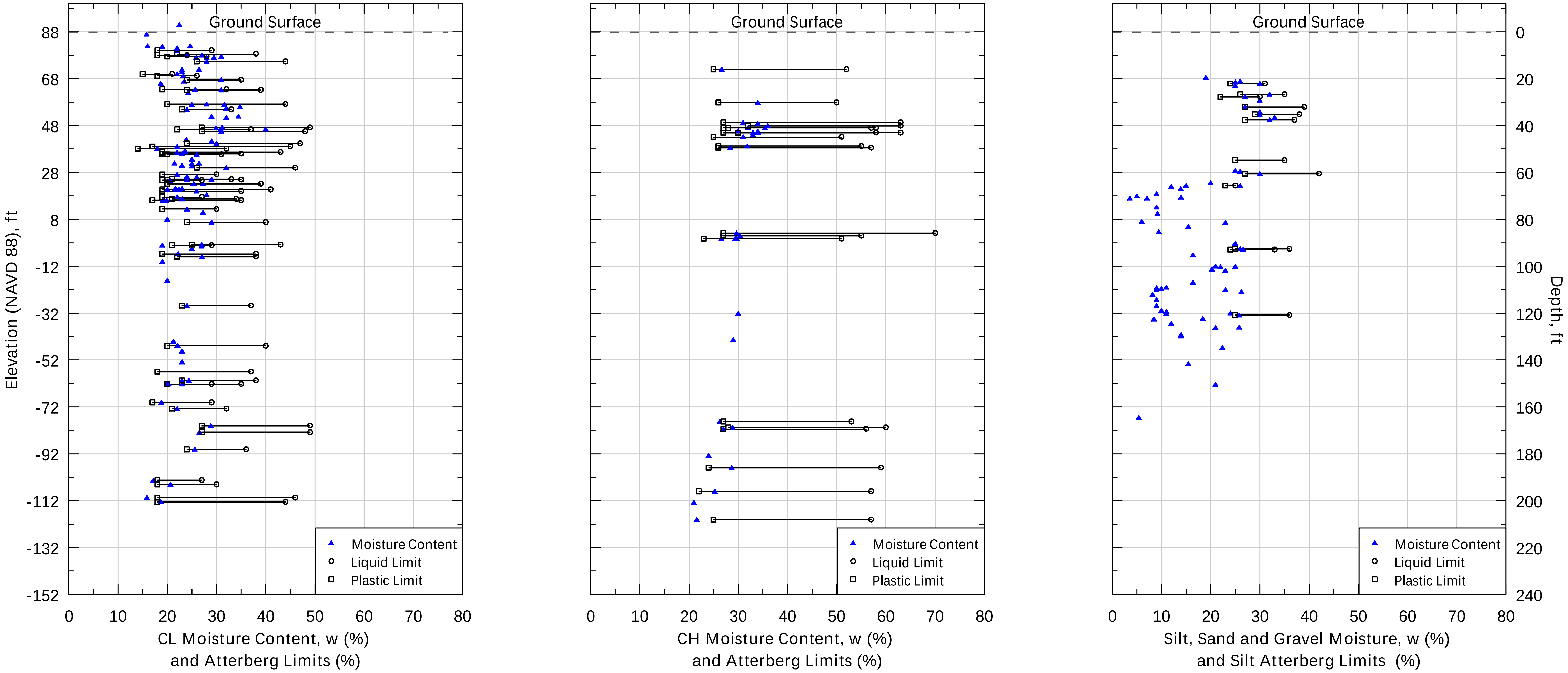
Figure 17.2



Notes
1. Ground surface elevation line represents the average surface elevation at 28th Street/Little Portugal Station.
2. CL: Low Plasticity Clay; CH: High Plasiticity Clay.

Moisture Content and Atterberg Limits -
28th Street / Little Portugal Station

Dec 2020

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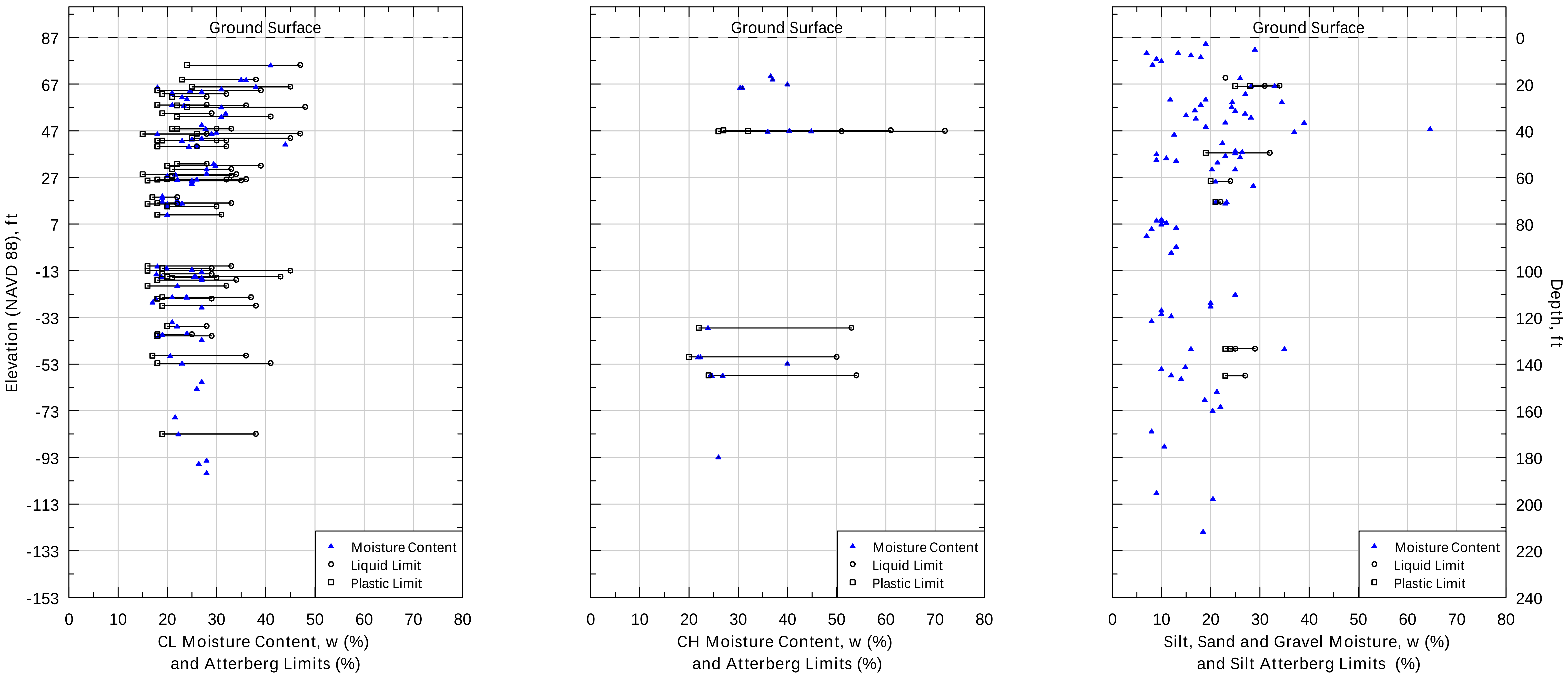
Figure 18.1



Notes
1. Ground surface elevation line represents the average surface elevation at Downtown San Jose Station.
2. CL: Low Plasticity Clay; CH: High Plasiticity Clay.

Moisture Content and Atterberg Limits - DTSJ Station

Dec 2020

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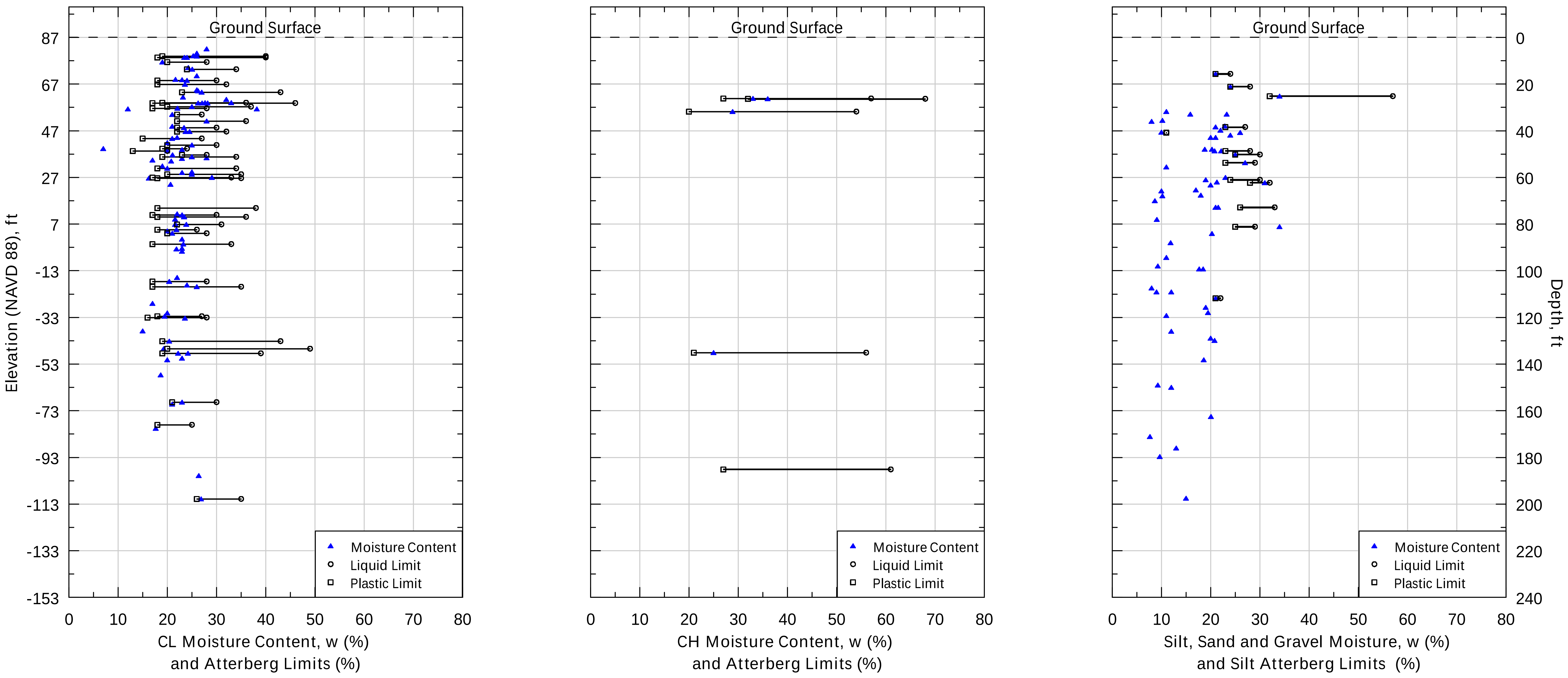
Figure 18.2



Notes

1. Ground surface elevation line represents the average surface elevation at Diridon Station.
2. CL: Low Plasticity Clay; CH: High Plasiticity Clay.

Moisture Content and Atterberg Limits - Diridon Station

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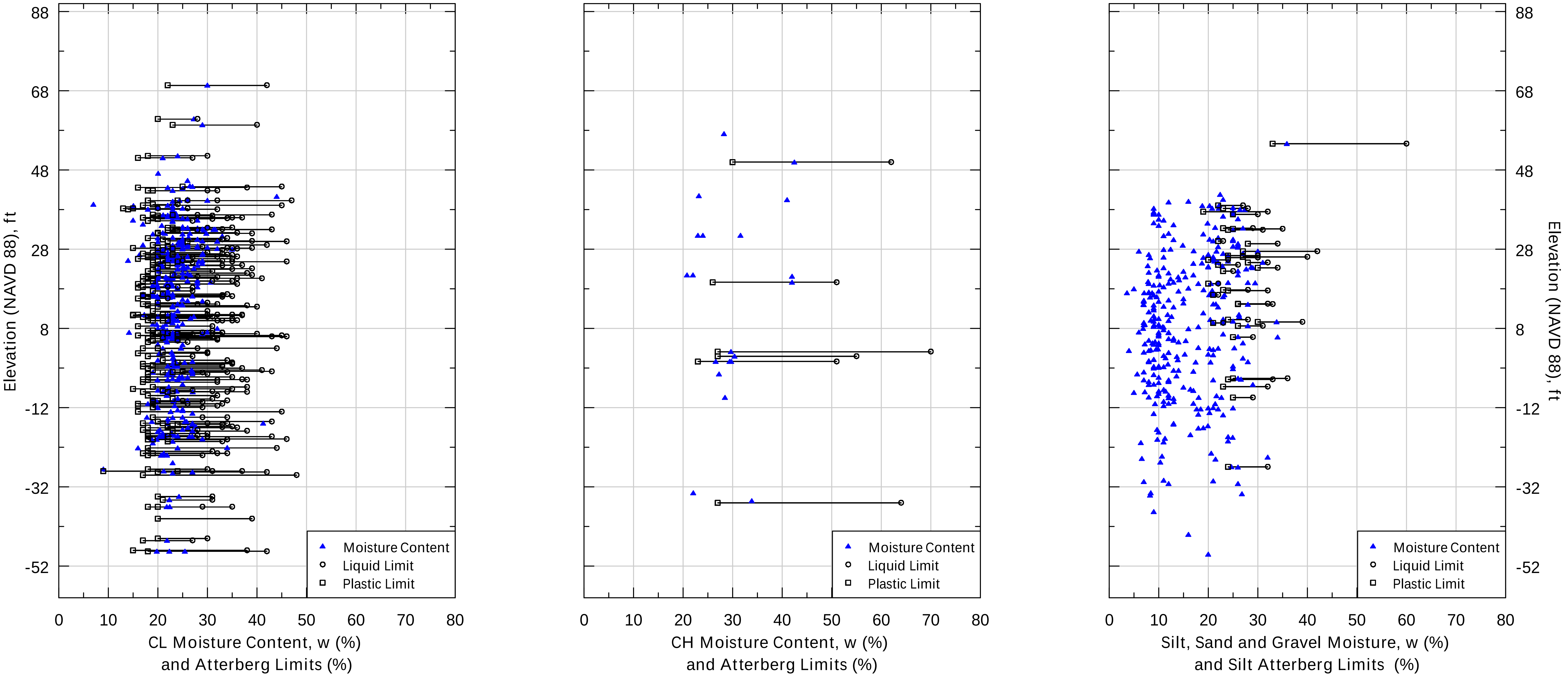
Figure 18.3



Notes

1. CL: Low Plasticity Clay; CH: High Plasiticity Clay.
2. Figure includes data from 5 feet above the tunnel crown to 5 feet below the tunnel invert.

Moisture Content and Atterberg Limits - Tunnel Zone

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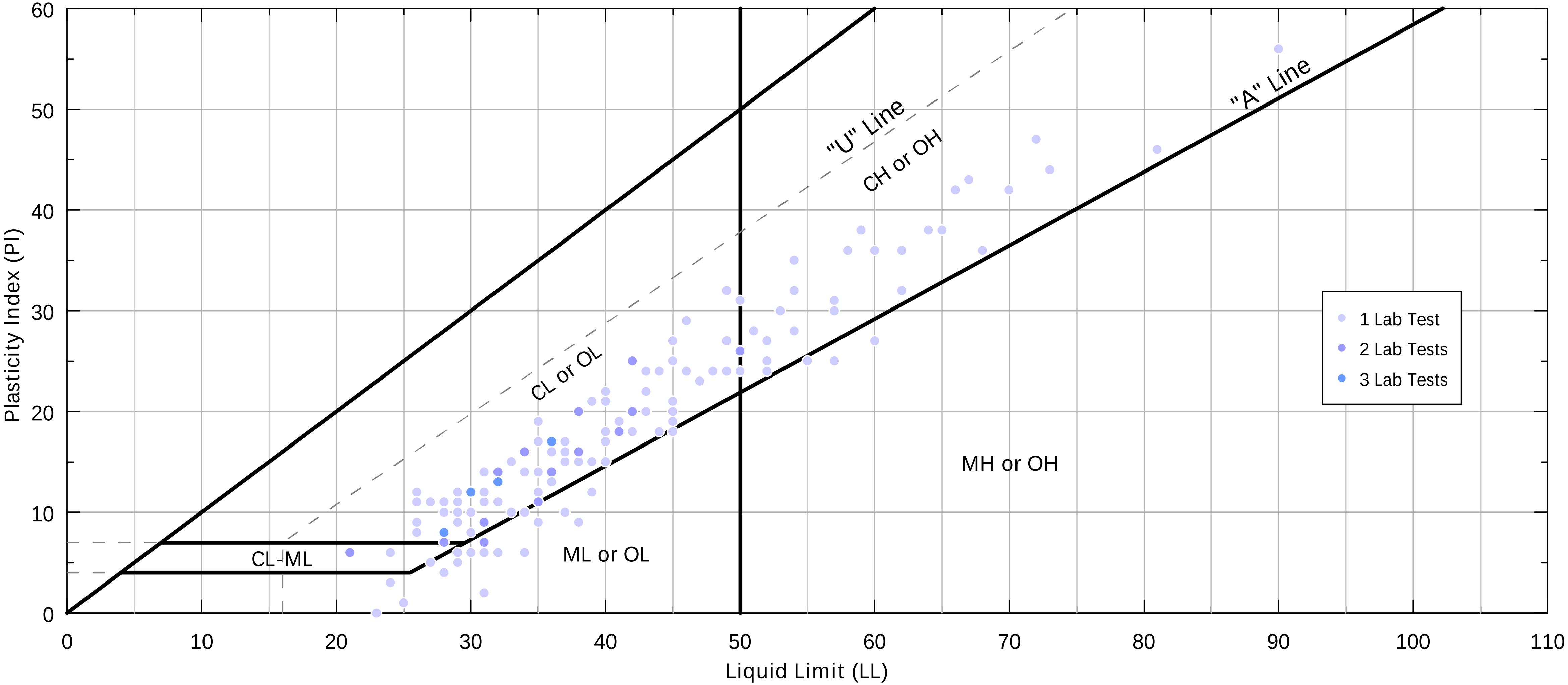
Figure 18.4



Notes:

1. This figure represents all available data points above an elevation of 50 feet (NAVD88) collected between 2001 and 2020. Seven lab tests returned non-plastic results.
2. The legend presents a color gradient of the number of duplicate values.

Atterberg Limits Above Elev. 50-ft (NAVD88)
Project Wide

Dec 2020

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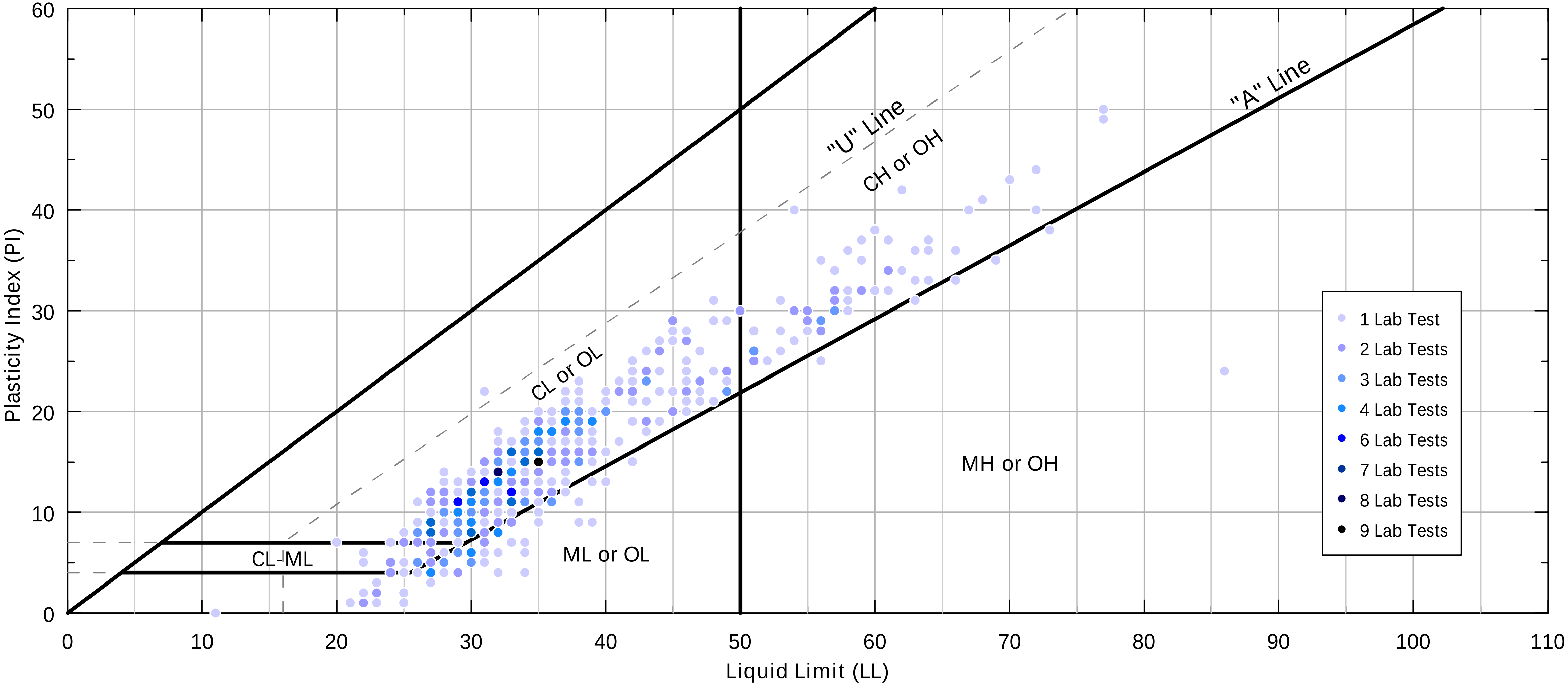
Figure 19.1



Notes:

1. This figure represents all available data points below an elevation of 50 feet (NAVD88) collected between 2001 and 2020. Nine lab tests returned non-plastic results.
2. The legend presents a color gradient of the number of duplicate values.

Atterberg Limits Below Elev. 50-ft (NAVD88)
Project Wide

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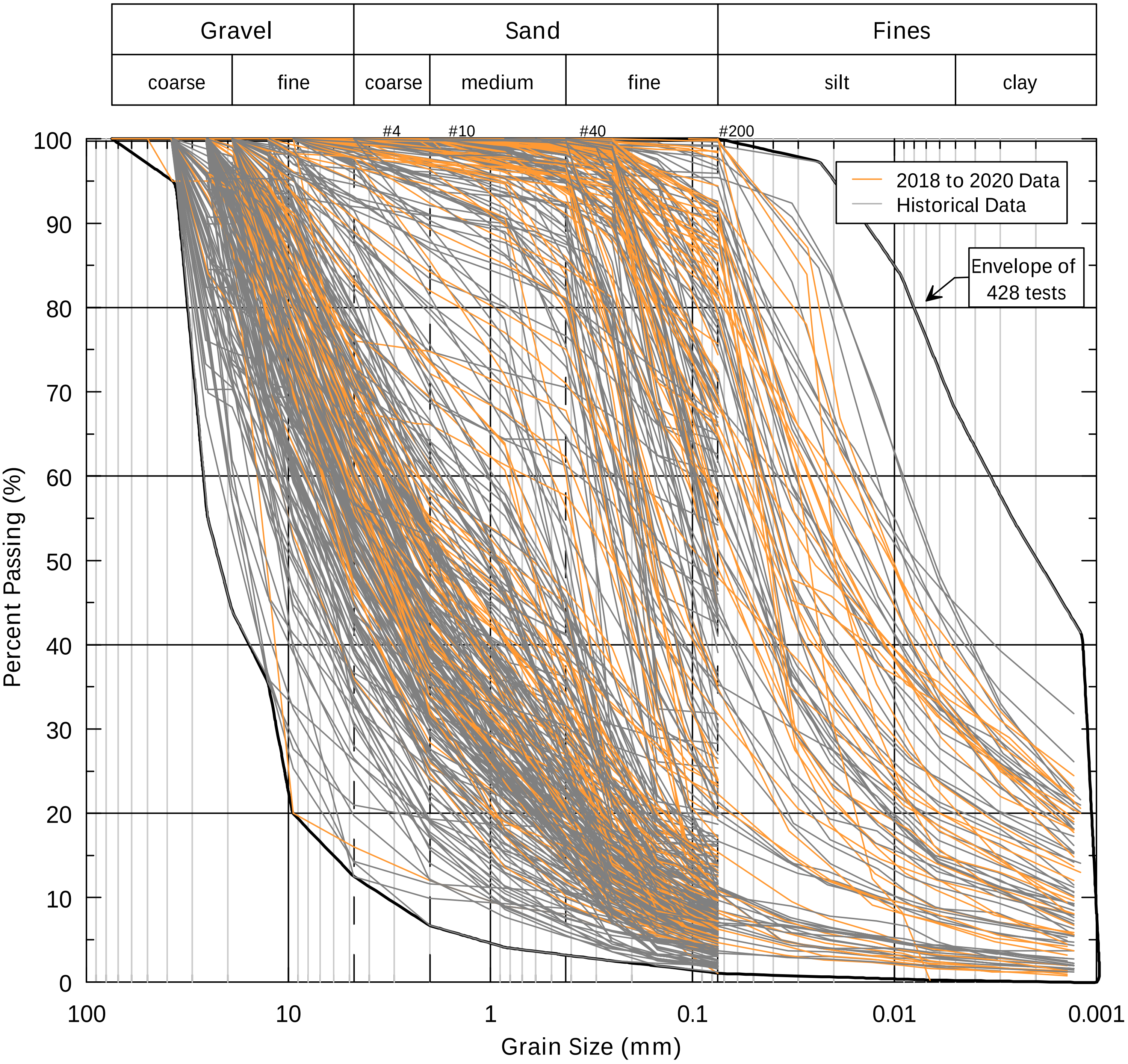
Figure 19.2



Notes:

1. Plots includes data from 5 feet above the tunnel crown to 5 feet below the tunnel invert.

Gradation Curve - Tunnel Zone

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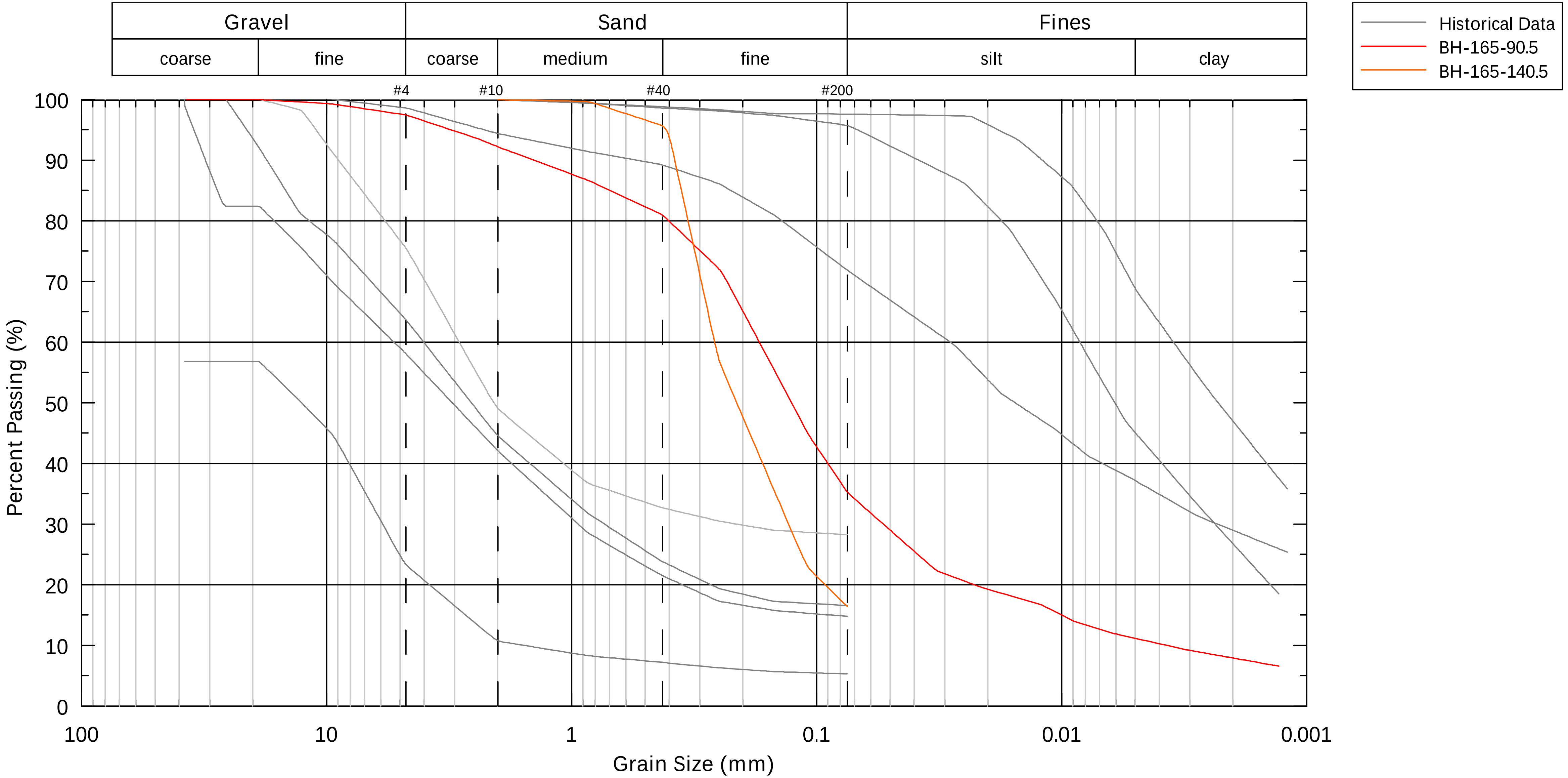
Figure 20.1



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.

Gradation Curve - East Portal

Dec 2020

BART Silicon Valley Phase II Extension Project
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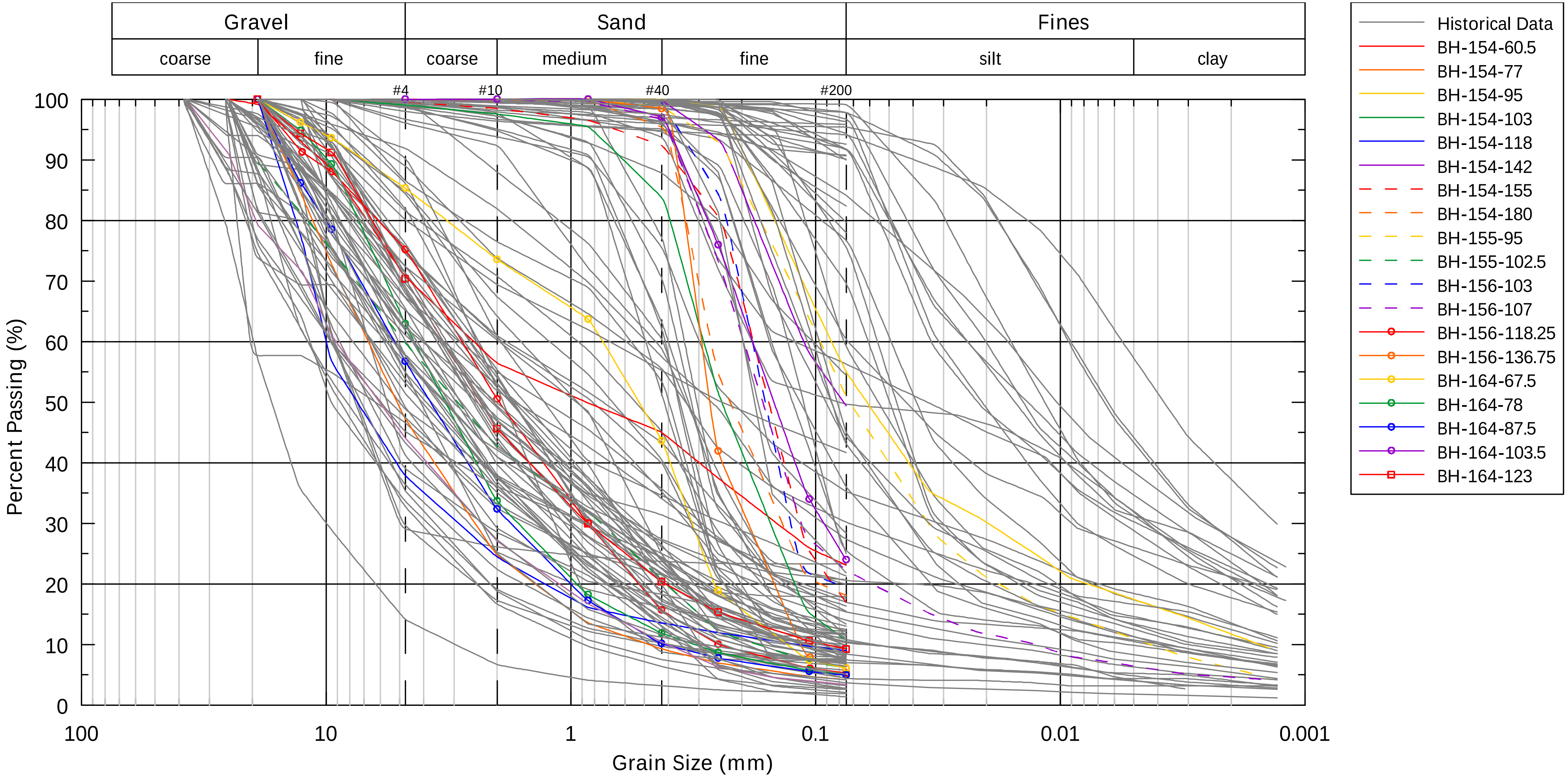
Figure 20.2



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.

Gradation Curve - 28th Street / Little Portugal Station

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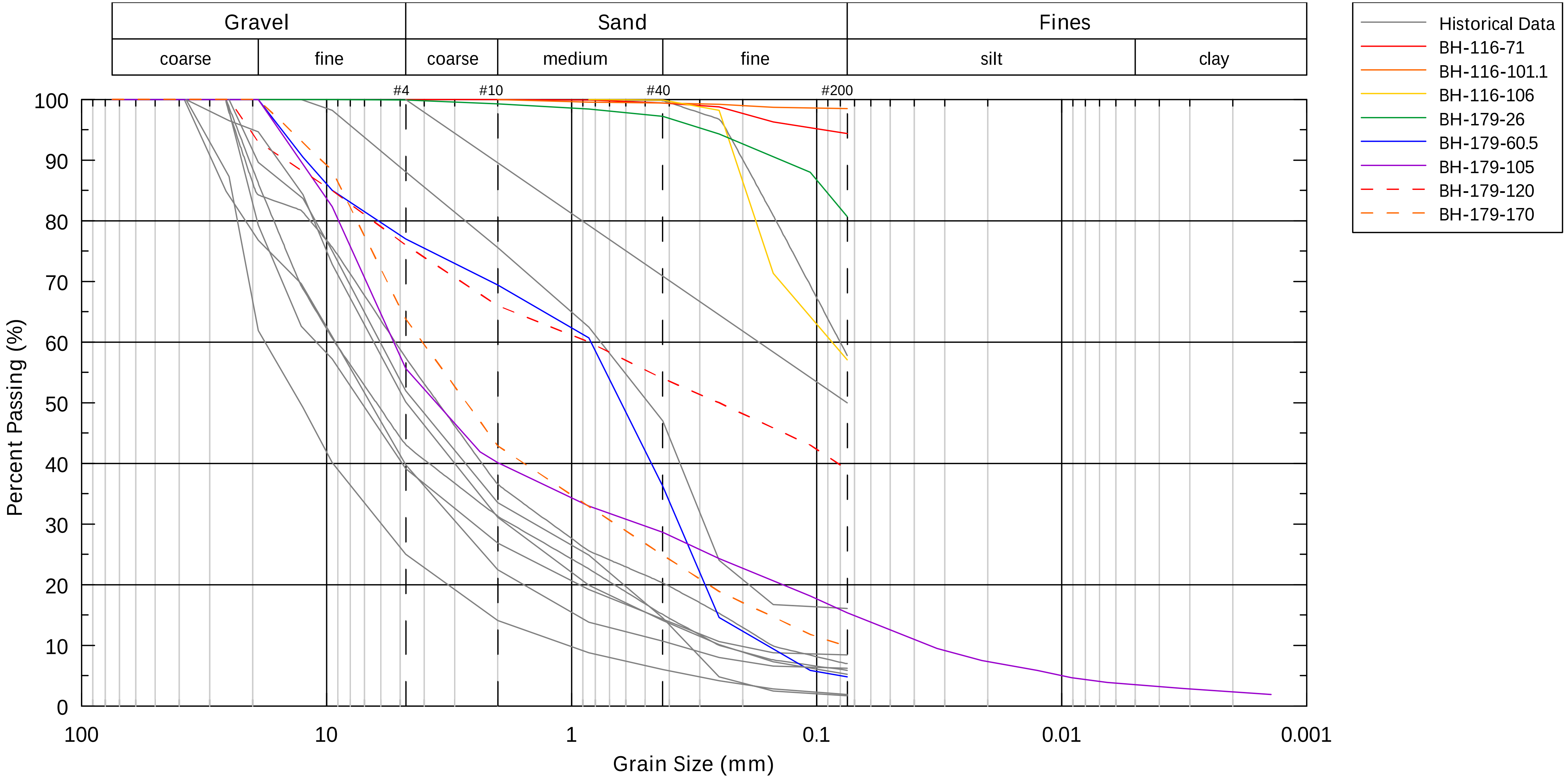
Figure 20.3



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.

Gradation Curve - East Emergency Stop

BART Silicon Valley Phase II Extension Project
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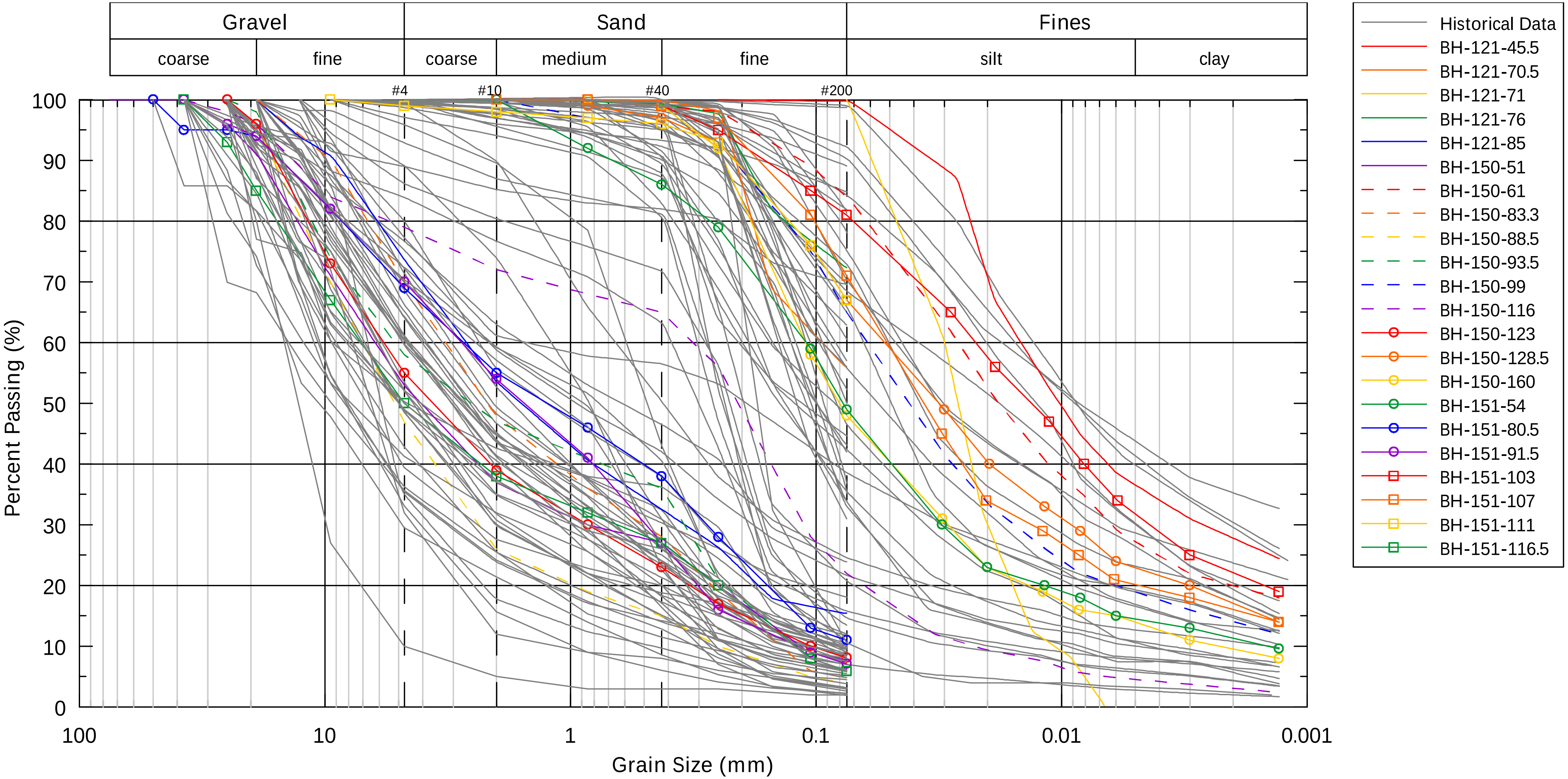
Figure 20.4



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.
2. DTSJ Station: Downtown San Jose Station.

Gradation Curve - DTSJ Station

Dec 2020

BART Silicon Valley Phase II Extension Project
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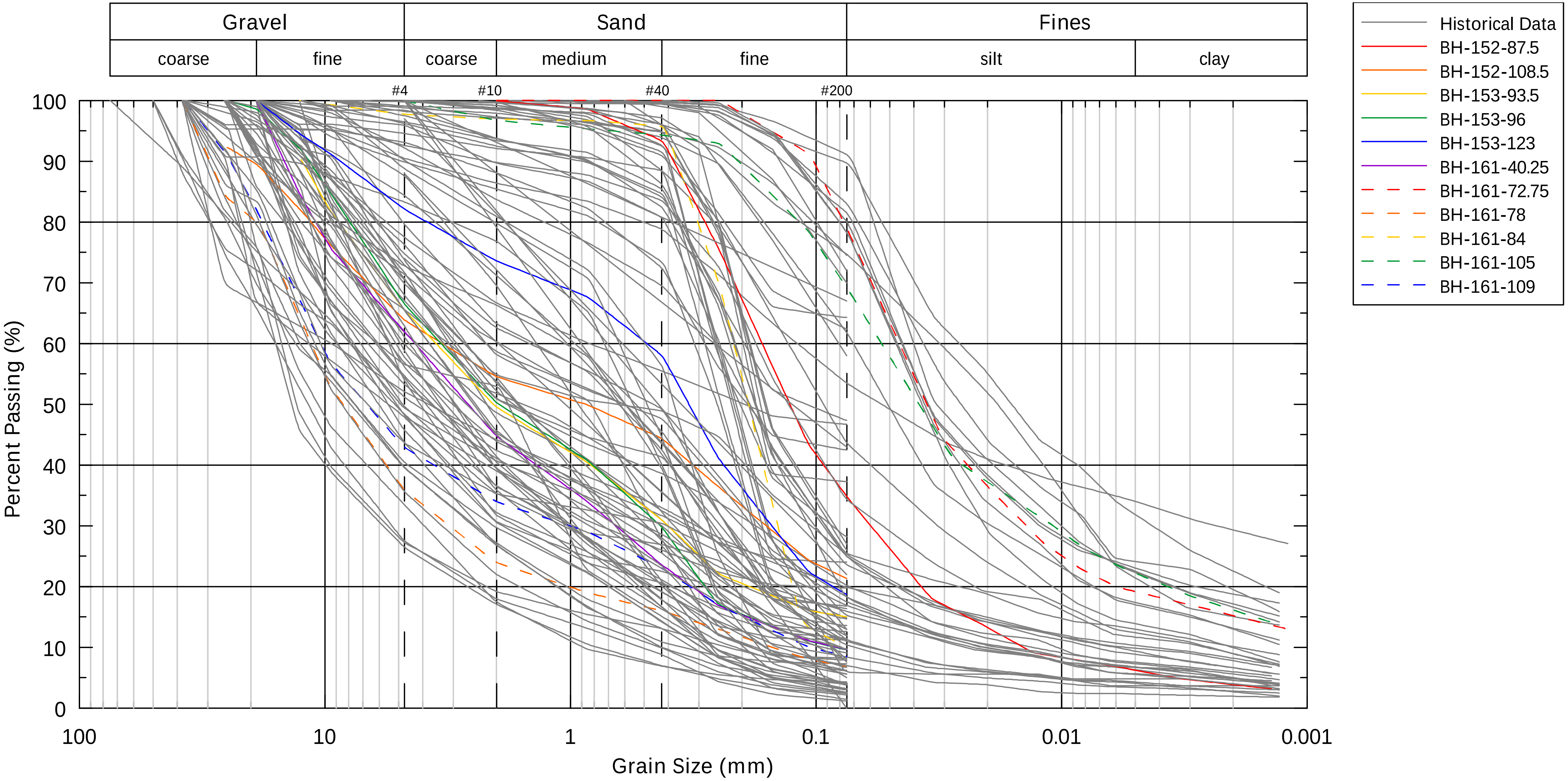
Figure 20.5



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.

Gradation Curve - Diridon Station

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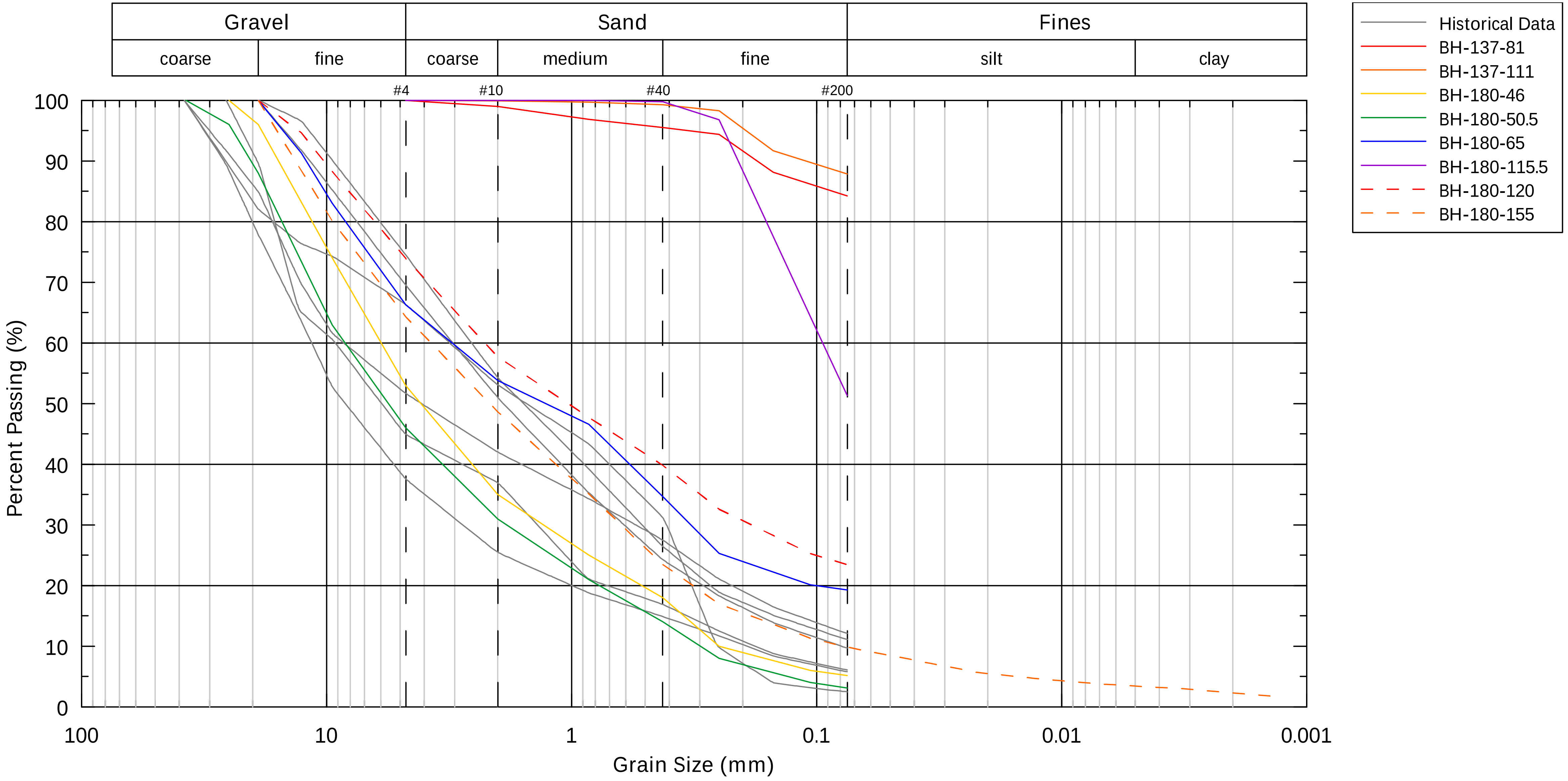
Figure 20.6



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.

Gradation Curve - West Emergency Stop

BART Silicon Valley Phase II Extension Project
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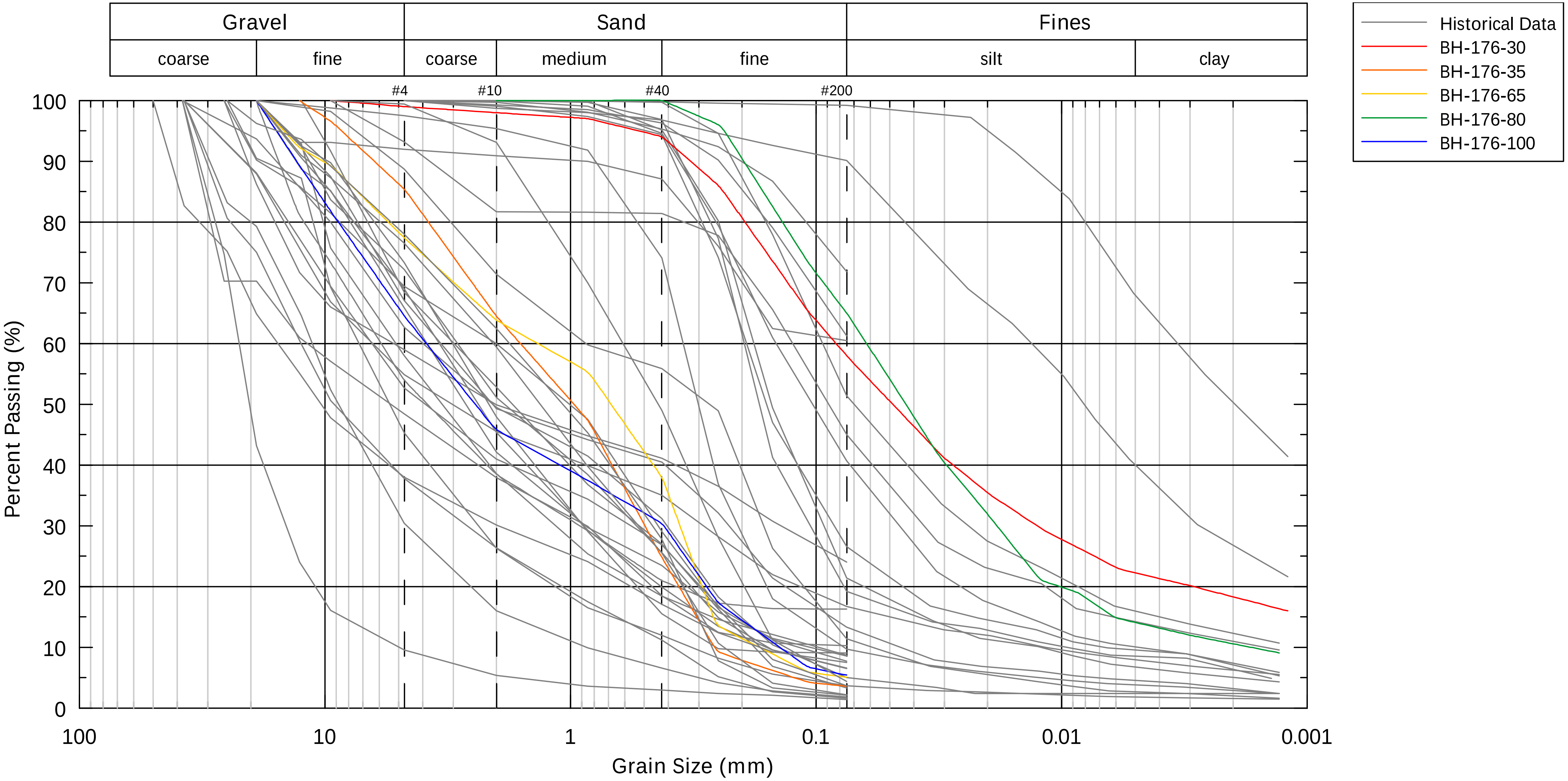
Figure 20.7



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.

Gradation Curve - West Portal

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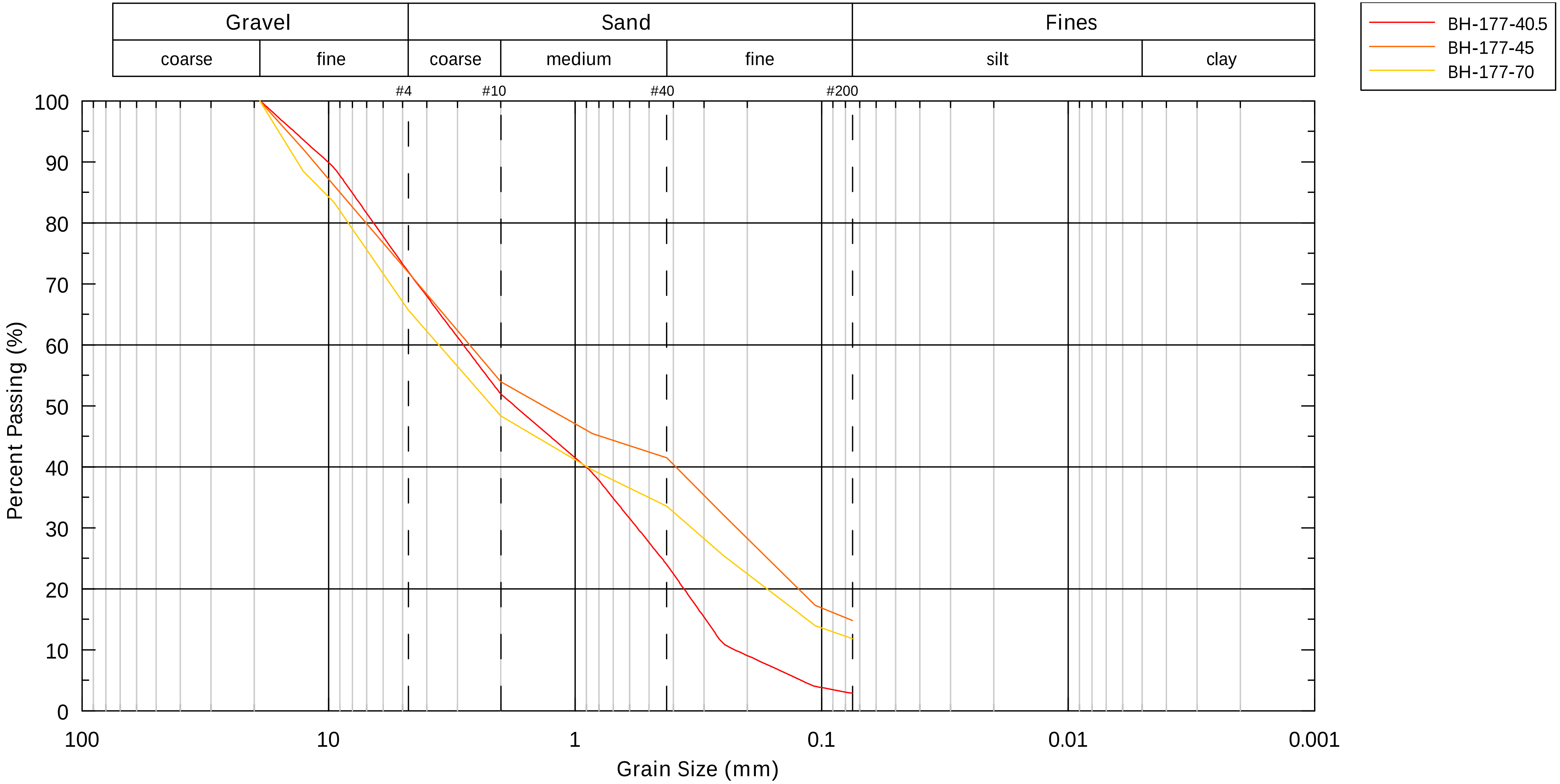
Figure 20.8



Notes:

1. Each plot presents the borehole identification number followed by the depth of the soil sample tested.

Gradation Curve - Santa Clara Station

Dec 2020

BART Silicon Valley Phase II Extension Project
Geotechnical Data Report
Santa Clara Valley Transportation Authority
San Jose, California

Figure 20.9

Drawings

Geotechnical Plan and Profile: Sheets 603000 to 603070

SOIL STRATIGRAPHY

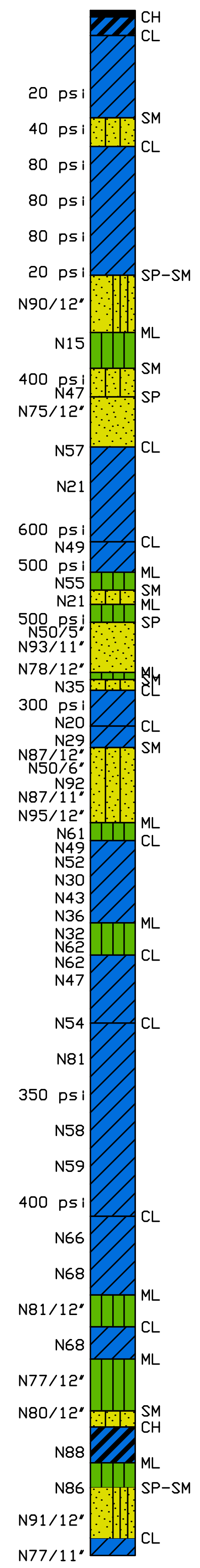
- ■ ASPHALT
- ▨ FAT CLAY (CH)
- ▨ LEAN CLAY (CL)
- ▨ SILTY CLAY (CL-ML)
- ▨ CONCRETE
- ▨ FILL
- ▨ CLAYEY GRAVEL (GC)
- ▨ SILTY GRAVEL (GM)
- ▨ POORLY-GRADED GRAVEL (GP)
- ▨ POORLY-GRADED GRAVEL WITH CLAY (OR SILTY CLAY) (GP-GC)
- ▨ POORLY-GRADED GRAVEL WITH SILT (GP-GM)
- ▨ WELL-GRADED GRAVEL (GW)
- ▨ WELL-GRADED GRAVEL WITH CLAY (OR SILTY CLAY) (GW-GC)
- ▨ WELL-GRADED GRAVEL WITH SILT (GW-GM)
- ▨ SILT (ML)
- ▨ HIGHLY PLASTICITY ORGANICS (OH)
- ▨ LOW PLASTICITY ORGANICS (OL)
- ▨ PEAT
- ▨ CLAYEY SAND (SC)
- ▨ SILTY, CLAYEY SAND (SC-SM)
- ▨ SILTY SAND (SM)
- ▨ POORLY GRADED SAND (SP)
- ▨ POORLY GRADED SAND WITH CLAY (OR SILTY CLAY) (SP-SC)
- ▨ POORLY GRADED SAND WITH SILT (SP-SM)
- ▨ WELL-GRADED SAND (SW)
- ▨ WELL-GRADED SAND WITH SILT (SW-SM)

SAMPLE TYPE

- ▨ BULK AUGER OR BAG
- ▨ GRAB
- ⧗ MODIFIED CALIFORNIA
- ■ DAMES AND MOORE PISTON
- ▨ PITCHER BARREL
- ☐ STANDARD CALIFORNIA
- ▨ SHELBY TUBE
- ☒ STANDARD PENETRATION TEST
- ▨ DAMES AND MOORE U-TYPE

SOIL BOREHOLES

2018-2020 GEOTECHNICAL INVESTIGATION



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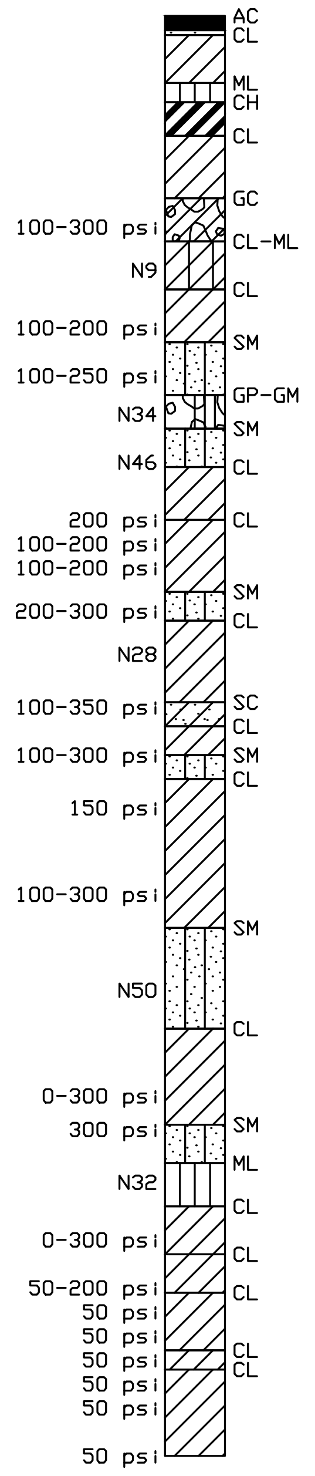
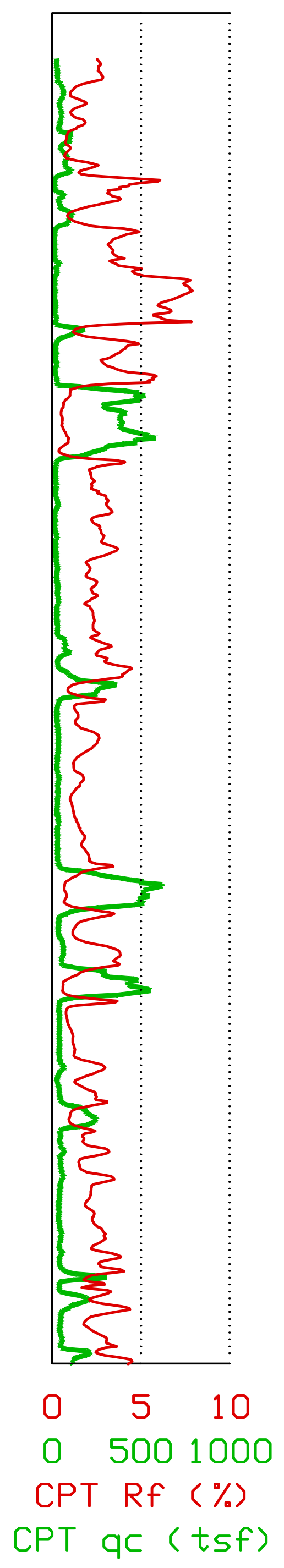


CPT SOUNDINGS

2018-2020 GEOTECHNICAL INVESTIGATION



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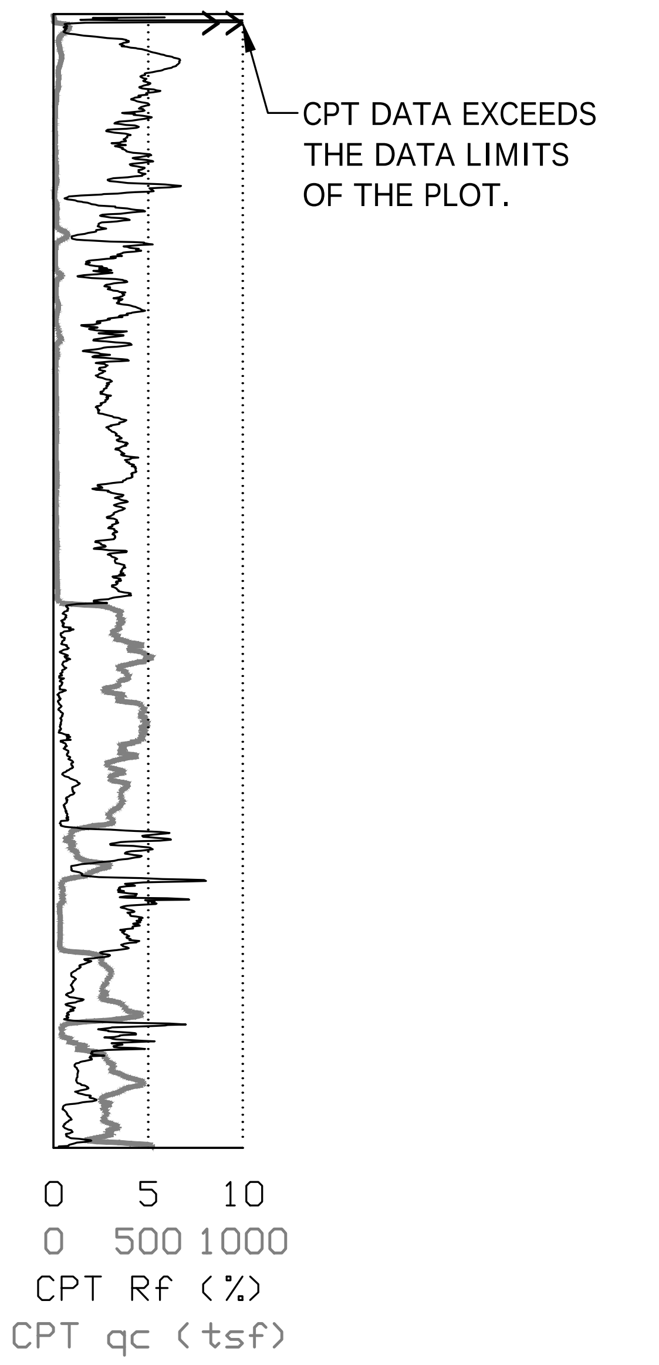

GENERAL NOTES:

1. ALIGNMENTS SHOWN ON PLAN AND PROFILE ARE BASED ON THE ALIGNMENT DATED 11-05-2020.
2. G1 ALIGNMENT IS A PROJECT BASE ALIGNMENT. WITHIN THE TUNNEL LIMITS IT FOLLOWS THE TUNNEL SPRING LINE. OUTSIDE OF THE TUNNEL, IT IS A BEST FIT ALIGNMENT BETWEEN THE S1 AND S2 TRACK AND EXTENDS TO THE LIMITS OF THE PROJECT. ALIGNMENT BEGINS AT 6162613.9701 EASTING AND 1957877.1360 NORTHING, (NAD83) AT STATION 550+53.09.
3. STATIONING REPRESENTED EXTENDS FROM BERRYESSA TAIL TRACK THROUGH TUNNEL, OUT OF WEST PORTAL TO END OF TRACK AT SANTA CLARA STATION. WITHIN THE TUNNEL, STATIONING FOLLOWS THE TUNNEL SPRING LINE.
4. OFFSET - A RIGHT ANGLE DISTANCE FROM A SURVEYED BASELINE.
5. RT OFFSET - A DISTANCE, TO THE RIGHT, FROM SURVEYED BASELINE IN THE DIRECTION OF INCREASING STATION VALUES.
6. LT OFFSET - A DISTANCE, TO THE LEFT, FROM A SURVEYED BASELINE IN THE DIRECTION OF INCREASING STATION VALUES.
7. UNCORRECTED BLOW COUNTS PRESENTED FOR LAST 12 INCHES OF DRIVE (OR FRACTION THEREOF) WITH A 140 LB AUTOMATIC TRIP HAMMER / 30 INCH DROP.
8. PRESSURE (PSI) RECORDED TO ADVANCE DAMES & MOORE PISTON, SHELBY TUBE, AND PITCHER BARREL SAMPLERS.
9. AVAILABLE HISTORICAL SOIL BOREHOLES AND CPT SOUNDINGS WITHIN 100 FEET OF TUNNEL SPRING LINE AND ALL 2018-2020 SOIL BOREHOLES ARE INCLUDED IN THE PLAN VIEW DRAWINGS.
10. WHERE MANY BOREHOLES AND CPTs ARE COMPLETED WITHIN 100 FEET OF THE ALIGNMENT THE PROFILE VIEW DRAWINGS DO NOT SHOW ALL PLAN VIEW BOREHOLES AND CPTs FOR LEGIBILITY. PRIORITY FOR SHOWING POINTS OF EXPLORATION WAS (1) THE 2018-2020 WORK AND (2) PROXIMITY TO TUNNEL SPRING LINE.

- — TOP OF RAIL
- ═ TUNNEL EXTENTS
- — EXISTING GROUND SURFACE
- ⊕ BOREHOLE HISTORICAL
- ⊕ BOREHOLE 2018-2020
- ▲ CPT HISTORICAL
- ▲ CPT 2018-2020

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						DRAWN BY	P.NG
						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
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BART SILICON VALLEY PHASE II
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VTA BSV Phase II

KEY TO GEOTECHNICAL
PLAN AND PROFILE

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603000		
CONTRACT NO.	SCALE AT D SIZE NTS	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603000	PAGE NO.

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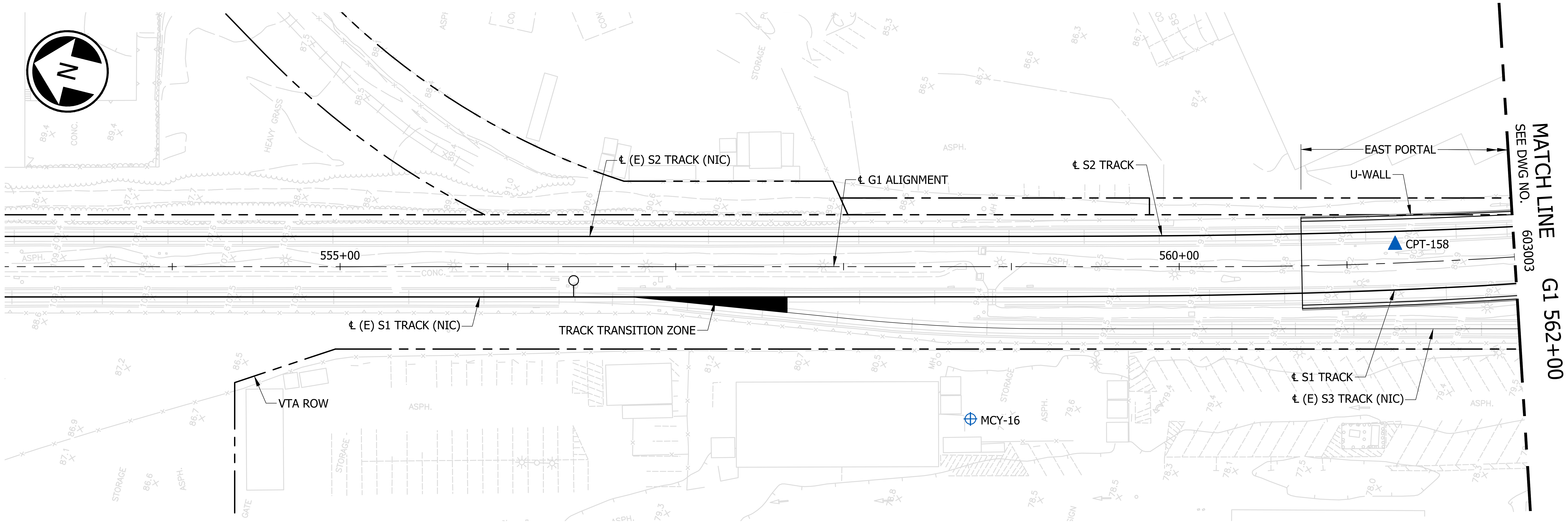

PLAN

SCALE: 1" = 40'

BAR SCALE

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 1A

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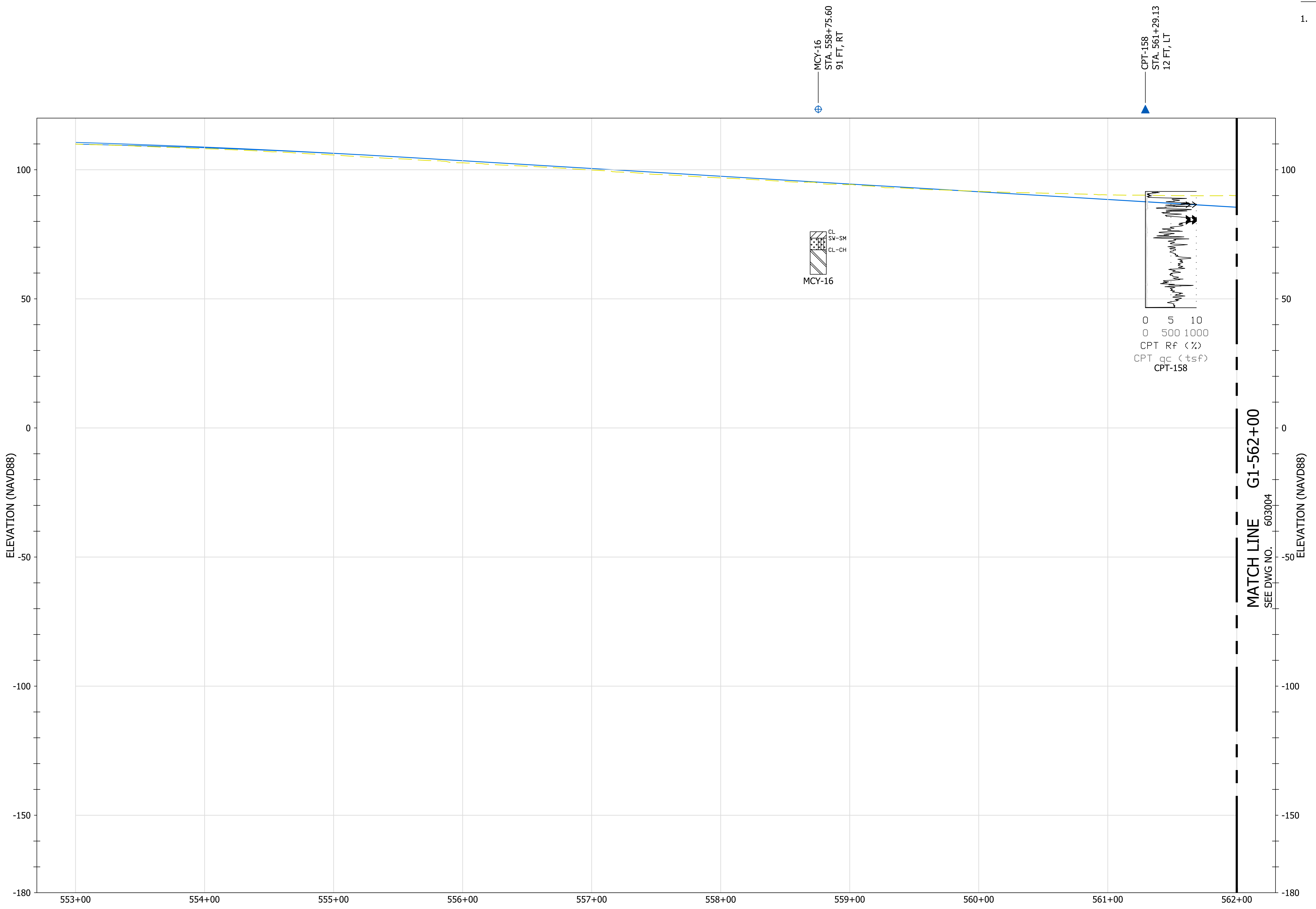
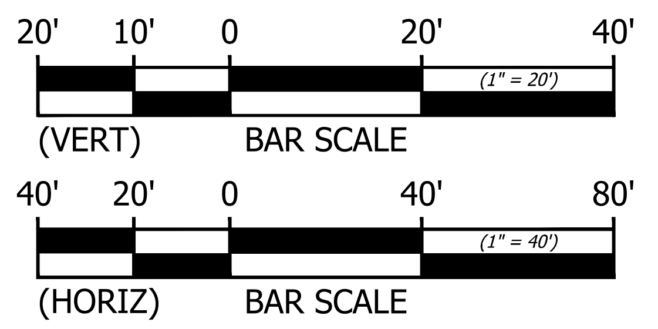
SHEET NOTES:

1. EAST END OF ALIGNMENT IS ELEVATED ON AN MSE WALL. BOREHOLE MCY-16 IS SHOWN BELOW FINISHED GRADE.



PROFILE

SCALE: 1"=40'H; 1"=20'V



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PROFILE
SHEET 1B

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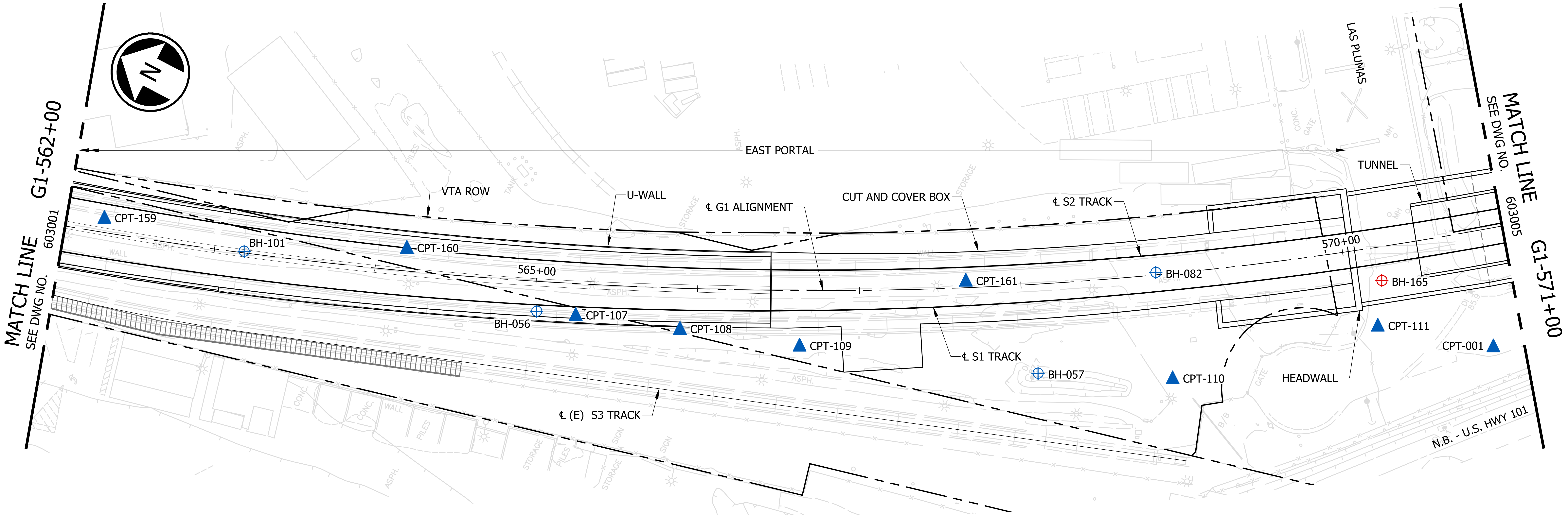

PLAN

SCALE: 1" = 40'

40' 20' 0 40' 80'

(1" = 40')

BAR SCALE

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 2A

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	SHEET NO. 603003	PAGE NO.

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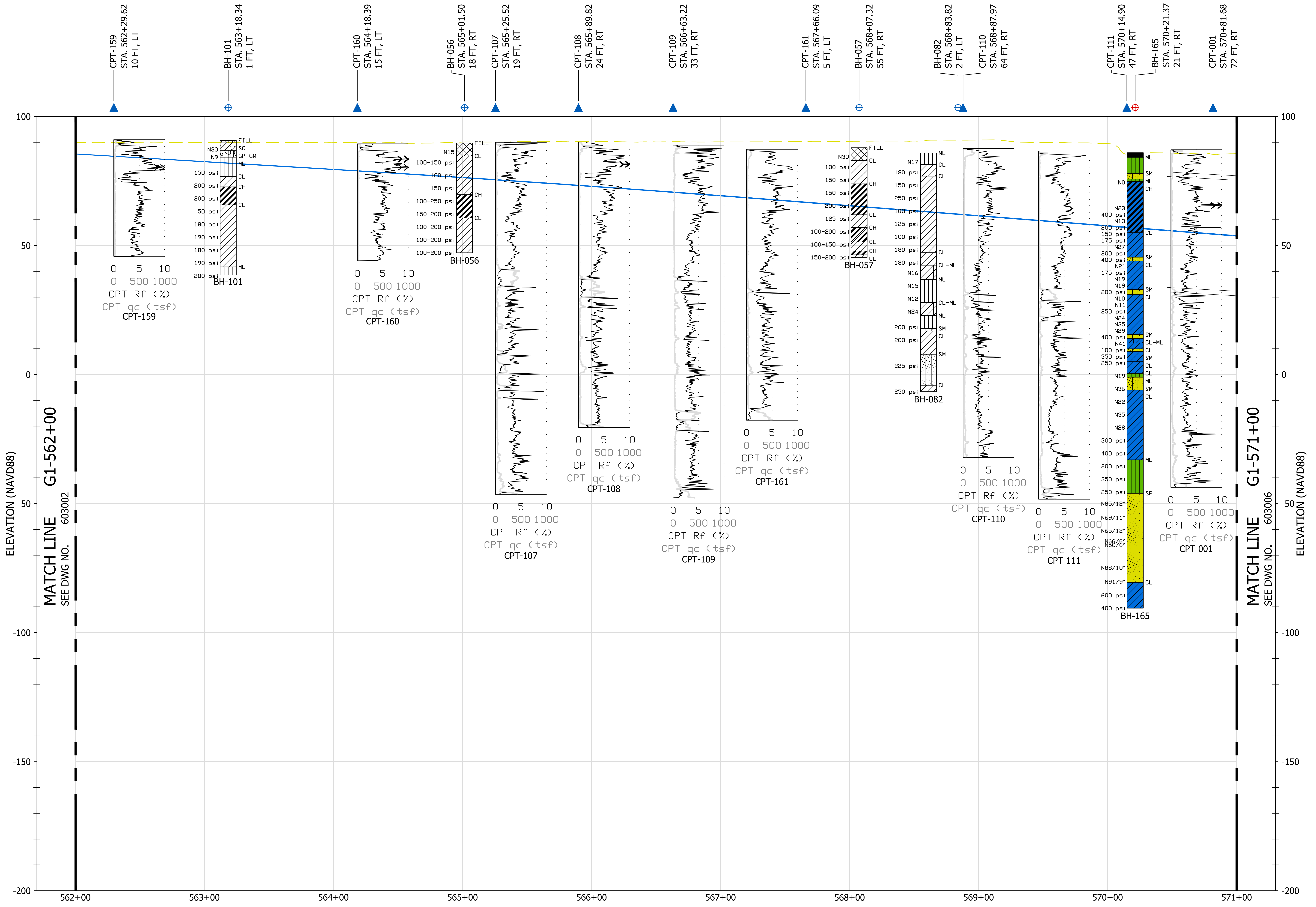
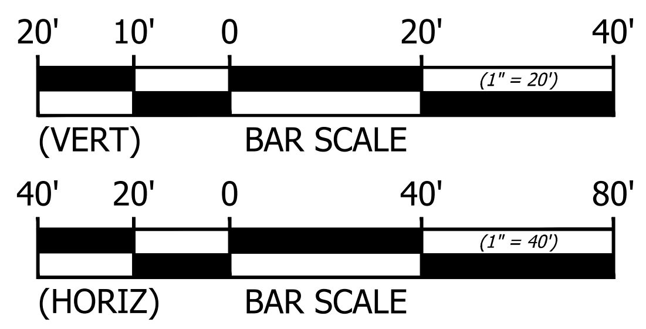


PROFILE

SCALE: 1"=40'H; 1"=20'V



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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 2B

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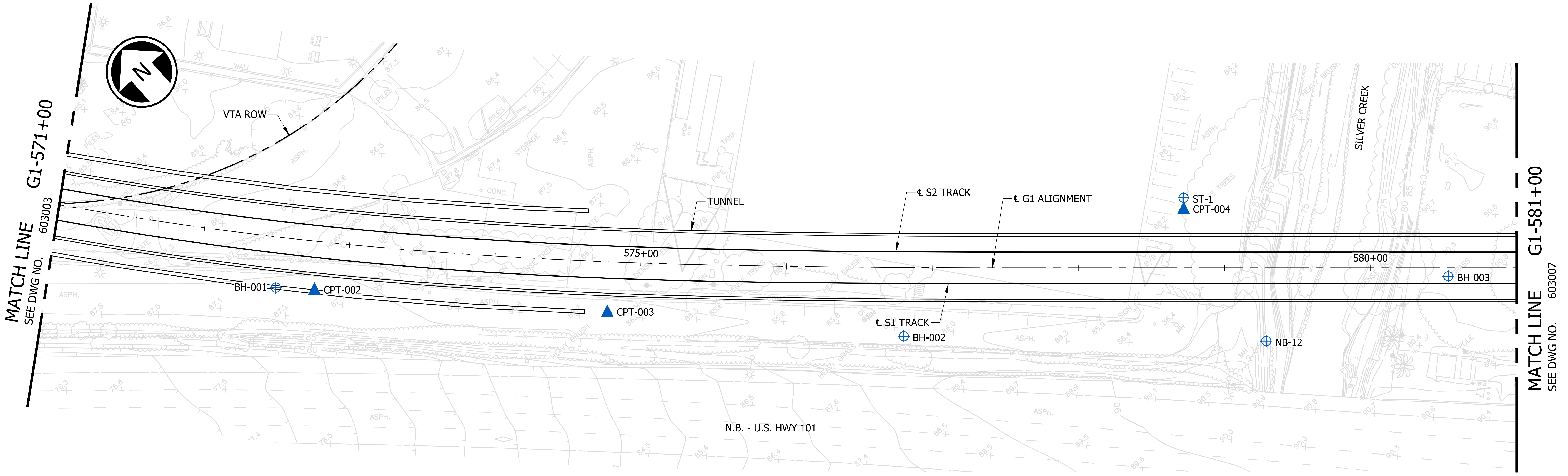

PLAN
SCALE: 1" = 40'

BAR SCALE

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 3A

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PROFILE

SCALE: 1"=40'H; 1"=20'V

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 3B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603006		
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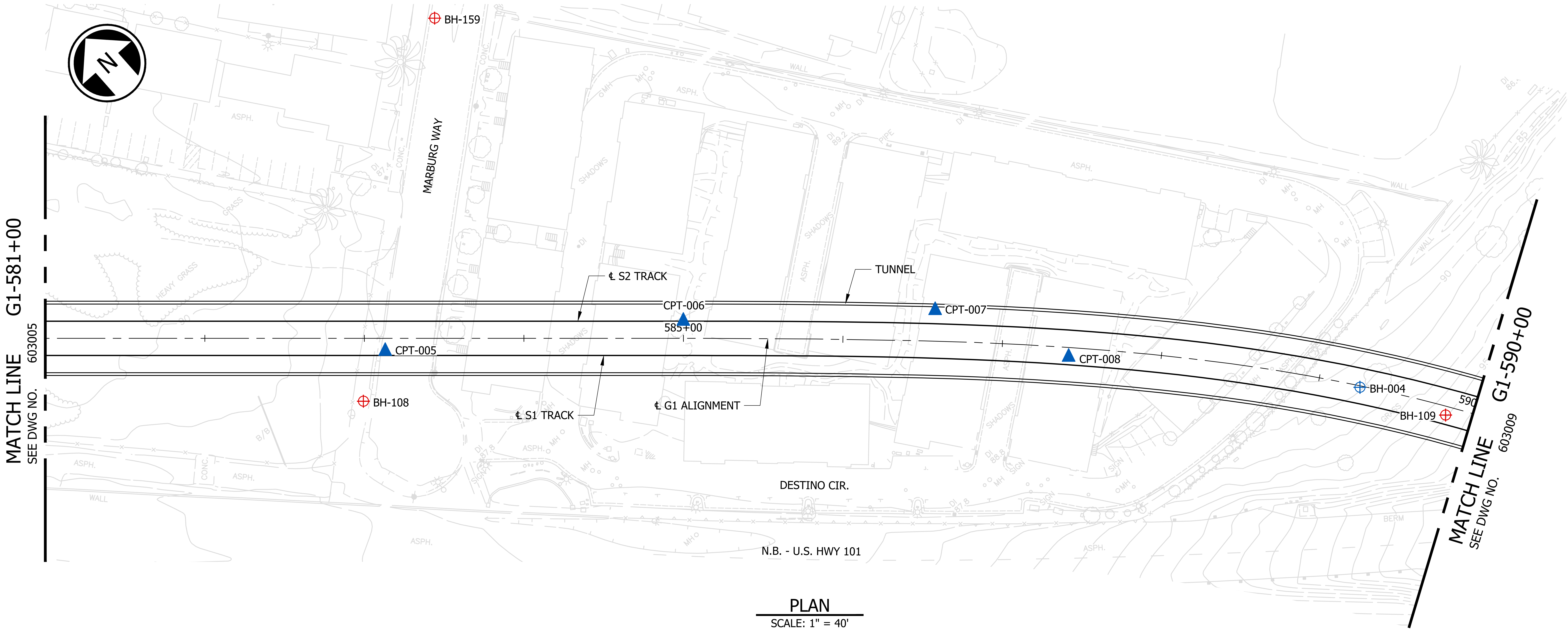
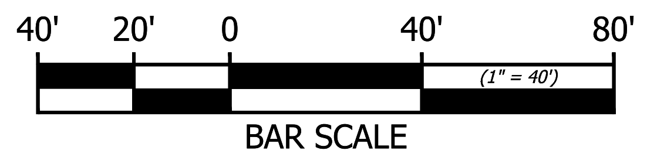


PLAN
SCALE: 1" = 40'



BAR SCALE

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PLAN
SHEET 4A

DRAWING FILE IDENTIFIER
385606-MMW-00-XX-DR-GE-603007

CONTRACT NO.	SCALE AT D SIZE	REV.
	1"=40'	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
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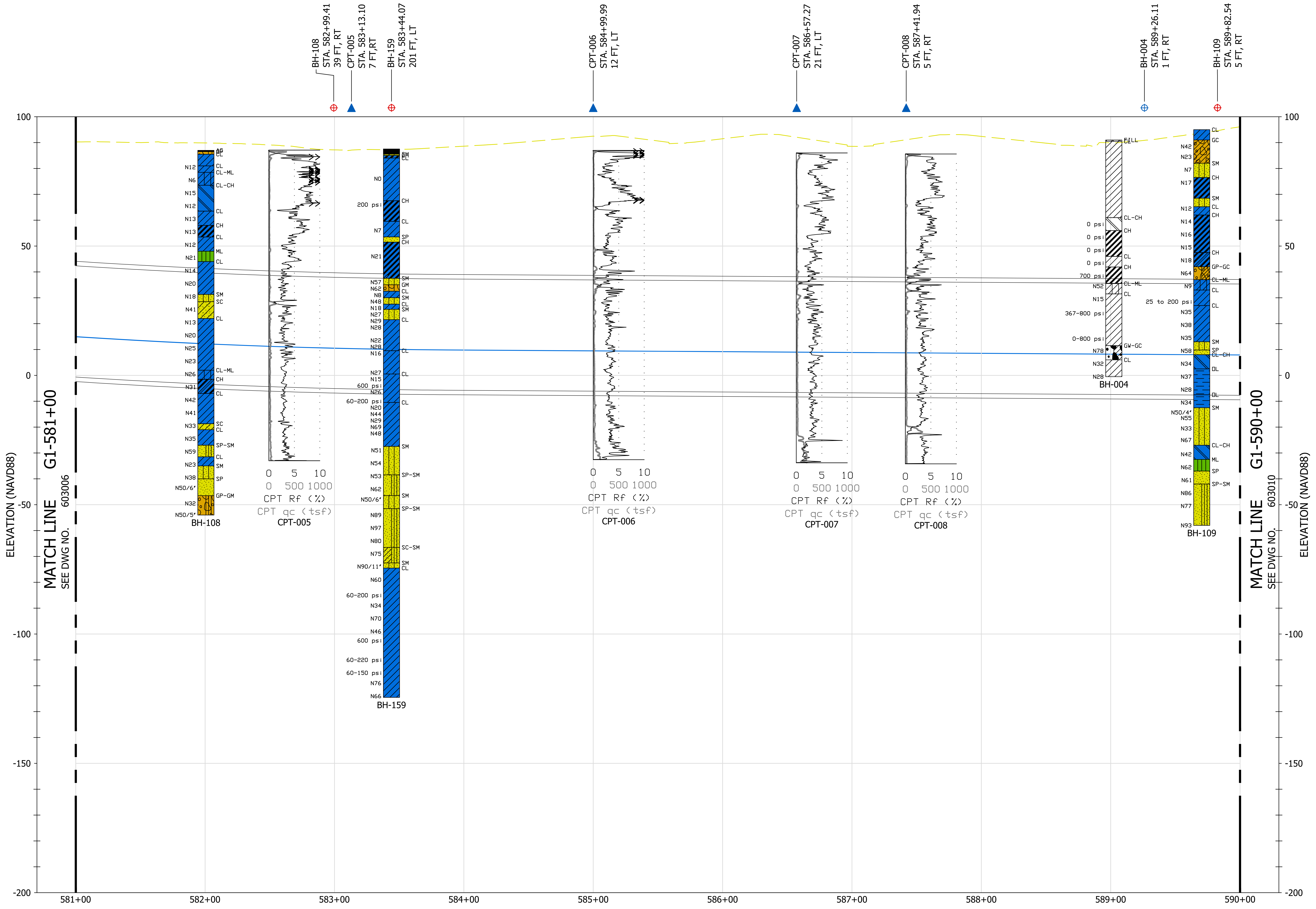

PROFILE

SCALE: 1"=40'H; 1"=20'V

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 4B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603008		
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SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603008	PAGE NO.

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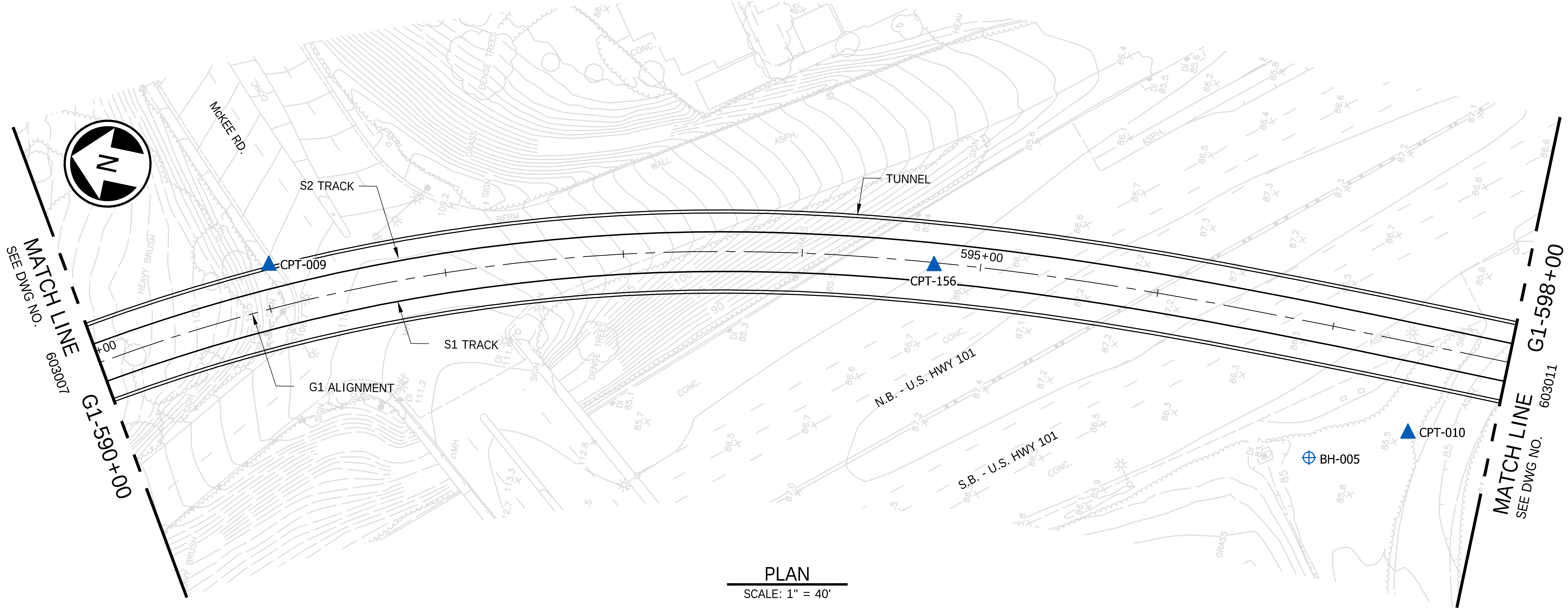
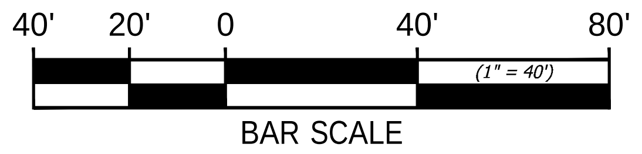


PLAN

SCALE: 1" = 40'



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 5A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603009		
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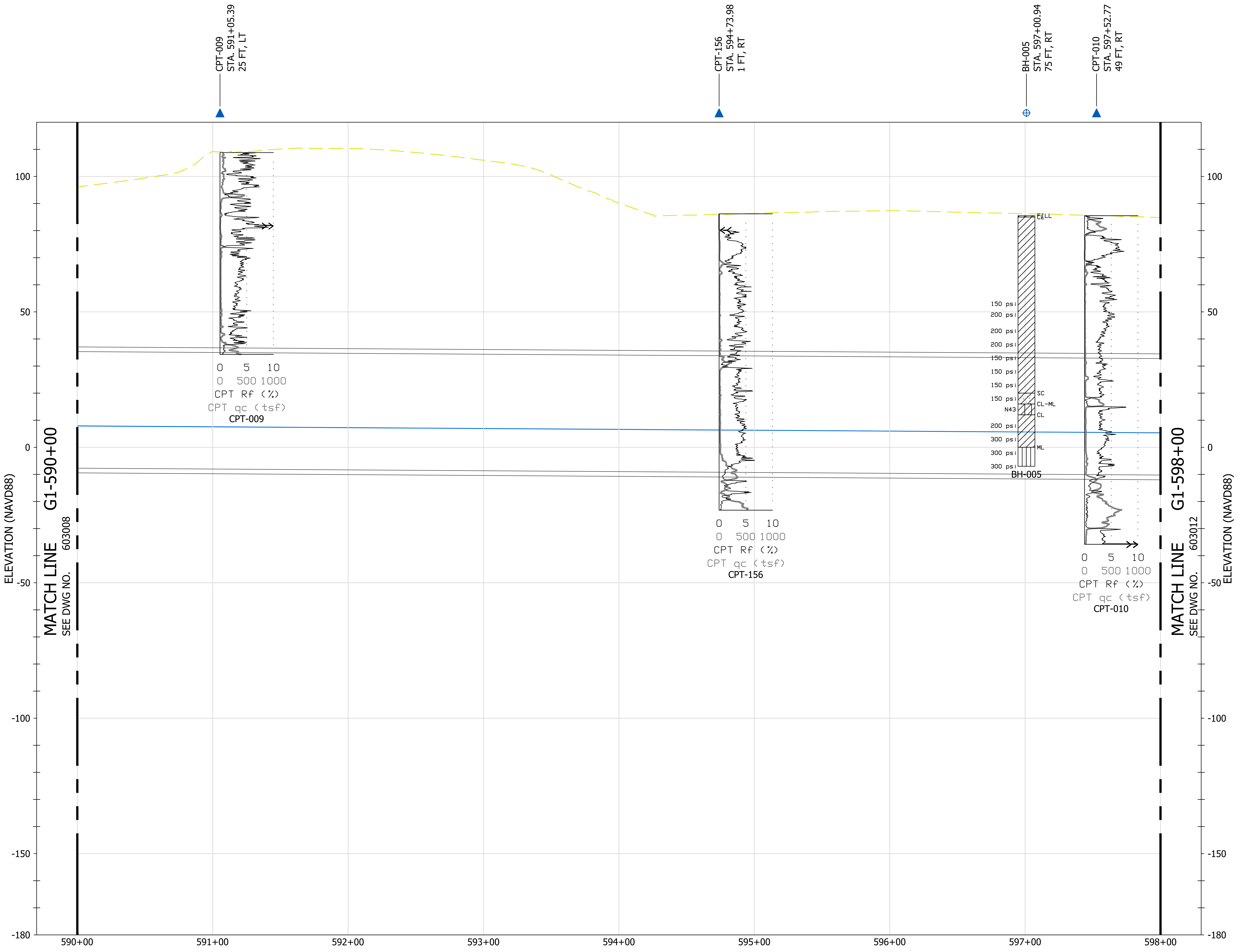
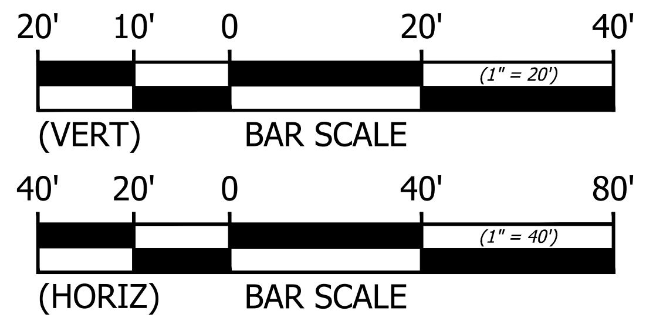


PROFILE

SCALE: 1"=40'H; 1"=20'V



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						DRAWN BY	P.NG
						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
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BART SILICON VALLEY PHASE II
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VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 5B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603010		
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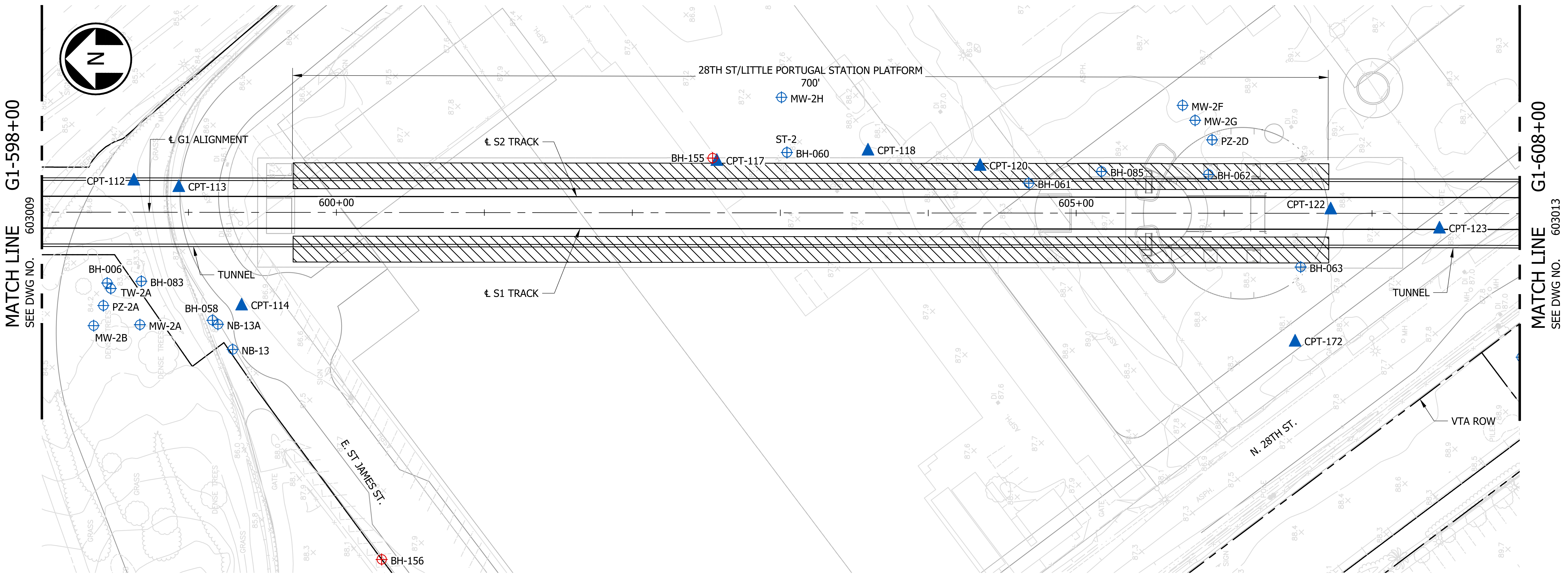
SHEET NOTES:

1. ARCHITECTURAL CONCEPT OF 28TH STREET/LITTLE PORTUGAL STATION TAKEN FROM MODEL DATED 2020-11-09, VERSION Z1.



PLAN

SCALE: 1" = 40'

40' 20' 0 40' 80'

(1" = 40')

BAR SCALE

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 6A

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SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603011	PAGE NO.

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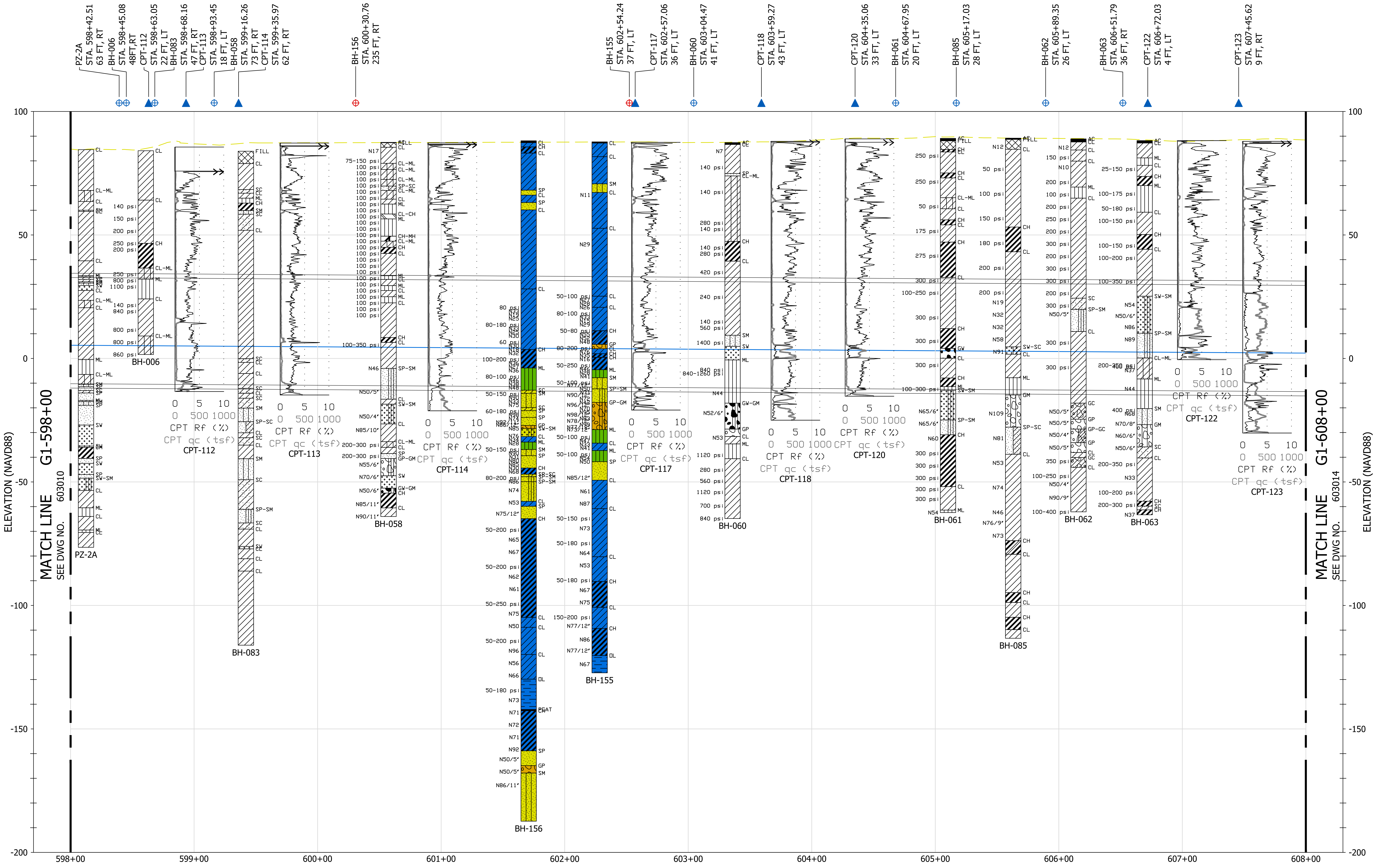
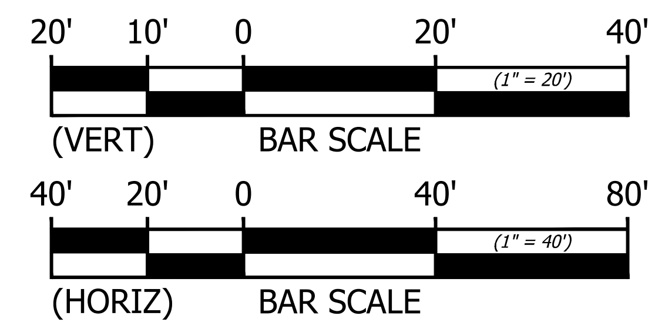


PROFILE

SCALE: 1"=40'H; 1"=20'V



SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED FOR CLARITY.
   - CPT-172
   - MW-2A
   - MW-2B
   - MW-2F
   - MW-2G
   - MW-2H
   - NB-13
   - NB-13A
   - PZ-2D
   - ST-2
   - TW-2A

NOT FOR CONSTRUCTION

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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK M.J.WALKER
COORD. CHECK
REVIEWED BY

APPROVED

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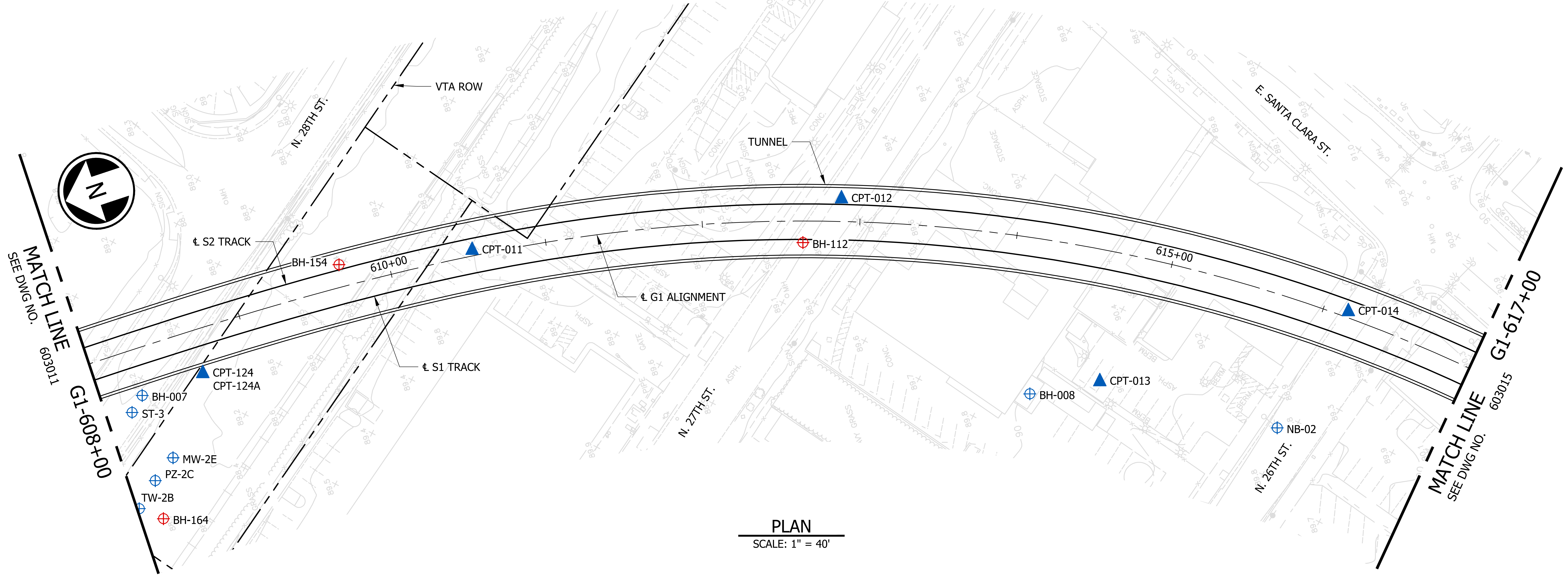
BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 6B

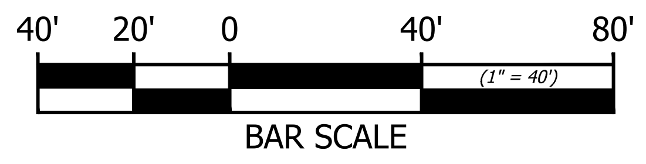
DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603012

CONTRACT NO.
SCALE AT D SIZE: AS SHOWN
REV.: P01
SUITABILITY DESCRIPTION: FOR REVIEW AND COMMENT
SUIT. CODE: S3
SHEET NO.: 603012
PAGE NO.



PLAN

SCALE: 1" = 40'



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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 7A

DRAWING FILE IDENTIFIER
385606-MMW-00-XX-DR-GE-603013

CONTRACT NO.	SCALE AT D SIZE	REV.
	1"=40'	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603013	

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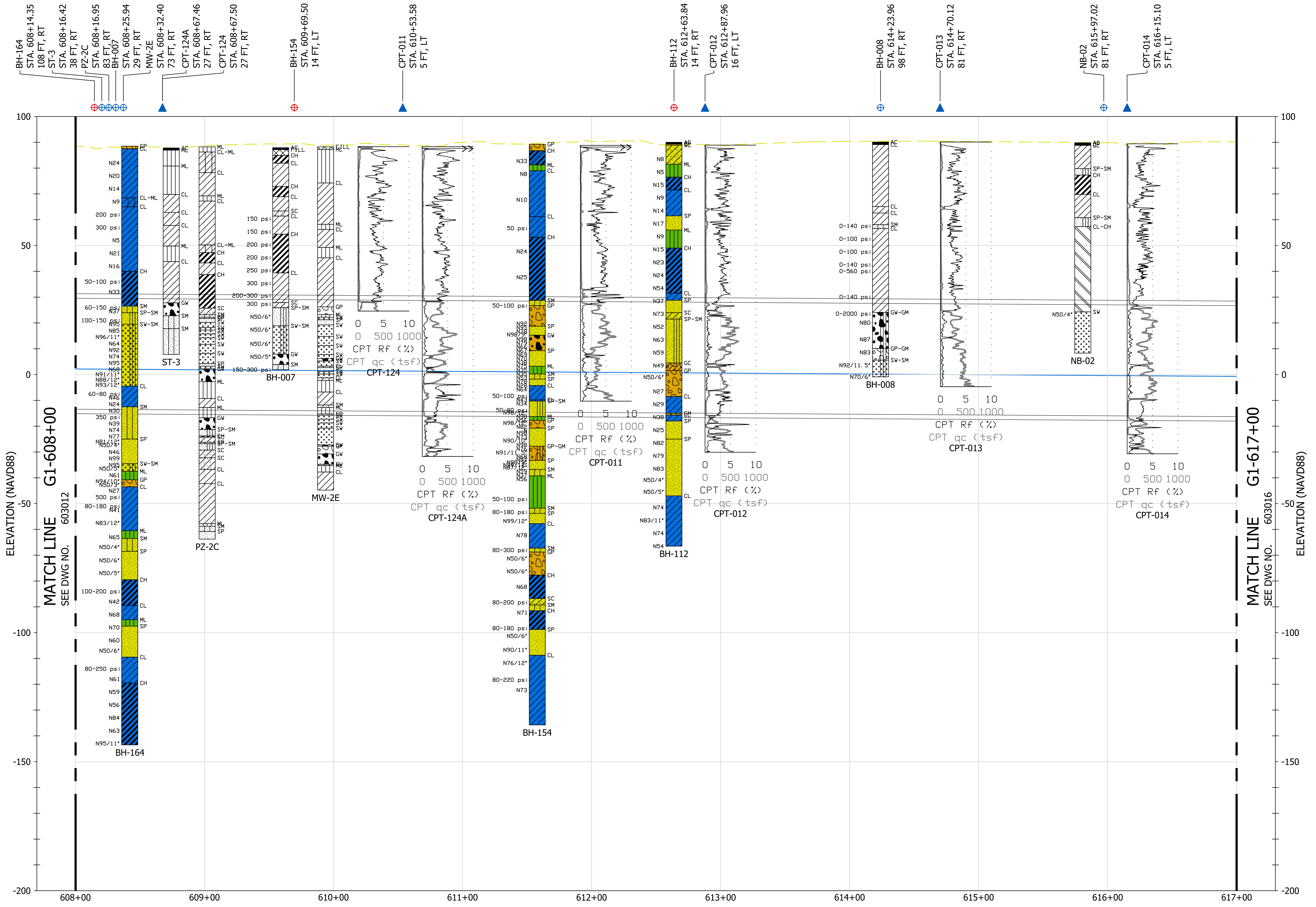
SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED FOR CLARITY.
   TW-2B



PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 7B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603014

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603014	

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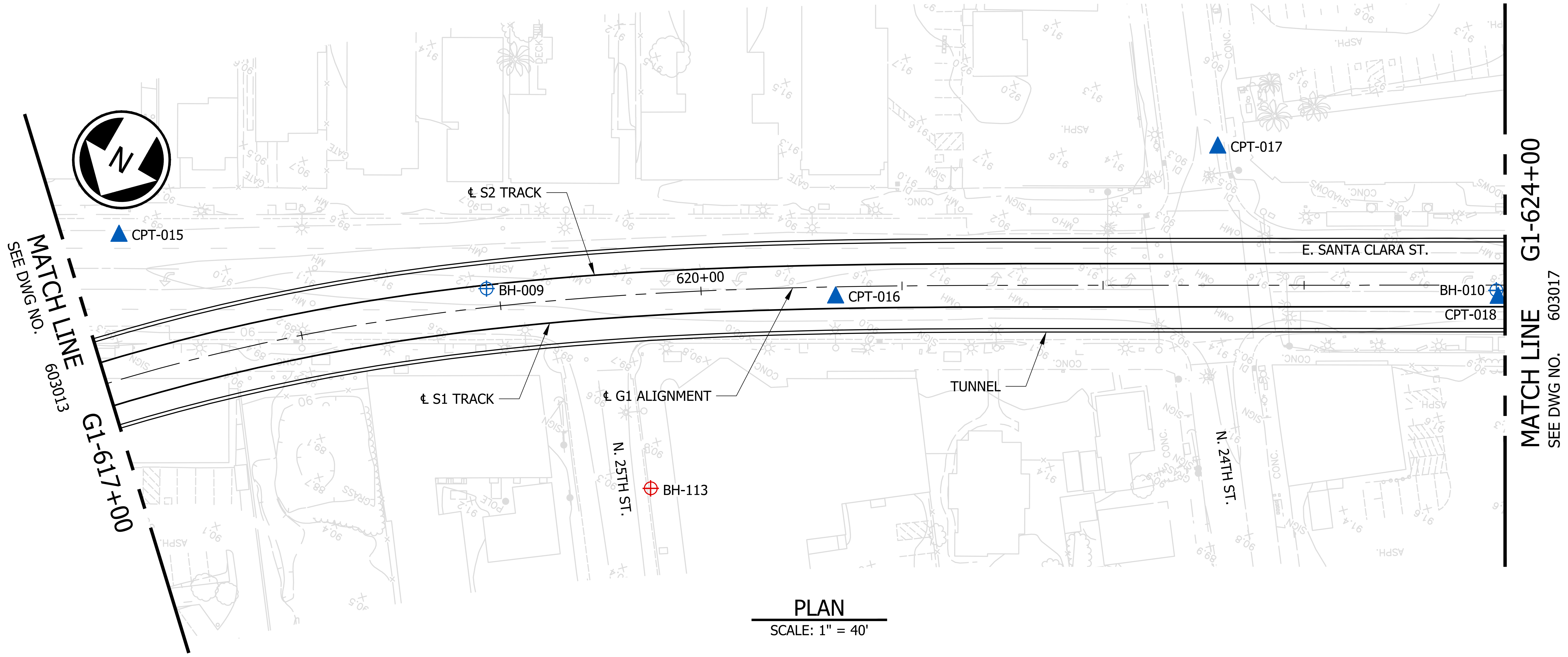
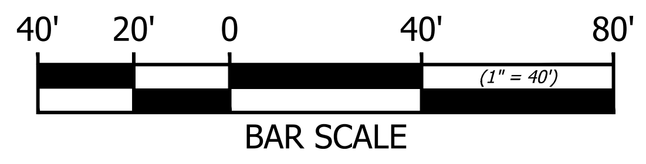


PLAN
SCALE: 1" = 40'



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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PLAN
SHEET 8A

DRAWING FILE IDENTIFIER
385606-MMW-00-XX-DR-GE-603015

CONTRACT NO.	SCALE AT D SIZE	REV.
	1"=40'	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603015	

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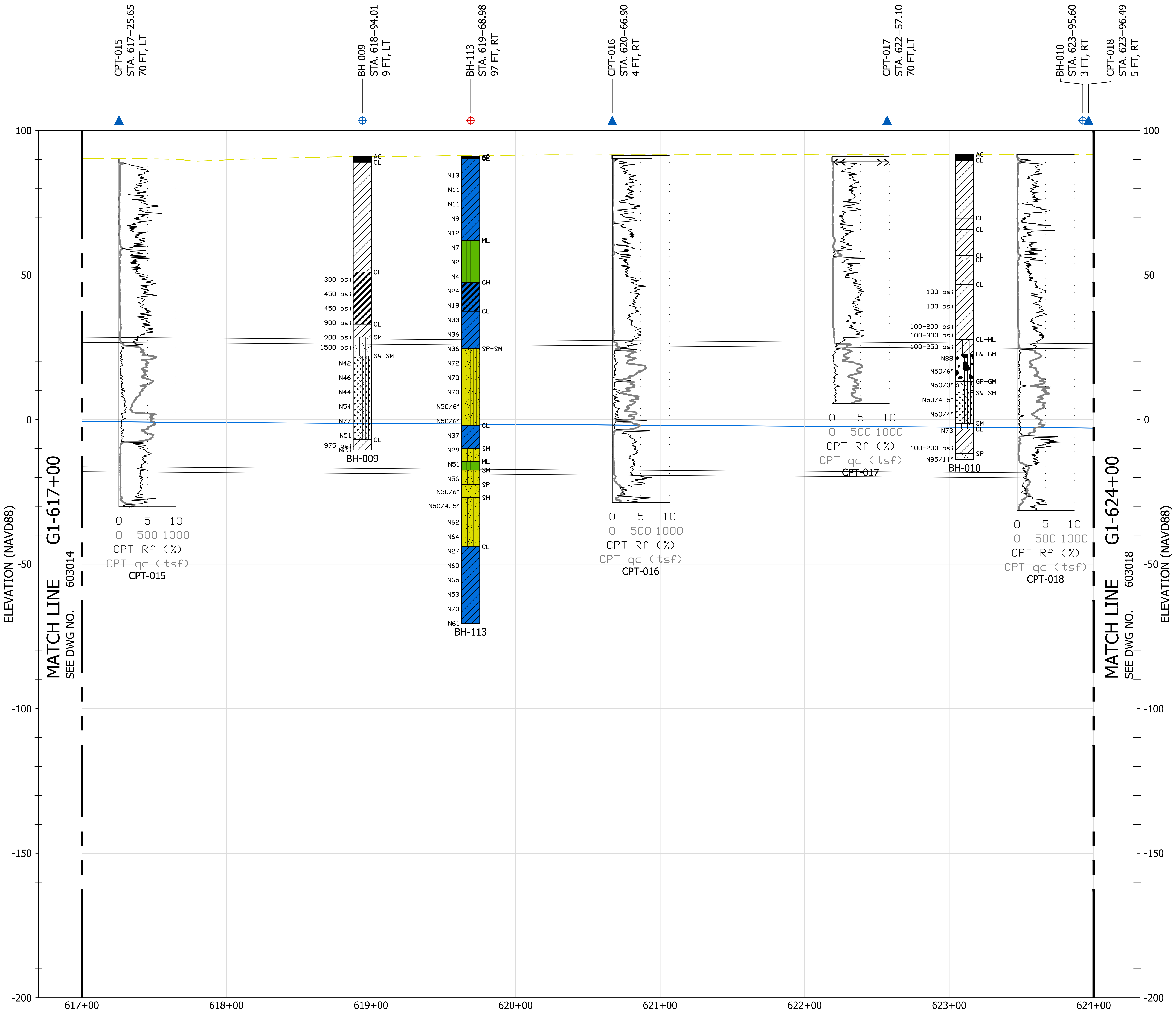

PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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PROFILE
SHEET 8B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603016		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603016	PAGE NO.

c:\users\car93597\appdata\local\projectwise\workdir\mott-use-pw\dms08673\385606-MMW-PWIDE-XX-DR-GE-603016.dwg 3/10/2020 8:47 AM
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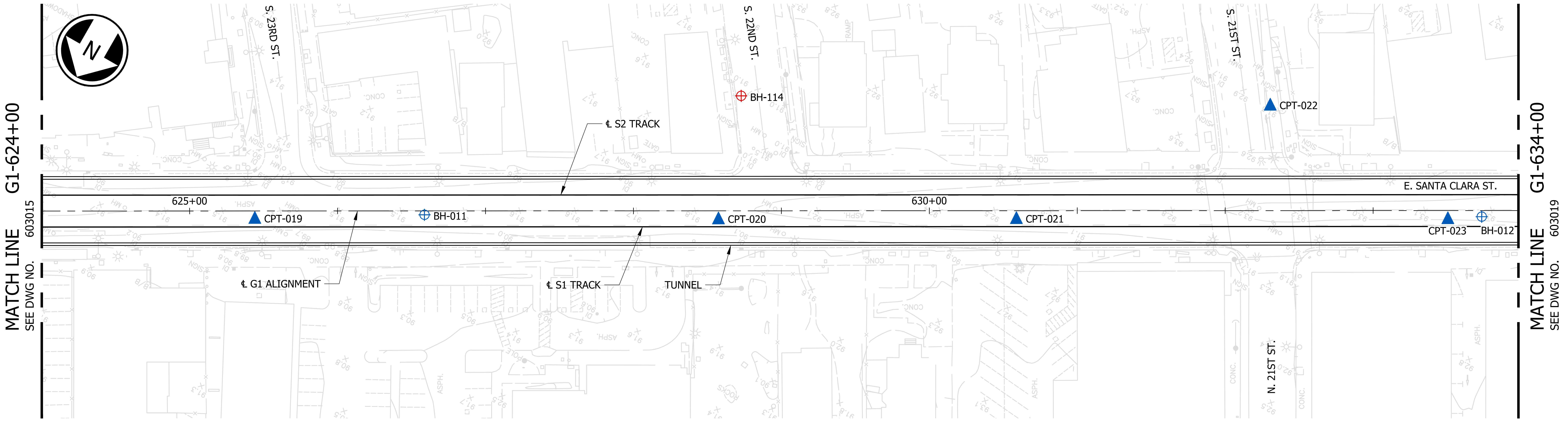

PLAN

SCALE: 1" = 40'

BAR SCALE

NOT FOR CONSTRUCTION

c:\users\car93597\appdata\local\projectwise\workdir\mott-use-pw\dms08673\385606-MMW-PWIDE-XX-DR-GE-603017.dwg 3/10/2020 9:31 AM

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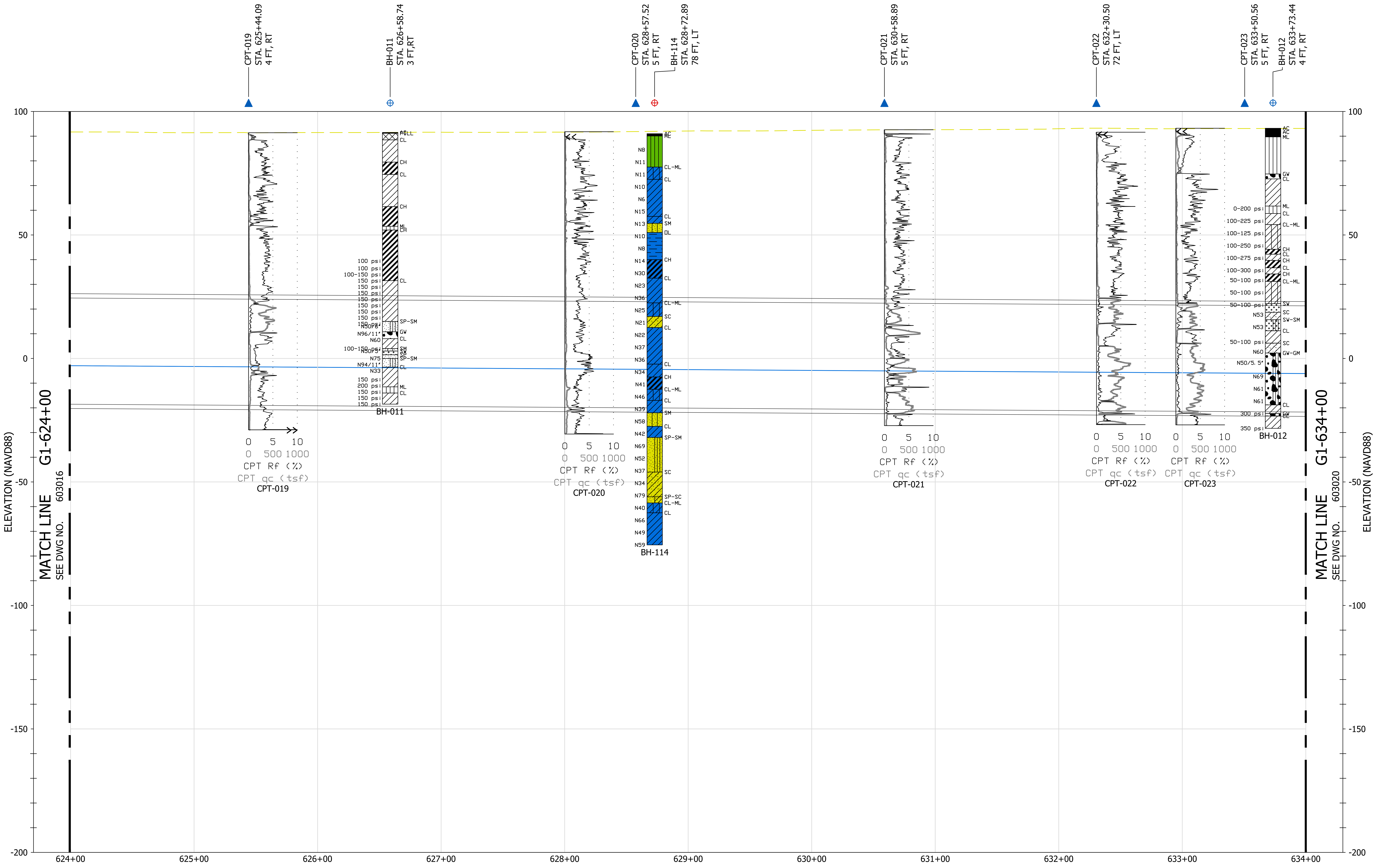
GEOTECHNICAL DATA REPORT
PLAN
SHEET 9A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603017		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603017	PAGE NO.



PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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PROFILE
SHEET 9B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603018

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603018	

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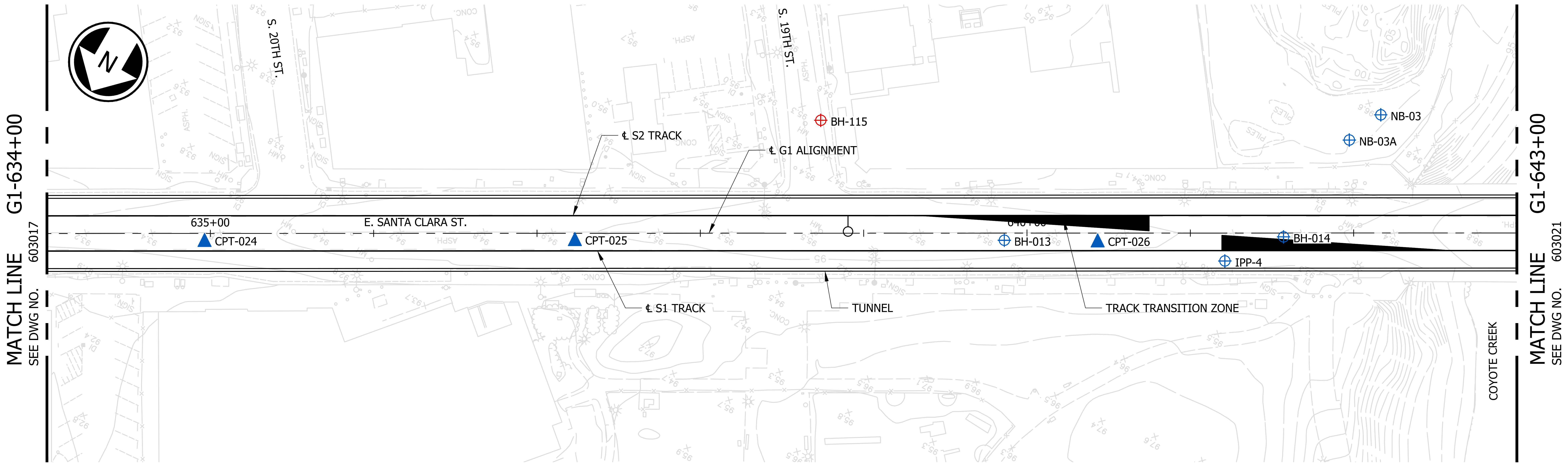

PLAN
SCALE: 1" = 40'

40' 20' 0 40' 80'
BAR SCALE

NOT FOR CONSTRUCTION

					DESIGNED BY	C.CARRENDER
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					DWG. CHECK	M.J.WALKER
					ENG. CHECK	M.J.WALKER
P01	12/23/20	PN	MW		Rev. 0 Issued Final	COORD. CHECK	
REV	DATE	BY	CHK	APP	DESCRIPTION	REVIEWED BY	

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 10A

DRAWING FILE IDENTIFIER
385606-MMW-00-XX-DR-GE-603019

CONTRACT NO.	SCALE AT D SIZE	REV.
	1"=40'	P01
SUITABILITY DESCRIPTION		SUIT. CODE
FOR REVIEW AND COMMENT		S3
	SHEET NO.	PAGE NO.
	603019	

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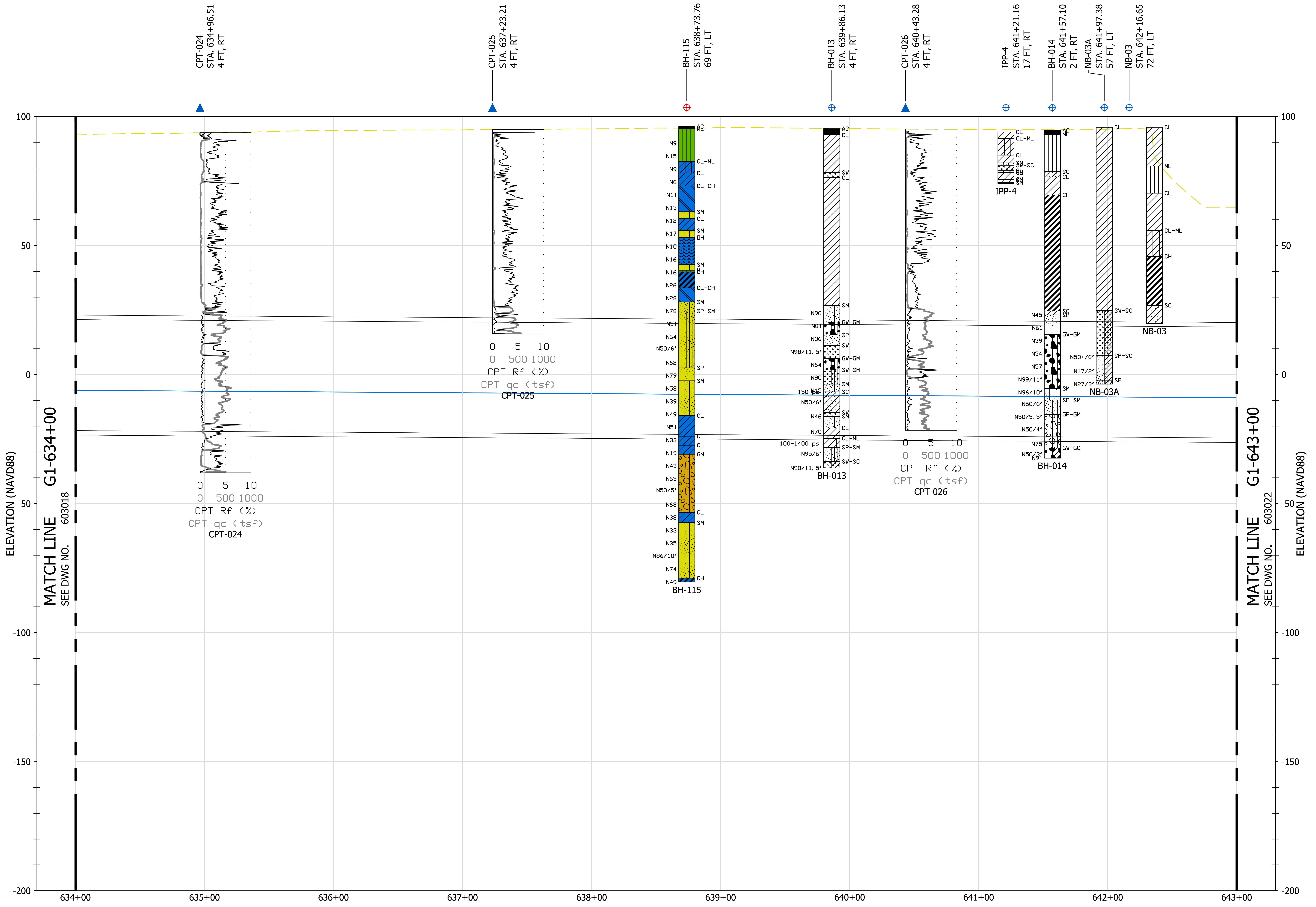
CAR93597



PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

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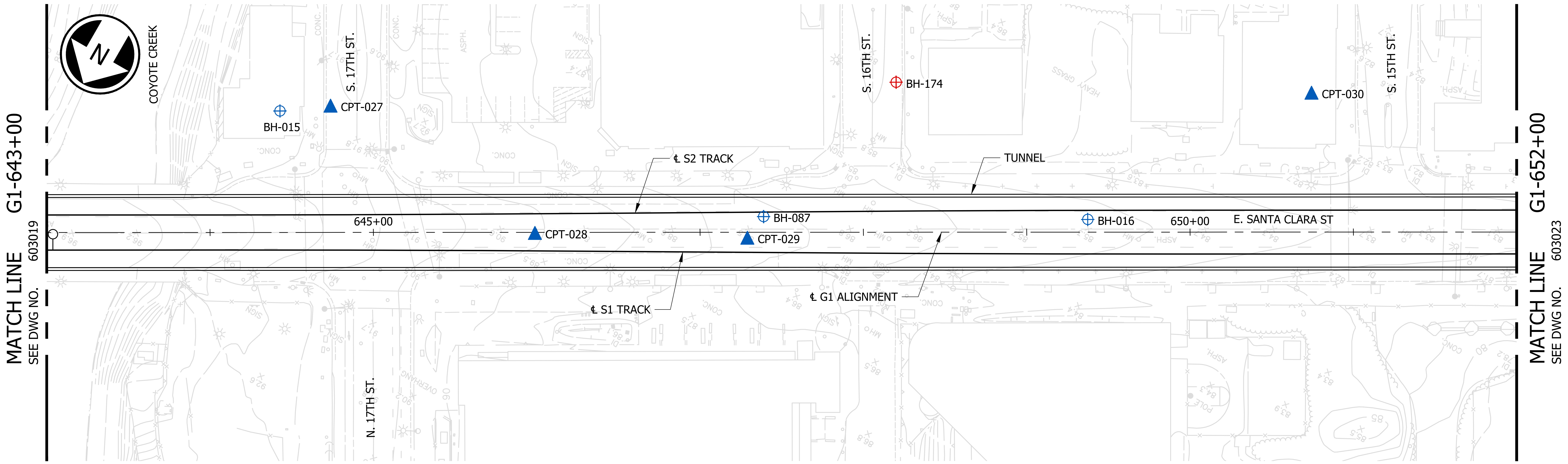
GEOTECHNICAL DATA REPORT
PROFILE
SHEET 10B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603020

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01
SUITABILITY DESCRIPTION		SUIT. CODE
FOR REVIEW AND COMMENT		S3
	SHEET NO.	PAGE NO.
	603020	



PLAN

SCALE: 1" = 40'

NOT FOR CONSTRUCTION

c:\users\car93597\appdata\local\projectwise\workdir\mott-use-pw\dms08673\385606-MMW-PWIDE-XX-DR-GE-603021.dwg 3/10/2020 11:59 AM

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK	M.J.WALKER
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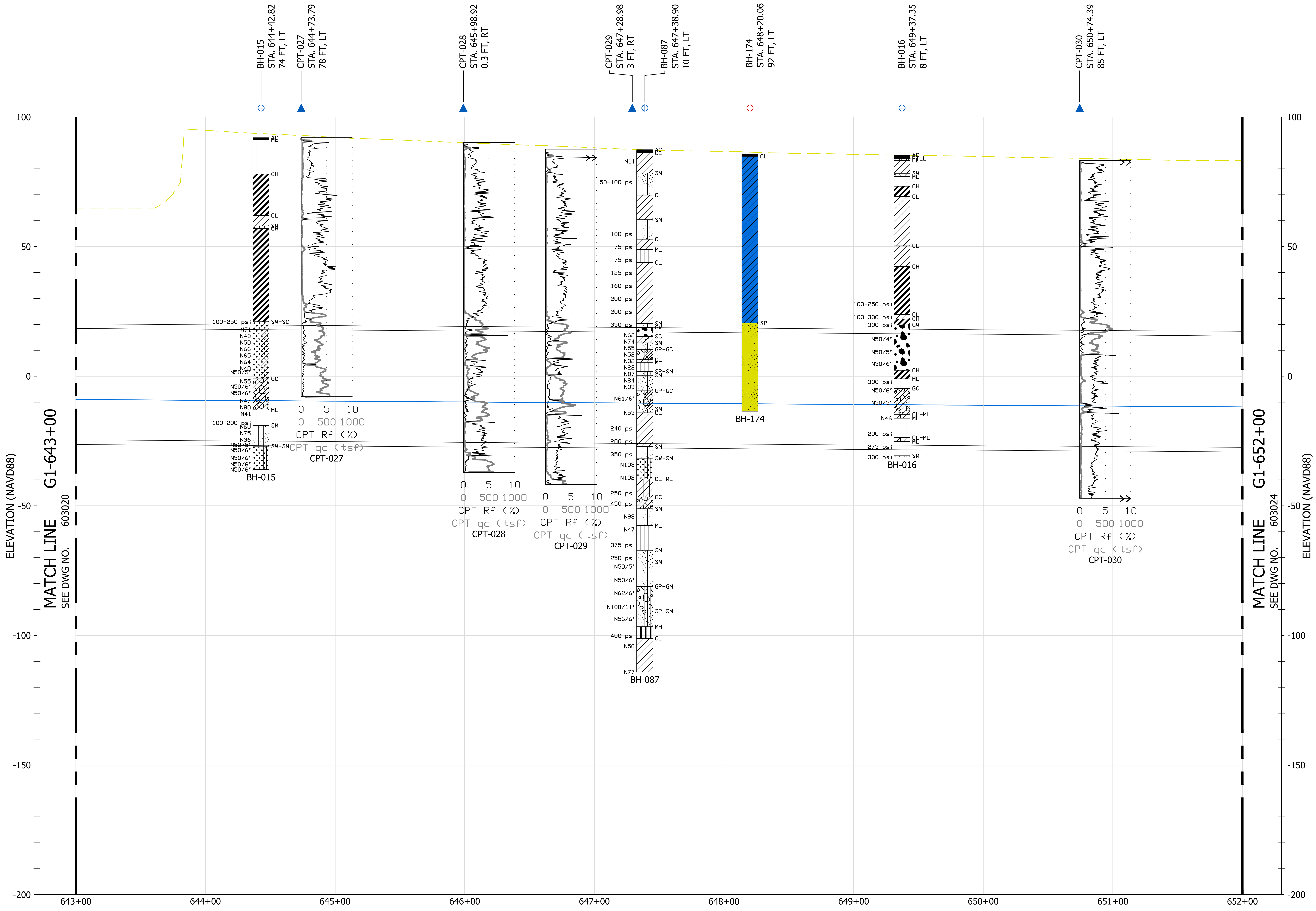
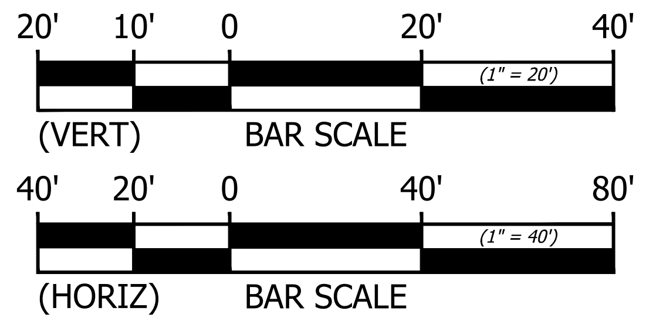
GEOTECHNICAL DATA REPORT
PLAN
SHEET 11A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603021		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603021	PAGE NO.



PROFILE

SCALE: 1"=40'H; 1"=20'V



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 11B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603022
CONTRACT NO.
SCALE AT D SIZE AS SHOWN
REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT
SUIT. CODE S3
SHEET NO. 603022
PAGE NO.

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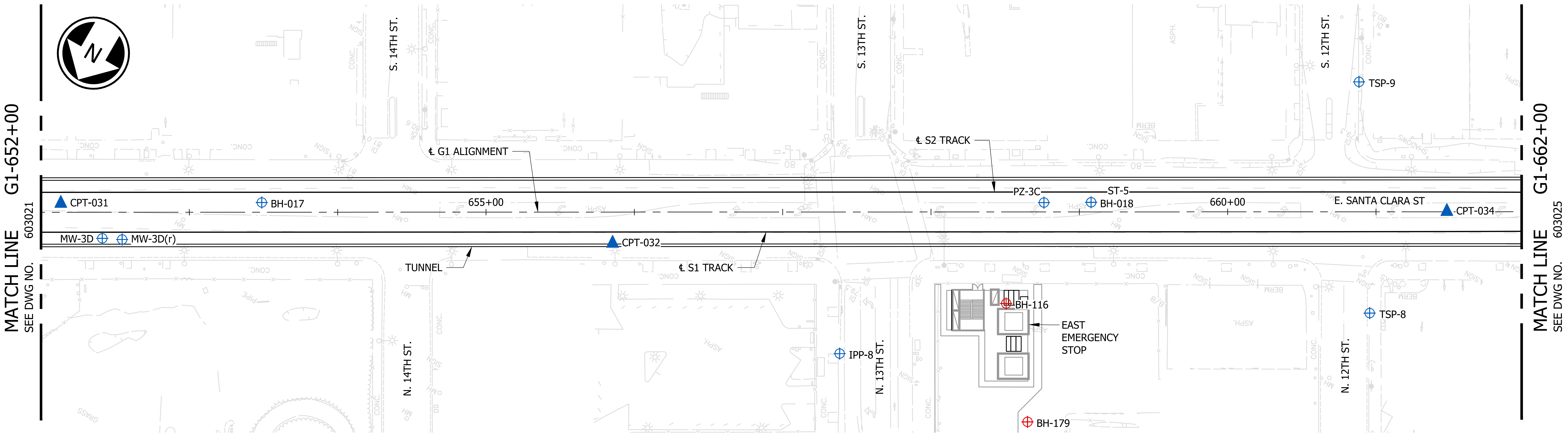
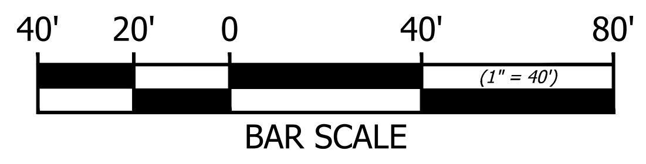
CAR93597

SHEET NOTES:

1. ARCHITECTURAL CONCEPT OF EAST EMERGENCY STOP FACILITY TAKEN FROM MODEL DATED 2020-12-21, VERSION U.



PLAN
SCALE: 1" = 40'



BAR SCALE

NOT FOR CONSTRUCTION

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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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COORD. CHECK	
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GEOTECHNICAL DATA REPORT
PLAN
SHEET 12A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603023		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603023	PAGE NO.

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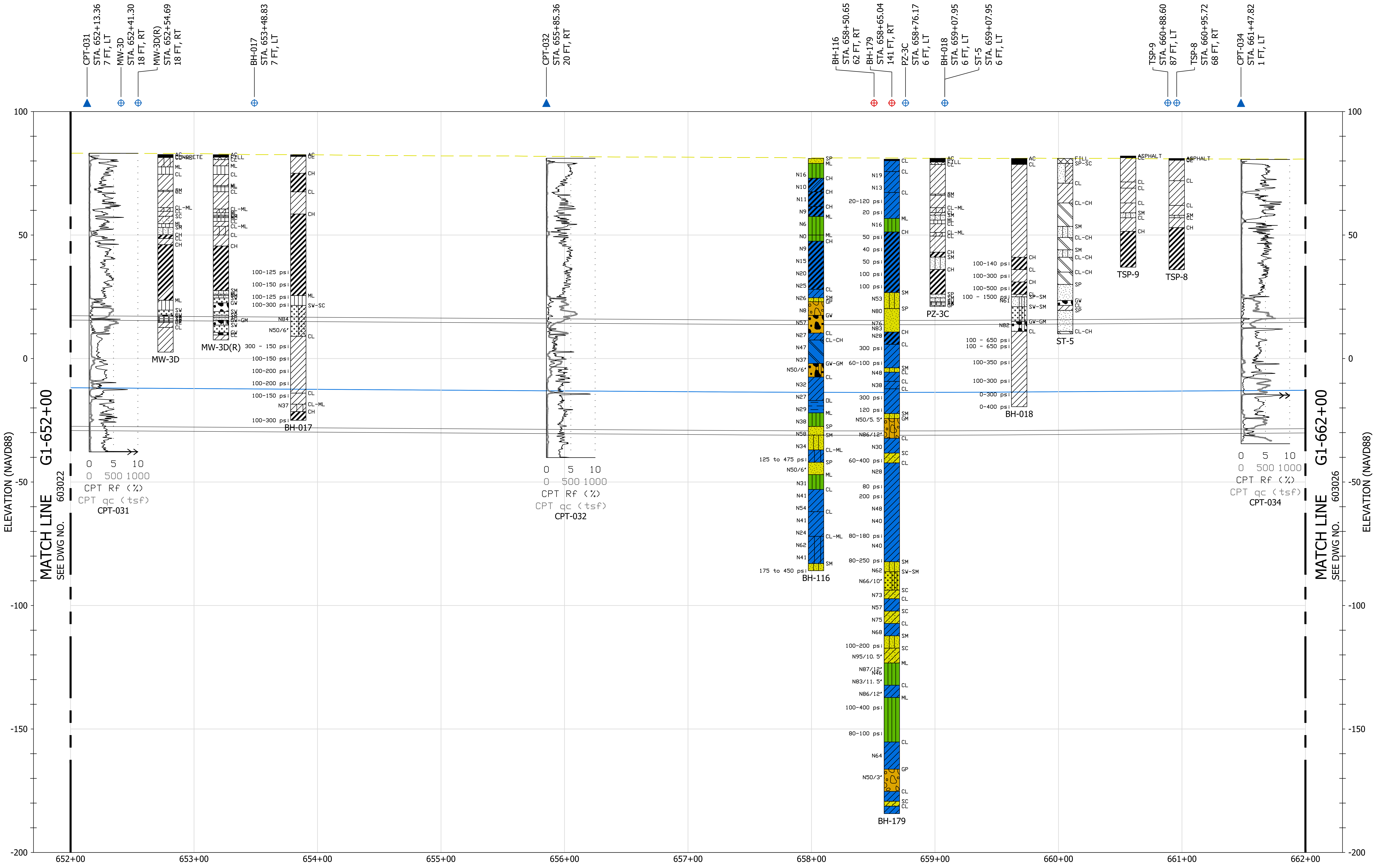
CAR93597

SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED. ELECTRONIC DATA NOT AVAILABLE.
   IPP-08



PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(VERT) BAR SCALE

40' 20' 0 40' 80'
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 12B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603024		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603024	PAGE NO.

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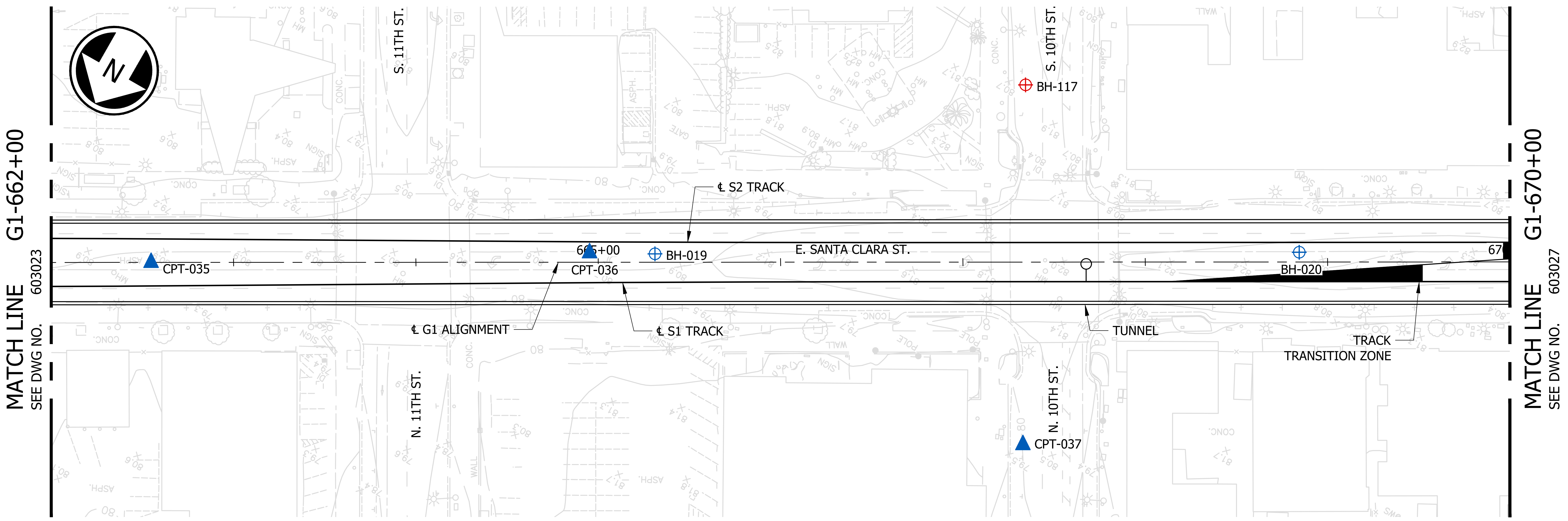

PLAN

SCALE: 1" = 40'

40' 20' 0 40' 80'
(1" = 40')
BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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GEOTECHNICAL DATA REPORT
PLAN
SHEET 13A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603025		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603025	PAGE NO.

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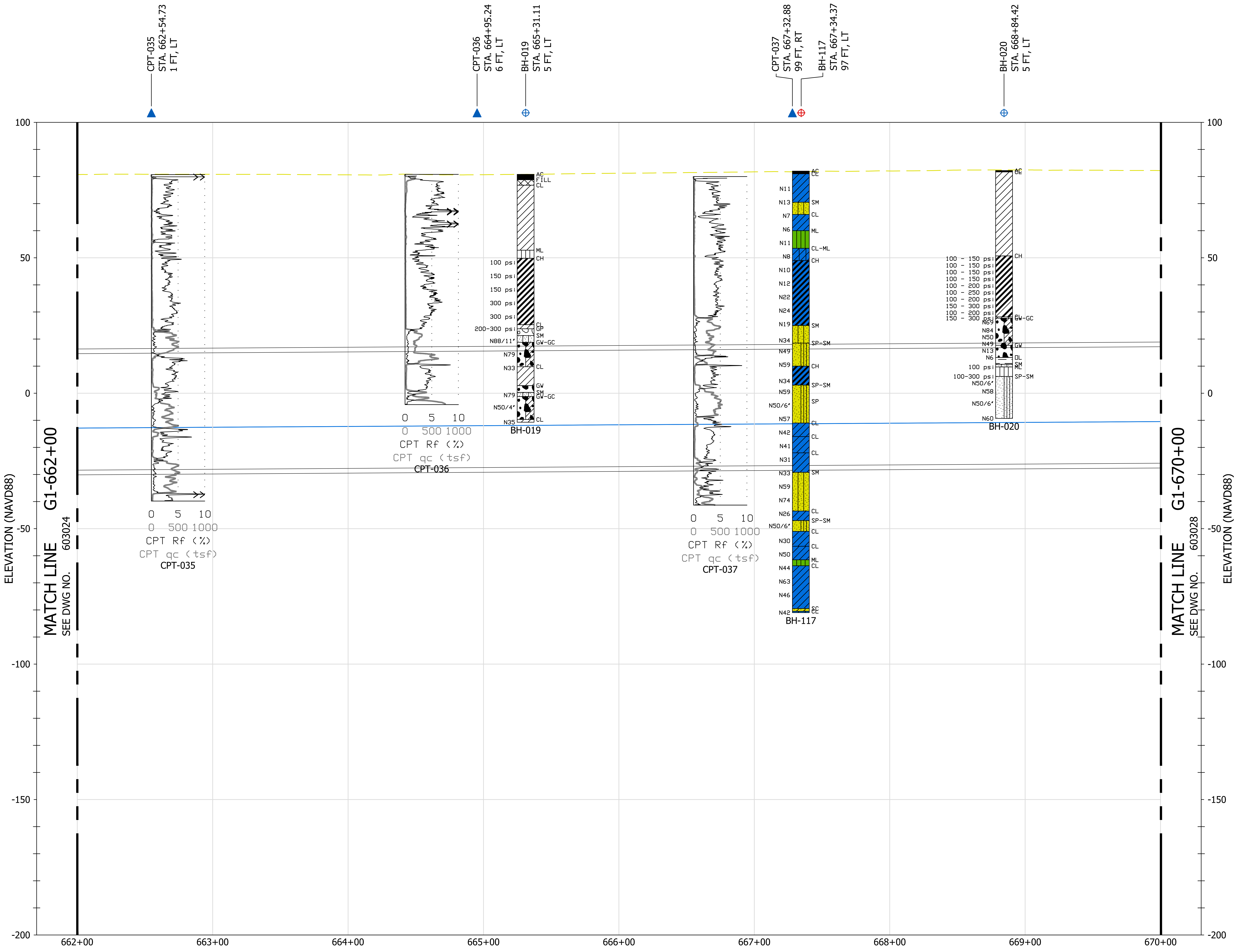
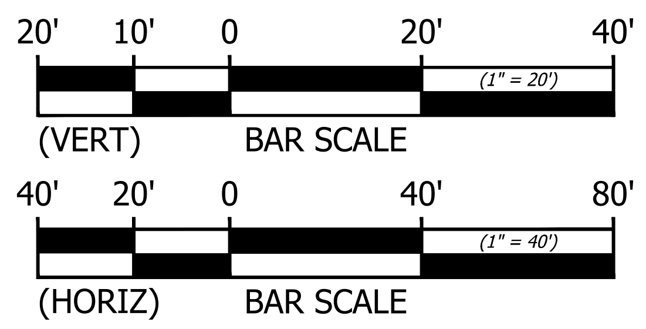


PROFILE

SCALE: 1"=40'H; 1"=20'V



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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 13B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603026

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01
SUITABILITY DESCRIPTION		SUIT. CODE
FOR REVIEW AND COMMENT		S3
	SHEET NO.	PAGE NO.
	603026	

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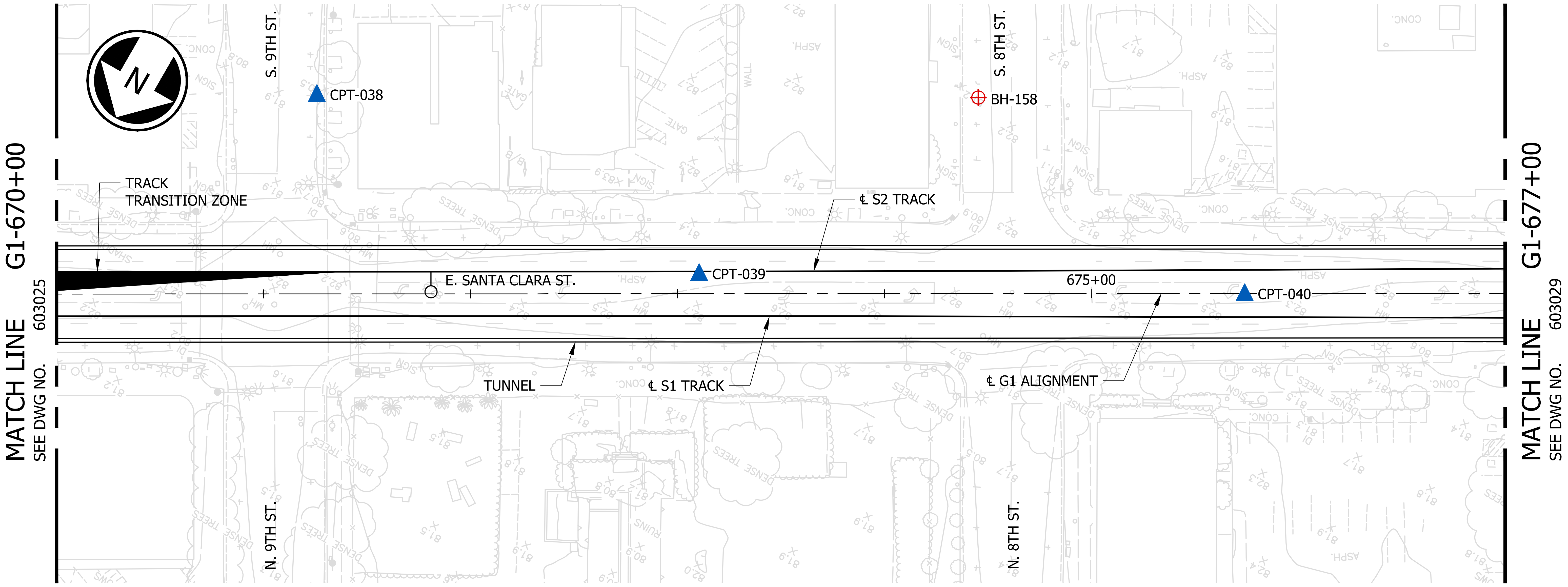

PLAN

SCALE: 1" = 40'

40' 20' 0 40' 80'
(1" = 40')
BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
DRAWN BY	P.NG
DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
REVIEWED BY	

APPROVED

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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 14A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603027		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603027	PAGE NO.

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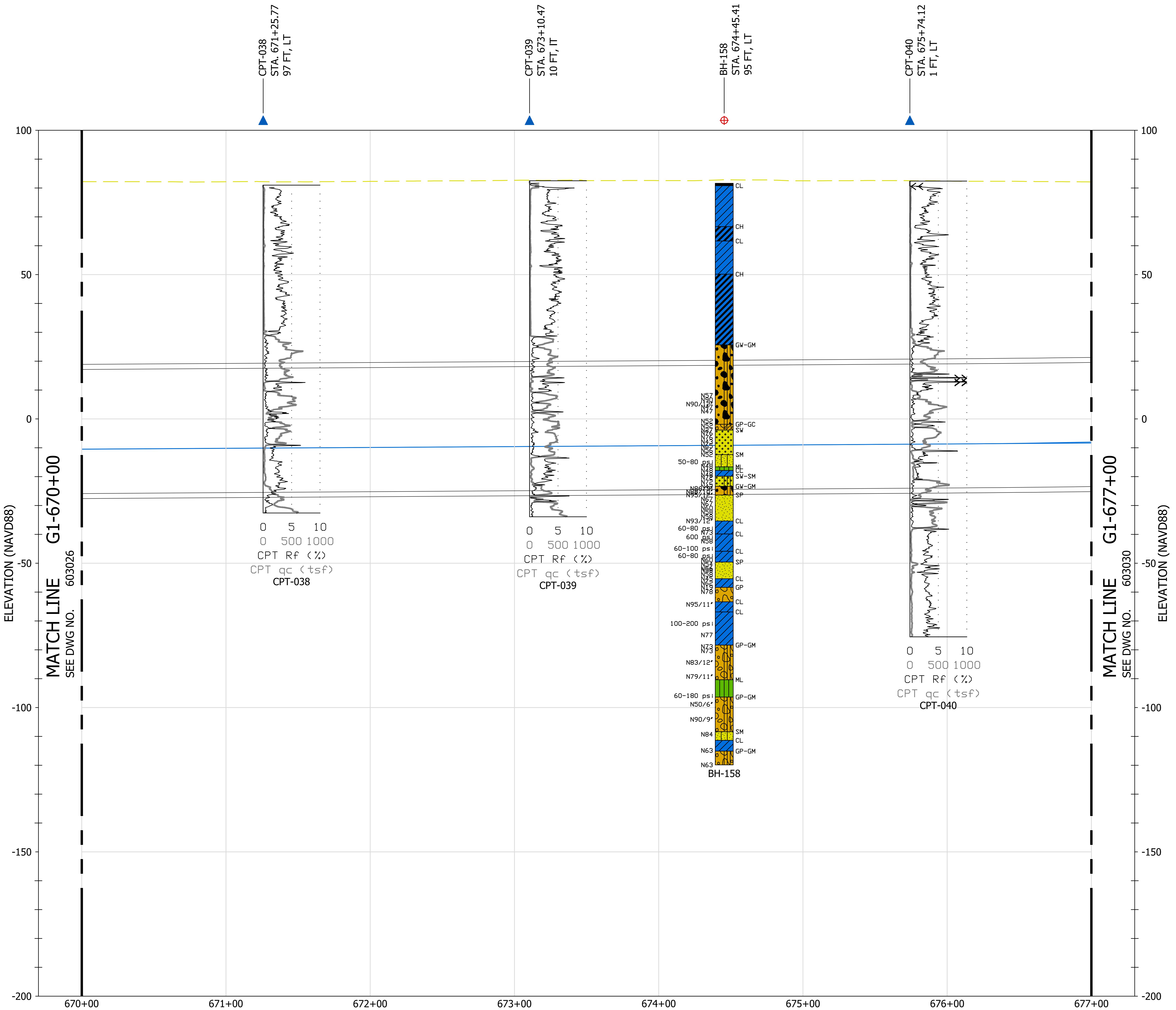
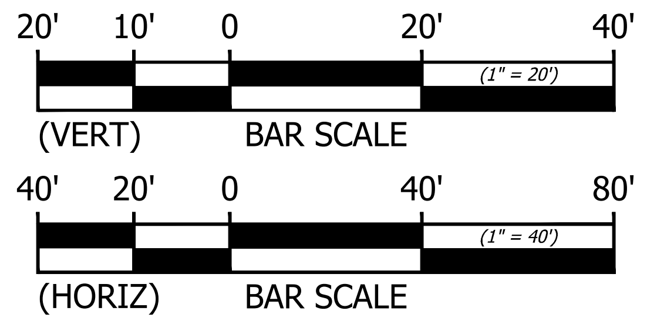


PROFILE

SCALE: 1"=40'H; 1"=20'V



NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 14B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603028		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603028	PAGE NO.

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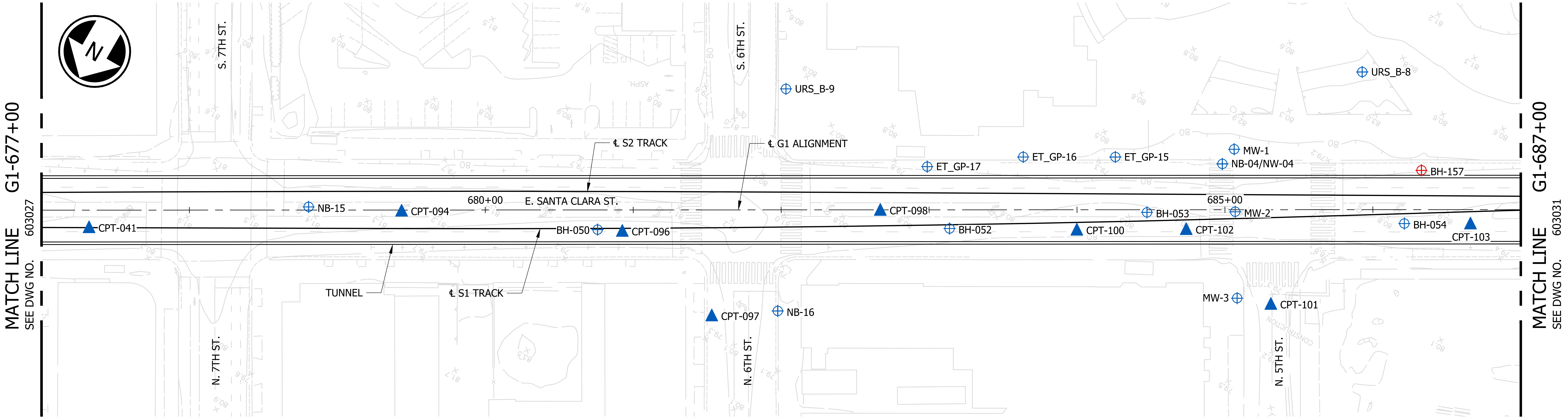

PLAN
SCALE: 1" = 40'

BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 15A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603029		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603029	PAGE NO.

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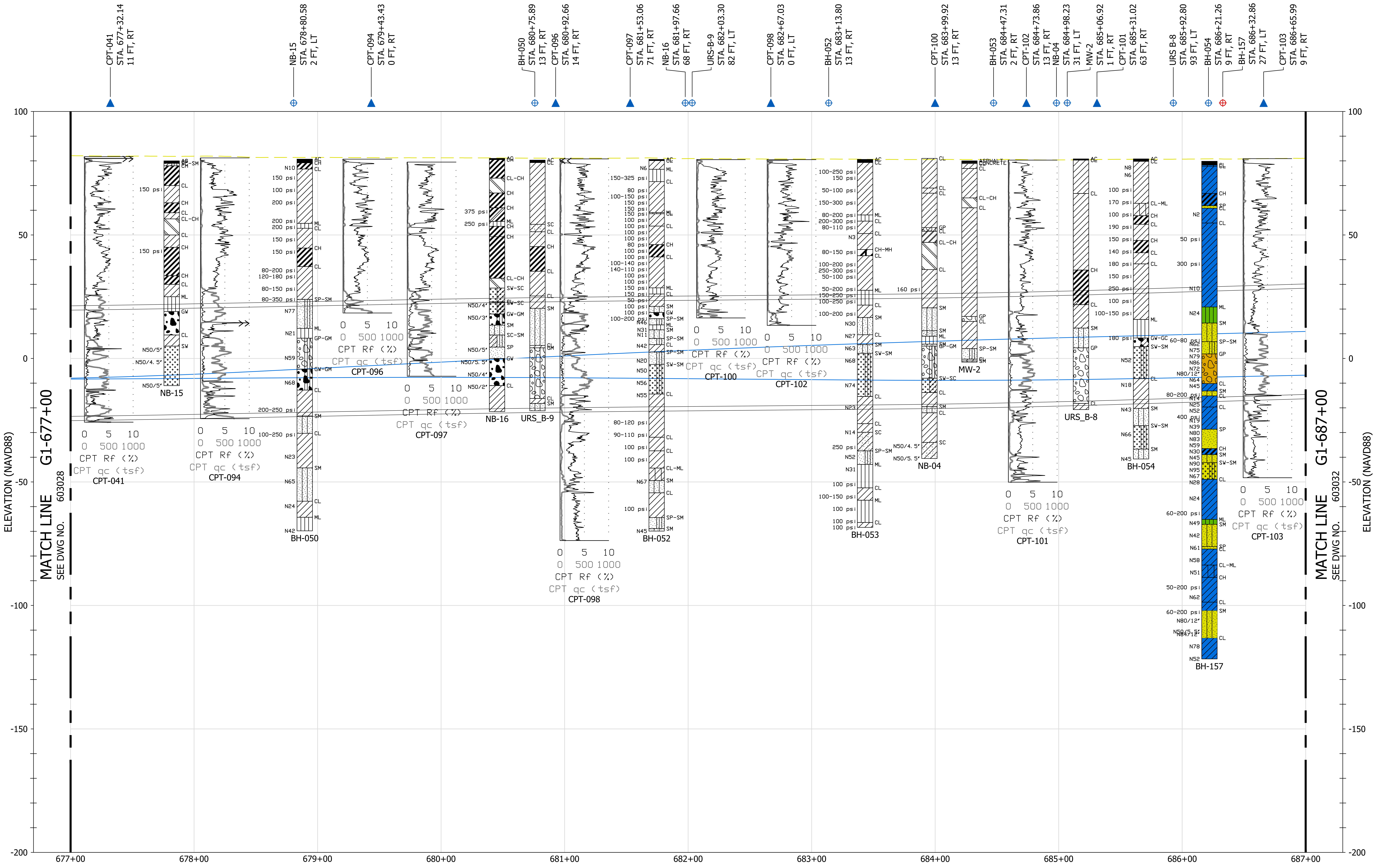
CAR93597

SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED FOR CLARITY.
   - ET_GP-15
   - ET_GP-16
   - ET_GP-17
   - MW-1
2. THE FOLLOWING MONITORING WELLS HAVE BEEN DESTROYED.
   - MW-3
   - NW-04



PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY C.CARRENDER
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DWG. CHECK M.J.WALKER
ENG. CHECK M.J.WALKER
COORD. CHECK
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BART SILICON VALLEY PHASE II EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 15B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603030
CONTRACT NO.
SCALE AT D SIZE AS SHOWN
REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT
SUIT. CODE S3
SHEET NO. 603030
PAGE NO.

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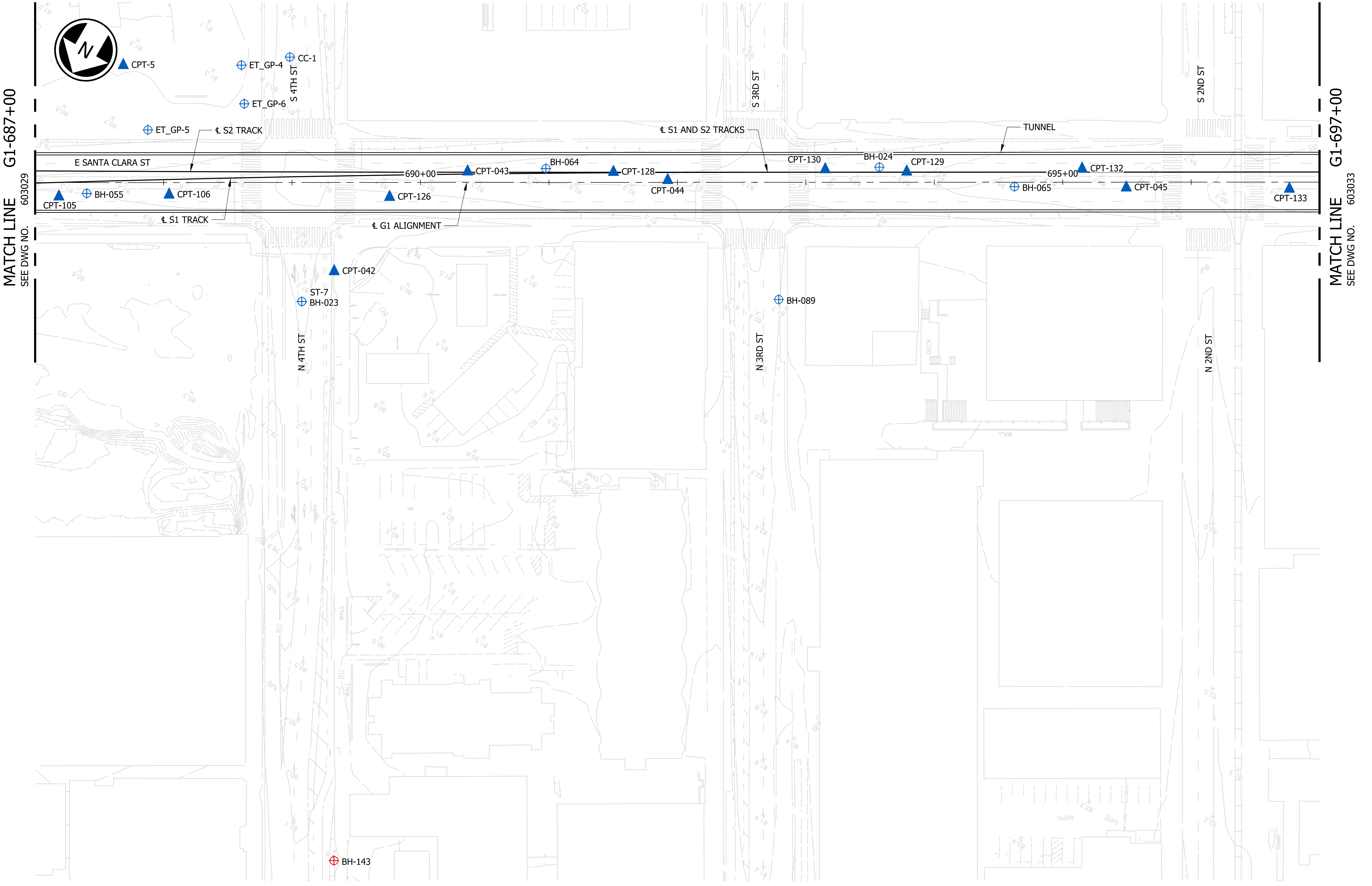

PLAN

SCALE: 1" = 40'

BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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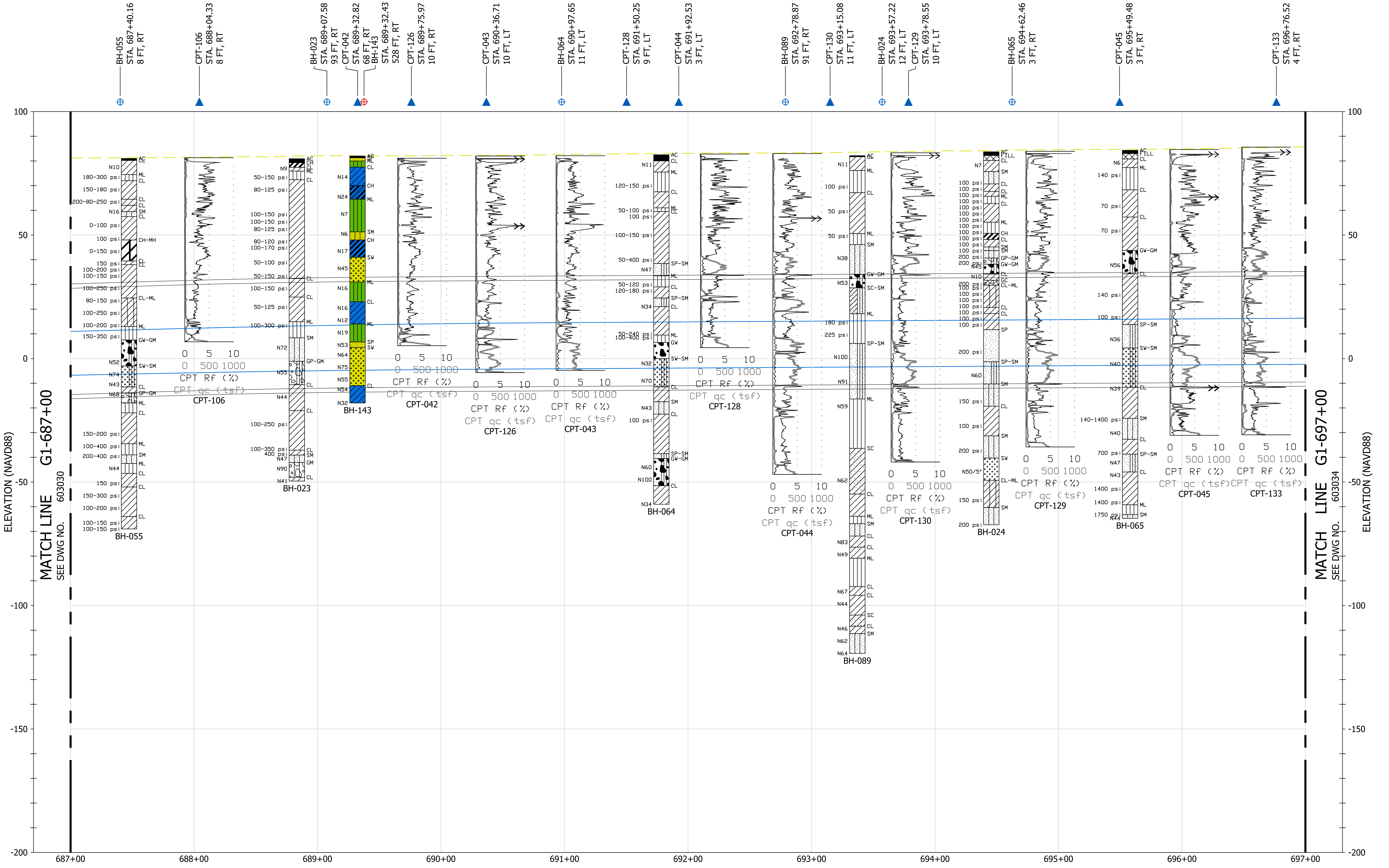
BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 16A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603031		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603031	PAGE NO.

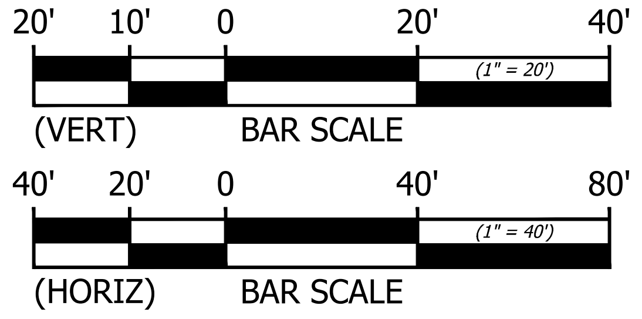


PROFILE

SCALE: 1"=40'H; 1"=20'V

SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED FOR CLARITY.
   - CC-1
   - CPT-5
   - CPT-105
   - CPT-132
   - ET_GP-4
   - ET_GP-5
   - ET_GP-6
   - ST-7



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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK M.J.WALKER
COORD. CHECK
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EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 16B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603032
CONTRACT NO.
SCALE AT D SIZE AS SHOWN
REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT
SUIT. CODE S3
SHEET NO. 603032
PAGE NO.

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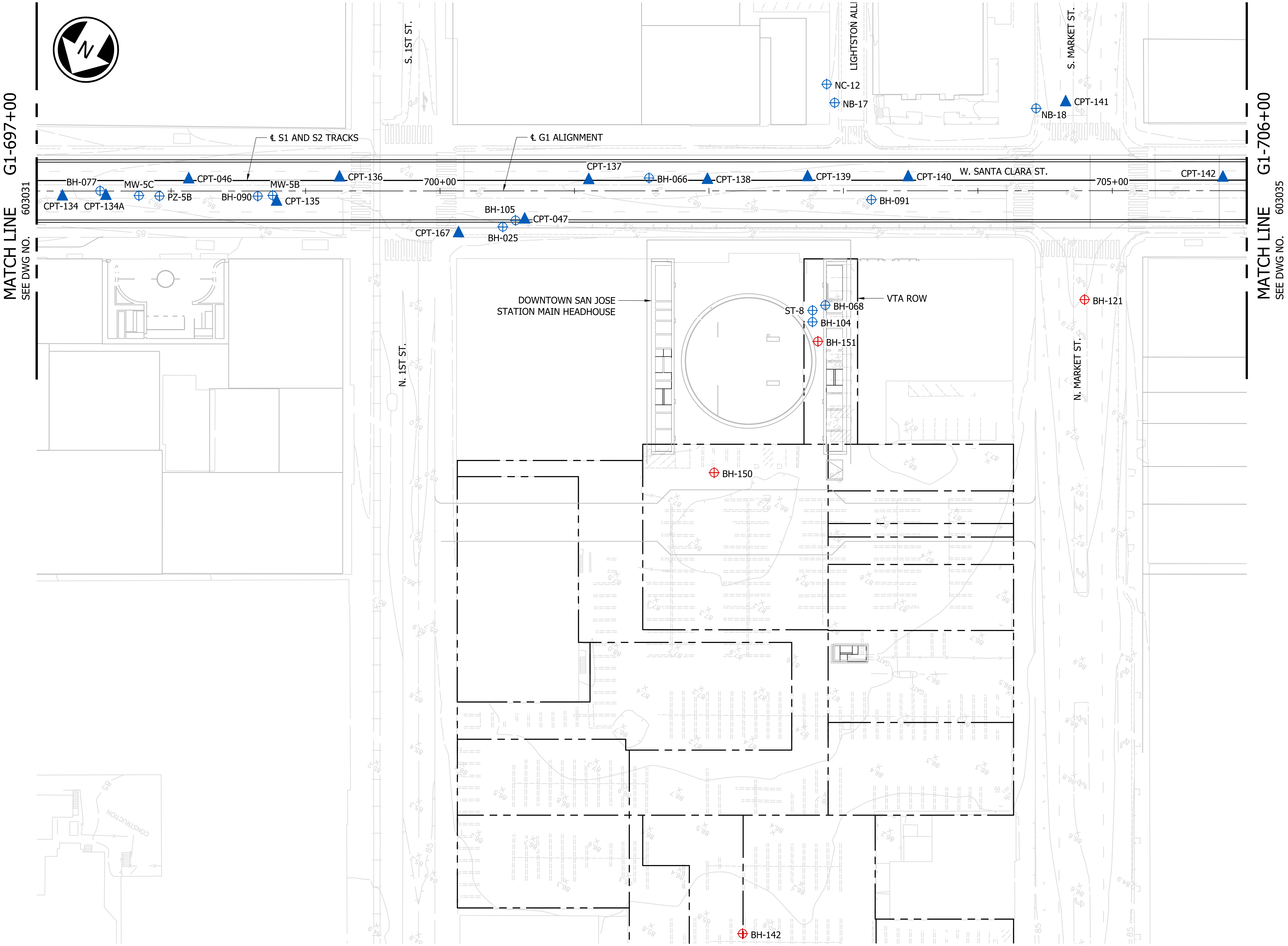
SHEET NOTES:

1. ARCHITECTURAL CONCEPT OF DOWNTOWN SAN JOSE STATION TAKEN FROM MODEL DATED 2020-11-16, VERSION Y.



PLAN

SCALE: 1" = 40'

BAR SCALE

NOT FOR CONSTRUCTION

						DESIGNED BY	C.CARRENDER
						DRAWN BY	P.NG
						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
P01	12/23/20	PN	MW		Rev. 0 Issued Final	COORD. CHECK	
REV	DATE	BY	CHK	APP	DESCRIPTION	REVIEWED BY	

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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 17A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603033		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603033	PAGE NO.

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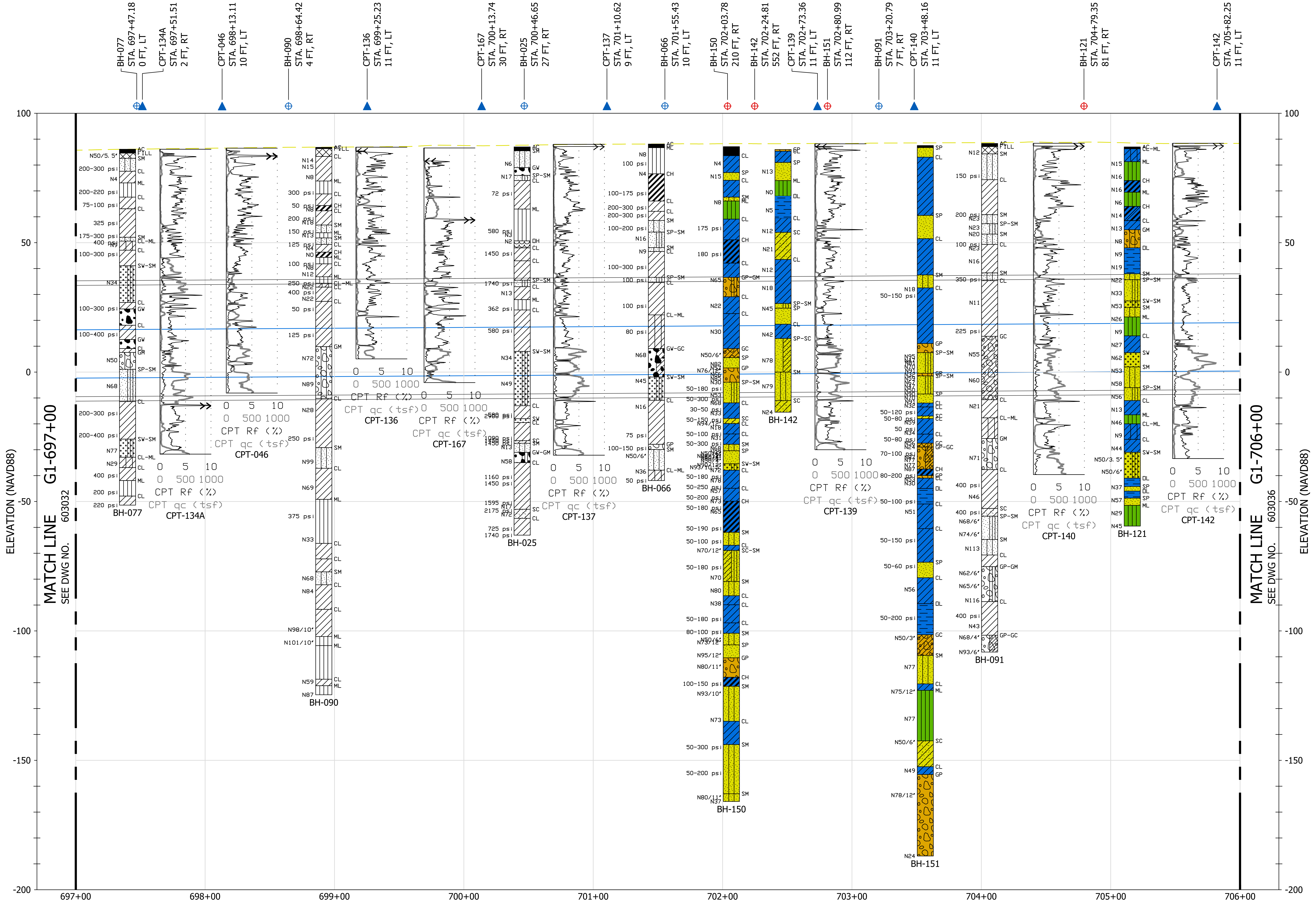

PROFILE

SCALE: 1"=40'H; 1"=20'V

SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED FOR CLARITY.
   - BH-068
   - BH-104
   - BH-105
   - CPT-047
   - CPT-134
   - CPT-135
   - CPT-138
   - CPT-141
   - MW-5B
   - MW-5C
   - NB-17
   - NB-18
   - NC-12
   - PZ-5B
   - ST-8

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
DRAWN BY	P.NG
DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 17B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603034

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603034	

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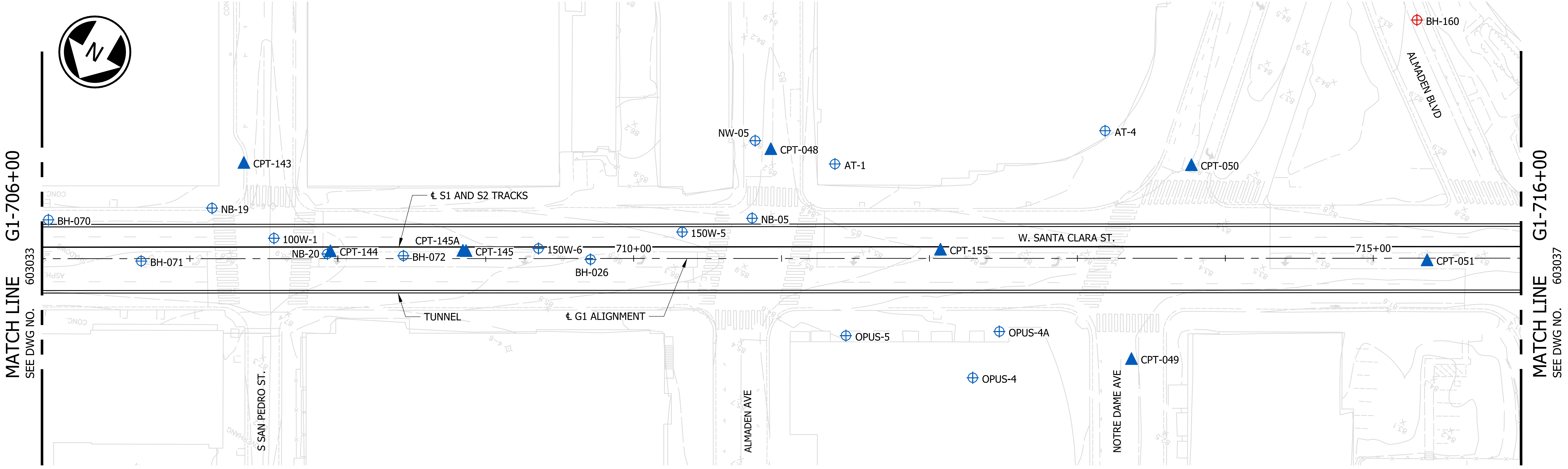
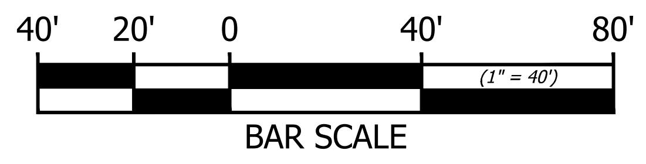


PLAN

SCALE: 1" = 40'



NOT FOR CONSTRUCTION

					DESIGNED BY	C.CARRENDER
					DRAWN BY	P.NG
					DWG. CHECK	M.J.WALKER
					ENG. CHECK	M.J.WALKER
P01	12/23/20	PN	MW		Rev. 0 Issued Final	COORD. CHECK	
REV	DATE	BY	CHK	APP	DESCRIPTION	REVIEWED BY	

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Transportation
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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 18A

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603035		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603035	PAGE NO.

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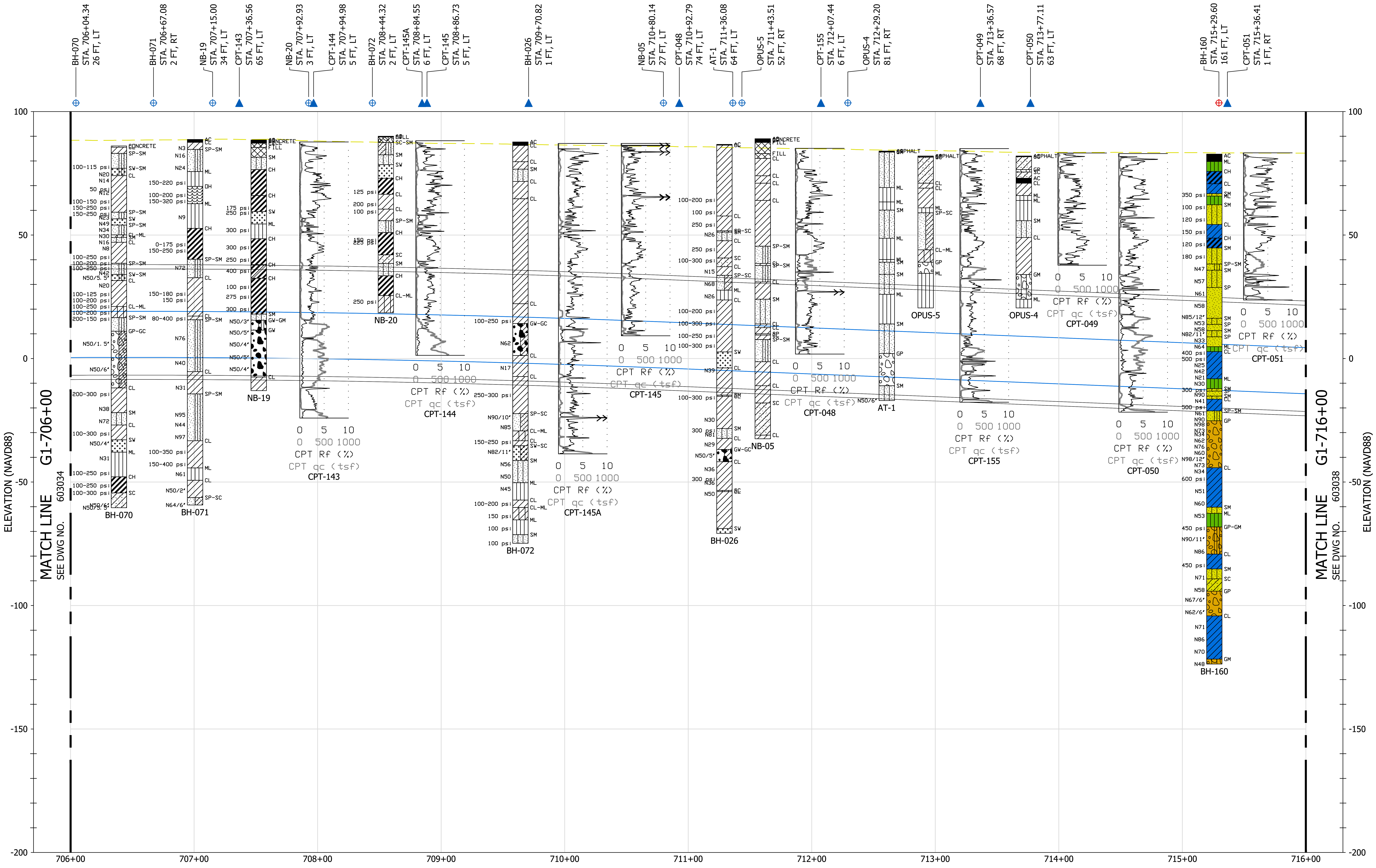
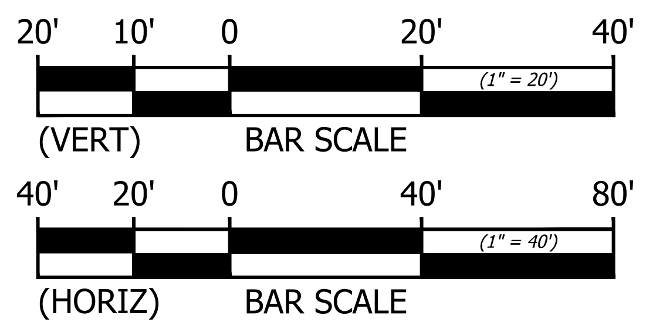


PROFILE

SCALE: 1"=40'H; 1"=20'V

SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED FOR CLARITY.
   - 100W-1
   - 150W-5
   - 150W-6
   - AT-4
   - NW-05
   - OPUS-4A



NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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BART SILICON VALLEY PHASE II EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 18B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603036		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
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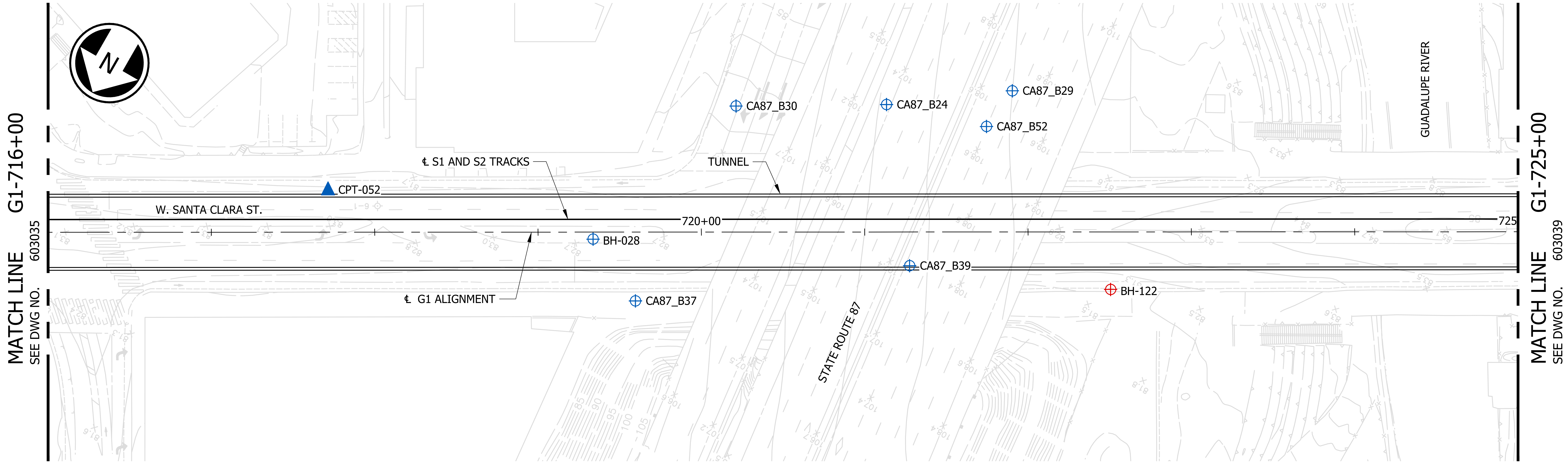
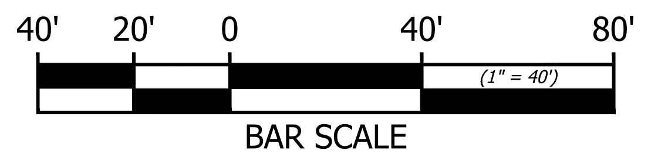


PLAN
SCALE: 1" = 40'



BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
DRAWN BY	P.NG
DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 19A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603037		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603037	PAGE NO.

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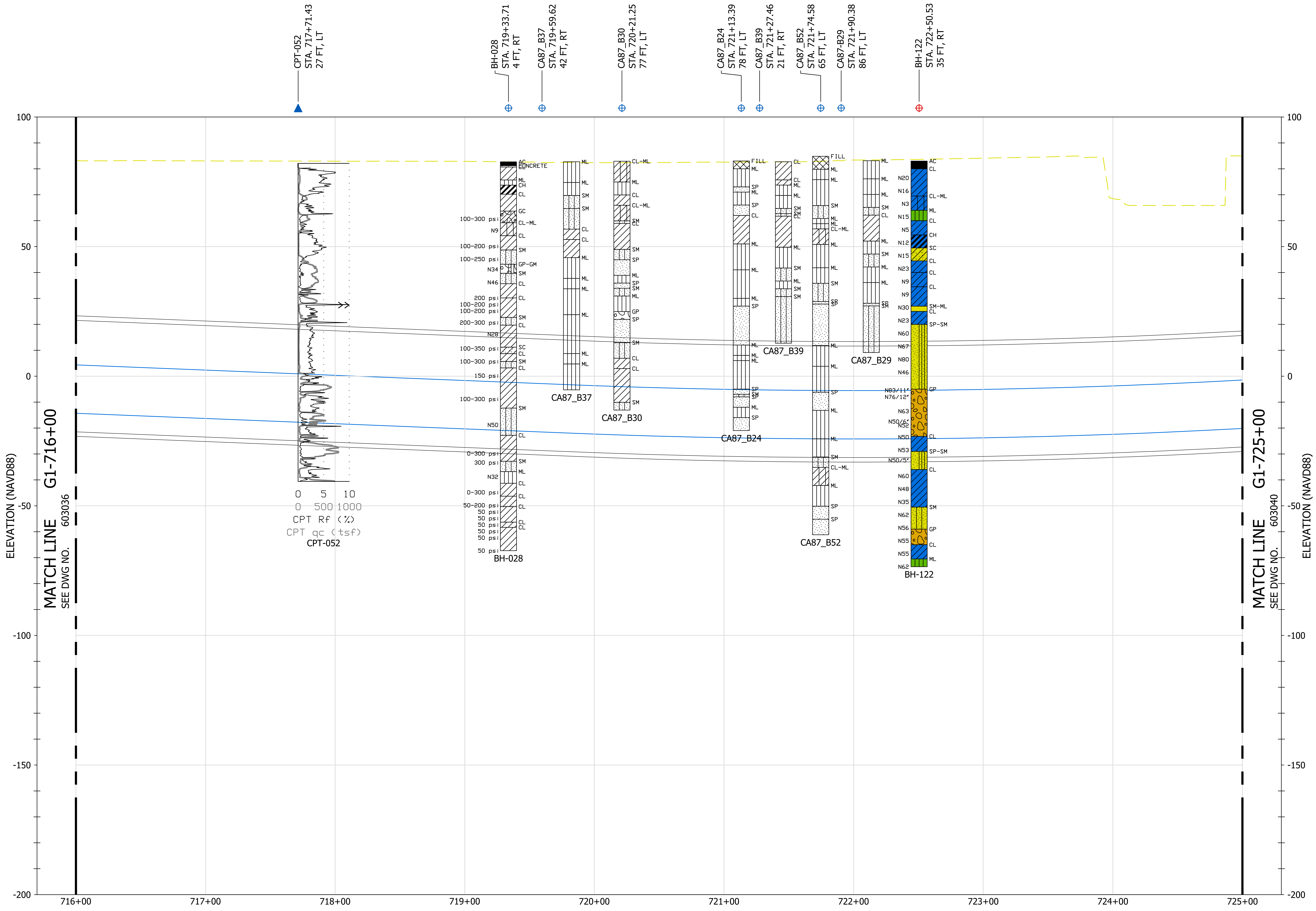

PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 19B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603038		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603038	PAGE NO.

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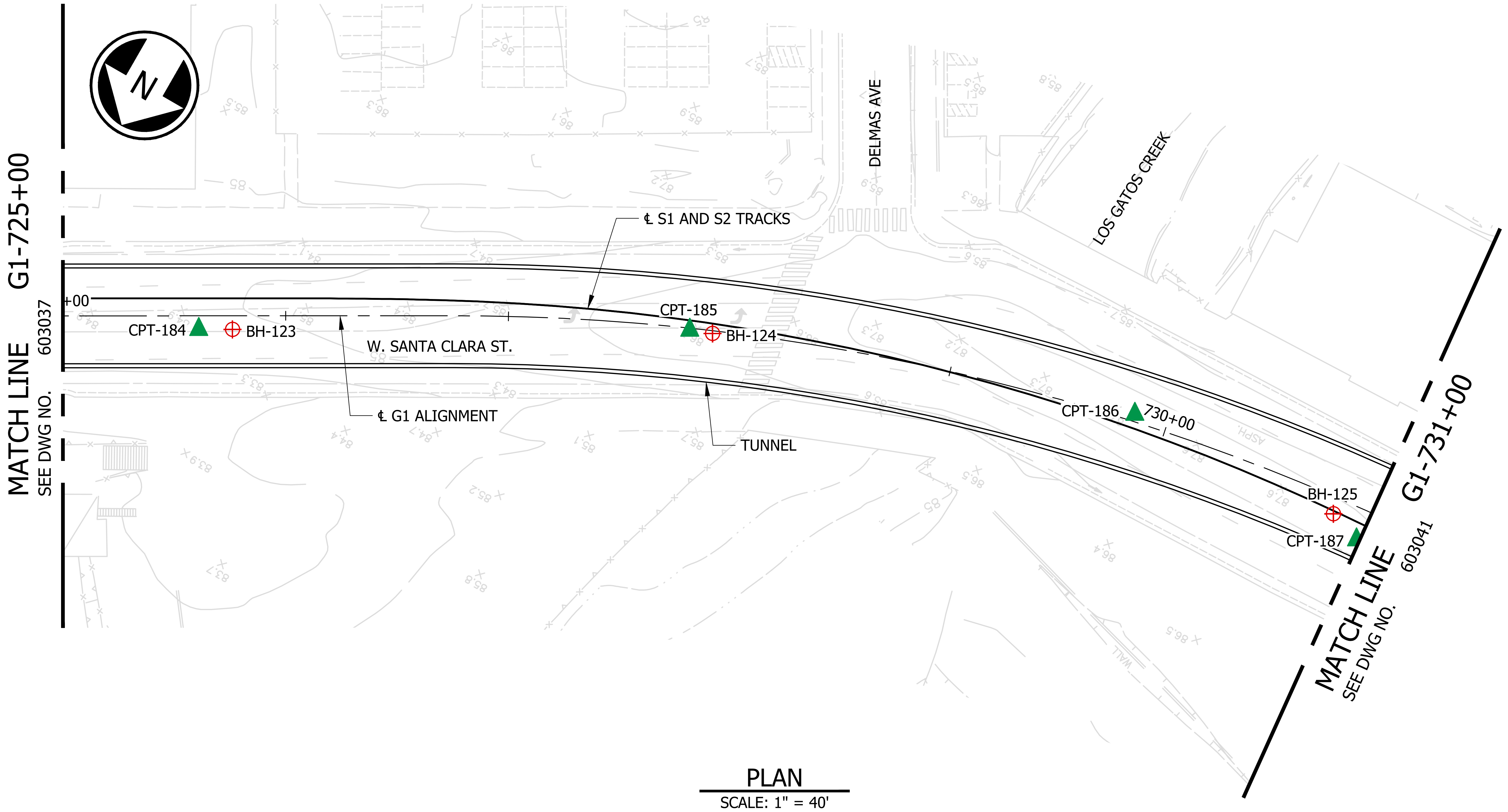

PLAN
SCALE: 1" = 40'

40' 20' 0 40' 80'
(1" = 40')
BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY C.CARRENDER
DRAWN BY P.NG
DWG. CHECK M.J.WALKER
ENG. CHECK M.J.WALKER
COORD. CHECK
REVIEWED BY

APPROVED

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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 20A

DRAWING FILE IDENTIFIER
385606-MMW-00-XX-DR-GE-603039

CONTRACT NO.	SCALE AT D SIZE	REV.
	1"=40'	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
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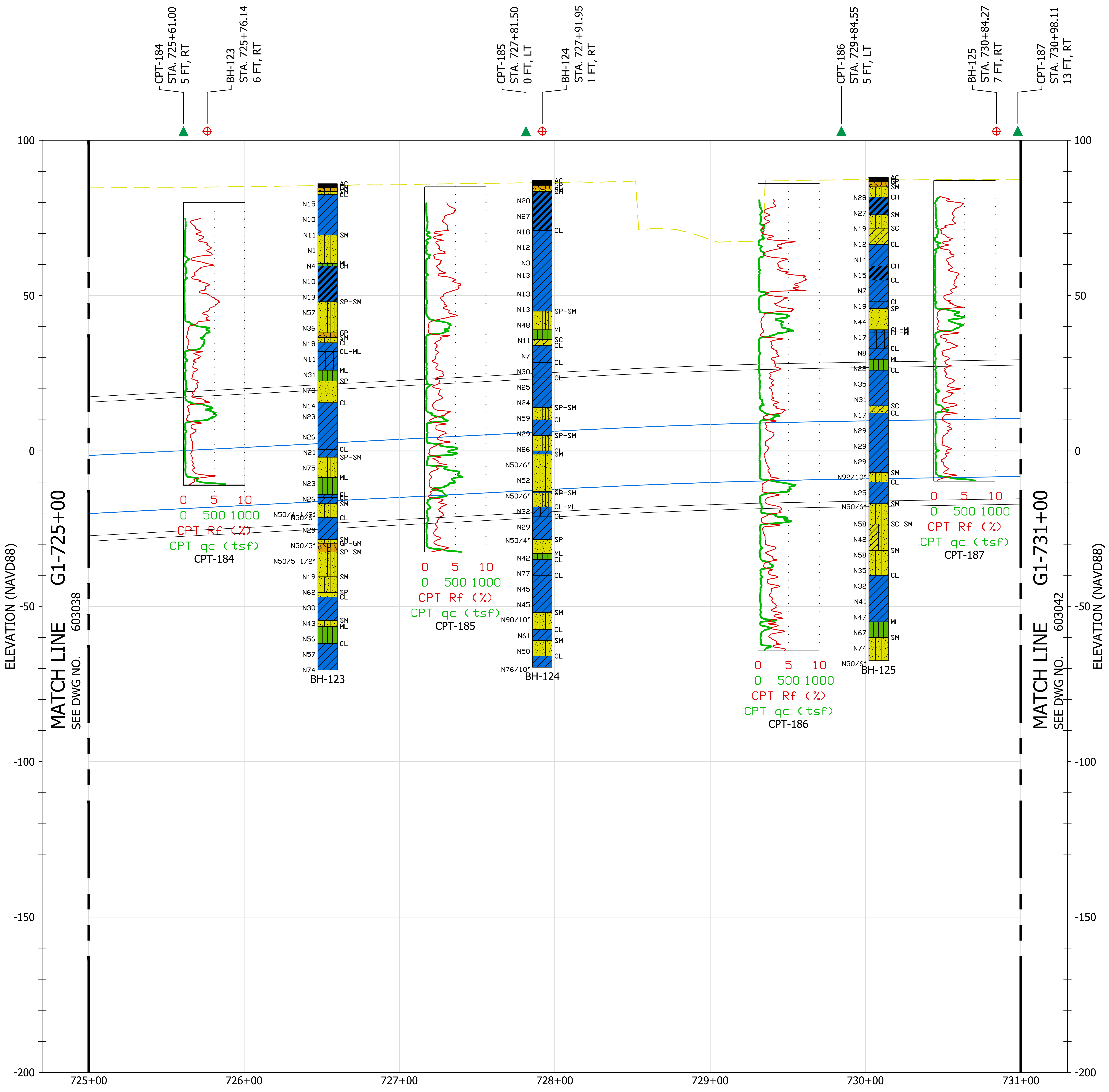
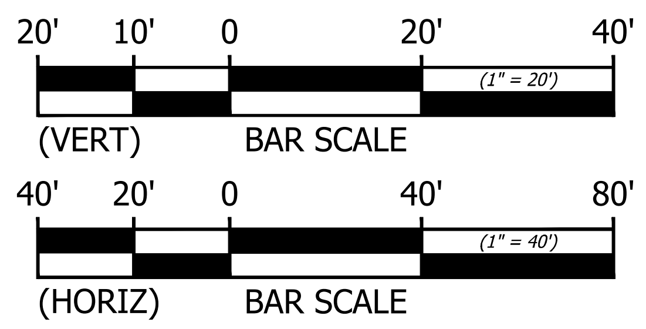


PROFILE

SCALE: 1"=40'H; 1"=20'V



NOT FOR CONSTRUCTION

						DESIGNED BY	C.CARRENDER
						DRAWN BY	P.NG
						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
P01	12/23/20	PN	MW		Rev. 0 Issued Final	COORD. CHECK	
REV	DATE	BY	CHK	APP	DESCRIPTION	REVIEWED BY	

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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 20B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603040		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603040	PAGE NO.

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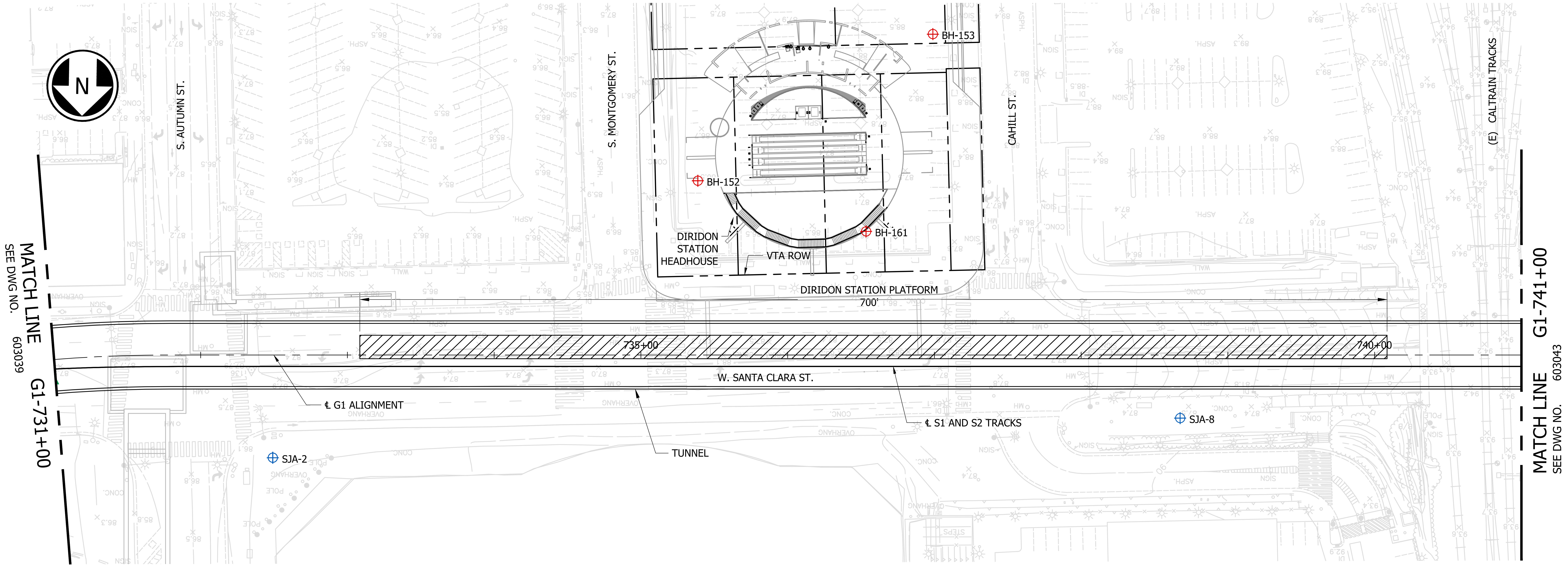
SHEET NOTES:

1. ARCHITECTURAL CONCEPT OF DIRIDON STATION TAKEN FROM MODEL DATED 2020-11-20, VERSION AM.



PLAN

SCALE: 1" = 40'

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 21A

DRAWING FILE IDENTIFIER		
385606-MMW-00-XX-DR-GE-603041		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603041	PAGE NO.

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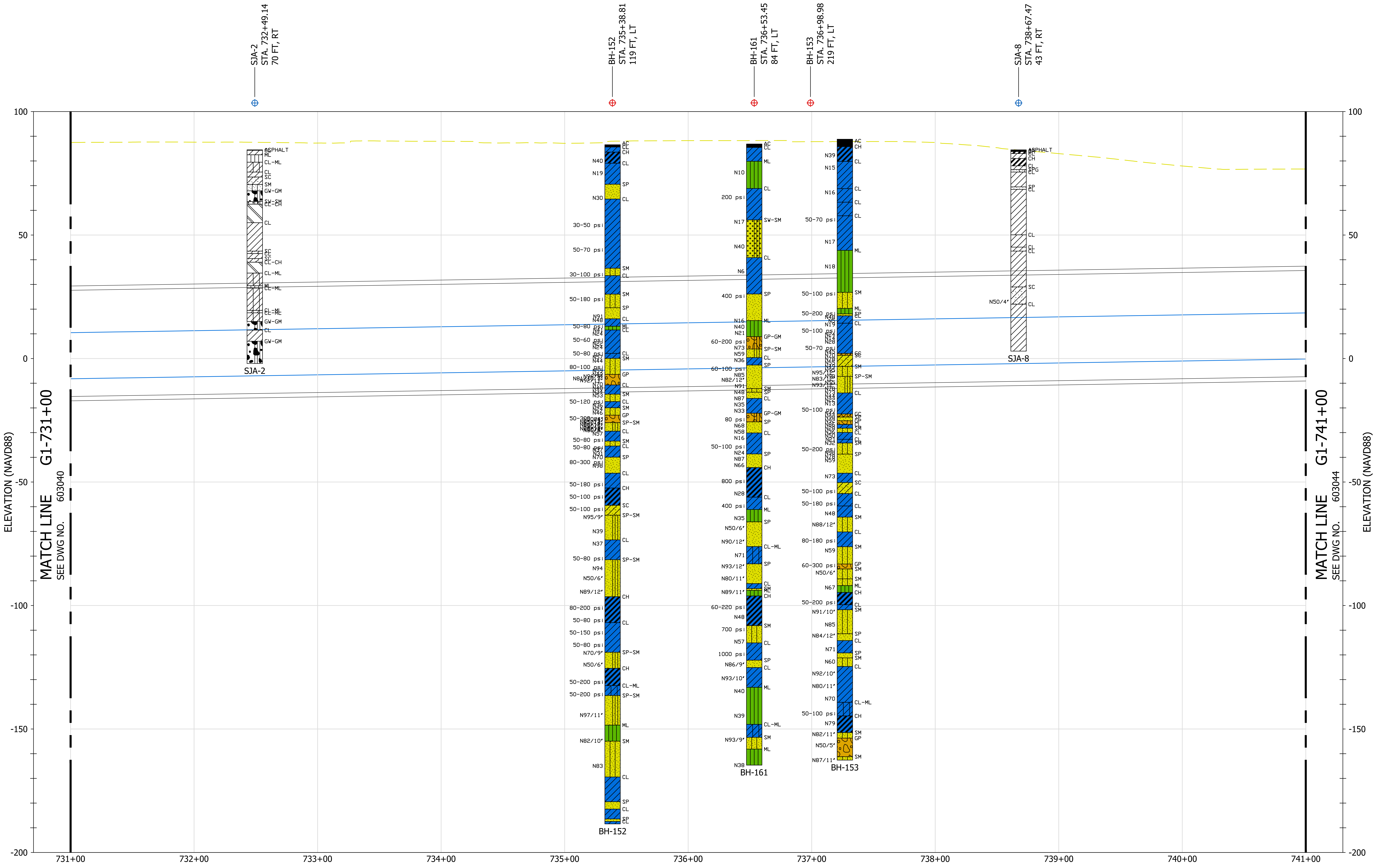
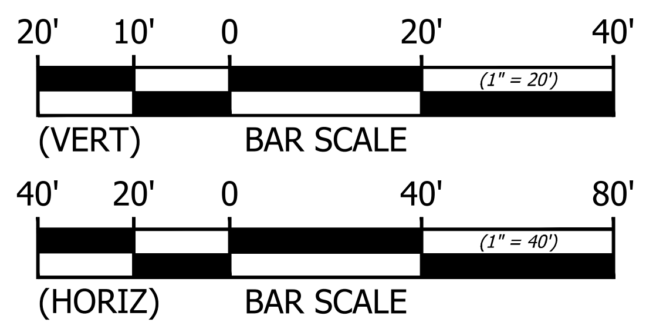


PROFILE

SCALE: 1"=40'H; 1"=20'V



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 21B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603042		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603042	PAGE NO.

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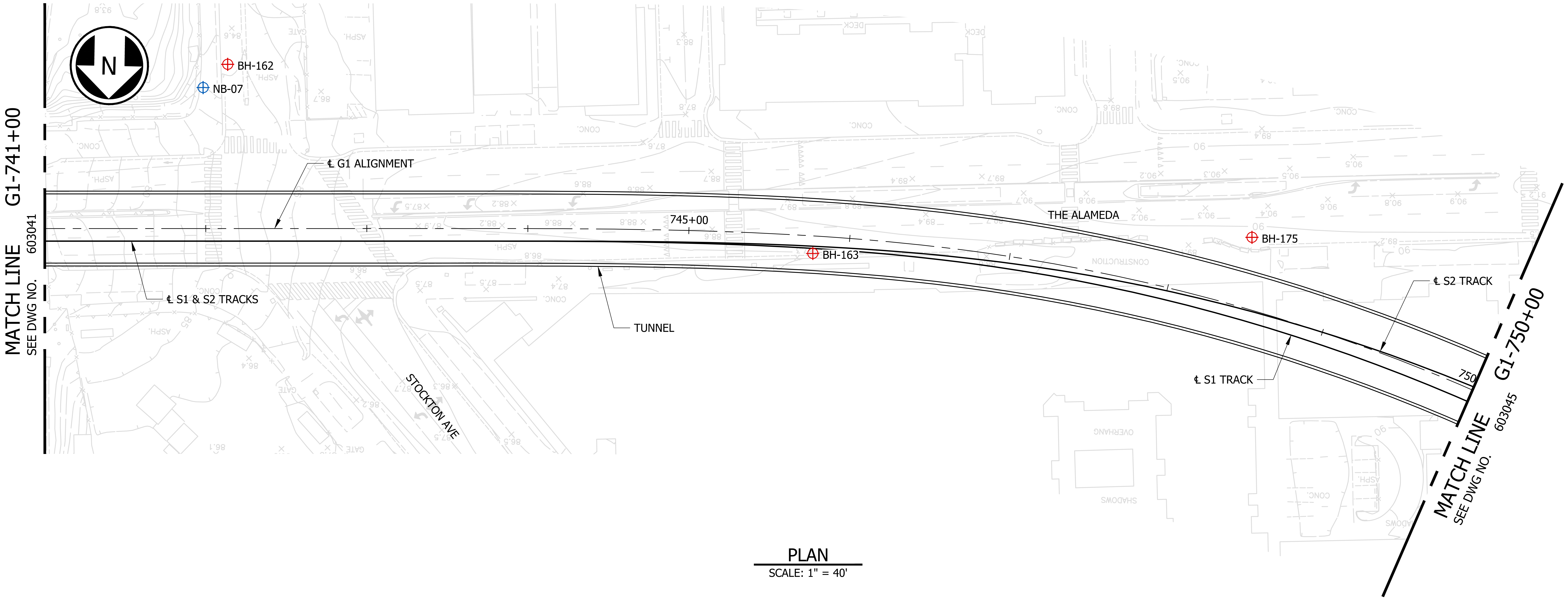
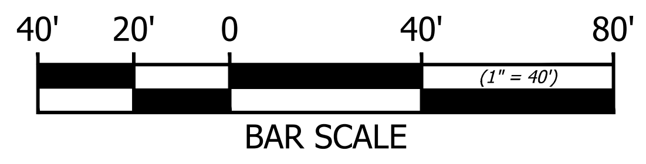


PLAN
SCALE: 1" = 40'



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 22A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603043		
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SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
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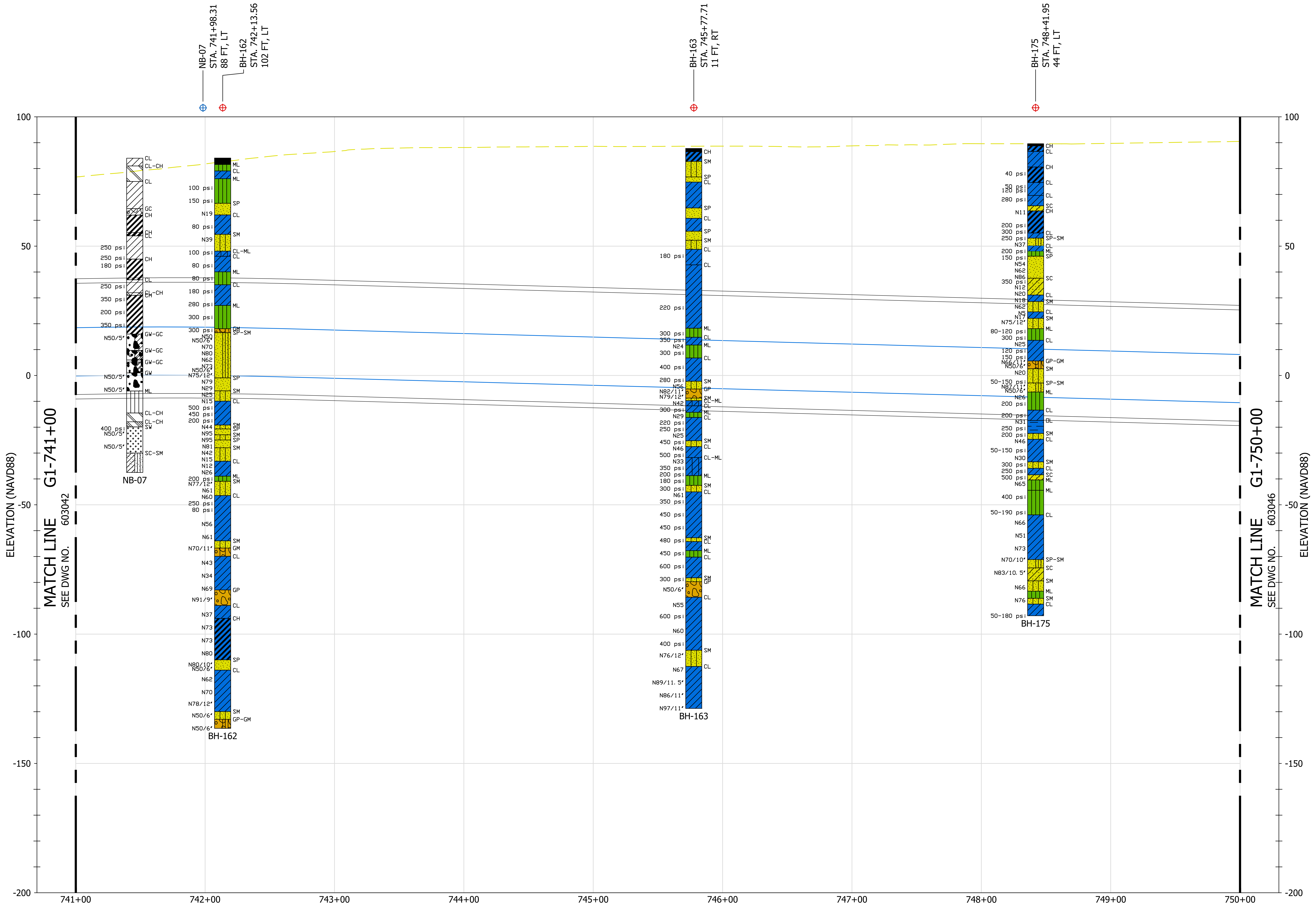
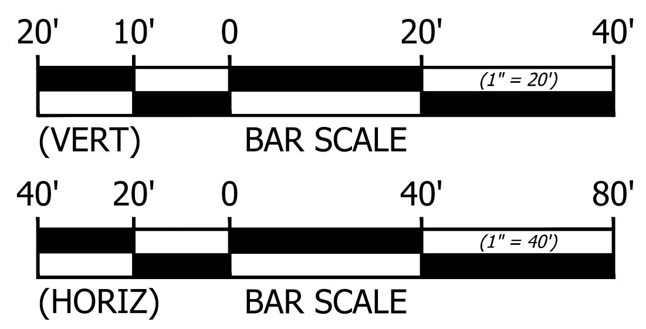


PROFILE

SCALE: 1"=40'H; 1"=20'V



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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 22B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603044

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
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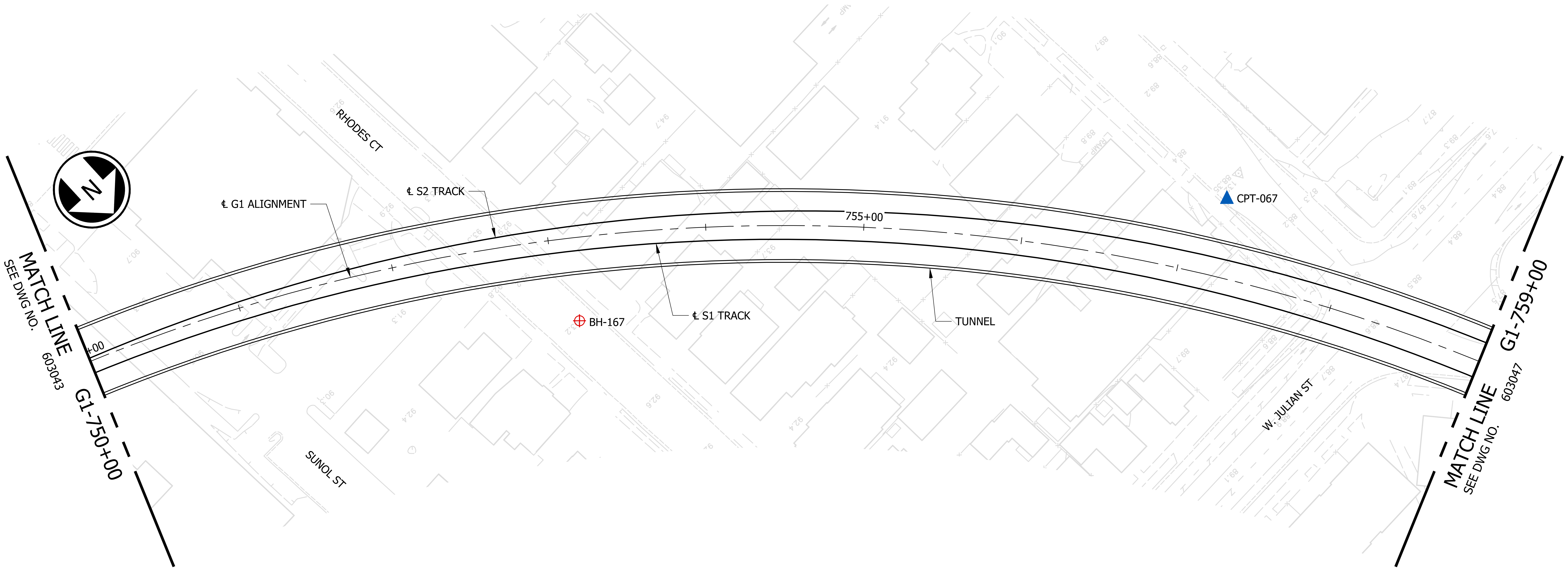
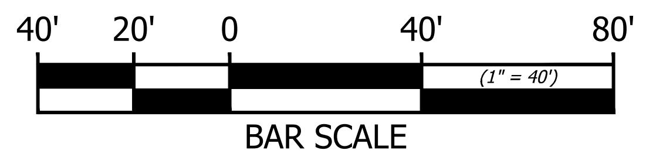


PLAN

SCALE: 1" = 40'



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						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
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EXTENSION PROJECT
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GEOTECHNICAL DATA REPORT
PLAN
SHEET 23A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603045		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603045	PAGE NO.

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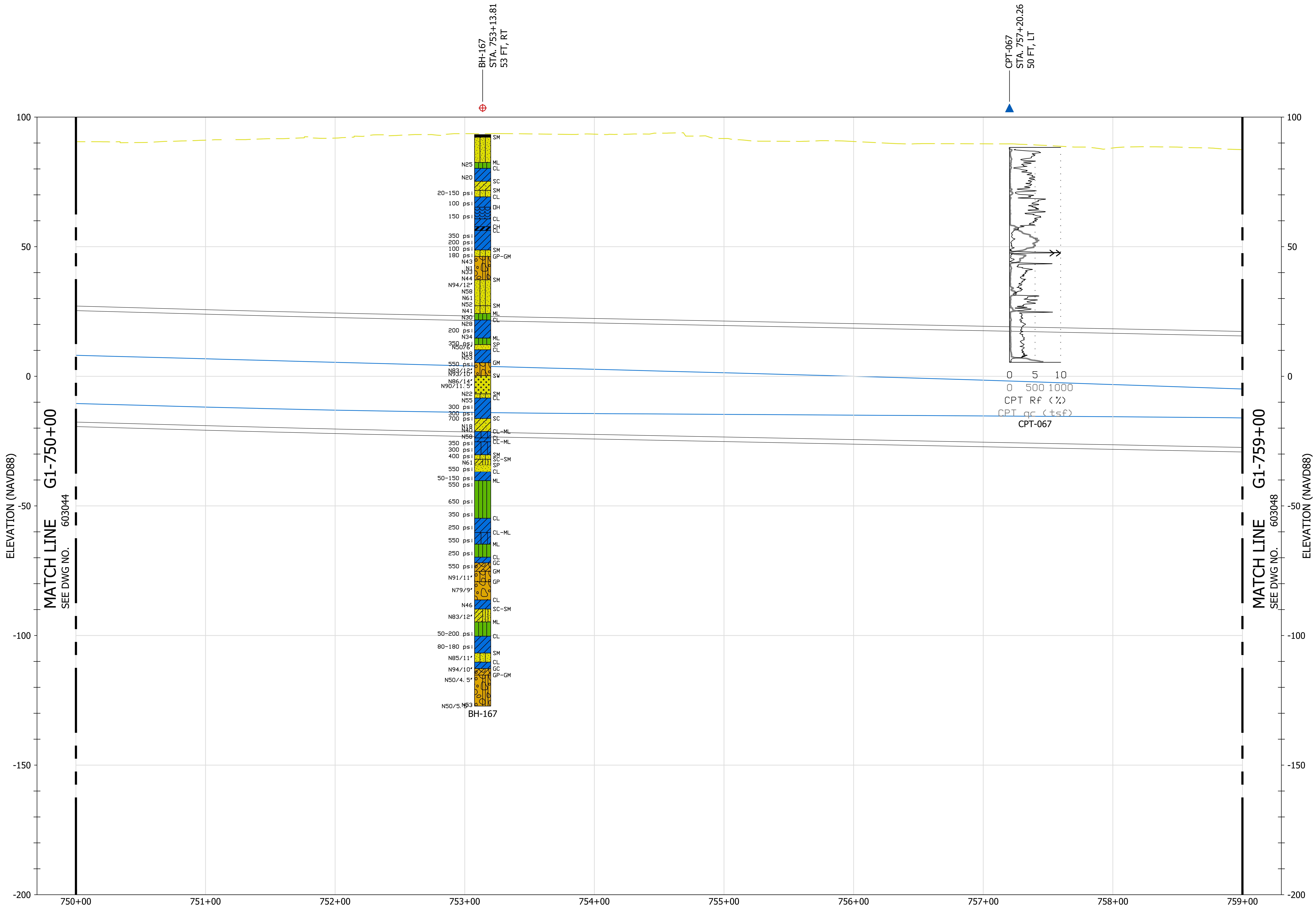
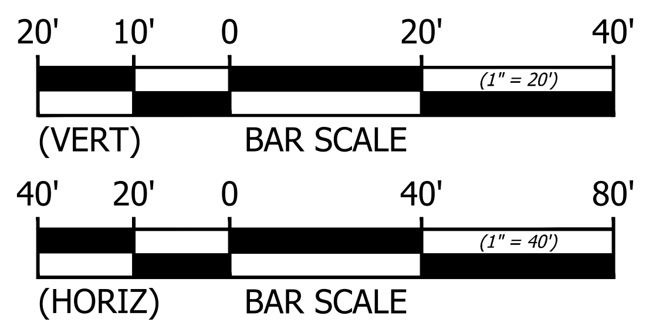


PROFILE

SCALE: 1"=40'H; 1"=20'V



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 23B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603046		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603046	PAGE NO.

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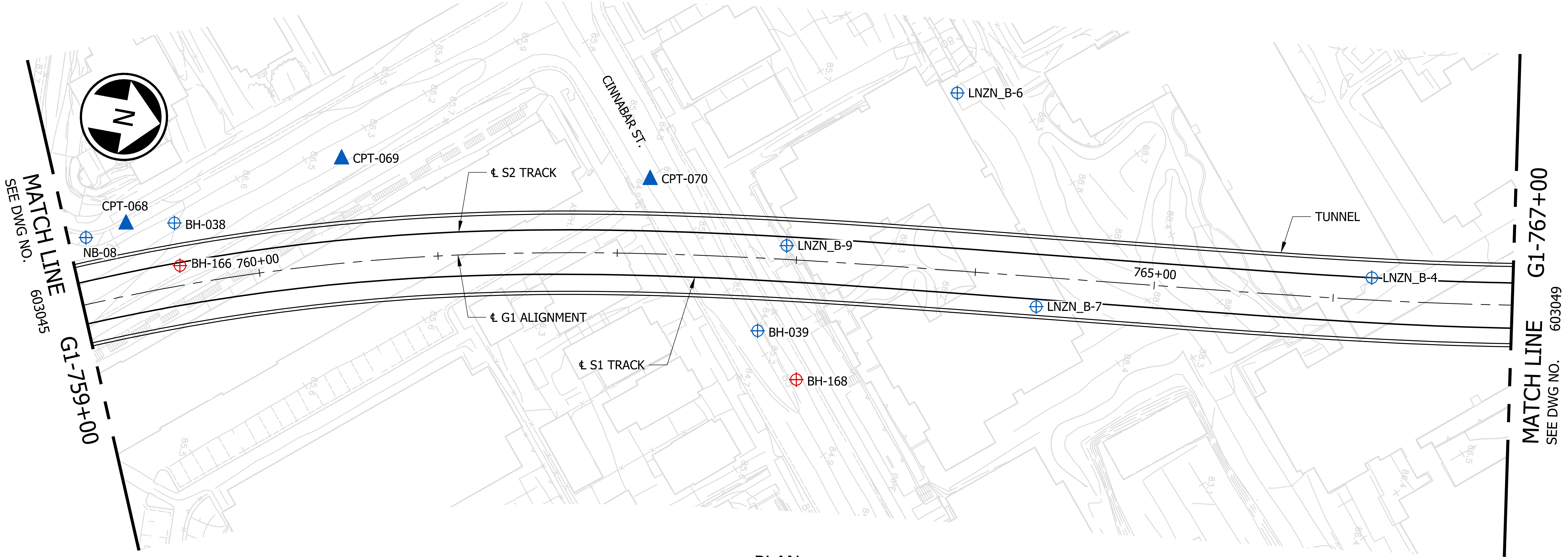

PLAN

SCALE: 1" = 40'

40' 20' 0 40' 80'
(1" = 40')
BAR SCALE

NOT FOR CONSTRUCTION

P01	12/23/20	PN	MW		Rev. 0 Issued Final
REV	DATE	BY	CHK	APP	DESCRIPTION

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 24A

DRAWING FILE IDENTIFIER
385606-MMW-00-XX-DR-GE-603047

CONTRACT NO.	SCALE AT D SIZE	REV.
	1"=40'	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
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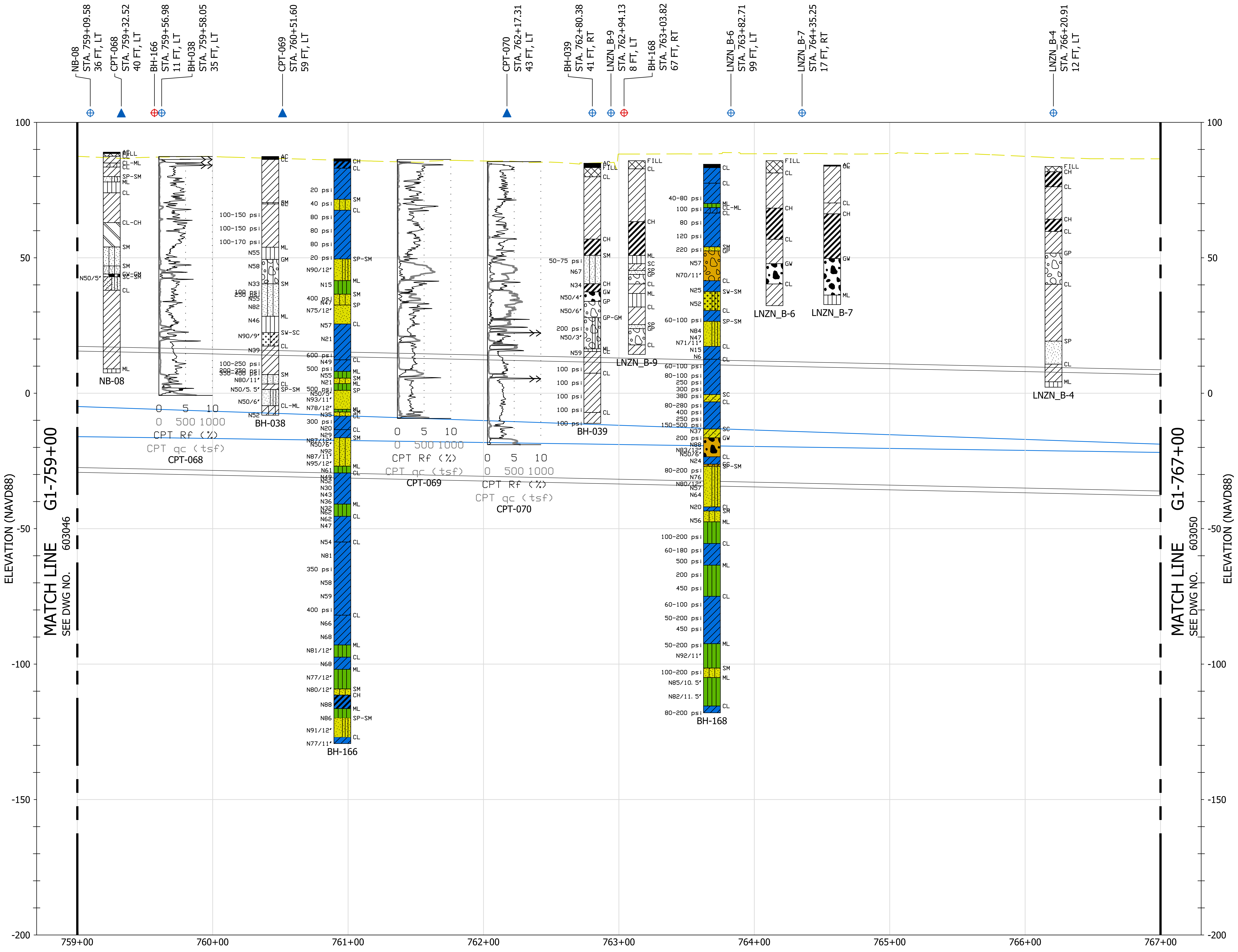
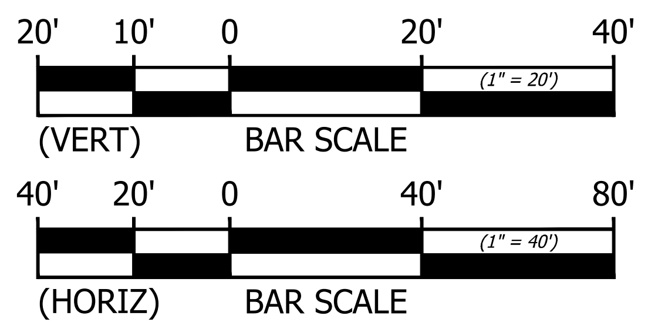


PROFILE

SCALE: 1"=40'H; 1"=20'V



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						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
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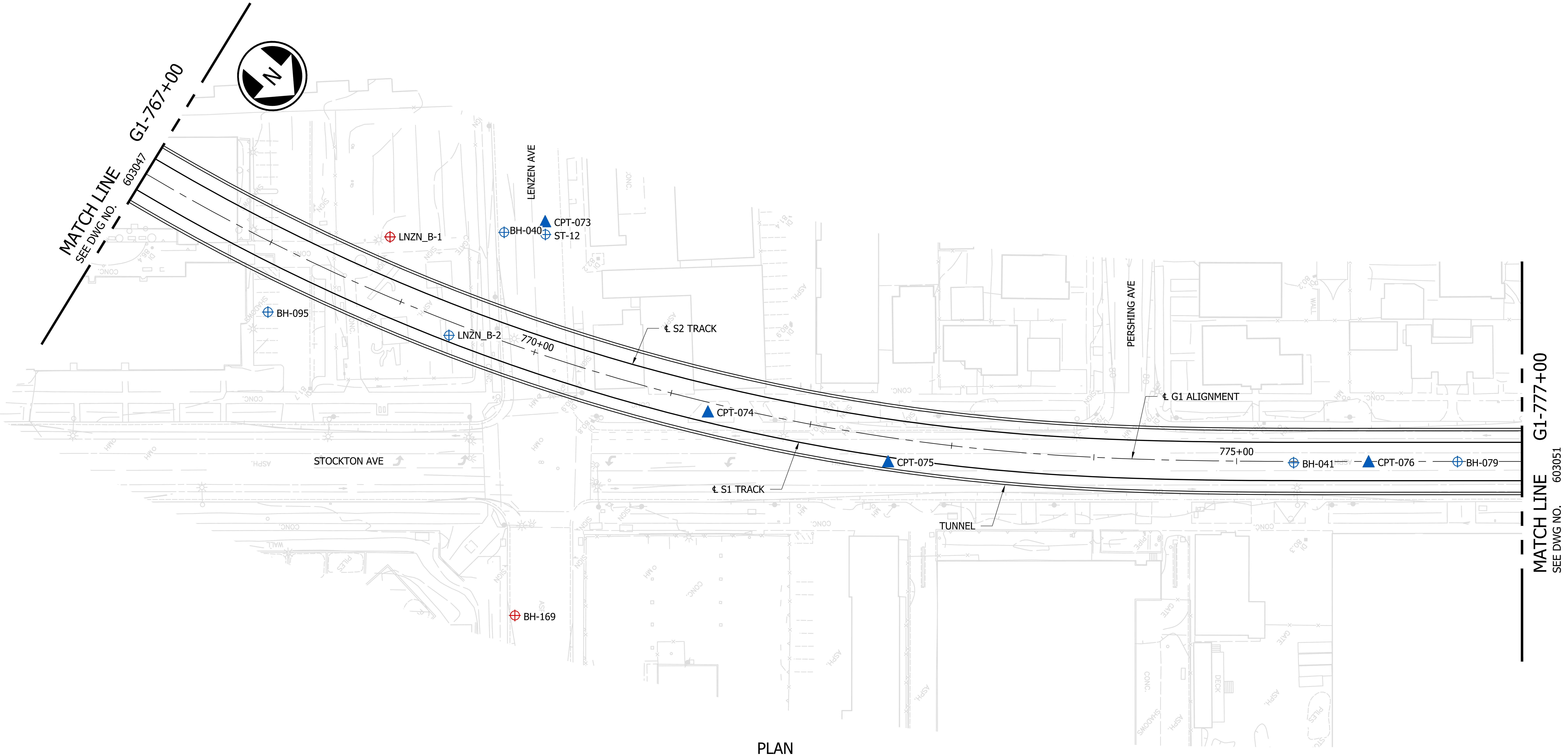
EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 24B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603048		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603048	PAGE NO.



PLAN

SCALE: 1" = 40'

BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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GEOTECHNICAL DATA REPORT
PLAN
SHEET 25A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603049		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603049	PAGE NO.

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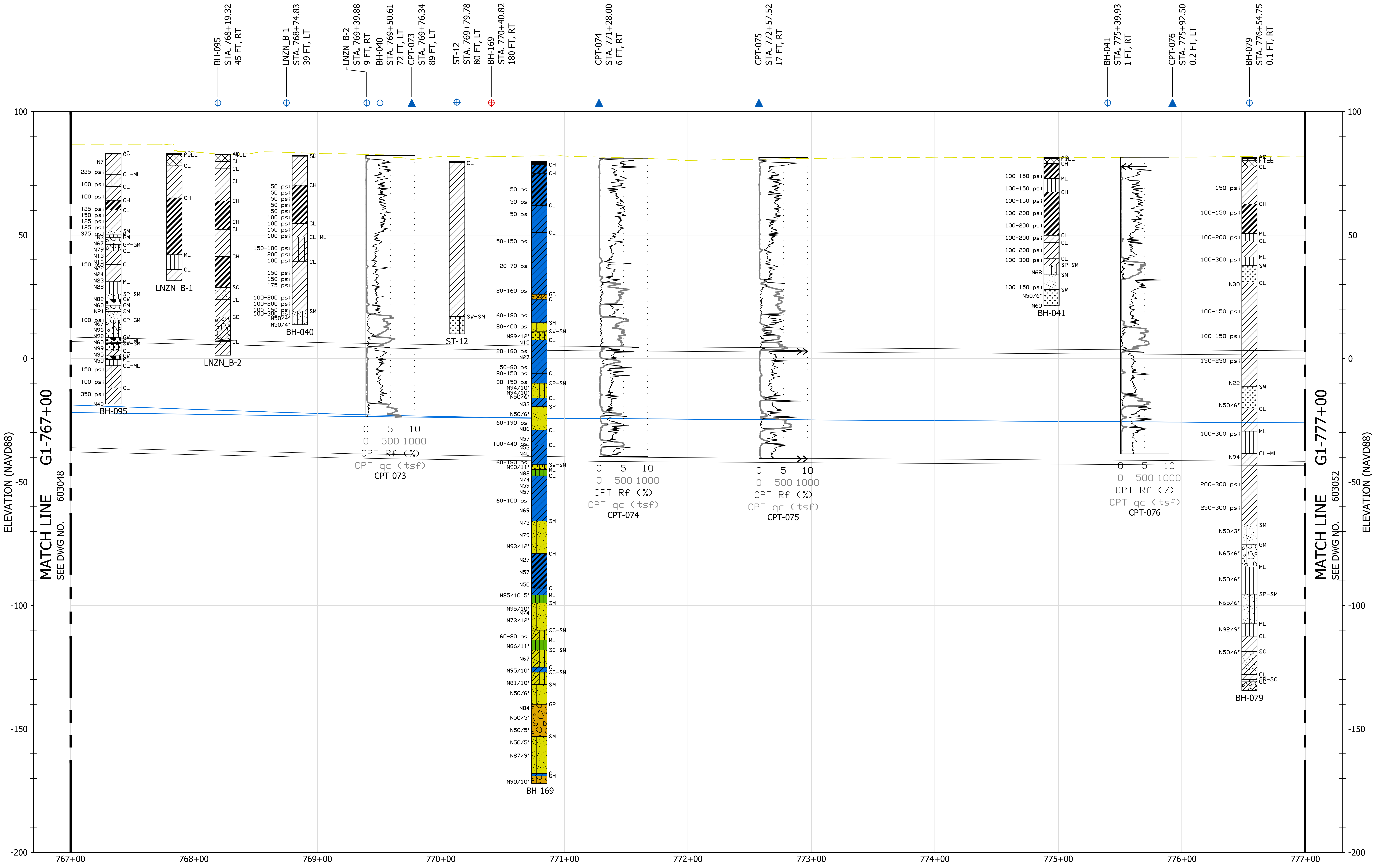
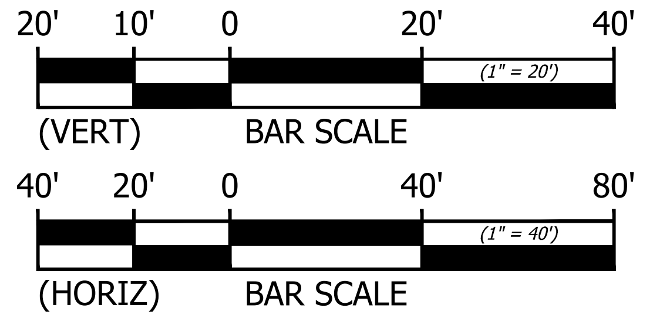


PROFILE

SCALE: 1"=40'H; 1"=20'V



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 25B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603050

CONTRACT NO.
SCALE AT D SIZE AS SHOWN
REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT
SUIT. CODE S3
SHEET NO. 603050
PAGE NO.

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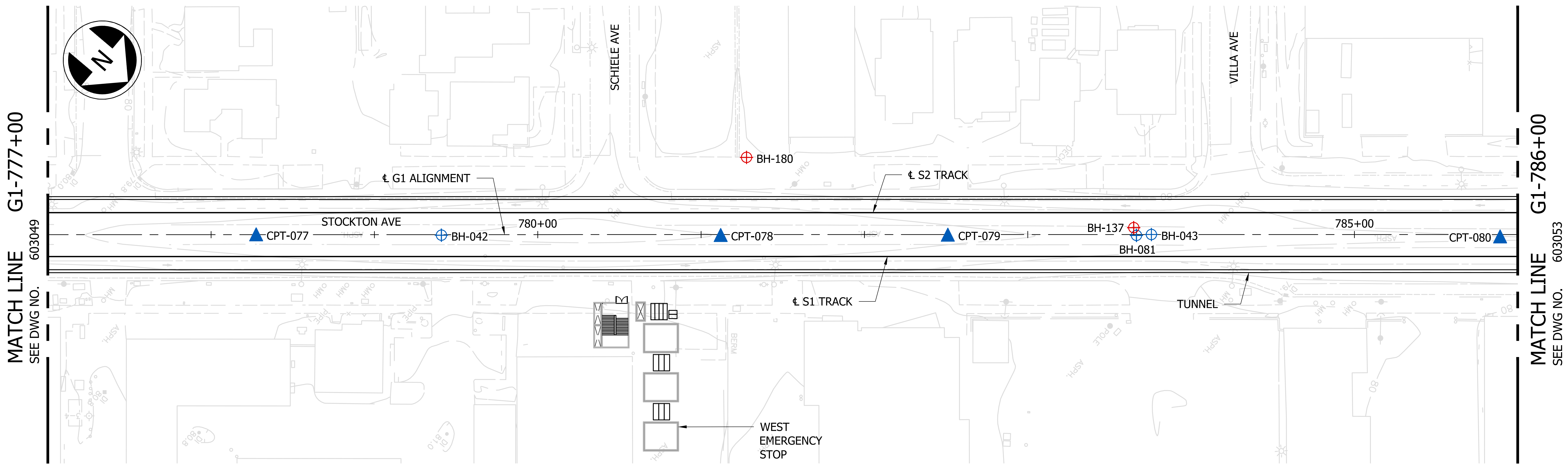
SHEET NOTES:

1. ARCHITECTURAL CONCEPT OF WEST EMERGENCY STOP FACILITY TAKEN FROM MODEL DATED 2020-12-08, VERSION W.



PLAN
SCALE: 1" = 40'

40' 20' 0 40' 80'
(1" = 40')
BAR SCALE

NOT FOR CONSTRUCTION

P01	12/23/20	PN	MW		Rev. 0 Issued Final
REV	DATE	BY	CHK	APP	DESCRIPTION

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 26A

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SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
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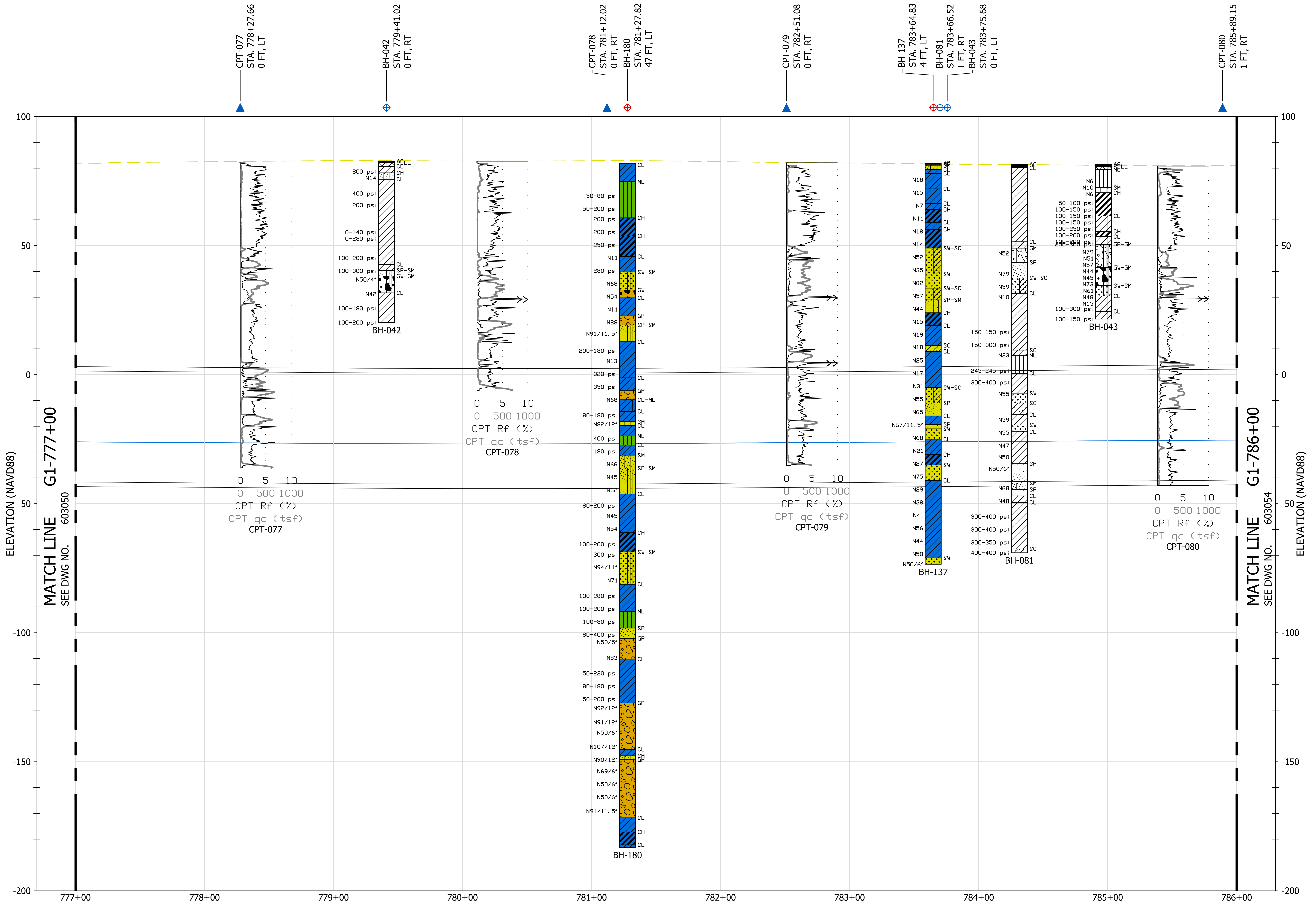
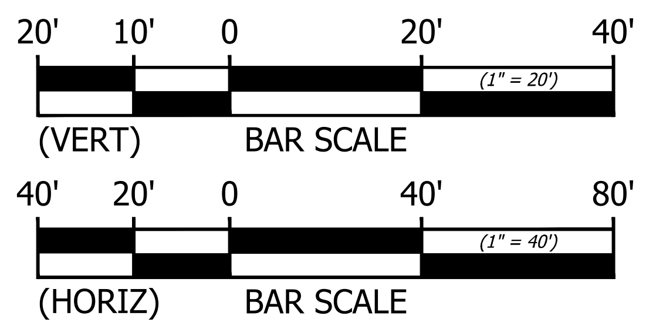


PROFILE

SCALE: 1"=40'H; 1"=20'V



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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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PROFILE
SHEET 26B

DRAWING FILE IDENTIFIER
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REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT
SUIT. CODE S3
SHEET NO. 603052
PAGE NO.

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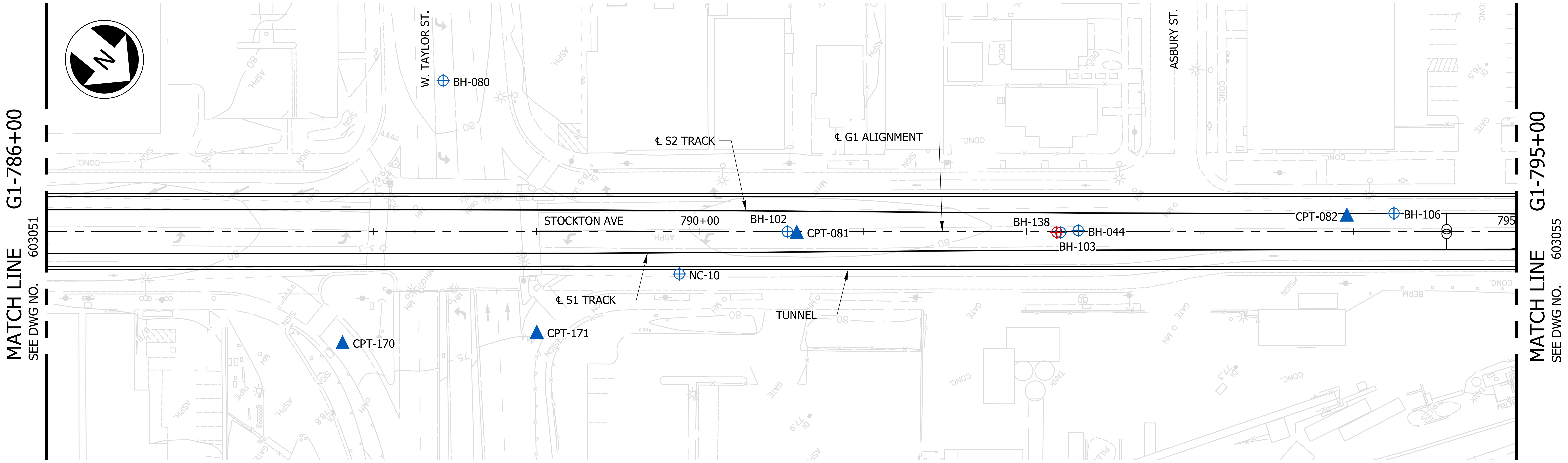

PLAN

SCALE: 1" = 40'

NOT FOR CONSTRUCTION

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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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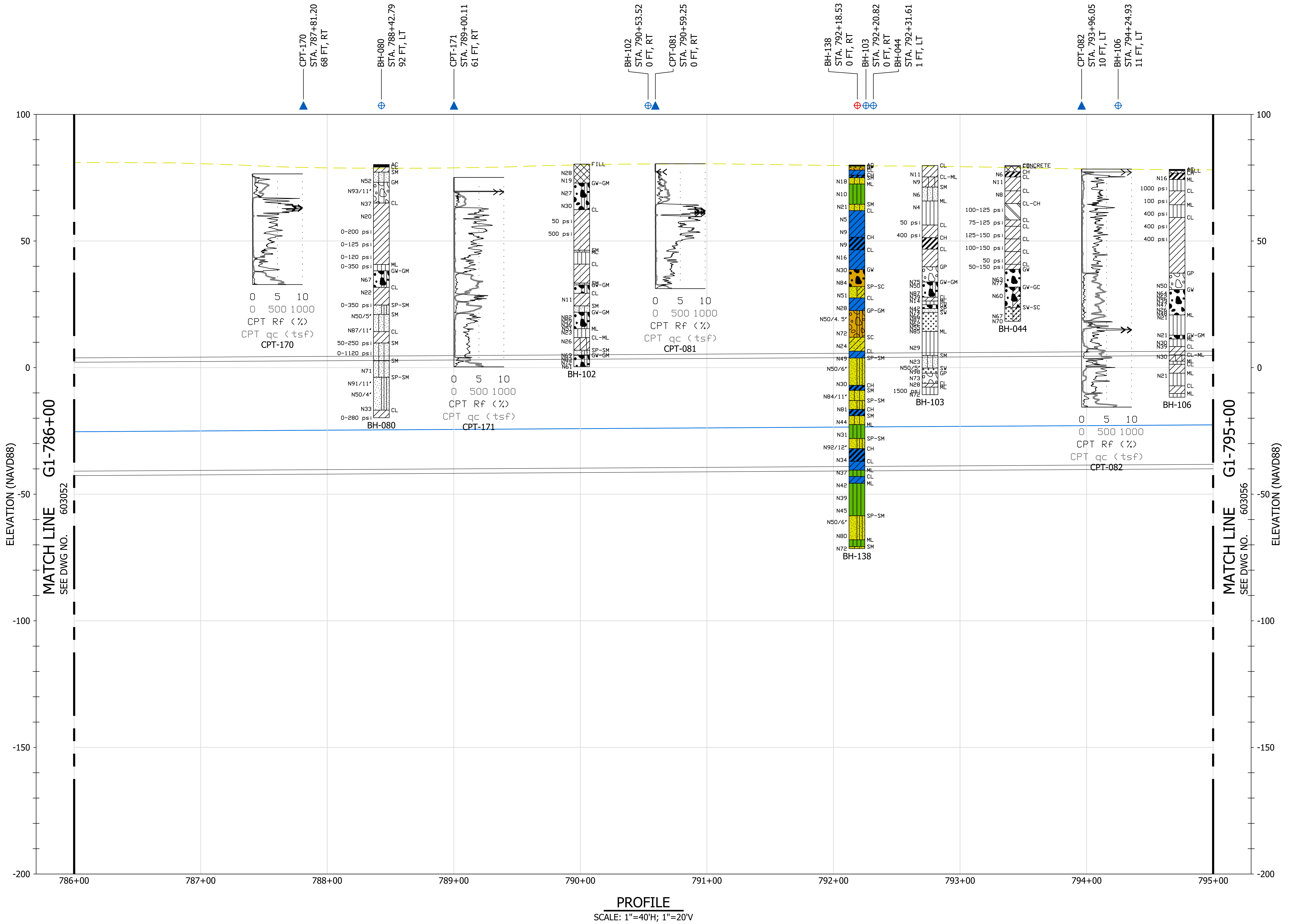
PLAN
SHEET 27A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603053		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603053	PAGE NO.

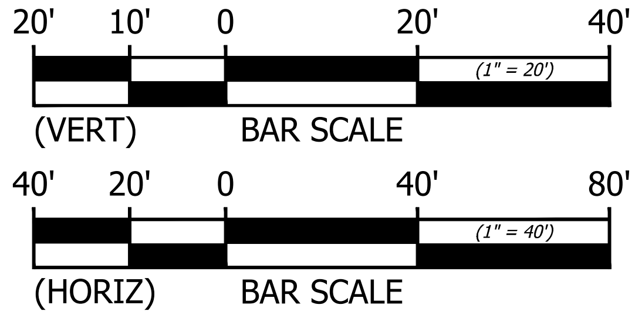
SHEET NOTES:

1. THE FOLLOWING FENCE LOG WAS OMITTED FOR CLARITY.
   NC-10



PROFILE

SCALE: 1"=40'H; 1"=20'V



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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 27B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603054		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603054	PAGE NO.

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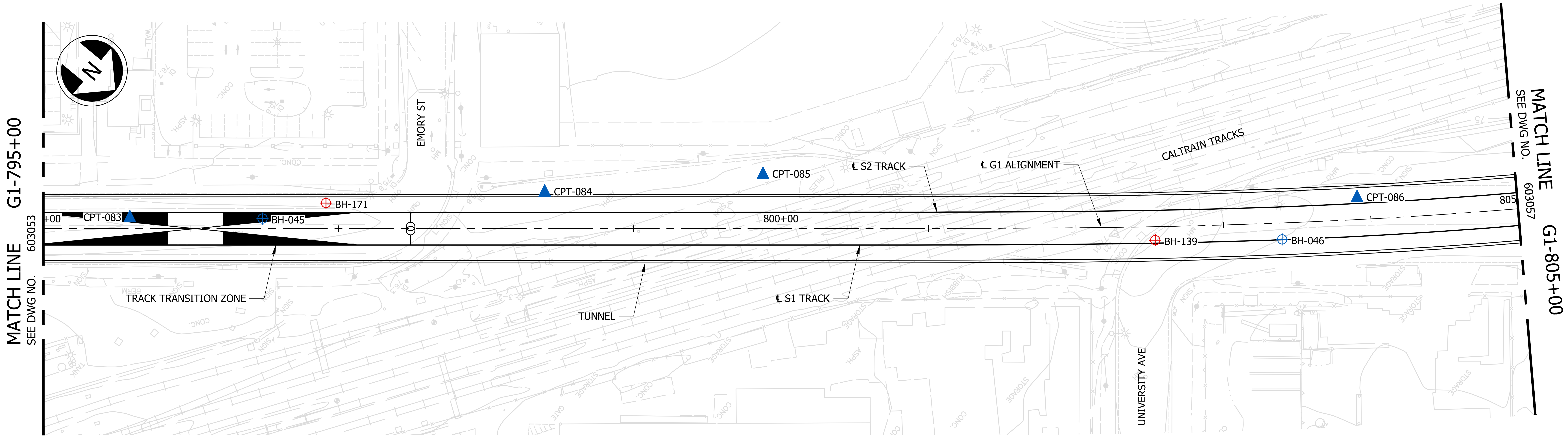
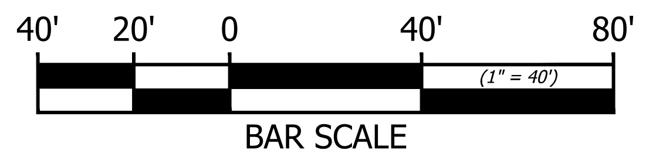


PLAN

SCALE: 1" = 40'



NOT FOR CONSTRUCTION

					DESIGNED BY	C.CARRENDER
					DRAWN BY	P.NG
					DWG. CHECK	M.J.WALKER
					ENG. CHECK	M.J.WALKER
P01	12/23/20	PN	MW		Rev. 0 Issued Final	COORD. CHECK	
REV	DATE	BY	CHK	APP	DESCRIPTION	REVIEWED BY	

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 28A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603055		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603055	PAGE NO.

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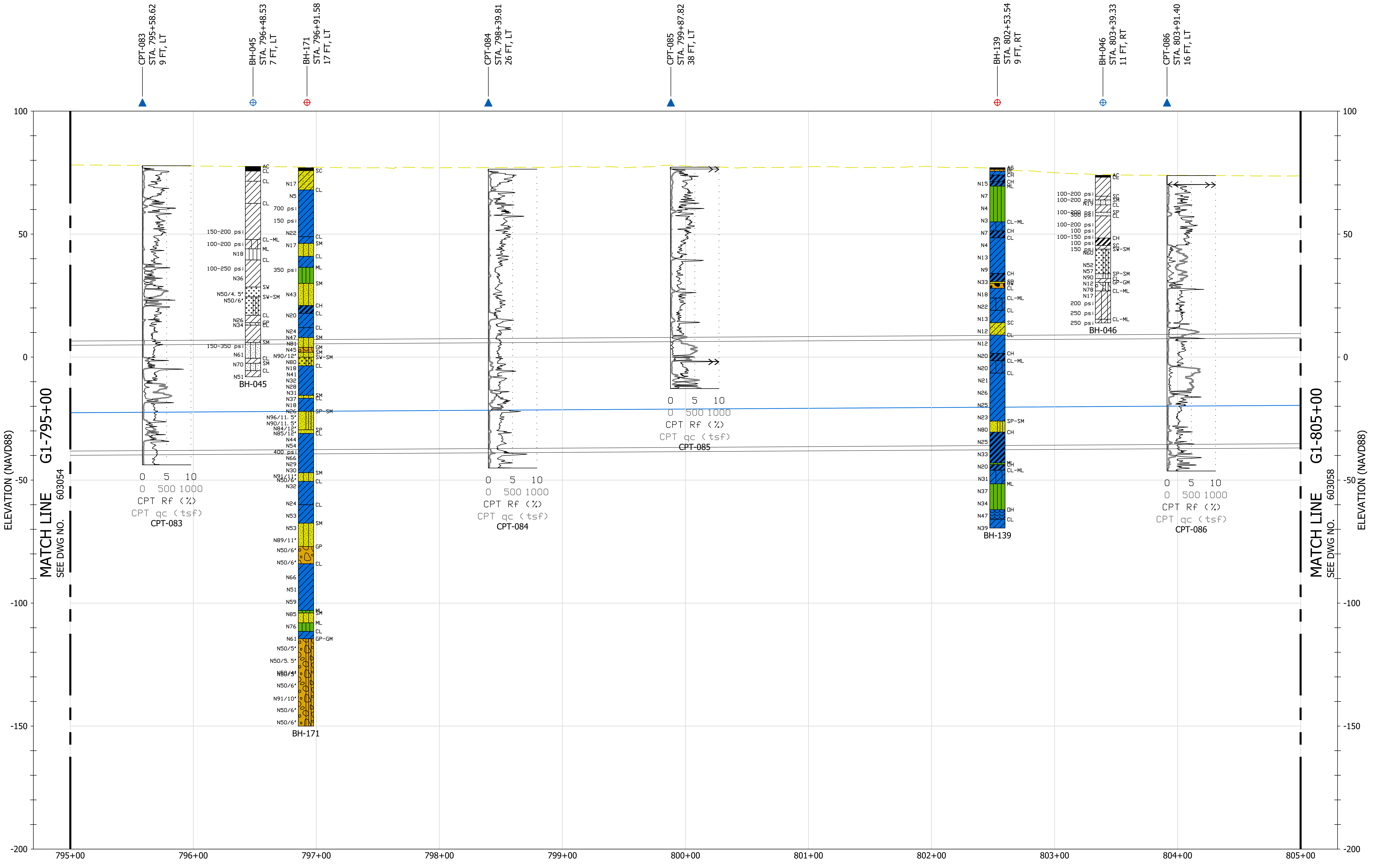
CAR93597



PROFILE

SCALE: 1"=40'H; 1"=20'V

NOT FOR CONSTRUCTION

c:\users\car93597\appdata\local\projectwise\workdir\mott-use-pw\dms08673\385606-MMW-PWIDE-XX-DR-GE-603056.dwg 5/20/2020 3:19 PM
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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
REVIEWED BY	

APPROVED

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EXTENSION PROJECT
VTA BSV Phase II

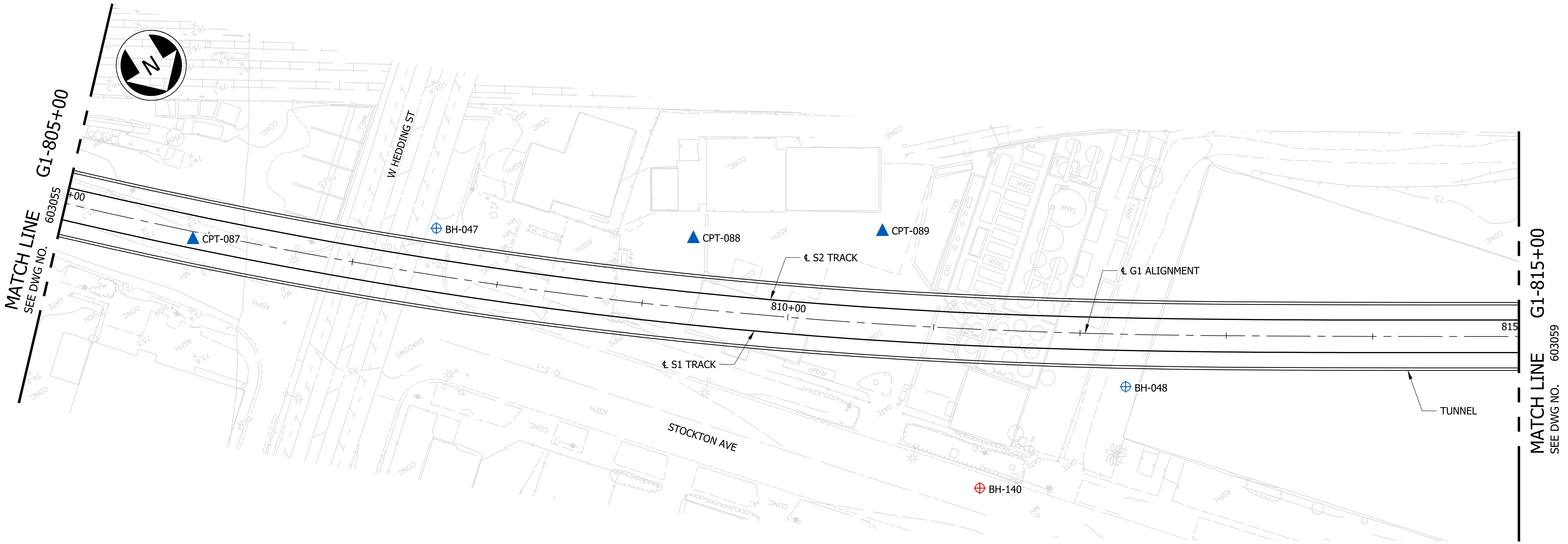
GEOTECHNICAL DATA REPORT
PROFILE
SHEET 28B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603056

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603056	



PLAN

SCALE: 1" = 40'

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 29A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603057		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603057	PAGE NO.

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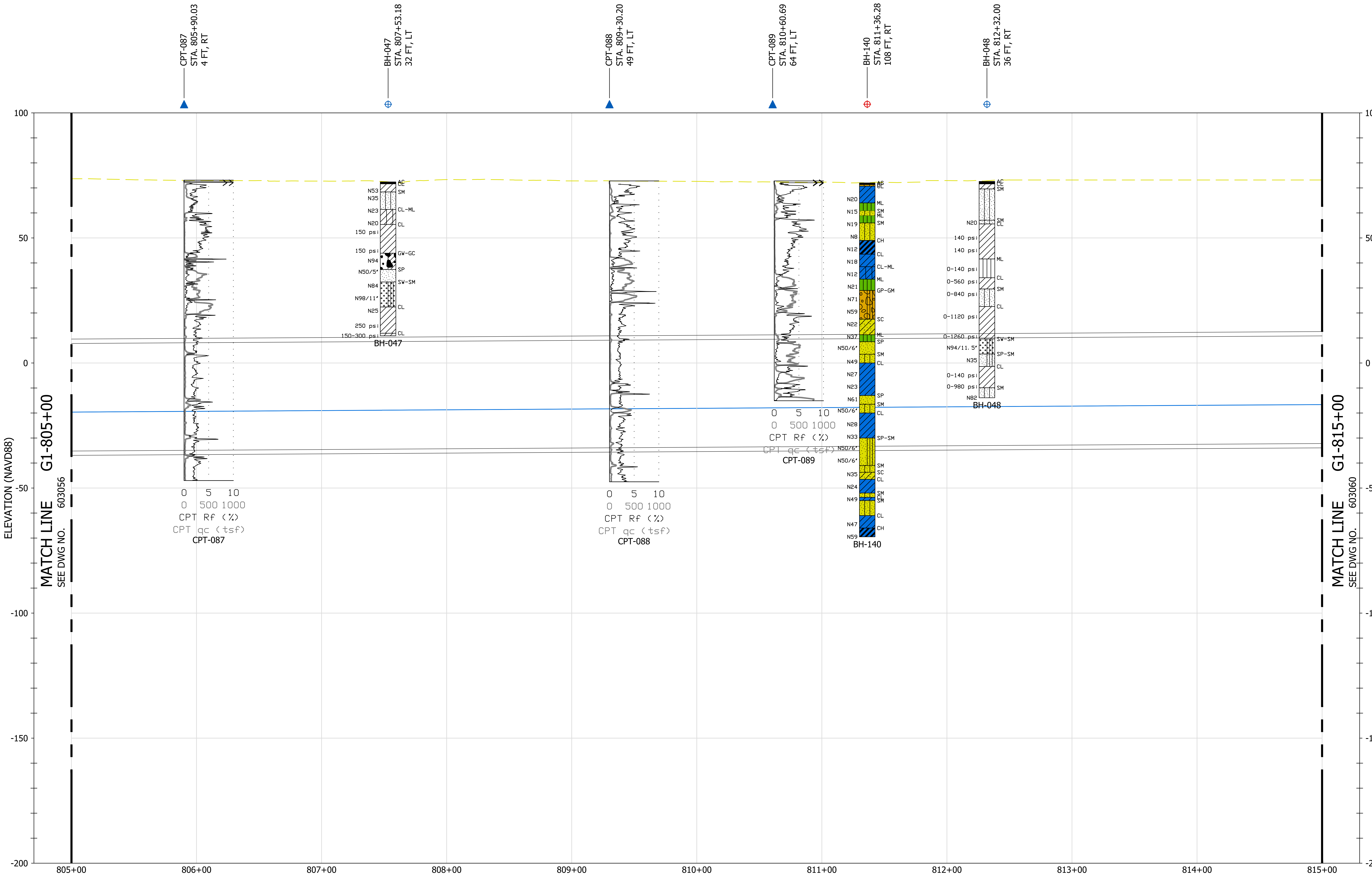
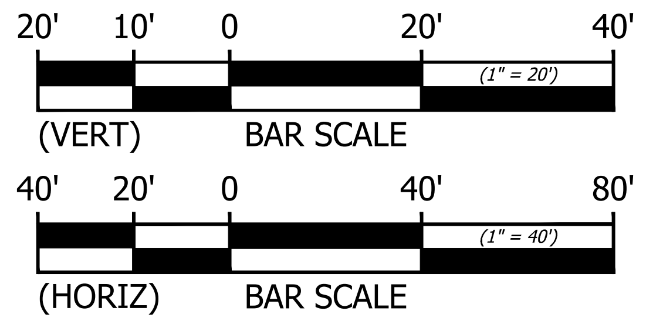
CAR93597



PROFILE

SCALE: 1"=40'H; 1"=20'V



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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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COORD. CHECK	
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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 29B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603058		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603058	PAGE NO.

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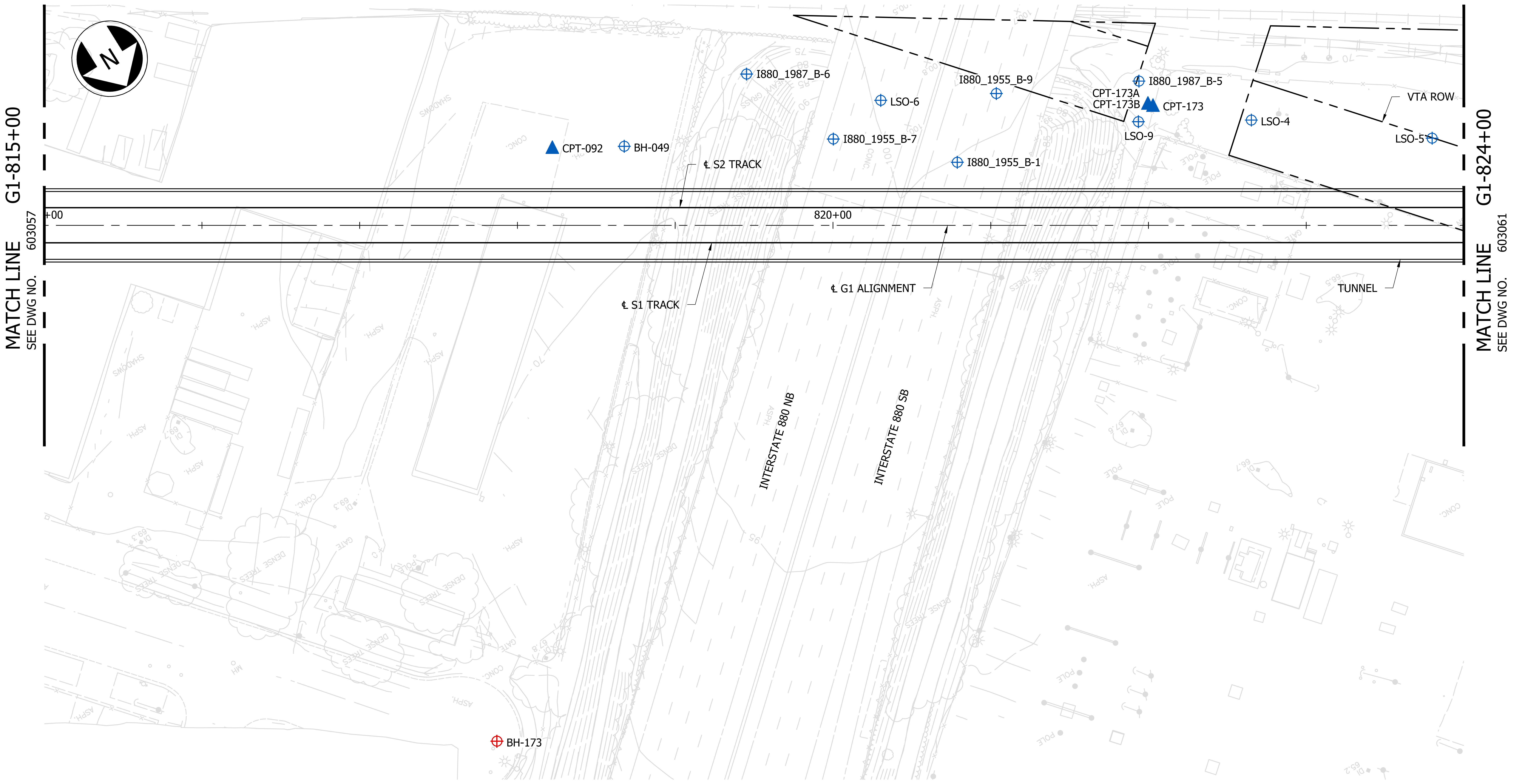
CAR93597



PLAN
SCALE: 1" = 40'

40' 20' 0 40' 80'
(1" = 40')
BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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COORD. CHECK	
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EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 30A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603059		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603059	PAGE NO.

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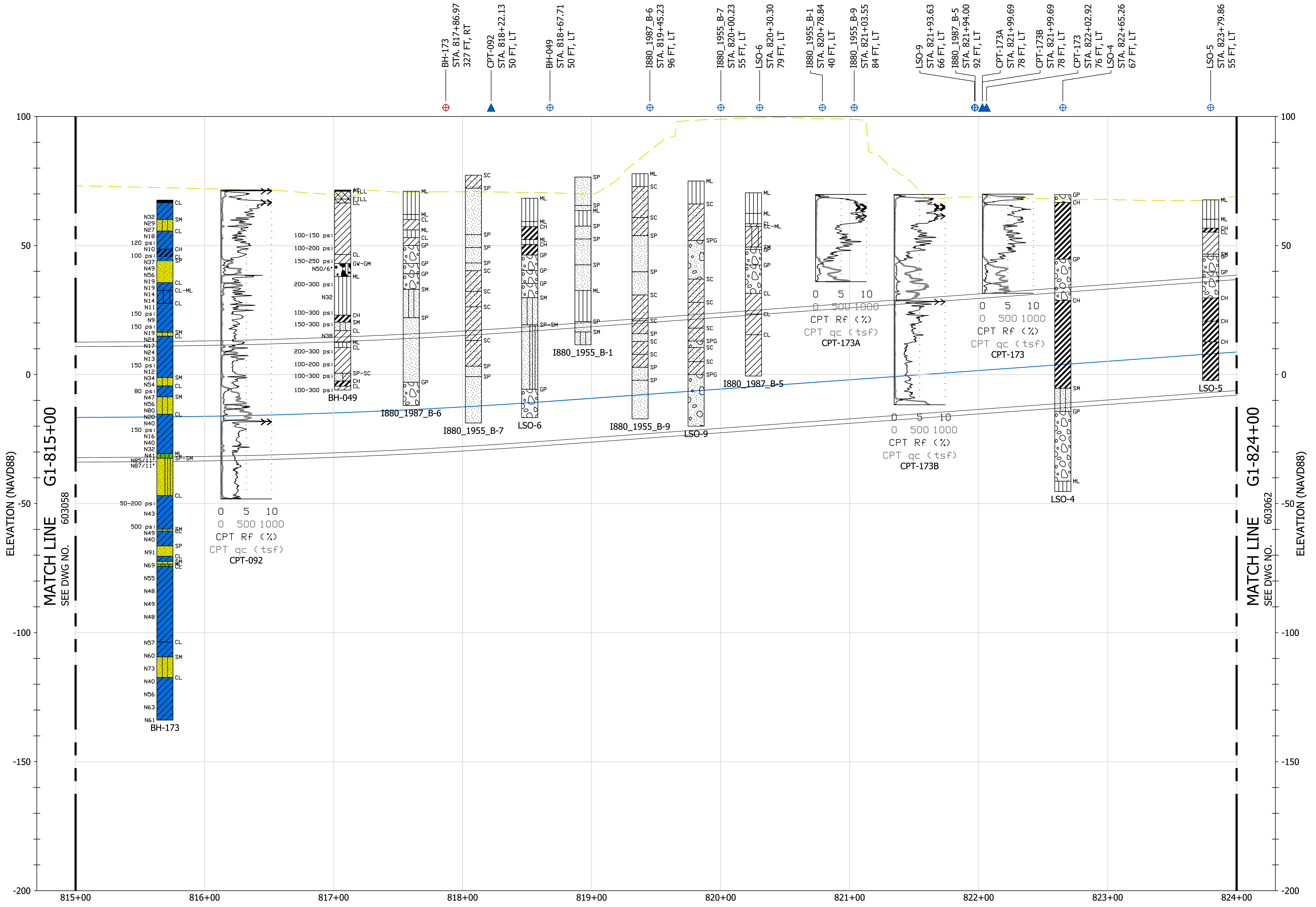
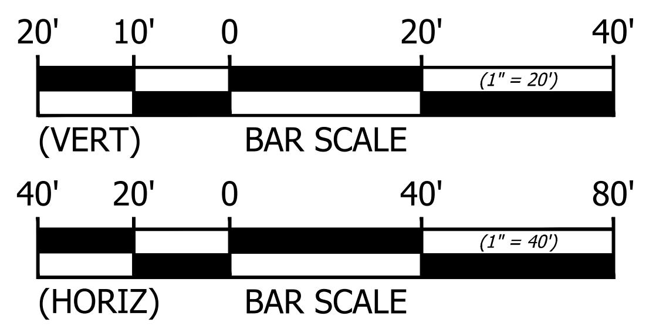
CAR93597



PROFILE

SCALE: 1"=40'H; 1"=20'V



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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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ENG. CHECK	M.J.WALKER
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EXTENSION PROJECT
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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 30B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603060		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603060	PAGE NO.

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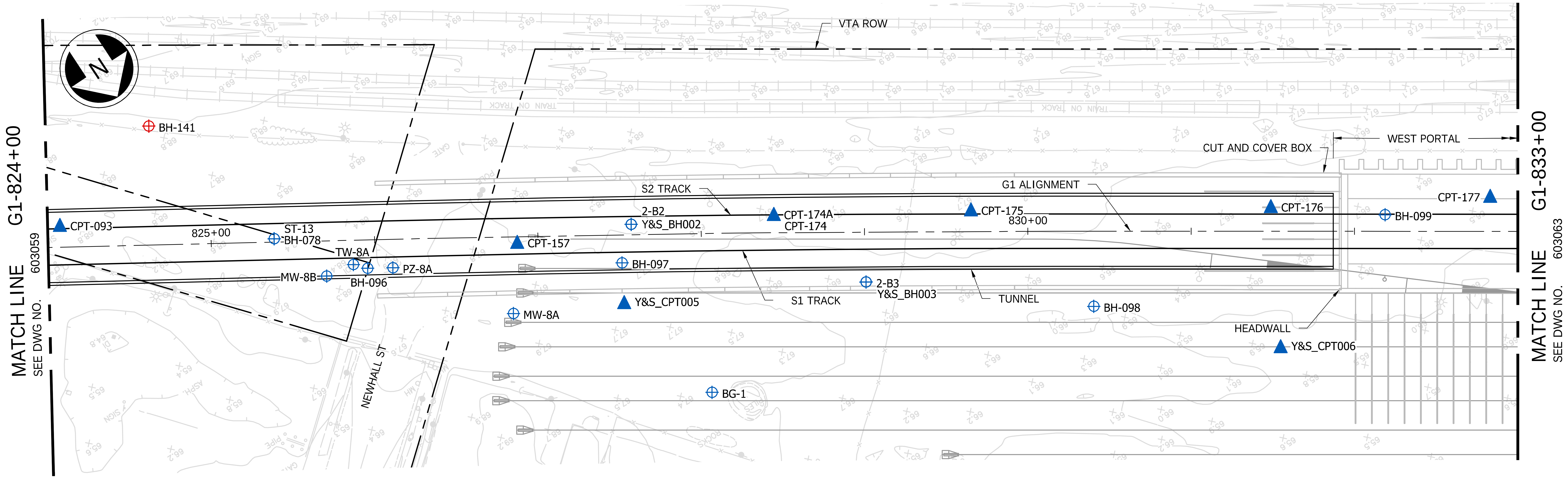
CAR93597



PLAN

SCALE: 1" = 40'

NOT FOR CONSTRUCTION

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						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
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PLAN
SHEET 31A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603061		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603061	PAGE NO.

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CAR93597

SHEET NOTES:

1. THE FOLLOWING FENCE LOG WAS OMITTED FOR CLARITY.
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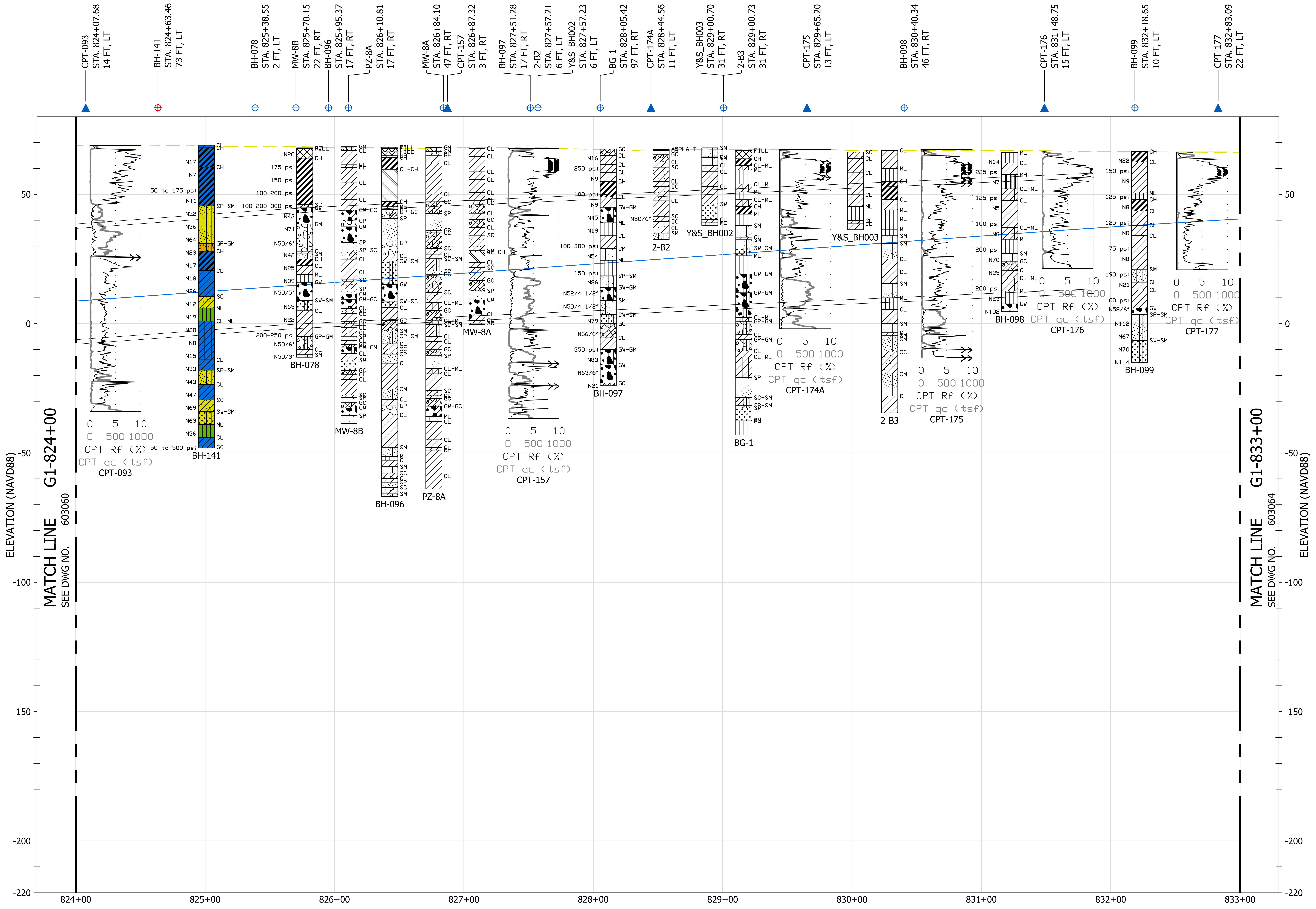
   - TW-8A
   - CPT-174
   - Y&S_CPT005
   - Y&S_CPT006



PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 31B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603062

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603062	

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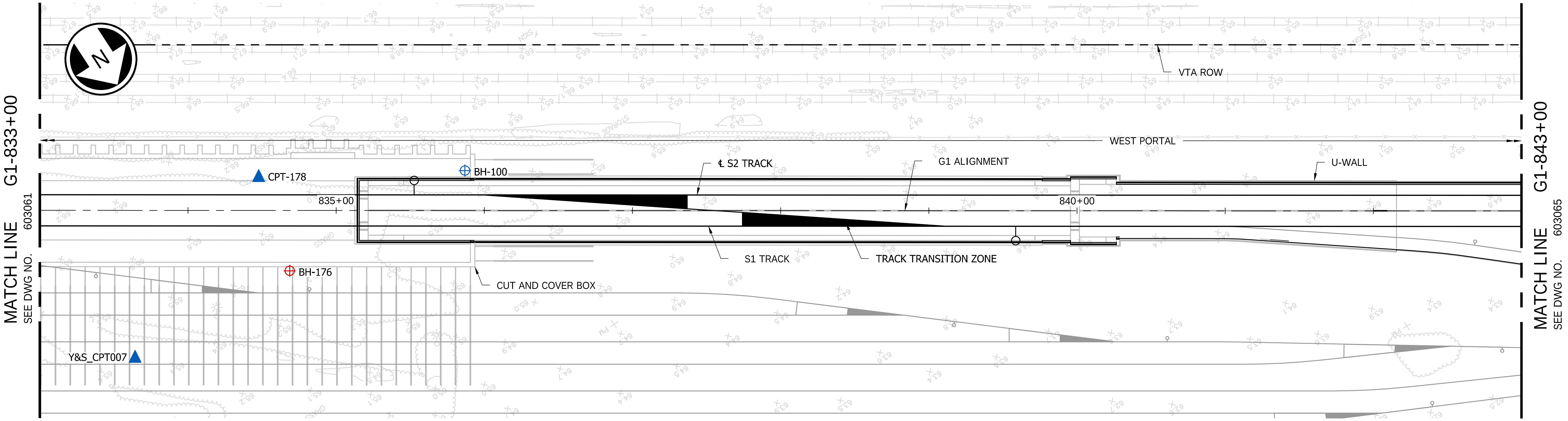

PLAN

SCALE: 1" = 40'

NOT FOR CONSTRUCTION

C:\users\car93597\appdata\local\projectwise\workdir\mott-use-pw\dms08673\385606-MMW-PWIDE-XX-DR-GE-603063.dwg Dec 23, 2020 - 4:07PM

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REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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EXTENSION PROJECT
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GEOTECHNICAL DATA REPORT
PLAN
SHEET 32A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603063		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603063	PAGE NO.

SHEET NOTES:

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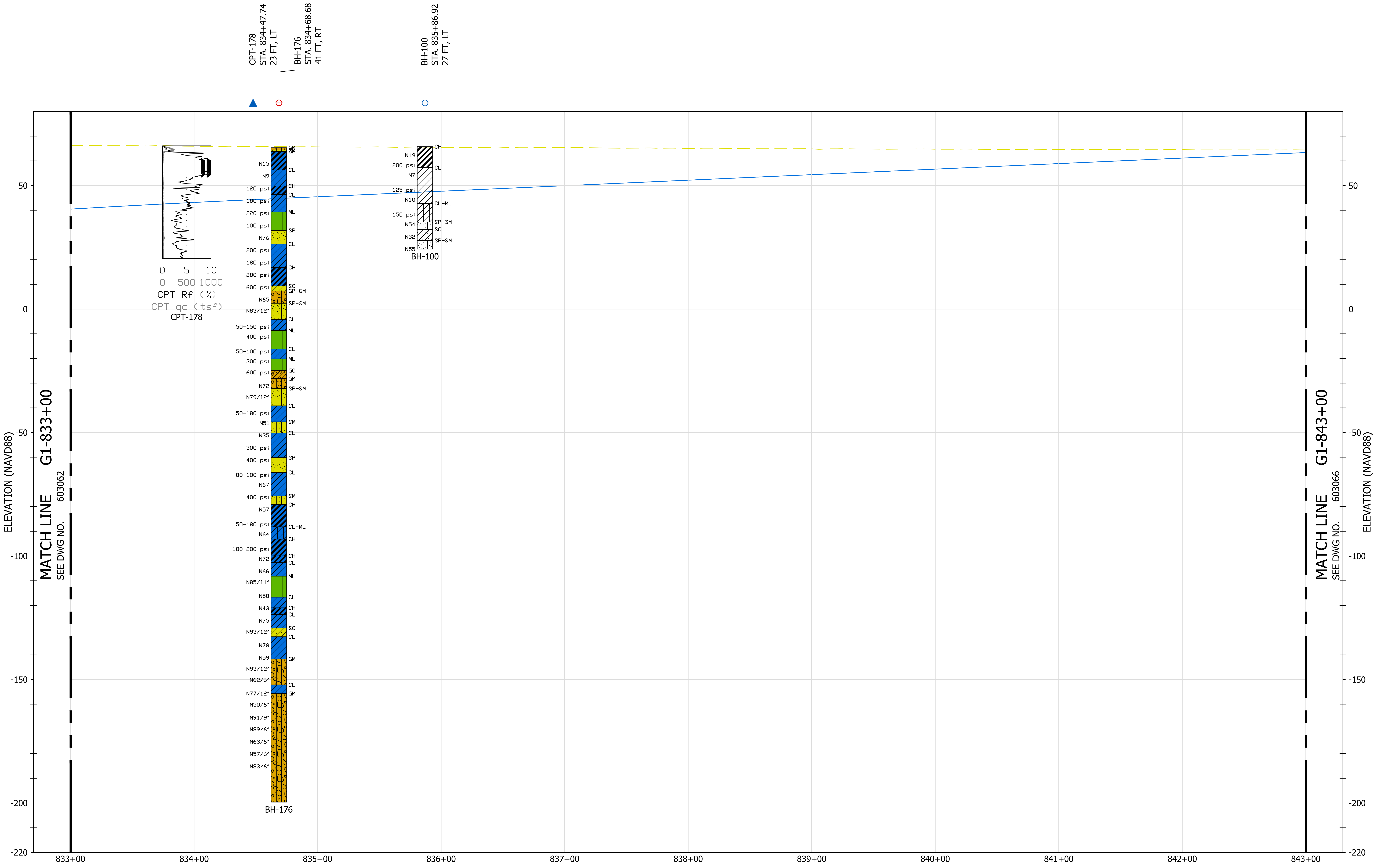
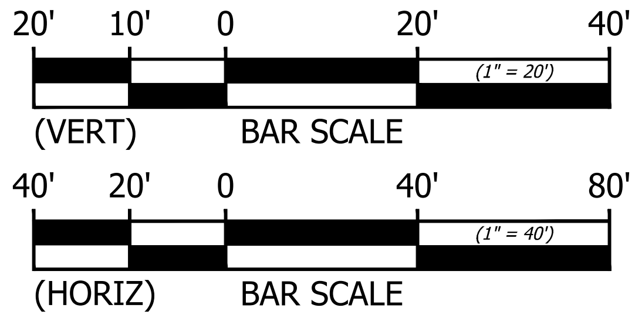
   Y&S_CPT007



PROFILE

SCALE: 1"=40'H; 1"=20'V



NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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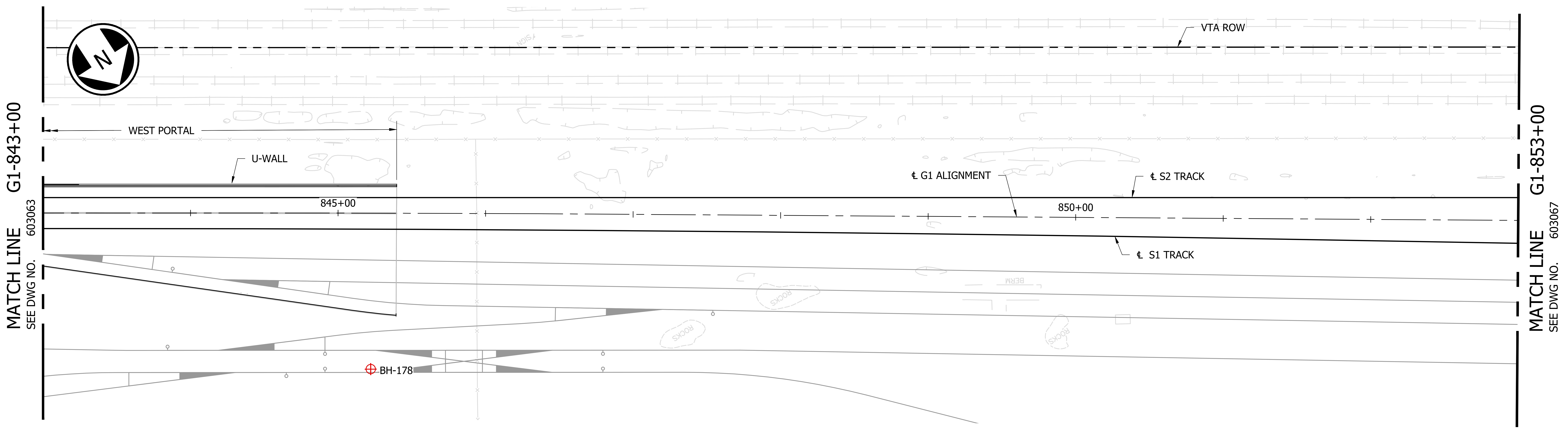
BART SILICON VALLEY PHASE II
EXTENSION PROJECT
VTA BSV Phase II

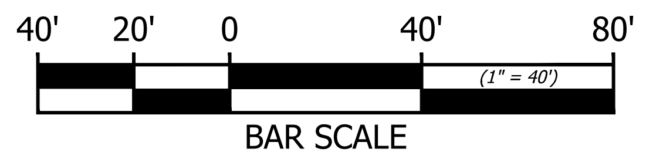
GEOTECHNICAL DATA REPORT
PROFILE
SHEET 32B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603064		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603064	PAGE NO.



PLAN

SCALE: 1" = 40'



BAR SCALE

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
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DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 33A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603065		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603065	PAGE NO.

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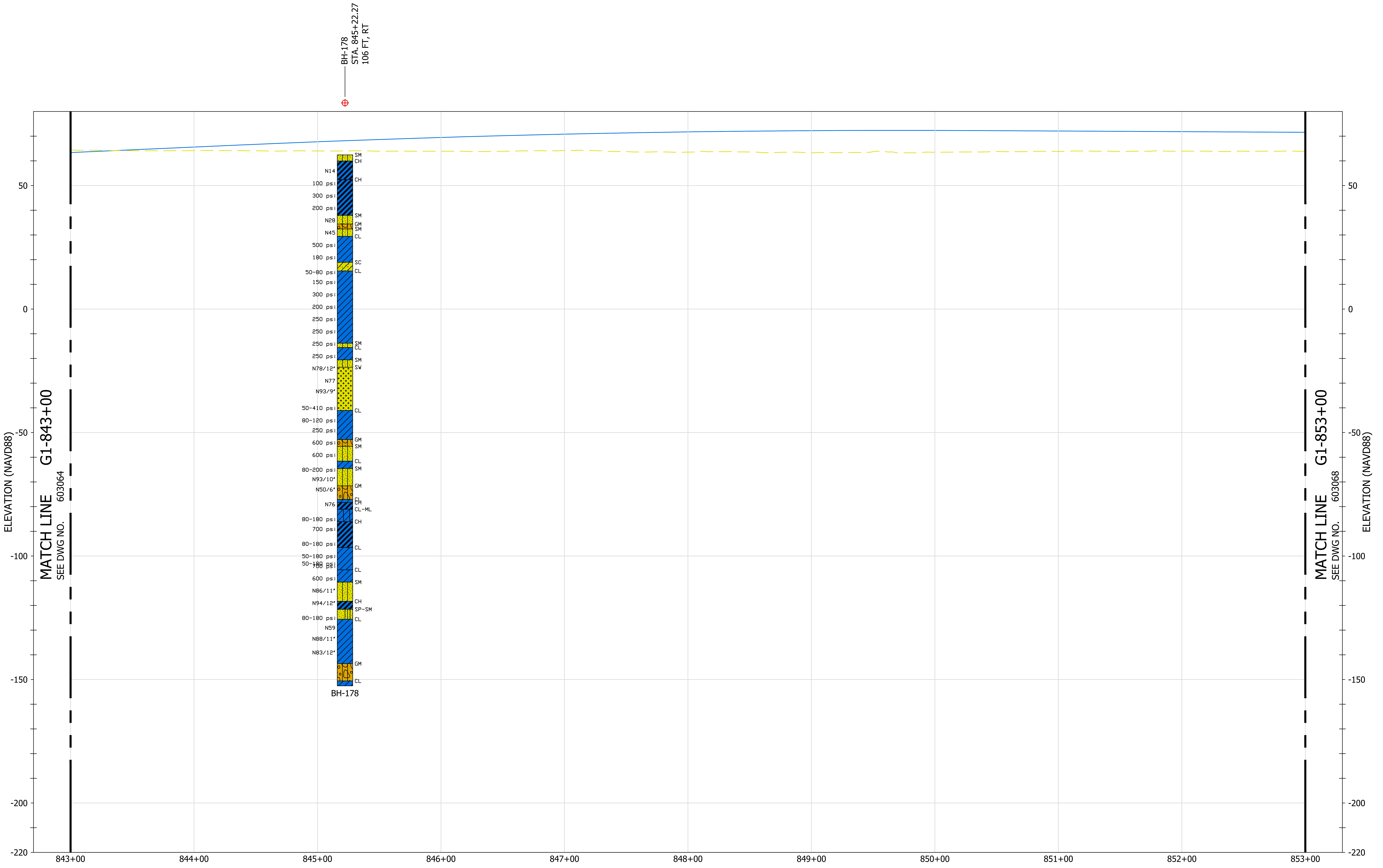
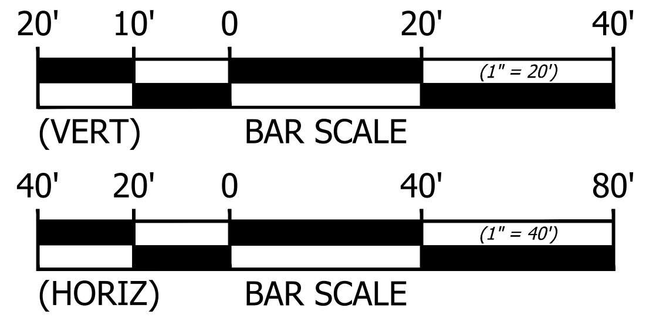


PROFILE

SCALE: 1"=40'H; 1"=20'V



NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

DESIGNED BY	C.CARRENDER
DRAWN BY	P.NG
DWG. CHECK	M.J.WALKER
ENG. CHECK	M.J.WALKER
COORD. CHECK	
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BART SILICON VALLEY PHASE II
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VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PROFILE
SHEET 33B

DRAWING FILE IDENTIFIER 385606-MMW-PWIDE-XX-DR-GE-603066		
CONTRACT NO.	SCALE AT D SIZE AS SHOWN	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603066	PAGE NO.

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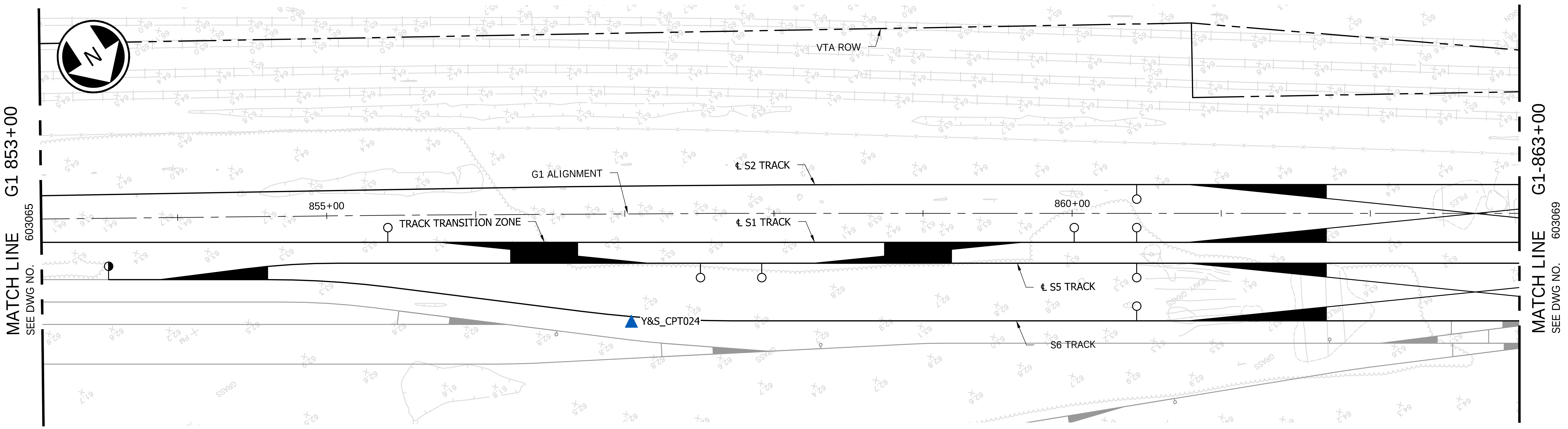

PLAN
SCALE: 1" = 40'

NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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EXTENSION PROJECT
VTA BSV Phase II

GEOTECHNICAL DATA REPORT
PLAN
SHEET 34A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603067		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603067	PAGE NO.

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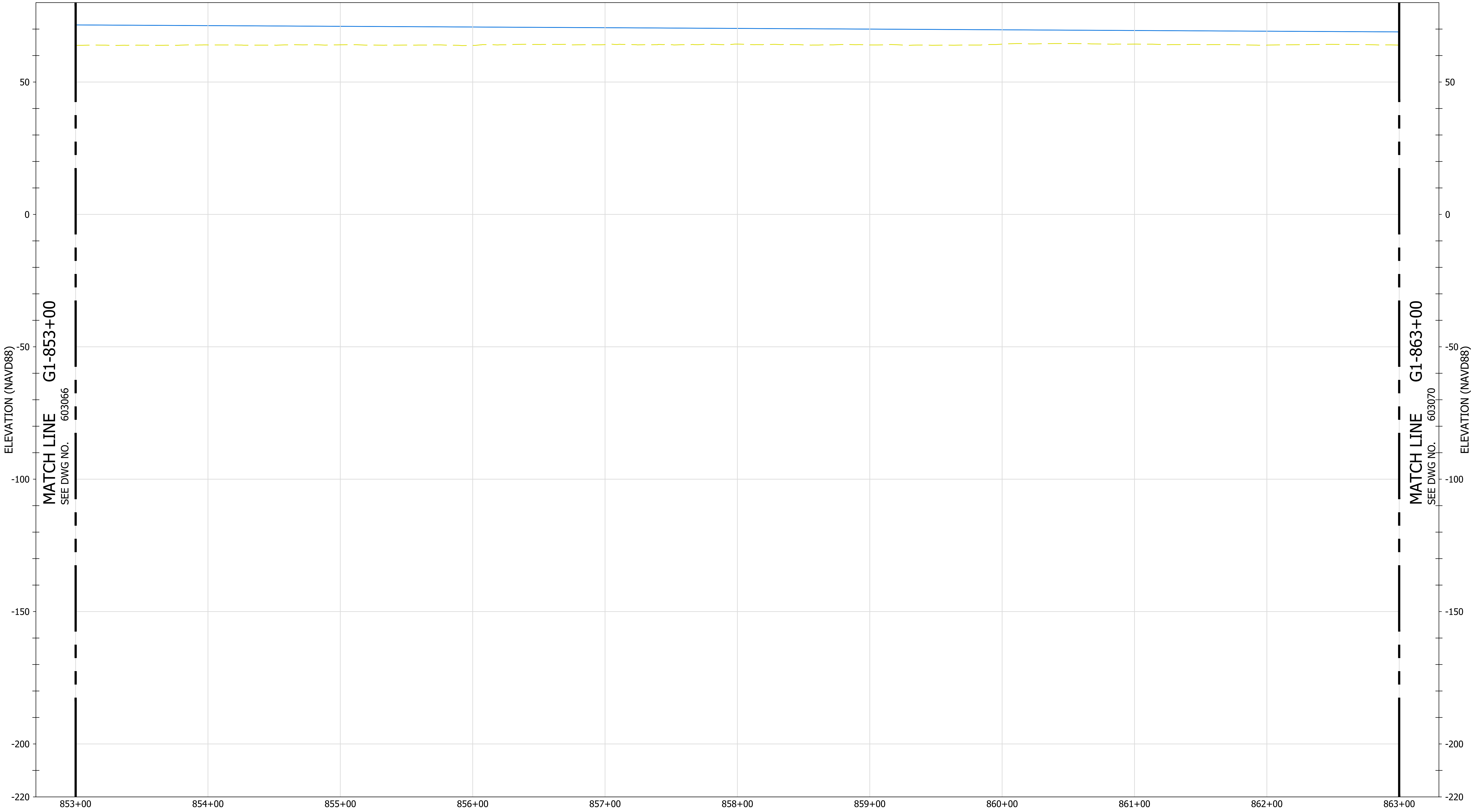
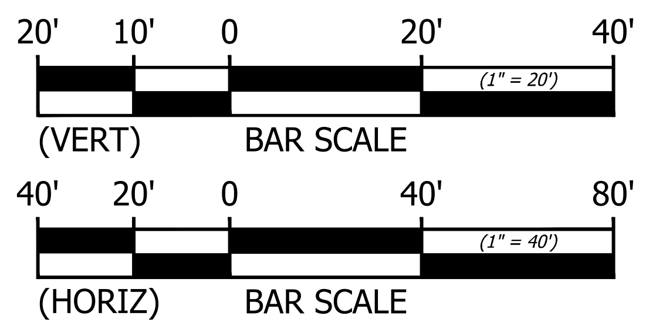
CAR93597

SHEET NOTES:

1. THE FOLLOWING FENCE LOG WAS OMITTED. ELECTRONIC DATA NOT AVAILABLE.
   Y&S_CPT024



PROFILE
SCALE: 1"=40'H; 1"=20'V



NOT FOR CONSTRUCTION

REV	DATE	BY	CHK	APP	DESCRIPTION
P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK	M.J.WALKER
COORD. CHECK	
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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 34B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603068

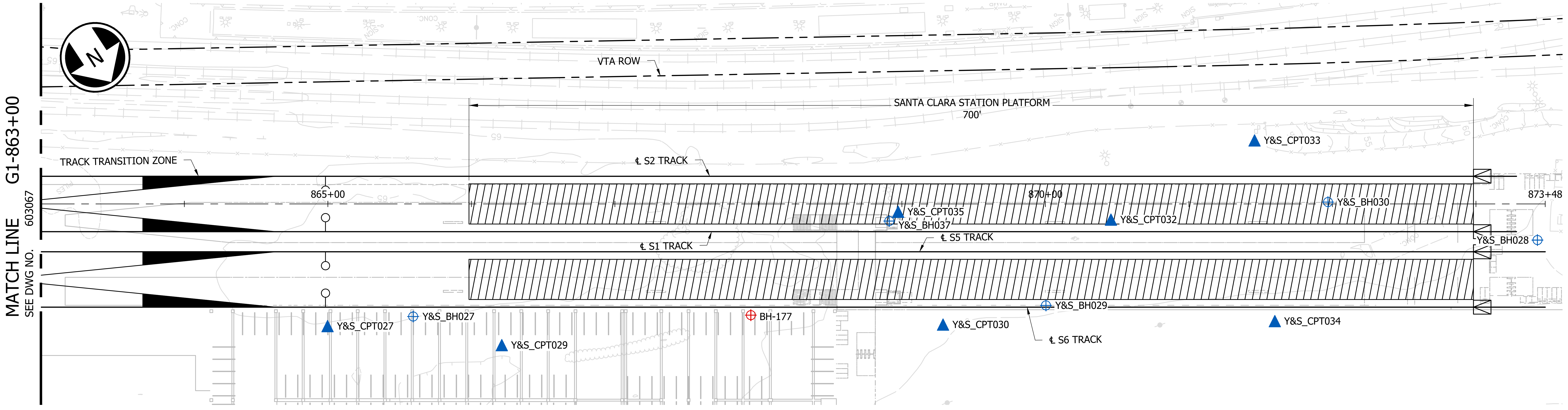
CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION	SUIT. CODE
FOR REVIEW AND COMMENT	S3

	SHEET NO.	PAGE NO.
	603068	

SHEET NOTES:

1. ARCHITECTURAL CONCEPT OF SANTA CLARA STATION/PARKING TAKEN FROM MODEL DATED 2020-09-30 VERSION R.



PLAN

SCALE: 1" = 40'

40' 20' 0 40' 80'
(1" = 40')
BAR SCALE

NOT FOR CONSTRUCTION

						DESIGNED BY	C.CARRENDER
						DRAWN BY	P.NG
						DWG. CHECK	M.J.WALKER
						ENG. CHECK	M.J.WALKER
P01	12/23/20	PN	MW		Rev. 0 Issued Final	COORD. CHECK	
REV	DATE	BY	CHK	APP	DESCRIPTION	REVIEWED BY	

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GEOTECHNICAL DATA REPORT
PLAN
SHEET 35A

DRAWING FILE IDENTIFIER 385606-MMW-00-XX-DR-GE-603069		
CONTRACT NO.	SCALE AT D SIZE 1"=40'	REV. P01
SUITABILITY DESCRIPTION FOR REVIEW AND COMMENT		SUIT. CODE S3
	SHEET NO. 603069	PAGE NO.

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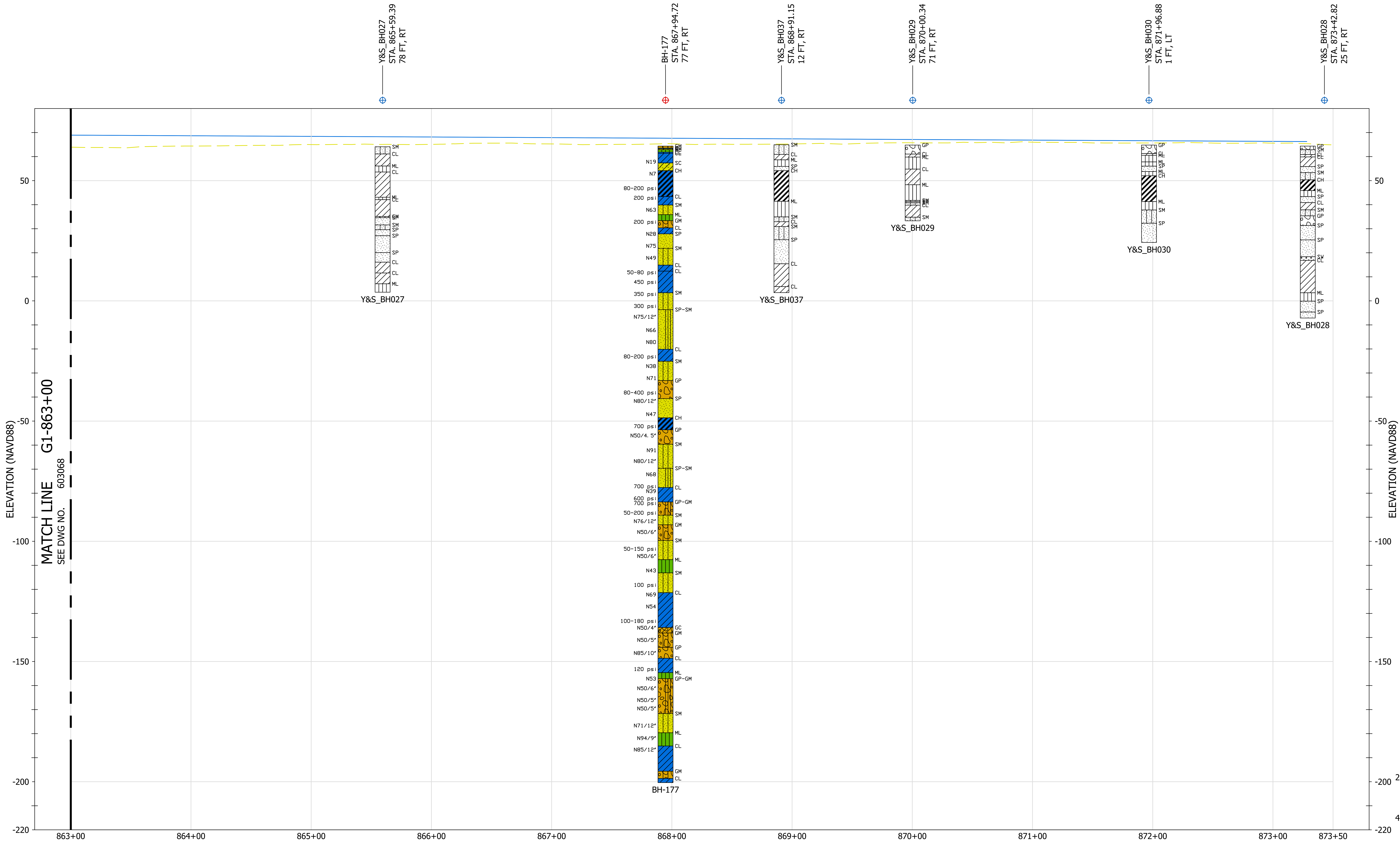
CAR93597

SHEET NOTES:

1. THE FOLLOWING FENCE LOGS WERE OMITTED. ELECTRONIC DATA NOT AVAILABLE.
    - Y&S_CPT027
    - Y&S_CPT029
    - Y&S_CPT030
    - Y&S_CPT032
    - Y&S_CPT033
    - Y&S_CPT034
    - Y&S_CPT035



PROFILE

SCALE: 1"=40'H; 1"=20'V

20' 10' 0 20' 40'
(1" = 20')
(VERT) BAR SCALE

40' 20' 0 40' 80'
(1" = 40')
(HORIZ) BAR SCALE

NOT FOR CONSTRUCTION

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P01	12/23/20	PN	MW		Rev. 0 Issued Final

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ENG. CHECK M.J.WALKER
COORD. CHECK
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GEOTECHNICAL DATA REPORT
PROFILE
SHEET 35B

DRAWING FILE IDENTIFIER
385606-MMW-PWIDE-XX-DR-GE-603070

CONTRACT NO.	SCALE AT D SIZE	REV.
	AS SHOWN	P01

SUITABILITY DESCRIPTION: FOR REVIEW AND COMMENT
SUIT. CODE: S3
SHEET NO.: 603070
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Appendix A
Intrusive Investigations

Borehole Logs
CPT Logs
Air and Gas Monitor Readings
SPT Energy Calibration
CPT Calibration
Project Permits and Compliance

Borehole Logs

2018 – 2019 Geotechnical Investigation by HNTB/WSP

2019 – 2020 Geotechnical Investigation by MMW

Borehole Locations

Table A-1. Summary of Exploratory Boreholes from October 2018 through October 2020

Borehole ID	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Total Depth (ft)	In Situ Testing			
					ATS[1]	VWP[2]	PS[3]	PMT[4]
BH-108	1,955,111.1	6,164,157.1	86.94	141.0				
BH-109	1,954,660.2	6,164,648.4	94.38	153.0				
BH-112	1,952,430.7	6,164,748.1	88.92	156.5				
BH-113	1,951,954.9	6,164,296.3	90.13	161.5				
BH-114	1,951,348.5	6,163,597.6	91.49	166.5				
BH-115	1,950,855.9	6,162,732.1	95.06	176.5				
BH-116	1,949,991.7	6,160,933.3	80.56	166.9				
BH-117	1,949,408.2	6,160,266.5	81.08	163.0				
BH-121	1,947,880.6	6,156,898.0	87.19	146.5				
BH-122	1,946,771.8	6,155,412.7	81.38	156.5				
BH-123	1,946,618.7	6,155,215.5	85.06	156.5				
BH-124	1,946,481.7	6,154,978.7	86.28	156.6				
BH-125	1,946,414.3	6,154,679.9	87.59	155.5				
BH-137	1,949,225.9	6,151,112.1	81.74	155.5				
BH-138	1,949,887.4	6,150,551.9	79.89	151.5				
BH-139	1,950,684.3	6,149,891.1	76.29	146.5				
BH-140	1,951,348.1	6,149,290.5	71.53	141.5				
BH-141	1,951,929.0	6,148,085.8	68.83	117.0				
BH-142 (SP-1) [5]	1,948,234.5	6,156,861.6	85.61	101.5				
BH-143 (SP-2) [5]	1,948,886.3	6,158,032.2	79.32	100.0				
BH-150	1,947,944.0	6,157,099.6	87.14	253.0		✓		✓
BH-151	1,947,821.0	6,157,081.3	87.51	273.5	✓	✓	✓	
BH-152	1,946,271.3	6,154,224.1	86.59	275.0		✓	✓	
BH-153	1,946,168.5	6,154,065.7	88.80	251.5		✓		
BH-154	1,952,701.7	6,164,836.0	89.31	225.0	✓	✓	✓	
BH-155	1,953,417.9	6,164,862.8	87.67	215.0		✓		
BH-156	1,953,640.9	6,164,591.3	88.17	275.5		✓	✓	
BH-157	1,948,522.7	6,158,579.1	79.84	201.5				
BH-158	1,949,055.5	6,159,642.4	81.67	201.5	✓	✓		✓

Borehole ID	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Total Depth (ft)	In Situ Testing			
					ATS[1]	VWP[2]	PS[3]	PMT[4]
BH-159	1,955,261.9	6,164,342.0	87.53	212.0	✓	✓		✓
BH-160	1,946,961.6	6,156,135.0	82.79	206.5		✓		
BH-161	1,946,303.8	6,154,108.7	86.88	251.5				✓
BH-162	1,946,275.3	6,153,549.0	84.09	220.5				
BH-163	1,946,385.7	6,153,183.6	87.75	216.5	✓	✓		
BH-164	1,952,858.1	6,164,718.6	88.63	232.0		✓		✓
BH-165	1,956,022.4	6,163,246.7	86.01	176.5		✓	✓	
BH-166	1,947,127.4	6,152,114.8	86.58	215.9	✓	✓		
BH-167	1,946,661.4	6,152,533.8	93.25	220.5				
BH-168	1,947,476.9	6,152,114.4	84.54	202.5		✓		
BH-169	1,948,258.8	6,152,070.0	79.99	252.0	✓	✓		
BH-171	1,950,237.9	6,150,233.3	76.98	227.0		✓		
BH-173	1,951,887.9	6,148,847.6	67.63	201.5		✓		
BH-174	1,950,367.2	6,161,916.7	85.50	99.0	✓			
BH-175	1,946,370.7	6,152,911.0	89.61	182.5		✓		
BH-176	1,952,544.5	6,147,277.2	65.35	265.0		✓		
BH-177	1,954,420.2	6,144,531.6	64.39	265.0		✓		
BH-178	1,953,176.3	6,146,431.7	62.43	215.0		✓	✓	
BH-179	1,950,048.3	6,160,894.6	80.71	265.0		✓	✓	
BH-180	1,949,024.4	6,151,220.0	81.78	265.0		✓	✓	

Northing, easting, and total depth values are rounded to nearest tenth (0.1) of a foot.
Elevation values rounded to the nearest hundredth (0.01) of a foot.

[1] Downhole accelerometer testing and/or loadcell testing
[2] Vibrating wire piezometer(s) installed
[3] Downhole P- and S-wave suspension velocity logging
[4] Pressuremeter testing was performed in a separate borehole, adjacent to the original borehole location
[5] Standpipe piezometer

Note: Borehole numbers BH-110, BH-111, BH-118 through BH-120, BH-126 through BH-136, BH-170 and BH-172 were skipped due to access issues. Borehole numbers BH-144 through BH-149 were not used. MMW GI began with borehole BH-150.

Project No. 2017-144-T02

MAJOR DIVISIONS			GROUP NAMES	
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	Clean gravels less than 5% fines	**GW**	Well-Graded Gravel
			GP	Poorly Graded Gravel
		Gravels with 5-12% fines	**GW-GM**	Well-Graded Gravel with Silt
			GW-GC	Well-Graded Gravel with Clay (or Silty Clay)
			GP-GM	Poorly Graded Gravel with Silt
			GP-GC	Poorly Graded Gravel with Clay (or Silty Clay)
		Gravels with more than 12% fines	**GM**	Silty Gravel
			GC	Clayey Gravel
			GC-GM	Silty, Clayey Gravel
	SANDS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	Clean sand less than 5% fines	**SW**	Well-Graded Sand
			SP	Poorly Graded Sand
		Sands with 5-12% fines	**SW-SM**	Well-Graded Sand with Silt
			SW-SC	Well-Graded Sand with Clay (or Silty Clay)
			SP-SM	Poorly Graded Sand with Silt
			SP-SC	Poorly Graded Sand with Clay (or Silty Clay)
		Sands with more than 12% fines	**SM**	Silty Sand
			SC	Clayey Sand
			SC-SM	Silty, Clayey Sand
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid Limit Less than 50%		**ML**	Silt
			CL	Lean Clay
			CL-ML	Silty Clay
			OL	Organic Silt
	SILTS AND CLAYS Liquid Limit Greater than 50%		**MH**	Elastic Silt
			CH	Fat Clay
			OH	Organic Clay
HIGHLY ORGANIC SOILS			**PT**	Peat or Highly Organic Soils
			FILL	Debris or Mixed Fill
			AC	Asphalt Concrete Pavement with Aggregate Base

GENERAL NOTES

Classification of Soils per ASTM D2487 or D2488

Geologic Formation noted in bold font at the top of interpreted interval

Uncorrected Blowcounts for Modified California Liner Sampler shown in " ( ) "

Length of sample symbol approximates recovery length

SAMPLER DRIVING RESISTANCE

Number of blows with 140 lb. hammer, falling 30-in. to drive sampler 1-ft. after seating sampler 6-in.; for example,

Blows/ft	Description
25	25 blows drove sampler 12" after initial 6" of seating
50/7"	50 blows drove sampler 7" after initial 6" of seating
Ref/3"	50 blows drove sampler 3" during initial 6" seating interval (Ref=Refusal)

STRENGTH TEST METHOD

UC = Unconfined Compression
TXUU = Unconsolidated Undrained Triaxial
TXCU = Consolidated Undrained Triaxial
tv = Pocket Torvane
pp = Pocket Penetrometer
FV = Field Vane Shear Test

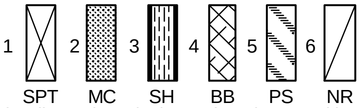
OTHER TESTS

k = Permeability
Consol = Consolidation
Gs = Specific Gravity
MA = Particle Size Analysis
PM = Pressuremeter
EI = Expansion Index
LEL = Lower Explosive Limit
OXY = Oxygen Level Reading (%)
OVM = Organic Vapor Measurement
CR = Corrosion
Abr. = SAT - Soil Abration Test

WATER LEVEL SYMBOLS

▽ Measured Depth to Water at Time of Drilling

SAMPLER TYPE



Samplers and sampler dimensions (unless otherwise noted in report text) are as follows:

1	SPT Sampler, driven 1 3/8" ID, 2" OD	4	Bulk Bag Sample (from cuttings)
2	MOD CA Liner Sampler 2.416" ID, 3" OD	5	Pitcher Sample
3	Shelby Thin-walled Tube, pushed 2 7/8" ID, 3" OD	6	No Recovery

SOIL STRUCTURE

Fissured: Containing shrinkage or relief cracks, often filled with fine sand or silt, usually more or less vertical.

Pocket: Inclusion of material of different texture that is smaller than the diameter of the sample.

Parting: Inclusion less than 1/8 inch thick extending through the sample.

Seam: Inclusion 1/8 inch to 3 inches thick extending through the sample.

Layer: Inclusion greater than 3 inches thick extending through the sample.

Laminated: Soil sample composed of alternating partings or seams of different soil types.

Interlayered: Soil sample composed of alternating layers of different soil type.

Homogeneous: Uniform composition

CONSISTENCY

Clays	Blows/Foot SPT	Pocket Penetrometer (tsf)
Very Soft	**< 2**	**0 - 0.25**
Soft	**2 - 4**	**0.25 - 0.5**
Medium	**4 - 8**	**0.5 - 1**
Stiff	**8 - 15**	**1 - 2**
Very Stiff	**15 - 30**	**2 - 4**
Hard	**> 30**	**Over 4**

RELATIVE DENSITY

Sands and Gravels	Blows/Foot SPT
Very Loose	**0 - 4**
Loose	**4 - 10**
Medium Dense	**10 - 30**
Dense	**30 - 50**
Very Dense	**Over 50**

INCREASING VISUAL MOISTURE CONTENT

↓
Dry
Moist
Wet

Information on each boring log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as from laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines on the logs may be transitional and approximate in nature. Water level measurements refer only to those observed at the time and places indicated, and can vary with time, geologic condition, or construction activity.

TERMS AND SYMBOLS USED ON BORING LOGS

FIGURE A

Project No. 2017-144-T02

Sheet 1 of 3

LOCATION: Marburg Way and Destino Circle
N 1,955,111 E 6,164,157

SURFACE EL: 86.9 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						6" ASPHALT CONCRETE							
85						POORLY GRADED GRAVEL (GP), brown (10YR 5/3) (AGGREGATE BASE)							
	5		1 9"		(12)	SANDY LEAN CLAY (CL), stiff, brown (10YR 5/3), moist, low plasticity, fine sand (FILL?)							
80						SANDY LEAN CLAY (CL), medium stiff to stiff, dark grayish-brown (2.5Y 4/2), moist, low plasticity, fine sand (NATIVE SOIL/ALLUVIUM) (pp=0.75/0.75/1.0/1.25/1.4 tsf)							
75	10		2 13"		(6)	SILTY CLAY (CL-ML), stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, trace fine sand --(pp=0.75/0.75/1.0/1.2/1.6 tsf) --Switched to rotary wash drilling at 12.5 feet.							
70	15		3 13"		(15)	LEAN TO FAT CLAY (CL-CH), stiff, grayish-brown (2.5Y 5/2) to light olive-brown (2.5Y 5/4), moist, medium to high plasticity (pp=1.5/1.5/1.75/1.8/1.75/1.5 tsf)							
65	20		4 17"		(12)	--grades with fine sand, olive-gray (5Y 4/2), medium stiff --(pp=0.75/0.75/1.0/1.25/1.0 tsf)							
60	25		5 15"		(13)	LEAN CLAY (CL), stiff, olive-gray (5Y 4/2) with dark yellowish-brown (10YR 3/6) mottling, wet, medium plasticity, trace fine sand and fine subrounded to subangular gravel (pp=1.0/0.75/1.0/1.7/1.6 tsf)							
55	30		6 16"		(13)	FAT CLAY (CH), stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4), moist, high plasticity (pp=0.75/1.0/1.2/1.5 tsf) --(pp=1.25/1.0/1.0 tsf)							
50	35		7 18"		(12)	SANDY LEAN CLAY (CL), medium stiff, gray (2.5Y N5/0), moist, low plasticity, fine sand --(pp=0.8/0.7/0.75 tsf)							
45	40		8 14"		(21)	SANDY SILT (ML), hard, olive-gray (5Y 4/2) and light olive-brown (2.5Y 5/4), moist, fine sand (pp>=4.5 tsf) --grades stiff (pp=1.5/1.75/1.5 tsf)							
40	45		9 17"		(14)	SANDY LEAN CLAY (CL), stiff, gray (2.5Y 5/1) and light olive-brown (2.5Y 5/3), wet, low to medium plasticity, fine sand, trace carbonate (pp=1.0/1.25/1.25/1.0/1.1/1.5 tsf) --(pp=1.0/1.0/1.0 tsf)							

Continued

BORING DEPTH: 141.0 ft
DEPTH TO WATER: Not Measured

START DATE: November 26, 2018
COMPLETION DATE: November 27, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-108
BART to Silicon Valley
San Jose, California

FIGURE A-1a

Project No. 2017-144-T02

Sheet 2 of 3

LOCATION: Marburg Way and Destino Circle
N 1,955,111 E 6,164,157

SURFACE EL: 86.9 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35		10 16"	(20)	--grades less sandy, olive-gray (5Y 4/2) (pp=1.5/1.5/1.75 tsf) --(pp=1.75/1.5/1.75 tsf)	107	23	66	31	11		MA
30	55	11 15"	(18)	SILTY SAND (SM), medium dense, dark greenish-gray (GLEY 5G 4/1), wet, fine sand, uncemented							
25	60	12 1"	41	CLAYEY SAND WITH GRAVEL (SC), dense, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), wet, fine sand, trace angular sandstone fragments to 1 ", uncemented							
20	65	13 9"	13	LEAN CLAY WITH SAND (CL), stiff, grayish-brown (2.5Y 5/2), wet, low to medium plasticity, fine sand							
15	70	14 18"	(20)	--(pp=1.5/1.25/1.25 tsf) --(pp=1.25/1.5/1.5/1.3/1.3 tsf)							
10	75	15 18"	(25)	--grades gray (2.5Y N5/0) with light olive-brown (2.5Y 5/4) mottling, trace carbonate (pp=1.5/1.75/1.5/1.6/1.5 tsf) --(pp=1.5/1.25/1.25 tsf)	107	23	76	30	8		MA
5	80	16 18"	(23)	--trace calcareous fine gravel and coarse sand (pp=1.75/1.75/1.25 tsf) --(pp=1.5/1.5/1.5/1.5/1.8/1.25 tsf)							
0	85	17 16"	(26)	SILTY CLAY WITH SAND (CL-ML), very stiff, gray (2.5Y N5/0) with olive-brown (2.5Y 4/3) mottling, moist, low plasticity, fine sand (pp=1.75/2.25/2.25 tsf) --(pp=2.5/2.0/2.25/3.2/2.5/3.1 tsf)							
-5	90	18 18"	(31)	FAT CLAY (CH), very stiff, grayish-brown (2.5Y 5/2) with fine black (2.5Y N2/0) speckling, moist, high plasticity --(pp=1.75/2.0/1.75/2.0/2.3 tsf) --(pp=2.25/2.0/2.0 tsf)		27					CR
-10	95	19 18"	(42)	SANDY LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low plasticity, fine sand --(pp=1.0/1.0/1.5 tsf)							

Continued

BORING DEPTH: 141.0 ft
DEPTH TO WATER: Not Measured

START DATE: November 26, 2018
COMPLETION DATE: November 27, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-108
BART to Silicon Valley
San Jose, California

FIGURE A-1b

Project No. 2017-144-T02

Sheet 3 of 3

LOCATION: Marburg Way and Destino Circle
N 1,955,111 E 6,164,157

SURFACE EL: 86.9 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			20 18"		(41)	--(pp=1.5/2.25/1.5/2.25/2.0/2.2 tsf)							
-15						--Resumed drilling on 11/27/2018 at 95 feet. --trace carbonaceous fine gravel (pp=2.25/2.0/2.75/3.2/3.4 tsf) --(pp=2.75/2.0/2.25 tsf)							
	105		21 18"		(33)	--grades yellowish-brown (10YR 5/6), less sand (pp=2.5/2.0 tsf)							
-20						CLAYEY SAND WITH GRAVEL (SC), medium dense, yellowish-brown (10YR 5/6), wet							
	110		22 18"		(35)	LEAN CLAY (CL), very stiff, yellowish-brown (10YR 5/6), moist, low plasticity (pp=2.25/2.0/2.75/3.2/2.8 tsf)							
-25													
	115		23 15"		(59)	POORLY GRADED SAND WITH SILT (SP-SM), dense, brown (10YR 5/3), wet, homogeneous, fine sand							
-30													
	120		24 18"		(23)	LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low plasticity --(pp=2.25/2.5/2.5/3.5/2.5/2.75 tsf)							
-35						SILTY SAND (SM), medium dense, olive-gray (5Y 4/2), wet, fine sand, uncemented							
	125		25 18"		(38)								
-40						POORLY GRADED SAND WITH GRAVEL (SP), very dense, brownish-gray (10YR 6/2), wet, fine to coarse sand, fine subrounded gravel, uncemented							
	130		26 4"		50/6"								
-45													
	135		27 6"		32	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), medium dense, gray (10YR 5/1), wet, fine to coarse sand, fine gravel, uncemented							
-50													
	140		28 11"		50/5"								
-55						--Boring terminated at a depth of 141.0 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 12.5 feet. --Boring backfilled with cement grout.							
	145												
-60													

BORING DEPTH: 141.0 ft
DEPTH TO WATER: Not Measured

START DATE: November 26, 2018
COMPLETION DATE: November 27, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-108
BART to Silicon Valley
San Jose, California

FIGURE A-1c

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: N.B. 101 and McKee Road
N 1,954,660 E 6,164,648

SURFACE EL: 94.4 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		1 6"		LEAN CLAY WITH SAND (CL), very stiff, dark grayish-brown (2.5Y 4/2) and olive-yellow (2.5Y 6/6), moist, low plasticity, trace gravel and asphalt (FILL) (pp=3.2 tsf)							
90	5	2 11"	(42)	CLAYEY GRAVEL WITH SAND (GC), medium dense, light olive-brown (2.5Y 5/4) and black (2.5Y N2/0), moist, fine angular gravel and pockets of ground asphalt (FILL) --Switched to rotary wash drilling at 6.5 feet.							
85	10	3 8"	(23)								
80	15	4 12"	(7)	SILTY SAND (SM), loose, light olive-brown (2.5Y 5/6), wet, fine sand (NATIVE SOIL)							
75	20	5 18"	(17)	FAT CLAY (CH), stiff, olive-brown (2.5Y 4/3), moist, high plasticity, trace organics --(pp=1.5/1.5/1.5 tsf)							
70	25	6 28"									Consol, TXCU
				SILTY SAND (SM), olive-brown (2.5Y 4/3), wet, fine sand, weak cementation							
65	30	7 14"	(12)	LEAN CLAY WITH SAND (CL), stiff, light olive-brown (2.5Y 5/3), wet, low plasticity, fine sand, homogeneous (pp=1.5/1.5/1.9 tsf)							
60	35	8 17"	(14)	FAT CLAY (CH), stiff, olive-gray (5Y 5/2), wet, high plasticity --(pp=1.1/1.0/1.2/1.6 tsf)							
55	40	9 15"	(16)	--grades gray (5Y 5/1), trace sand, carbonate and organics (pp=1.3/1.1/1.3/1.7 tsf) --(pp=1.3/1.2/1.7/1.5 tsf)							
50	45	10 15"	(15)	--grades dark gray (2.5Y N4/0) (pp=1.1/0.7/1.5/1.1/1.3 tsf) --(pp=1.5/1.0/1.2/1.5/1.5 tsf)							
45		11	(18)	FAT CLAY WITH SAND (CH), stiff, greenish-gray (GLEY 5GY 5/1) with light olive-brown (2.5Y 5/6)							

Continued

BORING DEPTH: 153.0 ft
DEPTH TO WATER: Not Measured

START DATE: April 8, 2019
COMPLETION DATE: April 11, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: CME 850
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-109
BART to Silicon Valley
San Jose, California

FIGURE A-2a

LOCATION: N.B. 101 and McKee Road
N 1,954,660 E 6,164,648

SURFACE EL: 94.4 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		18"		mottles, wet, high plasticity, fine and trace coarse sand (pp=0.9/1.3/1.3/1.5/1.5 tsf) --(pp=1.7/1.1/1.3/1.3/1.4 tsf)							
40	55	12 13"	64	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), very dense, olive (5Y 4/4), wet, fine to coarse sand, weakly cemented							
35	60	13 12"	9	SILTY CLAY WITH SAND (CL-ML), stiff, dark gray (2.5Y N4/0), wet, low plasticity, fine sand --(pp=1.3/1.5 tsf) --Resumed drilling on 4/10/2019 at 60.5 feet.							
30	65	14 24"	25 to 200 psi	LEAN CLAY WITH SAND (CL), stiff, dark greenish-gray (GLEY 5G to 5BG 4/1), wet, low plasticity, fine to coarse sand, carbonate nodules --(pp=1.5/1.6/1.7 tsf)							TXCU
25	70	15 18"	(35)	SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) with olive (5Y 5/4), mottling, moist, low to medium plasticity, fine sand and trace coarse sand --(pp=2.2/2.4/2.3/1.5/2.2 tsf) --(pp=2.4/2.2/2.8 tsf)							
20	75	16 18"	(38)	--grades stiff		20	87	31	14		MA
15	80	17 14"	(35)	--grades less sandy, very stiff --(pp=2.3/2.2/2.2/2.0 tsf) --(pp=2.2/2.7/2.3 tsf)							
10	85	18 16"	(58)	SILTY SAND (SM), olive-brown (2.5Y 4/3) with dark yellowish-brown (10YR 4/6) staining, wet, fine sand, weakly cemented POORLY GRADED SAND (SP), dense, dark grayish-brown (2.5Y 4/2), wet, fine to medium sand, uncemented							
5	90	19 17"	(34)	SANDY LEAN TO FAT CLAY (CL/CH), very stiff, olive-gray (5Y 5/2), moist, medium to high plasticity, trace coarse sand, trace carbonate nodules, sporadic brownish mottles (pp=2.4/2.3/2.6/2.4/3.1 tsf)				46	27		
0	95	20 17"	(37)	--(pp=2.5/2.8/2.8/2.5/3.0 tsf) ORGANIC CLAY (OL/OH), very stiff, gray (2.5Y N5/0) and light yellowish-brown (2.5Y 5/4), moist, medium to high plasticity (pp=2.6/2.5/2.1/3.0 tsf)		28		47	22		
-5		21	(28)	--(pp=3.5/3.5/3.2/3.0 tsf)							

Continued

BORING DEPTH: 153.0 ft
DEPTH TO WATER: Not Measured

START DATE: April 8, 2019
COMPLETION DATE: April 11, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: CME 850
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-2b

Project No. 2017-144-T02

Sheet 3 of 4

LOCATION: N.B. 101 and McKee Road
N 1,954,660 E 6,164,648

SURFACE EL: 94.4 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		18"		--grades olive-gray (5Y 5/2) --(pp=2.6/2.0/2.0/2.25 tsf) --(pp=1.8/2.3/2.3/3.0 tsf)							
-10	105	22 18"	(34)	ORGANIC SILT (OL), very stiff, greenish-gray (GLEY 5GY 5/1), wet, fine sand, trace fine and coarse subangular gravel, uncemented --(pp=2.0/2.0/2.0 tsf) --(pp=2.2/2.5/2.0 tsf)		24	100	NP	NP		MA, Hydrometer
		23 4"	(50/4")								
-15	110	24 13"	55	SILTY SAND (SM), very dense, dark olive-gray (5Y 3/2), wet, uncemented							
-20	115	25 14"	33	--grades with angular to subrounded fine gravel			13				
		26 12"	67								
-25	120			--grades very dark grayish-brown (2.5Y 3/2), less gravel --Resumed drilling on 4/11/2019 at 120 feet.							
-30	125	27 18"	(42)	LEAN TO FAT CLAY (CL/CH), hard, light olive-brown (2.5Y 5/4) with reddish-brown (5YR 5/3) peat, moist, medium to high plasticity (pp=4.2/4.4/4.2/3.7 tsf) --(pp=4.4/4.5/3.9/3.75 tsf)				51	26		
-35	130	28 15"	(62)	SILT WITH SAND (ML), very stiff to hard, dark grayish-brown (2.5Y 4/2), wet, fine sand, weakly cemented (pp=2.25/2.25 tsf) --(pp=3.5, >4.5, >4.5 tsf)							
-40	135	29 13"	(61)	POORLY GRADED SAND WITH GRAVEL (SP), dense, dark grayish-brown (2.5Y 4/2), wet, fine to coarse sand, fine gravel, uncemented							
-45	140	30 13"	86	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, very dark grayish-brown (2.5Y 3/2), wet, fine to coarse sand, fine subangular gravel							
-50	145	31 8"	77								
-55											

Continued

BORING DEPTH: 153.0 ft
DEPTH TO WATER: Not Measured

START DATE: April 8, 2019
COMPLETION DATE: April 11, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: CME 850
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-2c

Project No. 2017-144-T02

Sheet 4 of 4

LOCATION: N.B. 101 and McKee Road
N 1,954,660 E 6,164,648

SURFACE EL: 94.4 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		▨	32 15"	☒	93								
-60	155					--Boring terminated at a depth of 153.0 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 6.5 feet. --Boring backfilled with cement grout.							
-65	160												
-70	165												
-75	170												
-80	175												
-85	180												
-90	185												
-95	190												
-100	195												
-105													

BORING DEPTH: 153.0 ft
DEPTH TO WATER: Not Measured

START DATE: April 8, 2019
COMPLETION DATE: April 11, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: CME 850
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-2d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: N. 27th Street and E. Santa Clara Street
N 1,952,431 E 6,164,748

SURFACE EL: 88.9 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						8" ASPHALT CONCRETE							
						5" POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)							
85						CLAYEY SAND (SC), loose, olive-brown (2.5Y 4/3), moist, trace subangular coarse sand, fine sand, uncemented (FILL?)							
	5		1 14"		(8)								
80						SANDY SILT (ML), medium stiff, olive-gray (5Y 4/2), moist, low plasticity, fine sand (NATIVE SOIL/ALLUVIUM)							
	10		2 14"		(5)	--soft, gray (5Y 5/1), very moist (pp=0.75/0.75/0.5 tsf) --Switched to rotary wash drilling at 11.5 feet.							
75						FAT CLAY (CH), medium stiff, olive (5Y 5/3), wet, high plasticity, homogeneous							
	15		3 12"		(15)	--(pp=0.75/0.5/1.0 tsf)							
70						SANDY LEAN CLAY (CL), medium stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, fine sand (pp=0.75/0.75/0.75/0.8/0.8 tsf)							
	20		4 15"		(9)								
65													
	25		5 16"		(14)	--(pp=0.8 tsf)							
60						POORLY GRADED SAND (SP), medium dense, gray (2.5Y N5/0), wet, fine sand, uncemented							
	30		6 15"		(17)								
55						SILT (ML), stiff, dark greenish-gray (GLEY 5G 4/1), moist, low plasticity							
	35		7 18"		(9)	--(pp=1.5/1.5/1.5/2.0/2.0/1.7 tsf)							
50													
	40		8 13"		(15)	--grades clayey (pp=1.5/1.5/1.5 tsf)							
						FAT CLAY (CH), stiff, gray (2.5Y N5/0), moist, high plasticity (pp=1.75/1.5/1.5/1.75/1.75 tsf)							
45													
	45		9 13"		(23)	--(pp=1.5/1.25/2.0/1.75/2.0/1.7 tsf)				55	30		
40													

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 3, 2018
COMPLETION DATE: December 5, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-112

BART to Silicon Valley
San Jose, California

FIGURE A-3a

LOCATION: N. 27th Street and E. Santa Clara Street
N 1,952,431 E 6,164,748

SURFACE EL: 88.9 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		10 14"	(24)	--faint light olive-brown (2.5Y 5/4) mottling (pp=1.5/1.5/1.75/1.7 tsf) --(pp=1.75/1.5/1.75 tsf)							
35											
	55	11 12"	(54)	--grades very stiff, gray (2.5Y N5/0) and olive-brown (2.5Y 4/3) mottling, moist, trace carbonate --(pp=3.5/3.5/3.75 tsf)							
30				SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4) mottled, moist, low plasticity, fine sand							
	60	12 15"	(37)	--(pp=2.25/2.25/2.5/2.5/3.0 tsf) --(pp=2.0/2.0/2.0 tsf)							
25				POORLY GRADED SAND (SP), dense, grayish-brown (2.5Y 5/2), wet, fine to medium sand, uncemented							
	65	13 15"	(73/12")								Abr. (Comp.)
				CLAYEY SAND WITH GRAVEL (SC), dense, olive-brown (2.5Y 4/3), wet, fine sand and fine subrounded gravel							
20											
	70	14 7"	(52)	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand, fine subrounded to subangular gravel, uncemented							
15											
	75	15 12"	(63)								
10											
	80	16 7"	59	--grades very dense, trace coarse gravel --Resumed drilling on 12/4/2018 at 80 feet.		7					
5											
	85	17 7"	49	CLAYEY GRAVEL WITH SAND (GC), dense, brownish-gray (10YR 6/2), wet, fine to coarse sand, fine subangular gravel, uncemented							
0				POORLY GRADED GRAVEL WITH SAND (GP), very dense, red (2.5YR 4/8) and dark gray (2.5Y N4/0), wet, fine to coarse sand, fine and trace coarse angular gravel, uncemented							
	90	18 5"	50/6"								
-5											
	95	19 4"	27	--grades olive-gray (5Y 4/2), dense							
-10				SANDY LEAN CLAY (CL), very stiff, very dark gray							

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 3, 2018
COMPLETION DATE: December 5, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-112
BART to Silicon Valley
San Jose, California

FIGURE A-3b

LOCATION: N. 27th Street and E. Santa Clara Street
N 1,952,431 E 6,164,748

SURFACE EL: 88.9 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		20 18"	(29)	(2.5Y N3/0), moist, low plasticity, fine sand --(pp=1.75/1.75/1.75 tsf) --(pp=2.5/2.25 tsf)		20	67	29	10		MA
-15											
	105	21 16"	(38)	SILTY GRAVEL WITH SAND (GM) (GRAVEL POCKET), medium dense, dark gray (2.5Y N4/0), wet							
				SANDY LEAN CLAY (CL), very stiff, very dark gray (2.5Y N3/0), moist, low plasticity (pp=2.8/3.4 tsf)							
-20	110	22 8"	25	POORLY GRADED SAND (SP), medium dense, dark gray (2.5Y N4/0), wet, lenses of sandy lean clay, trace fine gravel and pockets of silty sand --interbedded clay and sand with gravel 112.5 to 115.0 feet							
-25	115	23 7"	82	POORLY GRADED SAND WITH GRAVEL (SP), very dense, dark grayish-brown (2.5Y 4/2), wet, fine to coarse sand, fine subrounded to subangular gravel, uncemented, trace clay							
-30	120	24 7"	79								
-35	125	25 7"	83								
-40	130	26 4"	50/4"	--grades olive-brown (2.5Y 4/3)							
-45	135	27 2"	50/5"	--more angular fine gravel							
				SANDY LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low to medium plasticity, fine sand, trace coarse sand							
-50	140	28 18"	(74)	--(pp=3.5/3.5/3.25/3.3 tsf) --(pp=3.75/3.75/3.75 tsf) --Resumed drilling on 12/5/2018 at 140 feet.				31	12		
-55	145	29 18"	(83/12")	--grades olive-gray (5Y 4/2) (pp=3.5/4.0/3.75/4.1/3.75 tsf) --(pp=3.5/3.0/3.25 tsf)							
-60											

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 3, 2018
COMPLETION DATE: December 5, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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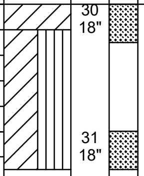
BART to Silicon Valley
San Jose, California

FIGURE A-3c

LOCATION: N. 27th Street and E. Santa Clara Street
N 1,952,431 E 6,164,748

SURFACE EL: 88.9 ft (datum)



ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		30 18"	(74)								
				SANDY, SILTY CLAY (CL-ML), hard, olive (5Y 5/3) to olive-gray (5Y 4/2), moist, low plasticity, fine sand							
-65											
	155	31 18"	(54)								
				--(pp=3.7/4.5/4.5 tsf)							
				--Boring terminated at a depth of 156.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 11.5 feet. --Boring backfilled with cement grout.							
-70	160										
-75	165										
-80	170										
-85	175										
-90	180										
-95	185										
-100	190										
-105	195										
-110											

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 3, 2018
COMPLETION DATE: December 5, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-3d

LOCATION: N. 25th Street at E. Santa Clara Street
N 1,951,955 E 6,164,296

SURFACE EL: 90.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						5" ASPHALT CONCRETE							
						3" POORLY GRADED GRAVEL (AGGREGATE BASE)							
85	5		1 16"		(13)	SANDY LEAN CLAY (CL), stiff to very stiff, olive-brown (2.5Y 4/3), moist, low plasticity, fine sand --(pp=1.75/1.75/1.5/3.2/3.0/3.7 tsf)							
80	10		2 12"		(11)	--grades light olive-brown (2.5Y 5/4), medium plasticity --(pp=2.25/2.25/2.5/2.75/3.3 tsf) --Switched to rotary wash drilling at 11.5 feet.							
75	15		3 13"		(11)	--grades with more sand, very dark gray (2.5Y N3/0) --(pp=1.25/1.0/0.75/1.25/1.3/1.5 tsf)							
70	20		4 10"		(9)	--grades very dark grayish-brown (2.5Y 3/2), less sandy --(pp=1.5/1.75/1.0/2.0/2.1 tsf)							
65	25		5 14"		(12)	--grades light olive-brown (2.5Y 5/4), stiff --(pp=1.0/1.0/0.75/1.9/1.2/1.25 tsf) --Resumed drilling on 12/11/2018 at 26.5 feet.							
60	30		6 18"		(7)	SANDY SILT (ML), medium stiff, dark olive-gray (5Y 3/2), wet, low plasticity, fine sand --(pp=0.5/0.7 tsf)							
55	35		7 18"		(2)	--grades soft --(tv=0.3 tsf)							
50	40		8 18"		(4)	--grades medium stiff --(tv=0.52 tsf) (pp=0.5/0.5/0.5 tsf)							
45	45		9 13"		(24)	FAT CLAY (CH), very stiff, very dark gray (2.5Y N3/0), moist, high plasticity, trace fine sand --(pp=1.5/1.75/1.75/2.25/2.5 tsf)				61	37		

Continued

BORING DEPTH: 161.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 6, 2018
COMPLETION DATE: December 12, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-113
BART to Silicon Valley
San Jose, California

FIGURE A-4a

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Sheet 2 of 4

LOCATION: N. 25th Street at E. Santa Clara Street
N 1,951,955 E 6,164,296

SURFACE EL: 90.1 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		10 18"	(18)	--grades stiff, dark gray (2.5Y N4/0) with dark grayish-brown (2.5Y 4/2) mottling (pp=1.5/1.5/1.25/1.8/1.9 tsf) --(pp=1.75/1.75/1.5/2.5/2.6 tsf)							
35	55	11 16"	(33)	SANDY LEAN CLAY (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, low to medium plasticity, fine and trace coarse sand --(pp=1.25/1.25/1.0/2.1/2.1 tsf) --(pp=2.0/2.25/2.0/3.0/3.6 tsf)				31	13		
30	60	12 14"	(36)	--grades stiff, gray (5Y 5/1) to olive-gray (5Y 4/2), medium plasticity (pp=1.25/1.25/1.25/2.25/1.9/2.0 tsf) --(pp=1.5/1.25/1.5 tsf)							
25	65	13 15"	(36)	--grades very stiff, olive-gray (5Y 4/2) (pp=2.25/2.25/2.25/3.0/2.1/2.3 tsf) --(pp=2.0/2.0/2.0 tsf) POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense, olive-gray (5Y 4/2), wet, fine to medium sand, angular fine gravel							
20	70	14 16"	(72)			12	7				MA
15	75	15 7"	70	--trace coarse gravel, very dense							
10	80	16 8"	70	--grades dark grayish-brown (2.5Y 4/2)							
5	85	17 3"	50/6"	--trace coarse gravel (silty sandstone fragments)							
0	90	18 4"	(50/6")								
				LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4), moist, low to medium plasticity, fine sand							
-5	95	19 14"	(37)	--(pp=2.5/2.25/2.5/3.0/3.0 tsf)		20	89	32	14		MA

Continued

BORING DEPTH: 161.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 6, 2018
COMPLETION DATE: December 12, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-113
BART to Silicon Valley
San Jose, California

FIGURE A-4b

Project No. 2017-144-T02

Sheet 3 of 4

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	LOCATION: N. 25th Street at E. Santa Clara Street N 1,951,955 E 6,164,296 SURFACE EL: 90.1 ft (datum) MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			20 18"		(29)	--(pp=2.5/2.0/2.25 tsf)							
						SILTY SAND (SM), medium dense, olive-gray (5Y 4/2), wet, fine sand, uncemented							
-15	105		21 18"		(51)	SANDY SILT (ML), very stiff, olive-gray (5Y 4/2), wet, fine sand, uncemented (pp=2.0/2.25/2.5 tsf)							
						SILTY SAND (SM), dense, dark greenish-gray (GLEY 5G 4/1), wet, homogeneous, fine sand, uncemented							
-20	110		22 18"		(56)	--Resumed drilling on 12/12/2018 at 111.5 feet.	102	25	45				MA
						POORLY GRADED SAND WITH GRAVEL (SP), very dense, grayish-brown (2.5Y 5/2), wet, fine sand, trace coarse sand and angular gravel (chert), uncemented							
-25	115		23 7"		50/6"								
						SILTY SAND (SM), very dense, olive (5Y 5/3), wet, homogeneous, fine sand, uncemented							
-30	120		24 7"		(50/4.5")								
-35	125		25 9"		62	--grades dark grayish-brown (2.5Y 4/2)							
-40	130		26 4"		64	--grades less silty with subangular fine gravel (sandstone fragments)							
-45	135		27 12"		27	LEAN CLAY (CL), very stiff, olive-gray (5Y 4/2), moist, medium plasticity, trace subrounded fine gravel (chert)				43	23		
-50	140		28 16"		(60)	--grades hard (pp=4.0/4.5 tsf) --grades sandy, fine sand							
-55	145		29 14"		(65)	--(pp=4.5/>4.5/>4.5 tsf) --(pp=4.25/4.5/4.5 tsf)				38	21		

Continued

BORING DEPTH: 161.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 6, 2018
COMPLETION DATE: December 12, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-113
BART to Silicon Valley
San Jose, California

FIGURE A-4c

LOCATION: N. 25th Street at E. Santa Clara Street
N 1,951,955 E 6,164,296

SURFACE EL: 90.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		▨	30 18"	▒	(53)	--grades olive (5Y 5/3) (pp=2.75/3.0/3.0/3.5 tsf) --(pp=4.0/4.5/4.25/>4.5 tsf)							
-65	155	▨	31 18"	▒	(73)	--grades olive-gray (5Y 4/2) (pp=4.5/4.5/4.5/>4.5 tsf)							
-70	160	▨	32 18"	▒	(61)	--grades light olive-brown (2.5Y 5/4) (pp=4.0/4.0/4.0/4.5 tsf) --Boring terminated at a depth of 161.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 11.5 feet. --Boring backfilled with cement grout.							
-75	165												
-80	170												
-85	175												
-90	180												
-95	185												
-100	190												
-105	195												

BORING DEPTH: 161.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 6, 2018
COMPLETION DATE: December 12, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-113

BART to Silicon Valley
San Jose, California

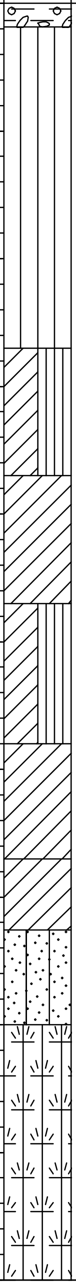
FIGURE A-4d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: S. 22nd Street at E. Santa Clara Street
N 1,951,349 E 6,163,598

SURFACE EL: 91.5 ft (datum)



ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
91.5	0			8" ASPHALT CONCRETE over 3" POORLY GRADED GRAVEL (PAVEMENT SECTION)							
90				SILT WITH SAND (ML), very stiff, brown (10YR 5/3), moist, low plasticity, fine sand (NATIVE SOIL)							
85	5	1 13"	(8)	--(pp=3.2/3.2 tsf)							
80	10	2 14"	(11)	--(pp=1.75/1.75/1.75 tsf) --grades sandy (pp=3.5/3.75 tsf) --Switched to rotary wash drilling at 11.5 feet.							
75	15	3 11"	(11)	SILTY CLAY WITH SAND (CL-ML), very stiff, dark brown (10YR 3/3), moist, low plasticity, fine sand --(pp=2.5/2.7 tsf)							
70	20	4 14"	(10)	LEAN CLAY (CL), stiff, grayish-brown (10YR 5/2), wet, low to medium plasticity, trace fine sand (pp=1.25/1.0/1.5/1.25/1.25/1.5 tsf)							
65	25	5 18"	(6)	SANDY, SILTY CLAY (CL-ML), medium stiff, grayish-brown (10YR 5/2), wet (tv=0.34 tsf)							
60	30	6 15"	(15)	LEAN CLAY (CL), stiff, gray (2.5Y N5/0) with olive-brown (2.5Y 4/3) mottling, moist, low to medium plasticity, trace fine and medium sand (pp=1.25/1.5/1.5/1.8/1.8 tsf)				35	17		
55	35	7 18"	(13)	SANDY LEAN CLAY (CL), stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, fine sand, trace coarse sand --(pp=1.25/1.25/1.25/1.25/1.75/1.4 tsf)							
				SILTY SAND (SM), loose, dark gray (2.5Y N4/0), wet							
50	40	8 18"	(10)	ORGANIC CLAY (OL), medium stiff, olive-gray (5Y 4/2), wet, low plasticity, some charcoal (pp=0.8/0.8/1.1 tsf)							
45	45	9 18"	(8)	--stiff (pp=1.0/0.75/0.75/1.1/1.25 tsf)							

Continued

BORING DEPTH: 166.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 13, 2018
COMPLETION DATE: December 17, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-114

BART to Silicon Valley
San Jose, California

FIGURE A-5a

LOCATION: S. 22nd Street at E. Santa Clara Street
N 1,951,349 E 6,163,598

SURFACE EL: 91.5 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			10 18"		(14)	--(pp=1.25/1.5/1.0 tsf)							
40						FAT CLAY (CH), stiff, dark gray (2.5Y N4/0), moist, high plasticity (pp=1.7/1.75/2.2 tsf)							
35	55		11 12"		(30)	--grades very stiff (pp=2.0/2.5/2.25/2.25/2.6 tsf)							
						SANDY LEAN CLAY (CL), stiff, gray (2.5Y N5/0) with light olive-brown (2.5Y 5/4) mottling, moist, low plasticity, fine sand							
30	60		12 18"		(23)	--(pp=1.5/1.75/2.0/1.75/1.8/2.1 tsf) --(pp=1.5/2.0/1.5/1.7/2.1 tsf)							
25	65		13 13"		(36)	--(pp=1.8/1.8/2.3 tsf) --grades very stiff, medium to high plasticity --(pp=2.5/2.5/3.0/2.25/2.5 tsf)							
						SILTY CLAY (CL-ML), very stiff, light olive-brown (2.5Y 5/4), moist, low plasticity							
20	70		14 16"		(25)	--(pp=2.25/2.5/2.75 tsf) --(pp=1.5/2.0/2.0/2.25/1.75/2.0 tsf)							
						CLAYEY SAND (SC), medium dense, olive-gray (5Y 4/2), wet, fine sand							
15	75		15 17"		(21)								
						LEAN CLAY (CL), stiff, grayish-brown (2.5Y 5/2), moist, low to medium plasticity, trace fine sand							
10	80		16 16"		(22)	--(pp=1.75/1.5/1.5/1.8/2.0/1.75 tsf) --(pp=1.5/1.25/1.5/1.5/1.75 tsf) --Resumed drilling on 12/14/2018 at 81.5 feet.		22	98	32	13		MA
5	85		17 18"		(37)	--grades very stiff, light olive-brown (2.5Y 5/4), trace carbonate --(pp=2.4/2.7/1.6/3.0/3.5 tsf)							
0	90		18 16"		(36)	--(pp=1.7/1.1/2.2 tsf)	103	23 23	97	34	13		MA
						SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4), moist, low plasticity, fine sand							
-5	95		19 18"		(34)	--(pp=1.8/1.8/1.7/1.5/1.6/1.5 tsf) --(pp=3.0/3.1/2.6 tsf)							
						FAT CLAY (CH)							

Continued

BORING DEPTH: 166.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 13, 2018
COMPLETION DATE: December 17, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-114

BART to Silicon Valley
San Jose, California

FIGURE A-5b

Project No. 2017-144-T02

Sheet 3 of 4

LOCATION: S. 22nd Street at E. Santa Clara Street
N 1,951,349 E 6,163,598

SURFACE EL: 91.5 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-10		20 15"	(41)	FAT CLAY (CH), very stiff, olive (5Y 5/3), moist, high plasticity, trace carbonate and fine sand --(pp=2.1/2.8/2.1 tsf) --(pp=2.7/3.4 tsf)		29					CR
-15	105	21 18"	(46)	SILTY CLAY (CL-ML), very stiff, gray (2.5Y N5/0) with light olive-brown (2.5Y 5/4) mottling, moist, low plasticity --(pp=3.1/3.0 tsf) --(pp=2.6/2.7 tsf)							
-20	110	22 18"	(39)	LEAN CLAY WITH SAND (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low to medium plasticity --(pp=3.0/3.1 tsf) --(pp=2.0/2.3/2.0 tsf)		20	82	34	15		Gs MA
-25	115	23 17"	(58)	SILTY SAND WITH GRAVEL (SM), dense, light olive-brown (2.5Y 5/4), wet, fine and trace coarse sand, fine gravel							
-30	120	24 17"	(42)	LEAN CLAY WITH SAND (CL), very stiff, grayish-brown (2.5Y 5/2), moist, medium plasticity, fine sand, trace medium and coarse sand --(pp=2.6/2.3 tsf) --(pp=1.3/1.5/1.7/2.0/2.3 tsf)							
-35	125	25 7"	69	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand, fine subrounded to subangular gravel, uncemented			11				MA
-40	130	26 4"	52								
-45	135	27 5"	37								
-50	140	28 18"	(34)	CLAYEY SAND (SC), medium dense, grayish-brown (2.5Y 5/2), wet, homogeneous, fine sand, weakly cemented --Resumed drilling on 12/17/2018 at 141.5 feet.							
-55	145	29 16"	(79)	--grades olive (5Y 5/3) and olive-gray (5Y 4/2), silty with medium plasticity fines (pp=3.5/3.5/3.0 tsf) POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), brownish-gray (10YR 6/2), wet,							

Continued

BORING DEPTH: 166.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 13, 2018
COMPLETION DATE: December 17, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-114
BART to Silicon Valley
San Jose, California

FIGURE A-5c

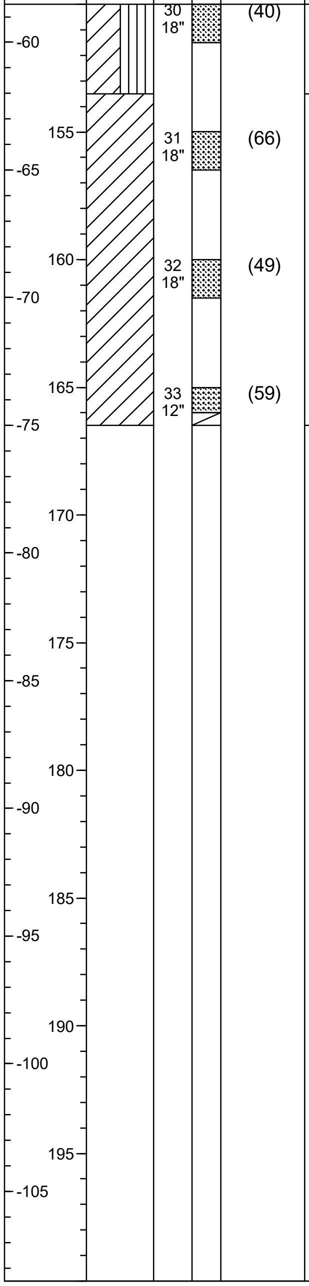
Project No. 2017-144-T02

Sheet 4 of 4

LOCATION: S. 22nd Street at E. Santa Clara Street
N 1,951,349 E 6,163,598

SURFACE EL: 91.5 ft (datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS



fine gravel, weakly cemented

SILTY CLAY WITH SAND (CL-ML), very stiff, olive (5Y 5/3), wet, low plasticity, trace fine sand
--(pp=3.0/2.75/2.5 tsf)
--(pp=3.5/3.6/3.7 tsf)

LEAN CLAY WITH SAND (CL), very stiff to hard, olive (5Y 5/3) and gray (5Y 5/1), moist, medium plasticity, fine sand
--(pp=3.75/4.25/4.5 tsf)
--(pp=2.6/2.7/2.6 tsf)
--grades olive (5Y 5/3), medium plasticity (pp=4.0/3.8/3.6 tsf)
--(pp=3.1/3.0/3.3 tsf)

--(pp=4.4/3.75/4.5 tsf)
--(pp=3.8/3.5/3.5 tsf)

--Boring terminated at a depth of 166.5 feet.
--Groundwater not encountered prior to switching to rotary wash drilling at a depth of 11.5 feet.
--Boring backfilled with cement grout.

BORING DEPTH: 166.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 13, 2018
COMPLETION DATE: December 17, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-114
BART to Silicon Valley
San Jose, California

FIGURE A-5d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: S. 19th Street at Santa Clara Street
N 1,950,856 E 6,162,732

SURFACE EL: 95.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			1 4"			7" ASPHALT over 4" POORLY GRADED GRAVEL (GP) (PAVEMENT SECTION)							
						SILT WITH SAND (ML), stiff, brown (10YR 5/3), moist, low plasticity, fine sand							
90	5		2 14"		(9)	--(pp=1.0/1.0/1.1 tsf)							
85	10		3 15"		(15)	--Switched to rotary wash drilling at 10 feet. --grades very stiff, clayey (pp=2.3/2.3/2.5 tsf)							
						SILTY CLAY (CL-ML), stiff, olive-brown (2.5Y 4/3), moist, low plasticity, few fine sand, trace medium sand							
80	15		4 14"		(9)	--(pp=0.75/1.25 tsf) --(pp=1.3/1.1/1.1 tsf)							
						LEAN CLAY WITH SAND (CL), stiff, olive-brown (2.5Y 4/3), moist, medium plasticity, fine sand							
75	20		5 14"		(6)	--(pp=0.75/1.0 tsf) --(pp=1.2/1.1/1.1 tsf)							
						LEAN TO FAT CLAY (CL-CH), stiff, brown (10YR 5/3), wet, medium to high plasticity							
70	25		6 16"		(11)	--(pp=1.1/1.2/1.1 tsf)							
65	30		7 10"		(13)	--grades light olive-brown (2.5Y 5/4), very stiff (pp=2.3/2.5 tsf)							
						SILTY SAND (SM), olive-brown (2.5Y 4/3), wet, fine sand, trace charcoal, uncemented							
60	35		8 14"		(12)	LEAN CLAY WITH SAND (CL), stiff, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), moist, medium plasticity, fine sand (pp=1.1/1.1/1.0/1.2/1.9/1.25 tsf)							
55	40		9 13"		(17)	SILTY SAND (SM), medium dense, brown (10YR 5/3), wet, fine sand, uncemented							
						ORGANIC CLAY (OH), stiff, olive (5Y 5/3) and dark gray (5Y 4/1), wet, high plasticity, trace medium sand, peat and charcoal (BASIN DEPOSIT?)							
50	45		10 15"		(10)	--(pp=1.2/1.2 tsf) --(pp=1.5/1.5 tsf)							

Continued

BORING DEPTH: 176.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 18, 2018
COMPLETION DATE: December 20, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-115
BART to Silicon Valley
San Jose, California

FIGURE A-6a

Project No. 2017-144-T02

Sheet 2 of 4

LOCATION: S. 19th Street at Santa Clara Street
N 1,950,856 E 6,162,732

SURFACE EL: 95.1 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		11 16"	▨	(16)	--grades dark gray (5Y 4/1) (pp=2.0/1.8 tsf)							
					SILTY SAND (SM), dark greenish-gray (GLEY 5G 4/1), wet, fine sand, uncemented							
40	55	12 16"	▨	(16)								
					SILT WITH SAND (ML), medium stiff, dark greenish-gray (GLEY 5G 4/1), wet, low plasticity, fine sand (pp=0.8/0.5/0.7 tsf)							
35	60	13 16"	▨	(26)	FAT CLAY WITH SAND (CH), stiff, bluish-gray (GLEY 5B 5/1) and olive (5Y 5/3), moist, high plasticity, fine sand (pp=1.75/1.75/2.1 tsf)							
					--(pp=1.5/1.6/1.7/2.2/2.1 tsf)							
30	65	14 17"	▨	(28)	LEAN TO FAT CLAY (CL-CH), very stiff, gray (5Y 5/1) with olive (5Y 5/3) mottling, moist, medium to high plasticity				54	30		
					--(pp=2.0/2.4 tsf)							
					--(pp=2.0/1.9/2.0 tsf)							
25	70	15 16"	▨	(78)	SILTY SAND (SM), dense, brownish-gray (2.5Y 6/2), wet, fine sand, uncemented							
					POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand, fine subrounded gravel, uncemented							
20	75	16 8"	☒	51								
15	80	17 10"	☒	64	--trace coarse gravel							~~Abr. (Comp.)~~
10	85	18 8"	☒	50/6"								
5	90	19 8"	☒	62	--grades oilve (5Y 5/3) and gray (5Y 5/1), gravelly, trace coarse gravel --Resumed drilling on 12/19/2018 at 91.5 feet.							
					POORLY GRADED SAND WITH GRAVEL (SP), dense, dark yellowish-brown (10YR 4/4), wet, fine sand and gravel, uncemented							
0	95	20 10"	▨	(79)	--Fluid losses noted 93.5 feet to 132.0 feet.							
					SILTY SAND WITH GRAVEL (SM)							

Continued

BORING DEPTH: 176.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 18, 2018
COMPLETION DATE: December 20, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-115
BART to Silicon Valley
San Jose, California

FIGURE A-6b

LOCATION: S. 19th Street at Santa Clara Street
N 1,950,856 E 6,162,732

SURFACE EL: 95.1 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		21 7"	58	SILTY SAND WITH GRAVEL (SM), very dense, grayish-brown (10YR 5/2), wet, fine to coarse sand, fine angular to subangular gravel, uncemented							
-10	105	22 1"	39	--grades dense							
-15	110	23 1"	49	--silty sandstone fragment (basal cobbles?)							
				SANDY LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4) with gray (2.5Y N5/0) and yellow (2.5Y 7/8) mottling, moist, low to medium plasticity, fine sand (pp=2.5/2.5/3.0/2.7 tsf)							
-20	115	24 18"	(51)	--(pp=2.5/3.0/2.75/>4.0/3.7 tsf)		19	87	34	16		MA
-25	120	25 10"	(33)	LEAN CLAY (CL), very stiff, olive-gray (5Y 4/2), moist, medium plasticity, a little silt (pp=2.25/2.5/2.75 tsf)							
-30	125	26 9"	(19)	SANDY LEAN CLAY (CL), stiff, olive-brown (2.5Y 4/3), wet, low plasticity, fine sand (pp=1.5/1.75/1.25 tsf)							
				SILTY GRAVEL WITH SAND (GM), dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand, fine subangular to subrounded gravel, uncemented							
-35	130	27 3"	43				15				MA
-40	135	28 3"	65	--grades very dense							
-45	140	29 1"	50/5"	--subrounded gravel layer or pocket --Resumed drilling on 12/20/2018 at 140 feet.							
-50	145	30 3"	68								

Continued

BORING DEPTH: 176.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 18, 2018
COMPLETION DATE: December 20, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-115

BART to Silicon Valley
San Jose, California

FIGURE A-6c

LOCATION: S. 19th Street at Santa Clara Street
N 1,950,856 E 6,162,732

SURFACE EL: 95.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			31 8"		(38)	SANDY LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low plasticity, fine sand --(pp=2.25/2.75/2.5 tsf)							
-60	155		32 5.5"		33	SILTY SAND (SM), dense, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), wet, fine sand, weakly cemented							
-65	160		33 6"		(35)	--grades medium dense, a little clay							
-70	165		34 9"		(86/10")	--grades olive (5Y 5/3), very dense, moist							
-75	170		35 4"		74	--grades gray (2.5Y N5/0), trace fine gravel, moderately cemented							
-80	175		36 6"		59	FAT CLAY (CH), hard, olive (5Y 5/3) and gray (5Y 5/1), moist, high plasticity --Boring terminated at a depth of 176.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 10 feet. --Boring backfilled with cement grout.							
-85	180												
-90	185												
-95	190												
-100	195												

BORING DEPTH: 176.5 ft
DEPTH TO WATER: Not Measured

START DATE: December 18, 2018
COMPLETION DATE: December 20, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos and Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-115

BART to Silicon Valley
San Jose, California

FIGURE A-6d

LOCATION: N. 13th Street and E. Santa Clara Street
N 1,949,992 E 6,160,933

SURFACE EL: 80.6 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
80						1" ASPHALT over POORLY GRADED SAND WITH GRAVEL (SP) (FILL)							
			1 2"			SANDY SILT (ML), very stiff, dark grayish-brown (2.5Y 4/2), moist, medium plasticity, fine sand (NATIVE SOIL)							
75	5		2 18"		(16)	--(pp=3.2/3.4/3.4/4.0/>4.5 tsf) --Switched to rotary wash drilling at 6 feet.							
						FAT CLAY WITH SAND (CH), stiff, grayish-brown (2.5Y 5/2), moist, high plasticity, fine sand							
70	10		3 11"		(10)	--(pp=1.8/1.2/2.2/2.25/1.6 tsf)							
						FAT CLAY (CH), stiff, olive-gray (5Y 4/2), wet, high plasticity							
65	15		4 14"		(11)	--(pp=1.3/1.2/1.3/1.4/1.75/2.0 tsf)							
60	20		5 10"		(9)	FAT CLAY WITH SAND (CH), stiff, olive (5Y 5/3), wet, high plasticity, medium sand --(pp=0.9/0.7/0.7/1.0/1.75/1.2 tsf)							
						SANDY SILT (ML), medium stiff, olive (5Y 5/3), wet, low plasticity, fine sand							
55	25		6 9"		5								
50	30		7 18"		0								
						SILT (ML), very soft, olive (5Y 5/3) to olive-brown (2.5Y 4/3), wet, low plasticity							
						FAT CLAY (CH), medium stiff, gray (2.5Y N5/0), wet, high plasticity (pp=0.8/0.8/1.1 tsf)							
45	35		8 15"		(9)	--(pp=0.8/0.8/0.6/1.0/0.75/0.75 tsf)							
40	40		9 16"		(15)	grades stiff (pp=1.6/1.75/1.6 tsf) --(pp=1.0/1.0 tsf)							
35	45		10 10"		(20)	--grades very stiff, trace organics/charcoal (pp=2.3/2.2/2.0/2.0/2.6/2.7 tsf)							

Continued

BORING DEPTH: 166.9 ft
DEPTH TO WATER: Not Measured

START DATE: January 14, 2019
COMPLETION DATE: January 16, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-116
BART to Silicon Valley
San Jose, California

FIGURE A-7a

Project No. 2017-144-T02

Sheet 2 of 4

LOCATION: N. 13th Street and E. Santa Clara Street
N 1,949,992 E 6,160,933

SURFACE EL: 80.6 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30		11	13"	(25)	--grades dark gray (2.5Y N4/0), trace organics (pp=1.8/1.8/1.4 tsf) --(pp=2.3/2.4/2.3/2.6/2.7 tsf)							
					LEAN CLAY WITH SAND (CL), stiff to very stiff, gray (2.5Y N5/0) w/ light olive-brown (2.5Y 5/4) mottling, moist, low plasticity, fine sand							
25	55	12	15"	(26)	(pp=1.7/1.7/1.8/1.8/1.9 tsf) --(pp=2.9/2.8/3.9 tsf)							
					SILTY SAND (SM), light olive-brown (2.5Y 5/4), moist, weakly cemented							
20	60	--	0"	8	POORLY GRADED GRAVEL (GP) --no recovery on SPT drive from 60 to 61.5 feet							
					WELL GRADED GRAVEL WITH SAND (GW), dense, brown (10YR 5/3), wet, medium to coarse sand, fine subrounded to subangular gravel, uncemented							
15	65	13	14"	(57)								
10	70	14	15"	(27)	--grades clayey		22	94	33	11		MA
					LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) and olive-yellow (2.5Y 4/3), moist, low to medium plasticity, fine sand (pp=2.8/3.7/2.7/3.1/3.0 tsf)							
5	75	--	3"	(47)	LEAN TO FAT CLAY WITH SAND (CL-CH), stiff, gray (2.5Y N5/0), moist, medium to high plasticity, fine sand							
0	80	15	2"	(37)	--Resumed drilling on 1/15/2019 at 81.5 feet.							
					WELL GRADED GRAVEL WITH SAND AND SILT (GW-GM), very dense, gray (2.5Y N5/0), wet, fine to coarse sand, fine and trace coarse subangular gravel, uncemented							
-5	85	16	5"	(50/6")								
					SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0), moist, medium plasticity, fine to medium sand							
-10	90	--	0"	(32)	-no recovery on MC drive from 90 to 91.5 feet							
-15	95	17	10"	(27)	--(pp=2.5/2.6/2.5 tsf)							
					ORGANIC CLAY (OL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, medium to high plasticity							

Continued

BORING DEPTH: 166.9 ft
DEPTH TO WATER: Not Measured

START DATE: January 14, 2019
COMPLETION DATE: January 16, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-116
BART to Silicon Valley
San Jose, California

FIGURE A-7b

LOCATION: N. 13th Street and E. Santa Clara Street
N 1,949,992 E 6,160,933

SURFACE EL: 80.6 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-20		18 12"	(29)	--(pp=3.0/3.6/3.7 tsf)		28	99	45	22		MA, CR
				SANDY SILT (ML), very stiff, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), homogeneous, fine sand, weakly cemented							
-25	105	19 15"	(38)	--(pp=2.3/2.3/2.7 tsf)		22	57				MA
				POORLY GRADED SAND (SP), dense, dark grayish-brown (2.5Y 4/2), wet, fine to medium sand, trace gravel, uncemented							Abr. (Comp.)
-30	110	20 13"	(58)								
				SILTY SAND (SM), light olive-brown (2.5Y 5/4), wet, fine sand, uncemented							
-35	115	21 12"	(34)								
				SANDY, SILTY CLAY (CL-ML), hard, gray (2.5Y N5/0), wet, low plasticity, fine sand							
-40	120	22 22"	125 to 475 psi		98	26					TXCU Consol
				POORLY GRADED SAND (SP), very dense, gray (2.5Y N5/0), wet, fine sand, uncemented							
-45	125	23 8"	(50/6")								
				SANDY SILT (ML), very stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, fine sand							
-50	130	24 14"	(31)	--(pp=2.5/3.1/2.2 tsf)							
				SANDY LEAN CLAY (CL), very stiff, dark greenish-gray (GLEY 5G 4/1), moist, low plasticity, fine sand, trace organics (pp=3.2/3.3 tsf)							
-55	135	25 17"	(41)	--(pp=2.2/2.7/2.7 tsf) --grades with less sand, hard				28	12		
-60	140	26 6"	54	--Resumed drilling on 1/16/2019 at 140.5 feet.							
				LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) with olive (5Y 5/3) mottling, moist, medium plasticity							
-65	145	27 18"	(41)	--(pp=2.8/2.7/2.8 tsf)				42	21		

Continued

BORING DEPTH: 166.9 ft
DEPTH TO WATER: Not Measured

START DATE: January 14, 2019
COMPLETION DATE: January 16, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-116
BART to Silicon Valley
San Jose, California

FIGURE A-7c

Project No. 2017-144-T02

Sheet 4 of 4

LOCATION: N. 13th Street and E. Santa Clara Street
N 1,949,992 E 6,160,933

SURFACE EL: 80.6 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-70		28 6"	24	--grades yellowish-brown (10YR 5/6), trace carbonate							
-75	155	29 18"	(62)	SILTY CLAY (CL-ML), hard, light yellowish-brown (10YR 6/4) to olive-yellow (5Y 6/6), moist, low plasticity --(pp=4.3/>4.5 tsf) --(pp>4.5 tsf)							
-80	160	30 6"	(41)	--grades very stiff (pp=3.5/3.5/3.0 tsf)							
-85	165	31 21"	175 to 450 psi	SILTY SAND (SM), dense, yellowish-brown (10YR 5/6), moist, homogeneous, fine sand, weakly cemented							
				--Boring terminated at a depth of 166.9 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 6 feet. --Boring backfilled with cement grout.							
-90	170										
-95	175										
-100	180										
-105	185										
-110	190										
-115	195										

BORING DEPTH: 166.9 ft
DEPTH TO WATER: Not Measured

START DATE: January 14, 2019
COMPLETION DATE: January 16, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

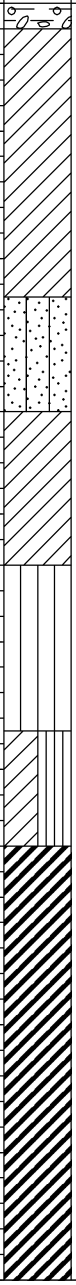
FIGURE A-7d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: Parking lane at east side of S. 10th Street at W. Santa Clara Street
N 1,949,408 E 6,160,267

SURFACE EL: 81.1 ft (datum)



ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
80				ASPHALT CONCRETE over AGGREGATE BASE							
				LEAN CLAY (CL), stiff, olive-brown (2.5Y 4/3), moist, trace fine sand, (NATIVE SOIL)							
75	5	1 18"	(11)	--(pp=1.0/1.0/1.0/1.0 tsf) --(pp=1.5/1.5/1.5/1.5 tsf) --grades silty, less sand at 6.5 feet							
70	10	2 18"	(13)	--(pp=1.5/1.0/1.5/1.75/1.75 tsf)							
				▽ SILTY SAND (SM), loose, olive-brown (2.5Y 4/3), wet, fine sand							
65	15	3 6"	(7)	--Switched to rotary wash drilling at 15 feet.							
				LEAN CLAY (CL), medium stiff to stiff, very dark gray (2.5Y N3/0), wet, trace fine sand, medium plasticity							
60	20	4 18"	(6)	--grades dark gray (2.5Y N4/0), few fine sand (pp=0.75/1.0/1.0)							
				SANDY SILT (ML), medium stiff, olive (5Y 5/3), wet, low plasticity, fine sand							
55	25	5 18"	(11)	--(tv=0.35 tsf) --(tv=0.28 tsf)							
				SILTY CLAY (CL-ML), soft, olive-gray (5Y 5/2), wet, low plasticity, trace fine sand (tv=0.15 tsf)							
50	30	6 18"	(8)	--grades olive (5Y 5/3) (tv=0.13 tsf)							
				FAT CLAY (CH), medium stiff to stiff, dark greenish-gray (GLEY 5G 4/1), wet, high plasticity							
45	35	7 18"	(10)	--(pp=0.75/0.75/1.5 tsf) --grades dark gray (2.5Y N4/0), moist (pp=1.75/2.0/1.5 tsf)							
40	40	8 18"	(12)	--(pp=1.0/1.0/1.0 tsf)				77	50		
35	45	9 18"	(22)	--very dark gray (2.5Y N3/0), trace fine sand and charcoal --(pp=1.5/1.5/1.5 tsf)							

Continued

BORING DEPTH: 163.0 ft
DEPTH TO WATER: 13.0 ft.,

START DATE: October 22, 2018
COMPLETION DATE: October 24, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-117
BART to Silicon Valley
San Jose, California

FIGURE A-8a

LOCATION: Parking lane at east side of S. 10th Street at W. Santa Clara Street
N 1,949,408 E 6,160,267

SURFACE EL: 81.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30			10 18"	▨	(24)	--(pp=1.25/1.0/1.25 tsf) --(pp=1.75/1.75/2.75 tsf)							
25	55		11 18"	▨	(19)	--grades greenish-gray (GLEY 5BG 5/1) (pp=1.25/1.25/1.5 tsf) --(pp=1.25,1.25,1.25 tsf)							
20	60		12 12"	☒	34	SILTY, CLAYEY SAND WITH GRAVEL (SC-SM), medium dense, olive (5Y 5/3), wet, fine sand, trace subrounded fine and coarse gravel, uncemented --dense, grades with gravel to 1"		15	24				MA
15	65		13 10"	☒	49	POORLY GRADED SAND WITH SILT (SP-SM), dense, dark olive-gray (5Y 3/2), wet, fine to coarse sand, trace subrounded fine gravel, uncemented							
10	70		14 6"	☒	59	--very dense							
5	75		15 12"	▨	(34)	LEAN CLAY (CL), stiff, gray (5Y 5/1) with olive (5Y 5/3) mottling, moist, medium plasticity --(pp=1.75/1.9/2.3 tsf)		22		43	19		
0	80		16 6"	☒	59	SILTY, CLAYEY SAND WITH GRAVEL (SC-SM), very dense, dark olive-gray (5Y 3/2), wet, fine to medium sand, trace fine gravel --Resumed drilling on 10/23/18 at 81.5 feet.							
-5	85		17 6"	☒	50/6"	--grades dark grayish-brown (2.5Y 4/2), subangular to subrounded fine gravel		6	15				MA
-10	90		18 4"	☒	57								
-15	95		19 18"	▨	(42)	LEAN CLAY (CL), very stiff, olive-gray (5Y 4/2), moist, low plasticity, trace fine sand (pp=1.75/2.0/2.25 tsf)							
						SANDY LEAN CLAY (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, low plasticity, fine sand							

Continued

BORING DEPTH: 163.0 ft
DEPTH TO WATER: 13.0 ft.,

START DATE: October 22, 2018
COMPLETION DATE: October 24, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-117
BART to Silicon Valley
San Jose, California

FIGURE A-8b

Sheet 3 of 4

LOCATION: Parking lane at east side of S. 10th Street at W. Santa Clara Street
N 1,949,408 E 6,160,267

SURFACE EL: 81.1 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-20		20 18"	(41)	--(pp=1.75/1.75/1.5 tsf) --(pp=2.5/2.5/2.5 tsf)							
-25	105	21 18"	(31)	SANDY LEAN CLAY (CL), very stiff, light yellowish-brown (10YR 6/4) to olive-brown (2.5Y 4/3), moist, low to medium plasticity, fine to medium sand (pp=2.25/2.25/2.5 tsf)	108 107	21 21	66 65	32 29	15 11		MA, Hydrometer Test MA, Hydrometer Test
-30	110	22 18"	(33)	--(pp=2.75/2.0/2.25 tsf) --(pp=2.0/2.25/2.75 tsf)							
-35	115	23 6"	59	SILTY SAND WITH GRAVEL (SM), very dense, yellowish-brown (10YR 5/6) to dark yellowish-brown (10YR 3/6), wet, fine to coarse sand and gravel, weakly cemented --grades olive-brown (2.5Y 4/3), moist							
-40	120	24 6"	74				19				
-45	125	25 12"	26	SANDY LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low plasticity, fine sand (pp=3.0/2.75 tsf)							
-50	130	26 6"	(50/6")	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, gray (2.5Y N5/0), wet, fine to coarse sand, some fine to coarse gravel			7				MA
-55	135	27 18"	(30)	SANDY LEAN CLAY (CL), very stiff, olive (5Y 5/3), moist, low plasticity, fine sand --(pp=2.0/2.0/2.25 tsf) --Resumed drilling on 10/24/18 at 136.5 feet.							
-60	140	28 18"	(50)	SANDY LEAN CLAY (CL), hard, light brownish-gray (2.5Y 6/2), moist, low plasticity, fine and trace coarse sand, trace diffuse carbonate (pp=4.5/4.5/4.5 tsf) --grades very stiff (pp=3.0/3.0/3.0 tsf)							
-65	145	29 18"	(44)	SILT WITH SAND (ML), very stiff, olive-gray (5Y 4/2), moist, low plasticity, fine sand, weakly cemented --(pp=2.0/2.25/2.0 tsf) LEAN CLAY (CL), very stiff, gray (5Y 5/1) with olive							

Continued

BORING DEPTH: 163.0 ft
DEPTH TO WATER: 13.0 ft.,

START DATE: October 22, 2018
COMPLETION DATE: October 24, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-8c

Project No. 2017-144-T02

Sheet 4 of 4

LOCATION: Parking lane at east side of S. 10th Street at
W. Santa Clara Street
N 1,949,408 E 6,160,267

SURFACE EL: 81.1 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-70		30 18"	(63)	(5Y 5/3) mottling, moist, low to medium plasticity (pp=3.25/3.25/3.0 tsf)							
				--hard, gray (5Y 5/1), trace fine sand (pp>4.5 tsf)							
				--grades sandy, olive (5Y 5/3) to olive-gray (5Y 4/2), fine sand							
-75	155	31 18"	(46)	--(pp=3.0/3.0/2.5 tsf)				35	16		
				--(pp=3.25/2.75/3.0 tsf)							
-80	160										
		32 12"	42	CLAYEY SAND (SC), dense, dark gray (2.5Y N4/0), moist, fine sand, weakly cemented							
				SANDY LEAN CLAY (CL), hard, dark gray (2.5Y N4/0), moist, low plasticity, fine sand							
-85	165			--Boring terminated at a depth of 163.0 feet.							
				--Groundwater measured at a depth of 13.0 feet prior to switching to rotary-wash drilling at a depth of 15.0 feet.							
-90	170			--Boring backfilled with cement grout.							
-95	175										
-100	180										
-105	185										
-110	190										
-115	195										

BORING DEPTH: 163.0 ft
DEPTH TO WATER: 13.0 ft.,

START DATE: October 22, 2018
COMPLETION DATE: October 24, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-117

BART to Silicon Valley
San Jose, California

FIGURE A-8d

Sheet 1 of 4

LOCATION: 64 N. Market Street
N 1,947,881 E 6,156,898

SURFACE EL: 87.2 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
					3" ASPHALT over 6" POORLY GRADED GRAVEL (GP) (PAVEMENT SECTION)							
85					SANDY SILTY CLAY (CL-ML), hard, very dark grayish-brown (2.5Y 3/2), moist, low plasticity, fine sand, trace angular gravel (FILL)							
	5	1	15"	(15)								
80					SANDY SILT (ML), hard, light olive-brown (2.5Y 5/4), moist, low plasticity, fine sand, weakly cemented (NATIVE SOIL) (pp>4.0 tsf)							
	10	2	14"	(16)								
75												
	15	3	11"	(16)	FAT CLAY (CH), very stiff, light olive-brown (2.5Y 5/4) to grayish-brown (2.5Y 5/2), moist, high plasticity, trace peat & organics --(pp=2.0/2.2/2.0/2.1/2.1 tsf)							
70					SILT WITH SAND (ML), stiff, olive-gray (5Y 4/2), moist, low plasticity, fine sand							
	20	4	12"	(6)	--(pp=1.0/1.1 tsf)							
65												
	25	5	10"	(14)	FAT CLAY WITH SAND (CH), stiff, very dark gray (2.5Y N3/0), moist, high plasticity, fine sand --(pp=1.2/1.7/1.5 tsf)							
60												
	30	6	16"	(13)	LEAN CLAY WITH SAND (CL), stiff, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), wet, low plasticity, fine sand, trace medium sand --(pp=1.6/1.5/1.7/1.5/1.7 tsf)							
55					SILTY GRAVEL (GM)							
	35		0"	8	--no recovery on SPT drive from 35 to 36.5 feet							
50												
	40	7	17"	(9)	ORGANIC CLAY WITH SAND (OL), stiff, greenish-gray (GLEY 5BG 5/1), wet, medium plasticity --(pp=2.3/2.4/2.2/1.25/1.4 tsf)							
45												
	45	8	15"	(19)	--(pp=1.6/1.7/1.5/1.7/1.9 tsf)		25	100	37	19		MA, Hydrometer
40												
					SILTY SAND (SM), medium dense, yellowish-brown							

Continued

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 21, 2019
COMPLETION DATE: January 23, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-9a

LOCATION: 64 N. Market Street
N 1,947,881 E 6,156,898

SURFACE EL: 87.2 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			9 15"		(22)	(10YR 5/6), moist, fine sand, weakly cemented							
35						POORLY GRADED SAND WITH SILT (SP-SM), medium dense, yellowish-brown (10YR 5/6), wet, fine sand, uncemented							
	55		10 15"		(33)	--grades gray (10YR N5/1), weakly cemented							
30													
	60		11 7"		53	WELL GRADED SAND WITH SILT (SW-SM), very dense, dark yellowish-brown (10YR 3/6), wet, trace subangular fine gravel, uncemented							
25						SITY SAND (SM), medium dense, greenish-gray (GLEY 5BG 5/1), wet, fine sand							
	65		12 17"		(26)								
20						SANDY SILT (ML), very stiff, dark gray (GLEY 5Y 4/1) to greenish-gray (GLEY 5BG 5/1), wet, low plasticity, fine sand (pp=2.4/2.2/2.3/2.7/2.9 tsf)							
	70		13 18"		(9)	--grades stiff, no sand (pp=1.0/1.3/1.5 tsf)		23 23	56 100				MA Hydrometer
15													
	75		14 15"		(27)	LEAN CLAY WITH SAND (CL), very stiff, gray (2.5Y N5/0), moist, low to medium plasticity, fine sand --(pp=2.5/2.3 tsf) --(pp=2.3/2.7/2.5 tsf)		20	72	31	13		MA
10						--Resumed drilling on 1/22/2019 at 76.5 feet.							
	80		15 7"		62	WELL GRADED SAND WITH GRAVEL (SW), very dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand and gravel, uncemented							
5													
	85		16 7"		53	SILTY SAND WITH GRAVEL (SM), very dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand, uncemented		7	15				MA
0													
	90		17 5"		58	--losing drilling fluid							
-5						POORLY GRADED SAND WITH SILT (SP-SM), very dense, olive-brown (2.5Y 4/3), wet, fine sand, uncemented							
	95		18 6"		56								
-10						SANDY LEAN TO FAT CLAY (CL/CH), stiff, light brownish-gray (10YR 6/2), wet, medium to high							

Continued

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 21, 2019
COMPLETION DATE: January 23, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-9b

LOCATION: 64 N. Market Street
N 1,947,881 E 6,156,898

SURFACE EL: 87.2 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		19	18"	(12)	plasticity, fine sand --(pp=1.5/1.8/1.7/1.7/1.9 tsf)				45	29		
-15												
	105	20	10"	(46)	SANDY SILT (ML), very stiff, olive-gray (5Y 5/2), wet, low plasticity, fine sand --(pp=2.2/2.4/2.2 tsf)							
-20					SILTY CLAY WITH SAND (CL-ML), stiff, olive-gray (5Y 5/2), wet, low plasticity, fine sand, trace organics							
	110	21	18"	(9)	--(pp=1.75/1.5 tsf) --(pp=1.3/1.5/1.5 tsf)							
-25					SANDY LEAN CLAY (CL), very stiff, greenish-gray (GLEY 5GY 5/1), moist, medium plasticity, fine sand							
	115	22	17"	(44)	--(pp=2.75/2.75 tsf) --few fine sand (pp=3.8/3.5 tsf)				38	19		
-30					WELL GRADED SAND WITH SILT (SW-SM), very dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand, trace subangular fine and coarse gravel							
	120	23	3"	50/3.5"								
-35												
	125	24	3"	50/6"								
-40					SANDY ORGANIC CLAY (OL), very stiff, greenish-gray (GLEY 5GY 5/1), wet, low plasticity, fine sand							
	130	25	17"	(37)	--Resumed drilling on 1/23/2019 at 130 feet. --(pp=3.5/3.75 tsf) --(pp=2.1 tsf)							
-45					POORLY GRADED SAND (SP), gray (2.5Y N5/0), moist, fine sand, uncemented							
	135	26	13"	(57)	SANDY ORGANIC CLAY (OL), stiff, greenish-gray (GLEY 5GY 5/1), wet, low plasticity, fine sand --(pp=1.7/1.7 tsf)							
-50					POORLY GRADED SAND (SP), very dense, dark gray (2.5Y N4/0), wet, fine sand, uncemented							
	140	27	18"	(29)	SANDY SILT (ML), very stiff, greenish-gray (GLEY 5GY 5/1), moist, low plasticity, trace carbonate nodules							
-55												
	145	28	18"	(45)	--(pp=2.4/2.6/3.0 tsf) --(pp=2.8/2.7/2.9 tsf) --grades dark greenish-gray (GLEY 5G 4/1) --(pp=3.7/3.1/3.5 tsf)				27	4		
-60												

Continued

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 21, 2019
COMPLETION DATE: January 23, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-9c

LOCATION: 64 N. Market Street
N 1,947,881 E 6,156,898

SURFACE EL: 87.2 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						--(pp=3.9/3.1/3.1 tsf) --Boring terminated at a depth of 146.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling. --Boring backfilled with cement grout.							
-65													
	155												
-70													
	160												
-75													
	165												
-80													
	170												
-85													
	175												
-90													
	180												
-95													
	185												
-100													
	190												
-105													
	195												
-110													

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 21, 2019
COMPLETION DATE: January 23, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-9d

Sheet 1 of 4

LOCATION: W. Santa Clara Street and SR. 87
N 1,946,772 E 6,155,413

SURFACE EL: 81.4 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
80						2.5" ASPHALT CONCRETE and 7" CONCRETE over 2.2 feet AGGREGATE BASE (PAVEMENT SECTION)							
75	5		1 18"		(20)	LEAN CLAY (CL), very stiff, brown (10YR 5/3), moist, low plasticity, trace fine sand (NATIVE SOIL) --(pp=3.5/3.75/3.5/4.5 tsf)							
70	10		2 18"		(16)	--grades sandy, yellowish-brown (10YR 5/6) to olive brown (2.5Y 4/3) (pp=2.0/2.0/2.0/3.25/3.0 tsf) --Switched to rotary wash drilling at 11.5 feet.							
65	15		3 18"		(3)	SILTY CLAY (CL-ML), medium stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4), moist, low plasticity, a little fine sand (pp=0.5/0.5/0.5/0.8/0.8 tsf)							
60	20		4 18"		(15)	SANDY SILT (ML), very stiff, olive-gray (5Y 4/2), wet, low plasticity, fine sand (pp=3.25/2.25/2.6 tsf)							
55	25		5 18"		(5)	LEAN CLAY WITH SAND (CL), medium stiff, very dark gray (2.5Y N3/0), wet, low plasticity, fine sand (pp=0.75/0.75/0.75 tsf) (tv=0.6 tsf)							
50	30		6 18"		(12)	FAT CLAY WITH SAND (CH), stiff, black (2.5Y N2/0), moist, high plasticity, fine sand (pp=1.25/1.0/1.0/0.9/1.0/1.3 tsf)							
45	35		7 18"		(15)	CLAYEY SAND (SC), medium dense, gray (5Y 5/1) and olive (5Y 5/3), moist, fine sand, uncemented							
40	40		8 14"		(23)	SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4), moist, low plasticity, fine sand (pp=2.0/2.25/2.0 tsf)							
35	45		9 14"		(9)	LEAN CLAY WITH SAND (CL), stiff, gray (2.5Y N5/0), wet, low plasticity, fine sand, trace carbonate nodules (pp=1.0/1.0/1.25/1.8/1.6/1.0 tsf)							
						SANDY LEAN CLAY (CL), stiff, gray (2.5Y N5/0),							

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 1, 2018
COMPLETION DATE: November 7, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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BART to Silicon Valley
San Jose, California

FIGURE A-10a

Project No. 2017-144-T02

Sheet 2 of 4

LOCATION: W. Santa Clara Street and SR. 87
N 1,946,772 E 6,155,413

SURFACE EL: 81.4 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30		10 18"	(9)	wet, low plasticity, fine sand (pp=1.25/1.25/1.25 tsf)							
25	55	11 16"	(30)								
				--very stiff (pp=2.5/2.5/2.5/2.4/3.1 tsf) SILTY SAND (SM), medium dense, gray (2.5Y N5/0), moist, fine sand, trace clay, uncemented							
20	60	12 16"	(23)	LEAN CLAY (CL), very stiff, gray (2.5Y N5/0), moist, low to medium plasticity, fine sand --(pp=2.5/3.5/2.2 tsf) --(pp=2.25/2.0/1.75/2.25/2.4 tsf) --Resumed drilling at 61.5 feet.	108 103	20 23	86 90	31 38	13 18		MA, Hydrometer Test MA, Hydrometer Test
15	65	13 7"	60	SILTY SAND WITH GRAVEL (SM), very dense, olive-brown (2.5Y 4/3) to light olive-brown (2.5Y 5/4), moist, fine to coarse sand, fine subangular to subrounded gravel, uncemented							
10	70	14 6"	67	--very dense							
5	75	15 7"	80			7					
0	80	16 6"	46	--dense			13				MA, Gs Gs = 2.745
-5	85	17 3"	83/11"	--Resumed drilling at 87 feet. --very dense, brown (10YR 5/3)							
-10	90	18 2"	50/6"	POORLY GRADED GRAVEL (GP), very dense, dark gray (10YR 4/1) and brown (10YR 5/3), wet, few fine to coarse sand, fine to coarse subangular gravel (chert, sandstone and basalt fragments)			4				MA
-15	95	19 4"	63	--Resumed drilling on 11/6/2018 at 95 feet (Hole Sloughing)							

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 1, 2018
COMPLETION DATE: November 7, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

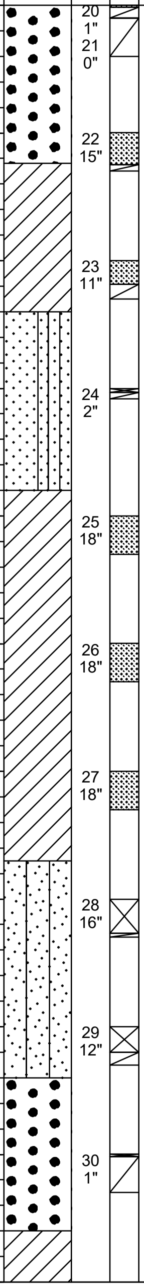
DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-122
BART to Silicon Valley
San Jose, California

FIGURE A-10b

LOCATION: W. Santa Clara Street and SR. 87
N 1,946,772 E 6,155,413

SURFACE EL: 81.4 ft (datum)



ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		20 1"	(50/6")	--grades gray (10YR 5/1)							
-20		21 0"	(52)								
	105	22 15"	(50)								
-25				LEAN CLAY WITH SAND (CL), very stiff, bluish-gray (GLEY 5B 5/1), moist, low to medium plasticity, fine and trace coarse sand, trace carbonate (pp=2.25/2.25/2.25 tsf)							
	110	23 11"	(53)		106	9 21	84	30 31	12 22		MA, Hydrometer Test
-30				--(pp=2.25/2.25/2.25 tsf)							
				POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, olive-brown (2.5Y 4/3), moist, fine sand and angular fine gravel, uncemented							
	115	24 2"	50/5"								
-35											
				SANDY LEAN CLAY (CL), hard, olive-yellow (2.5Y 6/6), moist, medium plasticity, fine sand, pockets of silty sand							
	120	25 18"	(60)								
-40				--pale yellow (2.5Y 7/4) (pp=4.25/4.5/4.25/4.5 tsf)							
	125	26 18"	(48)	--grades with less sand, very stiff (pp=3.25/3.25/3.25/3.5/3.3 tsf)				42	25		
-45											
	130	27 18"	(35)	--very dark grayish-brown (2.5Y 3/2)							
-50											
				SILTY SAND (SM), very dense, olive-brown (2.5Y 4/3), wet, fine sand, weakly cemented							
	135	28 16"	62								
-55											
				--grades with gravel							
	140	29 12"	56	--grades with coarse sand							
-60				POORLY GRADED GRAVEL WITH SAND (GP), very dense, gray (2.5Y N5/0) and olive-brown (2.5Y 4/3), wet, fine to coarse sand, fine and trace coarse subangular gravel							
	145	30 1"	55								
-65											
				SANDY LEAN CLAY (CL), very stiff, bluish-gray (GLEY 5B 5/1), moist, low to medium plasticity,							

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 1, 2018
COMPLETION DATE: November 7, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-122
BART to Silicon Valley
San Jose, California

FIGURE A-10c

Project No. 2017-144-T02

Sheet 4 of 4

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	LOCATION: W. Santa Clara Street and SR. 87 N 1,946,772 E 6,155,413 SURFACE EL: 81.4 ft (datum) MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-70			31 16"		(55)	fine sand, some carbonate nodules --hard (pp=3.5/3.5/3.5/4.2/4.2 tsf)							
-75	155		32 6"		(62)	SILT (ML), very stiff, dark greenish-gray (GLEY 5G 4/1), moist, low plasticity, fine sand --(pp=3.25/3.5/3.5 tsf)							
						--Boring terminated at a depth of 156.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 10 feet. --Boring backfilled with cement grout.							
-80	160												
-85	165												
-90	170												
-95	175												
-100	180												
-105	185												
-110	190												
-115	195												

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 1, 2018
COMPLETION DATE: November 7, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-122
BART to Silicon Valley
San Jose, California

FIGURE A-10d

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,619 E 6,155,216

SURFACE EL: 85.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						16" ASPHALT CONCRETE							
						SILTY GRAVEL (GM), brown (10YR 5/3), dry, rounded gravel (FILL)							
						SILTY SAND (SM), brown (10YR 5/3), moist (FILL)							
80	5		1 18"	▨	(15)	LEAN CLAY WITH SAND (CL), very stiff, dark brown (10YR 3/3) to reddish-brown (5YR 4/4), moist, medium plascticity, fine sand (NATIVE SOIL) --(pp= 2.6/2.9/3.0/3.0/2.75/3.25 tsf)							
75	10		2 12"	▨	(10)	--grades silty, yellowish-brown (10YR 5/6) --Switched to rotary wash drilling at 6.5 feet. --(pp= 3.25/3.0/3.5 tsf)							
70	15		3 10"	▨	(11)	--stiff, olive-brown (2.5Y 4/3) with dark brown (10YR 3/3) mottling, trace carbonate --(pp=1.5/1.25/1.25 tsf)							
						SILTY SAND (SM), very loose, dark gray (2.5Y N4/0), wet, fine sand, uncemented --partial fluid loss at 17 feet							
65	20		4 14"	▨	(1)								
60	25		5 18"	▨	(4)								
						SANDY SILT (ML), soft, dark greenish-gray (GLEY 5G 4/1), wet, fine sand							
						SANDY FAT CLAY (CH), stiff, very dark gray (2.5Y N3/0), wet, high plasticity, fine sand							
55	30		6 18"	▨	(10)	--(pp= 0.75/1.0/0.75 TSF) (tv=0.8 tsf)							
50	35		7 18"	▨	(13)	--grades stiff, gray (2.5Y N5/0) with olive-brown (2.5Y 4/3) mottling -- (pp= 1.0/1.0/1.3 tsf)							
						POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, olive-brown (2.5Y 4/3), moist, fine and coarse sand, fine gravel, uncemented							
45	40		8 11"	☒	57	--Resumed drilling on 10/26/2018 at 41.5 feet. --partial fluid loss at 43 feet							
40	45		9 7"	☒	36	--grades with more gravel, dense, wet							
						POORLY GRADED GRAVEL (GP), more fluid loss at 48 feet							

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: October 25, 2018
COMPLETION DATE: October 31, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-123
BART to Silicon Valley
San Jose, California

FIGURE A-11a

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,619 E 6,155,216

SURFACE EL: 85.1 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		10 18"	(18)	SILTY SAND (SM), medium dense, dark gray (2.5Y N4/0), wet, fine sand, trace fine gravel, uncemented							
30	55	11 18"	(11)	SANDY LEAN CLAY (CL), stiff, dark greenish-gray (GLEY 5G 4/1), wet, low plasticity, fine sand (pp=1.25/1.25/1.2 tsf)			93 93				MA, Hydrometer Test MA, Hydrometer Test
				SILTY CLAY (CL-ML), stiff, dark greenish-gray (GLEY 5G 4/1), wet, low plasticity, trace fine sand (pp=1.25/0.75/1.0 tsf) (tv=0.67 tsf)							
25	60	12 18"	(31)	--grades dark gray (GLEY 5Y 4/1), moist (pp=1.5/1.25/1.25 tsf)							
				SILT WITH SAND (ML), very stiff, gray (5Y 5/1) with olive (5Y 5/3) mottling, moist, low plasticity, fine sand							
20	65	13 9"	70	--(pp=2.5/2.5/2.5/3.25 tsf) --(pp=2.5/2.5/2.5/2.9 tsf)							
				POORLY GRADED SAND WITH GRAVEL (SP), very dense, olive-brown (2.5Y 4/3), moist, weakly cemented							
15	70	14 0"	14	--Resumed drilling on 10/29/2018 at 66.5 feet. --no recovery on SPT drive from 70 to 71.5 feet							
		15 7"	(23)	SANDY LEAN CLAY WITH GRAVEL (CL), medium stiff, gray (5YR 5/1) with reddish-brown (5YR 4/4) mottling, wet, low to medium plasticity --(pp=0.75/0.75/0.5/1.0 tsf)	119	17		35	19		Gs
10	75										
5	80	16 11"	(26)	--gray (2.5Y N5/0)							
0	85	17 11"	(21)			23					CR
				SANDY LEAN CLAY (CL), stiff, light yellowish-brown (2.5Y 6/3), moist, low plasticity, fine sand (pp=1.5/1.5/1.5 tsf)							
				POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, yellowish-brown (10YR 5/6) and gray (10YR 5/1), moist, fine to coarse sand, fine gravel, weakly cemented							
-5	90	18 7"	75								
-10	95	19 9"	23	SANDY SILT WITH GRAVEL (ML), stiff, dark gray (10YR 4/1) and brown (10YR 5/3), moist, low plasticity, fine sand and gravel							

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: October 25, 2018
COMPLETION DATE: October 31, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-123
BART to Silicon Valley
San Jose, California

FIGURE A-11b

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,619 E 6,155,216

SURFACE EL: 85.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			20 18"		26	LEAN CLAY WITH SAND (CL), very stiff, gray (10YR 5/1) and brown (10YR 5/3), moist (pp=2.5 tsf)			58				MA
-20	105		21 0" 21 6"		(50/4.5") 50/6"	SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0) with diffuse olive-brown (2.5Y 4/3) mottling, moist, low plasticity, fine and trace coarse subrounded sand							
-25	110		22 18"		(29)	SILTY SAND WITH GRAVEL (SM), very dense, brown (10YR 5/3), moist, fine to medium sand, fine gravel, uncemented --Resumed drilling on 10/30/2018 at 106.5 feet.							
-30	115		23 8"		(50/5")	LEAN CLAY WITH SAND (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, low plasticity, fine sand --(pp=2.9/3.2 tsf) --(pp=2.25/2.25/2.5 tsf)							
						SILTY SAND (SM), very dense, olive-yellow (2.5Y 6/6), moist							
-35	120		24 7"		92/11.5"	POORLY GRADED GRAVEL WITH SAND AND SILT (GP-GM), very dense, olive-gray (5Y 4/2), wet, fine gravel							
-40	125		25 3.5"		19	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, grayish-brown (2.5Y 5/2), moist, fine and trace coarse sand, fine gravel, uncemented --grades with lenses of sandy clay, medium medium dense, grayish-brown (2.5Y 5/2), wet							
-45	130		26 18"		(62)	SILTY SAND (SM), dense, yellowish-brown (10YR 5/6), wet, fine sand, trace clay							
						POORLY GRADED SAND (SP), dense, moist, fine to coarse sand, trace fine gravel, lenses of silt and silty sand							
-50	135		27 18"		(30)	SANDY LEAN CLAY (CL), very stiff, grayish-brown (10YR 5/2), moist, low plasticity, fine sand --(pp=2.25/2.25/2.0/2.3/2.25 tsf)							
-55	140		28 18"		(43)	SILTY SAND (SM), medium dense, olive (5Y 5/3), wet, fine sand, uncemented							
-60	145		29 18"		(56)	SILT (ML), very stiff, gray (10YR 5/1) with yellowish-brown (10YR 5/6) mottling, moist, low plasticity --(pp=3.25/3.25/3.25/3.3 tsf) --Resumed drilling on 10/31/2018 at 146 feet.							
						SANDY LEAN CLAY (CL), very stiff, greenish-gray							

Continued

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: October 25, 2018
COMPLETION DATE: October 31, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-123

BART to Silicon Valley
San Jose, California

FIGURE A-11c

Project No. 2017-144-T02

Sheet 4 of 4

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,619 E 6,155,216

SURFACE EL: 85.1 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		▨	30 18"	▒	(57)	(GLEY 5BG 5/1), moist, medium plasticity, fine sand --(pp=3.25/3.0/3.0/3.5/4.0 tsf)							
-70	155	▨	31 18"	▒	(74)	--(pp=4.0/3.75/3.5 tsf)							
						--Boring terminated at a depth of 156.5 feet. --Groundwater not encountered prior to switching to rotary wash at a depth of 6.5 feet. --Boring backfilled with cement grout.							
-75	160												
-80	165												
-85	170												
-90	175												
-95	180												
-100	185												
-105	190												
-110	195												

BORING DEPTH: 156.5 ft
DEPTH TO WATER: Not Measured

START DATE: October 25, 2018
COMPLETION DATE: October 31, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-123
BART to Silicon Valley
San Jose, California

FIGURE A-11d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,482 E 6,154,979

SURFACE EL: 86.3 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
85						16" ASPHALT CONCRETE							
						POORLY GRADED GRAVEL (GP), grayish-brown (2.5Y 5/2) (AGGREGATE BASE - FILL)							
						SILTY SAND (SM), brown (10YR 5/3), fine sand (FILL)							
80	5		1 18"	▨	(20)	FAT CLAY (CH), very stiff, dark gray (2.5Y N4/0), moist, high plasticity (NATIVE SOIL) (pp=2.25/2.5/2.5 tsf)							
75	10		2 14"	▨	(27)	--grades sandy, very dark gray (2.5Y N3/0), trace carbonate (pp=3.5/3.5/3.75 tsf)							
70	15		3 11"	▨	(18)	SANDY LEAN CLAY (CL), stiff, greenish-gray (GLEY 5BG 5/1), wet, medium plasticity, fine sand, strong hydrocarbon odor							
65	20		4 14"	▨	(12)	--grades with more sand, trace silt and coarse sand, strong hydrocarbon odor (pp=1.6/2.0/2.3 tsf)							
60	25		5 18"	▨	(3)	--grades medium stiff, dark gray (2.5Y N4/0), moist --(pp=0.75/1.0/0.75/1.0/0.9/0.75 tsf)							
55	30		6 14"	▨	(13)	--grades without sand, very stiff, gray (5Y 5/1) and olive (5Y 5/3), medium plasticity (pp=2.0/2.0/1.75/3.7/3.0/4.0 tsf)				38	20		
50	35		7 15"	▨	(13)	--grades sandy, stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4), wet, low plasticity, fine sand --mottled gray (10YR 5/1) and brown (10YR 5/3) (pp=0.5/0.75/0.5/1.0/1.25/1.25 tsf)							
45	40		8 15"	▨	(13)	--grades olive (5Y 5/3) (pp=1.0/1.0/1.25 tsf) --(pp=1.5/1.5/1.75 tsf)							
						POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense, olive (5Y 5/3), wet, fine to coarse sand, fine subangular gravel							
40	45		9 11"	☒	48								
						SILT (ML), stiff, olive (5Y 5/3), wet, low plasticity, trace fine sand, homogeneous							

Continued

BORING DEPTH: 156.6 ft
DEPTH TO WATER: Not Measured

START DATE: November 8, 2018
COMPLETION DATE: November 13, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-124
BART to Silicon Valley
San Jose, California

FIGURE A-12a

Project No. 2017-144-T02

Sheet 2 of 4

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,482 E 6,154,979

SURFACE EL: 86.3 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		10 15"	(11)	--(pp=1.7/1.25/1.7 tsf)							
35				CLAYEY SAND (SC), medium dense, olive (5Y 5/3), wet, fine sand							
30	55	11 6"	(7)	SANDY LEAN CLAY WITH GRAVEL (CL), medium stiff, gray (5Y 5/1), wet, fine sand, fine and coarse gravel							
25	60	12 17"	(30)	SANDY LEAN CLAY (CL), very stiff, olive-gray (5Y 4/2) with faint olive-brown (2.5Y 4/3) mottling, wet, low plasticity, fine sand, homogeneous (pp=2.25/2.25/2.25 tsf) --(pp=2.5/2.25/2.25/2.25 tsf)	113	20	69	27	9		MA
20	65	13 16"	(25)	LEAN CLAY (CL), stiff, olive (5Y 5/3) to olive-gray (5Y 4/2), moist, medium plasticity (pp=2.0/2.0/2.0 tsf) --(pp=1.75/1.75/1.5/1.75/2.25 tsf)		27		39	16		
15	70	14 18"	(24)	--grades gray (5Y 5/1) to olive-gray (5Y 4/2), fine sand (pp=1.5/1.5/1.25/1.5/1.7 tsf) --(pp=1.5/1.5/1.75/2.5/1.7 tsf)							
10	75	15 7"	59	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, grayish-brown (2.5Y 5/2), wet, fine to coarse sand, fine angular gravel							
5	80	16 18"	(29)	SANDY LEAN CLAY (CL), very stiff, very dark gray (10YR 3/1) to yellowish-brown (10YR 5/6), moist, low plasticity, fine sand --Resumed drilling on 11/9/2018 at 80 feet.							
0	85	17 9"	86	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, grayish-brown (10YR 5/2), wet, fine to coarse sand, fine subangular to angular gravel							
				LEAN CLAY (CL)							
-5	90	18 8"	50/6"	SILTY SAND WITH GRAVEL (SM), very dense, olive-brown (2.5Y 4/3) and reddish-brown (5YR 4/4), wet, fine to coarse sand, subrounded to subangular fine gravel							
-10	95	19 6"	52	--grades grayish-brown (10YR 5/2), less gravel		7	14				MA

Continued

BORING DEPTH: 156.6 ft
DEPTH TO WATER: Not Measured

START DATE: November 8, 2018
COMPLETION DATE: November 13, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

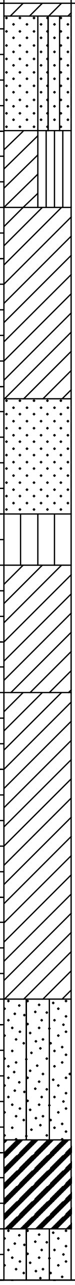
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-124
BART to Silicon Valley
San Jose, California

FIGURE A-12b

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,482 E 6,154,979

SURFACE EL: 86.3 ft (datum)



ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-15		20 18"	(72)	SANDY LEAN CLAY (CL), very stiff, olive-brown (2.5Y 4/3) and gray (2.5Y N5/0), wet, low plasticity, fine sand (pp=2.25/2.5/2.0 tsf)							Abr. (Comp.)
				POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, grayish-brown (2.5Y 5/2) to olive-brown (2.5Y 4/3), wet, low plasticity, fine sand, fine angular gravel							
-20	105	21 3"	32								
				SANDY SILTY CLAY (CL-ML), very stiff, dark gray (2.5Y N4/0), moist, low plasticity, fine sand							
-25	110	22 18"	(29)	SANDY LEAN CLAY (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, medium plasticity, fine sand --(pp=2.0/2.0/2.0/2.5/2.0 tsf) --(pp=2.5/2.25/2.25/2.5/3.0 tsf)							
-30	115	23 8"	(50/4")	--grades with fine to coarse gravel, light olive-brown (2.5Y 5/4)							
				POORLY GRADED SAND WITH GRAVEL (SP), very dense, brownish-gray (2.5Y 6/2), wet, fine to medium sand, fine subrounded to subangular gravel							
-35	120	24 12"	42	--partial loss of fluid at 118 feet							
				SANDY SILT WITH GRAVEL (ML), very stiff, gray (10YR 5/1) and yellowish-brown (10YR 5/6), moist, low plasticity, fine sand, fine to coarse gravel							
-40	125	25 18"	(77)								
				SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0), moist, low plasticity, fine sand --(pp=2.0/2.0/2.0/2.5/2.5 tsf)							
-45	130	26 16"	(45)	LEAN CLAY (CL), very stiff, light yellowish-brown (2.5Y 6/3), moist, low to medium plasticity --(pp=2.0/2.0/2.25/2.7/2.75 tsf) --grades yellowish-brown (10YR 5/6)							
-50	135	27 18"	(45)	--(pp=3.25/3.25/3.5/3.0/3.4 tsf) --Resumed drilling on 11/13/2018 at 135 feet.				35	15		
-55	140	28 16"	(90/10")	SILTY SAND (SM), very dense, yellowish-brown (10YR 5/6), moist, fine sand --grades gravelly at 142 feet							
-60	145	29 18"	(61)	FAT CLAY (CH), very stiff, yellowish-brown (10YR 5/6) and gray (10YR 5/1), moist, high plasticity --(pp=3.25/3.5/4.25/3.75/3.75 tsf)							
				SILTY SAND (SM), very dense, dark gray (10YR 4/1), wet, fine sand							

Continued

BORING DEPTH: 156.6 ft
DEPTH TO WATER: Not Measured

START DATE: November 8, 2018
COMPLETION DATE: November 13, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-124
BART to Silicon Valley
San Jose, California

FIGURE A-12c

LOCATION: W. Santa Clara Street and Delmas Avenue
N 1,946,482 E 6,154,979

SURFACE EL: 86.3 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-65			30 10"	☒	50								
	155					LEAN CLAY (CL), very stiff, yellowish-brown (10YR 5/6), moist, low plasticity, pockets of silty sand and clayey gravel							
-70			31 16"	▩	(76/10")	--SILTY SAND 154.7 to 155.5 feet --(pp=2.5/2.5/2.5/3.75/4.0 tsf) --CLAYEY GRAVEL WITH SAND 156.5 to 156.6 feet							
	160					--Boring terminated at a depth of 156.6 feet. --Groundwater not encountered prior to switching to rotary wash. --Boring backfilled with cement grout.							
-75													
	165												
-80													
	170												
-85													
	175												
-90													
	180												
-95													
	185												
-100													
	190												
-105													
	195												
-110													

BORING DEPTH: 156.6 ft
DEPTH TO WATER: Not Measured

START DATE: November 8, 2018
COMPLETION DATE: November 13, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-124
BART to Silicon Valley
San Jose, California

FIGURE A-12d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: W. Santa Clara Street at Autumn Street
N 1,946,414 E 6,154,680

SURFACE EL: 87.6 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
				15.5" ASPHALT CONCRETE							
85				POORLY GRADED GRAVEL (GP), grayish-brown (2.5Y 5/2) (AGGREGATE BASE)							
	5	1 18"	(28)	SILTY SAND (SM), medium dense, brown (10YR 5/3), moist, fine sand, weakly cemented, homogeneous (NATIVE SOIL)							
80				SANDY FAT CLAY (CH), very stiff, dark gray (2.5Y N4/0), moist, high plasticity, fine sand							
	10	2 18"	(27)	--(pp=3.25/3.25/3.75 tsf)							
75				SILTY SAND (SM), medium dense, olive (5Y 5/3), moist, fine sand, uncemented							
	15	3 13"	(19)	--Switched to rotary wash drilling at 12 feet.							
70				CLAYEY SAND (SC), medium dense, dark gray (2.5Y N4/0), moist, fine sand --grades with gravel at 18 feet							
	20	4 14"	12	--becomes gray (2.5Y N5/0), wet at 20 feet							
65				SANDY LEAN CLAY (CL), medium stiff, gray (2.5Y N5/0), moist							
	25	5 13"	(11)	--stiff (pp=1.0/1.0/1.0/1.0/1.0 tsf)							
60											
	30	6 14"	(15)	FAT CLAY (CH), stiff, dark gray (2.5Y N4/0), moist, high plasticity (pp=1.25/1.5/1.25/1.8/1.7 tsf) --grades brown (10YR 5/3) lean clay							
55				SANDY LEAN CLAY (CL), medium stiff to stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, fine sand							
	35	7 18"	(7)	--(pp=0.75/0.75/0.75/1.0/1.25/1.0 tsf)							
50											
	40	8 16"	(19)	LEAN CLAY (CL), very stiff, olive-brown (2.5Y 4/3), moist, medium plasticity (pp=2.0/2.0/2.25 tsf) --subangular fine to coarse gravel at 42 feet							
45				POORLY GRADED SAND (SP), dense, wet, olive (5Y 5/3), fine to medium sand, trace fine gravel, weakly to moderately cemented							
	45	9 2.5"	44								
40											

Continued

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 14, 2018
COMPLETION DATE: November 16, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-125
BART to Silicon Valley
San Jose, California

FIGURE A-13a

Project No. 2017-144-T02

Sheet 2 of 4

LOCATION: W. Santa Clara Street at Autumn Street
N 1,946,414 E 6,154,680

SURFACE EL: 87.6 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			10 18"		(17)	SANDY, SILTY LEAN CLAY (CL-ML), stiff, gray (2.5Y N5/0), moist, low plasticity, fine sand							
35						(pp=1.25/1.25/1.0/1.0/1.0 tsf)							
						--(pp=1.0/1.25/0.75/1.2/1.3 tsf)							
						--poorly graded sand layer 53 to 55 feet							
	55		11 18"		8	LEAN CLAY WITH SAND (CL), medium stiff to stiff, gray (2.5Y N5/0), wet, low plasticity, fine sand							
30													
						SILT (ML), very stiff, gray (2.5Y N5/0), wet, low plasticity, few fine sand (pp=3.0/4.0/4.2 tsf)							
	60		12 18"		(22)	--(pp=2.25/2.25/1.75 tsf)		22 27	90				MA, Hydrometer
25						SANDY LEAN CLAY (CL), very stiff to hard, gray (2.5Y N5/0), moist, low to medium plasticity, fine sand, trace fine angular carbonate-cemented sand nodules to 1/4" (pp=2.0/1.8 tsf)							
	65		13 18"		(35)					35	16		
						--(pp=2.5/2.25/2.25/4.0/4.2 tsf)							
20													
	70		14 18"		(31)	--grades stiff, brownish-gray (2.5Y 6/2), less sand (pp=1.0/1.0/1.0/1.5/1.5 tsf)							
15						--(pp=1.25/1.5/1.25 tsf)							
	75		15 18"		(17)	CLAYEY SAND WITH GRAVEL (SC), olive-gray (5Y 4/2), wet, fine sand and gravel							
10						LEAN CLAY WITH SAND (CL), stiff, olive-gray (5Y 4/2), wet, low to medium plasticity, fine sand, trace coarse sand (pp=1.0/1.2 tsf)							
						--grades with gravel at 78 feet							
	80		16 18"		(29)	--grades very stiff, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0)	107 106	22 14	74 71	31 33	12 12		MA MA
5						--(pp=2.25/2.0/2.25/2.25/2.2 tsf)							
	85		17 18"		(29)	--grades sandy, without gravel, gray (2.5Y N5/0), moist (pp=2.25/2.25/2.5 tsf)							
0						--(pp=4.2/4.0 tsf)							
						--grades light gray (2.5Y N7/0), carbonaceous (Marl Deposit)							
	90		18 18"		(29)	--(pp=2.2/2.25 tsf)				37	19		
-5						--(pp=2.0/2.25/2.5/1.7/3.2/2.75 tsf)							
						--grades brown (10YR 5/3) at 93 feet							
						--Resumed drilling on 11/15/2018 at 90 feet.							
	95		19 16"		(92/10")	SILTY SAND (SM), very dense, pale olive (5Y 6/3) with olive-yellow (5Y 6/6) mottling, moist, fine sand, weakly cemented							
-10						--grades with gravel, grayish brown (2.5Y 5/2), wet							

Continued

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 14, 2018
COMPLETION DATE: November 16, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-125
BART to Silicon Valley
San Jose, California

FIGURE A-13b

Project No. 2017-144-T02

Sheet 3 of 4

LOCATION: W. Santa Clara Street at Autumn Street
N 1,946,414 E 6,154,680

SURFACE EL: 87.6 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		20 18"	(25)	LEAN CLAY WITH SAND (CL), very stiff, dark gray (2.5Y N4/0), moist, low to medium plasticity, fine sand --(pp=2.0/2.0/2.1 tsf) --(pp=2.0/2.0/2.0/2.5/2.5/3.0 tsf)		23					CR
-15											
	105	21 8"	50/6"	SILTY SAND WITH GRAVEL (SM), very dense, grayish-brown (2.5Y 5/2), wet, fine sand, subangular fine gravel, uncemented		10	12				MA
-20											
	110	22 2"	58								
-25				SILTY, CLAYEY SAND (SC-SM), medium dense, olive-gray (5Y 4/2), moist, fine sand, weakly to moderately cemented							
	115	23 18"	(42)								
-30											
	120	24 10"	58	--grades with gravel at 119.5 feet SILTY SAND (SM), very dense, olive-gray (5Y 4/2), wet, fine sand, uncemented							
-35											
	125	25 18"	(35)	--medium dense, gray (2.5Y N5/0), moist, trace clay							
-40				SANDY LEAN CLAY (CL), very stiff, gray (2.5Y N5/0), moist, low to medium plasticity, fine sand							
	130	26 18"	(32)	--(pp=2.0/2.0/2.25/2.1/2.2 tsf)				33	14		
-45											
	135	27 18"	(41)	--grades olive (5Y 5/3) (pp=2.0/2.0/2.5/2.0/3.2/3.3 tsf)							
-50											
	140	28 16"	(47)	--Resumed drilling on 11/16/2018 at 140 feet. --grades greenish-gray (GLEY 5BG 5/1), medium to high plasticity, no sand (pp=3.5/3.25/2.75/3.3/3.3 tsf)							
-55				SANDY SILT (ML), very stiff, yellowish-brown (10YR 5/6), moist, low plasticity, fine sand							
	145	29 18"	(67)	--(pp=3.5/3.5/3.75/3.5 tsf)							
-60				SILTY SAND (SM), dense, yellowish-brown (10YR 5/6), wet, fine sand, weakly cemented							

Continued

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 14, 2018
COMPLETION DATE: November 16, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-125

BART to Silicon Valley
San Jose, California

FIGURE A-13c

LOCATION: W. Santa Clara Street at Autumn Street
N 1,946,414 E 6,154,680

SURFACE EL: 87.6 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		⁘	30 18"	▨	(74)								
-65		⁘											
	155	⁘	31 6"	☒	50/6"	--grades with fine subangular gravel, dark yellowish-brown (10YR 3/6) --Boring terminated at a depth of 155.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 12 feet. --Boring backfilled with cement grout.							
-70													
	160												
-75													
	165												
-80													
	170												
-85													
	175												
-90													
	180												
-95													
	185												
-100													
	190												
-105													
	195												
-110													

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 14, 2018
COMPLETION DATE: November 16, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-125

BART to Silicon Valley
San Jose, California

FIGURE A-13d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: Stockton Avenue Median at Villa Street
N 1,949,226 E 6,151,112

SURFACE EL: 81.7 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						6" ASPHALT							
80						4" POORLY GRADED GRAVEL (GP), coarse gravel (AGGREGATE BASE)							
	5		1 15"		(18)	SILTY SAND (SM), some lean clay and wood to 18" (FILL)							
75						SANDY LEAN CLAY (CL), dark gray (7.5YR N4/0) and light brown (7.5YR 6/3) (FILL)							
70	10		2 11"		(15)	SANDY LEAN CLAY (CL), very stiff to hard, olive-brown (2.5Y 4/3), moist, low plasticity, fine sand, pockets of clayey sand (NATIVE SOIL) (pp=3.25/3.5/3.75 tsf) --(pp=3.75/4.25/4.25/>4.5 tsf)							
65	15		3 13"		(7)	LEAN CLAY WITH SAND (CL), very stiff, grayish-brown (2.5Y 5/2), moist, low plasticity, fine sand, pockets of silty sand (pp=2.5/2.8 tsf) --Switched to rotary wash drilling at 11.5 feet.							
60	20		4 11"		(11)	LEAN CLAY (CL), stiff, pale olive (5Y 6/3), moist, low to medium plasticity, trace fine sand (pp=0.75/1.3/1.75 tsf) --(pp=1.2/1.3/1.4 tsf)							
						FAT CLAY (CH), stiff, olive-gray (5Y 4/2), moist, high plasticity (pp=1.5/1.2/1.2 tsf)							
55	25		5 12"		(18)	LEAN CLAY (CL), very stiff, olive-gray (5Y 4/2), wet, low plasticity (pp=2.5 tsf)							
50	30		6 13"		(14)	FAT CLAY (CH), very stiff, light olive-brown (2.5Y 5/4), moist, high plasticity (pp=2.0/2.1/2.1 tsf) --grades light yellowish-brown (2.5Y 6/3), moist, medium plasticity, sporadic ironoxide mottling --grades gray (2.5Y N5/0), wet (pp=2.2/2.2/2.0 tsf)							
45	35		7 8"		52	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), very dense, very dark grayish-brown (2.5Y 3/2), wet, fine to coarse sand, subrounded to subangular fine gravel, uncemented							
40	40		8 6"		35	--grades light olive-gray (5Y 6/2)							
35	45		9 3"		82	WELL GRADED SAND WITH GRAVEL (SW), very dense, light olive-brown (2.5Y 5/4), wet, subrounded to subangular fine and coarse gravel, trace fines, uncemented							
						WELL GRADED SAND WITH CLAY AND GRAVEL							

Continued

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 28, 2018
COMPLETION DATE: November 30, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: El Bhangoo and Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-137
BART to Silicon Valley
San Jose, California

FIGURE A-14a

LOCATION: Stockton Avenue Median at Villa Street
N 1,949,226 E 6,151,112

SURFACE EL: 81.7 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30			10 8"		57	(SW-SC), very dense, light olive-brown (2.5Y 5/4), wet, subrounded to subangular fine and coarse gravel, uncemented							
25	55		11 6"		(44)	POORLY GRADED SAND WITH SILT (SP-SM), medium dense, dark olive-brown (2.5Y 3/3), fine sand, trace flat subangular gravel, uncemented							
20	60		12 18"		(15)	FAT CLAY (CH), stiff, dark olive-gray (5Y 3/2), moist, high plasticity, trace fine sand --(pp=2.0/2.5/1.5/1.5/1.6/2.0 tsf) --(pp=1.25/1.5/1.5/1.2/1.2/1.5 tsf)							
15	65		13 18"		(19)	LEAN CLAY (CL), stiff, dark olive-gray (5Y 3/2), wet, low plasticity, trace fine sand (pp=1.0/1.0/1.25/1.2/1.2 tsf) --grades very stiff, medium plasticity (pp=1.75/2.0/2.75 tsf)							
10	70		14 18"		(18)	--(pp=1.75/2.0/2.0/2.0/2.2 tsf) CLAYEY SAND (SC), medium dense, dark olive-gray (5Y 3/2), wet, trace angular flat gravel							
5	75		15 18"		(25)	LEAN CLAY WITH SAND (CL), very stiff, very dark gray (2.5Y N3/0), wet, low plasticity --(pp=2.0/2.5/2.0/3.0/2.0/2.2 tsf) --(pp=2.5/3.5/3.5/3.2/2.7 tsf) --olive (5Y 5/3), trace medium sand and subangular fine gravel from 78 feet to 83 feet				29	8		
0	80		16 16"		(17)		102	23	84	27	9		MA
						--grades with less sand, stiff							
-5	85		17 18"		(31)	--(pp=1.25/1.5/1.75/1.5/1.5 tsf) --(pp=1.5/1.75/1.5/2.0/2.2 tsf) --hard, dark yellowish-brown (10YR 3/6), trace medium sand, few subrounded fine gravel (pp>4.5 tsf)				34	11		
-10	90		18 6"		55	WELL GRADED SAND WITH CLAY AND GRAVEL (SW-SC), very dense, dark yellowish-brown (10YR 3/6), wet, subrounded fine gravel, trace fines, uncemented							~~Abr. (Comp.)~~
-15	95		19 18"		(65)	POORLY GRADED SAND (SP), very dense, olive-brown (2.5Y 4/3) with reddish-brown (5YR 4/4) mottling, wet, medium sand, trace silt --gravelly from 96.5 feet to 98 feet							

Continued

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 28, 2018
COMPLETION DATE: November 30, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: El Bhangoo and Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-137
BART to Silicon Valley
San Jose, California

FIGURE A-14b

Project No. 2017-144-T02

Sheet 3 of 4

LOCATION: Stockton Avenue Median at Villa Street
N 1,949,226 E 6,151,112

SURFACE EL: 81.7 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-20		20 17"	(67/11.5")	LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4) with reddish brown (5YR 4/4) mottling, moist, low plasticity, trace coarse gravel (pp=3.25/3.0/3.25 tsf) --(pp=2.75/3.25/3.25 tsf)							
-25	105	21 7"	68	POORLY GRADED SAND (SP), very dense, olive-brown (2.5Y 4/3), wet, fine sand, subangular fine gravel, trace fines, uncemented							
-30	110	22 18"	(21)	WELL GRADED SAND WITH GRAVEL (SW), very dense, very dark brown (10YR 2/2), wet, subrounded fine gravel, trace fines, uncemented		23	88	48	31		MA
-35	115	23 18"	(27)	LEAN TO FAT CLAY (CL-CH), very stiff, dark gray (2.5Y N4/0), moist, medium to high plasticity, few fine sand --(pp=1.75/2.0/2.25/1.9/2.1/2.6 tsf) --(pp=2.75/2.75/2.5 tsf)		22					CR
-40	120	24 7"	75	GRAVELLY FAT CLAY WITH SAND (CH), stiff, olive (5Y 5/3), moist, high plasticity, medium sand, few subangular iron-oxide-stained fine gravel --(pp=1.75/1.25/1.75/1.8/1.8 tsf) --(pp=1.5/1.75/1.75/1.8 tsf)							
-45	125	25 18"	(29)	WELL GRADED SAND WITH GRAVEL (SW), very dense, olive-brown (2.5Y 4/3), wet, subrounded fine gravel, trace fines, uncemented LEAN CLAY (CL), very stiff, very dark gray (2.5Y N3/0), moist, medium plasticity (pp=2.5/2.25/2.25 tsf)							
-50	130	26 18"	(38)	--(pp=2.25/2.0/2.5/2.7/2.1 tsf) --grades very stiff to hard, dark greenish-gray (GLEY 5G 4/1), trace fine sand (pp=4.5/4.25/4.25/3.2/3.7/3.7 tsf) --(pp=4.5/4.0/4.25/3.7/4.3/4.2 tsf)				38	23		
-55	135	27 17"	(41)	--grades very stiff, very dark gray (2.5Y N3/0) (pp=3.0/3.0/2.75/3.4/3.2 tsf)							
-60	140	28 16"	(56)	--grades very stiff to hard, dark greenish-gray (GLEY 5G 4/1) (pp=3.5/3.75/4.0/2.8/3.7 tsf) --(pp=3.75/4.0/4.0/4.2/3.7/4.2 tsf)							
-65	145	29 18"	(44)	--grades very stiff, light yellowish-brown (2.5Y 6/3) (pp=3.25/3.5/3.25/3.8/3.0 tsf) --(pp=2.0/2.25/2.5/3.2/2.8 tsf)							

Continued

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 28, 2018
COMPLETION DATE: November 30, 2018
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: El Bhangoo and Virgil Santos
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-137
BART to Silicon Valley
San Jose, California

FIGURE A-14c

LOCATION: Stockton Avenue Median at Villa Street
N 1,949,226 E 6,151,112

SURFACE EL: 81.7 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-70		▨	30 18"	▩	(50)	--grades olive-brown (2.5Y 4/3), trace fine sand and angular to subrounded fine gravel (pp=2.5/3.0/2.75/3.2/3.7/3.7 tsf) --(pp=3.5/3.0/3.5/3.2/3.0 tsf)							
	155	░	31 3"	⊠	50/6"	WELL GRADED SAND WITH GRAVEL (SW), very dense, olive-brown (2.5Y 4/3), wet, subrounded to subangular fine gravel, trace fines, uncemented							
-75						--Boring terminated at a depth of 155.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 11.5 feet. --Boring backfilled with cement grout.							
	160												
-80													
	165												
-85													
	170												
-90													
	175												
-95													
	180												
-100													
	185												
-105													
	190												
-110													
	195												
-115													

BORING DEPTH: 155.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 28, 2018
COMPLETION DATE: November 30, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: El Bhangoo and Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-137

BART to Silicon Valley
San Jose, California

FIGURE A-14d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: Stockton Avenue and Asbury Street
N 1,949,887 E 6,150,552

SURFACE EL: 79.9 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		1 6"								
75	5	2 17"	(18)							
70	10	4 16"	(10)							
65	15	6 6"	(21)							
60	20	7 14"	(5)							
55	25	9 12"	(9)							
50	30	11 16"	(9)							
45	35	13 16"	(16)							
40	40	15 17"	(30)							
35	45	17 14"	(84)							

MATERIAL DESCRIPTION

6" ASPHALT CONCRETE

6" WELL GRADED SAND WITH GRAVEL (SW) (FILL)

POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)

LEAN CLAY WITH SAND (CL), stiff, black (10YR 2/1) to brown (10YR 5/3), moist, low plasticity, little fine gravel (FILL/RE-WORKED NATIVE SOIL)

FAT CLAY WITH SAND (CH), stiff, brown (10YR 5/3), moist, some fine sand

SILTY SAND (SM), medium dense, brown (10YR 5/3) with yellow (10YR 7/8) mottling, moist, fine sand, weakly cemented

SANDY SILT (ML), very stiff, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), moist, low plasticity (pp=2.5/2.6/2.5 tsf)
--Switched to rotary wash drilling at 11.5 feet.

SILTY SAND (SM), medium dense, olive-brown (2.5Y 4/3), wet, uncemented

LEAN CLAY (CL), medium stiff, dark gray (2.5Y N4/0), wet, medium plasticity, trace fine sand
--(pp=0.75/0.75 tsf)
--(pp=0.9/0.9/0.8/0.8 tsf)
--(pp=0.8/0.8 tsf)

FAT CLAY (CH), stiff, grayish-brown (2.5Y 5/2), wet, high plasticity
--(pp=1.25/1.25/1.25 tsf)
--(pp=1.1/0.8/1.0 tsf)

LEAN CLAY (CL), stiff, light grayish- to yellowish-brown (10YR 5/2 to 10YR 5/6), wet, medium plasticity, trace fine sand and organics
--(pp=1.3/0.9/1.1/1.9/2.5/2.9 tsf)
--(pp=1.75/1.75 tsf)
--(pp=1.7/1.5/2.2 tsf)

WELL GRADED GRAVEL WITH SAND (GW), medium dense, dark brown (10YR 3/3) to olive-brown (2.5Y 4/3), wet, fine to coarse sand and subrounded gravel, weakly cemented

POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), very dense, dark brown (10YR

Continued

BORING DEPTH: 151.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 2, 2019
COMPLETION DATE: January 4, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-138

BART to Silicon Valley
San Jose, California

FIGURE A-15a

LOCATION: Stockton Avenue and Asbury Street
N 1,949,887 E 6,150,552

SURFACE EL: 79.9 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		19 5"	51	3/3), wet, fine to coarse sand, fine gravel, uncemented							
25	55	20 7"	28	SANDY LEAN CLAY (CL), very stiff, light yellowish-brown (2.5Y 6/3) and olive-yellow (2.5Y 6/6), moist, low plasticity, fine sand							
20	60	21 2"	50/4.5"	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), very dense, olive-brown (2.5Y 4/3), wet, fine to coarse sand, fine and trace coarse subangular gravel, uncemented							
15	65	22 5"	72								
10	70	23 13"	(24)	CLAYEY SAND (SC), medium dense, yellowish-brown (10YR 5/6) and gray (10YR 5/1), moist, low plasticity fines, fine sand --Resumed drilling on 1/3/2019 at 71.5 feet.							
5	75	25 15"	(49)	SANDY LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low plasticity, fine and trace iron-oxide-stained coarse sand --(pp=2.9/3.7/3.5 tsf)							
0	80	27 4"	50/6"	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, brown (10YR 5/3), wet, fine to coarse sand, fine gravel, uncemented							
-5	85	28 4"	30								
				FAT CLAY (CH), gray (2.5Y N5/0)							
-10	90	29 15"	(84/11")	SILTY SAND WITH GRAVEL (SM), very dense, light olive-brown (2.5Y 5/4) to dark yellowish-brown (10YR 3/6) and gray (10YR 5/1), wet, fine to medium sand, fine angular gravel, weakly cemented		13	22				MA
-15	95	31 4"	81	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, wet, fine to medium sand, fine gravel							
				FAT CLAY (CH), brown (10YR 5/3)							
				SILTY SAND (SM), dense, olive-brown (2.5Y 4/3),							

Continued

BORING DEPTH: 151.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 2, 2019
COMPLETION DATE: January 4, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-138

BART to Silicon Valley
San Jose, California

FIGURE A-15b

Project No. 2017-144-T02

Sheet 3 of 4

LOCATION: Stockton Avenue and Asbury Street
N 1,949,887 E 6,150,552

SURFACE EL: 79.9 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		░	32 4"	⊠	44	wet, fine sand, homogeneous							
-25	105	▥	33 12"	▒	(41)	SILT WITH SAND (ML), hard, dark greenish-gray (GLEY 5G 4/1), moist, low plasticity, fine sand, homogeneous --(pp=>4.5/>4.5/>4.5 tsf)							
-30	110	░	34 4"	⊠	92/12"	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, dark greenish-gray (GLEY 5G 4/1), wet, fine to coarse sand, fine gravel, uncemented							
-35	115	▨	35 18"	▒	(34)	FAT CLAY WITH SAND (CH), very stiff, very dark grayish-brown (2.5Y 3/2), moist, high plasticity, fine sand --(pp=3.2/2.8/2.9/2.5/2.5 tsf)		34	86	64	37		Gs MA
-40	120	▧	37 18"	▒	(37)	LEAN CLAY (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, medium plasticity, trace fine sand, homogeneous (pp=2.6/2.4/2.7 tsf)				39	19		
		▥				SANDY SILT (ML), stiff, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), wet, low plasticity, fine sand --(pp=1.8/1.9/2.6 tsf)							
-45	125	▧	39 18"	▒	(42)	SANDY LEAN CLAY (CL), very stiff, light olive-brown (2.5Y 5/4), moist, low to medium plasticity, fine sand --(pp=3.2/3.3/2.8 tsf)				30	10		
-50	130	▥	41 5"	⊠	39	SANDY SILT (ML), hard, light olive-brown (2.5Y 5/4), moist, low plasticity, fine sand, weakly cemented, iron oxide staining --(pp>4.5 tsf) --Resumed drilling on 1/4/2019 at 126.5 feet.							
-55	135	▥	42 16"	▒	(45)	--grades with less sand, very stiff, dark gray (2.5Y N4/0), homogeneous (pp=2.5/2.7/2.6/2.6/2.0 tsf) --grades sandy, hard, gray (10YR 5/1) and dark yellowish-brown (10YR 3/6) --(pp>4.5 tsf)				29	6		
-60	140	░	44 5"	⊠	50/6"	POORLY GRADED SAND WITH SILT (SP-SM), very dense, light olive-brown (2.5Y 5/4), wet, fine to coarse sand, trace fine subangular to subrounded gravel, uncemented							
-65	145	░	45 5"	⊠	80	--grades olive-brown (2.5Y 4/3), trace clasts of clayey sand							
		▥				SANDY SILT (ML), hard, light olive-brown (2.5Y 5/4) to grayish-brown (2.5Y 5/2), wet, fine sand,							

Continued

BORING DEPTH: 151.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 2, 2019
COMPLETION DATE: January 4, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-138
BART to Silicon Valley
San Jose, California

FIGURE A-15c

Project No. 2017-144-T02

Sheet 4 of 4

LOCATION: Stockton Avenue and Asbury Street
N 1,949,887 E 6,150,552

SURFACE EL: 79.9 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			46 18"	▨	(72)	weakly cemented SILTY SAND (SM), very dense, yellowish-brown (10YR 5/6), wet, fine sand, weakly cemented (pp>4.5 tsf)							
-75	155					--Boring terminated at a depth of 151.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling at a depth of 11.5 feet. --Boring backfilled with cement grout.							
-80	160												
-85	165												
-90	170												
-95	175												
-100	180												
-105	185												
-110	190												
-115	195												

BORING DEPTH: 151.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 2, 2019
COMPLETION DATE: January 4, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-138

BART to Silicon Valley
San Jose, California

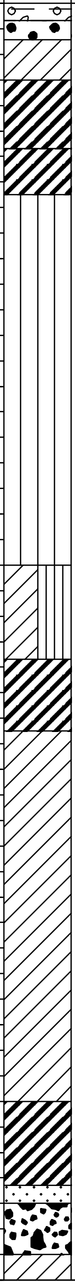
FIGURE A-15d

Project No. 2017-144-T02

Sheet 1 of 4

LOCATION: University Avenue and Stockton Avenue
N 1,950,684 E 6,149,891

SURFACE EL: 76.3 ft (datum)



ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
75										
		1 3"								
70	5	2 15"	(15)							
65	10	4 14"	(7)							
60	15	6 11"	4							
55	20	7 6"	3							
50	25	8 15"	(7)							
45	30	10 18"	(4)							
40	35	12 16"	(13)							
35	40	14 18"	(9)							
30	45	16 15"	(33)							

MATERIAL DESCRIPTION

8" ASPHALT CONCRETE

9" POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)

SANDY LEAN CLAY WITH GRAVEL (CL), very stiff, dark brown (10YR 3/3), moist, low plasticity, trace fine to coarse sand, fine subangular gravel, mixed texture (FILL)

FAT CLAY WITH SAND AND GRAVEL (CH), very stiff, black (2.5Y N2/0), moist, high plasticity, fine sand, angular fine gravel (FILL/RE-WORKED NATIVE SOIL)

FAT CLAY WITH SAND (CH), very stiff, dark gray (2.5Y N4/0), moist, high plasticity, fine sand (NATIVE SOIL) (pp=2.9/2.9/3.2/3.1/3.4/3.4 tsf)

SANDY SILT (ML), medium stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, fine sand, trace fine angular gravel (pp=0.7/0.7/0.8/1.0/1.2 tsf)
--grades gray (2.5Y N5/0) with light olive-brown (2.5Y 5/4) mottling, stiff at 15'
--grades olive-gray (5Y 4/2)

SANDY SILTY CLAY (CL-ML), soft, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), wet, low plasticity, fine sand (pp<0.5/<0.5 tsf)

FAT CLAY (CH), stiff, finely mottled olive (5Y 5/3) and gray (5Y 5/1), moist, high plasticity, trace fine sand (pp=1.7/1.5/1.8/2.7/2.0/1.7 tsf)

SANDY LEAN CLAY (CL), medium stiff, dark gray (5Y 4/1) to olive-gray (5Y 4/2), wet, low plasticity, fine sand, trace fine subangular gravel
--(pp=0.7/0.8/0.6 tsf)

--grades stiff (pp=1.5/1.5/1.25 tsf)
--(pp=1.6/1.9/1.6 tsf)

--grades silty, trace fine sand (pp=0.7/0.7/1.0/1.0/1.25 tsf)
--(pp=1.5/1.0/1.3 tsf)

FAT CLAY (CH), stiff, dark gray (2.5Y N5/0), moist, high plasticity, trace fine gravel (pp=1.5/1.8/1.75 tsf)
--(pp=0.7/0.7/0.6 tsf)

POORLY GRADED SAND LENS (SP)

WELL GRADED GRAVEL (GW)

Continued

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 7, 2019
COMPLETION DATE: January 9, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-139

BART to Silicon Valley
San Jose, California

FIGURE A-16a

LOCATION: University Avenue and Stockton Avenue
N 1,950,684 E 6,149,891

SURFACE EL: 76.3 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
25		18 15"	(18)	LEAN CLAY WITH SAND (CL), stiff, olive (5Y 5/3) to olive-gray (5Y 4/2), moist, low plasticity, fine sand (pp=1.9/1.3/1.1 tsf)							
20	55	20 18"	(22)	SILTY CLAY WITH SAND (CL-ML), very stiff, olive (5Y 5/3) and gray (5Y 5/1), moist, low plasticity, fine sand --(pp=3.6/3.4 tsf) --(pp=2.8/2.7/2.5 tsf)							
15	60	22 18"	(13)	LEAN CLAY (CL), stiff, olive-gray (5Y 4/2), moist, medium plasticity, trace fine to medium sand --(pp=1.1/1.6/1.4/1.6/1.6 tsf) --(pp=1.5/1.5/1.5 tsf)							
10	65	24 18"	(12)	CLAYEY SAND (SC), loose, greenish-gray (GLEY 5BG 5/1), wet, fine to coarse sand							
5	70	26 18"	(12)	LEAN CLAY WITH SAND (CL), very stiff, greenish-gray (GLEY 5BG 5/1), wet, low plasticity, fine and trace coarse sand --(pp=2.25/1.9/1.7 tsf) --(pp=2.1/2.9/2.4 tsf)		23 22	90	27	8		MA, Hydrometer
0	75	28 18"	(20)	--grades silty, fine sand							
				FAT CLAY (CH), very stiff, greenish-gray (GLEY 5BG 5/1), moist, high plasticity (pp=2.7/2.5/2.0 tsf) --(pp=2.5/2.5 tsf)							
-5	80	30 18"	(20)	SILTY CLAY (CL-ML), stiff to very stiff, greenish-gray (GLEY 5BG 5/1), moist, low plasticity, trace fine sand, homogeneous (pp=1.6/1.75/1.75 tsf) --(pp=2.7/3.2/2.5 tsf)							
-10	85	32 18"	(21)	LEAN CLAY WITH SAND (CL), stiff, greenish-gray (GLEY 5BG 5/1), moist, low to medium plasticity, fine sand --(pp=1.8/1.8/1.7 tsf) --(pp=1.6/1.6/1.8 tsf)							
-15	90	34 17"	(26)	--grades with medium to coarse sand and fine angular gravel, very stiff, trace carbonate --(pp=2.8/2.6 tsf) --(pp=2.8/3.0/3.2 tsf)							
-20	95	36 18"	(25)	--(pp=2.0/2.0/2.6 tsf) --(pp=2.0/2.0/2.3 tsf)		21 22	81	30	12		MA
				--grades sandy, dark greenish-gray (GLEY 5G 4/1), wet, fine sand							

Continued

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 7, 2019
COMPLETION DATE: January 9, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-139

BART to Silicon Valley
San Jose, California

FIGURE A-16b

LOCATION: University Avenue and Stockton Avenue
N 1,950,684 E 6,149,891

SURFACE EL: 76.3 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-25			38 18"		(23)	--few medium and coarse sand --(pp=2.2/2.5/1.8/2.3/2.2/1.7 tsf)				34	15		
-30	105		40 18"		(80)	POORLY GRADED SAND WITH SILT (SP-SM), dense, dark greenish-gray (GLEY 5G 4/1), wet, fine to medium sand, weakly cemented							
-35	110		42 18"		(25)	SANDY FAT CLAY (CH), very stiff, light greenish-gray (GLEY 5G 7/1), wet, high plasticity, fine sand, trace carbonate (pp=3.2/3.1/2.4 tsf)							CR
-40	115		44 18"		(33)	--grades gray (2.5Y N5/0) w/ olive-yellow (2.5Y 6/6) mottling, trace carbonate nodules, iron-oxide stained (pp=2.6/2.7/2.3 tsf) --(pp=2.3/2.7/2.2 tsf)							
-45	120		46 18"		(20)	SANDY SILT LENS (ML) (pp=2.25/2.1/2.3 tsf) SANDY FAT CLAY (CH), very stiff, dark greenish-gray (GLEY 5G 4/1), wet, high plasticity, fine sand (pp=2.4/2.5/2.1 tsf)							
-50	125		48 18"		(31)	SANDY, SILTY CLAY (CL-ML), very stiff, dark greenish-gray (GLEY 5G 4/1), wet, low plasticity, fine sand --(pp=3.5/3.5/3.8 tsf)				27	5		
-55	130		50 18"		(37)	SILT WITH SAND (ML), very stiff to hard, dark gray (2.5Y N4/0), wet, low plasticity, fine sand --(pp=3.5/3.5/3.3 tsf)							
-60	135		52 18"		(34)	--grades hard, trace organics --(pp=4.3/4.2/3.8 tsf)							
-65	140		54 15"		(47)	ORGANIC SILT (OH), hard, black (2.5Y N2/0), moist, high plasticity --(pp=4.4/4.3/4.4 tsf)				66	33		
-70	145		56 14"		(39)	SANDY LEAN CLAY (CL), very stiff to hard, light yellowish-brown (10YR 6/4) w/ reddish-brown (5YR 4/4) mottles, moist, low plasticity, fine to medium and trace coarse sand --(pp=2.6/2.7/2.7 tsf) --(pp=4.3/4.7/4.1 tsf)							

Continued

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 7, 2019
COMPLETION DATE: January 9, 2019
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-139
BART to Silicon Valley
San Jose, California

FIGURE A-16c

Project No. 2017-144-T02

Sheet 4 of 4

LOCATION: University Avenue and Stockton Avenue
N 1,950,684 E 6,149,891

SURFACE EL: 76.3 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						--Boring terminated at a depth of 146.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling. --Boring backfilled with cement grout.							
-75													
	155												
-80													
	160												
-85													
	165												
-90													
	170												
-95													
	175												
-100													
	180												
-105													
	185												
-110													
	190												
-115													
	195												
-120													

BORING DEPTH: 146.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 7, 2019
COMPLETION DATE: January 9, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-139

BART to Silicon Valley
San Jose, California

FIGURE A-16d

Project No. 2017-144-T02

Sheet 1 of 3

LOCATION: Stockton Avenue and McKendrie Street
N 1,951,348 E 6,149,291

SURFACE EL: 71.5 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
				8" ASPHALT CONCRETE							
				8" POORLY GRADED GRAVEL (AGGREGATE BASE)							
70 65	5	1 13"	(20)	LEAN CLAY (CL), very stiff, olive-yellow (2.5Y 6/6) and olive-brown (2.5Y 4/3), moist, low plasticity (pp=3.7/3.5/3.5 tsf) (NATIVE SOIL)							
	10	2 16"	(15)	SILT (ML), stiff, light olive-gray (5Y 6/2), moist, low plasticity (pp=1.0/1.0/1.25/2.5/1.75 tsf)							
60				SILTY SAND (SM), loose, brown (10YR 5/3), moist, fine sand							
	15	3 16"	(19)	SILT WITH SAND (ML), stiff, olive-gray (5Y 4/2), moist, low plasticity, fine sand --(pp=0.75/0.75/0.75/1.25/1.25 tsf)							
55 50	20	4 15"	(8)	SILTY SAND (SM), medium dense, olive-gray (5Y 4/2) and olive (5Y 5/3), moist, fine sand, trace clay, uncemented --grades with more silt, loose, wet							
45	25	5 14"	(12)	FAT CLAY (CH), stiff, gray (2.5Y N5/0) with light olive-brown (2.5Y 5/4) mottles, wet, high plasticity (pp=1.0/1.0/1.0/1.0/1.1/1.1 tsf)							
40	30	6 13"	(18)	SANDY LEAN CLAY (CL), stiff, gray (2.5Y N5/0) and light olive-brown (2.5Y 5/4) mottled, low plasticity, fine sand --(pp=1.5/1.5/1.5/1.8/2.0/2.5 tsf)							
35	35	7 18"	(12)	SILTY CLAY WITH SAND (CL-ML), stiff, gray (2.5Y N5/0) to dark gray (2.5Y N4/0), wet, low plasticity, fine sand --(pp=0.8/0.8/1.0 tsf) --(pp=1.0/1.0/1.0/1.0/1.0 tsf)							
30	40	8 17"	(21)	SANDY SILT (ML), very stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, fine sand (pp=1.9/2.2/2.4 tsf)							
25	45	9 0"	(71)	POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), dense, light olive-brown (2.5Y 5/4), moist							

Continued

BORING DEPTH: 141.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 19, 2018
COMPLETION DATE: November 20, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-140

BART to Silicon Valley
San Jose, California

FIGURE A-17a

LOCATION: Stockton Avenue and McKendrie Street
N 1,951,348 E 6,149,291

SURFACE EL: 71.5 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
20			10 6"		59								
15	55		11 18"		(22)	CLAYEY SAND (SC), medium dense, greenish-gray (GLEY 5BG 5/1), moist, low plasticity fines, fine sand, uncemented							
10	60		12 10"		(37)	SILT (ML), very stiff, light yellowish-brown (2.5Y 6/3), wet, low plasticity, few fine sand (pp=3.75/3.75/4.2 tsf)	97	26 26	87				MA MA
5	65		13 7"		50/6"	POORLY GRADED SAND WITH GRAVEL (SP), very dense, grayish-brown (2.5Y 5/2), wet, fine sand, trace coarse sand, fine gravel, uncemented							
0	70		14 6"		49	SILTY SAND WITH GRAVEL (SM), dense, light olive-brown (2.5Y 5/4), moist, fine to coarse sand, fine subangular gravel, weakly cemented							
-5	75		15 16"		(27)	LEAN CLAY WITH SAND (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, low to medium plasticity, fine sand --(pp=2.7/2.7/2.2 tsf) --(pp=2.25/2.25/2.25 tsf)		22	81	30	12		MA
-10	80		16 18"		(23)	--(pp=2.25/2.25/2.25/2.2/1.7/1.7 tsf)							
-15	85		17 14"		(61)	POORLY GRADED SAND (SP), dense, gray (2.5Y N5/0) and olive-yellow (2.5Y 6/6), moist, fine sand, uncemented							Abr. (Comp.)
-20	90		18 6"		50/6"	SILTY SAND WITH GRAVEL (SM), very dense, dark grayish-brown (2.5Y 4/2), wet, fine to medium sand, uncemented							
-25	95		19 18"		(28)	SANDY LEAN CLAY (CL), stiff, light olive-brown (2.5Y 5/4), moist, low to medium plasticity, fine sand --(pp=1.5/1.5/1.5/1.7/1.8/1.7 tsf) --grades with less sand, wet				31	13		

Continued

BORING DEPTH: 141.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 19, 2018
COMPLETION DATE: November 20, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-140

BART to Silicon Valley
San Jose, California

FIGURE A-17b

Project No. 2017-144-T02

Sheet 3 of 3

LOCATION: Stockton Avenue and McKendrie Street
N 1,951,348 E 6,149,291

SURFACE EL: 71.5 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-30		20 18"	(33)	--(pp=2.25/2.5/2.5/3.1/3.8/4.0 tsf) --Resumed drilling on 11/20/2018 at 101.5 feet.				37	13		
-35	105	21 9"	50/6"	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, olive-brown (2.5Y 4/3), wet, fine to medium sand, fine subangular gravel, uncemented							
-40	110	22 7"	50/6"								
				SILTY SAND (SM), medium dense, pale olive (5Y 6/3), wet, fine sand, uncemented							
-45	115	23 18"	(35)	CLAYEY SAND WITH GRAVEL (SC), medium dense, pale olive (5Y 6/3), wet, fine to coarse sand, fine gravel							
-50	120	24 16"	(24)	SANDY LEAN CLAY (CL), stiff, gray (2.5Y N5/0), moist, low plasticity, fine sand --(pp=1.75/1.75/2.0/1.75/1.75 tsf) --(pp=1.5/1.5/1.75/1.5/1.5 tsf)							
-55	125	25 16"	(49)	SILTY SAND (SM), greenish-gray (GLEY 5BG 5/1), wet, fine sand lens							
				LEAN CLAY WITH SAND (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, medium plasticity, fine sand							
-60	130	26 16"	(75)	SILTY SAND (SM), very dense, dark greenish-gray (GLEY 5G 4/1), moist, fine sand, homogeneous, uncemented							
-65	135	27 16"	(47)	SANDY LEAN CLAY WITH GRAVEL (CL), very stiff, greenish-gray (GLEY 5BG 5/1), moist, low plasticity, fine to coarse sand, fine subangular gravel --(pp=2.0/2.5/2.0 tsf) --(pp=2.5/2.5/2.5 tsf)							
-70	140	28 16"	(59)	LEAN TO FAT CLAY (CL/CH), very stiff, dark greenish-gray (GLEY 5G 4/1), moist, medium to high plasticity, little silt --(pp=3.25/3.75 tsf) --grades hard, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0) (pp=4.5/4.5/4.25/4.5 tsf)				51	26		
-75	145			--Boring terminated at a depth of 141.5 feet. --Groundwater not encountered prior to switching to rotary wash drilling. --Boring backfilled with cement grout.							

BORING DEPTH: 141.5 ft
DEPTH TO WATER: Not Measured

START DATE: November 19, 2018
COMPLETION DATE: November 20, 2018

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-140
BART to Silicon Valley
San Jose, California

FIGURE A-17c

Project No. 2017-144-T02

Sheet 1 of 3

LOCATION: Vacant lot at west end of Newhall St.
N 1,951,929 E 6,148,086

SURFACE EL: 68.8 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			1 2"			LEAN CLAY WITH SAND (CL), hard, brown (10YR 5/3), dry, low plasticity (FILL)							
						FAT CLAY (CH), stiff, black (2.5Y N2/0), moist, high plasticity, trace concrete clasts (FILL/RE-WORKED NATIVE SOIL)							
65	5		2 15"		(17)	FAT CLAY (CH), very stiff, black (2.5Y N2/0), moist, high plasticity (P=3.9/3.5/3.5 tsf) --(pp=2.2/3.3/2.8/3.3 tsf)							
60	10		3 11"		(7)	FAT CLAY (CH), medium stiff, olive-gray (5Y 4/2), wet, high plasticity, few fine to medium sand (pp=0.8/0.8/0.5 tsf)				64	38		
55						--grades black (2.5Y N2/0), little fine to medium sand							
	15		4 18"		50 to 175 psi	--grades without sand, stiff, dark yellowish-brown (10YR 3/6) with red (2.5YR 4/8) peat (1.0/1.3/1.5 tsf)							Consol, TXUU
50	20		5 10"		(11)	--(pp=1.3/1.4/1.0/1.7/1.5/1.75 tsf)							
45						--gravel layer 23 to 23.5 feet							
	25		6 9"		(52)	POORLY GRADED SAND WITH SILT (SP-SM), dense, olive-yellow (2.5Y 6/6) and dark gray (2.5Y N4/0), wet, uncemented			7				MA
40						--grades with gravel, olive-brown (2.5Y 4/3)							
	30		7 10"		36								Abr. (Comp.)
35	35		8 10"		(64)								
30						POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), medium dense, yellowish-brown (10YR 5/6), wet, fine and coarse gravel, few coarse sand, few clay, uncemented							
	40		9 8"		(23)								
25						SANDY FAT CLAY (CH), stiff, gray (2.5Y N5/0), wet, high plasticity							
	45		10 3"		(17)								
20						LEAN CLAY (CL), soft, gray (2.5Y N5/0), wet,							

Continued

BORING DEPTH: 117.0 ft
DEPTH TO WATER: Not Measured

START DATE: January 10, 2019
COMPLETION DATE: January 11, 2019
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-141
BART to Silicon Valley
San Jose, California

FIGURE A-18a

Project No. 2017-144-T02

Sheet 2 of 3

LOCATION: Vacant lot at west end of Newhall St.
N 1,951,929 E 6,148,086

SURFACE EL: 68.8 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		11	0"	(18)	medium plasticity, fine sand							
15												
	55	12	9"	(26)	--grades very stiff (pp=2.5/3.1/3.2/2.75/2.4 tsf)		23	91	40	20		MA
10	60	13	18"	(12)	CLAYEY SAND WITH GRAVEL (SC), light olive-brown (2.5Y 5/4), wet, fine to coarse sand, fine gravel (calcareous sand nodules)							
5	65	14	18"	(19)	SILT (ML), very stiff, light olive-brown (2.5Y 5/4), wet, low plasticity, few fine sand, homogeneous --(pp=1.7/1.9 tsf) --(2.3/2.5/2.3/2.3 tsf)		22	92				MA, Hydrometer
0	70	15	18"	(20)	SANDY, SILTY CLAY (CL-ML), stiff, greenish-gray (GLEY 5BG 5/1), wet, low plasticity, fine sand, few coarse sand, fine gravel (carbonate nodules) --(pp=1.7/1.7/1.7/2.0/1.8/1.5 tsf) --Resumed drilling on 1/11/2019 at 71.5 feet. --grades without coarse sand and fine gravel, olive-gray (5Y 4/2)							
-5	75	16	18"	(8)								
-10	80	17	18"	(15)	--grades dark olive-gray (5Y 3/2), stiff (pp=1.8/1.8/1.7 tsf)				26	7		
-15	85	18	18"	(33)	LEAN CLAY WITH SAND (CL), stiff, greenish-gray (GLEY 5BG 5/1), moist, low plasticity, fine sand, trace organics/charcoal --(pp=1.6/1.7/1.8 tsf) --(pp=1.5/1.7/1.8 tsf)							
-20	90	19	8"	43	POORLY GRADED SAND WITH SILT (SP-SM), dense, olive-brown (2.5Y 4/3), wet, fine sand, trace fine subrounded gravel, uncemented							
-25	95	20	18"	(47)	SANDY LEAN CLAY (CL), very stiff, dark gray (GLEY 5Y 4/1) to dark greenish-gray (GLEY 5G 4/1), moist, low plasticity, fine sand --(pp=2.8/2.8/2.7/3.2/2.7 tsf)							
-30					CLAYEY SAND (SC), dense, dark yellowish-brown							

Continued

BORING DEPTH: 117.0 ft
DEPTH TO WATER: Not Measured

START DATE: January 10, 2019
COMPLETION DATE: January 11, 2019
NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

LOG OF BORING NO. BH-141
BART to Silicon Valley
San Jose, California

FIGURE A-18b

Project No. 2017-144-T02

Sheet 3 of 3

LOCATION: Vacant lot at west end of Newhall St.
N 1,951,929 E 6,148,086

SURFACE EL: 68.8 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		21 16"	(69)	(10YR 3/6) and gray (10YR 5/1), moist, low to medium plasticity fines, fine sand				30	8		Gs
-35	105	22 6"	63	WELL GRADED SAND WITH SILT (SW-SM), very dense, brown (10YR 5/3), wet, fine sand, trace fine subangular to subrounded gravel, uncemented							
-40	110	23 7"	36	SILT (ML), hard, gray (10YR 5/1) with dark yellowish-brown (10YR 3/6), iron-oxide staining, moist, low plasticity, few fine sand							
-45	115	24 24"	50 to 500 psi	LEAN CLAY (CL), soft, gray (2.5Y N5/0), wet, low plasticity							TXCU
-50				CLAYEY GRAVEL WITH SAND (GC), dense to very dense, pale olive (5Y 6/3), wet, fine gravel, fine to coarse sand, low plasticity fines							
	120			--Boring terminated at a depth of 117 feet. --Groundwater not encountered prior to switching to rotary wash drilling. --Boring backfilled with cement grout.							
-55	125										
-60	130										
-65	135										
-70	140										
-75	145										
-80											

BORING DEPTH: 117.0 ft
DEPTH TO WATER: Not Measured

START DATE: January 10, 2019
COMPLETION DATE: January 11, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-141

BART to Silicon Valley
San Jose, California

FIGURE A-18c

LOCATION: VTA Parking Lot at 77 E. St. John Street
N 1,948,235 E 6,156,861

SURFACE EL: 85.7 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
85					4" ASPHALT over 4" POORLY GRADED GRAVEL WITH SAND (GP) (PAVEMENT SECTION)							
					LEAN CLAY (CL), brown (10YR 5/3), low plasticity							
80	5				POORLY GRADED SAND (SP), loose, yellowish-brown (10YR 5/6), wet, fine sand, trace silt (NATIVE SOIL)							
		1 14"	▨	(13)								
75	10											
					SILT WITH SAND (ML), very soft, grayish-brown (2.5Y 5/2), wet, low plasticity, fine sand							
70	15	2 6"	▨	(0)								
					ORGANIC CLAY (OL), medium stiff, greenish-gray (GLEY 5BG 5/1), wet, medium plasticity, some black mottling							
65	20											
		3 18"	▨	(5)	--(pp=0.5/0.5/0.5/0.7/1.0/1.1 tsf)							
60	25											
					SANDY CLAY WITH GRAVEL (CL), stiff, greenish-gray (GLEY 5BG 5/1), wet, low plasticity, fine sand and gravel (carbonaceous sand clasts)							
55	30	4 14"	▨	(12)	--(pp=1.0/1.0/1.0 tsf)							
					CLAYEY SAND (SC), medium dense, very dark gray (2.5Y N3/0) and black (2.5Y N2/0), wet, gap graded, medium to coarse sand, w/ clasts of lean sandy clay							
50	35											
		5 14"	▨	(21)								
45	40											
					SANDY LEAN CLAY (CL), stiff, olive-gray (5Y 5/2), wet, low plasticity, fine and trace coarse sand							
40	45	6 18"	▨	(12)	--(pp=1.25/0.75/1.0/1.0/1.1/0.8 tsf)							

Continued

BORING DEPTH: 101.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 17, 2019
COMPLETION DATE: January 17, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-142 (SP-1)

BART to Silicon Valley
San Jose, California

FIGURE A-19a

LOCATION: VTA Parking Lot at 77 E. St. John Street
N 1,948,235 E 6,156,861

SURFACE EL: 85.7 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35			7 18"		(18)	--grades yellowish-brown (10YR 5/6) to light olive-brown (2.5Y 5/4), moist (pp=1.5/1.25/1.25/1.6/1.9/2.2 tsf)							
30	55												
25	60		8 17"		(45)	POORLY GRADED SAND WITH SILT (SP-SM), medium dense, light olive-brown (2.5Y 5/4), wet, fine sand							
						POORLY GRADED SAND WITH GRAVEL (SP), medium dense, brown (10YR 5/3) and gray (10YR 5/1), wet							
20	65												
						SANDY LEAN CLAY (CL), hard, dark greenish gray (GLEY 5G 4/1), moist, fine sand							
15	70		9 18"		(42)	--(pp=4.25/4.0/4.5/4.2/>4.5 tsf)							
						POORLY GRADED SAND WITH CLAY AND GRAVEL (SP-SC), very dense, olive-gray (5Y 5/2), wet, fine to medium sand, fine subangular gravel							
10	75												
5	80		10 3"		78								
0	85												
						SILTY SAND WITH GRAVEL (SM), very dense, dark grayish-brown (2.5Y 4/2), wet, fine to medium sand, fine subangular gravel							
-5	90		11 5"		79								
-10	95												
						CLAYEY SAND (SC), medium dense, greenish-gray (GLEY 5BG 5/1), wet, fine to medium sand, homogeneous							

Continued

BORING DEPTH: 101.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 17, 2019
COMPLETION DATE: January 17, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-142 (SP-1)

BART to Silicon Valley
San Jose, California

FIGURE A-19b

LOCATION: VTA Parking Lot at 77 E. St. John Street
N 1,948,235 E 6,156,861

SURFACE EL: 85.7 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-15		▨	12 18"	▨	(24)								
						--Boring terminated at a depth of 101.5 feet. --Groundwater measured following the drilling at a depth of 5 feet. --Borehole fitted with 2" diameter schedule 40 PVC pipe (standpipe piezometer) with 0.020-inch screen from 80 to 95 feet. --Borehole annulus backfilled with No. 3 sand from 101.5 to 77 feet, bentonite pellets (seal) from 77 to 72 feet, and cement grout from 72 feet to 1 foot below ground surface.							
-20	105												
-25	110												
-30	115												
-35	120												
-40	125												
-45	130												
-50	135												
-55	140												
-60	145												

BORING DEPTH: 101.5 ft
DEPTH TO WATER: Not Measured

START DATE: January 17, 2019
COMPLETION DATE: January 17, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Virgil Santos
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-142 (SP-1)

BART to Silicon Valley
San Jose, California

FIGURE A-19c

Project No. 2017-144-T02

Sheet 1 of 3

LOCATION: 77-95 N. 4th Street
N 1,948,886 E 6,158,032

SURFACE EL: 79.5 ft (datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
				9" ASPHALT CONCRETE							
		1 2"		POORLY GRADED SAND WITH GRAVEL (SP), brown (10YR 4/3) (FILL)							
75	5			SANDY SILT (ML), dark brown (10YR 3/3), dry, fine sand							
		2 11"	(14)	LEAN CLAY WITH SAND (CL), stiff, light olive-brown (2.5Y 5/4), dry, medium plasticity, fine to medium sand							
70	10			--(pp=1.8/1.7/1.7/2.2/1.7 tsf)							
				SANDY FAT CLAY (CH), stiff, dark gray (2.5Y N4/0), wet, high plasticity, trace fine gravel, trace organics, sporadic brown mottling							
65	15	3 13"	(24)	--(pp=1.8/1.7/1.5/2.0/1.9 tsf)							
				SILT (ML), medium stiff, dark gray (2.5Y N4/0), wet, low plasticity, trace fine sand, sporadic iron oxide mottling and black organics							
60	20										
		4 15"	(7)	--(pp=0.6/0.7/0.5 tsf) --(pp=0.8/0.9/1.0 tsf)							
55	25			--grades sandy, stiff, fine sand							
50	30	5 15"	(6)	--(pp=1.1/1.1 tsf)							
				SILTY SAND (SM), medium dense, dark gray (2.5Y N4/0), wet, fine sand							
45	35			FAT CLAY WITH SAND AND GRAVEL (CH), stiff, light olive-brown (2.5Y 5/4) and gray (2.5Y N5/0), moist, high plasticity, fine sand and gravel							
		6 14"	(17)	--(pp=1.5/1.2/1.7 tsf)							
40	40										
				WELL GRADED SAND WITH GRAVEL (SW), dense, olive-brown (2.5Y 4/3), wet, fine and trace coarse subangular sand							
35	45	7 8"	45								
30											

Continued

BORING DEPTH: 100.0 ft
DEPTH TO WATER: Not Measured

START DATE: January 24, 2019
COMPLETION DATE: January 25, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

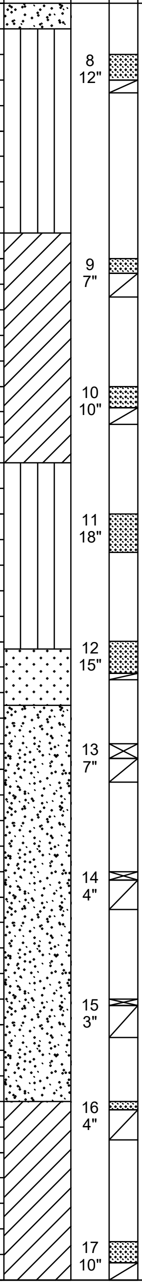
LOG OF BORING NO. BH-143 (SP-2)

BART to Silicon Valley
San Jose, California

FIGURE A-20a

LOCATION: 77-95 N. 4th Street
N 1,948,886 E 6,158,032

SURFACE EL: 79.5 ft (datum)



ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		8 12"	(16)	SILT (ML), stiff, light olive-brown (2.5Y 5/4) to olive-gray (5Y 4/2), moist, low plasticity --(pp=1.6/1.6 tsf)							
25	55										
20	60	9 7"	(16)	LEAN CLAY WITH SAND (CL), stiff, greenish-gray (GLEY 5BG 5/1), wet, low plasticity, fine sand --(pp=1.0/1.1/1.2/1.3/1.5 tsf) --Resumed drilling on 1/25/2019 at 61.5 feet.							
15	65	10 10"	(12)	--grades with organics, medium plasticity --(pp=1.5/1.6/1.4/1.25/1.6 tsf)							
10	70	11 18"	(19)	SILT (ML), very stiff, greenish-gray (GLEY 5BG 5/1), wet, low plasticity, some organics --(pp=1.7/2.7/2.2 tsf) --(pp=2.7/2.5/2.5 tsf)							
5	75	12 15"	(53)	POORLY GRADED SAND (SP), dense, light olive-brown (2.5Y 5/4), wet, medium and trace coarse sand, uncemented							
0	80	13 7"	64	WELL GRADED SAND WITH GRAVEL (SW), very dense, brown (10YR 5/3), wet, subrounded to angular fine gravel, uncemented							
-5	85	14 4"	45	--trace fine gravel --gravel layer from 87 to 89 feet							
-10	90	15 3"	55								
		16 4"	(54)	SANDY LEAN CLAY WITH GRAVEL (CL), stiff, greenish-gray (GLEY 5BG 5/1), wet, low plasticity, fine gravel --(pp=1.0/1.4/1.4/1.5/1.7/2.0 tsf)							
-15	95										
-20		17 10"	(32)								

Continued

BORING DEPTH: 100.0 ft
DEPTH TO WATER: Not Measured

START DATE: January 24, 2019
COMPLETION DATE: January 25, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-143 (SP-2)

BART to Silicon Valley
San Jose, California

FIGURE A-20b

Project No. 2017-144-T02

Sheet 3 of 3

LOCATION: 77-95 N. 4th Street
N 1,948,886 E 6,158,032

SURFACE EL: 79.5 ft (datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
						--grades light olive-brown (2.5Y 5/4), very stiff (pp=2.1/2.5/2.7 tsf) --Boring terminated at a depth of 100 feet. --Groundwater not encountered prior to switching to rotary wash drilling, and measured following drilling at a depth of 10 feet. --Borehole fitted with 2" diameter schedule 40 PVC pipe (standpipe piezometer) with 0.020-inch screen from 80 to 90 feet. --Borehole annulus backfilled with bentonite pellets from 100 to 93 feet, No. 3 sand from 93 to 77 feet, bentonite pellets (seal) from 77 to 74 feet, and cement grout from 74 feet to 1 foot below ground surface.							
-25	105												
-30	110												
-35	115												
-40	120												
-45	125												
-50	130												
-55	135												
-60	140												
-65	145												
-70													

BORING DEPTH: 100.0 ft
DEPTH TO WATER: Not Measured

START DATE: January 24, 2019
COMPLETION DATE: January 25, 2019

DRILLING METHOD: Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling
LOGGED BY: Craig Langbein
CHECKED BY: Mark McKee

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-143 (SP-2)
BART to Silicon Valley
San Jose, California

FIGURE A-20c

SOIL STRATIGRAPHY

■ ASPHALT	▨ CH	▨ CL	▨ CL-ML	▩ CONCRETE
▩ FILL	▩ GC	▩ GM	▩ GP	▩ GP-GC
▩ GP-GM	▩ GW	▩ GW-GM	▥ ML	▩ OH
▤ OL	▩ Peat	▨ SC	▨ SC-SM	▩ SM
▩ SP	▩ SP-SC	▩ SP-SM	▩ SW	▩ SW-SM

SAMPLE TYPE

▩ Bulk Auger or Bag (BS)	□ Standard California (SC)
▩ Grab (G)	▥ Shelby Tube (SH)
⧗ Modified California (MC)	⊠ Standard Penetration Test (SS)
■ Dames and Moore Piston (P)	◡ Dames and Moore U-Type (U)
▧ Pitcher Barrel (PB)	

NOTES

1. Classification of Soils per Caltrans Logging Manual (2010) with the exception of N-value to density correlations, which are not adjusted for ER_i.

2. A solid layer line boundary indicates that the layer change was observed in the retained sample or through cuttings and rig behavior.

3. A dashed layer line boundary indicates a layer change occurred between samples, but was not observed from cuttings or rig behavior.

∇ Depth at which Groundwater was encountered during drilling.

SAMPLER DIMENSIONS

Sample Type	BS	G	MC	P	PB	SC	SH	SS	U
Length (ft)	Varies	Varies	1.5	1.5	2.5	1.5	2.5	1.5	1.5
Inside Dia. (in.)			2.375	2.375	2.875	2.0	2.875	1.375	2.375
Hammer Wt. (lb.)			140	Hydraulic	Hydraulic	140	Hydraulic	140	140
Hammer Fall (in.)			30	Push	Push	30	Push	30	30

ABBREVIATIONS

LL -LIQUID LIMIT (%)
PL -PLASTIC LIMIT (%)
PI -PLASTIC INDEX (%)
PP -POCKET PENETROMETER (TSF)
TOR -POCKET TORVANE (TSF)
CONSOL -CONSOLIDATION
CORR -CORROSION
GS -SPECIFIC GRAVITY

P200 -MATERIAL PASSING NO. 200 SIEVE (%)
PMT -PRESSUREMETER
PSA -PARTICLE SIZE ANALYSIS
TXUU -UNCONSOLIDATED UNDRAINED TRIAXIAL
TXCU -CONSOLIDATED UNDRAINED TRIAXIAL
TXCD -CONSOLIDATED DRAINED TRIAXIAL
VWP -VIBRATING WIRE PIEZOMETER

CONSISTENCY

Cohesive Soils	Blows per Foot (SPT)	PP (tsf)	PTV (tsf)
Very Soft	0 - 1	< 0.25	< 0.12
Soft	2 - 3	< 0.50	< 0.25
Medium	4 - 7	< 1.00	< 0.50
Stiff	8 - 14	< 2.00	< 1.00
Very Stiff	15 - 29	< 4.00	< 2.00
Hard	> 30	> 4.00	> 2.00

RELATIVE DENSITY

Granular Soils	Blows per Foot (SPT)
Very Loose	0 - 4
Loose	5 - 9
Medium Dense	9 - 29
Dense	29 - 49
Very Dense	> 50

MMW TEAM
MOTT MACDONALD
WONG ENGINEERING

BART TO SILICON VALLEY PHASE II PROJECT
SANTA CLARA COUNTY, CA

TERMS AND SYMBOLS
1 of 1

SOIL BORING LOG

Page 1 of 10

BORING NO.
BH-150

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	July 15, 2019 at 8:55 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	July 19, 2019 at 12:30 pm

Boring Location: 65 W. Santa Clara St.

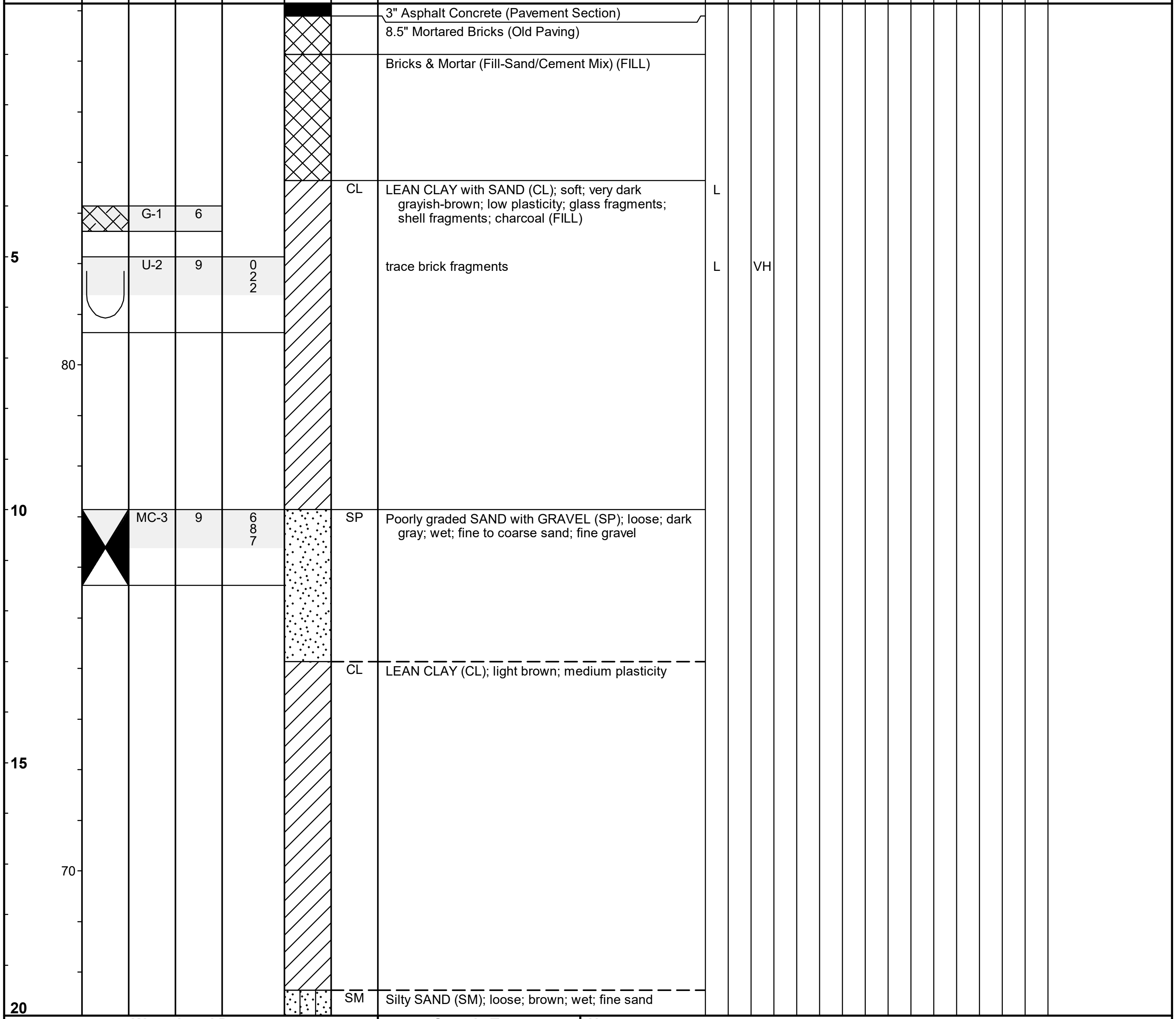
Northing: 1,947,944.028 **Easting:** 6,157,099.569

Horizontal Datum: NAD 1983

Elevation: 87.14 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		



Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
						■		3" Asphalt Concrete (Pavement Section)																
						▨		8.5" Mortared Bricks (Old Paving)																
						▨		Bricks & Mortar (Fill-Sand/Cement Mix) (FILL)																
						▨	CL	LEAN CLAY with SAND (CL); soft; very dark grayish-brown; low plasticity; glass fragments; shell fragments; charcoal (FILL)	L															
		▨	G-1	6		▨																		
5		U	U-2	9	0 2 2	▨		trace brick fragments	L		VH													
	80					▨																		
10		⧗	MC-3	9	6 8 7	⁘	SP	Poorly graded SAND with GRAVEL (SP); loose; dark gray; wet; fine to coarse sand; fine gravel																
						▨	CL	LEAN CLAY (CL); light brown; medium plasticity																
15						▨																		
	70					▨																		
20						⁘	SM	Silty SAND (SM); loose; brown; wet; fine sand																

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Depth (ft): Drilling Fluid
7/16/19	9.0	92.5	N/A	20
7/17/19	9.0	129.0	N/A	20
7/18/19	9.0	182.5	N/A	20
7/19/19	9.0	242.0	N/A	20

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.5 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 07/15/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 30, 50, 80, 100, 116, 143, 170, and 194 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 2 of 10

BORING NO.

BH-150

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			U-4	15	4 3 5		SM	Silty SAND (SM); loose; brown; wet; fine sand *(Continues)*																
							ML	Sandy SILT (ML); very stiff; olive gray; wet; low plasticity; trace charcoal	L					31	25	6	28	99						
25																								
	60																							
							CL	LEAN CLAY (CL); stiff; dark gray; wet; trace fine sand; medium plasticity																
30			P-5	16.5	175 psi				M		VH		0.5	48	24	24	31	89						VWP
35																								
							CH	FAT CLAY (CH); stiff; dark gray; wet; trace fine sand; high plasticity																
	50																							
40			P-6	16.5	180 psi				H		VH		0.7	61	27	34	40	80						CONSOL
45																								
							CL	LEAN CLAY (CL); gray																
	40							grades brown																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-150

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^{1} (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)^{4}	Field Tests: PTV (tsf)^{4}	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); gray *(Continues)*																
50			MC-7	15	9 28 37																			VWP
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); dense; gray; wet; fine gravel; few coarse gravels; fine to coarse sand											8	47	45			
55																								
	30																							
							CL	LEAN CLAY with SAND (CL); stiff; gray with olive mottling; moist; little fine sand; medium plasticity																
60			MC-8	15	5 9 13				M		VH													
														32	18	14	22	106	84	0	16	57	27	
								silty sand lens																
							CL	LEAN CLAY (CL); very stiff; olive gray; moist; trace fine sand; medium plasticity																
65																								
	20																							
70			MC-9	15	5 14 16				M		VH													
												2.2												
																								PMT
75																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-150

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
	10						CL	LEAN CLAY (CL); very stiff; olive gray; moist; trace fine sand; medium plasticity *(Continues)*																
							GC	Clayey GRAVEL (GC); very dense; olive brown; wet; trace fine to coarse sand; trace cobbles																
80			U-10	6	50/6																			VWP; broken cobble in shoe
							SP	Poorly graded SAND with SILT and GRAVEL (SP); dense; olive brown; wet; fine to coarse sand; some fine gravel																
			U-11	10	20 35 47														5	30	65			PMT
85			SS-12	10	17 28 29			grades to mostly coarse sand																
			U-13	6	26 50/6		GP	Poorly graded GRAVEL with SAND (GP); very dense; gray; wet; fine gravel; some fine to coarse sand; subangular to angular gravel																
	0		SS-14	10.5	22 30 36			grades brownish gray																86.5 - 88.0' fluid loss
			U-15	14	31 42 43														4	53	43			
90			MC-16	5	7 15 15			grades dense																
			PB-17	24	50-180 psi		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; grayish brown; wet; fine sand; some fine gravel																PMT
			U-18	6	36 50/6														6	42	52			
95			SS-19	7	11 24 29																			
	-10		PB-20	9	50-300 psi																			
			U-21	9	29 47 21																			PMT
100			PB-22	30	30-50 psi		CL	Sandy LEAN CLAY (CL); stiff to very stiff; light olive gray; wet; some silt; some fine sand; low plasticity	L					29	19	10	20		65	0	35	46	19	VWP
			U-23	6	16 15 18							2.8		29	19	10	18							
			PB-24	19	50-150 psi																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-150

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					CL	Sandy LEAN CLAY (CL); stiff to very stiff; light olive gray; wet; some silt; some fine sand; low plasticity *(Continues)*				2.7												
105					SC	Clayey SAND (SC); very dense; gray; moist																
		U-25	14	31 44 50/6																		
	-20	SS-26	13	3 8 10	CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; moist; fine sand; low plasticity	L															
		PB-27	30	50-100 psi		grades medium plasticity	M															
110																						
		U-28	18	11 14 17	CL	Sandy LEAN CLAY (CL); very stiff; pale olive to yellowish brown; moist; fine sand; medium plasticity	L															
												29	18	11	18	112						
										3.0												
		PB-29	21	50-300 psi																		
																						PMT
115		U-30	18	47 37 31	SM	Silty SAND with GRAVEL (SM); dense; gray and reddish brown; moist; fine sand; fine gravel																
						grades pale olive; no gravel											22	21	57	18	4	VWP
		SS-31	11	5 9 30																		
	-30																					
					SP	Poorly graded SAND (SP); very dense; olive brown; wet; trace fine to coarse gravel																
		U-32	NR	50/6																		PMT
		SS-33	8	32 50/6																		
		U-34	NR	50/4																		
120		SS-35	4	50/6																		
		U-36	NR	50/4																		
		SS-37	7	16 40 50/6																		
		U-38	6	43 50/4.5	SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; olive and gray; wet; fine to coarse sand; some fine gravel																PMT
																	8	45	47			
		SS-39	7	22 32 40																		
125		PB-40	25	50-180 psi	CL	Sandy LEAN CLAY (CL); hard; dark greenish gray; wet; some silt; some fine sand																
	-40									4.5												
		U-41	14	23 33 45																		
												29	18	11	18		67	0	33	45	22	PMT
						grades dark gray				4.2												
		PB-42	18	50-250 psi																		
130																						
																						PMT
		U-43	15	18 23																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-150

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					34		CL	LEAN CLAY (CL); hard; dark greenish gray; moist; low plasticity *(Continues)*	L															
			PB-44	15	50-200 psi						VH													
								grades with fine sand				>4.5												
135																								
			U-45	18	16 33 40																			PMT
														36	17	19	21	108						
	-50		PB-46	25	50-180 psi		CH	FAT CLAY (CH); very stiff; dark gray to dark olive; moist; high plasticity	H					50	20	30	22 22	106 104						TXCU
																								PMT
			U-47	18	18 23 42						VH													
140								grades gray																
												2.3												
								grades brown																
																								VWP
145			PB-48	30	50-190 psi						VH			54	24	30	27 24 25	98 102 101						SG; CONSOL; TXUU
	-60																							
												2.8												
							SM	Silty SAND (SM); medium dense; light olive brown; moist; fine sand																
150			PB-49	21	50-100 psi																			
							CL	LEAN CLAY with SAND (CL); very stiff; light gray and yellowish brown; moist; low plasticity																
155			U-50	9	20 50/6				L															
							SC-SM	Silty, Clayey SAND (SC-SM); very dense; light olive brown; moist; fine sand																
	-70																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-150

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		PB-51	23	50-180 psi	SC-SM	Silty, Clayey SAND (SC-SM); very dense; light olive brown; moist; fine sand *(Continues)*						26	21	5	20		48	0	52	34	14	
165		U-52	15	18 26 44																		
						grades olive gray																
	-80																					
					SM	Silty SAND with GRAVEL (SM); very dense; olive brown to yellowish brown; moist; fine to coarse sand; fine gravel																
170		SS-53	7	19 38 42																		VWP
					CL	Sandy LEAN CLAY (CL); hard; dark gray; moist; fine sand; trace coarse gravel; low plasticity																
175		SS-54	4	15 18 20			L															
	-90				CL	LEAN CLAY (CL); hard; dark greenish gray; moist; some silt; low plasticity																
180		PB-55	24	50-180 psi			L		VH													
										>4.5												
					CL	LEAN CLAY with SAND (CL); very stiff; pale olive; moist; fine sand; medium plasticity																
185		PB-56	30	80-100 psi			M		VH													
	-100																					

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-150

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM	Silty SAND with GRAVEL (SM); very dense; dark yellowish brown; wet; fine and medium sand; fine gravel *(Continues)*																
190			U	NR	50/6																			
			SS-57	7	23 50/6																			
							SP	Poorly graded SAND with GRAVEL (SP); very dense; yellowish brown to olive brown; moist; fine and medium sand; trace fine gravel																VWP
195			SS-58	8.5	35 45 50/6																			
	-110																							
							GP	Poorly graded GRAVEL with SAND (GP); very dense; grayish brown; moist; fine gravel; coarse sand; subangular gravel																
200			SS-59	5.5	30 50/5																			
205			PB-60	30	100-150 psi		CH	FAT CLAY (CH); very stiff; gray; wet; high plasticity	H		VH													
	-120																							
							SM	Silty SAND (SM); very dense; yellowish brown; wet; fine sand																
210			U-61	15	33 43 50/4																			
215																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-150

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							SM	Silty SAND (SM); very dense; yellowish brown; wet; fine sand *(Continues)*																
	-130																							
220		☒	SS-62	6.5	40 42 31			trace gravel; thinly bedded sand																
							CL	LEAN CLAY (CL); yellowish brown																
225																								
	-140																							
230		▨	PB-63	24	50-300 psi																			
							SM	Silty SAND with GRAVEL (SM); very dense; yellowish to olive brown; moist; fine to coarse sand; fine gravel																
235																								
	-150																							
240		▨	PB-64	21	50-200 psi																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-150

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
245	-160						SM	Silty SAND with GRAVEL (SM); very dense; yellowish to olive brown; moist; fine to coarse sand; fine gravel *(Continues)*																
250		∪	U-65	14	28 30 50/5		SM	Silty SAND (SM); very dense; yellowish reddish brown; wet; fine sand; trace fine gravel; thinly bedded silt and sand																
		☒	SS-66	16	10 4 33																			

Boring terminated at a depth of 253.0 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.5 feet bgs.
Vibrating wire piezometers installed at 30, 50, 80, 100, 116, 143, 170, and 194 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

Depth (ft)	Elevation (ft)
255	
	-170
260	
265	
	-180
270	

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-151

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	July 22, 2019 at 6:25 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	July 26, 2019 at 12:35 pm

Boring Location: 65 W. Santa Clara St.

Northing: 1,947,821.005 **Easting:** 6,157,081.329

Horizontal Datum: NAD 1983

Elevation: 87.51 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
						■		3" Asphalt Concrete; 7" Aggregate Base (Pavement Section)																
						⁘	SP	Poorly graded SAND with GRAVEL (SP); loose; brown; dry; some brick fragments (FILL)																
			G			⁘																		
						▨	CL	Sandy LEAN CLAY (CL); brown																
5						▨																		
	80					▨																		
10						▨																		
15						▨																		
	70					▨																		
						▨		grades gray																
20						▨																		

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
7/24/19	9.0	140.5	N/A	22
7/25/19	9.0	241.0	N/A	22

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 8.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 07/22/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 192 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-151

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
						▨	CL	Sandy LEAN CLAY (CL); brown *(Continues)*																
								grades light gray																
25																								
						░	SP	Poorly graded SAND (SP); gray																
	60																							
30																								
35																								
						▨	CL	LEAN CLAY (CL); gray																
	50																							
40																								
45																								
	40																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

MMW TEAM

SOIL BORING LOG

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BORING NO.
BH-151

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL	LEAN CLAY (CL); gray *(Continues)* grades olive gray																
50							SM	Silty SAND (SM); loose; gray; wet; fine sand																
			U-1	15	4 8 10									24	20	4	21		49	0	51	35	14	
55							CL	LEAN CLAY (CL); stiff; olive gray; trace fine sand; trace fine gravel; medium plasticity	M															
			PB-2	24	50-150 psi									39	20	19	30	93						SG; CONSOL
	30											1.2												
60																								
65																								
	20																							
70																								vibration testing
75																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 4 of 11

BORING NO.

BH-151

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CL																	
	10						GP	Poorly graded GRAVEL (GP); gray; fine gravel; rounded gravel																
80			U-3	15	37 45 50/6		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); dense; gray; wet; fine to coarse sand; little fine gravel; few coarse gravels											11	31	58			vibration testing
			SS-4	12	15 22 25																			
			U-5	8	25 31 50/6			grades to little coarse gravel																
85			SS-6	8	28 38 32			grades olive brown																
			U-7	11	25 41 50/6			grades gray; mostly coarse sand																
	0		SS-8	6	10 15 17																			
							GP	Poorly graded GRAVEL (GP); dense; gray to brown; wet; fine gravel; trace fine sand; angular gravel																
			U-9	7	11 23 36		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); dense; brown and gray; wet; fine to coarse sand; little fine gravel; trace coarse gravel																
90			U-10	9	15 33 34																			vibration testing
			SC-11	12	16 23 24			grades olive brown											7	30	63			
			SS-12	11.5	17 27 23																			
95			U-13	6	23 40 50/6			pocket of olive to dark gray coarse gravel																
			SS-14	6	15 27 43		SP	Poorly graded SAND with GRAVEL (SP); very dense; moist; medium and coarse sand; fine gravel; trace clasts of brown clay																
	-10		U-15	10	17 41 50/6																			
100			SS-16	4	23 12 20		CL	Sandy LEAN CLAY (CL); hard; olive gray; moist; fine to coarse sand; trace fine gravel; low plasticity																
			PB-17	19	50-120 psi				L		VH													
							CL	LEAN CLAY with SAND (CL); very stiff; bluish gray; moist; some silt; little fine sand; medium plasticity	M			2.2												
			PB-18	27	50-80 psi									43	20	23	26 26 19	100 100 110	81	0	19	49	32	CONSOL; TXUU

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-151

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
							CL																	
105							SC	Clayey SAND (SC); dense; gray; wet																
			U-19	18	22 25 34		CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; wet; little fine sand; low plasticity	L															
	-20		PB-20	28	50 psi						VH	4.3		32	16	16	22	105	71	0	29	51	20	
110			U-21	6	11 15 19			grades light olive brown																
			PB-22	30	50-80 psi						VH								67	1	32			
							CL	Sandy CLAY (CL); very stiff; yellowish brown; moist; some fine sand; low plasticity	L			3.3												
			U-23	16.5	15 23 33																			
115			U-24	15	15 15 9		GC	Clayey GRAVEL with SAND (GC); dense; light olive brown; fine gravel; medium sand; subrounded to angular gravel																
	-30		PB-25	14	70-100 psi		GP-GC	Poorly graded GRAVEL with CLAY and SAND (GP-GC); very dense; olive gray; wet; fine gravel; some fine gravel; some fine to coarse sand; little coarse gravel; subrounded to angular gravel											6	50	44			
120			U-26	9	17 37 50/6																			
			SS-27	9	11 27 50/6			grades olive; more medium and coarse sand																
			U-28	8	18 27 50/6																			
			SS-29	9	17 37 50/6			grades to subrounded gravel																
125			PB-30	27	80-200 psi		CH	FAT CLAY with SAND (CH); very stiff; dark greenish gray; moist; fine sand; high plasticity			VH	>4.5		53	22	31	24	102						SG; CONSOL
	-40		U-31	14	16 24 29		GP	Poorly graded GRAVEL (GP); dense; olive gray; wet; fine gravel; subrounded to subangular gravel																
							CL	Sandy LEAN CLAY (CL); very stiff; dark greenish gray; moist; fine sand; little fine gravel; low plasticity; trace charcoal	L			3.3												
130			SS-32	12	11 10 20						VH													

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					CL																	
					OL	ORGANIC CLAY (OL); stiff; dark gray to black; moist; low plasticity																
135		PB-33	18	50-100 psi			L					30	24	6	28	93						
						grades to very dark gray				2.2												
	-50																					
					CL	LEAN CLAY (CL); hard; gray; moist; medium plasticity																
140		U-34	13	17 21 30			M					41	18	23	23							
145																						
	-60																					
					CL	LEAN CLAY with SAND (CL); very stiff; light yellowish brown with yellowish brown mottles; wet; fine sand; low plasticity																
150		PB-35	20	50-150 psi			L		VH													
										3.8												
155																						
	-70																					
160																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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BORING NO.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description[2,3]**	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			PB-36	20	50-60 psi		CL																	
							SP	Poorly graded SAND (SP); medium dense; brownish gray; wet																
165																								
							CL	Sandy LEAN CLAY with GRAVEL (CL); hard; olive yellow to light olive brown; fine sand; fine gravel; medium plasticity																
	-80																							
170			U-37	15	19 24 32				M					38	19	19	22							
175																								
							OL	ORGANIC CLAY (OL); very stiff; dark gray; moist; some silt; low plasticity																
	-90																							
180			PB-38	21	50-200 psi				L		VH													
								grades to greenish gray																
185																								
	-100																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							OL	ORGANIC CLAY (OL); very stiff; dark gray; moist; some silt; low plasticity *(Continues)*																
							GC	Clayey GRAVEL (GC); very dense; olive yellow and gray; wet; fine gravel; fine sand; subangular gravel																
190			SS-39	3	50/3																			
																								VWP
195																								
							SM	Silty SAND (SM); very dense; brown; moist; fine sand; trace coarse gravel																
	-110																							
200			SS-40	9	16 29 48																			
205																								
	-120																							
							CL	LEAN CLAY with SAND and GRAVEL (CL); very stiff; light yellowish brown to olive yellow and gray; moist; fine sand; fine gravel; medium plasticity																
210			U-41	12	25 50/6																			
							ML	Sandy SILT (ML); hard; yellowish brown; moist; some fine sand; nonplastic; interbedded pockets of clean fine SAND (SP), very dense	NP															
215																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							ML	Sandy SILT (ML); hard; yellowish brown; moist; some fine sand; nonplastic; interbedded pockets of clean fine SAND (SP), very dense *(Continues)*																
	-130																							
220			SS-42	10.5	24 33 44			grades olive yellow to light olive brown with reddish staining																
225																								
	-140																							
								grades with fine rounded gravel																
230			U-43	6	50/6		SC	Clayey SAND (SC); very dense; light olive brown; wet; fine and medium sand																
235																								
	-150																							
240			SS-44	17.5	18 22 27		CL	Sandy LEAN CLAY (CL); hard; mottled light olive gray and yellowish brown; moist; fine sand; medium plasticity	M															
							GP	Poorly graded GRAVEL with SAND (GP); very dense; yellowish brown; wet; fine gravel; medium and coarse sand																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							GP	Poorly graded GRAVEL with SAND (GP); very dense; yellowish brown; wet; fine gravel; medium and coarse sand *(Continues)*																
245																								
	-160																							
250		☒	SS-45	6	28 50/6																			
255																								
	-170																							
260																								
265																								
	-180																							
270																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
							GP	Poorly graded GRAVEL with SAND (GP); very dense; yellowish brown; wet; fine gravel; medium and coarse sand *(Continues)*																
			U-46	NR	12 12 12																			

275

Boring terminated at a depth of 274.5 feet bgs.
Borehole overdrilled from 260 feet to 275 feet to accomodate OYO method downhole P.S. logging.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 8.0 feet bgs.
Vibrating wire piezometer installed at 192 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

-190

280

285

-200

290

295

-210

300

1.) Light gray shading indicates length of sample recovery.	2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.	4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-152

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	July 29, 2019 at 7:40 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	August 2, 2019 at 4:30 pm

Boring Location: Montgomery St. & W Santa Clara St.

Northing: 1,946,271.296 **Easting:** 6,154,224.094

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 86.59 ft.

Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
								7" Asphalt Concrete; 4"Aggregate Base (Pavement Section)																
							CL	LEAN CLAY with GRAVEL (CL); dark brown																
							CH	FAT CLAY with SAND (CH); hard; dark gray with dark brown mottling; very fine sand; high plasticity																
5			U-1	14	8 16 24				H			4.5												
	80																							
							CL	LEAN CLAY with SAND (CL); very stiff; olive gray with yellowish brown mottling; moist; low plasticity																
10			U-2	15	5 8 11				L			2.6												
15																								
							SP	Poorly graded SAND with GRAVEL (SP); dense; brown to very dark gray; wet; medium sand; fine gravel; lens of silty sand																
	70																							
20																								

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
7/30/19	9.0	94.5	N/A	14.5
7/31/19	9.0	130.0	N/A	14.5
8/1/19	9.0	192.5	N/A	14
8/2/19	9.0	251.5	N/A	14.5

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.5 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 07/29/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 67, 90 and 110 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			U-3	15	15 17 13		SP	Poorly graded SAND with GRAVEL (SP); dense; brown to very dark gray; wet; medium sand; fine gravel; lens of silty sand *(Continues)*																
							CL	Sandy CLAY (CL); very stiff; gray with olive brown mottles; moist; little silt; little fine sand; low plasticity																
25																								
	60																							
30			PB-4	28	30-50 psi				L		VH			28	17	11	22							
												2.2												
35																								
	50																							
								grades dark greenish gray																
40			PB-5	23	50-70 psi						L			32	22	10	25 24	100 100						TXCU
45																								
	40																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL	Sandy CLAY (CL); very stiff; gray with olive brown mottles; moist; little silt; little fine sand; low plasticity *(Continues)* grades olive																
50			PB-6	16	30-100 psi		SM	Silty SAND (SM); medium dense; dark greenish gray; wet; fine sand											34					
							CL	LEAN CLAY (CL); stiff; olive gray; wet; trace fine sand; low plasticity																
55																								
	30																							
60			PB-7	23	50-180 psi									35	18	17	16	112						
							SM	Silty SAND (SM); medium dense; olive gray; wet; fine sand									21	104						
65																								
							SP	Poorly graded SAND with GRAVEL (SP); dense; olive brown to grayish brown; moist; fine to coarse sand; fine gravel																
	20																							VWP
			U-8	14	41 45 46																			
70			SS-9	10	17 30 18																			
			PB-10	30	50-80 psi		CL	LEAN CLAY with SAND (CL); very stiff; grayish brown with black speckles; moist; fine sand; low plasticity	L		L													
			U-11	15	10 18 23		ML	SILT with SAND (ML); very stiff; olive and gray; moist; fine sand; low plasticity	L		M	3.9												
75			SS-12	15	8 9 15		CL	LEAN CLAY with SAND (CL); stiff; dark bluish gray; moist; fine sand; low plasticity	L		M													

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
							Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
					CL	LEAN CLAY with SAND (CL); stiff; dark bluish gray; moist; fine sand; low plasticity *(Continues)*																
	10	PB-13	30	50-60 psi								36	18	18	23 23 24	102 102 101						SG; CONSOL; TXUU
80		U-14	18	7 9 13						1.3												
		SS-15	18	8 11 13		grades dark gray; wet				1.2												
		PB-16	19	50-80 psi								26	18	8	22	102						
						grades very stiff; dark greenish gray; less sand				2.7												
85		U-17	16	15 25 32	CL	Sandy CLAY with GRAVEL (CL); hard; greenish gray; moist; trace fine sand; trace coarse sand; medium plasticity	M			4.3												
		SS-18	8	15 22 22		grades light olive brown with dark yellowish brown staining; little fine gravel; trace coarse gravel																
	0				SM	Silty SAND (SM); dense; olive brown; wet; fine sand; few clay																
		PB-19	24	80-100 psi													35	0	65	29	6	
90		U-20	15	17 20 39		grades with little fine gravel																VWP
		SS-21	10	11 13 29		grades yellowish brown; moist; clayey																
		U-22	7	46 50/3	GP	Poorly graded GRAVEL with SAND (GP); very dense; brownish gray; wet; fine gravel; medium and coarse sand; subrounded to subangular gravel																
		SS-23	6	31 50/4																		
95		U-24	8	42 50/5																		
	-10	SS-25	11	21 29 41		grades silty																
		U-26	16	46 29 19	CL	LEAN CLAY with SAND (CL); stiff; light olive brown; moist; fine sand; low plasticity	L			2.0												
		SC-27	11	12 13 21																		
100		SS-28	11	20 23 30																		
					SM	Silty SAND (SM); medium dense; greenish gray; wet; fine sand																
		PB-29	16	50-120 psi																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
							Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
		U-30	11	15 16 20	CL	Sandy LEAN CLAY (CL); very stiff; gray; moist; fine sand; medium plasticity *(Continues)*	M															
105										2.4												
		SC-31	11	10 11 13																		
	-20				SM	Silty SAND with GRAVEL (SM); dense; greenish gray; wet; fine to coarse sand; fine to coarse gravel																
		SS-32	11	17 19 27																		
		PB-33	18	50-300 psi													21	36	43			
					GP	Poorly graded GRAVEL with SAND (GP); very dense; light olive brown and gray; wet; fine to coarse gravel; medium and coarse sand; subrounded to angular gravel																
110																						VWP
		U-34	3	50/4																		
		SS-35	7	35 50/6																		
		U-36	2	50/4		lens of clean fine sand																
		SS-37	7	45 50/6	SP-SM	Poorly graded SAND with SILT (SP-SM); very dense; dark grayish brown; wet; fine to coarse sand; little fine gravel																
		U-38	NR	50/5																		
		SS-39	6	28 50/5																		
115		U	NR	50/2																		
		SS-40	4	50/5																		
		SS-41	4	16 34 23		grades with more gravel																
					CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; wet; fine sand; low plasticity	L															
	-30																					
		PB-42	30	50-80 psi																		
										3.7		27	18	9	20	108						
		PB-43	16	50-80 psi																		
120																						
					SM	Silty SAND (SM); medium dense; greenish gray; wet; fine sand																
		U-44	6	19 17 20	CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; moist; fine sand; low plasticity	L															
		SC-45	18	10 13 18																		
125										2.2												
		SS-46	18	15 25 45																		
						grades yellowish brown; trace charcoal																
	-40	PB-47	15	80-300 psi	SP	Poorly graded SAND (SP); very dense; olive; moist; fine sand																
		U-48	15	42 48 50/6		grades to gray; wet; medium and coarse sand																
130																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SP	Poorly graded SAND (SP); very dense; olive; moist; fine sand *(Continues)*																
							CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; moist; fine sand; medium plasticity																
135			PB-49	27	50-180 psi				M		VH			39	19	20	24 22	103 105						TXCU
	-50																							
												3.8												
							CH	FAT CLAY (CH); very stiff; light yellowish brown and gray; moist; high plasticity																
140			PB-50	24	50-100 psi				H		VH													
												2.9												
145			PB-51	30	50-100 psi																			
							SC	Clayey SAND (SC); dense; olive brown; moist; fine sand																
	-60																							
150			SS-52	7	45 50/3		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark gray and grayish brown; wet; medium and coarse sand; little fine gravel																
155			SS-53	4.5	31 20 19			grades dense																
	-70																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)^4	Field Tests: PTV (tsf)^4	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
			SS-54	8.5	19 17 20		CL	LEAN CLAY (CL); hard; light olive brown with dark yellowish brown staining; moist; few sands; low plasticity *(Continues)*	L		VH													
165			PB-55	23	50-80 psi																			
	-80											4.2												
								grades to mottled light and dark yellowish brown																
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; light olive brown to grayish brown; moist; medium and coarse sand; little fine gravel																
170			SS-56	9	30 44 50/6																			
175			SS-57	3.5	50/6																			
	-90																							
180			SS-58	5.5	39 50/6			grades with some fine gravel																
							CH	FAT CLAY (CH); very stiff; light olive brown and dark yellowish brown; moist; high plasticity																
185			PB-59	30	80-200 psi				H		VH													
	-100																							
												3.0												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CH	FAT CLAY (CH); very stiff; light olive brown and dark yellowish brown; moist; high plasticity *(Continues)*																
190			PB-60	24	50-80 psi																			
								grades hard; pale yellow and yellowish brown; sandy				4.2												
							CL	Sandy LEAN CLAY (CL); hard; gray and dark yellowish brown; moist; fine sand; low plasticity																
195			PB-61	18	50-150 psi				L															
	-110											4.5												
200			PB-62	23	50-80 psi																			
												4.5												
205			U-63	9	20 50/3			trace fine gravel																
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; light olive brown and very dark gray; wet; medium and coarse sand; some fine gravel																
	-120																							
210			SS-64	4	50/6																			
							CH	FAT CLAY (CH); very stiff; light olive brown with black speckles; moist; high plasticity																
215			PB-65	26	50-200 psi				H		VH													

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
	-130						CH	FAT CLAY (CH); very stiff; light olive brown with black speckles; moist; high plasticity *(Continues)*				3.9												
							CL-ML	Silty CLAY with SAND (CL-ML); hard; light olive brown; moist; fine sand; low plasticity																
220			PB-66	18	50-200 psi				L			>4.5												
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; light olive brown; wet; fine to coarse sand; little fine gravel																
225																								
	-140																							
230			SS-67	7.5	47 50/5																			
235							ML	Sandy SILT (ML); hard; light gray with dark yellowish brown mottling; moist; fine sand; low plasticity																
	-150																							
240			U-68	16	23 32 50/4						H	4.4												
							SM	Silty SAND (SM); very dense; dark grayish brown; fine sand; little silt; trace fine gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM	Silty SAND (SM); very dense; dark grayish brown; fine sand; little silt; trace fine gravel *(Continues)*																
245																								
	-160																							
250			SS-69	9	33 40 43																			
255								interbedded fine gravel																
							CL	LEAN CLAY (CL); brown																
	-170																							
260								grades silty; gray																
265																								
							SP	Poorly graded SAND with GRAVEL (SP)																
	-180																							
							CL	LEAN CLAY (CL); brown																
270																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-152

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
						▨	CL	LEAN CLAY (CL); brown *(Continues)*																
						░	SP	Poorly graded SAND (SP)																
						▨	CL	LEAN CLAY (CL)																
275																								

Boring terminated at a depth of 275.0 feet bgs.
Borehole overdrilled from 260 feet to 275 feet to accomodate OYO method downhole P.S. logging.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.5 feet bgs.
Vibrating wire piezometers installed at 67, 90 and 110 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

-190

280

285

-200

290

295

-210

300

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-153

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	August 5, 2019 at 9:00 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	August 9, 2019 at 12:00 pm

Boring Location: 4S South Montgomery St.

Northing: 1,946,168.479 **Easting:** 6,154,065.702

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 88.80 ft.

Vertical Datum: NAVD 88

							Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
						3" Asphalt Concrete; 33" Aggregate Base (Pavement Section)																
					CH	FAT CLAY (CH); hard; black; moist; high plasticity; some organics (Native)			VH													
5		U-1	15	8 19 20			H			4.5												
	80																					
					CL	LEAN CLAY with SAND (CL); stiff; dark olive to olive with yellowish brown mottles; moist; fine sand; medium plasticity																
10		U-2	14	5 6 9			M		VH	1.8		40	18	22	24							
15						brown sand lens																
						grades gray																
	70																					
20																						

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
8/6/19	9.0	97.0	N/A	21.5
8/7/19	9.0	136.5	N/A	20.5
8/8/19	9.0	196.5	N/A	23
8/9/19	9.0	251.5	N/A	23

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.5 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 08/05/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 65, 94, 131, 156, and 176 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-153

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
			U-3	13	5 7 9		CL	Sandy LEAN CLAY (CL); stiff; olive; moist; low plasticity	L		VH	1.6												
25							CL	LEAN CLAY (CL); stiff; light olive brown; moist; little fine sand; medium plasticity																
	60																							
30			PB-4	28	50-70 psi				M					46	17	29	28 26 27	94 98 97						CONSOL; TXUU
							CL	Sandy LEAN CLAY (CL); stiff; gray with light olive brown; moist; fine sand; low plasticity	L			1.1												
35																								
	50																							
40			U-5	18	4 7 10			grades some silt	L			1.9		30	22	8	23							
45							ML	Sandy SILT (ML); very stiff; gray with light olive brown mottling; moist; fine sand; low plasticity																

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-153

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
							ML	Sandy SILT (ML); very stiff; gray with light olive brown mottling; moist; fine sand; low plasticity *(Continues)*																
	40																							
50			U-6	17	5 8 10			grades with fine to medium sand	L			2.3		28	23	5	21 22	109 107						TXCD
55																								
	30																							
60			PB-7	29	50-100 psi																			
							SM	Silty SAND (SM); medium dense; bluish gray; wet; fine and medium sand; trace clay																
65																								VWP
			PB-10	26	50-200 psi																			
	20						ML	Sandy SILT (ML); very stiff; olive brown; wet; fine sand; low plasticity	L															
70								grades to silty sand; trace fine gravel																
			U-11	15	31 31 17		SP	Poorly graded SAND with GRAVEL (SP); medium dense; olive brown; wet; fine and medium sand																
							CL	LEAN CLAY with SAND (CL); stiff; brown; moist; fine sand; trace coarse gravel; low plasticity	L															
			SC-12	17	3 2 3																			
			SS-13	15	6 8 11																			
							CL	Sandy LEAN CLAY (CL); stiff; gray; moist; fine sand; medium plasticity	M															
75			PB-14	29	50-100 psi									38	18	20								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-153

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CL	Sandy LEAN CLAY (CL); stiff; gray; moist; fine sand; medium plasticity *(Continues)*				1.6												
	10		U-15	18	5 11 13							1.7												
80			SC-16	18	7 7 7			grades with more sand and fine gravel																
			SS-17	14	6 11 17			very stiff																
			PB-18	30	50-70 psi			grades dark greenish gray; low plasticity	L					31	22	9	22 24 22	103 99 105						CONSOL; TXCU
85			U-19	18	15 20 25							1.8 1.7												
			SC-20	17	15 20 50/6		GC	Clayey GRAVEL with SAND (GC); dense; olive gray and yellowish brown; moist; fine gravel; fine sand; subrounded to subangular gravel																
	0		SS-21	9	23 33 45		SC	Clayey SAND (SC); very dense; olive and dark yellowish brown; wet; fine and medium sand																
90			U-22	14	25 20 35																			
			SC-23	17	10 22 27																			
			SS-24	9	33 45 50/6		SM	Silty SAND with GRAVEL (SM); very dense; dark yellowish brown; wet; fine to coarse sand; some fine gravel																
			U-25	9	45 50/6			grades olive brown											15	34	51			VWP
95			SC-26	15	35 48 50/6																			
			SS-27	8	33 50/6		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark olive brown; wet; fine to coarse sand; some fine gravel											10	33	57			PSA performed on samples 27, 28 and 29
			SS-28	8	29 26 29																			
	-10		U-29	11	43 50/6																			
100			SC-30	13	20 33 45																			
			SS-31	6	12 23 50/6			pocket of fine gravel																
			U-32	13	35 27 17		CL	LEAN CLAY with SAND (CL); very stiff; olive brown; moist; little fine sand; medium plasticity; pockets of silty clay with organics	M			2.5												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-153

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
105			SC-33	8	9 12 10		CL	LEAN CLAY with SAND (CL); very stiff; olive brown; moist; little fine sand; medium plasticity; pockets of silty clay with organics *(Continues)*			VH													
			SS-34	3	5 7 6																			
	-20		PB-35	29	50-100 psi			grades light olive brown				2.6		35	17	18	26	98						
110			U-36	NR	9 16 28																			
			SC-37	17	25 48 50/6		GC	Clayey GRAVEL (GC); very dense; olive yellow; moist; fine gravel; little fine sand; trace coarse gravel; subangular gravel																
			SS-38	8	34 42 50/6		SP	Poorly graded SAND with GRAVEL (SP); very dense; olive brown; wet; medium and coarse sand; fine to coarse gravel																
115			U-39	15	46 48 38		GP	Poorly graded GRAVEL with SAND (GP); very dense; olive brown; wet; fine gravel; medium to coarse sand; subangular gravel																
			SC-40	9	10 13 15		CL	Sandy LEAN CLAY (CL); very stiff; olive brown; moist; low plasticity	L		VH	2.6												
			SS-41	4.5	8 10 26		SM	Silty SAND with GRAVEL (SM); dense; olive; moist; fine gravel; trace coarse gravel																
	-30		U-42	15	12 22 28		CL	LEAN CLAY (CL); hard; olive; moist; trace fine gravel; medium plasticity	M			3.8												
120			SC-43	15	8 10 11			grades very stiff																
			SS-44	13	6 10 22		CL	Sandy CLAY (CL); very stiff; gray; moist; fine sand; low plasticity																
125			PB-45	25	50-200 psi		SM	Silty SAND with GRAVEL (SM); very dense; olive; wet; fine sand; little medium to coarse sand; little fine gravel											19	18	64			
			U-46	14	45 48 50/6			grades with less silt																
			SC-47	13	24 35 43		SP	Poorly graded SAND (SP); dense; olive; wet; medium and coarse sand; trace fine gravel																
	-40		SS-48	5	12 27 32																			
130																								VWP

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-153

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
						░	SP	Poorly graded SAND (SP); dense; olive; wet; medium and coarse sand; trace fine gravel *(Continues)* pocket of silty sand																
135		☒	SS-49	12	28 32 41	▨	CL	LEAN CLAY with SAND (CL); stiff; gray; moist; fine sand; medium plasticity	M					49	20	29	19							
	-50					▨	SC	Clayey SAND (SC); dense; light olive brown with dark yellowish brown mottling; moist; fine sand																
140		▨	PB-50	24	50-100 psi									36	24	12	19	105						SG; CONSOL
						▨	CL	Sandy LEAN CLAY (CL); very stiff; light olive brown; moist; fine sand; medium plasticity																
145		▨	PB-51	21	50-180 psi				M															
												3.7												
	-60					▨	CL	LEAN CLAY with SAND (CL); very stiff; yellowish brown with black mottling; moist; fine sand; low plasticity																
150		∪	U-52	18	15 22 26				L															
												2.7												
						░	SM	Silty SAND with GRAVEL (SM); very dense; olive; moist; fine to coarse sand; fine to coarse gravel																rig chatter
155		☒	SS-53	8	38 50/6																			
																								VWP
	-70					▨	CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; moist; fine sand; trace fine and coarse gravel; medium plasticity																
160		▨																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-153

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			PB-54	16	80-180 psi		CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; moist; fine sand; trace fine and coarse gravel; medium plasticity *(Continues)*	M		VH	2.7												
165			U-55	18	20 26 33		SM	Silty SAND (SM); dense; gray and olive brown; wet; fine sand; trace clay																
	-80																							
170			PB-56	21	60-300 psi																			
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine to coarse gravel; medium to coarse sand; subrounded gravel																
							SM	Silty SAND with GRAVEL (SM); very dense; grayish brown; wet; medium and coarse sand; fine gravel																
175			SS-57	4	50/6																			
																								VWP
							SM	Silty SAND (SM); dense; light olive brown; moist; fine sand																
	-90																							
180			U-58	18	24 29 38																			
							ML	SILT (ML); very stiff; light olive brown; moist; low plasticity	L		VH	2.4												
							CH	FAT CLAY (CH); very stiff; light olive brown; moist; high plasticity																
185			PB-59	26	50-200 psi				H		VH	3.2												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
	-100						CL	Sandy LEAN CLAY (CL); very stiff; gray with dark yellowish brown mottling; moist; fine sand; low plasticity																
190			U-60	16	20 41 50/4				L															
							SM	Silty SAND (SM); very dense; light olive gray; moist; fine sand																
195			U-61	18	24 35 50/6			trace fine gravel																
	-110																							
200			U-62	10	34 50/6		SP	Poorly graded SAND (SP); very stiff; light olive brown; moist; fine sand																
							CL	Sandy CLAY (CL); hard; gray and dark yellowish brown; moist; medium plasticity																
205			U-63	18	25 32 39				M		VH													
												3.6												
							SP	Poorly graded SAND with GRAVEL (SP); dense; brown; wet; fine sand; some fine gravel																rig chatter
	-120																							
210			SS-64	9	24 23 37		SM	Silty SAND (SM); very dense; brown; moist; fine sand																
							CL	LEAN CLAY with SAND (CL); hard; gray with dark yellowish brown mottling; moist; fine sand; medium plasticity																
215			U-65	15	18 42 50/4				M		VH													

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description[2,3]**	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CL	LEAN CLAY with SAND (CL); hard; gray with dark yellowish brown mottling; moist; fine sand; medium plasticity *(Continues)*				4.4												
	-130																							
220			U-66	14	24 30 50/5			grades less gray				4.2												
225			U-67	18	15 30 40			grades light olive brown; sandy				4.5												
							CL-ML	Sandy, Silty CLAY (CL-ML); hard; gray and dark yellowish brown; moist; low plasticity																
	-140																							
230			PB-68	23	50-100 psi				L			>4.5												
							CH	FAT CLAY (CH); hard; pale yellow; moist; high plasticity																
235			U-69	18	20 31 48				H			>4.5												
	-150																							
240			U-70	11	32 50/5		SM	Silty SAND (SM); very dense; olive yellow; wet; fine sand																
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine gravel; some fine to coarse sand; trace coarse gravel; rounded gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
245		☒	SS-71	5	50/5		GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine gravel; some fine to coarse sand; trace coarse gravel; rounded gravel *(Continues)*																
	-160																							
250		☒	SS-72	7	41 37 50/5		SM	Silty SAND (SM); very dense; light yellowish brown; wet; fine and medium sand																
255																								
	-170																							
260																								
265																								
	-180																							
270																								

Boring terminated at a depth of 251.4 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.5 feet bgs.
Vibrating wire piezometers installed at 65, 94, 131, 156, and 176 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-154

Project: BART to Silicon Valley Phase II Project
Location: Santa Clara County, CA
Client: Santa Clara Valley Transportation Agency
Drilling Co.: Pitcher Services, LLC

Project No.: 507385606
Field Eng. Staff: Virgil Santos
Date/Time Started: August 12, 2019 at 8:00 am
Date/Time Finished: August 16, 2019 at 11:00 am

Boring Location: 70 N. 28th St.

Northing: 1,952,701.664 **Easting:** 6,164,835.987

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983
Elevation: 89.31 ft.
Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							GP	Poorly graded GRAVEL (GP); dense; brownish gray; moist; fine gravel; some fine and coarse sand (FILL)																
							CH	FAT CLAY (CH); hard; dark brown; moist; high plasticity																
5			U-1	14	7 14 19				H		VH	>4.5												
							ML	Sandy SILT (ML); medium stiff; brown with black mottling; wet; fine sand; low plasticity																
	80																							
10			U-2	14	1 3 5				L M		H	1.3												
							CL	LEAN CLAY (CL); stiff; gray with light olive brown mottling; moist; medium plasticity																
15																								
	70																							
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Drilling Fluid
8/13/19	9.0	91.5	N/A	12.9
8/14/19	9.0	118.0	N/A	12.5
8/15/19	9.0	181.5	N/A	12
8/16/19	9.0	225.0	N/A	12.5

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 8.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 08/12/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 78, 117, 146, and 161 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			U-3	16	3 4 6		CL	LEAN CLAY (CL); stiff; gray with light olive brown mottling; moist; medium plasticity *(Continues)*	M					26	18	8	23	103						
								grades with fine sand				1.3												
25																								
							CL	LEAN CLAY (CL); stiff; dark grayish brown; wet; low plasticity																
	60																							
30			PB-4	29	50 psi				L															
												1.2												
35																								
							CH	FAT CLAY (CH); stiff; dark gray; moist; high plasticity																
	50																							
40			U-5	13	4 9 15				H					63	27	36	31	90						
												1.8												
45																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-154

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
					CH	FAT CLAY (CH); stiff; dark gray; moist; high plasticity *(Continues)*																
	40																					
50		U-6	17	5 10 15								55	26	29	32	88						
						grades very stiff; gray																
										2.2												
55																						
						grades silty																
	30																					
60		PB-7	19	50-100 psi																		
					SM	Silty SAND with GRAVEL (SM); medium dense; dark grayish brown; wet; fine sand; little fine gravel									25	100	23	29	48			
					GP	Poorly graded GRAVEL with SAND (GP); dense to very dense; grayish brown; wet; fine gravel; medium sand; rounded to subangular gravel																
65																						
		U-8	12	36 42 50/6																		
	20																					
		SC-9	16	31 45 50/6																		
70																						
					SP	Poorly graded SAND (SP); very dense; dark gray to grayish brown; wet; medium sand; trace coarse gravel																
		SS-10	8	15 28 50/6																		
		U-11	11	38 48 50/3																		
		SC-12	15	38 48 50/6	GW	Well graded GRAVEL with SAND (GW); very dense; olive gray; wet; fine gravel; some fine to coarse sand; subangular gravel																
75																						
		SS-13	10	21 29																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-154

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
					50/6		GW	Well graded GRAVEL with SAND (GW); very dense; olive gray; wet; fine gravel; some fine to coarse sand; subangular gravel *(Continues)*																
			U-14	15	29 29 37														4	53	43			VWP
	10		SC-15	15	13 31 36																			
80			SS-16	10	10 31 38		SP	Poorly graded SAND (SP); very dense; grayish brown; wet; medium sand; trace fine to coarse gravel																
			U-17	13	22 33 37																			
			SC-18	11	15 13 25			medium dense; olive brown; no gravel																
85			SS-19	9	20 36 39			grades little fine to coarse gravel																
			U-20	11	14 13 22		ML	Sandy SILT (ML); very stiff; dark gray to very dark gray; wet																
			SC-21	12	13 15 20																			
90	0		SS-22	7	21 23 30		SM	Silty SAND (SM); very dense; dark olive brown; moist; fine sand; trace fine gravel																
			U-23	11	25 45 33		SP	Poorly graded SAND with GRAVEL (SP); medium dense; dark grayish brown; wet; little fine gravel																vibration testing
			SC-24	11	11 13 15																			
			SS-25	11	13 23 41		CL	Sandy LEAN CLAY (CL); very stiff; gray with dark yellowish brown staining; wet; medium plasticity	M															
95			PB-26	28	50-100 psi			grades dark greenish gray; some fine sand						38	19	19	22	105	55	0	45	38	17	
			U-27	14	11 20 23							2.8												
	-10		SC-28	11	9 11 23		CL SP-SM	LEAN CLAY (CL); very stiff; dark gray; moist; medium plasticity Poorly graded SAND with SILT (SP-SM); medium dense; olive gray; wet; medium sand	M		VH													
100			PB-29	26	50-80 psi																			vibration testing
			U-30	11	48 50/6			grades very dense											11	1	88			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-154

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
105			SC-31	14	26 48 50/6		SP-SM	Poorly graded SAND with SILT (SP-SM); medium dense; olive gray; wet; medium sand *(Continues)*																
			SS-32	8	20 26 30		ML	Sandy SILT (ML); very stiff; gray; moist; trace fine gravel; low plasticity	L															
			U-33	8	48 50/6		GP	Poorly graded GRAVEL with SAND (GP); very dense; olive gray; wet; fine and coarse gravel; fine to coarse sand; subrounded to subangular gravel																
	-20		SC-34	14	31 34 48																			
110			U-35	9	48 50/6		SP	Poorly graded SAND with GRAVEL (SP); very dense; dark gray; wet; fine and medium sand; little fine gravel																vibration testing
			SC-36	13	16 48 50/4																			
			SS-37	6	10 41 32																			
			U-38	7	16 40 50/4																			
115			SC-39	12	16 48 50/6			grades to grayish brown; trace coarse gravel																
			SS-40	6	13 26 50/6		GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; olive brown; wet; fine gravel; medium and coarse sand; subangular gravel																VWP
	-30		U-41	14	26 41 50/5.5												9		9	62	29			
120			SC-42	14	31 32 36			pocket of sandy clay																
			SS-43	9	20 47 50/3																			
			U-44	9	48 50/3		SP	Poorly graded SAND with GRAVEL (SP); very dense; dark olive gray; wet; medium sand; little fine gravel																
			SC-45	7	49 50/6																			
125			SS-46	6	37 50/6			lens of silt with sand																
			U-47	14	35 30 29		SM	Silty SAND (SM); dense; dark greenish gray; wet; fine sand																
			SC-48	11	13 17 20																			
	-40		SS-49	5	12 20 36		ML	SILT (ML); hard; bluish gray; wet; nonplastic	NP															
130																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-154

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					ML	SILT (ML); hard; bluish gray; wet; nonplastic *(Continues)*																
135		PB-50	30	50-100 psi																		
												NP	NP	NP	22	103						
										4.5												
	-50																					
140		PB-51	24	80-180 psi																		
					SM	Silty SAND (SM); dense; dark greenish gray; wet; fine sand											49	0	51			
					SP	Poorly graded SAND (SP); very dense; olive gray; wet; medium and coarse sand; trace fine gravel																
145		U-52	11	49 50/6																		
																						VWP
					CL	LEAN CLAY (CL); very stiff to hard; olive and gray; moist; medium plasticity																
	-60																					
150		U-53	17	20 33 45			M					38	23	15	24							
										3.8												
155		PB-54	21	80-300 psi																		
					SM	Silty SAND (SM); very dense; brown; wet; fine sand											17	0	83			
					GP	Poorly graded GRAVEL with SAND (GP); very dense; olive brown; wet; fine gravel; coarse sand; subrounded to subangular gravel																
	-70																					
160																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-154

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			SS-55	4	50/6		GP	Poorly graded GRAVEL with SAND (GP); very dense; olive brown; wet; fine gravel; coarse sand; subrounded to subangular gravel *(Continues)*																VWP
165			SS-56	3	50/6																			coarse gravel (sandstone) in shoe
							CH	FAT CLAY (CH); hard; olive brown to olive and gray; wet; trace coarse gravel; high plasticity																
	-80																							
170			U-57	13	25 28 40				H		VH	>4.5		60	28	32	29							
175			PB-58	20	80-200 psi																			
							SC	Clayey SAND (SC); dense; olive and gray; wet; fine sand																
							SM	Silty SAND (SM); dense; olive; wet; fine sand																
	-90																							
180			U-59	15	33 31 40														18	0	82			
							CH	FAT CLAY (CH); very stiff; olive gray; moist; high plasticity	H		VH													
185			PB-60	24	80-180 psi			grades very dark gray			VH	2.8												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-154

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SP	Poorly graded SAND with GRAVEL (SP); very dense; grayish brown; wet; medium sand; little fine gravel *(Continues)*																
	-100																							
190			SS-61	4	50/6																			
195			SS-62	6	40 50/5																			
							CL	LEAN CLAY (CL); hard; olive gray; wet; medium plasticity																
	-110																							
200			U-63	11	26 50/6				M		VH	>4.5		46	18	28	16							
								grades olive brown																
205			PB-64	26	80-220 psi							4.3												
	-120																							
210			U-65	18	21 32 41			grades olive and gray				4.5												
215																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-154

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^{1} (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)^{4}	Field Tests: PTV (tsf)^{4}	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
220	-130					▨	CL	LEAN CLAY (CL); hard; olive gray; wet; medium plasticity *(Continues)*																

225

Boring terminated at a depth of 225.0 feet bgs.
Borehole overdrilled from 210 feet to 225 feet to accomodate OYO method downhole P.S. logging.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 8.0 feet bgs.
Vibrating wire piezometers installed at 78, 117, 146, and 161 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

-140

230

235

-150

240

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 1 of 9

BORING NO.
BH-155

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	August 26, 2019 at 8:45 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	August 29, 2019 at 2:00 pm

Boring Location: 170 N. 28th St.

Northing: 1,953,417.85 **Easting:** 6,164,862.83

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 87.67 ft.

Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
								2" Asphalt Concrete; 4" Aggregate Base (Pavement Section)																
							CL	LEAN CLAY (CL); stiff; brown; moist; medium plasticity	M		VH													
5																								
			G				CL	LEAN CLAY with SAND (CL); very dark gray; moist; medium plasticity	M															
	80																							
10																								
15																								
							SM	Silty SAND (SM); loose; olive brown; moist; fine sand; trace coarse sand																
	70																							
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Drilling Fluid
8/27/19	9.0	97.5	N/A	10
8/28/19	9.0	136.0	N/A	9.7
8/29/19	9.0	196.0	N/A	10

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.5 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 08/26/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 79, 110, 131, and 180 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-155

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			U-1	14	6 5 6		SM																	
							CL	Sandy CLAY (CL); medium stiff; olive brown; moist; fine sand; trace fine gravel				1.1												
25								grades gray																
	60																							
30																								
35							CL	LEAN CLAY (CL); stiff; dark gray; moist; medium plasticity																
	50																							
40			U-2	14	5 10 19				M		VH	1.8		49	27	22	31	92						
45																								
	40																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-155

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^{1} (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)^{4}	Field Tests: PTV (tsf)^{4}	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); stiff; dark gray; moist; medium plasticity *(Continues)*																
50																								
55																								
	30																							
60																								
			PB-3	28	50-100 psi			grades dark gray; wet; trace fine sand	M															
												1.2												
			U-4	15	5 11 16		CL	Sandy CLAY (CL); stiff to very stiff; light olive brown with olive brown mottling; moist; little fine sand; low plasticity	L					27	19	8	21		70	0	30			
												2.0												
			SC-5	16	6 12 16																			
65												1.8												
			SS-6	12	3 10 16			grades less fine sand																
			PB-7	29	80-100 psi		CL	LEAN CLAY (CL); stiff; olive gray; moist; trace coarse sand; medium plasticity	M					41	19	22	20 22 22	104 103 102						CONSOL; TXUU
	20																							
												1.8												
			U-8	14	13 15 18																			
70								grades very stiff																
												2.1												
			SC-9	15	0 6 9																			
			SS-10	16	9 12 17																			
			PB-11	27	50-80 psi																			
75																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-155

							Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
					CL																	
	10	U-12	12	10 21 34	CH	FAT CLAY (CH); very stiff; olive brown; moist; high plasticity	H			3.2												
		SC-13	11	13 22 30																		VWP
80		SS-14	12	10 20 28		grades hard; dark gray																
		PB-15	20	80-200 psi																		
					GP	Poorly graded GRAVEL with SAND (GP); very dense; grayish brown; wet; fine gravel; coarse sand; subrounded to angular gravel																
		U-16	11	18 26 50/6	CL	Sandy CLAY (CL); hard; olive brown; wet; medium sand; trace coarse sand; low plasticity	L															
85		SC-17	14	18 22 13																		
					CH	Gravelly FAT CLAY (CH); very stiff; light olive brown; wet; fine gravel; high plasticity	H															
		SS-18	2	7 6 10																		
	0				CH	FAT CLAY (CH); very stiff; light olive brown; moist; high plasticity	H															
		PB-19	26	50-250 psi								51	23	28	29 30 27	93 93 97						SG; CONSOL; TXCU
90										2.5												
		U-20	15	11 16 30		grades medium plasticity grades grayish brown to olive gray	M															
		SC-21	15	11 12 16																		
					ML	Sandy SILT (ML); hard; dark gray; moist; little clay; low plasticity	L															
		SS-22	12	12 20 21																		
95		PB-23	18	50-100 psi											16	96	51	0	49	40	11	
					SM	Silty SAND (SM); dense to very dense; dark greenish gray; wet; fine sand																
	-10	U-24	11	27 50/6		lens of poorly graded medium and coarse sand																
		SC-25	18	18 20 30		grades dark gray																
100		SS-26	11	10 26 45	SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; gray; wet; fine to coarse sand; fine to coarse gravel																
		U-27	9	40 50/6																		
		SC-28	13	12 27 45													6	40	54			PSA performed on sample SC-28 and U-30

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-155

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
105			SS-29	12	6 12 30		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; gray; wet; fine to coarse sand; fine to coarse gravel *(Continues)*																
			U-30	9	46 50/6		GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; dark gray; wet; fine to coarse gravel; fine to coarse sand; subrounded to angular gravel																
	-20		SC-31	13	27 36 34																			
			SS-32	8	19 45 50/6																			
110			U-33	9	48 50/6																			VWP
			SC-34	13	18 36 47																			
			SS-35	3	28 50/6																			
			U-36	14	48 49 50/6			lens of fine to coarse gravel; olive brown; trace CaCO3																
115			SC-37	9	27 50/6																			
			SS-38	5	23 50/6																			
							ML	SILT (ML); very stiff; olive brown; wet; trace fine sand; medium plasticity	M															
	-30		PB-39	26	50-100 psi																			
120			U-40	18	12 17 30			grades olive brown with brown and gray mottling			VH	3.6		36	25	11	26							
			SC-41	18	16 17 16																			
							CL	LEAN CLAY (CL); hard; olive brown with brown and gray mottling; moist; medium plasticity	M															
			SS-42	12	13 16 25			grades dark olive brown to olive brown																
			PB-43	24	50-100 psi																			
125							ML	SILT with SAND (ML); stiff; olive brown; wet; fine sand; nonplastic	NP			2.0		NP	NP	NP	26	101	79	0	21			
	-40		U-44	17	18 22 32																			
			SC-45	17	11 20 30																			
130							SP	Poorly graded SAND (SP); very dense; very dark gray; wet; medium sand																VWP

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-155

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
					SP	Poorly graded SAND (SP); very dense; very dark gray; wet; medium sand *(Continues)*																
135		U-46	10	35 50/6																		
					CL	Sandy LEAN CLAY (CL); very stiff; olive gray; moist; fine sand; medium plasticity																
	-50																					
140		U-47	18	13 24 37			M		VH	2.4												
145		U-48	10	18 37 50/6		grades olive				3.2												
	-60																					
					CL	LEAN CLAY with SAND (CL); very stiff; olive brown; moist; medium plasticity																
150		PB-49	26	50-150 psi			M			2.1		35	20	15	20 20	107 107	76					TXCU
155		U-50	16	20 35 38						3.4												
	-70																					
160																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-155

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
			PB-51	26.5	50-180 psi		CL	LEAN CLAY with SAND (CL); very stiff; olive brown; moist; medium plasticity *(Continues)*																
												2.6												
165			U-52	17	21 29 35																			
												2.9												
	-80																							
							CL	LEAN CLAY (CL); very stiff; gray with yellowish brown mottling; moist; medium plasticity																
170			U-53	15	17 23 30				M			3.4		49	27	22	27							
175			PB-54	21	50-180 psi																			
								trace coarse sand				2.3												
	-90																							
							CH	FAT CLAY (CH); very stiff; dark gray to grayish brown; moist; high plasticity; marbled texture																
180			U-55	15	16 30 37				H			3.7												VWP
185			U-56	16.5	20 31 44			grades hard; bluish gray				4.5												
	-100																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-155

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL	Sandy LEAN CLAY (CL); very stiff; olive gray; moist; fine sand; medium plasticity																
190			PB-57	21	150-200 psi				M			2.4												
195			U-58	11.5	27 50/6			grades hard; olive brown lens of olive medium sand				4.4												
							CH	FAT CLAY (CH); hard; olive gray; moist; high plasticity																
	-110																							
200			U-59	14	21 36 50/6				H			>4.5												
205			U-60	12	27 50/6							>4.5												
	-120																							
							OL	ORGANIC CLAY (OL); hard; olive gray; moist; low plasticity																
210			U-61	14	21 30 37				L			4.5												
215																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-155

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
	-130							Boring terminated at a depth of 215.0 feet bgs. Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.5 feet bgs. Vibrating wire piezometers installed at 79, 110, 131, and 180 feet bgs. Backfilled with bentonite-cement grout. Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop. Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers. Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.																
220																								
225																								
	-140																							
230																								
235																								
	-150																							
240																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-156

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	August 19, 2019 at 7:45 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	August 23, 2019 at 4:30 pm

Boring Location: 1350 E. St. James St.

Northing: 1,953,640.946 **Easting:** 6,164,591.292

Horizontal Datum: NAD 1983

Elevation: 88.17 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
						■		3" Asphalt Concrete; 6" Aggregate Base (Pavement Section)																
						▨	CL	LEAN CLAY with GRAVEL (CL); fine gravel																
						▨	CH	FAT CLAY (CH); dark gray; moist; high plasticity	H		VH													
								brownish gray																
5						▨	CL	LEAN CLAY (CL); grayish brown; low plasticity	L															
	80																							
10																								
15																								
	70																							
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Depth (ft): Drilling Fluid
8/20/19	9.0	107.0	N/A	11
8/21/19	9.0	141.5	N/A	10.5
8/22/19	9.0	191.5	N/A	11
8/23/19	9.0	250.5	N/A	11

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 5.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 08/19/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 72, 101, 128, and 144 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SP	Poorly graded SAND (SP); gray																
							CL	LEAN CLAY (CL); brown																
25							SP	Poorly graded SAND (SP); brown																
	60						CL	LEAN CLAY (CL); gray; medium plasticity	M		VH													
30																								
35																								
	50																							
40																								
45																								
								grades silty																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
	40						CL	LEAN CLAY (CL); gray; medium plasticity *(Continues)*																
50																								
								grades sandy																
55																								
	30																							
60							CL	LEAN CLAY (CL); stiff; olive gray; moist; trace fine sand; trace fine gravel; medium plasticity																
65			PB-1	23	80 psi				M					39	20	19	27 25 25	98 100 100						CONSOL; TXCU
												1.8												
	20		U-2	18	8 13 20																			
												1.8												
			SC-3	18	3 7 12																			
70								grades olive brown with light olive brown mottling; trace medium sand																
			SS-4	10	4 12 13																			
			PB-5	23	80-180 psi									35	17	18	19 20	111 109						TXUU; VWP
								grades very stiff; olive; no sand																
												2.4												
75			U-6	15	7 12 21																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			SC-7	15	3 10 15		CL	LEAN CLAY (CL); stiff; olive gray; moist; trace fine sand; trace fine gravel; medium plasticity *(Continues)*																
												2.2												
			SS-8	13	7 13 17			grades light olive brown																
	10																							
			PB-9	27	60 psi			grades olive gray; sandy			VH													
80																								
			U-10	17	8 13 17																			
												2.5												
								grades with gray and pale olive mottling; low plasticity	L			2.8												
			SC-11	18	5 7 11																			
			SS-12	10	8 15 17		CH	FAT CLAY (CH); very stiff; gray with light olive brown mottling; moist; high plasticity	H															
85																								
			PB-13	14	100-200 psi									70	27	43	30	93						CONSOL
												3.8												
	0																							
			U-14	15	8 16 20			grades olive gray																
												2.8												
90																								
			SC-15	14	5 12 15																			
			SS-16	12	7 16 20																			
							ML	SILT (ML); very stiff; olive gray; moist; low plasticity																
			PB-17	28	80-100 psi									33	24	9	27							
								grades black																
95																								
												2.8												
			U-18	16	13 21 25			grades dark greenish gray	L															
												3.6												
			SC-19	17	6 13 25			grades with fine sand																
	-10																							
			SS-20	14	10 20 28																			
100																								
			PB-21	17	50-150 psi																			
							SC	Clayey SAND (SC); dense; dark gray; wet; fine sand																VWP
							SM	Silty SAND (SM); very dense; dark olive gray; moist; trace clay																
			U-22	15	28 40 50/6														19	0	81			

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-156

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
105		SC-23	16	17 13 20	SM	Silty SAND (SM); very dense; dark olive gray; moist; trace clay *(Continues)* grades olive																
		SS-24	14	15 30 45																		
	-20	PB-25	18	60-180 psi	SC	Clayey SAND (SC); olive; wet; fine sand									16	100	22	0	78	17	5	
110		U-26	13	35 48 50/6	SP	Poorly graded SAND (SP); very dense; olive brown; wet; fine sand grades to fine to coarse sand; trace fine gravel																rig chatter
		SC-27	16	12 24 50/6	SP	Poorly graded SAND with GRAVEL (SP); very dense; dark grayish brown; wet; fine to coarse sand; fine gravel																
		SS-28	10	30 42 50/5																		
		U-29	11	36 50/6																		
115		SS-30	11	21 35 50/6	GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine gravel; fine to coarse sand; subangular to subrounded gravel																
					SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); dense to very dense; olive brown; fine to coarse sand; little fine gravel																
	-30	U-32	13	42 40 36													5 13	25	70			
120		SC-33	18	10 15 19	CL	LEAN CLAY (CL); hard; light olive brown; moist; medium plasticity	M		VH													
		SS-34	5	13 13 15	ML	grades silty Sandy SILT (ML); hard; dark olive gray; moist; fine sand; nonplastic																
		PB-35	23	50-150 psi			NP			>4.5		NP	NP	NP	18	110						
125		U-36	12	25 40 50/6	SM	Silty SAND (SM); very dense; dark olive gray; moist; fine sand																
		SC-37	17	10 13 18	SP	grades dark gray Poorly graded SAND (SP); very dense; olive gray; moist; fine sand																
	-40	SS-38	12	20 30 50/6		grades dark olive gray; mostly medium and coarse sand; little fine gravel																VWP
130		U-39	15	45 46 39																		
		SC-40	16	16 20 10		grades medium dense; olive brown to dark gray; wet; mostly fine sand																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SP																	
			SS-41	18	10 30 38		CH	FAT CLAY (CH); hard; very dark gray; moist; high plasticity	H		VH													
			PB-42	21	80-200 psi																			
135																								
							SP-SC	Poorly graded SAND with CLAY (SP-SC); very dense; olive gray; wet; fine sand																
							SP-SM	Poorly graded SAND with SILT (SP-SM); very dense; olive gray; moist; fine sand																
			U-43	15	34 36 50/6														6 16	0	94			
	-50						SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark olive gray; moist; medium and coarse sand; fine gravel																rig chatter
140																								
			SS-44	11	32 34 40																			
																								VWP
145																								
			SS-45	4.5	29 41 12			grades olive gray																
							CL	LEAN CLAY (CL); hard; olive gray; moist; medium plasticity	M															
	-60						SP	Poorly graded SAND (SP); very dense; olive brown; wet; fine sand																rig chatter
150			U-46	9	25 50/6																			
							CH	FAT CLAY (CH); very stiff; olive gray; moist; high plasticity																
155			PB-47	19	50-200 psi				H		VH	2.9												
	-70																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			U-48	18	16 29 36		CH	FAT CLAY (CH); very stiff; olive gray; moist; high plasticity *(Continues)* grades with fine sand				3.8												
165			U-49	17	19 30 37			grades dark gray with yellowish brown mottling; no sand				3.7												
	-80																							
170			PB-50	20	50-200 psi			grades olive gray				2.9												
175			U-51	17	27 29 33			grades hard; gray with yellowish brown mottling				4.5												
	-90																							
180			U-52	18	16 28 33			grades very stiff; silty				3.6												
185			PB-53	20	50-250 psi			grades olive gray with yellowish brown mottling																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
							CH	FAT CLAY (CH); very stiff; olive gray; moist; high plasticity *(Continues)*																
190			U-54	16	15 30 45			grades olive gray				3.8												
							CL	Sandy LEAN CLAY (CL); very stiff; greenish gray; moist; medium plasticity																
195			U-55	18	20 22 28				M			2.2												
	-110						CL	LEAN CLAY with SAND (CL); hard; dark greenish gray; fine sand; trace coarse sand; medium plasticity																
200			PB-56	20	50-200 psi				M			4.2												
205			U-57	18	29 46 50/6			grades with slightly more sand; trace CaCO3				>4.5												
	-120						CL	LEAN CLAY (CL); hard; dark greenish gray; moist; medium plasticity																
210			U-58	18	19 26 30				M			>4.5												
215			U-59	16	22 30 36			grades greenish gray																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-156

							Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					CL	LEAN CLAY (CL); hard; dark greenish gray; moist; medium plasticity *(Continues)*				4.5												
	-130				OL	ORGANIC CLAY (OL); very stiff; dark gray; moist; medium plasticity																
220		PB-60	20	50-180 psi			M															
										3.2												
225		U-61	17	20 31 42		grades hard																
										4.0												
	-140																					
230		U-62	15	20 33 38	PEAT	PEAT (PEAT); hard; black; moist; nonplastic	NP			>4.5												
					CH	FAT CLAY (CH); hard; olive; moist; high plasticity	H															
235		U-63	16	25 34 38																		
										>4.5												
	-150																					
240		U-64	16	18 31 40		grades with faint yellowish brown mottling																
										>4.5												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CH	FAT CLAY (CH); hard; olive; moist; high plasticity *(Continues)*																
245			U-65	17	28 42 50/5			grades dark greenish gray				>4.5												
							SP	Poorly graded SAND with GRAVEL (SP); very dense; olive brown; wet; medium and coarse sand; fine gravel																rig chatter
	-160																							
250			SS-66	4	50/5																			
							GP	Poorly graded GRAVEL with SAND (GP); very dense; light olive brown; moist; fine gravel; medium and coarse sand; trace silt; subrounded to subangular gravel																
255			SS-67	4	50/5																			
							SM	Silty SAND (SM); very dense; light olive brown; wet; fine sand; trace clay clasts; few intermixed pockets of fine gravel																
	-170																							
260			U-68	11	36 50/5																			
265																								
	-180																							
270																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-156

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
275							SM	Silty SAND (SM); very dense; light olive brown; wet; fine sand; trace clay clasts; few intermixed pockets of fine gravel *(Continues)*																

Boring terminated at a depth of 275.5 feet bgs.
Borehole overdrilled from 261 feet to 276 feet to accomodate OYO method downhole P.S. logging.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 5.0 feet bgs.
Vibrating wire piezometers installed at 72, 101, 128, and 144 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

-190

280

285

-200

290

295

-210

300

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 1 of 8

BORING NO.

BH-157

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	October 16, 2019 at 10:00 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	October 24, 2019 at 11:30 am

Boring Location: E. Santa Clara at 5th St.

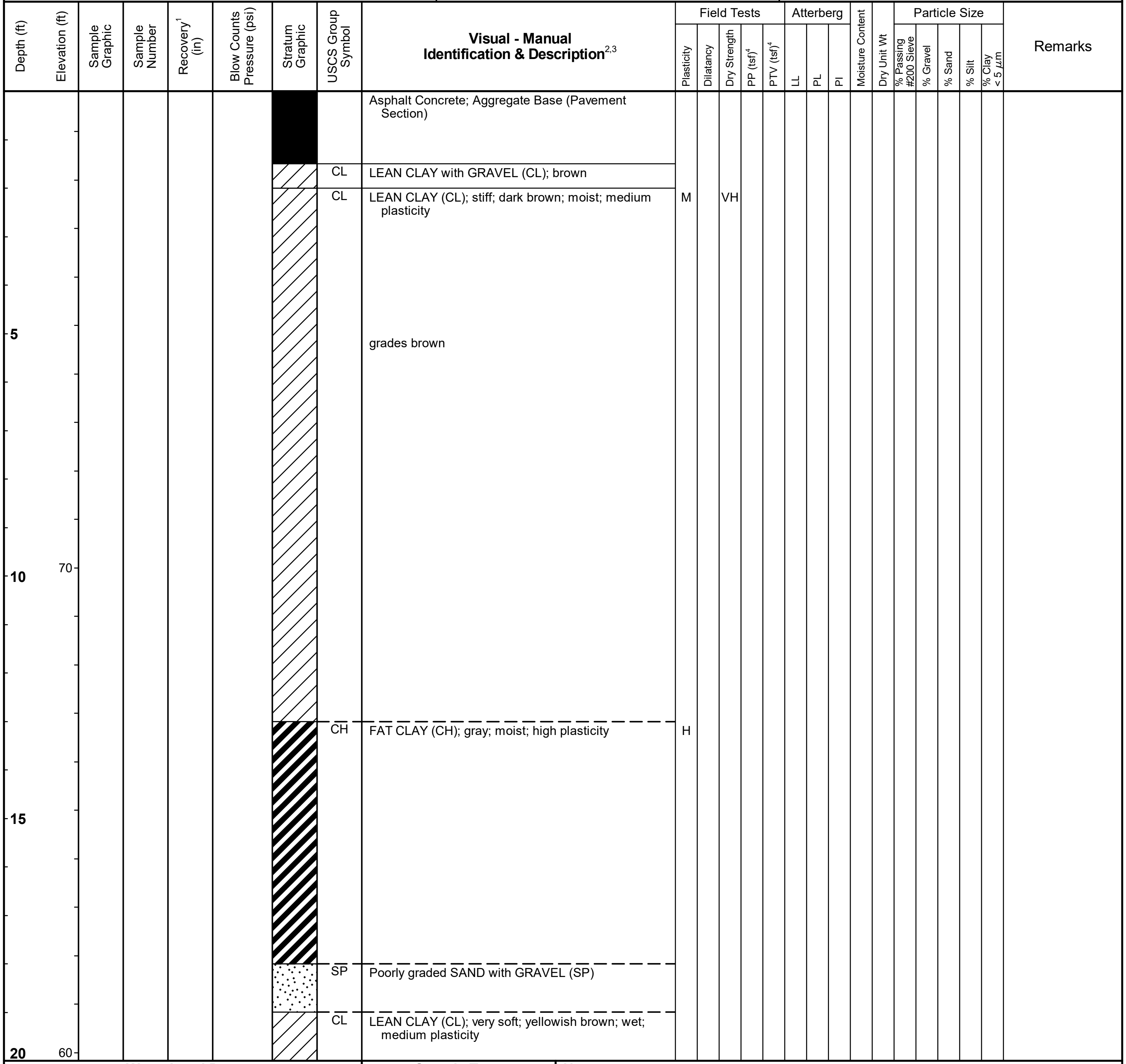
Northing: 1,948,522.714 **Easting:** 6,158,579.092

Horizontal Datum: NAD 1983

Elevation: 79.84 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		



USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Plasticity	Dry Strength
	Asphalt Concrete; Aggregate Base (Pavement Section)		
CL	LEAN CLAY with GRAVEL (CL); brown		
CL	LEAN CLAY (CL); stiff; dark brown; moist; medium plasticity	M	VH
	grades brown		
CH	FAT CLAY (CH); gray; moist; high plasticity	H	
SP	Poorly graded SAND with GRAVEL (SP)		
CL	LEAN CLAY (CL); very soft; yellowish brown; wet; medium plasticity		

Water Level Data

Date	Depth (ft) Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
10/17/19	11.0	72.5	N/A	13.5
10/18/19	11.0	101.0	N/A	15.2
10/21/19	11.0	122.5	N/A	5
10/22/19	11.0	146.5	N/A	15
10/23/19	11.0	176.5	N/A	14.5
10/24/19	11.0	201.5	N/A	14.5

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 11.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 10/16/19 were taken in drilling fluid and should not be used for design.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-157

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		☒	SS-1	2	0 0 2	▨	CL	LEAN CLAY (CL); very soft; yellowish brown; wet; medium plasticity *(Continues)*	M		M													
						▨		grades dark gray																
25						▨	CL	Sandy CLAY (CL); stiff; dark gray; wet; fine sand; low plasticity																
30	50	■	P-2	16.5	50 psi	▨			L					34	22	12	33	86						CONSOL
		■				▨						1.1												
35						▨																		
40	40	■	P-3	15	300 psi	▨																		
		■				▨						1.1												
45						▨																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-157

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					CL	Sandy CLAY (CL); stiff; dark gray; wet; fine sand; low plasticity *(Continues)*																
50	30	SS-4	11.5	2 4 6		grades grayish brown; medium plasticity	M															
55																						
					ML	Sandy SILT (ML); very stiff; dark greenish gray; wet; fine sand; low plasticity																
60	20	U-5	14	8 12 12			L					22	20	2	21	106						
65					SM	Silty SAND (SM); medium dense; light olive brown; wet; fine sand																
70	10	PB-6	20	60-80 psi																		
		SS-7	7.5	25 35 27																		
					SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; light olive brown; wet; fine to coarse sand; some fine gravel																
75		SC-8	14	28 37 38											9	124	11	34	54			fluid loss

1.) Light gray shading indicates length of sample recovery.

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3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-157

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; light olive brown; wet; fine to coarse sand; some fine gravel *(Continues)*																
		SS-9	6	22 42 37																		
					GP	Poorly graded GRAVEL with SAND (GP); very dense; olive brown; wet; fine gravel; fine to coarse sand; trace coarse gravel; subrounded to subangular gravel																rig chatter
80	0	U-10	11	41 43 43		trace coarse vesicular basalt gravel																CORR
		SS-11	5	22 29 43																		
85		U	NR	30 50/6																		
		SS-12	6	35 34 30																		
90	-10	SC-13	9	22 30 15		grades olive gray																
					CL	LEAN CLAY (CL); very stiff; yellowish brown																
		PB-14	16	80-200 psi																		
					SM	Silty SAND with GRAVEL (SM); medium dense; olive brown; wet; fine to coarse sand; fine to coarse gravel											21	37	42	14	7	
		SS	NR	7 5 9																		
95					CL	LEAN CLAY with SAND (CL); very stiff; olive yellow; moist; fine sand; medium plasticity																
		SC-15	15	4 9 16			M		VH	2.8												
100	-20	SS-16	9	14 24 28	CL	LEAN CLAY (CL); hard; gray; moist; few fine sand; medium plasticity	M															
		P-17	4	400 psi						2.3		44	18	26	24	92	88					Gravel slough at top of sample. Bottom half of sample tube deformed. Sample disturbed
		SS	NR	8 9																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-157

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
				10	CL	LEAN CLAY (CL); hard; gray; moist; few fine sand; medium plasticity *(Continues)*																
105																						
		U-18	NR	13 17 22																		18 inches of disturbed sample recovered by SPT
		U-19	14	13 31 49	SP	Poorly graded SAND (SP); dense; grayish brown; wet; fine and medium sand																rig chatter
110	-30																					
		SS-20	9	24 39 44		grades very dense; mostly medium and coarse sand; trace gravel																
		SC-21	14	24 28 31		grades dense																
115																						
		SS-22	8	11 15 15		pocket of silt; brown																
					CH	FAT CLAY (CH); very stiff; bluish gray; moist; high plasticity	H															
		U-23	15	13 19 26	SM	Silty SAND (SM); medium dense; olive gray; wet; fine sand; fine gravel																bottom 3 inches of sample U-23 washed out
120	-40																					
		SS-24	10	21 40 50/5		grades dark olive gray; few fine gravel																
					SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; dark gray; wet; fine to coarse sand; little fine gravel																
		SC-25	15	37 46 49													9	26	65			
125																						
		SS-26	6	21 33 34		grades with less silt and gravel																
		SC-27	13	7 12 16	CL	LEAN CLAY (CL); very stiff; gray; low plasticity	L		VH	2.3												
130	-50																					

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-157

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff; gray; low plasticity *(Continues)*																
135			SS-28	15	9 10 14			grades olive; little fine sand; trace carbonate																
140	-60		PB-29	24	60-200 psi			grades silty; hard; medium plasticity	M			4.4		36	21	15	22 21 22	104 107 105						TXCU
145			SS-30	14	9 21 28		ML	Sandy SILT (ML); hard; light olive brown; moist; low plasticity	L															
							SM	Silty SAND (SM); dense; light olive brown; wet; fine sand																
150	-70		SC-31	7	7 17 25												24	102	50					
155			SS-32	11	23 24 37																			
							SP	Poorly graded SAND with GRAVEL (SP); fine sand; fine gravel																
							CL	LEAN CLAY (CL); hard; light olive brown and gray; moist; medium plasticity																
160	-80																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-157

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			U-33	15	20 27 31		CL	LEAN CLAY (CL); hard; light olive brown and gray; moist; medium plasticity *(Continues)*	M		VH			46	25	21	27	98						
							CL-ML	Silty CLAY with SAND (CL-ML); hard; very dark gray; moist; fine sand; low plasticity																
165			SS-34	14	9 18 33				L															
							CH	FAT CLAY (CH); very stiff; greenish gray; moist; few fine sand; high plasticity																
170	-90		PB-35	25	50-200 psi							3.5		54	14	40	24	101	90					
175			SS-36	11	16 30 32			grades hard; laminated silty sand seams																
							CL	Sandy LEAN CLAY with GRAVEL (CL); very stiff; olive gray; wet; fine sand; fine to coarse gravel; low plasticity																
180	-100		PB-37	24	60-200 psi				L															
							SM	Silty SAND with GRAVEL (SM); very dense; olive; wet; fine sand; fine gravel																
185			SS-38	7	30 50/6																			rig chatter

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

MMW TEAM

SOIL BORING LOG

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BORING NO.

BH-157

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							SM	Silty SAND with GRAVEL (SM); very dense; olive; wet; fine sand; fine gravel *(Continues)*																
190	-110		SC	NR	50/5.5																			
			SS-39	7	34 50/6																			
							CL	LEAN CLAY with SAND (CL); very stiff; gray and yellowish brown; moist; low plasticity; laminated silty sand partings																
195			U-40	13	19 28 50/5				L		VH	3.2												
								grades to mottled dark gray and olive																
200	-120		SS-41	14	8 17 35			trace sand																
205																								
210	-130																							
215																								

Boring terminated at a depth of 201.5 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 11.0 feet bgs.
Backfilled with neat cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 1 of 8

BORING NO.

BH-158

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	October 1, 2019 at 9:40 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	October 8, 2019 at 1:45 pm

Boring Location: 18 S 18th St

Northing: 1,949,055.535 **Easting:** 6,159,642.432

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 81.67 ft.

Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
								5" Asphalt Concrete; 5" Aggregate Base (Pavement Section)																
							CL	LEAN CLAY (CL); brown; moist; low plasticity	L															
	80																							
5																								
								grades silty																
10																								
	70																							
15							CH	FAT CLAY (CH); gray; moist; high plasticity	H															
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
10/2/19	9.0	79.0	N/A	6.5
10/3/19	9.0	105.0	N/A	3.5
10/4/19	9.0	126.5	N/A	3.5
10/7/19	9.0	152.5	N/A	2.2
10/8/19	9.0	186.0	N/A	4

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 10/01/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 78 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-158

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); brown; moist; low plasticity	L															
	60																							
25																								
30																								
	50						CH	FAT CLAY (CH); gray; high plasticity	H															
35																								
40																								
	40																							
45																								

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-158

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CH	FAT CLAY (CH); gray; high plasticity *(Continues)*																
50																								
	30																							
																								PMT
55																								
							GW-GM	Well graded GRAVEL with SILT and SAND (GW-GM); very dense; dark grayish brown; wet; fine gravel; some fine to coarse sand; subrounded to angular gravel																rig chatter 56' - 65' continuous fluid loss
60																								
	20																							
65																								
70																								vibration testing
	10																							
			U	NR	15 21 36																			
			SC-1	18	31 37 50/6																			
75			SS-2	10	13 40 50/6																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-158

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
			U-3	9	36 50/6		GW-GM	Well graded GRAVEL with SILT and SAND (GW-GM); very dense; dark grayish brown; wet; fine gravel; some fine to coarse sand; subrounded to angular gravel *(Continues)*									9	128	8	48	44			
			SC-4	11	13 29 18																			VWP
								lens of brown lean clay with fine sand																vibration testing
80																								
	0		U	NR	14 50/4																			
			SC-5	11	18 35 17																			
			SS-6	5.5	9 11 16		GP-GC	Poorly graded GRAVEL with CLAY (GP-GC); medium dense; grayish brown; wet; fine gravel; trace coarse gravel; subangular to angular gravel																
85																								
			U-7	5	29 50/6		SW	Well graded SAND with GRAVEL (SW); dense; dark grayish brown; wet; fine to coarse sand; some fine gravel; trace silt; trace clay																
			SC-8	10	16 34 42																			
			SS-9	3.5	16 19 24			grades gray to dark gray																
90			U-10	8	14 27 38												11	124	5	39	56	3	2	
	-10		SC-11	8	11 21 35																			
			SS	3.5	4 21 31			grades very dense																SPT sample number missing
			PB-12	9	50-80 psi		SM	Silty SAND (SM); dense; yellowish brown; moist; fine sand											41					CORR
95																								
			U-13	9	19 33 50/6			grades dark olive gray																
			SC-14	11	12 18 30		ML	Sandy SILT (ML); hard; olive gray and light olive brown; little fine sand; trace fine gravel; low plasticity	L								20	110	77					
			SS-15	5.5	8 15 33		CL	Sandy LEAN CLAY (CL); very stiff to hard; grayish brown with dark yellowish brown mottles; wet; fine sand; low plasticity	L															
100																								
			U-16	1.5	23 50/5																			
	-20						SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); dense; gray; wet; fine to coarse sand; some fine gravel																
			SC-17	11	31 35 37												6	126	6	32	62			
			SS-18	6	13 16																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-158

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					26		SW-SM																	
105			U-19	5	36 50/3		GW-GM	Well graded GRAVEL with SILT and SAND (GW-GM); very dense; light olive brown; wet; fine gravel; some fine to coarse sand																
			SC-20	8	38 50/4												7	127	10	54	37			
			SS-21	6	45 50/6																			
			U-22	11	16 43 50/5		SP	Poorly graded SAND with GRAVEL (SP); very dense; grayish brown; wet; medium and coarse sand; fine gravel; trace coarse gravel																
110			SC-23	17	30 38 29																			
	-30		SS-24	6	19 19 41			grades with more gravel																
			U-25	14	18 27 50/5																			
115			SC-26	8	16 18 40																			
			SS-27	9	20 43 50/6			grades olive; silty																
			PB-28	26	60-80 psi		CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; wet; fine sand; low plasticity	L		VH	2.5		31	18	13	22 22 21	106 104 108						CONSOL; TXCU
120			U-29	15	17 30 43							2.8												
	-40		P-30	18	600 psi		CL	LEAN CLAY (CL); very stiff; grayish brown; moist; few fine and coarse sand; trace fine gravel; medium plasticity; trace carbonate	M															
			SC-31	11	16 28 30							3.5												
125			PB-32	27	60-100 psi							2.2		42	23	19	28	94	86					PMT
			PB-33	30	60-80 psi		CL	LEAN CLAY (CL); very stiff to hard; gray with olive yellow mottling; moist; medium plasticity	M															
130			U-34	18	20 30 30			trace fine sand																PMT
			SC-35	11	12 18 36							>4.5												
	-50						SP	Poorly graded SAND with GRAVEL (SP); dense to very dense; olive gray; wet; fine sand; fine gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-158

Depth (ft)	Elevation (ft)	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)^4	PTV (tsf)^4	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
		SS-36	12	23 26 30	SP	Poorly graded SAND with GRAVEL (SP); dense to very dense; olive gray; wet; fine sand; fine gravel *(Continues)*																
		U-37	2	50/6																		fluid loss
		SC-38	14	20 38 20																		
135																						
		SS-39	4	19 23 22		lens of sandy clay																
		U-40	12	16 22 40	CL	Sandy CLAY (CL); hard; olive gray; moist; fine sand; trace fine gravel; medium plasticity	M			>4.5												
		SC	NR	4 8 11																		
140		SC-41	13	30 42 36	GP	Poorly graded GRAVEL with SAND (GP); very dense; gray; wet; fine gravel; medium and coarse sand; subrounded to subangular gravel																
	-60																					
145		U-42	10	45 50/5	CL	LEAN CLAY (CL); hard; olive; moist; medium plasticity	M		VH	>4.5		46	23	23	20	106						
																						PMT
					CL	LEAN CLAY with SAND (CL); very stiff to hard; dark gray; wet; little fine to coarse sand; medium plasticity																
150		PB-43	14	100-200 psi			M					40	19	21	22	112	84					PMT
	-70																					
						grades olive brown																
155		U-44	17	22 34 43						2.8												
160																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-158

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
			U	NR	50/6		GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; olive brown; wet; medium sand; subrounded to angular gravel *(Continues)*																160.0' - 165.0' fluid loss
			SS-45	7	45 43 30																			
	-80																							
165			SS-46	4	33 50/6																			165.0' - 170.0' rig chatter
170			SS-47	4	29 50/5																			
	-90																							
							ML	Sandy SILT (ML); hard; grayish brown; wet; some fine sand; little clay; trace fine gravel																
175			PB-48	26	60-180 psi												16	114	51	4	45	32	19	
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; olive brown; wet; medium sand; subrounded to angular gravel																
180			SS-49	2	50/6																			180.0' - 185.0' rig chatter
	-100																							
185			SS-50	5	40 50/3																			

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SOIL BORING LOG

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BORING NO.

BH-158

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; olive brown; wet; medium sand; subrounded to angular gravel *(Continues)*																
190			U-51	3	27 50/5		SM	Silty SAND (SM); very dense; dark gray; wet; fine sand																
	-110																							
							CL	Sandy LEAN CLAY (CL); hard; bluish gray; moist; fine sand; low plasticity																
195			U-52	17	21 34 50/6				L															
								sand lens																
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; gray; wet; fine gravel; medium sand; subangular to angular gravel																196.5' - 200.0' rig chatter
200			SS-53	5	29 29 34																			
	-120																							
205																								
210																								
	-130																							
215																								

Boring terminated at a depth of 201.5 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.0 feet bgs.
Vibrating wire piezometer installed at 78 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

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2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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SOIL BORING LOG

Page 1 of 8

BORING NO.
BH-159

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	October 31, 2019 at 8:50 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	November 7, 2019 at 12:00 pm

Boring Location: 1605 Marburg Way

Northing: 1,955,261.885 **Easting:** 6,164,341.958

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 87.53 ft.

Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
						■		9" Asphalt Concrete; 15" Aggregate Base (Pavement Section)																
						⁘	SM	Silty SAND (SM); brown; moist																
						▨	CH	FAT CLAY (CH); dark gray; moist	H															
						▨	CL	LEAN CLAY (CL); brown; moist	L															
5																								
	80																							
10		⊠	SS-1	13.5	0 0 0			very soft																
15																								
	70																							
20																								

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
11/1/19	11.0	69.0	N/A	11
11/4/19	11.0	79.0	N/A	8.5
11/5/19	11.0	126.5	N/A	12.5
11/6/19	11.0	181.5	N/A	8
11/7/19	11.0	212.0	N/A	9.5

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 10/31/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 82 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-159

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		■	P-2	12	200 psi	▨	CH	FAT CLAY (CH); stiff; gray; wet; high plasticity; trace organics	H		VH	1.8		50	24	26	29	94						CONSOL
25																								
	60																							
						▧	CL	LEAN CLAY (CL); medium stiff; gray; wet; medium plasticity; trace organics																
30		☒	SS-3	11	0 1 6				M															
						⁘	SP	Poorly graded SAND with GRAVEL (SP)																
35																								
						▨	CH	FAT CLAY (CH); stiff; gray; wet; high plasticity	H															
	50																							
40		∪	U-4	13	3 9 12			sand lens				1.8		53	25	28	29	93						
45																								
																								PMT
	40																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-159

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CH	FAT CLAY (CH); stiff; gray; wet; high plasticity *(Continues)*																PMT
50			SS-5	14	15 22 35		SM	Silty SAND with GRAVEL (SM); very dense; grayish brown; wet; fine sand; fine gravel																
			SC-6	15	27 29 33		GM	Silty GRAVEL with SAND (GM); very dense; grayish brown; wet																
55			SS-7	11.5	1 3 5		CL	LEAN CLAY (CL); stiff; olive gray; wet; medium plasticity; trace silt	M		VH													
	30		U-8	17	15 18 30		SM	Silty SAND (SM); dense; gray; wet; fine sand; trace fine gravel									15	119	36	5	59			
60			SS-9	12.5	5 8 10		CL	LEAN CLAY (CL); very stiff; gray; wet; trace sand; trace fine gravel; low plasticity; trace silt	L		VH													
							SM	Silty SAND (SM); medium dense; gray; wet; fine sand; trace fine gravel																
			U-10	15	6 11 16												19	114	26	1	73			
65			SS-11	13.5	7 16 13			grades fine to coarse gravel																
							CL	LEAN CLAY (CL); very stiff; gray; wet; medium plasticity	M		VH													
	20		U-12	18	8 12 16			gravel pocket				2.2												vibration testing; PMT
70																								
			SS-13	14	8 9 13																			
75			SC-14	18	3 11 17																			PMT

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-159

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff; gray; wet; medium plasticity *(Continues)*				2.6		37	21	16	23	103						
	10		SS-15	14	5 8 8																			
							CL	LEAN CLAY with SAND (CL); very stiff; gray; wet; little fine sand; low plasticity	L															
																								vibration testing
80																								
																								VWP
85			U-16	18	6 10 17																			CORR
														30	21	9	23	105	76					
								silty sand lens																
							CL	LEAN CLAY (CL); stiff; gray; wet; medium plasticity; silty	M		VH													
	0		SS-17	13.5	3 7 8																			
90			P-18	16.5	600 psi			grades very stiff						41	19	22	27 23 23	99 104 104						CONSOL; TXCU
												2.3												
			SS-19	13	6 12 14			grades grayish brown																
																								PMT
95			PB-20	30	60-200 psi																			
																								PMT
	-10							sand and fine gravel pocket				2.6												
							CL	LEAN CLAY (CL); very stiff; brown; wet; low plasticity	L															
			SS-21	10.5	4 8 12																			
100																								
			U-22	18	9 17 27																			
												2.6		29	16	13	18	112						
																								PMT
			SS-23	12	5 12																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-159

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
				17	CL	LEAN CLAY (CL); very stiff; brown; wet; low plasticity *(Continues)*																
105																						
		U-24	18	17 28 41		grades hard																PMT
	-20									3.0												
		SS-25	11	12 19 29																		
110																						
																						PMT
115		U-26	17	20 24 27	SM	Silty SAND (SM); dense; brown; wet; fine sand																
															23	103	32					
	-30																					
120		SS-27	11	18 24 30		grades very dense; fine and medium sand; little silt																
125		U-28	16	16 20 33		silty clay pocket																
					SP-SM	Poorly graded SAND with SILT (SP-SM); very dense; grayish brown; wet; fine sand																
	-40																					
130		SS-29	10	13 27 35																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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SOIL BORING LOG

BORING NO.

BH-159

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SP-SM	Poorly graded SAND with SILT (SP-SM); very dense; grayish brown; wet; fine sand *(Continues)*																
							SM	Silty SAND with GRAVEL (SM); very dense; grayish brown; wet; fine to coarse sand; fine gravel																
135			SC-30	4	50/6																			
	-50																							
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; grayish brown; wet; fine to coarse sand; fine gravel																
140			SS-31	3	24 39 50/6																			
145			SC-32	14	47 47 50/6												8	129	14	27	60			
	-60																							
150			SS-33	5	19 30 50/6																			
							SC-SM	Silty, Clayey SAND with GRAVEL (SC-SM); very dense; grayish brown; wet; fine to coarse sand; fine gravel																
155			SC-34	10	34 43 32																			
	-70																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-159

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			SS-35	6.5	21 40 50/5		SM	Silty SAND (SM); very dense; grayish brown; wet; fine sand *(Continues)*																
							CL	LEAN CLAY (CL); very stiff to hard; olive gray; wet; medium plasticity																
165			U-36	15	16 27 33				M		VH	3.8												sampler assembled incorrectly, sample stored in bag.
	-80																							
																								PMT
170			PB-37	17	60-200 psi							3.4												PMT
175			SS-38	11	9 15 19																			
	-90																							
180			U-39	18	18 27 43							4.2												
185			MC-40	14	13 17 29			more silt																
	-100																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-159

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
		■	P-41	10	600 psi	▨	CL	LEAN CLAY (CL); very stiff to hard; olive gray; wet; medium plasticity *(Continues)*																
190						▨																		
195		▩	PB-42	16	60-220 psi	▨						3.6												
	-110					▨																		
200		▩	PB-43	26	60-150 psi	▨		grades olive brown				4.5												
205		⧗	MC-44	18	19 30 46	▨						3.6												
	-120					▨																		
210		⧗	MC-45	18	21 31 35	▨		olive brown with grayish green mottling				4.5												
215																								

Boring terminated at a depth of 212.0 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.0 feet bgs.
Vibrating wire piezometer installed at 82 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-160

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Joseph Ang
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	November 20, 2019 at 8:20 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	November 27, 2019 at 11:15 am

Boring Location:	1 Almaden Blvd	**Northing:** 1,946,961.638	**Easting:** 6,156,135.025
Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	16
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 82.79 ft.

Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
								9.5" Asphalt Concrete; Aggregate Base (Pavement Section)																
																								1' - 11' excavated via vacuum truck
	80																							
							ML	SILT with SAND (ML); yellowish brown; fine sand; little fine gravel; nonplastic																
5									NP															small soil sample obtained at 5' with hand auger after vacuuming for visual-manual ID
							CH	FAT CLAY (CH); very dark grayish brown; little silt; few fine gravel; high plasticity																
10																								
									H															small soil sample obtained at 11' with hand auger after vacuuming for visual-manual ID
							CL	Sandy CLAY (CL); dark yellowish brown; moist; fine sand; low plasticity																
	70																							
15			P-1	14	350 psi				L					29	17	12	20	106						
							SM	Silty SAND (SM); dark yellowish brown; moist; fine and medium sand																
							ML	SILT with SAND (ML); very dark grayish brown; moist; little fine sand; trace clay; trace coarse sand																
20																								

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
11/21/19	16.0	67.0	N/A	16.8
11/22/19	16.0	100.0	N/A	16.6
11/25/19	16.0	131.5	N/A	16.6
11/26/19	16.0	171.5	N/A	17.3
11/27/19	16.0	206.5	N/A	17.3

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 11.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 11/20/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 63 and 115 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-160

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
		P-2	18	100 psi	ML																	
					SM	Silty SAND (SM); dark gray; moist; fine and medium sand																
	60					pocket of fine gravel																
25		P-3	18	120 psi		grades to mostly fine sand									21	108	44					
						grades to mostly medium sand																
					CL	LEAN CLAY (CL); medium stiff; very dark gray; moist; medium plasticity																
30		P-4	16	150 psi			M					46	22	24								
										0.6												
	50																					
					CH	FAT CLAY (CH); stiff; dark greenish gray with olive mottling; moist; high plasticity																
35		P-5	13	120 psi			H					55	26	29	30	89						CONSOL
										1.1												
					SM	Silty SAND (SM); brown; moist																
40		P-6	14	180 psi											24	99	24					
						grades with mostly medium sand; fine to coarse gravel																
	40																					
					SP-SM	Poorly graded SAND with SILT (SP-SM); dense; dark yellowish brown; moist; medium sand; trace fine gravel																
45		SS-7	9.5	18 21 26																		
					SM	Silty SAND with GRAVEL (SM); very dense; dark yellowish brown; moist; fine sand; fine to coarse gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-160

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SM	Silty SAND with GRAVEL (SM); very dense; dark yellowish brown; moist; fine sand; fine to coarse gravel *(Continues)*																
50			U-8	10	10 23 34			pocket of medium and coarse sand; very dark grayish brown																
								grades to no gravel																
	30																							
							SP	Poorly graded SAND with GRAVEL (SP); very dense; dark grayish brown; moist; fine to coarse sand; little fine gravel																
55			SS-9	6	18 30 31																			
60			U-10	10	40 41 50/5.5			grades dark yellowish brown; some fine gravel									10		1	43	56			
	20																							VWP
65			SS-11	5	35 50/6			grades dark brown; mostly coarse sand; little fine to coarse gravel																
							SM	Silty SAND (SM); dense; dark yellowish brown; moist; fine sand																
			MC-12	14	10 15 38																			
							SP	Poorly graded SAND with GRAVEL (SP); very dense; black and very dark grayish brown; moist; coarse sand; few medium sand; little fine gravel																
70			SS-13	3.5	23 27 31																			
							SM	Silty SAND (SM); very dense; dark yellowish brown; moist; fine sand																
			U-14	8	32 50/5			grades with medium sand; fine gravel																
	10																							
			SS-15	4.5	18 19 14		SP	Poorly graded SAND (SP); dense; black and very dark grayish brown; moist; coarse sand; few medium sand; few fine to coarse gravel																
75																								
								pocket of gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-160

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							SP																	
			U-16	7.5	30 37 27																			
							ML	SILT (ML); very stiff; brown with brownish yellow mottling; moist; trace fine sand; trace clay; nonplastic	NP			2.8												
			P	NR	400 psi			interbedded sand and fine gravel																
80							CL	LEAN CLAY (CL); stiff; very dark greenish gray; moist; few fine sand; low plasticity																
			P-17	3	500 psi				L															
								pocket of gravel																
	0																							
			MC-18	5	13 15 10							1.5		33	19	14	24	104						
85																								
								grades dark greenish gray; medium plasticity																
			MC-19	18	8 14 28				M					35	18	17	24 25	104 104						TXCU
												1.8												
			MC-20	18	3 9 12			grades silty; mottled light olive gray to light gray; trace fine gravel																CORR
90												1.2		35	15	20								
							ML	SILT with SAND (ML); very stiff; yellowish brown; moist; little fine sand; low plasticity																
			MC-21	16	6 10 20				L															rig chatter
	-10											2.5												
			P-22	12	300 psi			little fine gravel																
95																								
							SM	Silty SAND with GRAVEL (SM); dark yellowish brown; moist; fine and medium sand; fine gravel																
							SP	Poorly graded SAND (SP); very dense; dark yellowish brown; moist; medium and coarse sand; little fine gravel																
			SS-23	7	22 50/5.5																			
							SM	Silty SAND (SM); mottled dark yellowish brown to olive yellow; moist; fine sand																
			U-24	14	14 19 22																			
							CL	LEAN CLAY (CL); very stiff; dark yelliwish brown; moist; trace fine sand; medium plasticity	M			2.2		35	22	13	28	95						
100								grades very dark gray; few fine sand																
			P	NR	500 psi			interbedded fine to coarse gravel																
								grades with little fine to coarse sand																
	-20																							
			MC-25	18	17 18							2.5												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-160

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					43		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; brown; moist; medium and coarse sand; some fine to coarse gravel; few silt *(Continues)*																
105																								
			SS-26	4.5	35 44 46																			
							GP	Poorly graded GRAVEL with SAND (GP); very dense; yellowish brown; moist; fine gravel; some fine to coarse sand; rounded to subangular gravel																
			U-27	8	28 50/6												10	128	3	50	47			
110																								
			SS-28	4	20 29 50/6																			
	-30																							
			U	NR	50/6																			
			SS-29	6.5	16 15 47																			
115																								VWP
								grades to subrounded to subangular gravel																
			SS-30	4	43 35 41																			
								interbedded layer of sandy silt; fine sand																
			SS-31	4	8 20 50/6																			
120																								
			SS-32	4	18 48 50/6																			
	-40																							
			SS-33	5.5	23 38 35																			
125																								
								grades dark brown																
			MC-34	15	13 13 21		CL	LEAN CLAY (CL); very stiff; dark grayish brown; some silt; trace fine sand; low plasticity; few interbedded fine gravel; few decayed wood fragments	L		H													
												2.2												
130																								
			P	NR	600 psi																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-160

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
	-50						CL	LEAN CLAY (CL); very stiff; dark grayish brown; some silt; trace fine sand; low plasticity; few interbedded fine gravel; few decayed wood fragments *(Continues)*																
135			MC-35	18	16 22 29			grades brown				2.2												
140			MC-36	17	15 28 32			grades hard				4.5												
	-60						SM	Silty SAND (SM); dense; yellowish brown; moist; fine and medium sand																
145			MC-37	18	20 26 27		ML	Sandy SILT (ML); very stiff; brown with yellowish brown mottling; moist; some fine sand; nonplastic	NP			2.0					21	108	52					
150			P-38	2	450 psi																			
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; very dark grayish brown; fine gravel; some fine to coarse sand; rounded to subangular gravel																
	-70																							
155			SS-39	4.5	40 50/5																			
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-160

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			U-40	7	41 50/5.5		GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; very dark grayish brown; fine gravel; some fine to coarse sand; rounded to subangular gravel *(Continues)*											7	57	36			
	-80						CL	LEAN CLAY (CL); very stiff; very dark greenish gray; wet; little silt; few fine sand; medium plasticity																
165			P-41	13	450 psi				M		H	2.2		40	18	22								
							SM	Silty SAND (SM); very dense; dark yellowish brown; moist; fine and medium sand																
170			MC-42	16	20 33 38																			
	-90						SC	Clayey SAND (SC); dense; brown with yellowish brown mottling; moist; fine and medium sand; few fine gravel																
175			MC-43	18	11 25 33									28	14	14			36					
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark yellowish brown; moist; fine to coarse gravel; little fine and medium sand; trace silt; rounded to subrounded gravel																
180			SS-44	4	67/6																			
	-100																							
185			SS-45	3	62/6																			
							CL	LEAN CLAY (CL); hard; very dark gray; moist; some silt; some fine sand; medium plasticity																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-160

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); hard; very dark gray; moist; some silt; some fine sand; medium plasticity *(Continues)*																
								decreasing sand content with depth																
190			MC-46	16	22 34 37				M		H													
								grades without sand				4.5		48	24	24								
	-110																							
195			MC-47	16	17 38 48							4.2												
								grades olive gray																
200			MC-48	16	19 33 37							4.5												
	-120																							
							GM	Silty GRAVEL with SAND (GM); very dense; dark brown; moist; mostly fine to coarse gravel; fine sand																
205			SS-49	1	30 22 26																			

Boring terminated at a depth of 206.5 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 11.0 feet bgs.
Vibrating wire piezometers installed at 63 and 115 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

210

-130

215

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 1 of 10

BORING NO.

BH-161

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	October 25, 2019 at 8:00 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	October 30, 2019 at 6:30 pm

Boring Location:	552 West Santa Clara St.			**Northing:** 1,946,303.786	**Easting:** 6,154,108.699
Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW	**Horizontal Datum:** NAD 1983	
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11	**Elevation:** 86.88 ft.	
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93		
Drilling Method:	Rotary Wash			**Vertical Datum:** NAVD 88	

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
								3" Asphalt Concrete; 7" Aggregate Base (Pavement Section)																
								(FILL)																
							CL	LEAN CLAY (CL); stiff; grayish brown; moist; medium plasticity			H													
5																								
	80						ML	Sandy SILT (ML); stiff; olive brown; moist; fine sand; low plasticity	L															
10		☒	SS-1	12	3 5 5																			
15																								
	70																							
							CL	LEAN CLAY (CL); medium stiff; dark olive gray; moist; medium plasticity																
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Depth (ft): Drilling Fluid
10/28/19	11.0	91.0	N/A	16.5
10/29/19	11.0	136.5	N/A	16.5
10/30/19	11.0	196.5	N/A	17.5

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 9.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 10/25/19 were taken in drilling fluid and should not be used for design.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-161

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		■	P-2	15	200 psi	▨	CL	LEAN CLAY (CL); medium stiff; dark olive gray; moist; medium plasticity *(Continues)*	M		H	0.8		32	18	14	24	101						CONSOL; CORR
25																								
	60																							
30		☒	SS-3	12	1 4 13			grades olive																
						⁘	SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); medium dense; olive to dark olive gray; wet; fine to coarse sand; some fine gravel																31.0' - 40.0' fluid loss
35																								
	50																							
40			SC-4	9	14 14 26			dense											10	38	52			
45																								
						▨	CL	LEAN CLAY (CL); medium stiff; olive gray; moist; few fine sand; low plasticity																
	40																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-161

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL	LEAN CLAY (CL); medium stiff; olive gray; moist; few fine sand; low plasticity *(Continues)*																
50		☒	SS-5	11	3 3 3				L		H													
55																								
	30																							
60		■	P-6	9	400 psi				L					33	17	16	29	80						fluid loss
							SP	Poorly graded SAND (SP); medium dense; dark olive gray; wet																
65																								
	20																							
70		☒	SS-7	NR	8 8 8																			
							ML	SILT with SAND (ML); very stiff; dark gray; moist; little fine sand; little clay; low plasticity																
			U-8	15	8 16 24				L					33	26	7	21 22	108 108	79	0	21	60	19	TXCD
												3.5												
75		☒	SS-9	12	5 8 13			grades to verigated light olive brown to olive brown			VH													PMT

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-161

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					ML	SILT with SAND (ML); very stiff; dark gray; moist; little fine sand; little clay; low plasticity *(Continues)*																
	10																					
		PB-10	10	60-200 psi																		
					GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); dense to very dense; olive gray to black; wet; fine to coarse gravel; little fine to coarse sand; rounded to subrounded gravel									9		7	64	29			
80																						
		SC	NR	30 35 38																		
																						82.5' - 83.5' fluid loss
					SP-SM	Poorly graded SAND with SILT (SP-SM); dense; dark grayish brown to very dark gray; wet; fine sand; trace fine gravel																
		SC-11	15	34 22 37											20		10	2	88			
85																						
		SS-12	6	33 18 18																		
					CL	LEAN CLAY (CL); hard; greenish gray; wet; low plasticity																
	0																					
		PB-13	24	60-100 psi			L					33	17	16	23	109						
					SP	Poorly graded SAND with GRAVEL (SP); very dense; olive brown to very dark gray; wet; fine and medium sand; fine gravel																
90																						
		SS-14	11	11 35 50/6																		
																						PMT
		SC-15	8	32 50/6																		
95																						
		SS-16	10	25 41 50/6																		
	-10					grades brown to olive brown																
		SC-17	12	13 24 24	SM	Silty SAND (SM); dense; dark yelllowish brown; wet; fine and medium sand									18	113	20					
100																						
					SP	Poorly graded SAND with GRAVEL (SP); very dense; mottled gray and olive brown; moist; fine sand; fine gravel; some carbonate stringers																
		SS-18	4	34 39 48																		
					CL	Sandy LEAN CLAY (CL); very stiff; dark olive gray; wet; some silt; some fine sand; low plasticity																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-161

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
105		U-19	18	9 14 21	CL	Sandy LEAN CLAY (CL); very stiff; dark olive gray; wet; some silt; some fine sand; low plasticity *(Continues)*	L		H	2.2		28	17	11	20	107	69 62	0	31	47	22	
	-20	SS-20	13	11 13 20		grades hard; mottled olive yellow to light olive brown	L															PMT
110		PB-21	21	80 psi	GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); dense; olive to dark olive gray; wet; fine to coarse gravel; some fine to coarse sand; rounded to subrounded gravel									12	104	8	57	34			CORR
		SS-22	5.5	14 27 41	SP	Poorly graded SAND with GRAVEL (SP); very dense; olive; moist; fine sand																
115		SC-23	14	23 34 24		grades olive to dark olive gray																
						grades olive brown																
	-30				CL	LEAN CLAY (CL); very stiff; dark olive gray; moist; low plasticity																
		SS-24	18	3 7 9			L		VH													
120		PB-25	30	50-100 psi		grades sandy; olive gray				3.3		28	16	12								PMT
		SS-26	14	4 9 15		grades dark olive gray	L		L													PMT
125					SP	Poorly graded SAND (SP); very dense; dark olive gray; wet; fine sand																
	-40	SC-27	13	16 37 50/6																		
		SS-28	4	26 30 36		grades with gravel																PMT
130					CH	FAT CLAY (CH); hard; gray to dark gray; moist; high plasticity																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-161

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CH	FAT CLAY (CH); hard; gray to dark gray; moist; high plasticity *(Continues)*																
																								PMT
135			P-29	16.5	800 psi				H		VH			56	21	35	25	99						CONSOL
												4.0												
	-50																							
																								PMT
140			SS-30	15	11 13 15			grades very stiff; brown	H															
																								PMT
							CL	LEAN CLAY (CL); very stiff; brown; medium plasticity; silty																
145			P-31	16	400 psi				M															
												2.7												
	-60																							
							ML	SILT (ML); hard; mottled grayish brown and dark yellowish brown; moist; low plasticity																
150			SS-32	15	9 12 23				L															
																								PMT
							SP	Poorly graded SAND with GRAVEL (SP); very dense; grayish brown; wet; fine and medium sand; fine gravel																rig chatter
155			SC	NR	50/6																			
	-70																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-161

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			SS-33	5	40 50/6		SP	Poorly graded SAND with GRAVEL (SP); very dense; grayish brown; wet; fine and medium sand; fine gravel *(Continues)*																
							CL-ML	Silty CLAY with SAND (CL-ML); hard; light olive brown; moist; fine sand; low plasticity																
165			U-34	18	18 29 42				L		VH	4.5		25	18	7								
	-80																							
170			SS-35	6.5	43 50/6		SP	Poorly graded SAND (SP); very dense; dark grayish brown; wet; fine sand; trace fine gravel																
175			SS-36	5.5	30 50/5			grades with gravel																
	-90																							
							CL	LEAN CLAY (CL)																
180			U-37	17	27 39 50/5		SM	Silty SAND (SM); medium dense; olive brown; wet; fine sand											32					
							ML	SILT (ML); very stiff; olive brown; moist; low plasticity	L			3.9												
							CH	FAT CLAY (CH); very stiff; mottled yellow and light olive brown; moist; high plasticity																
185			PB-38	14	60-220 psi						VH	3.6		61	27	34								
	-100																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-161

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CH	FAT CLAY (CH); very stiff; mottled yellow and light olive brown; moist; high plasticity *(Continues)*																
190			SS-39	7.5	19 20 28			grades hard; laminated partings of clay and silt																
195			P-40	10.5	700 psi		SM	Silty SAND (SM); very dense; olive brown; wet; fine sand																
	-110																							
200			SS-41	10	16 25 32																			
							CL	LEAN CLAY (CL); very stiff; mottled light olive brown to grayish brown; moist; medium plasticity																
205			P-42	12.25	1000 psi				M		VH	3.7												
	-120																							
							SP	Poorly graded SAND with GRAVEL (SP); very dense; mottled olive brown to very dark grayish brown; wet; fine and medium sand; fine gravel																
210			SS-43	6	36 50/3																			
							CL	LEAN CLAY (CL); hard; yellowish brown																
215			U	NR	26 43 50/4																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-161

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL	LEAN CLAY (CL); hard; yellowish brown *(Continues)*																
	-130																							
220			SC-44	5	14 18 22		ML	SILT with SAND (ML); hard; light olive brown; moist; trace fine gravel; low plasticity																
225																								
	-140																							
230		☒	SS-45	12	14 18 21			grades mottled light olive to grayish brown																
235							CL-ML	Silty CLAY with SAND (CL-ML); hard; light olive brown; moist; low plasticity																
	-150																							
240			U-46	15	19 43 50/3				L															
							SM	Silty SAND (SM); very dense; mottled light olive brown to grayish brown; moist																

1.) Light gray shading indicates length of sample recovery.

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3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-161

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM	Silty SAND (SM); very dense; mottled light olive brown to grayish brown; moist *(Continues)*																
245							ML	SILT with SAND (ML); hard; mottled light olive brown to grayish brown; moist; some fine sand; low plasticity																
	-160																							
250			SS-47	11	16 19 19				L															

Boring terminated at a depth of 251.5 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 9.0 feet bgs.
Backfilled with neat cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

255
-170
260
265
-180
270

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-162

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Joseph Ang
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	December 2, 2019 at 8:30 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	December 9, 2019 at 1:30 pm

Boring Location: 9 White St.

Northing: 1,946,275.292 **Easting:** 6,153,549.034

Horizontal Datum: NAD 1983

Elevation: 84.09 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
						■		9" Asphaltic Concrete; 6" Concrete; 15" Aggregate Base (Pavement Section)																
						▥	ML	Sandy SILT (ML); dark brown; moist; some fine to medium sand; trace clay; nonplastic	NP															
	80																							
5						▨	CL	LEAN CLAY (CL); brown; wet; little silt; few fine sand; low plasticity	L															
						▥	ML	SILT with SAND (ML); hard; dark grayish brown; moist; little fine sand; trace clay; low plasticity																
10		■	P-1	16	100 psi				L	R				30	24	6								
												4.5												
	70																							
15		■	P-2	16	150 psi			grades stiff; very dark grayish brown																
												1.5												
						░	SP	Poorly graded SAND (SP); medium dense; brown; moist; fine and coarse sand; some fine to coarse gravel																rig chatter
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
12/3/19	11.0	69.0	N/A	12.4
12/4/19	11.0	104.0	N/A	12.1
12/5/19	11.0	141.5	N/A	12.3
12/6/19	11.0	181.5	N/A	12
12/9/19	11.0	211.0	N/A	10.8

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 12/02/19 were taken in drilling fluid and should not be used for design.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

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SOIL BORING LOG

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BORING NO.

BH-162

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			SS-3	6.5	17 13 6		SP	Poorly graded SAND (SP); medium dense; brown; moist; fine and coarse sand; some fine to coarse gravel *(Continues)*																
							CL	LEAN CLAY (CL); medium stiff to stiff; greenish gray; wet; medium plasticity; few decomposed shell fragments																
	60																							
25			P-4	15	80 psi				M					49	17	32	29	93						CONSOL
												1.0												
							SM	Silty SAND (SM); medium dense; laminated dark gray and yellowish brown; moist; fine sand																
30			MC-5	14	11 20 19																			
	50																							
35			P-6	17	100 psi			grades dark grayish brown; mostly fine to medium sand; trace fine gravel																
							CL-ML	Silty CLAY (CL-ML); stiff; olive gray; wet; low plasticity	L			1.5												
							CL	LEAN CLAY (CL); stiff to very stiff; greenish gray; wet; medium plasticity; few decomposed shell fragments																
40			P-7	17	80 psi				M					35	18	17	24	100						
												2.0												
							ML	Sandy SILT (ML); very stiff; dark gray; moist; low plasticity																
	40																							
45			P-8	17	80 psi				L					27	22	5	22	104	58					
												3.0												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

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SOIL BORING LOG

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BORING NO.
BH-162

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					ML	Sandy SILT (ML); very stiff; dark gray; moist; low plasticity *(Continues)*																
					CL	LEAN CLAY (CL); very stiff; dark greenish gray; wet; some silt; medium plasticity																
50		P-9	17	180 psi			M															
										2.8												
	30																					
55		P-10	17	280 psi		grades light gray						42	19	23	24 26 25	99 101 101						CONSOL; TXCU
										2.2												
					ML	SILT with SAND (ML); hard; yellowish brown; moist; little fine sand; low plasticity																
60		P-11	17.5	300 psi			L					26	22	4								
										4.5												
	20																					
65		P-12	13.5	300 psi																		
					GM	Silty GRAVEL (GM); dense; light olive brown with yellowish brown mottling; moist; fine to coarse gravel; subrounded to subangular gravel																
		SS-13	6	22 32 18	SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark yellowish brown; moist; fine to coarse sand; some fine gravel																
70		U-14	4	50/6											7		5	38	57			
		SS-15	7.5	25 30 40																		
	10	MC-16	10	12 30 50/6		grades with more gravel; wet									8	133	8	41	51	6	2	
75																						

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SOIL BORING LOG

BORING NO.

BH-162

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			SS-17	3	8 27 35		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark yellowish brown; moist; fine to coarse sand; some fine gravel *(Continues)* grades olive brown; moist																
			SS-18	3	25 38 35			grades mottled yellowish brown and brown																
80																								
			U-19	2	50/6			pocket of silty sand									8		10	42	48			samples SS-18, U-19, and U-20 combined for sieve analysis
			U-20	4	25 50/6																			
	0																							
85			SS-21	8	22 29 50/6		SP	Poorly graded SAND with GRAVEL (SP); very dense; dark yellow brown; moist; fine to medium sand; some fine to coarse gravel																
			SS-22	1	12 20 9																			
90			U-23	14	10 13 12		SM	Silty SAND (SM); medium dense; brown; moist; fine sand; trace clay; trace coarse gravel																CORR
			SS	NR	5 6 9																			
	-10						CL	LEAN CLAY (CL); very stiff; very dark greenish gray; wet; little silt; little fine sand; trace coarse gravel; low plasticity																
95			P-24	2	500 psi				L															
			P-25	4	450 psi							2.0												
100			P-26	6	200 psi			grades with more silt						34	17	17	41	82						
			MC-27	12	13 16 28																			
							SM	Silty SAND (SM); medium dense; very dark gray; wet; fine to medium sand; little coarse gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-162

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM																	
105			SS-28	8.5	23 45 50/6		SP	Poorly graded SAND with GRAVEL (SP); very dense; very dark grayish brown; moist; fine to medium sand; little fine to coarse gravel; trace silt																
			U-29	15	23 45 50/6		SM	Silty SAND (SM); very dense; pale brown with yellowish staining; moist; fine sand; trace fine gravel											45	4	51	32	13	
110			SS-30	5	30 35 46		SP	Poorly graded SAND with GRAVEL (SP); very dense; dark yellowish brown with brownish yellow mottling; moist; medium sand; little fine to coarse gravel; trace silt																
			U-31	17	13 17 25		SM	Silty SAND (SM); medium dense; brown with brownish yellow mottling; moist; fine to medium sand																
	-30																							
115			MC-32	18	11 7 8			grades loose; dark greenish gray; wet																
			SS-33	15	5 6 6		CL	LEAN CLAY (CL); stiff; very dark greenish gray; wet; some silt; little fine sand; medium plasticity	M															
120			MC-34	18	7 11 15			grades very stiff				2.2												
			P-35	12.5	200 psi																			
							ML	SILT (ML); dense; very dark greenish gray; moist; some clay; trace fine sand; low plasticity	L					30	25	5								
	-40																							
125			U-36	8	27 50/6		SM	Silty SAND (SM); very dense; very dark greenish gray; moist; fine sand											24					
			SS-37	9	20 28 33																			
130			U-38	13	30 25 35																			
							CL	LEAN CLAY (CL); very stiff; dark gray; moist; some silt; medium plasticity	M		VH	3.2												

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SOIL BORING LOG

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BORING NO.

BH-162

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			P-39	11	250 psi		CL	LEAN CLAY (CL); very stiff; dark gray; moist; some silt; medium plasticity *(Continues)*						37	22	15	25	100						
												4.0												
								grades hard																
	-50																							
			P-40	5	80 psi																			
135												4.2												rig chatter
140			MC-41	18	23 26 30			grades very stiff; grayish brown and dark yellowish brown; low plasticity; laminated partings of clay and silt	L															
														34	23	11	25	100						
												2.5												
	-60																							
145			MC-42	16.5	13 28 33			trace fine gravel; medium plasticity	M		VH													
												2.5												
							SM	Silty SAND (SM); brown with yellowish brown mottling; moist; fine sand																
150			U-43	11	20 50/5																			
							GM	Silty GRAVEL with SAND (GM); dark yellowish brown; moist; fine to coarse gravel; fine to medium sand; subrounded gravel																
	-70						CL	LEAN CLAY (CL); very stiff; pale brown and yellowish brown; moist; few fine sand; low plasticity; laminated clay and silt																
155			MC-44	18	15 20 23				L															
								grades dark gray; mostly clay; some silt; medium plasticity	M			3.0												
160																								

1.) Light gray shading indicates length of sample recovery.

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4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-162

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			SS-45	14	12 16 18		CL	LEAN CLAY (CL); very stiff; pale brown and yellowish brown; moist; few fine sand; low plasticity; laminated clay and silt *(Continues)*																
								pocket of silty fine sand																
								grades brown with yellowish brown mottling; mostly silt; some clay; trace fine sand	M															
	-80																							rig chatter
165			MC-46	18	25 33 36			grades sandy; hard; trace fine gravel; low plasticity	L	S		4.5		30	19	11								
							GP	Poorly graded GRAVEL with SAND (GP); very dense; brown; moist; coarse gravel; little fine to medium sand; trace silt																rig chatter
170			SS-47	2.5	41 50/3																			
							CL	LEAN CLAY (CL); very stiff; dark yellowish brown; moist; some silt; little fine gravel; trace fine sand; low plasticity																
	-90																							
175			MC-48	10	12 17 20			grades very dark grayish brown; more silt	L			3.2												
								interbedded fine gravel																
							CH	FAT CLAY (CH); very stiff; brown with brownish yellow mottling; moist; few fine sand; trace fine gravel; high plasticity																
180			MC-49	14	21 35 38							3.2		56	28	28								
	-100																							
185			MC-50	18	20 33 40			grades to some fine sand				3.0												

1.) Light gray shading indicates length of sample recovery.
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SOIL BORING LOG

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BORING NO.

BH-162

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CH	FAT CLAY (CH); very stiff; brown with brownish yellow mottling; moist; few fine sand; trace fine gravel; high plasticity *(Continues)*																
190			MC-51	18	20 35 45																			
								grades hard				4.5												
	-110						SP	Poorly graded SAND with GRAVEL (SP); very dense; dark brown; moist; medium to coarse sand; some fine gravel; trace silt																rig chatter
195			MC	NR	30 50/4																			
			SS-52	2.5	50/6																			
							CL	LEAN CLAY with SAND (CL); hard; brown with dark yellowish brown mottling; moist; little silt; little fine sand; medium plasticity; laminated layers of sand; decomposed black wood fibers																
200			MC-53	18	13 27 35				M															
												4.5												
	-120																							
205			MC-54	17	20 30 40																			
								grades to some fine sand				4.2												
210			MC-55	12	28 50/6																			
												>4.5												
	-130						SM	Silty SAND (SM); very dense; brownish yellow with pale brown mottling; moist; fine sand; little fine gravel; intermixed pockets of clayey sand																
215			MC-56	4	50/6																			

1.) Light gray shading indicates length of sample recovery.

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SOIL BORING LOG

BORING NO.
BH-162

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
							SM																	
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; brown; moist; fine gravel; little medium to coarse sand; few silt; subrounded gravel																
220		☒	SS-57	5	50/5 40/1																			

Boring terminated at a depth of 220.5 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 7.0 feet bgs.
Backfilled with neat cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

-140
225
230
-150
235
240
-160

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SOIL BORING LOG

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BORING NO.

BH-163

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Joseph Ang
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	December 10, 2019 at 10:50 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	December 17, 2019 at 3:22 pm

Boring Location: 777 The Alameda				**Northing:** 1,946,385.717 **Easting:** 6,153,183.609
Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW	**Horizontal Datum:** NAD 1983
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11.5	**Elevation:** 87.75 ft.
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93	
Drilling Method:	Rotary Wash			**Vertical Datum:** NAVD 88

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
								2.5" Asphalt Concrete; 6" Concrete; 6" Aggregate Base (Pavement Section)																
							CH	FAT CLAY (CH); black; dry; little silt; trace fine sand; high plasticity; some organics	H		H													
5							SM	Silty SAND (SM); brown; dry; fine sand																
	80																							
10																								
							SP	Poorly graded SAND with GRAVEL (SP); medium sand; fine to coarse gravel																
							CL	LEAN CLAY (CL); brown; some silt																
15																								
								grades little silt																
	70																							
20																								

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
12/11/19	11.0	40.0	N/A	13.1
12/12/19	11.5	90.0	N/A	13.8
12/13/19	11.5	123.5	N/A	13.4
12/16/19	11.5	161.5	N/A	13.4
12/17/19	11.5	201.5	N/A	13.6

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 8.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 12/10/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 94 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
						▨	CL	LEAN CLAY (CL); brown; some silt *(Continues)*																
								grades few silt																
						⁙	SP	Poorly graded SAND with GRAVEL (SP); fine gravel																
25																								
						▨	CL	LEAN CLAY (CL); brown; few silt																
	60																							
30																								
						⁙	SP	Poorly graded SAND with GRAVEL (SP); fine gravel																
35																								
						⁙	SM	Silty SAND (SM); dark yellowish brown; fine sand																
	50																							
						▨	CL	LEAN CLAY (CL); brown; wet; low plasticity																
40		■	P-1	13	180 psi				L															
								interbedded coarse gravel; pocket of silty sand																
45						▨	CL	LEAN CLAY (CL); very stiff; dark greenish gray; wet; low plasticity																
	40							interbedded coarse gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff; dark greenish gray; wet; low plasticity *(Continues)*																
50								interbedded coarse gravel																
55																								
	30																							
60			P-2	17.5	220 psi			grades little silt; few fine sand	L															
												2.8												
								grades sandy; olive brown																
65																								
								grades light brownish gray																
	20																							
							ML	Sandy SILT (ML); very stiff; light brownish gray to dark yellowish brown; moist; low plasticity																
70			P-3	17.5	300 psi				L		M			28	23	5	19	111	53					
												3.0												vibration testing
			P-4	18	350 psi			few fine gravel																
							CL	LEAN CLAY (CL); very stiff; very dark greenish gray; moist; some silt; trace fine sand; medium plasticity; trace peat	M		M													
												3.5												
75			MC-5	18	9 12 12																			

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							ML	SILT with SAND (ML); stiff; very dark greenish gray; moist; little fine sand; low plasticity *(Continues)*	L			1.8												
	10		P-6	17.5	300 psi									28	24	4	20	107						CONSOL
								grades very stiff				3.5												
80																								vibration testing
							CL	LEAN CLAY (CL); very stiff; dark greenish gray; moist; some silt; few fine sand; medium plasticity																
			P-7	17.5	400 psi				M		M													
												2.5												
85																								
	0																							
			P-8	16.5	280 psi				L															
								grades olive brown; more silt				2.8												
90							SM	Silty SAND (SM); dense; dark yellowish brown; moist; fine to medium sand																vibration testing
			U-9	18	15 20 36			some fine to coarse gravel																
																			22					
			SS-10	5	32 50/5		GP	Poorly graded GRAVEL with SILT (GP); very dense; dark brown; moist; fine to coarse gravel; some fine to medium sand; few silt; subrounded gravel																
																								VWP
95			SS-11	4.5	29 50/6																			
							SM	Silty SAND (SM); medium dense; olive brown; moist; fine sand																
			MC-12	18	13 23 19																			
	-10						CL-ML	Silty CLAY (CL-ML); stiff; very dark gray; wet; trace fine to coarse sand; low plasticity	L	S		1.5		25	20	5	23	104						
			P-13	15	300 psi		CL	LEAN CLAY (CL); very stiff; very dark gray; wet; some silt; few fine sand; medium plasticity	M		H													
100																								
												2.5												
			MC-14	18	10 13 16		ML	SILT (ML); very stiff; very dark gray; wet; little clay; trace fine sand; trace gravel; trace peat																
												2.5												

1.) Light gray shading indicates length of sample recovery.

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Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		P-15	12	220 psi	CL	LEAN CLAY (CL); very stiff; very dark gray; wet; some silt; trace fine sand; trace fine to coarse gravel; low plasticity *(Continues)*	L															sample P-15 disturbed; bottom 5 of tube bent
105																						
						grades with little fine to coarse sand																
		P-16	17	250 psi		grades dark greenish gray						30	18	12	21 21 20	105 109 110	71					CONSOL; TXCU
	-20																					
										2.8												
		MC-17	9	8 8 17																		
110																						
						grades greenish gray; little silt; little medium to coarse sand																
		P-18	17.5	450 psi																		CORR
						few fine sand; trace coarse sand																
					SM	Silty SAND (SM); medium dense; mottled olive and gray; moist; fine to medium sand																
						grades with fine gravel																
		U-19	18	15 25 21																		
115																						
					CL	LEAN CLAY (CL); stiff; dark greenish gray; moist; little silt; trace fine to medium sand; medium plasticity	M															
										1.8												
		P-20	17	500 psi																		
	-30																					
						grades very stiff; trace silt; trace coarse sand																
										3.2												
		MC-21	18	13 15 18	CL-ML	Silty CLAY (CL-ML); very stiff; dark greenish gray; moist; trace fine to coarse sand; low plasticity																
120																						
												27	20	7	22	105						
										2.2												
		P-22	17.5	350 psi		pocket of fine gravel																
										2.8												
		P-23	17.5	200 psi																		
125						grades with less silt; trace fine sand																
										3.0												
					ML	SILT (ML); hard; dark greenish gray; moist; few fine sand; trace clay; low plasticity																
		P-24	17	180 psi			L		H			32	24	8			86					
	-40																					
										4.5												
130																						
		P-25	4	300 psi																		
					SM	Silty SAND (SM); very dark greenish gray; wet; fine sand; trace coarse sand; trace fine gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							SM																	
			U-26	17	18 26 35		CL	LEAN CLAY (CL); very stiff; very dark greenish gray; moist; few silt; trace fine sand; medium plasticity; trace peat	M		H	2.9												
135			P-27	10	350 psi			grades hard; light olive brown; moist; little fine sand				>4.5		47	24	23	26	98						
	-50							grades very dark greenish gray																
140			P-28	17	450 psi				M		VH	4.5		44	22	22	23 25 24	103 102 101						CONSOL; TXCU
145			P-29	15	450 psi			grades to mottled grayish brown and yellowish brown; trace silt; trace fine to coarse sand; low plasticity	L			4.0												
	-60																							
150			P-30	16.5	480 psi																			
							SM	Silty SAND (SM); mottled pale brown and yellowish brown; fine sand; some silt; trace clay																
							CL	LEAN CLAY (CL); hard; mottled grayish brown and yellowish brown; moist; few silt; trace fine to medium sand; medium plasticity																
155			P-31	10	450 psi				M		VH													
							ML	Sandy SILT (ML); olive brown; moist; some fine sand; little clay									22	104	63	0	37	44	19	
	-70																							
							CL	LEAN CLAY (CL); very stiff; very dark greenish gray; moist; few silt; trace fine sand; medium plasticity																
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			P-32	15	600 psi		CL	LEAN CLAY (CL); very stiff; very dark greenish gray; moist; few silt; trace fine sand; medium plasticity *(Continues)*	M															
								grades mottled grayish brown and yellowish brown; little silt; trace fine gravel				3.5												
165			P-33	13.5	300 psi																			
							SM	Silty SAND (SM); dark yellowish brown with yellowish brown mottling; moist; fine sand; trace clay																
	-80						GP	Poorly graded GRAVEL with SAND (GP); very dense; yellowish brown to dark yellowish brown; moist; fine to coarse gravel; some fine to coarse sand; few silt; subrounded to angular gravel																rig chatter
170			SS-34	4.5	50/6																			
							CL	LEAN CLAY (CL); very stiff; dark gray with olive mottling; moist; little silt; trace fine sand; low plasticity																
175			MC-35	18	20 27 28				L		H													
												3.2		33	19	14	21	107						
	-90																							
								grades very dark gray																
180			P-36	2	600 psi						VH													rig chatter; sample P-36 disturbed; tube flattened; soil sample placed in bag
								grades dark gray																
185			MC-37	17	17 25 35																			
								grades hard; trace peat				4.5												
	-100							grades yellowish brown																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

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Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					CL	LEAN CLAY (CL); very stiff; dark gray with olive mottling; moist; little silt; trace fine sand; low plasticity *(Continues)*																
190		P-38	14.5	400 psi						4.2												
					SM	Silty SAND (SM); very dense; yellowish brown with olive brown mottling; moist; fine sand; trace peat																
195		MC-39	12	26 50/6																		
	-110																					
200		MC-40	18	23 32 35	CL	LEAN CLAY (CL); very stiff; dark yellowish brown with gray mottling; few silt; trace fine sand; medium plasticity	M		VH	3.8												
205		MC-41	17.5	26 39 50/5.5		grades hard; few fine sand; trace organics				4.2												
	-120					grades dark yellowish brown																
210		MC-42	17	20 36 50/5		grades little silt				4.5												
215		MC-43	14	28 47 50/5						>4.5												

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	

Boring terminated at a depth of 216.5 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 8.0 feet bgs.
Vibrating wire piezometer installed at 94 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

-130

220

225

-140

230

235

-150

240

1.) Light gray shading indicates length of sample recovery.

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BORING NO.
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Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	October 9, 2019 at 8:00 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	October 15, 2019 at 12:30 pm

Boring Location: 70 N. 28th St.

Northing: 1,952,858.12 **Easting:** 6,164,718.571

Horizontal Datum: NAD 1983

Elevation: 88.63 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							GP	12" Aggregate Base (GP)																
							CL	LEAN CLAY (CL); very stiff; dark gray; moist; trace fine sand; medium plasticity																
5			SS-1	7.5	6 9 15				M		H													
								grades gray with light olive brown mottling																
	80																							
10			U-2	11	4 9 11									38	22	16								
												2.2												
								grades with fine sand																
15 ▽			SS-3	11	2 6 8																			
								grades grayish brown and gray; trace fine sand																
	70																							
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Drilling Fluid
10/9/19	0.0	16.5	15	NA
10/10/19	9.0	90.5	N/A	12.8
10/11/19	9.0	127.5	N/A	13.5
10/14/19	9.0	165.5	N/A	10.5
10/15/19	9.0	221.5	N/A	12

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 15.0 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 10/09/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 70, 95, 125 and 160 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		∪	U-4	18	2 2 7	▥	CL-ML	Silty CLAY with SAND (CL-ML); medium stiff; light olive brown; wet; low plasticity	L															
												0.8												
						▨	CL	Sandy CLAY (CL); dark grayish brown; wet; fine sand; low plasticity																
25		■	P-5	17	200 psi				L					32	19	13	26	98						CONSOL
	60																							
30		■	P-6	18	300 psi			grades with less sand			H													
												0.8												
35		☒	SS-7	13	0 2 3			grades gray to olive gray; medium plasticity	M															
	50																							
40		∪	U-8	12	4 9 12			grades stiff																
												1.2												
45		☒	SS-9	9	0 7 9			grades very stiff																

1.) Light gray shading indicates length of sample recovery.

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4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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BORING NO.

BH-164

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL																	
	40						CH	FAT CLAY (CH); very stiff; dark greenish gray; moist; high plasticity																
50			PB-10	24	50-100 psi				H					57	26	31	28	94						PMT
												2.2												
																								PMT
55			SS-11	8.5	7 13 20			grades hard; mottled olive brown and gray																
	30																							
60			PB-12	22	60-150 psi			pocket of clayey gravel with sand																
							SM	Silty SAND with GRAVEL (SM); dense; grayish brown; wet; medium sand; fine gravel																
			SS-13	7.5	21 22 15																			rig chatter
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; wet; fine to coarse sand; little fine gravel																
65			PB-14	NR	100-150 psi																			
			U-15	14	30 45 50/6												14	120	6	15	79			
	20																							
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; grayish brown; moist; fine to coarse sand; some fine to coarse gravel; few silt																
70			SS-16	9	23 39 46																			VWP
			U-17	13	36 46 50/5			pockets of poorly graded sand																
75			SS-18	7	20 28 36			grades with less gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-164

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; grayish brown; moist; fine to coarse sand; some fine to coarse gravel; few silt *(Continues)*																
	10		U-19	12	39 44 48			grades without coarse gravel									9	127	5	37	58			
80			SS-20	6	22 39 35																			
			U-21	13	35 45 50/6																			
85			SS-22	8	9 21 47			pocket of lean clay grades olive brown; wet																
			U-23	8	41 50/5														5	43	52			
	0																							
90			SS-24	5.5	38 50/6																			
			U-25	8	43 50/6			grades with less silt																
							CL	LEAN CLAY (CL); very stiff; dark gray; wet; low plasticity																
95			PB-26	25	60-80 psi				L		VH	3.2												VWP
			U-27	16	9 18 28							2.7		38	22	16	27	97						CORR
	-10		SS-28	9	6 10 14																			
100																								
			U-29	18	15 12 18		SM	Silty SAND (SM); medium dense; greenish gray; moist; fine sand																rig chatter
			P-30	17	350 psi														24	0	76			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-164

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							SM	Silty SAND (SM); medium dense; greenish gray; moist; fine sand *(Continues)*																
105								grades dense; dark greenish gray; wet; trace fine gravel																
			SS-31	15	6 16 23																			
	-20		U-32	8	26 48 26																			
110																								
			U-33	14	16 27 50/6			grades less silty; very dense; trace charcoal									26	96	14					
			SS-34	7	31 50/6		SP-SM	Poorly graded SAND with SILT (SP-SM); very dense; olive; wet; medium sand; trace fine gravel																
115																								rig chatter
			U	NR	50/4																			
			SS-35	6	28 23 23			grades to medium to coarse sand																
	-30																							
			SS-36	8	29 49 50/6																			
120																								
			SC-37	14	37 45 50/6																			
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; olive gray; wet; fine to coarse sand; little fine gravel									8	131	9	30	61			
			SS-38	3.5	50/5																			
125																								VWP
								pocket of lean clay; brown																
			SC-39	15	19 26 35		ML	Sandy SILT (ML); hard; greenish gray; wet; fine sand											56					
	-40		SS-40	9	22 44 50/4																			
							GP	Poorly graded GRAVEL with SAND (GP); very dense; olive; wet; fine gravel; medium to coarse sand; angular gravel																
130																								
			SC-41	3	50/3																			SC-41 disturbed; recovered in bag

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG
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BORING NO.
BH-164

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			SS-42	11	6 12 15		CL	LEAN CLAY (CL); very stiff; olive gray; moist; medium plasticity; trace carbonate *(Continues)*	M		VH													
			P-43	17	500 psi									40	20	20	22 22 22	106 107 104	88					CONSOL; TXCU
135								grades few fine sand																PMT
												2.9												
			PB-44	26	80-180 psi																			PMT
	-50											3.2												
140			SS-45	10	9 17 24			grades hard; mottled gray and olive gray	M															
																								PMT
145			U-46	11	33 50/6			some carbonate				>4.5		37	18	19								PMT
	-60						ML	Sandy SILT (ML); hard; olive; moist; fine sand; low plasticity																
150			SS-47	10	18 30 35				L		L													
							SM	Silty SAND (SM); very dense; olive brown; wet																
155			U	NR	50/4																			
							SP	Poorly graded SAND with GRAVEL (SP); very dense; olive gray; wet; fine to medium sand; fine gravel																
	-70																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-164

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			SS-48	5.5	50/6		SP	Poorly graded SAND with GRAVEL (SP); very dense; olive gray; wet; fine to medium sand; fine gravel *(Continues)*																VWP
165			SC-49	4	50/5			medium to coarse sand; fine gravel									5							
							CH	FAT CLAY (CH); very stiff; olive gray; moist; high plasticity																
	-80																							
170			PB-50	18	100-200 psi				H		VH			56	27	29	27	91						
												3.2												
175			SS-51	13.5	9 14 28																			
								trace fine sand																
							CL	LEAN CLAY (CL); hard; gray with light olive brown mottling; moist; low plasticity																
	-90																							
180			U-52	18	19 26 42				L															
												4.3												
							ML	Sandy SILT (ML); hard; dark greenish gray; moist; fine sand; low plasticity																
185			SS-53	14	13 27 43				L															
							SP	Poorly graded SAND with GRAVEL (SP); very dense; grayish brown; wet; fine sand; fine gravel																

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-164

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)^4	PTV (tsf)^4	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
	-100						SP	Poorly graded SAND with GRAVEL (SP); very dense; grayish brown; wet; fine sand; fine gravel *(Continues)*																
190			SS-54	8.5	23 25 35			some clasts of sandy clay																
195			SC-55	6	50/6																			
							CL	LEAN CLAY (CL); hard; olive gray; moist; trace fine sand; low plasticity																
	-110																							
200			PB-56	24	80-250 psi				L			4.3												
205			SS-57	10	25 28 33																			
							CH	FAT CLAY (CH); hard; gray and light olive brown; moist; high plasticity																
	-120																							
210			U-58	14	23 27 32				H			4.0												
215			SS-59	9	22 26 30			grades gray																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-164

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							CH	FAT CLAY (CH); hard; gray and light olive brown; moist; high plasticity *(Continues)*																
	-130																							
220			U-60	18	32 38 46						VH													
												4.5												
225			SS-61	14	15 26 37			grades dark greenish gray; medium plasticity; silty	M															
	-140																							
230			U-62	14	21 45 50/5			grades dark gray; high plasticity	H															
												4.5												
235																								
	-150																							
240																								

Boring terminated at a depth of 232.0 feet bgs.
Groundwater encountered at a depth of 15.0 feet bgs prior to switching to rotary wash drilling.
Vibrating wire piezometers installed at 70, 95, 125 and 160 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-165

Project: BART to Silicon Valley Phase II Project
Location: Santa Clara County, CA
Client: Santa Clara Valley Transportation Agency
Drilling Co.: Pitcher Services, LLC

Project No.: 507385606
Field Eng. Staff: Joseph Ang
Date/Time Started: November 12, 2019 at 11:35 am
Date/Time Finished: November 19, 2019 at 12:20 pm

Boring Location: 1550 Las Plumas Ave

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Northing: 1,956,022.361 **Easting:** 6,163,246.735
Horizontal Datum: NAD 1983
Elevation: 86.01 ft.
Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
								10.5" Asphalt Concrete; 11" Aggregate Base (Pavement Section)																
							ML	SILT (ML); dark grayish brown; moist; trace clay; trace fine and medium sand; medium plasticity	M															
5																								
	80																							
								grades to dark yellowish brown																
							SM	Silty SAND (SM); dark yellowish brown; moist; fine and medium sand																
10			SS-1	18	0 0 0		ML	SILT (ML); very soft; dark brown with dark gray mottling; moist; trace clay; medium plasticity	M															
							CH	FAT CLAY (CH); stiff; dark gray; moist; little silt; high plasticity	H															
15																								
	70																							
20																								

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
11/13/19	11.0	26.5	N/A	4.6
11/14/19	11.0	71.5	N/A	9.1
11/15/19	11.0	116.5	N/A	12.4
11/18/19	11.0	166.0	N/A	6.8
11/19/19	11.0	166.0	N/A	8.3

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 10.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 11/12/19 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 38 and 72 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

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SOIL BORING LOG

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BORING NO.

BH-165

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			MC-2	8	4 9 14		CH	FAT CLAY (CH); stiff; dark gray; moist; little silt; high plasticity *(Continues)*	H			1.8												
			P-3	11	400 psi							1.0		60	24	36	31	91						CONSOL
25	60		MC-4	10	5 5 8							1.8												
			P-5	14	200 psi			grades dark gray with dark yellowish brown mottling; wet; trace silt	H			1.0												
30			P-6	15	150 psi																			
							CL	LEAN CLAY (CL); stiff; dark greenish gray; wet; medium plasticity	M															
			P-7	15.5	175 psi							1.0		42	17	25	26 25 24	97 101 104						CONSOL; TXCU
35	50		MC-8	14	4 12 15							1.4												CORR
			P-9	15	200 psi							1.5												VWP
								grades olive brown; silty																
40			P-10	15	400 psi																			
							SM	Silty SAND with GRAVEL (SM); olive brown; wet; fine sand; fine gravel																
							CL	Sandy LEAN CLAY (CL); stiff; olive brown; wet; some fine gravel; trace fine gravel; medium plasticity	M															
			MC-11	15	2 9 12							1.2												
45	40		P-12	15	175 psi							2.5		40	20	20	25 27	99 98	59					TXCU
			U-13	14	7 7																			

1.) Light gray shading indicates length of sample recovery.

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3.) Maximum Particle Size observed may be limited by sampler dimensions.

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SOIL BORING LOG

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BORING NO.

BH-165

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					12		CL	Sandy LEAN CLAY (CL); stiff; olive brown; wet; some fine gravel; trace fine gravel; medium plasticity *(Continues)*	L															
								grades with less sand; gray; low plasticity																
50			MC-14	16	2 8 11									32	21	11	26	98	88					
								grades light olive brown				1.2												
			P-15	16	200 psi																			
							SM	Silty SAND (SM); gray; wet; fine sand																
								pocket of fine gravel																
55			SS-16	18	0 3 7		CL	LEAN CLAY (CL); stiff; gray; wet; trace fine sand; medium plasticity; trace peat	M															
	30																							
			MC-17	17	3 3 8																			
								grades sandy; low plasticity	L					26	17	9	22	107	57					
60			P-18	16	250 psi			grades very stiff; olive brown; little fine sand																
												2.5												
			MC-19	18	3 8 16																			
65			MC-20	14	13 17 18									33	22	11	23	103						
	20											3.5												
			MC-21	13	8 13 16																			
												2.0												
70			P-22	17	400 psi																			
							SM	Silty SAND (SM); dark gray; moist; fine sand; trace coarse sand																
								pocket of fine gravel																
							CL-ML	Silty CLAY with SAND (CL-ML); very stiff; dark gray; wet; fine sand; low plasticity																VWP
			U-23	15	8 16 25				L															
														26	21	5	25	101	78					
												2.5												
							CL	LEAN CLAY (CL); very stiff; dark gray; wet; trace fine sand; low plasticity																
75			P-24	15	100 psi				L															

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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SOIL BORING LOG

BORING NO.

BH-165

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		■				⁘	SM	Silty SAND (SM); dark gray; wet; fine to coarse sand *(Continues)*																
						▨	CL	LEAN CLAY (CL); stiff; dark gray; wet; trace fine sand; low plasticity																
		■	P-25	16	350 psi	▨			L					34	20	14	23	105						
						▨						2.5												
						▨		grades very stiff																
80		■	P-26	17	250 psi	▨		grades to medium plasticity	M															
						▨	CL	Sandy CLAY (CL); very stiff; dark gray; wet; fine sand; low plasticity	L			2.5												
						▨		pocket of fine gravel																
85		☒	SS-27	14	6 6 13	▨																		
	0					‖	ML	SILT (ML); very stiff; dark greenish gray; wet; trace fine sand; nonplastic	NP															
						⁘	SM	Silty SAND (SM); dense; olive gray; wet; fine to medium sand																
90		∪	U-28	14	13 18 18	⁘													35	3	62	24	11	
						⁘		pocket of fine gravel																
						▨	CL	LEAN CLAY (CL); very stiff; light olive brown; wet; trace fine sand; low plasticity																
95		☒	SS-29	13	4 10 12	▨			L															
	-10					▨																		
100		∪	U-30	18	12 18 17	▨								29	18	11	21	107						
						▨						2.5												

1.) Light gray shading indicates length of sample recovery.

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3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-165

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
						▨	CL	LEAN CLAY (CL); very stiff; light olive brown; wet; trace fine sand; low plasticity *(Continues)*																
105	-20	☒	SS-31	14	9 13 15	▨		pocket of fine gravel																
110		■	P-32	17	300 psi	▨						3.7												
115	-30	■	P-33	5.5	400 psi	▨		grades hard																
						▥	ML	Sandy SILT (ML); very stiff; dark gray; wet; fine sand; low plasticity																
120		■	P-34	17	200 psi	▥			L	R	M	3.1		27	23	4								
						▥		pocket of lean clay																
125	-40	■	P-35	16	350 psi	▥													67					
130		■	P-36	13	250 psi	▥		grades nonplastic; trace decayed wood fibers; trace shells grades dark greenish gray																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SP	Poorly graded SAND with GRAVEL (SP); very dense; dark gray and light olive brown; wet; medium sand; fine gravel; interbedded pockets of silty fine sand *(Continues)*																
135		☒	SS-37	5	35 50/6																			
	-50																							
140		∪	U-38	12	15 19 50/5												26	99	16	0	84			
145		☒	SS-39	5.5	26 15 50/6			grades without pockets of silty sand																
	-60																							
150		∪	U	NR	66/6																			
		☒	SS-40	4	50/6			grades to mostly coarse sand; some fine to coarse gravel																
155																								
	-70																							
160		☒																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-165

							Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	**Visual - Manual Identification & Description[2,3]**	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
		SS-41	6	38 50/4	SP	Poorly graded SAND with GRAVEL (SP); very dense; dark gray and light olive brown; wet; medium sand; fine gravel; interbedded pockets of silty fine sand *(Continues)*																
165		SS-42	4.5	32 41 50/3																		
	-80																					
					CL	LEAN CLAY (CL); hard; olive gray; wet; fine to coarse gravel; medium plasticity																
170		P	NR	600 psi		interbedded fine to coarse gravel																
175		P-43	3	400 psi			M															
	-90																					

Boring terminated at a depth of 176.5 feet bgs.
Borehole overdrilled from 162 feet to 177 feet to accomodate OYO method downhole P.S. logging.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 10.0 feet bgs.
Vibrating wire piezometers installed at 38 and 72 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

Depth (ft)	Elevation (ft)
180	
185	
	-100

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-166

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	January 2, 2020 at 9:00 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	January 10, 2020 at 12:30 pm

Boring Location: 366 North Morrison St.

Northing: 1,947,127.361 **Easting:** 6,152,114.796

Horizontal Datum: NAD 1983

Elevation: 86.58 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
						■		6" Asphalt Concrete; 5" Aggregate Base (Pavement Section)																
		▨	BS			▨	CH	FAT CLAY (CH); stiff; dark gray; moist	H		VH													
						▨	CL	LEAN CLAY (CL); stiff; olive brown; moist; some silt; low plasticity	L		H													
5																								
	80																							
10		■	P-1	16	20 psi														100			46	54	
												1.0												
15		■	P-2	7.5	40 psi	▨	SM	Silty SAND (SM); medium dense; grayish brown; wet; fine sand									18	114	34					
	70																							
								grades with gravel																
						▨	CL	LEAN CLAY (CL); stiff; very dark gray; wet; trace fine sand; low plasticity																
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Depth (ft): Drilling Fluid
1/3/20	11.0	70.0	N/A	11.1
1/6/20	11.0	90.0	N/A	12.2
1/7/20	11.0	110.0	N/A	11.4
1/8/20	11.0	141.5	N/A	12.4
1/9/20	11.0	176.5	N/A	12.4
1/10/20	11.0	211.0	N/A	12.4

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 01/02/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 105 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-166

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description[2,3]**	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			P-3	16	80 psi		CL	LEAN CLAY (CL); stiff; very dark gray; wet; trace fine sand; low plasticity *(Continues)*	L		H													
								grades dark greenish gray				1.1												
25			P-4	11	80 psi							1.4												
	60																							
30			P-5	15	80 psi							1.8												
35			P-6	17	20 psi									34	18	16	24	99						CONSOL
								grades greenish gray with light olive brown mottling				1.2												
	50																							
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark olive gray; wet; fine to coarse sand; little fine gravel; few silt																rig chatter
40			U-7	9	40 50/6												12	124	8	18	74			
45			SS-8	12	3 7 8		ML	SILT (ML); stiff; light olive brown; moist; trace fine sand; low plasticity	L					30	25	5	24							
	40																							
								grades gray																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-166

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					ML	SILT (ML); stiff; light olive brown; moist; trace fine sand; low plasticity *(Continues)*																
50		P	NR	400 psi	SM	Silty SAND with GRAVEL (SM); dense; yellowish brown; wet; fine sand; fine gravel																
		MC-9	10	15 17 30													40					
					SP	Poorly graded SAND with GRAVEL (SP); very dense; olive; wet; medium sand; fine gravel																
55		U-10	8	25 50/6																		
	30																					
60		SS-11	3	34 42 15		grades with more fine gravel; trace coarse gravel																
					CL	LEAN CLAY with SAND (CL); stiff; greenish gray; moist; fine sand; low plasticity; trace carbonate																
65		MC-12	15	3 8 13			L		H	1.8		28	17	11	20	109						
	20																					
70																						vibration testing
		P-13	15	600 psi						1.8												
		MC-14	16	12 19 30						2.2												
					CL	Sandy LEAN CLAY (CL); very stiff; olive gray and light olive brown; moist; fine sand; medium plasticity	M															
75																						

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-166

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
	10	P-15	11	500 psi	CL	Sandy LEAN CLAY (CL); very stiff; olive gray and light olive brown; moist; fine sand; medium plasticity *(Continues)*						35	20	15	27							
						grades dark brown to reddish brown; trace fine gravel																
		MC-16	16	9 15 40	ML	Sandy SILT (ML); hard; light yellowish brown; wet; fine to medium sand																
						grades more sandy											60					
80																						vibration testing
		MC-17	6	9 9 12	SM	Silty SAND with GRAVEL (SM); medium dense; dark gray; wet; fine to medium sand																
					ML	SILT (ML); very stiff; pale yellow; wet; some clay; low plasticity																
		P-18	16	500 psi											25	98	92	0	8	58	34	
										3.0												
85																						
					SP	Poorly graded SAND with GRAVEL (SP); very dense; dark grayish brown; wet; fine to coarse sand; fine gravel																
		U-19	4.5	50/5		pocket of fine to coarse gravel																
	0																					
		SS-20	4.5	24 43 50/5																		
90																						vibration testing
		U-21	7	28 50/6		grades to coarse sand																
					ML	Sandy SILT (ML); hard; light olive brown; moist; fine sand; low plasticity																
		MC-22	13	11 12 23			L			4.0												
					SM	Silty SAND (SM); medium dense; olive yellow; moist; fine sand																
95					CL	Sandy CLAY (CL); stiff; dark greenish gray; wet; fine sand; low plasticity																
		P-23	16	300 psi			L		M			32	18	14	22	104	53					CONSOL
	-10																					
						trace fine gravel; pocket of sand																
		MC-24	16	11 9 11		little silt																
										1.8												
100					CL	LEAN CLAY with SAND (CL); very stiff; light yellowish brown; moist; fine sand; low plasticity																
		MC-25	16	9 10 19			L		H													
										2.5												
																						rig chatter
		SS-26	4	37 50/6	SM	Silty SAND with GRAVEL (SM); very dense; dark grayish brown; moist; medium to coarse sand; fine gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-166

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					SM	Silty SAND with GRAVEL (SM); very dense; dark grayish brown; moist; medium to coarse sand; fine gravel *(Continues)*																
105		U	NR	50/6																		VWP
	-20	SS-27	4	41 46 46		grades with more gravel											21					
		SS-28	3	37 50/5																		
110																						
		SS-29	4.5	23 45 50/6																		
																						fluid loss
		U-30	12	30 25 36	ML	SILT (ML); hard; light yellowish brown and olive yellow; moist; low plasticity	L					32	24	8	25	97						CORR
										4.5												
115																						
		MC	NR	9 24 25	CL	LEAN CLAY with SAND (CL); very stiff; dark greenish gray; moist; fine sand; low plasticity; trace carbonate																fluid loss
	-30																					
		MC-31	8	17 22 30			L		VH													
120		MC-32	18	5 13 17																		
										2.2		31	20	11	24	101						
		MC-33	18	12 17 26																		
										2.5												
125		MC-34	18	10 15 21																		
	-40									2.7												
		MC	NR	10 12 20	ML	SILT (ML); very stiff; dark gray; wet; low plasticity																
		MC-35	18	13 23 39			L	R														
130										3.5		30	24	6	24	100						
		U-36	18	26 30																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
					32		CL	LEAN CLAY with SAND (CL); very stiff; dark greenish gray; moist; fine to medium sand; medium plasticity *(Continues)*	M			2.2												
			MC-37	18	16 21 26																			
135								disseminated calcite fine gravel																
	-50																							
140			MC-38	17	20 23 31																			
												3.5		39	24	15	29	94						
							CL	LEAN CLAY with SAND (CL); very stiff; gray with light olive brown mottling; moist; fine sand; low plasticity																
145			MC-39	18	23 41 40				L															
	-60											3.2												
150			P-40	13	350 psi																			
								grades hard				>4.5												
								pocket of gravel																rig chatter
155			MC-41	18	16 25 33				M															
								sandy																
								grades light olive brown; medium plasticity						37	17	20	21	106						
	-70																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-166

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			MC-42	18	19 27 32		CL	LEAN CLAY with SAND (CL); very stiff; gray with light olive brown mottling; moist; fine sand; low plasticity *(Continues)*																
								gray and light olive brown mottled				3.5												
165			P-43	9	400 psi				M															
								grades light olive brown with black speckling																
	-80																							
							CL	Sandy LEAN CLAY (CL); hard; gray with dark yellowish brown mottling; moist; fine sand; low plasticity																
170			MC-44	18	20 28 38				L															
												4.0												
175			MC-45	18	20 27 41																			
								grades silty																
	-90											3.8												
							ML	Sandy SILT (ML); hard; dark greenish gray and olive; wet; fine sand; low plasticity																
180			MC-46	18	22 31 50/6				L															
							CL	LEAN CLAY (CL); hard; dark yellowish brown; moist; medium plasticity																
185			MC-47	18	20 29 39				M															
	-100											4.3												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							ML	SILT with SAND (ML); hard; yellowish brown and gray; moist; fine sand; nonplastic																
190			MC-48	18	22 27 50/6				NP															
												4.5												
195			MC-49	12	30 50/6																			
							SM	Silty SAND (SM); very dense; brown; moist; fine sand																
	-110																							
							CH	Sandy FAT CLAY (CH); hard; strong brown; moist; fine sand; high plasticity																
200			MC-50	12	21 40 48				H															
												>4.5												
							ML	SILT (ML); hard; yellowish brown; moist; fine sand; nonplastic																
205			MC-51	18	25 40 46				NP															
												>4.5												
	-120						SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; brown; wet; fine to medium sand; little fine gravel; trace coarse gravel																rig chatter
210			SS-52	4.5	41 50/6																			
							CL	Sandy LEAN CLAY with GRAVEL (CL); hard; dark brown to reddish brown; moist; fine sand; coarse gravel; low plasticity																
215			MC-53	8	27 50/5				L															
								grades to mostly coarse silty gravel																rig chatter

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description**[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
	-130							Boring terminated at a depth of 215.9 feet bgs. Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.0 feet bgs. Vibrating wire piezometer installed at 105 feet bgs. Backfilled with bentonite-cement grout. Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop. Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers. Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.																
220																								
225																								
	-140																							
230																								
235																								
	-150																							
240																								

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-167

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Malek Zuhaika
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	April 2, 2020 at 9:10 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	April 10, 2020 at 12:00 pm

Boring Location: 133 Rhodes Court

Northing: 1,946,661.396 **Easting:** 6,152,533.843

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 93.25 ft.

Vertical Datum: NAVD 88

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
								3" Asphalt Concrete; 9" Aggregate Base (Pavement Section)																
							SM	Silty SAND with GRAVEL (SM); black; dry; fine sand; fine gravel																
			BS-1																					2' - 6' excavated via vacuum truck
	90																							
5																								
								grades with less silt; light olive brown																
10			U-2	12	11 9 16			grades moist trace coarse gravel																
							ML	Sandy SILT (ML); hard; olive yellow with gray mottling; moist; fine sand; low plasticity	L			>4.5		29	23	6								
							CL	LEAN CLAY with SAND (CL); very stiff; yellowish brown with gray mottling; moist; fine sand; medium plasticity																
	80																							
15			MC-3	12	5 9 11				M			2.5												
							SC	Clayey SAND (SC); dark grayish brown; wet; fine sand																
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
4/2/20	0.0	22.5	20.5	NA
4/3/20	11.0	41.5	N/A	10.8
4/6/20	11.0	84.5	N/A	18.7
4/7/20	11.0	114.0	N/A	17.9
4/8/20	11.0	141.5	N/A	17.8
4/9/20	11.0	181.5	N/A	18.2
4/10/20	11.0	220.0	N/A	18.6

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 20.5 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 04/02/20 were taken in drilling fluid and should not be used for design.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-167

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
∇		SH-4	30	20-150 psi	SC	Clayey SAND (SC); dark grayish brown; wet; fine sand *(Continues)*											46					
					SM	Silty SAND (SM); olive brown; moist																
	70																					
					CL	LEAN CLAY (CL); dark greenish gray; wet; medium plasticity																
25		P-5	15	100 psi			M		H			36	20	16	29	92						
						pocket of silty sand																
					OH	ORGANIC CLAY (OH); stiff; gray; moist; high plasticity																
30		P-6	14	150 psi		pocket of silty sand	H					57	26	31	37	84						
										1.2												
		P-7	16		CL	Sandy LEAN CLAY (CL); very stiff; gray; wet; fine sand; low plasticity	L															
	60																					
										3.0												
35		P-8	16			pocket of silty sand; olive brown																
					CH	FAT CLAY with SAND (CH); stiff; greenish gray; moist; fine sand; high plasticity	H					72	25	47								
										1.0												
					CL	LEAN CLAY with SAND (CL); very stiff; light yellowish brown; moist; fine sand; medium plasticity																
		P-9	15	350 psi		pocket of silty sand	M															
										2.5												
40		P-10	17	200 psi		grades hard; dark yellowish brown and gray; low plasticity	L					34	20	14	22 22 23	106 106 103	73					CONSOL; TXCU
										4.2												
		P-11	16	100 psi		grades very stiff; light olive brown																
	50																					
										2.0												
					SM	Silty SAND (SM); light olive brown; wet; fine sand																
45		P-12	10	180 psi																		
																						47' - 68' rig chatter; continuous fluid loss (approximately 1000 gallons total)
					GP-GM																	
		MC-13	10	28 25											9	130	10	46	45			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-167

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
				18	GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); medium dense; light olive brown; wet; fine to coarse gravel; fine to coarse sand; subangular to angular gravel *(Continues)*																
50		SS	NR	10 1 0																		
		U-14	10	8 12 21																		
	40																					
55		SS-15	8	18 23 21		grades dense; coarse subrounded to subangular gravel																
					SM	Silty SAND with GRAVEL (SM); very dense; olive; wet; fine to coarse sand; some fine to coarse sand																
		U-16	13	33 44 50/6													15	39	46			
						grades olive brown																
60		SS-17	9.5	18 18 40																		
		SS-18	8	25 27 34																		
	30																					
65		SS-19	3	24 27 25		grades olive																
					SM	Silty SAND (SM); medium dense; dark grayish brown with reddish brown mottling; wet; fine to medium sand																
		MC-20	4.5	9 22 19																		
70		U-21	18	21 17 13	ML	Sandy SILT (ML); very stiff; dark gray; wet; fine sand; few clay; low plasticity	L								23	103	56	0	44	43	13	
		MC-22	14	8 11 17	CL	LEAN CLAY (CL); very stiff; dark greenish gray with black speckling; moist; medium plasticity	M		H	3.0												CORR
	20																					
75		P-23	18	200 psi		grades with fine sand						36	16	20	23 22 22	103 107 106	82					CONSOL; TXCU
						grades to sandy clay				2.5												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-167

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			MC-24	16	9 14 20		CL	LEAN CLAY (CL); very stiff; dark greenish gray with black speckling; moist; medium plasticity *(Continues)*																
								pocket of silty sand				3.0												
			P-25	13	350 psi		ML	SILT with SAND (ML); hard; dark greenish gray; moist; fine sand; low plasticity	L					32	26	6								
80								grades olive brown				4.5												
			U-26	6	50/6		SP	Poorly graded SAND (SP); very dense; olive brown; wet; medium sand; few fine gravel																rig chatter
	10		SS	NR	13 8 10		CL	LEAN CLAY (CL); very stiff; light olive brown with reddish brown laminations; moist; fine sand; medium plasticity																
85			MC-27	2	17 24 29				M															
			P-28	10.5	550 psi									45	16	29								
							GM	Silty GRAVEL with SAND (GM); very dense; olive; moist; fine to coarse gravel; fine to medium sand; subangular to angular gravel																88' - 101.5' rig chatter
90			U	NR	23 33 50/6																			
			SS-29	10	25 43 50/4														20					
	0		SS-30	10	29 36 50/8		SW	Well graded SAND with GRAVEL (SW); very dense; olive; moist; fine to coarse sand; some fine gravel; trace silt																
95			U-31	9	40 50/5.5														4	42	54			
			SS-32	2	7 9 13																			
100							SM	Silty SAND (SM); light olive brown; wet; fine sand																
			U-33	14	25 25 30																			
							CL	Sandy LEAN CLAY (CL); hard; light olive brown; moist; fine sand; low plasticity	L			4.0		32	18	14								
	-10		P-34	17	300 psi			grades with less sand																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-167

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL	Sandy LEAN CLAY (CL); hard; light olive brown; moist; fine sand; low plasticity *(Continues)*																
105																								
			P-35	18	300 psi												25	100	82	0	18	52	30	
								grades with fine gravel; olive brown																
			P-36	12	700 psi																			
110							SC	Clayey SAND with GRAVEL (SC); medium dense; light brownish gray; wet; fine to medium sand; some fine gravel																rig chatter
			SS	NR	11 8 10																			
			MC-37	18	15 19 21																			
	-20																11	125	32	32	36	21	11	
							CL-ML	Silty CLAY with SAND (CL-ML); hard; light olive brown and gray; moist; fine sand; low plasticity																
115			MC-38	15	15 28 30				L															
												4.0												
							CL	Sandy LEAN CLAY (CL); very stiff; olive; moist; fine sand; trace fine to coarse gravel; medium plasticity																
			P-39	17	350 psi				M															
							CL-ML	Sandy, Silty CLAY (CL-ML); very stiff; dark greenish gray; moist; fine sand; low plasticity	L			2.3												
120			P-40	17	300 psi																			
												3.0												
								grades with less silt; greenish gray																
			P-41	13	400 psi																			
	-30																							
							SM	Silty SAND (SM); dense; light olive brown; wet; fine sand; trace clay																rig chatter
125			MC-42	18	16 25 36		SC-SM	Silty, Clayey SAND (SC-SM); dense; greenish gray with black speckling; moist; fine sand																
			P-43	11	550 psi		SP	Poorly graded SAND (SP); dark greenish gray; wet; fine to medium sand; trace silt																
																								rig chatter
130			PB-44	30	50-150 psi		CL	Sandy LEAN CLAY (CL); very stiff; dark greenish gray; moist; fine sand; low plasticity	L															

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-167

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					CL	Sandy LEAN CLAY (CL); very stiff; dark greenish gray; moist; fine sand; low plasticity *(Continues)*				2.5												
	-40																					
		P-45	15	550 psi	ML	SILT with SAND (ML); very stiff; dark gray; wet; fine sand				3.2												
135																						
140		P-46	14	650 psi																		
	-50																					
145		P-47	13	350 psi		grades sandy; very dark gray																
					CL	LEAN CLAY (CL); very stiff; olive gray with light olive brown mottling; moist; trace fine sand; medium plasticity																
150		P-48	9	250 psi			M			3.7												
	-60																					
					CL-ML	Sandy, Silty CLAY (CL-ML); hard; light olive brown; moist; fine sand; low plasticity																
155		P-49	15	550 psi			L			>4.5												
					ML	Sandy SILT (ML); very stiff; light yellowish brown with yellowish brown mottling; moist; fine sand; low plasticity																
160																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-167

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
		P-50	11	250 psi	ML	Sandy SILT (ML); very stiff; light yellowish brown with yellowish brown mottling; moist; fine sand; low plasticity *(Continues)*	L			3.2												
	-70				CL	Sandy LEAN CLAY with GRAVEL (CL); hard; light olive brown; moist; fine gravel; medium plasticity	M															
165		P-51	6	550 psi	GC	Clayey GRAVEL with SAND (GC); very dense; light brownish gray; wet; fine gravel; fine to coarse sand; subangular gravel																165.5' - 179.5' rig chatter
					GM	Silty GRAVEL with SAND (GM); very dense; dark grayish brown; moist; fine gravel; medium to coarse sand; subrounded to subangular gravel																
170		SS-52	4	41 50/5																		
	-80				GP	Poorly graded GRAVEL with SAND (GP); very dense; olive brown; wet; fine to coarse gravel; medium to coarse sand; subrounded to subangular gravel																
175		U-53	2	29 50/3																		
					CL	Sandy LEAN CLAY (CL); hard; light olive brown with yellowish brown staining; moist; fine sand; trace fine gravel; medium plasticity																
180		MC-54	9	18 21 25			M			4.2												
	-90				SC-SM	Silty, Clayey SAND (SC-SM); very dense; olive brown; wet; fine sand																183' - 193.5' minor rig chatter
185		U-55	6	33 50/6																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-167

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							ML	Sandy SILT (ML); hard; light olive brown; moist; fine sand; trace clay; low plasticity *(Continues)*																
190			PB-56	23	50-200 psi				L															
												>4.5												
	-100																							
							CL	LEAN CLAY (CL); hard; light olive brown; moist; little silt; low plasticity																
195			PB-57	20	80-180 psi				L															
200							SM	Silty SAND (SM); very dense; yellowish brown; moist; fine sand																rig chatter
			U-58	11	35 50/5																			
	-110																							
							CL	Sandy LEAN CLAY (CL); hard; yellowish brown; moist; fine to medium sand; trace fine gravel; medium plasticity																
205			MC-59	10	30 44 50/4				M		H													
							GC	Clayey GRAVEL with SAND (GC); very dense; olive brown with light brownish gray mottling; wet; fine gravel; fine to coarse sand; subrounded to angular gravel																206' - 218.5' rig chatter
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; light olive brown; wet; fine gravel; medium to coarse sand; subangular gravel																
210			SS-60	3.5	50/4.5																			
	-120																							
215																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-167

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)^4	PTV (tsf)^4	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; light olive brown; wet; fine gravel; medium to coarse sand; subangular gravel *(Continues)*																
			U	NR	19 20 33			dense																
220		☒	SS-61	3.5	50/5.5																			

Boring terminated at a depth of 220.5 feet bgs.
Groundwater encountered at a depth of 20.5 feet bgs prior to switching to rotary wash drilling.
Backfilled with neat cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

-130

225

230

-140

235

240

-150

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-168

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Joseph Ang, Malek Zuhaika
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	June 15, 2020 at 9:40 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	June 19, 2020 at 12:00 pm

Boring Location: 850 Cinnabar Street

Northing: 1,947,476.89 **Easting:** 6,152,114.407

Horizontal Datum: NAD 1983

Elevation: 84.54 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
								7" Asphalt Concrete; 8" Aggregate Base (Pavement Section)																
							CL	LEAN CLAY with SAND (CL); dark olive brown; dry; little silt; little fine to medium sand; medium plasticity	M		VH													1' - 9' excavated via vacuum truck
			BS-1																					
5	80																							
			G-2				CL	LEAN CLAY (CL); stiff; gray with dark yellowish brown mottling; moist; little silt; trace fine sand; medium plasticity	M		H													
10			SH-3	30	40-80 psi									41	23	18	36	81						
								grades brown				1.0												
	▽ 70						ML	Sandy SILT (ML); dark grayish brown; wet; some fine sand; little clay																
15			P-4	17	100 psi												22	104	56	0	44	40	16	groundwater encountered at 14.5' during dry drilling; groundwater level measured at 14.2' after waiting 10 minutes
							CL-ML	Silty CLAY with SAND (CL-ML); stiff; dark greenish gray; wet; low plasticity	L		M	1.8												
							CL	LEAN CLAY (CL); stiff; dark greenish gray; wet; medium plasticity																
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Depth (ft): Drilling Fluid
6/15/20		14.5	14.5	NA
6/16/20	11.0	51.5	N/A	10.8
6/17/20	11.0	101.0	N/A	14.7
6/18/20	11.0	146.5	N/A	15.8
6/19/20	11.0	202.5	N/A	15.4

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 14.5 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 06/15/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 48 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-168

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			P-5	17	80 psi		CL	LEAN CLAY (CL); stiff; dark greenish gray; wet; medium plasticity *(Continues)*	M		VH													
												1.0												
	60																							
25			P-6	18	120 psi						VH			49	22	27	29 35 38	92 88 85						CONSOL; TXCU
												1.2												
30			P-7	16	220 psi																			
							SM	Silty SAND (SM); brown; wet; fine sand; trace coarse sand; trace fine gravel																
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark brown; wet; fine to coarse gravel; fine to coarse sand; rounded gravel																32' - 43' rig chatter
	50																							
35			SS-8	15	16 28 29																			
40			U-9	8	20 50/5												10	133	4	50	46			
								coarse gravel up to 3"																
							CL	Gravelly LEAN CLAY (CL); very stiff; gray; wet; medium plasticity																
																								rig chatter
	40																							
45			MC-10	6	6 9 16				M															
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; very dark grayish brown; wet; fine to coarse sand; some fine gravel																47' - 54' rig chatter

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-168

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
					SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; very dark grayish brown; wet; fine to coarse sand; some fine gravel *(Continues)*																VWP
50		SS-11	15	26 26 26											7		9	37	54			
					CL	Sandy CLAY (CL); stiff; grayish brown with dark yellowish brown mottling; wet; medium plasticity	M		VH													
55	30	PB-12	16	60-100 psi						1.8												
					SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); dense; dark yellowish brown; wet; fine to coarse sand; some fine gravel																rig chatter
60		U-13	18	29 39 45											11	128	6	30	64			
		SS-14	5	7 7 40																		
65	20	U-15	5	21 50/5		grades very dense																
		SS-16	5	10 10 5	CL	Sandy CLAY (CL); medium stiff; brown; wet; low plasticity	L		H													
						grades dark greenish gray																
70		MC-17	18	4 3 3						0.8					25	99	60					
		PB-18	19	60-100 psi	CL	LEAN CLAY with SAND (CL); very stiff; dark greenish gray; wet; medium plasticity	M		VH													
75	10	PB-19	29	80-100 psi																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-168

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
							Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
					CL	LEAN CLAY with SAND (CL); very stiff; dark greenish gray; wet; medium plasticity *(Continues)*																
										4.0												
		P-20	16	250 psi																		
80																						
										2.2												
		P-21	17	300 psi								44	17	27	25 25	101 100	84					TXCU
						pocket of light greenish gray clay; grades with trace calcite nodules																
		P-22	14	380 psi																		
	0																					
85					SC	Clayey SAND (SC); dark olive gray; wet; fine sand; trace coarse sand; trace fine gravel									18	109	46					
		SH-23	30	80-280 psi																		
					CL	LEAN CLAY (CL); very stiff; dark greenish gray; wet; few fine sand; medium plasticity	M		VH													
										2.0												
90		P-24	11	400 psi																		
						grades with sand; low plasticity																
		P-25	17	250 psi			L		H			34	17	17	21 22	109 106	74					TXCU
										2.2												
	-10																					
95		SH-26	11	150-500 psi		pockets of clayey sand and silty sand with gravel																rig chatter
		MC-27	15	9 15 22																		CORR
					SC	Clayey SAND (SC); olive brown with dark yellowish brown mottling; wet; fine sand																
		P-28	6	200 psi								28	18	10			37					
100																						
					GW	Well graded GRAVEL with SAND (GW); very dense; olive and yellowish gray; wet; fine to coarse gravel; some fine to coarse sand; trace silt; subrounded to angular gravel																rig chatter
		SS-29	13	29 40 48																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
105	-20	U-30	8	33 50/6	GW	Well graded GRAVEL with SAND (GW); very dense; olive and yellowish gray; wet; fine to coarse gravel; some fine to coarse sand; trace silt; subrounded to angular gravel *(Continues)*									10	131	4	55	41			
		U	NR	50/6																		
		SS-31	5.5	7 9 15	CL	Sandy CLAY (CL); very stiff; olive brown with olive yellow mottling; wet; low plasticity	L															
110		PB-32	12	80-200 psi	GC	Clayey GRAVEL with SAND (GC); dense; dark olive brown; wet; fine to coarse gravel; subangular to angular gravel																
					SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark olive brown; wet; fine to coarse sand; some fine gravel																
115	-30	SS-33	12.5	35 33 43																		
		U	NR	13 30 50/3																		
		SS-34	8.5	22 27 30											8		11	32	57	8	3	samples SS-33, SS-34 and SS-35 combined for sieve analysis
120		SS-35	8	12 28 36																		
125	-40	SS-36	2	9 7 13		grades with clay																
					CL	LEAN CLAY (CL); very stiff; olive brown; moist; medium plasticity	M															
					SM	Silty SAND (SM); very dense; dark greenish gray; wet; fine sand																
						pocket of gravel																rig chatter
130		SS-37	8	25 27 29																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description[2,3]**	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							ML	SILT (ML); hard; dark greenish gray; wet; medium plasticity *(Continues)*																
	-50																							
135			PB-38	10	100-200 psi				M			>4.5		39	26	13	27	78						
								pocket of gravel																
140			PB-39	25	60-180 psi		CL	LEAN CLAY (CL); very stiff; olive gray; wet; medium plasticity	M			3.5												
	-60																							
145			P-40	4	500 psi																			
								pocket of sand and gravel																
							ML	SILT (ML); hard; olive gray with olive brown mottling; wet; low plasticity																
150			P-41	6	200 psi				L			>4.5		31	25	6								
	-70																							
155			P-42	16	450 psi							4.5												
								pocket of fine gravel																
							CL	LEAN CLAY (CL); hard; olive gray with brownish yellow mottling; wet; trace fine sand; low plasticity																
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-168

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			PB-43	16	60-100 psi		CL	LEAN CLAY (CL); hard; olive gray with brownish yellow mottling; wet; trace fine sand; low plasticity *(Continues)*	L		VH	4.0												
	-80																							
165			PB-44	26	50-200 psi							4.4												
170			P-45	13	450 psi							>4.5												
	-90																							
175			PB-46	27	50-200 psi																			
							ML	SILT (ML); hard; greenish gray with olive brown mottling; wet; low plasticity	L			4.0												
180			MC-47	17	22 42 50/5			greenish gray with olive brown and black mottling				>4.5 >4.5												
	-100																							
185			PB-48	18	100-200 psi																			
							SM	Silty SAND (SM); dense; olive brown; wet; fine sand																
								pocket of gravel																

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-168

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM	Silty SAND (SM); dense; olive brown; wet; fine sand *(Continues)*																
190			U-49	16.5	29 35 50/4.5		ML	SILT with SAND (ML); hard; olive yellow with olive brown mottling; wet				>4.5												
195	-110		U-50	17.5	19 32 50/5.5																			
200			PB-51	28	80-200 psi		CL	LEAN CLAY (CL); hard; brown; wet; low plasticity	L															
205	-120																							
210																								
215	-130																							

Boring terminated at a depth of 202.5 feet bgs.
Groundwater encountered at a depth of 14.5 feet bgs prior to switching to rotary wash drilling.
Vibrating wire piezometer installed at 48 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-169

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos, Jackson Zhong
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	January 15, 2020 at 9:00 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	January 23, 2020 at 2:30 pm

Boring Location: Lenzen Ave. and Stockton Ave.

Northing: 1,948,258.847 **Easting:** 6,152,069.96

Horizontal Datum: NAD 1983

Elevation: 79.99 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
								6" Asphalt Concrete; 12" Aggregate Base (Pavement Section)																
			BS-1				CH	Sandy FAT CLAY (CH); very dark gray; moist; fine sand; little silt; trace coarse sand; high plasticity	H															
5							CH	FAT CLAY (CH); medium stiff; olive brown; wet; high plasticity																
10	70		P-2	10	50 psi				H			0.5		62	26	36	39	80						CONSOL
15			P-3	6	50 psi			grades very stiff; olive brown with reddish brown speckling				2.3												
							CL	LEAN CLAY (CL); very stiff; grayish brown with reddish brown speckling; wet																
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Drilling Fluid
1/16/20	11.0	77.0	N/A	11.8
1/17/20	11.0	98.5	N/A	11.2
1/20/20	11.0	124.0	N/A	10.5
1/21/20	11.0	166.5	N/A	11.1
1/22/20	11.0	206.5	N/A	11.2
1/23/20	11.0	241.0	N/A	11.3

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 5.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 01/15/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 103 feet bgs.
Hammer energy calibration was completed by Gregg Drilling at BH-169 at sample depths: 111, 114.5, 123, 125, 130, 132.5, 140, 145, 150, 155, 160 feet below ground surface.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-169

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
		P-4	7	50 psi	CL	LEAN CLAY (CL); very stiff; grayish brown with reddish brown speckling; wet *(Continues)*				2.2												
25																						
						grades gray																
						grades brown																
					CL	LEAN CLAY with SAND (CL); stiff; dark greenish gray; moist; fine sand; low plasticity																
30	50	SH-5	30	50-150 psi			L															
										1.2												
35																						
						6" sand with gravel layer																rig chatter
40	40	SH-6	30	20-70 psi			L					30	17	13			74					
										1.5												
45																						
						grades light olive brown; trace fine to coarse gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY with SAND (CL); stiff; dark greenish gray; moist; fine sand; low plasticity *(Continues)*																
50	30		SH-7	30	20-160 psi				L															
								grades very stiff				2.2												
							GC	Clayey GRAVEL (GC)																rig chatter
55																								
							CL	LEAN CLAY with SAND (CL); very stiff; light brownish gray with light olive brown mottling; moist; fine sand; low plasticity																
60	20		SH-8	28	60-180 psi				L															
												2.2												
65			SH-9	24	80-400 psi																			
							SM	Silty SAND with GRAVEL (SM); light olive brown; wet; fine sand; fine gravel; trace coarse sand																
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; olive brown; wet; fine to coarse sand; few silt; some fine gravel																
70	10		U-10	6	39 50/6														5	41	53			
			SS-11	NR	10 6 9																			
							CL	LEAN CLAY with SAND (CL); stiff; dark greenish gray; moist; fine sand; low plasticity																
			PB-12	26	20-180 psi				L					32	18	14	23 23	104 104						TXCU
75																								

1.) Light gray shading indicates length of sample recovery.

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4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY with SAND (CL); stiff; dark greenish gray; moist; fine sand; low plasticity *(Continues)*				1.8												
			MC-13	18	6 12 15			grades greenish gray				1.8												
80	0																							
			PB-14	28	50-80 psi			grades very stiff				3.2												
85			P	NR	80-150 psi																			
							CL	Sandy LEAN CLAY (CL); very stiff; pale olive; moist; fine sand; trace fine gravel; low plasticity	L															
			PB-15	30	80-150 psi							2.8												rig chatter
90	-10						SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; olive yellow; wet; fine to coarse sand; some fine gravel																
			U-16	9	44 50/4														6	39	54	4	2	
			SS-17	5	44 50/4			grades dark yellowish brown																
95			U	NR	50/6																			
							CL	LEAN CLAY (CL); very stiff; light yellowish brown; moist; fine sand; medium plasticity																
			MC-18	15	12 15 18				M			2.5		36	18	18	26	96						CORR
																								rig chatter
100	-20						SP	Poorly graded SAND with GRAVEL (SP); very dense; olive brown; moist; fine to coarse sand; fine gravel																
																								vibration testing
			SS-19	4	50/6																			
																								VWP
			PB	NR	60-190 psi																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
105							SP	Poorly graded SAND with GRAVEL (SP); very dense; olive brown; moist; fine to coarse sand; fine gravel *(Continues)*																
			SS-20	5	22 46 40																			
							CL	Sandy LEAN CLAY (CL); very stiff; light olive brown; moist; fine to medium sand; low plasticity																
110	-30																							vibration testing
			MC-21	8	22 24 33				L			2.5							68	0	32	35	33	
			PB	NR	100-440 psi			pocket of fine sand and fine gravel; dark greenish gray																
			MC-22	13	33 26 27																			
115							CL	Sandy CLAY (CL); very stiff; olive gray; moist; fine sand; trace gravel; low plasticity	L															
			MC-23	9	16 20 20							2.2		29	18	11	22	103						
120	-40		PB-24	8	60-180 psi				L			2.5												
			MC-25	9	43 50/5		SW-SM	Well graded SAND with SILT (SW-SM); very dense; gray; wet; fine to coarse sand; trace fine gravel											11	2	86			
125			MC-26	16	23 35 47		ML	Sandy SILT (ML); hard; dark greenish gray; moist; low plasticity	L															
			U-27	16	22 30 44		CL	LEAN CLAY (CL); very stiff; dark gray; moist; medium plasticity	M			3.2												
130	-50		MC-28	18	10 25 34							3.2		43	20	23	26	99						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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BORING NO.

BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff; dark gray; moist; medium plasticity *(Continues)*																
			MC-29	15	15 27 30			grades dark greenish gray																
												3.7												
135			PB-30	25	60-100 psi									37	20	17	20 23 23	108 106 105						CONSOL; TXCU
								grades light gray with yellowish brown mottling; little fine sand																
								hard				4.2												
140	-60		MC-31	18	24 30 39			grades to low plasticity	L															
														29	19	10	22	106						
												3.8												
145			MC-32	16	21 31 42																			
							SM	Silty SAND (SM); very dense; light yellowish brown; moist; fine sand																
								grades with fine to coarse gravel																rig chatter
150	-70		SS-33	11	15 33 46																			
155			SS-34	3	43 50/6																			
							CH	FAT CLAY with SAND (CH); very stiff; pale olive to pale yellow; moist; fine sand; high plasticity; trace carbonate nodules																
160	-80																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			MC-35	18	13 12 15		CH	FAT CLAY with SAND (CH); very stiff; pale olive to pale yellow; moist; fine sand; high plasticity; trace carbonate nodules *(Continues)*	H															
								grades with gray marbling				2.0												
165			MC-36	10	21 25 32			grades hard; gray with dark yellowish brown mottling				4.4		56	27	29	26	101						
170	-90		MC-37	18	16 23 27																			
								grades very stiff				3.0												
							CL	Sandy LEAN CLAY with GRAVEL (CL); hard; dark bluish gray; moist; fine sand; coarse gravel; low plasticity																
175			MC-38	10.5	35 50/4.5				L															
							ML	Sandy SILT (ML); dark grayish brown; moist; fine sand; trace fine gravel																
							SM	Silty SAND (SM); dense; light olive brown; moist; fine sand; trace fine gravel																
180	-100		MC	NR	22 45 50/4																			
			SS-39	7	37 34 40																			
								pocket of clay																
185			SS-40	10	23 50/6																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SM	Silty SAND (SM); dense; light olive brown; moist; fine sand; trace fine gravel *(Continues)*																
190	-110		PB-41	18	60-80 psi		SC-SM	Silty, Clayey SAND (SC-SM); yellowish brown; wet; fine sand																
							ML	SILT (ML); hard; light olive brown; moist; trace fine sand; low plasticity																
195			MC-42	17	23 36 50/5				L															
							SC-SM	Silty, Clayey SAND (SC-SM); dense; olive yellow; moist; fine sand; trace fine gravel																
200	-120		MC-43	18	19 28 39																			
205			MC-44	16	25 45 50/4		CL	Sandy LEAN CLAY (CL); hard; brownish yellow; moist; fine sand; trace fine gravel; low plasticity	L			3.9												
							SC-SM	Silty, Clayey SAND (SC-SM); very dense; olive yellow; moist; fine sand; trace fine gravel																rig chatter
210	-130		MC-45	16	24 31 50/4																			
							SM	Silty SAND with GRAVEL (SM); very dense; olive brown; moist; fine to medium sand; fine gravel																rig chatter
215			SS-46	3.5	50/6																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM	Silty SAND with GRAVEL (SM); very dense; olive brown; moist; fine to medium sand; fine gravel *(Continues)*																
								grades to mostly fine to coarse sand																rig chatter
																								150 gallon fluid loss
220	-140		SS-47	5.5	23 46 38		GP	Poorly graded GRAVEL with SAND (GP); very dense; olive brown; wet; fine gravel; medium to coarse sand; angular gravel																
225			SS-48	1.5	50/5																			
								grades fine to coarse gravel																
230	-150		SS-49	4.5	50/5																			
							SM	Silty SAND with GRAVEL (SM); very dense; olive brown; wet; medium to coarse sand; fine to coarse gravel																
235			SS-50	4.5	50/5																				borehole caved about 1 foot of slough while tripping rods
240	-160		SS-51	2	37 50/3																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-169

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
245							SM	Silty SAND with GRAVEL (SM); very dense; olive brown; wet; medium to coarse sand; fine to coarse gravel *(Continues)*																
							CL	Sandy LEAN CLAY (CL); yellowish brown; fine sand; low plasticity																
							GM	Silty GRAVEL with SAND (GM); very dense; olive brown; moist; coarse gravel; fine sand; subrounded to subangular gravel																
250	-170		SS-52	4.5	25 40 50/4																			
255																								
260	-180																							
265																								
270	-190																							

Boring terminated at a depth of 252.0 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 5.0 feet bgs.
Vibrating wire piezometer installed at 103 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

Hammer energy calibration was completed by Gregg Drilling at BH-169 at sample depths: 111, 114.5, 123, 125, 130, 132.5, 140, 145, 150, 155, 160 feet below ground surface.

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-171

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos, Jackson Zhong
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	January 24, 2020 at 9:10 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	January 31, 2020 at 11:45 am

Boring Location: Stockton Ave. and Emory St.

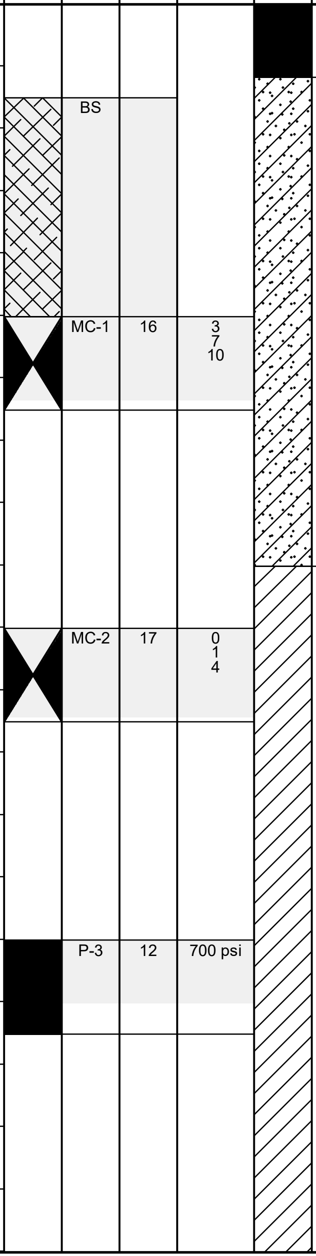
Northing: 1,950,237.895 **Easting:** 6,150,233.292

Horizontal Datum: NAD 1983

Elevation: 76.98 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11.5
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		



Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
						11" Asphalt Concrete; 3" Aggregate Base (Pavement Section)																
					SC	Clayey SAND (SC); medium dense; dark gray and light yellowish brown; moist; fine sand; trace fine gravel																
		BS																				
5		MC-1	16	3 7 10																		
	70																					
						pocket of sand																
					CL	LEAN CLAY with SAND (CL); soft; yellowish brown; wet; fine sand; trace fine gravel; medium plasticity	M															
10		MC-2	17	0 1 4																		
										0.3		36	23	13	27	96						
						pocket of fine gravel																
15		P-3	12	700 psi																		
						grades stiff				1.5												
	60																					
						pocket of fine sand and gravel																
						grades to no gravel; very dark gray																
20																						

Water Level Data

Date	Depth (ft): Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
1/27/20	11.5	76.5	N/A	11.5
1/28/20	11.5	110.5	N/A	12
1/29/20	11.5	146.5	N/A	11.6
1/30/20	11.5	191.5	N/A	12.2
1/31/20	11.5	225.5	N/A	12.3

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 10.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 01/24/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 100 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-171

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			P-4	15	150 psi		CL	LEAN CLAY with SAND (CL); soft; yellowish brown; wet; fine sand; trace fine gravel; medium plasticity *(Continues)*	M					45	20	25	28	93	82					CONSOL
												1.0												
								grades olive brown																
25			MC-5	12	6 11 11																			
												1.8												
	50																							
							CL	Sandy LEAN CLAY with GRAVEL (CL); stiff; bluish gray; wet; fine sand; fine gravel; low plasticity																
30			MC-6	18	3 5 12				L															
							SM	Silty SAND (SM); medium dense; bluish gray; moist; fine sand																
35																								
							CL	Sandy LEAN CLAY (CL); bluish gray; fine sand; medium plasticity																
	40																							
40			P-7	16	350 psi				M					35	20	15								
							ML	Sandy SILT (ML); very stiff; olive gray; wet; fine sand; low plasticity	L					27	23	4			60					
45																								
	30																							
							SM	Silty SAND (SM); dense; very dark grayish brown; wet; fine sand; trace fine gravel																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-171

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
							Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
					SM	Silty SAND (SM); dense; very dark grayish brown; wet; fine sand; trace fine gravel *(Continues)*																rig chatter
50		SS-8	11	9 15 28																		
55																						
					CH	FAT CLAY (CH); very stiff; olive gray and yellowish brown; moist; high plasticity																
	20																					
		MC-9	18	7 8 12			H															
					CL	LEAN CLAY (CL); stiff; olive gray; moist; low plasticity	L			1.5												
60																						
65		MC-10	18	6 10 14	CL	LEAN CLAY with SAND (CL); very stiff; light yellowish brown with reddish brown staining; moist; fine sand; low plasticity	L					32	15	17	23	102						
										2.5												
	10																					
		MC-11	17	17 25 22		grades sandy																
										3.8												
					SM	Silty SAND with GRAVEL (SM); very dense; olive yellow to olive; moist; fine sand; fine to coarse gravel																
70		MC-12	16	27 43 38																		
		SS-13	6.5	26 22 23																		rig chatter
					GM	Silty GRAVEL with SAND (GM); dense; light olive brown; moist; fine gravel; fine sand; subrounded to angular gravel																
75		MC-14	16	30 40 50/6	SM	Silty SAND with GRAVEL (SM); very dense; light olive brown; moist; fine to coarse sand; fine gravel									15	116	17	17	66			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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SOIL BORING LOG

BORING NO.

BH-171

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM	Silty SAND with GRAVEL (SM); very dense; light olive brown; moist; fine to coarse sand; fine gravel *(Continues)*																
	0						SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; light olive brown; moist; fine to coarse sand; fine gravel																
			SS-15	15	38 40 40												20		8	37	55	6	2	
80			SS-16	2	16 8 10																			
							CL	Sandy LEAN CLAY (CL); very stiff; dark greenish gray to greenish gray; moist; fine sand; low plasticity																
			MC-17	15	13 19 22				L		M	2.8												
85			MC-18	18	12 15 17			grades greenish gray				2.0												
	-10																							
			MC-19	18	10 13 15			grades with more sand				2.2		32	16	16	23	103						rig chatter
90			MC-20	15	10 13 18			grades with silt				2.8												
			MC-21	18	11 16 21		SM	Silty SAND (SM); medium dense; dark greenish gray; wet; fine sand																
							CL	Sandy LEAN CLAY (CL); stiff; greenish gray; wet; fine sand; low plasticity	L			1.8												
95			MC-22	18	8 7 11							1.8		28	18	10	23	103						
	-20							grades very stiff; light yellowish brown with brownish yellow mottling; moist																
			MC-23	18	5 9 17				L			2.8												
							SP-SM	Poorly graded SAND with SILT (SP-SM); very dense; light olive brown; wet; fine to medium sand; trace fine gravel																
100			MC-24	15	27 46 50/5.5												21	108	10	1	88	9	2	VWP
			SS-25	11	28 40 50/5.5			grades olive																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-171

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^{1} (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)^{4}	PTV (tsf)^{4}	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SP-SM	Poorly graded SAND with SILT (SP-SM); very dense; light olive brown; wet; fine to medium sand; trace fine gravel *(Continues)*																
105			SS-26	8	34 50/6																			
	-30		SS-27	7	35 50/6		SP	Poorly graded SAND (SP); very dense; black; moist; fine to medium sand; trace coarse sand																
							CL	LEAN CLAY (CL); very stiff; greenish gray; moist; medium plasticity																
			MC-28	18	17 20 24				M															
110												3.2												
			MC-29	16	17 26 28																			
								trace black speckling				3.8												
			P-30	11	400 psi			grades sandy; hard; light yellowish brown; fine sand						35	20	15	22 22	106 106	68					TXCU
115												>4.5												
	-40		MC-31	15	19 32 34																			
												4.0												
			MC-32	18	8 13 16			grades very stiff																
120												2.0												
			MC-33	18	11 16 14			grades olive yellow																
								grades stiff; low plasticity	L			1.8		27	17	10	22	106						
			MC-34	17	12 41 50/5		SM	Silty SAND (SM); very dense; olive yellow; wet; fine sand; trace fine gravel																
125																								
	-50		SS-35	5	50/6																			
							CL	LEAN CLAY (CL); very stiff; dark greenish gray; moist; low plasticity																
			MC-36	18	8 13 19				L															
												2.8		29	20	9								
130																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-171

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff; dark greenish gray; moist; low plasticity *(Continues)*																
135			MC-37	18	7 9 15							2.2												
	-60						CL	LEAN CLAY (CL); very stiff; olive gray; moist; medium plasticity																
140			MC-38	18	14 22 31				M			3.0		47	21	26	27	96						
							SM	Silty SAND (SM); dense; light olive brown and brown; wet; fine sand																
145			MC-39	18	13 22 31												23	106	34					
	-70																							
150			MC-40	17	20 39 50/5			grades very dense pocket of sandy silt																
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine gravel; coarse sand																rig chatter; fluid loss
155			SS-41	5	50/6																			
	-80																							rig chatter
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-171

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	Particle Size: % Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			SS-42	2.5	50/6		GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine gravel; coarse sand *(Continues)*																
							CL	LEAN CLAY (CL); hard; olive to olive gray; moist; medium plasticity																
								grades greenish gray																
165			MC-43	14	24 32 34				M			4.5		46	21	25	25	99						
	-90																							
170			MC-44	15	16 23 28			grades very stiff; olive with yellowish brown mottling				3.5												
175			MC-45	14	20 26 33			grades hard; olive with yellowish brown mottling and trace black speckling				4.0												
	-100																							
180			MC-46	18	32 42 43		ML	Sandy SILT (ML); hard; brown; moist; nonplastic	NP															
							SM	Silty SAND (SM); very dense; yellowish brown; moist; fine sand																
185			MC-47	18	22 36 40		ML	Sandy SILT (ML); hard; light olive brown; moist; fine sand; nonplastic; some lean clay lens	NP															
	-110																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					CL	Sandy LEAN CLAY (CL); very stiff; light yellowish brown with yellowish brown mottling; moist; fine sand; low plasticity																
190		MC-48	18	26 27 34			L															
										3.2												rig chatter
					GP-GM	Poorly graded GRAVEL with SILT (GP-GM); very dense; olive brown; wet; fine gravel; fine sand; subangular gravel																
195		SS-49	5	50/5																		
	-120																					
200		SS-50	3	50/5.5																		
205		U	NR	50/4																		
		SS-51	4.5	50/5																		
	-130																					
																						fluid loss
210		SS-52	2	50/6																		sandstone fragments
215		SS-53	4	41 50/4																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-171

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
	-140						GP-GM	Poorly graded GRAVEL with SILT (GP-GM); very dense; olive brown; wet; fine gravel; fine sand; subangular gravel *(Continues)*																
220		☒	SS-54	1	50/6																			sandstone fragments
225		☒	SS-55	1	50/6																			
	-150																							
230																								
235																								
	-160																							
240																								

Boring terminated at a depth of 227.0 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 10.0 feet bgs.
Vibrating wire piezometer installed at 100 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 1 of 8

BORING NO.
BH-173

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Virgil Santos
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	February 3, 2020 at 8:35 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	February 10, 2020 at 11:20 am

Boring Location: 1048 Stockton Ave.

Northing: 1,951,887.924 **Easting:** 6,148,847.622

Horizontal Datum: NAD 1983

Elevation: 67.63 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
								8" Asphalt Concrete; 4" Aggregate Base (Pavement Section)																
							CL	LEAN CLAY (CL); very stiff; light brown; moist; low plasticity	L															
			BS-1																					
5			MC-2	14	8 12 20																			
								grades with light gray mottling																
												3.5												
	60		MC-3	18	5 12 17		SM	Silty SAND with GRAVEL (SM); medium dense; reddish brown; moist; fine to coarse sand; little fine gravel																
																	7	110	16	29	55	11	5	
								grades more silty																
10			U-4	5	12 15 12																			
	▽																							
							CL	LEAN CLAY (CL); stiff; gray; moist; medium plasticity																
			MC-5	18	2 7 11				M															
												1.5												
15			P-6	13	120 psi									38	18	20	25	98						
												1.0												
	50		MC-7	11	2 5 5																			
												1.2												
							CH	FAT CLAY (CH); stiff; very dark gray; wet; high plasticity																
20																								

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
2/3/20	0.0	11.3	11.3	NA
2/4/20	11.0	44.0	N/A	7.7
2/5/20	11.0	79.0	N/A	10.5
2/6/20	11.0	121.5	N/A	10.5
2/7/20	11.0	161.5	N/A	9.5
2/10/20	11.0	201.5	N/A	10

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 11.3 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 02/03/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 70 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-173

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			P-8	16	100 psi		CH	FAT CLAY (CH); stiff; very dark gray; wet; high plasticity *(Continues)*	H			1.0		58	22	36	35	85						CONSOL
							CL	LEAN CLAY (CL); stiff; gray; moist																
			MC-9	18	0 10 27																			
							SP	Poorly graded SAND with GRAVEL (SP); dense; gray; wet; fine to medium sand; fine to coarse gravel; trace silt																
25			SS-10	7	17 24 25			grades to brownish gray																rig chatter
	40		U-11	15	20 28 28														4					
30			SS-12	7	16 12 7																			
							CL	LEAN CLAY (CL); very stiff; gray; moist; medium plasticity	M															
			MC-13	4	9 9 10																			
35			MC-14	11	10 9 5		CL-ML	Sandy, Silty CLAY (CL-ML); stiff; gray; wet; fine sand; trace gravel						26	19	7	22	107						
	30		SS-15	8.5	6 5 9			grades less sand																
40			MC-16	14	4 5 6		CL	LEAN CLAY (CL); stiff; gray; moist; low plasticity	L			1.0												
			P-17	17	150 psi							1.5		34	17	17	25 20 21	98 105 108						TXCU
45			MC-18	18	3 3 6																			
	20		P-19	17	150 psi																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-173

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					CL	LEAN CLAY (CL); stiff; gray; moist; low plasticity *(Continues)*																
						grades medium plasticity	M			2.0												
50		MC-20	18	4 8 11		grades gray with black speckling																
										1.5												
					SM	Silty SAND (SM); medium dense; brown; wet																
		U-21	18	8 11 13	CL	LEAN CLAY (CL); stiff; gray with brownish gray mottling; moist; little silt; medium plasticity; occasional calcite nodules	M			1.6												
55		MC-22	14	6 7 10						1.0												
	10	MC-23	16	5 12 12		grades very stiff; gray and rusty brown mottling				2.8												
60		MC-24	18	5 6 7		grades stiff				1.0												
		P-25	13	150 psi		pocket of sandy silt; greenish gray						32	24	8	22	104						
65		SS	NR	3 5 7																		
	0	MC-26	16	10 16 18		grades very stiff				2.0												
					SM	Silty SAND (SM); very dense; brown; wet; fine sand; trace fine gravel																rig chatter
70		SS-27	9	22 25 29																		VWP
					CL	LEAN CLAY (CL); very stiff; gray; moist; trace gravel; medium plasticity																
		P-28	13.5	80 psi			M					37	17	20	22	103						
										2.5												
75		MC-29	16	12 21 26		grades rusty brown with gray mottling; low plasticity	L					31	23	8	24	102						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-173

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SM	Silty SAND (SM); very dense; grayish brown; wet; fine sand				2.8												
	-10		SS-30	8.5	25 28 28																			
80			SS-31	11.5	19 34 46														20					
								trace gravel																
																								rig chatter
			SS-32	3	29 12 8			grades with coarse gravel																
							CL	LEAN CLAY (CL); very stiff; brown; wet; medium plasticity																
85			MC-33	16	13 19 21				M															CORR
														38	23	15	27	99						
								grades dark greenish gray; moist				3.2												
	-20		P	NR	150 psi																			
90			MC-34	NR	2 3 13																			
			U-35	12	12 20 20																			
												2.0												
95			MC	NR	9 13 19																			
	-30		MC-36	18	7 18 23																			
							ML	Sandy SILT (ML); very stiff; brown; wet											51					
100			SS-37	8	35 50/5		SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; olive brown; wet; fine to coarse sand; some fine gravel											13	36	51			rig chatter
			SS-38	4	37 50/5																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; olive brown; wet; fine to coarse sand; some fine gravel *(Continues)*																
105																								
	-40																							
110			SS-39	3																				
							CL	LEAN CLAY (CL); very stiff; olive gray; moist; medium plasticity; silty	M			2.2												
115			PB-40	4	50-200 psi																			
	-50																							
120			MC-41	18	15 16 27																			
								gray pocket				2.8 2.2												
125			P-42	8	500 psi																			
								grades less silty				2.2												
	-60		MC-43	15	31 26 23		SM	Silty SAND (SM); dense; brown; wet; fine sand																
							CL	LEAN CLAY (CL); very stiff; light olive gray; moist; medium plasticity	M			2.5												
130			U-44	4	19 18 22							2.8												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	**Visual - Manual Identification & Description[2,3]**	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff; light olive gray; moist; medium plasticity *(Continues)*																
							SP	Poorly graded SAND with GRAVEL (SP); very dense; grayish brown; wet; fine to medium sand; fine gravel; trace silt																rig chatter
135			SS-45	5	43 44 47																			
	-70																							
							CL	LEAN CLAY (CL); very stiff; olive brown; moist																
140			MC-46	14	14 35 34		SM	Silty SAND (SM); dense; dark gray; wet; fine sand; trace gravel																
							ML	Sandy SILT (ML); hard; gray; wet																
							CL	LEAN CLAY (CL); hard; dark greenish gray; moist; medium plasticity																
145			MC-47	15	12 23 32				M															
												>4.5												
	-80																							
								grades greenish gray																
150			MC-48	15	13 18 30																			
155			MC-49	18	16 17 32			grades silty; very stiff																
												3.8												
	-90																							
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			MC-50	18	15 18 30		CL	LEAN CLAY (CL); hard; dark greenish gray; moist; medium plasticity *(Continues)*				3.2												
165																								
	-100																							
170			MC-51	18	17 25 32			pocket of silty sand; grayish brown; wet																
							CL	LEAN CLAY (CL); very stiff; light olive brown; moist; medium plasticity	M															
175			MC-52	17	21 28 32							3.8												
							SM	Silty SAND (SM); very dense; grayish brown; wet; fine sand																
	-110																							
180			SS-53	7.5	27 31 42																			
185			SS-54	10	11 17 23		CL	LEAN CLAY (CL); hard; mottled gray and brown; moist; medium plasticity	M															
	-120																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-173

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							CL	LEAN CLAY (CL); hard; mottled gray and brown; moist; medium plasticity *(Continues)*																
190			MC-55	16	10 24 32							4.5												
195			MC-56	14	18 23 40			grades very stiff				3.7												
	-130																							
200			MC-57	16	13 23 38			grades sandy; trace gravel				3.5												

Boring terminated at a depth of 201.5 feet bgs.
Groundwater encountered at a depth of 11.3 feet bgs prior to switching to rotary wash drilling.
Vibrating wire piezometer installed at 70 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

205

-140

210

215

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-174

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Malek Zuhaika
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	January 13, 2020 at 9:00 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	January 14, 2020 at 2:25 pm

Boring Location: South 16th St. and East Santa Clara St.				**Northing:** 1,950,367.15 **Easting:** 6,161,916.721
Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW	**Horizontal Datum:** NAD 1983
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11	**Elevation:** 85.50 ft.
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93	
Drilling Method:	Rotary Wash			**Vertical Datum:** NAVD 88

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
						■		7" Asphalt Concrete; 1" Aggregate Base (Pavement Section)																
						▨	CL	LEAN CLAY (CL); dark gray; silty																
		▨	BS			▨																		
		▨	BS			▨																		
5						▨																		
	80					▨																		
		▨	BS			▨																		
10						▨																		
15						▨																		
	70					▨																		
						▨		lens of fine to coarse sand																
						▨		less silt																
20						▨																		

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
1/14/20	11.0	79.0	N/A	10.4

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 01/13/20 were taken in drilling fluid and should not be used for design.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
						▨	CL	LEAN CLAY (CL); dark gray; silty *(Continues)*																
								grades with medium sand																
25	60							pocket of silty sand																
30																								
								grades gray																
35	50																							
40																								
								grades greenish gray																
45	40																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
						▨	CL	LEAN CLAY (CL); dark gray; silty *(Continues)*																
50						▨																		
55	30					▨																		
60						▨																		
65	20					░	SP	Poorly graded SAND with GRAVEL (SP); fine to medium sand; fine to coarse gravel																layer logged from cuttings; silty fines may be washed out
70						░																		
75	10					░																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-174

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SP	Poorly graded SAND with GRAVEL (SP); fine to medium sand; fine to coarse gravel *(Continues)*																
																								vibration testing
80																								
85																								
	0																							
																								vibration testing
90																								
95																								
	-10																							
																								vibration testing

Boring terminated at a depth of 99.0 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.0 feet bgs.
Backfilled with neat cement grout.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

100

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[1] Light gray shading indicates length of sample recovery.

[2] Soil descriptions between sampled depths logged from cuttings or rig behavior.

[3] Maximum Particle Size observed may be limited by sampler dimensions.

[4] "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-175

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Malek Zuhaika
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	March 25, 2020 at 9:35 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	April 1, 2020 at 11:50 am

Boring Location: 817 The Alameda

Northing: 1,946,370.657 **Easting:** 6,152,911.015

Horizontal Datum: NAD 1983

Elevation: 89.61 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	21
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^{1} (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)^{4}	PTV (tsf)^{4}	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
								5" Asphalt Concrete; 5" Aggregate Base (Pavement Section)																
							CH	FAT CLAY with SAND (CH); black; moist; high plasticity																1' - 6' excavated via vacuum truck
			BS-1						H		H													
							CL	Sandy CLAY (CL); very dark grayish brown; moist; fine sand; few silt; medium plasticity	M		H													
5																								
							CH	Sandy FAT CLAY (CH); stiff; olive brown with reddish brown streaks; moist; fine sand; fine gravel; high plasticity																
	80																							
10			P-2	15	40 psi				H		H			53	23	30	35	86						
												1.0												
								pocket of fine gravel																
15			P	NR	50 psi		CL	LEAN CLAY with SAND (CL); very stiff; dark grayish brown; moist; fine sand; low plasticity																
			P-3	16	120 psi				L		H													
												2.2												
	70																							
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
3/26/20	19.0	31.5	N/A	4.5
3/27/20	21.0	69.0	N/A	12.2
3/30/20	21.0	100.5	N/A	16.2
3/31/20	21.0	136.5	N/A	17.7
4/1/20	21.0	182.5	N/A	16.8

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.0 feet below ground surface (bgs).
Groundwater level readings after the first day of drilling on 03/25/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 48 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-175

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			P-4	15	280 psi		CL	LEAN CLAY (CL); stiff; dark gray; moist; few fine sand; low plasticity	L															
												2.0												
							SC	Clayey SAND (SC); loose; olive; wet; fine sand																
25			U-5	12	4 5 6																			
							CH	FAT CLAY (CH); stiff; dark gray; moist; few fine sand; high plasticity	H															
	60																							
30			P-6	12	200 psi									67	24	43	30	90	94					CONSOL
												1.5												
			P-7	16	300 psi												22 23	107 105						TXCU
								pocket of silt																
							CL	LEAN CLAY with SAND (CL); stiff; dark gray; moist; fine sand; low plasticity																
35			P-8	16	250 psi				L															
												1.5												
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); dense; olive gray; wet; fine sand; little fine gravel																rig chatter
			SS-9	6	20 25 12																			
	50						CL	Sandy LEAN CLAY with GRAVEL (CL); stiff; light olive brown; moist; fine to medium sand; fine gravel; low plasticity																
40			P-10	14	200 psi				L		M													
												1.5												
							ML	Sandy SILT (ML); dark gray; wet; fine to coarse sand; little clay																
			P-11	16	150 psi												24	99	63	5	32	37	26	
								grades pale yellow																
							SP	Poorly graded SAND with GRAVEL (SP); dense; olive brown; wet; fine to coarse sand; fine gravel																
																								rig chatter
45			U-12	18	14 19 35																			
			SS-13	13	24 35			grades very dense																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-175

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
	40			27	SP	Poorly graded SAND with GRAVEL (SP); dense; olive brown; wet; fine to coarse sand; fine gravel *(Continues)*																VWP
50		U-14	11	27 44 42											10	128	4	38	58			
					SC	Clayey SAND (SC); medium dense; greenish gray; wet; fine sand																
		P	NR	350 psi																		
55		MC-15	17	6 6 6								28	19	9	20	110	40					
						grades greenish gray with yellowish brown streaking																
		MC-16	5	6 9 11		pocket of coarse gravel grades with less sand																
					CL	Sandy LEAN CLAY (CL); very stiff; greenish gray; moist; fine to medium sand; medium plasticity	M															
60	30	MC-17	10	5 7 11						2.5												
					SM	Silty SAND (SM); dense; olive brown; wet; fine to coarse sand; few fine gravel																
		U-18	13	33 39 23											17	110	35	9	55			
						pocket of silt; olive brown and brownish red																
																						rig chatter
65		SS	NR	10 2 3																		
					CL	LEAN CLAY with SAND (CL); stiff; light yellowish brown; moist; fine sand; low plasticity	L															
		MC-19	16	0 6 11						1.5												
					SM	Silty SAND with GRAVEL (SM); very dense; olive brown; wet; fine to medium sand; fine gravel																
		U-20	11	25 50/6													44					
						grades without gravel; dark yellowish brown																
70	20	PB-21	30	80-120 psi																		
					ML	SILT with SAND (ML); hard; olive brown; moist; fine sand				4.5		32	24	8	21	108	73					
		P-22	3.5	300 psi		grades olive brown with gray mottling																
75																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-175

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			MC-23	18	7 12 13		CL	Sandy CLAY (CL); very stiff; gray; moist; fine sand; low plasticity *(Continues)*																
			P-24	15	120 psi			grades stiff; dark gray	L		M													
	10											1.5												
80																								
			P-25	8	150 psi									31	16	15			64					
																								rig chatter
			SS-26	8	16 50/5																			
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; light olive brown; moist; coarse gravel; fine to coarse sand; subrounded gravel																
85																								
			SS-27	5	50/6																			
			SS-28	2.5	26 11 9		SM	Silty SAND (SM); olive; wet; fine to coarse sand																
																								rig chatter
	0		PB-29	29	50-150 psi			grades light olive brown; little clay; few fine gravel									14	124	48	11	41	32	16	
90																								
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; light olive brown; wet; fine to coarse sand; fine gravel																
			U-30	7	37 50/5														14	34	52			crushed cobble
95			SS-31	3.5	50/6																			
							ML	SILT with SAND (ML); very stiff; light olive brown; moist; fine sand; trace fine gravel; low plasticity																
			MC-32	18	11 12 14				L															
												2.0												
								grades very dark greenish gray																
			P-33	15	200 psi									29	25	4	23 18	106 114	71					TXCD
100	-10																							
																								rig chatter
			U-34	12	39 13																			
								pocket of silt																
							CL	Sandy CLAY (CL); very stiff; dark greenish gray; moist; low plasticity																
			P-35	17	200 psi				L		L													

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-175

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					CL	Sandy CLAY (CL); very stiff; dark greenish gray; moist; low plasticity *(Continues)*				2.8												
105																						
		MC-36	18	10 13 18								33	22	11			70					
					OL	ORGANIC SILT (OL); very stiff; very dark greenish gray; moist; trace fine sand; medium plasticity	M			2.8												
		P-37	5	250 psi								38	20	18	26	95						
	-20																					
110																						
		P-38	14	200 psi																		
					SM	Silty SAND (SM); medium dense; very dark gray; wet; medium sand; trace coarse sand; trace fine gravel																
		MC-39	18	26 29 17																		
					CL	Sandy LEAN CLAY (CL); very stiff; greenish gray; moist; fine sand; low plasticity	L			2.0												
115																						rig chatter
		PB-40	26	50-150 psi																		
	-30																					
120		MC-41	18	8 13 17			M		M			33	17	16								
										3.0												
		P-42	16	300 psi																		
					SM	Silty SAND (SM); dark greenish gray; wet; fine to medium sand; trace clay																
125		P-43	18	250 psi																		
					CL	LEAN CLAY (CL); very stiff; dark greenish gray; moist; medium plasticity	M		M	3.3												
		P-44	15	500 psi		grades with silt; trace gravel																
					SC	Clayey SAND (SC); dense; dark greenish gray; wet; fine sand																
						pocket of gravel																rig chatter
	-40																					
130		MC-45	14	13 28 37	ML	SILT with SAND (ML); very stiff; dark greenish gray; moist; nonplastic	NP			3.2												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-175

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							ML	SILT with SAND (ML); very stiff; dark greenish gray; moist; nonplastic *(Continues)*																
							ML	SILT (ML); hard; yellowish brown; wet; fine sand; trace clay; medium plasticity																
135		■	P-46	8	400 psi				M					38	27	11			91					
								grades dark greenish gray																
	-50																							
140		▨	PB-47	24	50-190 psi																			
												>4.5												
							CL	LEAN CLAY with SAND (CL); hard; olive gray with faint light olive brown mottling; moist; fine sand; low plasticity																
145		⧗	MC-48	18	17 26 40				L															
												>4.5												
	-60																							
150		⧗	MC-49	16	12 21 30			grades with disseminated calcite																
												>4.5												
155		⧗	MC-50	15	24 32 41			pocket of silty sand																
	-70																							
160		⧗																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			MC-51	10	20 50/4		CL	grades to clayey sand with fine gravel																
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; olive; moist; fine to medium sand; fine gravel																rig chatter
							SC	Clayey SAND with GRAVEL (SC); very dense; olive brown; moist; fine to coarse sand; fine gravel																rig chatter
165			SS-52	5.5	33 50/4.5																			
																								fluid loss
							SM	Silty SAND (SM); very dense; olive brown; moist; fine sand; trace fine gravel																
170	-80		SS-53	6	26 35 31																			
							ML	Sandy SILT (ML); very stiff; light olive brown and gray; moist; fine sand; low plasticity																
175			U-54	18	17 31 45				L															
							SM	Silty SAND (SM); dense; olive gray; wet; fine sand																
								pocket of gravel																rig chatter; fluid loss
							CL	Sandy CLAY (CL); hard; light olive brown; moist; fine sand; low plasticity																
180	-90		PB-55	29	50-180 psi				L			>4.5												
185																								

Boring terminated at a depth of 182.5 feet bgs.
Groundwater was not encountered prior to switching to rotary wash drilling at a depth of 6.0 feet bgs.
Vibrating wire piezometer installed at 48 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG
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BORING NO.
BH-176

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Christian Rodil
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	April 15, 2020 at 8:15 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	April 20, 2020 at 4:00 pm

Boring Location: Newhall Yard

Northing: 1,952,544.544 **Easting:** 6,147,277.174

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 65.35 ft.

Vertical Datum: NAVD 88

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
							GM	Silty GRAVEL with SAND (GM); dark brown; dry; fine to coarse gravel; fine and medium sand; subrounded gravel (FILL)																
							SM	Silty SAND (SM); brown; fine to coarse sand (FILL)																
							CH	FAT CLAY (CH); very stiff; black; moist; high plasticity; some organics (Reworked Fill and Native Soil)	H															
		▨	BS-1																					R-value
5	60	⧗	MC-2	10	1 6 9			grades with fine sand; very dark greenish gray; clasts of black organic clay			H			81	35	46	38	78						
												2.0												
								grades black (Native Soil)																
		▨	G-3																					
	▽						CL	Sandy LEAN CLAY (CL); stiff; gray with fine dark yellowish brown mottles; moist; low plasticity	L		H													
10		⧗	MC-4	9	1 4 5																			
								grades grayish brown; wet				1.0												
								grades very dark gray			M													
15	50	■	P-5	17	120 psi																			CORR
							CH	FAT CLAY with SAND (CH); very stiff; olive gray with dark yellowish brown mottling; moist; fine sand; high plasticity	H					58	26	32	30	91						TXUU
												2.2												
							CL	LEAN CLAY (CL); medium stiff; very dark grayish brown; moist; few fine sand; medium plasticity																
20																								

Water Level Data

Date	Depth (ft)			
	Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
4/15/20	0.0	10.5	9.3	NA
4/16/20	9.0	101.0	N/A	8
4/17/20	9.0	191.0	N/A	8
4/20/20	9.0	250.5	N/A	8

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 9.3 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 04/15/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 31 and 58 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-176

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			P-6	16.5	180 psi		CL	LEAN CLAY (CL); medium stiff; very dark grayish brown; moist; few fine sand; medium plasticity *(Continues)*	M		H			45	18	27	24 30 25	99 94 100	86					CONSOL; TXCU
								grades greenish gray; wet; trace fine sand				0.5												
25	40		P-7	16	220 psi																			
							ML	Sandy SILT (ML); stiff; very dark greenish gray; wet; fine sand; nonplastic	NP			1.0												
								pocket of lean clay; dark yellowish brown																
								grades dark yellowish brown																
30			P-8	18	100 psi												25 20	101 110	58	1	41	37	21	TXCD
								grades light olive brown																
																								VWP
							SP	Poorly graded SAND (SP); very dense; olive; wet; fine to coarse sand; few fine gravel																
35	30		U-9	18	29 31 45												14	122	4	15	82			
							CL	Sandy LEAN CLAY (CL); very stiff; dark greenish gray; wet; fine sand; low plasticity																
40			P-10	18	200 psi				L		H						24	100						CONSOL
								grades dark gray; medium sand; few coarse sand; medium plasticity	M			2.5												
45	20		P-11	17	180 psi			grades without sand; stiff; dark greenish gray						42	20	22								
												1.5												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-176

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL																	
							CH	FAT CLAY with SAND (CH); very stiff; grayish brown; wet; fine sand; high plasticity																
50			P-12	16	280 psi				H		H			52	27	25	33 34	89 89						TXCU
												2.0												
55	10		P-13	16	600 psi																			
							SC	Clayey SAND (SC); dense; light olive brown; wet; fine sand																
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; olive brown; wet; fine to coarse gravel; some fine to coarse sand; subrounded to subangular gravel																VWP; rig chatter
60			SS-14	14	25 34 31														12					
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; dark grayish brown; wet; fine to coarse sand; little fine gravel																
65	0		U-15	10	33 50/6														5	23	72			
							CL	Sandy LEAN CLAY (CL); stiff; dark greenish gray; moist; fine sand; low plasticity																
70			PB-16	25	50-150 psi				L		H													
												1.5												
							ML	Sandy SILT (ML); dark greenish gray; moist; fine to medium sand																
75	-10		P-17	7	400 psi			pocket of gravel																
								2-ft layer of sandy clay																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-176

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							ML	Sandy SILT (ML); dark greenish gray; moist; fine to medium sand *(Continues)*																rig chatter
80			PB-18	30	50-100 psi			grades fine sand									22	108	65	0	35	51	14	
							CL	Sandy LEAN CLAY (CL); stiff; dark greenish gray; moist; fine sand; low plasticity	L			1.8												
85	-20		P-19	16	300 psi																			
							ML	Sandy SILT (ML); very stiff; dark greenish gray; moist; fine sand; low plasticity	L					27	24	3			63					
								grades with fine gravel; light olive brown; fine to coarse sand																
90			P-20	7.5	600 psi																			
							GC	Clayey GRAVEL with SAND (GC); very dense; light olive brown; wet; fine to coarse gravel; fine to coarse sand; subangular gravel																rig chatter
							GM	Silty GRAVEL with SAND (GM); very dense; light olive brown; moist; fine gravel; medium to coarse sand; subangular gravel																
95	-30		SS-21	6	32 40																			
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; very dark grayish brown; wet; fine to coarse sand; some fine gravel																
100			U-22	9	29 50/6												12	123	5	35	59			
								pocket of lean clay; dark yellowish brown																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-176

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SP-SM																	
							CL	Sandy CLAY (CL); stiff; greenish gray; moist; fine to coarse sand; trace fine gravel; low plasticity																
105	-40		PB-23	17	50-180 psi				L															
110			MC-24	18	6 20 31							1.5		32	19	13								
							SM	Silty SAND (SM); very dark greenish gray; wet; fine sand																
								pocket of fine gravel with sand																	rig chatter
115	-50		SS-25	2	28 18 17			grades with less silt; medium sand; few fine gravel																
							CL	LEAN CLAY with SAND (CL); very stiff; very dark greenish gray; moist; fine sand; trace silt; low plasticity																
120			P-26	17	300 psi				L		VH													
								grades with less sand				3.5												
125	-60		P-27	12	400 psi																			
							SP	Poorly graded SAND (SP); dense; black; wet; fine to medium sand																
								pocket of gravel																	rig chatter
								pocket of lean clay; light greenish gray																
130			PB-28	28	80-100 psi																			
							CL	LEAN CLAY (CL); hard; mottled greenish and bluish gray with light olive brown; moist; medium plasticity	M		H													

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-176

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); hard; mottled greenish and bluish gray with light olive brown; moist; medium plasticity *(Continues)*				4.0												
135	-70		MC-29	18	12 32 35																			
								grades sandy; medium sand				4.0												
140			P-30	14	400 psi																			
								grades with silt																
							SM	Silty SAND (SM); dense; dark greenish gray; wet; fine sand																
							CH	FAT CLAY (CH); hard; very dark greenish gray; moist; high plasticity																
145	-80		MC-31	16	18 27 30				H		H													
150			PB-32	3	50-180 psi			grades with fine sand; very stiff				3.3												
							CL-ML	Silty CLAY (CL-ML); hard; greenish gray; moist; trace fine sand; low plasticity																
155	-90		MC-33	18	19 29 35				L															
												4.5												
							CH	FAT CLAY (CH); hard; dark greenish gray; moist; high plasticity																
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Plasticity	Dilatancy	Dry Strength	PP (tsf)^4	PTV (tsf)^4	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			PB-34	5	100-200 psi		CH	FAT CLAY (CH); hard; dark greenish gray; moist; high plasticity *(Continues)*	H			>4.5												
165	-100		MC-35	18	23 33 39		CH	Sandy FAT CLAY (CH); hard; grayish brown; moist; fine sand; high plasticity pocket of sandy clay; light olive brown	H															light rig chatter
							CL	LEAN CLAY with SAND (CL); hard; light olive gray with yellowish brown mottling; moist; low plasticity																
170			MC-36	18	19 28 38				L			4.0												
							ML	SILT with SAND (ML); hard; olive gray with olive yellow mottling; moist; fine sand; low plasticity																
175	-110		MC-37	11	35 50/5			pocket of silty sand with gravel	L															rig chatter
180			MC-38	17	23 27 31			grades clayey				4.5												
							CL	Sandy LEAN CLAY (CL); very stiff; yellowish brown and dark yellowish brown; wet; fine to medium sand																
185	-120		MC-39	18	14 17 26																			
							CH	FAT CLAY (CH); very stiff; dark olive gray with pale brown mottling; moist; few fine to coarse sand				3.5												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CH	FAT CLAY (CH); very stiff; dark olive gray with pale brown mottling; moist; few fine to coarse sand *(Continues)*																
							CL	Sandy LEAN CLAY (CL); very stiff; light olive brown; moist; fine sand; low plasticity																
190			MC-40	18	19 30 45				L			3.5												
							SC	Clayey SAND with GRAVEL (SC); very dense; yellowish brown; wet; fine and medium sand; fine gravel																
195	-130		U-41	12	43 50/6			pocket of silty sand																rig chatter
							CL	Sandy LEAN CLAY (CL); hard; light olive brown; moist; fine sand; low plasticity																
200			MC-42	18	20 33 45			grades silty; some black speckling	L			4.5												
205	-140		SS-43	12	19 26 33			grades with fine to medium sand; fine to coarse gravel																rig chatter
							GM	Silty GRAVEL with SAND (GM); very dense; light olive brown; wet; fine to coarse gravel; fine to coarse sand; trace clay; subangular gravel																207' - 217.5' rig chatter
210			SS-44	4	43 50/6																			
								intermixed pockets of silty clay; brownish yellow																
215	-150		SS-45	5	62/6																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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SOIL BORING LOG

BORING NO.
BH-176

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							GM	Silty GRAVEL with SAND (GM); very dense; light olive brown; wet; fine to coarse gravel; fine to coarse sand; trace clay; subangular gravel *(Continues)*																
							CL	Sandy LEAN CLAY with GRAVEL (CL); hard; light olive brown and dark yellowish brown; moist; fine gravel; low plasticity																
220			MC-46	12	27 50/6				L															
							GM	Silty GRAVEL with SAND (GM); very dense; olive; wet; fine to coarse gravel; medium and coarse sand; subangular to angular gravel																221' - 265' rig chatter
225	-160		SS-47	4	50/6			grades dark grayish brown and yellowish brown																
230			SS-48	6	41 50/3																			
235	-170		SS-49	NR	89/6																			
240			SS-50	3	63/6			grades olive brown; trace clay																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-176

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)^4	PTV (tsf)^4	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							GM	Silty GRAVEL with SAND (GM); very dense; olive; wet; fine to coarse gravel; medium and coarse sand; subangular to angular gravel *(Continues)*																
245	-180	☒	SS-51	3	57/6																			
250		☒	SS-52	3	83/6			grades dark grayish brown																
255	-190																							
260																								
265	-200																							

Boring terminated at a depth of 265.0 feet bgs.
Borehole overdrilled from 250 feet to 265 feet to accomodate OYO method downhole P.S. logging.
Groundwater encountered at a depth of 9.3 feet bgs prior to switching to rotary wash drilling.
Vibrating wire piezometers installed at 31 and 58 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

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1.) Light gray shading indicates length of sample recovery.	2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.	4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-177

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Christian Rodil, Malek Zuhaika
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	April 21, 2020 at 7:30 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	April 24, 2020 at 3:30 pm

Boring Location: Newhall Yard

Northing: 1,954,420.167 **Easting:** 6,144,531.566

Horizontal Datum: NAD 1983

Elevation: 64.39 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							GM	Silty GRAVEL (GM); light gray																
							CL	Gravelly LEAN CLAY with SAND (CL); dark yellowish brown																
							SM	Silty SAND (SM); olive; fine to coarse sand; trace fine gravel																0' - 3' intermixed layers of fill
							ML	Sandy SILT with GRAVEL (ML); dark brown; fine to coarse sand; fine to coarse gravel																
			G-1	6			CL	LEAN CLAY with GRAVEL (CL); light olive brown and olive brown; fine to coarse gravel																
							CL	Sandy LEAN CLAY (CL); very stiff; black; moist; medium plasticity																
			G-2	6																				
	60																							
5			MC-3	12	1 6 13				M					42	17	25	20	106						
												3.0												
							SC	Clayey SAND (SC); light yellowish brown; moist; fine sand																
								grades olive brown																
10			MC-4	14	1 3 4		CH	FAT CLAY (CH); stiff; grayish brown with fine reddish brown mottling; moist; high plasticity	H					50	24	26								CORR
												1.0												
	∇																							
								grades dark grayish brown																
	50																							
15			SH-5	28	80-200 psi			pocket of clayey sand; olive brown																groundwater encountered after retrieving SH-5; groundwater level measured at 12.0' after waiting 15 minutes
												1.5												
								grades dark greenish gray																
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Depth (ft): Bottom of Hole	Depth (ft): Water	Depth (ft): Drilling Fluid
4/21/20	0.0	17.5	12	NA
4/22/20	9.0	110.0	N/A	12.5
4/23/20	9.0	191.5	N/A	12
4/24/20	9.0	251.0	N/A	12

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 12.0 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 04/21/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 32 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-177

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
			P-6	14	200 psi		CH	FAT CLAY (CH); stiff; grayish brown with fine reddish brown mottling; moist; high plasticity *(Continues)*						50	20	30	25 27 26	100 96 97						CONSOL; TXCU
							CL	Sandy LEAN CLAY (CL); stiff; light brownish gray; moist; fine sand; low plasticity	L			1.8												
	40						SM	Silty SAND (SM); very dense; light olive brown; moist; fine to medium sand																
25			SS-7	12	15 23 40																			
								layer of fine to coarse gravel																26.5' - 28.5' rig chatter
							ML	SILT (ML); very dark gray; wet; few fine sand; low plasticity																
30			P-8	3	200 psi				L										86					sample P-8 plugged; 3 cobble slough
							GM	Silty GRAVEL with SAND (GM); fine and coarse gravel																rig chatter
																								VWP
	30						CL	Sandy LEAN CLAY (CL); very stiff; gray and light olive brown; moist; fine to medium sand; low plasticity																
35			MC-9	16	12 13 15				L					26	18	8	20	109	54					
																								36' - 49.5' rig chatter
							SP	Poorly graded SAND with GRAVEL (SP); dense; dark olive gray; wet; fine to coarse sand; fine gravel																
40			U-10	14	38 36 39														3	28	69			
							SM	Silty SAND with GRAVEL (SM); dense; dark grayish brown; moist; fine to coarse sand; fine gravel																
	20																							
45			SS-11	12	25 26 23														15	28	57			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-177

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
						⁙	SM	Silty SAND with GRAVEL (SM); dense; dark grayish brown; moist; fine to coarse sand; fine gravel *(Continues)*																
						▨	CL	Sandy LEAN CLAY (CL); stiff; light olive brown; moist; fine sand; low plasticity	L															
50		▨	PB-12	30	50-80 psi	▨																		
						▨	CL	Sandy LEAN CLAY (CL); stiff; greenish gray; wet; fine to coarse sand; medium plasticity	M			1.9												
	10																							
55		■	P-13	16	450 psi	▨								37	18	19								
								grades to fine sand				2.0												
60		■	P-14	15	350 psi	▨																		
						⁙	SM	Silty SAND (SM); gray; wet; fine sand																
								grades light olive brown																
	0																							
65		■	P-15	15	300 psi	⁙								23	20	3			39					
								grades light yellowish brown																
						⁙	SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; olive brown to very dark grayish brown; wet; fine to coarse sand; fine gravel																68' - 84.5' rig chatter
								pocket of clay; dark greenish gray																
70		⧗	MC-16	12	25 50/6	⁙											10	127	12	34	54			
	-10																							
75		☒	SS-17	6	22 29 37	⁙																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; olive brown to very dark grayish brown; wet; fine to coarse sand; fine gravel *(Continues)*																
80		U-18	12	28 40 40																		
	-20				CL	LEAN CLAY with SAND (CL); very stiff; greenish gray; wet; fine and medium sand; low plasticity	L		H													
85		PB-19	12	80-200 psi						2.0												
					SM	Silty SAND (SM); medium dense; light yellowish brown with dark yellowish brown mottling; moist; fine and medium sand																
90		MC-20	18	12 18 20																		
						grades with fine gravel; very dense; olive brown																92' - 105' rig chatter
	-30																					
95		SS-21	4	29 31 40																		
					GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine gravel; fine to medium sand; subangular to angular gravel																
						pocket of clay; olive yellow																
100		PB-22	20	80-400 psi																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-177

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
	-40						GP																	
105			U-23	3	30 50/6		SP	Poorly graded SAND (SP); very dense; dark grayish brown; wet; medium to coarse sand; trace fine gravel																
110			SS-24	3	21 19 28			grades with fine to coarse gravel																
							CH	FAT CLAY (CH); very stiff; light olive brown; moist; high plasticity																
	-50																							
115			P-25	2	700 psi				H		H	3.2												
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark grayish brown; wet; fine gravel; coarse sand; subangular to angular gravel																rig chatter
120			U-26	2.5	50/4.5																			
							SM	Silty SAND (SM); very dense; very dark greenish gray; wet; fine sand; trace fine gravel																
	-60																							
125			MC-27	14	19 43 48																			
								grades olive																
130			SS-28	5	30 50/6			few fine gravel																

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-177

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							SM	Silty SAND (SM); very dense; very dark greenish gray; wet; fine sand; trace fine gravel *(Continues)*																
							SP-SM	Poorly graded SAND with SILT (SP-SM); dense; very dark greenish gray; wet; fine sand																
	-70																							
135			U-29	18	28 33 35																			
								grades silty																
								grades olive brown																
140			P	NR	700 psi																			
								grades very dark greenish gray; trace clay																
			U-30	10	16 15 24		CL	LEAN CLAY (CL); hard; dark greenish gray; moist; medium plasticity	M			>4.5												broken cobble recovered at top of sample U-30
	-80																							
145			P	NR	600 psi																			
			P	NR	700 psi																			
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); dense; olive brown; wet; fine gravel; fine to medium sand; subrounded to subangular gravel																rig chatter
150			PB-31	21	50-200 psi																			
							SM	Silty SAND (SM); very dense; dark yellowish brown; moist; fine sand																
	-90																							
155			U-32	10	26 50/6																			
								seam of silty clay; light greenish gray																
							GM	Silty GRAVEL with SAND (GM); very dense; olive; wet; fine gravel; fine to medium sand; subangular to angular gravel																rig chatter
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
			SS-33	3	50/6		GM	Silty GRAVEL with SAND (GM); very dense; olive; wet; fine gravel; fine to medium sand; subangular to angular gravel *(Continues)*																
							SM	Silty SAND (SM); very dense; olive; wet; fine sand																
	-100																							
165			PB-34	24	50-150 psi																			
170			U-35	4	50/6			grades with fine to coarse gravel																rig chatter
							ML	SILT with SAND (ML); hard; olive gray; moist; fine sand; trace coarse sand; nonplastic																
	-110																							
175			MC-36	18	17 18 25				NP			>4.5												
							SM	Silty SAND (SM); dense; light olive brown; fine sand																
180			PB-37	16	100 psi																			
	-120																							
185			MC-38	18	17 31 38			grades greenish gray																
							CL	LEAN CLAY (CL); hard; dark greenish gray; moist; medium plasticity	M			4.0												
								grades brownish yellow																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); hard; dark greenish gray; moist; medium plasticity *(Continues)*																
190			MC-39	18	16 23 31																			
												4.0												
	-130																							
195			PB-40	25	100-180 psi																			
								grades light olive brown; little fine sand; little silt				>4.5												
																								199.5' - 213' rig chatter
200			MC-41	4	50/4			grades with fine to coarse gravel; fine to coarse sand																
							GC	Clayey GRAVEL with SAND (GC); very dense; light olive brown; wet; fine to coarse gravel; subrounded to angular gravel																
							GM	Silty GRAVEL with SAND (GM); very dense; olive brown; moist; fine to coarse gravel; fine to coarse sand; subangular to angular gravel																
	-140																							
205			SS-42	3.5	50/5																			
							GP	Poorly graded GRAVEL with SAND (GP); very dark grayish brown; wet; fine to coarse gravel; coarse sand; subrounded to angular gravel																
210			U-43	10	35 50/4																			
							CL	LEAN CLAY with SAND (CL); hard; light olive brown; moist; low plasticity																
	-150																							
215			PB-44	26	120 psi				L															

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

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									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Plasticity	Dilatancy	Dry Strength	PP (tsf)^4	PTV (tsf)^4	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							CL	LEAN CLAY with SAND (CL); hard; light olive brown; moist; low plasticity *(Continues)*				>4.5												
							ML	SILT with SAND (ML); hard; light gray and light olive brown; moist; fine sand; nonplastic																
220			MC-45	18	16 21 32				NP															
							GP-GM	Poorly graded GRAVEL with SILT and SAND (GP-GM); very dense; olive brown; wet; fine gravel; fine to coarse sand; subangular to angular gravel																rig chatter
	-160																							
225			SS-46	3	50/6																			
230			U	NR	50/5																			
			SS-47	3	50/5																			
	-170																							
235																								
							SM	Silty SAND with GRAVEL (SM); very dense; dark grayish brown; wet; fine to coarse sand; fine gravel																
240			SS-48	4	21 50/6																			
							ML																	

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
							ML	SILT (ML); hard; olive gray; moist; low plasticity *(Continues)*																
245			U-49	13	20 44 50/3				L															
							CL	Sandy LEAN CLAY (CL); hard; dark greenish gray; fine to medium sand; medium plasticity																
250			MC-50	11	35 50/6				M															
	-190																							
255																								
260							GM	Silty GRAVEL (GM)																
							CL	LEAN CLAY (CL); olive brown																
	-200																							
265																								

Boring terminated at a depth of 265.0 feet bgs.
Borehole overdrilled from 250 feet to 265 feet to accomodate OYO method downhole P.S. logging.
Groundwater encountered at a depth of 12.0 feet bgs prior to switching to rotary wash drilling.
Vibrating wire piezometer installed at 32 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

270

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-178

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Malek Zuhaika
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	April 27, 2020 at 7:45 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	April 30, 2020 at 1:40 pm

Boring Location: Newhall Yard

Northing: 1,953,176.318 **Easting:** 6,146,431.655

Horizontal Datum: NAD 1983

Elevation: 62.43 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					SM	Silty SAND with GRAVEL (SM); very dark to dark greenish gray; dry; fine to medium sand; fine to coarse gravel (FILL)																
						grades with clay																
	60	BS-1	24		CH	FAT CLAY (CH); stiff; very dark brown; moist; high plasticity (Native Soil)	H															R-value
						grades with fine sand; gray with reddish brown speckles																
5		MC-2	14	3 5 9					VH			73	29	44	33	82						
										1.5												
	∇																					
10		P-3	13	100 psi	CH	FAT CLAY (CH); medium stiff; grayish brown with reddish brown speckles; high plasticity	H		H													groundwater encountered at 9' during dry drilling; groundwater level measured at 7.1' after waiting 15 minutes
											0.3											
	50																					
15		P-4	15	300 psi		grades stiff						60	22	38	33 30 28	86 93 95						CONSOL; TXCU
										1.5												
20						grades black; trace fine sand																

Water Level Data

Date	Depth (ft): Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
4/27/20	0.0	9.0	9	NA
4/28/20	9.0	81.5	N/A	7
4/29/20	9.0	135.5	N/A	7
4/30/20	9.0	201.5	N/A	7

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 9.0 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 04/27/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometer (VWP) installed at 29 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

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Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		■	P-5	16	200 psi		CH	FAT CLAY (CH); medium stiff; grayish brown with reddish brown speckles; high plasticity *(Continues)*	H		VH			64	28	36	31	89						TXUU
												1.0	0.6											
	40																							
							SM	Silty SAND (SM); medium dense; dark olive; wet; fine sand																
25		∪	U-6	18	9 14 14									NP	NP	NP	23	103						
							GM	Silty GRAVEL (GM); dark olive brown; fine to coarse gravel; subrounded to angular gravel																rig chatter
																								VWP
30		☒	SS-7	9	15 20 25		SM	Silty SAND with GRAVEL (SM); dense; very dark grayish brown; wet; fine to coarse sand; fine gravel																
	30																							
							CL	LEAN CLAY with SAND (CL); dark gray; moist; medium plasticity																
35		■	P-8	4	500 psi				M															
40		■	P-9	14	180 psi									35	19	16	26 24	98 99						CONSOL; TXUU
								grades very stiff; gray				2.5												
	20																							
							SC	Clayey SAND (SC); dark greenish gray; wet; fine to medium sand																
45		▨	PB-10	24	50-80 psi																			
							CL	LEAN CLAY with SAND (CL); very stiff; dark greenish gray; moist; low plasticity; trace carbonate nodules																

[1] Light gray shading indicates length of sample recovery.

[2] Soil descriptions between sampled depths logged from cuttings or rig behavior.

[3] Maximum Particle Size observed may be limited by sampler dimensions.

[4] "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-178

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							CL	LEAN CLAY with SAND (CL); very stiff; dark greenish gray; moist; low plasticity; trace carbonate nodules *(Continues)*																
50			P-11	17	150 psi				L															
												2.0												
	10																							
55			P-12	16	300 psi																			
								grades stiff; dark gray and olive gray				1.5												
								grades greenish gray																
60			P-13	16	200 psi			grades medium plasticity	M					43	17	26	26 26	97 96	82					CONSOL; TXUU
								grades without carbonate nodules																
												1.7												
	0																							
65			P-14	16	250 psi																			
								grades very stiff				2.2												
70			P-15	17	250 psi																			
								grades fine to medium sand; stiff; greenish gray with black speckling																
												1.5												
	-10																							
75			P-16	16	250 psi																			

1.) Light gray shading indicates length of sample recovery.

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3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-178

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					SM	Silty SAND (SM); dark greenish gray; wet; fine to medium sand																
					CL	LEAN CLAY with SAND (CL); very stiff; light yellowish brown to light olive brown; moist; fine sand; low plasticity																
80		P-17	17	250 psi			L										83					
										2.2												
	-20																					
					SM	Silty SAND (SM); dense; pale olive; wet; fine to medium sand; few fine gravel																
85		U-18	13	18 28 50/6													22	9	70			
					SW	Well graded SAND with GRAVEL (SW); very dense; olive; wet; fine to coarse sand; fine gravel																rig chatter
90		SS-19	7	25 44 33																		
	-30																					
95		U-20	7	43 50/3													5	15	80			
						pocket of silty sand																
100		PB-21	20	50-410 psi		more fine gravel																
	-40																					
					CL	LEAN CLAY (CL); hard; dark greenish gray; wet; little silt; low plasticity																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
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Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
					CL	LEAN CLAY (CL); hard; dark greenish gray; wet; little silt; low plasticity *(Continues)*																
105		PB-22	20	80-120 psi			L															
										>4.5												
110		P-23	17	250 psi		grades with trace fine sand			VH													
						grades very stiff; medium plasticity	M			3.1												
	-50																					
						grades black																
115		P-24	5	600 psi																		
					GM	Silty GRAVEL (GM); very dark gray and black; wet; fine gravel; angular gravel; medium plasticity fines																rig chatter
					SM	Silty SAND (SM); very dark olive gray; moist; fine sand																
120		P-25	9	600 psi																		
						grades olive gray and dark yellowish brown mottling																
	-60																					rig chatter
					CL	Sandy LEAN CLAY (CL); very stiff; dark olive gray; moist; medium plasticity																
125		PB-26	4	80-200 psi			M		H	3.3												
						pocket of gravel																rig chatter
					SM	Silty SAND (SM); very dense; dark greenish gray; wet; fine sand																
130		U-27	9	26 43 50/4																		

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

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BORING NO.

BH-178

Depth (ft)	Elevation (ft)	Sample Number	Recovery^{1} (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Plasticity	Dilatancy	Dry Strength	PP (tsf)^{4}	PTV (tsf)^{4}	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
	-70				SM	Silty SAND (SM); very dense; dark greenish gray; wet; fine sand *(Continues)*																
					GM	Silty GRAVEL with SAND (GM); very dense; olive gray; wet; fine gravel; fine to coarse sand; subangular to angular gravel																rig chatter
135		SS-28	2.5	50/6																		
					CL	LEAN CLAY (CL); hard; light olive brown; moist; little silt; trace fine sand; low plasticity																
140		U-29	10	18 32 44			L															
					CH	FAT CLAY (CH); hard; dark greenish gray; moist; high plasticity	H		H													
	-80																					
					CL-ML	Sandy, Silty CLAY (CL-ML); dark greenish gray; moist; fine sand; low plasticity																
145		PB-30	12	80-180 psi			L															
					CH	Sandy FAT CLAY (CH); very stiff; dark greenish gray; moist; high plasticity																
150		P-31	13	700 psi			H		H	3.1												
	-90																					
155		PB-32	16	80-180 psi																		
						grades without sand; greenish gray; some carbonate nodules				2.1												
					CL	LEAN CLAY (CL); hard; olive gray with dark yellowish brown mottling; moist; few silt; medium plasticity																
160																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-178

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
			PB	NR	50-180 psi		CL	LEAN CLAY (CL); hard; olive gray with dark yellowish brown mottling; moist; few silt; medium plasticity *(Continues)*																
	-100																							
			PB-33	18	50-180 psi				M			>4.5												
165																								
			P-34	12	700 psi			pocket of fine to medium sand																
							CL	LEAN CLAY with SAND (CL); dark greenish gray; moist; fine sand; low plasticity																
170			P-35	10	600 psi				L															
	-110																							
							SM	Silty SAND (SM); very dense; light gray with light olive brown mottling; moist; fine sand																
175			MC-36	16	16 36 50/5																			
																								rig chatter
180			U-37	13	35 44 50/6			grades with trace fine gravel																
							CH	FAT CLAY (CH); hard; olive brown and dark gray; moist; high plasticity	H			>4.5												
	-120																							
							SP-SM	Poorly graded SAND with SILT (SP-SM); dense; olive brown; wet; fine to medium sand; little silt																
185			PB-38	28	80-180 psi																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-178

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	Sandy LEAN CLAY (CL); hard; yellowish brown; moist; medium plasticity *(Continues)*																
190			MC-39	17	15 21 38				M															
								interbedded fine gravel																192' - 195' rig chatter
	-130																							
195			U-40	11	38 50/5			pocket of silty sand; yellowish brown; moist																
200			MC-41	15	18 33 50/6			grades yellowish brown with trace black speckling																
	-140																							
								pocket of gravel																rig chatter
205								grades olive brown																
							GM	Silty GRAVEL (GM); dark olive gray; wet																rig chatter
210																								
	-150																							
							CL	LEAN CLAY (CL); yellowish brown; moist																
215																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-178

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
								Boring terminated at a depth of 215.0 feet bgs. Borehole overdrilled from 200 feet to 215 feet to accomodate OYO method downhole P.S. logging. Groundwater encountered at a depth of 9.0 feet bgs prior to switching to rotary wash drilling. Vibrating wire piezometer installed at 29 feet bgs. Backfilled with bentonite-cement grout. Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop. Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers. Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.																
220																								
	-160																							
225																								
230																								
	-170																							
235																								
240																								
	-180																							

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-179

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Lilian Lorincz
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	October 19, 2020 at 8:30 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	October 26, 2020 at 11:15 am

Boring Location: 579 East Santa Clara St.

Northing: 1,950,048.343 **Easting:** 6,160,894.576

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	9
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Horizontal Datum: NAD 1983

Elevation: 80.71 ft.

Vertical Datum: NAD 88

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	Remarks
						0.5" Asphalt Concrete, 7" Aggregate Base (Pavement Section)																
	80				CL	LEAN CLAY with SAND (CL); medium stiff; olive brown to olive yellow; moist; fine sand; low plasticity (Fill)	L															Core through pavement section. Hand auger to 5 feet
						pocket of poorly graded fine sand																
		BS-1				trace brick and concrete fragments									17							R-value
5		MC-2	16.5	6 7 12	CL	LEAN CLAY (CL); medium stiff to hard; olive brown to olive yellow; moist; trace fine sand; low plasticity (Native)	L		M													Switch to 7 inch O.D. Solid Stem Auger
										4.0		32	19	13								
10		MC-3	15.5	4 5 8																		
	70					very stiff				2.0												
	▽					grades light brownish gray																Groundwater encountered at 13.5'; measured after 15 minutes at 13'. Hydrocarbon odor in cuttings
15		SH-4	30	20-120 psi		grades medium stiff; wet; medium plasticity	M															
										0.5	0.3											
																						Switch to rotary wash at 17.5'
20																						

Water Level Data

Date	Depth (ft) Bottom of Casing	Depth (ft) Bottom of Hole	Depth (ft) Water	Drilling Fluid
10/19/20	9.0	13.5	13.5	NA
10/20/20	9.0	91.5	N/A	10.9
10/21/20	9.0	162.0	N/A	9.3
10/22/20	9.0	180.0	N/A	10.2
10/23/20	9.0	222.0	N/A	8.4
10/26/20	9.0	265.0	N/A	3.5

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 13.5 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 10/19/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 28, 61, 92, 105, 120, 150, 170 and 200 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

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SOIL BORING LOG

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BORING NO.

BH-179

									Field Tests					Atterberg					Particle Size					
Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
	60	■	P-5	16	20 psi	▨	CL	LEAN CLAY (CL); medium stiff to hard; olive brown to olive yellow; moist; trace fine sand; low plasticity (Native) *(Continues)*	M					40	22	18								
								grades hard; olive gray				4.0												
						▥	ML	SILT with SAND (ML); medium stiff; yellowish brown; wet; little fine sand																rig chatter
25		∪	U-6	18	5 7 9																			
								grades clayey									24	103	81	0	19			
																								VWP
						▨	CH	FAT CLAY (CH); stiff to very stiff; olive gray to gray; moist; high plasticity																clay in cuttings
30	50	■	P-7	18	50 psi				H			1.0												
35		■	P-8	14	40 psi				H			1.8												
40	40	■	P-9	13	50 psi			trace black nodules (organics)	H			1.2												CORR
45		■	P-10	15.5	100 psi			grades very stiff				2.5		68	27	41	35 33 32	86 89 91						CONSOL; TXCU

1.) Light gray shading indicates length of sample recovery.

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3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-179

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
						▨	CH	FAT CLAY (CH); stiff to very stiff; olive gray to gray; moist; high plasticity *(Continues)*																
50	30	■	P-11	7.5	100 psi	▨						2.2												
						░	SM	Silty SAND with GRAVEL (SM); very dense; yellowish brown with orange mottling; wet; fine to coarse sand; fine to coarse gravel																
55		☒	SS-12	9.5	25 26 27	░																		
60	20	∪	U-13	12	23 37 43	░																		cobbles up to 3" diameter in slough
						░	SP	Poorly graded SAND with GRAVEL (SP); very dense; olive brown; moist; fine to coarse sand; little fine to coarse gravel									14	118	5	23	72			VWP
						░																		rig chatter
65		☒	SS	NR	20 36 40	░																		no recovery on SPT; sampler blocked by coarse gravel and cobbles
		∪	U-14	4	19 35 48	░																		
70	10	⧗	MC-15	18	8 12 16	▨	CH	FAT CLAY (CH); stiff; olive gray to dark bluish gray mottled with olive yellow; moist; high plasticity	H			1.2												
75		■	P-16	18	300 psi	▨	CL	LEAN CLAY (CL); very stiff; dark bluish gray mottled with yellowish brown; moist; low plasticity	L					31	21	10	22	103						CONSOL

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-179

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff; dark bluish gray mottled with yellowish brown; moist; low plasticity *(Continues)*				3.0												
80	0		PB-17	30	60-100 psi			trace calcite sand nodules				2.5												
							SM	Silty SAND (SM); medium dense; olive brown; wet; medium to coarse sand; trace fine gravel																
85			MC-18	18	13 24 24																			
							CL	LEAN CLAY with SAND (CL); very stiff; yellowish brown; moist; little sand; low plasticity	L			2.5		32	17	15			78					
90	-10		MC-19	13	9 16 22		CL	LEAN CLAY (CL); hard; mottled olive gray and yellowish brown; moist; low plasticity; silty	L			4.5		31	23	8								
																								VWP
95			P-20	17.5	300 psi			grades very stiff; olive gray; medium plasticity; less silty	M		M	2.2												
100	-20		P-21	15	120 psi			grades dark gray				2.7		43	22	21	27 26	98 98						TXCU; CORR
							SM	Silty SAND (SM); yellowish brown; wet; medium sand																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-179

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					SM	Silty SAND (SM); yellowish brown; wet; medium sand *(Continues)*																
105		MC-22	5	50/5.5"	GM	Silty GRAVEL with SAND (GM); very dense; yellowish brown; wet; fine subrounded to subangular gravel; some fine to coarse sand									11		15	44	40	12	3	VWP
110	-30	U-23	10	26 36 50/6"																		
					CL	LEAN CLAY with SAND (CL); very stiff; olive yellow; moist; fine sand; low plasticity																rig chatter stops, clay in cuttings
115		MC-24	16.5	7 12 18			L			2.2		31	21	10	22	105						
					SC	Clayey SAND with GRAVEL (SC); dense; olive gray; moist; fine to coarse sand; little fine to coarse gravel																
120	-40	PB-25	21.5	60-400 psi													39	24	37			VWP; PB sampler refusal at 24 inches
					CL	LEAN CLAY (CL); very stiff to hard; olive gray; moist; trace fine sand; low plasticity; calcium carbonate nodules																
125		MC-26	18	5 12 16			L			2.9												
130	-50	PB-27	22	80 psi		grades no sand				4.5												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-179

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
							CL	LEAN CLAY (CL); very stiff to hard; olive gray; moist; trace fine sand; low plasticity; calcium carbonate nodules *(Continues)*																
135			P-28	14.5	200 psi			grades medium plasticity	M			4.5		36	18	18	24 20 18	102 112 115						CONSOL; TXCU
140	-60		MC-29	14	9 16 32			grades olive gray mottled with olive yellow				3.6												
145			MC-30	14	11 15 25			grades hard; olive gray; low plasticity	L			4.5		30	21	9	22	107						
								grades olive yellow																
150	-70		PB-31	27	80-180 psi			grades with trace fine sand; medium plasticity; calcium carbonate stringers very stiff	M			2.0												VWP
155			SS-32	6	10 18 22																			rig chatter
160																								

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-179

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
	-80		PB-33	24	80-250 psi		CL	LEAN CLAY (CL); very stiff to hard; olive gray; moist; trace fine sand; low plasticity; calcium carbonate nodules *(Continues)* grades with sand; low plasticity	L			4.5												
							SM	Silty SAND (SM); dense; yellowish brown; moist; fine sand; trace coarse gravel																
165			MC-34	11	16 25 37																			
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; olive brown; wet; fine to coarse sand; some fine gravel; trace clay; moderately cemented sand nodules																
170	-90		SS-35	6	16 50/4"														10	36	54			VWP; borehole caves to 50 feet depth
							SC	Clayey SAND (SC); very dense; olive gray; moist; fine sand; trace coarse gravel																rig chatter
175			MC-36	8	14 27 46																			
							CL	Sandy LEAN CLAY (CL); very stiff; olive gray; moist; fine sand; low plasticity																
180	-100		U-37	7	14 23 34				L		M	3.0												borehole caves twice, 2 feet and 4.5 feet respectively, during attempts to sample at 180 feet depth
							SC	Clayey SAND (SC); very dense; olive gray; moist; fine to medium sand; trace fine to coarse gravel																rig chatter
185			SS-38	5	25 37 38																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.
BH-179

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI	Moisture Content	Dry Unit Wt	% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					CL	LEAN CLAY (CL); very stiff; dark bluish gray; moist; medium plasticity *(Continues)*																
190	-110	MC-39	3	45 31 37			M			3.7												
					SM	Silty SAND (SM); dense; olive gray; moist; fine sand																
195		PB-40	15.5	100-200 psi																		PB sampler refusal at 24 inches
					SC	Clayey SAND (SC); very dense; olive gray with orange mottling; moist; fine to medium sand; calcium carbonate stringers and nodules																
200	-120	MC-41	14	30 45 50/4.5"																		VWP
					ML	SILT (ML); hard; olive gray; moist; low plasticity																
205		MC	NR	23 37 50/6"																		
		SS-42	14	17 19 27			L															
																						rig chatter
210	-130	U-43	14	20 33 50.5"						4.5												
					CL	LEAN CLAY (CL); hard; olive brown with yellowish brown nodules; moist; medium plasticity																
215		MC-44	18	23 36 50/6"			M															

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-179

Depth (ft)	Elevation (ft)	Sample Number	Recovery^{1} (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)^{4}	PTV (tsf)^{4}	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
					CL	LEAN CLAY (CL); hard; olive brown with yellowish brown nodules; moist; medium plasticity *(Continues)*				4.5												
					ML	SILT (ML); hard; yellowish brown; moist; low plasticity																
220	-140	SH-45	18	100-400 psi			L			>4.5												SH sampler refusal at 24 inches
225																						
230	-150	PB-46	26	80-100 psi		grades very stiff; olive gray to dark bluish gray; wet; medium plasticity; trace calcium carbonate nodules	M			3.2												
235																						
					CL	LEAN CLAY (CL); hard; olive yellow mottled with yellowish brown; moist; medium plasticity																
240	-160	U-47	16	24 30 34		grades with black mottling; calcium carbonate nodules	M		H	4.0												

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-179

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
245							CL	LEAN CLAY (CL); hard; olive yellow mottled with yellowish brown; moist; medium plasticity *(Continues)*																
							GP	Poorly graded GRAVEL with SAND (GP); very dense; yellowish brown mottled with orange; wet; coarse subangular gravel; fine to coarse sand; trace silt																247'- 256' rig chatter
250			SS-48	3	50/3"																			
	-170																							
255																								
							CL	LEAN CLAY (CL); olive yellow; medium plasticity																251'-265' soil description logged from cuttings and rig behavior
260							SC	Clayey SAND (SC); yellowish brown; fine to coarse sand; fine gravel																260'- 262' rig chatter
	-180																							
							CL	LEAN CLAY (CL); yellowish brown to olive yellow; medium plasticity																
265																								

Boring terminated at a depth of 265.0 feet bgs.
Borehole overdrilled from 250 feet to 265 feet to accomodate OYO method downhole P.S. logging.
Groundwater encountered at a depth of 13.5 feet bgs prior to switching to rotary wash drilling.
Vibrating wire piezometers installed at 28, 61, 92, 105, 120, 150, 170 and 200 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

270

-190

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 1 of 10

BORING NO.

BH-180

Project:	BART to Silicon Valley Phase II Project	**Project No.:**	507385606
Location:	Santa Clara County, CA	**Field Eng. Staff:**	Malek Zuhaika
Client:	Santa Clara Valley Transportation Agency	**Date/Time Started:**	June 29, 2020 at 8:20 am
Drilling Co.:	Pitcher Services, LLC	**Date/Time Finished:**	July 6, 2020 at 11:35 am

Boring Location: 615 Stockton Ave.

Northing: 1,949,024.373 **Easting:** 6,151,219.998

Horizontal Datum: NAD 1983

Elevation: 81.78 ft.

Vertical Datum: NAVD 88

Drill Rig:	Truck-Mounted Failing 1500	**Casing Type:**	SW
Hammer Type:	Automatic Hammer	**Casing Depth (ft):**	11
Drilling Fluid:	Bentonite	**Inside Diameter (in):**	5.93
Drilling Method:	Rotary Wash		

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Group Symbol	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	Atterberg: LL	PL	PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	Remarks
								4" Concrete; 2" Poorly graded fine SAND (Pavement Section)																
			BS-1				CL	Sandy LEAN CLAY (CL); black; dry; fine to coarse sand; medium plasticity	M		H			36	19	17	18							
	80																							
			BS-2					grades with less sand; pale olive; silty																
5																								
							ML	SILT (ML); soft; olive brown; moist; nonplastic																
			G-3																					
10			SH-4	21	50-80 psi				NP		M													
														NP	NP	NP	27	93						
	70											0.5	0.1											
15			SH-5	30	50-200 psi																			
								grades medium stiff; olive brown with yellowish brown streaks																
∇												1.0												groundwater encountered at 17.3' after retrieving SH-5; grounwater level measured at 16.9' after waiting 20 minutes
20																								

Water Level Data

Date	Depth (ft): Bottom of Casing	Bottom of Hole	Water	Drilling Fluid
6/29/20	0.0	17.5	17.3	NA
6/30/20	11.0	97.5	N/A	16.4
7/1/20	11.0	172.5	N/A	15.8
7/2/20	11.0	240.5	N/A	16.5
7/6/20	11.0	265.0	N/A	16.4

Sample Type

BS	Bulk Sample
G	Grab Sample
U	Dames and Moore U
SS	Standard Penetration Test
SC	Standard California
MC	Modified California
P	Dames and Moore Piston
SH	Shelby Tube
PB	Pitcher Barrel

Notes:

Groundwater encountered at a depth of 17.3 feet below ground surface (bgs) prior to switching to rotary wash drilling.
Groundwater level readings after the first day of drilling on 06/29/20 were taken in drilling fluid and should not be used for design.
Vibrating wire piezometers (VWP) installed at 20, 47, 115 and 161 feet bgs.

Dilatancy:	N - None		S - Slow		R - Rapid
Plasticity:	NP - Nonplastic	L - Low	M - Medium	H - High	
Dry Strength:	N - None	L - Low	M - Medium	H - High	VH - Very High

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

BORING NO.

BH-180

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
		■	P-6	15	200 psi		ML	SILT (ML); soft; olive brown; moist; nonplastic *(Continues)*																VWP
												1.0												
							CH	FAT CLAY (CH); medium stiff; very dark gray; wet; high plasticity	H															
	60																							
								grades olive brown																
25		■	P-7	17	200 psi			grades stiff	H					58	22	36	31 33 33	87 90 88	100					CONSOL; TXCU
												2.0												
							CH	FAT CLAY (CH); very stiff; dark olive gray; wet; high plasticity																
30		■	P-8	15	250 psi				H		VH													
								grades greenish gray; ;silty				1.2												
	50																							
								pocket of gravel																rig chatter
								pocket of gravel																rig chatter
35		☒	SS-9	18	4 5 6																			
								pocket of sandy clay; brown; fine sand; low plasticity	L															
							CL	LEAN CLAY (CL); stiff; dark gray; wet; medium plasticity; silty	M															
40		■	P-10	17	280 psi									48	19	29	28	94						
												1.8												
	40																							
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); dense; dark olive gray; wet; some fine to coarse sand; some fine to coarse gravel																rig chatter
45		∪	U-11	17	25 39 29																			potential cobbles indicated by fractured coarse angular gravel in samples
																			5	47	48			
																								VWP

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.

BH-180

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); dense; dark olive gray; wet; some fine to coarse sand; some fine to coarse gravel *(Continues)*																
							GW	Well graded GRAVEL with SAND (GW); dense; dark olive gray; wet; mostly fine to coarse gravel; some fine to coarse sand; subrounded to angular gravel																
50			U-12	12	21 31 23														3	54	43			
	30																							
							CL	LEAN CLAY with SAND (CL); stiff; gray; wet; medium plasticity																
55			MC-13	18	7 4 7			grades gray with black mottling	M		H			31	19	12	27		84					no recovery on first MC drive; disturbed sample MC-13 recovered by driving a second MC sampler
								grades yellowish brown																
							GP	Poorly graded GRAVEL with SAND (GP); very dense; olive gray; wet; mostly fine to coarse gravel; trace silt																rig chatter
60			SS-14	13	40 42 46																			
	20																							
							SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; olive gray; wet; mostly fine to coarse sand; some fine to coarse gravel																
65			U-15	9	41 50/5.5												11	127	6	39	55			potential cobbles indicated by fractured coarse angular gravel in samples
							CL	LEAN CLAY (CL); stiff; greenish gray with black speckling; wet; low plasticity																
70			PB-16	7	200-180 psi				L															sample PB-16 disturbed during sampling
	10																							
75			MC-17	18	0 6 7			grades sandy; trace peat																CORR

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-180

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
							CL	LEAN CLAY (CL); stiff; greenish gray with black speckling; wet; low plasticity *(Continues)*				1.7 1.2												
80			P-18	16	320 psi									30	16	14	20 20 20	103 108 109	69					CONSOL; TXCU
												2.0												
	0																							
							CL	Sandy LEAN CLAY (CL); very stiff; olive brown; wet; trace silt; low plasticity																
85			P-19	17	350 psi				L															
												3.2												
							GP	Poorly graded GRAVEL with SAND (GP); very dense; olive brown; wet; mostly fine to coarse gravel; fine to coarse sand; trace silt; subrounded to subangular gravel																rig chatter
90			SS-20	14	33 39 29			pocket of silty sand; brownish red																
							CL-ML	Silty CLAY (CL-ML); stiff; dark greenish gray; wet; low plasticity																
	-10																							
95			PB-21	29	80-180 psi				L															
							CL	LEAN CLAY (CL); very stiff; greenish gray with trace black mottling; wet; medium plasticity	M															
												2.7												
100			U-22	12	32 50/6		SM	Silty SAND with GRAVEL (SM); dense; grayish brown; wet; mostly fine to coarse sand; fine gravel																light rig chatter
							CL	LEAN CLAY (CL); very stiff; dark greenish gray; wet; medium plasticity																
	-20																							

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

Depth (ft)	Elevation (ft)	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 μm	Remarks
					CL	LEAN CLAY (CL); very stiff; dark greenish gray; wet; medium plasticity *(Continues)*																
105		P-23	18	400 psi			M															
					ML	SILT (ML); hard; olive gray with olive brown mottling and yellowish brown streaks; wet; low plasticity	L			>4.5												
					CL	LEAN CLAY (CL); very stiff; olive with yellowish brown streaks; wet; medium plasticity; silty																
110		P-24	7	180 psi			M		H	3.1		42	20	22	27	94						
	-30																					
					SM	Silty SAND (SM); dense; yellowish red with olive brown mottling; wet; mostly fine sand																
115		U-25	18	26 31 35		grades to yellowish brown with yellowish red streaks									27	96	28	0	72			VWP
					SP-SM	Poorly graded SAND with SILT and GRAVEL (SP-SM); dense; dark olive gray; wet; mostly fine to coarse sand; little fine gravel																rig chatter
120		SS-26	14	12 10 35		pocket of clay									9		14	29	57			samples SS-26A and SS-27 combined for sieve analysis
	-40																					
125		SS-27	11	32 15 47		grades with coarse gravel; very dense																
					CL	LEAN CLAY (CL); very stiff; greenish gray; wet; medium plasticity																
130		PB-28	29	80-200 psi			M					42	18	24	20 22 26	109 104 99						CONSOL; TXCU
	-50																					

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-180

Depth (ft)	Elevation (ft)	Sample Number	Recovery^1 (in)	Blow Counts Pressure (psi)	USCS Symbol Group	Visual - Manual Identification & Description^{2,3}	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)^4	Field Tests: PTV (tsf)^4	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
					CL	LEAN CLAY (CL); very stiff; greenish gray; wet; medium plasticity *(Continues)*				4.0												
135		MC-29	17	14 19 26						3.4 3.5												
140		MC-30	18	25 26 28																		piston sampler refusal at 600 psi without penetrating soil; sample MC-30 obtained with sand catcher
	-60																					
					CH	FAT CLAY (CH); very stiff; gray with light brown mottling; wet; high plasticity																
145		PB-31	29	100-200 psi			H			3.5		62	20	42								
150		P-32	6	300 psi																		
					SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; dark olive gray; wet; mostly fine to coarse sand; some fine gravel																rig chatter
	-70																					
155		SS-33	11	32 44 50/5													10	36	54	7	3	samples SS-33 and SS-34 combined for sieve and hydrometer
																						fluid loss
160																						

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-180

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests: Plasticity	Field Tests: Dilatancy	Field Tests: Dry Strength	Field Tests: PP (tsf)[4]	Field Tests: PTV (tsf)[4]	Atterberg: LL	Atterberg: PL	Atterberg: PI	Moisture Content	Dry Unit Wt	Particle Size: % Passing #200 Sieve	Particle Size: % Gravel	Particle Size: % Sand	Particle Size: % Silt	Particle Size: % Clay < 5 µm	Remarks
			SS-34	10	37 35 36		SW-SM	Well graded SAND with SILT and GRAVEL (SW-SM); very dense; dark olive gray; wet; mostly fine to coarse sand; some fine gravel *(Continues)*																VWP
	-80																							
							CL	LEAN CLAY (CL); hard; olive brown with olive gray mottling; wet; medium plasticity																
165			PB-35	30	100-280 psi				M															rig chatter
												>4.5												
170			PB-36	25	100-200 psi																			
	-90											>4.5												
							ML	Sandy SILT (ML); very stiff; yellowish brown; wet; fine sand; low plasticity																
175			PB-37	30	100-80 psi				L					34	27	7								
												2.7												
180			PB-38	20	80-400 psi		SP	Poorly graded SAND with GRAVEL (SP); very dense; dark olive gray; wet; mostly fine to coarse sand; fine gravel; trace silt																rig chatter
	-100																							
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark olive gray; wet; mostly fine to coarse gravel; fine to coarse sand; trace silt																rig chatter
185			SS-39	4.5	50/5																			

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

Page 8 of 10

BORING NO.

BH-180

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark olive gray; wet; mostly fine to coarse gravel; fine to coarse sand; trace silt *(Continues)*																
190		☒	SS-40	10	35 43 40																			
	-110																							
							CL	LEAN CLAY (CL); very stiff; brown; wet; trace fine sand; medium plasticity																
195		▨	PB-41	18	50-220 psi			pocket of clayey fine sand; dark yellowish brown	M															
200		▨	PB-42	28	80-180 psi																			
	-120											3.0												
205		▨	PB-43	25	50-200 psi			grades hard				>4.5												
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark olive gray; wet; mostly fine to coarse gravel; fine to coarse sand; trace silt; subrounded to subangular gravel																rig chatter
210		☒	SS-44	10	42 50/6																			
	-130																							
215		☒	SS-45	11	43 41 50/6			grades with more silt and sand																

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

3.) Maximum Particle Size observed may be limited by sampler dimensions.

4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-180

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 µm	
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark olive gray; wet; mostly fine to coarse gravel; fine to coarse sand; trace silt; subrounded to subangular gravel *(Continues)*																
220			SS-46	4	50/6																			
	-140																							
225			SS-47	7	41 66/6																			
							CL	LEAN CLAY (CL); very stiff; brown; wet; medium plasticity																
							SM	Silty SAND with GRAVEL (SM); very dense; dark olive gray; wet; mostly fine to coarse sand; fine gravel																
230			MC-48	8	40 50/6																			
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark olive brown; wet; mostly fine to coarse gravel; fine to coarse sand; trace silt																	rig chatter
	-150																							
235			SS-49	4	69/6																			
240			SS-50	4	50/6			grades with trace clay																
	-160																							

1.) Light gray shading indicates length of sample recovery.

2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.

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4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

SOIL BORING LOG

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BORING NO.
BH-180

Depth (ft)	Elevation (ft)	Sample Graphic	Sample Number	Recovery[1] (in)	Blow Counts Pressure (psi)	Stratum Graphic	USCS Symbol Group	Visual - Manual Identification & Description[2,3]	Field Tests					Atterberg			Moisture Content	Dry Unit Wt	Particle Size					Remarks
									Plasticity	Dilatancy	Dry Strength	PP (tsf)[4]	PTV (tsf)[4]	LL	PL	PI			% Passing #200 Sieve	% Gravel	% Sand	% Silt	% Clay < 5 μm	
							GP	Poorly graded GRAVEL with SAND (GP); very dense; dark olive brown; wet; mostly fine to coarse gravel; fine to coarse sand; trace silt *(Continues)*																
245		☒	SS-51	5	50/6																			
250		☒	SS-52	7.5	41 50/5.5																			
	-170																							
							CL	Sandy LEAN CLAY (CL); brown; low plasticity	L															
255																								
								pocket of sand and gravel																
																								rig chatter
							CH	FAT CLAY (CH); dark gray; high plasticity	H															
260																								
	-180																							
							CL	Gravelly LEAN CLAY (CL); greenish gray; medium plasticity	M															
265																								
270																								
	-190																							

Boring terminated at a depth of 265.0 feet bgs.
Borehole overdrilled from 250 feet to 265 feet to accomodate OYO method downhole P.S. logging.
Groundwater encountered at a depth of 17.3 feet bgs prior to switching to rotary wash drilling.
Vibrating wire piezometers installed at 20, 47, 115 and 161 feet bgs.
Backfilled with bentonite-cement grout.
Blow Counts recorded for every 6 inches of drive (or fraction thereof) with a 140-lb automatic trip hammer / 30-inch drop.
Pressure (psi) recorded to advance D&M Piston, Shelby Tube, and Pitcher Barrel samplers.

Note: The size of the boreholes and rotary wash drilling methods employed for field investigation obscured the assessment of cobble content in the alluvial deposits. The results of our review of the geologic and geotechnical information in the site vicinity and our observation during field exploration indicate that small cobbles are present in the alluvial deposits.

1.) Light gray shading indicates length of sample recovery.
2.) Soil descriptions between sampled depths logged from cuttings or rig behavior.
3.) Maximum Particle Size observed may be limited by sampler dimensions.
4.) "PP" and "PTV" denote average pocket penetrometer and pocket torvane readings.

Cone Penetration Test Logs

Cone Penetration Test Locations

Table A-2. CPT and PPDT Location Summary

CPT ID	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Total Depth (ft)	PPDT[1] Depth (ft)
CPT-184	1,946,617.3	6,155,213.3	85.15	90.9	39.5, 66.9, 91.2
CPT-185	1,946,479.5	6,154,974.2	86.36	117.5	43.6, 74.6
CPT-186	1,946,418.3	6,154,805.2	87.14	150.1	43.7, 74.9, 123.1
CPT-187	1,946,414.1	6,154,686.9	87.54	96.6	

All values except for elevation rounded to the nearest tenth (0.1) of a foot.

[1] Pore Pressure Dissipation Test

GREGG DRILLING & TESTING, LLC.
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

10/25/18

PARIKH
Attn: Mark McKee

Subject: CPT Site Investigation
Bart to Silicon Valley
San Jose, California
GREGG Project Number: 18-185MA

Dear Mr. McKee:

The following report presents the results of GREGG Drilling & Testing's Cone Penetration Test investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☒
2	Pore Pressure Dissipation Tests	(PPD)	☒
3	Seismic Cone Penetration Tests	(SCPTU)	☐
4	UVOST Laser Induced Fluorescence	(UVOST)	☐
5	Groundwater Sampling	(GWS)	☐
6	Soil Sampling	(SS)	☐
7	Vapor Sampling	(VS)	☐
8	Pressuremeter Testing	(PMT)	☐
9	Vane Shear Testing	(VST)	☐
10	Dilatometer Testing	(DMT)	☐

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (562) 427-6899.

Sincerely,
GREGG Drilling & Testing, LLC.

Mary Walden
Operations Manager

Cone Penetration Test Sounding Summary

-Table 1-

CPT Sounding Identification	Date	Termination Depth (feet)	Depth of Groundwater Samples (feet)	Depth of Soil Samples (feet)	Depth of Pore Pressure Dissipation Tests (feet)
CPT 184	10/24/2018	90.88	-	-	39.5, 66.9, 91.2
CPT 185	10/24/2018	117.45	-	-	43.6, 74.6
CPT 186	10/23/2018	150.1	-	-	43.7, 74.9, 123.1
CPT 187	10/23/2018	96.62	-	-	-

Bibliography

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Mayne, P.W., “NHI (2002) Manual on Subsurface Investigations: Geotechnical Site Characterization”, available through www.ce.gatech.edu/~geosys/Faculty/Mayne/papers/index.html, Section 5.3, pp. 107-112.

Robertson, P.K., R.G. Campanella, D. Gillespie and A. Rice, “Seismic CPT to Measure In-Situ Shear Wave Velocity”, Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8, 1986 pp. 791-803.

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Campanella, R.G. and I. Weemees, “Development and Use of An Electrical Resistivity Cone for Groundwater Contamination Studies”, Canadian Geotechnical Journal, Vol. 27 No. 5, 1990 pp. 557-567.

DeGroot, D.J. and A.J. Lutenegger, “Reliability of Soil Gas Sampling and Characterization Techniques”, International Site Characterization Conference - Atlanta, 1998.

Woeller, D.J., P.K. Robertson, T.J. Boyd and Dave Thomas, “Detection of Polyaromatic Hydrocarbon Contaminants Using the UVIF-CPT”, 53rd Canadian Geotechnical Conference Montreal, QC October pp. 733-739, 2000.

Zemo, D.A., T.A. Delfino, J.D. Gallinatti, V.A. Baker and L.R. Hilpert, “Field Comparison of Analytical Results from Discrete-Depth Groundwater Samplers” BAT EnviroProbe and QED HydroPunch, Sixth national Outdoor Action Conference, Las Vegas, Nevada Proceedings, 1992, pp 299-312.

Copies of ASTM Standards are available through www.astm.org

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.

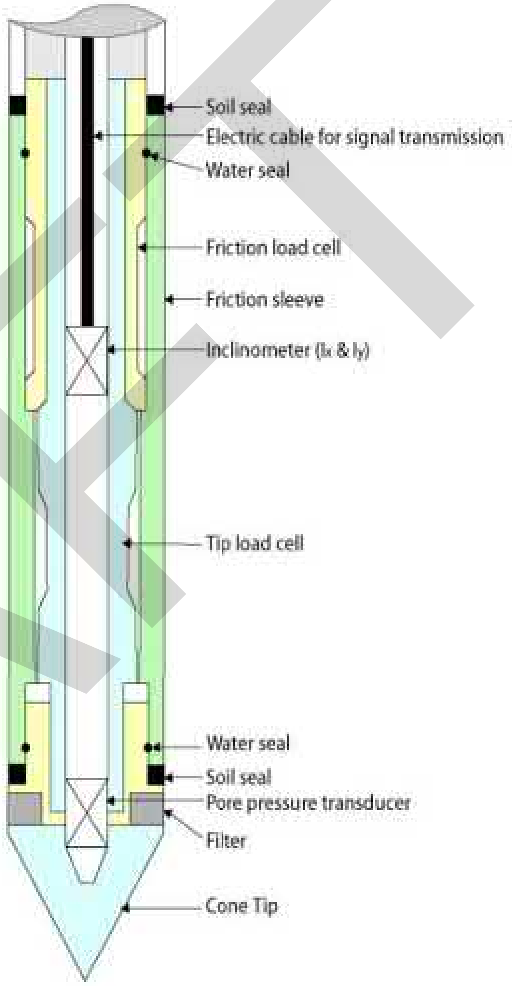


Figure CPT

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)

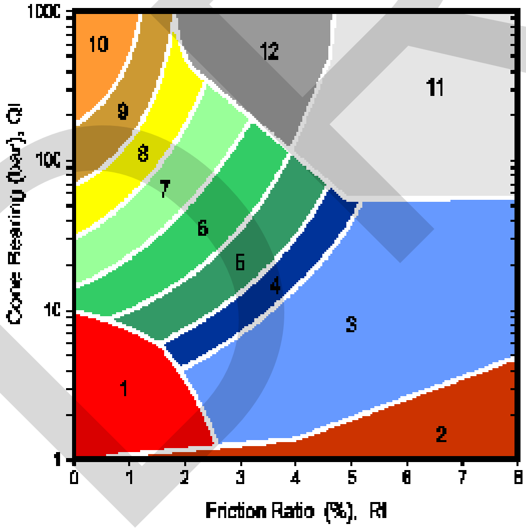
Note: The repeatability during field use will depend somewhat on ground conditions, abrasion, maintenance and zero load stability.

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) $q_t = q_c + u\,(1-a)$

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

SBT_n Zones	
1	sensitive fine grained
2	organic soil
3	clay
4	clay & silty clay

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

Pore Pressure Dissipation Tests (PPDT)

Pore Pressure Dissipation Tests (PPDT's) conducted at various intervals can be used to measure equilibrium water pressure (at the time of the CPT). If conditions are hydrostatic, the equilibrium water pressure can be used to determine the approximate depth of the ground water table. A PPDT is conducted when penetration is halted at specific intervals determined by the field representative. The variation of the penetration pore pressure (*u)* with time is measured behind the tip of the cone and recorded.

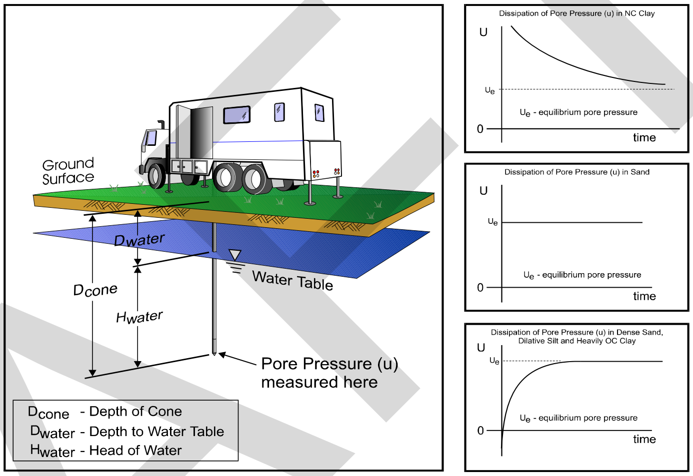
Pore pressure dissipation data can be interpreted to provide estimates of:

- Equilibrium piezometric pressure
- Phreatic Surface
- In situ horizontal coefficient of consolidation (c_h)
- In situ horizontal coefficient of permeability (k_h)

In order to correctly interpret the equilibrium piezometric pressure and/or the phreatic surface, the pore pressure must be monitored until it reaches equilibrium, *Figure PPDT*. This time is commonly referred to as t_{100}, the point at which 100% of the excess pore pressure has dissipated.

A complete reference on pore pressure dissipation tests is presented by Robertson et al. 1992 and Lunne et al. 1997.

A summary of the pore pressure dissipation tests are summarized in Table 1.



Water Table Calculation

$$D_{water} = D_{cone} - H_{water}$$

where $H_{water} = U_e$ (depth units)

Useful Conversion Factors:
1psi = 0.704m = 2.31 feet (water)
1tsf = 0.958 bar = 13.9 psi
1m = 3.28 feet

Figure PPDT

Seismic Cone Penetration Testing (SCPT)

Seismic Cone Penetration Testing (SCPT) can be conducted at various intervals during the Cone Penetration Test. Shear wave velocity (Vs) can then be calculated over a specified interval with depth. A small interval for seismic testing, such as 1-1.5m (3-5ft) allows for a detailed look at the shear wave profile with depth. Conversely, a larger interval such as 3-6m (10-20ft) allows for a more average shear wave velocity to be calculated. Gregg's cones have a horizontally active geophone located 0.2m (0.66ft) behind the tip.

To conduct the seismic shear wave test, the penetration of the cone is stopped and the rods are decoupled from the rig. An automatic hammer is triggered to send a shear wave into the soil. The distance from the source to the cone is calculated knowing the total depth of the cone and the horizontal offset distance between the source and the cone. To calculate an interval velocity, a minimum of two tests must be performed at two different depths. The arrival times between the two wave traces are compared to obtain the difference in time (Δt). The difference in depth is calculated (Δd) and velocity can be determined using the simple equation: $v = \Delta d/\Delta t$

Multiple wave traces can be recorded at the same depth to improve quality of the data.

A complete reference on seismic cone penetration tests is presented by Robertson et al. 1986 and Lunne et al. 1997.

A summary the shear wave velocities, arrival times and wave traces are provided with the report.

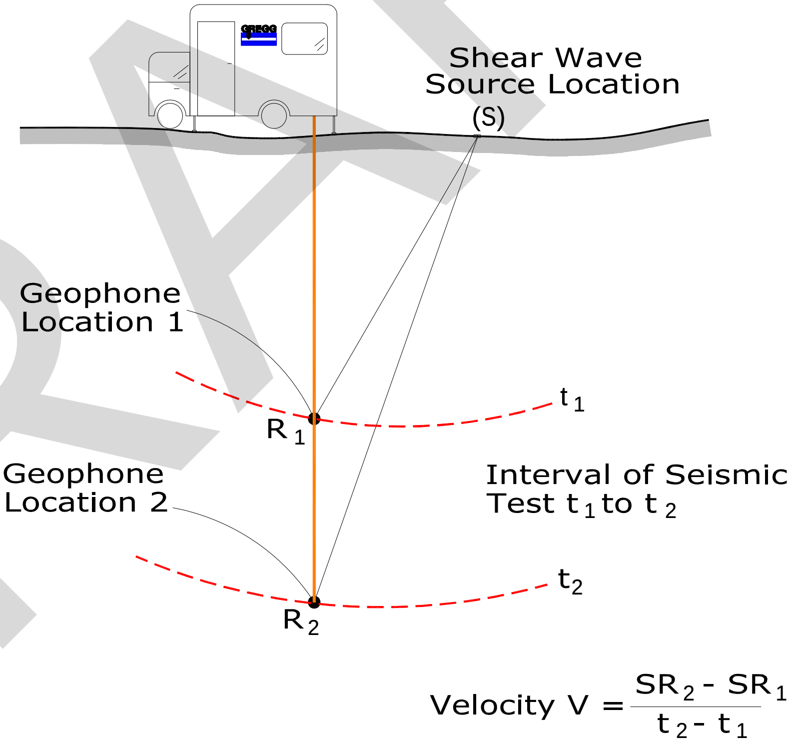


Figure SCPT

Groundwater Sampling

Gregg Drilling & Testing, Inc. conducts groundwater sampling using a sampler as shown in *Figure GWS*. The groundwater sampler has a retrievable stainless steel or disposable PVC screen with steel drop off tip. This allows for samples to be taken at multiple depth intervals within the same sounding location. In areas of slower water recharge, provisions may be made to set temporary PVC well screens during sampling to allow the pushing equipment to advance to the next sample location while the groundwater is allowed to infiltrate.

The groundwater sampler operates by advancing 44.5mm (1¾ inch) hollow push rods with the filter tip in a closed configuration to the base of the desired sampling interval. Once at the desired sample depth, the push rods are retracted; exposing the encased filter screen and allowing groundwater to infiltrate hydrostatically from the formation into the inlet screen. A small diameter bailer (approximately ½ or ¾ inch) is lowered through the push rods into the screen section for sample collection. The number of downhole trips with the bailer and time necessary to complete the sample collection at each depth interval is a function of sampling protocols, volume requirements, and the yield characteristics and storage capacity of the formation. Upon completion of sample collection, the push rods and sampler, with the exception of the PVC screen and steel drop off tip are retrieved to the ground surface, decontaminated and prepared for the next sampling event.

For a detailed reference on direct push groundwater sampling, refer to Zemo et. al., 1992.

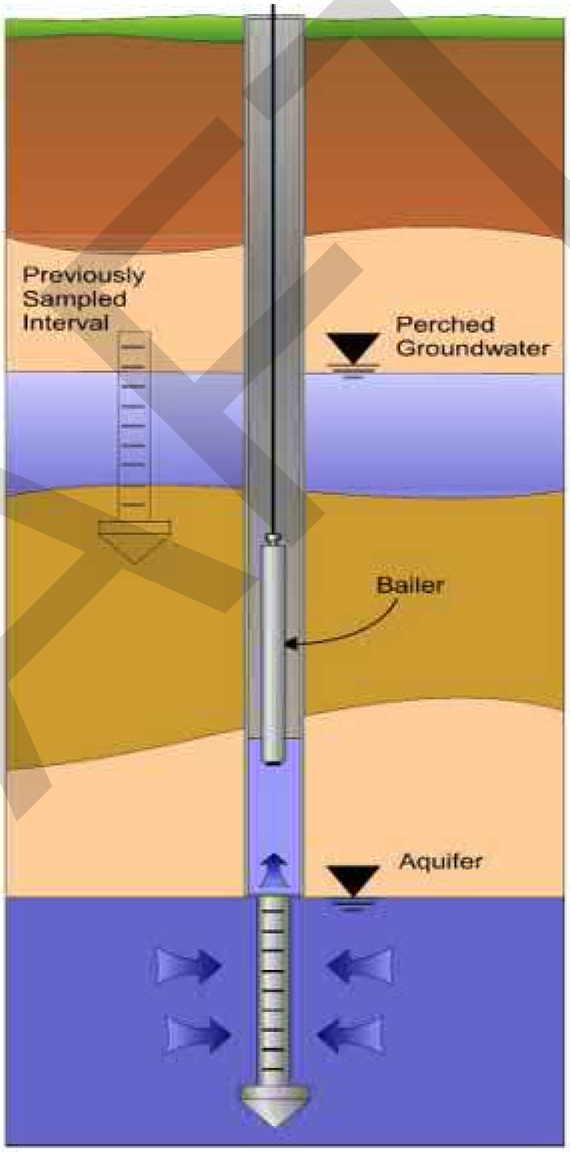


Figure GWS

Soil Sampling

Gregg Drilling & Testing, Inc. uses a piston-type push-in sampler to obtain small soil samples without generating any soil cuttings, *Figure SS*. Two different types of samplers (12 and 18 inch) are used depending on the soil type and density. The soil sampler is initially pushed in a "closed" position to the desired sampling interval using the CPT pushing equipment. Keeping the sampler closed minimizes the potential of cross contamination. The inner tip of the sampler is then retracted leaving a hollow soil sampler with inner 1¼" diameter sample tubes. The hollow sampler is then pushed in a locked "open" position to collect a soil sample. The filled sampler and push rods are then retrieved to the ground surface. Because the soil enters the sampler at a constant rate, the opportunity for 100% recovery is increased. For environmental analysis, the soil sample tube ends are sealed with Teflon and plastic caps. Often, a longer "split tube" can be used for geotechnical sampling.

For a detailed reference on direct push soil sampling, refer to Robertson et al, 1998.

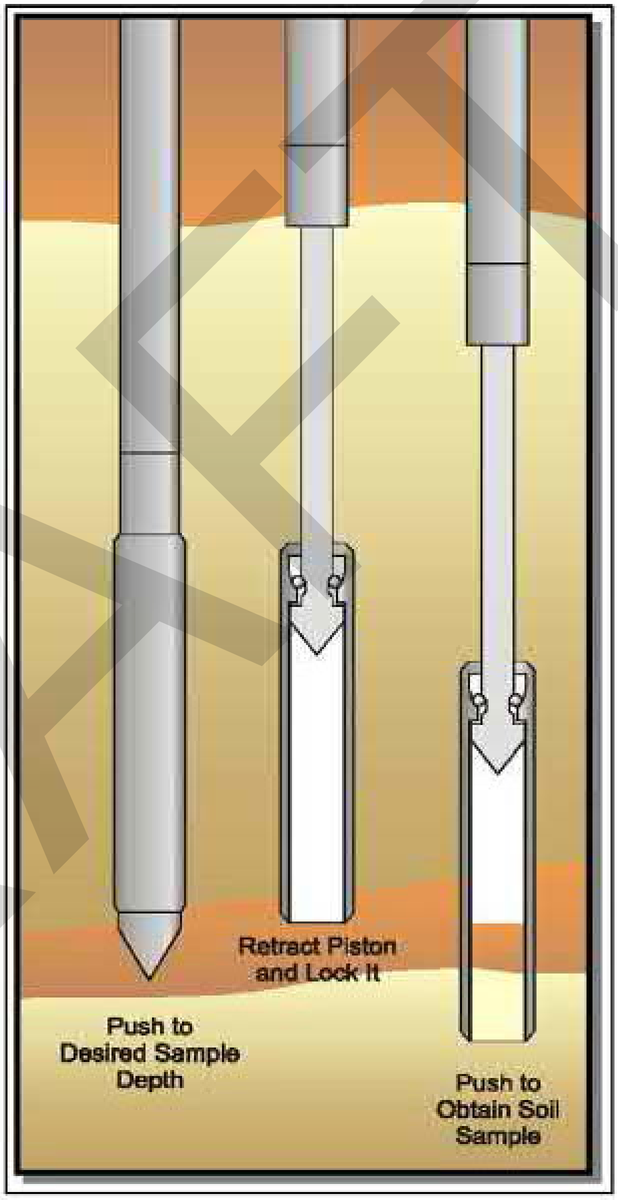


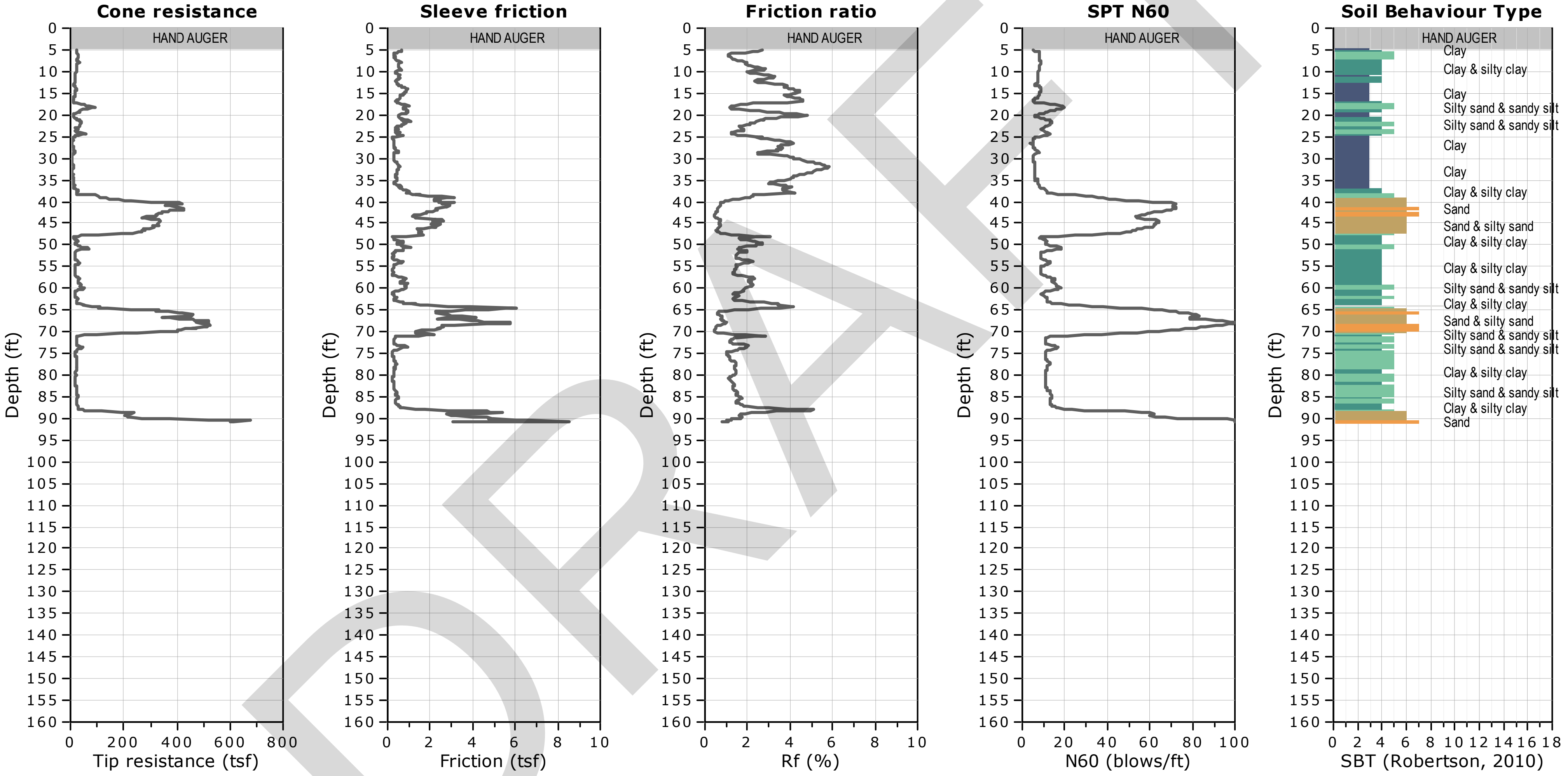
Figure SS

GREGG DRILLING, INC.
www.greggdrilling.com

CPT: CPT 184

CLIENT: PARIKH
SITE: BART TO SILICON VALLEY

Field Rep: I. BHANGOO
Total depth: 90.88 ft, Date: 10/24/2018



SBTn legend

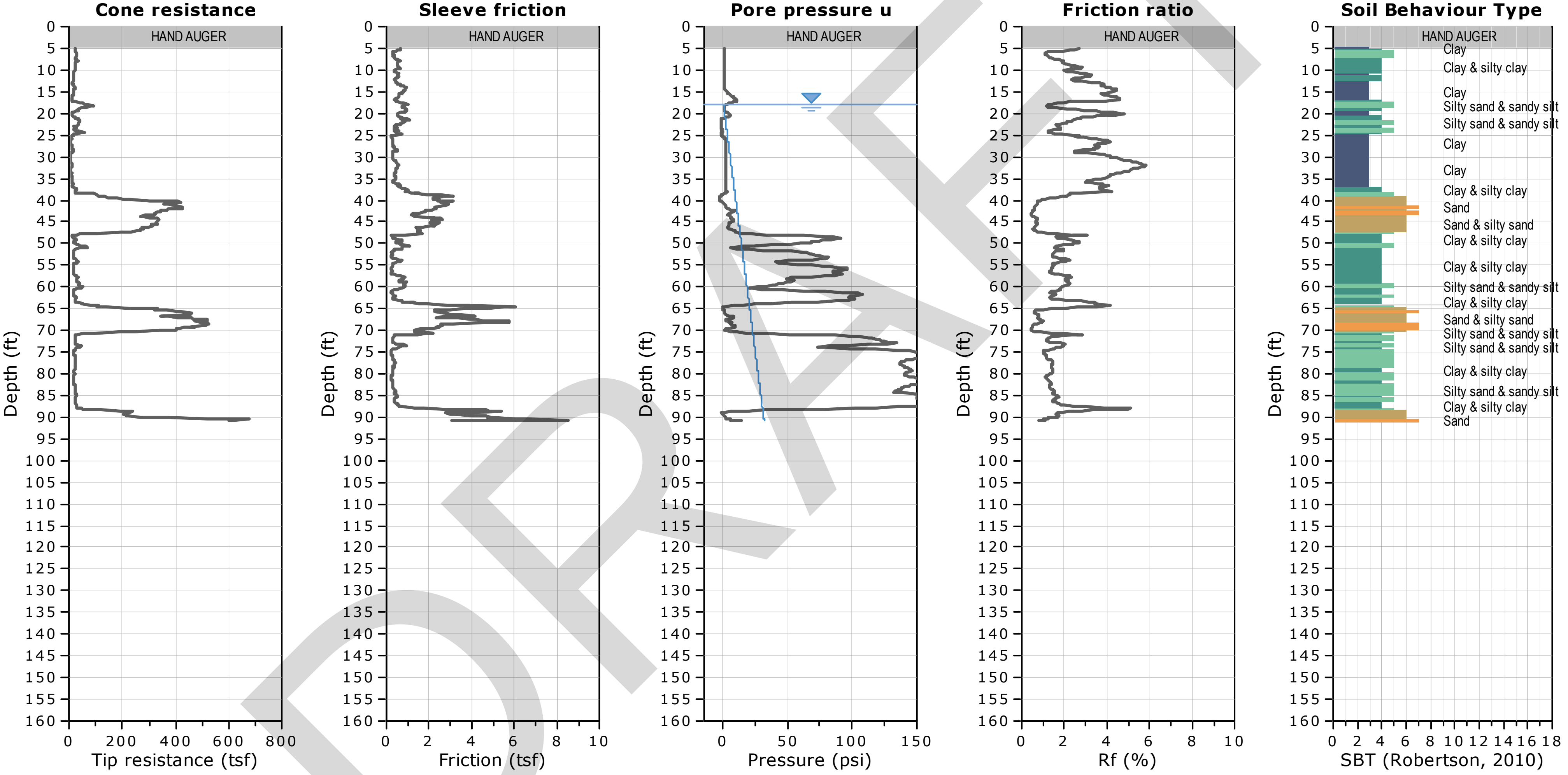
🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

GREGG DRILLING, INC.
www.greggdrilling.com

CPT: CPT 184

CLIENT: PARIKH
SITE: BART TO SILICON VALLEY

Field Rep: I. BHANGOO
Total depth: 90.88 ft, Date: 10/24/2018



SBTn legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty clay	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	▨ 8. Very stiff sand to clayey sand
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	☐ 9. Very stiff fine grained

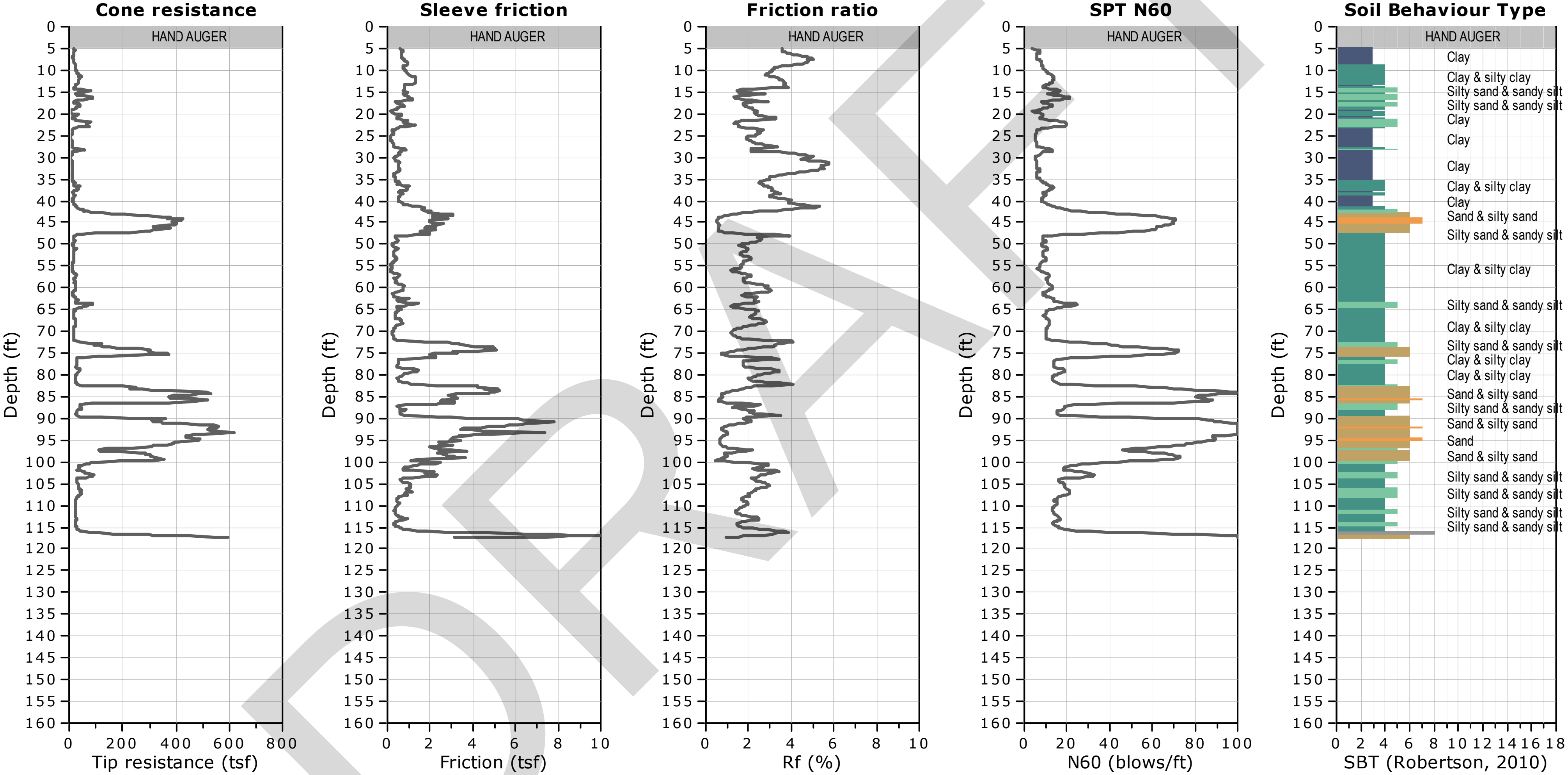
WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, INC.
www.greggdrilling.com

CPT: CPT 185

CLIENT: PARIKH
SITE: BART TO SILICON VALLEY

Field Rep: I. BHANGOO
Total depth: 117.45 ft, Date: 10/24/2018



SBTn legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty clay	🟧 7. Gravely sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬛ 8. Very stiff sand to clayey sand
🟦 3. Clay to silty clay	🟫 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

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www.greggdrilling.com

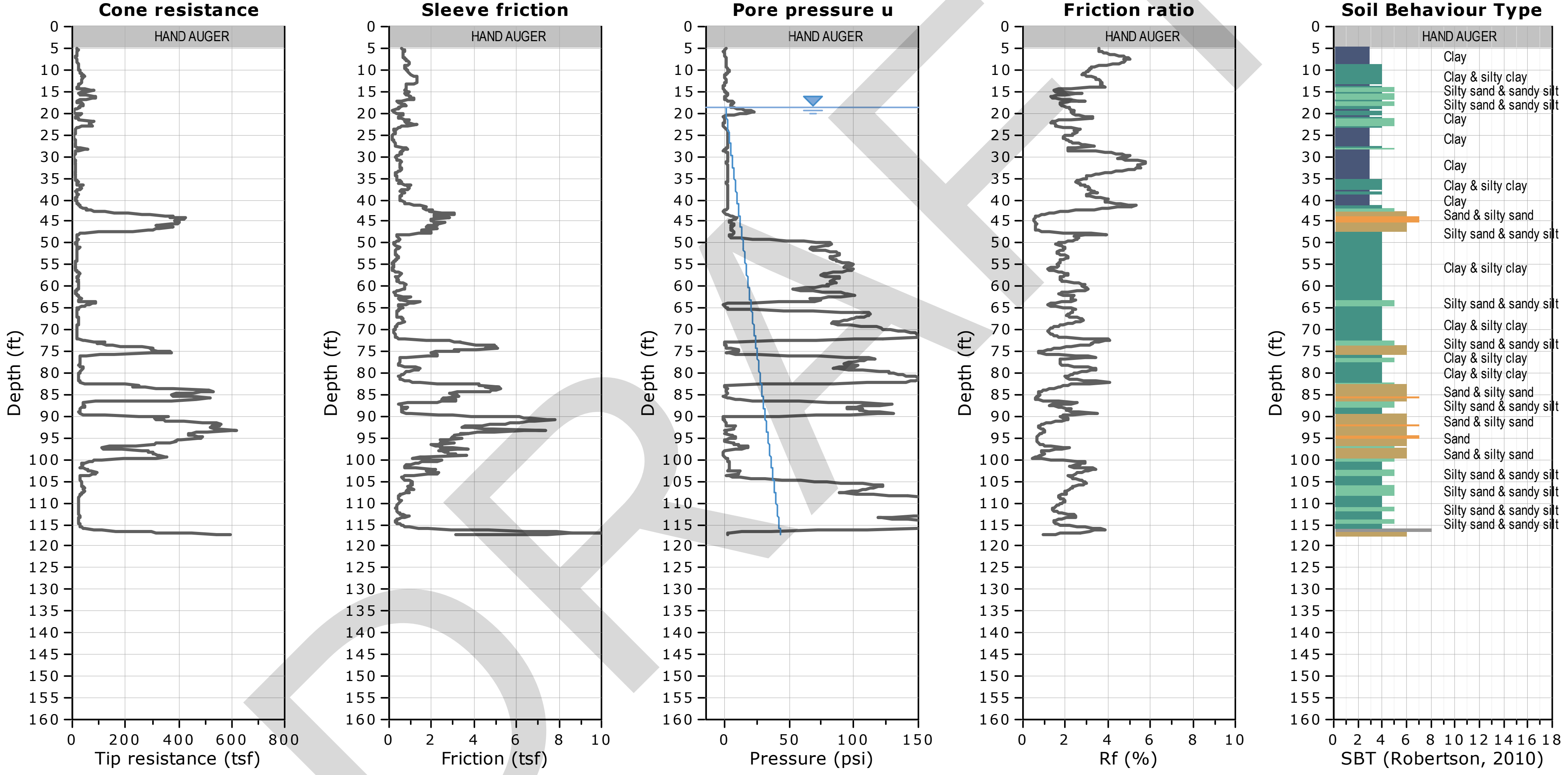
CPT: CPT 185

CLIENT: **PARIKH**

SITE: **BART TO SILICON VALLEY**

Field Rep: I. BHANGOO

Total depth: 117.45 ft, Date: 10/24/2018



SBTn legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟨 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬜ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

GREGG DRILLING, INC.
www.greggdrilling.com

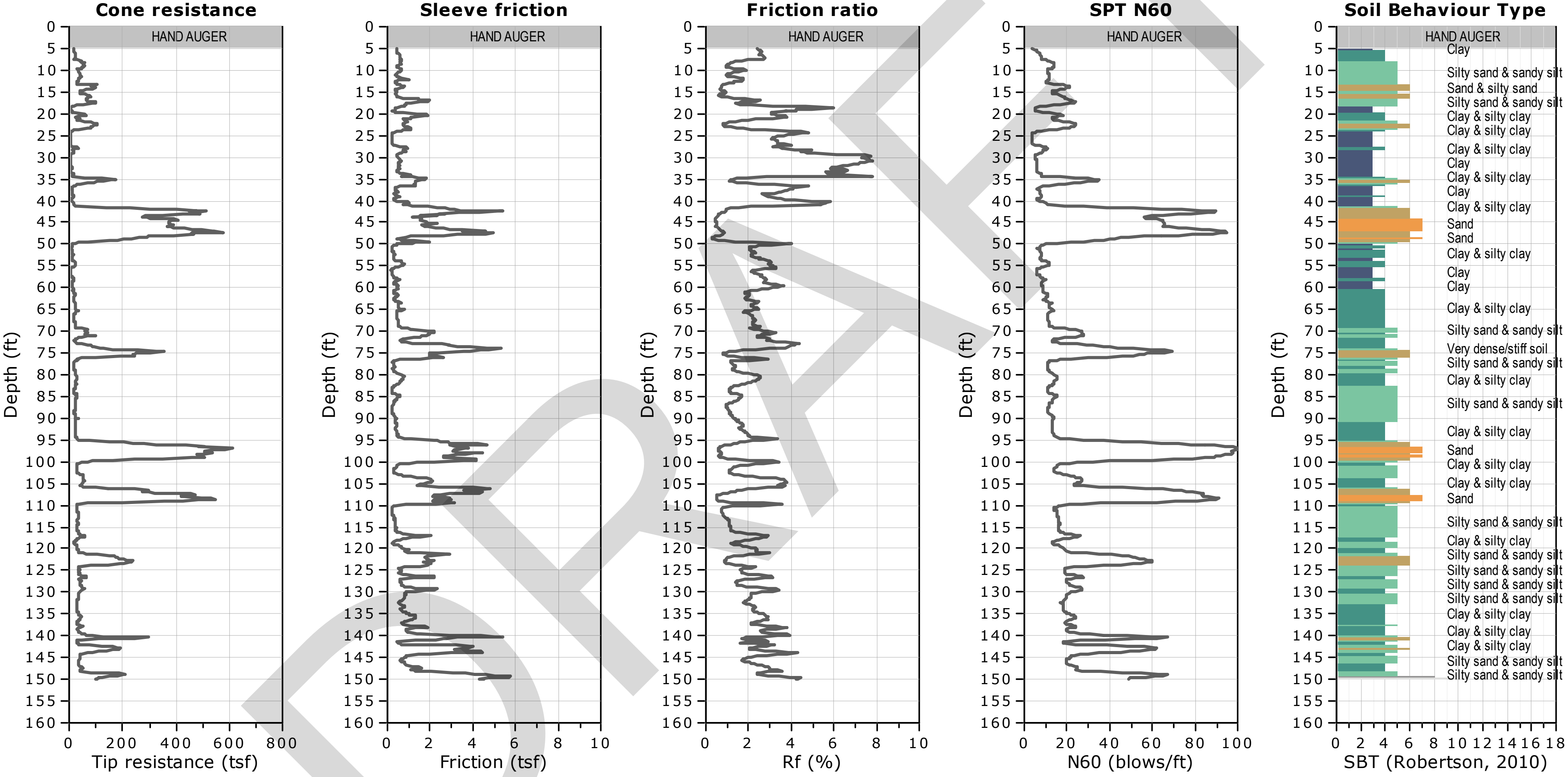
CPT: CPT 186

CLIENT: PARIKH

SITE: BART TO SILICON VALLEY

Field Rep: I. BHANGOO

Total depth: 150.10 ft, Date: 10/23/2018



SBTn legend

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

GREGG DRILLING, INC.
www.greggdrilling.com

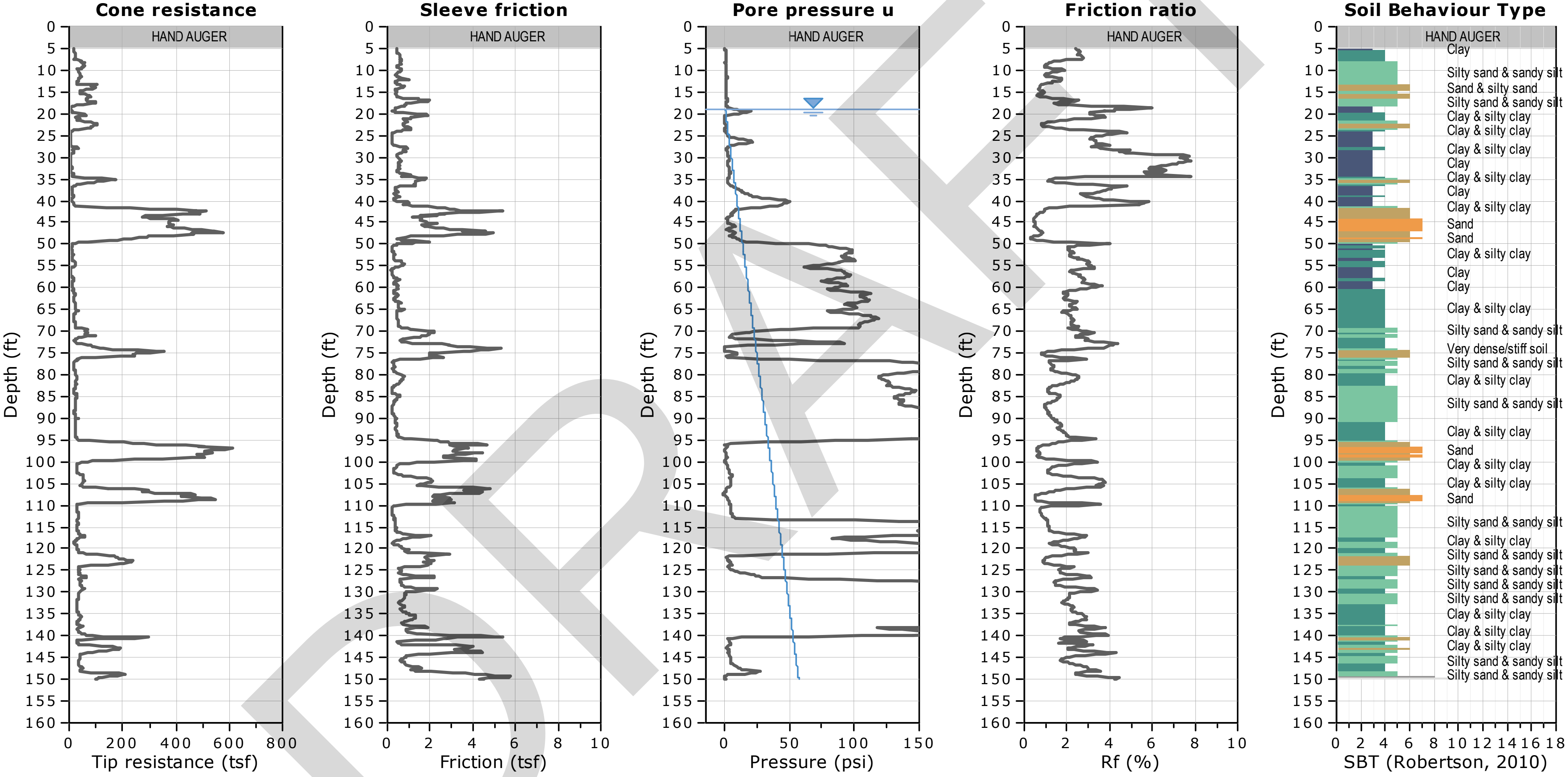
CPT: CPT 186

CLIENT: PARIKH

SITE: BART TO SILICON VALLEY

Field Rep: I. BHANGOO

Total depth: 150.10 ft, Date: 10/23/2018



SBTn legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravely sand to sand
- ⬜ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

WATER TABLE FOR ESTIMATING PURPOSES ONLY

CPeT-IT v.18.0.2.4 - CPTU data presentation & interpretation software - Report created on: 10/25/2018, 10:42:19 AM
Project file: C:\CDP\180185MA\Report\180185.cpt

GREGG DRILLING, INC.
www.greggdrilling.com

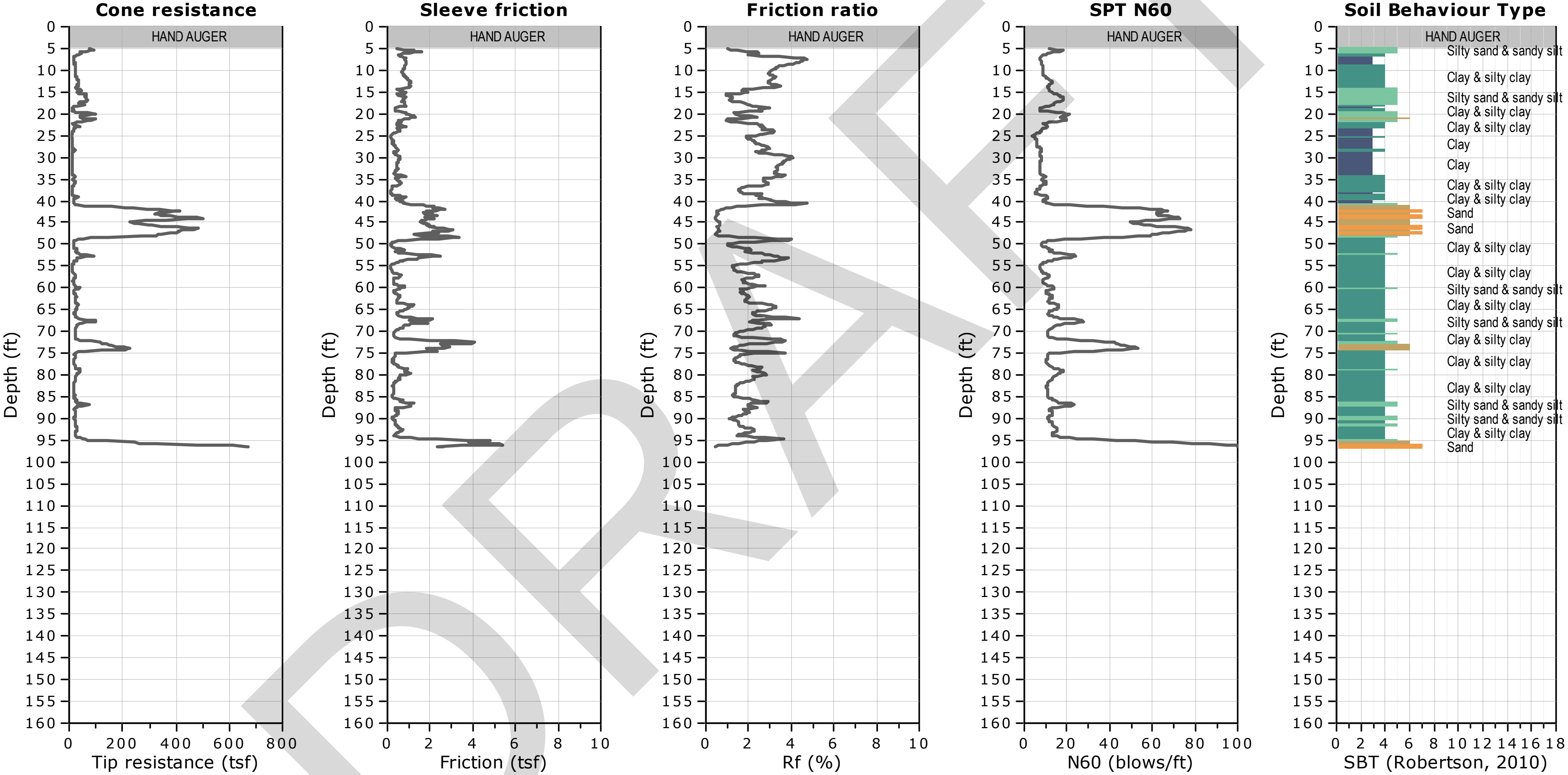
CPT: CPT 187

CLIENT: **PARIKH**

SITE: **BART TO SILICON VALLEY**

Field Rep: I. BHANGOO

Total depth: 96.62 ft, Date: 10/23/2018



SBTn legend

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

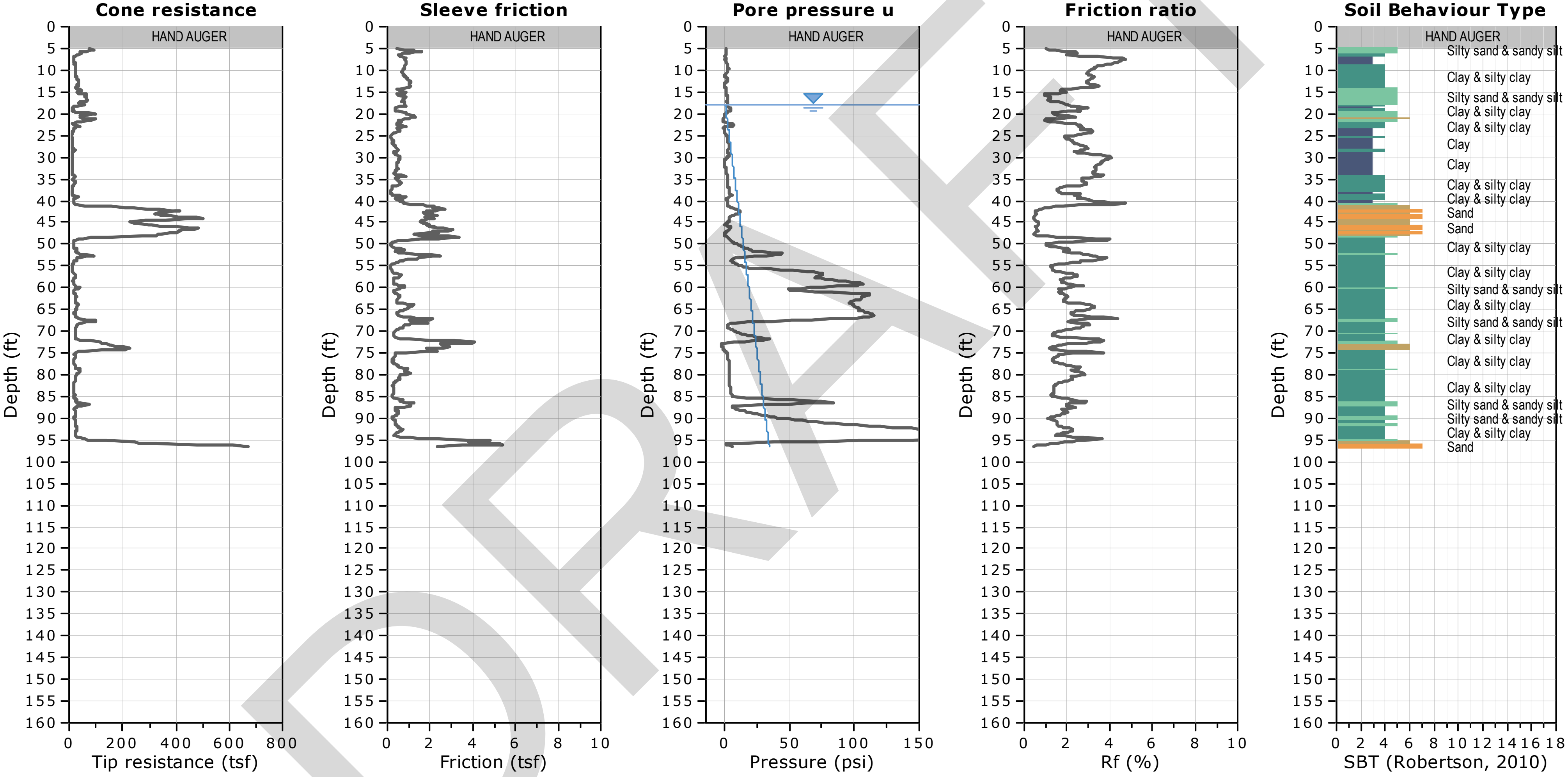
CPT: CPT 187

CLIENT: PARIKH

SITE: BART TO SILICON VALLEY

Field Rep: I. BHANGOO

Total depth: 96.62 ft, Date: 10/23/2018



SBTn legend

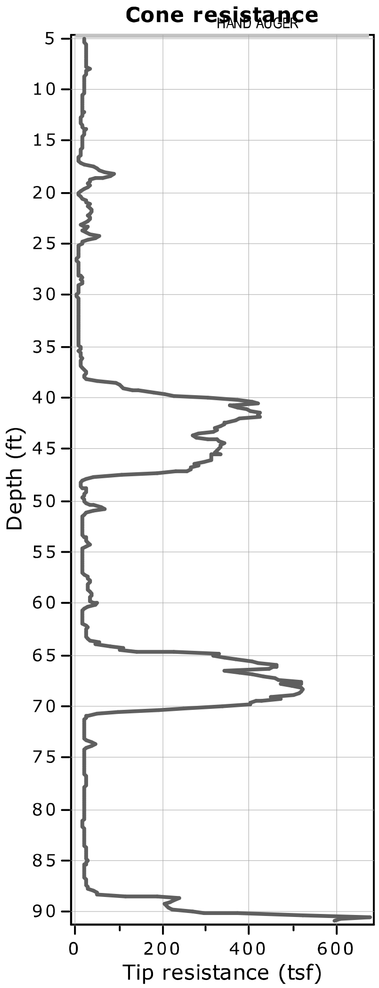
🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravely sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

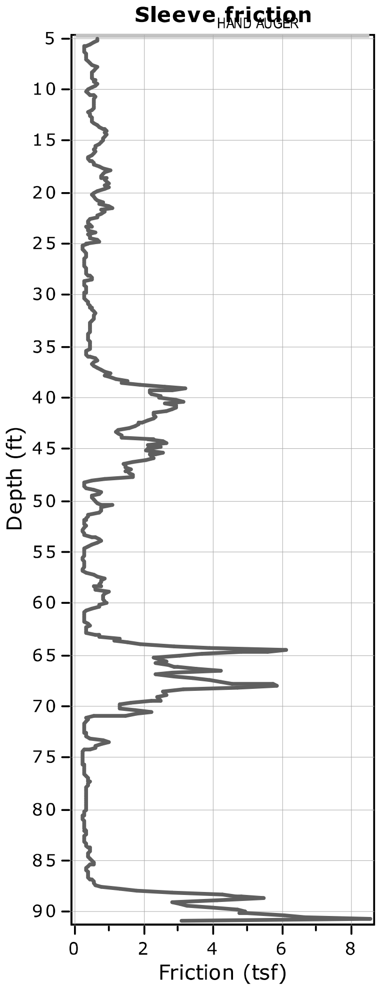
WATER TABLE FOR ESTIMATING PURPOSES ONLY

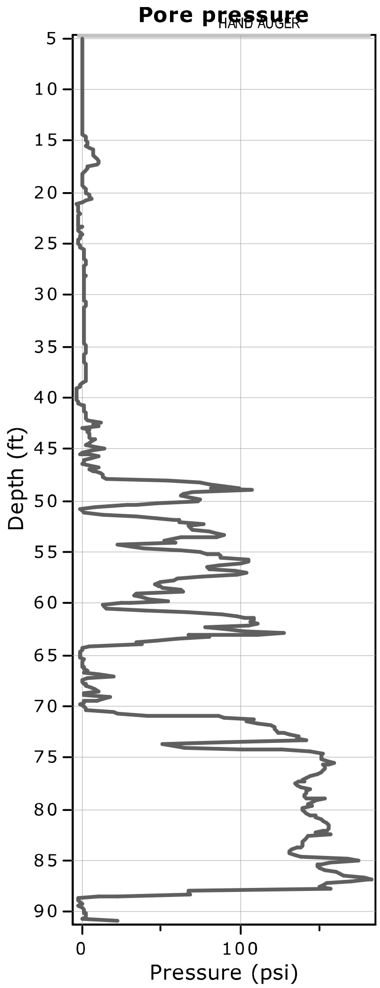
CPT: CPT-184

Project: **VTA's BART Phase II**
Location: **San Jose**

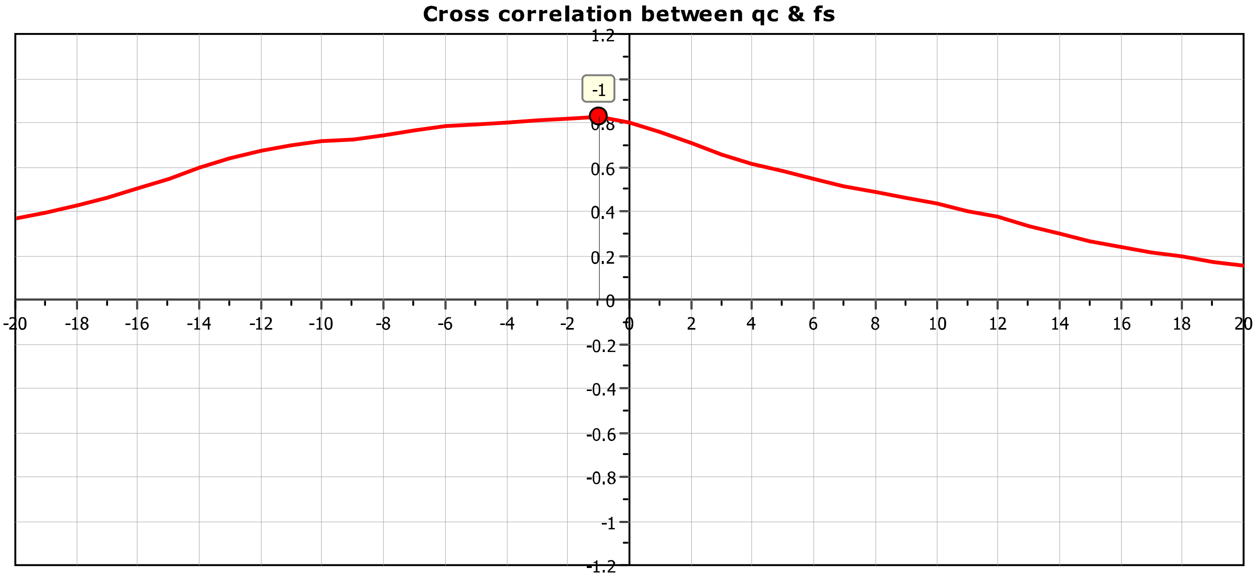
Total depth: 90.88 ft
Surface Elevation: 85.10 ft


Cone resistance

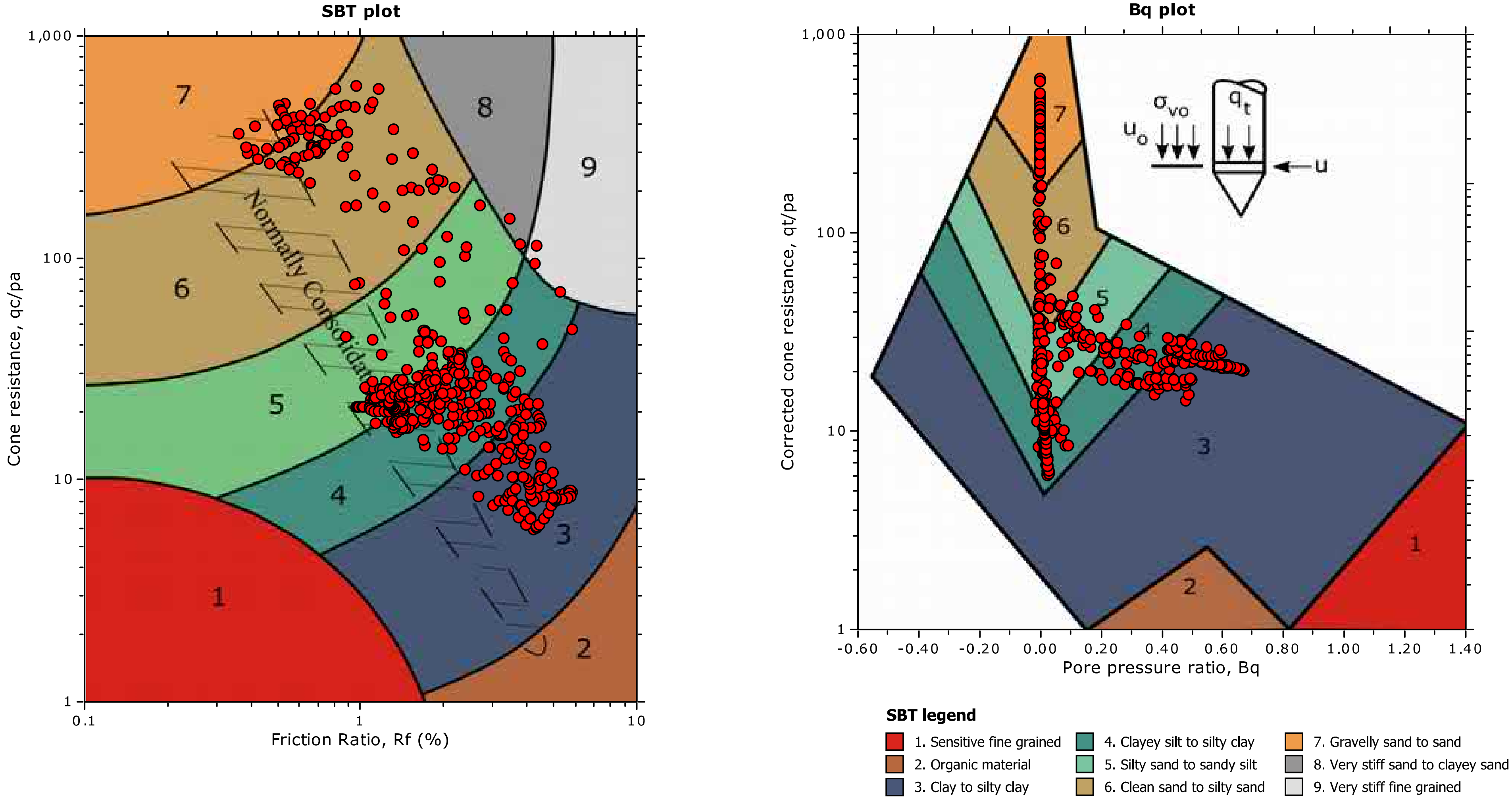

Sleeve friction


Pore pressure

The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).


Cross correlation between qc & fs

SBT - Bq plots

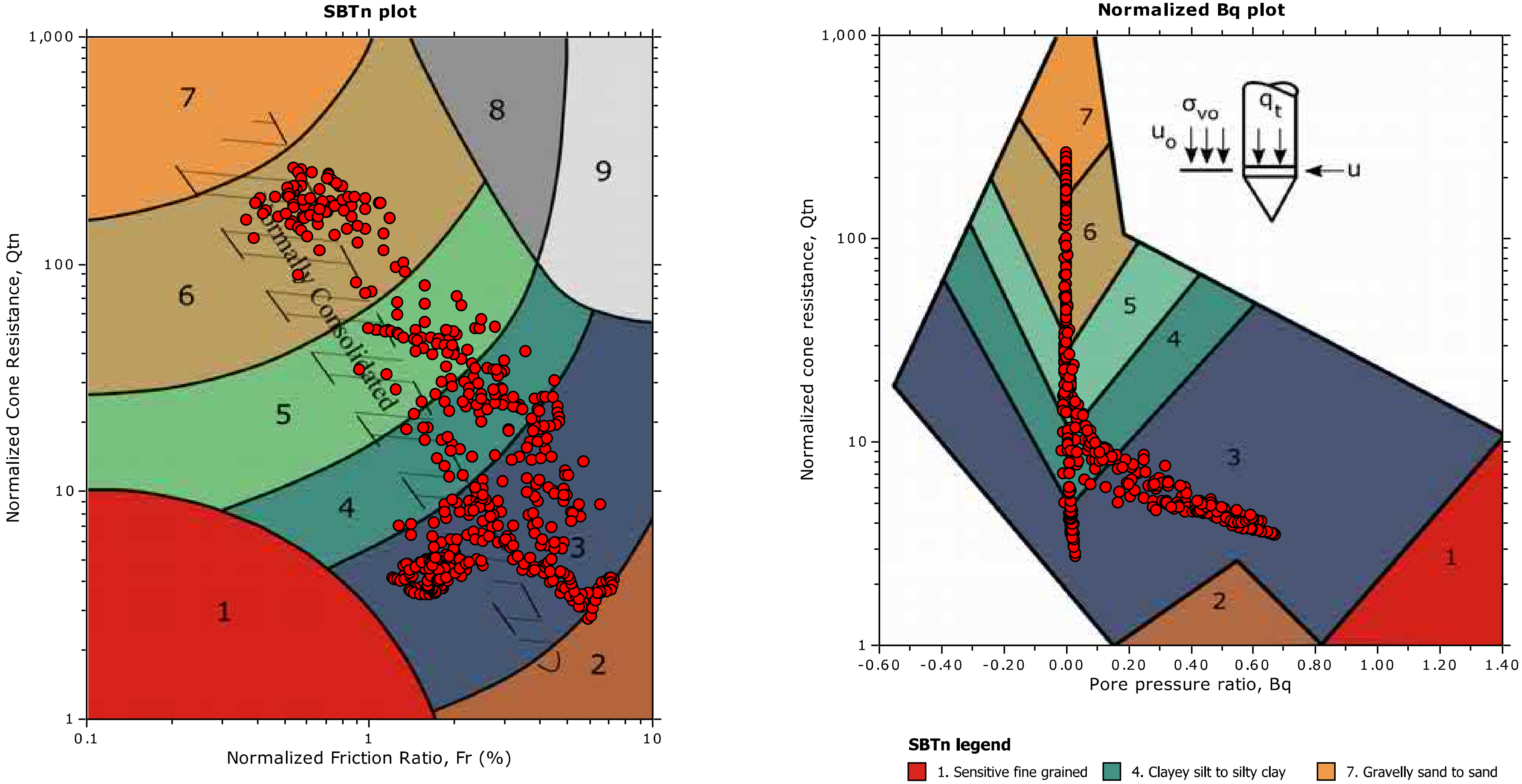

SBT plot
Cone resistance, qc/pa
1,000
100
10
1
0.1
1
10
Friction Ratio, Rf (%)
7
6
5
4
3
2
1
8
9
Normally Consolidated
Bq plot
Corrected cone resistance, qt/pa
1,000
100
10
1
-0.60
-0.40
-0.20
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Pore pressure ratio, Bq
σvo
uo
qt
u
SBT legend
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravelly sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

MMW

Project: **VTA's BART Phase II**
Location: **San Jose**

CPT: CPT-184
Total depth: 90.88 ft
Surface Elevation: 85.10 ft

SBT - Bq plots (normalized)



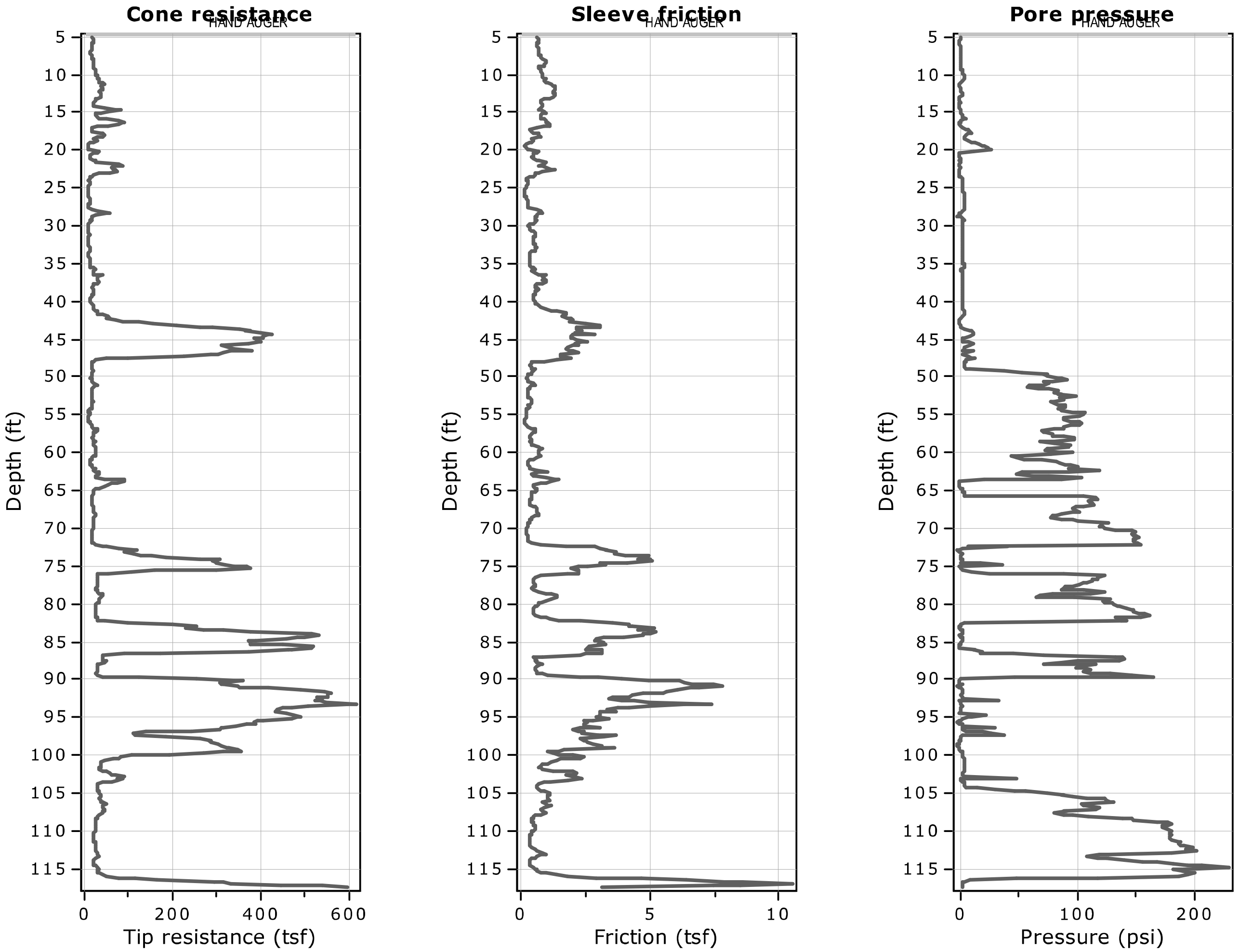
SBTn legend

🟥 1. Sensitive fine grained
🟫 2. Organic material
🟦 3. Clay to silty clay
🟩 4. Clayey silt to silty clay
🟩 5. Silty sand to sandy silt
🟫 6. Clean sand to silty sand
🟧 7. Gravelly sand to sand
⬛ 8. Very stiff sand to clayey sand
⬜ 9. Very stiff fine grained

CPT: CPT-185

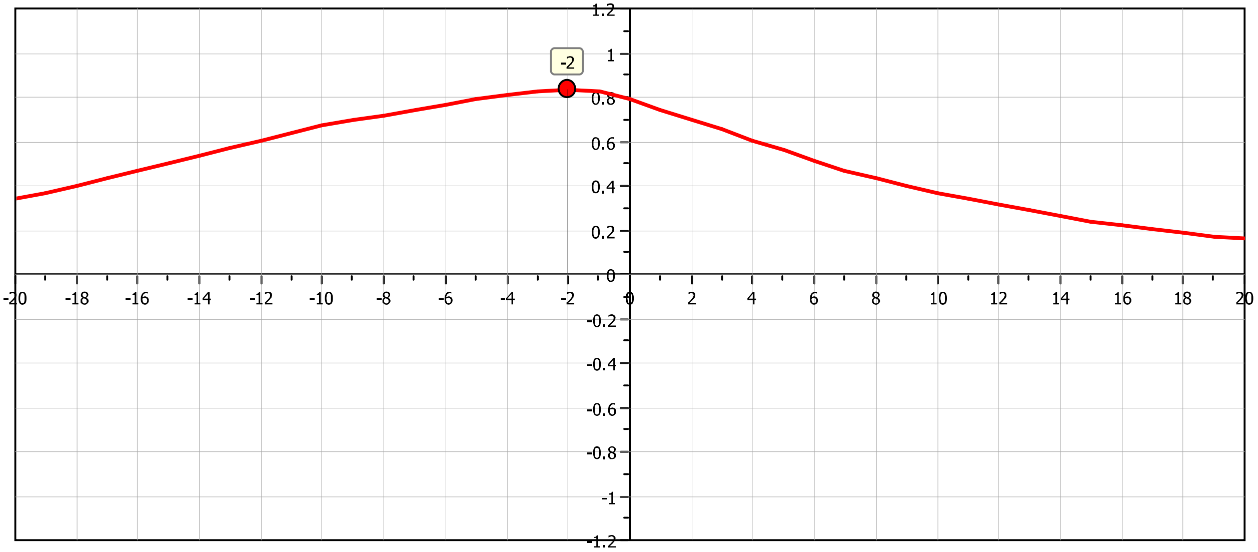
Project: **VTA's BART Phase II**
Location: **San Jose**

Total depth: 117.45 ft
Surface Elevation: 86.40 ft

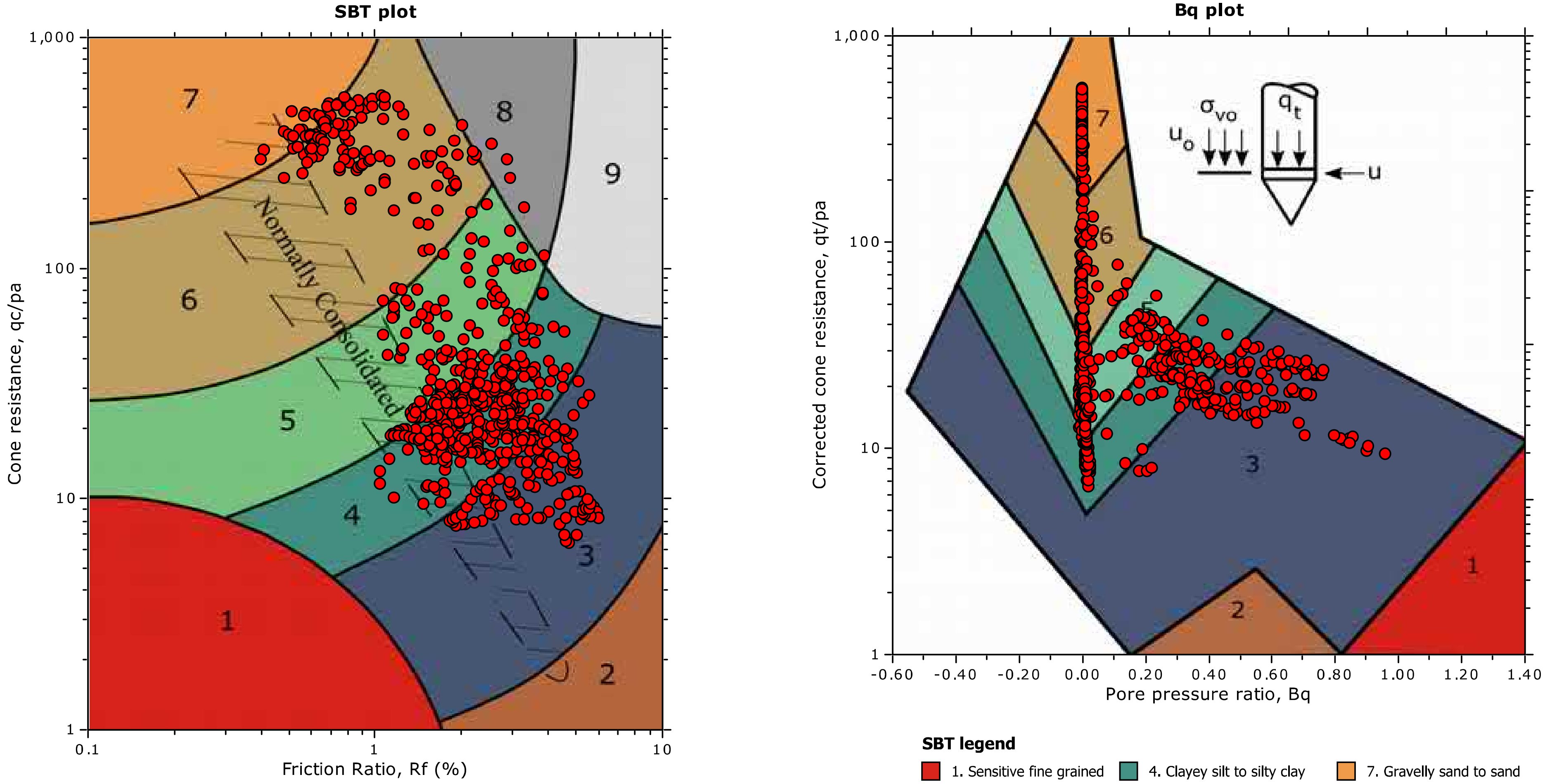


The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

Cross correlation between qc & fs



SBT - Bq plots

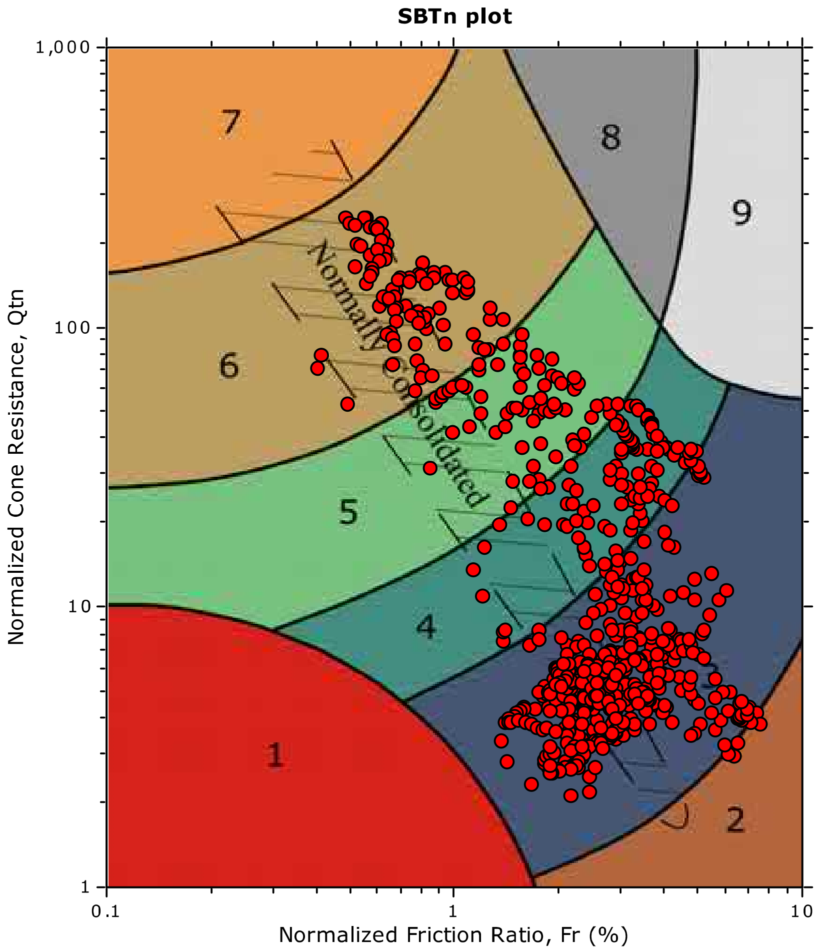

SBT plot

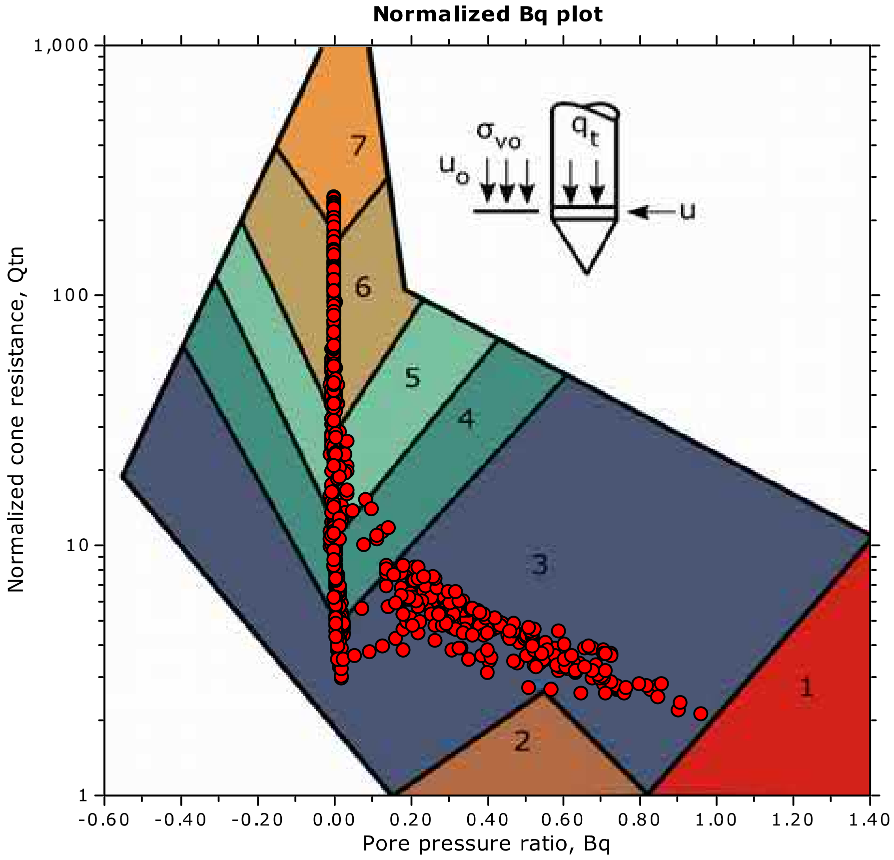
Bq plot

SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravelly sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

SBT - Bq plots (normalized)





SBTn legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟨 6. Clean sand to silty sand
- 🟧 7. Gravelly sand to sand
- ⬛ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

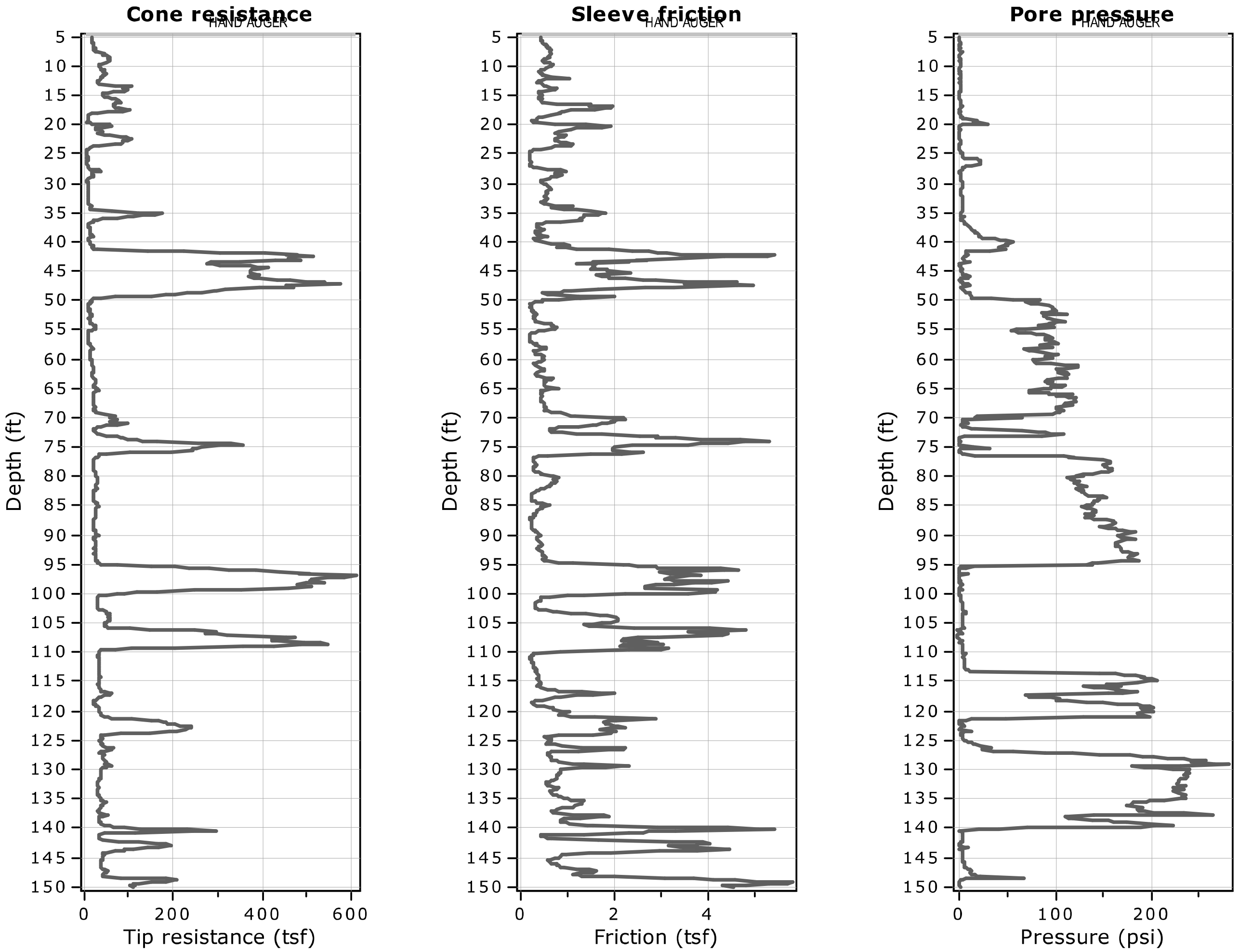
CPT: CPT-186

Project: **VTA's BART Phase II**

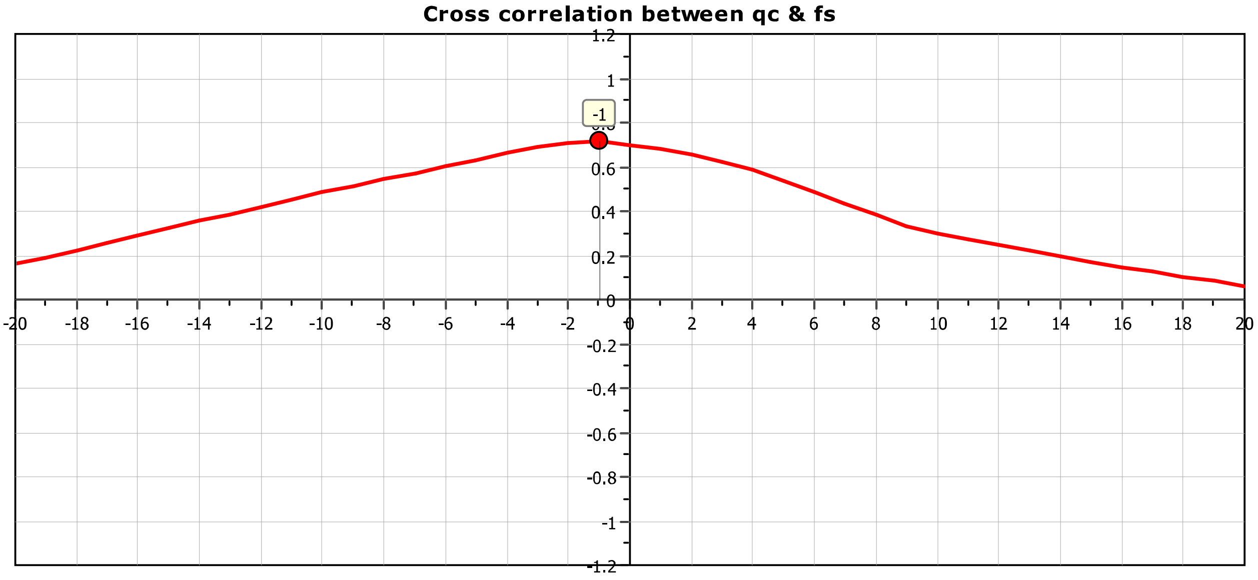
Location: **San Jose**

Total depth: 150.10 ft

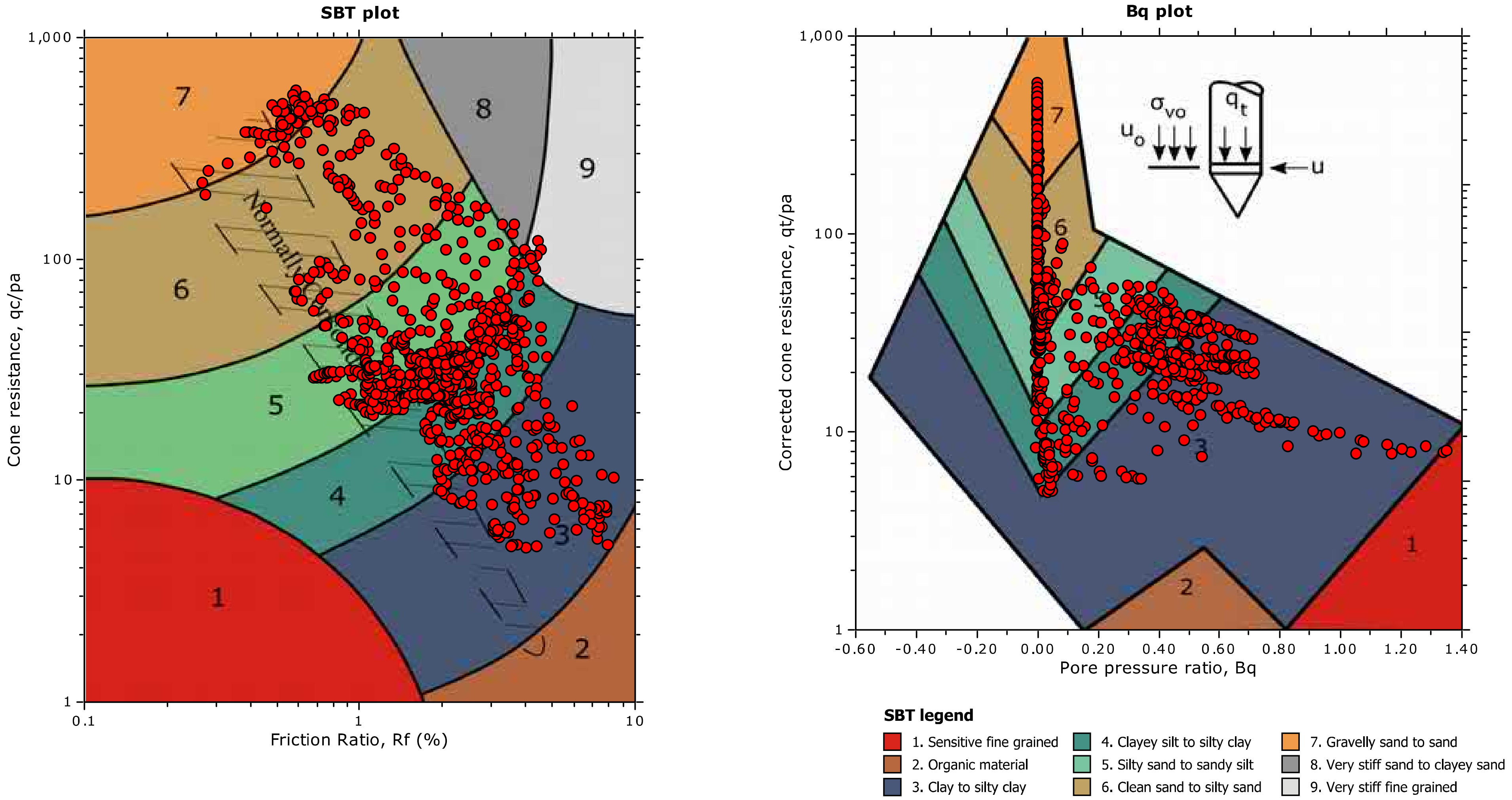
Surface Elevation: 87.10 ft



The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).

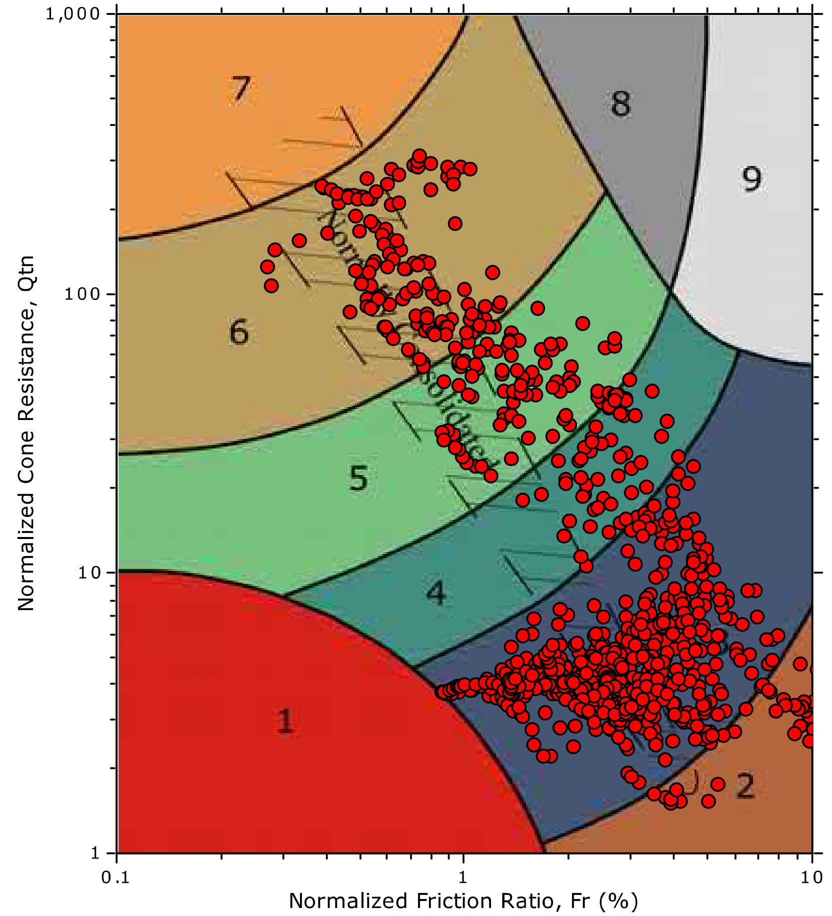


SBT - Bq plots

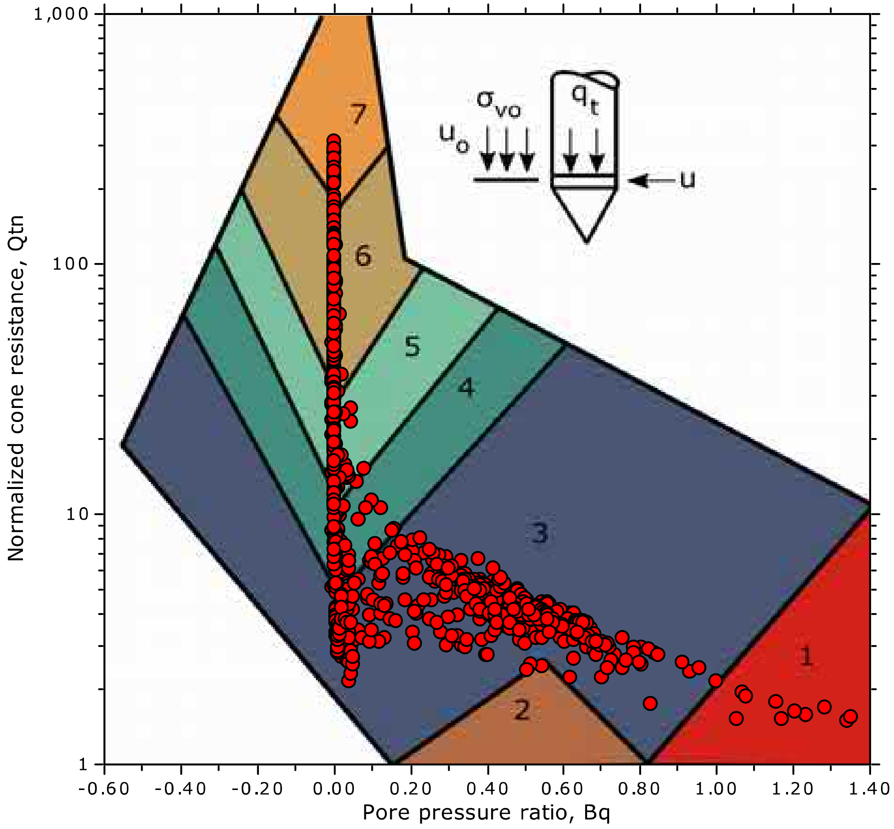

SBT plot
Cone resistance, qc/pa
1,000
100
10
1
0.1
1
10
Friction Ratio, Rf (%)
1
2
3
4
5
6
7
8
9
Normally consolidated
Bq plot
Corrected cone resistance, qt/pa
1,000
100
10
1
-0.60
-0.40
-0.20
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
Pore pressure ratio, Bq
σvo
qt
uo
u
1
2
3
6
7
SBT legend
1. Sensitive fine grained
2. Organic material
3. Clay to silty clay
4. Clayey silt to silty clay
5. Silty sand to sandy silt
6. Clean sand to silty sand
7. Gravelly sand to sand
8. Very stiff sand to clayey sand
9. Very stiff fine grained

SBT - Bq plots (normalized)

SBTn plot



Normalized Bq plot



SBTn legend

🟥 1. Sensitive fine grained	🟩 4. Clayey silt to silty clay	🟧 7. Gravelly sand to sand
🟫 2. Organic material	🟩 5. Silty sand to sandy silt	⬜ 8. Very stiff sand to clayey sand
🟦 3. Clay to silty clay	🟨 6. Clean sand to silty sand	⬜ 9. Very stiff fine grained

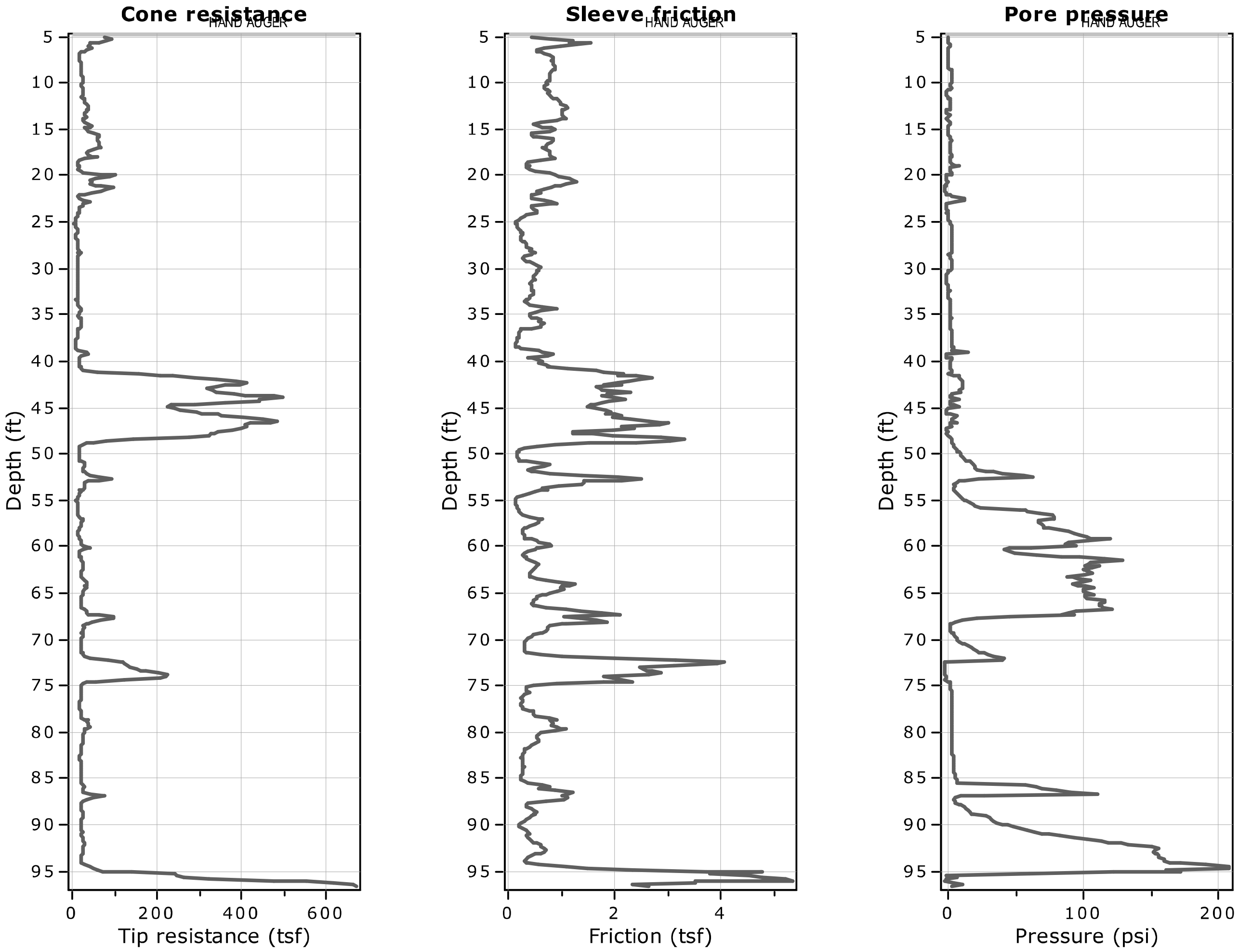
CPT: CPT-187

Project: **VTA's BART Phase II**

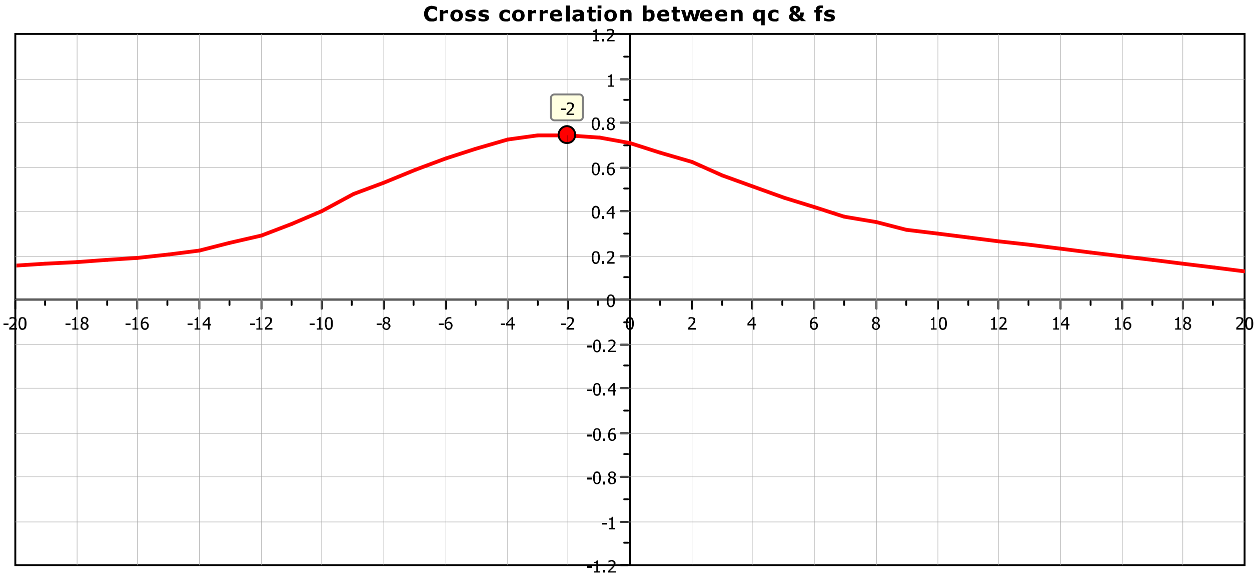
Location: **San Jose**

Total depth: 96.62 ft

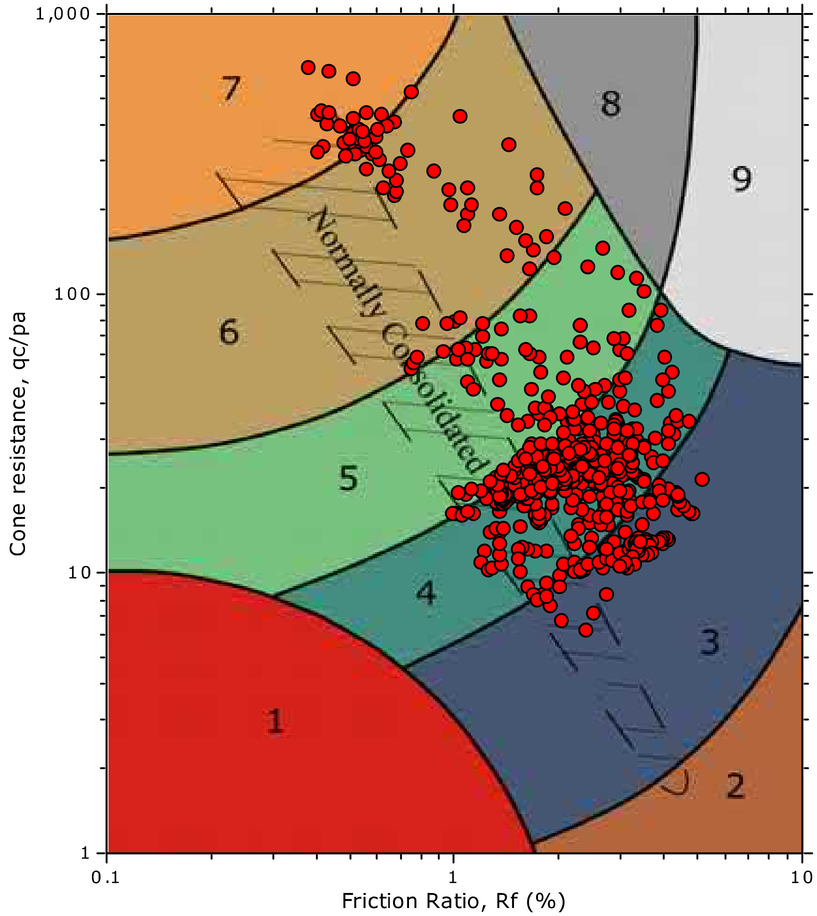
Surface Elevation: 87.50 ft



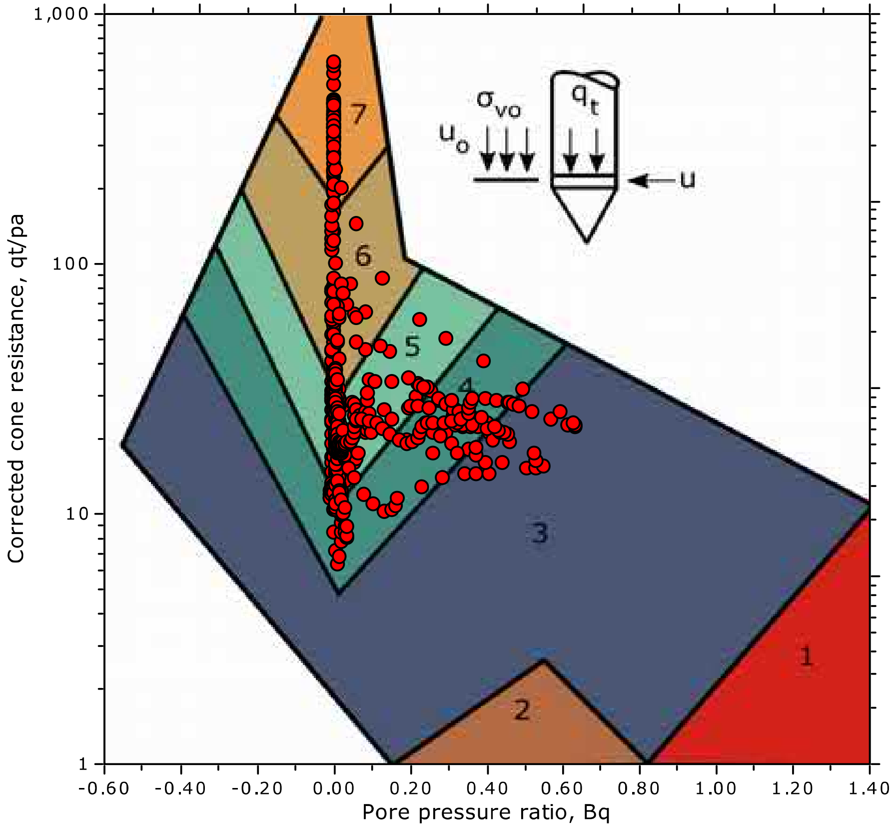
The plot below presents the cross correlation coeficient between the raw qc and fs values (as measured on the field). X axes presents the lag distance (one lag is the distance between two sucessive CPT measurements).



SBT - Bq plots



SBT plot

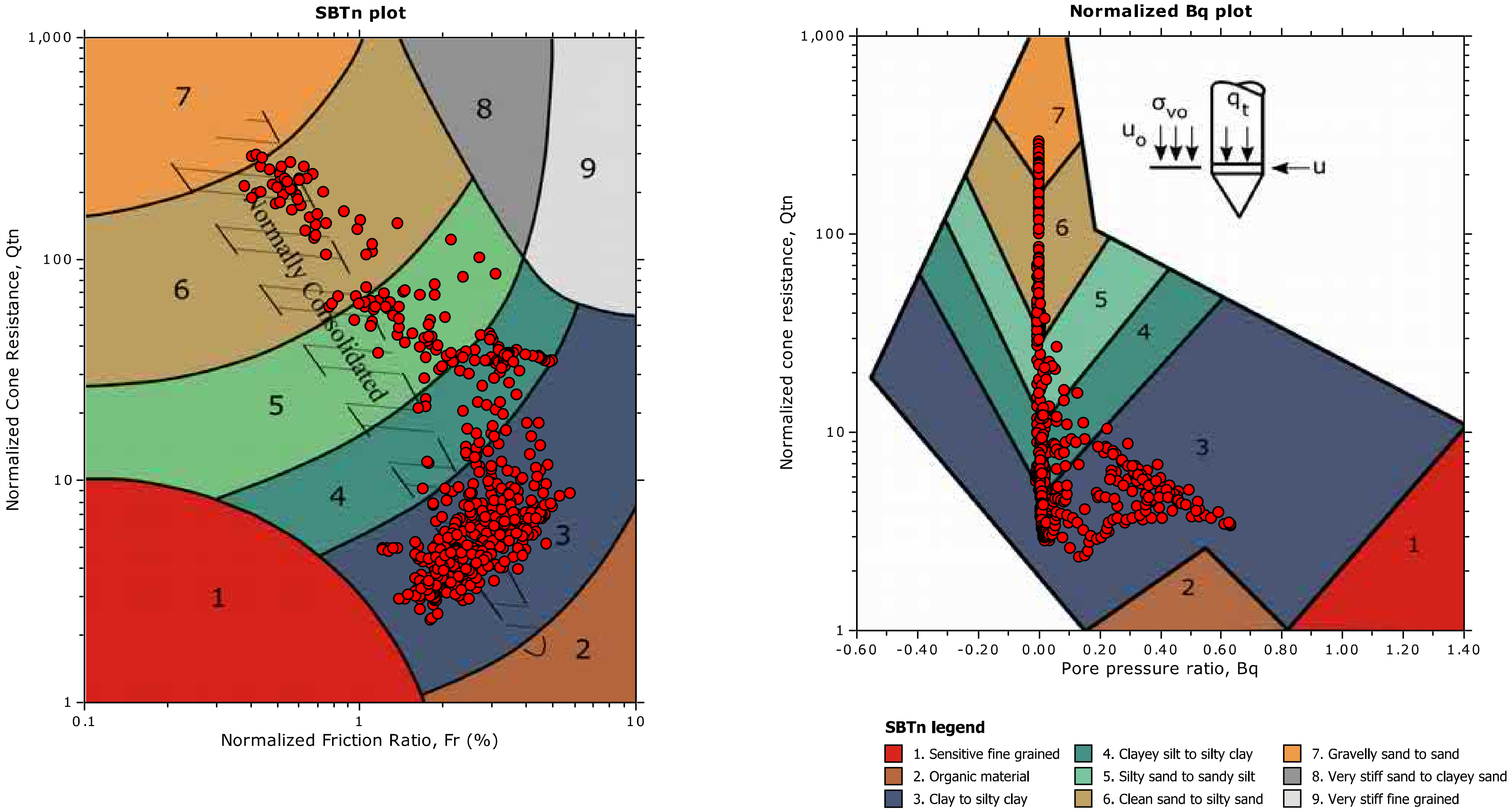


Bq plot

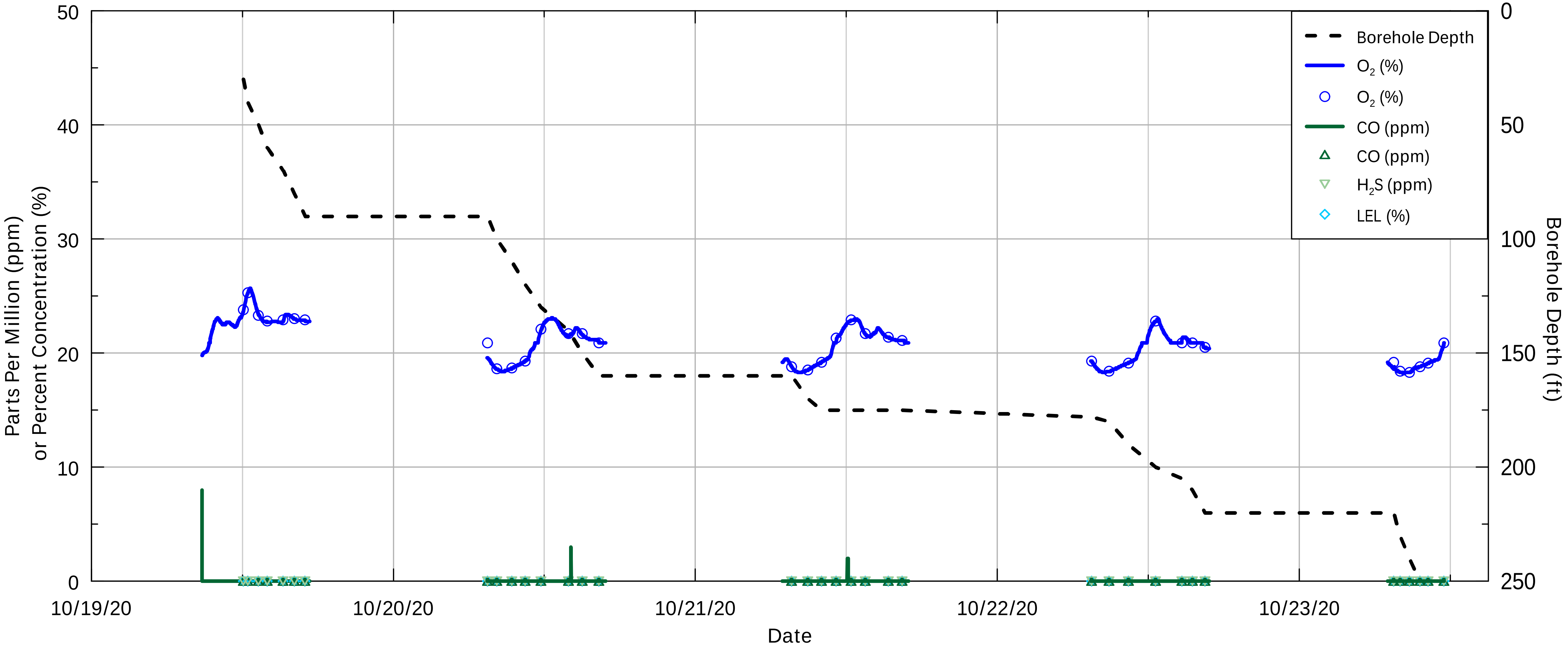
SBT legend

- 🟥 1. Sensitive fine grained
- 🟫 2. Organic material
- 🟦 3. Clay to silty clay
- 🟩 4. Clayey silt to silty clay
- 🟩 5. Silty sand to sandy silt
- 🟫 6. Clean sand to silty sand
- 🟧 7. Gravelly sand to sand
- ⬜ 8. Very stiff sand to clayey sand
- ⬜ 9. Very stiff fine grained

SBT - Bq plots (normalized)



Air and Gas Monitor Readings



Notes:

1. Symbols represent manual readings collected by MMW field staff at approximately 10-foot intervals during drilling and sampling at BH-179.
2. Lines represent continuous readings collected by the QRAE 3 meter at 1-minute intervals.
3. The QRAE 3 includes sensors to measure concentrations of O_2, LEL, CO, H_2S, SO_2, and HCN. The SO_2 and HCN readings were below the reporting limits of the device.

Air and Gas Monitor Readings - East Emergency Stop

BART Silicon Valley Phase II Extension Project
Geotechnical Data Report
Santa Clara Valley Transportation Authority
San Jose, California

Dec 2020

Figure A-1

SPT Energy Calibration

GREGG DRILLING, LLC
ENVIRONMENTAL AND GEOTECHNICAL INVESTIGATION SERVICES

January 21, 2020

Mott MacDonald
Attn: Scott Ball

Re: Standard Penetration Energy Measurements
Automatic Hammer on Mud Rotary Drill Rig, PD-48
BART To Silicon Valley Project Area, 655 Lenzen Ave., San Jose. Boring BH-169

Dear Mr. Ball,

This report offers results of energy measurements and related calculations made on January 17th & 20th, 2020 during Standard Penetration Testing (SPT) on Pitcher Drilling's mud rotary drill rig. Dynamic tests were performed on an instrumented section of NWJ drill rod attached to the sampler rod string. All dynamic measurements were obtained and recorded using a SPT Analyzer®.

Average Energy: 76%
Sample Depths tested (in feet): 111, 114.5, 123, 125, 130, 132.5, 140, 145, 150, 155, 160

***Note:** If the SPT Analyzer did not measure all blows for a sample depth, the reported blow count and therefore calculated N60 value in the following tables will be incorrect. Often blows are excluded from calculations if the sensors are loose or have drifted from the baseline. Field records of actual blow count values should be used in place of the blow counts shown in the following tables.

Equipment:

SPT energy measurements were made on SPT and Modified California samplers driven by the hammer/anvil system on the Pitcher Drilling drill rig on January 17th and 20th, 2020. The rig was tested on the BART to Silicon Valley Project area. In total, 11 energy measurements were collected corresponding to 11 different samples at increasing depth.

Gregg used a SPT Analyzer (SPTA) to acquire and process measurements of force and velocity with every impact of the automatic hammer on the sample rods. Gregg follows the procedure outlined in ASTM D4633. Two strain gauges mounted on a two foot section of NWJ rod measured force, while two piezoresistive accelerometers bolted on the same rod measured acceleration. The gauges were mounted approximately 6" from the top of the rod.
Analog signals from the gauges and accelerometers were collected, digitized, displayed in real-time, and stored by the SPTA. Selected output from the SPTA for each recorded impact of the hammer included:

- Maximum force in the rod (FMX)
- Maximum velocity in the rod (VMX)
- Maximum calculated transferred energy (EFV)
- Blows per minute (BPM)
- Energy transferred to the rods (ETR)

Data and Calculations:

The purpose of testing was to measure the energy transferred from the hammer to the drill rod and to calculate the energy efficiency of the hammer. The SPTA measurements of force and velocity were reviewed after field testing and analyzed to calculate the transferred energy (EFV).

The maximum energy transferred past the gauge location, EFV, is computed by the SPTA using force (F) and velocity (V) records as follows:

$$EMX = \int_a^b F(t)\, V(t)\, dt$$

The time "a" corresponds to the start of the record when the energy transfer begins and "b" is the time at which energy transferred to the rod reaches a maximum value. The energy transferred is defined as ETR, and is usually used to define the efficiency of the hammer/anvil system.

Results:

Tables for each sample depth summarize the average calculated energies for each sample tested as well as the details for each sample. It is shown that the overall average (ETR) energy for this system is 76%. The Summary of SPT Test Results table at the end provides a summary of all the samples tested at each sampling depth. The plots and tables present selected measured and calculated results as a function of blow number. The results include:

- the blow number
- BC (blow count in feet) *NOTE: This is calculated by dividing the number of blows for each 6" of penetration by the 6" depth interval and is therefore only approximate. If some blows were deleted due to erroneous or poor data, the penetration depths are not correct.
- FMX (maximum rod force)
- VMX (maximum rod velocity)
- BPM (blows per minute)
- EFV (energy using the Force Velocity method in ft-lbs)
- ETR (energy transferred as a percentage of maximum)

At the end of each table is a statistical evaluation of the results for each variable including the average, standard deviation, maximum, minimum and what blow number these maximums and minimums occurred.

If you have any questions or comments on this report, please do not hesitate to call our office at (562) 427-6899.

Sincerely,

Kelly Cabal

Kelly Cabal
Data Management & Communications
Gregg Drilling, LLC

SPT Energy Calibration
(SPTE)

The International Reference Test Procedure for the Standard Penetration Test (SPT) (1989) states that "In situations where comparisons of SPT results are important, calibrations shall be made to evaluate the efficiency of the equipment in terms of energy transfer."

Gregg Drilling & Testing, Inc. utilizes a Pile Dynamics, Inc. Pile Drive Analyzer® (PDA) system to calibrate SPT systems. The SPT system is a complicated dynamic mechanical system involving the hammer, anvil rods, sampler wire rope, and winch (or cathead), *Figure SPTE*.

The PDA system measures the energy by inserting a 4-foot long instrumented AWJ or NWJ rod section into the rod string above the ground surface and immediately below the SPT hammer. This section is equipped with strain gauge transducers, to measure force, and piezoresistive accelerometers, to measure the acceleration history that is required to derive velocity. Instrumenting opposite sides of the rod helps to reduce the effects of non-uniform hammer impacts on the recorded signals.

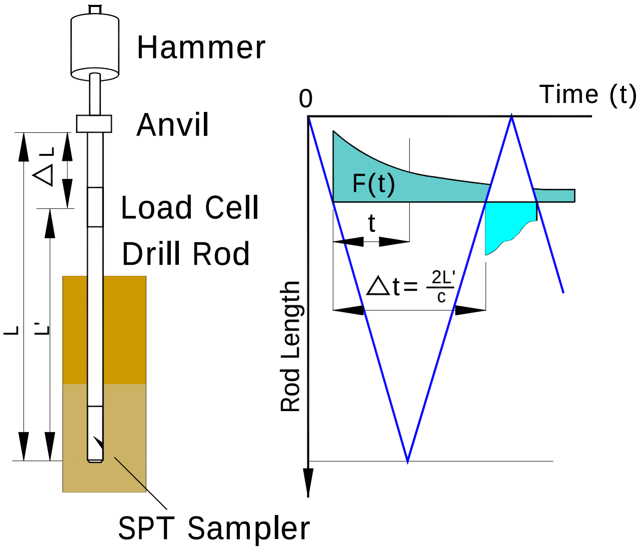


Figure SPTE

The system acquires data for both the Force Squared-Time (F2) method and the Force Velocity (FV) method. It is recommended that greater emphasis be placed on the results of the FV method over the F2 method because it is valid for non-uniform rod cross-sections and does not require empirical correction factors.

The energy transferred to the instrumented rod section was computed from the dynamic force and velocity records by the two methods mentioned above. The FV method uses both the force and velocity records to calculate the maximum transferred energy as:

$$FV = \int F(t)V(t)dt$$

The integration is performed over the time period from which the energy transfer begins (non-zero) and terminates at the time when the energy transfer reaches a maximum value. This method is theoretically correct for all rod lengths regardless of the 2L/c stress wave travel time (L= rod length, c = stress wave speed in the rod) and the number of changes in rod cross sectional area. This method is used for calculating and reporting N_{60} values from the recorded SPT and LPT blow counts.

The energy ratio ER (expressed as a percent of the theoretical energy of a standard SPT system – 140 lb hammer falling 30 inches), is computed as:

$$ER = \frac{FV}{\text{Rated Hammer Energy}}$$

The other method of computing energy transfer, F2, uses only the force record trace up to the 2L/c travel time cut off as:

$F2 = cEA \int F(t)^2 dt$
E = Modulus of Elasticity of the drill rod
A = Rod cross sectional area
c = stress wave speed of the rod

In this equation the integration time starts at the hammer impact time and ends at the return of the stress wave (or where the force trace crosses zero) after impact. This method was the basis for the original ASTM standard D4633-86 entitled “Standard Test Method for Stress Wave Energy Measurement for Dynamic Penetrometer Testing Systems”. For this method to be valid, the integration cut-off time and the first zero force must occur between 0.9 (2L/c) and 1.2 (2L/c). Data that does not meet these criteria are flagged as invalid.

Tabular results from the energy measurements are presented to the client. The relevant columns are below the ‘Average Energy’ header. The Force Velocity values are reported for both the entire trace (MAX) and up to the 2L/c time. The Force Squared-Time method has been reported up to the 2L/c time. These values have been reported as a percentage of the theoretical energy of a standard SPT test (140 pound hammer falling 30 inches). A rated hammer energy of 350 ft-lbs was used for the calculation of ER so that direct comparisons between hammers could be made. The FV method at 2L/c was used for calculating equivalent N_{60} values. For completeness, the average peak force and the average peak velocity values have been reported.

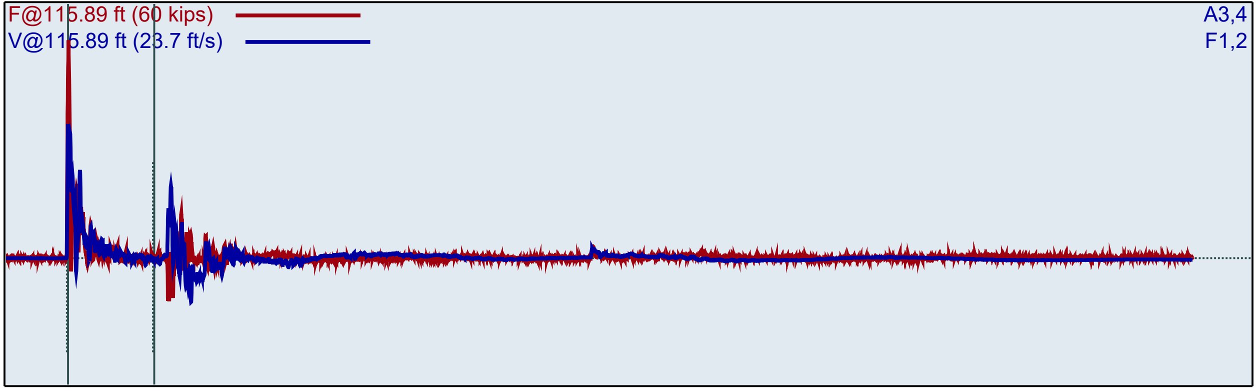
The objective of the dynamic measurements is to determine the energy ratio or efficiency of the SPT system. The measured energy ratio is used to normalize the recorded SPT N values to an industry accepted standard efficiency of 60% (N_{60}).

For a detailed reference on SPT Energy Measurements refer to Daniel et. al., 2000.

PD-46 111
Wessam Zanaty Test date: 1/20/2020
BH-169

AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 115.89 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (111.00 - 112.50 ft], displaying BN: 83



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
7	22	49	11.7	30.2	259	74.0
8	22	51	12.3	30.5	267	76.4
9	22	51	12.7	30.5	270	77.1
10	22	48	11.2	30.5	246	70.4
11	22	51	12.8	31.0	270	77.1
12	22	51	12.3	30.9	271	77.3
13	22	44	11.0	30.8	216	61.8
14	22	51	12.0	31.3	270	77.3
15	22	51	13.2	31.2	276	78.8
16	22	51	12.3	31.1	273	78.1
17	22	46	11.2	31.1	246	70.2
18	22	43	10.1	30.9	192	54.8
19	22	51	12.9	31.6	275	78.5
20	22	51	12.5	31.1	274	78.3
21	22	52	13.1	31.2	272	77.6
22	22	48	11.5	31.3	255	72.8
23	22	51	13.2	31.5	279	79.7
24	22	51	12.7	31.2	266	76.0
25	22	51	12.3	31.5	271	77.5
26	22	51	12.9	31.3	271	77.3
27	22	50	12.1	31.4	266	75.9
28	22	52	13.2	31.6	276	78.8
29	24	47	11.5	31.4	246	70.2
30	24	51	12.3	31.6	276	78.9
31	24	52	12.6	31.6	274	78.3
32	24	51	12.4	31.5	272	77.7
33	24	50	13.3	31.7	273	78.0
34	24	50	13.0	32.0	275	78.7

35	24	51	13.0	32.0	275	78.7
36	24	51	12.9	32.2	277	79.0
37	24	51	12.4	32.1	274	78.3
38	24	51	12.7	32.1	273	78.1
39	24	51	12.7	32.0	277	79.2
40	24	50	13.1	32.1	275	78.6
41	24	52	13.2	32.1	278	79.5
42	24	50	12.9	32.2	276	79.0
43	24	47	13.7	32.0	274	78.3
44	24	47	11.7	32.1	253	72.2
45	24	51	12.8	32.3	278	79.4
46	24	51	12.7	32.1	274	78.2
47	24	50	12.7	32.4	275	78.7
48	24	51	12.5	32.2	274	78.3
49	24	48	14.0	32.5	276	78.8
50	24	51	12.5	32.0	274	78.4
51	24	51	12.4	32.0	276	78.8
52	24	51	12.6	32.1	280	80.0
53	33	52	12.7	32.1	279	79.7
54	33	52	12.6	32.1	279	79.8
55	33	43	10.3	31.7	202	57.6
56	33	51	12.2	32.5	275	78.5
57	33	51	12.7	32.3	276	78.9
58	33	45	13.6	32.4	279	79.8
59	33	48	13.9	32.3	283	80.8
60	33	51	12.2	32.2	278	79.4
61	33	50	12.6	32.4	279	79.7
62	33	52	12.6	32.5	280	80.1
63	33	50	12.5	32.4	278	79.5
64	33	51	12.8	32.3	277	79.2
65	33	51	12.3	32.4	277	79.1
66	33	51	12.1	32.4	280	79.9
67	33	52	12.6	32.4	283	80.8
68	33	50	12.2	32.4	276	78.8
69	33	52	12.6	32.7	278	79.3
70	33	51	12.9	32.5	275	78.7
71	33	51	12.5	32.6	272	77.8
72	33	51	12.6	32.9	275	78.7
73	33	51	12.5	32.7	272	77.6
74	33	51	12.5	32.9	278	79.3
75	33	51	12.6	32.6	272	77.7
76	33	51	12.6	32.7	272	77.8
77	33	51	12.7	32.7	271	77.4
78	33	51	12.6	32.7	273	78.1
79	33	52	12.6	32.8	277	79.1
80	33	52	12.3	32.9	279	79.8
81	33	52	12.6	32.8	279	79.8
82	33	52	12.9	32.8	278	79.4
83	33	51	12.4	32.9	277	79.0
84	33	49	13.5	32.8	279	79.7
85	33	52	12.1	32.7	274	78.2
	Average	51	12.6	32.3	274	78.3
	Std Dev	2	0.5	0.4	11	3.2
	Maximum	52	14.0	32.9	283	80.8
	Minimum	43	10.3	31.4	202	57.6

N-value: 57

Sample Interval Time: 146.34 seconds.

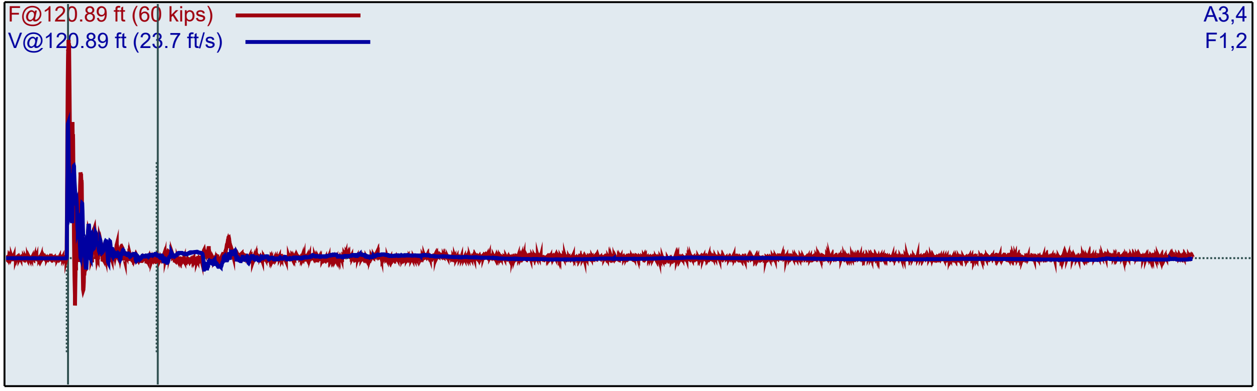
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/17/2020

AR: 1.42 in^2
LE: 120.89 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (114.50 - 116.00 ft], displaying BN: 166



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
86	30	50	11.7	1.9	266	76.0
87	30	50	12.1	12.2	268	76.7
88	30	51	12.0	27.0	269	76.8
89	30	50	11.9	30.8	268	76.5
90	30	51	11.8	34.3	269	76.9
91	30	50	12.4	36.2	271	77.5
92	30	51	12.5	37.0	276	78.8
93	30	50	12.7	37.4	278	79.6
94	30	50	12.5	37.6	275	78.6
95	30	49	13.0	38.0	275	78.5
96	30	49	12.8	38.2	276	78.8
97	30	49	12.8	38.2	275	78.5
98	30	50	12.3	38.5	273	78.0
99	30	50	12.6	38.7	278	79.4
100	30	50	12.5	38.9	276	78.9
101	30	49	12.5	39.1	274	78.3
102	30	50	12.3	39.1	275	78.5
103	30	50	12.5	39.3	279	79.6
104	30	50	12.1	39.3	276	78.8
105	30	49	12.4	39.4	276	78.9
106	30	50	12.1	39.3	273	78.0
107	30	50	12.5	39.4	276	78.8
108	30	49	12.2	39.3	269	77.0
109	30	50	12.1	39.5	272	77.8
110	30	50	12.4	39.8	276	78.9
111	30	51	12.5	39.7	278	79.3
112	30	50	12.3	39.5	277	79.2
113	30	51	12.3	39.6	275	78.5
114	30	51	12.0	39.5	271	77.3
115	30	51	12.0	39.7	273	78.0
116	26	51	12.3	39.9	272	77.8

117	26	51	12.3	39.5	275	78.6
118	26	51	11.8	39.6	271	77.4
119	26	51	12.2	39.8	272	77.6
120	26	51	12.1	39.8	269	76.9
121	26	50	12.4	39.9	269	76.8
122	26	50	12.3	40.0	270	77.0
123	26	50	12.4	39.9	271	77.3
124	26	50	12.2	39.9	268	76.6
125	26	50	12.4	40.2	270	77.2
126	26	50	12.2	39.9	268	76.7
127	26	50	12.3	40.0	268	76.4
128	26	51	12.2	40.2	270	77.1
129	26	50	12.4	40.3	273	78.0
130	26	50	12.4	40.1	274	78.2
131	26	51	12.1	40.1	272	77.7
132	26	50	12.0	40.4	272	77.6
133	26	50	12.5	40.2	271	77.5
134	26	50	12.3	40.3	267	76.2
135	26	50	12.5	40.6	270	77.1
136	26	49	11.9	40.3	266	75.9
137	26	50	12.0	40.5	271	77.5
138	26	50	12.1	40.4	266	76.1
139	26	51	12.4	40.7	274	78.2
140	26	50	12.2	40.6	272	77.7
141	26	51	12.4	40.6	274	78.3
142	27	51	12.4	40.5	274	78.4
143	27	50	12.3	40.4	270	77.0
144	27	50	12.2	40.5	267	76.2
145	27	50	12.5	40.5	271	77.3
146	27	50	12.2	40.5	270	77.2
147	27	50	12.3	40.7	267	76.3
148	27	50	12.1	40.5	268	76.5
149	27	50	12.0	40.8	270	77.0
150	27	50	12.0	40.6	268	76.5
151	27	50	12.2	40.3	267	76.1
152	27	50	12.5	40.4	272	77.7
153	27	51	12.3	40.5	271	77.3
154	27	50	12.5	40.9	274	78.4
155	27	50	11.9	41.3	269	76.8
156	27	51	12.0	41.1	274	78.2
157	27	50	12.1	41.1	270	77.1
158	27	50	12.5	41.1	269	76.9
159	27	50	12.1	41.1	269	76.9
160	27	50	12.4	41.1	268	76.5
161	27	50	12.5	41.3	274	78.2
162	27	51	12.6	41.2	274	78.3
163	27	52	12.5	41.2	271	77.5
164	27	51	12.3	41.2	272	77.8
165	27	51	12.3	41.3	271	77.3
166	27	51	12.5	41.2	274	78.3
167	27	51	12.4	41.2	274	78.3
168	27	51	12.5	41.5	276	78.7
	Average	50	12.3	40.5	271	77.3
	Std Dev	0	0.2	0.5	3	0.7
	Maximum	52	12.6	41.5	276	78.7
	Minimum	49	11.8	39.5	266	75.9

N-value: 53

Sample Interval Time: 128.05 seconds.

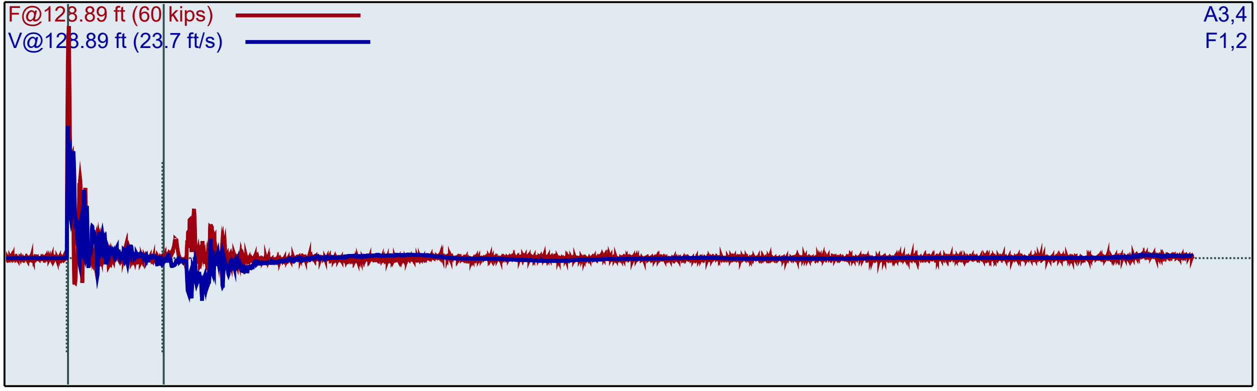
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/17/2020

AR: 1.42 in^2
LE: 128.89 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (123.00 - 124.00 ft], displaying BN: 258



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
169	43	53	11.8	1.9	256	73.2
170	43	55	12.2	14.4	264	75.3
171	43	54	12.0	27.1	261	74.6
172	43	55	11.9	30.8	263	75.2
173	43	55	12.0	34.2	270	77.2
174	43	55	12.4	36.0	275	78.6
175	43	56	12.3	36.7	273	78.0
176	43	56	12.2	37.0	274	78.4
177	43	56	12.2	37.5	273	78.1
178	43	56	12.4	37.7	278	79.3
179	43	55	12.0	37.7	271	77.4
180	43	55	12.1	37.9	275	78.6
181	43	56	12.3	38.0	273	78.1
182	43	55	12.2	38.1	272	77.6
183	43	56	12.4	38.6	278	79.3
184	43	56	12.3	38.6	278	79.5
185	43	55	12.4	38.8	280	79.9
186	43	56	12.3	38.8	274	78.3
187	43	56	12.3	38.8	276	78.7
188	43	56	12.4	38.8	277	79.1
189	43	56	12.3	38.8	274	78.2
190	43	55	12.2	38.8	270	77.3
191	43	55	12.3	38.8	276	78.8
192	43	55	12.4	38.8	276	78.9
193	43	55	12.3	38.9	275	78.5
194	43	54	12.4	39.2	274	78.2
195	43	55	12.4	39.2	277	79.2
196	43	55	12.3	39.1	275	78.7
197	43	55	12.3	39.5	276	79.0
198	43	54	12.2	39.6	274	78.2
199	43	55	12.3	39.8	276	79.0

200	43	54	12.4	39.6	276	78.9
201	43	55	12.4	39.8	276	78.8
202	43	54	12.3	39.8	279	79.7
203	43	54	12.4	39.9	278	79.4
204	43	54	12.2	39.8	268	76.5
205	43	54	12.3	40.0	271	77.4
206	43	54	12.3	40.4	278	79.5
207	43	54	12.3	39.9	272	77.8
208	43	54	12.3	39.9	279	79.8
209	43	54	12.2	40.1	279	79.7
210	43	54	12.5	40.2	276	78.7
211	50	54	12.0	40.5	277	79.0
212	50	54	12.3	40.4	280	79.9
213	50	54	12.3	40.7	280	79.9
214	50	54	11.9	40.8	276	78.7
215	50	55	12.0	40.3	269	77.0
216	50	55	12.2	40.6	277	79.2
217	50	54	11.9	40.7	267	76.4
218	50	54	12.2	40.7	276	79.0
219	50	54	11.8	40.9	269	76.9
220	50	54	12.1	40.3	269	76.7
221	50	54	12.2	40.5	271	77.4
222	50	54	12.2	40.4	276	78.7
223	50	54	12.4	40.5	280	80.1
224	50	55	12.0	40.4	276	78.8
225	50	55	12.3	40.3	279	79.8
226	50	55	12.3	40.4	276	79.0
227	50	54	11.9	40.4	278	79.5
228	50	55	12.4	40.5	280	80.0
229	50	55	12.3	40.3	280	80.1
230	50	55	12.0	40.6	275	78.5
231	50	55	12.4	40.5	279	79.6
232	50	55	12.4	40.1	278	79.4
233	50	56	12.4	40.4	278	79.5
234	50	55	12.3	40.6	281	80.2
235	50	55	12.4	40.4	277	79.3
236	50	55	12.2	40.6	278	79.4
237	50	55	12.6	40.7	275	78.5
238	50	55	12.3	39.9	281	80.4
239	50	54	12.2	39.9	281	80.2
240	50	54	12.1	40.3	279	79.7
241	50	54	12.3	39.9	280	80.1
242	50	54	12.2	40.0	281	80.4
243	50	55	12.2	40.2	279	79.7
244	50	54	12.2	40.2	278	79.5
245	50	54	12.1	40.0	280	80.0
246	50	54	12.2	40.2	284	81.1
247	50	54	12.2	39.8	277	79.1
248	50	55	12.5	40.1	276	78.9
249	50	54	12.2	39.9	280	79.9
250	50	54	12.3	40.0	282	80.5
251	50	54	12.0	40.1	280	79.9
252	50	55	12.1	40.4	280	80.1
253	50	55	12.3	40.1	278	79.4
254	50	55	12.0	39.8	280	80.0
255	50	55	12.2	40.3	278	79.5
256	50	54	12.0	39.9	277	79.0
257	50	54	12.1	40.4	279	79.6
258	50	54	12.2	40.2	281	80.4
259	50	54	11.8	40.1	280	79.9
260	50	54	12.4	40.5	277	79.0

Average	55	12.2	38.7	276	78.8
Std Dev	1	0.2	5.0	5	1.3
Maximum	56	12.6	40.9	284	81.1
Minimum	53	11.8	1.9	256	73.2

N-value: 92

Sample Interval Time: 143.11 seconds.

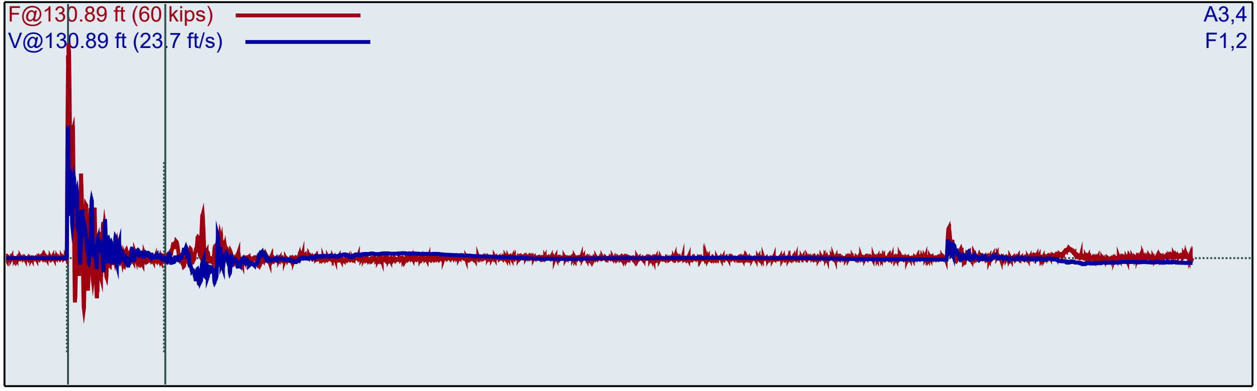
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/17/2020

AR: 1.42 in^2
LE: 130.89 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (125.00 - 126.50 ft], displaying BN: 364



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
262	23	50	11.8	8.3	253	72.3
263	23	49	12.4	9.3	249	71.2
264	23	51	12.1	17.2	254	72.7
265	23	50	12.1	19.5	257	73.3
266	23	51	12.1	21.5	257	73.4
267	23	51	12.1	22.7	256	73.2
268	23	50	11.7	23.7	254	72.7
269	23	51	11.8	24.5	253	72.4
270	23	51	12.1	24.7	257	73.5
271	23	50	11.7	25.0	253	72.3
272	23	52	12.0	25.2	260	74.3
273	23	50	11.5	25.4	255	73.0
274	23	49	11.4	25.5	249	71.1
275	23	50	11.6	25.7	250	71.4
276	23	49	11.5	26.0	249	71.2
277	23	51	11.8	26.2	256	73.1
278	23	50	11.5	26.6	250	71.5
279	23	51	11.8	26.7	254	72.5
280	23	50	11.8	26.8	254	72.5
281	23	51	11.8	27.0	256	73.1
282	23	51	11.9	27.1	253	72.3
283	23	51	11.8	27.4	256	73.2
284	23	51	12.1	27.5	258	73.7
285	35	50	11.9	27.3	254	72.6
286	35	50	11.3	27.5	256	73.1
287	35	52	12.0	27.7	258	73.8
288	35	51	11.6	27.6	255	72.8
289	35	51	11.8	28.0	258	73.6
290	35	51	11.7	27.8	256	73.2
291	35	51	11.9	27.8	252	71.9
292	35	51	11.8	28.1	256	73.1

293	35	52	11.9	28.2	255	72.8
294	35	52	11.8	28.2	255	72.9
295	35	52	11.8	28.3	256	73.1
296	35	52	11.9	28.6	256	73.0
297	35	51	11.4	28.7	257	73.4
298	35	52	12.1	28.6	261	74.5
299	35	51	11.6	29.0	258	73.7
300	35	51	11.5	28.9	254	72.5
301	35	51	11.5	29.1	257	73.5
302	35	51	11.7	29.0	254	72.7
303	35	51	11.7	29.0	256	73.3
304	35	51	11.6	29.1	252	72.1
305	35	52	11.8	29.4	259	74.1
306	35	51	11.7	29.4	258	73.6
307	35	51	11.9	29.3	259	73.9
308	35	51	12.1	29.4	261	74.5
309	35	51	12.2	29.5	261	74.7
310	35	51	12.1	29.6	259	73.9
311	35	51	11.9	29.9	259	74.0
312	35	51	11.8	29.9	259	74.0
313	35	51	12.0	29.7	260	74.3
314	35	51	12.1	29.9	259	74.0
315	35	51	11.9	30.2	258	73.8
316	35	51	12.1	30.0	263	75.1
317	35	51	11.7	30.4	255	72.8
318	35	51	11.7	30.2	256	73.0
319	35	51	12.0	30.4	259	74.0
320	47	51	12.2	30.5	259	73.9
321	47	50	11.8	30.4	257	73.6
322	47	51	11.8	30.7	259	73.9
323	47	51	11.8	30.7	258	73.6
324	47	51	12.0	30.8	261	74.7
325	47	51	11.9	30.8	258	73.8
326	47	51	11.7	30.8	258	73.6
327	47	52	11.8	30.9	261	74.5
328	47	51	11.8	31.3	258	73.7
329	47	52	11.8	30.9	257	73.4
330	47	51	11.7	30.6	259	74.0
331	47	51	11.9	30.9	260	74.2
332	47	51	11.8	31.1	258	73.8
333	47	52	11.8	31.4	258	73.7
334	47	51	11.6	31.1	258	73.7
335	47	51	11.6	31.5	258	73.8
336	47	51	11.6	31.4	254	72.5
337	47	51	11.7	31.6	255	72.8
338	47	51	11.9	31.6	259	73.9
339	47	51	12.0	31.6	259	74.1
340	47	51	11.7	31.7	256	73.1
341	47	51	11.8	31.9	260	74.2
342	47	51	11.9	31.9	255	72.9
343	47	51	11.9	31.6	258	73.8
344	47	51	11.9	31.9	257	73.5
345	47	51	11.9	32.0	260	74.4
346	47	51	11.9	32.0	258	73.7
347	47	51	11.9	32.0	258	73.6
348	47	51	11.6	32.3	255	72.8
349	47	51	12.2	32.2	260	74.2
350	47	51	12.2	32.4	263	75.2
351	47	51	11.9	32.4	259	73.9
352	47	51	12.3	32.4	261	74.5
353	47	50	12.1	32.3	260	74.2

354	47	51	12.4	32.5	263	75.2
355	47	51	12.1	32.6	262	74.8
356	47	51	12.0	32.7	257	73.5
357	47	51	12.0	32.6	261	74.5
358	47	50	12.0	32.5	259	73.9
359	47	51	12.4	32.7	264	75.5
360	47	50	12.3	32.8	263	75.2
361	47	51	12.2	32.7	262	74.7
362	47	50	12.3	32.9	266	76.1
363	47	50	11.9	33.0	262	74.9
364	47	50	12.2	32.8	263	75.0
365	47	50	12.3	33.0	264	75.4
366	47	50	12.3	33.4	261	74.6
	Average	51	11.9	30.6	258	73.8
	Std Dev	0	0.2	1.6	3	0.8
	Maximum	52	12.4	33.4	266	76.1
	Minimum	50	11.3	27.3	252	71.9

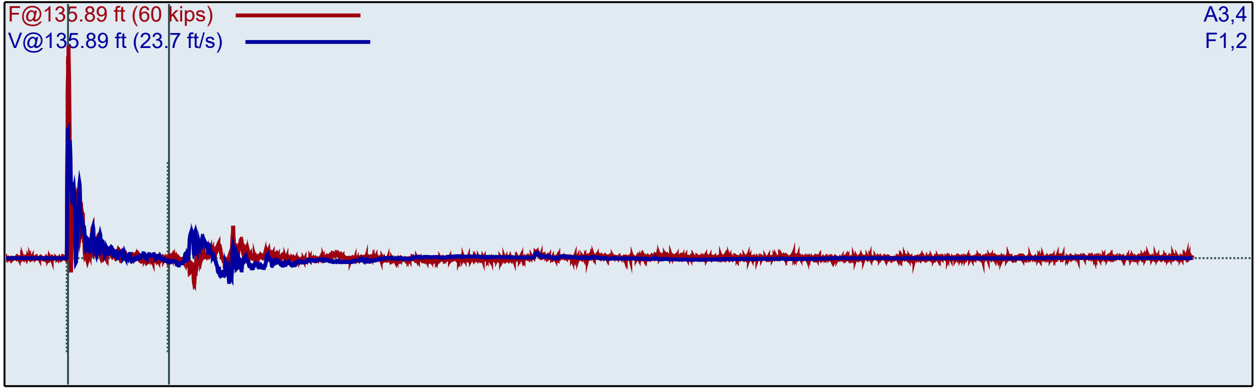
N-value: 82

Sample Interval Time: 219.07 seconds.

PD-46 111
Wessam Zanaty Test date: 1/20/2020
BH-169

AR: 1.42 in^2 SP: 0.492 k/ft3
LE: 135.89 ft EM: 30000 ksi
WS: 16807.9 ft/s

Depth: (130.00 - 131.50 ft], displaying BN: 434



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1
A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
368	10	49	11.9	9.7	262	74.7
369	10	49	11.8	10.3	264	75.4
370	10	50	11.6	22.2	264	75.4
371	10	50	11.6	25.4	265	75.6
372	10	50	11.8	27.4	269	76.9
373	10	49	11.5	28.8	263	75.2
374	10	49	11.7	29.5	267	76.3
375	10	49	11.7	29.8	266	76.0
376	10	50	11.8	30.1	267	76.2
377	10	49	11.8	30.1	263	75.3
378	25	50	11.7	30.3	264	75.4
379	25	50	11.8	30.6	270	77.0
380	25	50	11.7	30.6	267	76.4
381	25	50	11.8	30.8	268	76.5
382	25	51	11.5	31.0	268	76.6
383	25	50	11.8	31.1	266	76.0
384	25	50	11.7	31.1	267	76.2
385	25	50	11.7	31.2	265	75.6
386	25	50	11.6	31.3	269	76.9
387	25	51	11.5	31.4	268	76.5
388	25	49	11.7	31.2	267	76.4
389	25	49	11.8	31.2	268	76.5
390	25	49	11.7	31.3	270	77.2
391	25	49	11.4	31.3	266	75.9
392	25	49	11.5	31.6	266	76.1
393	25	49	11.4	31.2	265	75.8
394	25	49	11.6	31.6	268	76.5
395	25	50	11.5	31.5	268	76.5
396	25	50	11.8	31.7	269	77.0
397	25	49	11.4	31.6	267	76.3
398	25	50	11.5	31.7	268	76.5

399	25	50	11.9	31.8	265	75.8
400	25	49	11.3	32.0	266	76.0
401	25	49	11.6	32.0	263	75.2
402	25	50	11.4	32.0	264	75.4
403	34	50	11.6	32.0	263	75.3
404	34	50	12.2	32.1	266	76.0
405	34	50	11.6	32.2	267	76.4
406	34	50	12.0	32.2	265	75.8
407	34	50	11.6	32.2	264	75.6
408	34	50	11.4	32.2	264	75.5
409	34	49	11.5	32.1	261	74.5
410	34	50	12.3	32.4	265	75.6
411	34	49	11.5	32.1	259	74.0
412	34	49	11.3	32.6	262	74.7
413	34	50	11.8	32.2	264	75.4
414	34	50	11.6	32.3	262	74.8
415	34	50	11.7	32.4	259	73.9
416	34	50	12.0	32.6	262	74.9
417	34	50	11.5	32.8	260	74.2
418	34	50	11.6	32.8	260	74.2
419	34	50	11.5	32.5	261	74.6
420	34	49	11.7	32.4	258	73.8
421	34	50	11.6	32.7	263	75.2
422	34	50	11.7	32.6	260	74.2
423	34	48	12.0	32.5	256	73.2
424	34	49	11.7	33.1	261	74.4
425	34	49	11.4	32.6	260	74.2
426	34	50	11.6	32.5	260	74.3
427	34	49	11.7	32.5	266	75.9
428	34	49	11.6	32.3	261	74.5
429	34	49	11.8	32.6	263	75.1
430	34	49	12.0	32.4	260	74.3
431	34	49	11.5	32.4	260	74.3
432	34	50	11.8	32.3	263	75.1
433	34	49	11.8	32.6	262	74.9
434	34	50	11.9	32.8	263	75.1
435	34	49	12.2	32.6	262	74.8
436	34	44	10.3	32.4	199	56.9
	Average	50	11.7	32.0	263	75.1
	Std Dev	1	0.3	0.6	9	2.6
	Maximum	51	12.3	33.1	270	77.2
	Minimum	44	10.3	30.3	199	56.9

N-value: 59

Sample Interval Time: 134.02 seconds.

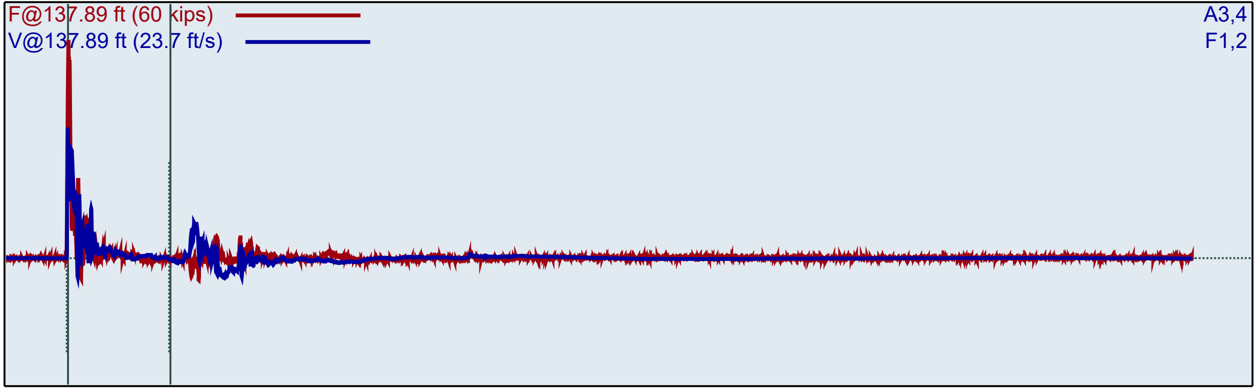
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/20/2020

AR: 1.42 in^2
LE: 137.89 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (132.50 - 134.00 ft], displaying BN: 506



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
437	15	52	11.6	1.9	255	72.8
438	15	50	11.8	10.1	256	73.2
439	15	50	11.8	24.0	257	73.6
440	15	50	11.7	26.8	258	73.7
441	15	50	11.8	29.4	255	72.8
442	15	50	12.1	30.8	256	73.0
443	15	50	11.6	31.8	255	73.0
444	15	50	11.6	32.4	255	72.8
445	15	50	12.2	32.9	258	73.6
446	15	51	12.3	33.3	264	75.3
447	15	51	12.5	33.4	263	75.1
448	15	50	11.3	33.3	242	69.0
449	15	50	12.3	33.6	260	74.2
450	15	51	12.3	33.9	261	74.6
451	15	51	12.5	34.0	262	75.0
452	27	51	12.4	34.0	260	74.3
453	27	51	11.9	34.3	257	73.6
454	27	50	12.3	34.2	263	75.3
455	27	50	12.1	34.3	258	73.8
456	27	51	12.5	34.5	264	75.4
457	27	50	12.4	34.6	258	73.8
458	27	51	12.2	34.4	260	74.1
459	27	50	12.3	34.7	258	73.8
460	27	52	11.6	34.8	255	72.8
461	27	51	11.7	34.9	250	71.4
462	27	52	11.8	35.3	262	74.8
463	27	51	12.1	35.0	254	72.5
464	27	52	12.2	35.3	259	73.9
465	27	51	12.2	35.4	258	73.6
466	27	51	12.0	35.1	252	72.1
467	27	51	12.1	35.5	259	74.0

468	27	51	11.5	35.7	247	70.5
469	27	51	11.9	35.7	250	71.5
470	27	51	12.2	35.5	256	73.2
471	27	51	12.3	35.7	255	72.8
472	27	51	12.7	35.9	259	73.9
473	27	52	12.2	35.5	257	73.4
474	27	51	12.2	35.6	255	72.9
475	27	52	12.2	35.7	259	74.0
476	27	51	12.1	35.7	256	73.3
477	27	50	12.6	35.7	256	73.1
478	27	51	12.0	36.0	255	72.8
479	30	51	11.9	36.3	252	72.0
480	30	50	12.4	36.3	260	74.4
481	30	51	12.4	36.1	260	74.2
482	30	51	12.1	36.2	257	73.5
483	30	50	12.0	36.3	256	73.1
484	30	51	12.6	36.2	254	72.7
485	30	50	12.3	36.1	257	73.5
486	30	50	12.3	36.5	260	74.2
487	30	49	12.5	35.9	260	74.3
488	30	50	12.1	35.9	256	73.2
489	30	49	12.2	36.1	257	73.4
490	30	50	12.3	36.6	258	73.7
491	30	51	12.0	36.2	255	72.7
492	30	50	12.0	36.2	257	73.3
493	30	50	12.3	36.5	260	74.2
494	30	50	12.4	36.4	257	73.4
495	30	50	12.2	36.5	258	73.6
496	30	50	11.8	36.4	258	73.8
497	30	50	12.4	36.5	260	74.4
498	30	50	11.9	36.7	260	74.3
499	30	51	12.1	36.7	260	74.4
500	30	50	12.1	36.6	256	73.3
501	30	51	12.4	36.8	262	75.0
502	30	51	12.4	37.0	254	72.5
503	30	50	12.8	36.8	258	73.8
504	30	50	12.1	36.8	252	71.9
505	30	50	12.0	36.9	257	73.3
506	30	51	12.1	36.9	252	72.1
507	30	52	11.8	36.8	260	74.3
508	30	51	11.5	37.0	255	72.8
	Average	51	12.2	35.8	257	73.4
	Std Dev	1	0.3	0.8	3	0.9
	Maximum	52	12.8	37.0	264	75.4
	Minimum	49	11.5	34.0	247	70.5

N-value: 57

Sample Interval Time: 126.42 seconds.

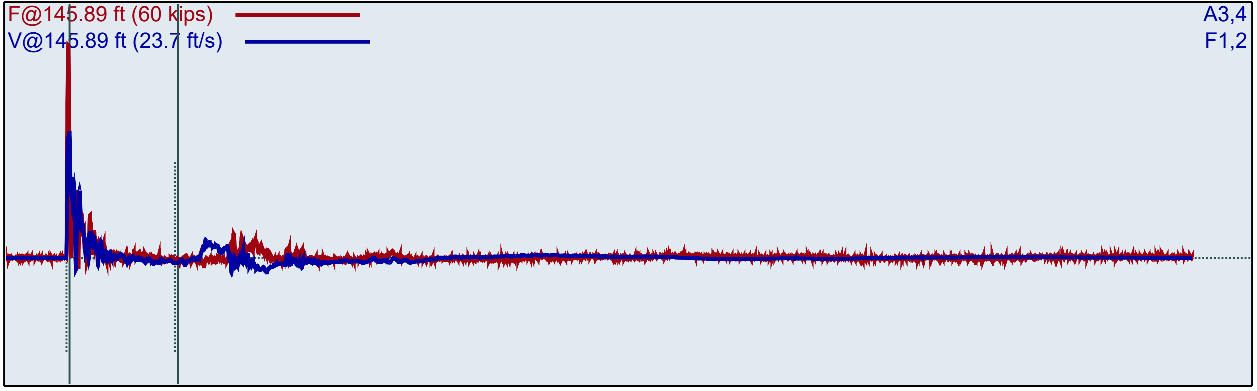
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/20/2020

AR: 1.42 in^2
LE: 145.89 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (140.00 - 141.50 ft], displaying BN: 596



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
509	21	50	11.4	1.9	256	73.2
510	21	51	12.1	10.1	264	75.5
511	21	50	12.2	22.2	262	75.0
512	21	40	9.4	25.3	162	46.3
513	21	47	11.1	29.3	232	66.4
514	21	49	11.6	30.9	252	71.9
515	21	42	9.8	31.4	180	51.4
517	21	51	12.4	33.5	265	75.8
518	21	50	12.1	33.2	264	75.4
519	21	46	11.1	33.4	224	64.0
520	21	42	9.8	33.7	181	51.6
521	21	42	10.2	34.2	190	54.3
522	21	50	11.8	34.9	264	75.5
523	21	51	12.1	34.6	267	76.3
524	21	39	9.8	34.1	173	49.4
525	21	51	12.1	35.5	262	74.9
526	21	50	12.6	35.0	261	74.5
527	21	43	9.9	34.6	182	52.0
528	21	42	10.1	35.5	184	52.5
529	21	52	12.2	36.3	263	75.3
530	30	52	12.1	36.0	267	76.4
531	30	52	11.9	36.0	268	76.5
532	30	53	12.1	36.2	272	77.8
533	30	50	12.7	36.0	272	77.8
534	30	50	12.8	35.9	270	77.0
535	30	52	12.3	36.2	272	77.6
536	30	52	12.2	36.2	269	76.9
537	30	52	12.4	36.4	274	78.4
538	30	50	12.1	36.3	267	76.2
539	30	53	12.3	36.5	272	77.7
540	30	52	12.2	36.4	272	77.7

541	30	53	12.2	36.7	270	77.1
542	30	51	11.9	36.6	267	76.3
543	30	53	11.9	37.0	271	77.4
544	30	52	12.1	36.7	273	78.1
545	30	50	11.4	36.7	255	72.9
546	30	52	12.2	36.9	274	78.4
547	30	52	11.9	37.0	273	78.0
548	30	53	11.8	37.1	272	77.7
549	30	52	12.0	37.0	270	77.2
550	30	53	12.0	37.3	271	77.5
551	30	53	12.1	37.4	273	77.9
552	30	52	12.0	37.4	273	77.9
553	30	52	12.3	37.4	271	77.6
554	30	53	12.0	37.3	271	77.4
555	30	53	11.9	37.3	273	77.9
556	30	53	12.2	37.2	276	78.8
557	30	53	11.9	37.2	273	78.1
558	30	52	11.9	37.4	275	78.6
559	30	52	11.7	37.7	274	78.2
560	39	53	11.9	37.5	273	78.0
561	39	52	11.8	37.6	273	77.9
562	39	52	11.7	37.7	275	78.5
563	39	53	12.0	37.8	275	78.6
564	39	53	12.2	37.8	277	79.1
565	39	52	11.7	37.7	270	77.2
566	39	53	12.1	37.7	277	79.0
567	39	52	11.6	37.7	275	78.7
568	39	51	11.8	38.3	271	77.4
569	39	52	11.9	38.2	276	78.7
570	39	52	12.0	38.1	277	79.2
571	39	52	12.0	38.4	276	78.9
572	39	52	12.1	38.3	277	79.1
573	39	50	11.8	38.4	272	77.7
574	39	51	11.7	38.5	271	77.4
575	39	52	12.1	38.2	275	78.7
576	39	51	12.2	38.4	271	77.5
577	39	52	12.2	38.7	278	79.4
578	39	52	11.9	38.3	276	78.8
579	39	51	11.9	38.6	273	78.0
580	39	52	12.4	39.0	276	78.9
581	39	51	12.4	38.5	275	78.5
582	39	52	11.9	39.0	274	78.2
583	39	50	12.1	39.3	270	77.1
584	39	52	11.9	39.1	276	78.8
585	39	53	12.0	39.1	274	78.3
586	39	52	12.0	38.9	277	79.1
587	39	52	11.8	38.8	273	77.9
588	39	52	12.0	38.8	275	78.6
589	39	52	12.2	39.1	275	78.6
590	39	52	11.5	38.9	274	78.3
591	39	51	11.6	39.0	271	77.4
592	39	53	11.9	39.3	276	78.8
593	39	52	11.8	39.0	274	78.4
594	39	51	11.5	39.2	272	77.8
595	39	50	11.6	39.0	265	75.7
596	39	50	11.7	38.8	267	76.4
597	39	52	11.9	38.8	277	79.2
598	39	52	11.9	38.8	273	77.9

Average	52	12.0	37.8	273	77.9
Std Dev	1	0.3	1.0	4	1.0
Maximum	53	12.8	39.3	278	79.4
Minimum	50	11.4	35.9	255	72.9

N-value: 69

Sample Interval Time: 151.13 seconds.

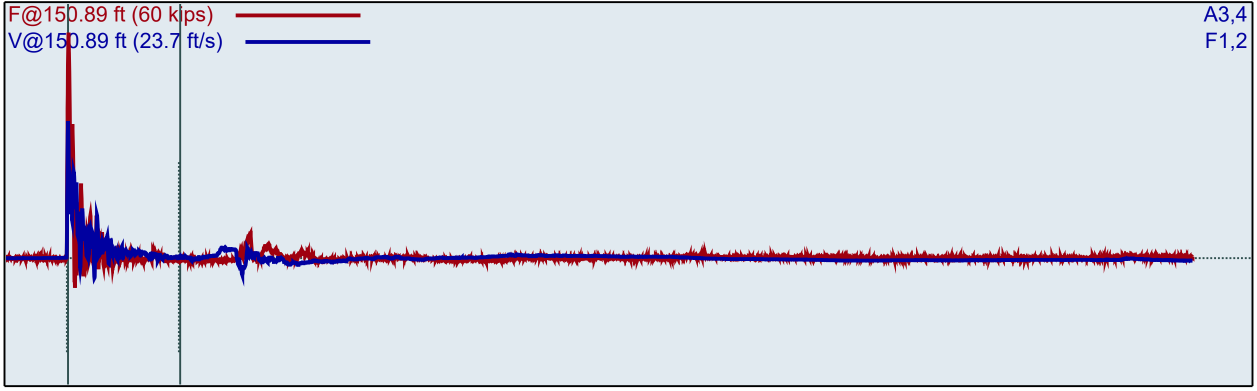
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/20/2020

AR: 1.42 in^2
LE: 150.89 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (145.00 - 146.50 ft], displaying BN: 691



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
600	21	49	11.0	13.3	262	74.8
601	21	50	11.7	13.7	271	77.4
602	21	49	11.4	27.5	265	75.7
603	21	50	11.9	30.7	274	78.3
604	21	51	11.8	33.5	278	79.4
605	21	50	12.1	34.7	276	78.9
606	21	50	11.7	35.6	272	77.7
607	21	50	11.9	36.1	276	79.0
608	21	50	12.3	36.5	277	79.3
609	21	51	12.3	36.8	272	77.9
610	21	51	12.1	37.0	272	77.8
611	21	51	12.2	37.1	273	78.0
612	21	51	12.0	37.2	269	76.9
613	21	49	12.0	37.1	263	75.3
614	21	50	11.8	37.5	263	75.1
615	21	50	11.9	37.4	266	75.9
616	21	49	12.4	37.7	271	77.3
617	21	50	12.2	37.8	263	75.2
618	21	49	12.4	38.0	260	74.2
619	21	50	12.0	38.0	266	76.1
620	21	49	12.4	38.1	269	76.9
621	31	50	12.2	38.0	264	75.5
622	31	50	11.5	38.4	268	76.6
623	31	50	12.3	38.1	267	76.2
624	31	51	12.0	38.2	263	75.1
625	31	51	12.3	38.2	268	76.6
626	31	50	12.2	38.3	267	76.2
627	31	49	12.5	38.3	269	76.8
628	31	50	12.4	38.1	268	76.7
629	31	51	12.2	38.3	266	75.9
630	31	50	12.4	38.4	272	77.6

631	31	51	12.3	38.2	265	75.6
632	31	51	12.4	38.5	263	75.1
633	31	50	12.3	38.4	266	76.0
634	31	50	12.2	38.4	264	75.5
635	31	51	12.4	38.4	268	76.5
636	31	51	12.5	38.6	268	76.5
637	31	49	12.4	38.8	268	76.6
638	31	50	12.4	39.1	267	76.4
639	31	51	11.6	39.1	263	75.2
640	31	50	12.5	39.3	266	76.1
641	31	50	12.3	39.2	263	75.2
642	31	50	12.3	39.1	263	75.0
643	31	49	12.4	38.7	267	76.2
644	31	50	12.2	38.8	265	75.8
645	31	51	12.1	39.0	265	75.9
646	31	51	12.3	38.8	266	76.0
647	31	49	12.2	39.0	266	76.0
648	31	50	12.3	39.2	265	75.8
649	31	50	12.2	39.0	268	76.5
650	31	50	12.0	38.9	263	75.3
651	31	50	12.3	38.8	268	76.5
652	42	50	12.0	39.0	271	77.5
653	42	49	12.0	39.1	268	76.7
654	42	49	12.4	39.4	271	77.5
655	42	50	12.4	39.2	267	76.3
656	42	50	12.3	39.5	267	76.4
657	42	49	11.6	39.3	268	76.7
658	42	50	12.1	39.3	264	75.4
659	42	50	12.4	39.5	270	77.1
660	42	50	11.9	39.4	269	77.0
661	42	52	11.9	39.5	265	75.6
662	42	52	12.6	39.4	269	76.8
663	42	51	12.0	39.4	262	74.9
664	42	51	12.2	39.5	270	77.2
665	42	53	12.6	39.5	266	76.1
666	42	53	12.5	39.3	268	76.6
667	42	52	12.6	39.4	269	76.9
668	42	52	12.6	39.4	268	76.4
669	42	51	12.6	39.4	268	76.6
670	42	52	11.7	39.1	262	74.9
671	42	53	12.3	39.6	270	77.3
672	42	52	12.8	39.8	268	76.5
673	42	52	12.6	39.2	266	76.1
674	42	50	12.9	39.3	269	77.0
675	42	51	12.4	39.3	269	76.9
676	42	50	11.8	39.5	263	75.3
677	42	52	12.4	39.5	272	77.6
678	42	52	12.6	39.6	272	77.7
679	42	52	12.2	39.7	268	76.7
680	42	51	12.5	39.5	276	78.8
681	42	50	11.9	39.5	266	76.0
682	42	51	11.8	39.7	267	76.3
683	42	53	12.5	39.9	275	78.6
684	42	53	12.3	39.7	272	77.7
685	42	51	11.8	39.8	268	76.6
686	42	53	12.4	39.9	274	78.2
687	42	51	11.7	40.0	266	76.0
688	42	53	12.0	39.9	270	77.0
689	42	53	12.2	39.8	270	77.2
690	42	52	11.5	39.8	267	76.2
691	42	53	12.7	40.0	271	77.3

692	42	53	12.3	39.9	270	77.0
693	42	53	11.9	39.9	270	77.1
	Average	51	12.2	39.2	268	76.4
	Std Dev	1	0.3	0.5	3	0.8
	Maximum	53	12.9	40.0	276	78.8
	Minimum	49	11.5	38.0	262	74.9

N-value: 73

Sample Interval Time: 148.14 seconds.

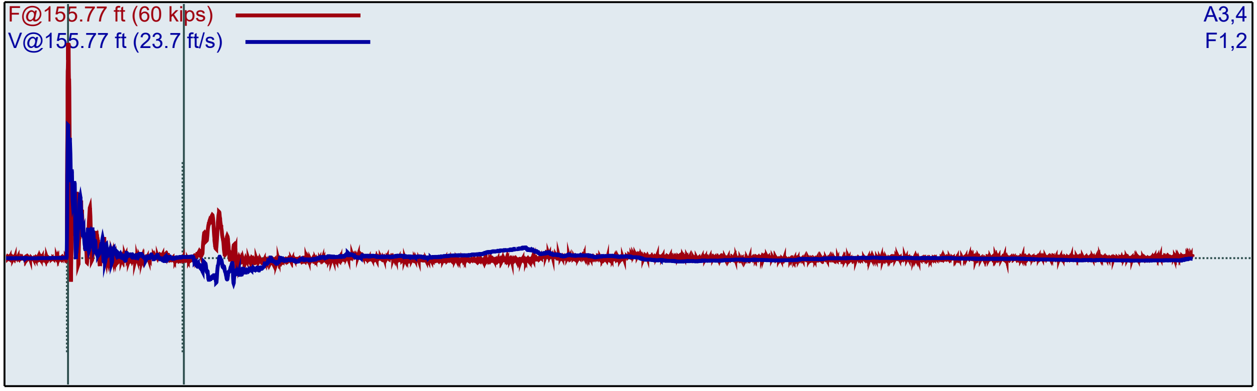
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/20/2020

AR: 1.42 in^2
LE: 155.77 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (150.00 - 151.50 ft], displaying BN: 785



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
695	15	49	11.7	1.9	256	73.0
696	15	47	11.7	12.7	261	74.5
697	15	48	11.5	29.1	261	74.7
698	15	49	12.0	32.1	270	77.3
699	15	49	12.0	34.6	273	78.0
700	15	49	12.4	35.9	272	77.9
701	15	49	12.7	36.6	273	78.0
702	15	48	12.3	37.2	271	77.3
703	15	49	12.1	37.2	270	77.2
704	15	48	12.5	37.5	271	77.5
705	15	49	12.3	37.7	270	77.2
706	15	49	12.3	37.7	272	77.6
707	15	48	12.7	37.9	273	77.9
708	15	48	12.4	37.9	272	77.8
709	33	50	11.6	38.1	272	77.6
710	33	49	12.0	38.2	272	77.8
711	33	48	12.4	38.2	269	76.9
712	33	48	11.8	38.2	269	77.0
713	33	50	11.9	38.1	272	77.6
714	33	48	12.6	38.3	277	79.1
715	33	48	12.8	38.3	268	76.7
716	33	48	12.9	38.6	272	77.8
717	33	49	12.9	38.7	275	78.6
718	33	48	12.5	38.5	272	77.8
719	33	49	12.9	38.4	273	78.0
720	33	49	12.1	38.7	273	78.0
721	33	47	11.6	38.5	253	72.4
722	33	48	13.0	39.1	275	78.5
723	33	52	12.4	38.9	280	80.1
724	33	51	12.1	38.8	273	78.1
725	33	42	10.5	38.1	206	58.8

726	33	48	13.6	39.7	277	79.3
727	33	50	11.7	39.0	273	78.0
728	33	50	12.1	38.9	269	76.9
729	33	47	12.7	39.0	273	78.1
730	33	50	12.7	39.1	272	77.6
731	33	45	13.1	39.0	275	78.6
732	33	48	12.5	39.3	271	77.5
733	33	48	12.9	39.0	270	77.2
734	33	43	10.3	38.4	202	57.7
735	33	48	12.6	39.9	274	78.4
736	33	45	10.4	38.6	216	61.8
737	33	47	13.3	39.6	273	78.1
738	33	51	12.0	39.2	277	79.3
739	33	46	11.2	38.8	233	66.7
740	33	49	12.5	39.8	276	78.8
741	33	48	11.7	39.3	275	78.5
742	46	49	12.0	39.7	277	79.0
743	46	51	11.9	39.8	279	79.7
744	46	50	12.0	39.9	281	80.2
745	46	50	11.6	39.6	279	79.7
746	46	50	11.9	39.5	275	78.6
747	46	50	11.9	40.1	282	80.5
748	46	50	11.8	40.0	274	78.4
749	46	50	11.9	40.4	278	79.3
750	46	49	12.1	39.8	274	78.4
751	46	43	11.9	39.3	248	70.7
752	46	51	12.0	40.1	280	80.0
753	46	50	12.1	39.6	284	81.1
754	46	48	11.4	39.3	261	74.5
755	46	49	11.8	40.1	270	77.2
756	46	50	12.1	39.9	285	81.4
757	46	50	11.9	40.2	278	79.4
758	46	50	12.0	40.2	278	79.5
759	46	50	12.2	40.0	284	81.0
760	46	50	11.8	40.0	274	78.3
761	46	51	12.0	40.2	282	80.5
762	46	50	11.7	40.2	281	80.3
763	46	51	11.9	40.4	278	79.3
764	46	51	12.1	40.2	276	78.9
765	46	50	12.0	40.6	280	79.9
766	46	50	11.9	40.6	276	78.8
767	46	48	11.5	40.1	259	73.9
768	46	50	12.0	40.6	279	79.8
769	46	51	11.9	40.7	277	79.1
770	46	51	12.0	40.7	281	80.4
771	46	50	11.9	40.3	276	78.9
772	46	43	10.3	39.7	208	59.5
773	46	42	9.7	40.3	185	52.8
774	46	47	11.4	40.1	253	72.3
775	46	51	12.1	41.3	274	78.4
776	46	50	12.0	39.5	273	77.9
777	46	41	9.8	39.0	183	52.4
778	46	47	11.6	40.6	250	71.4
779	46	50	12.1	39.8	270	77.0
780	46	51	12.1	39.7	274	78.3
781	46	45	10.9	39.0	227	64.8
782	46	47	11.3	40.9	246	70.4
783	46	47	11.4	39.7	260	74.3
784	46	51	12.3	39.7	273	78.0
785	46	50	12.3	39.8	274	78.4
786	46	50	12.0	39.7	274	78.2

787	46	49	12.0	39.8	270	77.2
	Average	49	11.9	39.5	266	76.1
	Std Dev	2	0.7	0.8	22	6.2
	Maximum	52	13.6	41.3	285	81.4
	Minimum	41	9.7	38.1	183	52.4

N-value: 79

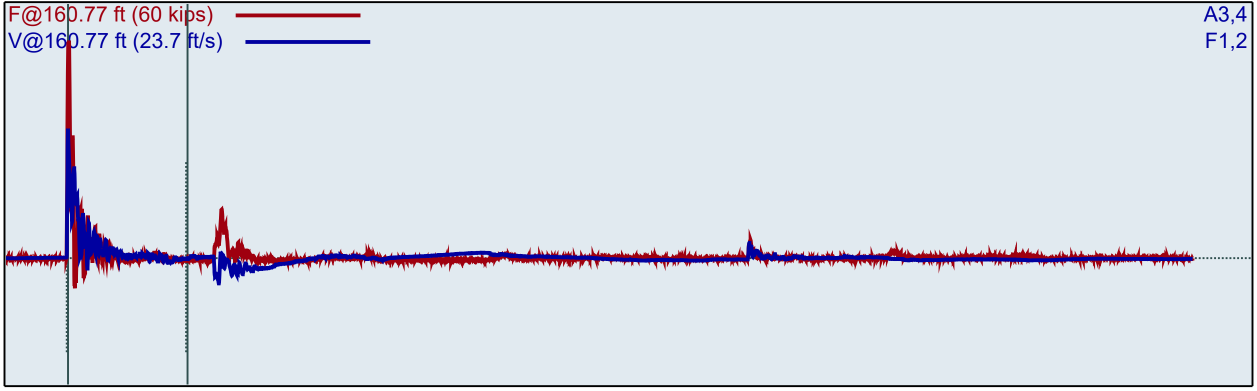
Sample Interval Time: 144.89 seconds.

PD-46
Wessam Zanaty
BH-169

111
Test date: 1/20/2020

AR: 1.42 in^2
LE: 160.77 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi


Depth: (155.00 - 156.00 ft], displaying BN: 879

F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC	FMX	VMX	BPM	EFV	ETR
	/6"	kips	ft/s	bpm	ft-lb	%
790	43	50	12.3	8.5	276	78.9
791	43	48	12.0	13.7	263	75.2
792	43	50	12.3	27.0	276	78.9
793	43	50	12.4	29.3	278	79.4
794	43	50	12.2	31.2	274	78.3
795	43	50	12.4	31.9	274	78.3
796	43	50	12.3	32.5	276	78.9
797	43	50	12.3	32.6	273	78.0
798	43	46	10.9	32.3	223	63.7
799	43	46	10.8	32.8	215	61.5
800	43	49	11.1	33.2	241	68.8
801	43	52	12.3	33.5	274	78.3
802	43	50	12.3	33.0	267	76.2
803	43	51	12.5	33.7	272	77.6
804	43	50	12.4	33.3	273	77.9
805	43	50	12.5	33.5	268	76.5
806	43	49	12.3	33.5	264	75.4
807	43	42	10.1	32.9	182	52.0
808	43	43	10.1	33.7	187	53.3
809	43	48	11.2	33.9	240	68.6
810	43	51	12.5	33.9	269	76.8
811	43	42	9.8	33.0	179	51.2
812	43	50	11.9	34.2	265	75.7
813	43	50	12.5	33.9	269	77.0
814	43	44	10.4	33.3	198	56.5
815	43	43	9.8	33.6	179	51.0
816	43	44	9.7	33.8	180	51.4
817	43	49	11.2	34.2	240	68.6
818	43	51	12.4	34.2	267	76.2
819	43	51	12.5	34.1	269	76.9
820	43	50	12.6	34.0	267	76.2

821	43	42	9.8	33.5	181	51.8
822	43	44	10.4	34.1	198	56.6
823	43	50	11.7	34.5	263	75.1
824	43	51	12.2	34.0	265	75.6
825	43	43	9.9	33.7	185	52.9
826	43	49	11.5	34.6	240	68.7
827	43	50	11.8	34.4	257	73.6
828	43	43	9.9	33.8	187	53.3
829	43	50	11.8	34.7	257	73.3
830	43	50	12.0	34.3	268	76.7
831	43	51	12.1	34.6	268	76.7
832	50	50	11.9	34.3	263	75.3
833	50	51	12.1	34.4	272	77.6
834	50	45	10.5	33.9	211	60.2
835	50	51	11.6	34.9	267	76.4
836	50	46	10.5	34.0	219	62.4
837	50	50	11.7	34.9	270	77.3
838	50	51	11.7	34.5	266	76.0
839	50	42	9.8	33.9	182	52.1
840	50	51	11.7	35.0	265	75.9
841	50	49	11.7	34.4	255	72.9
842	50	43	9.9	34.1	192	54.8
843	50	49	11.5	35.0	257	73.3
844	50	50	11.4	34.7	267	76.2
845	50	50	11.6	34.8	265	75.7
846	50	51	12.2	34.7	271	77.5
847	50	50	12.2	34.8	265	75.7
848	50	49	12.1	34.6	260	74.3
849	50	50	11.7	35.0	265	75.7
850	50	50	11.7	34.8	264	75.5
851	50	51	11.9	34.8	274	78.4
852	50	48	11.0	34.5	252	72.0
853	50	48	10.9	34.7	232	66.4
854	50	50	11.6	35.2	268	76.6
855	50	50	11.5	34.5	259	74.0
856	50	49	11.2	34.6	249	71.1
857	50	50	11.8	34.9	261	74.5
858	50	50	11.6	34.9	262	74.8
859	50	50	11.8	34.8	272	77.8
860	50	48	11.4	34.6	251	71.6
861	50	50	11.5	34.8	254	72.7
862	50	50	11.8	35.1	267	76.2
863	50	50	11.5	34.9	262	74.7
864	50	48	11.3	34.4	247	70.7
865	50	47	11.3	34.8	232	66.4
866	50	48	11.4	35.2	256	73.3
867	50	51	12.0	35.1	270	77.1
868	50	50	11.9	35.1	264	75.3
869	50	49	11.6	35.0	263	75.2
870	50	50	11.9	35.1	266	75.9
871	50	49	12.0	35.1	267	76.2
872	50	50	12.5	35.1	271	77.5
873	50	50	12.4	35.2	270	77.3
874	50	50	12.3	35.1	270	77.3
875	50	50	12.1	35.1	266	76.0
876	50	50	12.2	35.0	268	76.6
877	50	50	12.4	35.0	269	76.9
878	50	51	12.1	35.1	275	78.7
879	50	51	12.0	35.3	268	76.6
880	50	51	12.2	35.2	276	79.0
881	50	51	12.0	35.2	274	78.4

Average	49	11.6	33.6	252	71.9
Std Dev	3	0.8	3.6	29	8.3
Maximum	52	12.6	35.3	278	79.4
Minimum	42	9.7	8.5	179	51.0

N-value: 92

Sample Interval Time: 162.80 seconds.

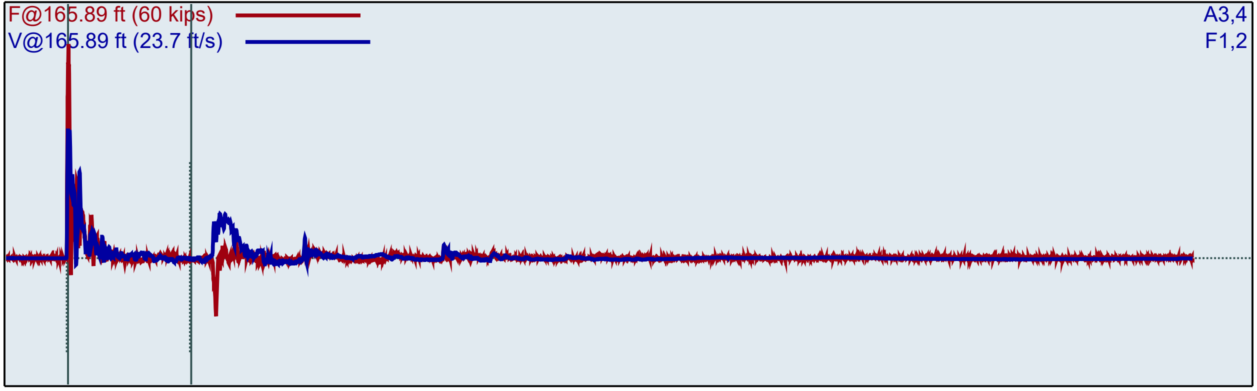
PD-46
Wessam Zanaty
BH-169

111
Test date: 1/20/2020

AR: 1.42 in^2
LE: 165.89 ft
WS: 16807.9 ft/s

SP: 0.492 k/ft3
EM: 30000 ksi

Depth: (160.00 - 161.50 ft], displaying BN: 920



F1 : [150NWJ2] 212.78 PDICAL (1) FF1
F2 : [150NWJ1] 210.83 PDICAL (1) FF1

A3 (PR): [K5674] 345 mv/6.4v/5000g (1) VF1
A4 (PR): [K3719] 368 mv/6.4v/5000g (1) VF1

BL#	BC /6"	FMX kips	VMX ft/s	BPM bpm	EFV ft-lb	ETR %
884	13	40	10.0	5.3	177	50.5
885	13	50	12.1	12.9	276	79.0
886	13	49	12.1	29.2	281	80.2
887	13	49	12.2	32.2	280	80.0
888	13	49	12.7	35.0	286	81.7
889	13	49	12.7	36.6	284	81.3
890	13	50	12.5	37.4	282	80.7
891	13	50	12.4	37.6	285	81.5
892	13	50	12.1	38.1	283	80.9
893	13	50	12.6	38.1	287	82.1
894	13	47	11.4	38.0	252	71.9
895	13	50	11.8	39.0	281	80.3
896	12	50	12.2	38.4	279	79.8
897	12	49	13.0	38.8	282	80.6
898	12	50	12.5	39.0	283	80.9
899	12	50	12.5	38.8	280	80.0
900	12	50	12.2	38.8	273	77.9
901	12	51	13.1	39.4	283	80.9
902	12	51	12.5	39.2	281	80.4
903	12	51	12.6	39.4	283	80.7
904	12	50	12.4	39.6	280	79.9
905	12	48	11.7	38.9	240	68.6
906	12	50	12.5	39.8	286	81.6
907	12	51	13.2	39.5	279	79.7
908	15	51	12.7	39.5	282	80.5
909	15	50	12.6	39.5	282	80.6
910	15	50	12.5	39.6	284	81.2
911	15	49	12.0	39.6	282	80.5
912	15	51	12.4	39.5	284	81.2
913	15	51	12.8	39.6	284	81.3
914	15	50	12.2	39.2	277	79.3

915	15	50	11.9	39.7	279	79.8
916	15	48	12.3	39.4	278	79.5
917	15	49	11.8	39.5	276	78.7
918	15	51	12.4	39.7	284	81.0
919	15	50	12.7	39.9	281	80.2
920	15	50	12.0	39.7	282	80.6
921	15	48	13.1	39.7	285	81.5
922	15	50	11.9	39.8	283	80.9
	Average	50	12.4	39.4	280	79.9
	Std Dev	1	0.4	0.4	8	2.4
	Maximum	51	13.2	39.9	286	81.6
	Minimum	48	11.7	38.4	240	68.6

N-value: 27

Sample Interval Time: 62.54 seconds.

Summary of SPT Test Results

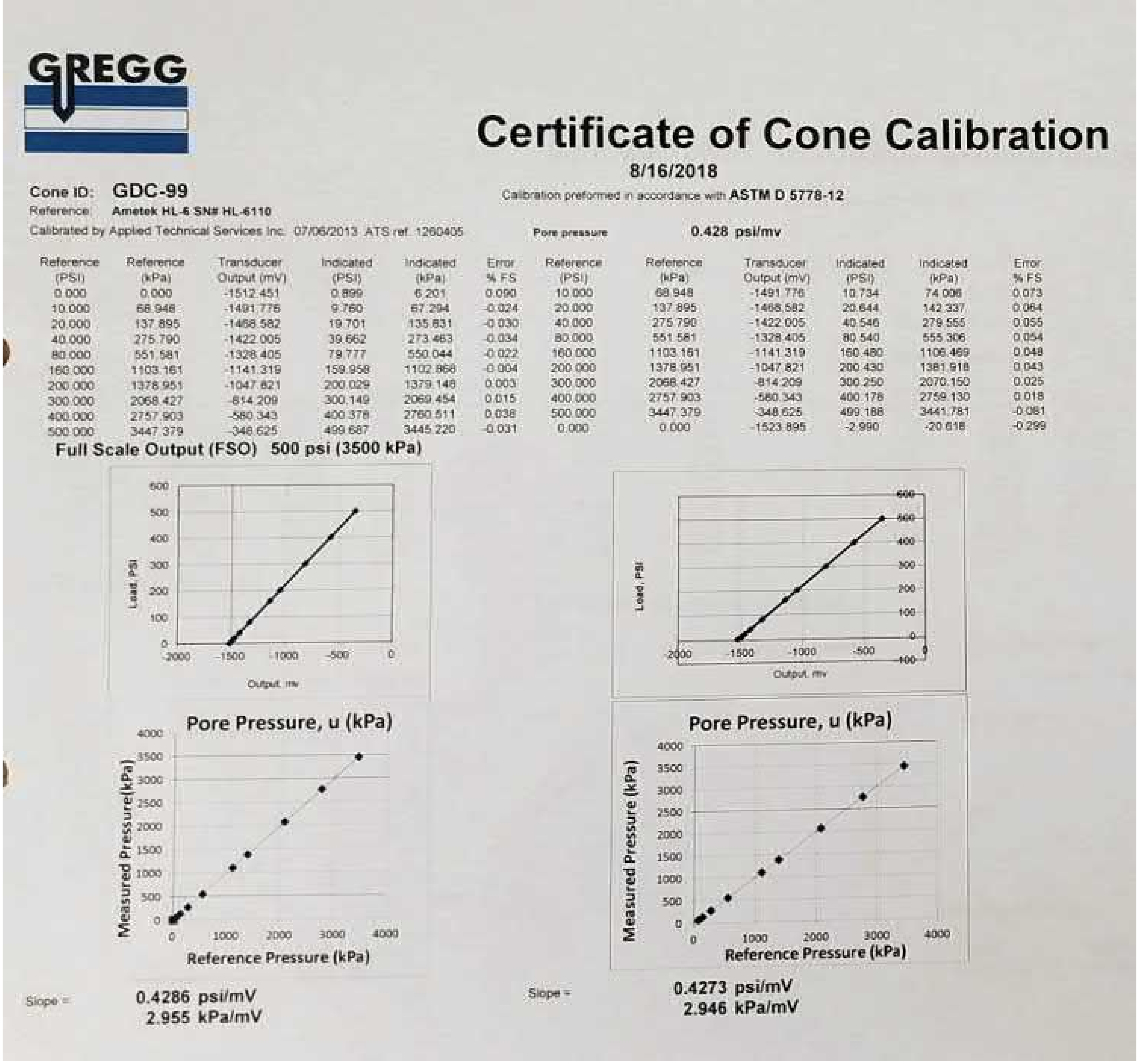
Project: PD-46, Test Dates: 1/17/2020, 1/20/2020

FMX: Maximum Force
VMX: Maximum Velocity
BPM: Blows/Minute

EFV: Maximum Energy
ETR: Energy Transfer Ratio - Rated

Instr. Length ft	Blows Applied /6"	**N Value**	**N60 Value**	Average FMX kips	Average VMX ft/s	Average BPM bpm	Average EFV ft-lb	Average ETR %
115.89	**22-24-33**	**57**	**72**	51	12.6	32.3	274	78.3
120.89	**30-26-27**	**53**	**67**	50	12.3	40.5	271	77.3
128.89	**43-50**	**50**	**63**	55	12.2	38.7	276	78.8
130.89	**23-35-47**	**82**	**103**	51	11.9	30.6	258	73.8
135.89	**10-25-34**	**59**	**74**	50	11.7	32.0	263	75.1
137.89	**15-27-30**	**57**	**72**	51	12.2	35.8	257	73.4
145.89	**21-30-39**	**69**	**87**	52	12.0	37.8	273	77.9
150.89	**21-31-42**	**73**	**92**	51	12.2	39.2	268	76.4
155.77	**15-33-46**	**79**	**100**	49	11.9	39.5	266	76.1
160.77	**43-50**	**50**	**63**	49	11.6	33.6	252	71.9
165.89	**13-12-15**	**27**	**34**	50	12.4	39.4	280	79.9
			Overall Average Values:	51	12.1	36.1	266	76.0
			Standard Deviation:	2	0.5	4.1	16	4.5
			Overall Maximum Value:	56	14.0	41.5	286	81.6
			Overall Minimum Value:	41	9.7	1.9	179	51.0

CPT Calibration



Certificate of Cone Calibration

8/16/2018

Cone ID: **GDC-99**
Reference: **Ametek HL-6 SN# HL-6110**
Calibrated by Applied Technical Services Inc. 07/06/2013 ATS ref. 1260405

Calibration preformed in accordance with **ASTM D 5778-12**

Pore pressure **0.428 psi/mv**

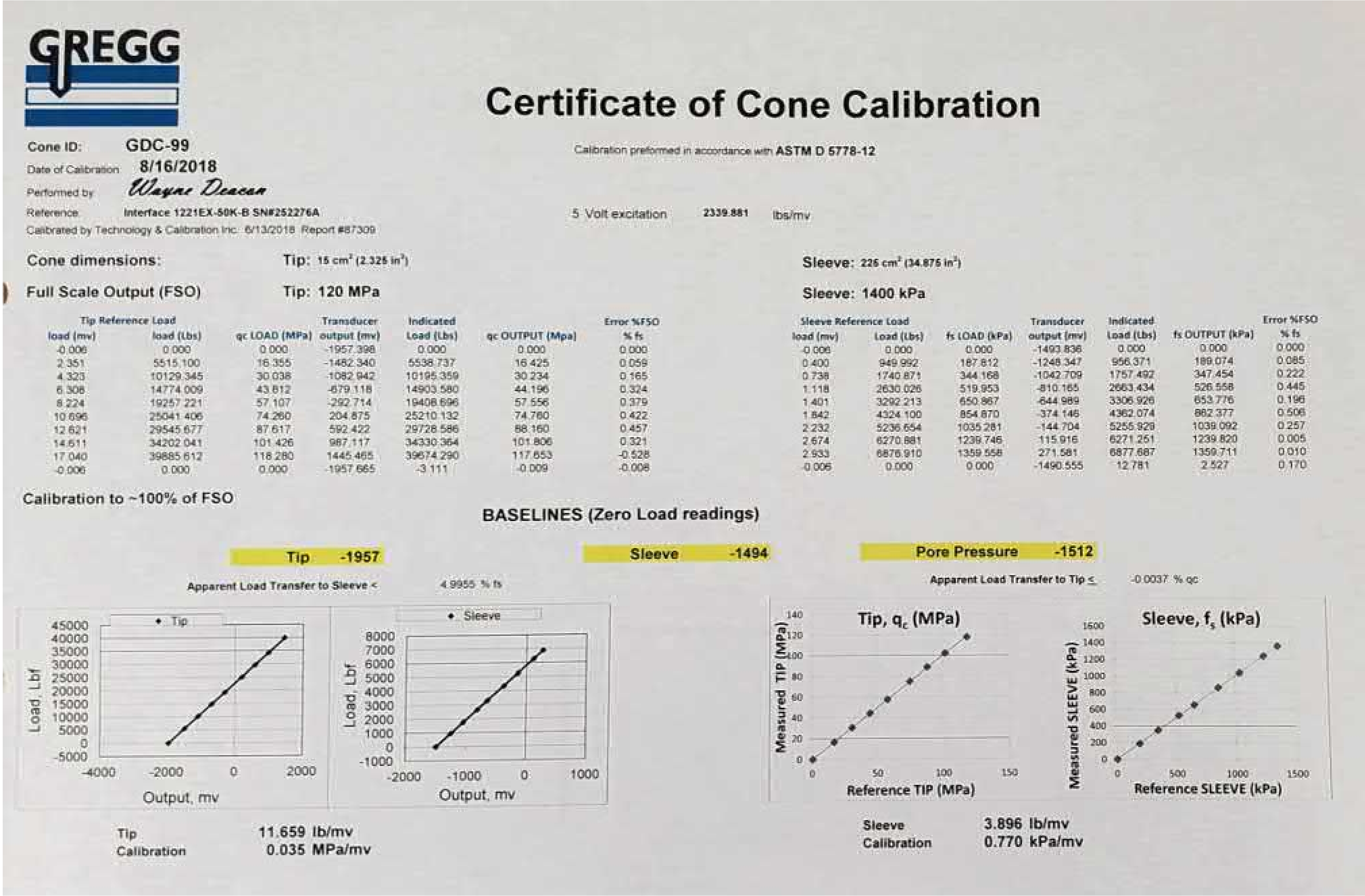
Reference (PSI)	Reference (kPa)	Transducer Output (mV)	Indicated (PSI)	Indicated (kPa)	Error % FS
0.000	0.000	-1512.451	0.899	6.201	0.090
10.000	68.948	-1491.776	9.760	67.294	-0.024
20.000	137.895	-1468.582	19.701	135.831	-0.030
40.000	275.790	-1422.005	39.662	273.463	-0.034
80.000	551.581	-1328.405	79.777	550.044	-0.022
160.000	1103.161	-1141.319	159.958	1102.868	-0.004
200.000	1378.951	-1047.821	200.029	1379.148	0.003
300.000	2068.427	-814.209	300.149	2069.454	0.015
400.000	2757.903	-580.343	400.378	2760.511	0.038
500.000	3447.379	-348.625	499.687	3445.220	-0.031

Reference (PSI)	Reference (kPa)	Transducer Output (mV)	Indicated (PSI)	Indicated (kPa)	Error % FS
10.000	68.948	-1491.776	10.734	74.006	0.073
20.000	137.895	-1468.582	20.644	142.337	0.064
40.000	275.790	-1422.005	40.546	279.555	0.055
80.000	551.581	-1328.405	80.540	555.306	0.054
160.000	1103.161	-1141.319	160.480	1106.469	0.048
200.000	1378.951	-1047.821	200.430	1381.918	0.043
300.000	2068.427	-814.209	300.250	2070.150	0.025
400.000	2757.903	-580.343	400.178	2759.130	0.018
500.000	3447.379	-348.625	499.186	3441.781	-0.081
0.000	0.000	-1523.895	-2.990	-20.618	-0.299

Full Scale Output (FSO) 500 psi (3500 kPa)

Slope = **0.4286 psi/mV**
2.955 kPa/mV

Slope = **0.4273 psi/mV**
2.946 kPa/mV



GREGG

Certificate of Cone Calibration

Cone ID: GDC-99

Date of Calibration **8/16/2018**

Performed by *Wayne Deacon*

Reference **Interface 1221EX-50K-B SN#252276A**

Calibrated by Technology & Calibration Inc. 6/13/2018 Report #87309

Calibration preformed in accordance with **ASTM D 5778-12**

5 Volt excitation **2339.881** lbs/mv

Cone dimensions: **Tip:** 15 cm² (2.325 in²) **Sleeve:** 225 cm² (34.875 in²)

Full Scale Output (FSO) **Tip: 120 MPa** **Sleeve: 1400 kPa**

Tip Reference Load			Transducer	Indicated		Error %FSO
load (mv)	load (Lbs)	qc LOAD (MPa)	output (mv)	Load (Lbs)	qc OUTPUT (Mpa)	% fs
-0.006	0.000	0.000	-1957.398	0.000	0.000	0.000
2.351	5515.100	16.355	-1482.340	5538.737	16.425	0.059
4.323	10129.345	30.038	-1082.942	10195.359	30.234	0.165
6.308	14774.009	43.812	-679.118	14903.580	44.196	0.324
8.224	19257.221	57.107	-292.714	19408.696	57.556	0.379
10.696	25041.406	74.260	204.875	25210.132	74.760	0.422
12.621	29545.677	87.617	592.422	29728.586	88.160	0.457
14.611	34202.041	101.426	987.117	34330.364	101.806	0.321
17.040	39885.612	118.280	1445.465	39674.290	117.653	-0.528
-0.006	0.000	0.000	-1957.665	-3.111	-0.009	-0.008

Sleeve Reference Load			Transducer	Indicated		Error %FSO
load (mv)	Load (Lbs)	fs LOAD (kPa)	output (mv)	Load (Lbs)	fs OUTPUT (kPa)	% fs
-0.006	0.000	0.000	-1493.836	0.000	0.000	0.000
0.400	949.992	187.812	-1248.347	956.371	189.074	0.085
0.738	1740.871	344.168	-1042.709	1757.492	347.454	0.222
1.118	2630.026	519.953	-810.165	2663.434	526.558	0.445
1.401	3292.213	650.867	-644.989	3306.926	653.776	0.196
1.842	4324.100	854.870	-374.146	4362.074	862.377	0.506
2.232	5236.654	1035.281	-144.704	5255.929	1039.092	0.257
2.674	6270.881	1239.746	115.916	6271.251	1239.820	0.005
2.933	6876.910	1359.558	271.581	6877.687	1359.711	0.010
-0.006	0.000	0.000	-1490.555	12.781	2.527	0.170

Calibration to ~100% of FSO

BASELINES (Zero Load readings)

Tip -1957 **Sleeve -1494** **Pore Pressure -1512**

Apparent Load Transfer to Sleeve < 4.9955 % fs

Apparent Load Transfer to Tip ≤ -0.0037 % qc

Tip Calibration 11.659 lb/mv 0.035 MPa/mv

Sleeve Calibration 3.896 lb/mv 0.770 kPa/mv

Project Permits and Compliance

2019 – 2020 Geotechnical Investigation Permits
SEIS/SEIR Mitigation Measures

2019 – 2020 Geotechnical Investigation Permits

Table A-3. Valley Water Well Permits and Traffic Control Plans

Permit Number	Borehole ID(s)	Traffic Control Plan #, Lane Closure (LC)
E20190711002	BH-150	NA
C20190711002	BH-151	NA
E20190711001	BH-152	NA
C20190711001	BH-153	NA
E20190807004	BH-154	NA
E20190821002	BH-155	NA
E20190821002	BH-156	NA
E20190927001	BH-157	Plan #3248, LC 10/10/19
E20190927001	BH-158	Plan #3249
E20190927001	BH-159	Plan #3250
E20190927001	BH-160	Plan #3251
E20190711001	BH-161	NA
E20190927001	BH-162	Plan #3359
E20190927001	BH-163	Plan #3293
E20190807004	BH-164	NA
E20190927001	BH-165	Plan #3360
E20190927001	BH-166	Plan #3361
E20190927001	BH-167, BH-167-PMT	Plan #3488
E20190927001	BH-168, BH-168-PMT	Plan #3292
E20190927001	BH-169, BH-169-PMT	Plan #3291
E20190927001	BH-171, BH-171-PMT	Plan #3460
E20190927001	BH-173, BH-173-PMT	Plan #3461
E20190927001	BH-174, BH-174-PMT	Plan #3462
E20190927001	BH-175, BH-175-PMT	Plan #3490
E20191118003	BH-176	NA
E20191118003	BH-177	NA
E20191118003	BH-178	NA
E20181214001	BH-179	NA
E20190927001	BH-180	NA

Table A-4. CSJ Encroachment Permits

EP Number	Borehole ID(s)
#19-140224	BH-157, BH-158, BH-159
#19-147209	BH-160, BH-162, BH-163, BH-165, BH-166
#19-154646	BH-169, BH-171, BH-173, BH-174
#20-112625	BH-167, BH-168, BH-175
#20-118165 (Quarterly Groundwater Monitoring)	BH-41, BH-80, BH-58, BH-143, BH-157, MW-2C, MW-2D, MW-4A, MW-4B, MW-5B, MW-5C, MW-6A, MW-6B, MW-6C, NB-13A, NB-17, NW-01, PZ-2B, PZ-6E, ST-5
#20-123353	BH-180

SEIS/SEIR Mitigation Measures

Table A-5. Relevant Mitigation Measures

Measure No.	Mitigation Measures
TRA-CNST-C (Prepare and Implement an Emergency Services Coordination Plan)	Traffic management subcontractor was hired for the investigation and when required, traffic control plans were developed including consideration for Emergency Services
AQ-CNST-B (use U.S. Environmental Protection Agency (EPA) Tier 4 or Cleaner Engines	Where machinery with EPA Tier 4 or cleaner engine was available, this was used during the works. Note that for some specialized equipment, EPA Tier 4 or cleaner engine was not available
AQ-CNST-C Maintain Construction Equipment	To MMW knowledge, all construction equipment used in the GI was maintained in accordance with manufacturer's specification
AQ-CNST-D Minimizing Idling Times	When practical, idling times were minimized on all GI activities
AQ-CNST-E Use equipment Meeting ARB Certification Standards	All equipment used for the GI met ARB's most recent certification standards
AQ-CNST-F Ensure Heavy-Duty Diesel Trucks Comply with EPA Emission Standards	All diesel engines used for the GI complied with EPA emission standards
AQ-CNST-G Use Low-Sulphur Fuel	All equipment used for the GI made use of low-sulphur fuel
AQ-CNST-H Locate Construction Areas Away from Sensitive Receptors	Where feasible, the equipment and staging areas for the GI were located away from sensitive receptors
AQ-CNST-I Use Low-Volatile Organic Compound (VOC) Coatings	No coatings were used during the GI works
BIO-CNST-A Avoid Nesting Bird Season	Tree removal and pruning was not done during the GI works
BIO-CNST-B Conduct Preconstruction/Predisturbance Surveys for Nesting Birds	Tree removal or pruning was not done during the GI works
BIO-CNST-C Conduct Preconstruction Surveys for Roosting Bats and Implement Protective Measures	The GI works did not include tree removal or trimming or any demolition of existing buildings
BIO-CNST-D	The GI works did not enter riparian habitat

Measure No.	Mitigation Measures
Protect Riparian Habitat	
BIO-CNST-E Conduct Preconstruction Tricolored Blackbird Nesting Surveys and Determine Appropriate Action	The GI works did not encounter identified nesting substrate conditions.
BIO-CNST-F Conduct Preconstruction Burrowing Owl Surveys and Determine Appropriate Action	A qualified ecology specialist completed preconstruction surveys for the GI works, in accordance to the mitigation measures proposed in the SEIS/SEIR. GI works occurred outside of 250-foot exclusion zone of observed inactive nests.
CUL-CNST-A Implement Programmatic Agreement and Archaeological Resources Treatment Plan	The GI works were not anticipated to impact archaeological resources. This assumption was confirmed during the works
GEO-CNST-I Stop Construction if Paleontological Resources are Discovered and Determine Appropriate Action	The GI works did not encounter paleontological resources.
HAZ-CNST-A Prepare Remedial Action Plans	Active Phase II environmental assessment activities were completed using the geotechnical investigation work. Staff on-site were HAZWOPER trained. All soil cuttings and drilling fluids were drummed and disposed of in accordance with appropriate standards.
Noise and Vibration NV-CNST-A to S	Refer to the noise and vibration report which will be provided under separate cover. Drilling and sampling activities does not exceed typical construction noise thresholds.
AES-CNST-A Replace Trees	No trees were removed during the GI works

Appendix B
In Situ Tests

Pressuremeter Tests

Downhole Geophysical Logging

Slug Tests

Dissipation Tests

Pressuremeter Tests

Pressuremeter Test Locations

Table B-1. Summary of Pressuremeter Tests

Borehole Number	Northing, NAD83 (ft)[1]	Easting, NAD83 (ft)[1]	Elevation NAVD88 (ft)	Depth of Test (ft)[2]
BH-150	1,947,944.0	6,157,099.6	87.14	73, 83, 93, 98, 113, 118, 123, 128, 131, 136, 139,
BH-158	1,949,055.5	6,159,642.4	81.67	53, 126, 129, 147, 150,
BH-159	1,955,261.9	6,164,342.0	87.53	46, 48, 69, 75, 93, 96, 103, 106, 113, 169, 172,
BH-161	1,946,303.8	6,154,108.7	86.88	75, 93, 107, 120, 124, 129, 134, 139, 142, 152
BH-164	1,952,858.1	6,164,718.6	88.63	50, 53, 58, 99, 102, 105.5, 138, 143, 146

[1] Values rounded to the nearest tenth (0.1) of a foot.

[2] Values rounded to the nearest foot.

GREGG

GREGG DRILLING & TESTING, INC.
GEOTECHNICAL AND ENVIRONMENTAL INVESTIGATION SERVICES

December 18, 2019

Mott MacDonald
Attn: Robert Chew and Morteza Khorshidi
2007 Gateway Pl
Suite 550
San Jose, CA 95110

Subject: PMT Site Investigation
BART, San Jose, CA
Pitcher Project Number: P7190203

Dear Robert & Morteza:

The following report presents the results of GREGG/PITCHER Drilling & Testing's site investigation for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☐
2	Pore Pressure Dissipation Tests	(PPD)	☐
3	Seismic Cone Penetration Tests	(SCPTU)	☐
4	Pressuremeter Tests	(PMT)	☒
5	UVOST Laser Induced Fluorescence	(UVOST)	☐
6	Groundwater Sampling	(GWS)	☐
7	Soil Sampling	(SS)	☐
8	Vapor Sampling	(VS)	☐
9	Vane Shear Testing	(VST)	☐
10	SPT Energy Calibration	(SPTE)	☐

Tests were carried using a TEXAM pre-bored pressuremeter according to ASTM D4719. A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact the undersigned.

Sincerely,
GREGG/PITCHER Drilling & Testing, Inc.

Tim Boyd

Pressuremeter Test Sounding Summary

-Table 1-

Boring Number	Date	Depth to center of probe (feet)	Menard Modulus, E_M (psi)	Limit Pressure, P_L (psi)	Notes
BH-150-PMT	11.11.19	73	1665	160	
BH-150-PMT	11.11.19	83	n.a.	n.a.	Did not load soil
BH-150-PMT	11.11.19	88	n.a.	n.a.	Did not load soil
BH-150-PMT	11.12.19	93	9471	653	
BH-150-PMT	11.13.19	98	1236	218	
BH-150-PMT	11.13.19	113	11231	682	
BH-150-PMT	11.13.19	118	n.a.	n.a.	Did not load soil
BH-150-PMT	11.13.19	123	n.a.	n.a.	Did not load soil
BH-150-PMT	11.14.19	128	1928	232	
BH-150-PMT	11.14.19	131	n.a.	n.a.	
BH-150-PMT	11.14.19	136	3437	276	
BH-150-PMT	11.14.19	139	4292	297	
BH-161-PMT	11.18.19	75	1767	n.a.	Did not reach PL
BH-161-PMT	11.18.19	93	5761	493	
BH-161-PMT	11.18.19	107	5012	319	
BH-161-PMT	11.19.19	120	2963	n.a.	Did not reach PL
BH-161-PMT	11.19.19	124	3163	276	
BH-161-PMT	11.19.19	129	3839	283	
BH-161-PMT	11.19.19	134	3357	290	
BH-161-PMT	11.20.19	139	3317	n.a.	Did not reach PL
BH-161-PMT	11.20.19	142	3409	341	
BH-161-PMT	11.20.19	152	5954	n.a.	Did not reach PL
BH-164-PMT	11.21.19	53	3469	170	

BH-164-PMT	11.21.19	50	1943	127	
BH-164-PMT	11.21.19	58	3469	170	
BH-164-PMT	11.21.19	102	n.a.	n.a,	Invalid test
BH-164-PMT	11.21.19	99	521	n.a.	Did not reach PL
BH-164-PMT	11.22.19	102	n.a.	n.a.	Did load soil
BH-164-PMT	11.22.19	105.5	n.a.	n.a.	Did load soil
BH-164-PMT	11.22.19	138	6385	363	
BH-158-PMT	11.25.19	53	965	n.a.	Did not reach PL
BH-158-PMT	11.27.19	126	3597	341	
BH-158-PMT	11.27.19	129	4379	363	
BH-158-PMT	11.27.19	147	8317	421	
BH-158-PMT	11.27.19	150	4130	370	
BH-159-PMT	12.02.19	46	1279	102	
BH-159-PMT	12.02.19	48	1219	145	
BH-159-PMT	12.02.19	69	502	n.a.	Did not reach PL
BH-159-PMT	12.03.19	75	1273	n.a.	Did not reach PL
BH-159-PMT	12.03.19	93	4575	232	
BH-159-PMT	12.03.19	96	3598	254	
BH-159-PMT	12.04.19	103	5084	254	
BH-159-PMT	12.04.19	106	3703	261	
BH-159-PMT	12.04.19	113	5300	392	
BH-159-PMT	12.05.19	169	3376	363	
BH-159-PMT	12.05.19	172	6540	363	
BH-164-PMT	12.06.19	143	5592	348	
BH-164-PMT	12.06.19	146	3661	384	

Bibliography

Clark, B.G., “Pressuremeter Testing, Parts I, II and III”

Briaud, J-L., 1992, The Pressuremeter. Balkema.

Amar, S., Clark, B.G.F., Gambin, M.P. & Orr T.L.L., “The application of pressuremeter Test Results To Foundation Design In Europe”, A state-of-the-art report by the ISSMFE European Technical Committee on Pressuremeters, 1991.

Baguelin, F., Jezequel, J.F., Shields, “The Pressuremeter and Foundation Engineering” , First Edition, 1978, Trans Tech Publications.

Copies of ASTM Standards are available through www.astm.org

Pressuremeter

Gregg Drilling & Testing, Inc. uses a model G-Type MENARD pressuremeter to measure in situ strength and deformation properties of all types of soil and soft rock as well as ice and permafrost. Well established interpretation methods can be used to determine the following:

- Bearing capacity of shallow and deep foundations
- Settlement of all foundations
- Deformation of all laterally loaded piles and sheet piles
- Resistance of anchors

The pressuremeter consists of a probe, a control unit, and tubing used to connect the probe with the control unit. The probe is a cylindrical metal casing with an inner rubber membrane and outer protective sheath constructed to form three independent cells. When in use the central cell is inflated with water and the guard cells with gas. The control unit houses all regulators, valves, and pressure gages to reduce and control the pressure applied to the probe cells. The control unit also supplies the flow of water to the measuring cell.

The test is accomplished by placing the probe at a test depth in a pre-drilled borehole. The probe can also be driven to a test depth within a slotted casing. Equal increments of pressure are then applied to the probe and held constant. Volume changes are noted at select time intervals after each pressure increment. By plotting the injected volume versus pressure (*figure Volume vs Pressure*), one can obtain an in situ pressure volume curve. The "limit pressure" (P_L) is the pressure at which failure occurs and through well established correlations, can be directly related to bearing capacity. The slope of the pressure volume curve is called the Menard modulus and can be used to calculate settlements.

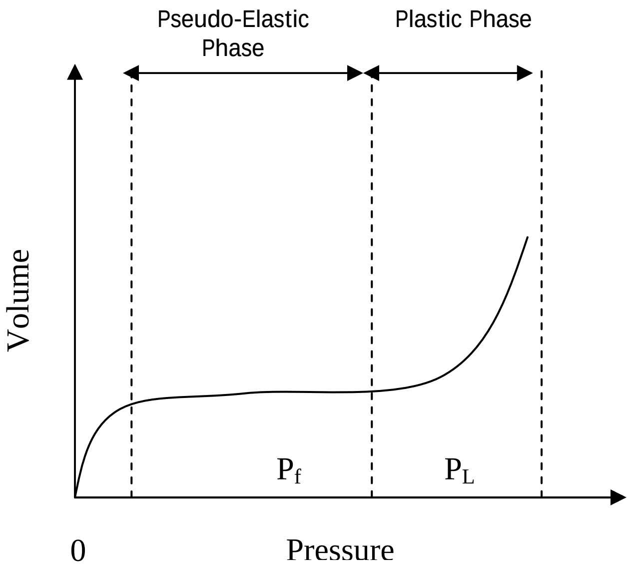


Figure Volume vs. Pressure Plot

TEXAM Pressuremeter Test

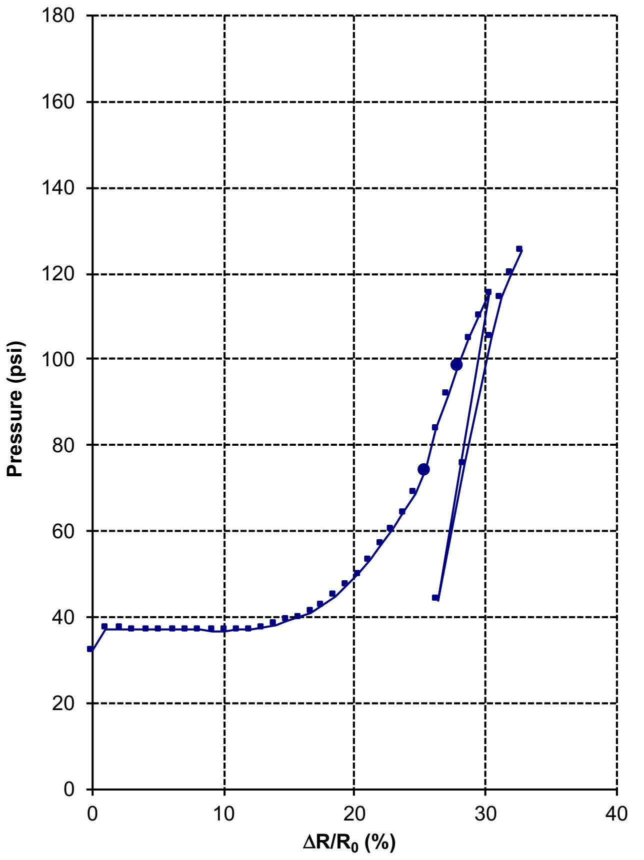
Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	73.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	**Volume in³**	**Pressure psi**	**Volume in³**	**$\Delta R/R_0$ %**
0	0.0	32	0.0	0.00
6	2.4	37	2.4	1.05
6	4.9	37	4.9	2.09
7	7.3	37	7.3	3.13
7	9.8	37	9.7	4.16
8	12.2	37	12.2	5.17
8	14.6	37	14.6	6.18
9	17.1	37	17.0	7.18
9	19.5	37	19.5	8.17
9	22.0	37	21.9	9.15
9	24.4	37	24.4	10.12
10	26.9	37	26.8	11.08
10	29.3	37	29.2	12.03
11	31.7	37	31.7	12.98
12	34.2	38	34.1	13.91
13	36.6	39	36.5	14.84
14	39.1	40	39.0	15.76
15	41.5	41	41.4	16.68
17	43.9	43	43.9	17.58
19	46.4	45	46.3	18.48
22	48.8	47	48.7	19.37
25	51.3	50	51.1	20.26
28	53.7	53	53.6	21.13
32	56.1	57	56.0	22.00
36	58.6	60	58.4	22.87
39	61.0	64	60.8	23.72
44	63.5	69	63.2	24.57
50	65.9	74	65.7	25.41
59	68.3	84	68.1	26.24
68	70.8	92	70.5	27.07
75	73.2	99	72.9	27.89
81	75.7	105	75.3	28.71
86	78.1	110	77.7	29.53
92	80.6	115	80.1	30.34
20	68.3	44	68.2	26.31
52	74.4	76	74.2	28.35
82	80.6	105	80.1	30.36
91	83.0	115	82.5	31.15
97	85.4	120	85.0	31.95
102	87.9	125	87.4	32.75

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Pressuremeter Test - Corrected Curve



Test Results

Pressiometer modulus E:	**1,665 psi**
Ultimate pressure P_L:	**160 psi**
Ratio E / P_L:	10.44
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

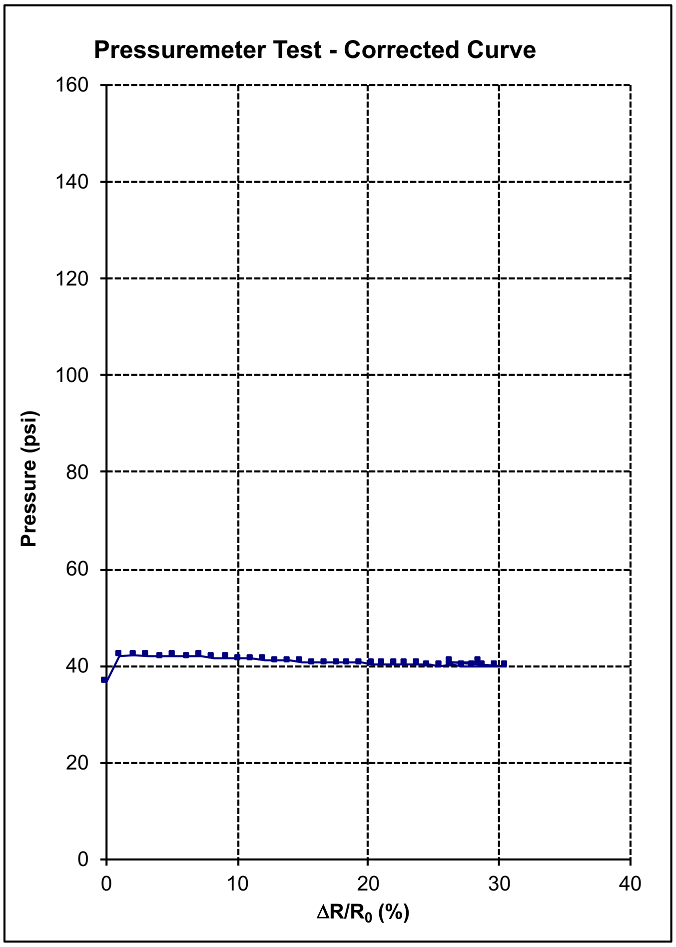
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	83.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	37	0.0	0.00
6	2.4	42	2.4	1.05
7	4.9	42	4.8	2.09
7	7.3	42	7.3	3.13
8	9.8	42	9.7	4.16
8	12.2	42	12.2	5.17
9	14.6	42	14.6	6.18
9	17.1	42	17.0	7.18
9	19.5	42	19.5	8.17
9	22.0	42	21.9	9.14
10	24.4	42	24.4	10.12
10	26.9	41	26.8	11.08
10	29.3	41	29.2	12.03
10	31.7	41	31.7	12.98
10	34.2	41	34.1	13.92
10	36.6	41	36.6	14.85
10	39.1	41	39.0	15.77
11	41.5	41	41.4	16.69
11	43.9	41	43.9	17.60
11	46.4	41	46.3	18.50
11	48.8	41	48.8	19.39
11	51.3	40	51.2	20.28
11	53.7	40	53.6	21.16
11	56.1	40	56.1	22.04
11	58.6	40	58.5	22.91
11	61.0	40	61.0	23.77
11	63.5	40	63.4	24.63
11	65.9	40	65.9	25.48
11	68.3	40	68.3	26.33
11	70.8	40	70.7	27.17
12	73.2	40	73.2	28.00
12	75.7	40	75.6	28.83
12	78.1	40	78.1	29.65
12	80.6	40	80.5	30.47
12	68.3	41	68.3	26.32
12	74.4	41	74.4	28.41
	80.6			
	83.0			
	85.4			
	87.9			

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

Pressiometer modulus E:	**n.a.**
Ultimate pressure P_L:	**n.a**
Ratio E / P_L:	n.a.
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

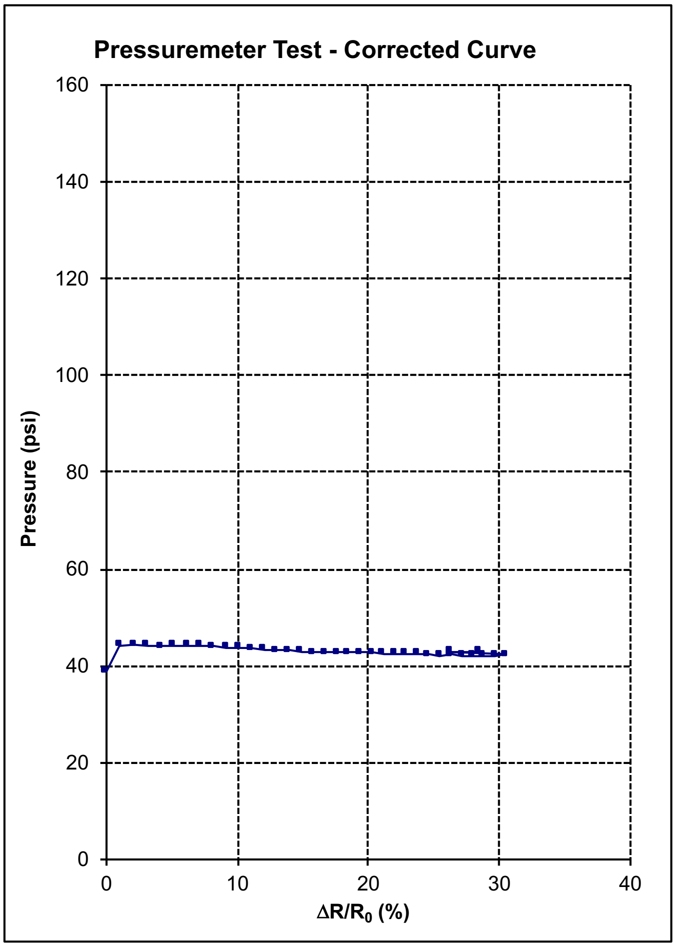
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	88.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	**Volume in³**	**Pressure psi**	**Volume in³**	**$\Delta R/R_0$ %**
0	0.0	39	0.0	0.00
6	2.4	44	2.4	1.05
7	4.9	44	4.8	2.09
7	7.3	44	7.3	3.13
8	9.8	44	9.7	4.16
8	12.2	44	12.2	5.17
9	14.6	44	14.6	6.18
9	17.1	44	17.0	7.18
9	19.5	44	19.5	8.17
9	22.0	44	21.9	9.14
10	24.4	44	24.4	10.12
10	26.9	44	26.8	11.08
10	29.3	43	29.2	12.03
10	31.7	43	31.7	12.98
10	34.2	43	34.1	13.92
10	36.6	43	36.6	14.85
10	39.1	43	39.0	15.77
11	41.5	43	41.4	16.69
11	43.9	43	43.9	17.60
11	46.4	43	46.3	18.50
11	48.8	43	48.8	19.39
11	51.3	43	51.2	20.28
11	53.7	43	53.6	21.16
11	56.1	43	56.1	22.04
11	58.6	42	58.5	22.91
11	61.0	42	61.0	23.77
11	63.5	42	63.4	24.63
11	65.9	42	65.9	25.48
11	68.3	42	68.3	26.33
11	70.8	42	70.7	27.17
12	73.2	42	73.2	28.00
12	75.7	42	75.6	28.83
12	78.1	42	78.1	29.65
12	80.6	42	80.5	30.47
12	68.3	43	68.3	26.32
12	74.4	43	74.4	28.41
	80.6			
	83.0			
	85.4			
	87.9			

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

Pressiometer modulus E:	**n.a.**
Ultimate pressure P_L:	**n.a**
Ratio E / P_L:	n.a.
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	93.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	41	0.0	0.00	
1	2.4	41	2.4	1.06	
2	4.9	42	4.9	2.10	
4	7.3	43	7.3	3.14	
5	9.8	43	9.7	4.16	
6	12.2	43	12.2	5.18	
8	14.6	45	14.6	6.18	
11	17.1	48	17.0	7.18	
13	19.5	49	19.5	8.16	
25	22.0	60	21.9	9.13	
40	24.4	75	24.3	10.08	
55	26.9	90	26.6	11.02	
95	29.3	130	28.9	11.92	◀
153	31.7	188	31.2	12.78	
209	34.2	243	33.4	13.64	
258	36.6	292	35.7	14.50	◀
84	34.2	118	33.9	13.82	
239	36.6	273	35.7	14.53	
295	39.1	329	38.0	15.38	
323	41.5	357	40.3	16.26	
76	37.8	110	37.6	15.22	
293	41.5	326	40.4	16.30	
346	43.9	380	42.7	17.14	
372	46.4	405	45.0	18.01	
386	48.8	420	47.4	18.89	
409	51.3	442	49.8	19.75	
427	53.7	461	52.1	20.61	
442	56.1	475	54.5	21.47	
455	58.6	487	56.9	22.33	
468	61.0	501	59.3	23.18	
478	63.5	511	61.7	24.03	
480	65.9	513	64.1	24.88	
485	68.3	517	66.6	25.73	
507	70.8	540	68.9	26.54	
515	73.2	547	71.3	27.37	
522	75.7	555	73.7	28.19	
532	78.1	565	76.1	29.01	
539	80.6	571	78.6	29.82	
9	82.3	41	82.3	31.07	

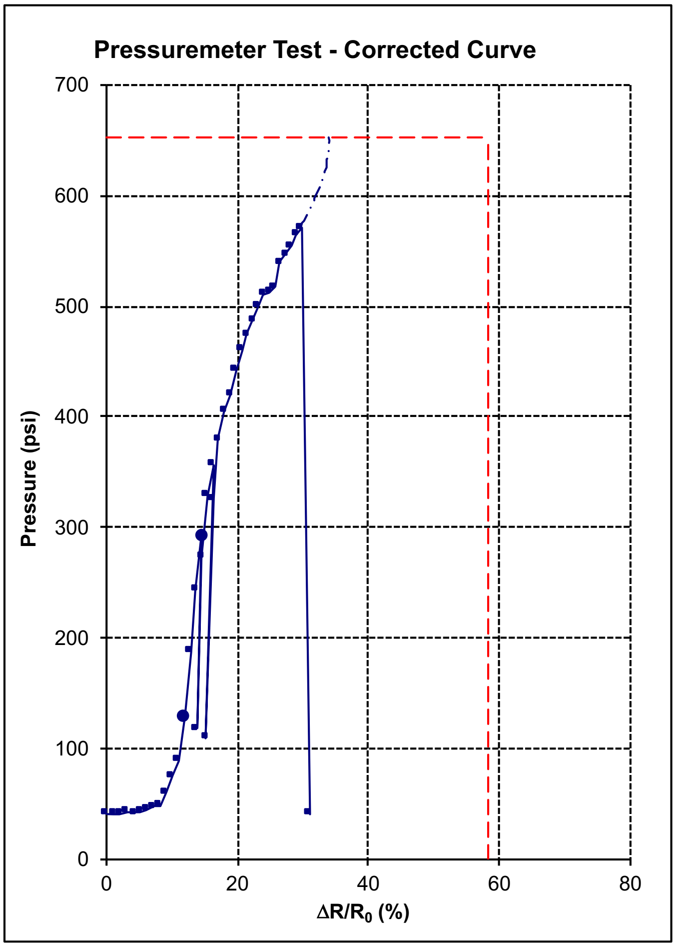
Remarks

Calibrations References:

Soil Description:

Drilling method: MUD

Notes:



Test Results

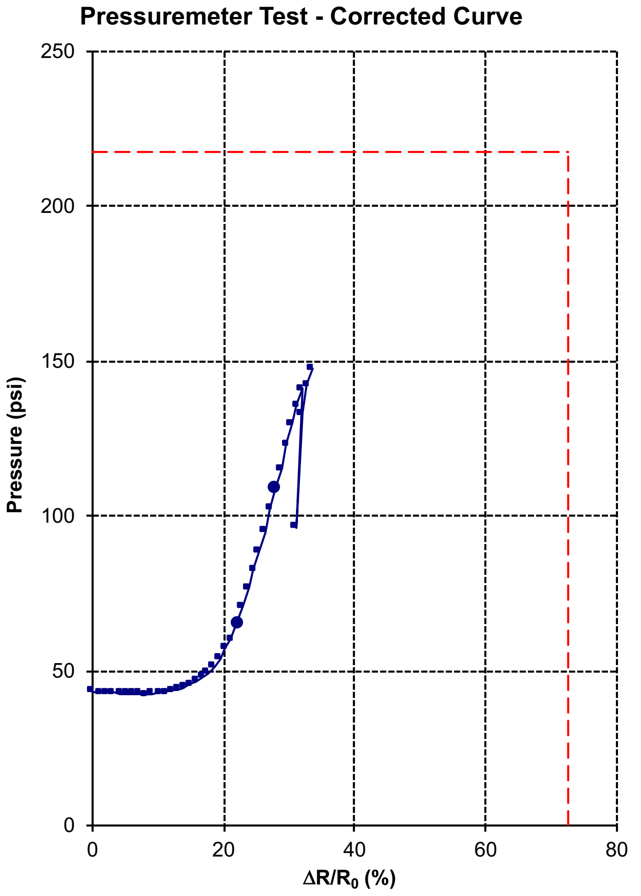
Pressiometer modulus E:	**9,471 psi**
Ultimate pressure P_L:	**653 psi**
Ratio E / P_L:	14.51
Yield pressure P_F:	292 psi
Ratio P_L / P_F:	2.23

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	98.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	43	0.0	0.00	
1	2.4	43	2.4	1.06	
2	4.9	43	4.9	2.10	
2	7.3	43	7.3	3.14	
3	9.8	42	9.8	4.17	
3	12.2	43	12.2	5.18	
4	14.6	43	14.6	6.19	
4	17.1	43	17.1	7.19	
5	19.5	42	19.5	8.18	
5	22.0	43	21.9	9.16	
6	24.4	43	24.4	10.13	
6	26.9	43	26.8	11.09	
7	29.3	43	29.3	12.04	
8	31.7	44	31.7	12.99	
9	34.2	45	34.1	13.92	
10	36.6	46	36.6	14.85	
11	39.1	47	39.0	15.77	
13	41.5	48	41.4	16.69	
15	43.9	49	43.9	17.60	
17	46.4	51	46.3	18.49	
19	48.8	54	48.7	19.39	
23	51.3	57	51.2	20.27	
26	53.7	60	53.6	21.15	
31	56.1	65	56.0	22.02	◄
37	58.6	71	58.4	22.88	
43	61.0	77	60.9	23.74	
49	63.5	83	63.3	24.59	
55	65.9	89	65.7	25.43	
61	68.3	95	68.1	26.27	
68	70.8	102	70.5	27.10	
75	73.2	109	73.0	27.93	
82	75.7	115	75.4	28.75	
89	78.1	123	77.8	29.56	
96	80.6	130	80.2	30.37	
102	83.0	136	82.6	31.18	
107	85.4	141	85.0	31.98	
63	82.4	96	82.2	31.03	
99	85.4	133	85.1	31.99	
109	87.9	142	87.5	32.79	
114	90.3	148	89.9	33.58	



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

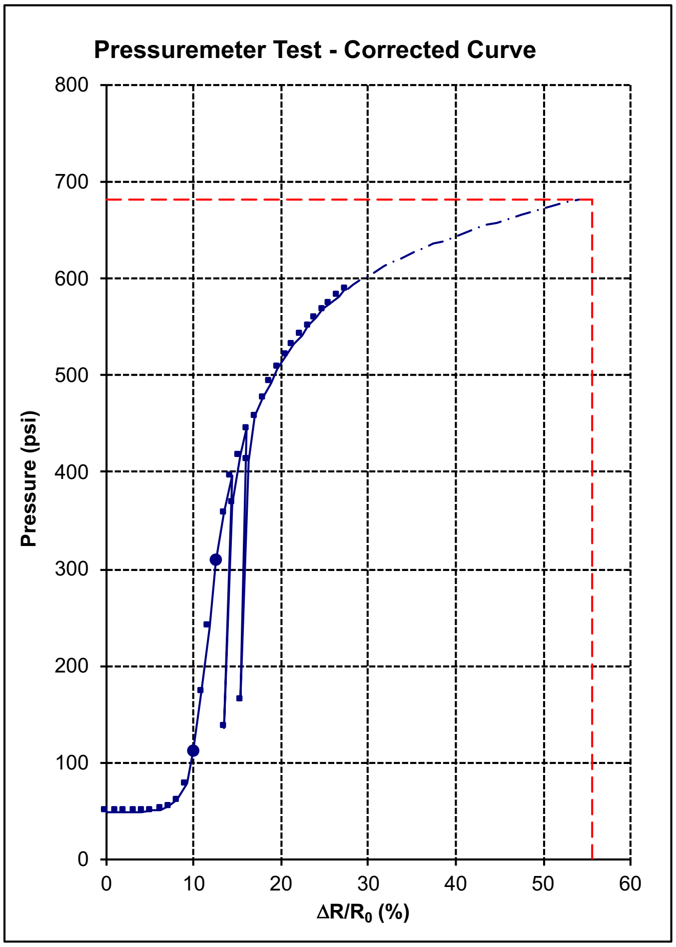
Test Results

Pressiometer modulus E:	**1,236 psi**
Ultimate pressure P_L:	**218 psi**
Ratio E / P_L:	5.68
Yield pressure P_F:	65 psi
Ratio P_L / P_F:	3.33

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	113.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	50	0.0	0.00	
1	2.4	50	2.4	1.06	
1	4.9	49	4.9	2.11	
2	7.3	49	7.3	3.14	
3	9.8	49	9.8	4.17	
4	12.2	50	12.2	5.18	
7	14.6	52	14.6	6.19	
10	17.1	54	17.1	7.18	
17	19.5	61	19.5	8.16	
34	22.0	77	21.8	9.11	
68	24.4	112	24.2	10.03	◄
131	26.9	174	26.4	10.91	
198	29.3	241	28.6	11.77	
265	31.7	308	30.8	12.62	◄
316	34.2	358	33.0	13.49	
354	36.6	396	35.3	14.37	
94	33.6	137	33.2	13.57	
326	36.6	368	35.4	14.41	
376	39.1	417	37.7	15.27	
403	41.5	444	40.0	16.15	
123	38.4	165	38.0	15.39	
371	41.5	413	40.1	16.19	
416	43.9	457	42.4	17.04	
435	46.4	476	44.8	17.92	
452	48.8	493	47.1	18.80	
467	51.3	508	49.5	19.67	
479	53.7	520	51.9	20.54	
491	56.1	532	54.3	21.41	
501	58.6	541	56.7	22.27	
511	61.0	551	59.1	23.12	
519	63.5	559	61.5	23.97	
528	65.9	568	64.0	24.82	
534	68.3	574	66.4	25.66	
542	70.8	582	68.8	26.50	
549	73.2	589	71.2	27.33	



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

Pressiometer modulus E:	**11,231 psi**
Ultimate pressure P_L:	**682 psi**
Ratio E / P_L:	16.48
Yield pressure P_F:	308 psi
Ratio P_L / P_F:	2.21

TEXAM COMPANION V.3.3

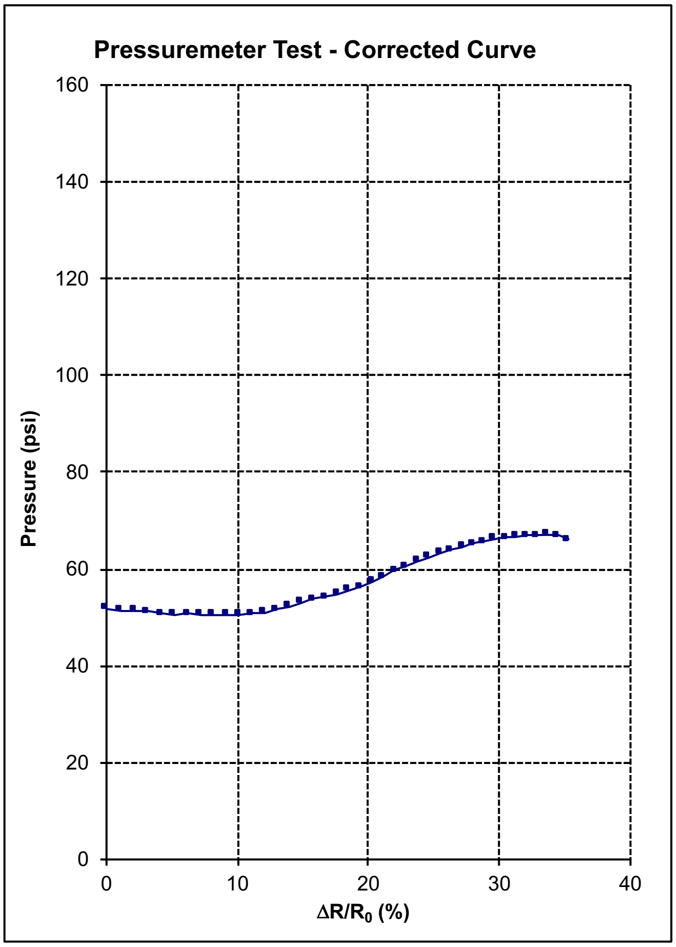
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	118.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	52	0.0	0.00
1	2.4	52	2.4	1.06
1	4.9	52	4.9	2.11
2	7.3	51	7.3	3.14
3	9.8	51	9.8	4.17
3	12.2	51	12.2	5.18
3	14.6	51	14.6	6.19
4	17.1	51	17.1	7.19
4	19.5	51	19.5	8.18
4	22.0	50	22.0	9.16
5	24.4	51	24.4	10.13
6	26.9	51	26.8	11.09
6	29.3	51	29.3	12.04
7	31.7	52	31.7	12.99
8	34.2	52	34.1	13.93
9	36.6	53	36.6	14.85
10	39.1	54	39.0	15.78
11	41.5	54	41.5	16.69
11	43.9	55	43.9	17.60
12	46.4	56	46.3	18.50
13	48.8	56	48.8	19.39
15	51.3	57	51.2	20.28
16	53.7	59	53.6	21.16
17	56.1	60	56.1	22.04
18	58.6	61	58.5	22.90
19	61.0	62	61.0	23.77
20	63.5	62	63.4	24.62
21	65.9	63	65.8	25.47
21	68.3	64	68.3	26.32
22	70.8	65	70.7	27.16
23	73.2	65	73.1	27.99
23	75.7	66	75.6	28.82
24	78.1	66	78.0	29.64
24	80.6	66	80.5	30.46
24	83.0	67	82.9	31.27
25	85.4	67	85.3	32.08
25	87.9	67	87.8	32.89
25	90.3	67	90.2	33.68
25	92.8	67	92.7	34.48
24	95.2	66	95.1	35.27

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:


Pressuremeter Test - Corrected Curve

Test Results

Pressiometer modulus E:	**n.a.**
Ultimate pressure P_L:	**n.a**
Ratio E / P_L:	n.a.
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

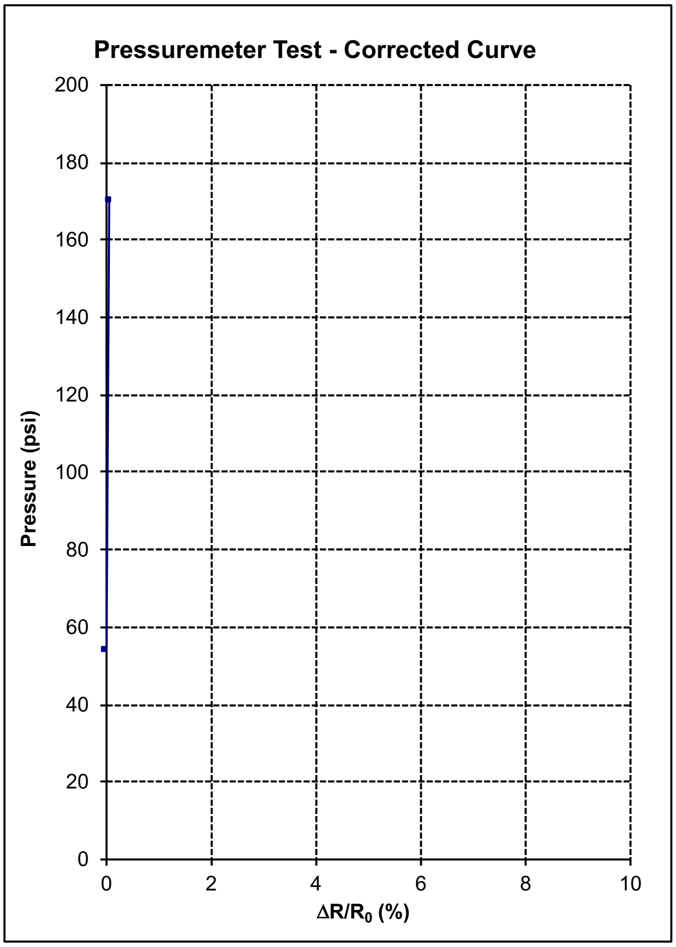
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	123.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	54	0.0	0.00
116	0.6	170	0.1	0.05
	4.9			
	7.3			
	9.8			
	12.2			
	14.6			
	17.1			
	19.5			
	22.0			
	24.4			
	26.9			
	29.3			
	31.7			
	34.2			
	36.6			
	39.1			
	41.5			
	43.9			
	46.4			
	48.8			
	51.3			
	53.7			
	56.1			
	58.6			
	61.0			
	63.5			
	65.9			
	68.3			
	70.8			
	73.2			
	75.7			
	78.1			
	80.6			
	83.0			
	85.4			
	87.9			
	90.3			
	92.8			
	95.2			

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

Pressiometer modulus E:	**n.a.**
Ultimate pressure P_L:	**n.a.**
Ratio E / P_L:	n.a.
Yield pressure P_F:	#N/A
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-150-PMT	Test depth:	128.00 ft
Test date: (mm/dd/yyyy)	11/14/2019	Manometer height above ground:	1.64 ft
Test number:	10	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	56	0.0	0.00
1	2.4	56	2.4	1.06
2	4.9	56	4.9	2.10
2	7.3	56	7.3	3.14
3	9.8	56	9.8	4.17
4	12.2	56	12.2	5.18
4	14.6	56	14.6	6.19
4	17.1	56	17.1	7.19
5	19.5	56	19.5	8.18
6	22.0	57	21.9	9.16
6	24.4	57	24.4	10.13
6	26.9	57	26.8	11.09
7	29.3	57	29.3	12.04
8	31.7	58	31.7	12.99
8	34.2	58	34.1	13.92
9	36.6	58	36.6	14.85
10	39.1	59	39.0	15.78
10	41.5	60	41.5	16.69
11	43.9	60	43.9	17.60
12	46.4	61	46.3	18.50
13	48.8	62	48.8	19.39
15	51.3	64	51.2	20.28
17	53.7	65	53.6	21.16
18	56.1	67	56.1	22.03
20	58.6	69	58.5	22.90
23	61.0	71	60.9	23.76
27	63.5	75	63.4	24.61
32	65.9	80	65.8	25.46
35	68.3	83	68.2	26.30
45	70.8	93	70.6	27.12
55	73.2	103	73.0	27.95
64	75.7	112	75.4	28.76
73	78.1	121	77.8	29.58
82	80.6	130	80.2	30.38
91	83.0	138	82.6	31.19
98	85.4	146	85.1	31.99
55	81.8	102	81.6	30.83
93	85.4	141	85.1	31.99
103	87.9	151	87.5	32.79
111	90.3	159	89.9	33.57

Remarks

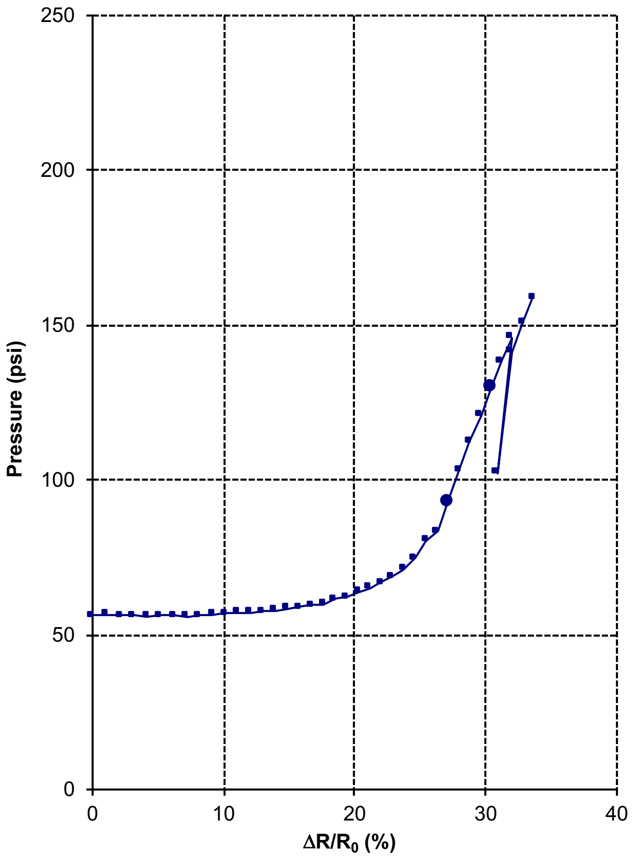
Calibrations References:

Soil Description:

Drilling method: MUD

Notes:

Pressuremeter Test - Corrected Curve



Test Results

Pressiometer modulus E:	**1,928 psi**
Ultimate pressure P_L:	**232 psi**
Ratio E / P_L:	8.31
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

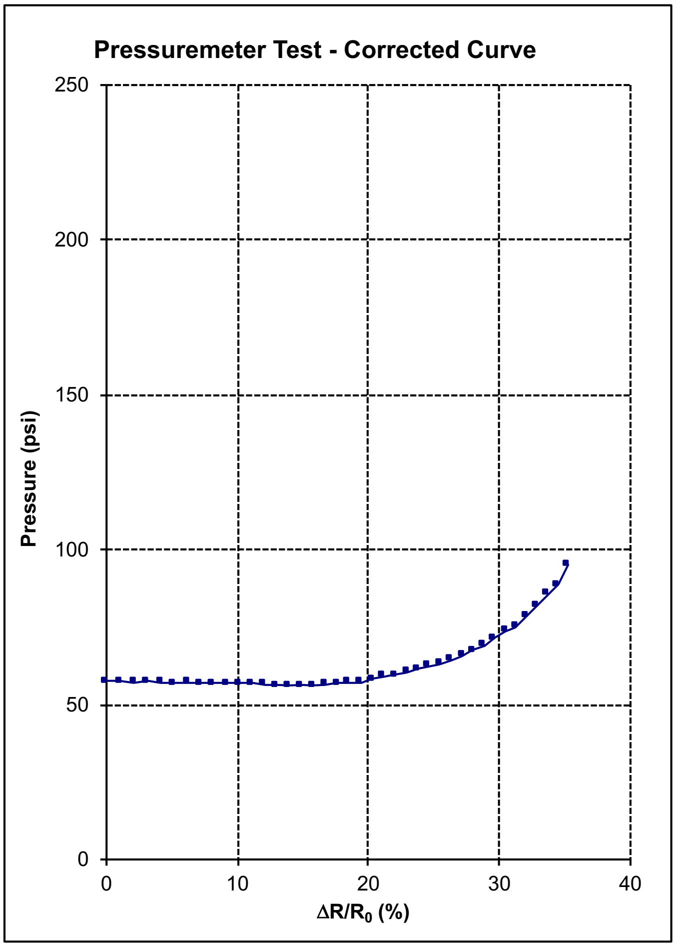
Project name: BART SAN JOSE MOTT MACDONALD
Borehole name: BH1
Test date: (mm/dd/yyyy) 11/11/2019
Test number: BH-150-PMT
Probe size: N

Use of a slotted casing: No
Test depth: 131.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	57	0.0	0.00
1	2.4	58	2.4	1.06
1	4.9	57	4.9	2.11
2	7.3	57	7.3	3.14
3	9.8	57	9.8	4.17
3	12.2	57	12.2	5.18
4	14.6	57	14.6	6.19
4	17.1	57	17.1	7.19
4	19.5	57	19.5	8.18
4	22.0	57	22.0	9.16
4	24.4	57	24.4	10.13
5	26.9	57	26.8	11.09
5	29.3	57	29.3	12.04
5	31.7	56	31.7	12.99
5	34.2	56	34.2	13.93
6	36.6	56	36.6	14.86
6	39.1	56	39.0	15.78
6	41.5	57	41.5	16.70
7	43.9	57	43.9	17.61
7	46.4	57	46.4	18.51
7	48.8	57	48.8	19.40
8	51.3	58	51.2	20.29
9	53.7	59	53.7	21.17
10	56.1	59	56.1	22.04
11	58.6	61	58.5	22.91
12	61.0	61	61.0	23.77
13	63.5	62	63.4	24.63
14	65.9	63	65.9	25.48
15	68.3	64	68.3	26.32
16	70.8	66	70.7	27.16
18	73.2	67	73.2	28.00
20	75.7	69	75.6	28.82
22	78.1	71	78.0	29.64
25	80.6	74	80.5	30.46
26	83.0	75	82.9	31.27
29	85.4	79	85.3	32.08
33	87.9	82	87.7	32.87
37	90.3	86	90.2	33.67
40	92.8	89	92.6	34.46
46	95.2	95	95.0	35.24

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

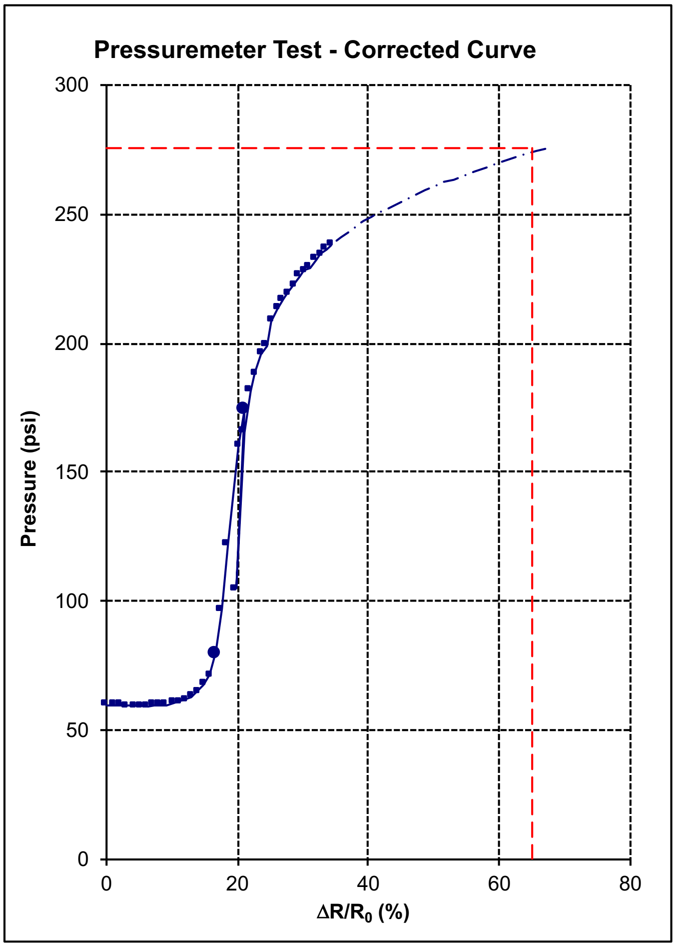
Pressiometer modulus E:	**n.a.**
Ultimate pressure P_L:	**n.a.**
Ratio E / P_L:	n.a.
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM Pressuremeter Test

Project name: BART SAN JOSE MOTT MACDONALD
Borehole name: BH1
Test date: (mm/dd/yyyy) 11/11/2019
Test number: BH-150-PMT
Probe size: N

Use of a slotted casing: No
Test depth: 136.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	60	0.0	0.00	
1	2.4	60	2.4	1.06	
2	4.9	60	4.9	2.10	
2	7.3	60	7.3	3.14	
3	9.8	59	9.8	4.17	
3	12.2	59	12.2	5.18	
4	14.6	59	14.6	6.19	
4	17.1	60	17.1	7.19	
5	19.5	60	19.5	8.18	
5	22.0	60	21.9	9.16	
6	24.4	60	24.4	10.13	
7	26.9	61	26.8	11.09	
8	29.3	62	29.3	12.04	
9	31.7	63	31.7	12.98	
12	34.2	65	34.1	13.92	
15	36.6	68	36.6	14.85	
19	39.1	71	39.0	15.76	
27	41.5	80	41.4	16.67	◄
44	43.9	97	43.8	17.55	
70	46.4	122	46.1	18.42	
108	51.3	160	50.8	20.15	
122	53.7	174	53.2	21.01	◄
53	50.0	105	49.8	19.78	
114	53.7	166	53.3	21.02	
130	56.1	182	55.6	21.88	
137	58.6	188	58.1	22.74	
144	61.0	196	60.5	23.59	
147	63.5	199	62.9	24.45	
157	65.9	209	65.3	25.29	
162	68.3	213	67.7	26.13	
165	70.8	217	70.1	26.97	
168	73.2	219	72.6	27.80	
171	75.7	223	75.0	28.62	
175	78.1	226	77.4	29.45	
177	80.6	228	79.9	30.26	
178	83.0	229	82.3	31.08	
181	85.4	233	84.7	31.88	
183	87.9	235	87.2	32.68	
185	90.3	236	89.6	33.48	
187	92.8	238	92.0	34.28	



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

Pressiometer modulus E: **3,437 psi**

Ultimate pressure P_L: **276 psi**

Ratio E / P_L: 12.47

Yield pressure P_F: 174 psi

Ratio P_L / P_F: 1.58

TEXAM COMPANION V.3.3

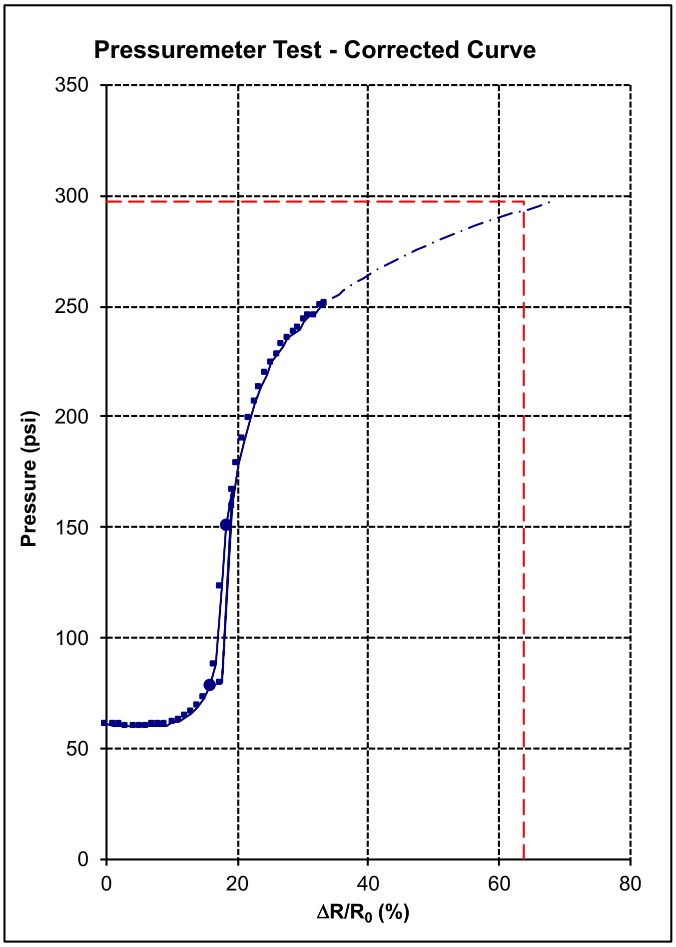
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	139.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-150-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	61	0.0	0.00	
0	2.4	61	2.4	1.06	
1	4.9	61	4.9	2.11	
2	7.3	60	7.3	3.14	
2	9.8	60	9.8	4.17	
3	12.2	60	12.2	5.19	
3	14.6	60	14.6	6.19	
4	17.1	60	17.1	7.19	
4	19.5	60	19.5	8.18	
4	22.0	60	22.0	9.16	
6	24.4	62	24.4	10.13	
7	26.9	63	26.8	11.09	
9	29.3	64	29.3	12.04	
11	31.7	66	31.7	12.98	
14	34.2	69	34.1	13.92	
18	36.6	73	36.5	14.84	
24	39.1	78	39.0	15.76	◄
34	41.5	88	41.4	16.66	
69	43.9	123	43.7	17.52	
97	46.4	150	46.0	18.38	◄
113	48.8	167	48.4	19.25	
26	43.9	79	43.8	17.58	
106	48.8	159	48.4	19.26	
125	51.3	178	50.8	20.13	
136	53.7	189	53.2	20.99	
146	56.1	199	55.6	21.86	
153	58.6	206	58.0	22.72	
160	61.0	213	60.4	23.57	
166	63.5	219	62.8	24.42	
171	65.9	224	65.2	25.27	
175	68.3	228	67.7	26.11	
179	70.8	232	70.1	26.95	
182	73.2	235	72.5	27.78	
185	75.7	238	75.0	28.61	
187	78.1	240	77.4	29.43	
191	80.6	243	79.8	30.24	
193	83.0	246	82.2	31.06	
193	85.4	246	84.7	31.87	
197	87.9	250	87.1	32.67	
198	90.3	251	89.6	33.47	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

Pressiometer modulus E:	**4,292 psi**
Ultimate pressure P_L:	**297 psi**
Ratio E / P_L:	14.44
Yield pressure P_F:	150 psi
Ratio P_L / P_F:	1.98

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

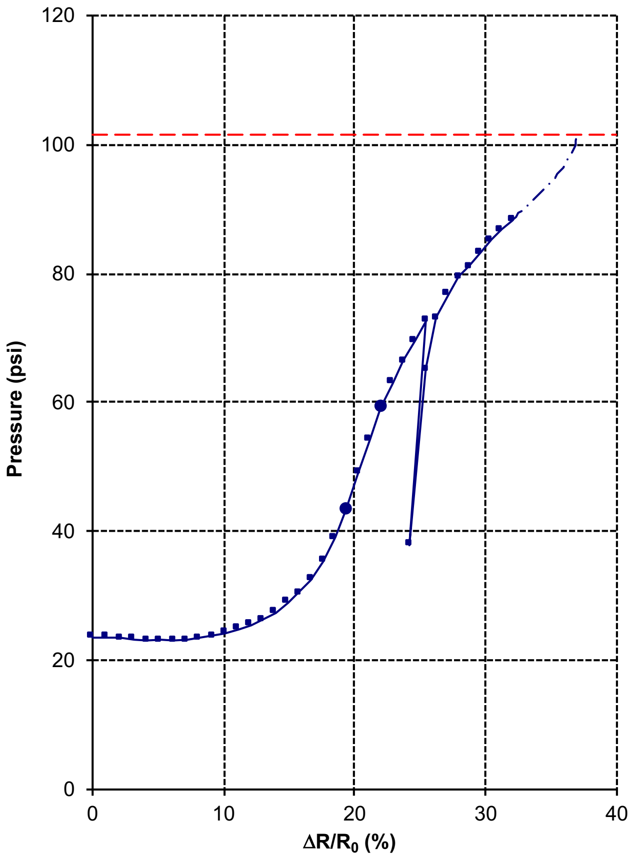
Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-158-PMT	Test depth:	53.00 ft
Test date: (mm/dd/yyyy)	11/25/2019	Manometer height above ground:	1.64 ft
Test number:	1	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	24	0.0	0.00	
1	2.4	24	2.4	1.06	
1	4.9	23	4.9	2.11	
2	7.3	23	7.3	3.14	
2	9.8	23	9.8	4.17	
3	12.2	23	12.2	5.18	
3	14.6	23	14.6	6.19	
3	17.1	23	17.1	7.19	
4	19.5	24	19.5	8.18	
4	22.0	24	21.9	9.16	
5	24.4	24	24.4	10.13	
6	26.9	25	26.8	11.09	
7	29.3	26	29.3	12.04	
8	31.7	26	31.7	12.99	
9	34.2	27	34.1	13.92	
11	36.6	29	36.6	14.85	
13	39.1	31	39.0	15.77	
15	41.5	33	41.4	16.68	
18	43.9	35	43.9	17.59	
22	46.4	39	46.3	18.48	
26	48.8	43	48.7	19.37	◀
32	51.3	49	51.1	20.25	
37	53.7	54	53.5	21.13	
42	56.1	59	56.0	22.00	◀
46	58.6	63	58.4	22.86	
49	61.0	66	60.8	23.72	
53	63.5	70	63.2	24.57	
56	65.9	73	65.7	25.42	
21	62.2	38	62.2	24.19	
48	65.9	65	65.7	25.43	
56	68.3	73	68.1	26.26	
60	70.8	77	70.5	27.10	
63	73.2	79	73.0	27.93	
65	75.7	81	75.4	28.76	
67	78.1	83	77.8	29.58	
69	80.6	85	80.3	30.39	
71	83.0	87	82.7	31.21	
72	85.4	88	85.1	32.01	
	87.9				
	90.3				

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Pressuremeter Test - Corrected Curve



Test Results

Pressiometer modulus E:	**965 psi**
Ultimate pressure P_L:	**n.a psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	59 psi
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-158-PMT	Test depth:	126.00 ft
Test date: (mm/dd/yyyy)	11/27/2019	Manometer height above ground:	1.64 ft
Test number:	3	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	55	0.0	0.00	
0	2.4	55	2.4	1.06	
1	4.9	55	4.9	2.11	
2	7.3	55	7.3	3.14	
2	9.8	55	9.8	4.17	
3	12.2	55	12.2	5.18	
4	14.6	56	14.6	6.19	
6	17.1	57	17.1	7.19	
8	19.5	58	19.5	8.17	
11	22.0	61	21.9	9.15	
18	24.4	68	24.3	10.11	
37	26.9	87	26.7	11.04	
59	29.3	109	29.1	11.96	◄
83	31.7	133	31.4	12.87	
100	34.2	150	33.8	13.78	
128	36.6	177	36.1	14.68	
146	39.1	195	38.5	15.57	◄
162	41.5	210	40.9	16.47	
174	43.9	222	43.3	17.36	
181	46.4	229	45.7	18.25	
190	48.8	238	48.1	19.14	
200	51.3	248	50.5	20.01	
131	50.0	180	49.5	19.67	
106	48.8	154	48.4	19.26	
89	47.6	137	47.2	18.84	
70	46.4	119	46.1	18.42	
114	47.6	162	47.1	18.80	
140	48.8	188	48.3	19.21	
159	50.0	207	49.4	19.63	
177	51.3	225	50.6	20.05	
197	53.7	245	52.9	20.90	
208	56.1	256	55.3	21.77	
216	58.6	263	57.7	22.63	
151	57.4	199	56.8	22.28	
122	56.1	170	55.7	21.89	
100	54.9	148	54.5	21.48	
85	53.7	133	53.4	21.06	
131	54.9	179	54.4	21.44	
145	56.1	193	55.6	21.85	
182	57.4	229	56.6	22.24	

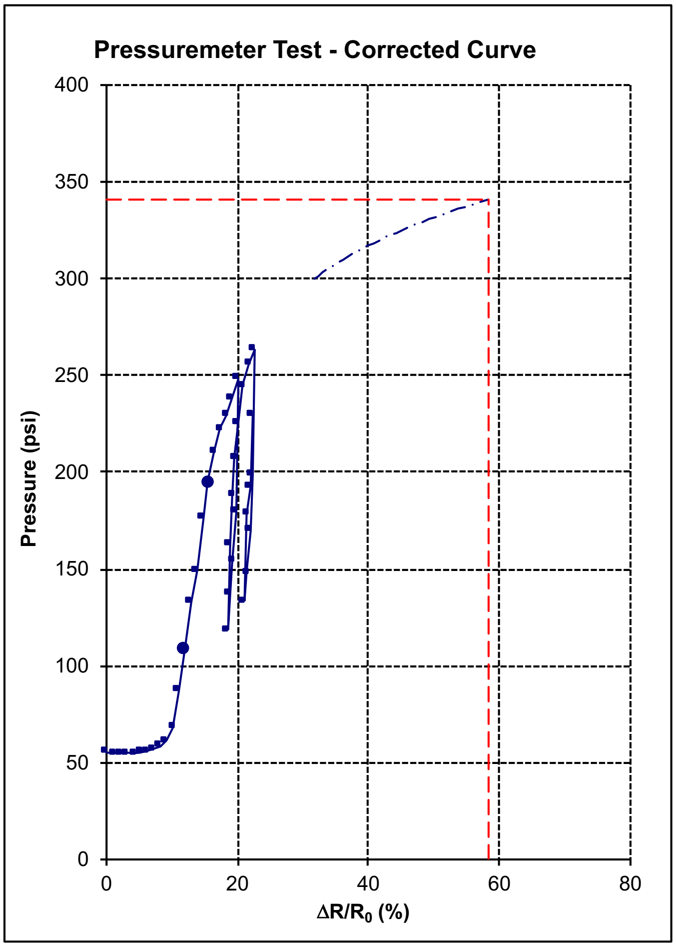
Remarks

Calibrations References:

Soil Description:

Drilling method: MUD

Notes:



Test Results

Pressiometer modulus E:	**3,597 psi**
Ultimate pressure P_L:	**341 psi**
Ratio E / P_L:	10.55
Yield pressure P_F:	195 psi
Ratio P_L / P_F:	1.75

TEXAM COMPANION V.3.3

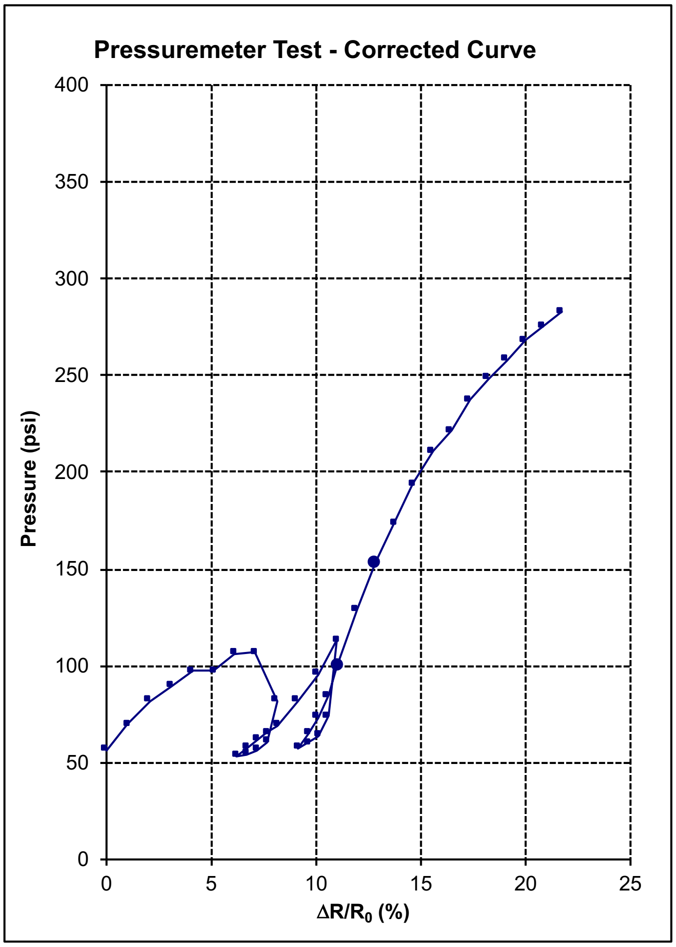
TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-158-PMT	Test depth:	129.00 ft
Test date: (mm/dd/yyyy)	11/27/2019	Manometer height above ground:	1.64 ft
Test number:	2	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	57	0.0	0.00
14	2.4	70	2.4	1.04
27	4.9	82	4.8	2.06
35	7.3	89	7.2	3.09
43	9.8	97	9.6	4.10
44	12.2	97	12.0	5.12
54	14.6	106	14.4	6.11
54	17.1	107	16.9	7.11
30	19.5	82	19.4	8.14
8	18.3	61	18.3	7.68
4	17.1	57	17.1	7.19
2	15.9	55	15.9	6.69
0	14.6	53	14.6	6.20
5	15.9	58	15.8	6.69
9	17.1	62	17.1	7.18
13	18.3	66	18.3	7.67
17	19.5	69	19.5	8.16
30	22.0	82	21.8	9.12
44	24.4	96	24.2	10.07
62	26.9	113	26.6	11.00
23	25.6	74	25.5	10.58
12	24.4	64	24.4	10.12
8	23.2	60	23.2	9.64
6	22.0	58	21.9	9.15
13	23.2	65	23.1	9.63
22	24.4	74	24.3	10.10
33	25.6	85	25.5	10.57
49	26.9	100	26.7	11.02
78	29.3	129	29.0	11.93
103	31.7	153	31.3	12.84
123	34.2	173	33.7	13.75
143	36.6	194	36.0	14.65
161	39.1	211	38.4	15.55
171	41.5	221	40.8	16.45
187	43.9	237	43.2	17.34
199	46.4	248	45.6	18.23
209	48.8	258	48.0	19.11
219	51.3	268	50.4	19.99
226	53.7	276	52.8	20.86
234	56.1	283	55.2	21.73

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

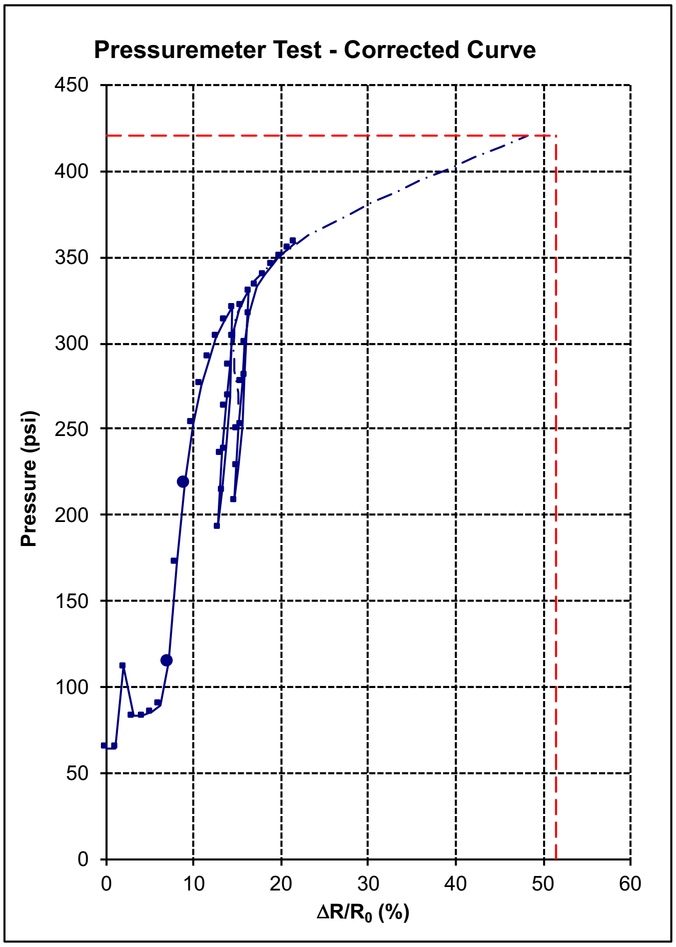
Pressiometer modulus E:	**4,379 psi**
Ultimate pressure P_L:	**363 psi**
Ratio E / P_L:	12.08
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-158-PMT	Test depth:	147.00 ft
Test date: (mm/dd/yyyy)	11/27/2019	Manometer height above ground:	1.64 ft
Test number:	5	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	64	0.0	0.00	
1	2.4	65	2.4	1.06	
49	4.9	112	4.7	2.02	
21	7.3	83	7.2	3.11	
22	9.8	83	9.7	4.14	
24	12.2	86	12.1	5.15	
29	14.6	90	14.5	6.15	
54	17.1	115	16.9	7.11	◀
112	19.5	172	19.1	8.01	
159	22.0	219	21.3	8.91	◀
194	24.4	253	23.6	9.83	
217	26.9	276	26.0	10.76	
233	29.3	292	28.4	11.69	
245	31.7	303	30.8	12.63	
255	34.2	313	33.2	13.55	
263	36.6	321	35.6	14.47	
211	35.4	269	34.6	14.09	
180	34.2	238	33.5	13.66	
156	33.0	214	32.3	13.23	
135	31.7	193	31.2	12.79	
178	33.0	236	32.3	13.20	
205	34.2	264	33.4	13.63	
229	35.4	287	34.5	14.06	
246	36.6	304	35.6	14.50	
264	39.1	322	38.0	15.40	
273	41.5	330	40.4	16.30	
224	40.3	281	39.4	15.92	
194	39.1	252	38.3	15.50	
170	37.8	228	37.2	15.08	
150	36.6	208	36.0	14.64	
192	37.8	250	37.1	15.04	
220	39.1	277	38.2	15.46	
242	40.3	300	39.3	15.89	
259	41.5	317	40.5	16.32	
275	43.9	333	42.9	17.21	
283	46.4	340	45.3	18.11	
289	48.8	346	47.7	19.00	
293	51.3	351	50.1	19.88	
298	53.7	355	52.5	20.76	
301	56.1	358	55.0	21.63	



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

Pressiometer modulus E:	**8,317 psi**
Ultimate pressure P_L:	**421 psi**
Ratio E / P_L:	19.77
Yield pressure P_F:	219 psi
Ratio P_L / P_F:	1.92

TEXAM COMPANION V.3.3

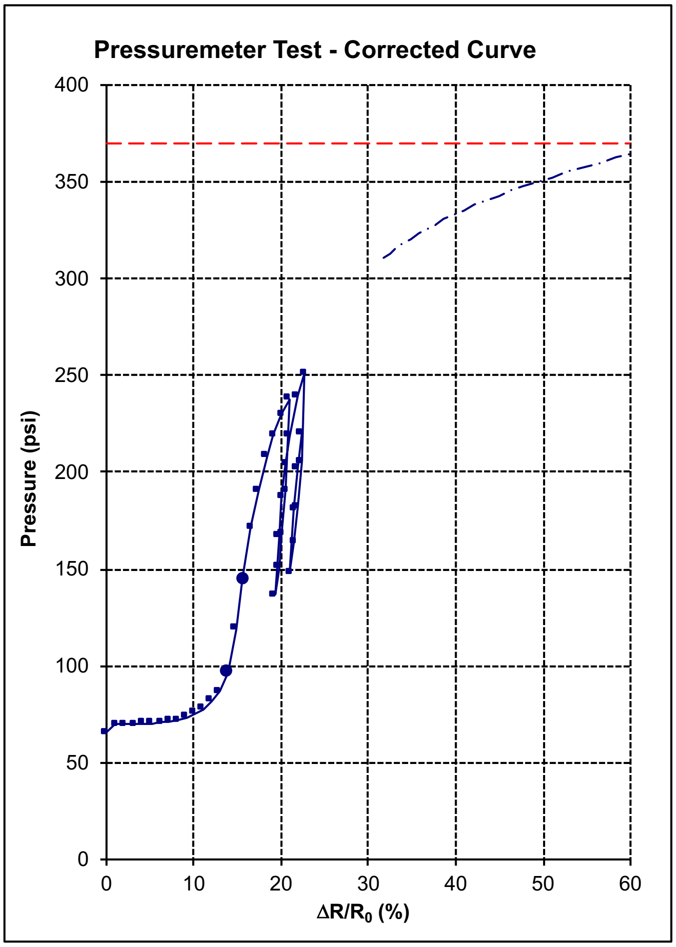
TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-158-PMT	Test depth:	150.00 ft
Test date: (mm/dd/yyyy)	11/27/2019	Manometer height above ground:	1.64 ft
Test number:	4	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	66	0.0	0.00	
5	2.4	70	2.4	1.05	
6	4.9	70	4.9	2.10	
6	7.3	70	7.3	3.13	
7	9.8	70	9.7	4.16	
8	12.2	70	12.2	5.18	
9	14.6	71	14.6	6.18	
10	17.1	71	17.0	7.18	
11	19.5	72	19.5	8.17	
13	22.0	74	21.9	9.14	
15	24.4	76	24.4	10.11	
18	26.9	78	26.8	11.07	
22	29.3	82	29.2	12.02	
27	31.7	87	31.6	12.96	
37	34.2	97	34.0	13.88	◀
60	36.6	119	36.4	14.78	
86	39.1	145	38.7	15.66	◀
113	41.5	172	41.1	16.54	
132	43.9	191	43.4	17.42	
149	46.4	208	45.8	18.30	
160	48.8	219	48.2	19.18	
171	51.3	230	50.6	20.06	
180	53.7	238	53.0	20.93	
132	52.5	191	52.0	20.55	
110	51.3	168	50.8	20.14	
92	50.0	151	49.7	19.72	
78	48.8	136	48.5	19.30	
108	50.0	167	49.6	19.70	
129	51.3	187	50.8	20.12	
146	52.5	204	51.9	20.53	
160	53.7	219	53.1	20.96	
181	56.1	240	55.4	21.80	
193	58.6	251	57.8	22.66	
148	57.4	206	56.8	22.29	
124	56.1	182	55.7	21.88	
105	54.9	164	54.5	21.47	
90	53.7	148	53.3	21.05	
123	54.9	181	54.4	21.45	
144	56.1	202	55.6	21.85	
162	57.4	220	56.7	22.27	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:


Pressuremeter Test - Corrected Curve

Test Results

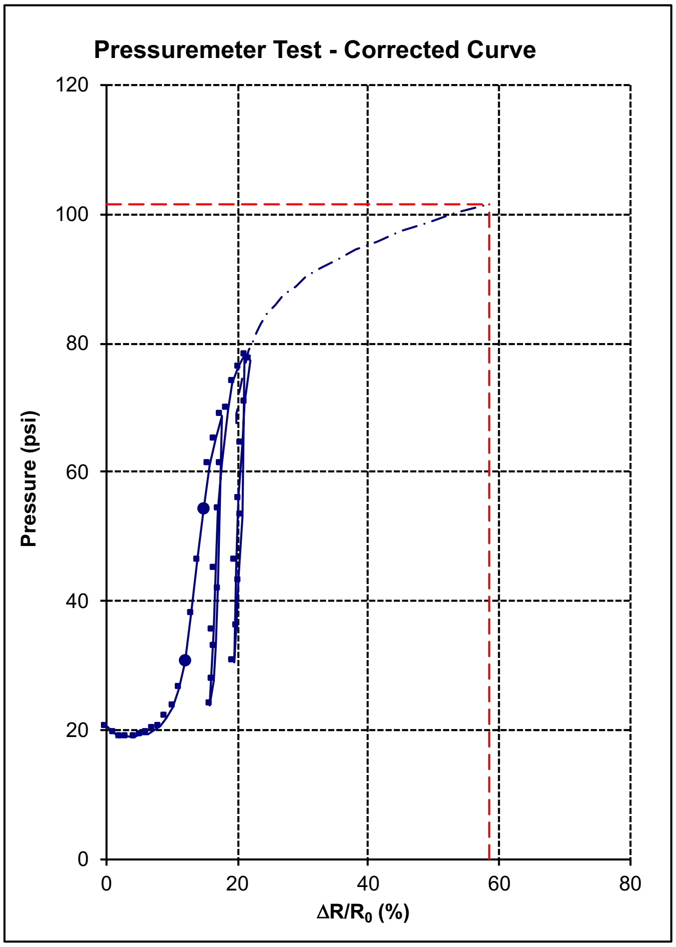
Pressiometer modulus E:	**4,130 psi**
Ultimate pressure P_L:	**370 psi**
Ratio E / P_L:	11.17
Yield pressure P_F:	145 psi
Ratio P_L / P_F:	2.55

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	46.00 ft
Test date: (mm/dd/yyyy)	12/02/2019	Manometer height above ground:	1.64 ft
Test number:	2	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	21	0.0	0.00	
0	2.4	20	2.4	1.06	
0	4.9	19	4.9	2.11	
1	7.3	19	7.3	3.14	
1	9.8	19	9.8	4.17	
2	12.2	19	12.2	5.19	
2	14.6	19	14.6	6.19	
3	17.1	20	17.1	7.19	
4	19.5	21	19.5	8.18	
6	22.0	22	21.9	9.15	
8	24.4	24	24.4	10.12	
11	26.9	26	26.8	11.08	
15	29.3	31	29.2	12.03	◄
23	31.7	38	31.6	12.96	
31	34.2	46	34.0	13.89	
39	36.6	54	36.5	14.81	◄
47	39.1	61	38.9	15.72	
51	41.5	65	41.3	16.63	
55	43.9	69	43.7	17.53	
28	42.7	42	42.6	17.12	
19	41.5	33	41.4	16.68	
13	40.3	28	40.2	16.23	
9	39.1	24	39.0	15.78	
21	40.3	36	40.2	16.22	
31	41.5	45	41.4	16.66	
40	42.7	54	42.6	17.10	
47	43.9	61	43.7	17.55	
56	46.4	70	46.2	18.44	
60	48.8	74	48.6	19.32	
62	51.3	76	51.0	20.21	
64	53.7	78	53.4	21.09	
39	52.5	53	52.3	20.69	
29	51.3	43	51.1	20.26	
22	50.0	36	50.0	19.83	
17	48.8	31	48.8	19.39	
32	50.0	46	49.9	19.81	
42	51.3	56	51.1	20.24	
51	52.5	65	52.3	20.67	
57	53.7	71	53.5	21.10	
64	56.1	77	55.9	21.97	


Pressuremeter Test - Corrected Curve

Test Results

Pressiometer modulus E:	**1,279 psi**
Ultimate pressure P_L:	**102 psi**
Ratio E / P_L:	12.60
Yield pressure P_F:	54 psi
Ratio P_L / P_F:	1.87

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

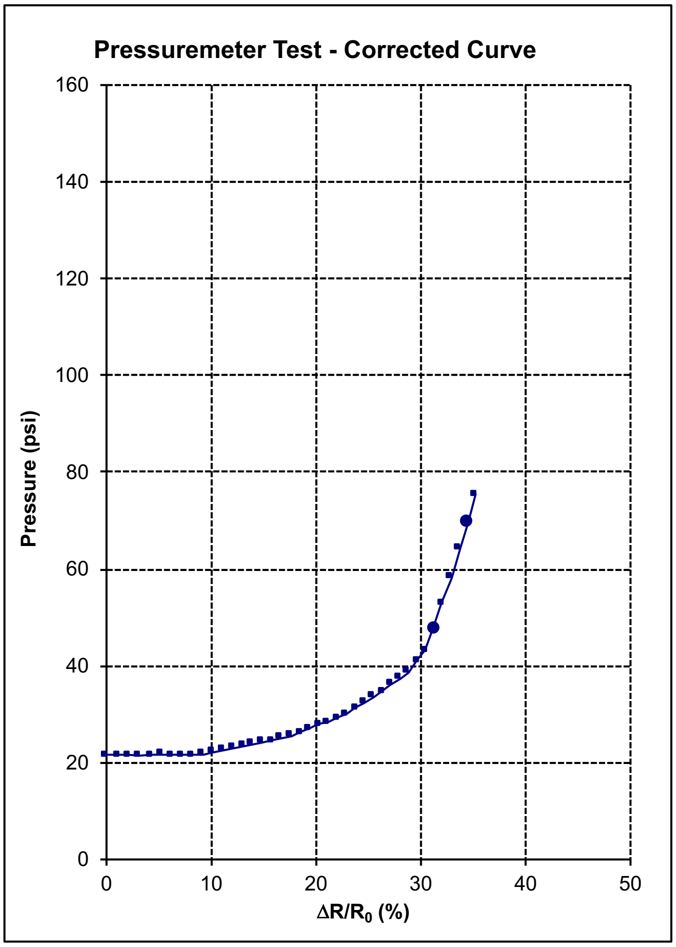
TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name: BART Silicon Valley Phase II
Borehole name: BH-159-PMT
Test date: (mm/dd/yyyy) 12/02/2019
Test number: 1
Probe size: N

Use of a slotted casing: No
Test depth: 48.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	22	0.0	0.00
1	2.4	22	2.4	1.06
2	4.9	22	4.9	2.10
2	7.3	21	7.3	3.14
3	9.8	22	9.8	4.17
3	12.2	22	12.2	5.18
3	14.6	22	14.6	6.19
4	17.1	22	17.1	7.19
4	19.5	22	19.5	8.18
4	22.0	22	22.0	9.16
5	24.4	22	24.4	10.13
6	26.9	23	26.8	11.09
7	29.3	23	29.3	12.04
7	31.7	23	31.7	12.99
8	34.2	24	34.1	13.92
9	36.6	24	36.6	14.85
9	39.1	24	39.0	15.78
10	41.5	25	41.5	16.69
10	43.9	26	43.9	17.60
11	46.4	26	46.3	18.50
12	48.8	27	48.8	19.39
13	51.3	28	51.2	20.28
14	53.7	28	53.6	21.16
15	56.1	29	56.1	22.04
16	58.6	30	58.5	22.91
17	61.0	31	61.0	23.77
18	63.5	32	63.4	24.62
19	65.9	34	65.8	25.47
20	68.3	35	68.3	26.32
22	70.8	36	70.7	27.15
23	73.2	37	73.1	27.99
25	75.7	39	75.6	28.81
27	78.1	41	78.0	29.64
29	80.6	43	80.4	30.45
34	83.0	48	82.9	31.26
39	85.4	53	85.3	32.06
44	87.9	58	87.7	32.86
50	90.3	64	90.1	33.65
56	92.8	70	92.5	34.44
61	95.2	75	95.0	35.22



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

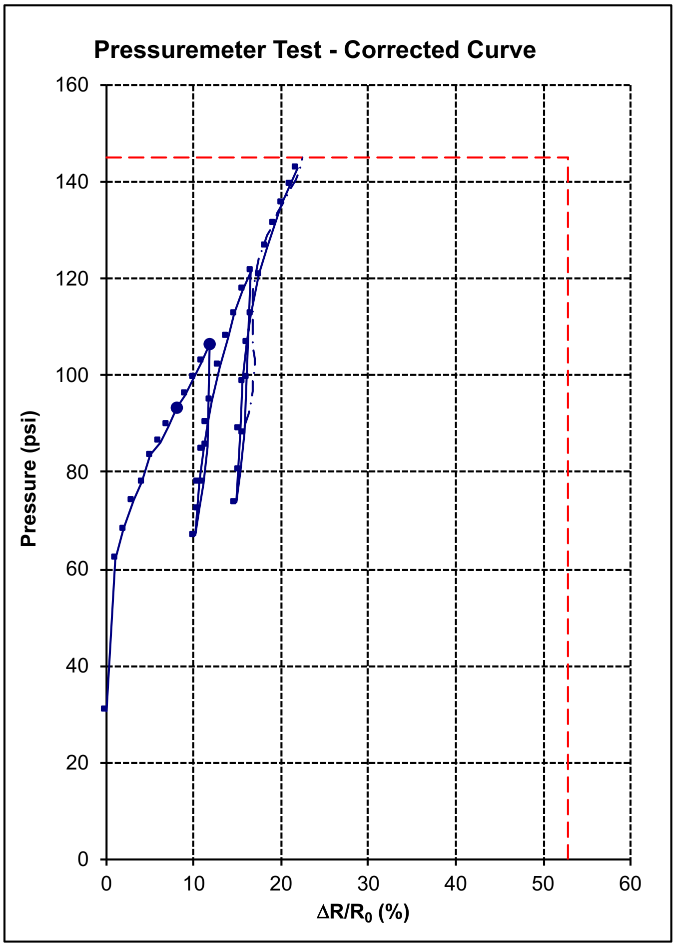
Test Results

Pressiometer modulus E:	**1,219 psi**
Ultimate pressure P_L:	**145 psi**
Ratio E / P_L:	8.40
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	69.00 ft
Test date: (mm/dd/yyyy)	12/02/2019	Manometer height above ground:	1.64 ft
Test number:	3	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	31	0.0	0.00	
32	2.4	62	2.3	1.00	
39	4.9	68	4.7	2.04	
46	7.3	74	7.1	3.07	
50	9.8	78	9.6	4.09	
56	12.2	83	12.0	5.10	
59	14.6	86	14.4	6.10	
63	17.1	90	16.8	7.09	
67	19.5	93	19.3	8.08	◀
70	22.0	96	21.7	9.05	
73	24.4	99	24.1	10.02	
77	26.9	103	26.5	10.98	
81	29.3	106	29.0	11.93	◀
60	28.1	85	27.8	11.48	
52	26.9	78	26.6	11.02	
47	25.6	72	25.4	10.54	
41	24.4	67	24.2	10.07	
52	25.6	78	25.4	10.53	
59	26.9	85	26.6	11.00	
64	28.1	90	27.8	11.47	
69	29.3	95	29.0	11.94	
77	31.7	102	31.4	12.88	
83	34.2	108	33.8	13.81	
88	36.6	113	36.3	14.73	
93	39.1	118	38.7	15.65	
97	41.5	121	41.1	16.56	
75	40.3	99	40.0	16.14	
64	39.1	88	38.8	15.69	
56	37.8	80	37.6	15.25	
49	36.6	74	36.4	14.79	
64	37.8	89	37.6	15.23	
74	39.1	99	38.8	15.68	
82	40.3	107	39.9	16.13	
88	41.5	113	41.1	16.57	
96	43.9	121	43.6	17.47	
102	46.4	127	46.0	18.37	
107	48.8	131	48.4	19.25	
112	51.3	136	50.8	20.14	
115	53.7	139	53.2	21.02	
119	56.1	143	55.7	21.89	


Pressuremeter Test - Corrected Curve

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

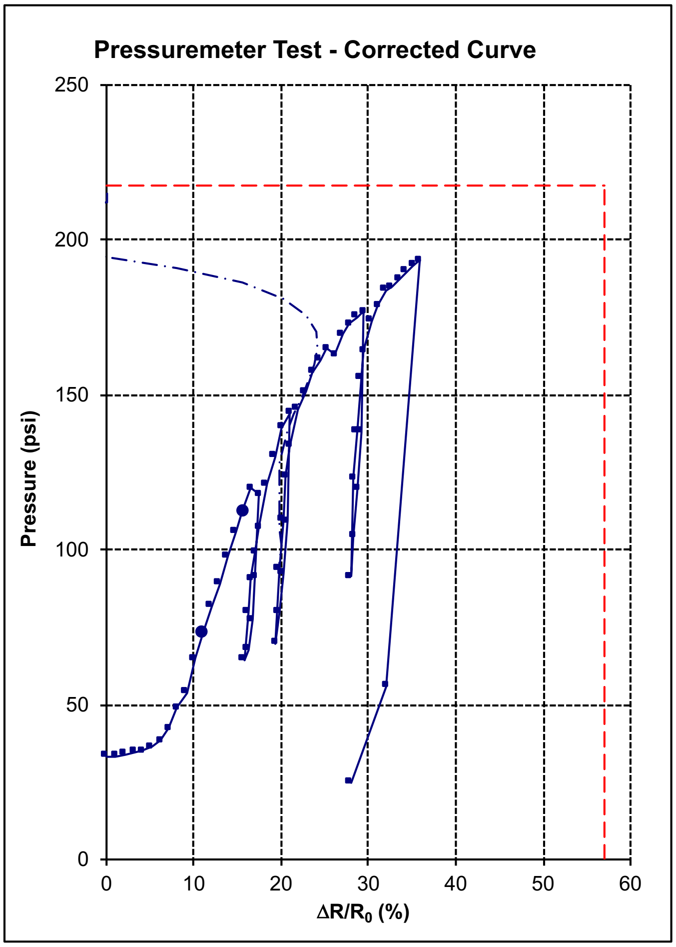
Test Results

Pressiometer modulus E:	**502 psi**
Ultimate pressure P_L:	**n.a. psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	106 psi
Ratio P_L / P_F:	#VALUE!

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	75.00 ft
Test date: (mm/dd/yyyy)	12/03/2019	Manometer height above ground:	1.64 ft
Test number:	4	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	33	0.0	0.00	
1	2.4	33	2.4	1.06	
2	4.9	34	4.9	2.10	
4	7.3	35	7.3	3.14	
5	9.8	35	9.7	4.16	
7	12.2	36	12.2	5.18	
9	14.6	38	14.6	6.18	
13	17.1	42	17.0	7.17	
21	19.5	49	19.4	8.15	
26	22.0	54	21.9	9.12	
37	24.4	65	24.3	10.08	
46	26.9	73	26.7	11.03	◀
54	29.3	82	29.1	11.97	
62	31.7	89	31.5	12.91	
71	34.2	98	33.9	13.83	
79	36.6	106	36.3	14.75	
86	39.1	112	38.7	15.67	◀
94	41.5	120	41.1	16.57	
92	43.9	118	43.6	17.49	
65	42.7	91	42.5	17.07	
51	41.5	77	41.3	16.63	
42	40.3	68	40.1	16.19	
38	39.1	64	38.9	15.74	
54	40.3	80	40.1	16.17	
65	41.5	91	41.3	16.61	
73	42.7	99	42.4	17.06	
81	43.9	107	43.6	17.50	
95	46.4	121	46.0	18.38	
104	48.8	130	48.4	19.27	
114	51.3	139	50.8	20.14	
118	53.7	144	53.3	21.02	
84	52.5	109	52.2	20.63	
67	51.3	92	51.0	20.21	
54	50.0	80	49.8	19.78	
44	48.8	70	48.7	19.35	
68	50.0	94	49.8	19.76	
84	51.3	109	50.9	20.19	
98	52.5	124	52.1	20.61	
108	53.7	133	53.3	21.03	
120	56.1	145	55.7	21.90	
126	58.6	151	58.1	22.76	
132	61.0	157	60.5	23.61	
136	63.5	161	62.9	24.47	
140	65.9	165	65.4	25.31	
138	68.3	163	67.8	26.16	
145	70.8	169	70.2	27.00	
148	73.2	173	72.7	27.83	
151	75.7	175	75.1	28.65	
152	78.1	177	77.5	29.48	
113	76.9	138	76.5	29.12	
95	75.7	119	75.3	28.73	
80	74.4	104	74.1	28.33	



Test Results

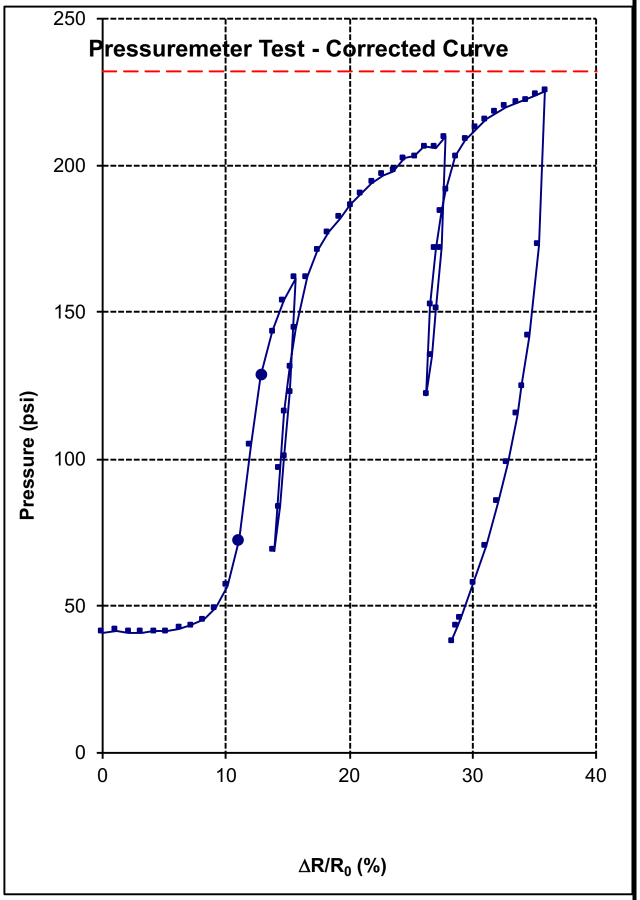
Pressiometer modulus E:	**1,273 psi**
Ultimate pressure P_L:	**n.a. psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	112 psi
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	93.00 ft
Test date: (mm/dd/yyyy)	12/03/2019	Manometer height above ground:	1.64 ft
Test number:	6	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	41	0.0	0.00
2	2.4	42	2.4	1.06
2	4.9	41	4.9	2.10
2	7.3	41	7.3	3.14
3	9.8	41	9.8	4.17
4	12.2	41	12.2	5.18
5	14.6	42	14.6	6.19
7	17.1	43	17.1	7.18
9	19.5	45	19.5	8.17
13	22.0	49	21.9	9.14
21	24.4	57	24.3	10.10
37	26.9	72	26.7	11.04
70	29.3	105	29.0	11.95
94	31.7	128	31.4	12.86
109	34.2	143	33.8	13.78
120	36.6	154	36.2	14.69
128	39.1	162	38.6	15.61
89	37.8	123	37.5	15.20
66	36.6	101	36.4	14.77
49	35.4	84	35.2	14.33
34	34.2	69	34.0	13.89
62	35.4	97	35.2	14.31
82	36.6	116	36.3	14.75
97	37.8	131	37.5	15.19
110	39.1	144	38.6	15.63
128	41.5	162	41.0	16.52
137	43.9	171	43.4	17.42
144	46.4	177	45.8	18.32
149	48.8	182	48.3	19.21
153	51.3	186	50.7	20.09
157	53.7	190	53.1	20.97
161	56.1	194	55.5	21.84
164	58.6	197	58.0	22.71
165	61.0	198	60.4	23.57
169	63.5	202	62.8	24.42
170	65.9	203	65.3	25.27
174	68.3	207	67.7	26.12
173	70.8	206	70.1	26.96
177	73.2	210	72.6	27.79
139	72.0	172	71.5	27.42
118	70.8	151	70.3	27.03
102	69.6	135	69.2	26.63
89	68.3	122	68.0	26.23
120	69.6	153	69.1	26.61
139	70.8	172	70.3	27.00
152	72.0	185	71.4	27.41
159	73.2	192	72.6	27.81
171	75.7	203	75.0	28.63
177	78.1	209	77.4	29.45
180	80.6	213	79.9	30.26
183	83.0	216	82.3	31.07
186	85.4	218	84.7	31.88
188	87.9	220	87.2	32.68
189	90.3	221	89.6	33.48
190	92.8	222	92.0	34.27
192	95.2	224	94.5	35.06
193	97.6	225	96.9	35.85
141	95.8	173	95.3	35.32
110	93.4	142	92.9	34.57
93	91.5	125	91.2	34.00
83	90.3	115	90.0	33.61
67	87.9	99	87.6	32.83
53	85.4	85	85.2	32.05
38	82.4	71	82.2	31.05
25	79.3	58	79.2	30.05
14	76.3	46	76.2	29.04
10	75.4	43	75.3	28.73
6	74.0	38	74.0	28.28



Test Results

Pressiometer modulus E: **4,575 psi**

Ultimate pressure P_L: **232 psi**

Ratio E / P_L: 19.71

Yield pressure P_F: 128 psi

Ratio P_L / P_F: 1.81

AM COMPANION V.3.3

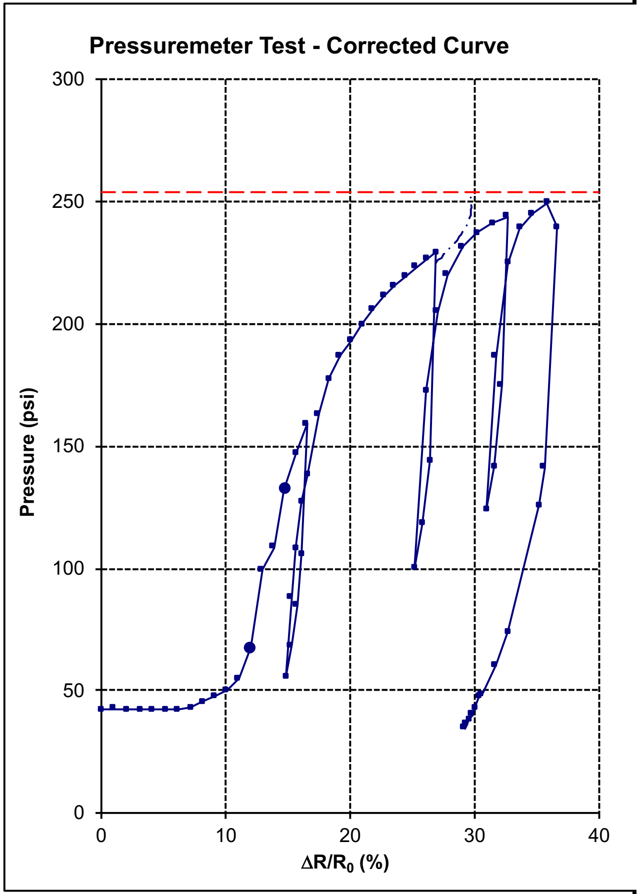
Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	96.00 ft
Test date: (mm/dd/yyyy)	12/03/2019	Manometer height above ground:	1.64 ft
Test number:	5	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	ΔR/R$_0$ %
0	0.0	42	0.0	0.00
1	2.4	43	2.4	1.06
2	4.9	42	4.9	2.10
2	7.3	42	7.3	3.14
3	9.8	42	9.8	4.17
3	12.2	42	12.2	5.18
4	14.6	42	14.6	6.19
5	17.1	43	17.1	7.19
8	19.5	46	19.5	8.17
10	22.0	48	21.9	9.15
13	24.4	50	24.4	10.11
18	26.9	55	26.8	11.07
31	29.3	68	29.2	12.01
63	31.7	99	31.5	12.91
73	34.2	109	33.9	13.83
97	36.6	133	36.2	14.73
111	39.1	147	38.6	15.63
124	41.5	159	41.0	16.53
70	40.3	106	40.0	16.15
50	39.1	85	38.9	15.72
33	37.8	69	37.7	15.28
20	36.6	56	36.5	14.84
52	37.8	88	37.6	15.25
73	39.1	108	38.8	15.69
92	40.3	127	39.9	16.12
103	41.5	138	41.1	16.56
128	43.9	163	43.5	17.43
143	46.4	178	45.8	18.32
152	48.8	187	48.2	19.20
159	51.3	193	50.7	20.08
165	53.7	200	53.1	20.96
171	56.1	206	55.5	21.83
177	58.6	211	57.9	22.69
181	61.0	216	60.3	23.55
185	63.5	219	62.8	24.40
189	65.9	223	65.2	25.25
192	68.3	226	67.6	26.09
195	70.8	229	70.0	26.93
110	69.0	144	68.5	26.41
84	67.1	118	66.8	25.81
66	65.3	100	65.0	25.20
139	68.3	173	67.8	26.16
171	70.8	205	70.1	26.96
186	73.2	220	72.5	27.78
198	76.9	232	76.1	29.01
204	80.6	237	79.8	30.23
207	84.2	241	83.4	31.45
210	87.9	244	87.1	32.65
142	86.0	175	85.5	32.14
108	84.2	142	83.8	31.57
90	82.4	124	82.0	30.99
153	84.8	186	84.2	31.72
191	87.9	225	87.1	32.68
206	90.9	239	90.1	33.66
212	94.0	245	93.2	34.64
216	97.6	249	96.8	35.82
206	100.1	239	99.3	36.61
108	96.5	141	96.1	35.60
92	95.2	126	94.8	35.19
41	87.3	74	87.1	32.66
27	84.2	61	84.1	31.67
15	80.9	49	80.8	30.57
14	80.2	47	80.2	30.37
9	79.3	43	79.3	30.07
7	78.5	40	78.5	29.79
5	77.7	38	77.7	29.54
2	77.1	36	77.1	29.34
1	76.6	34	76.6	29.16



Test Results

Pressiometer modulus E:	**3,598 psi**
Ultimate pressure P$_L$:	**254 psi**
Ratio E / P$_L$:	14.18
Yield pressure P$_F$:	133 psi
Ratio P$_L$ / P$_F$:	1.92

AM COMPANION V.3.3

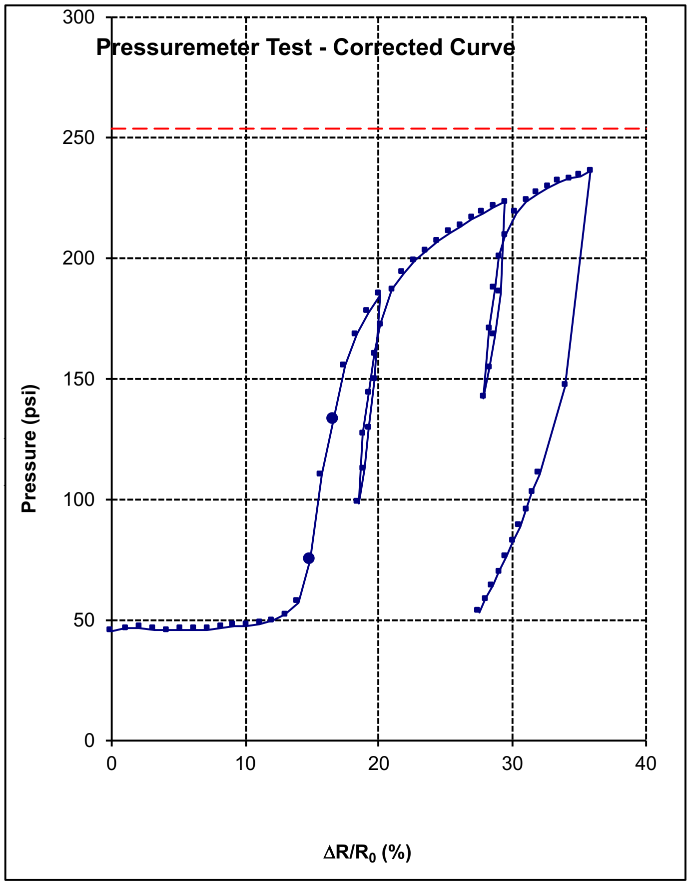
Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	103.00 ft
Test date: (mm/dd/yyyy)	12/04/2019	Manometer height above ground:	1.64 ft
Test number:	8	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	ΔR/R₀ %
0	0.0	45	0.0	0.00
2	2.4	46	2.4	1.06
3	4.9	47	4.9	2.10
3	7.3	46	7.3	3.14
3	9.8	46	9.8	4.17
4	12.2	46	12.2	5.18
5	14.6	46	14.6	6.19
5	17.1	46	17.1	7.19
6	19.5	47	19.5	8.17
8	22.0	48	21.9	9.15
8	24.4	48	24.4	10.12
9	26.9	48	26.8	11.08
10	29.3	50	29.3	12.04
13	31.7	52	31.7	12.98
18	34.2	57	34.1	13.91
36	36.6	75	36.5	14.81
72	39.1	110	38.8	15.69
95	41.5	133	41.1	16.57
117	43.9	155	43.5	17.45
131	46.4	168	45.9	18.33
140	48.8	178	48.3	19.22
147	51.3	185	50.7	20.10
112	50.0	149	49.6	19.70
92	48.8	129	48.5	19.29
75	47.6	113	47.3	18.86
60	46.4	98	46.1	18.43
89	47.6	127	47.3	18.84
106	48.8	144	48.4	19.27
122	50.0	160	49.6	19.69
135	51.3	173	50.7	20.11
149	53.7	187	53.1	20.98
156	56.1	194	55.5	21.85
162	58.6	199	58.0	22.71
166	61.0	203	60.4	23.57
170	63.5	207	62.8	24.42
174	65.9	211	65.2	25.27
176	68.3	213	67.7	26.11
180	70.8	217	70.1	26.95
182	73.2	219	72.5	27.78
184	75.7	221	75.0	28.61
187	78.1	223	77.4	29.43
149	76.9	186	76.3	29.07
131	75.7	168	75.2	28.68
117	74.4	154	74.0	28.28
105	73.2	142	72.8	27.88
134	74.4	171	73.9	28.26
151	75.7	187	75.1	28.65
164	76.9	201	76.3	29.05
172	78.1	209	77.5	29.45
182	80.6	219	79.9	30.26
187	83.0	224	82.3	31.07
190	85.4	227	84.7	31.87
193	87.9	229	87.1	32.68
195	90.3	232	89.6	33.47
197	92.8	233	92.0	34.27
198	95.2	234	94.4	35.06
200	97.6	236	96.9	35.84
111	91.5	147	91.1	33.98
74	85.4	111	85.2	32.02
66	83.9	103	83.7	31.52
59	82.4	96	82.2	31.03
52	80.9	89	80.7	30.53
46	79.3	82	79.2	30.02
40	77.8	76	77.7	29.52
33	76.3	70	76.2	29.01
27	74.8	64	74.6	28.50
22	73.2	59	73.1	27.99
16	71.7	53	71.6	27.48



Test Results

Pressiometer modulus E:	**5,084 psi**
Ultimate pressure P_L:	**254 psi**
Ratio E / P_L:	20.03
Yield pressure P_F:	133 psi
Ratio P_L / P_F:	1.91

AM COMPANION V.3.3

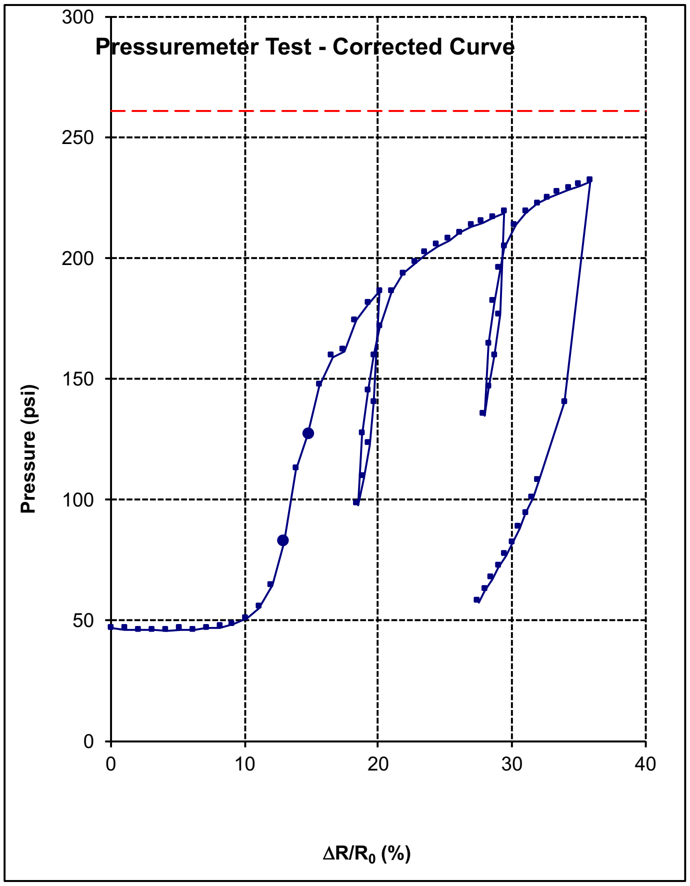
Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II		Use of a slotted casing:	No
Borehole name:	BH-159-PMT		Test depth:	106.00 ft
Test date: (mm/dd/yyyy)	12/04/2019		Manometer height above ground:	1.64 ft
Test number:	7		Poisson's coefficient:	0.33
Probe size:	N		Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	47	0.0	0.00
1	2.4	47	2.4	1.06
1	4.9	46	4.9	2.11
2	7.3	46	7.3	3.14
2	9.8	46	9.8	4.17
3	12.2	46	12.2	5.18
3	14.6	46	14.6	6.19
4	17.1	47	17.1	7.19
5	19.5	47	19.5	8.18
7	22.0	49	21.9	9.15
10	24.4	51	24.4	10.12
14	26.9	55	26.8	11.08
24	29.3	65	29.2	12.02
42	31.7	83	31.6	12.94
72	34.2	112	33.9	13.83
87	36.6	127	36.3	14.74
108	39.1	147	38.6	15.64
120	41.5	159	41.0	16.54
122	43.9	162	43.5	17.44
135	46.4	174	45.9	18.33
142	48.8	181	48.3	19.22
147	51.3	186	50.7	20.10
101	50.0	140	49.7	19.72
84	48.8	123	48.5	19.30
70	47.6	109	47.3	18.87
59	46.4	98	46.2	18.43
88	47.6	127	47.3	18.84
106	48.8	145	48.4	19.27
121	50.0	160	49.6	19.69
132	51.3	171	50.8	20.12
147	53.7	186	53.1	20.98
155	56.1	193	55.6	21.85
159	58.6	198	58.0	22.71
163	61.0	202	60.4	23.57
167	63.5	205	62.8	24.43
169	65.9	208	65.3	25.28
172	68.3	211	67.7	26.12
175	70.8	213	70.1	26.96
177	73.2	215	72.6	27.79
179	75.7	217	75.0	28.62
181	78.1	219	77.4	29.44
139	76.9	177	76.4	29.08
122	75.7	160	75.2	28.69
108	74.4	146	74.0	28.29
97	73.2	135	72.9	27.89
126	74.4	165	74.0	28.27
144	75.7	182	75.1	28.66
157	76.9	195	76.3	29.06
166	78.1	204	77.5	29.46
176	80.6	214	79.9	30.27
181	83.0	219	82.3	31.08
185	85.4	222	84.7	31.88
187	87.9	225	87.2	32.68
189	90.3	227	89.6	33.48
191	92.8	229	92.0	34.27
192	95.2	230	94.5	35.06
194	97.6	232	96.9	35.85
103	91.5	140	91.1	33.99
70	85.4	108	85.2	32.02
63	83.9	101	83.7	31.53
57	82.4	94	82.2	31.03
50	80.9	88	80.7	30.53
44	79.3	82	79.2	30.03
39	77.8	77	77.7	29.52
34	76.3	72	76.2	29.01
29	74.8	67	74.6	28.50
24	73.2	62	73.1	27.99
19	71.7	58	71.6	27.47



Test Results

Pressiometer modulus E:	**3,703 psi**
Ultimate pressure P_L:	**261 psi**
Ratio E / P_L:	14.19
Yield pressure P_F:	127 psi
Ratio P_L / P_F:	2.06

AM COMPANION V.3.3

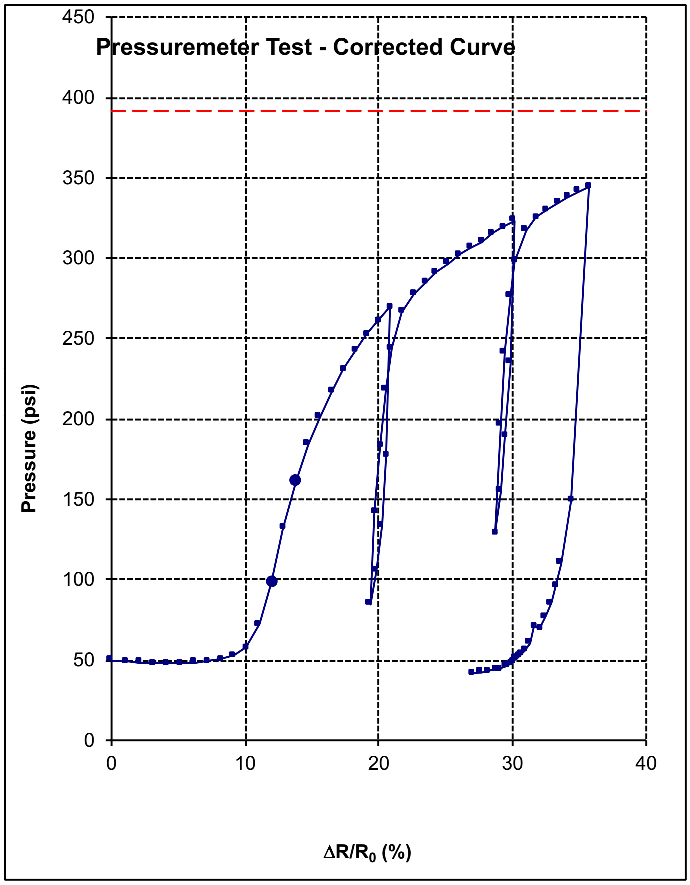
Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	113.00 ft
Test date: (mm/dd/yyyy)	12/04/2019	Manometer height above ground:	1.64 ft
Test number:	9	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	50	0.0	0.00
0	2.4	49	2.4	1.06
0	4.9	48	4.9	2.11
1	7.3	48	7.3	3.14
1	9.8	48	9.8	4.17
2	12.2	48	12.2	5.19
3	14.6	49	14.6	6.19
4	17.1	49	17.1	7.19
5	19.5	50	19.5	8.18
8	22.0	53	21.9	9.15
13	24.4	57	24.4	10.11
28	26.9	72	26.7	11.06
55	29.3	98	29.1	11.97
89	31.7	132	31.4	12.87
118	34.2	162	33.7	13.76
141	36.6	184	36.1	14.66
158	39.1	201	38.5	15.56
174	41.5	217	40.8	16.46
188	43.9	231	43.2	17.35
200	46.4	242	45.6	18.24
210	48.8	252	48.0	19.12
219	51.3	261	50.4	20.00
227	53.7	269	52.8	20.87
135	52.5	177	52.0	20.56
92	51.3	134	50.9	20.17
63	50.0	105	49.8	19.77
43	48.8	85	48.7	19.35
101	50.0	143	49.7	19.72
141	51.3	183	50.7	20.11
177	52.5	219	51.8	20.50
202	53.7	244	52.9	20.91
225	56.1	267	55.3	21.75
236	58.6	277	57.7	22.61
243	61.0	285	60.1	23.46
249	63.5	291	62.5	24.32
255	65.9	297	64.9	25.16
260	68.3	302	67.4	26.00
265	70.8	306	69.8	26.84
269	73.2	310	72.2	27.67
274	75.7	315	74.6	28.50
278	78.1	319	77.1	29.32
282	80.6	323	79.5	30.13
194	79.3	235	78.6	29.83
148	78.1	189	77.5	29.48
114	76.9	155	76.5	29.11
88	75.7	129	75.3	28.73
156	76.9	197	76.3	29.06
201	78.1	242	77.3	29.42
236	79.3	277	78.4	29.78
257	80.6	298	79.6	30.16
276	83.0	317	81.9	30.96
285	85.4	325	84.4	31.76
289	87.9	330	86.8	32.55
293	90.3	334	89.2	33.35
297	92.8	338	91.6	34.14
301	95.2	341	94.1	34.93
304	97.6	344	96.5	35.71
108	92.8	149	92.3	34.38
69	90.3	110	90.1	33.63
55	89.1	96	88.9	33.25
44	87.9	85	87.7	32.86
36	86.7	77	86.5	32.47
29	85.4	70	85.3	32.08
30	84.2	71	84.1	31.67
20	83.0	61	82.9	31.28
15	81.8	56	81.7	30.88
13	81.2	54	81.1	30.68
11	80.6	52	80.5	30.48
10	79.9	51	79.9	30.27



Test Results

Pressiometer modulus E:	**5,300 psi**
Ultimate pressure P_L:	**392 psi**
Ratio E / P_L:	13.53
Yield pressure P_F:	162 psi
Ratio P_L / P_F:	2.42

AM COMPANION V.3.3

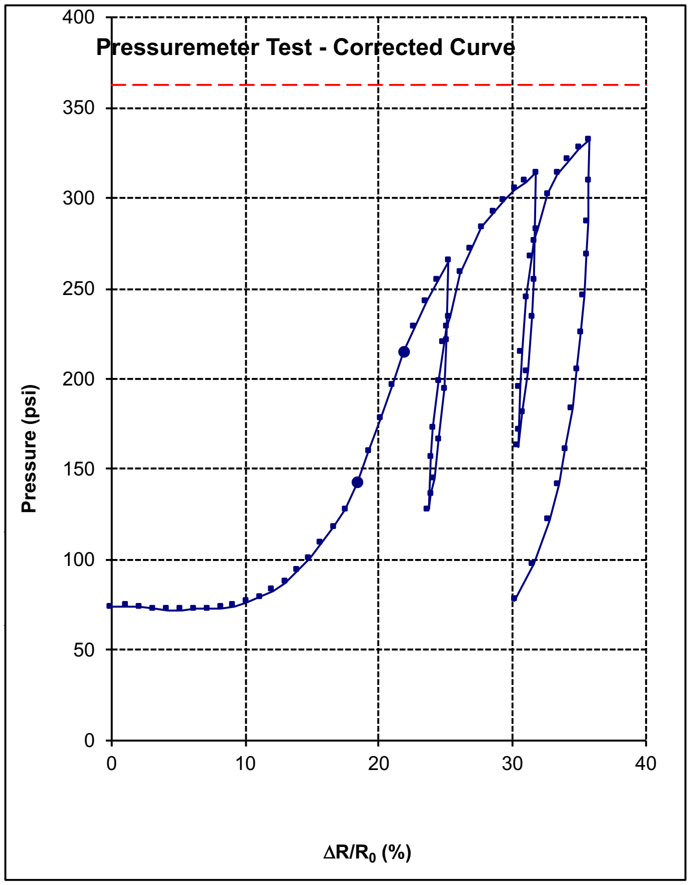
Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	169.00 ft
Test date: (mm/dd/yyyy)	12/05/2019	Manometer height above ground:	1.64 ft
Test number:	11	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	ΔR/R₀ %
0	0.0	74	0.0	0.00
1	2.4	74	2.4	1.06
1	4.9	74	4.9	2.11
1	7.3	73	7.3	3.14
1	9.8	72	9.8	4.17
1	12.2	72	12.2	5.19
2	14.6	73	14.6	6.19
3	17.1	73	17.1	7.19
4	19.5	73	19.5	8.18
6	22.0	75	21.9	9.15
8	24.4	76	24.4	10.12
11	26.9	79	26.8	11.08
15	29.3	83	29.2	12.03
20	31.7	87	31.7	12.97
26	34.2	94	34.1	13.90
33	36.6	100	36.5	14.82
42	39.1	110	38.9	15.73
51	41.5	118	41.3	16.63
61	43.9	127	43.7	17.53
76	46.4	142	46.1	18.41
94	48.8	160	48.5	19.28
112	51.3	178	50.8	20.15
130	53.7	196	53.2	21.00
149	56.1	215	55.6	21.86
163	58.6	229	58.0	22.71
177	61.0	243	60.4	23.55
189	63.5	254	62.7	24.40
199	65.9	265	65.1	25.24
155	65.3	221	64.7	25.08
129	64.7	194	64.2	24.90
101	63.5	167	63.1	24.51
79	62.2	145	61.9	24.11
70	61.6	136	61.4	23.91
62	61.0	128	60.8	23.71
91	61.6	157	61.3	23.88
107	62.2	173	61.8	24.08
133	63.5	199	63.0	24.47
154	64.7	220	64.1	24.87
162	65.3	228	64.7	25.07
168	65.9	234	65.3	25.28
192	68.3	258	67.6	26.09
206	70.8	272	70.0	26.92
218	73.2	284	72.4	27.74
226	75.7	292	74.8	28.56
234	78.1	299	77.2	29.37
239	80.6	305	79.6	30.19
244	83.0	309	82.1	31.00
249	85.4	314	84.5	31.80
189	84.8	255	84.1	31.67
169	84.2	234	83.6	31.50
139	83.0	204	82.5	31.13
116	81.8	182	81.3	30.75
106	81.2	172	80.8	30.56
97	80.6	163	80.2	30.37
130	81.2	195	80.7	30.53
150	81.8	215	81.2	30.71
180	83.0	245	82.3	31.08
203	84.2	268	83.4	31.45
211	84.8	276	84.0	31.65
218	85.4	283	84.6	31.84
237	87.9	302	87.0	32.62
248	90.3	314	89.4	33.41
256	92.8	321	91.8	34.19
262	95.2	327	94.2	34.98
267	97.6	332	96.6	35.76
244	97.5	309	96.6	35.75
222	97.2	287	96.3	35.66
204	96.8	269	96.0	35.55
181	96.1	246	95.4	35.37



Test Results

Pressiometer modulus E:	**3,376 psi**
Ultimate pressure P_L:	**363 psi**
Ratio E / P_L:	9.31
Yield pressure P_F:	215 psi
Ratio P_L / P_F:	1.69

AM COMPANION V.3.3

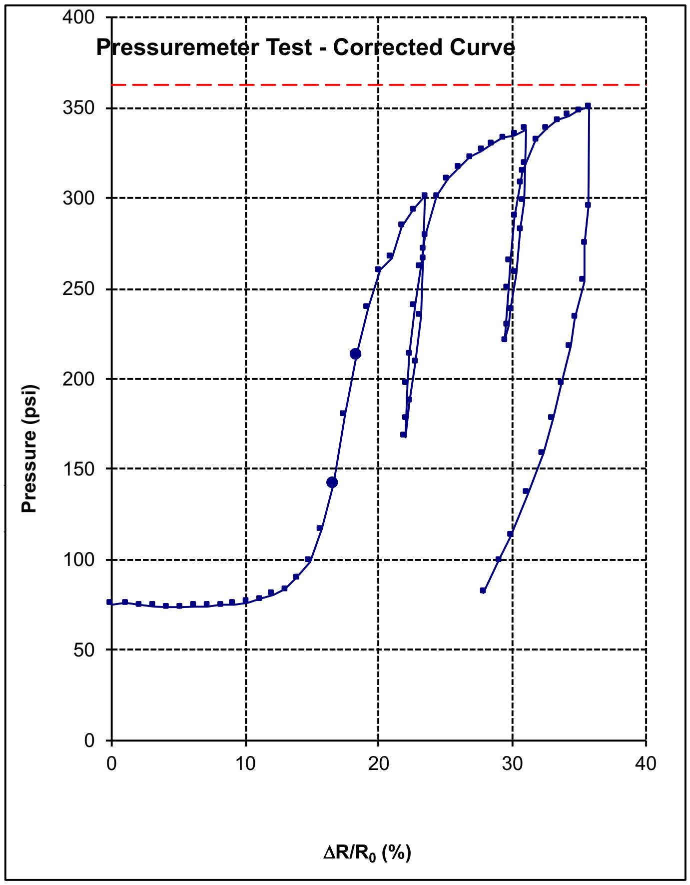
Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-159-PMT	Test depth:	172.00 ft
Test date: (mm/dd/yyyy)	12/05/2019	Manometer height above ground:	1.64 ft
Test number:	10	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	75	0.0	0.00
1	2.4	76	2.4	1.06
1	4.9	75	4.9	2.11
1	7.3	74	7.3	3.14
2	9.8	74	9.8	4.17
2	12.2	74	12.2	5.19
3	14.6	74	14.6	6.19
3	17.1	74	17.1	7.19
4	19.5	75	19.5	8.18
5	22.0	75	21.9	9.16
7	24.4	77	24.4	10.12
9	26.9	78	26.8	11.08
12	29.3	81	29.2	12.03
15	31.7	84	31.7	12.98
21	34.2	90	34.1	13.91
30	36.6	99	36.5	14.82
49	39.1	117	38.9	15.72
74	41.5	142	41.2	16.60
112	43.9	180	43.5	17.46
146	46.4	214	45.8	18.31
172	48.8	240	48.2	19.17
192	51.3	260	50.5	20.04
200	53.7	267	52.9	20.91
217	56.1	284	55.3	21.76
226	58.6	294	57.7	22.62
234	61.0	301	60.1	23.48
199	60.4	266	59.7	23.31
167	59.8	234	59.2	23.13
141	58.6	209	58.0	22.74
120	57.4	187	56.9	22.33
110	56.8	177	56.3	22.13
101	56.1	168	55.8	21.92
130	56.8	197	56.3	22.10
146	57.4	214	56.8	22.30
173	58.6	241	57.9	22.69
195	59.8	262	59.1	23.10
204	60.4	271	59.6	23.30
212	61.0	279	60.2	23.51
234	63.5	301	62.6	24.34
244	65.9	311	65.0	25.18
250	68.3	317	67.4	26.02
255	70.8	322	69.8	26.85
259	73.2	326	72.2	27.68
263	75.7	330	74.7	28.51
267	78.1	333	77.1	29.33
268	80.6	335	79.5	30.15
272	83.0	338	82.0	30.96
232	82.4	298	81.5	30.81
216	81.8	282	81.0	30.62
192	80.6	258	79.8	30.25
172	79.3	238	78.7	29.86
163	78.7	229	78.1	29.67
154	78.1	221	77.5	29.47
183	78.7	250	78.0	29.64
199	79.3	266	78.6	29.83
223	80.6	290	79.7	30.21
242	81.8	308	80.9	30.59
248	82.4	314	81.4	30.79
253	83.0	319	82.0	30.98
266	85.4	332	84.4	31.78
272	87.9	339	86.8	32.58
277	90.3	343	89.3	33.37
279	92.8	346	91.7	34.16
282	95.2	348	94.1	34.95
284	97.6	350	96.6	35.74
229	97.3	295	96.4	35.69
208	96.5	274	95.7	35.45
188	96.0	254	95.3	35.32
167	94.0	234	93.4	34.72



Test Results

Pressiometer modulus E:	**6,540**	**psi**
Ultimate pressure P_L:	**363**	**psi**
Ratio E / P_L:	18.04	
Yield pressure P_F:	214	psi
Ratio P_L / P_F:	1.70	

AM COMPANION V.3.3

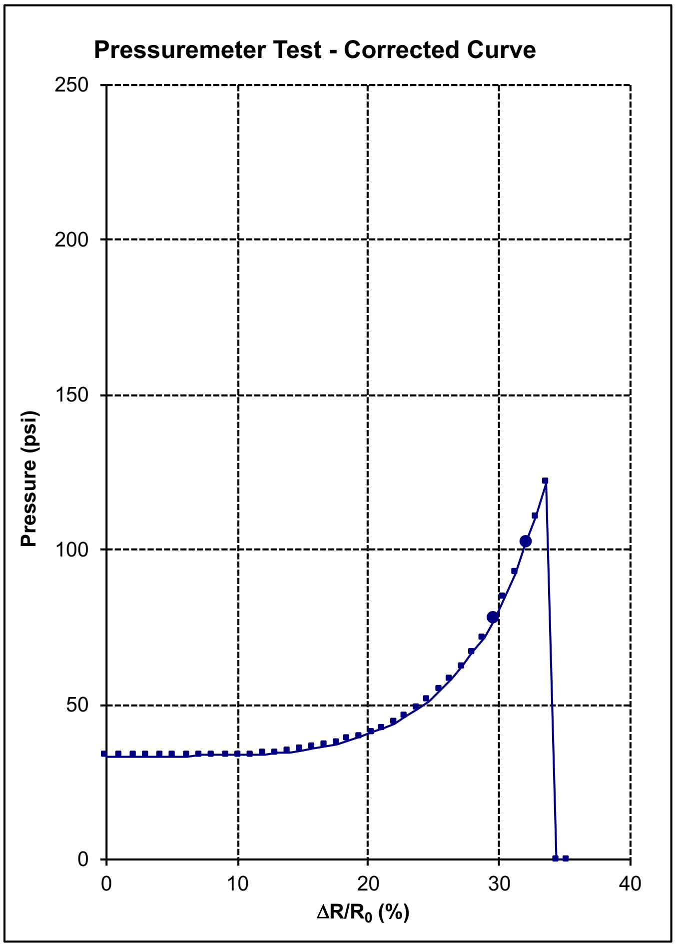
Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	75.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	33	0.0	0.00
1	2.4	33	2.4	1.06
1	4.9	33	4.9	2.11
2	7.3	33	7.3	3.14
2	9.8	33	9.8	4.17
3	12.2	33	12.2	5.19
3	14.6	33	14.6	6.19
3	17.1	34	17.1	7.19
4	19.5	34	19.5	8.18
4	22.0	34	22.0	9.16
5	24.4	34	24.4	10.13
5	26.9	34	26.8	11.09
6	29.3	34	29.3	12.04
6	31.7	34	31.7	12.99
7	34.2	35	34.2	13.93
7	36.6	35	36.6	14.86
8	39.1	36	39.0	15.78
9	41.5	36	41.5	16.70
10	43.9	37	43.9	17.60
11	46.4	39	46.3	18.50
12	48.8	39	48.8	19.40
13	51.3	41	51.2	20.28
15	53.7	42	53.6	21.16
17	56.1	44	56.1	22.04
19	58.6	46	58.5	22.90
21	61.0	48	60.9	23.76
24	63.5	51	63.4	24.62
28	65.9	55	65.8	25.47
31	68.3	58	68.2	26.31
36	70.8	62	70.7	27.14
40	73.2	67	73.1	27.97
45	75.7	71	75.5	28.80
51	78.1	78	77.9	29.61
58	80.6	85	80.3	30.42
66	83.0	92	82.8	31.23
76	85.4	102	85.2	32.02
84	87.9	111	87.6	32.82
95	90.3	121	90.0	33.61
106	92.8	#NUM!	92.4	34.39
120	95.2	#NUM!	94.8	35.16



Test Results

Pressiometer modulus E:	**1,767 psi**
Ultimate pressure P_L:	**n.a. psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM COMPANION V.3.3

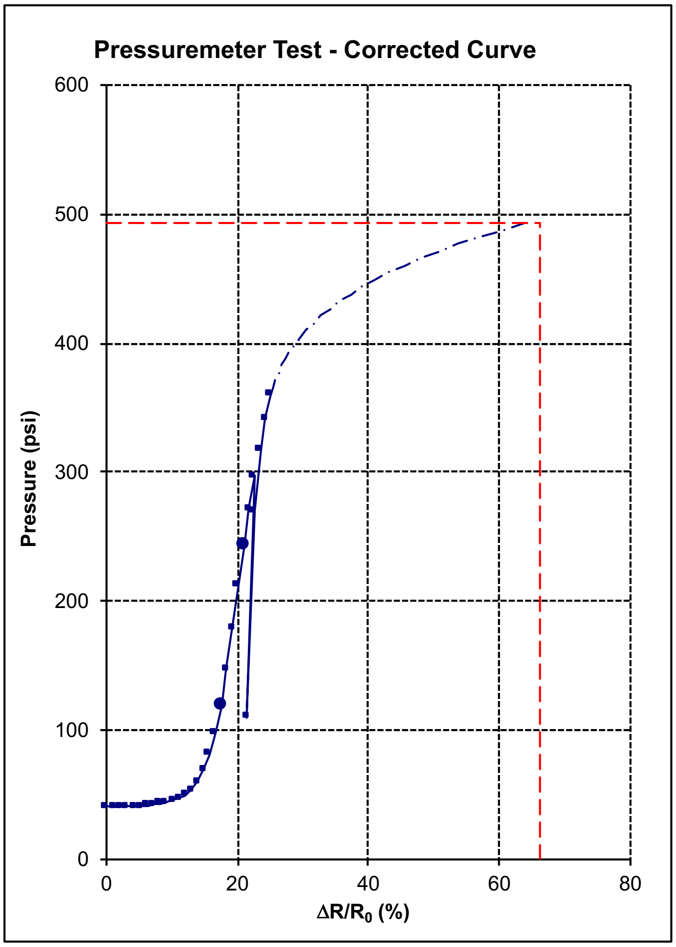
DRAFT

TEXAM Pressuremeter Test

Project name: BART SAN JOSE MOTT MACDONALD
Borehole name: BH1
Test date: (mm/dd/yyyy) 11/11/2019
Test number: BH-161-PMT
Probe size: N

Use of a slotted casing: No
Test depth: 93.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	41	0.0	0.00	
0	2.4	41	2.4	1.06	
1	4.9	41	4.9	2.11	
2	7.3	41	7.3	3.14	
2	9.8	41	9.8	4.17	
3	12.2	41	12.2	5.19	
4	14.6	42	14.6	6.19	
5	17.1	43	17.1	7.19	
6	19.5	43	19.5	8.18	
7	22.0	44	21.9	9.15	
9	24.4	46	24.4	10.12	
11	26.9	47	26.8	11.08	
14	29.3	50	29.2	12.03	
18	31.7	54	31.7	12.97	
24	34.2	60	34.1	13.90	
34	36.6	69	36.5	14.82	
46	39.1	82	38.9	15.73	
63	41.5	99	41.3	16.62	
84	43.9	120	43.6	17.51	◄
112	46.4	148	46.0	18.37	
144	48.8	179	48.3	19.23	
176	51.3	212	50.6	20.08	
209	53.7	244	53.0	20.92	◄
237	56.1	272	55.3	21.76	
262	58.6	297	57.7	22.60	
75	54.9	110	54.7	21.53	
235	58.6	270	57.8	22.63	
282	61.0	317	60.0	23.44	
307	63.5	342	62.4	24.27	
326	65.9	361	64.8	25.10	
	68.3				
	70.8				
	73.2				
	75.7				
	78.1				
	80.6				
	83.0				
	85.4				
	87.9				
	90.3				



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

Pressiometer modulus E:	**5,761 psi**
Ultimate pressure P_L:	**493 psi**
Ratio E / P_L:	11.68
Yield pressure P_F:	244 psi
Ratio P_L / P_F:	2.02

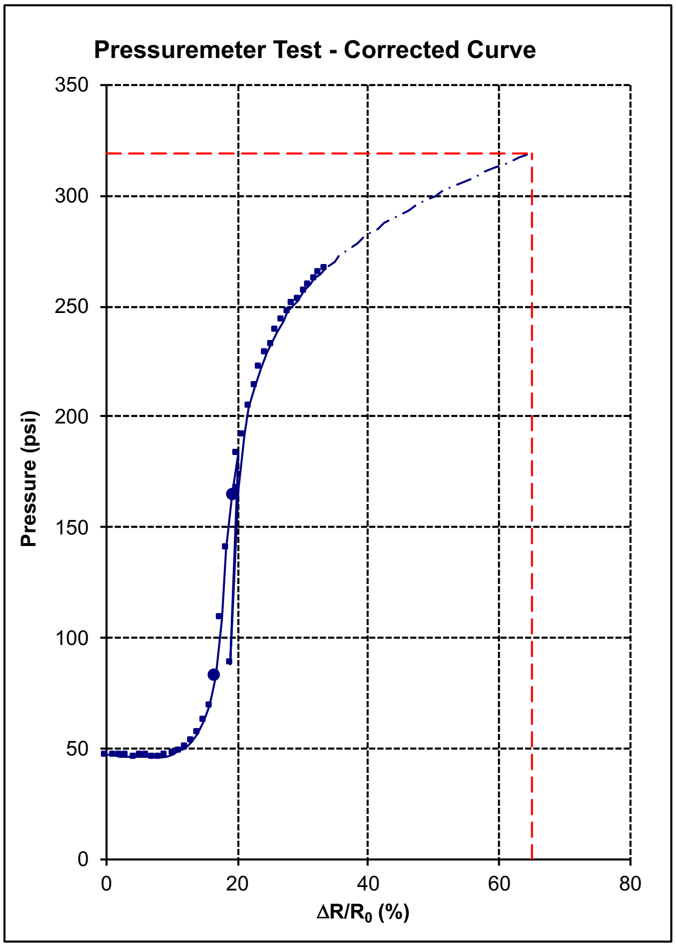
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	107.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	**Volume in³**	**Pressure psi**	**Volume in³**	**ΔR/R$_0$ %**	
0	0.0	47	0.0	0.00	
1	2.4	47	2.4	1.06	
1	4.9	47	4.9	2.11	
1	7.3	47	7.3	3.14	
2	9.8	46	9.8	4.17	
2	12.2	47	12.2	5.19	
3	14.6	46	14.6	6.19	
3	17.1	46	17.1	7.19	
3	19.5	46	19.5	8.18	
4	22.0	47	22.0	9.16	
5	24.4	48	24.4	10.13	
7	26.9	49	26.8	11.09	
9	29.3	50	29.3	12.04	
12	31.7	53	31.7	12.98	
16	34.2	57	34.1	13.91	
21	36.6	62	36.5	14.83	
28	39.1	69	38.9	15.75	
42	41.5	83	41.3	16.64	◀
68	43.9	109	43.7	17.51	
100	46.4	141	46.0	18.36	
125	48.8	165	48.3	19.22	◀
143	51.3	184	50.7	20.08	
48	47.6	88	47.4	18.89	
127	51.3	167	50.7	20.11	
151	53.7	192	53.1	20.95	
164	56.1	204	55.5	21.81	
173	58.6	214	57.9	22.67	
182	61.0	222	60.3	23.52	
189	63.5	229	62.7	24.37	
193	65.9	233	65.1	25.22	
199	68.3	239	67.5	26.06	
204	70.8	243	69.9	26.89	
208	73.2	248	72.4	27.72	
211	75.7	251	74.8	28.55	
213	78.1	253	77.2	29.37	
217	80.6	257	79.6	30.19	
220	83.0	260	82.1	31.00	
223	85.4	262	84.5	31.80	
225	87.9	265	86.9	32.61	
228	90.3	267	89.4	33.40	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

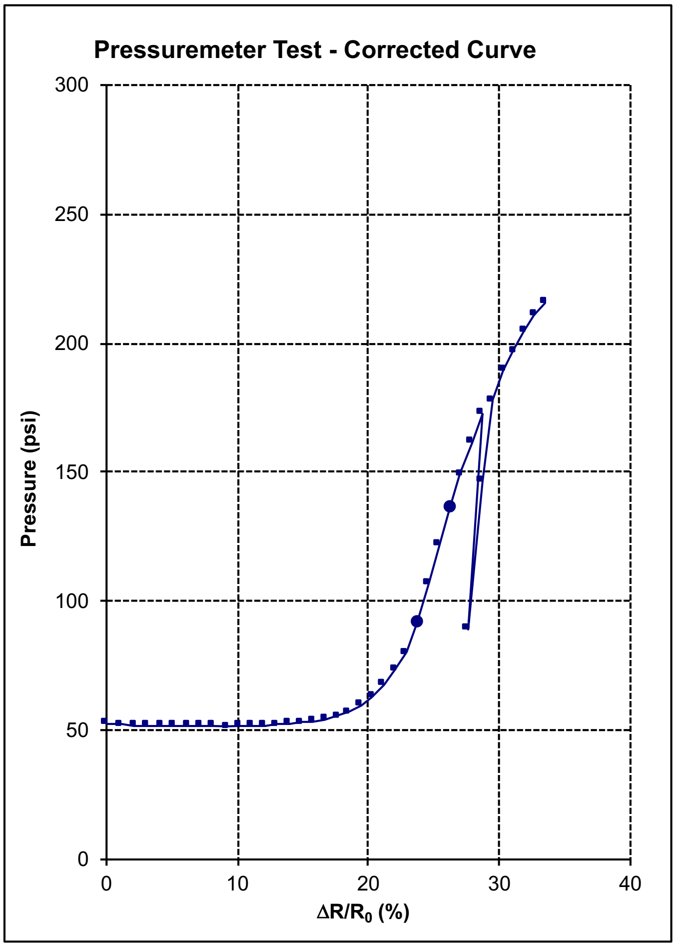
Pressiometer modulus E:	**5,012 psi**
Ultimate pressure P$_L$:	**319 psi**
Ratio E / P$_L$:	15.71
Yield pressure P$_F$:	165 psi
Ratio P$_L$ / P$_F$:	1.93

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	120.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	53	0.0	0.00
0	2.4	52	2.4	1.06
1	4.9	52	4.9	2.11
1	7.3	52	7.3	3.14
2	9.8	52	9.8	4.17
2	12.2	52	12.2	5.19
2	14.6	52	14.6	6.19
3	17.1	52	17.1	7.19
3	19.5	52	19.5	8.18
3	22.0	52	22.0	9.16
4	24.4	52	24.4	10.13
4	26.9	52	26.8	11.09
5	29.3	52	29.3	12.04
5	31.7	52	31.7	12.99
6	34.2	53	34.1	13.93
6	36.6	53	36.6	14.86
7	39.1	53	39.0	15.78
8	41.5	54	41.5	16.69
9	43.9	55	43.9	17.60
11	46.4	57	46.3	18.50
14	48.8	60	48.8	19.39
17	51.3	63	51.2	20.27
22	53.7	68	53.6	21.15
27	56.1	73	56.0	22.02
34	58.6	80	58.4	22.88
46	61.0	92	60.8	23.72
62	63.5	107	63.2	24.56
76	65.9	122	65.6	25.39
91	68.3	136	68.0	26.21
104	70.8	149	70.4	27.04
116	73.2	162	72.7	27.85
127	75.7	173	75.1	28.67
44	72.0	89	71.8	27.54
101	75.7	147	75.2	28.70
133	78.1	178	77.6	29.49
144	80.6	189	79.9	30.29
152	83.0	197	82.4	31.09
160	85.4	205	84.8	31.89
166	87.9	211	87.2	32.69
170	90.3	216	89.6	33.48



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

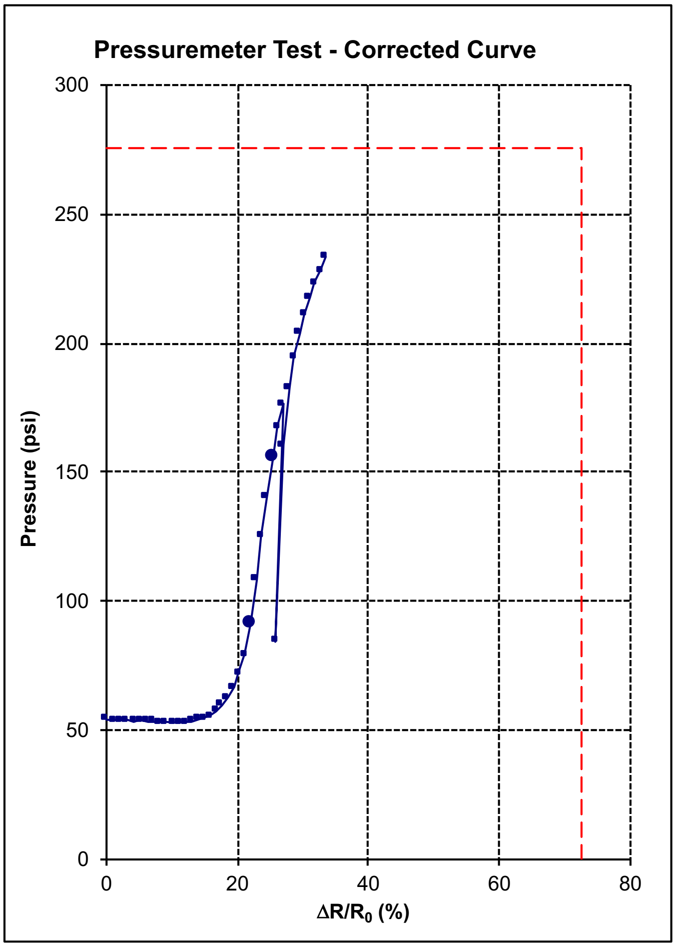
Pressiometer modulus E:	**2,963 psi**
Ultimate pressure P_L:	**n.a. psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	124.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	54	0.0	0.00
0	2.4	54	2.4	1.06
1	4.9	54	4.9	2.11
1	7.3	54	7.3	3.14
2	9.8	54	9.8	4.17
2	12.2	54	12.2	5.19
3	14.6	54	14.6	6.19
3	17.1	53	17.1	7.19
3	19.5	53	19.5	8.18
3	22.0	53	22.0	9.16
3	24.4	53	24.4	10.13
4	26.9	53	26.8	11.09
4	29.3	53	29.3	12.04
5	31.7	54	31.7	12.99
6	34.2	54	34.2	13.93
6	36.6	55	36.6	14.86
7	39.1	56	39.0	15.78
9	41.5	57	41.5	16.69
12	43.9	60	43.9	17.60
15	46.4	63	46.3	18.49
19	48.8	67	48.7	19.38
24	51.3	72	51.2	20.26
32	53.7	79	53.6	21.13
44	56.1	92	56.0	21.99 ◄
61	58.6	108	58.3	22.84
77	61.0	125	60.7	23.68
93	63.5	141	63.1	24.51
109	65.9	156	65.5	25.34
120	68.3	167	67.8	26.17
129	70.8	177	70.2	27.00
37	67.1	85	67.0	25.87
113	70.8	160	70.3	27.02
135	73.2	183	72.7	27.83
148	75.7	195	75.1	28.64
157	78.1	204	77.5	29.45
164	80.6	211	79.9	30.26
171	83.0	218	82.3	31.07
176	85.4	223	84.7	31.87
181	87.9	228	87.1	32.67
187	90.3	233	89.5	33.46



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

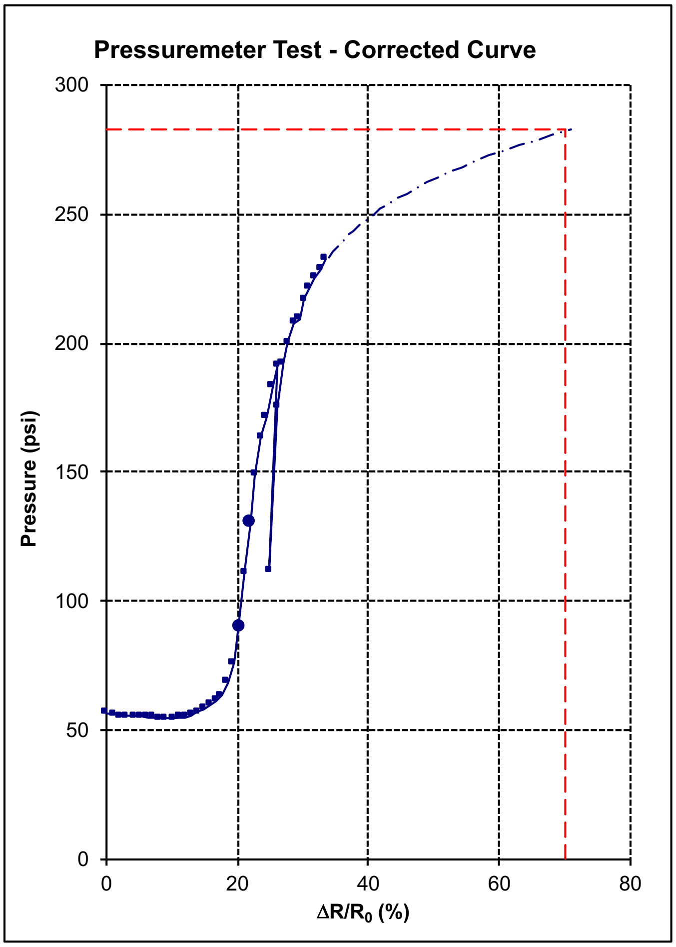
Test Results

Pressiometer modulus E:	**3,163 psi**
Ultimate pressure P_L:	**276 psi**
Ratio E / P_L:	11.48
Yield pressure P_F:	92 psi
Ratio P_L / P_F:	3.01

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	129.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	ΔR/R$_0$ %	
0	0.0	57	0.0	0.00	
0	2.4	56	2.4	1.06	
1	4.9	56	4.9	2.11	
1	7.3	55	7.3	3.14	
1	9.8	55	9.8	4.17	
2	12.2	55	12.2	5.19	
2	14.6	55	14.6	6.19	
2	17.1	55	17.1	7.19	
2	19.5	55	19.5	8.18	
3	22.0	55	22.0	9.16	
3	24.4	55	24.4	10.13	
3	26.9	55	26.8	11.09	
4	29.3	55	29.3	12.04	
5	31.7	56	31.7	12.99	
6	34.2	57	34.1	13.93	
8	36.6	58	36.6	14.86	
9	39.1	60	39.0	15.78	
11	41.5	61	41.4	16.69	
13	43.9	64	43.9	17.59	
18	46.4	69	46.3	18.49	
26	48.8	76	48.7	19.37	
40	51.3	90	51.1	20.24	◀
61	53.7	111	53.4	21.09	
81	56.1	131	55.8	21.94	◀
99	58.6	149	58.2	22.78	
114	61.0	164	60.5	23.62	
122	63.5	172	63.0	24.47	
134	65.9	183	65.3	25.30	
142	68.3	191	67.8	26.14	
62	64.7	112	64.4	24.98	
126	68.3	175	67.8	26.16	
143	70.8	192	70.2	26.98	
151	73.2	200	72.6	27.80	
159	75.7	208	75.0	28.62	
160	78.1	209	77.4	29.45	
168	80.6	217	79.8	30.26	
173	83.0	222	82.3	31.06	
176	85.4	225	84.7	31.87	
179	87.9	228	87.1	32.67	
183	90.3	233	89.5	33.46	



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

Pressiometer modulus E:	**3,839 psi**
Ultimate pressure P$_L$:	**283 psi**
Ratio E / P$_L$:	13.57
Yield pressure P$_F$:	131 psi
Ratio P$_L$ / P$_F$:	2.17

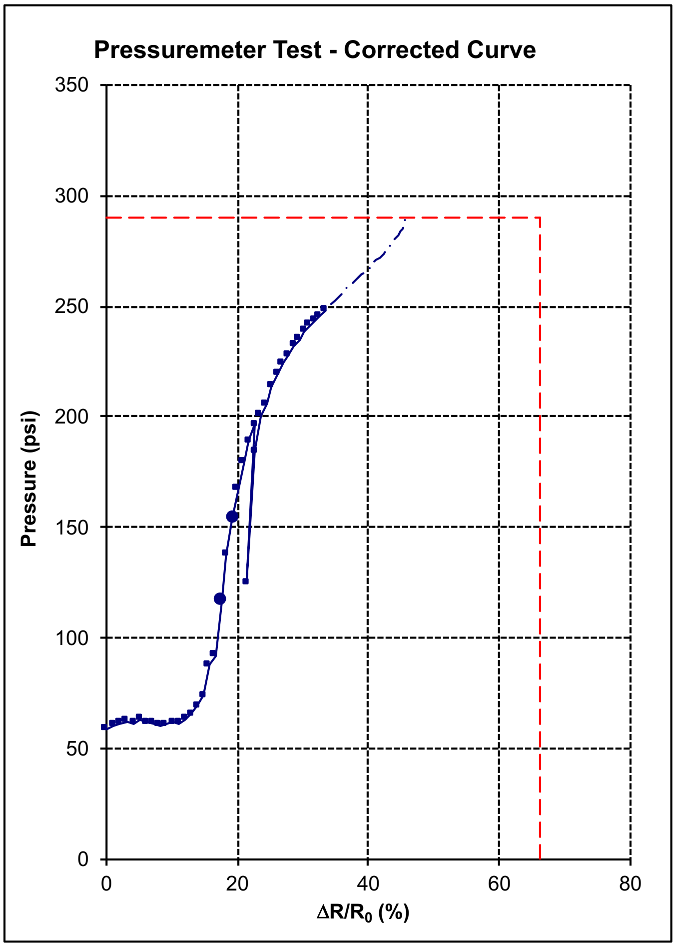
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	134.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	ΔR/R$_0$ %	
0	0.0	59	0.0	0.00	
2	2.4	60	2.4	1.06	
4	4.9	61	4.9	2.10	
6	7.3	62	7.3	3.13	
5	9.8	61	9.7	4.16	
7	12.2	63	12.2	5.18	
7	14.6	62	14.6	6.19	
6	17.1	61	17.1	7.18	
6	19.5	61	19.5	8.17	
7	22.0	61	21.9	9.15	
8	24.4	62	24.4	10.12	
8	26.9	62	26.8	11.08	
10	29.3	63	29.2	12.04	
12	31.7	66	31.7	12.98	
16	34.2	69	34.1	13.91	
21	36.6	74	36.5	14.83	
36	39.1	88	38.9	15.73	
39	41.5	92	41.3	16.64	
65	43.9	117	43.7	17.51	◀
85	46.4	137	46.0	18.39	
102	48.8	154	48.4	19.26	◀
115	51.3	167	50.8	20.13	
128	53.7	180	53.2	20.99	
137	56.1	189	55.6	21.85	
145	58.6	197	58.0	22.71	
73	54.9	125	54.6	21.51	
132	58.6	184	58.0	22.73	
149	61.0	201	60.4	23.57	
154	63.5	206	62.8	24.42	
162	65.9	214	65.2	25.26	
168	68.3	219	67.6	26.10	
173	70.8	225	70.1	26.94	
176	73.2	227	72.5	27.77	
181	75.7	232	74.9	28.59	
183	78.1	235	77.3	29.41	
187	80.6	239	79.8	30.23	
190	83.0	242	82.2	31.04	
192	85.4	243	84.6	31.85	
194	87.9	246	87.1	32.65	
197	90.3	248	89.5	33.45	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

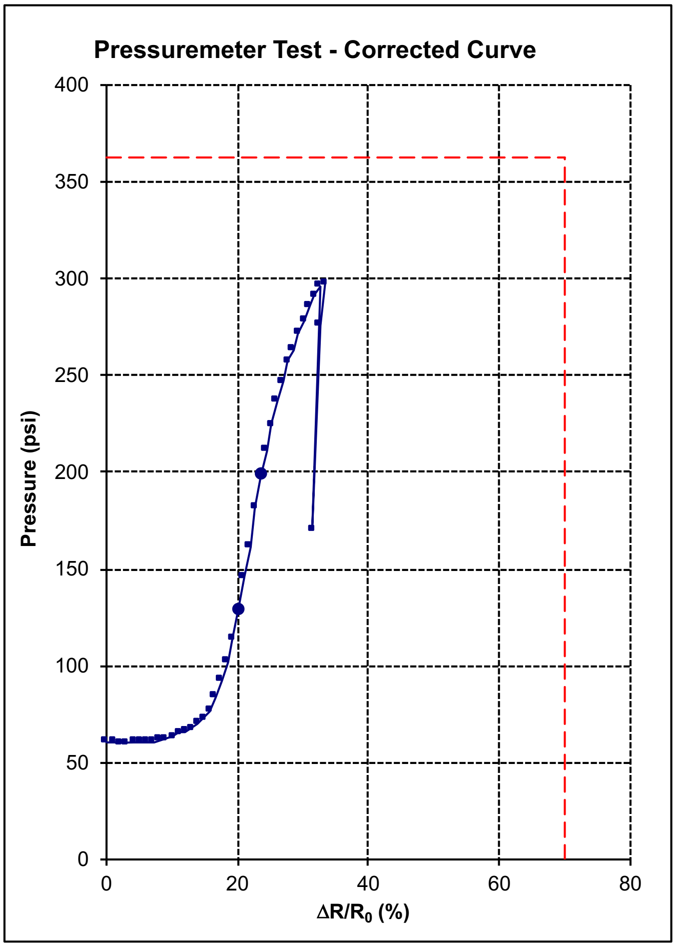
Pressiometer modulus E:	**3,357 psi**
Ultimate pressure P$_L$:	**290 psi**
Ratio E / P$_L$:	11.57
Yield pressure P$_F$:	154 psi
Ratio P$_L$ / P$_F$:	1.88

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	139.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	61	0.0	0.00
1	2.4	61	2.4	1.06
1	4.9	60	4.9	2.11
1	7.3	60	7.3	3.14
2	9.8	61	9.8	4.17
3	12.2	61	12.2	5.18
3	14.6	61	14.6	6.19
3	17.1	61	17.1	7.19
5	19.5	62	19.5	8.18
6	22.0	62	21.9	9.15
7	24.4	63	24.4	10.12
10	26.9	65	26.8	11.08
11	29.3	66	29.2	12.03
12	31.7	68	31.7	12.98
15	34.2	70	34.1	13.91
18	36.6	73	36.5	14.84
22	39.1	76	39.0	15.76
30	41.5	84	41.4	16.66
38	43.9	93	43.8	17.56
48	46.4	102	46.2	18.44
59	48.8	114	48.6	19.32
75	51.3	129	50.9	20.19 ◄
92	53.7	146	53.3	21.04
107	56.1	161	55.7	21.90
127	58.6	181	58.0	22.74
144	61.0	198	60.4	23.58
157	63.5	211	62.8	24.42
171	65.9	225	65.2	25.25
183	68.3	237	67.6	26.08
193	70.8	247	70.0	26.91
204	73.2	257	72.4	27.73
209	75.7	263	74.8	28.55
218	78.1	272	77.2	29.36
225	80.6	278	79.6	30.18
233	83.0	286	82.0	30.98
238	85.4	291	84.4	31.78
243	87.9	296	86.9	32.58
117	84.2	171	83.7	31.55
222	87.9	276	86.9	32.61
244	90.3	297	89.3	33.38



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

Pressiometer modulus E:	**3,317 psi**
Ultimate pressure P_L:	**n.a. psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	129 psi
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

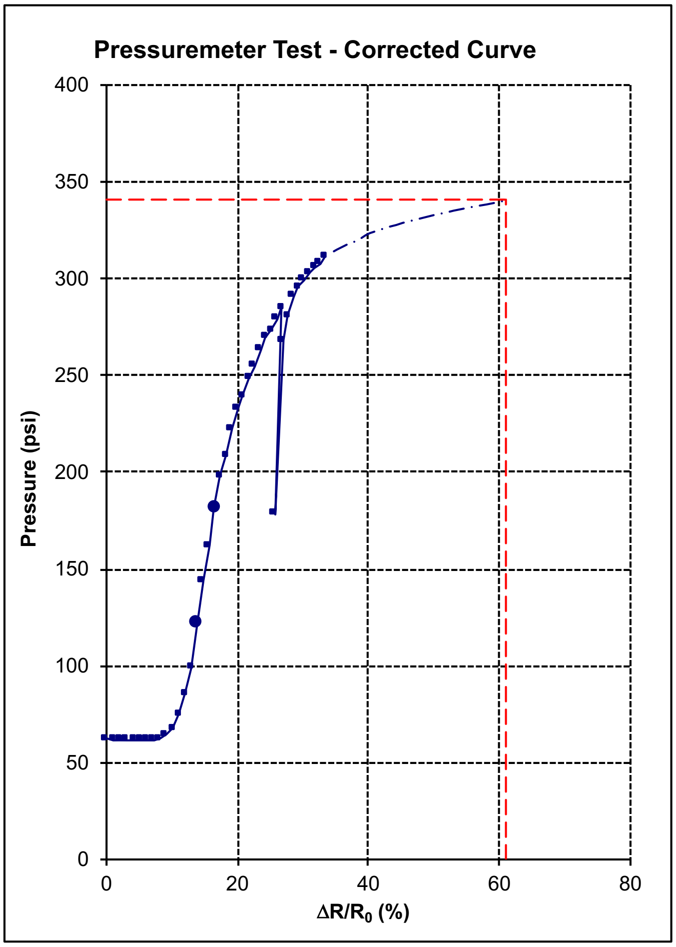
TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	142.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	62	0.0	0.00	
0	2.4	62	2.4	1.06	
1	4.9	62	4.9	2.11	
1	7.3	62	7.3	3.14	
2	9.8	62	9.8	4.17	
2	12.2	62	12.2	5.19	
3	14.6	62	14.6	6.19	
3	17.1	62	17.1	7.19	
4	19.5	62	19.5	8.18	
7	22.0	64	21.9	9.15	
10	24.4	68	24.4	10.12	
18	26.9	75	26.8	11.07	
29	29.3	86	29.2	12.00	
42	31.7	99	31.6	12.93	
66	34.2	122	33.9	13.83	◀
88	36.6	144	36.2	14.73	
106	39.1	162	38.6	15.62	
126	41.5	182	41.0	16.51	◀
142	43.9	198	43.3	17.39	
153	46.4	209	45.7	18.28	
167	48.8	222	48.1	19.16	
177	51.3	233	50.5	20.03	
184	53.7	239	52.9	20.91	
193	56.1	248	55.3	21.77	
199	58.6	255	57.7	22.63	
208	61.0	263	60.2	23.48	
214	63.5	270	62.6	24.33	
218	65.9	274	65.0	25.18	
224	68.3	279	67.4	26.02	
230	70.8	285	69.8	26.85	
123	67.1	178	66.6	25.74	
213	70.8	268	69.9	26.88	
226	73.2	281	72.3	27.70	
236	75.7	291	74.7	28.51	
241	78.1	295	77.1	29.33	
245	80.6	299	79.5	30.15	
248	83.0	303	82.0	30.96	
251	85.4	306	84.4	31.77	
253	87.9	308	86.8	32.57	
257	90.3	311	89.2	33.36	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

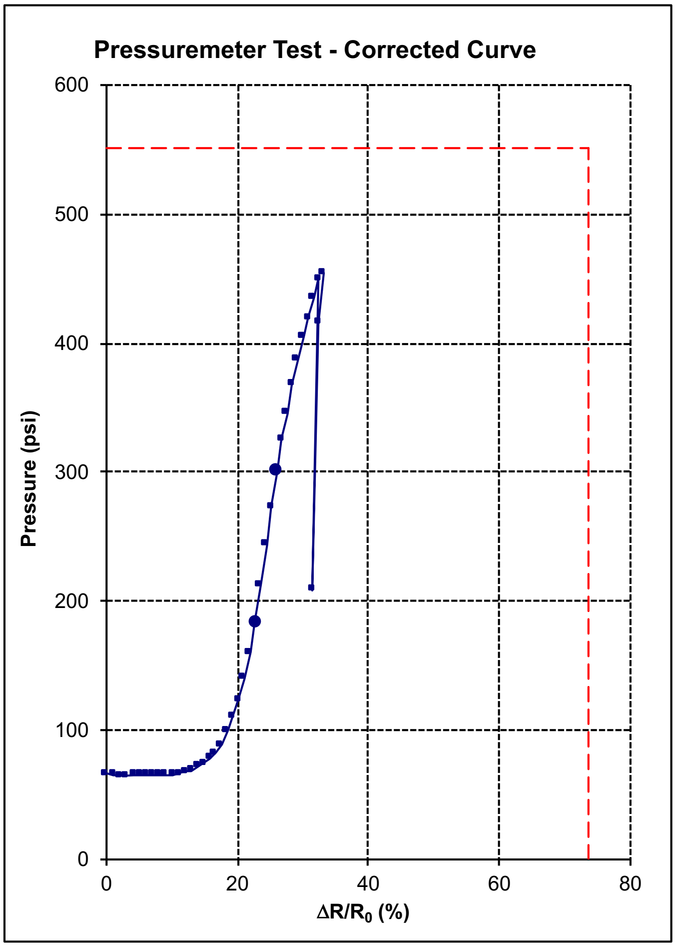
Pressiometer modulus E:	**3,409 psi**
Ultimate pressure P_L:	**341 psi**
Ratio E / P_L:	10.00
Yield pressure P_F:	182 psi
Ratio P_L / P_F:	1.88

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	152.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-161-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	67	0.0	0.00	
0	2.4	66	2.4	1.06	
0	4.9	65	4.9	2.11	
0	7.3	65	7.3	3.14	
1	9.8	65	9.8	4.17	
2	12.2	65	12.2	5.19	
2	14.6	65	14.6	6.19	
3	17.1	65	17.1	7.19	
3	19.5	65	19.5	8.18	
4	22.0	66	22.0	9.16	
4	24.4	66	24.4	10.13	
5	26.9	67	26.8	11.09	
7	29.3	68	29.3	12.04	
8	31.7	69	31.7	12.98	
11	34.2	72	34.1	13.92	
14	36.6	74	36.6	14.84	
18	39.1	78	39.0	15.76	
22	41.5	82	41.4	16.67	
29	43.9	89	43.8	17.57	
40	46.4	100	46.2	18.46	
50	48.8	110	48.6	19.34	
64	51.3	124	51.0	20.20	
80	53.7	140	53.4	21.06	
100	56.1	160	55.7	21.91	
124	58.6	184	58.1	22.74	◄
153	61.0	213	60.4	23.56	
185	63.5	244	62.7	24.38	
213	65.9	273	65.0	25.19	
242	68.3	301	67.3	26.00	
266	70.8	326	69.7	26.80	
287	73.2	346	72.0	27.61	
309	75.7	368	74.4	28.41	
327	78.1	387	76.7	29.21	
346	80.6	405	79.1	30.01	
360	83.0	419	81.5	30.80	
376	85.4	435	83.9	31.59	
391	87.9	450	86.2	32.38	
150	84.2	209	83.6	31.50	
356	87.9	415	86.4	32.43	
395	90.3	454	88.7	33.17	



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

Pressiometer modulus E:	**5,954 psi**
Ultimate pressure P_L:	**n.a. psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	184 psi
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

DRAFT

TEXAM Pressuremeter Test

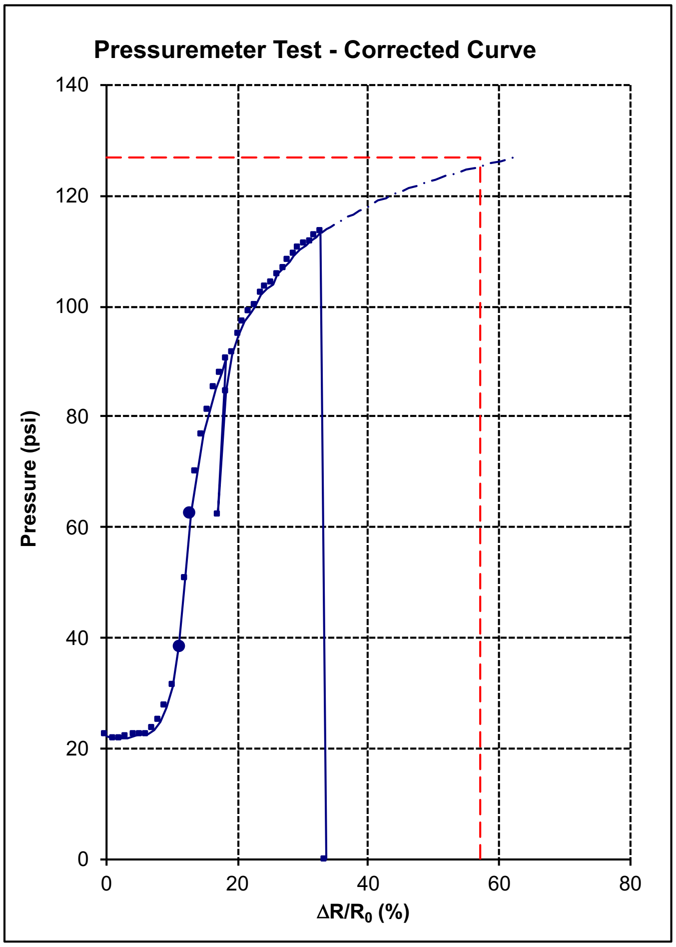
Project name: BART SAN JOSE MOTT MACDONALD
Borehole name: BH1
Test date: (mm/dd/yyyy) 11/11/2019
Test number: BH-164-PMT
Probe size: N

Use of a slotted casing: No
Test depth: 50.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	22	0.0	0.00	
0	2.4	22	2.4	1.06	
1	4.9	22	4.9	2.11	
2	7.3	22	7.3	3.14	
2	9.8	22	9.8	4.17	
3	12.2	22	12.2	5.18	
3	14.6	22	14.6	6.19	
5	17.1	23	17.1	7.19	
7	19.5	25	19.5	8.17	
10	22.0	28	21.9	9.14	
14	24.4	31	24.3	10.11	
21	26.9	38	26.7	11.06	◀
34	29.3	51	29.1	11.99	
46	31.7	63	31.5	12.91	◀
53	34.2	70	33.9	13.84	
60	36.6	77	36.3	14.75	
65	39.1	81	38.7	15.67	
69	41.5	85	41.2	16.58	
72	43.9	88	43.6	17.48	
75	46.4	90	46.0	18.38	
46	42.7	62	42.5	17.08	
69	46.4	85	46.0	18.39	
76	48.8	91	48.4	19.28	
79	51.3	95	50.9	20.16	
82	53.7	97	53.3	21.04	
83	56.1	99	55.7	21.91	
85	58.6	100	58.2	22.78	
87	61.0	102	60.6	23.64	
88	63.5	103	63.0	24.50	
89	65.9	104	65.5	25.35	
91	68.3	106	67.9	26.19	
92	70.8	107	70.3	27.03	
93	73.2	108	72.8	27.86	
94	75.7	109	75.2	28.69	
95	78.1	110	77.6	29.51	
96	80.6	111	80.1	30.33	
97	83.0	112	82.5	31.15	
98	85.4	113	85.0	31.95	
99	87.9	113	87.4	32.76	
99	90.3	#NUM!	89.8	33.56	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

Pressiometer modulus E:	**1,943 psi**
Ultimate pressure P_L:	**127 psi**
Ratio E / P_L:	15.31
Yield pressure P_F:	63 psi
Ratio P_L / P_F:	2.03

TEXAM COMPANION V.3.3

DRAFT

TEXAM Pressuremeter Test

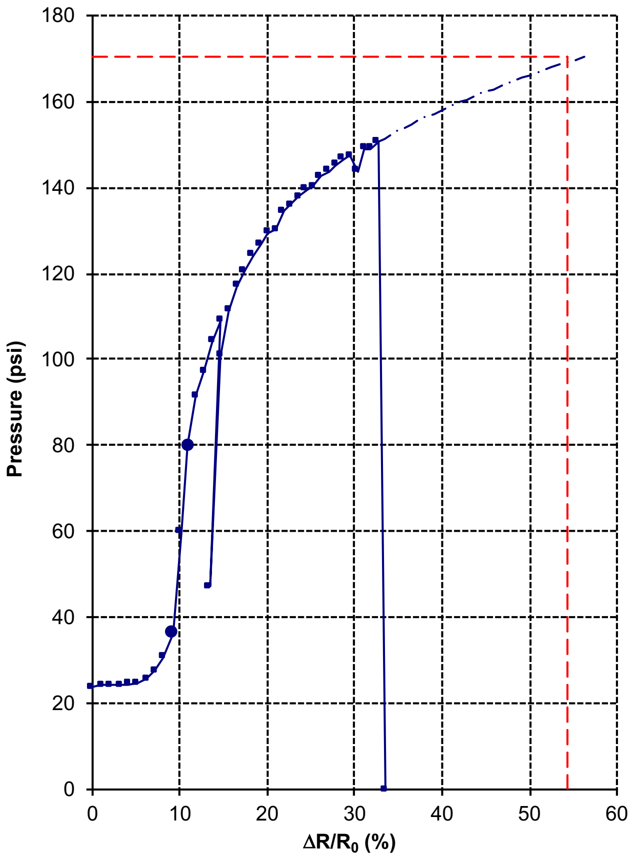
Project name:	BART SAN JOSE MOTT MACDONALD		Use of a slotted casing:	No
Borehole name:	BH1		Test depth:	53.00 ft
Test date: (mm/dd/yyyy)	11/11/2019		Manometer height above ground:	1.64 ft
Test number:	BH-164-PMT		Poisson's coefficient:	0.33
Probe size:	N		Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	24	0.0	0.00	
1	2.4	24	2.4	1.06	
2	4.9	24	4.9	2.10	
2	7.3	24	7.3	3.14	
3	9.8	24	9.7	4.17	
4	12.2	25	12.2	5.18	
5	14.6	26	14.6	6.19	
8	17.1	28	17.0	7.18	
11	19.5	31	19.5	8.16	
17	22.0	36	21.9	9.13	◄
41	24.4	60	24.2	10.05	
61	26.9	80	26.5	10.98	◄
73	29.3	92	28.9	11.91	
79	31.7	97	31.3	12.85	
86	34.2	104	33.7	13.77	
91	36.6	109	36.2	14.70	
29	33.0	47	32.8	13.41	
83	36.6	101	36.2	14.71	
94	39.1	111	38.6	15.62	
99	41.5	117	41.0	16.52	
103	43.9	121	43.4	17.43	
107	46.4	124	45.9	18.32	
110	48.8	127	48.3	19.21	
112	51.3	129	50.7	20.10	
113	53.7	130	53.1	20.98	
118	56.1	135	55.6	21.85	
119	58.6	136	58.0	22.72	
121	61.0	138	60.4	23.58	
123	63.5	139	62.9	24.44	
124	65.9	140	65.3	25.29	
126	68.3	143	67.7	26.13	
127	70.8	144	70.2	26.97	
129	73.2	145	72.6	27.80	
130	75.7	147	75.0	28.63	
131	78.1	147	77.5	29.45	
128	80.6	144	79.9	30.28	
133	83.0	149	82.3	31.09	
133	85.4	149	84.8	31.90	
135	87.9	151	87.2	32.70	
127	90.3	#NUM!	89.7	33.51	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Pressuremeter Test - Corrected Curve



Test Results

Pressiometer modulus E:	**3,469 psi**
Ultimate pressure P_L:	**170 psi**
Ratio E / P_L:	20.35
Yield pressure P_F:	80 psi
Ratio P_L / P_F:	2.13

TEXAM COMPANION V.3.3

DRAFT

TEXAM Pressuremeter Test

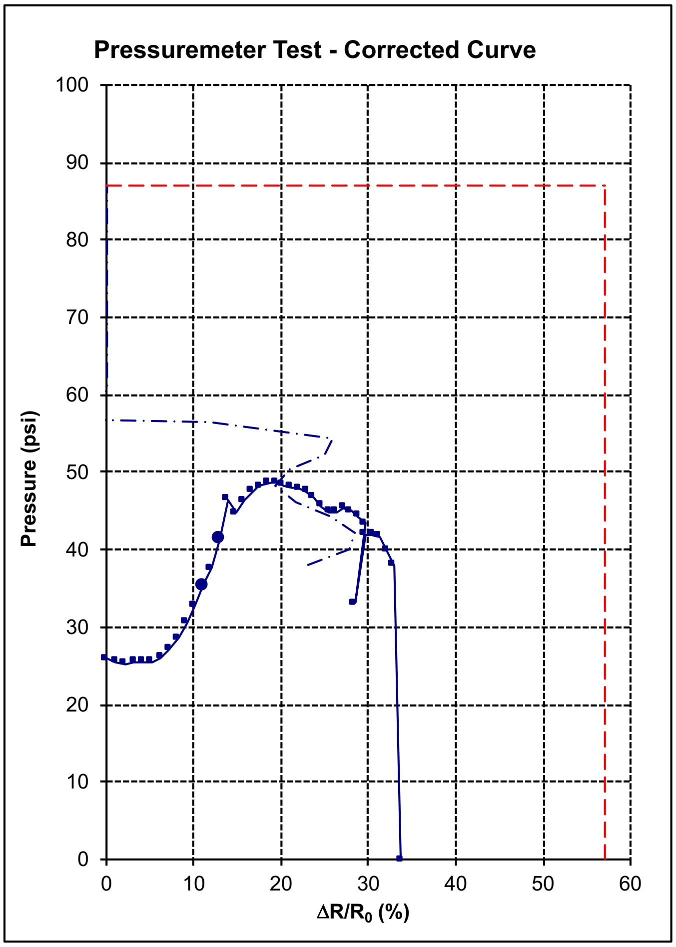
Project name:	BART SAN JOSE MOTT MACDONALD
Borehole name:	BH1
Test date: (mm/dd/yyyy)	11/11/2019
Test number:	BH-164-PMT
Probe size:	N

Use of a slotted casing:	No
Test depth:	58.00 ft
Manometer height above ground:	1.64 ft
Poisson's coefficient:	0.33
Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in^3	Pressure psi	Volume in^3	ΔR/R$_0$ %	
0	0.0	26	0.0	0.00	
0	2.4	25	2.4	1.06	
1	4.9	25	4.9	2.11	
2	7.3	25	7.3	3.14	
2	9.8	26	9.8	4.17	
2	12.2	26	12.2	5.18	
3	14.6	26	14.6	6.19	
5	17.1	27	17.1	7.19	
7	19.5	29	19.5	8.17	
9	22.0	30	21.9	9.15	
12	24.4	33	24.4	10.11	
15	26.9	35	26.8	11.07	◄
17	29.3	38	29.2	12.02	
21	31.7	41	31.6	12.96	◄
26	34.2	47	34.0	13.89	
25	36.6	45	36.5	14.82	
27	39.1	46	38.9	15.74	
28	41.5	47	41.4	16.66	
29	43.9	48	43.8	17.56	
29	46.4	49	46.2	18.46	
30	48.8	49	48.7	19.36	
29	51.3	48	51.1	20.25	
29	53.7	48	53.6	21.13	
29	56.1	48	56.0	22.01	
29	58.6	47	58.4	22.88	
28	61.0	47	60.9	23.74	
27	63.5	46	63.3	24.60	
26	65.9	45	65.8	25.45	
26	68.3	45	68.2	26.30	
27	70.8	45	70.7	27.14	
27	73.2	45	73.1	27.97	
26	75.7	44	75.5	28.81	
25	78.1	43	78.0	29.63	
15	74.4	33	74.4	28.41	
23	78.1	42	78.0	29.63	
24	80.6	42	80.4	30.45	
23	83.0	42	82.9	31.27	
22	85.4	40	85.3	32.08	
20	87.9	38	87.8	32.88	
17	90.3	#NUM!	90.2	33.69	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

Pressiometer modulus E:	**478 psi**
Ultimate pressure P$_L$:	**n.a. psi**
Ratio E / P$_L$:	#VALUE!
Yield pressure P$_F$:	41 psi
Ratio P$_L$ / P$_F$:	#VALUE!

DRAFT

TEXAM Pressuremeter Test

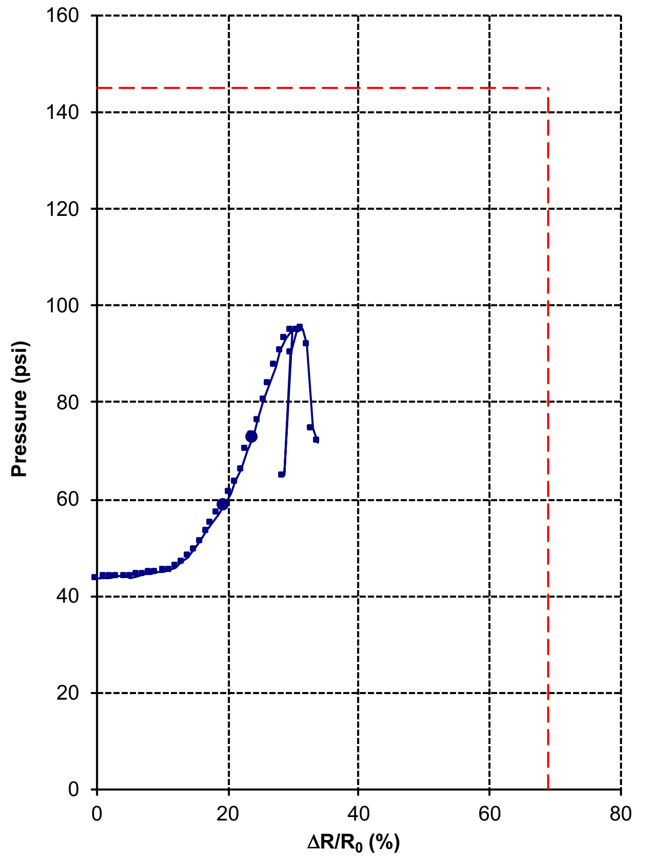
Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	99.00 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-164-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	ΔR/R₀ %	
0	0.0	44	0.0	0.00	
1	2.4	44	2.4	1.06	
2	4.9	44	4.9	2.11	
2	7.3	44	7.3	3.15	
3	9.8	44	9.8	4.17	
3	12.2	44	12.2	5.19	
4	14.6	44	14.6	6.20	
4	17.1	44	17.1	7.20	
5	19.5	45	19.5	8.19	
5	22.0	45	22.0	9.17	
6	24.4	45	24.4	10.14	
6	26.9	45	26.9	11.10	
7	29.3	46	29.3	12.05	
8	31.7	47	31.7	13.00	
10	34.2	48	34.2	13.94	
11	36.6	50	36.6	14.87	
13	39.1	51	39.1	15.79	
15	41.5	53	41.5	16.71	
17	43.9	55	43.9	17.62	
19	46.4	57	46.4	18.52	
21	48.8	59	48.8	19.42	◀
23	51.3	61	51.3	20.31	
26	53.7	63	53.7	21.19	
29	56.1	66	56.2	22.07	
32	58.6	70	58.6	22.94	
36	61.0	73	61.0	23.80	
39	63.5	76	63.5	24.66	
43	65.9	81	65.9	25.51	
47	68.3	84	68.4	26.36	
50	70.8	88	70.8	27.20	
54	73.2	91	73.3	28.03	
56	75.7	93	75.7	28.86	
58	78.1	95	78.2	29.69	
28	74.4	65	74.5	28.44	
53	78.1	90	78.1	29.69	
58	80.6	95	80.6	30.50	
58	83.0	95	83.0	31.32	
55	85.4	92	85.5	32.13	
38	87.9	75	87.9	32.93	
35	90.3	72	90.3	33.72	

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Pressuremeter Test - Corrected Curve



Test Results

Pressiometer modulus E:	**521 psi**
Ultimate pressure P_L:	**n.a. psi**
Ratio E / P_L:	#VALUE!
Yield pressure P_F:	59 psi
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

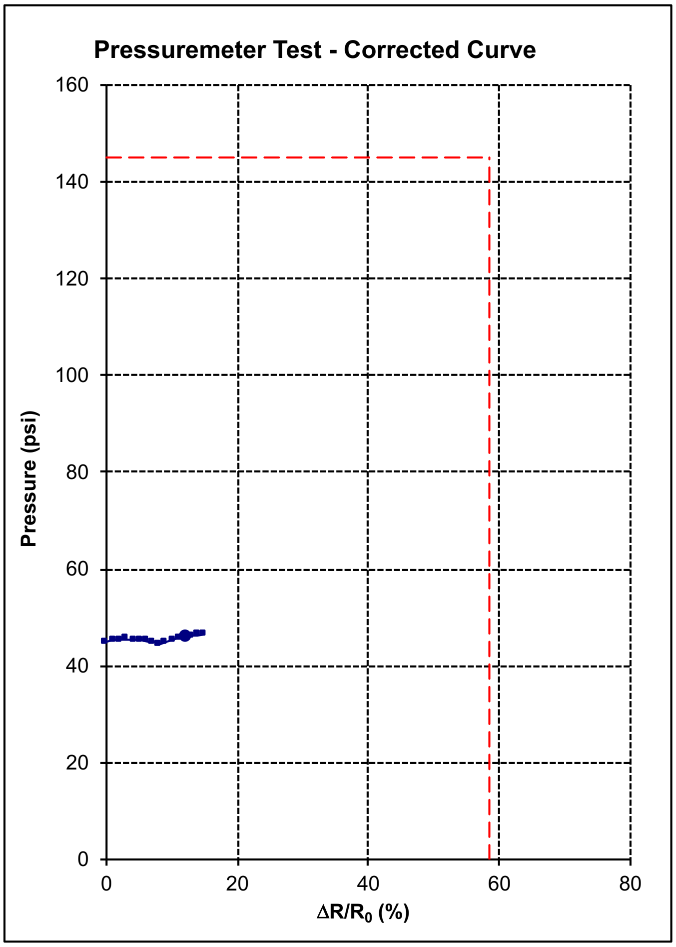
Project name: BART SAN JOSE MOTT MACDONALD
Borehole name: BH1
Test date: (mm/dd/yyyy) 11/11/2019
Test number: BH-164-PMT
Probe size: N

Use of a slotted casing: No
Test depth: 102.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings		
Pressure psi	**Volume in^3**	**Pressure psi**	**Volume in^3**	**$\Delta R/R_0$ %**
0	0.0	45	0.0	0.00
1	2.4	45	2.4	1.06
1	4.9	45	4.9	2.11
2	7.3	45	7.3	3.14
2	9.8	45	9.8	4.17
3	12.2	45	12.2	5.18
3	14.6	45	14.6	6.19
3	17.1	45	17.1	7.19
4	19.5	44	19.5	8.18
4	22.0	45	22.0	9.16
4	24.4	45	24.4	10.13
5	26.9	46	26.8	11.09
5	29.3	46	29.3	12.04
5	31.7	46	31.7	12.99
6	34.2	46	34.2	13.93
6	36.6	46	36.6	14.86
	33.0			
	36.6			
	39.1			
	41.5			
	43.9			
	46.4			
	48.8			
	51.3			
	53.7			
	56.1			
	58.6			
	61.0			
	63.5			
	65.9			
	68.3			
	70.8			
	73.2			
	75.7			
	78.1			
	80.6			
	83.0			
	85.4			
	87.9			
	90.3			

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:



Test Results

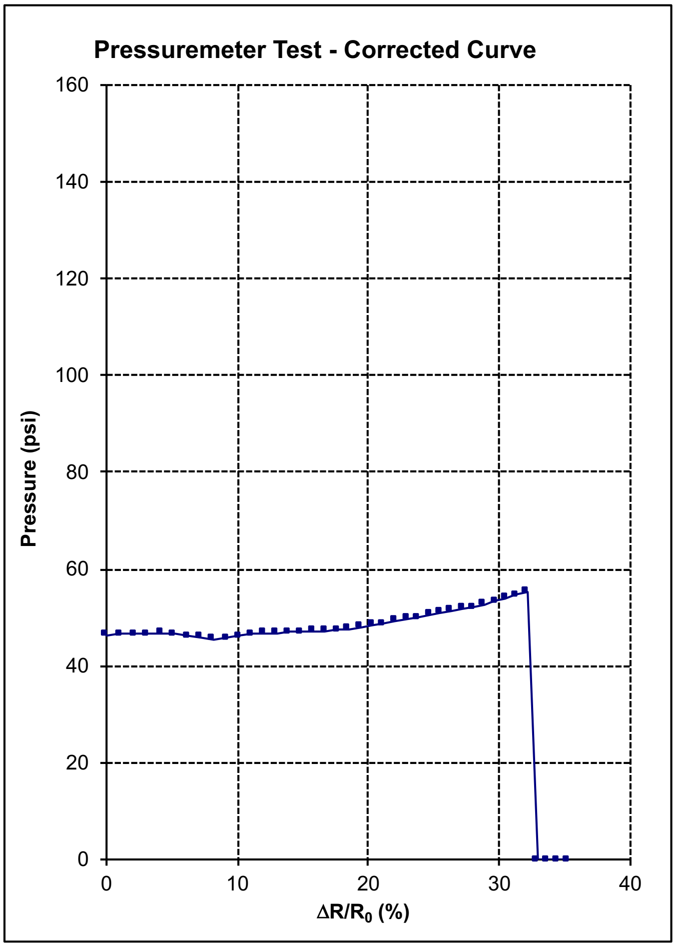
Pressiometer modulus E:	**n.a.**
Ultimate pressure P_L:	**n.a.**
Ratio E / P_L:	n.a.
Yield pressure P_F:	#N/A
Ratio P_L / P_F:	#VALUE!

TEXAM COMPANION V.3.3

TEXAM Pressuremeter Test

Project name:	BART SAN JOSE MOTT MACDONALD	Use of a slotted casing:	No
Borehole name:	BH1	Test depth:	105.50 ft
Test date: (mm/dd/yyyy)	11/11/2019	Manometer height above ground:	1.64 ft
Test number:	BH-164-PMT	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	46	0.0	0.00
1	2.4	47	2.4	1.06
1	4.9	47	4.9	2.11
2	7.3	47	7.3	3.14
2	9.8	47	9.8	4.17
3	12.2	47	12.2	5.19
3	14.6	46	14.6	6.19
3	17.1	46	17.1	7.19
3	19.5	46	19.5	8.18
3	22.0	46	22.0	9.16
4	24.4	46	24.4	10.13
4	26.9	47	26.8	11.09
4	29.3	47	29.3	12.05
4	31.7	47	31.7	12.99
5	34.2	47	34.2	13.93
5	36.6	47	36.6	14.86
5	39.1	47	39.0	15.78
5	41.5	47	41.5	16.70
6	43.9	47	43.9	17.61
6	46.4	48	46.4	18.51
6	48.8	48	48.8	19.40
7	51.3	48	51.2	20.29
7	53.7	49	53.7	21.17
8	56.1	49	56.1	22.05
8	58.6	50	58.6	22.92
9	61.0	50	61.0	23.78
9	63.5	51	63.4	24.64
10	65.9	51	65.9	25.49
11	68.3	52	68.3	26.33
11	70.8	52	70.7	27.17
11	73.2	52	73.2	28.00
12	75.7	53	75.6	28.83
13	78.1	53	78.1	29.66
14	80.6	54	80.5	30.47
14	83.0	55	82.9	31.29
15	85.4	55	85.4	32.09
16	87.9	#DIV/0!	87.8	32.90
17	90.3	#DIV/0!	90.3	33.69
18	92.8	#DIV/0!	92.7	34.49
19	95.2	#DIV/0!	95.1	35.28



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Test Results

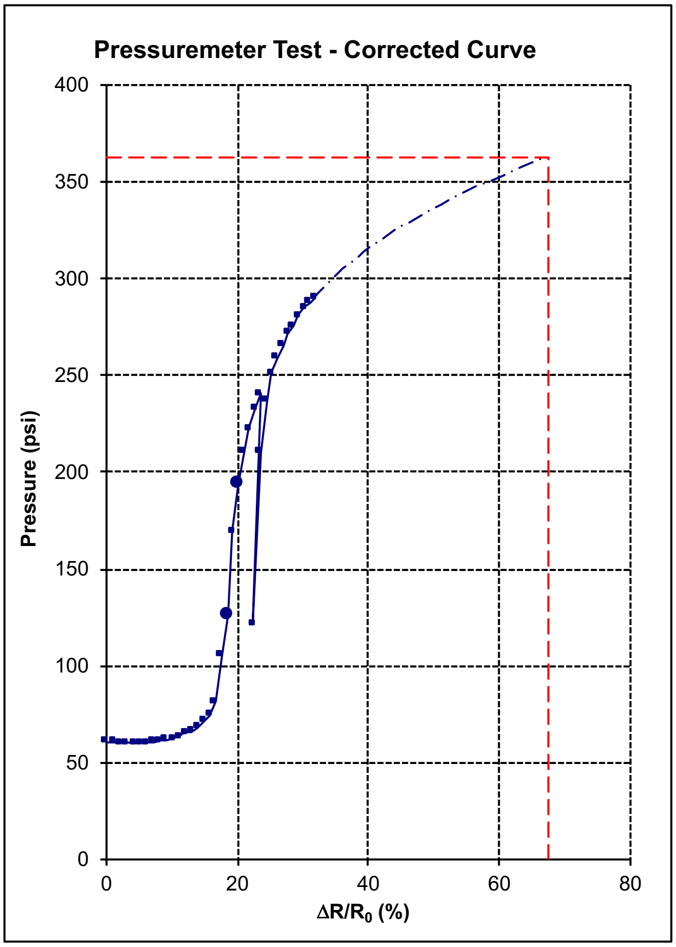
Pressiometer modulus E:	**n.a.**
Ultimate pressure P_L:	**n.a.**
Ratio E / P_L:	n.a.
Yield pressure P_F:	n.a.
Ratio P_L / P_F:	#VALUE!

TEXAM Pressuremeter Test

Project name: BART SAN JOSE MOTT MACDONALD
Borehole name: BH1
Test date: (mm/dd/yyyy) 11/11/2019
Test number: BH-164-PMT
Probe size: N

Use of a slotted casing: No
Test depth: 138.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	61	0.0	0.00	
1	2.4	60	2.4	1.06	
1	4.9	60	4.9	2.11	
2	7.3	60	7.3	3.14	
2	9.8	60	9.8	4.17	
3	12.2	60	12.2	5.19	
3	14.6	60	14.6	6.19	
4	17.1	61	17.1	7.19	
4	19.5	61	19.5	8.18	
5	22.0	62	21.9	9.16	
6	24.4	62	24.4	10.13	
7	26.9	63	26.8	11.09	
10	29.3	65	29.3	12.04	
11	31.7	66	31.7	12.98	
13	34.2	68	34.1	13.92	
16	36.6	71	36.6	14.84	
20	39.1	74	39.0	15.76	
27	41.5	82	41.4	16.67	
51	43.9	105	43.7	17.54	
72	46.4	127	46.1	18.41	◀
115	48.8	169	48.4	19.25	
140	51.3	194	50.7	20.10	◀
157	53.7	211	53.1	20.96	
169	56.1	222	55.5	21.82	
179	58.6	233	57.9	22.68	
187	61.0	241	60.3	23.53	
68	57.4	122	57.1	22.40	
156	61.0	210	60.4	23.57	
183	63.5	237	62.7	24.40	
197	65.9	251	65.1	25.23	
205	68.3	259	67.5	26.07	
212	70.8	266	70.0	26.90	
218	73.2	272	72.4	27.73	
222	75.7	276	74.8	28.55	
227	78.1	281	77.2	29.37	
231	80.6	285	79.6	30.19	
235	83.0	288	82.1	31.00	
237	85.4	290	84.5	31.81	
	87.9				
	90.3				



Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

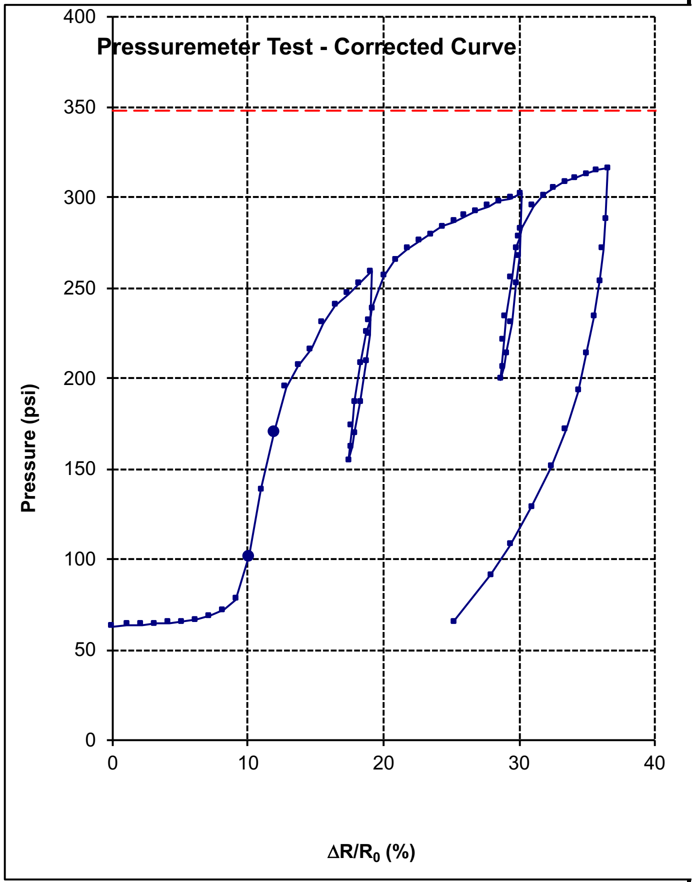
Test Results

Pressiometer modulus E: **6,385 psi**
Ultimate pressure P_L: **363 psi**
Ratio E / P_L: 17.61
Yield pressure P_F: 194 psi
Ratio P_L / P_F: 1.86

TEXAM Pressuremeter Test

Project name:	BART Silicon Valley Phase II	Use of a slotted casing:	No
Borehole name:	BH-164-PMT	Test depth:	143.00 ft
Test date: (mm/dd/yyyy)	12/06/2019	Manometer height above ground:	1.64 ft
Test number:	10	Poisson's coefficient:	0.33
Probe size:	N	Fluid density:	1.000

Raw Readings		Corrected Readings			
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %	
0	0.0	63	0.0	0.00	
2	2.4	64	2.4	1.06	
3	4.9	64	4.9	2.10	
3	7.3	64	7.3	3.14	
4	9.8	65	9.7	4.16	
6	12.2	66	12.2	5.18	
7	14.6	67	14.6	6.19	
9	17.1	69	17.0	7.18	
13	19.5	72	19.5	8.16	
19	22.0	78	21.9	9.13	
44	24.4	102	24.2	10.06	◀
81	26.9	139	26.5	10.97	
113	29.3	171	28.8	11.87	◀
137	31.7	195	31.2	12.78	
150	34.2	207	33.6	13.70	
159	36.6	216	36.0	14.62	
173	39.1	231	38.4	15.52	
183	41.5	240	40.8	16.43	
190	43.9	247	43.2	17.33	
196	46.4	253	45.6	18.22	
202	48.8	259	48.0	19.11	
167	48.2	224	47.5	18.94	
152	47.6	209	47.0	18.74	
130	46.4	187	45.8	18.32	
113	45.2	170	44.7	17.90	
105	44.5	162	44.1	17.68	
98	43.9	155	43.5	17.47	
117	44.5	174	44.1	17.66	
130	45.2	187	44.6	17.87	
151	46.4	208	45.8	18.29	
168	47.6	225	46.9	18.71	
175	48.2	232	47.5	18.93	
182	48.8	238	48.1	19.14	
200	51.3	257	50.4	20.01	
209	53.7	266	52.9	20.88	
215	56.1	271	55.3	21.75	
219	58.6	276	57.7	22.61	
223	61.0	280	60.1	23.47	
228	63.5	284	62.5	24.32	
231	65.9	287	65.0	25.17	
234	68.3	290	67.4	26.02	
237	70.8	293	69.8	26.85	
239	73.2	295	72.3	27.69	
242	75.7	298	74.7	28.52	
244	78.1	300	77.1	29.34	
246	80.6	302	79.6	30.16	
212	79.9	268	79.1	30.00	
196	79.3	252	78.5	29.81	
175	78.1	231	77.4	29.43	
158	76.9	214	76.2	29.04	
150	76.3	206	75.7	28.85	
144	75.7	200	75.1	28.65	
165	76.3	221	75.6	28.83	
179	76.9	234	76.2	29.02	
200	78.1	256	77.3	29.40	
216	79.3	272	78.5	29.79	
222	79.9	278	79.0	29.98	
227	80.6	283	79.6	30.18	
239	83.0	295	82.0	30.98	
245	85.4	301	84.4	31.78	
250	87.9	306	86.9	32.58	
253	90.3	309	89.3	33.38	
255	92.8	311	91.7	34.17	
258	95.2	313	94.2	34.96	
259	97.6	315	96.6	35.74	
261	100.1	316	99.0	36.53	
232	99.5	288	98.6	36.39	
216	98.9	272	98.0	36.21	
198	98.0	254	97.2	35.95	



Test Results

Pressiometer modulus E:	**5,592 psi**
Ultimate pressure P_L:	**348 psi**
Ratio E / P_L:	16.06
Yield pressure P_F:	171 psi
Ratio P_L / P_F:	2.04

M COMPANION V.3.3

Remarks

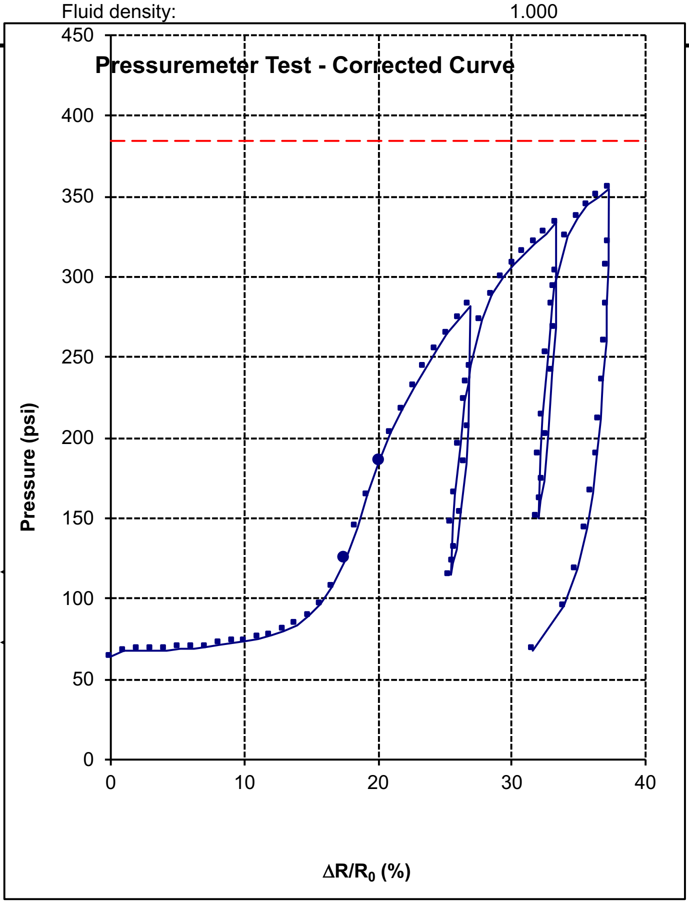
Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

TEXAM Pressuremeter Test

Project name: BART Silicon Valley Phase II
Borehole name: BH-164-PMT
Test date: (mm/dd/yyyy) 12/06/2019
Test number: 9
Probe size: N

Use of a slotted casing: No
Test depth: 146.00 ft
Manometer height above ground: 1.64 ft
Poisson's coefficient: 0.33
Fluid density: 1.000

Raw Readings		Corrected Readings		
Pressure psi	Volume in³	Pressure psi	Volume in³	$\Delta R/R_0$ %
0	0.0	64	0.0	0.00
4	2.4	68	2.4	1.05
5	4.9	68	4.9	2.10
6	7.3	68	7.3	3.14
7	9.8	68	9.7	4.16
8	12.2	69	12.2	5.18
8	14.6	69	14.6	6.18
9	17.1	70	17.1	7.18
11	19.5	72	19.5	8.16
13	22.0	73	21.9	9.14
14	24.4	74	24.4	10.11
16	26.9	75	26.8	11.07
18	29.3	77	29.2	12.02
21	31.7	80	31.6	12.97
25	34.2	84	34.1	13.90
30	36.6	89	36.5	14.82
38	39.1	97	38.9	15.73
49	41.5	107	41.3	16.63
67	43.9	125	43.7	17.51
86	46.4	144	46.0	18.39
106	48.8	164	48.4	19.25
127	51.3	185	50.7	20.11
145	53.7	203	53.1	20.97
160	56.1	218	55.5	21.83
173	58.6	231	57.9	22.68
185	61.0	243	60.3	23.53
197	63.5	255	62.7	24.37
207	65.9	264	65.1	25.21
216	68.3	273	67.5	26.04
225	70.8	282	69.9	26.87
149	70.2	206	69.6	26.77
127	69.6	184	69.1	26.59
96	68.3	153	68.0	26.21
74	67.1	131	66.8	25.82
65	66.5	122	66.3	25.62
57	65.9	114	65.7	25.42
89	66.5	146	66.2	25.59
107	67.1	164	66.7	25.77
138	68.3	196	67.8	26.15
165	69.6	223	68.9	26.53
176	70.2	233	69.5	26.73
186	70.8	244	70.0	26.93
215	73.2	273	72.4	27.72
231	75.7	289	74.7	28.53
243	78.1	300	77.1	29.34
250	80.6	307	79.5	30.15
257	83.0	315	81.9	30.96
264	85.4	321	84.4	31.76
269	87.9	327	86.8	32.56
277	90.3	334	89.2	33.35
211	89.7	268	88.8	33.24
184	89.1	241	88.3	33.07
145	87.9	202	87.3	32.72
116	86.7	173	86.2	32.36
104	86.0	161	85.6	32.17
93	85.4	150	85.1	31.99
133	86.0	190	85.5	32.14
156	86.7	213	86.0	32.31
194	87.9	252	87.1	32.66
225	89.1	282	88.2	33.02
236	89.7	293	88.7	33.20
245	90.3	302	89.3	33.39
268	92.8	325	91.7	34.16
279	95.2	336	94.1	34.93
287	97.6	344	96.5	35.71
293	100.1	350	98.9	36.48
298	102.5	354	101.3	37.26
264	102.4	321	101.3	37.25
250	102.2	307	101.2	37.23



Test Results

Pressiometer modulus E:	**3,661 psi**
Ultimate pressure P_L:	**384 psi**
Ratio E / P_L:	9.52
Yield pressure P_F:	185 psi
Ratio P_L / P_F:	2.08

AM COMPANION V.3.3

Remarks

Calibrations References:
Soil Description:
Drilling method: MUD
Notes:

Downhole Geophysical Logging

Downhole Geophysical Logging Locations

Table B-2. Summary of Downhole Geophysical Logging

Borehole Number	Northing NAD83 (ft)[1]	Easting NAD83 (ft)[1]	Elevation NAVD88 (ft)	Depth Interval Logged	
				Top Depth (ft)	Bottom Depth (ft)
BH-151	1,947,821.0	6,157,081.3	87.51	39	245
BH-152	1,946,271.3	6,154,224.1	86.59	34	260
BH-154	1,952,701.7	6,164,836.0	89.31	20	212
BH-156	1,953,641.0	6,164,591.3	88.17	20	261
BH-165	1,956,022.4	6,163,246.7	86.01	13	152
BH-176	1,952,544.5	6,147,277.2	65.35	15	243
BH-177	1,954,420.2	6,144,531.6	64.39	15	251
BH-178	1,953,176.3	6,146,431.7	62.43	10	204
BH-179	1,950,048.3	6,160,894.6	80.71	10	252
BH-180	1,949,024.4	6,151,220.0	81.78	40	252

[1] Values rounded to the nearest tenth (0.1) of a foot.

NORCAL

BSVII

DUAL INDUCTION WITH GAMMA

COMPANY	MOTT MACDONALD	OTHER SERVICES
WELL	bh-151	r-2
FIELD	santa clarra avenue	
COUNTRY		
STATE	CA	
COUNTY	santa clara	
LAT.:		
LONG.:		

Perm. Datum		Elev	KB	0.00
Log. Datum	GS		DF	0.00
Drill Datum			GL	0.00

DATE	25 Jul 1	29 Aug 1	29 Aug 1
RUN#	0	0	0
TYPE OF LOG	DUIN		
DEPTH DRILLER	273.00	0.00	0.00
DEPTH LOGGER	256.00	0.00	0.00
LOG DEEPEST	256.00	0.00	0.00
LOG SHALLOW	7.00	0.00	0.00
FLUID IN HOLE	SLURRY		
SALINITY			
DENSITY			
LEVEL			
MAX TEMP °C	0.00	0.00	0.00
RIG TIME			
RECORDED BY	wjh		
WITNESSED BY	FAUSTUS		

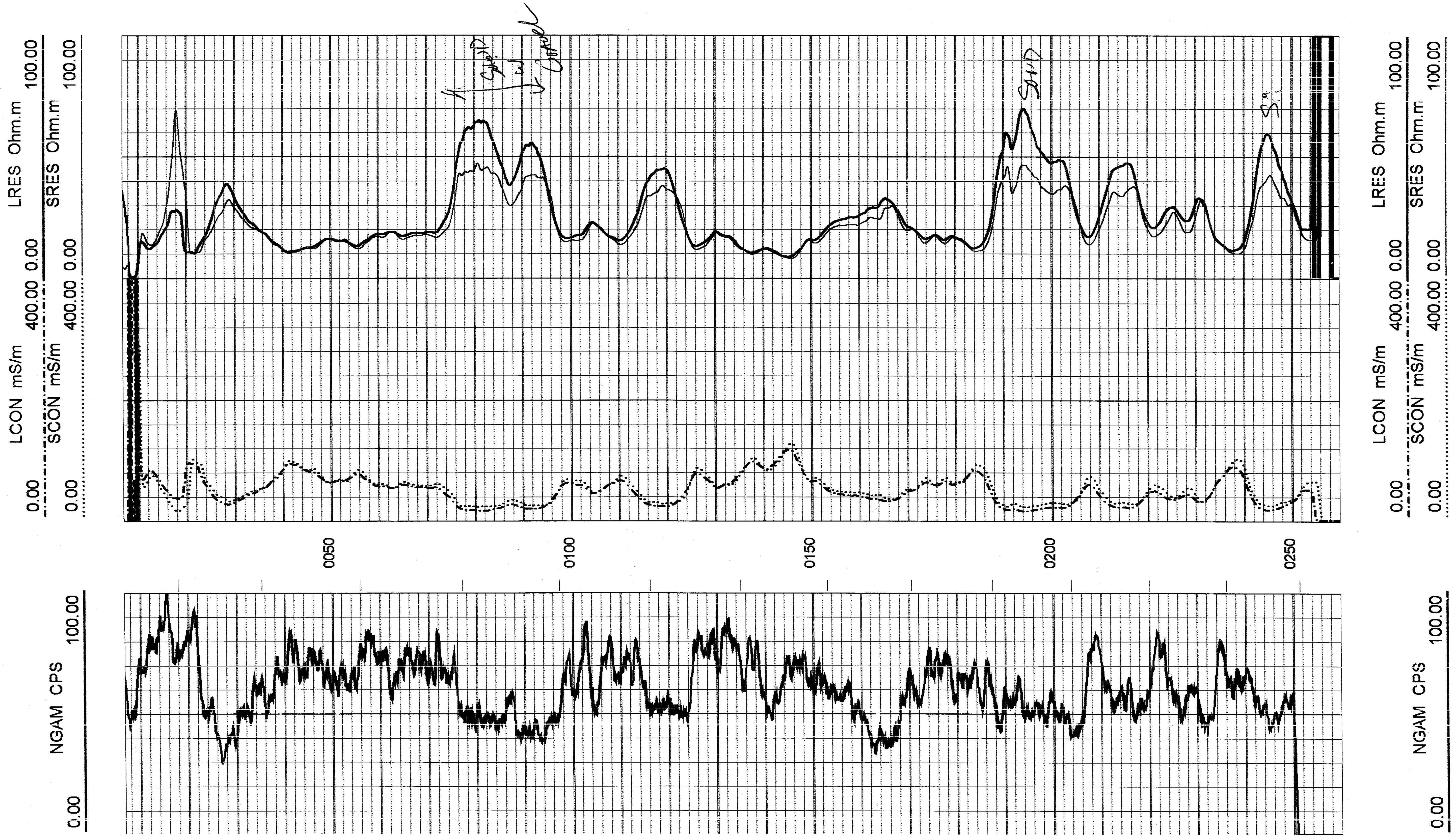
RUN#	BIT RECORD			CASING RECORD			
	SIZE	FROM	TO	SIZE	WEIGHT	FROM	TO
0	5.00	90.00	273.00	8.00	0.00	0.00	9.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

ROBERTSON GEOLOGGING TECHNOLOGY

REMARKS (C:\Winlogger\Data\mott-macdonanld\b-152-dual-induction.hed)

Hello MARTIN
This is a complement to the E-log

Depth: 6.00 ft Date: 25 Jul 2019 Time: 15:00:55 File: "C:\Winlogger\Data\mott-macdonanld\b-152-dual-induction.LOG"

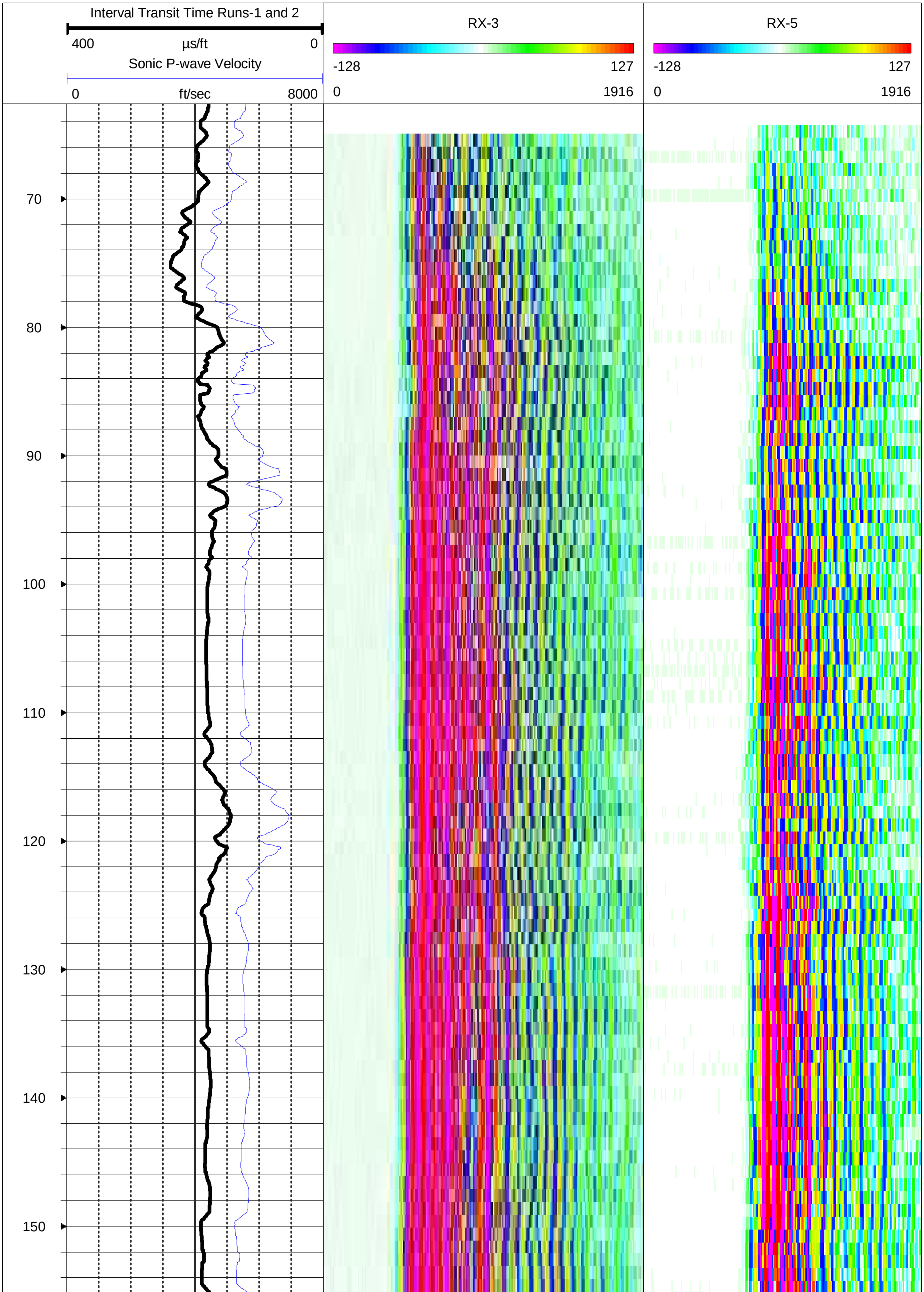


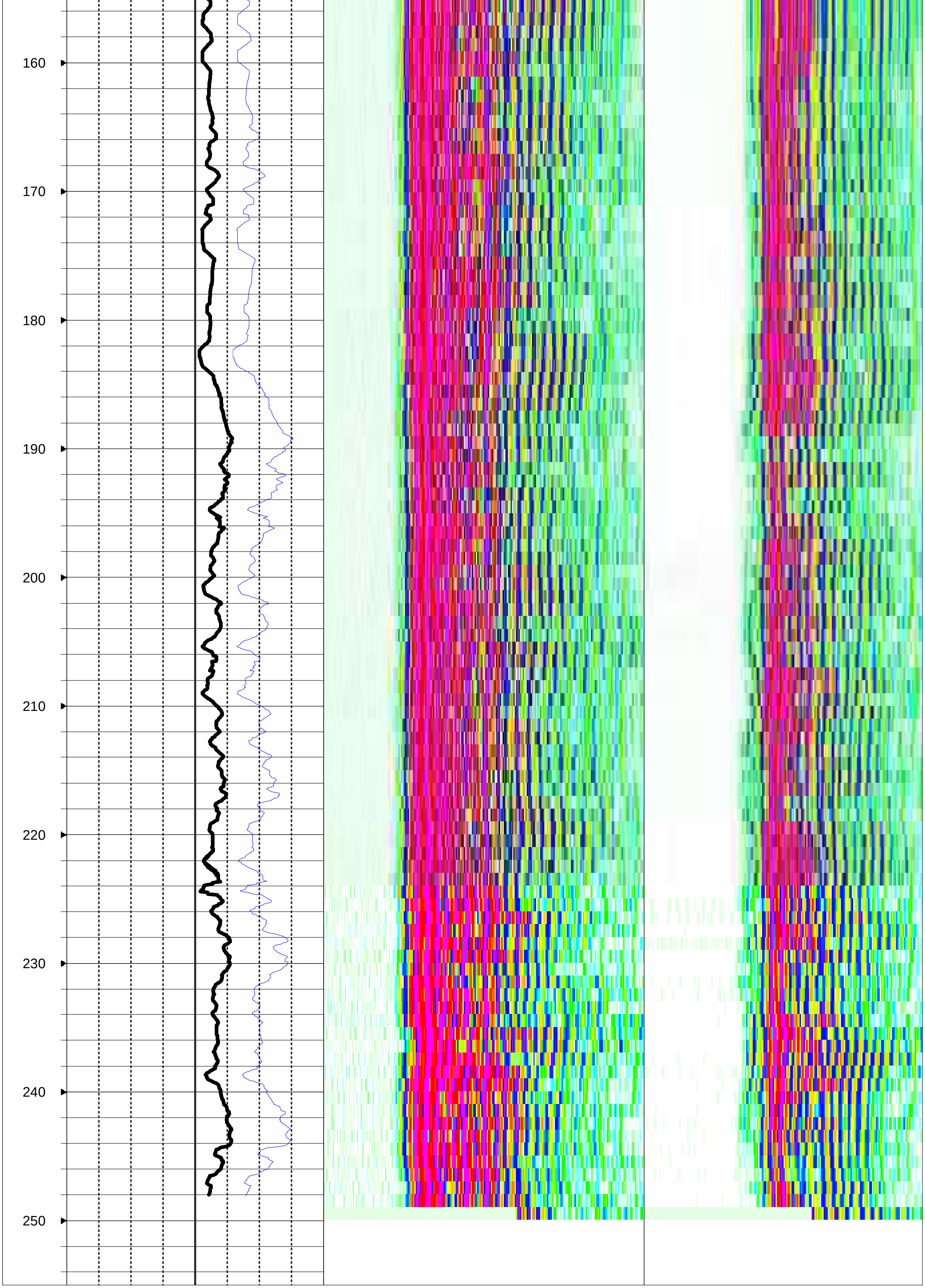
NORCAL

Full Waveform Sonic Log

COMPANY:	MMW Joint Venture	DATE:	July 27, 2019
WELL ID:	BH-151	CASING:	hwt steel to 10-ft bgs
FIELD:	BSVII, San Jose	JOB NO.	NA195051
COUNTY:	SANTA CLARA	STATE:	CA

NOTES: Site at 55 Santa Clara Street, San Jose



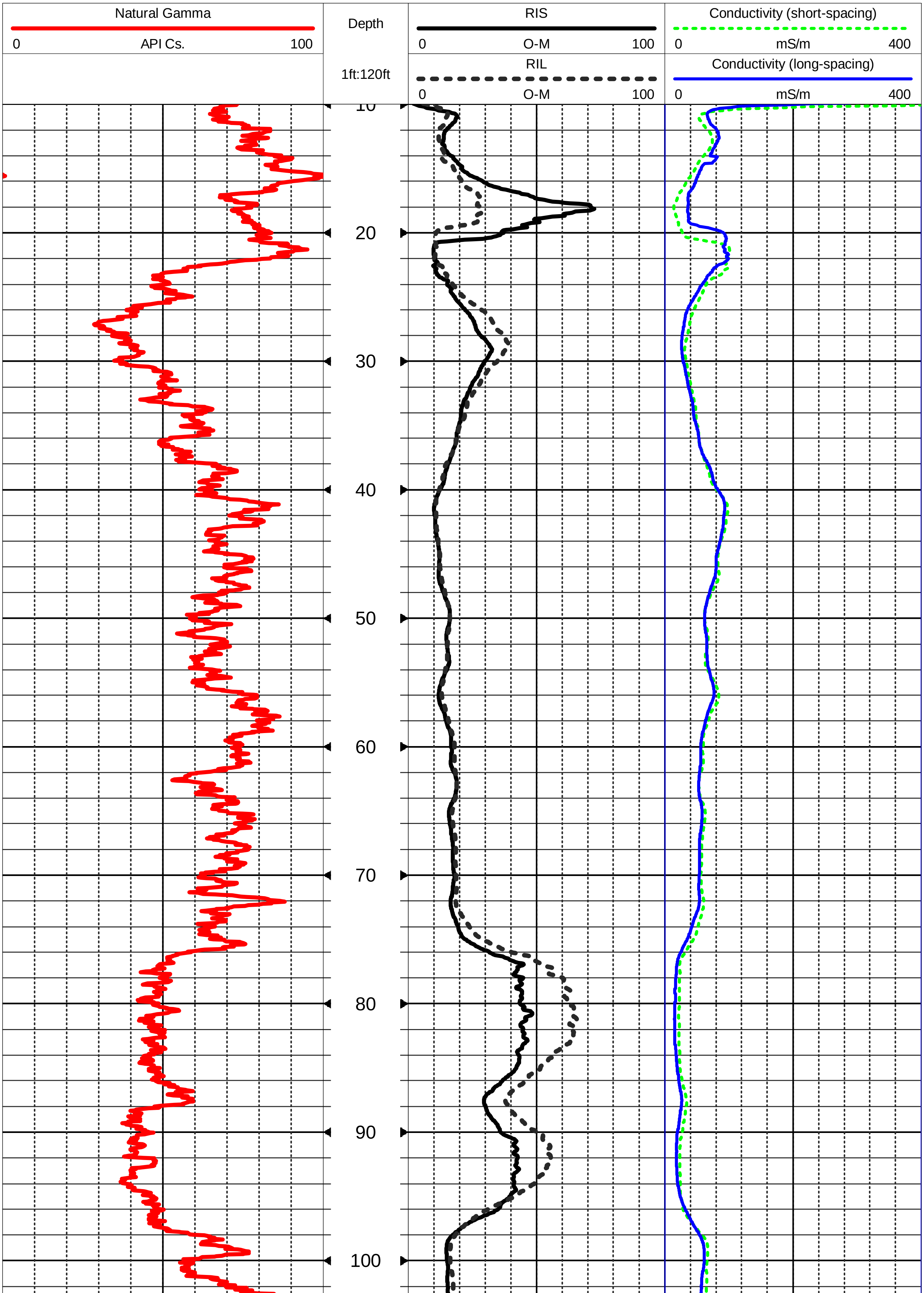

160
170
180
190
200
210
220
230
240
250

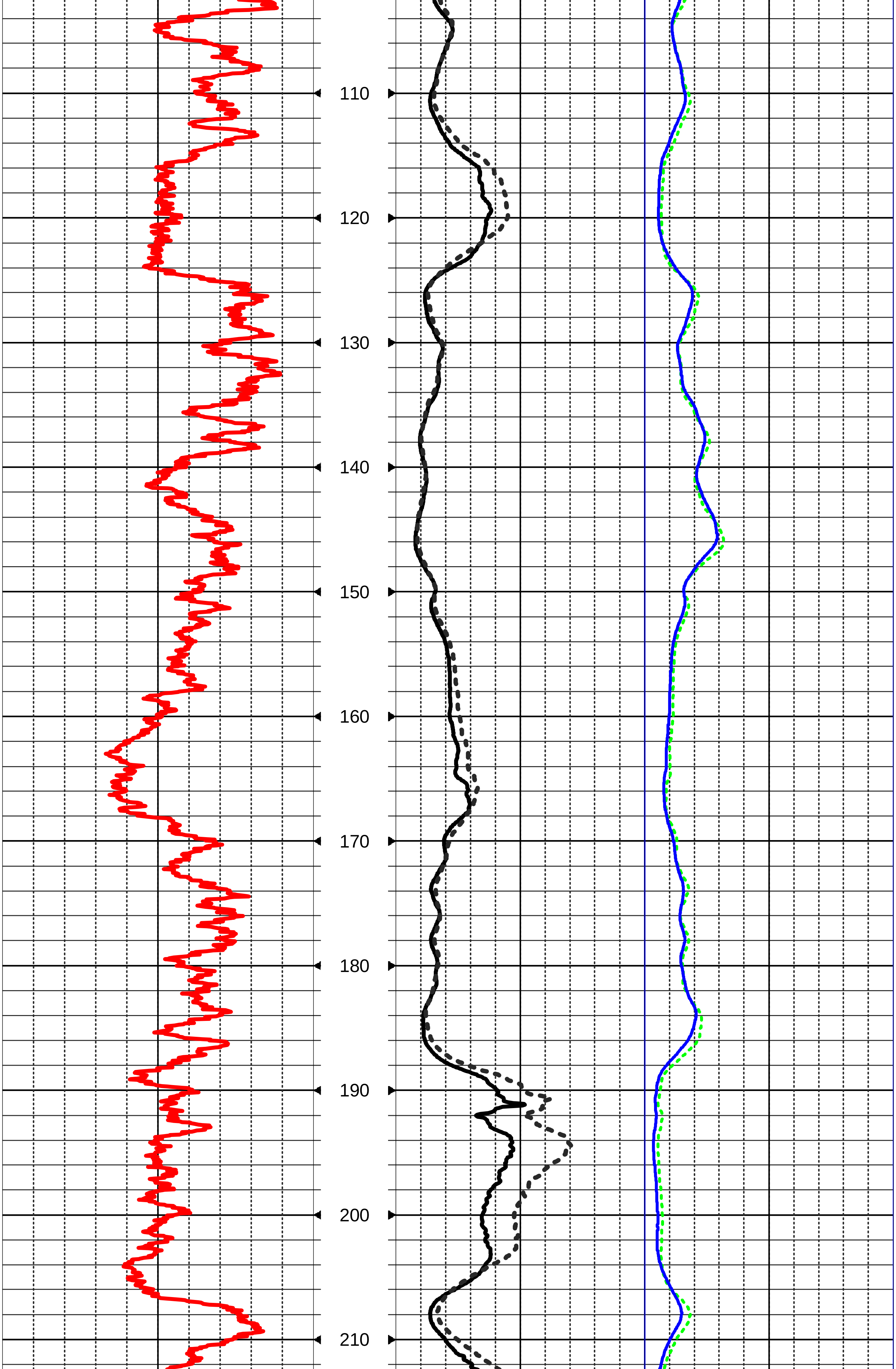
NORCAL

Natural Gamma and Dual Induction Logs

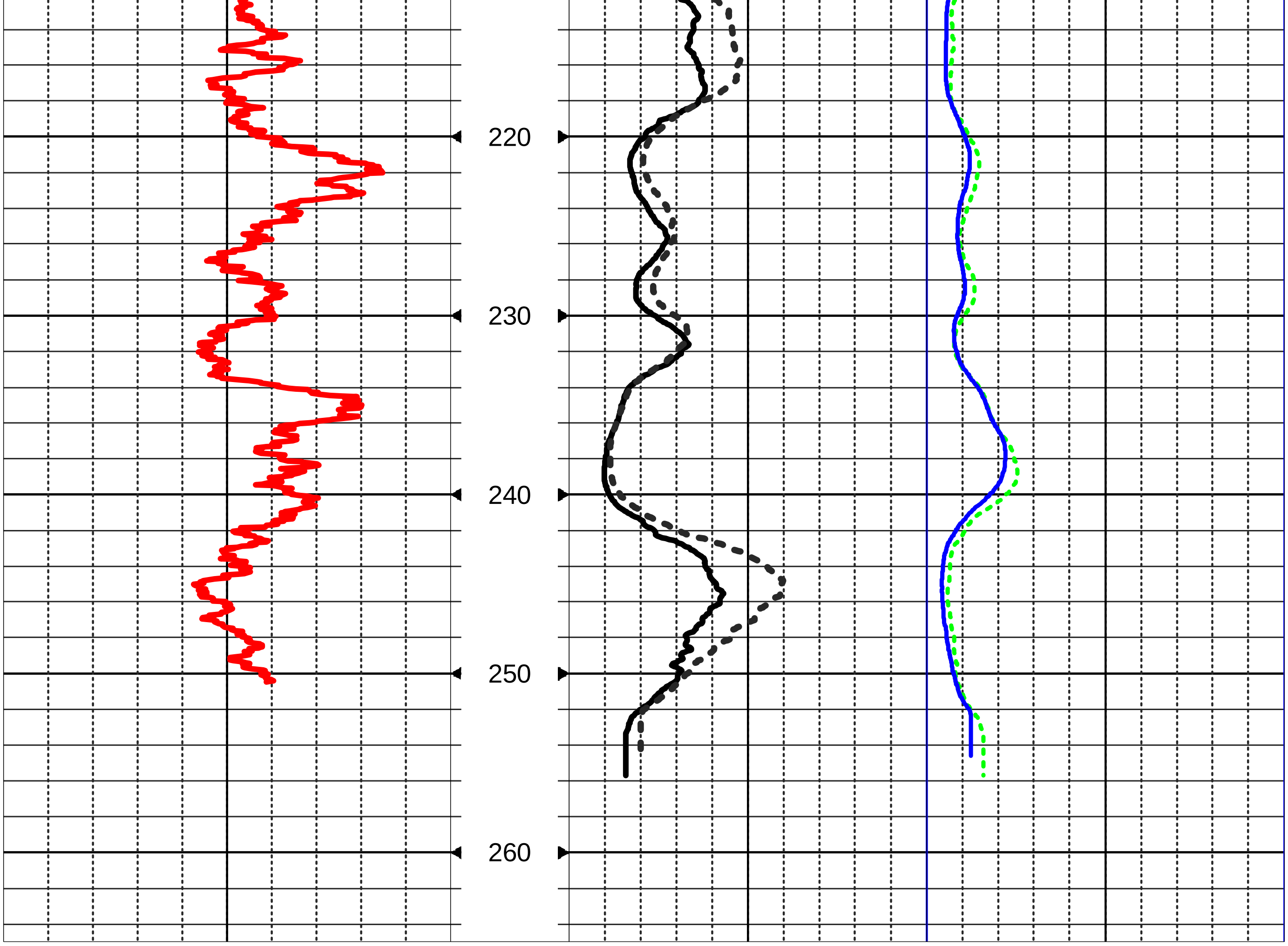
COMPANY:	MMW Joint Venture	DATE:	July 27, 2019
WELL ID:	BH-151	CASING:	hwt steel to 10-ft bgs
FIELD:	BSVII, San Jose	JOB NO.	NA195051
COUNTY:	SANTA CLARA	STATE:	CA

NOTES: Site at 55 Santa Clara Street, San Jose





110
120
130
140
150
160
170
180
190
200
210


220
230
240
250
260

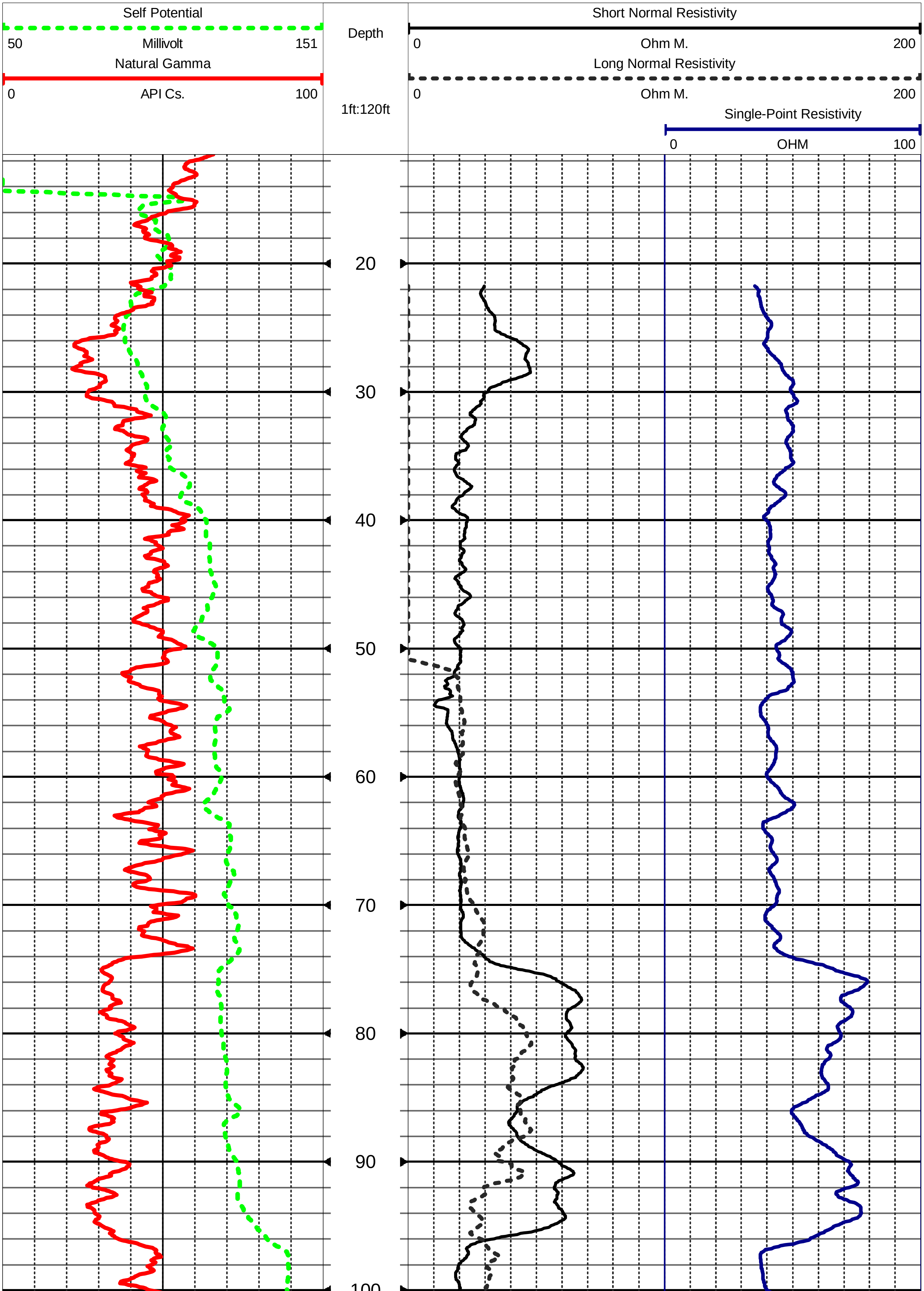
NORCAL

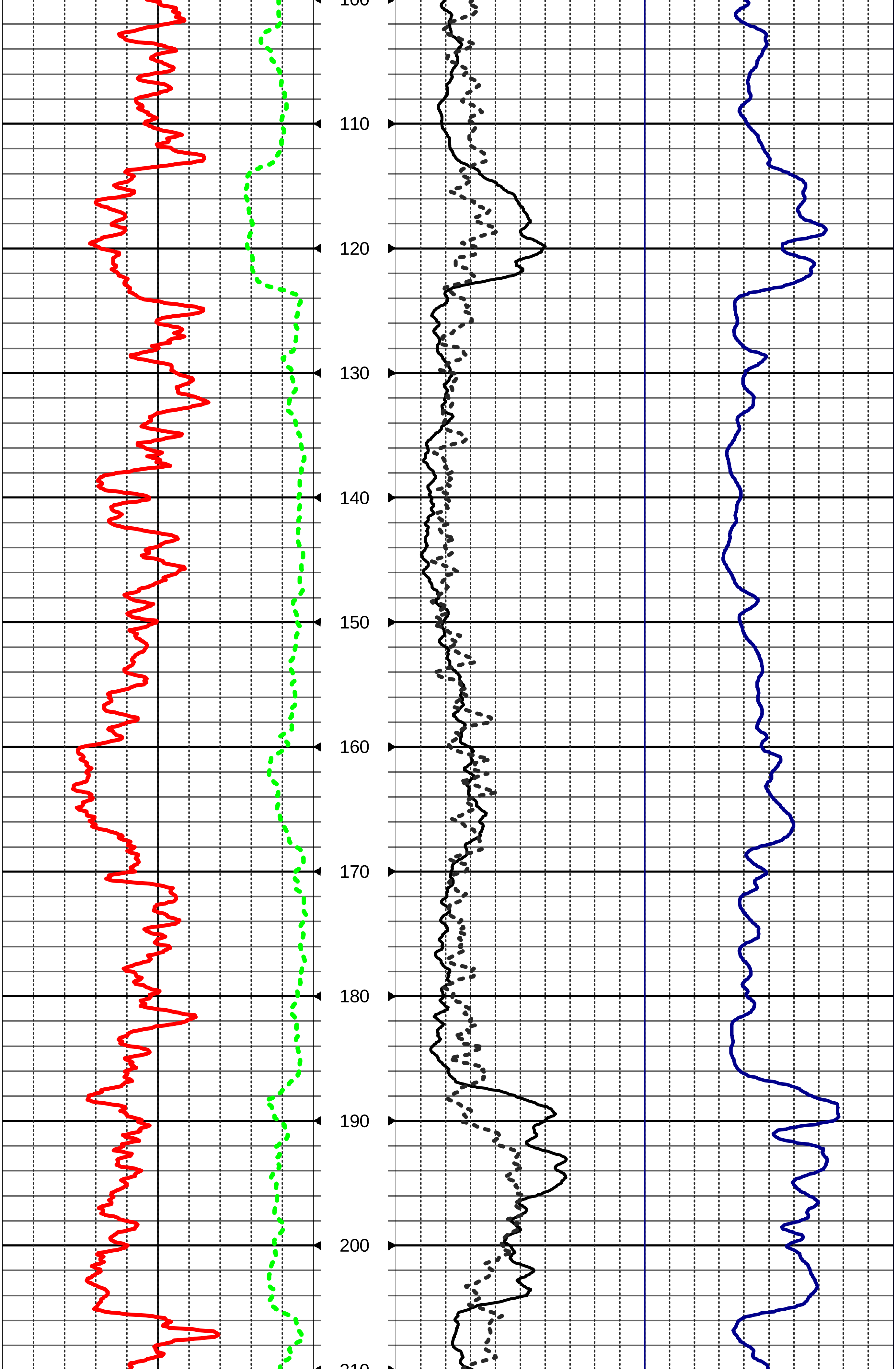
Natural Gamma and Electric Logs

COMPANY: MMW Joint Venture
WELL ID: BH-151
FIELD: BSVII, San Jose
COUNTY: SANTA CLARA

DATE: July 27, 2019
CASING: hwt steel to 10-ft bgs
JOB NO. NA195051
STATE: CA

NOTES: Site at 55 Santa Clara Street, San Jose

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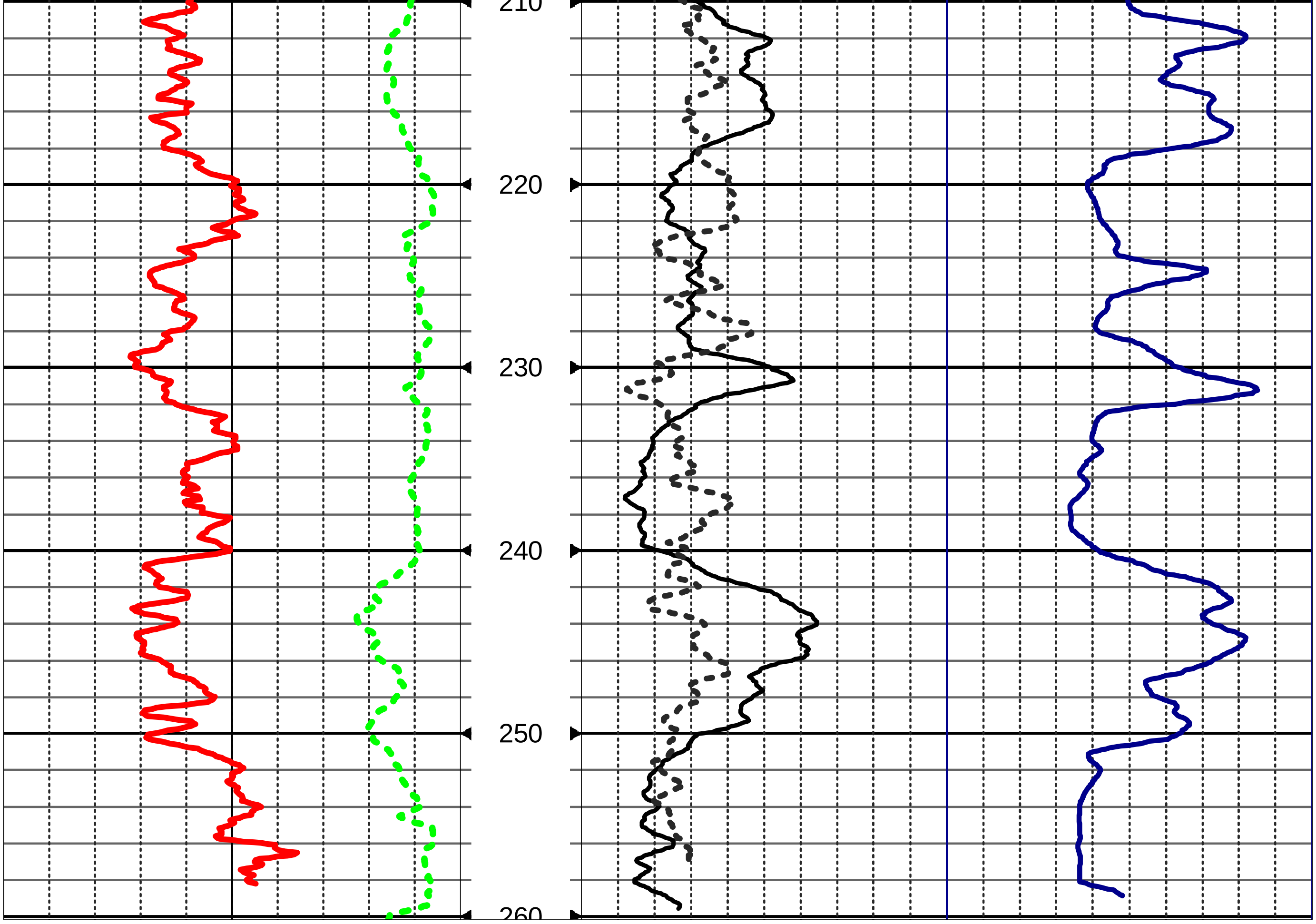
120
130
140
150
160
170
180
190
200


210
220
230
240
250
260

NORCAL
NORCAL GEOPHYSICAL CONSULTANTS, INC.

E-log-Gamma, Sonic PS-wave Suspension Summary Log Plot

CO MMW JV
WELL BH-151
FLD BSVII
CTY San Jose
STE CA
FILING No NS195051

COMPANY Mott MacDonald Wong JV
WELL ID BH-151
FIELD BART Silicon Valley II
COUNTRY USA STATE CA
LOCATION
55 Santa Clara Street

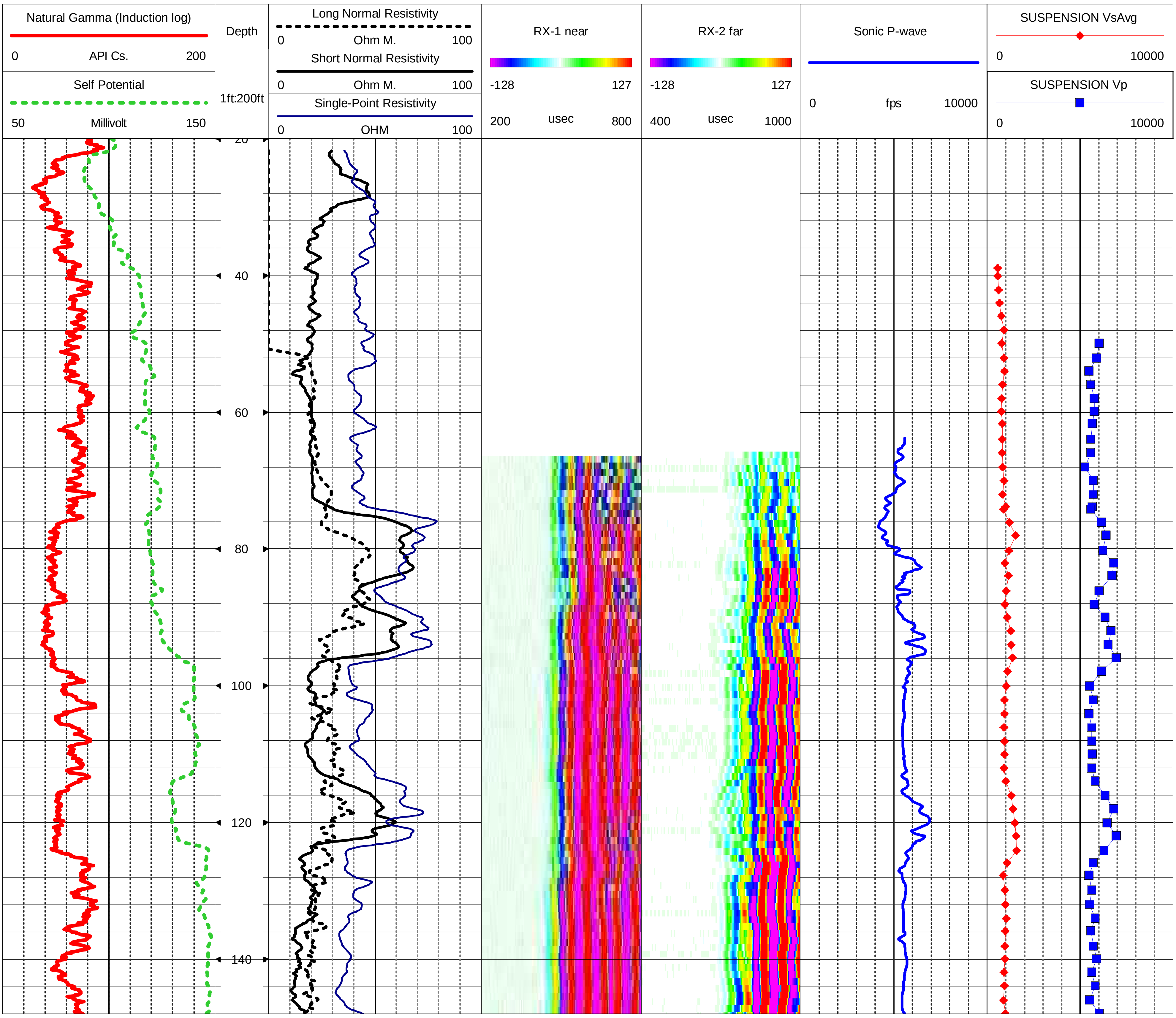
OTHER SERVICES
Dual Induction,
SONIC: Dual
Reciever-Transmitter

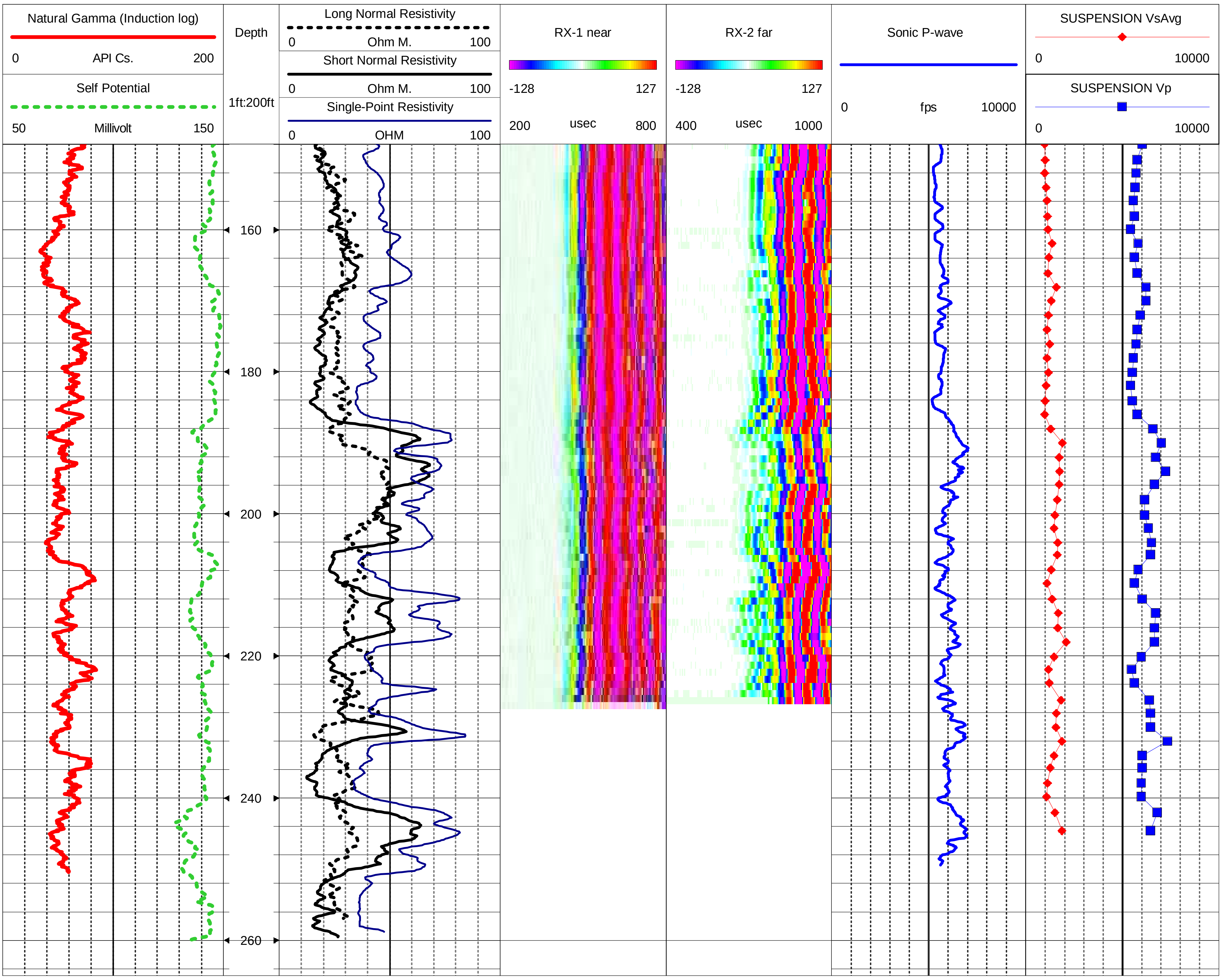
SEC TWP RGE

PERMANENT DATUM Pavement ELEVATION K.B.
LOG MEAS. FROM ABOVE PERM. DATUM D.F.
DRILLING MEAS. FROM G.L.

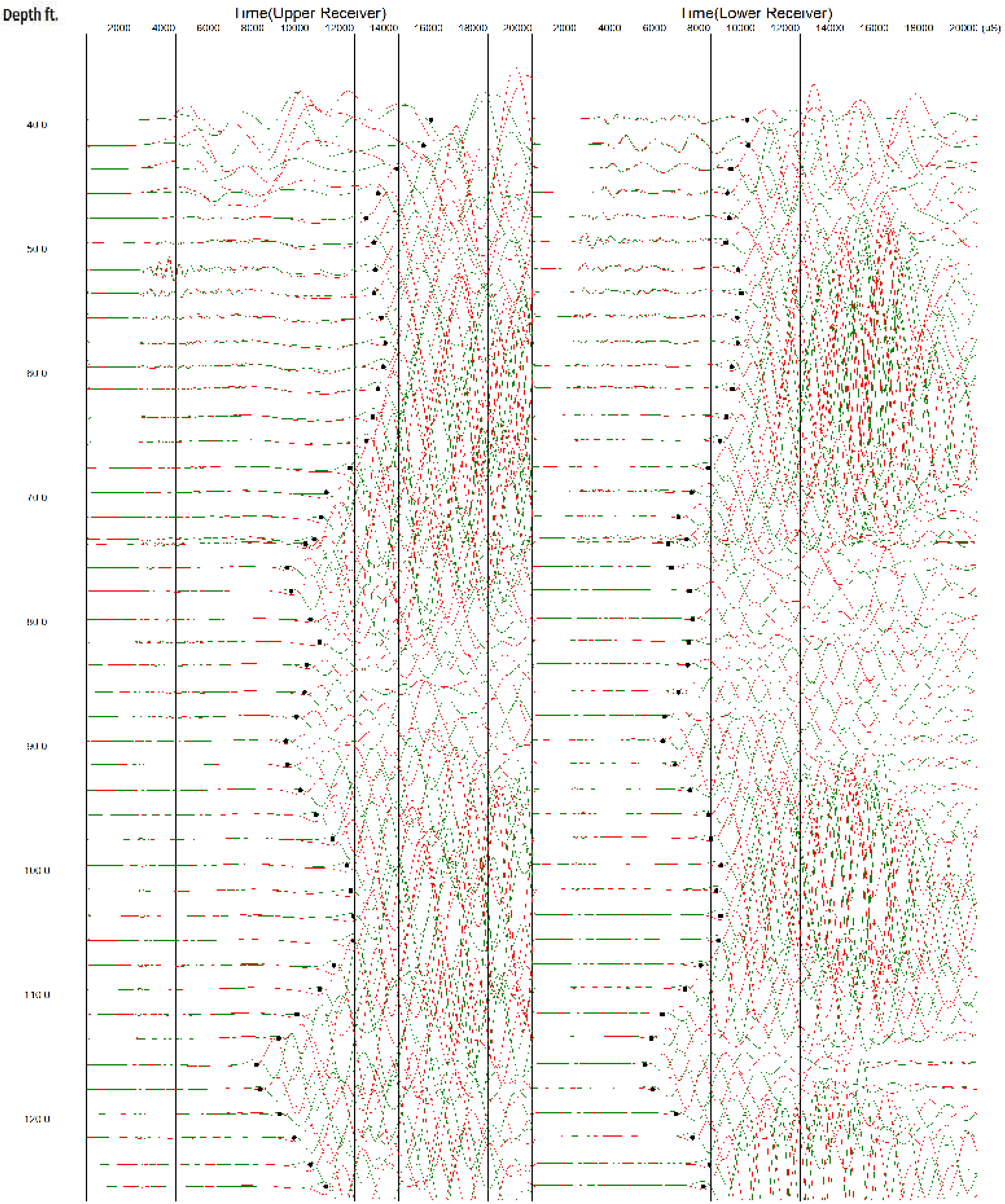
DATE	July 25, 2019	TYPE FLUID IN HOLE	SLURRY
RUN No	Runs-1, 2 and 3	SALINITY	
TYPE LOG	E-log-Gamma, Sonic, PS-wave Susp.	DENSITY	
DEPTH-DRILLER	268	LEVEL	BEGIN at ~ 8-FT BGS
DEPTH-LOGGER	250	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	250		
TOP LOGGED INTERVAL	40		
OPERATING RIG TIME	1		
RECORDED BY	W HENRICH		
WITNESSED BY	FAUSTAS BUSKEVICIUS		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	8	0	10	8	STEEL	0	10
2	~6.0"	10	90'				
3	~5.0	90	268				

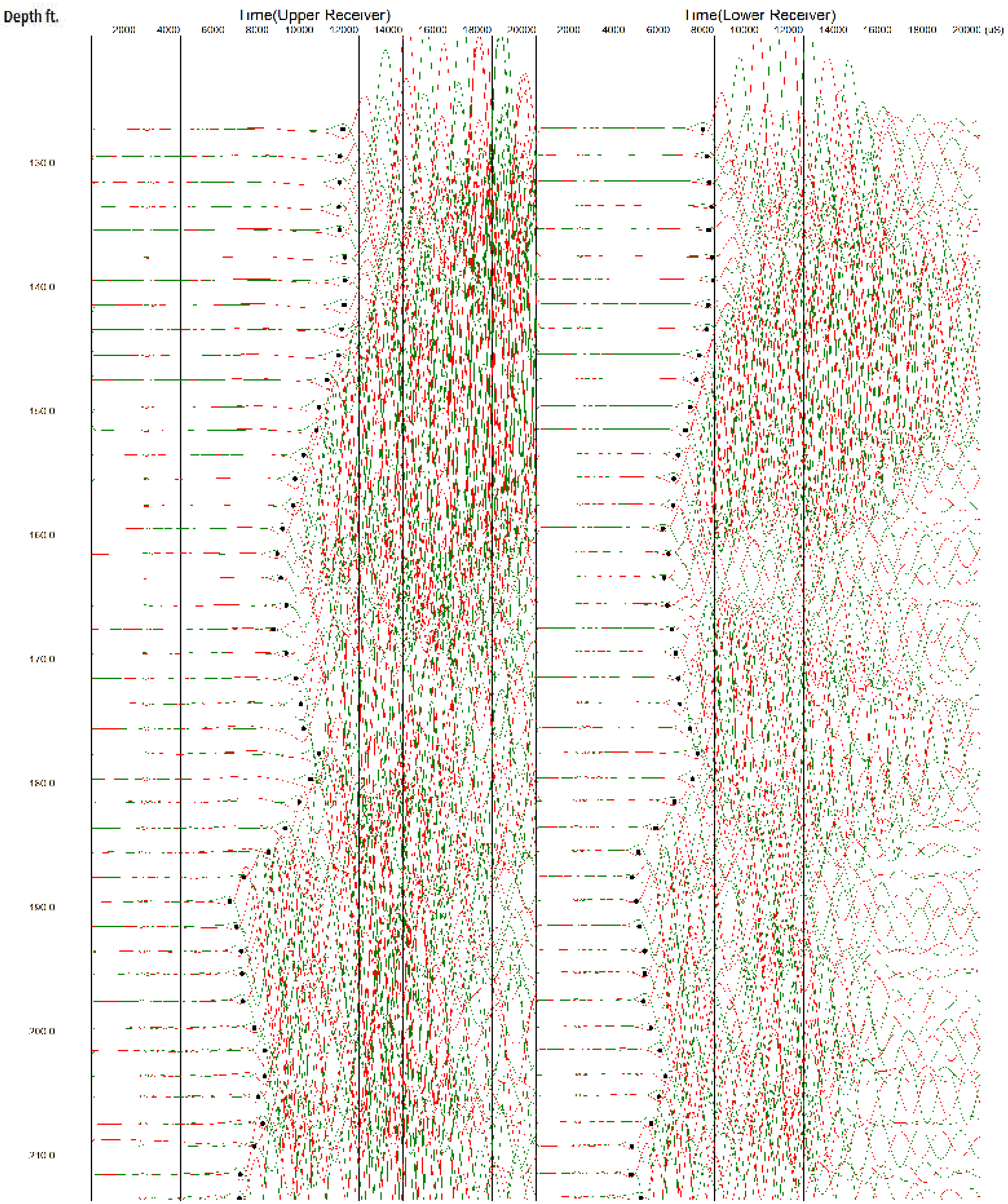



Natural Gamma (Induction log)
0 API Cs. 200
Self Potential
50 Millivolt 150
Depth
1ft:200ft
Long Normal Resistivity
0 Ohm M. 100
Short Normal Resistivity
0 Ohm M. 100
Single-Point Resistivity
0 OHM 100
RX-1 near
-128 127
200 usec 800
RX-2 far
-128 127
400 usec 1000
Sonic P-wave
0 fps 10000
SUSPENSION VsAvg
0 10000
SUSPENSION Vp
0 10000
160
180
200
220
240
260

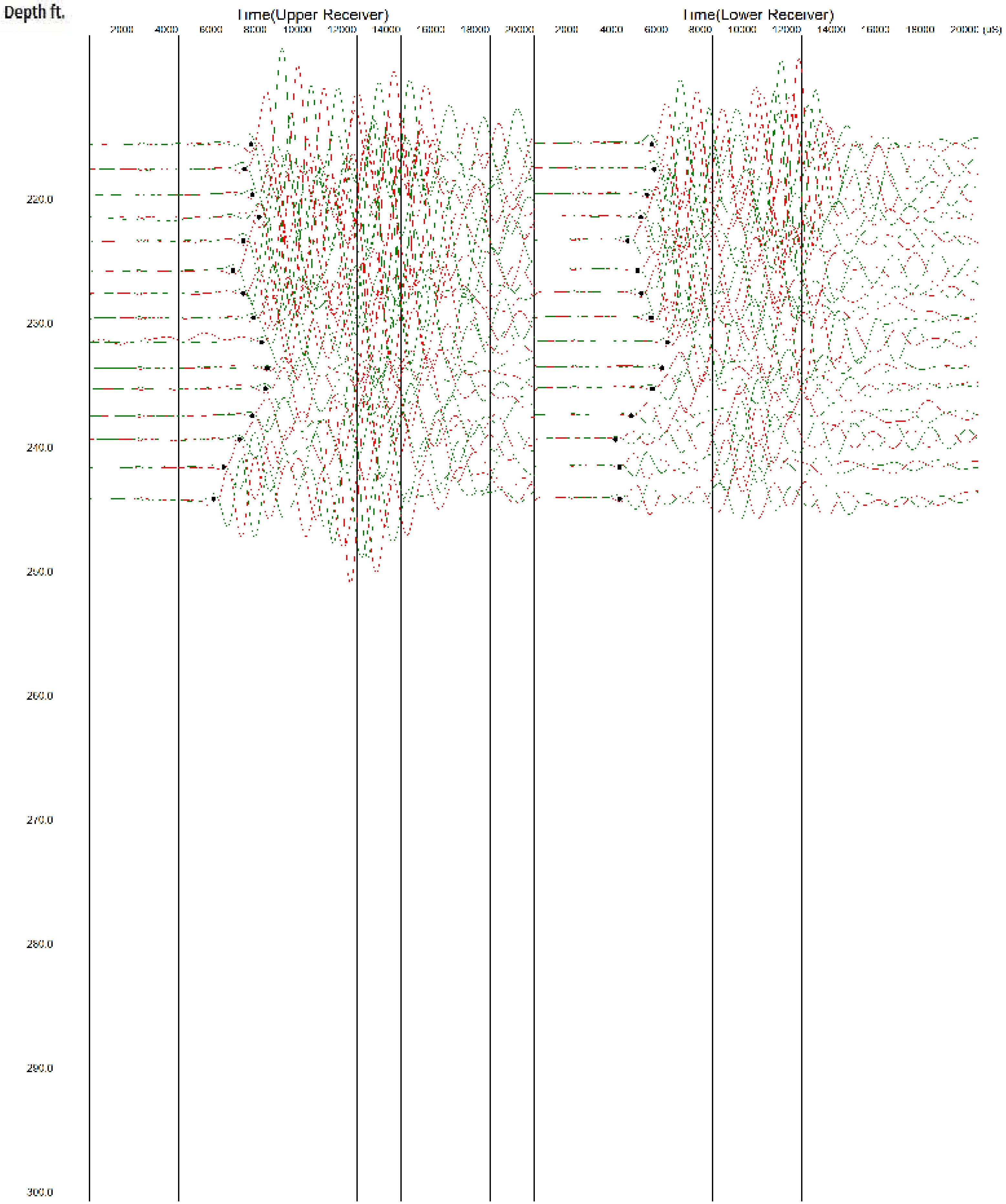
PS-wave Suspension Records **S Wave**



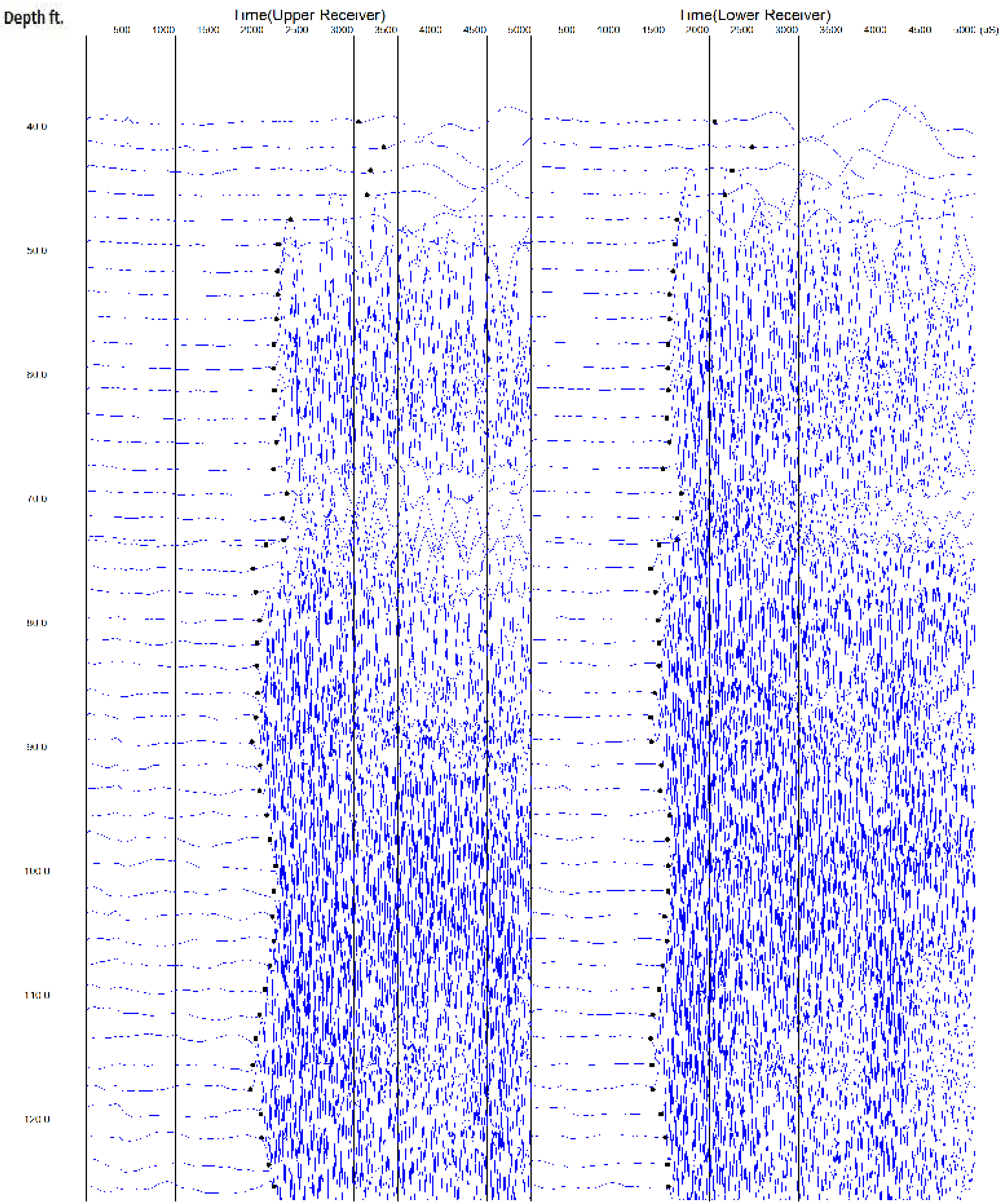
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
210.0

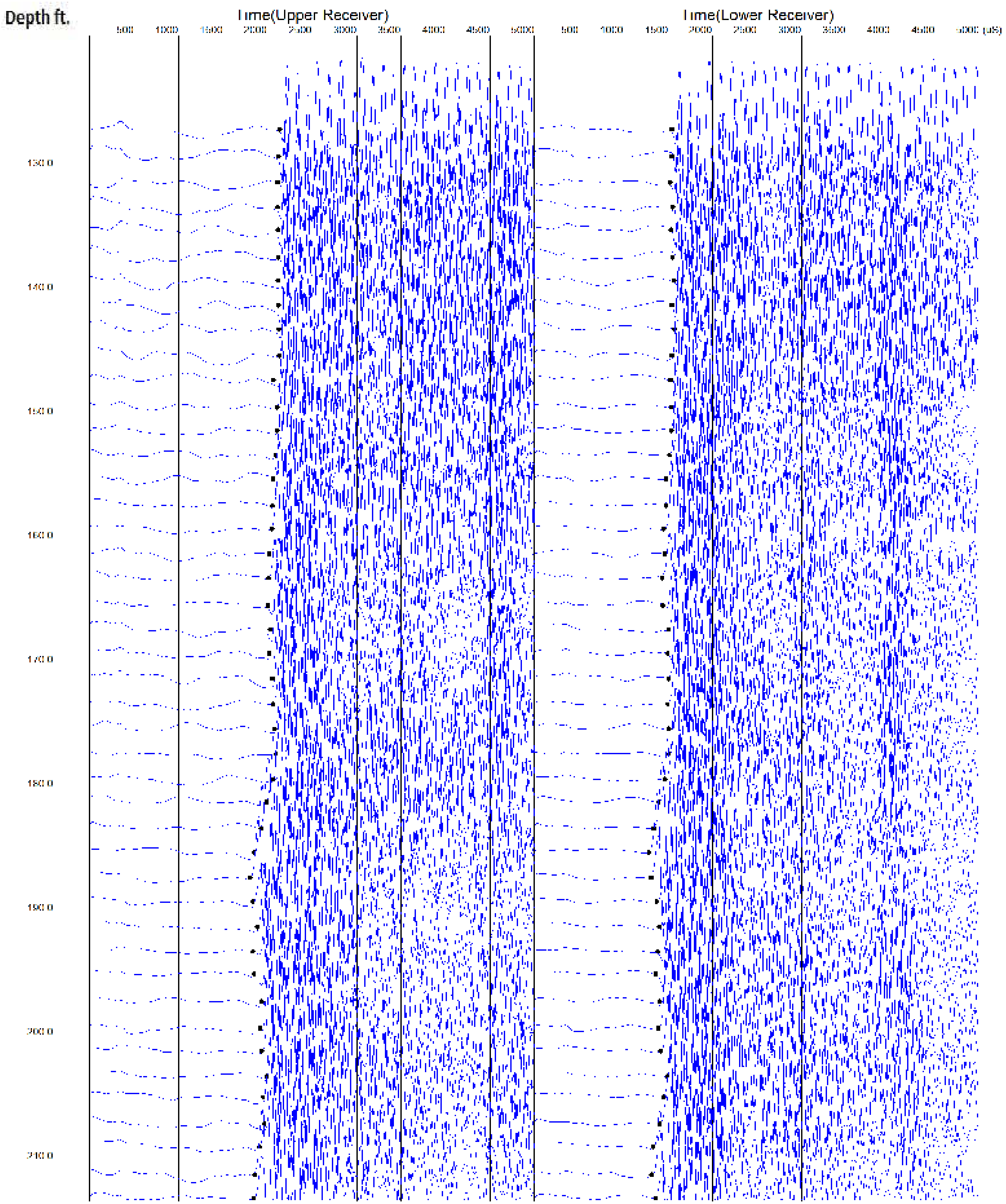
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (µS)
220.0
230.0
240.0
250.0
260.0
270.0
280.0
290.0
300.0

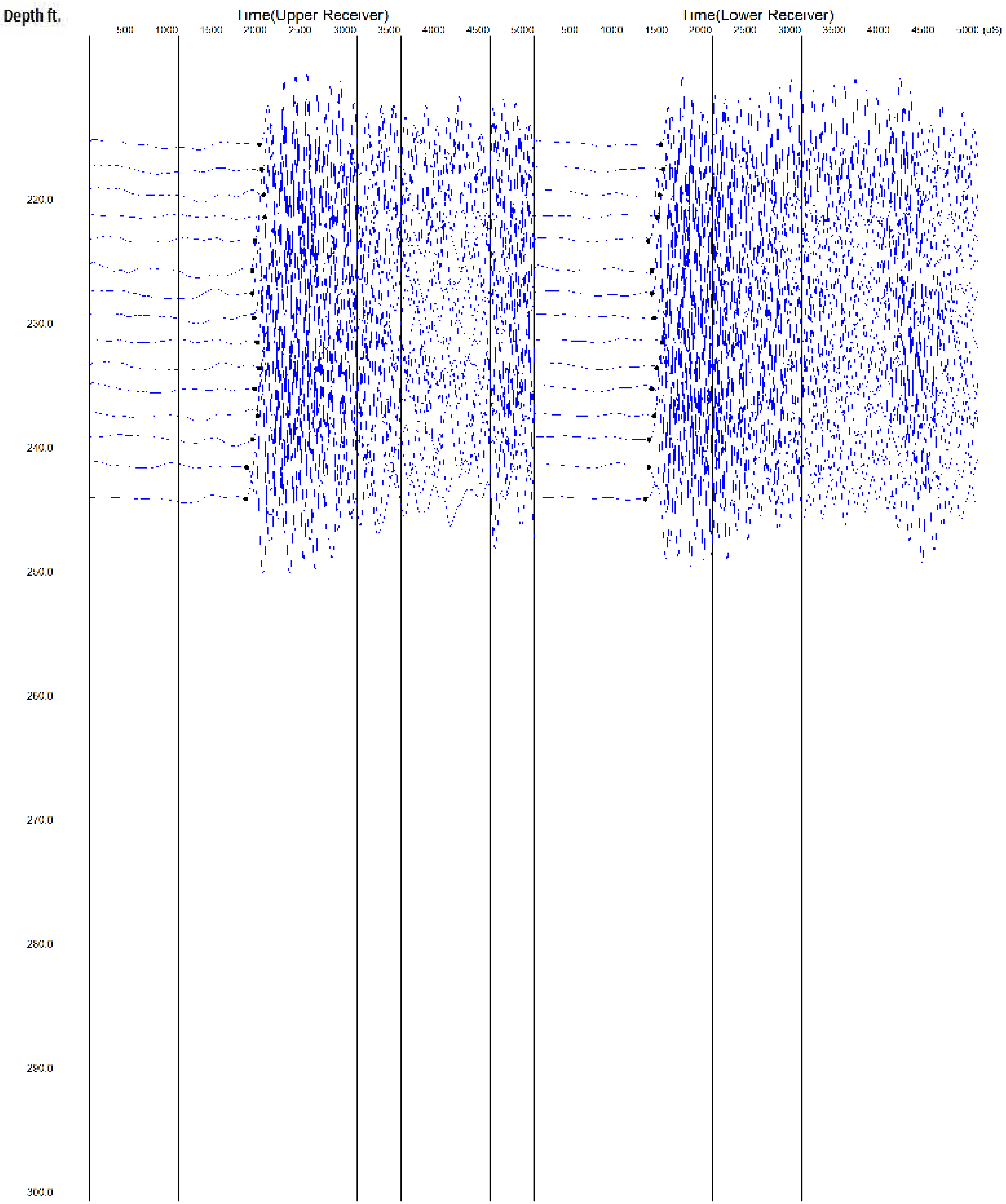
P Wave

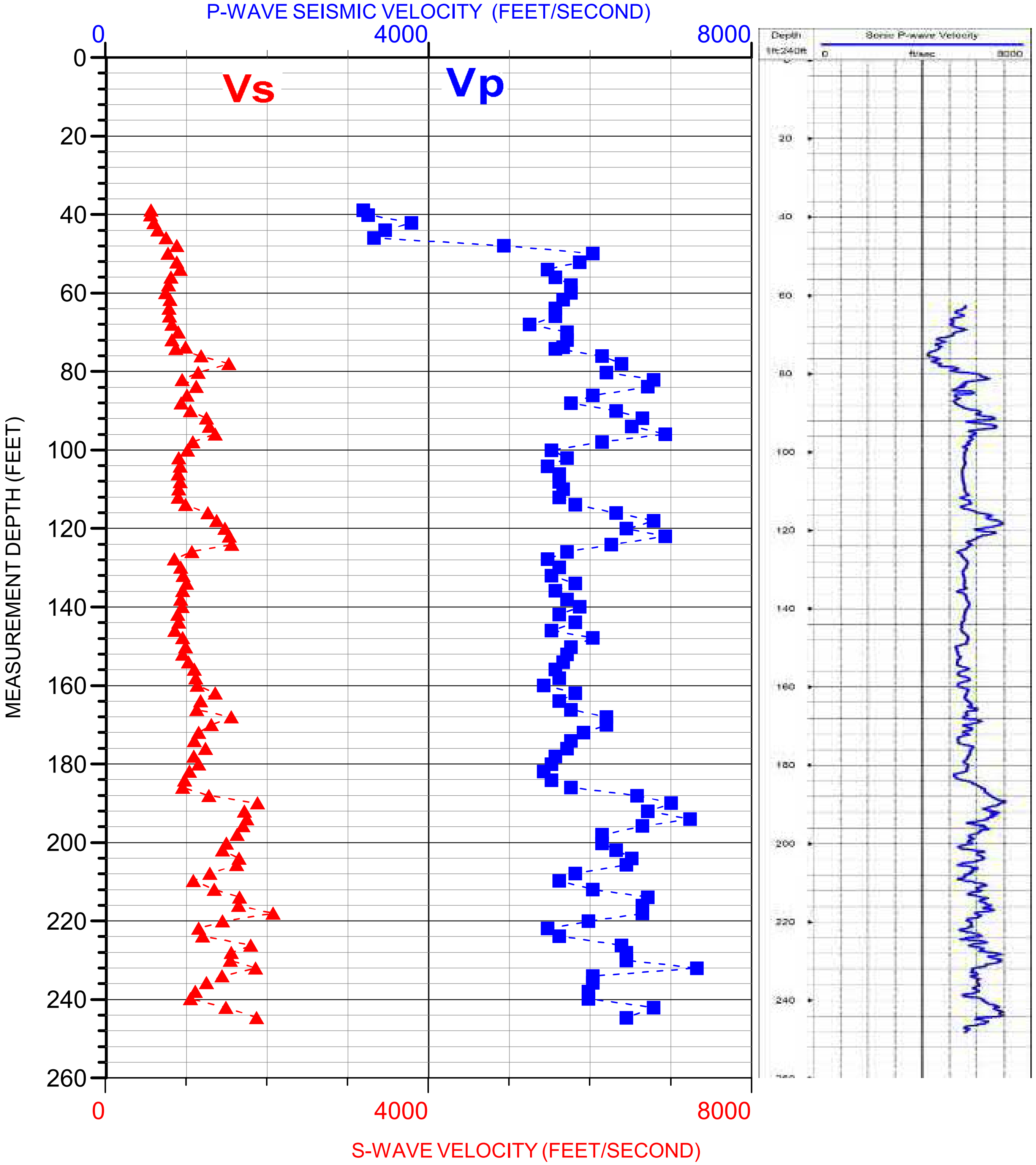

Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0
210.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
220.0
230.0
240.0
250.0
260.0
270.0
280.0
290.0
300.0



P- & S- SUSPENSION
WAVE VELOCITY
LEGEND

- ▲ - - ▲ - - ▲ *Vs- R1-R2 interval
- ■ - - ■ - - ■ *Vp- R1-R2 interval

*Interval velocities should be used to calculate elastic moduli values

NORCAL

SUSPENSION P- AND S-WAVE & SONIC VELOCITY PROFILE BOREHOLE BH-151

LOCATION: 55 Santa Clara Street, San Jose California		
CLIENT: Mott MacDonald		1
JOB #: NS195051	NORCAL GEOPHYSICAL CONSULTANTS INC.	
DATE: July 25, 2019	DRAWN BY: W. HENRICH	APPROVED BY: WJH

Borehole BH-151, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195056
Survey Date: July 25, 2019

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
11.87	171	174	172	980	38.93	560	572	566	
12.22	171	173	172	1000	40.10	560	568	564	
12.84	187	181	184	1163	42.12	612	592	602	
13.41	198	200	199	1064	44.00	648	656	652	
14.01	228	233	230	1020	45.95	749	763	756	
14.62	269	273	271	1515	47.97	882	896	889	
15.22	238	236	237	1852	49.92	781	774	777	6039
15.88	265	276	270	1802	52.11	868	906	887	5875
16.45	281	286	283	1681	53.98	922	937	930	5481
17.06	248	249	248	1709	55.97	812	816	814	5574
17.68	239	238	239	1770	58.01	785	781	783	5772
18.26	227	230	229	1770	59.92	746	756	751	5772
18.80	244	244	244	1739	61.69	800	800	800	5671
19.49	239	242	240	1709	63.96	785	792	789	5574
20.10	242	244	243	1709	65.94	792	800	796	5574
20.74	250	254	252	1613	68.06	820	833	826	5260
21.34	273	279	276	1754	70.01	896	916	906	5721
21.95	249	254	251	1754	72.01	816	833	824	5721
22.49	303	305	304	1739	73.80	994	1000	997	5671
22.61	265	270	267	1709	74.17	868	887	877	5574
23.19	357	368	362	1887	76.10	1172	1206	1189	6153
23.77	463	472	467	1961	78.00	1519	1548	1533	6394
24.46	350	352	351	1905	80.25	1147	1155	1151	6211
25.02	289	292	291	2083	82.10	948	959	954	6794
25.58	342	345	344	2062	83.91	1124	1131	1127	6724
26.25	311	309	310	1852	86.14	1019	1013	1016	6039
26.85	287	286	287	1770	88.08	943	937	940	5772
27.44	323	323	323	1942	90.04	1058	1058	1058	6332
28.03	382	385	383	2041	91.95	1252	1262	1257	6655
28.65	391	397	394	2000	94.00	1282	1302	1292	6522
29.25	413	417	415	2128	95.95	1356	1367	1361	6938
29.84	329	331	330	1887	97.91	1079	1086	1083	6153
30.49	311	311	311	1695	100.04	1019	1019	1019	5527
31.12	278	278	278	1754	102.09	911	911	911	5721
31.74	281	286	283	1681	104.12	922	937	930	5481
32.33	276	276	276	1724	106.08	906	906	906	5622
32.95	279	286	283	1724	108.10	916	937	927	5622
33.53	279	278	279	1739	110.00	916	911	914	5671
34.16	278	275	276	1724	112.06	911	901	906	5622

34.74	305	303	304	1786	113.97	1000	994	997	5823
35.38	388	388	388	1942	116.09	1272	1272	1272	6332
35.98	420	420	420	2083	118.05	1379	1379	1379	6794
36.59	459	446	453	1980	120.06	1505	1465	1485	6457
37.18	467	472	469	2128	121.97	1533	1548	1540	6938
37.83	481	476	478	1923	124.12	1577	1562	1570	6271
38.37	323	331	327	1754	125.89	1058	1086	1072	5721
38.94	260	262	261	1681	127.77	854	859	857	5481
39.60	287	284	286	1724	129.92	943	932	937	5622
40.24	292	298	295	1695	132.02	959	976	968	5527
40.85	307	307	307	1786	134.03	1006	1006	1006	5823
41.41	292	294	293	1709	135.85	959	965	962	5574
42.09	284	287	286	1754	138.08	932	943	937	5721
42.65	289	292	291	1802	139.93	948	959	954	5875
43.26	273	275	274	1724	141.93	896	901	899	5622
43.85	276	279	278	1786	143.86	906	916	911	5823
44.50	260	267	264	1695	145.99	854	877	866	5527
45.09	291	294	292	1852	147.92	954	965	959	6039
45.77	301	305	303	1770	150.16	988	1000	994	5772
46.33	292	294	293	1754	152.02	959	965	962	5721
46.95	314	314	314	1739	154.04	1032	1032	1032	5671
47.52	331	340	336	1709	155.92	1086	1116	1101	5574
48.19	345	340	342	1724	158.10	1131	1116	1124	5622
48.75	347	347	347	1667	159.96	1139	1139	1139	5435
49.36	413	417	415	1786	161.96	1356	1367	1361	5823
49.96	357	362	360	1724	163.92	1172	1189	1180	5622
50.64	347	345	346	1770	166.13	1139	1131	1135	5772
51.23	481	472	476	1905	168.07	1577	1548	1562	6211
51.82	400	403	402	1905	170.00	1312	1323	1318	6211
52.43	352	352	352	1818	172.01	1155	1155	1155	5929
53.05	336	336	336	1770	174.05	1101	1101	1101	5772
53.67	376	382	379	1754	176.07	1233	1252	1243	5721
54.28	333	336	334	1709	178.09	1094	1101	1097	5574
54.90	352	352	352	1695	180.11	1155	1155	1155	5527
55.46	318	318	318	1667	181.95	1045	1045	1045	5435
56.11	298	301	299	1695	184.10	976	988	982	5527
56.70	292	294	293	1770	186.02	959	965	962	5772
57.32	391	391	391	2020	188.05	1282	1282	1282	6588
57.91	575	575	575	2151	190.00	1886	1886	1886	7013
58.53	532	521	526	2062	192.04	1745	1709	1727	6724
59.14	538	532	535	2222	194.04	1764	1745	1755	7246
59.69	521	521	521	2041	195.83	1709	1709	1709	6655
60.36	490	505	498	1887	198.04	1608	1657	1633	6153
61.02	450	463	457	1887	200.20	1478	1519	1498	6153
61.57	439	446	443	1942	202.02	1439	1465	1452	6332
62.20	505	505	505	2000	204.06	1657	1657	1657	6522
62.71	485	505	495	1980	205.73	1593	1657	1625	6457

63.36	391	400	395	1786	207.89	1282	1312	1297	5823
63.94	333	331	332	1724	209.77	1094	1086	1090	5622
64.61	407	417	412	1852	211.99	1334	1367	1350	6039
65.21	515	500	508	2062	213.94	1691	1640	1666	6724
65.85	495	510	503	2041	216.04	1624	1674	1649	6655
66.46	641	625	633	2041	218.06	2103	2051	2077	6655
67.09	442	442	442	1835	220.10	1452	1452	1452	5983
67.64	350	355	352	1681	221.92	1147	1163	1155	5481
68.22	365	370	368	1724	223.82	1197	1215	1206	5622
68.95	532	568	550	1961	226.22	1745	1864	1805	6394
69.51	472	481	476	1980	228.07	1548	1577	1562	6457
70.11	472	472	472	1980	230.04	1548	1548	1548	6457
70.71	562	575	568	2247	232.00	1843	1886	1864	7328
71.34	442	439	441	1852	234.06	1452	1439	1445	6039
71.85	379	388	383	1852	235.72	1243	1272	1257	6039
72.52	338	342	340	1835	237.93	1108	1124	1116	5983
73.10	316	327	322	1835	239.83	1038	1072	1055	5983
73.78	459	455	457	2083	242.06	1505	1491	1498	6794
74.56	568	575	571	1980	244.63	1864	1886	1875	6457

NORCAL
NORCAL GEOPHYSICAL CONSULTANTS, INC.

Electric-Natural Gamma, Tri-Sonic, PS-wave Suspension Summary Log Plot

CO MMW JV
WELL BH-152
FLD BSVII
CTY San Jose
STE CA
FILING No NS195051

COMPANY Mott MacDonald Wong JC
WELL ID BH-152
FIELD BART Silicon Valley II
COUNTRY USA STATE CA

LOCATION
Santa Clara and Montgomery Streets

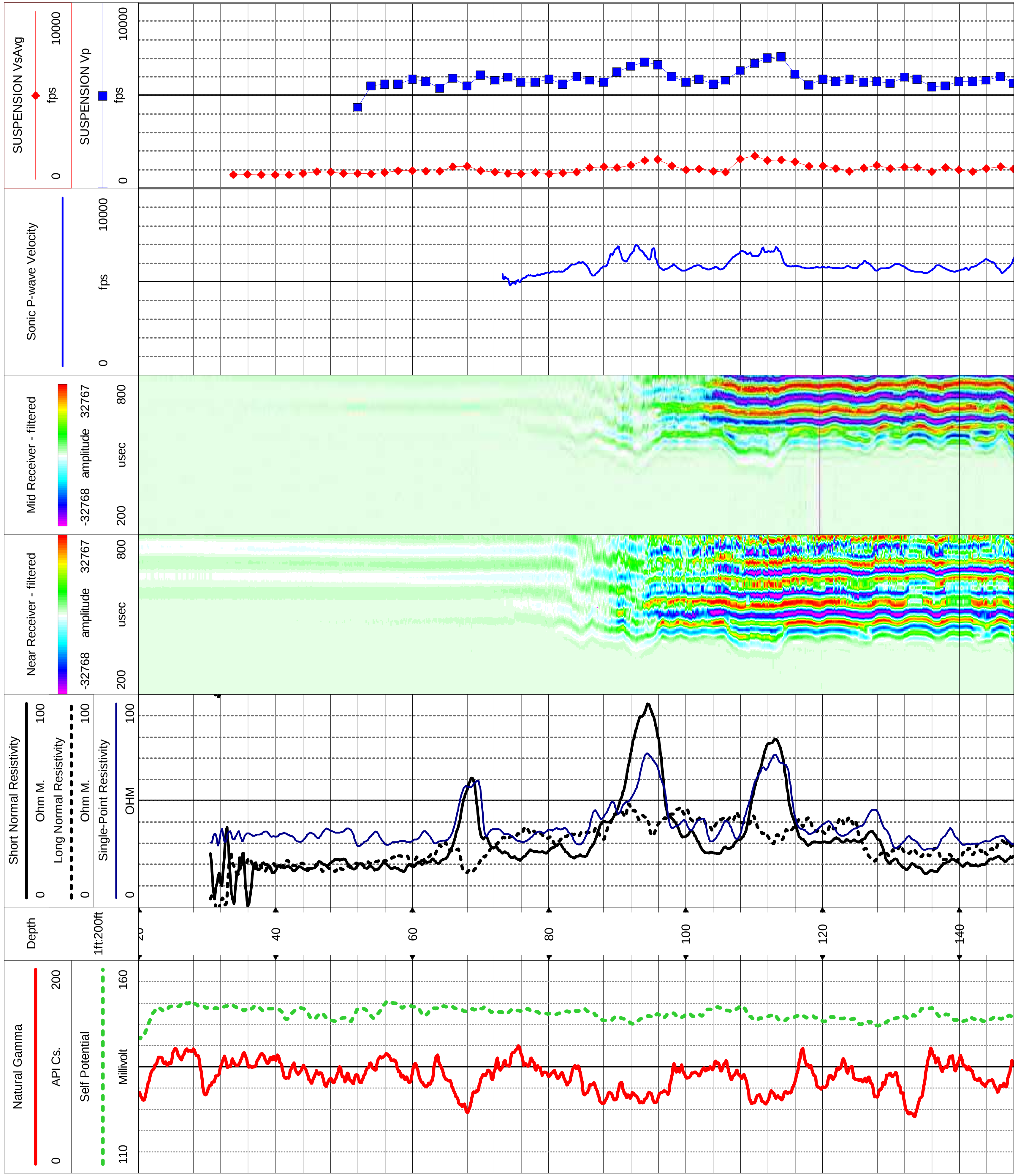
OTHER SERVICES

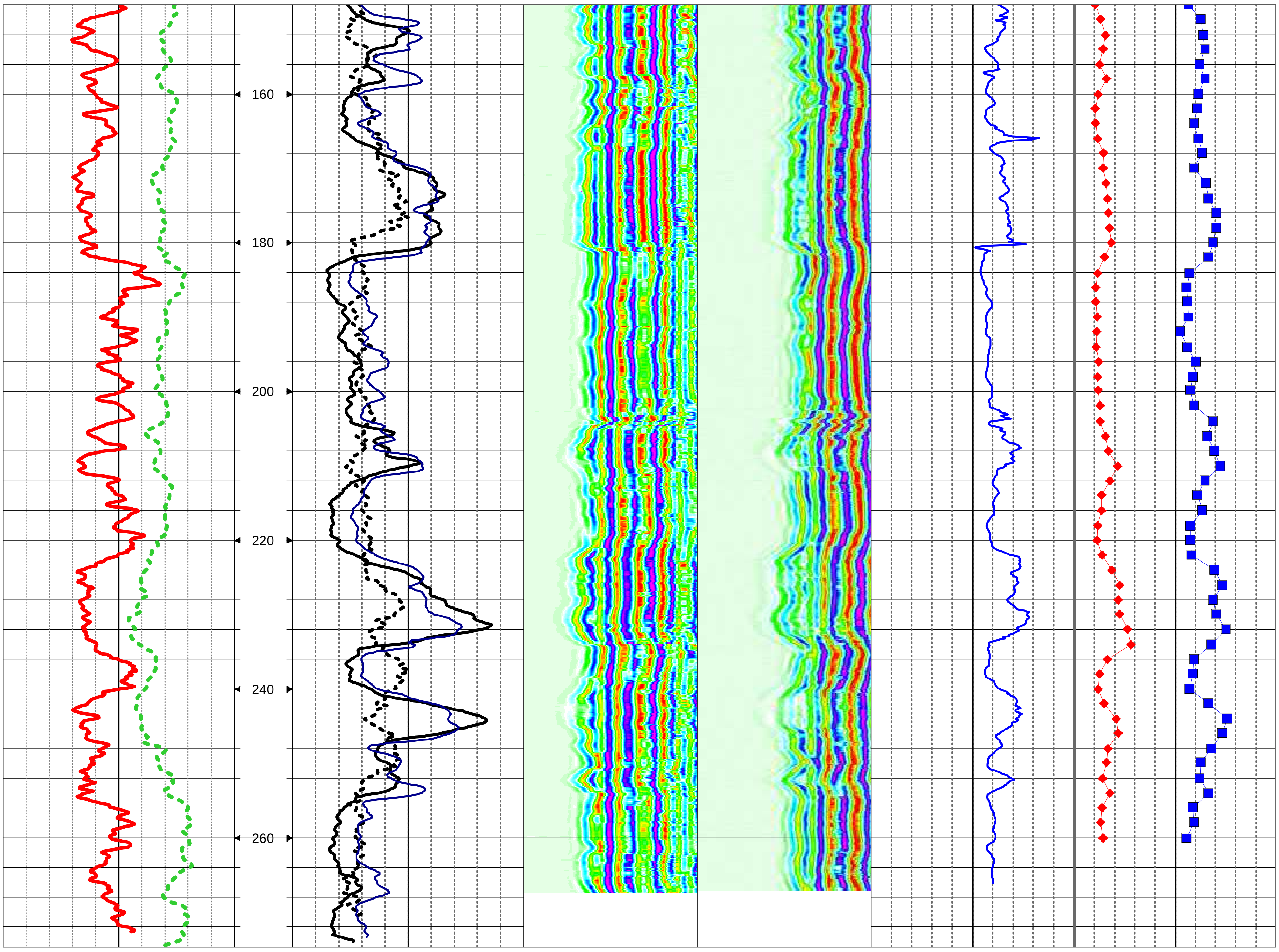
SEC TWP RGE

PERMANENT DATUM	Pavement	ELEVATION	K.B.
LOG MEAS. FROM		ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.

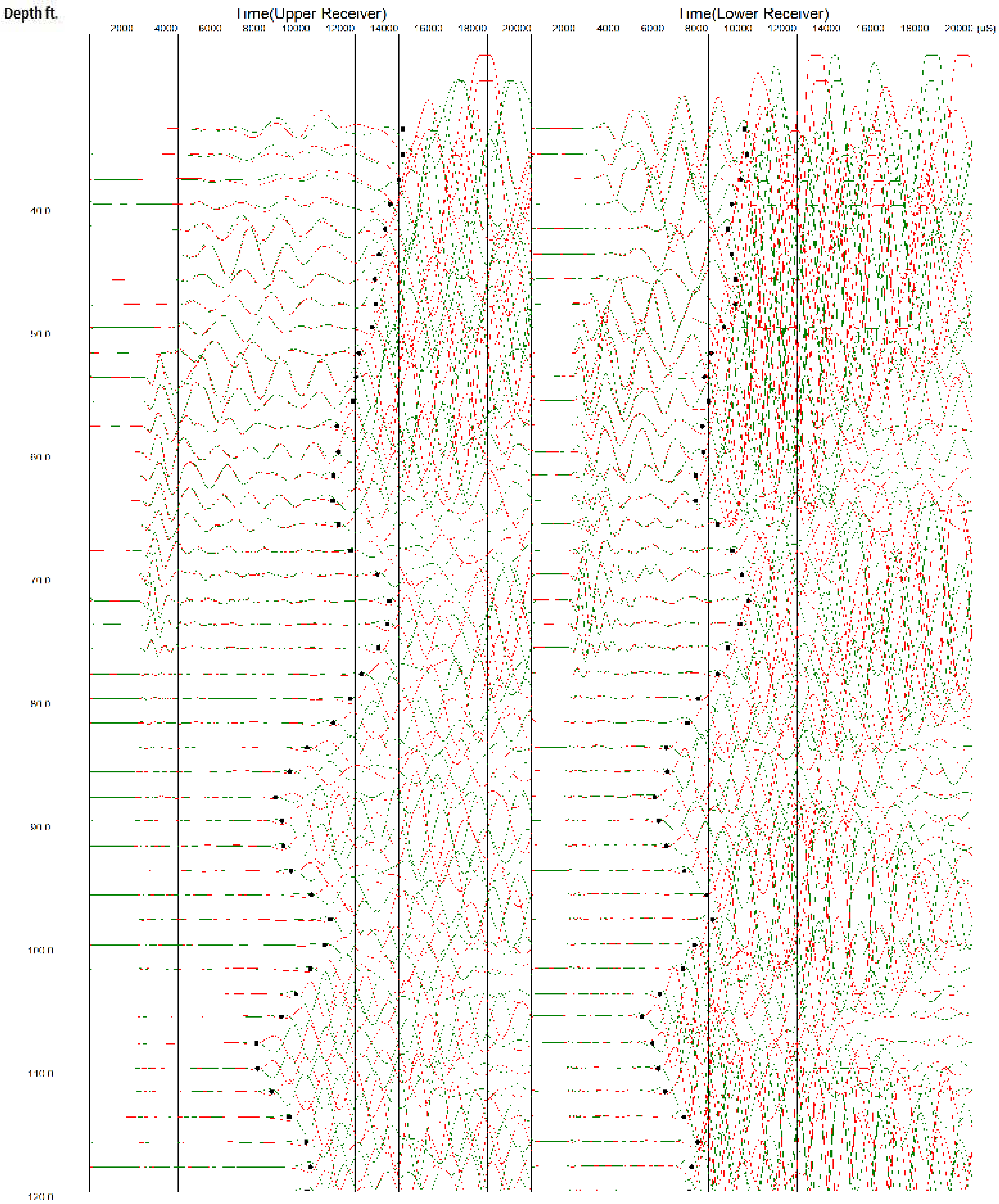
DATE	Aug 1, 2019	TYPE FLUID IN HOLE	SLURRY
RUN No	Run-1	SALINITY	
TYPE LOG	Electric-Natural Gamma	DENSITY	
DEPTH-DRILLER	275	LEVEL	BEGIN AT "10-FT BGS
DEPTH-LOGGER	270	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	270		
TOP LOGGED INTERVAL	30		
OPERATING RIG TIME	1		
RECORDED BY	W HENRICH		
WITNESSED BY	FAUSTAS BUSKEVICIUS		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	8"	0	10 ft	8"	STEEL	0	10 ft
2	~6.0"	10	110 ft				
3	~5.0	110	275 ft				

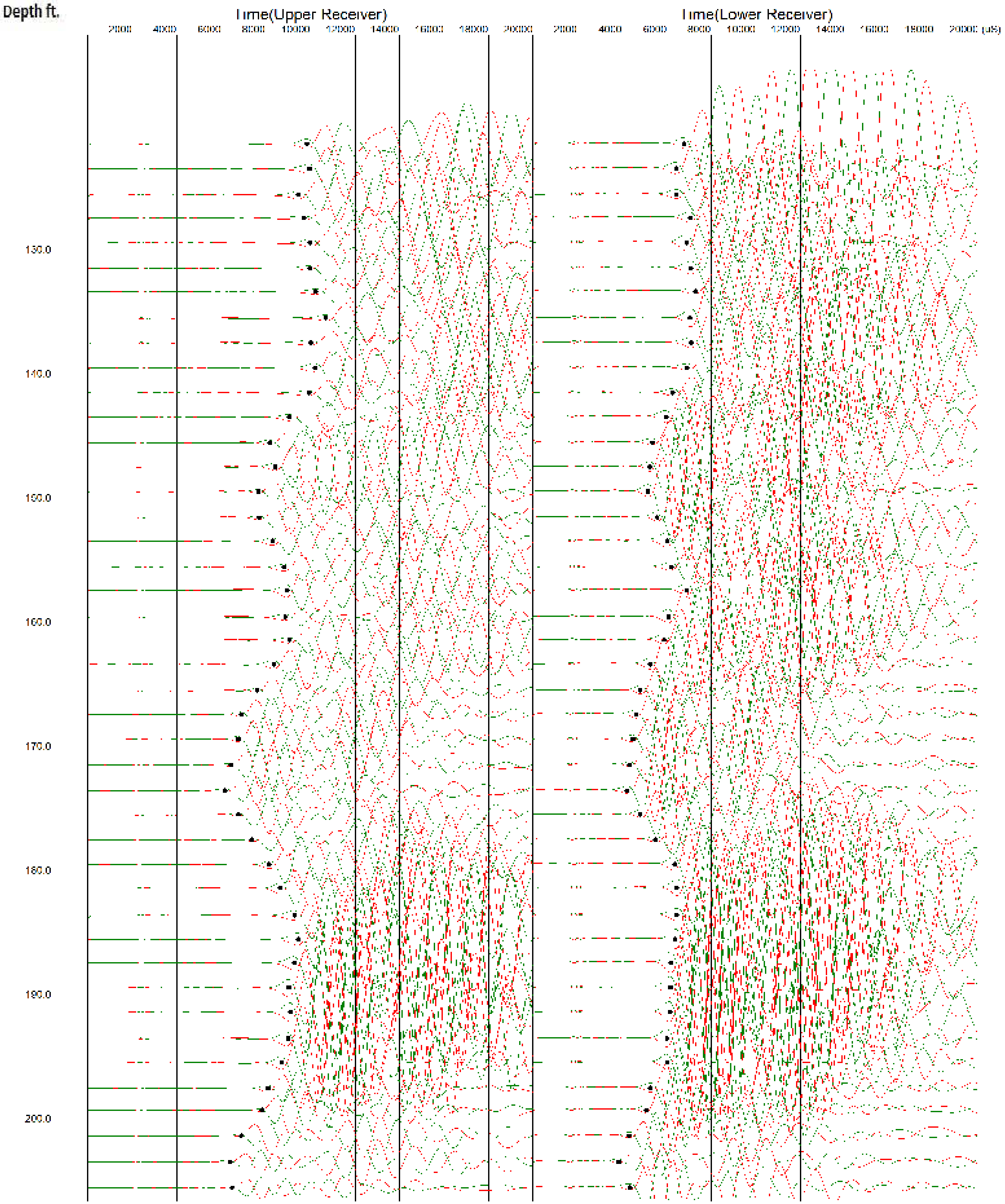



160
180
200
220
240
260

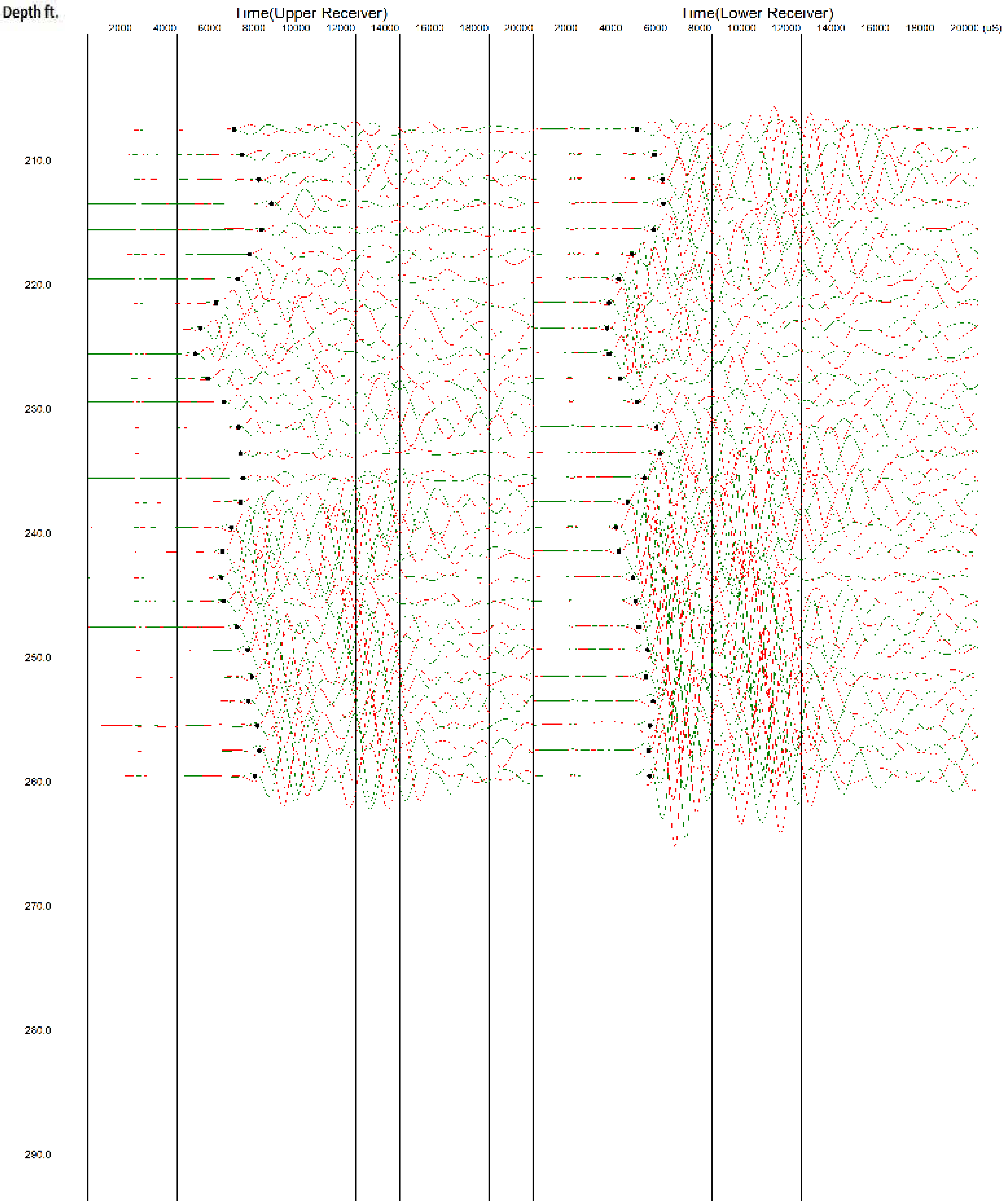
PS-wave Suspension Records **S Wave**



S Wave

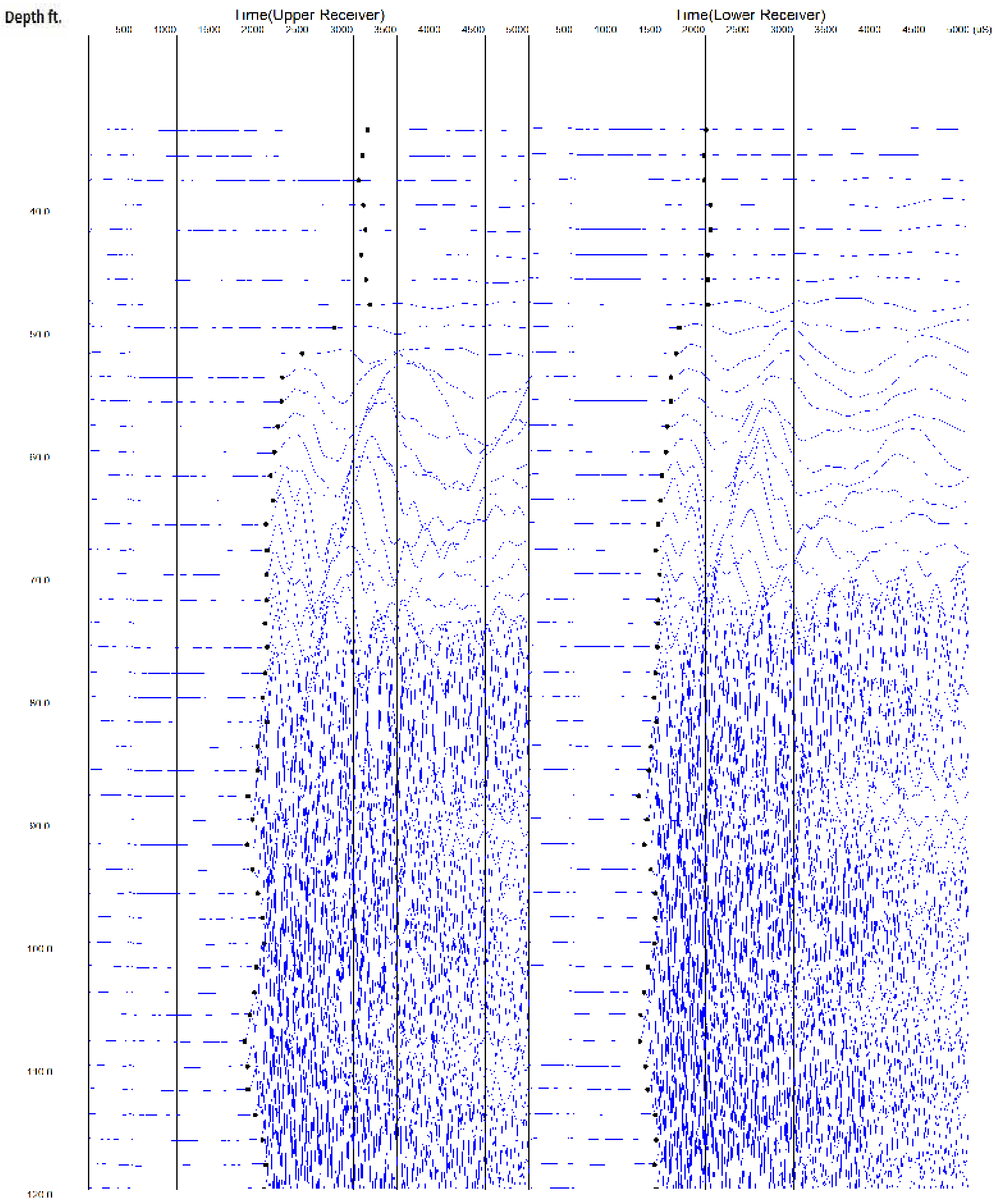

Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0

S Wave

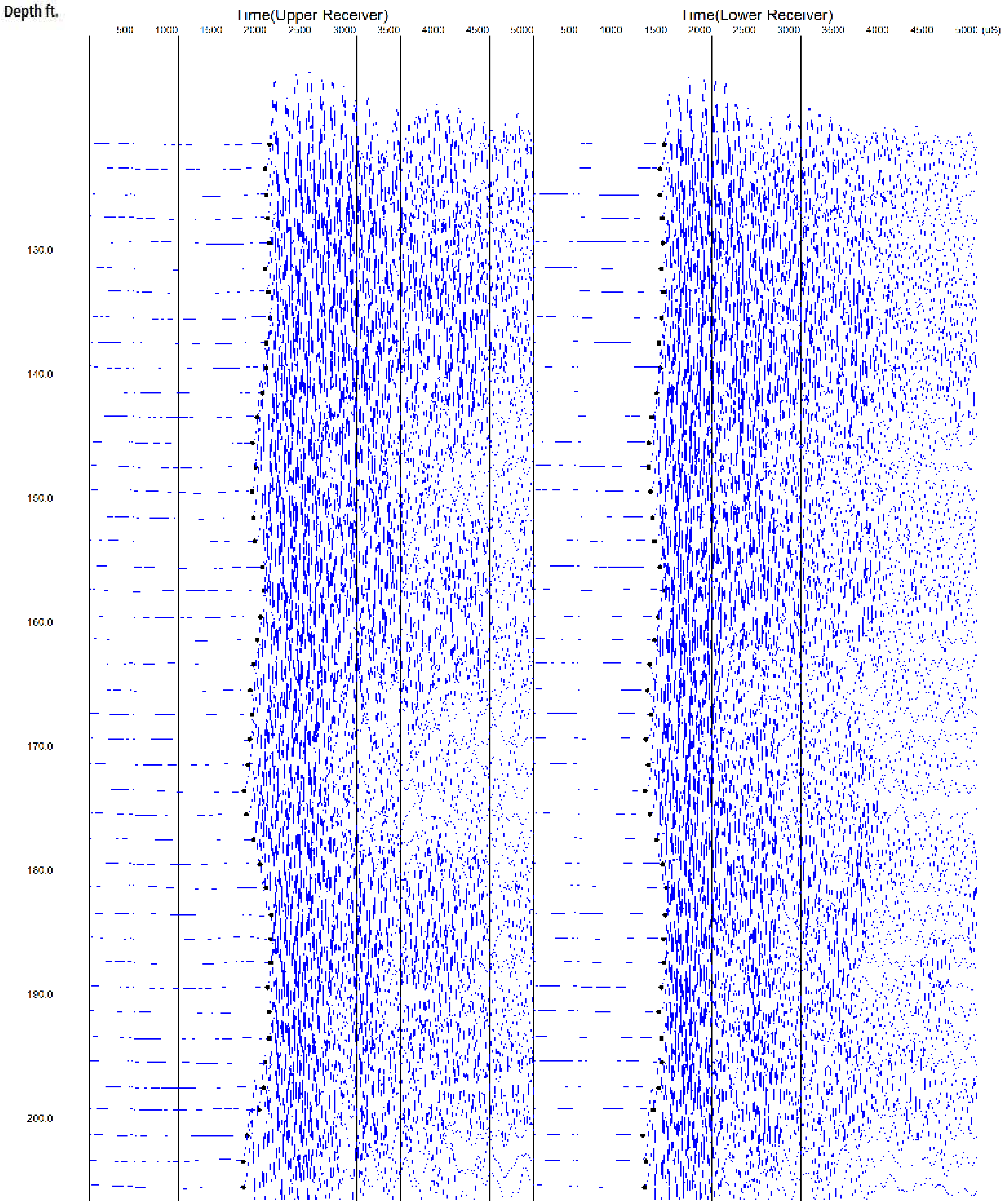


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (µS)
210.0
220.0
230.0
240.0
250.0
260.0
270.0
280.0
290.0

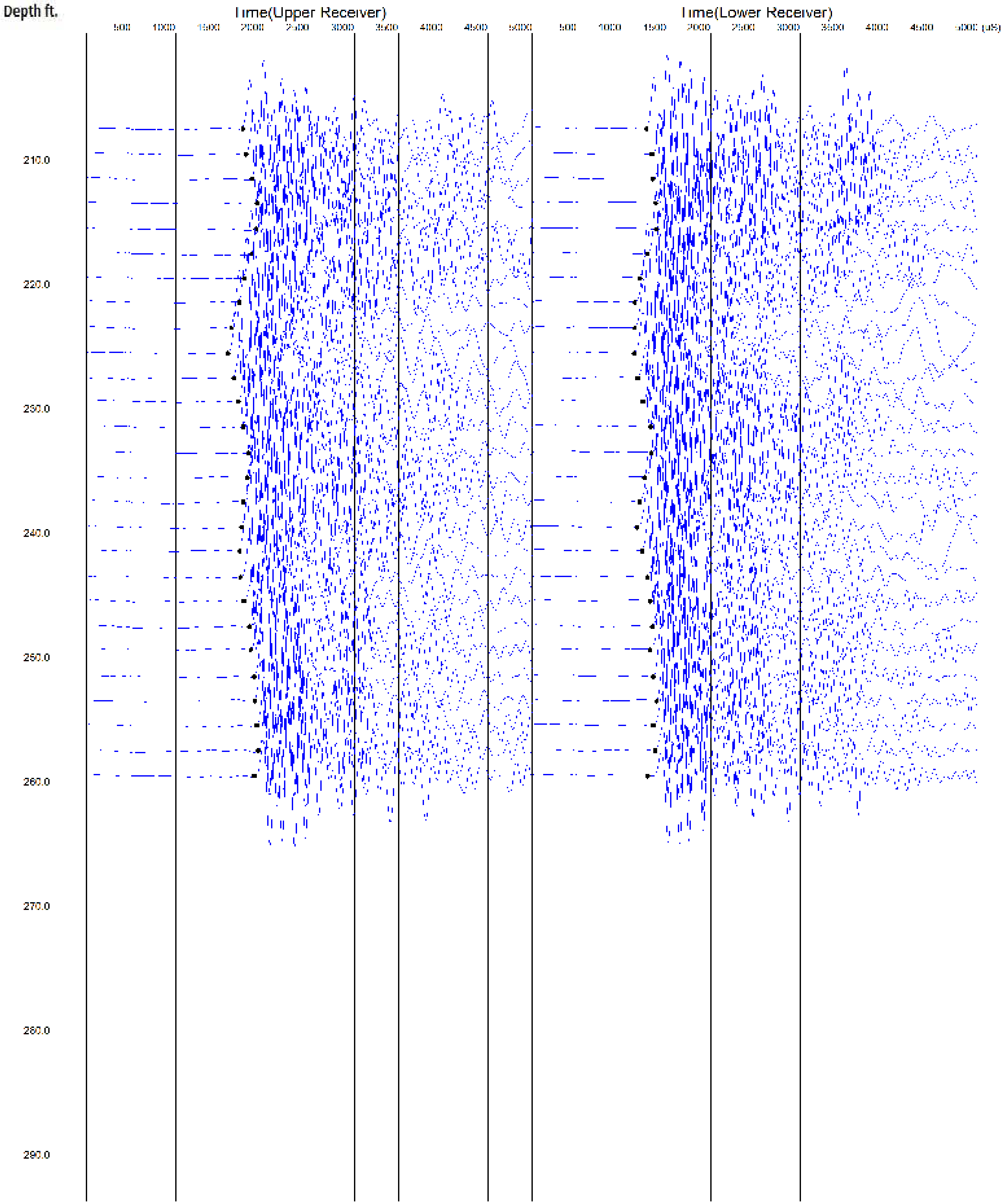
P Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
40.0
50.0
60.0
70.0
80.0
90.0
100.0
110.0
120.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
130.0
140.0
150.0
160.0
170.0
180.0
190.0
200.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
210.0
220.0
230.0
240.0
250.0
260.0
270.0
280.0
290.0

Borehole BH-152, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: August 1, 2019

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
10.31	216	224	220	866	33.84	707	736	721	
10.95	225	225	225	897	35.91	739	739	739	
11.56	220	221	221	926	37.93	723	726	724	
12.18	216	223	220	943	39.97	710	732	721	
12.79	223	221	222	922	41.97	732	726	729	
13.41	244	248	246	939	44.01	800	812	806	
14.03	272	270	271	897	46.03	892	887	889	
14.65	260	273	267	858	48.07	854	896	875	
15.22	242	248	245	917	49.92	792	812	802	
15.85	245	248	246	1333	52.01	804	812	808	4348
16.45	233	237	235	1695	53.97	763	777	770	5527
17.05	255	258	256	1724	55.93	837	846	841	5622
17.66	287	286	287	1724	57.95	943	937	940	5622
18.30	284	287	286	1802	60.05	932	943	937	5875
18.89	278	278	278	1770	61.97	911	911	911	5772
19.51	281	275	278	1653	64.00	922	901	911	5390
20.09	355	352	353	1818	65.91	1163	1155	1159	5929
20.74	362	365	364	1695	68.05	1189	1197	1193	5527
21.33	286	286	286	1869	69.99	937	937	937	6095
21.97	266	267	267	1786	72.09	873	877	875	5823
22.55	246	246	246	1835	73.99	808	808	808	5983
23.14	240	236	238	1754	75.93	789	774	781	5721
23.78	262	254	258	1754	78.01	859	833	846	5721
24.39	233	235	234	1802	80.01	763	770	767	5875
24.99	250	253	251	1724	82.00	820	829	824	5622
25.61	266	265	265	1852	84.02	873	868	870	6039
26.20	340	345	342	1786	85.97	1116	1131	1124	5823
26.83	350	355	352	1754	88.03	1147	1163	1155	5721
27.42	342	333	338	1923	89.97	1124	1094	1109	6271
28.04	373	379	376	2020	91.99	1224	1243	1233	6588
28.66	455	455	455	2083	94.03	1491	1491	1491	6794
29.25	472	476	474	2041	95.95	1548	1562	1555	6655
29.86	368	370	369	1852	97.97	1206	1215	1211	6039
30.49	305	307	306	1754	100.02	1000	1006	1003	5721
31.08	314	318	316	1802	101.97	1032	1045	1038	5875
31.71	282	281	282	1724	104.04	927	922	924	5622
32.26	267	270	269	1786	105.83	877	887	882	5823
32.91	476	481	478	1942	107.99	1562	1577	1570	6332
33.55	532	526	529	2062	110.06	1745	1727	1736	6724

34.12	459	459	459	2151	111.94	1505	1505	1505	7013
34.74	463	472	467	2174	113.98	1519	1548	1533	7089
35.36	435	439	437	1887	116.01	1426	1439	1433	6153
35.98	357	362	360	1709	118.04	1172	1189	1180	5574
36.59	370	365	368	1802	120.05	1215	1197	1206	5875
37.17	323	325	324	1770	121.95	1058	1065	1062	5772
37.78	282	282	282	1802	123.95	927	927	927	5875
38.42	329	331	330	1754	126.06	1079	1086	1083	5721
39.00	370	379	375	1770	127.94	1215	1243	1229	5772
39.60	325	323	324	1739	129.94	1065	1058	1062	5671
40.23	347	345	346	1835	131.98	1139	1131	1135	5983
40.80	336	340	338	1802	133.87	1101	1116	1108	5875
41.45	273	275	274	1681	135.98	896	901	899	5481
42.06	345	340	342	1695	138.00	1131	1116	1124	5527
42.67	307	299	303	1770	139.98	1006	982	994	5772
43.28	275	270	272	1770	142.01	901	887	894	5772
43.88	329	325	327	1786	143.95	1079	1065	1072	5823
44.51	357	352	355	1852	146.03	1172	1155	1163	6039
45.10	316	313	314	1739	147.98	1038	1025	1032	5671
45.70	400	397	398	1923	149.95	1312	1302	1307	6271
46.35	467	481	474	1961	152.06	1533	1577	1555	6394
46.92	439	439	439	1980	153.95	1439	1439	1439	6457
47.56	388	379	383	1905	156.05	1272	1243	1257	6211
48.14	485	485	485	1980	157.94	1593	1593	1593	6457
48.78	362	357	360	1887	160.05	1189	1172	1180	6153
49.35	318	313	315	1869	161.91	1045	1025	1035	6095
49.96	321	323	322	1818	163.90	1052	1058	1055	5929
50.60	360	355	357	1887	166.00	1180	1163	1172	6153
51.18	435	446	441	1942	167.91	1426	1465	1446	6332
51.79	435	442	439	1818	169.92	1426	1452	1439	5929
52.42	463	490	477	2000	172.00	1519	1608	1564	6522
53.05	505	505	505	2041	174.05	1657	1657	1657	6655
53.64	515	515	515	2151	176.00	1691	1691	1691	7013
54.26	532	526	529	2151	178.03	1745	1727	1736	7013
54.86	556	568	562	2105	179.99	1823	1864	1843	6865
55.44	450	463	457	2041	181.89	1478	1519	1498	6655
56.11	357	350	353	1754	184.08	1172	1147	1159	5721
56.69	323	325	324	1709	186.01	1058	1065	1062	5574
57.28	325	327	326	1724	187.92	1065	1072	1069	5622
57.89	350	347	348	1739	189.94	1147	1139	1143	5671
58.49	340	340	340	1613	191.89	1116	1116	1116	5260
59.14	331	338	334	1724	194.03	1086	1108	1097	5622
59.73	370	373	372	1852	195.97	1215	1224	1220	6039
60.36	350	355	352	1802	198.03	1147	1163	1155	5875
60.90	362	365	364	1770	199.80	1189	1197	1193	5772
61.53	391	388	389	1818	201.86	1282	1272	1277	5929
62.17	391	394	392	2105	203.97	1282	1292	1287	6865

62.80	481	463	472	2020	206.03	1577	1519	1548	6588
63.39	526	510	518	2128	207.97	1727	1674	1700	6938
64.02	685	633	659	2222	210.03	2247	2077	2162	7246
64.62	538	538	538	1980	212.00	1764	1764	1764	6457
65.20	410	420	415	1869	213.92	1345	1379	1362	6095
65.84	413	413	413	1942	216.02	1356	1356	1356	6332
66.45	347	357	352	1770	218.01	1139	1172	1155	5772
67.05	350	338	344	1770	219.98	1147	1108	1128	5772
67.65	413	427	420	1786	221.94	1356	1402	1379	5823
68.27	562	575	568	2128	223.99	1843	1886	1864	6938
68.89	676	694	685	2247	226.02	2217	2278	2248	7328
69.50	667	658	662	2105	228.03	2187	2158	2173	6865
70.07	676	704	690	2151	229.90	2217	2310	2264	7013
70.69	833	781	807	2299	231.94	2734	2563	2649	7496
71.33	862	847	855	2083	234.02	2828	2780	2804	6794
71.94	510	495	503	1818	236.02	1674	1624	1649	5929
72.53	388	373	380	1802	237.97	1272	1224	1248	5875
73.16	368	362	365	1754	240.03	1206	1189	1197	5721
73.74	446	450	448	2041	241.92	1465	1478	1471	6655
74.38	625	649	637	2326	244.02	2051	2130	2091	7583
74.96	641	685	663	2247	245.95	2103	2247	2175	7328
75.59	521	495	508	2083	248.00	1709	1624	1667	6794
76.16	490	481	485	1923	249.86	1608	1577	1593	6271
76.81	424	439	431	1905	252.01	1390	1439	1415	6211
77.41	538	543	541	2041	253.98	1764	1783	1774	6655
78.02	420	420	420	1802	255.96	1379	1379	1379	5875
78.62	397	397	397	1818	257.95	1302	1302	1302	5929
79.25	431	442	437	1709	260.01	1414	1452	1433	5574

NORCAL GEOPHYSICAL CONSULTANTS, INC.

Summary Logs
Gamma, E-logs,
Sonic P-wave &
PS-wave Suspension

CO MMW JV
WELL BH-154
FLD BSVII
CTY San Jose
STE CA
FILING No NS195051

COMPANY Mott MacDonald Wong JC
WELL ID BH-154
FIELD BART Silicon Valley II
COUNTRY USA STATE CA

LOCATION
Five Wounds and 29th Street, San Jose, California

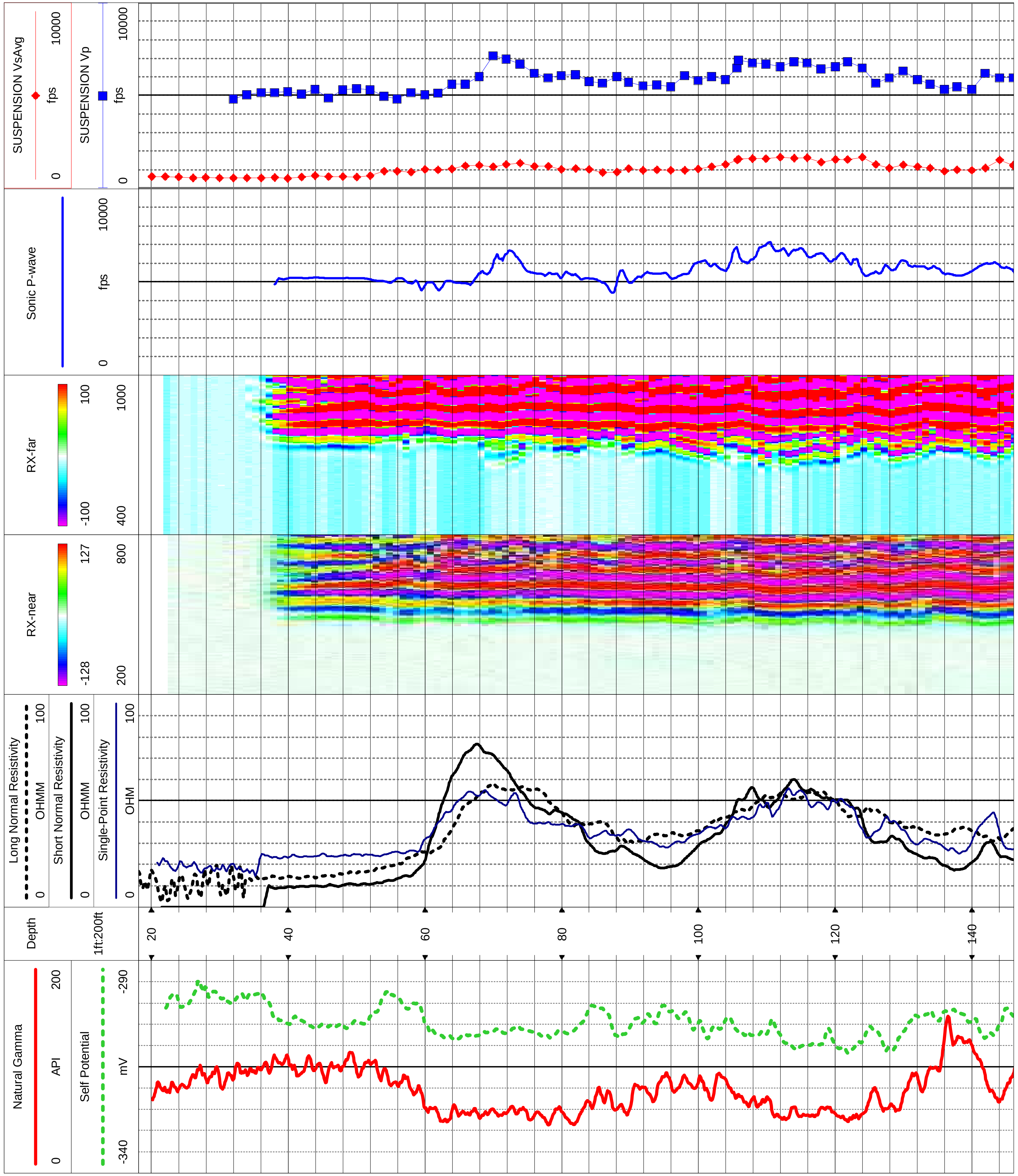
OTHER SERVICES

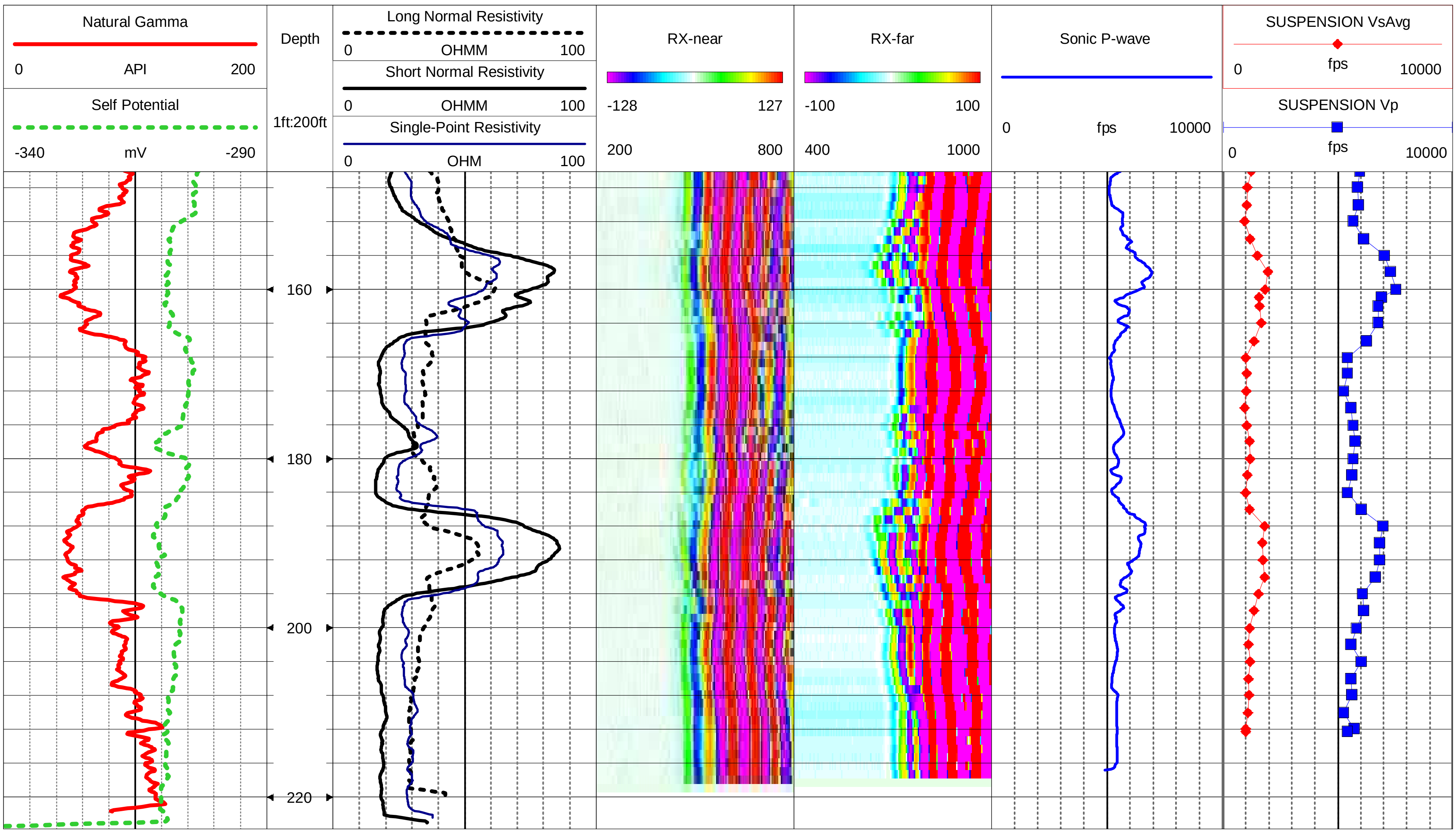
SEC TWP RGE

PERMANENT DATUM	Pavement	ELEVATION	K.B.
LOG MEAS. FROM	Ground Surface	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	Ground Surface		G.L.

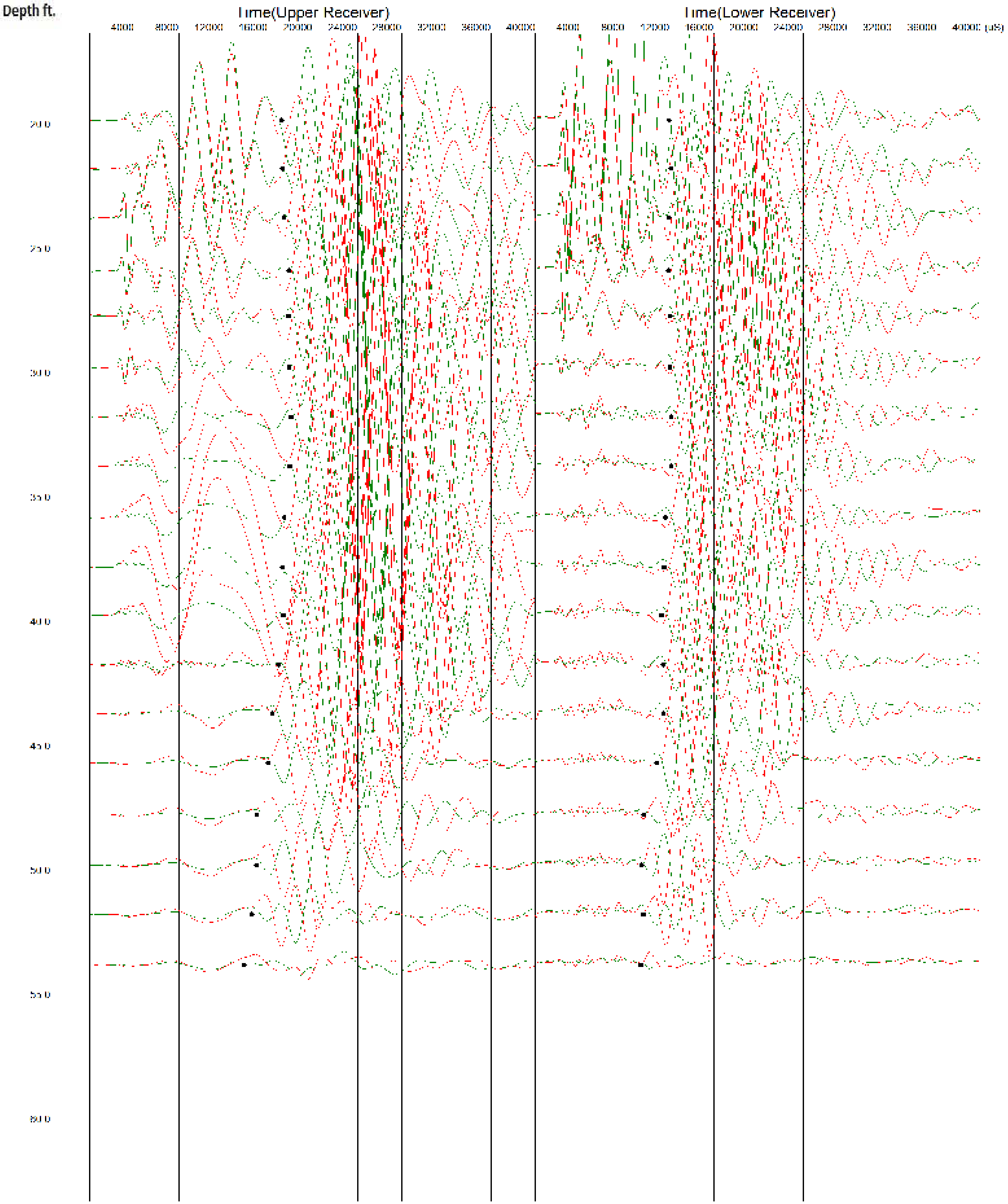
DATE	Aug 15, 2019	TYPE FLUID IN HOLE	SLURRY
RUN No	Run-1, 2 and 3	SALINITY	~ 10 Ohm-M
TYPE LOG	Gamma-E-log, Sonic & PS-wave	DENSITY	
DEPTH-DRILLER	225	LEVEL	BEGIN AT "10-ft BGS
DEPTH-LOGGER	225	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	224		
TOP LOGGED INTERVAL	20		
OPERATING RIG TIME	1		
RECORDED BY	W HENRICH		
WITNESSED BY	FAUSTAS BUSKEVICIUS		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	8"	0	12-ft bgs	8"	STEEL	0	12-ft bgs
2	6"	12	130-ft bgs				
3	5"	130	225-ft bgs				

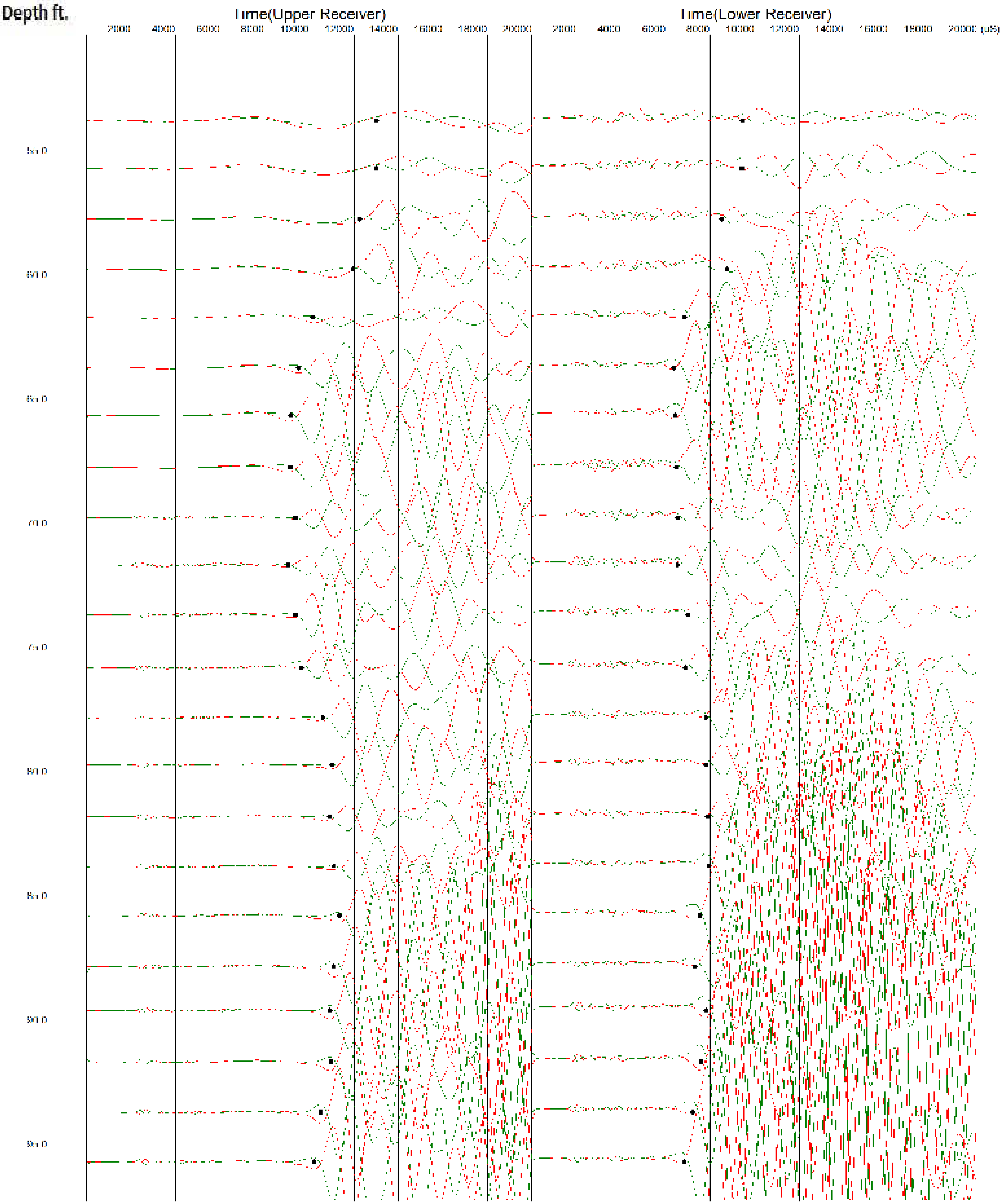



Natural Gamma
0 API 200
Self Potential
-340 mV -290
Depth
1ft:200ft
160
180
200
220
Long Normal Resistivity
0 OHMM 100
Short Normal Resistivity
0 OHMM 100
Single-Point Resistivity
0 OHM 100
RX-near
-128 127
200 800
RX-far
-100 100
400 1000
Sonic P-wave
0 fps 10000
SUSPENSION VsAvg
0 fps 10000
SUSPENSION Vp
0 fps 10000

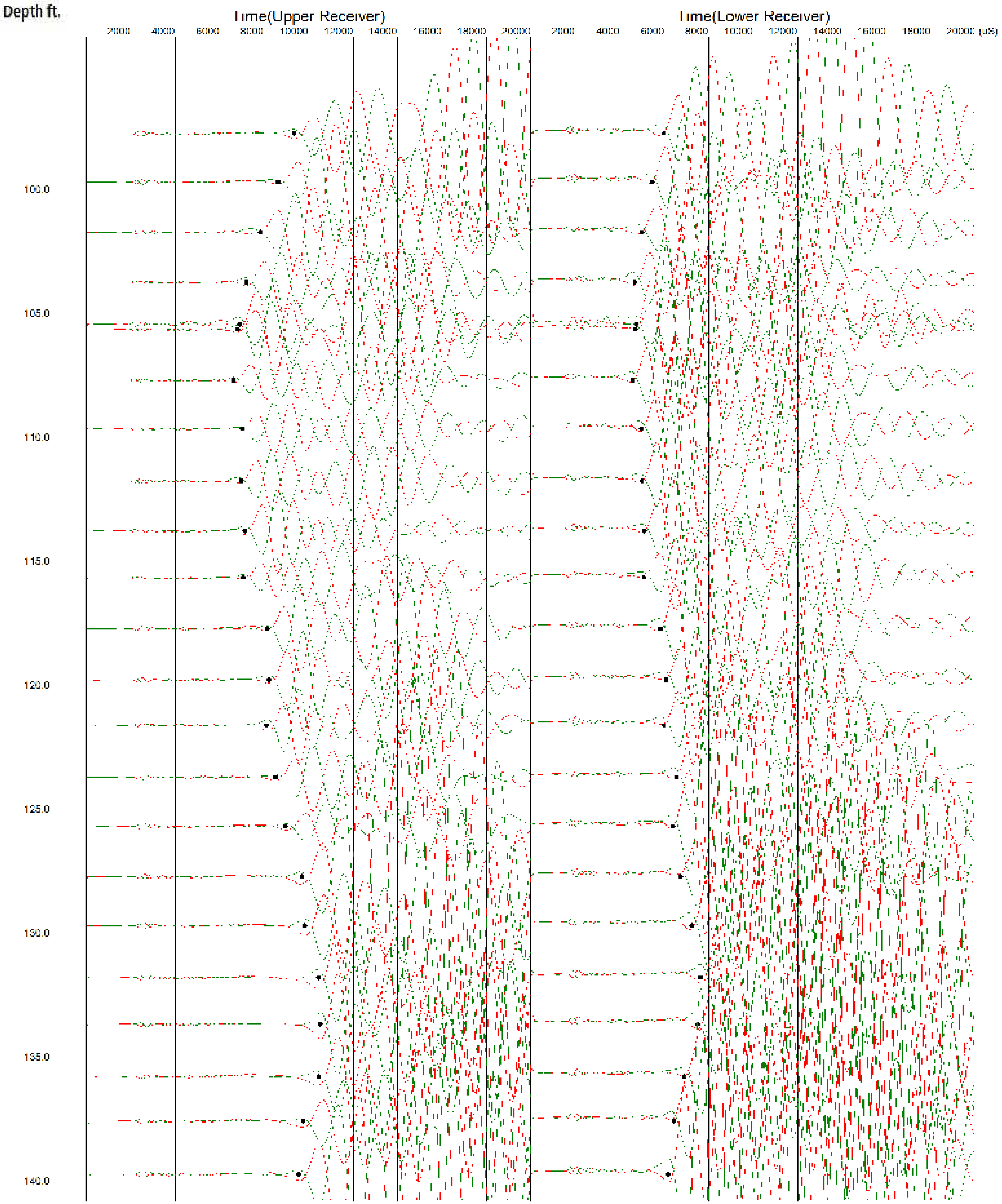
PS-wave Suspension Records **S Wave**



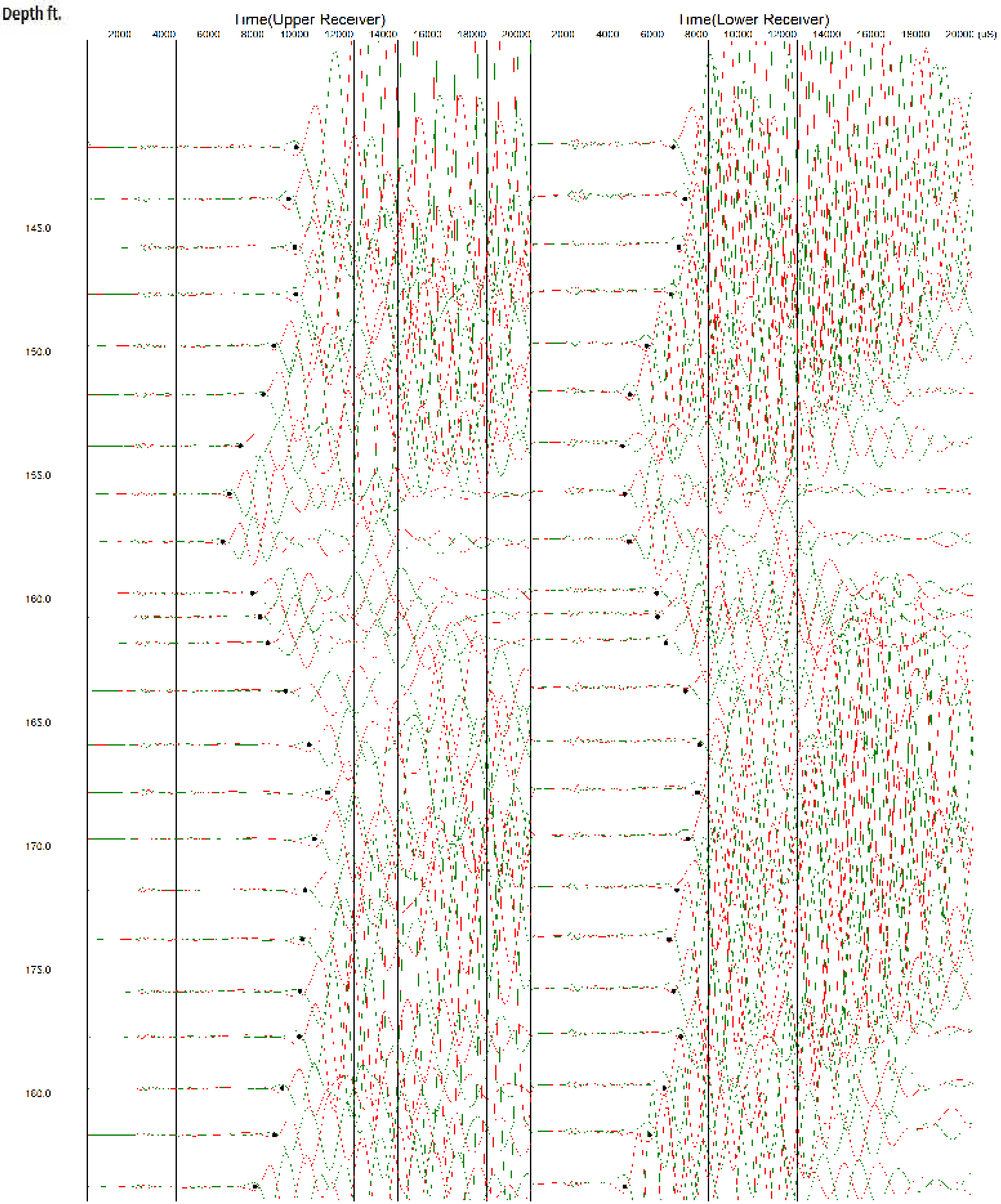
S Wave


Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0
950.0

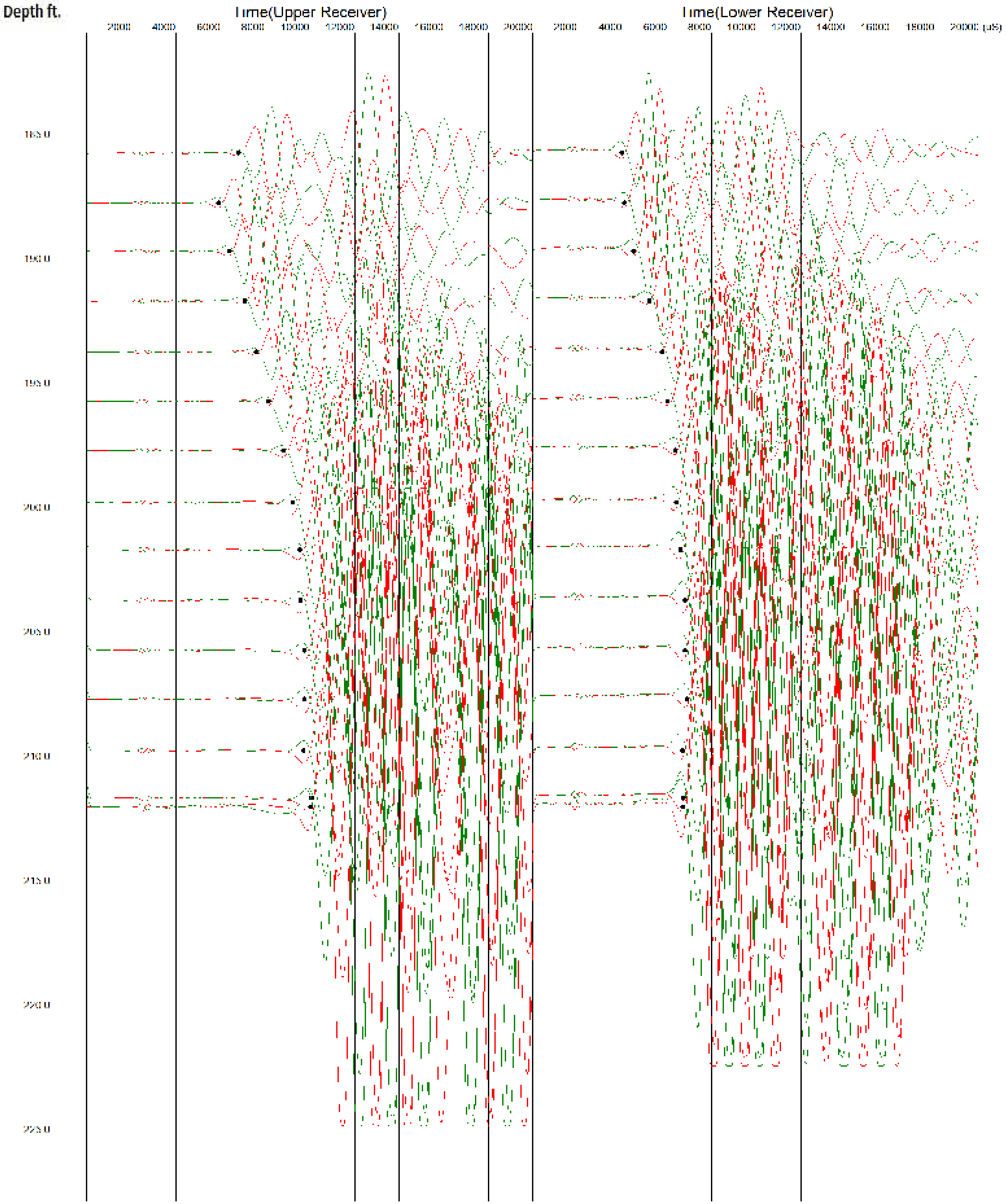
S Wave


Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (µS)
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0
140.0

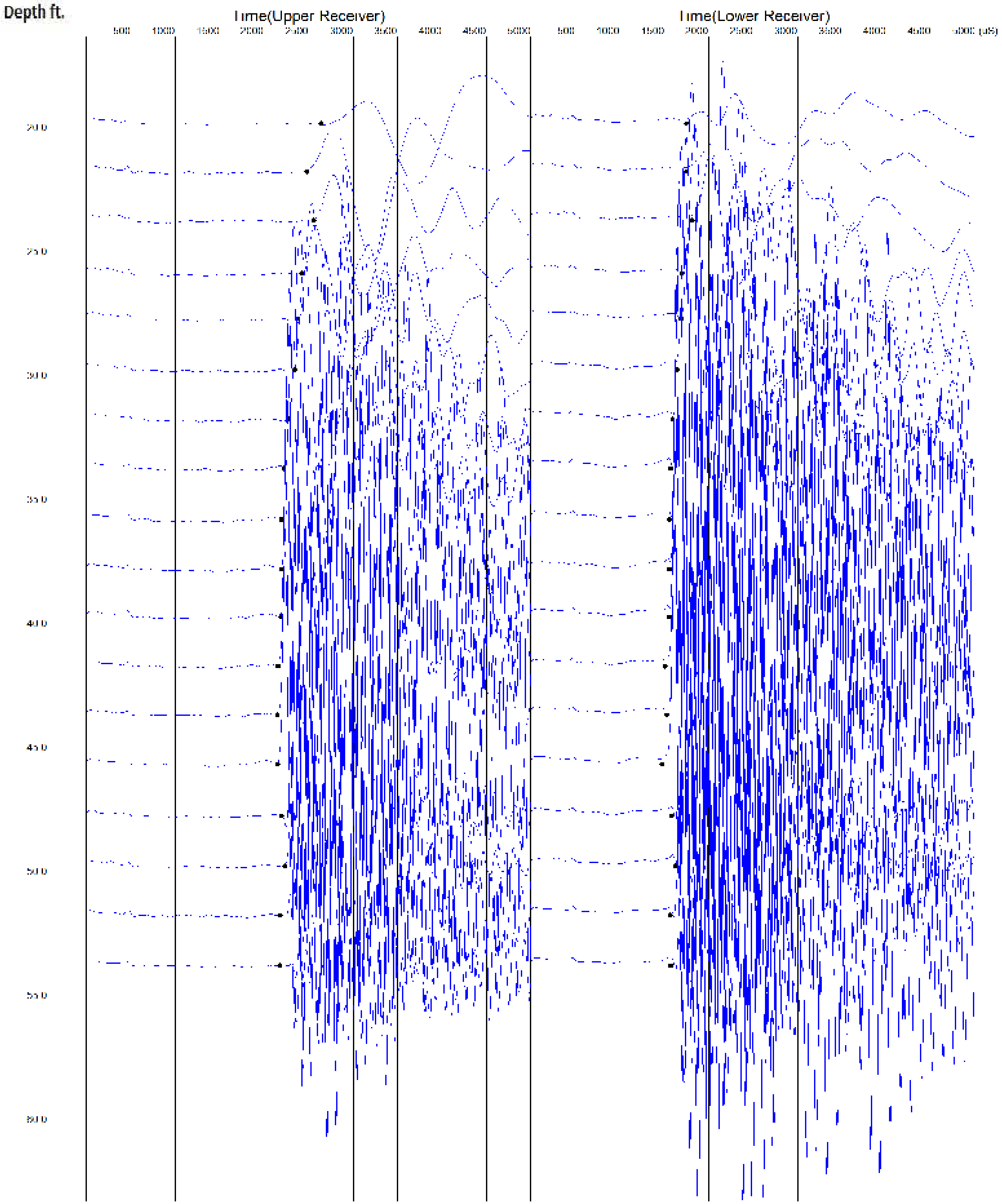
S Wave


Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (µS)
145.0
150.0
155.0
160.0
165.0
170.0
175.0
180.0

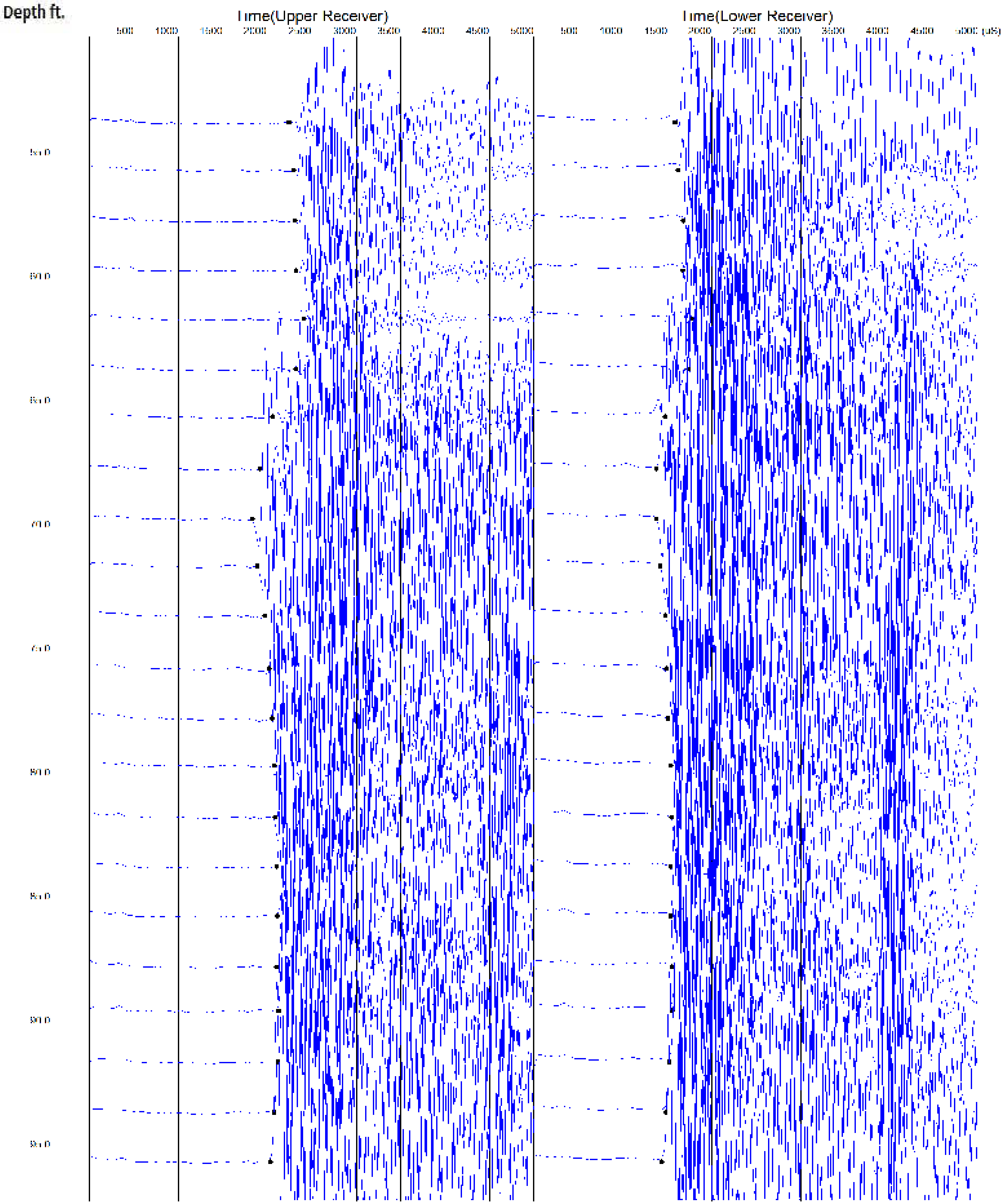
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (μS)
185.0
190.0
195.0
200.0
205.0
210.0
215.0
220.0
225.0

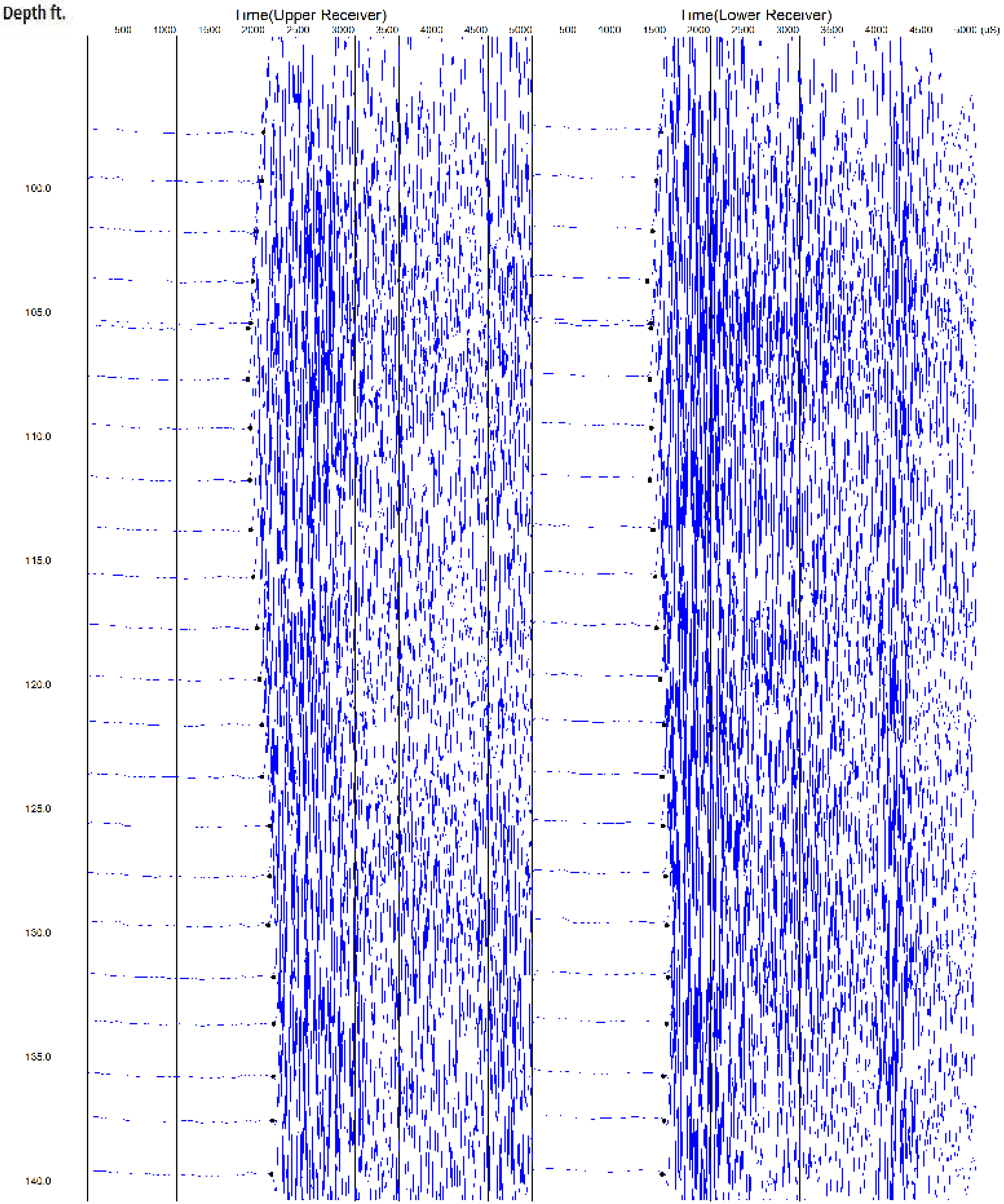
P Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0

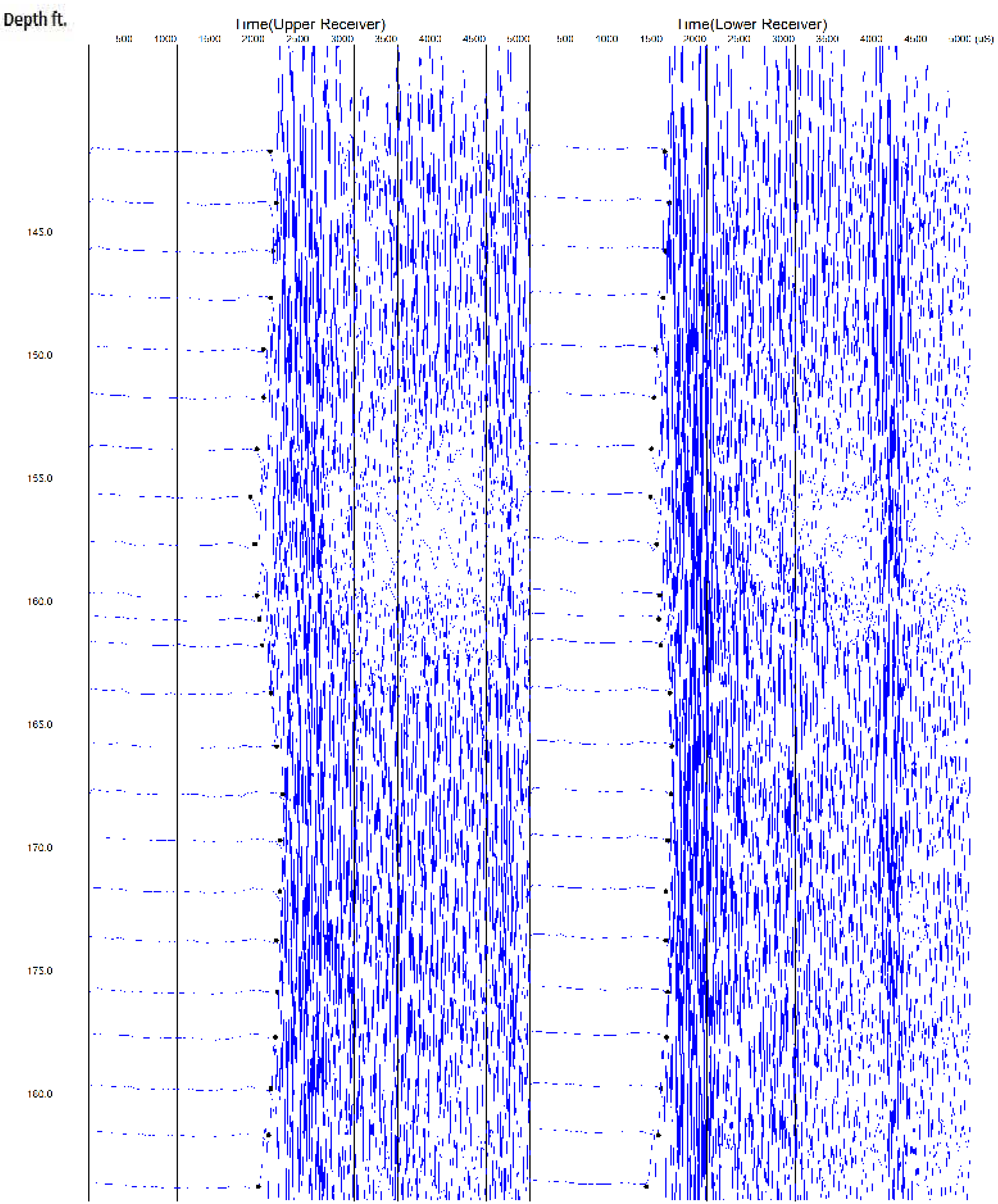
P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0
95.0

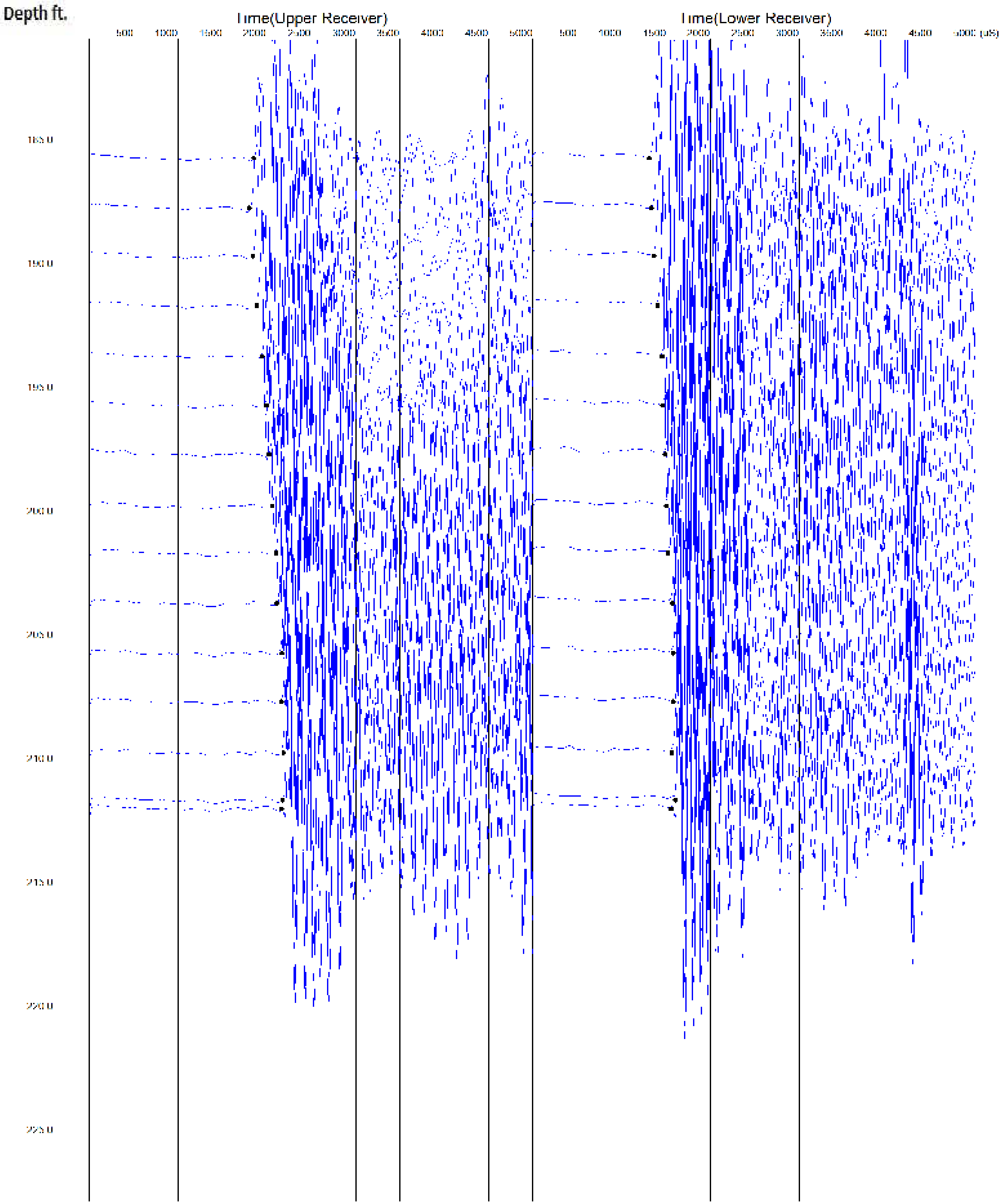
P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0
140.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
145.0
150.0
155.0
160.0
165.0
170.0
175.0
180.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (µS)
185.0
190.0
195.0
200.0
205.0
210.0
215.0
220.0
225.0

Borehole BH-154, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: August 15 , 2019

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
6.12	188	194	191	1124	20.07	617	636	626	
6.71	194	195	195	1370	22.02	636	641	638	
7.31	182	184	183	1342	23.98	599	603	601	
7.96	168	167	167	1379	26.11	550	547	549	
8.52	174	174	174	1449	27.95	570	570	570	
9.14	170	171	171	1429	29.99	558	562	560	
9.75	169	170	169	1471	31.99	554	558	556	
10.36	171	175	173	1538	33.98	562	574	568	5048
10.99	172	172	172	1575	36.05	566	566	566	5167
11.59	172	176	174	1575	38.04	566	578	572	5167
12.18	163	167	165	1587	39.97	536	547	541	5208
12.79	180	184	182	1550	41.97	590	603	597	5087
13.39	203	205	204	1626	43.92	667	672	670	5335
14.00	194	195	195	1481	45.92	636	641	638	4861
14.63	191	187	189	1613	47.99	626	612	619	5292
15.25	187	182	185	1639	50.02	612	599	605	5379
15.85	203	207	205	1613	51.99	667	678	672	5292
16.47	225	225	225	1653	54.03	739	739	739	5423
16.47	278	279	279	1515	54.03	911	916	914	4971
17.05	278	281	279	1471	55.94	911	922	916	4825
17.68	265	269	267	1575	57.99	868	882	875	5167
18.28	313	309	311	1538	59.99	1025	1013	1019	5048
18.88	299	309	304	1563	61.94	982	1013	997	5126
19.50	316	318	317	1709	63.98	1038	1045	1042	5608
20.09	368	365	366	1709	65.90	1206	1197	1202	5608
20.72	379	370	375	1835	67.99	1243	1215	1229	6020
21.34	350	352	351	2174	70.02	1147	1155	1151	7132
21.92	391	397	394	2128	71.91	1282	1302	1292	6981
22.53	413	420	417	2041	73.91	1356	1379	1367	6696
23.18	360	362	361	1887	76.04	1180	1189	1184	6190
23.79	355	362	358	1818	78.06	1163	1189	1176	5965
24.37	309	316	313	1852	79.97	1013	1038	1025	6076
25.01	325	331	328	1869	82.04	1065	1086	1076	6133
25.61	311	314	313	1754	84.04	1019	1032	1025	5756
26.22	262	262	262	1724	86.03	859	859	859	5657
26.85	265	265	265	1835	88.08	868	868	868	6020
27.38	323	321	322	1739	89.84	1058	1052	1055	5706
28.01	292	296	294	1681	91.91	959	971	965	5514
28.63	301	305	303	1695	93.94	988	1000	994	5561
29.25	296	298	297	1667	95.95	971	976	974	5468
29.87	299	294	297	1852	98.00	982	965	974	6076
30.46	316	318	317	1770	99.95	1038	1045	1042	5807
31.08	355	352	353	1835	101.98	1163	1155	1159	6020

31.70	391	394	392	1786	104.00	1282	1292	1287	5859
32.21	459	476	467	1980	105.69	1505	1562	1534	6497
32.28	467	485	476	2105	105.90	1533	1593	1563	6907
32.90	476	500	488	2062	107.94	1562	1640	1601	6765
33.50	495	485	490	2041	109.92	1624	1593	1608	6696
34.14	500	515	508	2000	112.01	1640	1691	1666	6562
34.76	490	505	498	2083	114.03	1608	1657	1633	6835
35.33	500	500	500	2062	115.91	1640	1640	1640	6765
35.95	427	435	431	1961	117.96	1402	1426	1414	6433
36.58	472	476	474	2000	120.03	1548	1562	1555	6562
37.14	476	463	470	2083	121.86	1562	1519	1541	6835
37.79	505	510	508	1980	123.97	1657	1674	1665	6497
38.39	400	382	391	1724	125.95	1312	1252	1282	5657
39.00	333	338	336	1818	127.96	1094	1108	1101	5965
39.61	379	394	386	1923	129.95	1243	1292	1267	6309
40.25	355	357	356	1786	132.05	1163	1172	1168	5859
40.82	329	338	333	1709	133.93	1079	1108	1094	5608
41.46	281	284	282	1626	136.03	922	932	927	5335
42.01	299	303	301	1667	137.83	982	994	988	5468
42.67	298	294	296	1626	139.98	976	965	971	5335
43.27	331	331	331	1887	141.96	1086	1086	1086	6190
43.91	467	467	467	1818	144.06	1533	1533	1533	5965
44.50	370	376	373	1818	146.01	1215	1233	1224	5965
45.09	321	327	324	1786	147.92	1052	1072	1062	5859
45.73	316	314	315	1802	150.02	1038	1032	1035	5912
46.32	291	287	289	1724	151.96	954	943	948	5657
46.95	360	362	361	1869	154.04	1180	1189	1184	6133
47.55	455	459	457	2139	156.00	1491	1505	1498	7018
48.14	602	588	595	2222	157.93	1976	1930	1953	7291
48.77	549	575	562	2299	160.02	1803	1886	1844	7542
49.06	476	490	483	2105	160.96	1562	1608	1585	6907
49.38	481	490	485	2062	162.01	1577	1608	1593	6765
49.97	510	505	508	2062	163.96	1674	1657	1665	6765
50.64	413	420	417	1905	166.13	1356	1379	1367	6249
51.23	303	299	301	1653	168.07	994	982	988	5423
51.80	316	316	316	1653	169.94	1038	1038	1038	5423
52.43	309	307	308	1600	172.02	1013	1006	1010	5249
53.04	291	291	291	1695	174.02	954	954	954	5561
53.68	314	316	315	1724	176.11	1032	1038	1035	5657
54.24	357	357	357	1754	177.94	1172	1172	1172	5756
54.87	362	355	358	1724	180.03	1189	1163	1176	5657
55.45	323	323	323	1709	181.91	1058	1058	1058	5608
56.09	303	298	300	1653	184.01	994	976	985	5423
56.69	352	357	355	1835	185.99	1155	1172	1163	6020
57.30	549	556	553	2128	188.00	1803	1823	1813	6981
57.90	515	532	524	2083	189.95	1691	1745	1718	6835
58.51	532	526	529	2083	191.95	1745	1727	1736	6835
59.13	556	549	553	2020	193.99	1823	1803	1813	6628
59.73	467	476	472	1852	195.98	1533	1562	1548	6076
60.33	417	407	412	1869	197.94	1367	1334	1350	6133
60.97	355	352	353	1770	200.04	1163	1155	1159	5807

61.55	342	340	341	1695	201.95	1124	1116	1120	5561
62.17	362	362	362	1835	203.97	1189	1189	1189	6020
62.78	340	338	339	1695	205.99	1116	1108	1112	5561
63.38	355	345	350	1709	207.94	1163	1131	1147	5608
64.01	329	333	331	1600	210.01	1079	1094	1086	5249
64.59	298	301	299	1739	211.92	976	988	982	5706
64.70	301	303	302	1653	212.28	988	994	991	5423

NORCAL GEOPHYSICAL CONSULTANTS, INC.

Summary Logs
Gamma, E-logs, Sonic P-wave & PS-wave Suspension

CO MMW JV
WELL BH-156
FLD BSVII
CTY San Jose
STE CA
FILING No NS195051

COMPANY	Mott MacDonald Wong JC		
WELL ID	BH-156		
FIELD	BART Silicon Valley II		
COUNTRY	USA	STATE	CA

LOCATION
St James and 29th Street, San Jose, California

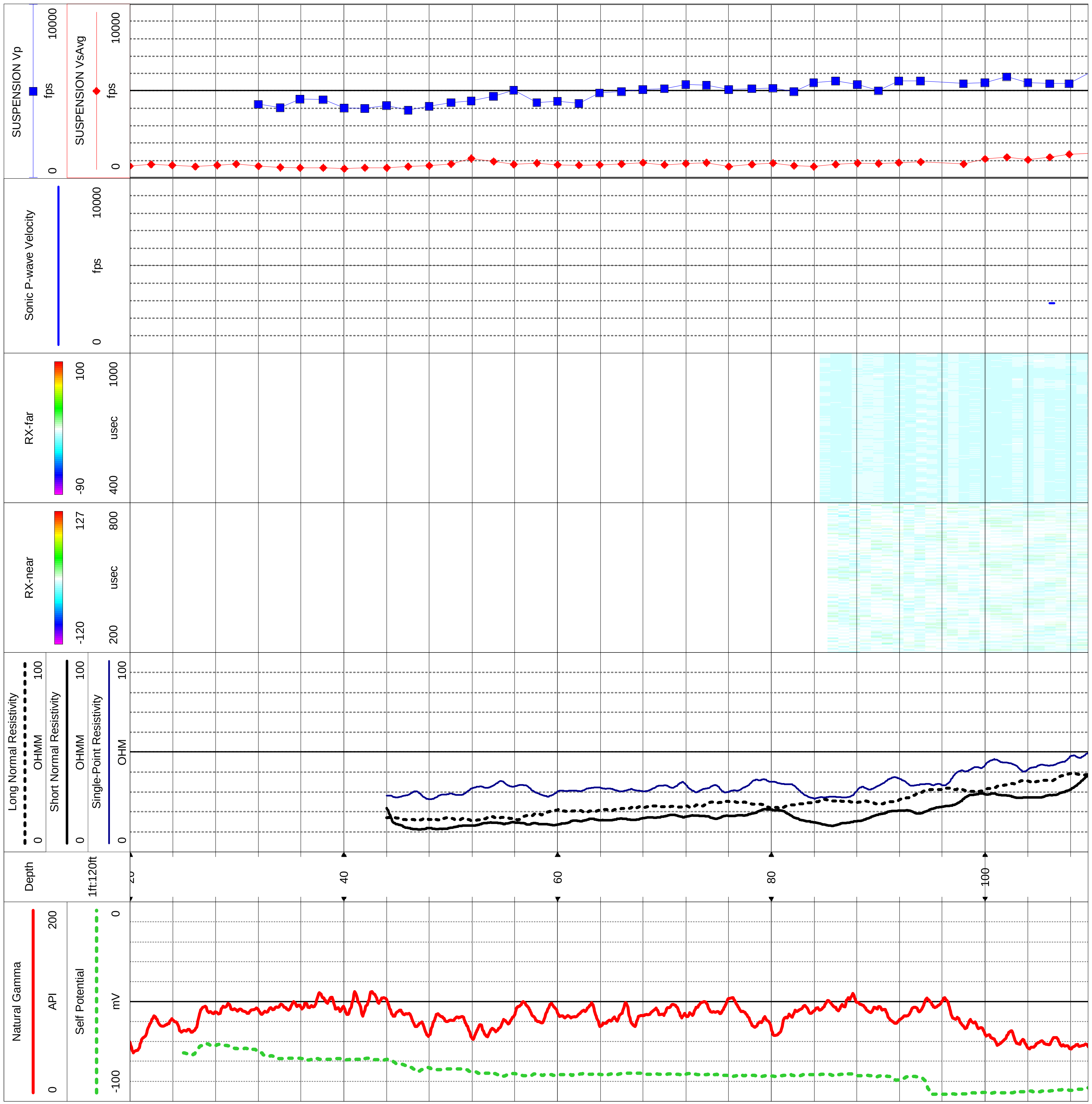
SEC TWP RGE

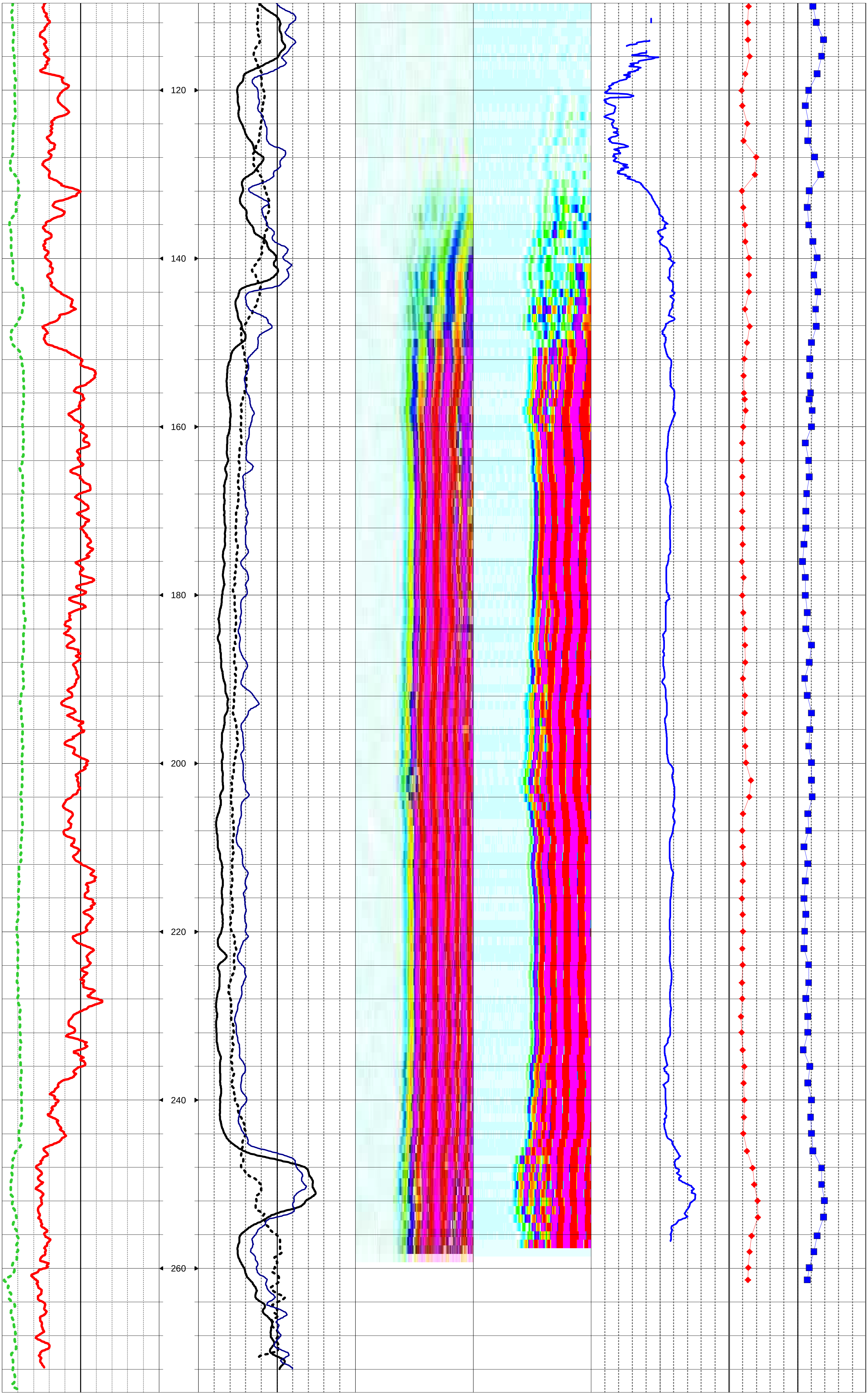
OTHER SERVICES

PERMANENT DATUM	Pavement	ELEVATION		K.B.
LOG MEAS. FROM	Ground Surface	ABOVE PERM. DATUM		D.F.
DRILLING MEAS. FROM	Ground Surface			G.L.

DATE	Aug 23, 2019	TYPE FLUID IN HOLE	SLURRY
RUN No	Run-1, 2 and 3	SALINITY	~ 10 Ohm-M
TYPE LOG	Gamma-E-log, Sonic & Ps-wave	DENSITY	
DEPTH-DRILLER	275	LEVEL	BEGIN AT "20-FT BGS
DEPTH-LOGGER	275	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	273		
TOP LOGGED INTERVAL	20		
OPERATING RIG TIME	1		
RECORDED BY	W HENRICH		
WITNESSED BY	FAUSTAS BUSKEVICIUS		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	8"	0	10 ft bgs	8"	STEEL	0	10-ft bgs
2	5"	10	275 ft bgs				




120
140
160
180
200
220
240
260

Borehole BH-156, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: August 23, 2019

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
6.09	200	210	205	1316	19.97	656	689	673	
6.70	234	231	233	1282	21.97	767	759	763	
7.29	221	219	220	1220	23.93	726	719	723	
7.96	200	194	197	1299	26.10	656	636	646	
8.58	216	225	220	1190	28.14	707	739	723	
9.12	240	240	240	1274	29.93	789	789	789	
9.76	212	203	208	1290	32.02	695	667	681	
10.38	181	185	183	1235	34.04	594	608	601	
10.94	175	174	174	1379	35.90	574	570	572	4525
11.60	171	179	175	1370	38.07	562	586	574	4494
12.20	161	167	164	1227	40.04	529	547	538	4026
12.79	177	177	177	1220	41.96	582	582	582	4001
13.41	174	176	175	1266	44.00	570	578	574	4153
14.03	194	198	196	1190	46.03	636	651	643	3906
14.63	216	212	214	1258	48.01	707	695	701	4127
15.25	231	250	241	1325	50.02	759	820	790	4346
15.83	325	357	341	1351	51.93	1065	1172	1118	4434
16.46	281	291	286	1429	54.00	922	954	938	4687
17.04	234	236	235	1538	55.90	767	774	770	5048
17.70	253	260	256	1325	58.06	829	854	841	4346
18.28	227	227	227	1342	59.99	746	746	746	4404
18.90	219	219	219	1316	62.02	719	719	719	4317
19.49	223	231	227	1493	63.93	732	759	746	4897
20.12	240	253	246	1515	66.00	789	829	809	4971
20.73	263	266	265	1550	68.00	863	873	868	5087
21.34	234	229	232	1563	70.00	767	753	760	5126
21.95	253	255	254	1639	72.00	829	837	833	5379
22.54	260	272	266	1626	73.94	854	892	873	5335
23.17	202	202	202	1550	76.03	661	661	661	5087
23.83	234	234	234	1563	78.19	767	767	767	5126
24.43	263	255	259	1575	80.14	863	837	850	5167
25.03	221	210	216	1515	82.11	726	689	708	4971
25.60	221	214	217	1538	83.98	726	701	713	5048
25.60	202	202	202	1667	83.98	661	664	663	5468
26.22	233	239	236	1695	86.03	763	785	774	5561
26.84	263	250	257	1639	88.06	863	820	842	5379
27.44	250	248	249	1527	90.04	820	812	816	5009
28.02	266	272	269	1695	91.92	873	892	882	5561
28.64	281	287	284	1695	93.96	922	943	932	5561
29.87	243	244	243	1653	97.99	796	800	798	5423
30.48	331	329	330	1667	99.99	1086	1079	1083	5468
31.10	362	365	364	1770	102.05	1189	1197	1193	5807
31.70	314	316	315	1667	104.00	1032	1038	1035	5468

32.33	352	368	360	1653	106.06	1155	1206	1181	5423
32.88	413	407	410	1653	107.86	1356	1334	1345	5423
33.53	442	435	439	1869	110.02	1452	1426	1439	6133
34.13	410	413	412	1942	111.98	1345	1356	1350	6371
34.75	427	420	424	2105	114.01	1402	1379	1390	6907
35.35	455	463	459	2062	115.99	1491	1519	1505	6765
35.98	357	365	361	1961	118.06	1172	1197	1185	6433
36.58	276	281	279	1770	120.02	906	922	914	5807
37.15	291	303	297	1695	121.87	954	994	974	5561
37.79	400	413	407	1770	123.98	1312	1356	1334	5807
38.41	318	336	327	1754	126.02	1045	1101	1073	5756
39.00	595	617	606	1905	127.96	1953	2025	1989	6249
39.63	581	575	578	2041	130.02	1907	1886	1897	6696
40.23	287	286	287	1786	131.98	943	937	940	5859
40.83	316	313	314	1739	133.95	1038	1025	1032	5706
41.46	352	362	357	1770	136.03	1155	1189	1172	5807
42.06	355	368	361	1869	137.99	1163	1206	1185	6133
42.64	450	435	443	1961	139.91	1478	1426	1452	6433
43.27	446	446	446	1887	141.97	1465	1465	1465	6190
43.89	439	442	441	1980	143.99	1439	1452	1445	6497
44.50	352	357	355	1923	146.01	1155	1172	1163	6309
45.13	442	467	455	1942	148.07	1452	1533	1492	6371
45.72	394	397	395	1835	150.01	1292	1302	1297	6020
46.31	342	342	342	1802	151.93	1124	1124	1124	5912
46.92	318	327	323	1802	153.94	1045	1072	1059	5912
47.55	333	336	334	1818	156.00	1094	1101	1097	5965
47.78	345	350	347	1786	156.75	1131	1147	1139	5859
48.18	368	370	369	1852	158.06	1206	1215	1211	6076
48.77	316	314	315	1835	160.00	1038	1032	1035	6020
49.35	289	298	293	1695	161.91	948	976	962	5561
49.99	289	291	290	1770	164.00	948	954	951	5807
50.58	298	296	297	1786	165.96	976	971	974	5859
51.19	299	296	298	1724	167.95	982	971	976	5657
51.82	289	296	292	1709	170.02	948	971	959	5608
52.44	291	292	292	1709	172.04	954	959	957	5608
53.03	305	301	303	1667	173.98	1000	988	994	5468
53.65	287	289	288	1639	176.03	943	948	946	5379
54.23	325	329	327	1695	177.93	1065	1079	1072	5561
54.88	294	296	295	1695	180.04	965	971	968	5561
55.50	311	318	315	1739	182.08	1019	1045	1032	5706
56.09	347	347	347	1709	184.02	1139	1139	1139	5608
56.68	352	360	356	1835	185.96	1155	1180	1168	6020
57.30	360	362	361	1786	187.99	1180	1189	1184	5859
57.89	311	313	312	1681	189.94	1019	1025	1022	5514
58.50	352	350	351	1739	191.93	1155	1147	1151	5706
59.14	345	345	345	1835	194.02	1131	1131	1131	6020
59.73	342	347	345	1802	195.98	1124	1139	1131	5912
60.34	368	362	365	1770	197.96	1206	1189	1197	5807
60.94	382	370	376	1835	199.94	1252	1215	1234	6020
61.57	481	490	485	1835	202.01	1577	1608	1593	6020
62.17	442	455	449	1852	203.98	1452	1491	1472	6076

62.79	311	316	314	1754	206.00	1019	1038	1029	5756
63.40	291	299	295	1770	208.00	954	982	968	5807
63.99	305	307	306	1667	209.93	1000	1006	1003	5468
64.60	321	321	321	1754	211.94	1052	1052	1052	5756
65.21	298	309	303	1695	213.96	976	1013	995	5561
65.85	281	291	286	1667	216.05	922	954	938	5468
66.43	299	305	302	1709	217.96	982	1000	991	5608
67.05	309	309	309	1681	219.97	1013	1013	1013	5514
67.66	296	299	298	1667	222.00	971	982	976	5468
68.26	301	301	301	1770	223.95	988	988	988	5807
68.90	282	292	287	1770	226.06	927	959	943	5807
69.48	294	292	293	1709	227.95	965	959	962	5608
70.12	262	266	264	1754	230.07	859	873	866	5756
70.71	276	281	279	1754	231.98	906	922	914	5756
71.33	307	305	306	1653	234.04	1006	1000	1003	5423
71.94	333	340	337	1802	236.02	1094	1116	1105	5912
72.53	323	331	327	1754	237.98	1058	1086	1072	5756
73.15	347	333	340	1835	239.99	1139	1094	1116	6020
73.77	327	340	333	1818	242.03	1072	1116	1094	5965
74.36	318	323	321	1835	243.97	1045	1058	1052	6020
75.00	400	400	400	1869	246.06	1312	1312	1312	6133
75.62	521	532	526	2062	248.09	1709	1745	1727	6765
76.21	549	575	562	2062	250.03	1803	1886	1844	6765
76.80	610	658	634	2128	251.98	2001	2158	2080	6981
77.40	641	641	641	2105	253.95	2103	2103	2103	6907
78.07	510	495	503	1961	256.13	1674	1624	1649	6433
78.65	463	459	461	1887	258.04	1519	1505	1512	6190
79.23	427	435	431	1786	259.93	1402	1426	1414	5859
79.66	413	435	424	1739	261.36	1356	1426	1391	5706

NORCAL

NORCAL GEOPHYSICAL CONSULTANTS, INC.

Electric-Natural Gamma, Tri-Sonic, PS-wave Suspension Summary Log Plot

CO MMW JV
WELL BH-165
FLD BSVII
CTY SAN JOSE
STE CA
FILING No NS195051

COMPANY	Mott MacDonald Wong JC		
WELL ID	BH-165		
FIELD	BART Silicon Valley II		
COUNTRY	USA	STATE	CA

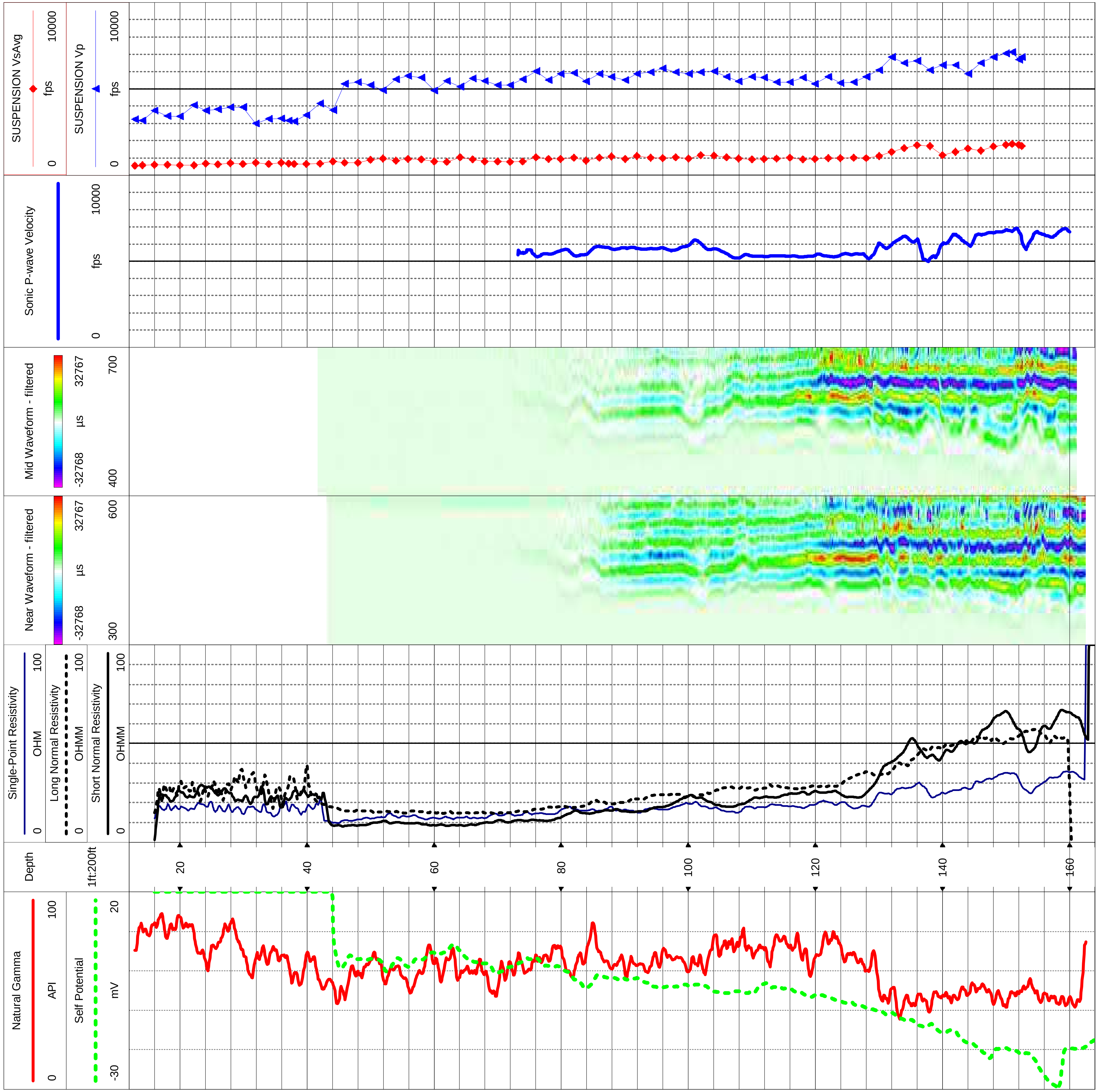
LOCATION
Los Plumas and N. Marburg Way

OTHER SERVICES

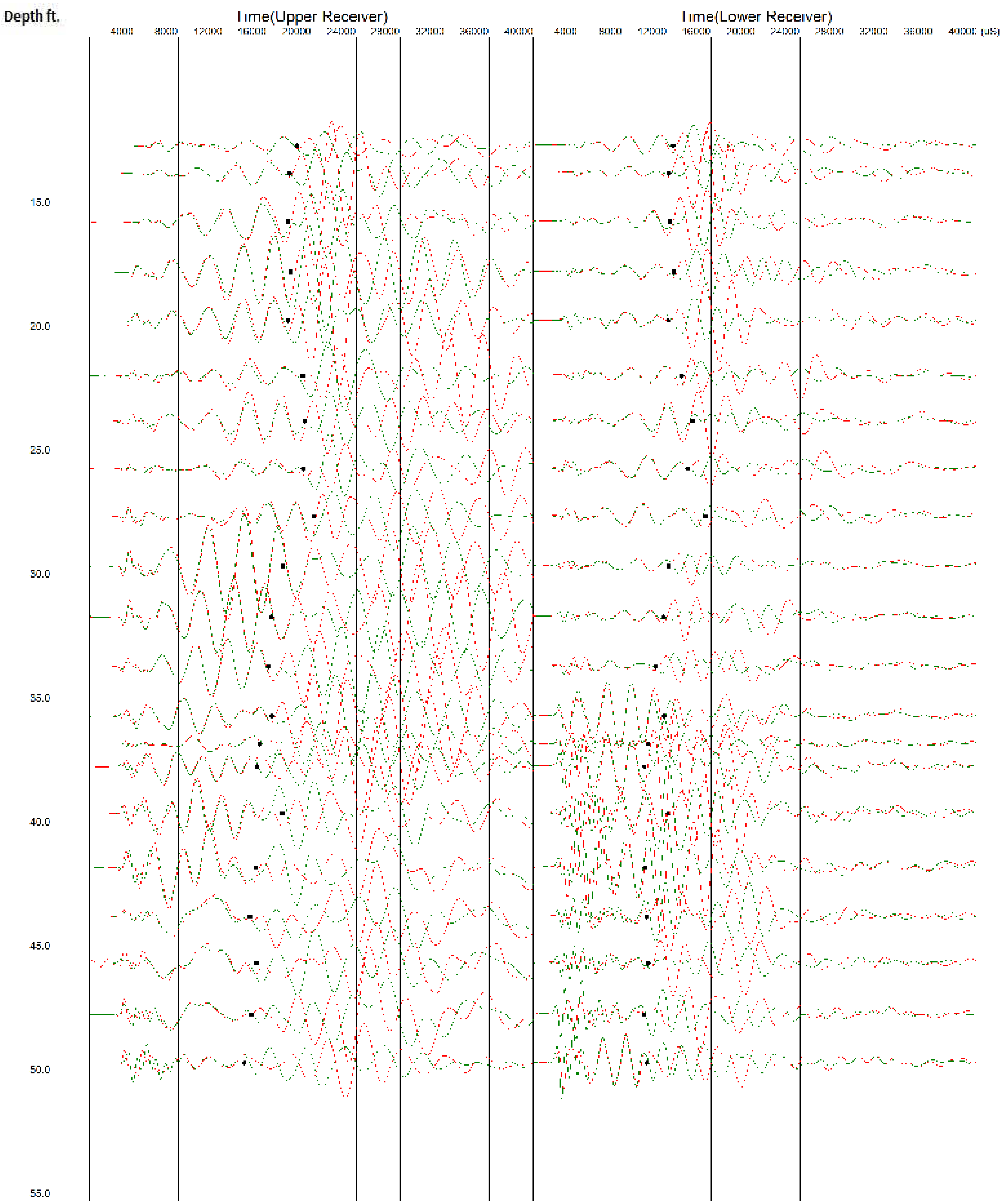
SEC TWP RGE

PERMANENT DATUM	Pavement	ELEVATION	K.B.
LOG MEAS. FROM	Pavement	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.
DATE	November 18, 2019	TYPE FLUID IN HOLE	SLURRY
RUN No	Runs-1, 3 and 5	SALINITY	
TYPE LOG	"E' Log-Gamma, Sonic, PS-SUSP	DENSITY	
DEPTH-DRILLER	165	LEVEL	BEGIN AT "10-FT BGS
DEPTH-LOGGER	165	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	165		
TOP LOGGED INTERVAL	12		
OPERATING RIG TIME	1		
RECORDED BY	W HENRICH		
WITNESSED BY	JOE		

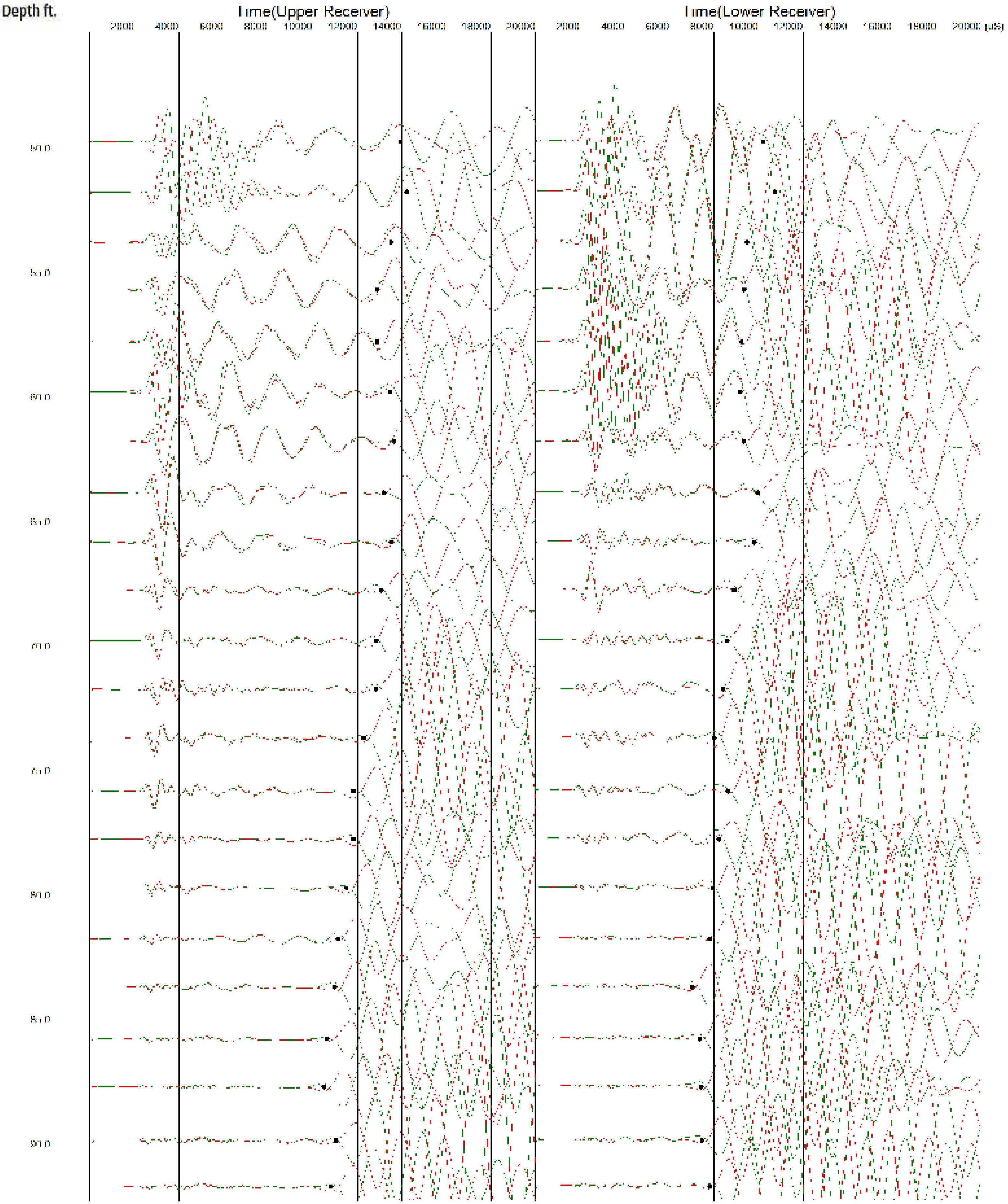
RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	8"	0	10 ft	6	STEEL	0	10 ft
2	5"	10	165 ft				



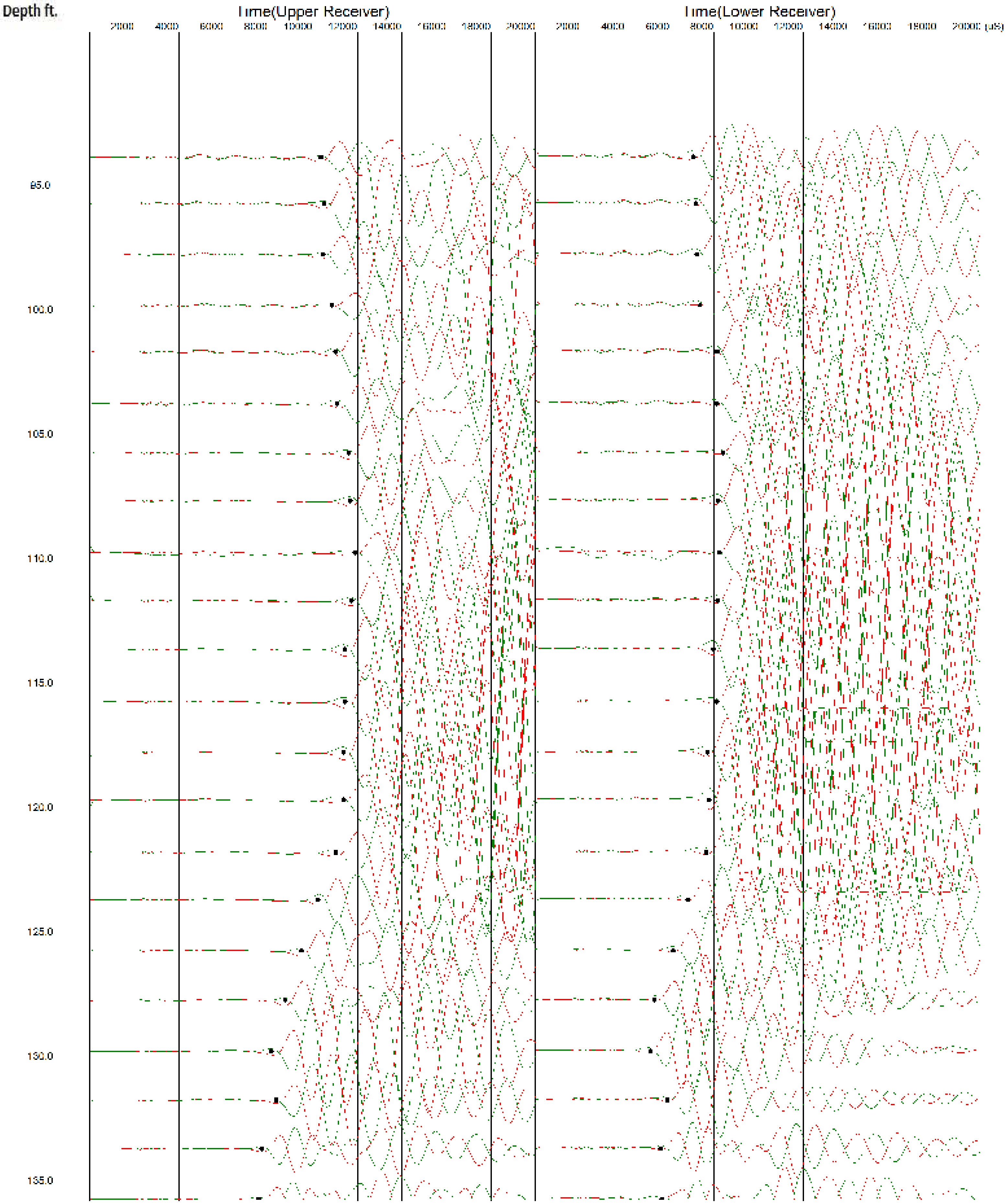
S Wave


Depth ft.
Time(Upper Receiver)
4000
8000
12000
16000
20000
24000
28000
32000
36000
40000
Time(Lower Receiver)
4000
8000
12000
16000
20000
24000
28000
32000
36000
40000 (uS)
15.0
20.0
25.0
30.0
35.0
40.0
45.0
50.0
55.0

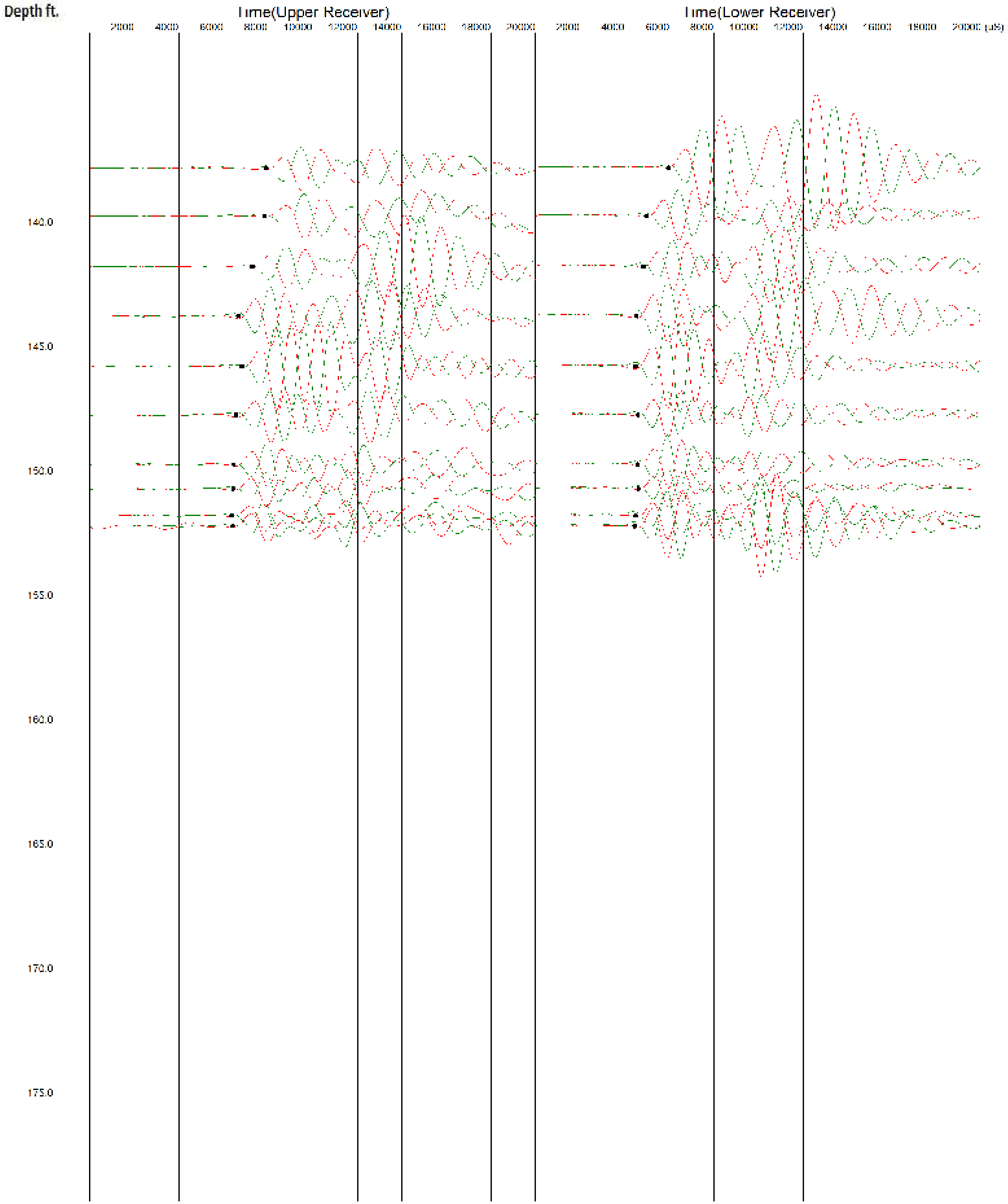
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (µS)
500
550
600
650
700
750
800
850
900

S Wave

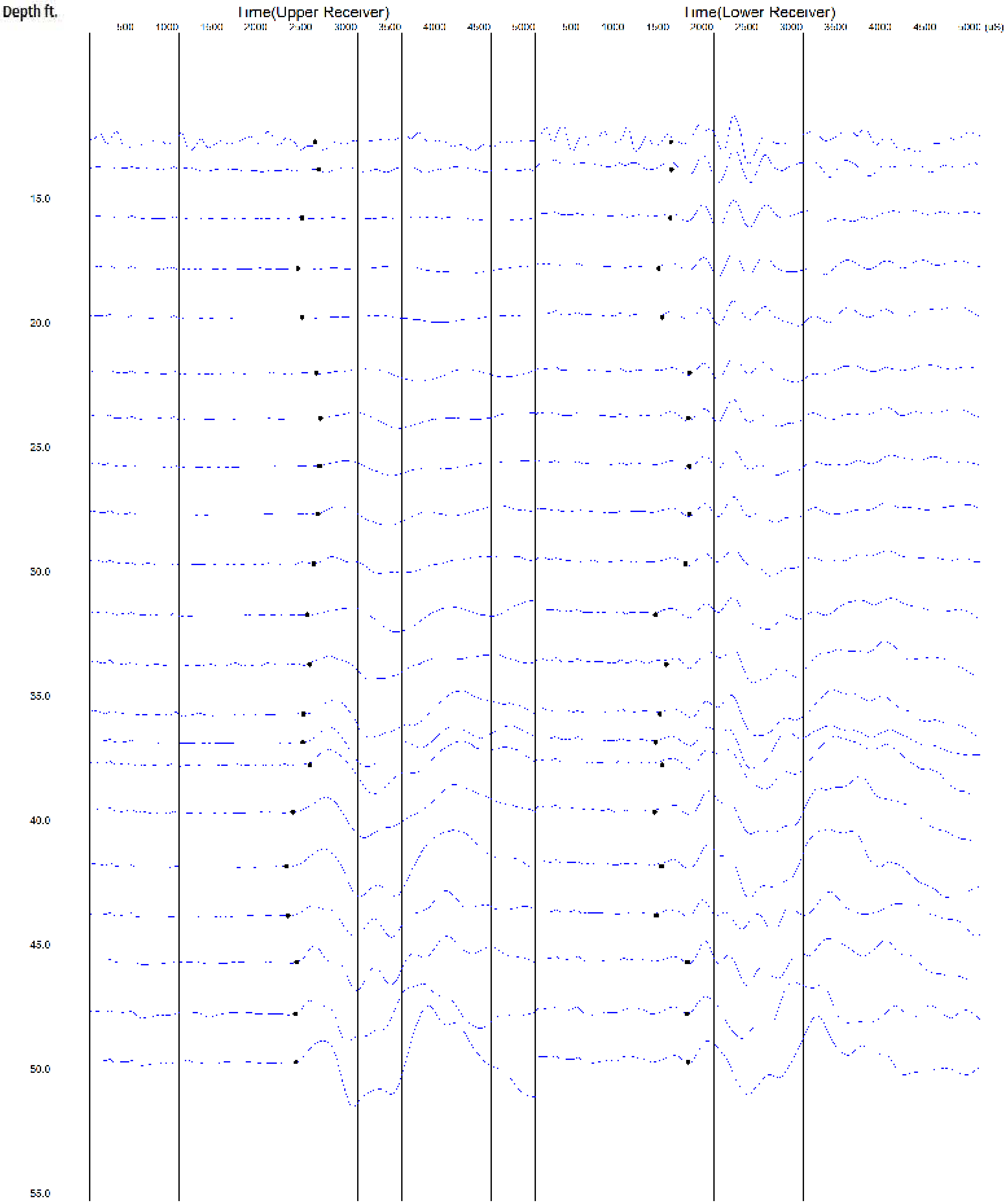

Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
95.0
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0

S Wave

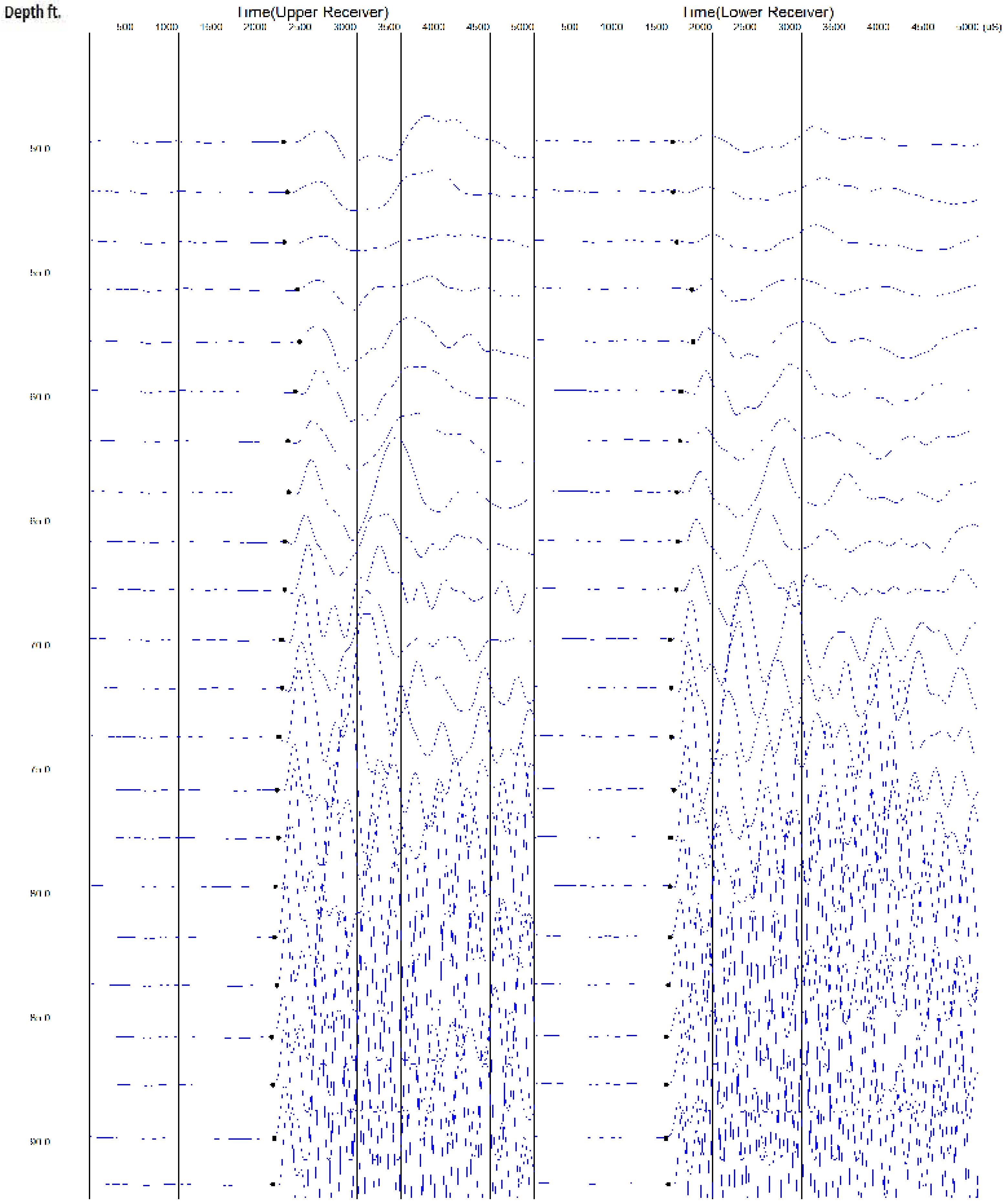

Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (µS)
140.0
145.0
150.0
155.0
160.0
165.0
170.0
175.0

SUSPENSION DATA

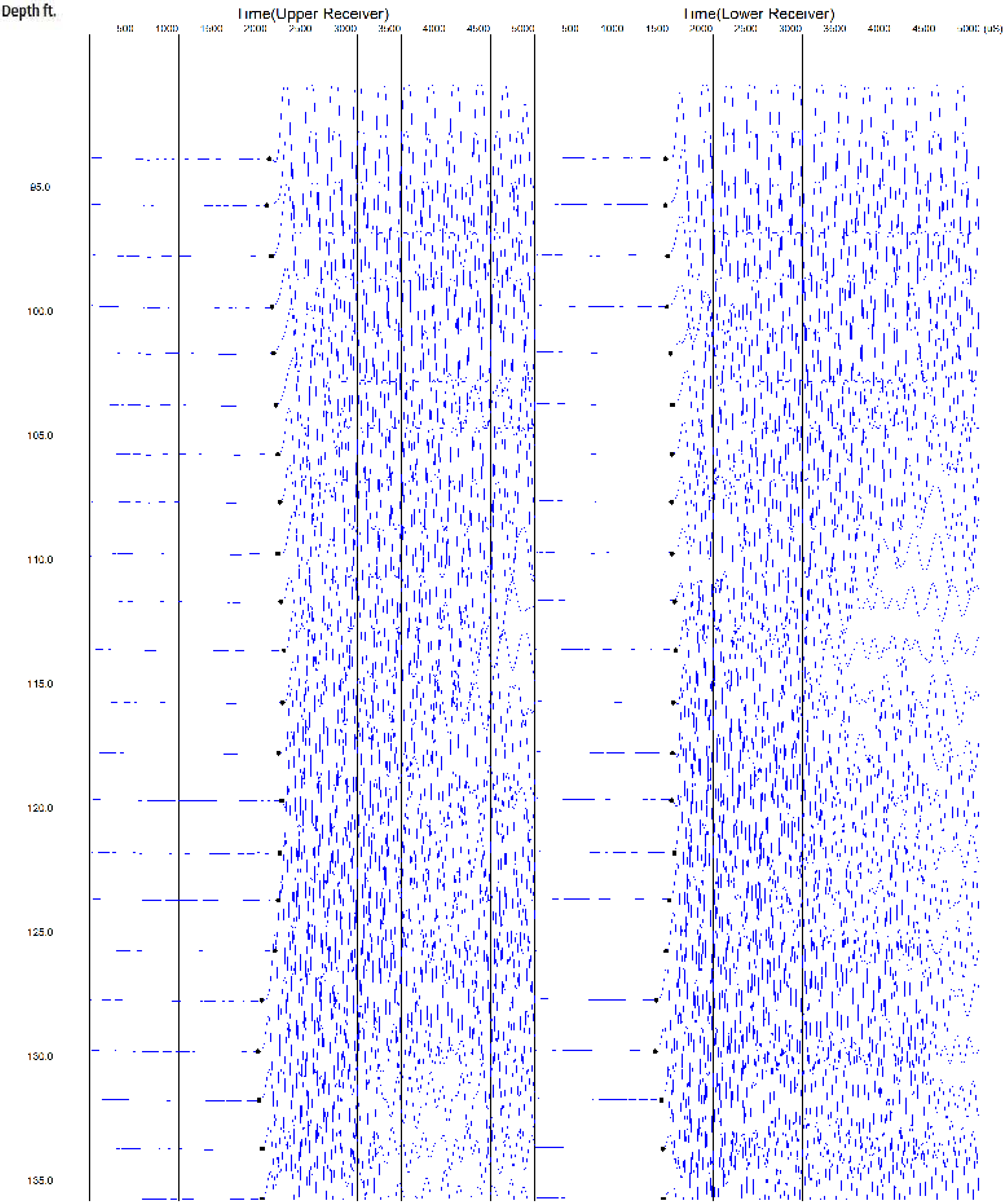
P Wave



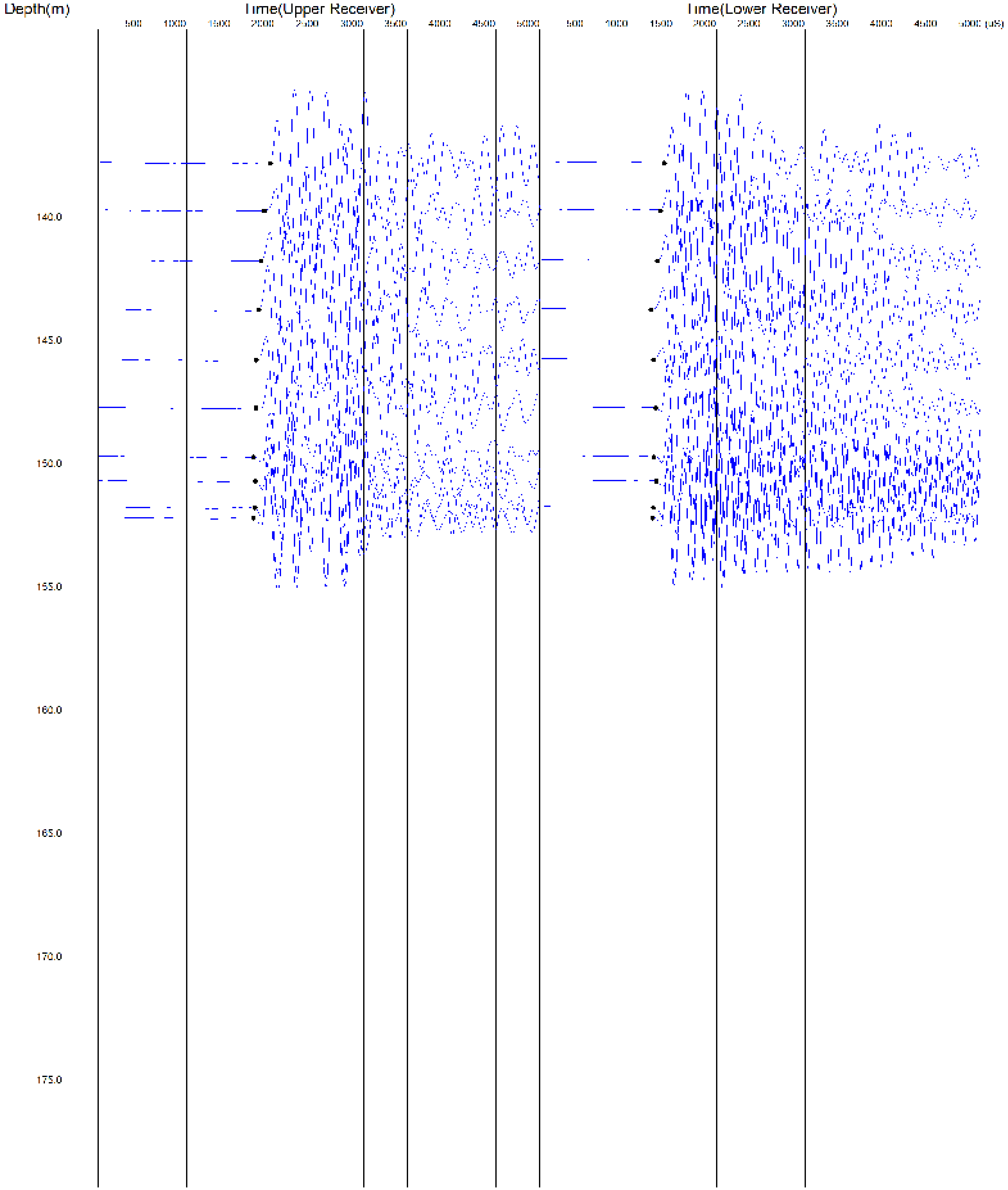
P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
500.0
550.0
600.0
650.0
700.0
750.0
800.0
850.0
900.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
95.0
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0

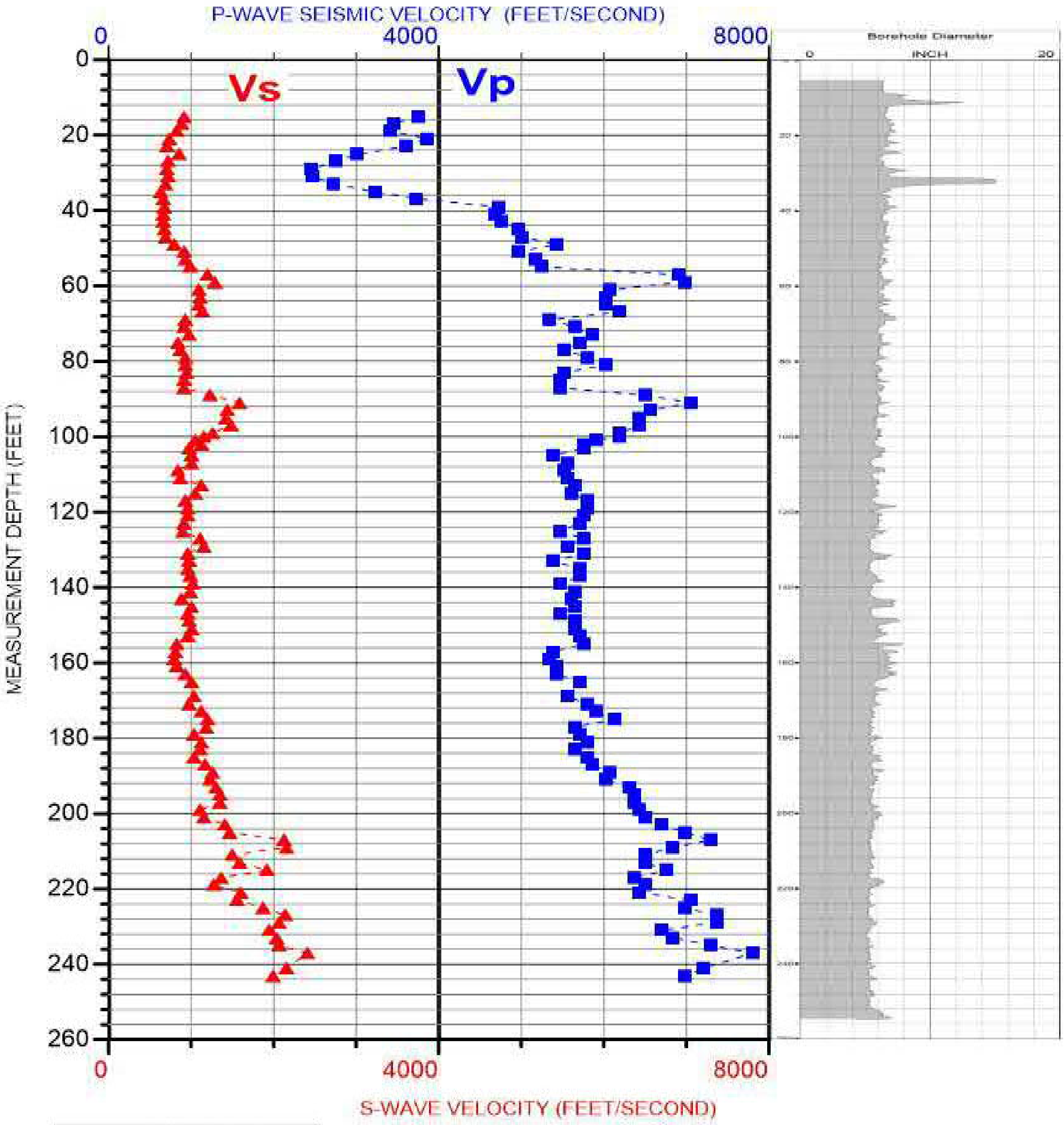
P Wave


Depth(m)
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
140.0
145.0
150.0
155.0
160.0
165.0
170.0
175.0

Borehole BH-165, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: November 18 , 2019

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
3.94	162	161	162	985	12.94	533	529	531	3232
4.29	170	174	172	962	14.07	558	570	564	3155
4.88	174	180	177	1143	16.02	570	590	580	3750
5.50	179	182	181	1047	18.04	586	599	592	3435
6.10	171	175	173	1042	20.01	562	574	568	3418
6.78	170	171	171	1235	22.25	558	562	560	4050
7.33	195	198	197	1143	24.06	641	651	646	3750
7.92	181	189	185	1163	25.99	594	621	608	3815
8.51	212	208	210	1198	27.92	695	684	689	3929
9.12	188	197	192	1198	29.92	617	646	631	3929
9.74	212	216	214	913	31.97	695	707	701	2996
10.35	198	192	195	995	33.96	651	631	641	3265
10.96	212	217	215	1000	35.96	695	713	704	3281
11.31	202	202	202	962	37.10	661	661	661	3155
11.58	197	194	195	952	38.00	646	636	641	3125
12.16	194	188	191	1064	39.89	636	617	626	3490
12.83	205	200	202	1266	42.08	672	656	664	4153
13.43	229	238	234	1149	44.07	753	781	767	3771
14.00	208	217	213	1613	45.94	684	713	698	5292
14.64	219	216	217	1639	48.02	719	707	713	5379
15.23	263	272	267	1653	49.96	863	892	877	5423
15.23	265	272	268	1587	49.96	868	892	880	5208
15.84	284	287	286	1504	51.98	932	943	937	4934
16.46	249	249	249	1695	54.00	816	816	816	5561
17.04	281	282	282	1754	55.92	922	927	924	5756
17.68	278	269	273	1724	58.02	911	882	897	5657
18.29	229	237	233	1493	60.01	753	777	765	4897
18.90	233	230	231	1667	62.01	763	756	759	5468
19.53	309	309	309	1563	64.07	1013	1013	1013	5126
20.14	267	272	270	1709	66.07	877	892	884	5608
20.72	239	239	239	1667	67.99	785	785	785	5468
21.34	236	236	236	1587	70.02	774	774	774	5208
21.94	227	228	228	1587	71.97	746	749	747	5208
22.53	234	235	234	1695	73.93	767	770	768	5561
23.19	313	313	313	1835	76.07	1025	1025	1025	6020
23.77	278	278	278	1681	77.99	911	911	911	5514
24.37	276	279	278	1786	79.94	906	916	911	5859
24.99	299	301	300	1802	82.00	982	988	985	5912
25.58	250	255	253	1653	83.93	820	837	829	5423

26.22	305	303	304	1786	86.01	1000	994	997	5859
26.81	325	327	326	1739	87.95	1065	1072	1069	5706
27.46	282	278	280	1681	90.09	927	911	919	5514
28.02	333	333	333	1786	91.94	1094	1094	1094	5859
28.68	305	305	305	1818	94.11	1000	1000	1000	5965
29.25	298	298	298	1887	95.98	976	976	976	6190
29.88	309	313	311	1818	98.03	1013	1025	1019	5965
30.50	287	286	287	1786	100.08	943	937	940	5859
31.07	342	352	347	1818	101.94	1124	1155	1139	5965
31.71	336	338	337	1835	104.03	1101	1108	1105	6020
32.31	309	313	311	1739	106.02	1013	1025	1019	5706
32.90	284	287	286	1653	107.93	932	943	937	5423
33.53	279	272	276	1739	110.01	916	892	904	5706
34.12	281	279	280	1724	111.95	922	916	919	5657
34.72	291	284	287	1639	113.90	954	932	943	5379
35.36	301	301	301	1639	116.01	988	988	988	5379
35.98	272	273	272	1724	118.05	892	896	894	5657
36.56	278	279	279	1613	119.94	911	916	914	5292
37.21	292	296	294	1739	122.07	959	971	965	5706
37.78	292	291	292	1626	123.96	959	954	957	5335
38.41	298	303	300	1639	126.01	976	994	985	5379
39.01	294	292	293	1739	128.00	965	959	962	5706
39.64	333	333	333	1852	130.04	1094	1094	1094	6076
40.24	410	403	407	2083	132.02	1345	1323	1334	6835
40.84	472	472	472	1980	133.98	1548	1548	1548	6497
41.45	526	526	526	2020	136.00	1727	1727	1727	6628
42.08	505	515	510	1852	138.06	1657	1691	1674	6076
42.67	340	355	347	1942	139.99	1116	1163	1140	6371
43.29	403	410	407	1942	142.03	1323	1345	1334	6371
43.90	463	467	465	1786	144.02	1519	1533	1526	5859
44.51	427	427	427	1980	146.04	1402	1402	1402	6497
45.11	505	500	503	2083	148.00	1657	1640	1649	6835
45.71	532	532	532	2151	149.98	1745	1745	1745	7056
46.01	538	556	547	2174	150.97	1764	1823	1793	7132
46.34	526	538	532	2041	152.04	1727	1764	1745	6696
46.47	510	505	508	2083	152.46	1674	1657	1665	6835



P- & S- SUSPENSION
WAVE VELOCITY
LEGEND

▲ - ▲ - ▲ *Vs- R1-R2 interval
■ - ■ - ■ *Vp- R1-R2 interval

*Interval velocities
should be used to
calculate elastic
moduli values

NORCAL

SUSPENSION P- AND S-WAVE VELOCITY PROFILE BOREHOLE BH-176

LOCATION: Santa Clara, California		
CLIENT: Mott MacDonald		1
JOB #: NS195051	NORCAL GEOPHYSICAL CONSULTANTS INC.	
DATE: April 20, 2020	DRAWN BY: W. HENRICH	APPROVED BY: WJH

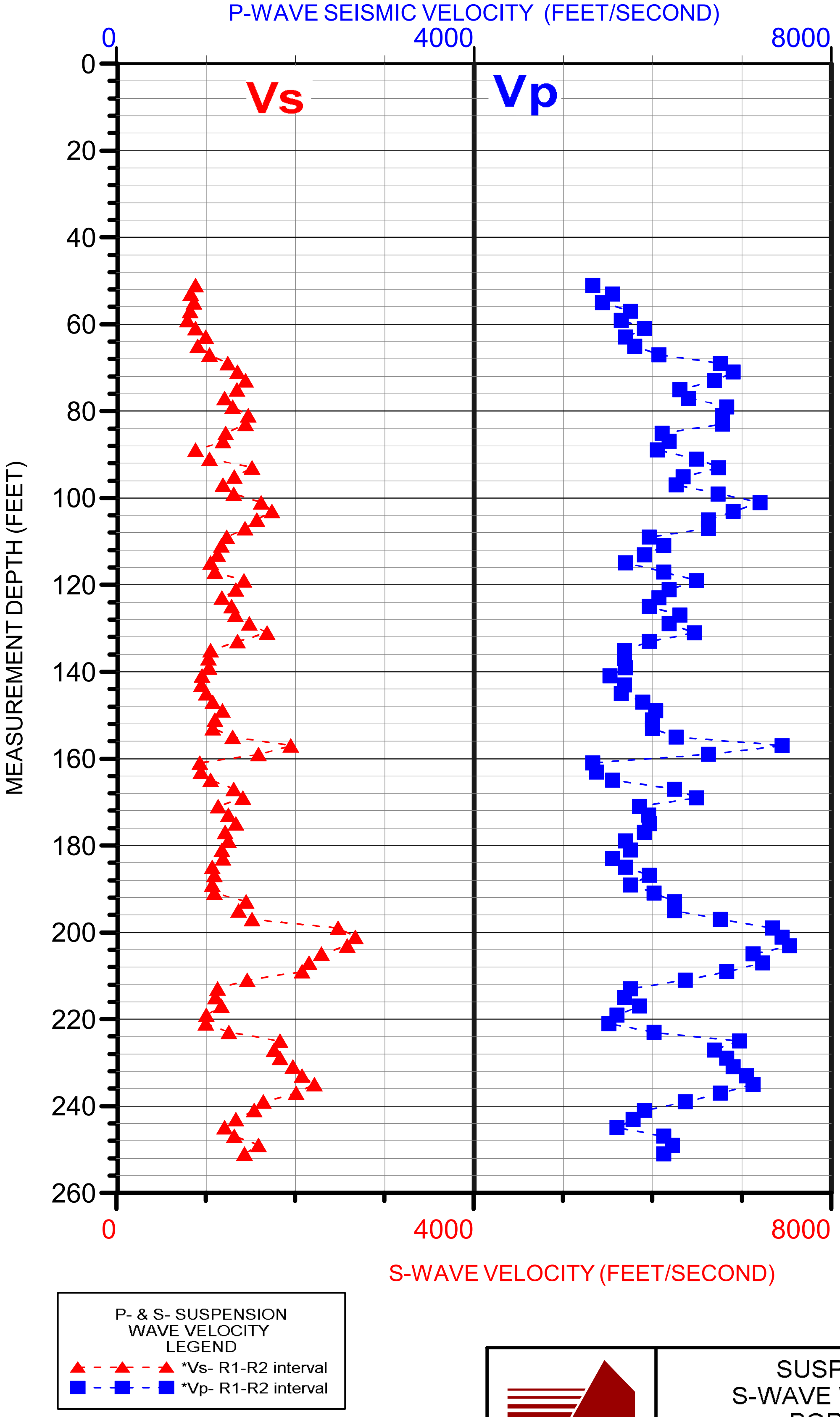
Borehole BH-176, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date:Apil 20 , 2020

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
4.59	281	281	281	1143	15.05	922	922	922	3750
5.15	270	266	268	1053	16.90	887	873	880	3454
5.79	249	253	251	1042	19.01	816	829	822	3418
6.39	223	222	223	1176	20.95	732	729	731	3860
7.00	216	216	216	1099	22.97	707	707	707	3605
7.64	259	260	260	917	25.06	850	854	852	3010
8.22	217	224	221	840	26.96	713	736	724	2757
8.85	214	221	217	746	29.03	701	726	713	2448
9.43	220	218	219	752	30.95	723	716	720	2467
10.03	212	214	213	830	32.91	695	701	698	2723
10.67	191	192	192	985	35.02	626	631	629	3232
11.25	202	200	201	1136	36.90	661	656	659	3728
11.89	207	207	207	1439	39.01	681	681	681	4721
12.48	200	205	202	1429	40.96	656	672	664	4687
13.08	204	201	202	1449	42.90	670	659	664	4755
13.72	205	206	205	1515	45.02	672	675	674	4971
14.34	210	211	211	1527	47.04	689	692	691	5009
14.93	244	244	244	1653	48.97	800	800	800	5423
15.53	279	279	279	1515	50.95	916	916	916	4971
16.16	284	284	284	1575	53.01	932	932	932	5167
16.74	299	301	300	1600	54.92	982	988	985	5249
17.38	365	368	366	2105	57.02	1197	1206	1202	6907
17.97	391	397	394	2128	58.97	1282	1302	1292	6981
18.60	333	336	334	1852	61.04	1094	1101	1097	6076
19.20	336	345	340	1835	62.99	1101	1131	1116	6020
19.82	333	336	334	1835	65.02	1094	1101	1097	6020
20.40	347	352	350	1887	66.94	1139	1155	1147	6190
21.04	282	282	282	1626	69.03	927	927	927	5335
21.61	282	279	281	1724	70.89	927	916	922	5657
22.23	296	303	299	1786	72.95	971	994	982	5859
22.86	259	258	258	1739	75.01	850	846	848	5706
23.45	263	266	265	1681	76.95	863	873	868	5514
24.07	281	291	286	1770	78.97	922	954	938	5807
24.69	282	286	284	1835	81.00	927	937	932	6020
25.29	286	289	287	1681	82.97	937	948	943	5514
25.91	278	282	280	1667	85.02	911	927	919	5468
26.53	279	278	279	1667	87.04	916	911	914	5468
27.12	376	373	375	1980	88.99	1233	1224	1229	6497
27.73	476	490	483	2151	90.97	1562	1608	1585	7056

28.34	450	431	441	2000	92.98	1478	1414	1446	6562
28.96	427	442	435	1961	95.01	1402	1452	1427	6433
29.57	446	455	450	1961	97.01	1465	1491	1478	6433
30.21	376	388	382	1887	99.10	1233	1272	1253	6190
30.44	350	357	353	1887	99.87	1147	1172	1159	6190
30.78	314	323	319	1802	100.97	1032	1058	1045	5912
31.09	347	338	343	1754	101.99	1139	1108	1124	5756
31.40	298	298	298	1754	103.01	976	976	976	5756
32.02	307	309	308	1639	105.04	1006	1013	1010	5379
32.60	303	311	307	1695	106.97	994	1019	1007	5561
33.23	254	255	254	1681	109.03	833	837	835	5514
33.84	265	266	265	1695	111.04	868	873	870	5561
34.42	342	342	342	1724	112.94	1124	1124	1124	5657
35.03	314	323	319	1709	114.92	1032	1058	1045	5608
35.64	286	284	285	1770	116.94	937	932	935	5807
36.27	291	296	293	1770	118.99	954	971	962	5807
36.86	294	294	294	1754	120.93	965	965	965	5756
37.47	276	278	277	1739	122.94	906	911	909	5706
38.13	273	275	274	1667	125.09	896	901	899	5468
38.71	336	338	337	1754	127.01	1101	1108	1105	5756
39.33	350	352	351	1695	129.04	1147	1155	1151	5561
39.93	292	294	293	1754	131.02	959	965	962	5756
40.52	298	298	298	1639	132.94	976	976	976	5379
41.16	294	294	294	1739	135.04	965	965	965	5706
41.75	305	303	304	1739	136.99	1000	994	997	5706
42.40	313	311	312	1667	139.11	1025	1019	1022	5468
42.99	301	307	304	1724	141.04	988	1006	997	5657
43.58	270	273	272	1709	142.98	887	896	892	5608
44.21	305	305	305	1724	145.04	1000	1000	1000	5657
44.82	292	298	295	1667	147.04	959	976	968	5468
45.40	298	298	298	1724	148.96	976	976	976	5657
45.99	307	311	309	1724	150.89	1006	1019	1013	5657
46.62	294	291	292	1739	152.96	965	954	959	5706
47.23	251	253	252	1754	154.96	824	829	826	5756
47.86	248	246	247	1639	157.04	812	808	810	5379
48.47	239	243	241	1626	159.02	785	796	791	5335
49.06	253	253	253	1653	160.95	829	829	829	5423
49.68	284	284	284	1653	163.01	932	932	932	5423
50.29	307	311	309	1739	165.00	1006	1019	1013	5706
51.50	318	316	317	1695	168.95	1045	1038	1042	5561
52.10	299	292	296	1770	170.94	982	959	971	5807
52.71	342	342	342	1802	172.94	1124	1124	1124	5912
53.35	370	365	368	1869	175.03	1215	1197	1206	6133
53.94	357	362	360	1724	176.97	1172	1189	1180	5657
54.57	316	318	317	1739	179.04	1038	1045	1042	5706
55.16	342	342	342	1770	180.97	1124	1124	1124	5807
55.76	338	336	337	1724	182.93	1108	1101	1105	5657

56.39	318	314	316	1770	185.02	1045	1032	1038	5807
56.99	355	357	356	1786	186.99	1163	1172	1168	5859
57.61	382	385	383	1852	189.02	1252	1262	1257	6076
58.21	373	379	376	1835	190.99	1224	1243	1233	6020
58.83	394	400	397	1923	193.01	1292	1312	1302	6309
59.44	413	413	413	1942	195.01	1356	1356	1356	6371
60.05	403	420	412	1942	197.02	1323	1379	1351	6371
60.65	336	342	339	1961	199.00	1101	1124	1112	6433
61.27	357	347	352	1980	201.02	1172	1139	1155	6497
61.85	431	427	429	2041	202.91	1414	1402	1408	6696
62.48	446	450	448	2128	205.00	1465	1478	1471	6981
63.10	641	658	649	2222	207.02	2103	2158	2131	7291
63.69	649	667	658	2083	208.96	2130	2187	2159	6835
64.31	450	463	457	1980	211.00	1478	1519	1498	6497
64.92	476	490	483	1980	213.00	1562	1608	1585	6497
65.53	588	581	585	2062	214.99	1930	1907	1919	6765
66.13	420	413	417	1942	216.97	1379	1356	1367	6371
66.72	382	394	388	1980	218.91	1252	1292	1272	6497
67.36	485	495	490	1961	221.00	1593	1624	1608	6433
67.95	472	481	476	2151	222.94	1548	1577	1562	7056
68.60	575	568	571	2128	225.07	1886	1864	1875	6981
69.19	649	658	654	2247	227.02	2130	2158	2144	7373
69.77	617	641	629	2247	228.91	2025	2103	2064	7373
70.40	588	602	595	2041	230.96	1930	1976	1953	6696
70.99	617	625	621	2083	232.91	2025	2051	2038	6835
71.63	625	633	629	2222	235.00	2051	2077	2064	7291
72.23	735	735	735	2381	236.98	2412	2412	2412	7812
73.46	641	676	658	2198	241.00	2103	2217	2160	7211
74.07	595	617	606	2128	243.02	1953	2025	1989	6981

Note: Vs/Vp values in blue shaded columns appear on the Velocity Profile Plot next sheet

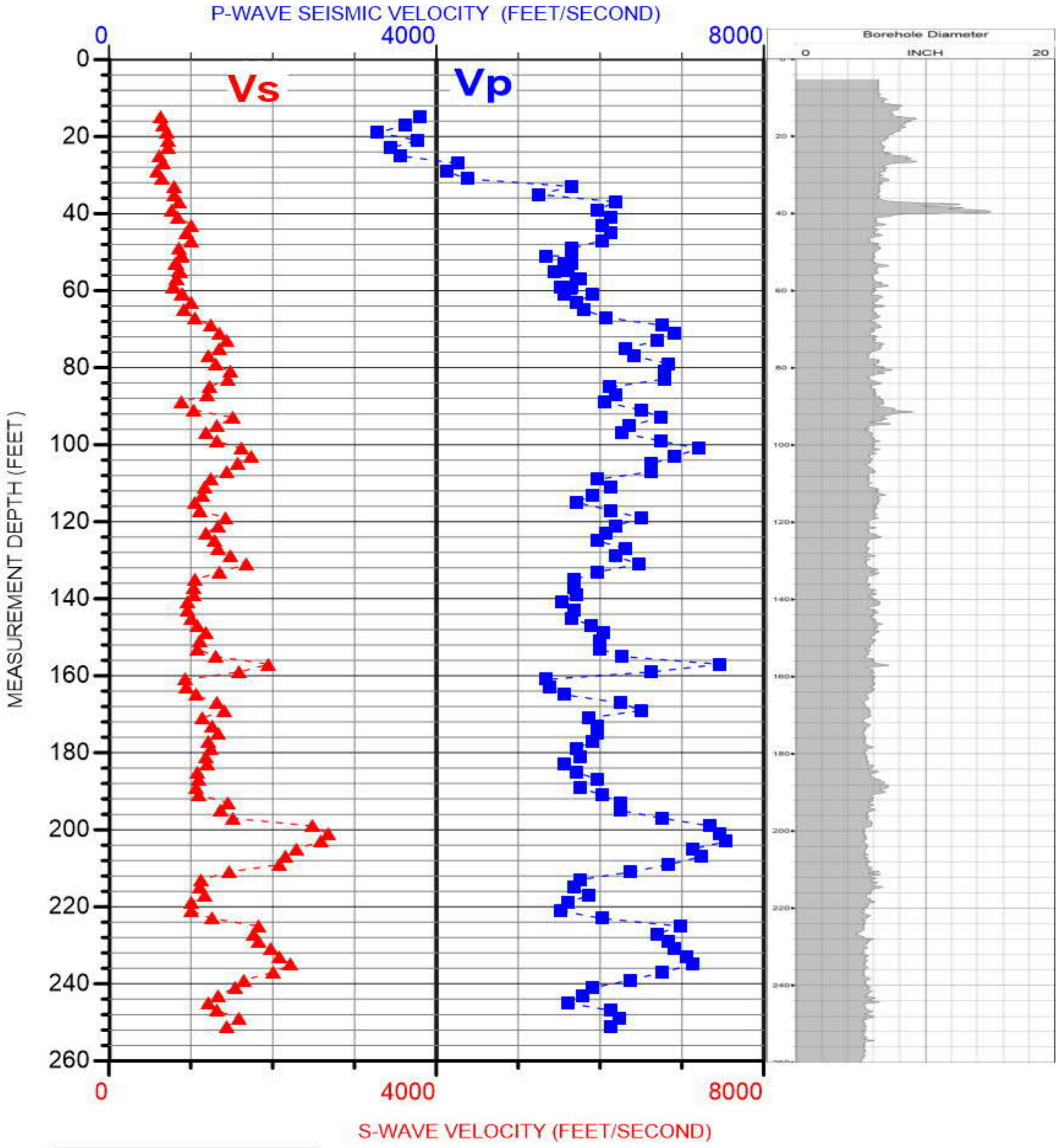


*Interval velocities should be used to calculate elastic moduli values

NORCAL

SUSPENSION P- AND S-WAVE VELOCITY PROFILE BOREHOLE BH-177

LOCATION: Santa Clara, California		
CLIENT: Mott MacDonald		1
JOB #: NS195051	NORCAL GEOPHYSICAL CONSULTANTS INC.	
DATE: April 24, 2020	DRAWN BY: W. HENRICH	APPROVED BY: WJH



*Interval velocities should be used to calculate elastic moduli values

SUSPENSION P- AND S-WAVE VELOCITY PROFILE BOREHOLE BH-177

NORCAL

LOCATION: Santa Clara, California

CLIENT: Mott MacDonald

JOB #: NS195051

NORCAL GEOPHYSICAL CONSULTANTS INC.

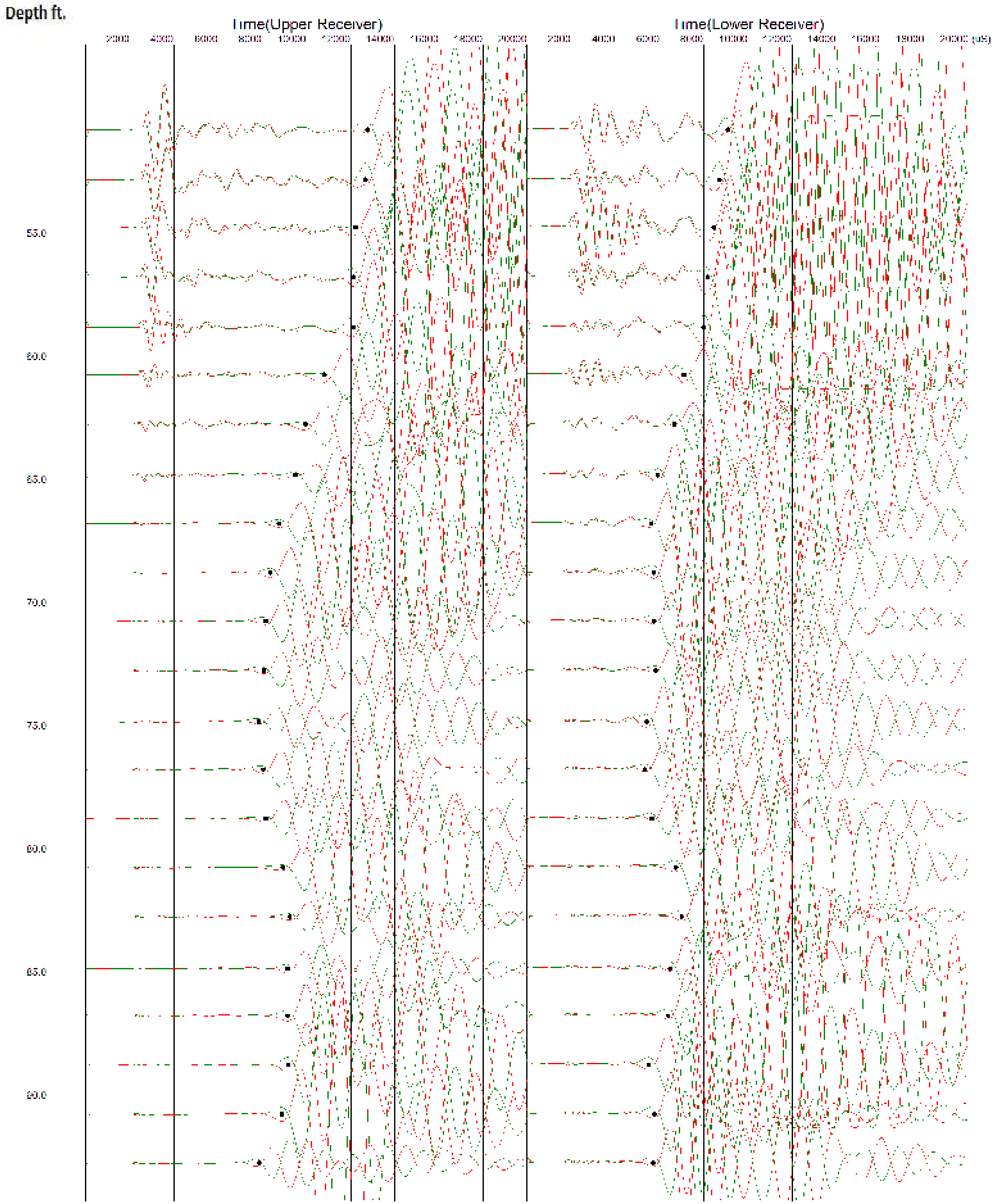
DATE: April 24, 2020

DRAWN BY: W. HENRICH

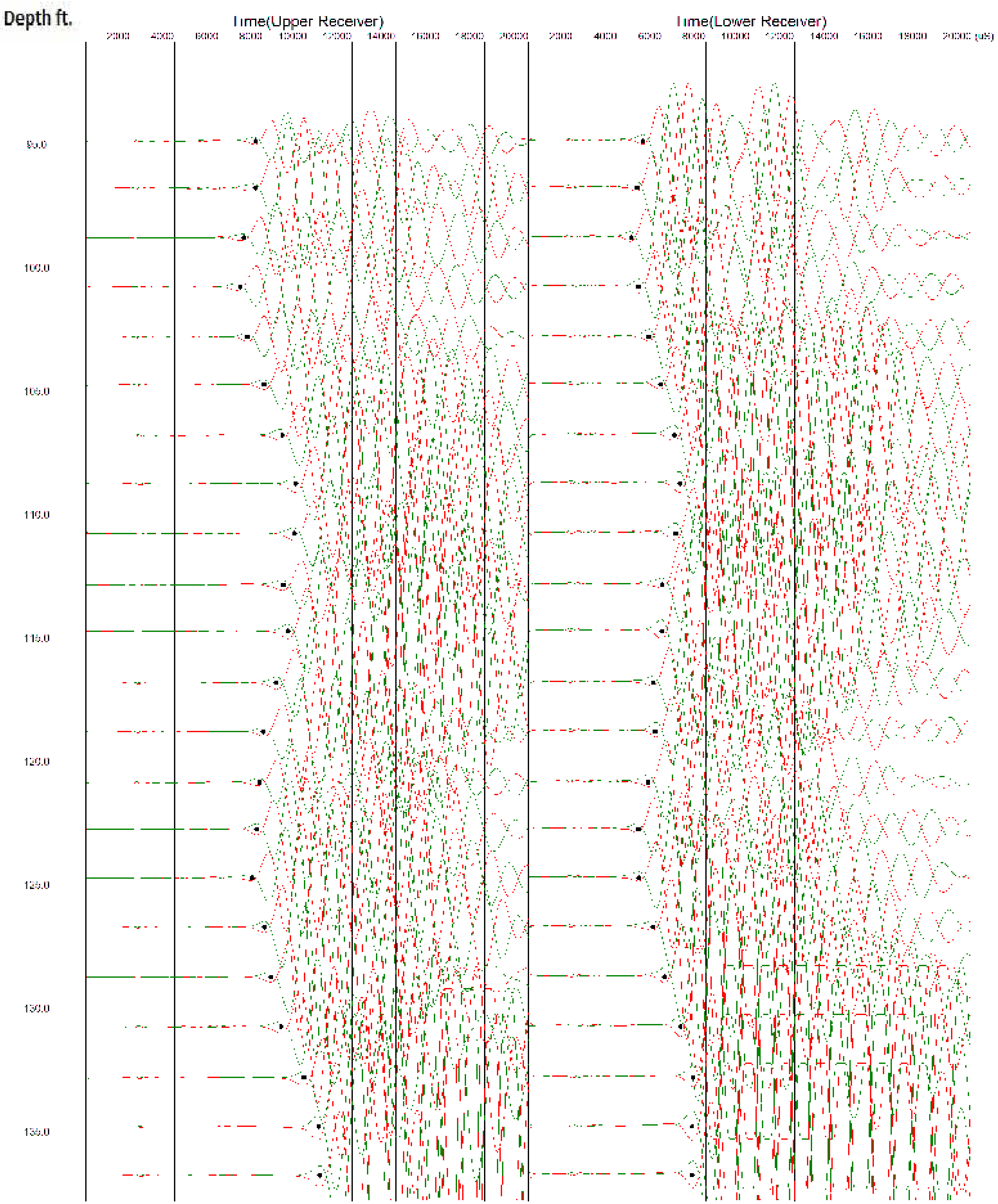
APPROVED BY: WJH

2

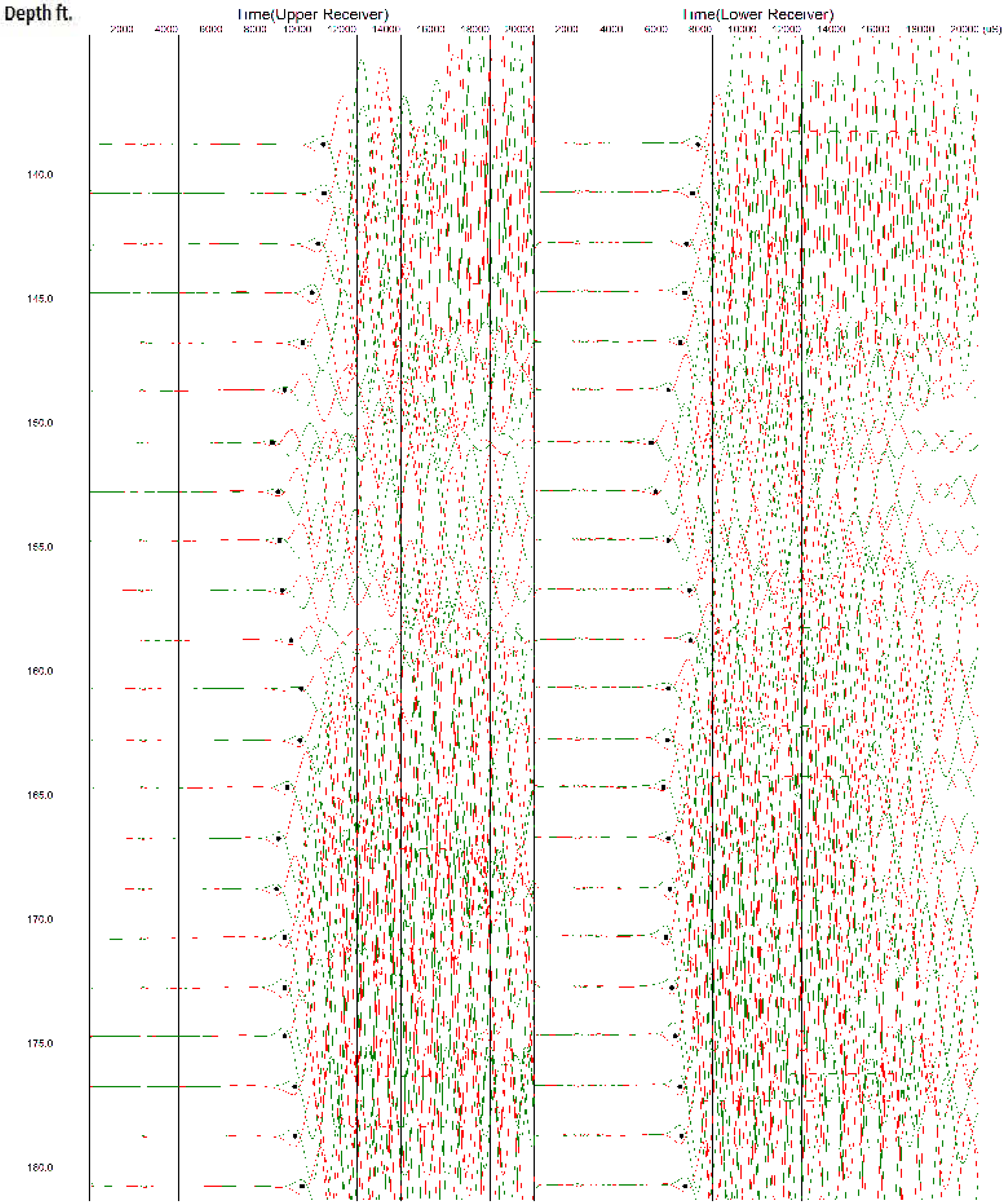
S Wave


Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
55.0
60.0
65.0
70.0
75.0
80.0
85.0
90.0

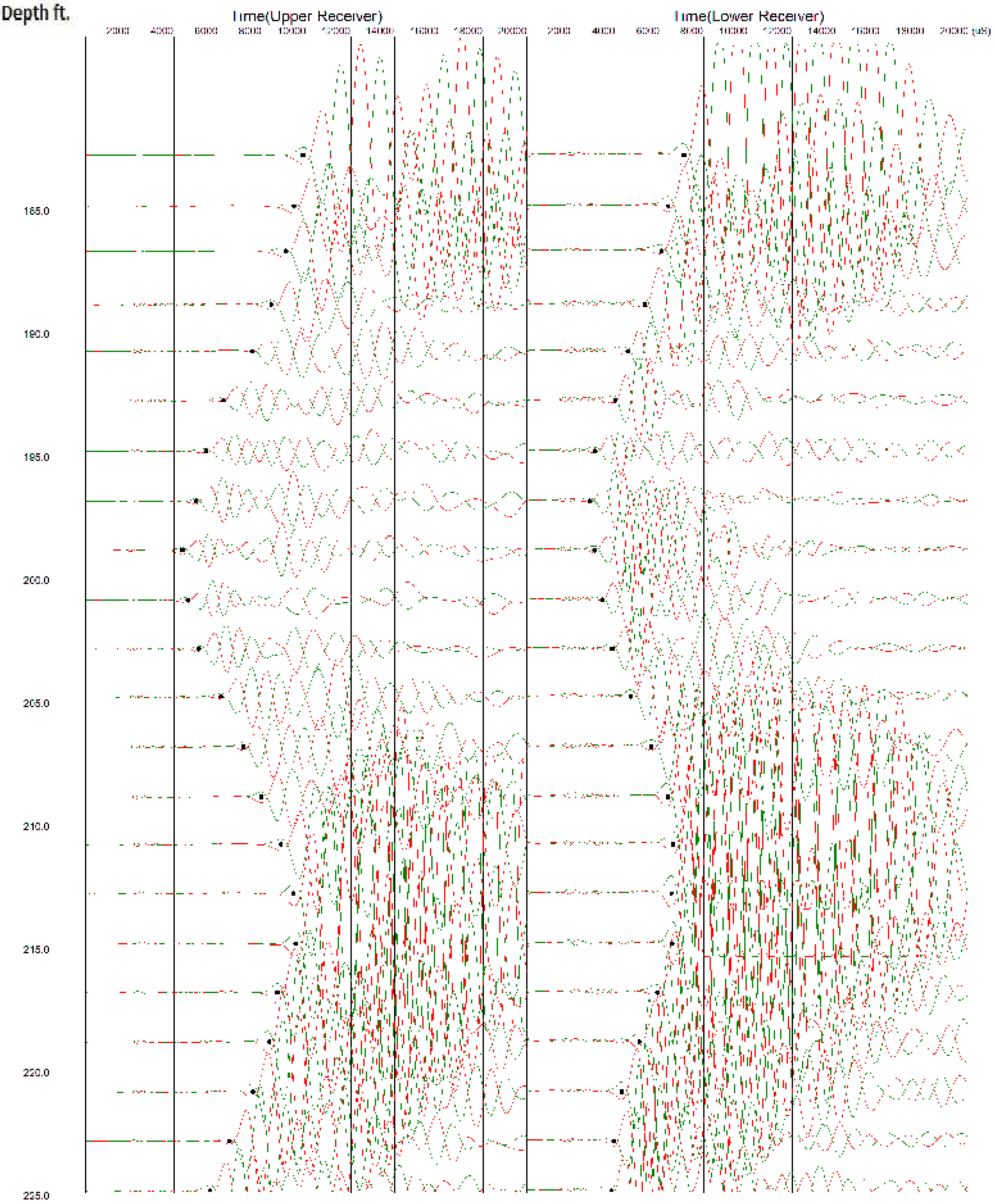
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
95.0
100.0
105.0
110.0
115.0
120.0
125.0
130.0
135.0

S Wave

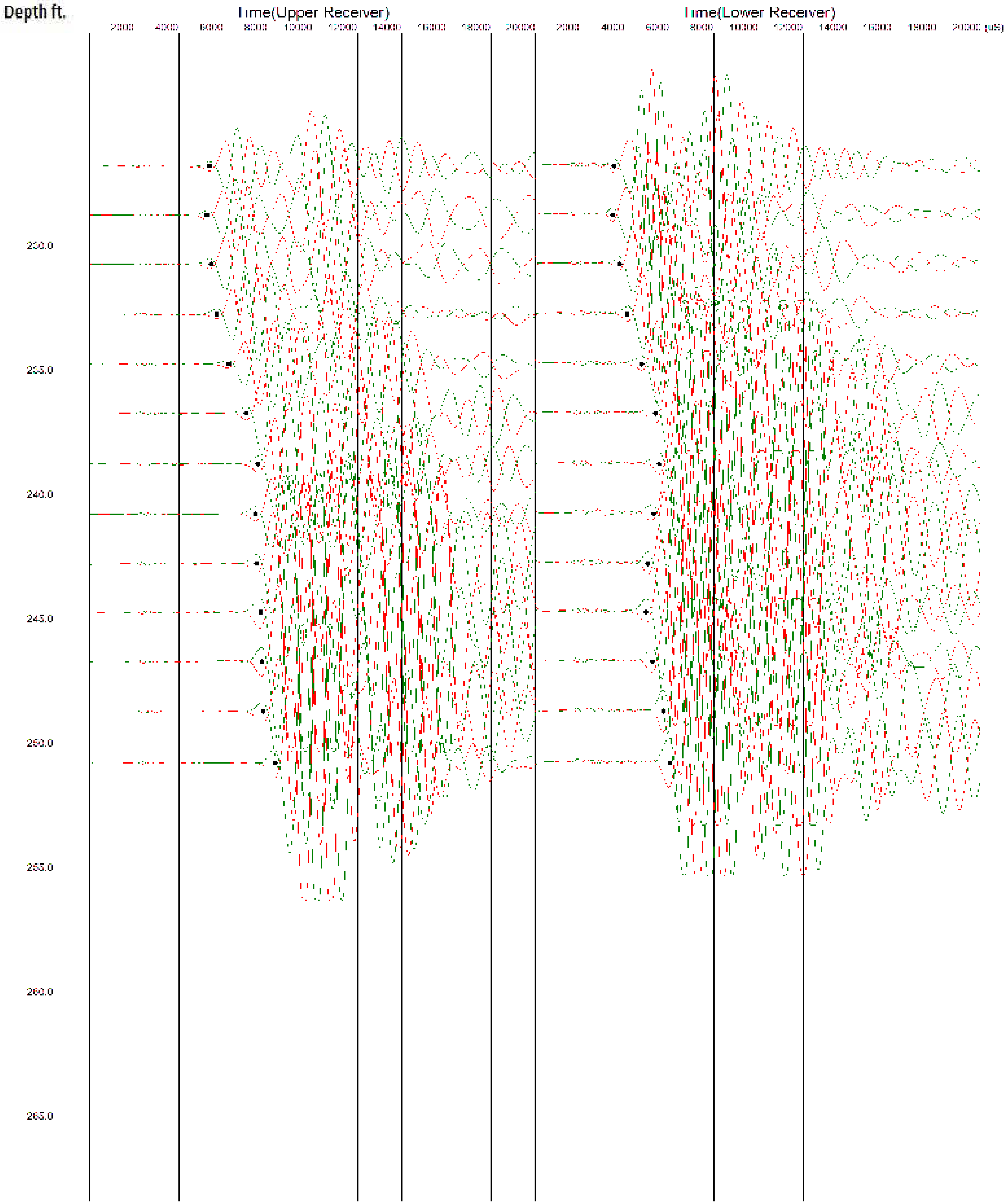

Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
140.0
145.0
150.0
155.0
160.0
165.0
170.0
175.0
180.0

S Wave



Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
185.0
190.0
195.0
200.0
205.0
210.0
215.0
220.0
225.0

S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
230.0
235.0
240.0
245.0
250.0
255.0
260.0
265.0

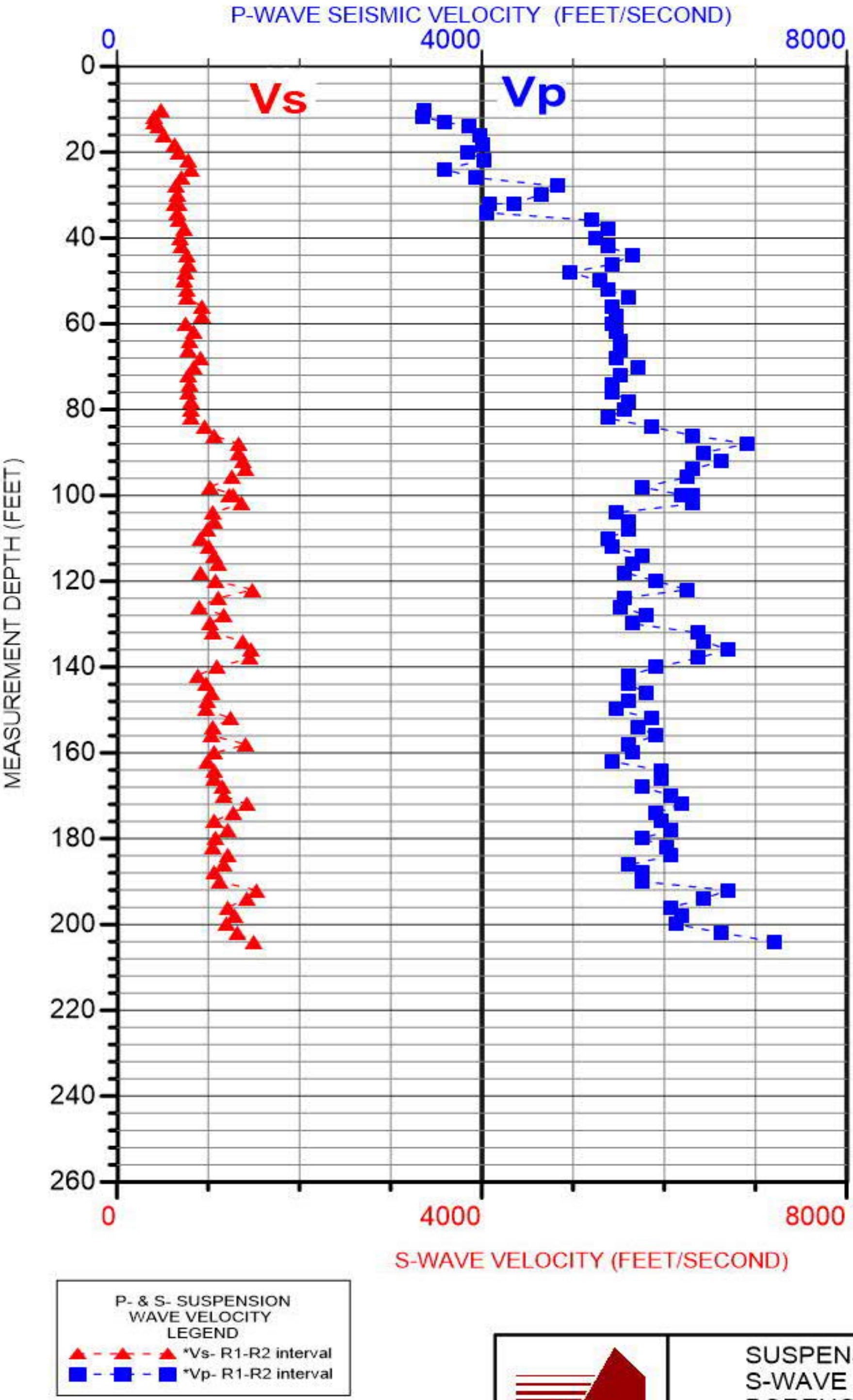
Borehole BH-177, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: Apil 24 , 2020

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
4.57	191	195	193	1156	15.00	626	641	633	3793
5.17	200	202	201	1105	16.96	656	661	659	3625
5.79	221	214	217	1000	19.00	726	701	713	3281
6.40	217	225	221	1149	21.00	713	739	726	3771
7.01	219	221	220	1047	22.99	719	726	723	3435
7.63	187	192	189	1087	25.03	612	631	622	3566
8.22	202	198	200	1299	26.98	661	651	656	4261
8.85	181	179	180	1258	29.04	594	586	590	4127
9.44	198	200	199	1333	30.98	651	656	654	4375
10.04	240	248	244	1724	32.95	789	812	800	5657
10.67	243	243	243	1600	35.01	796	796	796	5249
11.26	263	258	260	1887	36.95	863	846	854	6190
11.90	221	243	232	1818	39.05	726	796	761	5965
12.49	250	266	258	1869	40.98	820	873	846	6133
13.11	305	313	309	1835	43.02	1000	1025	1013	6020
13.72	291	287	289	1869	45.03	954	943	948	6133
14.33	313	298	305	1835	47.00	1025	976	1001	6020
14.94	263	260	262	1724	49.01	863	854	859	5657
15.54	275	266	270	1724	50.97	901	873	887	5657
15.55	270	272	271	1626	51.02	887	893	890	5335
16.14	250	240	245	1724	52.96	820	789	804	5657
16.17	256	251	253	1695	53.04	838	823	831	5561
16.75	260	258	259	1709	54.95	854	846	850	5608
16.76	264	266	265	1660	55.00	866	873	870	5445
17.36	255	253	254	1739	56.97	837	829	833	5706
17.37	251	254	253	1754	57.00	824	834	829	5756
17.99	243	234	238	1681	59.01	796	767	781	5514
18.00	242	244	243	1724	59.04	792	800	796	5657
18.57	260	287	274	1695	60.93	854	943	899	5561
18.58	272	269	270	1802	60.97	892	882	887	5912
19.20	301	309	305	1739	62.98	988	1013	1000	5706
19.82	276	280	278	1770	65.04	906	919	912	5807
20.43	318	318	318	1852	67.02	1044	1045	1045	6076
21.03	380	381	380	2062	69.01	1247	1250	1248	6765
21.63	417	410	413	2105	70.98	1367	1345	1356	6907
22.24	439	442	441	2041	72.98	1439	1452	1445	6696
22.88	407	418	412	1923	75.07	1334	1372	1353	6309
23.47	370	370	370	1953	76.99	1215	1215	1215	6408
24.08	393	401	397	2083	78.99	1288	1316	1302	6835
24.68	452	449	450	2069	80.98	1482	1473	1478	6788
25.29	444	439	441	2069	82.98	1456	1439	1448	6788
25.93	373	373	373	1863	85.08	1224	1224	1224	6113
26.51	362	366	364	1887	86.99	1189	1200	1195	6190

27.12	271	272	271	1847	88.99	888	892	890	6061
27.74	316	319	317	1980	91.00	1037	1045	1041	6497
28.34	463	463	463	2056	92.98	1518	1519	1518	6746
28.99	401	405	403	1935	95.11	1316	1330	1323	6350
29.57	362	364	363	1911	97.01	1189	1195	1192	6269
30.18	397	403	400	2053	99.03	1303	1324	1313	6737
30.79	490	500	495	2198	101.03	1608	1640	1624	7211
31.42	532	532	532	2105	103.07	1745	1745	1745	6907
32.00	467	490	479	2020	104.98	1533	1608	1571	6628
32.62	420	459	439	2020	107.03	1379	1505	1442	6628
33.22	376	379	377	1818	108.99	1233	1243	1238	5965
33.84	357	360	358	1869	111.02	1172	1180	1176	6133
34.47	347	345	346	1802	113.09	1139	1131	1135	5912
35.04	323	321	322	1739	114.96	1058	1052	1055	5706
35.68	336	338	337	1869	117.06	1101	1108	1105	6133
36.28	427	442	435	1980	119.04	1402	1452	1427	6497
36.91	417	400	408	1887	121.09	1367	1312	1340	6190
37.49	365	355	360	1852	123.00	1197	1163	1180	6076
38.09	403	385	394	1818	124.97	1323	1262	1292	5965
38.70	401	410	405	1923	126.96	1316	1345	1330	6309
39.31	449	457	453	1887	128.98	1473	1500	1487	6190
39.93	514	514	514	1974	130.99	1685	1685	1685	6475
40.56	410	417	413	1818	133.06	1345	1367	1356	5965
41.16	322	321	321	1734	135.05	1056	1052	1054	5689
41.76	314	316	315	1734	137.02	1030	1038	1034	5689
42.38	313	321	317	1739	139.05	1025	1054	1040	5706
42.97	292	292	292	1685	140.99	957	957	957	5530
43.60	290	292	291	1734	143.05	950	957	954	5689
44.20	307	307	307	1724	145.02	1008	1008	1008	5657
44.81	332	328	330	1796	147.03	1089	1075	1082	5894
45.40	359	364	361	1840	148.94	1177	1195	1186	6038
46.04	336	338	337	1829	151.06	1103	1108	1106	6002
46.64	332	328	330	1829	153.03	1089	1075	1082	6002
47.24	399	395	397	1911	155.00	1309	1295	1302	6269
47.86	581	610	596	2273	157.01	1908	2001	1954	7457
48.47	485	485	485	2020	159.02	1593	1593	1593	6628
49.06	286	286	286	1626	160.97	937	937	937	5335
49.70	287	289	288	1639	163.05	943	948	946	5379
50.28	318	327	323	1695	164.95	1045	1072	1059	5561
50.91	400	400	400	1905	167.02	1312	1312	1312	6249
51.52	435	427	431	1980	169.04	1426	1402	1414	6497
52.11	352	342	347	1786	170.98	1155	1124	1139	5859
52.73	387	378	383	1818	173.01	1270	1240	1257	5965
53.33	413	403	408	1818	174.96	1356	1323	1339	5965
53.95	370	373	372	1802	176.99	1215	1224	1220	5912
54.56	382	382	382	1739	178.99	1252	1252	1252	5706
55.17	352	368	360	1754	181.01	1155	1206	1181	5756
55.77	370	357	364	1695	182.97	1215	1172	1193	5561
56.40	327	329	328	1739	185.05	1072	1079	1076	5706
56.96	336	333	334	1818	186.87	1101	1094	1097	5965
57.62	327	327	327	1754	189.05	1072	1072	1072	5756

58.20	336	333	334	1835	190.95	1101	1094	1097	6020
58.81	448	437	443	1905	192.95	1471	1433	1452	6249
59.43	410	424	417	1905	195.00	1345	1390	1367	6249
60.05	455	472	463	2062	197.02	1491	1548	1519	6765
60.66	758	758	758	2239	199.02	2486	2486	2486	7345
61.28	833	798	816	2273	201.04	2734	2618	2676	7457
61.89	781	794	787	2299	203.04	2563	2604	2584	7542
62.48	685	714	700	2174	204.98	2247	2344	2295	7132
63.10	658	658	658	2206	207.01	2158	2158	2158	7237
63.72	649	617	633	2083	209.05	2130	2025	2078	6835
64.30	450	442	446	1942	210.97	1478	1452	1465	6371
64.91	342	347	345	1754	212.96	1124	1139	1131	5756
65.53	336	342	339	1734	215.01	1101	1124	1112	5689
66.14	357	360	358	1786	217.00	1172	1180	1176	5859
66.75	307	309	308	1709	218.99	1006	1013	1010	5608
67.37	311	299	305	1681	221.03	1019	982	1001	5514
67.98	379	391	385	1835	223.03	1243	1282	1262	6020
68.59	562	556	559	2128	225.04	1843	1823	1833	6981
69.20	532	543	538	2041	227.04	1745	1783	1764	6696
69.80	556	562	559	2083	229.01	1823	1843	1833	6835
70.40	588	617	603	2105	230.98	1930	2025	1978	6907
71.02	633	633	633	2151	233.00	2077	2077	2077	7056
71.63	676	676	676	2174	235.01	2217	2217	2217	7132
72.24	602	625	614	2062	237.00	1976	2051	2014	6765
72.86	505	500	503	1942	239.03	1657	1640	1649	6371
73.46	459	481	470	1802	241.02	1505	1577	1541	5912
74.07	410	407	408	1765	243.02	1345	1334	1339	5790
74.67	368	370	369	1709	244.98	1206	1215	1211	5608
75.27	407	400	403	1869	246.96	1334	1312	1323	6133
75.88	484	485	485	1899	248.97	1588	1593	1590	6230
76.52	442	431	437	1869	251.04	1452	1414	1433	6133

Note: Vs/Vp values in blue shaded columns appear on the Velocity Profile Plot next sheet



*Interval velocities should be used to calculate elastic moduli values

NORCAL

SUSPENSION P- AND
S-WAVE VELOCITY PROFILE
BOREHOLE BH-178

LOCATION: Santa Clara, California

CLIENT: Mott MacDonald

JOB #: NS195051

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: April 30, 2020

DRAWN BY: W. HENRICH

APPROVED BY: WJH

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Borehole BH-178, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: April 30 , 2020

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
3.13	147	147	147	1026	10.26	482	482	482	3365
3.59	123	129	126	1020	11.77	404	423	413	3348
3.96	124	123	124	1093	12.99	408	404	406	3586
4.25	137	141	139	1176	13.94	451	463	457	3860
4.89	156	156	156	1212	16.06	513	513	513	3977
5.57	189	197	193	1220	18.28	621	646	634	4001
6.10	210	205	208	1170	20.00	689	672	681	3837
6.64	225	248	236	1227	21.80	739	812	776	4026
7.30	243	248	245	1093	23.96	796	812	804	3586
7.91	216	217	216	1198	25.94	707	713	710	3929
8.51	203	192	198	1471	27.92	667	631	649	4825
9.08	203	202	202	1418	29.79	667	661	664	4654
9.77	208	203	206	1325	32.05	684	667	675	4346
9.77	193	197	195	1242	32.05	633	646	640	4076
10.39	199	207	203	1235	34.09	654	678	666	4050
10.94	208	208	208	1587	35.90	684	684	684	5208
11.57	223	224	224	1639	37.95	732	736	734	5379
12.19	210	210	210	1600	39.99	689	689	689	5249
12.81	218	216	217	1639	42.04	716	710	713	5379
13.41	231	233	232	1724	43.99	759	763	761	5657
14.06	236	237	236	1653	46.12	774	777	776	5423
14.63	228	230	229	1515	47.99	749	756	753	4971
15.25	226	227	227	1613	50.03	742	746	744	5292
15.86	231	234	233	1639	52.02	759	767	763	5379
16.43	235	236	235	1709	53.92	770	774	772	5608
17.06	281	286	283	1653	55.98	922	937	930	5423
17.71	281	282	282	1667	58.11	922	927	924	5468
18.32	228	230	229	1653	60.09	749	756	753	5423
18.89	254	258	256	1667	61.96	833	846	839	5468
19.48	239	244	242	1681	63.90	785	800	793	5514
20.13	239	240	240	1681	66.04	785	789	787	5514
20.73	276	279	278	1667	68.02	906	916	911	5468
21.34	259	255	257	1739	70.03	850	837	843	5706
21.94	235	238	236	1681	71.97	770	781	776	5514
22.56	242	246	244	1653	74.03	792	808	800	5423
23.13	238	238	238	1653	75.89	781	781	781	5423
23.78	248	249	248	1709	78.03	812	816	814	5608
24.39	245	246	246	1695	80.01	804	808	806	5561
24.99	245	249	247	1639	82.00	804	816	810	5379

25.60	296	291	293	1786	83.99	971	954	962	5859
26.22	325	321	323	1923	86.04	1065	1052	1058	6309
26.82	407	407	407	2105	87.98	1334	1334	1334	6907
27.44	410	403	407	1961	90.02	1345	1323	1334	6433
28.04	417	420	418	2020	92.01	1367	1379	1373	6628
28.62	431	431	431	1923	93.89	1414	1414	1414	6309
29.20	388	379	383	1905	95.79	1272	1243	1257	6249
29.89	314	309	312	1754	98.08	1032	1013	1022	5756
30.44	391	391	391	1887	99.86	1282	1282	1282	6190
30.45	373	379	376	1923	99.90	1224	1243	1233	6309
31.07	413	420	417	1923	101.95	1356	1379	1367	6309
31.71	316	321	318	1667	104.04	1038	1052	1045	5468
32.31	327	321	324	1709	105.99	1072	1052	1062	5608
32.92	301	305	303	1709	108.02	988	1000	994	5608
33.54	276	278	277	1639	110.03	906	911	909	5379
34.13	303	307	305	1653	111.97	994	1006	1000	5423
34.75	327	323	325	1754	114.00	1072	1058	1065	5756
35.37	331	342	337	1724	116.04	1086	1124	1105	5657
35.95	278	279	279	1695	117.96	911	916	914	5561
36.57	329	327	328	1802	119.97	1079	1072	1076	5912
37.17	455	455	455	1905	121.96	1491	1491	1491	6249
37.77	342	338	340	1695	123.91	1124	1108	1116	5561
38.39	278	275	276	1681	125.97	911	901	906	5514
39.00	355	357	356	1770	127.96	1163	1172	1168	5807
39.60	311	311	311	1724	129.92	1019	1019	1019	5657
40.24	321	316	318	1942	132.03	1052	1038	1045	6371
40.84	417	424	420	1961	134.00	1367	1390	1379	6433
41.45	442	450	446	2041	135.98	1452	1478	1465	6696
42.03	442	446	444	1942	137.89	1452	1465	1458	6371
42.69	336	336	336	1802	140.05	1101	1101	1101	5912
43.27	267	269	268	1709	141.98	877	882	880	5608
43.89	296	301	299	1709	144.01	971	988	979	5608
44.51	314	314	314	1770	146.04	1032	1032	1032	5807
45.10	303	299	301	1709	147.97	994	982	988	5608
45.69	299	298	299	1667	149.90	982	976	979	5468
46.33	379	385	382	1786	152.00	1243	1262	1252	5859
46.94	321	323	322	1739	153.99	1052	1058	1055	5706
47.53	316	316	316	1802	155.95	1038	1038	1038	5912
48.17	435	427	431	1709	158.05	1426	1402	1414	5608
48.77	327	327	327	1724	160.02	1072	1072	1072	5657
49.38	301	299	300	1653	162.00	988	982	985	5423
50.02	325	329	327	1818	164.10	1065	1079	1072	5965
50.59	327	323	325	1818	165.99	1072	1058	1065	5965
51.19	352	355	353	1754	167.94	1155	1163	1159	5756
51.81	357	357	357	1852	169.99	1172	1172	1172	6076
52.41	435	431	433	1887	171.94	1426	1414	1420	6190
53.02	388	388	388	1802	173.96	1272	1272	1272	5912

53.64	323	325	324	1818	175.99	1058	1065	1062	5965
54.27	370	370	370	1852	178.04	1215	1215	1215	6076
54.83	331	331	331	1754	179.89	1086	1086	1086	5756
55.48	316	323	320	1835	182.03	1038	1058	1048	6020
56.07	373	370	372	1852	183.97	1224	1215	1220	6076
56.73	360	355	357	1709	186.11	1180	1163	1172	5608
57.28	327	327	327	1754	187.92	1072	1072	1072	5756
57.91	345	340	342	1754	190.01	1131	1116	1124	5756
58.53	463	467	465	2041	192.02	1519	1533	1526	6696
59.13	435	431	433	1961	193.99	1426	1414	1420	6433
59.74	373	370	372	1852	196.00	1224	1215	1220	6076
60.37	391	400	395	1887	198.06	1282	1312	1297	6190
60.95	373	355	364	1869	199.96	1224	1163	1194	6133
61.55	400	400	400	2020	201.95	1312	1312	1312	6628
62.20	463	455	459	2198	204.07	1519	1491	1505	7211

Note: Vs/Vp values in blue shaded columns appear on the Velocity Profile Plot next sheet

NORCAL GEOPHYSICAL CONSULTANTS, INC.

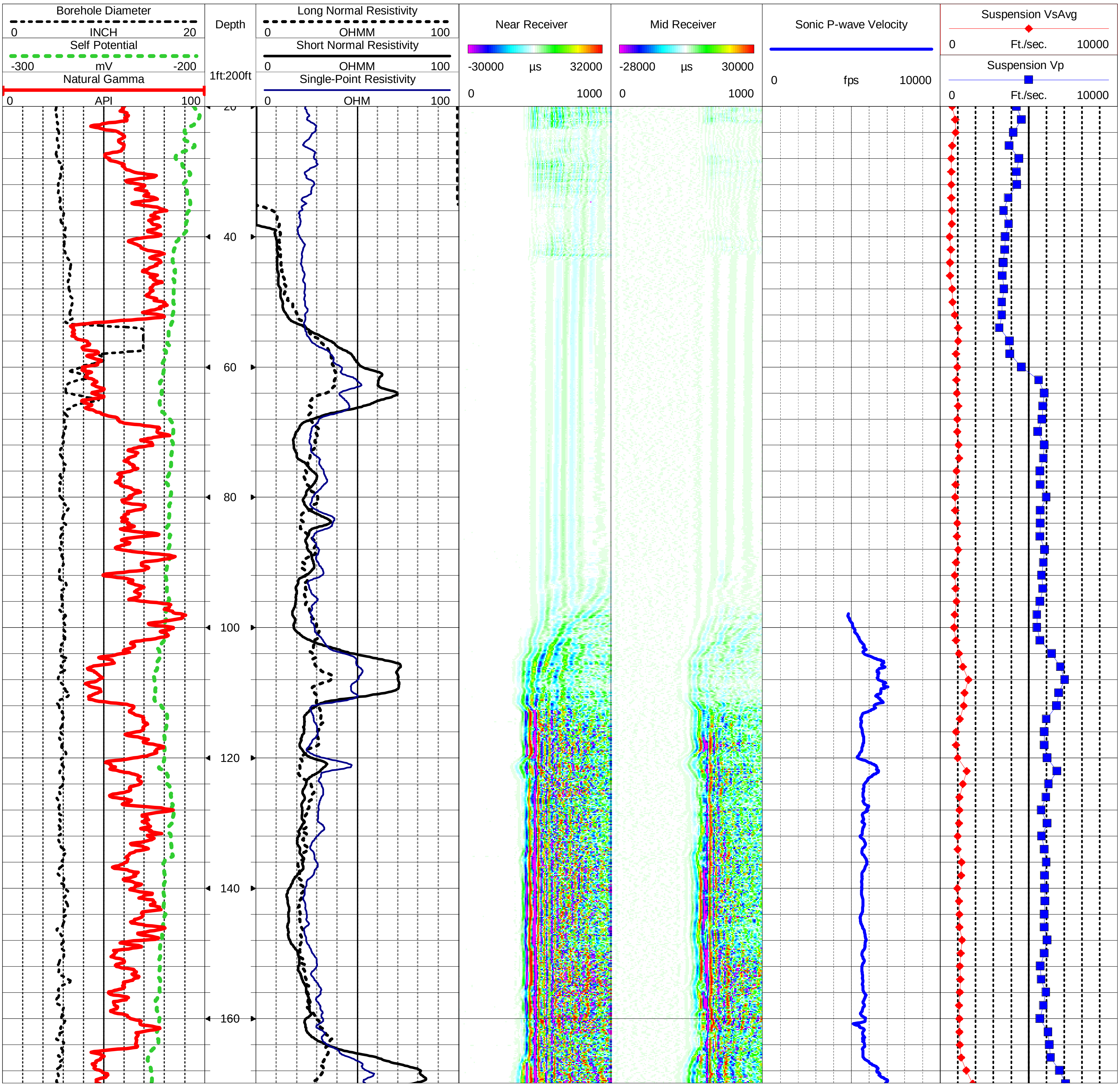
E-log-Gamma, Sonic
PS-wave Suspension
Summary Log Plot

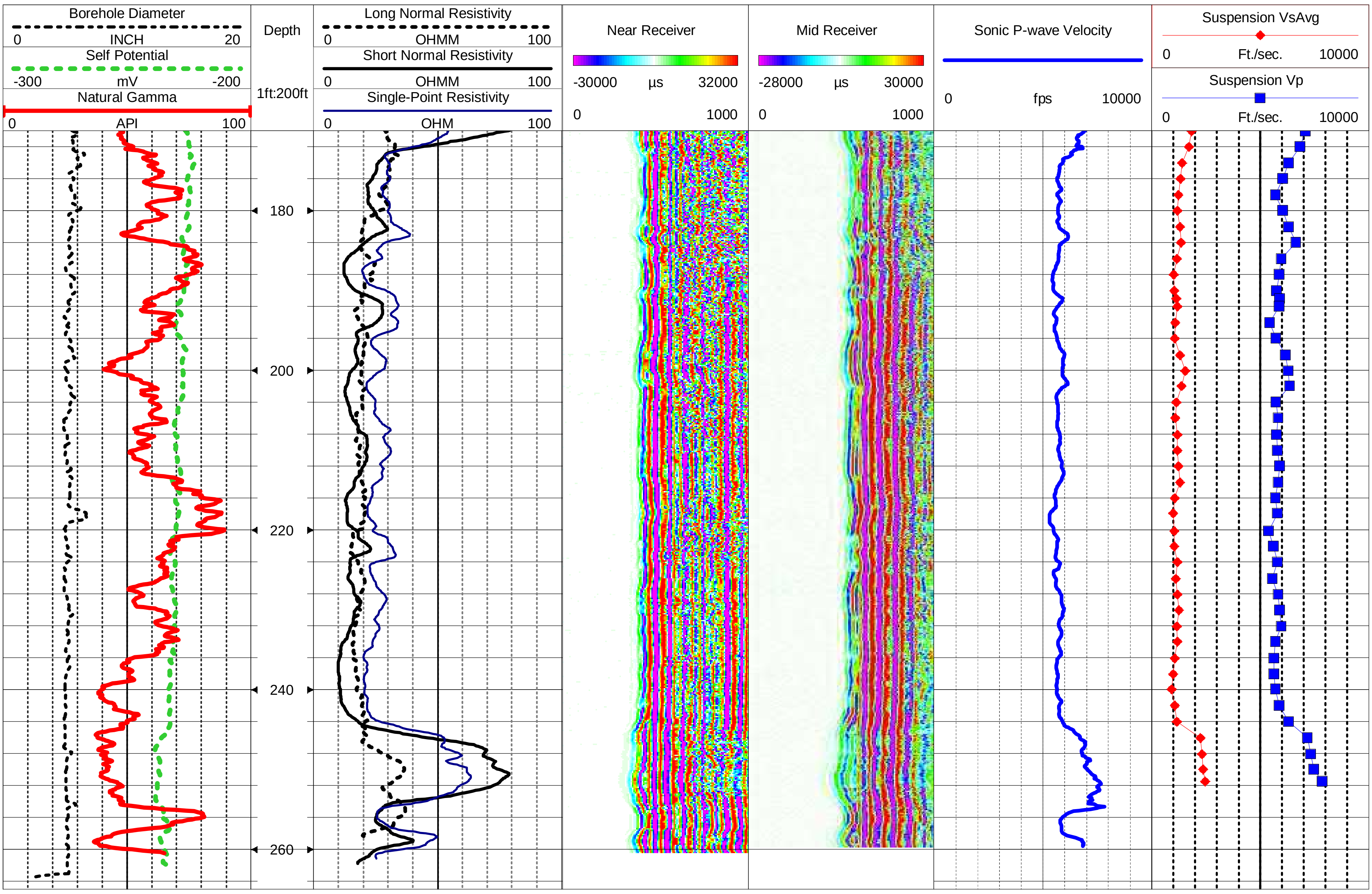
COMPANY	Mott MacDonald Wong JV
WELL ID	BH-179
FIELD	BART Silicon Valley II
COUNTRY	USA
STATE	CA
LOCATION	475 E. Santa Clara Street
OTHER SERVICES	
SEC	
TWP	
RGE	

CO **MMW JV**
WELL **BH-179**
FLD **BSVII**
CTY **San Jose**
STE **CA**
FILING No **NS195051**

PERMANENT DATUM	Pavement	ELEVATION	K.B.
LOG MEAS. FROM		ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM			G.L.
DATE	OCtober 23, 2020	TYPE FLUID IN HOLE	SLURRY
RUN No	Runs-1, 2 and 3	SALINITY	
TYPE LOG	E-log-Gamma, Sonic, PS-wave Susp.	DENSITY	
DEPTH-DRILLER	265	LEVEL	5
DEPTH-LOGGER	264	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	265		
TOP LOGGED INTERVAL	10		
OPERATING RIG TIME	1		
RECORDED BY	W HENRICH		
WITNESSED BY	Laren Cz		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	6	0	10	5.5	STEEL	0	10
2	4 7/8"	10	265				




Borehole Diameter
0 INCH 20
Self Potential
-300 mV -200
Natural Gamma
0 API 100
Depth
1ft:200ft
180
200
220
240
260
Long Normal Resistivity
0 OHMM 100
Short Normal Resistivity
0 OHMM 100
Single-Point Resistivity
0 OHM 100
Near Receiver
-30000 µs 32000
0 1000
Mid Receiver
-28000 µs 30000
0 1000
Sonic P-wave Velocity
0 fps 10000
Suspension VsAvg
0 Ft./sec. 10000
Suspension Vp
0 Ft./sec. 10000

Borehole BH-179, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II
CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: October 23, 2020

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
3.07	184	192	188	990	10.08	603	631	617	3248
3.66	180	172	176	957	12.02	590	566	578	3140
4.27	188	187	187	1170	14.02	617	612	614	3837
4.88	181	181	181	1099	16.01	594	594	594	3605
5.50	200	207	203	1351	18.06	656	678	667	4434
6.10	197	195	196	1307	20.00	646	641	643	4289
6.72	243	255	249	1399	22.04	796	837	817	4589
7.32	255	258	256	1258	24.03	837	846	841	4127
7.93	192	200	196	1183	26.01	631	656	644	3883
8.54	187	185	186	1351	28.02	612	608	610	4434
9.15	185	179	182	1307	30.01	608	586	597	4289
9.76	180	184	182	1316	32.02	590	603	597	4317
10.37	191	185	188	1170	34.02	626	608	617	3837
10.97	192	192	192	1087	36.00	631	631	631	3566
11.59	188	195	192	1176	38.03	617	641	629	3860
12.20	152	153	153	1117	40.02	500	503	502	3666
12.80	177	177	177	1111	41.99	582	582	582	3645
13.40	156	169	163	1081	43.98	513	554	533	3547
13.42	162	167	165	1087	44.02	533	547	540	3566
14.02	163	161	162	1070	46.00	536	529	533	3509
14.63	197	197	197	1099	48.01	646	646	646	3605
15.25	205	205	205	1058	50.04	672	672	672	3472
15.86	243	240	242	1064	52.02	796	789	793	3490
16.46	305	305	305	1015	53.99	1000	1000	1000	3331
17.07	301	298	299	1190	56.01	988	976	982	3906
17.68	269	269	269	1198	58.02	882	882	882	3929
18.29	291	291	291	1399	60.02	954	954	954	4589
18.90	269	275	272	1695	62.02	882	901	892	5561
19.51	278	284	281	1786	64.00	911	932	922	5859
20.12	313	338	325	1739	66.02	1025	1108	1067	5706
20.12	305	307	306	1765	66.02	1000	1008	1004	5790
20.74	285	290	287	1754	68.03	936	950	943	5756
21.31	285	286	286	1676	69.93	936	939	937	5499
21.94	311	310	311	1786	71.98	1021	1017	1019	5859
22.56	315	319	317	1775	74.01	1034	1047	1040	5824
23.16	271	270	270	1714	76.00	888	885	887	5624
23.79	252	258	255	1724	78.04	826	846	836	5657
24.38	249	250	250	1829	79.99	817	820	819	6002

24.99	249	251	250	1724	81.98	817	823	820	5657
25.60	291	291	291	1724	84.00	954	954	954	5657
26.21	275	281	278	1714	86.00	901	922	911	5624
26.83	301	299	300	1796	88.03	988	980	984	5894
27.44	269	268	268	1775	90.04	882	879	880	5824
28.04	246	248	247	1744	92.01	807	812	809	5722
28.65	260	262	261	1765	94.00	854	860	857	5790
29.26	269	270	269	1714	96.00	882	885	884	5624
29.88	244	246	245	1667	98.03	799	807	803	5468
30.47	231	234	233	1667	99.96	759	769	764	5468
30.48	230	233	231	1667	99.99	755	764	759	5468
31.08	264	262	263	1714	101.98	866	860	863	5624
31.70	313	321	317	1911	104.01	1025	1052	1038	6269
32.31	387	387	387	2069	105.99	1268	1268	1268	6788
32.92	472	481	476	2143	108.02	1548	1577	1562	7030
33.53	417	417	417	2041	110.02	1367	1367	1367	6696
34.14	393	399	396	2000	112.02	1288	1309	1299	6562
34.75	335	330	333	1829	114.02	1099	1084	1091	6002
35.36	266	267	266	1786	116.02	873	876	874	5859
35.97	267	269	268	1786	118.01	876	882	879	5859
36.58	288	296	292	1840	120.00	946	973	960	6038
37.19	441	452	446	2013	122.02	1447	1482	1465	6606
37.79	381	391	386	1863	123.99	1249	1282	1265	6113
38.41	326	323	325	1818	126.02	1070	1061	1065	5965
39.01	322	322	322	1734	128.00	1056	1056	1056	5689
39.63	315	316	316	1840	130.01	1034	1038	1036	6038
40.24	300	298	299	1744	132.02	984	976	980	5722
40.85	295	293	294	1786	134.01	969	961	965	5859
41.45	357	362	360	1829	136.00	1172	1189	1180	6002
42.07	350	355	353	1796	138.02	1150	1166	1158	5894
42.67	290	291	290	1796	139.99	950	954	952	5894
43.28	319	322	321	1807	142.01	1047	1056	1052	5929
43.90	326	326	326	1786	144.03	1070	1070	1070	5859
44.50	322	325	323	1786	146.00	1056	1065	1061	5859
45.10	366	377	371	1840	147.97	1200	1237	1218	6038
45.72	347	349	348	1786	149.99	1139	1144	1142	5859
46.31	330	336	333	1724	151.93	1084	1103	1094	5657
46.94	339	344	342	1734	154.00	1113	1129	1121	5689
47.54	332	333	333	1818	155.98	1089	1094	1091	5965
48.15	316	321	318	1775	157.99	1038	1052	1045	5824
48.77	322	322	322	1714	160.00	1056	1056	1056	5624
49.39	326	326	326	1852	162.03	1070	1070	1070	6076
49.99	335	335	335	1875	164.00	1099	1099	1099	6152
50.60	357	357	357	1899	166.00	1172	1172	1172	6230
51.20	444	446	445	2055	167.99	1456	1465	1460	6742
51.82	556	556	556	2158	170.02	1823	1823	1823	7081

52.42	514	521	517	2083	172.00	1685	1709	1697	6835
53.03	417	424	420	1923	173.99	1367	1390	1379	6309
53.64	397	397	397	1840	176.00	1302	1302	1302	6038
54.25	364	373	369	1734	177.99	1195	1224	1209	5689
54.86	352	354	353	1840	180.00	1155	1161	1158	6038
55.47	393	393	393	1923	181.99	1288	1288	1288	6309
56.07	403	410	407	2027	183.95	1323	1345	1334	6650
56.70	350	347	349	1818	186.02	1150	1139	1145	5965
57.30	305	306	306	1786	187.99	1000	1004	1002	5859
57.92	310	311	311	1754	190.03	1017	1021	1019	5756
58.21	338	339	339	1796	190.99	1108	1113	1111	5894
58.52	350	359	355	1786	191.99	1150	1177	1164	5859
59.14	322	328	325	1657	194.02	1056	1075	1065	5438
59.74	315	318	316	1744	196.00	1034	1043	1038	5722
60.37	393	397	395	1875	198.07	1288	1302	1295	6152
60.98	460	466	463	1911	200.06	1510	1528	1519	6269
61.56	410	410	410	1935	201.98	1345	1345	1345	6350
62.18	341	344	342	1744	204.00	1118	1129	1124	5722
62.78	323	328	325	1775	205.98	1061	1075	1068	5824
63.41	354	357	355	1754	208.05	1161	1172	1166	5756
64.02	357	357	357	1765	210.03	1172	1172	1172	5790
64.62	368	375	371	1796	212.01	1206	1230	1218	5894
65.23	389	393	391	1775	214.02	1275	1288	1282	5824
65.84	315	319	317	1734	216.01	1034	1047	1040	5689
66.42	294	300	297	1765	217.93	965	984	975	5790
67.09	310	316	313	1639	220.11	1017	1038	1028	5379
67.68	311	311	311	1705	222.04	1021	1021	1021	5592
68.28	354	352	353	1765	224.01	1161	1155	1158	5790
68.91	336	333	335	1695	226.08	1103	1094	1099	5561
69.52	357	352	355	1775	228.08	1172	1155	1163	5824
70.11	381	373	377	1796	230.01	1249	1224	1237	5894
70.73	349	352	350	1818	232.05	1144	1155	1150	5965
71.32	350	355	353	1734	234.00	1150	1166	1158	5689
71.95	315	315	315	1714	236.06	1034	1034	1034	5624
72.55	298	299	298	1714	238.04	976	980	978	5624
73.14	276	275	275	1734	239.98	905	901	903	5689
73.76	323	318	321	1786	242.01	1061	1043	1052	5859
74.37	347	350	349	1923	243.99	1139	1150	1145	6309
74.99	688	676	682	2190	246.05	2257	2217	2237	7184
75.61	694	708	701	2230	248.06	2278	2321	2300	7318
76.19	725	714	719	2273	249.98	2377	2344	2360	7457
76.66	735	750	743	2390	251.50	2412	2461	2437	7843

NORCAL
NORCAL GEOPHYSICAL CONSULTANTS, INC.

Summary Logs
Gamma, Induction
Sonic P-wave &
PS-Wave Suspension

CO MMW JV
WELL BH-180
FLD BSVII
CTY San Jose
STE CA
FILING No NS195051

COMPANY	Mott MacDonald Wong JC		
WELL ID	BH-180		
FIELD	BART Silicon Valley II		
COUNTRY	USA	STATE	CA

LOCATION
615 Stockton Street
San Jose, CA

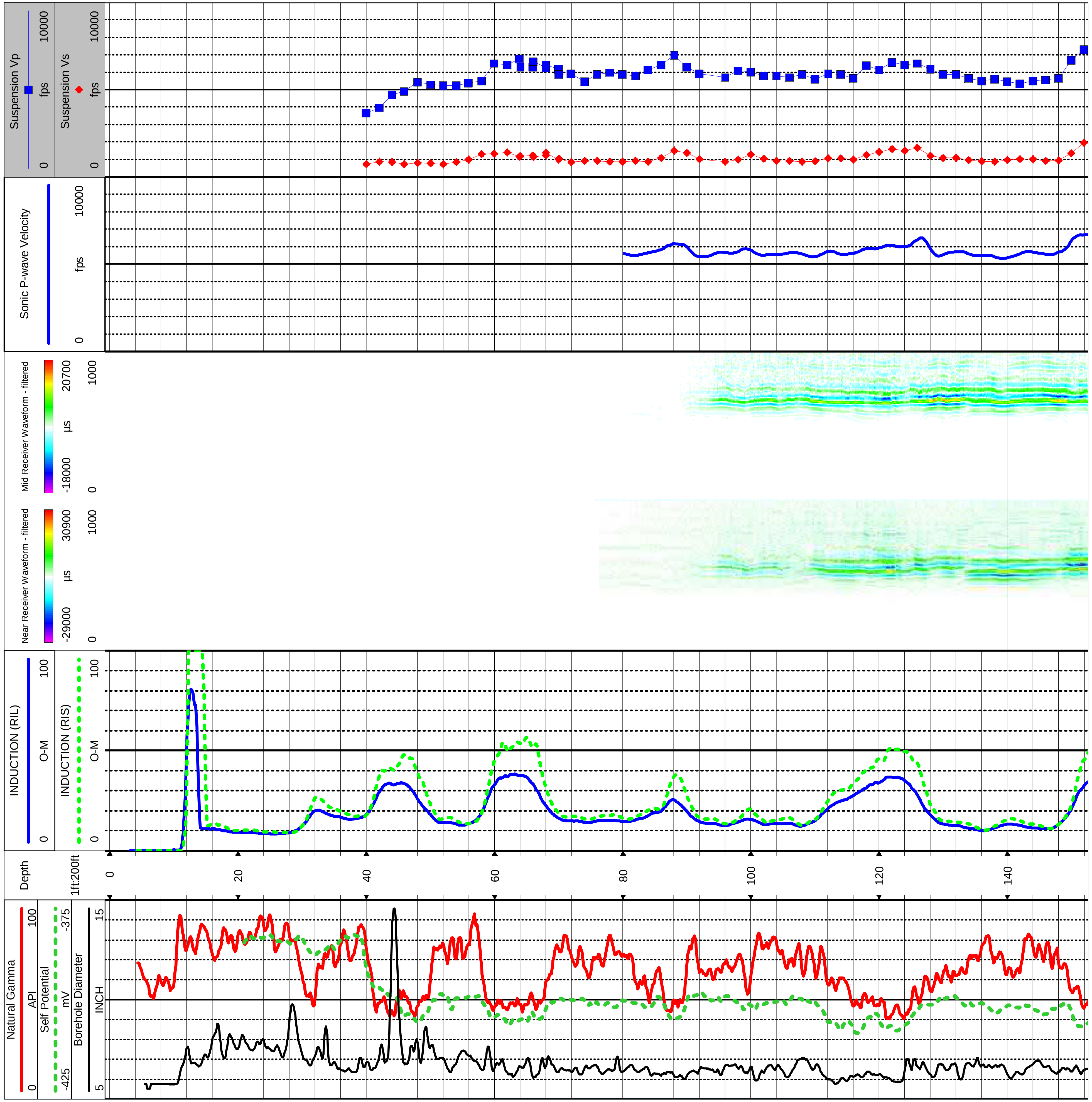
SEC TWP RGE

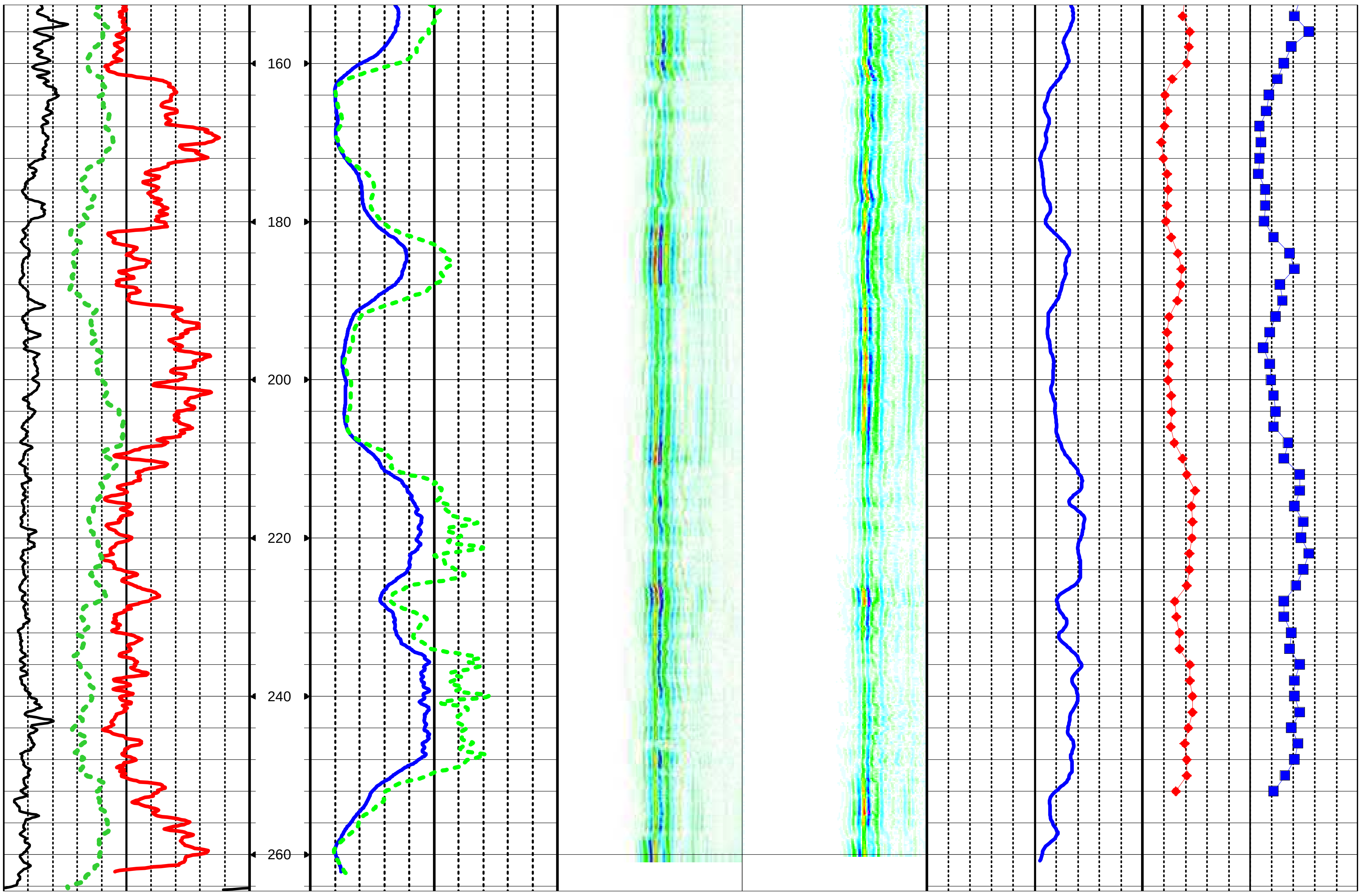
OTHER SERVICES
Caliper (Borehole Diameter)
Elecrtic Logs

PERMANENT DATUM	Pavement	ELEVATION	K.B.
LOG MEAS. FROM	Ground Surface	ABOVE PERM. DATUM	D.F.
DRILLING MEAS. FROM	Ground Surface		G.L.

DATE	July 2, 2020	TYPE FLUID IN HOLE	SLURRY
RUN No	Run-1, 2	SALINITY	~ 10 Ohm-M
TYPE LOG	Gamma-Induction, Sonic & PS-wave	DENSITY	
DEPTH-DRILLER	265	LEVEL	BEGIN AT "20-FT BGS
DEPTH-LOGGER	265	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	265		
TOP LOGGED INTERVAL	20		
OPERATING RIG TIME	1		
RECORDED BY	W HENRICH		
WITNESSED BY	Scott Ball		

RUN	BOREHOLE RECORD			CASING RECORD			
NO.	BIT	FROM	TO	SIZE	WGT.	FROM	TO
1	6"	0	15 ft bgs	8"	STEEL	0	15-ft bgs
2	5"	15	265 ft bgs				




160
180
200
220
240
260

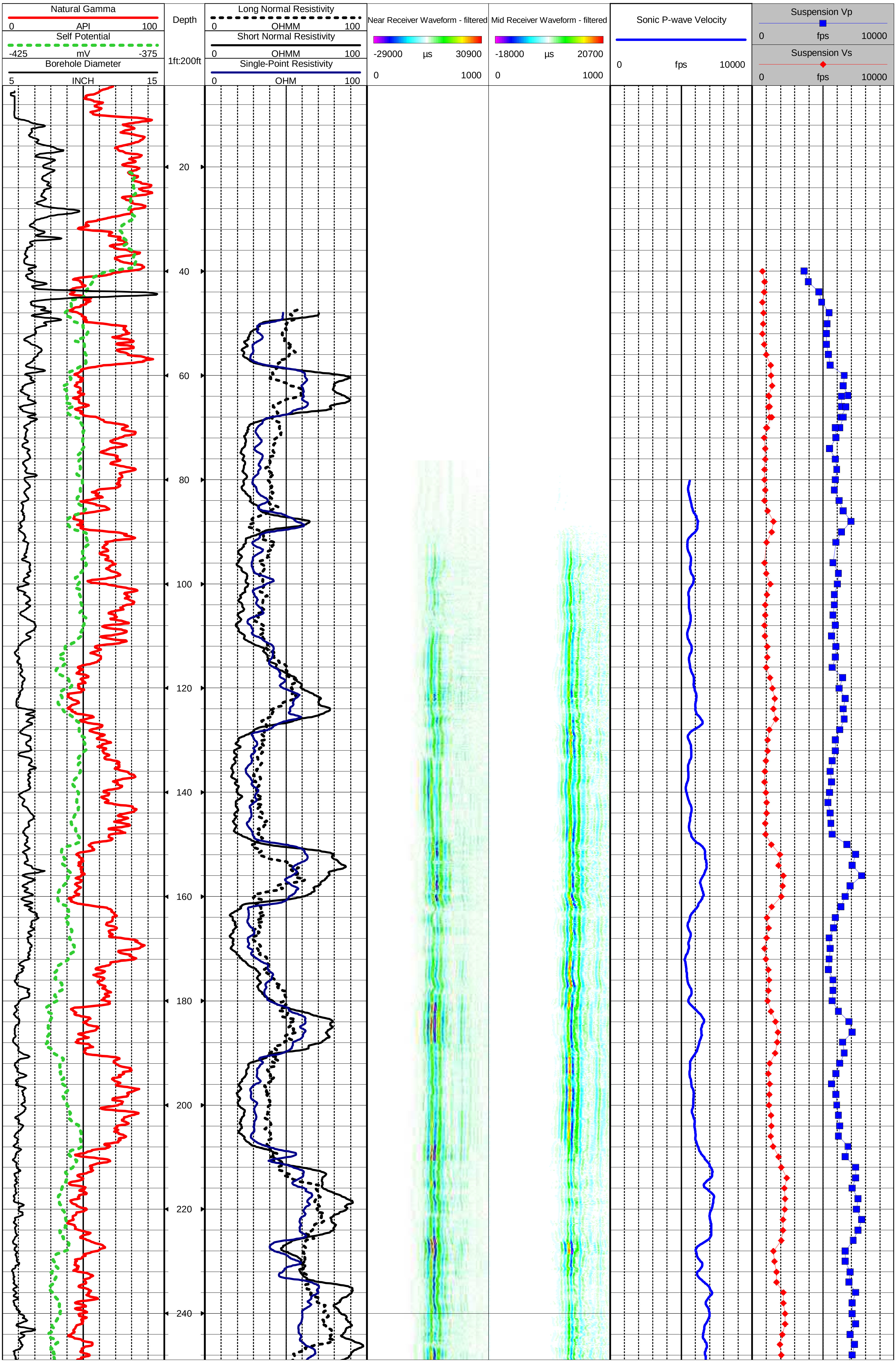
NORCAL

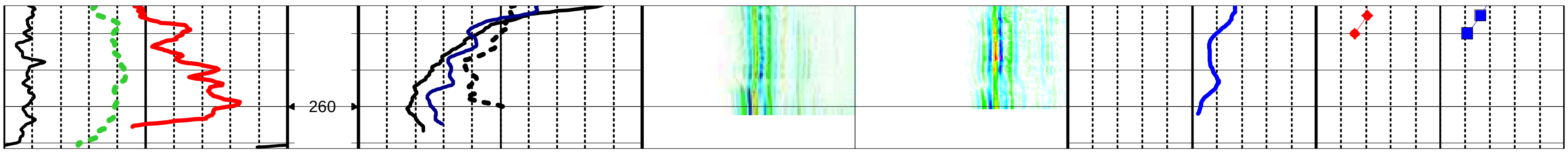
LOG SUMMARY PLOT

COMPANY: MMW Joint Venture
WELL ID: BH-180
FIELD: BSVII, San Jose
COUNTY: SANTA CLARA

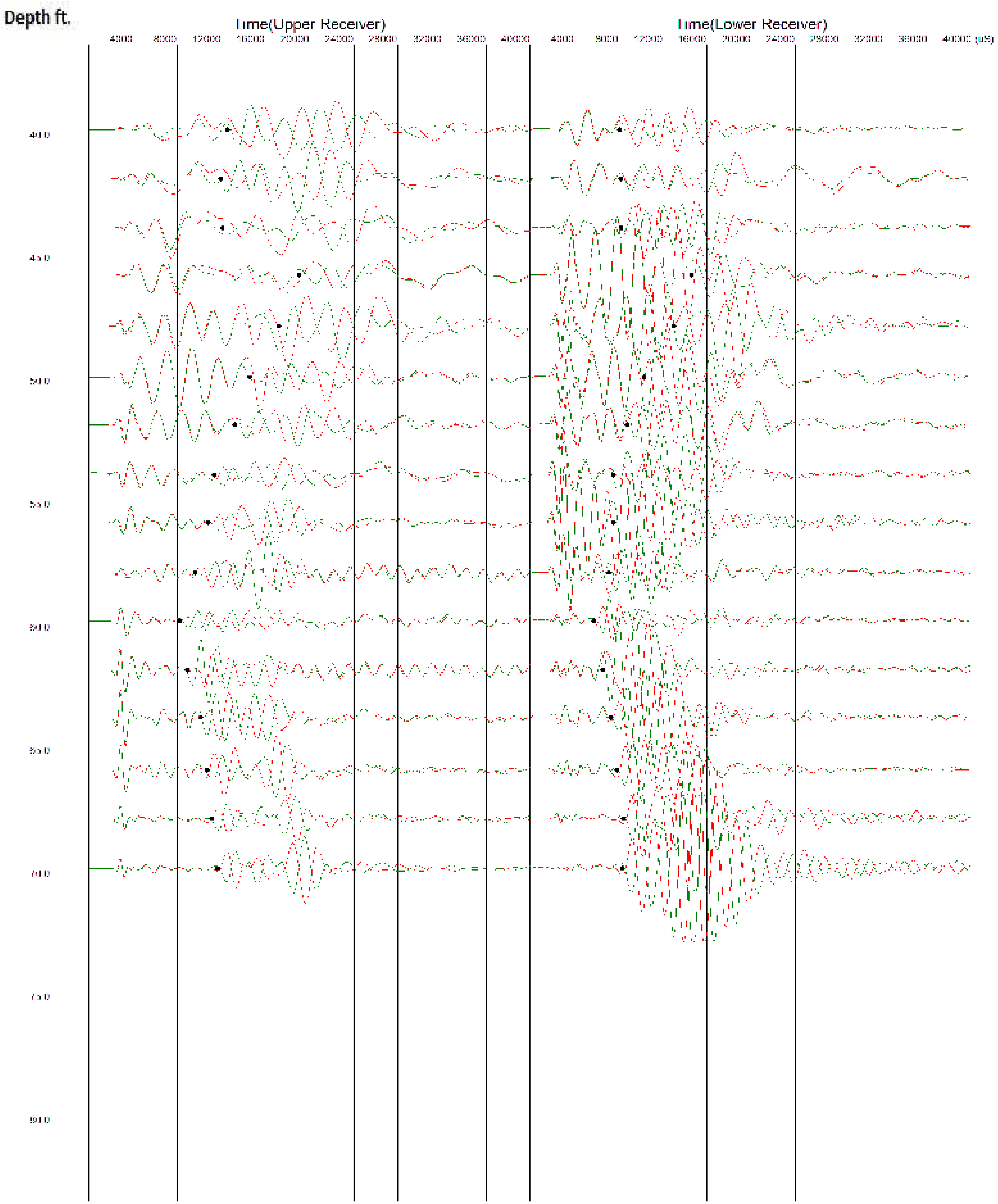
DATE: July 2, 2020
CASING: hwt steel to 15-ft bgs
JOB NO. NA195051
STATE: CA

NOTES: Run-1

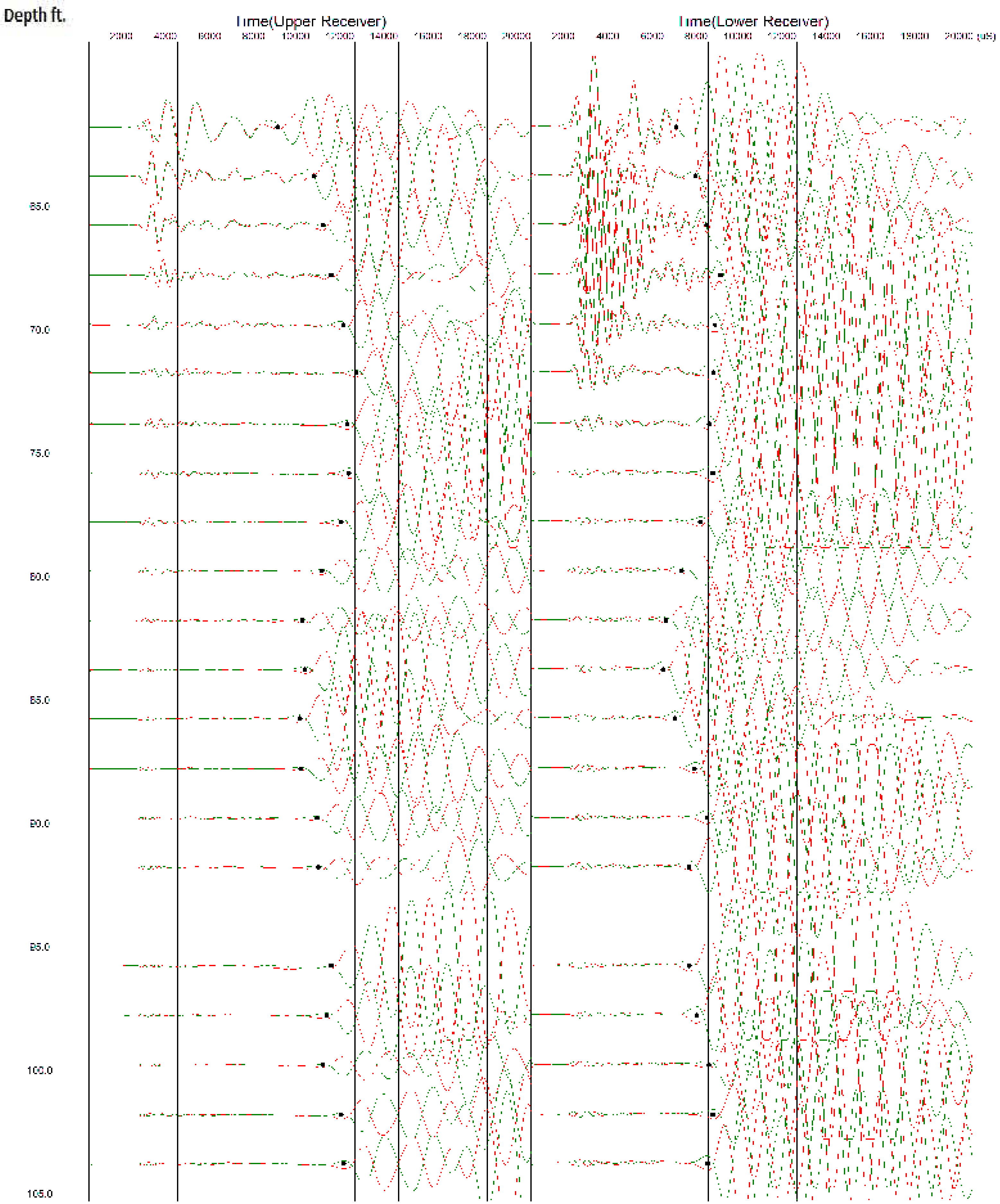



260

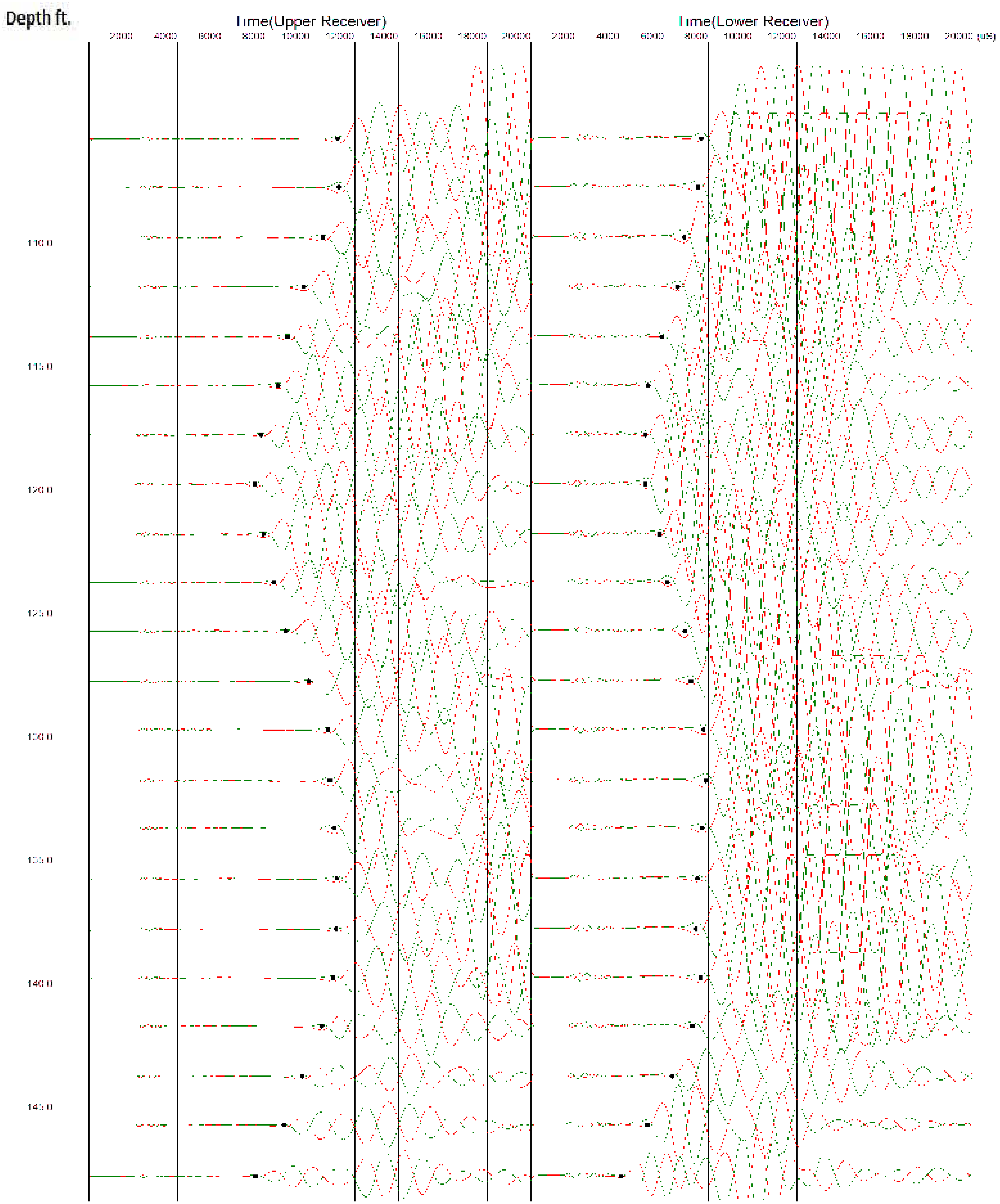
S Wave Upper Section



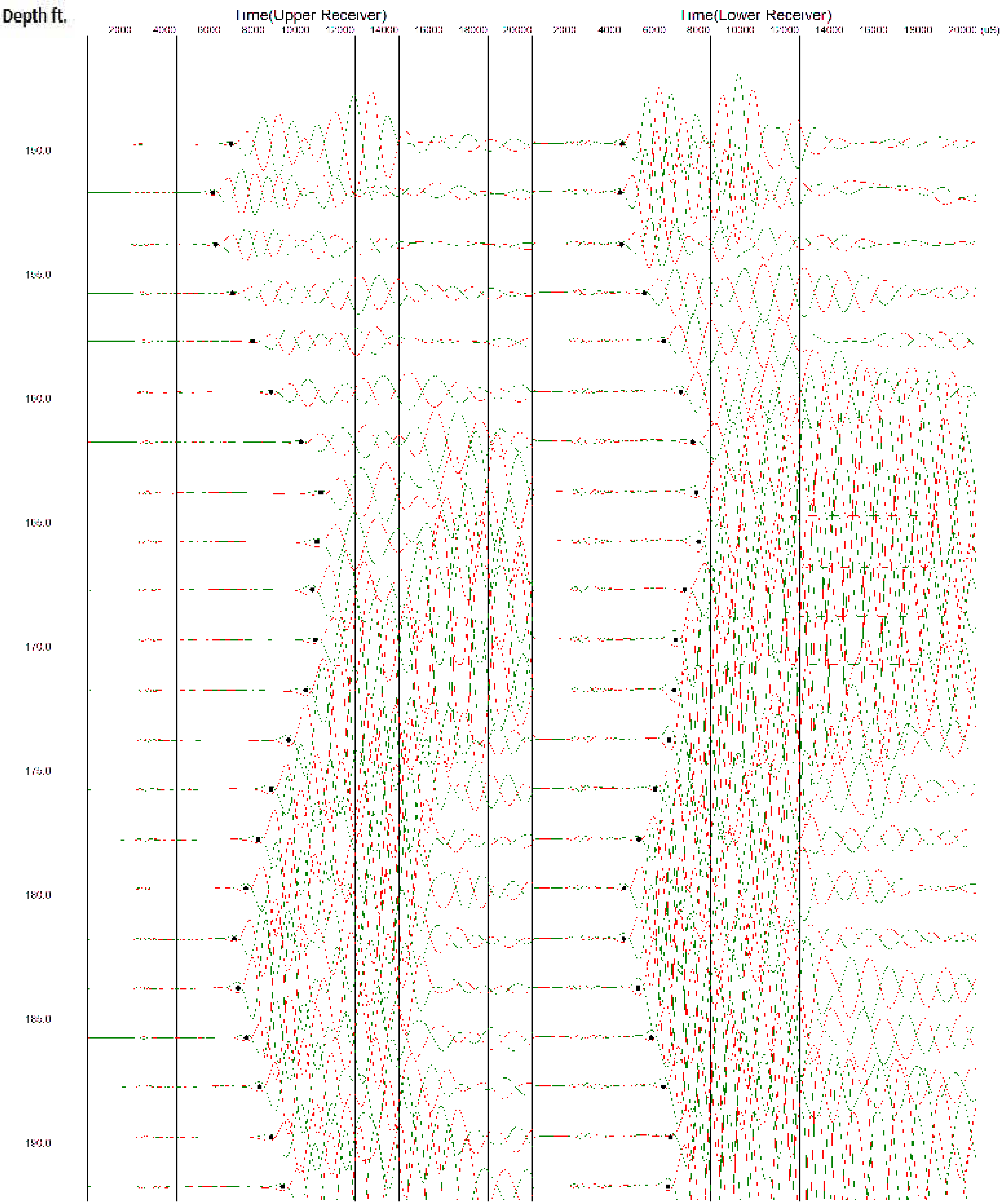
S Wave Lower Section



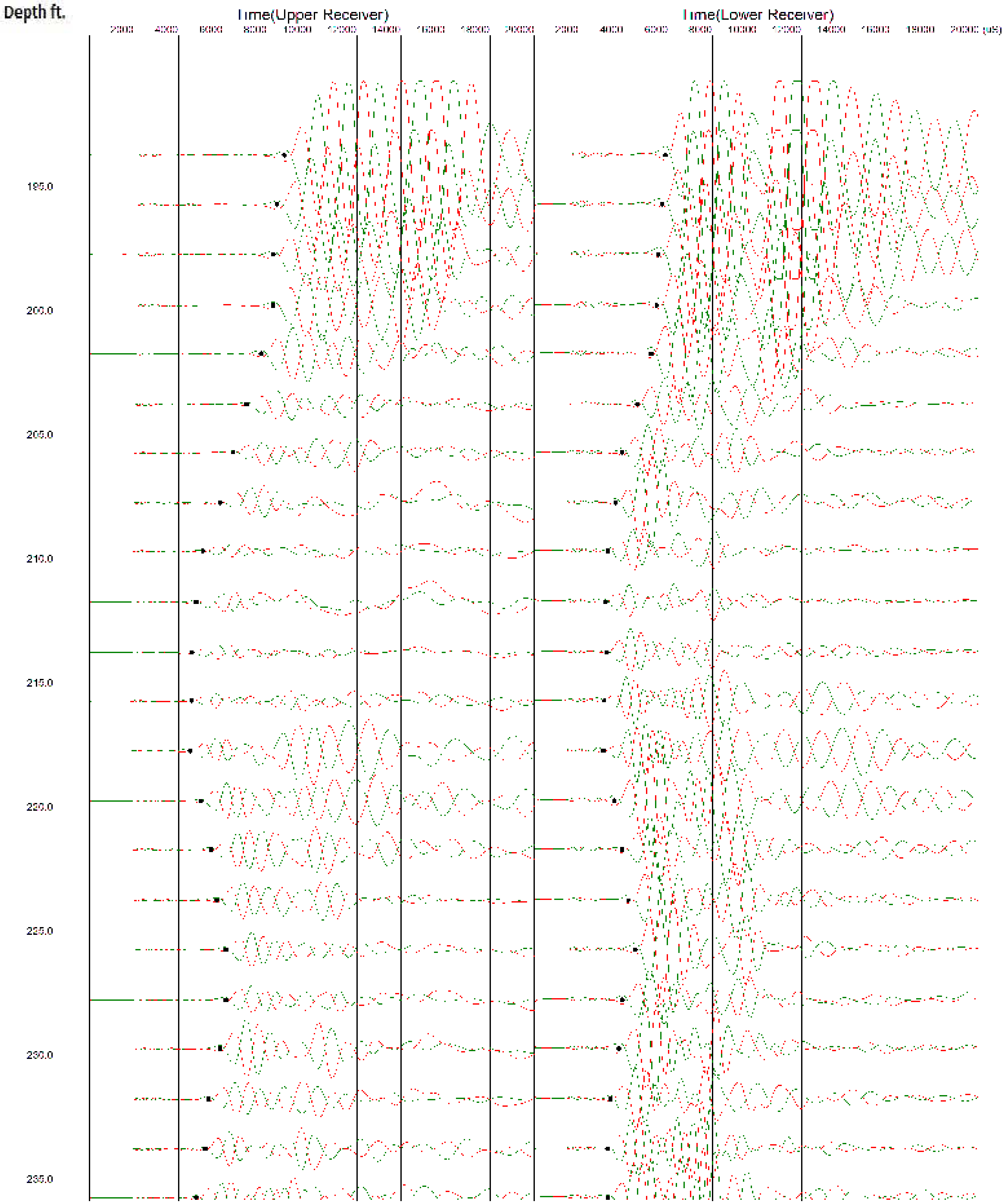
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0

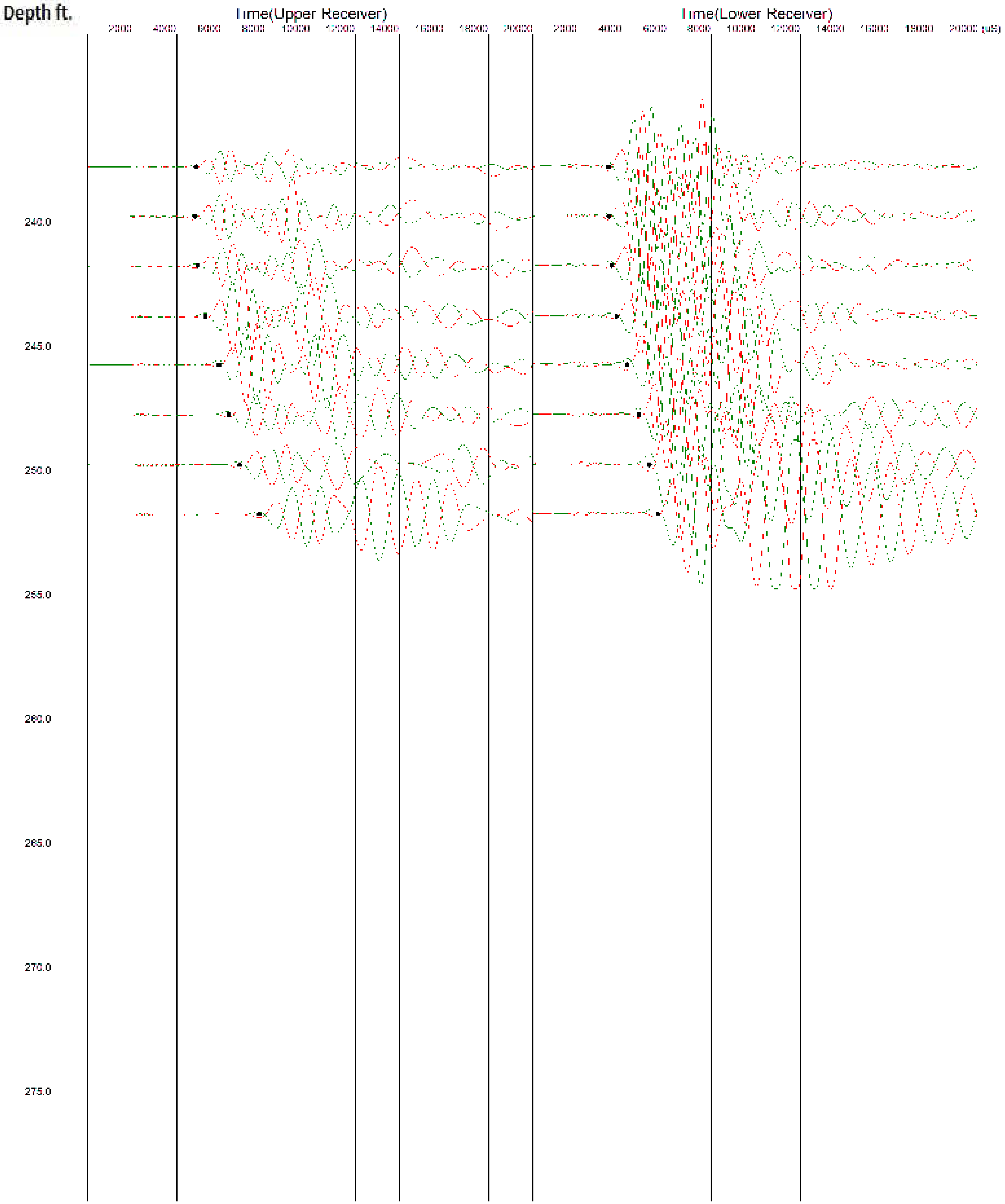
S Wave


Depth ft.
Time(Upper Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
150.0
155.0
160.0
165.0
170.0
175.0
180.0
185.0
190.0

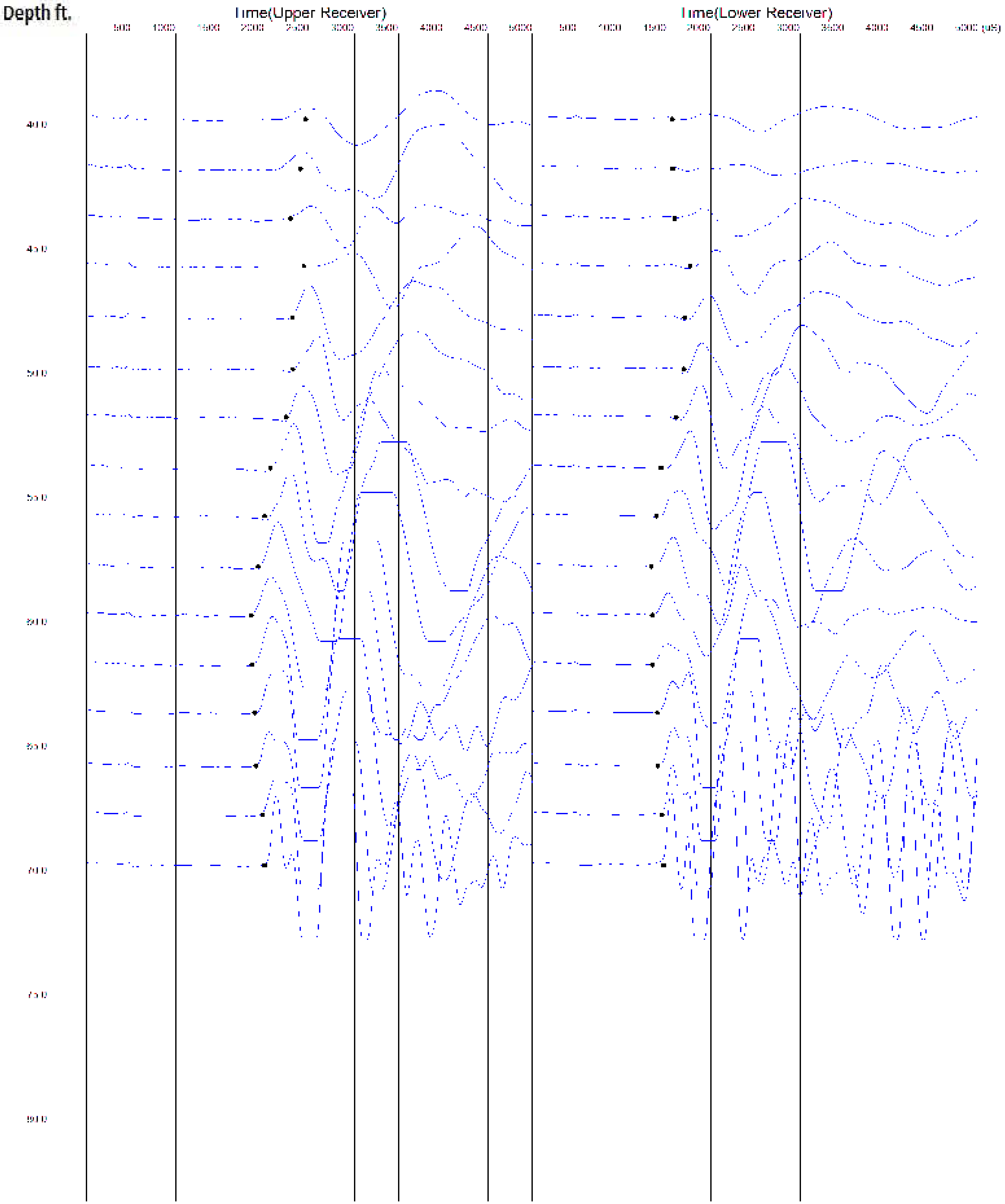
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
195.0
200.0
205.0
210.0
215.0
220.0
225.0
230.0
235.0

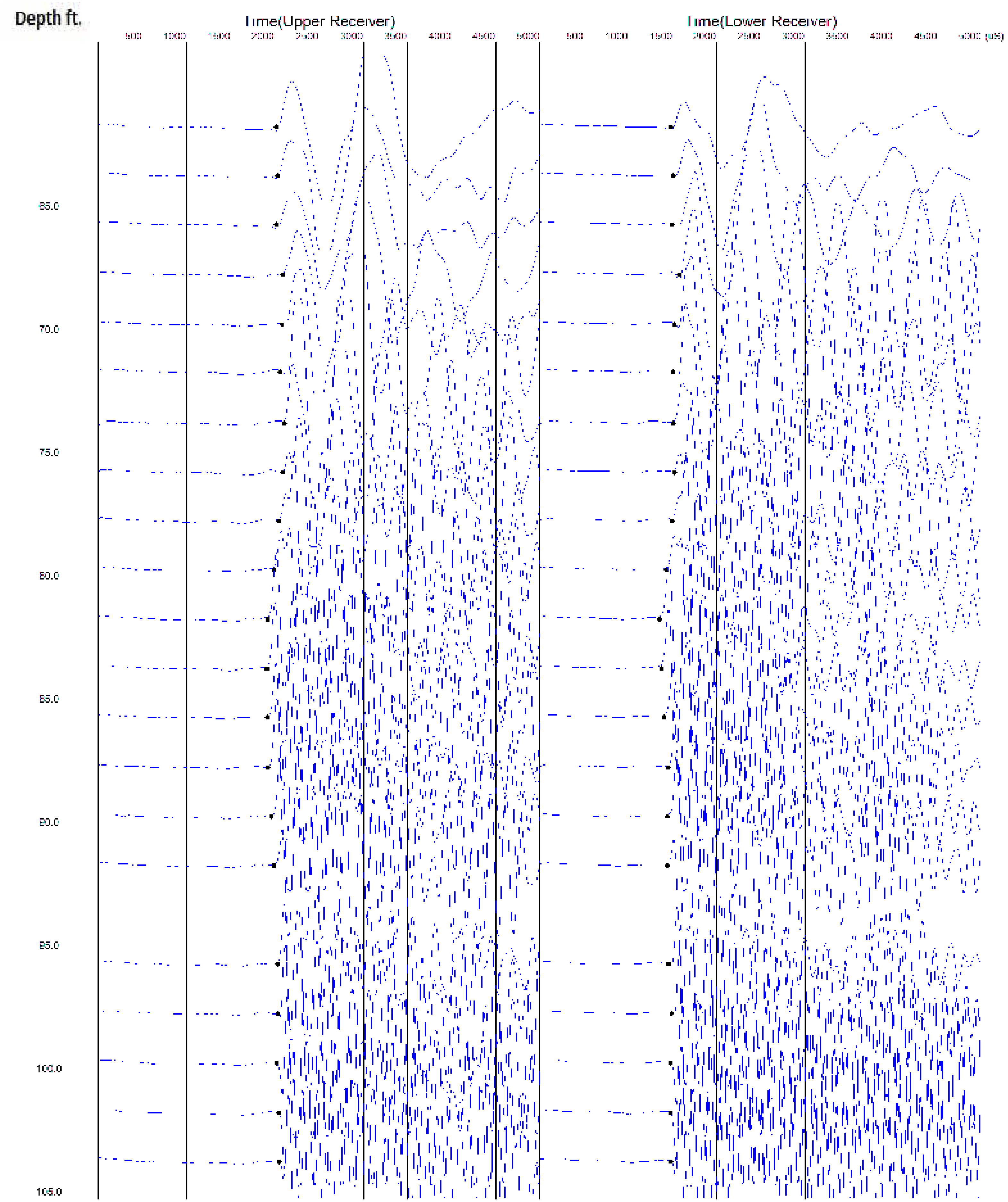
S Wave


Depth ft.
Time(Upper Receiver)
Time(Lower Receiver)
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000 (uS)
240.0
245.0
250.0
255.0
260.0
265.0
270.0
275.0

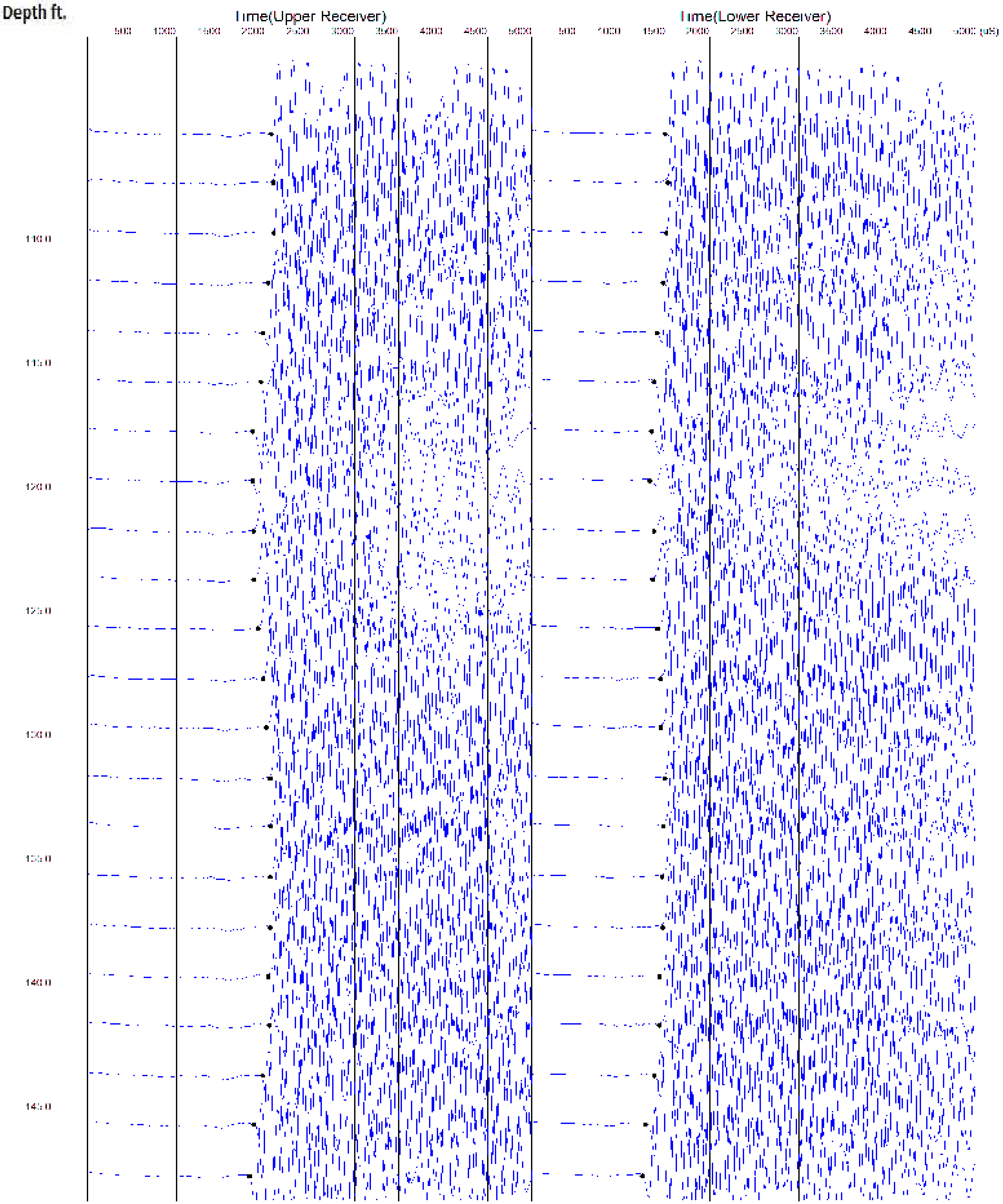
P Wave Upper Section



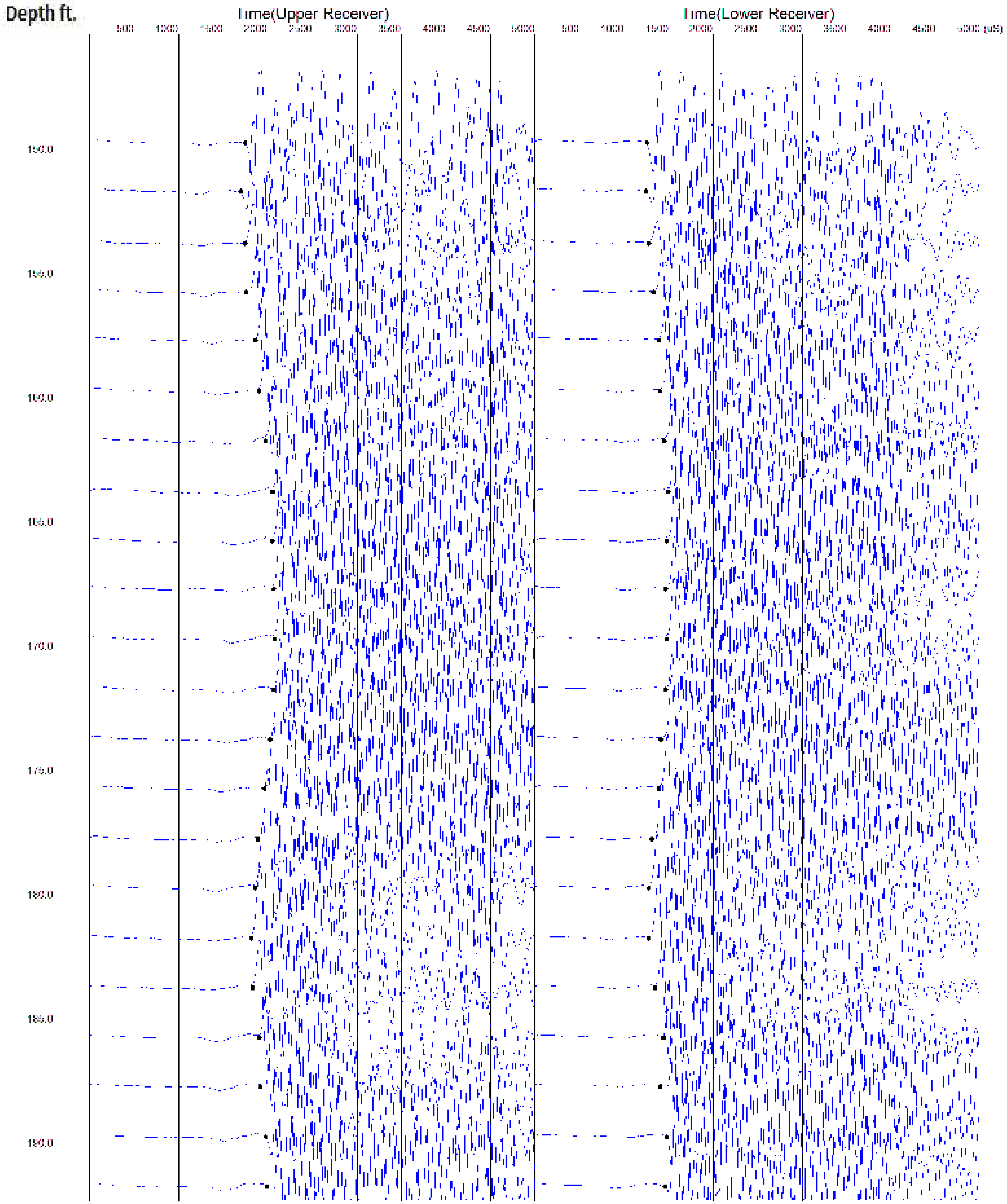
P Wave Lower Section



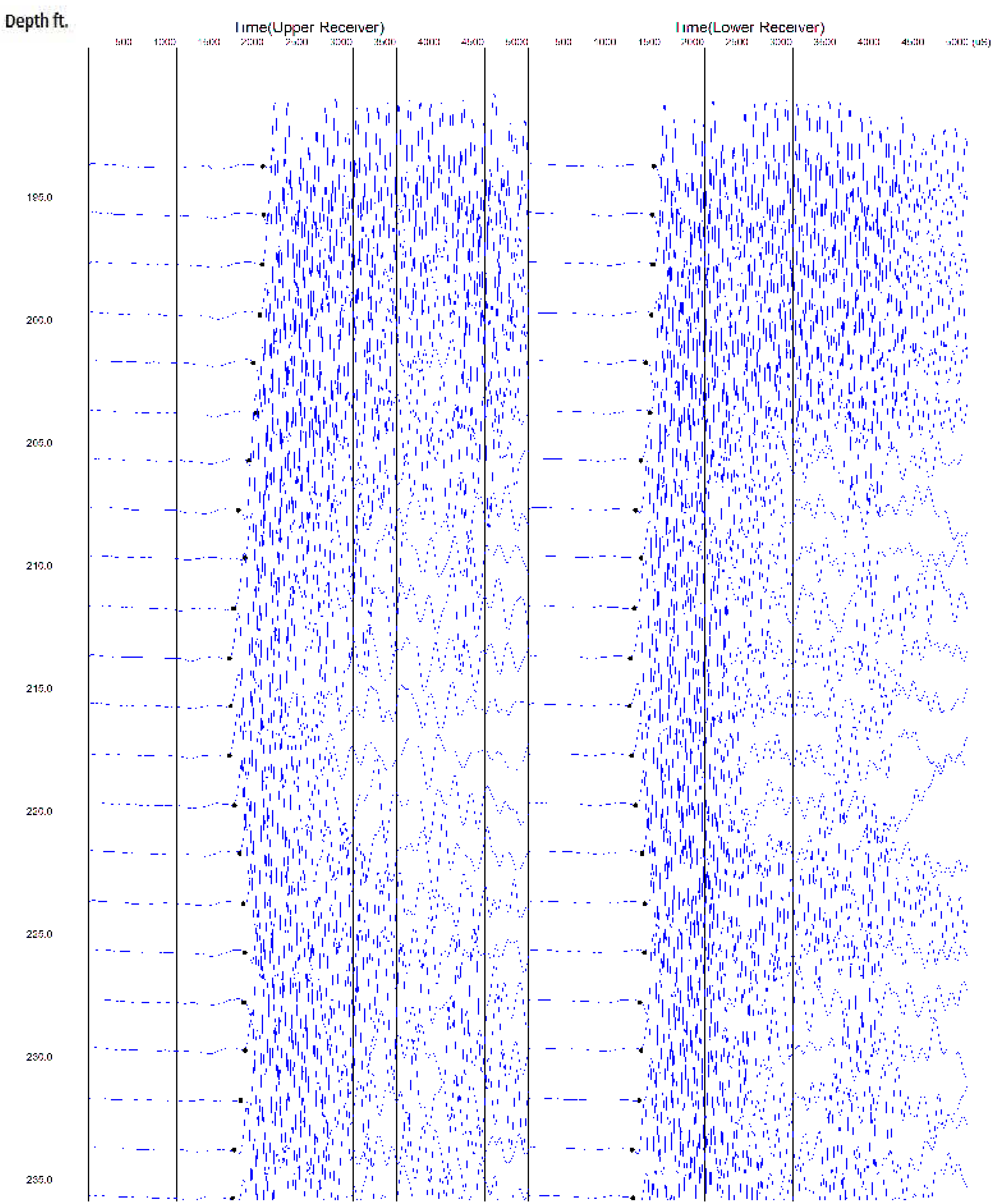
P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
110.0
115.0
120.0
125.0
130.0
135.0
140.0
145.0

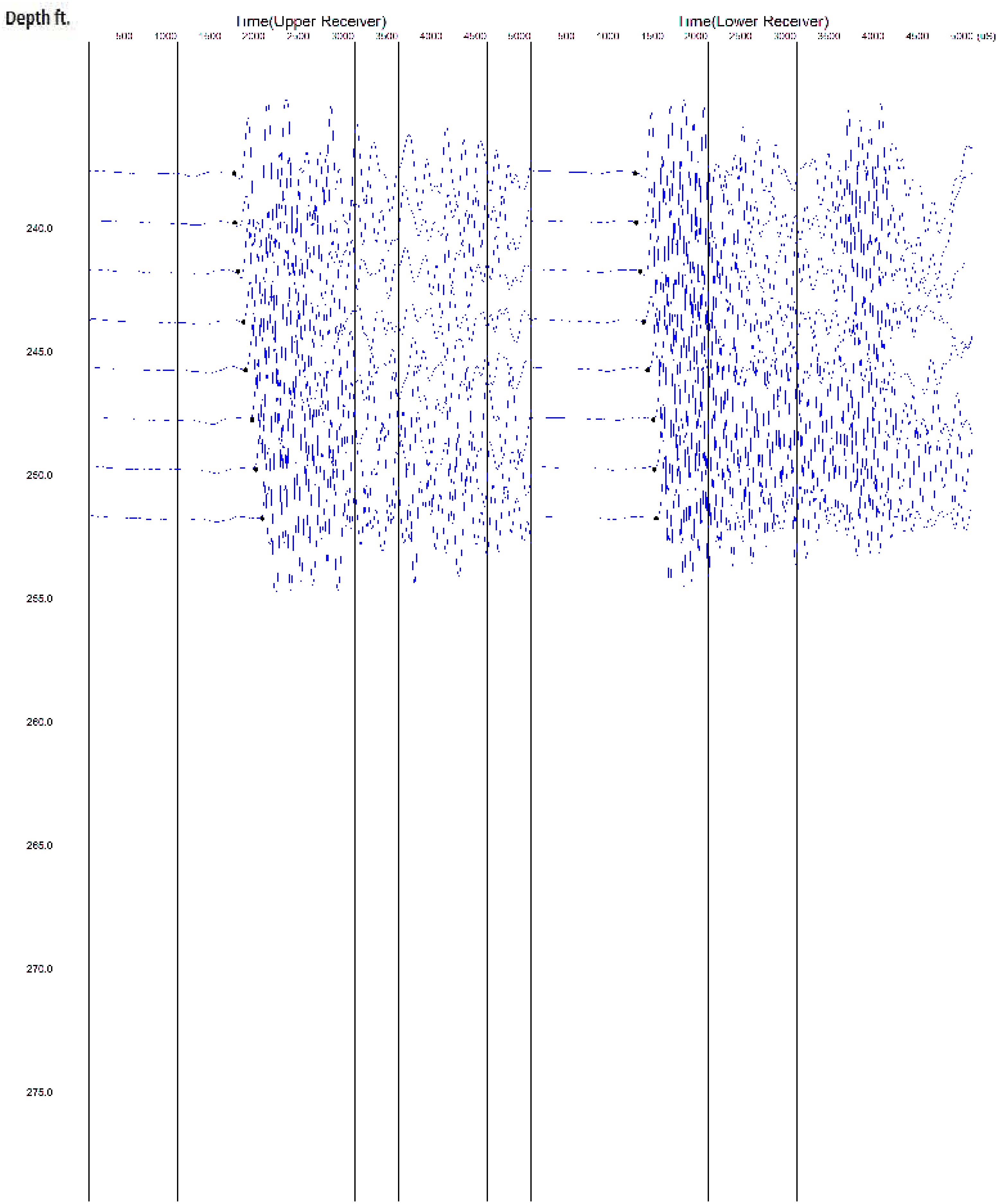
P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
150.0
155.0
160.0
165.0
170.0
175.0
180.0
185.0
190.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
195.0
200.0
205.0
210.0
215.0
220.0
225.0
230.0
235.0

P Wave


Depth ft.
Time(Upper Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
Time(Lower Receiver)
500
1000
1500
2000
2500
3000
3500
4000
4500
5000 (uS)
240.0
245.0
250.0
255.0
260.0
265.0
270.0
275.0

Borehole BH-180, P- and S-Wave Suspension Velocity Table, BART Silicon Valley II

CLIENT: MMW Joint Venture
by NORCAL GEOPHYSICAL CONSULTANTS, INC. JOB NUMBER 195051
Survey Date: July 2, 2020

METRIC UNITS DEPTHS & INTERVAL VELOCITIES					IMPERIAL UNITS DEPTHS AND INTERVAL VELOCITIES				
Depth	VsLeft	VsRight	VsAvg	Vp	Depth	VsLeft	VsRight	VsAvg	Vp
Meters	M/sec.	M/sec.	M/sec.	M/sec.	Feet	Ft./sec.	Ft./sec.	Ft./sec.	Ft./sec.
12.19	225	221	223	1117	40.01	739	726	732	3666
12.81	275	260	268	1205	42.02	901	854	878	3953
13.42	255	258	256	1439	44.02	837	846	841	4721
14.00	223	225	224	1493	45.93	732	739	736	4897
14.63	243	236	239	1653	47.99	796	774	785	5423
15.26	234	238	236	1613	50.06	767	781	774	5292
15.85	221	227	224	1600	51.99	726	746	736	5249
16.47	258	258	258	1600	54.04	846	846	846	5249
17.06	301	309	305	1639	55.98	988	1013	1000	5379
17.68	397	397	397	1681	58.01	1302	1302	1302	5514
18.28	403	403	403	1980	59.97	1323	1323	1323	6497
18.89	439	410	424	1961	61.96	1439	1345	1392	6433
18.90	490	521	506	1887	62.01	1608	1709	1659	6190
19.47	357	342	350	2062	63.89	1172	1124	1148	6765
19.51	357	370	364	1923	64.00	1172	1215	1193	6309
20.11	373	373	373	1923	65.98	1224	1224	1224	6309
20.13	352	347	350	2020	66.03	1155	1139	1147	6628
20.73	379	368	373	1905	68.00	1243	1206	1224	6249
20.73	417	420	418	1961	68.02	1367	1379	1373	6433
21.34	301	301	301	1887	70.02	988	988	988	6190
21.34	314	318	316	1786	70.03	1032	1045	1038	5859
21.93	258	263	260	1802	71.96	846	863	854	5912
22.57	276	278	277	1667	74.04	906	911	909	5468
23.18	282	282	282	1786	76.05	927	927	927	5859
23.78	265	269	267	1818	78.02	868	882	875	5965
24.38	267	267	267	1786	79.99	877	877	877	5859
24.99	281	279	280	1770	81.99	922	916	919	5807
25.60	262	263	262	1869	84.00	859	863	861	6133
26.21	329	327	328	1961	85.98	1079	1072	1076	6433
26.83	459	459	459	2128	88.02	1505	1505	1505	6981
27.44	420	417	418	1923	90.02	1379	1367	1373	6309
28.04	309	311	310	1802	92.00	1013	1019	1016	5912
29.26	263	265	264	1739	95.99	863	868	866	5706
29.87	305	305	305	1852	97.99	1000	1000	1000	6076
30.48	385	400	392	1835	100.01	1262	1312	1287	6020
31.10	313	316	314	1770	102.03	1025	1038	1032	5807
31.70	281	281	281	1770	104.01	922	922	922	5807
32.31	281	282	282	1739	106.01	922	927	924	5706
32.91	265	266	265	1786	107.98	868	873	870	5859
33.53	272	275	273	1709	110.02	892	901	896	5608
34.15	321	323	322	1802	112.03	1052	1058	1055	5912
34.76	325	327	326	1786	114.05	1065	1072	1069	5859
35.36	303	307	305	1724	116.02	994	1006	1000	5657

35.97	382	385	383	1942	118.01	1252	1262	1257	6371
36.58	431	431	431	1869	120.01	1414	1414	1414	6133
37.20	481	485	483	2000	122.04	1577	1593	1585	6562
37.79	459	459	459	1961	124.00	1505	1505	1505	6433
38.39	500	515	508	1980	125.96	1640	1691	1666	6497
39.01	370	362	366	1887	127.99	1215	1189	1202	6190
39.61	331	336	333	1786	129.97	1086	1101	1094	5859
40.24	331	331	331	1786	132.03	1086	1086	1086	5859
40.82	298	298	298	1724	133.94	976	976	976	5657
41.45	270	273	272	1681	136.00	887	896	892	5514
42.07	267	269	268	1709	138.03	877	882	880	5608
42.68	294	296	295	1667	140.02	965	971	968	5468
43.27	307	311	309	1626	141.98	1006	1019	1013	5335
43.90	305	307	306	1681	144.02	1000	1006	1003	5514
44.49	279	282	281	1695	145.98	916	927	922	5561
45.12	289	291	290	1724	148.04	948	954	951	5657
45.72	407	417	412	2041	150.00	1334	1367	1350	6696
46.31	595	595	595	2222	151.95	1953	1953	1953	7291
46.95	562	568	565	2151	154.04	1843	1864	1854	7056
47.55	676	658	667	2353	156.01	2217	2158	2188	7720
48.14	667	649	658	2105	157.94	2187	2130	2159	6907
48.76	633	625	629	2000	159.99	2077	2051	2064	6562
49.37	417	417	417	1905	161.99	1367	1367	1367	6249
50.00	318	321	319	1786	164.05	1045	1052	1048	5859
50.61	347	355	351	1754	166.03	1139	1163	1151	5756
51.20	309	309	309	1653	167.97	1013	1013	1013	5423
51.81	260	263	262	1681	169.98	854	863	859	5514
52.43	292	292	292	1653	172.02	959	959	959	5423
53.04	345	350	347	1639	174.01	1131	1147	1139	5379
53.64	362	365	364	1739	175.99	1189	1197	1193	5706
54.26	347	350	348	1739	178.03	1139	1147	1143	5706
54.86	331	338	334	1724	179.99	1086	1108	1097	5657
55.48	403	400	402	1852	182.03	1323	1312	1318	6076
56.09	490	505	498	2083	184.02	1608	1657	1633	6835
56.70	556	556	556	2151	186.02	1823	1823	1823	7056
57.30	538	543	541	1942	187.98	1764	1783	1774	6371
57.92	505	476	491	1980	190.02	1657	1562	1610	6497
58.53	373	376	375	1887	192.02	1224	1233	1229	6190
59.13	347	345	346	1802	193.99	1139	1131	1135	5912
59.73	368	376	372	1709	195.97	1206	1233	1220	5608
60.35	368	373	370	1802	197.99	1206	1224	1215	5912
60.97	355	365	360	1818	200.04	1163	1197	1180	5965
61.57	400	407	403	1852	202.00	1312	1334	1323	6076
62.19	413	407	410	1887	204.05	1356	1334	1345	6190
62.78	397	397	397	1852	205.98	1302	1302	1302	6076
63.39	442	450	446	2062	207.99	1452	1478	1465	6765
63.99	575	556	565	2000	209.95	1886	1823	1854	6562
64.61	633	617	625	2222	211.99	2077	2025	2051	7291
65.23	746	735	741	2222	214.02	2448	2412	2430	7291
65.83	694	685	690	2151	215.98	2278	2247	2263	7056
66.44	704	704	704	2273	217.99	2310	2310	2310	7457

67.06	704	694	699	2247	220.01	2310	2278	2294	7373
67.66	658	667	662	2353	221.98	2158	2187	2173	7720
68.28	649	676	663	2273	224.01	2130	2217	2174	7457
68.89	625	625	625	2174	226.01	2051	2051	2051	7132
69.50	455	455	455	2000	228.02	1491	1491	1491	6562
70.10	490	472	481	2000	229.99	1608	1548	1578	6562
70.72	526	526	526	2105	232.02	1727	1727	1727	6907
71.33	515	526	521	2083	234.04	1691	1727	1709	6835
71.93	676	658	667	2222	235.99	2217	2158	2188	7291
72.55	676	667	671	2151	238.03	2217	2187	2202	7056
73.16	704	704	704	2151	240.02	2310	2310	2310	7056
73.76	704	704	704	2222	242.01	2310	2310	2310	7291
74.38	649	641	645	2105	244.04	2130	2103	2117	6907
74.98	602	595	599	2198	245.99	1976	1953	1965	7211
75.59	633	625	629	2151	248.01	2077	2051	2064	7056
76.21	625	633	629	2020	250.03	2051	2077	2064	6628
76.81	481	467	474	1852	252.01	1577	1533	1555	6076

Slug Tests

Slug Test Locations

Table B-3. Summary of Slug Test Locations

Well ID	Elevation, NAVD88 (ft)	Location	Number of Tests	Casing Diameter (in)	Well Screen	
					Top Depth (ft)	Bottom Depth (ft)
MW-2E	88.2	28th St. / Little Portugal Station	10	2	110	120
MW-5A	87.6	DTSJ Station	8	2	115	125
ST-08	87.7	DTSJ Station	10	4	76.3	86.3
MW-6H	89.3	Diridon Station	10	2	108	118
MW-6L[1]	90.1	Diridon Station	15	2	34	44
ST-10	88.8	Diridon Station	9	4	68	73
ST-13	68.0	West Portal	10	4	23	31

[1] Water level datalogger was suspended within screen depth during the first 10 tests at MW-6L. Datalogger was reinstalled at 33 feet bgs and five (5) additional tests were completed.

In-Situ Inc.

Calibration Report

Report Number: 20160830002558-474270

221 East Lincoln Avenue, Fort Collins, CO 80524 USA
1-970-498-1500, 1-800-446-7488, FAX: 1-970-498-1598
Visit us at www.in-situ.com

Instrument Details:

Instrument Model:	**Baro TROLL 500**
Full Scale Pressure Range	**30 PSI / 1 m / 15 ft /**
Serial Number:	**474270**

Calibration Details:

Calibration Result:	**PASS**
Calibration Date:	2016-08-30 00:25:58 (UTC)
Nominal Range of Applied Temperature:	-5 C to +50 C
Temperature Accuracy Specification:	+/- 0.1 C From -5 C to +50 C
Nominal Range of Applied Pressure:	7.0 PSI to 30.0 PSI
Pressure Accuracy Specification:	+/- 0.2 %FS from -5 C to +50 C, +/- 0.1 %FS at +15 C

Post-Calibration Check:

Parameter	Applied	Reported	Deviation
Pressure	30.0001	29.9987	-0.0045
Pressure	16.2000	16.1991	-0.0029
Pressure	6.9999	6.9986	-0.0046
Temperature	38.8560	38.8578	0.0018

Calibration Procedures and Equipment Used:

Automated calibration procedures used.
Manu Agilent Model 34970A SerialNo MY44038789
Manu Mensor Model CPC6000 SerialNo 610913
Manu Instrulab Model 3312A-14-15-24 SerialNo 31154
Manu Instrulab Model 406X-0031-01 SerialNo 19528-1
Manu Agilent Model 53131A-010 SerialNo MY47002282
Manu MENSOR Model 600 SerialNo 622004

Notes:

1. Standards used in this calibration are traceable to the National Institute of Standards and Technology.
2. This calibration report shall not be reproduced, except in full, without the written approval of In-Situ, Inc.
3. A calibration interval of 12 to 18 months is recommended.

Performed By: KK

Report generated: 2020-09-01 15:49:26 UTC

In-Situ Inc.

Calibration Report

Report Number: 20160818184424-470934

221 East Lincoln Avenue, Fort Collins, CO 80524 USA
1-970-498-1500, 1-800-446-7488, FAX: 1-970-498-1598
Visit us at www.in-situ.com

Instrument Details:

Instrument Model:	**Level TROLL 700**
Full Scale Pressure Range	**1000 PSI / 693 m / 2273 ft / non-vented**
Serial Number:	**470934**

Calibration Details:

Calibration Result:	**PASS**
Calibration Date:	2016-08-18 18:44:24 (UTC)
Nominal Range of Applied Temperature:	-5 C to +50 C
Temperature Accuracy Specification:	+/- 0.1 C From -5 C to +50 C
Nominal Range of Applied Pressure:	7.0 PSI to 1000.0 PSI
Pressure Accuracy Specification:	+/- 0.1 %FS from -5 C to +50 C, +/- 0.05 %FS at +15 C

Post-Calibration Check:

Parameter	Applied	Reported	Deviation
Pressure	1000.0150	1000.0990	0.0084
Pressure	424.0650	424.2385	0.0173
Pressure	7.0000	7.0919	0.0092
Temperature	24.6740	24.6953	0.0213

Calibration Procedures and Equipment Used:

Automated calibration procedures used.
Manu Agilent Model 34980A SerialNo MY44014053
Manu Instrulab Model 4312A-15 SerialNo 30117
Manu Instrulab Model 832-151-01 SerialNo 12086
Manu Mensor Model PCS-400 SerialNo 180695
Manu Mensor Model PCS-400 SerialNo 180695
Manu Agilent Model 53131A-010 SerialNo MY47002282
Manu MENSOR Model 600 SerialNo 620225

Notes:

1. Standards used in this calibration are traceable to the National Institute of Standards and Technology.
2. This calibration report shall not be reproduced, except in full, without the written approval of In-Situ, Inc.
3. A calibration interval of 12 to 18 months is recommended.

Performed By: FM

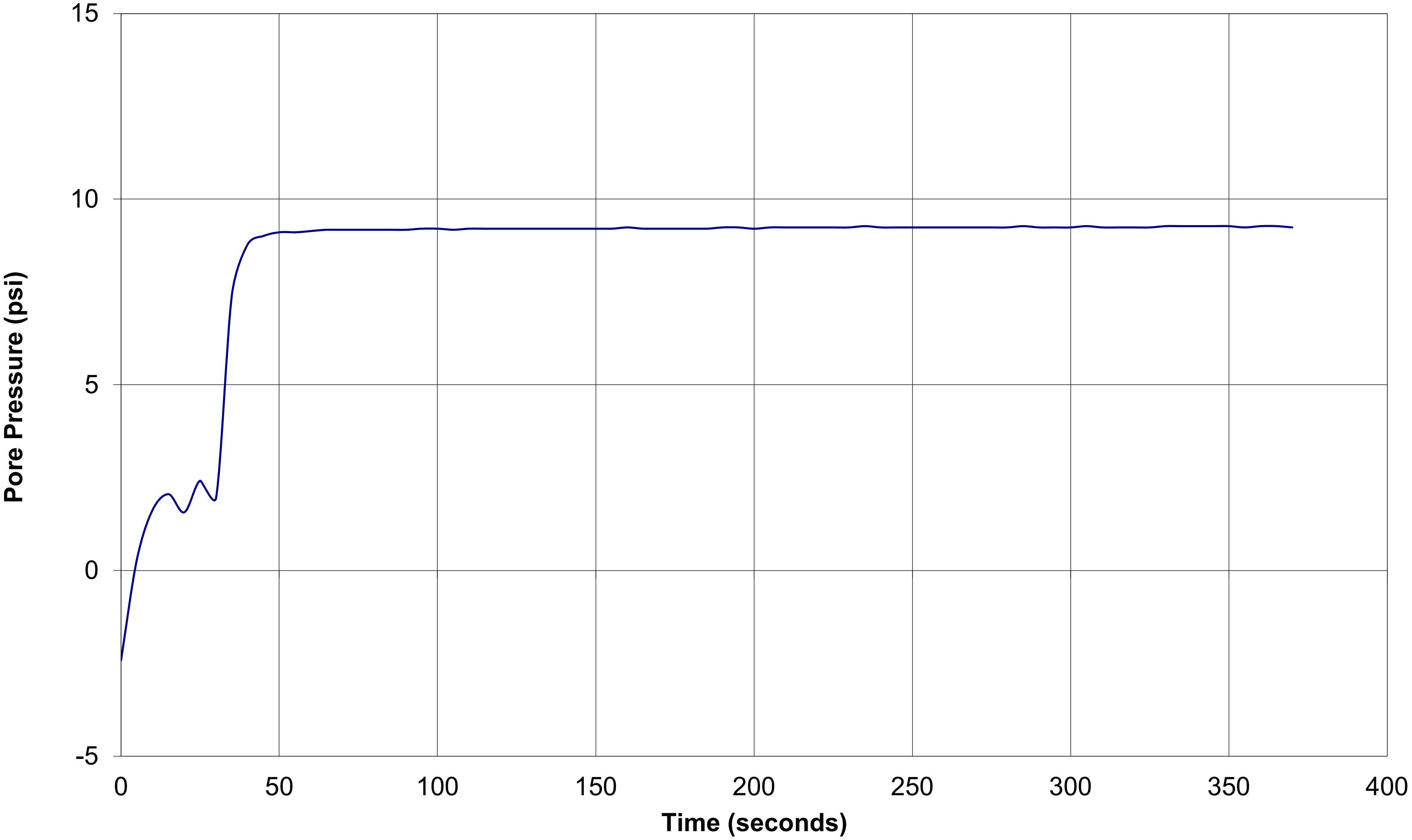
Report generated: 2020-09-01 15:48:44 UTC

Dissipation Tests

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 184
Depth: 39.5340015
Site: BART to Silicon
Engineer: I. BHANGOO



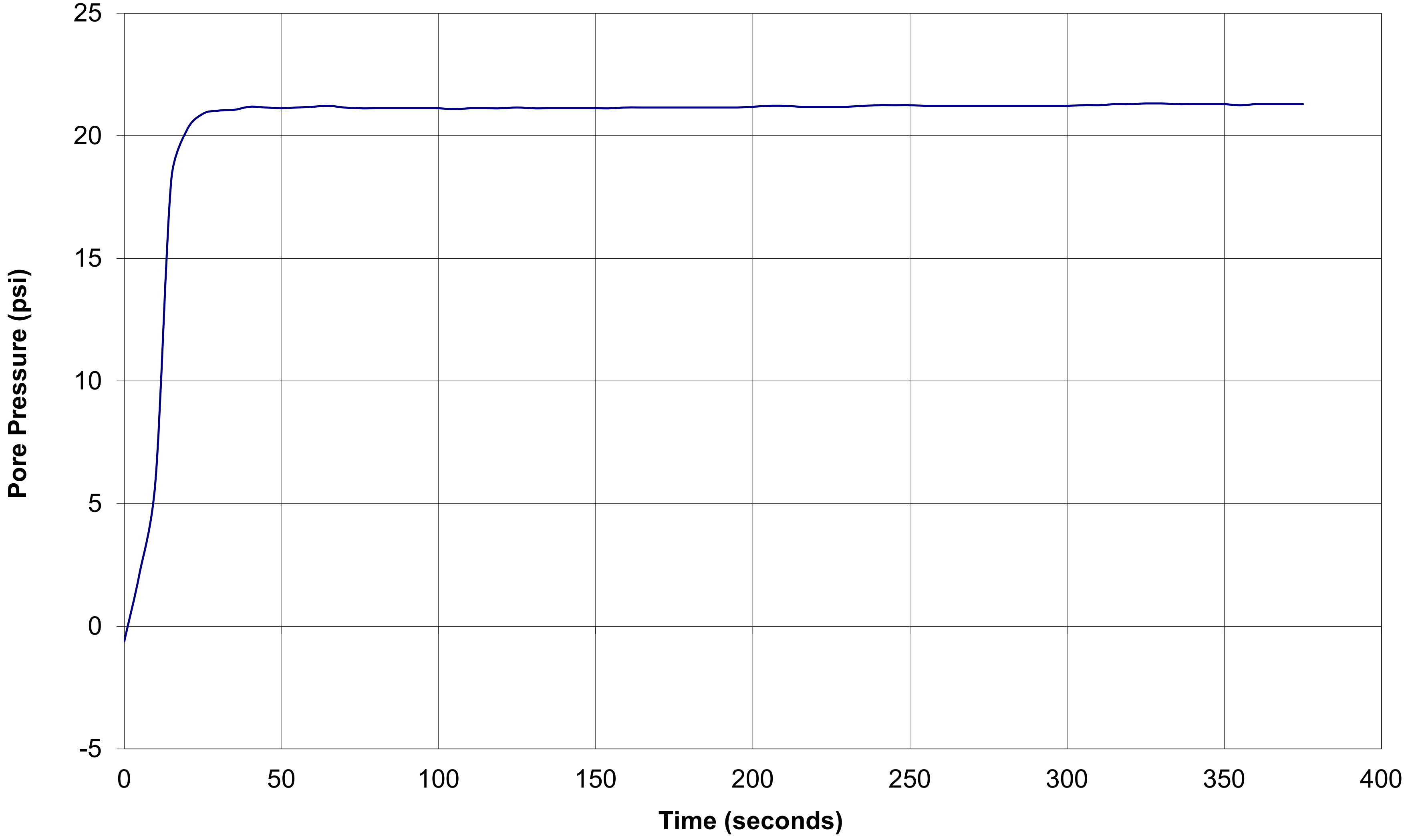
Sounding: **cpt 184**
Depth: **39.5340015**

Time (seconds)	Pore Pressure (psi)
0	-2.416298824
5	0.29396752
10	1.632773776
15	2.057273164
20	1.567466112
25	2.416464888
30	1.959311668
35	7.41249776
40	8.783957848
45	9.012534244
50	9.11049574
55	9.11049574
60	9.143149572
65	9.175803404
70	9.175803404
75	9.175803404
80	9.175803404
85	9.175803404
90	9.175803404
95	9.208457236
100	9.208457236
105	9.175803404
110	9.208457236
115	9.208457236
120	9.208457236
125	9.208457236
130	9.208457236
135	9.208457236
140	9.208457236
145	9.208457236
150	9.208457236
155	9.208457236
160	9.241111068
165	9.208457236
170	9.208457236
175	9.208457236
180	9.208457236
185	9.208457236
190	9.241111068
195	9.241111068
200	9.208457236
205	9.241111068
210	9.241111068
215	9.241111068
220	9.241111068
225	9.241111068
230	9.241111068
235	9.2737649
240	9.241111068
245	9.241111068
250	9.241111068
255	9.241111068
260	9.241111068
265	9.241111068
270	9.241111068
275	9.241111068
280	9.241111068
285	9.2737649
290	9.241111068
295	9.241111068
300	9.241111068
305	9.2737649
310	9.241111068
315	9.241111068
320	9.241111068
325	9.241111068
330	9.2737649
335	9.2737649
340	9.2737649
345	9.2737649
350	9.2737649
355	9.241111068
360	9.2737649
365	9.2737649
370	9.241111068

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 184
Depth: 66.928932
Site: BART to Silicon
Engineer: I. BHANGOO



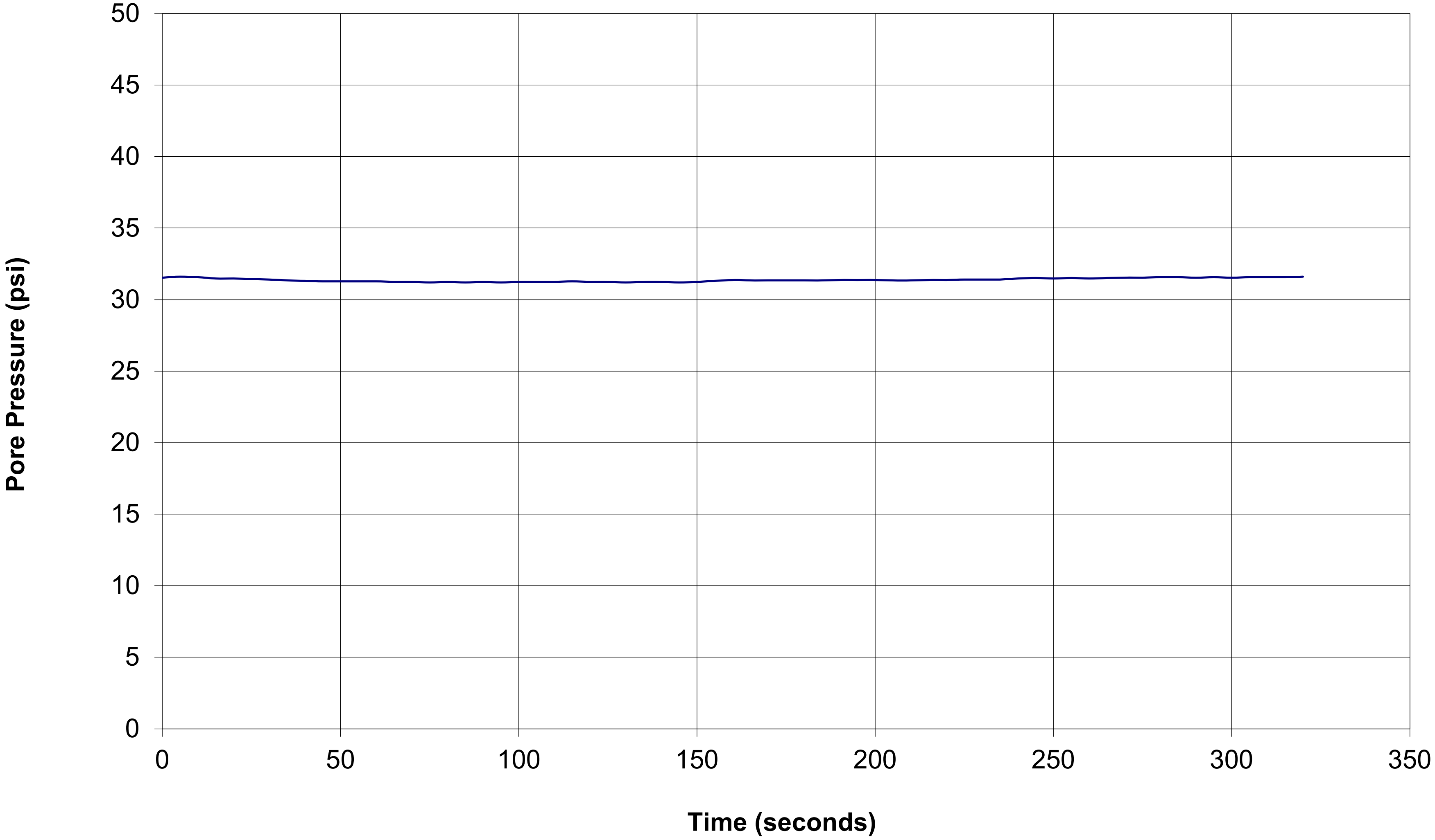
Sounding: **cpt 184**
Depth: **66.928932**

Time (seconds)	Pore Pressure (psi)	Time (seconds)	Pore Pressure (psi)	Time (seconds)	Pore Pressure (psi)
0	-0.620339348	170	21.15975119	340	21.29036652
5	2.220542324	175	21.15975119	345	21.29036652
10	5.943076176	180	21.15975119	350	21.29036652
15	18.25356228	185	21.15975119	355	21.25771268
20	20.24544432	190	21.15975119	360	21.29036652
25	20.89852053	195	21.15975119	365	21.29036652
30	21.02913586	200	21.19240502	370	21.29036652
35	21.06178969	205	21.22505885	375	21.29036652
40	21.19240502	210	21.22505885		
45	21.15975119	215	21.19240502		
50	21.12709736	220	21.19240502		
55	21.15975119	225	21.19240502		
60	21.19240502	230	21.19240502		
65	21.22505885	235	21.22505885		
70	21.15975119	240	21.25771268		
75	21.12709736	245	21.25771268		
80	21.12709736	250	21.25771268		
85	21.12709736	255	21.22505885		
90	21.12709736	260	21.22505885		
95	21.12709736	265	21.22505885		
100	21.12709736	270	21.22505885		
105	21.09444352	275	21.22505885		
110	21.12709736	280	21.22505885		
115	21.12709736	285	21.22505885		
120	21.12709736	290	21.22505885		
125	21.15975119	295	21.22505885		
130	21.12709736	300	21.22505885		
135	21.12709736	305	21.25771268		
140	21.12709736	310	21.25771268		
145	21.12709736	315	21.29036652		
150	21.12709736	320	21.29036652		
155	21.12709736	325	21.32302035		
160	21.15975119	330	21.32302035		
165	21.15975119	335	21.29036652		

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 184
Depth: 91.207074
Site: BART to Silicon
Engineer: I. BHANGOO



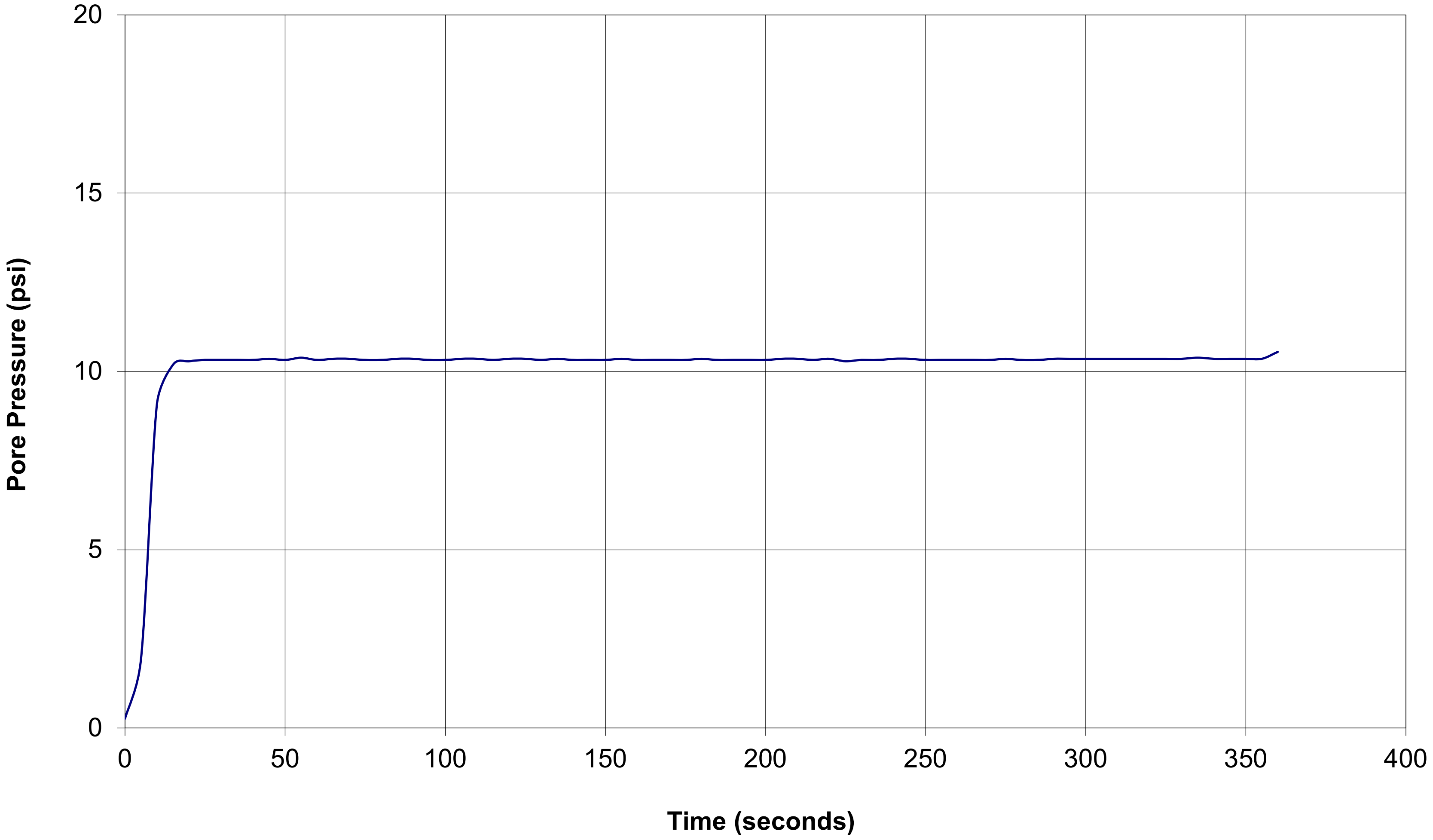
Sounding: **cpt 184**
Depth: **91.207074**

Time (seconds)	Pore Pressure (psi)
0	31.54366249
5	31.60896972
10	31.57631589
15	31.47835482
20	31.47835482
25	31.44570099
30	31.41304716
35	31.3477395
40	31.31508566
45	31.28243183
50	31.28243183
55	31.28243183
60	31.28243183
65	31.249778
70	31.249778
75	31.21712417
80	31.249778
85	31.21712417
90	31.249778
95	31.21712417
100	31.249778
105	31.249778
110	31.249778
115	31.28243183
120	31.249778
125	31.249778
130	31.21712417
135	31.249778
140	31.249778
145	31.21712417
150	31.249778
155	31.31508566
160	31.38039333
165	31.3477395
170	31.3477395
175	31.3477395
180	31.3477395
185	31.3477395
190	31.38039333
195	31.38039333
200	31.38039333
205	31.3477395
210	31.3477395
215	31.38039333
220	31.38039333
225	31.41304716
230	31.41304716
235	31.41304716
240	31.47835482
245	31.51100866
250	31.47835482
255	31.51100866
260	31.47835482
265	31.51100866
270	31.54366249
275	31.54366249
280	31.57631589
285	31.57631589
290	31.54366249
295	31.57631589
300	31.54366249
305	31.57631589
310	31.57631589
315	31.57631589
320	31.60896972

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 185
Depth: 43.635039
Site: BART to Silicon
Engineer: I. BHANGOO



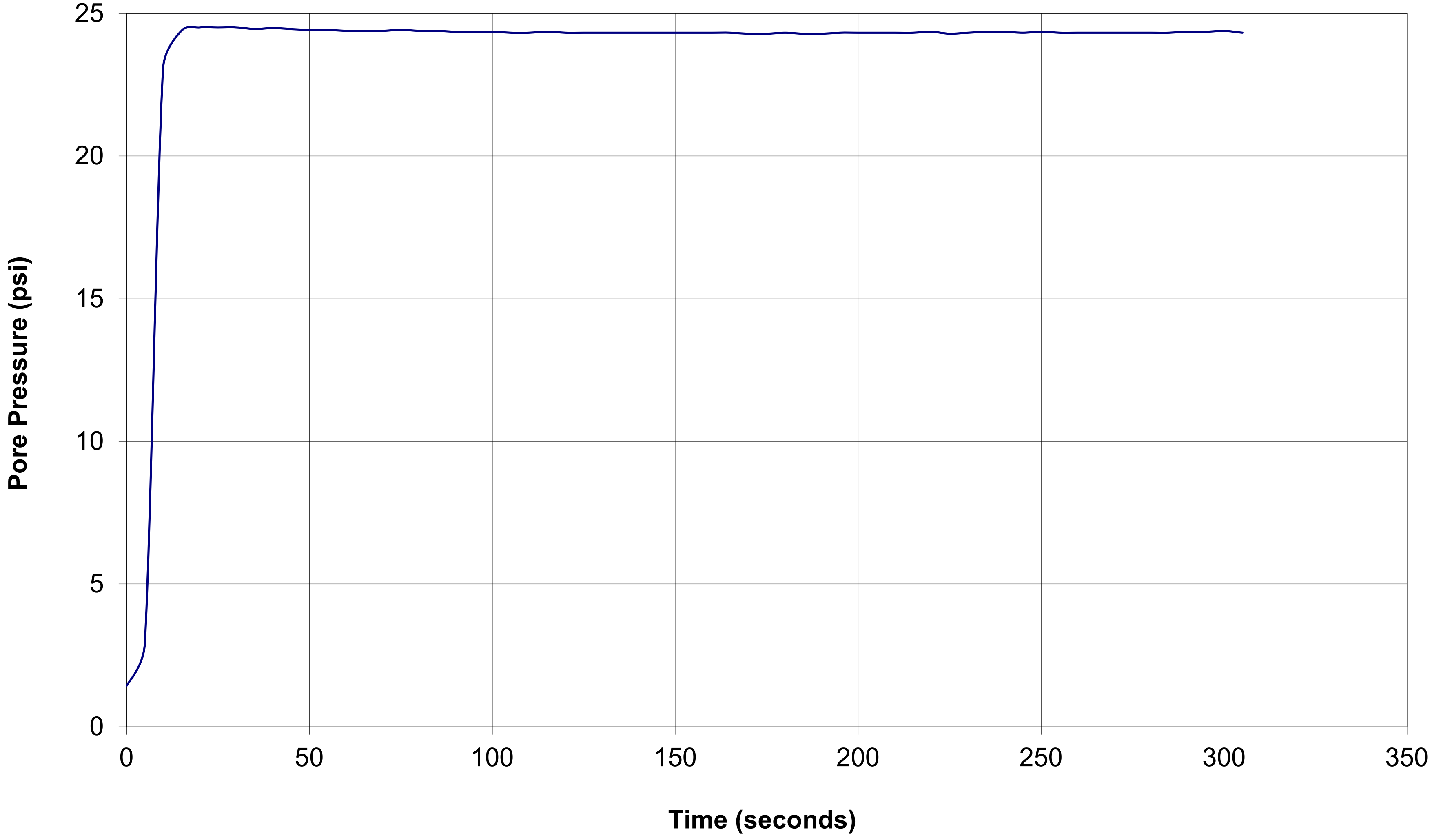
Sounding: **cpt 185**
Depth: **43.635039**

Time (seconds)	Pore Pressure (psi)
0	0.261364192
5	1.92670834
10	9.077892412
15	10.18812184
20	10.28608334
25	10.31873717
30	10.31873717
35	10.31873717
40	10.31873717
45	10.351391
50	10.31873717
55	10.38404484
60	10.31873717
65	10.351391
70	10.351391
75	10.31873717
80	10.31873717
85	10.351391
90	10.351391
95	10.31873717
100	10.31873717
105	10.351391
110	10.351391
115	10.31873717
120	10.351391
125	10.351391
130	10.31873717
135	10.351391
140	10.31873717
145	10.31873717
150	10.31873717
155	10.351391
160	10.31873717
165	10.31873717
170	10.31873717
175	10.31873717
180	10.351391
185	10.31873717
190	10.31873717
195	10.31873717
200	10.31873717
205	10.351391
210	10.351391
215	10.31873717
220	10.351391
225	10.28608334
230	10.31873717
235	10.31873717
240	10.351391
245	10.351391
250	10.31873717
255	10.31873717
260	10.31873717
265	10.31873717
270	10.31873717
275	10.351391
280	10.31873717
285	10.31873717
290	10.351391
295	10.351391
300	10.351391
305	10.351391
310	10.351391
315	10.351391
320	10.351391
325	10.351391
330	10.351391
335	10.38404484
340	10.351391
345	10.351391
350	10.351391
355	10.351391
360	10.547314

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 185
Depth: 74.6388825
Site: BART to Silicon
Engineer: I. BHANGOO



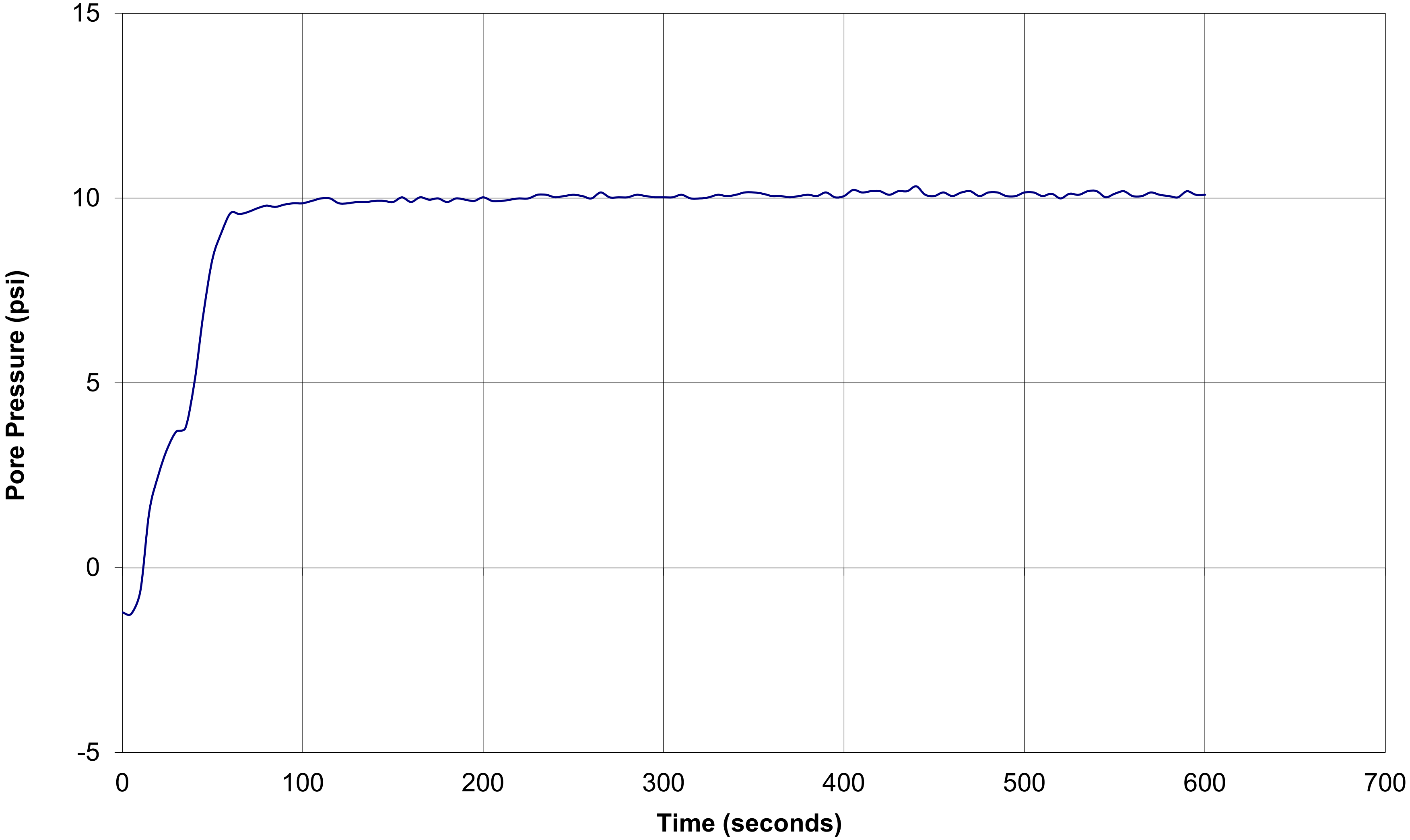
Sounding: **cpt 185**
Depth: **74.6388825**

Time (seconds)	Pore Pressure (psi)
0	1.436901288
5	2.906322872
10	23.0863765
15	24.39252892
20	24.52314382
25	24.52314382
30	24.52314382
35	24.45783658
40	24.49048999
45	24.45783658
50	24.42518275
55	24.42518275
60	24.39252892
65	24.39252892
70	24.39252892
75	24.42518275
80	24.39252892
85	24.39252892
90	24.35987509
95	24.35987509
100	24.35987509
105	24.32722126
110	24.32722126
115	24.35987509
120	24.32722126
125	24.32722126
130	24.32722126
135	24.32722126
140	24.32722126
145	24.32722126
150	24.32722126
155	24.32722126
160	24.32722126
165	24.32722126
170	24.29456742
175	24.29456742
180	24.32722126
185	24.29456742
190	24.29456742
195	24.32722126
200	24.32722126
205	24.32722126
210	24.32722126
215	24.32722126
220	24.35987509
225	24.29456742
230	24.32722126
235	24.35987509
240	24.35987509
245	24.32722126
250	24.35987509
255	24.32722126
260	24.32722126
265	24.32722126
270	24.32722126
275	24.32722126
280	24.32722126
285	24.32722126
290	24.35987509
295	24.35987509
300	24.39252892
305	24.32722126

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 186
Depth: 43.7990805
Site: BART to Silicon
Engineer: I. BHANGOO



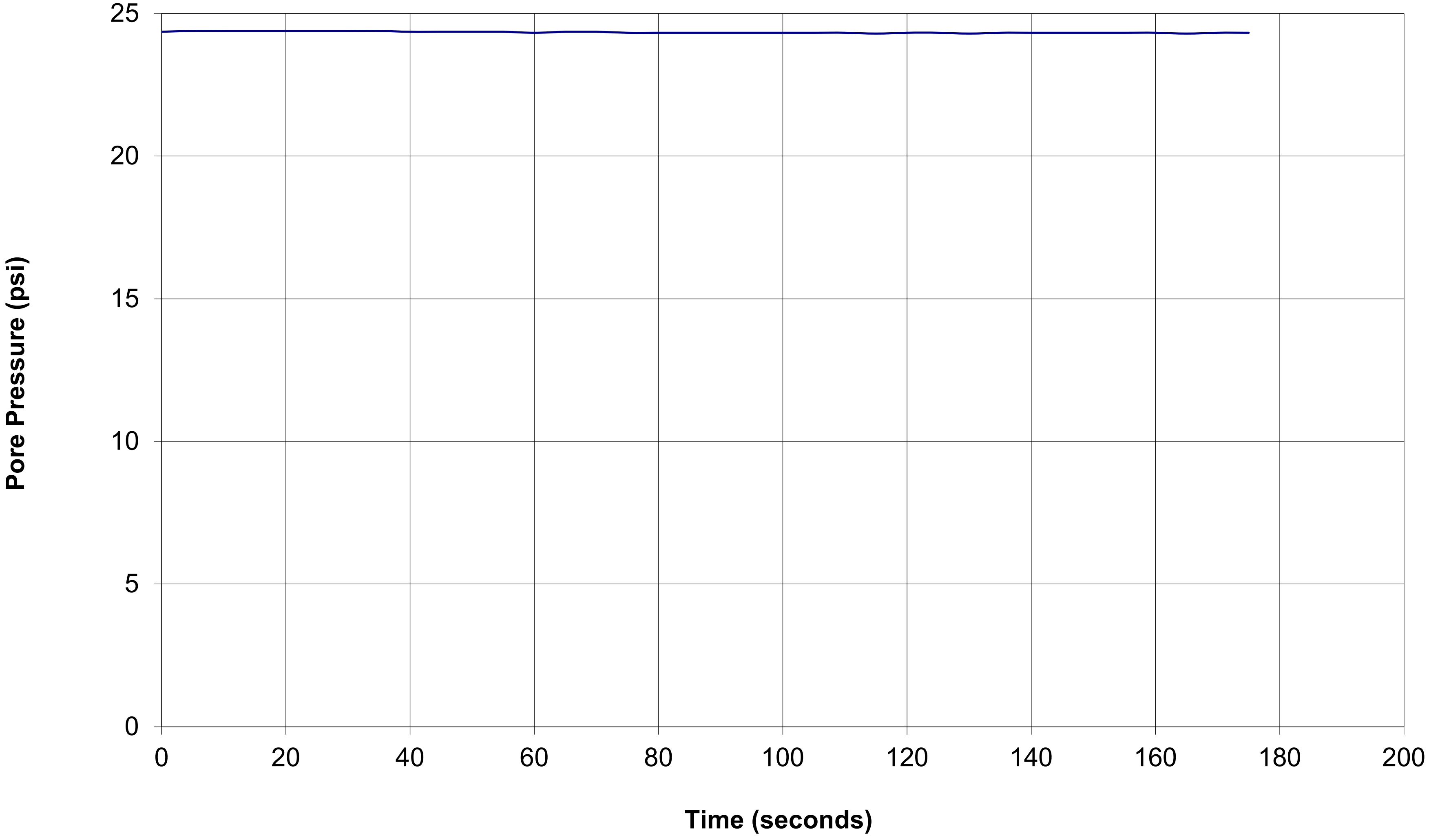
Sounding: **cpt 186**
Depth: **43.7990805**

Time (seconds)	Pore Pressure (psi)	Time (seconds)	Pore Pressure (psi)	Time (seconds)	Pore Pressure (psi)	Time (seconds)	Pore Pressure (psi)
0	-1.208032568	170	9.959569844	340	10.09018517	510	10.05753134
5	-1.2406864	175	9.992223676	345	10.15549284	515	10.122839
10	-0.62026402	180	9.894262608	350	10.15549284	520	9.992223676
15	1.534887608	185	9.992223676	355	10.122839	525	10.122839
20	2.514501712	190	9.959569844	360	10.05753134	530	10.09018517
25	3.232885588	195	9.926916012	365	10.05753134	535	10.18814667
30	3.690038808	200	10.02487751	370	10.02487751	540	10.18814667
35	3.788000304	205	9.926916012	375	10.05753134	545	10.02487751
40	5.028845064	210	9.926916012	380	10.09018517	550	10.122839
45	6.890112204	215	9.959569844	385	10.05753134	555	10.18814667
50	8.35953336	220	9.992223676	390	10.15549284	560	10.05753134
55	9.077917236	225	9.992223676	395	10.02487751	565	10.05753134
60	9.60037812	230	10.09018517	400	10.05753134	570	10.15549284
65	9.567724288	235	10.09018517	405	10.2208005	575	10.09018517
70	9.633031952	240	10.02487751	410	10.15549284	580	10.05753134
75	9.730993448	245	10.05753134	415	10.18814667	585	10.02487751
80	9.796301112	250	10.09018517	420	10.18814667	590	10.18814667
85	9.76364728	255	10.05753134	425	10.09018517	595	10.09018517
90	9.828954944	260	9.992223676	430	10.18814667	600	10.09018517
95	9.861608776	265	10.15549284	435	10.18814667		
100	9.861608776	270	10.02487751	440	10.318762		
105	9.926916012	275	10.02487751	445	10.09018517		
110	9.992223676	280	10.02487751	450	10.05753134		
115	9.992223676	285	10.09018517	455	10.15549284		
120	9.861608776	290	10.05753134	460	10.05753134		
125	9.861608776	295	10.02487751	465	10.15549284		
130	9.894262608	300	10.02487751	470	10.18814667		
135	9.894262608	305	10.02487751	475	10.05753134		
140	9.926916012	310	10.09018517	480	10.15549284		
145	9.926916012	315	9.992223676	485	10.15549284		
150	9.894262608	320	9.992223676	490	10.05753134		
155	10.02487751	325	10.02487751	495	10.05753134		
160	9.894262608	330	10.09018517	500	10.15549284		
165	10.02487751	335	10.05753134	505	10.15549284		

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 186
Depth: 74.9669655
Site: BART to Silicon
Engineer: I. BHANGOO



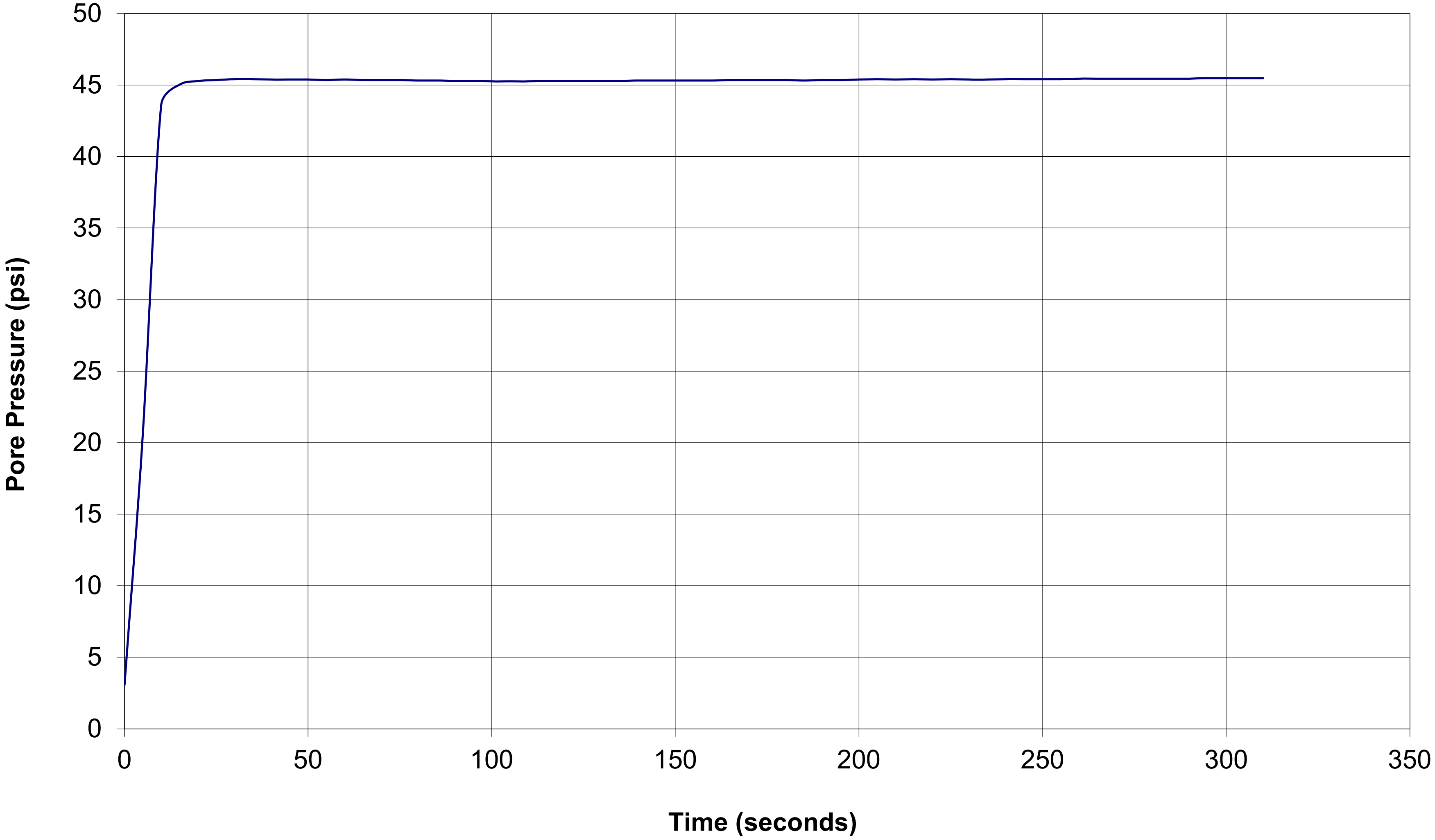
Sounding: **cpt 186**
Depth: **74.9669655**

Time (seconds)	Pore Pressure (psi)
0	24.35989948
5	24.39255332
10	24.39255332
15	24.39255332
20	24.39255332
25	24.39255332
30	24.39255332
35	24.39255332
40	24.35989948
45	24.35989948
50	24.35989948
55	24.35989948
60	24.32724565
65	24.35989948
70	24.35989948
75	24.32724565
80	24.32724565
85	24.32724565
90	24.32724565
95	24.32724565
100	24.32724565
105	24.32724565
110	24.32724565
115	24.29459182
120	24.32724565
125	24.32724565
130	24.29459182
135	24.32724565
140	24.32724565
145	24.32724565
150	24.32724565
155	24.32724565
160	24.32724565
165	24.29459182
170	24.32724565
175	24.32724565

GREGG DRILLING & TESTING

Pore Pressure Dissipation Test

Sounding: cpt 186
Depth: 123.1951665
Site: BART to Silicon
Engineer: I. BHANGOO



Sounding: **cpt 186**
Depth: **123.1951665**

Time (seconds)	Pore Pressure (psi)
0	3.069616428
5	20.70267287
10	43.62564667
15	45.02976059
20	45.29099082
25	45.35629848
30	45.42160614
35	45.42160614
40	45.38895231
45	45.38895231
50	45.38895231
55	45.35629848
60	45.38895231
65	45.35629848
70	45.35629848
75	45.35629848
80	45.32364465
85	45.32364465
90	45.29099082
95	45.29099082
100	45.25833698
105	45.25833698
110	45.25833698
115	45.29099082
120	45.29099082
125	45.29099082
130	45.29099082
135	45.29099082
140	45.32364465
145	45.32364465
150	45.32364465
155	45.32364465
160	45.32364465
165	45.35629848
170	45.35629848
175	45.35629848
180	45.35629848
185	45.32364465
190	45.35629848
195	45.35629848
200	45.38895231
205	45.42160614
210	45.38895231
215	45.42160614
220	45.38895231
225	45.42160614
230	45.38895231
235	45.38895231
240	45.42160614
245	45.42160614
250	45.42160614
255	45.42160614
260	45.45425998
265	45.45425998
270	45.45425998
275	45.45425998
280	45.45425998
285	45.45425998
290	45.45425998
295	45.48691381
300	45.48691381
305	45.48691381
310	45.48691381

Appendix C
Groundwater

Groundwater Monitoring
Groundwater Corrosivity Test Results
Vibrating Wire Piezometer Calibration

Groundwater Monitoring

Groundwater Monitoring Locations

Table C-1. Manual Water Level Reading Locations

Well ID	Screen / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
TW-2A	130 – 150	28th St. / Little Portugal Station	
PZ-2A	70, 122, 160	28th St. / Little Portugal Station	
MW-2A	127 – 137	28th St. / Little Portugal Station	
MW-2B	100 – 110	28th St. / Little Portugal Station	
MW-2C	98 – 108	28th St. / Little Portugal Station	
MW-2D	126 – 136	28th St. / Little Portugal Station	
PZ-2B	78, 116, 152	28th St. / Little Portugal Station	
ST-02	78 – 88	28th St. / Little Portugal Station	PTE
MW-2H	105 – 115	28th St. / Little Portugal Station	PTE
PZ-2D	51, 96, 137	28th St. / Little Portugal Station	PTE
TW-2B	108 – 128	28th St. / Little Portugal Station	
MW-2E	110 – 120	28th St. / Little Portugal Station	
BH-015	30, 90	28th St. Station to East Emergency Stop	
TW-5A	78 – 93	DTSJ Station	
NB-17	45, 70	DTSJ Station	
MW-6C	150 – 160	Diridon Station	RTC
PZ-6E	74, 94, 137	Diridon Station	RTC
TW-6A	72 – 87	Diridon Station	
PZ-6K	59, 79, 141	Diridon Station	
BH-074	30	Diridon Station	
BH-076	105	Diridon Station	
PZ-6J	60, 92, 133	Diridon Station	
TW-6B	106 – 116	Diridon Station	
ST-11	80 – 85	Diridon Station	
BH-168	48	Diridon Station to West Emergency Stop	
BH-041	20, 40	Diridon Station to West Emergency Stop	RTC
BH-080	47	West Emergency Stop to West Portal	RTC
BH-047	20, 40	West Emergency Stop to West Portal	
TW-8A	55 – 75	West Portal	
PZ-8A	32, 86, 130	West Portal	
MW-8A	53 – 63	West Portal	
MW-8B	97 – 107	West Portal	

Well ID	Screen / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
Y&S BH-008[4]	9 – 39	NYMF	
BH-178	29	NYMF	

[1] Screen depths and VWP installation depths rounded to the nearest foot.

[2] Precise location of all monitoring wells is provided in Figure 9.

[3] PTE – Permission to Enter required for access to private property; RTC – Rolling Traffic Control and Police Escort required for access.

[4] Yards & Shops (Y&S) also known as Newhall Yard and Maintenance Facility (NYMF).

Groundwater Monitoring Locations

Table C-2. Datalogger Installation Locations

Well ID	Datalogger Type	Screen / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
BH-165	4-channel	38, 72	East Portal	
ST-01	Water Level	68 – 73	East Portal	PTE
BH-159	1-channel	82	East Portal to 28th St. Station	
BH-058	1-channel	31	28th St. / Little Portugal Station	
BH-063	4-channel	81	28th St. / Little Portugal Station	PTE
BH-154	4-channel	78, 117, 146, 161	28th St. / Little Portugal Station	
BH-155	4-channel	79, 110, 131, 180	28th St. / Little Portugal Station	PTE
BH-156	4-channel	72, 101, 128, 144	28th St. / Little Portugal Station	PTE
BH-164	4-channel	70, 95, 125, 160	28th St. / Little Portugal Station	
MW-2F	Water Level	105 – 125	28th St. / Little Portugal Station	PTE
MW-2G	Water Level	63 – 73	28th St. / Little Portugal Station	PTE
NB-13A	4-channel	40, 70	28th St. / Little Portugal Station	
NW-01	Water Level	70 – 80	28th St. / Little Portugal Station	
MW-3C	Water Level	68 – 78	28th St. Station to East Emergency Stop	PTE
BH-179	8-channel	28, 61, 92, 105, 120, 150, 170, 200	East Emergency Stop	PTE
PZ-3C	1-channel	59	East Emergency Stop	RTC
BH-158	1-channel	78	East Emergency Stop to DTSJ Station	
BH-068	4-channel	30, 80, 160	DTSJ Station	
BH-142	Water Level	85 – 95	DTSJ Station	
BH-150	8-channel	30, 50, 80, 101, 116, 143, 170, 194	DTSJ Station	
BH-151	1-channel	192	DTSJ Station	
MW-5A	Water Level	115 – 125	DTSJ Station	
MW-5B	Water Level	83 – 93	DTSJ Station	RTC
MW-5C	Water Level	111 – 121	DTSJ Station	RTC
PZ-4A	4-channel	64, 109, 151	DTSJ Station	RTC
PZ-5A	4-channel	64, 104, 144	DTSJ Station	

Well ID	Datalogger Type	Screen / VWP Depth (ft)[1]	Location[2]	Access Restrictions[3]
ST-08	Water Level	76 – 86	DTSJ Station	
NW-05	Water Level	80 – 90	DTSJ Station to Diridon Station	RTC
BH-160	4-channel	63, 115	DTSJ Station to Diridon Station	
BH-152	4-channel	67, 90, 110	Diridon Station	
BH-153	4-channel, 1-channel	65, 94, 131, 156, 176	Diridon Station	
MW-6B	Water Level	110 – 120	Diridon Station	RTC
MW-6D	Water Level	76 – 86	Diridon Station	
MW-6E	Water Level	120 – 130	Diridon Station	
MW-6G	Water Level	125 – 135	Diridon Station	
MW-6H	Water Level, Barometric Pressure	108 – 118	Diridon Station	
MW-6J	Water Level	103 – 113	Diridon Station	
MW-6K	Water Level	150 – 160	Diridon Station	
MW-6L	Water Level	34 – 44	Diridon Station	
NW-06	Water Level	90 – 100	Diridon Station	
PZ-6D	4-channel	60, 105, 138	Diridon Station	
ST-10	Water Level	68 – 73	Diridon Station	
BH-163	1-channel	94	Diridon Station to West Emergency Stop	
BH-175	1-channel	48	Diridon Station to West Emergency Stop	
BH-037	4-channel	21, 61	Diridon Station to West Emergency Stop	
BH-166	1-channel	105	Diridon Station to West Emergency Stop	
BH-169	1-channel	103	Diridon Station to West Emergency Stop	
BH-180	4-channel	20, 47, 115, 161	West Emergency Stop	
BH-171	1-channel	100	West Emergency Stop to West Portal	
BH-173	1-channel	70	West Emergency Stop to West Portal	
ST-13	Water Level	21 – 31	West Portal	
MW-8F	Water Level	52 – 62	West Portal	
BH-176	4-channel	31, 58	West Portal / NYMF	
BH-177	1-channel	32	Santa Clara Station	PTE

[1] Screen depths and VWP installation depths rounded to the nearest foot.

[2] Precise location of all monitoring wells is provided in Figure 9

[3] PTE – Permission to Enter required for access to private property; RTC – Rolling Traffic Control and Police Escort required for access.

Groundwater Corrosivity Test Results

Groundwater Corrosivity Test Locations

Table C-3. Groundwater Corrosivity Test Locations

Borehole ID	Location	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Well Screen	
					Top Depth (ft)	Bottom Depth (ft)
MW-2E	28th Street / Little Portugal Station	1952840.24	6164753.25	88.24	110	120
MW-5A	DTSJ Station	1947847.41	6157071.56	87.57	115	125
MW-6H	Diridon Station	1945954.64	6154178.65	89.27	108	118
MW-6L	Diridon Station	1946085.68	6153886.48	90.12	34	44
MW-8A	West Portal	1952123.36	6147938.00	67.72	53	63
ST-8	DTSJ Station	1947803.10	6157096.30	87.66	76.3	86.3
ST-10	Diridon Station	1946091.50	6154194.60	88.76	68	73
ST-13	West Portal	1952004.80	6148035.50	68.00	21	31

California State Certified Laboratory No. 2153

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925 **462 2771** Fax. 925 **462 2775**
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Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Client Project No.: 507385606
Client Project Name: BSVII
Date Sampled: 05/20/20
Date Received: 05/21/20
Matrix: Ground Water

4 June, 2020
Job No.2005117
Sample No.001-003
Cust. No.12259

Analyte	**Results**	**Reporting Limit**	**Method**	**Date Analyzed**
Lab No.001				
Sample I.D.: MW-5A				
Alkalinity	370	2 mg/L	SM 2320B	05/22/20
pH (Field)	7.8	--	--	05/20/20
pH (Laboratory)	7.61	--	SM 4500-H$^+$B	05/21/20
Total Dissolved Solids	620	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	300	1 mg/L	SM 2340B	05/28/20
Water Temperature (Field)	19.1°C	--	SM 2550B	05/20/20
Langlier Index SI	0.971	--	--	06/03/20
Ryznar Index RSI	5.858	--	--	06/03/20
Lab No.002				
Sample I.D.: ST-8				
Alkalinity	87	2 mg/L	SM 2320B	05/22/20
pH (Field)	8.04	--	--	05/20/20
pH (Laboratory)	9.68	--	SM 4500-H$^+$B	05/21/20
Total Dissolved Solids	220	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	70	1 mg/L	SM 2340B	05/28/20
Water Temperature (Field)	20.7°C	--	SM 2550B	05/20/20
Langlier Index SI	0.020	--	--	06/03/20
Ryznar Index RSI	8	--	--	06/03/20
Lab No.003				
Sample I.D.: ST-10				
Alkalinity	190	2 mg/L	SM 2320B	05/22/20
pH (Field)	7.56	--	--	05/20/20
pH (Laboratory)	7.32	--	SM 4500-H$^+$B	05/21/20
Total Dissolved Solids	360	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	130	1 mg/L	SM 2340B	05/28/20
Water Temperature (Field)	21.2°C	--	SM 2550B	05/20/20
Langlier Index SI	0.142	--	--	06/03/20
Ryznar Index RSI	7.276	--	--	06/03/20

Cheryl McMillen
Laboratory Director

QUALITY CONTROL SUMMARY

Method No.: EPA 200.7
Spiked Sample No.2005091-001

Date Analyzed: 05/28/20
Matrix: Water

Analytes	Sample mg/L	True Value mg/L	MS Conc. mg/L	MSD Conc. mg/L	Average Rec. %	RPD %	Average LCS Rec. %	Acceptance Limits (%)		
								MS/MSD	RPD	LCS
Calcium	14.6	20.50	37.110	36.830	109.12	0.757	107.71	85 - 115	20	85 - 115

Analyte	Method No.	Date Analyzed	Sample No.	Blank (mg/L)	Sample Results (mg/L)	Dup. Sample Results (mg/L)	RPD %	Reporting Limit (mg/L)	QC Limits (%)
Alkalinity	SM2320B	05/22/20	2005087-001	N.D.	374.4	378.5	1.1	2	15

Analyte	Method No.	Date Analyzed	Sample ID	Sample Result	Dup. Sample Result	Difference	Not to Exceed (pH Units)
pH	SM4500-H$^+$B	05/21/20	2005121-001	8.588	8.608	0.020	0.200

Analyte	Method No.	Date Analyzed	Blank (mg/L)	True Value (mg/L)	LCS Results (mg/L)	Recovery (%)	Reporting Limit (mg/L)	QC Limits (%)
Calcium Hardness	SM2340B	05/28/20	N.D.	51.19	55.14	107.7	1	85-115
Solids, Total Dissolved	SM 2540C	05/29/20	N.D.	1000	995	99.5	10	85-115

Comments:

SI - Saturation Index
- If index is 0, water is in chemical balance.
- If index is a plus quantity, there is a tendency for calcium carbonate deposition.
- If the index is a minus quantity, calcium carbonate does not precipitate, and the probability of corrosion will increase with an increase in the negative value of the index.

RSI - Ryznar Stability Index
- With water having a Stability Index of 6.0 or less, scaling increases and the tendency for corrosion decreases. When the Stability Index is above 7.0, a protective coating of calcium carbonate may not be developed.

Notes:

Conc. – Concentration
Dup. - Duplicate
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
MS – Matrix Spike
MSD – Matrix Spike Duplicate
N.D. – None Detected
Rec. - Recovery
RPD – Relative Percent Deviation
QC – Quality Control

Average Recovery Percent = (((MS + MSD concentration / 2) – sample concentration) / Spike added) x 100
Relative Percent Deviation = 100 x ((MS – MSD) / (MS + MSD / 2))

Chain of Custody

Page 1 of 1

CERCO analytical
1100 Willow Pass Court
Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775

Job No.	CU#		Client Project I.D.	Schedule Analyte	Date Sampled	Date Due
2005117	12259		507385606			

Full Name John Hunt

Phone 510 900-2100 X

Fax 510 900-2101

Company and/or Mailing Address Inspection Services, Inc.

Cell 510-809-5130 ☐

Sample Source BSVII

ANALYSIS — **Langlier Index**

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Alk pH TDS	Ca Hardness			Langlier Index			Temperature, Water (Field) & Time		pH (Field) w/Time Analyzed				
001	MW-5A	5-20		GW	Pl	500mL	Cold	1	X							19.1		7.8				
001	MW-5A	5-20		GW	Pl	125mL	HNO3	1		X												
																x		x				
													x									
002	ST-8	5-20		GW	Pl	500mL	Cold	1	X							20.7		8.04				
002	ST-8	5-20		GW	Pl	125mL	HNO3	1		X												
													X									
003	ST-10	5-20		GW	Pl	500mL	Cold	1	X							21.2		7.56				
003	ST-10	5-20		GW	Pl	125mL	HNO3	1		X												
													X									

MATRIX
DW - Drinking Water
GW - Ground Water
SW - Surface Water
WW - Waste Water
Water
SL - Sludge
S - Soil
Product

ABBREVIATIONS
HB - Hosebib
PV - Petcock Valve
PT - Pressure Tank
PH - Pump House
RR - Restroom
GL - Glass
PL - Plastic
ST - Sterile

SAMPLE RECEIPT

Total No. of Containers	2
Rec'd Good Cond/Cold	
Conforms to Record	
Temp. a t Lab -°C	
Sampler	

Relinquished By:	Date 05/21/2020	Time
Received By: Cheryl McM	Date 5/21/20	Time 1256
Relinquished By:	Date	Time
Received By:	Date	Time
Relinquished By:	Date	Time
Received By:	Date	Time

Comments:

Email Address jhunt@inspectionservices.net

California State Certified Laboratory No. 2153

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analytical
1100 Willow Pass Court, Suite A
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925 **462 2771** Fax. 925 **462 2775**
www.cercoanalytical.com

Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Client Project No.: 507385606
Client Project Name: BSVII
Date Sampled: 05/22/20
Date Received: 05/26/20
Matrix: Ground Water

5 June, 2020
Job No.2005124
Sample No.001-003
Cust. No.12259

Analyte	**Results**	**Reporting Limit**	**Method**	**Date Analyzed**
Lab No.001				
Sample I.D.: MW-6H				
Alkalinity	200	2 mg/L	SM 2320B	06/04/20
pH (Field)	8.15	--	--	05/22/20
pH (Laboratory)	7.47	--	SM 4500-H^+B	05/26/20
Total Dissolved Solids	380	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	140	1 mg/L	SM 2340B	06/04/20
Water Temperature (Field)	19.2°C	--	SM 2550B	05/22/20
Langlier Index SI	0.562	--	--	06/05/20
Ryznar Index RSI	7.026	--	--	06/05/20
Lab No.002				
Sample I.D.: ST-13				
Alkalinity	330	2 mg/L	SM 2320B	06/04/20
pH (Field)	7.63	--	--	05/22/20
pH (Laboratory)	7.19	--	SM 4500-H^+B	05/26/20
Total Dissolved Solids	660	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	310	1 mg/L	SM 2340B	06/04/20
Water Temperature (Field)	19.4°C	--	SM 2550B	05/22/20
Langlier Index SI	0.556	--	--	06/05/20
Ryznar Index RSI	6.518	--	--	06/05/20
Lab No.003				
Sample I.D.: MW-8A				
Alkalinity	270	2 mg/L	SM 2320B	06/04/20
pH (Field)	7.51	--	--	05/22/20
pH (Laboratory)	7.37	--	SM 4500-H^+B	05/26/20
Total Dissolved Solids	490	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	210	1 mg/L	SM 2340B	06/04/20
Water Temperature (Field)	20.0°C	--	SM 2550B	05/22/20
Langlier Index SI	0.211	--	--	06/05/20
Ryznar Index RSI	7.088	--	--	06/05/20

Cheryl McMillen
Laboratory Director

QUALITY CONTROL SUMMARY

Method No.: EPA 200.7
Spiked Sample No.2005145-001

Date Analyzed: 06/04/20
Matrix: Water

Analytes	Sample mg/L	True Value mg/L	MS Conc. mg/L	MSD Conc. mg/L	Average Rec. %	RPD %	Average LCS Rec. %	Acceptance Limits (%)		
								MS/MSD	RPD	LCS
Calcium	7.457	20.50	28.790	28.150	102.50	2.248	105.51	85 - 115	20	85 - 115

Analyte	Method No.	Date Analyzed	Sample No.	Blank (mg/L)	Sample Results (mg/L)	Dup. Sample Results (mg/L)	RPD %	Reporting Limit (mg/L)	QC Limits (%)
Alkalinity	SM2320B	06/04/20	2005123-001	N.D.	390	383	1.8	2	15

Analyte	Method No.	Date Analyzed	Sample ID	Sample Result	Dup. Sample Result	Difference	Not to Exceed (pH Units)
pH	SM4500-H$^+$B	05/26/20	2005123-001	7.707	7.736	0.029	0.200

Analyte	Method No.	Date Analyzed	Blank (mg/L)	True Value (mg/L)	LCS Results (mg/L)	Recovery (%)	Reporting Limit (mg/L)	QC Limits (%)
Calcium Hardness	SM2340B	06/04/20	N.D.	135.6	137.48	101.4	1	85-115
Solids, Total Dissolved	SM 2540C	05/29/20	N.D.	1000	995	99.5	10	85-115

Comments:

SI - Saturation Index
- If index is 0, water is in chemical balance.
- If index is a plus quantity, there is a tendency for calcium carbonate deposition.
- If the index is a minus quantity, calcium carbonate does not precipitate, and the probability of corrosion will increase with an increase in the negative value of the index.

RSI - Ryznar Stability Index
- With water having a Stability Index of 6.0 or less, scaling increases and the tendency for corrosion decreases. When the Stability Index is above 7.0, a protective coating of calcium carbonate may not be developed.

Notes:

Conc. – Concentration	MSD – Matrix Spike Duplicate
Dup. - Duplicate	N.D. – None Detected
LCS – Laboratory Control Sample	Rec. - Recovery
LCSD – Laboratory Control Sample Duplicate	RPD – Relative Percent Deviation
MS – Matrix Spike	QC – Quality Control

Average Recovery Percent = (((MS + MSD concentration / 2) – sample concentration) / Spike added) x 100
Relative Percent Deviation = 100 x ((MS – MSD) / (MS + MSD / 2))

Chain of Custody

Page 1 of 1

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CERCO analytical

Job No.	CU#		Client Project I.D.
2005124	12259		557385606

Schedule:
Analyte:

Date Sampled:

Date Due:

Full Name John Hunt
~~Mr. Sam Sayawat, P.E.~~

Phone 510 900-2100 X
Fax 510 900-2101

Company and/or Mailing Address
Inspection Services, Inc.

Cell 510-809-~~[illegible]~~ ☐ 5130

Sample Source
BSVII

									ANALYSIS									Langlier Index				
Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qtv.	Alk pH TDS	Ca Hardness			Langlier Index			Temperature, Water (Field) & Time		pH (Field) w/Time Analyzed				
001	MW-6H	5-22		DW	Pl	500mL	Cold	1	X							192		8.15				
001	MW-6H	5-22		DW	Pl	125mL	HNO3	1		X												
																x		x				
002	ST-13	5-22		DW	Pl	500mL	Cold	1	X				x			194		7.63				
002	ST-13	5-22		DW	Pl	125mL	HNO3	1		X												
													X									
003	MW-8A	5-22		DW	Pl	500mL	Cold	1	X							20.0		7.51				
003	MW-8A	5-22		DW	Pl	125mL	HNO3	1		X												
													X									

MATRIX
DW - Drinking Water
GW - Ground Water
SW - Surface Water
WW - Waste Water
Water
SL - Sludge
S - Soil
Product

ABBREVIATIONS
HB - Hosebib
PV - Petcock Valve
PT - Pressure Tank
PH - Pump House
RR - Restroom
GL - Glass
PL - Plastic
ST - Sterile

SAMPLE RECEIPT

Total No. of Containers	2
Rec'd Good Cond/Cold	
Conforms to Record	
Temp. a t Lab -°C	
Sampler	

Relinquished By:	Date 5/26/2020	Time 12:35
Received By:	Date 5/26/20	Time 12:35
Relinquished By:	Date	Time
Received By:	Date	Time
Relinquished By:	Date	Time
Received By:	Date	Time

Comments:

Email Address jhunt@inspection-services.net

California State Certified Laboratory No. 2153

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Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Client Project No.: 507385606
Client Project Name: BSVII
Date Sampled: 05/26/20
Date Received: 05/26/20
Matrix: Ground Water

5 June, 2020
Job No.2005123
Sample No.001-002
Cust. No.12259

Analyte	Results	Reporting Limit	Method	Date Analyzed
Lab No.001				
Sample I.D.: MW-2E				
Alkalinity	390	2 mg/L	SM 2320B	06/04/20
pH (Field)	7.84	--	--	05/26/20
pH (Laboratory)	7.71	--	SM 4500-H^+B	05/26/20
Total Dissolved Solids	780	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	270	1 mg/L	SM 2340B	06/04/20
Water Temperature (Field)	21.1°C	--	SM 2550B	05/26/20
Langlier Index SI	0.807	--	--	06/05/20
Ryznar Index RSI	6.226	--	--	06/05/20
Lab No.002				
Sample I.D.: MW-6L				
Alkalinity	430	2 mg/L	SM 2320B	06/04/20
pH (Field)	8.10	--	--	05/26/20
pH (Laboratory)	7.22	--	SM 4500-H^+B	05/26/20
Total Dissolved Solids	740	10 mg/L	SM 2540C	05/29/20
Calcium Hardness (as $CaCO_3$)	320	1 mg/L	SM 2340B	06/04/20
Water Temperature (Field)	20.4°C	--	SM 2550B	05/26/20
Langlier Index SI	1.161	--	--	06/05/20
Ryznar Index RSI	5.778	--	--	06/05/20

Cheryl McMillen
Laboratory Director

QUALITY CONTROL SUMMARY

Method No.: EPA 200.7
Spiked Sample No.2005145-001

Date Analyzed: 06/04/20
Matrix: Water

Analytes	Sample mg/L	True Value mg/L	MS Conc. mg/L	MSD Conc. mg/L	Average Rec. %	RPD %	Average LCS Rec. %	Acceptance Limits (%)		
								MS/MSD	RPD	LCS
Calcium	7.457	20.50	28.790	28.150	102.50	2.248	105.51	85 - 115	20	85 - 115

Analyte	Method No.	Date Analyzed	Sample No.	Blank (mg/L)	Sample Results (mg/L)	Dup. Sample Results (mg/L)	RPD %	Reporting Limit (mg/L)	QC Limits (%)
Alkalinity	SM2320B	06/04/20	2005123-001	N.D.	390	383	1.8	2	15

Analyte	Method No.	Date Analyzed	Sample ID	Sample Result	Dup. Sample Result	Difference	Not to Exceed (pH Units)
pH	SM4500-H^+B	05/26/20	2005123-001	7.707	7.736	0.029	0.200

Analyte	Method No.	Date Analyzed	Blank (mg/L)	True Value (mg/L)	LCS Results (mg/L)	Recovery (%)	Reporting Limit (mg/L)	QC Limits (%)
Calcium Hardness	SM2340B	06/04/20	N.D.	135.6	137.48	101.4	1	85-115
Solids, Total Dissolved	SM 2540C	05/29/20	N.D.	1000	995	99.5	10	85-115

Comments:

SI - Saturation Index
- If index is 0, water is in chemical balance.
- If index is a plus quantity, there is a tendency for calcium carbonate deposition.
- If the index is a minus quantity, calcium carbonate does not precipitate, and the probability of corrosion will increase with an increase in the negative value of the index.

RSI - Ryznar Stability Index
- With water having a Stability Index of 6.0 or less, scaling increases and the tendency for corrosion decreases. When the Stability Index is above 7.0, a protective coating of calcium carbonate may not be developed.

Notes:

Conc. – Concentration
Dup. - Duplicate
LCS – Laboratory Control Sample
LCSD – Laboratory Control Sample Duplicate
MS – Matrix Spike
MSD – Matrix Spike Duplicate
N.D. – None Detected
Rec. - Recovery
RPD – Relative Percent Deviation
QC – Quality Control

Average Recovery Percent = (((MS + MSD concentration / 2) – sample concentration) / Spike added) x 100
Relative Percent Deviation = 100 x ((MS – MSD) / (MS + MSD / 2))

Chain of Custody

507385606

Page of 1

3942-A Valley Avenue
Pleasanton CA 94566
Tel: 925.462.2771
Fax: 925.462.2775

CERCO analytical, inc

Package Job No.	Langlier Index 2005123	CU# 12259	Schedule Analyte	Date Sampled	Date Due

Full Name ISI John Hunt

Fax

Phone

Company 510 809 5130

Sample Source BSV 11

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Alk pH TDS	Ca Hardness		Temperature, Water (Field)	Langlier Index		Field Temp	Field PH		
001	MW 2E	5/26/20	10:00	DW	Pl	500mL	Cold	1	X						21.1°C	7.84		
001				DW	Pl	250mL	HNO3	1		X								
												X						
002	MW 6L	5/26/20	0840			500	Cold	1	X				X		20.4°C	8.10		
002						125	HNO3	1		X								

NOTES:

SAMPLE RECEIPT

Total No. of Containers	2
Rec'd Good Cond/Cold	☐
Conforms to Record	☐
Sampler	☐

MATRIX

DW - Drinking Water
GW - Ground Water
SW - Surface Water
WW - Waste Water
Water
SL - Sludge
S - Soil

ABBREVIATIONS

HB - Hosebib
PV - Petcock Valve
PT - Pressure Tank
PH - Pump House
RR - Restroom
GL - Glass
PL - Plastic
ST - Sterile

Site Mgr. ______ Site Mgr.Tel# ______ Cell# ______

Site Access ______

Emer. Name 1		Emer.Phone 1	
Emer. Name 2		Emer.Phone 2	
Emer. Name 3		Emer.Phone 3	
Emer. Name 4		Emer.Phone 4	
Emer. Name 5	*See file	EDT	

Agency ______ Agency # ______ Fax# ______

	Date	Time
Relinquished By:	5/26/2020	12:35
Received By:	5/26/20	1235
Relinquished By:		
Received By:		
Relinquished By:		
Received By:		

Vibrating Wire Piezometer Calibration

Vibrating Wire Piezometers Installed

Table C-4. Vibrating Wire Piezometer Installation Details

Borehole ID	Elevation NAVD88 (ft)	VWP Installation Depth (ft)[1] Soil Classification (USCS)							
BH-150	87.14	30	50	80	100	116	143	170	194
		CL	CL	GC	CL	SM	CH	SM	SP
BH-151	87.51								192
									GC
BH-152	86.59		67	90	110				
			SP	SM	GP				
BH-153	88.80		65	94		131	156	176	
			SM	GP		SP	SM	SM	
BH-154	89.31		78			117	146	161	
			GP			GP	SP	GP	
BH-155	87.67		79		110	131			180
			CH		GP-GM	SP			CH
BH-156	88.17		72		101	128	144		
			CL		SC	SP	SP-SM		
BH-158	81.67		78						
			GW-GM						
BH-159	87.53			82					
				CL					
BH-160	82.79		63		115				
			SP		GP				
BH-163	87.75			94					
				GP					
BH-164	88.63		70	95		125		160	
			SW-SM	CL		SW-SM		SP	
BH-165	86.01	38	72						
		CL	CL-ML						
BH-166	86.58				105				
					SM				
BH-168	84.54		48						
			SW-SM						
BH-169	79.99				103				
					SP				
BH-171	76.98				100				
					SP-SM				
BH-173	67.63		70						
			SM						

Borehole ID	Elevation NAVD88 (ft)	VWP Installation Depth (ft)[1] Soil Classification (USCS)							
BH-175	89.61	48							
		SP							
BH-176	65.35	31	58						
		ML	GP-GM						
BH-177	64.39	32							
		GM							
BH-178	62.43	29							
		GM							
BH-179	80.71	28	61	92	105	120	150	170	200
		ML	SP	CL	GM	SC	CL	SW-SM	SC
BH-180	81.78	20	47		115			161	
		ML	SW-SM		SM			SW-SM	

[1] Values rounded to the nearest foot.

SLOPE INDICATOR

BH-150
Depth: 29.8 ft

VW Piezometer Calibration Certificate

Serial #: 1902142
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 7/2/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.044416E-4	-2.166346E-2	9.937680E+2
psi	-1.514797E-5	-3.142019E-3	1.441339E+2

Pressure in kPa/psi = (A x Hz^{2}) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	9.910965E+2	-2.138209E-2	1.339490E-1	-1.047240E-4	6.218716E-5	-2.802401E-3
psi	1.437413E+2	-3.101101E-3	1.942698E-2	-1.518840E-5	9.019168E-6	-4.064396E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^{2}) + (C4 x Hz x T) + (C5 x T^{2})

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2982.9	-0.1	-0.02	0.04
35.0	5.08	2927.7	35.1	5.10	-0.04
70.0	10.15	2872.0	70.1	10.16	-0.02
105.0	15.23	2815.2	105.0	15.23	-0.01
140.0	20.31	2757.4	139.9	20.30	0.02
175.0	25.38	2698.2	174.9	25.37	0.01
210.0	30.46	2637.7	210.0	30.46	0.01
245.0	35.53	2575.8	245.0	35.54	-0.01
280.0	40.61	2512.6	280.0	40.61	0.01
315.0	45.69	2447.7	315.0	45.69	0.00
350.0	50.76	2381.1	350.0	50.77	-0.01

BH-150
Depth: 49.8 ft

VW Piezometer Calibration Certificate

Serial #: 1902189
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 7/8/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.150226E-4	8.495083E-3	9.577260E+2
psi	-1.668262E-5	1.232108E-3	1.389064E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	9.580765E+2	7.466263E-3	1.807502E-2	-1.150657E-4	7.156688E-5	-2.191991E-3
psi	1.389524E+2	1.082852E-3	2.621468E-3	-1.668828E-5	1.037953E-5	-3.179102E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.4 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	2922.6	0.1	0.01	-0.02
35.0	5.08	2869.5	35.0	5.08	0.00
70.0	10.15	2815.4	69.9	10.14	0.02
105.0	15.23	2760.2	104.8	15.21	0.04
140.0	20.31	2703.5	140.0	20.31	0.00
175.0	25.38	2645.7	175.1	25.39	-0.02
210.0	30.46	2586.8	210.0	30.46	-0.01
245.0	35.53	2526.4	245.0	35.54	-0.01
280.0	40.61	2464.5	280.0	40.62	-0.01
315.0	45.69	2401.1	315.0	45.69	0.00
350.0	50.76	2335.9	350.0	50.76	0.01

SLOPE INDICATOR

BH-150
Depth: 79.8 ft

VW Piezometer Calibration Certificate

Serial #: 1902143
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 7/2/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.185024E-5	-7.657303E-2	1.038009E+3
psi	-1.332175E-5	-1.110598E-2	1.505505E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.036638E+3	-7.714399E-2	8.454051E-2	-9.191628E-5	6.110728E-5	-1.932707E-3
psi	1.503463E+2	-1.118840E-2	1.226113E-2	-1.333086E-5	8.862550E-6	-2.803056E-4

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.5 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2970.5	0.1	0.01	-0.02
35.0	5.08	2913.9	35.0	5.08	0.00
70.0	10.15	2856.3	69.9	10.14	0.02
105.0	15.23	2797.6	104.9	15.22	0.02
140.0	20.31	2737.7	140.0	20.30	0.01
175.0	25.38	2676.7	175.0	25.38	0.01
210.0	30.46	2614.4	210.0	30.46	0.00
245.0	35.53	2550.8	245.1	35.54	-0.02
280.0	40.61	2485.9	280.1	40.62	-0.01
315.0	45.69	2419.6	315.0	45.69	0.00
350.0	50.76	2351.7	350.0	50.76	0.01

SLOPE INDICATOR

BH-150
Depth: 99.8 ft

VW Piezometer Calibration Certificate

Serial #: 1901883
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 6/24/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.314278E-4	-2.146884E-1	1.802797E+3
psi	-1.906199E-5	-3.113792E-2	2.614736E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.801403E+3	-2.151812E-1	4.507333E-2	-1.316145E-4	9.309956E-5	-1.962927E-3
psi	2.612622E+2	-3.120830E-2	6.537104E-3	-1.908840E-5	1.350247E-5	-2.846885E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2975.6	0.3	0.04	-0.04
70.0	10.15	2905.3	69.7	10.11	0.04
140.0	20.31	2832.8	139.9	20.30	0.01
210.0	30.46	2759.1	209.9	30.45	0.01
280.0	40.61	2683.9	279.9	40.59	0.02
350.0	50.76	2607.0	349.9	50.74	0.02
420.0	60.92	2528.2	420.0	60.91	0.01
490.0	71.07	2447.4	490.1	71.09	-0.02
560.0	81.22	2364.6	560.3	81.26	-0.04
630.0	91.37	2279.9	630.2	91.40	-0.02
700.0	101.53	2193.3	699.7	101.48	0.05

SLOPE INDICATOR

BH-150
Depth: 115.8 ft

VW Piezometer Calibration Certificate

Serial #: 1901885	Part #: 52611035
Range : 700 kPa	Cable Part # : 50613824
Cable Length: 60 m	Calibrated by: JLW
Date of Calibration: 6/24/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.596126E-4	-4.711030E-2	1.505347E+3
psi	-2.314985E-5	-6.832772E-3	2.183321E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.503112E+3	-4.761852E-2	1.672169E-1	-1.596929E-4	5.385498E-5	-2.644684E-3
psi	2.180003E+2	-6.906239E-3	2.425191E-2	-2.316068E-5	7.810730E-6	-3.835655E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2926.8	0.2	0.03	-0.03
70.0	10.15	2855.0	69.8	10.13	0.02
140.0	20.31	2780.9	140.0	20.30	0.00
210.0	30.46	2705.0	210.0	30.46	0.00
280.0	40.61	2627.1	280.0	40.61	0.00
350.0	50.76	2546.9	350.0	50.76	0.00
420.0	60.92	2464.3	420.0	60.91	0.01
490.0	71.07	2378.8	490.1	71.08	-0.01
560.0	81.22	2290.4	560.1	81.24	-0.02
630.0	91.37	2198.8	630.1	91.39	-0.01
700.0	101.53	2103.7	699.9	101.51	0.02

12123 Harbour Reach Drive Suite 106, Mukilteo, WA 98275 USA
www.slopeindicator.com

SLOPE INDICATOR

BH-150
Depth: 142.8 ft

VW Piezometer Calibration Certificate

Serial #: 1901877
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 6/11/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.644904E-4	-9.165429E-2	1.666830E+3
psi	-2.385732E-5	-1.329333E-2	2.417533E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.664839E+3	-9.165787E-2	7.658855E-2	-1.647077E-4	6.626213E-5	-1.514113E-3
psi	2.414560E+2	-1.329338E-2	1.110784E-2	-2.388799E-5	9.610171E-6	-2.195958E-4

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2916.6	0.3	0.04	-0.04
70.0	10.15	2849.6	70.0	10.15	0.01
140.0	20.31	2780.9	139.9	20.29	0.02
210.0	30.46	2710.6	209.8	30.43	0.03
280.0	40.61	2638.5	279.9	40.59	0.02
350.0	50.76	2564.5	350.0	50.76	0.00
420.0	60.92	2488.6	420.0	60.92	0.00
490.0	71.07	2410.4	490.2	71.10	-0.03
560.0	81.22	2330.1	560.2	81.25	-0.03
630.0	91.37	2247.3	630.1	91.39	-0.02
700.0	101.53	2162.1	699.7	101.49	0.04

SLOPE INDICATOR

BH-150
Depth: 169.8 ft

VW Piezometer Calibration Certificate

Serial #: 1901882
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 6/24/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.407631E-4	-1.558916E-1	1.731924E+3
psi	-2.041596E-5	-2.261017E-2	2.511943E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.731258E+3	-1.571527E-1	7.175762E-2	-1.407604E-4	8.139304E-5	-1.600578E-3
psi	2.510889E+2	-2.279227E-2	1.040720E-2	-2.041485E-5	1.180465E-5	-2.321360E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.1 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2997.0	0.4	0.06	-0.05
70.0	10.15	2926.8	69.9	10.13	0.02
140.0	20.31	2854.8	139.7	20.26	0.05
210.0	30.46	2781.0	209.7	30.42	0.04
280.0	40.61	2705.2	280.1	40.62	-0.01
350.0	50.76	2628.0	350.1	50.77	-0.01
420.0	60.92	2549.0	420.0	60.91	0.01
490.0	71.07	2467.6	490.1	71.09	-0.02
560.0	81.22	2384.1	560.2	81.25	-0.03
630.0	91.37	2298.3	630.1	91.39	-0.01
700.0	101.53	2210.2	699.8	101.49	0.04

BH-150
Depth: 194.3 ft

VW Piezometer Calibration Certificate

Serial #: 1901884
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 6/24/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.385025E-4	-1.396292E-1	1.658333E+3
psi	-2.008809E-5	-2.025150E-2	2.405209E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.658254E+3	-1.416553E-1	1.293691E-1	-1.383396E-4	7.227697E-5	-2.899349E-3
psi	2.405009E+2	-2.054464E-2	1.876274E-2	-2.006376E-5	1.048252E-5	-4.205002E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.6 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2992.2	0.5	0.07	-0.07
70.0	10.15	2919.7	70.0	10.15	0.00
140.0	20.31	2845.4	139.7	20.26	0.05
210.0	30.46	2769.1	209.7	30.41	0.05
280.0	40.61	2690.9	279.7	40.57	0.04
350.0	50.76	2610.6	349.9	50.75	0.02
420.0	60.92	2528.0	420.2	60.95	-0.03
490.0	71.07	2443.2	490.4	71.13	-0.06
560.0	81.22	2356.3	560.3	81.27	-0.05
630.0	91.37	2267.0	630.0	91.37	0.00
700.0	101.53	2174.8	699.6	101.47	0.06

SLOPE INDICATOR

BH-151
Depth: 192.1 ft

VW Piezometer Calibration Certificate

Serial #: 1901881
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 6/24/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.313531E-4	-4.942275E-2	1.380113E+3
psi	-1.905116E-5	-7.168164E-3	2.001685E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.375979E+3	-4.866731E-2	2.042592E-1	-1.316024E-4	2.969781E-5	-1.940766E-3
psi	1.995619E+2	-7.058348E-3	2.962425E-2	-1.908664E-5	4.307152E-6	-2.814744E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.4 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3057.9	0.7	0.11	-0.10
70.0	10.15	2975.9	69.8	10.12	0.03
140.0	20.31	2890.9	139.5	20.23	0.07
210.0	30.46	2803.2	209.4	30.37	0.08
280.0	40.61	2712.1	279.9	40.60	0.01
350.0	50.76	2618.5	350.1	50.77	-0.01
420.0	60.92	2521.5	420.4	60.97	-0.05
490.0	71.07	2421.2	490.4	71.13	-0.06
560.0	81.22	2317.3	560.2	81.26	-0.03
630.0	91.37	2209.0	630.0	91.37	0.00
700.0	101.53	2095.7	699.6	101.47	0.05

BH-152
Depth: 67 ft

VW Piezometer Calibration Certificate

Serial #: 1703921
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 12/1/2017

Part #: 52611024
Cable Part # : 50613824
Calibrated by: KB
Note:

ABC Calibration Factors

	A	B	C
kPa	-6.726340E-5	-1.317549E-1	1.005524E+3
psi	-9.755732E-6	-1.910943E-2	1.458389E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.003311E+3	-1.336530E-1	6.402860E-2	-6.702627E-5	4.635615E-5	-6.521345E-4
psi	1.459479E+2	-1.938405E-2	9.286236E-3	-9.720996E-6	6.723154E-6	-9.458078E-5

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.5 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	3008.9	0.1	0.02	-0.03
35.0	5.08	2943.3	35.0	5.08	-0.01
70.0	10.15	2876.6	69.9	10.14	0.02
105.0	15.23	2808.6	104.9	15.21	0.03
140.0	20.31	2739.2	139.9	20.30	0.02
175.0	25.38	2668.5	175.0	25.38	0.01
210.0	30.46	2596.4	210.0	30.46	0.00
245.0	35.53	2522.7	245.1	35.55	-0.02
280.0	40.61	2447.4	280.2	40.64	-0.05
315.0	45.69	2370.9	315.1	45.69	-0.01
350.0	50.76	2292.8	349.8	50.74	0.05

SLOPE INDICATOR

BH-152
Depth: 90 ft

VW Piezometer Calibration Certificate

Serial #:	1703922	Part #:	52611024
Range :	350 kPa	Cable Part # :	50613824
Cable Length:	30 m	Calibrated by:	KB
Date of Calibration:	12/1/2017	Note:	

ABC Calibration Factors

	A	B	C
kPa	-1.125356E-4	-7.323039E-2	1.204852E+3
psi	-1.632191E-5	-1.062117E-2	1.747490E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.204132E+3	-7.490067E-2	1.909944E-1	-1.122494E-4	1.734882E-5	-1.532552E-3
psi	1.746384E+2	-1.086304E-2	2.770042E-2	-1.627983E-5	2.516145E-6	-2.222701E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.5 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2962.8	0.0	0.00	-0.01
35.0	5.08	2915.2	35.0	5.08	0.00
70.0	10.15	2866.8	70.0	10.16	-0.01
105.0	15.23	2817.8	105.0	15.22	0.01
140.0	20.31	2768.0	139.9	20.29	0.02
175.0	25.38	2717.2	175.0	25.38	0.00
210.0	30.46	2665.6	210.0	30.46	-0.01
245.0	35.53	2613.1	245.1	35.54	-0.02
280.0	40.61	2559.7	280.1	40.62	-0.02
315.0	45.69	2505.4	315.0	45.69	0.00
350.0	50.76	2450.0	349.9	50.75	0.02

SLOPE INDICATOR

BH-152
Depth: 110 ft

VW Piezometer Calibration Certificate

Serial #: 1701680
Range : 350 kPa
Cable Length: 45 m
Date of Calibration: 5/31/2017

Part #: 52611027
Cable Part # : 50613524
Calibrated by: AM
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.880441E-5	6.461886E-3	7.481664E+2
psi	-1.433037E-5	9.372174E-4	1.085124E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	7.454815E+2	6.474662E-3	1.472002E-1	-9.892995E-5	3.847903E-5	-5.902910E-4
psi	1.081191E+2	9.390373E-4	2.134883E-2	-1.434807E-5	5.580715E-6	-8.561146E-5

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.7 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2784.5	0.1	0.01	-0.02
35.0	5.08	2719.6	35.0	5.07	0.01
70.0	10.15	2652.9	69.9	10.14	0.02
105.0	15.23	2584.4	104.9	15.22	0.02
140.0	20.31	2513.8	140.1	20.31	-0.01
175.0	25.38	2441.4	175.0	25.39	-0.01
210.0	30.46	2366.7	210.0	30.46	-0.01
245.0	35.53	2289.6	245.0	35.53	0.00
280.0	40.61	2209.7	280.0	40.61	0.00
315.0	45.69	2126.8	315.0	45.69	0.00
350.0	50.76	2040.5	350.0	50.76	0.01

SLOPE INDICATOR

BH-153
Depth: 64.7 ft

VW Piezometer Calibration Certificate

Serial #: 1902352
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 7/25/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.183559E-4	3.087395E-2	9.235834E+2
psi	-1.716607E-5	4.477888E-3	1.339545E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	9.234805E+2	2.872125E-2	1.655374E-1	-1.180616E-4	3.541176E-5	-1.118010E-3
psi	1.339348E+2	4.165518E-3	2.400832E-2	-1.712278E-5	5.135861E-6	-1.621479E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2926.9	0.0	0.00	-0.01
35.0	5.08	2873.6	35.0	5.07	0.01
70.0	10.15	2819.1	70.0	10.15	0.00
105.0	15.23	2763.6	105.0	15.22	0.01
140.0	20.31	2706.8	140.0	20.30	0.00
175.0	25.38	2648.7	175.0	25.38	-0.01
210.0	30.46	2589.3	210.0	30.46	0.00
245.0	35.53	2528.5	245.0	35.53	0.01
280.0	40.61	2466.1	279.9	40.60	0.02
315.0	45.69	2401.7	315.0	45.69	-0.01
350.0	50.76	2335.7	350.0	50.76	0.00

BH-153
Depth: 93.7 ft

VW Piezometer Calibration Certificate

Serial #: 1901951
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 7/29/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.435951E-5	-1.356214E-1	1.226650E+3
psi	-1.368569E-5	-1.967022E-2	1.779105E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.229000E+3	-1.395923E-1	2.371567E-1	-9.357476E-5	-1.142995E-5	-2.305785E-3
psi	1.782451E+2	-2.024544E-2	3.439546E-2	-1.357139E-5	-1.657716E-6	-3.344141E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2957.8	0.0	0.00	0.00
35.0	5.08	2906.8	35.1	5.10	-0.04
70.0	10.15	2855.3	70.1	10.17	-0.03
105.0	15.23	2803.3	104.9	15.22	0.02
140.0	20.31	2750.6	139.7	20.26	0.08
175.0	25.38	2696.2	175.0	25.39	-0.01
210.0	30.46	2641.6	209.9	30.45	0.02
245.0	35.53	2585.5	245.2	35.57	-0.06
280.0	40.61	2529.2	280.0	40.61	-0.01
315.0	45.69	2471.4	315.1	45.71	-0.04
350.0	50.76	2413.3	349.8	50.73	0.06

SLOPE INDICATOR

BH-153
Depth: 130.7 ft

VW Piezometer Calibration Certificate

Serial #: 1902415
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/1/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.334463E-4	-1.827637E-1	1.624777E+3
psi	-1.935475E-5	-2.650763E-2	2.356540E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.619485E+3	-1.813437E-1	1.756764E-1	-1.340623E-4	1.022814E-4	-4.252580E-3
psi	2.348782E+2	-2.630075E-2	2.547881E-2	-1.944341E-5	1.483414E-5	-6.167629E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.4 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2870.6	0.5	0.07	-0.07
70.0	10.15	2796.6	70.0	10.15	0.00
140.0	20.31	2721.1	139.4	20.21	0.09
210.0	30.46	2642.8	209.7	30.42	0.04
280.0	40.61	2562.8	279.9	40.60	0.01
350.0	50.76	2481.0	349.9	50.75	0.01
420.0	60.92	2396.8	420.1	60.93	-0.02
490.0	71.07	2310.3	490.3	71.11	-0.04
560.0	81.22	2221.3	560.4	81.27	-0.05
630.0	91.37	2129.8	630.2	91.40	-0.03
700.0	101.53	2035.9	699.6	101.46	0.06

SLOPE INDICATOR

BH-153
Depth: 155.7 ft

VW Piezometer Calibration Certificate

Serial #: 1902411
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/1/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.409543E-4	-9.118601E-2	1.464949E+3
psi	-2.044369E-5	-1.322541E-2	2.124729E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.463049E+3	-9.162042E-2	1.365185E-1	-1.410620E-4	5.863457E-5	-2.851712E-3
psi	2.121898E+2	-1.328795E-2	1.979964E-2	-2.045859E-5	8.503926E-6	-4.135913E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2916.2	0.3	0.05	-0.05
70.0	10.15	2838.9	70.1	10.16	-0.01
140.0	20.31	2759.7	139.8	20.28	0.03
210.0	30.46	2678.4	209.5	30.39	0.07
280.0	40.61	2594.0	279.9	40.60	0.01
350.0	50.76	2507.3	350.2	50.79	-0.03
420.0	60.92	2418.3	420.1	60.93	-0.02
490.0	71.07	2326.2	490.1	71.08	-0.01
560.0	81.22	2230.7	560.1	81.24	-0.02
630.0	91.37	2131.7	630.0	91.38	-0.01
700.0	101.53	2028.8	699.8	101.49	0.03

SLOPE INDICATOR

BH-153
Depth: 175.7 ft

VW Piezometer Calibration Certificate

Serial #: 1902412
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/1/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.449446E-4	3.038778E-2	1.245863E+3
psi	-2.102244E-5	4.407375E-3	1.806972E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.240245E+3	3.200846E-2	2.572755E-1	-1.455795E-4	7.976448E-5	-5.990112E-3
psi	1.798760E+2	4.642271E-3	3.731334E-2	-2.111378E-5	1.156845E-5	-8.687617E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3038.4	0.1	0.01	-0.01
70.0	10.15	2955.0	70.0	10.15	0.00
140.0	20.31	2869.1	139.9	20.29	0.01
210.0	30.46	2780.3	209.9	30.45	0.01
280.0	40.61	2688.3	280.1	40.62	-0.01
350.0	50.76	2593.0	350.1	50.78	-0.01
420.0	60.92	2494.0	420.1	60.93	-0.01
490.0	71.07	2390.8	490.0	71.07	0.00
560.0	81.22	2282.8	559.9	81.21	0.01
630.0	91.37	2168.8	630.0	91.37	0.00
700.0	101.53	2048.3	700.0	101.52	0.00

SLOPE INDICATOR

BH-154
Depth: 77.6 ft

VW Piezometer Calibration Certificate

Serial #: 1901952	Part #: 52611024
Range : 350 kPa	Cable Part # : 50613824
Cable Length: 30 m	Calibrated by: JLW
Date of Calibration: 7/1/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-7.199869E-5	-1.899829E-1	1.246783E+3
psi	-1.044253E-5	-2.755469E-2	1.808306E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.245730E+3	-1.898180E-1	-2.208525E-2	-7.228556E-5	8.412886E-5	-1.898979E-3
psi	1.806715E+2	-2.752980E-2	-3.203082E-3	-1.048377E-5	1.220143E-5	-2.754139E-4

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3046.1	0.0	0.00	-0.01
35.0	5.08	2990.0	35.1	5.09	-0.02
70.0	10.15	2933.4	70.0	10.15	0.01
105.0	15.23	2875.9	104.9	15.22	0.02
140.0	20.31	2817.5	140.0	20.30	0.01
175.0	25.38	2758.3	175.0	25.38	0.01
210.0	30.46	2698.2	210.0	30.46	0.00
245.0	35.53	2637.1	245.1	35.55	-0.02
280.0	40.61	2575.2	280.1	40.62	-0.02
315.0	45.69	2512.3	315.1	45.70	-0.02
350.0	50.76	2448.6	349.9	50.75	0.02

BH-154
Depth: 116.6 ft

VW Piezometer Calibration Certificate

Serial #: 1701678	Part #: 52611027
Range : 350 kPa	Cable Part # : 50613524
Cable Length: 45 m	Calibrated by: AM
Date of Calibration: 6/5/2017	Note:

ABC Calibration Factors

	A	B	C
kPa	-8.205154E-5	-1.519198E-1	1.203691E+3
psi	-1.190057E-5	-2.203411E-2	1.745806E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.209713E+3	-1.565567E-1	-4.045234E-2	-8.136638E-5	5.672622E-5	-9.345126E-4
psi	1.754479E+2	-2.270583E-2	-5.866909E-3	-1.180078E-5	8.227153E-6	-1.355348E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.0 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3014.6	0.0	0.01	-0.01
35.0	5.08	2960.2	35.0	5.07	0.01
70.0	10.15	2905.0	69.9	10.14	0.02
105.0	15.23	2848.9	104.9	15.22	0.02
140.0	20.31	2792.0	139.9	20.29	0.02
175.0	25.38	2734.2	174.9	25.37	0.03
210.0	30.46	2675.3	210.0	30.46	0.00
245.0	35.53	2615.4	245.1	35.55	-0.03
280.0	40.61	2554.6	280.1	40.63	-0.04
315.0	45.69	2492.9	315.1	45.70	-0.02
350.0	50.76	2430.3	349.9	50.74	0.04

SLOPE INDICATOR

BH-154
Depth: 145.6 ft

VW Piezometer Calibration Certificate

Serial #: 1902413
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/1/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.162739E-4	-2.462030E-1	1.734103E+3
psi	-1.686410E-5	-3.570873E-2	2.515104E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.733276E+3	-2.474959E-1	1.786022E-1	-1.161868E-4	4.205720E-5	-3.468676E-3
psi	2.513816E+2	-3.589498E-2	2.590315E-2	-1.685088E-5	6.099666E-6	-5.030712E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.2 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2945.0	0.6	0.09	-0.08
70.0	10.15	2870.1	69.7	10.10	0.05
140.0	20.31	2792.5	139.9	20.29	0.02
210.0	30.46	2713.7	209.7	30.42	0.04
280.0	40.61	2633.1	279.7	40.56	0.05
350.0	50.76	2550.4	349.9	50.75	0.02
420.0	60.92	2465.7	420.1	60.93	-0.02
490.0	71.07	2378.9	490.4	71.13	-0.06
560.0	81.22	2290.1	560.5	81.29	-0.07
630.0	91.37	2199.3	630.2	91.41	-0.03
700.0	101.53	2106.6	699.5	101.45	0.08

BH-154
Depth: 160.6 ft

VW Piezometer Calibration Certificate

Serial #: 1902410	Part #: 52611035
Range : 700 kPa	Cable Part # : 50613824
Cable Length: 60 m	Calibrated by: JLW
Date of Calibration: 8/1/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.530283E-4	-4.714015E-3	1.355434E+3
psi	-2.219488E-5	-6.837101E-4	1.965891E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.355726E+3	-6.581800E-3	-7.252603E-2	-1.530596E-4	1.399178E-4	1.156981E-3
psi	1.966245E+2	-9.545758E-4	-1.051864E-2	-2.219864E-5	2.029265E-5	1.678000E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.5 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2960.5	0.2	0.04	-0.04
70.0	10.15	2883.1	69.8	10.13	0.02
140.0	20.31	2803.1	139.8	20.28	0.03
210.0	30.46	2720.6	209.9	30.45	0.01
280.0	40.61	2635.7	279.9	40.60	0.01
350.0	50.76	2547.9	350.0	50.76	0.00
420.0	60.92	2457.0	420.0	60.92	-0.01
490.0	71.07	2362.7	490.0	71.07	-0.01
560.0	81.22	2264.4	560.1	81.24	-0.02
630.0	91.37	2161.8	630.1	91.39	-0.01
700.0	101.53	2054.5	699.8	101.50	0.03

SLOPE INDICATOR

BH-155
Depth: 78.8 ft

VW Piezometer Calibration Certificate

Serial #: 1902467
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 8/9/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: VC
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.774715E-5	-4.675163E-2	1.018564E+3
psi	-1.417703E-5	-6.780751E-3	1.477302E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.017927E+3	-4.702136E-2	-4.889506E-2	-9.799769E-5	1.047687E-4	-1.650719E-3
psi	1.476326E+2	-6.819632E-3	-7.091379E-3	-1.421286E-5	1.519488E-5	-2.394081E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2997.5	0.2	0.02	-0.05
35.0	5.08	2942.1	34.9	5.06	0.02
70.0	10.15	2885.3	69.9	10.14	0.02
105.0	15.23	2827.6	104.8	15.21	0.04
140.0	20.31	2768.4	140.0	20.31	0.00
175.0	25.38	2708.1	175.1	25.40	-0.03
210.0	30.46	2646.8	210.1	30.47	-0.01
245.0	35.53	2584.1	245.0	35.54	-0.01
280.0	40.61	2520.0	280.0	40.61	0.00
315.0	45.69	2454.4	315.0	45.68	0.01
350.0	50.76	2387.2	349.9	50.75	0.02

SLOPE INDICATOR

BH-155
Depth: 109.8 ft

VW Piezometer Calibration Certificate

Serial #: 1902446
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/8/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.459451E-4	-3.213670E-2	1.361724E+3
psi	-2.116755E-5	-4.661034E-3	1.975014E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.359365E+3	-3.250912E-2	8.578486E-2	-1.461883E-4	1.020831E-4	-1.713873E-3
psi	1.971523E+2	-4.714883E-3	1.244160E-2	-2.120207E-5	1.480538E-5	-2.485675E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.3 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	2946.1	0.3	0.04	-0.04
70.0	10.15	2867.0	70.0	10.15	0.01
140.0	20.31	2785.5	139.8	20.28	0.03
210.0	30.46	2701.4	209.9	30.44	0.02
280.0	40.61	2614.8	279.8	40.59	0.02
350.0	50.76	2525.2	349.9	50.75	0.01
420.0	60.92	2432.4	420.1	60.92	-0.01
490.0	71.07	2336.1	490.2	71.09	-0.02
560.0	81.22	2235.9	560.2	81.26	-0.04
630.0	91.37	2131.6	630.1	91.39	-0.01
700.0	101.53	2022.5	699.7	101.49	0.04

SLOPE INDICATOR

BH-155
Depth: 130.8 ft

VW Piezometer Calibration Certificate

Serial #: 1902447
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/8/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.498209E-4	-1.428075E-1	1.641020E+3
psi	-2.172969E-5	-2.071248E-2	2.380098E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.640126E+3	-1.442635E-1	7.340158E-2	-1.499854E-4	1.352750E-4	-3.168672E-3
psi	2.378718E+2	-2.092292E-2	1.064562E-2	-2.175278E-5	1.961929E-5	-4.595608E-4

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2866.8	0.3	0.04	-0.04
70.0	10.15	2796.5	70.0	10.15	0.00
140.0	20.31	2724.5	139.8	20.28	0.02
210.0	30.46	2650.8	209.7	30.42	0.04
280.0	40.61	2575.1	279.8	40.58	0.03
350.0	50.76	2497.3	350.0	50.77	0.00
420.0	60.92	2417.5	420.2	60.94	-0.03
490.0	71.07	2335.6	490.2	71.10	-0.03
560.0	81.22	2251.2	560.2	81.26	-0.04
630.0	91.37	2164.3	630.1	91.40	-0.02
700.0	101.53	2075.0	699.6	101.47	0.05

SLOPE INDICATOR

BH-155
Depth: 179.3 ft

VW Piezometer Calibration Certificate

Serial #: 1902448
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/8/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.576378E-4	-9.989487E-3	1.499239E+3
psi	-2.286343E-5	-1.448853E-3	2.174462E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.497828E+3	-1.002278E-2	2.021236E-2	-1.579697E-4	1.020623E-4	-2.629277E-3
psi	2.172339E+2	-1.453630E-3	2.931452E-3	-2.291076E-5	1.480236E-5	-3.813310E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3052.3	0.1	0.02	-0.02
70.0	10.15	2979.7	69.9	10.13	0.02
140.0	20.31	2904.9	140.0	20.31	0.00
210.0	30.46	2828.2	210.1	30.47	-0.01
280.0	40.61	2749.5	280.1	40.62	-0.01
350.0	50.76	2668.6	350.0	50.76	0.00
420.0	60.92	2585.1	420.0	60.91	0.01
490.0	71.07	2498.8	490.0	71.07	0.00
560.0	81.22	2409.5	560.0	81.22	0.00
630.0	91.37	2316.8	630.0	91.37	0.01
700.0	101.53	2220.2	700.0	101.53	0.00

SLOPE INDICATOR

BH-156
Depth: 71.5 ft

VW Piezometer Calibration Certificate

Serial #: 1902348
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 7/29/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-6.297132E-5	-3.376382E-1	1.555256E+3
psi	-9.133218E-6	-4.897028E-2	2.255708E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.559168E+3	-3.411141E-1	-4.922678E-2	-6.263797E-5	1.006727E-4	-1.637304E-3
psi	2.261302E+2	-4.947268E-2	-7.139489E-3	-9.084550E-6	1.460083E-5	-2.374625E-4

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.4 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	2965.6	0.1	0.02	-0.04
35.0	5.08	2916.3	35.0	5.08	-0.01
70.0	10.15	2866.7	69.8	10.13	0.04
105.0	15.23	2816.5	104.8	15.20	0.07
140.0	20.31	2765.6	139.8	20.28	0.04
175.0	25.38	2714.0	175.1	25.39	-0.02
210.0	30.46	2661.8	210.4	30.51	-0.10
245.0	35.53	2609.8	245.2	35.56	-0.05
280.0	40.61	2557.5	279.9	40.59	0.04
315.0	45.69	2504.3	314.8	45.65	0.06
350.0	50.76	2450.0	350.1	50.77	-0.02

SLOPE INDICATOR

BH-156
Depth: 100.5 ft

VW Piezometer Calibration Certificate

Serial #: 1902449	Part #: 52611035
Range : 700 kPa	Cable Part # : 50613824
Cable Length: 60 m	Calibrated by: JLW
Date of Calibration: 8/8/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.460801E-4	-7.121828E-2	1.553111E+3
psi	-2.118713E-5	-1.032934E-2	2.252597E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.550691E+3	-7.177640E-2	1.917819E-1	-1.462274E-4	7.304709E-5	-4.181472E-3
psi	2.249008E+2	-1.040992E-2	2.781463E-2	-2.120774E-5	1.059421E-5	-6.064499E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	3025.8	0.2	0.03	-0.03
70.0	10.15	2951.8	70.1	10.16	-0.01
140.0	20.31	2876.2	139.8	20.28	0.03
210.0	30.46	2798.4	209.8	30.44	0.02
280.0	40.61	2718.5	279.9	40.60	0.01
350.0	50.76	2636.4	350.0	50.76	0.00
420.0	60.92	2551.9	420.1	60.93	-0.01
490.0	71.07	2464.8	490.1	71.08	-0.01
560.0	81.22	2374.8	560.1	81.24	-0.02
630.0	91.37	2281.7	630.1	91.39	-0.01
700.0	101.53	2185.4	699.8	101.50	0.03

SLOPE INDICATOR

BH-156
Depth: 127.5 ft

VW Piezometer Calibration Certificate

Serial #: 1902452	Part #: 52611035
Range : 700 kPa	Cable Part # : 50613824
Cable Length: 60 m	Calibrated by: JLW
Date of Calibration: 8/8/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.329148E-4	-1.831531E-1	1.676438E+3
psi	-1.927766E-5	-2.656411E-2	2.431468E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.675729E+3	-1.838385E-1	-3.384476E-3	-1.331726E-4	1.244334E-4	-2.884719E-3
psi	2.430354E+2	-2.666258E-2	-4.908595E-4	-1.931437E-5	1.804690E-5	-4.183784E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2928.3	0.4	0.05	-0.05
70.0	10.15	2855.3	69.9	10.13	0.02
140.0	20.31	2780.3	139.8	20.27	0.03
210.0	30.46	2703.6	209.7	30.42	0.04
280.0	40.61	2624.9	279.9	40.59	0.02
350.0	50.76	2544.4	349.9	50.75	0.01
420.0	60.92	2461.7	420.1	60.93	-0.02
490.0	71.07	2376.8	490.3	71.11	-0.04
560.0	81.22	2289.6	560.3	81.27	-0.05
630.0	91.37	2200.1	630.1	91.39	-0.02
700.0	101.53	2108.1	699.6	101.48	0.05

BH-156
Depth: 143.5 ft

VW Piezometer Calibration Certificate

Serial #: 1902458	Part #: 52611035
Range : 700 kPa	Cable Part # : 50613824
Cable Length: 60 m	Calibrated by: JLW
Date of Calibration: 8/8/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.489333E-4	-5.154282E-2	1.517207E+3
psi	-2.160095E-5	-7.475654E-3	2.200523E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.515724E+3	-5.185568E-2	3.662507E-2	-1.491999E-4	1.043754E-4	-2.726039E-3
psi	2.198294E+2	-7.520766E-3	5.311830E-3	-2.163885E-5	1.513784E-5	-3.953646E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.5 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3023.0	0.4	0.05	-0.05
70.0	10.15	2949.1	69.9	10.14	0.01
140.0	20.31	2873.2	139.6	20.25	0.05
210.0	30.46	2794.8	209.8	30.44	0.02
280.0	40.61	2714.3	280.1	40.62	-0.01
350.0	50.76	2631.8	350.0	50.76	0.00
420.0	60.92	2546.6	420.1	60.93	-0.01
490.0	71.07	2458.7	490.1	71.09	-0.02
560.0	81.22	2367.8	560.2	81.25	-0.02
630.0	91.37	2273.7	630.1	91.38	-0.01
700.0	101.53	2176.1	699.8	101.49	0.03

SLOPE INDICATOR

BH-158
Depth: 80 ft

VW Piezometer Calibration Certificate

Serial #: 1902468
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 8/9/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: VC
Note:

ABC Calibration Factors

	A	B	C
kPa	-8.771908E-5	-1.182579E-1	1.133561E+3
psi	-1.272258E-5	-1.715186E-2	1.644091E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.137383E+3	-1.224739E-1	7.401322E-2	-8.713025E-5	6.100456E-5	-1.817010E-3
psi	1.649577E+2	-1.776271E-2	1.073433E-2	-1.263673E-5	8.847652E-6	-2.635257E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2983.2	0.1	0.02	-0.03
35.0	5.08	2928.4	35.0	5.08	0.00
70.0	10.15	2872.7	70.0	10.15	0.01
105.0	15.23	2816.0	105.0	15.22	0.02
140.0	20.31	2758.4	139.9	20.29	0.02
175.0	25.38	2699.7	175.0	25.38	0.01
210.0	30.46	2640.0	210.0	30.46	0.00
245.0	35.53	2579.1	245.1	35.55	-0.02
280.0	40.61	2517.1	280.1	40.63	-0.04
315.0	45.69	2454.1	315.1	45.69	-0.01
350.0	50.76	2390.0	349.9	50.74	0.04

BH-159
Depth: 82 ft

VW Piezometer Calibration Certificate

Serial #: 1902474
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 8/9/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: VC
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.411469E-5	-5.705481E-2	1.011654E+3
psi	-1.365018E-5	-8.275101E-3	1.467280E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.013508E+3	-5.977573E-2	7.675936E-2	-9.384016E-5	6.980506E-5	-2.534153E-3
psi	1.469917E+2	-8.669431E-3	1.113261E-2	-1.360989E-5	1.012401E-5	-3.675349E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2989.4	0.0	0.01	-0.01
35.0	5.08	2932.5	35.0	5.08	0.00
70.0	10.15	2874.5	70.0	10.15	0.00
105.0	15.23	2815.5	105.0	15.22	0.01
140.0	20.31	2755.4	139.9	20.29	0.03
175.0	25.38	2693.9	174.9	25.37	0.01
210.0	30.46	2631.0	210.1	30.47	-0.02
245.0	35.53	2566.9	245.1	35.55	-0.02
280.0	40.61	2501.4	280.1	40.62	-0.02
315.0	45.69	2434.4	315.0	45.69	0.00
350.0	50.76	2365.8	349.9	50.75	0.02

SLOPE INDICATOR

BH-160
Depth: 63 ft

VW Piezometer Calibration Certificate

Serial #: 1902472
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 8/9/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: VC
Note:

ABC Calibration Factors

	A	B	C
kPa	-8.142068E-5	-2.050240E-1	1.330356E+3
psi	-1.180907E-5	-2.973622E-2	1.929518E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.323905E+3	-2.008578E-1	1.818682E-2	-8.239898E-5	6.012080E-5	-1.711957E-3
psi	1.920094E+2	-2.913094E-2	2.637682E-3	-1.195054E-5	8.719478E-6	-2.482896E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2974.8	-0.1	-0.01	0.02
35.0	5.08	2923.4	35.1	5.10	-0.04
70.0	10.15	2871.9	70.0	10.15	0.00
105.0	15.23	2819.7	104.9	15.21	0.03
140.0	20.31	2766.5	140.0	20.31	0.00
175.0	25.38	2712.7	175.0	25.39	-0.01
210.0	30.46	2658.3	210.0	30.46	0.01
245.0	35.53	2603.0	245.0	35.53	0.00
280.0	40.61	2547.0	280.0	40.61	0.01
315.0	45.69	2490.0	315.0	45.69	-0.01
350.0	50.76	2432.3	350.0	50.76	0.00

SLOPE INDICATOR

BH-160
Depth: 115 ft

VW Piezometer Calibration Certificate

Serial #: 1902414
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/1/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.320195E-4	-1.233323E-1	1.477207E+3
psi	-1.914781E-5	-1.788784E-2	2.142508E+2

Pressure in kPa/psi = (A x Hz^{2}) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.473180E+3	-1.212534E-1	1.958402E-2	-1.330081E-4	1.402529E-4	-2.621667E-3
psi	2.136592E+2	-1.758570E-2	2.840322E-3	-1.929051E-5	2.034125E-5	-3.802273E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^{2}) + (C4 x Hz x T) + (C5 x T^{2})

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	2911.0	-0.5	-0.08	0.08
70.0	10.15	2830.8	70.2	10.17	-0.02
140.0	20.31	2749.3	140.2	20.34	-0.03
210.0	30.46	2665.5	210.5	30.53	-0.07
280.0	40.61	2580.0	280.2	40.65	-0.03
350.0	50.76	2492.3	349.8	50.73	0.03
420.0	60.92	2401.4	419.7	60.88	0.04
490.0	71.07	2307.4	489.8	71.03	0.04
560.0	81.22	2210.0	559.9	81.20	0.02
630.0	91.37	2108.9	630.0	91.37	0.01
700.0	101.53	2003.4	700.2	101.56	-0.04

SLOPE INDICATOR

BH-163
Depth: 94 ft

VW Piezometer Calibration Certificate

Serial #: 1902493
Range : 1750 kPa
Cable Length: 250 ft
Date of Calibration: 8/12/2019

Part #: 52611040
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-3.186321E-4	-5.392883E-1	4.255921E+3
psi	-4.621368E-5	-7.821716E-2	6.172692E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	4.243673E+3	-5.329933E-1	3.614387E-1	-3.200057E-4	4.181783E-5	-8.371352E-3
psi	6.154711E+2	-7.730142E-2	5.242041E-2	-4.641127E-5	6.064950E-6	-1.214119E-3

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2905.0	0.3	0.05	-0.02
175.0	25.38	2830.9	175.7	25.49	-0.04
350.0	50.76	2755.9	349.7	50.72	0.02
525.0	76.14	2678.9	524.6	76.08	0.03
700.0	101.53	2600.6	698.5	101.31	0.09
875.0	126.91	2519.4	874.8	126.87	0.01
1050.0	152.29	2437.0	1049.3	152.19	0.04
1225.0	177.67	2351.4	1226.1	177.83	-0.06
1400.0	203.05	2263.4	1403.0	203.48	-0.17
1575.0	228.43	2175.9	1573.9	228.28	0.06
1750.0	253.82	2083.5	1749.1	253.69	0.05

SLOPE INDICATOR

BH-164
Depth: 70 ft

VW Piezometer Calibration Certificate

Serial #: 1902469	Part #: 52611024
Range : 350 kPa	Cable Part # : 50613824
Cable Length: 30 m	Calibrated by: VC
Date of Calibration: 8/9/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.111172E-4	-3.874924E-2	1.123137E+3
psi	-1.611619E-5	-5.620102E-3	1.628973E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.127604E+3	-4.325147E-2	4.638691E-2	-1.105020E-4	7.135729E-5	-2.051351E-3
psi	1.635394E+2	-6.272875E-3	6.727616E-3	-1.602640E-5	1.034914E-5	-2.975128E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	3009.6	0.1	0.01	-0.01
35.0	5.08	2959.8	35.0	5.08	0.00
70.0	10.15	2909.2	70.0	10.15	0.01
105.0	15.23	2857.9	104.8	15.21	0.05
140.0	20.31	2805.4	139.9	20.29	0.03
175.0	25.38	2751.9	175.0	25.38	0.00
210.0	30.46	2697.5	210.1	30.47	-0.02
245.0	35.53	2642.1	245.1	35.55	-0.02
280.0	40.61	2585.6	280.1	40.62	-0.03
315.0	45.69	2528.1	315.0	45.69	0.00
350.0	50.76	2469.4	349.9	50.74	0.04

SLOPE INDICATOR

BH-164
Depth: 95 ft

VW Piezometer Calibration Certificate

Serial #: 1902470
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 8/9/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: VC
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.641444E-5	1.419707E-2	8.981069E+2
psi	-1.398373E-5	2.059111E-3	1.302594E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	8.955747E+2	1.268993E-2	4.178010E-1	-9.585842E-5	-9.349566E-5	-7.242786E-5
psi	1.298876E+2	1.840454E-3	6.059478E-2	-1.390260E-5	-1.355992E-5	-1.050440E-5

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	3126.4	0.1	0.01	-0.03
35.0	5.08	3066.5	35.0	5.08	0.00
70.0	10.15	3005.3	70.0	10.15	0.01
105.0	15.23	2942.8	104.9	15.22	0.02
140.0	20.31	2878.8	139.9	20.30	0.02
175.0	25.38	2813.3	175.0	25.38	0.01
210.0	30.46	2746.1	210.0	30.46	-0.01
245.0	35.53	2677.2	245.1	35.54	-0.02
280.0	40.61	2606.6	280.0	40.62	-0.01
315.0	45.69	2534.0	315.0	45.69	0.00
350.0	50.76	2459.2	349.9	50.75	0.02

BH-164
Depth: 125 ft

VW Piezometer Calibration Certificate

Serial #: 1902450	Part #: 52611035
Range : 700 kPa	Cable Part # : 50613824
Cable Length: 60 m	Calibrated by: JLW
Date of Calibration: 8/8/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.041887E-4	-3.333799E-1	1.847512E+3
psi	-1.511129E-5	-4.835267E-2	2.679590E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.847440E+3	-3.348401E-1	1.510281E-2	-1.042251E-4	1.092732E-4	-2.187446E-3
psi	2.679391E+2	-4.856274E-2	2.190400E-3	-1.511604E-5	1.584818E-5	-3.172511E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.5 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2905.2	-0.4	-0.06	0.06
70.0	10.15	2829.1	70.4	10.22	-0.06
140.0	20.31	2753.0	140.1	20.32	-0.01
210.0	30.46	2675.0	210.2	30.49	-0.03
280.0	40.61	2596.0	279.9	40.60	0.01
350.0	50.76	2515.3	349.8	50.73	0.03
420.0	60.92	2432.8	419.8	60.89	0.03
490.0	71.07	2348.4	490.0	71.07	0.00
560.0	81.22	2262.3	560.1	81.23	-0.01
630.0	91.37	2174.2	630.2	91.40	-0.02
700.0	101.53	2084.5	699.9	101.51	0.02

SLOPE INDICATOR

BH-164
Depth: 160 ft

VW Piezometer Calibration Certificate

Serial #: 1902454
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/8/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.687498E-4	6.523612E-2	1.305928E+3
psi	-2.447509E-5	9.461700E-3	1.894089E+2

Pressure in kPa/psi = $(A \times Hz^{2}) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.303799E+3	6.416787E-2	1.773987E-1	-1.687538E-4	6.994712E-5	-2.729673E-3
psi	1.890934E+2	9.306435E-3	2.572860E-2	-2.447481E-5	1.014461E-5	-3.958917E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^{2}) + (C4 \times Hz \times T) + (C5 \times T^{2})$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.6 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2981.7	0.2	0.02	-0.02
70.0	10.15	2906.6	69.9	10.14	0.02
140.0	20.31	2829.1	139.8	20.28	0.02
210.0	30.46	2749.1	209.9	30.45	0.01
280.0	40.61	2666.6	279.9	40.60	0.01
350.0	50.76	2581.2	350.0	50.76	0.00
420.0	60.92	2492.7	420.0	60.92	0.00
490.0	71.07	2400.6	490.1	71.08	-0.01
560.0	81.22	2304.5	560.1	81.23	-0.01
630.0	91.37	2203.9	630.1	91.38	-0.01
700.0	101.53	2098.2	699.9	101.51	0.01

SLOPE INDICATOR

BH-165
Depth: 38 ft

VW Piezometer Calibration Certificate

Serial #: 1902471	Part #: 52611024
Range : 350 kPa	Cable Part # : 50613824
Cable Length: 30 m	Calibrated by: VC
Date of Calibration: 8/9/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.093952E-4	2.361581E-2	9.566460E+2
psi	-1.586643E-5	3.425184E-3	1.387498E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	9.541212E+2	2.384245E-2	9.360820E-2	-1.096496E-4	7.262138E-5	-2.872837E-3
psi	1.383787E+2	3.457933E-3	1.357624E-2	-1.590277E-5	1.053247E-5	-4.166551E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	3067.2	-0.1	-0.01	0.02
35.0	5.08	3012.5	35.0	5.08	0.00
70.0	10.15	2956.8	70.1	10.16	-0.02
105.0	15.23	2900.2	105.0	15.23	0.00
140.0	20.31	2842.3	140.0	20.31	0.00
175.0	25.38	2783.2	175.0	25.38	0.01
210.0	30.46	2722.7	210.0	30.46	0.00
245.0	35.53	2660.8	245.0	35.53	0.01
280.0	40.61	2597.3	280.0	40.61	0.00
315.0	45.69	2532.2	315.0	45.69	0.00
350.0	50.76	2465.3	350.0	50.76	0.00

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BH-165
Depth: 72 ft

VW Piezometer Calibration Certificate

Serial #: 1902473
Range : 350 kPa
Cable Length: 30 m
Date of Calibration: 8/9/2019

Part #: 52611024
Cable Part # : 50613824
Calibrated by: VC
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.118992E-4	-2.898952E-2	1.069796E+3
psi	-1.622961E-5	-4.204575E-3	1.551608E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.068018E+3	-2.868202E-2	4.218134E-2	-1.122840E-4	9.492821E-5	-3.450890E-3
psi	1.548975E+2	-4.159829E-3	6.117671E-3	-1.628484E-5	1.376769E-5	-5.004917E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2965.0	0.1	0.02	-0.03
35.0	5.08	2914.2	35.0	5.08	0.00
70.0	10.15	2862.6	69.8	10.13	0.04
105.0	15.23	2810.0	104.8	15.20	0.07
140.0	20.31	2755.9	140.0	20.31	-0.01
175.0	25.38	2701.1	175.1	25.39	-0.02
210.0	30.46	2645.3	210.1	30.47	-0.02
245.0	35.53	2588.4	245.1	35.54	-0.02
280.0	40.61	2530.3	280.0	40.61	-0.01
315.0	45.69	2470.9	315.0	45.68	0.01
350.0	50.76	2410.1	349.9	50.76	0.01

SLOPE INDICATOR

BH-166
Depth: 105 ft

VW Piezometer Calibration Certificate

Serial #: 1904678
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 12/15/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: SH
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.426793E-4	3.101145E-2	1.148135E+3
psi	-2.069388E-5	4.497831E-3	1.665229E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.145062E+3	2.862779E-2	4.351046E-1	-1.421771E-4	1.491273E-5	-5.873020E-3
psi	1.660714E+2	4.151964E-3	6.310437E-2	-2.062032E-5	2.162832E-6	-8.517796E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2947.3	0.1	0.02	-0.02
70.0	10.15	2859.9	69.8	10.13	0.02
140.0	20.31	2769.2	139.9	20.29	0.02
210.0	30.46	2674.9	210.2	30.49	-0.03
280.0	40.61	2577.7	280.0	40.62	-0.01
350.0	50.76	2476.4	349.9	50.75	0.01
420.0	60.92	2370.4	420.0	60.91	0.01
490.0	71.07	2259.2	490.0	71.06	0.01
560.0	81.22	2141.8	560.0	81.23	-0.01
630.0	91.37	2017.3	630.1	91.38	-0.01
700.0	101.53	1884.3	700.0	101.52	0.00

BH-168
Depth: 48 ft

VW Piezometer Calibration Certificate

Serial #: 1701251
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 4/7/2017

Part #: 52611035
Cable Part # : 50613524
Calibrated by: AM
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.578176E-4	4.187579E-2	1.193436E+3
psi	-2.288951E-5	6.073570E-3	1.730933E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.191504E+3	4.144445E-2	1.460549E-1	-1.578563E-4	4.265516E-5	-1.870281E-3
psi	1.728070E+2	6.010798E-3	2.118273E-2	-2.289431E-5	6.186390E-6	-2.712518E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2885.9	-0.1	-0.01	0.01
70.0	10.15	2804.0	70.0	10.16	0.00
140.0	20.31	2719.6	140.1	20.32	-0.01
210.0	30.46	2632.4	210.1	30.47	-0.01
280.0	40.61	2542.1	280.0	40.61	0.00
350.0	50.76	2448.3	350.0	50.76	0.00
420.0	60.92	2350.5	419.9	60.91	0.01
490.0	71.07	2248.1	490.0	71.06	0.00
560.0	81.22	2140.4	560.1	81.23	-0.01
630.0	91.37	2026.8	630.0	91.38	0.00
700.0	101.53	1905.9	700.0	101.52	0.00

SLOPE INDICATOR

BH-169
Depth: 103 ft

VW Piezometer Calibration Certificate

Serial #: 1904680
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 12/15/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: SH
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.530796E-4	1.438361E-2	1.303530E+3
psi	-2.220232E-5	2.086166E-3	1.890611E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.297419E+3	1.681538E-2	1.819317E-1	-1.538079E-4	6.812024E-5	-3.225264E-3
psi	1.881681E+2	2.438779E-3	2.638603E-2	-2.230716E-5	9.879658E-6	-4.677685E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2965.7	-0.2	-0.03	0.03
70.0	10.15	2886.0	70.0	10.16	-0.01
140.0	20.31	2804.4	139.9	20.30	0.01
210.0	30.46	2719.9	210.2	30.49	-0.03
280.0	40.61	2632.8	280.3	40.66	-0.04
350.0	50.76	2543.2	350.0	50.76	0.00
420.0	60.92	2450.1	419.8	60.89	0.02
490.0	71.07	2353.1	489.8	71.03	0.03
560.0	81.22	2251.6	559.9	81.20	0.02
630.0	91.37	2145.0	630.1	91.38	-0.01
700.0	101.53	2032.9	700.1	101.55	-0.02

SLOPE INDICATOR

BH-171
Depth: 100.2 ft

VW Piezometer Calibration Certificate

Serial #: 1904866
Range : 350 kPa
Cable Length: 45 m
Date of Calibration: 12/28/2019

Part #: 52611027
Cable Part # : 50613824
Calibrated by: SH
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.133389E-4	-1.441844E-3	9.944128E+2
psi	-1.643842E-5	-2.091218E-4	1.442274E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	9.884312E+2	1.665761E-3	5.811107E-2	-1.141484E-4	7.071478E-5	-1.401621E-3
psi	1.433548E+2	2.415897E-4	8.428001E-3	-1.655524E-5	1.025595E-5	-2.032808E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.5 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	2955.6	0.1	0.01	-0.02
35.0	5.08	2903.1	35.0	5.08	0.00
70.0	10.15	2849.6	70.0	10.15	0.01
105.0	15.23	2795.3	104.8	15.20	0.06
140.0	20.31	2739.4	139.9	20.30	0.02
175.0	25.38	2682.1	175.2	25.41	-0.06
210.0	30.46	2624.2	210.1	30.48	-0.04
245.0	35.53	2565.1	245.0	35.53	0.01
280.0	40.61	2504.5	279.9	40.59	0.03
315.0	45.69	2442.1	315.0	45.68	0.01
350.0	50.76	2378.0	350.1	50.77	-0.02

SLOPE INDICATOR

BH-173
Depth: 70 ft

VW Piezometer Calibration Certificate

Serial #: 1904864
Range : 350 kPa
Cable Length: 45 m
Date of Calibration: 12/28/2019

Part #: 52611027
Cable Part # : 50613824
Calibrated by: SH
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.074833E-5	-2.009092E-1	1.398415E+3
psi	-1.316193E-5	-2.913942E-2	2.028230E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.396626E+3	-1.995762E-1	-1.256905E-1	-9.135751E-5	1.197239E-4	-1.615946E-3
psi	2.025563E+2	-2.894506E-2	-1.822922E-2	-1.324982E-5	1.736387E-5	-2.343649E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied	Equivalent	Frequency	Calculated		Error
(kPa)	(psi)	(Hz)	(kPa)	(psi)	(%FS)
0.0	0.00	2971.5	0.1	0.02	-0.04
35.0	5.08	2924.1	35.0	5.08	0.00
70.0	10.15	2876.2	69.8	10.13	0.05
105.0	15.23	2827.4	104.9	15.22	0.03
140.0	20.31	2778.0	140.0	20.30	0.01
175.0	25.38	2728.1	174.9	25.37	0.02
210.0	30.46	2677.3	210.0	30.46	-0.01
245.0	35.53	2625.9	245.1	35.55	-0.03
280.0	40.61	2573.8	280.2	40.63	-0.05
315.0	45.69	2521.2	315.1	45.69	-0.01
350.0	50.76	2468.0	349.8	50.74	0.05

SLOPE INDICATOR

BH-175
Depth: 48 ft

VW Piezometer Calibration Certificate

Serial #: 1904867
Range : 350 kPa
Cable Length: 45 m
Date of Calibration: 12/28/2019

Part #: 52611027
Cable Part # : 50613824
Calibrated by: SH
Note:

ABC Calibration Factors

	A	B	C
kPa	-7.155368E-5	-2.244816E-1	1.294142E+3
psi	-1.037798E-5	-3.255830E-2	1.876994E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.296052E+3	-2.258857E-1	-9.791946E-2	-7.156809E-5	9.319018E-5	-1.586150E-3
psi	1.879698E+2	-3.276080E-2	-1.420152E-2	-1.037971E-5	1.351562E-5	-2.300435E-4

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	2964.0	0.2	0.02	-0.05
35.0	5.08	2910.0	35.0	5.07	0.01
70.0	10.15	2855.5	69.7	10.11	0.09
105.0	15.23	2799.5	104.9	15.22	0.02
140.0	20.31	2742.6	140.3	20.34	-0.07
175.0	25.38	2685.9	175.0	25.38	0.00
210.0	30.46	2628.0	210.0	30.46	-0.01
245.0	35.53	2569.4	245.0	35.53	0.01
280.0	40.61	2509.8	280.0	40.61	0.00
315.0	45.69	2449.4	315.0	45.69	0.00
350.0	50.76	2388.1	350.0	50.76	0.00

BH-176
Depth: 29.4 ft

VW Piezometer Calibration Certificate

Serial #: 1904868
Range : 350 kPa
Cable Length: 45 m
Date of Calibration: 12/28/2019

Part #: 52611027
Cable Part # : 50613824
Calibrated by: SH
Note:

ABC Calibration Factors

	A	B	C
kPa	-8.516124E-5	-1.726240E-1	1.161561E+3
psi	-1.235159E-5	-2.503700E-2	1.684702E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.159703E+3	-1.729792E-1	1.237637E-1	-8.529234E-5	5.821877E-5	-2.421822E-3
psi	1.681948E+2	-2.508763E-2	1.794978E-2	-1.237017E-5	8.443621E-6	-3.512432E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2816.1	0.1	0.01	-0.02
35.0	5.08	2762.1	35.0	5.08	-0.01
70.0	10.15	2707.4	70.0	10.15	0.01
105.0	15.23	2651.9	104.9	15.21	0.04
140.0	20.31	2595.5	139.8	20.28	0.05
175.0	25.38	2537.8	175.0	25.38	0.00
210.0	30.46	2479.4	210.0	30.46	-0.01
245.0	35.53	2419.9	245.1	35.55	-0.04
280.0	40.61	2359.6	280.1	40.62	-0.02
315.0	45.69	2298.2	315.0	45.69	-0.01
350.0	50.76	2235.9	349.9	50.74	0.04

BH-176
Depth: 57.4 ft

VW Piezometer Calibration Certificate

Serial #: 1904684	Part #: 52611035
Range : 700 kPa	Cable Part # : 50613824
Cable Length: 60 m	Calibrated by: SH
Date of Calibration: 12/21/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-1.403048E-4	-2.277320E-1	1.986109E+3
psi	-2.034949E-5	-3.302974E-2	2.880608E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.984587E+3	-2.276382E-1	-4.363245E-2	-1.407824E-4	1.521830E-4	-3.728748E-3
psi	2.878299E+2	-3.301497E-2	-6.328129E-3	-2.041804E-5	2.207150E-5	-5.407901E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3037.0	0.4	0.06	-0.06
70.0	10.15	2972.0	70.0	10.15	0.00
140.0	20.31	2905.9	139.6	20.24	0.06
210.0	30.46	2838.2	209.6	30.39	0.06
280.0	40.61	2768.9	279.9	40.59	0.02
350.0	50.76	2698.3	350.1	50.78	-0.01
420.0	60.92	2626.3	420.3	60.96	-0.04
490.0	71.07	2553.0	490.2	71.10	-0.03
560.0	81.22	2478.0	560.2	81.26	-0.04
630.0	91.37	2401.5	630.0	91.38	-0.01
700.0	101.53	2323.3	699.7	101.48	0.04

SLOPE INDICATOR

BH-177
Depth: 32 ft

VW Piezometer Calibration Certificate

Serial #: 1904679
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 12/15/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: SH
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.463411E-4	9.177108E-3	1.218053E+3
psi	-2.122498E-5	1.331027E-3	1.766637E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.215716E+3	8.133501E-3	2.508541E-1	-1.464472E-4	7.581899E-5	-5.050223E-3
psi	1.763185E+2	1.179623E-3	3.638203E-2	-2.123962E-5	1.099623E-5	-7.324471E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2916.2	0.3	0.04	-0.04
70.0	10.15	2832.5	69.9	10.14	0.01
140.0	20.31	2746.1	139.7	20.26	0.04
210.0	30.46	2656.1	210.0	30.46	0.00
280.0	40.61	2563.4	280.0	40.61	0.00
350.0	50.76	2467.2	349.9	50.75	0.01
420.0	60.92	2366.8	420.0	60.92	0.00
490.0	71.07	2261.9	490.1	71.08	-0.01
560.0	81.22	2151.9	560.1	81.24	-0.02
630.0	91.37	2036.0	630.1	91.39	-0.02
700.0	101.53	1913.4	699.8	101.50	0.02

BH-178
Depth: 29 ft

VW Piezometer Calibration Certificate

Serial #: 95788	Part #: 52611024
Range : 50 psi	Cable Part # : 50613524
Cable Length: 30 m	Calibrated by: KB
Date of Calibration: 5/12/2008	Note:

ABC Calibration Factors

	A	B	C
kPa	-6.044300E-5	-1.144121E-1	8.440548E+2
psi	-8.766516E-6	-1.659408E-2	1.224198E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	8.461565E+2	-1.153167E-1	-1.160210E-1	-6.043083E-5	5.579186E-5	-1.187242E-3
psi	1.227203E+2	-1.672468E-2	-1.682683E-2	-8.764443E-6	8.091641E-6	-1.721888E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.6 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (psi)	Equivalent (kPa)	Frequency (Hz)	Calculated (psi)	Calculated (kPa)	Error (%FS)
0.00	0.0	2908.7	-0.02	-0.1	0.03
5.00	34.5	2833.7	5.00	34.5	-0.01
10.00	68.9	2757.3	10.02	69.1	-0.03
15.00	103.4	2679.6	15.01	103.5	-0.02
20.00	137.9	2600.1	20.01	138.0	-0.01
25.00	172.4	2518.9	25.00	172.4	0.00
30.00	206.8	2435.7	29.99	206.8	0.01
35.00	241.3	2350.5	34.98	241.2	0.04
40.00	275.8	2262.6	40.00	275.8	0.01
45.00	310.3	2172.3	45.00	310.3	-0.01
50.00	344.7	2079.4	50.01	344.8	-0.02

SLOPE INDICATOR

BH-179
Depth: 28 ft

VW Piezometer Calibration Certificate

Serial #: 87285R
Range : 350 kPa
Cable Length: 30 M
Date of Calibration: 8/28/2020

Part #: 52611024
Cable Part # : 50613524
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.586274E-5	-8.350985E-3	8.685477E+2
psi	-1.390372E-5	-1.211208E-3	1.259722E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	8.685715E+2	-9.596221E-3	4.687065E-2	-9.579050E-5	5.955957E-5	-1.225650E-3
psi	1.259712E+2	-1.391765E-3	6.797774E-3	-1.389275E-5	8.638081E-6	-1.777592E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.8 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2966.8	0.0	0.00	0.00
35.0	5.08	2905.4	35.1	5.09	-0.02
70.0	10.15	2843.0	70.0	10.15	0.01
105.0	15.23	2779.3	104.8	15.21	0.04
140.0	20.31	2713.5	140.0	20.31	-0.01
175.0	25.38	2646.5	175.0	25.39	-0.01
210.0	30.46	2577.8	210.0	30.46	0.00
245.0	35.53	2507.2	245.0	35.54	0.00
280.0	40.61	2434.6	280.0	40.61	0.00
315.0	45.69	2359.9	315.0	45.68	0.01
350.0	50.76	2282.6	350.0	50.77	0.00

SLOPE INDICATOR

BH-179
Depth: 61 ft

VW Piezometer Calibration Certificate

Serial #: 85434R
Range : 350 kPa
Cable Length: 85 FT
Date of Calibration: 8/28/2020

Part #: 52611020
Cable Part # : 50613524
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.053632E-4	8.395022E-3	9.140220E+2
psi	-1.528164E-5	1.217595E-3	1.325677E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	9.135945E+2	7.719354E-3	4.079271E-2	-1.053291E-4	3.294267E-5	3.808804E-4
psi	1.325010E+2	1.119558E-3	5.916274E-3	-1.527616E-5	4.777762E-6	5.524009E-5

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.8 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2985.3	0.1	0.01	-0.02
35.0	5.08	2928.5	35.0	5.08	0.00
70.0	10.15	2870.6	69.9	10.14	0.03
105.0	15.23	2811.3	104.9	15.21	0.03
140.0	20.31	2750.6	140.0	20.30	0.01
175.0	25.38	2688.3	175.1	25.40	-0.04
210.0	30.46	2625.0	210.0	30.46	-0.01
245.0	35.53	2560.0	245.0	35.53	0.00
280.0	40.61	2493.2	280.0	40.61	0.00
315.0	45.69	2424.6	315.0	45.68	0.01
350.0	50.76	2353.9	350.0	50.76	0.01

SLOPE INDICATOR

BH-179
Depth: 92 ft

VW Piezometer Calibration Certificate

Serial #: 2002532	Part #: 52611024
Range : 350 kPa	Cable Part # : 50613824
Cable Length: 30 M	Calibrated by: BB
Date of Calibration: 6/17/2020	Note:

ABC Calibration Factors

	A	B	C
kPa	-8.975391E-5	-1.805016E-1	1.404673E+3
psi	-1.301770E-5	-2.617954E-2	2.037306E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.407968E+3	-1.842015E-1	9.753541E-2	-8.920037E-5	4.301143E-5	-2.720735E-3
psi	2.042013E+2	-2.671523E-2	1.414582E-2	-1.293696E-5	6.238061E-6	-3.945954E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3076.2	0.1	0.01	-0.02
35.0	5.08	3028.2	35.0	5.08	-0.01
70.0	10.15	2979.6	70.0	10.15	0.00
105.0	15.23	2930.5	104.9	15.22	0.02
140.0	20.31	2880.6	139.9	20.30	0.01
175.0	25.38	2830.0	175.0	25.38	-0.01
210.0	30.46	2778.8	210.0	30.46	-0.01
245.0	35.53	2726.9	245.1	35.54	-0.02
280.0	40.61	2674.3	280.1	40.62	-0.01
315.0	45.69	2620.9	315.1	45.70	-0.02
350.0	50.76	2567.0	349.9	50.75	0.03

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BH-179
Depth: 105 ft

VW Piezometer Calibration Certificate

Serial #: 1701252R
Range : 700 kPa
Cable Length: 60 M
Date of Calibration: 8/28/2020

Part #: 52611035
Cable Part # : 50613824
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.632206E-4	4.997000E-2	1.228709E+3
psi	-2.367315E-5	7.247536E-3	1.782092E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.227371E+3	4.961421E-2	7.965774E-2	-1.633511E-4	6.277027E-5	-1.952424E-3
psi	1.780088E+2	7.195679E-3	1.155297E-2	-2.369124E-5	9.103737E-6	-2.831652E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.

TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.

Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 14.7 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2901.2	-0.1	-0.02	0.02
70.0	10.15	2821.9	70.0	10.15	0.00
140.0	20.31	2740.2	140.1	20.31	-0.01
210.0	30.46	2655.7	210.3	30.50	-0.04
280.0	40.61	2568.6	280.2	40.64	-0.03
350.0	50.76	2478.2	350.1	50.78	-0.02
420.0	60.92	2384.5	419.8	60.89	0.03
490.0	71.07	2286.4	489.7	71.02	0.04
560.0	81.22	2183.7	559.5	81.15	0.07
630.0	91.37	2073.3	630.7	91.48	-0.10
700.0	101.53	1959.6	699.9	101.51	0.02

SLOPE INDICATOR

BH-179
Depth: 120 ft

VW Piezometer Calibration Certificate

Serial #: 1902451
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/8/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.538539E-4	-1.602085E-2	1.392330E+3
psi	-2.231462E-5	-2.323628E-3	2.019404E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.389232E+3	-1.655414E-2	1.384251E-1	-1.540103E-4	8.827220E-5	-4.119317E-4
psi	2.014840E+2	-2.400891E-3	2.007616E-2	-2.233652E-5	1.280235E-5	-5.974354E-5

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2956.5	0.1	0.02	-0.02
70.0	10.15	2880.2	69.9	10.14	0.02
140.0	20.31	2801.3	140.1	20.32	-0.02
210.0	30.46	2720.6	210.0	30.45	0.00
280.0	40.61	2637.5	279.8	40.58	0.03
350.0	50.76	2551.4	349.9	50.75	0.01
420.0	60.92	2462.3	420.1	60.93	-0.01
490.0	71.07	2370.1	490.1	71.08	-0.01
560.0	81.22	2274.1	560.2	81.26	-0.03
630.0	91.37	2174.4	630.1	91.38	-0.01
700.0	101.53	2070.1	699.9	101.50	0.02

SLOPE INDICATOR

BH-179
Depth: 150 ft

VW Piezometer Calibration Certificate

Serial #: 1902453
Range : 700 kPa
Cable Length: 60 m
Date of Calibration: 8/8/2019

Part #: 52611035
Cable Part # : 50613824
Calibrated by: JLW
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.709651E-4	-3.795874E-2	1.572528E+3
psi	-2.479639E-5	-5.505450E-3	2.280759E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.575045E+3	-4.320367E-2	1.887068E-1	-1.704879E-4	1.792856E-4	-9.492033E-3
psi	2.284329E+2	-6.265942E-3	2.736864E-2	-2.472631E-5	2.600226E-5	-1.376655E-3

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.5 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2924.2	-0.4	-0.06	0.05
70.0	10.15	2855.1	70.5	10.23	-0.07
140.0	20.31	2785.7	140.1	20.32	-0.01
210.0	30.46	2714.3	209.9	30.45	0.01
280.0	40.61	2640.8	280.0	40.61	0.00
350.0	50.76	2565.5	349.9	50.75	0.02
420.0	60.92	2487.9	419.9	60.90	0.02
490.0	71.07	2407.8	490.0	71.06	0.01
560.0	81.22	2325.1	560.0	81.22	0.00
630.0	91.37	2239.5	630.1	91.38	-0.01
700.0	101.53	2150.8	700.0	101.53	0.00

SLOPE INDICATOR

BH-179
Depth: 170 ft

VW Piezometer Calibration Certificate

Serial #: 2002528
Range : 700 kPa
Cable Length: 60 M
Date of Calibration: 6/17/2020

Part #: 52611035
Cable Part # : 50613824
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.183165E-4	-3.173923E-1	2.108078E+3
psi	-1.716036E-5	-4.603386E-2	3.057509E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	2.107179E+3	-3.179743E-1	3.879556E-2	-1.184750E-4	8.966623E-5	-2.914809E-3
psi	3.056097E+2	-4.611665E-2	5.626622E-3	-1.718274E-5	1.300453E-5	-4.227424E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3087.3	0.5	0.07	-0.07
70.0	10.15	3020.4	70.0	10.16	-0.01
140.0	20.31	2952.4	139.7	20.26	0.05
210.0	30.46	2883.1	209.5	30.39	0.07
280.0	40.61	2812.7	279.3	40.51	0.10
350.0	50.76	2740.0	350.1	50.78	-0.02
420.0	60.92	2666.5	420.5	60.99	-0.07
490.0	71.07	2592.1	490.4	71.13	-0.06
560.0	81.22	2516.2	560.4	81.27	-0.05
630.0	91.37	2439.1	630.0	91.38	-0.01
700.0	101.53	2360.6	699.5	101.46	0.07

SLOPE INDICATOR

BH-179
Depth: 200 ft

VW Piezometer Calibration Certificate

Serial #: 1902494	Part #: 52611040
Range : 1750 kPa	Cable Part # : 50613824
Cable Length: 250 ft	Calibrated by: JLW
Date of Calibration: 8/12/2019	Note:

ABC Calibration Factors

	A	B	C
kPa	-3.710084E-4	-2.517953E-2	3.265981E+3
psi	-5.381022E-5	-3.651982E-3	4.736905E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	3.255638E+3	-2.344239E-2	6.512242E-1	-3.715182E-4	3.472826E-5	-8.816698E-3
psi	4.721737E+2	-3.399912E-3	9.444876E-2	-5.388226E-5	5.036731E-6	-1.278709E-3

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.3 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2933.3	-0.1	-0.02	0.01
175.0	25.38	2852.6	175.1	25.40	-0.01
350.0	50.76	2769.7	350.1	50.78	-0.01
525.0	76.14	2684.3	525.1	76.16	-0.01
700.0	101.53	2596.3	699.7	101.49	0.02
875.0	126.91	2505.0	874.8	126.88	0.01
1050.0	152.29	2410.2	1050.1	152.30	0.00
1225.0	177.67	2311.7	1225.1	177.69	-0.01
1400.0	203.05	2209.0	1400.0	203.05	0.00
1575.0	228.43	2101.2	1575.1	228.44	0.00
1750.0	253.82	1987.8	1750.0	253.81	0.00

BH-180
Depth: 20 ft

VW Piezometer Calibration Certificate

Serial #: 2002533
Range : 350 kPa
Cable Length: 30 M
Date of Calibration: 6/17/2020

Part #: 52611024
Cable Part # : 50613824
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-9.200363E-5	-6.625656E-2	1.121704E+3
psi	-1.334400E-5	-9.609702E-3	1.626894E+2

Pressure in kPa/psi $= (A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.128405E+3	-7.241881E-2	1.342062E-1	-9.098105E-5	2.117045E-5	-2.009149E-3
psi	1.636555E+2	-1.050309E-2	1.946428E-2	-1.319522E-5	3.070406E-6	-2.913922E-4

Pressure in kPa/psi $= C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	(psi)	Error (%FS)
0.0	0.00	3150.2	-0.0	-0.01	0.01
35.0	5.08	3095.4	35.1	5.09	-0.02
70.0	10.15	3040.0	70.0	10.16	-0.01
105.0	15.23	2983.7	105.0	15.22	0.01
140.0	20.31	2926.2	140.0	20.31	-0.01
175.0	25.38	2867.9	175.0	25.38	0.01
210.0	30.46	2808.4	210.0	30.46	0.00
245.0	35.53	2747.8	245.0	35.53	0.01
280.0	40.61	2685.9	280.0	40.61	-0.01
315.0	45.69	2622.8	315.0	45.69	-0.01
350.0	50.76	2558.4	350.0	50.76	0.00

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BH-180
Depth: 47 ft

VW Piezometer Calibration Certificate

Serial #: 2002535
Range : 350 kPa
Cable Length: 30 M
Date of Calibration: 6/17/2020

Part #: 52611024
Cable Part # : 50613824
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-7.166031E-5	-1.481049E-1	1.041532E+3
psi	-1.039345E-5	-2.148080E-2	1.510615E+2

Pressure in kPa/psi = (A x Hz^2) + (B x Hz) + C, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.038676E+3	-1.472654E-1	7.551760E-2	-7.199848E-5	5.490712E-5	-1.629753E-3
psi	1.506419E+2	-2.135829E-2	1.095252E-2	-1.044213E-5	7.963324E-6	-2.363674E-4

Pressure in kPa/psi = C0 + (C1 x Hz) + (C2 x T) + (C3 x Hz^2) + (C4 x Hz x T) + (C5 x T^2)

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	2916.2	0.2	0.03	-0.06
35.0	5.08	2854.2	35.0	5.08	-0.01
70.0	10.15	2791.3	69.8	10.12	0.06
105.0	15.23	2727.1	104.7	15.18	0.09
140.0	20.31	2660.9	140.1	20.31	-0.02
175.0	25.38	2594.2	175.1	25.39	-0.02
210.0	30.46	2526.2	210.1	30.47	-0.02
245.0	35.53	2456.9	245.1	35.55	-0.02
280.0	40.61	2386.2	280.1	40.62	-0.03
315.0	45.69	2314.1	315.1	45.70	-0.02
350.0	50.76	2240.8	349.8	50.74	0.05

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BH-180
Depth: 115 ft

VW Piezometer Calibration Certificate

Serial #: 2002529
Range : 700 kPa
Cable Length: 60 M
Date of Calibration: 6/17/2020

Part #: 52611035
Cable Part # : 50613824
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.299536E-4	-2.430486E-1	1.964040E+3
psi	-1.884818E-5	-3.525122E-2	2.848599E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.963932E+3	-2.434559E-1	-8.585534E-3	-1.302373E-4	1.063030E-4	-4.212357E-3
psi	2.848342E+2	-3.530905E-2	-1.245183E-3	-1.888866E-5	1.541740E-5	-6.109292E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15°C

Thermistor reading is 15.4 °C.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3062.9	0.5	0.07	-0.07
70.0	10.15	2995.3	70.1	10.17	-0.02
140.0	20.31	2926.6	139.7	20.26	0.05
210.0	30.46	2856.5	209.4	30.37	0.09
280.0	40.61	2784.4	279.8	40.58	0.03
350.0	50.76	2710.9	350.1	50.78	-0.02
420.0	60.92	2636.2	420.2	60.94	-0.03
490.0	71.07	2559.8	490.4	71.12	-0.05
560.0	81.22	2481.9	560.3	81.27	-0.05
630.0	91.37	2402.5	630.0	91.38	0.00
700.0	101.53	2321.3	699.6	101.47	0.06

SLOPE INDICATOR

BH-180
Depth: 161 ft

VW Piezometer Calibration Certificate

Serial #: 2002530
Range : 700 kPa
Cable Length: 60 M
Date of Calibration: 6/17/2020

Part #: 52611035
Cable Part # : 50613824
Calibrated by: BB
Note:

ABC Calibration Factors

	A	B	C
kPa	-1.415534E-4	-1.062602E-1	1.633704E+3
psi	-2.053059E-5	-1.541174E-2	2.369487E+2

Pressure in kPa/psi = $(A \times Hz^2) + (B \times Hz) + C$, where Hz is frequency in Hertz.

TI Calibration Factors

	C0	C1	C2	C3	C4	C5
kPa	1.633435E+3	-1.087611E-1	1.963248E-1	-1.413316E-4	8.367454E-5	-4.667061E-3
psi	2.369014E+2	-1.577391E-2	2.847350E-2	-2.049769E-5	1.213554E-5	-6.768761E-4

Pressure in kPa/psi = $C0 + (C1 \times Hz) + (C2 \times T) + (C3 \times Hz^2) + (C4 \times Hz \times T) + (C5 \times T^2)$

Where Hz is the frequency reading in Hertz and T is the Thermistor reading in degrees C.
TI factors are calculated from temperatures at 5.0, 15.0 and 25.0 degrees C.
Applied pressure and temperature are NIST traceable.

Summary of Test Results at 15℃

Thermistor reading is 15.4 ℃.

Applied Pressure is referenced to 1 atm. Calculated Pressure uses ABC Calibration factors.

Applied (kPa)	Equivalent (psi)	Frequency (Hz)	Calculated (kPa)	Calculated (psi)	Error (%FS)
0.0	0.00	3042.4	0.2	0.02	-0.02
70.0	10.15	2969.5	70.0	10.15	0.01
140.0	20.31	2894.9	139.8	20.28	0.03
210.0	30.46	2818.3	209.9	30.44	0.01
280.0	40.61	2740.0	279.8	40.58	0.03
350.0	50.76	2659.4	350.0	50.76	0.00
420.0	60.92	2576.8	420.0	60.91	0.00
490.0	71.07	2491.6	490.2	71.09	-0.02
560.0	81.22	2403.9	560.3	81.26	-0.04
630.0	91.37	2313.6	630.2	91.40	-0.02
700.0	101.53	2220.6	699.7	101.49	0.04

Appendix D
Laboratory Index Tests

Laboratory Index Test Summary Tables
Moisture and Density Test Results
Specific Gravity Test Results
Fines Content Test Results
Particle Size Analysis Results
Sieve and Hydrometer Results
Atterberg Limits Results

Laboratory Index Test Summary Tables

BH-108 to BH-143 Summary Table
BH-150 to BH-180 Summary Table

Laboratory Index Testing

Table D-1. Summary of Index Tests

Test Type	Standard	No. Tests Assigned (MMW)	No. Tests Assigned (HNTB/WSP)
Unit Weight	ASTM D7263	156	14
Moisture Content	ASTM D2216	189	55
Specific Gravity	ASTM D854	7	4
Sieve Analysis	ASTM D6913	83	46
Sieve and Hydrometer	ASTM D7928	39	13
Fines Content	ASTM D1140	80	0
Atterberg Limits	ASTM D4318	272	33

Table D-2. Summary of 2018 - 2019 GI Laboratory Index Testing Results

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC%	FINES %	ATTERBURG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	TEST LISTING
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4				
BH-108	50.5	10A	Sandy Lean CLAY (CL)	131	107	23	66	31	11														T, A, S
BH-108	75.5	15A	Lean CLAY with sand (CL)	131	107	23	76	30	8														T, A, S
BH-108	90.5	18A&B	Fat CLAY (CH)			27										1337	7.90	9	245				M, Co
BH-109	25.0	6	Fat CLAY (CH)																				CU, *C
BH-109	64.0	14	Lean CLAY with sand (CL)																				CU
BH-109	75.0	16B	Lean CLAY (CL)			20	87	31	14														M, A, S
BH-109	84.5	18A&18B	Silty SAND (SM)																				*Abr. (Comp.)
BH-109	89.0	19	Sandy Lean CLAY (CL/CH)					46	27														A
BH-109	95.0	20B	Organic CLAY (OL/OH)			28		47	22														M, A
BH-109	105.0	22A&22B	Organic SILT (OL)			24	100	NP	NP														M, S, H, A
BH-109	115.0	24, 25, 26	Silty SAND (SM)				13																F
BH-109	124.0	27	Fat CLAY (CL/CH)					51	26														A
BH-112	45.0	9	Fat CLAY (CH)					55	30														A
BH-112	65.5	13A&B,14,15	Clayey SAND with gravel (SC)																				Abr. (Comp.)
BH-112	81.0	16	Poorly-graded SAND with silt and			7																	M, S
			gravel (SP-SM)																				
BH-112	100.5	20A&B	Sandy Lean CLAY (CL)			20	67	29	10														M, A, S
BH-112	140.5	28	Sandy Lean CLAY (CL)					31	12														A
BH-113	45.0	9	Fat CLAY (CH)					61	37														A
BH-113	55.0	11	Sandy Lean CLAY (CL)					31	13														A
BH-113	70.5	14A	Poorly-graded SAND with silt and			12	7																M, S
			gravel (SP-SM)																				
BH-113	96.0	19B	Lean CLAY (CL)			20	89	32	14														M, A, S
BH-113	110.5	22A	Silty SAND (SM)	127	102	25																	T
BH-113	111.0	22B	Silty SAND (SM)				45																S
BH-113	135.0	27	Lean CLAY (CL)					43	23														A
BH-113	145.0	29	Sandy Lean CLAY (CL)					38	21														A
BH-114	30.0	6	Lean CLAY (CL)					35	17														A
BH-114	81.0	16B	Lean CLAY (CL)			22	98	32	13														M, A, S
BH-114	90.5	18A	Lean CLAY (CL)	127	103	23																	T

Classification Tests
UWW = Unit Wet Weight
UDW = Unit Dry Weight
MC = Moisture Content
Fines = % Passing #200 Sieve
LL = Liquid Limit
PI = Plasticity Index

Direct Shear Test
C = Assigned Cohesion, ksf
PHI = Assigned Friction Angle, degrees

Compaction Test
MAX DD = Maximum Dry Density
OPT MC = Optimum Moisture Content

Compressive Strength Tests
Qu = Unconfined Compression
Su = Undrained Shear Strength
u = Unconsolidated Undrained
p = Pocket Penetrometer
t = Torvane
m = Miniature Vane

Corrosivity Tests
R = Resistivity, ohm-cm, satur.
pH = pH
Cl = Chloride, ppm
SO_4 = Sulfate, ppm

Test Listing Abbreviations
M = Moisture Content
T = Total & Dry Unit Weight
S = Sieve Analysis
FC = % Passing #200 Sieve
H = Hydrometer Analysis
A = Atterberg Limits
P = Compaction Test

D = Direct Shear Test
C = Consolidation Test
Co = Corrosivity Tests
CU = CU Triaxial
U = UU Triaxial
R = R-Value
SE = Sand Equivelant

Abr. (Comp.) = Abrasion Test (Composite Sample)
Gs = Specific Gravity
* Canceled lab test originally assigned by HNTB/WSP

Table D-2. Summary of 2018 - 2019 GI Laboratory Index Testing Results

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC%	FINES %	ATTERBURG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	TEST LISTING
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4				
BH-114	91.0	18B	Lean CLAY (CL)			23	97	34	13														M, A, S
BH-114	100.4	20A&B	Fat CLAY (CH)			29										1996	8.20	7	59				M, Co
BH-114	110.5	22A	Lean CLAY with sand (CL)																				Gs
BH-114	111.0	22B	Lean CLAY with sand (CL)			20	82	34	15														M, A, S
BH-114	125.0	25	Poorly-graded SAND with silt and gravel (SP-SM)				11																S
BH-115	65.0	14	Fat CLAY (CH)					54	30														A
BH-115	80.0	17,18,19&20	Poorly-graded SAND with silt and gravel (SP-SM)																				Abr. (Comp).
BH-115	116.0	24	Lean CLAY (CL)			19	87	34	16														M, A, S
BH-115	130.0	27	Silty GRAVEL with sand (GM)				15																S
BH-116	71.0	14B	Lean CLAY (CL)			22	94	33	11														M, A, S
BH-116	101.1	18A&B	Organic CLAY (OL)			28	99	45	22							1635	8.20	12	104				M, A, S, Co
BH-116	106.0	19B	Sandy SILT (ML)			22	57																M, S
BH-116	110.0	20,21A&B	Poorly-graded SAND (SP)																				Abr. (Comp).
BH-116	120.0	22	Sandy, silty CLAY (CL-ML)																				CU
BH-116	121.0	22	Sandy, silty CLAY (CL-ML)	123	98	26																	T, C
BH-116	135.0	25	Sandy Lean CLAY (CL)					28	12														A
BH-116	145.0	27	Lean CLAY (CL)					42	21														A
BH-117	40.5	8	Fat CLAY (CH)					77	50														A
BH-117	61.0	12	Silty, clayey SAND with gravel (SC-SM)			15	24																M, S
BH-117	76.0	15	Lean CLAY (CL)			22		43	19														M, A
BH-117	85.5	17	Silty, clayey SAND with gravel (SC-SM)			6	15																M, S
BH-117	105.5	21A	Sandy Lean CLAY (CL)	131	108	21	66	32	15														T, A, S, H
BH-117	106.0	21B	Sandy Lean CLAY (CL)	130	107	21	65	29	11														T, A, S, H
BH-117	120.5	24	Silty SAND with gravel (SM)				19																F
BH-117	130.5	26	Poorly-graded SAND with silt and gravel (SP-SM)				7																S

Classification Tests
UWW = Unit Wet Weight
UDW = Unit Dry Weight
MC = Moisture Content
Fines = % Passing #200 Sieve
LL = Liquid Limit
PI = Plasticity Index

Direct Shear Test
C = Assigned Cohesion, ksf
PHI = Assigned Friction Angle, degrees

Compaction Test
MAX DD = Maximum Dry Density
OPT MC = Optimum Moisture Content

Compressive Strength Tests
Qu = Unconfined Compression
Su = Undrained Shear Strength
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m = Miniature Vane

Corrosivity Tests
R = Resistivity, ohm-cm, satur.
pH = pH
Cl = Chloride, ppm
SO_4 = Sulfate, ppm

Test Listing Abbreviations
M = Moisture Content
T = Total & Dry Unit Weight
S = Sieve Analysis
FC = % Passing #200 Sieve
H = Hydrometer Analysis
A = Atterberg Limits
P = Compaction Test
D = Direct Shear Test
C = Consolidation Test
Co = Corrosivity Tests
CU = CU Triaxial
U = UU Triaxial
R = R-Value
SE = Sand Equivelant
Abr. (Comp.) = Abrasion Test (Composite Sample)
Gs = Specific Gravity

Table D-2. Summary of 2018 - 2019 GI Laboratory Index Testing Results

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC%	FINES %	ATTERBURG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	TEST LISTING
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4				
BH-117	155.0	31	Sandy Lean CLAY (CL)					35	16														A
BH-121	45.5	8A	Organic CLAY with sand (OL)			25	100	37	19														M, A, S, H
BH-121	70.5	13A	Sandy SILT (ML)			23	56																M, S
BH-121	71.0	13B	SILT (ML)			23	100																M, F, H
BH-121	76.0	14B	Lean CLAY with sand (CL)			20	72	31	13														M, A, S
BH-121	85.0	16&17	Silty SAND with gravel (SM)			7	15																M, S
BH-121	100.0	19	Sandy Lean CLAY (CL)					45	29														A
BH-121	115.0	22	Sandy Lean CLAY (CL)					38	19														A
BH-121	145.0	28	Sandy SILT (ML)					27	4														A
BH-122	60.5	12A	Lean CLAY (CL)	130	108	20	86	31	13														T, A, S, H
BH-122	61.0	12B	Lean CLAY (CL)	128	103	23	90	38	18														T, A, S, H
BH-122	75.0	15	Poorly-graded SAND with silt and			7																	M
			gravel (SP-SM)																				
BH-122	80.0	16	Silty SAND with gravel (SM)				13																S, Gs
BH-122	90.5	18	Poorly-graded GRAVEL (GP)				4																S
BH-122	110.5	23A	Lean CLAY with sand (CL)			9		30	12														M, A
BH-122	111.0	23B	Lean CLAY with sand (CL)	129	106	21	84	31	22														T, A, S, H
BH-122	125.5	26	Sandy Lean CLAY (CL)					42	25														A
BH-123	55.5	11A	Silty CLAY (CL-ML)				93																S, H
BH-123	56.0	11B	Silty CLAY (CL-ML)				93																S, H
BH-123	74.5	15	Sandy Lean CLAY with gravel (CL)	140	119	17		35	19														T, A, Gs
BH-123	85.5	17A&B	Sandy Lean CLAY (CL)			23										4235	7.50	10	47				M, Co
BH-123	101.0	20	Sandy Lean CLAY (CL)				58																S
BH-124	29.0	6	Lean CLAY (CL)					38	20														A
BH-124	61.0	12B	Sandy Lean CLAY (CL)	135	113	20	69	27	9														T, A, S
BH-124	65.5	13A	Lean CLAY (CL)			27		39	16														M, A
BH-124	95.0	19	Silty SAND with gravel (SM)			7	14																M, S
BH-124	100.5	20B,C&D	Poorly-graded SAND with silt and																				Abr. (Comp)
			gravel (SP-SM)																				
BH-124	135.0	27	Lean CLAY (CL)					35	15														A

Classification Tests
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Direct Shear Test
C = Assigned Cohesion, ksf
PHI = Assigned Friction Angle, degrees

Compaction Test
MAX DD = Maximum Dry Density
OPT MC = Optimum Moisture Content

Compressive Strength Tests
Qu = Unconfined Compression
Su = Undrained Shear Strength
u = Unconsolidated Undrained
p = Pocket Penetrometer
t = Torvane
m = Miniature Vane

Corrosivity Tests
R = Resistivity, ohm-cm, satur.
pH = pH
Cl = Chloride, ppm
SO_4 = Sulfate, ppm

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Table D-2. Summary of 2018 - 2019 GI Laboratory Index Testing Results

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC%	FINES %	ATTERBERG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	TEST LISTING
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4				
BH-125	60.5	12A	SILT (ML)			22	90																M, S, H
BH-125	61.0	12B	SILT (ML)			27																	M
BH-125	65.0	13	Sandy Lean CLAY (CL)					35	16														A
BH-125	80.5	16A	Lean CLAY with sand (CL)	131	107	22	74	31	12														T, A, S
BH-125	81.0	16B	Lean CLAY with sand (CL)	121	106	14	71	33	12														T, A, S
BH-125	90.0	18	Sandy Lean CLAY (CL)					37	19														A
BH-125	101.0	20A&B	Lean CLAY with sand (CL)			23										1416	7.60	15	315				M, Co
BH-125	105.5	21	Silty SAND with gravel (SM)			10	12																M, S
BH-125	130.5	26	Sandy Lean CLAY (CL)					33	14														A
BH-137	75.0	15	Lean CLAY with sand (CL)					29	8														A
BH-137	80.6	16A	Lean CLAY with sand (CL)	125	102	23																	T
BH-137	81.0	16B	Lean CLAY with sand (CL)				84	27	9														A, S
BH-137	85.0	17	Lean CLAY (CL)					34	11														A
BH-137	90.0	18,19A&B	Well-graded SAND with clay and gravel (SW-SC)																				Abr. (Comp)
BH-137	110.5	22A	Lean CLAY (CL)			23																	M
BH-137	111.0	22B	Lean CLAY (CL)				88	48	31														A, S
BH-137	115.5	23A&B	Gravelly Fat CLAY with sand (CH)			22										2293	7.70	13	40				M, Co
BH-137	130.0	26	Lean CLAY (CL)					38	23														A
BH-138	90.5	29&30	Silty SAND with gravel (SM)			13	22																M, S
BH-138	115.5	35	Fat CLAY with sand (CH)			34																	M, Gs
BH-138	116.0	36	Fat CLAY with sand (CH)				86	64	37														A, S
BH-138	120.0	37	Lean CLAY (CL)					39	19														A
BH-138	125.0	39	Sandy Lean CLAY (CL)					30	10														A
BH-138	135.0	42	SILT with sand (ML)					29	6														A
BH-139	70.5	26	Silty CLAY (CL-ML)			23		27	8														M, A
BH-139	71.0	27	Silty CLAY (CL-ML)			22	90																M, S, H
BH-139	95.5	36	Lean CLAY with sand (CL)			21	81	30	12														M, A, S
BH-139	96.0	37	Lean CLAY with sand (CL)			22																	M
BH-139	100.5	38	Sandy Lean CLAY (CL)					34	15														A

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Table D-2. Summary of 2018 - 2019 GI Laboratory Index Testing Results

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC%	FINES %	ATTERBURG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	TEST LISTING
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4				
BH-139	110.5	42&43	Sandy Fat CLAY (CH)													2338	8.10	7	113				Co
BH-139	125.0	48	Sandy, silty CLAY (CL-ML)					27	5														A
BH-139	140.5	54	Organic SILT (OH)					66	33														A
BH-140	60.5	12A	SILT (ML)			26	87																M, S
BH-140	61.0	12B	SILT (ML)	122	97	26																	T
BH-140	75.5	15A	Lean CLAY with sand (CL)			22	81	30	12														M, A, S
BH-140	85.5	17A,B&18	Poorly-graded SAND (SP)																				Abr. (Comp)
BH-140	95.0	19	Sandy Lean CLAY (CL)					31	13														A
BH-140	100.0	20	Lean CLAY with sand (CL)					37	13														A
BH-140	140.5	28	Fat CLAY (CH)					51	26														A
BH-141	11.0	3	Fat CLAY (CH)					64	38														A
BH-141	15.0	4	Fat CLAY with sand (CH)																				C, U
BH-141	25.5	6	Poorly GRADED SAND WITH SILT				7																S
BH-141	30.5	7, 8 & 9	Poorly-graded SAND with silt (SP-SM)																				Abr. (Comp)
BH-141	55.5	12	Lean CLAY (CL)			23	91	40	20														M, A, S
BH-141	66.0	14B	SILT (ML)			22	92																M, S, H
BH-141	80.0	17	Sandy, silty CLAY (CL-ML)					26	7														A
BH-141	100.0	21	Clayey SAND (SC)					30	8														A
BH-141	115.0	24	Lean CLAY (CL)																				CU

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Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines		Liquid Limit	Plastic Limit	Plasticity Index			
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay					Wet	Dry
BH-150	U-4A	21.0'-21.5'	ML								31	25	6	28.2	127.3	99.3
	P-5	30.0'-31.5'	CL								48	24	24	31.0	116.5	88.9
	P-6	40.0'-41.5'	CH								61	27	34	40.4	112.0	79.7
	MC-7A	51.0'-51.5'	GP-GM	9.0	38.0	16.0	10.0	19.0	8.0 (total fines)							
	MC-8A	61.0'-61.5'	CL				1.0	15.0	57.0	27.0	32	18	14	22.1	128.9	105.6
	U-11A	83.3'-83.8'	SP		30.0	22.0	20.0	23.0	5.0 (total fines)							
	U-15A	88.5'-89.0'	GP	4.0	49.0	21.0	11.0	11.0	4.0 (total fines)							
	U-18	93.5'-94.0'	SP-SM	2.0	40.0	11.0	11.0	30.0	6.0 (total fines)							
	PB-22	99.0'-101.5'	CL				4.0	31.0	46.0	19.0	29	19	10	19.9		
	U-23	101.5'-103.0'	CL								29	19	10	17.8		
	U-28A	112.0'-112.5'	CL								29	18	11	17.7	132.2	112.3
	U-30A, 31, 32, 33	116.0'-117.5'	SM	4.0	17.0	7.0	7.0	43.0	18.0	4.0						
	U-38 & 39	123.0'-124.0'	SW-SM	4.0	41.0	16.0	16.0	15.0	8.0 (total fines)							
	U-41A	128.0'-129.0'	CL				3.0	30.0	45.0	22.0	29	18	11	18.2		
	U-45A	136.5'-137.0'	CL								36	17	19	20.6	130.0	107.9
	PB-46	137.0'-139.5'	CH								50	20	30	22.3	127.3	104.0
	PB-46	137.0'-139.5'	CH								50	20	30	21.8	129.4	106.2
	PB-48	145.0'-147.5'	CH								54	24	30	26.9	124.9	98.4
	PB-48	145.0'-147.5'	CH								54	24	30	24.4	126.9	102.0

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines							
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-150	PB-48	145.0'-147.5'	CH								54	24	30	24.7	126.1	101.1
	PB-51	160.0'-162.5'	SC-SM				1.0	51.0	34.0	14.0	26	21	5	20.4		
BH-151	U-1B	54.0'-54.5'	SM				14.0	37.0	35.0	14.0	24	20	4	21.4		
	PB-2	55.5'-58.0'	CL								39	20	19	29.8	121.4	93.5
	U-3A, 4, 5, 6	80.5'-84.5'	SP-SM	6.0	25.0	14.0	17.0	27.0	11.0 (total fines)							
	U-11B, 13	91.5'-95.0'	SP-SM	6.0	24.0	16.0	27.0	20.0	7.0 (total fines)							
	PB-18	103.0'-105.5'	CL				1.0	18.0	49.0	32.0	43	20	23	25.5	125.9	100.3
	PB-18	103.0'-105.5'	CL				1.0	18.0	49.0	32.0	43	20	23	18.8	130.9	110.2
	PB-18	103.0'-105.5'	CL				1.0	18.0	49.0	32.0	43	20	23	25.8	126.1	100.2
	PB-20	107.0'-109.5'	CL				1.0	28.0	51.0	20.0	32	16	16	22.1	128.4	105.2
	PB-22	111.0'-113.5'	CL		1.0	1.0	2.0	29.0	67.0 (total fines)							
	PB-25	116.5'-119.0'	GP-GC	15.0	35.0	12.0	11.0	21.0	6.0 (total fines)							
	PB-30	125.0'-127.5'	CH								53	22	31	23.9	126.5	102.1
	PB-33	135.0'-137.5'	OL								30	24	6	28.2	119.4	93.1
	U-34A	140.2'-141.5'	CL								41	18	23	23.0		
	U-37A	170.5'-171.5'	CL								38	19	19	22.3		
BH-152	PB-4	30.0'-32.5'	CL								28	17	11	22.1		
	PB-5	40.0'-42.5'	CL								32	22	10	23.7	123.5	99.8
	PB-5	40.0'-42.5'	CL								32	22	10	24.6	124.6	100.1

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel		% Sand			% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-152	PB-6	50.0'-52.5'	SM						34.0 (total fines)							
	PB-7	60.0'-62.5'	CL								35	18	17	16.3	130.3	112.0
	PB-7	61.6'-62.5'	SM											21.3	126.4	104.2
	PB-13	76.5'-79.0'	CL								36	18	18	23.5	124.8	101.0
	PB-13	76.5'-79.0'	CL								36	18	18	23.4	126.3	102.4
	PB-13	76.5'-79.0'	CL								36	18	18	23.4	126.4	102.4
	PB-16	82.0'-84.5'	CL								26	18	8	21.9	124.5	102.1
	PB-19	87.5'-90.0'	SM			0.6	6.7	58.1	29.0	6.0						
	PB-33	108.5'-111.0'	SM	10.5	25.6	9.3	10.2	23.1	21.0 (total fines)							
	PB-42	119.1'-119.5'	CL								27	18	9	19.5	128.9	107.9
	PB-49	135.0'-137.5'	CL								39	19	20	24.2	128.4	103.4
	PB-49	135.0'-137.5'	CL								39	19	20	22.2	128.8	105.5
BH-153	U-2A	10.5'-11.5'	CL								40	18	22	23.5		
	PB-4	30.0'-32.5'	CL								46	17	29	27.1	123.0	96.8
	PB-4	30.0'-32.5'	CL								46	17	29	28.2	120.3	93.9
	PB-4	30.0'-32.5'	CL								46	17	29	26.3	123.2	97.6
	U-5A	40.5'-41.5'	CL								30	22	8	23.4		
	U-6	50.5'-51.5'	ML								28	23	5	22.2	131.2	107.4
	U-6	50.5'-51.5'	ML								28	23	5	20.8	131.8	109.1

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel Coarse	Fine	% Sand Coarse	Medium	Fine	% Fines Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-153	PB-14	75.0'-77.5'	CL								38	18	20			
	PB-18	82.0'-84.5'	CL								31	22	9	21.6	125.5	103.2
	PB-18	82.0'-84.5'	CL								31	22	9	23.8	123.1	99.4
	PB-18	82.0'-84.5'	CL								31	22	9	21.6	127.2	104.6
	U-25	93.5'-94.0'	SM		34.4	16.0	18.6	16.0	15.0 (total fines)							
	U-27, 28, 29A, 29B	96.0'-99.5'	SP-SM	1.4	32.0	16.3	20.5	20.2	9.6 (total fines)							
	PB-35	108.7'-109.5'	CL								35	17	18	26.0	123.6	98.1
	PB-45	123.0'-125.5'	SM		17.8	8.6	15.6	39.3	18.7 (total fines)							
	SS-49A	135.3'-136.5'	CL								49	20	29	19.3		
	PB-50	140.0'-142.5'	SC								36	24	12	18.6	124.4	104.9
BH-154	U-3A	20.0'-21.5'	CL								26	18	8	23.3	126.6	102.7
	U-5A	40.0'-41.5'	CH								63	27	36	31.0	118.6	90.5
	U-6A	50.0'-51.5'	CH								55	26	29	31.9	116.3	88.2
	U-7 & 8B	60.5'-68.5'	SM	0.8	28.4	14.3	11.5	21.9	23.1 (total fines)					25.0	125.0	100.0
	U-14B	77.0'-77.5'	GW		52.7	22.5	15.5	5.1	4.2 (total fines)							
	PB-26	96.0'-97.5'	CL				0.1	44.9	38.0	17.0	38	19	19	22.2	128.4	105.1
	U-30B	103.0'-103.5'	SP-SM		0.9	1.5	13.9	73.0	10.7 (total fines)							
	U-41B	118.0'-118.5'	GP-GM		62.1	13.4	10.9	4.6	9.0 (total fines)					9.0		
	PB-50	136.0'-137.5'	ML								NP	NP	NP	22.4	126.2	103.1

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel		% Sand			% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-154	PB-51	141.0'-142.5'	SM				0.3	50.3	49.4 (total fines)							
	U-53B	150.0'-151.5'	CL								38	23	15	24.4		
	PB-54	156.5'-157.5'	SM		0.4	1.1	6.2	75.3	17.0 (total fines)							
	U-57B	170.0'-171.5'	CH								60	28	32	28.9		
	U-59B	180.0'-180.5'	SM			0.1	4.5	77.3	18.1 (total fines)							
	U-63B	200.0'-201.0'	CL								46	18	28	15.9		
BH-155	U-2A	40.5'-41.5'	CL								49	27	22	31.1	120.6	91.9
	U-4A	63.0'-63.5'	CL					29.5	70.5 (total fines)		27	19	8	20.6		
	PB-7	67.0'-69.5'	CL								41	19	22	22.4	124.2	101.5
	PB-7	67.0'-69.5'	CL								41	19	22	20.0	124.9	104.1
	PB-7	67.0'-69.5'	CL								41	19	22	21.9	125.3	102.8
	PB-19	88.0'-90.5'	CH								51	23	28	26.6	123.0	97.2
	PB-19	88.0'-90.5'	CH								51	23	28	29.4	119.8	92.6
	PB-19	88.0'-90.5'	CH								51	23	28	29.7	120.1	92.6
	PB-23	95.0'-97.5'	ML				1.3	47.6	40.0	11.0				16.4	112.0	96.2
	U-28A, 30	102.5'-106.5'	SP-SM	10.4	29.8	17.1	22.0	14.6	6.1 (total fines)							
	U-40A	120.5'-121.0'	ML								36	25	11	25.8		
	PB-43	125.7'-126.5'	ML					21.1	78.9 (total fines)		NP	NP	NP	25.8	127.4	101.3
	PB-49	150.0'-152.5'	CL						75.5 (total fines)		35	20	15	20.3	128.8	107.1

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines							
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-155	PB-49	150.0'-152.5'	CL						75.5 (total fines)		35	20	15	20.0	128.6	107.2
	U-53A	170.5'-171.5'	CL								49	27	22	26.6		
BH-156	PB-1	65.0'-67.5'	CL								39	20	19	25.4	125.3	99.9
	PB-1	65.0'-67.5'	CL								39	20	19	27.3	124.4	97.7
	PB-1	65.0'-67.5'	CL								39	20	19	25.3	125.2	99.9
	PB-5	72.0'-74.5'	CL								35	17	18	19.9	130.3	108.7
	PB-5	72.0'-74.5'	CL								35	17	18	19.1	132.2	111.0
	PB-13	86.0'-88.5'	CH								70	27	43	29.7	120.7	93.1
	PB-17	93.0'-95.5'	ML								33	24	9	26.6		
	U-22A	103.0'-103.5'	SM				0.5	80.1	19.4 (total fines)							
	PB-25	107.0'-109.5'	SM			0.1	3.3	74.3	17.3	5.0				16.4	115.9	99.6
	U-32B	118.0'-118.5'	SW-SM		24.8	24.7	34.8	10.4	5.3 (total fines)							
	U-32B	118.5'-118.5'	SW-SM						13.2 (total fines)							
	PB-35	122.5'-125.0'	ML								NP	NP	NP	18.4	129.9	109.7
	U-43B	136.5'-137.0'	SP-SM				1.5	92.4	6.1 (total fines)							
	U-43B	137.0'-137.0'	SP-SM						15.6 (total fines)							
BH-157	P-2	30.0'-31.5'	CL								34	22	12	33.1	114.8	86.2
	U-5A	60.5'-61.0'	ML								22	20	2	20.6	128.0	106.2
	SC-8A	75.5'-76.0'	SP-SM		34.4	10.4	15.9	28.2	11.2 (total fines)					8.7	135.2	124.3

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-157	PB-14	93.0'-94.5'	SM	13.0	24.0	14.0	11.0	17.0	14.0	7.0						
	P-17	102.0'-103.5'	CL						88.5 (total fines)		44	18	26	24.0	114.6	92.4
	SC-25A	124.3'-124.8'	SW-SM		25.7	24.4	24.3	16.3	9.2 (total fines)							
	PB-29	140.0'-142.5'	CL								36	21	15	22.4	128.6	105.1
	PB-29	140.0'-142.5'	CL								36	21	15	22.3	126.6	103.5
	PB-29	140.0'-142.5'	CL								36	21	15	21.5	130.3	107.3
	SC-31	150.0'-150.5'	SM						50.0 (total fines)					23.5	125.8	101.8
	U-33A	160.5'-161.0'	CL								46	25	21	26.6	124.5	98.4
	PB-35	170.0'-172.5'	CL						89.9 (total fines)		54	14	40	24.3	125.8	101.2
BH-158	U-3A	77.0'-77.5'	GW-GM		48.2	16.1	17.0	10.9	7.9 (total fines)					9.3	139.6	127.8
	U-10	89.5'-90.0'	SW		39.4	28.9	17.7	9.4	3.2	1.5				11.4	138.5	124.3
	PB-12	94.0'-95.0'	SM						41.1 (total fines)							
	SC-14B	98.3'-99.5'	ML						77.2 (total fines)					19.9	131.5	109.6
	SC-17A	102.5'-103.0'	SW-SM		32.1	17.3	27.9	16.3	6.4 (total fines)					6.4	134.1	126.0
	SC-20	106.5'-107.0'	GW-GM		53.7	12.4	9.4	14.8	9.8 (total fines)					6.6	134.9	126.6
	PB-28	117.0'-119.5'	CL								31	18	13	22.3	127.8	104.5
	PB-28	117.0'-119.5'	CL								31	18	13	21.8	129.5	106.3
	PB-28	117.0'-119.5'	CL								31	18	13	21.0	130.4	107.8
	PB-32	124.0'-126.5'	CL						85.5 (total fines)		42	23	19	27.7	120.3	94.2

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay	Atterberg Limits Liquid Limit	Plastic Limit	Plasticity Index	Moisture Content (%)	Unit Weight (pcf) Wet	Dry
BH-158	U-42A	145.5'-146.0'	CL								46	23	23	20.5	127.9	106.2
	PB-43	150.0'-152.5'	CL						83.5 (total fines)		40	19	21	22.2	136.2	111.5
	PB-48	175.0'-177.5'	ML		4.0	6.0	6.0	33.0	32.0	19.0				16.2	132.8	114.2
BH-159	P-2	20.0'-21.5'	CH								50	24	26	29.3	121.6	94.0
	U-4A	40.0'-40.5'	CH								53	25	28	29.5	120.1	92.8
	U-8A	58.5'-59.0'	SM		4.9	5.8	8.2	45.3	35.8 (total fines)					14.9	136.4	118.8
	U-10A	63.0'-64.0'	SM		0.8	2.8	16.7	53.7	26.0 (total fines)					18.7	135.0	113.7
	SC-14A	76.0'-76.5'	CL								37	21	16	22.8	127.1	103.5
	U-16	85.5'-86.0'	CL						76.5 (total fines)		30	21	9	22.8	128.9	104.9
	P-18	90.0'-91.5'	CL								41	19	22	22.6	127.6	104.1
	P-18	90.0'-91.5'	CL								41	19	22	22.6	127.9	104.3
	P-18	90.0'-91.5'	CL								41	19	22	26.8	125.2	98.7
	U-22A	102.0'-102.5'	CL								29	16	13	17.9	132.4	112.2
	U-26A	116.0'-116.5'	SM						31.8 (total fines)					23.0	127.3	103.4
	SC-32A	145.5'-146.0'	SP-SM		26.7	22.8	23.1	13.5	13.8 (total fines)					8.3	139.8	129.2
BH-160	P-1	15.0'-16.5'	CL								29	17	12	20.2	127.1	105.8
	P-3	25.0'-26.5'	SM						44.2 (total fines)					20.6	130.6	108.3
	P-4	30.0'-31.5'	CL								46	22	24			
	P-5	35.0'-36.5'	CH								55	26	29	30.4	116.4	89.3

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel		% Sand			% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-160	P-6	40.0'-41.5'	SM						24.5 (total fines)					23.7	122.6	99.2
	U-10A	60.0'-61.5'	SP		43.0	16.5	20.1	19.4	1.0 (total fines)					9.7		
	MC-18	84.0'-85.5'	CL								33	19	14	23.5	129.1	104.5
	MC-19	87.0'-88.0'	CL								35	18	17	24.4	128.8	103.6
	MC-19	87.0'-88.0'	CL								35	18	17	24.9	129.6	103.8
	MC-20A	90.0'-90.5'	CL								35	15	20			
	U-24A	99.5'-100.0'	CL								35	22	13	27.7	121.7	95.3
	U-27	108.5'-109.5'	GP		50.0	14.7	17.8	14.3	3.1 (total fines)					10.3	141.0	127.8
	MC-37A	146.0'-146.5'	ML						52.4 (total fines)					20.9	130.0	107.5
	U-40	160.5'-161.0'	GP-GM		57.2	14.4	11.1	10.4	6.9 (total fines)							
	P-41	165.0'-166.5'	CL								40	18	22			
	MC-43A, B	176.0'-176.5'	SC						36.4 (total fines)		28	14	14			
	MC-46A	191.0'-191.5'	CL								48	24	24			
BH-161	P-2	20.0'-21.5'	CL								32	18	14	23.6	124.4	100.7
	SC-4A	40.3'-40.8'	SW-SM		38.0	17.2	21.2	14.0	9.6 (total fines)							
	P-6	60.0'-60.8'	CL								33	17	16	29.1	103.4	80.1
	U-8	72.8'-74.0'	ML					21.0	60.0	19.0	33	26	7	21.5	130.7	107.6
	U-8	72.8'-74.0'	ML					21.0	60.0	19.0	33	26	7	21.0	130.9	108.1
	PB-10	78.0'-80.0'	GP-GM	20.0	44.0	12.0	8.0	9.2	6.8 (total fines)					9.1		

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel			% Sand		% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-161	SC-11A	84.0'-84.5'	SP-SM		2.2	0.8	1.2	85.7	10.0 (total fines)					20.3		
	PB-13	88.5'-91.0'	CL								33	17	16	23.3	133.9	108.6
	SC-17	99.3'-99.8'	SM						19.7 (total fines)					17.6	132.4	112.5
	U-19A	104.5'-105.5'	CL			3.2	2.5	25.1	47.2	22.0	28	17	11	20.4	129.3	107.4
	U-19A	104.8'-105.5'	CL						62.2 (total fines)							
	PB-21	109.0'-111.5'	GP-GM	18.0	39.0	9.0	11.0	14.5	8.5 (total fines)					12.0	117.1	104.5
	PB-25	120.0'-122.5'	CL								28	16	12			
	P-29	135.0'-136.5'	CH								56	21	35	25.0	123.3	98.6
	U-34A	166.0'-166.5'	CL-ML								25	18	7			
	U-37B	180.0'-190.0'	SM						32.0 (total fines)							
	PB-38	185.0'-187.5'	CH								61	27	34			
BH-162	P-1	10.0'-11.5'	ML								30	24	6			
	P-4	25.0'-26.5'	CL								49	17	32	28.9	119.8	93.0
	P-7	40.0'-41.5'	CL								35	18	17	23.8	123.3	99.6
	P-8	45.0'-46.5'	ML						58.0 (total fines)		27	22	5	22.2	127.2	104.1
	P-10	55.0'-56.5'	CL								42	19	23	25.1	126.2	100.9
	P-10	55.0'-56.5'	CL								42	19	23	24.2	123.3	99.2
	P-10	55.0'-56.5'	CL								42	19	23	26.0	127.7	101.3
	P-11	60.0'-61.5'	ML								26	22	4			

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-162	U-14	70.0'-70.5'	SP-SM		38.1	18.8	23.6	14.2	5.4 (total fines)					6.9		
	MC-16	74.0'-75.5'	SP-SM		40.7	16.3	18.0	16.9	6.2	2.0				8.4	143.8	132.6
	U-18, 19, 20	81.5'-83.5'	SP-SM		42.4	11.9	16.7	18.8	10.2 (total fines)					8.4		
	P-26	100.0'-101.5'	CL								34	17	17	41.3	115.2	81.5
	U-29B	108.0'-108.5'	SM		3.9	2.5	6.7	41.9	31.6	13.4						
	P-35	123.5'-124.0'	ML								30	25	5			
	U-36	125.0'-126.0'	SM						24.4 (total fines)							
	P-39	132.0'-133.5'	CL								37	22	15	25.0	125.5	100.4
	MC-41A	141.0'-141.5'	CL								34	23	11	25.4	126.0	100.5
	MC-46A	166.0'-166.5'	CL								30	19	11			
	MC-49	180.8'-181.5'	CH								56	28	28			
BH-163	P-3	70.0'-71.5'	ML						52.6 (total fines)		28	23	5	19.1	131.8	110.7
	P-6	77.5'-79.0'	ML								28	24	4	20.4	128.9	107.1
	U-9A	91.5'-92.0'	SM						22.3 (total fines)							
	MC-12	98.0'-98.5'	CL-ML								25	20	5	23.2	128.3	104.1
	P-16	107.0'-108.5'	CL						71.2 (total fines)		30	18	12	21.3	127.3	104.9
	P-16	107.0'-108.5'	CL						71.2 (total fines)		30	18	12	20.9	131.7	109.0
	P-16	107.0'-108.5'	CL						71.2 (total fines)		30	18	12	20.3	132.7	110.4
	MC-21	120.5'-121.0'	CL-ML								27	20	7	21.7	128.1	105.2

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines		Liquid Limit	Plastic Limit	Plasticity Index			
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay					Wet	Dry
BH-163	P-24	127.0'-128.5'	ML						86.0 (total fines)		32	24	8			
	P-27	135.0'-136.5'	CL								47	24	23	26.2	124.1	98.3
	P-28	140.0'-141.5'	CL								44	22	22	23.3	126.4	102.5
	P-28	140.0'-141.5'	CL								44	22	22	25.0	127.4	101.9
	P-28	140.0'-141.5'	CL								44	22	22	24.4	125.9	101.2
	P-31	155.5'-156.0'	ML			2.0	2.0	33.0	44.0	19.0				22.5	127.6	104.2
	MC-35	176.0'-176.5'	CL								33	19	14	20.8	129.6	107.3
BH-164	U-2A	10.0'-11.5'	CL								38	22	16			
	P-5	25.0'-26.5'	CL								32	19	13	25.7	123.0	97.8
	PB-10	50.0'-52.5'	CH								57	26	31	28.4	120.4	93.7
	U-15	67.5'-68.0'	SP-SM		14.7	11.7	30.0	37.5	6.1 (total fines)					13.9	136.5	119.8
	U-19A	78.0'-78.5'	SW-SM		37.0	29.2	21.8	6.8	5.0 (total fines)					9.2	139.2	127.5
	U-23	87.5'-88.0'	SW-SM		43.2	24.4	22.2	5.2	4.9 (total fines)							
	U-27	96.5'-97.5'	CL								38	22	16	27.1	123.2	97.0
	P-30	103.5'-105.0'	SM				3.0	73.0	24.0 (total fines)							
	U-33A	111.5'-112.0'	SM						14.3 (total fines)					26.3	120.9	95.7
	SC-37A	123.0'-123.5'	SW-SM		29.6	24.7	25.3	11.1	9.3 (total fines)					8.4	142.1	131.0
	SC-39A	126.5'-127.0'	ML						56.4 (total fines)							
	P-43	134.5'-136.0'	CL						87.9 (total fines)		40	20	20	22.2	127.3	104.2

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines							
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-164	P-43	134.5'-136.0'	CL						87.9 (total fines)		40	20	20	22.1	129.7	106.3
	P-43	134.5'-136.0'	CL						87.9 (total fines)		40	20	20	22.0	130.9	106.7
	U-46A	145.5'-146.0'	CL								37	18	19			
	SC-49	165.0'-165.4'	SP											5.4		
	PB-50	170.0'-172.5'	CH								56	27	29	27.0	115.1	90.6
BH-165	P-3	22.5'-24.0'	CH								60	24	36	31.3	119.4	90.9
	P-7	32.5'-34.0'	CL								42	17	25	24.4	128.7	103.5
	P-7	32.5'-34.0'	CL								42	17	25	26.1	122.8	97.4
	P-7	32.5'-34.0'	CL								42	17	25	25.4	127.2	101.5
	P-12	45.0'-46.5'	CL						58.9 (total fines)		40	20	20	26.6	124.0	97.9
	P-12	45.0'-46.5'	CL						58.9 (total fines)		40	20	20	25.2	124.5	99.4
	MC-14B	50.5'-51.0'	CL						88.0 (total fines)		32	21	11	26.3	124.1	98.3
	MC-17A	58.5'-59.0'	CL						56.8 (total fines)		26	17	9	21.5	130.2	107.1
	MC-20B	65.5'-66.5'	CL								33	22	11	23.3	127.2	103.1
	U-23B	73.0'-73.5'	CL-ML						78.0 (total fines)		26	21	5	24.6	125.4	100.6
	P-25	77.5'-79.0'	CL								34	20	14	22.6	128.6	104.9
	U-28A	90.5'-91.0'	SM		2.6	5.2	11.3	45.6	24.3	11.0						
	U-30B	100.5'-101.5'	CL								29	18	11	21.2	130.1	107.3
	P-34	120.0'-121.5'	ML								27	23	4			

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel		% Sand			% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-165	P-35	125.0'-126.5'	ML						67.4 (total fines)							
	U-38A	140.5'-141.0'	SP				4.4	79.2	16.4 (total fines)					26.2	124.9	99.0
BH-166	P-1	10.0'-11.5'	CL						46.0	54.0						
	P-2	15.0'-16.0'	SM						33.9 (total fines)					18.1	134.2	113.6
	P-6	35.0'-36.5'	CL								34	18	16	24.1	123.4	99.5
	U-7	40.0'-40.5'	SP-SM		18.0	19.9	29.2	24.9	7.9 (total fines)					12.0	139.5	124.5
	SS-8	45.0'-46.5'	ML								30	25	5	23.9		
	MC-9A	52.0'-52.5'	SM						40.3 (total fines)							
	MC-12A	65.5'-66.5'	CL								28	17	11	20.2	130.7	108.7
	P-15	76.0'-77.5'	CL								35	20	15	26.6		
	MC-16A	79.3'-79.8'	ML						60.1 (total fines)							
	P-18	83.5'-85.0'	ML				1.0	7.0	58.0	34.0				25.3	123.2	98.3
	P-23	95.5'-97.0'	CL						52.8 (total fines)		32	18	14	21.8	127.1	104.4
	SS-27	106.5'-107.0'	SM						20.9 (total fines)							
	U-30	113.5'-115.0'	ML								32	24	8	24.7	121.4	97.3
	MC-32A	121.0'-121.5'	CL								31	20	11	24.3	125.4	100.9
	MC-35A	130.0'-130.5'	ML								30	24	6	23.7	123.7	100.0
	MC-38A	141.0'-141.5'	CL								39	24	15	29.1	121.4	94.0
	MC-41A	156.0'-156.5'	CL								37	17	20	21.3	128.0	105.6

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-167	U-2A	10.8'-11.5'	ML								29	23	6			
	SH-4	20.0'-21.5'	SC						46.2 (total fines)							
	P-5	25.0'-26.5'	CL								36	20	16	29.3	119.4	92.3
	P-6	30.0'-31.5'	OH								57	26	31	36.8	115.3	84.3
	P-8	35.5'-36.5'	CH								72	25	47			
	P-10	40.0'-41.5'	CL						72.9 (total fines)		34	20	14	22.0	129.9	106.5
	P-10	40.0'-41.5'	CL						72.9 (total fines)		34	20	14	21.6	128.4	105.6
	P-10	40.0'-41.5'	CL						72.9 (total fines)		34	20	14	22.9	126.2	102.7
	MC-13	47.5'-48.0'	GP-GM		45.7	17.0	8.9	18.7	9.6 (total fines)					8.5	141.2	130.1
	U-16B	57.0'-57.5'	GM		38.6	12.5	20.4	13.3	15.3 (total fines)							
	U-21B	69.5'-70.0'	ML			0.3	0.9	42.9	42.9	13.0				22.9	126.9	103.3
	P-23	74.0'-75.5'	CL						81.9 (total fines)		36	16	20	22.8	126.3	102.9
	P-23	74.0'-75.5'	CL						81.9 (total fines)		36	16	20	21.7	129.8	106.6
	P-23	74.0'-75.5'	CL						81.9 (total fines)		36	16	20	22.4	129.2	105.6
	P-25	79.0'-80.5'	ML								32	26	6			
	P-28	87.0'-88.5'	CL								45	16	29			
	SS-29	91.0'-92.0'	GM						19.8 (total fines)							
	U-31	96.0'-96.5'	SW		42.4	21.7	22.0	10.3	3.6 (total fines)							
	U-33A	101.5'-102.5'	CL								32	18	14			

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines							
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-167	P-35	106.0'-107.5'	CL					18.0	52.0	30.0				25.0	124.5	99.6
	MC-37B	113.0'-113.5'	SC		32.2	1.7	8.4	25.9	20.8	11.0				11.3	139.2	125.1
BH-168	SH-3	10.0'-12.5'	CL								41	23	18	36.2	110.3	81.0
	P-4	15.0'-16.5'	ML				1.0	43.0	40.0	16.0				22.3	126.9	103.8
	P-6	25.0'-26.5'	CL								49	22	27	28.6	118.4	92.1
	P-6	25.0'-26.5'	CL								49	22	27	34.9	119.1	88.3
	P-6	25.0'-26.5'	CL								49	22	27	37.6	116.9	85.0
	U-9	40.0'-40.5'	GP		49.6	18.5	13.8	14.2	3.9 (total fines)					9.7	145.8	132.9
	SS-11	50.0'-51.3'	SW-SM		36.9	19.6	18.9	15.9	8.7 (total fines)					7.5		
	U-13B	60.0'-60.5'	SP-SM		30.4	13.9	29.2	20.8	5.7 (total fines)					10.9	142.3	128.3
	MC-17A	70.5'-71.0'	CL						60.4 (total fines)					24.8	123.7	99.1
	P-21	81.5'-83.0'	CL						83.5 (total fines)		44	17	27	24.7	126.4	101.4
	P-21	81.5'-83.0'	CL						83.5 (total fines)		44	17	27	24.7	125.3	100.4
	P-22	85.0'-85.5'	SC						46.5 (total fines)					17.5	128.0	108.9
	P-25	92.5'-94.0'	CL						74.1 (total fines)		34	17	17	21.2	131.6	108.6
	P-25	92.5'-94.0'	CL						74.1 (total fines)		34	17	17	22.4	130.1	106.3
	P-28	99.5'-101.0'	SC						36.9 (total fines)		28	18	10			
	U-30	104.5'-105.0'	GW	5.5	49.5	16.5	13.5	11.0	3.9 (total fines)					9.7	144.2	131.4
	SS-33, 34, 35	118.0'-119.0'	SP-SM		31.9	18.5	19.3	19.5	7.8	3.0				8.4		

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay	Atterberg Limits Liquid Limit	Plastic Limit	Plasticity Index	Moisture Content (%)	Unit Weight (pcf) Wet	Dry
BH-168	PB-38	135.0'-137.5'	ML								39	26	13	26.6	98.3	77.6
	P-41	150.0'-150.5'	ML								31	25	6			
BH-169	P-2	10.0'-11.5'	CH								62	26	36	39.2	111.1	79.9
	SH-6	40.0'-42.5'	CL						74.5 (total fines)		30	17	13			
	U-10	70.0'-70.5'	SW-SM		41.4	20.8	21.2	11.2	5.3 (total fines)							
	PB-12	74.5'-77.0'	CL								32	18	14	23.3	128.0	103.8
	PB-12	74.5'-77.0'	CL								32	18	14	23.0	127.5	103.7
	U-16A	91.0'-91.5'	SP-SM		39.3	20.8	15.5	18.2	4.3	2.0						
	MC-18	97.0'-98.5'	CL								36	18	18	26.1	121.1	96.0
	MC-21	111.0'-111.5'	CL			1.0	6.7	24.2	35.2	33.0						
	MC-23	117.0'-118.5'	CL								29	18	11	22.4	126.2	103.1
	MC-25	123.0'-123.5'	SW-SM		2.3	12.2	29.2	44.9	11.4 (total fines)							
	MC-28A	131.0'-131.5'	CL								43	20	23	25.9	125.0	99.3
	PB-30	135.0'-137.5'	CL								37	20	17	23.1	130.9	106.3
	PB-30	135.0'-137.5'	CL								37	20	17	22.6	128.7	105.0
	PB-30	135.0'-137.5'	CL								37	20	17	19.9	129.0	107.6
	MC-31A	141.0'-141.5'	CL								29	19	10	21.6	128.6	105.8
	MC-36	165.5'-166.5'	CH								56	27	29	25.6	127.2	101.3
BH-171	MC-2A	11.0'-11.5'	CL								36	23	13	27.2	122.5	96.3

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines		Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay						
BH-171	P-4	20.0'-21.5'	CL						82.5 (total fines)		45	20	25	28.2	119.6	93.3
	P-7	40.0'-41.0'	CL								35	20	15			
	P-7	40.5'-41.5'	ML						60.3 (total fines)		27	23	4			
	MC-10B	65.5'-66.5'	CL								32	15	17	23.3	126.0	102.2
	MC-14B	75.5'-76.0'	SM		16.8	11.0	9.9	45.2	17.1 (total fines)					15.3	133.7	116.0
	SS-15	77.5'-79.0'	SW-SM		36.9	21.8	19.9	13.0	6.5	2.0				20.5		
	MC-19A	88.5'-89.0'	CL								32	16	16	23.4	126.7	102.7
	MC-22A	96.0'-96.5'	CL								28	18	10	23.4	126.8	102.8
	MC-24A	100.5'-101.0'	SP-SM		1.3	1.8	16.7	69.8	8.9	1.5				20.6	130.0	107.8
	P-30	114.0'-115.0'	CL						67.8 (total fines)		35	20	15	22.4	129.9	106.1
	P-30	114.0'-115.0'	CL						67.8 (total fines)		35	20	15	21.8	129.3	106.2
	MC-33A	122.5'-123.0'	CL								27	17	10	21.9	129.4	106.1
	MC-36A	129.0'-129.5'	CL								29	20	9			
	MC-38A	141.0'-141.5'	CL								47	21	26	27.4	121.8	95.6
	MC-39A	146.0'-146.5'	SM						34.1 (total fines)					22.7	130.0	106.0
	MC-43	165.5'-166.5'	CL								46	21	25	25.1	124.4	99.4
BH-173	MC-3A	8.5'-9.0'	SM		28.9	14.7	10.3	30.2	10.9	5.0				6.8	117.5	110.1
	P-6	15.0'-16.5'	CL								38	18	20	24.9	122.0	97.6
	P-8	20.0'-21.5'	CH								58	22	36	34.9	115.2	85.4

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel		% Sand			% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-173	U-11A	27.5'-29.0'	SP						4.2 (total fines)							
	MC-14	35.5'-36.5'	CL-ML								26	19	7	22.5	130.9	106.9
	P-17	42.5'-44.0'	CL								34	17	17	25.0	122.4	98.0
	P-17	42.5'-44.0'	CL								34	17	17	20.1	126.6	105.5
	P-17	42.5'-44.0'	CL								34	17	17	21.4	131.0	107.9
	P-25	62.5'-64.0'	CL								32	24	8	21.7	127.0	104.3
	P-28	72.5'-74.0'	CL								37	17	20	22.0	125.8	103.1
	MC-29B	75.5'-76.5'	CL								31	23	8	23.8	125.7	101.5
	SS-31	80.0'-81.0'	SM						19.9 (total fines)							
	MC-33	85.5'-86.5'	CL								38	23	15	27.0	125.9	99.1
	MC-36A	98.5'-99.0'	ML						51.2 (total fines)							
	SS-37	100.0'-101.0'	SP-SM		36.2	11.1	15.4	24.0	13.2 (total fines)							
BH-175	P-2	10.0'-11.5'	CH								53	23	30	34.6	115.1	85.5
	P-6	30.0'-31.0'	CH						94.0 (total fines)		67	24	43	30.4	117.3	89.9
	P-7	32.5'-34.0'	CH											22.4	130.4	106.5
	P-7	32.5'-34.0'	CH											23.2	129.4	105.1
	P-11	42.5'-43.5'	ML		5.0	4.0	6.0	22.0	37.0	26.0				23.9	122.8	99.2
	U-14A	50.5'-51.0'	SP		38.0	16.1	25.5	16.1	4.3 (total fines)					9.7	140.5	128.1
	MC-15A	55.0'-55.5'	SC						39.8 (total fines)		28	19	9	19.9	132.1	110.1

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-175	U-18A	62.0'-62.5'	SM		9.3	6.5	9.2	39.7	35.3 (total fines)					17.1	128.4	109.7
	U-20B	68.0'-68.5'	SM						43.6 (total fines)							
	PB-21	72.0'-72.5'	ML						72.9 (total fines)		32	24	8	20.8	129.8	107.5
	P-25	81.0'-82.0'	CL						64.3 (total fines)		31	16	15			
	PB-29	89.5'-92.0'	SM		11.0	7.0	11.0	23.0	32.0	16.0				13.9	141.5	124.2
	U-30	93.0'-93.5'	SP-SM		34.0	16.1	17.4	18.5	14.1 (total fines)							
	P-33	99.0'-100.5'	ML						70.7 (total fines)		29	25	4	18.1	134.5	113.9
	P-33	99.0'-100.5'	ML						70.7 (total fines)		29	25	4	22.7	130.4	106.3
	MC-36B	106.5'-107.0'	CL						70.0 (total fines)		33	22	11			
	P-37	108.5'-110.0'	OL								38	20	18	26.5	119.9	94.8
	MC-41B	120.5'-121.5'	CL								33	17	16			
	P-46	135.0'-135.5'	ML						90.6 (total fines)		38	27	11			
BH-176	MC-2	5.0'-5.5'	CH								81	35	46	37.8	107.3	77.9
	P-5	15.5'-16.5'	CH								58	26	32	29.9	117.8	90.7
	P-6	20.0'-21.5'	CL						85.6 (total fines)		45	18	27	23.9	122.4	98.8
	P-6	20.0'-21.5'	CL						85.6 (total fines)		45	18	27	29.5	121.4	93.8
	P-6	20.0'-21.5'	CL						85.6 (total fines)		45	18	27	24.8	125.2	100.3
	P-8	30.0'-31.5'	ML		1.0	1.0	4.0	36.0	37.0	21.0				25.0	126.0	100.9
	P-8	30.0'-31.5'	ML		1.0	1.0	4.0	36.0	37.0	21.0				19.8	131.6	109.9

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis							Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				% Gravel		% Sand			% Fines		Liquid Limit	Plastic Limit	Plasticity Index			
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay					Wet	Dry
BH-176	U-9B	35.0'-35.5'	SP		14.6	20.9	39.6	21.3	3.6 (total fines)					13.9	139.4	122.4
	P-10	40.0'-41.5'	CL											23.6	123.7	100.1
	P-11	45.0'-46.5'	CL								42	20	22			
	P-12	50.0'-51.5'	CH								52	27	25	33.7	118.5	88.6
	P-12	50.0'-51.5'	CH								52	27	25	33.0	118.7	89.3
	SS-14	60.0'-61.0'	GP-GM						11.5 (total fines)							
	U-15	65.0'-65.5'	SP-SM		22.6	13.6	25.9	32.9	5.1 (total fines)							
	PB-18	80.0'-81.5'	ML					35.0	51.0	14.0				21.9	131.7	108.0
	P-19	86.0'-86.5'	ML						63.2 (total fines)		27	24	3			
	U-22	100.0'-100.5'	SP-SM		35.4	18.7	15.5	24.9	5.4 (total fines)					11.7	136.9	122.6
	MC-24B	110.5'-111.0'	CL								32	19	13			
BH-177	MC-3	5.0'-6.5'	CL								42	17	25	19.6	126.7	105.9
	MC-4A	10.5'-11.5'	CH								50	24	26			
	P-6	20.0'-21.5'	CH								50	20	30	24.6	125.0	100.3
	P-6	20.0'-21.5'	CH								50	20	30	26.7	121.2	95.7
	P-6	20.0'-21.5'	CH								50	20	30	25.7	121.7	96.8
	P-8	30.0'-30.3'	ML						86.3 (total fines)							
	MC-9A	35.5'-36.0'	CL						53.9 (total fines)		26	18	8	19.7	130.7	109.2
	U-10A	40.5'-41.0'	SP		28.0	20.0	28.0	21.0	3.0 (total fines)							

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel		% Sand			% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-177	SS-11	45.0'-46.0'	SM		28.1	17.9	12.5	26.7	14.8 (total fines)							
	P-13	55.0'-56.5'	CL								37	18	19			
	P-15	65.0'-66.3'	SM						38.7 (total fines)		23	20	3			
	MC-16	70.0'-70.5'	SP-SM		34.3	17.3	14.8	21.7	11.8 (total fines)					9.8	139.2	126.8
BH-178	MC-2B	5.0'-6.5'	CH								73	29	44	33.0	109.6	82.4
	P-4	15.0'-16.5'	CH								60	22	38	30.4	121.3	93.1
	P-4	15.0'-16.5'	CH								60	22	38	28.4	121.6	94.7
	P-4	15.0'-16.5'	CH								60	22	38	33.0	114.8	86.3
	P-5	20.0'-21.5'	CH								64	28	36	31.0	116.7	89.1
	U-6A	25.5'-26.5'	SM								NP	NP	NP	23.3	127.5	103.4
	P-9	40.0'-41.5'	CL								35	19	16	24.4	123.7	99.4
	P-9	40.0'-41.5'	CL								35	19	16	25.8	123.0	97.7
	P-13	60.0'-61.5'	CL						81.5 (total fines)		43	17	26	26.5	121.9	96.4
	P-13	60.0'-61.5'	CL						81.5 (total fines)		43	17	26	26.2	122.8	97.3
	P-17	80.0'-81.5'	CL						83.1 (total fines)							
	U-18B	85.0'-85.5'	SM		8.6	4.4	7.9	57.6	21.6 (total fines)							
	U-20	95.0'-95.5'	SW		15.2	12.2	50.8	17.0	4.9 (total fines)							
BH-179	BS-1	3.0'-5.0'	CL											16.6		
	MC-2A	6.0'-6.5'	CL								32	19	13			

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel Coarse	 Fine	 % Sand Coarse	 Medium	 Fine	 % Fines Silt	 Clay	Atterberg Limits Liquid Limit	 Plastic Limit	 Plasticity Index	Moisture Content (%)	Unit Weight (pcf) Wet	 Dry
BH-179	P-5	20.0'-21.5'	CL								40	22	18			
	U-6A	26.0'-26.5'	ML		0.1	0.7	2.1	16.5	80.7 (total fines)					23.9	127.7	103.0
	P-10	45.0'-46.5'	CH								68	27	41	35.2	116.4	86.1
	P-10	45.0'-46.5'	CH								68	27	41	33.3	118.2	88.7
	P-10	45.0'-46.5'	CH								68	27	41	32.0	119.9	90.8
	U-13A	60.5'-61.0'	SP		23.0	7.6	33.2	31.3	4.8 (total fines)					14.2	135.2	118.4
	P-16	75.0'-76.5'	CL								31	21	10	22.4	125.5	102.5
	MC-18A	86.3'-86.5'	CL						77.6 (total fines)		32	17	15			
	MC-19A	90.5'-91.0'	CL								31	23	8			
	P-21	100.0'-101.5'	CL								43	22	21	26.9	123.9	97.6
	P-21	100.0'-101.5'	CL								43	22	21	26.4	123.8	97.9
	MC-22	105.0'-105.5'	GM		44.3	15.5	11.5	13.3	12.4	3.0				10.7		
	MC-24A	116.0'-116.5'	CL								31	21	10	22.3	128.5	105.0
	PB-25	120.0'-122.0'	SC	7.0	17.0	10.0	12.0	15.0	39.0 (total fines)							
	P-28	135.0'-136.5'	CL								36	18	18	23.7	125.7	101.6
	P-28	135.0'-136.5'	CL								36	18	18	19.9	133.9	111.7
	P-28	135.0'-136.5'	CL								36	18	18	18.2	135.8	114.9
	MC-30A	145.5'-146.0'	CL								30	21	9	21.9	129.9	106.5
	SS-35	170.0'-170.8'	SW-SM		36.2	20.9	18.0	15.2	9.8 (total fines)							

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel			% Sand		% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-180	BS-1	0.5'-1.5'	CL								36	19	17	18.5		
	SH-4	11.0'-12.5'	ML								NP	NP	NP	26.6	117.2	92.5
	P-7	25.0'-26.5'	CH						99.8 (total fines)		58	22	36	32.9	119.8	90.1
	P-7	25.0'-26.5'	CH						99.8 (total fines)		58	22	36	31.2	114.2	87.1
	P-7	25.0'-26.5'	CH						99.8 (total fines)		58	22	36	33.5	117.8	88.3
	P-10	40.0'-41.5'	CL								48	19	29	28.5	120.2	93.5
	U-11A	46.0'-46.5'	SW-SM	4.0	43.0	18.0	17.0	13.0	5.2 (total fines)							
	U-12A	50.0'-51.5'	GW	12.0	42.0	15.0	17.0	11.0	3.0 (total fines)							
	MC-13	56.0'-56.5'	CL						84.3 (total fines)		31	19	12	27.0		
	U-15	65.0'-66.0'	SP-SM		39.4	14.7	22.4	18.0	5.6 (total fines)					11.0	141.5	127.4
	P-18	80.0'-81.5'	CL						68.8 (total fines)		30	16	14	20.3	130.9	108.8
	P-18	80.0'-81.5'	CL						68.8 (total fines)		30	16	14	20.3	130.5	108.5
	P-18	80.0'-81.5'	CL						68.8 (total fines)		30	16	14	20.4	124.0	103.0
	P-24	110.0'-111.5'	CL								42	20	22	27.0	119.5	94.1
	U-25	115.5'-116.5'	SM				0.3	71.5	28.2 (total fines)					26.8	121.6	95.9
	SS-26A, 27	120.0'-121.5'	SP-SM		29.4	18.3	20.1	18.5	13.7 (total fines)					9.0		
	PB-28	130.0'-132.5'	CL								42	18	24	25.5	124.0	98.8
	PB-28	130.0'-132.5'	CL								42	18	24	22.4	127.0	103.8
	PB-28	130.0'-132.5'	CL								42	18	24	19.8	130.1	108.7

Table D-3. Summary of 2019 - 2020 GI Laboratory Index Testing Results

Boring No.	Sample No.	Sample Depth (ft)	USCS	Particle Size Analysis % Gravel		% Sand			% Fines		Atterberg Limits			Moisture Content (%)	Unit Weight (pcf)	
				Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	Liquid Limit	Plastic Limit	Plasticity Index		Wet	Dry
BH-180	PB-31	145.0'-147.5'	CH								62	20	42			
	SS-33, 34	155.0'-156.4'	SW-SM		35.7	15.6	25.2	13.6	6.9	3.0						
	PB-37	175.0'-177.5'	ML								34	27	7			

Moisture and Density Test Results

MOISTURE & DENSITY TEST

ISI Lab No.: G-63982

Client : Mott MacDonald Project : BSVII Job no : 507385606

Boring #	BH-150	BH-150	BH-150	BH-150	BH-150	BH-150	BH-150	BH-150
Sample #	4A	5	8A	22	23	28A	41A	45A
Depth (ft.)	21	30	61	99	101.5	112	128.5	136.5
Soil type: (visual)	Gray sandy silt	Gray clay	Greenish gray clay with sand	Greenish gray sandy clay	Greenish gray sandy clay	Grayish brown sandy clay	Greenish gray sandy clay	Gray clay
1. Date tested:	10/01/19	10/01/19	10/01/19	10/01/19	10/01/19	10/01/19	10/01/19	10/01/19
2. Tested by:	JH	JH	JH	JH	JH	JH	JH	JH
3. Specimen height (in.)	5.35	3.20	5.97			5.75		5.30
4. Wt. of specimen + tare (gm)	796.27	450.63	906.98			918.48		832.83
5. Tare wt. (gm)	0.00	0.00	0.00			0.00		0.00
6. Diameter (in.)	2.38	2.42	2.39			2.42		2.42
7. Wet wt. of soil + dish wt. (gm)	238.98	157.24	206.30	205.74	158.53	227.48	254.89	214.15
8. Dry wt. of soil + dish wt. (gm)	197.67	131.95	178.19	180.06	142.25	200.98	223.35	186.25
9. Wt. of dish (gm)	51.11	50.46	50.89	50.86	50.85	51.07	50.10	50.59
10. Dish ID								

Wet Density (pcf)	127.3	116.5	128.9			132.2		130.0
Dry Density (pcf)	99.3	88.9	105.6			112.3		107.9
Moisture Content (%)	28.2	31.0	22.1	19.9	17.8	17.7	18.2	20.6

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.696	0.894	0.596			0.500		0.562
Saturation (%)	109.3	93.7	100.1			95.5		98.8

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

Inspection Services Inc, Berkeley, CA

MOISTURE & DENSITY TEST

Client : Mott MacDonald
Project : BSVII
ISI Lab No.: G-63982
Job no : 507385606

Boring #	BH-150	BH-151	BH-151	BH-151	BH-151	BH-151		
Sample #	51	1B	20	34A	37A	33		
Depth (ft.)	160	55	107	140.2	170.5	135		
Soil type: (visual)	Grayish brown silty, clayey sand	Greenish gray silty, clayey sand	Dark greenish gray clay with sand	Greenish gray clay	Grayish brown clay	Greenish gray sandy silt		
1. Date tested:	10/02/19	10/02/19	10/02/19	10/02/19	10/02/19	10/15/19		
2. Tested by:	JH	JH	JH	JH	JH	JH		
3. Specimen height (in.)			3.98			3.10		
4. Wt. of specimen + tare (gm)			862.77			624.70		
5. Tare wt. (gm)			0.00			0.00		
6. Diameter (in.)			2.86			2.86		
7. Wet wt. of soil + dish wt. (gm)	264.55	251.09	253.44	229.79	238.15	254.75		
8. Dry wt. of soil + dish wt. (gm)	228.25	215.50	215.09	196.37	204.06	209.84		
9. Wt. of dish (gm)	50.63	49.52	41.81	50.87	51.04	50.59		
10. Dish ID								

Wet Density (pcf)			128.4			119.4		
Dry Density (pcf)			105.2			93.1		
Moisture Content (%)	20.4	21.4	22.1	23.0	22.3	28.2		

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio			0.602			0.809		
Saturation (%)			99.3			94.1		

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

Inspection Services Inc, Berkeley, CA

MOISTURE & DENSITY TEST

ISI Lab No.: G-64351

Client : Mott MacDonald

Project : BSVII

Job no : 507385606

Boring #	BH-157	BH-157	BH-158	BH-158	BH-158	BH-159	BH-160	BH-160
Sample #	17	35	32	43	48	16	1	3
Depth (ft.)	102	170	124	150	175	85.5	15	25
Soil type: (visual)	Gray clay	Greenish gray clay	Grayish brown clay	Gray clay with sand	Grayish brown sandy silt	Greenish gray sandy clay	Grayish brown sandy clay	Gray silty sand
1. Date tested:	02/05/20	02/07/20	02/07/20	02/07/20	02/05/20	02/05/20	02/05/20	02/05/20
2. Tested by:	JH	JH	JH	JH	JH	JH	JH	JH
3. Specimen height (in.)	5.89	3.82	3.82	4.30	4.34	5.91	4.20	3.27
4. Wt. of specimen + tare (gm)	1082.37	810.95	775.60	988.21	972.58	920.44	650.58	520.53
5. Tare wt. (gm)	260.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. Diameter (in.)	2.43	2.86	2.86	2.86	2.86	2.42	2.43	2.43
7. Wet wt. of soil + dish wt. (gm)	317.75	293.28	293.11	343.97	421.91	397.25	210.74	278.20
8. Dry wt. of soil + dish wt. (gm)	272.53	252.46	248.47	296.95	374.93	338.90	183.92	239.25
9. Wt. of dish (gm)	84.17	84.61	87.05	84.92	85.64	83.48	51.19	50.11
10. Dish ID								

Wet Density (pcf)	114.6	125.8	120.3	136.2	132.8	128.9	127.1	130.6
Dry Density (pcf)	92.4	101.2	94.2	111.5	114.2	104.9	105.8	108.3
Moisture Content (%)	24.0	24.3	27.7	22.2	16.2	22.8	20.2	20.6

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.824	0.665	0.788	0.512	0.475	0.606	0.593	0.555
Saturation (%)	78.7	98.7	94.8	117.0	92.3	101.8	92.0	100.2

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

MOISTURE & DENSITY TEST

ISI Lab No.: G-64351

Client : Mott MacDonald

Project : BSVII

Job no : 507385606

Boring #	BH-160	BH-161	BH-161	BH-161	BH-161			
Sample #	6	6	10	13	21			
Depth (ft.)	40	60	77.5	88.5	109			
Soil type: (visual)	Grayish brown silty sand	Gray clay	Gray poorly graded gravel with silt and sand	Greenish gray clay	Grayish brown poorly graded gravel with silt and sand			
1. Date tested:	02/05/20	02/05/20	02/05/20	02/05/20	02/05/20			
2. Tested by:	JH	JH	JH	JH	JH			
3. Specimen height (in.)	4.12	3.24		3.31	6.00			
4. Wt. of specimen + tare (gm)	615.66	593.21		748.08	1185.62			
5. Tare wt. (gm)	0.00	185.04		0.00	0.00			
6. Diameter (in.)	2.43	2.43		2.86	2.86			
7. Wet wt. of soil + dish wt. (gm)	571.32	151.87	887.79	335.35	1671.45			
8. Dry wt. of soil + dish wt. (gm)	478.29	129.17	843.58	288.77	1544.18			
9. Wt. of dish (gm)	85.12	51.07	359.19	88.53	485.83			
10. Dish ID								

Wet Density (pcf)	122.6	103.4		133.9	117.1			
Dry Density (pcf)	99.2	80.1		108.6	104.5			
Moisture Content (%)	23.7	29.1	9.1	23.3	12.0			

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.699	1.103		0.551	0.612			
Saturation (%)	91.4	71.1		114.0	53.0			

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

MOISTURE & DENSITY TEST

Client : Mott MacDonald
Project : BSVII
ISI Lab No.: G-64461
Job no : 507385606

Boring #	BH-162	BH-162	BH-162	BH-162	BH-163	BH-163	BH-163	BH-164
Sample #	7	8	26	39	3	27	31	10
Depth (ft.)	40	45	100	132	70	135	155	50
Soil type: (visual)	Gray clay	Greenish gray sandy silt	Gray clay	Greenish gray clay	Grayish brown sandy silt	Grayish brown clay	Grayish brown sandy silt	Gray clay
1. Date tested:	04/03/20	04/03/20	03/31/20	04/03/20	04/03/20	04/03/20	03/31/20	04/03/20
2. Tested by:	JH	JH	JH	JH	JH	JH	JH	JH
3. Specimen height (in.)	4.51	4.25	4.81	4.25	4.32	4.34	4.34	3.43
4. Wt. of specimen + tare (gm)	671.86	653.42	895.29	644.43	687.81	650.95	674.79	696.78
5. Tare wt. (gm)	0.00	0.00	220.07	0.00	0.00	0.00	0.00	0.00
6. Diameter (in.)	2.42	2.42	2.43	2.42	2.42	2.42	2.43	2.86
7. Wet wt. of soil + dish wt. (gm)	253.69	231.11	246.21	227.76	359.14	241.56	275.73	242.20
8. Dry wt. of soil + dish wt. (gm)	214.68	198.40	188.89	192.39	315.02	201.95	234.50	199.91
9. Wt. of dish (gm)	50.80	51.05	50.07	50.90	83.46	51.02	51.06	51.16
10. Dish ID								

Wet Density (pcf)	123.3	127.2	115.2	125.5	131.8	124.1	127.6	120.4
Dry Density (pcf)	99.6	104.1	81.5	100.4	110.7	98.3	104.2	93.7
Moisture Content (%)	23.8	22.2	41.3	25.0	19.1	26.2	22.5	28.4

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.692	0.618	1.066	0.678	0.522	0.714	0.617	0.798
Saturation (%)	92.9	97.0	104.6	99.5	98.5	99.3	98.4	96.2

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

MOISTURE & DENSITY TEST

Client : Mott MacDonald
Project : BSVII
ISI Lab No.: G-64461
Job no : 507385606

Boring #	BH-164	BH-164	BH-165	BH-166	BH-166	BH-166	BH-166	BH-169
Sample #	27	50	25	2	15	18	30	18
Depth (ft.)	96.5	170	77.5	15	76	83.5	113.5	97
Soil type: (visual)	Gray clay	Greenish gray clay	Greenish gray clay	Grayish brown silty sand	Grayish brown clay	Greenish gray silt	Grayish brown silt	Grayish brown clay
1. Date tested:	03/31/20	04/03/20	04/03/20	03/31/20	04/03/20	03/31/20	03/31/20	03/31/20
2. Tested by:	JH	JH	JH	JH	JH	JH	JH	JH
3. Specimen height (in.)	3.62	3.50	4.53	3.61		4.82	3.23	5.91
4. Wt. of specimen + tare (gm)	539.04	679.70	704.03	585.28		723.32	473.78	836.26
5. Tare wt. (gm)	0.00	0.00	0.00	0.00		0.00	0.00	0.00
6. Diameter (in.)	2.42	2.86	2.42	2.42		2.43	2.42	2.38
7. Wet wt. of soil + dish wt. (gm)	205.21	248.91	265.53	463.80	200.57	295.19	228.93	287.57
8. Dry wt. of soil + dish wt. (gm)	172.31	206.78	225.94	405.71	169.07	244.08	193.67	238.61
9. Wt. of dish (gm)	50.77	50.84	51.09	84.96	50.55	41.75	51.14	50.79
10. Dish ID								

Wet Density (pcf)	123.2	115.1	128.6	134.2		123.2	121.4	121.1
Dry Density (pcf)	97.0	90.6	104.9	113.6		98.3	97.3	96.0
Moisture Content (%)	27.1	27.0	22.6	18.1	26.6	25.3	24.7	26.1

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.737	0.860	0.607	0.483		0.713	0.731	0.754
Saturation (%)	99.1	84.8	100.8	101.2		95.6	91.3	93.3

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

MOISTURE & DENSITY TEST

Client : Mott MacDonald
Project : BSVII
ISI Lab No.: G-64677
Job no : 507385606

Boring #	BH-167	BH-167	BH-167	BH-176				
Sample #	5	6	35	18				
Depth (ft.)	25	30	106	80				
Soil type: (visual)	Gray clay	Greenish gray clay	Grayish brown silt with sand	Greenish gray sandy silt				
1. Date tested:	06/09/20	06/09/20	06/09/20	06/10/20				
2. Tested by:	JH	JH	JH	JH				
3. Specimen height (in.)	4.18	3.63	2.84	5.83				
4. Wt. of specimen + tare (gm)	603.05	505.59	427.30	1295.56				
5. Tare wt. (gm)	0.00	0.00	0.00	0.00				
6. Diameter (in.)	2.42	2.42	2.42	2.86				
7. Wet wt. of soil + dish wt. (gm)	245.58	206.42	227.22	441.46				
8. Dry wt. of soil + dish wt. (gm)	201.49	164.62	191.93	377.23				
9. Wt. of dish (gm)	51.01	50.93	50.78	83.52				
10. Dish ID								

Wet Density (pcf)	119.4	115.3	124.5	131.7				
Dry Density (pcf)	92.3	84.3	99.6	108.0				
Moisture Content (%)	29.3	36.8	25.0	21.9				

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.825	0.999	0.691	0.559				
Saturation (%)	95.9	99.4	97.6	105.5				

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

Inspection Services Inc, Berkeley, CA

MOISTURE & DENSITY TEST

Client : Mott MacDonald
Project : BSVII
ISI Lab No.: G-64779
Job no : 507385606

Boring #	BH-168	BH-168	BH-168					
Sample #	4	22	38					
Depth (ft.)	15	84	135					
Soil type: (visual)	Greenish gray sandy silt (Top of Tube)	Greenish gray clayey sand (Bottom of Tube)	Greenish gray silt					
1. Date tested:	07/21/20	07/21/20	07/21/20					
2. Tested by:	JH	JH	JH					
3. Specimen height (in.)	4.52	2.79	3.15					
4. Wt. of specimen + tare (gm)	693.19	431.66	522.66					
5. Tare wt. (gm)	0.00	0.00	0.00					
6. Diameter (in.)	2.42	2.42	2.86					
7. Wet wt. of soil + dish wt. (gm)	383.44	468.71	275.19					
8. Dry wt. of soil + dish wt. (gm)	329.28	411.96	235.32					
9. Wt. of dish (gm)	85.89	88.57	85.54					
10. Dish ID								
Wet Density (pcf)	126.9	128.0	98.3					
Dry Density (pcf)	103.8	108.9	77.6					
Moisture Content (%)	22.3	17.5	26.6					
Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.623	0.547	1.170					
Saturation (%)	96.4	86.6	61.4					

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

Inspection Services Inc, Berkeley, CA

MOISTURE & DENSITY TEST

Client : Mott MacDonald
Project : BSVII
ISI Lab No.: G-64461
Job no : 507385606

Boring #	BH-173	BH-173	BH-173	BH-173		BH-173		
Sample #	6	17	28	33		25		
Depth (ft.)	15	42.5	72.5	85.5		62.5		
Soil type: (visual)	Greenish gray clay	Gray clay	Greenish gray clay	Grayish brown clay		Greenish gray sandy silt		
1. Date tested:	04/03/20	04/03/20	04/03/20	03/31/20		05/01/20		
2. Tested by:	JH	JH	JH	JH		JH		
3. Specimen height (in.)	4.41	4.30	4.52	5.55		5.51		
4. Wt. of specimen + tare (gm)	649.98	636.25	687.08	816.39		845.39		
5. Tare wt. (gm)	0.00	0.00	0.00	0.00		0.00		
6. Diameter (in.)	2.42	2.42	2.42	2.38		2.42		
7. Wet wt. of soil + dish wt. (gm)	271.42	273.65	265.68	268.68		270.19		
8. Dry wt. of soil + dish wt. (gm)	227.38	229.11	226.86	222.39		231.07		
9. Wt. of dish (gm)	50.73	50.61	50.40	50.85		50.81		
10. Dish ID								
Wet Density (pcf)	122.0	122.4	125.8	125.9		127.0		
Dry Density (pcf)	97.6	98.0	103.1	99.1		104.3		
Moisture Content (%)	24.9	25.0	22.0	27.0		21.7		
Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.726	0.719	0.634	0.700		0.615		
Saturation (%)	92.8	93.7	93.7	104.1		95.3		

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

Inspection Services Inc, Berkeley, CA

MOISTURE & DENSITY TEST

ISI Lab No.: G-64461
Client : Mott MacDonald Project : BSVII Job no : 507385606

Boring #	BH-175	BH-175	BH-175	BH-175	BH-175			
Sample #	2	11	21	29	37			
Depth (ft.)	10	42.5	70	89.5	108.5			
Soil type: (visual)	Grayish brown clay	Gray sandy silt	Grayish brown sandy silt	Grayish brown silty sand	Greenish gray clay			
1. Date tested:	04/23/30	04/23/20	04/22/20	04/22/20	04/23/20			
2. Tested by:	JH	JH	JH	JH	JH			
3. Specimen height (in.)	3.87	5.12	4.98	4.65	5.03			
4. Wt. of specimen + tare (gm)	538.06	759.90	1091.32	1110.44	728.96			
5. Tare wt. (gm)	0.00	0.00	0.00	0.00	0.00			
6. Diameter (in.)	2.42	2.42	2.86	2.86	2.42			
7. Wet wt. of soil + dish wt. (gm)	227.02	237.93	386.87	426.93	223.79			
8. Dry wt. of soil + dish wt. (gm)	181.74	201.84	335.04	385.29	187.57			
9. Wt. of dish (gm)	50.81	50.63	85.62	85.41	50.94			
10. Dish ID								

Wet Density (pcf)	115.1	122.8	129.8	141.5	119.9			
Dry Density (pcf)	85.5	99.2	107.5	124.2	94.8			
Moisture Content (%)	34.6	23.9	20.8	13.9	26.5			

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.971	0.699	0.567	0.356	0.777			
Saturation (%)	96.2	92.2	98.9	105.3	92.1			

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

Inspection Services Inc, Berkeley, CA

MOISTURE CONTENT TEST

G-65158

Client : Mott MacDonald
Project : BSVII
Job no : 507385606

Boring #	BH-179							
Sample #	1							
Depth (ft.)	3							
Soil type: (visual)	Brown clay							
Date tested:	11/09/20							
Tested by:	JH							
Wet wt. of soil + dish wt. (gm)	1763.81							
Dry wt. of soil + dish wt. (gm)	1512.43							
Wt. of dish (gm)	0.00							
Dish ID								

Moisture Content (%)	16.6							

INSPECTION SERVICES, INC.

CHECKED BY_________

MOISTURE & DENSITY TEST

ISI Lab No.: G-64897

Client : Mott MacDonald Project : BSVII Job no : 507385606

Boring #	BH-180	BH-180						
Sample #	10	24						
Depth (ft.)	40	110						
Soil type: (visual)	Greenish gray clay (Top Section)	Grayish brown clay (Bottom Section)						
1. Date tested:	08/21/20	08/21/20						
2. Tested by:	JH	JH						
3. Specimen height (in.)	2.73	3.53						
4. Wt. of specimen + tare (gm)	396.46	509.68						
5. Tare wt. (gm)	0.00	0.00						
6. Diameter (in.)	2.42	2.42						
7. Wet wt. of soil + dish wt. (gm)	194.61	213.94						
8. Dry wt. of soil + dish wt. (gm)	162.70	179.25						
9. Wt. of dish (gm)	50.74	50.59						
10. Dish ID								

Wet Density (pcf)	120.2	119.5						
Dry Density (pcf)	93.5	94.1						
Moisture Content (%)	28.5	27.0						

Gs (Assumed)	2.70	2.70	2.70	2.70	2.70	2.70	2.70	2.70
Void Ratio	0.801	0.790						
Saturation (%)	96.0	92.1						

Additional data:

Wt. of dry soil + dish before washing (gm)								
Wt. of dry soil + dish after washing (gm)								
% Passing # 200 sieve								
USCS symbol								

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-TD2 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 11/01/2019

Boring #	BH-152	#200 S.A	Bott		S.A / Hydro-meter	S.A	Shelby Top	
Sample #	4	6	7	16	19	33	7	42
Depth ft.	32.4'	50	61.6'	82	89.5'	108.5	60	119.1
Ht of Sample			1"	5"			5"	2"
Tare #	G34	G112	G16	G134	G26	G109	G100	G81
Gross Wet Wt.	317.13	[illegible]	236.24	1171.1	555.1		1221.0	393.8
Gross Dry Wt.	275.14	[illegible]	209.50	980.8	453.8		1065.0	343.20
Tare Wt.	84.79	110.3	84.07	110.2	85.0	112.1	110.2	83.58
Wt. of Water	41.99	[illegible]	26.74	190.3	101.3		156	50.6
Net dry Wt.	190.35	25X.02	125.43	870.6	368.8		954.8	259.62
% Moisture	22.1%	18%	21.3%	21.9%			16.3%	19.5%
Dry Density			104.2	102.1			112.0	107.9
Wet Density			126.4	124.5			130.3	128.9
Pocket Pen	2.75							
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = \frac{Wds (g) \times f}{L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	Sandy lean CLAY, (CL), very stiff, Dark greenish gray, moist, trace fine sand, medium plasticity PP: 2.75	SILTY SAND, (SM), Dark greenish gray, moist, fine sand	SILT, (ML), Dark greenish gray, very stiff, trace fine sand, non-plastic	SILT, (ML), very stiff, Dark greenish gray, moist, shelby cut tube 5" height	SILTY SAND, (SM), Dark olive Brown, moist, fine sand	SILTY SAND w/GRAVEL, (SM), Dark gray, moist, fine to co medium sand, fine gravel	lean CLAY, (CL), very stiff, light greenish gray, trace fine sand, some fine gravels	lean CLAY, (CL), very stiff, Dark greenish gray, trace fine sand

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-TO2 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 11/12/2019

Boring #	BH-153		S.A	S.A	Dia: 2.416 in	S.A		
Sample #	#2A	#5A	#25	27, 28 29A, 29B	#35	#45	#49A	
Depth ft.	10.5	40.5	93.5'	96'	108.7'	123	135.3	
Ht of Sample(in)	2				2		BAG	
Tare #	G115	G82	G150	59	G82	T113	G76	
Gross Wet Wt.	400.32	388.10	1091.7	2353.9	382.95	4028.2	300.10	
Gross Dry Wt.	345.18	330.65	1008.4	2161.0	321.56	3606.5	265.27	
Tare Wt.	110.57	85.37	110.2	102.90	85.38	772.3	85.00	
Wt. of Water	55.14	57.45	83.3	192.9	61.39	421.7	34.83	
Net dry Wt.	234.61	245.28	898.2	2058.1	236.18	2834.2	180.27	
% Moisture	23.5%	23.4%			26.0%		19.3%	
Dry Density					98.13			
Wet Density					123.6			
Pocket Pen								
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = \frac{Wds (g) \times f}{L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	Lean CLAY, (CL), Dark olive Brown, moist, very stiff, medium plasticity, trace fine sand.	SILT (ML), Dark greenish gray, moist, trace fine sand, low plasticity	SILTY SAND w/ GRAVEL, (SM), Dark gray wet, fine to coarse sand, fine gravel	Poorly graded SAND w/ SILT and GRAVEL (SP), Dark yellowish Brown, wet, fine to coarse sand, fine gravel	lean CLAY, (CL), Olive Brown, moist, medium stiff, low to medium plasticity	SILTY SAND w/ GRAVEL, (SM), Dark gray, fine to medium sand, fine gravel.	lean CLAY w/ SAND, (CL), GRAY, moist, stiff, fine sand, medium to high plasticity	

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-B1-T02 Lab # G970 Tested By: D- NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 11/21/2019

Boring #	BH-154				S.A	S.A/Hyd	S.A	S.A
Sample #	3A	5A	6A	7	14B	26	30B	41B
Depth ft.	20	40	50	60	77	96	103.5'	118
Ht of Sample	2	2	1	1		2		
Tare #	G32	G58	G20	G18	G131	G32	G102	G5
Gross Wet Wt.	389.19	370.13	223.75	234.20	606.5	393.40	508.3	1001.3
Gross Dry Wt.	331.55	302.86	189.80	204.08	553.81	337.18	450.0	917.90
Tare Wt.	84.29	85.14	83.69	83.83	109.97	84.30	110.0	83.84
Wt. of Water	57.64	67.27	33.95	30.12	52.69	56.22	58.3	83.4
Net dry Wt.	247.26	217.72	106.11	120.25	443.84	252.88	340.0	834.1
% Moisture	23.3%	31 %	31.9%	25.0%		22.2%		9%
Dry Density	102.7	90.5	88.2	100.0		105.1		
Wet Density	126.6	118.6	116.3	125		128.4		
Pocket Pen								
	lean CLAY w/SAND, (CL), light olive Brown, moist, low plasticity	fat CLAY, (CH), very stiff, Dark, bluish gray.	fat CLAY, (CH), STIFF, DARK GREENISH GRAY, MOIST, HIGH PLASTICITY	lean CLAY, (CL), Olive Brown, moist, Stiff, medium plasticity	Well graded GRAVEL w/SAND, (GW), Olive gray, wet, subangular fine and coarse gravel, fine to coarse sand, uncemented	lean CLAY, (CL), moist, Dark gray.	Poorly graded SAND w/ SILT, (SP-SM), olive gray, wet, fine to medium sand	Poorly graded GRAVEL W/ SILT AND SAND, (GP), VERY DENSE, OLIVE BROWN WET, FINE GRAVEL, MEDIUM TO COARSE SAND, UNCEMENTED

$\phi = 2.416"$ $f = 0.831$

$$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$$

$$\gamma d = \frac{Wds (g) \times f}{L (in)}$$

$\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-T02 Lab # G

Tested By: D. NGUYEN

Page #:

Project Name: BART TO SILICON VALLEY

Date Tested: 11/27/2019

Boring #	BH-154	S.A		S.A	PI / Moisture	S.A	PI / Moisture	S.A
Sample #	50	51	53B	54	57B	59B	63B	7 &8B
Depth ft.	137.3'	142	150	155	170	180 ft	200	60.5'-63'
Ht of Sample	1							
Tare #	G32	G40	G40	G34	G135	G58	G8	59
Gross Wet Wt.	236.06	344.33	227.61	432.9	243.42	383.63	465.5	
Gross Dry Wt.	208.32	307.94	199.67	372.7	213.46	334.02	413.03	1613.6
Tare Wt.	84.30	85.12	85.13	84.8	109.64	85.14	84.02	103.2
Wt. of Water	27.74		27.94		29.96		52.47	
Net dry Wt.	124.02		114.54		103.82		329.01	
% Moisture	22.4%		24.4%		28.9%		15.9%	
Dry Density	103.1							
Wet Density	126.2							
Pocket Pen								
	SILT, (ML), Dark greenish gray, moist, Non-plastic	SILTY SAND, (SM), Greenish gray, moist, fine sand, uncemented	Lean CLAY, (CL), OLIVE BROWN, moist, low plasticity	SILTY SAND, (SM), Brown, very dense, wet, fine sand, uncemented	fat CLAY, (CH), Olive Brown, High plasticity	SILTY SAND, (SM), Dark greenish gray, moist, fine sand	Sandy lean CLAY, (CL), Olive Brown, moist	SILTY SAND W/ GRAVEL, (SM), WET, MEDIUM DENSE, FINE TO MEDIUM SAND, FINE GRAVEL, UNCEMENTED

$\phi = 2.416"$ $f = 0.831$

$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$

$\gamma d = \frac{Wds (g) \times f}{L (in)}$

$\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-TD2 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 12/16/2019

Boring #	BH-155	PB						
Sample #	2A	23						
Depth ft.	40.5	95						
Ht of Sample	2"	4"						
Tare #	G32	G77						
Gross Wet Wt.	374.42	848.31						
Gross Dry Wt.	305.52	740.57						
Tare Wt.	84.29	84.94						
Wt. of Water	68.9	107.74						
Net dry Wt.	221.23	655.63						
% Moisture	31.1%	16.4%						
Dry Density	91.9	96.38						
Wet Density	120.5	112.19						
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$ $\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds (g) \times f}{L (in)}$	Lean CLAY (CL) Dark Bluish gray, moist, very stiff, high plasticity.	SANDY SILT (ML) Dark greenish gray, medium dense, wet, fine sand.						

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-701 Lab # G970 Tested By: D-NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 01/14/2020

Boring #	BH-155	S.A						
Sample #	S.A 4A	28A, 30	40 A	43	53 A			
Depth ft.	63	102.5	120.5	125.7	170.5			
Ht of Sample				2"				
Tare #	G6	S10	G7	G108	G58			
Gross Wet Wt.	371.11	1651.6	215.68	416.14	212.32			
Gross Dry Wt.	322.14	1525.3	188.84	353.27	185.64			
Tare Wt.	83.86	103.36	84.67	109.42	85.14			
Wt. of Water	48.97	126.30	26.84	62.87	26.68			
Net dry Wt.	238.28	1421.94	104.17	243.85	100.5			
% Moisture			25.8 %	25.78%	26.5%			
Dry Density				101.3				
Wet Density				127.4				
Pocket Pen								
	SILT W/SAND, (ML), LIGHT OLIVE BROWN, MOIST, STIFF, LOW-PLASTICITY, FINE SAND	POORLY GRADED SAND W/ SILT AND GRAVEL, (SP), GRAY, WET, MEDIUM TO COARSE SAND, FINE SUBROUNDED GRAVEL	SILT, (ML), OLIVE BROWN, MOIST, LOW-PLASTICITY	SILT W/ SAND, (ML), OLIVE BROWN, WET, NON-PLASTIC, FINE SAND. (Sample Dia : 2.416 in)	SILTY LEAN CLAY (CL), YELLOWISH BROWN, MOIST, MEDIUM TO HIGH PLASTICITY			

$\phi = 2.416"$ $f = 0.831$

$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$

$\gamma d = \frac{Wds (g) \times f}{L (in)}$

$\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-T01 Lab #

Tested By: N-A

Page #: 1

Project Name: BART TO SILICON VALLEY

Date Tested: 12-10-19

	PL	SA.	Hyd.	-200	PL	-200		
Boring #	BH - 1	56	PB		PB			
Sample #	17	22A	25	32B	35	43B		
Depth ft.	93	103	107	118	122.5	136.5		
Ht of Sample			1"		1"			
Tare #	G106	G54	G57	G1	G107	G111		
Gross Wet Wt.	286.39	222.63	224.00	586.71	265.62	392.73		
Gross Dry Wt.	249.33	203.59	204.31	541.23	241.33	342.68		
Tare Wt.	109.98	84.18	84.49	85.42	109.36	110.66		
Wt. of Water	37.06	19.04	19.69	45.43	24.29	50.05		
Net dry Wt.	139.35	119.41	119.82	455.81	131.97	232.02		
% Moisture	26.6%		16.4%		18.4%			
Dry Density			99.57		109.7			
Wet Density			115.9		129.9			
Pocket Pen								
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L\,(in)}$ $\gamma d = \frac{Wds\,(g) \times f}{L\,(in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	SILT, (ML), HARD, GRAY, MOIST, LOW-PLASTICITY	SILTY SAND, (SM), DENSE, DARK OLIVE GRAY, MOIST, FINE SAND, UNCEMENTED	SILTY SAND, (SM), VERY DENSE, DARK OLIVE GRAY, MOIST, FINE SAND, UNCEMENTED	POORLY GRADED SAND W/SILT AND GRAVEL (SP), VERY DENSE, OLIVE BROWN, WET, FINE TO COARSE SAND, FINE GRAVEL	SANDY SILT (ML), DARK OLIVE GRAY, MOIST, HARD, NON-PLASTIC, FINE SAND	POORLY GRADED SAND, (SP), VERY DENSE, OLIVE GRAY, MOIST, FINE SAND, UNCEMENTED		

PARIKH CONSULTANTS, INC.

Gmoisture 04/06/00

G80
82.25
239.84
218.55

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-T02 Lab #

Tested By: D- NGUYEN

Page #:

Project Name: BART TO SILICON VALLEY

Date Tested: 02/20/2020

UPDATED SIEVE ANALYSIS TESTS OF SAMPLE #32B @ 118', #43B @ 136.5'

Boring #	BH-156							
Sample #	32B	43B						
Depth ft.	118'	136.5'						
Ht of Sample								
Tare #	G35	G21						
Gross Wet Wt.	396.55	352.24						
Gross Dry Wt.	370.55	302.50						
Tare Wt.	84.39	83.43						
Wt. of Water	26.0	49.74						
Net dry Wt.	286.16	219.07						
% Moisture								
Dry Density								
Wet Density								
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L\ (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$ $\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds\ (g) \times f}{L\ (in)}$	WELL GRADED SAND W/SILT AND GRAVEL (SW-SM), WET, OLIVE BROWN, DENSE, FINE TO COARSE SAND, FINE GRAVEL, TRACE COARSE GRAVEL.	POORLY GRADED SAND W/SILT (SP-SM), MOIST, FINE SAND, VERY DENSE, OLIVE GRAY, UNCEMENTED.						

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DM

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-T02 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 01/22/2020

Boring #	BH-157	S.A	S.A	-#200				
Sample #	5A	8A	25A	31	33A			
Depth ft.	60.5	75.5	123.25	150	160.5			
Ht of Sample	2"	6"		2"	2"			
Tare #	G42	G15	G60	G33	G72			
Gross Wet Wt.	393.10	705.7	728.39	277.48	385.33			
Gross Dry Wt.	340.58	655.65	676.66	240.70	322.33			
Tare Wt.	85.10	82.92	85.17	84.30	85.59			
Wt. of Water	52.52	50.05	51.73	36.78	63.0			
Net dry Wt.	255.48	572.73	591.49	156.4	236.74			
% Moisture	20.6%	8.7%		23.5%	26.6%			
Dry Density	106.2	124.3		101.8	98.4			
Wet Density	128.0	135.1		125.8	124.5			
Pocket Pen								
	SILT, (ML), DARK GREENISH GRAY, MOIST, MEDIUM DENSE, LITTLE SAND, LOW-PLASTICITY. (Dia: 2.416")	Poorly Graded SAND w/ SILT and GRAVEL, (SP-SM), VERY DENSE, LIGHT OLIVE BROWN, WET, FINE GRAVEL, FINE AND TRACE COARSE (Dia: 2.93") SAND.	WELL GRADED SAND w/ SILT and GRAVEL, (SW), VERY DENSE, WET, DARK GRAY, FINE GRAVEL. UNCEMENTED.	SILTY SAND, (SM), DENSE, LIGHT OLIVE BROWN, WET, FINE SAND, UNCEMENTED. (Dia 1.93")	Lean CLAY, (CL), OLIVE BROWN, HARD, MOIST, MEDIUM PLASTICITY (Dia: 2.416")			

$\gamma d = \dfrac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L\ (in)}$

$\phi = 2.416"$ $f = 0.831$

$\gamma d = \dfrac{Wds(g) \times f}{L\ (in)}$

$\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$

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P7

MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-TO2 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 01/22/2020

Boring #	BH-158	M&D	-#200	SA	SA	PI		
Sample #	3A	10	14B	17A	20	42A		
Depth ft.	77	89.5	98	102.5	106.5	145.5		
Ht of Sample	6"	4"	2"	6"	6"	2"		
Tare #	G53	G125	G68	G56	G22	G125		
Gross Wet Wt.	1092.1	776.76	286.41	701.01	705.82	417.98		
Gross Dry Wt.	1006.6	708.54	252.87	663.92	667.28	365.71		
Tare Wt.	83.96	110.05	84.49	83.35	84.06	110.05		
Wt. of Water	85.5	68.22	33.54	37.09	38.54	52.27		
Net dry Wt.	922.64	598.49	168.38	580.57	583.22	255.66		
% Moisture	9.3%	11.4%	19.9%	6.4%	6.6%	20.4%		
Dry Density	127.8	124.3	109.6	126.0	126.6	106.2		
Wet Density	139.6	138.5	131.5	134.0	134.9	127.9		
Pocket Pen								
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = \frac{Wds (g) \times f}{L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	Well graded GRAVEL w/ SILT and SAND. (GW-GM) DENSE, GRAY, SUBROUNDED GRAVEL, FINE TO MEDIUM SAND (Dia: 2.416)	WELL GRADED SAND w/ GRAVEL (SW) WET, MEDIUM DENSE TO DENSE, GRAYISH BROWN, FINE GRAVEL, FINE TO COARSE SAND	SILT w/ SAND. (ML), DENSE, DARK OLIVE GRAY, WET, FINE SAND, UNCEMENTED (Dia: 1.93")	Well graded SAND W/ SILT and GRAVEL (SW-SM) DENSE, WET, SUB-ANGULAR FINE GRAVEL. uncementation (Dia: 1.93")	Well graded GRAVEL w/ SILT and SAND. (GW-GM) WET, VERY DENSE, LIGHT OLIVE BROWN, FINE TO COARSE SAND AND GRAVEL, UNCEMENTED (Dia: 1.93")	LEAN CLAY. (CL), HARD, OLIVE, MOIST, HIGH PLASTICITY, (Dia: 2.416")		

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-T02 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 01/22/2020

Boring #	BH-159					- #200	SA	
Sample #	4A	8A	10A	14A	22A	26A	32A	
Depth ft.	40	58.5	63.5	76	102	116	145.5'	
Ht of Sample	2"	5"	3"	2"	2"	2"	6"	
Tare #	G65	G72	G31	G58	G102	G65	G23	
Gross Wet Wt.	372.57	906.43	571.80	280.36	428.56	389.70	729.27	
Gross Dry Wt.	306.74	800.13	494.94	244.09	380.13	332.36	680.19	
Tare Wt.	83.43	85.60	84.40	85.14	110.00	83.43	84.98	
Wt. of Water	65.83	106.3	76.86	36.27	48.43	57.34	49.08	
Net dry Wt.	223.31	714.53	410.54	158.95	270.13	248.93	595.21	
% Moisture	29.5%	14.9%	18.7%	22.8%	17.9%	23.0%	8.2%	
Dry Density	92.8	118.8	113.7	103.5	112.2	103.4	129.2	
Wet Density	120.1	136.4	135.0	127.1	132.3	127.2	139.8	
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds (g) \times f}{L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	Fat CLAY, (CH), STIFF, DARK GRAY HIGH PLASTICITY (Dia: 2.416")	SILTY SAND (SM), DENSE, GRAY, WET, FINE SAND, LITTLE ROUNDED FINE GRAVEL (Dia: 2.416")	SILTY SAND, (SM), OLIVE BROWN, MEDIUM DENSE, WET, TRACE GRADES FINE TO COARSE GRAVEL (DIA: 2.416")	LEAN CLAY (CL), VERY STIFF, WET, GRAY, MEDIUM PLASTICITY (Dia: 1.93")	SANDY LEAN CLAY (CL), DARK YELLOWISH BROWN, MOIST, MEDIUM PLASTICITY, FINE SAND (Dia: 2.416)	SILTY SAND, (SM), DARK YELLOWISH BROWN DENSE, WET, LITTLE SILT. (Dia: 2.416")	SILTY SAND W/ GRAVEL, (SM), VERY DENSE, GRAYISH BROWN, WET, FINE ROUNDED SAND. (Dia: 1.93")	

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-702 Lab # G970 Tested By: D-NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 01/29/2020

Boring #	BH-160		PI/M&D	M&D/SA	-#200	S.A	PI/-#200	
Sample #	GA 10A	18	24A	27	37A	40	43A	
Depth ft.	61	85	99.5	109	146	160.5	176	
Ht of Sample	4"	2"	2"	4"	2"			
Tare #	G78	G81	G34	G80	G122	G38	G2	
Gross Wet Wt.	821.22	394.23	377.80	763.0	423.38	912.49	561.37	
Gross Dry Wt.	756.34	335.05	314.27	699.58	369.38	834.48	506.26	
Tare Wt.	83.68	83.57	84.86	84.25	110.59	84.82	84.05	
Wt. of Water	64.88	59.18	63.53	63.42	54.00	78.01	55.11	
Net dry Wt.	672.66	251.48	229.41	615.33	258.79	749.66	422.21	
% Moisture	9.6%	23.5%	27.7%	10.31%	20.9%			
Dry Density	SAMPLE DISTURBED.	104.5	95.32	127.8	107.5			
Wet Density		129.0	121.7	141.0	130.0			
Pocket Pen								
$\phi = 2.416''$ $f = 0.831$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = \frac{Wds (g) \times f}{L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	POORLY GRADED SAND W/ GRAVEL, (SP), VERY DENSE, DARK YELLOWISH BROWN, MEDIUM TO COARSE SAND, UNCEMENTED (Dia: 2.416")	Lean CLAY, (CL), DARK GREENISH GRAY, MOIST, STIFF, MEDIUM PLASTICITY (Dia: 2.416")	SILTY CLAY, (CL-ML), VERY STIFF, DARK YELLOWISH BROWN, MOIST, TRACE FINE SAND, LOW-PLASTICITY (Dia: 2.416")	POORLY GRADED GRAVEL W/SAND, (GP), VERY DENSE, YELLOWISH BROWN, MOIST, SOME COARSE SAND AND FINE GRAVEL. (Dia: 2.416")	SANDY SILT, (ML), STIFF, BROWN, MOIST, FINE SAND, UNCEMENTED, NON-PLASTIC. (Dia: 2.416")	POORLY GRADED GRAVEL W/SILT AND SAND, GP-GM, VERY DENSE, VERY DARK GRAYISH BROWN, LITTLE SILT, FINE ROUNDED GRAVEL.	CLAYEY SAND, (SC), MEDIUM DENSE, OLIVE BROWN, MOIST, FINE TO MEDIUM SAND, TRACE FINE GRAVEL, UNCEMENTED	

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Gmoisture 04/06/00

DM

MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-TO2 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 01/29/2020

Boring #	BH-161	Moist/S.A	M.SD/-#200	-#200	-#200	PI		
Sample #	S.A 4A	11A	17A	19A	37B	34A		
Depth ft.	40.25	84	99.25	105	180.5			
Ht of Sample			6" / Dia: 1.93"	2"				
Tare #	G126	G131	G127	G75	G106			
Gross Wet Wt.		420.48	719.88	395.70	410.42			
Gross Dry Wt.	704.03	368.12	628.42	343.02	353.90			
Tare Wt.	110.57	109.95	109.97	84.55	109.97			
Wt. of Water		52.36	91.46	52.68	56.52			
Net dry Wt.		258.17	518.45	258.47	243.93			
% Moisture		20.3%	17.6%	20.4%				
Dry Density			112.5	107.4				
Wet Density			132.3	129.3				
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub ϕ = 2.416" f = 0.831 $\gamma d = \frac{Wds(g) \times f}{L (in)}$	Well graded SAND w/ SILT and GRAVEL (SW-SM), VERY DENSE, MOIST, GRAY, MEDIUM SAND, FINE GRAVEL.	Poorly graded SAND w/ SILT (SP-SM), DENSE, DARK GRAYISH BROWN, WET, FINE SAND, FINE GRAVEL.	SILTY SAND (SM), DARK YELLOWISH BROWN, DENSE, WET, FINE TO MEDIUM SAND (tube: 170.84g)	Sandy lean CLAY (CL), MEDIUM DENSE, GREENISH GRAY, FINE SAND, MOIST, MEDIUM PLASTICITY (Dia: 2.416")	SILTY SAND (SM) MEDIUM DENSE, OLIVE BROWN, WET, FINE SAND, NON-PLASTIC.	SILTY CLAY w/ SAND (CL-ML), HARD, LIGHT OLIVE BROWN, MOIST, LOW-PLASTICITY, FINE SAND.		

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-702 Lab # Tested By: D. NGUYEN Page #:
Project Name: BART TO SILICON VALLEY Date Tested: 04/03/2020

Boring #	BH-162							
Test(s) request	M / S.A	M/D /S.A/Hydro	S.A / M	S.A / Hydro	-#200	PI / M&D	PI	PI
Sample #	14	16	18,19 20	29A	36	41A	46A	49
Depth ft.	70	75	83.5	108.5	125.5	141	166	181
Ht of Sample	BAG	6"				2"		
Dia. of Sample (in)		2.416				2.416"		
Tare #	G36	G7	G72			G35		
Gross Wet Wt.	601.62	1122.60	529.67			387.56		
Gross Dry Wt.	568.14	1042.3	495.15			326.18		
Tare Wt.	84.94	84.67	85.67			84.36		
Wt. of Water	33.48	80.3	34.52			61.38		
Net dry Wt.	483.2	957.63	409.48			241.82		
% Moisture	6.9%	8.4%	8.4%			25.4%		
Dry Density		132.6				100.5		
Wet Density		143.7				126.0		
Pocket Pen								
γd = 4.8493 x Wds(g) / (φ)² (in) x L (in) γd = pcf X 0.1572 = KN/m-cub φ = 2.416" f = 0.831 γd = Wds (g) x f / L (in)	Poorly graded SAND w/ SILT AND GRAVEL, (SP-SM), DARK YELLOWISH - BROWN MOIST, MEDIUM TO COARSE SAND, FINE GRAVEL, UNCEMENTED	POORLY GRADED SAND w/ SILT AND GRAVEL (SP-SM), DARK YELLOWISH - BROWN MOIST, MEDIUM AND COARSE SAND UNCEMENTED	POORLY GRADED SAND w/ SILT and GRAVEL (SP-SM), MOTTLED YELLOWISH - BROWN, MEDIUM TO COARSE SAND, FINE GRAVEL (Disturbed for density test)	Replaced by #29B	SILTY SAND, (SM), DARK GREENISH - GRAY FINE SAND, UNCEMENTED	LEAN CLAY, (CL), GRAYISH - BROWN, SOME NON PLASTIC SILT LOW-PLASTICITY	LEAN CLAY (CL), YELLOWISH - BROWN, , SOME FINE SAND, TRACE SUBROUNDED FINE GRAVEL,	FAT CLAY, (CH), DARK BROWN, BROWN, FEW FINE SAND, HIGH PLASTICITY

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-702 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 05/08/2020

Boring #	BH-162							
Test(s) request	S.A/ Hydro replace 29A							
Sample #	29B							
Depth ft.	108.0							
Ht of Sample								
Dia. of Sample (in)								
Tare #	G74							
Gross Wet Wt.	551.10							
Gross Dry Wt.	487.35							
Tare Wt.	83.84							
Wt. of Water								
Net dry Wt.								
% Moisture								
Dry Density								
Wet Density								
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub ϕ = 2.416" f = 0.831 $\gamma d = \frac{Wds(g) \times f}{L (in)}$	SILTY SAND, (SM), PALE BROWN FINE SAND, LITTLE SUBANGULAR FINE GRAVEL, UNCEMENTED							

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-181-702 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 04/08/2020

Boring #	BH-163							
Test(s) request	-#200	PI / M&D	PI / M&D	PI / M&D				
Sample #	9A	12	21	35				
Depth ft.	91.5	98	120.5	176				
Ht of Sample		2"	2"	2"				
Dia. of Sample (in)		2.416	2.416	2.416				
Tare #	G127	G2	G122	G26				
Gross Wet Wt.	560.30	392.83	418.79	396.94				
Gross Dry Wt.	501.67	334.66	363.81	343.34				
Tare Wt.	109.90	84.08	110.61	85.01				
Wt. of Water		58.17	54.98	53.6				
Net dry Wt.		250.58	253.2	258.33				
% Moisture		23.2 %	21.7 %	20.7%				
Dry Density		104.1	105.2	107.3				
Wet Density		128.3	128.0	129.6				
Pocket Pen								
$\phi = 2.416"$ f = 0.831 $\gamma d = \frac{Wds(g) \times f}{L (in)}$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub	SILTY SAND, YELLOWISH BROWN, MOIST, FINE TO MEDIUM SAND, LITTLE SILT, WEAK CEMENTATION	SILTY CLAY (CL-ML), DARK GREENISH-GRAY, TRACE FINE SAND, WET, LOW PLASTICITY	SILTY CLAY (CL-ML), DARK GREENISH-GRAY, MOIST, LOW PLASTICITY, TRACE FINE TO COARSE SAND	LEAN CLAY (CL) DARK GREENISH-GRAY, MEDIUM PLASTICITY, LITTLE SILT				

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-702 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY-(Date Tested: 04/08/2020

Boring #	BH-164							
Test(s) request	SA/MSD	S.A/MSD	S.A	-#200/MSD	MSD/S.A	-#200	Moisture	
Sample #	15A	19A	23	33A	37A	39A	49	
Depth ft.	67.5	78	87.5	111.5	123	126.5	165	
Ht of Sample	6"	6"		3"	6"		BAG	
Dia. of Sample (in)	2.416	2.416		2.416	1.93	1.93		
Tare #	G75	G108	G118	G119	G60	G15	G38	
Gross Wet Wt.	1069.9	1114.6	1022.2	546.76	739.71	669.26	436.64	
Gross Dry Wt.	949.4	1030	936.58	456.04	688.74	573.82	418.63	
Tare Wt.	84.41	109.49	110.10	110.46	85.16	82.90	84.68	
Wt. of Water	120.5	84.6		90.72	50.97		18.01	
Net dry Wt.	864.99	920.51		345.58	603.58		333.95	
% Moisture	13.9%	9.2%		26.3%	8.4%		5.4%	
Dry Density	119.8	127.5		95.7	130.9			
Wet Density	136.5	139.2		120.9	141.9			
Pocket Pen								
ϕ = 2.416" f = 0.831 $\gamma d = \frac{Wds (g) \times f}{L (in)}$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub	Poorly graded SAND w/ SILT. (SP-SM). GRAYISH-BROWN, WET, MEDIUM TO COARSE SAND, FINE GRAVEL, UNCEMENTED	WELL GRADED SAND w/ SILT AND GRAVEL, (SW-SM) MOIST, GRAYISH-BROWN. FINE GRAVEL, UNCEMENTED	WELL GRADED SAND w/ GRAVEL (SW), OLIVE BROWN - GRAY, FINE GRAVEL	SILTY SAND, (SM), WET, DARK GREENISH-GRAY, TRACE FINE ANGULAR GRAVEL, FINE SAND, UNCEMENTED	WELL GRADED SAND w/ SILT AND GRAVEL, (SW-SM), OLIVE, WET, SUBANGULAR FINE GRAVEL.	SANDY SILT, (ML), GREENISH-GRAY, WET, FINE SAND, UNCEMENTED	Poorly graded GRAVEL w/ SAND. (GP) MOIST, SUBROUNDED FINE GRAVEL, MEDIUM TO COARSE SAND	

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-TD2 Lab # Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 03/31/2020

Boring #	BH-165							
Test(s) request	PI/M&D -#200	PI/M&D -#200	PI/M&D	PI/M&D -#200	SA/Hy	PI/M&D	M&D SA	
Sample #	14B	17A	20B	23B	28A	30B	38A	
Depth ft.	50.5	58.5	65.5	73	90.5	100.5	140.5	
Ht of Sample	2"	2"	2"	2"		2"	4"	
Dia. of Sample (in)	2.416	2.416	2.416	2.416		2.416	2.416	
Tare #	G124	G115	G129	G81	S10	G50	G11	
Gross Wet Wt.	408.21	423.83	416.43	385.30	1069.9	397.15	685.74	
Gross Dry Wt.	346.04	368.40	358.56	325.70	940.89	342.41	561.08	
Tare Wt.	109.43	110.56	110.37	83.60	103.35	84.15	84.40	
Wt. of Water	62.17	55.43	57.87	59.6	129.01	54.74	124.66	
Net dry Wt.	236.61	257.84	248.19	242.1	837.54	258.26	476.68	
% Moisture	26.2%	21.5%	23.3%	24.6%		21.2%	26.2%	
Dry Density	98.3	107.1	103.12	100.6		107.31	99.0	
Wet Density	124.14	130.2	127.17	125.4		130.05	125.0	
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$ $\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds(g) \times f}{L (in)}$	LEAN CLAY, (CL), GRAY, WET, TRACE GRAVEL, FINE SAND, LOW PLASTICITY	SANDY LEAN CLAY, (CL), LIGHT GREENISH-GRAY, MOIST, LOW PLASTICITY	LEAN CLAY, (CL), LIGHT GREENISH-GRAY, MOIST, LOW PLASTICITY	SANDY SILTY CLAY, (CL-ML), DARK GRAY, WET, FINE SAND, LOW PLASTICITY	SILTY SAND, (SM), OLIVE-GRAY, WET, FINE TO MEDIUM SAND, WEAK CEMENTATION	LEAN CLAY, (CL), LIGHT OLIVE-BROWN, MOIST, TRACE FINE SAND, LOW PLASTICITY	SILTY SAND (SM), DARK GRAY, WET, MEDIUM SUBANGULAR SAND, UNCEMENTED	

MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-T02 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY PROJECT Date Tested: 03/12/2020

Boring #	BH-166							
Test(s) request	M&D / S.A	PI / M	-#200	PI / M&D	-#200	-#200	PI / M&D	PI / M&D
Sample #	7	8	9A	12A	16A	27	32A	35A
Depth ft.	40	45	52	65.5	79.3'	106.5	121	130
Ht of Sample (in)	5	BAG		2			2	2"
Dia. of Sample (in)	2.416			2.416			2.416	2.416
Tare #	G56	G11	G44	G108	G103	G6	G115	G7
Gross Wet Wt.	922.46	238.50	376.58	423.96	418.24	303.40	412.36	382.28
Gross Dry Wt.	832.45	208.81	323.41	371.10	362.17	292.74	353.37	325.36
Tare Wt.	83.37	84.40	84.12	109.49	109.89	83.82	110.56	84.66
Wt. of Water	90.01	29.69	53.17	52.86	56.07	10.66	58.99	56.92
Net dry Wt.	749.08	124.41	239.29	261.61	252.28	208.92	242.81	240.7
% Moisture	12.0%	23.9%		20.2%			24.3%	23.6%
Dry Density	124.5			108.7			100.9	100.0
Wet Density	139.4			130.7			125.4	123.6
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2(in) \times L(in)}$ γd = pcf X 0.1572 = KN/m-cub $\phi = 2.416"$ f = 0.831 $\gamma d = \frac{Wds(g) \times f}{L(in)}$	POORLY GRADED SAND) W/ SILT and GRAVEL, (SP-SM), DARK OLIVE-GRAY, WET SUBANGULAR TO SUBROUNDED FINE SAND	SILT, (ML), LIGHT OLIVE BROWN LOW PLASTICITY, TRACE FINE SAND	SILTY SAND (SM), DARK YELLOWISH-BROWN, MOIST	LEAN CLAY w/SAND (CL), DARK GREENISH - GRAY, MOIST, MEDIUM PLASTICITY FINE SAND, TRACE CARBONATE	SILTY SAND, (SM), OLIVE-BROWN, MOIST, FINE SAND, UNCEMENTED	SILTY SAND, (SM), OLIVE-GRAY, MOIST TRACE FINE GRAVEL	LEAN CLAY w/SAND (CL), GREENISH-GRAY, MOIST, LOW PLASTICITY, FINE SAND, TRACE CARBONATE	SILT, (ML), DARK GRAY, MOIST LOW TO NON PLASTIC

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-TO2 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 03/16/2020

Boring #	BH-166							
Test(s) request	PI/M&D	PI/M&D						
Sample #	38A	41A						
Depth ft.	141	156						
Ht of Sample	2"	2"						
Dia. of Sample (in)	2.416	2.416						
Tare #	G107	G74						
Gross Wet Wt.	401.41	391.97						
Gross Dry Wt.	335.49	337.91						
Tare Wt.	109.30	83.80						
Wt. of Water	65.92	54.06						
Net dry Wt.	226.19	254.11						
% Moisture	29.1%	21.3%						
Dry Density	94.0	105.6						
Wet Density	121.4	128.1						
Pocket Pen								
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds(g) \times f}{L (in)}$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub	LEAN CLAY w/ SAND (CL), MOIST, MEDIUM PLASTICITY, DARK GREENISH GRAY	LEAN CLAY w/ SAND (CL), GRAY, MOIST, MEDIUM PLASTICITY						

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-702 Lab # 6970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 05/11/2020

Boring #	BH-167							
Test(s) request	PI	-#200	M&D/S.A	S.A	M&D S.A/Hydro	-#200	S.A	PI
Sample #	2A	4	13B, 13A	16B	21B	29	31	33A
Depth ft.	10.5	22.5	47.5	57	69.5	91'	96	102
Ht of Sample			6"		5"			
Dia. of Sample (in)			2.416		2.416			
Tare #		G43	G79	G16	G106	G2	G70	
Gross Wet Wt.		418.24	1103.9	923.84	873.36	426.76	1085.8	
Gross Dry Wt.		354.80	1023.9	834.00	731.30	400.68	990.23	
Tare Wt.		84.58	84.41	84.07	110.0	84.10	83.70	
Wt. of Water		63.44	80	89.84	142.06	26.08	95.57	
Net dry Wt.		270.22	939.49	749.93	621.3	316.58	906.53	
% Moisture			8.5%		22.9%			
Dry Density			130.1		103.3			
Wet Density			141.2		126.9			
Pocket Pen								
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds(g) \times f}{L\ (in)}$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2\ (in) \times L\ (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	SANDY SILT, (ML), LIGHT OLIVE BROWN, LOW-PLASTICITY, TRACE ANGULAR COARSE GRAVEL, FINE SAND	SILTY SAND (SM), OLIVE BROWN, MOIST, UNCEMENTED	POORLY GRADED GRAVEL W/SILT AND SAND, (GP-GM), WET, OLIVE BROWN, ANGULAR TO SUBANGULAR FINE GRAVEL, FINE AND COARSE SAND, WEAK CEMENTATION	SILTY SAND W/ GRAVEL, (SM), OLIVE, WET, FINE TO MEDIUM SAND, FINE ANGULAR TO SUBANGULAR GRAVEL, TRACE COARSE GRAVEL, UNCEMENTED	SANDY SILT (ML), WET, DARK GRAY, FINE SAND, TRACE CLAY	SILTY GRAVEL W/SAND, (GM), OLIVE, MOIST, ANGULAR TO SUBANGULAR FINE GRAVEL, TRACE SUBANGULAR COARSE GRAVEL, FINE TO MEDIUM SAND, UNCEMENTED	WELL GRADED SAND W/ GRAVEL, (SW), OLIVE, MOIST, ANGULAR TO SUBANGULAR FINE GRAVEL, FINE TO COARSE SAND, UNCEMENTED	SANDY LEAN CLAY, (CL), LIGHT OLIVE BROWN, MOIST, FINE SAND, LOW-PLASTICITY

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-TD4 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 05/11/2020

Boring #	BH-167							
Test(s) request	M&D S.A/Hydro							
Sample #	37B							
Depth ft.	113							
Ht of Sample	5.71"							
Dia. of Sample (in)	2.416							
Tare #	G40							
Gross Wet Wt.	1041.6							
Gross Dry Wt.	944.52							
Tare Wt.	85.09							
Wt. of Water	97.08							
Net dry Wt.	859.43							
% Moisture	11.3%							
Dry Density	125.1							
Wet Density	139.2							
Pocket Pen								

$\phi = 2.416"$ $f = 0.831$

$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$

$\gamma d = \frac{Wds (g) \times f}{L (in)}$

$\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$

CLAYEY SAND w/ GRAVEL (SC), WET,
LIGHT BROWN, SUBANGULAR FINE
GRAVEL, FINE SAND

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-TD 4P Lab # G970 Tested By: DO NGUYEN Page #:

Project Name: BART TO SILICON VALLEY PROJECT Date Tested: 07/13/2020

Boring #	BH-168							
Test(s) request	PI, M&D	M&D S.A	M, S.A	M&D, S.A	M&D -#200	S.A M&D	Moisture S.A & Hydro	
Sample #	3	9	11	13B	17A	30+shoe	33, 34, 35	
Depth ft.	12.3'	40	50	60	70.5	104.5	114-120.5'	
Ht of Sample	3"	5"	BAG	5"	2"	4"	BAGS	
Dia. of sample (in)	2.93	2.416		2.416	2.416	2.416		
Tare #	G126	G113	G1	G57	G117	S13	S11	
Gross Wet Wt.	696.14	987.08	756.23	940.39	408.21	796.33	1612.0	
Gross Dry Wt.	540.56	909.30	709.68	856.30	349.07	734.75	1495.3	
Tare Wt.	110.62	109.69	85.39	84.45	110.60	102.07	104.54	
Wt. of Water	155.58	77.78	46.55	84.09	59.14	61.58	116.7	
Net dry Wt.	429.94	799.61	624.29	771.85	238.47	632.68	1390.76	
% Moisture	36.2%	9.7%	7.5%	10.9%	24.8%	9.7%	8.4%	
Dry Density	81.0	132.9		128.3	99.1	131.4		
Wet Density	110.3	145.8		142.3	123.7	144.2		
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub ϕ = 2.416" f = 0.831 $\gamma d = \frac{Wds(g) \times f}{L (in)}$	LEAN CLAY (CL), OLIVE BROWN, MOIST, MEDIUM PLASTICITY	WELL-GRADED GRAVEL W/SAND, (GW), OLIVE BROWN, MOIST, FINE AND COARSE SUBANGULAR GRAVEL, MOSTLY COARSE SAND, TRACE SILT, UNCEMENTED	WELL GRADED SAND W/SILT AND GRAVEL, (SW-SM), OLIVE BROWN, MOIST, FINE TO COARSE SUBANGULAR SAND, FINE SUBANGULAR GRAVEL, UNCEMENTED	POORLY GRADED SAND W/SILT AND GRAVEL (SP-SM), OLIVE BROWN, MOIST, MOSTLY MEDIUM TO COARSE SAND, FINE GRAVEL UNCEMENTED	SANDY LEAN CLAY, (CL), LIGHT GREENISH GRAY, MOIST, FINE SAND, LOW-PLASTICITY	WELL GRADED GRAVEL W/SAND, (GW), OLIVE BROWN, MOIST, SUBANGULAR FINE TO COARSE GRAVEL, COARSE SAND, TRACE SILT, UNCEMENTED	POORLY GRADED SAND W/SILT AND GRAVEL (GP-SM), GRAY, MOIST, MEDIUM TO COARSE SAND, FINE SUBROUNDED GRAVEL, UNCEMENTED.	

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-102 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 03/14/2020

Boring #	BH-169							
Test(s) request	-#200	S.A	Hydro	Hydro	PI/MSD	PI/MSD	PI/MSD	PI/MSD
Sample #	6	10	16A	21	23	28A	31A	36
Depth ft.	40	70	91'	111'	117	131	141	165.5
Ht of Sample					2"	2"	2"	2"
Dia. of Sample (in)					2.416	2.416	2.416	2.416
Tare #	G33	G72	G112	G73	G131	G30	G77	G29
Gross Wet Wt.	383.62	872.86	1063.8	456.11	413.76	385.56	394.48	390.49
Gross Dry Wt.	325.16	831.96	976.55	389.11	358.15	323.67	339.49	328.12
Tare Wt.	84.29	85.66	110.19	84.17	109.93	84.65	84.94	84.40
Wt. of Water	58.46	40.9	87.25	67	55.61	61.89	54.99	62.37
Net dry Wt.	240.87	746.3	866.36	304.94	248.22	239.02	254.55	243.72
% Moisture					22.4%	25.9%	21.6%	25.6%
Dry Density					103.1	99.3	105.8	101.3
Wet Density					126.2	125.0	128.6	127.2
Pocket Pen								
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds(g) \times f}{L(in)}$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L(in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	LEAN CLAY W/SAND (CL), DARK GREENISH-GRAY, MOIST, MEDIUM PLASTICITY, FINE SAND	WELL GRADED SAND W/SILT AND GRAVEL (SW-SM), OLIVE BROWN, WET, MEDIUM AND COARSE SAND, FINE SUBROUNDED GRAVEL, UNCEMENTED	POORLY GRADED SAND W/SILT AND GRAVEL, (SP-SM), DARK YELLOWISH BROWN, WET, MEDIUM TO COARSE SAND, FINE GRAVEL	SANDY LEAN CLAY, (CL), LIGHT OLIVE BROWN, MOIST, SOME FINE GRAVEL, FINE SAND, LOW-PLASTICITY	LEAN CLAY (CL), OLIVE GRAY, MOIST, LOW-PLASTICITY, FINE SAND, TRACE FINE GRAVEL.	LEAN CLAY (CL), DARK GRAY, MOIST, MEDIUM PLASTICITY	LEAN CLAY, (CL), LIGHT YELLOWISH BROWN, MOIST, LOW PLASTICITY	FAT CLAY W/SAND (CH), OLIVE/PALE YELLOW, FINE SAND, HIGH PLASTICITY

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-102 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 04/30/2020

Boring #	BH-171							
Test(s) request	PI / MSD	PI / MSD	MSD / SA	S.A / Hydrometer	PI / MSD	PI / MSD	Hydro MSD	PI / MSD
Sample #	2A	10B	14B	15	19A	22A	24A	33A
Depth ft.	11	65.5	75.5	77.5	88.5	96	100.5'	122.5
Ht of Sample	2"	2"	6"		2"	2"	5"	2"
Dia. of Sample (in)	2.416	2.416	2.416		2.416	2.416	2.416	2.416
Tare #	G68	G21	G80	G30	G129	G131	G111	G74
Gross Wet Wt.	379.40	386.64	1049.5	823.23	415.26	415.10	893.05	395.23
Gross Dry Wt.	316.40	329.39	921.4	697.70	357.51	357.32	759.57	339.28
Tare Wt.	84.52	83.43	84.23	84.66	110.37	109.93	110.65	83.82
Wt. of Water	63.0	57.25	128.1	125.53	57.75	57.78	133.48	55.95
Net dry Wt.	231.88	245.96	837.17	613.04	247.14	247.39	648.92	255.46
% Moisture	27.2%	23.3%	15.3%	20.5%	23.4%	23.4%	20.6%	21.9%
Dry Density	96.35	102.2	115.9		102.69	102.8	107.8	106.14
Wet Density	122.6	126.0	137.6		126.68	126.8	130.0	129.4
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub ϕ = 2.416" f = 0.831 $\gamma d = \frac{Wds(g) \times f}{L (in)}$	LEAN CLAY w/ SAND, (CL), YELLOWISH-BROWN, MOIST, TRACE FINE GRAVEL,	LEAN CLAY w/ SAND, (CL), LIGHT YELLOWISH BROWN, MOIST, MEDIUM PLASTICITY, FINE SAND	SILTY SAND w/ GRAVEL, (SM), LIGHT OLIVE BROWN, MOIST, FINE SAND, UNCEMENTED	WELL GRADED SAND w/ SILT AND GRAVEL (SW-SP), LIGHT OLIVE BROWN, MOIST, SUBROUNDED FINE GRAVEL, FINE SAND	SANDY LEAN CLAY, (CL), GREENISH-GRAY, MOIST, MEDIUM PLASTICITY, FINE SAND	SANDY LEAN CLAY, (CL), GREENISH-GRAY, WET, LOW-PLASTICITY, FINE SAND	POORLY GRADED SAND w/ SILT, (SP-SM), LIGHT OLIVE BROWN, WET, UNCEMENTED	SANDY LEAN CLAY, (CL), LIGHT YELLOWISH-BROWN, MEDIUM PLASTICITY,

MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-7D2 Lab # 6970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 04/30/2020

Boring #	BH-A1							
Test(s) request	PI/M&D	M&D/-#200	PI/M&D					
Sample #	38A	39A	43					
Depth ft.	141	146	165.5					
Ht of Sample	2"	2"	2"					
Dia. of Sample (in)	2.416	2.416	2.416					
Tare #	G50	G51	G30					
Gross Wet Wt.	377.21	397.94	383.95					
Gross Dry Wt.	314.24	340.16	323.91					
Tare Wt.	84.15	85.01	84.65					
Wt. of Water	62.97	57.78	60.04					
Net dry Wt.	230.09	255.15	239.26					
% Moisture	27.4%	22.6%	25.1%					
Dry Density	95.6	106.0	99.4					
Wet Density	121.8	130.0	124.4					
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$ $\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds (g) \times f}{L (in)}$	LEAN CLAY (CL), OLIVE GRAY, MOIST, HIGH PLASTICITY	SILTY SAND (SM) LIGHT OLIVE BROWN FINE SAND UNCEMENTED	LEAN CLAY (CL), OLIVE GRAY, MOIST HIGH PLASTICITY					

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-TD2 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 05/12/2020

Boring #	BH-173							
Test(s) request	M&D/Hydr	-#200	PI/M&D	M&D/PI	-#200	-#200	S.A	
Sample #	3A	11A	14	29B	31	36A	37	
Depth ft.	8.5	28.5	35.5	75.5'	80	98.5	100	
Ht of Sample	6"		2"	2"				
Dia. of Sample (in)	2.416		2.416	2.416				
Tare #	G126	G123	G74	G37	G49	G4	G23	
Gross Wet Wt.	959.09	622.14	398.96	387.68	488.80	547.40	401.25	
Gross Dry Wt.	905.26	572.91	341.17	329.46	434.27	469.17	383.94	
Tare Wt.	110.62	109.52	83.81	85.18	84.18	84.19	84.94	
Wt. of Water	53.83		57.79	58.22				
Net dry Wt.	794.64		257.36	244.28				
% Moisture	6.8 %		22.5 %	23.8 %				
Dry Density	110.1		106.9	101.5				
Wet Density	117.5		131.0	125.7				
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub ϕ = 2.416" f = 0.831 $\gamma d = \frac{Wds (g) \times f}{L (in)}$	SILTY SAND w/ GRAVEL, (SM), REDDISH - BROWN, MOIST.	POORLY GRADED SAND (SP), Brownish - GRAY, wet, FINE TO MEDIUM SAND, FINE TO COARSE GRAVEL	SILTY CLAY (CL - ML), GRAY, WET TRACE GRAVEL, LOW PLASTICITY	SILT, (ML), DARK YELLOWISH BROWN AND GRAY MOTTLED, MOIST, LOW PLASTICITY	SILTY SAND, (SM), GRAYISH - BROWN, WET, FINE SAND	SANDY SILT, (ML), DARK GREENISH GRAY FINE SAND, LOW PLASTICITY	SILTY SAND w/ GRAVEL, (SM), OLIVE BROWN, WET, FINE SUBROUNDED GRAVEL	

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-702 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 04/30/2020

Boring #	BH-175							
Test(s) request	M&D/S.A	PI M&D/-#200	M&D S.A	-#200	S.A	PI/-#200		
Sample #	14A	15A	18A	20B	30	36B		
Depth ft.	50.5	55	62	68	93	106.5		
Ht of Sample	6"	2"	6"					
Dia. of Sample (in)	2.416"	2.416"	2.416					
Tare #	G121	G64	G59	G28	G3	G37		
Gross Wet Wt.	1124.7	402.74	1012.1	402.20	776.60	443.34		
Gross Dry Wt.	1034.9	350.00	877.0	351.96	718.00	370.65		
Tare Wt.	110.21	84.91	84.85	83.35	85.49	85.18		
Wt. of Water	89.8	52.74	135.1	50.24	58.6	72.69		
Net dry Wt.	924.69	265.09	792.15	268.61	632.51	285.47		
% Moisture	9.7 %	19.9%	17.1%					
Dry Density	128.1	110.1	109.7					
Wet Density	140.5	132.0	128.4					
Pocket Pen								
$\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ γd = pcf X 0.1572 = KN/m-cub ϕ = 2.416" f = 0.831 $\gamma d = \frac{Wds(g) \times f}{L (in)}$	POORLY GLADED SAND W/GRAVEL (SP), OLIVE-BROWN, WET, ANGULAR TO SUBROUNDED FINE GRAVEL, COARSE SAND, UNCEMENTED	CLAYEY SAND (SC), GREENISH GRAY, WET, FINE SAND, LOW PLASTICITY	SILTY SAND (SM), OLIVE BROWN, WET, FINE TO MEDIUM SAND, WEAK CEMENTATION	SILTY SAND (SM), OLIVE-BROWN, WET, FINE SAND, WEAK CEMENTATION	SILTY SAND W/ GRAVEL (SM), LIGHT OLIVE BROWN, WET, FINE SAND, FINE GRAVEL	CLAYEY SAND (SC), DARK GREENISH-GRAY, LOW-PLASTICITY		

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MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-121-704 Lab # G970 Tested By: D-NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 05/20/2020

Boring #	BH-176							
Test(s) request	PI/M&D	S.A/M&D	-#200	S.A	M&D/S.A	PI		
Sample #	2	9B	14	15	22	24B		
Depth ft.	5	35	60	65	100	110.5		
Ht of Sample	2"	6"			6"			
Dia. of Sample (in)	2.416	2.416			2.416			
Tare #	G61	G135	G6	S11	G4			
Gross Wet Wt.	343.00	1116.02	492.52	1028.0	1072.7			
Gross Dry Wt.	272.13	993.42	465.23	913.07	969.5			
Tare Wt.	84.77	109.63	83.79	104.54	84.18			
Wt. of Water	70.87	122.6	27.29	114.93	103.2			
Net dry Wt.	187.36	883.79	381.44	808.53	885.32			
% Moisture	37.8%	13.9%			11.7%			
Dry Density	77.85	122.40			122.61			
Wet Density	107.30	139.39			136.9			
Pocket Pen								
	FAT CLAY, (CH), VERY DARK GREENISH-GRAY MOIST, HIGH PLASTICITY	POORLY GRADED SAND, (SP), WET, DARK-OLIVE, MEDIUM SAND, TRACE SUBROUDED FINE GRAVEL.	SILTY GRAVEL, (GM), WET, BROWN, SUBANGULAR TO SUBROUNDED GRAVEL, TRACE SAND.	POORLY GRADED SAND W/SILT AND GRAVEL, (SP-SM), DARK GRAYISH BROWN, WET, SUBANGULAR TO SUBROUNDED FINE GRAVEL, MEDIUM TO COARSE SAND, UNCEMENTED	POORLY GRADED SAND W/ SILT AND GRAVEL, (SP-SM), WET, VERY DARK GRAYISH BROWN, SUBANGULAR FINE GRAVEL, COARSE SAND	SANDY LEAN CLAY, (CL), MOIST, GREENISH GRAY LOW PLASTICITY, TRACE COARSE SAND AND FINE GRAVEL		

$\phi = 2.416"$ $f = 0.831$

$\gamma d = \dfrac{\text{Wds (g)} \times f}{L \text{ (in)}}$

$\gamma d = \dfrac{4.8493 \times \text{Wds(g)}}{(\phi)^2 \text{ (in)} \times L \text{ (in)}}$

$\gamma d = \text{pcf} \times 0.1572 = \text{KN/m-cub}$

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-TO4 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 05/20/2020

Boring #	BH-177							
Test(s) request	PI/M&D	PI	-#200	PI/M&D -#200	S.A	M&D/S.A		
Sample #	3	4A	8	9A	11	16B, 16A		
Depth ft.	5.0	10.5	30	35.5	45	70		
Ht of Sample	2"			2"		6"		
Dia. of Sample (in)	2.416			2.416		2.416		
Tare #	G115		G82	G81	G127	G117		
Gross Wet Wt.	415.39		344.88	398.21	643.71	1115.45		
Gross Dry Wt.	365.37		287.80	346.34	602.71	1025.95		
Tare Wt.	110.54		85.33	83.56	109.90	110.60		
Wt. of Water	50.02		57.08	51.87		89.5		
Net dry Wt.	254.83		202.47	262.78		915.35		
% Moisture	19.6%			19.7%		9.8%		
Dry Density	105.88			109.2		126.78		
Wet Density	126.67			130.74		139.17		
Pocket Pen								
$\phi = 2.416"$ f = 0.831 $\gamma d = \frac{\text{Wds (g)} \times f}{L \text{ (in)}}$ $\gamma d = \frac{4.8493 \times \text{Wds(g)}}{(\phi)^2 \text{ (in)} \times L \text{ (in)}}$ γd = pcf X 0.1572 = KN/m-cub	SANDY LEAN CLAY (CL), BLACK, MOIST, HIGH PLASTICITY	FAT CLAY, (CH), GRAYISH BROWN, MOIST, HIGH PLASTICITY	SILT, (ML), VERY DARK GRAY, MOIST, LOW PLASTICITY	SANDY LEAN CLAY, (CL), LIGHT OLIVE BROWN, MOIST, FINE TO MEDIUM SAND LOW-PLASTICITY	SILTY SAND W/ GRAVEL, (SM), DARK GRAYISH BROWN, ANGULAR TO SUBANGULAR FINE GRAVEL, FINE TO COARSE SAND, UNCEMENTED	POORLY GRADED SAND W/ SILT AND GRAVEL, (SP-SM), OLIVE BROWN, MOIST, ANGULAR TO SUBROUNDED FINE GRAVEL FINE TO COARSE SAND		

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MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-T04 Lab # G970 Tested By: D. NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 05/21/2020

Boring #	BH-178							
Test(s) request	PI/MSD	PI/MSD	S.A	S.A				
Sample #	2B	6A	18B	20				
Depth ft.	5	25.5	85	95				
Ht of Sample	2"	2"						
Dia. of sample (in)	2.416	2.416						
Tare #	G3	G44	G38	G119				
Gross Wet Wt.	349.26	390.89	548.97	884.91				
Gross Dry Wt.	283.79	332.91	474.82	785.57				
Tare Wt.	85.49	84.09	84.66	110.44				
Wt. of Water	65.47	57.98	74.15	99.34				
Net dry Wt.	198.3	248.82	390.16	675.13				
% Moisture	33%	23.3%						
Dry Density	82.39	103.4						
Wet Density	109.60	127.5						
Pocket Pen								
$\phi = 2.416"$ $f = 0.831$ $\gamma d = \frac{Wds(g) \times f}{L (in)}$ $\gamma d = \frac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$ $\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$	FAT CLAY, (CH), VERY DARK BROWN, MOIST, HIGH PLASTICITY	SILTY SAND, (SM), DARK OLIVE, WET, FINE SAND, NON-PLASTIC	SILTY SAND (SM) PALE OLIVE, WET FINE SAND TRACE FINE SUBROUNDED GRAVEL	WELL GRADED SAND W/ GRAVEL (SW), OLIVE, WET, FINE AND COARSE GRAVEL, MEDIUM SAND				

PARIKH CONSULTANTS, INC.

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-705 Lab # G986 Tested By: DO NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 11/10/2020

Boring #	BH-179							
Test(s) request	PI	S, A	S, A	PI / -#200	PI	S/Hydro	M&D, PI	M&D PI
Sample #	2A	6A	13A	18A	19A	22	24A	30A
Depth ft.	6	26'	61'	86.3'	91	105	116	146
Ht of Sample		3"	6"				2"	2"
Dia. of sample (in)		2.416"	2.416				2.416	2.416
Tare #		G65	S9			S13	G55	G135
Gross Wet Wt.		544.26	1079.0			933.45	393.91	422.23
Gross Dry Wt.		455.29	957.91			853.25	337.50	366.00
Tare Wt.		83.44	102.90			102.03	84.77	109.65
Wt. of Water		88.97	121.09			80.2	56.41	56.23
Net dry Wt.		371.85	855.01			751.22	252.73	256.35
% Moisture		23.9%	14.2%			10.7%	22.3%	21.9%
Dry Density		103.0	118.4				105.0	106.5
Wet Density		127.6	135.2				128.4	129.9
Pocket Pen								
	LEAN CLAY, (CL), MOIST, DARK YELLOWISH BROWN, LOW-PLASTICITY	SILT w/SAND, (ML), MOIST, OLIVE BROWN LOW TO NON-PLASTICITY	POORLY GRADED SAND w/ GRAVEL, (SP), MOIST, DARK GREENISH-GRAY, MOSTLY MEDIUM SAND, LITTLE SUBROUNDED FINE GRAVEL, UNCEMENTED	LEAN CLAY w/SAND, (CL), MOIST, GRAY, MEDIUM PLASTICITY	LEAN CLAY, (CL), MOIST, DARK YELLOWISH BROWN, LOW-PLASTICITY	SILTY GRAVEL w/SAND, (GM), WET, GRAY, SUBANGULAR FINE GRAVEL, ANGULAR FINE TO COARSE SAND, UNCEMENTED	LEAN CLAY, (CL), MOIST, DARK YELLOWISH-BROWN, LOW PLASTICITY	LEAN CLAY (CL), MOIST, GREENISH-GRAY, LOW PLASTICITY

$\phi = 2.416"$ $f = 0.831$

$\gamma d = \dfrac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$

$\gamma d = \dfrac{Wds (g) \times f}{L (in)}$

$\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$

PARIKH CONSULTANTS, INC.

MOISTURE / DENSITY

(D2216 / CAL 226)

Project #: 2019-131-705 Lab # G986 Tested By: DO NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 11/17/2020

Boring #	BH-179								
Test(s) request	S.A								
Sample #	35								
Depth ft.	170'								
Ht of Sample	BAG								
Dia. of sample (in)									
Tare #	G100								
Gross Wet Wt.									
Gross Dry Wt.	276.65								
Tare Wt.	110.14								
Wt. of Water									
Net dry Wt.									
% Moisture									
Dry Density									
Wet Density									
Pocket Pen									

$\phi = 2.416"$ $f = 0.831$

$\gamma d = \dfrac{4.8493 \times Wds(g)}{(\phi)^2 (in) \times L (in)}$

$\gamma d = \dfrac{Wds(g) \times f}{L (in)}$

$\gamma d = pcf \times 0.1572 = KN/m\text{-}cub$

WELL GRADED SAND W/ SILT AND GRAVEL, (SW-SM), MOIST, GRAY, SUBANGULAR MEDIUM TO COARSE SAND, SUBROUNDED FINE GRAVEL, UNCEMENTED

PARIKH CONSULTANTS, INC.

MOISTURE / DENSITY (D2216 / CAL 226)

Project #: 2019-131-704 Lab # G981 Tested By: DO NGUYEN Page #:

Project Name: BART TO SILICON VALLEY Date Tested: 08/11/2020

Boring #	BH-180							
Test(s) request	PI	PI	PI/#200	S.A	S.A	S.A	Sieve & Hydro	
Sample #	1	4	13	15	25B	26A, 27	33, 34	
Depth ft.	0.5-1.5	11'	56'	65'	115.5'	120'	155-160'	
Ht of Sample	BAG	5"		5"	2"	BAG		
Dia. of sample (in)		2.8756		2.416	2.416			
Tare #	G1	S13	G64	S6	G106	S12	S11	
Gross Wet Wt.	203.48	1100.6	402.46	975.46	402.70	983.22	1174.6	
Gross Dry Wt.	185.05	890.61	334.24	890.80	340.87	910.58	1110.8	
Tare Wt.	85.39	102.01	84.89	123.98	109.98	102.60	104.60	
Wt. of Water	18.43	209.99	68.22	84.66	61.83	72.64	63.8	
Net dry Wt.	99.66	788.6	249.35	766.82	230.89	807.98	1006.2	
% Moisture	18.5%	26.6%		11.0%	26.8%	9.0%		
Dry Density		92.5		127.4	95.9			
Wet Density		117.2		141.5	121.6			
Pocket Pen								
φ = 2.416" f = 0.831 γd = Wds (g) x f / L (in) γd = 4.8493 x Wds(g) / (φ)² (in) x L (in) γd = pcf X 0.1572 = KN/m-cub	SANDY LEAN CLAY, (CL), BLACK, MOIST, LOW PLASTICITY, TRACE FINE GRAVEL, FINE AND MEDIUM SAND	SILT, (ML), MOIST, DARK YELLOWISH BROWN, NON-PLASTIC	LEAN CLAY W/SAND (CL), MOIST, GREENISH GRAY, MEDIUM PLASTICITY	POORLY GRADED SAND W/SILT AND GRAVEL, (SP-SM), MOIST, GRAY, FINE ANGULAR GRAVEL, MEDIUM TO COARSE SAND, UNCEMENTED	SILTY SAND, (SM), MOIST, DARK YELLOWISH BROWN, FINE SAND, WEAK CEMENTATION	SILTY SAND W/GRAVEL, (SM), MOIST, GRAY, FINE SUBANGULAR GRAVEL, MEDIUM TO COARSE SAND, UNCEMENTED	WELL GRADED SAND W/SILT AND GRAVEL, (SW-SM), OLIVE BROWN, MOIST, MOSTLY MEDIUM AND COARSE SAND, LITTLE FINE SUBANGULAR GRAVEL, UNCEMENTED	

PARIKH CONSULTANTS, INC.

Specific Gravity Test Results

COOPER
TESTING LABORATORY

Specific Gravity by Pycnometer
ASTM D 854

CTL Job#:	157-365	**Project Name:**	BART to Silicon Valley	**Date:**	04/03/19
Client:	Parikh Consultants	**Project No.:**	2017-144-T02	**Run By:**	MD
				Checked	DC

Boring:	BH-114							
Sample:	22A							
Depth, ft.:	110.5							
Pan No.:								
Soil Description (visual)	Olive Brown CLAY							
Pycnometer ID:	P02							
Mass of Clean, Dry Pycnometer (g):	158.06							
Mass of Pycnometer, Soil, and Water (g):	720.06							
Temperature of Slurry (°C):	21.0							
Tare ID:								
Mass of Tare (g):	161.59							
Mass of Dry Soil and Tare (g):	261.28							
Mass of Dry Soil (g):	99.69							
Mass of Pycnometer and Water at Test Temp (g):	656.33							
Specific Gravity @ Test Temp:	2.773							
Specific Gravity @ 20 °C:	**2.772**							

COOPER
TESTING LABORATORY

Specific Gravity by Pycnometer
ASTM D 854

CTL Job#:	157-361	**Project Name:**	Bart to Silicon Valley	**Date:**	01/30/19
Client:	Parikh Consultants	**Project No.:**	2017-144-T02	**Run By:**	MD
				Checked	DC

Boring:	BH-122							
Sample:								
Depth, ft.:	81							
Pan No.:								
Soil Description (visual)	Olive Brown Silty SAND w/ Gravel							
Pycnometer ID:	P04							
Mass of Clean, Dry Pycnometer (g):	158.78							
Mass of Pycnometer, Soil, and Water (g):	715.87							
Temperature of Slurry (°C):	21.5							
Tare ID:								
Mass of Tare (g):	161.60							
Mass of Dry Soil and Tare (g):	254.28							
Mass of Dry Soil (g):	92.68							
Mass of Pycnometer and Water at Test Temp (g):	656.94							
Specific Gravity @ Test Temp:	2.746							
Specific Gravity @ 20 °C:	**2.745**							

COOPER TESTING LABORATORY

Specific Gravity by Pycnometer
ASTM D 854

CTL Job#:	157-364	**Project Name:**	BART to Silicon Valley	**Date:**	04/01/19
Client:	Parikh Consultants	**Project No.:**	2017-144-T02	**Run By:**	MD
				Checked	DC

Boring:	BH-123								
Sample:	15								
Depth, ft.:	74.5								
Pan No.:									
Soil Description (visual)	Olive Gray Clayey SAND								
Pycnometer ID:	P02								
Mass of Clean, Dry Pycnometer (g):	158.06								
Mass of Pycnometer, Soil, and Water (g):	722.26								
Temperature of Slurry (°C):	19.5								
Tare ID:									
Mass of Tare (g):	163.57								
Mass of Dry Soil and Tare (g):	267.52								
Mass of Dry Soil (g):	103.95								
Mass of Pycnometer and Water at Test Temp (g):	656.49								
Specific Gravity @ Test Temp:	2.723								
Specific Gravity @ 20 °C:	**2.723**								

COOPER
TESTING LABORATORY

Specific Gravity by Pycnometer
ASTM D 854

CTL Job#:	157-366	**Project Name:**	BART to Silicon Valley	**Date:**	04/17/19
Client:	Parikh Consultants	**Project No.:**	2017-144-T02	**Run By:**	MD
				Checked	DC

Boring:	BH-138							
Sample:	35							
Depth, ft.:	115.5							
Pan No.:								
Soil Description (visual)	Dark Brown CLAY							
Pycnometer ID:	P02							
Mass of Clean, Dry Pycnometer (g):	158.06							
Mass of Pycnometer, Soil, and Water (g):	711.71							
Temperature of Slurry (°C):	20.3							
Tare ID:								
Mass of Tare (g):	161.59							
Mass of Dry Soil and Tare (g):	250.82							
Mass of Dry Soil (g):	89.23							
Mass of Pycnometer and Water at Test Temp (g):	656.40							
Specific Gravity @ Test Temp:	2.630							
Specific Gravity @ 20 °C:	**2.630**							

ASTM D-854
SPECIFIC GRAVITY OF SOILS REPORT

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-150	BH-151	BH-151		
Sample Number	48	2	30		
Depth (ft)	147.5	55.5	125		
Date	10/07/19	10/11/19	10/23/19		
Flask ID	P	P	P		
Calibrated mass of dry pycnometer (gms)	169.40	169.40	169.40		
Calibrated volume of pycnometer (ml)	499.16	499.16	499.16		
Mass of pyc, water& soil (gms)	700.45	700.95	700.27		
Test Temperature (^{o}C)	23.1	22.8	23.0		
Pan plus dry soil (g)	201.42	414.36	216.28		
Pan weight (g)	148.61	361.51	163.82		
Density of water at test temperature from ASTM D-854 Table 1 (g/cc)	0.99752	0.99759	0.99754		
Temperature Coefficient from ASTM D-854 Table 1(K)	0.99931	0.99938	0.99933		
Mass of pycnometer and water at test temp (gms)	667.32	667.36	667.33		
Mass of soil & solids (gms)	52.81	52.85	52.46		
	2.683	2.744	2.687		
Specific Gravity of soil solids at test temperature	2.681	2.743	2.685		

ASTM D-854
SPECIFIC GRAVITY OF SOILS REPORT

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-141	BH-152	BH-153	BH-155	
Sample Number	21	13	50	19	
Depth (ft)	100	76.5	140	88	
Date	12/26/19	12/27/19	12/27/19	12/26/19	
Flask ID	J	P	J	P	
Calibrated mass of dry pycnometer (gms)	153.00	169.40	153.00	169.40	
Calibrated volume of pycnometer (ml)	498.84	499.16	498.84	499.16	
Mass of pyc, water& soil (gms)	711.97	701.33	684.87	702.06	
Test Temperature (^{o}C)	18.1	17.7	17.7	18.1	
Pan plus dry soil (g)	260.79	411.81	415.26	221.84	
Pan weight (g)	163.82	359.13	361.83	167.41	
Density of water at test temperature from ASTM D-854 Table 1 (g/cc)	0.99858	0.99865	0.99865	0.99858	
Temperature Coefficient from ASTM D-854 Table 1(K)	1.00037	1.00045	1.00045	1.00037	
Mass of pycnometer and water at test temp (gms)	651.13	667.89	651.17	667.85	
Mass of soil & solids (gms)	96.97	52.68	53.43	54.43	
	2.684	2.739	2.709	2.692	
Specific Gravity of soil solids at test temperature	2.685	2.74	2.71	2.693	

Fines Content Test Results

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A

Specimens Soaked Overnight without Deflocculating Agent

Dry Mass Determined Directly

Client Name Mott MacDonald

Project Name BSVII

Project Number 507385606

Boring Number	BH-109	BH-117	BH-155		
Sample Number	24-26	24	49		
Depth (ft)	110	120	150		
Percent of Soil Finer than No. 200 Sieve	12.7	19.0	75.5		
Visual Classification	Grayish brown silty sand with gravel	Gray silty sand with gravel	Grayish brown clay with sand		

Date	11/04/19	11/04/19	02/07/20		
Weight of Dry Soil + Pan (before wash)	2335.9	367.4	359.0		
Weight of Dry Soil + Pan (after wash)	2112.3	313.9	152.3		
Weight of Pan	576.1	85.1	85.3		

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-157	BH-157	BH-158	BH-158	BH-159
Sample Number	17	35	32	43	16
Depth (ft)	102	170	124	150	85.5
Percent of Soil Finer than No. 200 Sieve	88.5	89.9	85.5	83.5	76.5
Visual Classification	Gray clay	Greenish gray clay	Grayish brown clay	Gray clay with sand	Greenish gray sandy clay

Date	02/05/20	02/07/20	02/07/20	02/07/20	02/05/20
Weight of Dry Soil + Pan (before wash)	272.5	252.5	248.5	297.0	338.9
Weight of Dry Soil + Pan (after wash)	105.8	101.6	110.5	119.9	143.5
Weight of Pan	84.2	84.6	87.1	84.9	83.5

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-158	BH-160	BH-160		
Sample Number	12	3	6		
Depth (ft)	94	25	40		
Percent of Soil Finer than No. 200 Sieve	41.1	44.2	24.5		
Visual Classification	Gray silty sand	Gray silty sand	Grayish brown silty sand		

Date	02/08/20	02/05/20	02/05/20		
Weight of Dry Soil + Pan (before wash)	182.8	239.3	478.3		
Weight of Dry Soil + Pan (after wash)	128.8	155.6	382.0		
Weight of Pan	51.5	50.1	85.1		

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-162	BH-163	BH-163	BH-163	BH-164
Sample Number	8	3	16	24	43
Depth (ft)	45	70	107	127	134.5
Percent of Soil Finer than No. 200 Sieve	58.0	52.6	71.2	86.0	87.9
Visual Classification	Greenish gray sandy silt	Grayish brown sandy silt	Greenish gray sandy clay	Gray silt	Greenish gray clay
Date	04/03/20	04/03/20	05/09/20	04/03/20	05/09/20
Weight of Dry Soil + Pan (before wash)	198.4	315.0	162.2	271.4	149.2
Weight of Dry Soil + Pan (after wash)	113.0	193.2	83.2	111.3	62.3
Weight of Pan	51.1	83.5	51.2	85.1	50.4

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-165	BH-165	BH-166	BH-166	
Sample Number	12	35	2	23	
Depth (ft)	45	125	15	95.5	
Percent of Soil Finer than No. 200 Sieve	58.9	67.4	33.9	52.8	
Visual Classification	Greenish gray sandy clay	Gray sandy silt	Grayish brown silty sand	Gray sandy clay	

Date	05/19/20	04/03/20	03/31/20	05/19/20	
Weight of Dry Soil + Pan (before wash)	194.8	331.9	405.7	111.1	
Weight of Dry Soil + Pan (after wash)	109.7	167.9	297.1	79.3	
Weight of Pan	50.4	88.6	85.0	50.8	

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-167	BH-167	BH-176	BH-176	BH-177
Sample Number	10	23	6	19	15
Depth (ft)	40	74	20	85	65
Percent of Soil Finer than No. 200 Sieve	72.9	81.9	85.6	63.2	38.7
Visual Classification	Grayish brown clay with sand	Greenish gray clay with sand	Greenish gray clay with sand	Greenish gray sandy silt	Grayish brown silty sand

Date	07/09/20	07/09/20	07/06/20	06/10/20	06/10/20
Weight of Dry Soil + Pan (before wash)	192.9	213.5	160.6	162.4	188.6
Weight of Dry Soil + Pan (after wash)	89.4	80.8	66.9	86.0	135.2
Weight of Pan	50.9	51.4	51.2	41.6	50.6

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A

Specimens Soaked Overnight without Deflocculating Agent

Dry Mass Determined Directly

Client Name Mott MacDonald

Project Name BSVII

Project Number 507385606

Boring Number	BH-168	BH-168	BH-168	BH-168	
Sample Number	21	22	25	28	
Depth (ft)	81.5	84	92.5	99.5	
Percent of Soil Finer than No. 200 Sieve	83.5	46.5	74.1	36.9	
Visual Classification	Greenish gray clay with sand	Greenish gray clayey sand	Greenish gray clay with sand	Grayish brown clayey sand	
Date	08/01/20	07/21/20	08/01/20	07/21/20	
Weight of Dry Soil + Pan (before wash)	123.7	412.0	148.7	433.9	
Weight of Dry Soil + Pan (after wash)	63.0	261.6	76.0	342.8	
Weight of Pan	51.0	88.6	50.7	187.3	

INSPECTION SERVICES, INC., BERKELEY, CA

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-171	BH-171	BH-171	BH-175	BH-175
Sample Number	4	7 Bottom	30	6	21
Depth (ft)	20	40	114	30	70
Percent of Soil Finer than No. 200 Sieve	82.5	60.3	67.8	94.0	72.9
Visual Classification	Dark gray clay with sand	Greenish gray sandy silt	Grayish brown sandy clay	Greenish gray clay	Grayish brown sandy silt

Date	04/30/20	04/23/20	05/19/20	04/30/20	04/22/20
Weight of Dry Soil + Pan (before wash)	150.8	199.6	140.2	146.6	335.0
Weight of Dry Soil + Pan (after wash)	68.1	110.1	80.0	56.9	153.3
Weight of Pan	50.6	51.2	51.5	51.2	85.6

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-175	BH-175	BH-175		
Sample Number	25	33	46		
Depth (ft)	81	99	135		
Percent of Soil Finer than No. 200 Sieve	64.3	70.7	90.6		
Visual Classification	Greenish gray sandy clay	Greenish gray sandy silt	Grayish brown silt		
Date	04/23/20	05/20/20	04/23/20		
Weight of Dry Soil + Pan (before wash)	194.4	135.3	181.5		
Weight of Dry Soil + Pan (after wash)	101.7	75.7	63.2		
Weight of Pan	50.4	50.9	50.9		

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A
Specimens Soaked Overnight without Deflocculating Agent
Dry Mass Determined Directly

Client Name Mott MacDonald
Project Name BSVII
Project Number 507385606

Boring Number	BH-178	BH-178			
Sample Number	13	17			
Depth (ft)	60	80			
Percent of Soil Finer than No. 200 Sieve	81.5	83.1			
Visual Classification	Greenish gray clay with sand	Grayish brown clay with sand			
Date	05/29/20	05/29/20			
Weight of Dry Soil + Pan (before wash)	143.3	179.0			
Weight of Dry Soil + Pan (after wash)	67.9	71.9			
Weight of Pan	50.9	50.2			

ASTM D-1140
PERCENT PASSING NO. 200 SIEVE REPORT

Method A

Specimens Soaked Overnight without Deflocculating Agent

Dry Mass Determined Directly

Client Name Mott MacDonald

Project Name BSVII

Project Number 507385606

Boring Number	BH-180	BH-180			
Sample Number	7	18			
Depth (ft)	25	80			
Percent of Soil Finer than No. 200 Sieve	99.8	68.8			
Visual Classification	Grayish brown clay	Greenish gray sandy clay			

Date	08/21/20	08/21/20			
Weight of Dry Soil + Pan (before wash)	169.0	187.9			
Weight of Dry Soil + Pan (after wash)	51.5	93.8			
Weight of Pan	51.3	51.1			

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

– #200

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-T02

Sample #: BH-152 #6 @ 50' Tested By: D. NGUYEN Date Tested: 11/05/2019

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	171.04		66%	34%	
Wash - #200 + Pan	87.98		34%		
TOTAL	259.02		100%		

G112

Fines: 34%

Dry Wt + Tare	369.32
Tare Wt	110.3
Dry Wt of Soil	259.02

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-701

Sample #: BH-155 #4A @ 63' Tested By: D. NGUYEN Date Tested: 01/16/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	70.23		29.5%	70.5%	
Wash - #200 + Pan	168.07				
TOTAL	238.3				

- #200

Dry Wt + Tare	322.14
Tare Wt	83.86
Dry Wt of Soil	238.3

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-181-TD1
Sample #: BH-155 # 43 @ 125.7' Tested By: D. NGUYEN Date Tested: 01/20/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	51.45		21.1%	78.9%	
Wash - #200 + Pan	192.40				
TOTAL	243.85				

— #200

Dry Wt + Tare	353.27
Tare Wt	109.42
Dry Wt of Soil	243.85

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G-970 Proj.#: 2019-125-Geo

Sample #: BH-156 #22A @ 103 Tested By: Nasir Ahmad Date Tested: 12-11-19

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)	0.69		0.5	99.5	
No.60 (250 - µm)	21.65		15.6	84.4	
No.140 (106 - µm)	108.48		78.4	21.6	
No.200 (75 - µm)	111.57		80.6	19.4	
Wash - #200 + Pan	26.88				
TOTAL	138.45				

Dry Wt + Tare 222.63

Tare Wt 84.18

Dry Wt of Soil 138.45

Sample #: BH-156 #43B @ 136.5 Tested By: N.A Date Tested: 12-11-19

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	161.92		84.4	15.6	
Wash - #200 + Pan	29.95				
TOTAL	191.87				

-200

Dry Wt + Tare 302.13

Tare Wt 110.26

Dry Wt of Soil 191.87

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-T01

Sample #: BH-156 #32B @ 118 Tested By: N.A. Date Tested: 12-11-19

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	435.33		86.8	13.2	
Wash - #200 + Pan	65.96				
TOTAL	501.29				

T200

Dry Wt + Tare	586.71
Tare Wt	85.42
Dry Wt of Soil	501.29

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-702

Sample #: BH-157 #31 @ 150' Tested By: D. NGUYEN Date Tested: 02/03/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	78.3		50.1%	49.9%	
Wash - #200 + Pan	78.1				
TOTAL	156.4				

-#200

Dry Wt + Tare 240.70

Tare Wt 84.30

Dry Wt of Soil 156.4

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare

Tare Wt

Dry Wt of Soil

PARIKH CONSULTANTS, INC.

Gsieves 04/26/00

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-702

Sample #: BH-158 #14B @ 98' Tested By: D. NGUYEN Date Tested: 02/03/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	38.4		22.8 %	77.2 % ✓	
Wash - #200 + Pan	129.98				
TOTAL	168.38 ✓				

— #200

Dry Wt + Tare	252.87
Tare Wt	84.49
Dry Wt of Soil	168.38 ✓

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: Proj.#: 2019-131-T02

Sample #: BH-159 #26A @ 116' Tested By: D-NGUYEN Date Tested: 02/03/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Weight Retained Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	169.8		68.2%	31.8%	
Wash - #200 + Pan	79.13				
TOTAL	248.93				

-#200

Dry Wt + Tare 332.36

Tare Wt 83.43

Dry Wt of Soil 248.93

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Weight Retained Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare

Tare Wt

Dry Wt of Soil

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: 6970 Proj.#: 2019-181-702
Sample #: BH-160 #37A @ 146' Tested By: D. NGUYEN Date Tested: 02/06/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	123.1		47.6%	52.4%	
Wash - #200 + Pan	135.69				
TOTAL	258.79				

-#200

Dry Wt + Tare	369.38
Tare Wt	110.59
Dry Wt of Soil	258.79

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-702

Sample #: BH-160 #43A @ 176' Tested By: D. NGUYEN Date Tested: 02/06/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	268.5		63.6 %	36.4%	
Wash - #200 + Pan	153.71				
TOTAL	422.21				

-#200

Dry Wt + Tare	506.26
Tare Wt	84.05
Dry Wt of Soil	422.21

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-702

Sample #: BH-161 #17A@99'4" Tested By: D. NGUYEN Date Tested: 02/05/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	416.1		80.3%	19.7%	
Wash - #200 + Pan	102.35				
TOTAL	518.45				

-#200

Dry Wt + Tare	628.42
Tare Wt	109.97
Dry Wt of Soil	518.45

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-T02

Sample #: BH-161 #-19A@105' Tested By: D. NGUYEN Date Tested: 02/05/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	97.5		37.8 %	62.2 %	
Wash - #200 + Pan	160.97				
TOTAL	258.47				

-#200

Dry Wt + Tare 343.02

Tare Wt 84.55

Dry Wt of Soil 258.47

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare

Tare Wt

Dry Wt of Soil

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: Proj.#: 2019-131-T62

Sample #: BH-161 #37B@ 180.5' Tested By: D. NGUYEN Date Tested: 02/03/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	165.8		68.0 %	32.0%	
Wash - #200 + Pan	78.13				
TOTAL	243.93				

- #200

Dry Wt + Tare	353.90
Tare Wt	109.97
Dry Wt of Soil	243.93

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: Proj.#: 2019-131-702

Sample #: BH-162 #36 @ 125.5' Tested By: D. NGUYEN Date Tested: 04/13/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	185.0		75.6%	24.4%	
Wash - #200 + Pan	59.83				
TOTAL	244.83				

-#200

Dry Wt + Tare	330.19
Tare Wt	85.36
Dry Wt of Soil	244.83

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or C AL 202

Project Name: BART TO SILICON VALLEY Lab #: 6990 Proj.#: 2019-131-702

Sample #: BH-163 #9A@91.5 Tested By: D. NGUYEN Date Tested: 04/18/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	304.3		77.7%	22.3%	
Wash - #200 + Pan	87.47				
TOTAL	391.77				

— #200

Dry Wt + Tare	501.67
Tare Wt	109.90
Dry Wt of Soil	391.77

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: 6970 Proj.#: 2018-131-702

Sample #: BH-164 # 33 A @ 111.5 Tested By: D. NGUYEN Date Tested: 04/17/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	296.07		85.7%	14.3%	
Wash - #200 + Pan	49.51				
TOTAL	345.58				

— #200

Dry Wt + Tare	456.04
Tare Wt	110.46
Dry Wt of Soil	345.58

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-161-702

Sample #: BH-164 #39A @126.5 Tested By: D. NGUYEN Date Tested: 04/17/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	214.20		43.6 %	56.4%	
Wash - #200 + Pan	276.72				
TOTAL	490.92				

-#200

Dry Wt + Tare	573.82
Tare Wt	82.90
Dry Wt of Soil	490.92

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: 6970 Proj.#: 2019-131-702

Sample #: BH-165 #14B @ 50.5' Tested By: D. NGUYEN Date Tested: 04/03/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	30.46		12.0%	88.0%	
Wash - #200 + Pan	224.15				
TOTAL	254.61				

-#200

G124

Dry Wt + Tare	364.04
Tare Wt	109.43
Dry Wt of Soil	254.61

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-181-702

Sample #: BH-165 #17A@58'2" Tested By: D. NGUYEN Date Tested: 04/03/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	111.29		43.2 %	56.8 %	
Wash - #200 + Pan	146.55				
TOTAL	257.84				

-#200

Dry Wt + Tare	368.40
Tare Wt	110.56
Dry Wt of Soil	257.84

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G470 Proj.#: 2019-131-TD2

Sample #: BH-165 #23B @ 73' Tested By: D. NGUYEN Date Tested: 04/08/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	53.29		22 %	78 %	
Wash - #200 + Pan	188.81				
TOTAL	242.10				

-#200

Dry Wt + Tare	325.70
Tare Wt	83.60
Dry Wt of Soil	242.10

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G9770 Proj.#: 2019-181-702

Sample #: BH-166 #9A @ Tested By: D. NGUYEN Date Tested: 03/16/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	142.97		59.7%	40.3%	
Wash - #200 + Pan	96.32				
TOTAL	239.29				

-#200

Dry Wt + Tare	323.41
Tare Wt	84.12
Dry Wt of Soil	239.29

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-T02

Sample #: BH-166 #16A@79.3' Tested By: D. NGUYEN Date Tested: 03/16/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	100.72		40%	60%	
Wash - #200 + Pan	151.56				
TOTAL	252.28				

- #200

G103

Dry Wt + Tare	362.17
Tare Wt	109.89
Dry Wt of Soil	252.28

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-181-702

Sample #: BH-166 #27 @ 106'" Tested By: D-NGUYEN Date Tested: 03/16/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	165.22		79.1%	20.9%	
Wash - #200 + Pan	43.70				
TOTAL	208.92				

-#200

G-6

Dry Wt + Tare	292.74
Tare Wt	83.82
Dry Wt of Soil	208.92

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj #: 2019-131-704

Sample #: BH-167 #4 @ 20' Tested By: D. NGUYEN Date Tested: 05/26/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	145.38		53.8 %	46.2 %	
Wash - #200 + Pan	124.84				
TOTAL	270.22				

-#200

Dry Wt + Tare	354.80
Tare Wt	84.58
Dry Wt of Soil	270.22

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

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SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-181-702

Sample #: BH-167 #29 @ 91' Tested By: D. NGUYEN Date Tested: 05/27/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	253.77		80.2 %	19.8 %	
Wash - #200 + Pan	62.81				
TOTAL	316.58				

- #200

Dry Wt + Tare	400.68
Tare Wt	84.10
Dry Wt of Soil	316.58

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-TDY

Sample #: BH-168 #17A @ 70.5' Tested By: DO NGUYEN Date Tested: 07/17/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	94.40		39.6%	60.4%	
Wash - #200 + Pan	144.07				
TOTAL	238.47				

-#200

Dry Wt + Tare	349.07
Tare Wt	110.6
Dry Wt of Soil	238.47

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: 6970 Proj.#: 2019-131-702

Sample #: BH-169 #6 @ 40' Tested By: D. NGUYEN Date Tested: 04/29/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	61.34		25.5%	74.5%	
Wash - #200 + Pan	179.53				
TOTAL	240.87				

— #200

Dry Wt + Tare 325.16

Tare Wt 84.29

Dry Wt of Soil 240.87

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare

Tare Wt

Dry Wt of Soil

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-TDL

Sample #: BH-171 #39A @ 146' Tested By: D. NGUYEN Date Tested: 05/09/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - μm)					
No.40 (425 - μm)					
No.60 (250 - μm)					
No.140 (106 - μm)					
No.200 (75 - μm)	168.16		66 %	34 %	
Wash - #200 + Pan	86.99				
TOTAL	255.15				

-#200

Dry Wt + Tare	340.16
Tare Wt	85.01
Dry Wt of Soil	255.15

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - μm)					
No.40 (425 - μm)					
No.60 (250 - μm)					
No.140 (106 - μm)					
No.200 (75 - μm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-T02

Sample #: BH-173 #11A @ 28.5' Tested By: D. NGUYEN Date Tested: 04/29/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	443.95		95.8%	4.2%	
Wash - #200 + Pan	19.44				
TOTAL	463.39				

-#200

Dry Wt + Tare	572.91
Tare Wt	109.52
Dry Wt of Soil	463.39

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-702

Sample #: BH-173 #31 @ 80' Tested By: D. NGUYEN Date Tested: 04/29/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	280.29		80.1%	19.9%	
Wash - #200 + Pan	69.8				
TOTAL	350.09				

- #200

Dry Wt + Tare	434.27
Tare Wt	84.18
Dry Wt of Soil	350.09

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G9910 Proj.#: 2019-131-TO2

Sample #: BH-173 #36A @ 98.5' Tested By: D. NGUYEN Date Tested: 04/25/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	187.97		48.8%	51.2 %	
Wash - #200 + Pan	197.01				
TOTAL	384.98				

— #200

Dry Wt + Tare	469.17
Tare Wt	84.19
Dry Wt of Soil	384.98

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj #: 2019-131-702

Sample #: BH-175 H15A @ 55' Tested By: D. NGUYEN Date Tested: 05/09/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	159.64		60.2 %	39.8 %	
Wash - #200 + Pan	105.45				
TOTAL	265.09				

-#200

Dry Wt + Tare	350.00
Tare Wt	84.91
Dry Wt of Soil	265.09

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-181-702

Sample #: BK-17S #20B @68' Tested By: D. NGUYEN Date Tested: 05/09/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	151.55		56.4%	43.6%	
Wash - #200 + Pan	117.06				
TOTAL	268.61				

-#200

Dry Wt + Tare 351.96

Tare Wt 83.35

Dry Wt of Soil 268.61

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare

Tare Wt

Dry Wt of Soil

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-702

Sample #: BH-175 #36B@106.5 Tested By: D. NGUYEN Date Tested: 05/09/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - μm)					
No.40 (425 - μm)					
No.60 (250 - μm)					
No.140 (106 - μm)					
No.200 (75 - μm)	85.61		30%	70%	
Wash - #200 + Pan	199.86				
TOTAL	285.47				

-#200

Dry Wt + Tare	370.65
Tare Wt	85.18
Dry Wt of Soil	285.47

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - μm)					
No.40 (425 - μm)					
No.60 (250 - μm)					
No.140 (106 - μm)					
No.200 (75 - μm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: 6970 Proj.#: 2019-131-704

Sample #: BH-176 #14 @ 60' Tested By: D. NGUYEN Date Tested: 05/26/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	337.52		88.5%	11.5%	
Wash - #200 + Pan	43.92				
TOTAL	381.44				

— #200

Dry Wt + Tare	465.23
Tare Wt	83.79
Dry Wt of Soil	381.44

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G970 Proj.#: 2019-131-704

Sample #: BH-177 #8 @ 30' Tested By: D. NGUYEN Date Tested: 05/26/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	27.70		13.68%	86.32%	
Wash - #200 + Pan	174.77				
TOTAL	202.47				

-#200

Dry Wt + Tare	287.80
Tare Wt	85.33
Dry Wt of Soil	202.47

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY　Lab #: 6970　Proj.#: 2019-131-704

Sample #: BH-177 #9A @ 35.5'　Tested By: D. NGUYEN　Date Tested: 05/26/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	121.19		46.1%	53.9%	
Wash - #200 + Pan	141.59				
TOTAL	262.78				

— #200

Dry Wt + Tare 346.34

Tare Wt 83.56

Dry Wt of Soil 262.78

Sample #:　Tested By:　Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare

Tare Wt

Dry Wt of Soil

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G986 Proj.#: 2019-131-T05

Sample #: BH-179 #18A @ 86.3' Tested By: DO NGUYEN Date Tested: 11/13/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	21.91		22.4%	77.6%	
Wash - #200 + Pan	75.74				
TOTAL	97.65				

– #200

Dry Wt + Tare	181.97
Tare Wt	84.32
Dry Wt of Soil	97.65

Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name: BART TO SILICON VALLEY Lab #: G981 Proj.#: 2019-131-T04

Sample #: BH-180 #13 @ 56' Tested By: DO NGUYEN Date Tested: 08/17/2020

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)	39.20		15.7%	84.3%	
Wash - #200 + Pan	210.15				
TOTAL	249.35				

G-64

-#200

Dry Wt + Tare	334.24
Tare Wt	84.89
Dry Wt of Soil	249.35

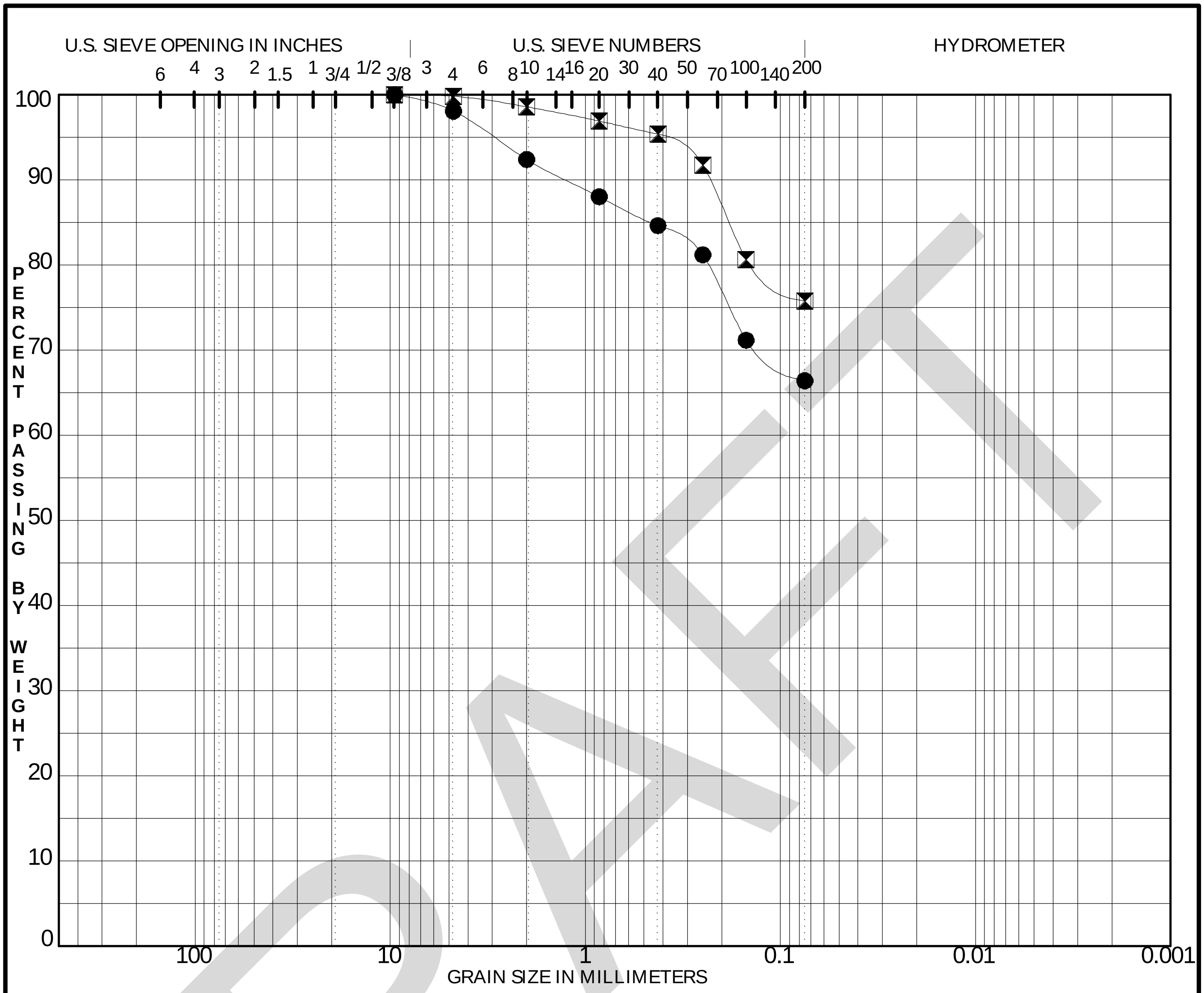
Sample #: Tested By: Date Tested:

U.S. Standard Sieve	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING of TOTAL	Remarks
2-in. (50.0-mm)					
1 1/2-in. (37.5-mm)					
1-in. (25.0-mm)					
3/4-in. (19.0-mm)					
1/2-in. (12.5-mm)					
3/8-in. (9.5-mm)					
No. 4 (4.75-mm)					
No. 10 (2.00mm)					
No.20 (850 - µm)					
No.40 (425 - µm)					
No.60 (250 - µm)					
No.140 (106 - µm)					
No.200 (75 - µm)					
Wash - #200 + Pan					
TOTAL					

Dry Wt + Tare	
Tare Wt	
Dry Wt of Soil	

PARIKH CONSULTANTS, INC.

Particle Size Analysis Results



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-108	50.5	66	98	Sandy Lean CLAY (CL)	CL
⧗	BH-108	75.5	76	100	Lean CLAY with sand (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

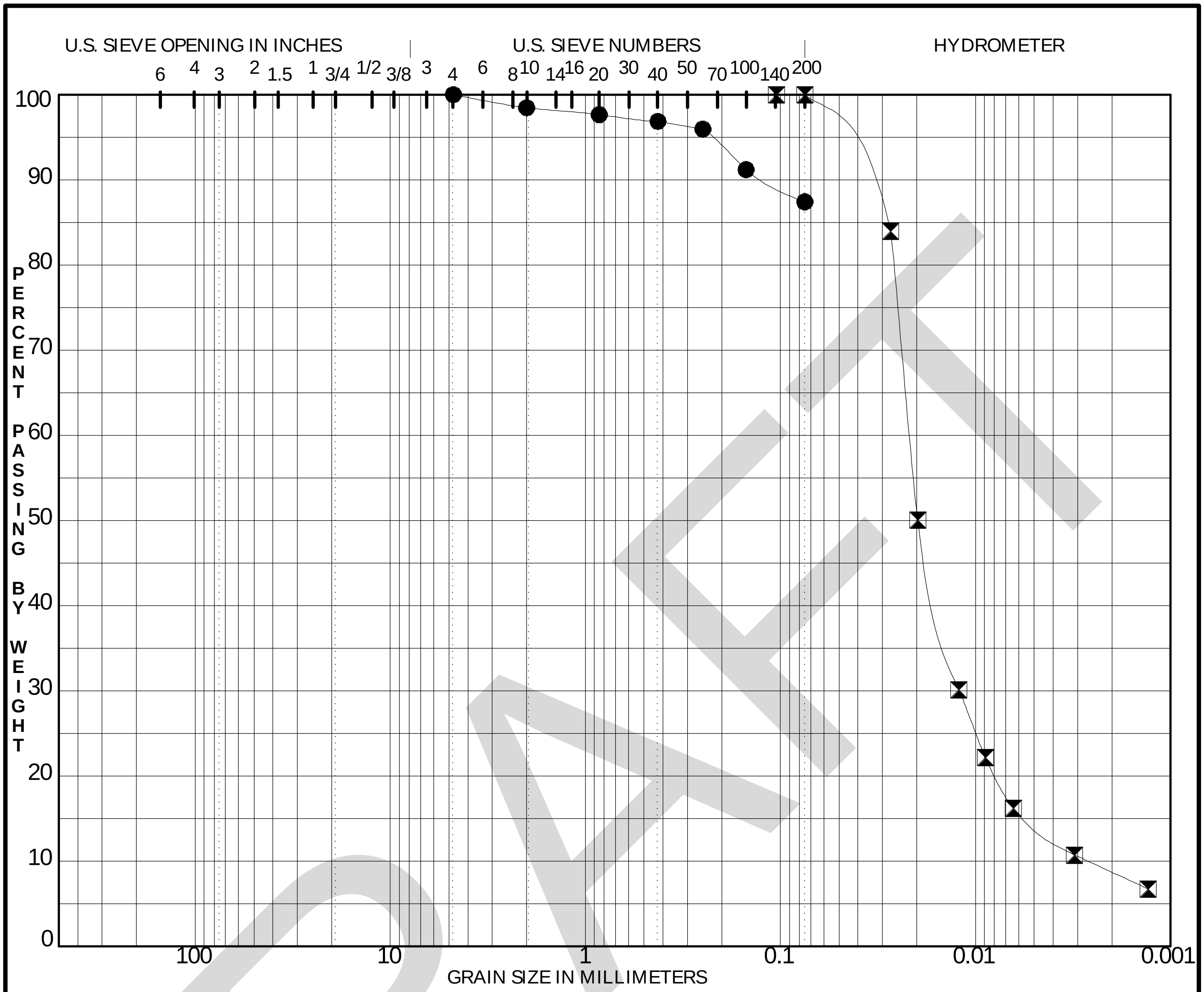
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-109	75.0	87	100	Lean CLAY (CL)	CL
⧗	BH-109	105.0	100		Organic SILT (OL)	OL

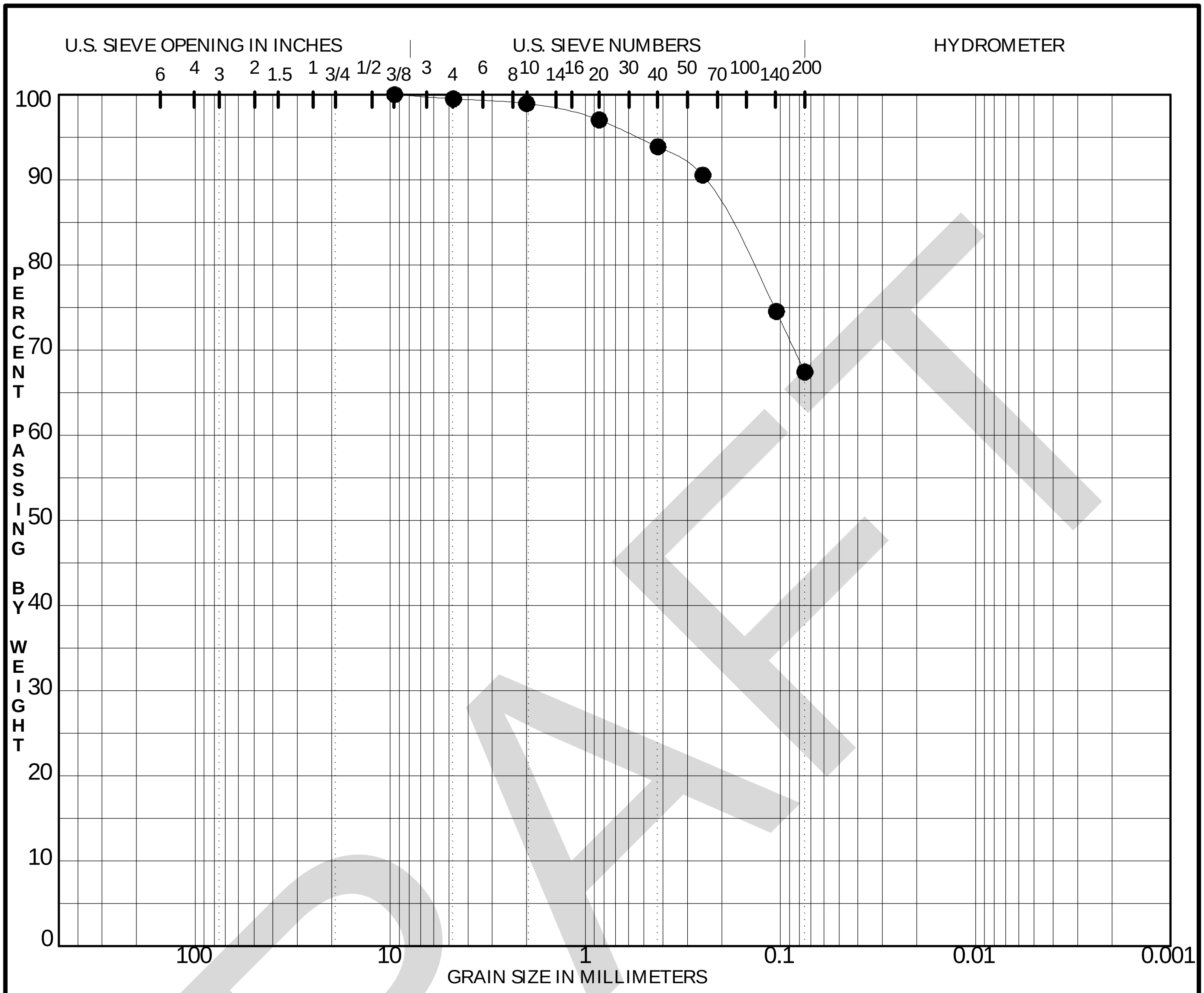
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-112	100.5	67	99	Sandy Lean CLAY (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

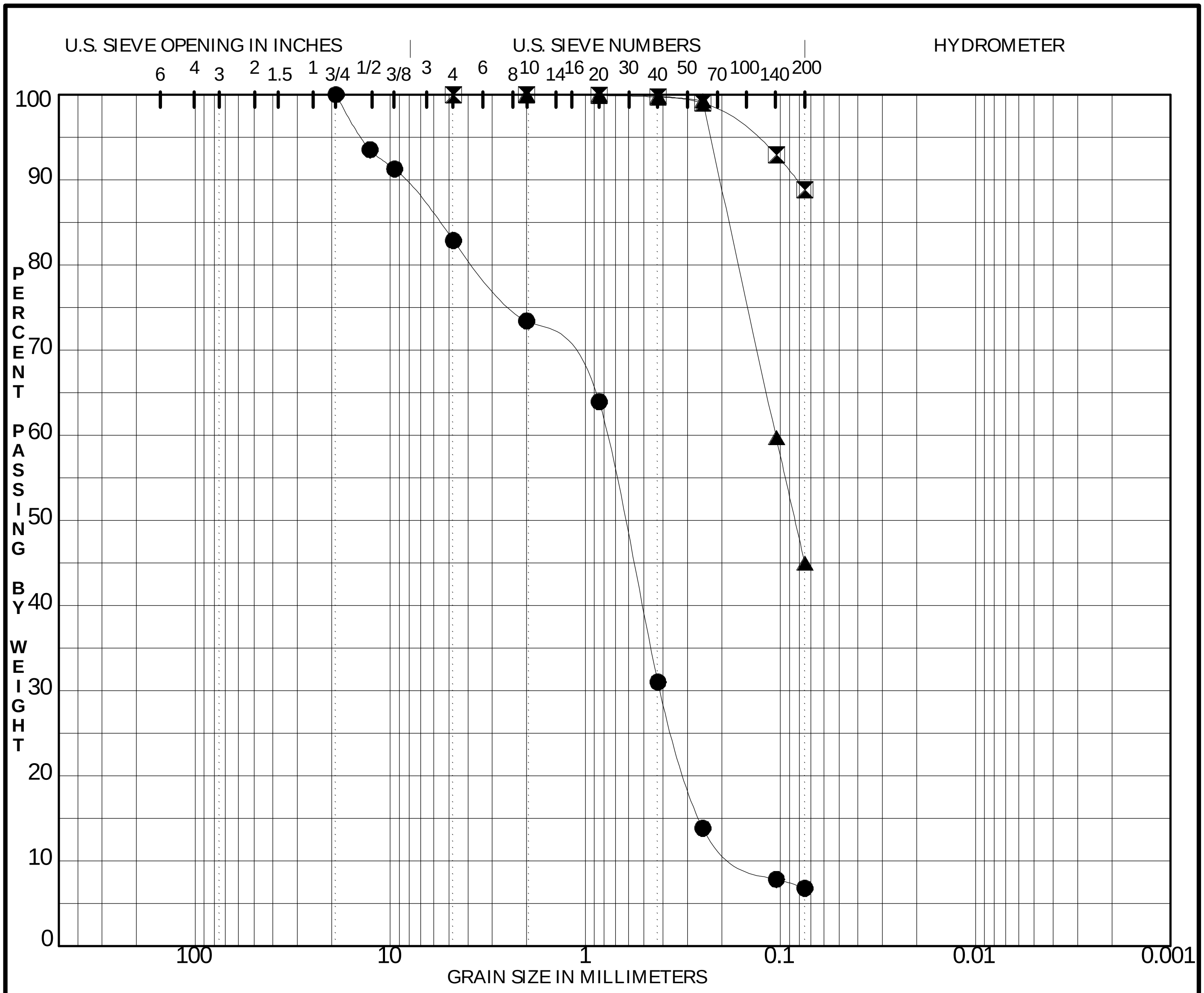
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-113	70.5	7	83	Poorly-graded SAND with silt and gravel (SP-SM)	SP-SM
⧗	BH-113	96.0	89	100	Lean CLAY (CL)	CL
▲	BH-113	111.0	45		Silty SAND (SM)	SM

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

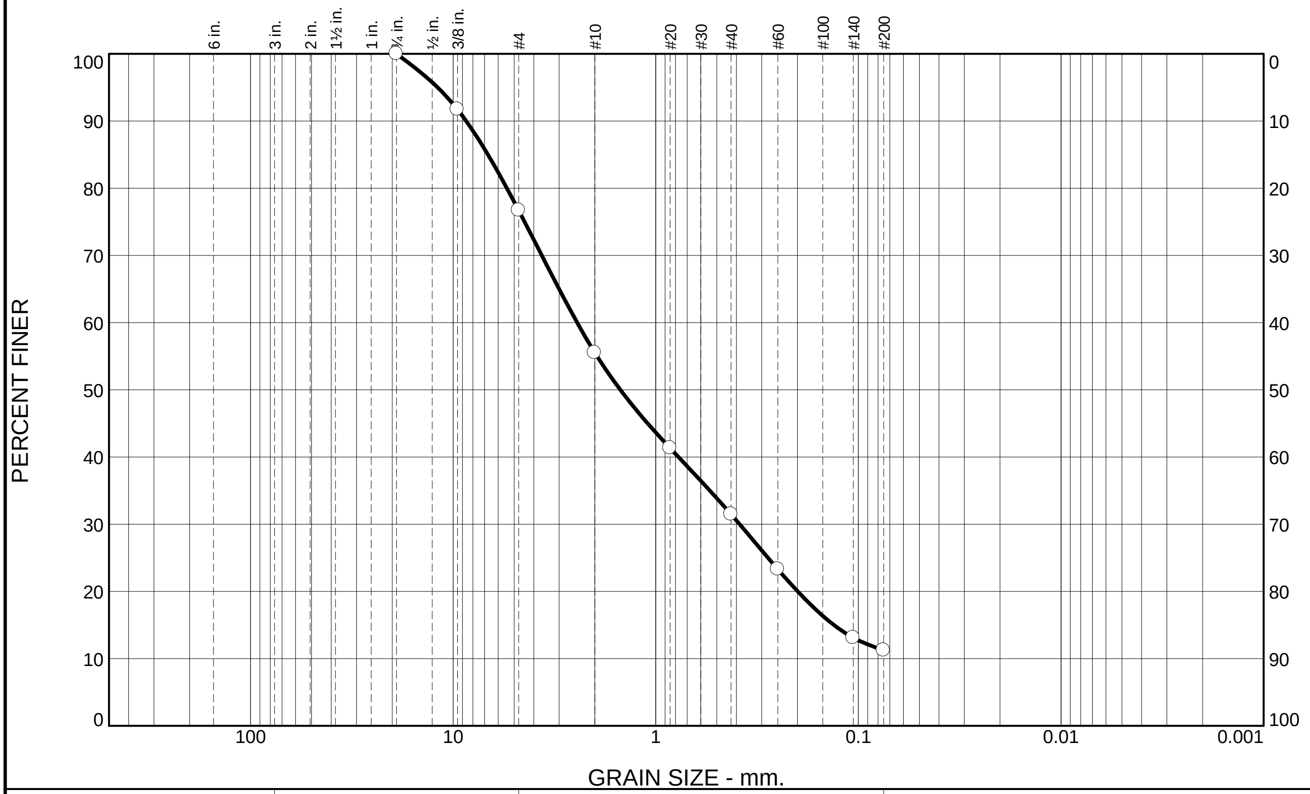
BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	23	21	25	20	11	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	92		
#4	77		
#10	56		
#20	41		
#40	31		
#60	23		
#140	13		
#200	11		

* (no specification provided)

Soil Description

Grayish brown poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 8.6294 D_{85}= 6.7413 D_{60}= 2.4443
D_{50}= 1.4972 D_{30}= 0.3857 D_{15}= 0.1322
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO=

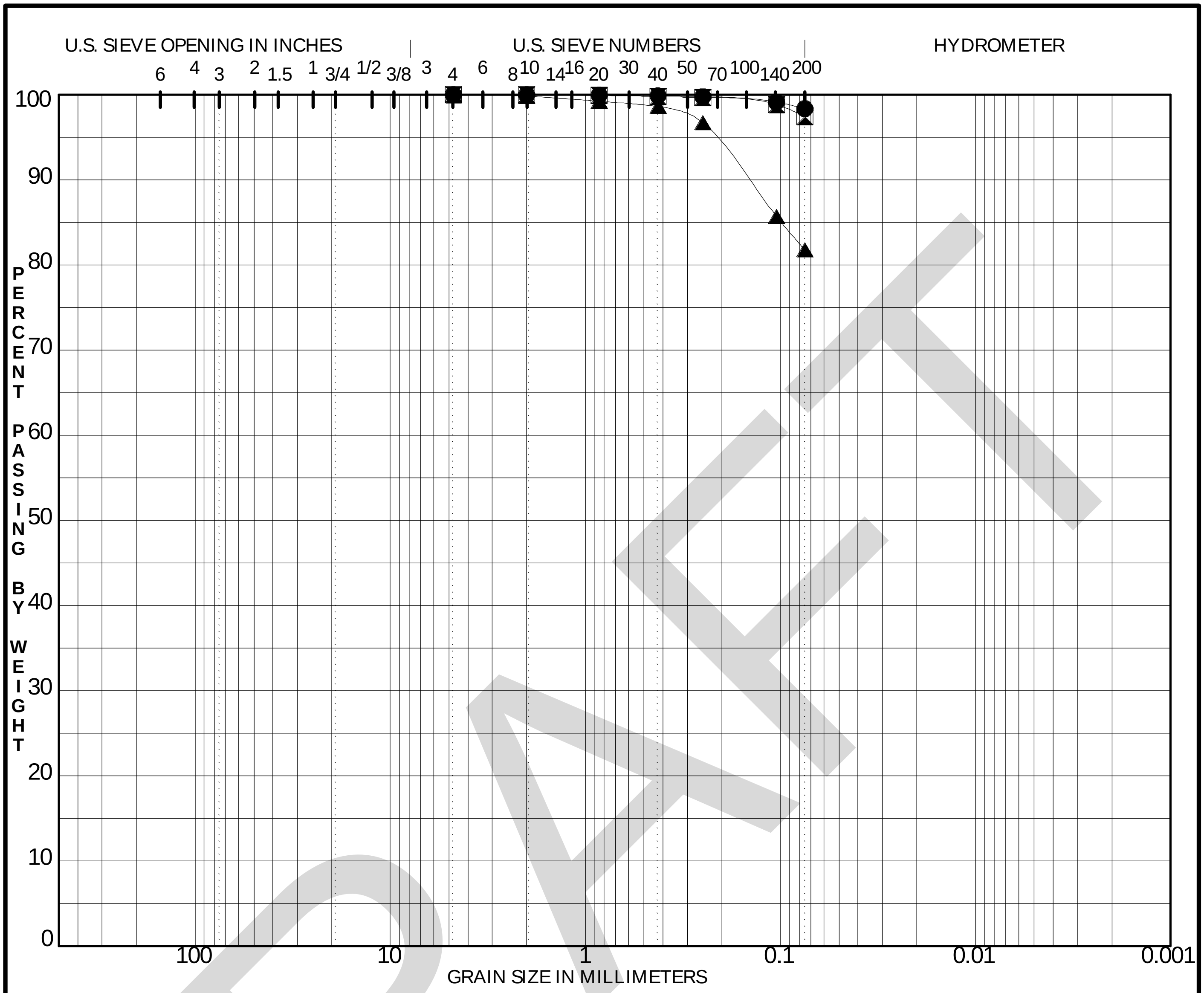
Remarks

Source of Sample: BH-114 **Depth:** 125
Sample Number: 25 **Date:** 12-3-19

isi

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JP **Checked By:** JH



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-114	81.0	98	100	Lean CLAY (CL)	CL
☒	BH-114	91.0	97	100	Lean CLAY (CL)	CL
▲	BH-114	111.0	82	100	Lean CLAY with sand (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

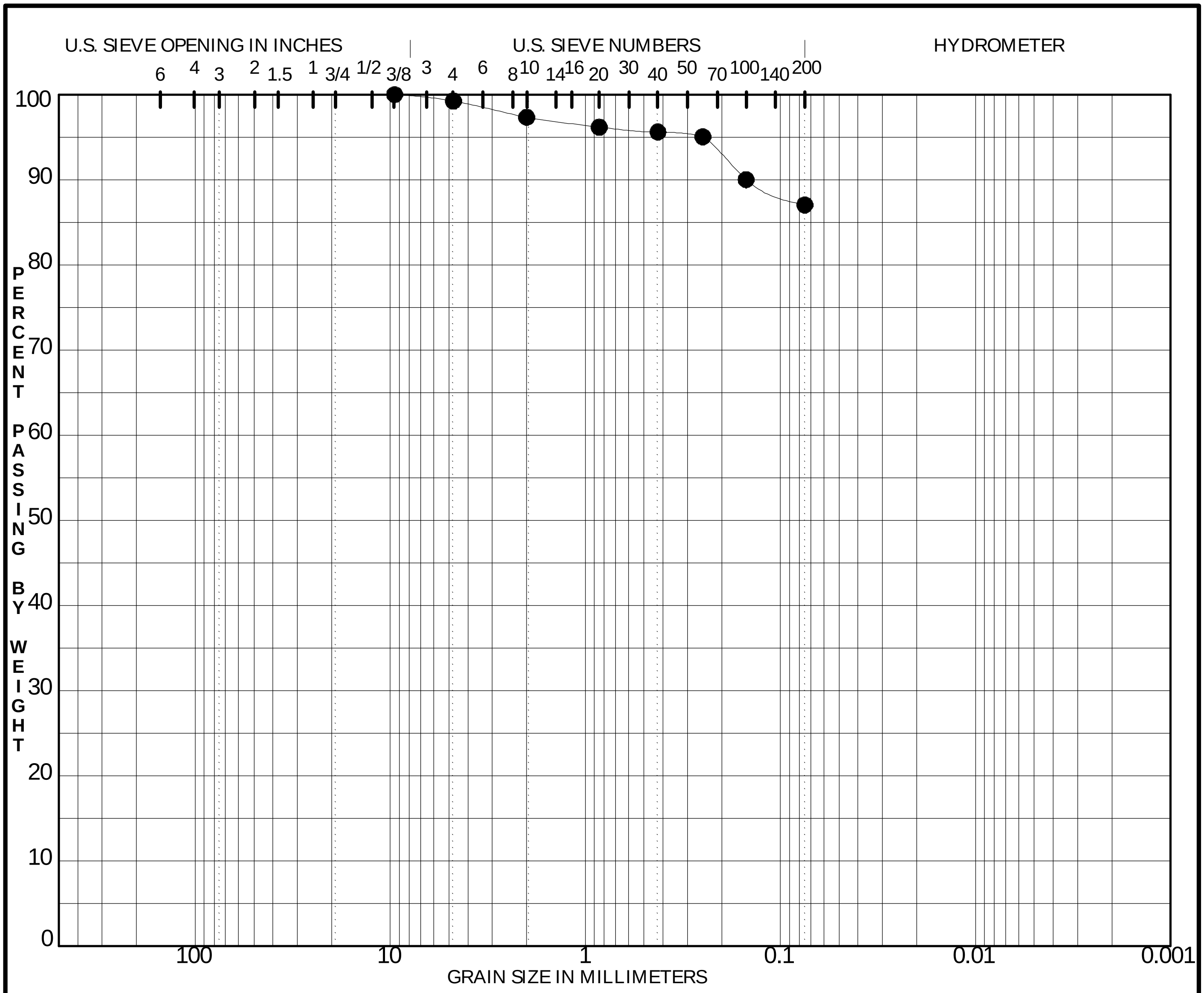
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19



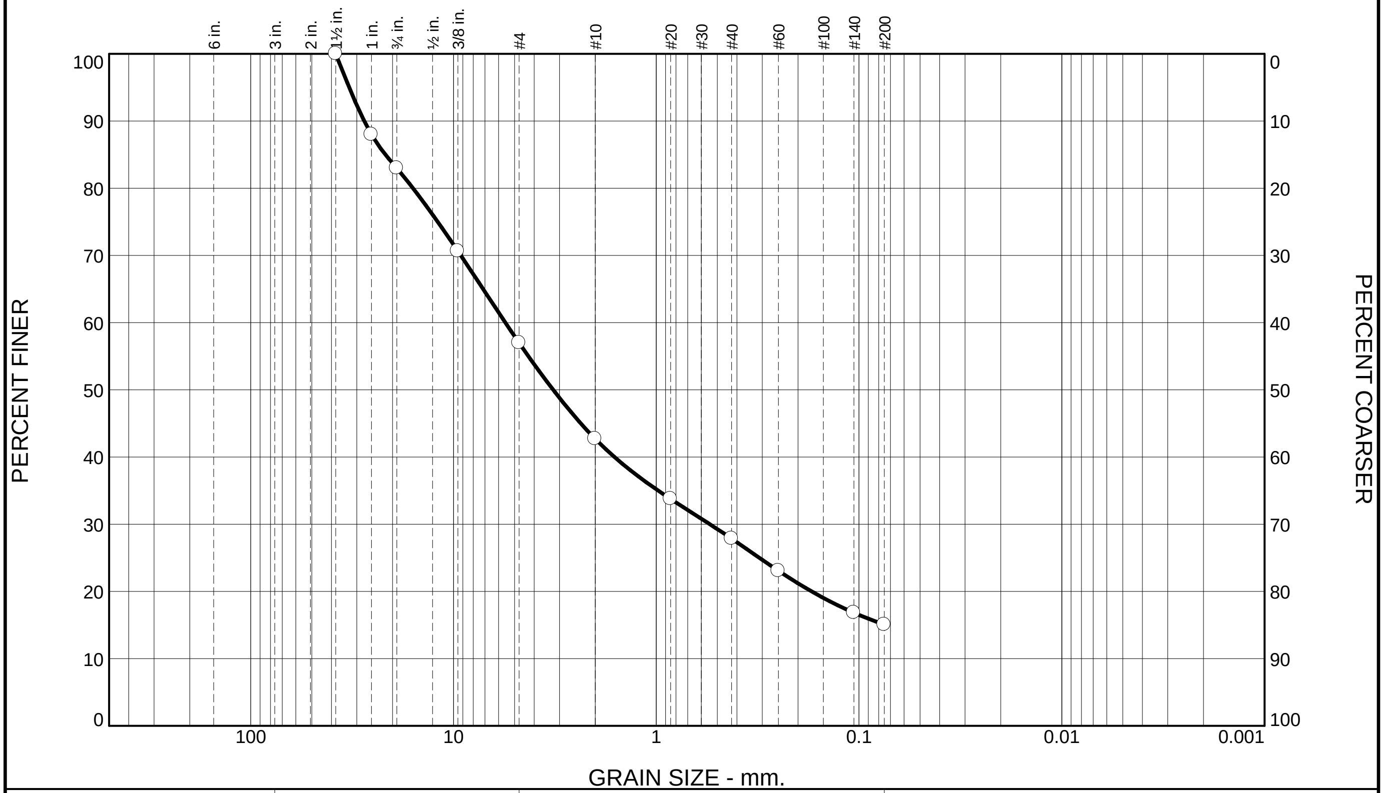
Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-115	116.0	87	99	Lean CLAY (CL)	CL

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19

PREP'D BY: Sara Chalian	GRADATION TEST DATA	FIGURE
APP'D BY: Mark McKee	**BART TO SILICON VALLEY** **San Jose, California**	
DATE: 6/19/19		PROJECT No.
DWG FILE:		2017-144-T02

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	17	26	14	15	13	15	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	88		
3/4	83		
3/8	71		
#4	57		
#10	43		
#20	34		
#40	28		
#60	23		
#140	17		
#200	15		

* (no specification provided)

Soil Description

Gray silty gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 27.5987 D_{85}= 21.6776 D_{60}= 5.5515

D_{50}= 3.2270 D_{30}= 0.5446 D_{15}=

D_{10}= C_u= C_c=

Classification

USCS= GM AASHTO=

Remarks

Source of Sample: BH-115 **Depth:** 130

Sample Number: 27-30

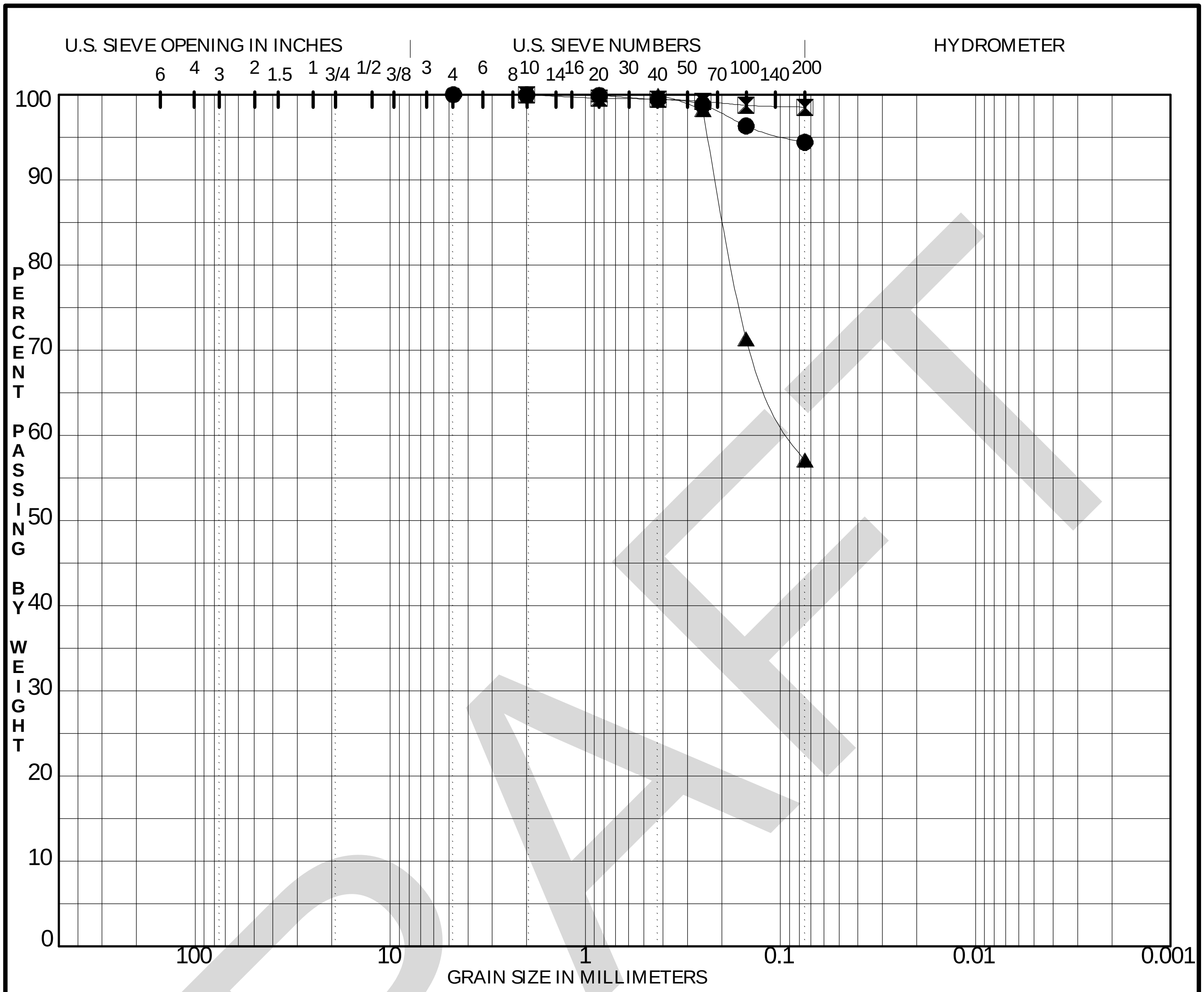
Date: 12-3-19

Client: Mott MacDonald

Project: BSVII
507385606

Project No: 2966-001.0 **Figure**

Tested By: JP **Checked By:** JH



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-116	71.0	94	100	Lean CLAY (CL)	CL
⧗	BH-116	101.1	99		Organic CLAY (OL)	OL
▲	BH-116	106.0	57		Sandy SILT (ML)	ML

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19

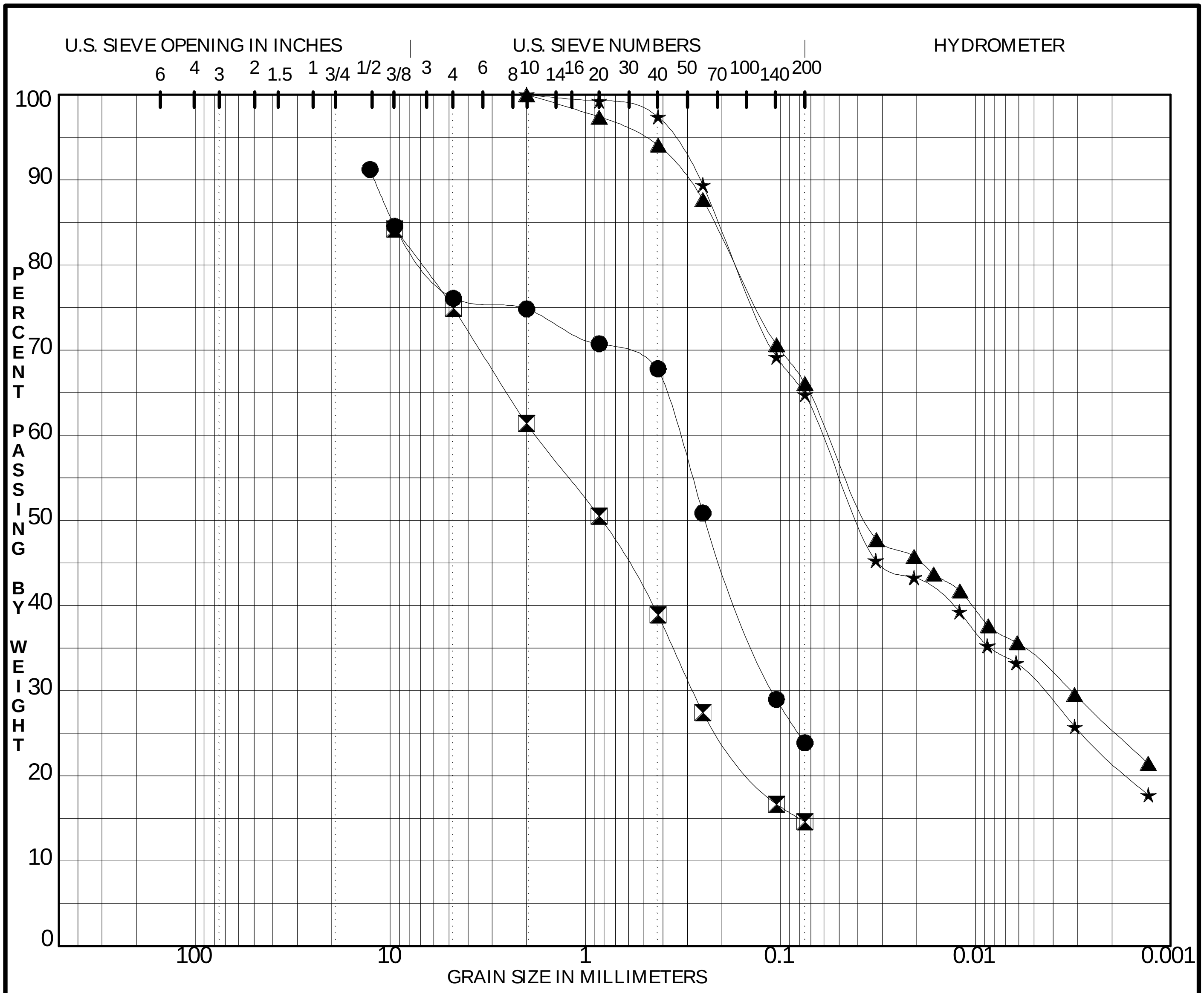
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-117	61.0	24	76	Silty, clayey SAND with gravel (SC-SM)	SC-SM
⧗	BH-117	85.5	15	75	Silty, clayey SAND with gravel (SC-SM)	SC-SM
▲	BH-117	105.5	66		Sandy Lean CLAY (CL)	CL
★	BH-117	106.0	65		Sandy Lean CLAY (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

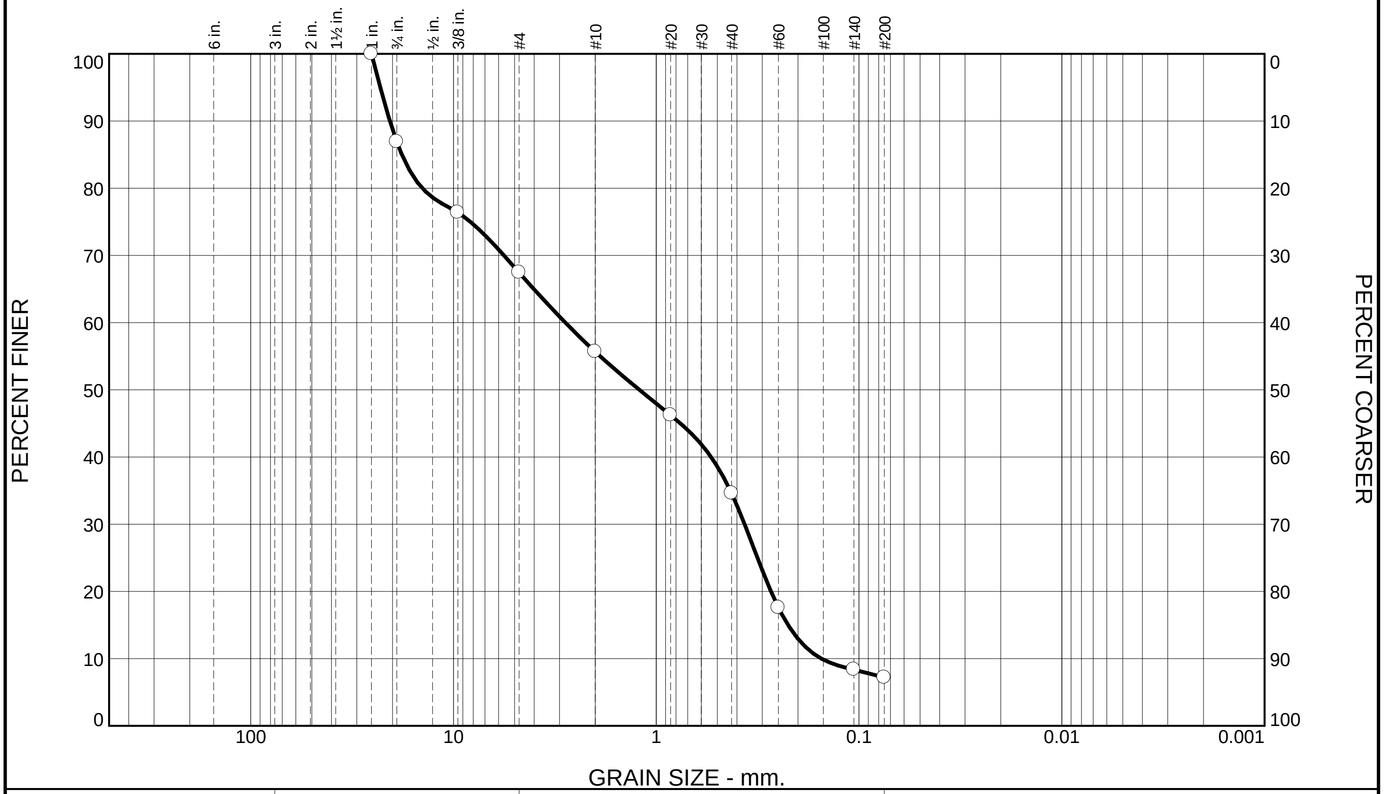
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	13	20	11	21	28	7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100		
3/4	87		
3/8	76		
#4	67		
#10	56		
#20	46		
#40	35		
#60	18		
#140	8		
#200	7.2		

* (no specification provided)

Soil Description

Gray poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 20.5996	D_{85}= 17.9814	D_{60}= 2.8094
D_{50}= 1.2115	D_{30}= 0.3668	D_{15}= 0.2240
D_{10}= 0.1533	C_u= 18.32	C_c= 0.31

Classification

USCS= SP-SM AASHTO=

Remarks

Source of Sample: BH-117 **Depth:** 130

Sample Number: 26

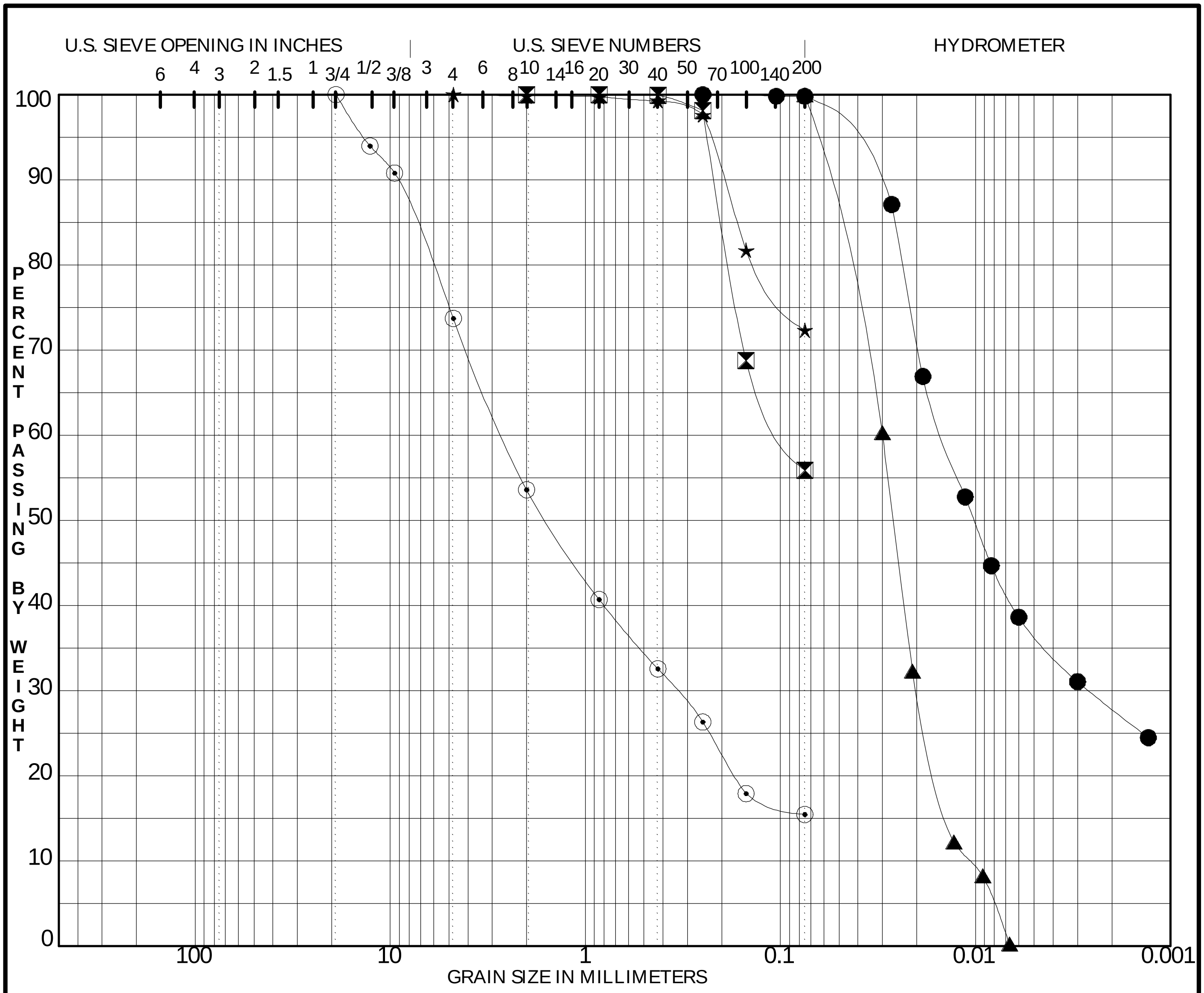
Date: 12-3-19

Client: Mott MacDonald

Project: BSVII
507385606

Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-121	45.5	100		Organic CLAY with sand (OL)	OL
⧗	BH-121	70.5	56		Sandy SILT (ML)	ML
▲	BH-121	71.0	100		SILT (ML)	ML
★	BH-121	76.0	72	100	Lean CLAY with sand (CL)	CL
⊙	BH-121	85&90	15	74	Silty SAND with gravel (SM)	SM

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19

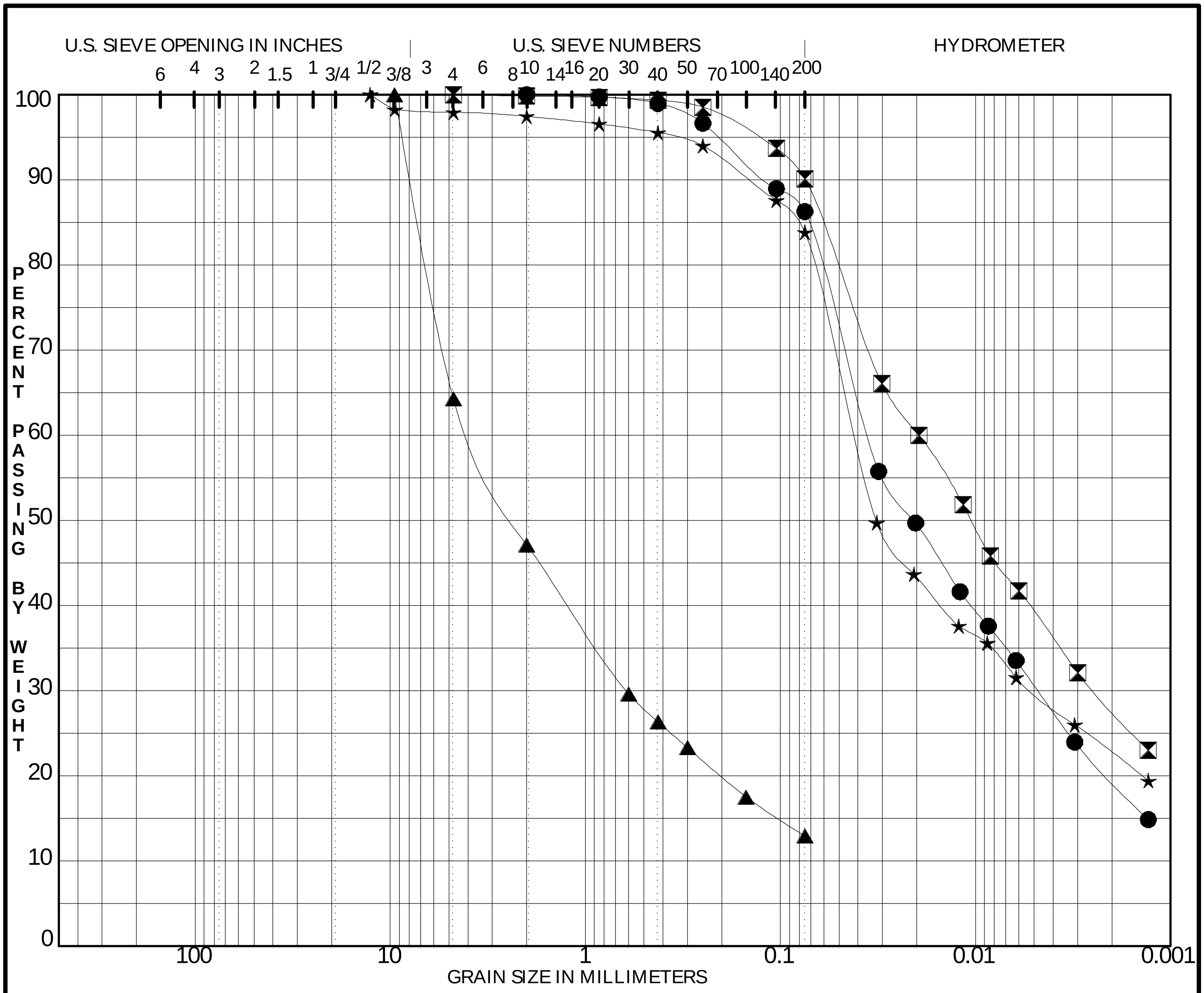
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-122	60.5	86		Lean CLAY (CL)	CL
⧗	BH-122	61.0	90	100	Lean CLAY (CL)	CL
▲	BH-122	81.0	13	64	Silty SAND with gravel (SM)	SM
★	BH-122	111.0	84	98	Lean CLAY with sand (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

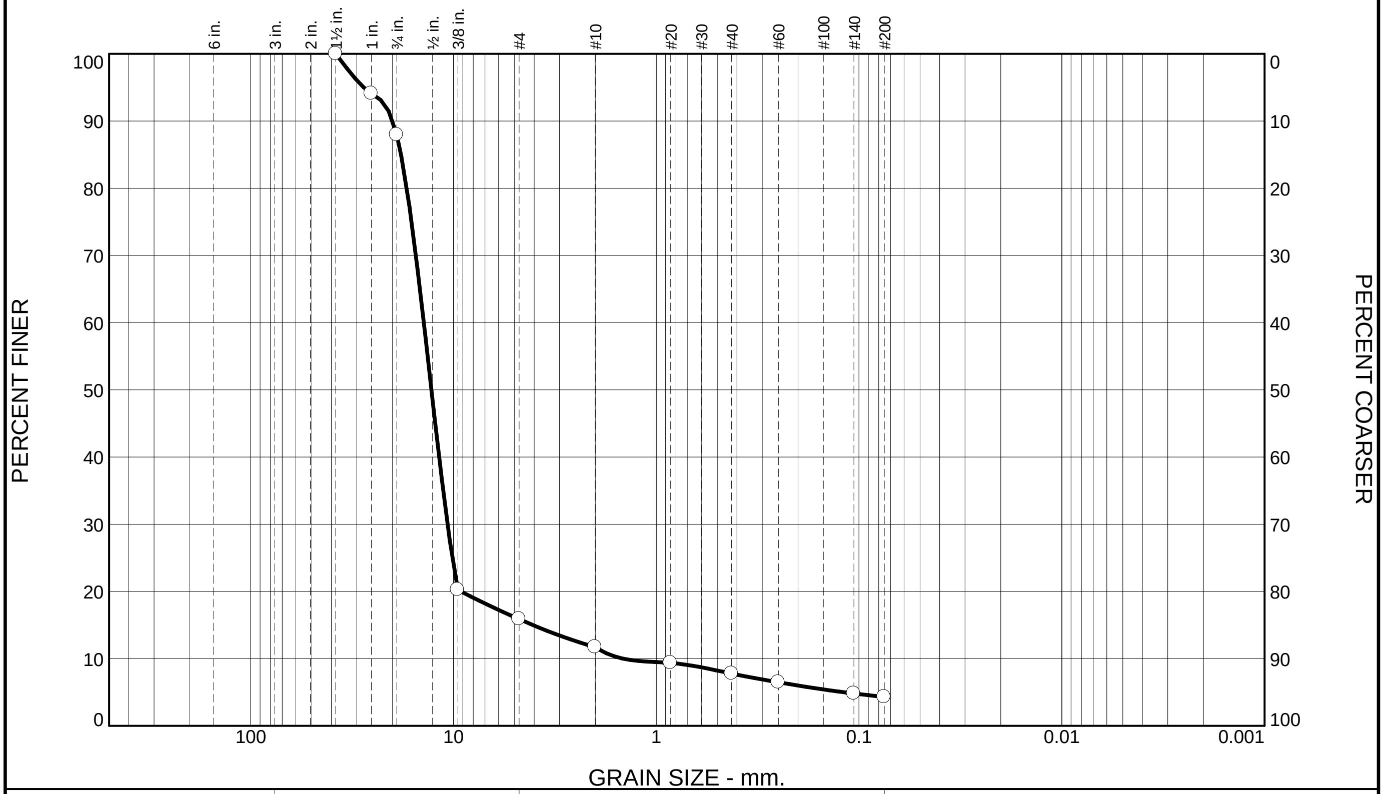
BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	12	72	4	4	4	4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	94		
3/4	88		
3/8	20		
#4	16		
#10	12		
#20	9		
#40	8		
#60	6		
#140	5		
#200	4.3		

* (no specification provided)

Soil Description

Gray poorly graded gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 19.9466	D_{85}= 18.1493	D_{60}= 14.0137
D_{50}= 12.8578	D_{30}= 10.7069	D_{15}= 4.0647
D_{10}= 1.4610	C_u= 9.59	C_c= 5.60

Classification

USCS= GP AASHTO=

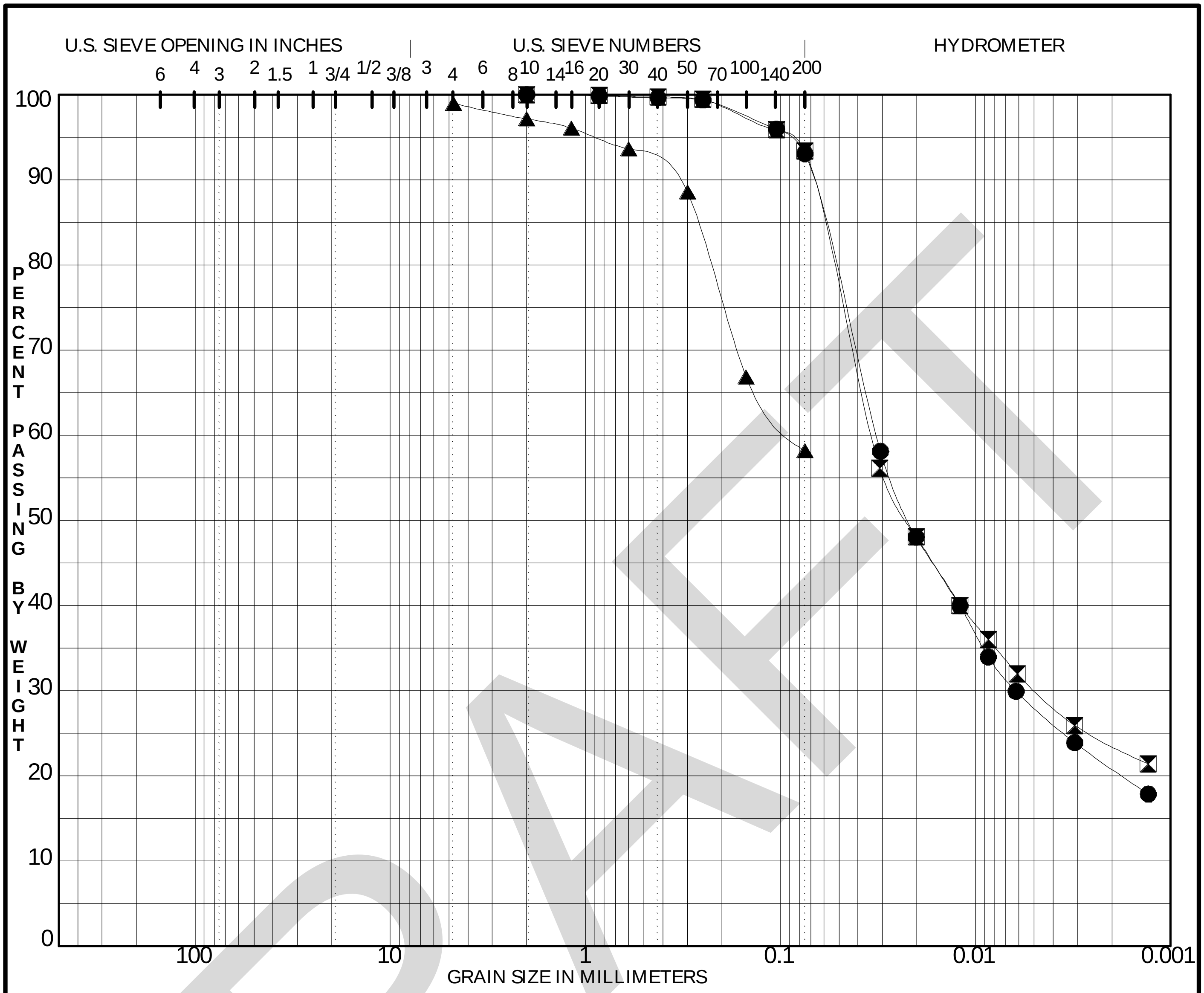
Remarks

Source of Sample: BH-122 **Depth:** 90
Sample Number: 18

Date: 12-3-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JP **Checked By:** JH



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-123	55.5	93		Silty CLAY (CL-ML)	CL-ML
⧗	BH-123	56.0	93		Silty CLAY (CL-ML)	CL-ML
▲	BH-123	101.0	58	99	Sandy Lean CLAY (CL)	CL

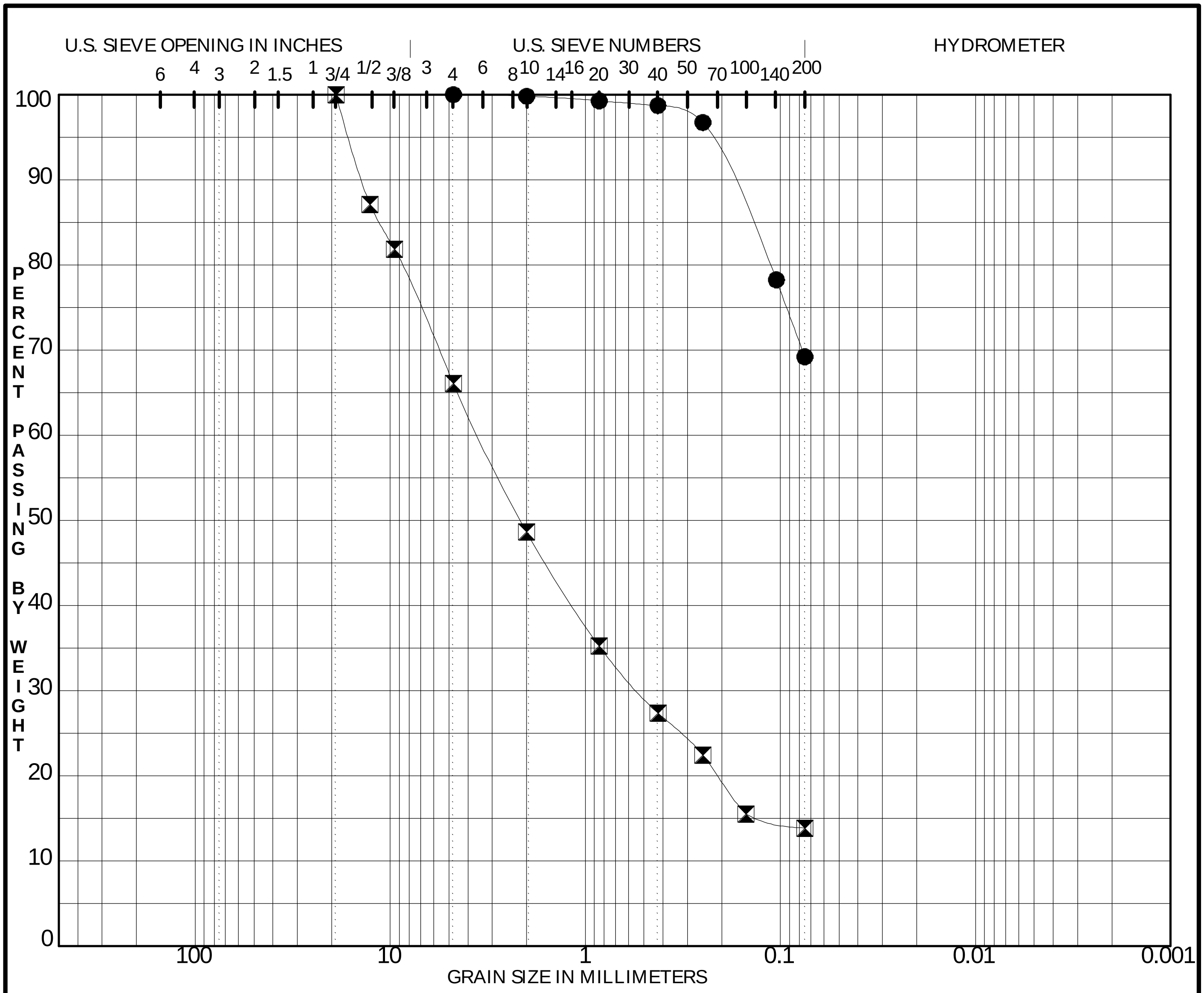
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-124	61.0	69	100	Sandy Lean CLAY (CL)	CL
⧗	BH-124	95.0	14	66	Silty SAND with gravel (SM)	SM

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/20/19

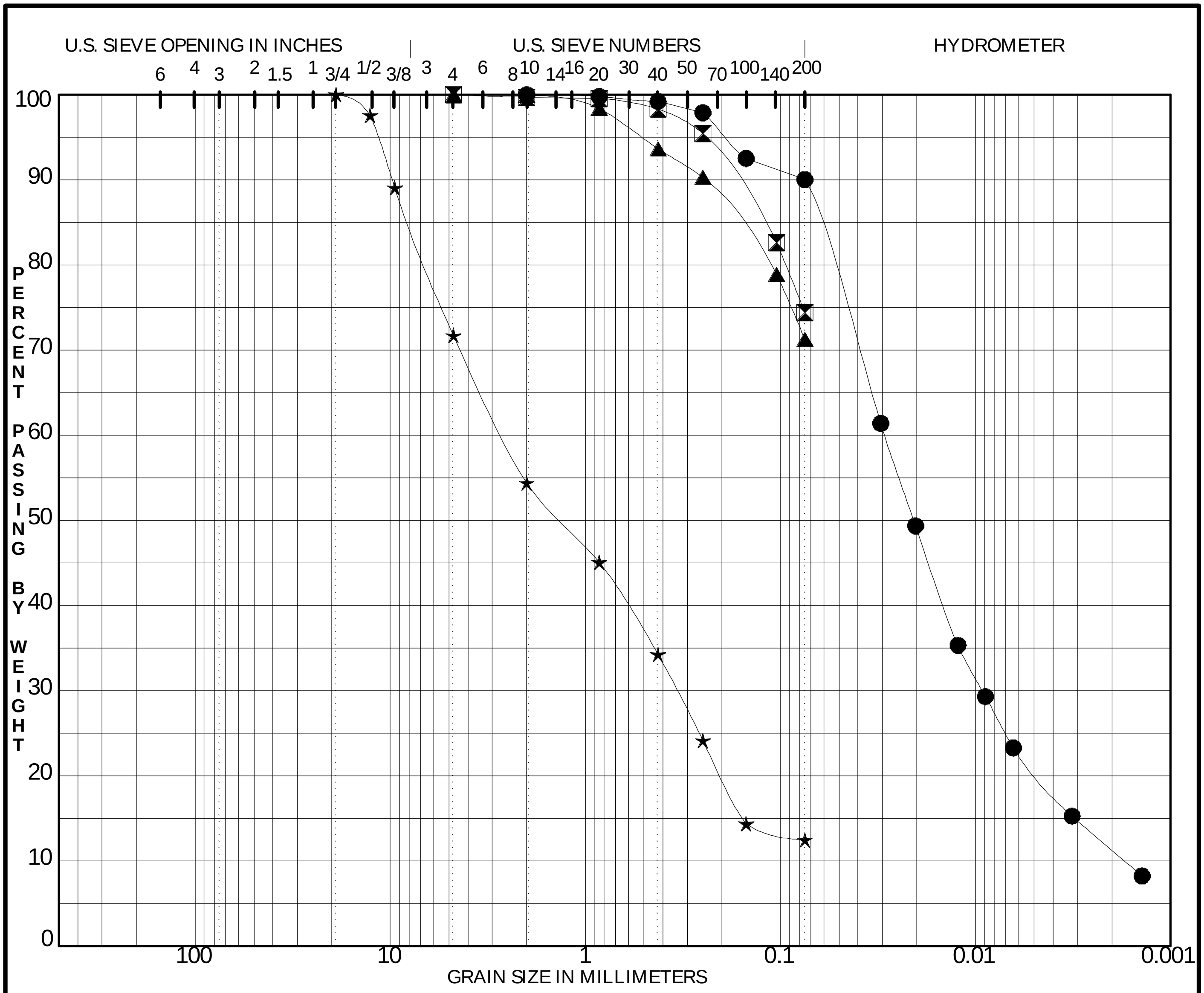
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-125	60.5	90		SILT (ML)	ML
⧗	BH-125	80.5	74	100	Lean CLAY with sand (CL)	CL
▲	BH-125	81.0	71	100	Lean CLAY with sand (CL)	CL
★	BH-125	105.5	12	72	Silty SAND with gravel (SM)	SM

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/20/19

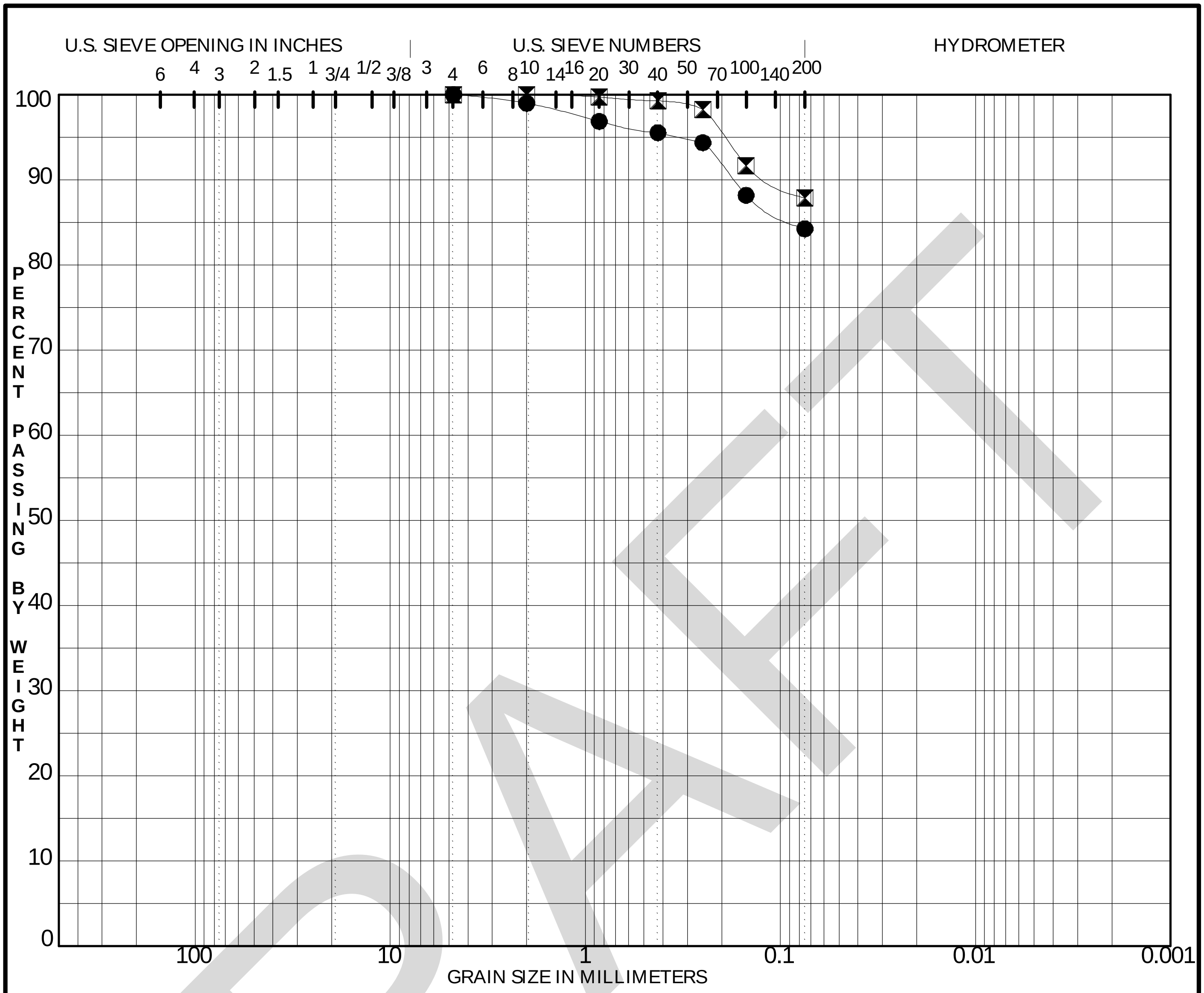
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-137	81.0	84	100	Lean CLAY with sand (CL)	CL
⧗	BH-137	111.0	88	100	Lean CLAY (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

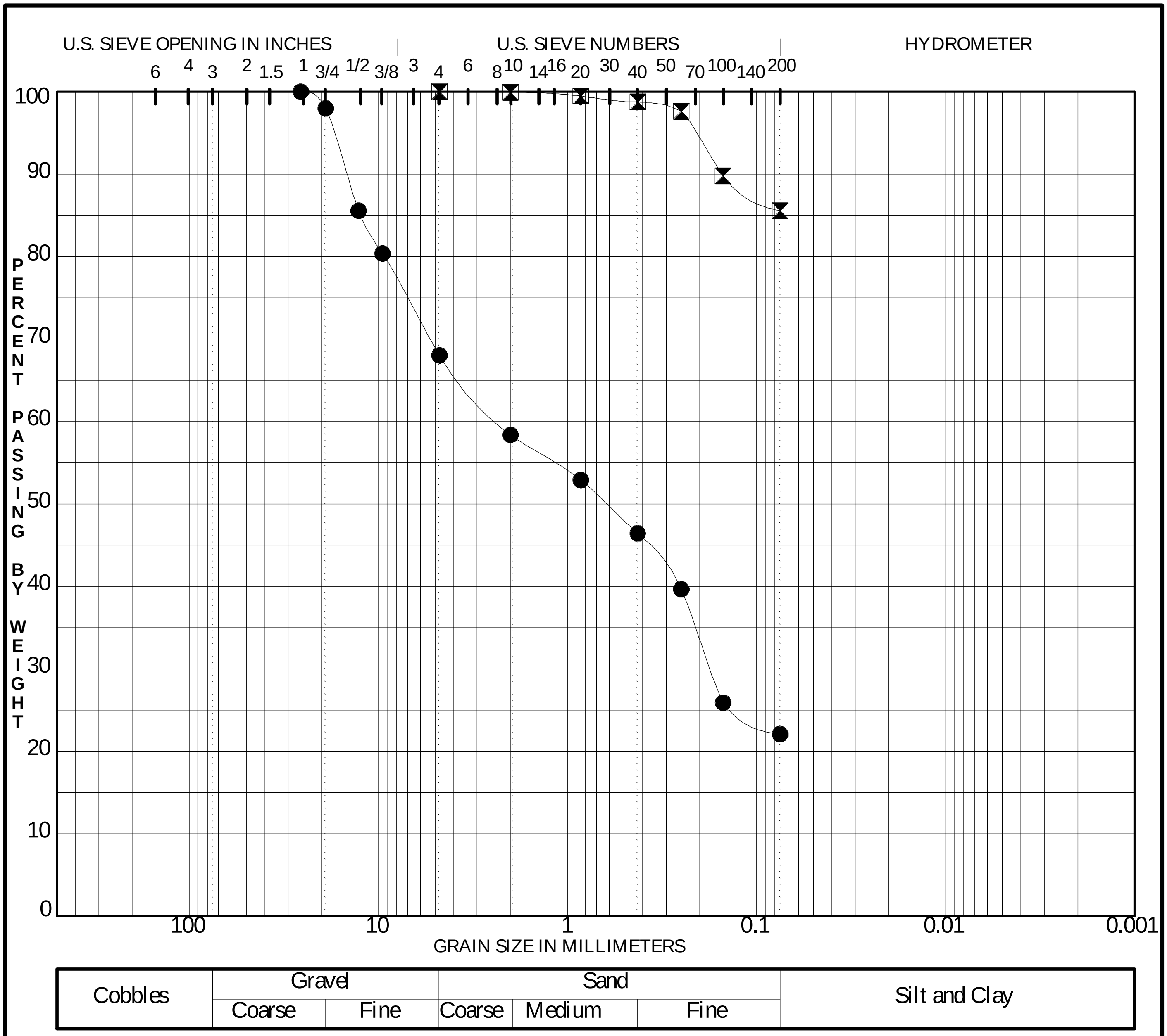
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/20/19



Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-138	90.5-91	22	68	Silty SAND with gravel (SM)	SM
⧗	BH-138	116.0	86	100	Fat CLAY with sand (CH)	CH

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/20/19

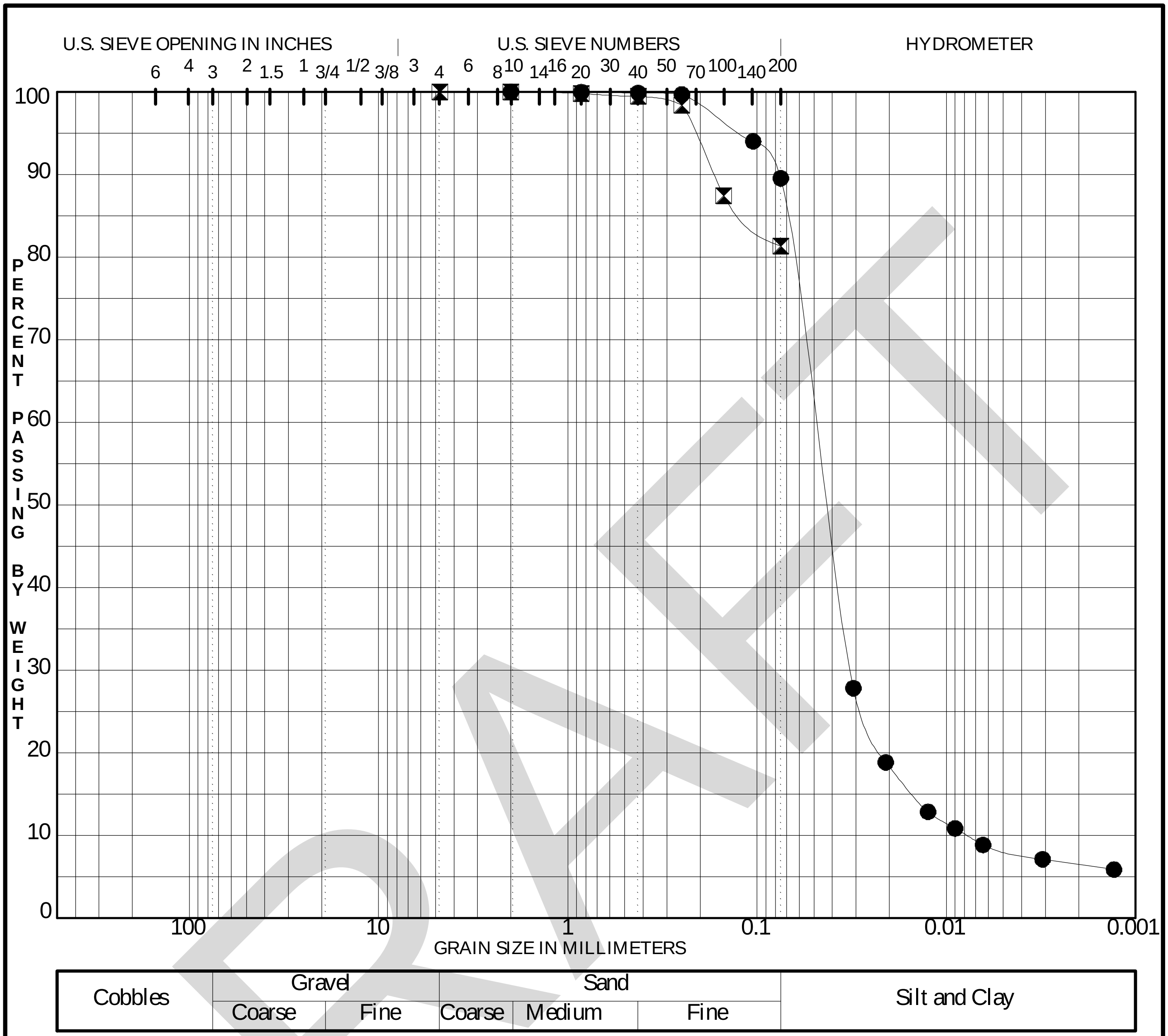
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-139	71.0	90		Silty CLAY (CL-ML)	CL-ML
⧗	BH-139	95.5	81	100	Lean CLAY with sand (CL)	CL

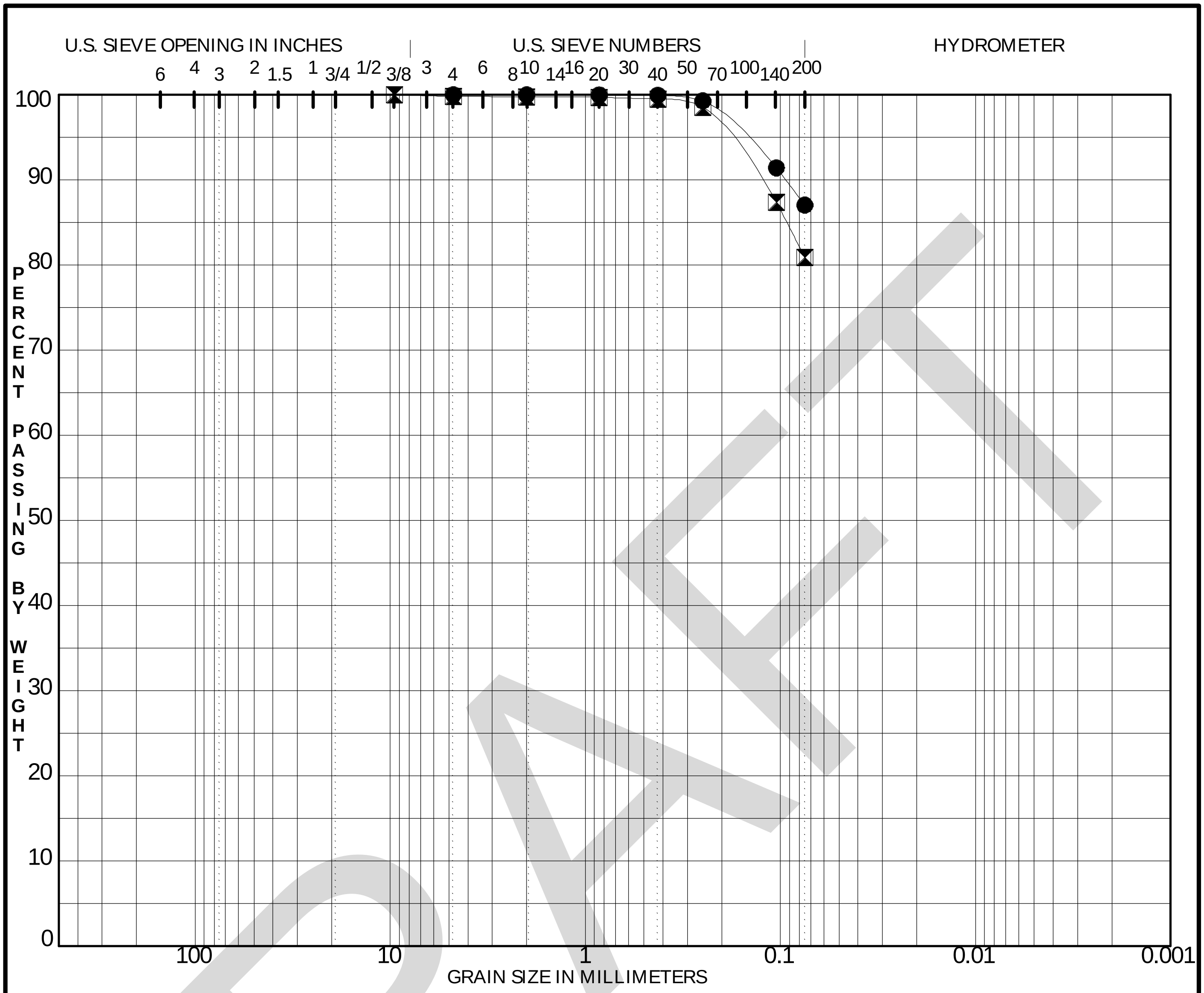
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-140	60.5	87	100	SILT (ML)	ML
⧗	BH-140	75.5	81	100	Lean CLAY with sand (CL)	CL

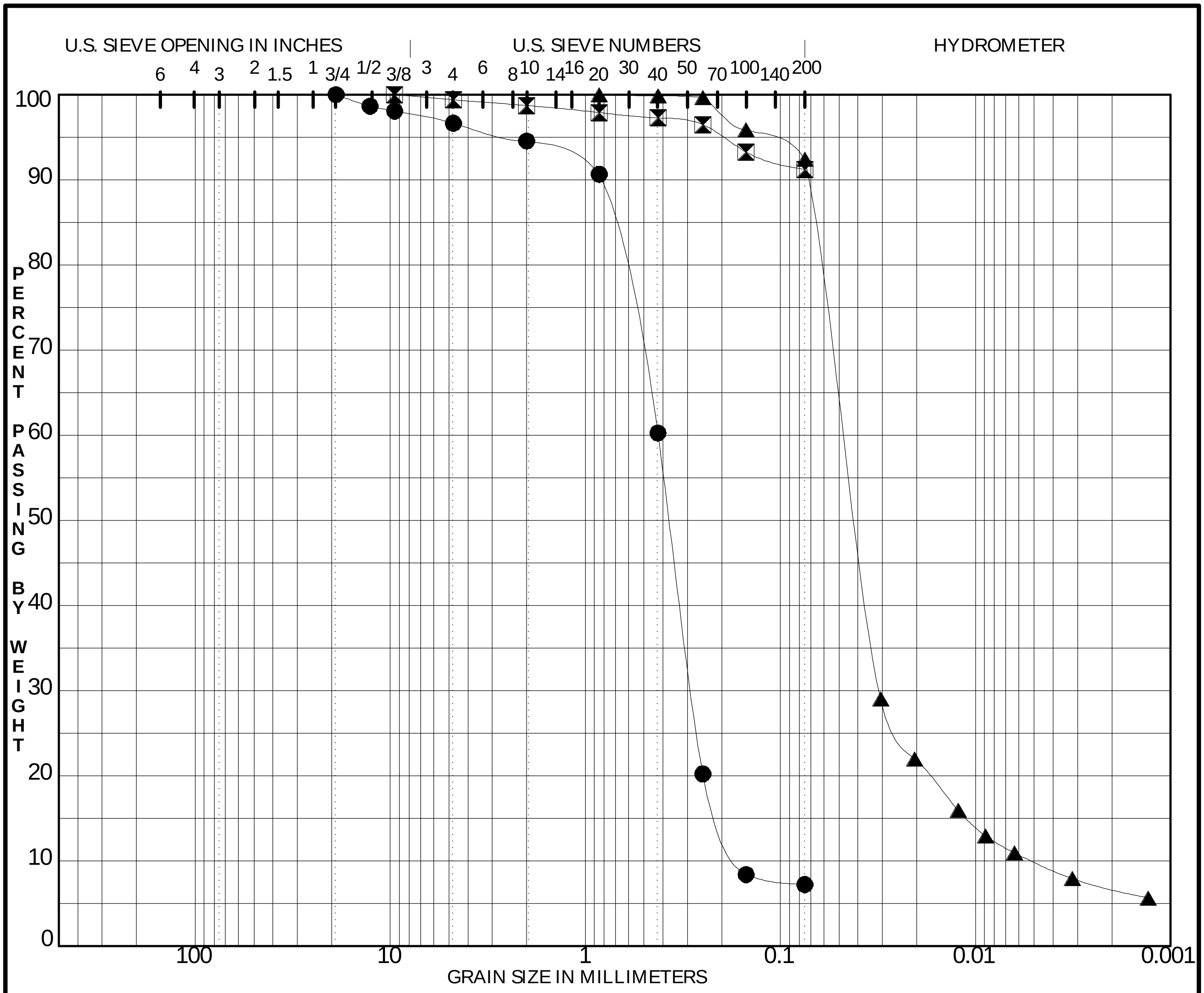
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-141	25.5	7	97	Poorly GRADED SAND WITH SILT	SP-SM
⧗	BH-141	55.5	91	99	Lean CLAY (CL)	CL
▲	BH-141	66.0	92		SILT (ML)	ML

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/20/19

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

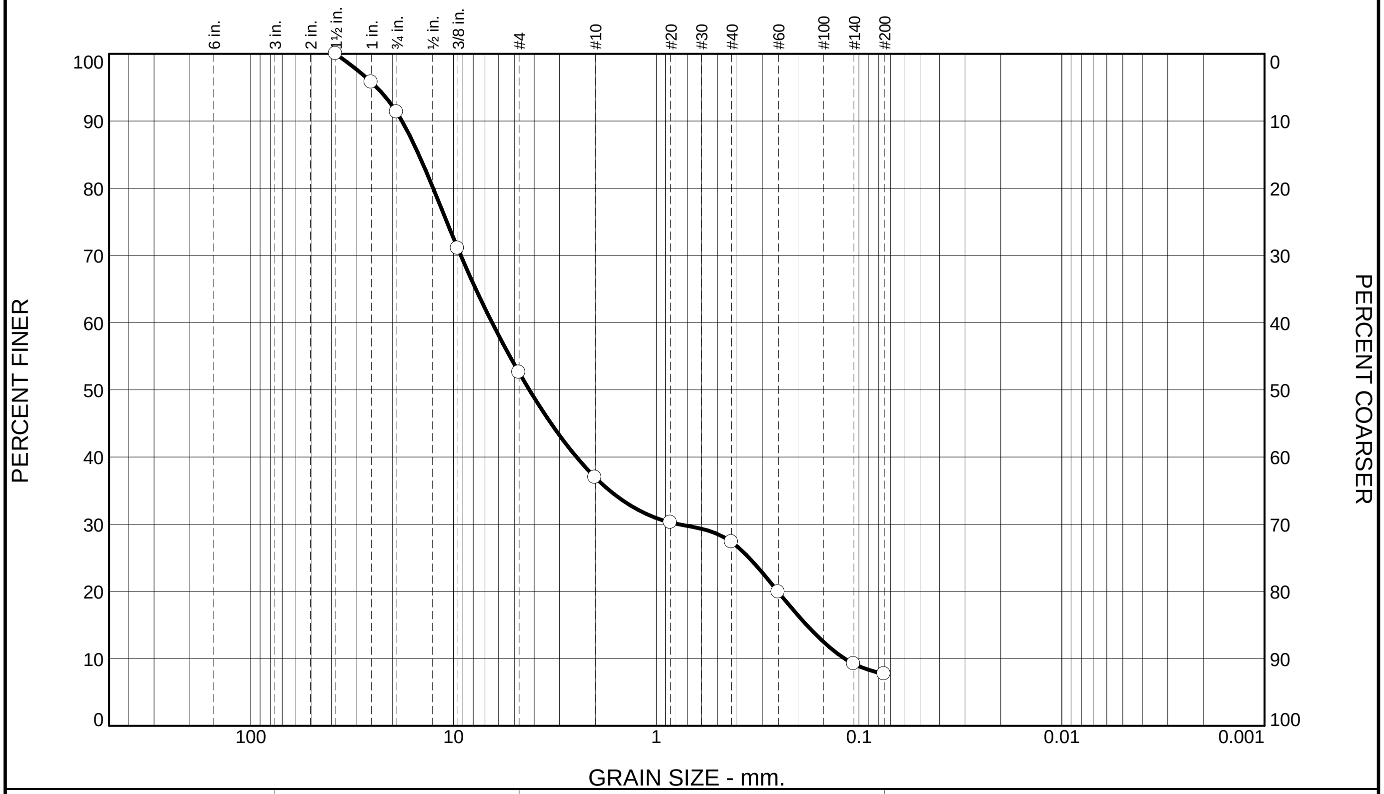
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	9	38	16	10	19	8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	96		
3/4	91		
3/8	71		
#4	53		
#10	37		
#20	30		
#40	27		
#60	20		
#140	9		
#200	7.7		

* (no specification provided)

Soil Description

Gray poorly graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 17.9561 D_{85}= 14.8478 D_{60}= 6.4602

D_{50}= 4.2304 D_{30}= 0.7798 D_{15}= 0.1812

D_{10}= 0.1177 C_u= 54.88 C_c= 0.80

Classification

USCS= GP-GM AASHTO=

Remarks

Source of Sample: BH-150 **Depth:** 51

Sample Number: 7A

Date: 10-7-19

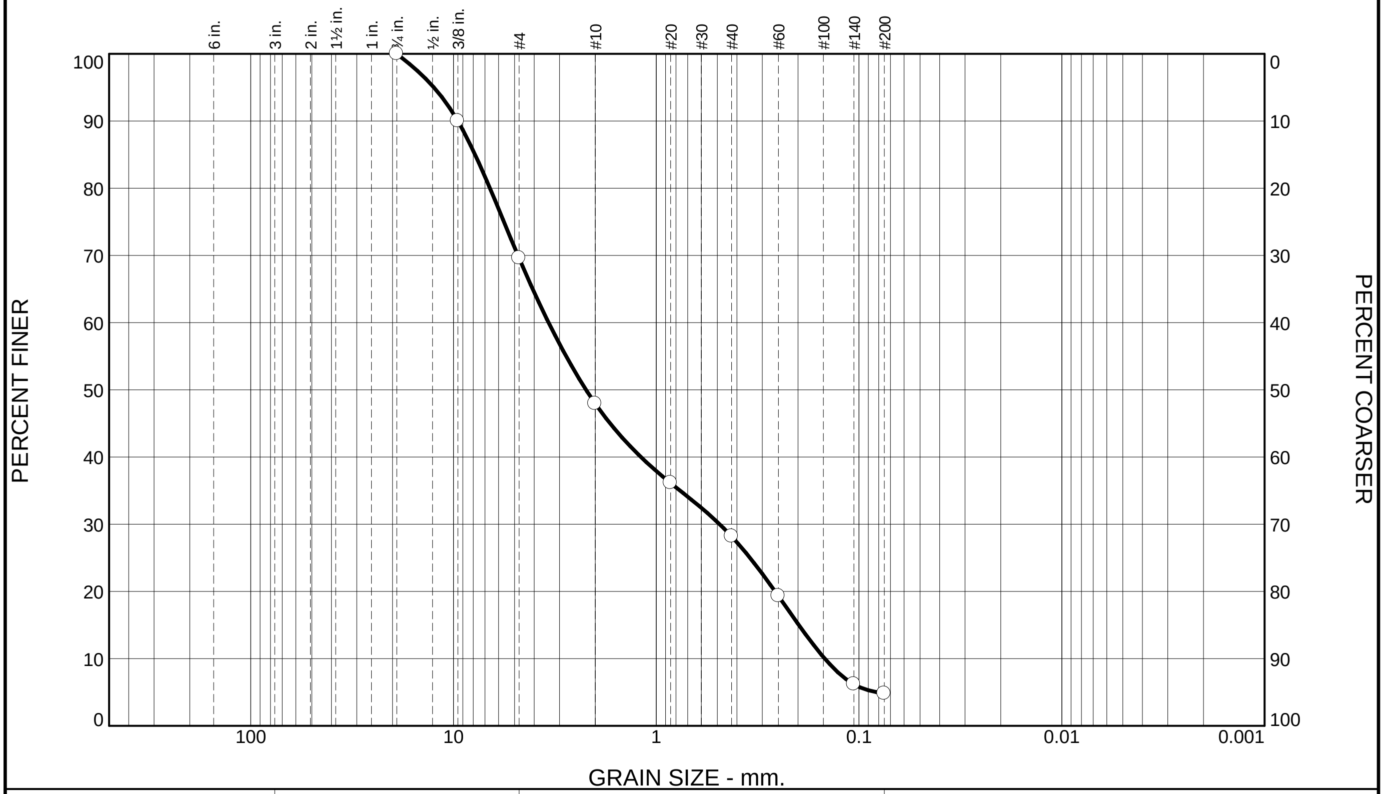
Client: Mott MacDonald

Project: BSVII
507385606

Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	30	22	20	23	5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	90		
#4	70		
#10	48		
#20	36		
#40	28		
#60	19		
#140	6		
#200	4.8		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 9.5289 D_{85}= 7.8342 D_{60}= 3.3978

D_{50}= 2.2210 D_{30}= 0.4870 D_{15}= 0.1982

D_{10}= 0.1476 C_u= 23.03 C_c= 0.47

Classification

USCS= SP AASHTO=

Remarks

Source of Sample: BH-150 **Depth:** 83.3

Sample Number: 11A

Date: 10-7-19

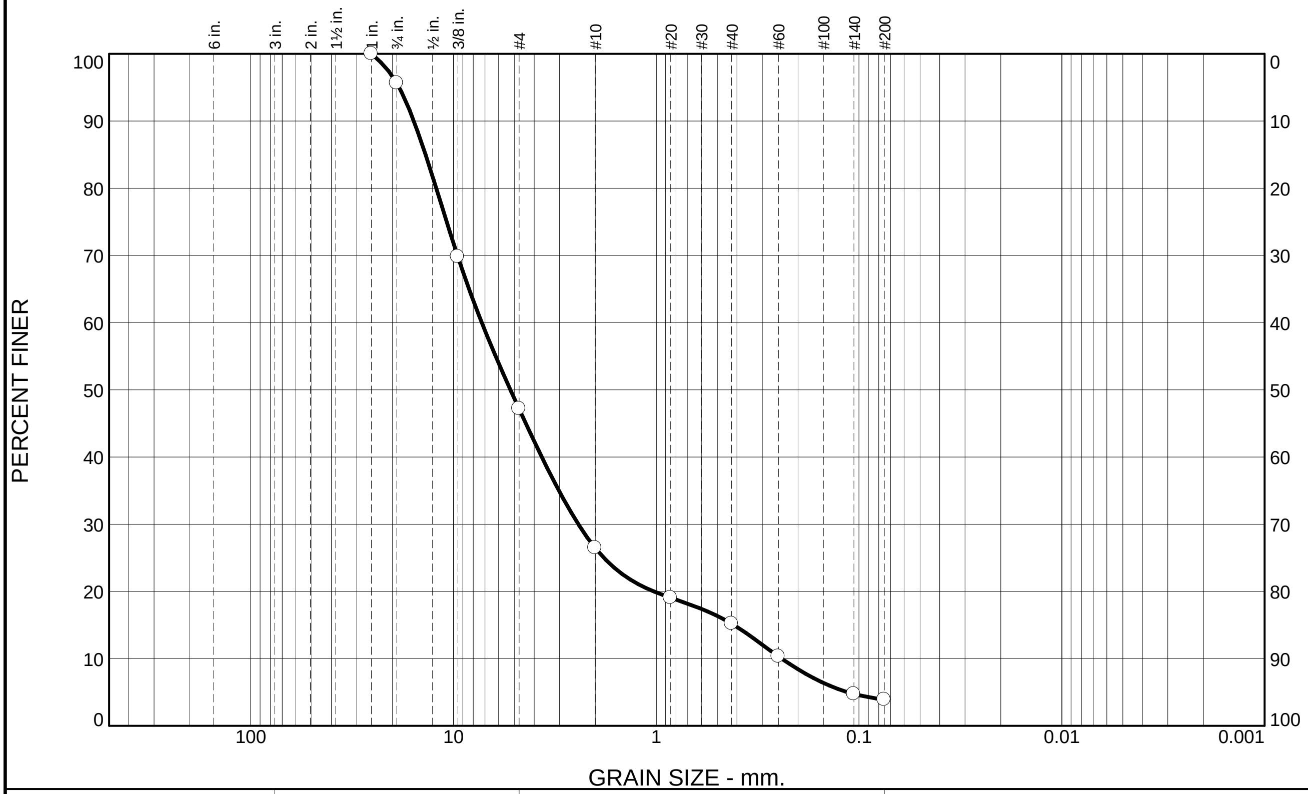
Client: Mott MacDonald

Project: BSVII
507385606

Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	4	49	21	11	11	4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100		
3/4	96		
3/8	70		
#4	47		
#10	26		
#20	19		
#40	15		
#60	10		
#140	5		
#200	3.9		

* (no specification provided)

Soil Description

Gray poorly graded gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.7048 D_{85}= 13.7461 D_{60}= 7.2613
D_{50}= 5.2434 D_{30}= 2.4239 D_{15}= 0.4142
D_{10}= 0.2412 C_u= 30.11 C_c= 3.36

Classification

USCS= GP AASHTO=

Remarks

Source of Sample: BH-150 **Depth:** 88.5
Sample Number: 15A

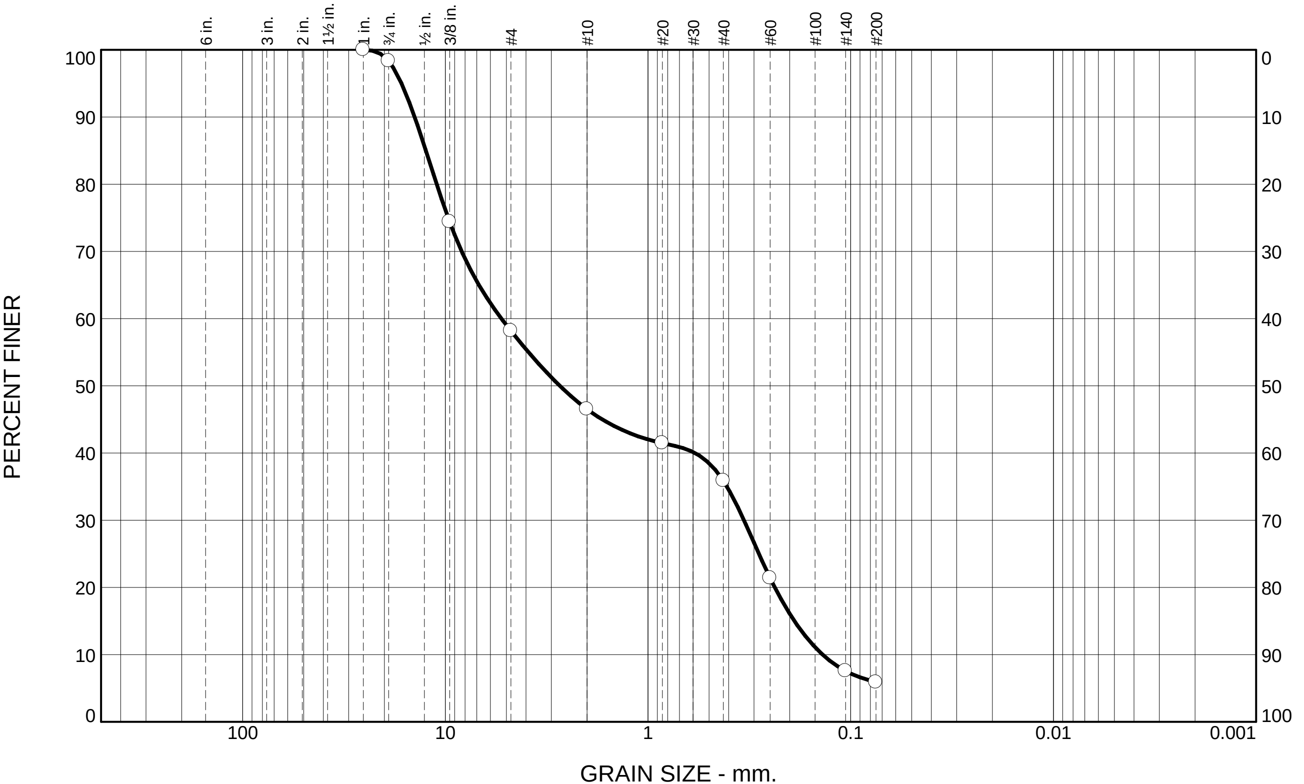
Date: 10-7-19

isi

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	2	40	11	11	30	6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100		
3/4	98		
3/8	74		
#4	58		
#10	47		
#20	41		
#40	36		
#60	21		
#140	8		
#200	5.9		

* (no specification provided)

Soil Description

Gray poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.1804	D_{85}= 12.4821	D_{60}= 5.2914
D_{50}= 2.7257	D_{30}= 0.3364	D_{15}= 0.1896
D_{10}= 0.1376	C_u= 38.45	C_c= 0.16

Classification

USCS= SP-SM AASHTO=

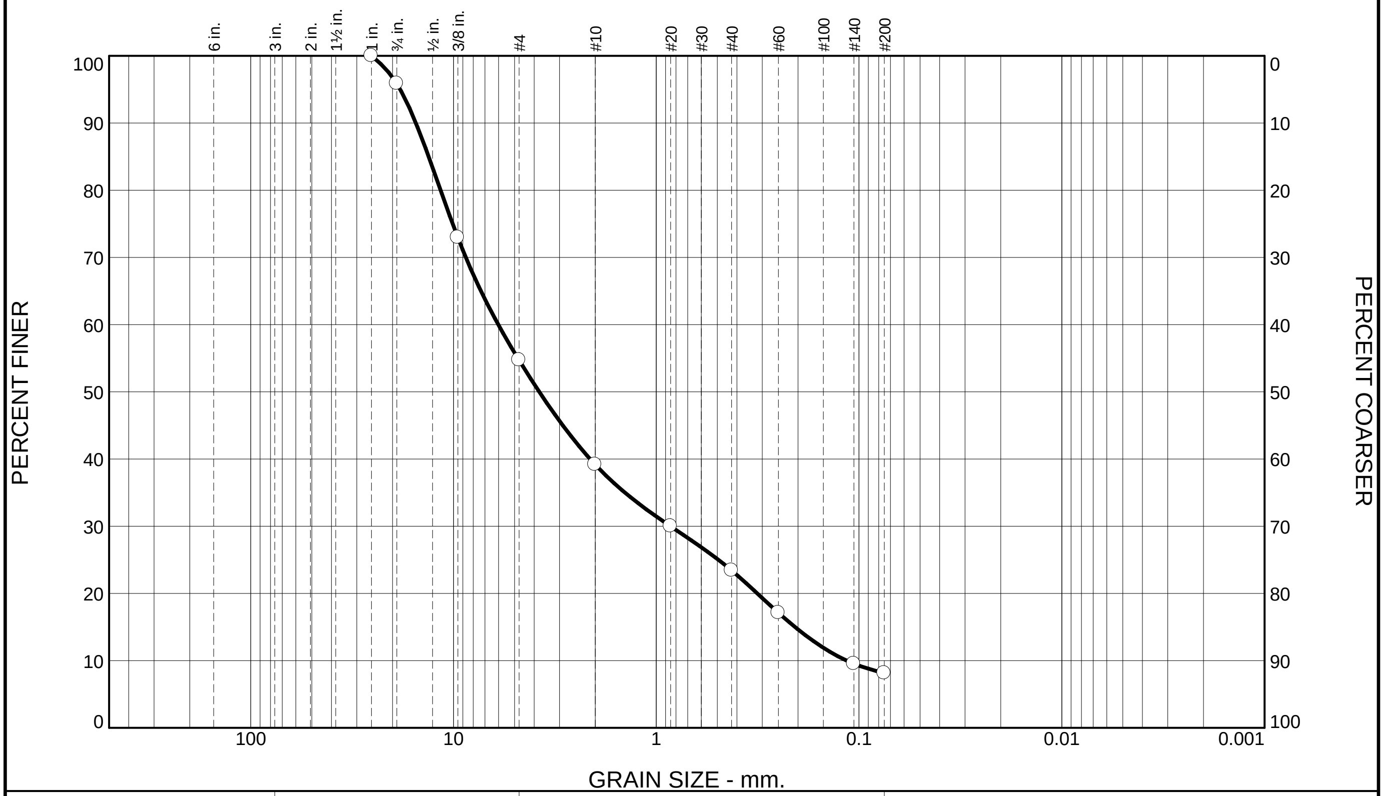
Remarks

Source of Sample: BH-150 **Depth:** 93.5
Sample Number: 18 **Date:** 10-7-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	4	41	16	16	15	8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100		
3/4	96		
3/8	73		
#4	55		
#10	39		
#20	30		
#40	23		
#60	17		
#140	10		
#200	8.1		

* (no specification provided)

Soil Description

Gray well graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.3430 D_{85}= 13.2701 D_{60}= 6.0194
D_{50}= 3.7776 D_{30}= 0.8515 D_{15}= 0.2069
D_{10}= 0.1151 C_u= 52.28 C_c= 1.05

Classification

USCS= SW-SM AASHTO=

Remarks

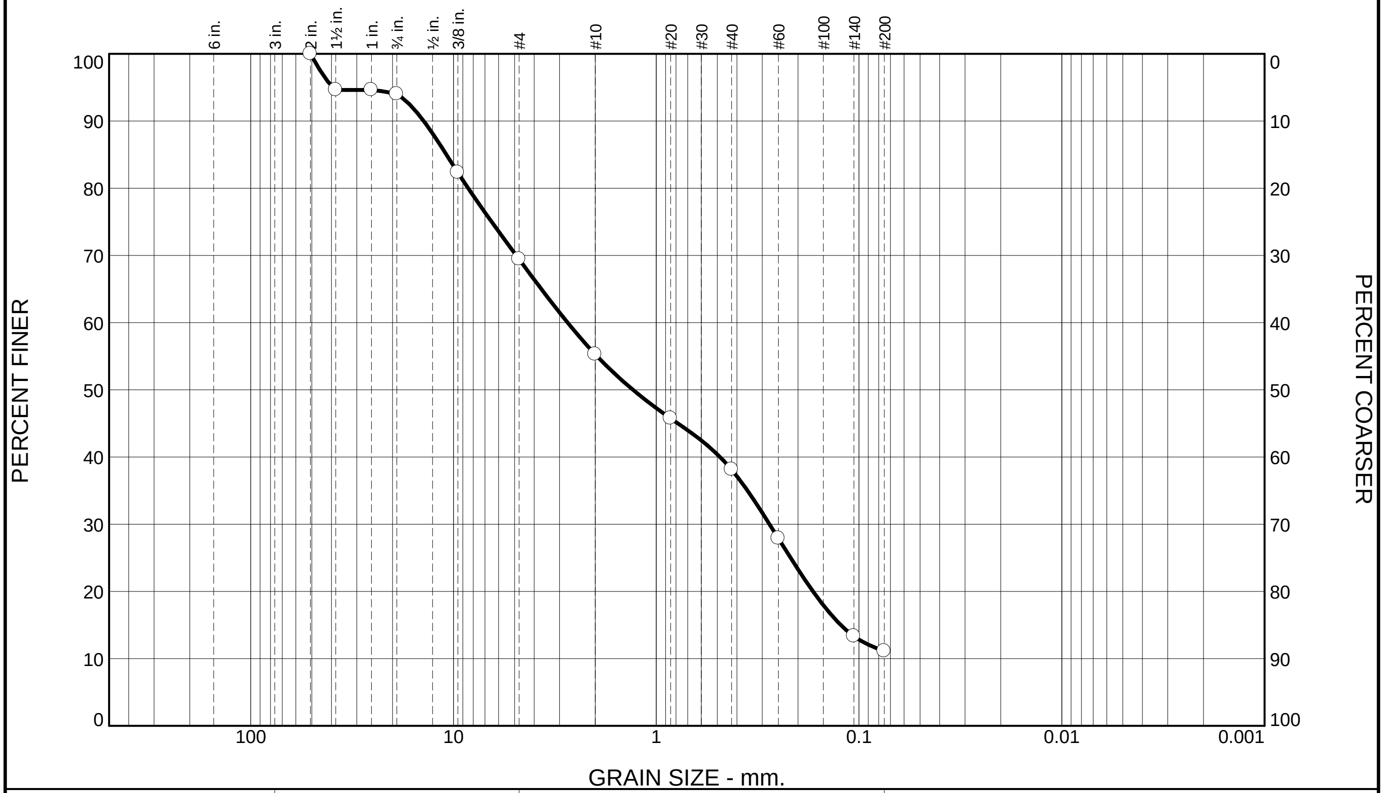
Source of Sample: BH-150 **Depth:** 123
Sample Number: 38 & 39

Date: 10-7-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	6	25	14	17	27	11	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
2	100		
1.5	95		
1	95		
3/4	94		
3/8	82		
#4	69		
#10	55		
#20	46		
#40	38		
#60	28		
#140	13		
#200	11		

* (no specification provided)

Soil Description

Grayish brown poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.0388 D_{85}= 10.8491 D_{60}= 2.7384
D_{50}= 1.3033 D_{30}= 0.2765 D_{15}= 0.1231
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

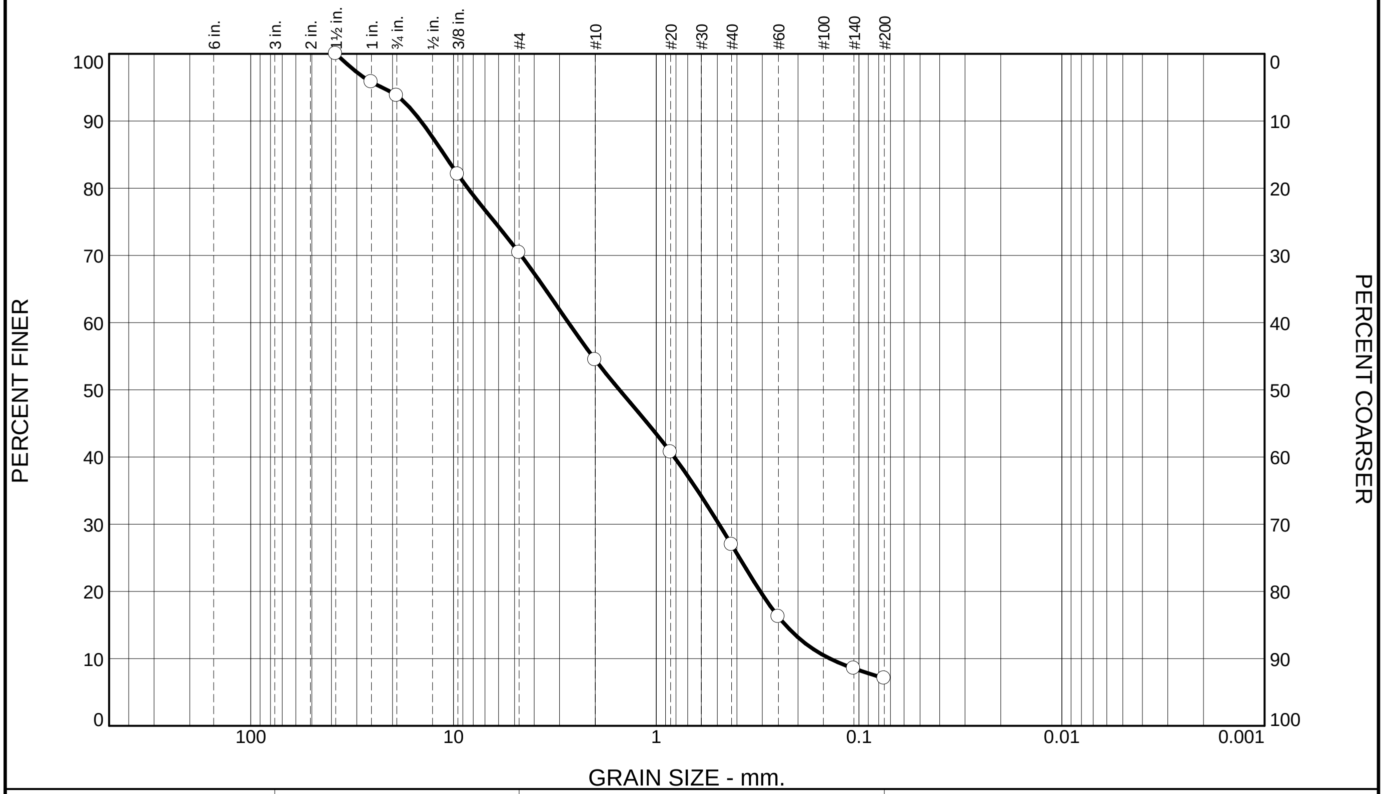
Source of Sample: BH-151 **Depth:** 80.5
Sample Number: 3A,4,5,6

Date: 10-7-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	6	24	16	27	20	7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	96		
3/4	94		
3/8	82		
#4	70		
#10	54		
#20	41		
#40	27		
#60	16		
#140	9		
#200	7.1		

* (no specification provided)

Soil Description

Grayish brown poorly graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.5010	D_{85}= 11.1124	D_{60}= 2.7136
D_{50}= 1.5211	D_{30}= 0.4902	D_{15}= 0.2306
D_{10}= 0.1392	C_u= 19.49	C_c= 0.64

Classification

USCS= SP-SM AASHTO=

Remarks

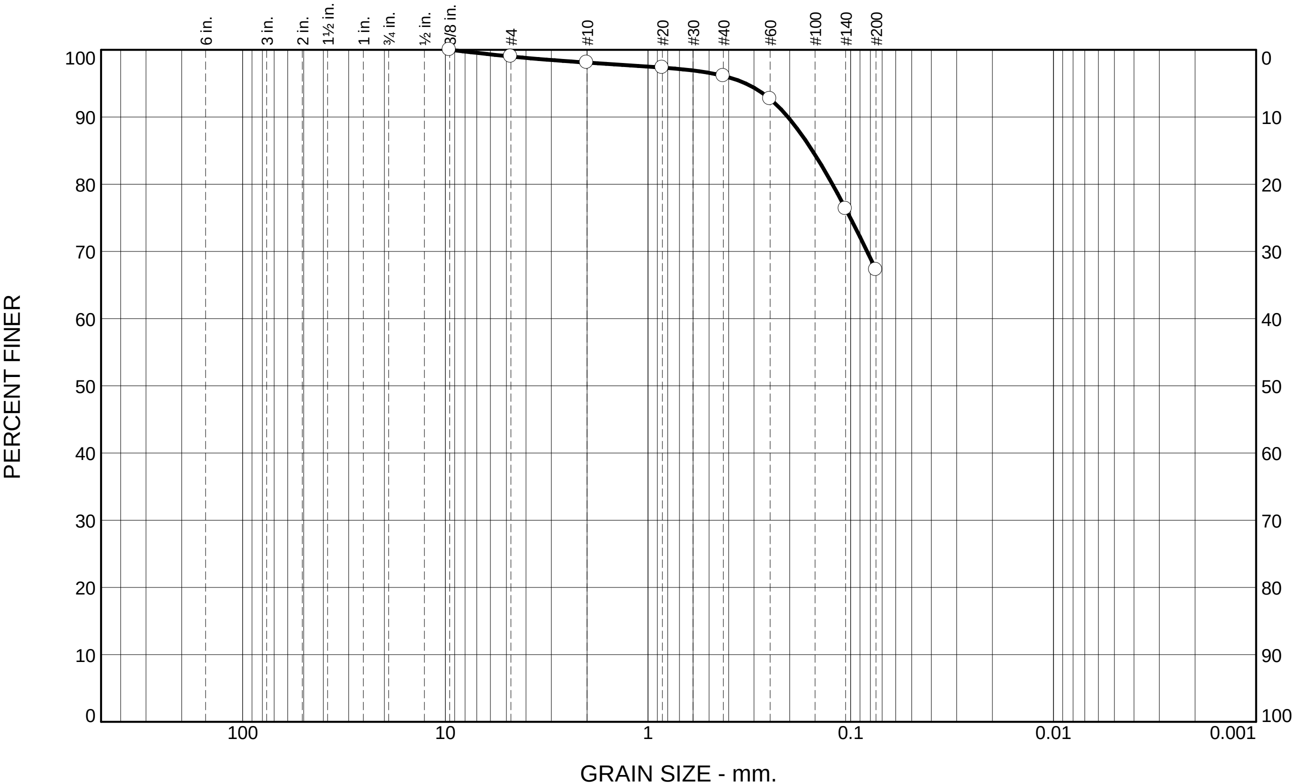
Source of Sample: BH-151 **Depth:** 91.5
Sample Number: 11B,13

Date: 10-7-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	1	2	29	67	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100		
#4	99		
#10	98		
#20	97		
#40	96		
#60	93		
#140	76		
#200	67		

* (no specification provided)

Soil Description

Grayish brown sandy clay

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2042 D_{85}= 0.1547 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

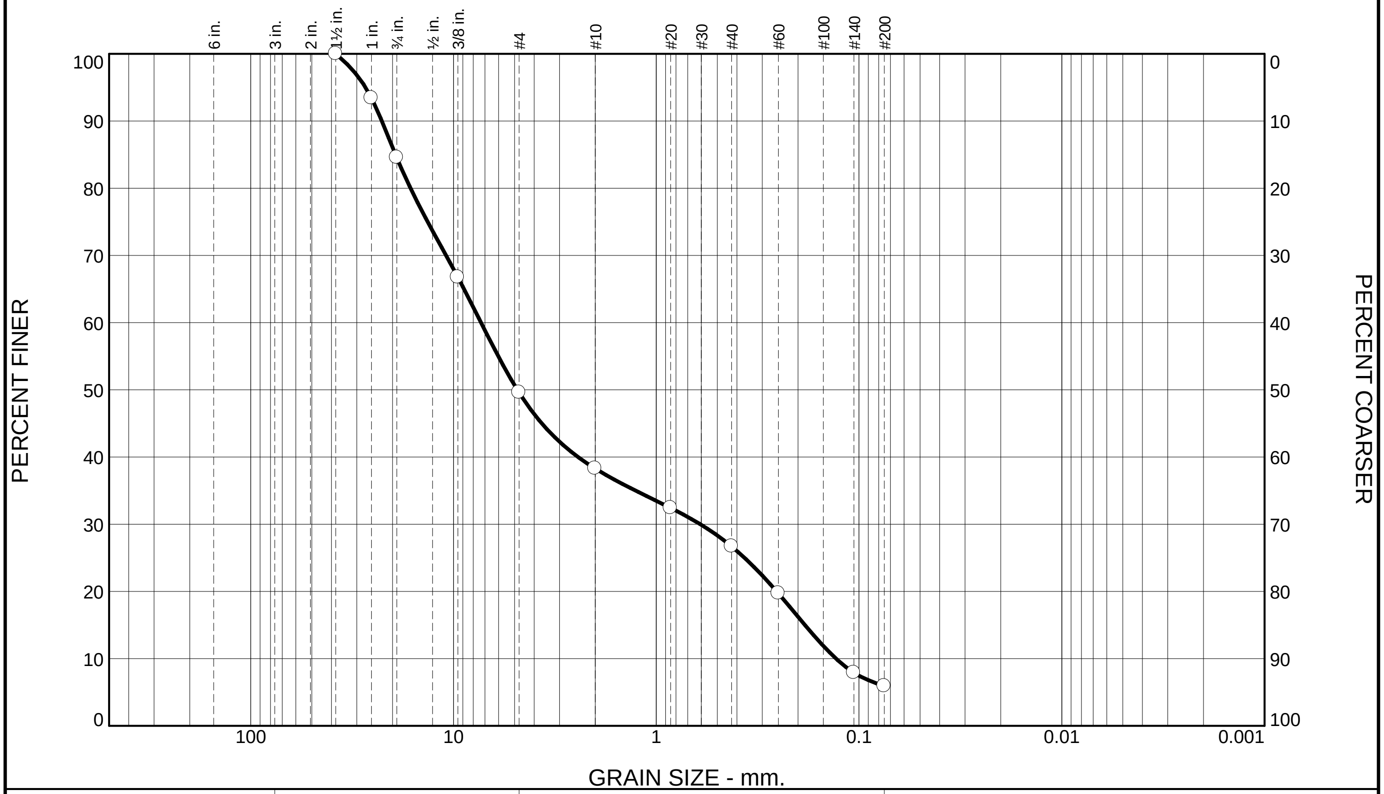
Remarks

Source of Sample: BH-151 **Depth:** 111
Sample Number: 22 **Date:** 10-7-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	15	35	12	11	21	6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	93		
3/4	85		
3/8	67		
#4	50		
#10	38		
#20	32		
#40	27		
#60	20		
#140	8		
#200	5.9		

* (no specification provided)

Soil Description

Grayish brown poorly graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 22.5732	D_{85}= 19.3265	D_{60}= 7.3228
D_{50}= 4.8465	D_{30}= 0.6071	D_{15}= 0.1849
D_{10}= 0.1299	C_u= 56.38	C_c= 0.39

Classification

USCS= GP-GM AASHTO=

Remarks

Source of Sample: BH-151 **Depth:** 116.5
Sample Number: 25

Date: 10-7-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

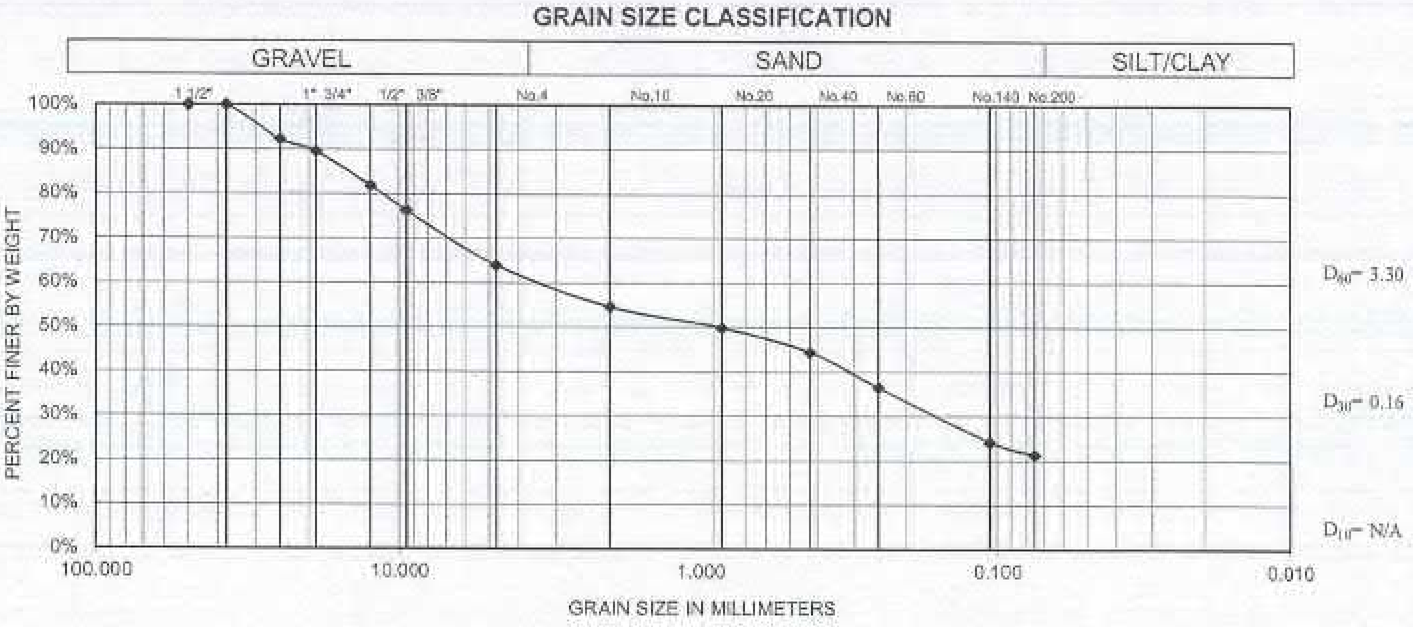
Tested By: SK **Checked By:** JH

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G970	Project #:	2019-127-GEO	
Sample #:	BH-152 #33	Depth:	108.5'	Reported By:	D. NGUYEN	Date Tested:	11/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)	0.0		0.0%	100.0%		Dry Wt + Tare	3749.3
1-in. (25.0-mm)	229.7		7.7%	92.3%		Tare Wt	772.4
3/4-in. (19.0-mm)	312.3		10.5%	89.5%		Dry Wt of Soil	2976.9
1/2-in. (12.5-mm)	540.1		18.1%	81.9%			
3/8-in. (9.5-mm)	706.5		23.7%	76.3%			
No. 4 (4.75-mm)	1073.7		36.1%	63.9%		**Gravel**	**36.1%**
No. 10 (2.00mm)	1352.3		45.4%	54.6%			
No.20 (850 - μm)	1492.1		50.1%	49.9%		**Sand**	**42.6%**
No.40 (425 - μm)	1656.6		55.6%	44.4%			
No.60 (250 - μm)	1892.1		63.6%	36.4%		**Fines**	**21.3%**
No.140 (106 - μm)	2257.3		75.8%	24.2%			
No.200 (75 - μm)	2341.4		78.7%	21.3%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	2976.9						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-152 #33	108.5'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

PARIKH CONSULTANTS, INC.

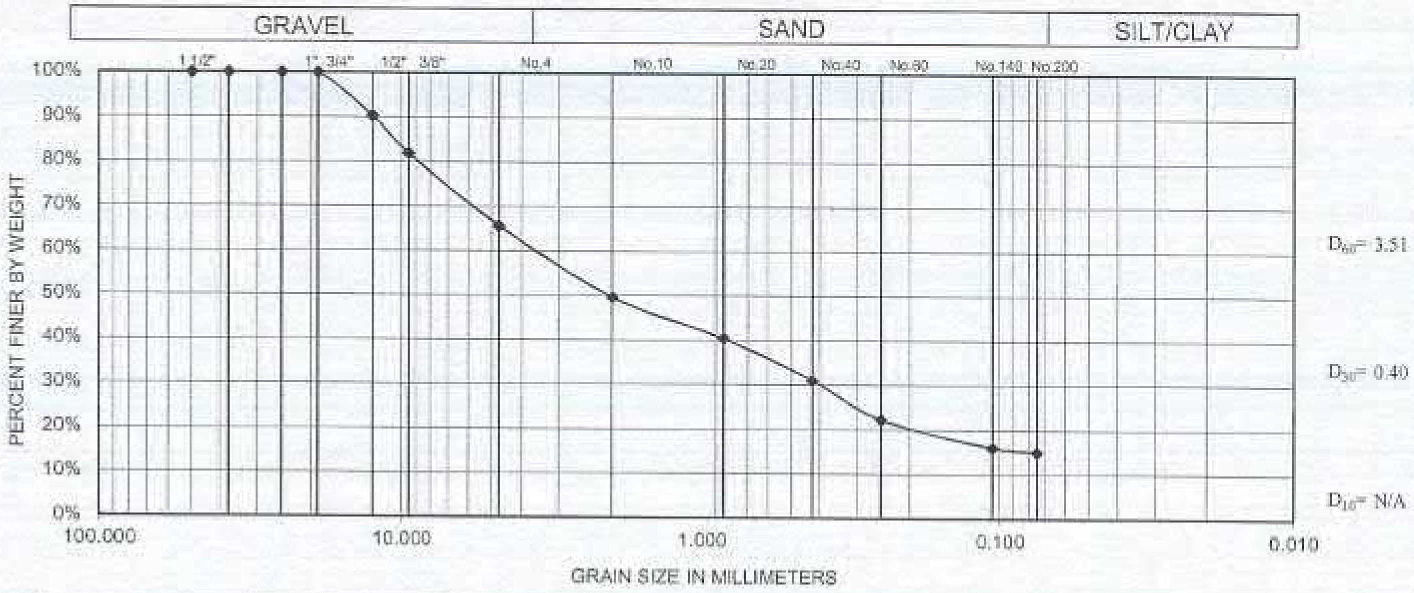
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-127-GEO
Sample #:	BH-153 # 25 Depth: 93.5'	Reported By:	D. NGUYEN	Date Tested:	11/18/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	1008.4
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.2
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	898.2
1/2-in. (12.5-mm)	87.1		9.7%	90.3%			
3/8-in. (9.5-mm)	162.6		18.1%	81.9%			
No. 4 (4.75-mm)	309.1		34.4%	65.6%		**Gravel**	**34.4%**
No. 10 (2.00mm)	452.9		50.4%	49.6%			
No.20 (850 - µm)	535.7		59.6%	40.4%		**Sand**	**50.6%**
No.40 (425 - µm)	620.0		69.0%	31.0%			
No.60 (250 - µm)	698.7		77.8%	22.2%		**Fines**	**15.0%**
No.140 (106 - µm)	754.5		84.0%	16.0%			
No.200 (75 - µm)	763.2		85.0%	15.0%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	898.2						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-153 # 25	93.5'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

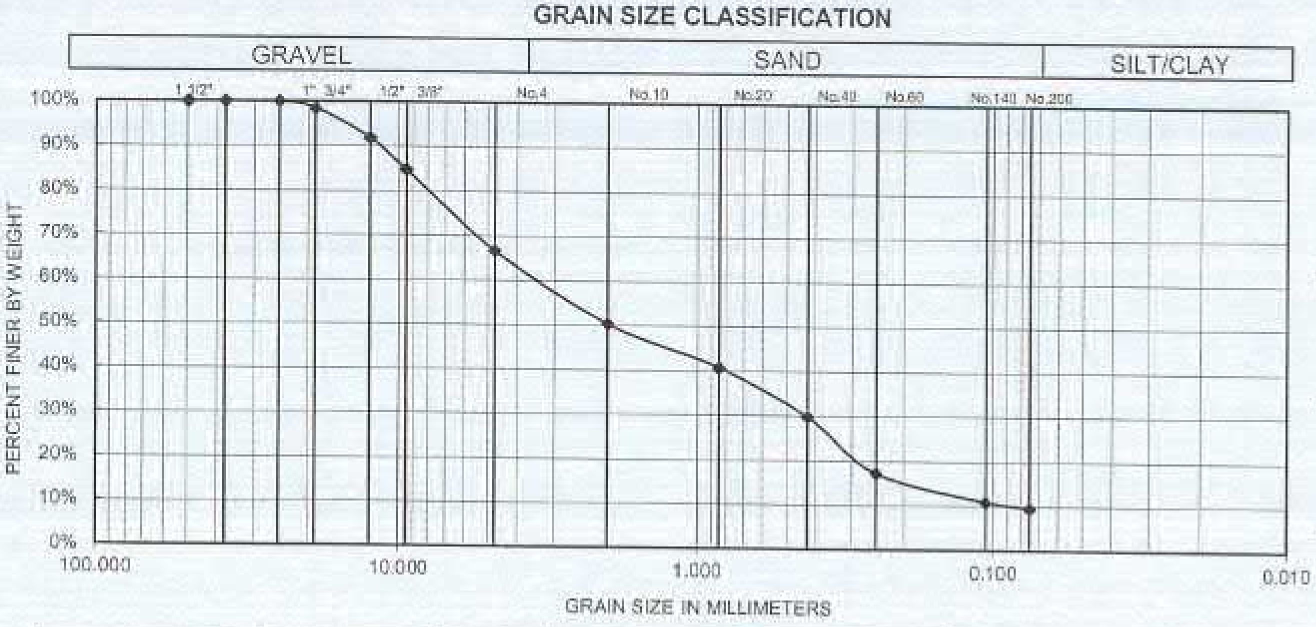
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY			Lab #	G970	Project #:	2019-127-GEO
Sample #:	BH-153 #27,28,29A,29B	Depth:	96'-99.4'	Reported By:	D. NGUYEN	Date Tested:	11/18/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	2161.0
1-in. (25.0-mm)	0.0		0.0%	100.0%		Tare Wt	102.9
3/4-in. (19.0-mm)	29.4		1.4%	98.6%		Dry Wt of Soil	2058.1
1/2-in. (12.5-mm)	167.0		8.1%	91.9%			
3/8-in. (9.5-mm)	312.6		15.2%	84.8%			
No. 4 (4.75-mm)	687.8		33.4%	66.6%		**Gravel**	**33.4%**
No. 10 (2.00mm)	1022.2		49.7%	50.3%			
No.20 (850 - µm)	1220.3		59.3%	40.7%		**Sand**	**57.0%**
No.40 (425 - µm)	1445.7		70.2%	29.8%			
No.60 (250 - µm)	1704.5		82.8%	17.2%		**Fines**	**9.6%**
No.140 (106 - µm)	1833.1		89.1%	10.9%			
No.200 (75 - µm)	1860.4		90.4%	9.6%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	2058.1						



D_{60}= 3.35

D_{30}= 0.43

D_{10}= 0.08

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-153 #27,28,29A,29B	96'-99.4'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	40.25	0.67

PARIKH CONSULTANTS, INC.

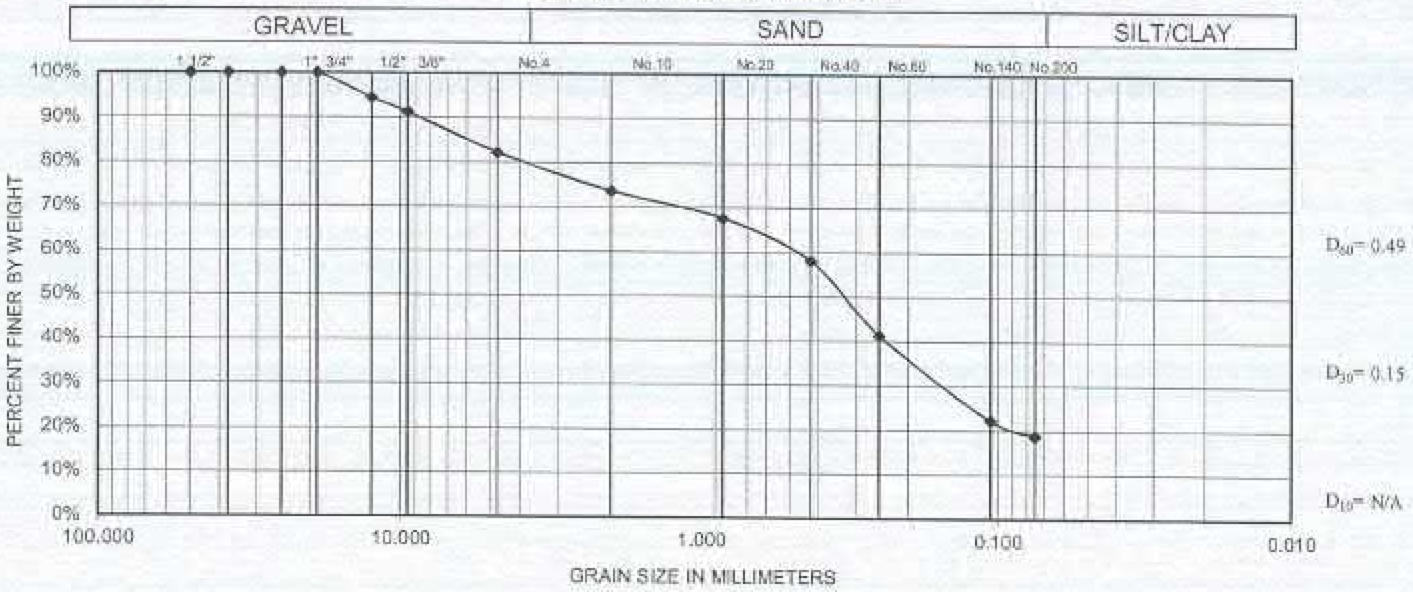
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY			Lab #	G970	Project #:	2019-127-GEO
Sample #:	BH-153 #45	Depth:	123'	Reported By:	D. NGUYEN	Date Tested:	11/18/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	3606.5
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	772.3
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	2834.2
1/2-in. (12.5-mm)	158.4		5.6%	94.4%			
3/8-in. (9.5-mm)	248.3		8.8%	91.2%			
No. 4 (4.75-mm)	505.8		17.8%	82.2%		**Gravel**	**17.8%**
No. 10 (2.00mm)	747.7		26.4%	73.6%			
No.20 (850 - µm)	917.9		32.4%	67.6%		**Sand**	**63.5%**
No.40 (425 - µm)	1191.0		42.0%	58.0%			
No.60 (250 - µm)	1665.3		58.8%	41.2%		**Fines**	**18.7%**
No.140 (106 - µm)	2204.5		77.8%	22.2%			
No.200 (75 - µm)	2304.6		81.3%	18.7%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	2834.2						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-153 #45	123'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

PARIKH CONSULTANTS, INC.

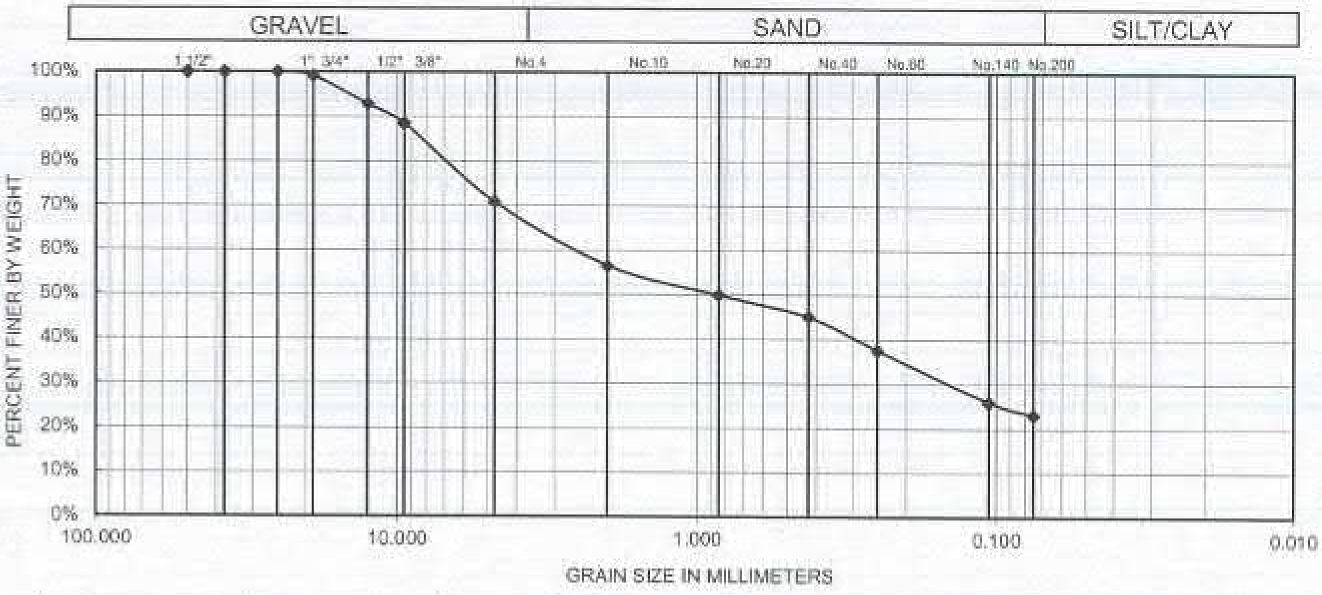
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G970	Project #:	2019-131-T02	
Sample #:	BH-154 #7 &8B	Depth:	60.5'-68'	Reported By:	D. NGUYEN	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	1612.6
1-in. (25.0-mm)	0.0		0.0%	100.0%		Tare Wt	103.2
3/4-in. (19.0-mm)	12.8		0.8%	99.2%		Dry Wt of Soil	1509.4
1/2-in. (12.5-mm)	108.6		7.2%	92.8%			
3/8-in. (9.5-mm)	174.0		11.5%	88.5%			
No. 4 (4.75-mm)	440.2		29.2%	70.8%		**Gravel**	**29.2%**
No. 10 (2.00mm)	656.8		43.5%	56.5%			
No.20 (850 - µm)	756.4		50.1%	49.9%		**Sand**	**47.7%**
No.40 (425 - µm)	830.2		55.0%	45.0%			
No.60 (250 - µm)	943.7		62.5%	37.5%		**Fines**	**23.1%**
No.140 (106 - µm)	1119.1		74.1%	25.9%			
No.200 (75 - µm)	1160.5		76.9%	23.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	1509.4						

GRAIN SIZE CLASSIFICATION



D_{60}= 2.47

D_{30}= 0.14

D_{10}= N/A

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-154 #7 &8B	60.5'-68'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

PARIKH CONSULTANTS, INC.

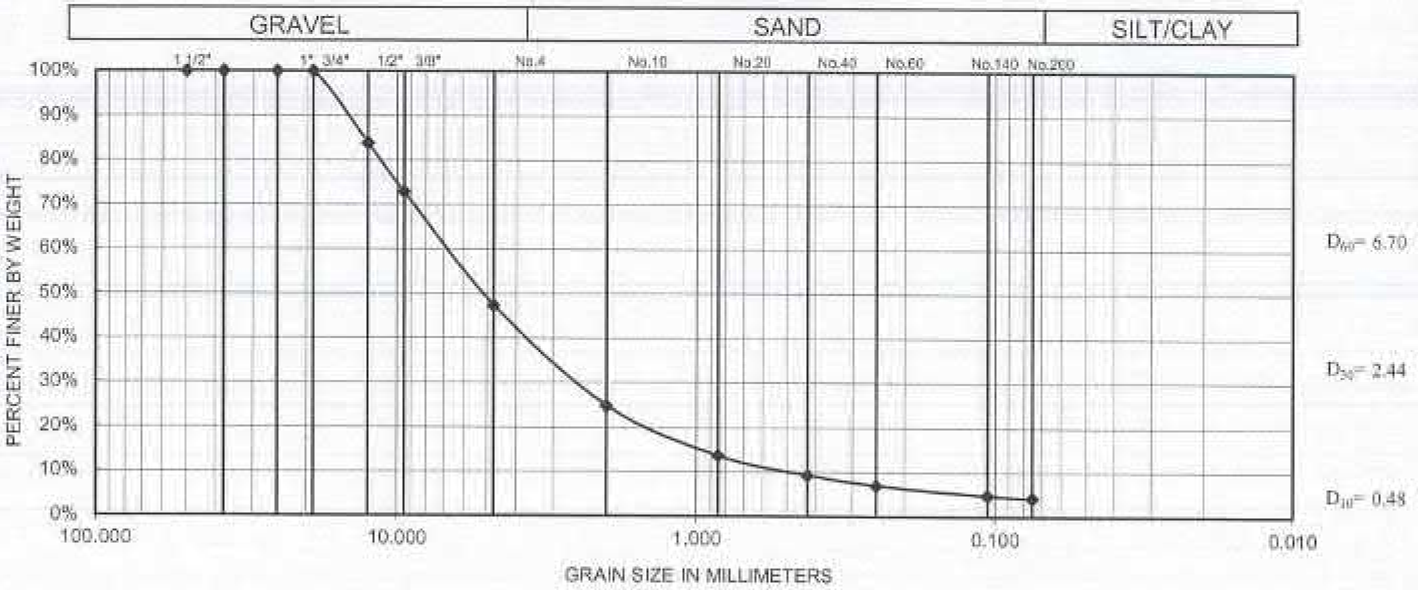
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-154 #14B Depth: 77'	Reported By:	D. NGUYEN	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	553.8
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	109.9
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	443.9
1/2-in. (12.5-mm)	71.4		16.1%	83.9%			
3/8-in. (9.5-mm)	120.6		27.2%	72.8%			
No. 4 (4.75-mm)	233.8		52.7%	47.3%		**Gravel**	**52.7%**
No. 10 (2.00mm)	333.7		75.2%	24.8%			
No.20 (850 - µm)	383.5		86.4%	13.6%		**Sand**	**43.1%**
No.40 (425 - µm)	402.7		90.7%	9.3%			
No.60 (250 - µm)	413.0		93.0%	7.0%		**Fines**	**4.2%**
No.140 (106 - µm)	422.9		95.3%	4.7%			
No.200 (75 - µm)	425.3		95.8%	4.2%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	443.9						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-154 #14B	77'	GW	WELL-GRADED GRAVEL WITH SAND	14.06	1.86

PARIKH CONSULTANTS, INC.

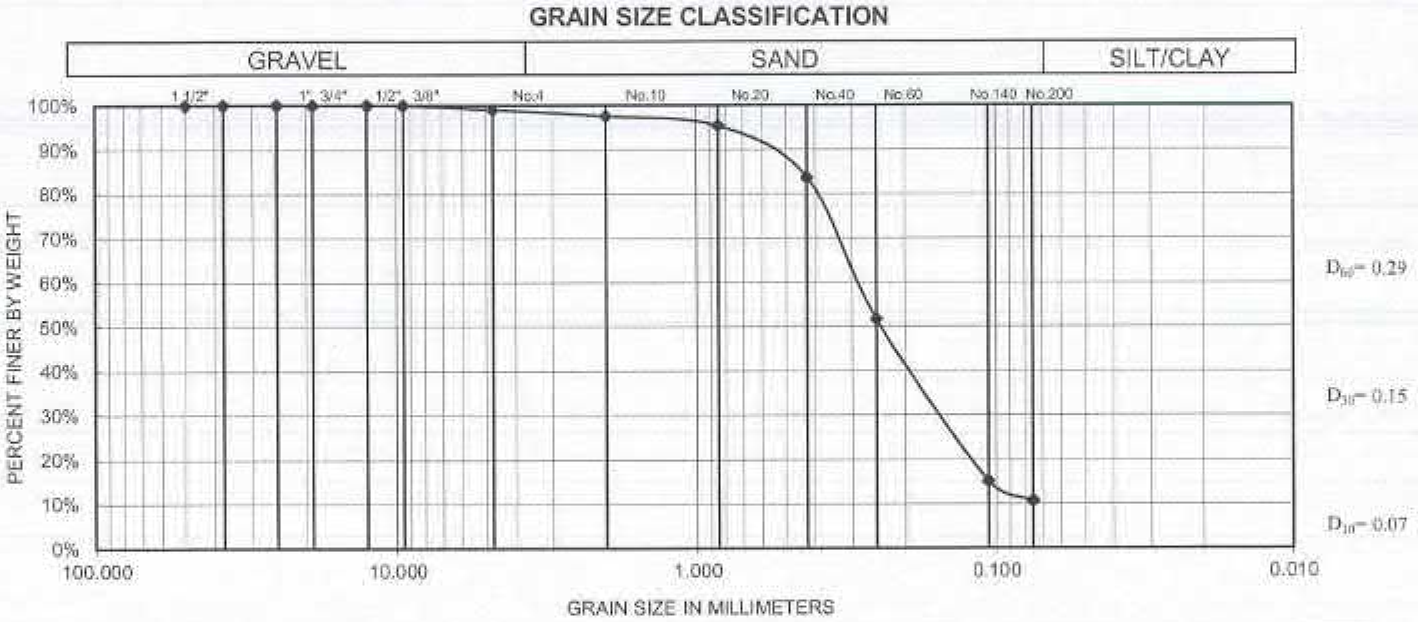
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-154 # 30B Depth: 103.5'	Reported By:	D. NGUYEN	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	450.0
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.0
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	340.0
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)	0.0		0.0%	100.0%			
No. 4 (4.75-mm)	3.2		0.9%	99.1%		**Gravel**	**0.9%**
No. 10 (2.00mm)	8.3		2.4%	97.6%			
No.20 (850 - µm)	15.5		4.6%	95.4%		**Sand**	**88.3%**
No.40 (425 - µm)	55.3		16.3%	83.7%			
No.60 (250 - µm)	164.5		48.4%	51.6%		**Fines**	**10.7%**
No.140 (106 - µm)	288.8		84.9%	15.1%			
No.200 (75 - µm)	303.5		89.3%	10.7%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	340.0						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-154 # 30B	103.5'	SP-SM	POORLY-GRADED SAND WITH SILT	4.06	1.12

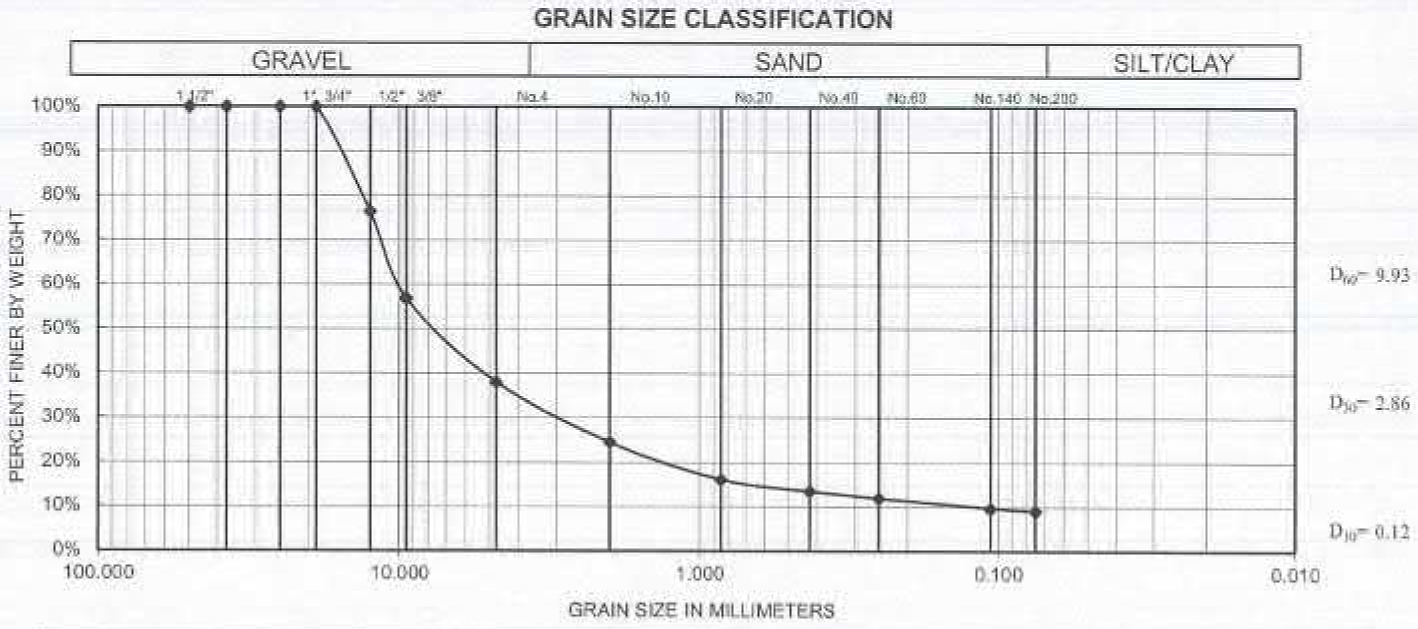
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G970	Project #:	2019-131-T02	
Sample #:	BH-154 #41B	Depth:	118'	Reported By:	D. NGUYEN	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	874.0
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.8
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	790.2
1/2-in. (12.5-mm)	186.1		23.6%	76.4%			
3/8-in. (9.5-mm)	341.4		43.2%	56.8%			
No. 4 (4.75-mm)	490.6		62.1%	37.9%		**Gravel**	**62.1%**
No. 10 (2.00mm)	596.9		75.5%	24.5%			
No.20 (850 - µm)	662.6		83.8%	16.2%		**Sand**	**28.9%**
No.40 (425 - µm)	683.1		86.4%	13.6%			
No.60 (250 - µm)	695.8		88.0%	12.0%		**Fines**	**9.0%**
No.140 (106 - µm)	713.5		90.3%	9.7%			
No.200 (75 - µm)	719.3		91.0%	9.0%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	790.2						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-154 #41B	118'	GP-GM	POORLY-GRADED GRAVEL WITH SILT AND SAND	83.78	6.92

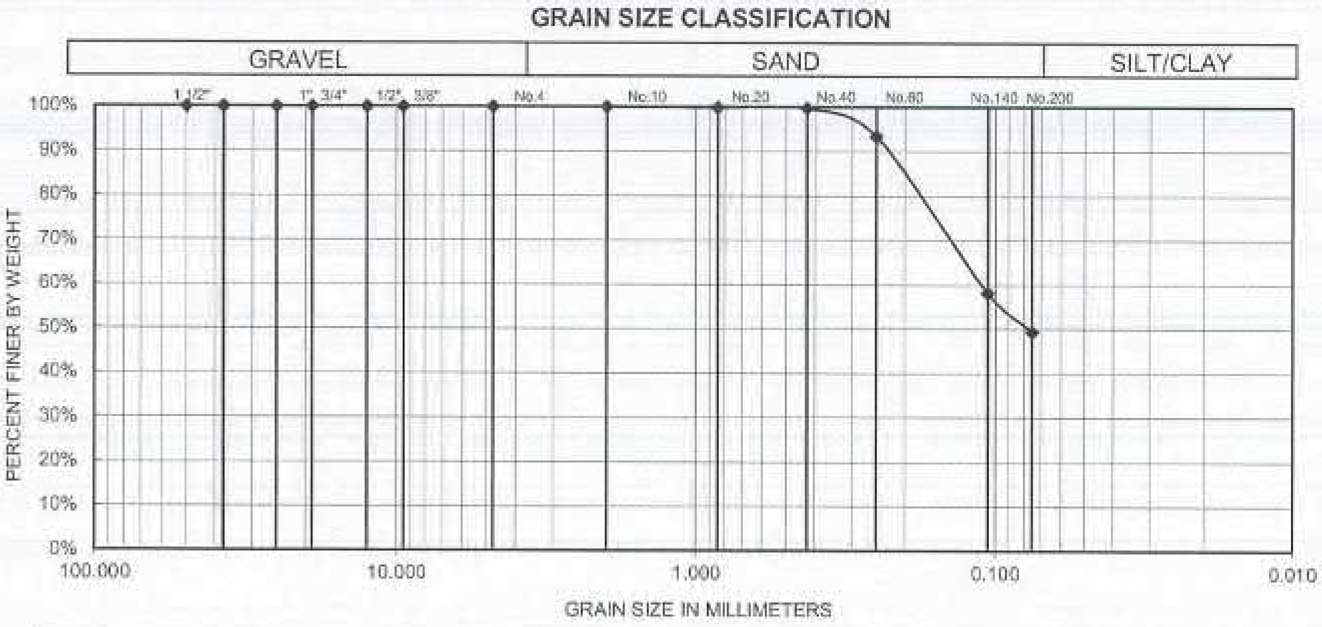
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-154 #51 Depth: 142'	Reported By:	D. NGUYEN	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	307.9
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.1
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	222.8
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)			0.0%	100.0%			
No. 4 (4.75-mm)			0.0%	100.0%		**Gravel**	**0.0%**
No. 10 (2.00mm)	0.0		0.0%	100.0%			
No.20 (850 - µm)	0.2		0.1%	99.9%		**Sand**	**50.6%**
No.40 (425 - µm)	0.6		0.3%	99.7%			
No.60 (250 - µm)	14.8		6.6%	93.4%		**Fines**	**49.4%**
No.140 (106 - µm)	93.3		41.9%	58.1%			
No.200 (75 - µm)	112.7		50.6%	49.4%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	222.8						



D_{60}= 0.11

D_{30}= N/A

D_{10}= N/A

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-154 #51	142'	SM	SILTY SAND	N/A	N/A

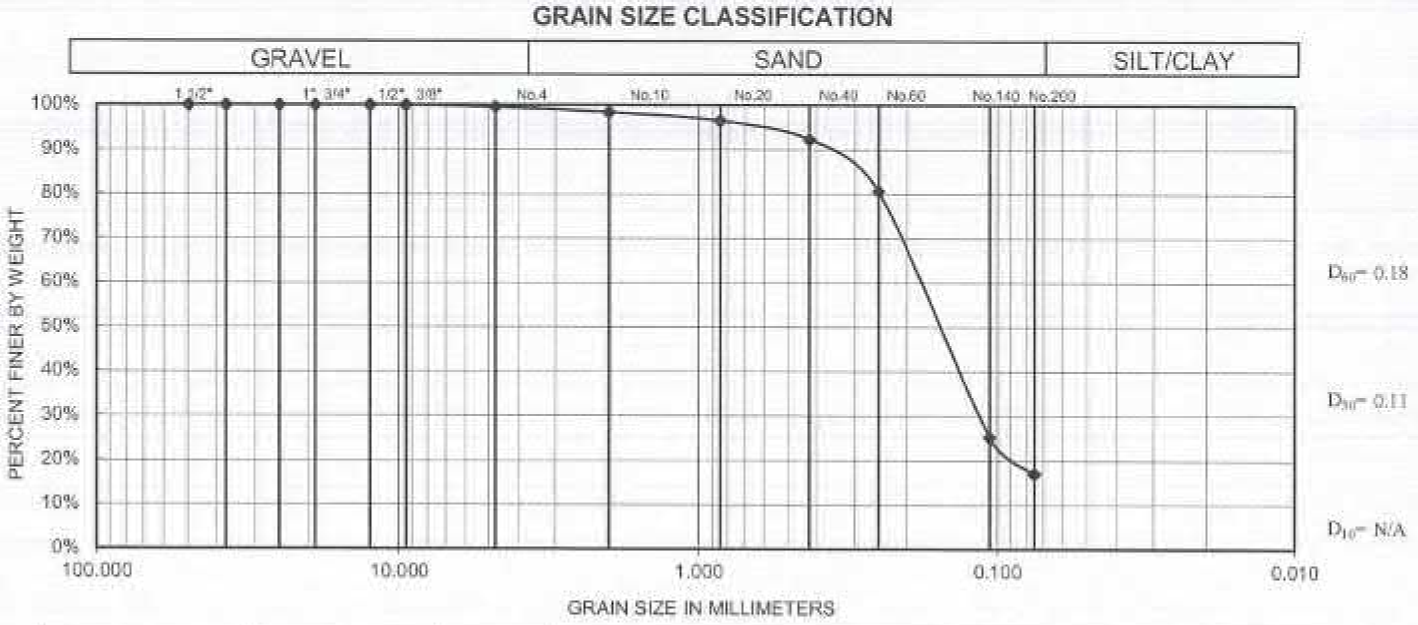
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-154 #54 Depth: 155'	Reported By:	D. NGUYEN	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	372.7
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.8
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	287.9
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)	0.0		0.0%	100.0%			
No. 4 (4.75-mm)	1.2		0.4%	99.6%		**Gravel**	**0.4%**
No. 10 (2.00mm)	4.4		1.5%	98.5%			
No.20 (850 - μm)	9.9		3.4%	96.6%		**Sand**	**82.6%**
No.40 (425 - μm)	22.1		7.7%	92.3%			
No.60 (250 - μm)	55.8		19.4%	80.6%		**Fines**	**17.0%**
No.140 (106 - μm)	215.5		74.9%	25.1%			
No.200 (75 - μm)	239.1		83.0%	17.0%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	287.9						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-154 #54	155'	SM	SILTY SAND	N/A	N/A

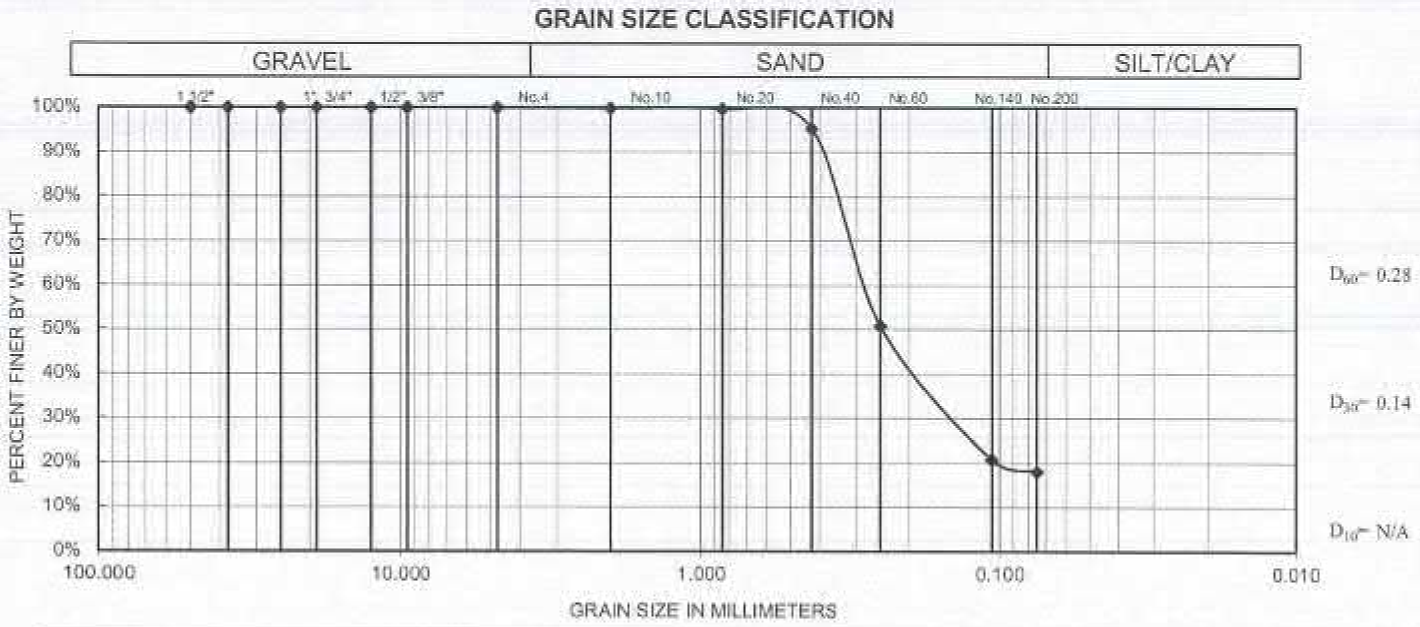
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-154 #59B Depth: 180'	Reported By:	D. NGUYEN	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	334.0
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.1
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	248.9
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)			0.0%	100.0%			
No. 4 (4.75-mm)	0.0		0.0%	100.0%		**Gravel**	**0.0%**
No. 10 (2.00mm)	0.2		0.1%	99.9%			
No.20 (850 - μm)	0.7		0.3%	99.7%		**Sand**	**81.9%**
No.40 (425 - μm)	11.5		4.6%	95.4%			
No.60 (250 - μm)	122.4		49.2%	50.8%		**Fines**	**18.1%**
No.140 (106 - μm)	197.2		79.2%	20.8%			
No.200 (75 - μm)	203.9		81.9%	18.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	248.9						



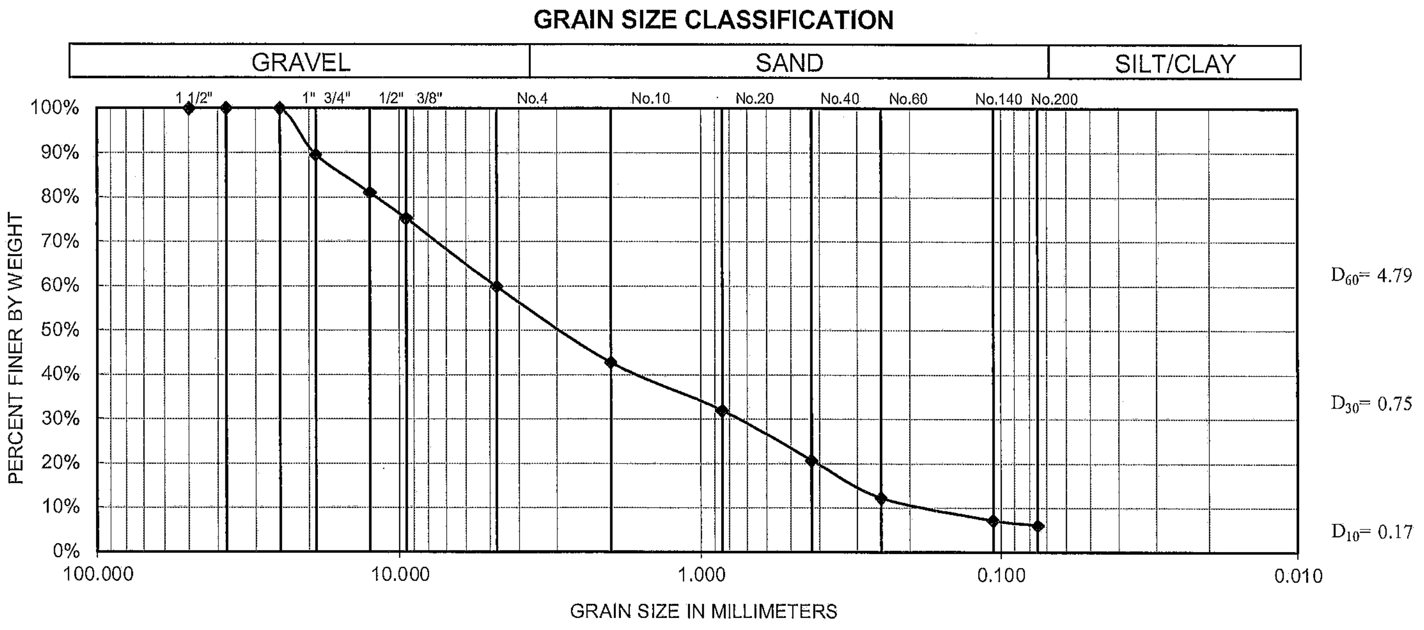
SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-154 #59B	180'	SM	SILTY SAND	N/A	N/A

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T01
Sample #:	BH-155 #28A,30 Depth: 102.5'	Reported By:	D. NGUYEN	Date Tested:	1/21/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	1525.3
1-in. (25.0-mm)	0.0		0.0%	100.0%		Tare Wt	103.4
3/4-in. (19.0-mm)	147.8		10.4%	89.6%		Dry Wt of Soil	1421.9
1/2-in. (12.5-mm)	269.9		19.0%	81.0%			
3/8-in. (9.5-mm)	352.9		24.8%	75.2%			
No. 4 (4.75-mm)	571.4		40.2%	59.8%		**Gravel**	**40.2%**
No. 10 (2.00mm)	814.0		57.2%	42.8%			
No.20 (850 - µm)	967.5		68.0%	32.0%		**Sand**	**53.7%**
No.40 (425 - µm)	1127.5		79.3%	20.7%			
No.60 (250 - µm)	1248.0		87.8%	12.2%		**Fines**	**6.1%**
No.140 (106 - µm)	1319.5		92.8%	7.2%			
No.200 (75 - µm)	1335.2		93.9%	6.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	1421.9						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-155 #28A,30	102.5'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	28.04	0.69

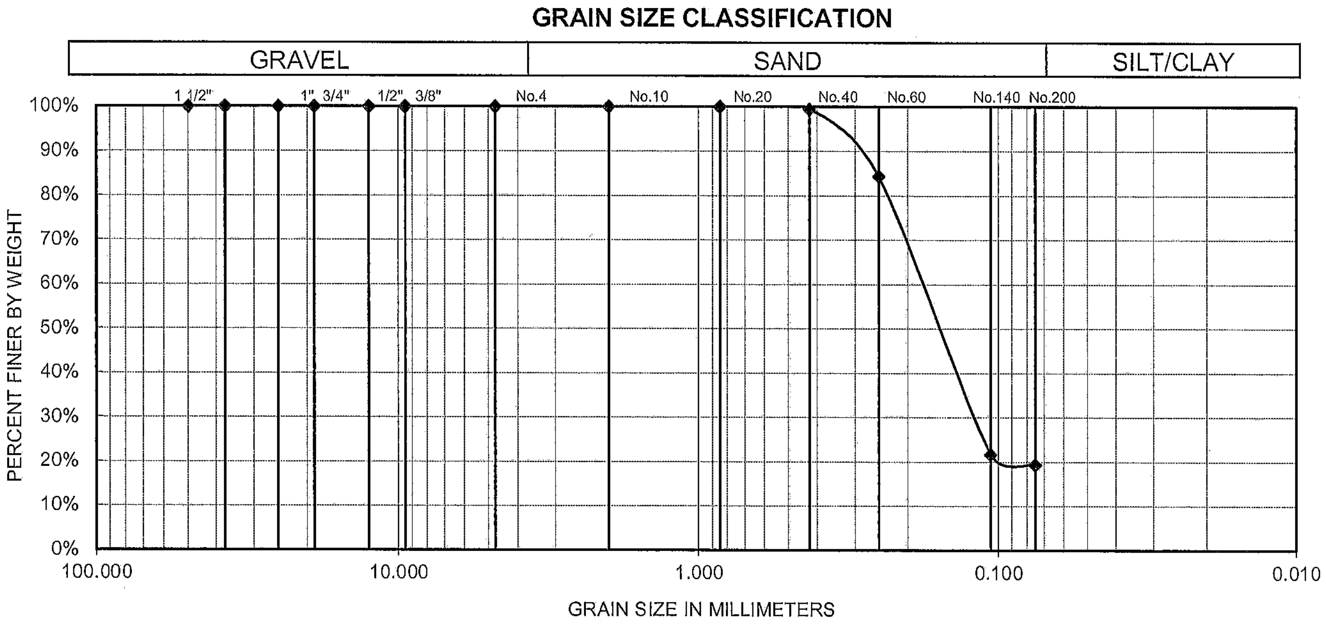
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-156 #22A Depth: 103'	Reported By:	Nasir Ahmad	Date Tested:	12/11/2019

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	222.63
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.18
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	138.45
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)			0.0%	100.0%			
No. 4 (4.75-mm)			0.0%	100.0%		**Gravel**	**0.0%**
No. 10 (2.00mm)			0.0%	100.0%			
No.20 (850 - µm)			0.0%	100.0%		**Sand**	**80.6%**
No.40 (425 - µm)	0.69		0.5%	99.5%			
No.60 (250 - µm)	21.65		15.6%	84.4%		**Fines**	**19.4%**
No.140 (106 - µm)	108.48		78.4%	21.6%			
No.200 (75 - µm)	111.57		80.6%	19.4%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	138.45						



D_{60}= 0.18

D_{30}= 0.12

D_{10}= N/A

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-156 #22A	103'	SM	SILTY SAND	N/A	N/A

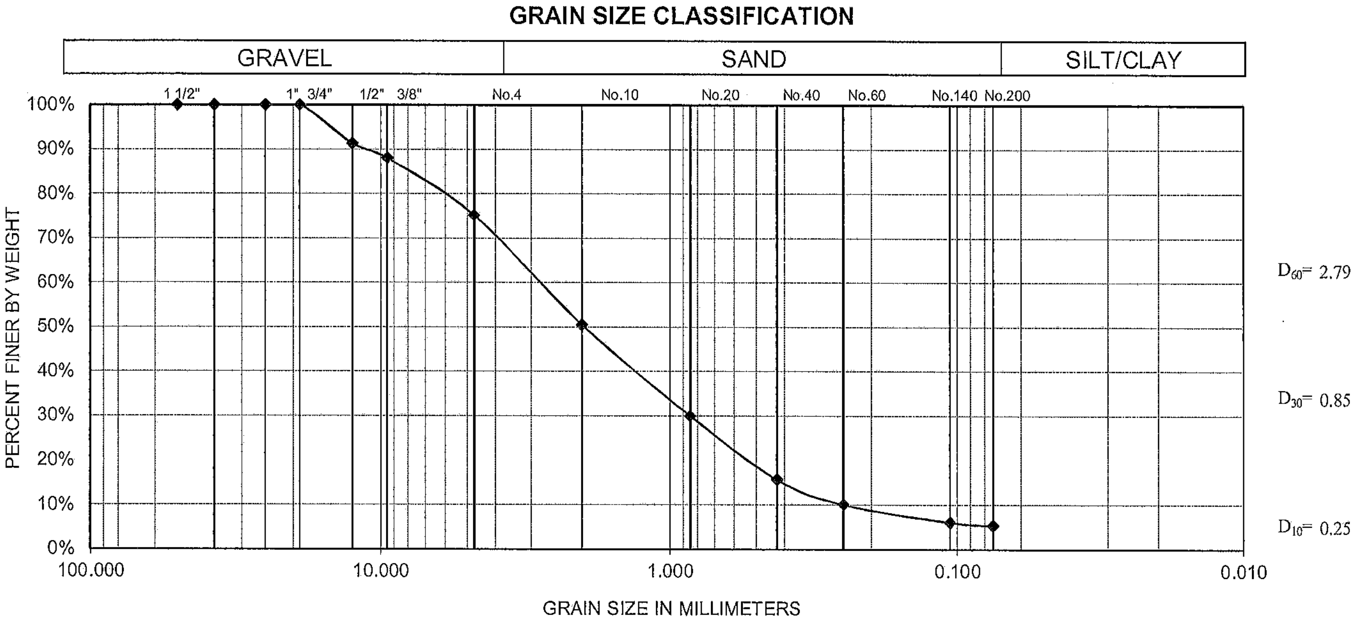
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-156 #32B Depth: 118'	Reported By:	D. Nguyen	Date Tested:	02/24/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	370.55
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.39
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	286.16
1/2-in. (12.5-mm)	24.83		8.7%	91.3%			
3/8-in. (9.5-mm)	34.21		12.0%	88.0%			
No. 4 (4.75-mm)	70.94		24.8%	75.2%		**Gravel**	**24.8%**
No. 10 (2.00mm)	141.59		49.5%	50.5%			
No.20 (850 - µm)	200.33		70.0%	30.0%		**Sand**	**69.9%**
No.40 (425 - µm)	241.30		84.3%	15.7%			
No.60 (250 - µm)	257.38		89.9%	10.1%		**Fines**	**5.3%**
No.140 (106 - µm)	268.75		93.9%	6.1%			
No.200 (75 - µm)	271.02		94.7%	5.3%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	286.16						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-156 #32B	118'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	11.29	1.05

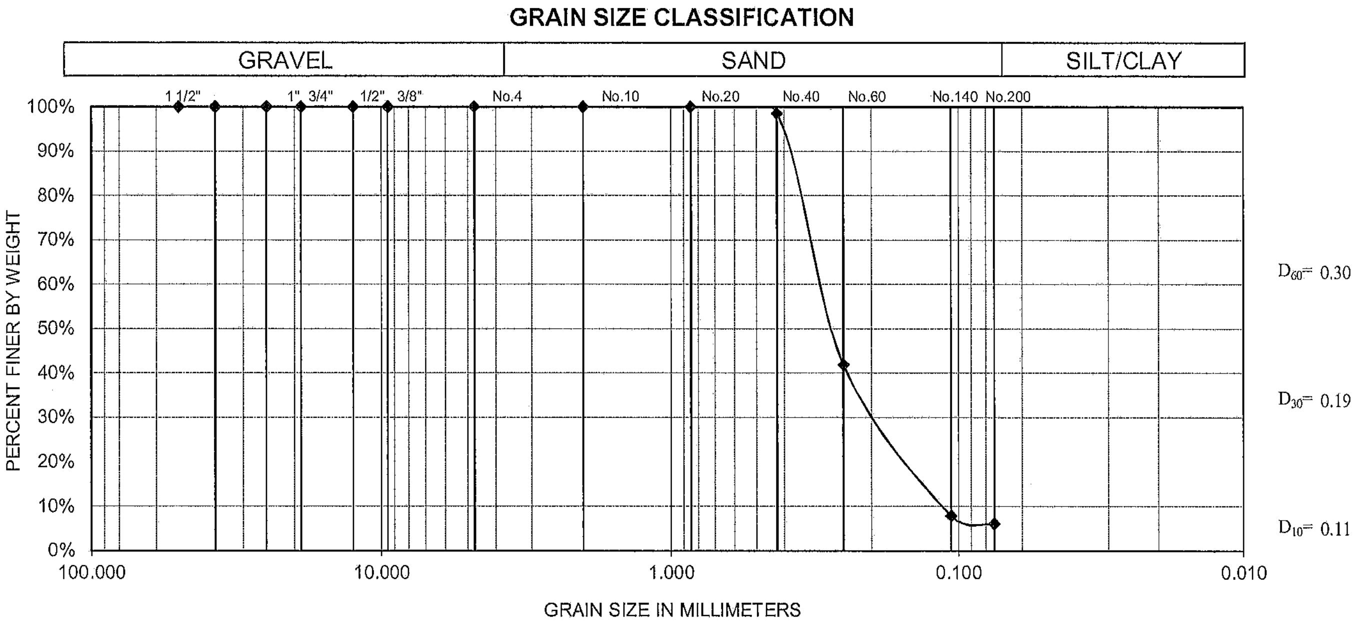
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-156 #43B Depth: 136.5'	Reported By:	D. Nguyen	Date Tested:	02/24/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	302.50
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.43
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	219.07
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)			0.0%	100.0%			
No. 4 (4.75-mm)			0.0%	100.0%		**Gravel**	**0.0%**
No. 10 (2.00mm)	0.0		0.0%	100.0%			
No.20 (850 - μm)	0.15		0.1%	99.9%		**Sand**	**93.9%**
No.40 (425 - μm)	3.34		1.5%	98.5%			
No.60 (250 - μm)	127.25		58.1%	41.9%		**Fines**	**6.1%**
No.140 (106 - μm)	201.80		92.1%	7.9%			
No.200 (75 - μm)	205.75		93.9%	6.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	219.07						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-156 #43B	136.5'	SP-SM	POORLY-GRADED SAND WITH SILT	2.65	1.03

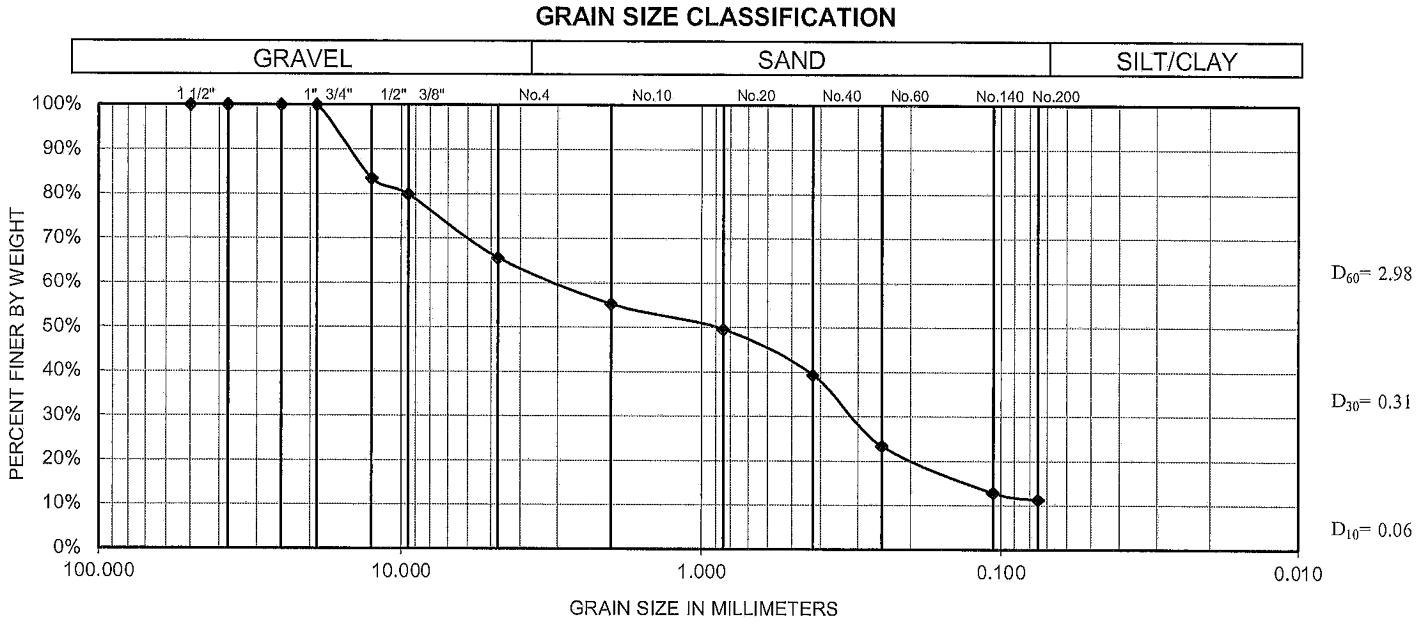
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-157 #8A Depth: 75.5'	Reported By:	D. NGUYEN	Date Tested:	01/29/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	655.65
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	82.92
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	572.73
1/2-in. (12.5-mm)	94.75		16.5%	83.5%			
3/8-in. (9.5-mm)	115.48		20.2%	79.8%			
No. 4 (4.75-mm)	197.01		34.4%	65.6%		**Gravel**	**34.4%**
No. 10 (2.00mm)	256.33		44.8%	55.2%			
No.20 (850 - µm)	288.85		50.4%	49.6%		**Sand**	**54.4%**
No.40 (425 - µm)	347.25		60.6%	39.4%			
No.60 (250 - µm)	439.15		76.7%	23.3%		**Fines**	**11.2%**
No.140 (106 - µm)	499.20		87.2%	12.8%			
No.200 (75 - µm)	508.51		88.8%	11.2%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	572.73						



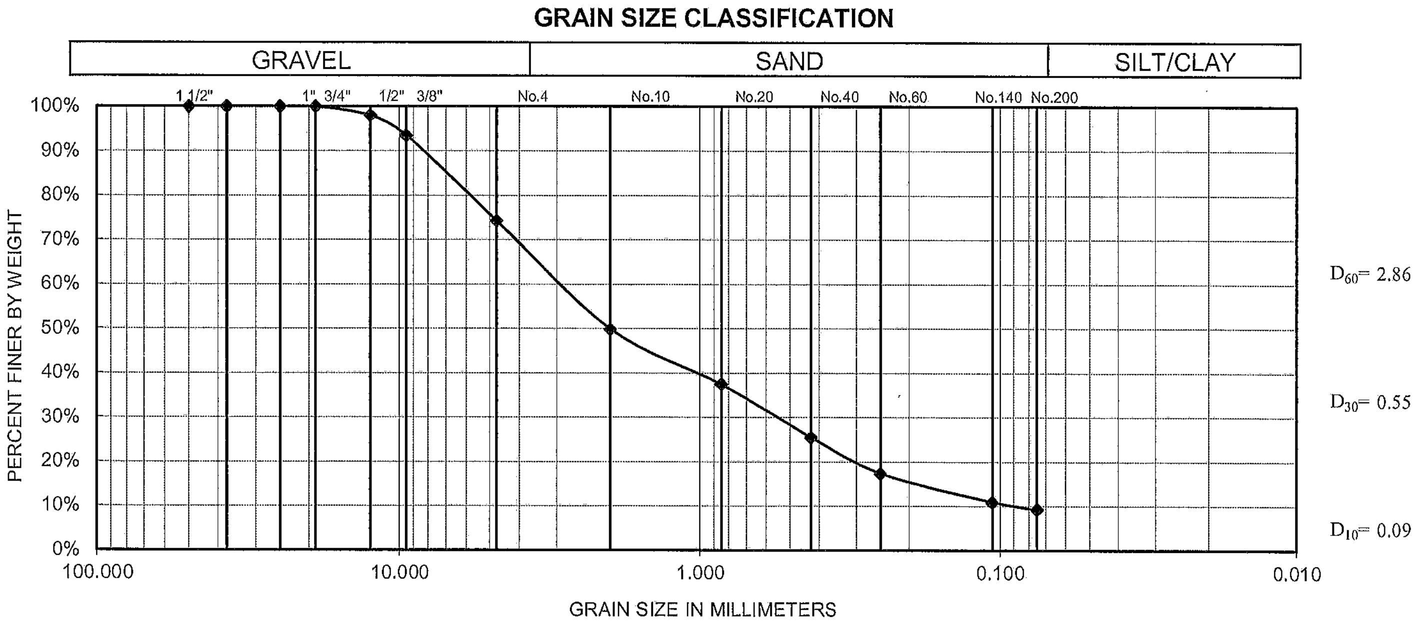
SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-157 #8A	75.5'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	51.35	0.56

PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-157 #25A Depth: 123.25'	Reported By:	D. NGUYEN	Date Tested:	01/30/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	676.66
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.17
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	591.49
1/2-in. (12.5-mm)	11.87		2.0%	98.0%			
3/8-in. (9.5-mm)	38.24		6.5%	93.5%			
No. 4 (4.75-mm)	152.14		25.7%	74.3%		**Gravel**	**25.7%**
No. 10 (2.00mm)	296.62		50.1%	49.9%			
No.20 (850 - μm)	370.09		62.6%	37.4%		**Sand**	**65.1%**
No.40 (425 - μm)	440.63		74.5%	25.5%			
No.60 (250 - μm)	488.71		82.6%	17.4%		**Fines**	**9.2%**
No.140 (106 - μm)	526.97		89.1%	10.9%			
No.200 (75 - μm)	536.91		90.8%	9.2%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	591.49						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-157 #25A	123.25'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	32.58	1.21

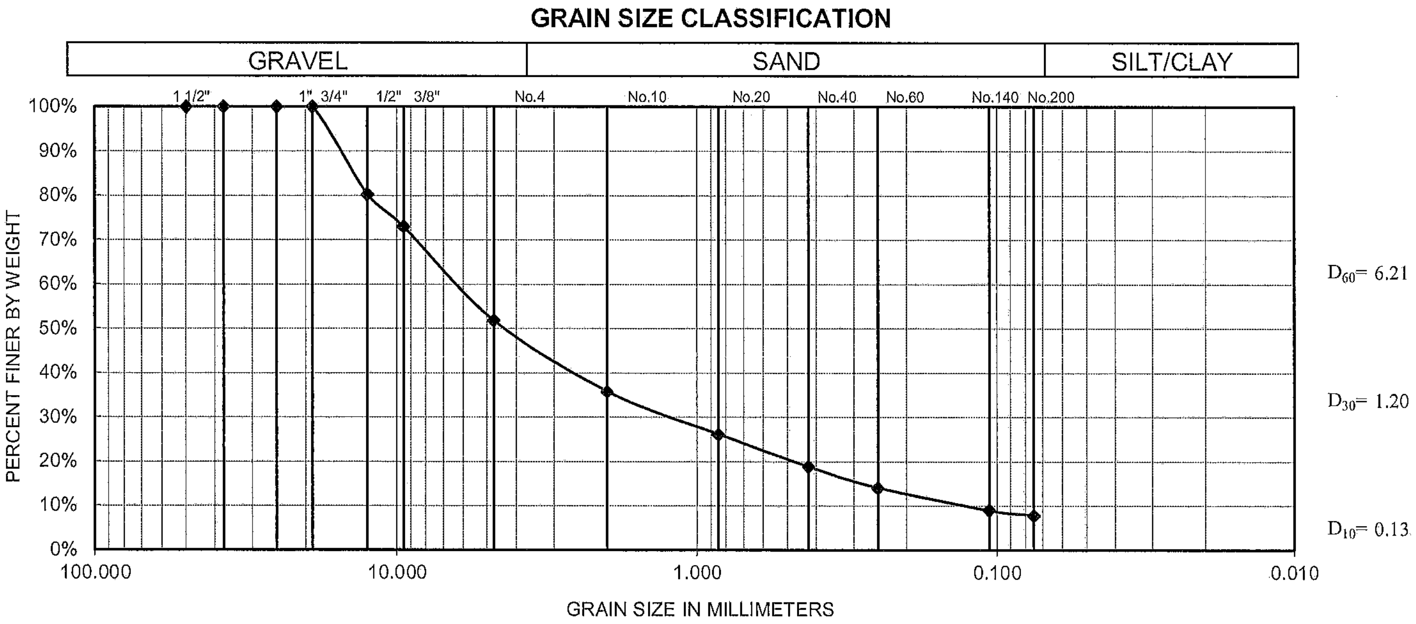
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-158 #3A Depth: 77'	Reported By:	D. NGUYEN	Date Tested:	02/03/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	1006.6
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.96
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	922.64
1/2-in. (12.5-mm)	181.78		19.7%	80.3%			
3/8-in. (9.5-mm)	249.39		27.0%	73.0%			
No. 4 (4.75-mm)	444.31		48.2%	51.8%		**Gravel**	**48.2%**
No. 10 (2.00mm)	592.46		64.2%	35.8%			
No.20 (850 - µm)	681.69		73.9%	26.1%		**Sand**	**44.0%**
No.40 (425 - µm)	749.5		81.2%	18.8%			
No.60 (250 - µm)	793.0		85.9%	14.1%		**Fines**	**7.9%**
No.140 (106 - µm)	840.0		91.0%	9.0%			
No.200 (75 - µm)	850.1		92.1%	7.9%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	922.64						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-158 #3A	77'	GW-GM	WELL-GRADED GRAVEL WITH SILT AND SAND	49.13	1.83

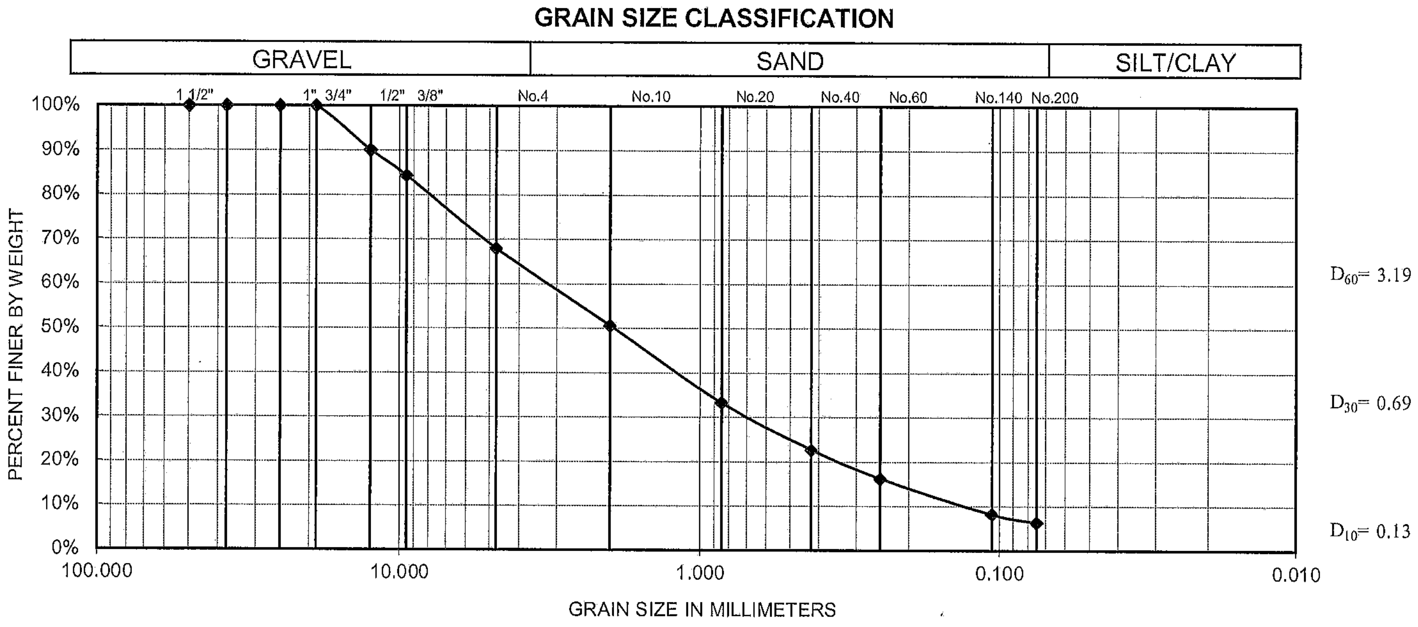
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-158 #17A Depth: 102.5'	Reported By:	D. NGUYEN	Date Tested:	02/05/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	663.92
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.35
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	580.57
1/2-in. (12.5-mm)	57.6		9.9%	90.1%			
3/8-in. (9.5-mm)	90.6		15.6%	84.4%			
No. 4 (4.75-mm)	186.1		32.1%	67.9%		**Gravel**	**32.1%**
No. 10 (2.00mm)	286.6		49.4%	50.6%			
No.20 (850 - μm)	387.8		66.8%	33.2%		**Sand**	**61.6%**
No.40 (425 - μm)	448.8		77.3%	22.7%			
No.60 (250 - μm)	486.3		83.8%	16.2%		**Fines**	**6.4%**
No.140 (106 - μm)	533.2		91.8%	8.2%			
No.200 (75 - μm)	543.6		93.6%	6.4%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	580.57						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-158 #17A	102.5'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	24.78	1.15

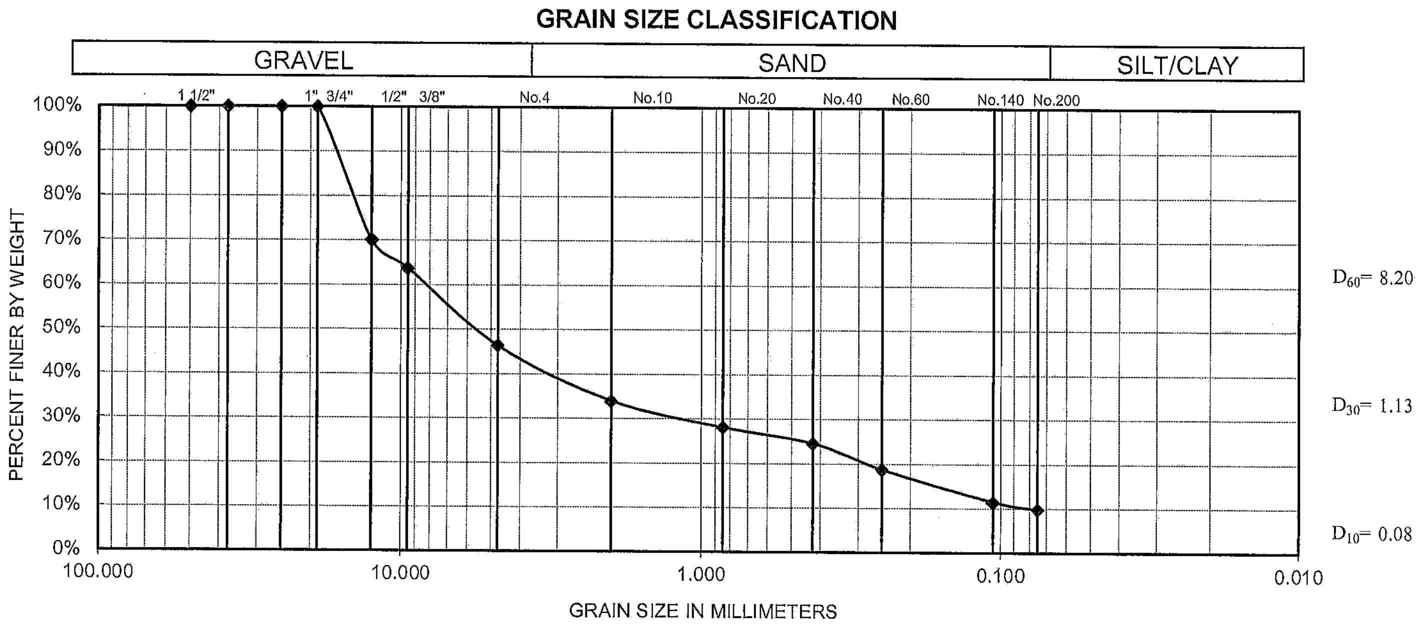
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-158 #20 Depth: 106.5'	Reported By:	D. NGUYEN	Date Tested:	02/03/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	667.28
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.06
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	583.22
1/2-in. (12.5-mm)	174.2		29.9%	70.1%			
3/8-in. (9.5-mm)	211.8		36.3%	63.7%			
No. 4 (4.75-mm)	313.1		53.7%	46.3%		**Gravel**	**53.7%**
No. 10 (2.00mm)	385.6		66.1%	33.9%			
No.20 (850 - µm)	419.4		71.9%	28.1%		**Sand**	**36.6%**
No.40 (425 - µm)	440.2		75.5%	24.5%			
No.60 (250 - µm)	474.2		81.3%	18.7%		**Fines**	**9.8%**
No.140 (106 - µm)	516.5		88.6%	11.4%			
No.200 (75 - µm)	526.3		90.2%	9.8%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	583.22						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-158 #20	106.5'	GW-GM	WELL-GRADED GRAVEL WITH SILT AND SAND	104.07	1.97

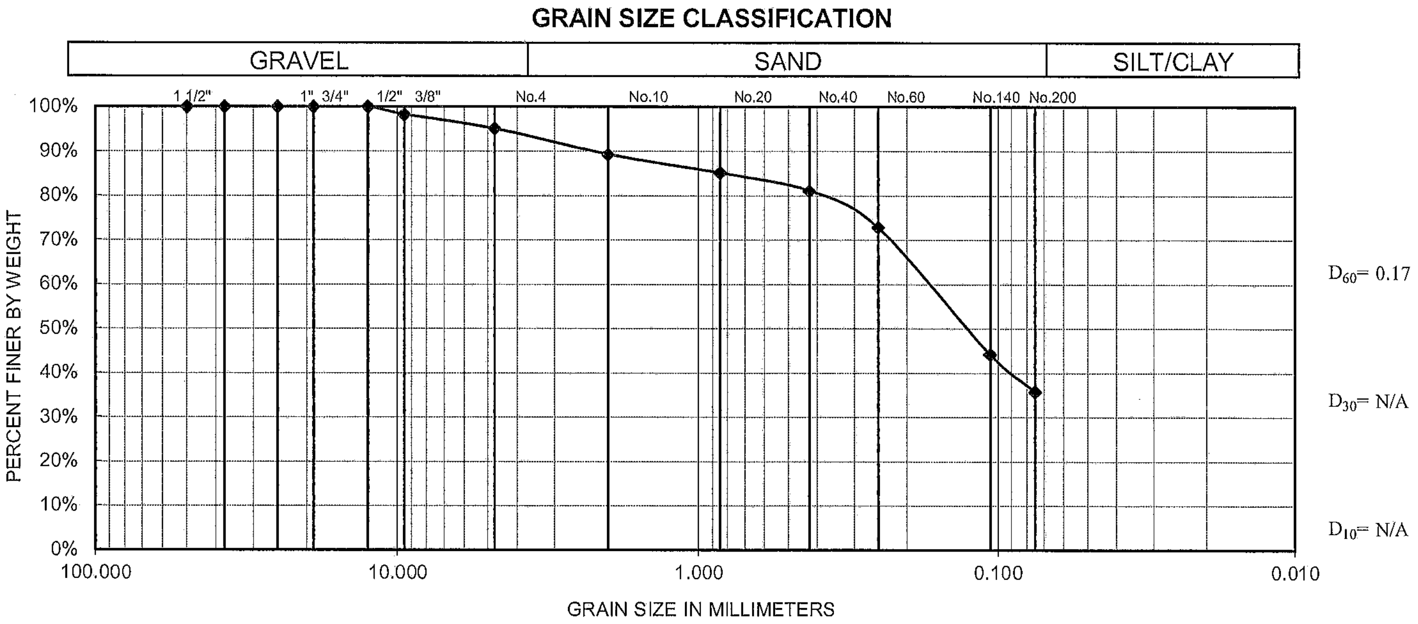
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-159 #8A Depth: 58.5'	Reported By:	D. NGUYEN	Date Tested:	02/05/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	800.13
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.60
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	714.53
1/2-in. (12.5-mm)	0.0		0.0%	100.0%			
3/8-in. (9.5-mm)	11.9		1.7%	98.3%			
No. 4 (4.75-mm)	34.9		4.9%	95.1%		**Gravel**	**4.9%**
No. 10 (2.00mm)	76.3		10.7%	89.3%			
No.20 (850 - μm)	106.2		14.9%	85.1%		**Sand**	**59.3%**
No.40 (425 - μm)	134.8		18.9%	81.1%			
No.60 (250 - μm)	194.0		27.2%	72.8%		**Fines**	**35.8%**
No.140 (106 - μm)	398.7		55.8%	44.2%			
No.200 (75 - μm)	458.7		64.2%	35.8%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	714.53						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-159 #8A	58.5'	SM	SILTY SAND	N/A	N/A

PARIKH CONSULTANTS, INC.

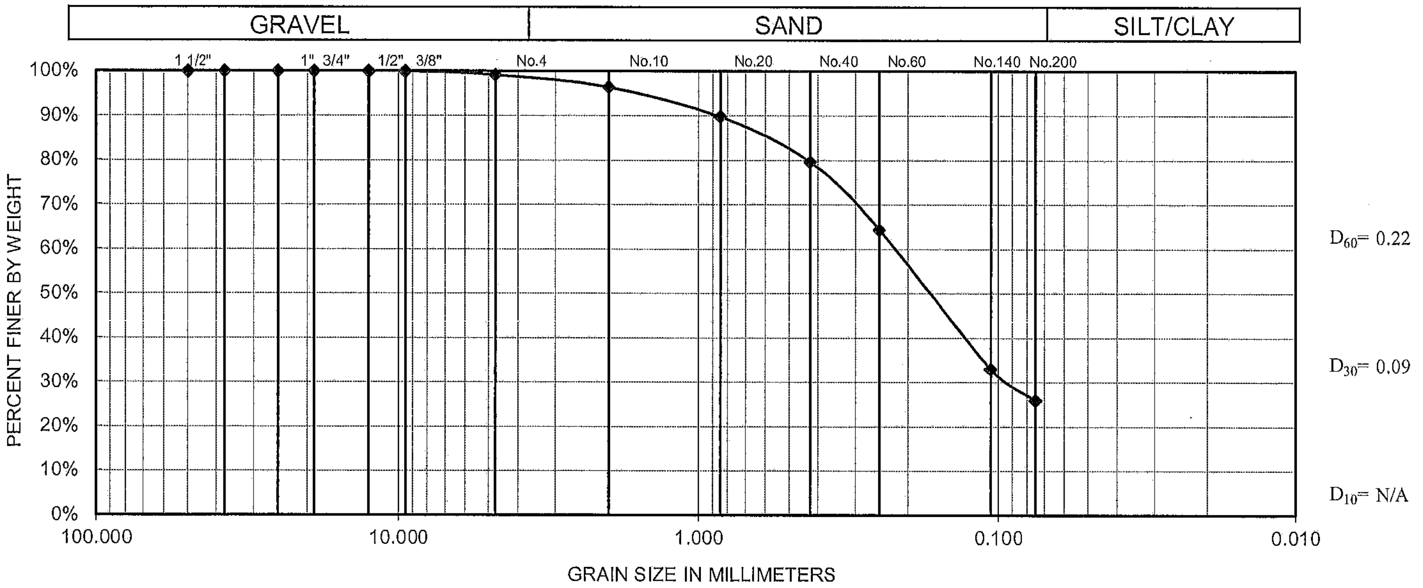
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-159 #10A Depth: 63.5'	Reported By:	D. NGUYEN	Date Tested:	02/03/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	494.94
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.40
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	410.54
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)	0.0		0.0%	100.0%			
No. 4 (4.75-mm)	3.3		0.8%	99.2%		**Gravel**	**0.8%**
No. 10 (2.00mm)	14.9		3.6%	96.4%			
No.20 (850 - μm)	42.0		10.2%	89.8%		**Sand**	**73.2%**
No.40 (425 - μm)	83.6		20.4%	79.6%			
No.60 (250 - μm)	146.2		35.6%	64.4%		**Fines**	**26.0%**
No.140 (106 - μm)	275.1		67.0%	33.0%			
No.200 (75 - μm)	304.0		74.0%	26.0%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	410.54						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-159 #10A	63.5'	SM	SILTY SAND	N/A	N/A

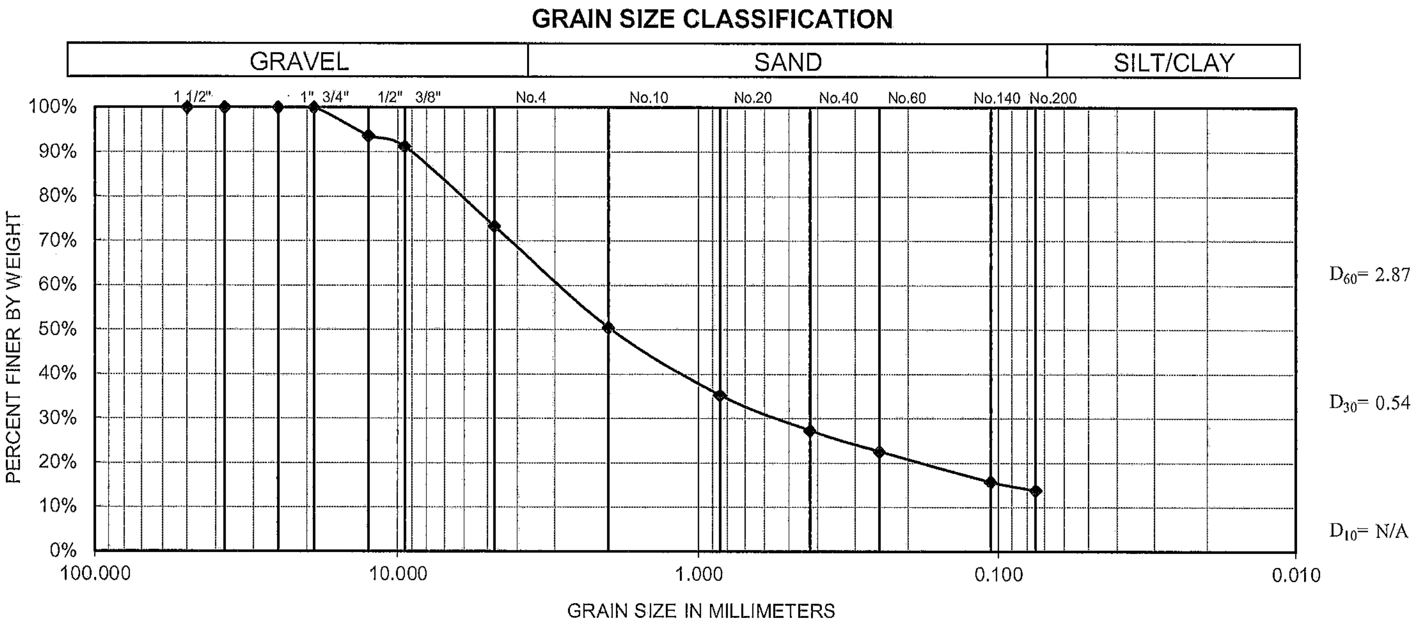
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-159 #32A Depth: 145.5'	Reported By:	D. NGUYEN	Date Tested:	02/04/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	680.19
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.98
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	595.21
1/2-in. (12.5-mm)	37.7		6.3%	93.7%			
3/8-in. (9.5-mm)	51.9		8.7%	91.3%			
No. 4 (4.75-mm)	159.0		26.7%	73.3%		**Gravel**	**26.7%**
No. 10 (2.00mm)	294.9		49.5%	50.5%			
No.20 (850 - μm)	385.5		64.8%	35.2%		**Sand**	**59.5%**
No.40 (425 - μm)	432.5		72.7%	27.3%			
No.60 (250 - μm)	461.0		77.5%	22.5%		**Fines**	**13.8%**
No.140 (106 - μm)	501.7		84.3%	15.7%			
No.200 (75 - μm)	513.1		86.2%	13.8%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	595.21						



D_{60}= 2.87

D_{30}= 0.54

D_{10}= N/A

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-159 #32A	145.5'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

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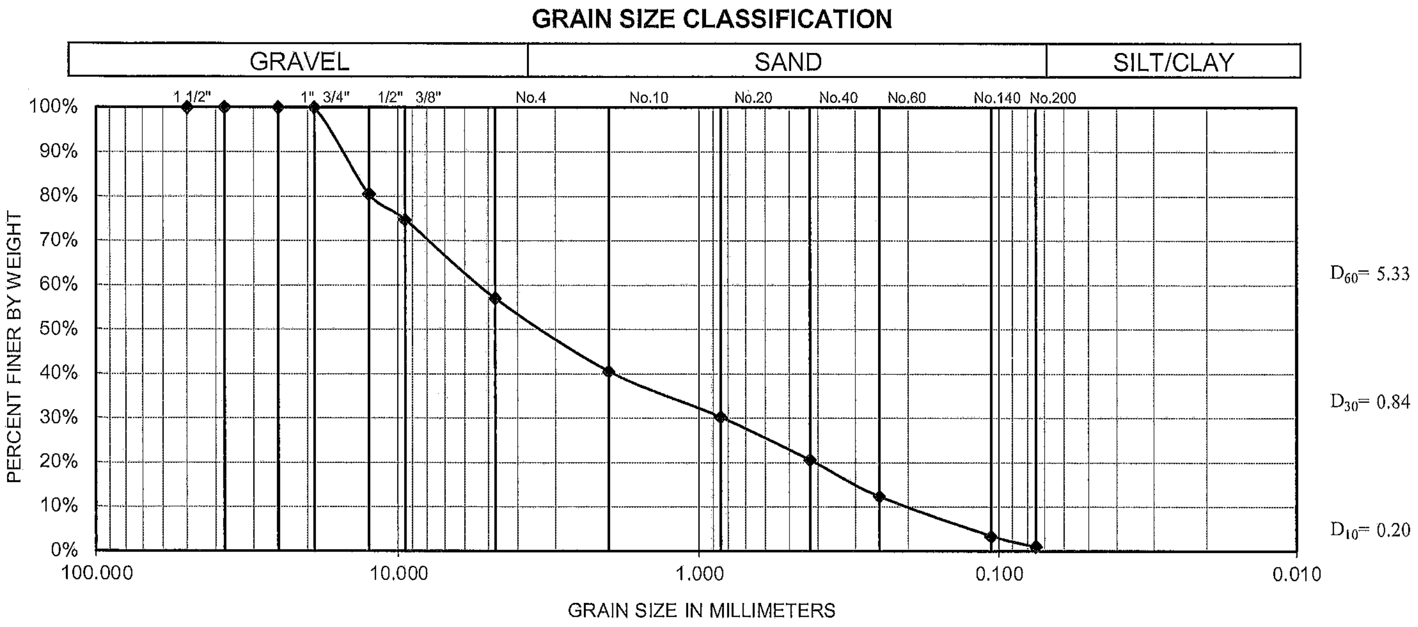
SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY			Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-160 #10A	Depth:	61'	Reported By:	D. NGUYEN	Date Tested:	01/30/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	756.34
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.68
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	672.66
1/2-in. (12.5-mm)	131.20		19.5%	80.5%			
3/8-in. (9.5-mm)	169.80		25.2%	74.8%			
No. 4 (4.75-mm)	289.00		43.0%	57.0%		**Gravel**	**43.0%**
No. 10 (2.00mm)	400.00		59.5%	40.5%			
No.20 (850 - µm)	469.20		69.8%	30.2%		**Sand**	**56.0%**
No.40 (425 - µm)	534.90		79.5%	20.5%			
No.60 (250 - µm)	590.10		87.7%	12.3%		**Fines**	**1.0%**
No.140 (106 - µm)	650.10		96.6%	3.4%			
No.200 (75 - µm)	665.70		99.0%	1.0%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	672.66						



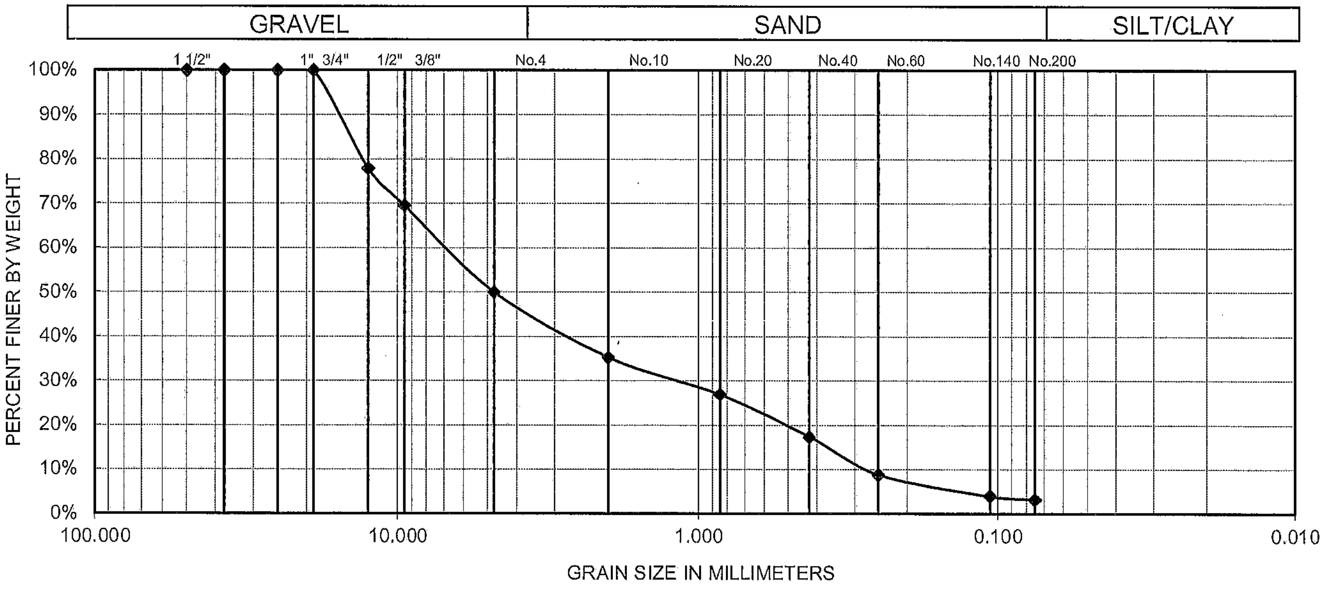
SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-160 #10A	61'	SP	POORLY-GRADED SAND WITH GRAVEL	26.55	0.65

SIEVE ANALYSIS
ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-160 #27 Depth: 109'	Reported By:	D. NGUYEN	Date Tested:	02/06/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	699.58
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.25
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	615.33
1/2-in. (12.5-mm)	135.90		22.1%	77.9%			
3/8-in. (9.5-mm)	187.70		30.5%	69.5%			
No. 4 (4.75-mm)	307.90		50.0%	50.0%		**Gravel**	**50.0%**
No. 10 (2.00mm)	398.50		64.8%	35.2%			
No.20 (850 - µm)	450.10		73.1%	26.9%		**Sand**	**46.8%**
No.40 (425 - µm)	508.20		82.6%	17.4%			
No.60 (250 - µm)	561.10		91.2%	8.8%		**Fines**	**3.1%**
No.140 (106 - µm)	591.20		96.1%	3.9%			
No.200 (75 - µm)	596.00		96.9%	3.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	615.33						

GRAIN SIZE CLASSIFICATION



D_{60}= 6.78

D_{30}= 1.17

D_{10}= 0.27

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-160 #27	109'	GP	POORLY-GRADED GRAVEL WITH SAND	25.21	0.75

PARIKH CONSULTANTS, INC.

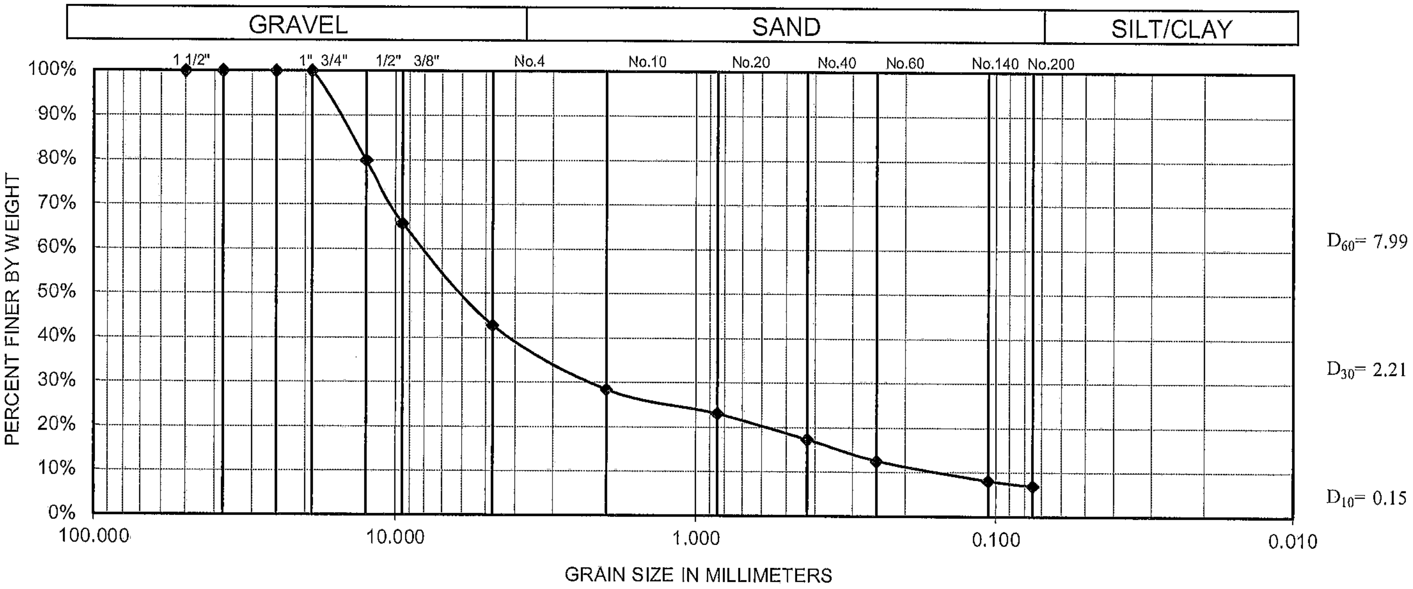
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-160 #40 Depth: 160.5'	Reported By:	D. NGUYEN	Date Tested:	02/06/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	834.48
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.82
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	749.66
1/2-in. (12.5-mm)	151.30		20.2%	79.8%			
3/8-in. (9.5-mm)	256.80		34.3%	65.7%			
No. 4 (4.75-mm)	429.10		57.2%	42.8%		**Gravel**	**57.2%**
No. 10 (2.00mm)	537.10		71.6%	28.4%			
No.20 (850 - μm)	577.10		77.0%	23.0%		**Sand**	**35.9%**
No.40 (425 - μm)	620.10		82.7%	17.3%			
No.60 (250 - μm)	655.90		87.5%	12.5%		**Fines**	**6.9%**
No.140 (106 - μm)	689.30		91.9%	8.1%			
No.200 (75 - μm)	698.20		93.1%	6.9%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	749.66						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-160 #40	160.5'	GP-GM	POORLY-GRADED GRAVEL WITH SILT AND SAND	51.79	3.95

PARIKH CONSULTANTS, INC.

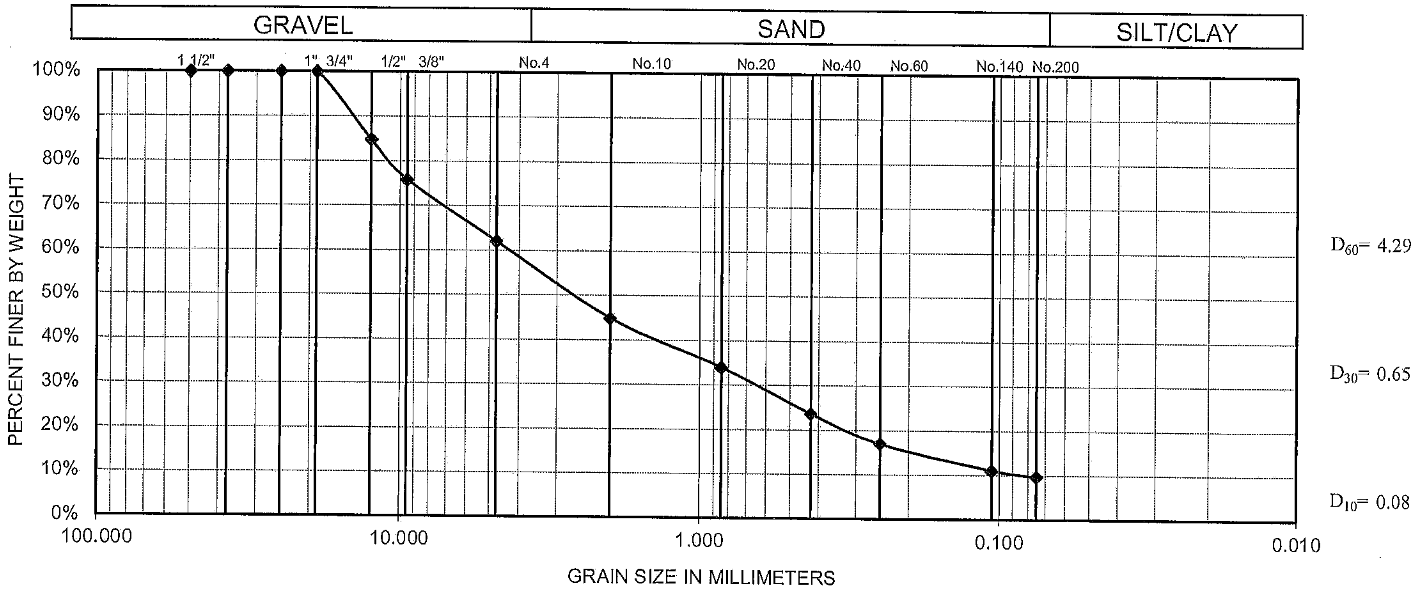
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-161 #4A Depth: 40.25'	Reported By:	D. NGUYEN	Date Tested:	02/04/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	704.03
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.57
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	593.46
1/2-in. (12.5-mm)	90.6		15.3%	84.7%			
3/8-in. (9.5-mm)	143.6		24.2%	75.8%			
No. 4 (4.75-mm)	225.5		38.0%	62.0%		**Gravel**	**38.0%**
No. 10 (2.00mm)	327.5		55.2%	44.8%			
No.20 (850 - μm)	392.0		66.1%	33.9%		**Sand**	**52.4%**
No.40 (425 - μm)	453.4		76.4%	23.6%			
No.60 (250 - μm)	493.1		83.1%	16.9%		**Fines**	**9.6%**
No.140 (106 - μm)	527.8		88.9%	11.1%			
No.200 (75 - μm)	536.3		90.4%	9.6%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	593.46						

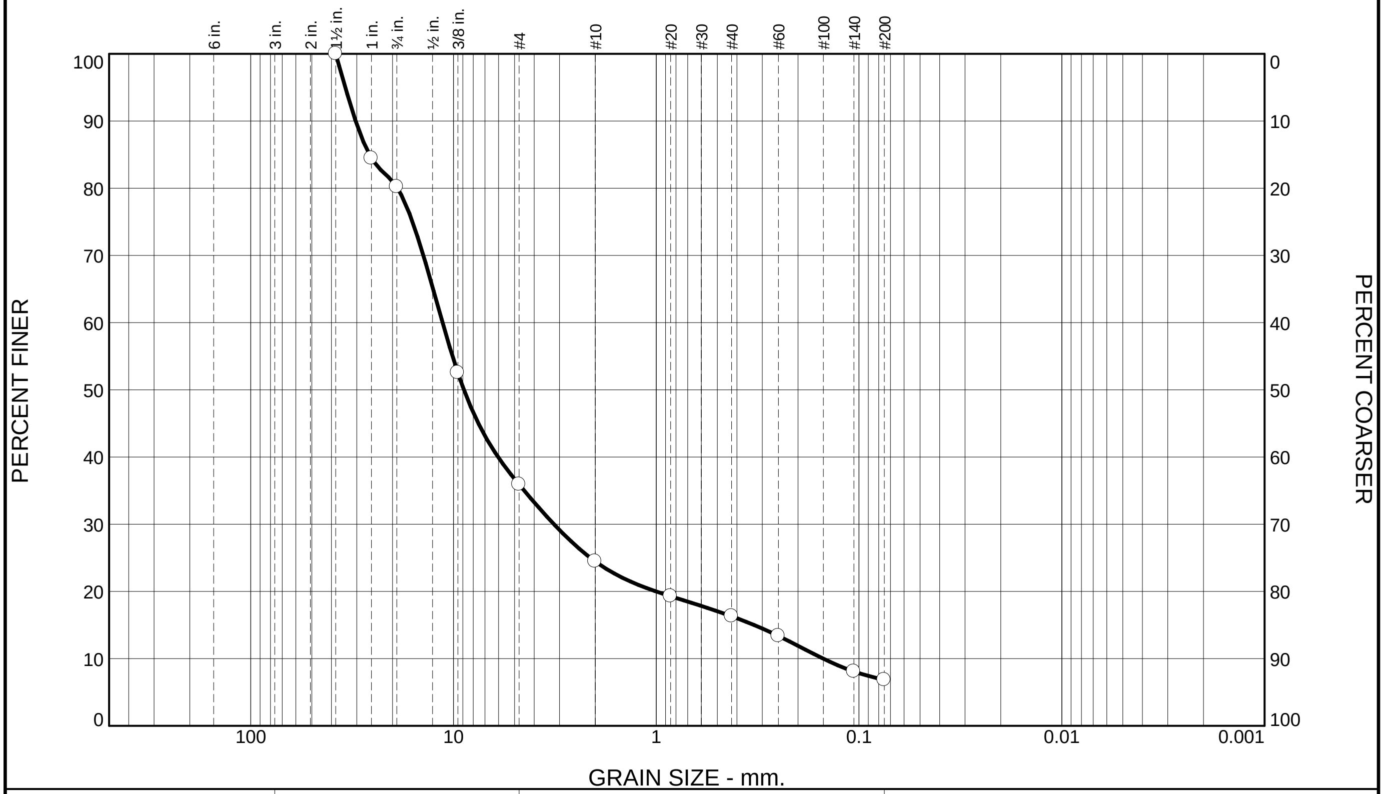
GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-161 #4A	40.25'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	52.39	1.21

PARIKH CONSULTANTS, INC.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	20	44	12	8	9	7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	84		
3/4	80		
3/8	53		
#4	36		
#10	24		
#20	19		
#40	16		
#60	13		
#140	8		
#200	6.8		

* (no specification provided)

Soil Description

Gray poorly graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 30.4007	D_{85}= 26.0381	D_{60}= 11.3275
D_{50}= 8.8905	D_{30}= 3.1971	D_{15}= 0.3296
D_{10}= 0.1501	C_u= 75.48	C_c= 6.01

Classification

USCS= GP-GM AASHTO=

Remarks

Source of Sample: BH-161 **Depth:** 77.5
Sample Number: 10

Date: 2-14-20

Client: Mott MacDonald
Project: BSVII
507385606

Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

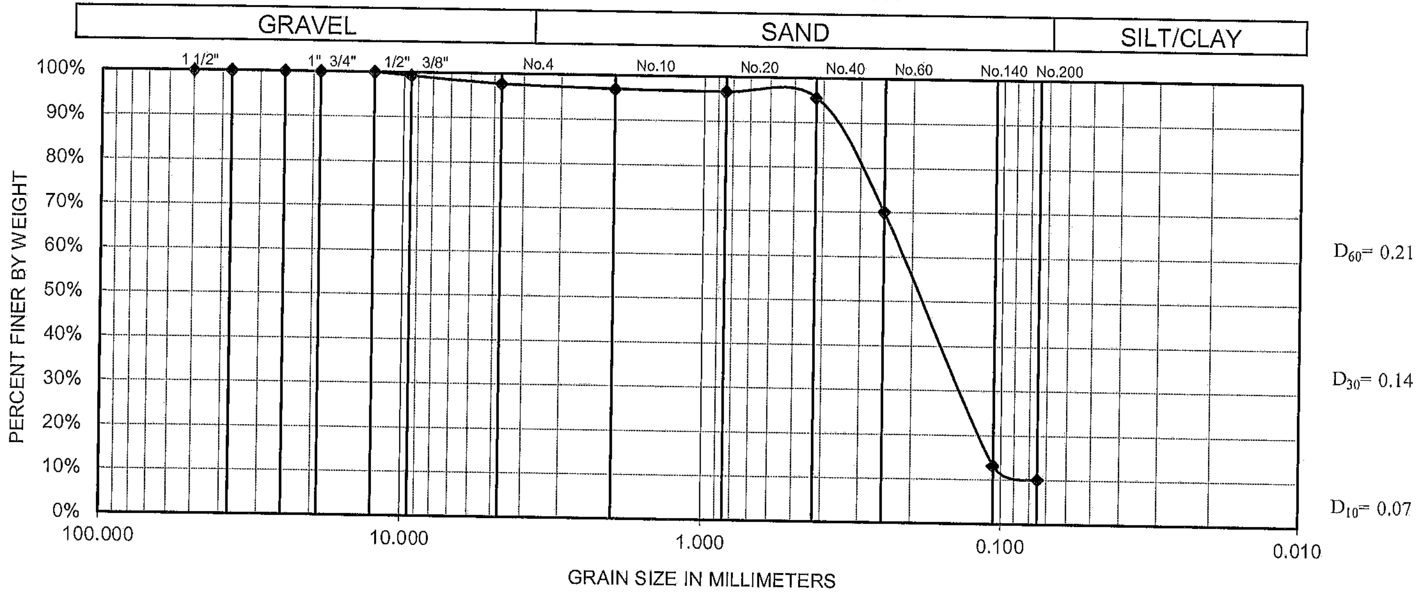
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-161 #11A Depth: 84'	Reported By:	D. NGUYEN	Date Tested:	02/03/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	368.12
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	109.95
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	258.17
1/2-in. (12.5-mm)	0.0		0.0%	100.0%			
3/8-in. (9.5-mm)	1.8		0.7%	99.3%			
No. 4 (4.75-mm)	5.8		2.2%	97.8%		**Gravel**	**2.2%**
No. 10 (2.00mm)	7.9		3.1%	96.9%			
No.20 (850 - µm)	8.5		3.3%	96.7%		**Sand**	**87.7%**
No.40 (425 - µm)	11.1		4.3%	95.7%			
No.60 (250 - µm)	77.1		29.9%	70.1%		**Fines**	**10.0%**
No.140 (106 - µm)	224.2		86.8%	13.2%			
No.200 (75 - µm)	232.3		90.0%	10.0%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	258.17						

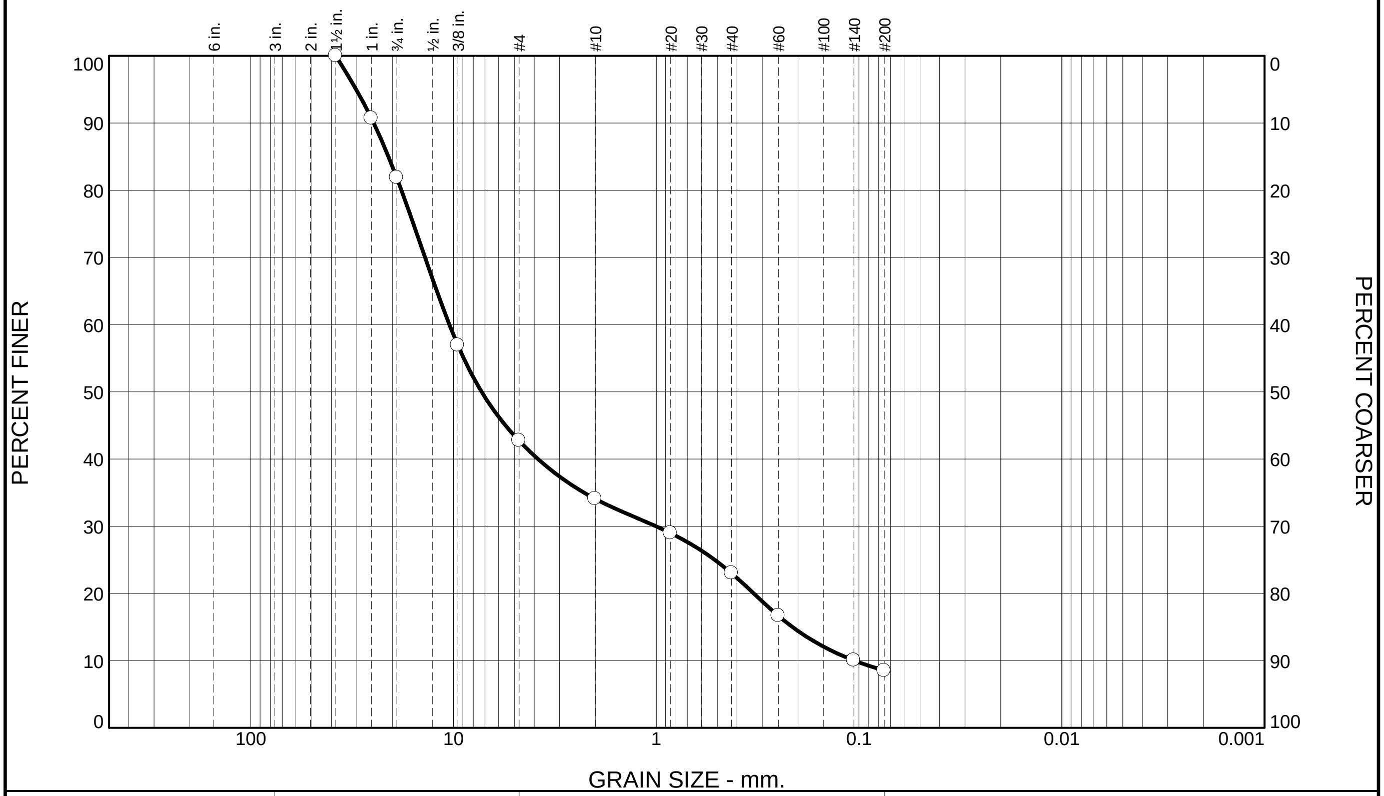
GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-161 #11A	84'	SP-SM	POORLY-GRADED SAND WITH SILT	2.87	1.16

PARIKH CONSULTANTS, INC.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	18	39	9	11	15	8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	91		
3/4	82		
3/8	57		
#4	43		
#10	34		
#20	29		
#40	23		
#60	17		
#140	10		
#200	8.5		

* (no specification provided)

Soil Description

Grayish brown poorly graded gravel with silt and sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 24.7646 D_{85}= 20.9427 D_{60}= 10.4902
D_{50}= 7.2748 D_{30}= 1.0059 D_{15}= 0.2130
D_{10}= 0.1053 C_u= 99.59 C_c= 0.92

Classification

USCS= GP-GM AASHTO=

Remarks

Source of Sample: BH-161 **Depth:** 109
Sample Number: 21

Date: 2-14-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

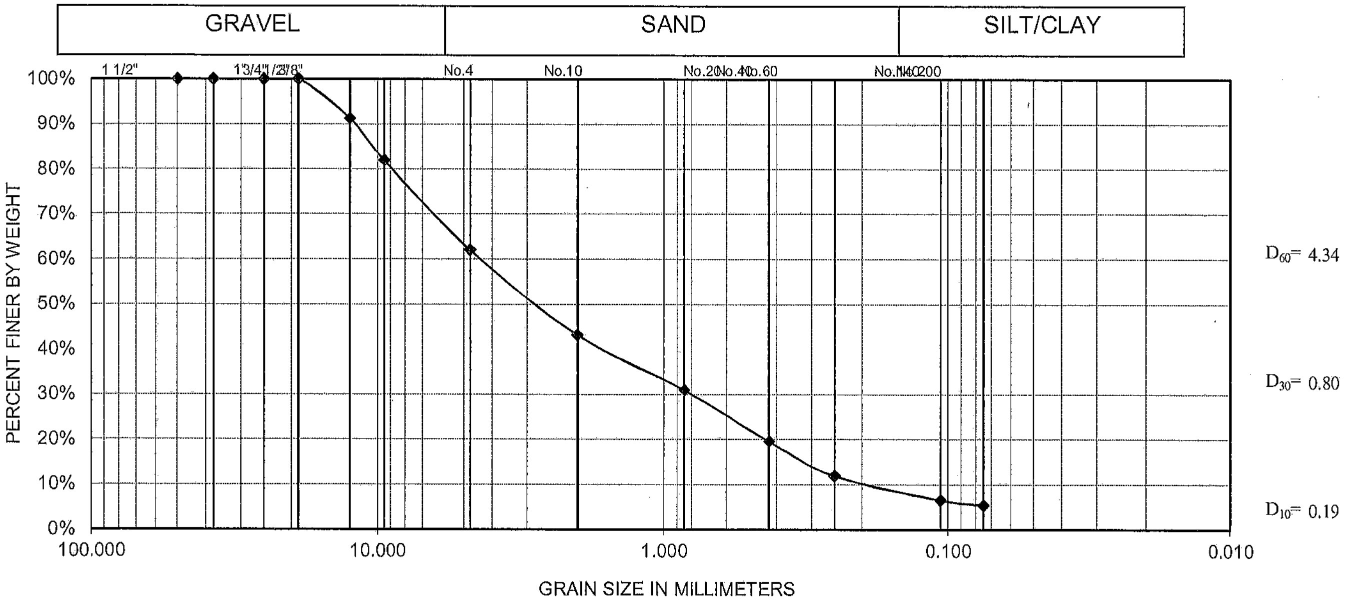
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-162 #14 Depth: 70'	Reported By:	D. NGUYEN	Date Tested:	5/9/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	568.14
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.94
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	483.20
1/2-in. (12.5-mm)	42.7		8.8%	91.2%			
3/8-in. (9.5-mm)	87.33		18.1%	81.9%			
No. 4 (4.75-mm)	183.89		38.1%	61.9%		**Gravel**	**38%**
No. 10 (2.00mm)	274.88		56.9%	43.1%			
No.20 (850 - µm)	333.74		69.1%	30.9%		**Sand**	**57%**
No.40 (425 - µm)	388.82		80.5%	19.5%			
No.60 (250 - µm)	425.82		88.1%	11.9%		**Fines**	**5%**
No.140 (106 - µm)	451.77		93.5%	6.5%			
No.200 (75 - µm)	457.31		94.6%	5.4%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	483.20						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-162 #14	70'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	23.45	0.80

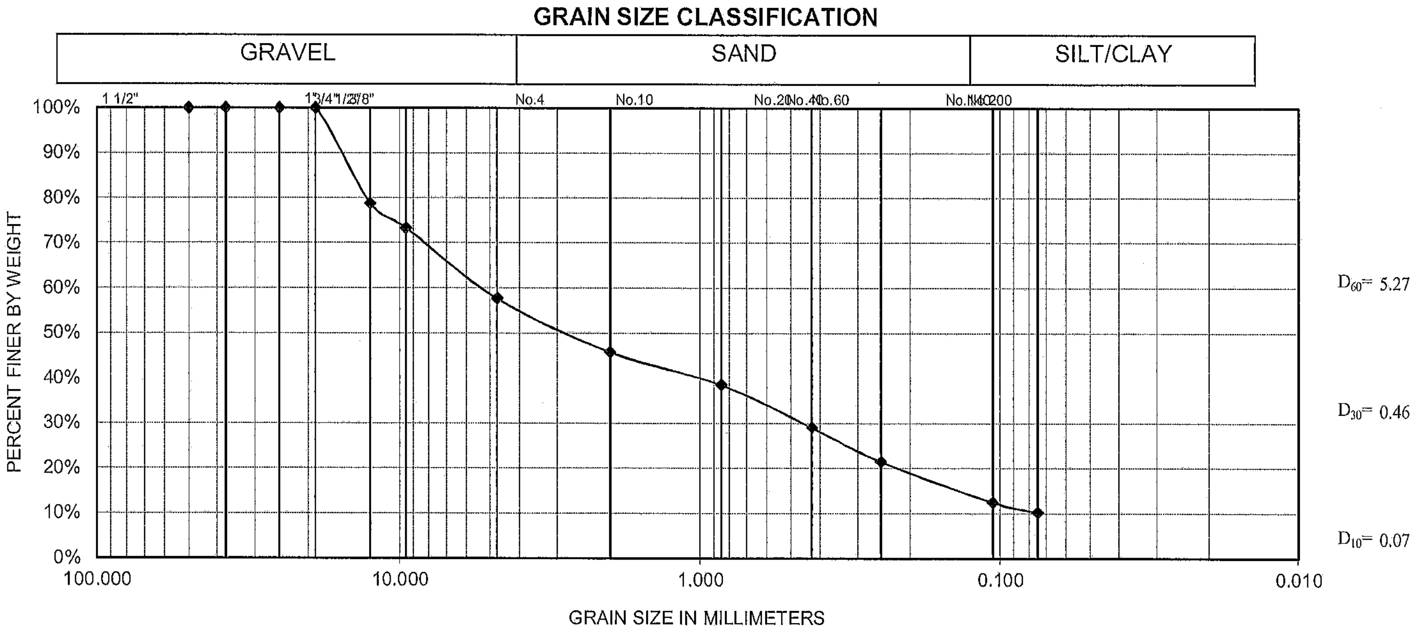
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-162 #18,#19,#20 Depth: 83.5'	Reported By:	D. NGUYEN	Date Tested:	5/9/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	891.55
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.42
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	808.13
1/2-in. (12.5-mm)	171.5		21.2%	78.8%			
3/8-in. (9.5-mm)	215.93		26.7%	73.3%			
No. 4 (4.75-mm)	342.35		42.4%	57.6%		**Gravel**	**42.4%**
No. 10 (2.00mm)	438.37		54.2%	45.8%			
No.20 (850 - µm)	497.21		61.5%	38.5%		**Sand**	**47.5%**
No.40 (425 - µm)	573.61		71.0%	29.0%			
No.60 (250 - µm)	634.92		78.6%	21.4%		**Fines**	**10.2%**
No.140 (106 - µm)	707.79		87.6%	12.4%			
No.200 (75 - µm)	725.94		89.8%	10.2%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	808.13						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-162 #18,#19,#20	83.5'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	72.19	0.54

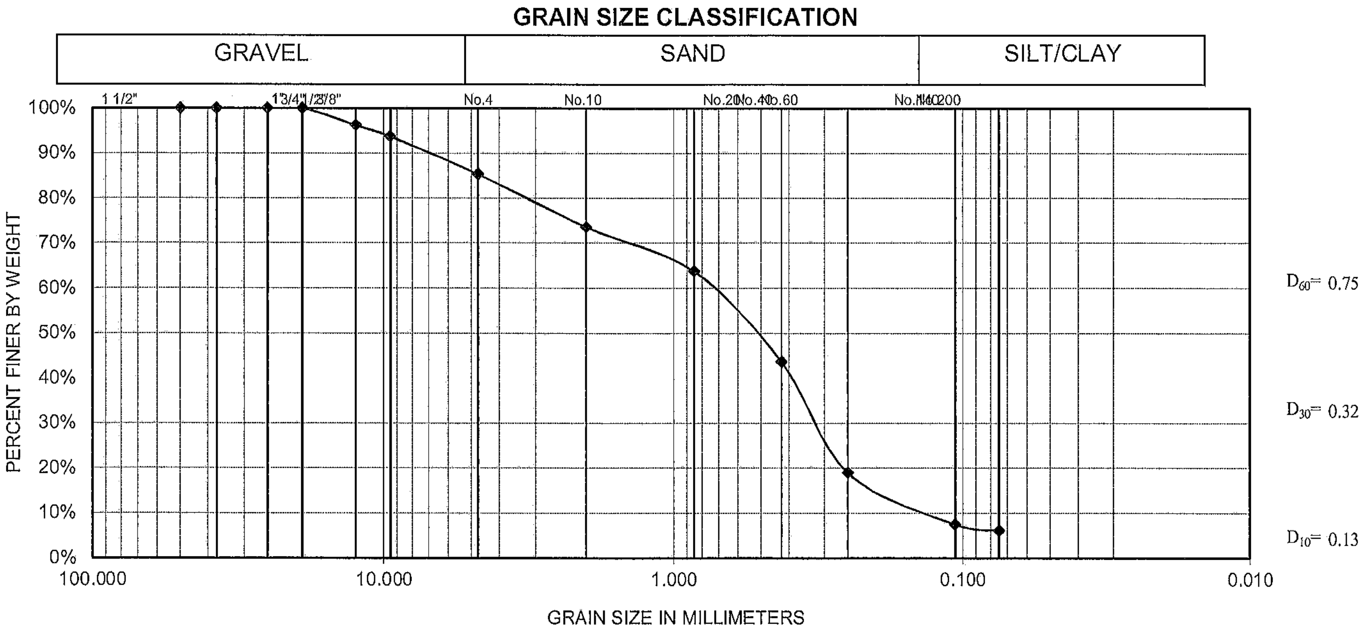
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-164 #15A Depth: 68'	Reported By:	D. NGUYEN	Date Tested:	5/9/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	949.40
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.41
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	864.99
1/2-in. (12.5-mm)	33.02		3.8%	96.2%			
3/8-in. (9.5-mm)	55.02		6.4%	93.6%			
No. 4 (4.75-mm)	126.93		14.7%	85.3%		**Gravel**	**14.7%**
No. 10 (2.00mm)	228.50		26.4%	73.6%			
No.20 (850 - µm)	314.11		36.3%	63.7%		**Sand**	**79.2%**
No.40 (425 - µm)	487.57		56.4%	43.6%			
No.60 (250 - µm)	701.65		81.1%	18.9%		**Fines**	**6.1%**
No.140 (106 - µm)	800.74		92.6%	7.4%			
No.200 (75 - µm)	811.93		93.9%	6.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	864.99						



GRAIN SIZE CLASSIFICATION

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-164 #15A	68'	SP-SM	POORLY-GRADED SAND WITH SILT	5.82	1.05

PARIKH CONSULTANTS, INC.

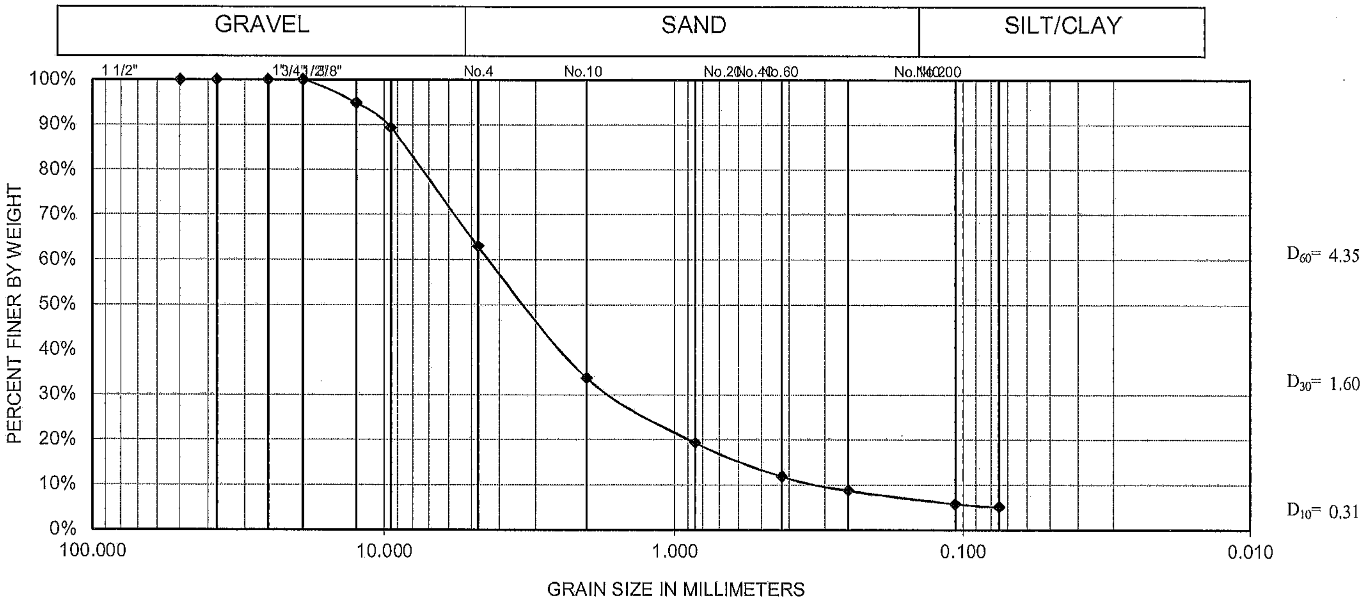
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G970		Project #:	2019-131-T02
Sample #:	BH-164 #19A	Depth:	78'	Reported By:	D. NGUYEN	Date Tested:	5/9/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	1030.00
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	109.49
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	920.51
1/2-in. (12.5-mm)	47.45		5.2%	94.8%			
3/8-in. (9.5-mm)	98.06		10.7%	89.3%			
No. 4 (4.75-mm)	341.03		37.0%	63.0%		**Gravel**	**37.0%**
No. 10 (2.00mm)	610.22		66.3%	33.7%			
No.20 (850 - µm)	742.63		80.7%	19.3%		**Sand**	**57.9%**
No.40 (425 - µm)	811.29		88.1%	11.9%			
No.60 (250 - µm)	840.48		91.3%	8.7%		**Fines**	**5.0%**
No.140 (106 - µm)	867.58		94.2%	5.8%			
No.200 (75 - µm)	874.33		95.0%	5.0%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	920.51						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-164 #19A	78'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	13.99	1.90

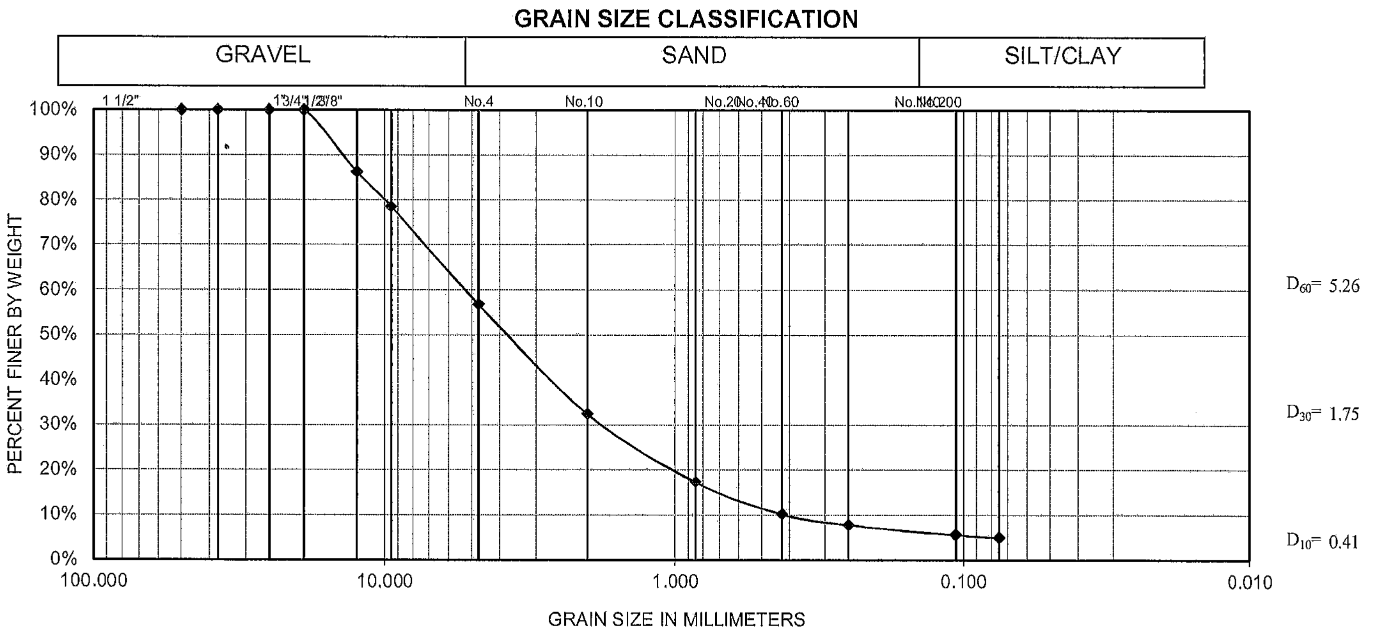
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G970	Project #:	2019-131-T02	
Sample #:	BH-164 #23	Depth:	87.5	Reported By:	D. NGUYEN	Date Tested:	5/9/2020

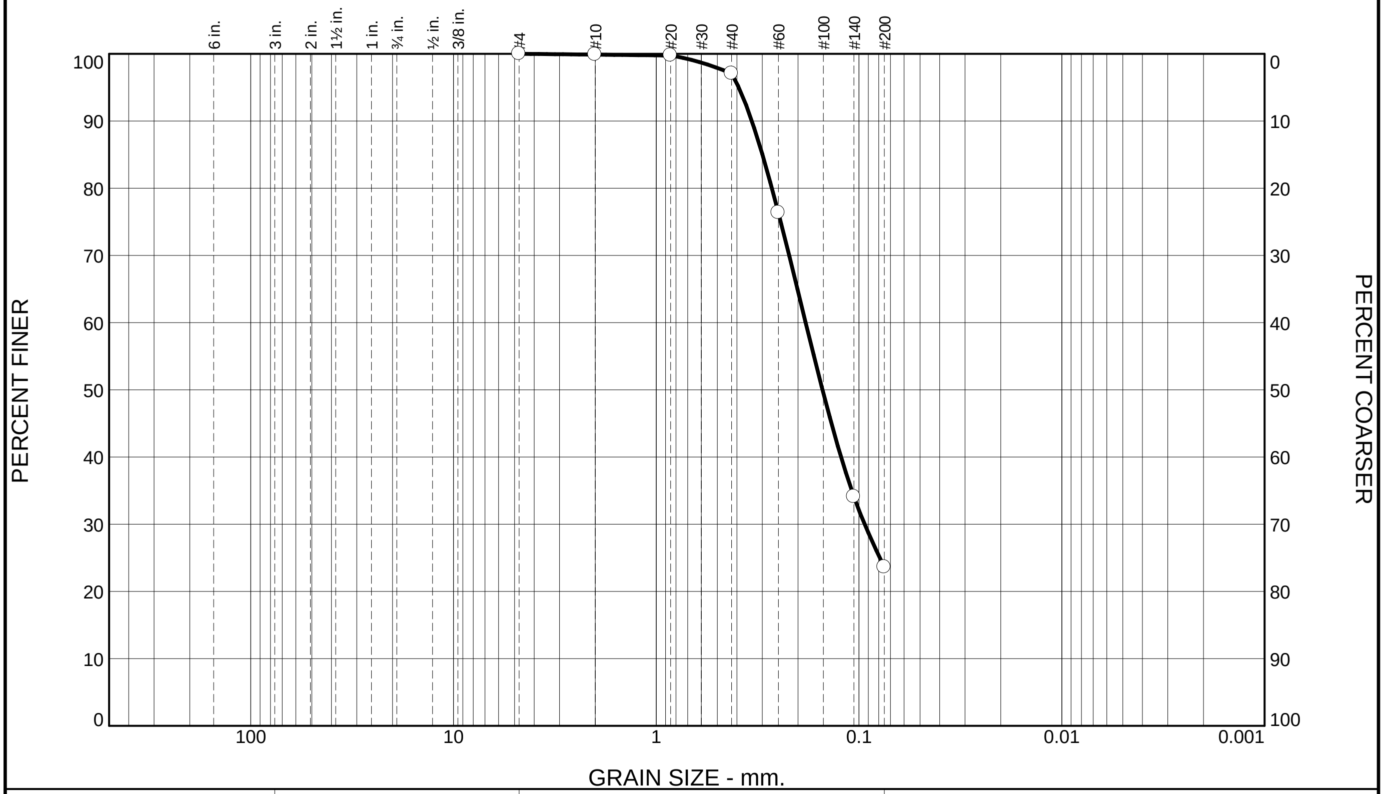
U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	936.58
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.10
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	826.48
1/2-in. (12.5-mm)	113.89		13.8%	86.2%			
3/8-in. (9.5-mm)	177.56		21.5%	78.5%			
No. 4 (4.75-mm)	357.10		43.2%	56.8%		**Gravel**	**43.2%**
No. 10 (2.00mm)	559.08		67.6%	32.4%			
No.20 (850 - μm)	683.84		82.7%	17.3%		**Sand**	**51.9%**
No.40 (425 - μm)	742.64		89.9%	10.1%			
No.60 (250 - μm)	762.49		92.3%	7.7%		**Fines**	**4.9%**
No.140 (106 - μm)	780.67		94.5%	5.5%			
No.200 (75 - μm)	785.82		95.1%	4.9%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	826.48						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-164 #23	87.5	SW	WELL-GRADED SAND WITH GRAVEL	12.78	1.41

PARIKH CONSULTANTS, INC.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	73	24	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#10	100		
#20	100		
#40	97		
#60	76		
#140	34		
#200	24		

* (no specification provided)

Soil Description

Gray silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3378	D_{85}= 0.2996	D_{60}= 0.1833
D_{50}= 0.1514	D_{30}= 0.0939	D_{15}=
D_{10}=	C_u=	C_c=

Classification

USCS= SM AASHTO=

Remarks

Source of Sample: BH-164 **Depth:** 103.5
Sample Number: 30

Date: 6-3-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

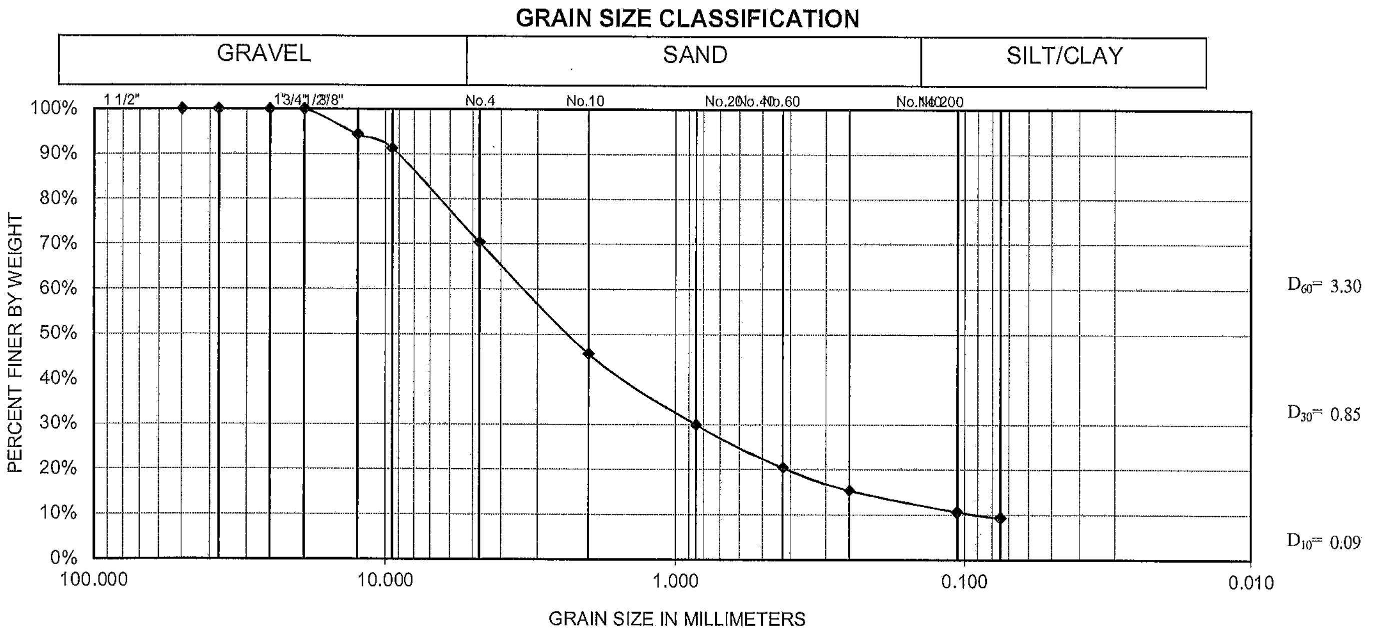
Tested By: JH **Checked By:** JH

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-164 #37A Depth: 123	Reported By:	D. NGUYEN	Date Tested:	5/9/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	688.74
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.16
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	603.58
1/2-in. (12.5-mm)	34.14		5.7%	94.3%			
3/8-in. (9.5-mm)	52.74		8.7%	91.3%			
No. 4 (4.75-mm)	178.76		29.6%	70.4%		**Gravel**	**29.6%**
No. 10 (2.00mm)	328.00		54.3%	45.7%			
No.20 (850 - μm)	422.99		70.1%	29.9%		**Sand**	**61.1%**
No.40 (425 - μm)	480.54		79.6%	20.4%			
No.60 (250 - μm)	510.89		84.6%	15.4%		**Fines**	**9.3%**
No.140 (106 - μm)	539.64		89.4%	10.6%			
No.200 (75 - μm)	547.62		90.7%	9.3%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	603.58						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-164 #37A	123	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	36.40	2.43

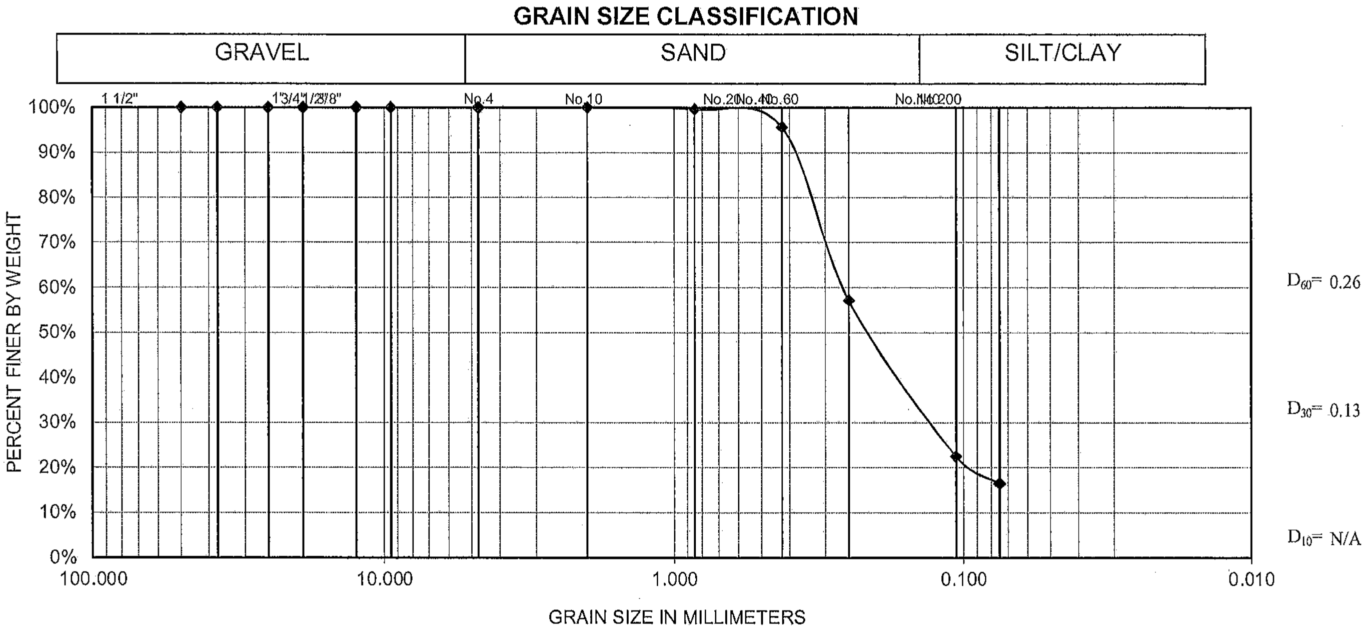
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-165 #38A Depth: 140.5	Reported By:	D. NGUYEN	Date Tested:	5/9/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	561.08
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.40
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	476.68
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)			0.0%	100.0%			
No. 4 (4.75-mm)			0.0%	100.0%		**Gravel**	**0.0%**
No. 10 (2.00mm)	0.0		0.0%	100.0%			
No.20 (850 - µm)	1.80		0.4%	99.6%		**Sand**	**83.6%**
No.40 (425 - µm)	20.92		4.4%	95.6%			
No.60 (250 - µm)	204.63		42.9%	57.1%		**Fines**	**16.4%**
No.140 (106 - µm)	369.74		77.6%	22.4%			
No.200 (75 - µm)	398.31		83.6%	16.4%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	476.68						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-165 #38A	140.5	SM	SILTY SAND	N/A	N/A

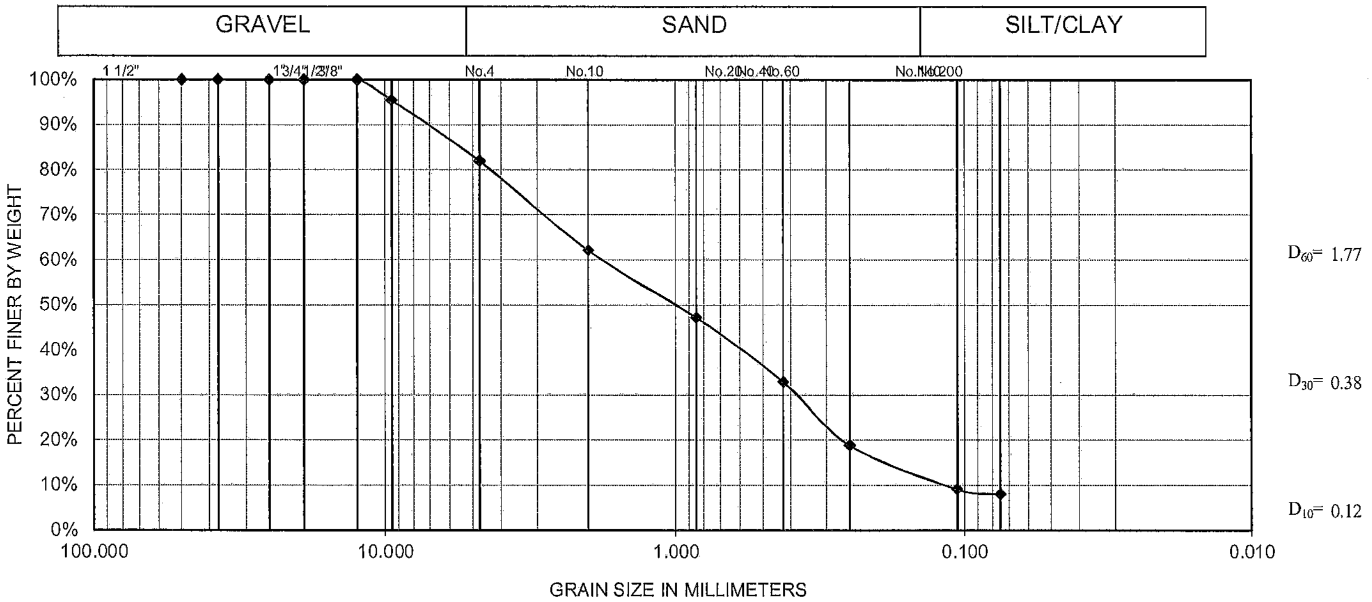
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-166 #7 Depth: 40'	Reported By:	D. NGUYEN	Date Tested:	4/1/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	832.45
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.37
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	749.08
1/2-in. (12.5-mm)	0.0		0.0%	100.0%			
3/8-in. (9.5-mm)	34.13		4.6%	95.4%			
No. 4 (4.75-mm)	134.95		18.0%	82.0%		**Gravel**	**18.0%**
No. 10 (2.00mm)	283.90		37.9%	62.1%			
No.20 (850 - µm)	395.61		52.8%	47.2%		**Sand**	**74.0%**
No.40 (425 - µm)	502.69		67.1%	32.9%			
No.60 (250 - µm)	608.11		81.2%	18.8%		**Fines**	**7.9%**
No.140 (106 - µm)	681.35		91.0%	9.0%			
No.200 (75 - µm)	689.57		92.1%	7.9%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	749.08						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-166 #7	40'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	15.38	0.71

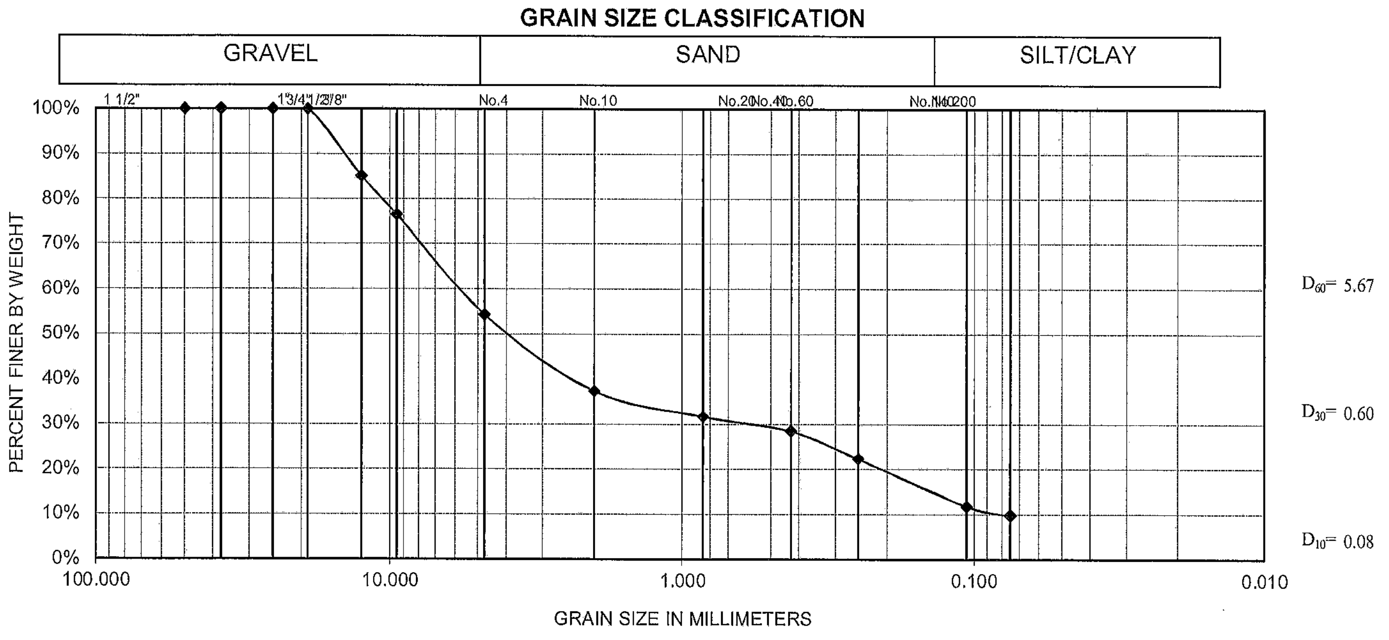
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-167 #13A,13B Depth: 47.5'-48.5'	Reported By:	D. NGUYEN	Date Tested:	4/29/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	877.00
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.41
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	792.59
1/2-in. (12.5-mm)	118.15		14.9%	85.1%			
3/8-in. (9.5-mm)	186.23		23.5%	76.5%			
No. 4 (4.75-mm)	362.17		45.7%	54.3%		**Gravel**	**45.7%**
No. 10 (2.00mm)	497.10		62.7%	37.3%			
No.20 (850 - µm)	541.52		68.3%	31.7%		**Sand**	**44.7%**
No.40 (425 - µm)	567.52		71.6%	28.4%			
No.60 (250 - µm)	616.15		77.7%	22.3%		**Fines**	**9.6%**
No.140 (106 - µm)	699.43		88.2%	11.8%			
No.200 (75 - µm)	716.13		90.4%	9.6%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	792.59						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-167 #13A,13B	47.5'-48.5'	GP-GM	POORLY-GRADED GRAVEL WITH SILT AND SAND	71.40	0.79

PARIKH CONSULTANTS, INC.

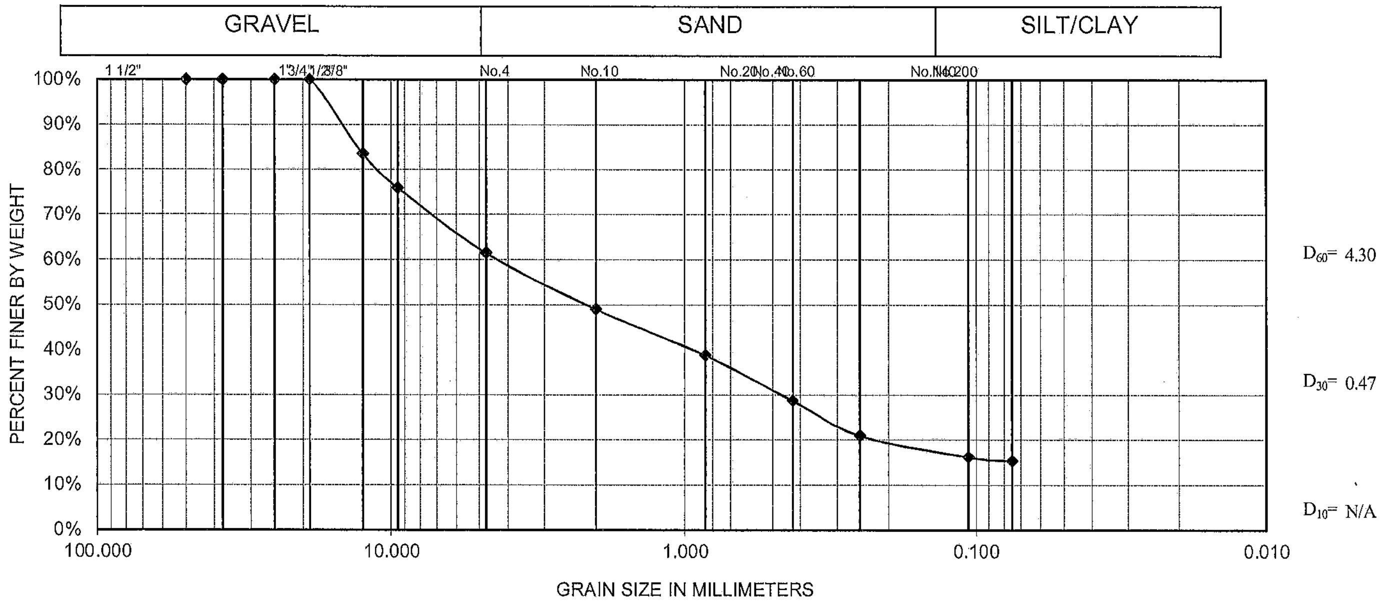
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-167 #16B Depth: 57'	Reported By:	D. NGUYEN	Date Tested:	4/29/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	834.00
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.07
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	749.93
1/2-in. (12.5-mm)	124.02		16.5%	83.5%			
3/8-in. (9.5-mm)	180.38		24.1%	75.9%			
No. 4 (4.75-mm)	289.13		38.6%	61.4%		**Gravel**	**38.6%**
No. 10 (2.00mm)	382.53		51.0%	49.0%			
No.20 (850 - µm)	459.44		61.3%	38.7%		**Sand**	**46.2%**
No.40 (425 - µm)	535.36		71.4%	28.6%			
No.60 (250 - µm)	593.32		79.1%	20.9%		**Fines**	**15.3%**
No.140 (106 - µm)	628.66		83.8%	16.2%			
No.200 (75 - µm)	635.36		84.7%	15.3%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	749.93						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-167 #16B	57'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

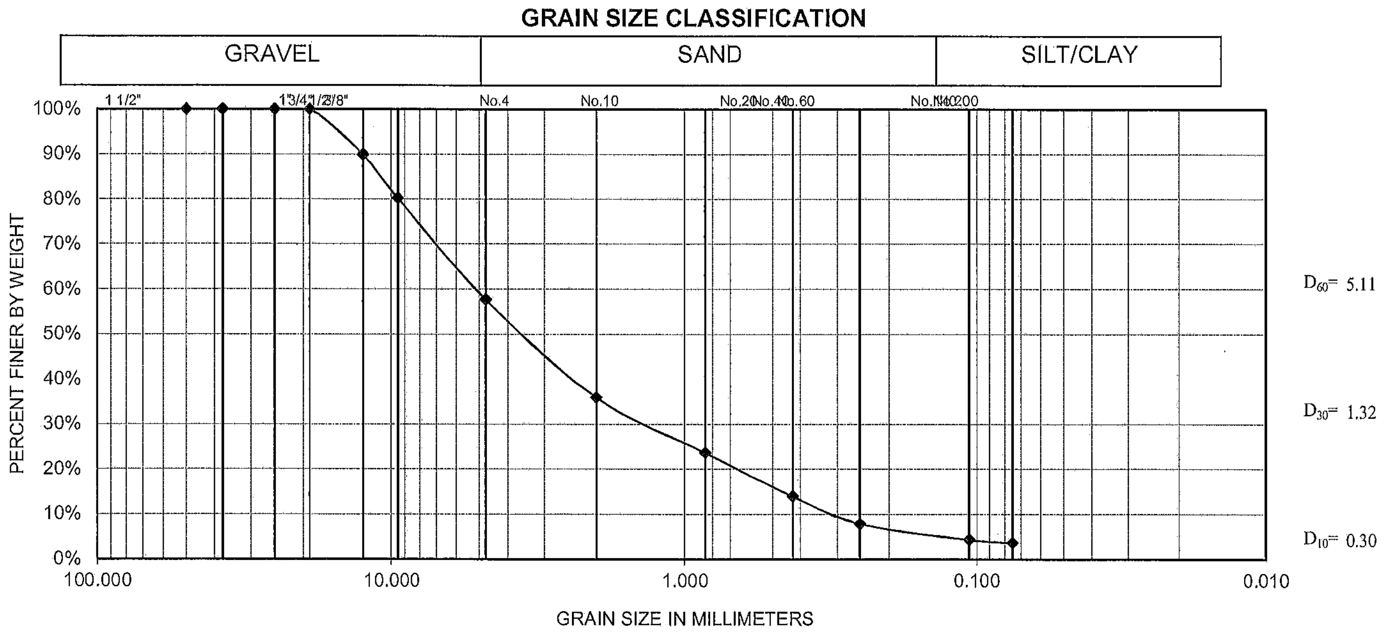
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-167 #31 Depth: 96'	Reported By:	D. NGUYEN	Date Tested:	5/27/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	912.91
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.70
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	829.21
1/2-in. (12.5-mm)	84.16		10.1%	89.9%			
3/8-in. (9.5-mm)	164.24		19.8%	80.2%			
No. 4 (4.75-mm)	351.50		42.4%	57.6%		**Gravel**	**42.4%**
No. 10 (2.00mm)	531.38		64.1%	35.9%			
No.20 (850 - μm)	633.22		76.4%	23.6%		**Sand**	**54.0%**
No.40 (425 - μm)	713.76		86.1%	13.9%			
No.60 (250 - μm)	764.22		92.2%	7.8%		**Fines**	**3.6%**
No.140 (106 - μm)	793.57		95.7%	4.3%			
No.200 (75 - μm)	799.48		96.4%	3.6%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	829.21						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-167 #31	96'	SW	WELL-GRADED SAND WITH GRAVEL	16.93	1.14

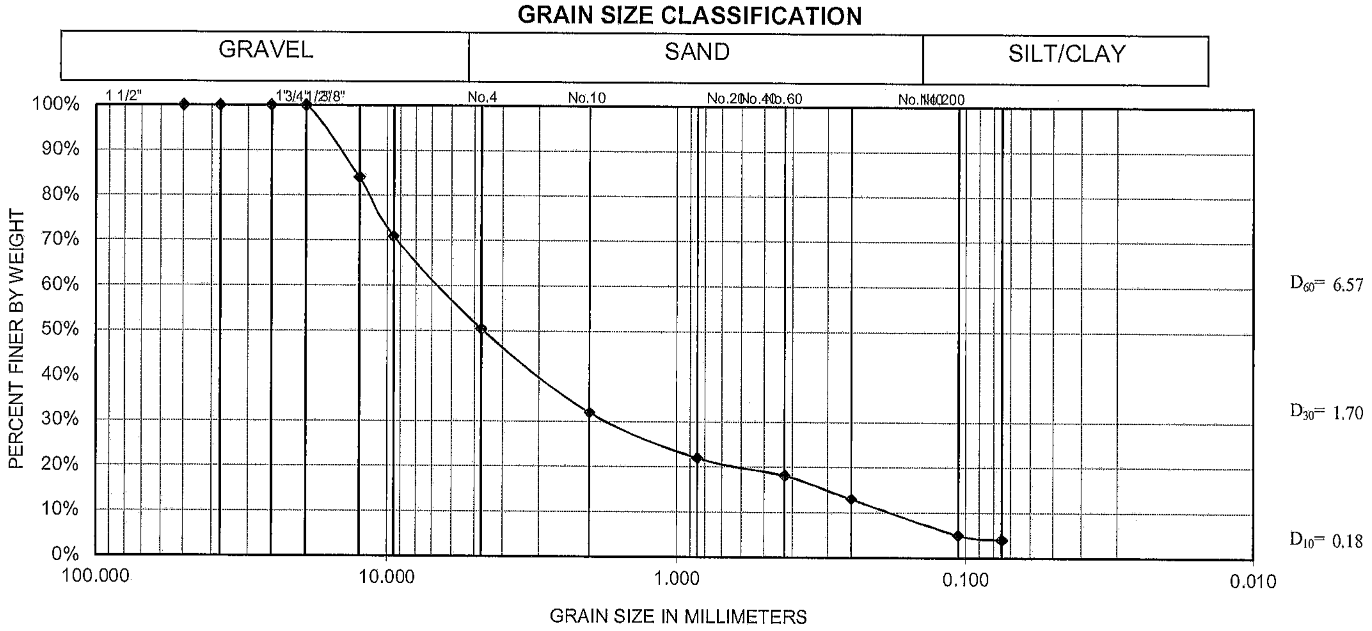
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-168 #9 Depth: 40'	Reported By:	D. NGUYEN	Date Tested:	7/16/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	801.38
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	109.69
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	691.69
1/2-in. (12.5-mm)	111.22		16.1%	83.9%			
3/8-in. (9.5-mm)	201.60		29.1%	70.9%			
No. 4 (4.75-mm)	342.98		49.6%	50.4%		**Gravel**	**49.6%**
No. 10 (2.00mm)	471.07		68.1%	31.9%			
No.20 (850 - µm)	540.13		78.1%	21.9%		**Sand**	**46.5%**
No.40 (425 - µm)	566.53		81.9%	18.1%			
No.60 (250 - µm)	602.09		87.0%	13.0%		**Fines**	**3.9%**
No.140 (106 - µm)	657.19		95.0%	5.0%			
No.200 (75 - µm)	664.47		96.1%	3.9%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	691.69						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-168 #9	40'	GW	WELL-GRADED GRAVEL WITH SAND	36.15	2.42

PARIKH CONSULTANTS, INC.

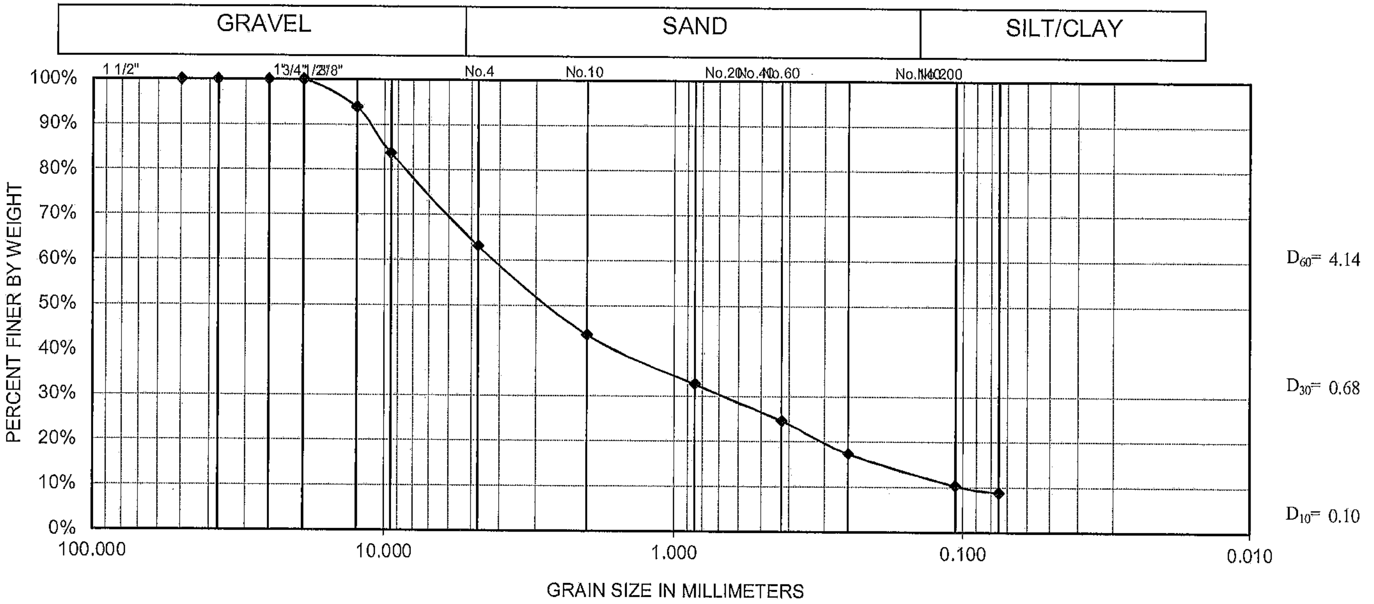
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-168 #11 Depth: 50'	Reported By:	D. NGUYEN	Date Tested:	7/16/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	709.68
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.39
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	624.29
1/2-in. (12.5-mm)	38.52		6.2%	93.8%			
3/8-in. (9.5-mm)	102.43		16.4%	83.6%			
No. 4 (4.75-mm)	230.40		36.9%	63.1%		**Gravel**	**36.9%**
No. 10 (2.00mm)	352.75		56.5%	43.5%			
No.20 (850 - µm)	420.66		67.4%	32.6%		**Sand**	**54.4%**
No.40 (425 - µm)	470.99		75.4%	24.6%			
No.60 (250 - µm)	516.05		82.7%	17.3%		**Fines**	**8.7%**
No.140 (106 - µm)	560.22		89.7%	10.3%			
No.200 (75 - µm)	569.95		91.3%	8.7%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	624.29						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-168 #11	50'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	41.44	1.11

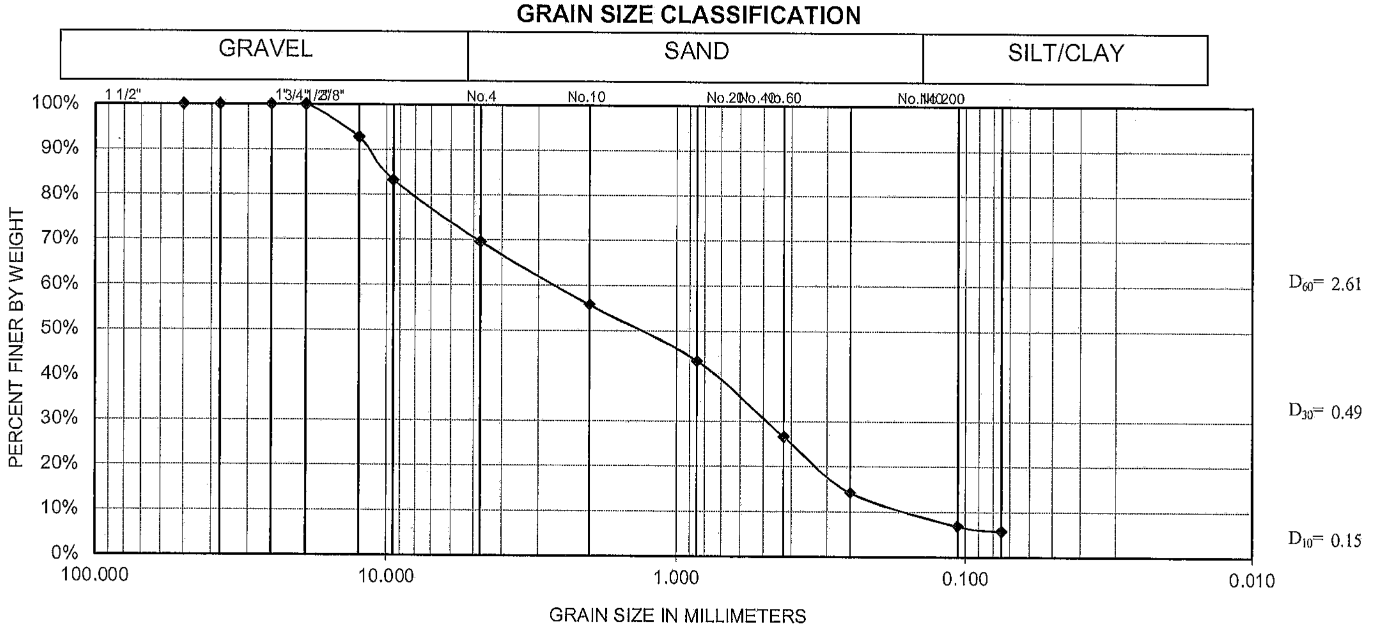
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-168 #13B Depth: 60'	Reported By:	D. NGUYEN	Date Tested:	7/16/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	713.42
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.45
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	628.97
1/2-in. (12.5-mm)	46.04		7.3%	92.7%			
3/8-in. (9.5-mm)	105.29		16.7%	83.3%			
No. 4 (4.75-mm)	190.90		30.4%	69.6%		**Gravel**	**30.4%**
No. 10 (2.00mm)	278.58		44.3%	55.7%			
No.20 (850 - µm)	356.46		56.7%	43.3%		**Sand**	**63.9%**
No.40 (425 - µm)	461.95		73.4%	26.6%			
No.60 (250 - µm)	539.54		85.8%	14.2%		**Fines**	**5.7%**
No.140 (106 - µm)	586.28		93.2%	6.8%			
No.200 (75 - µm)	593.04		94.3%	5.7%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	628.97						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-168 #13B	60'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	16.99	0.60

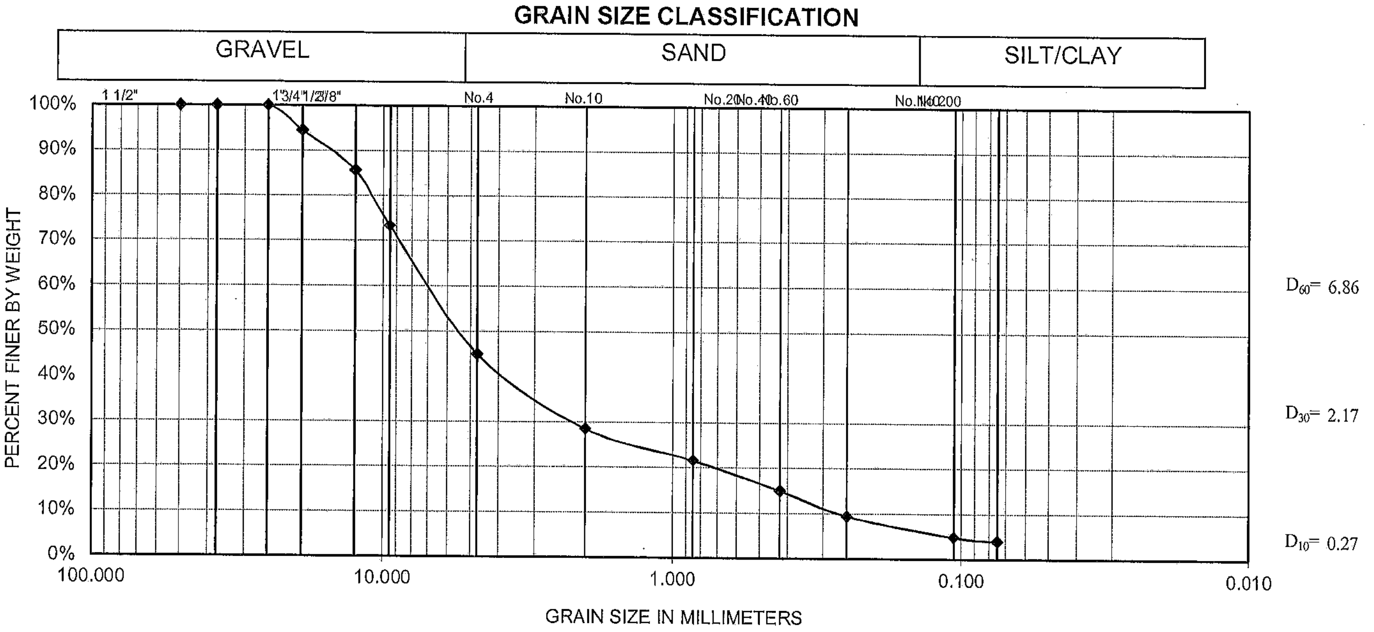
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-168 #30+sho Depth: 104.5'	Reported By:	D. NGUYEN	Date Tested:	7/16/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	1293.70
1-in. (25.0-mm)	0.0		0.0%	100.0%		Tare Wt	102.07
3/4-in. (19.0-mm)	65.8		5.5%	94.5%		Dry Wt of Soil	1191.63
1/2-in. (12.5-mm)	171.19		14.4%	85.6%			
3/8-in. (9.5-mm)	317.96		26.7%	73.3%			
No. 4 (4.75-mm)	656.14		55.1%	44.9%		**Gravel**	**55.1%**
No. 10 (2.00mm)	853.04		71.6%	28.4%			
No.20 (850 - µm)	934.70		78.4%	21.6%		**Sand**	**41.0%**
No.40 (425 - µm)	1013.80		85.1%	14.9%			
No.60 (250 - µm)	1079.90		90.6%	9.4%		**Fines**	**3.9%**
No.140 (106 - µm)	1134.80		95.2%	4.8%			
No.200 (75 - µm)	1145.20		96.1%	3.9%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	1191.63						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-168 #30+shoe	104.5'	GW	WELL-GRADED GRAVEL WITH SAND	25.86	2.59

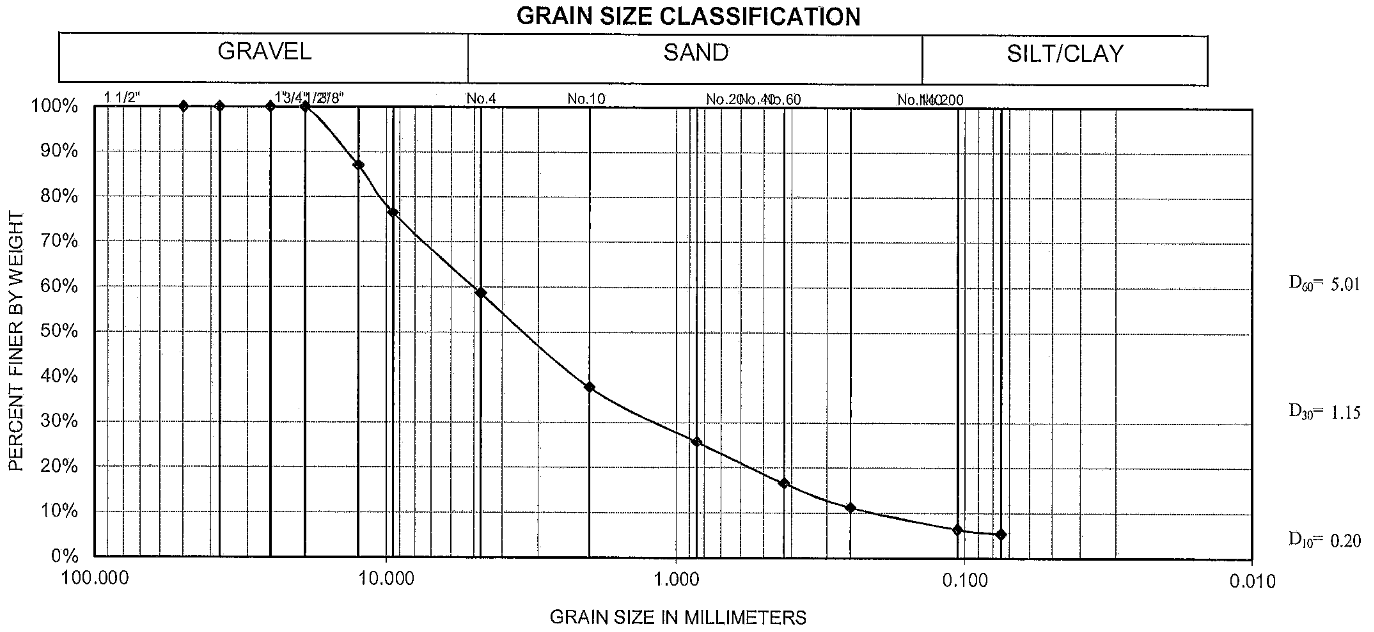
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-169 #10 Depth: 70'	Reported By:	D. NGUYEN	Date Tested:	4/29/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	831.96
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.66
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	746.30
1/2-in. (12.5-mm)	97.30		13.0%	87.0%			
3/8-in. (9.5-mm)	175.42		23.5%	76.5%			
No. 4 (4.75-mm)	308.94		41.4%	58.6%		**Gravel**	**41.4%**
No. 10 (2.00mm)	464.50		62.2%	37.8%			
No.20 (850 - µm)	554.55		74.3%	25.7%		**Sand**	**53.3%**
No.40 (425 - µm)	622.62		83.4%	16.6%			
No.60 (250 - µm)	662.84		88.8%	11.2%		**Fines**	**5.3%**
No.140 (106 - µm)	698.88		93.6%	6.4%			
No.200 (75 - µm)	706.47		94.7%	5.3%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	746.30						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-169 #10	70'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	24.75	1.31

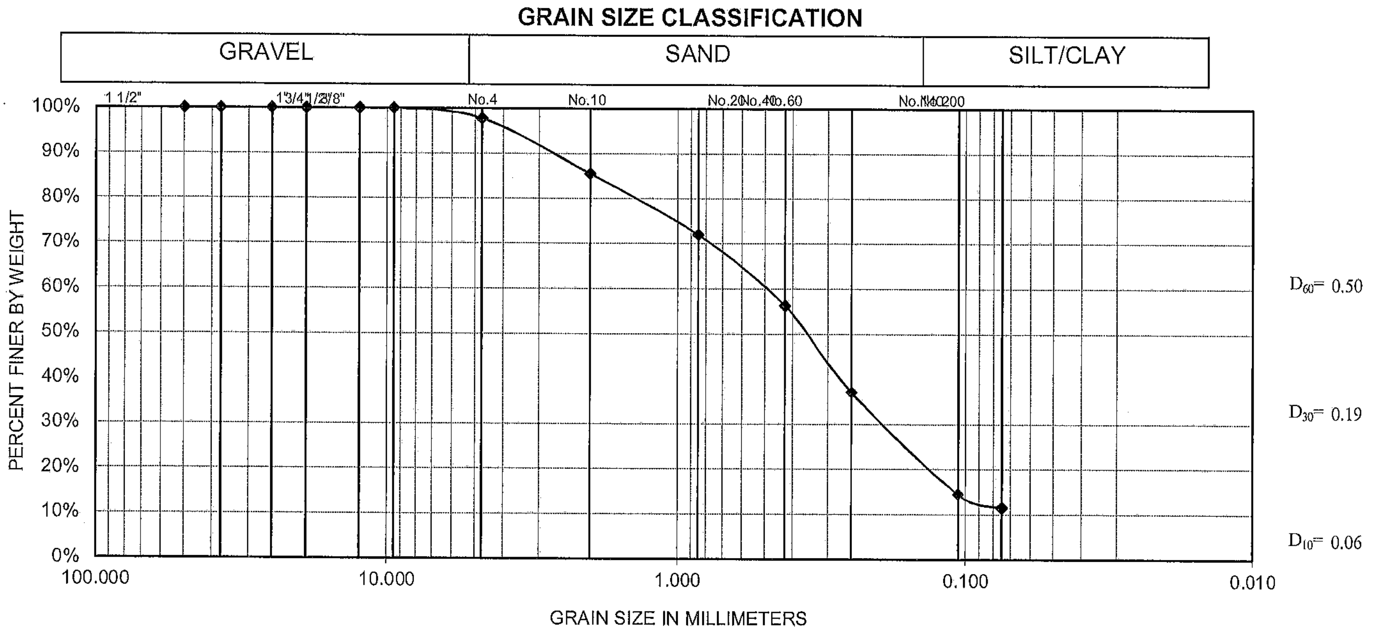
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-169 #25 Depth: 123'	Reported By:	D. NGUYEN	Date Tested:	4/29/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	482.71
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.39
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	399.32
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)	0.00		0.0%	100.0%			
No. 4 (4.75-mm)	9.00		2.3%	97.7%		**Gravel**	**2.3%**
No. 10 (2.00mm)	57.84		14.5%	85.5%			
No.20 (850 - µm)	112.08		28.1%	71.9%		**Sand**	**86.4%**
No.40 (425 - µm)	174.55		43.7%	56.3%			
No.60 (250 - µm)	251.42		63.0%	37.0%		**Fines**	**11.4%**
No.140 (106 - µm)	341.76		85.6%	14.4%			
No.200 (75 - µm)	353.85		88.6%	11.4%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	399.32						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-169 #25	123'	SW-SM	WELL-GRADED SAND WITH SILT	7.83	1.14

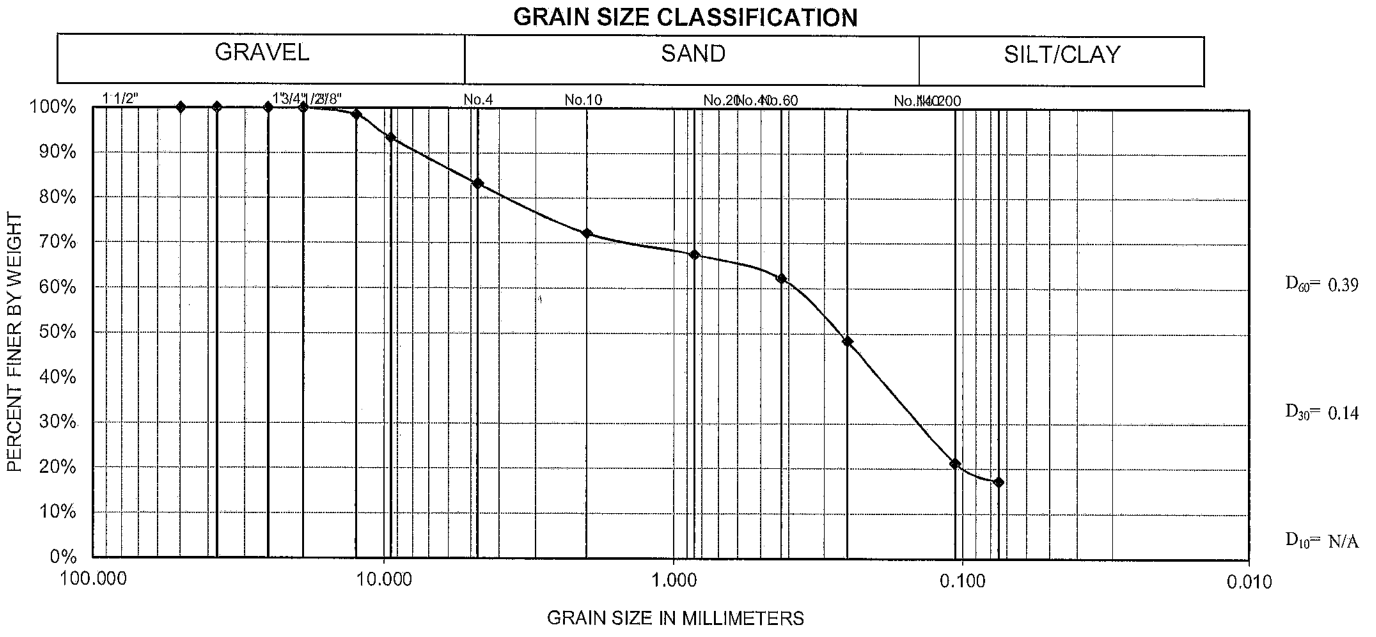
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-171 #14B Depth: 75.5'	Reported By:	D. NGUYEN	Date Tested:	5/14/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	921.40
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.23
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	837.17
1/2-in. (12.5-mm)	12.90		1.5%	98.5%			
3/8-in. (9.5-mm)	55.80		6.7%	93.3%			
No. 4 (4.75-mm)	140.62		16.8%	83.2%		**Gravel**	**16.8%**
No. 10 (2.00mm)	232.90		27.8%	72.2%			
No.20 (850 - µm)	271.75		32.5%	67.5%		**Sand**	**66.1%**
No.40 (425 - µm)	316.07		37.8%	62.2%			
No.60 (250 - µm)	433.17		51.7%	48.3%		**Fines**	**17.1%**
No.140 (106 - µm)	659.55		78.8%	21.2%			
No.200 (75 - µm)	694.33		82.9%	17.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	837.17						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-171 #14B	75.5'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

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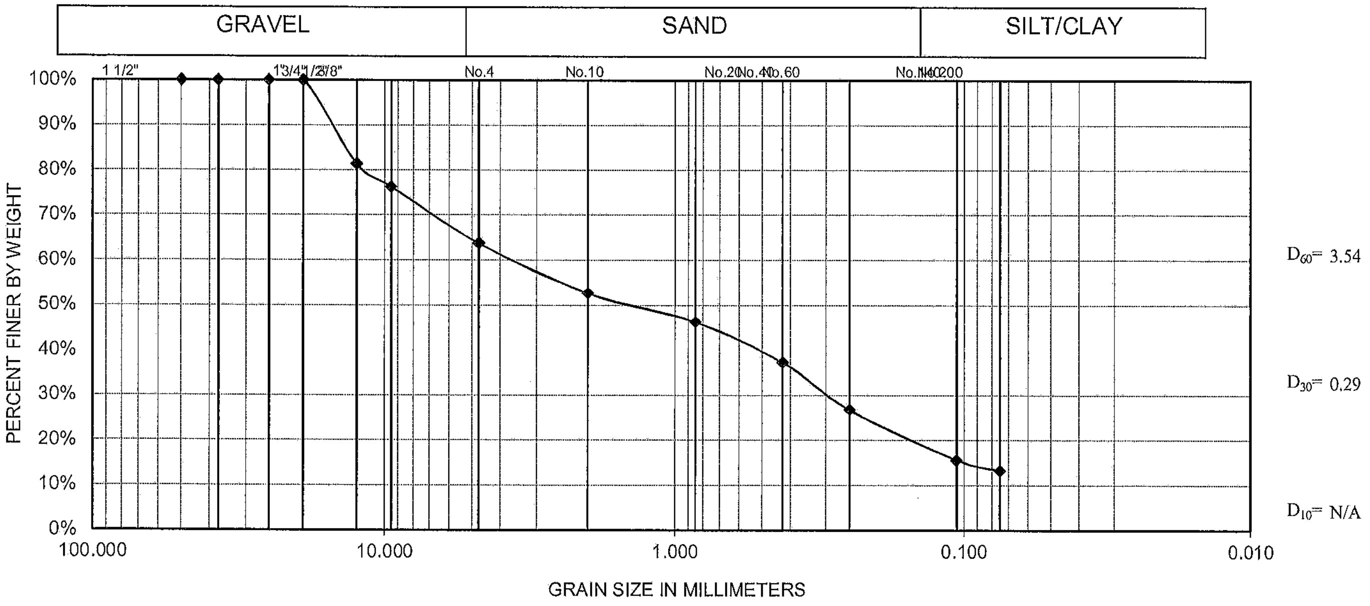
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-173 #37 Depth: 100'	Reported By:	D. NGUYEN	Date Tested:	5/14/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	383.94
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.94
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	299.00
1/2-in. (12.5-mm)	55.7		18.6%	81.4%			
3/8-in. (9.5-mm)	70.9		23.7%	76.3%			
No. 4 (4.75-mm)	108.3		36.2%	63.8%		**Gravel**	**36.2%**
No. 10 (2.00mm)	141.6		47.3%	52.7%			
No.20 (850 - µm)	160.70		53.7%	46.3%		**Sand**	**50.6%**
No.40 (425 - µm)	187.63		62.8%	37.2%			
No.60 (250 - µm)	218.97		73.2%	26.8%		**Fines**	**13.2%**
No.140 (106 - µm)	252.29		84.4%	15.6%			
No.200 (75 - µm)	259.52		86.8%	13.2%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	299.00						

GRAIN SIZE CLASSIFICATION



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-173 #37	100'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

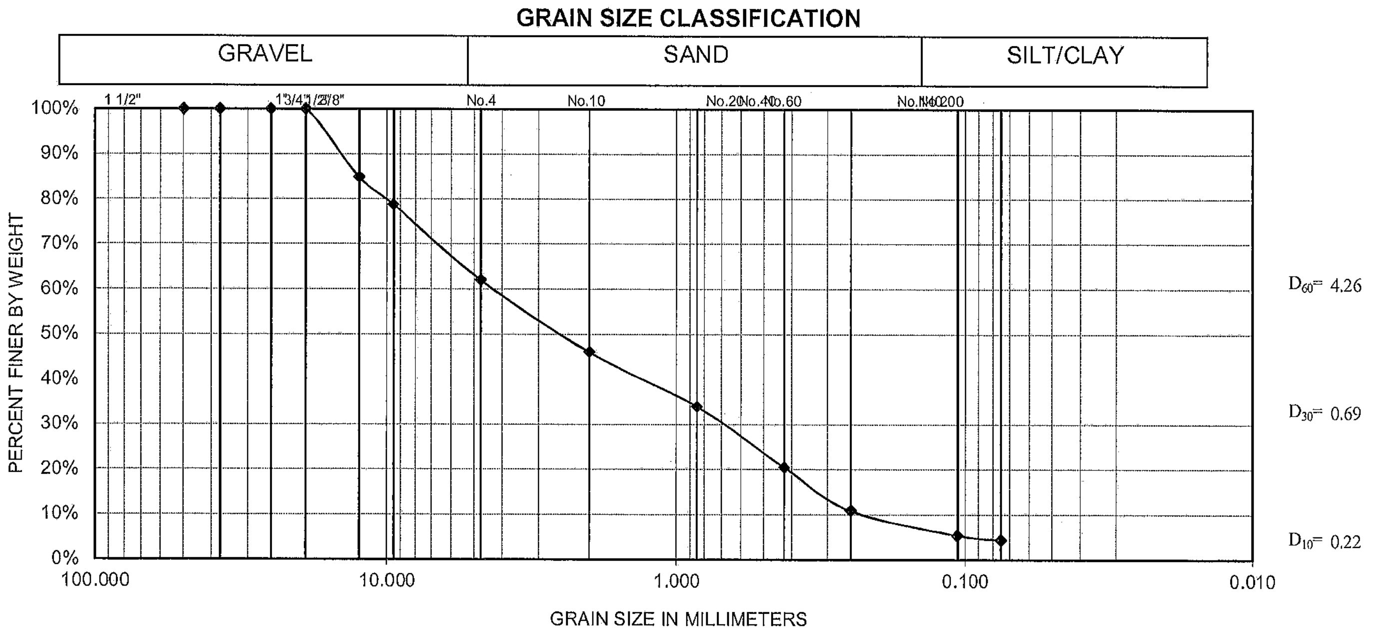
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-175 #14A Depth: 50.5'	Reported By:	D. NGUYEN	Date Tested:	5/14/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	892.79
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.21
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	782.58
1/2-in. (12.5-mm)	118.54		15.1%	84.9%			
3/8-in. (9.5-mm)	166.34		21.3%	78.7%			
No. 4 (4.75-mm)	297.12		38.0%	62.0%		**Gravel**	**38.0%**
No. 10 (2.00mm)	422.89		54.0%	46.0%			
No.20 (850 - µm)	517.10		66.1%	33.9%		**Sand**	**57.7%**
No.40 (425 - µm)	622.70		79.6%	20.4%			
No.60 (250 - µm)	697.95		89.2%	10.8%		**Fines**	**4.3%**
No.140 (106 - µm)	740.79		94.7%	5.3%			
No.200 (75 - µm)	748.54		95.7%	4.3%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	782.58						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-175 #14A	50.5'	SP	POORLY-GRADED SAND WITH GRAVEL	19.35	0.52

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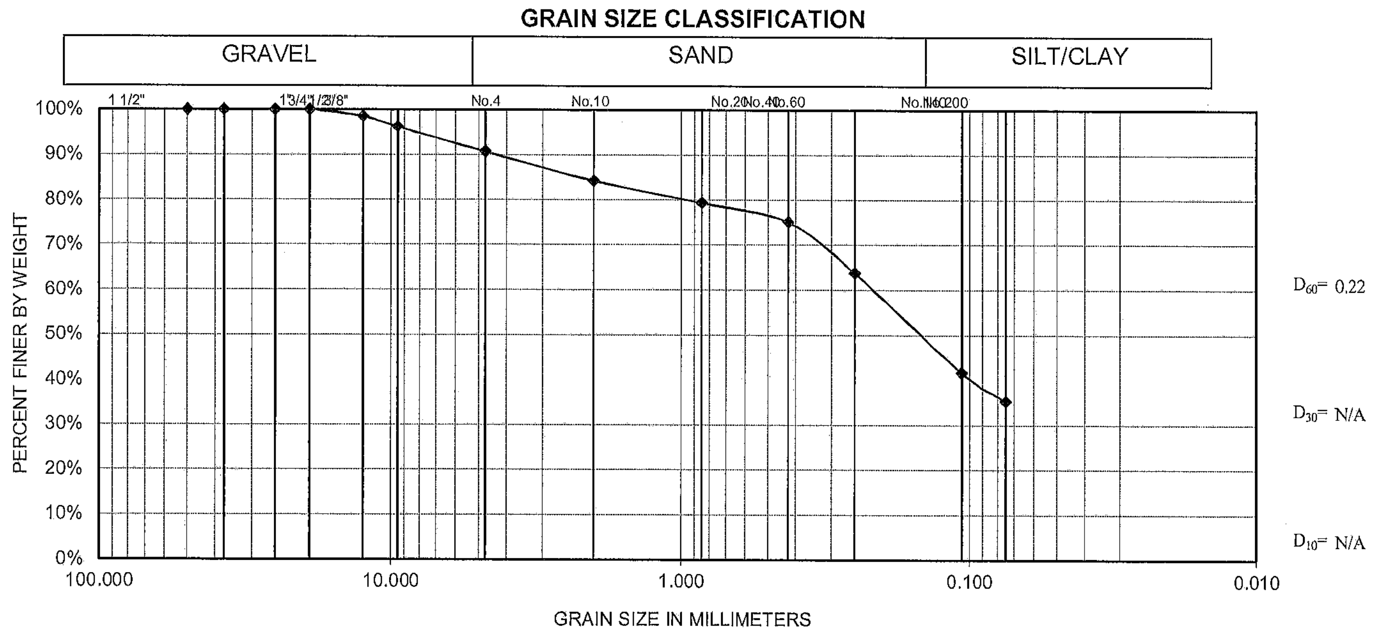
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-175 #18A Depth: 62'	Reported By:	D. NGUYEN	Date Tested:	5/14/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	877.00
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.85
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	792.15
1/2-in. (12.5-mm)	12.37		1.6%	98.4%			
3/8-in. (9.5-mm)	30.33		3.8%	96.2%			
No. 4 (4.75-mm)	73.92		9.3%	90.7%		**Gravel**	**9.3%**
No. 10 (2.00mm)	125.08		15.8%	84.2%			
No.20 (850 - µm)	163.79		20.7%	79.3%		**Sand**	**55.4%**
No.40 (425 - µm)	197.67		25.0%	75.0%			
No.60 (250 - µm)	286.91		36.2%	63.8%		**Fines**	**35.3%**
No.140 (106 - µm)	462.59		58.4%	41.6%			
No.200 (75 - µm)	512.49		64.7%	35.3%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	792.15						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-175 #18A	62'	SM	SILTY SAND	N/A	N/A

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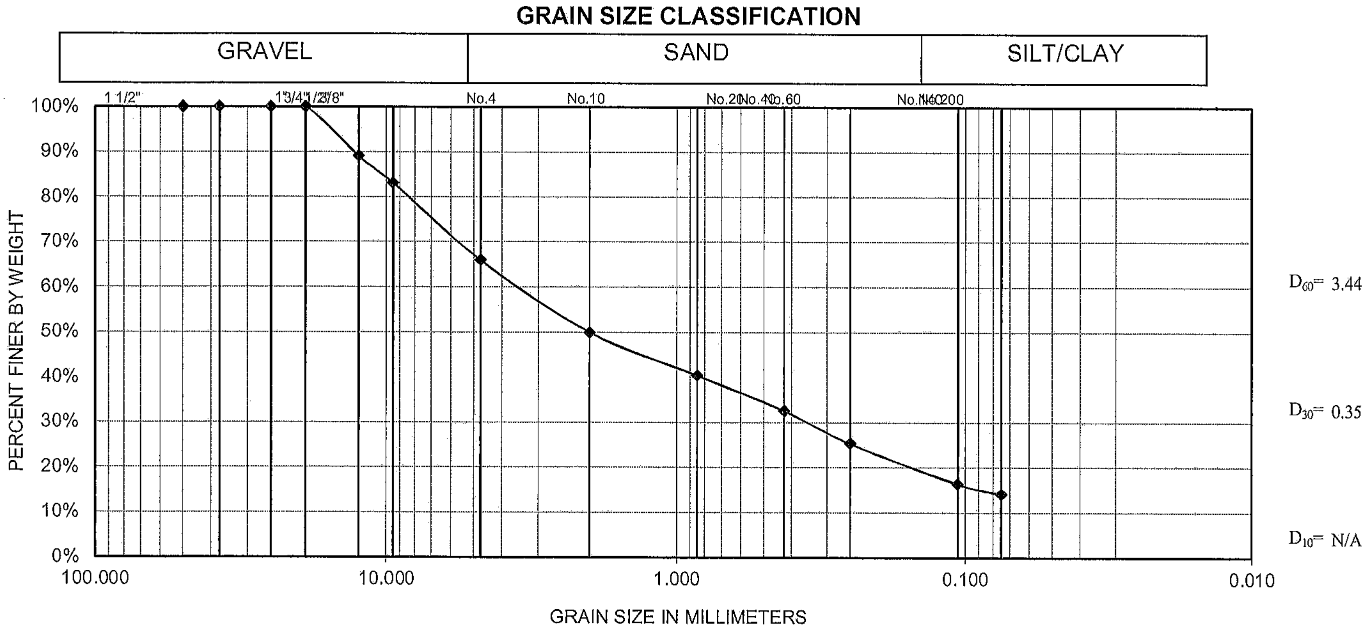
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T02
Sample #:	BH-175 #30 Depth: 93'	Reported By:	D. NGUYEN	Date Tested:	5/14/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	718.00
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	85.49
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	632.51
1/2-in. (12.5-mm)	69.06		10.9%	89.1%			
3/8-in. (9.5-mm)	106.80		16.9%	83.1%			
No. 4 (4.75-mm)	214.88		34.0%	66.0%		**Gravel**	**34%**
No. 10 (2.00mm)	316.65		50.1%	49.9%			
No.20 (850 - µm)	377.10		59.6%	40.4%		**Sand**	**52%**
No.40 (425 - µm)	426.69		67.5%	32.5%			
No.60 (250 - µm)	472.77		74.7%	25.3%		**Fines**	**14%**
No.140 (106 - µm)	529.39		83.7%	16.3%			
No.200 (75 - µm)	543.50		85.9%	14.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	632.51						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-175 #30	93'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

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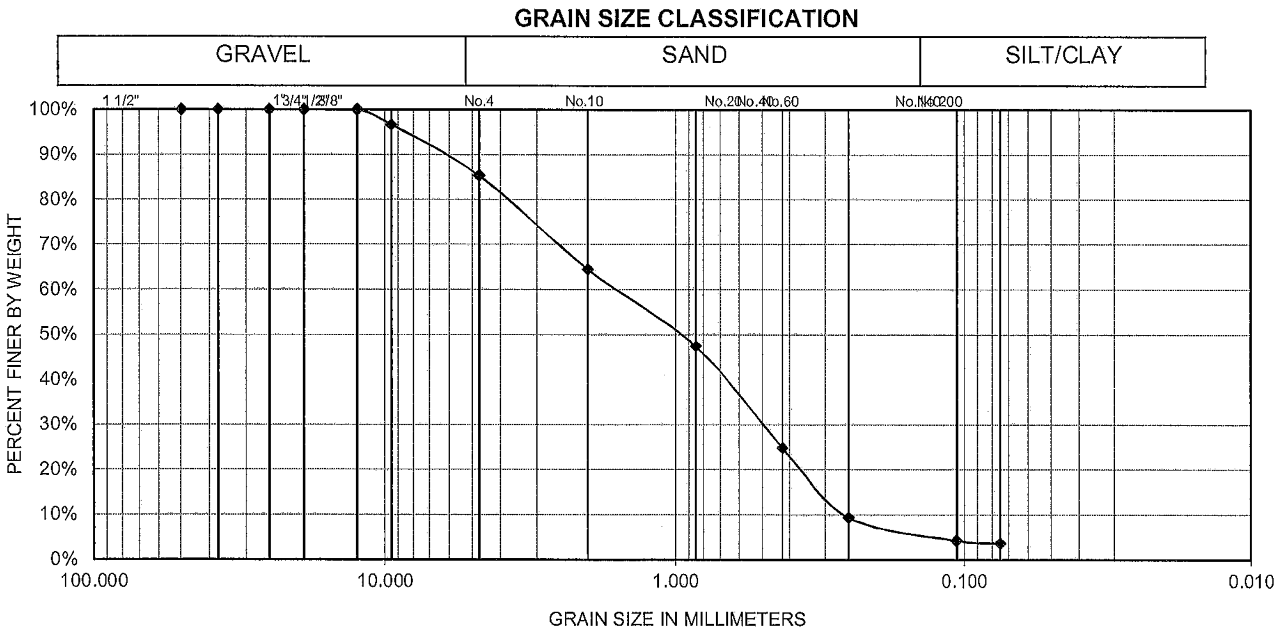
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-176 #9B Depth: 35'	Reported By:	D. NGUYEN	Date Tested:	5/14/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	981.29
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	109.63
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	871.66
1/2-in. (12.5-mm)	0.00		0.0%	100.0%			
3/8-in. (9.5-mm)	29.40		3.4%	96.6%			
No. 4 (4.75-mm)	127.63		14.6%	85.4%		**Gravel**	**14.6%**
No. 10 (2.00mm)	309.46		35.5%	64.5%			
No.20 (850 - µm)	459.07		52.7%	47.3%		**Sand**	**81.8%**
No.40 (425 - µm)	654.97		75.1%	24.9%			
No.60 (250 - µm)	790.26		90.7%	9.3%		**Fines**	**3.6%**
No.140 (106 - µm)	834.74		95.8%	4.2%			
No.200 (75 - µm)	840.35		96.4%	3.6%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	871.66						



D_{60}= 1.60

D_{30}= 0.50

D_{10}= 0.26

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-176 #9B	35'	SP	POORLY-GRADED SAND	6.25	0.61

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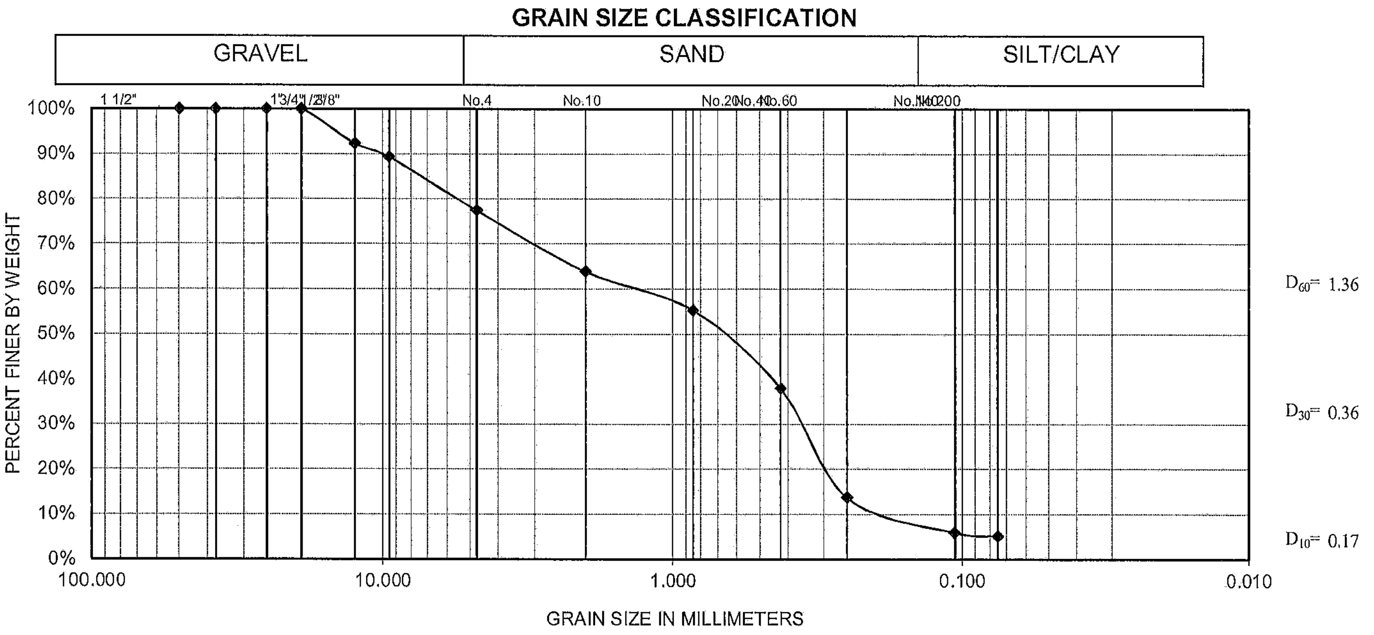
Gsieves 09/25/07 (FYW)

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G970		Project #:	2019-131-T04
Sample #:	BH-176 #15	Depth:	65'	Reported By:	D. NGUYEN	Date Tested:	5/26/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	913.07
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	104.54
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	808.53
1/2-in. (12.5-mm)	62.32		7.7%	92.3%			
3/8-in. (9.5-mm)	86.64		10.7%	89.3%			
No. 4 (4.75-mm)	182.55		22.6%	77.4%		**Gravel**	**22.6%**
No. 10 (2.00mm)	292.15		36.1%	63.9%			
No.20 (850 - µm)	361.67		44.7%	55.3%		**Sand**	**72.3%**
No.40 (425 - µm)	501.80		62.1%	37.9%			
No.60 (250 - µm)	698.32		86.4%	13.6%		**Fines**	**5.1%**
No.140 (106 - µm)	760.98		94.1%	5.9%			
No.200 (75 - µm)	767.44		94.9%	5.1%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	808.53						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-176 #15	65'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	8.14	0.56

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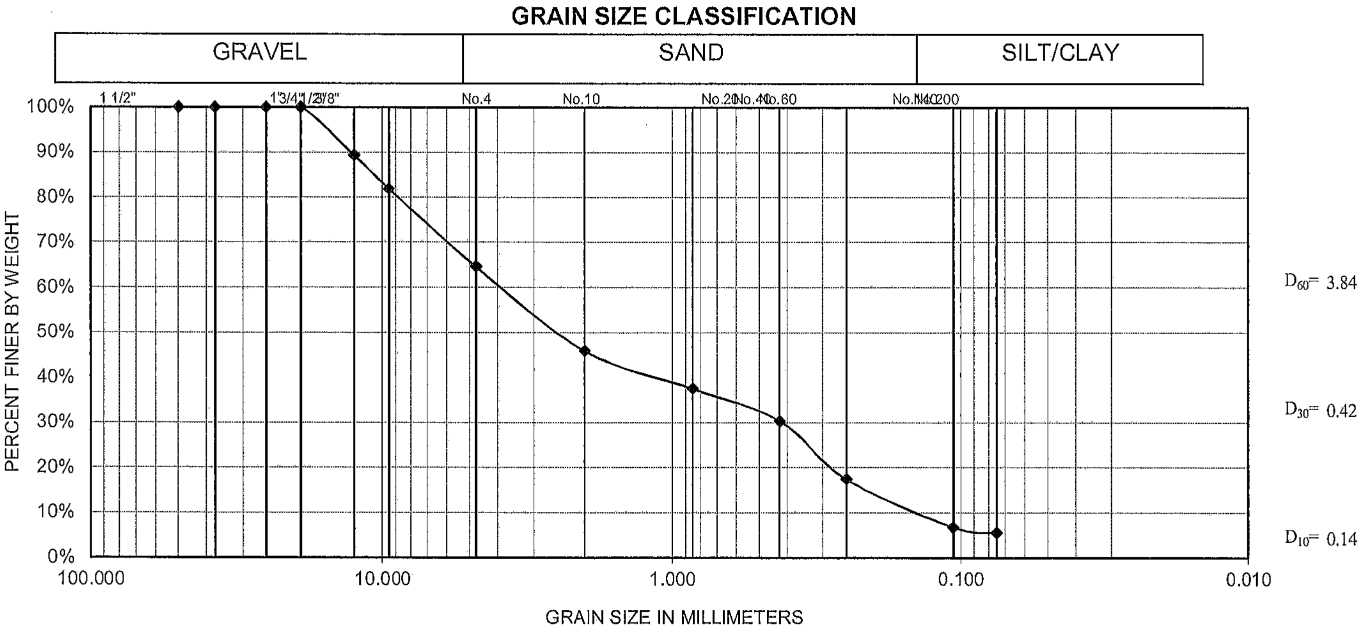
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-176 #22 Depth: 100'	Reported By:	D. NGUYEN	Date Tested:	5/26/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	945.56
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.18
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	861.38
1/2-in. (12.5-mm)	91.98		10.7%	89.3%			
3/8-in. (9.5-mm)	156.09		18.1%	81.9%			
No. 4 (4.75-mm)	305.19		35.4%	64.6%		**Gravel**	**35.4%**
No. 10 (2.00mm)	466.16		54.1%	45.9%			
No.20 (850 - µm)	538.51		62.5%	37.5%		**Sand**	**59.1%**
No.40 (425 - µm)	599.98		69.7%	30.3%			
No.60 (250 - µm)	711.61		82.6%	17.4%		**Fines**	**5.4%**
No.140 (106 - µm)	803.70		93.3%	6.7%			
No.200 (75 - µm)	814.50		94.6%	5.4%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	861.38						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-176 #22	100'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	27.82	0.33

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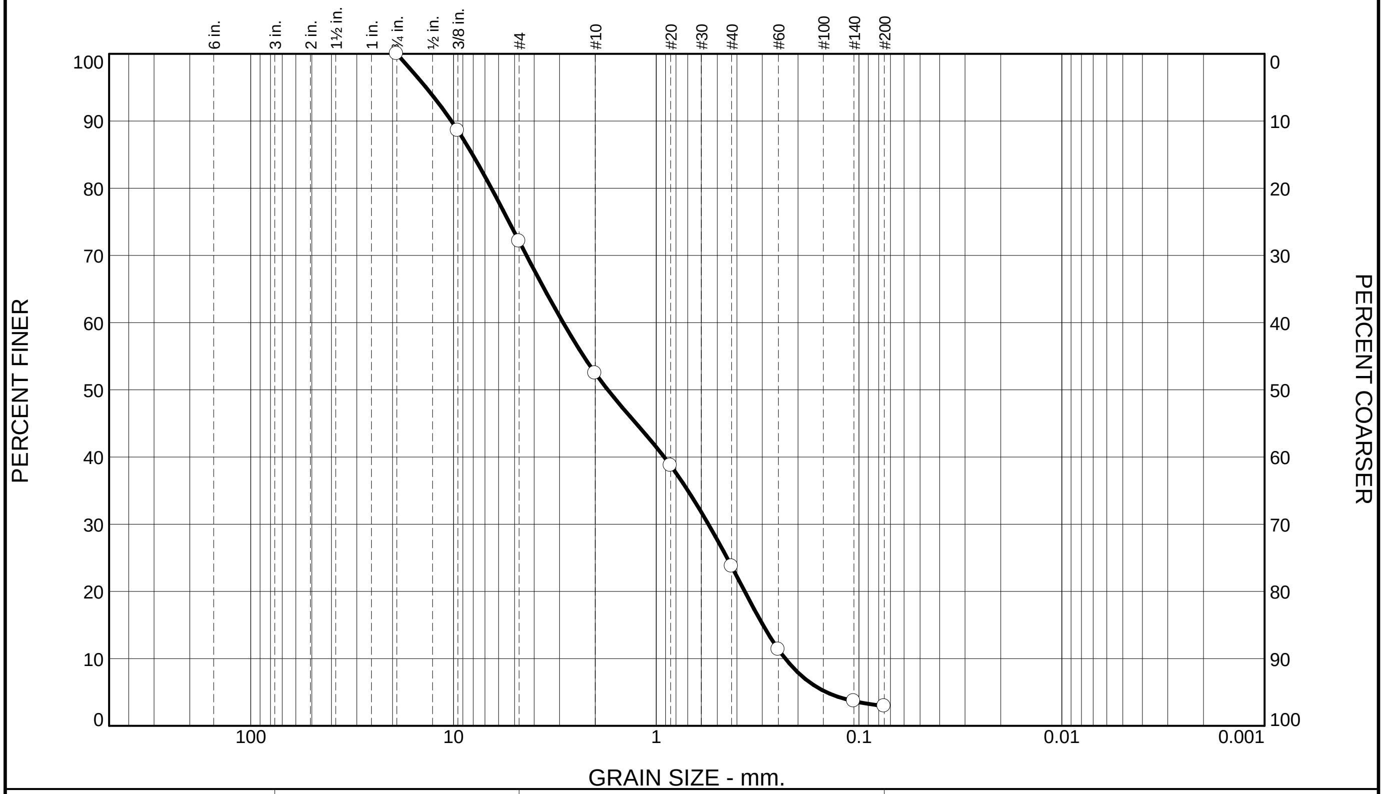
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	28	20	28	21	3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	89		
#4	72		
#10	52		
#20	39		
#40	24		
#60	11		
#140	4		
#200	2.9		

* (no specification provided)

Soil Description

Brown poorly graded sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.2462	D_{85}= 8.0578	D_{60}= 2.8813
D_{50}= 1.7356	D_{30}= 0.5533	D_{15}= 0.2977
D_{10}= 0.2312	C_u= 12.46	C_c= 0.46

Classification

USCS= SP AASHTO=

Remarks

Source of Sample: BH-177 **Depth:** 40.5
Sample Number: 10A

Date: 7-21-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2973-001.0 **Figure**

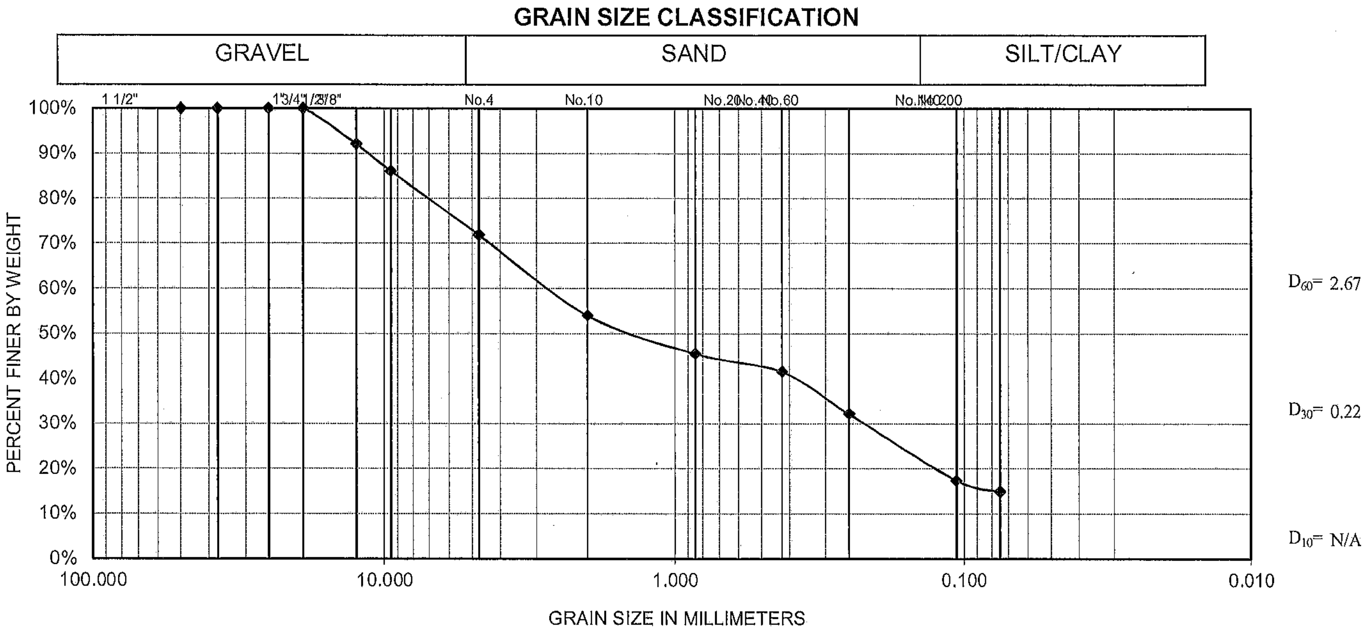
Tested By: JH **Checked By:** JH

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-177 #11 Depth: 45'	Reported By:	D. NGUYEN	Date Tested:	5/26/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	602.71
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	109.90
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	492.81
1/2-in. (12.5-mm)	38.86		7.9%	92.1%			
3/8-in. (9.5-mm)	68.69		13.9%	86.1%			
No. 4 (4.75-mm)	138.47		28.1%	71.9%		**Gravel**	**28.1%**
No. 10 (2.00mm)	226.82		46.0%	54.0%			
No.20 (850 - μm)	268.65		54.5%	45.5%		**Sand**	**57.1%**
No.40 (425 - μm)	288.37		58.5%	41.5%			
No.60 (250 - μm)	334.54		67.9%	32.1%		**Fines**	**14.8%**
No.140 (106 - μm)	407.45		82.7%	17.3%			
No.200 (75 - μm)	419.74		85.2%	14.8%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	492.81						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-177 #11	45'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

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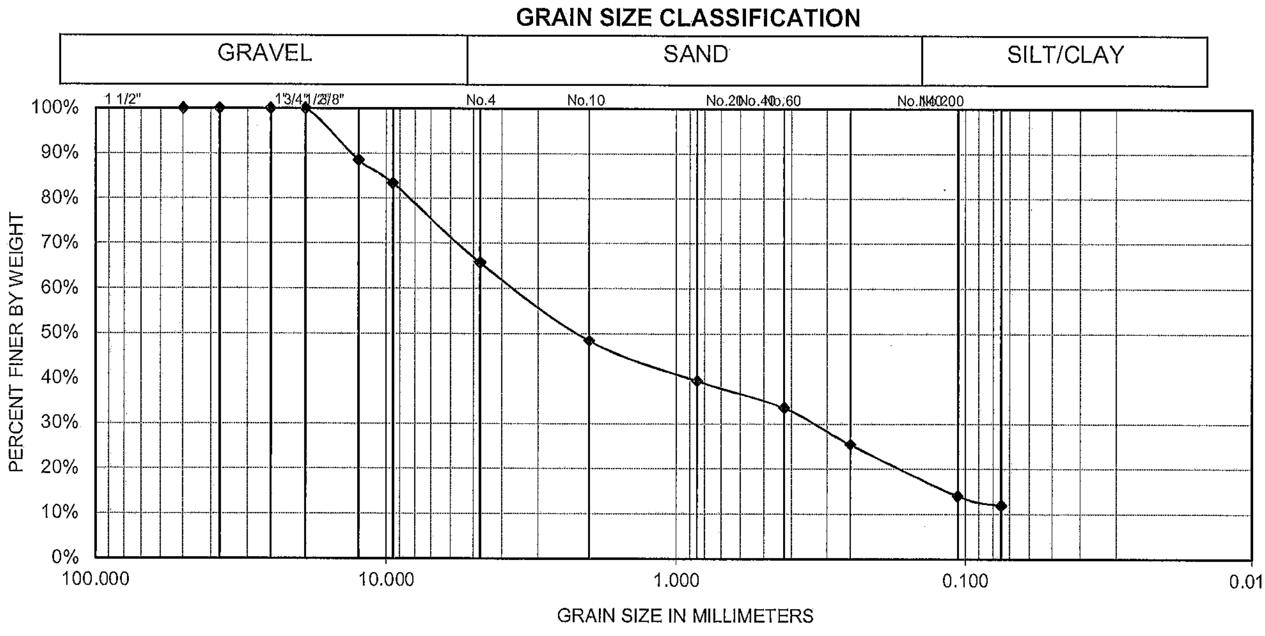
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G970	Project #:	2019-131-T04	
Sample #:	BH-177 #16A, 16B	Depth: 70'-71'	Reported By:	D. NGUYEN	Date Tested:	5/26/2020	

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	1403.49
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.60
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	1292.89
1/2-in. (12.5-mm)	148.76		11.5%	88.5%			
3/8-in. (9.5-mm)	215.68		16.7%	83.3%			
No. 4 (4.75-mm)	443.40		34.3%	65.7%		**Gravel**	**34.3%**
No. 10 (2.00mm)	667.68		51.6%	48.4%			
No.20 (850 - µm)	781.93		60.5%	39.5%		**Sand**	**53.9%**
No.40 (425 - µm)	859.48		66.5%	33.5%			
No.60 (250 - µm)	963.90		74.6%	25.4%		**Fines**	**11.8%**
No.140 (106 - µm)	1112.50		86.0%	14.0%			
No.200 (75 - µm)	1140.20		88.2%	11.8%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	1292.89						



D_{60}= 3.57

D_{30}= 0.34

D_{10}= 0.06

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-177 #16A, 16B	70'-71'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	63.83	0.57

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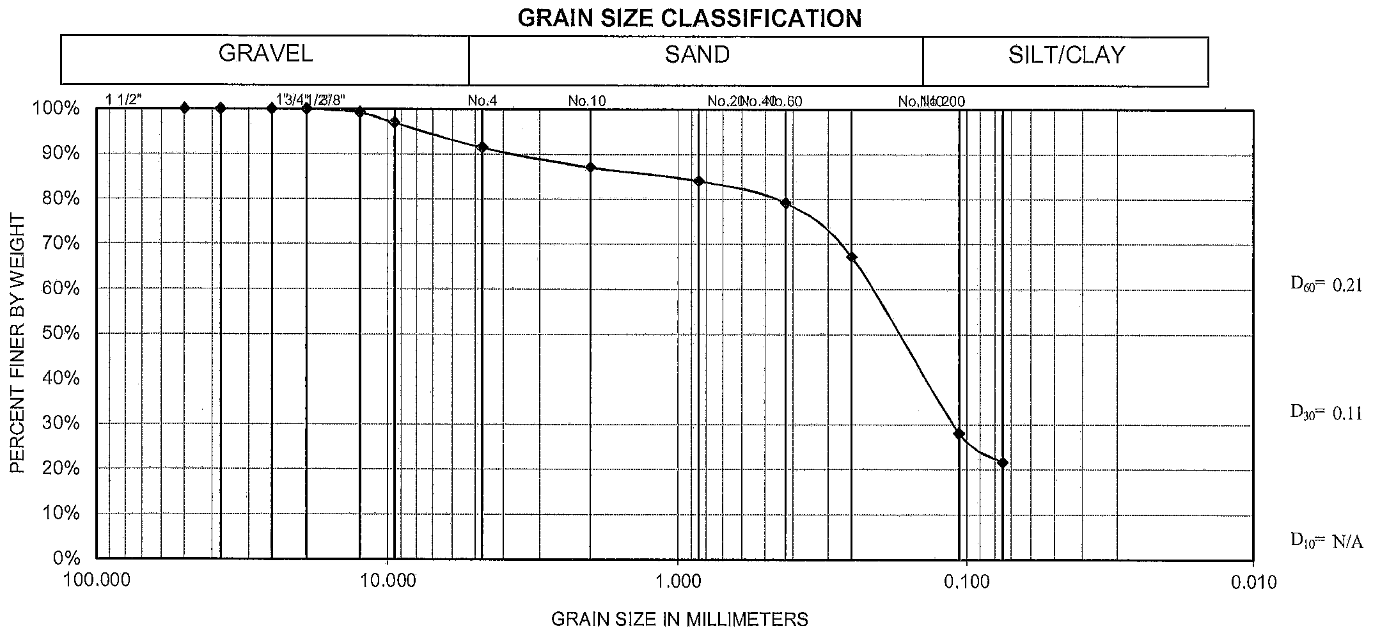
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-178 #18B Depth: 85'	Reported By:	D. NGUYEN	Date Tested:	5/26/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	474.82
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	84.66
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	390.16
1/2-in. (12.5-mm)	3.18		0.8%	99.2%			
3/8-in. (9.5-mm)	12.14		3.1%	96.9%			
No. 4 (4.75-mm)	33.45		8.6%	91.4%		**Gravel**	**8.6%**
No. 10 (2.00mm)	50.46		12.9%	87.1%			
No.20 (850 - µm)	62.08		15.9%	84.1%		**Sand**	**69.9%**
No.40 (425 - µm)	81.01		20.8%	79.2%			
No.60 (250 - µm)	127.74		32.7%	67.3%		**Fines**	**21.6%**
No.140 (106 - µm)	280.84		72.0%	28.0%			
No.200 (75 - µm)	306.00		78.4%	21.6%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	390.16						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-178 #18B	85'	SM	SILTY SAND	N/A	N/A

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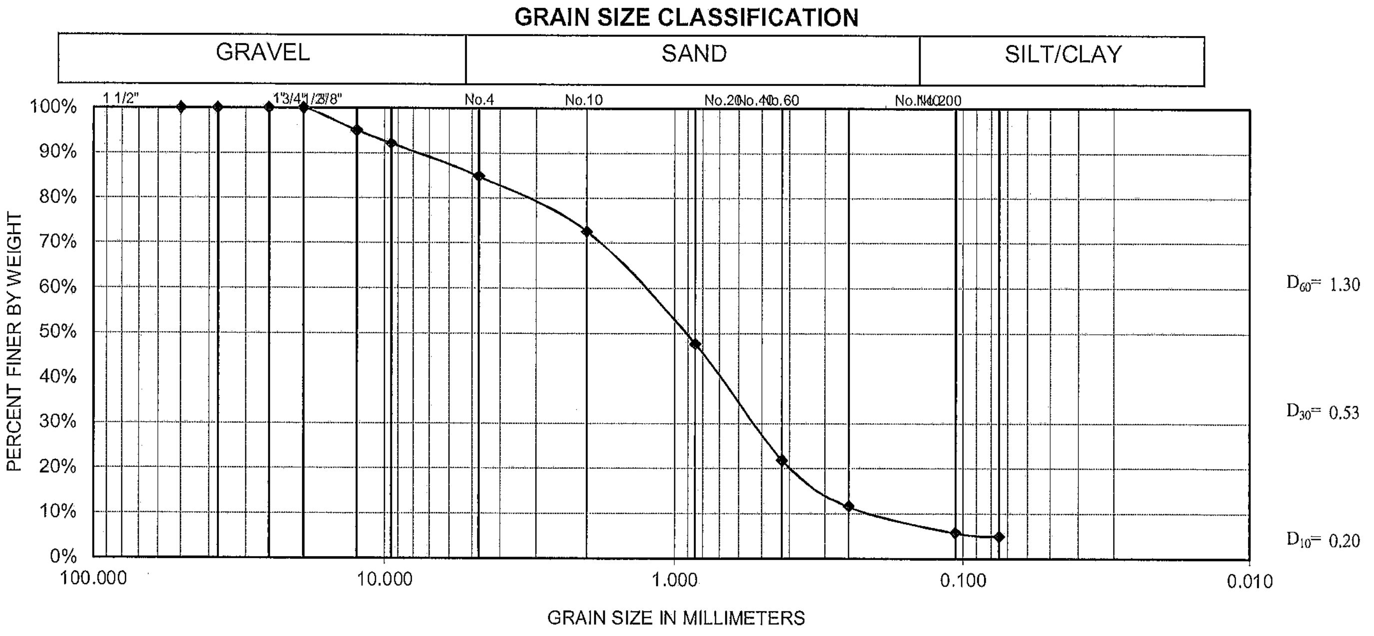
Gsieves 09/25/07 (FYW)

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G970	Project #:	2019-131-T04
Sample #:	BH-178 #20 Depth: 95'	Reported By:	D. NGUYEN	Date Tested:	5/26/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	785.57
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.44
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	675.13
1/2-in. (12.5-mm)	33.77		5.0%	95.0%			
3/8-in. (9.5-mm)	53.24		7.9%	92.1%			
No. 4 (4.75-mm)	102.55		15.2%	84.8%		**Gravel**	**15.2%**
No. 10 (2.00mm)	184.60		27.3%	72.7%			
No.20 (850 - µm)	353.09		52.3%	47.7%		**Sand**	**80.0%**
No.40 (425 - µm)	527.58		78.1%	21.9%			
No.60 (250 - µm)	597.44		88.5%	11.5%		**Fines**	**4.9%**
No.140 (106 - µm)	637.03		94.4%	5.6%			
No.200 (75 - µm)	642.35		95.1%	4.9%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	675.13						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-178 #20	95'	SW	WELL-GRADED SAND WITH GRAVEL	6.46	1.08

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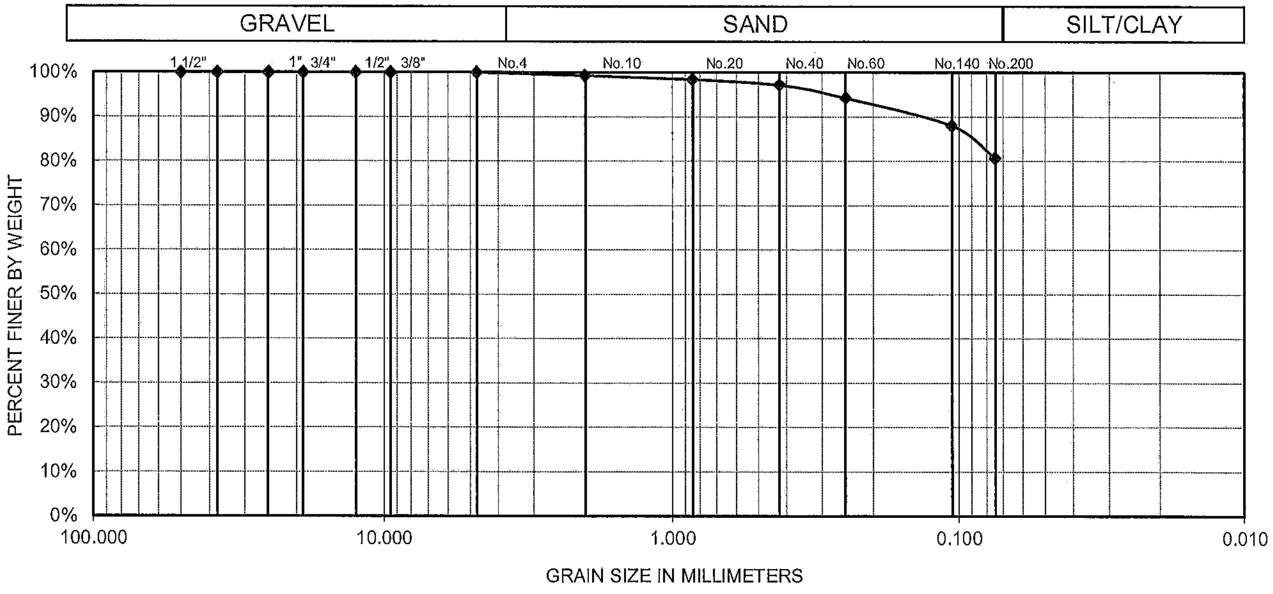
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G986	Project #:	2019-131-T05
Sample #:	BH-179 #6A Depth: 26'	Reported By:	D. NGUYEN	Date Tested:	11/18/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	455.29
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	83.44
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	371.85
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)	0.00		0.0%	100.0%			
No. 4 (4.75-mm)	0.23		0.1%	99.9%		**Gravel**	**0.1%**
No. 10 (2.00mm)	2.78		0.7%	99.3%			
No.20 (850 - µm)	6.00		1.6%	98.4%		**Sand**	**19.2%**
No.40 (425 - µm)	10.56		2.8%	97.2%			
No.60 (250 - µm)	21.32		5.7%	94.3%		**Fines**	**80.7%**
No.140 (106 - µm)	44.58		12.0%	88.0%			
No.200 (75 - µm)	71.76		19.3%	80.7%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	371.85						

GRAIN SIZE CLASSIFICATION



D_{60}= N/A

D_{30}= N/A

D_{10}= N/A

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-179 #6A	26'	ML	SILT WITH SAND	N/A	N/A

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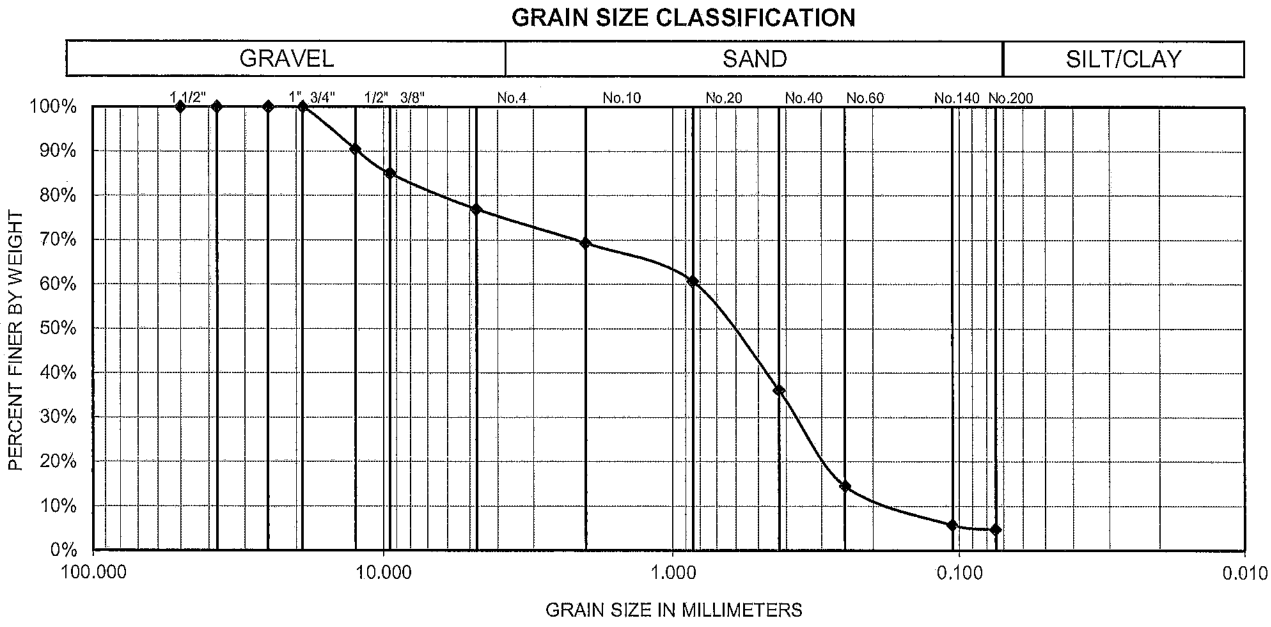
SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G986	Project #:	2019-131-T05
Sample #:	BH-179 #13A Depth: 61'	Reported By:	D. NGUYEN	Date Tested:	11/18/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	940.81
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	102.90
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	837.91
1/2-in. (12.5-mm)	80.01		9.5%	90.5%			
3/8-in. (9.5-mm)	125.50		15.0%	85.0%			
No. 4 (4.75-mm)	192.90		23.0%	77.0%		**Gravel**	**23.0%**
No. 10 (2.00mm)	256.80		30.6%	69.4%			
No.20 (850 - µm)	329.10		39.3%	60.7%		**Sand**	**72.2%**
No.40 (425 - µm)	534.92		63.8%	36.2%			
No.60 (250 - µm)	715.65		85.4%	14.6%		**Fines**	**4.8%**
No.140 (106 - µm)	788.75		94.1%	5.9%			
No.200 (75 - µm)	797.59		95.2%	4.8%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	837.91						



D_{60}= 0.83

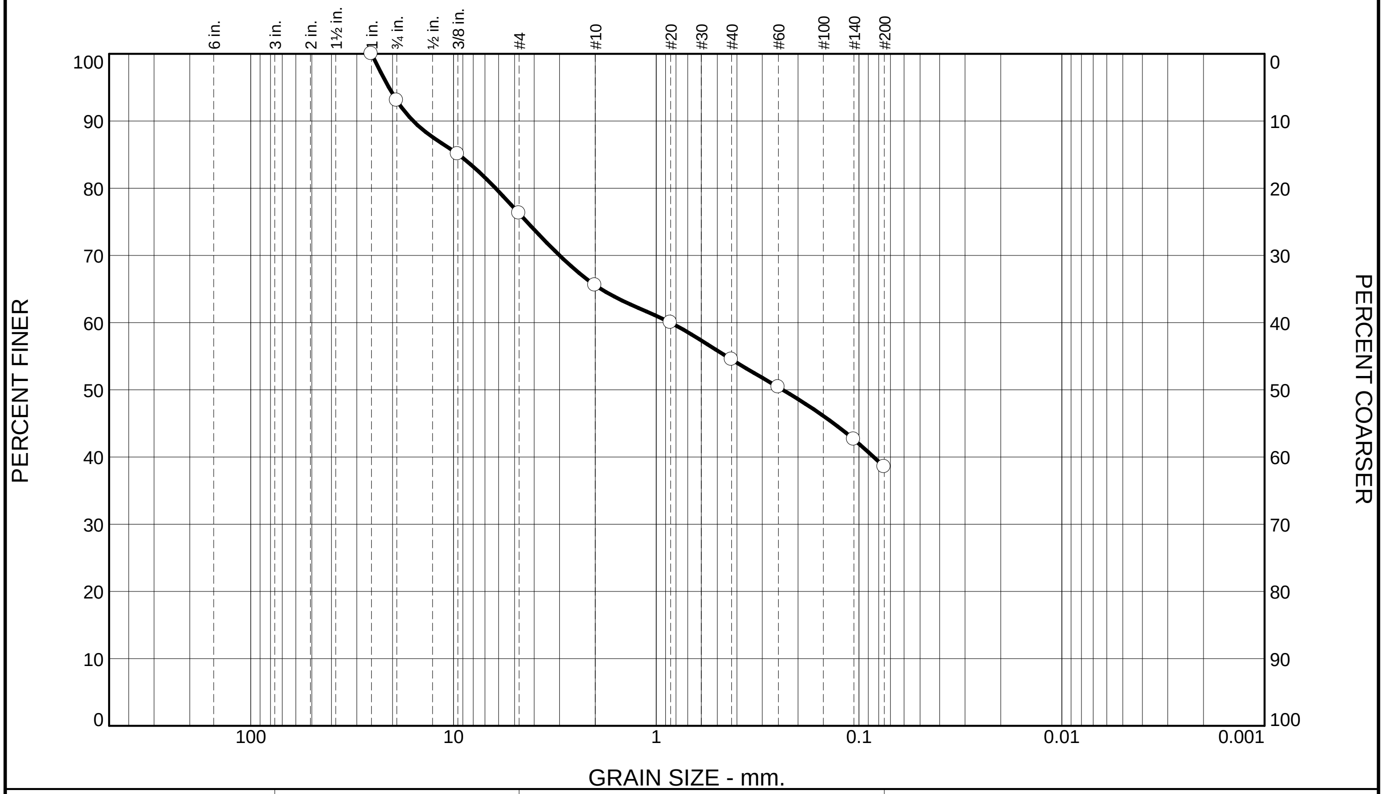
D_{30}= 0.37

D_{10}= 0.16

SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-179 #13A	61'	SP	POORLY-GRADED SAND WITH GRAVEL	5.23	1.01

PARIKH CONSULTANTS, INC.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	7	17	10	12	15	39	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100		
3/4	93		
3/8	85		
#4	76		
#10	66		
#20	60		
#40	54		
#60	50		
#140	43		
#200	39		

* (no specification provided)

Soil Description

Greenish gray clayey sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 15.8229 D_{85}= 9.4534 D_{60}= 0.8517

D_{50}= 0.2379 D_{30}= D_{15}=

D_{10}= C_u= C_c=

Classification

USCS= SC AASHTO=

Remarks

Source of Sample: BH-179 **Depth:** 120

Sample Number: 25

Date: 11-30-20

Client: Mott MacDonald

Project: BSVII 507385606

Project No: 2973-001.0 **Figure**

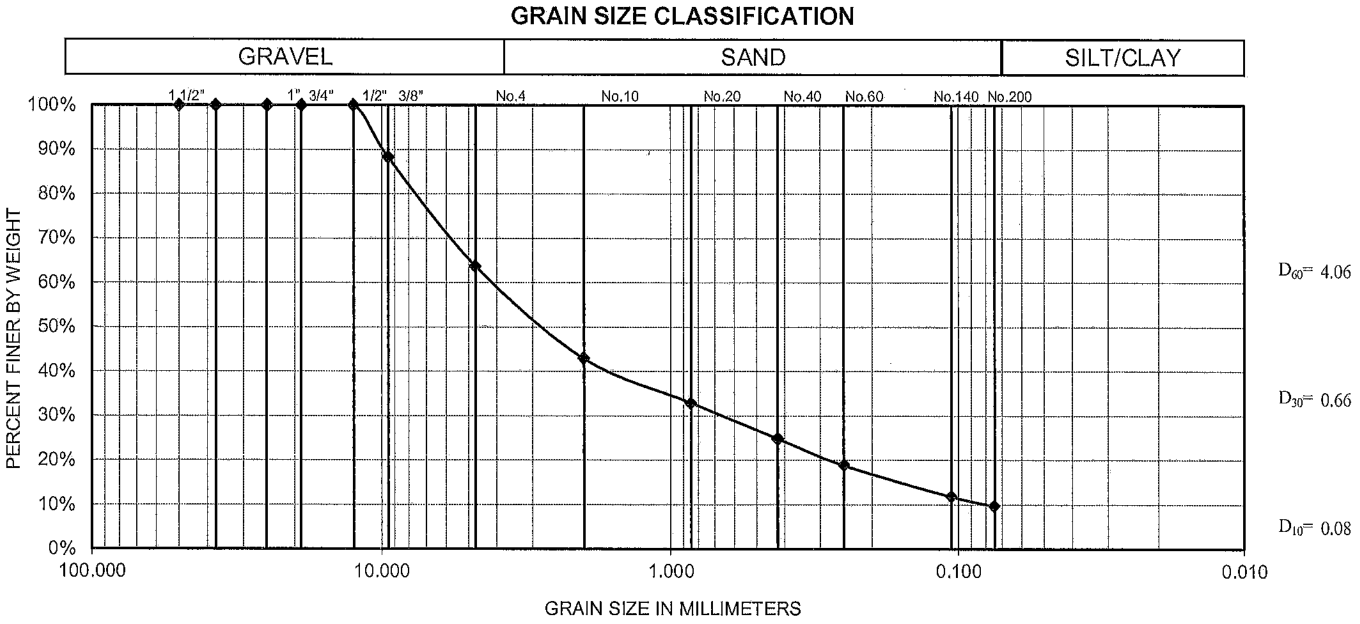
Tested By: MH **Checked By:** JH

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G986	Project #:	2019-131-T05
Sample #:	BH-179 #35 Depth: 170'	Reported By:	D. NGUYEN	Date Tested:	11/18/2020

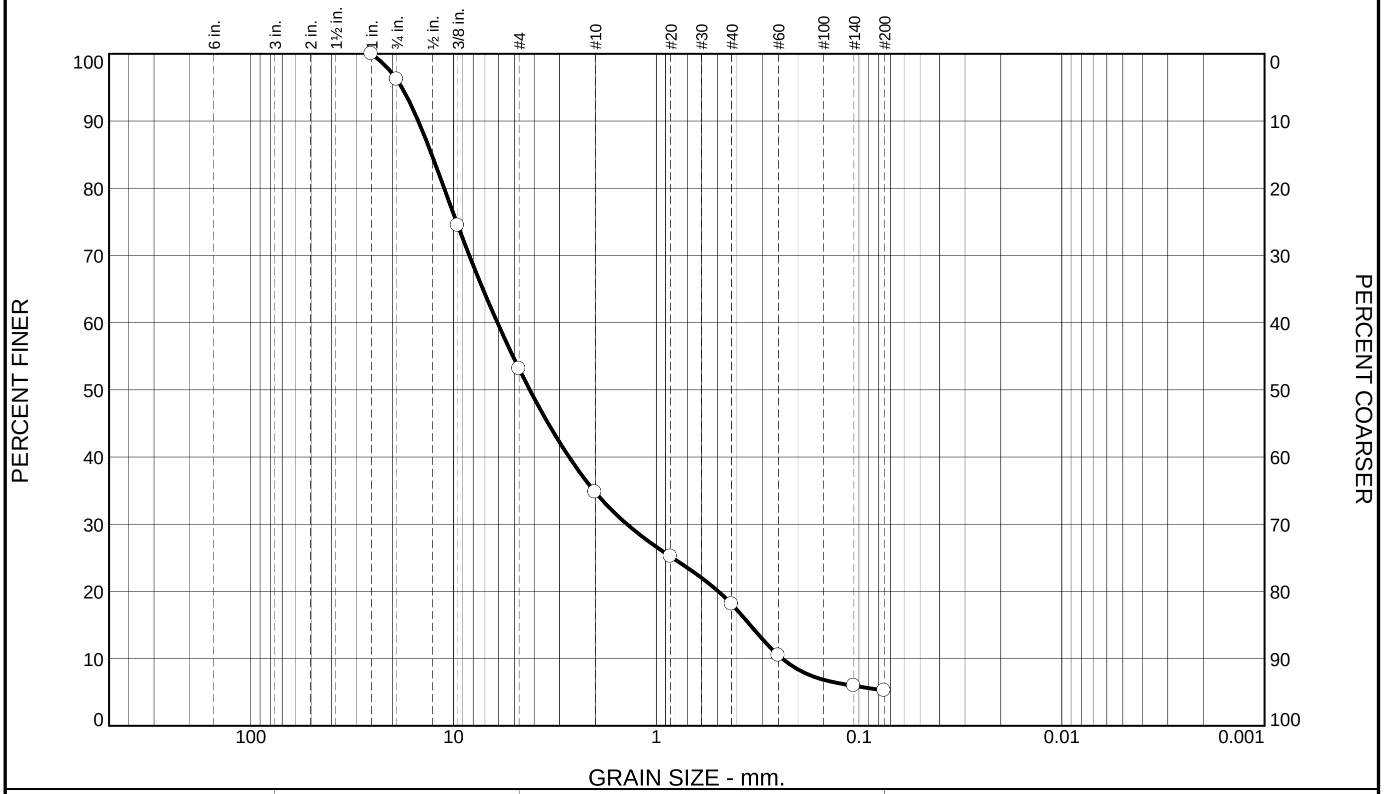
U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	276.65
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	110.14
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	166.51
1/2-in. (12.5-mm)	0.00		0.0%	100.0%			
3/8-in. (9.5-mm)	19.40		11.7%	88.3%			
No. 4 (4.75-mm)	60.26		36.2%	63.8%		**Gravel**	**36.2%**
No. 10 (2.00mm)	95.00		57.1%	42.9%			
No.20 (850 - µm)	111.68		67.1%	32.9%		**Sand**	**54%**
No.40 (425 - µm)	125.02		75.1%	24.9%			
No.60 (250 - µm)	134.99		81.1%	18.9%		**Fines**	**9.8%**
No.140 (106 - µm)	146.83		88.2%	11.8%			
No.200 (75 - µm)	150.27		90.2%	9.8%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	166.51						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-179 #35	170'	SW-SM	WELL-GRADED SAND WITH SILT AND GRAVEL	51.89	1.37

PARIKH CONSULTANTS, INC.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	4	43	18	17	13	5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100		
3/4	96		
3/8	74		
#4	53		
#10	35		
#20	25		
#40	18		
#60	10		
#140	6		
#200	5.2		

* (no specification provided)

Soil Description

Brown well graded sand with silt and gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 14.9260 D_{85}= 12.8138 D_{60}= 6.0783
D_{50}= 4.2071 D_{30}= 1.3952 D_{15}= 0.3442
D_{10}= 0.2396 C_u= 25.37 C_c= 1.34

Classification

USCS= SW-SM AASHTO=

Remarks

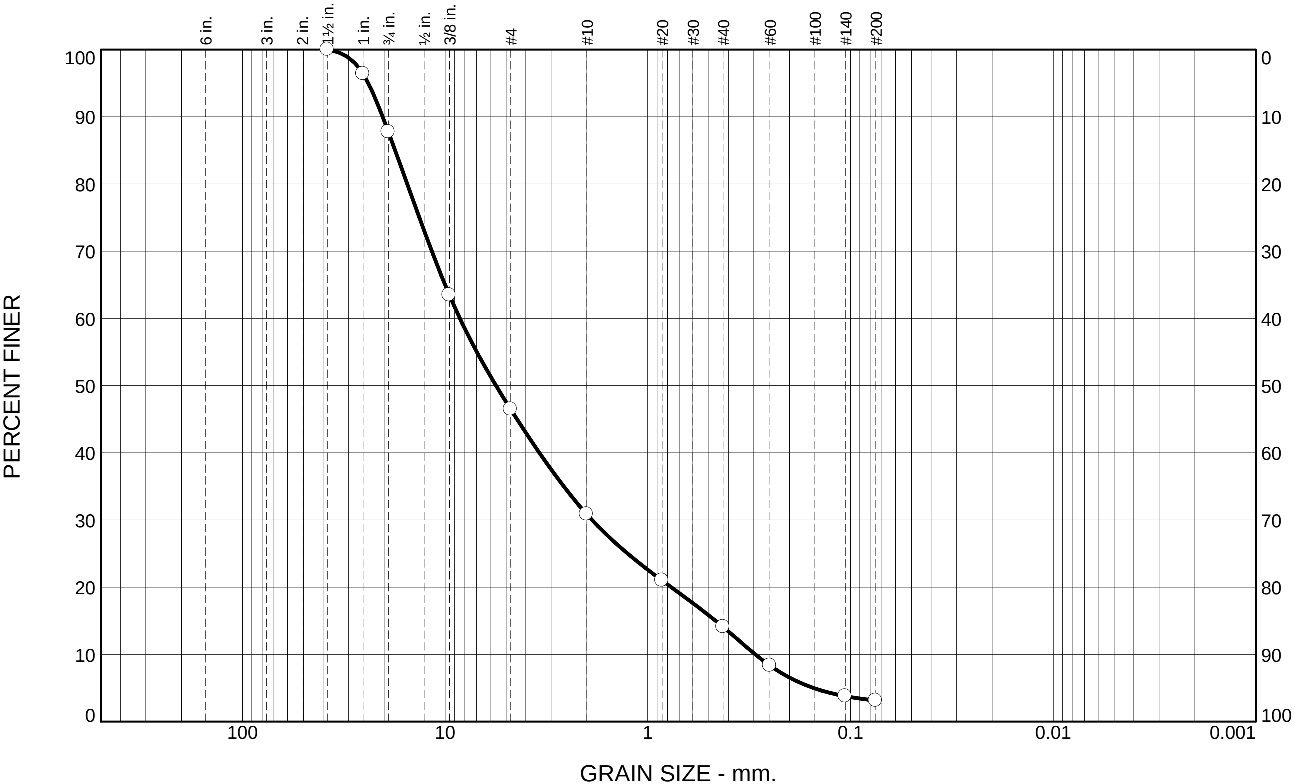
Source of Sample: BH-180 **Depth:** 46
Sample Number: 11A

Date: 9-9-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2973-001.0 **Figure**

Tested By: JH **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	12	42	15	17	11	3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	96		
3/4	88		
3/8	63		
#4	46		
#10	31		
#20	21		
#40	14		
#60	8		
#140	4		
#200	3.1		

* (no specification provided)

Soil Description

Grayish brown well graded gravel with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 20.3266 D_{85}= 17.6468 D_{60}= 8.4613
D_{50}= 5.6122 D_{30}= 1.8845 D_{15}= 0.4630
D_{10}= 0.2950 C_u= 28.68 C_c= 1.42

Classification

USCS= GW AASHTO=

Remarks

Source of Sample: BH-180 **Depth:** 50
Sample Number: 12
Date: 9-9-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2973-001.0 **Figure**

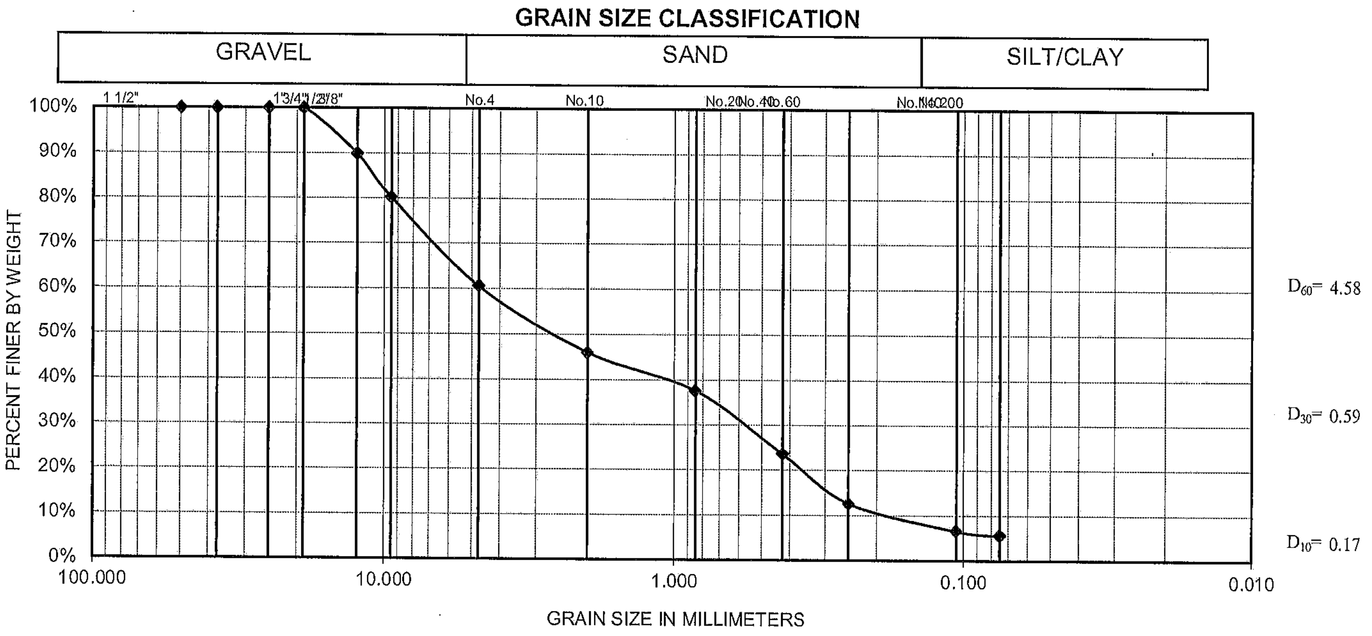
Tested By: JH **Checked By:** JH

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G981	Project #:	2019-131-T04
Sample #:	BH-180 #15 Depth: 65'	Reported By:	D. NGUYEN	Date Tested:	8/17/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	852.43
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	123.98
3/4-in. (19.0-mm)	0.0		0.0%	100.0%		Dry Wt of Soil	728.45
1/2-in. (12.5-mm)	73.9		10.1%	89.9%			
3/8-in. (9.5-mm)	144.4		19.8%	80.2%			
No. 4 (4.75-mm)	287.00		39.4%	60.6%		**Gravel**	**39.4%**
No. 10 (2.00mm)	393.74		54.1%	45.9%			
No.20 (850 - µm)	455.28		62.5%	37.5%		**Sand**	**55.0%**
No.40 (425 - µm)	556.79		76.4%	23.6%			
No.60 (250 - µm)	636.90		87.4%	12.6%		**Fines**	**5.6%**
No.140 (106 - µm)	680.80		93.5%	6.5%			
No.200 (75 - µm)	688.01		94.4%	5.6%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	728.45						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-180 #15	65'	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL	26.43	0.43

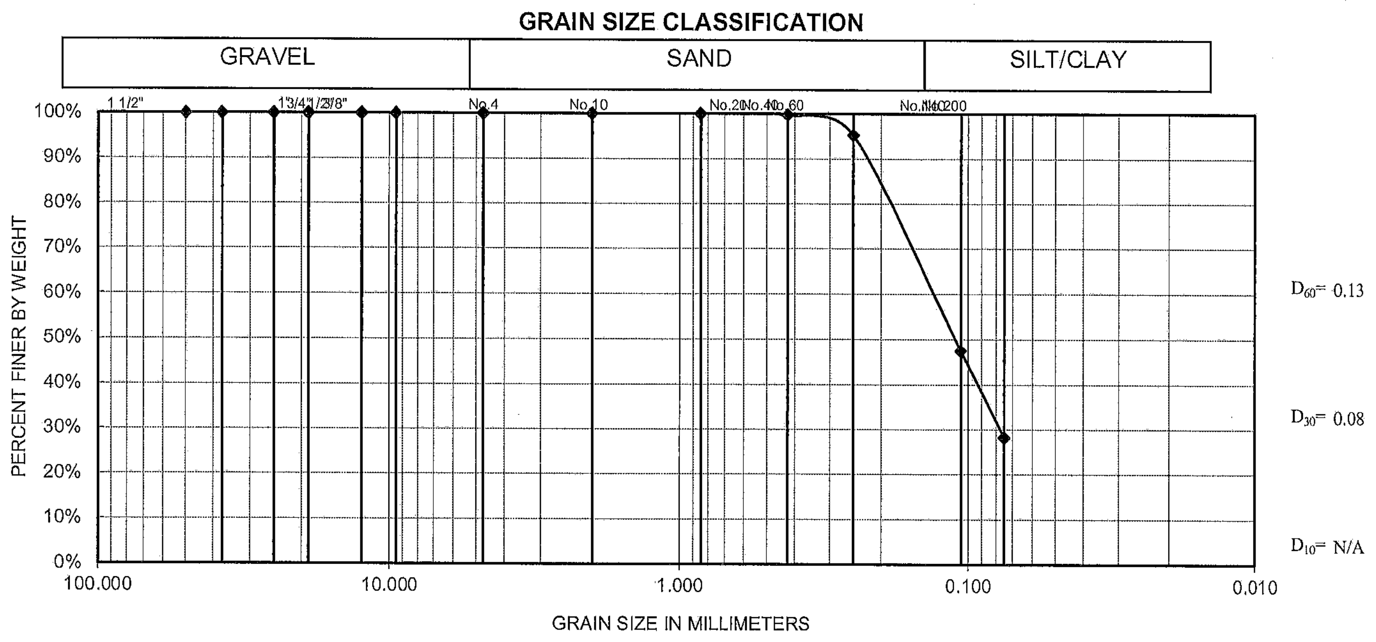
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY		Lab #	G981	Project #:	2019-131-T04	
Sample #:	BH-180 #25B	Depth:	115.5'	Reported By:	D. NGUYEN	Date Tested:	8/17/2020

U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	340.87
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	109.98
3/4-in. (19.0-mm)			0.0%	100.0%		Dry Wt of Soil	230.89
1/2-in. (12.5-mm)			0.0%	100.0%			
3/8-in. (9.5-mm)			0.0%	100.0%			
No. 4 (4.75-mm)	0.00		0.0%	100.0%		**Gravel**	**0.0%**
No. 10 (2.00mm)	0.05		0.0%	100.0%			
No.20 (850 - µm)	0.07		0.0%	100.0%		**Sand**	**71.8%**
No.40 (425 - µm)	0.67		0.3%	99.7%			
No.60 (250 - µm)	11.02		4.8%	95.2%		**Fines**	**28.2%**
No.140 (106 - µm)	121.49		52.6%	47.4%			
No.200 (75 - µm)	165.78		71.8%	28.2%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	230.89						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-180 #25B	115.5'	SM	SILTY SAND	N/A	N/A

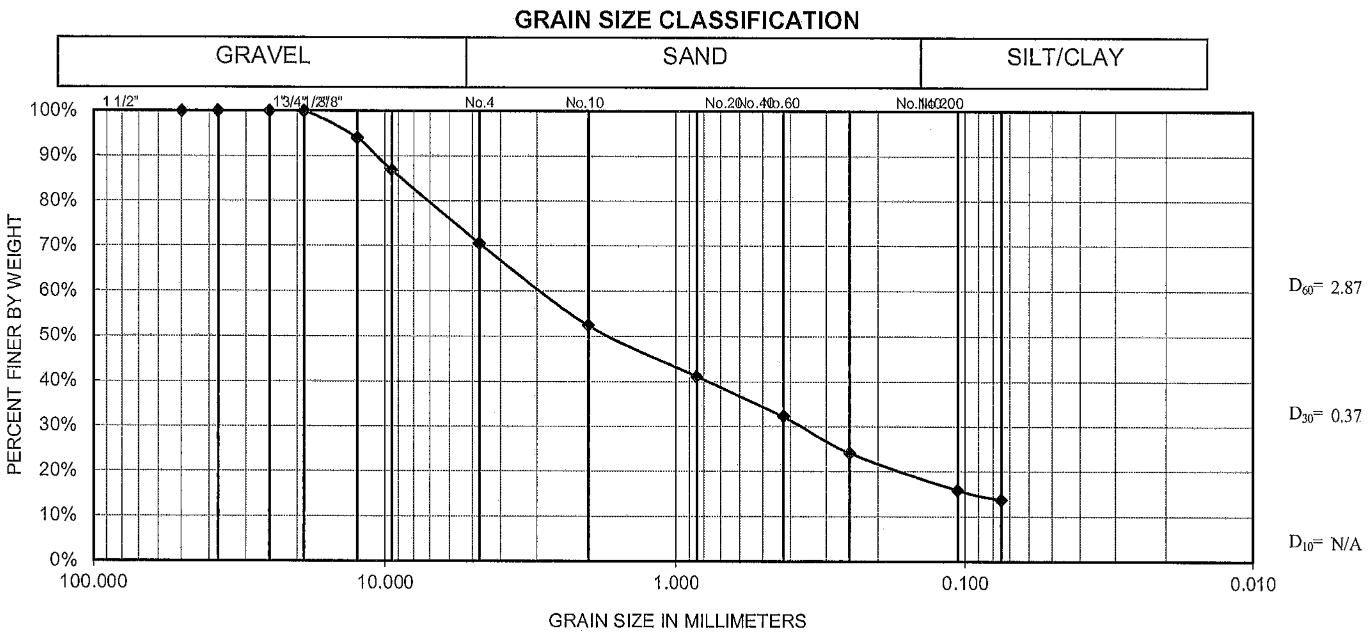
PARIKH CONSULTANTS, INC.

SIEVE ANALYSIS

ASTM C117 & C136, D422 or CAL 202

Project Name:	BART TO SILICON VALLEY	Lab #	G981	Project #:	2019-131-T04
Sample #:	BH-180 #26A, 27 Depth: 120'	Reported By:	D. NGUYEN	Date Tested:	8/17/2020

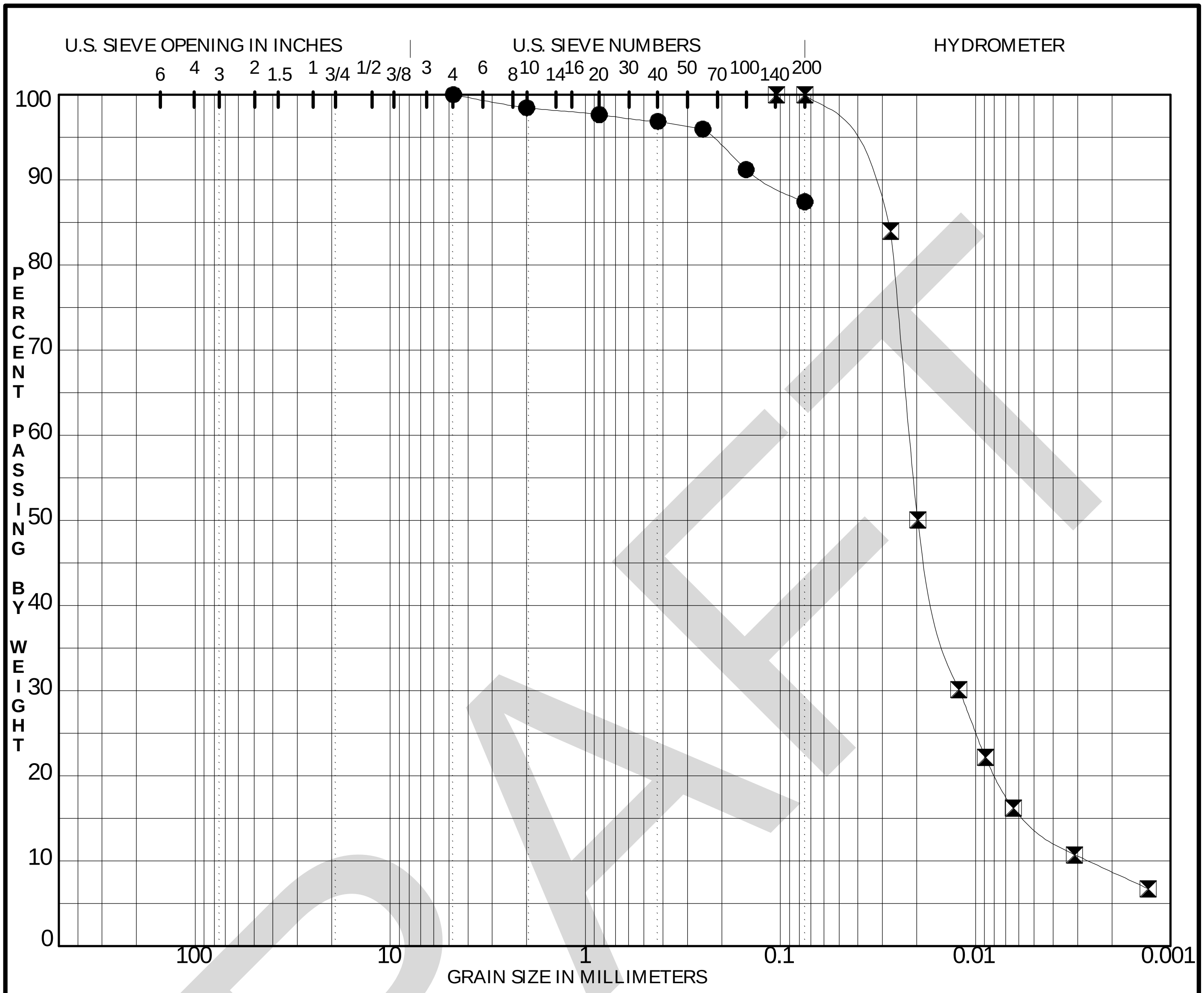
U.S. Standard Seive	Weight Retained Cumulative/ Individual	Tare:	Percent RETAINED Cumulative	Percent PASSING Cumulative	Percent PASSING Cumulative		
2-in. (50-mm)			0.0%	100.0%			
1 1/2-in. (37.5-mm)			0.0%	100.0%		Dry Wt + Tare	910.58
1-in. (25.0-mm)			0.0%	100.0%		Tare Wt	102.60
3/4-in. (19.0-mm)	0.00		0.0%	100.0%		Dry Wt of Soil	807.98
1/2-in. (12.5-mm)	48.70		6.0%	94.0%			
3/8-in. (9.5-mm)	106.45		13.2%	86.8%			
No. 4 (4.75-mm)	237.27		29.4%	70.6%		**Gravel**	**29.4%**
No. 10 (2.00mm)	384.92		47.6%	52.4%			
No.20 (850 - μm)	476.00		58.9%	41.1%		**Sand**	**56.9%**
No.40 (425 - μm)	547.58		67.8%	32.2%			
No.60 (250 - μm)	613.76		76.0%	24.0%		**Fines**	**13.7%**
No.140 (106 - μm)	680.40		84.2%	15.8%			
No.200 (75 - μm)	697.08		86.3%	13.7%			
Wash - #200 + Pan			0.0%	100.0%			
TOTAL	807.98						



SAMPLE NO.	DEPTH	U.S.C.	CLASSIFICATION	Cu	Cc
BH-180 #26A, 27	120'	SM	SILTY SAND WITH GRAVEL	N/A	N/A

PARIKH CONSULTANTS, INC.

Sieve and Hydrometer Results



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-109	75.0	87	100	Lean CLAY (CL)	CL
⧗	BH-109	105.0	100		Organic SILT (OL)	OL

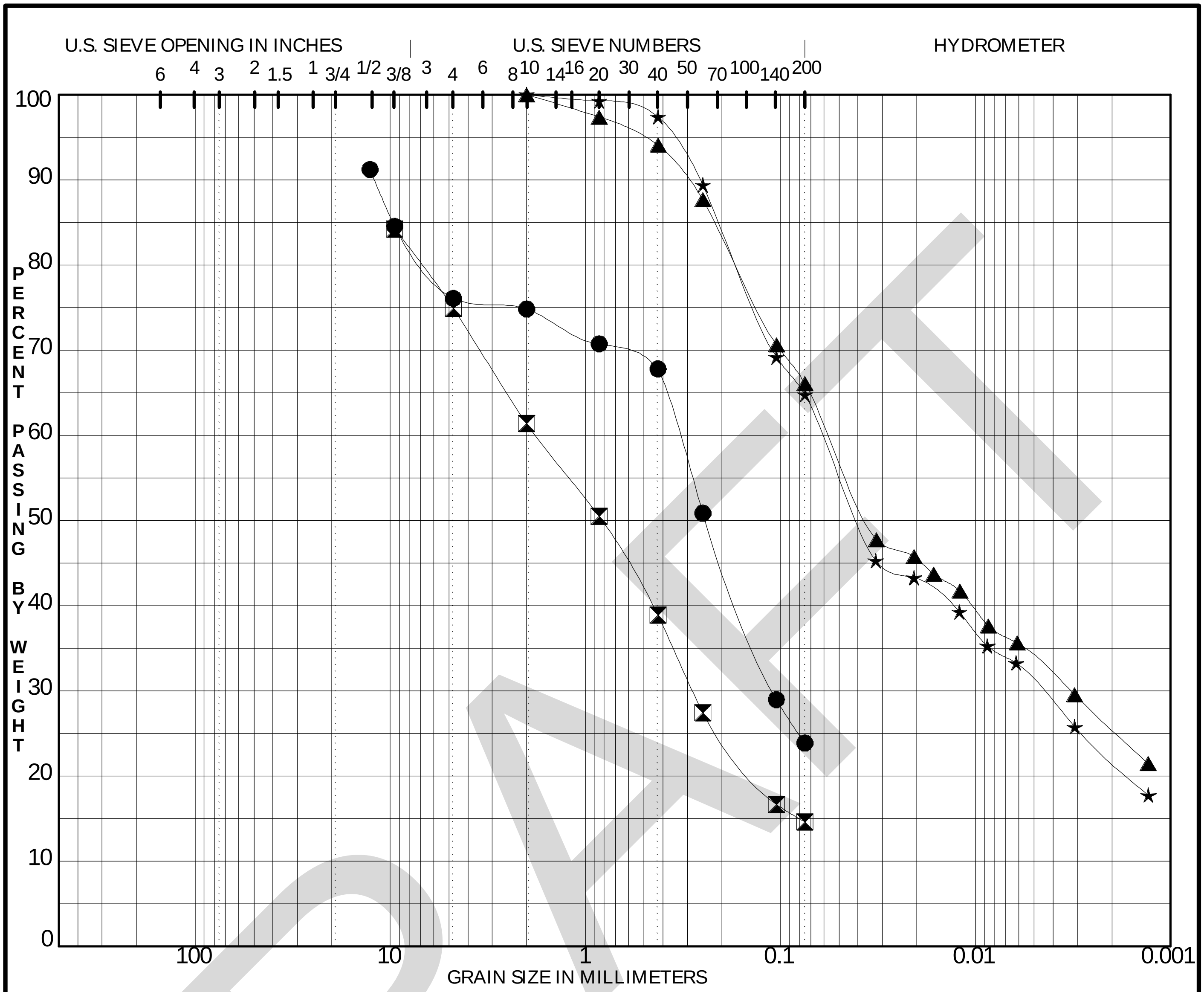
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-117	61.0	24	76	Silty, clayey SAND with gravel (SC-SM)	SC-SM
⧗	BH-117	85.5	15	75	Silty, clayey SAND with gravel (SC-SM)	SC-SM
▲	BH-117	105.5	66		Sandy Lean CLAY (CL)	CL
★	BH-117	106.0	65		Sandy Lean CLAY (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

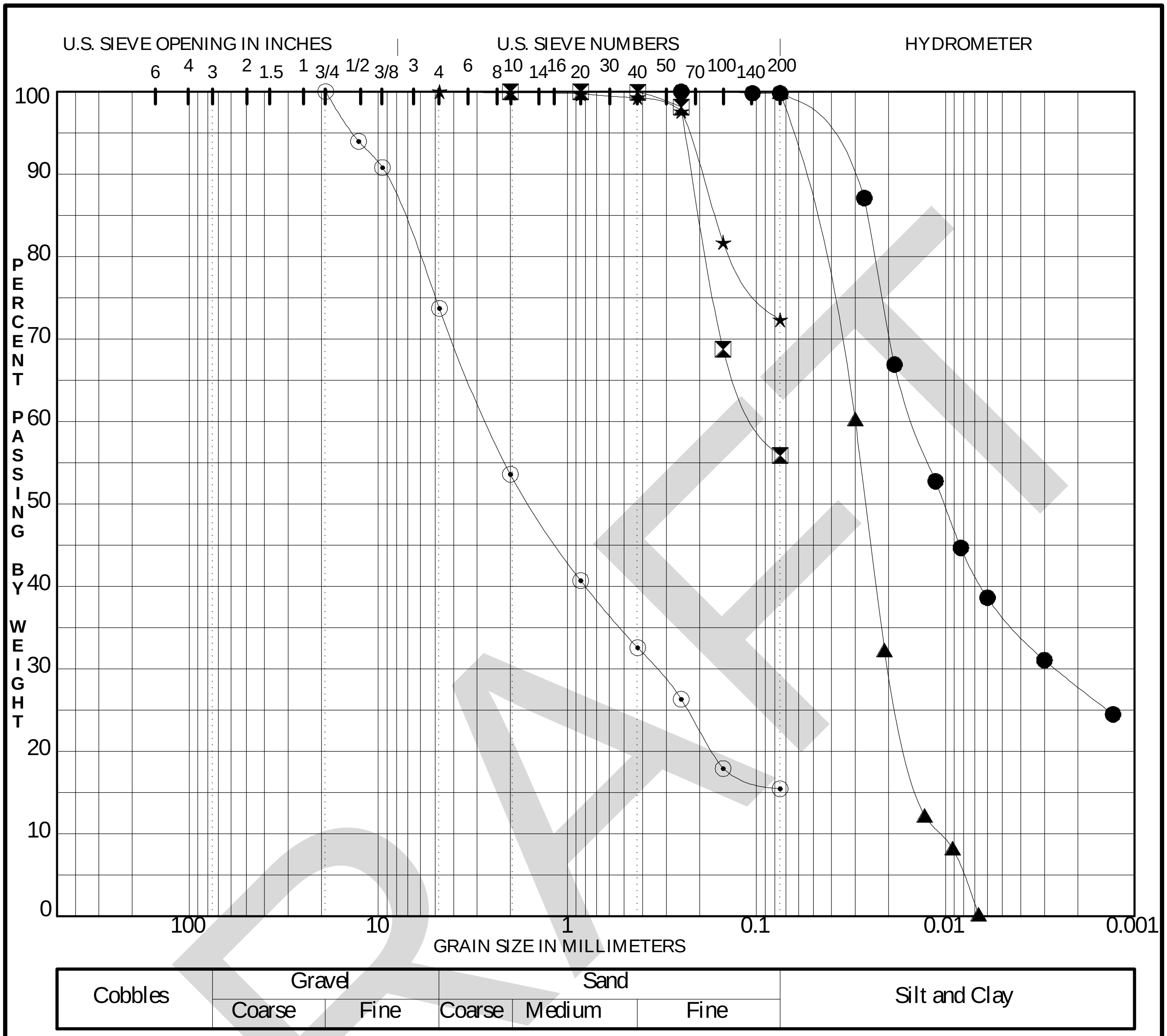
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19



Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-121	45.5	100		Organic CLAY with sand (OL)	OL
⧗	BH-121	70.5	56		Sandy SILT (ML)	ML
▲	BH-121	71.0	100		SILT (ML)	ML
★	BH-121	76.0	72	100	Lean CLAY with sand (CL)	CL
⊙	BH-121	85& 90	15	74	Silty SAND with gravel (SM)	SM

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

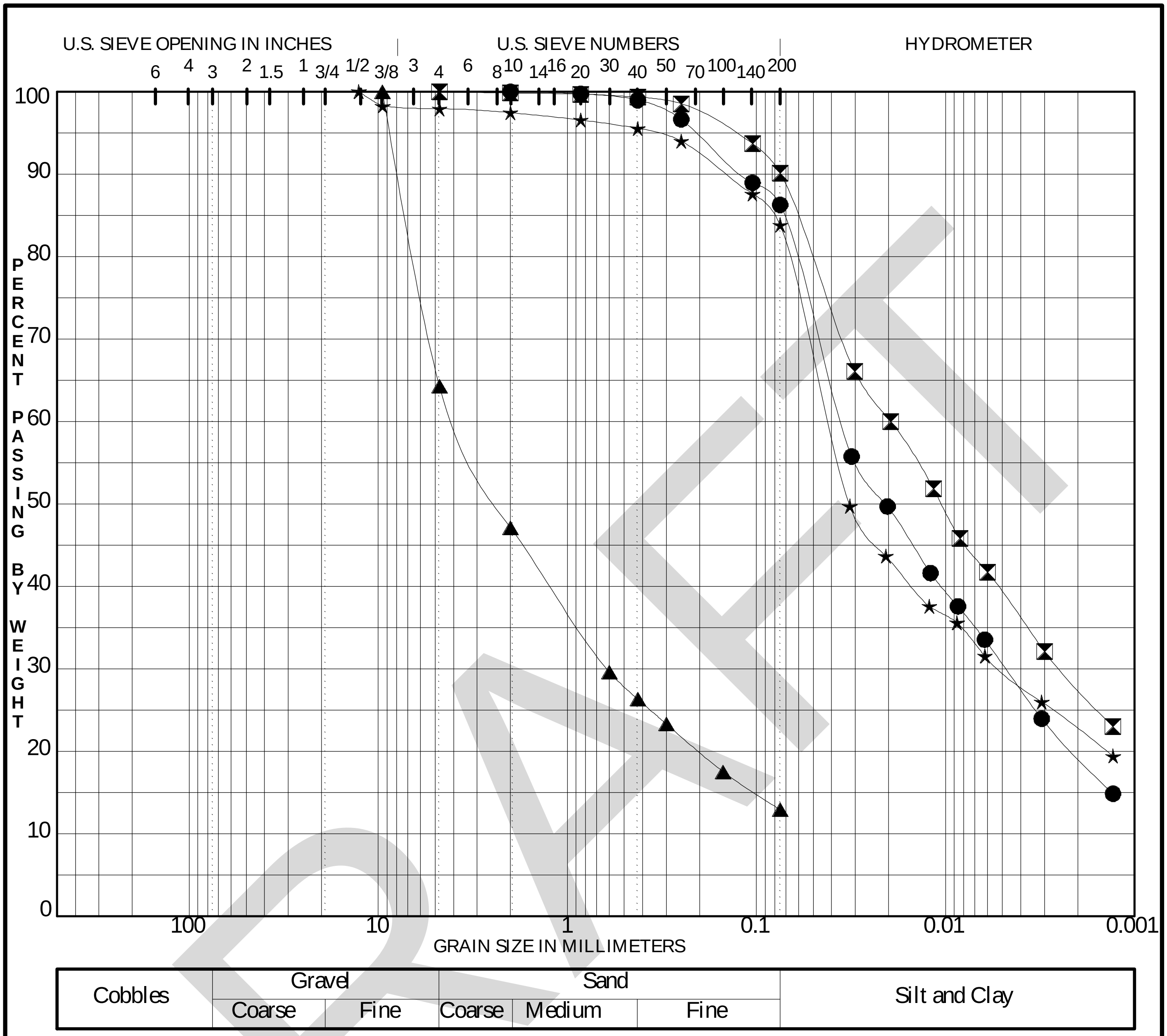
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19



Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-122	60.5	86		Lean CLAY (CL)	CL
⧗	BH-122	61.0	90	100	Lean CLAY (CL)	CL
▲	BH-122	81.0	13	64	Silty SAND with gravel (SM)	SM
★	BH-122	111.0	84	98	Lean CLAY with sand (CL)	CL

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

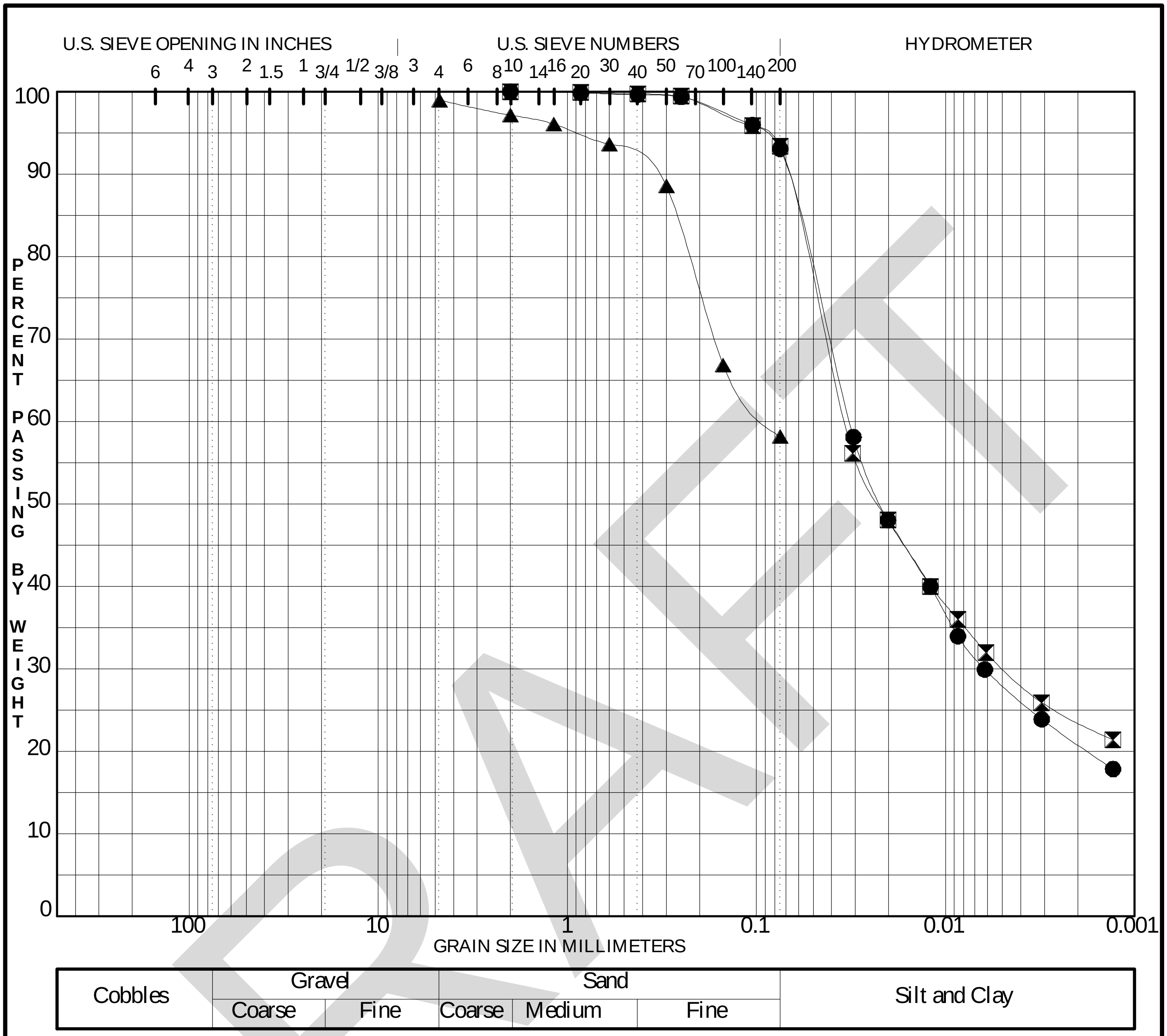
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/19/19



Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-123	55.5	93		Silty CLAY (CL-ML)	CL-ML
⧗	BH-123	56.0	93		Silty CLAY (CL-ML)	CL-ML
▲	BH-123	101.0	58	99	Sandy Lean CLAY (CL)	CL

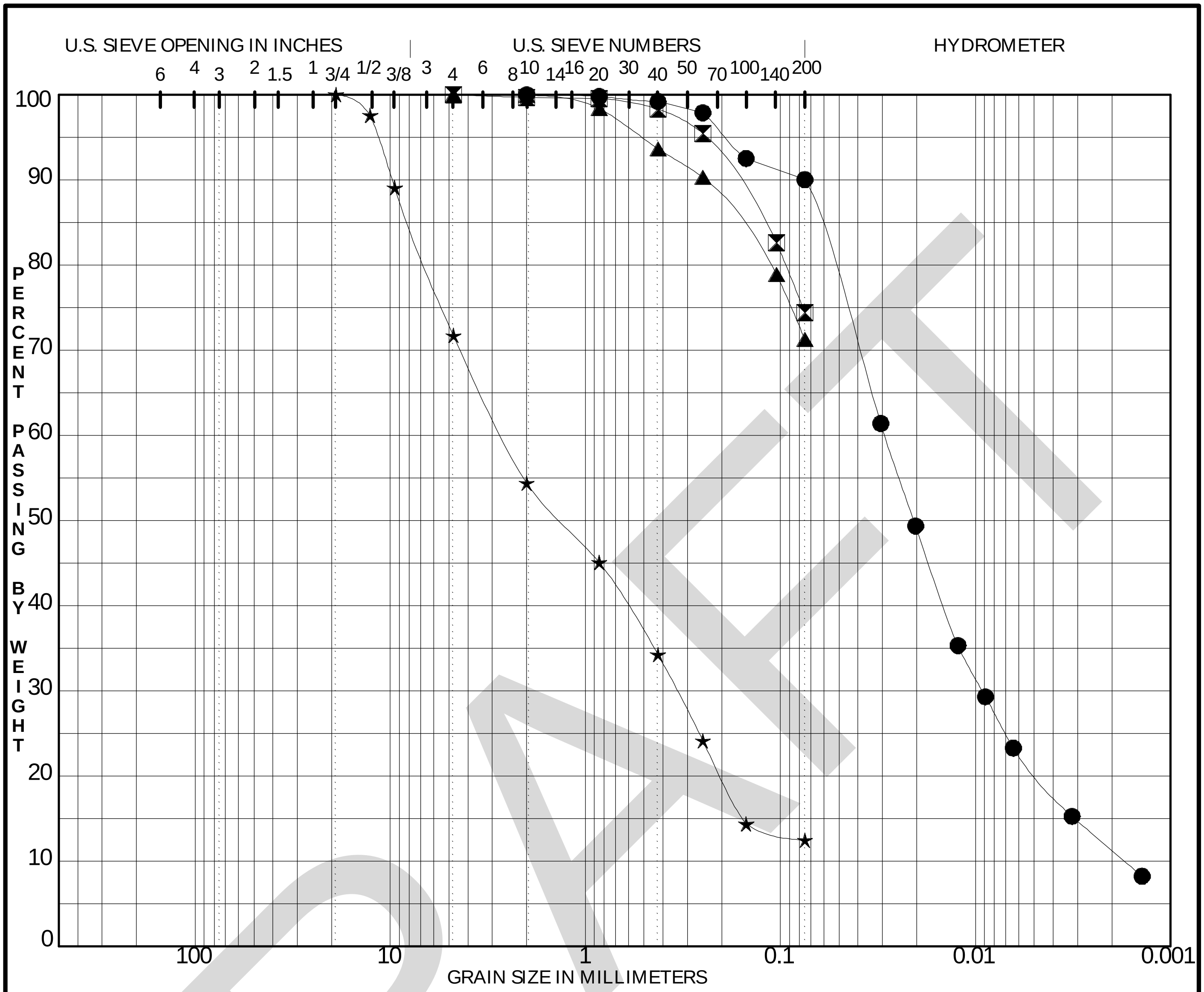
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/19/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-125	60.5	90		SILT (ML)	ML
⧗	BH-125	80.5	74	100	Lean CLAY with sand (CL)	CL
▲	BH-125	81.0	71	100	Lean CLAY with sand (CL)	CL
★	BH-125	105.5	12	72	Silty SAND with gravel (SM)	SM

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

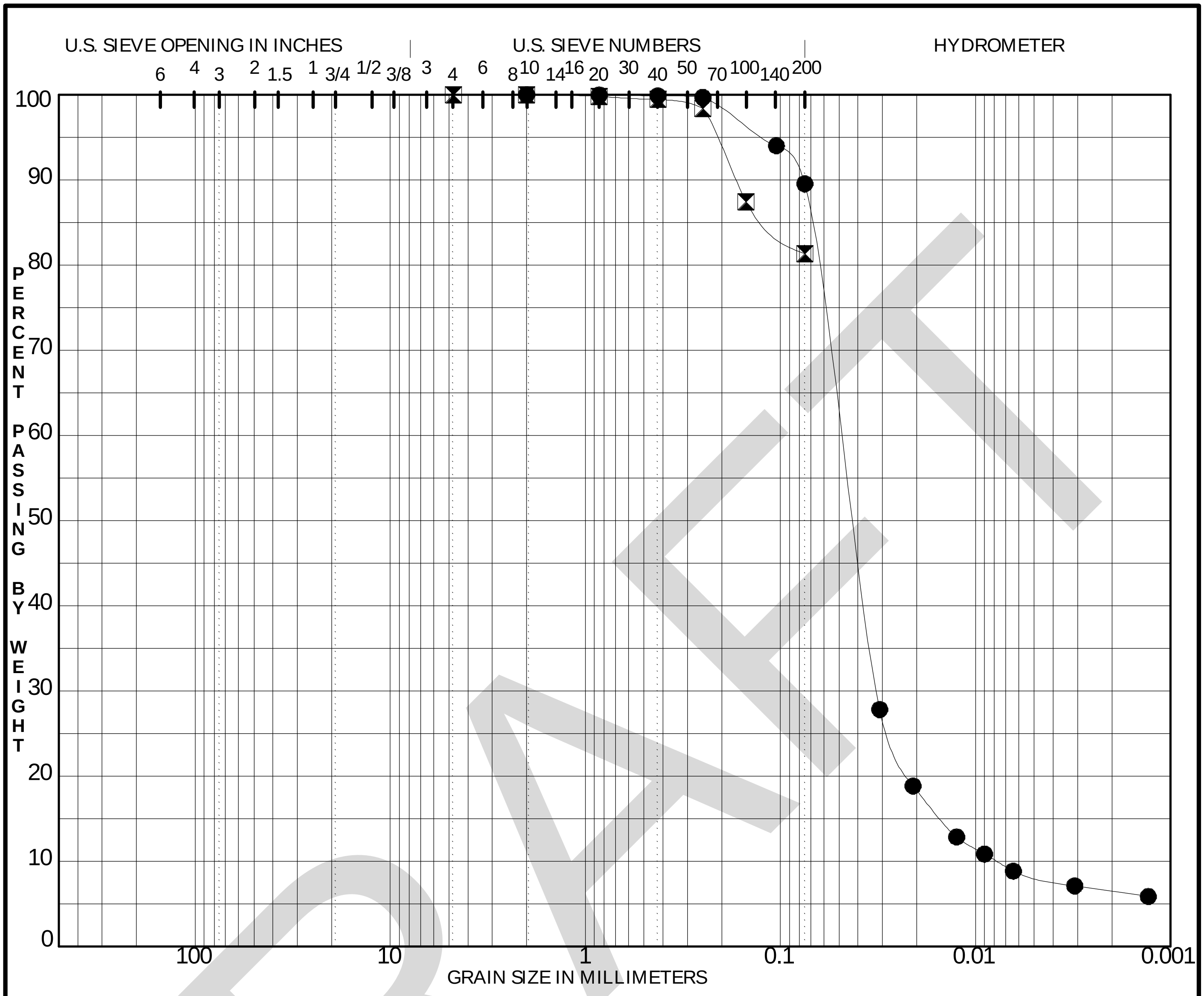
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

GRADATION_B BART TO SILICON VALLEY - SC.GPJ STD.GDT 6/20/19



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-139	71.0	90		Silty CLAY (CL-ML)	CL-ML
⧗	BH-139	95.5	81	100	Lean CLAY with sand (CL)	CL

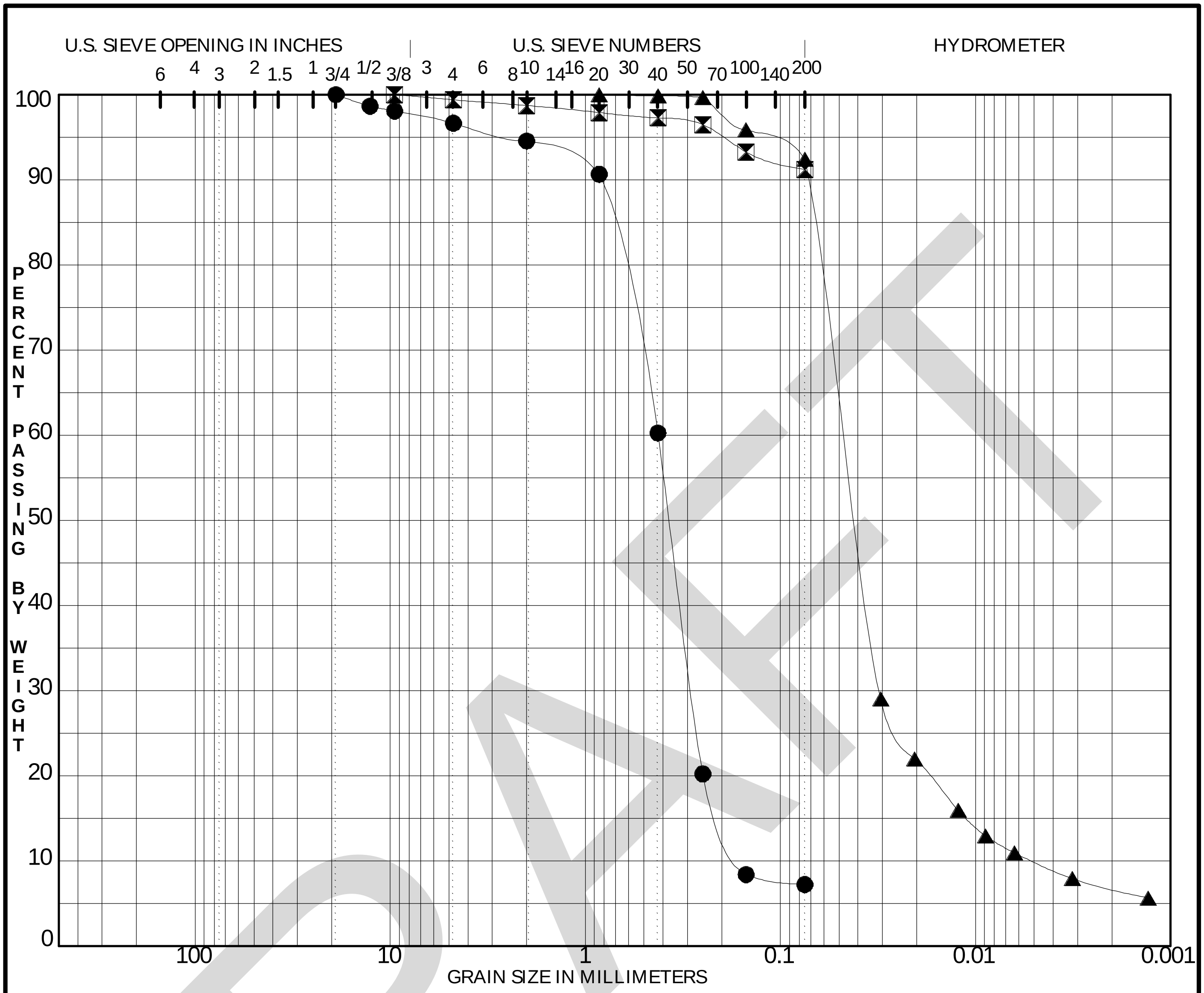
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02



Cobbles	Gravel		Sand			Silt and Clay
	Coarse	Fine	Coarse	Medium	Fine	

Key Symbol	Boring No.	Depth (Feet)	% Passing No. 200 Sieve	% Passing No. 4 Sieve	Sample Descsription	USCS
●	BH-141	25.5	7	97	Poorly GRADED SAND WITH SILT	SP-SM
⧗	BH-141	55.5	91	99	Lean CLAY (CL)	CL
▲	BH-141	66.0	92		SILT (ML)	ML

PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
6/20/19
DWG FILE:

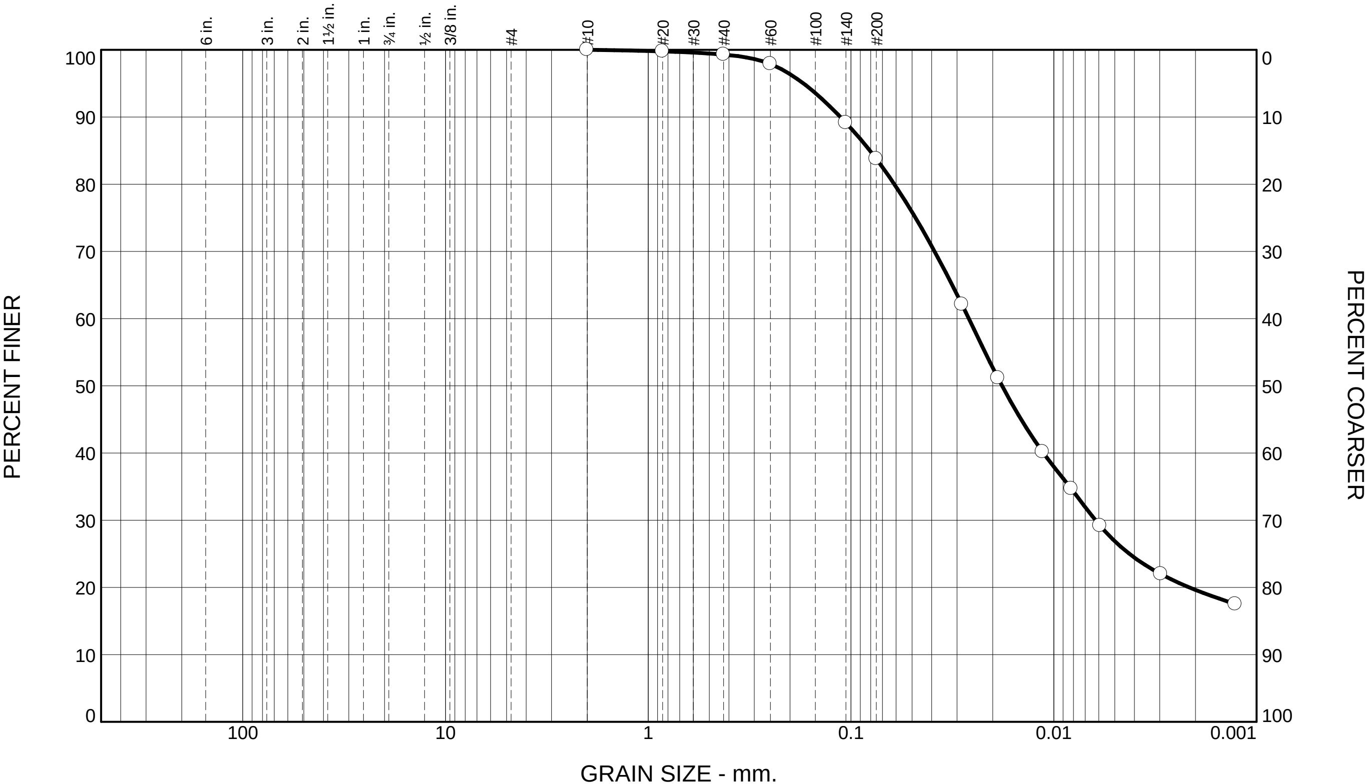
GRADATION TEST DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE

PROJECT No.
2017-144-T02

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	15	57	27

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	99		
#60	98		
#140	89		
#200	84		
0.0284 mm.	62		
0.0188 mm.	51		
0.0113 mm.	40		
0.0082 mm.	35		
0.0059 mm.	29		
0.0030 mm.	22		
0.0013 mm.	18		

* (no specification provided)

Soil Description

Greenish gray clay with sand

Atterberg Limits

PL= 18 LL= 32 PI= 14

Coefficients

D_{90}= 0.1129 D_{85}= 0.0807 D_{60}= 0.0262
D_{50}= 0.0180 D_{30}= 0.0062 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(11)

Remarks

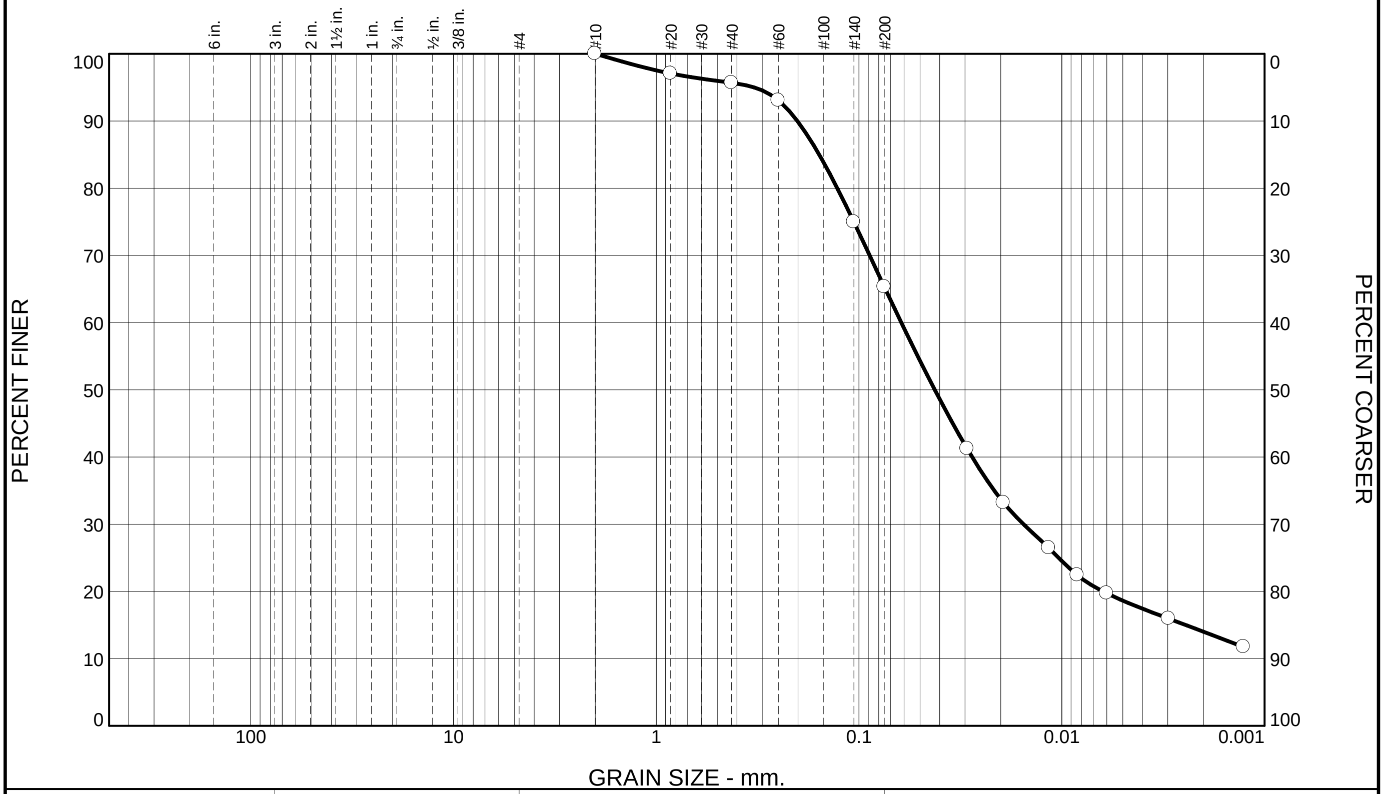
Source of Sample: BH-150 **Depth:** 61
Sample Number: 8A

Date: 10-11-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	4	31	46	19

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	97		
#40	96		
#60	93		
#140	75		
#200	65		
0.0293 mm.	41		
0.0194 mm.	33		
0.0116 mm.	26		
0.0084 mm.	22		
0.0060 mm.	20		
0.0030 mm.	16		
0.0013 mm.	12		

* (no specification provided)

Soil Description

Greenish gray sandy clay

Atterberg Limits

PL= 19 LL= 29 PI= 10

Coefficients

D_{90}= 0.2014 D_{85}= 0.1572 D_{60}= 0.0619
D_{50}= 0.0423 D_{30}= 0.0154 D_{15}= 0.0024
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(4)

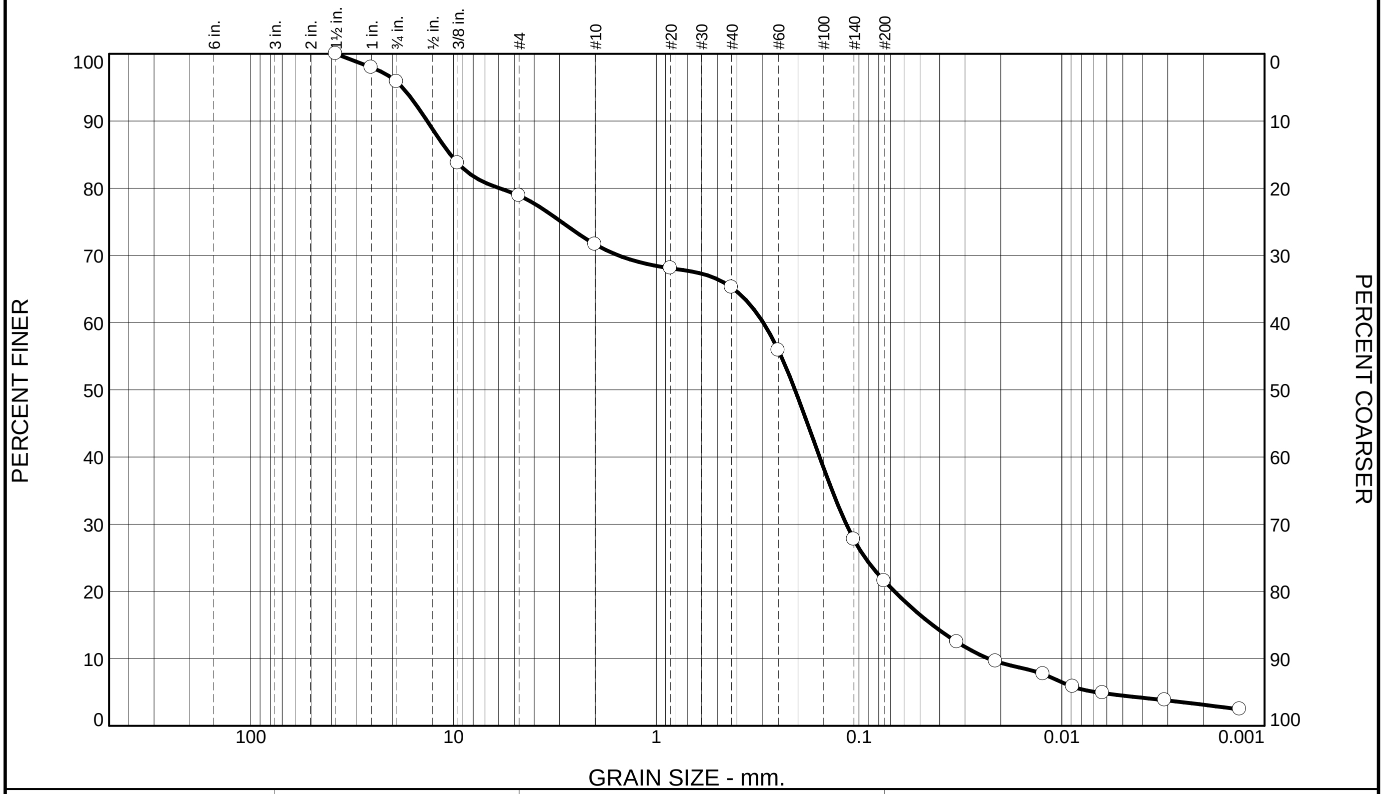
Remarks

Source of Sample: BH-150 **Depth:** 99
Sample Number: 22 **Date:** 10-15-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	4	17	7	7	43	18	4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	98		
3/4	96		
3/8	84		
#4	79		
#10	72		
#20	68		
#40	65		
#60	56		
#140	28		
#200	22		
0.0328 mm.	12		
0.0211 mm.	9.6		
0.0123 mm.	7.7		
0.0088 mm.	5.8		
0.0063 mm.	4.9		
0.0031 mm.	3.8		
0.0013 mm.	2.4		

* (no specification provided)

Soil Description

Grayish brown silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 13.4936	D_{85}= 10.3582	D_{60}= 0.2970
D_{50}= 0.2070	D_{30}= 0.1156	D_{15}= 0.0434
D_{10}= 0.0230	C_u= 12.92	C_c= 1.96

Classification

USCS= SM AASHTO=

Remarks

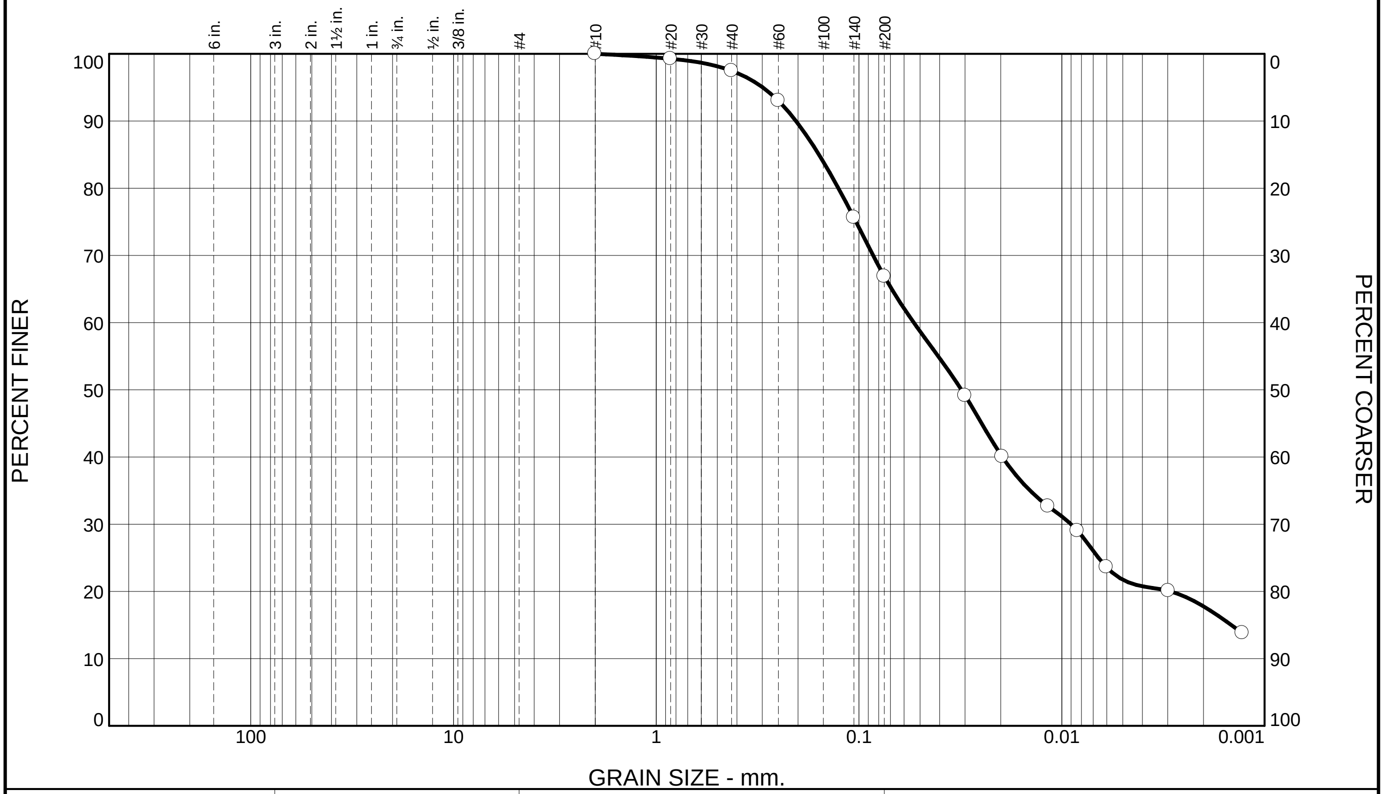
Source of Sample: BH-150 **Depth:** 116
Sample Number: 30A,31,32,33

Date: 10-11-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	3	30	45	22

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	99		
#40	97		
#60	93		
#140	76		
#200	67		
0.0300 mm.	49		
0.0197 mm.	40		
0.0117 mm.	33		
0.0084 mm.	29		
0.0060 mm.	24		
0.0030 mm.	20		
0.0013 mm.	14		

* (no specification provided)

Soil Description

Greenish gray sandy clay

Atterberg Limits

PL= 18 LL= 29 PI= 11

Coefficients

D_{90}= 0.2047 D_{85}= 0.1577 D_{60}= 0.0537
D_{50}= 0.0313 D_{30}= 0.0090 D_{15}= 0.0015
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(5)

Remarks

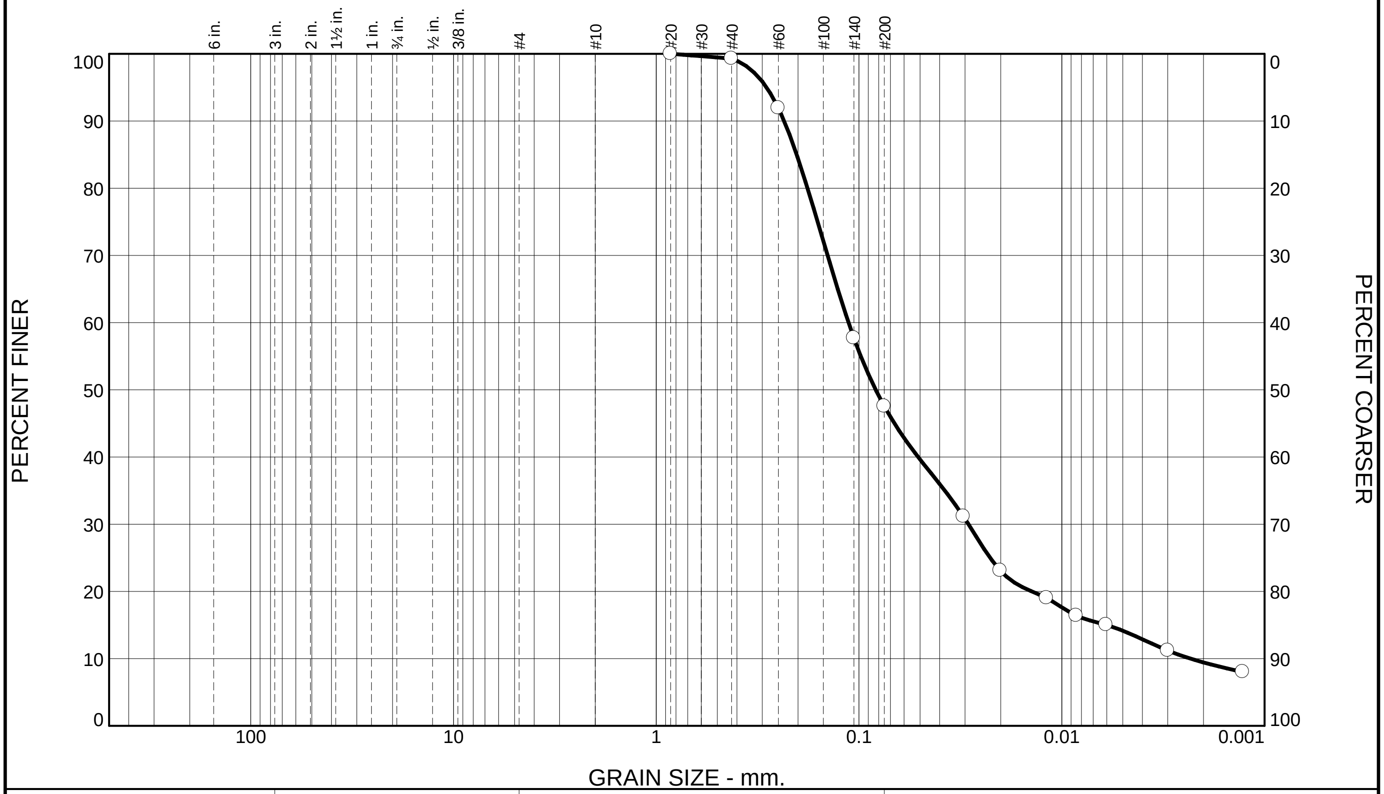
Source of Sample: BH-150 **Depth:** 128.5
Sample Number: 41A

Date: 10-11-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	51	34	14

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#20	100		
#40	99		
#60	92		
#140	58		
#200	48		
0.0305 mm.	31		
0.0201 mm.	23		
0.0119 mm.	19		
0.0085 mm.	16		
0.0060 mm.	15		
0.0030 mm.	11		
0.0013 mm.	8.0		

* (no specification provided)

Soil Description

Grayish brown silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2342 D_{85}= 0.2031 D_{60}= 0.1127
D_{50}= 0.0828 D_{30}= 0.0289 D_{15}= 0.0060
D_{10}= 0.0023 C_u= 48.57 C_c= 3.19

Classification

USCS= SM AASHTO=

Remarks

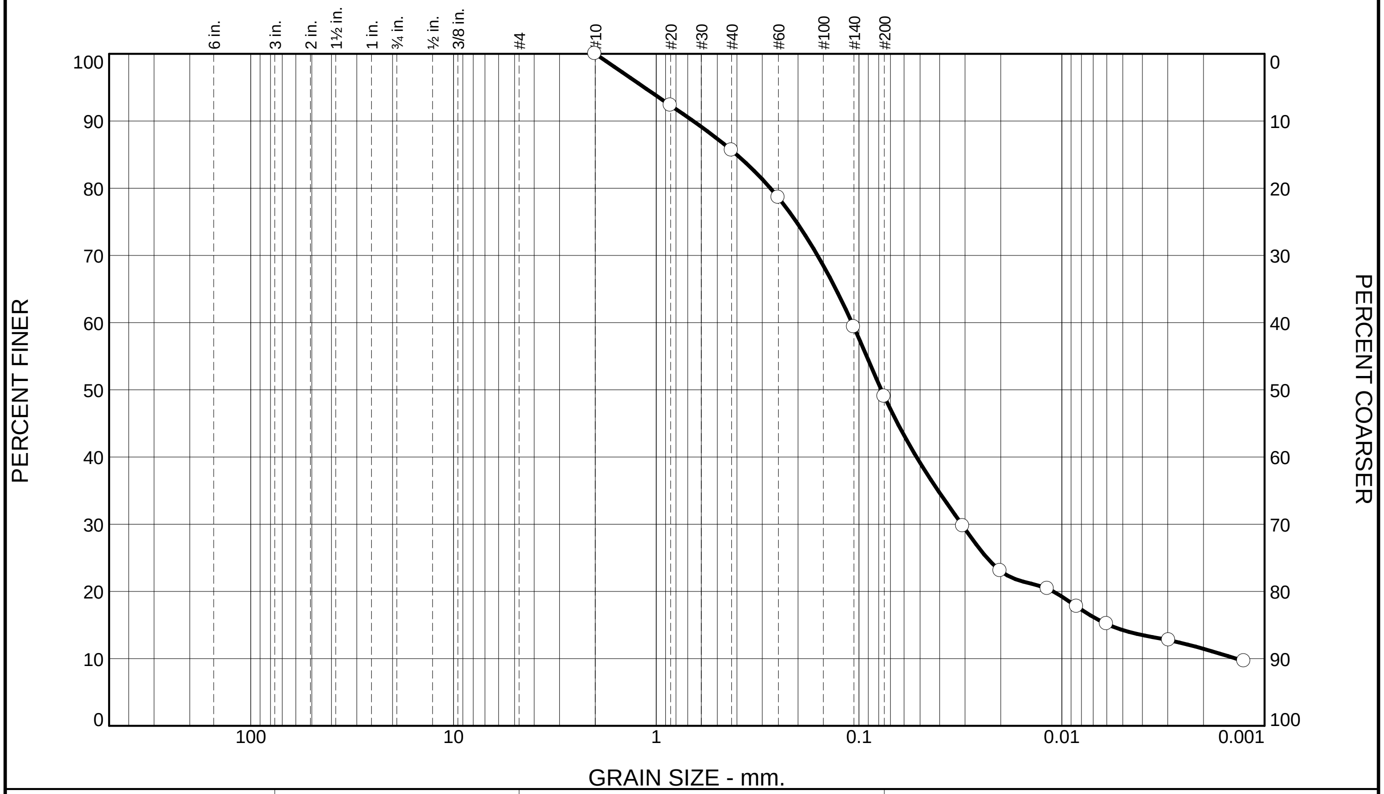
Source of Sample: BH-150 **Depth:** 160
Sample Number: 51

Date: 10-11-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	14	37	35	14

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	92		
#40	86		
#60	79		
#140	59		
#200	49		
0.0307 mm.	30		
0.0201 mm.	23		
0.0117 mm.	20		
0.0084 mm.	18		
0.0060 mm.	15		
0.0030 mm.	13		
0.0013 mm.	9.6		

* (no specification provided)

Soil Description

Greenish gray silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.6581	D_{85}= 0.4017	D_{60}= 0.1084
D_{50}= 0.0776	D_{30}= 0.0312	D_{15}= 0.0059
D_{10}= 0.0014	C_u= 78.42	C_c= 6.48

Classification

USCS= SM AASHTO=

Remarks

Reviewer Note: Atterberg Test results for this sample are LL = 24, PI = 4. SC-SM.

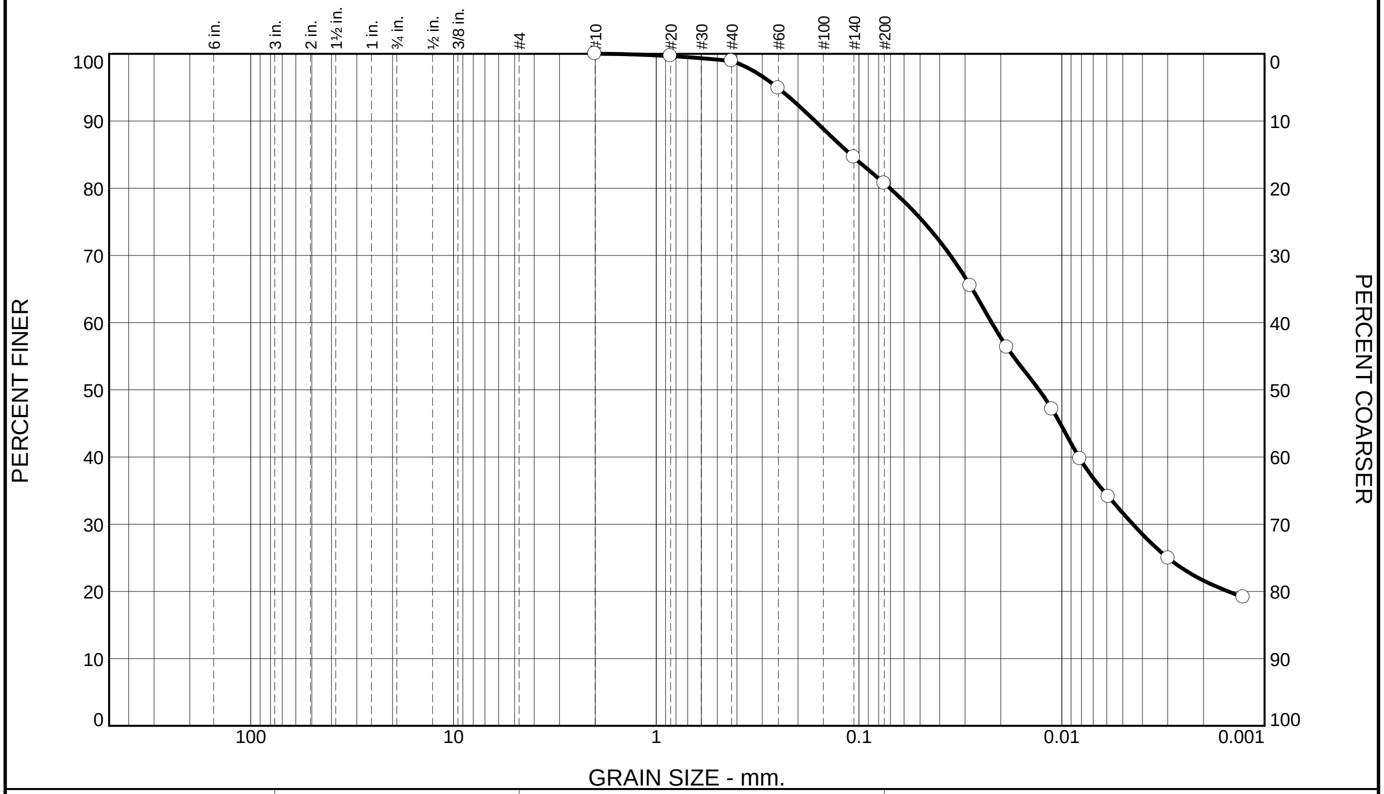
Source of Sample: BH-151 **Depth:** 55
Sample Number: 1B

Date: 10-11-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	18	49	32

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	99		
#60	95		
#140	85		
#200	81		
0.0282 mm.	65		
0.0186 mm.	56		
0.0112 mm.	47		
0.0081 mm.	40		
0.0059 mm.	34		
0.0030 mm.	25		
0.0013 mm.	19		

* (no specification provided)

Soil Description

Greenish gray clay with sand

Atterberg Limits

PL= 20 LL= 43 PI= 23

Coefficients

D_{90}= 0.1647	D_{85}= 0.1099	D_{60}= 0.0222
D_{50}= 0.0129	D_{30}= 0.0045	D_{15}=
D_{10}=	C_u=	C_c=

Classification

USCS= CL AASHTO= A-7-6(18)

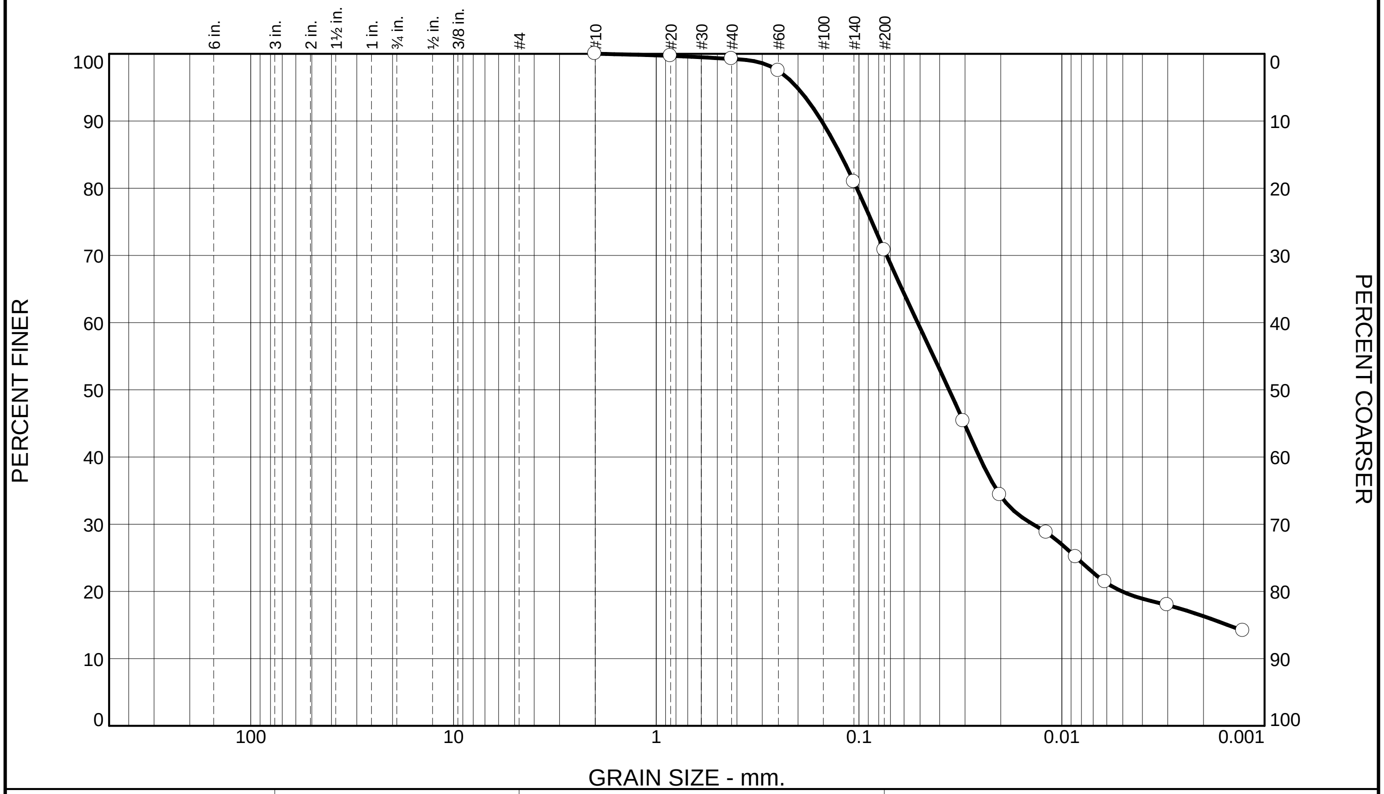
Remarks

Source of Sample: BH-151 **Depth:** 103
Sample Number: 18
Date: 10-21-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0
Figure

Tested By: SK **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	28	51	20

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	99		
#60	97		
#140	81		
#200	71		
0.0306 mm.	45		
0.0202 mm.	34		
0.0119 mm.	29		
0.0085 mm.	25		
0.0061 mm.	21		
0.0030 mm.	18		
0.0013 mm.	14		

* (no specification provided)

Soil Description

Dark greenish gray clay with sand

Atterberg Limits

PL= 16 LL= 32 PI= 16

Coefficients

D_{90}= 0.1529 D_{85}= 0.1234 D_{60}= 0.0514
D_{50}= 0.0360 D_{30}= 0.0139 D_{15}= 0.0015
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-6(9)

Remarks

Source of Sample: BH-151 **Depth:** 107
Sample Number: 20 **Date:** 10-15-19

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: SK **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T02
Sample: 19	Depth (ft): 89.5	Lab #:	G970
Boring: BH-152		Date Tested:	11/04/19
Location:		Tested By:	DN
Material description:	SILTY SAND (SM),	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS	+ #4 / #10	- #4 / #10
Tare ID		G26
Sample WET Weight + Tare		555.1
Sample DRY Weight + Tare		453.8
Tare Weight		85
Weight of Water		101.3
Weight of DRY Sample		368.8
Water Content, %		27.5

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	84.19
Sample WET Weight + Tare	306.92
Sample DRY Weight + Tare	306.77
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.999
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.93

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	0		100.00
* #4	0		100.00
#8	1.6	0.43	99.57
* #10	2.3	0.62	99.38
Pan	366.5		
Total	368.8		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0.1		99.38
#20	1.50	1.49	97.88
#40	6.68	6.64	92.73
#60	24.25	24.12	75.26
#140	57.06	56.74	42.63
#200	65.10	64.74	34.64
Pan	68.29	67.91	31.47
Total	99.93		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R W	% Total Sample	Corr. Coef.		Corr. Dia (mm) (D)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	
21	2	21	23	-6.0	18.2		17.9	0.0133	12.5	0.0333
24	5	21	19	-6.0	14.2		14.0	0.0133	13.3	0.0216
34*	15	21	14	-6.0	9.2		9.1	0.0133	14.2	0.0129
49	30	21	13	-6.0	8.2		8.1	0.0133	14.4	0.0092
1:19	60	21	12	-6.0	7.2		7.1	0.0133	14.5	0.0065
4:49	250	22	9	-5.5	4.9		4.8	0.0131	15.1	0.0032
	1440	21	8	-6.0	3.2		3.2	0.0133	15.3	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

Cal 203 Requires hydro readigs @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

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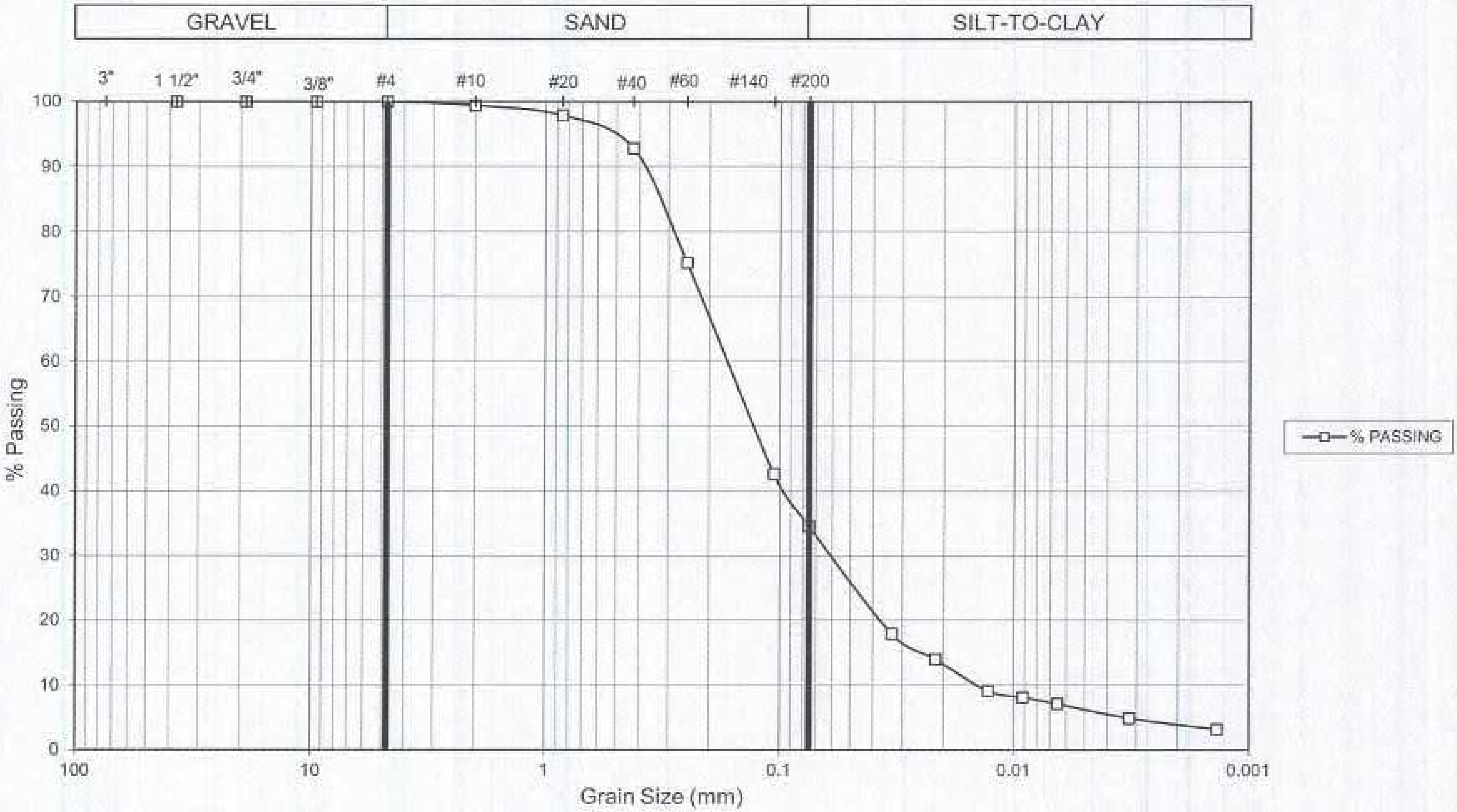
GRAIN SIZE DISTRIBUTION

(408) 452-9000

Project:	BART to Silicon Valley	Project #:	2019-131-T02
Client:	BH-152	Tested by:	DN
Source/Location:	0 Sample: 19 @ 89.5 feet	Lab # :	G944
Material Description:	SILTY SAND (SM),	Date Tested:	11/4/2019



Reported By: 0

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T02
Sample: 26	Depth (ft): 96	Lab #:	G970
Boring: BH-154		Date Tested:	12/03/19
Location: 70 N 27th Street		Tested By:	DN
Material description: SANDY SILT (ML),		Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS	+ #4 / #10	- #4 / #10
Tare ID		G27
Sample WET Weight + Tare		435.23
Sample DRY Weight + Tare		378.04
Tare Weight		84.4
Weight of Water		57.19
Weight of DRY Sample		293.64
Water Content, %		19.5

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.08
Sample WET Weight + Tare	27.63
Sample DRY Weight + Tare	27.44
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.989
Hydro Wet WT	50
Hydro Corr Wt = (Wet X F) = W	49.43

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	0		100.00
* #4	0		100.00
#8	0	0.00	100.00
* #10	0	0.00	100.00
Pan	293.64		
Total	293.64		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		100.00
#20	0.00	0.00	100.00
#40	0.03	0.06	99.94
#60	0.63	1.27	98.73
#140	16.22	32.82	67.18
#200	22.20	44.92	55.08
Pan	24.05	48.66	51.34
Total	49.43		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Comp. Corr.	Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	(L)	Corr. Dia (mm) (D)
10:32	2	20	23	-6.5	17.5		35.1	0.0135	12.5	0.0337
10:35	5	20	21	-6.5	15.5		31.0	0.0135	12.9	0.0216
10:45	15	20	18	-6.5	12.5		25.0	0.0135	13.4	0.0127
11:00	30	20	16	-6.5	10.5		21.0	0.0135	13.8	0.0091
11:30	60	20	15	-6.5	9.5		19.0	0.0135	14.0	0.0065
2:40	250	21	12	-6.0	7.4		14.8	0.0133	14.5	0.0032
10:30	1440	20	10	-6.5	4.7		9.4	0.0135	14.9	0.0014

cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

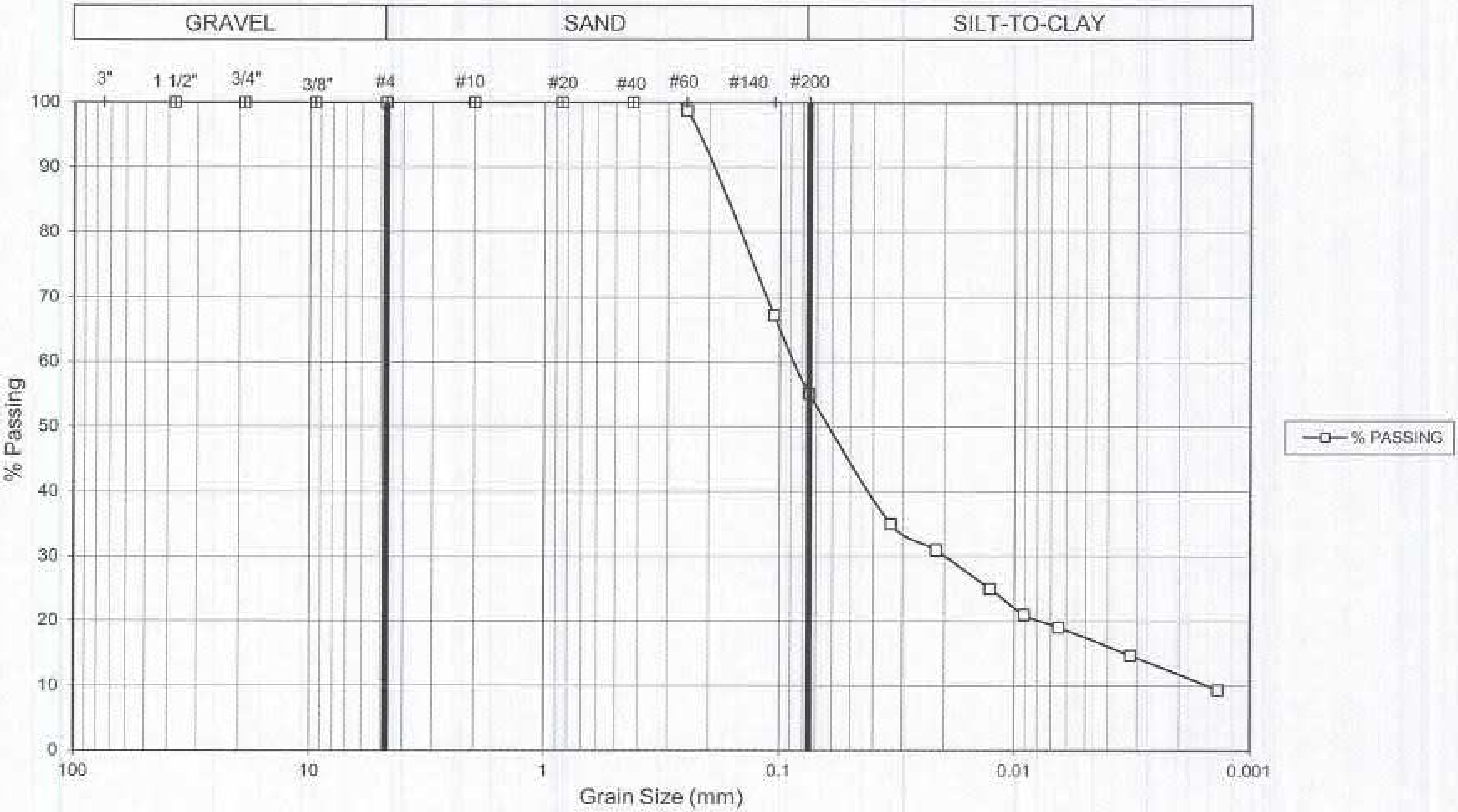
ydro readigs @ 1 hr and 24 hrs

ONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

PARIKH CONSULTANTS, INC.

Project:	BART to Silicon Valley			Project #:	2019-131-T02
Client:	BH-154			Tested by:	DN
Source/Location:	70 N 27th Street	Sample:	26 @ 96 feet	Lab # :	G944
Material Description:	SANDY SILT (ML),			Date Tested:	12/3/2019



Reported By: 0

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley
Proj. #: 2019-131-T02
Sample: 23
Depth (ft): 95
Lab #: G970
Boring: BH-155
Date Tested: 12/11/19
Location: 170 N 28th St. San Jose, CA
Tested By: DN
Material description: SANDY SILT (ML),
Checked By:

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS	+ #4 / #10	- #4 / #10
Tare ID		G103
Sample WET Weight + Tare		533.1
Sample DRY Weight + Tare		462.88
Tare Weight		109.93
Weight of Water		70.22
Weight of DRY Sample		352.95
Water Content, %		19.9

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.11
Sample WET Weight + Tare	24.74
Sample DRY Weight + Tare	24.61
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.990
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.05

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	0		100.00
* #4	0		100.00
#8	0	0.00	100.00
* #10	0	0.00	100.00
Pan	352.95		
Total	352.95		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		100.00
#20	0.11	0.11	99.89
#40	1.32	1.33	98.67
#60	6.97	7.04	92.96
#140	36.22	36.57	63.43
#200	48.49	48.96	51.04
Pan	56.28	56.82	43.18
Total	99.05		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Hydrometer Reading Comp. Corr.	Hydrometer Reading Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	Corr. Coef. (L)	Corr. Dia (mm) (D)
11:40	2	20	33	-6.5	27.5		27.5	0.0135	10.7	0.0312
11:43	5	20	27	-6.5	21.5		21.5	0.0135	11.8	0.0207
11:53	15	20	22	-6.5	16.5		16.5	0.0135	12.7	0.0124
12:08	30	20	20	-6.5	14.5		14.5	0.0135	13.1	0.0089
12:38	60	20	18	-6.5	12.5		12.5	0.0135	13.4	0.0064
15:48	250	21	13	-6.0	8.2		8.2	0.0133	14.4	0.0032
11:45	1440	20	10	-6.5	4.5		4.5	0.0135	14.9	0.0014

cc of 4% Solution (40 gm/l)

$D = K\ (L/T)^{1/2}$

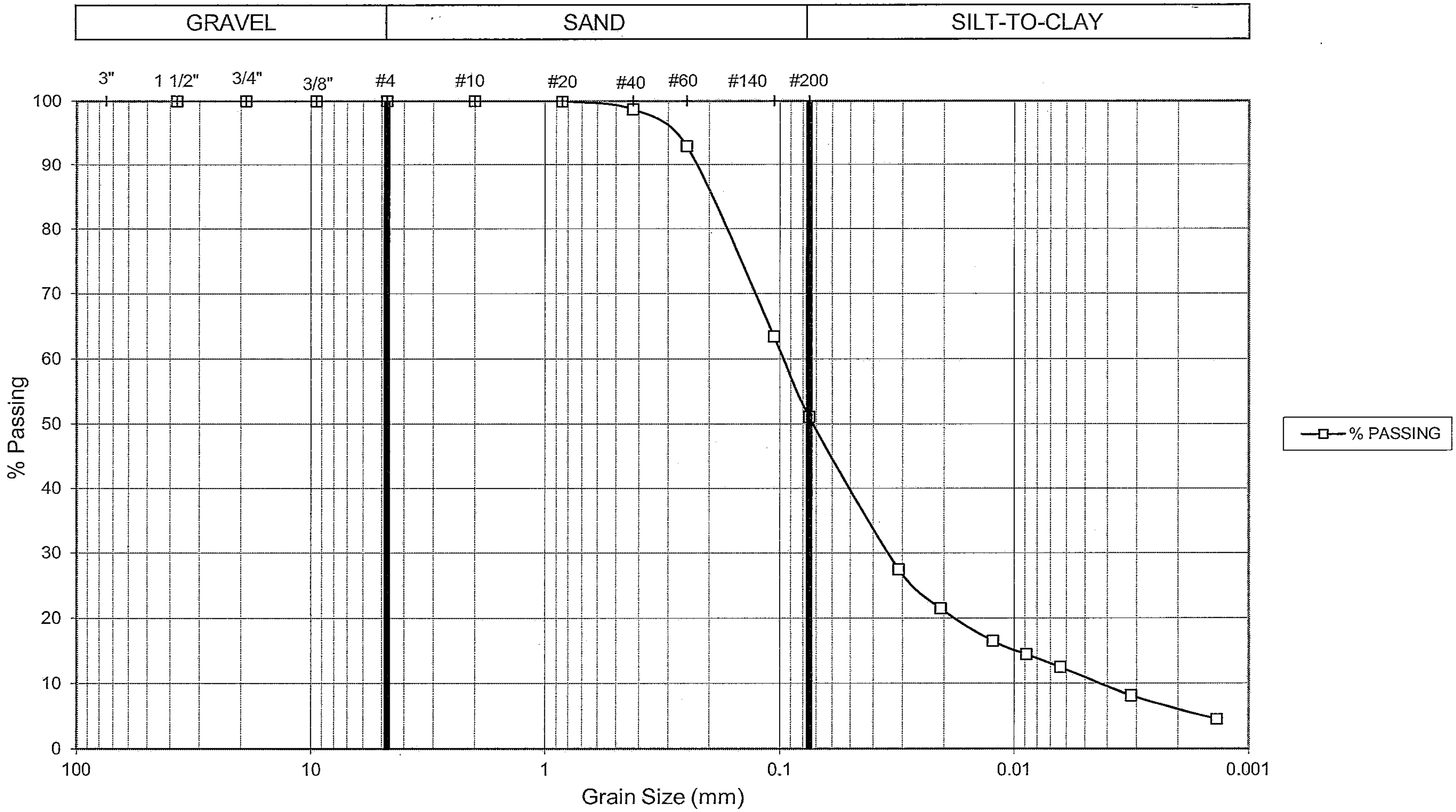
ydro readigs @ 1 hr and 24 hrs

ONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley			Project #:	2019-131-T02
Client:	BH-155			Tested by:	DN
Source/Location:	170 N 28th St. San Jose, CA	Sample:	23 @ 95 feet	Lab # :	G970
Material Description:	SANDY SILT (ML),			Date Tested:	12/11/2019



Reported By:	0	D. NGUYEN

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley		Proj. #:	2019-131-T02
Sample:	25	Depth (ft): 107	Lab #:	G970
Boring:	BH-156		Date Tested:	12/12/19
Location:	1350 E St. James St. San Jose, Ca		Tested By:	NA
Material description:	SILTY SAND (SM),		Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS	+ #4 / #10	- #4 / #10
Tare ID		G57
Sample WET Weight + Tare		224
Sample DRY Weight + Tare		204.31
Tare Weight		84.49
Weight of Water		19.69
Weight of DRY Sample		119.82
Water Content, %		16.4

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	10.71
Sample WET Weight + Tare	31.04
Sample DRY Weight + Tare	30.97
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.997
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.66

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	0		100.00
* #4	0		100.00
#8	0	0.00	100.00
* #10	0	0.00	100.00
Pan	119.82		
Total	119.82		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0.05		100.00
#20	0.43	0.43	99.57
#40	3.37	3.38	96.62
#60	26.64	26.73	73.27
#140	72.52	72.77	27.23
#200	77.44	77.71	22.29
Pan	78.48	78.75	21.25
Total	99.66		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Comp. Corr.	Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	(L)	Corr. Dia (mm) (D)
11:17	2	21	20	-6.0	15.2		15.1	0.0133	13.1	0.0340
11:20	5	21	17	-6.0	12.2		12.1	0.0133	13.6	0.0219
11:30	15	21	15	-6.0	10.2		10.1	0.0133	14.0	0.0128
11:45	30	21	13	-6.0	8.2		8.1	0.0133	14.4	0.0092
12:15	60	21	12	-6.0	7.2		7.2	0.0133	14.5	0.0065
5:30:00 P	250	21	10	-6.0	5.2		5.2	0.0133	14.9	0.0032
11:17	1440	21	9	-6.0	4.2		4.2	0.0133	15.1	0.0014

cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

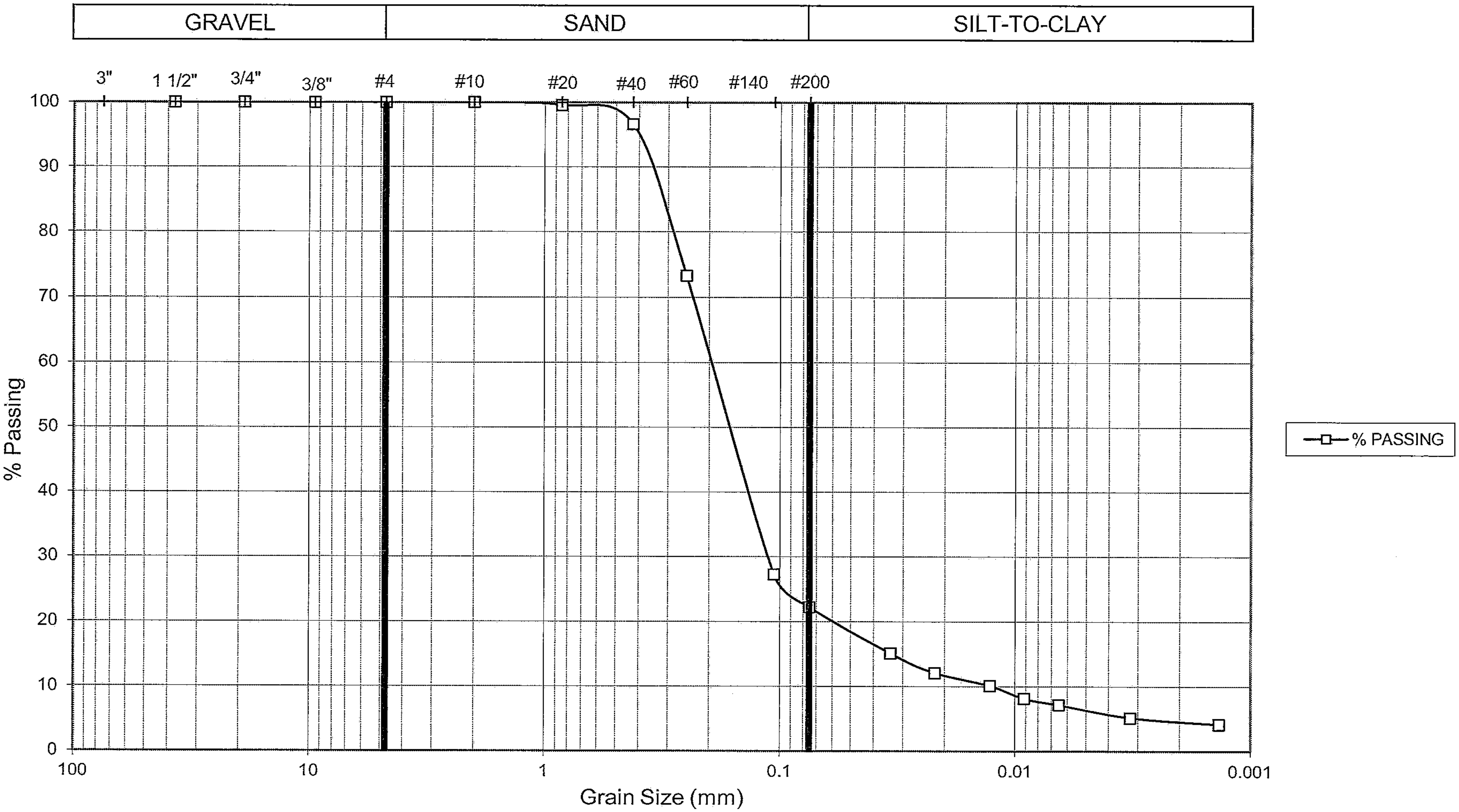
ydro readigs @ 1 hr and 24 hrs

ONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

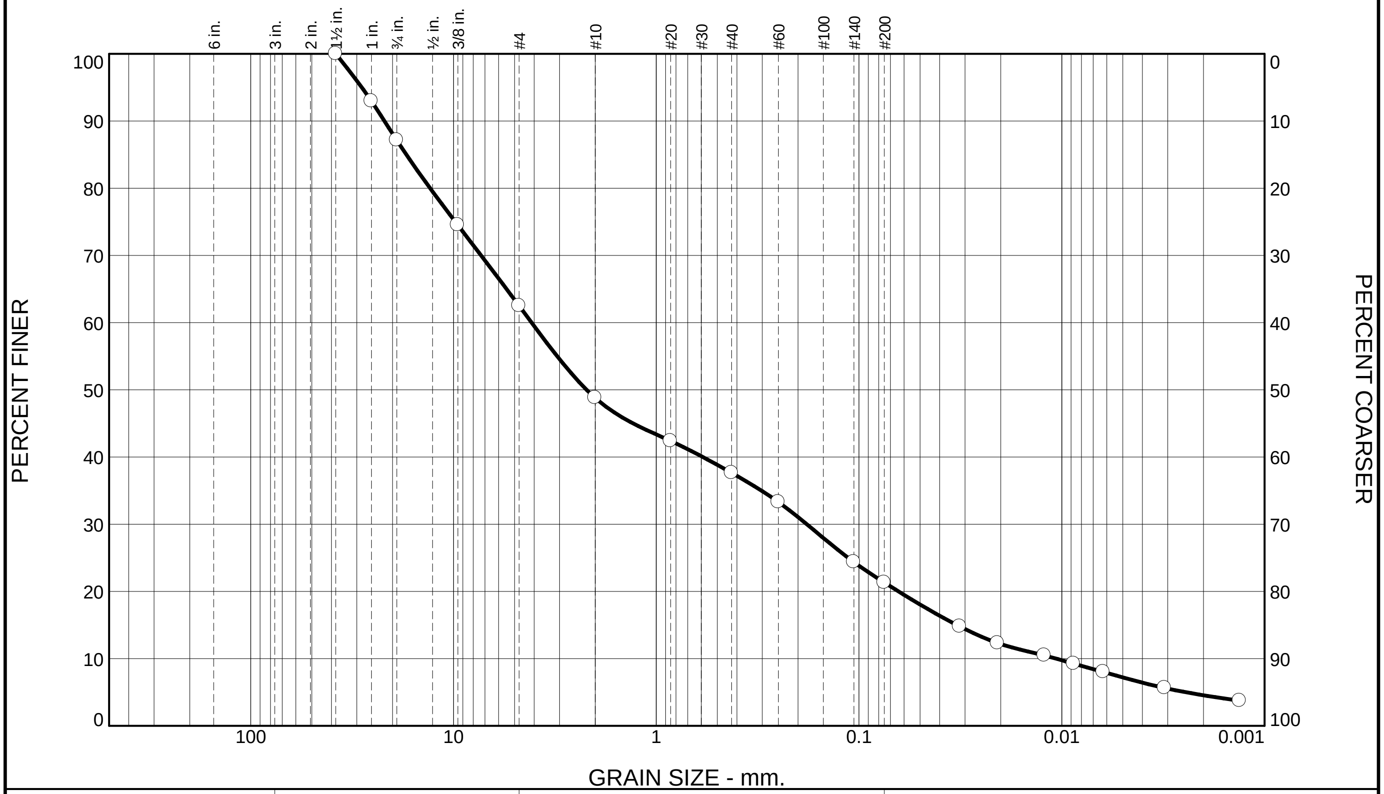
GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley	Project #:	2019-131-T02
Client:	BH-156	Tested by:	NA
Source/Location:	1350 E St. James St. San Jose, Ca Sample: 25 @ 107 feet	Lab # :	G970
Material Description:	SILTY SAND (SM),	Date Tested:	12/12/2019



Reported By: 0

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	13	24	14	11	17	14	7

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100		
1	93		
3/4	87		
3/8	75		
#4	63		
#10	49		
#20	42		
#40	38		
#60	33		
#140	24		
#200	21		
0.0318 mm.	15		
0.0207 mm.	12		
0.0122 mm.	10		
0.0087 mm.	9.2		
0.0062 mm.	8.0		
0.0031 mm.	5.6		
0.0013 mm.	3.7		

* (no specification provided)

Soil Description

Greenish gray silty sand with gravel

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 21.9171 D_{85}= 17.0927 D_{60}= 4.1215
D_{50}= 2.2060 D_{30}= 0.1811 D_{15}= 0.0329
D_{10}= 0.0107 C_u= 386.03 C_c= 0.75

Classification

USCS= SM AASHTO=

Remarks

Source of Sample: BH-157 **Depth:** 92
Sample Number: 14

Date: 4-10-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley	Proj. #:	2019-131-T02
Sample: 10	Depth (ft): 89.5'	Lab #:	G970
Boring:	BH-158	Date Tested:	02/03/20
Location:	18 S 18th St San Jose CA	Tested By:	DN
Material description:	WELL-GRADED SAND WITH GRAVEL (SW	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		
Sample WET Weight + Tare		
Sample DRY Weight + Tare		
Tare Weight		
Weight of Water		
Weight of DRY Sample		810.69
Water Content, %		11.4

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.12
Sample WET Weight + Tare	36.02
Sample DRY Weight + Tare	36
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.999
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.92

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	121.17	14.95	85.05
* #4	319.1	39.36	60.64
#8	501	61.80	38.20
* #10	553.2	68.24	31.76
Pan	257.49	31.76	
Total	810.69		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		31.76
#20	37.60	11.95	19.81
#40	55.60	17.67	14.09
#60	66.70	21.20	10.56
#140	82.50	26.22	5.54
#200	85.30	27.11	4.65
Pan	85.90	27.31	4.46
Total	99.92		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Hydrometer Reading Comp. Corr.	Hydrometer Reading Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	Corr. Coef. (L)	Corr. Dia (mm) (D)
10:32	2	21	15	-6.0	10.2		3.2	0.0133	14.0	0.0351
10:35	5	21	13	-6.0	8.2		2.6	0.0133	14.4	0.0225
10:45	15	21	12	-6.0	7.2		2.3	0.0133	14.5	0.0131
11:00	30	21	11	-6.0	6.2		2.0	0.0133	14.7	0.0093
11:30	60	21	10	-6.0	5.2		1.6	0.0133	14.9	0.0066
14:40	250	21	9	-6.0	4.2		1.3	0.0133	15.1	0.0033
10:32	1440	21	7	-6.0	2.2		0.7	0.0133	15.5	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

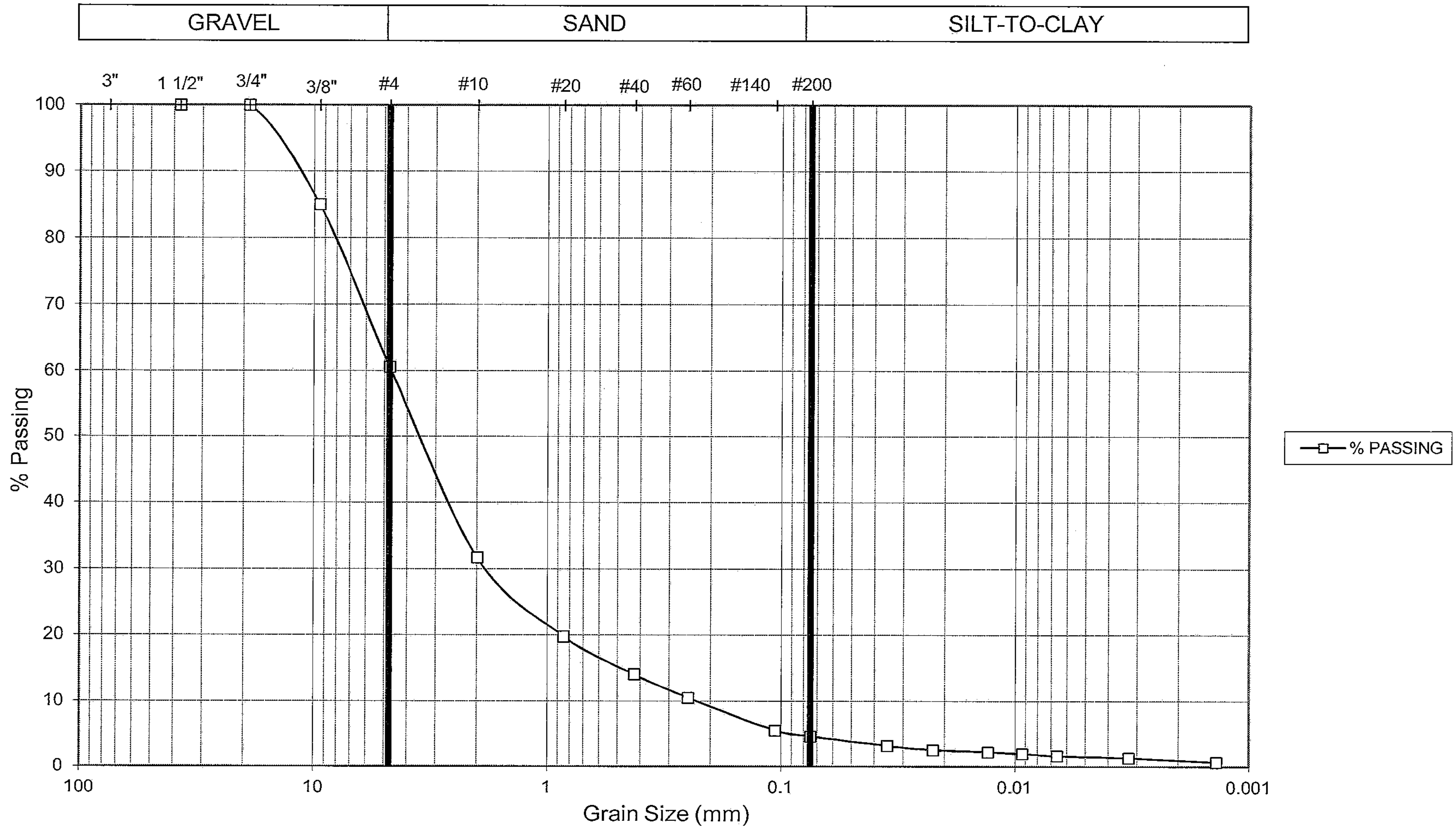
Cal 203 Requires hydro readigs @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

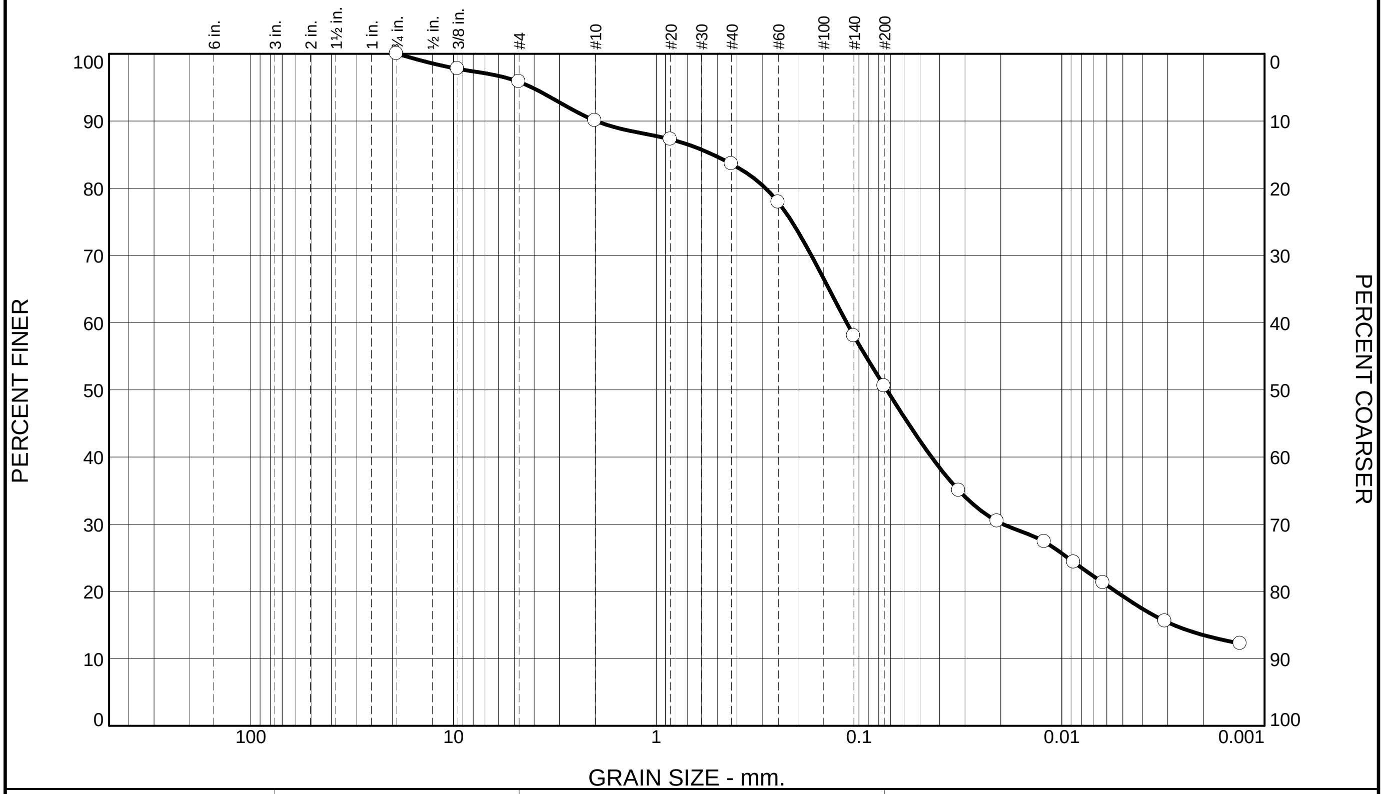
PARIKH CONSULTANTS, INC.

Project: BART to Silicon Valley
Project #: 2019-131-T02
Client: BH-158
Tested by: DN
Source/Location: 18 S 18th St San Jose CA
Sample: 10 @ 89.5' feet
Lab # : G970
Material Description: WELL-GRADED SAND WITH GRAVEL (SW),
Date Tested: 2/3/2020



Reported By: 0 Do Nguyen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	4	6	6	33	32	19

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	98		
#4	96		
#10	90		
#20	87		
#40	84		
#60	78		
#140	58		
#200	51		
0.0322 mm.	35		
0.0208 mm.	30		
0.0122 mm.	27		
0.0087 mm.	24		
0.0062 mm.	21		
0.0031 mm.	16		
0.0013 mm.	12		

* (no specification provided)

Soil Description

Grayish brown sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.9857 D_{85}= 0.5262 D_{60}= 0.1151

D_{50}= 0.0730 D_{30}= 0.0194 D_{15}= 0.0028

D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: BH-158 **Depth:** 175

Sample Number: 48

Date: 2-26-20

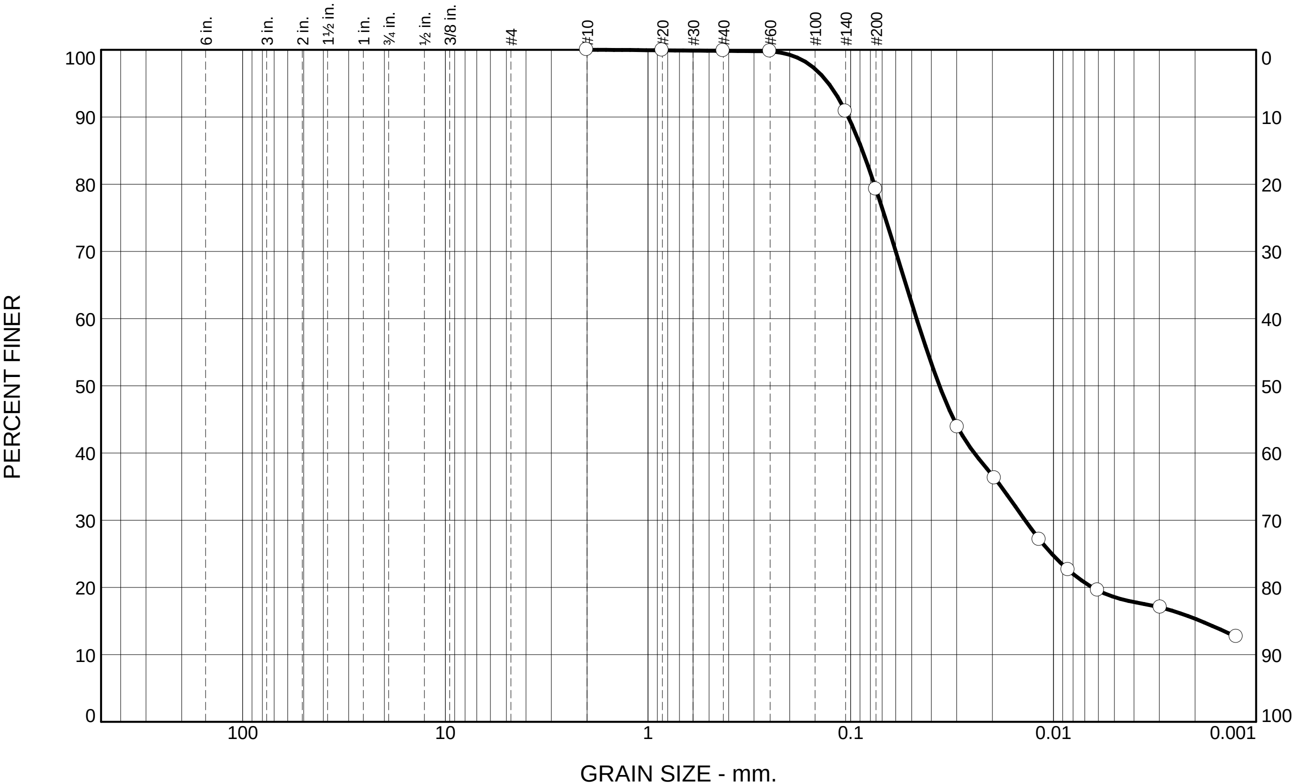
Client: Mott MacDonald

Project: BSVII
507385606

Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	21	60	19

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	100		
#60	100		
#140	91		
#200	79		
0.0297 mm.	44		
0.0195 mm.	36		
0.0117 mm.	27		
0.0084 mm.	23		
0.0060 mm.	20		
0.0030 mm.	17		
0.0012 mm.	13		

* (no specification provided)

Soil Description

Greenish gray silt with sand

Atterberg Limits

PL= 26 LL= 33 PI= 7

Coefficients

D_{90}= 0.1028 D_{85}= 0.0876 D_{60}= 0.0473
D_{50}= 0.0365 D_{30}= 0.0138 D_{15}= 0.0019
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(5)

Remarks

Source of Sample: BH-161 **Depth:** 72
Sample Number: 8
Date: 4-29-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T02
Sample: 19A	Depth (ft): 105'	Lab #:	G970
Boring: BH-161		Date Tested:	02/11/20
Location: 552 W Santa Clara, San Jose		Tested By:	DN
Material description:	SANDY SILT (ML),	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS	+ #4 / #10	- #4 / #10
Tare ID		G73
Sample WET Weight + Tare		414.16
Sample DRY Weight + Tare		360.76
Tare Weight		84.16
Weight of Water		53.4
Weight of DRY Sample		276.6
Water Content, %		19.3

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.09
Sample WET Weight + Tare	26.12
Sample DRY Weight + Tare	26.03
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.994
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.40

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	0		100.00
* #4	0		100.00
#8	0	0.00	100.00
* #10	8.91	3.22	96.78
Pan	267.69		
Total	276.6		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		96.78
#20	1.51	1.47	95.31
#40	2.52	2.45	94.33
#60	3.95	3.85	92.93
#140	19.11	18.61	78.17
#200	28.31	27.56	69.22
Pan	31.65	30.81	65.96
Total	99.40		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Hydrometer Reading Comp. Corr.	Hydrometer Reading Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	Corr. Coef. (L)	Corr. Dia (mm) (D)
10:32	2	21	47	-6.0	42.2		40.7	0.0133	8.2	0.0268
10:35	5	21	42	-6.0	37.2		35.9	0.0133	9.1	0.0179
10:45	15	21	36	-6.0	31.2		30.1	0.0133	10.2	0.0109
11:00	30	21	32	-6.0	27.2		26.2	0.0133	10.9	0.0080
11:30	60	21	29	-6.0	24.2		23.3	0.0133	11.4	0.0058
14:40	250	21	24	-6.0	19.2		18.5	0.0133	12.4	0.0030
10:32	1440	21	19	-6.0	14.2		13.7	0.0133	13.3	0.0013

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

Cal 203 Requires hydro readigs @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Project: BART to Silicon Valley

Project #: 2019-131-T02

Client: BH-161

Tested by: DN

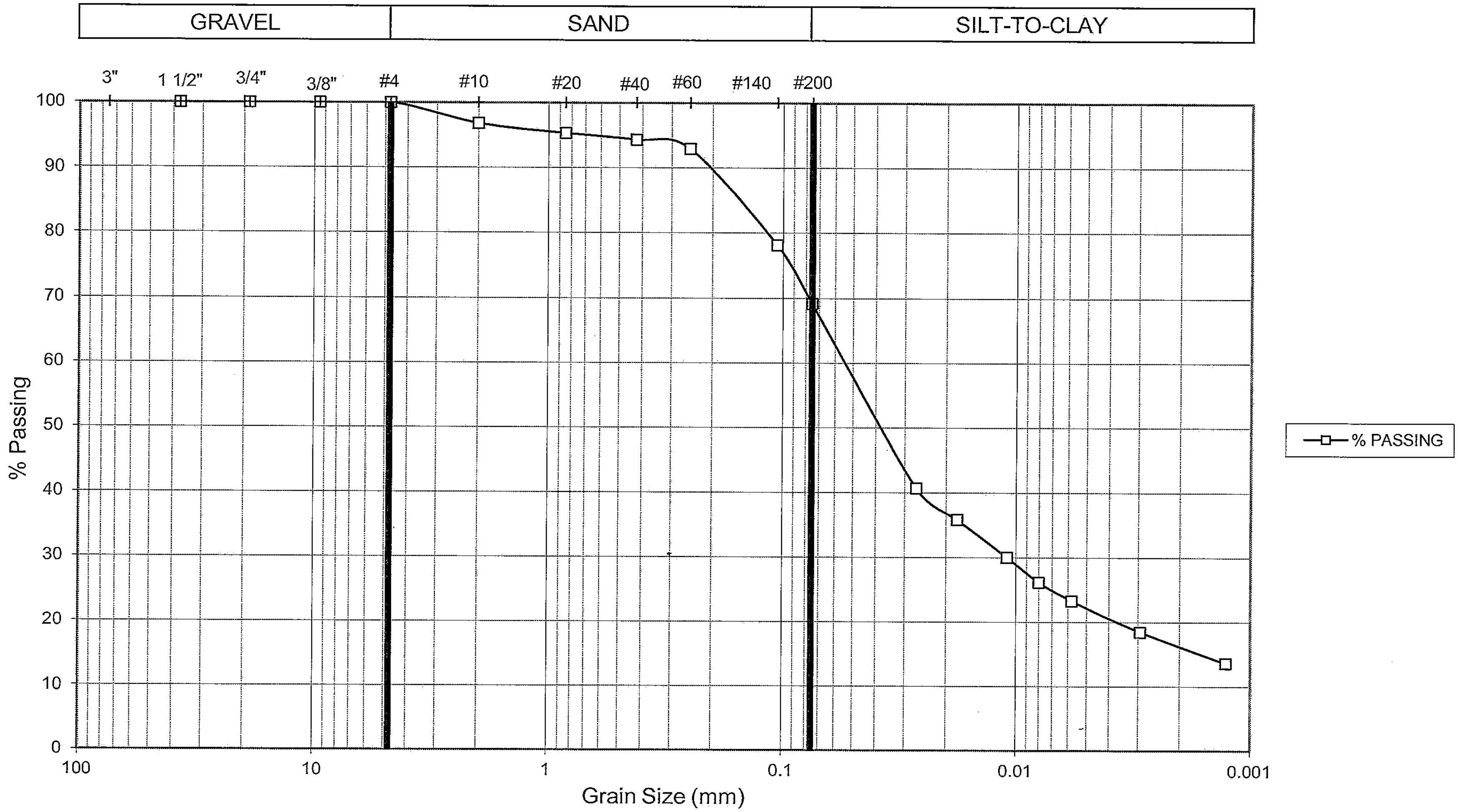
Source/Location: 552 W Santa Clara, San Jose

Sample: 19A @ 105' feet

Lab # : G970

Material Description: SANDY SILT (ML),

Date Tested: 2/11/2020



Reported By: 0 Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley	Proj. #:	2019-131-T04
Sample: 16	Depth (ft): 75	Lab #:	G970
Boring:	BH-162	Date Tested:	05/08/20
Location:	9 White Street, San Jose, CA	Tested By:	DN
Material description:	POORLY-GRADED SAND WITH SILT AND GRAVEL (	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G7
Sample WET Weight + Tare		1122.6
Sample DRY Weight + Tare		1042.3
Tare Weight		84.67
Weight of Water		80.3
Weight of DRY Sample		957.63
Water Content, %		8.4

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.07
Sample WET Weight + Tare	36.56
Sample DRY Weight + Tare	36.5
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.998
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.76

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	208.1	21.73	78.27
* #4	389.34	40.66	59.34
#8	521.6	54.47	45.53
* #10	545.8	56.99	43.01
Pan	411.83	43.01	
Total	957.63		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		43.01
#20	20.65	8.90	34.10
#40	41.71	17.98	25.03
#60	56.78	24.48	18.53
#140	76.06	32.79	10.22
#200	80.81	34.83	8.17
Pan	81.60	35.17	7.83
Total	99.76		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R W	% Total Sample	Corr. Coef.		Corr. Dia (mm) (D)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	
9:32	2	21	16	-6.0	11.2		4.8	0.0133	13.8	0.0349
9:35	5	21	14	-6.0	9.2		3.9	0.0133	14.2	0.0224
9:45	15	21	12	-6.0	7.2		3.1	0.0133	14.5	0.0131
10:00	30	21	11	-6.0	6.2		2.6	0.0133	14.7	0.0093
10:30	60	21	10	-6.0	5.2		2.2	0.0133	14.9	0.0066
13:40	250	21	9	-6.0	4.2		1.8	0.0133	15.1	0.0033
9:32	1440	21	7	-6.0	2.2		0.9	0.0133	15.5	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

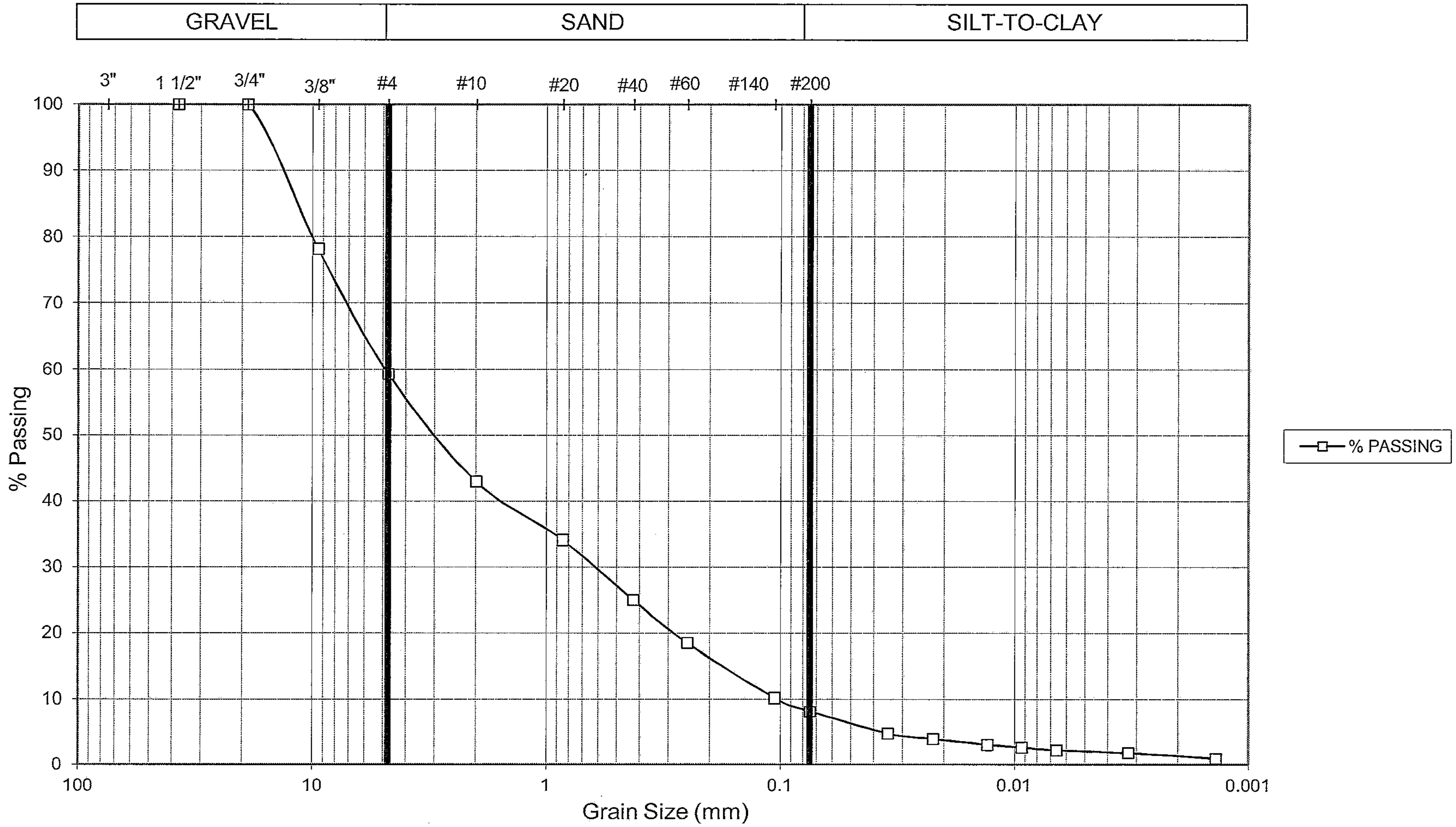
Cal 203 Requires hydro readigs @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley		Project #:	2019-131-T04
Client:	BH-162		Tested by:	DN
Source/Location:	9 White Street, San Jose, CA	Sample: 16 @ 75 feet	Lab # :	G970
Material Description:	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM),		Date Tested:	5/8/2020



Reported By: 0 Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T04
Sample: 29B	Depth (ft): 101.5	Lab #:	G970
Boring: BH-162		Date Tested:	05/11/20
Location: 9 White Street, San Jose, CA		Tested By:	DN
Material description:	SILTY SAND (SM),	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G74
Sample WET Weight + Tare		551.1
Sample DRY Weight + Tare		487.35
Tare Weight		83.84
Weight of Water		63.75
Weight of DRY Sample		403.51
Water Content, %		15.8

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.04
Sample WET Weight + Tare	33.87
Sample DRY Weight + Tare	33.73
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.994
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.39

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	4.55	1.13	98.87
* #4	15.76	3.91	96.09
#8	23.66	5.86	94.14
* #10	25.98	6.44	93.56
Pan	377.53	93.56	
Total	403.51		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		93.56
#20	2.27	2.14	91.42
#40	7.12	6.70	86.86
#60	16.17	15.22	78.34
#140	41.58	39.14	54.42
#200	51.60	48.58	44.99
Pan	54.56	51.36	42.20
Total	99.39		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Hydrometer Reading Comp. Corr.	Hydrometer Reading Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	Corr. Coef. (L)	Corr. Dia (mm) (D)
10:32	2	21	33	-6.0	28.2		26.3	0.0133	10.7	0.0308
10:35	5	21	29	-6.0	24.2		22.6	0.0133	11.4	0.0201
10:45	15	21	24	-6.0	19.2		17.9	0.0133	12.4	0.0121
11:00	30	21	22	-6.0	17.2		16.0	0.0133	12.7	0.0087
11:30	60	21	20	-6.0	15.2		14.2	0.0133	13.1	0.0062
14:40	250	21	17	-6.0	12.2		11.4	0.0133	13.6	0.0031
10:32	1440	21	15	-6.0	10.2		9.5	0.0133	14.0	0.0013

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

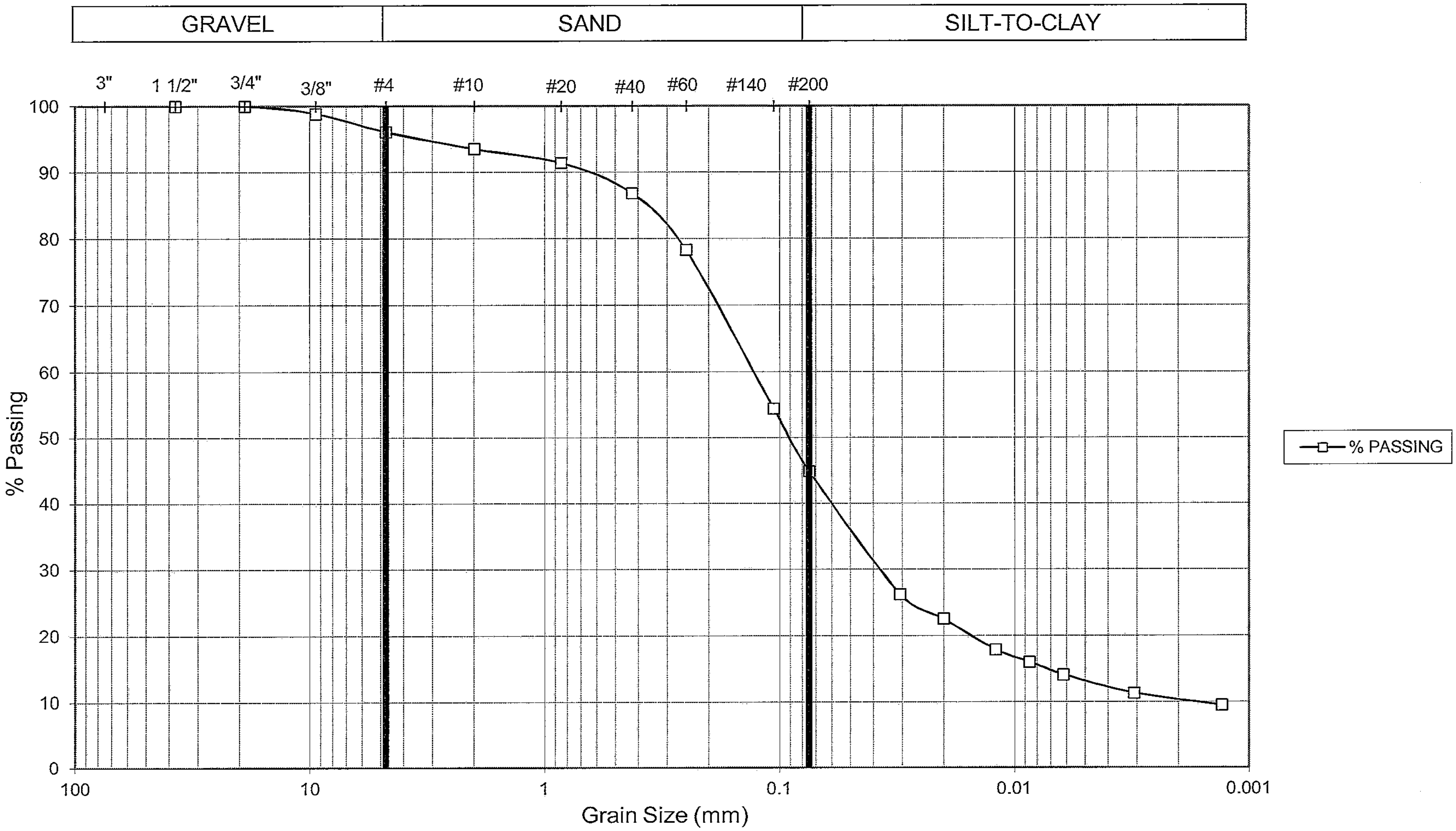
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

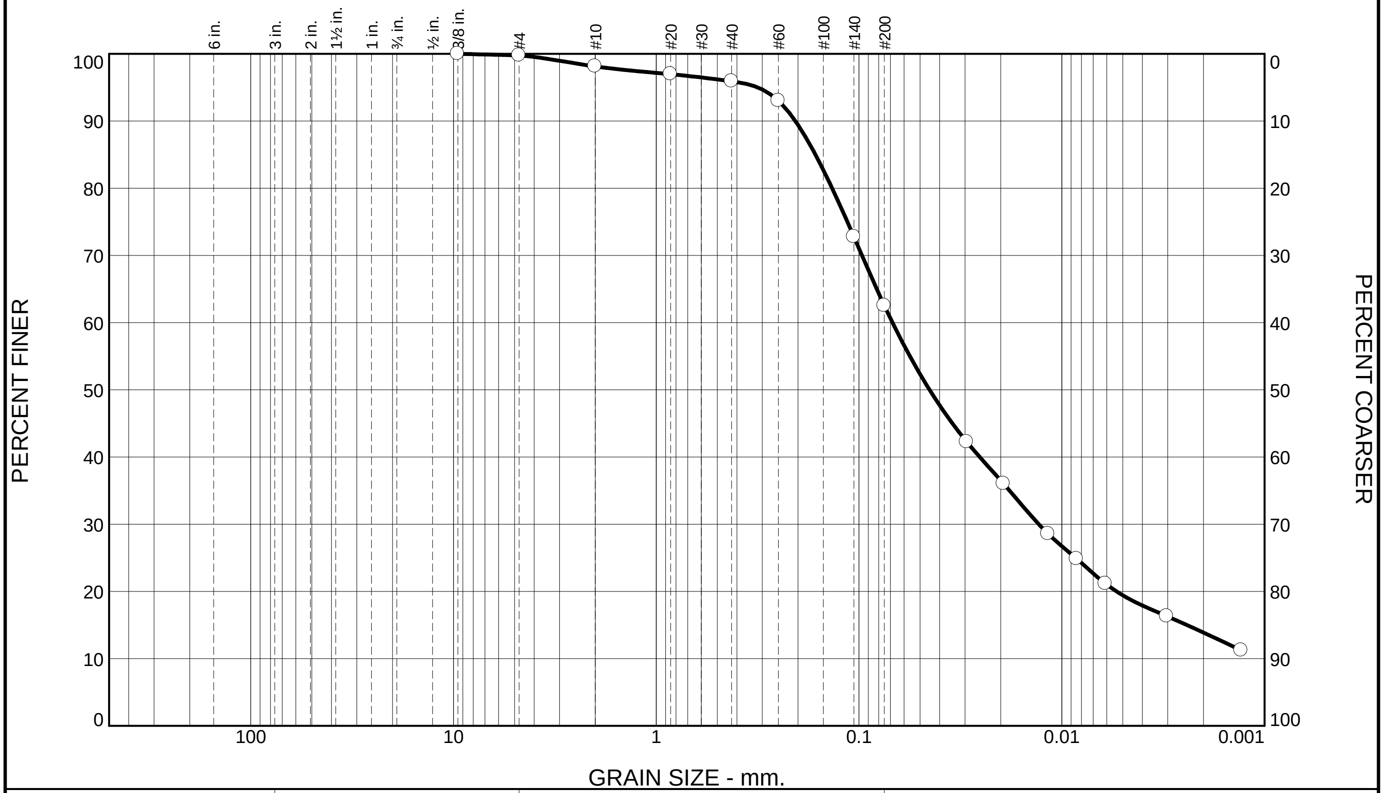
GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley	Project #:	2019-131-T04
Client:	BH-162	Tested by:	DN
Source/Location:	9 White Street, San Jose, CA Sample: 29B @ 101.5 feet	Lab # :	G970
Material Description:	SILTY SAND (SM),	Date Tested:	5/11/2020



Reported By:	0	Do Nguyen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	2	2	33	44	19

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100		
#4	100		
#10	98		
#20	97		
#40	96		
#60	93		
#140	73		
#200	63		
0.0294 mm.	42		
0.0194 mm.	36		
0.0117 mm.	29		
0.0084 mm.	25		
0.0061 mm.	21		
0.0030 mm.	16		
0.0013 mm.	11		

* (no specification provided)

Soil Description

Grayish brown sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2062 D_{85}= 0.1641 D_{60}= 0.0684
D_{50}= 0.0449 D_{30}= 0.0130 D_{15}= 0.0024
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: BH-163 **Depth:** 155
Sample Number: 31

Date: 4-10-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley	Proj. #:	2019-131-T02
Sample:	28A Depth (ft): 90.5'	Lab #:	G970
Boring:	BH-165	Date Tested:	05/09/20
Location:	1550 Las Plumas Ave, San Jose, CA	Tested By:	DN
Material description:	SILTY SAND (SM),	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		S10
Sample WET Weight + Tare		1069.9
Sample DRY Weight + Tare		940.89
Tare Weight		103.35
Weight of Water		129.01
Weight of DRY Sample		837.54
Water Content, %		15.4

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.2
Sample WET Weight + Tare	29.79
Sample DRY Weight + Tare	29.74
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.997
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.73

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	5.91	0.71	99.29
* #4	21.43	2.56	97.44
#8	55.40	6.61	93.39
* #10	65.12	7.78	92.22
Pan	772.42	92.22	
Total	837.54		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		92.22
#20	6.06	5.60	86.62
#40	12.25	11.33	80.90
#60	21.83	20.19	72.04
#140	51.85	47.95	44.28
#200	61.53	56.90	35.33
Pan	64.82	59.94	32.28
Total	99.73		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R W	% Total Sample	Corr. Coef.		Corr. Dia (mm)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	(D)
9:32	2	21	29	-6.0	24.2		22.2	0.0133	11.4	0.0318
9:35	5	21	26	-6.0	21.2		19.4	0.0133	12.0	0.0206
9:45	15	21	23	-6.0	18.2		16.7	0.0133	12.5	0.0121
10:00	30	21	20	-6.0	15.2		13.9	0.0133	13.1	0.0088
10:30	60	21	18	-6.0	13.2		12.1	0.0133	13.4	0.0063
13:40	250	21	15	-6.0	10.2		9.3	0.0133	14.0	0.0031
9:30	1440	21	12	-6.0	7.2		6.6	0.0133	14.5	0.0013

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

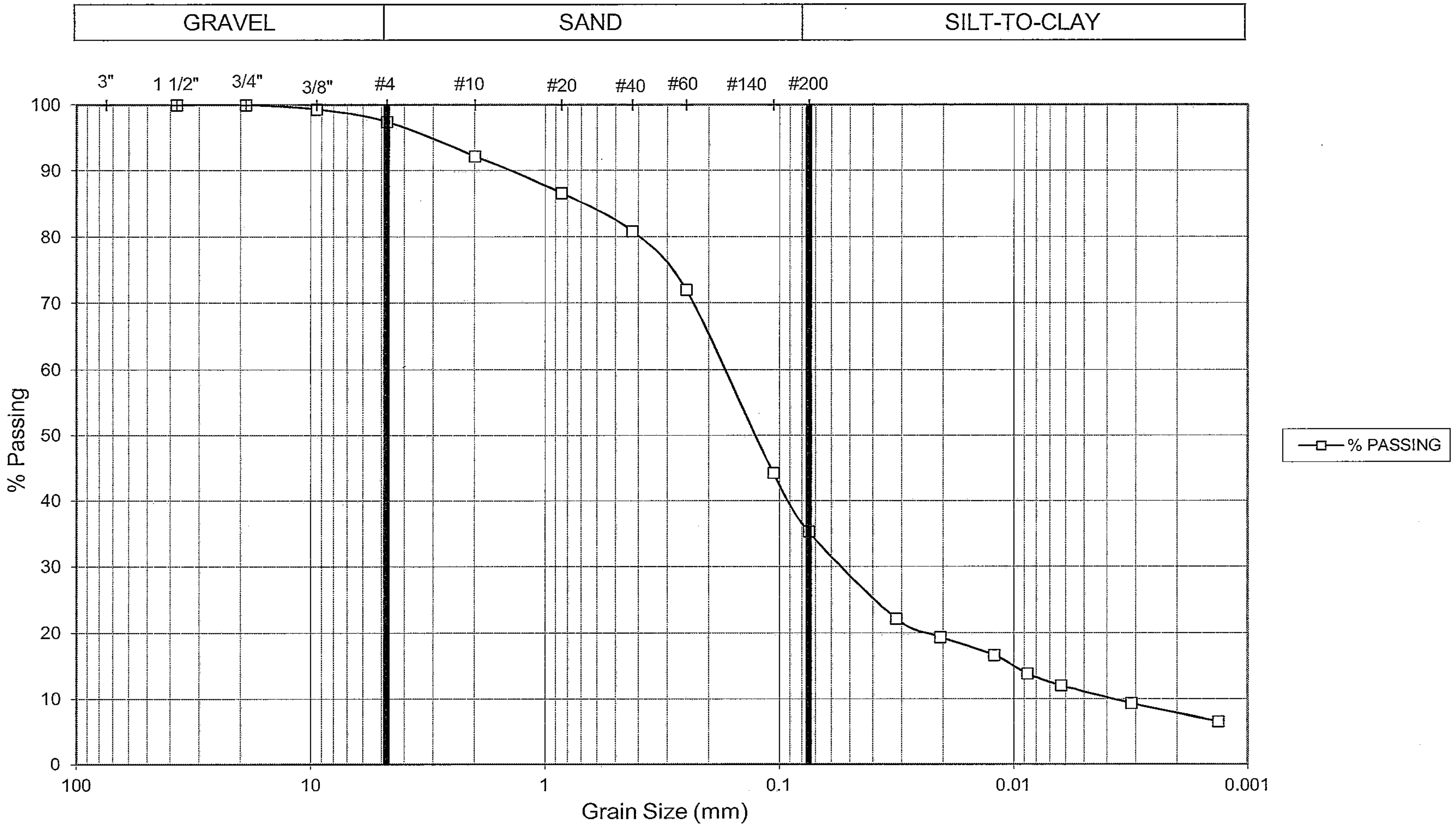
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

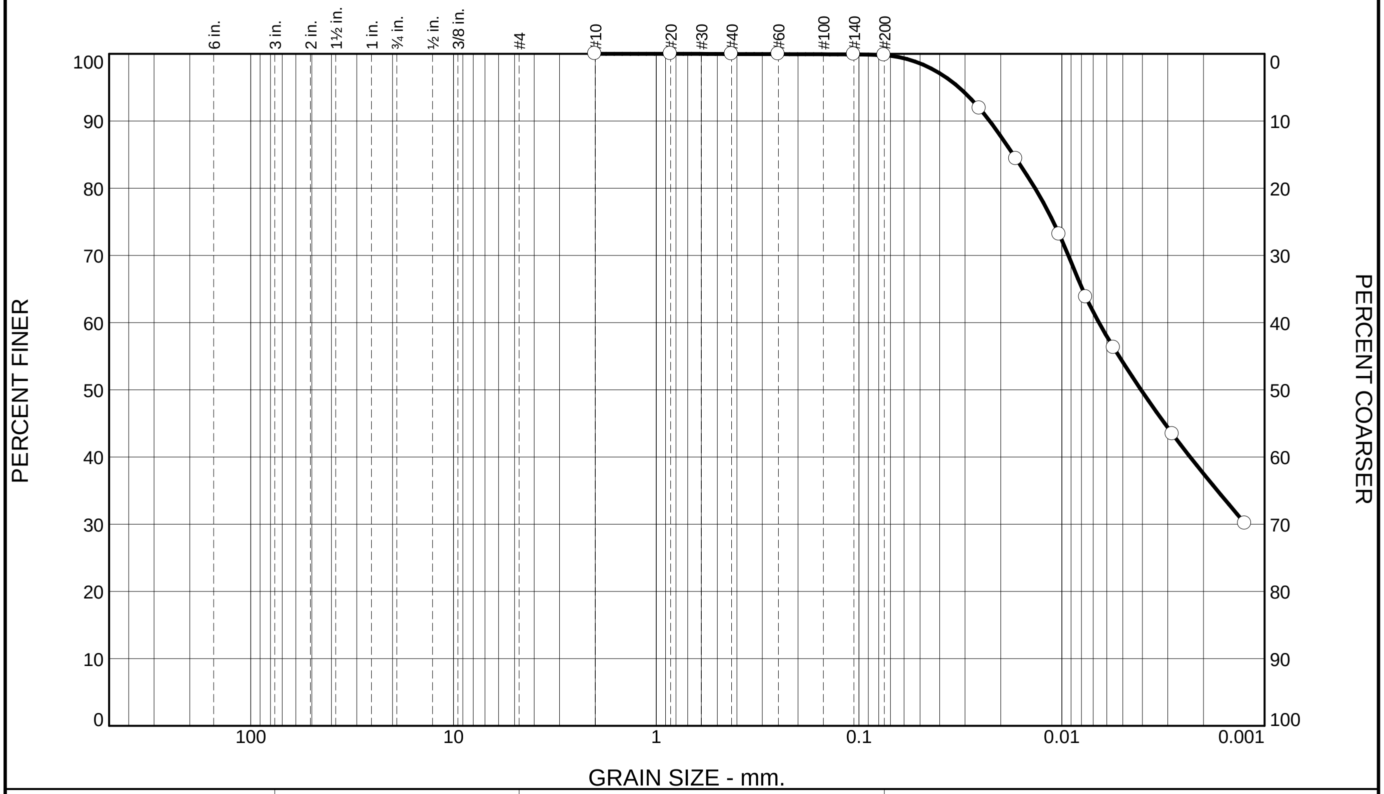
GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley	Project #:	2019-131-T02
Client:	BH-165	Tested by:	DN
Source/Location:	1550 Las Plumas Ave, San Jose, CA Sample: 28A @ 90.5' feet	Lab # :	G970
Material Description:	SILTY SAND (SM),	Date Tested:	5/9/2020



Reported By: 0 Do Nguyen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	0	46	54

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	100		
#60	100		
#140	100		
#200	100		
0.0254 mm.	92		
0.0168 mm.	84		
0.0103 mm.	73		
0.0076 mm.	64		
0.0055 mm.	56		
0.0028 mm.	43		
0.0012 mm.	30		

* (no specification provided)

Soil Description

Grayish brown clay

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0227 D_{85}= 0.0174 D_{60}= 0.0066
D_{50}= 0.0041 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO=

Remarks

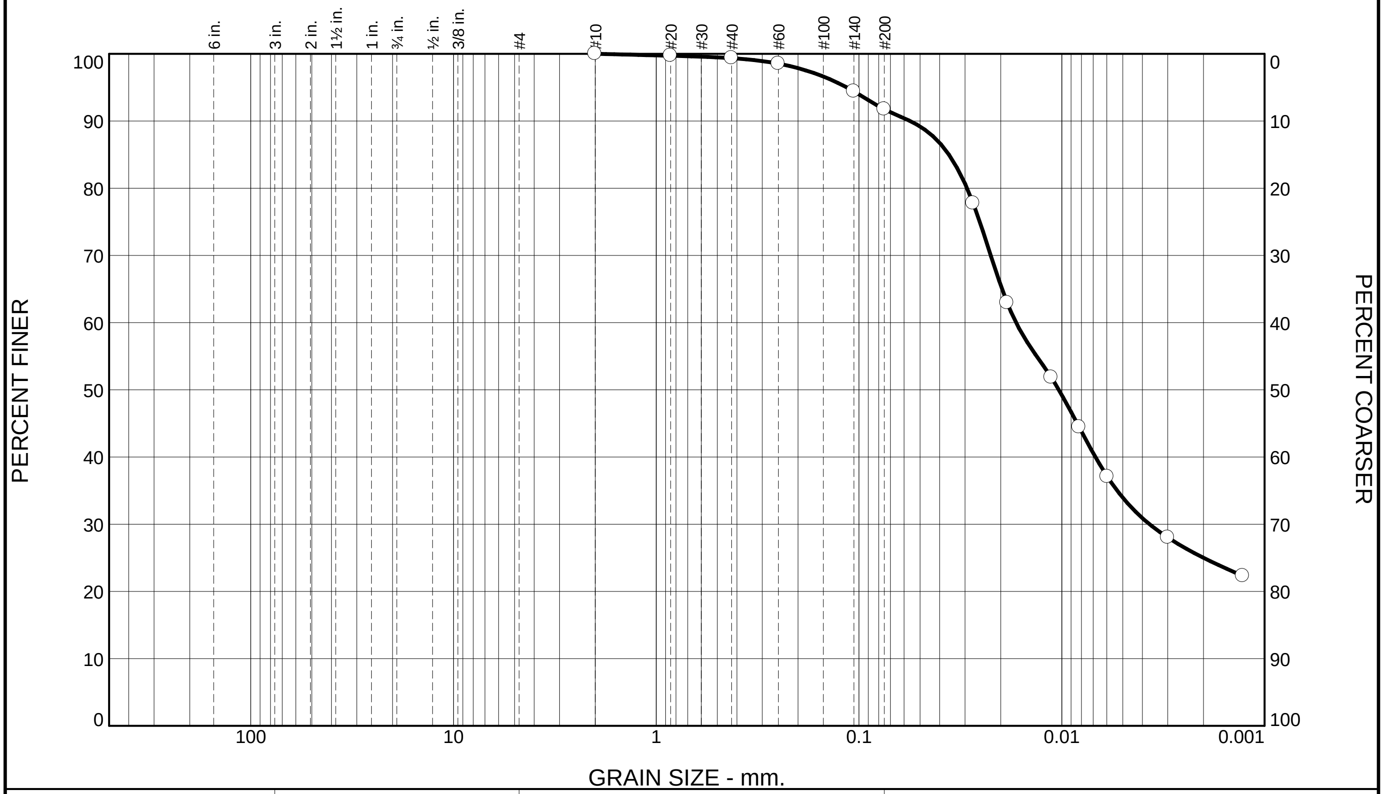
Source of Sample: BH-166 **Depth:** 10
Sample Number: 1

Date: 4-10-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	7	58	34

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	99		
#60	99		
#140	94		
#200	92		
0.0273 mm.	78		
0.0186 mm.	63		
0.0113 mm.	52		
0.0082 mm.	44		
0.0060 mm.	37		
0.0030 mm.	28		
0.0013 mm.	22		

* (no specification provided)

Soil Description

Greenish gray silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0561 D_{85}= 0.0361 D_{60}= 0.0168
D_{50}= 0.0103 D_{30}= 0.0037 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: BH-166 **Depth:** 83.5
Sample Number: 18

Date: 4-10-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T04
Sample: 21B	Depth (ft): 69.5'	Lab #:	G970
Boring: BH-167		Date Tested:	05/12/20
Location: 133 Rhodes, San Jose, CA		Tested By:	DN
Material description: SANDY SILT (ML),		Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G106
Sample WET Weight + Tare		873.36
Sample DRY Weight + Tare		731.3
Tare Weight		110
Weight of Water		142.06
Weight of DRY Sample		621.3
Water Content, %		22.9

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.07
Sample WET Weight + Tare	35.98
Sample DRY Weight + Tare	35.93
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.998
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.80

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"			100.00
3/8"			100.00
* #4			100.00
#8	0	0.00	100.00
* #10	1.9	0.31	99.69
Pan	619.4	99.69	
Total	621.3		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		99.69
#20	0.18	0.18	99.51
#40	0.92	0.92	98.78
#60	3.85	3.85	95.85
#140	30.78	30.75	68.95
#200	43.82	43.77	55.92
Pan	55.98	55.92	43.77
Total	99.80		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R / W	% Total Sample	Corr. Coef.		Corr. Dia (mm) (D)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	
8:32	2	21	34	-6.0	29.2		28.9	0.0133	10.5	0.0305
8:35	5	21	29	-6.0	24.2		23.9	0.0133	11.4	0.0201
8:45	15	21	24	-6.0	19.2		19.0	0.0133	12.4	0.0121
9:00	30	21	21	-6.0	16.2		16.0	0.0133	12.9	0.0087
9:30	60	21	19	-6.0	14.2		14.0	0.0133	13.3	0.0062
12:40	250	21	16	-6.0	11.2		11.1	0.0133	13.8	0.0031
8:30	1440	21	13	-6.0	8.2		8.1	0.0133	14.4	0.0013

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

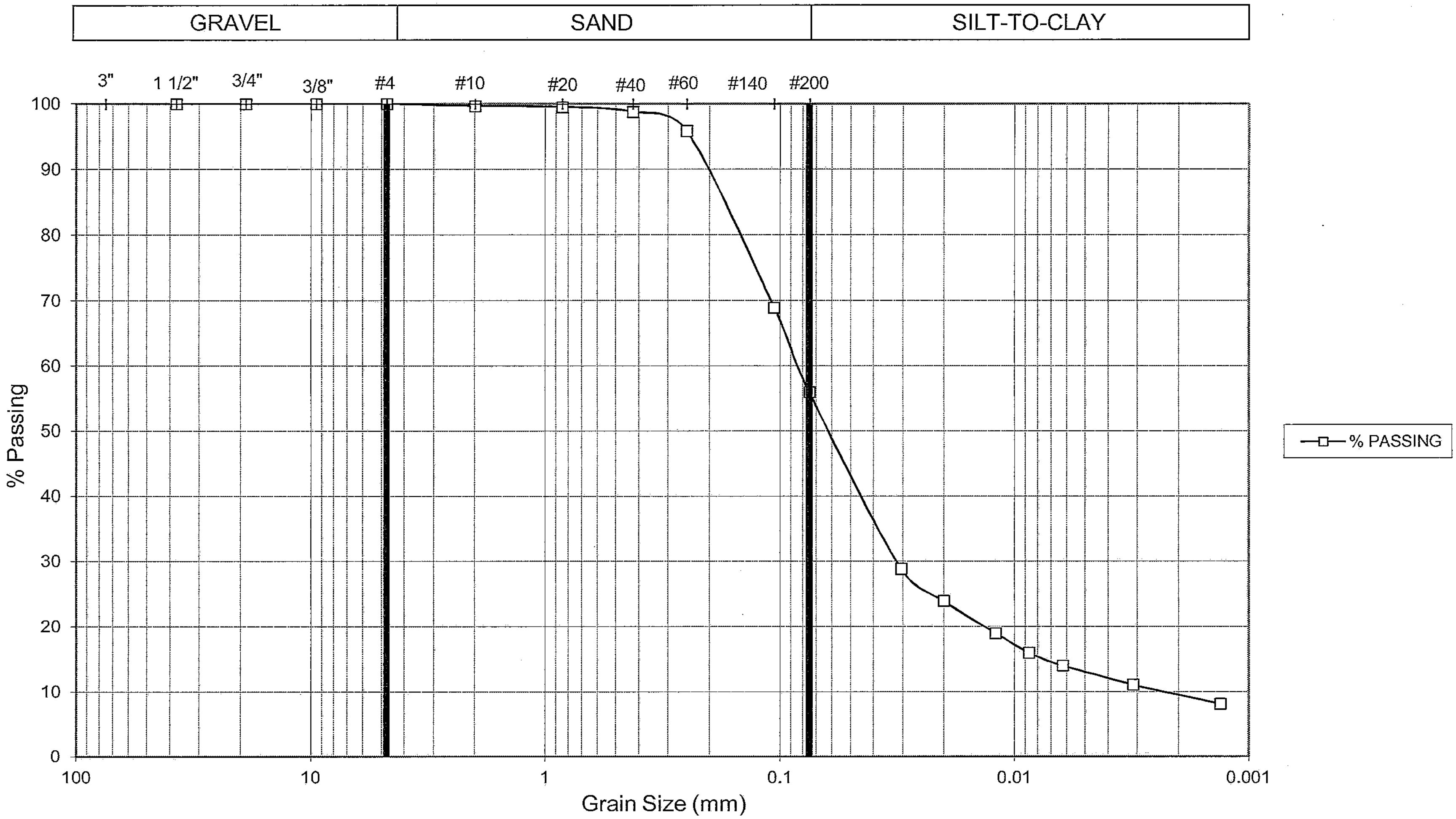
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

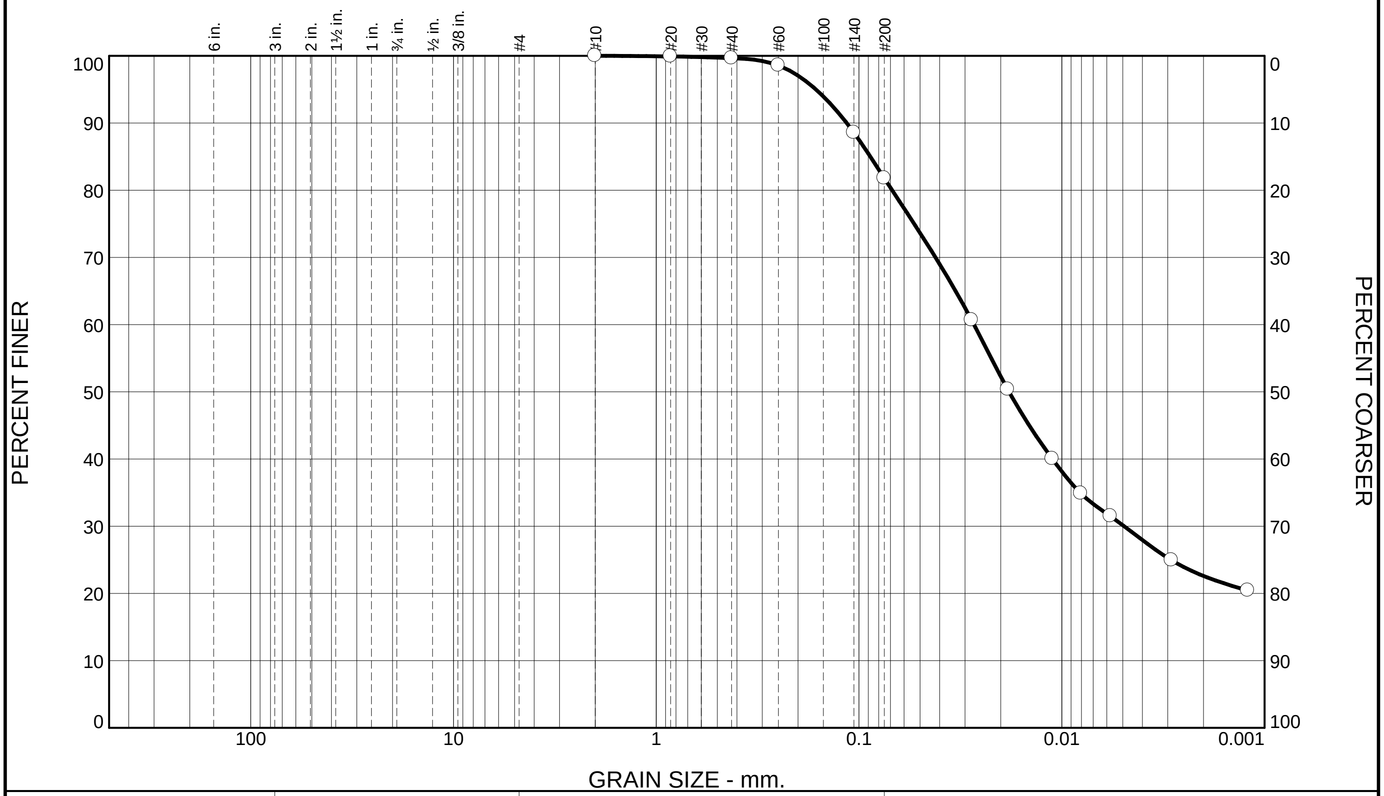
PARIKH CONSULTANTS, INC.

Project:	BART to Silicon Valley	Project #:	2019-131-T04
Client:	BH-167	Tested by:	DN
Source/Location:	133 Rhodes, San Jose, CA Sample: 21B @ 69.5' feet	Lab # :	G970
Material Description:	SANDY SILT (ML),	Date Tested:	5/12/2020



Reported By:	0	Do Nguyen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	18	52	30

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	100		
#60	99		
#140	89		
#200	82		
0.0278 mm.	61		
0.0185 mm.	50		
0.0111 mm.	40		
0.0080 mm.	35		
0.0058 mm.	31		
0.0029 mm.	25		
0.0012 mm.	20		

* (no specification provided)

Soil Description

Grayish brown silt with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1151 D_{85}= 0.0880 D_{60}= 0.0271
D_{50}= 0.0182 D_{30}= 0.0049 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: BH-167 **Depth:** 106
Sample Number: 35

Date: 7-2-20

Client: Mott MacDonald
Project: BSVII
507385606

Project No: 2973-001.0 **Figure**

Tested By: JH **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T04
Sample: 37B	Depth (ft): 113'	Lab #:	G970
Boring: BH-167		Date Tested:	05/11/20
Location: 133 Rhodes, San Jose, CA		Tested By:	DN
Material description:	CLAYEY SAND WITH GRAVEL (SC),	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G40
Sample WET Weight + Tare		1041.6
Sample DRY Weight + Tare		944.52
Tare Weight		85.09
Weight of Water		97.08
Weight of DRY Sample		859.43
Water Content, %		11.3

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.06
Sample WET Weight + Tare	39.68
Sample DRY Weight + Tare	39.55
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.995
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.55

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	132.57	15.43	84.57
* #4	276.71	32.20	67.80
#8	290.42	33.79	66.21
* #10	291.38	33.90	66.10
Pan	568.05	66.10	
Total	859.43		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		66.10
#20	7.20	4.78	61.32
#40	12.64	8.39	57.70
#60	23.81	15.81	50.29
#140	44.92	29.83	36.27
#200	51.60	34.26	31.83
Pan	55.98	37.17	28.93
Total	99.55		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R / W	% Total Sample	Corr. Coef.		Corr. Dia (mm)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	(D)
9:32	2	21	36	-6.0	31.2		20.5	0.0133	10.2	0.0300
9:35	5	21	32	-6.0	27.2		17.9	0.0133	10.9	0.0196
9:45	15	21	27	-6.0	22.2		14.6	0.0133	11.8	0.0118
10:00	30	21	25	-6.0	20.2		13.3	0.0133	12.2	0.0085
10:30	60	21	23	-6.0	18.2		12.0	0.0133	12.5	0.0061
3:40:00 P	250	21	20	-6.0	15.2		10.0	0.0133	13.1	0.0030
9:30	1440	21	17	-6.0	12.2		8.0	0.0133	13.6	0.0013

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

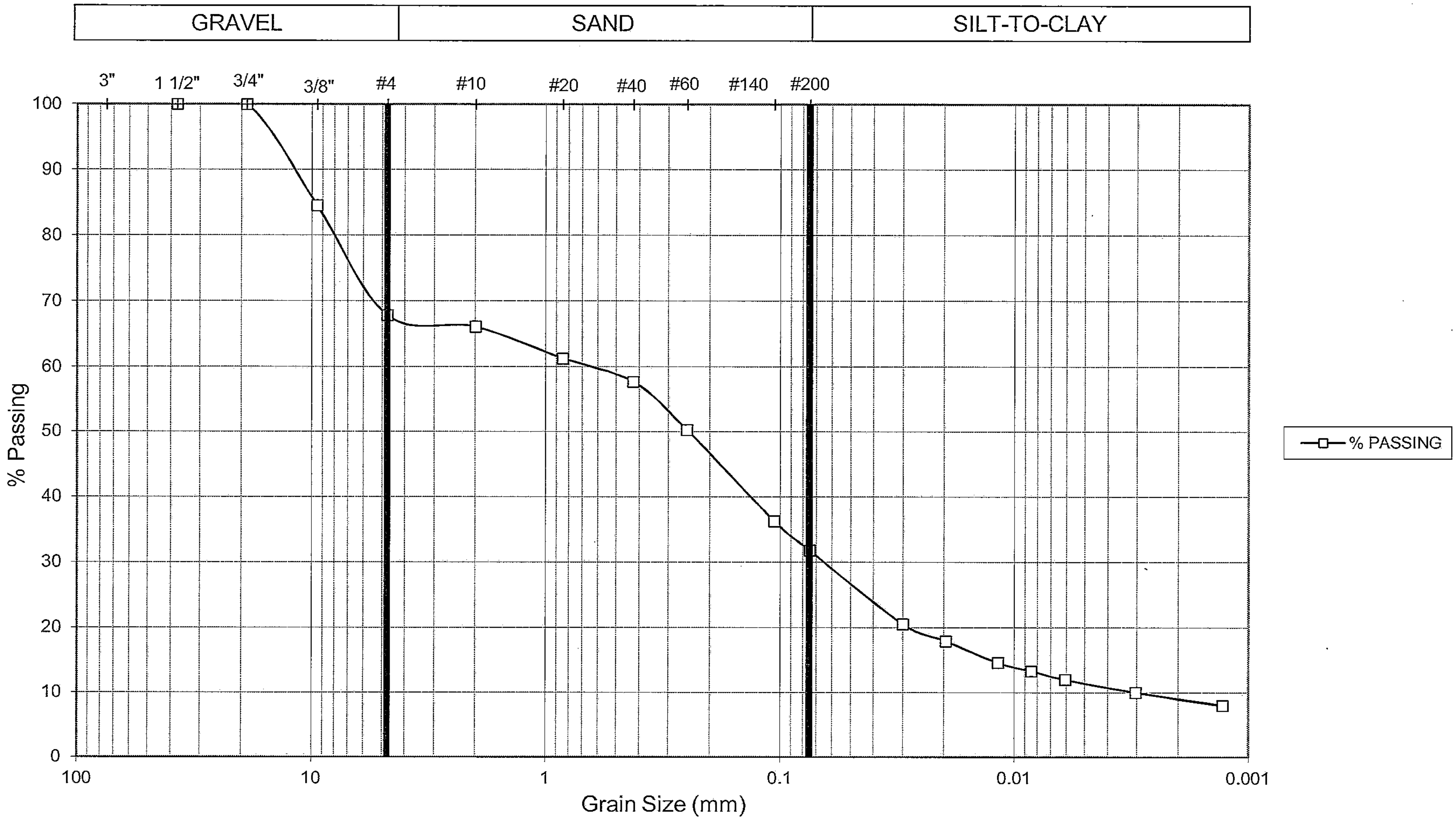
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

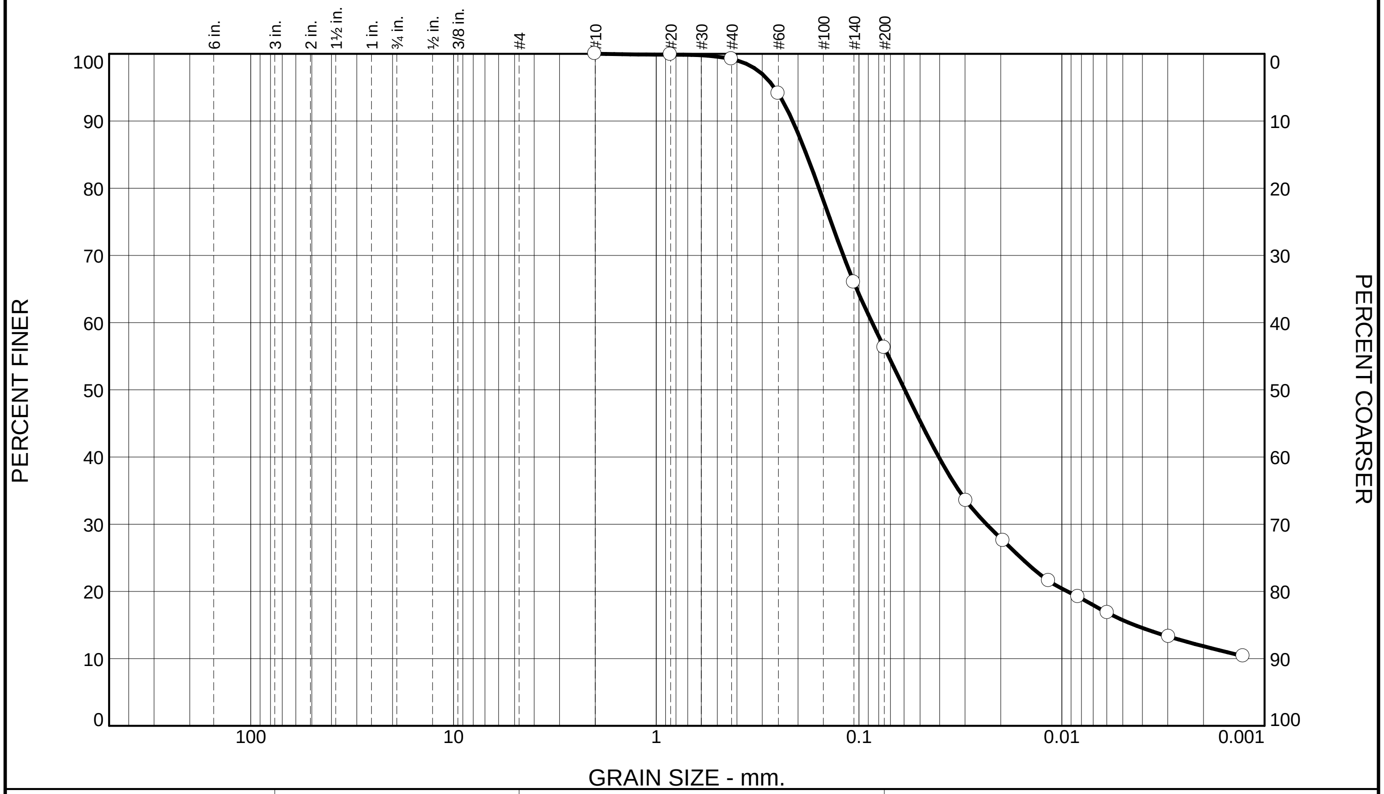
GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley	Project #:	2019-131-T04
Client:	BH-167	Tested by:	DN
Source/Location:	133 Rhodes, San Jose, CA Sample: 37B @ 113' feet	Lab # :	G970
Material Description:	CLAYEY SAND WITH GRAVEL (SC),	Date Tested:	5/11/2020



Reported By:	0	Do Nguyen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	1	43	40	16

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	99		
#60	94		
#140	66		
#200	56		
0.0296 mm.	33		
0.0194 mm.	28		
0.0116 mm.	22		
0.0083 mm.	19		
0.0059 mm.	17		
0.0030 mm.	13		
0.0013 mm.	10		

* (no specification provided)

Soil Description

Greenish gray sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.2125 D_{85}= 0.1815 D_{60}= 0.0862
D_{50}= 0.0595 D_{30}= 0.0235 D_{15}= 0.0044
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: BH-168 **Depth:** 15
Sample Number: 4

Date: 8-2-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2973-001.0 **Figure**

Tested By: JH **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley			Proj. #:	2019-131-T04
Sample:	33,34,35	Depth (ft):	114'-120'	Lab #:	G970
Boring:	BH-168			Date Tested:	07/20/20
Location:				Tested By:	DN
Material description:	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM			Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		S11
Sample WET Weight + Tare		1612
Sample DRY Weight + Tare		1495.3
Tare Weight		104.54
Weight of Water		116.7
Weight of DRY Sample		1390.76
Water Content, %		8.4

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	10.8
Sample WET Weight + Tare	45.88
Sample DRY Weight + Tare	45.78
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.997
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.71

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	11.61		100.00
3/8"	198.81	14.30	85.70
* #4	444.06	31.93	68.07
#8	661.44	47.56	52.44
* #10	701.61	50.45	49.55
Pan	689.15	49.55	
Total	1390.76		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		49.55
#20	18.56	9.22	40.33
#40	38.74	19.25	30.30
#60	56.27	27.96	21.59
#140	73.79	36.67	12.88
#200	77.95	38.74	10.82
Pan	21.76	10.82	38.74
Total	99.71		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Comp. Corr.	Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	(L)	Corr. Dia (mm) (D)
9:32	2	20	20	-6.5	14.7		7.2	0.0135	13.1	0.0344
9:35	5	20	17	-6.5	11.7		5.8	0.0135	13.6	0.0222
9:45	15	20	15	-6.5	9.7		4.8	0.0135	14.0	0.0130
10:00	30	20	13	-6.5	7.7		3.8	0.0135	14.4	0.0093
10:30	60	20	12	-6.5	6.7		3.3	0.0135	14.5	0.0066
13:40	250	21	10	-6.0	5.2		2.6	0.0133	14.9	0.0032
9:30	1440	20	8	-6.5	2.7		1.3	0.0135	15.3	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Project: BART to Silicon Valley

Project #: 2019-131-T04

Client: BH-168

Tested by: DN

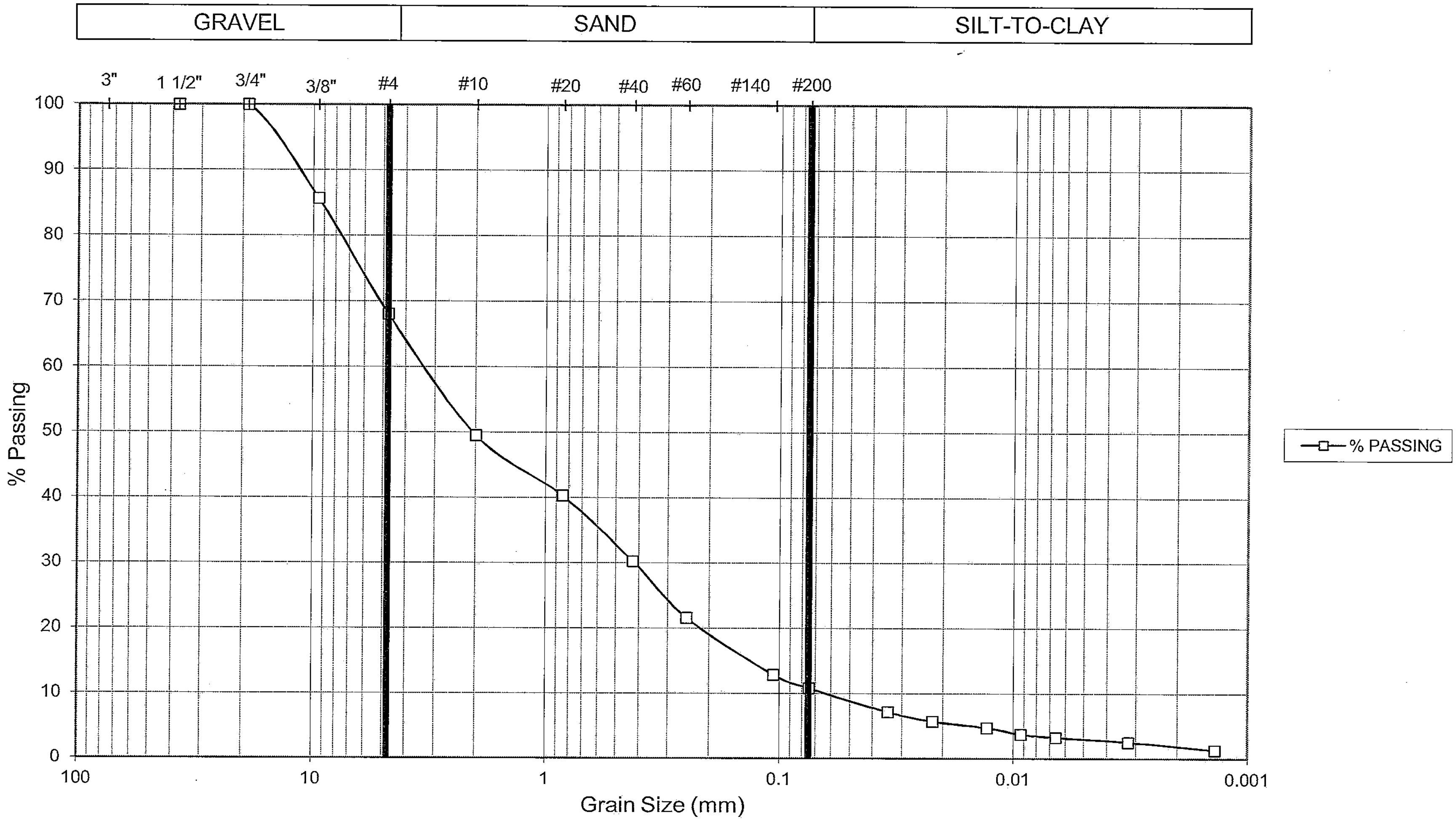
Source/Location: 0

Sample: 33,34,35 @ 114'-120' feet

Lab # : G970

Material Description: POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM),

Date Tested: 7/20/2020



Reported By: 0 Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T02
Sample: 16A	Depth (ft): 91	Lab #:	G970
Boring: BH-169		Date Tested:	04/17/20
Location: 658 Lenzen Ave, San Jose, CA		Tested By:	DN
Material description:	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SI	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G112
Sample WET Weight + Tare		1063.8
Sample DRY Weight + Tare		976.55
Tare Weight		110.19
Weight of Water		87.25
Weight of DRY Sample		866.36
Water Content, %		10.1

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.06
Sample WET Weight + Tare	39.87
Sample DRY Weight + Tare	39.58
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.9899
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	98.99

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	130.23	15.03	84.97
* #4	340.17	39.26	60.74
#8	496.84	57.35	42.65
* #10	520.64	60.10	39.90
Pan	345.72	39.90	
Total	866.36		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		39.90
#20	21.15	8.53	31.38
#40	38.45	15.50	24.41
#60	55.36	22.32	17.59
#140	78.76	31.75	8.16
#200	83.46	33.64	6.26
Pan	16.54	6.67	33.24
Total	98.99		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Hydrometer Reading Comp. Corr.	Hydrometer Reading Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	Corr. Coef. (L)	Corr. Dia (mm) (D)
10:32	2	20	16	-6.5	10.7		4.3	0.0135	13.8	0.0354
10:35	5	20	13	-6.5	7.7		3.1	0.0135	14.4	0.0228
10:45	15	20	12	-6.5	6.7		2.7	0.0135	14.5	0.0133
11:00	30	20	11	-6.5	5.7		2.3	0.0135	14.7	0.0094
11:30	60	20	10	-6.5	4.7		1.9	0.0135	14.9	0.0067
14:40	250	21	9	-6.0	4.2		1.7	0.0133	15.1	0.0033
10:30	1440	20	8	-6.5	2.7		1.1	0.0135	15.3	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

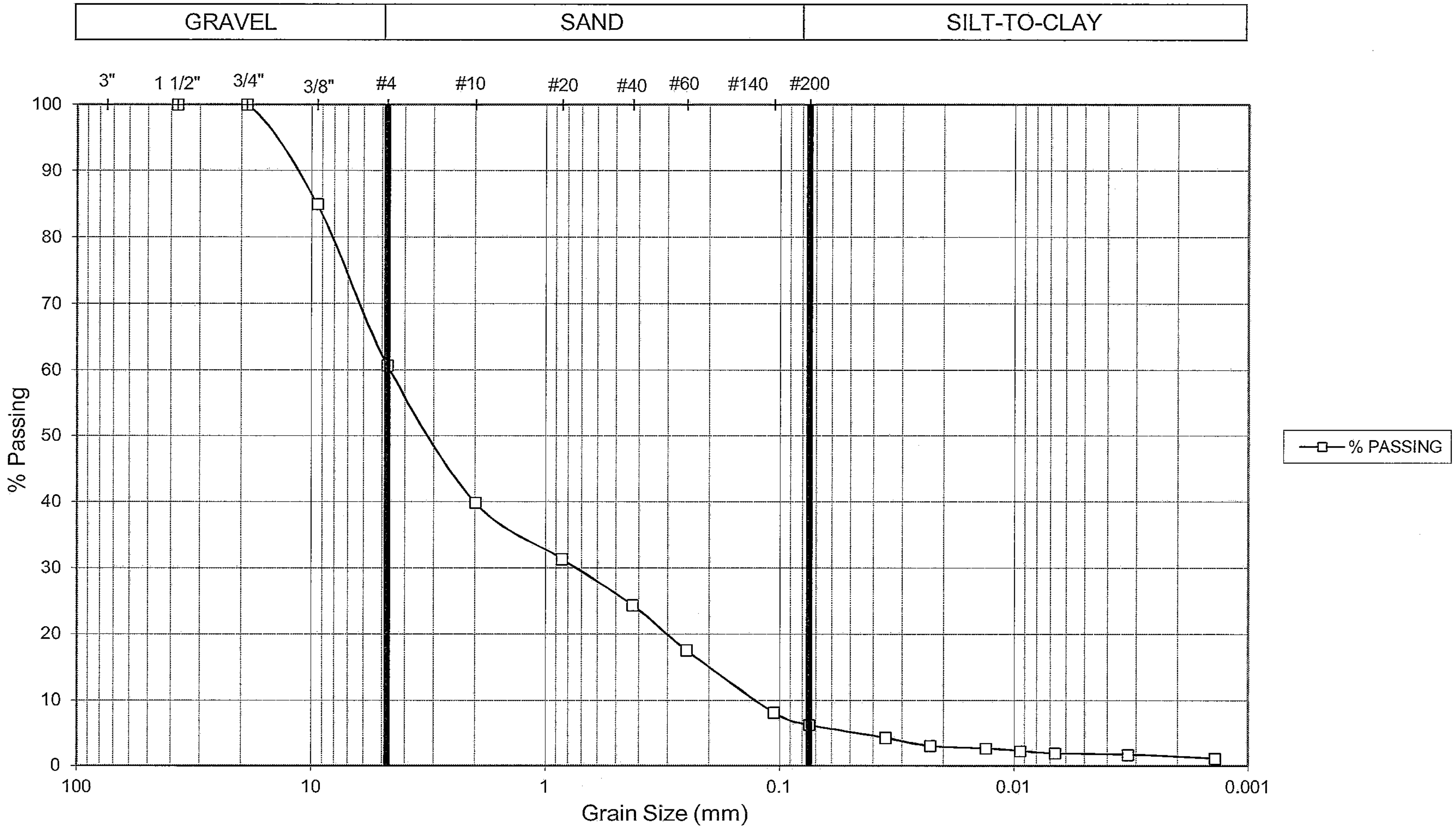
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

PARIKH CONSULTANTS, INC.

Project:	BART to Silicon Valley	Project #:	2019-131-T02
Client:	BH-169	Tested by:	DN
Source/Location:	658 Lenzen Ave, San Jose, CA — Sample: 16A @ 91 feet	Lab # :	G970
Material Description:	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM),	Date Tested:	4/17/2020



Reported By:	0	Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project: BART to Silicon Valley		Proj. #:	2019-131-T02
Sample: 21	Depth (ft): 111	Lab #:	G970
Boring: BH-169		Date Tested:	04/16/20
Location: 658 Lenzen Ave, San Jose, CA		Tested By:	DN
Material description: SANDY LEAN CLAY (CL),		Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G73
Sample WET Weight + Tare		456.11
Sample DRY Weight + Tare		389.11
Tare Weight		84.17
Weight of Water		67
Weight of DRY Sample		304.94
Water Content, %		22.0

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	10.91
Sample WET Weight + Tare	33.74
Sample DRY Weight + Tare	33.42
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.986
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	98.60

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	0	0.00	100.00
* #4	0	0.00	100.00
#8	0	0.00	100.00
* #10	2.97	0.97	99.03
Pan	301.97	99.03	
Total	304.94		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		99.03
#20	3.00	3.01	96.01
#40	6.64	6.67	92.36
#60	10.78	10.83	88.20
#140	24.41	24.52	74.51
#200	30.70	30.83	68.19
Pan	32.61	32.75	66.27
Total	98.60		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R / W	% Total Sample	Corr. Coef.		Corr. Dia (mm)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	(D)
8:32	2	20	55	-6.5	49.7		49.4	0.0135	6.7	0.0246
8:35	5	20	51	-6.5	45.7		45.4	0.0135	7.4	0.0164
8:45	15	20	45	-6.5	39.7		39.5	0.0135	8.5	0.0101
9:00	30	20	42	-6.5	36.7		36.5	0.0135	9.1	0.0074
9:30	60	20	39	-6.5	33.7		33.5	0.0135	9.6	0.0054
12:40	250	21	34	-6.0	29.2		29.0	0.0133	10.5	0.0027
8:30	1440	20	26	-6.5	20.7		20.6	0.0135	12.0	0.0012

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K \ (L/T)^{1/2}$

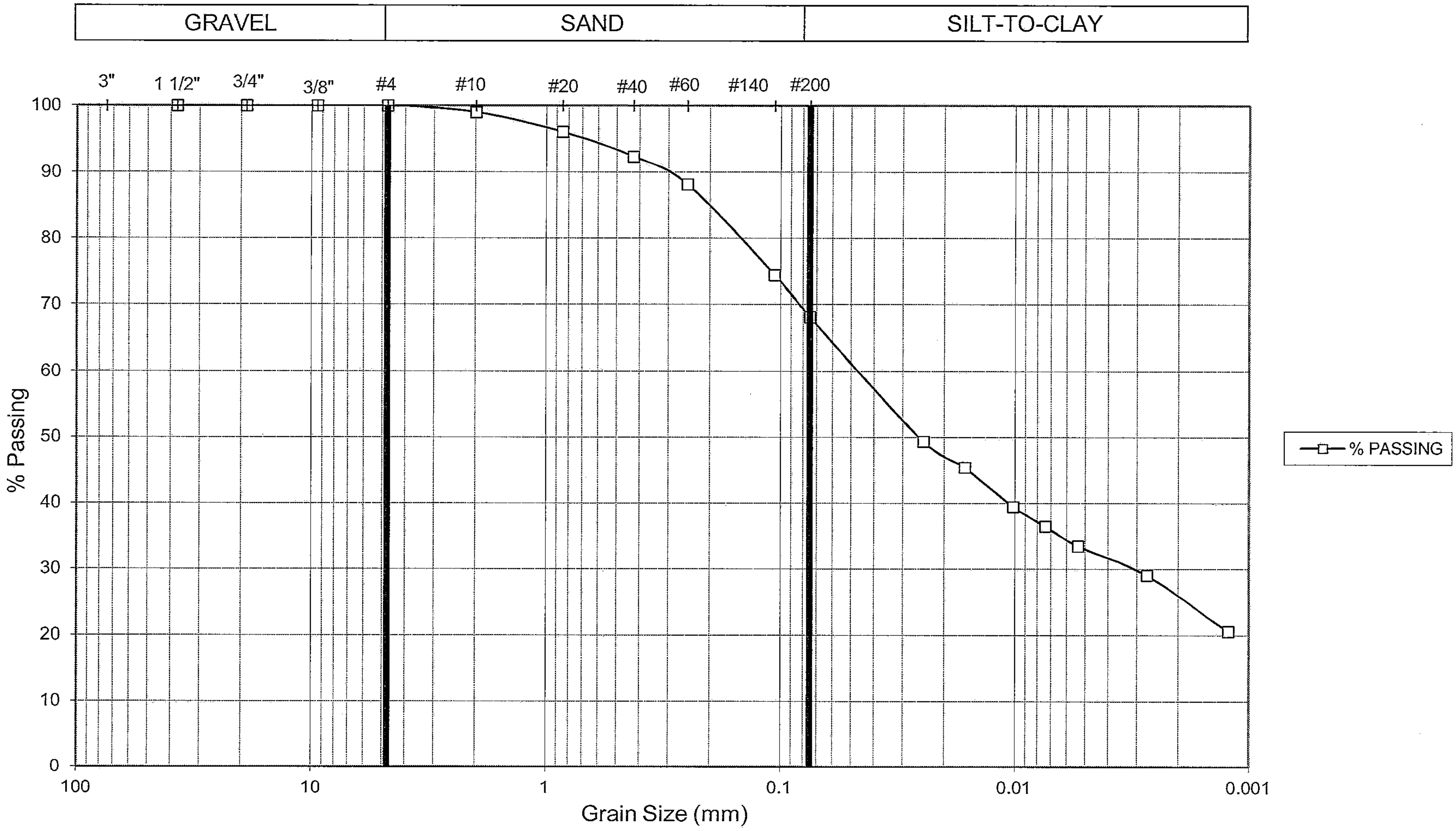
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

PARIKH CONSULTANTS, INC.

Project:	BART to Silicon Valley	Project #:	2019-131-T02
Client:	BH-169	Tested by:	DN
Source/Location:	658 Lenzen Ave, San Jose, CA Sample: 21 @ 111 feet	Lab # :	G970
Material Description:	SANDY LEAN CLAY (CL),	Date Tested:	4/16/2020



Reported By:	0	Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley	Proj. #:	2019-131-T02
Sample: 15	Depth (ft): 77.5	Lab #:	G970
Boring:	BH-171	Date Tested:	05/07/20
Location:	760 Emery St, San Jose, CA	Tested By:	DN
Material description:	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G30
Sample WET Weight + Tare		823.23
Sample DRY Weight + Tare		697.7
Tare Weight		84.66
Weight of Water		125.53
Weight of DRY Sample		613.04
Water Content, %		20.5

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.08
Sample WET Weight + Tare	41.12
Sample DRY Weight + Tare	40.99
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.996
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.57

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	78.51	12.81	87.19
* #4	226.32	36.92	63.08
#8	338.33	55.19	44.81
* #10	359.64	58.67	41.33
Pan	253.4	41.33	
Total	613.04		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		41.33
#20	29.07	12.07	29.27
#40	47.84	19.86	21.47
#60	60.64	25.17	16.16
#140	75.51	31.35	9.99
#200	79.06	32.82	8.51
Pan	79.67	33.07	8.26
Total	99.57		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

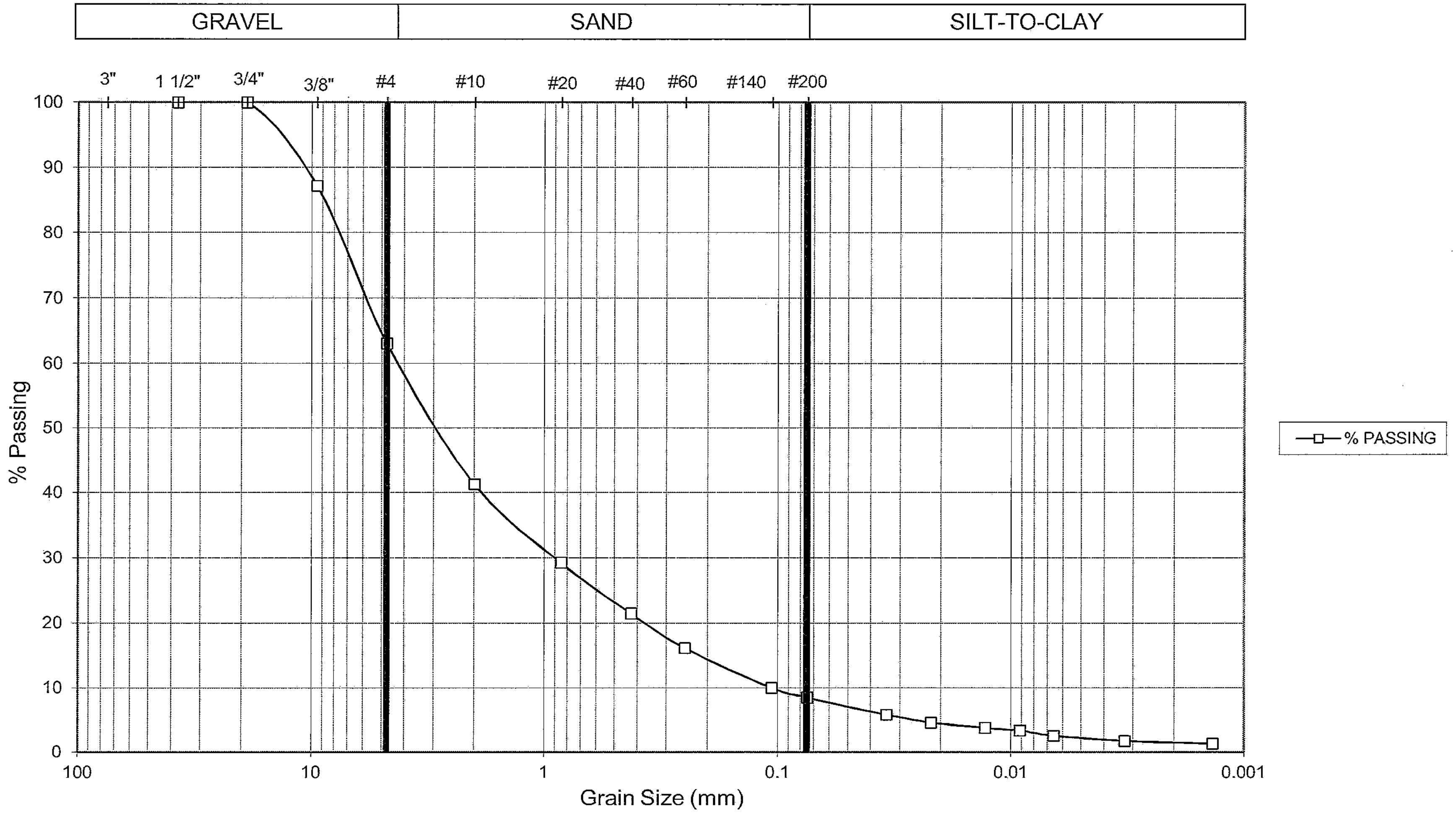
TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading Orig.	Hydrometer Reading Comp. Corr.	Hydrometer Reading Corr. (R)	100R / W	% Total Sample	Corr. Coef. (K)	Corr. Coef. (L)	Corr. Dia (mm) (D)
10:32	2	21	19	-6.0	14.2		5.8	0.0133	13.3	0.0342
10:35	5	21	16	-6.0	11.2		4.6	0.0133	13.8	0.0221
10:45	15	21	14	-6.0	9.2		3.8	0.0133	14.2	0.0129
11:00	30	21	13	-6.0	8.2		3.4	0.0133	14.4	0.0092
11:30	60	21	11	-6.0	6.2		2.5	0.0133	14.7	0.0066
14:40	250	21	9	-6.0	4.2		1.7	0.0133	15.1	0.0033
10:30	1440	21	8	-6.0	3.2		1.3	0.0133	15.3	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

Cal 203 Requires hydro readings @ 1 hr and 24 hrs

GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley	Project #:	2019-131-T02
Client:	BH-171	Tested by:	DN
Source/Location:	760 Emery St, San Jose, CA Sample: 15 @ 77.5 feet	Lab # :	G970
Material Description:	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM),	Date Tested:	5/7/2020



Reported By: 0 Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley		Proj. #:	2019-131-T02
Sample:	24A	Depth (ft): 100.5'	Lab #:	G970
Boring:	BH-171		Date Tested:	05/12/20
Location:	760 Emery St, San Jose, CA		Tested By:	DN
Material description:	POORLY-GRADED SAND WITH SILT (SP-SM),		Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G111
Sample WET Weight + Tare		893.05
Sample DRY Weight + Tare		759.57
Tare Weight		110.65
Weight of Water		133.48
Weight of DRY Sample		648.92
Water Content, %		20.6

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.04
Sample WET Weight + Tare	40.32
Sample DRY Weight + Tare	40.3
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.999
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	99.93

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	0	0.00	100.00
* #4	8.57	1.32	98.68
#8	18.29	2.82	97.18
* #10	20.04	3.09	96.91
Pan	628.88	96.91	
Total	648.92		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		96.91
#20	2.34	2.27	94.64
#40	17.25	16.73	80.18
#60	39.55	38.35	58.56
#140	83.61	81.08	15.83
#200	89.20	86.50	10.41
Pan	10.80	10.47	86.44
Total	99.93		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R / W	% Total Sample	Corr. Coef.		Corr. Dia (mm) (D)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	
10:32	2	21	10	-6.0	5.2		5.0	0.0133	14.9	0.0363
10:35	5	21	9	-6.0	4.2		4.0	0.0133	15.1	0.0231
10:45	15	21	8	-6.0	3.2		3.1	0.0133	15.3	0.0134
11:00	30	21	8	-6.0	3.2		3.1	0.0133	15.3	0.0095
11:30	60	21	7	-6.0	2.2		2.1	0.0133	15.5	0.0067
14:40	250	21	6	-6.0	1.2		1.2	0.0133	15.6	0.0033
10:30	1440	21	6	-6.0	1.2		1.2	0.0133	15.6	0.0014

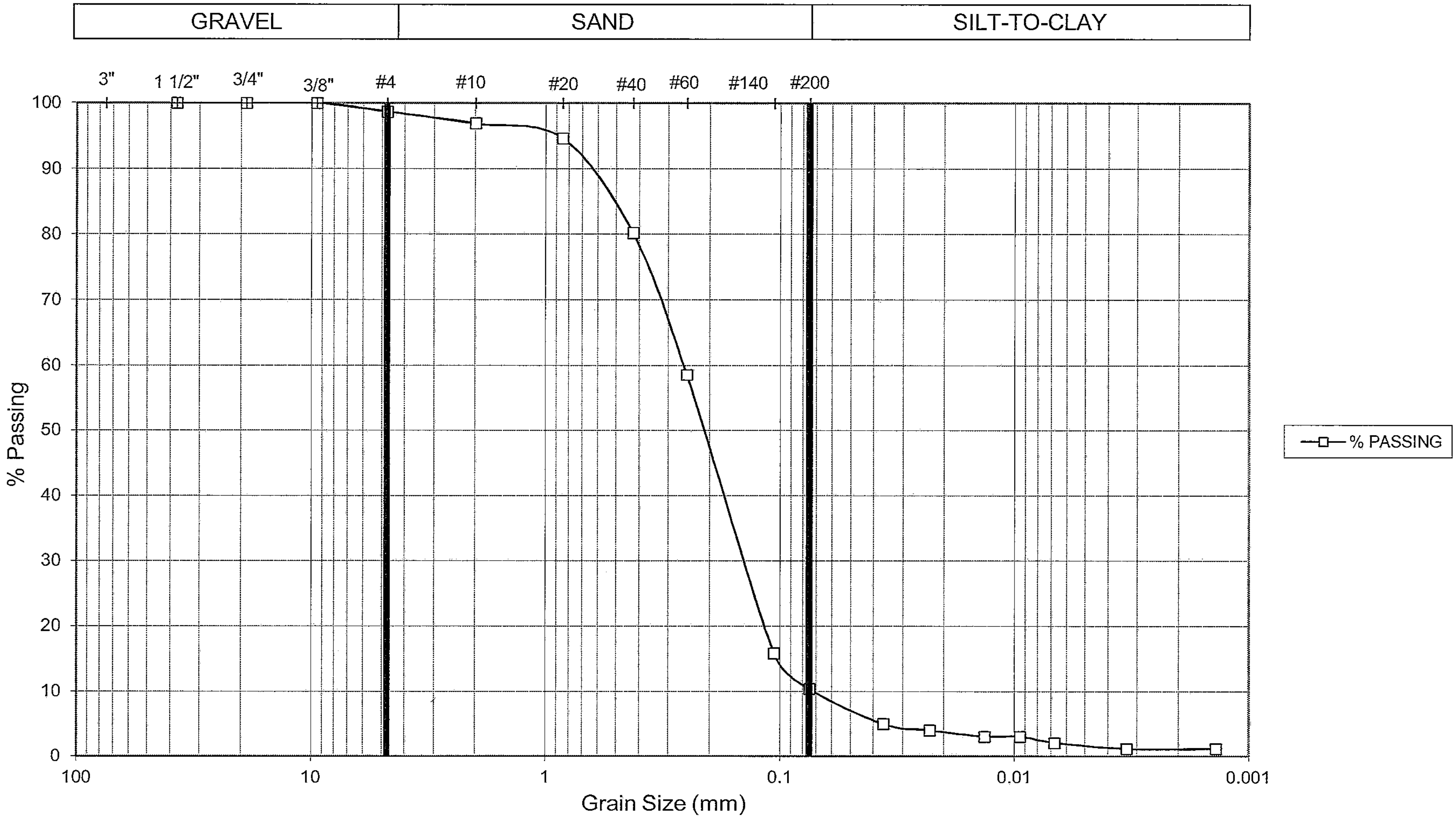
Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

Cal 203 Requires hydro readigs @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley		Project #:	2019-131-T02
Client:	BH-171		Tested by:	DN
Source/Location:	760 Emery St, San Jose, CA	Sample: 24A @ 100.5' feet	Lab # :	G970
Material Description:	POORLY-GRADED SAND WITH SILT (SP-SM),		Date Tested:	5/12/2020



Reported By:	0	Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley	Proj. #:	2019-131-T02
Sample:	3A Depth (ft): 8.5'	Lab #:	G970
Boring:	BH-173	Date Tested:	05/14/20
Location:	1048 Stockton Ave, San Jose, CA	Tested By:	DN
Material description:	SILTY SAND WITH GRAVEL (SM),	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		G126
Sample WET Weight + Tare		959.09
Sample DRY Weight + Tare		905.26
Tare Weight		110.62
Weight of Water		53.83
Weight of DRY Sample		794.64
Water Content, %		6.8

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	10.68
Sample WET Weight + Tare	31.95
Sample DRY Weight + Tare	31.73
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.990
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	98.97

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	67.03	8.44	91.56
* #4	229.61	28.89	71.11
#8	332.9	41.89	58.11
* #10	346.61	43.62	56.38
Pan	448.03	56.38	
Total	794.64		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		56.38
#20	8.98	5.12	51.27
#40	18.04	10.28	46.10
#60	36.72	20.92	35.46
#140	65.10	37.09	19.29
#200	71.01	40.45	15.93
Pan	72.40	41.25	15.13
Total	98.97		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R W	% Total Sample	Corr. Coef.		Corr. Dia (mm)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	(D)
9:32	2	20	24	-6.5	18.7		10.5	0.0135	12.4	0.0335
9:35	5	20	22	-6.5	16.7		9.4	0.0135	12.7	0.0215
9:45	15	20	19	-6.5	13.7		7.7	0.0135	13.3	0.0127
10:00	30	20	17	-6.5	11.7		6.6	0.0135	13.6	0.0091
10:30	60	20	16	-6.5	10.7		6.0	0.0135	13.8	0.0065
13:40	250	21	13	-6.0	8.2		4.6	0.0133	14.4	0.0032
9:30	1440	20	11	-6.5	5.7		3.2	0.0135	14.7	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

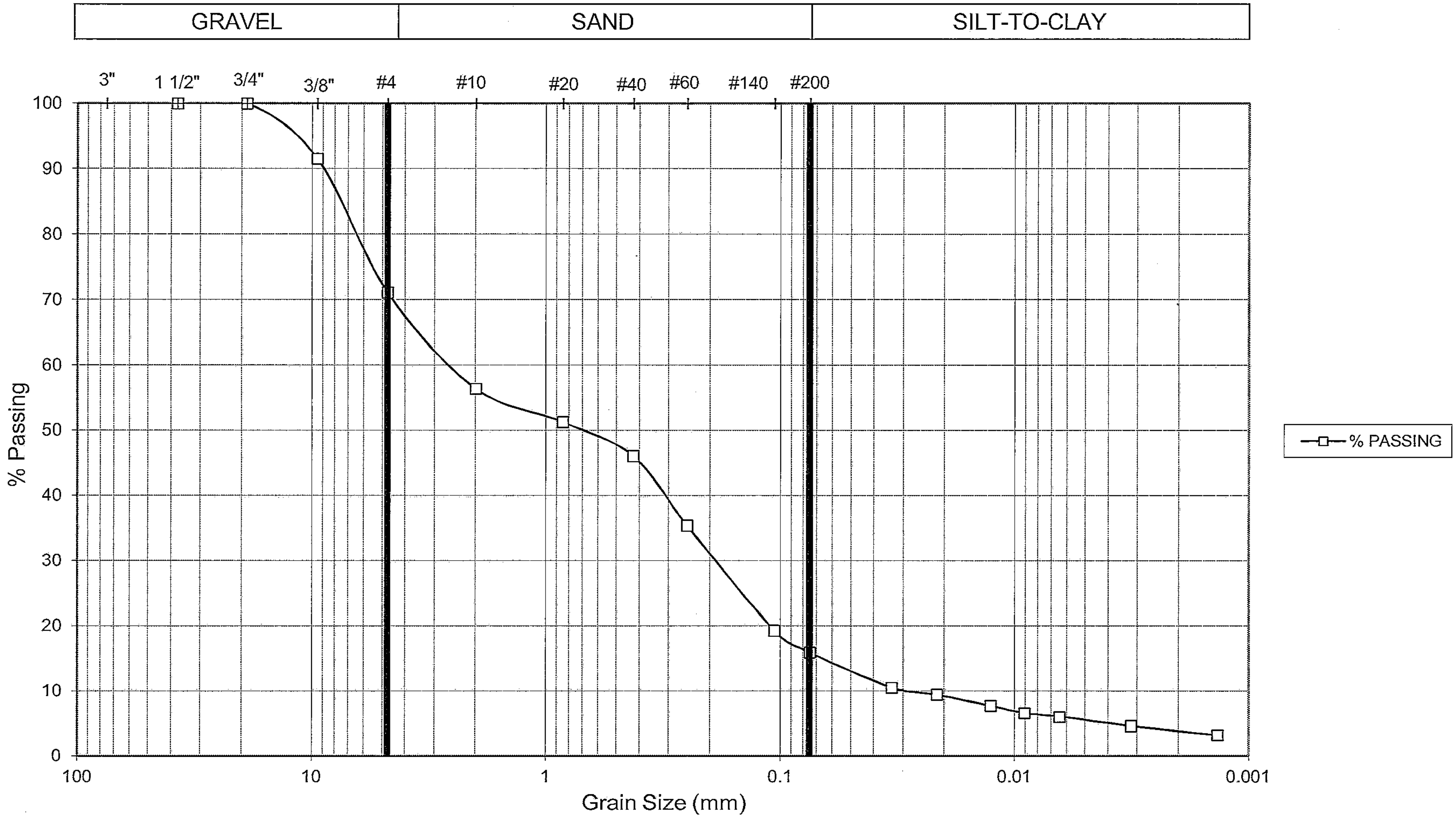
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

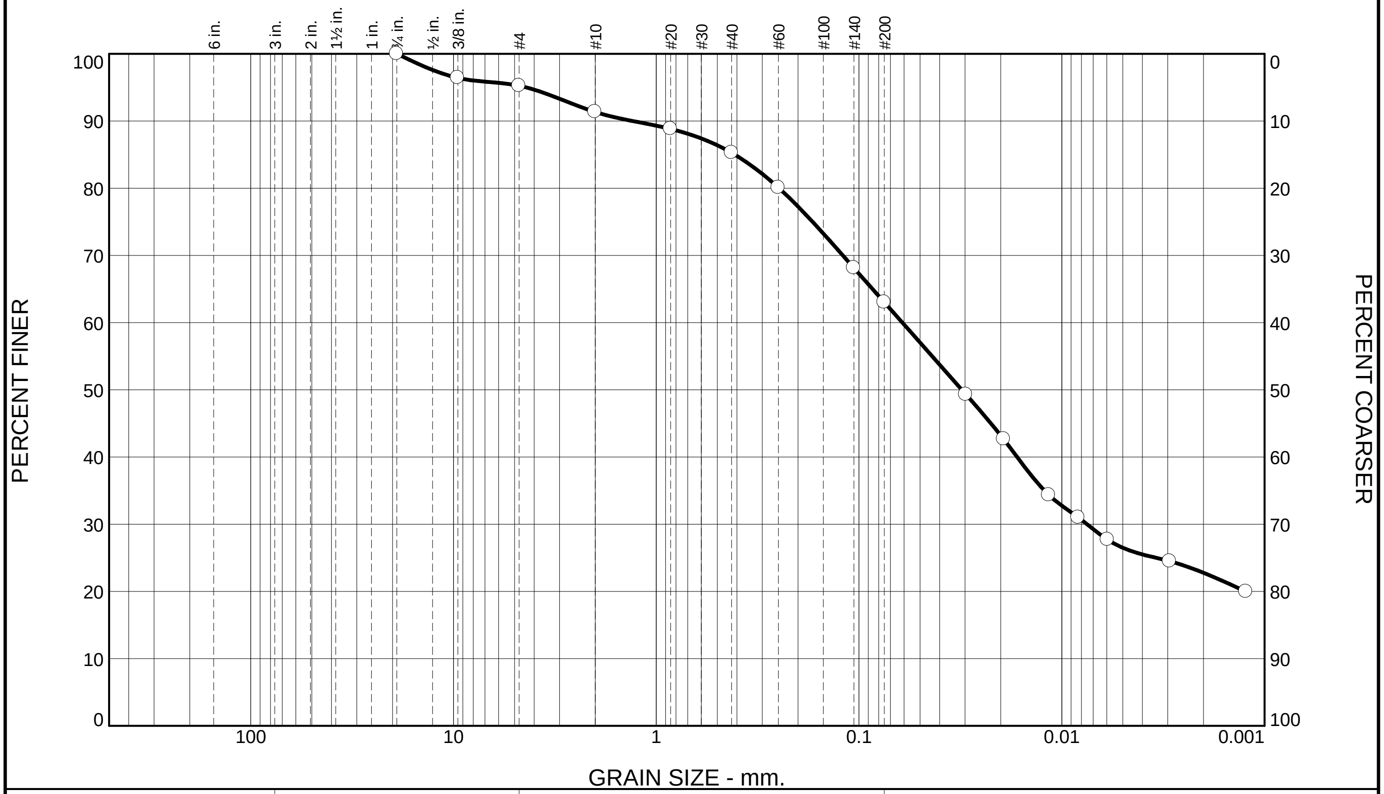
PARIKH CONSULTANTS, INC.

Project:	BART to Silicon Valley	Project #:	2019-131-T02
Client:	BH-173	Tested by:	DN
Source/Location:	1048 Stockton Ave, San Jose, CA Sample: 3A @ 8.5' feet	Lab # :	G970
Material Description:	SILTY SAND WITH GRAVEL (SM),	Date Tested:	5/14/2020



Reported By: 0 Do Nguyen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	5	4	6	22	37	26

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	96		
#4	95		
#10	91		
#20	89		
#40	85		
#60	80		
#140	68		
#200	63		
0.0297 mm.	49		
0.0193 mm.	43		
0.0116 mm.	34		
0.0083 mm.	31		
0.0059 mm.	28		
0.0029 mm.	24		
0.0012 mm.	20		

* (no specification provided)

Soil Description

Gray sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.3116 D_{85}= 0.4108 D_{60}= 0.0612
D_{50}= 0.0311 D_{30}= 0.0075 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

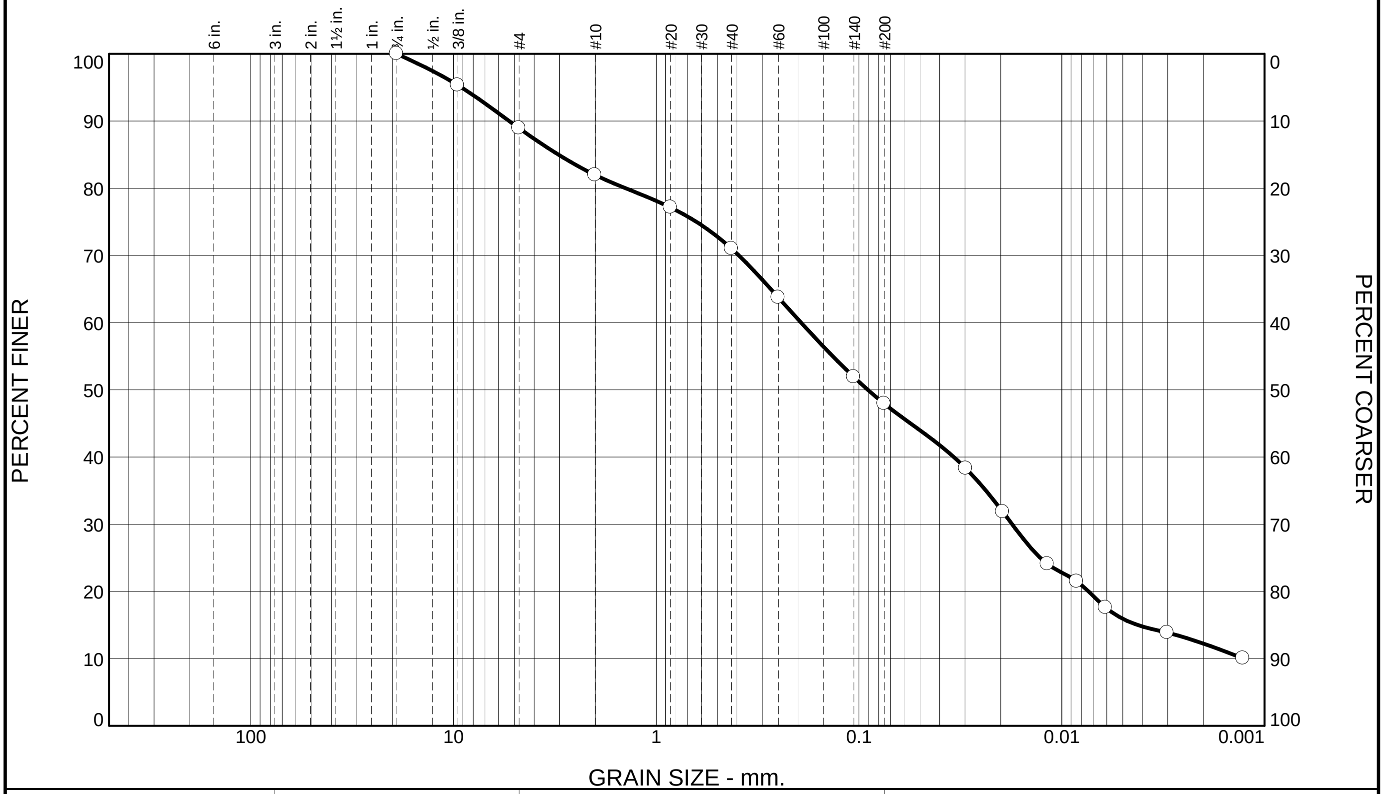
Source of Sample: BH-175 **Depth:** 42.5
Sample Number: 11

Date: 6-3-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	11	7	11	23	32	16

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100		
3/8	95		
#4	89		
#10	82		
#20	77		
#40	71		
#60	64		
#140	52		
#200	48		
0.0297 mm.	38		
0.0195 mm.	32		
0.0117 mm.	24		
0.0084 mm.	21		
0.0061 mm.	18		
0.0030 mm.	14		
0.0013 mm.	10		

* (no specification provided)

Soil Description

Grayish brown silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 5.3198	D_{85}= 3.0426	D_{60}= 0.1931
D_{50}= 0.0906	D_{30}= 0.0176	D_{15}= 0.0042
D_{10}=	C_u=	C_c=

Classification

USCS= SM AASHTO=

Remarks

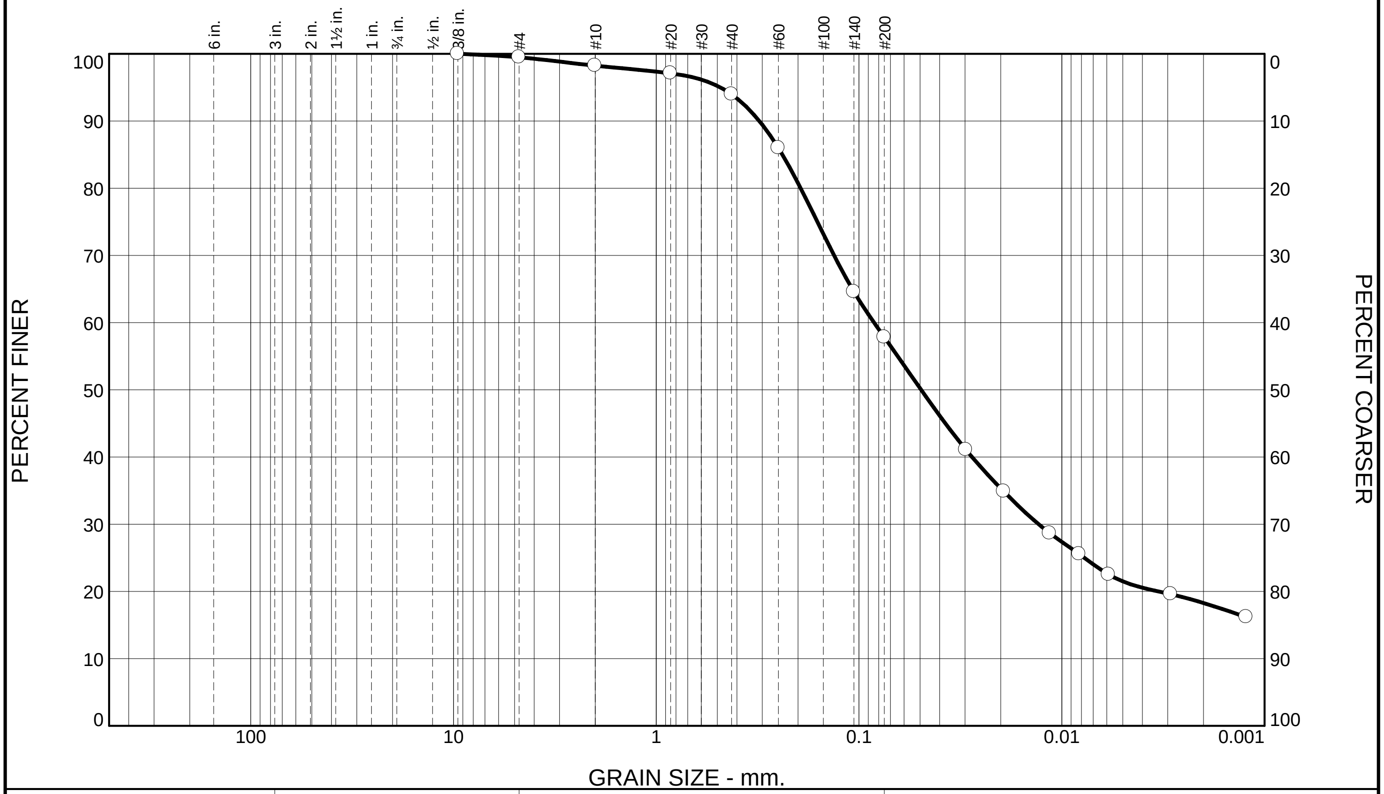
Source of Sample: BH-175 **Depth:** 89.5
Sample Number: 29

Date: 6-3-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2966-001.0 **Figure**

Tested By: JH **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	1	1	4	36	37	21

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100		
#4	99		
#10	98		
#20	97		
#40	94		
#60	86		
#140	65		
#200	58		
0.0297 mm.	41		
0.0193 mm.	35		
0.0115 mm.	29		
0.0082 mm.	26		
0.0059 mm.	23		
0.0029 mm.	20		
0.0012 mm.	16		

* (no specification provided)

Soil Description

Greenish gray sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.3104 D_{85}= 0.2388 D_{60}= 0.0844
D_{50}= 0.0494 D_{30}= 0.0130 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

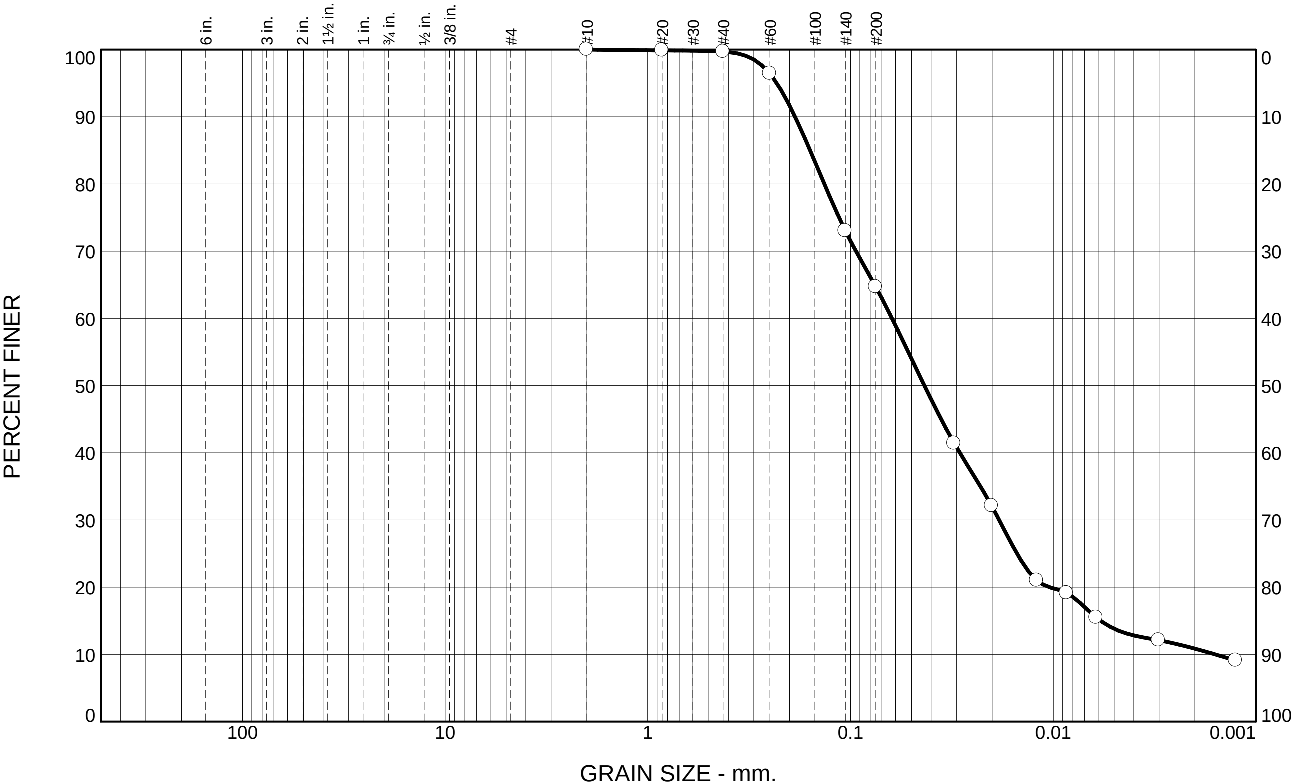
Source of Sample: BH-176 **Depth:** 30
Sample Number: 8

Date: 7-10-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2973-001.0 **Figure**

Tested By: JH **Checked By:** JH

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	0	35	51	14

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100		
#20	100		
#40	100		
#60	96		
#140	73		
#200	65		
0.0308 mm.	41		
0.0201 mm.	32		
0.0120 mm.	21		
0.0086 mm.	19		
0.0061 mm.	15		
0.0030 mm.	12		
0.0013 mm.	9.1		

* (no specification provided)

Soil Description

Greenish gray sandy silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.1878 D_{85}= 0.1583 D_{60}= 0.0624
D_{50}= 0.0432 D_{30}= 0.0185 D_{15}= 0.0058
D_{10}= 0.0016 C_u= 39.27 C_c= 3.44

Classification

USCS= ML AASHTO=

Remarks

Source of Sample: BH-176 **Depth:** 80
Sample Number: 18

Date: 7-2-20

Client: Mott MacDonald
Project: BSVII
507385606
Project No: 2973-001.0 **Figure**

Tested By: JH **Checked By:** JH

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley	Proj. #:	2019-131-T05
Sample: 22	Depth (ft): 105'	Lab #:	G986
Boring:	BH-179	Date Tested:	11/18/20
Location:		Tested By:	DN
Material description:	SILTY GRAVEL WITH SAND (GM),	Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		S13
Sample WET Weight + Tare		933.45
Sample DRY Weight + Tare		853.25
Tare Weight		102.03
Weight of Water		80.2
Weight of DRY Sample		751.22
Water Content, %		10.7

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.05
Sample WET Weight + Tare	34.73
Sample DRY Weight + Tare	34.43
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.987
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	98.73

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	0		100.00
3/8"	132.58	17.65	82.35
* #4	333.07	44.34	55.66
#8	436.61	58.12	41.88
* #10	449.5	59.84	40.16
Pan	301.72	40.16	
Total	751.22		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		40.16
#20	17.79	7.24	32.93
#40	28.36	11.54	28.63
#60	38.99	15.86	24.30
#140	54.15	22.03	18.14
#200	60.94	24.79	15.37
Pan	37.79	15.37	24.79
Total	98.73		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R W	% Total Sample	Corr. Coef.		Corr. Dia (mm) (D)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	
9:32	2	20	29	-6.5	23.7		9.5	0.0135	11.4	0.0322
9:35	5	20	24	-6.5	18.7		7.5	0.0135	12.4	0.0212
9:45	15	20	20	-6.5	14.7		5.9	0.0135	13.1	0.0126
10:00	30	20	17	-6.5	11.7		4.7	0.0135	13.6	0.0091
10:30	60	20	15	-6.5	9.7		3.9	0.0135	14.0	0.0065
13:40	250	21	12	-6.0	7.2		2.9	0.0133	14.5	0.0032
9:30	1440	20	10	-6.5	4.7		1.9	0.0135	14.9	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

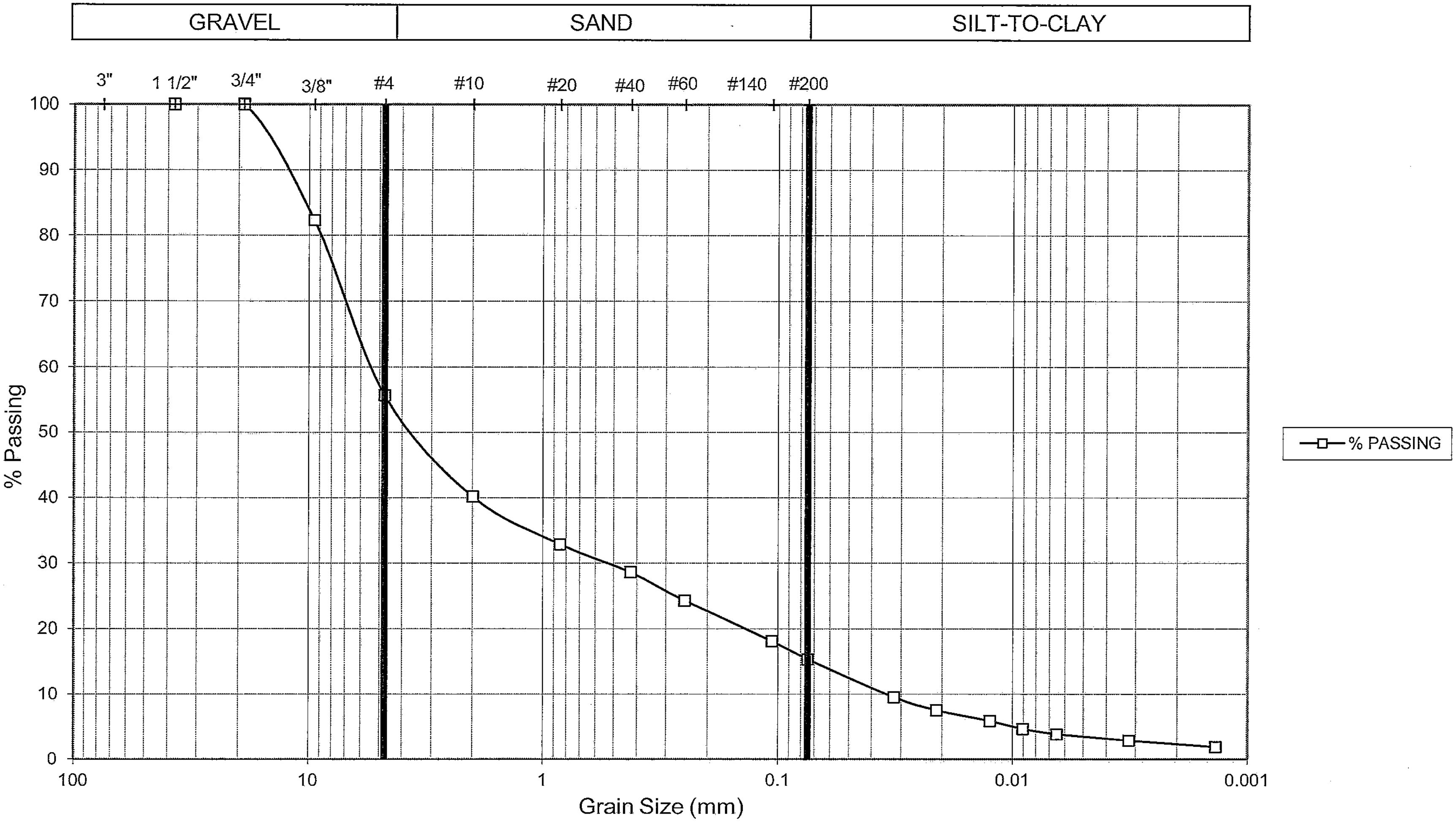
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

GRAIN SIZE DISTRIBUTION

PARIKH CONSULTANTS, INC.

Project:	BART to Silicon Valley	Project #:	2019-131-T05
Client:	BH-179	Tested by:	DN
Source/Location:	0 Sample: 22 @ 105' feet	Lab # :	G986
Material Description:	SILTY GRAVEL WITH SAND (GM),	Date Tested:	11/18/2020



Reported By: 0 Do Nguyen

SIEVE & HYDROMETER ANALYSIS

ASTM D422 / Cal 203

Project:	BART to Silicon Valley		Proj. #:	2019-131-T04
Sample:	33,34	Depth (ft): 155'-160'	Lab #:	G981
Boring:	BH-180		Date Tested:	08/18/20
Location:	Stockton Avenue Vent shaft		Tested By:	DN
Material description:	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM		Checked By:	

*** Split sample as follows: Cal 203 - sieve #4 / ASTM D422 - Sieve #10**

SIEVE ANALYSIS WEIGHTS		+ #4 / #10
Tare ID		S11
Sample WET Weight + Tare		1174.6
Sample DRY Weight + Tare		1110.8
Tare Weight		104.6
Weight of Water		63.8
Weight of DRY Sample		1006.2
Water Content, %		6.3

HYDROSCOPIC CORR. FACTOR (F)	
Tare weight	11.14
Sample WET Weight + Tare	36.35
Sample DRY Weight + Tare	36.08
Hydro Factor (F) = (Dry Wt/ Wet Wt)	0.989
Hydro Wet WT	100
Hydro Corr Wt = (Wet X F) = W	98.93

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
1 1/2"	0		100.00
3/4"	96.12		100.00
3/8"	199.46	19.82	80.18
* #4	359.3	35.71	64.29
#8	491.11	48.81	51.19
* #10	516.65	51.35	48.65
Pan	489.55	48.65	
Total	1006.2		

U.S. Sieve Size	Wt of Dry Soil Retained	% Dry Soil Retained	% Finer Than
#10	0		48.65
#20	27.55	13.55	35.10
#40	51.19	25.18	23.48
#60	64.40	31.67	16.98
#140	75.92	37.34	11.32
#200	78.91	38.81	9.85
Pan	20.02	9.85	38.81
Total	98.93		

Temp C	Corr
16	-8.0
17	-7.5
18	-7.0
19	-7.0
20	-6.5
21	-6.0
22	-5.5
23	-5.0
24	-4.5
25	-4.0

HYDROMETER TEST

TIME	El. Time T Min.	Temp. deg C	Hydrometer Reading			100R / W	% Total Sample	Corr. Coef.		Corr. Dia (mm) (D)
			Orig.	Comp. Corr.	Corr. (R)			(K)	(L)	
9:32	2	20	20	-6.5	14.7		7.2	0.0135	13.1	0.0344
9:35	5	20	17	-6.5	11.7		5.7	0.0135	13.6	0.0222
9:45	15	20	15	-6.5	9.7		4.7	0.0135	14.0	0.0130
10:00	30	20	14	-6.5	8.7		4.2	0.0135	14.2	0.0093
10:30	60	20	13	-6.5	7.7		3.7	0.0135	14.4	0.0066
13:40	250	21	11	-6.0	6.2		3.0	0.0133	14.7	0.0032
9:30	1440	20	9	-6.5	3.7		1.8	0.0135	15.1	0.0014

Deflocculant 125 cc of 4% Solution (40 gm/l) $D = K\ (L/T)^{1/2}$

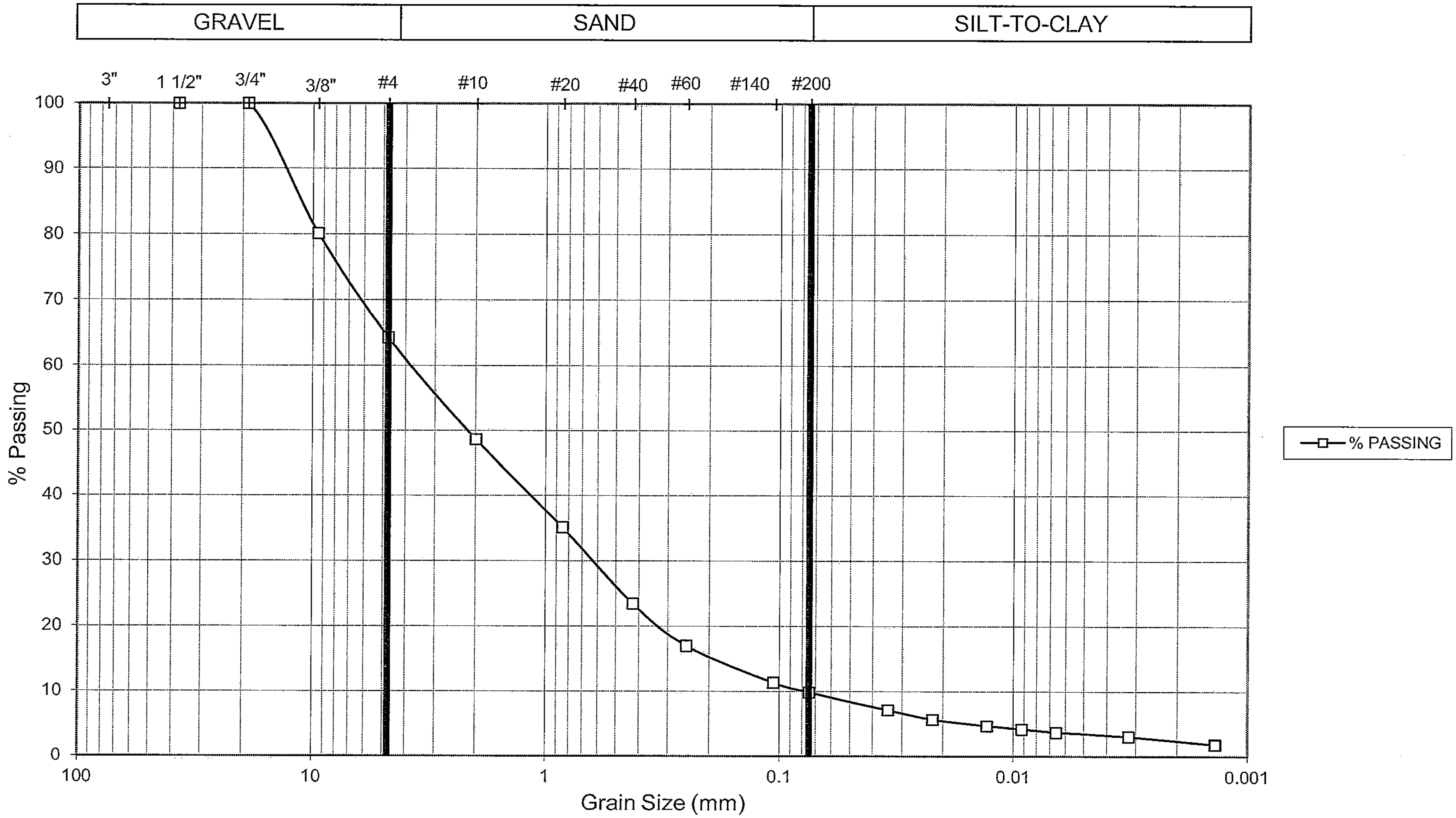
Cal 203 Requires hydro readings @ 1 hr and 24 hrs

PARIKH CONSULTANTS, INC.

PARIKH CONSULTANTS, INC.

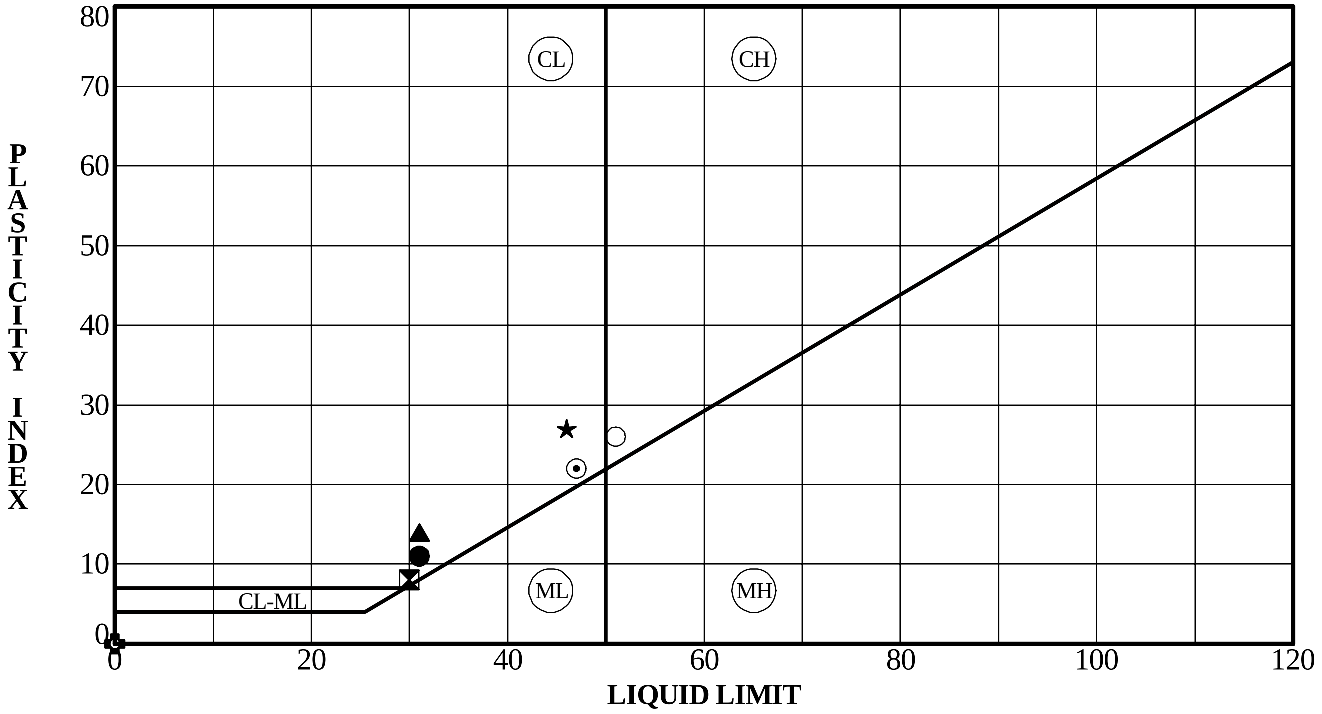
GRAIN SIZE DISTRIBUTION

Project:	BART to Silicon Valley	Project #:	2019-131-T04
Client:	BH-180	Tested by:	DN
Source/Location:	Stockton Avenue Vent shaft Sample: 33,34 @ 155'-160' feet	Lab # :	G970
Material Description:	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM),	Date Tested:	8/18/2020



Reported By: 0 Do Nguyen

Atterberg Limits Test Results



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-108	50.5	31	11	0.273	23	66	CL
⧗	BH-108	75.5	30	8	0.100	23	76	CL
▲	BH-109	75.0	31	14	0.181	20	87	CL
★	BH-109	89.0	46	27	---	---		CL/CH
⊙	BH-109	95.0	47	22	0.123	28		OL/OH
✤	BH-109	105.0	NP	NP		24	100	OL
○	BH-109	124.0	51	26	---	---		CL/CH

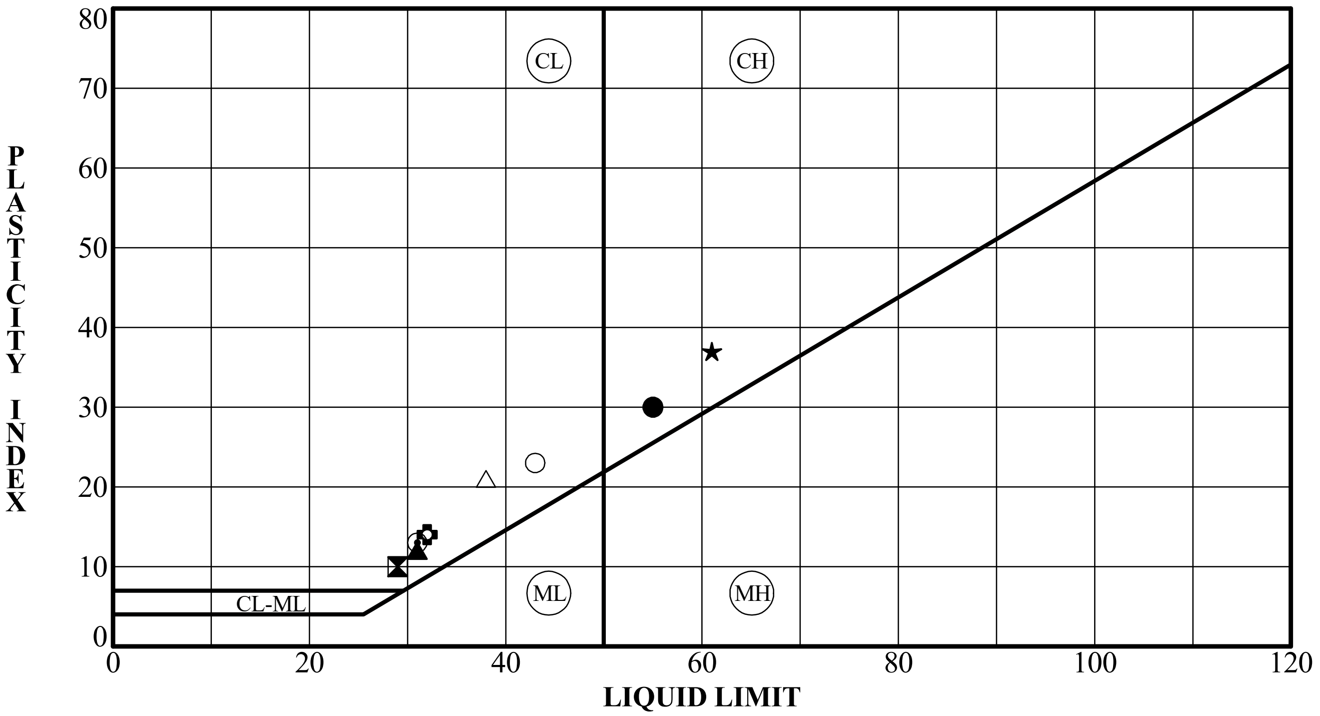
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
12/22/20
DWG FILE:

PLASTICITY CHART AND DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE
1

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-112	45.0	55	30	---	---		CH
⧗	BH-112	100.5	29	10	0.080	20	67	CL
▲	BH-112	140.5	31	12	---	---		CL
★	BH-113	45.0	61	37	---	---		CH
⊙	BH-113	55.0	31	13	---	---		CL
✿	BH-113	96.0	32	14	0.138	20	89	CL
○	BH-113	135.0	43	23	---	---		CL
△	BH-113	145.0	38	21	---	---		CL

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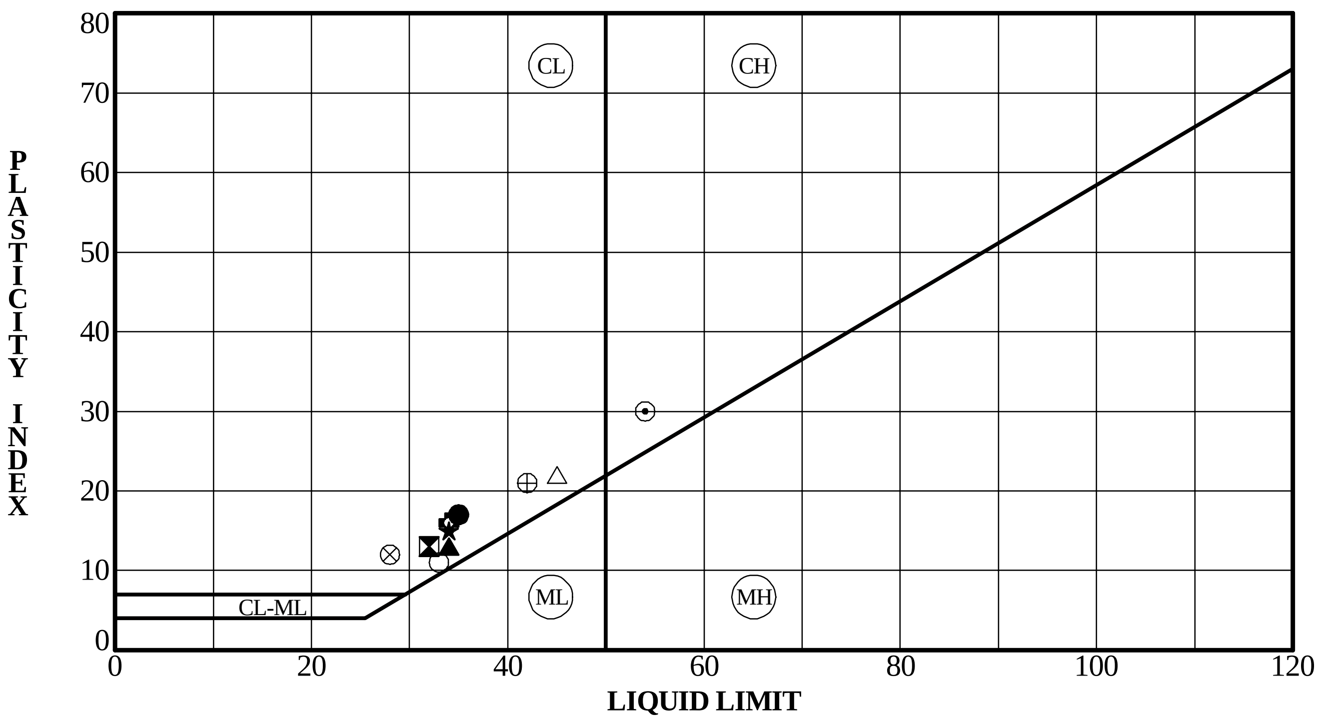
Sara Chalian
APP'D BY:
Mark McKee
DATE:
9/30/20
DWG FILE:

PLASTICITY CHART AND DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE
2

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-114	30.0	35	17	---	---		CL
⧗	BH-114	81.0	32	13	0.244	22	98	CL
▲	BH-114	91.0	34	13	0.179	23	97	CL
★	BH-114	111.0	34	15	0.054	20	82	CL
⊙	BH-115	65.0	54	30	---	---		CH
✿	BH-115	116.0	34	16	0.050	19	87	CL
○	BH-116	71.0	33	11	0.027	22		CL
△	BH-116	101.1	45	22	0.227	28	98	OL
⊗	BH-116	135.0	28	12	---	---		CL
⊕	BH-116	145.0	42	21	---	---		CL

ATTERBERG BSVII 2018 - 2019 BORING LOGS.GPJ VERSION-042904.GDT 12/22/20

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12/22/20
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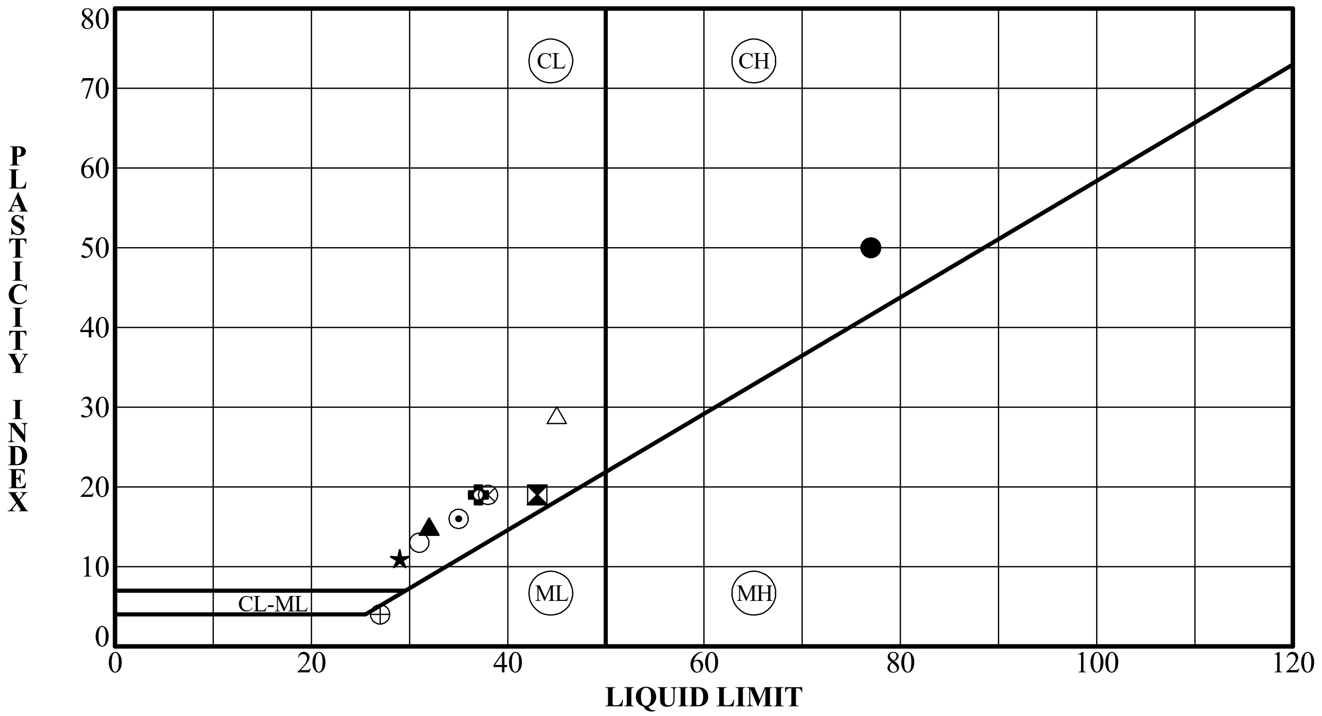
PLASTICITY CHART AND DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE
3

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-117	40.5	77	50	---	---		CH
⧗	BH-117	76.0	43	19	-0.111	22		CL
▲	BH-117	105.5	32	15	0.280	21	66	CL
★	BH-117	106.0	29	11	0.264	21	65	CL
⊙	BH-117	155.0	35	16	---	---		CL
✿	BH-121	45.5	37	19	0.368	25	100	OL
○	BH-121	76.0	31	13	0.154	20	72	CL
△	BH-121	100.0	45	29	---	---		CL
⊗	BH-121	115.0	38	19	---	---		CL
⊕	BH-121	145.0	27	4	---	---		ML

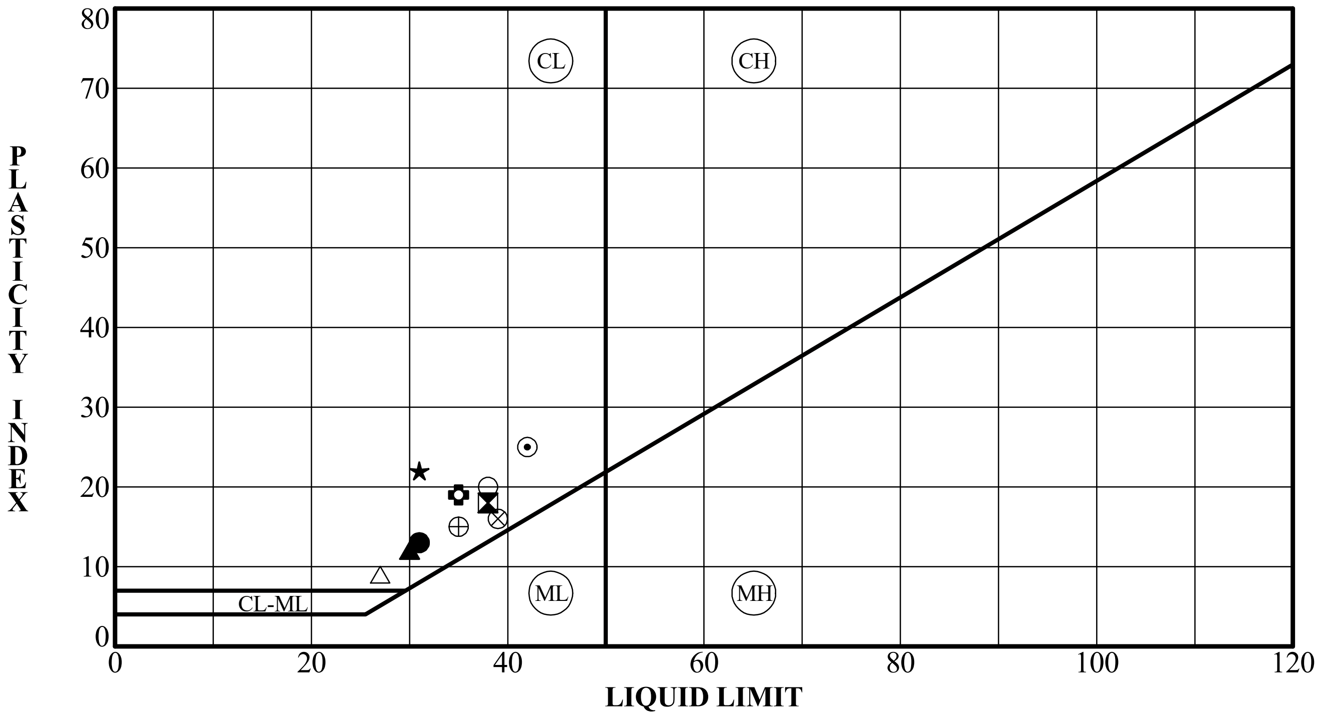
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
9/30/20
DWG FILE:

PLASTICITY CHART AND DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE
4

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-122	60.5	31	13	0.177	20	86	CL
⊠	BH-122	61.0	38	18	0.189	23	90	CL
▲	BH-122	110.5	30	12	-0.750	9		CL
★	BH-122	111.0	31	22	0.555	21	84	CL
⊙	BH-122	125.5	42	25	---	---		CL
✿	BH-123	74.5	35	19	0.068	17		CL
○	BH-124	29.0	38	20	---	---		CL
△	BH-124	61.0	27	9	0.200	20	69	CL
⊗	BH-124	65.5	39	16	0.225	27		CL
⊕	BH-124	135.0	35	15	---	---		CL

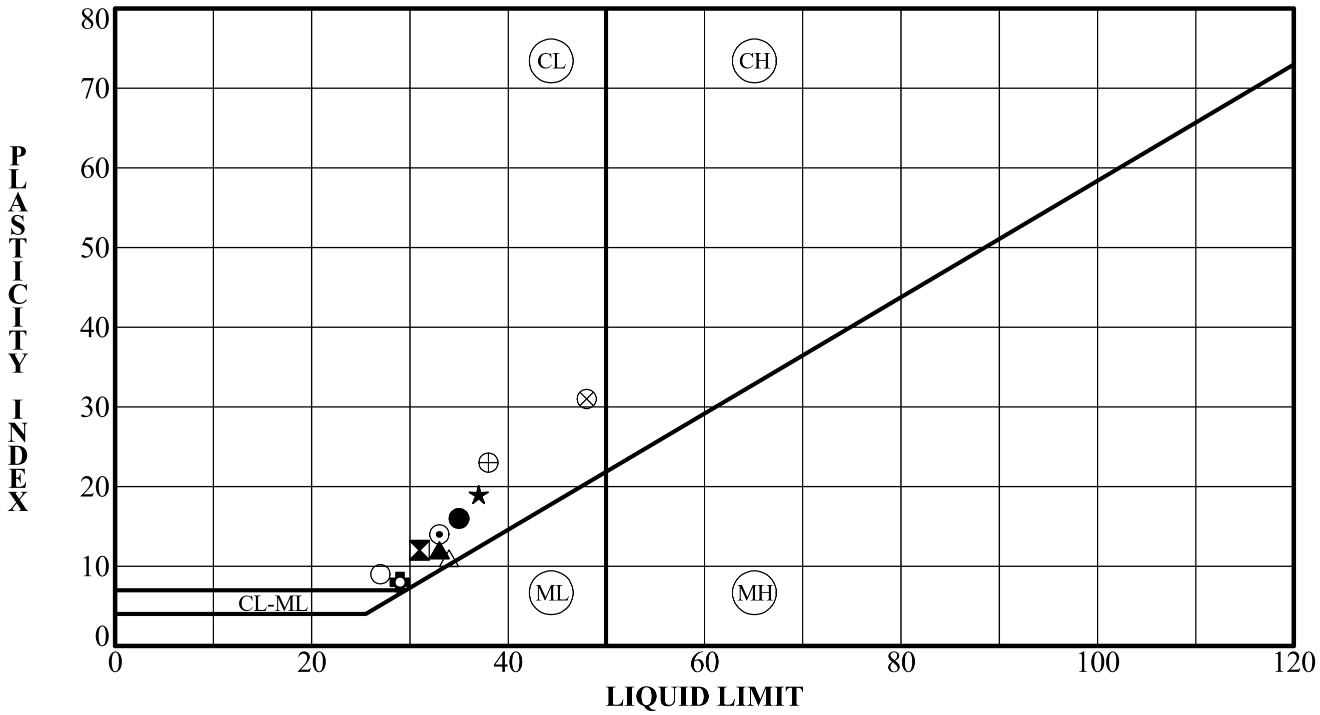
PREP'D BY:
Sara Chalian
APP'D BY:
Mark McKee
DATE:
9/30/20
DWG FILE:

PLASTICITY CHART AND DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE
5

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-125	65.0	35	16	---	---		CL
⧗	BH-125	80.5	31	12	0.242	22	74	CL
▲	BH-125	81.0	33	12	-0.567	14	71	CL
★	BH-125	90.0	37	19	---	---		CL
⊙	BH-125	130.5	33	14	---	---		CL
✿	BH-137	75.0	29	8	---	---		CL
○	BH-137	81.0	27	9	---	---	84	CL
△	BH-137	85.0	34	11	---	---		CL
⊗	BH-137	111.0	48	31	---	---	88	CL
⊕	BH-137	130.0	38	23	---	---		CL

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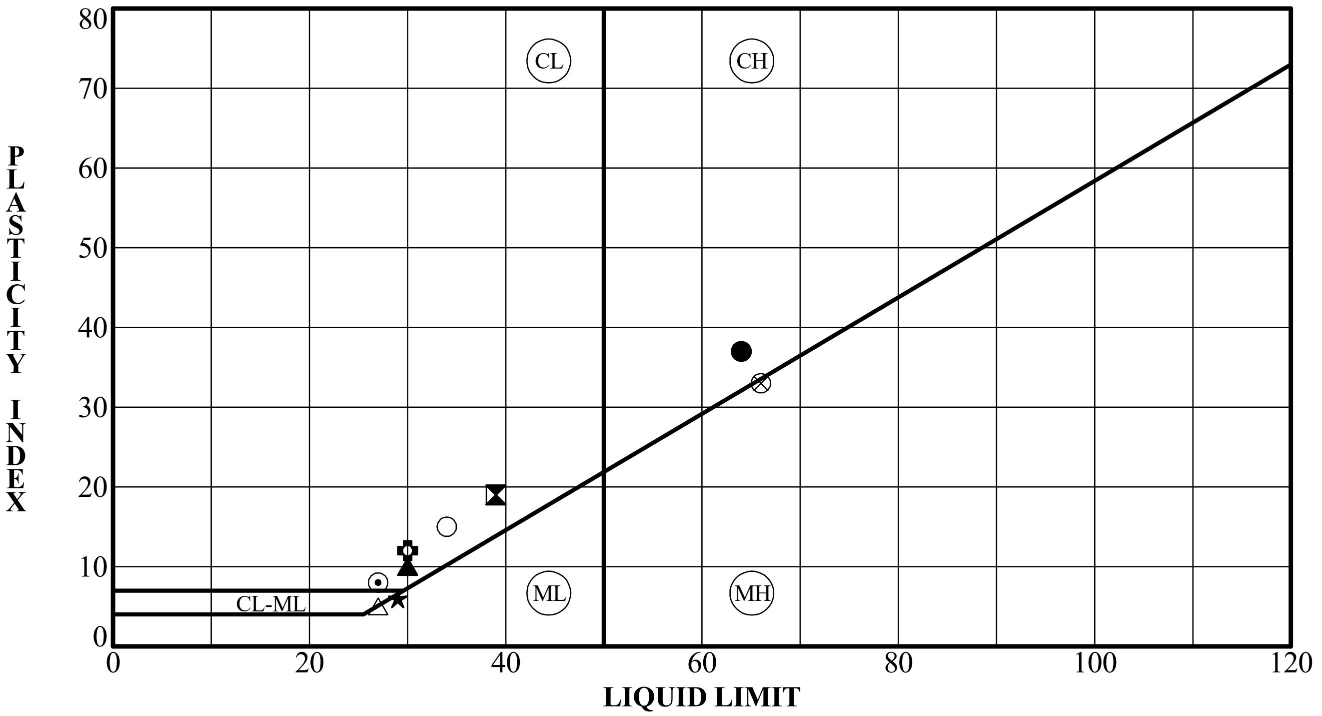
Sara Chalian
APP'D BY:
Mark McKee
DATE:
9/30/20
DWG FILE:

PLASTICITY CHART AND DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE
6

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-138	116.0	64	37	---	---	86	CH
⧗	BH-138	120.0	39	19	---	---		CL
▲	BH-138	125.0	30	10	---	---		CL
★	BH-138	135.0	29	6	---	---		ML
⊙	BH-139	70.5	27	8	0.500	23		CL-ML
✤	BH-139	95.5	30	12	0.250	21	81	CL
○	BH-139	100.5	34	15	---	---		CL
△	BH-139	125.0	27	5	---	---		CL-ML
⊗	BH-139	140.5	66	33	---	---		OH

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9/30/20
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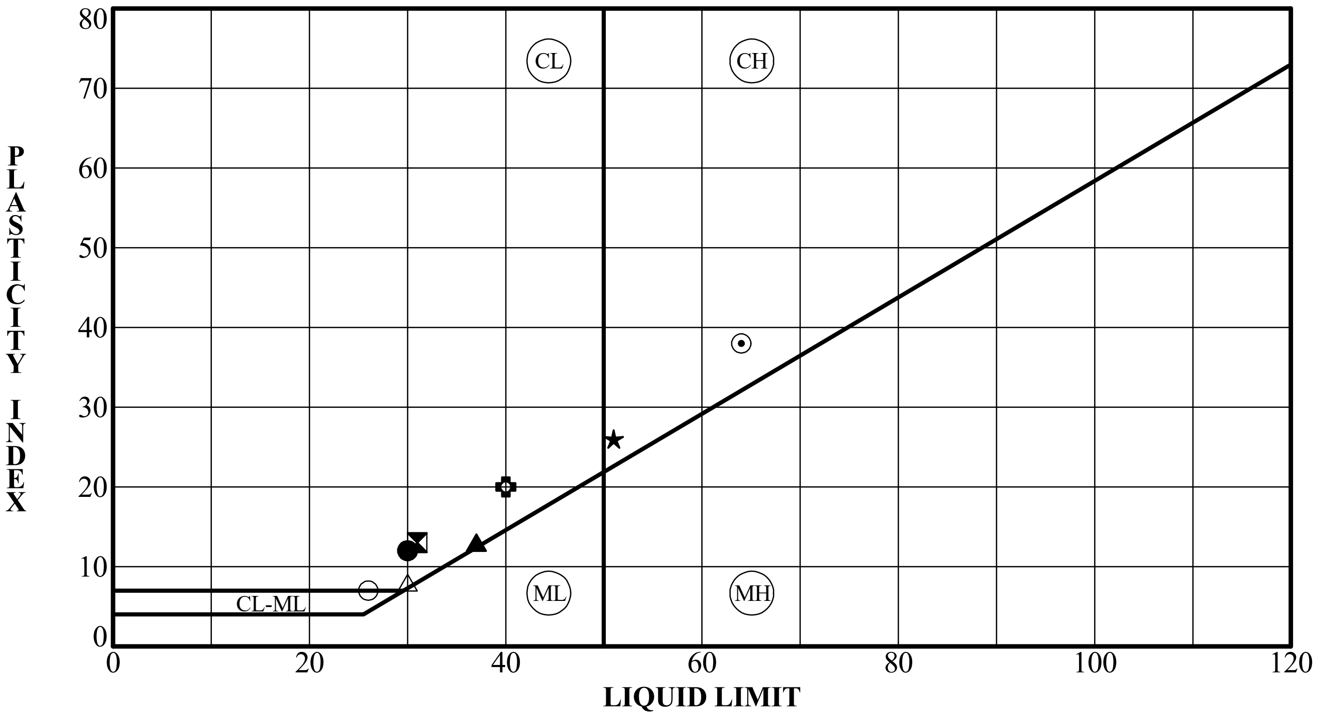
PLASTICITY CHART AND DATA

BART TO SILICON VALLEY
San Jose, California

FIGURE
7

PROJECT No.
2017-144-T02



Key Symbol	Boring No.	Depth (Feet)	Liquid Limit	Plasticity Index	Liquidity Index	Water Content (%)	% Passing #200 Sieve	USCS
●	BH-140	75.5	30	12	0.350	22	81	CL
⧗	BH-140	95.0	31	13	---	---		CL
▲	BH-140	100.0	37	13	---	---		CL
★	BH-140	140.5	51	26	---	---		CH
⊙	BH-141	11.0	64	38	---	---		CH
✿	BH-141	55.5	40	20	0.150	23	91	CL
○	BH-141	80.0	26	7	---	---		CL-ML
△	BH-141	100.0	30	8	---	---		SC

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Sara Chalian
APP'D BY:
Mark McKee
DATE:
9/30/20
DWG FILE:

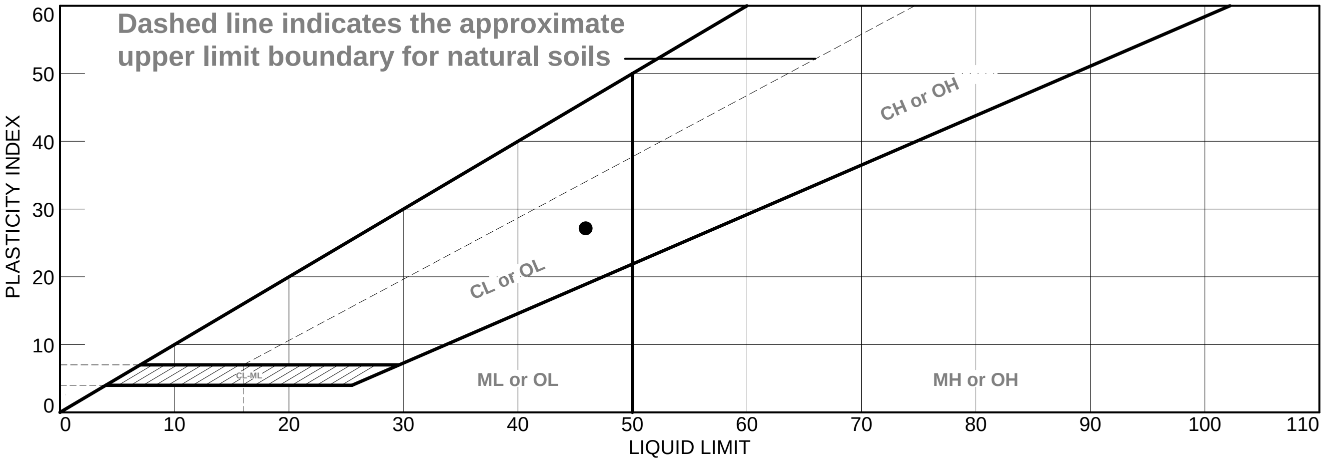
PLASTICITY CHART AND DATA

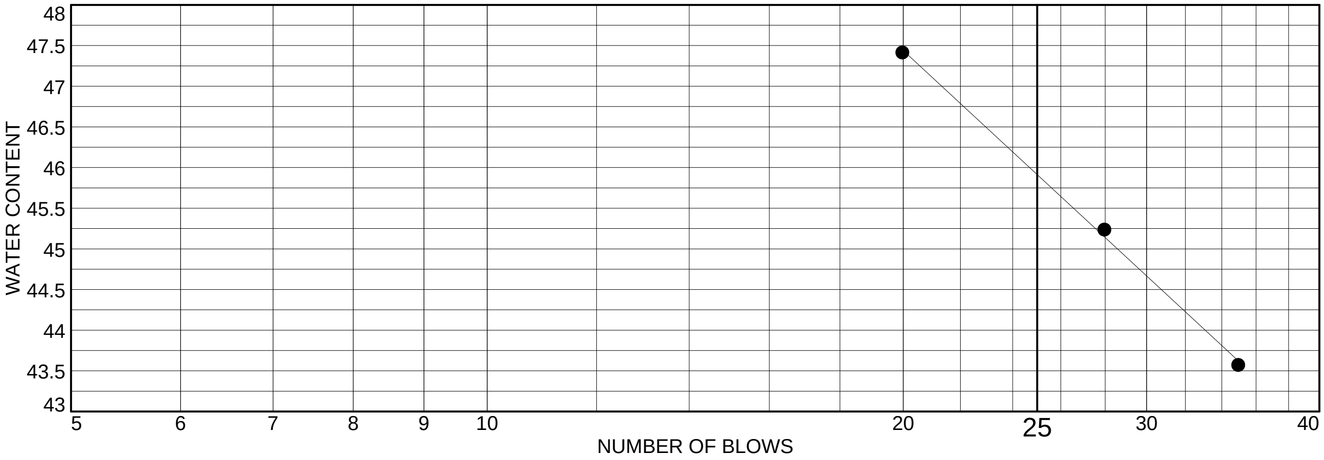
BART TO SILICON VALLEY
San Jose, California

FIGURE
8

PROJECT No.
2017-144-T02

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	46	19	27			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

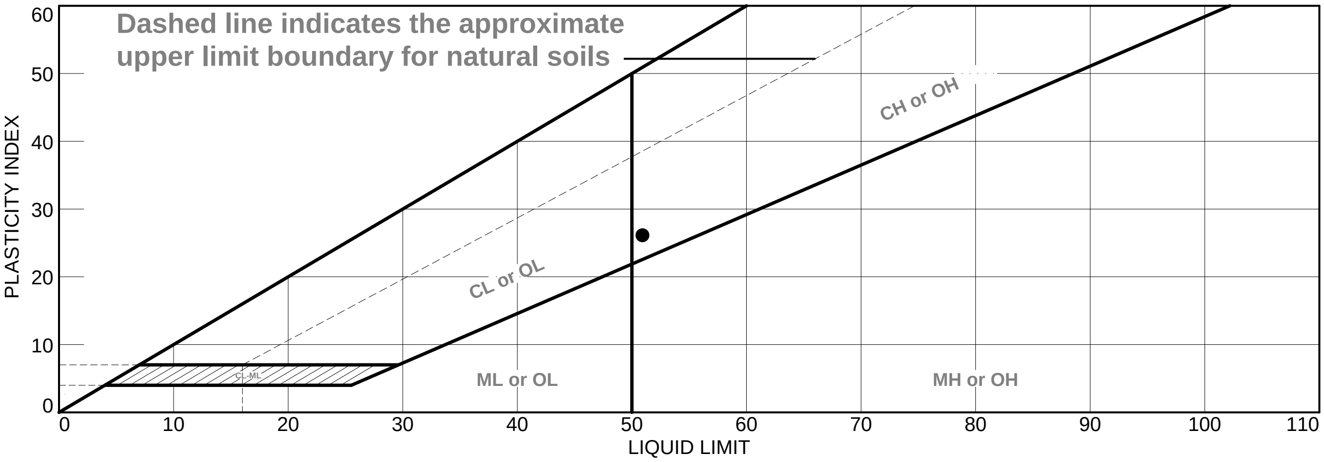
● **Source of Sample:** BH-109 **Depth:** 89 **Sample Number:** 19

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	51	25	26			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

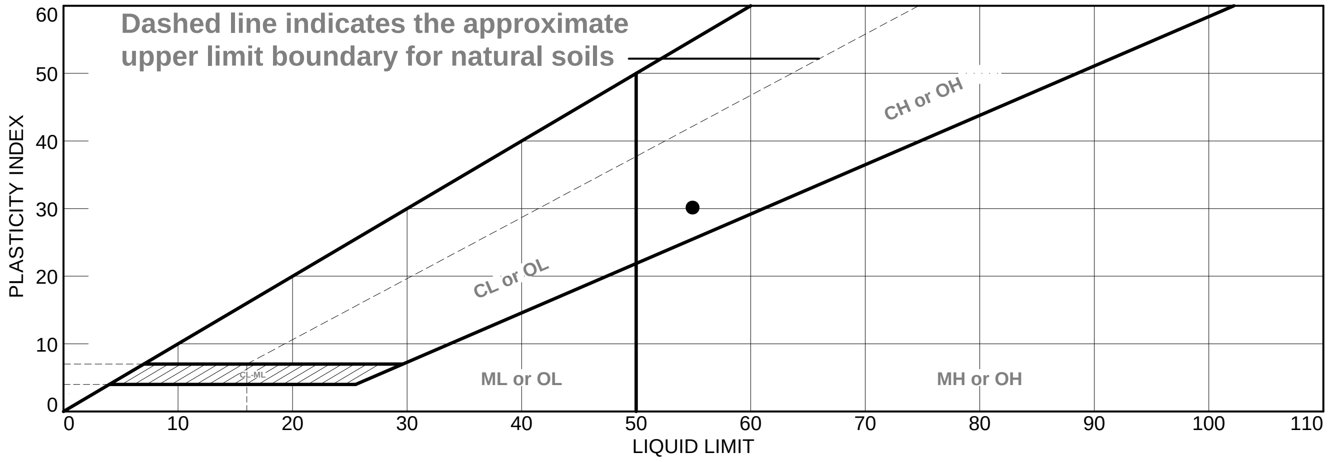
● **Source of Sample:** BH-109 **Depth:** 124 **Sample Number:** 27

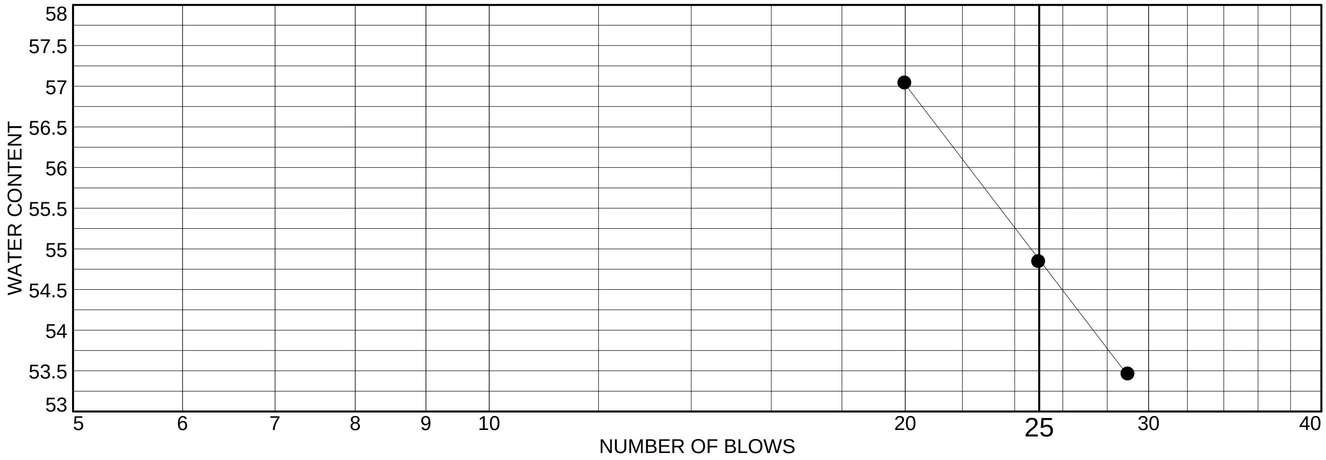
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	55	25	30			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-112 **Depth:** ~~13~~ **Sample Number:** 9

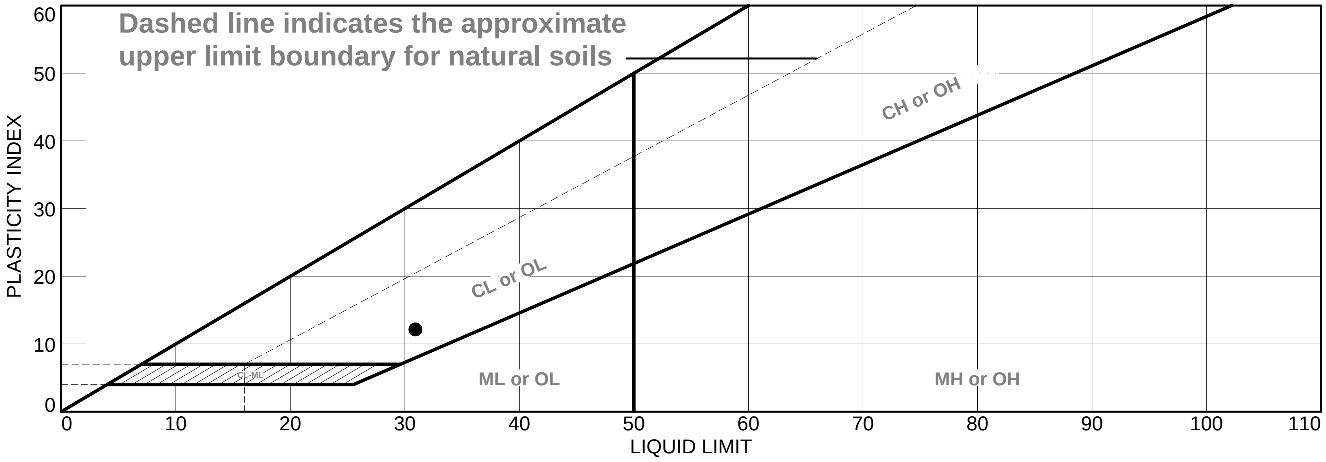
Reviewer Note: Sample depth is 45-ft bgs.
There is no sample at 13-ft.

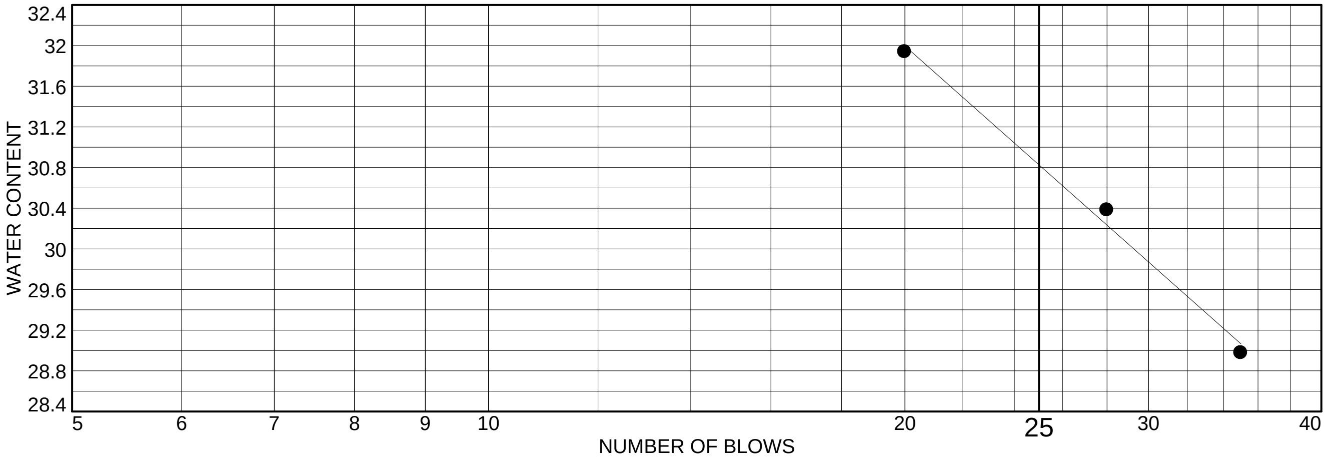
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay with sand	31	19	12			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

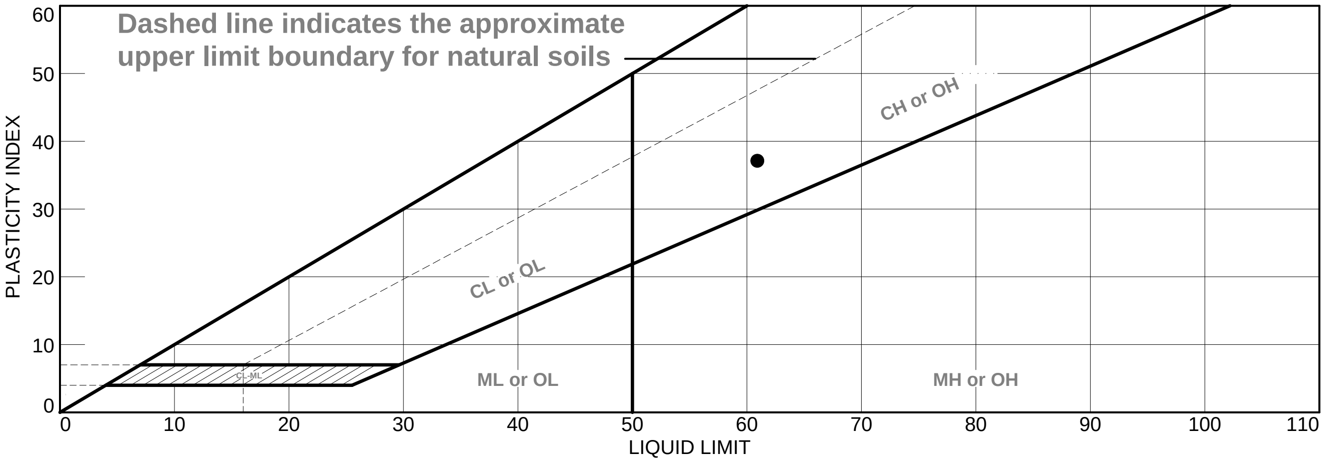
● **Source of Sample:** BH-112 **Depth:** 140 **Sample Number:** 28

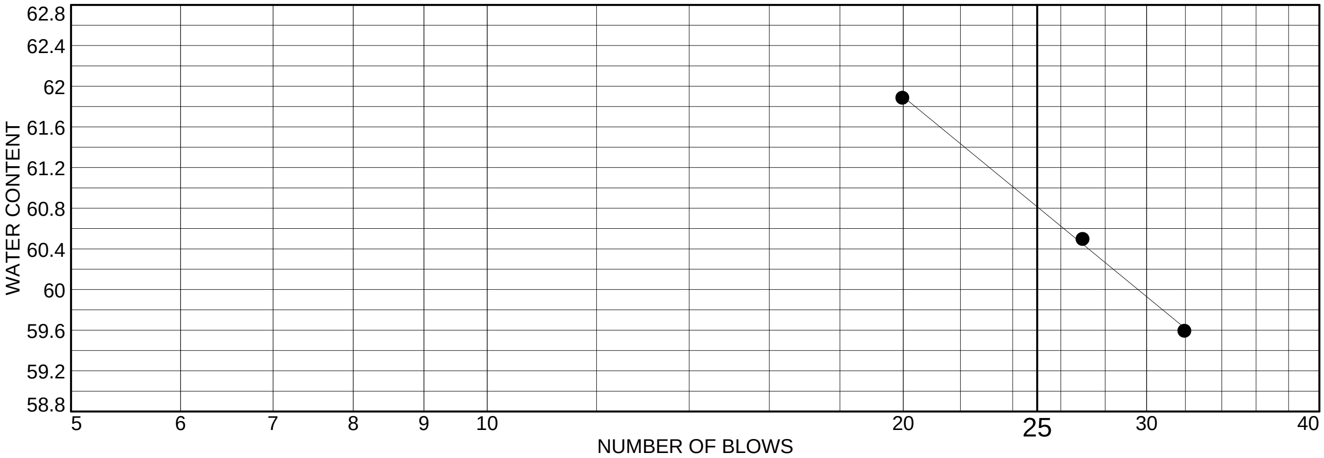
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	61	24	37			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

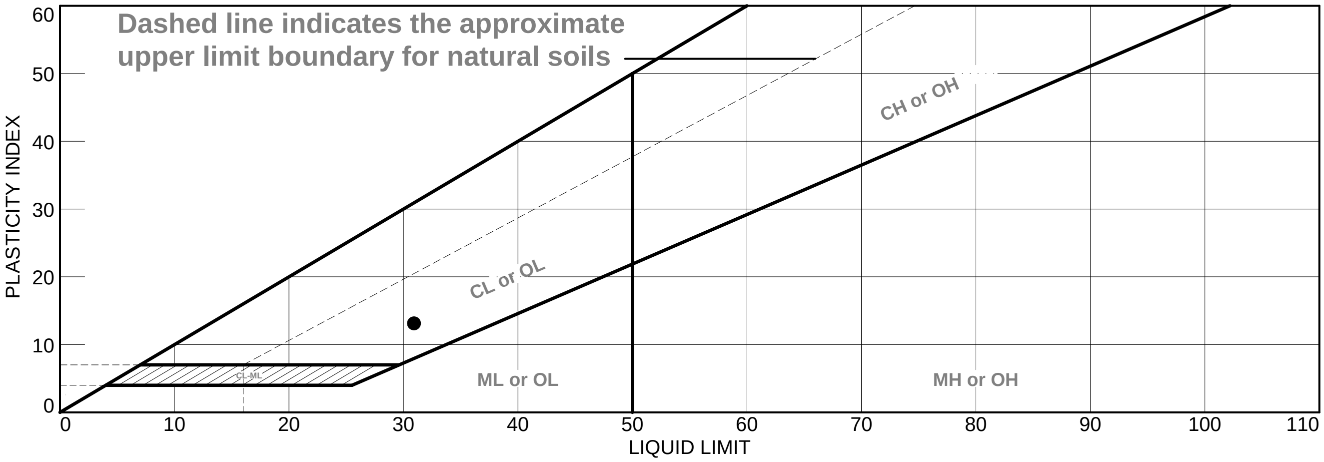
● **Source of Sample:** BH-113 **Depth:** 45 **Sample Number:** 9

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	31	18	13			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

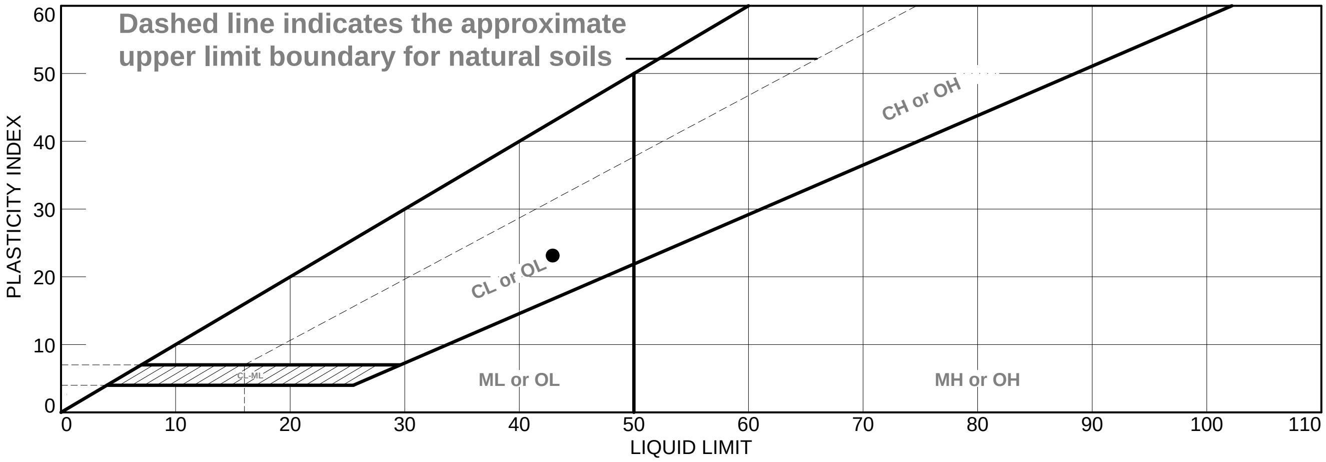
●**Source of Sample:** BH-113 **Depth:** 55 **Sample Number:** 11

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	43	20	23			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

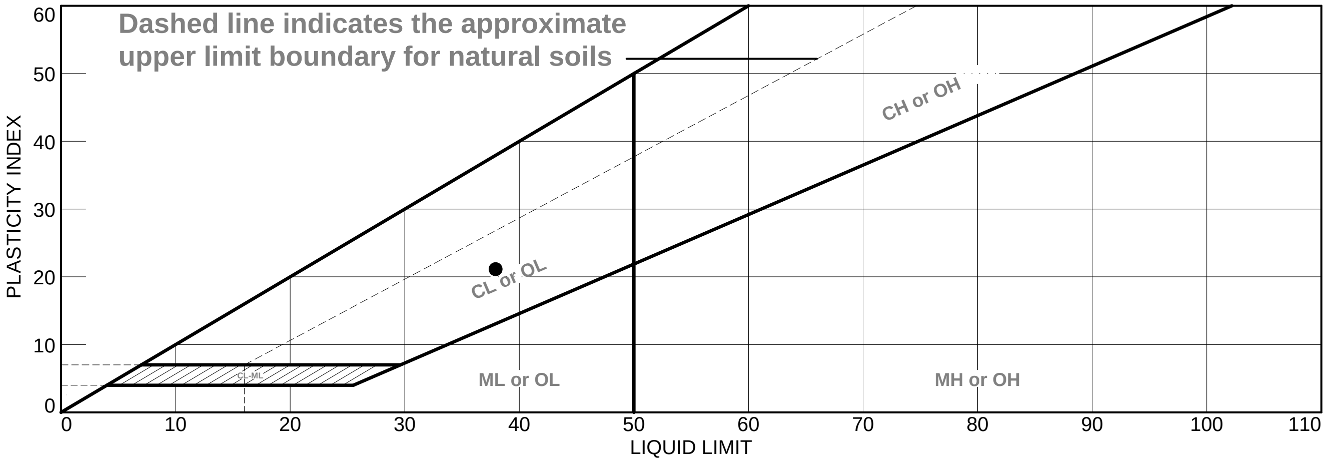
●**Source of Sample:** BH-113 **Depth:** 135 **Sample Number:** 27

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	38	17	21			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

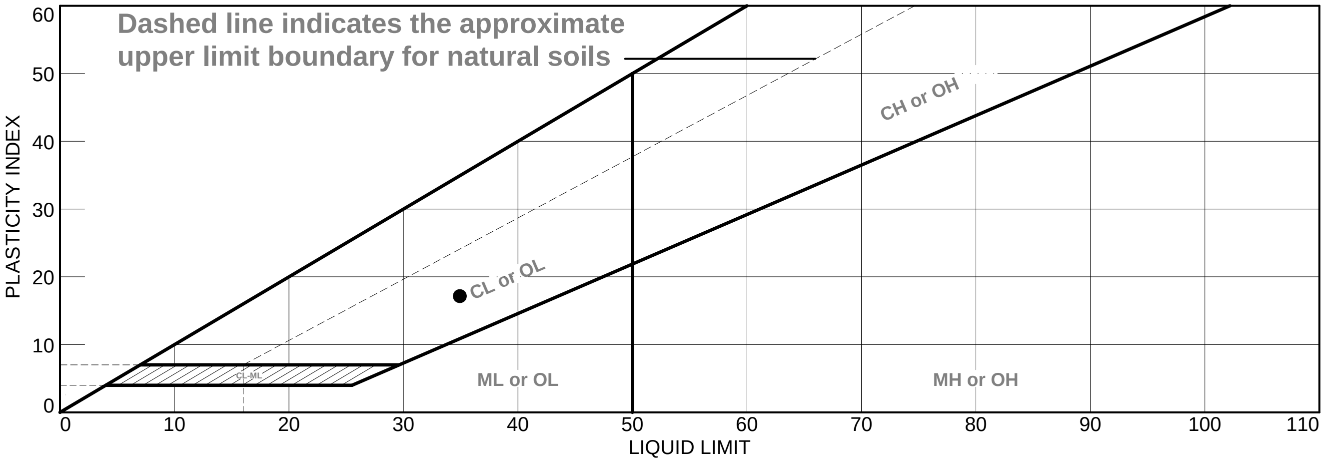
● **Source of Sample:** BH-113 **Depth:** 145 **Sample Number:** 29

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	35	18	17			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

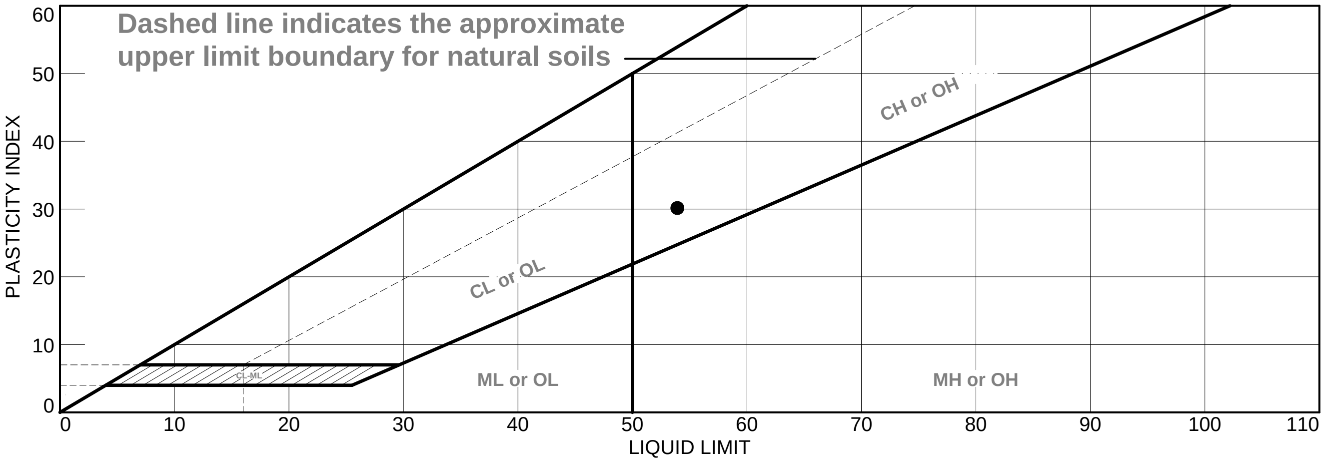
● **Source of Sample:** BH-114 **Depth:** 30 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	54	24	30			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

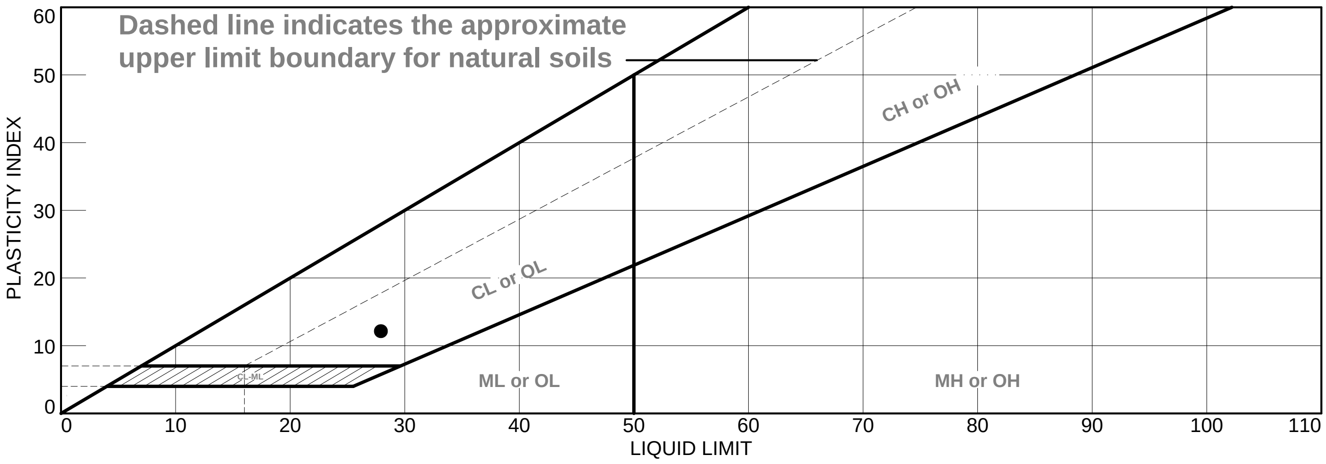
●**Source of Sample:** BH-115 **Depth:** 65 **Sample Number:** 14

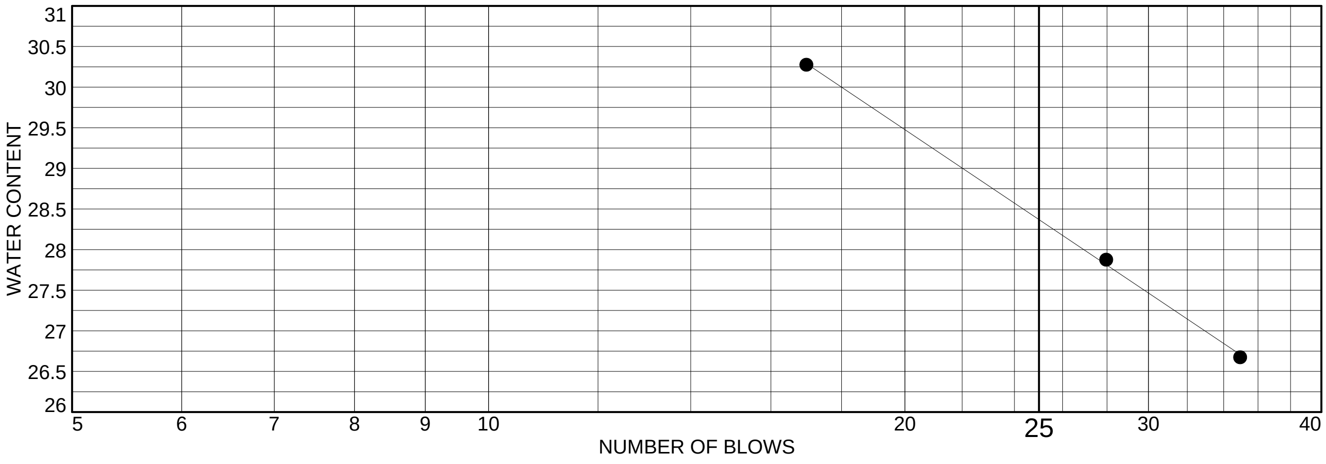
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray sandy clay	28	16	12			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

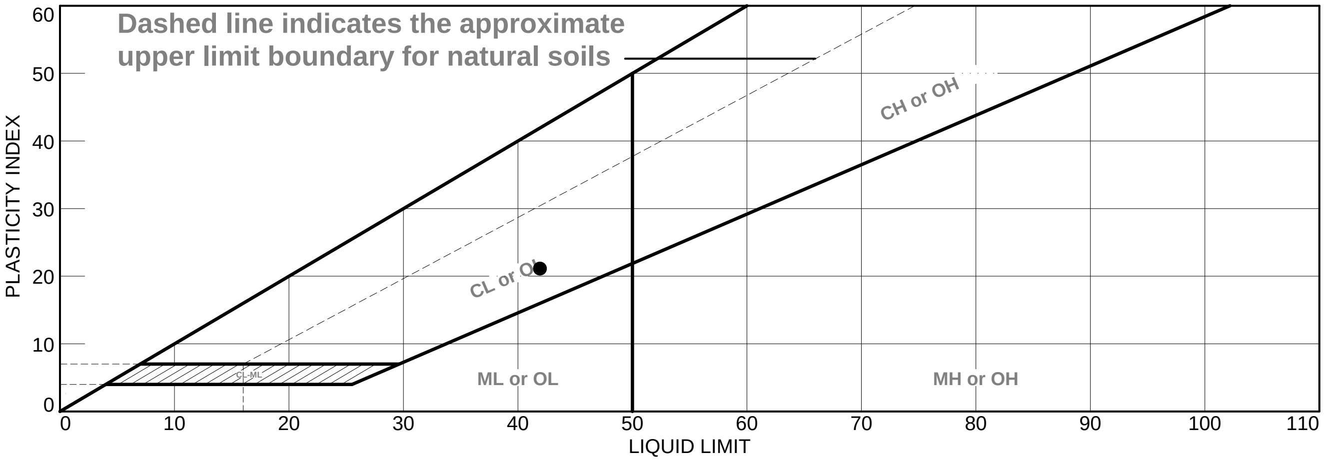
● **Source of Sample:** BH-116 **Depth:** 135 **Sample Number:** 25

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	42	21	21			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

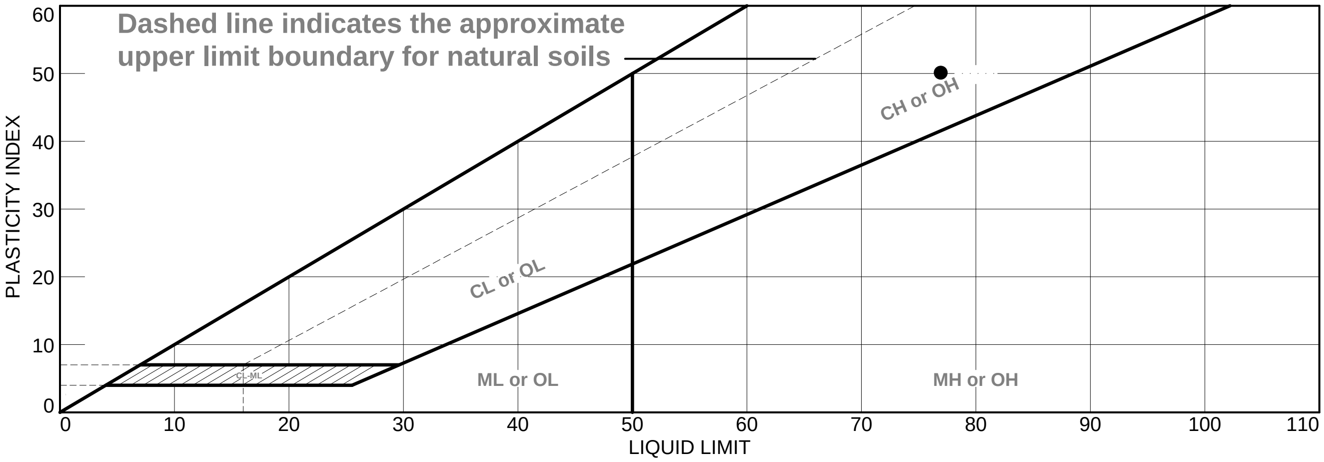
● **Source of Sample:** BH-116 **Depth:** 145 **Sample Number:** 27

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	77	27	50			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

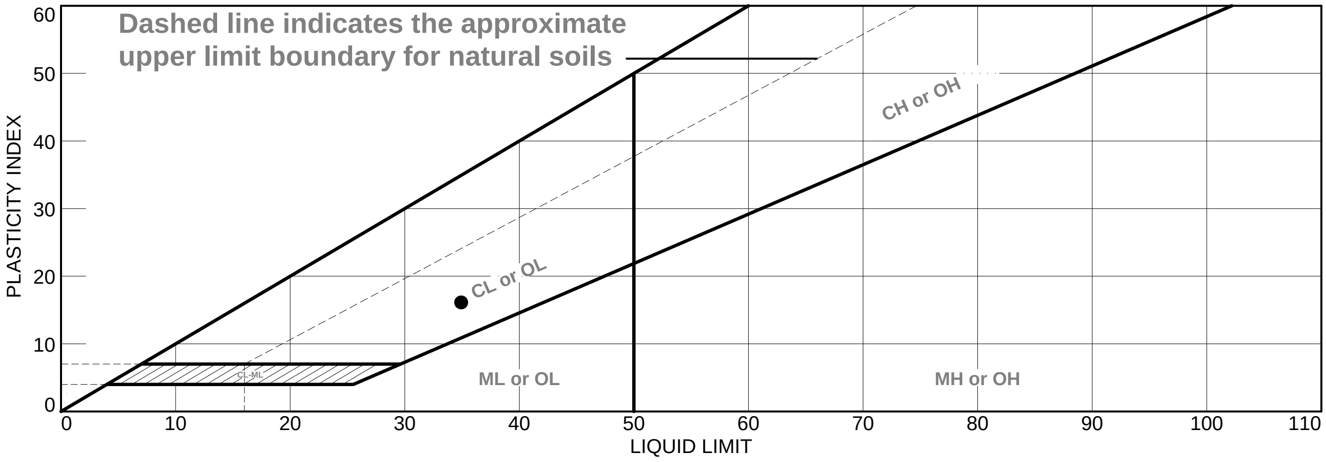
●**Source of Sample:** BH-117 **Depth:** 40.5 **Sample Number:** 8

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	35	19	16			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

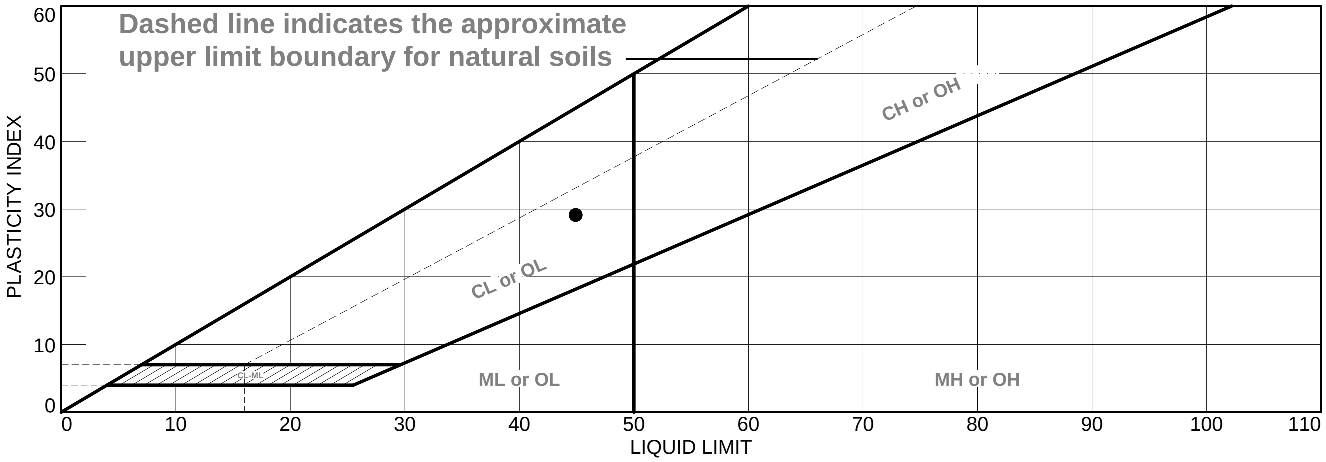
● **Source of Sample:** BH-117 **Depth:** 155 **Sample Number:** 31

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	45	16	29			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

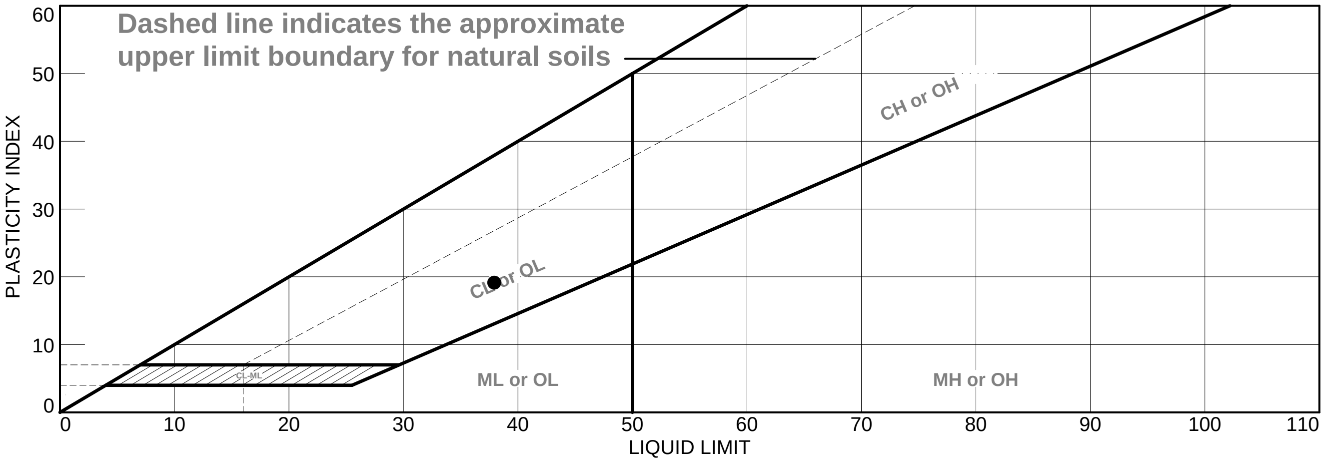
●**Source of Sample:** BH-121 **Depth:** 100 **Sample Number:** 19

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	38	19	19			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

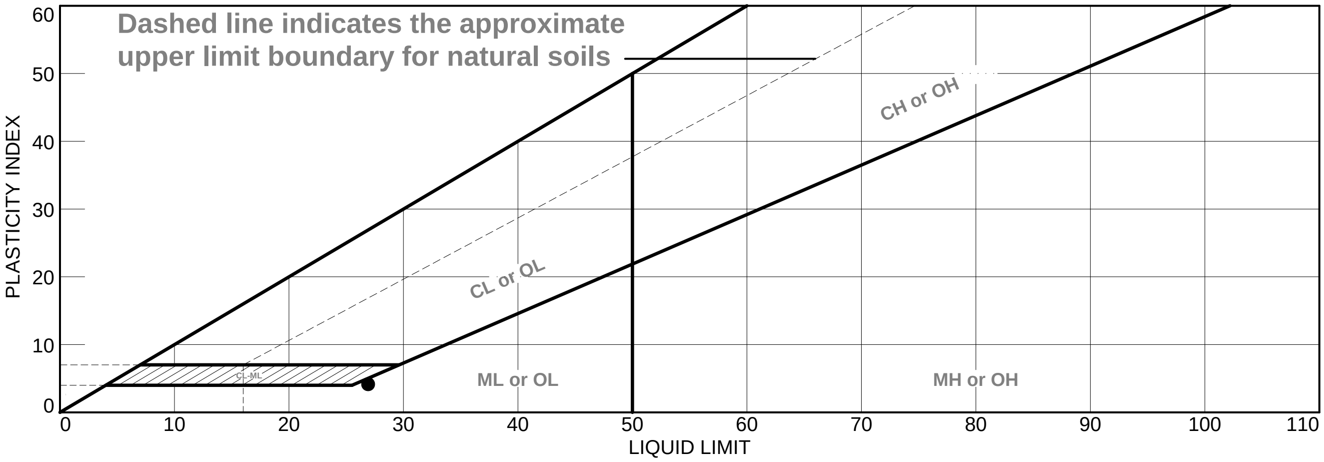
● **Source of Sample:** BH-121 **Depth:** 115 **Sample Number:** 22

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray sandy silt	27	23	4			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

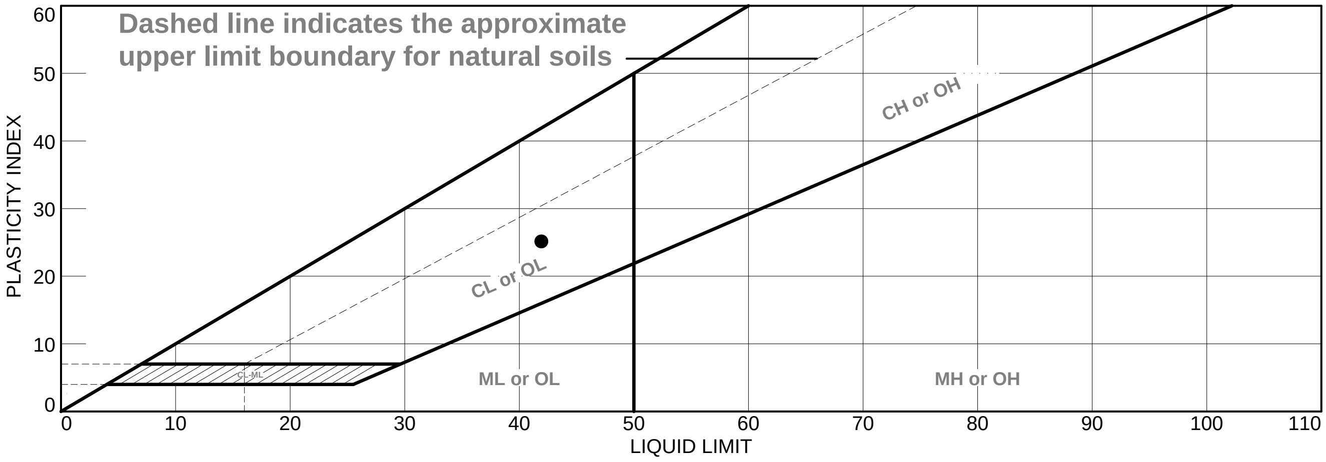
● **Source of Sample:** BH-121 **Depth:** 145 **Sample Number:** 26

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	42	17	25			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

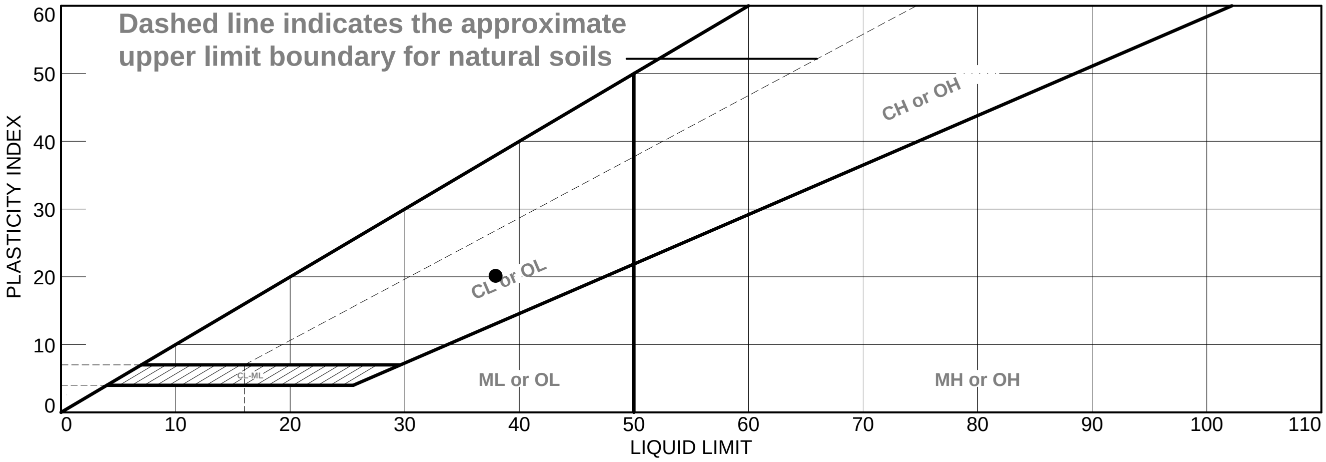
● **Source of Sample:** BH-122 **Depth:** 125 **Sample Number:** 26

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	38	18	20			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

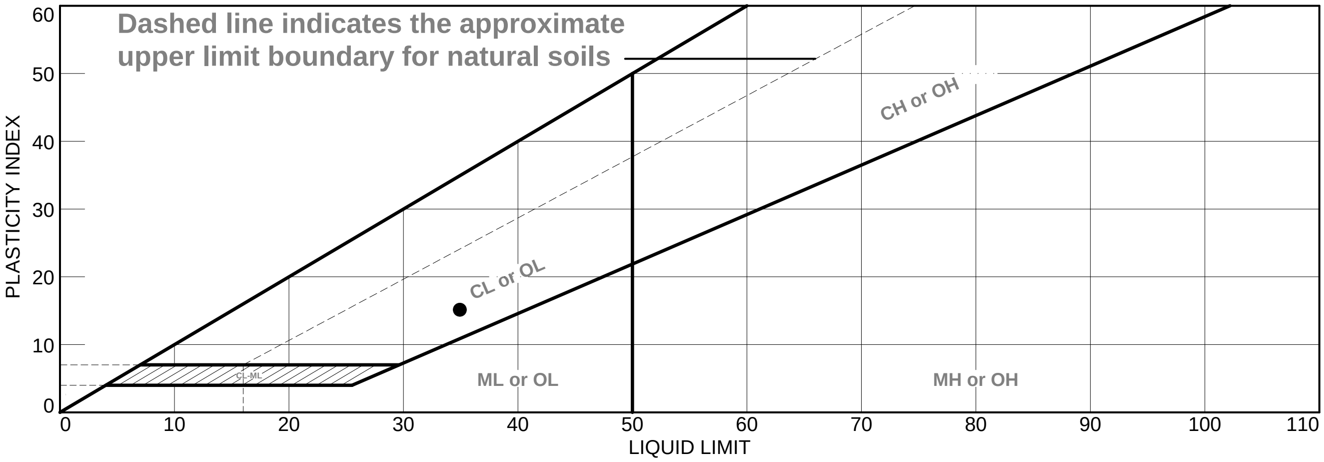
● **Source of Sample:** BH-124 **Depth:** 28.5 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown clay	35	20	15			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

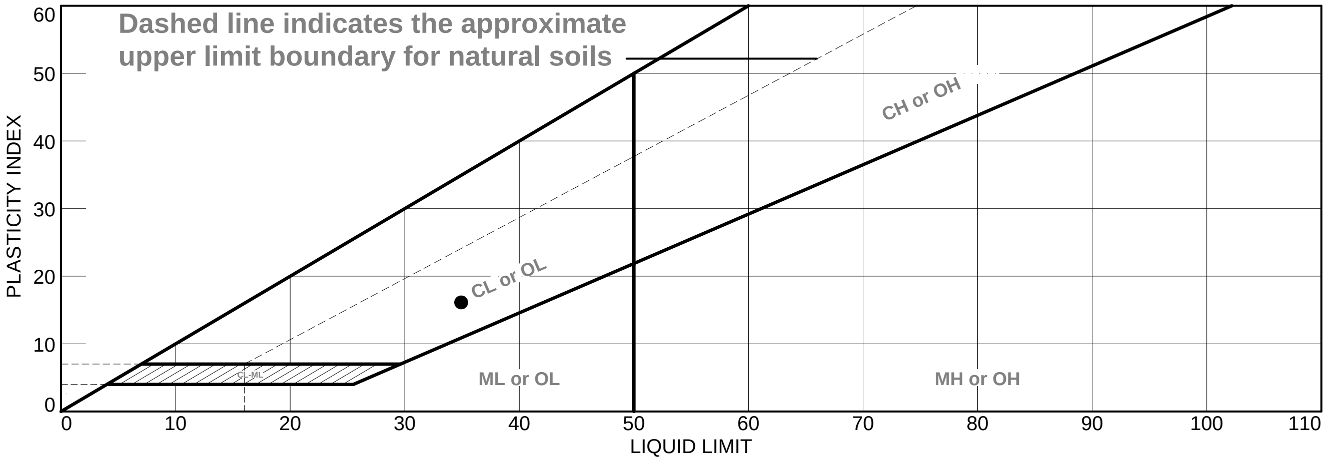
● **Source of Sample:** BH-124 **Depth:** 135 **Sample Number:** 27

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	35	19	16			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

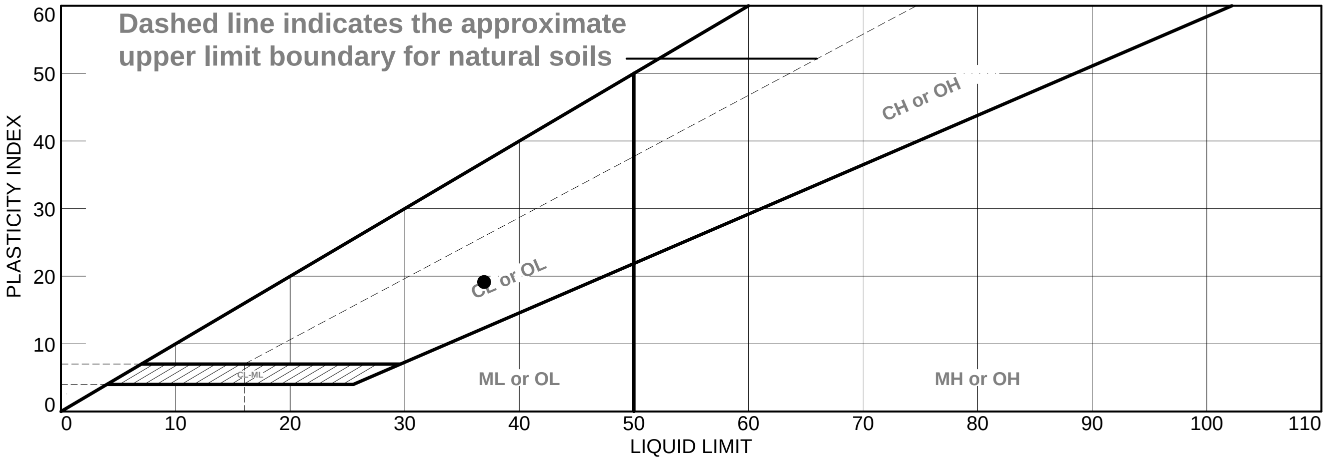
● **Source of Sample:** BH-125 **Depth:** 65 **Sample Number:** 13

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	37	18	19			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

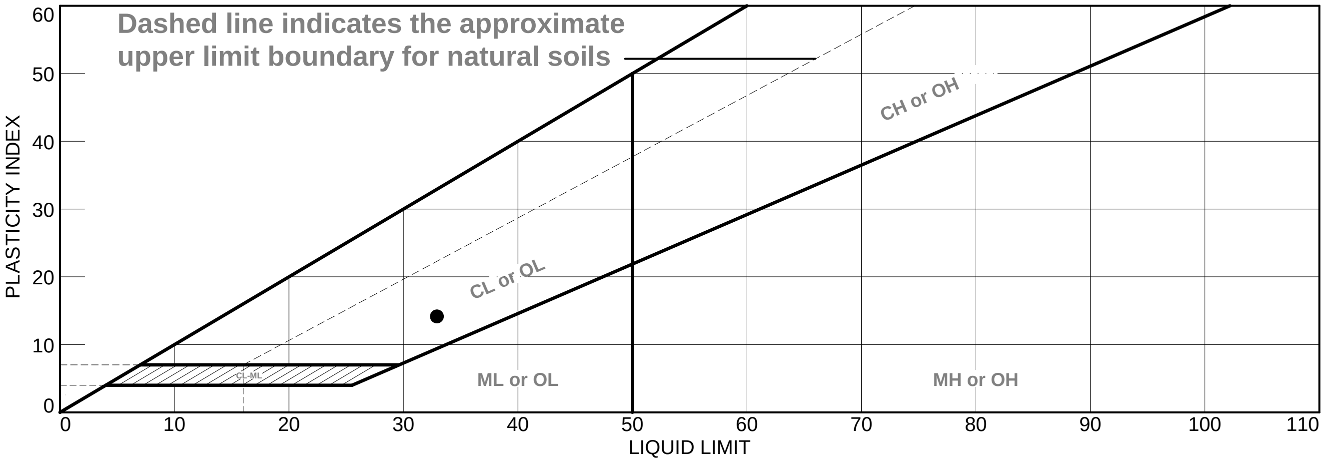
● **Source of Sample:** BH-125 **Depth:** 90 **Sample Number:** 18

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	33	19	14			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

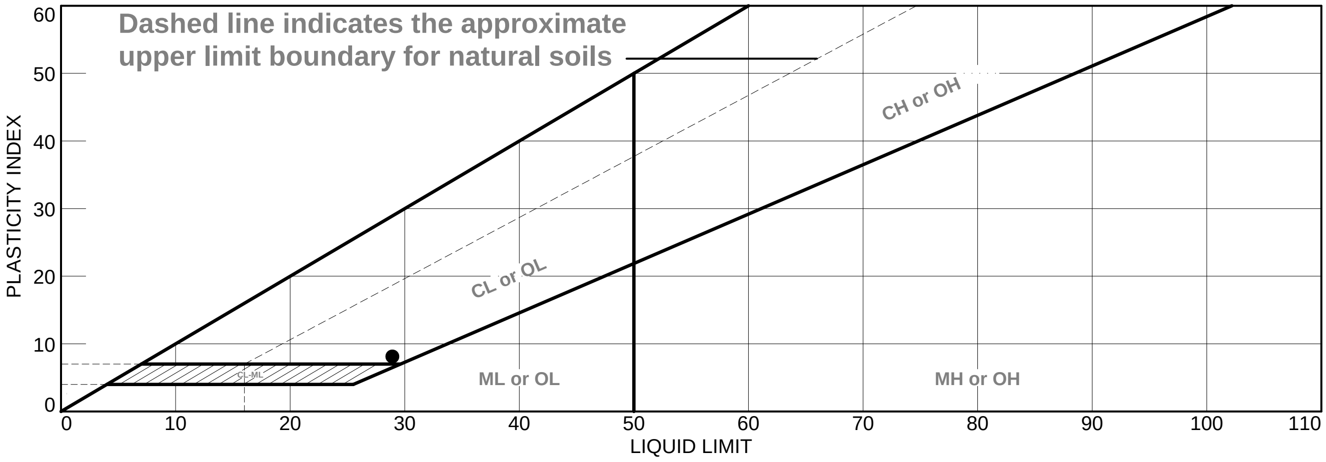
● **Source of Sample:** BH-125 **Depth:** 130 **Sample Number:** 26

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	29	21	8			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

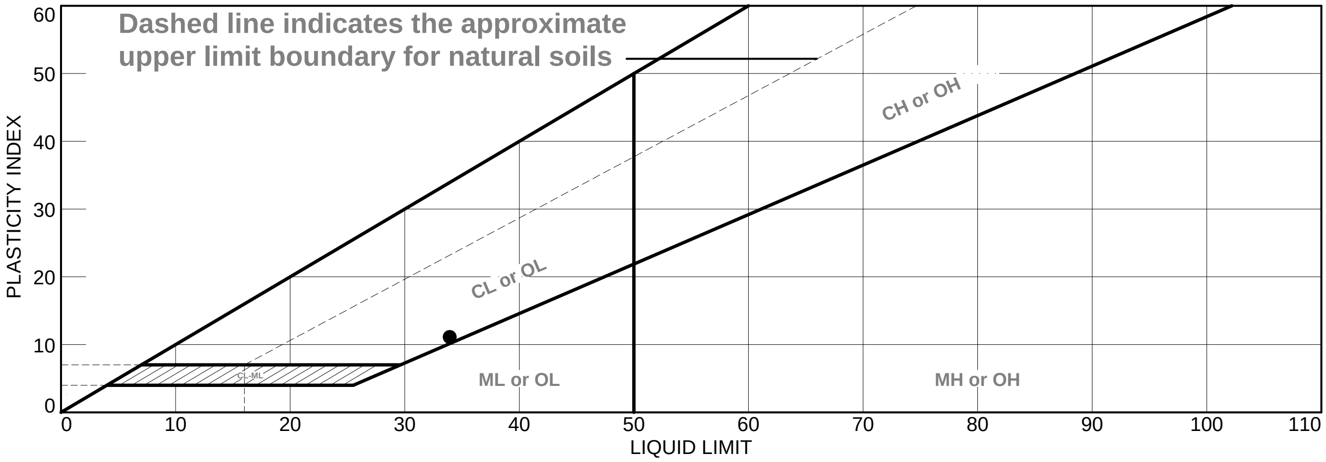
● **Source of Sample:** BH-137 **Depth:** 75 **Sample Number:** 15

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay with sand	34	23	11			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

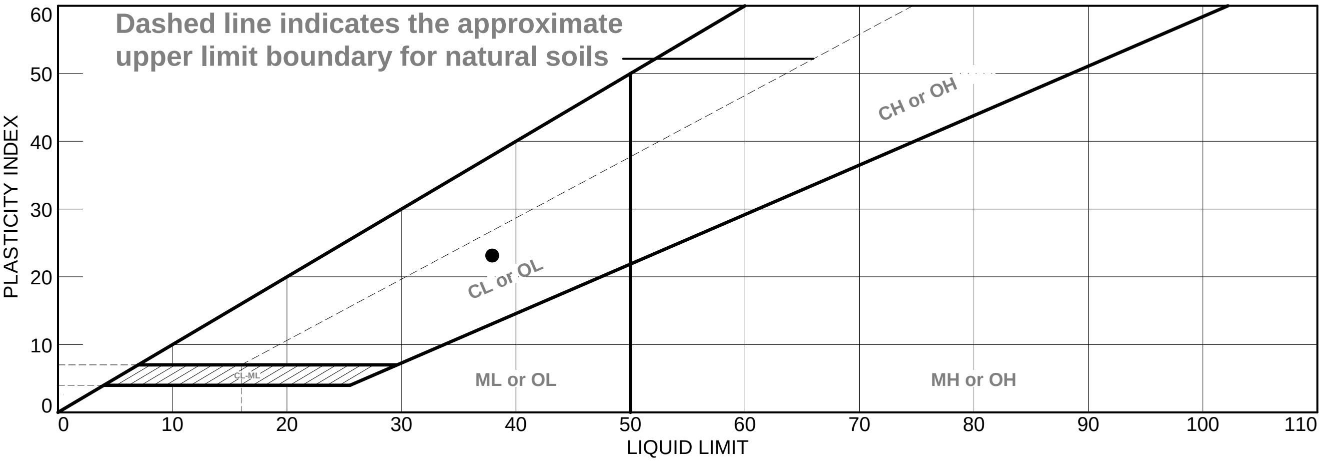
● **Source of Sample:** BH-137 **Depth:** 85 **Sample Number:** 17

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	38	15	23			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

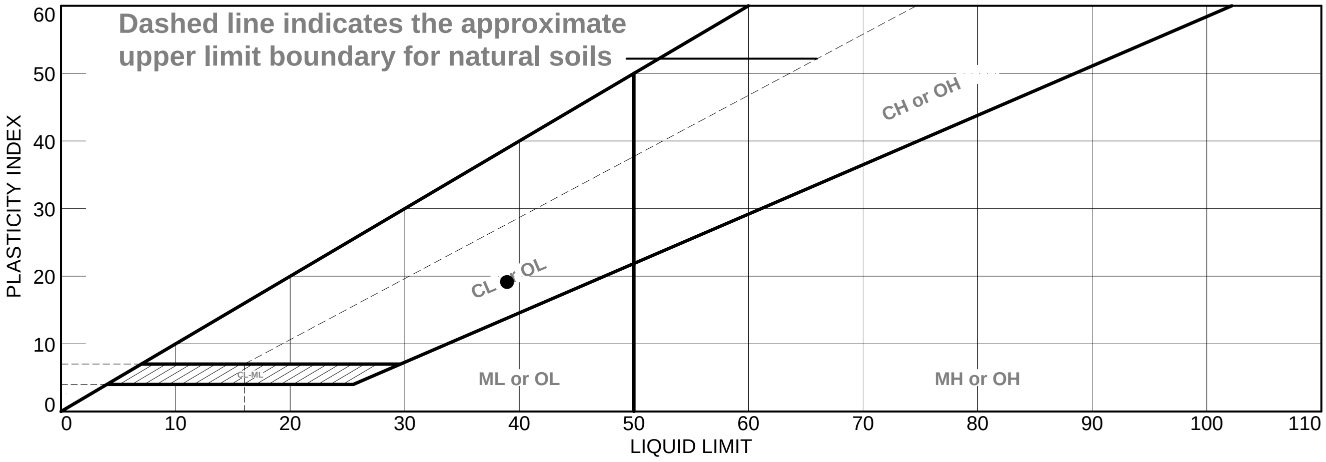
● **Source of Sample:** BH-137 **Depth:** 130 **Sample Number:** 26

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	39	20	19			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

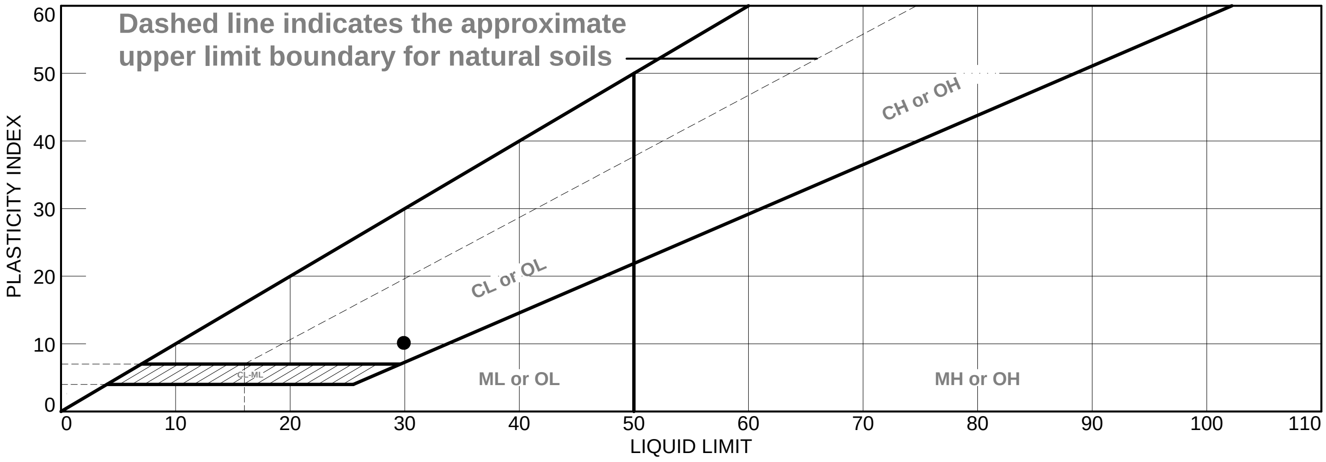
● **Source of Sample:** BH-138 **Depth:** 120 **Sample Number:** 37

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay with sand	30	20	10			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

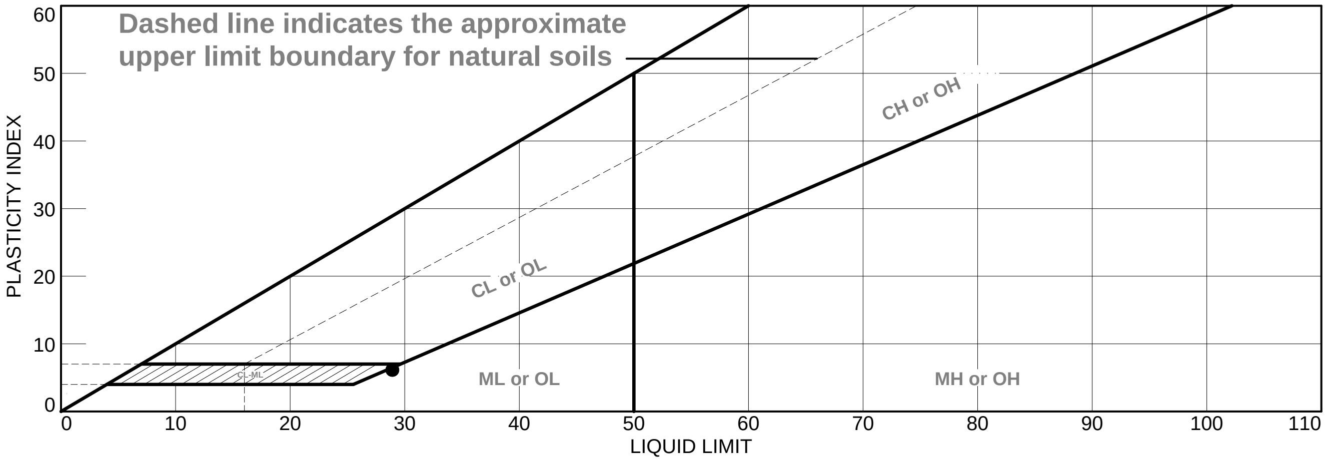
● **Source of Sample:** BH-138 **Depth:** 125 **Sample Number:** 39

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clayey silt with sand	29	23	6			ML-CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

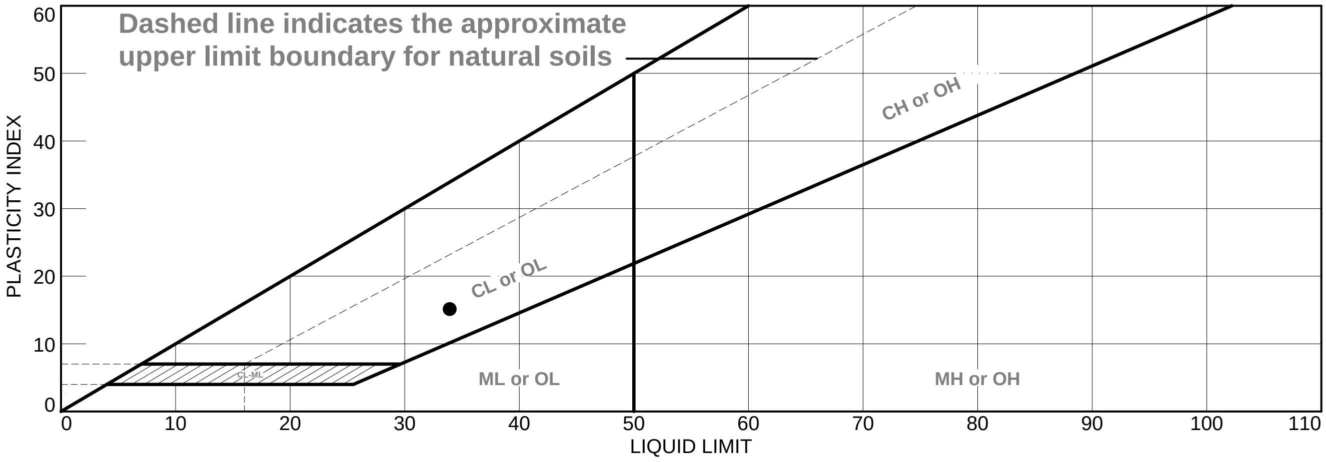
● **Source of Sample:** BH-138 **Depth:** 135 **Sample Number:** 42

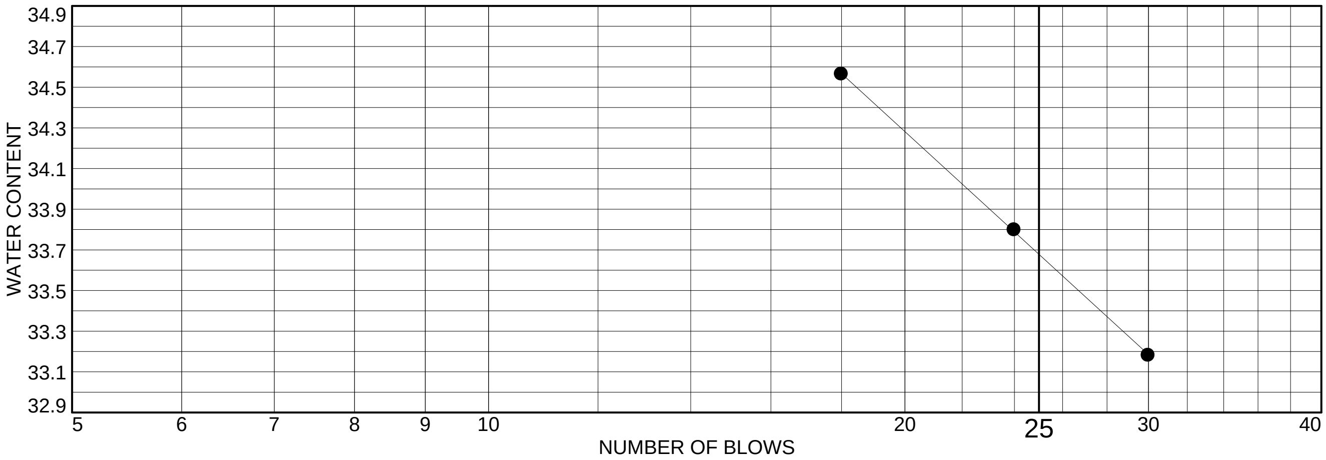
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	34	19	15			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-139 **Depth:** ~~102~~ **Sample Number:** 38

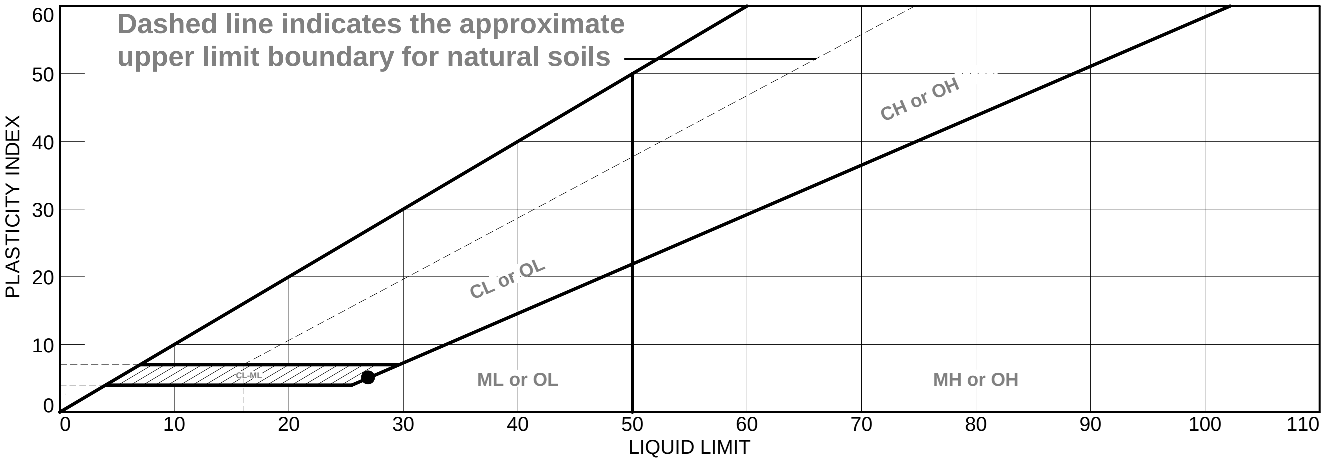
Reviewer Note: Sample depth is 100.5-ft bgs.
There is no sample at 102-ft.

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray silty clay with sand	27	22	5			ML-CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

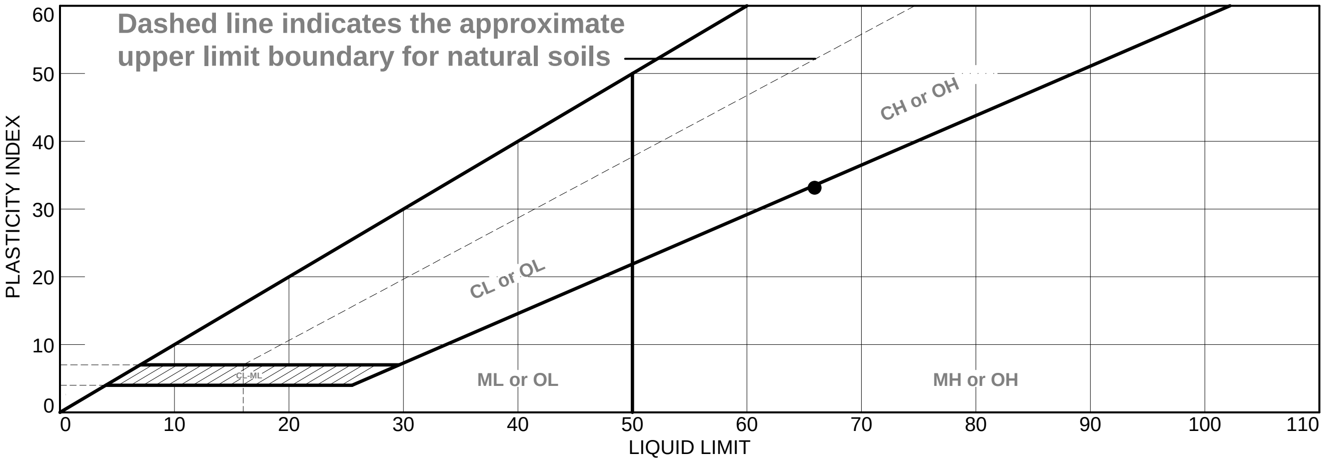
● **Source of Sample:** BH-139 **Depth:** 125 **Sample Number:** 48

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray silt with organics	66	33	33			MH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

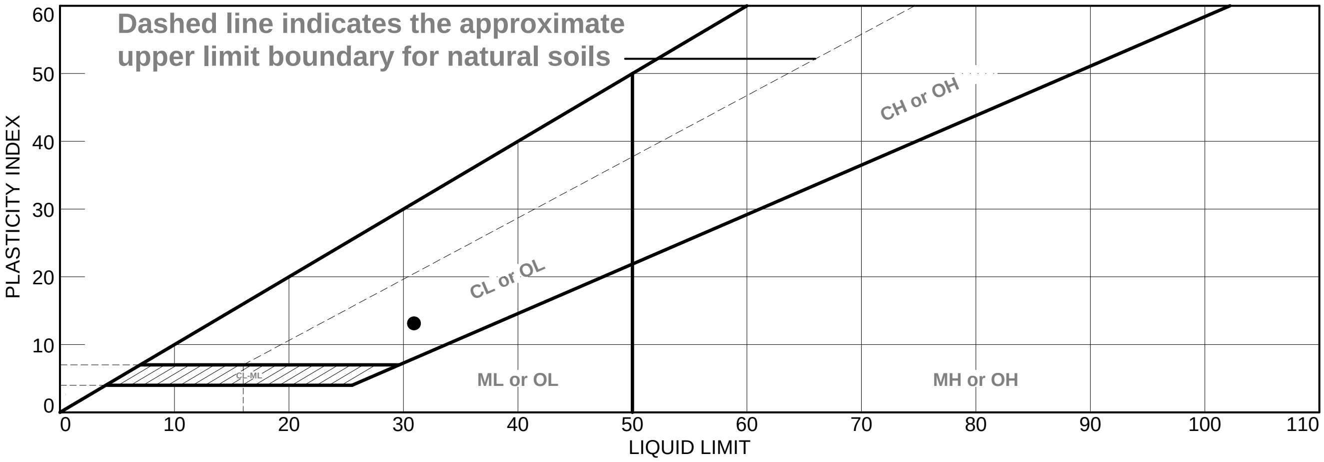
● **Source of Sample:** BH-139 **Depth:** 140 **Sample Number:** 54

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	31	18	13			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

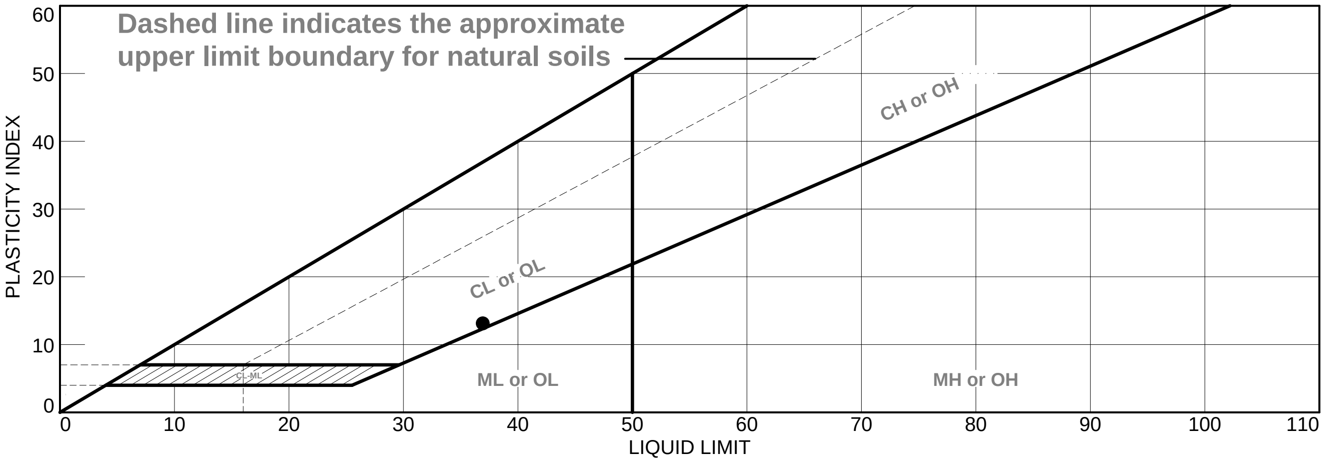
● **Source of Sample:** BH-140 **Depth:** 95 **Sample Number:** 19

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy clay	37	24	13			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

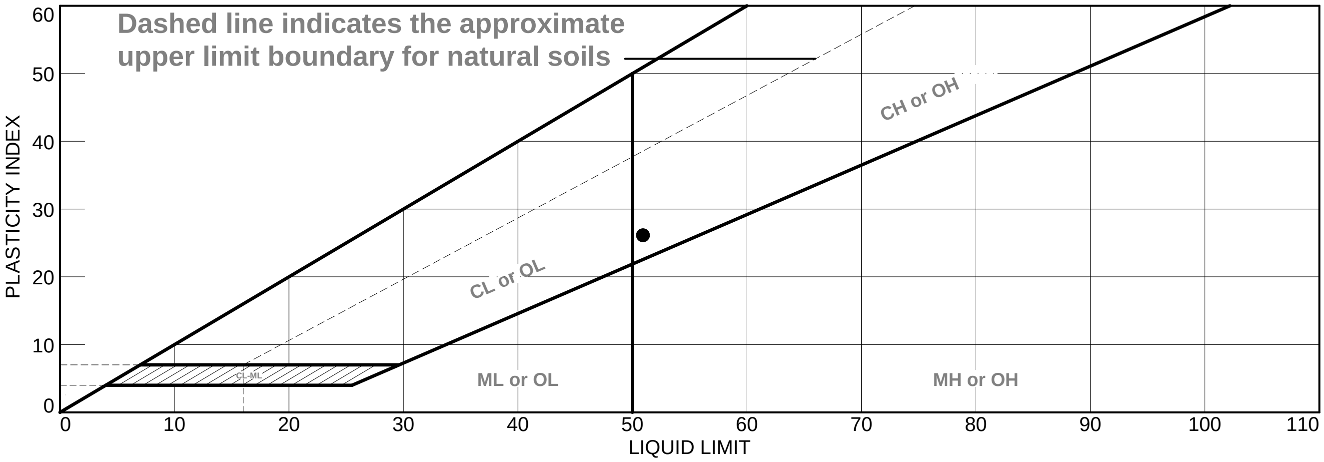
● **Source of Sample:** BH-140 **Depth:** 100 **Sample Number:** 20

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown clay	51	25	26			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

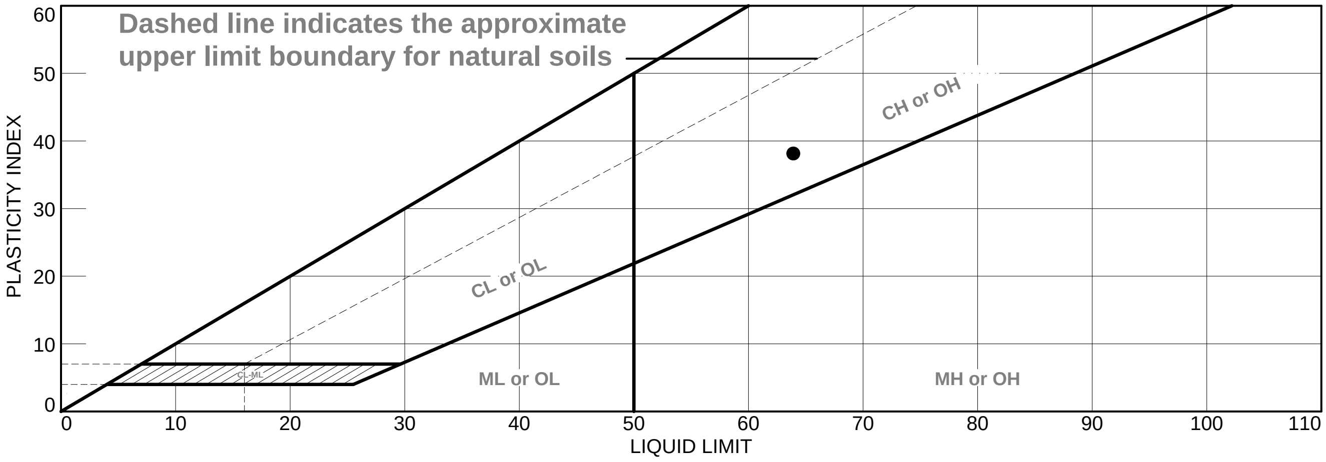
●**Source of Sample:** BH-140 **Depth:** 140 **Sample Number:** 28

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	64	26	38			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

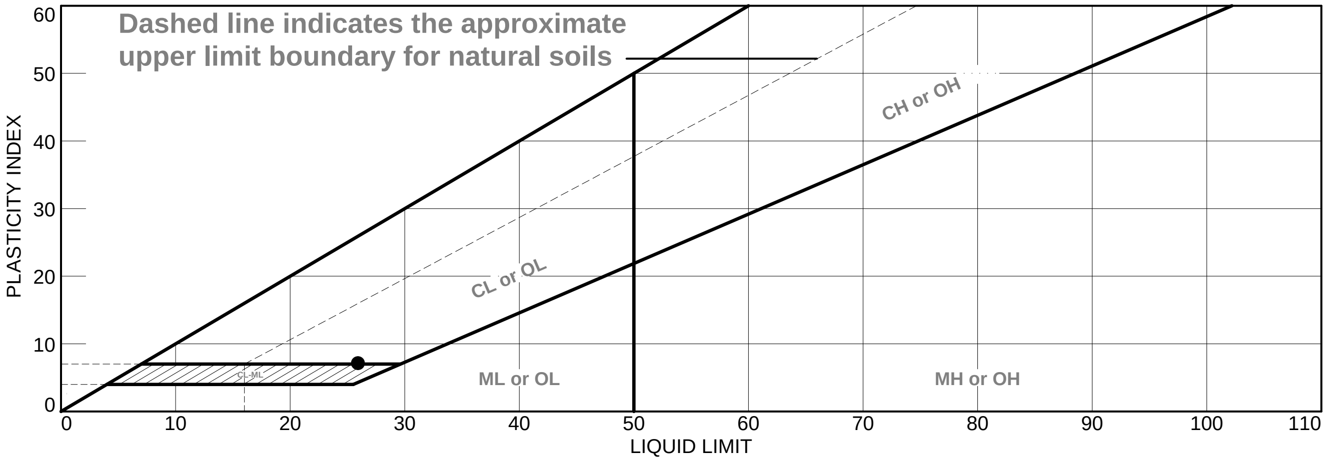
● **Source of Sample:** BH-141 **Depth:** 11 **Sample Number:** 3

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silty clay	26	19	7			ML-CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

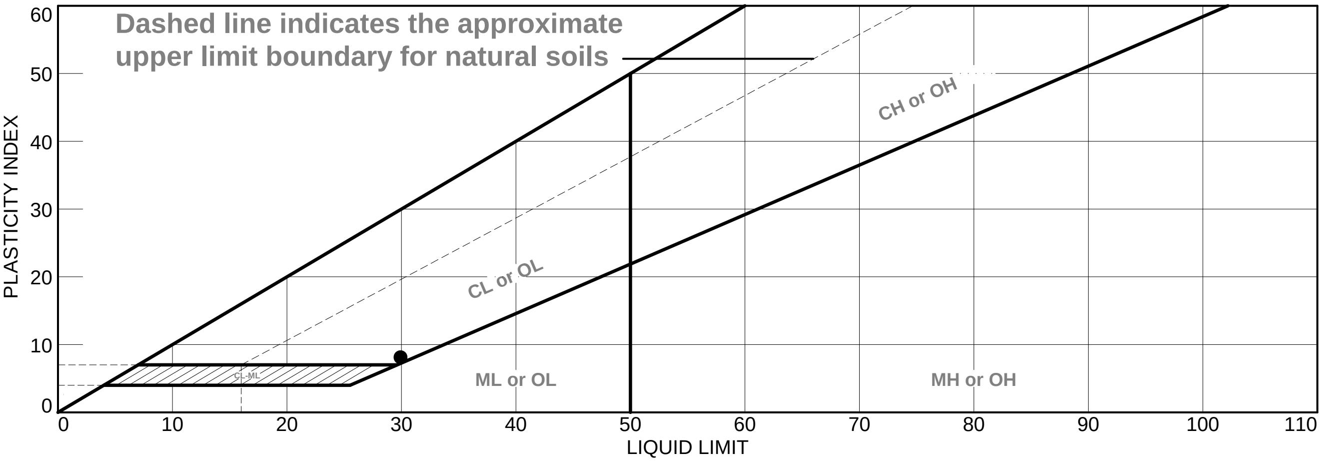
● **Source of Sample:** BH-141 **Depth:** 80 **Sample Number:** 17

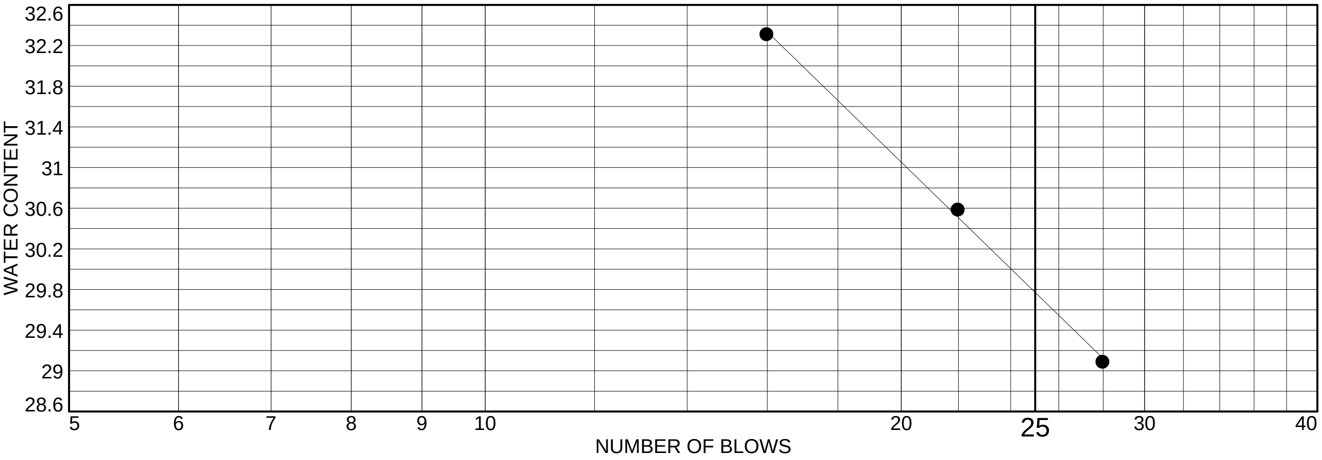
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clayey sand	30	22	8			SC

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

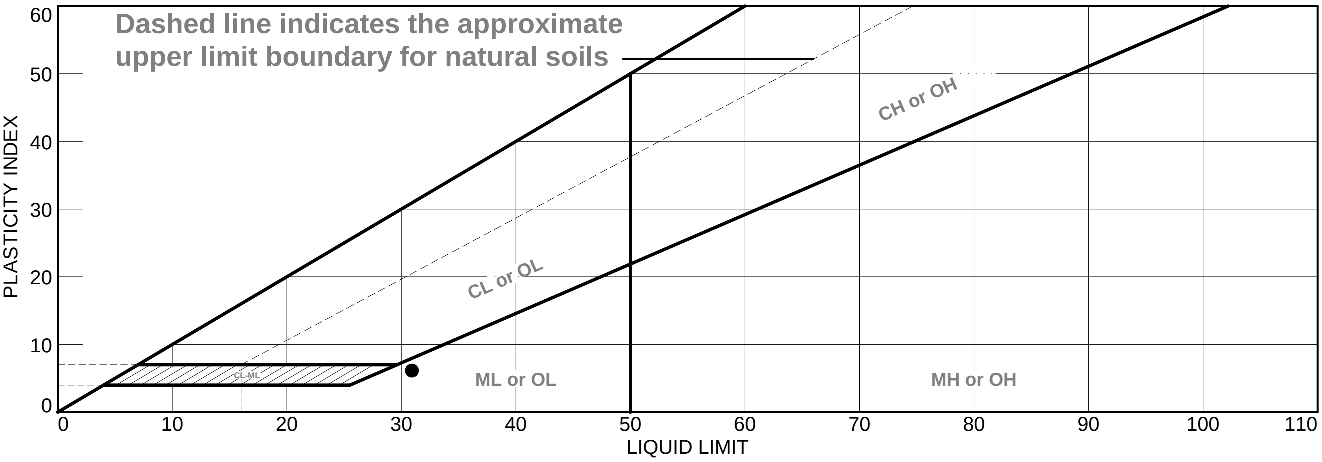
● **Source of Sample:** BH-141 **Depth:** 100 **Sample Number:** 21

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray sandy silt	31	25	6			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

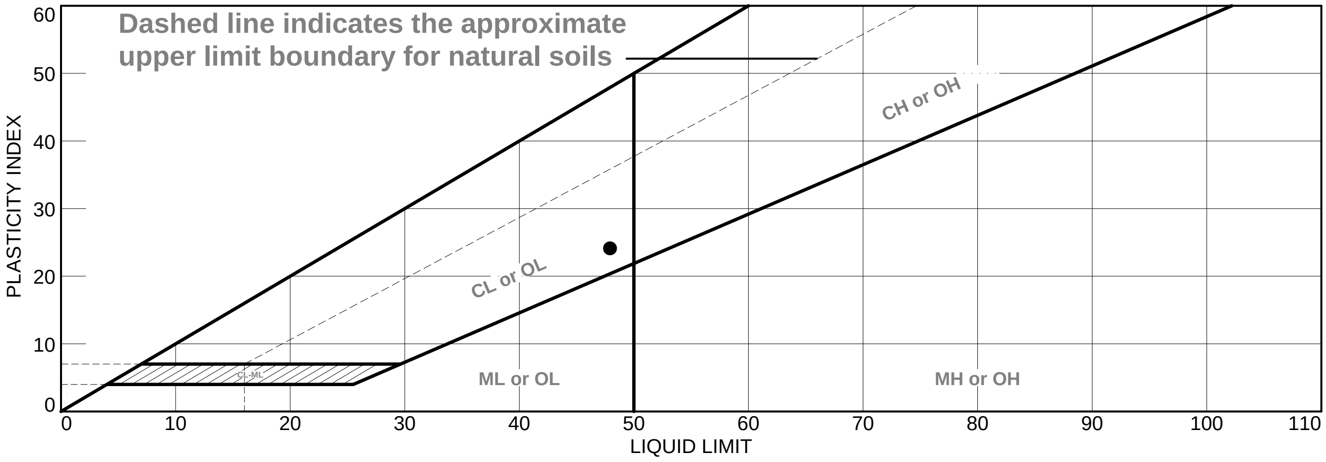
●**Source of Sample:** BH-150 **Depth:** 21 **Sample Number:** 4A

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	48	24	24			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

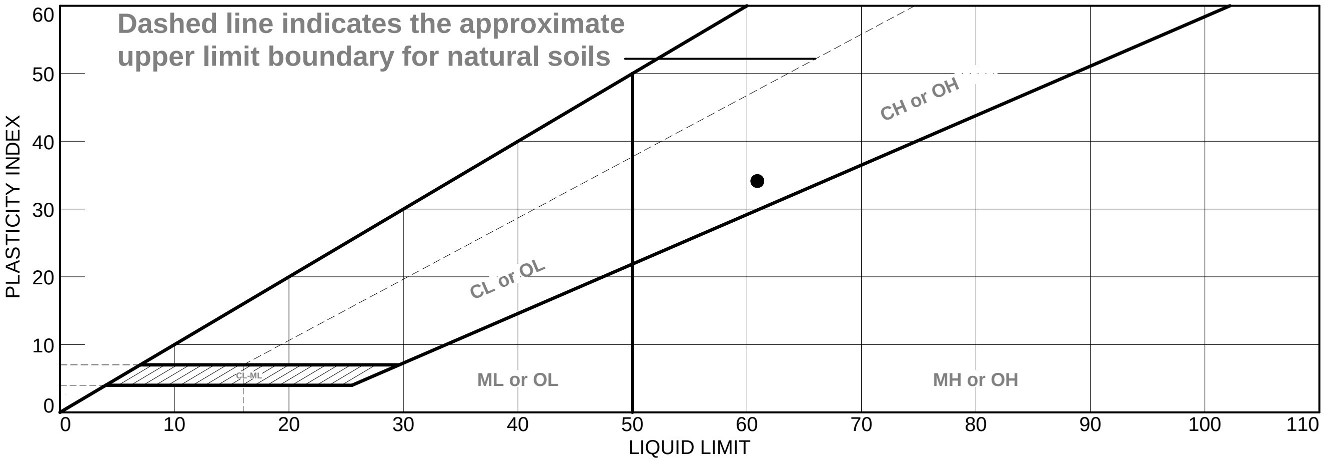
● **Source of Sample:** BH-150 **Depth:** 30 **Sample Number:** 5

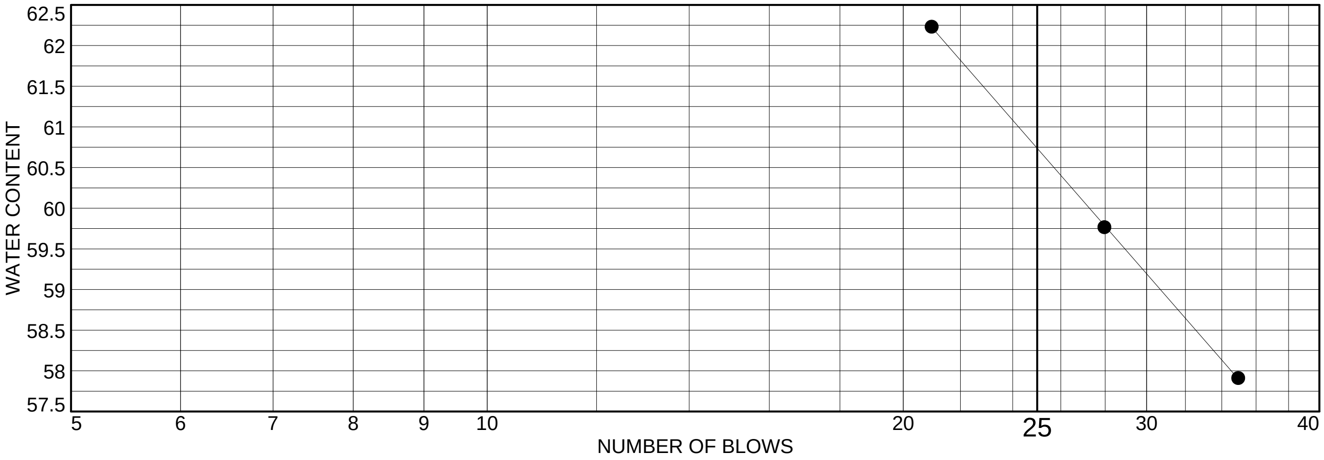
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay with organics	61	27	34			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

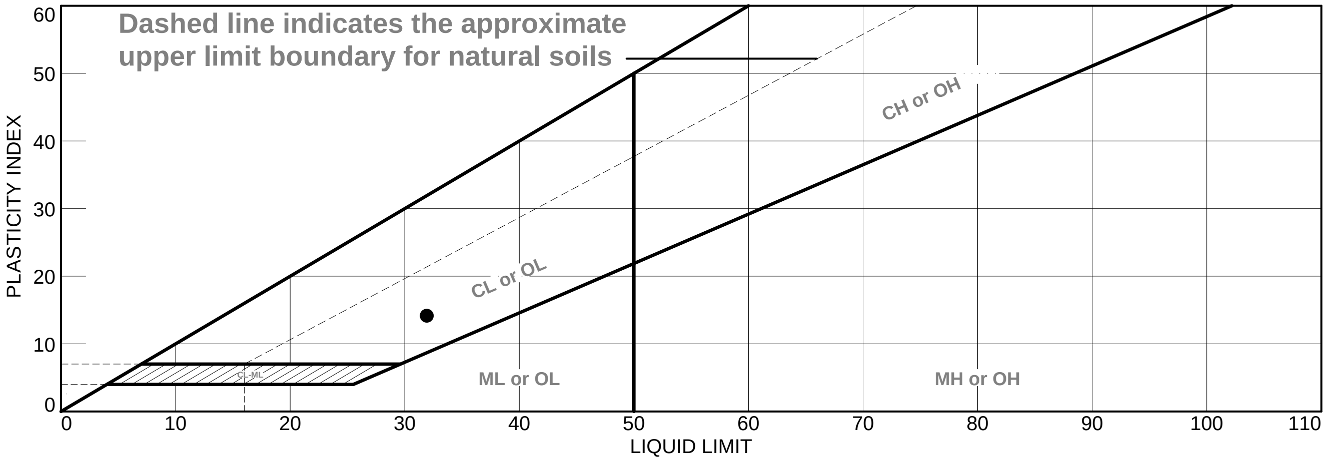
● **Source of Sample:** BH-150 **Depth:** 40 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	32	18	14	99	84	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

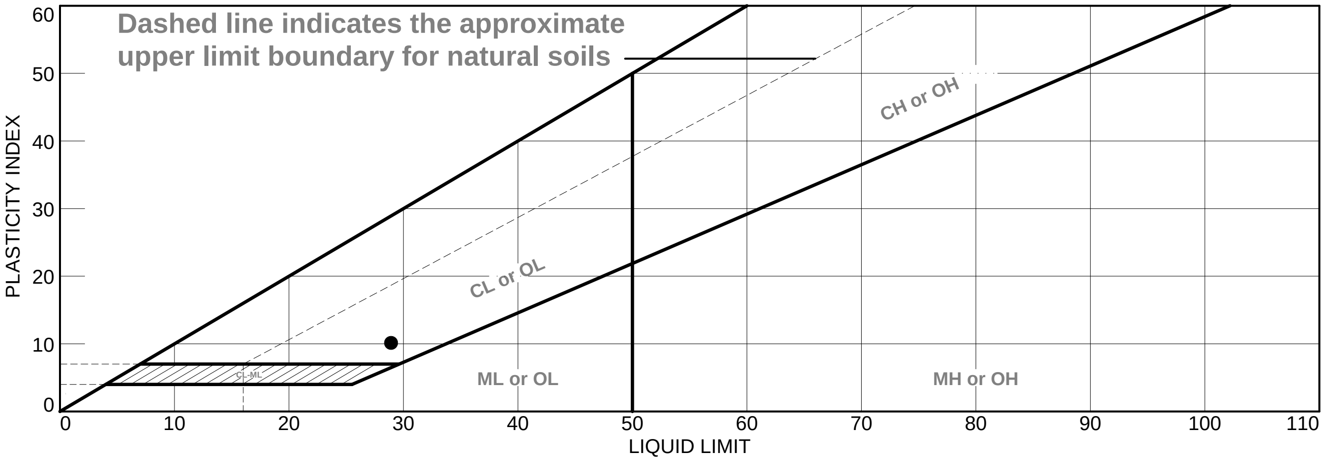
● **Source of Sample:** BH-150 **Depth:** 61 **Sample Number:** 8A

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	29	19	10	96	65	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

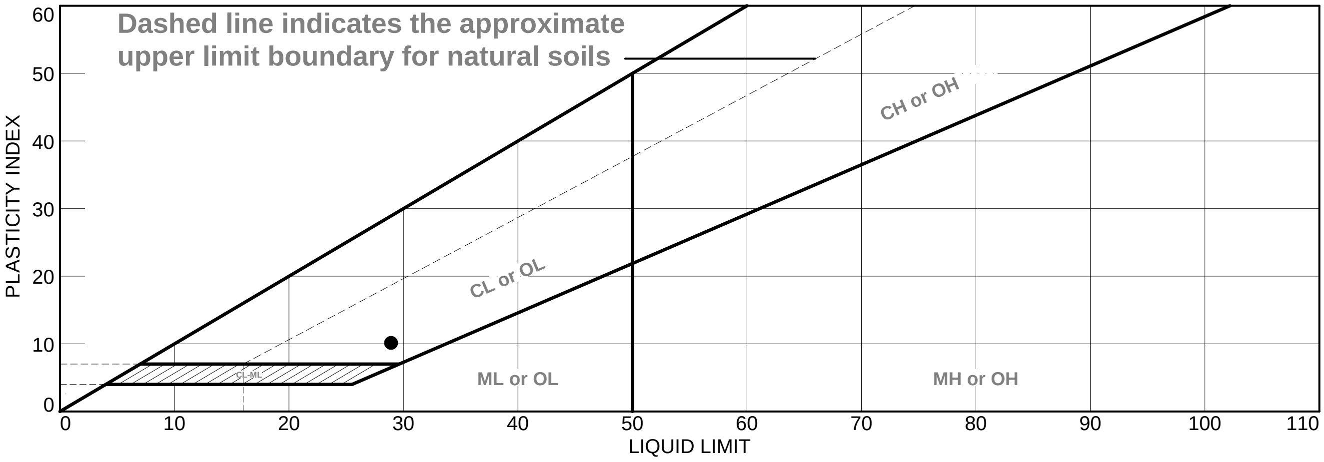
● **Source of Sample:** BH-150 **Depth:** 99 **Sample Number:** 22

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	29	19	10			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

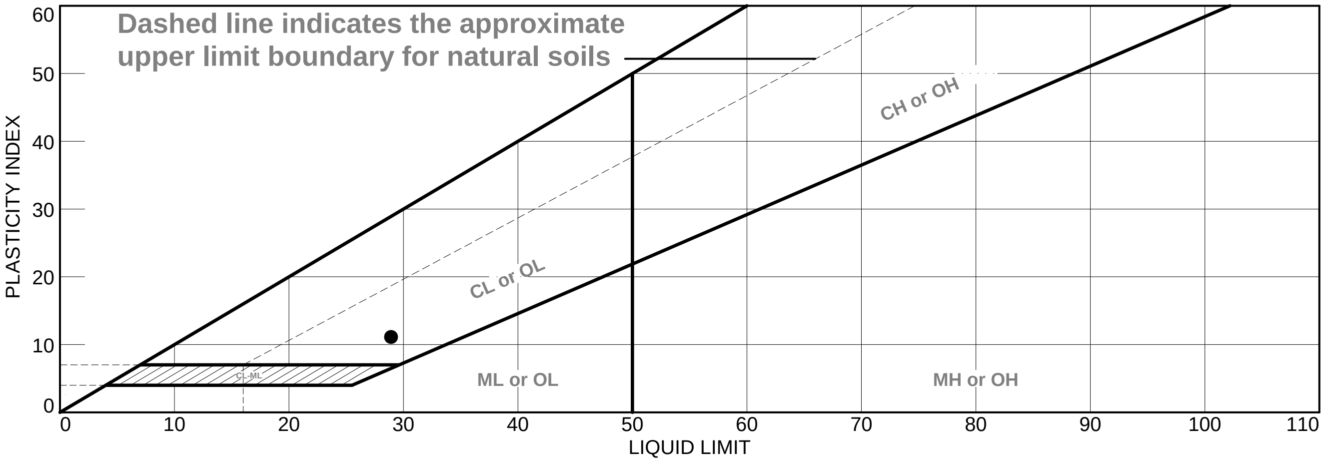
● **Source of Sample:** BH-150 **Depth:** 101.5 **Sample Number:** 23

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy clay	29	18	11			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

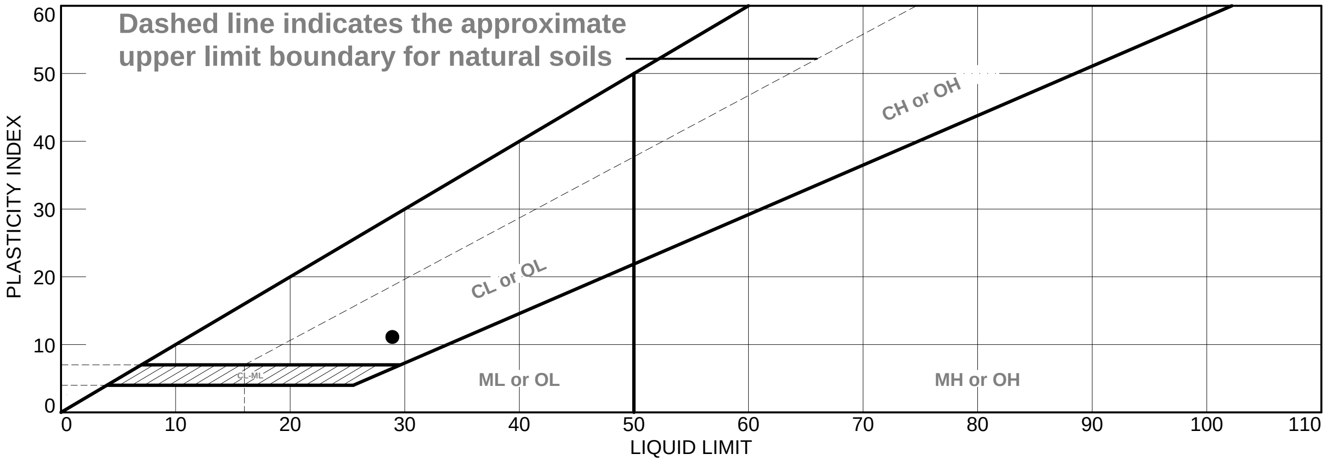
●**Source of Sample:** BH-150 **Depth:** 112 **Sample Number:** 28A

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	29	18	11	97	67	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

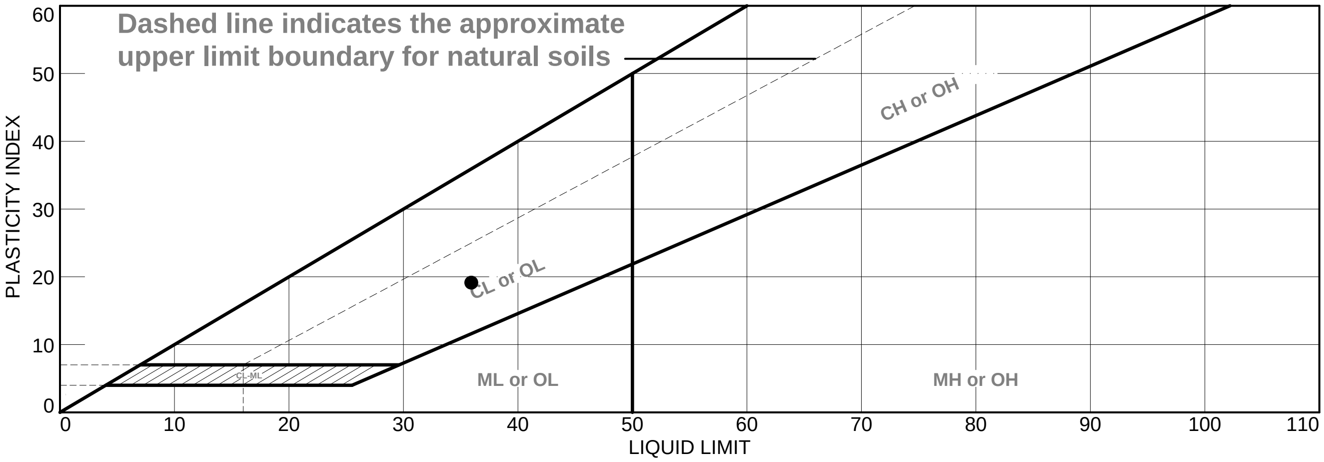
● **Source of Sample:** BH-150 **Depth:** 128.5 **Sample Number:** 41A

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	36	17	19			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

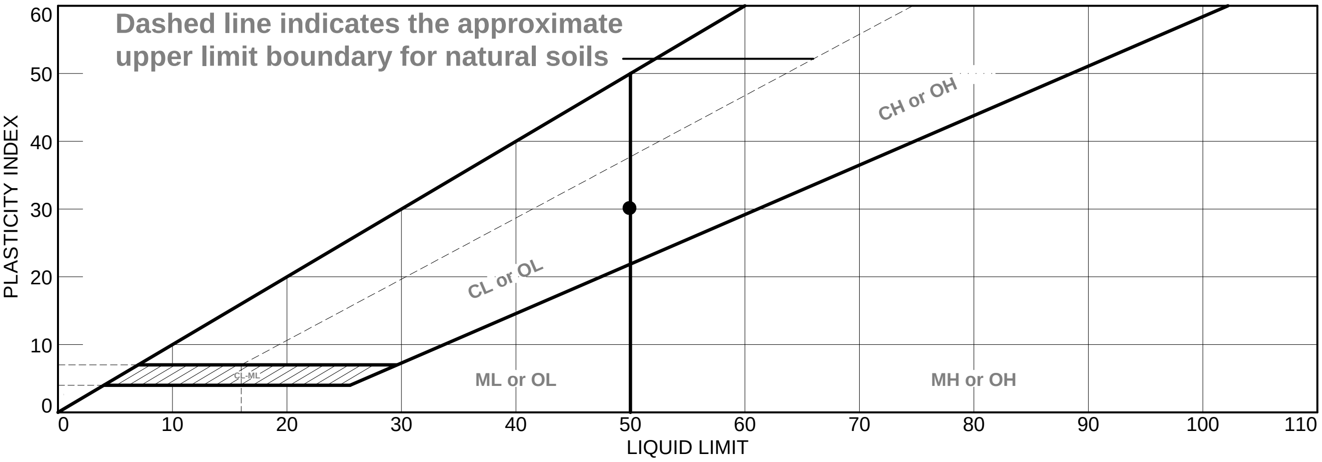
● **Source of Sample:** BH-150 **Depth:** 136.5 **Sample Number:** 45A

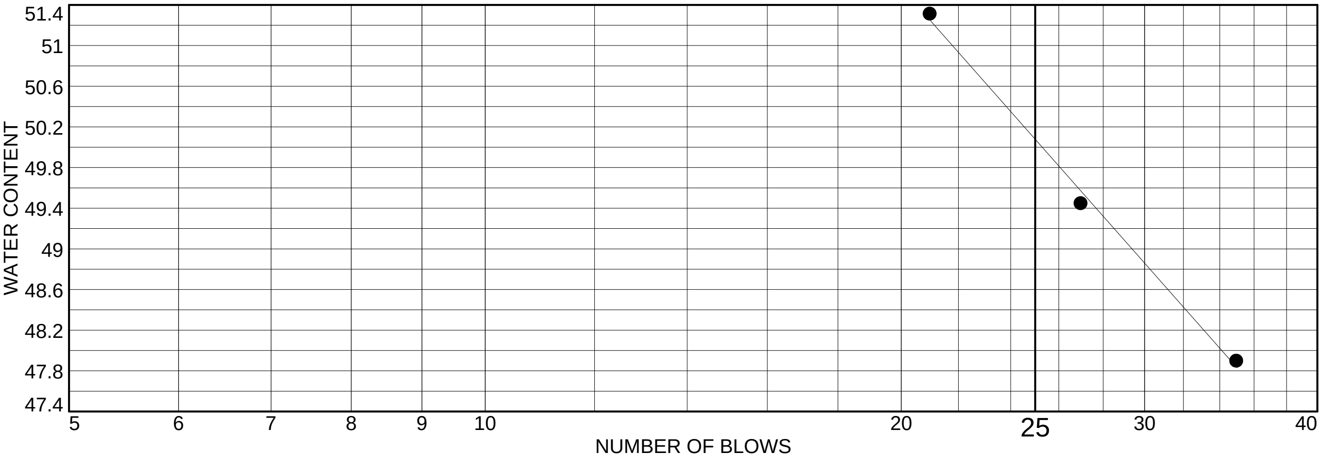
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	50	20	30			CL-CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

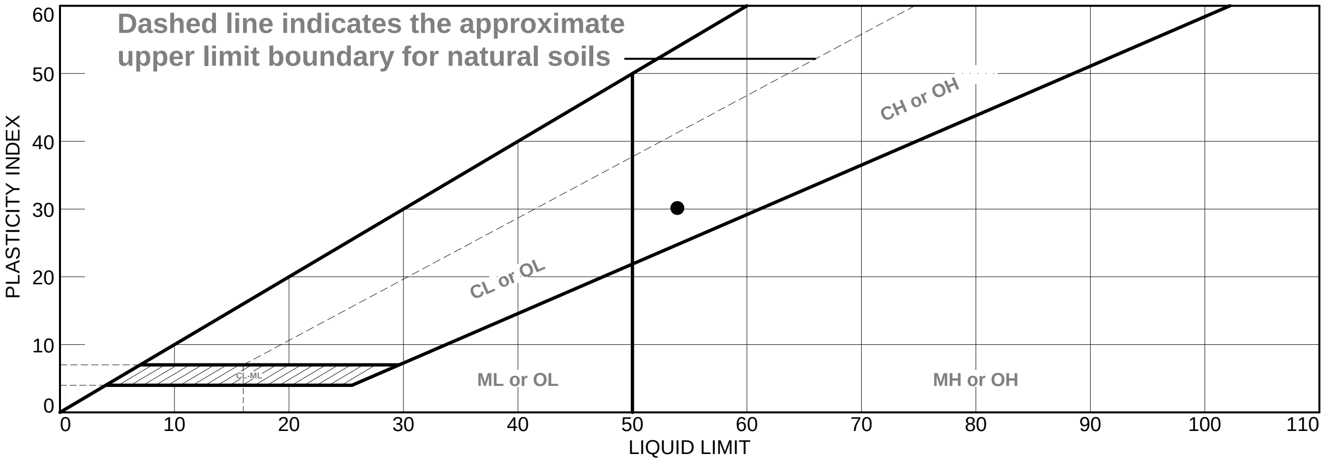
● **Source of Sample:** BH-150 **Depth:** 137 **Sample Number:** 46

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	54	24	30			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

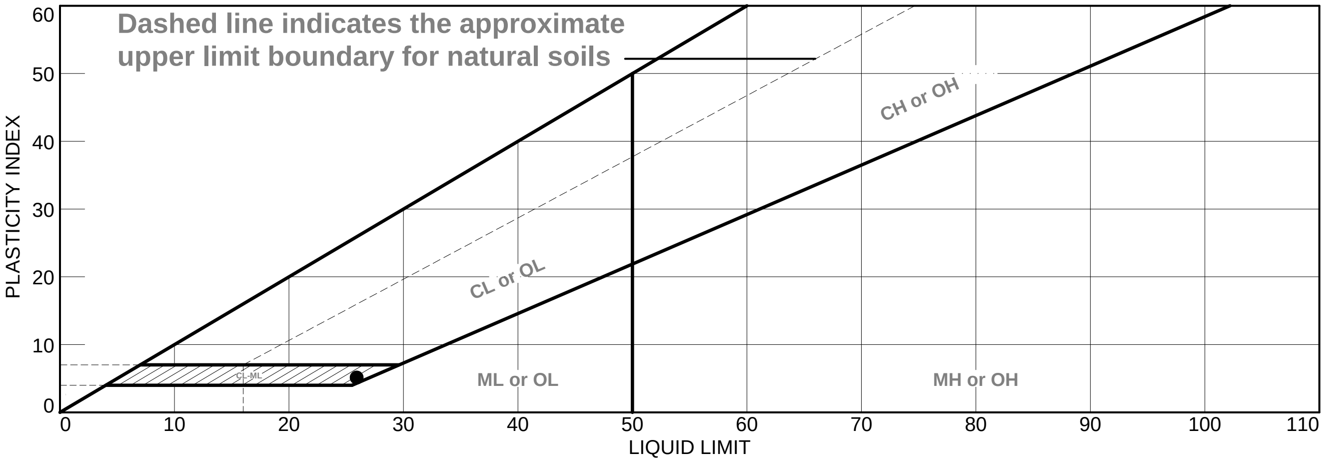
●**Source of Sample:** BH-150 **Depth:** 147.5 **Sample Number:** 48

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown silty, clayey sand	26	21	5	99	48	SC-SM

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

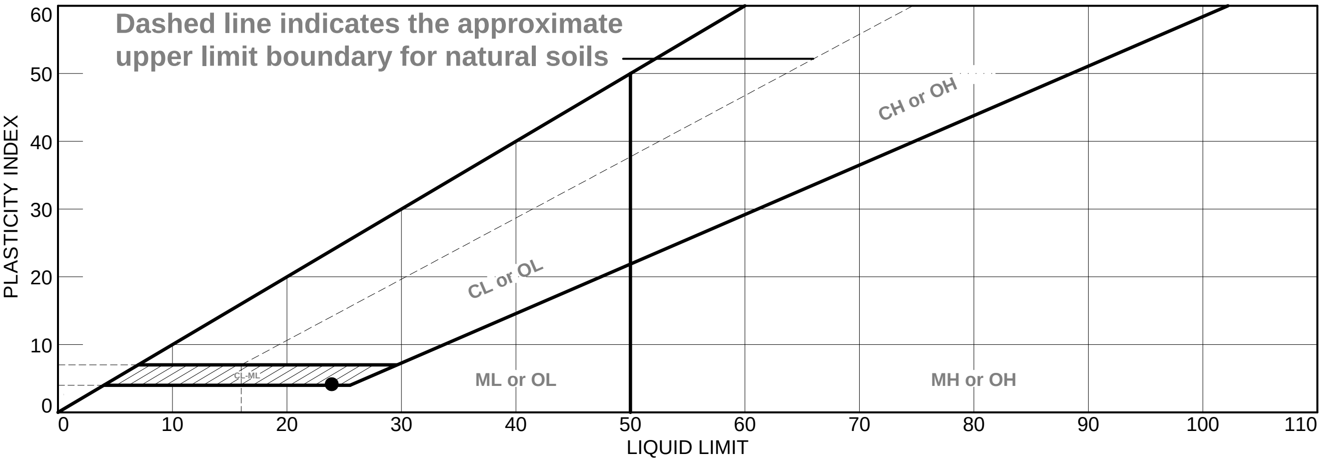
● **Source of Sample:** BH-150 **Depth:** 160 **Sample Number:** 51

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray silty, clayey sand	24	20	4	86	49	SC-SM

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

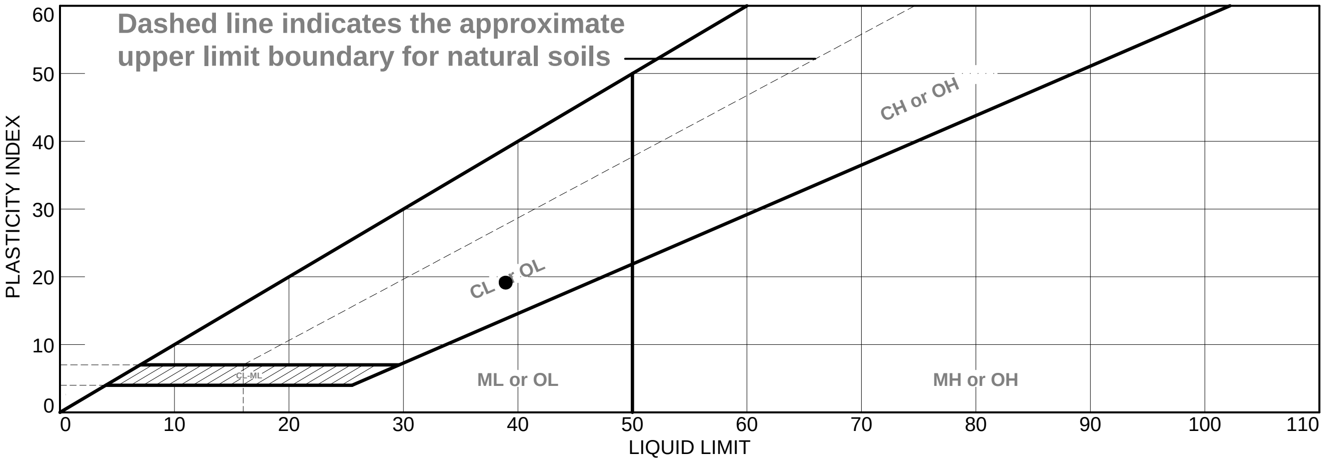
●**Source of Sample:** BH-151 **Depth:** 55 **Sample Number:** 1B

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	39	20	19			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

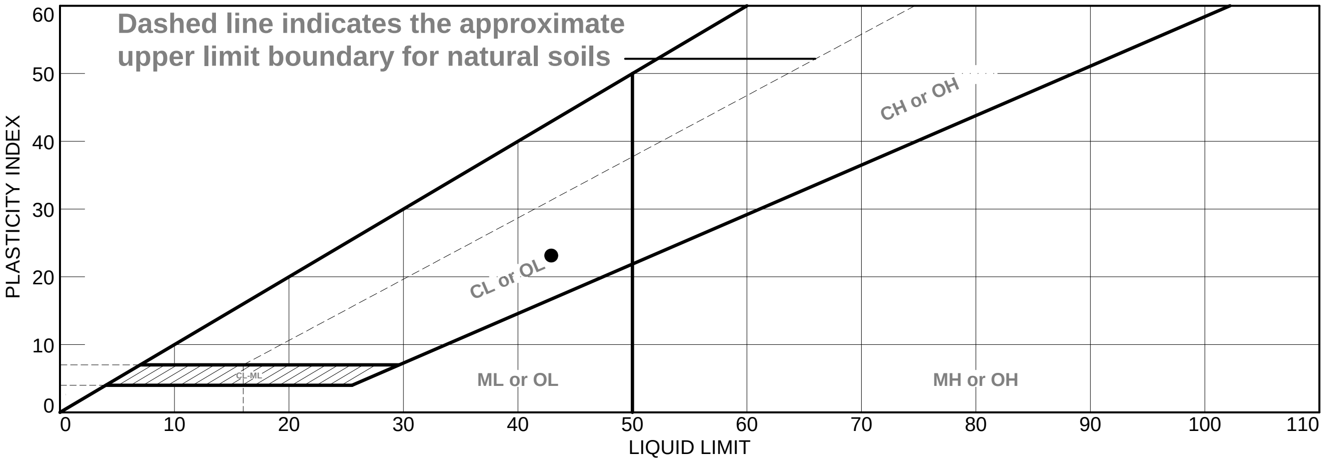
● **Source of Sample:** BH-151 **Depth:** 55.5 **Sample Number:** 2

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	43	20	23	99	81	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

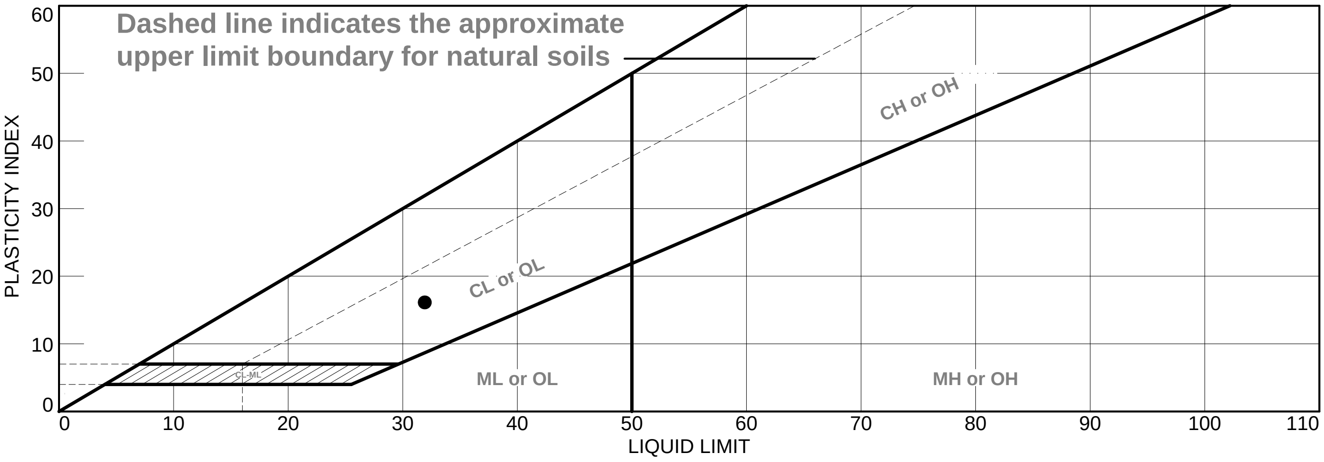
● **Source of Sample:** BH-151 **Depth:** 103 **Sample Number:** 18

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT


Dashed line indicates the approximate upper limit boundary for natural soils

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark greenish gray clay with sand	32	16	16	99	71	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

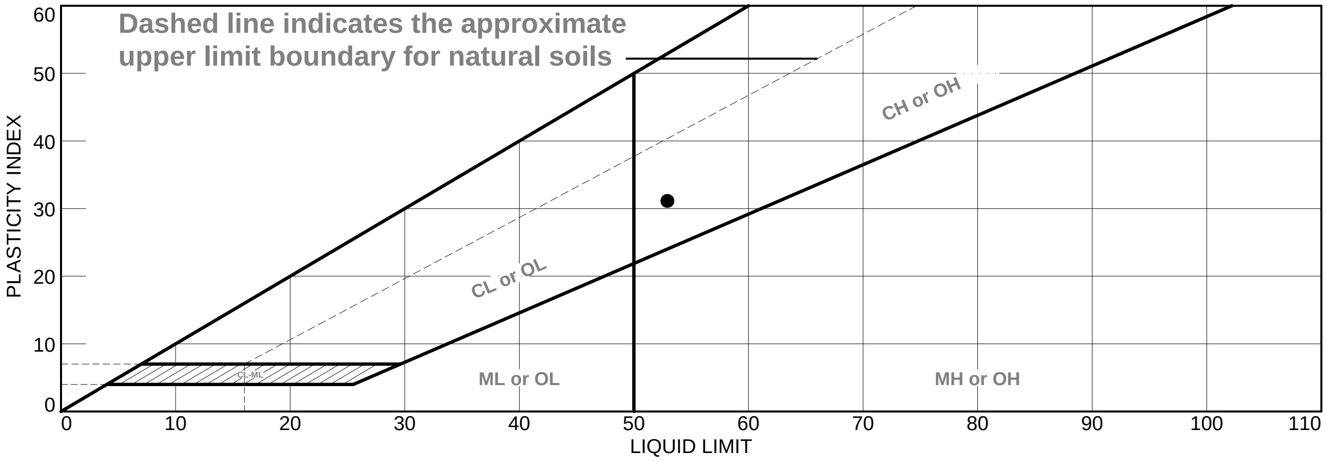
● **Source of Sample:** BH-151 **Depth:** 107 **Sample Number:** 20

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	53	22	31			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

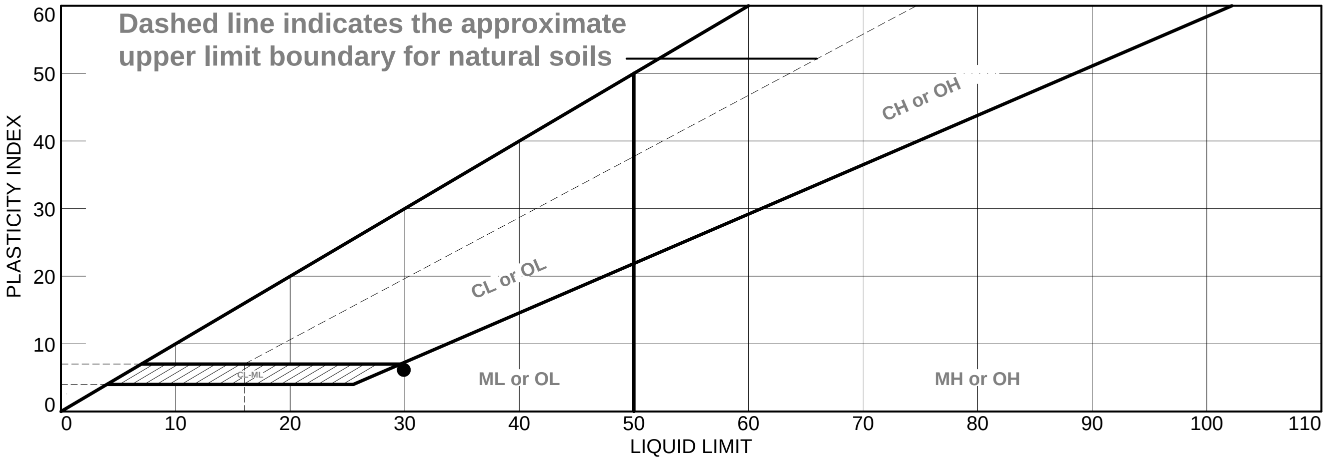
● **Source of Sample:** BH-151 **Depth:** 125 **Sample Number:** 30

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silt	30	24	6			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

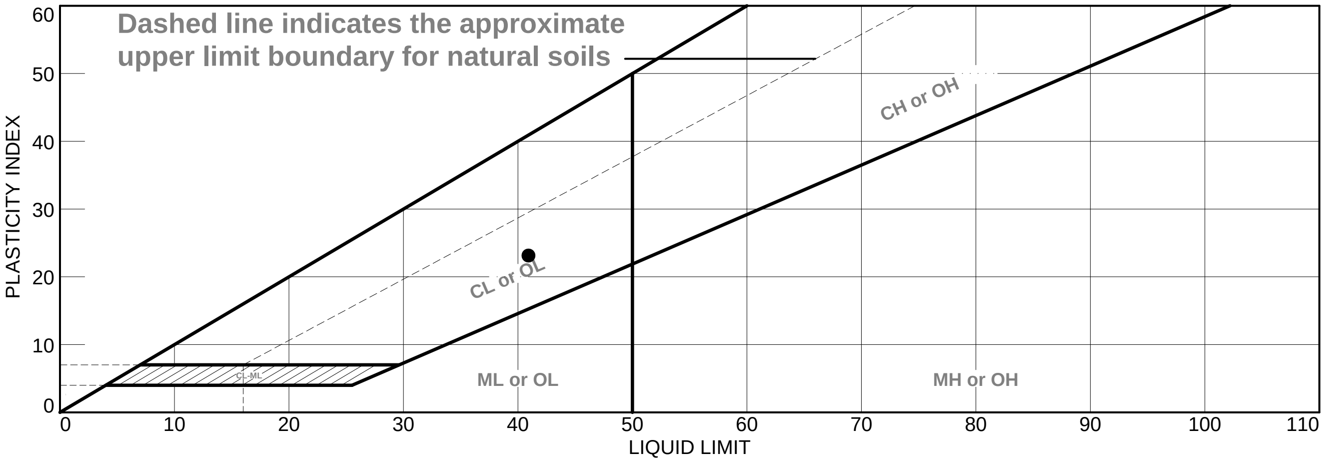
● **Source of Sample:** BH-151 **Depth:** 135 **Sample Number:** 33

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	41	18	23			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

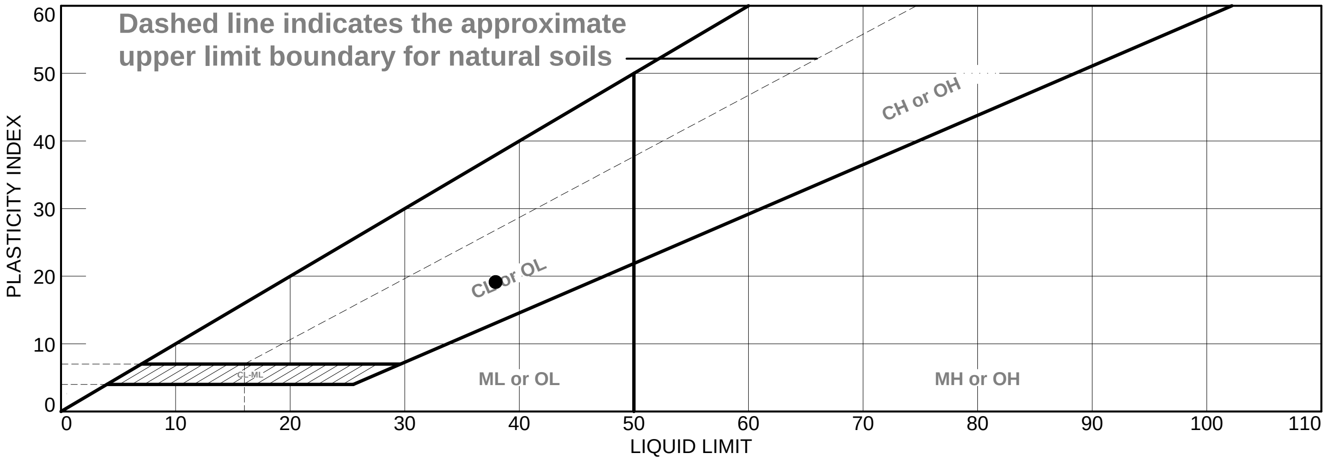
●**Source of Sample:** BH-151 **Depth:** 140.2 **Sample Number:** 34A

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	38	19	19			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

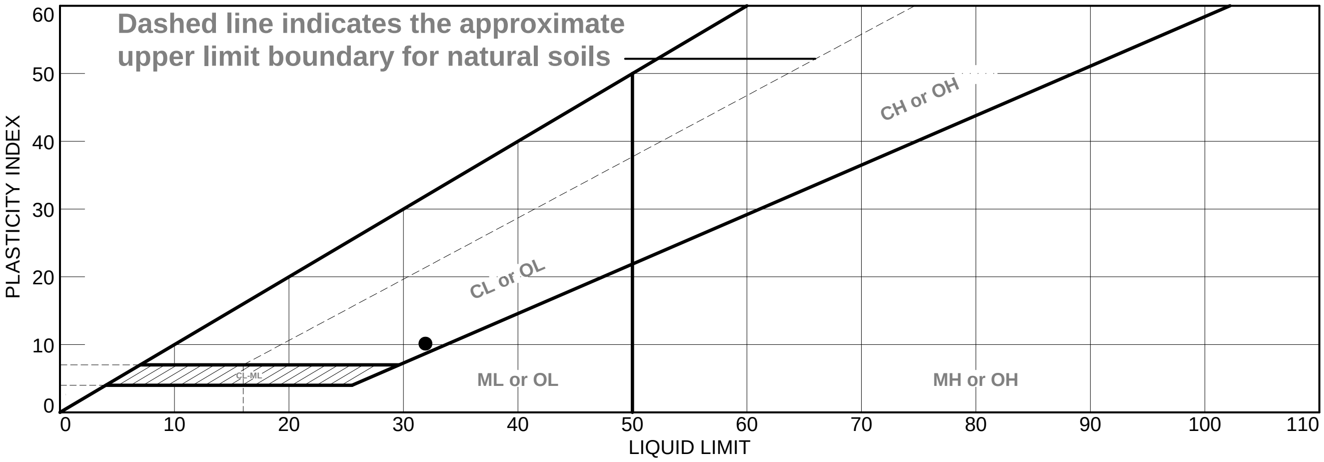
● **Source of Sample:** BH-151 **Depth:** 170.5 **Sample Number:** 37A

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	32	22	10			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

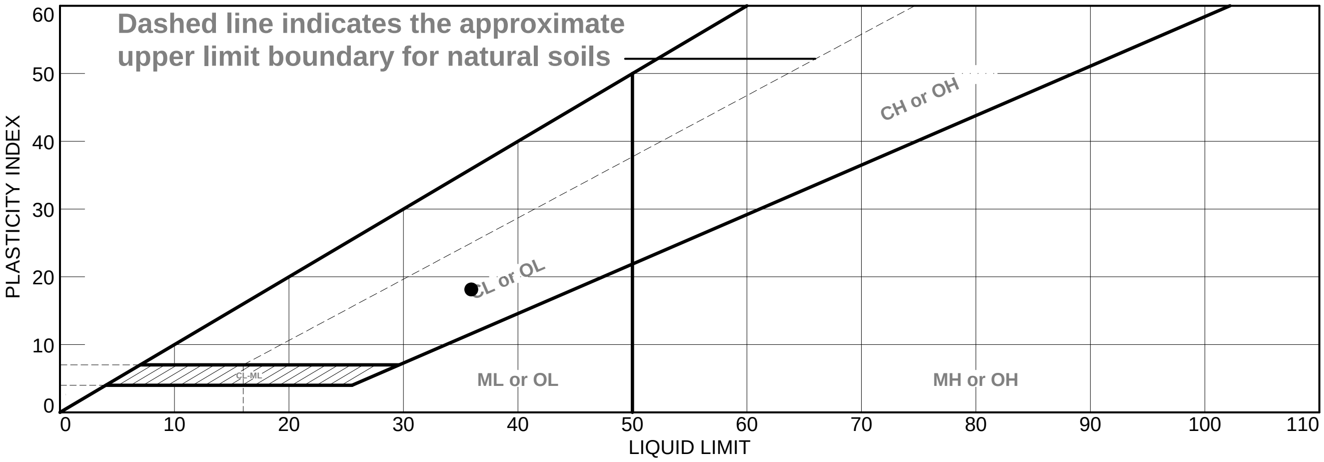
● **Source of Sample:** BH-152 **Depth:** 40 **Sample Number:** 5

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	36	18	18			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

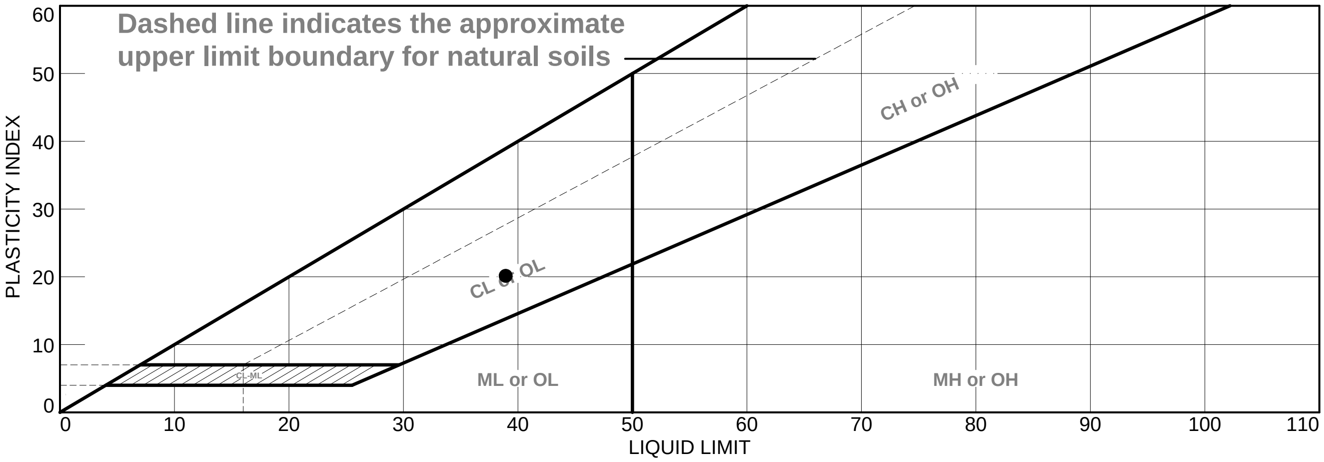
●**Source of Sample:** BH-152 **Depth:** 76.5 **Sample Number:** 13

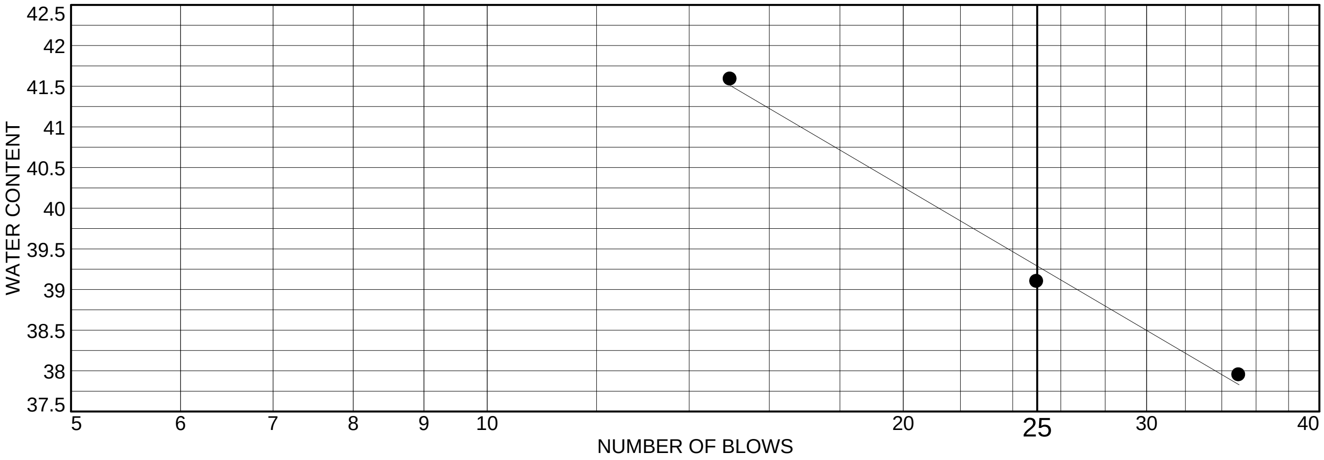
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	39	19	20			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-152 **Depth:** 135 **Sample Number:** 49

Remarks:

Figure

Tested By: JH **Checked By:** JH

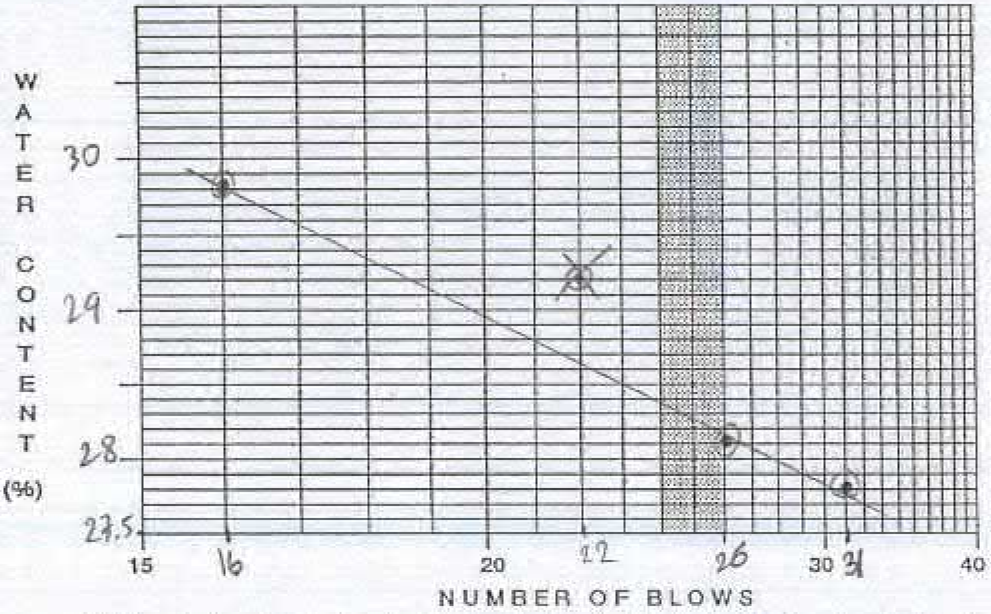
ATTERBERG LIMIT

ASTM D4318 or CAL 204

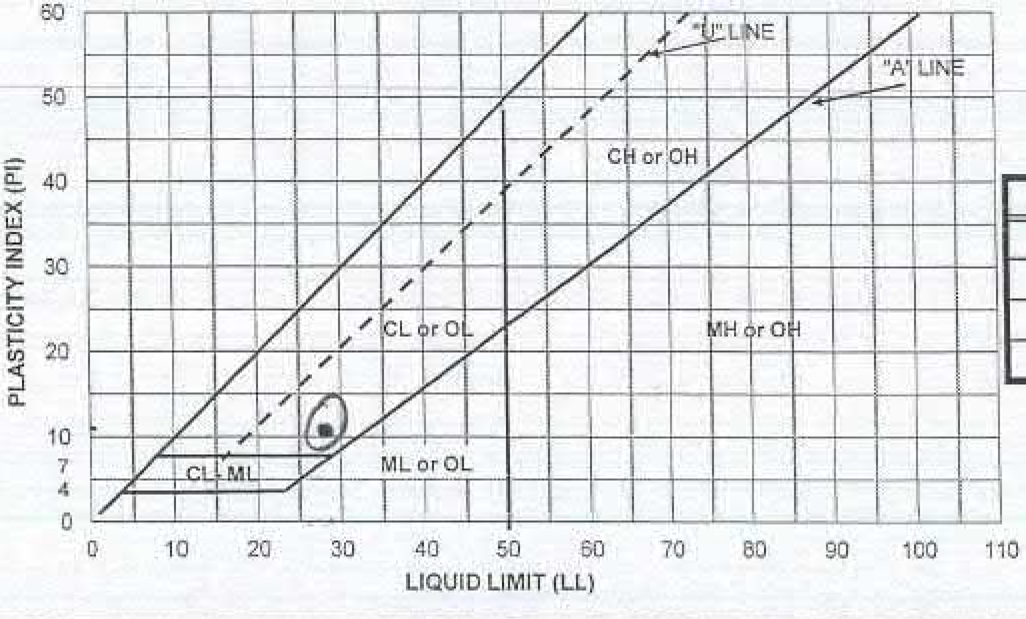
Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-T02
Sample #:	BH-152 #4 @ 32.4' Lab #: 6970	Date:	11/07/2019
Sample Description:	Sandy Lean CLAY, (CL), olive	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	26	~~22~~	16				
TARE NO.	V3	V21	~~A1~~	N7	V15	V18		
TARE + WET WT (gms)	34.06	33.92	~~34.55~~	37.66	18.37	19.0		
TARE + DRY WT (gms)	29.05	28.92	~~29.23~~	31.53	17.38	17.85		
TARE WT (gms)	11.05	11.14	~~11.01~~	10.94	11.07	11.05		
WT OF WATER (gms)	5.01	5	~~5.32~~	6.13	0.99	1.15		
DRY WT SOIL (gms)	18	17.38	~~18.22~~	20.59	6.31	6.8		
WATER CONTENT %	27.8	28.1	~~29.2~~	29.8	16	17		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	28
PL	17
PI	11
WC	22 %.

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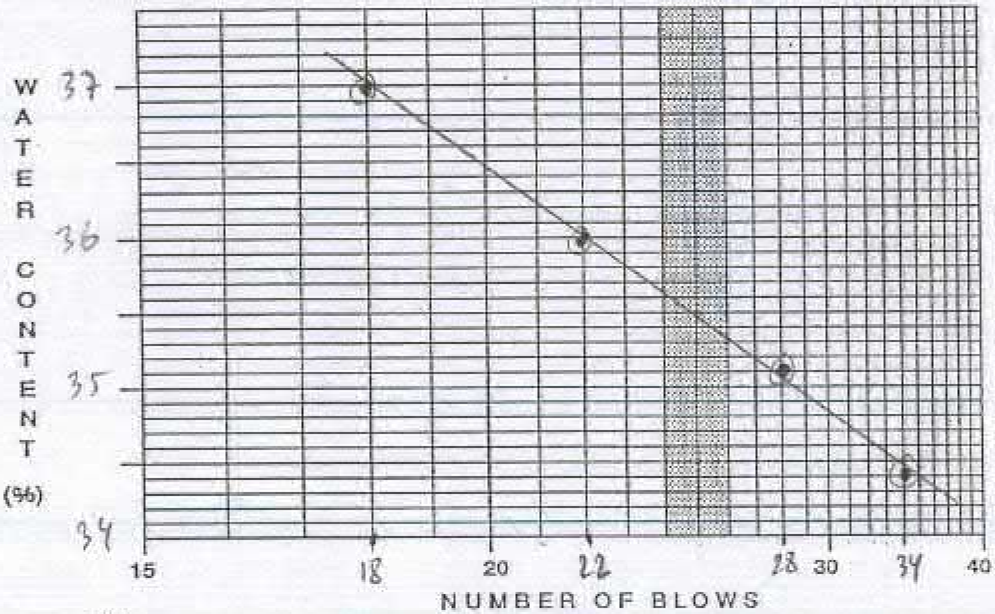
ATTERBERG LIMIT

ASTM D4318 or CAL 204

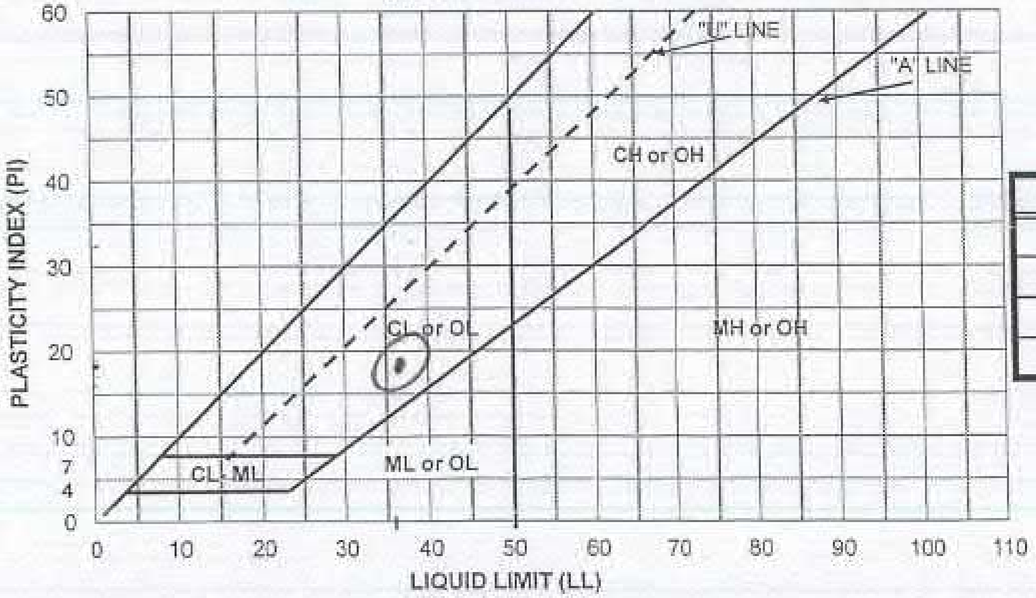
Project Name: BART TO SILICON VALLEY	Project #: 2019-131-T02
Sample #: BH-152 #7@ 60 Lab #: G970	Date: 11/06/2019
Sample Description: lean CLAY, (CL), light greenish gray	Tested By: D. NGUYEN

(TOP) Estimate of % sample retain on #40 Sieve ☐ gray

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	28	22	18				
TARE NO.	V10	V1	A11	V11	G3	V17		
TARE + WET WT (gms)	34.66	32.08	34.64	34.42	18.8	18.02		
TARE + DRY WT (gms)	28.60	26.59	28.38	28.04	17.5	17.04		
TARE WT (gms)	10.96	10.95	11.01	10.81	10.71	11.09		
WT OF WATER (gms)	6.06	5.49	6.26	6.38	1.3	0.98		
DRY WT SOIL (gms)	17.64	15.64	17.37	17.23	6.79	5.95		
WATER CONTENT %	34.4%	35.1%	36.0%	37.0%	19%	17%		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	35
PL	18
PI	17
WC	16 %

PARIKH CONSULTANTS, INC.

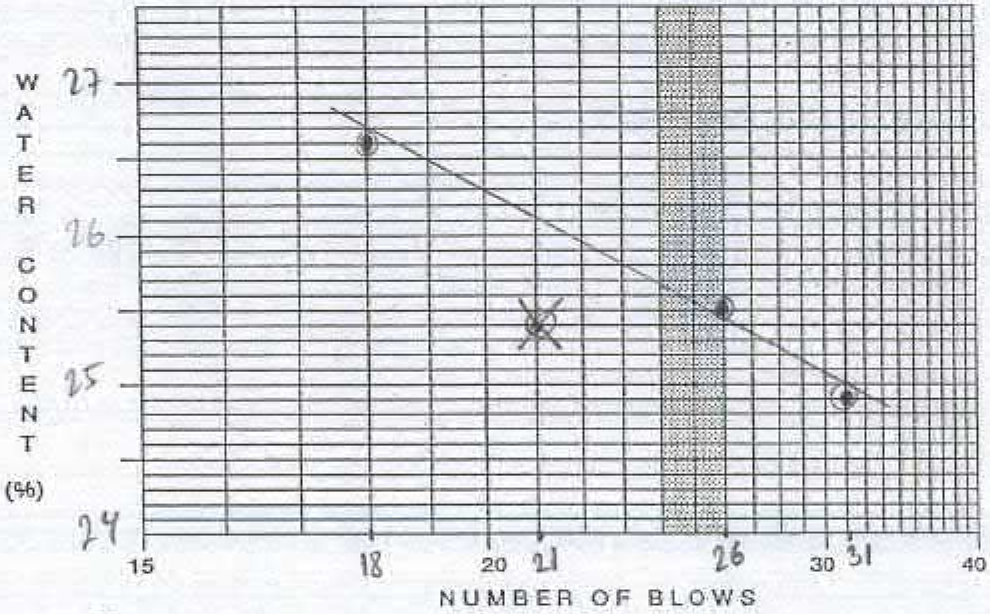
ATTERBERG LIMIT

ASTM D4318 or CAL 204

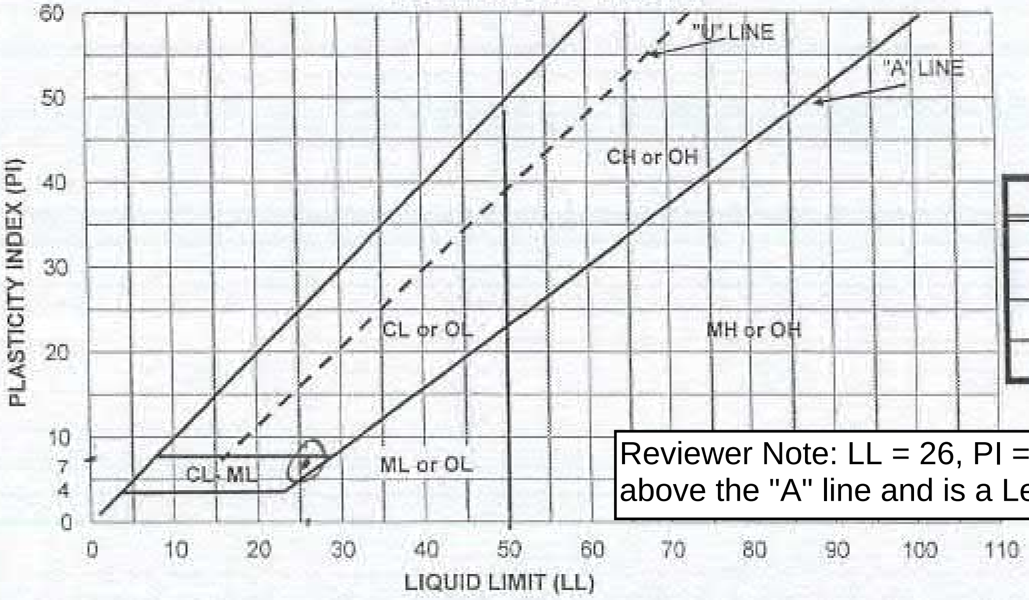
Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-T02
Sample #:	BH-152 #16 @ 82' Lab #: 6970	Date:	11/07/2019
Sample Description:	Sandy SILT (ML), Dark gray	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	26	~~21~~	18	▨	▨	▨	▨
TARE NO.	G5	V23	~~V4~~	M1	A2	G4		
TARE + WET WT (gms)	36.43	34.52	~~34.70~~	37.32	18.87	19.06		
TARE + DRY WT (gms)	31.40	29.73	~~29.91~~	31.80	17.70	17.76		
TARE WT (gms)	11.21	10.97	~~11.08~~	11.05	11.08	10.67		
WT OF WATER (gms)	5.03	4.79	~~4.79~~	5.52	1.17	1.3		
DRY WT SOIL (gms)	20.19	18.76	~~18.83~~	20.75	6.62	7.09		
WATER CONTENT %	24.9	25.5	~~25.4~~	26.6	18	18		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	26
PL	18
PI	8
WC	22 %

Reviewer Note: LL = 26, PI = 8 plots above the "A" line and is a Lean Clay (CL).

ATTERBERG LIMIT

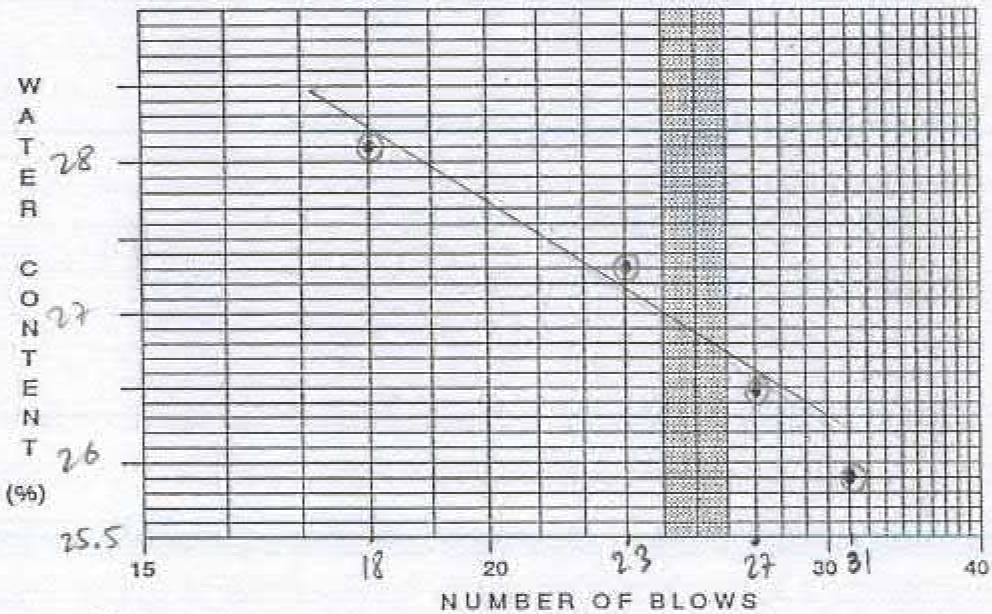
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-T02
Sample #: BH-152 #42 @ 119.1' Lab #: G970
Date: 11/07/2019
Sample Description: lean CLAY, (CL), Dark greenish gray
Tested By: D. NGUYEN

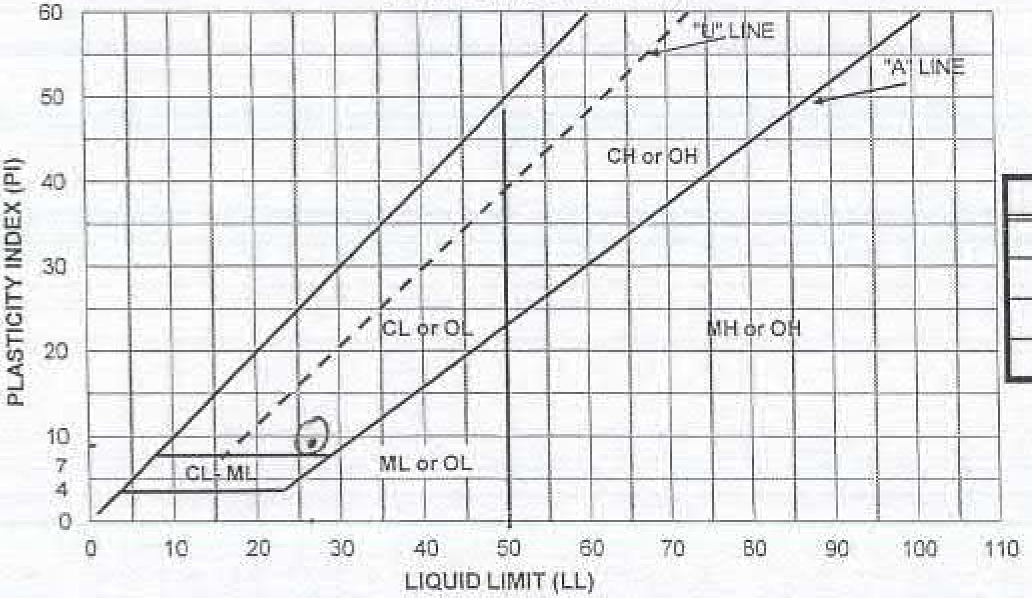
Estimate of % sample retain on #40 Sieve ☐

G131

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	27	23	18				
TARE NO.	V1	A11	V10	G3	V11	V17		
TARE + WET WT (gms)	33.43	35.53	34.15	37.10	19.53	19.53		
TARE + DRY WT (gms)	28.80	30.39	29.18	31.31	18.19	18.26		
TARE WT (gms)	10.95	11.01	10.96	10.70	10.81	11.08		
WT OF WATER (gms)	4.63	5.14	4.97	5.79	1.34	1.27		
DRY WT SOIL (gms)	17.85	19.38	18.22	20.61	7.38	7.18		
WATER CONTENT %	25.9	26.5	27.3	28.1	18	18		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	27
PL	18
PI	9
WC	20%

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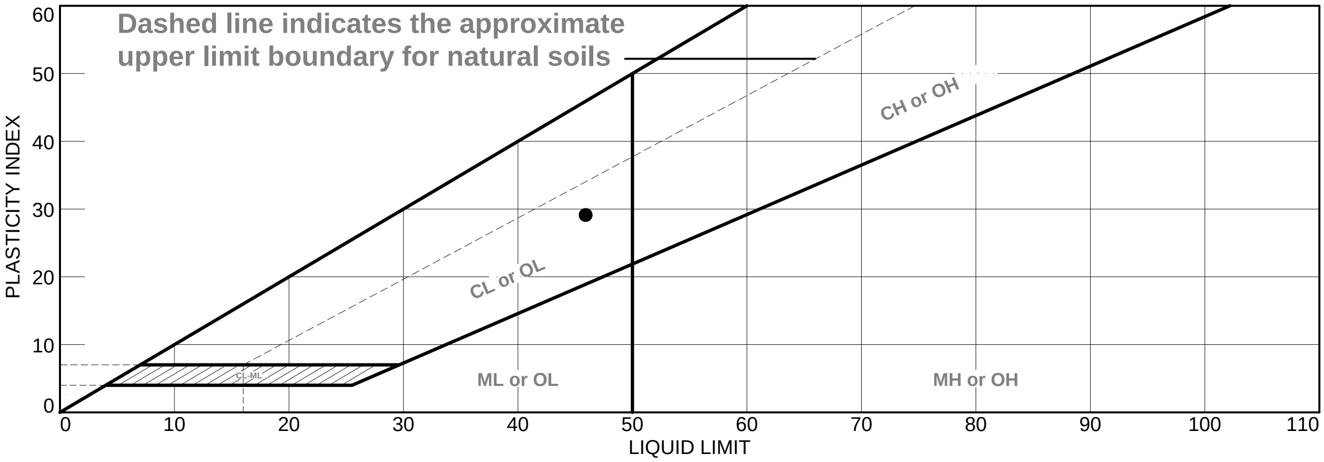
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	46	17	29			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

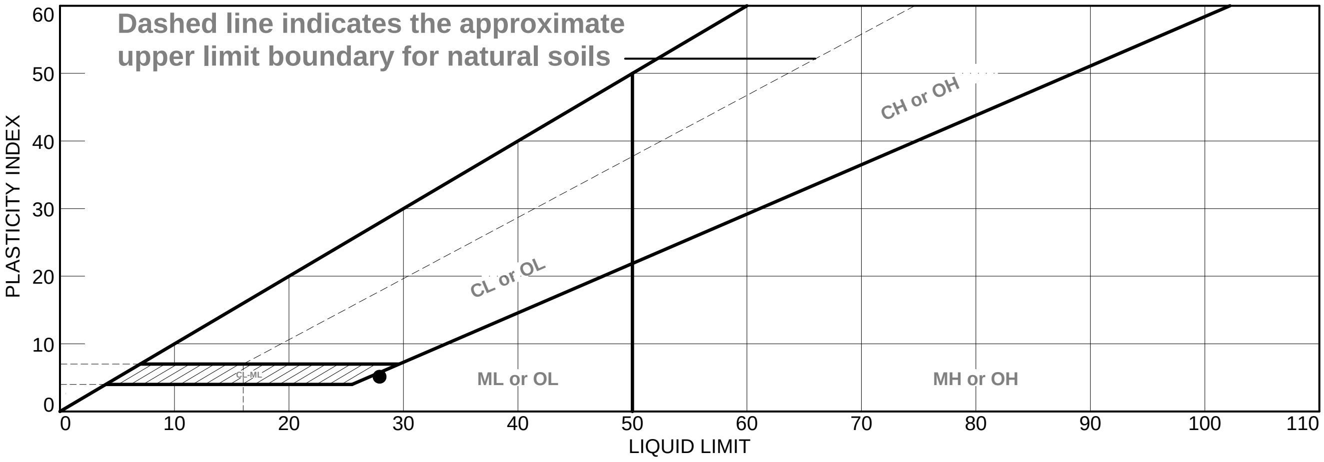
●**Source of Sample:** BH-153 **Depth:** 30 **Sample Number:** 4

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silt	28	23	5			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

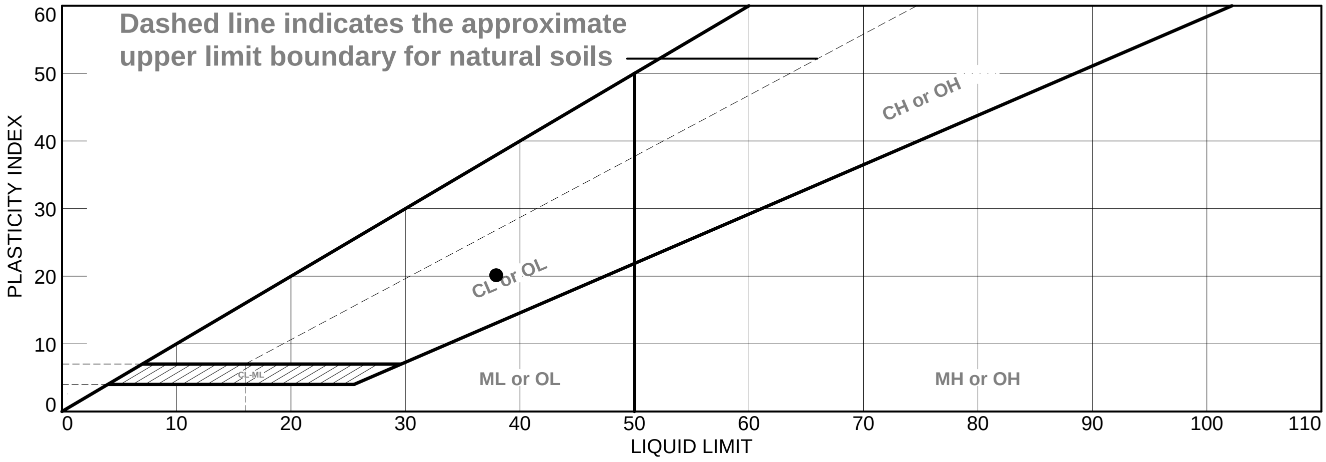
●**Source of Sample:** BH-153 **Depth:** 50.5 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	38	18	20			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

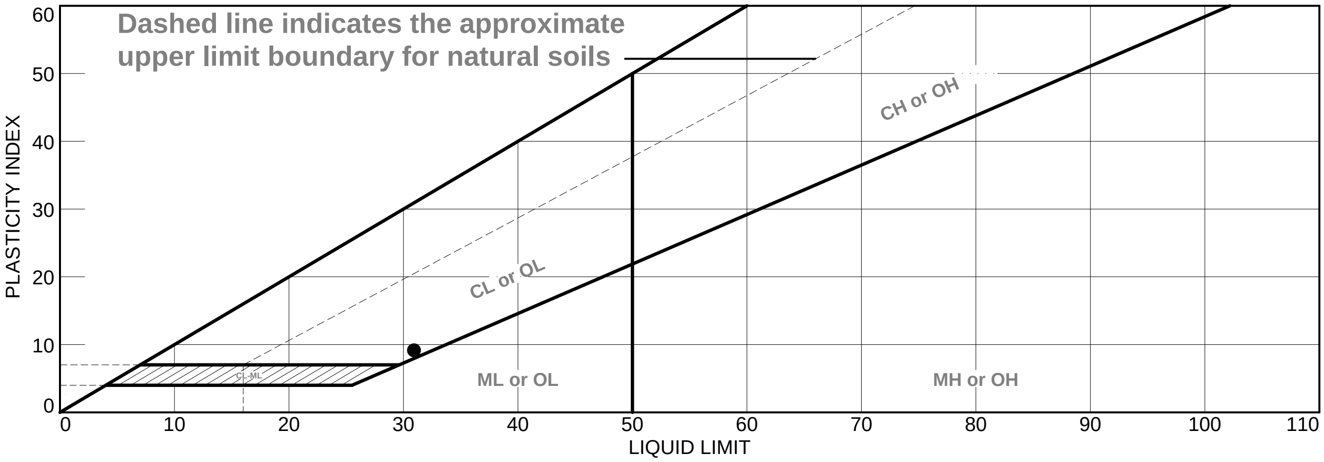
● **Source of Sample:** BH-153 **Depth:** 75 **Sample Number:** 14

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	31	22	9			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

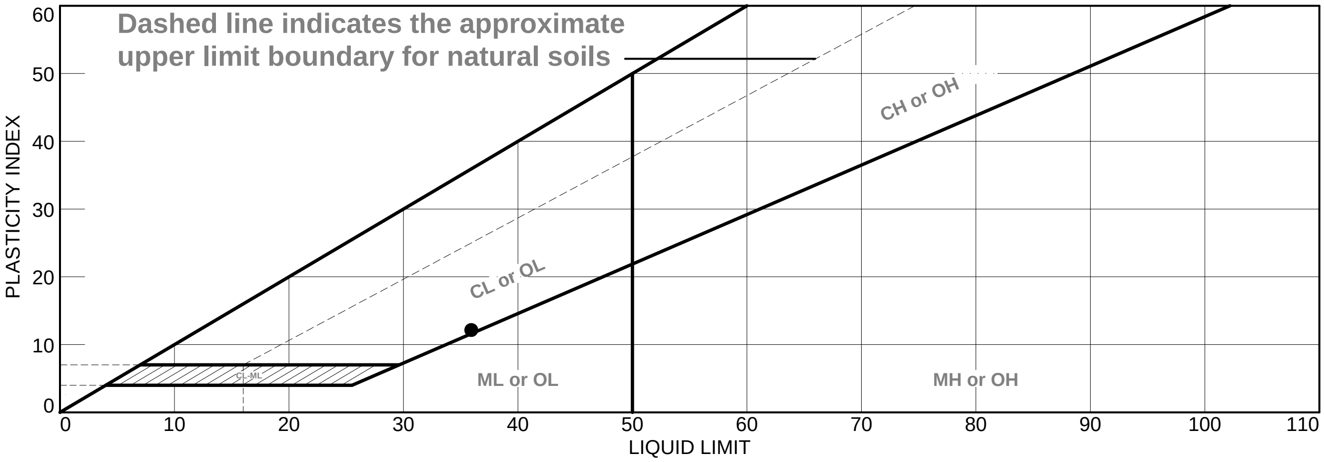
● **Source of Sample:** BH-153 **Depth:** 82 **Sample Number:** 18

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clayey sand	36	24	12			SC

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-153 **Depth:** 140 **Sample Number:** 50

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

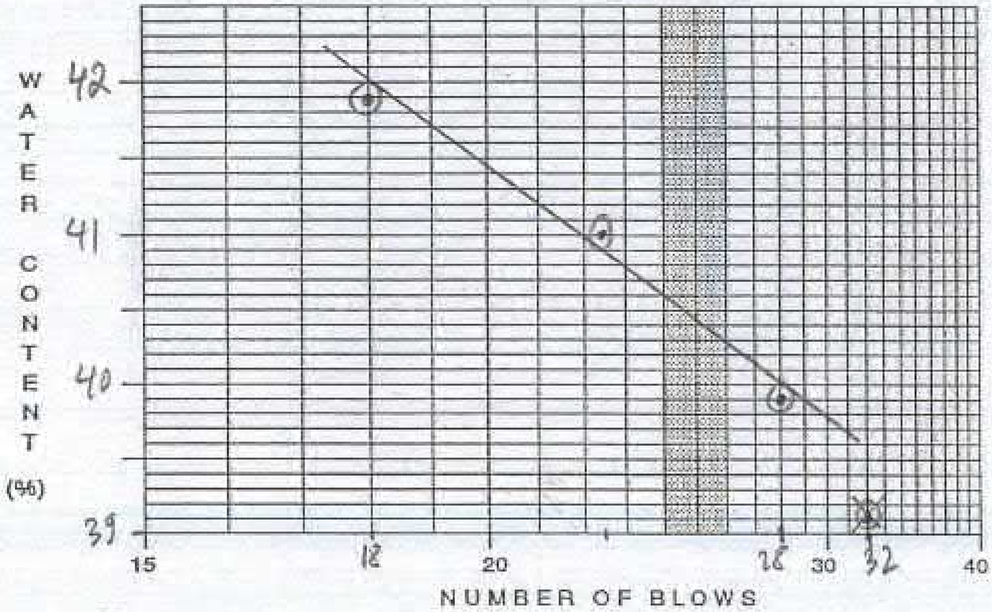
Project Name: BART TO SILICON VALLEY   Project #: 2019-131-T02

Sample #: BA-153 # 2A@10.5   Lab #: G970   Date: 1/13/2019

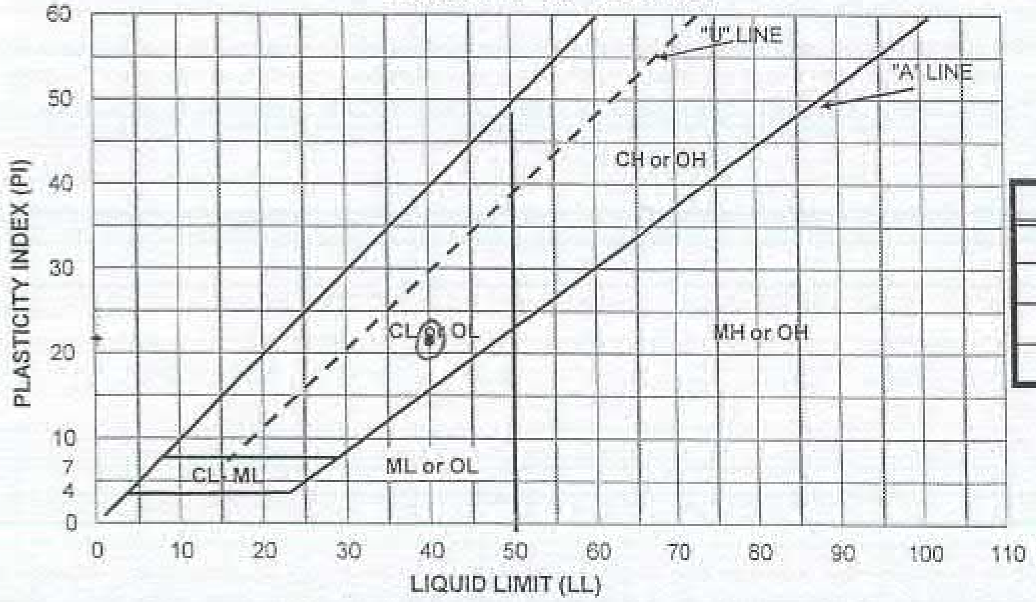
Sample Description: lean CLAY, (CL), Dark Olive Brown   Tested By: D- NGUYEN

Estimate of % sample retain on #40 Sieve ☐   G132

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~32~~	28	22-23	18				
TARE NO.	~~V4~~	A1	N6	V15	N4	G3		
TARE + WET WT (gms)	~~36.52~~	34.84	34.37	35.59	19.48	18.10		
TARE + DRY WT (gms)	~~29.37~~	28.04	27.63	28.35	18.21	16.96		
TARE WT (gms)	~~11.09~~	11.01	11.21	11.07	11.07	10.70		
WT OF WATER (gms)	~~7.15~~	6.8	6.74	7.24	1.27	1.14		
DRY WT SOIL (gms)	~~18.28~~	17.03	16.42	17.28	7.14	6.26		
WATER CONTENT %	~~39.1~~	39.9	41.0	41.9	18	18		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	40 %
PL	18 %
PI	22 %
WC	24 %

PARIKH CONSULTANTS, INC.

TM

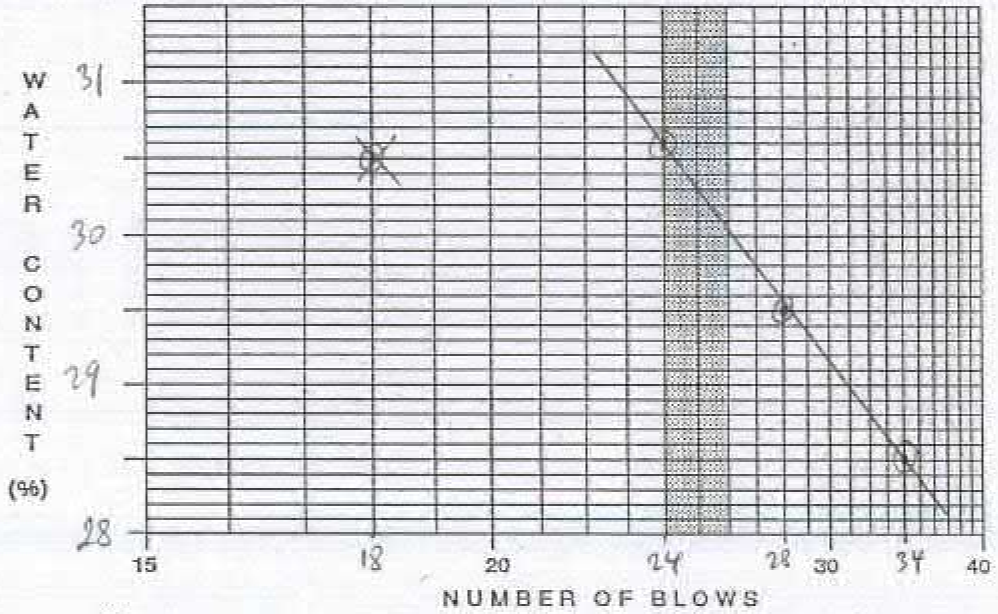
ATTERBERG LIMIT

ASTM D4318 or CAL 204

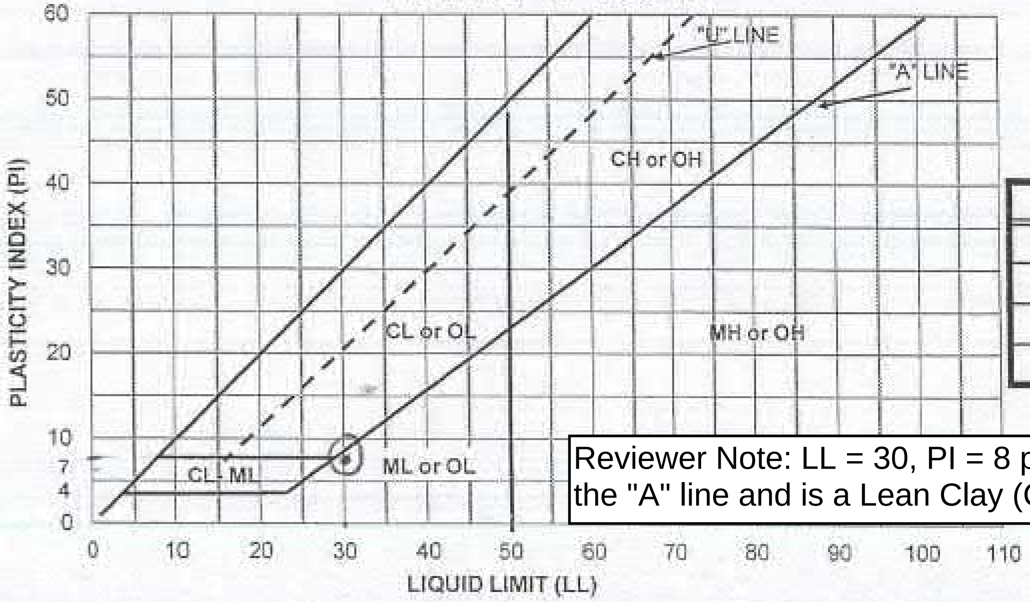
Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-702
Sample #:	BH-153 #5A @ 40.5' Lab #: G970	Date:	11/18/2019
Sample Description:	SILT, (ML), Dark greenish gray	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S10

	LIQUID LIMIT				PLASTIC LIMIT				WC
NUMBER OF BLOWS	34	28	24	~~18~~					
TARE NO.	V3	V23	G5	~~A2~~	G1	V21			
TARE + WET WT (gms)	34.59	35.31	35.24	~~35.71~~	20.24	19.38			
TARE + DRY WT (gms)	29.37	29.76	29.61	~~29.95~~	18.62	17.90			
TARE WT (gms)	11.04	10.96	11.21	~~11.09~~	11.14	11.13			
WT OF WATER (gms)	5.22	5.55	5.63	~~5.76~~	1.62	1.48			
DRY WT SOIL (gms)	18.33	18.8	18.4	~~18.86~~	7.48	6.77			
WATER CONTENT %	28.5	29.5	30.6	~~30.5~~	22	22			



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:

LL	30 %
PL	22 %
PI	8 %
WC	23 %

Reviewer Note: LL = 30, PI = 8 plots on/above the "A" line and is a Lean Clay (CL).

PARIKH CONSULTANTS, INC.

JM

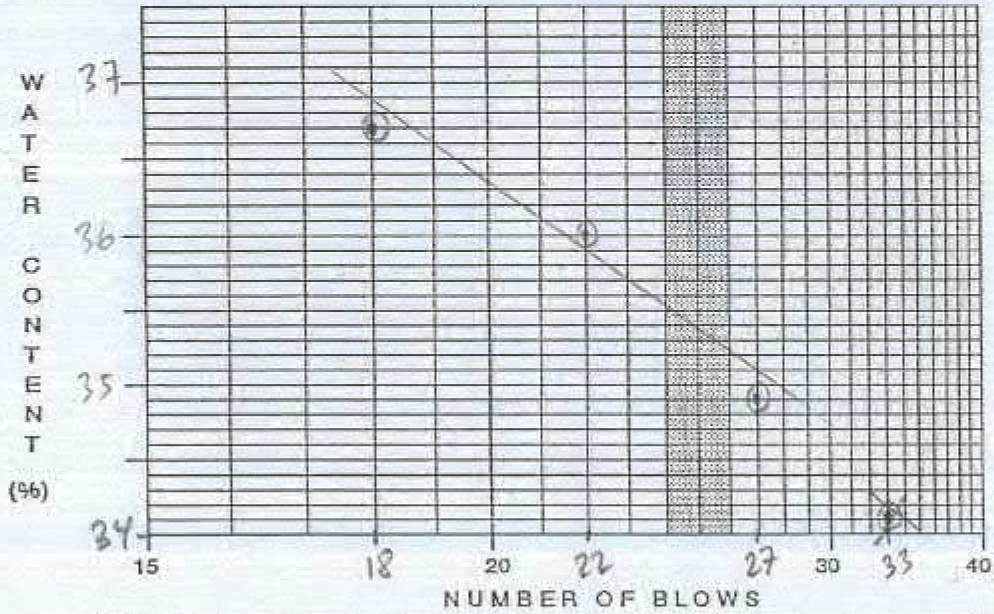
ATTERBERG LIMIT

ASTM D4318 or CAL 204

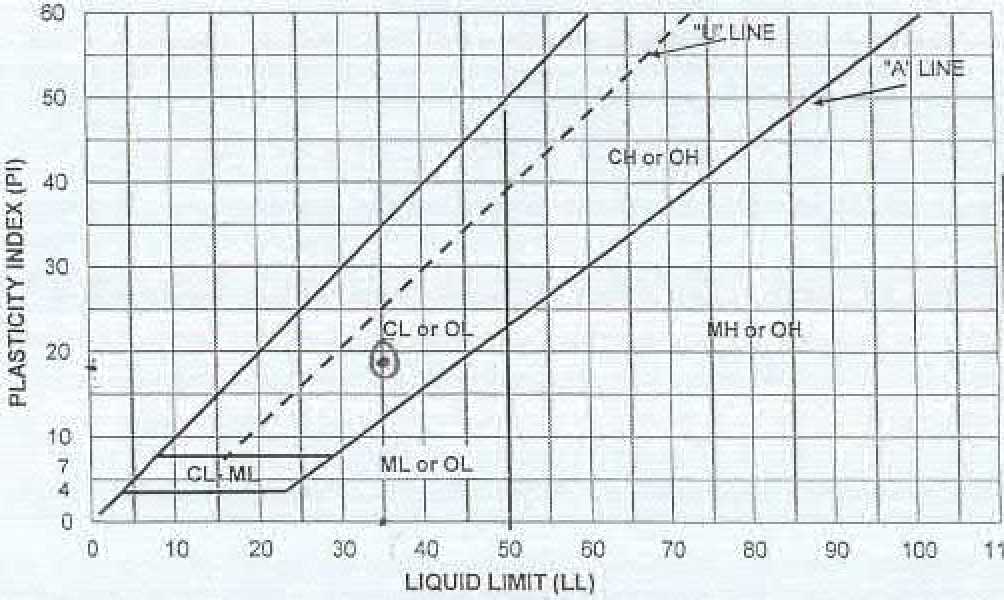
Project Name: BART TO SILICON VALLEY		Project #:	2019-131-T02
Sample #: BH-153 #35 @ 108.7'	Lab #: G970	Date:	11/14
Sample Description: Lean CLAY,(CL), Yellowish Brown		Tested By:	D-NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S10

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~33~~	27	22	18				
TARE NO.	~~A2~~	V21	G5	V23	V3	G1		
TARE + WET WT (gms)	~~37.56~~	35.96	34.88	35.60	18.44	17.66		
TARE + DRY WT (gms)	~~30.83~~	29.53	28.62	28.99	17.36	16.76		
TARE WT (gms)	~~11.09~~	11.13	11.22	10.97	11.05	11.14		
WT OF WATER (gms)	~~6.73~~	6.43	6.26	6.61	1.08	0.9		
DRY WT SOIL (gms)	~~18.74~~	18.4	17.4	18.02	6.31	5.62		
WATER CONTENT %	~~34.1~~	34.9	36.0	36.7	17 %	16 %		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	35 %
PL	17 %
PI	18 %
WC	26 %

PARIKH CONSULTANTS, INC.

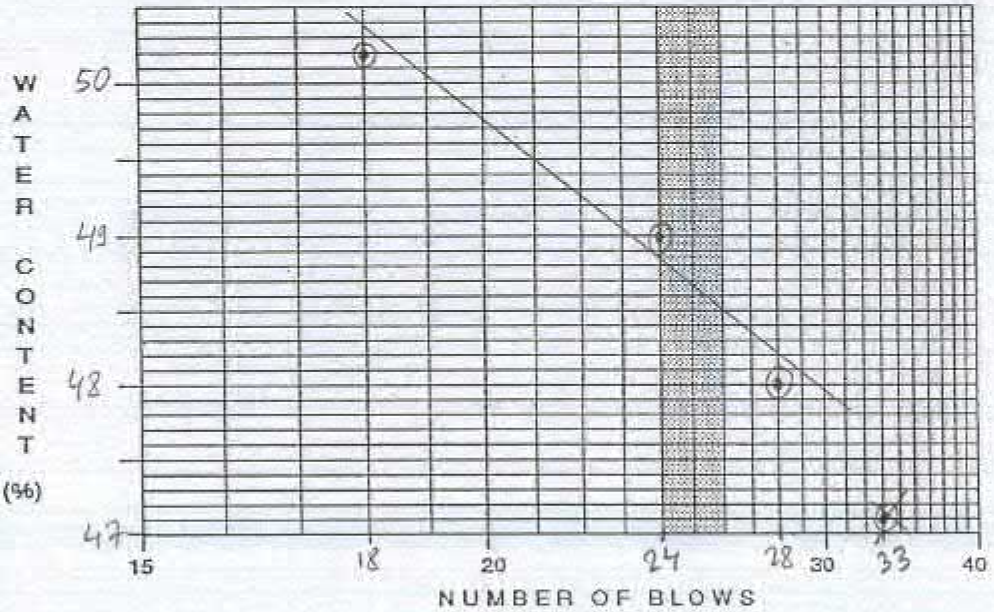
ATTERBERG LIMIT

ASTM D4318 or CAL 204

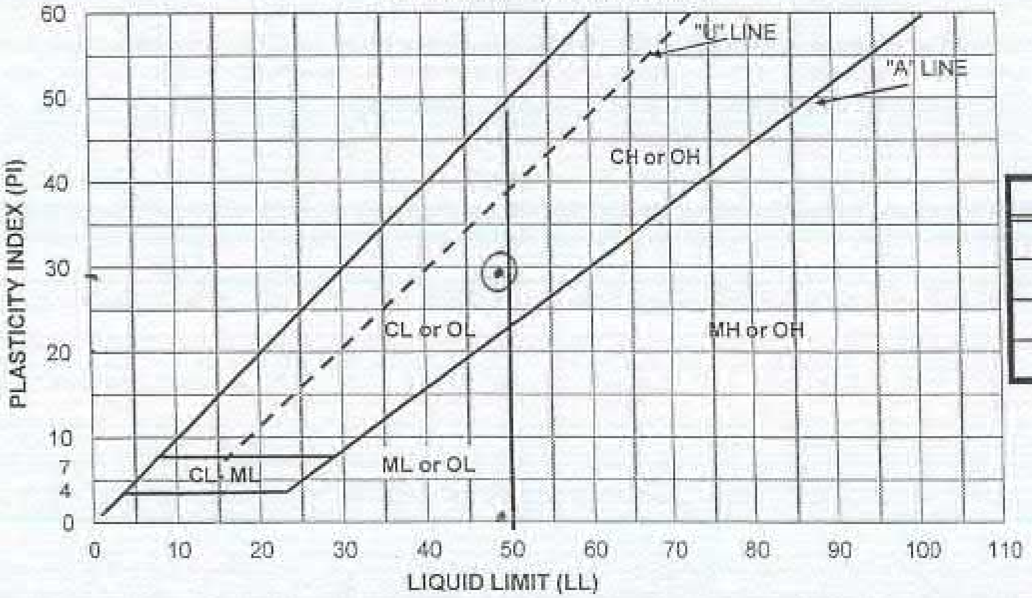
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-T02
Sample #: BH-153 #49A @135.5' Lab #: G970
Date: 11/19/2019
Sample Description: Lean CLAY, (CL/CH) Dark greenish gray
Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 512

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~33~~	28	24	18				
TARE NO.	~~G3~~	V15	N4	A10	A1	N6		
TARE + WET WT (gms)	~~29.99~~	30.07	32.02	33.14	17.17	17.68		
TARE + DRY WT (gms)	~~23.81~~	23.91	25.13	25.76	16.18	16.58		
TARE WT (gms)	~~10.69~~	11.07	11.07	11.07	11.02	11.20		
WT OF WATER (gms)	~~6.18~~	6.16	6.89	7.38	0.99	1.1		
DRY WT SOIL (gms)	~~13.12~~	12.84	14.06	14.69	5.16	5.38		
WATER CONTENT %	~~47.1~~	48.0	49.0	50.2	19	20		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	49
PL	20
PI	29
WC	19%

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

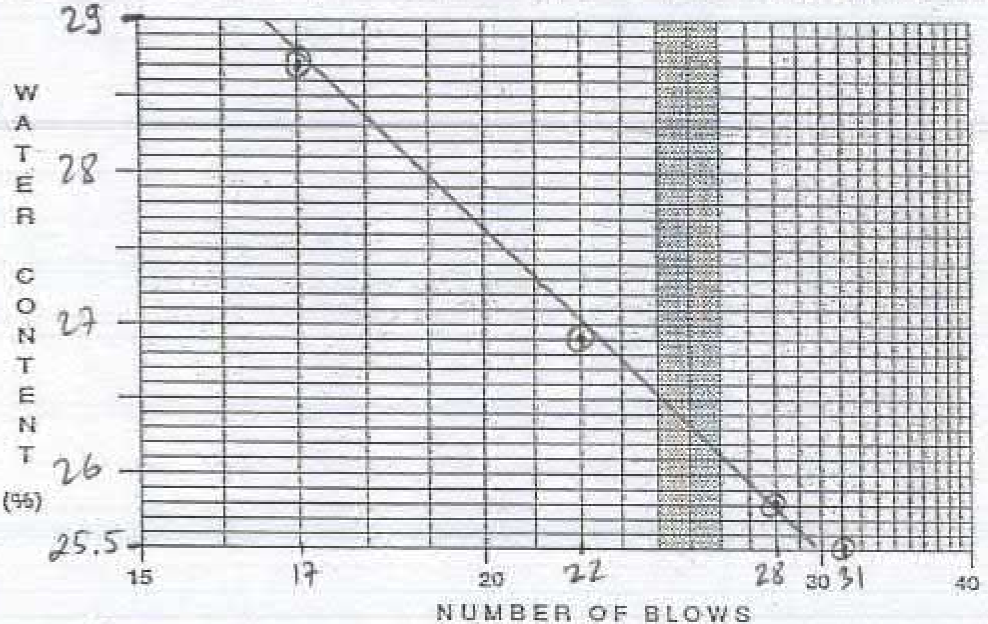
Project Name: BART TO SILICON VALLEY Project #: 2019-131-T02

Sample #: BH-154 #3A@20' Lab #: G970 Date: 12/10/2019

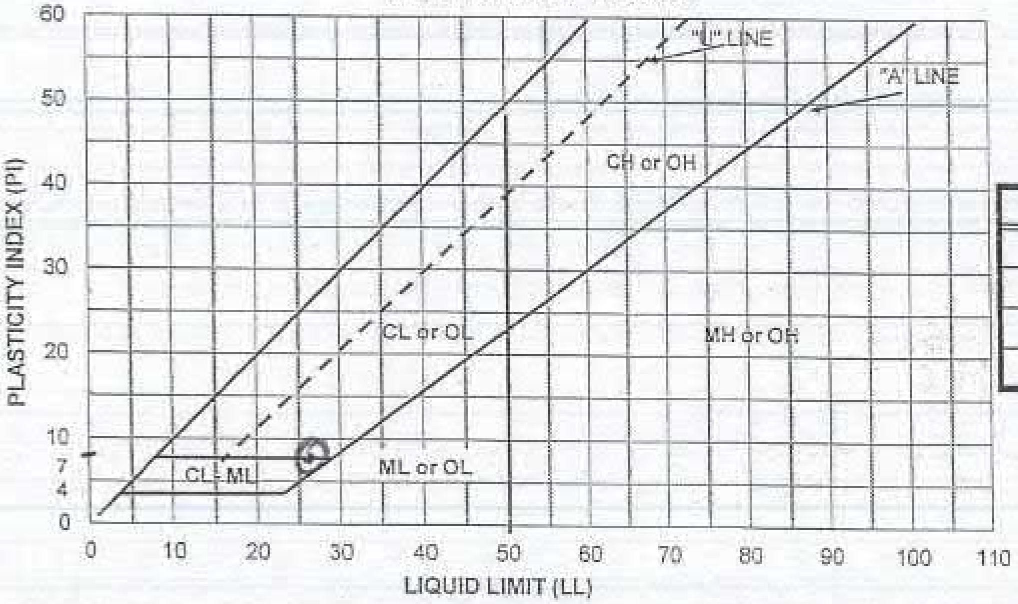
Sample Description: lean CLAY w/SAND (CL), light olive Brown Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S10

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	28	22	17				
TARE NO.	N17	N4	V23	V8	V22	G11		
TARE + WET WT (gms)	34.69	33.39	33.04	37.93	20.20	19.12		
TARE + DRY WT (gms)	29.89	28.81	28.37	31.93	18.82	17.89		
TARE WT (gms)	11.07	11.06	10.98	11.03	10.98	11.13		
WT OF WATER (gms)	4.8	4.58	4.67	6.0	1.38	1.23		
DRY WT SOIL (gms)	18.82	17.75	17.39	20.9	7.84	6.76		
WATER CONTENT %	25.5%	25.8%	26.9%	28.7%	18%	18%		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	26%
PL	18%
PI	8%
WC	23%

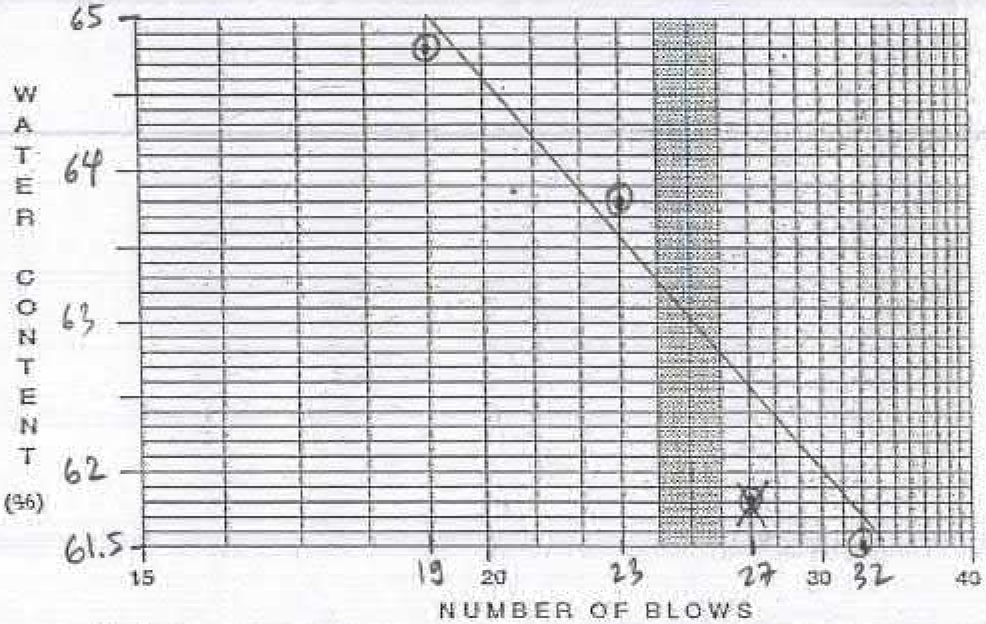
PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

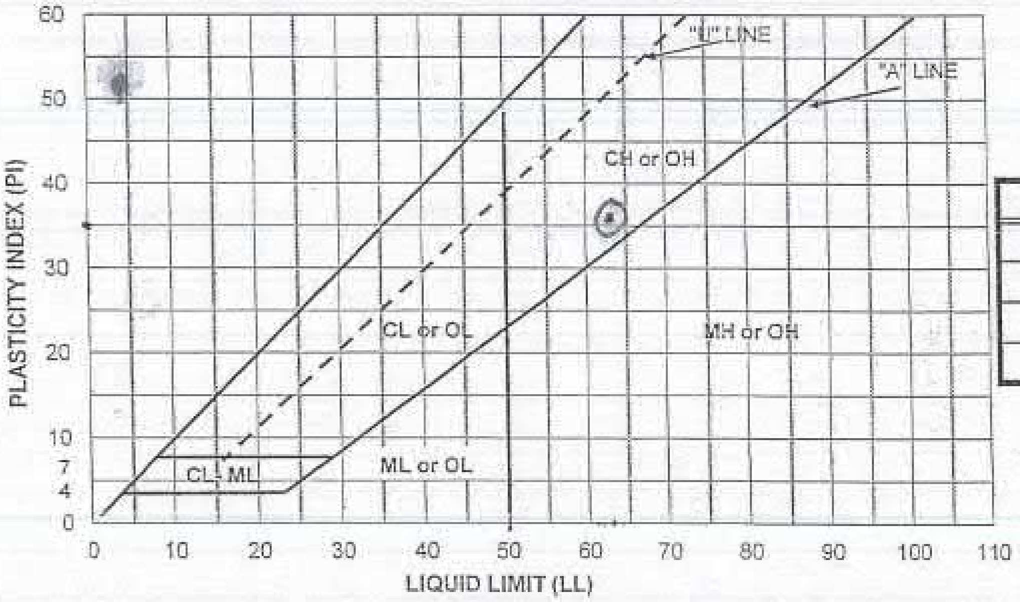
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY		Project #: 2019-131-702	
Sample #: BH-154 #5A @40'	Lab #: G970	Date: 12/09/2019	
Sample Description: fat CLAY, (CH), Greenish Gray.		Tested By: D. NGUYEN	
Estimate of % sample retain on #40 Sieve	☐	G 103 / 511	

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	27	23	19				
TARE NO.	V10	V1	G4	V18	V12	V21		
TARE + WET WT (gms)	30.86	32.78	30.06	32.08	19.39	17.71		
TARE + DRY WT (gms)	23.28	24.43	22.51	23.81	17.61	16.33		
TARE WT (gms)	10.95	10.95	10.67	11.04	11.13	11.12		
WT OF WATER (gms)	7.58	8.33	7.55	8.27	1.78	1.38		
DRY WT SOIL (gms)	12.33	13.48	11.84	12.77	6.48	5.21		
WATER CONTENT %	61.5	61.8	63.8	64.8	28	26		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	63%
PL	27%
PI	36%
WC	31%

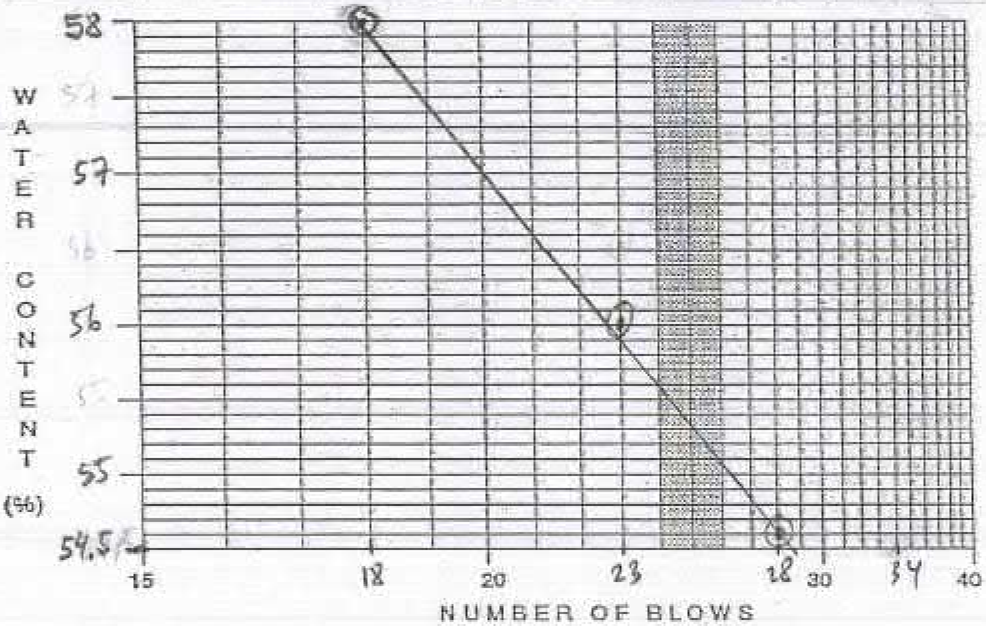
PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

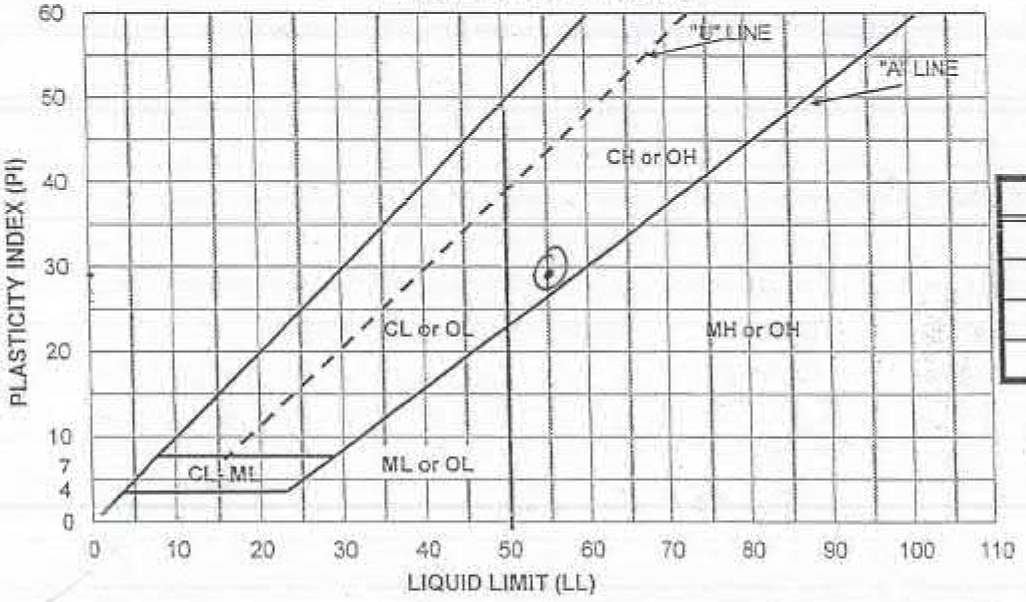
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-T02
Sample #: BH-154 #6A @51'
Lab #: G970
Date: 12/05/2019
Sample Description: FAT CLAY, (CH), Dark greenish gray
Tested By: D-NGUYEN
Estimate of % sample retain on #40 Sieve ☐
G116 / 510

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	28	23	18				
TARE NO.	V23	N4	N1	G11	V22	V8		
TARE + WET WT (gms)	30.62	29.59	33.00	34.19	19.04	18.49		
TARE + DRY WT (gms)	23.73	23.05	25.12	25.73	17.39	16.95		
TARE WT (gms)	10.96	11.07	11.05	11.13	10.98	11.03		
WT OF WATER (gms)	6.89	6.54	7.88	8.46	1.65	1.54		
DRY WT SOIL (gms)	12.77	11.98	14.07	14.6	6.41	5.92		
WATER CONTENT %	54.0	54.6	56.0	58.0	25.7	26		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	55%
PL	26%
PI	29%
WC	32%

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

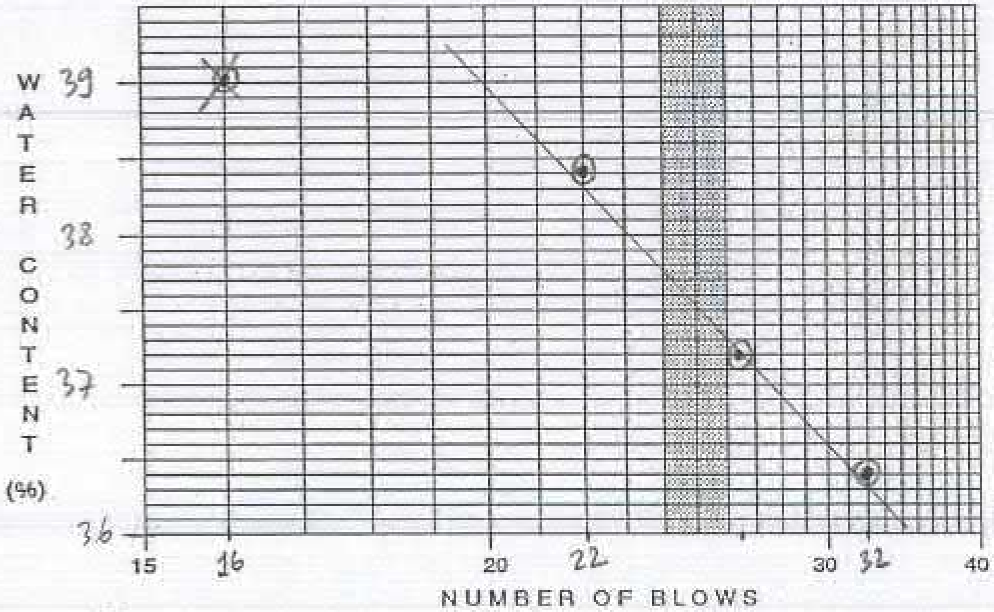
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-T02
Sample #: BH-154 # 26 @ 96'
Lab #: G970
Date: 12/02/2019
Sample Description: lean CLAY, (CL), Dark grayish Brown
Tested By: D. NGUYEN

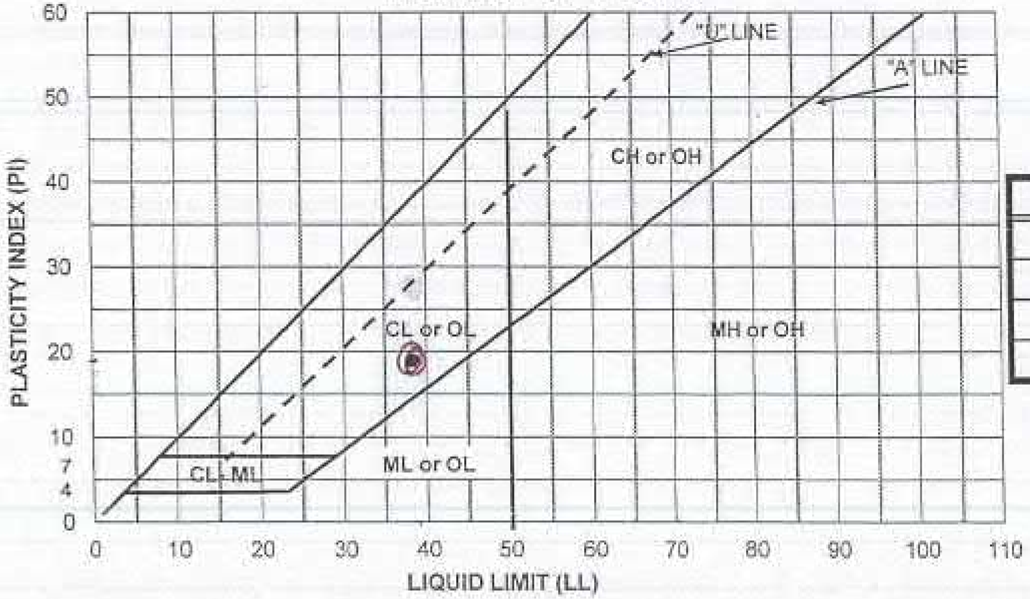
Estimate of % sample retain on #40 Sieve ☐

S-8

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	26-27	22	~~16~~				
TARE NO.	V2	G9	V7	~~N10~~	V11	G6		
TARE + WET WT (gms)	34.70	33.35	31.19	~~35.15~~	17.14	16.50		
TARE + DRY WT (gms)	28.37	27.32	25.60	~~28.41~~	16.15	15.62		
TARE WT (gms)	11.00	11.11	11.05	~~11.15~~	10.81	10.97		
WT OF WATER (gms)	6.33	6.03	5.59	~~6.74~~	0.99	0.88		
DRY WT SOIL (gms)	17.37	16.21	14.55	~~17.26~~	5.34	4.65		
WATER CONTENT %	36.4 %	37.2%	38.4%	~~39.0%~~	18.5 %	18.9%		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	38 %
PL	19 %
PI	19 %
WC	22 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

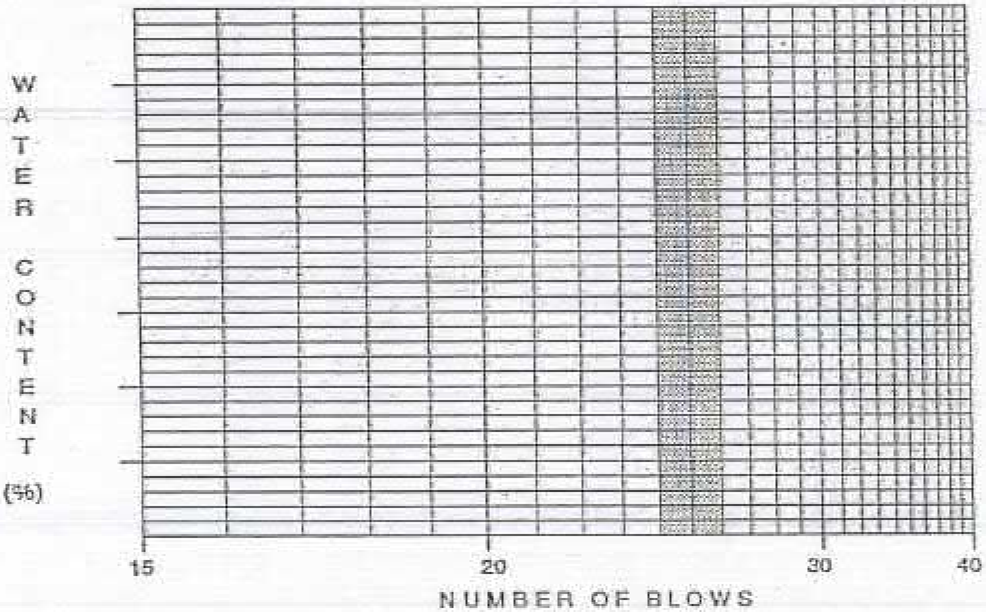
Project Name: BART TO SILICON VALLEY — Project #: 2019-131-T02

Sample #: BH-154 #50 @137.3' Lab #: — Date: 12/10/2019

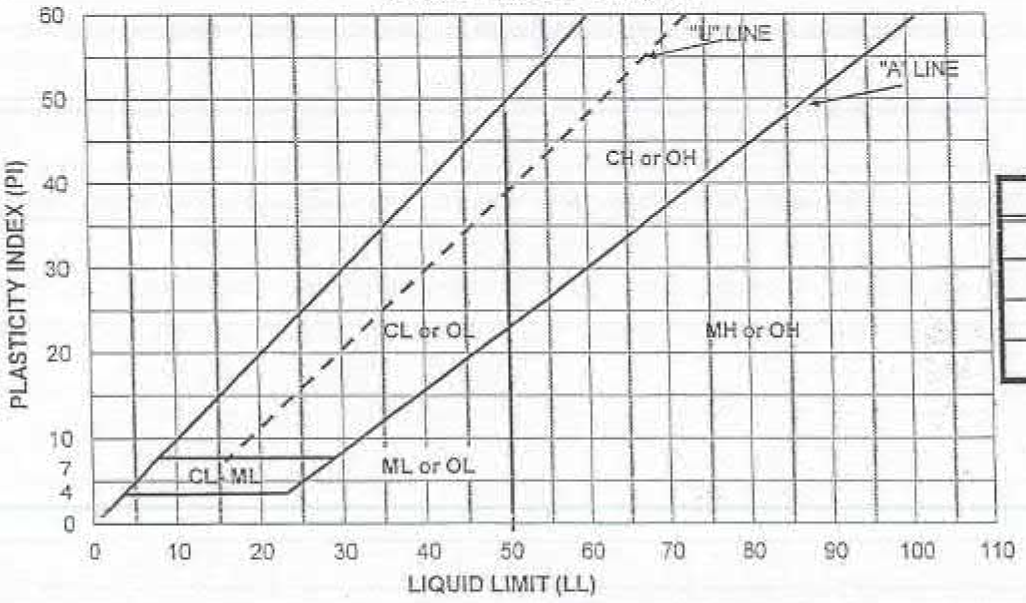
Sample Description: SILT, (ML), BLUISH GREY — Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS					▨	▨	▨	▨
TARE NO.								
TARE + WET WT (gms)								
TARE + DRY WT (gms)	NON PLASTIC							
TARE WT (gms)								
WT OF WATER (gms)								
DRY WT SOIL (gms)								
WATER CONTENT %								



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	
PL	
PI	
WC	22 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY Project #: 2019-161-T02

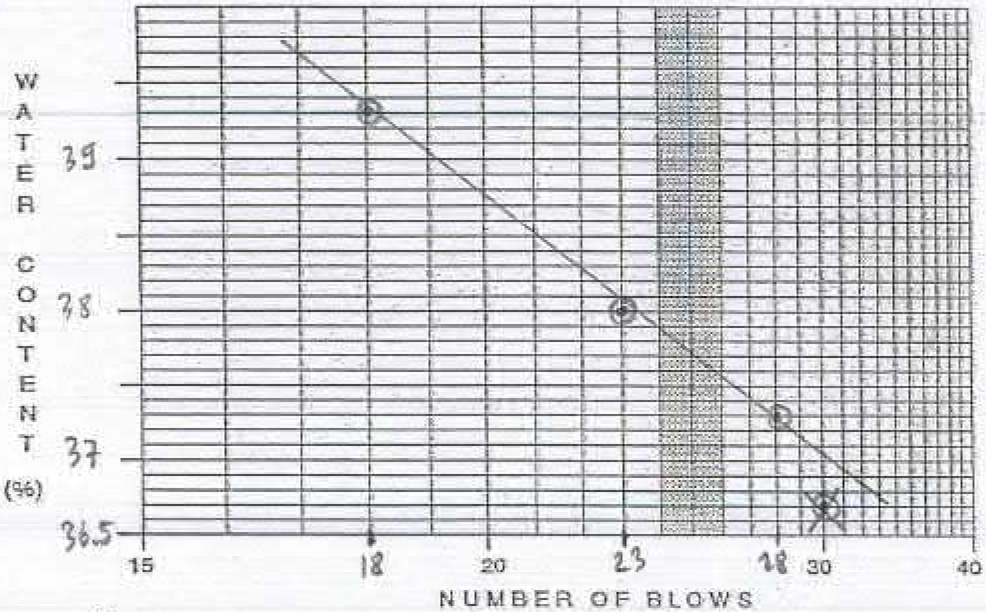
Sample #: BH-154 # 53B @150' Lab #: G970 Date: 12/05/2019

Sample Description: lean CLAY, (CL), GREENISH GRAY Tested By: D-NGUYEN

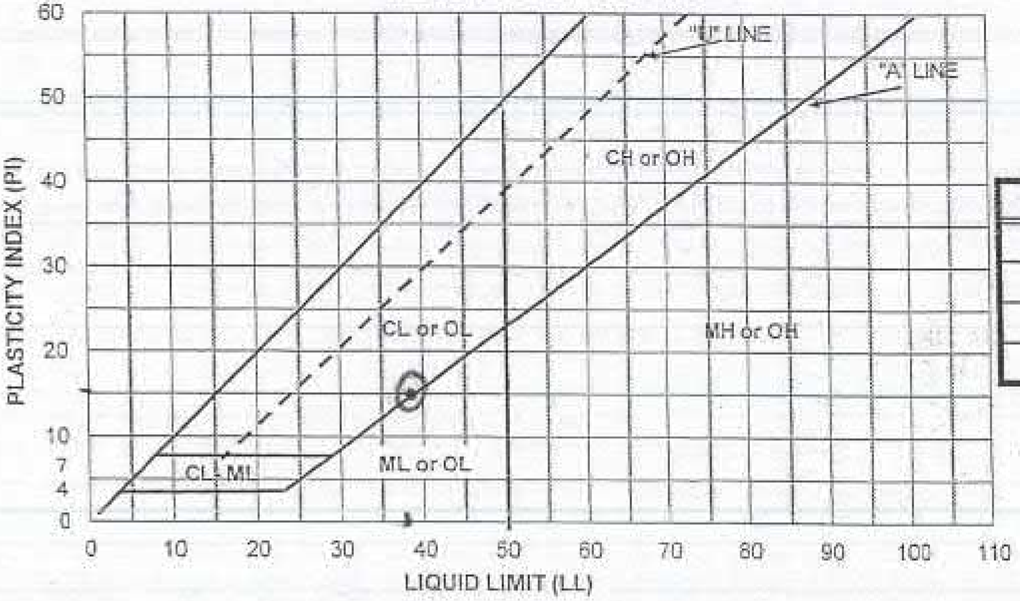
Estimate of % sample retain on #40 Sieve ☐

S-8

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~30~~	28	23	18	▨	▨	▨	▨
TARE NO.	~~N10~~	V2	G6	G9	J11	V7		
TARE + WET WT (gms)	~~31.92~~	27.59	30.62	32.14	18.70	17.97		
TARE + DRY WT (gms)	~~26.35~~	23.08	25.21	26.21	17.22	16.67		
TARE WT (gms)	~~11.16~~	11.0	10.97	11.13	10.81	11.07		
WT OF WATER (gms)	~~5.57~~	4.51	5.41	5.93	1.48	1.3		
DRY WT SOIL (gms)	~~15.19~~	12.08	14.24	15.08	6.41	5.6		
WATER CONTENT %	~~36.7%~~	37.3%	38.0%	39.3%	23 %	23 %		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	38 %
PL	23%
PI	15 %
WC	24%

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY

Project #: 2019-131-702

Sample #: BA-154 # 57B @ 130 Lab #: G970

Date: 12/10/2019

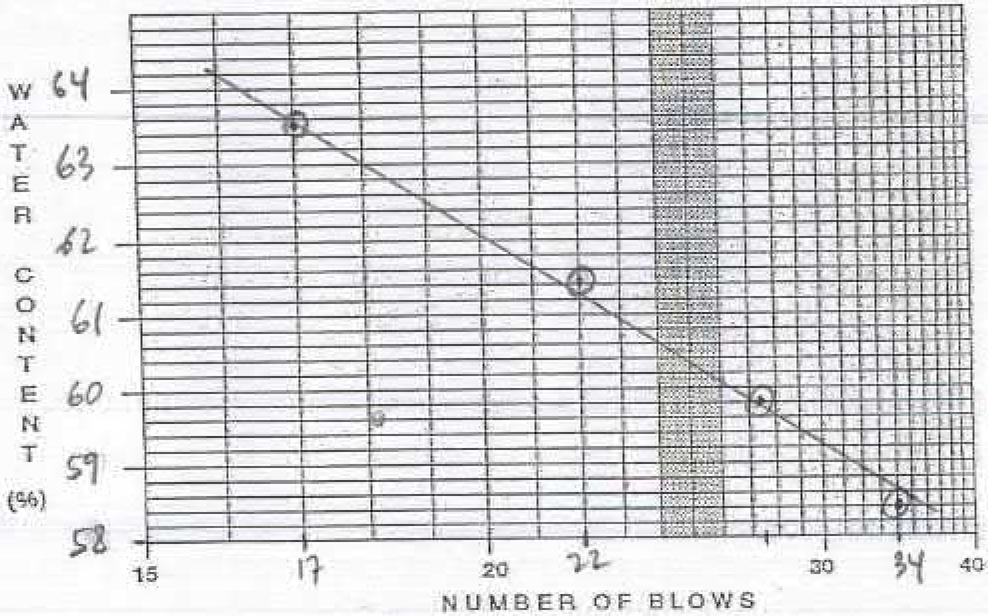
Sample Description: Fat CLAY, (CH), olive Brown

Tested By: D. NGUYEN

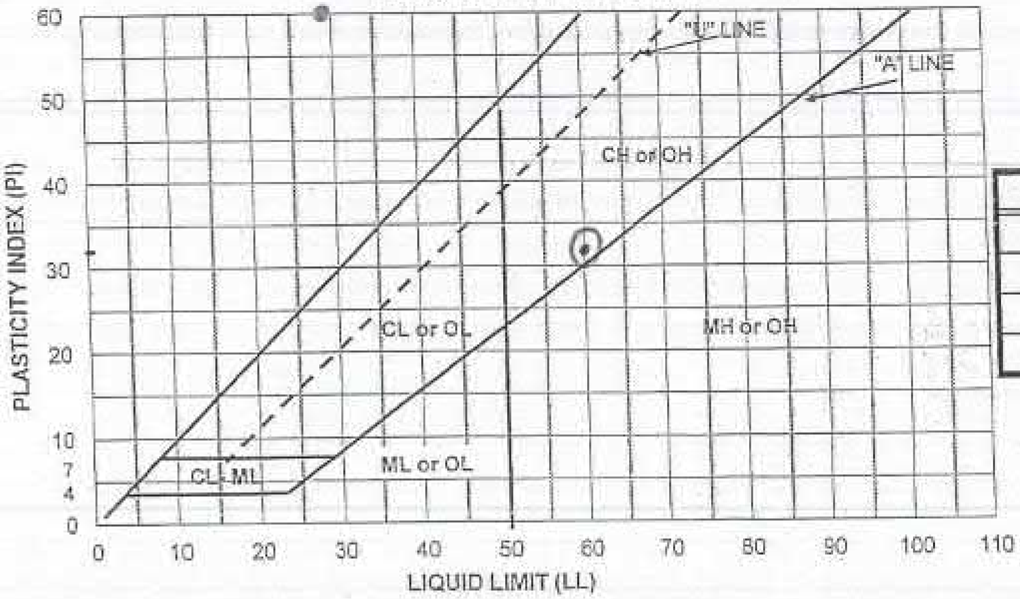
Estimate of % sample retain on #40 Sieve ☐

511

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	27-28	22	17				
TARE NO.	G4	V1	V21	V10	V18	V12		
TARE + WET WT (gms)	30.09	30.41	31.44	32.34	18.12	19.19		
TARE + DRY WT (gms)	22.93	23.13	23.71	24.04	16.59	17.42		
TARE WT (gms)	10.68	10.96	11.12	10.97	11.06	11.12		
WT OF WATER (gms)	7.16	7.28	7.73	8.3	1.53	1.77		
DRY WT SOIL (gms)	12.25	12.17	12.59	13.07	5.53	6.3		
WATER CONTENT %	58.4	59.8	61.4	63.5	27.7	28.1		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	60%
PL	28%
PI	32%
WC	29%

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

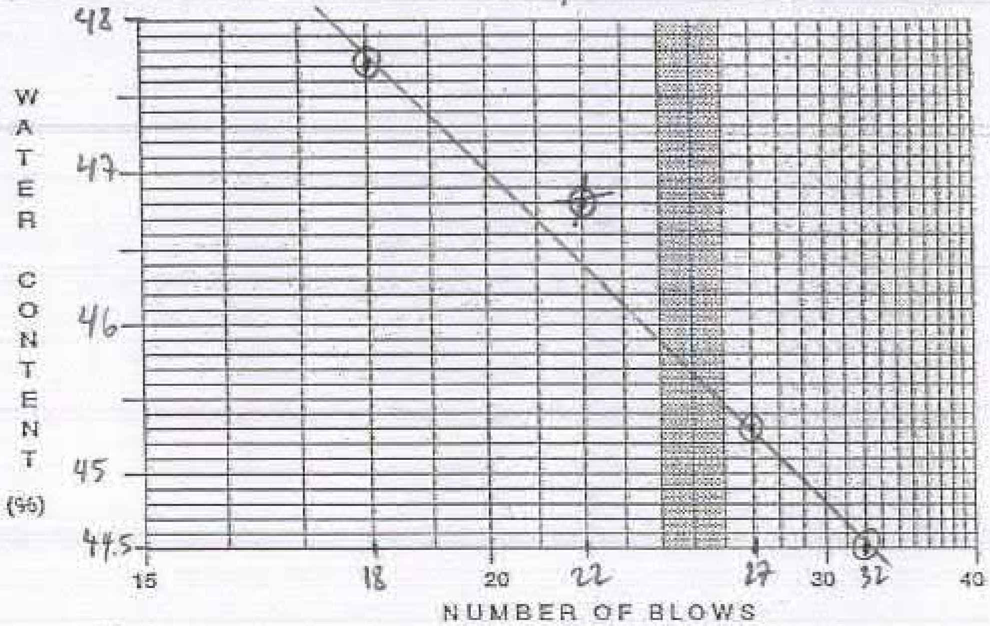
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-154 # 63B @200 Lab #: G970 Date: 12/10/2019

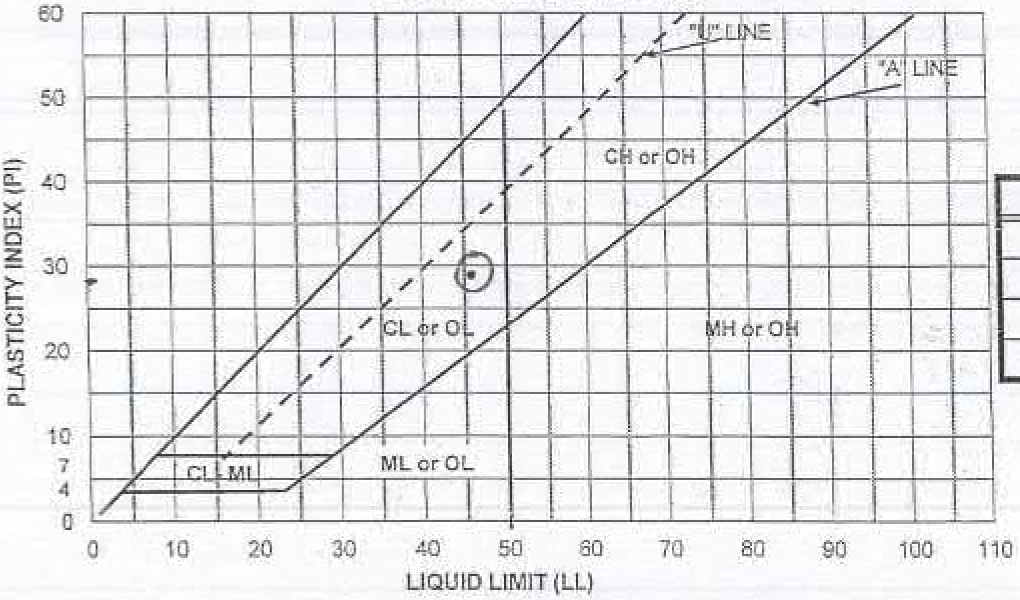
Sample Description: Sandy lean CLAY, (CL), olive brown Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	27	22	18				
TARE NO.	V17	G8	V11	N10	V2	A1		
TARE + WET WT (gms)	32.58	29.35	30.16	33.92	17.81	19.36		
TARE + DRY WT (gms)	25.96	23.53	23.99	26.56	16.80	18.09		
TARE WT (gms)	11.08	10.67	10.80	11.14	10.99	11.00		
WT OF WATER (gms)	6.62	5.82	6.17	7.36	1.01	1.27		
DRY WT SOIL (gms)	14.88	12.86	13.19	15.42	5.81	7.09		
WATER CONTENT %	44.5%	45.3%	46.8%	47.7%	17.4%	17.9%		

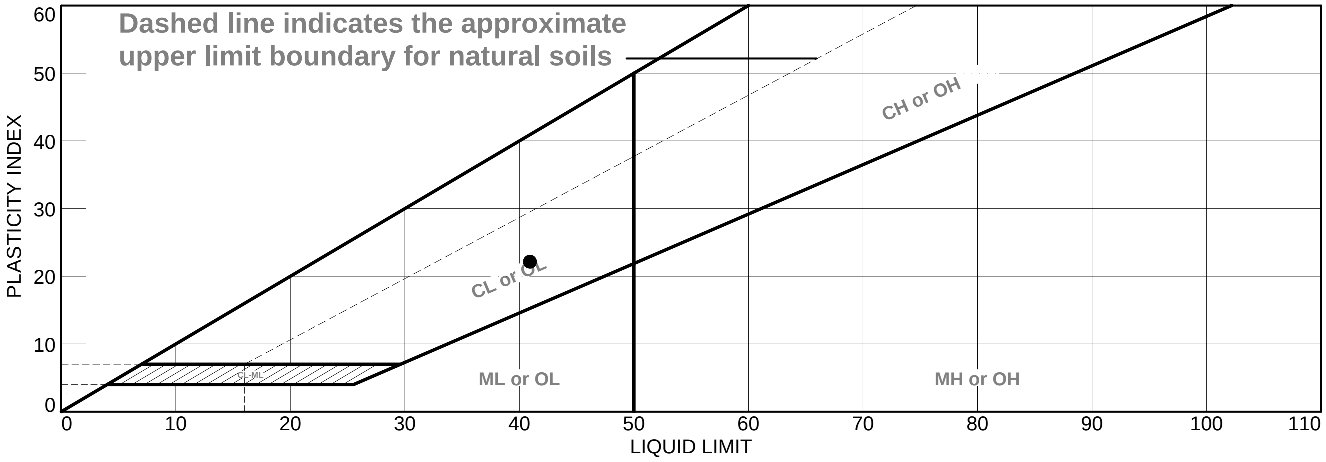


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	46 %
PL	18 %
PI	28 %
WC	16 %

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown clay	41	19	22			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

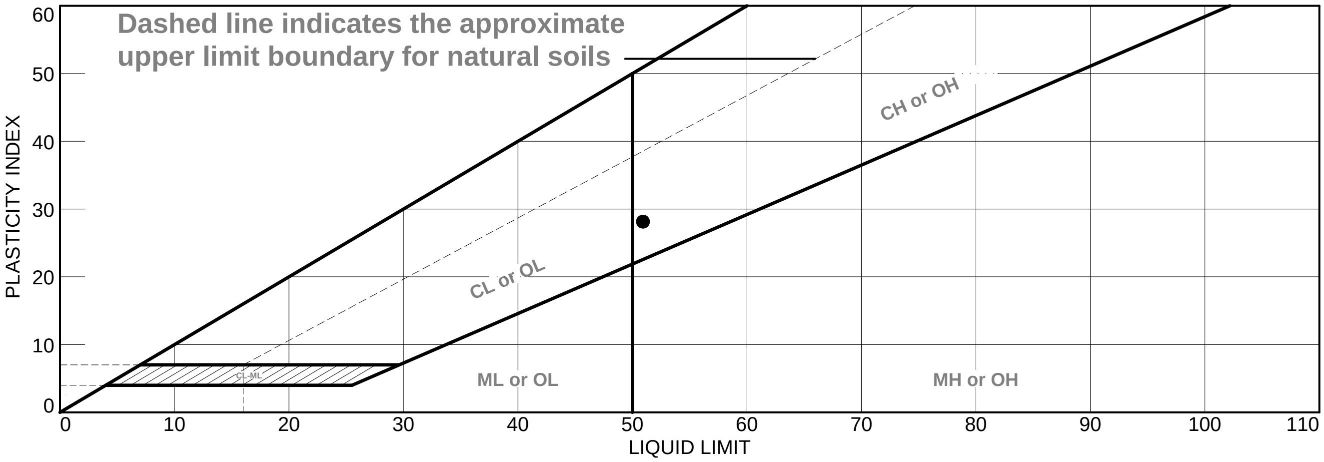
● **Source of Sample:** BH-155 **Depth:** 67 **Sample Number:** 7

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	51	23	28			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

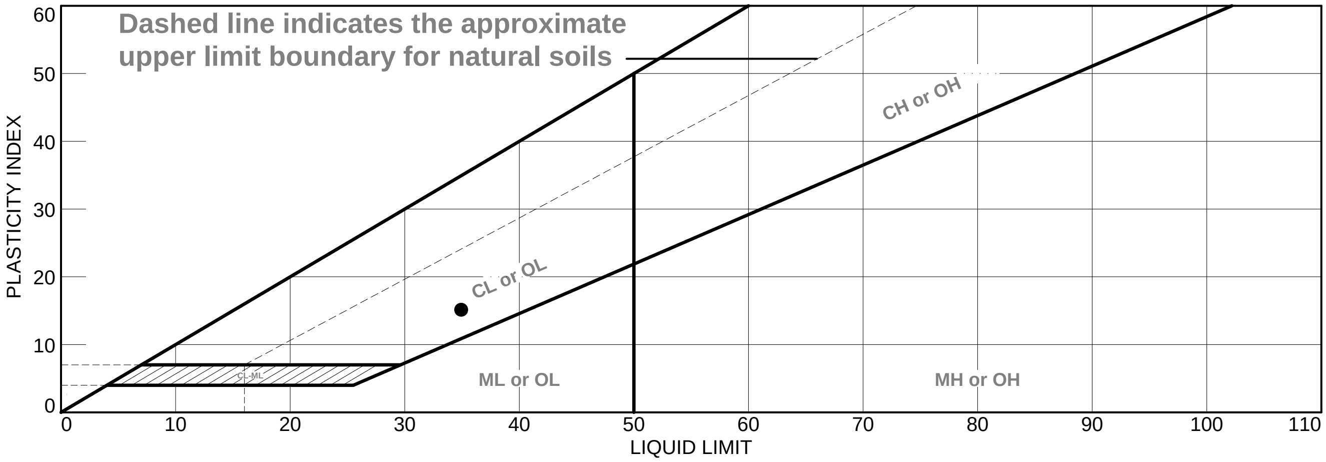
● **Source of Sample:** BH-155 **Depth:** 88 **Sample Number:** 19

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay with sand	35	20	15		75.5	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-155 **Depth:** 150 **Sample Number:** 49

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

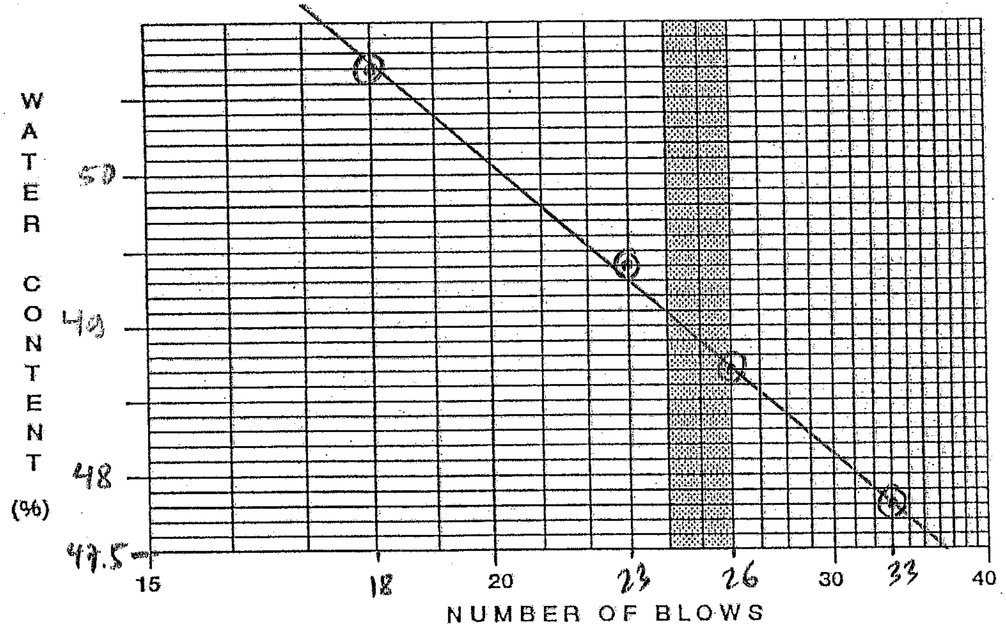
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-155 #2A @ 40.5' Lab #: 6970 Date: 12/17/2019

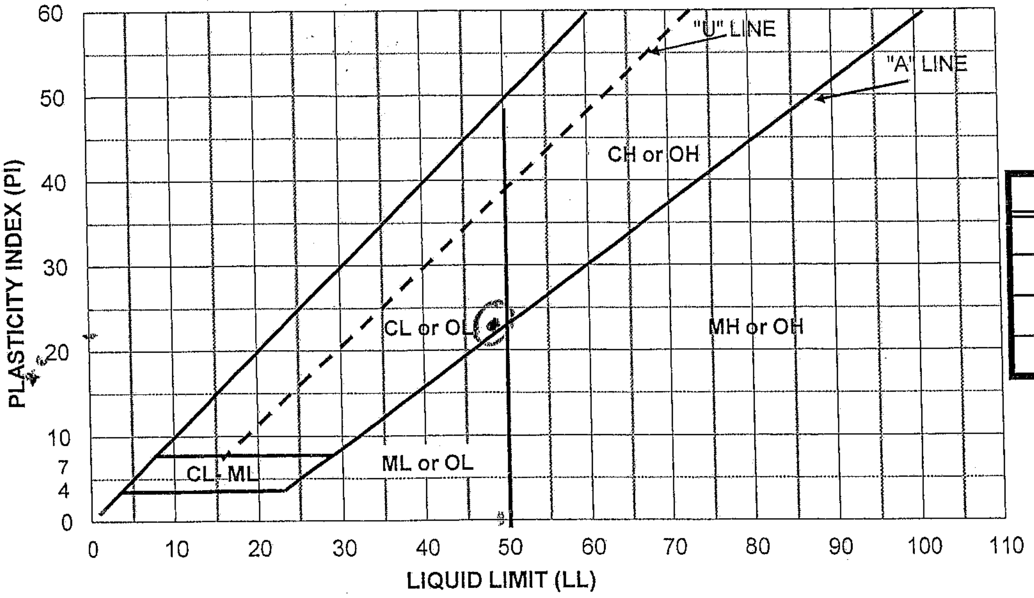
Sample Description: lean CLAY, (CL), Dark greenish gray Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	26	23	18				
TARE NO.	A1	V11	N10	G8	V17	V2		
TARE + WET WT (gms)	33.70	31.02	34.80	33.91	21.44	20.02		
TARE + DRY WT (gms)	26.36	24.40	26.98	26.09	19.22	18.17		
TARE WT (gms)	11.0	10.81	11.14	10.68	11.08	10.99		
WT OF WATER (gms)	7.34	6.62	7.82	7.82	2.22	1.85		
DRY WT SOIL (gms)	15.36	13.59	15.84	15.41	8.14	7.18		
WATER CONTENT %	47.8%	48.7%	49.4%	50.7%	27.3%	25.8%		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	49 %
PL	27 %
PI	22 %
WC	31%

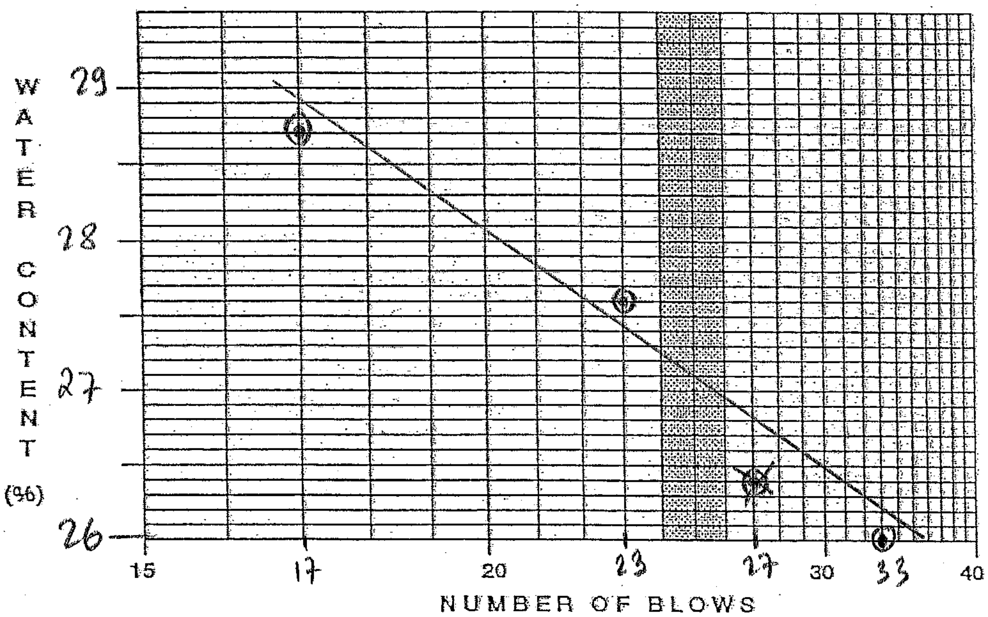
ATTERBERG LIMIT

ASTM D4318 or CAL 204

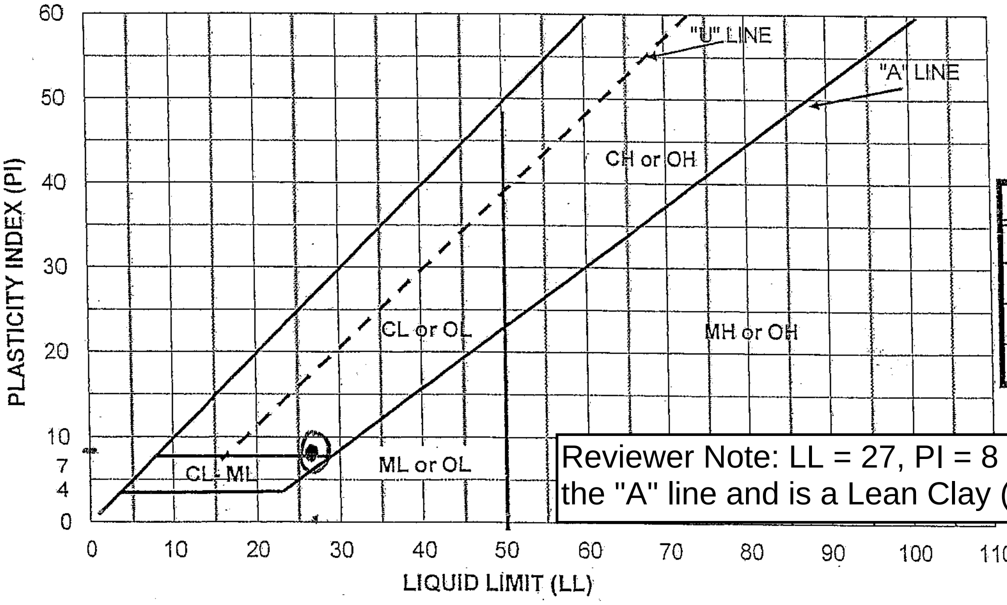
Project Name: BART TO SILICON VALLEY		Project #: 2019-131-701	
Sample #: BH-155 # 4A @ 63'	Lab #: G970	Date: 01/16/2020	
Sample Description: SILT W/SAND (ML), LIGHT OLIVE BROWN		Tested By: D. NGUYEN	

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	~~27~~	23	17	▨	▨	▨	▨
TARE NO.	G6	~~V2~~	V22	V7	A2	N7		
TARE + WET WT (gms)	34.06	~~35.54~~	35.70	36.35	19.40	22.66		
TARE + DRY WT (gms)	29.29	~~30.42~~	30.35	30.71	18.08	20.76		
TARE WT (gms)	10.96	~~11.00~~	10.98	11.05	11.08	10.93		
WT OF WATER (gms)	4.77	~~5.12~~	5.35	5.64	1.32	1.9		
DRY WT SOIL (gms)	18.33	~~19.42~~	19.37	19.66	7.0	9.83		
WATER CONTENT %	26.0 %	~~26.4 %~~	27.6 %	28.7 %	18.9	19.3		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



Reviewer Note: LL = 27, PI = 8 plots on/above the "A" line and is a Lean Clay (CL).

SUMMARY:	
LL	27 %
PL	19 %
PI	8 %
WC	21%

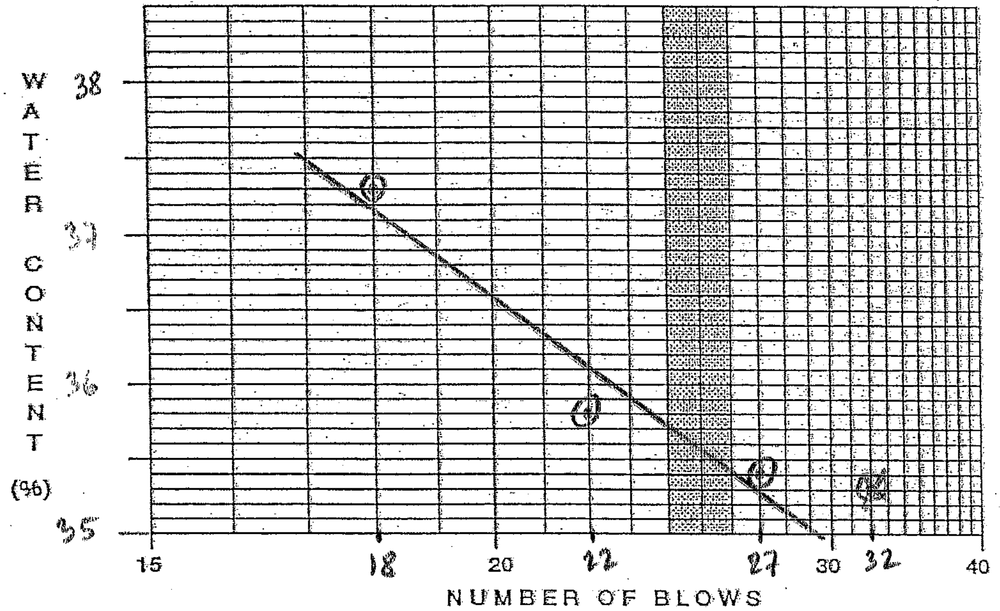
ATTERBERG LIMIT

ASTM D4318 or CAL 204

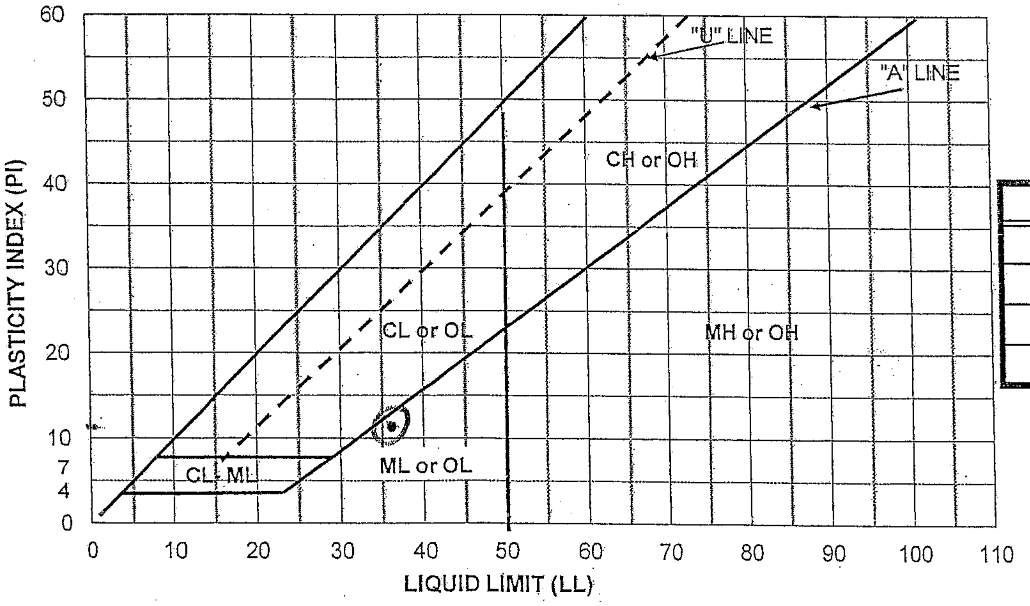
Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-T01
Sample #:	BH-155 #40A @ 120'	Lab #:	G970
Date:	01/17/2020		
Sample Description:	SILT, (ML), OLIVE BROWN	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	27	22	18				
TARE NO.	V16	G5	V5	V3	G7	G10		
TARE + WET WT (gms)	31.93	32.23	31.96	33.86	18.56	19.76		
TARE + DRY WT (gms)	26.45	26.73	26.44	27.66	17.03	18.01		
TARE WT (gms)	10.91	11.21	11.02	11.04	10.75	11.15		
WT OF WATER (gms)	5.48	5.5	5.52	6.2	1.53	1.75		
DRY WT SOIL (gms)	15.54	15.52	15.42	16.62	6.28	6.86		
WATER CONTENT %	35.3	35.4	35.8	37.3	24.4	25.5		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	36 %
PL	25 %
PI	11 %
WC	26 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY Project #: 2019-131-T01

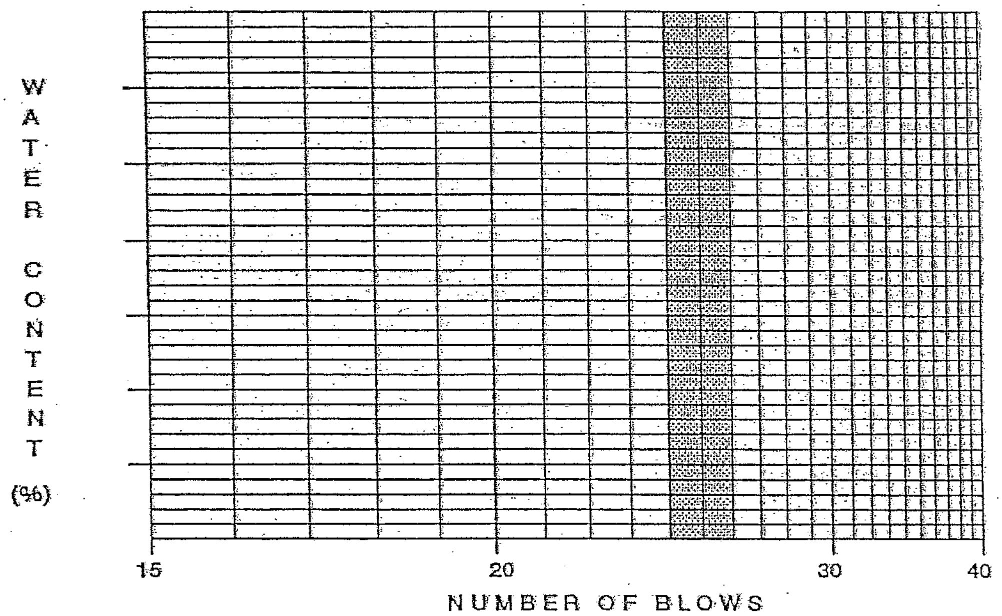
Sample #: BH-155 #43 @125.7 Lab #: G970 Date: 01/17/2020

Sample Description: SILT W/SAND, (ML), OLIVE BROWN Tested By: D. NGUYEN

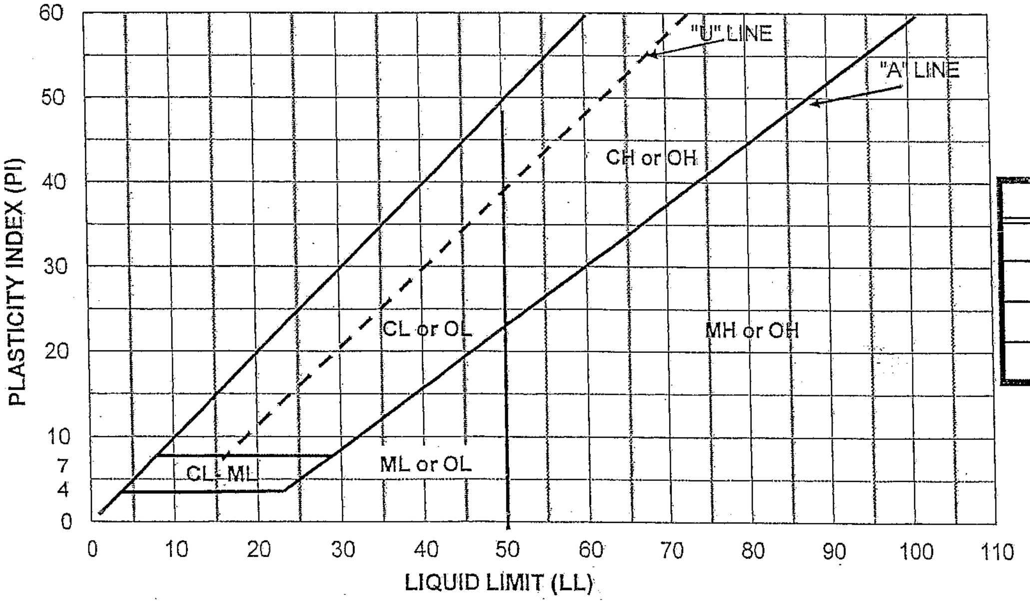
Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS								
TARE NO.								
TARE + WET WT (gms)								
TARE + DRY WT (gms)								
TARE WT (gms)								
WT OF WATER (gms)								
DRY WT SOIL (gms)								
WATER CONTENT %								

NON-PLASTIC



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	
PL	
PI	
WC	26%

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

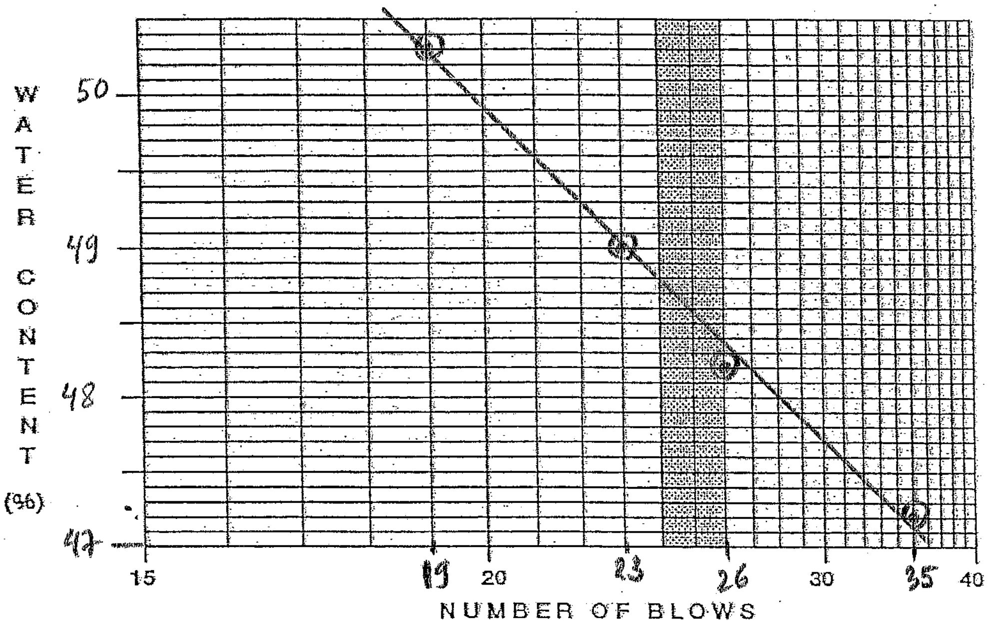
Project Name: BART TO SILICON VALLEY Project #: 2019-131-T01

Sample #: BH-155 #53A @170.5 Lab #: G910 Date: 01/17/2020

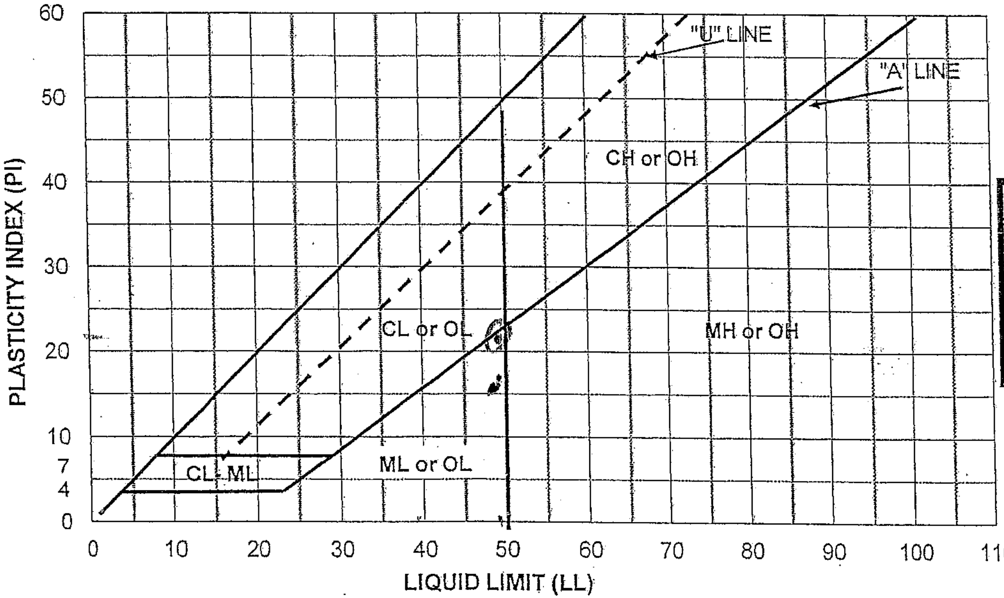
Sample Description: SILTY LEAN CLAY, (CL), YELLOWISH BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	26	23	19				
TARE NO.	N10	V18	V11	A7	V10	A11		
TARE + WET WT (gms)	31.43	32.22	30.23	34.16	18.76	19.49		
TARE + DRY WT (gms)	24.93	25.33	23.84	26.43	17.12	17.68		
TARE WT (gms)	11.15	11.04	10.81	11.05	10.96	11.00		
WT OF WATER (gms)	6.5	6.89	6.39	7.73	1.64	1.81		
DRY WT SOIL (gms)	13.78	14.29	13.03	15.38	6.16	6.68		
WATER CONTENT %	47.2	48.2	49.0	50.3	26.6	27.1		

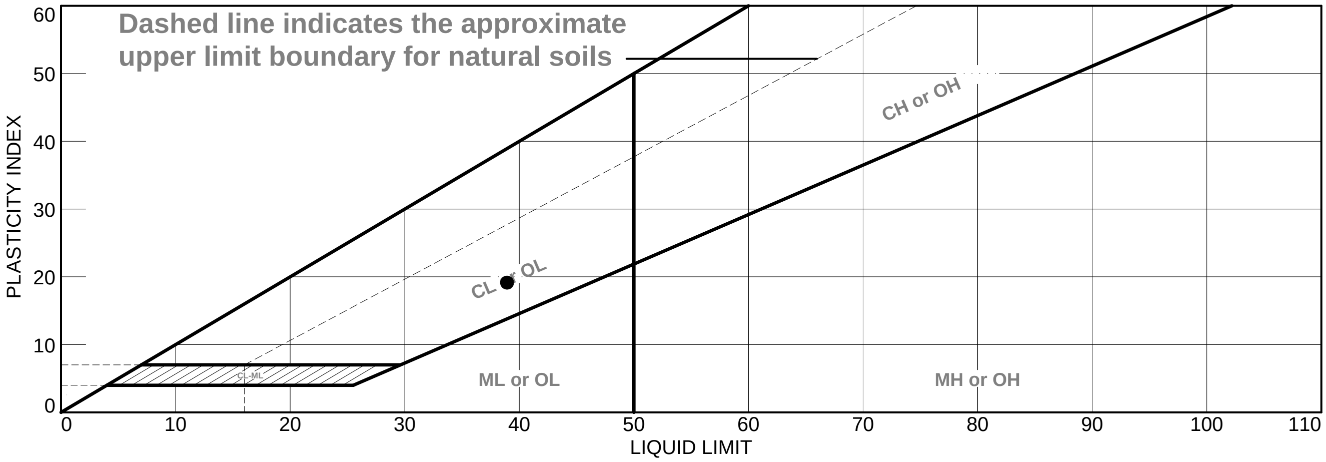


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	49%
PL	27%
PI	22%
WC	26%

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	39	20	19			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

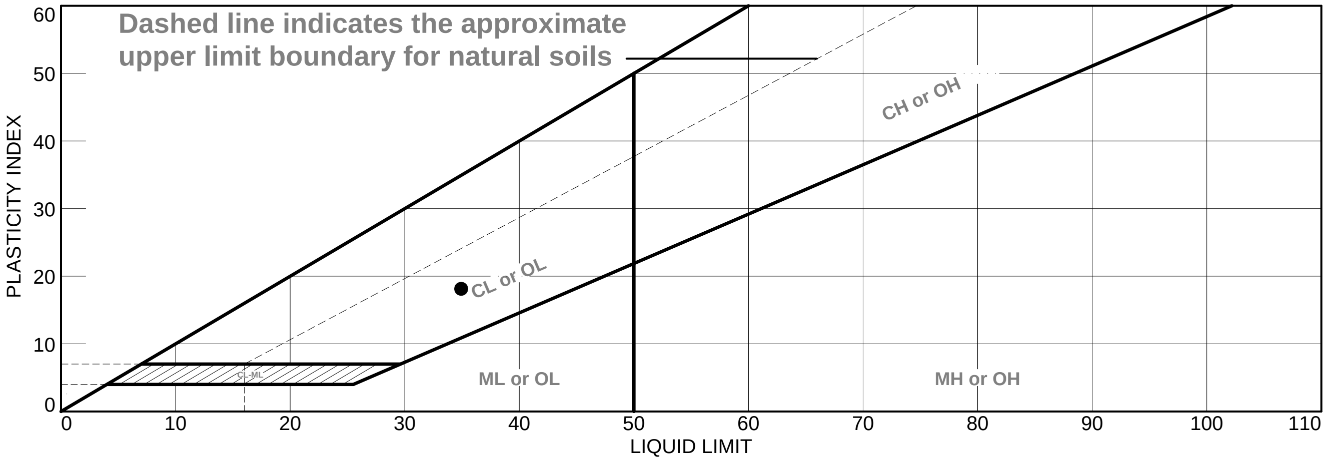
●**Source of Sample:** BH-156 **Depth:** 65 **Sample Number:** 1

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	35	17	18			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

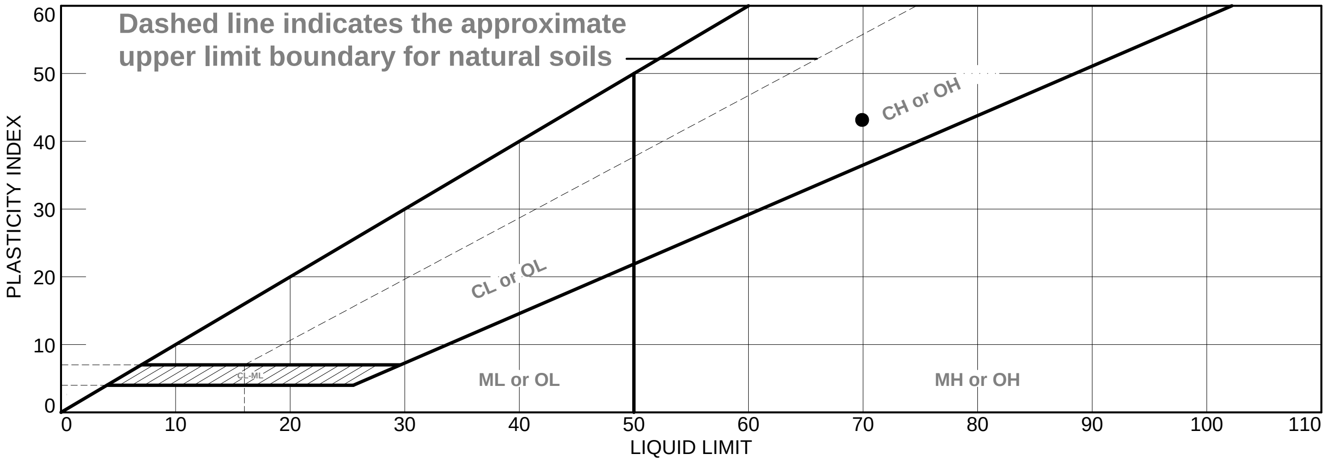
●**Source of Sample:** BH-156 **Depth:** 72 **Sample Number:** 5

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT


Dashed line indicates the approximate upper limit boundary for natural soils

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	70	27	43			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-156 **Depth:** 86 **Sample Number:** 13

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

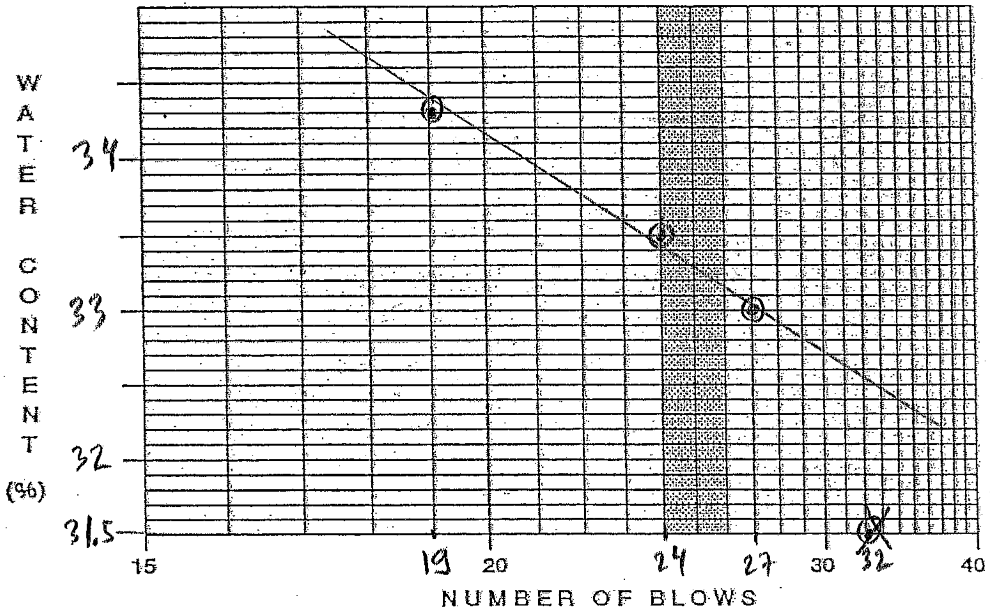
Project Name: BART TO SILICON VALLEY PROJECT Project #: 2019-131-701

Sample #: BH-156 #17@93' Lab #: G970 Date: 01/15/2020

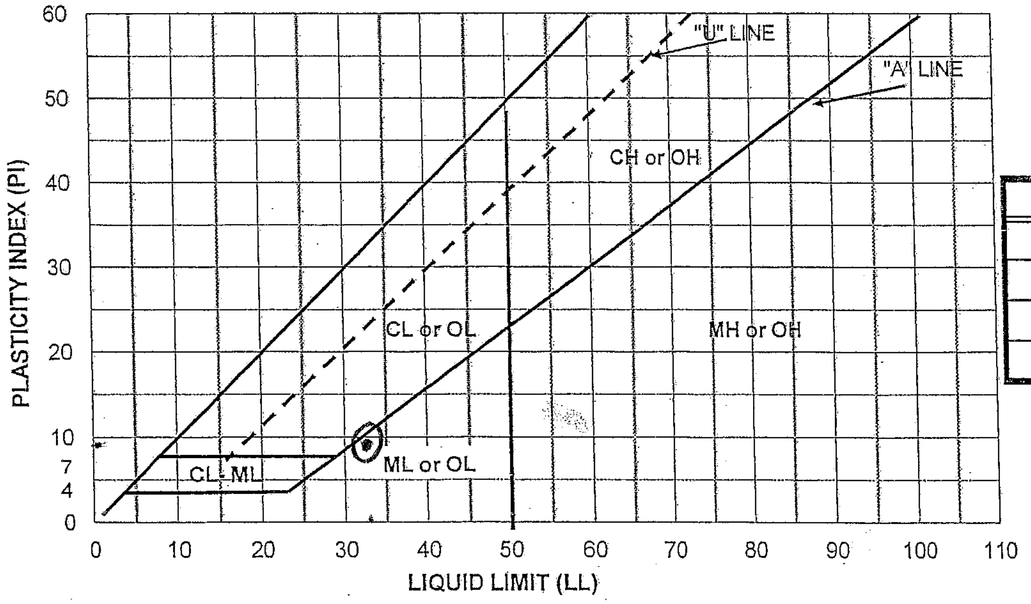
Sample Description: SILT, (ML), GRAY, HARD. Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	27	24	19				
TARE NO.	V12	N4	A1	G11	V1	V4		
TARE + WET WT (gms)	36.43	32.79	35.07	34.57	21.61	18.54		
TARE + DRY WT (gms)	30.36	27.40	29.03	28.58	19.60	17.12		
TARE WT (gms)	11.12	11.07	11.01	11.13	10.94	11.08		
WT OF WATER (gms)	6.07	5.39	6.04	5.99	2.01	1.42		
DRY WT SOIL (gms)	19.24	16.33	18.02	17.45	8.66	6.04		
WATER CONTENT %	31.5	33.0	33.5	34.3	23.2	23.5		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	33 %
PL	24 %
PI	9 %
WC	27 %

ATTERBERG LIMIT

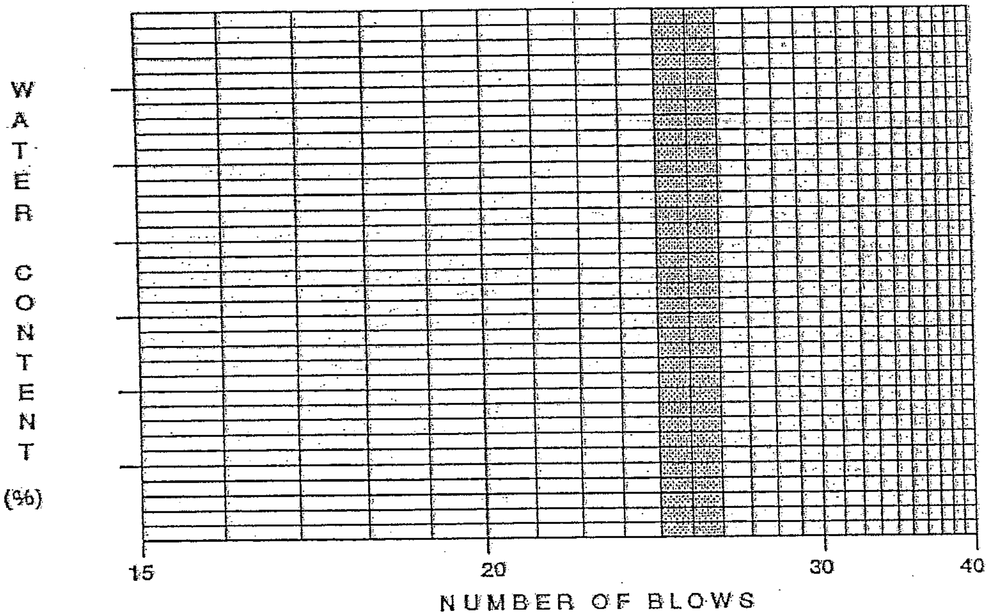
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-T61
Sample #: B4-156 #35 @ 122.5 Lab #: G990
Date: 12-11-19
Sample Description: Gray Sandy Silt, (ML)
Tested By: N.A

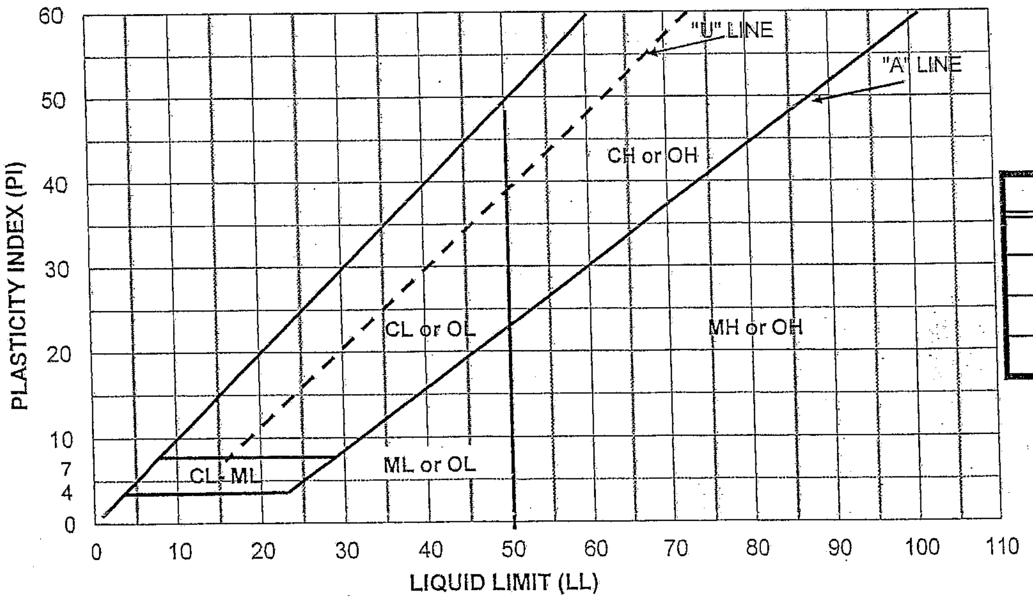
Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS					▨	▨	▨	▨
TARE NO.								
TARE + WET WT (gms)								
TARE + DRY WT (gms)								
TARE WT (gms)								
WT OF WATER (gms)								
DRY WT SOIL (gms)								
WATER CONTENT %								

None Plastic

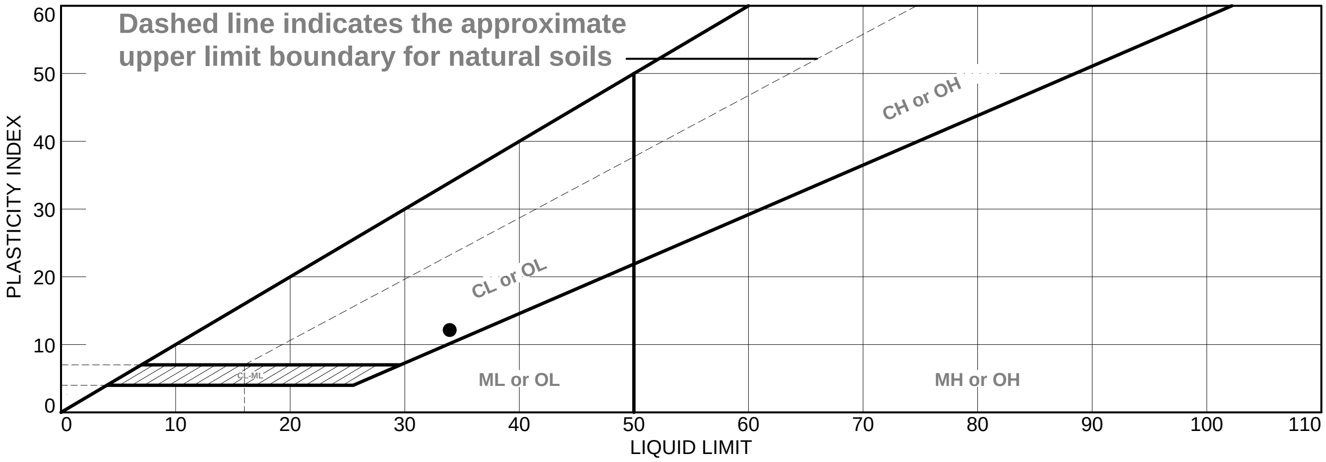


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	
PL	
PI	
WC	18%

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy clay	34	22	12			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

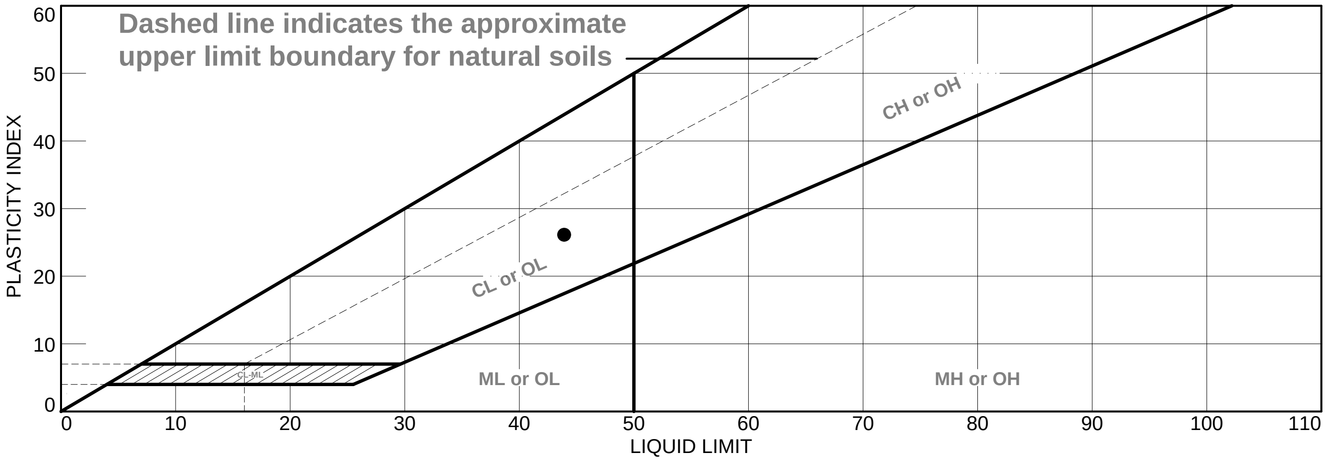
● **Source of Sample:** BH-157 **Depth:** 30 **Sample Number:** 2

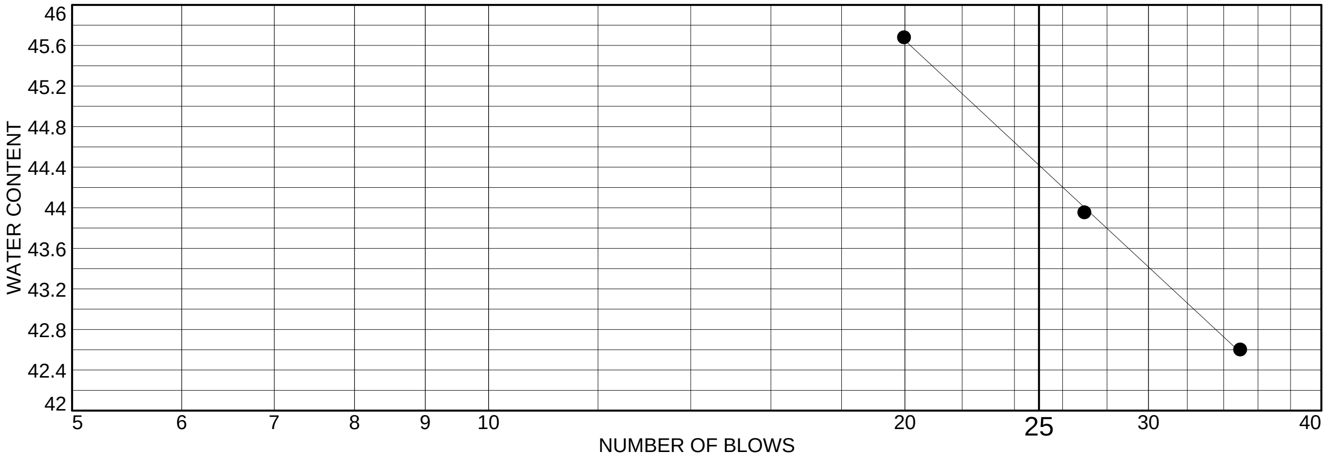
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	44	18	26		88.5	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

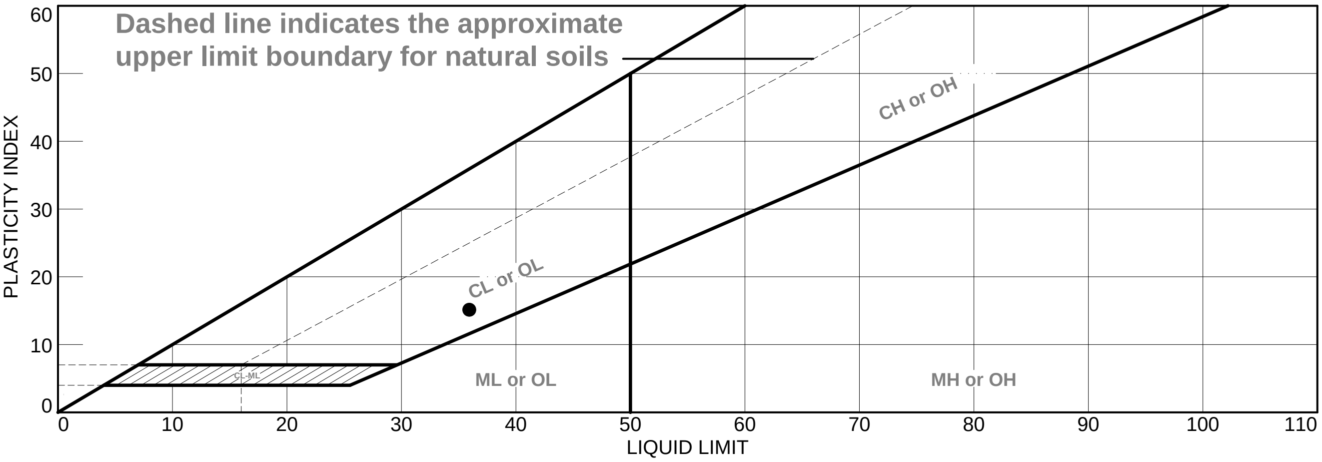
● **Source of Sample:** BH-157 **Depth:** 102 **Sample Number:** 17

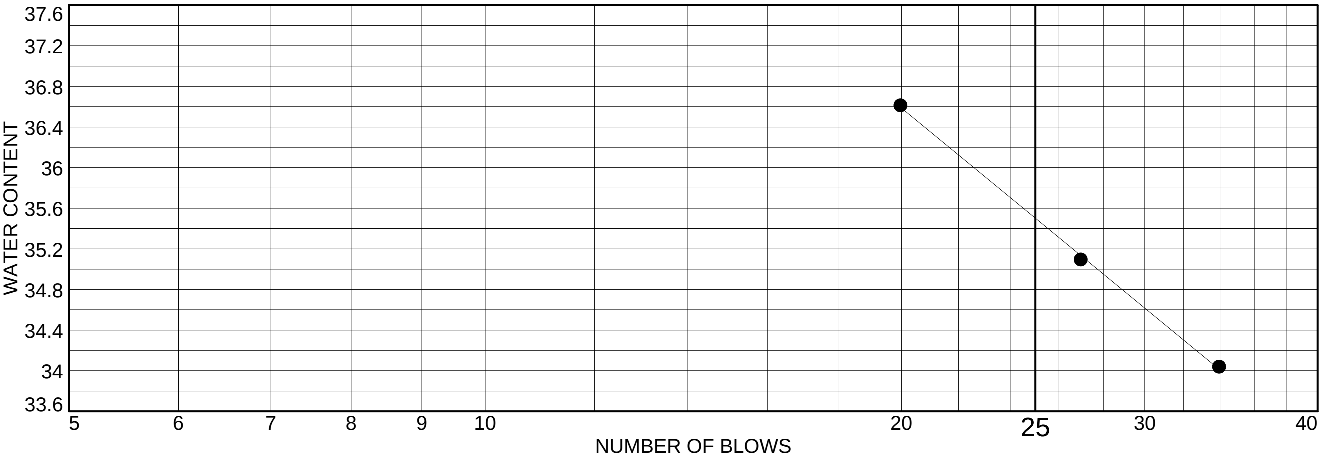
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	36	21	15			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

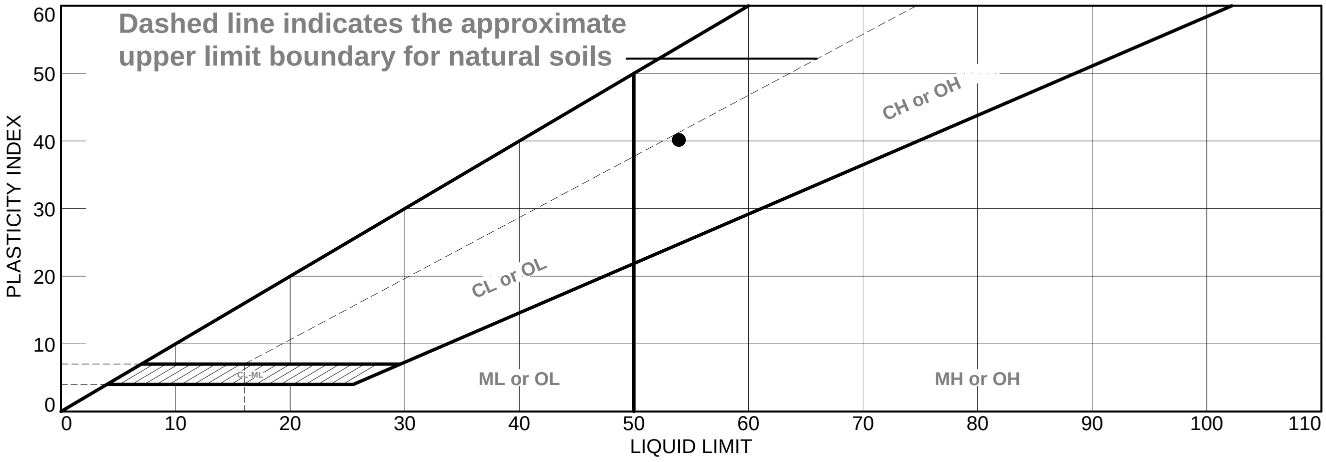
● **Source of Sample:** BH-157 **Depth:** 140 **Sample Number:** 29

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	54	14	40		89.9	CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-157 **Depth:** 170 **Sample Number:** 35

Remarks:

Figure

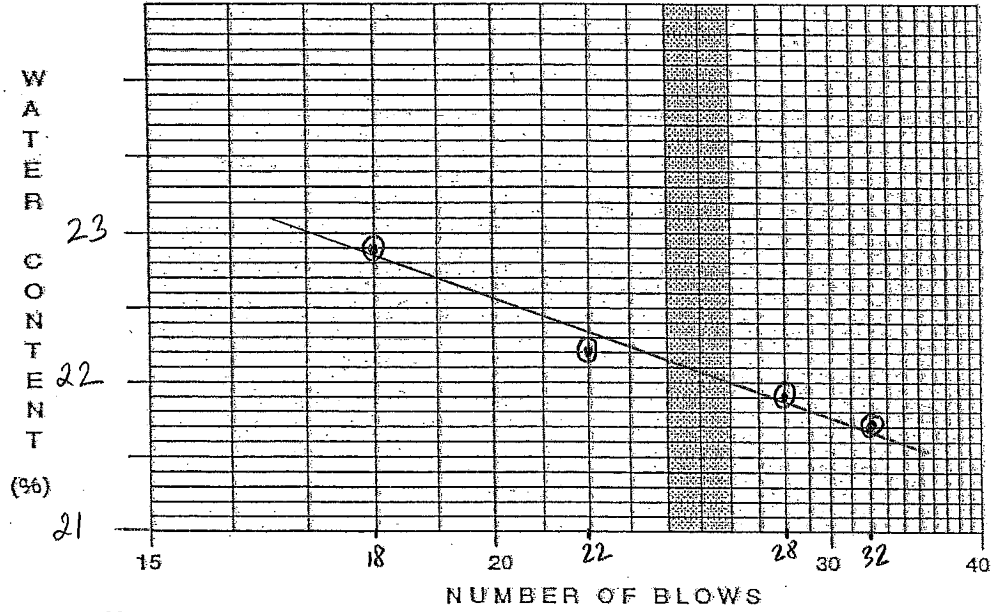
Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

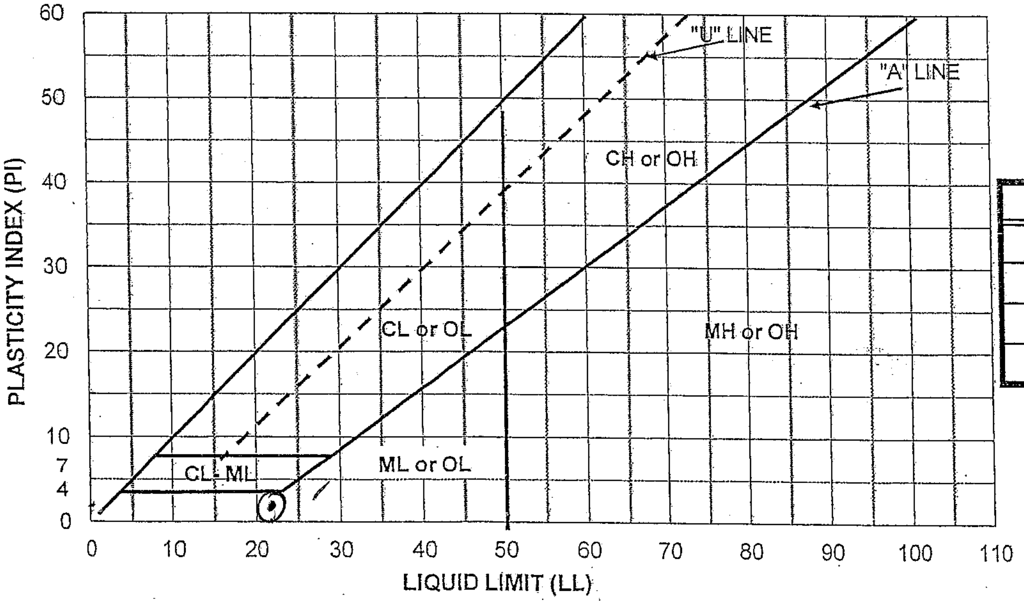
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY	Project #: 2019-131-702
Sample #: BH-157 #5A @60.5 Lab #: G970	Date: 01/28/2020
Sample Description: SILT, (ML), DARK GREENISH GRAY.	Tested By: D. NGUYEN
Estimate of % sample retain on #40 Sieve ☐	G22 / Sg

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	28	22	18				
TARE NO.	G5	V11	V2	A2	G6	G3		
TARE + WET WT (gms)	32.76	30.02	33.38	32.30	18.10	18.84		
TARE + DRY WT (gms)	28.92	26.57	29.31	28.35	16.93	17.50		
TARE WT (gms)	11.21	10.81	10.99	11.08	10.97	10.70		
WT OF WATER (gms)	3.84	3.45	4.07	3.95	1.17	1.34		
DRY WT SOIL (gms)	17.71	15.76	18.32	17.27	5.96	6.8		
WATER CONTENT %	21.7	21.9	22.2	22.9	19.6	19.7		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	22 %
PL	20 %
PI	2 %
WC	21 %

dm

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY Project #: 2019-181-702

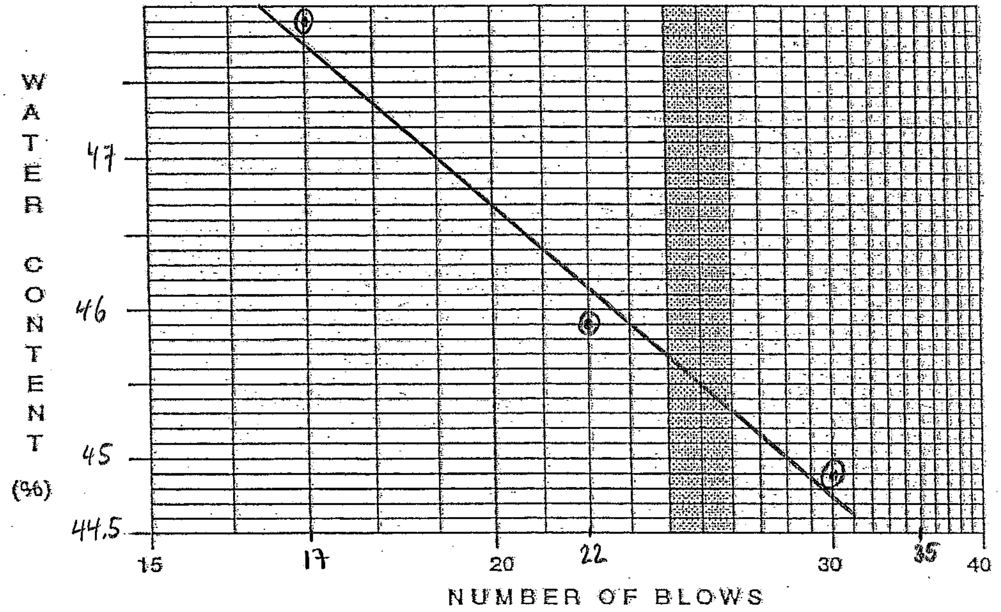
Sample #: BH-157 #33A @ 160.5 Lab #: G970 Date: 01/28/2020

Sample Description: Lean CLAY, (CL), OLIVE BROWN Tested By: D. NGUYEN

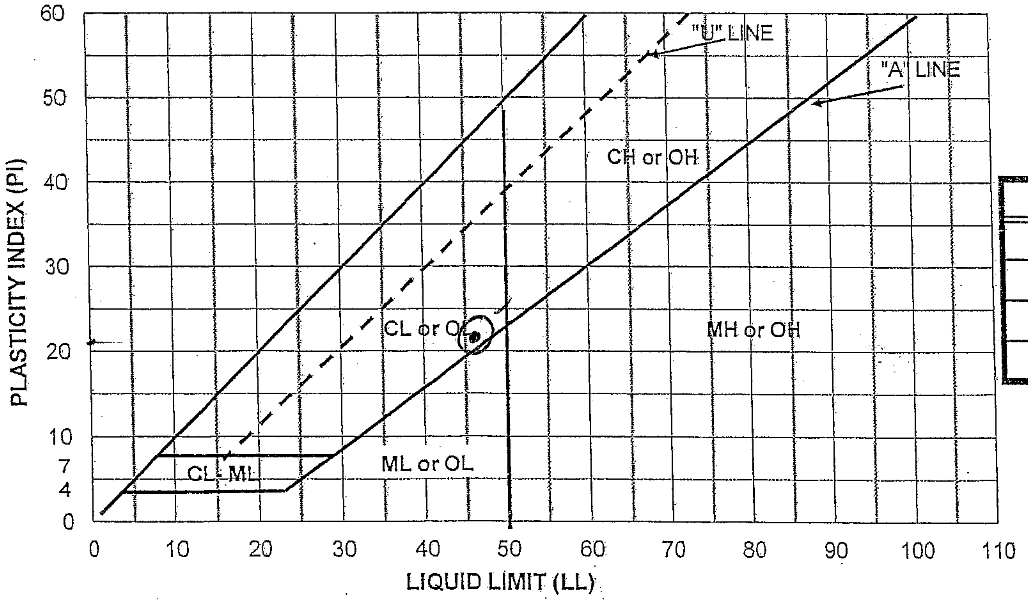
Estimate of % sample retain on #40 Sieve ☐

S12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	30	22	17	▨	▨	▨	▨
TARE NO.	N4	V12	A1	G11	V4	V1		
TARE + WET WT (gms)	34.52	30.73	33.52	36.25	19.67	18.12		
TARE + DRY WT (gms)	27.32	24.65	26.44	28.12	17.95	16.68		
TARE WT (gms)	11.07	11.12	11.00	11.13	11.08	10.95		
WT OF WATER (gms)	7.2	6.08	7.08	8.13	1.72	1.44		
DRY WT SOIL (gms)	16.25	13.53	15.44	16.99	6.87	5.73		
WATER CONTENT %	44.3	44.9	45.9	47.9	25.0	25.1		



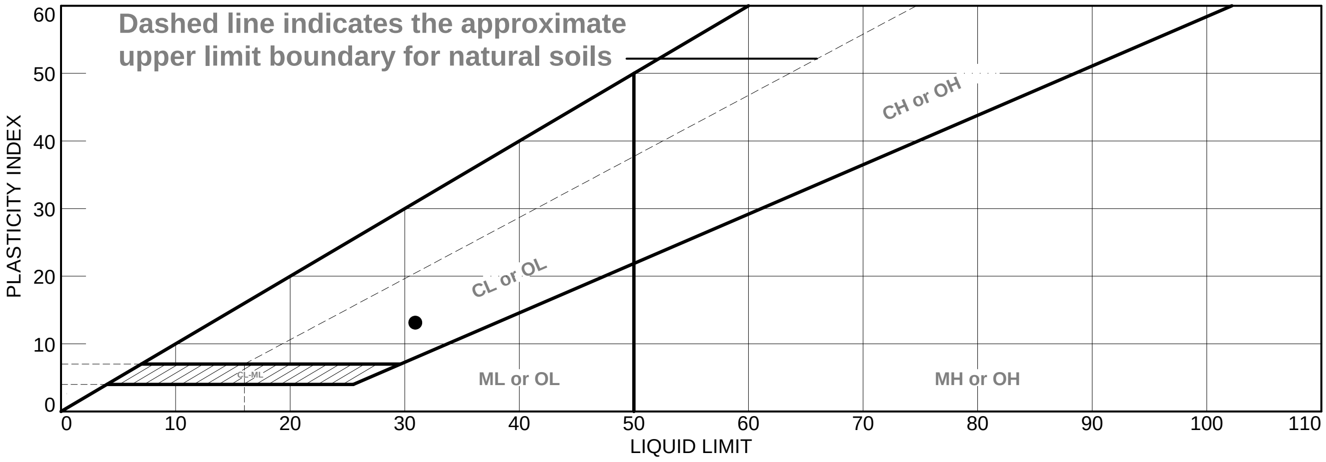
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

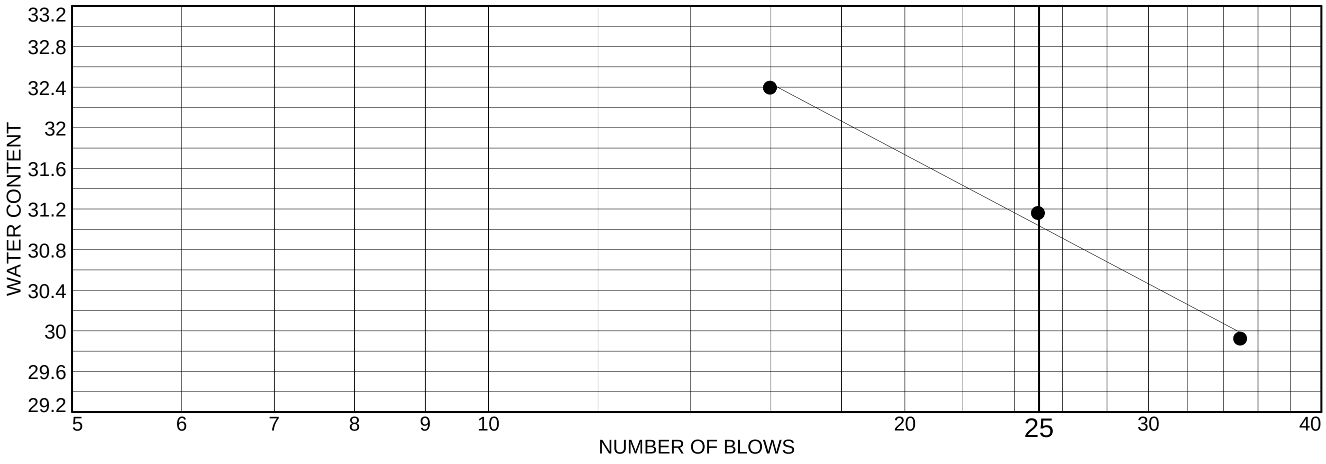


SUMMARY:	
LL	46 %
PL	25 %
PI	21 %
WC	27 %

PARIKH CONSULTANTS, INC.

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	31	18	13			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

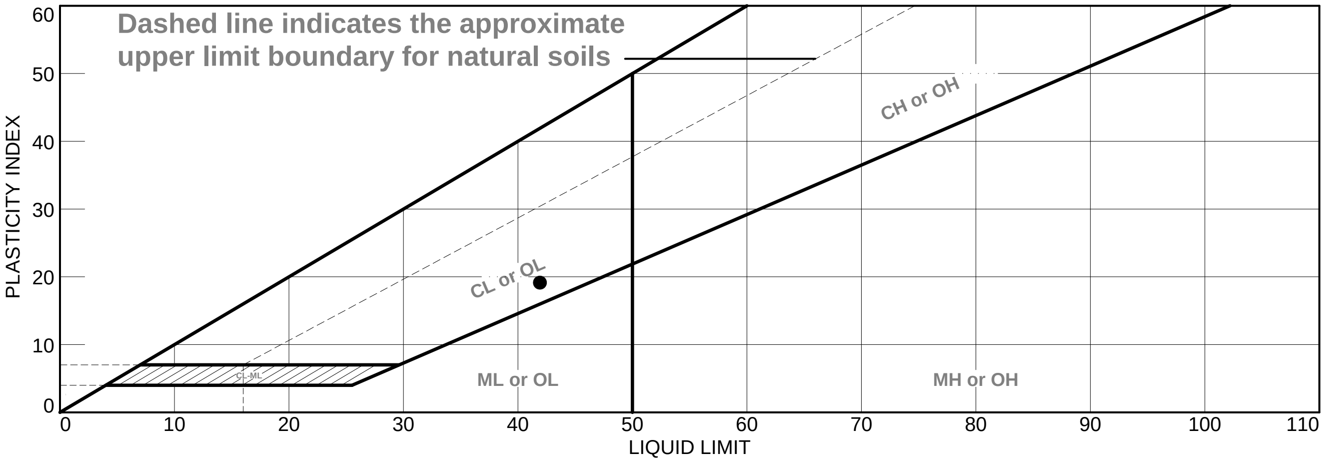
● **Source of Sample:** BH-158 **Depth:** 117 **Sample Number:** 28

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	42	23	19		85.5	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

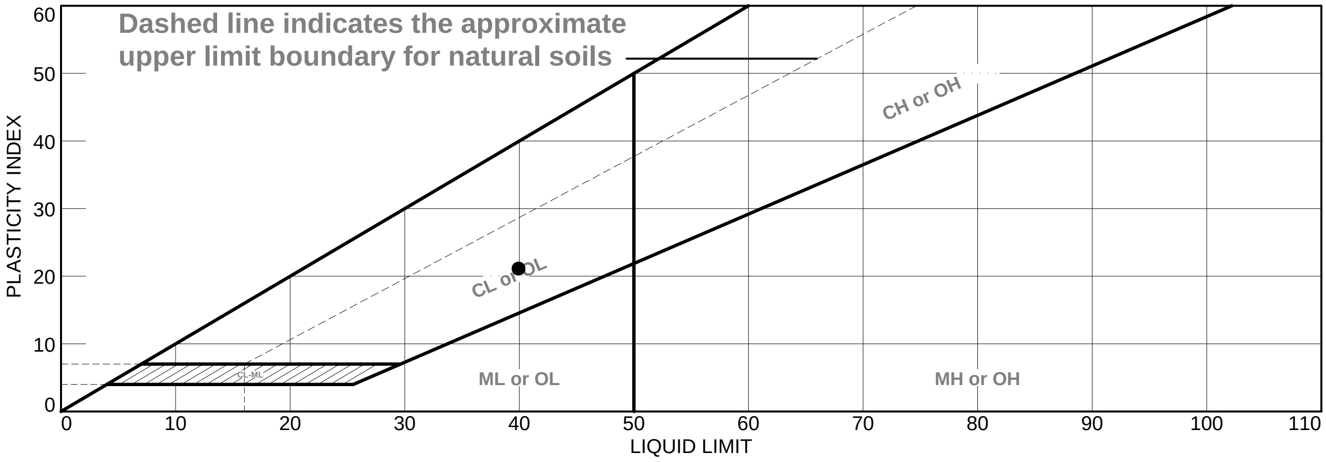
● **Source of Sample:** BH-158 **Depth:** 124 **Sample Number:** 32

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay with sand	40	19	21		83.5	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-158 **Depth:** 150 **Sample Number:** 43

Remarks:

Figure

Tested By: JH **Checked By:** JH

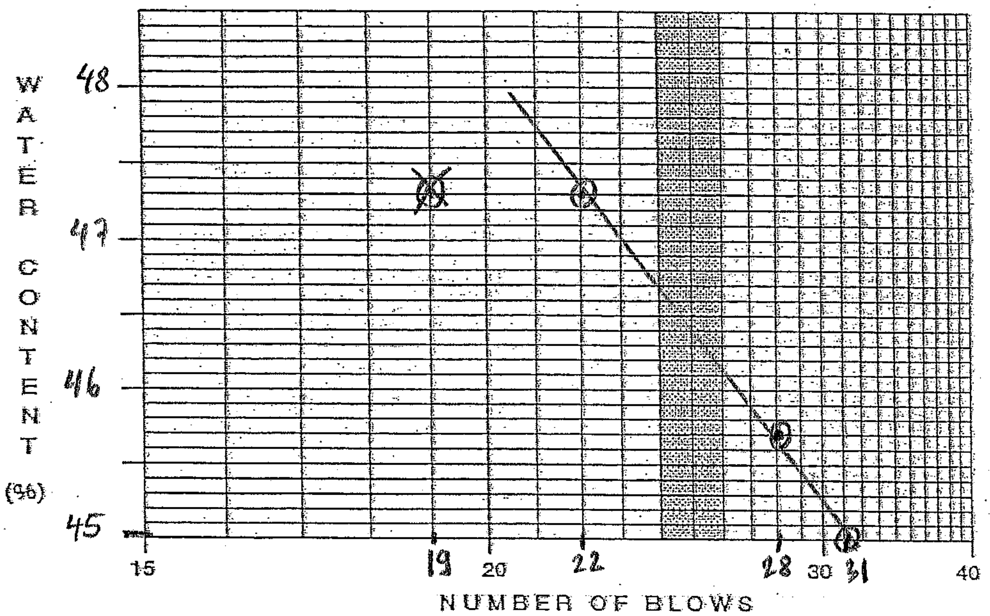
ATTERBERG LIMIT

ASTM D4318 or CAL 204

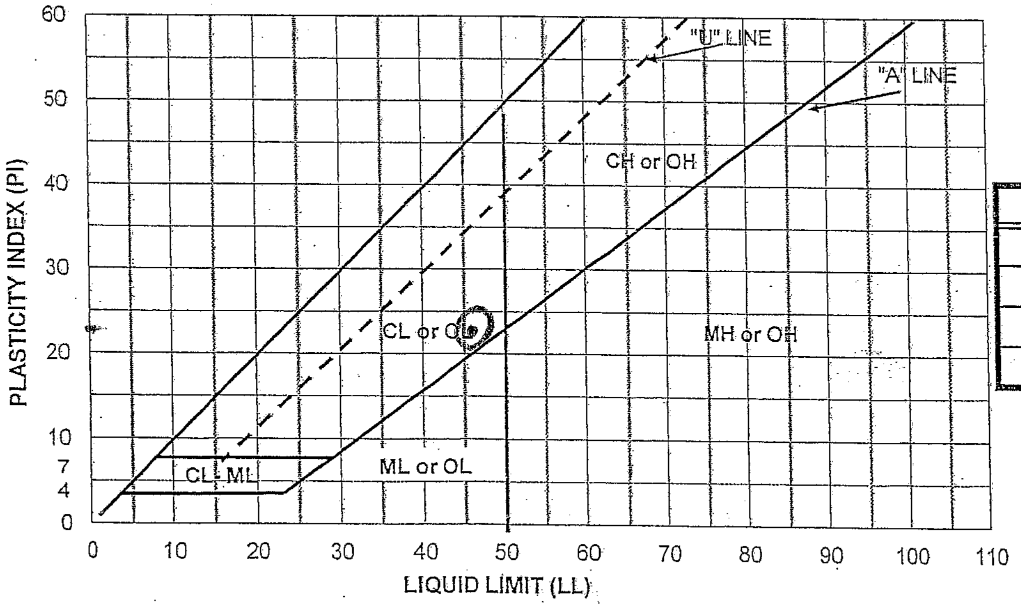
Project Name:	BART TO SILICON VALLEY	Project #:	2019-181-T02
Sample #:	BH-158 #42A @ 145½ Lab #: G970	Date:	01/21/2020
Sample Description:	Lean CLAY, (CL), OLIVE	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	28	22	~~19~~				
TARE NO.	N4	V4	G11	~~V12~~	V11	V1		
TARE + WET WT (gms)	31.10	33.85	33.63	~~34.39~~	17.75	19.41		
TARE + DRY WT (gms)	24.88	26.71	26.40	~~26.92~~	16.43	17.84		
TARE WT (gms)	11.06	11.08	11.13	~~11.12~~	10.81	10.94		
WT OF WATER (gms)	6.22	7.14	7.23	~~7.47~~	1.32	1.57		
DRY WT SOIL (gms)	13.82	15.63	15.27	~~15.8~~	5.62	6.9		
WATER CONTENT %	45%	45.7%	47.3%	~~47.3~~	23.48	22.7		

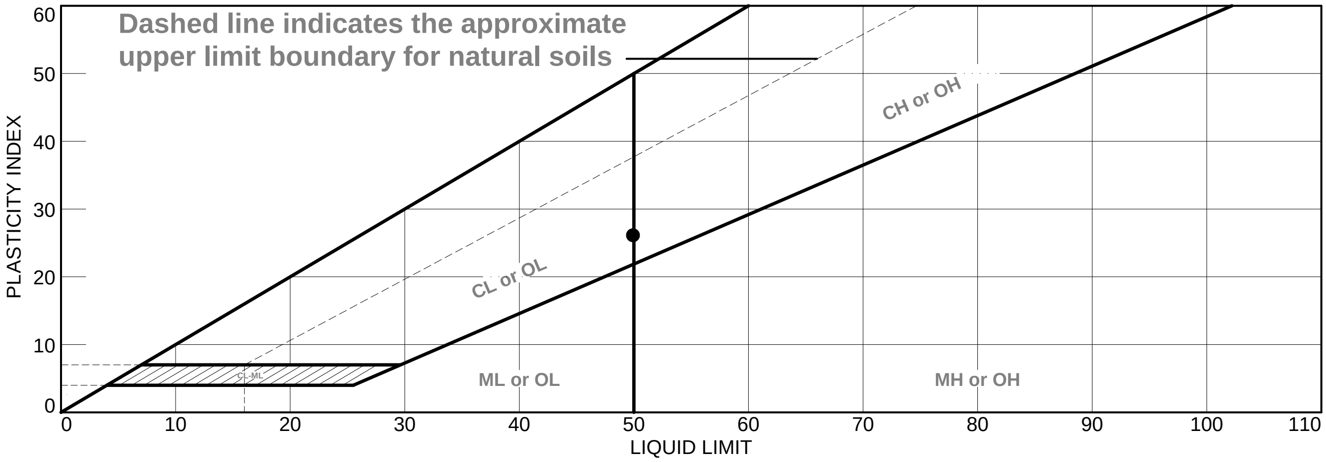


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	46 %
PL	23 %
PI	23 %
WC	20 %

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with organics	50	24	26			CL-CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

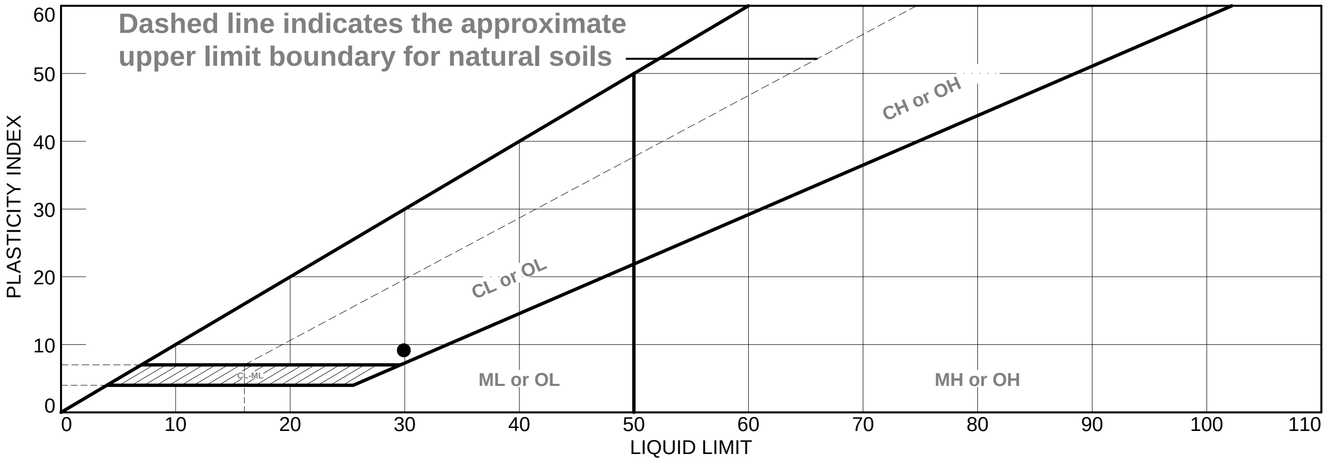
● **Source of Sample:** BH-159 **Depth:** 20 **Sample Number:** 2

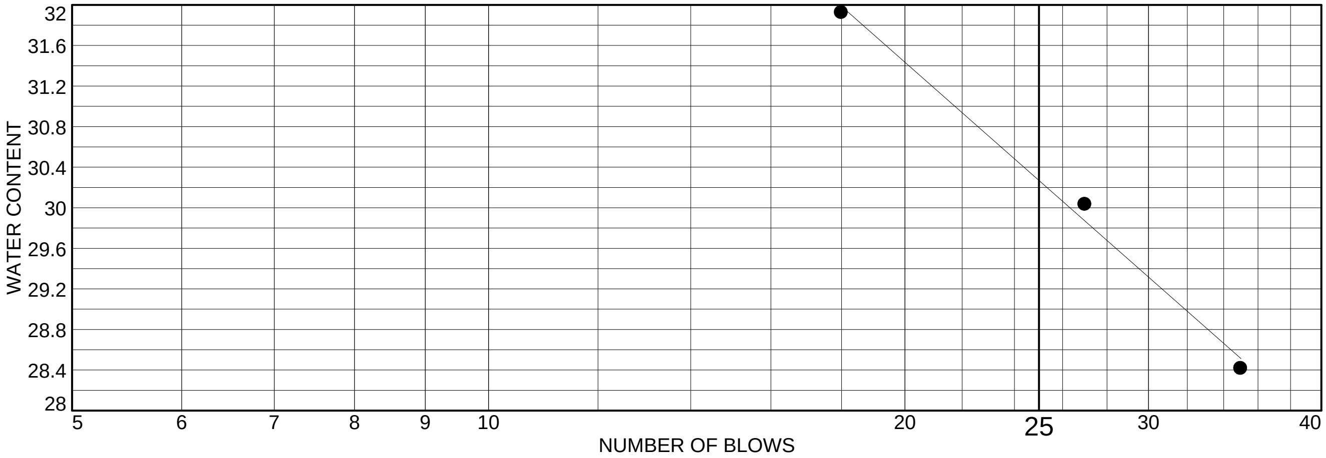
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	30	21	9		76.5	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

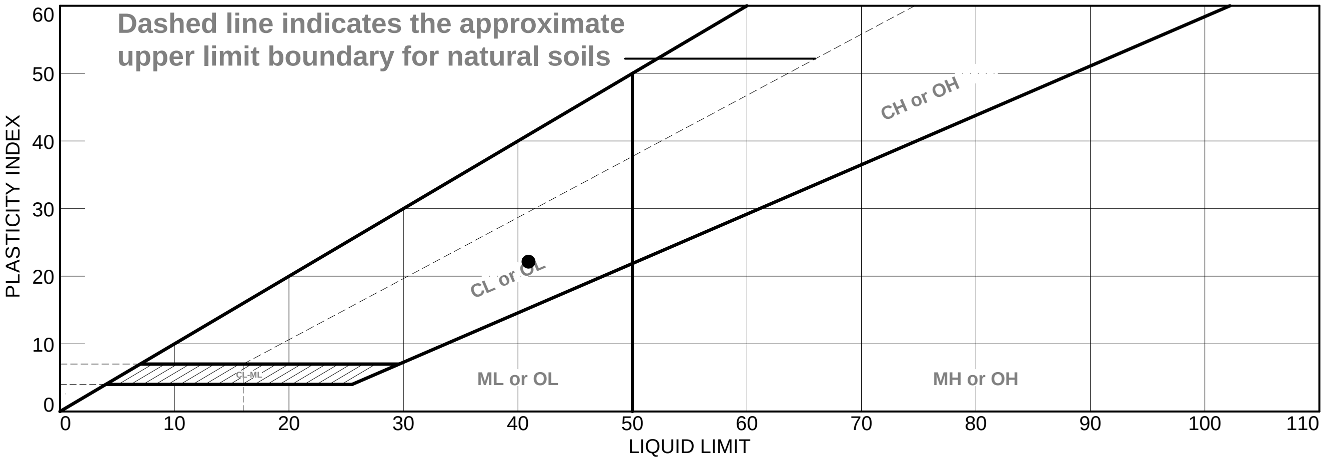
● **Source of Sample:** BH-159 **Depth:** 85.5 **Sample Number:** 16

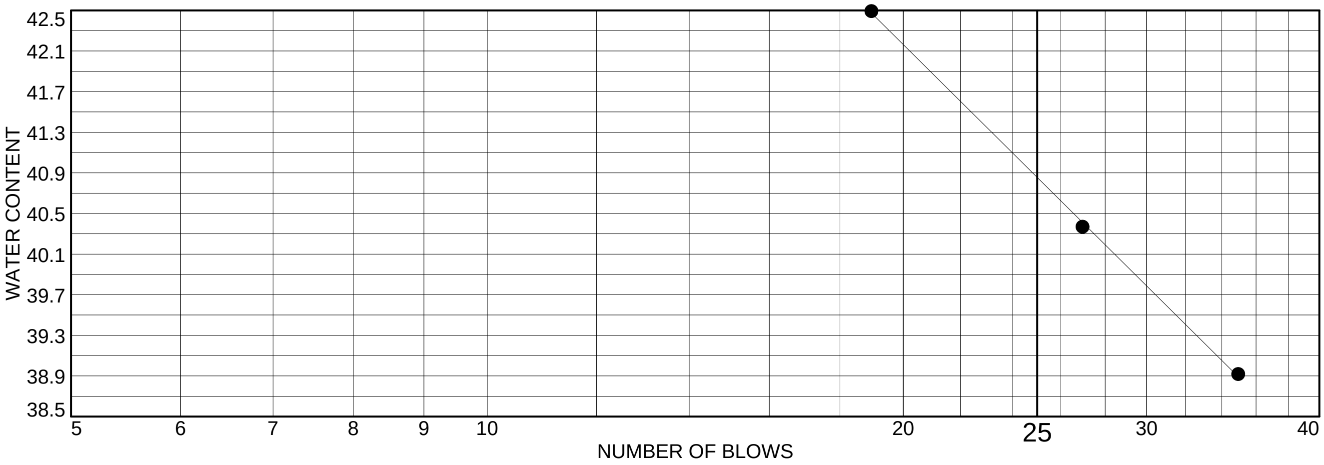
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	41	19	22			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-159 **Depth:** 90 **Sample Number:** 18

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

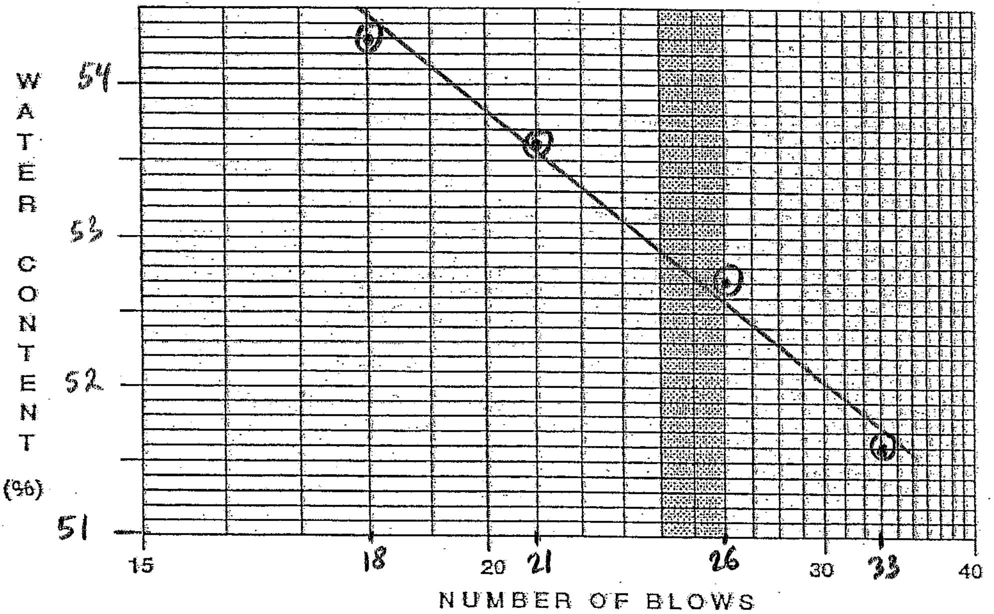
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-159 #4A@ 40' Lab #: G970 Date: 01/31/2020

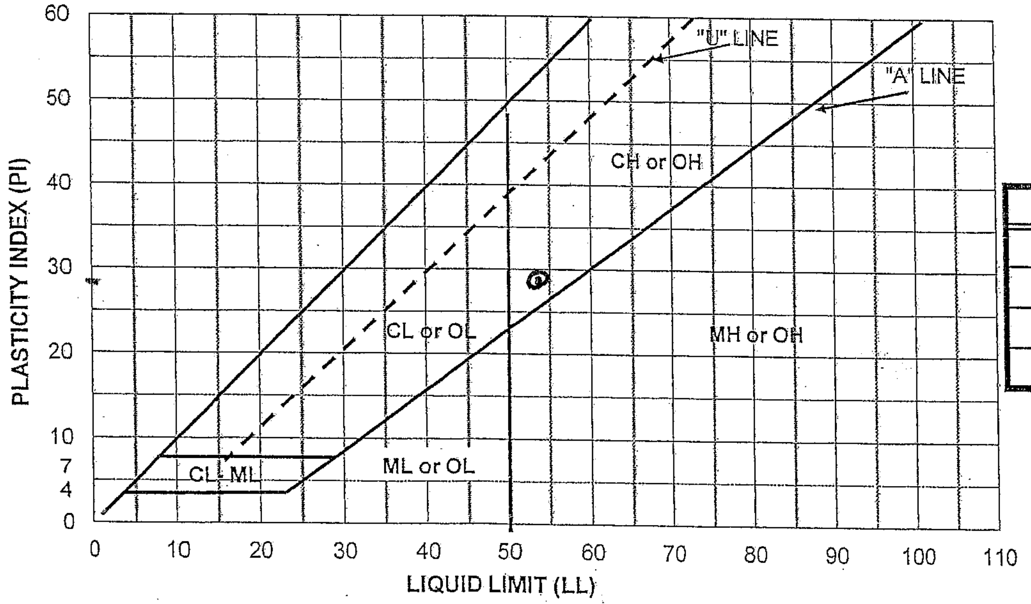
Sample Description: Fat Clay (CH), Dark Gray Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	26	21	18				
TARE NO.	V2	G2	G6	A2	G5	G3		
TARE + WET WT (gms)	32.28	32.80	34.55	33.54	19.23	19.08		
TARE + DRY WT (gms)	25.03	25.17	26.32	25.64	17.63	17.39		
TARE WT (gms)	10.99	10.68	10.97	11.08	11.21	10.70		
WT OF WATER (gms)	7.25	7.63	8.23	7.9	1.6	1.69		
DRY WT SOIL (gms)	14.04	14.49	15.35	14.56	6.42	6.69		
WATER CONTENT %	51.6	52.7	53.6	54.3	24.9	25.3		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	53 %
PL	25 %
PI	28 %
WC	30 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY — Project #: 2019-131-702

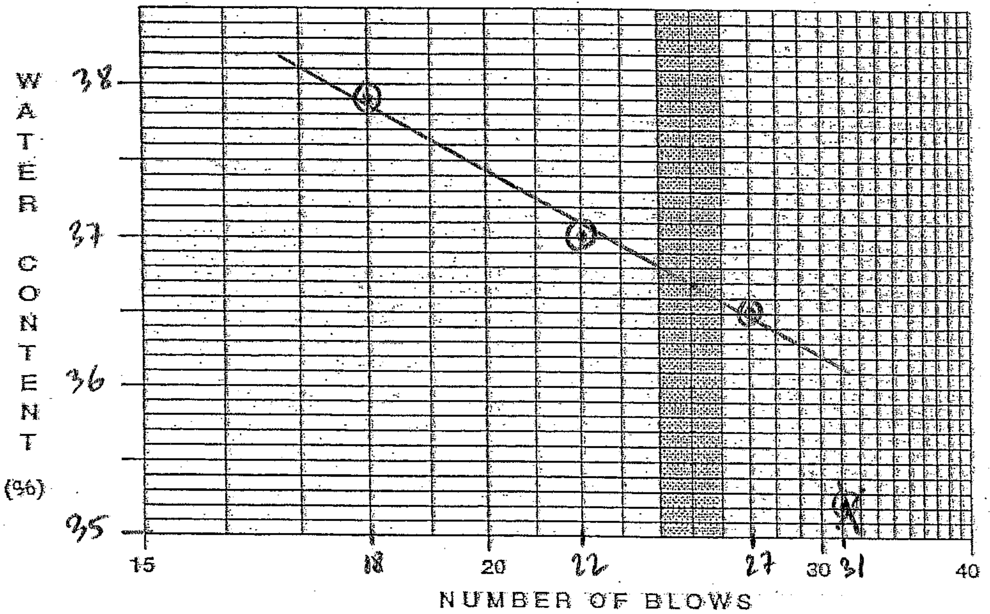
Sample #: BH-159 #14A @ 76' — Lab #: G970 — Date: 02/04/2020

Sample Description: lean CLAY, (CL), GRAY — Tested By: D. NGUYEN

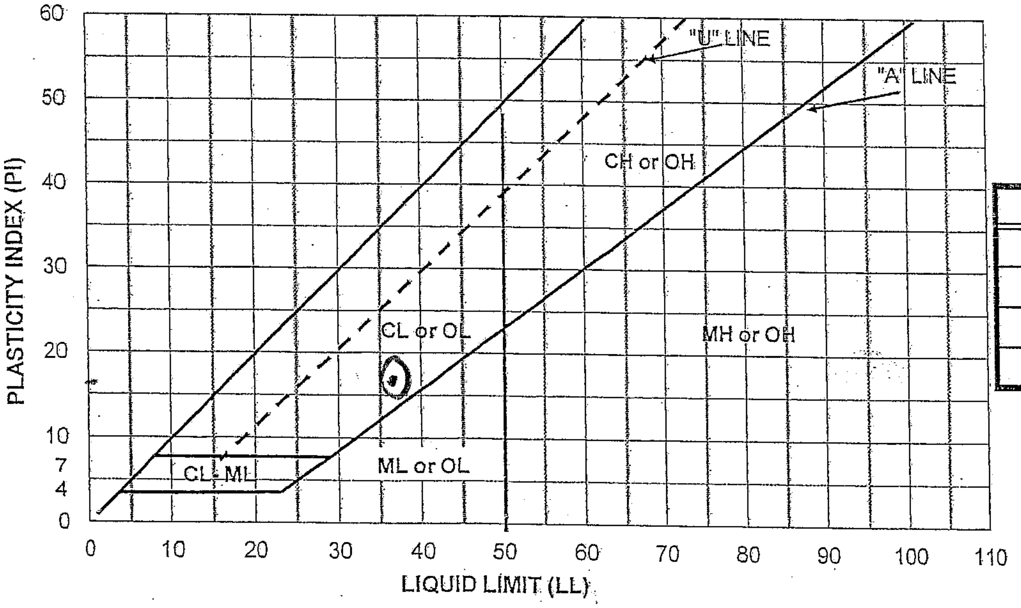
Estimate of % sample retain on #40 Sieve ☐ 513

	LIQUID LIMIT			
NUMBER OF BLOWS	~~31~~	27	22	18
TARE NO.	~~N6~~	V21	V22	J8
TARE + WET WT (gms)	~~36.52~~	37.59	36.96	36.72
TARE + DRY WT (gms)	~~29.93~~	30.52	29.95	29.66
TARE WT (gms)	~~11.20~~	11.13	10.98	11.04
WT OF WATER (gms)	~~6.59~~	7.07	7.01	7.06
DRY WT SOIL (gms)	~~18.73~~	19.39	18.97	18.62
WATER CONTENT %	~~35.2~~	36.5	37.0	37.9

PLASTIC LIMIT			WC
G2	N7		
19.49	16.47		
17.97	15.53		
10.68	10.93		
1.52	0.94		
7.29	4.6		
20.9%	20.4%		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	37 %
PL	21 %
PI	16 %
WC	23 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

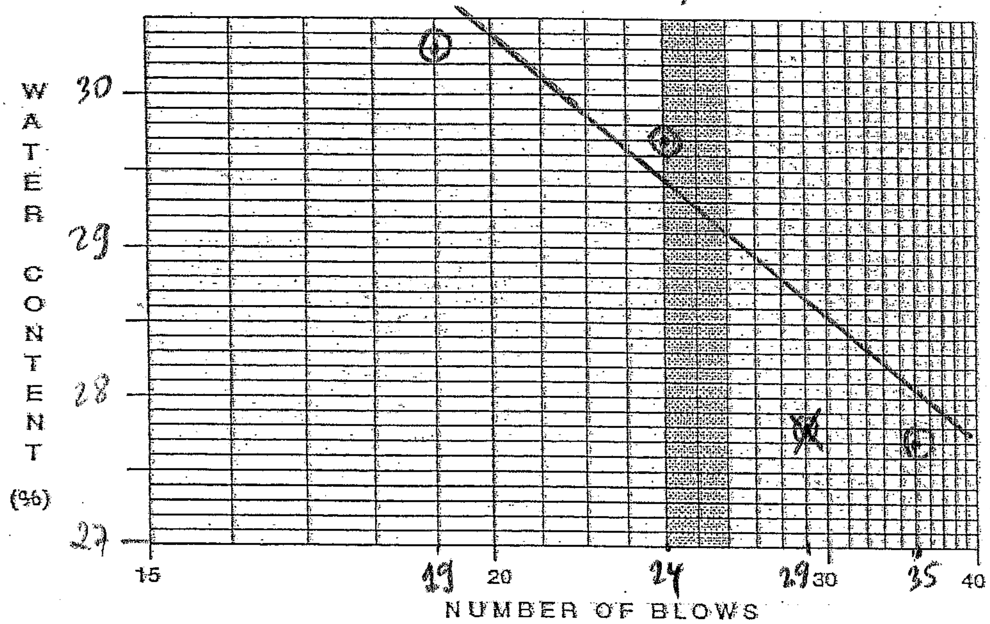
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-159 #22 A@102 Lab #: G970 Date: 1-4-2020

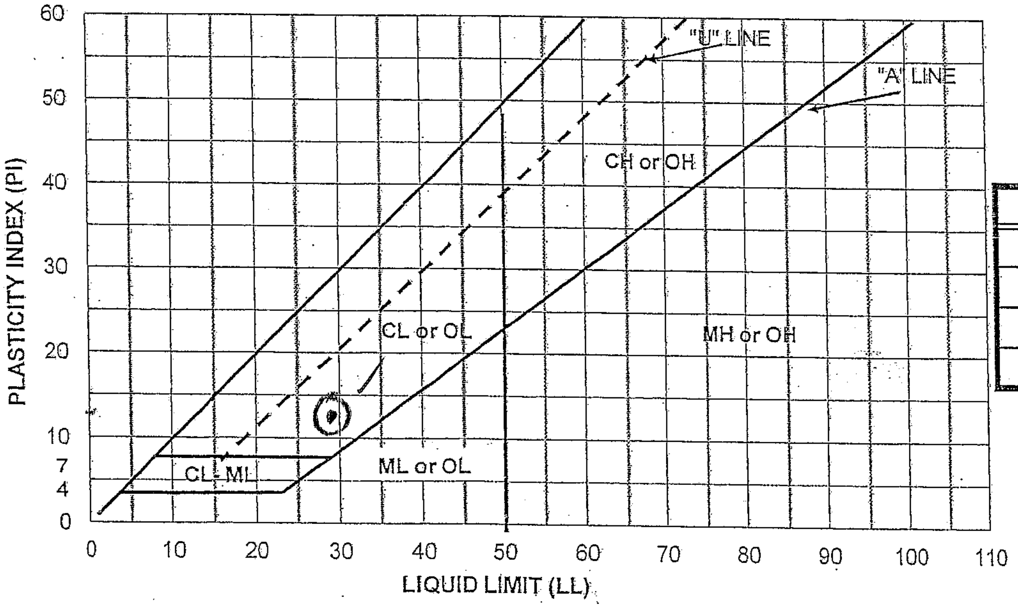
Sample Description: Sandy lean clay, (CL), Dark yellowish Brown Tested By: N.A

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	24	19	~~29~~				
TARE NO.	A4	G1	V10	~~G4~~	A10	N1		
TARE + WET WT (gms)	26.93	27.83	29.79	~~36.24~~	19.78	20.01		
TARE + DRY WT (gms)	23.41	24.01	25.41	~~30.67~~	18.59	18.81		
TARE WT (gms)	10.70	11.15	10.96	~~10.67~~	11.10	11.06		
WT OF WATER (gms)	3.52	3.82	4.38	~~5.57~~	1.19	1.2		
DRY WT SOIL (gms)	12.71	12.86	14.45	~~20.0~~	7.49	7.75		
WATER CONTENT %	27.7	29.7	30.31	~~27.8~~	15.9	15.5		



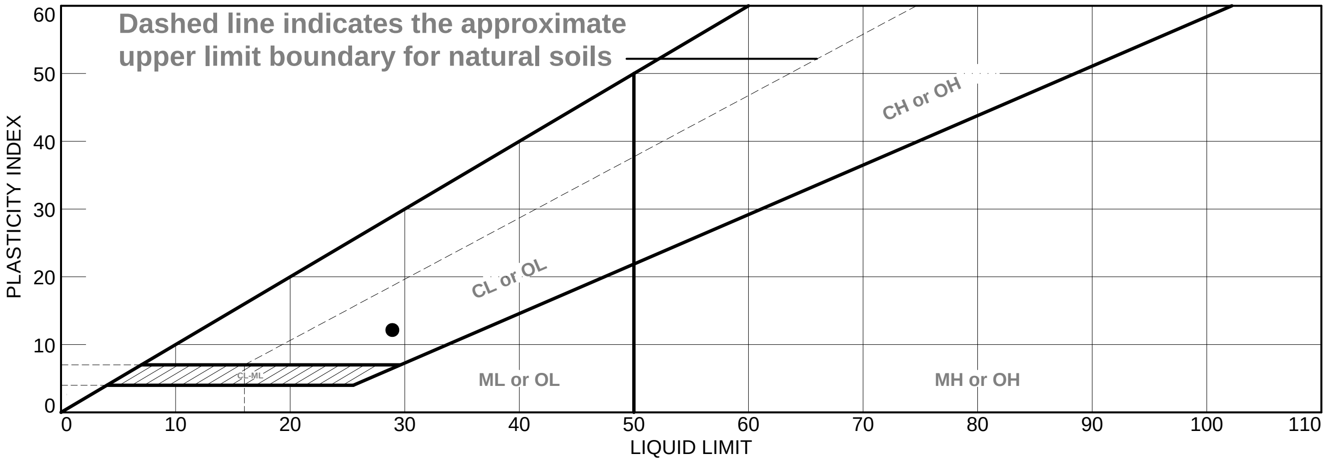
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	29 %
PL	16 %
PI	13 %
WC	18 %

PARIKH CONSULTANTS, INC.

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy clay	29	17	12			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

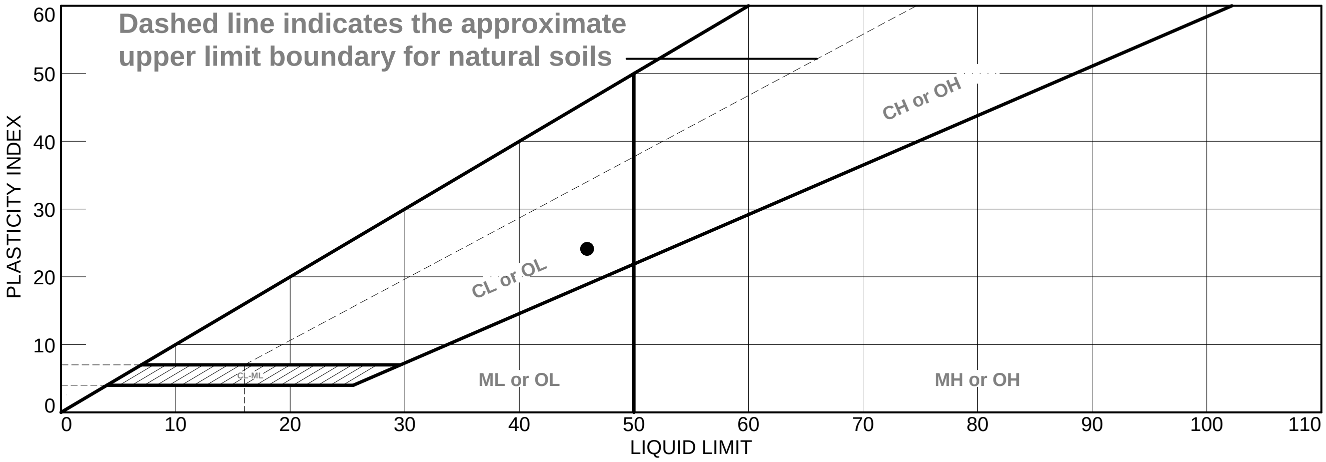
● **Source of Sample:** BH-160 **Depth:** 15 **Sample Number:** 1

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	46	22	24			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

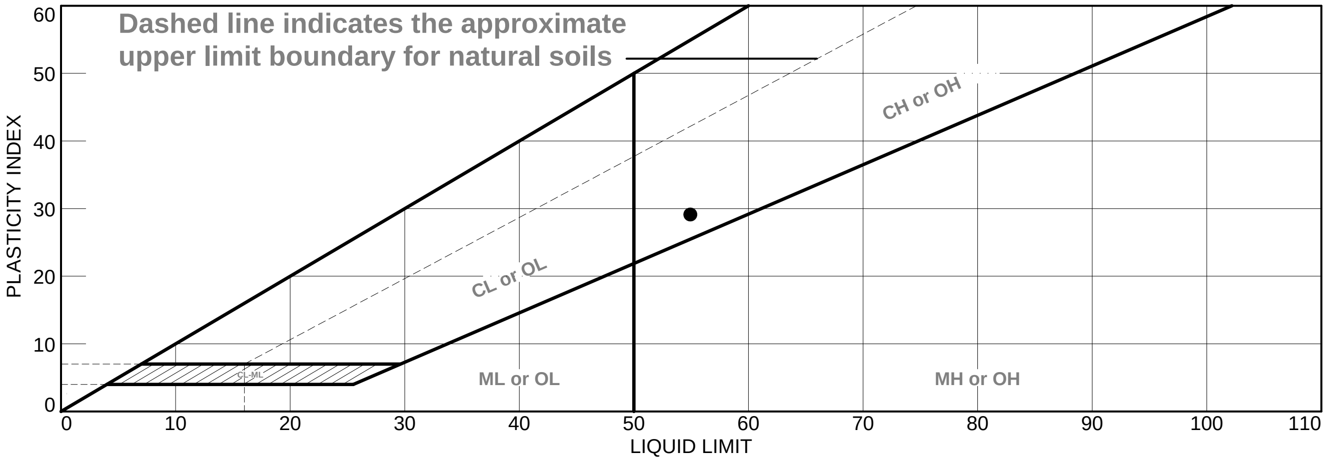
●**Source of Sample:** BH-160 **Depth:** 30 **Sample Number:** 4

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	55	26	29			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

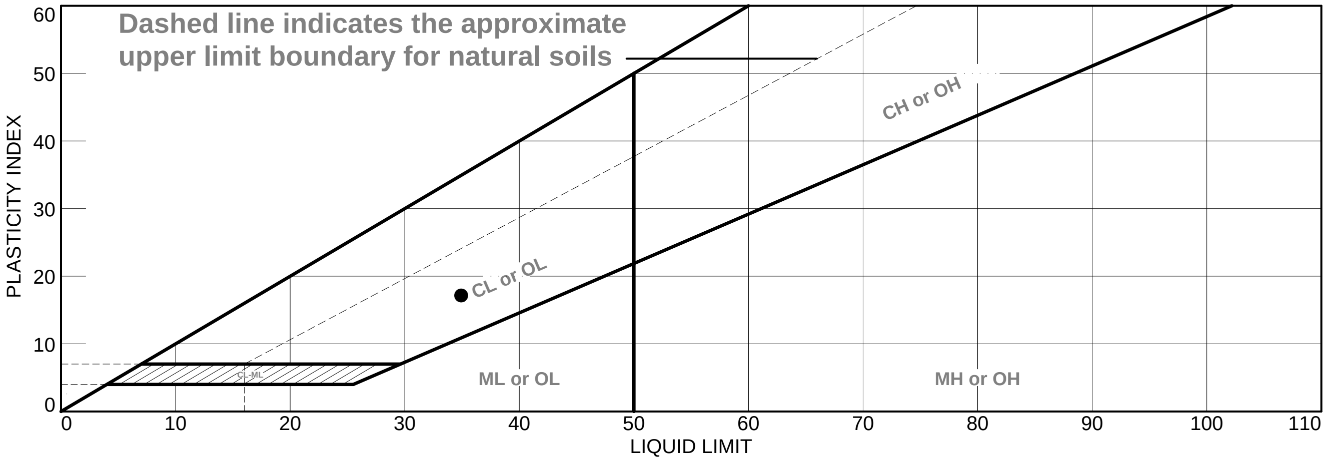
● **Source of Sample:** BH-160 **Depth:** 35 **Sample Number:** 5

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	35	18	17			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

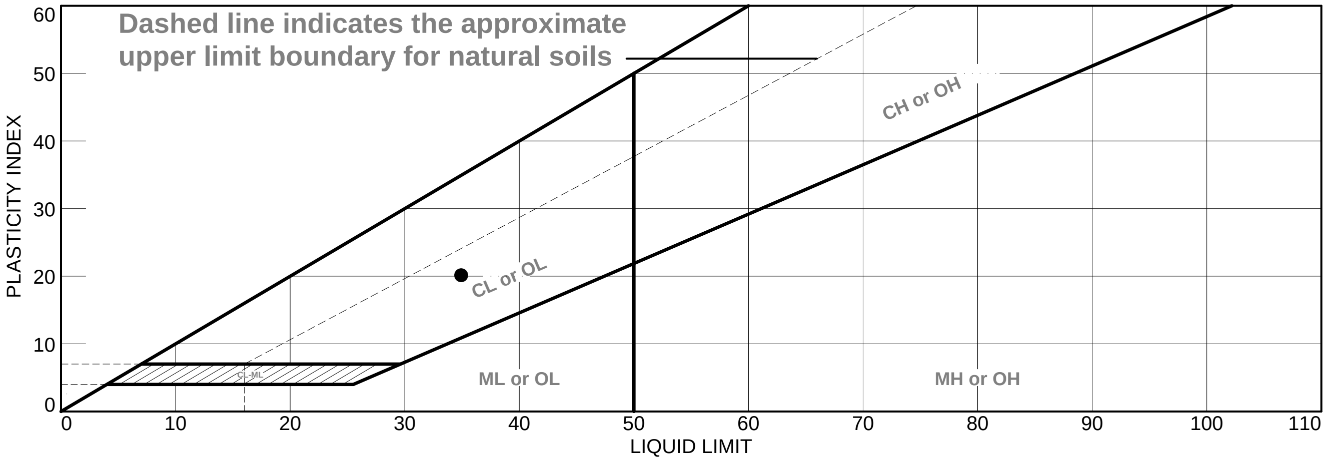
● **Source of Sample:** BH-160 **Depth:** 87 **Sample Number:** 19

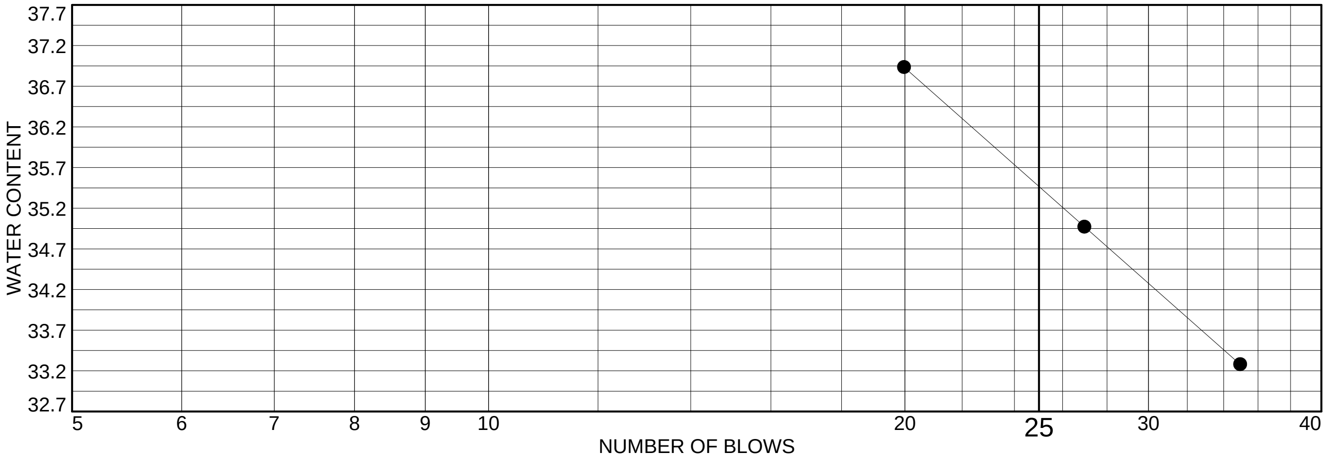
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	35	15	20			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

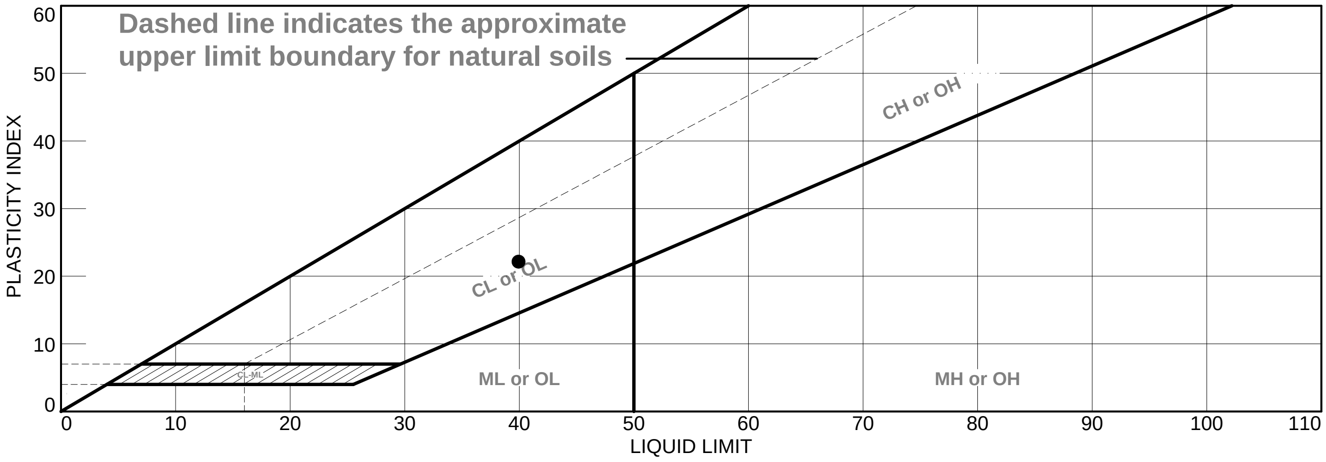
● **Source of Sample:** BH-160 **Depth:** 89.5 **Sample Number:** 20A

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	40	18	22			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

●**Source of Sample:** BH-160 **Depth:** 165 **Sample Number:** 41

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

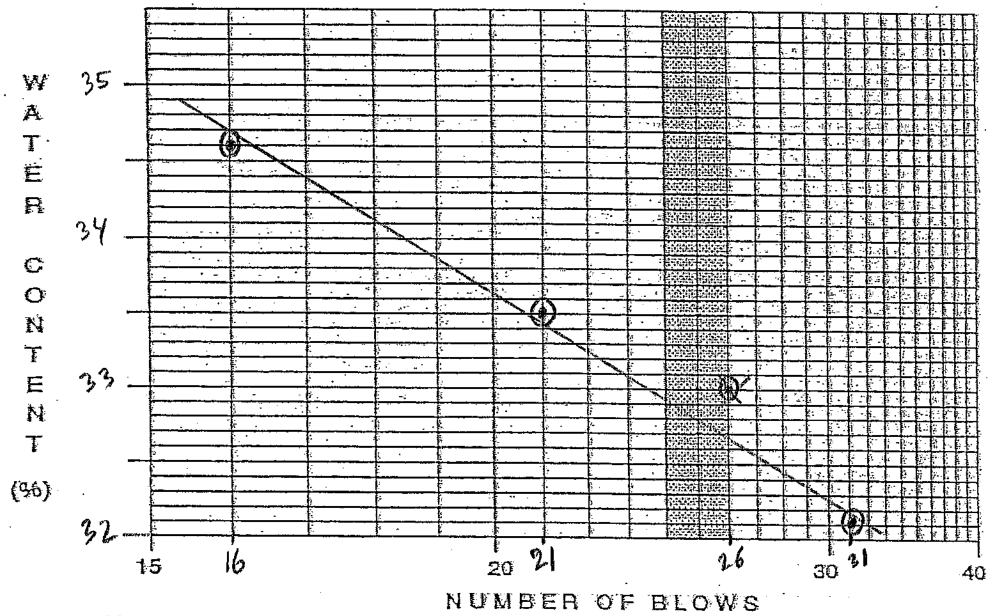
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-160 #18 @ 85' Lab #: G970 Date: 02/06/2020

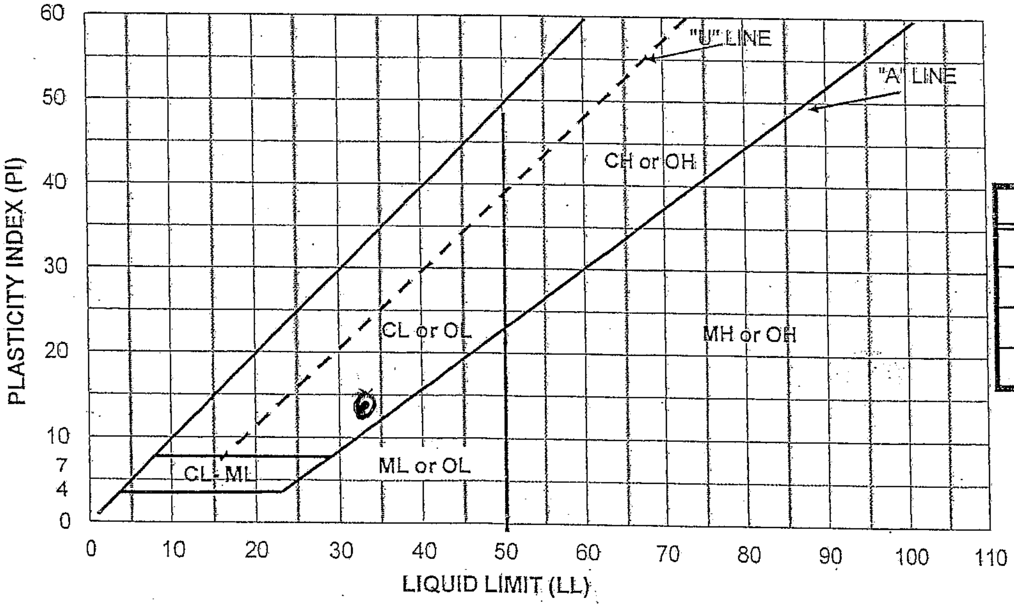
Sample Description: Lean CLAY, (CL), Dark greenish gray Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	26	21	16				
TARE NO.	V2	G6	G5	V7	A2	G3		
TARE + WET WT (gms)	35.64	35.65	34.03	37.25	21.74	18.91		
TARE + DRY WT (gms)	29.65	29.53	28.30	30.51	20.05	17.63		
TARE WT (gms)	10.99	10.97	11.21	11.05	11.09	10.70		
WT OF WATER (gms)	5.99	6.12	5.73	6.74	1.69	1.28		
DRY WT SOIL (gms)	18.66	18.56	17.09	19.46	8.96	6.93		
WATER CONTENT %	32.1	33.0	33.5	34.6	18.9	18.5		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



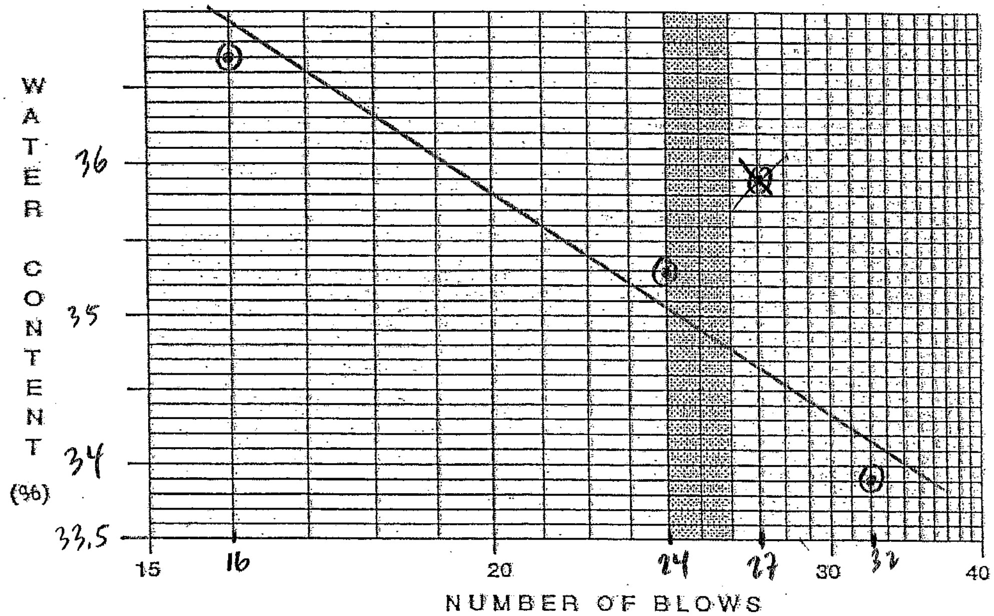
SUMMARY:	
LL	33 %
PL	19 %
PI	14 %
WC	23 %

ATTERBERG LIMIT
ASTM D4318 or CAL 204

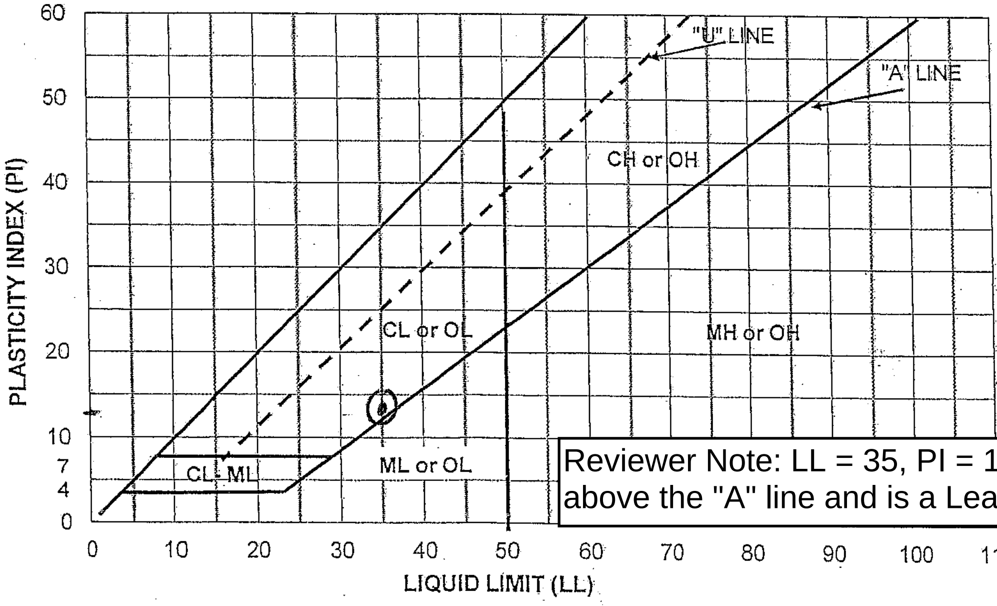
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702
Sample #: BH-160 #24A @ 99.5 Lab #: G970 Date: 02/05/2020
Sample Description: SILTY CLAY, (CL-ML), DARK YELLOWISH BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	~~27~~	24	16				
TARE NO.	V4	~~G11~~	G9	N4	V11	V1		
TARE + WET WT (gms)	34.48	~~37.12~~	34.94	36.02	17.65	20.63		
TARE + DRY WT (gms)	28.56	~~30.26~~	28.72	29.32	16.45	18.89		
TARE WT (gms)	11.09	~~11.13~~	11.11	11.08	10.81	10.95		
WT OF WATER (gms)	5.92	~~6.86~~	6.22	6.7	1.2	1.74		
DRY WT SOIL (gms)	17.47	~~19.13~~	17.61	18.24	5.64	7.94		
WATER CONTENT %	33.9	~~35.9~~	35.3	36.7	21.3	21.9		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	35 %
PL	22 %
PI	13 %
WC	28 %

Reviewer Note: LL = 35, PI = 13 plots on/above the "A" line and is a Lean Clay (CL).

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

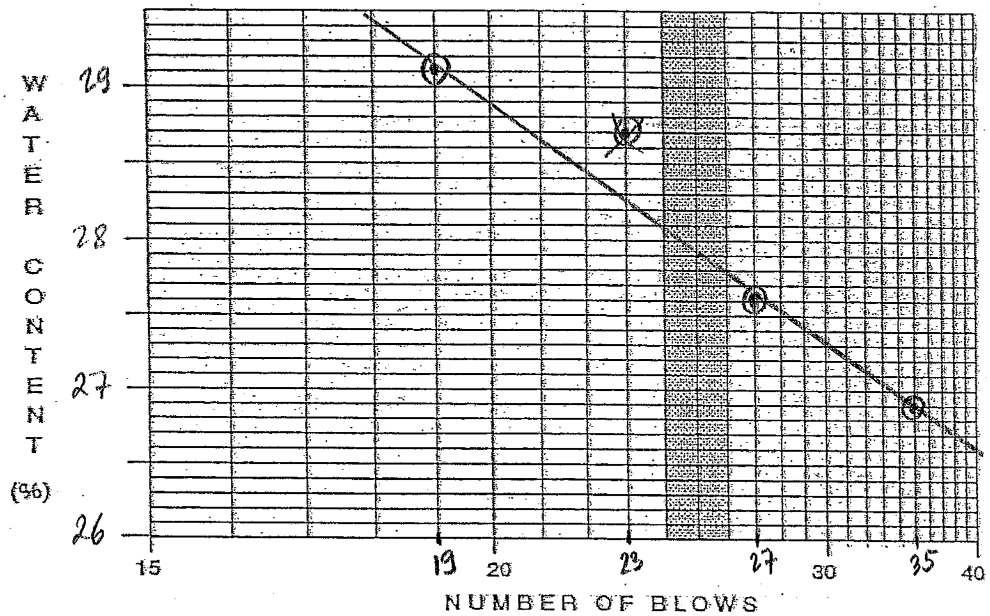
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-160 #43A @ 176' Lab #: G990 Date: 02/06/2020

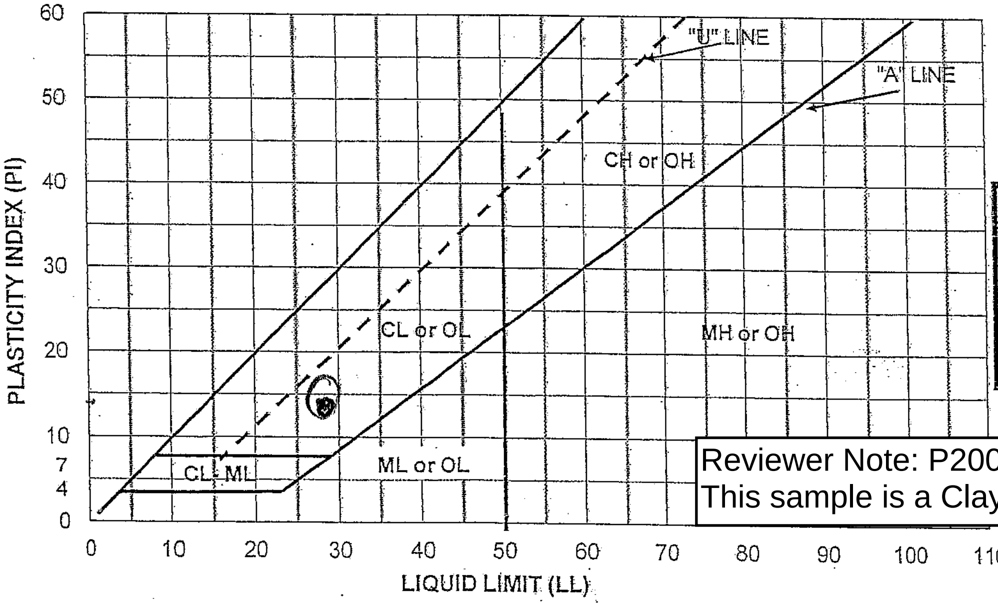
Sample Description: SANDY LEAN CLAY, (CL), OLIVE BROWN Tested By: D-NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	27	23	19				
TARE NO.	V1	N4	V11	G11	G9	V4		
TARE + WET WT (gms)	37.51	36.15	38.18	38.53	18.10	19.91		
TARE + DRY WT (gms)	31.88	30.72	32.08	32.36	17.27	18.83		
TARE WT (gms)	10.95	11.07	10.80	11.13	11.11	11.08		
WT OF WATER (gms)	5.63	5.43	6.1	6.17	0.83	1.08		
DRY WT SOIL (gms)	20.93	19.65	21.28	21.23	6.16	7.75		
WATER CONTENT %	26.9%	27.6%	28.7	29.1	13.5%	13.9%		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	28 %
PL	14 %
PI	14 %
WC	

not requested

Reviewer Note: P200 = 36.4%.
This sample is a Clayey Sand (SC).

ATTERBERG LIMIT

ASTM D4318 or CAL 204

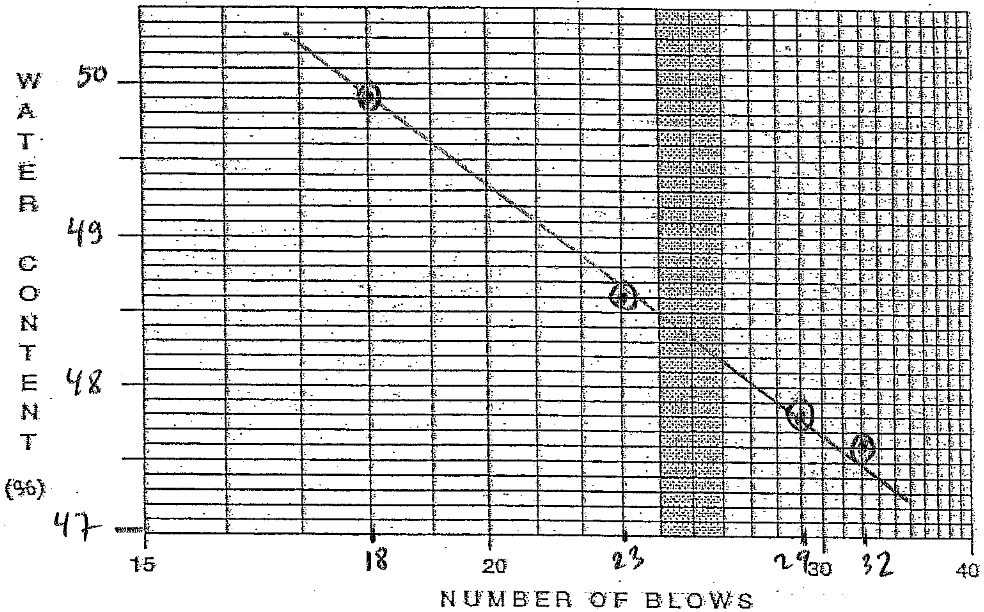
Project Name: BART TO SILICON VALLEY Project #: 2019-131-T02

Sample #: BH-160 #46A@191' Lab #: G970 Date: 02/04/2020

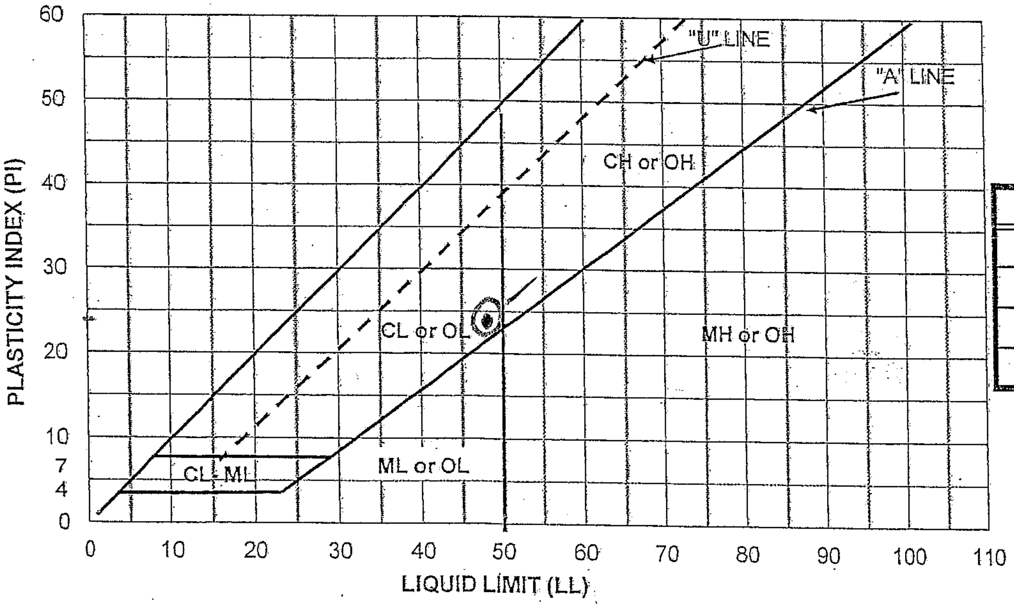
Sample Description: Lean CLAY, (CL), Greenish gray, Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ ≤12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	29	23	18				
TARE NO.	V4	N4	V1	V11	G11	G9		
TARE + WET WT (gms)	35.54	35.87	36.76	37.31	17.88	19.63		
TARE + DRY WT (gms)	27.66	27.85	28.31	28.48	16.56	17.97		
TARE WT (gms)	11.09	11.07	10.94	10.80	11.14	11.11		
WT OF WATER (gms)	7.88	8.02	8.45	8.83	1.32	1.66		
DRY WT SOIL (gms)	16.57	16.78	17.37	17.68	5.42	6.86		
WATER CONTENT %	47.6	47.8	48.6	49.9	24.4	24.2		

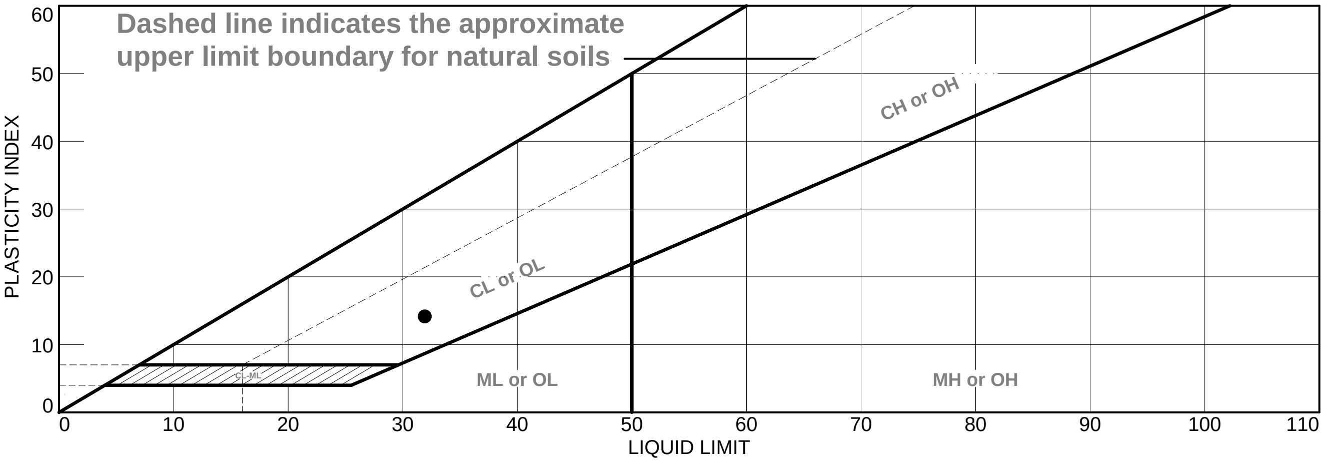


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	48 %
PL	24 %
PI	24 %
WC	NOT REQUESTED

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	32	18	14			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

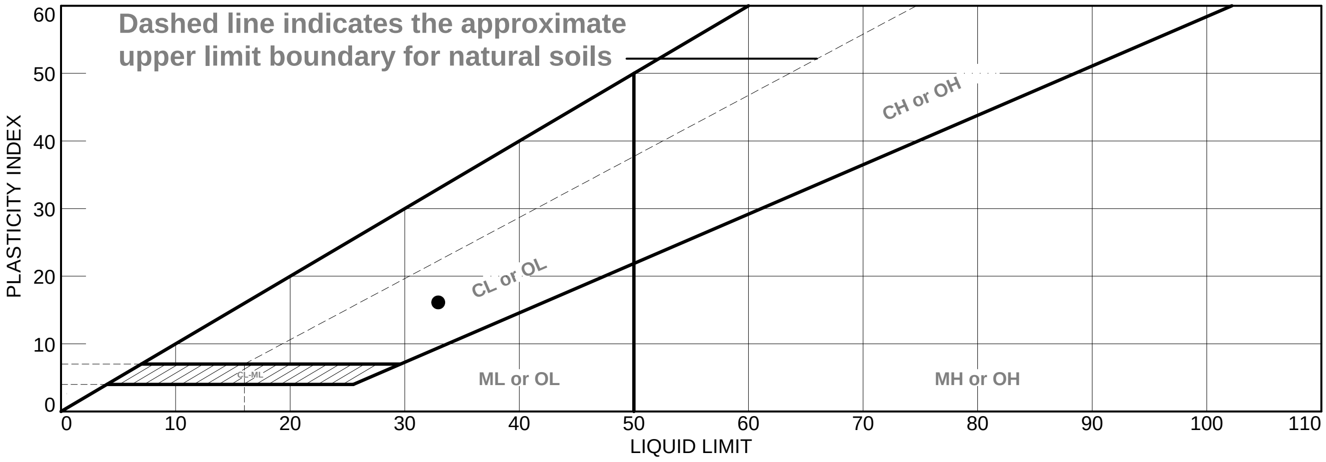
● **Source of Sample:** BH-161 **Depth:** 20 **Sample Number:** 2

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	33	17	16			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

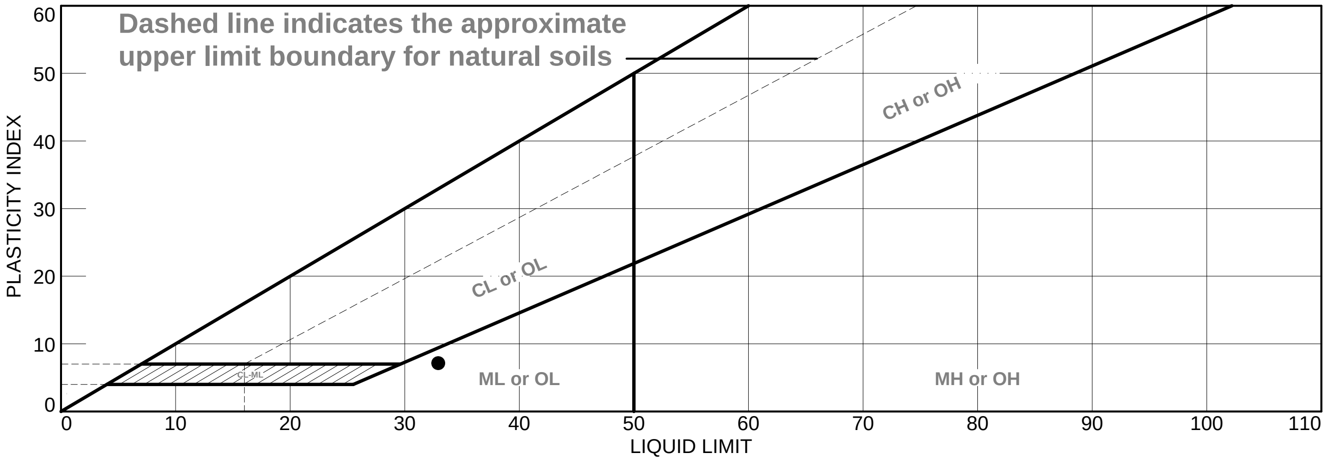
● **Source of Sample:** BH-161 **Depth:** 60 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	**LL**	**PL**	**PI**	**%<#40**	**%<#200**	**USCS**
●	Greenish gray silt with sand	33	26	7	100	79	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

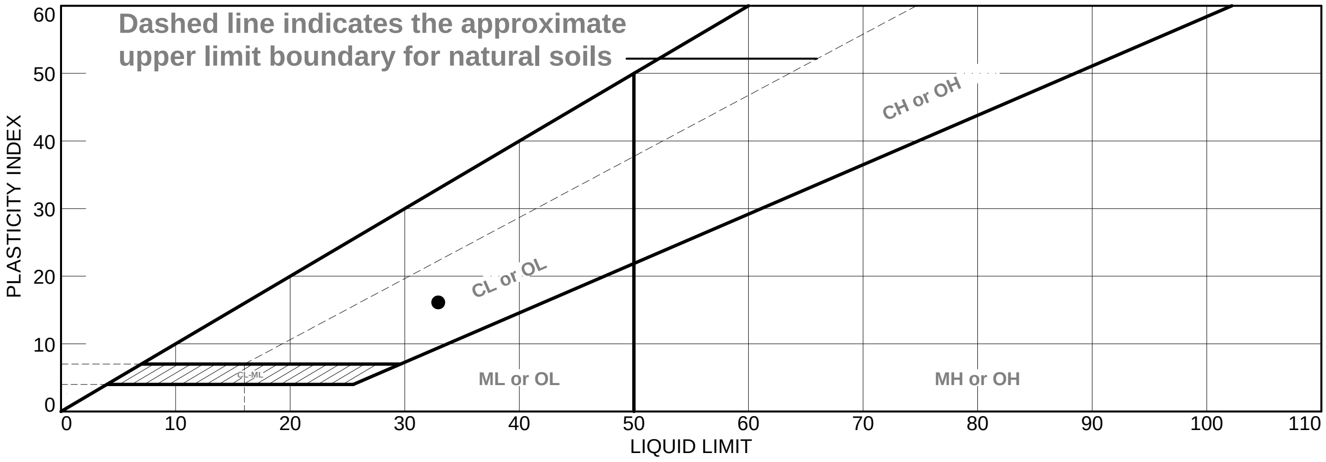
● **Source of Sample:** BH-161 **Depth:** 72 **Sample Number:** 8

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	33	17	16			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

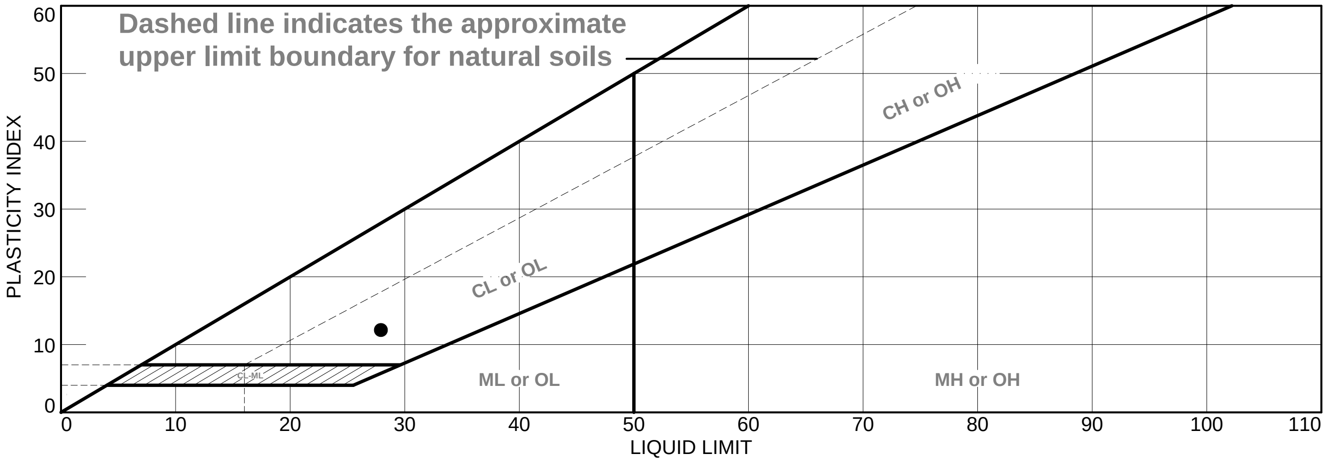
● **Source of Sample:** BH-161 **Depth:** 88.5 **Sample Number:** 13

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	28	16	12			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

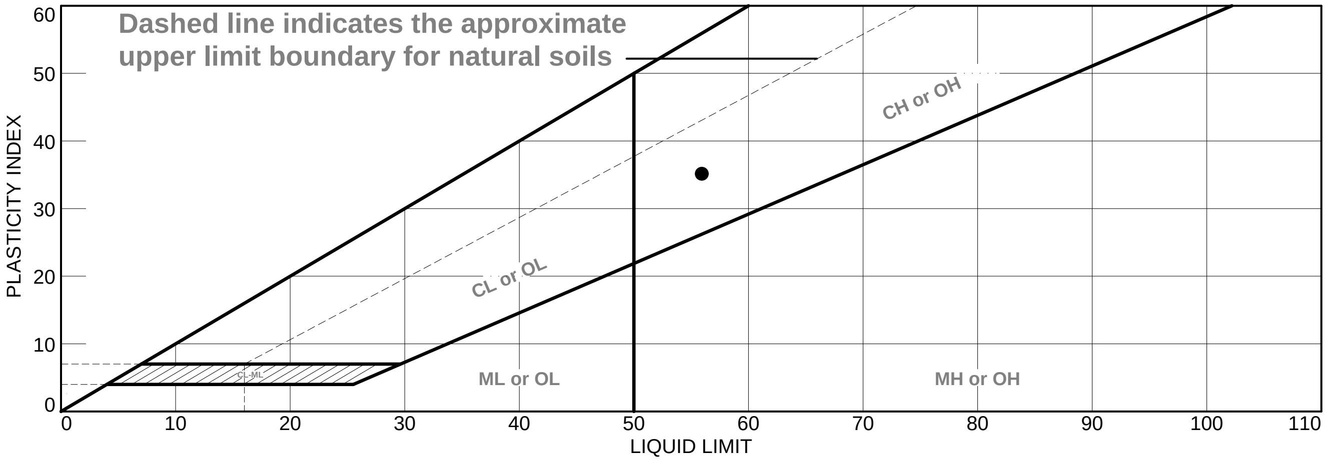
●**Source of Sample:** BH-161 **Depth:** 120 **Sample Number:** 25

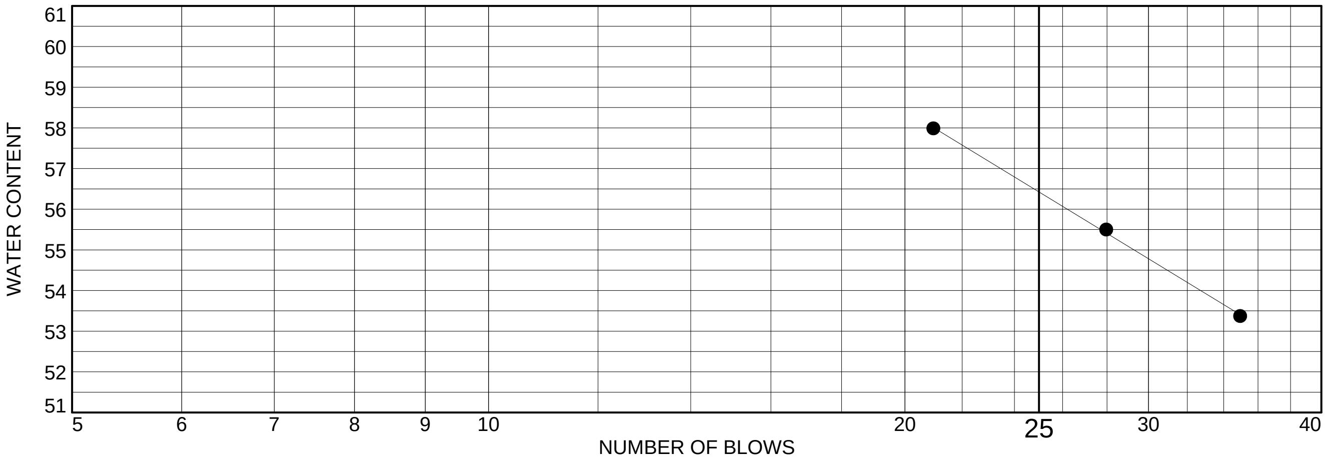
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	56	21	35			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

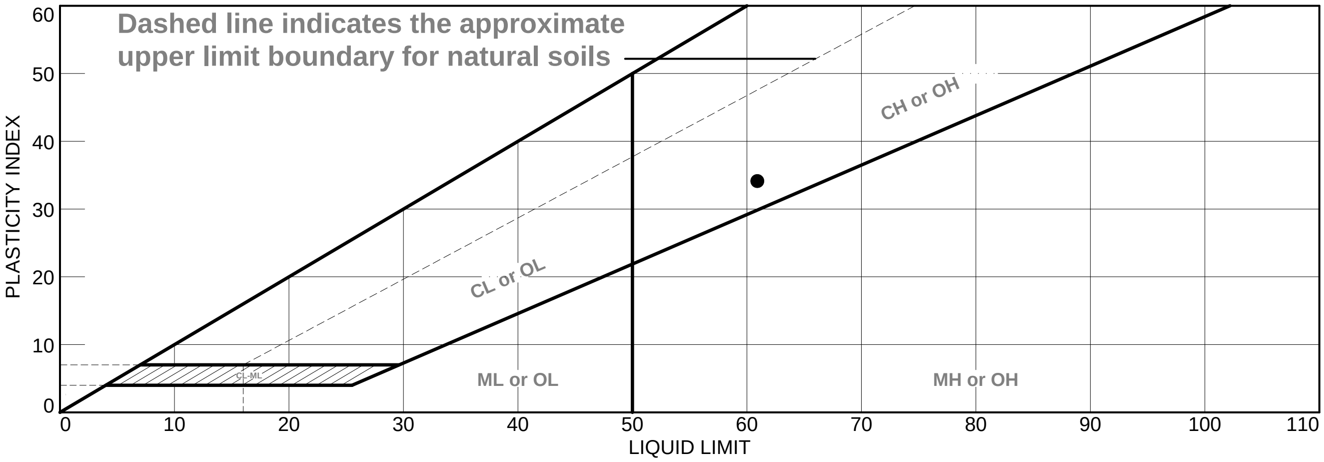
● **Source of Sample:** BH-161 **Depth:** 135 **Sample Number:** 29

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	61	27	34			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-161 **Depth:** 185 **Sample Number:** 38

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

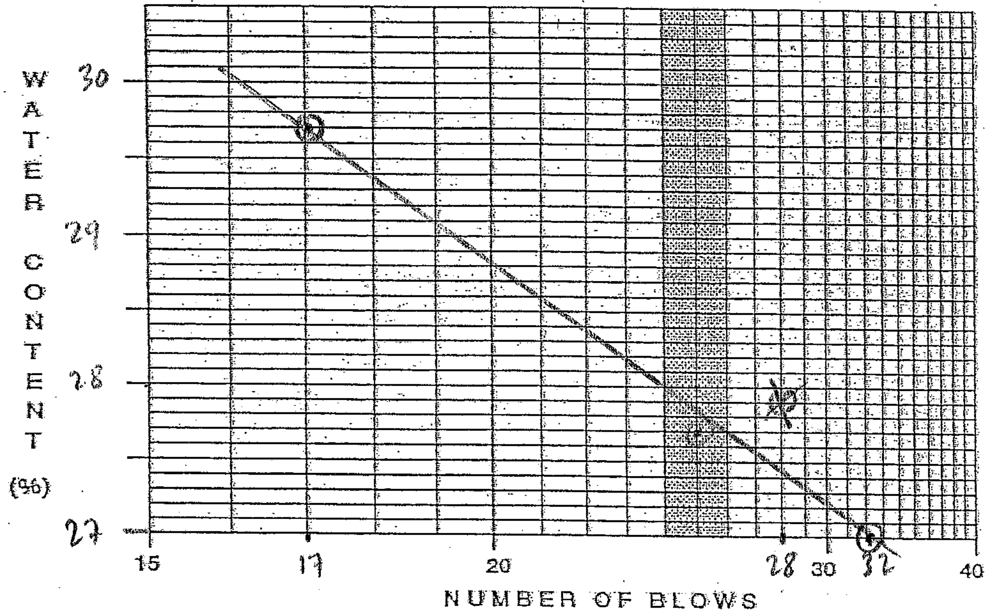
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-161 #19A@105 Lab #: G970 Date: 1-4-2020

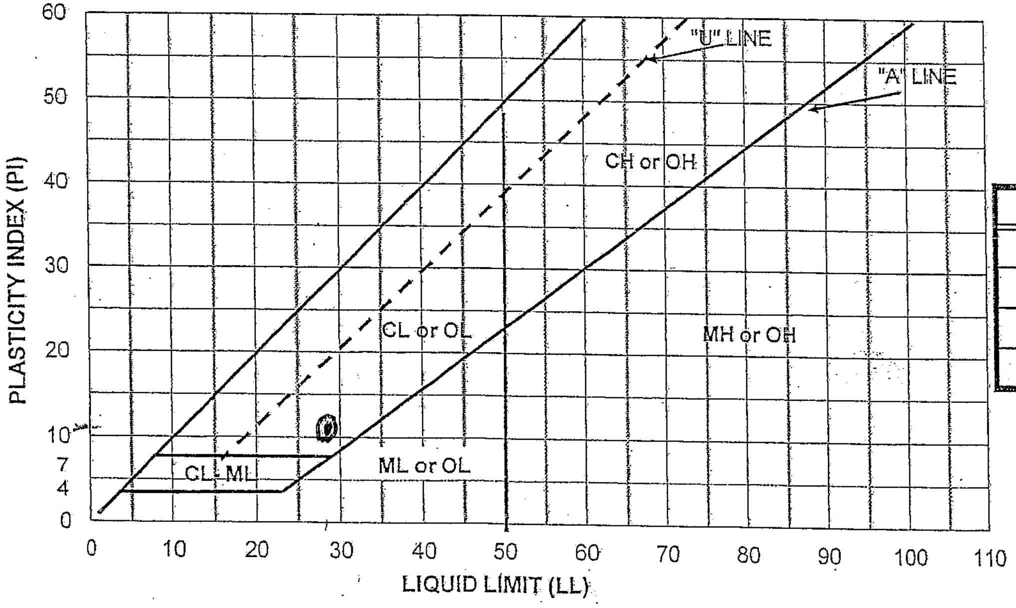
Sample Description: Sandy lean CLAY, (CL), Greenish Gray Tested By: N.A

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~28~~	17	25	32				
TARE NO.	~~V5~~	V23	G8	V15	G17	A7		
TARE + WET WT (gms)	~~25.59~~	28.19	37.78	34.48	19.58	18.77		
TARE + DRY WT (gms)	~~22.41~~	24.25	31.90	29.50	18.27	17.68		
TARE WT (gms)	~~11.01~~	10.97	10.68	11.06	10.76	11.07		
WT OF WATER (gms)	~~3.18~~	3.94	5.88	4.98	1.31	1.09		
DRY WT SOIL (gms)	~~11.4~~	13.28	21.22	18.44	7.51	6.61		
WATER CONTENT %	~~27.9~~	29.7	27.7	27.0	17.4	16.5		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	28%
PL	17%
PI	11%
WC	20%

ATTERBERG LIMIT

ASTM D4318 or CAL 204

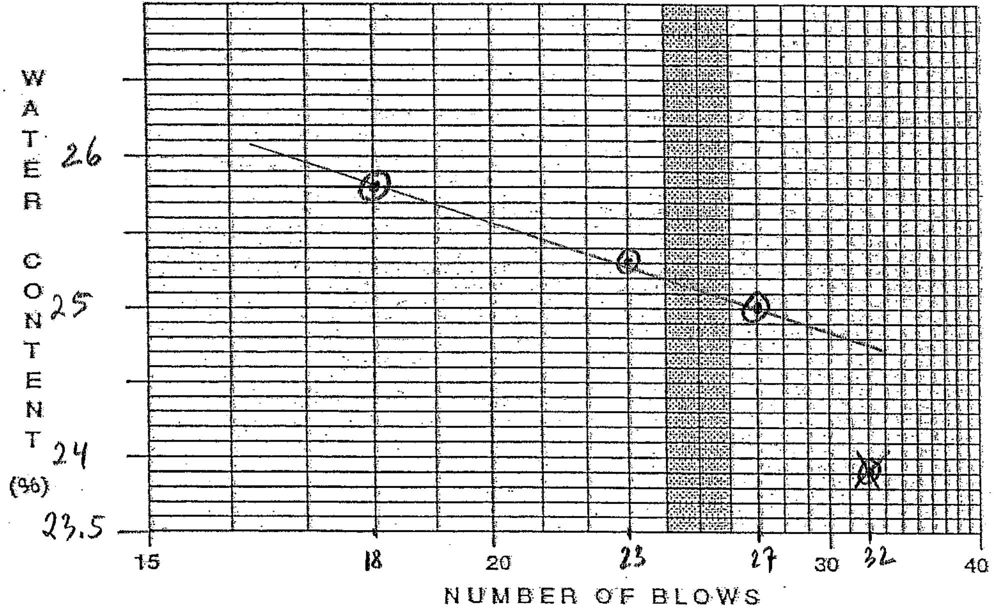
Project Name: BART TO SILICON VALLEY Project #: 2019-131-T02

Sample #: BH-161 #34A @ 166' Lab #: G970 Date: 02/05/2020

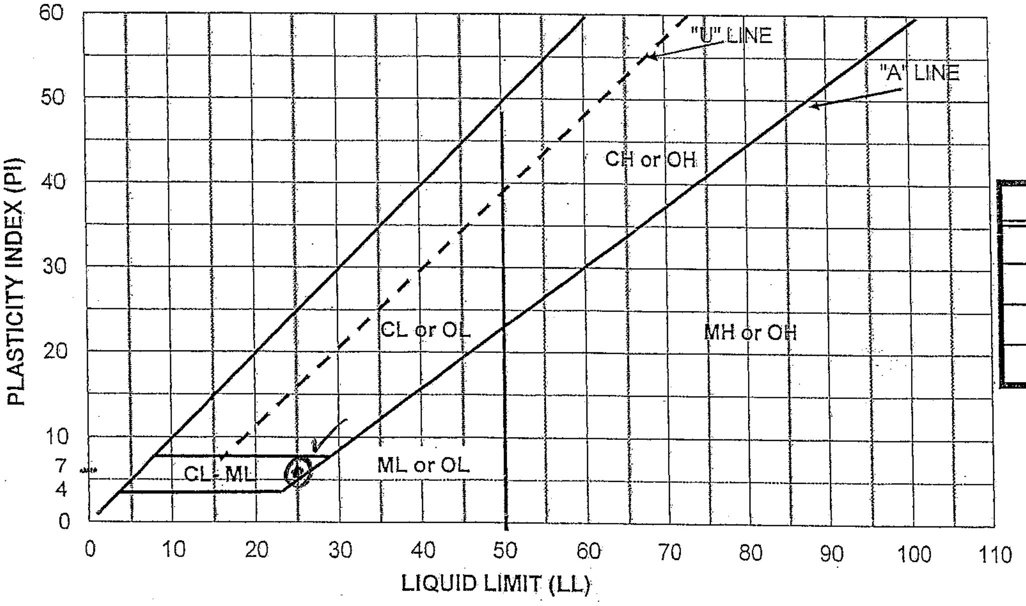
Sample Description: SILTY CLAY W/SAND (CL-ML) LIGHT OLIVE-BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~32~~	27	23	18	▨	▨	▨	▨
TARE NO.	~~A2~~	G5	G6	V2	V7	G3		
TARE + WET WT (gms)	~~32.64~~	35.02	35.96	39.12	21.16	18.39		
TARE + DRY WT (gms)	~~28.51~~	30.26	30.92	33.35	19.57	17.20		
TARE WT (gms)	~~11.10~~	11.21	10.98	11.00	11.05	10.70		
WT OF WATER (gms)	~~4.16~~	4.76	5.04	5.77	1.59	1.19		
DRY WT SOIL (gms)	~~17.41~~	19.05	19.94	22.35	8.52	6.5		
WATER CONTENT %	~~23.9~~	25.0	25.3	25.8	18.7	18.3		

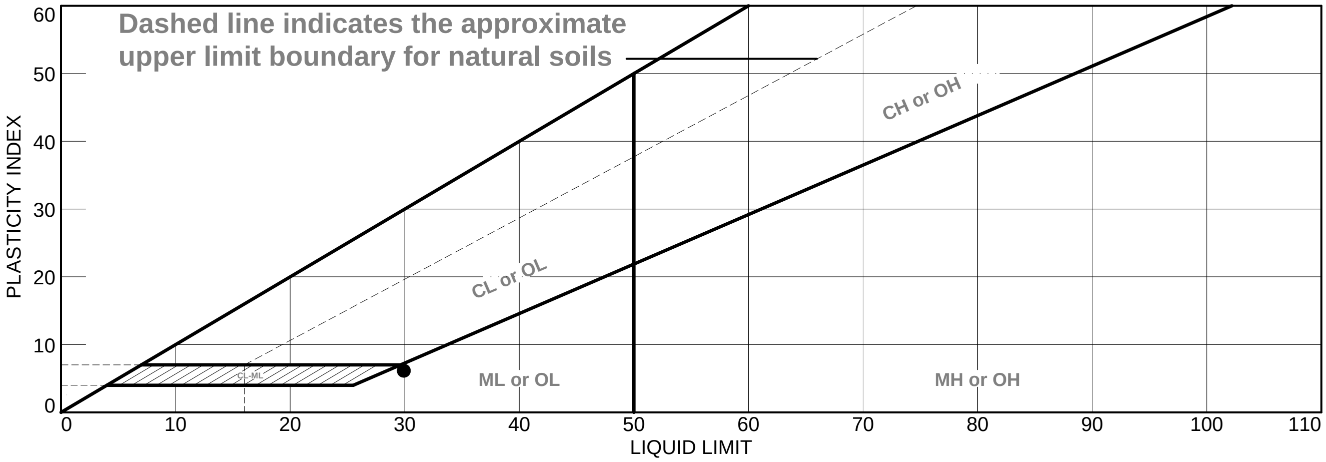


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	25 %
PL	18 %
PI	7 %
WC	

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown silt	30	24	6			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

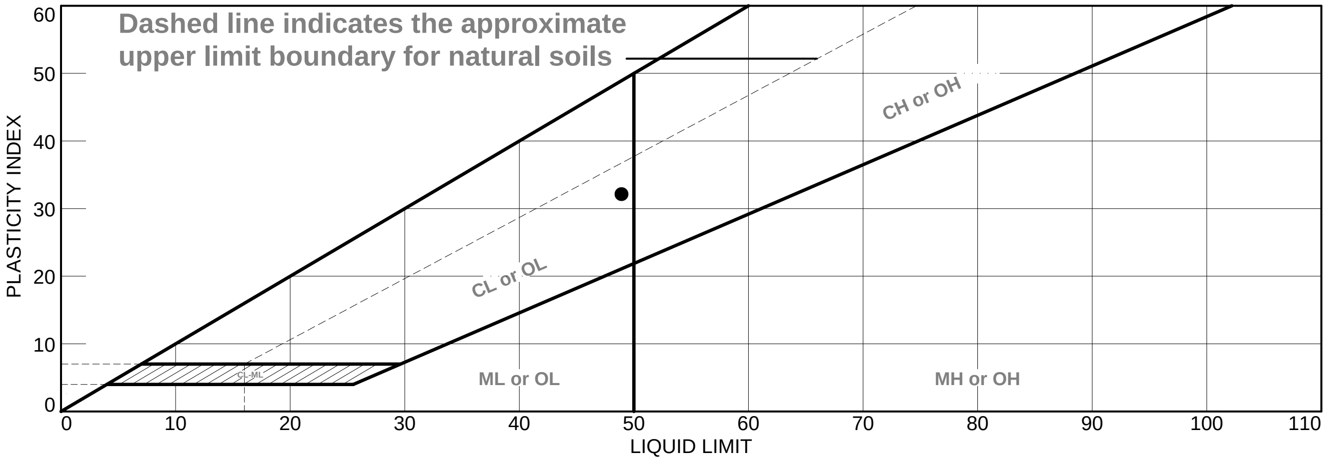
● **Source of Sample:** BH-162 **Depth:** 10 **Sample Number:** 1

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	**LL**	**PL**	**PI**	**%<#40**	**%<#200**	**USCS**
●	Greenish gray clay	49	17	32			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

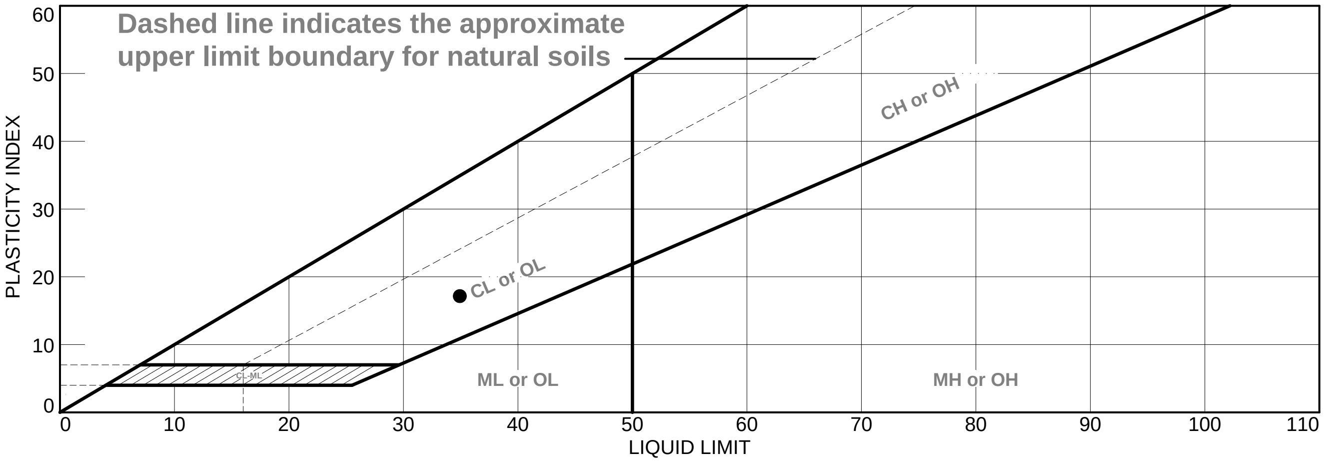
● **Source of Sample:** BH-162 **Depth:** 25 **Sample Number:** 4

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	35	18	17			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

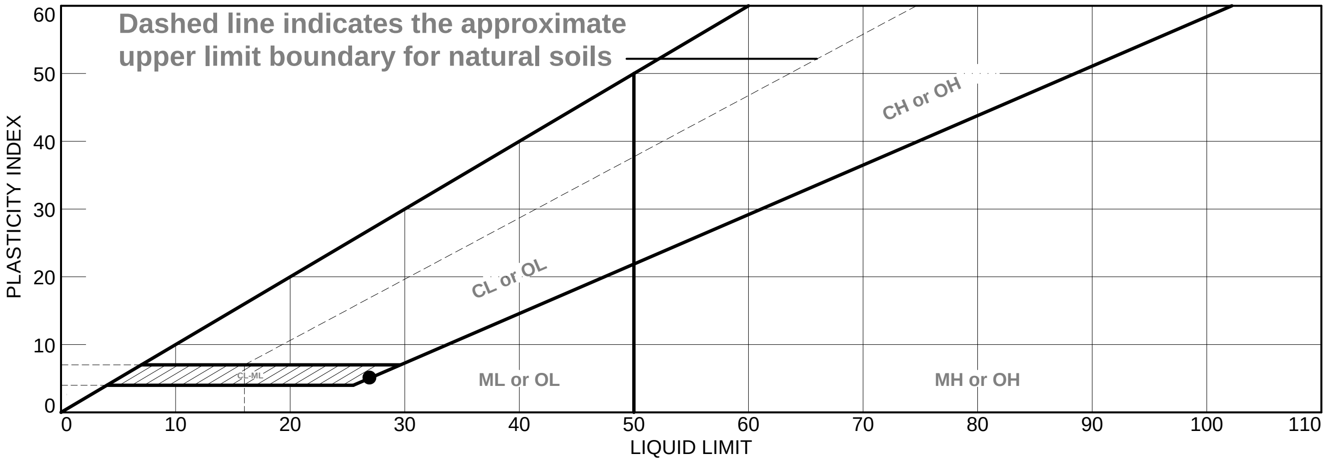
● **Source of Sample:** BH-162 **Depth:** 40 **Sample Number:** 7

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silt	27	22	5		58.0	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

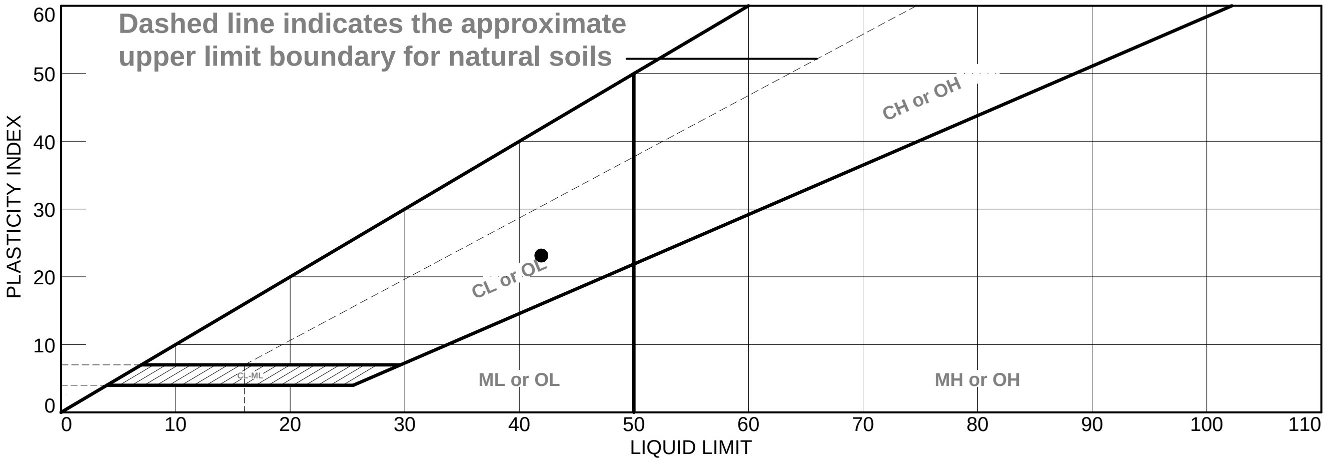
●**Source of Sample:** BH-162 **Depth:** 45 **Sample Number:** 8

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	42	19	23			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

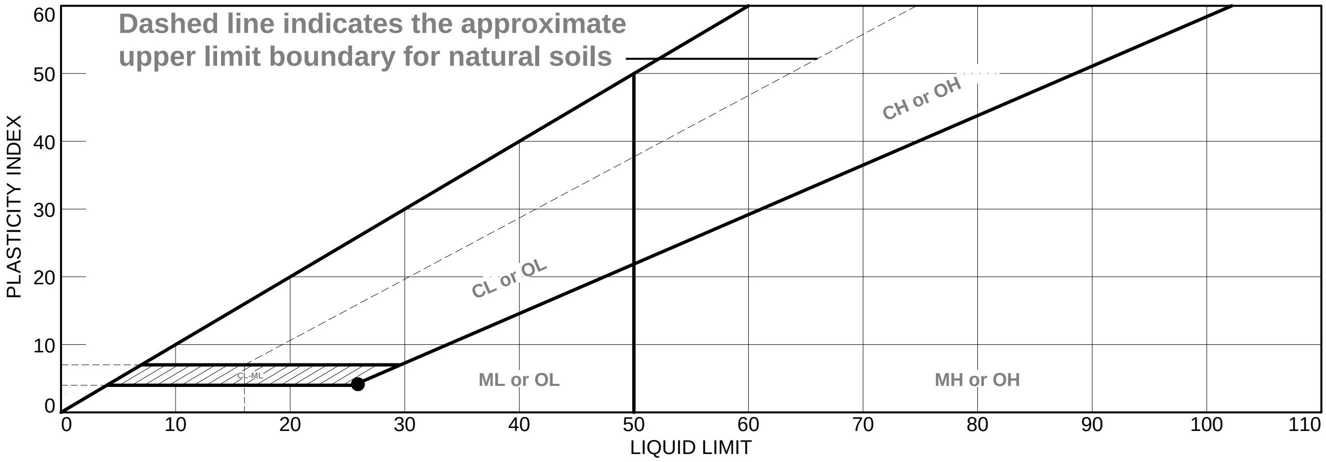
●**Source of Sample:** BH-162 **Depth:** 55 **Sample Number:** 10

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy silt	26	22	4			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

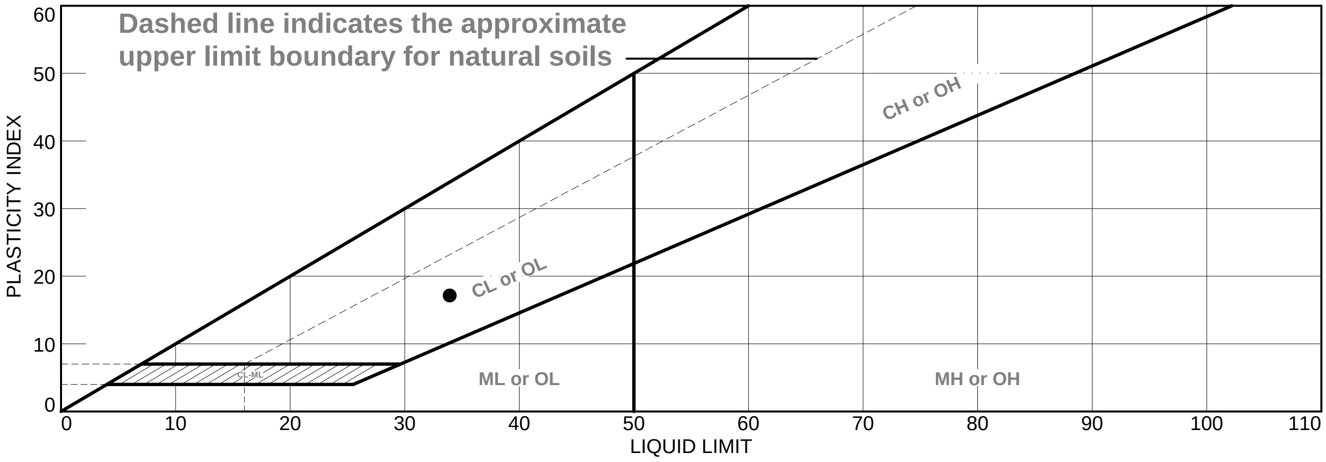
● **Source of Sample:** BH-162 **Depth:** 60 **Sample Number:** 11

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	34	17	17			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

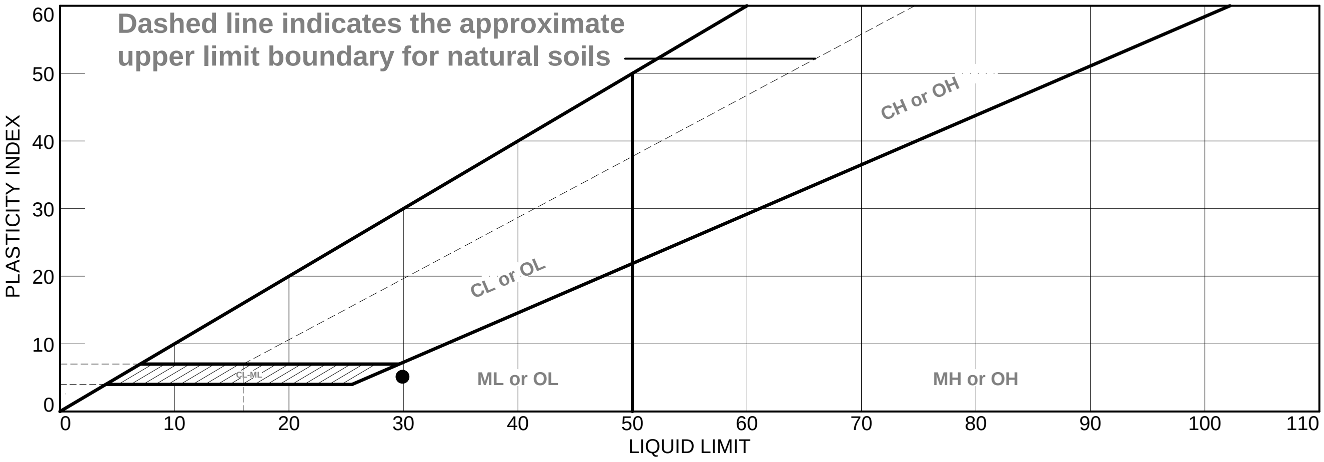
● **Source of Sample:** BH-162 **Depth:** 100 **Sample Number:** 26

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray silt	30	25	5			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

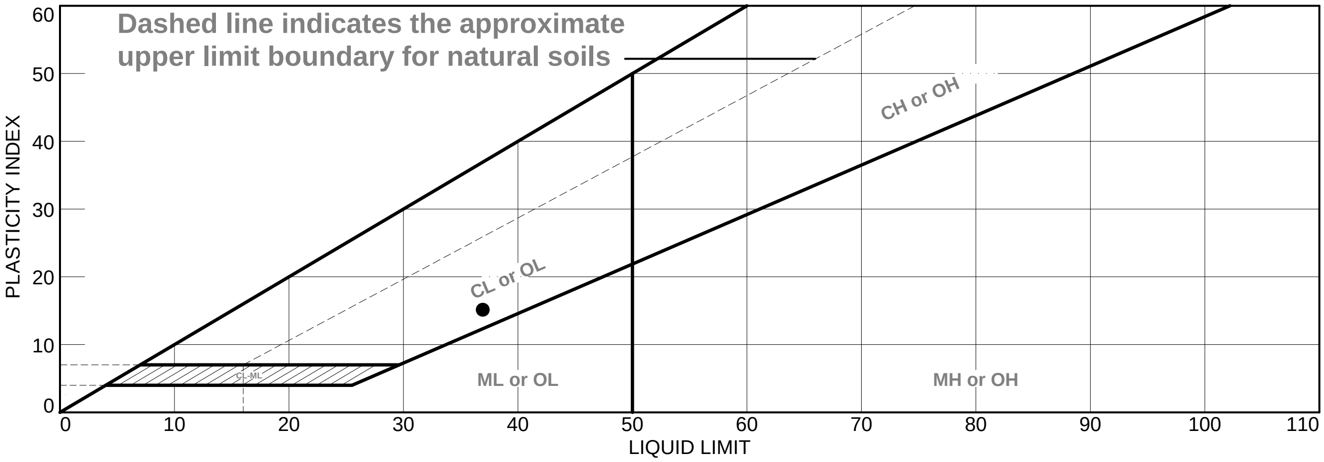
● **Source of Sample:** BH-162 **Depth:** 122.5 **Sample Number:** 35

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	37	22	15			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-162 **Depth:** 132 **Sample Number:** 39

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

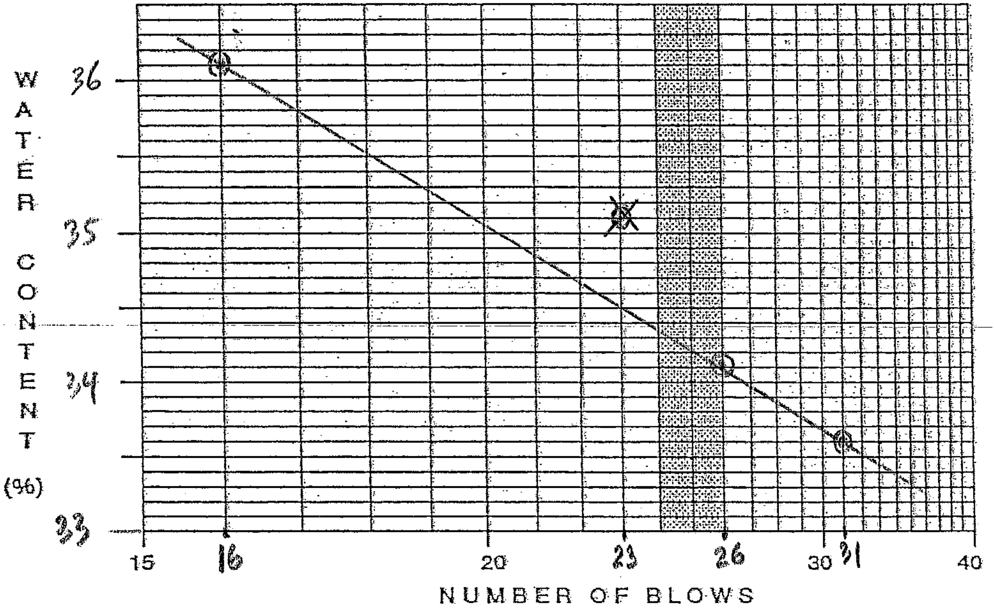
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-162 #41A@ 141' Lab #: G970 Date: 04/13/2020

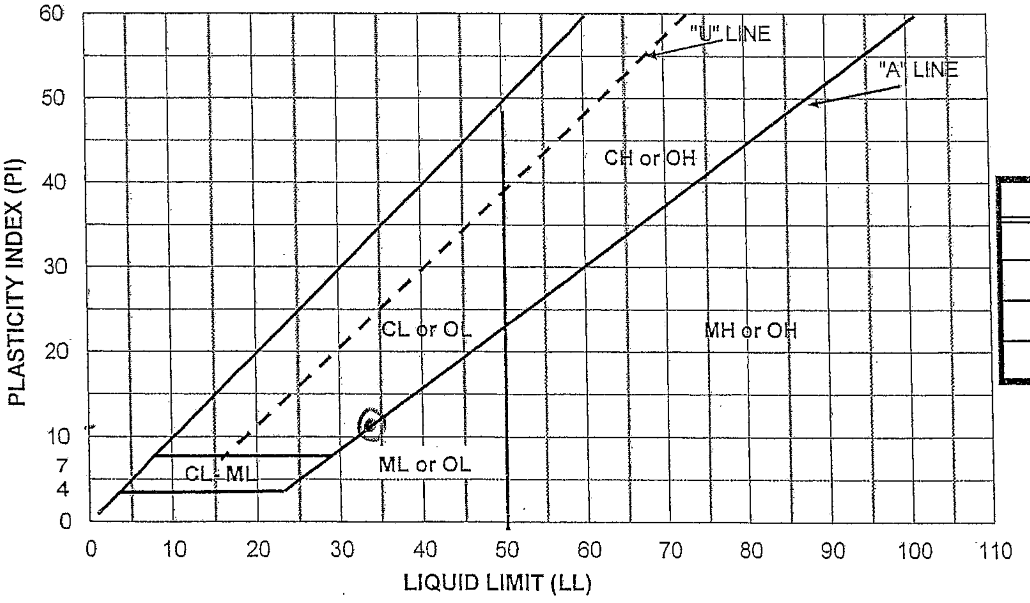
Sample Description: LEAN CLAY, (CL), GRAYISH-BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	26	~~23~~	16	▨	▨	▨	▨
TARE NO.	V15	N9	~~G4~~	V5	V6	V23		
TARE + WET WT (gms)	39.00	38.22	~~36.98~~	40.73	19.46	18.15		
TARE + DRY WT (gms)	31.98	31.32	~~30.15~~	32.85	17.91	16.82		
TARE WT (gms)	11.07	11.08	~~10.67~~	11.00	11.01	10.96		
WT OF WATER (gms)	7.02	6.9	~~6.83~~	7.88	1.55	1.33		
DRY WT SOIL (gms)	20.91	20.24	~~19.48~~	21.85	6.9	5.86		
WATER CONTENT %	33.6	34.1	~~35.1~~	36.1	22.5	22.7		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	34 %
PL	23 %
PI	11 %
WC	25 %

PARIKH CONSULTANTS, INC.

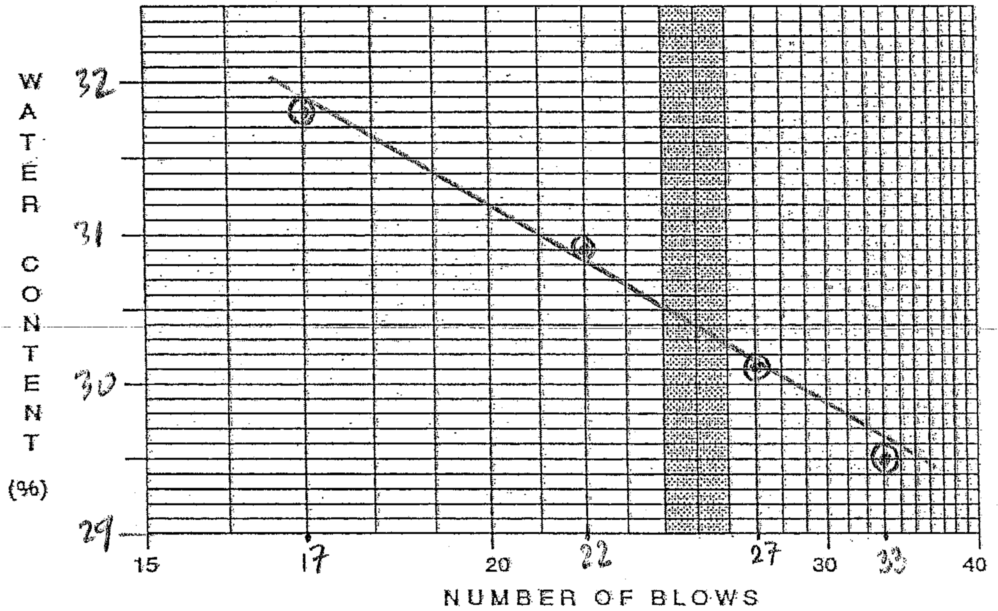
ATTERBERG LIMIT

ASTM D4318 or CAL 204

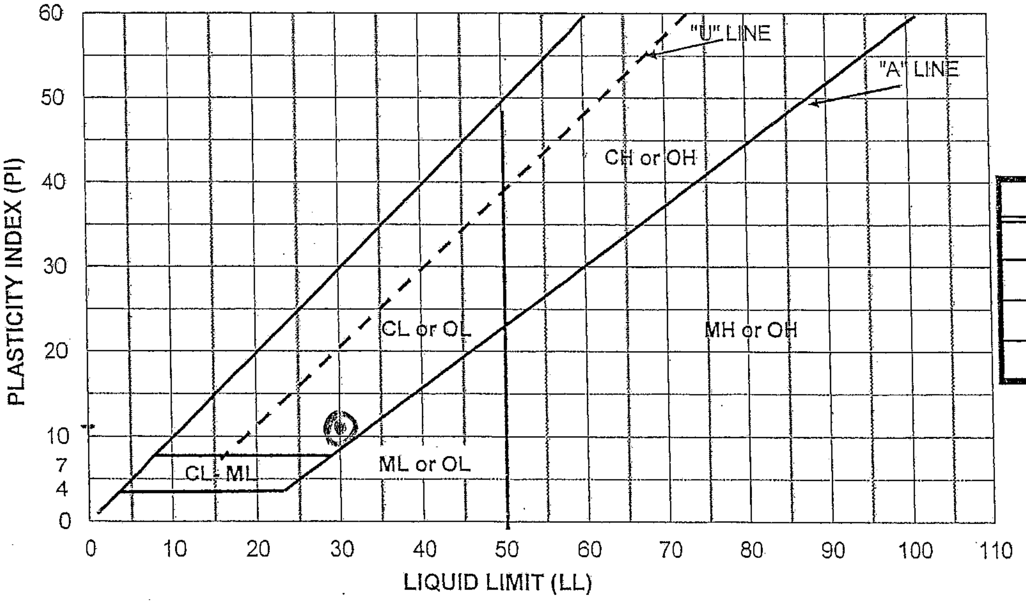
Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-702
Sample #:	BH-162 #46A @ 166' Lab #: G970	Date:	04/13/2020
Sample Description:	LEAN CLAY, (CL), DARK YELLOWISH-BROWN	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	27	22	17	▨	▨	▨	▨
TARE NO.	N2	A10	V24	V18	V12	A8		
TARE + WET WT (gms)	37.36	39.27	42.58	38.70	18.62	17.82		
TARE + DRY WT (gms)	31.35	32.75	35.16	32.03	17.42	16.74		
TARE WT (gms)	11.00	11.07	11.13	11.05	11.12	10.98		
WT OF WATER (gms)	6.01	6.52	7.42	6.67	1.2	1.08		
DRY WT SOIL (gms)	20.35	21.68	24.03	20.98	6.3	5.76		
WATER CONTENT %	29.5	30.1	30.9	31.8	19.0	18.8		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	30 %
PL	19 %
PI	11 %
WC	

ATTERBERG LIMIT
ASTM D4318 or CAL 204

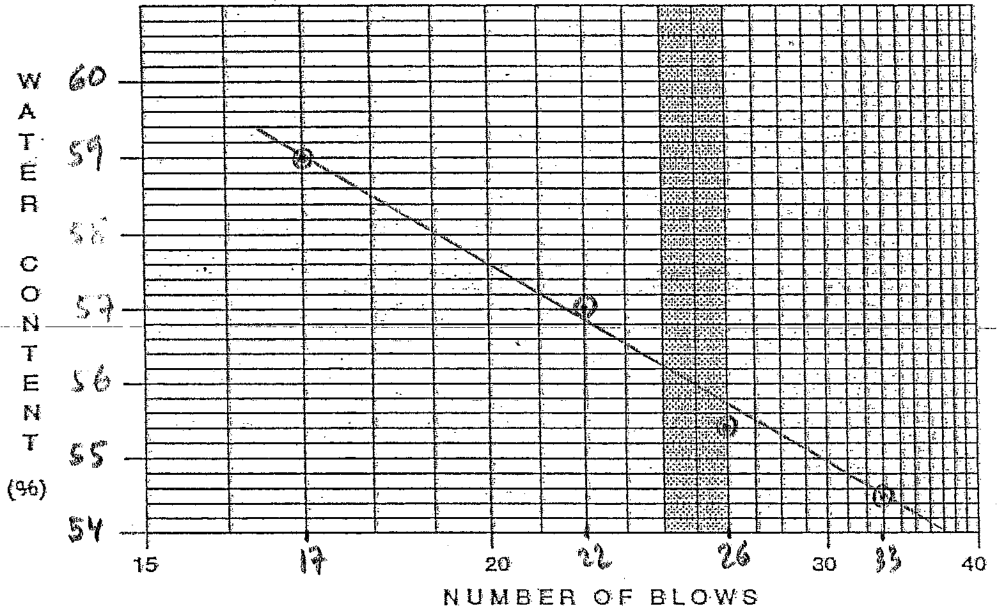
Project Name: BART TO SILICON VALLEY　Project #: 2019-131-702

Sample #: BH-162 #49@181'　Lab #: G970　Date: 04/13/2020

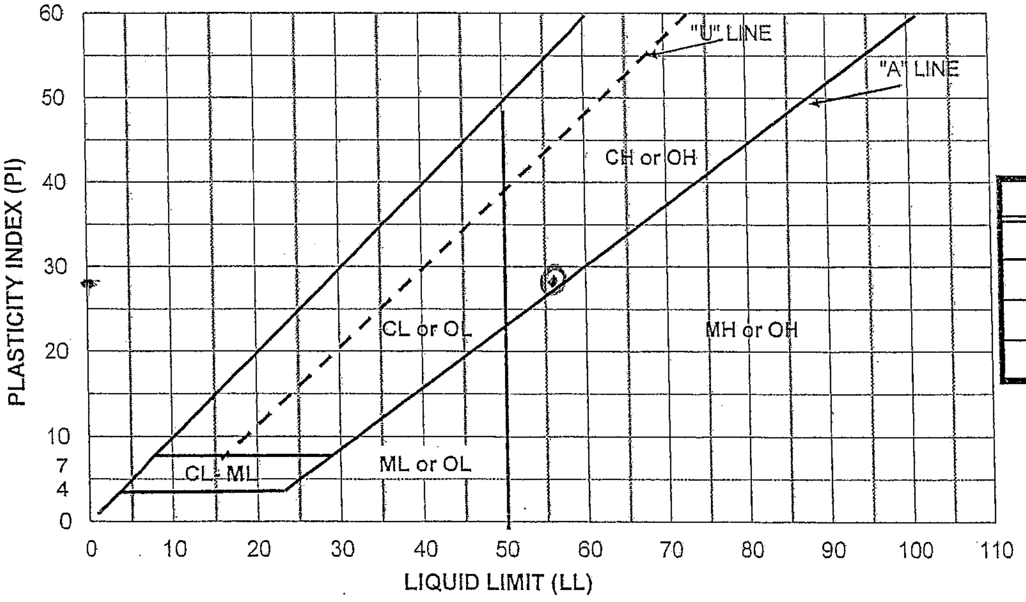
Sample Description: FAT CLAY, (CH), DARK BROWN　Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐　S12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	26	22	17				
TARE NO.	G7	V1	G9	N7	V11	V7		
TARE + WET WT (gms)	35.08	36.75	35.94	37.23	18.00	18.20		
TARE + DRY WT (gms)	26.50	27.55	26.93	27.47	16.43	16.67		
TARE WT (gms)	10.75	10.95	11.11	10.94	10.80	11.05		
WT OF WATER (gms)	8.58	9.2	9.01	9.76	1.57	1.53		
DRY WT SOIL (gms)	15.75	16.6	15.82	16.53	5.63	5.62		
WATER CONTENT %	54.5	55.4	57.0	59.0	27.9	27.2		

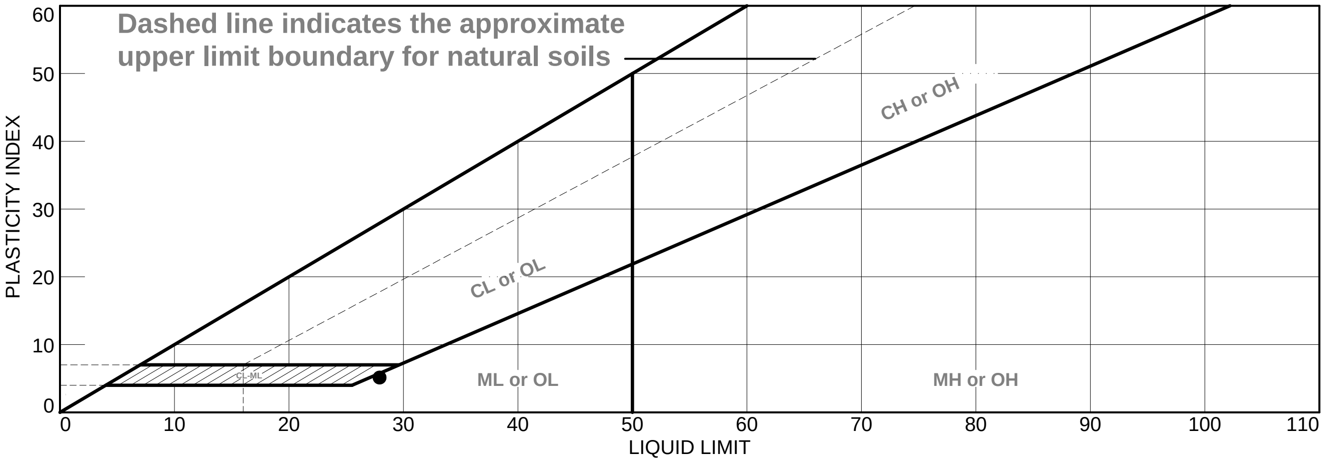


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	56 %
PL	28 %
PI	28 %
WC	

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy silt	28	23	5		52.6	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

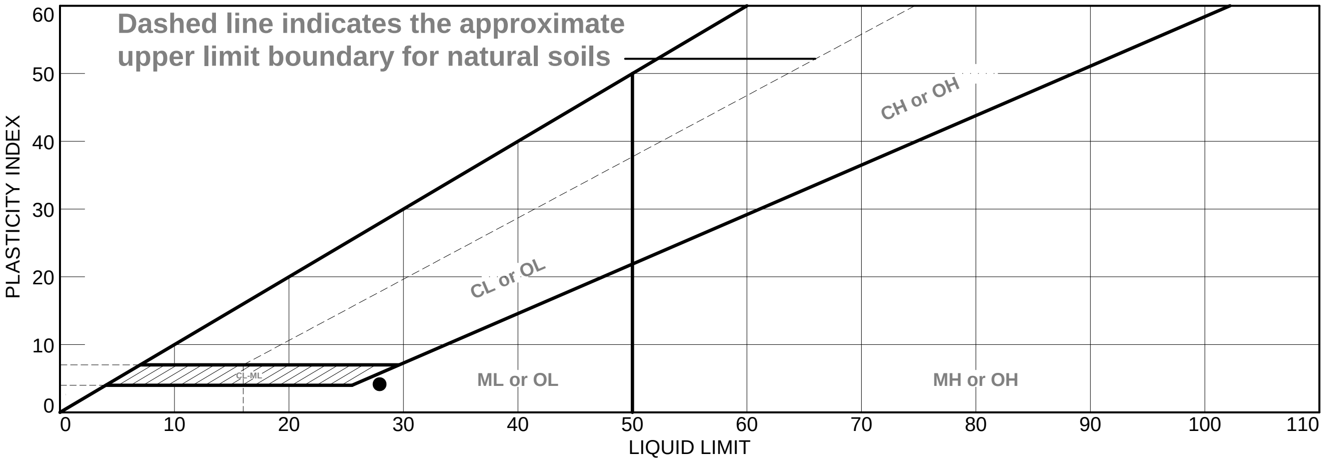
● **Source of Sample:** BH-163 **Depth:** 70 **Sample Number:** 3

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray silt	28	24	4			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

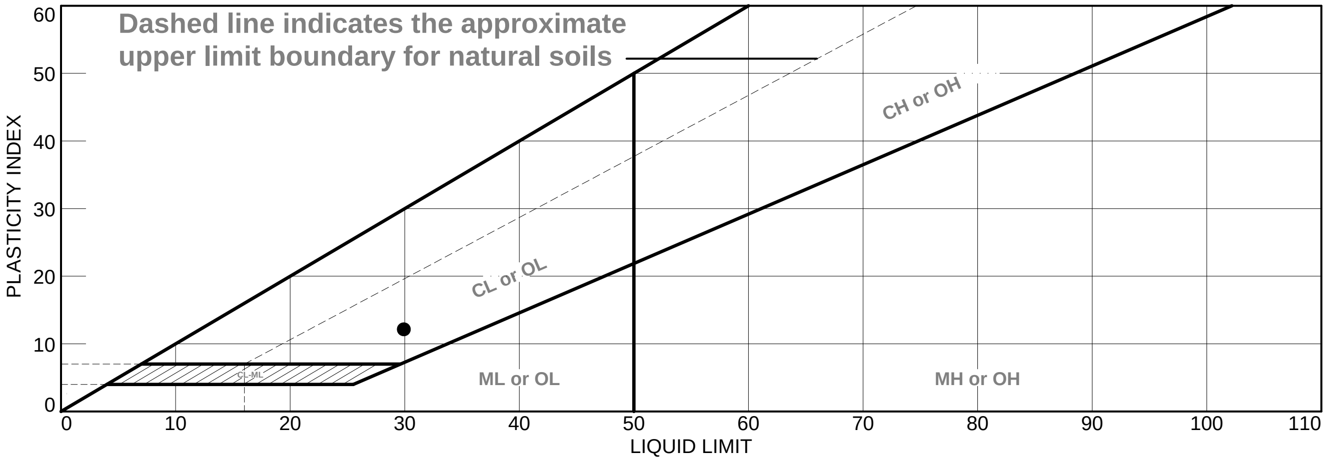
● **Source of Sample:** BH-163 **Depth:** 77.5 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	30	18	12		71.2	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

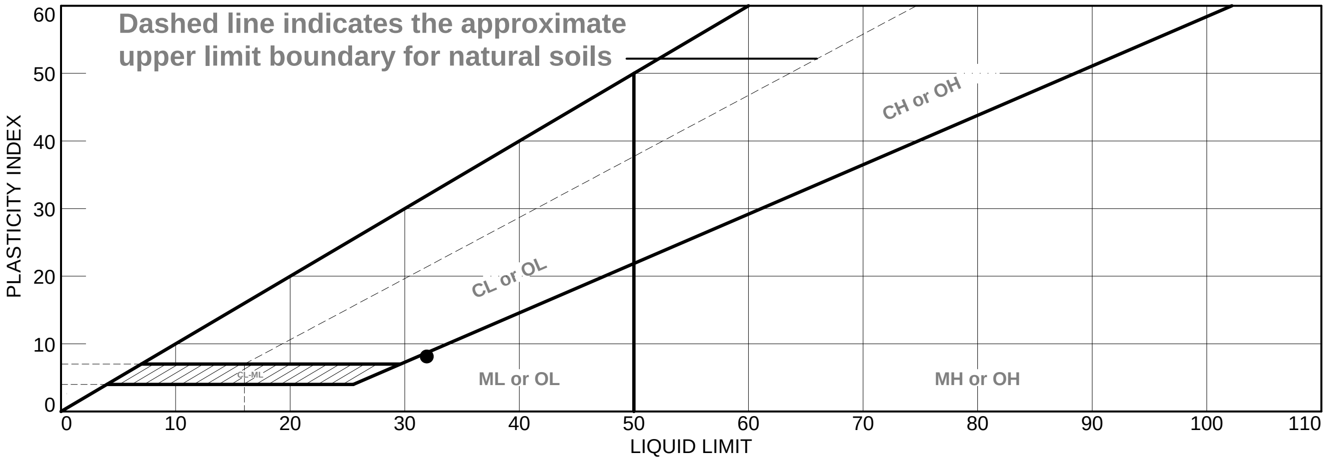
● **Source of Sample:** BH-163 **Depth:** 107 **Sample Number:** 16

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray silt	32	24	8		86.0	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

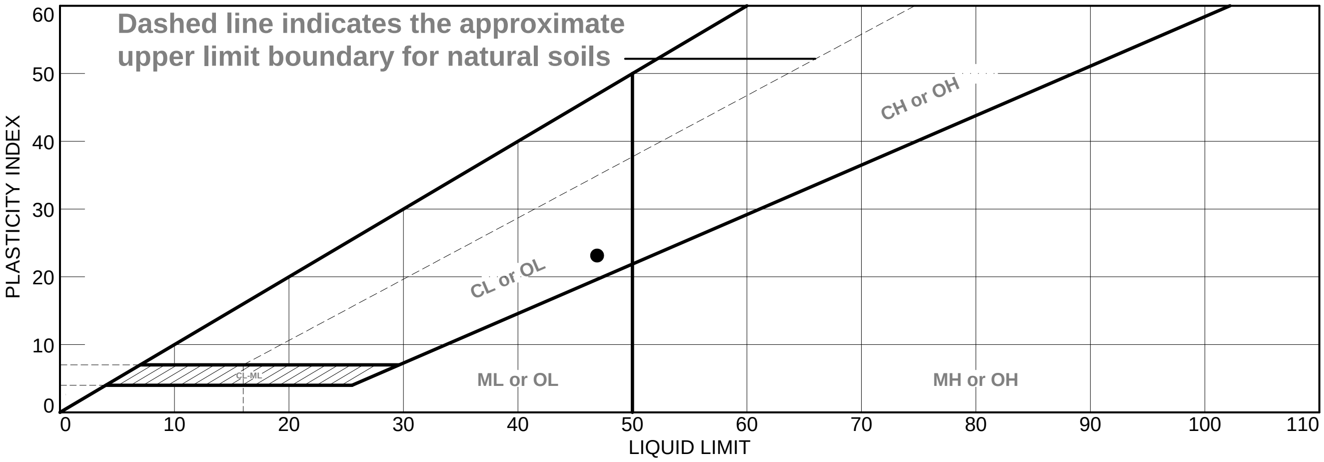
● **Source of Sample:** BH-163 **Depth:** 127 **Sample Number:** 24

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	47	24	23			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

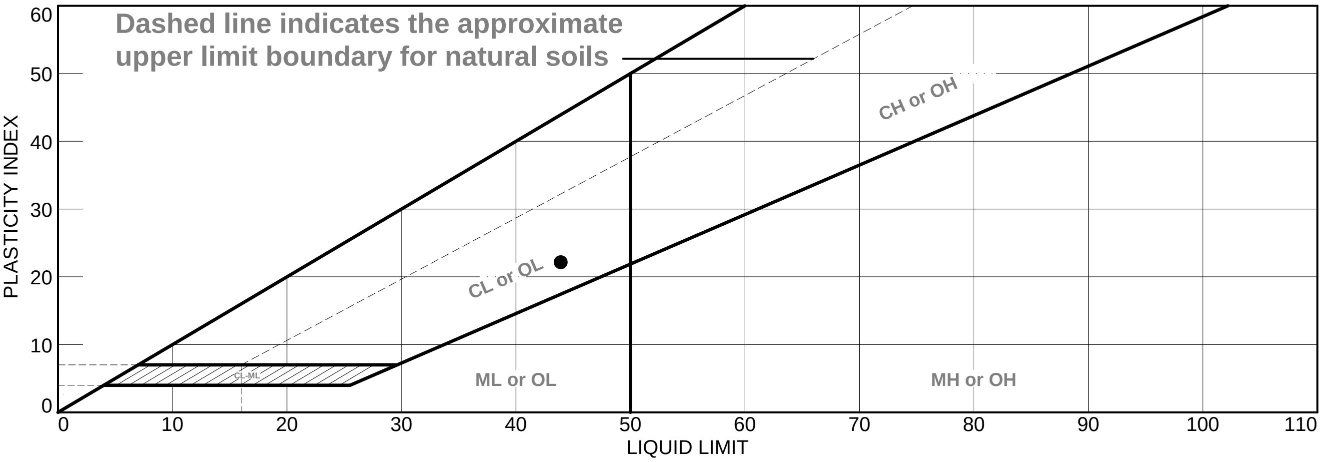
● **Source of Sample:** BH-163 **Depth:** 135 **Sample Number:** 27

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	44	22	22			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-163 **Depth:** 140 **Sample Number:** 28

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

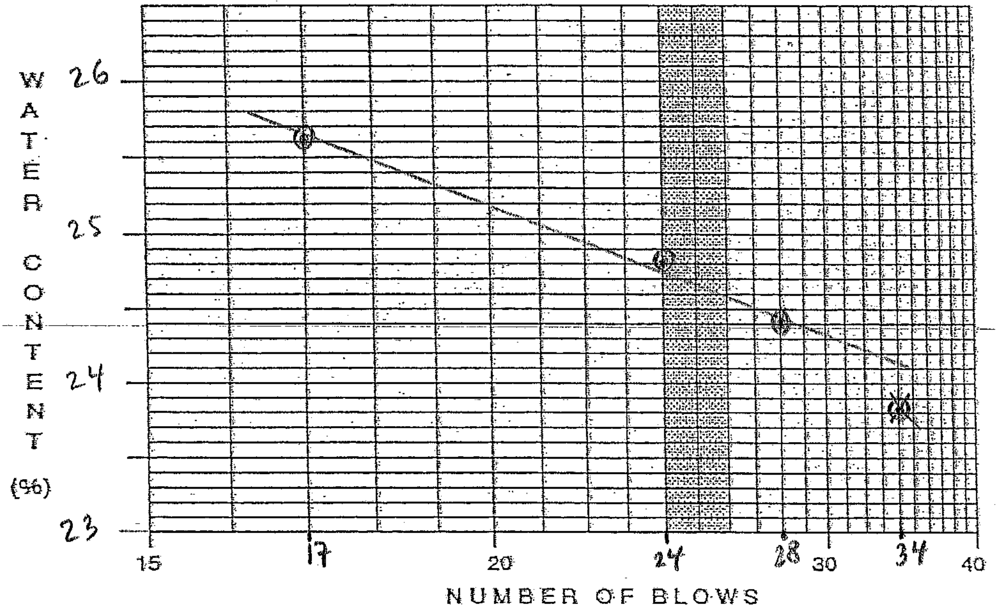
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702
Sample #: BH-163 #12 @ 98'
Lab #: G970
Date: 04/18/2020
Sample Description: SILTY CLAY, (CL-ML), DARK GREENISH-GRAY
Tested By: D-NGUYEN

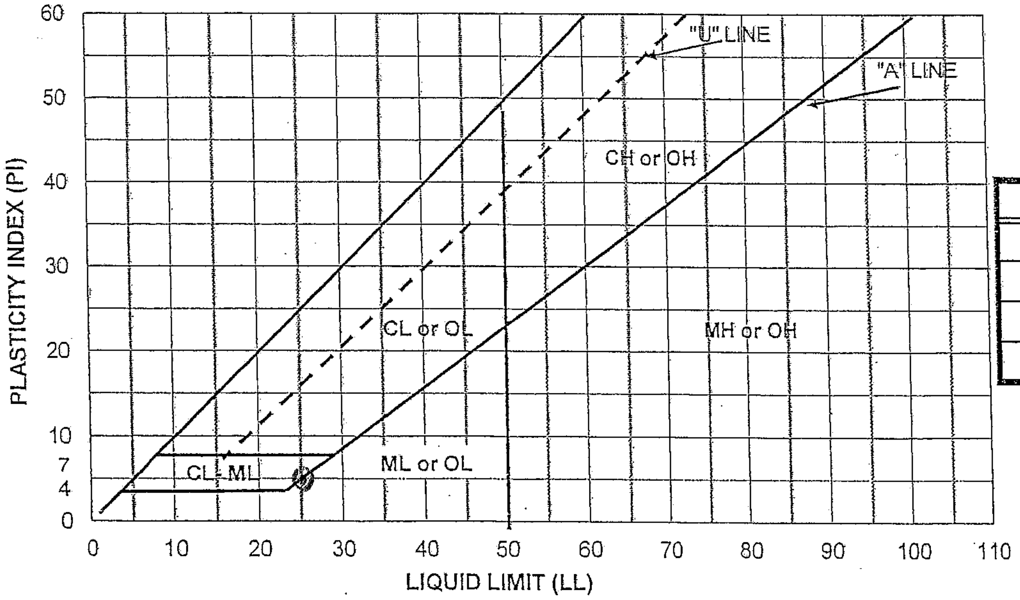
Estimate of % sample retain on #40 Sieve ☐

5 11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~34~~	28	24	17				
TARE NO.	~~A11~~	V21	V12	G5	G4	V24		
TARE + WET WT (gms)	~~36.49~~	36.81	38.87	40.30	16.99	19.50		
TARE + DRY WT (gms)	~~31.59~~	31.77	33.36	34.37	15.92	18.08		
TARE WT (gms)	~~11.01~~	11.15	11.13	11.21	10.68	11.12		
WT OF WATER (gms)	~~4.9~~	5.04	5.51	5.93	1.07	1.42		
DRY WT SOIL (gms)	~~20.58~~	20.62	22.23	23.16	5.24	6.96		
WATER CONTENT %	~~23.8~~	24.4	24.8	25.6	20.4	20.4		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	25 %
PL	20 %
PI	5 %
WC	23.2 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

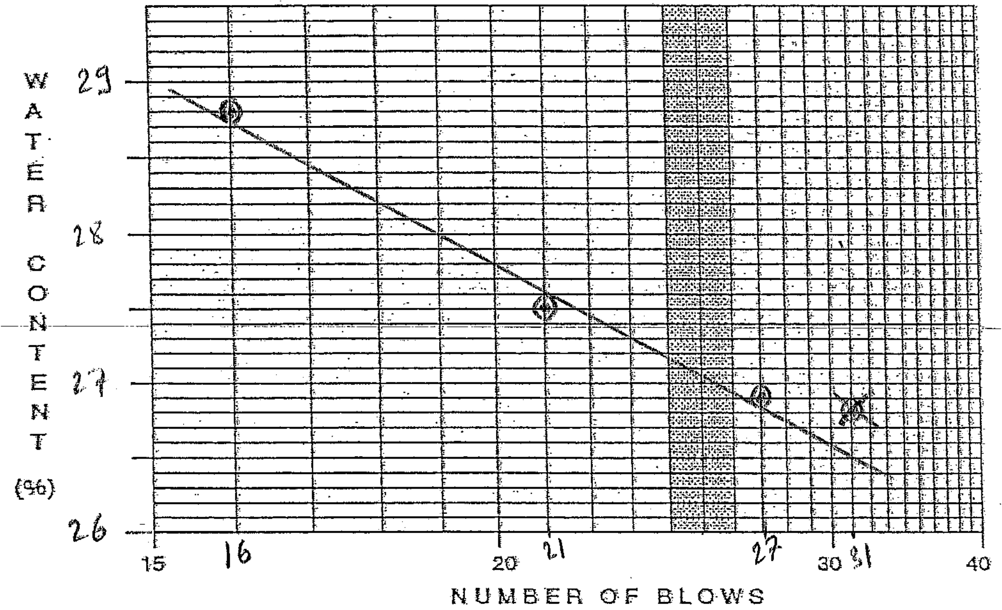
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-7D2

Sample #: BH-163 # 21 @ 120½ Lab #: G970
Date: 04/18/2020

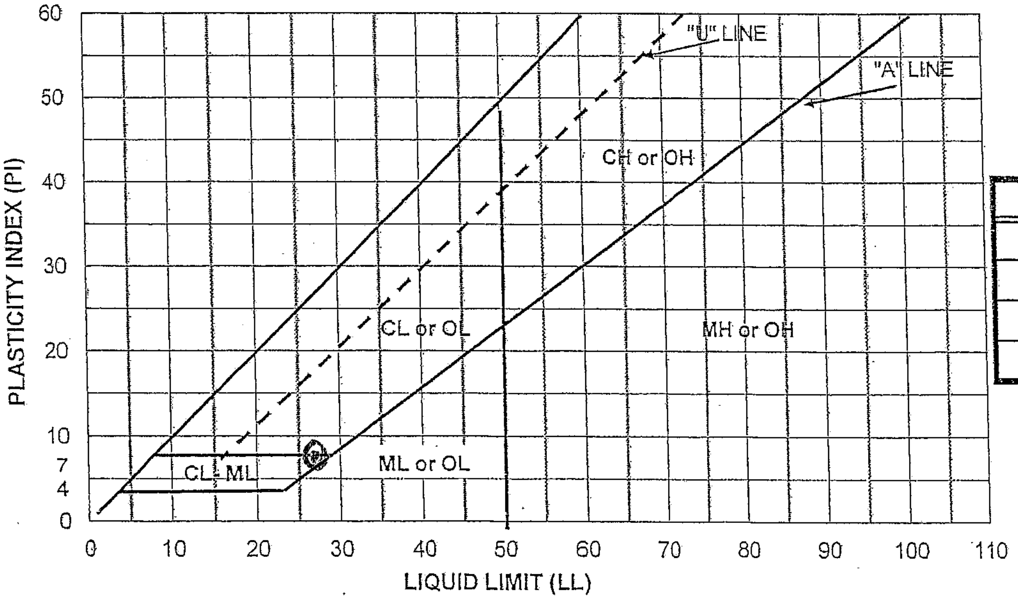
Sample Description: SILTY CLAY, (CL-ML), DARK GREENISH-GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ G34 / 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~31~~	27	21	16				
TARE NO.	~~V15~~	V4	V6	V23	V5	N9		
TARE + WET WT (gms)	~~41.13~~	40.18	39.50	38.22	18.05	18.98		
TARE + DRY WT (gms)	~~34.77~~	34.01	33.36	32.12	16.88	17.65		
TARE WT (gms)	~~11.08~~	11.10	11.01	10.96	11.00	11.08		
WT OF WATER (gms)	~~6.36~~	6.17	6.14	6.1	1.17	1.33		
DRY WT SOIL (gms)	~~23.69~~	22.91	22.35	21.16	5.88	6.57		
WATER CONTENT %	~~26.8%~~	26.9%	27.5%	28.8%	19.9	20.2		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	27 %
PL	20 %
PI	7 %
WC	22 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

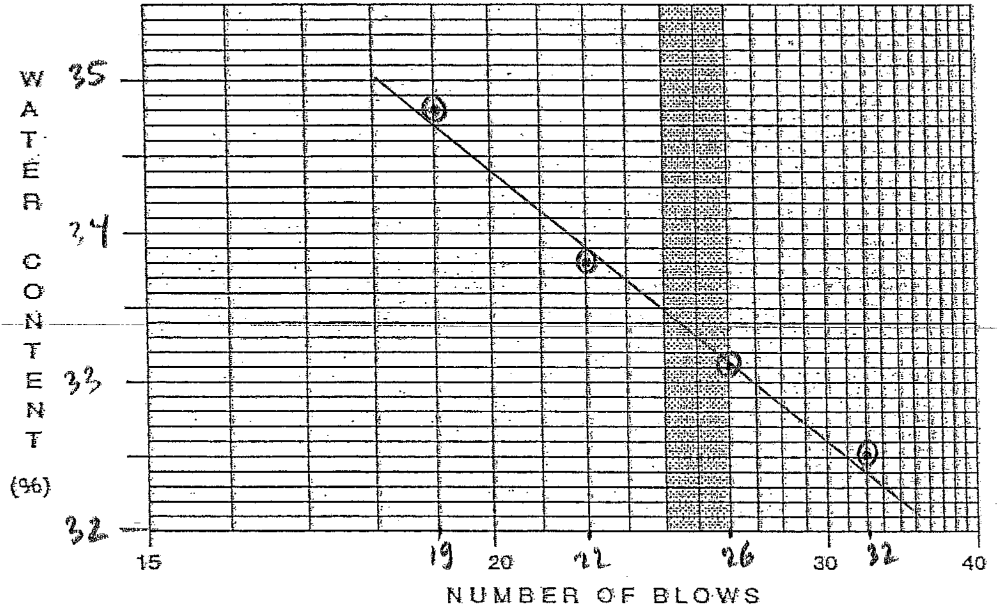
Project Name: BART TO SILICON VALLEY Project #: 2019-131-TD2

Sample #: BH-163 #35 @ 176' Lab #: G970 Date: 04/18/2020

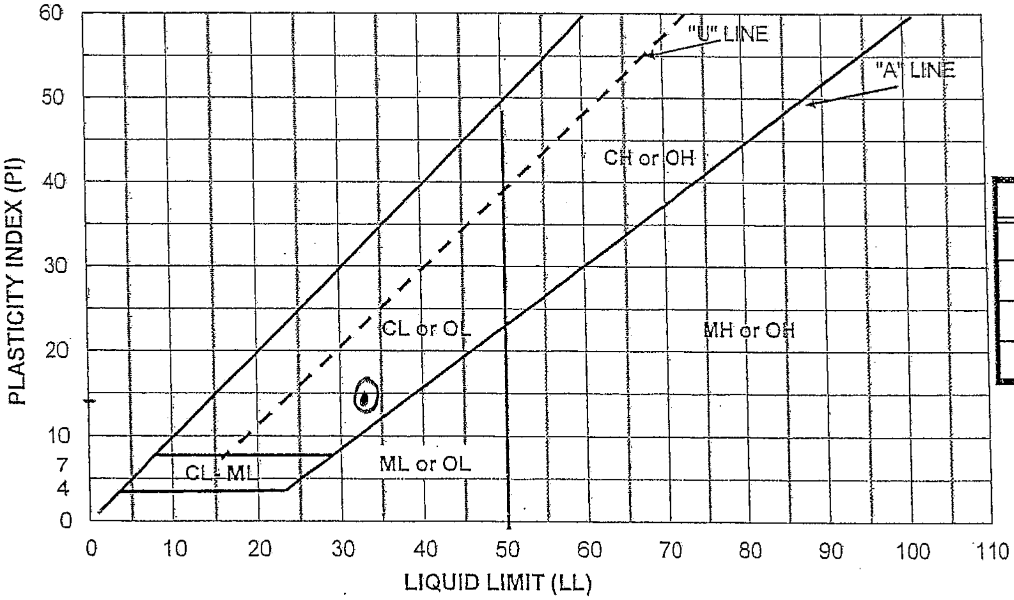
Sample Description: LEAN CLAY, (CL), DARK GREENISH GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S 12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	26	22	19				
TARE NO.	N7	G9	V7	V22	V2	G3		
TARE + WET WT (gms)	38.28	35.87	38.68	37.98	19.33	18.00		
TARE + DRY WT (gms)	31.57	29.71	31.70	31.01	17.97	16.84		
TARE WT (gms)	10.94	11.12	11.05	10.99	10.99	10.70		
WT OF WATER (gms)	6.71	6.16	6.98	6.97	1.36	1.16		
DRY WT SOIL (gms)	20.63	18.59	20.65	20.02	6.98	6.14		
WATER CONTENT %	32.5	33.1	33.8	34.8	19.5	18.9		

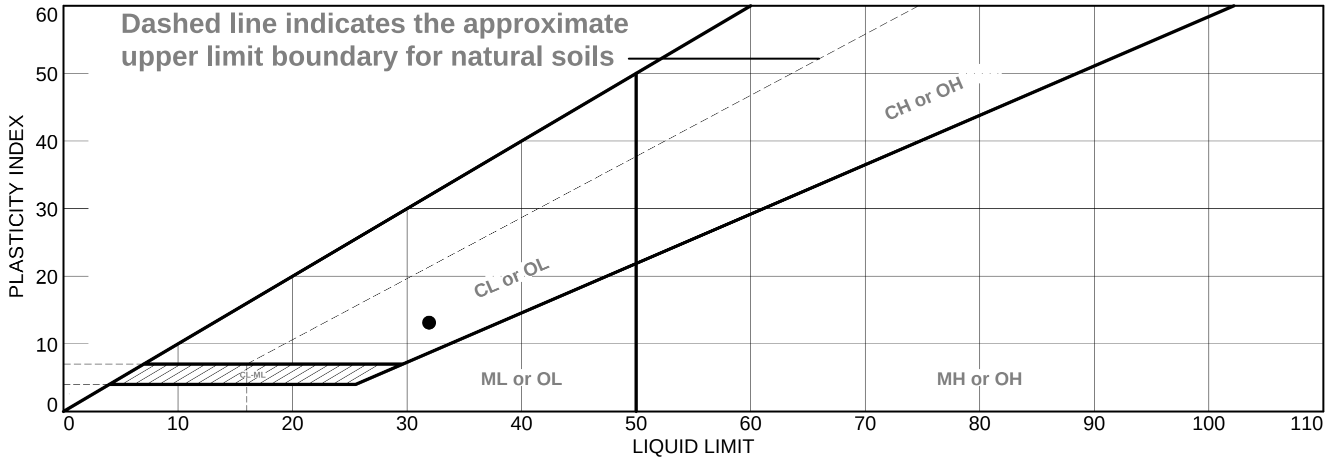


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	33 %
PL	19 %
PI	14 %
WC	21 %

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	32	19	13			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

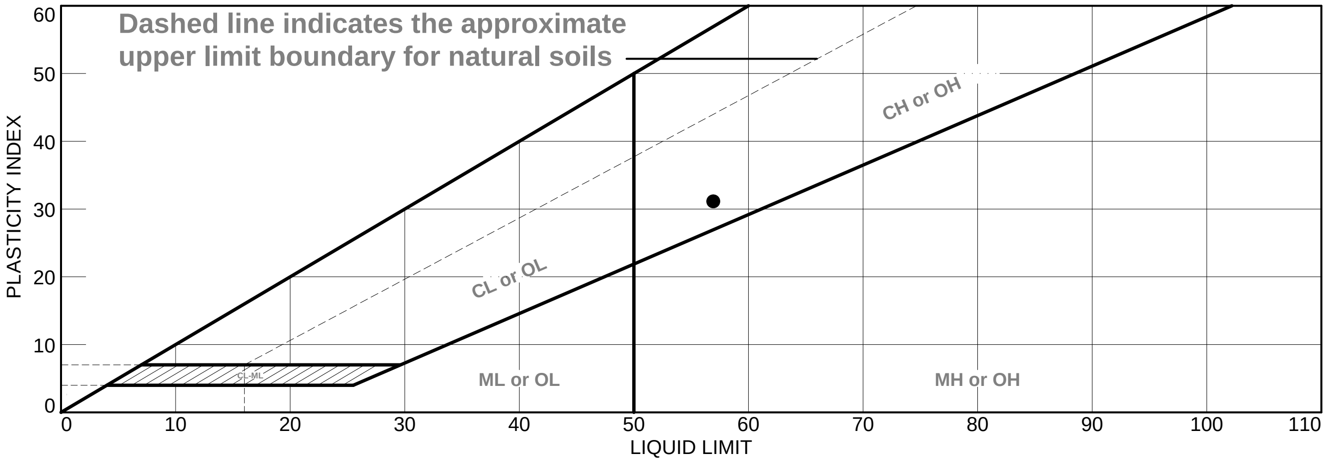
● **Source of Sample:** BH-164 **Depth:** 25 **Sample Number:** 5

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	57	26	31			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

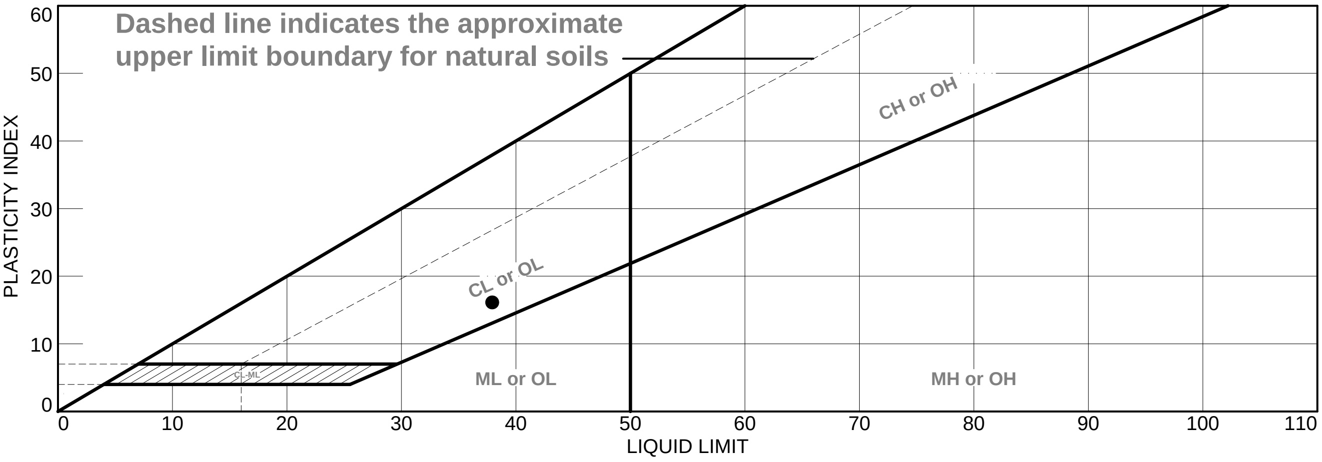
● **Source of Sample:** BH-164 **Depth:** 50 **Sample Number:** 10

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	38	22	16			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

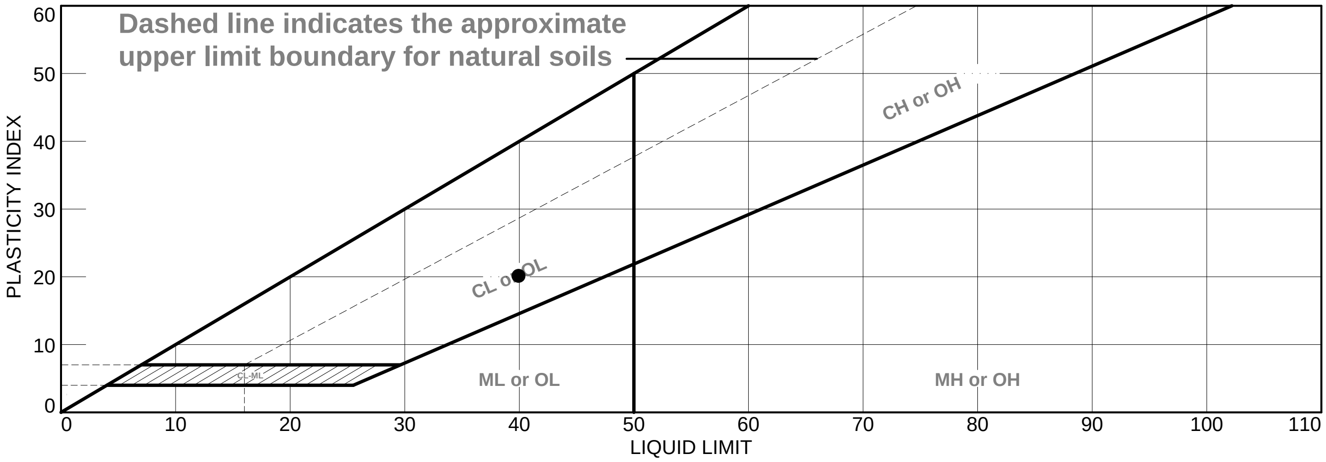
● **Source of Sample:** BH-164 **Depth:** 96.5 **Sample Number:** 27

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT


Dashed line indicates the approximate upper limit boundary for natural soils

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	40	20	20		87.9	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

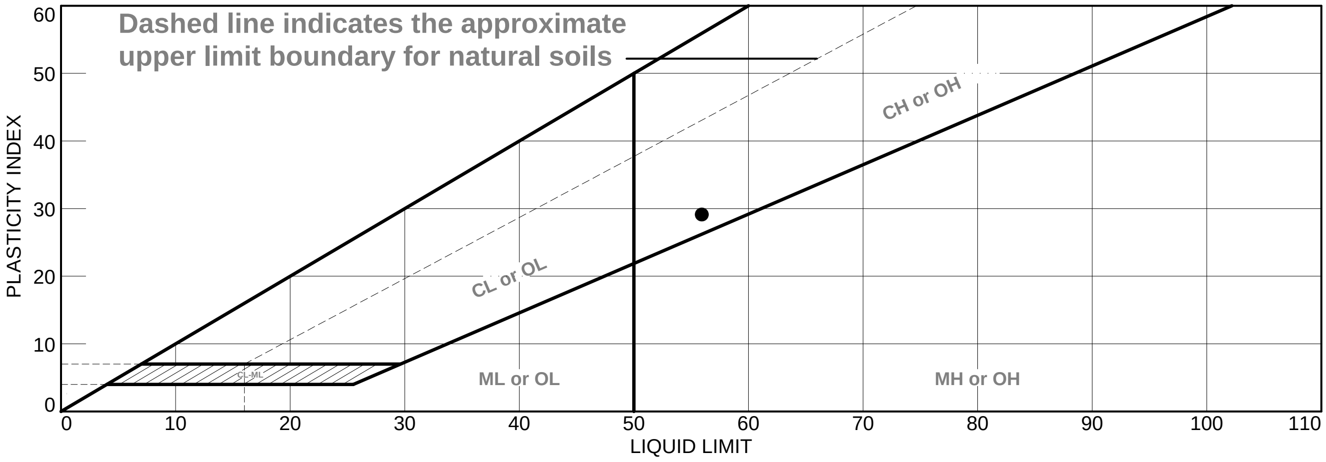
●**Source of Sample:** BH-164 **Depth:** 134.5 **Sample Number:** 43

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	56	27	29			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-164 **Depth:** 170 **Sample Number:** 50

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

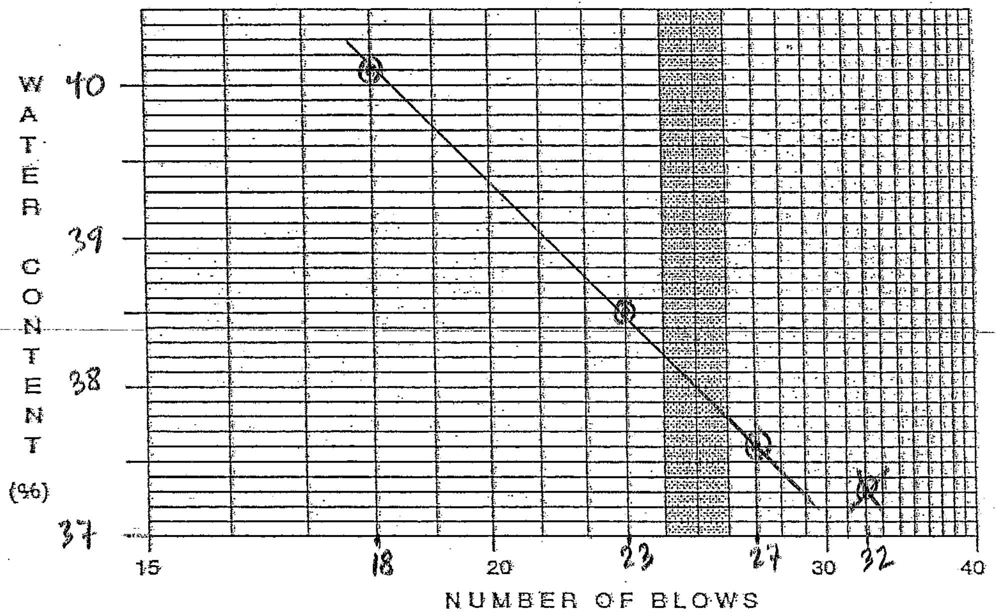
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-164 # 2A @ 11' Lab #: 6970 Date: 04/21/2020

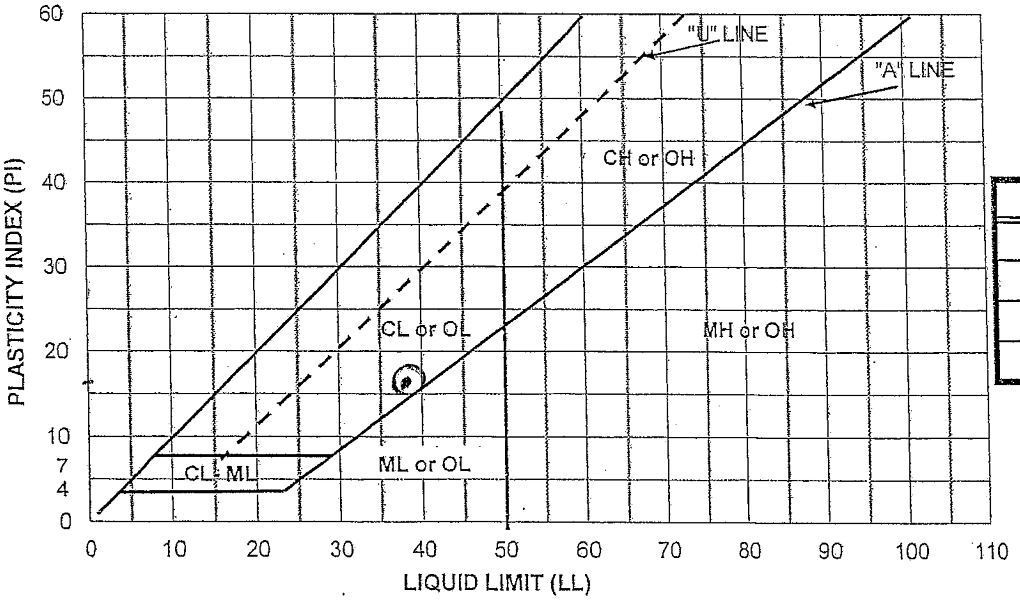
Sample Description: LEAN CLAY, (CL), DARK YELLOWISH BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~32~~	27	23	18				
TARE NO.	~~V5~~	N9	V4	V6	V23	V15		
TARE + WET WT (gms)	~~35.24~~	38.94	38.07	38.78	19.40	19.10		
TARE + DRY WT (gms)	~~28.65~~	31.32	30.57	30.83	17.84	17.66		
TARE WT (gms)	~~11.00~~	11.08	11.09	11.01	10.96	11.07		
WT OF WATER (gms)	~~6.59~~	7.62	7.5	7.95	1.56	1.44		
DRY WT SOIL (gms)	~~17.65~~	20.24	19.48	19.82	6.88	6.59		
WATER CONTENT %	~~37.3~~	37.6	38.5	40.1	22.7	21.9		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	38 %
PL	22 %
PI	16 %
WC	

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

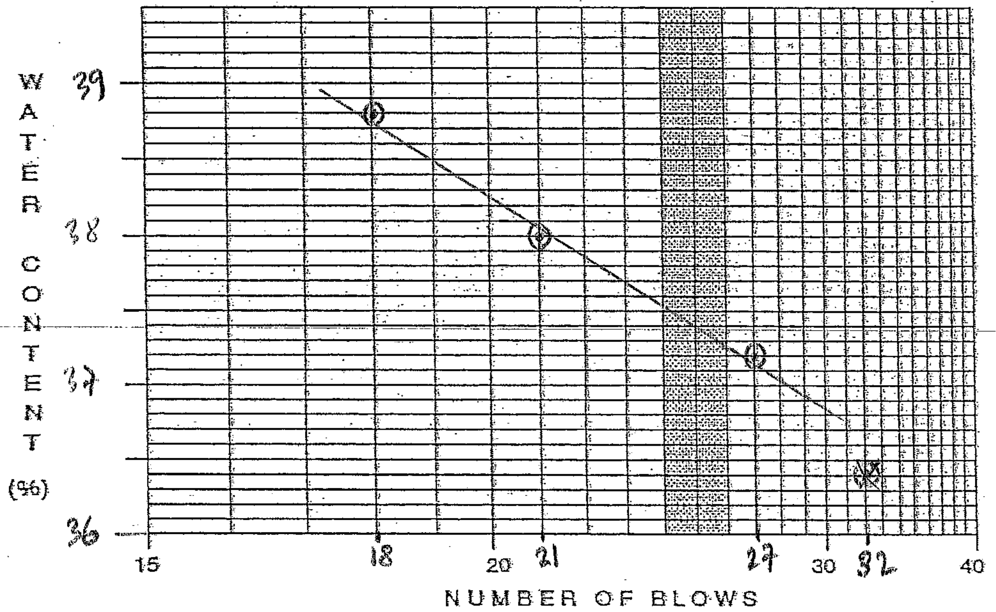
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY		Project #: 2019-131-TD2	
Sample #: BH-164 #46A @ 145.5'	Lab #: G970	Date: 04/21/2020	
Sample Description: LEAN CLAY, (CL), OLIVE BROWN		Tested By: D.NGUYEN	

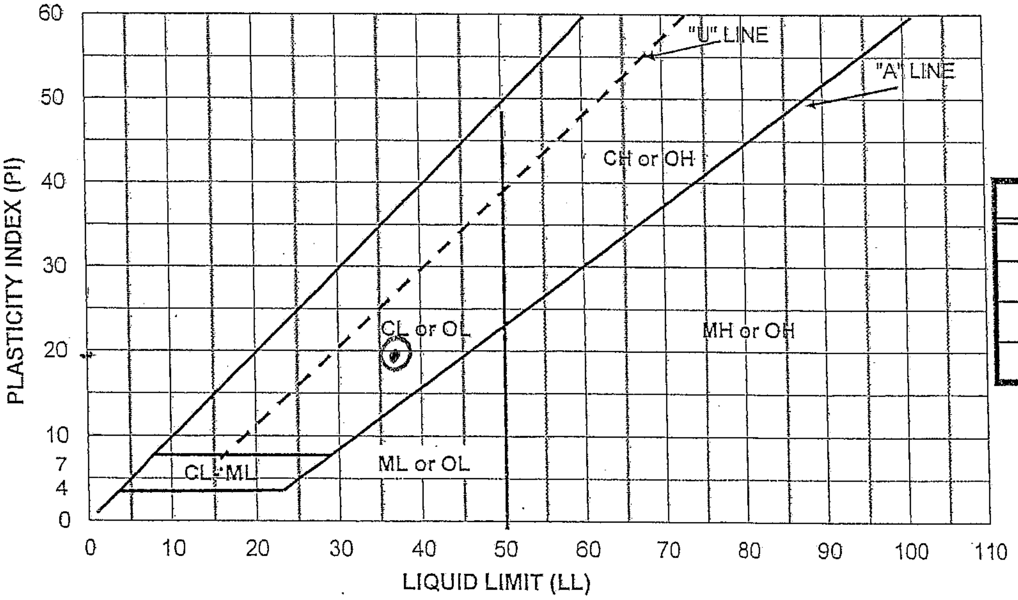
Estimate of % sample retain on #40 Sieve ☐

S11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~32~~	27	21	18				
TARE NO.	~~V24~~	V12	V21	G5	G4	A8		
TARE + WET WT (gms)	~~34.07~~	37.36	38.74	37.96	18.85	18.82		
TARE + DRY WT (gms)	~~27.95~~	30.25	31.13	30.48	17.58	17.60		
TARE WT (gms)	~~11.12~~	11.13	11.12	11.21	10.68	10.98		
WT OF WATER (gms)	~~6.12~~	7.11	7.61	7.48	1.27	1.22		
DRY WT SOIL (gms)	~~16.83~~	19.12	20.01	19.27	6.9	6.62		
WATER CONTENT %	~~36.4~~	37.2	38.0	38.8	18.4	18.4		

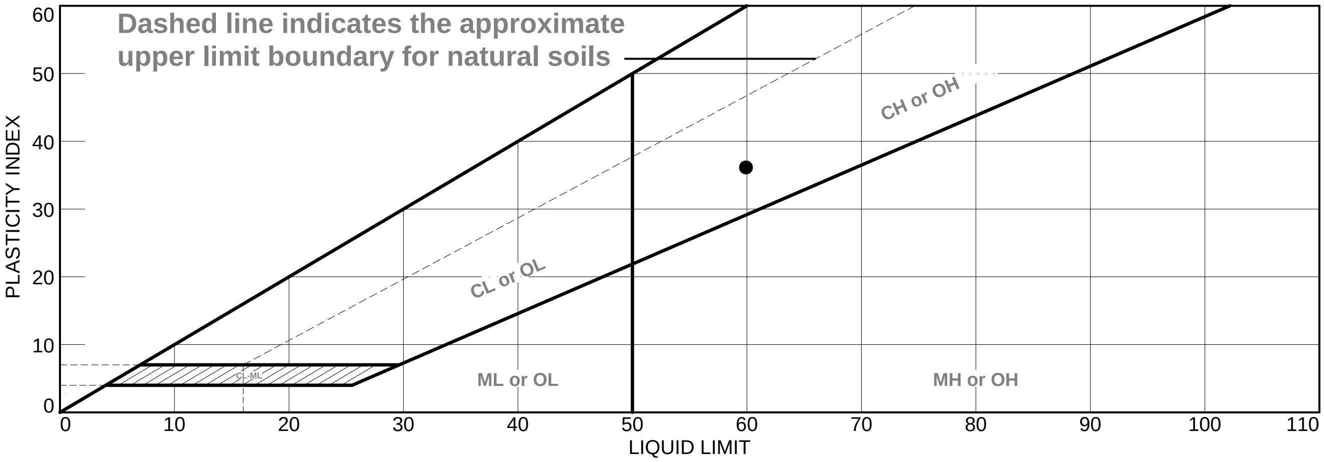


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	37 %
PL	18 %
PI	19 %
WC	

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	60	24	36			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

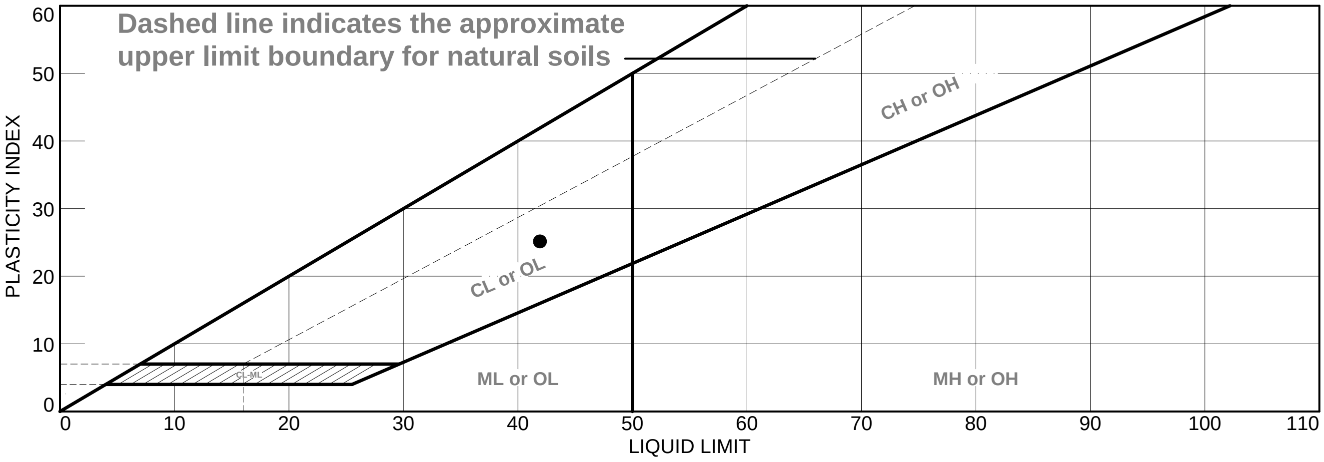
●**Source of Sample:** BH-165 **Depth:** 22.5 **Sample Number:** 3

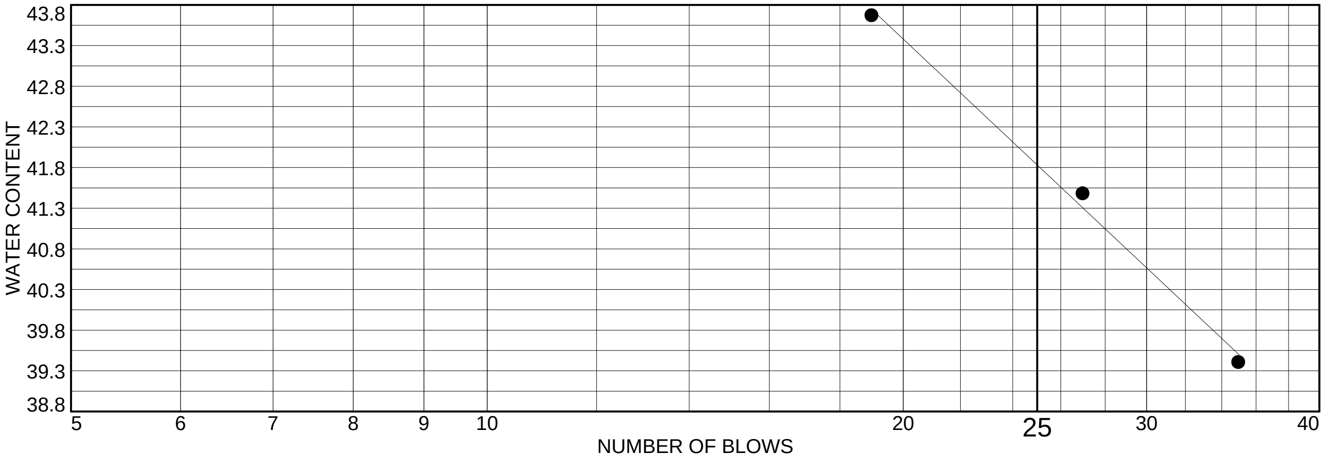
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	42	17	25			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

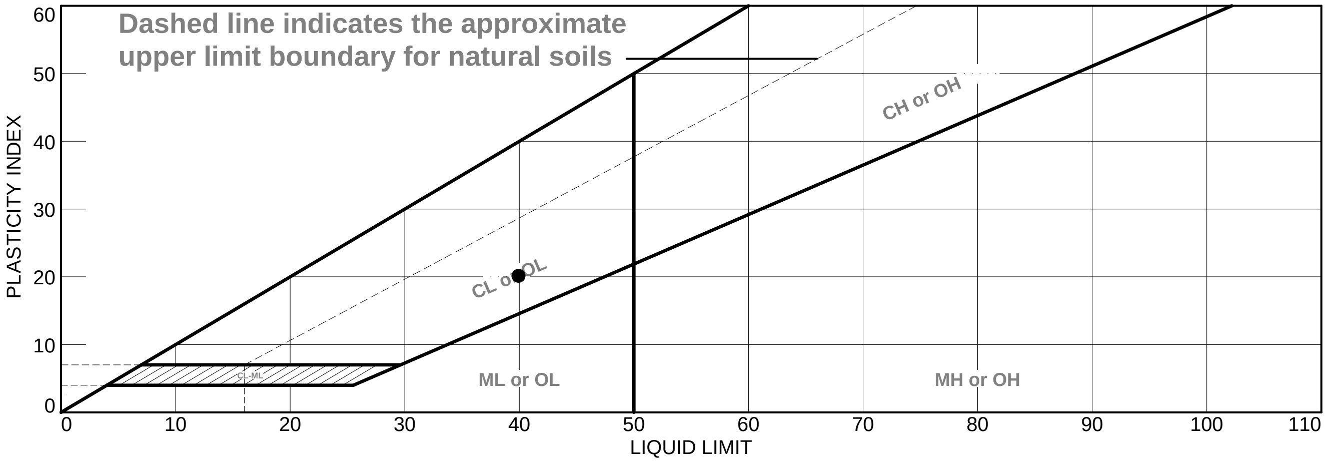
● **Source of Sample:** BH-165 **Depth:** 32.5 **Sample Number:** 7

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	40	20	20		58.9	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

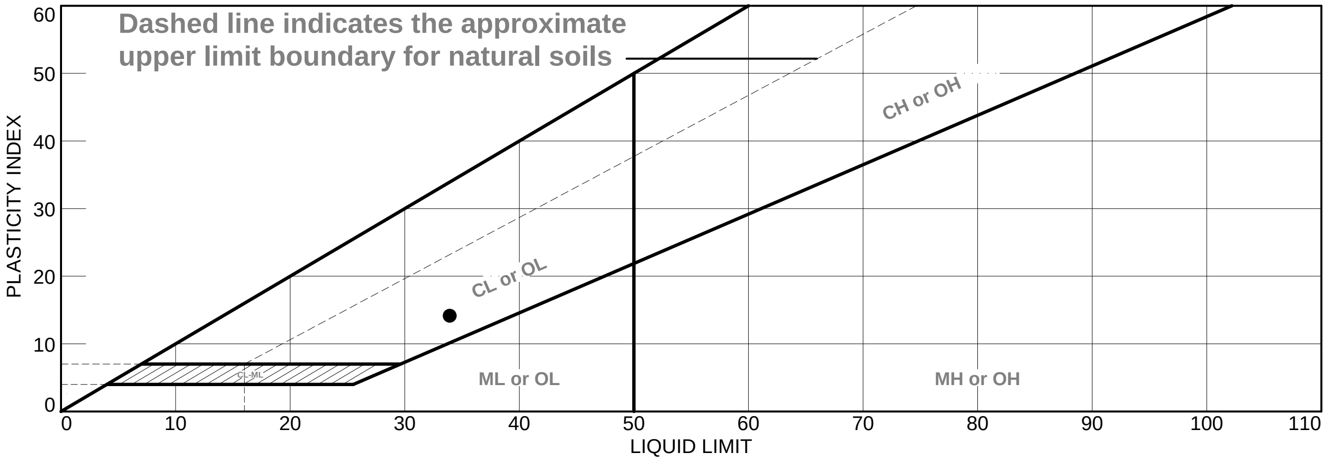
●**Source of Sample:** BH-165 **Depth:** 45 **Sample Number:** 12

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	34	20	14			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

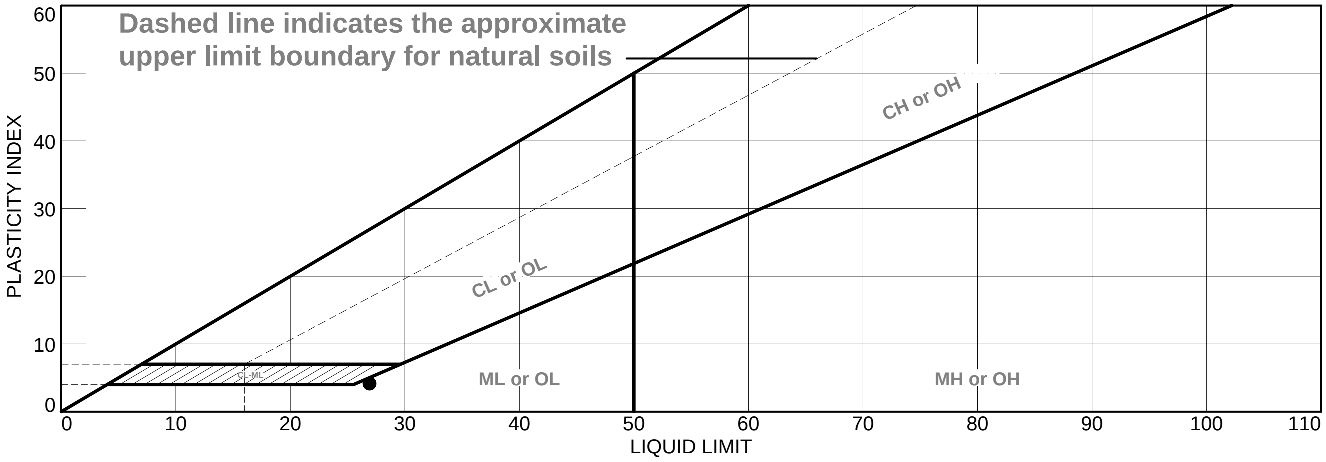
● **Source of Sample:** BH-165 **Depth:** 77.5 **Sample Number:** 25

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray sandy silt	27	23	4			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

●**Source of Sample:** BH-165 **Depth:** 120 **Sample Number:** 34

Remarks:

Figure

Tested By: JH **Checked By:** JH

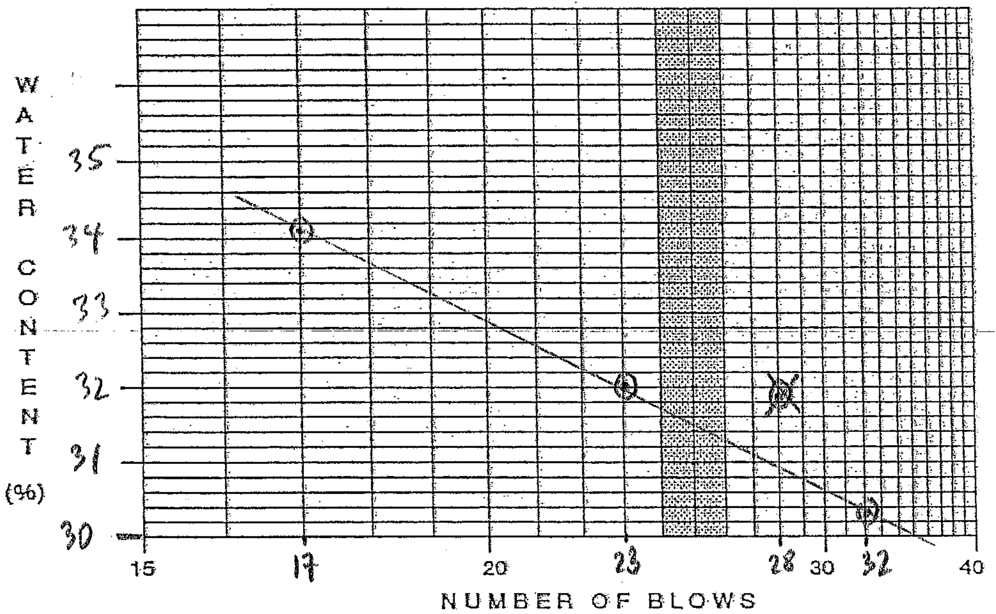
ATTERBERG LIMIT

ASTM D4318 or CAL 204

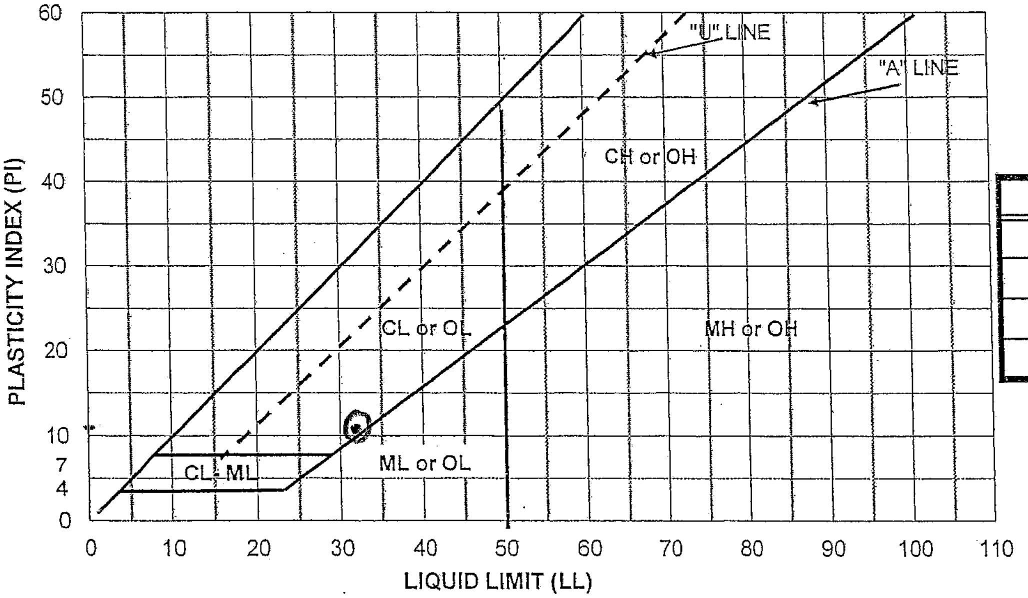
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702
Sample #: BH-165 #14B @ 50.5' Lab #: G9:70
Date: 04/07/2020
Sample Description: LEAN CLAY, (CL), GRAY
Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 512

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	~~28~~	23	17	▨	▨	▨	▨
TARE NO.	V11	~~V22~~	G11	N7	G9	V7		
TARE + WET WT (gms)	35.30	~~34.87~~	35.03	36.85	19.16	18.23		
TARE + DRY WT (gms)	29.60	~~29.09~~	29.23	30.26	17.76	17.02		
TARE WT (gms)	10.80	~~10.99~~	11.13	10.94	11.11	11.05		
WT OF WATER (gms)	5.7	~~5.78~~	5.8	6.59	1.4	1.21		
DRY WT SOIL (gms)	18.8	~~18.1~~	18.1	19.32	6.65	5.97		
WATER CONTENT %	30.3	~~31.9~~	32.0	34.1	21.1	20.3		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	32 %
PL	21 %
PI	11 %
WC	26 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

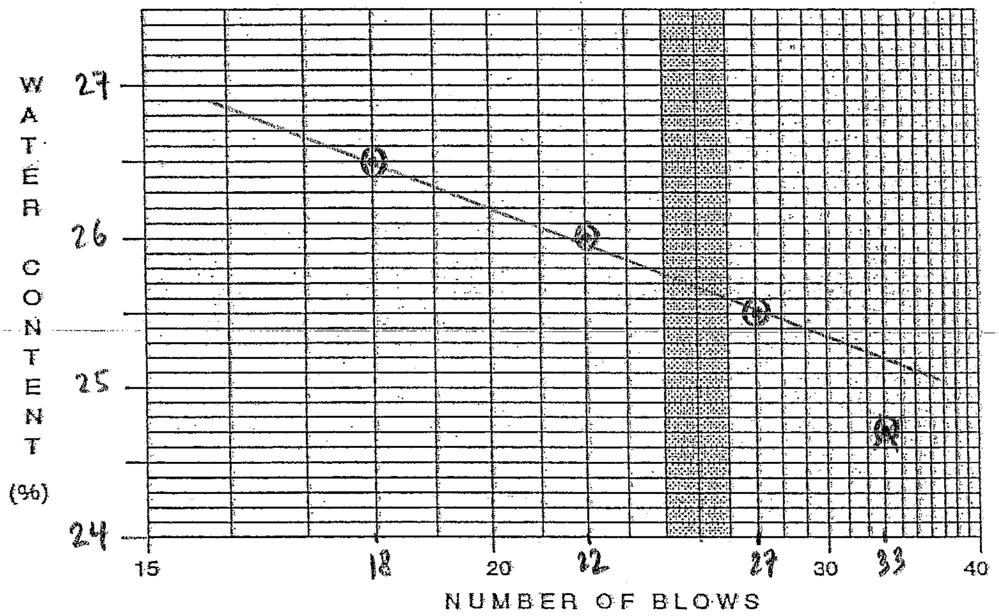
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-165. #17A @ 58.5' Lab #: G970 Date: 04/07/2020

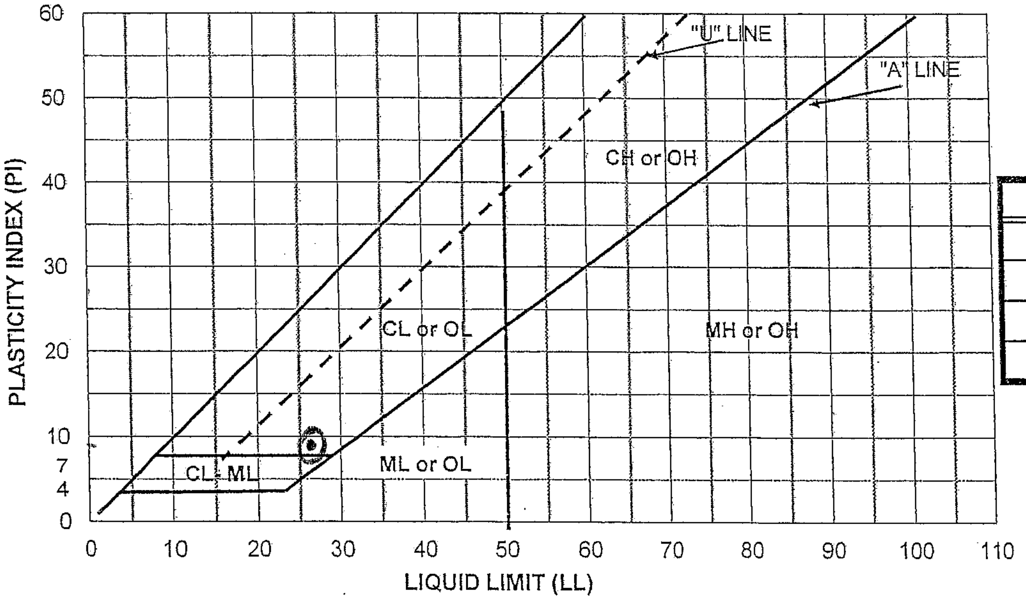
Sample Description: LEAN CLAY, (CL), LIGHT GREENISH GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ ≤ 11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~33~~	27	22	18	▨	▨	▨	▨
TARE NO.	~~N2~~	A11	V18	A8	A10	V24		
TARE + WET WT (gms)	~~36.35~~	32.49	36.70	36.97	17.93	17.85		
TARE + DRY WT (gms)	~~31.32~~	28.13	31.41	31.53	16.92	16.85		
TARE WT (gms)	~~10.99~~	11.01	11.05	10.97	11.07	11.12		
WT OF WATER (gms)	~~5.03~~	4.36	5.29	5.44	1.01	1.0		
DRY WT SOIL (gms)	~~20.33~~	17.12	20.36	20.56	5.85	5.73		
WATER CONTENT %	~~24.7~~	25.5	26.0	26.5	17.3	17.5		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	26 %
PL	17 %
PI	9 %
WC	21 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

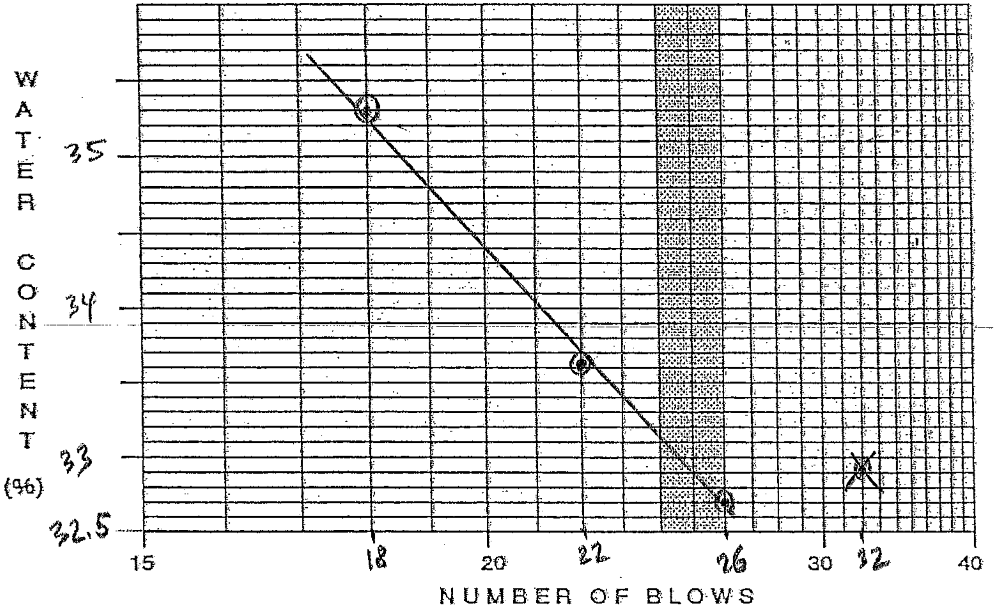
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-165 #20B@65.5 Lab #: G970 Date: 04/03/2020

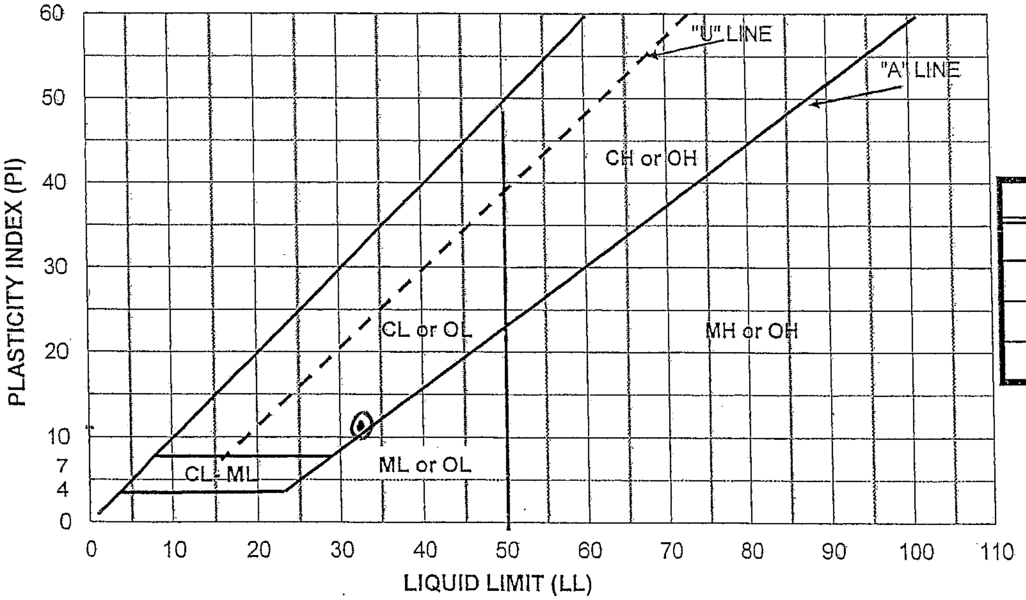
Sample Description: LEAN CLAY, (CL), LIGHT GREENISH GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 511

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~32~~	26	22	18	▨	▨	▨	▨
TARE NO.	~~A8~~	N2	V18	A11	V24	A10		
TARE + WET WT (gms)	~~31.80~~	35.03	33.78	38.01	19.13	17.78		
TARE + DRY WT (gms)	~~26.64~~	29.10	28.06	30.96	17.70	16.59		
TARE WT (gms)	~~10.97~~	10.99	11.05	11.00	11.12	11.08		
WT OF WATER (gms)	~~5.16~~	5.93	5.72	7.05	1.43	1.19		
DRY WT SOIL (gms)	~~15.67~~	18.11	17.01	19.96	6.58	5.51		
WATER CONTENT %	~~32.9~~	32.7	33.6	35.3	21.7	21.5		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



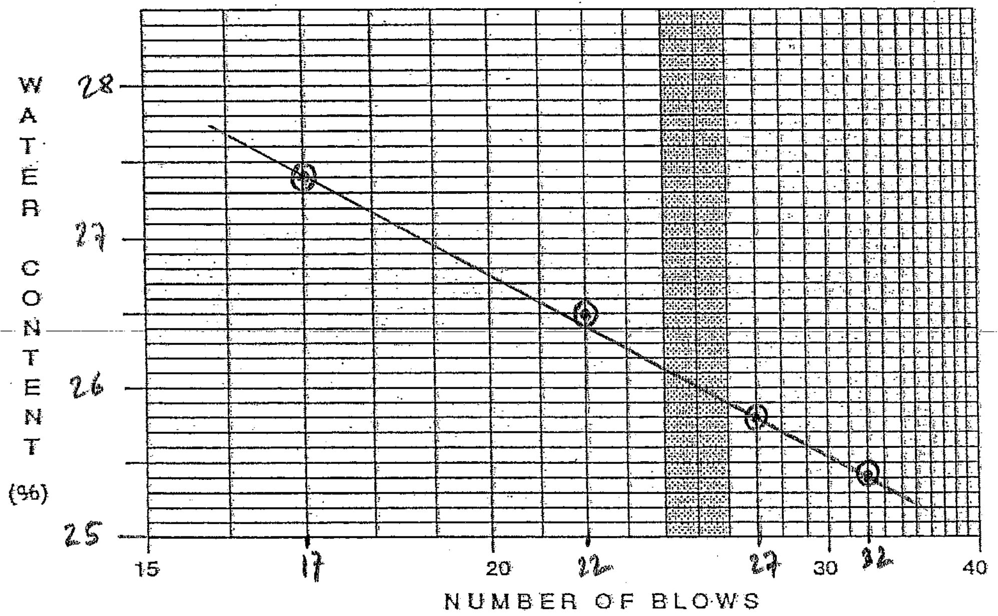
SUMMARY:	
LL	33 %
PL	22 %
PI	11 %
WC	23 %

ATTERBERG LIMIT
ASTM D4318 or CAL 204

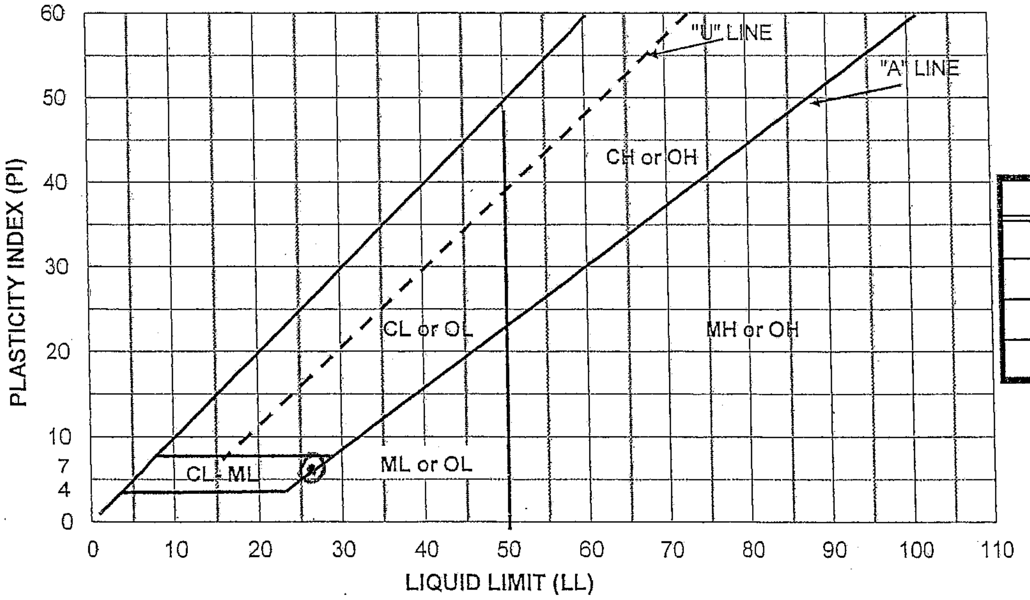
Project Name: BART TO SILICON VALLEY Project #: 2019-131-102
Sample #: BH-165 #23B @ 73' Lab #: G970 Date: 04/07/2020
Sample Description: SILTY CLAY, (CL-ML), DARK GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S13

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	27	22	17	▨	▨	▨	▨
TARE NO.	G3	V2	G7	V1	G5	V12		
TARE + WET WT (gms)	35.89	36.44	36.68	37.48	18.79	19.58		
TARE + DRY WT (gms)	30.78	31.22	31.25	31.78	17.50	18.13		
TARE WT (gms)	10.70	11.00	10.75	10.95	11.21	11.12		
WT OF WATER (gms)	5.11	5.22	5.43	5.7	1.29	1.45		
DRY WT SOIL (gms)	20.08	20.22	20.5	20.83	6.29	7.01		
WATER CONTENT %	25.4	25.8	26.5	27.4	20.5	20.7		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



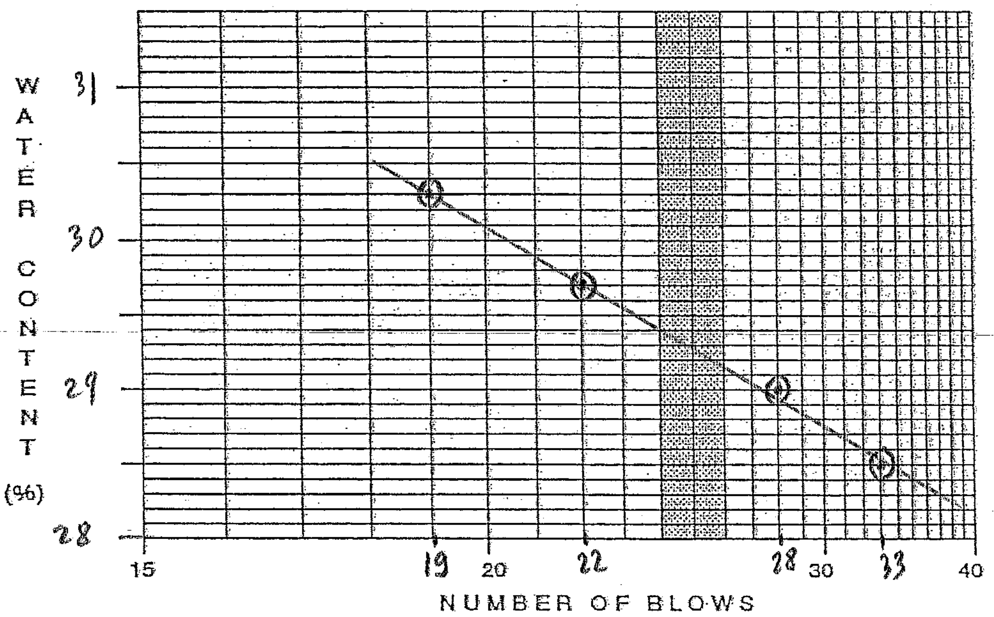
SUMMARY:	
LL	26 %
PL	21 %
PI	5 %
WC	25 %

ATTERBERG LIMIT
ASTM D4318 or CAL 204

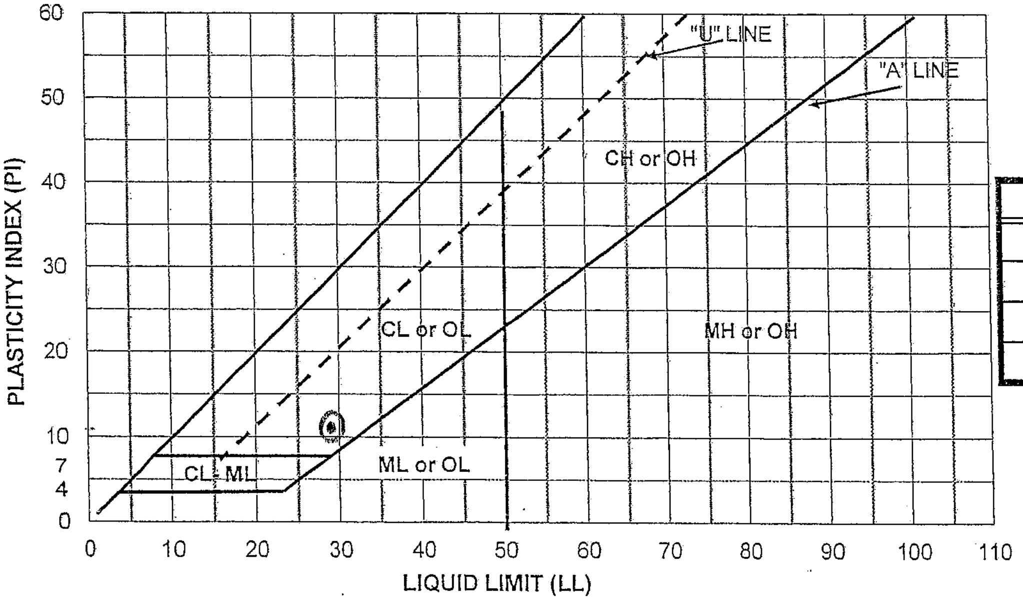
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702
Sample #: BH-165 #30B @ 100.5' Lab #: G970 Date: 04/07/2020
Sample Description: LEAN CLAY, (CL), LIGHT OLIVE BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S9

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	28	22	19	▨	▨	▨	▨
TARE NO.	G4	V6	N9	V15	V5	V23		
TARE + WET WT (gms)	38.56	38.52	38.46	40.89	20.19	19.49		
TARE + DRY WT (gms)	32.38	32.33	32.19	33.95	18.76	18.21		
TARE WT (gms)	10.68	11.01	11.08	11.07	11.01	10.96		
WT OF WATER (gms)	6.18	6.19	6.27	6.94	1.43	1.28		
DRY WT SOIL (gms)	21.7	21.32	21.11	22.88	7.75	7.25		
WATER CONTENT %	28.5	29.0	29.7	30.3	18.5	17.7		

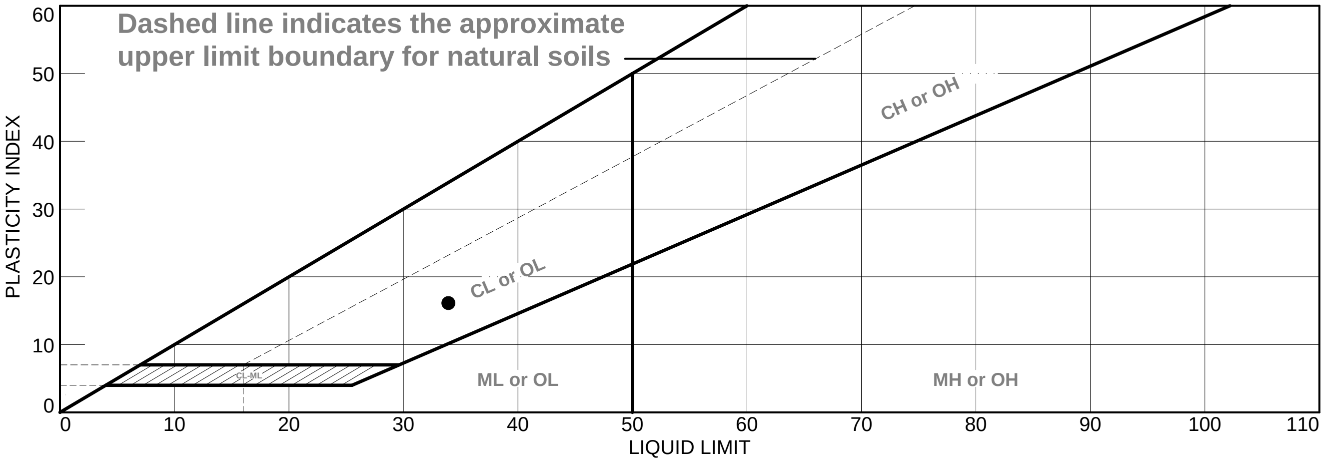


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	29 %
PL	18 %
PI	11 %
WC	21%

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay with sand	34	18	16			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

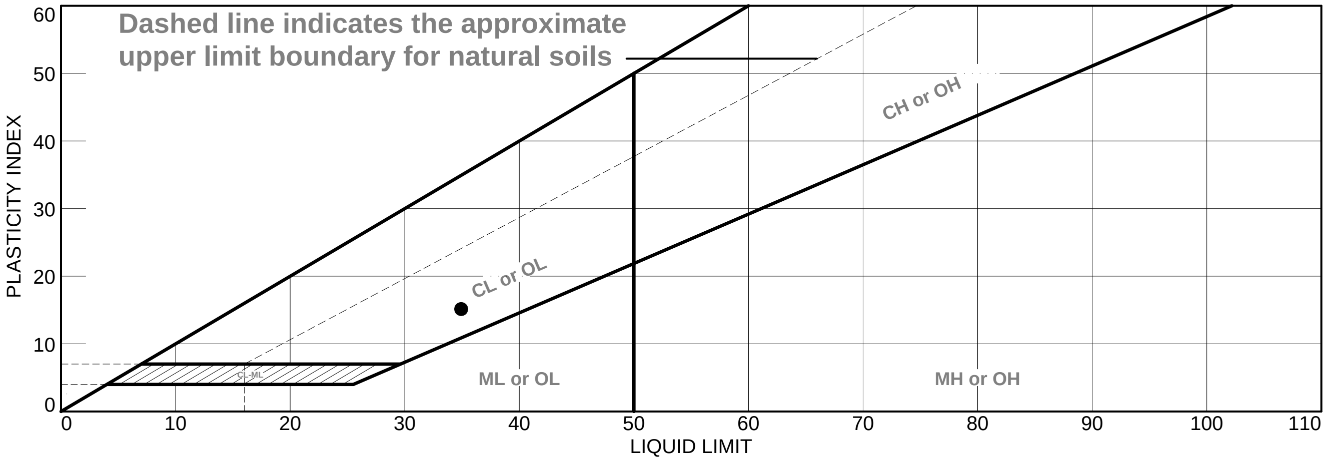
●**Source of Sample:** BH-166 **Depth:** 35 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	35	20	15			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

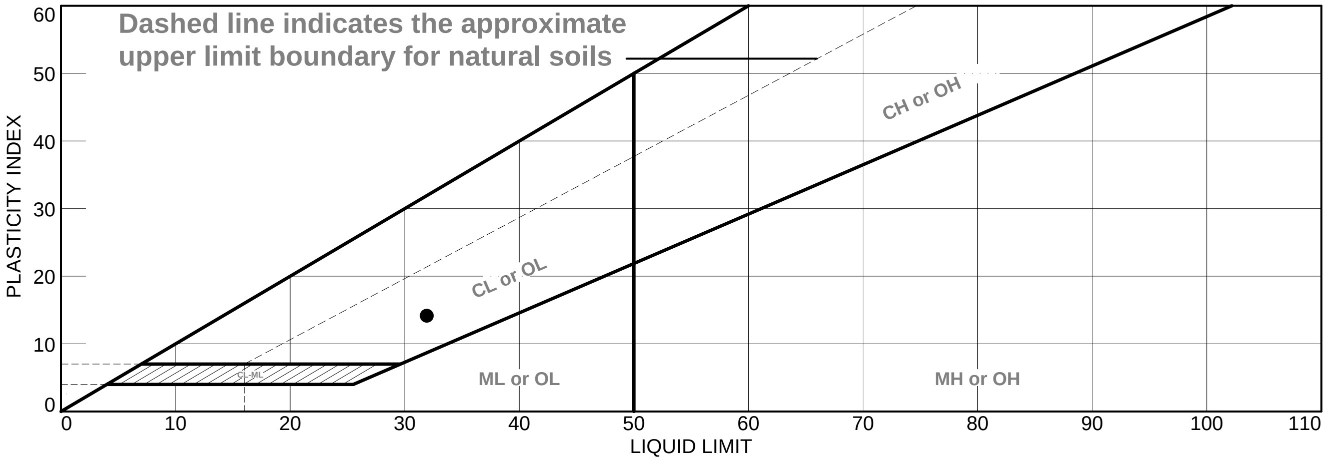
● **Source of Sample:** BH-166 **Depth:** 76 **Sample Number:** 15

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray sandy clay	32	18	14		52.8	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

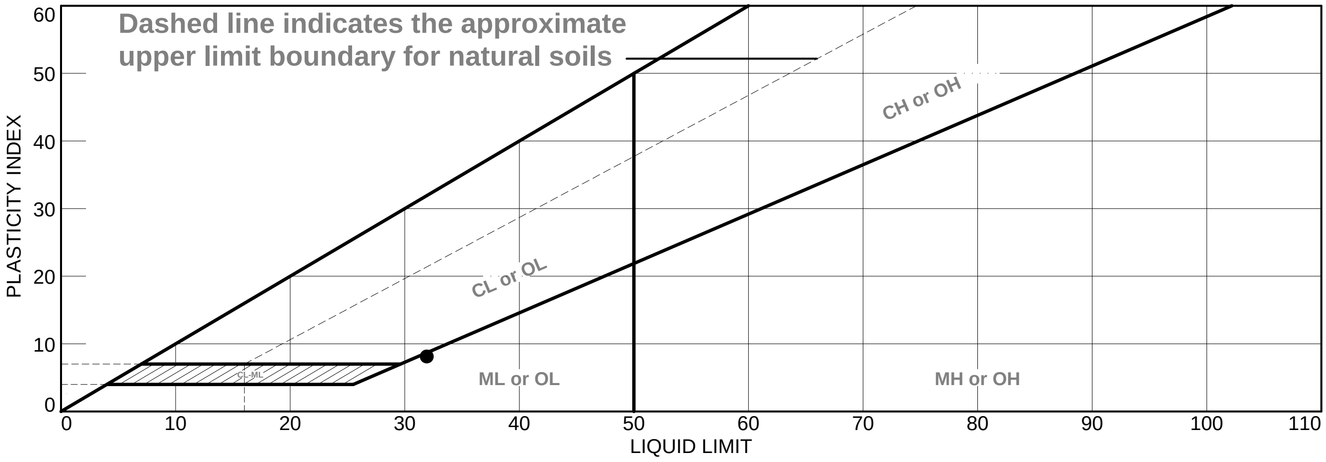
● **Source of Sample:** BH-166 **Depth:** 95.5 **Sample Number:** 23

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown silt	32	24	8			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-166 **Depth:** 113.5 **Sample Number:** 30

Remarks:

Figure

Tested By: JH **Checked By:** JH

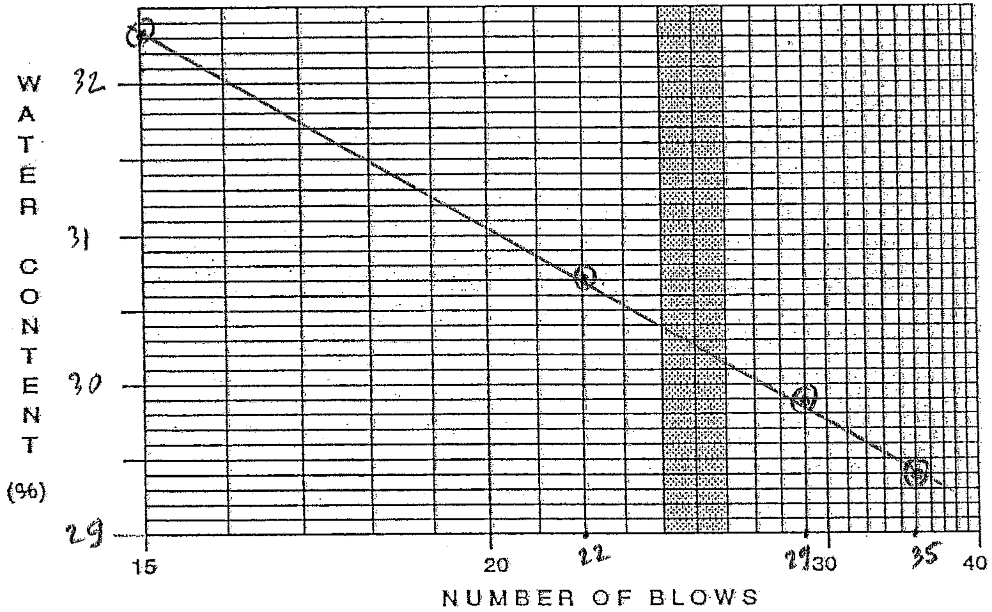
ATTERBERG LIMIT

ASTM D4318 or CAL 204

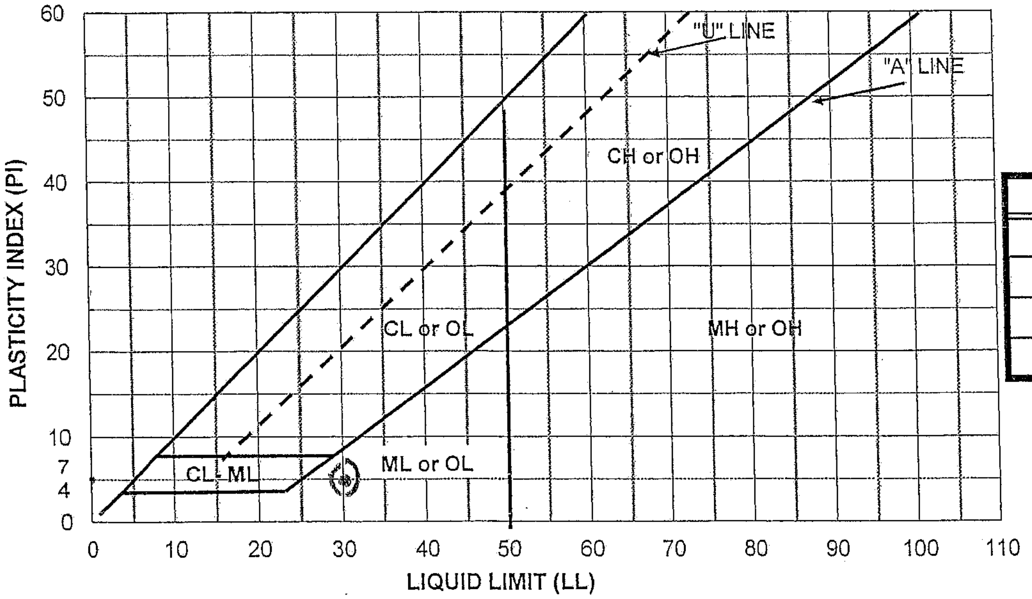
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702
Sample #: BH-166 #8 @ 45'
Lab #: G970
Date: 03/31/2020
Sample Description: SILT, (ML), DARK YELLOWISH BROWN
Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	29	22	15				
TARE NO.	G11	V11	G2	N7	V22	G9		
TARE + WET WT (gms)	33.86	32.24	35.23	39.31	19.71	20.07		
TARE + DRY WT (gms)	28.70	27.30	29.46	32.38	17.97	18.30		
TARE WT (gms)	11.13	10.80	10.69	10.94	10.99	11.11		
WT OF WATER (gms)	5.16	4.94	5.77	6.93	1.74	1.77		
DRY WT SOIL (gms)	17.57	16.5	18.77	21.44	6.98	7.19		
WATER CONTENT %	29.4	29.9	30.7	32.3	24.9	24.6		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	30 %
PL	25 %
PI	5 %
WC	24 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

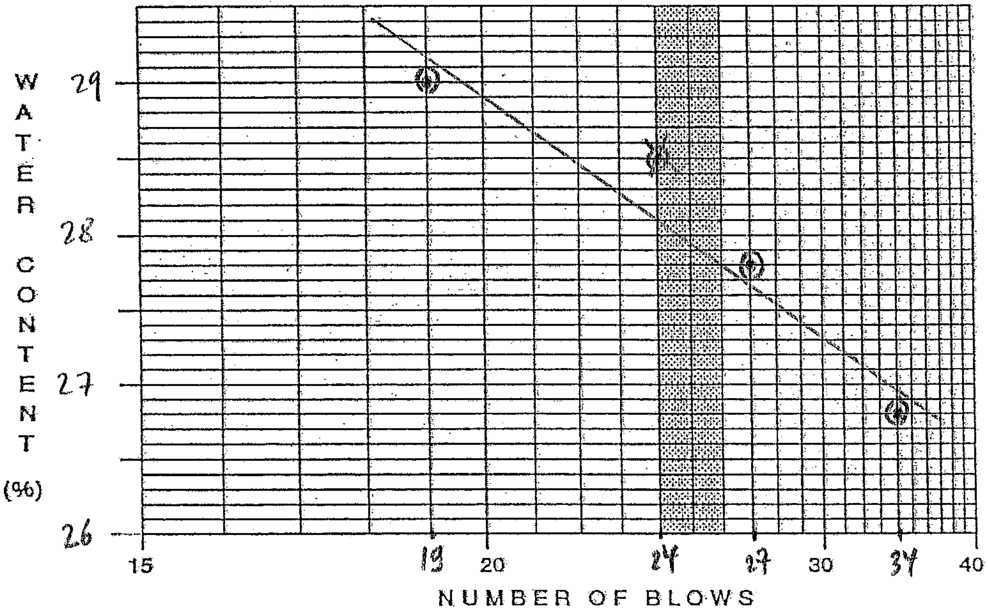
Project Name: BART TO SILICON VALLEY Project #: 2019-131-T02

Sample #: BH-166 #12A @ 65½' Lab #: G970 Date: 03/31/2020

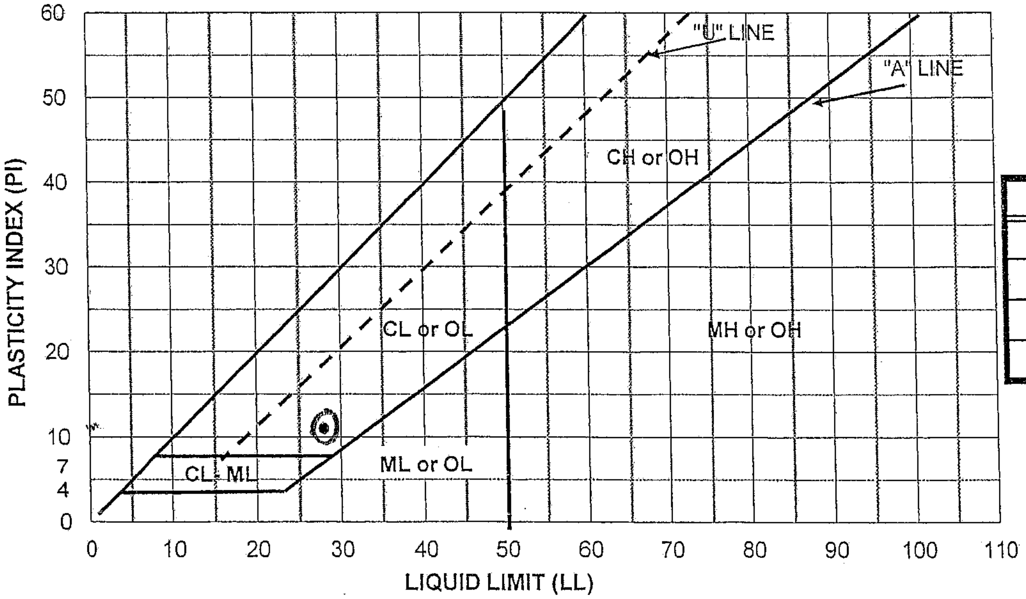
Sample Description: Lean CLAY w/SAND,(CL), DARK GREENISH GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	27	~~24~~	19	▨	▨	▨	▨
TARE NO.	J23	V5	~~G4~~	N9	V6	V15		
TARE + WET WT (gms)	37.47	36.14	~~32.61~~	38.29	20.62	18.91		
TARE + DRY WT (gms)	31.87	30.68	~~27.75~~	32.18	19.22	17.77		
TARE WT (gms)	10.96	11.01	~~10.68~~	11.08	11.01	11.07		
WT OF WATER (gms)	5.6	5.46	~~4.86~~	6.11	1.4	1.14		
DRY WT SOIL (gms)	20.91	19.67	~~17.07~~	21.1	8.21	6.7		
WATER CONTENT %	26.8	27.8	~~28.5~~	29.0	17.1	17.0		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	28 %
PL	17 %
PI	11 %
WC	20 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

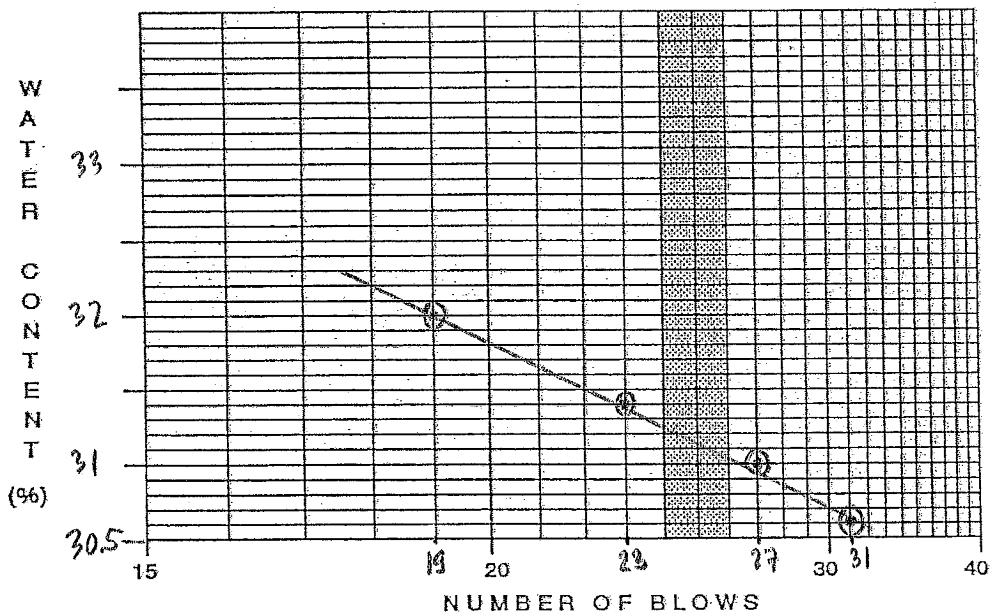
Project Name: BART TO SILICON VALLEY Project #: 2019-131-T02

Sample #: BH-166 #32A @ 121 Lab #: G970 Date: 03/13/2020

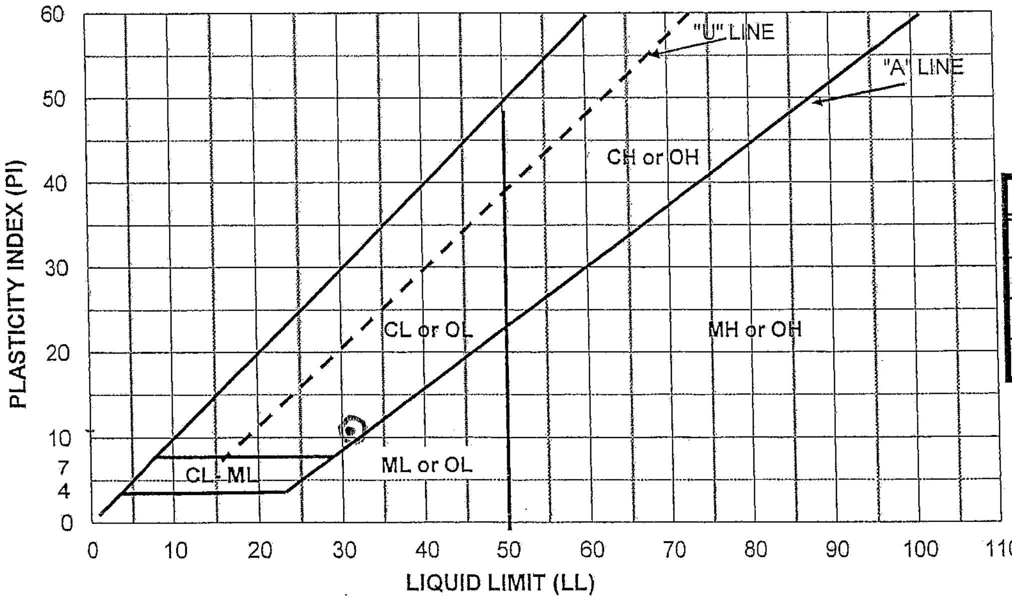
Sample Description: LEAN CLAY w/ SAND, (CL), DARK GREENISH GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	27	23	19				
TARE NO.	G4	V23	V15	V5	V6	N9		
TARE + WET WT (gms)	36.52	35.62	36.33	38.58	19.0	18.30		
TARE + DRY WT (gms)	30.47	29.78	30.29	31.90	17.69	17.12		
TARE WT (gms)	10.68	10.96	11.08	11.01	11.02	11.09		
WT OF WATER (gms)	6.05	5.84	6.04	6.68	1.31	1.18		
DRY WT SOIL (gms)	19.79	18.82	19.21	20.89	6.67	6.03		
WATER CONTENT %	30.6	31.0	31.4	32.0	19.6	19.6		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	31 %
PL	20 %
PI	11 %
WC	24%

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

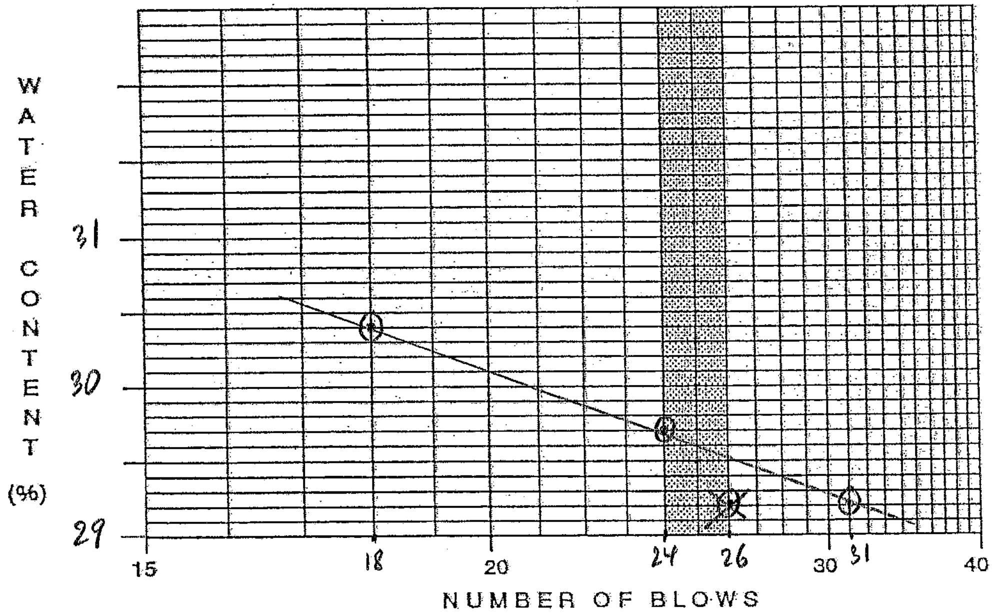
ASTM D4318 or CAL 204

Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-702
Sample #:	BH-166 #35A @ 130' Lab #: G970	Date:	04/01/2020
Sample Description:	SILT, (ML), DARK GRAY	Tested By:	D. NGUYEN

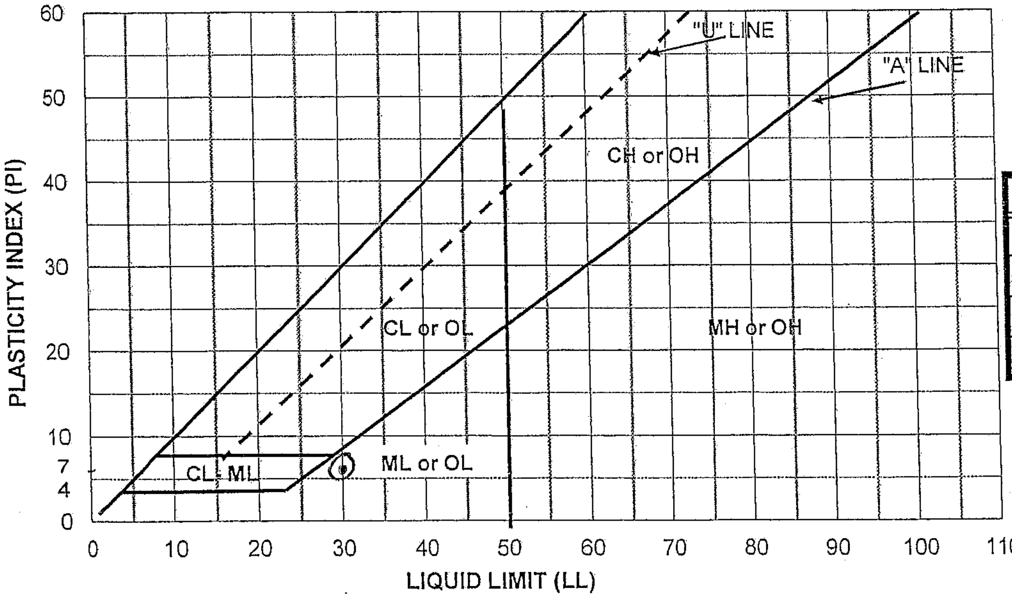
Estimate of % sample retain on #40 Sieve ☐

≤ 13

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	~~26~~	24	18				
TARE NO.	G3	~~G7~~	V1	V12	V2	G5		
TARE + WET WT (gms)	30.81	~~31.04~~	30.93	34.81	18.34	17.36		
TARE + DRY WT (gms)	26.26	~~26.45~~	26.35	29.29	16.89	16.20		
TARE WT (gms)	10.70	~~10.75~~	10.94	11.12	11.00	11.21		
WT OF WATER (gms)	4.55	~~4.59~~	4.58	5.52	1.45	1.16		
DRY WT SOIL (gms)	15.56	~~15.7~~	15.41	18.17	5.89	4.99		
WATER CONTENT %	29.2	~~29.2~~	29.7	30.4	24.6	23.2		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	30 %
PL	24 %
PI	6 %
WC	24 %

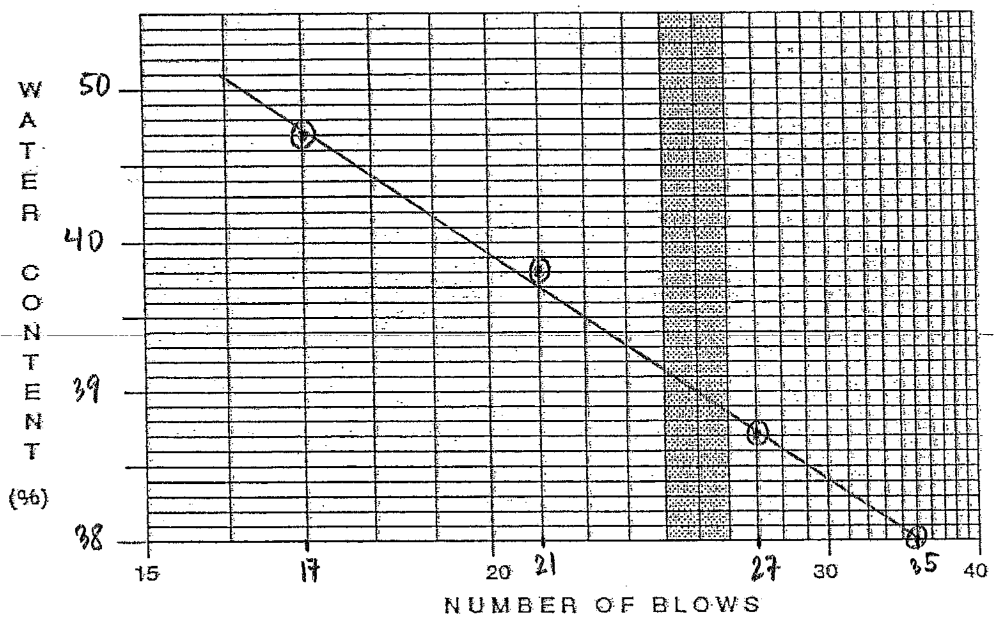
ATTERBERG LIMIT

ASTM D4318 or CAL 204

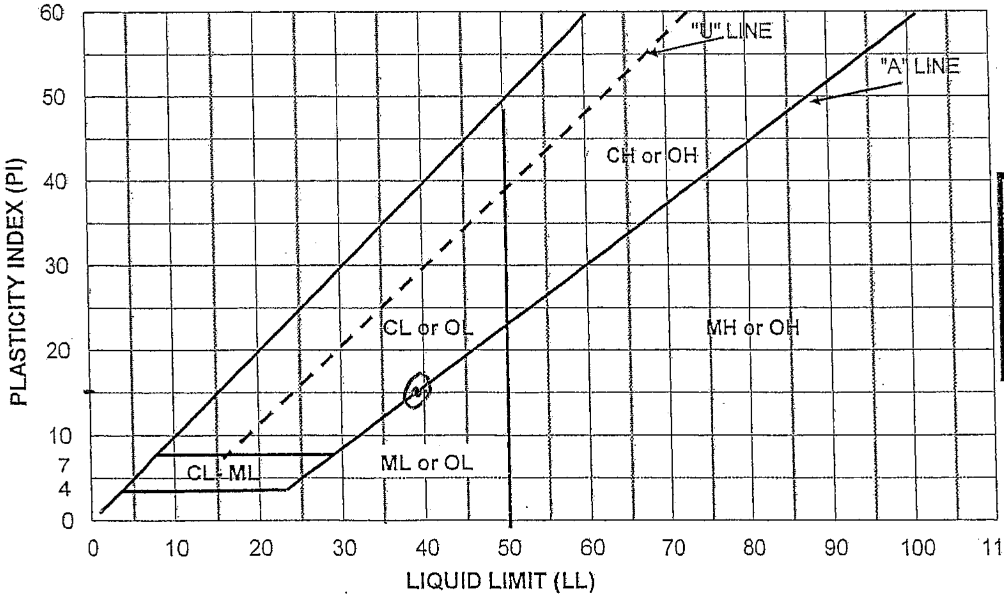
Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-702
Sample #:	BH-166 #38A @141' Lab #: G970	Date:	04/01/2020
Sample Description:	LEAN CLAY w/ SAND, (CL), DARK GREENISH GRAY	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	27	21	17	▨	▨	▨	▨
TARE NO.	V15	V6	V5	G4	N9	V23		
TARE + WET WT (gms)	34.49	37.53	35.73	37.25	18.64	18.08		
TARE + DRY WT (gms)	28.04	30.13	28.69	29.57	17.16	16.73		
TARE WT (gms)	11.07	11.01	11.01	10.68	11.09	10.96		
WT OF WATER (gms)	6.45	7.4	7.04	7.68	1.48	1.35		
DRY WT SOIL (gms)	16.97	19.12	17.68	18.89	6.07	5.77		
WATER CONTENT %	38.0	38.7	39.8	40.7	24.4	23.4		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	39 %
PL	24 %
PI	15 %
WC	29%

ATTERBERG LIMIT

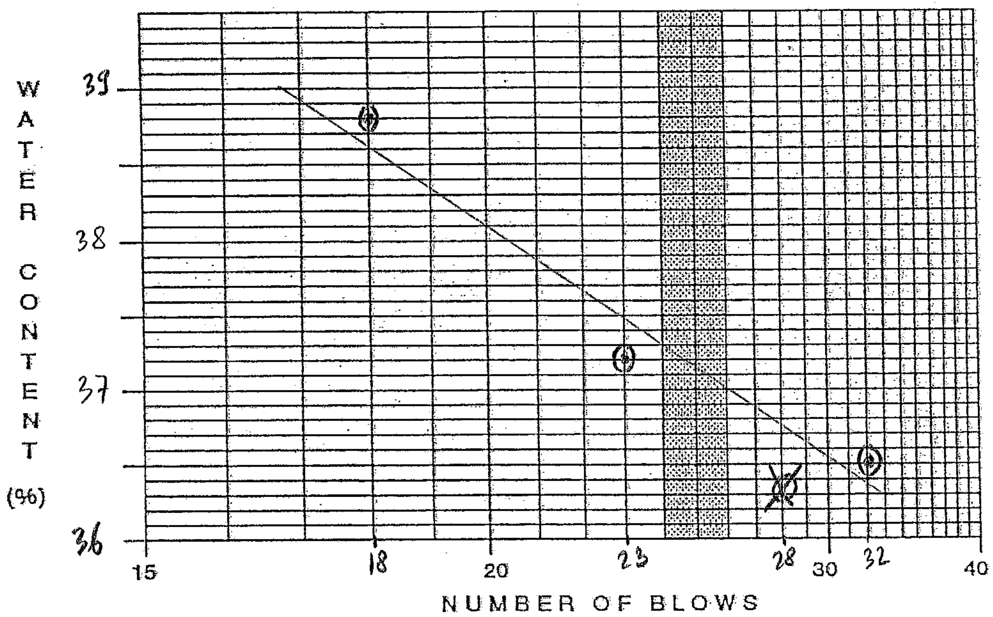
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY	Project #: 2019-181-702
Sample #: BH-166 #41A @156' Lab #: G990	Date: 04/01/2020
Sample Description: LEAN CLAY w/SAND, (CL), GRAY	Tested By: D-NGUYEN

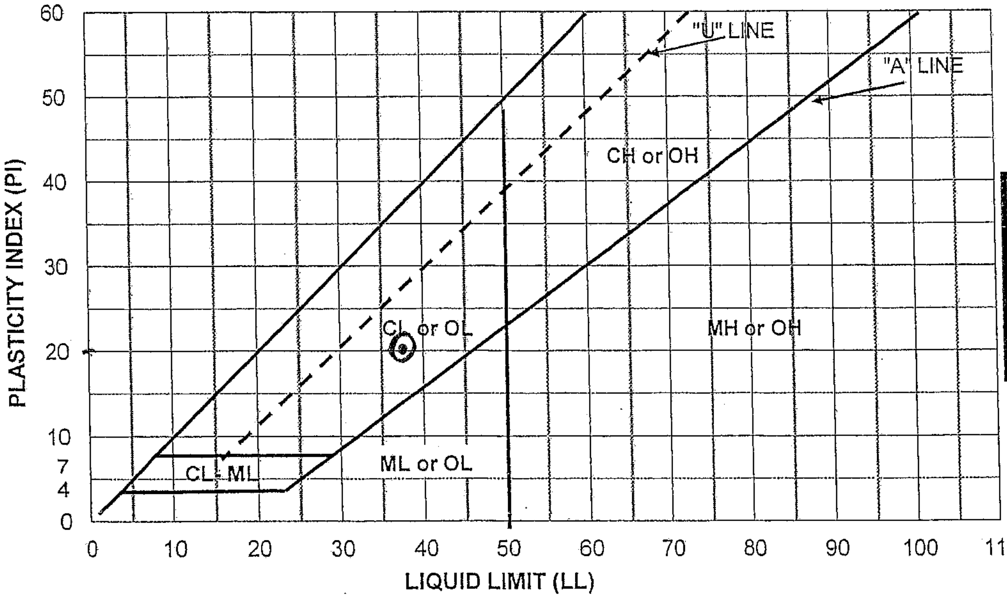
Estimate of % sample retain on #40 Sieve ☐

512

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	28	23	18				
TARE NO.	G11	~~V11~~	V22	N7	G9	V7		
TARE + WET WT (gms)	37.44	~~37.92~~	39.56	38.30	19.28	18.82		
TARE + DRY WT (gms)	30.41	~~30.69~~	31.82	30.65	18.07	17.70		
TARE WT (gms)	11.13	~~10.80~~	10.99	10.94	11.11	11.06		
WT OF WATER (gms)	7.03	~~7.23~~	7.74	7.65	1.21	1.12		
DRY WT SOIL (gms)	19.28	~~19.89~~	20.83	19.71	6.96	6.64		
WATER CONTENT %	36.5	~~36.3~~	37.2	38.8	17.4	16.9		



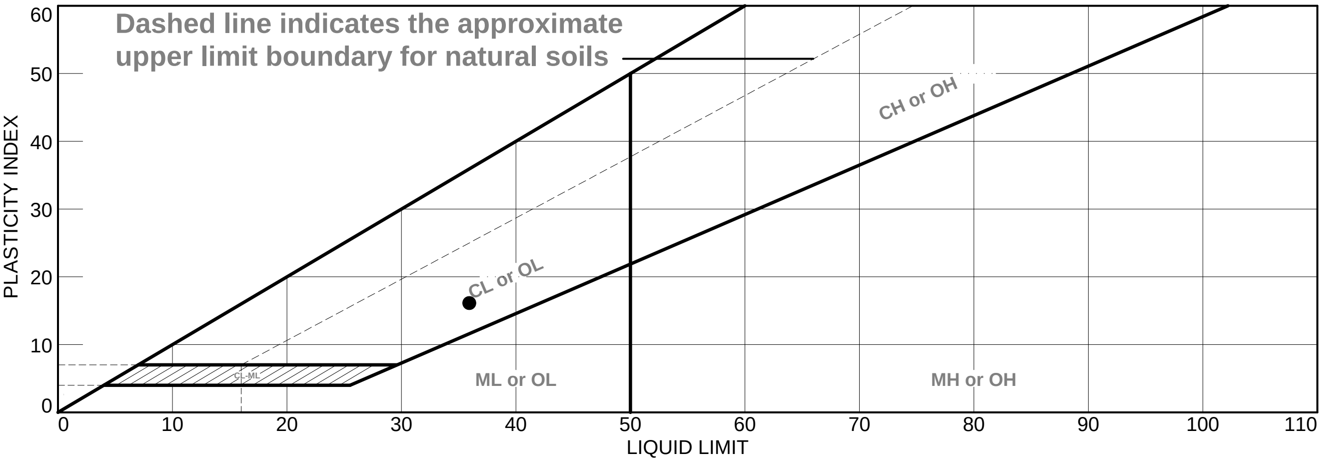
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	37 %
PL	17 %
PI	20 %
WC	21 %

PARIKH CONSULTANTS, INC.

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	36	20	16			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

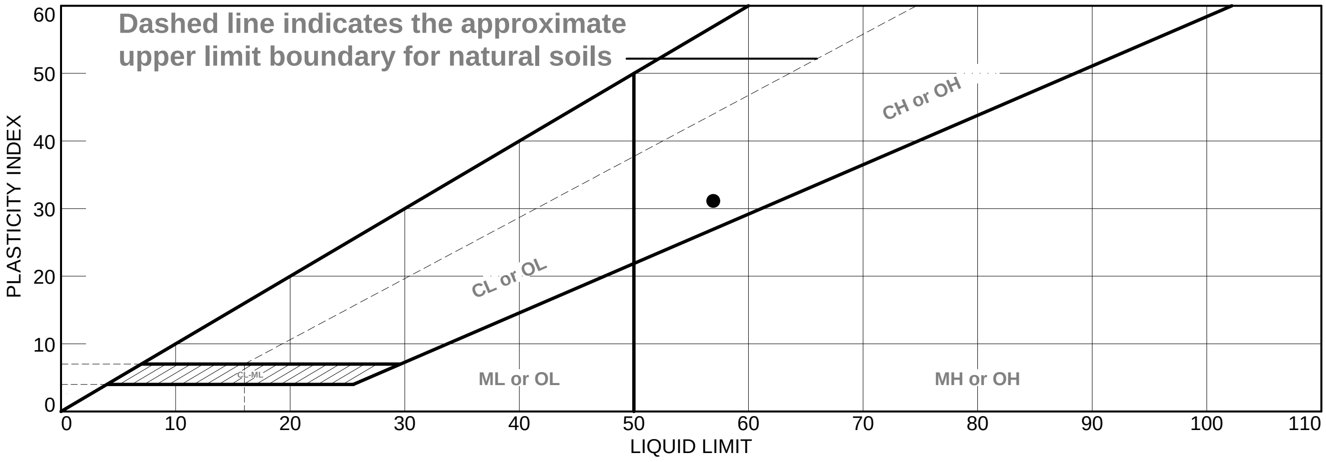
● **Source of Sample:** BH-167 **Depth:** 25 **Sample Number:** 5

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	57	26	31			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

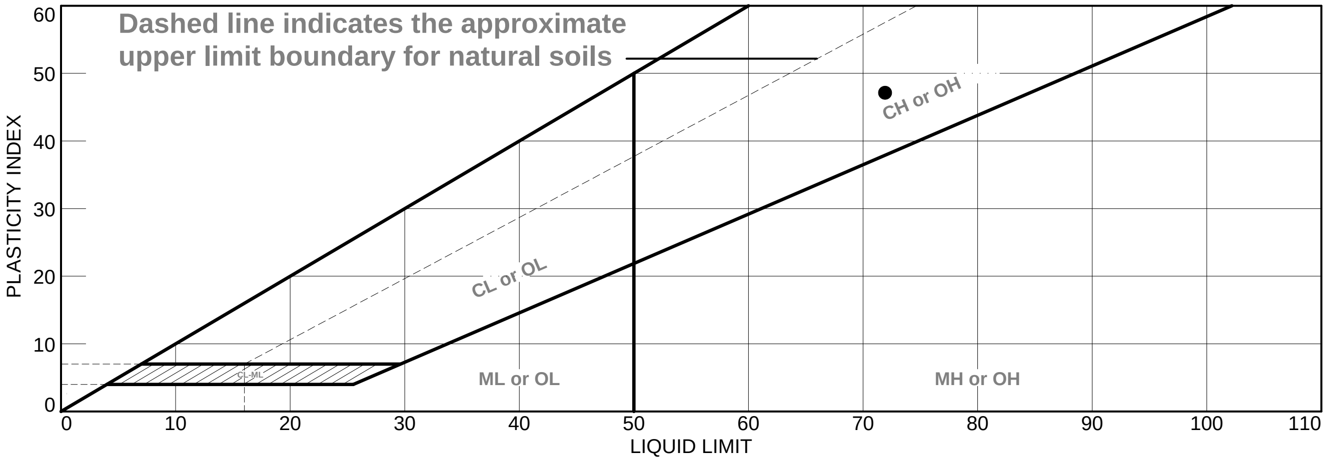
● **Source of Sample:** BH-167 **Depth:** 30 **Sample Number:** 6

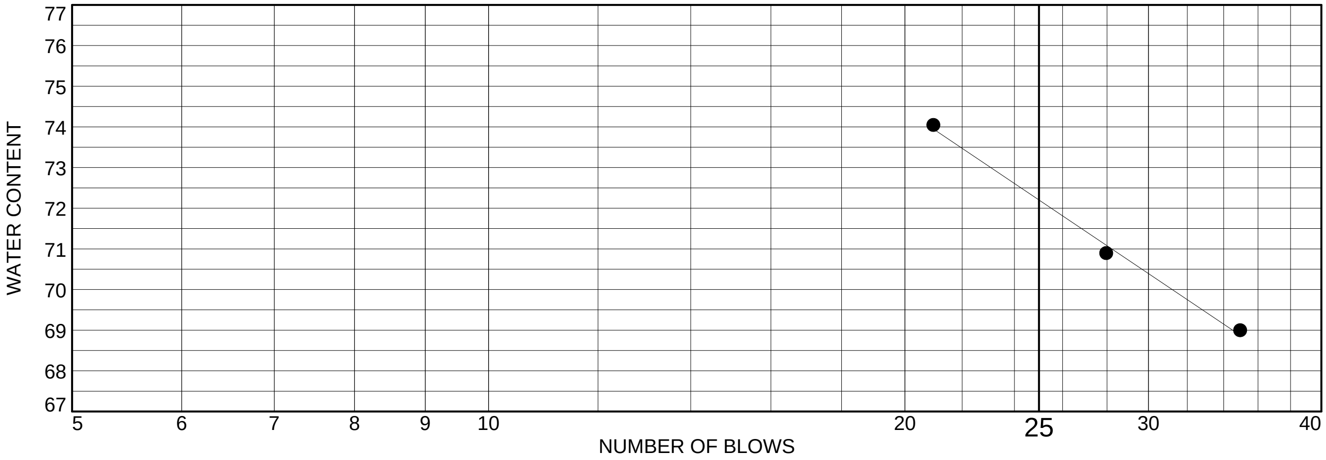
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	72	25	47			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

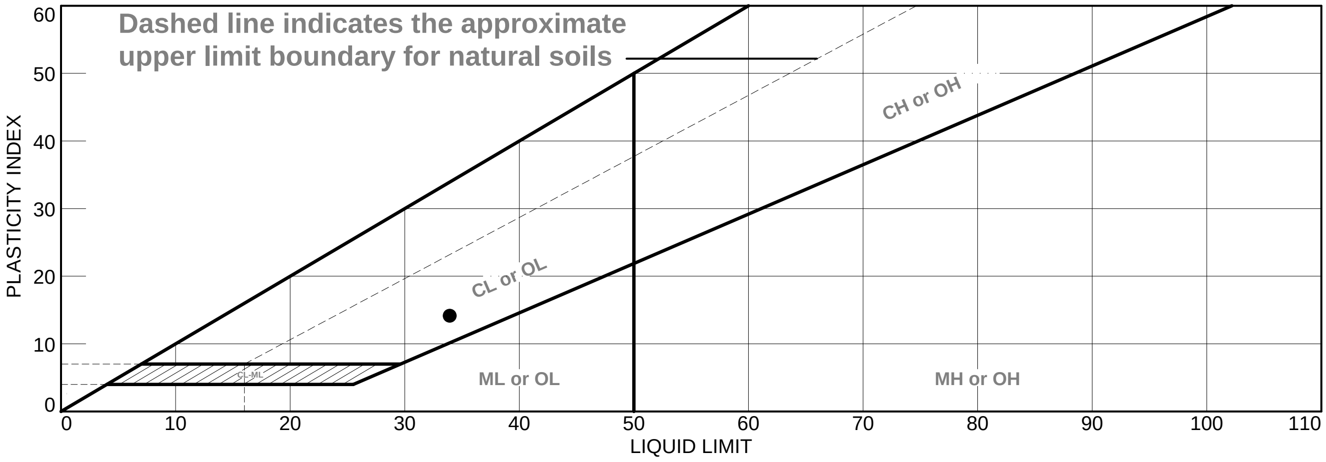
● **Source of Sample:** BH-167 **Depth:** 35 **Sample Number:** 8

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay with sand	34	20	14		72.9	CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

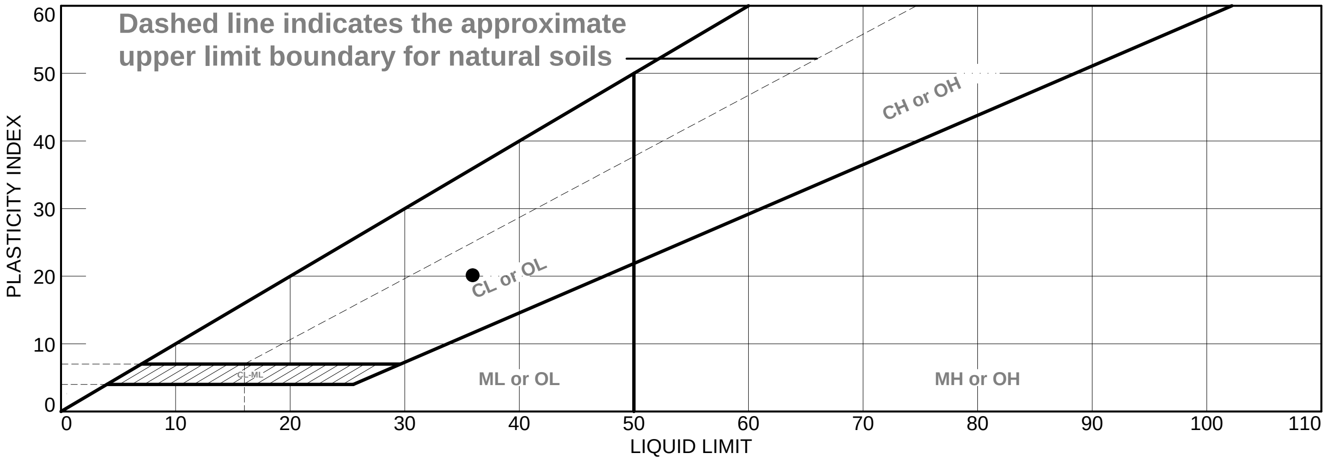
● **Source of Sample:** BH-167 **Depth:** 40 **Sample Number:** 10

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	36	16	20		81.9	CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

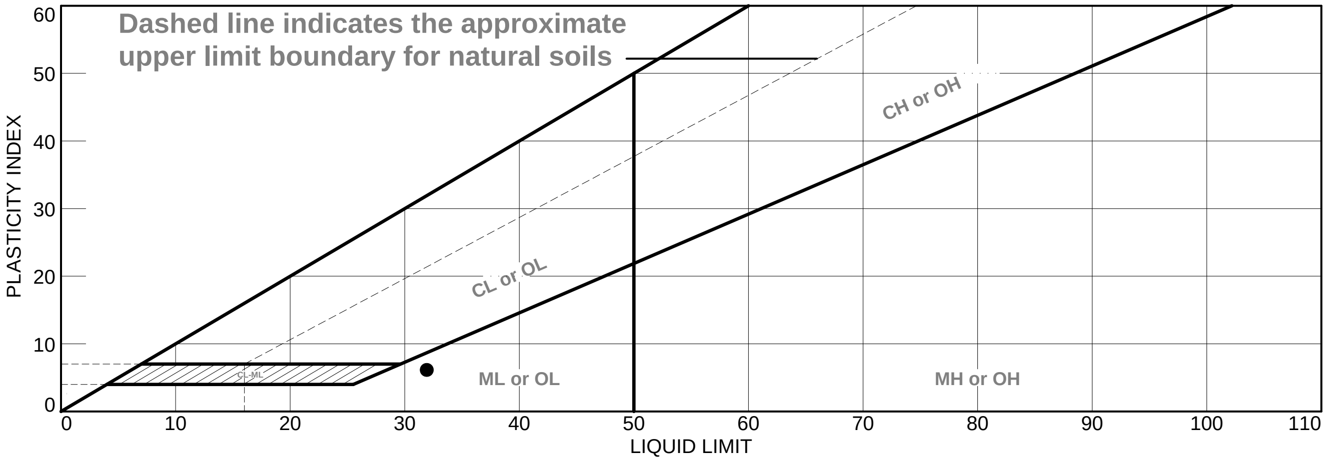
● **Source of Sample:** BH-167 **Depth:** 74 **Sample Number:** 23

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy silt	32	26	6			ML

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

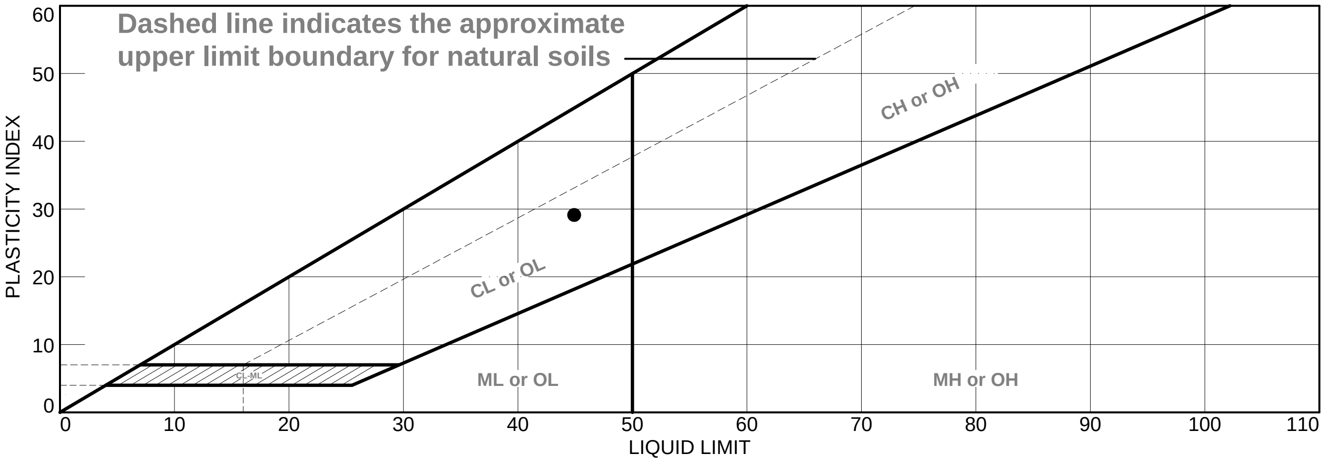
●**Source of Sample:** BH-167 **Depth:** 79 **Sample Number:** 25

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	45	16	29			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-167 **Depth:** 87 **Sample Number:** 28

Remarks:

Figure

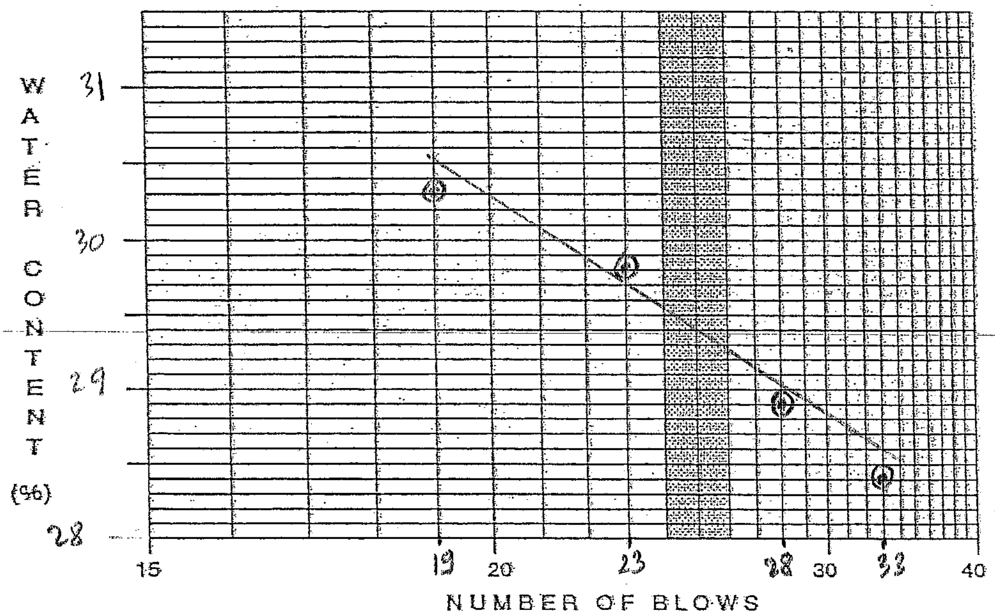
Tested By: JH **Checked By:** JH

ATTERBERG LIMIT
ASTM D4318 or CAL 204

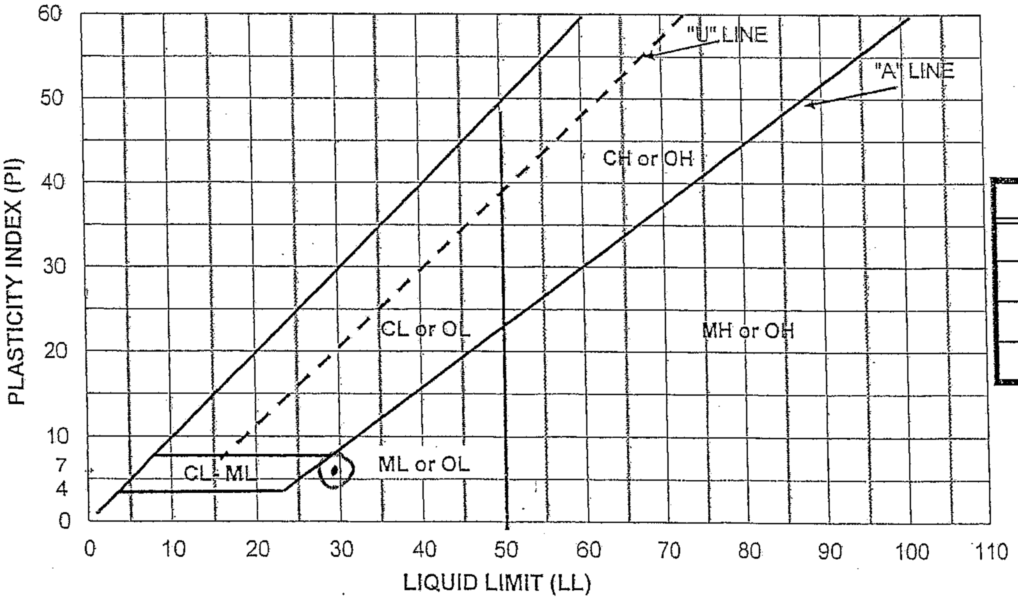
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-704
Sample #: BA-167 #2A @ 10.5'
Lab #: G970
Date: 05/22/2020
Sample Description: SANDY SILT, (ML), LIGHT OLIVE BROWN
Tested By: D. NGUYEN
Estimate of % sample retain on #40 Sieve ☐

S6

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	28	23	19	▨	▨	▨	▨
TARE NO.	G1	V11	N10	V1	V3	V23		
TARE + WET WT (gms)	37.20	31.68	36.69	39.17	17.22	17.71		
TARE + DRY WT (gms)	31.42	27.00	30.83	32.60	16.05	16.45		
TARE WT (gms)	11.14	10.80	11.14	10.95	11.04	10.97		
WT OF WATER (gms)	5.78	4.68	5.86	6.57	1.17	1.26		
DRY WT SOIL (gms)	20.28	16.2	19.69	21.65	5.01	5.48		
WATER CONTENT %	28.5	28.9	29.8	30.3	23.4	23.0		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	29 %
PL	23 %
PI	6 %
WC	

ATTERBERG LIMIT

ASTM D4318 or CAL 204

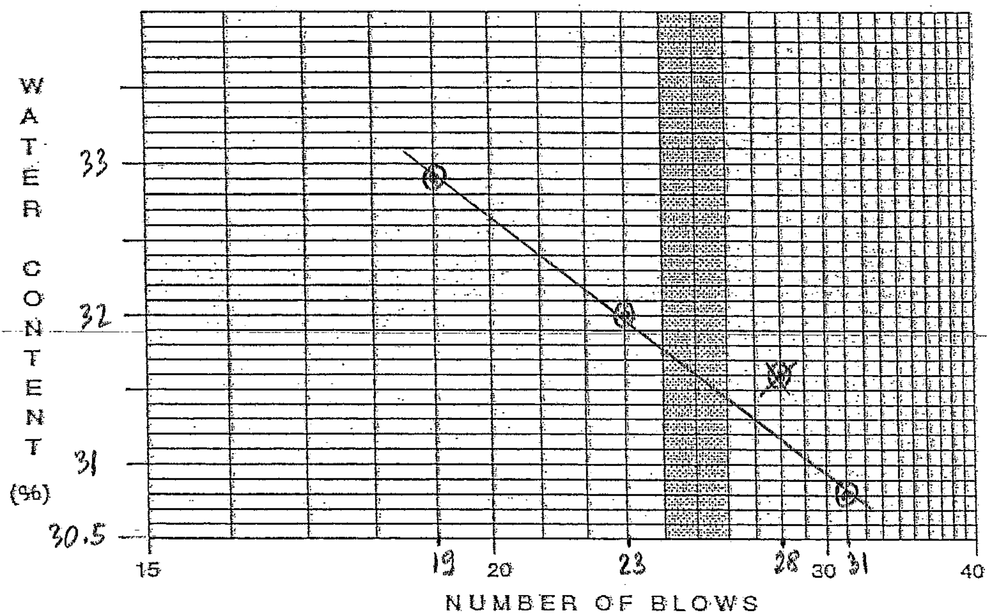
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-167 #33A @102' Lab #: G970 Date: 05/22/2020

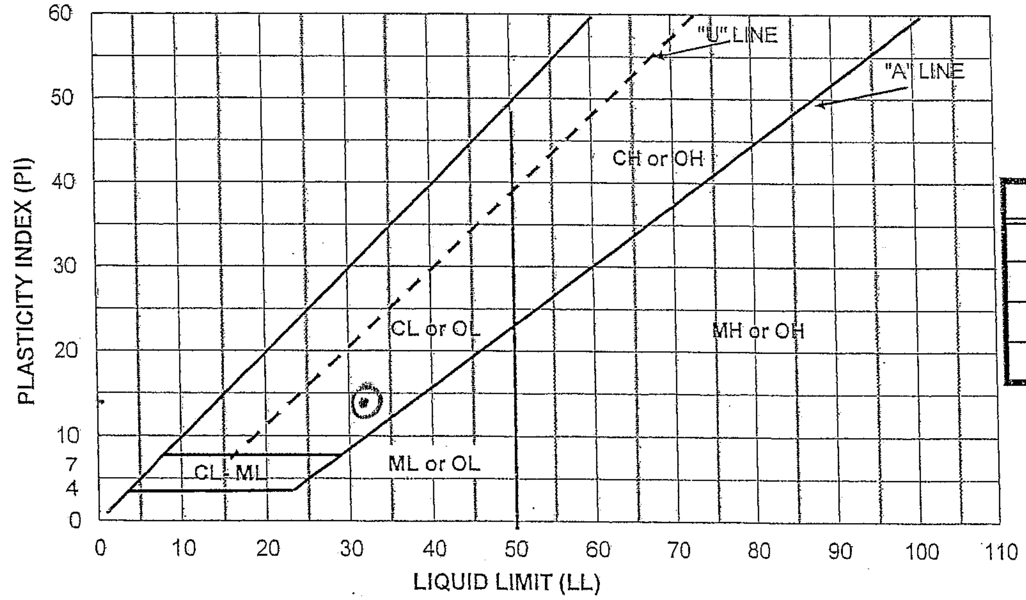
Sample Description: SANDY LEAN CLAY, (CL), LIGHT OLIVE BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 56

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	~~28~~	23	19				
TARE NO.	V5	~~V4~~	V6	V10	N8	N9		
TARE + WET WT (gms)	37.58	~~40.22~~	36.81	36.76	17.78	18.09		
TARE + DRY WT (gms)	31.32	~~33.23~~	30.56	30.37	16.70	17.02		
TARE WT (gms)	11.00	~~11.08~~	11.01	10.96	10.96	11.09		
WT OF WATER (gms)	6.26	~~6.99~~	6.25	6.39	1.08	1.07		
DRY WT SOIL (gms)	20.32	~~22.15~~	19.55	19.41	5.74	5.93		
WATER CONTENT %	30.8	~~31.6~~	32.0	32.9	18.8	18.0		

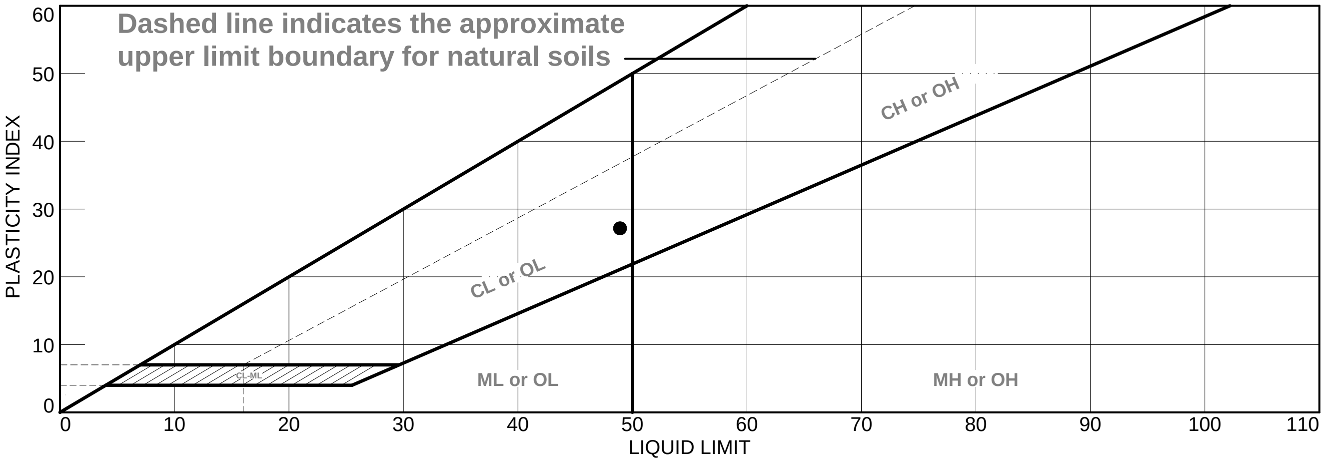


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	32 %
PL	18 %
PI	14 %
WC	

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	49	22	27			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

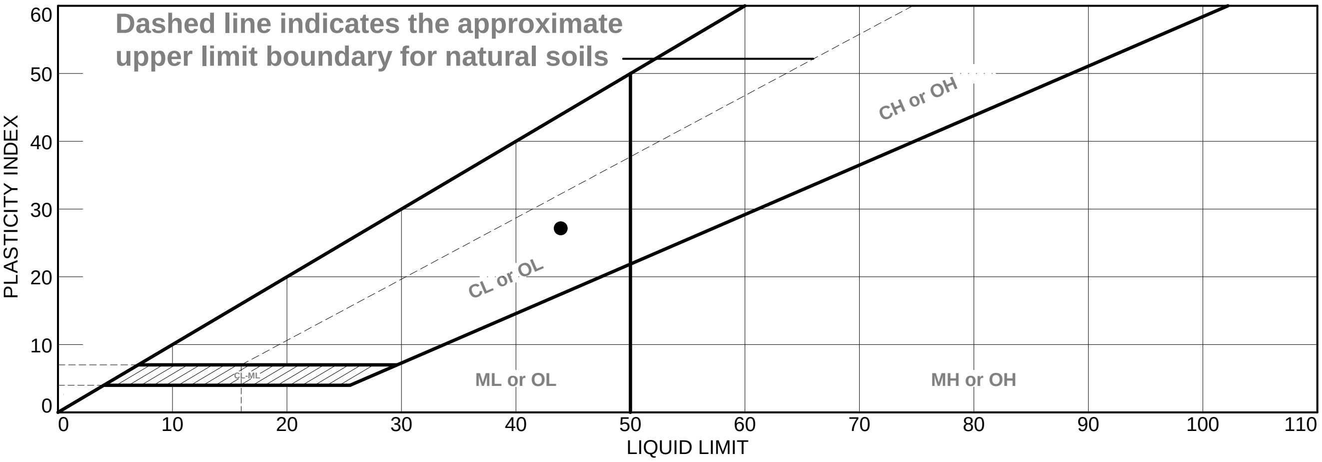
● **Source of Sample:** BH-168 **Depth:** 25 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	44	17	27		83.5	CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

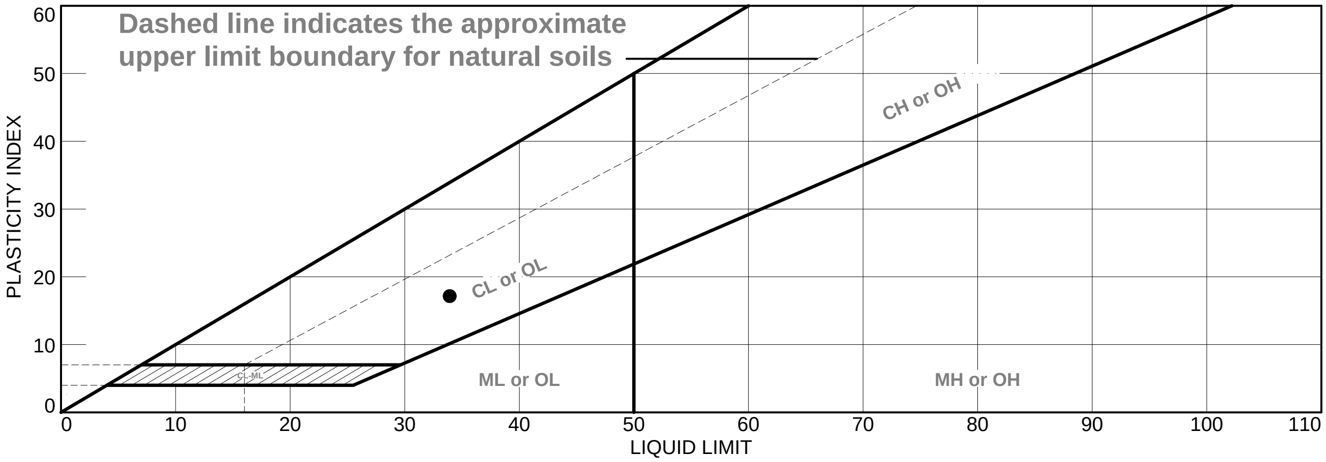
●**Source of Sample:** BH-168 **Depth:** 81.5 **Sample Number:** 21

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	34	17	17		74.1	CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

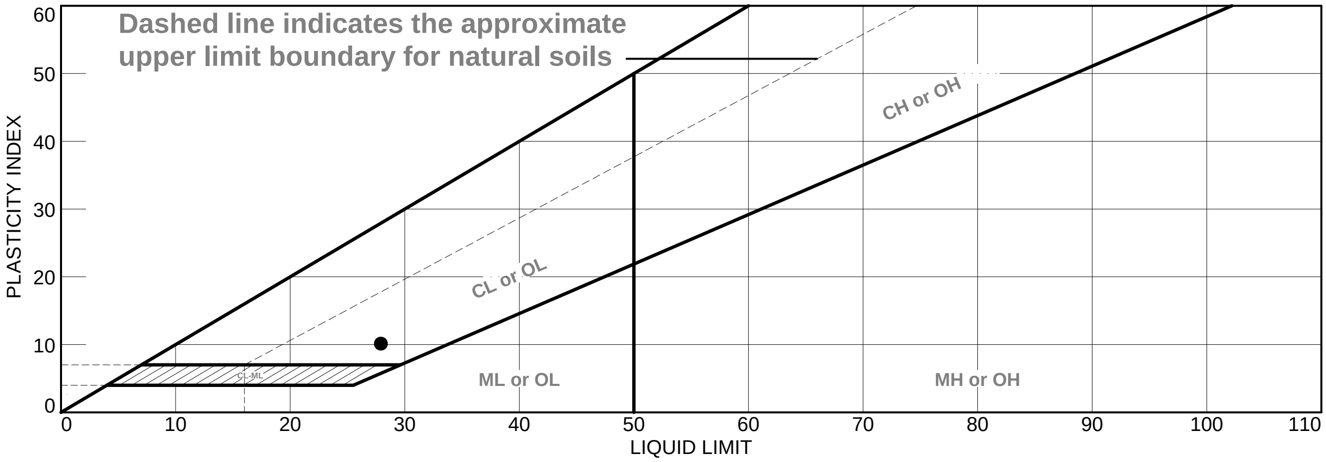
● **Source of Sample:** BH-168 **Depth:** 92.5 **Sample Number:** 25

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clayey sand	28	18	10		36.9	SC

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

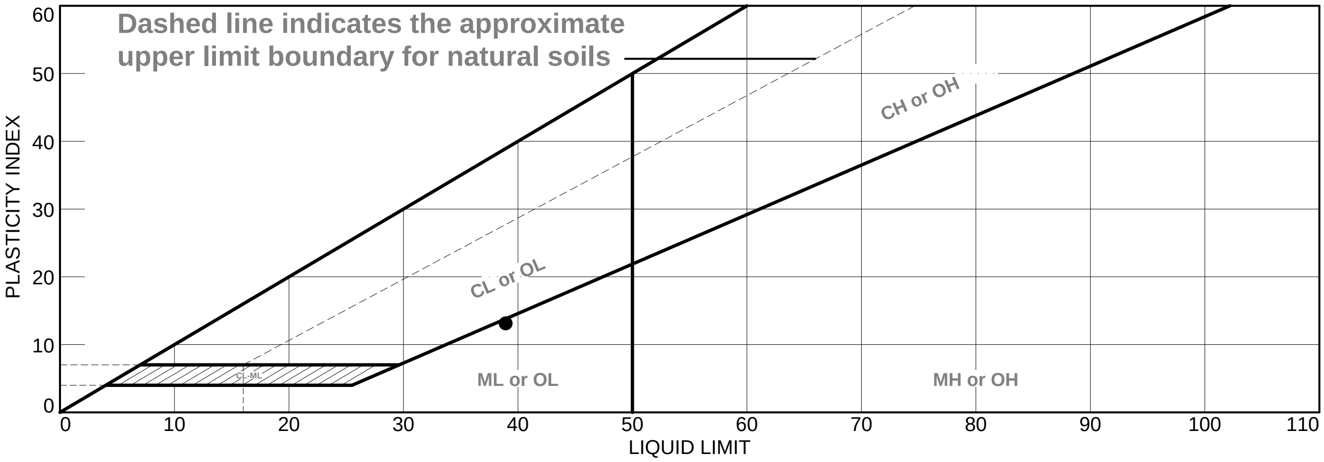
● **Source of Sample:** BH-168 **Depth:** 99.5 **Sample Number:** 28

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray silt	39	26	13			ML

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

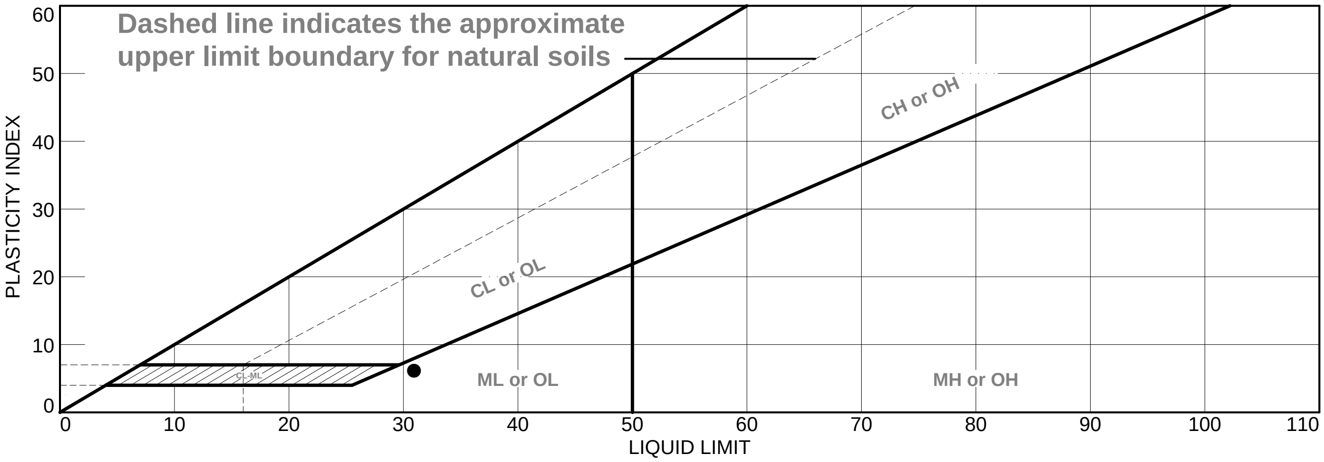
●**Source of Sample:** BH-168 **Depth:** 135 **Sample Number:** 38

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray silt	31	25	6			ML

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-168 **Depth:** 150 **Sample Number:** 41

Remarks:

Figure

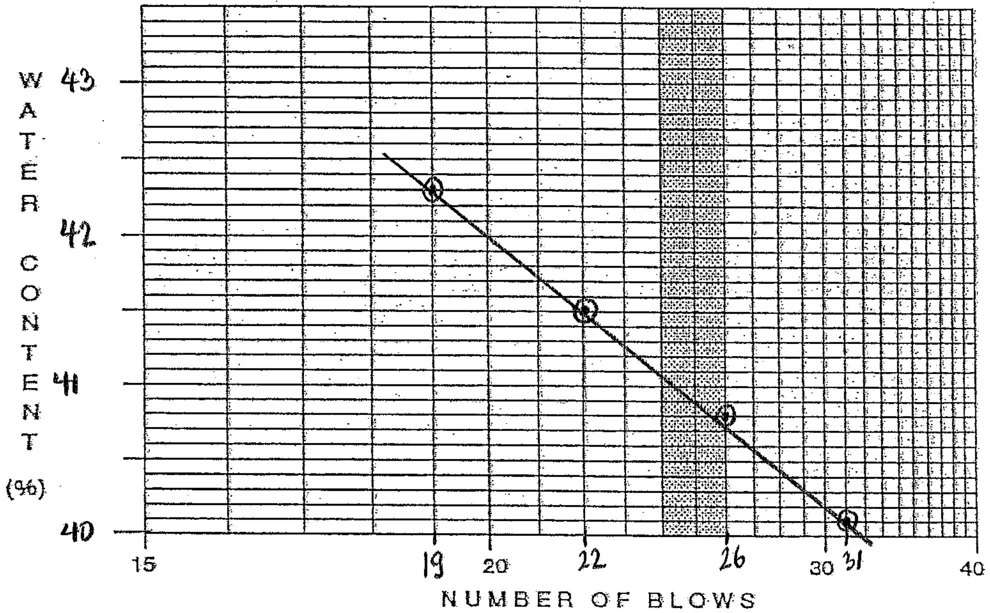
Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

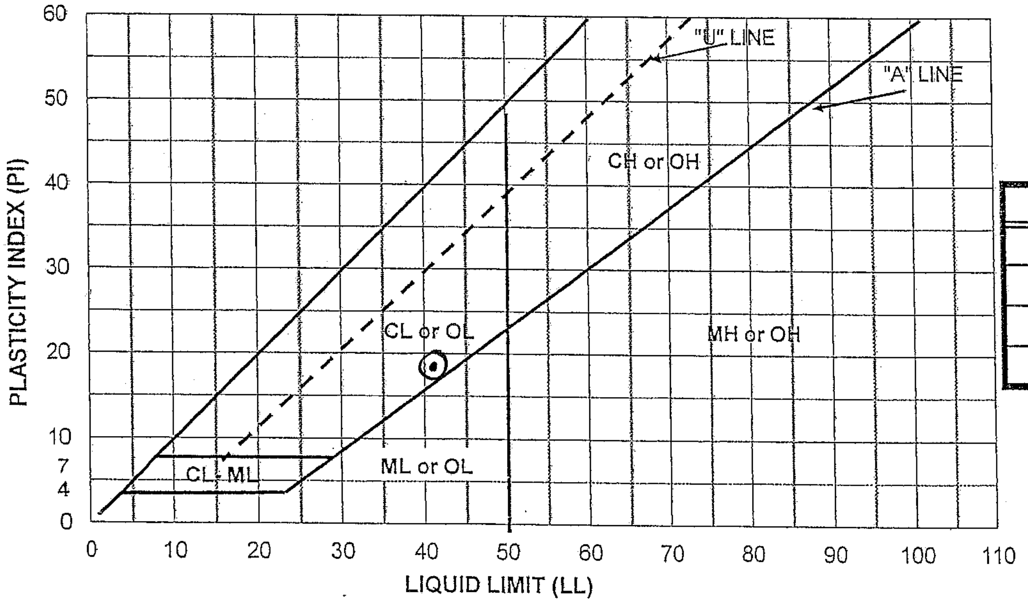
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY PROJECT Project #: 2019-131-T04
Sample #: BH-168 #3 @ 12.3' Lab #: G970 Date: 07/15/2020
Sample Description: LEAN CLAY, (CL), OLIVE BROWN Tested By: DO NGUYEN
Estimate of % sample retain on #40 Sieve ☐ S11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	26	22	19				
TARE NO.	G5	N3	A10	V7	G9	V15		
TARE + WET WT (gms)	37.59	38.96	37.41	38.19	17.73	17.72		
TARE + DRY WT (gms)	30.04	30.89	29.69	30.12	16.48	16.48		
TARE WT (gms)	11.21	11.10	11.07	11.05	11.11	11.07		
WT OF WATER (gms)	7.55	8.07	7.72	8.07	1.25	1.24		
DRY WT SOIL (gms)	18.83	19.79	18.62	19.07	5.37	5.41		
WATER CONTENT %	40.1	40.8	41.5	42.3	23.3%	23 %		

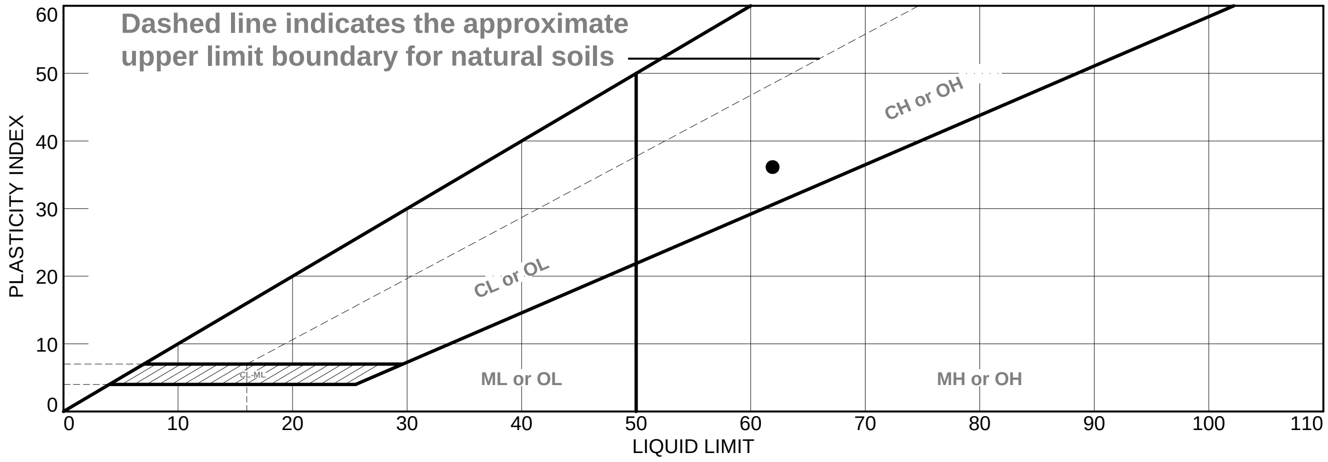


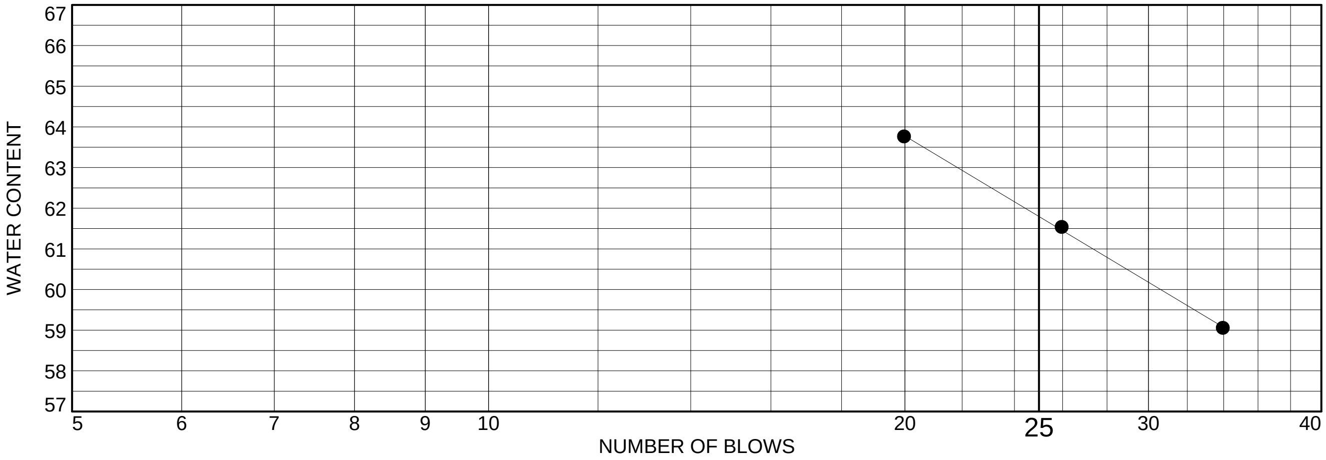
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	41 %
PL	23 %
PI	18 %
WC	36 %

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	62	26	36			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

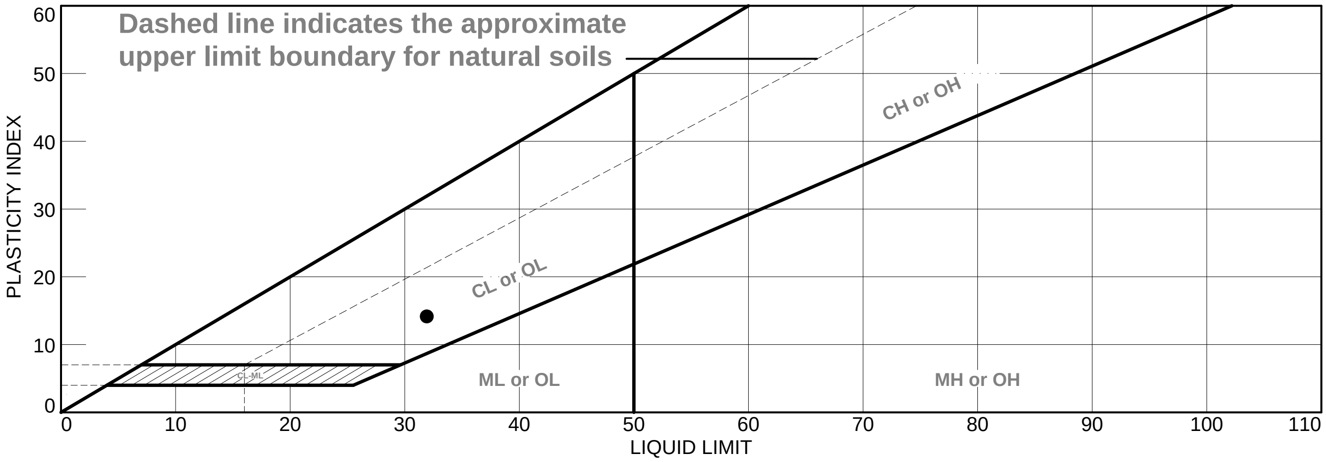
● **Source of Sample:** BH-169 **Depth:** 10 **Sample Number:** 2

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	32	18	14			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

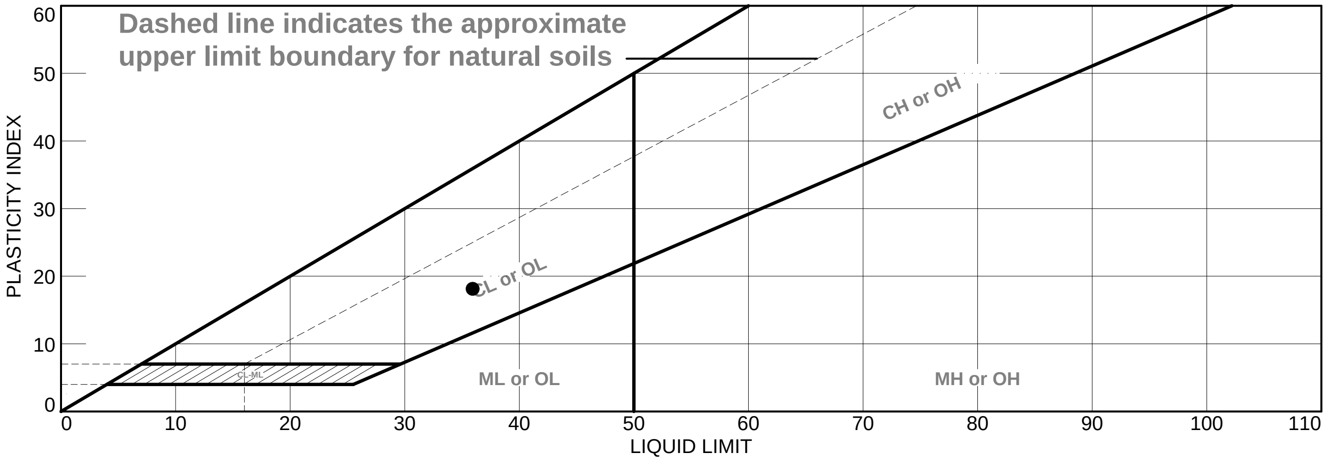
●**Source of Sample:** BH-169 **Depth:** 74.5 **Sample Number:** 12

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	36	18	18			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

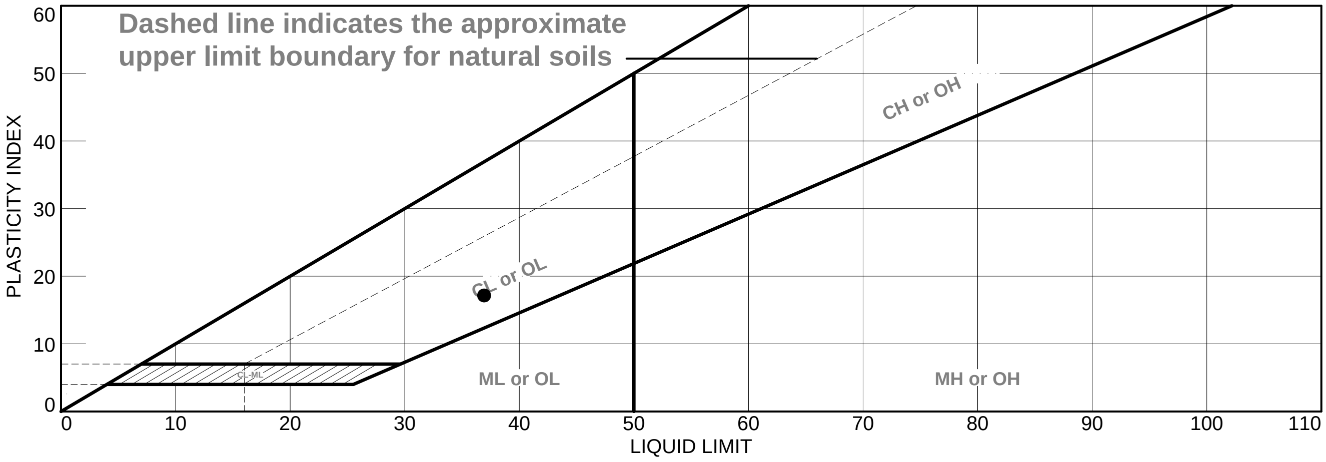
● **Source of Sample:** BH-169 **Depth:** 97 **Sample Number:** 18

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	37	20	17			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-169 **Depth:** 135 **Sample Number:** 30

Remarks:

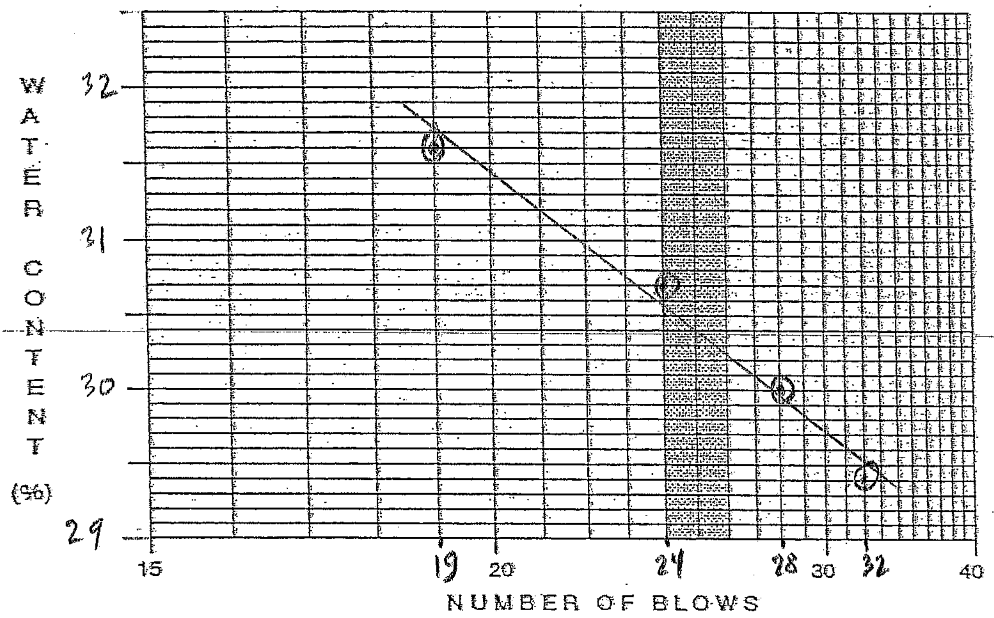
Figure

Tested By: JH **Checked By:** JH

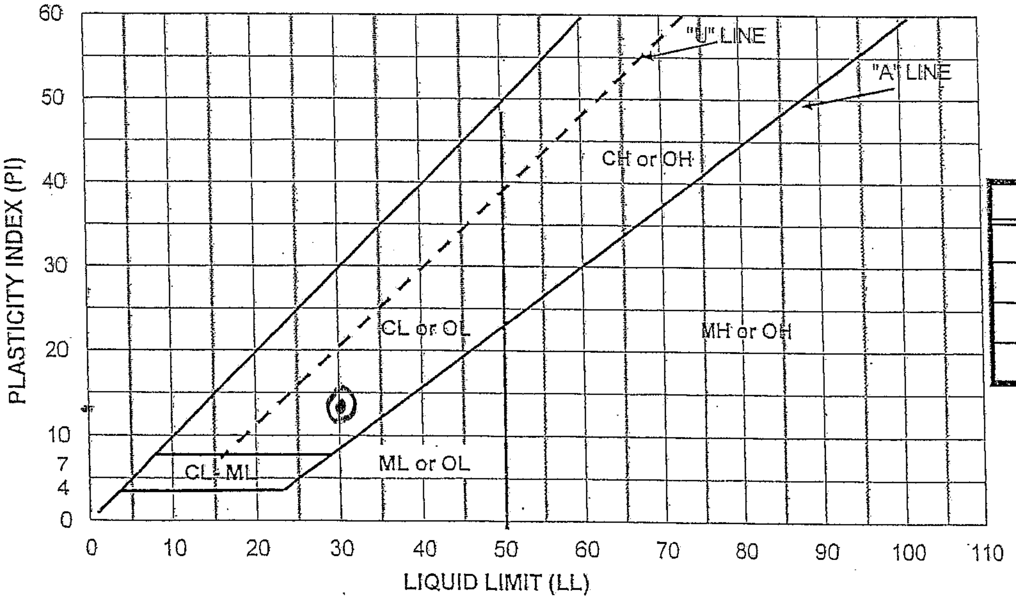
ATTERBERG LIMIT
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY Project #: 2019-131-702
Sample #: BH-169 #6 @ 40' Lab #: 6970 Date: 04/27/2020
Sample Description: LEAN CLAY w/SAND (CL), DARK GREENISH-GRAY Tested By: D-NGUYEN
Estimate of % sample retain on #40 Sieve ☐ S11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	28	24	19				
TARE NO.	V21	A8	G4	G5	V24	V12		
TARE + WET WT (gms)	40.41	40.75	39.18	40.01	18.51	18.78		
TARE + DRY WT (gms)	33.76	33.87	32.49	33.10	17.45	17.68		
TARE WT (gms)	11.13	10.97	10.68	11.22	11.13	11.14		
WT OF WATER (gms)	6.65	6.88	6.69	6.91	1.06	1.1		
DRY WT SOIL (gms)	22.63	22.9	21.81	21.88	6.32	6.54		
WATER CONTENT %	29.4	30.0	30.7	31.6	16.8	16.8		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	30%
PL	17%
PI	13%
WC	

PARIKH CONSULTANTS, INC.

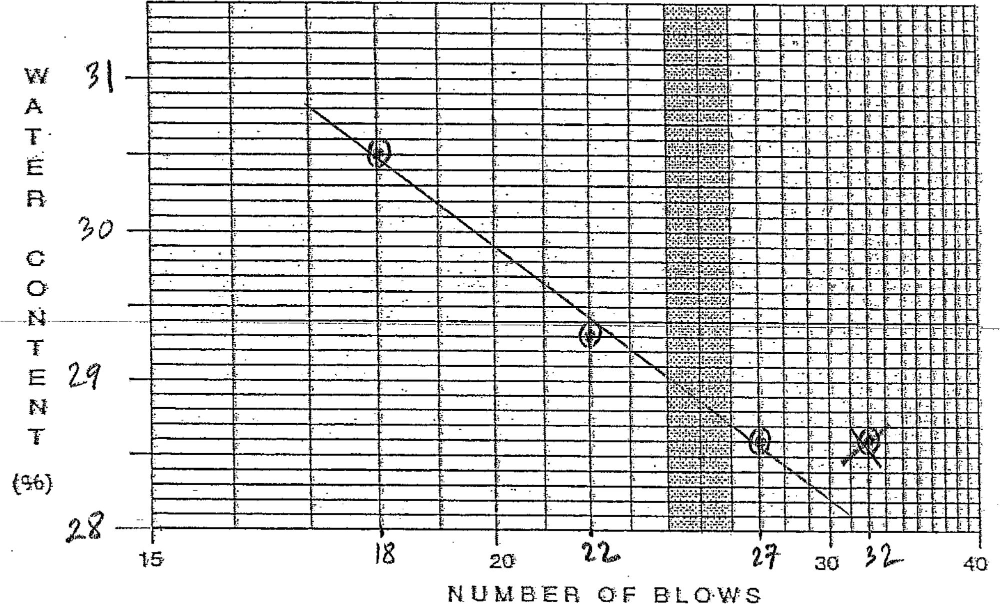
ATTERBERG LIMIT

ASTM D4318 or CAL 204

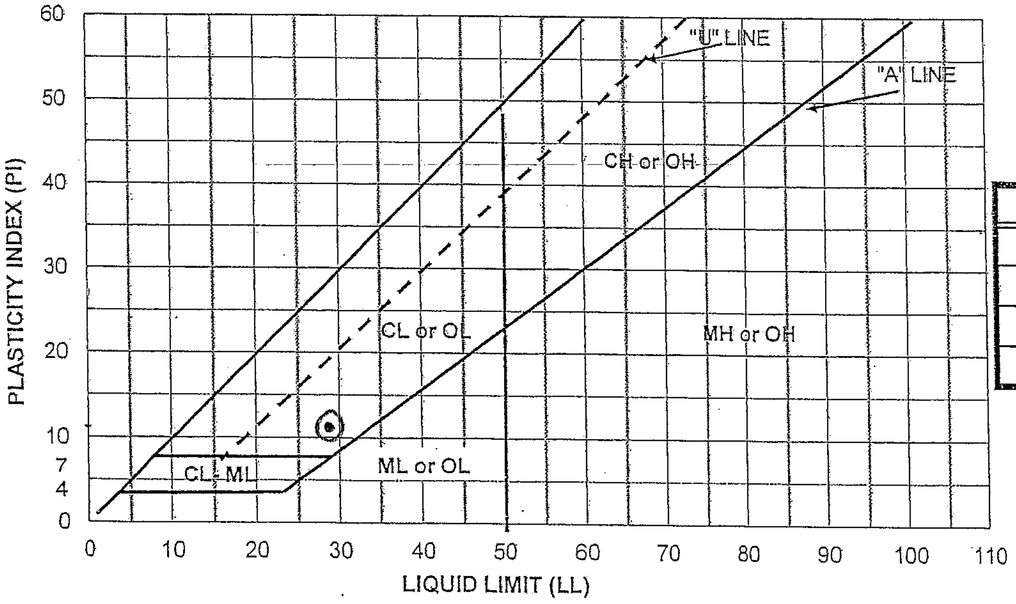
Project Name: BART TO SILICON VALLEY		Project #: 2019-131-70
Sample #: BH-169 #23 @117	Lab #: 6970	Date: 04
Sample Description: LEAN CLAY, (CL), OLIVE - GRAY		Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S 11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~32~~	27	22	18				
TARE NO.	~~A8~~	G5	G4	V21	V12	V24		
TARE + WET WT (gms)	~~37.86~~	38.13	36.94	39.40	18.62	18.71		
TARE + DRY WT (gms)	~~31.89~~	32.14	30.98	32.80	17.49	17.59		
TARE WT (gms)	~~10.98~~	11.21	10.67	11.14	11.13	11.15		
WT OF WATER (gms)	~~5.97~~	5.99	5.96	6.6	1.13	1.12		
DRY WT SOIL (gms)	~~20.91~~	20.93	20.31	21.66	6.36	6.44		
WATER CONTENT %	~~28.6~~	28.6	29.3	30.5	17.8	17.4		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	29 %
PL	18 %
PI	11 %
WC	22 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

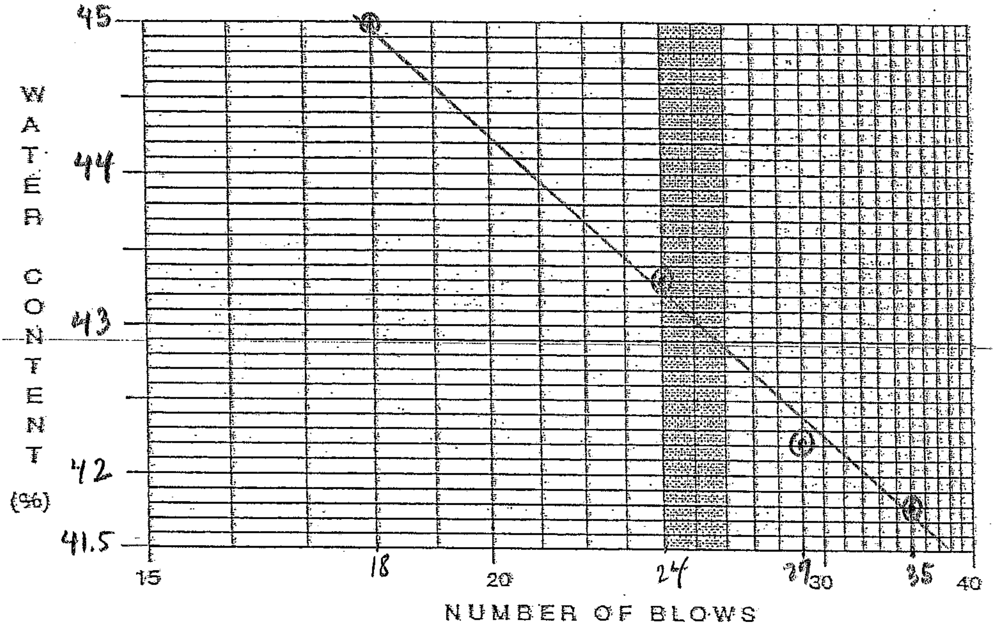
Project Name: BART TO SILICON VALLEY Project #: 2019-131-T02

Sample #: BH-169 # 28A @ 131' Lab #: G970 Date: 04/27/2020

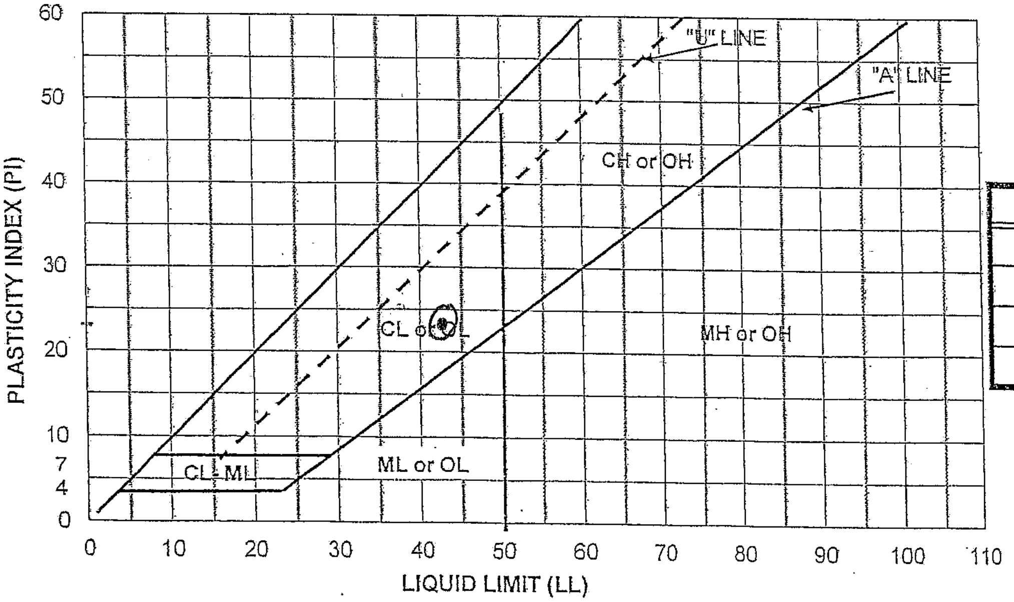
Sample Description: LEAN CLAY, (CL), DARK GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	29	24	18				
TARE NO.	N7	V2	V22	G-9	V7	G3		
TARE + WET WT (gms)	35.62	36.36	37.21	38.15	18.14	18.11		
TARE + DRY WT (gms)	28.35	28.83	29.28	29.75	16.96	16.87		
TARE WT (gms)	10.94	10.99	10.98	11.10	11.06	10.70		
WT OF WATER (gms)	7.27	7.53	7.93	8.4	1.18	1.24		
DRY WT SOIL (gms)	17.41	17.84	18.3	18.65	5.9	6.17		
WATER CONTENT %	41.8	42.2	43.3	45.0	20.0	20.1		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	43 %
PL	20 %
PI	23 %
WC	26 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

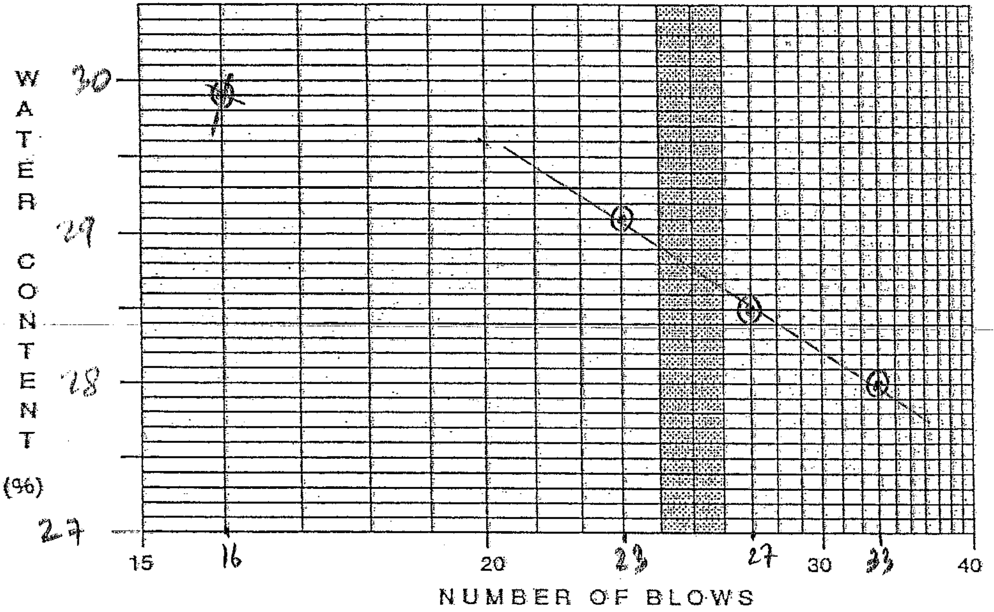
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-169 #31A@141' Lab #: G970 Date: 04/25/2020

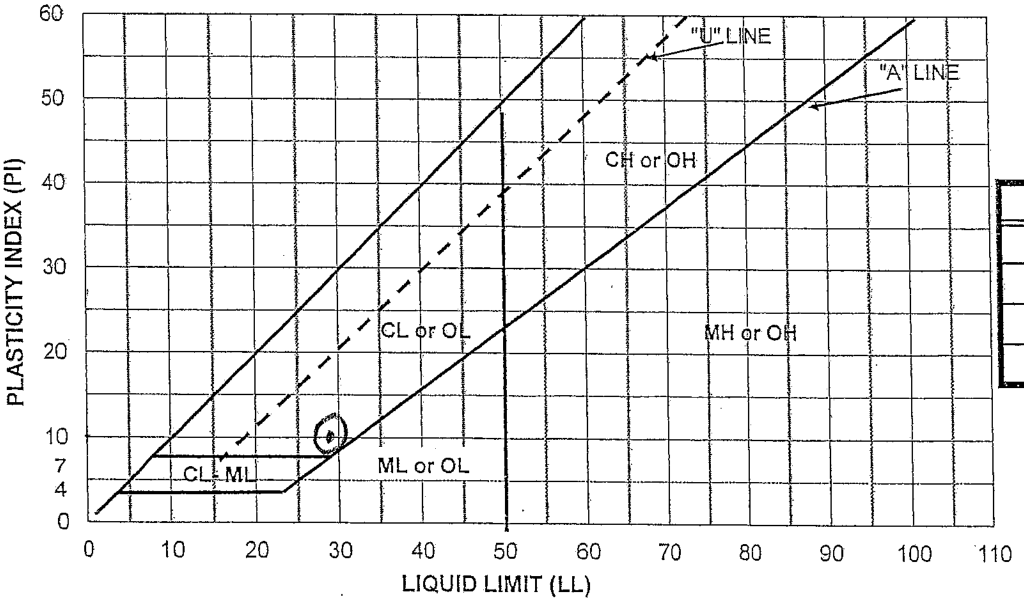
Sample Description: LEAN CLAY, (CL), LIGHT YELLOWISH -BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S/12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	27	23	16				
TARE NO.	N7	G3	V22	G9	V2	V7		
TARE + WET WT (gms)	40.39	39.17	42.10	41.15	20.67	18.59		
TARE + DRY WT (gms)	33.95	32.86	35.09	34.23	19.14	17.41		
TARE WT (gms)	10.93	10.70	10.98	11.10	10.99	11.05		
WT OF WATER (gms)	6.44	6.31	7.01	6.92	1.53	1.18		
DRY WT SOIL (gms)	23.02	22.16	24.11	23.13	8.15	6.36		
WATER CONTENT %	28.0	28.5	29.1	29.9	18.8	18.6		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	29 %
PL	19 %
PI	10 %
WC	22 %

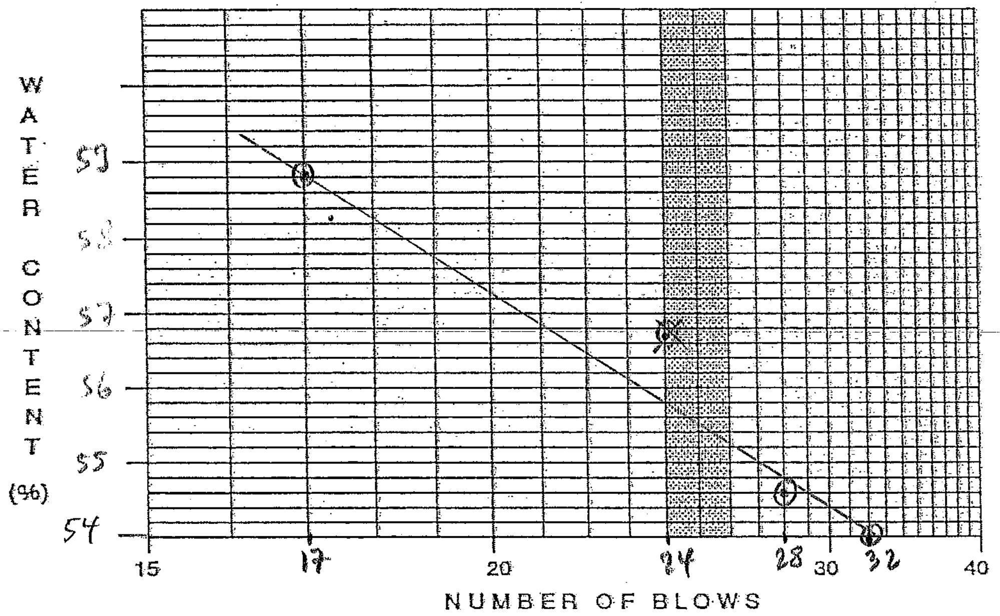
ATTERBERG LIMIT

ASTM D4318 or CAL 204

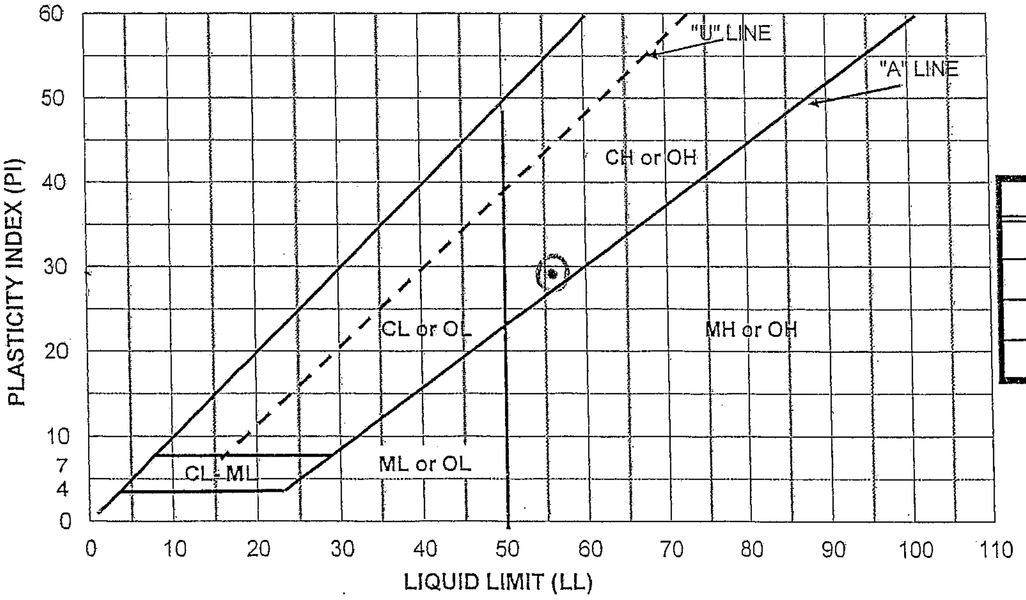
Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-TO2
Sample #:	BH-169 #36 @ 165.5 Lab #: 6470	Date:	04/25/2020
Sample Description:	FAT CLAY, (CH), OLIVE/PALE YELLOW	Tested By:	D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 511

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	28	~~24~~	17				
TARE NO.	G5	V24	~~V12~~	G4	V21	A8		
TARE + WET WT (gms)	37.46	37.44	~~37.47~~	34.72	17.88	17.62		
TARE + DRY WT (gms)	28.26	28.14	~~27.94~~	25.82	16.44	16.24		
TARE WT (gms)	11.21	11.12	~~11.13~~	10.68	11.13	10.97		
WT OF WATER (gms)	9.2	9.3	~~9.53~~	8.9	1.44	1.38		
DRY WT SOIL (gms)	17.05	17.02	~~16.81~~	15.14	5.31	5.27		
WATER CONTENT %	54.0	54.6	~~56.7~~	58.8	27.1	26.2		

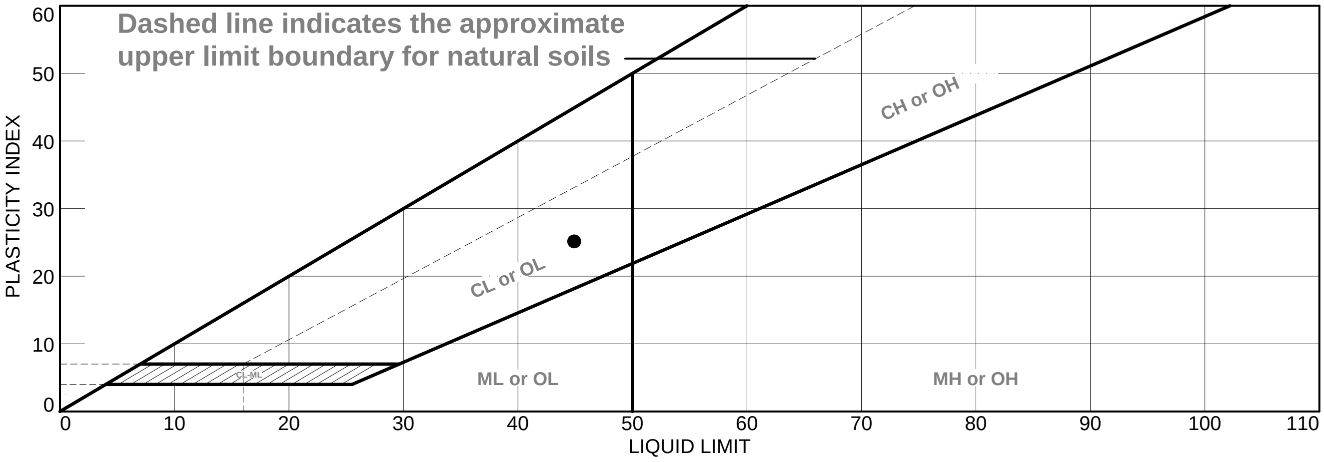


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	56%
PL	27%
PI	29%
WC	26%

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark gray clay with sand	45	20	25		82.5	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

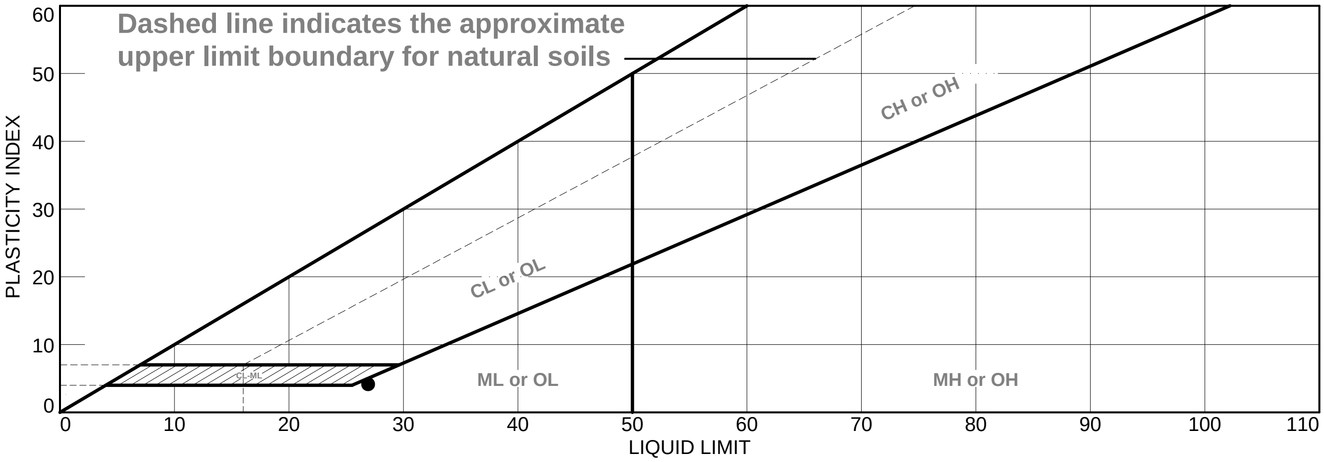
● **Source of Sample:** BH-171 **Depth:** 20 **Sample Number:** 4

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silt	27	23	4		60.3	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

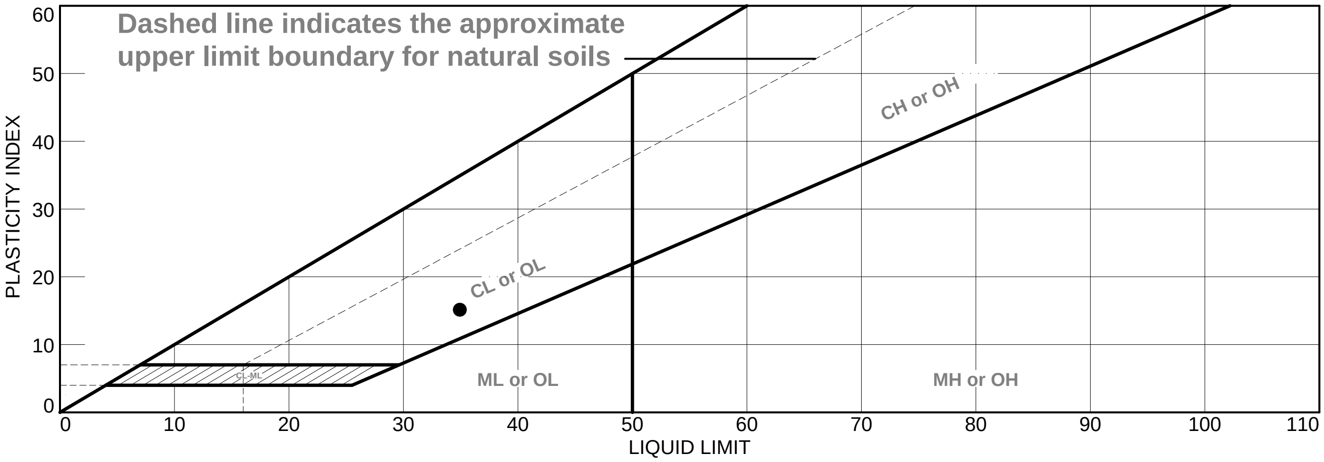
● **Source of Sample:** BH-171 **Depth:** 40 **Sample Number:** 7 BOTTOM

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	35	20	15			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

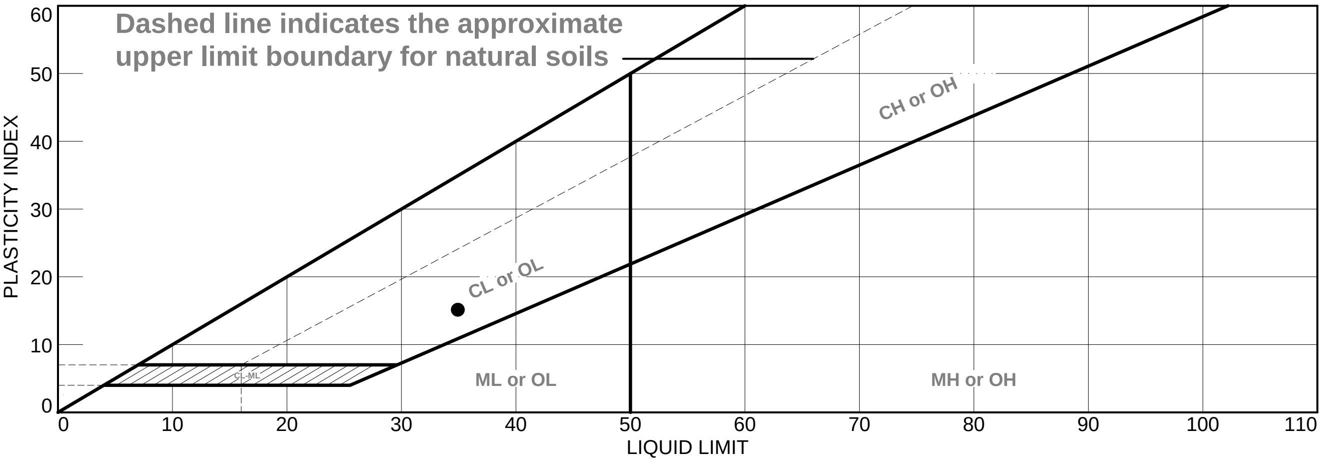
● **Source of Sample:** BH-171 **Depth:** 40 **Sample Number:** 7 TOP

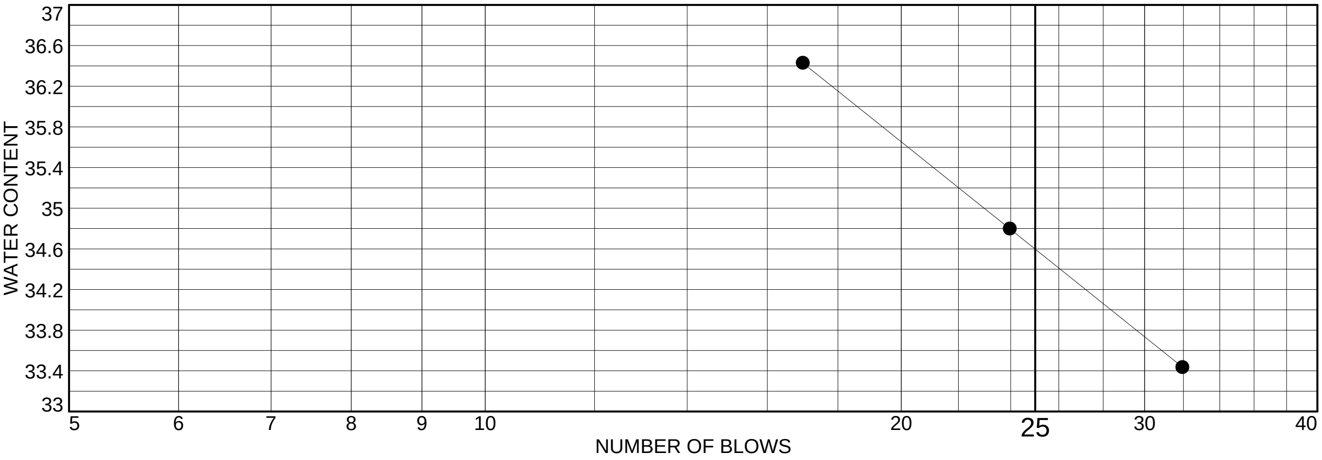
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy clay	35	20	15		67.8	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-171 **Depth:** 114 **Sample Number:** 30

Remarks:

Figure

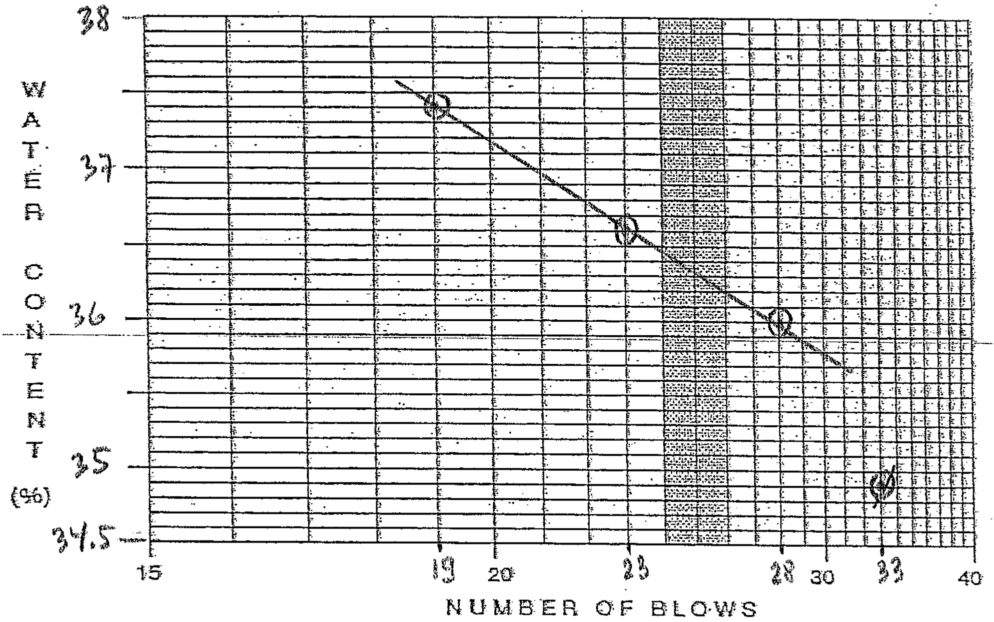
Tested By: JH **Checked By:** JH

ATTERBERG LIMIT
ASTM D4318 or CAL 204

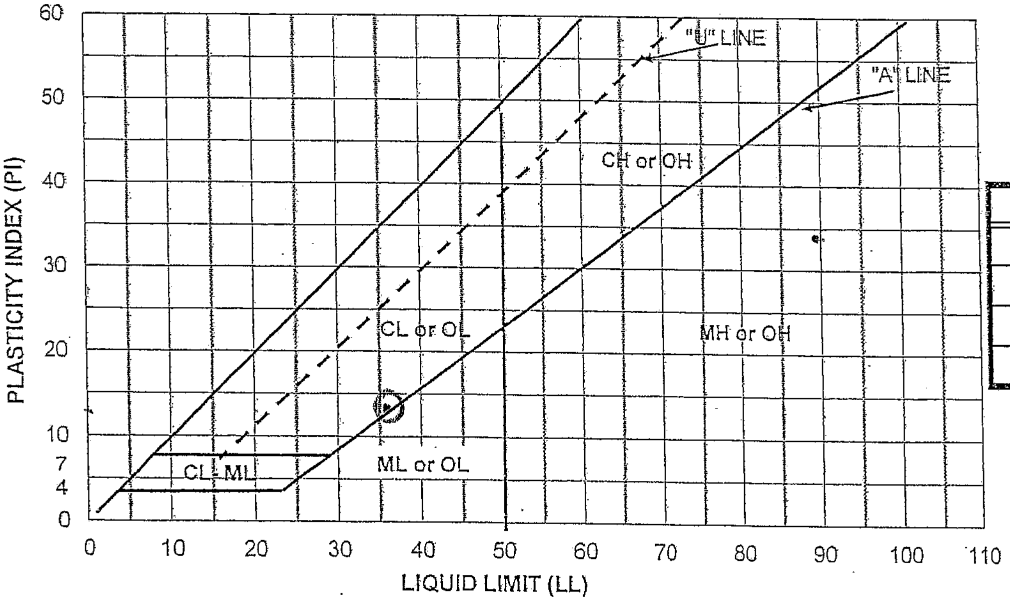
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702
Sample #: BH-A1 #2A @ 11' Lab #: G970 Date: 05/16/2020
Sample Description: LEAN CLAY, (CL), YELLOWISH BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~33~~	28	23	19				
TARE NO.	~~G11~~	G4	G6	V18	N2	G7		
TARE + WET WT (gms)	~~35.61~~	34.83	36.40	37.33	17.84	17.20		
TARE + DRY WT (gms)	~~29.28~~	28.44	29.59	30.17	16.54	16.00		
TARE WT (gms)	~~11.12~~	10.68	10.96	11.04	11.00	10.75		
WT OF WATER (gms)	~~6.33~~	6.39	6.81	7.16	1.3	1.2		
DRY WT SOIL (gms)	~~18.16~~	17.76	18.63	19.13	5.54	5.25		
WATER CONTENT %	~~34.9~~	36.0	36.6	37.4	23.5	22.9		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	36%
PL	23%
PI	13%
WC	27%

ATTERBERG LIMIT

ASTM D4318 or CAL 204

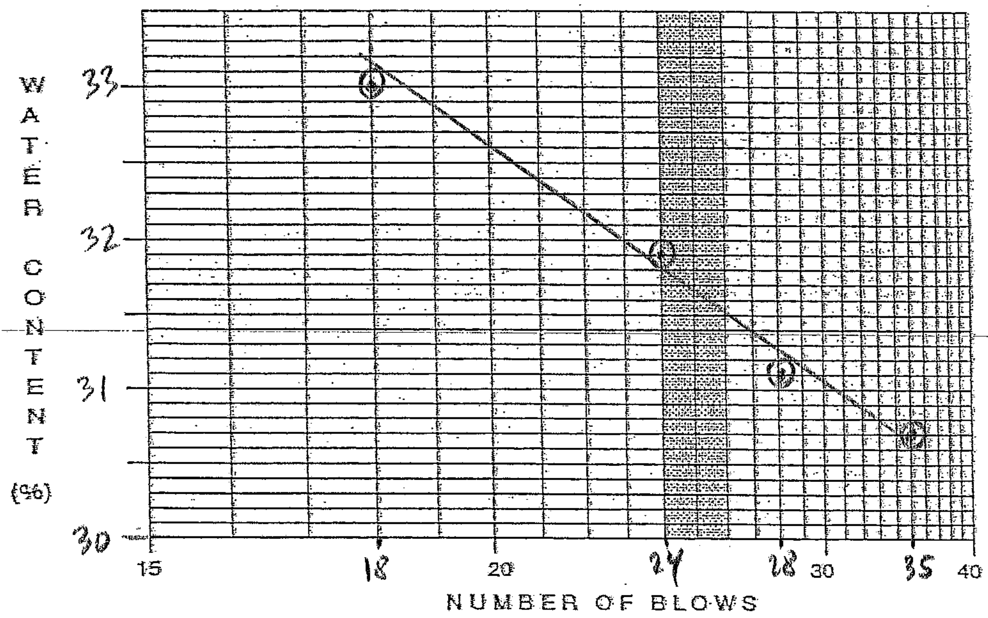
Project Name: BART TD SILICON VALLEY Project #: 2019-131-702

Sample #: BH - 171 #10B@65½ Lab #: G970 Date: 05/15/2020

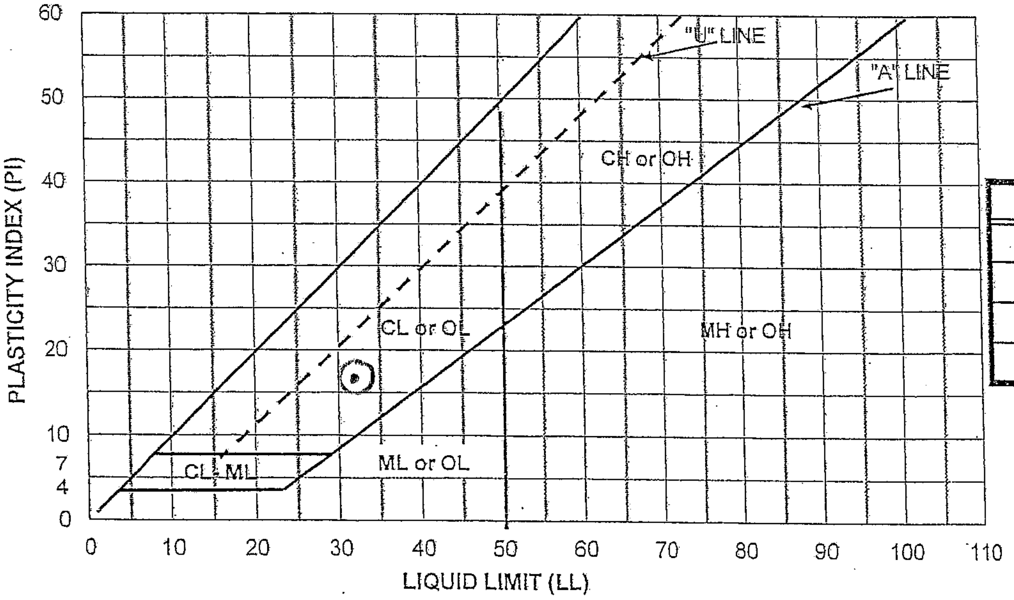
Sample Description: LEAN CLAY, (CL), LIGHT YELLOWISH BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 5g

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	28	24	18				
TARE NO.	G7	V18	G11	G4	G6	N2		
TARE + WET WT (gms)	36.77	40.66	38.91	40.39	17.95	17.83		
TARE + DRY WT (gms)	30.65	33.63	32.19	33.01	17.04	16.93		
TARE WT (gms)	10.74	11.04	11.12	10.68	10.96	11.00		
WT OF WATER (gms)	6.12	7.03	6.72	7.38	0.91	0.9		
DRY WT SOIL (gms)	19.91	22.59	21.07	22.33	6.08	5.93		
WATER CONTENT %	30.7	31.1	31.9	33.0	15.0	15.2		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	32 %
PL	15 %
PI	17 %
WC	23 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY Project #: 2019-131-102

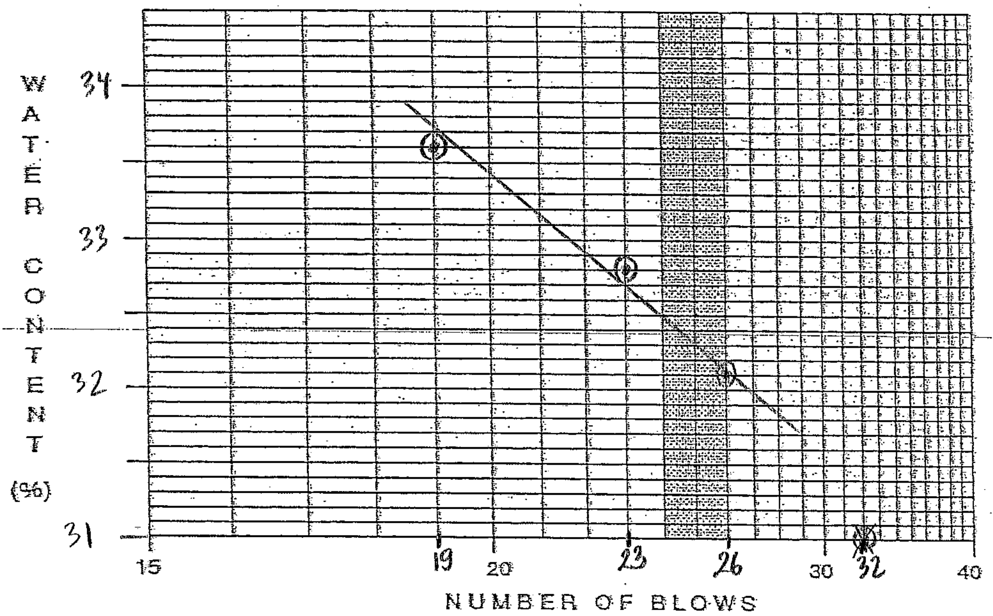
Sample #: BH-171 # 19A @ 88½ Lab #: 6970 Date: 05/18/2020

Sample Description: LEAN CLAY, (CL), GREENISH GRAY Tested By: D. NGUYEN

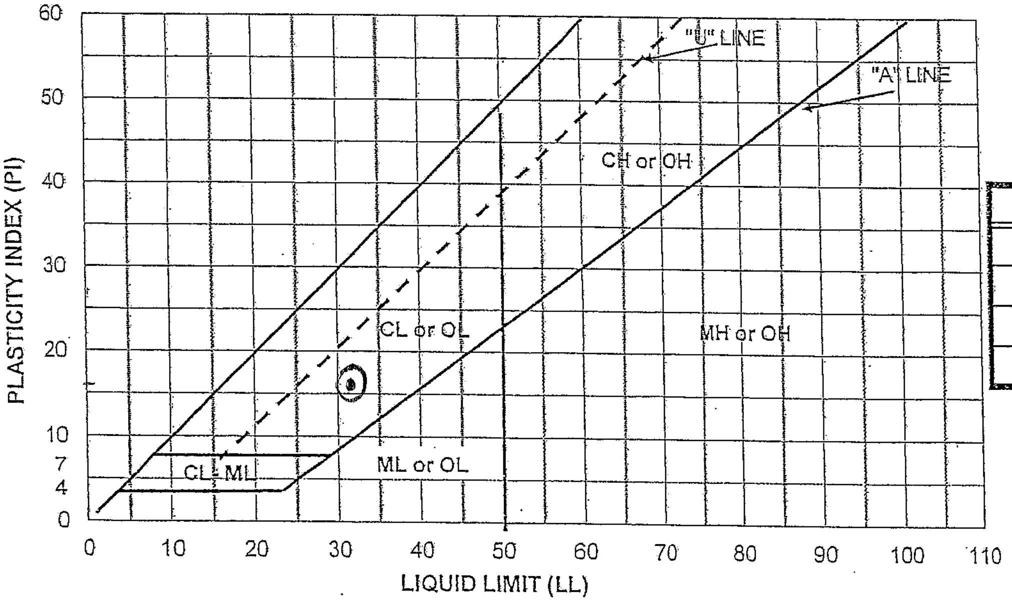
Estimate of % sample retain on #40 Sieve ☐

S11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~32~~	26	23	19				
TARE NO.	~~G5~~	V24	N7	G9	V12	V21		
TARE + WET WT (gms)	~~36.18~~	38.83	36.72	39.31	17.56	17.83		
TARE + DRY WT (gms)	~~30.27~~	32.10	30.35	32.21	16.67	16.92		
TARE WT (gms)	~~11.21~~	11.12	10.92	11.11	11.12	11.12		
WT OF WATER (gms)	~~5.91~~	6.73	6.37	7.1	0.89	0.91		
DRY WT SOIL (gms)	~~19.06~~	20.98	19.43	21.1	5.55	5.8		
WATER CONTENT %	~~31.0~~	32.1	32.8	33.6	16.0	15.7		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	32%
PL	16.0%
PI	16%
WC	23%

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

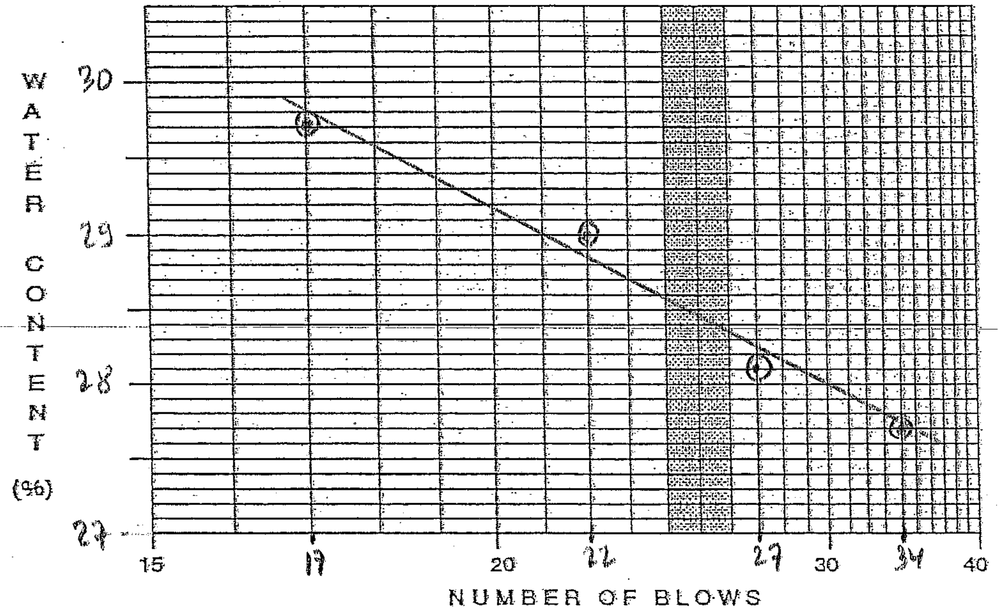
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702
Sample #: BH-171 #22A @96'
Lab #: 970
Date: 05/15/2020
Sample Description: SANDY LEAN CLAY, (CL), GREENISH-GRAY
Tested By: D. NGUYEN

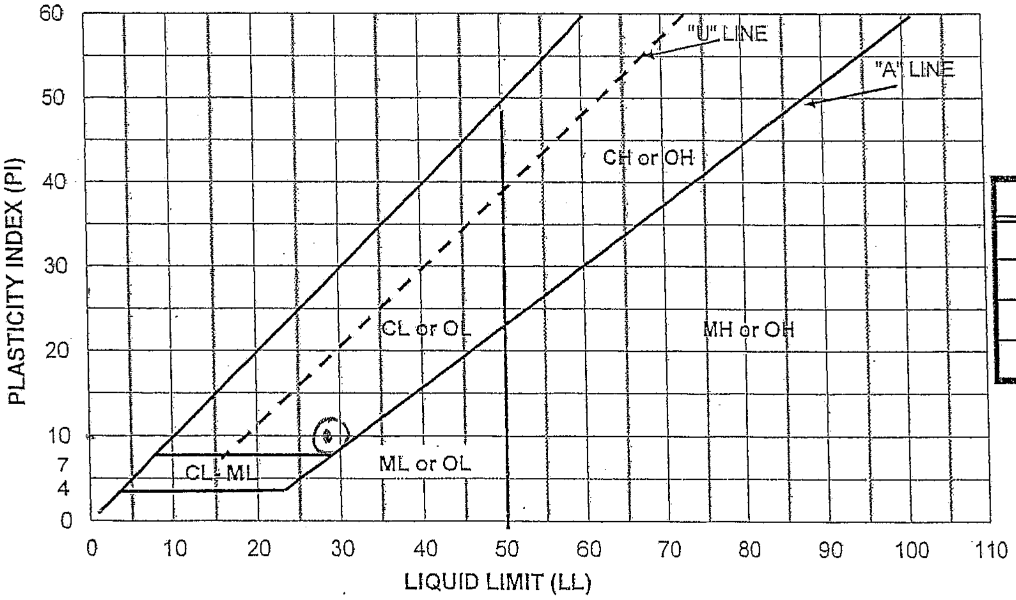
Estimate of % sample retain on #40 Sieve ☐

511

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	27	22	17				
TARE NO.	V24	G5	V21	G9	N7	V12		
TARE + WET WT (gms)	39.33	39.00	37.48	39.42	17.89	18.35		
TARE + DRY WT (gms)	33.21	32.90	31.55	32.93	16.83	17.22		
TARE WT (gms)	11.12	11.21	11.12	11.11	10.93	11.13		
WT OF WATER (gms)	6.12	6.1	5.93	6.49	1.06	1.13		
DRY WT SOIL (gms)	22.09	21.69	20.43	21.82	5.9	6.09		
WATER CONTENT %	27.7	28.1	29.0	29.7	18.0	18.6		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	28 %
PL	18 %
PI	10 %
WC	23 %

ATTERBERG LIMIT

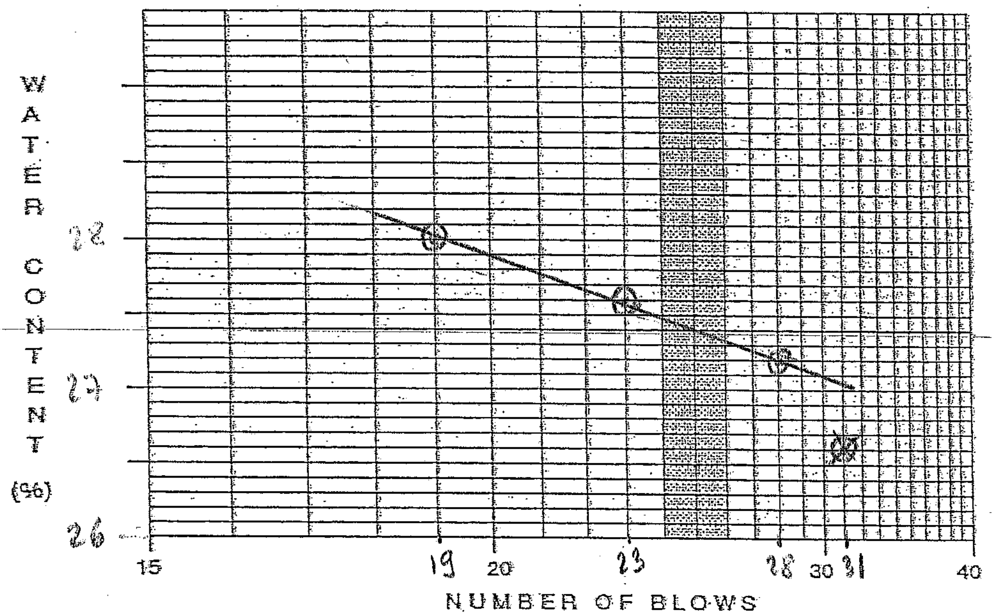
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY	Project #: 2019-181-702
Sample #: BH-131 H 33A @ 101' Lab #: 6970	Date: 05/16/2020
Sample Description: SANDY LEAN CLAY, (CL), LIGHT YELLOWISH -BROWN	Tested By: D. NGUYEN

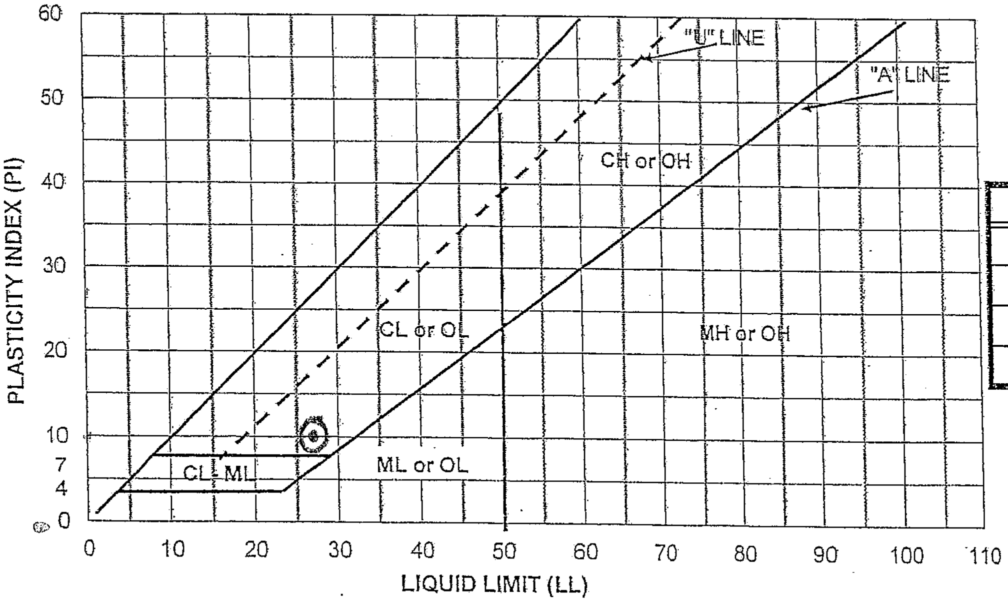
Estimate of % sample retain on #40 Sieve ☐

S11

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~31~~	28	23	19				
TARE NO.	~~V12~~	V21	V24	G9	G5	N7		
TARE + WET WT (gms)	~~38.73~~	40.20	39.79	39.79	18.52	17.98		
TARE + DRY WT (gms)	~~32.93~~	33.99	33.58	33.52	17.44	16.76		
TARE WT (gms)	~~11.13~~	11.12	11.12	11.11	11.22	10.93		
WT OF WATER (gms)	~~5.8~~	6.21	6.21	6.27	1.08	1.02		
DRY WT SOIL (gms)	~~21.8~~	22.87	22.46	22.58	6.22	5.83		
WATER CONTENT %	~~26.6~~	27.2	27.6	28.0	17.4	17.4		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	27 %
PL	17 %
PI	10 %
WC	22 %

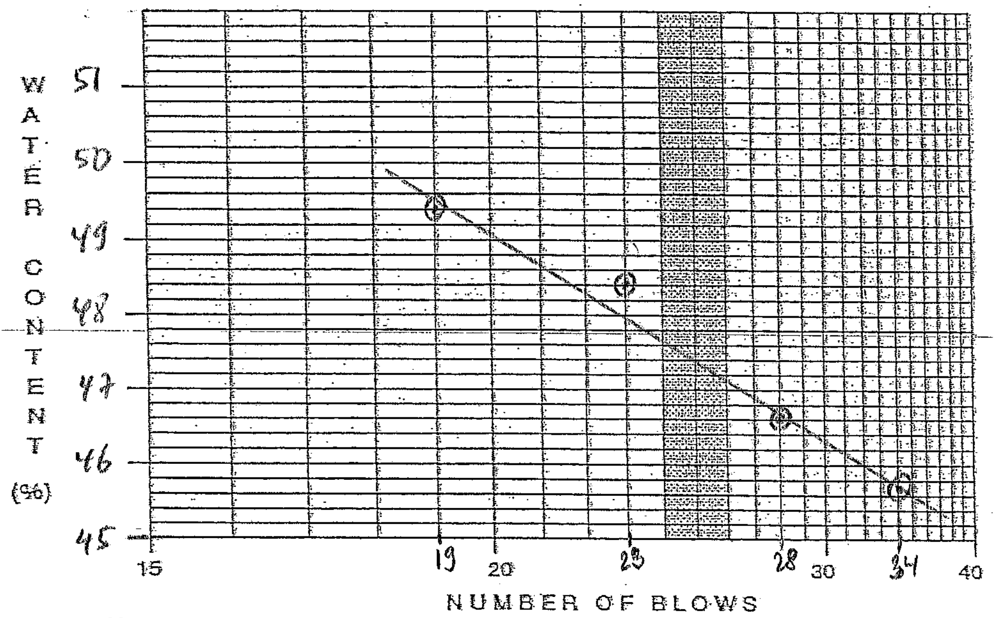
ATTERBERG LIMIT

ASTM D4318 or CAL 204

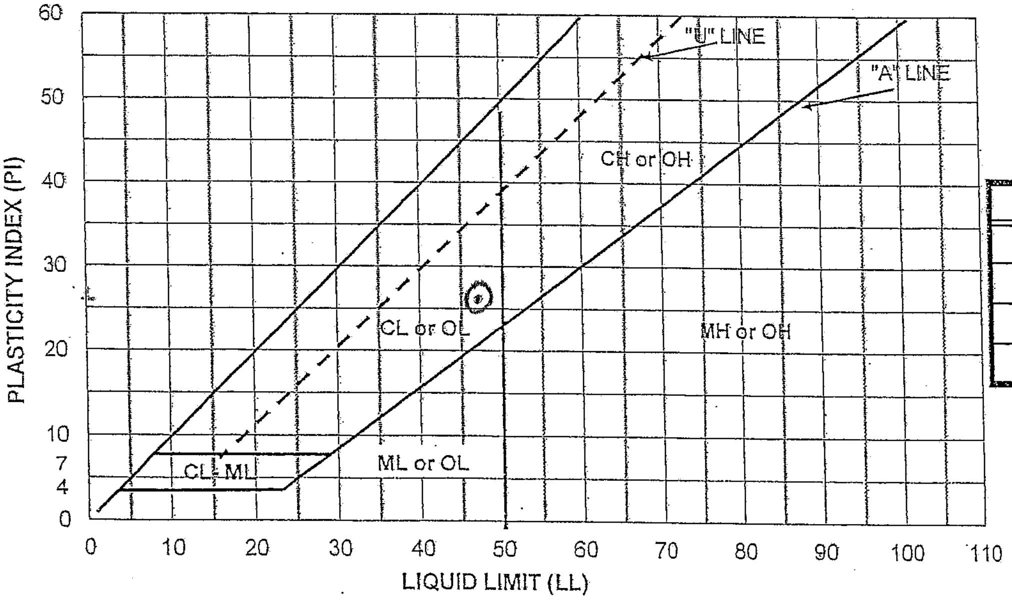
Project Name: BART TO SILICON VALLEY
Project #: 2019-181-702
Sample #: BH-171 # 38A @141' Lab #: G-970
Date: 05/18/2020
Sample Description: LEAN CLAY, (CL), OLIVE-GRAY
Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 5g

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	28	23	19				
TARE NO.	N2	V18	G7	G4	G11	G6		
TARE + WET WT (gms)	38.04	37.28	37.08	37.29	18.26	17.92		
TARE + DRY WT (gms)	29.56	28.94	28.49	28.49	17.05	16.71		
TARE WT (gms)	10.99	11.04	10.74	10.67	11.12	10.96		
WT OF WATER (gms)	8.48	8.34	8.59	8.8	1.21	1.21		
DRY WT SOIL (gms)	18.57	17.9	17.75	17.82	5.93	5.75		
WATER CONTENT %	45.7	46.6	48.4	49.4	20.4	21.0		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	47 %
PL	21 %
PI	26 %
WC	27 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

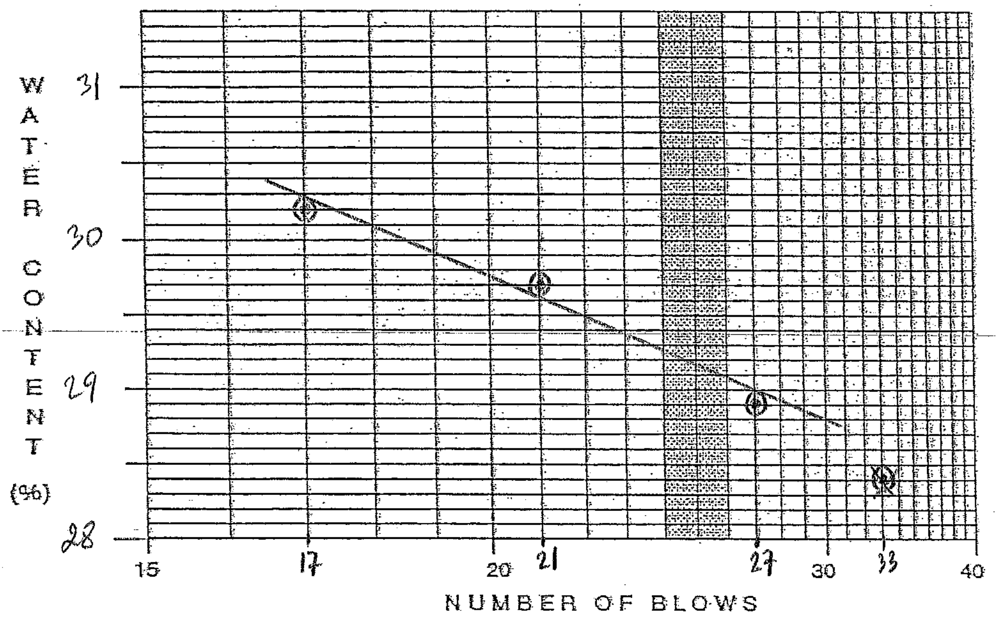
Sample #: BH-171 #36A @ 129' Lab #: G910 Date: 05/18/2020

Sample Description: LEAN CLAY, (CL), DARK GREENISH-GRAY Tested By: D-NGUYEN

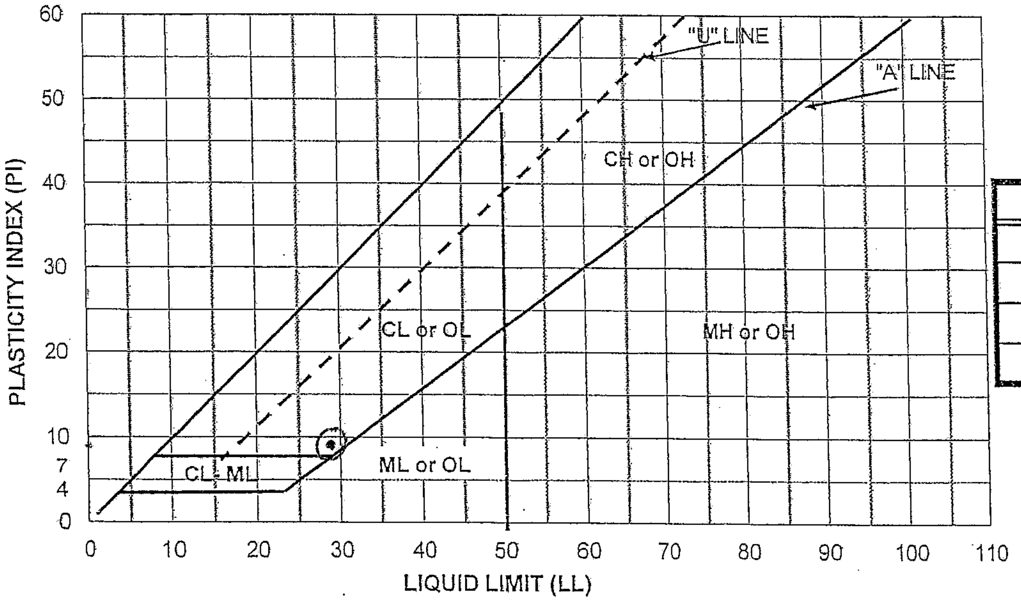
Estimate of % sample retain on #40 Sieve ☐

S10

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~33~~	27	21	17				
TARE NO.	~~V17~~	N3	N1	G12	N12	N10		
TARE + WET WT (gms)	~~38.52~~	38.68	38.16	35.99	17.89	18.34		
TARE + DRY WT (gms)	~~32.44~~	32.50	31.96	30.11	16.75	17.12		
TARE WT (gms)	~~11.06~~	11.11	11.05	10.61	11.13	11.15		
WT OF WATER (gms)	~~6.08~~	6.18	6.2	5.88	1.14	1.22		
DRY WT SOIL (gms)	~~21.38~~	21.39	20.91	19.5	5.62	5.97		
WATER CONTENT %	~~28.4~~	28.9	29.7	30.2	20.3	20.4		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	29 %
PL	20 %
PI	9 %
WC	

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702

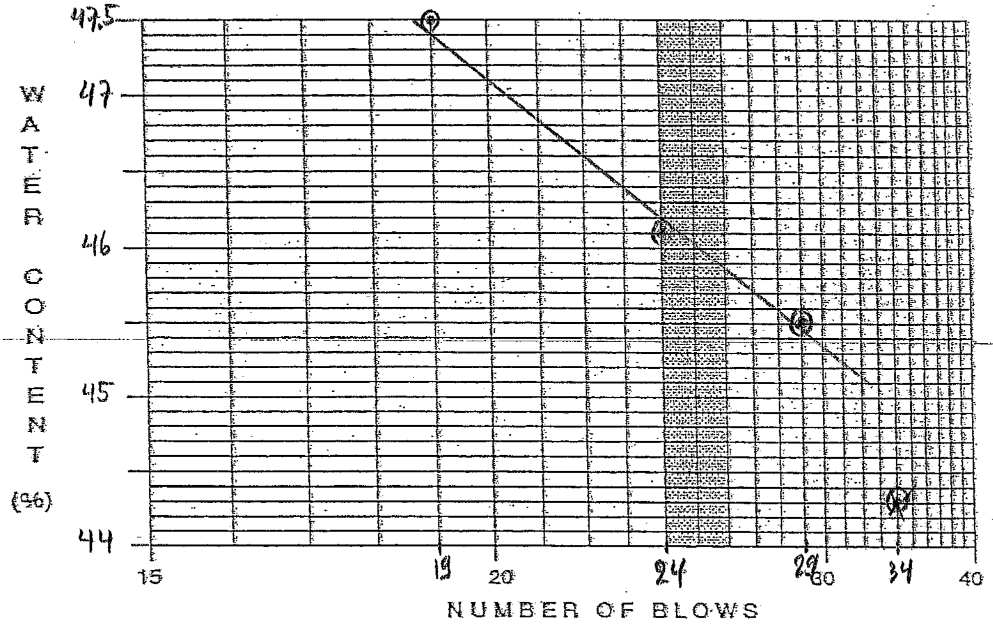
Sample #: BH-171 #43 @ 165 1/2 Lab #: G970
Date: 05/18/2020

Sample Description: LEAN CLAY, (CL), OLIVE GRAY
Tested By: D. NGUYEN

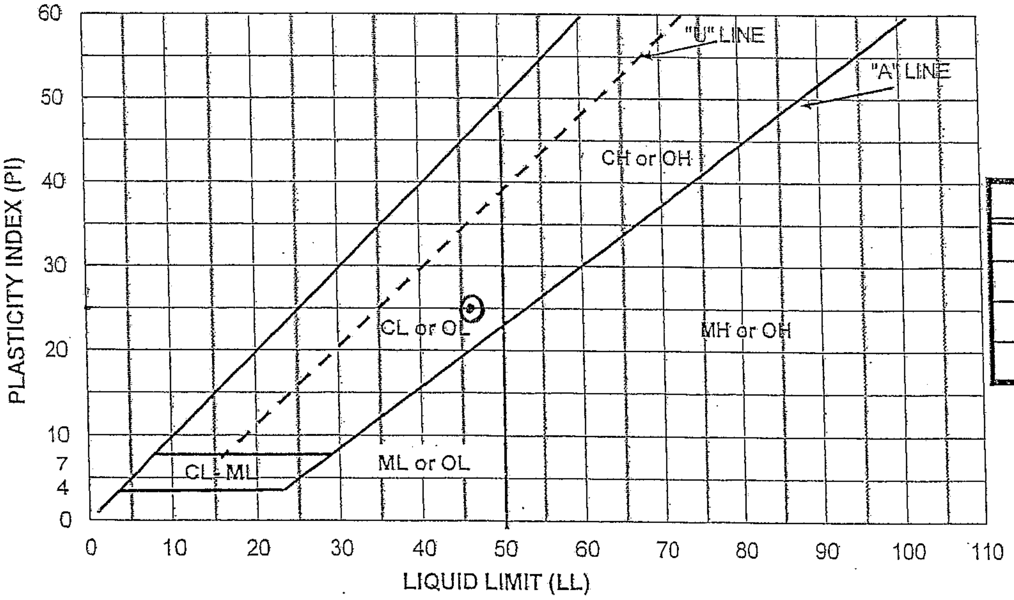
Estimate of % sample retain on #40 Sieve ☐

512

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	29	24	19				
TARE NO.	V1	N9	V22	V11	V23	A8		
TARE + WET WT (gms)	35.65	37.06	36.40	36.34	16.83	17.26		
TARE + DRY WT (gms)	28.06	28.93	28.37	28.12	15.82	16.17		
TARE WT (gms)	10.94	11.08	10.97	10.80	10.96	10.97		
WT OF WATER (gms)	7.59	8.13	8.03	8.22	1.01	1.09		
DRY WT SOIL (gms)	17.12	17.85	17.4	17.32	4.86	5.2		
WATER CONTENT %	44.3	45.5	46.1	47.5	20.8	21.0		

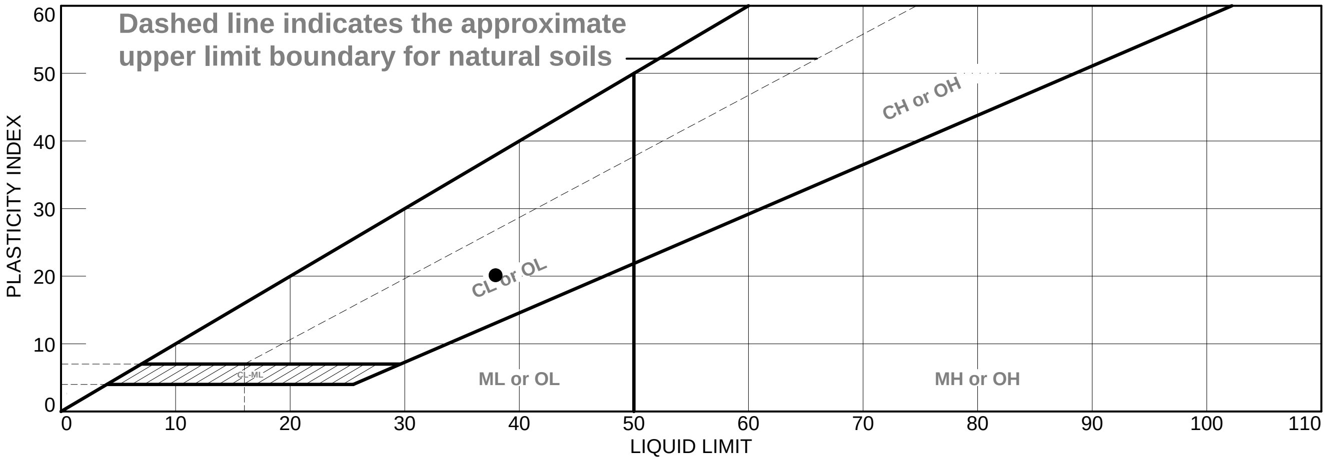


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	46%
PL	21%
PI	25%
WC	25%

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	38	18	20			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

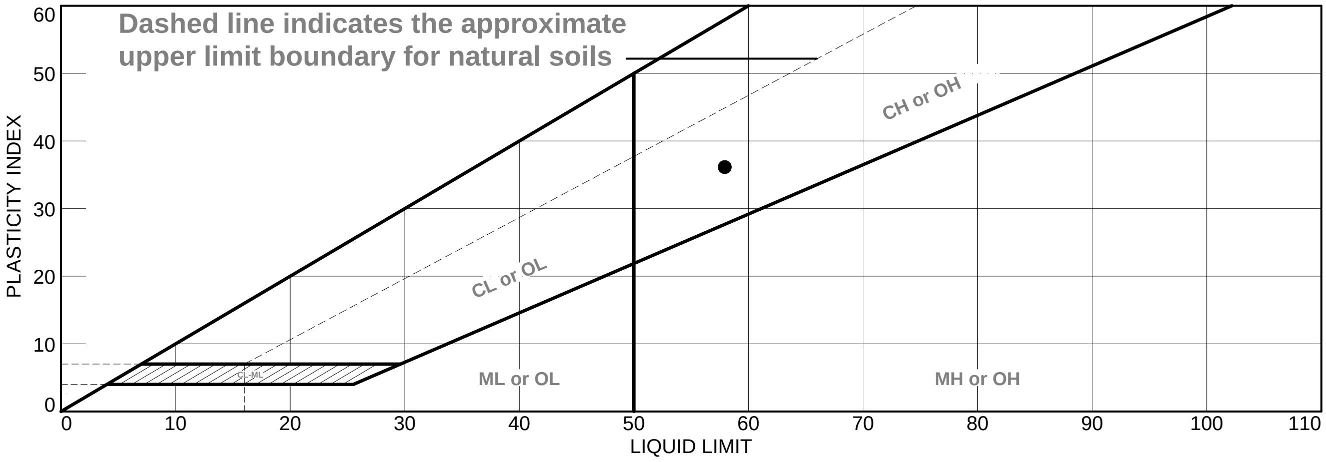
● **Source of Sample:** BH-173 **Depth:** 15 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark gray clay	58	22	36			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

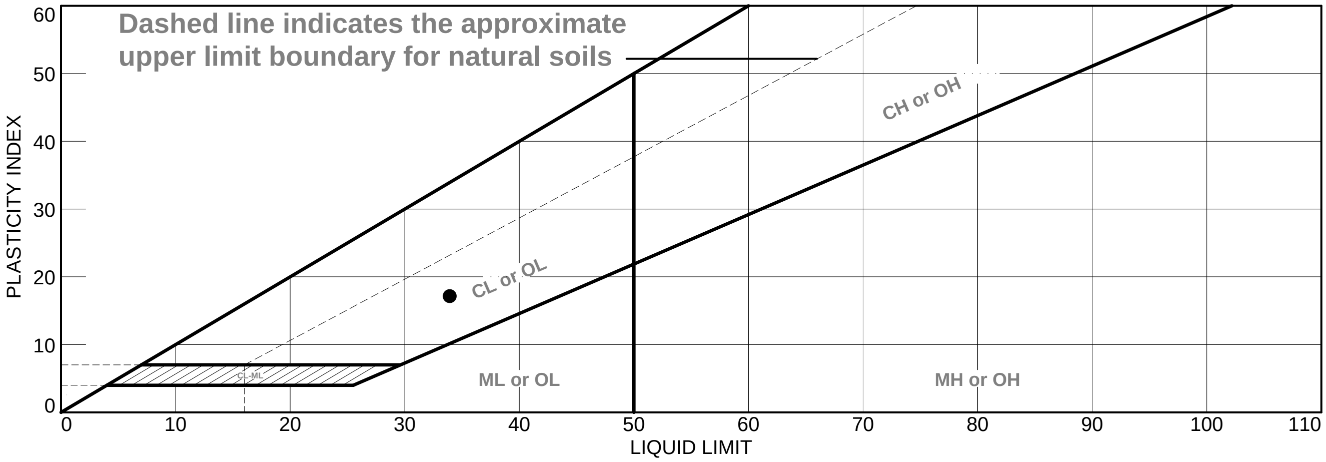
● **Source of Sample:** BH-173 **Depth:** 20 **Sample Number:** 8

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	34	17	17			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

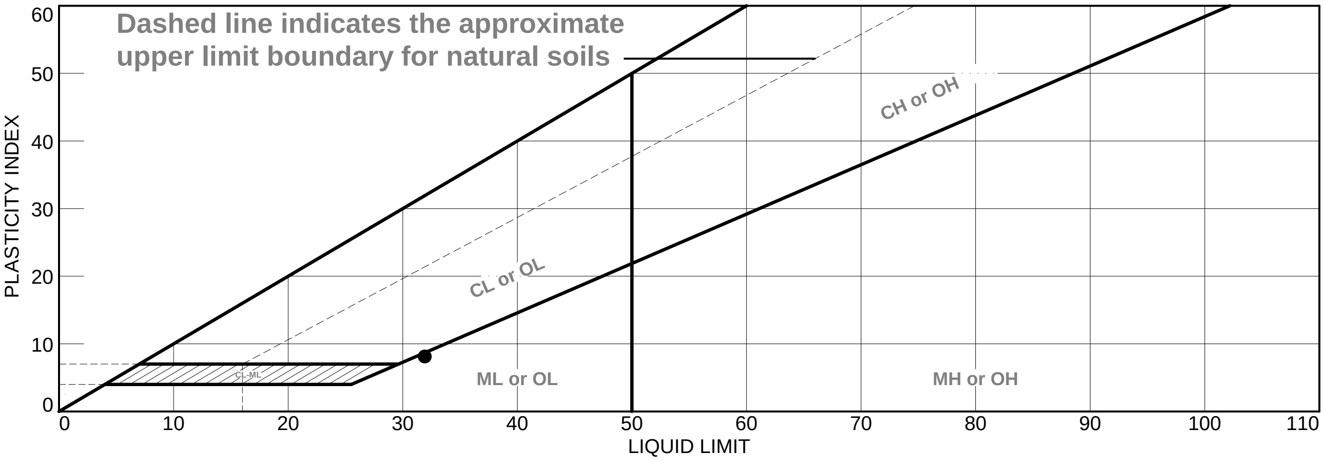
● **Source of Sample:** BH-173 **Depth:** 42.5 **Sample Number:** 17

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silt	32	24	8			ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

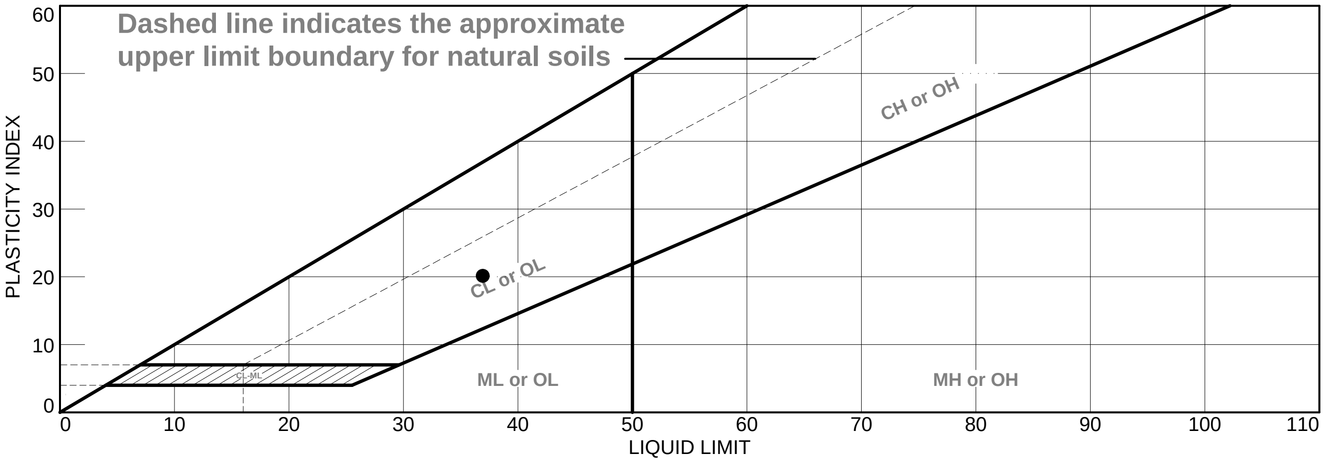
● **Source of Sample:** BH-173 **Depth:** 62.5 **Sample Number:** 25

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	37	17	20			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

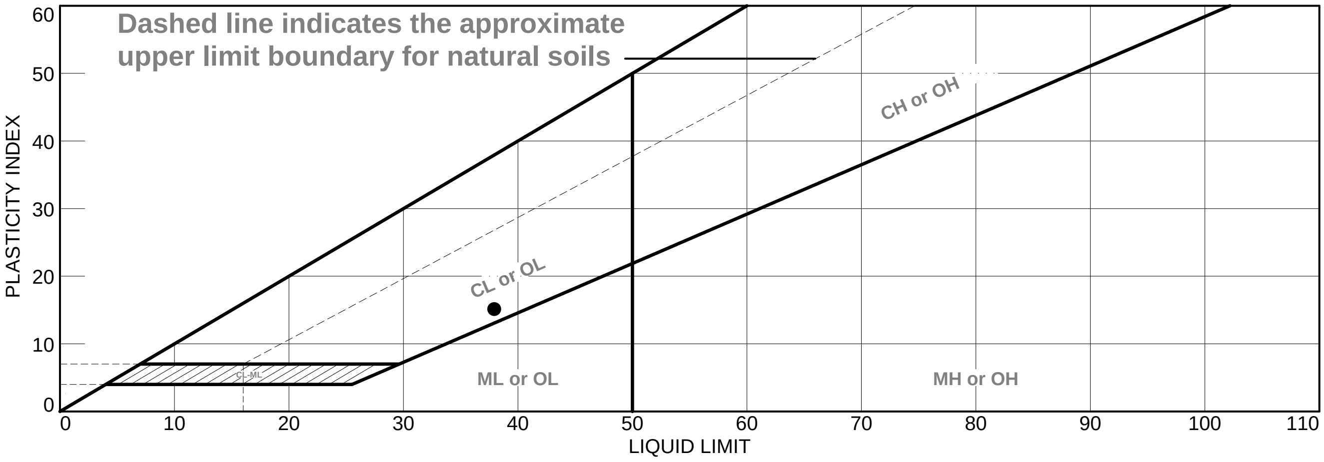
● **Source of Sample:** BH-173 **Depth:** 72.5 **Sample Number:** 28

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	38	23	15			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

●**Source of Sample:** BH-173 **Depth:** 85.5 **Sample Number:** 33

Remarks:

Figure

Tested By: JH **Checked By:** JH

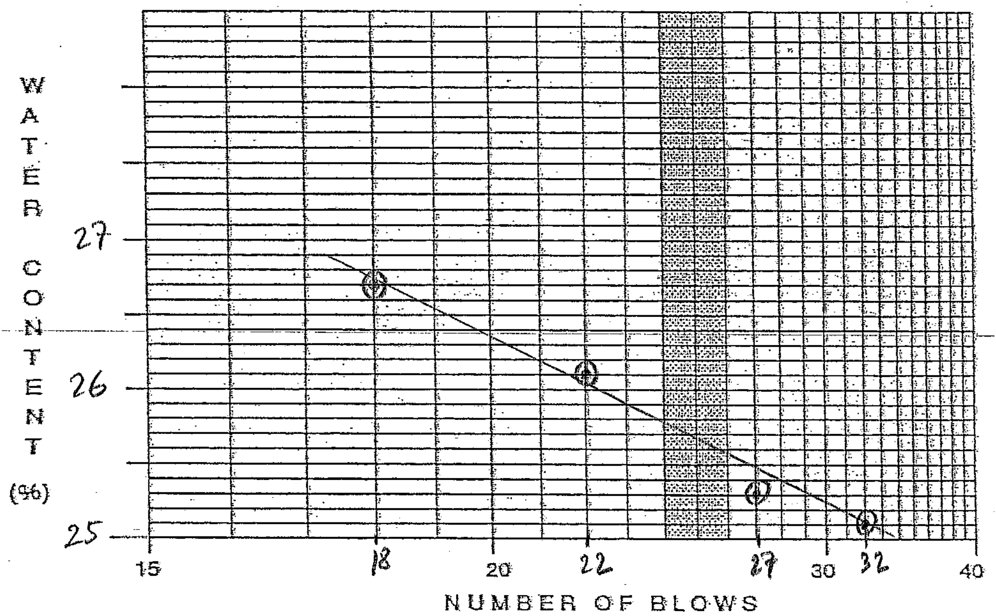
ATTERBERG LIMIT

ASTM D4318 or CAL 204

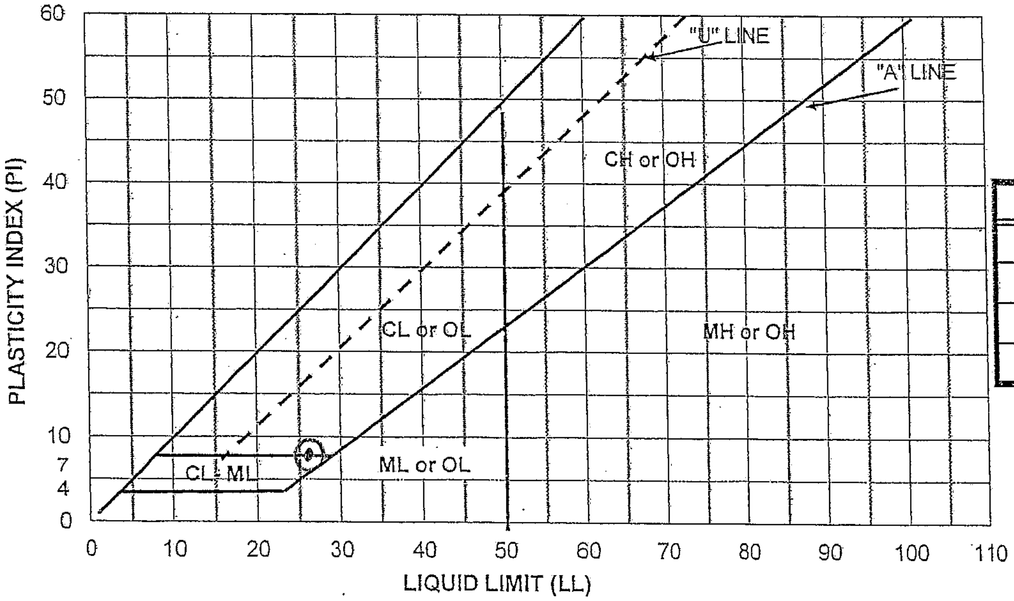
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702
Sample #: BH-173 #14 @ 35½ Lab #: G970
Date: 04/21/2020
Sample Description: SILTY CLAY, (CL-ML), GRAY.
Tested By: D-NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 512

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	27	22	18	▨	▨	▨	▨
TARE NO.	V2	G9	N7	V22	N7	G3		
TARE + WET WT (gms)	38.92	39.20	38.75	41.05	19.08	17.63		
TARE + DRY WT (gms)	33.31	33.53	33.01	34.71	17.69	16.53		
TARE WT (gms)	10.99	11.11	11.05	10.98	10.93	10.69		
WT OF WATER (gms)	5.61	5.67	5.74	6.34	1.39	1.1		
DRY WT SOIL (gms)	22.32	22.42	21.96	23.73	6.76	5.84		
WATER CONTENT %	25.1	25.3	26.1	26.7	20.6	18.8		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	26 %
PL	19 %
PI	7 %
WC	22 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

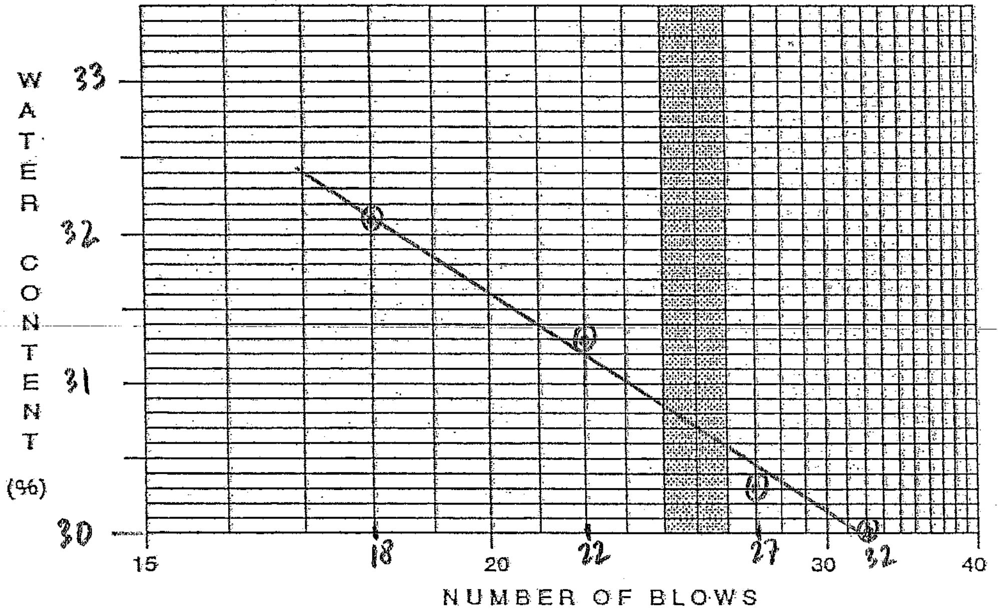
Project Name: BART TO SILICON VALLEY — Project #: 2019-181-T02

Sample #: BH-173 # 29B @ 75.5' Lab #: G970 — Date: 04/21/2020

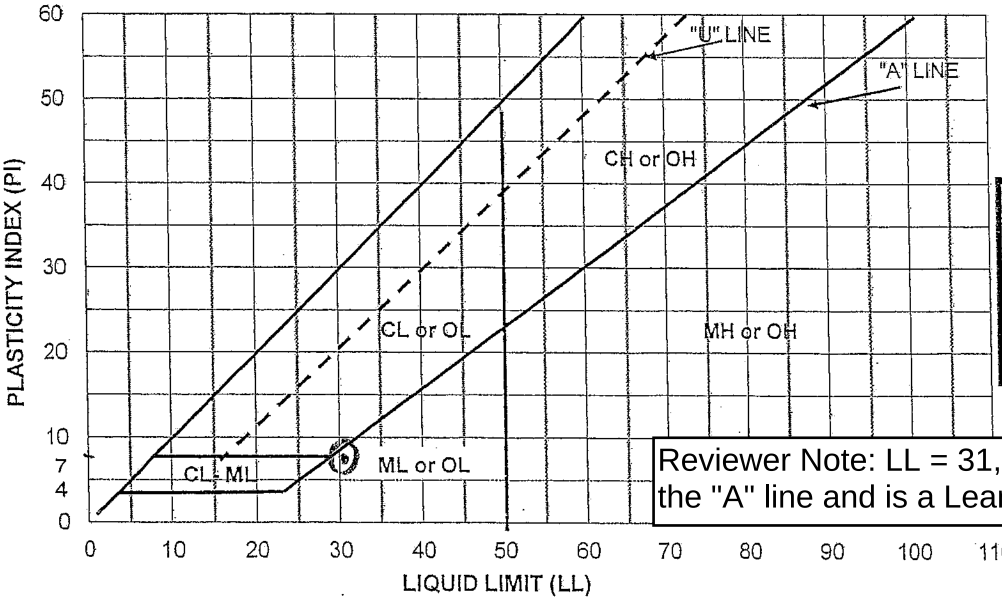
Sample Description: SILT (ML), Dark yellowish Brown — Tested By: D-NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 512

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	32	27	22	18				
TARE NO.	V7	G3	N7	G9	V2	V22		
TARE + WET WT (gms)	35.56	36.04	36.77	37.88	17.86	17.35		
TARE + DRY WT (gms)	29.90	30.14	30.62	31.37	16.56	16.20		
TARE WT (gms)	11.05	10.70	10.94	11.11	10.99	10.99		
WT OF WATER (gms)	5.66	5.9	6.15	6.51	1.3	1.15		
DRY WT SOIL (gms)	18.85	19.44	19.68	20.26	5.57	5.21		
WATER CONTENT %	30.0	30.3	31.3	32.1	23.3	22.1		



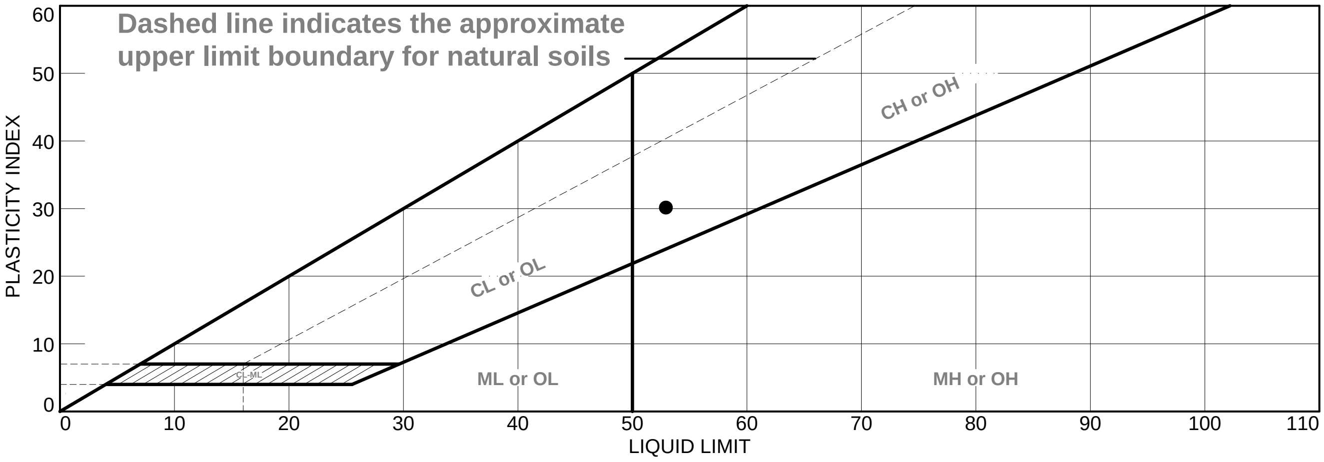
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	31 %
PL	23 %
PI	8 %
WC	24 %

Reviewer Note: LL = 31, PI = 8 plots on the "A" line and is a Lean Clay (CL).

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	53	23	30			CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

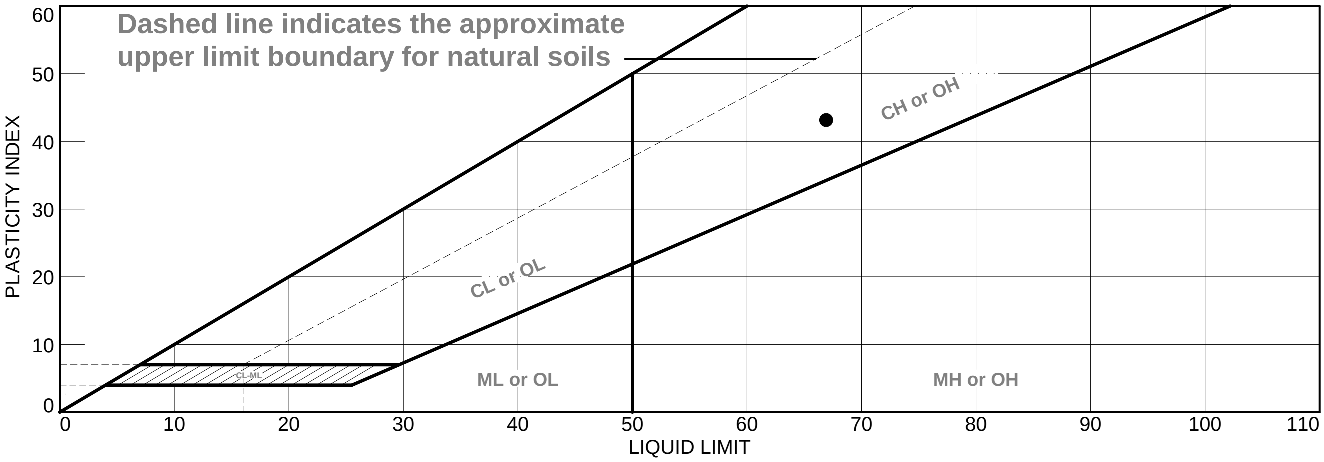
● **Source of Sample:** BH-175 **Depth:** 10 **Sample Number:** 2

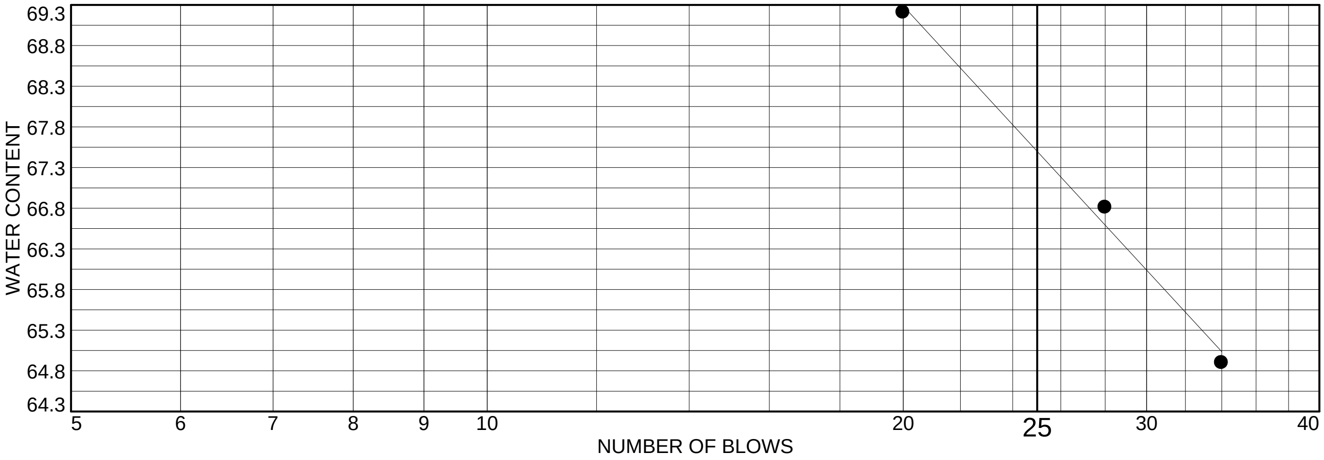
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	67	24	43		94.0	CH

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

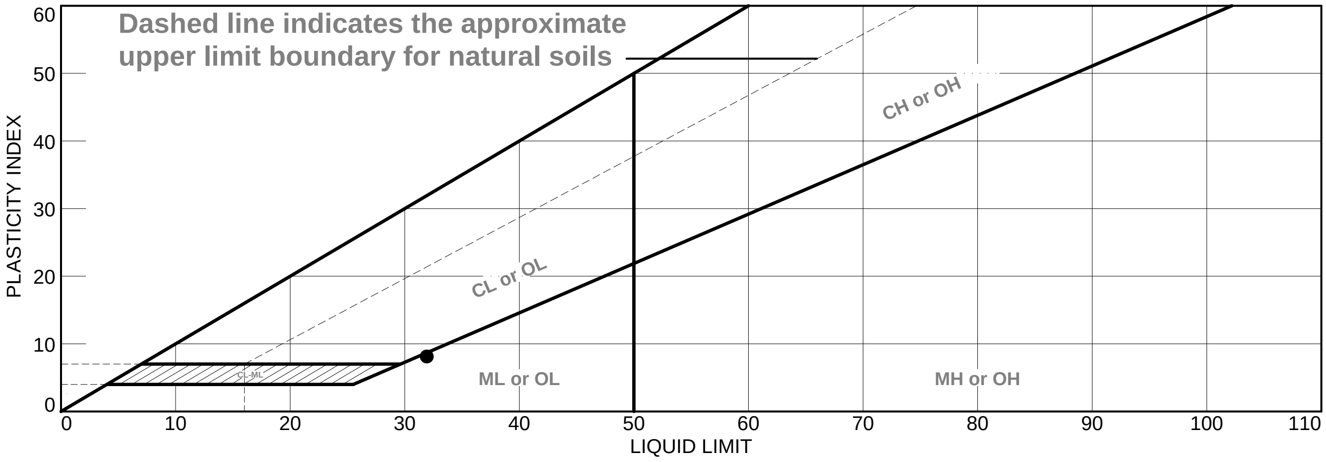
● **Source of Sample:** BH-175 **Depth:** 30 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown sandy silt	32	24	8		72.9	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

●**Source of Sample:** BH-175 **Depth:** 70 **Sample Number:** 21

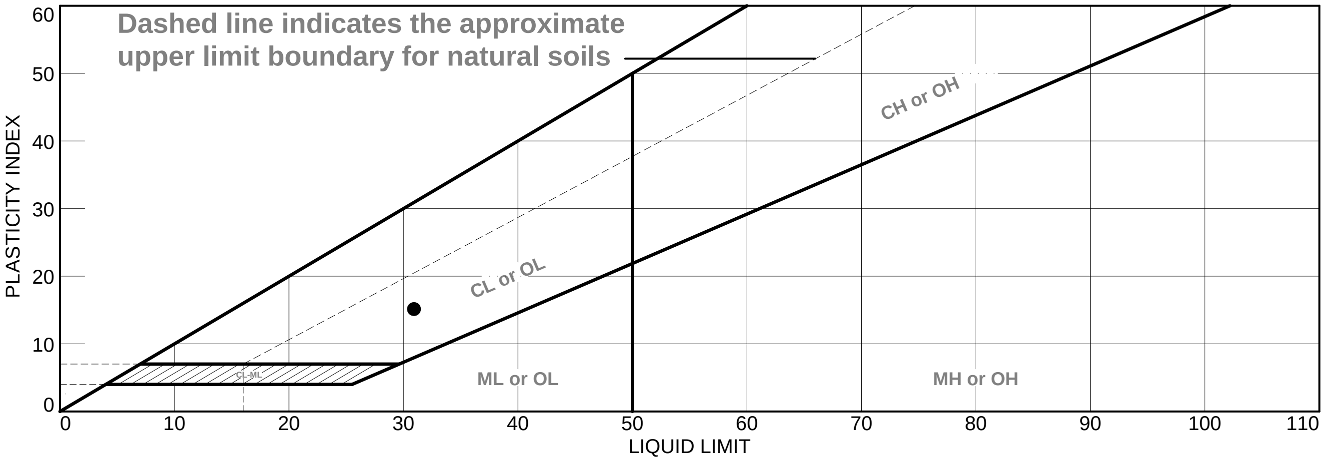
Remarks:

Figure

Tested By: JH

Checked By: JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	31	16	15		64.3	CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

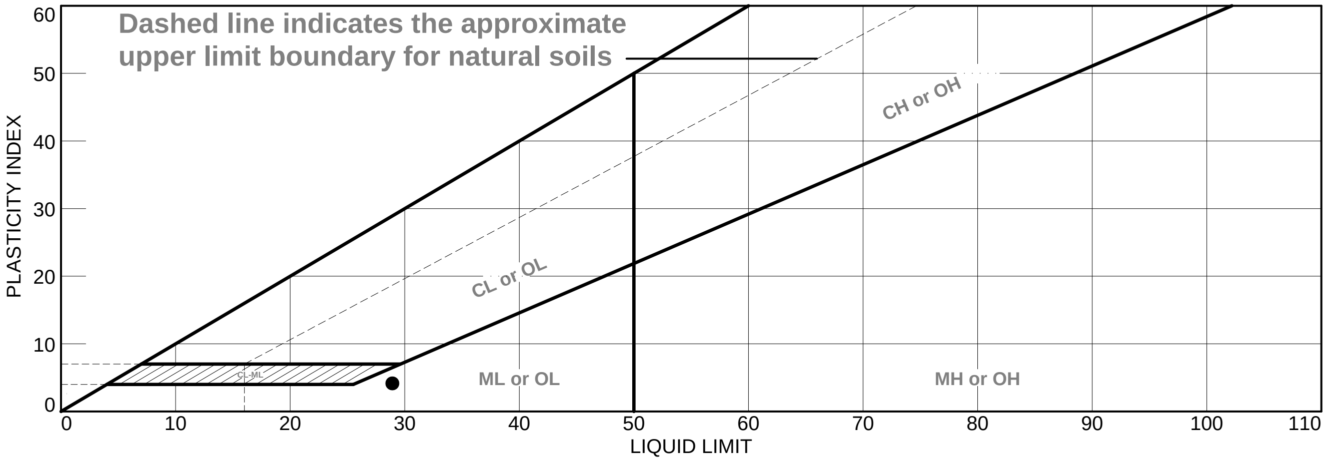
●**Source of Sample:** BH-175 **Depth:** 81 **Sample Number:** 25

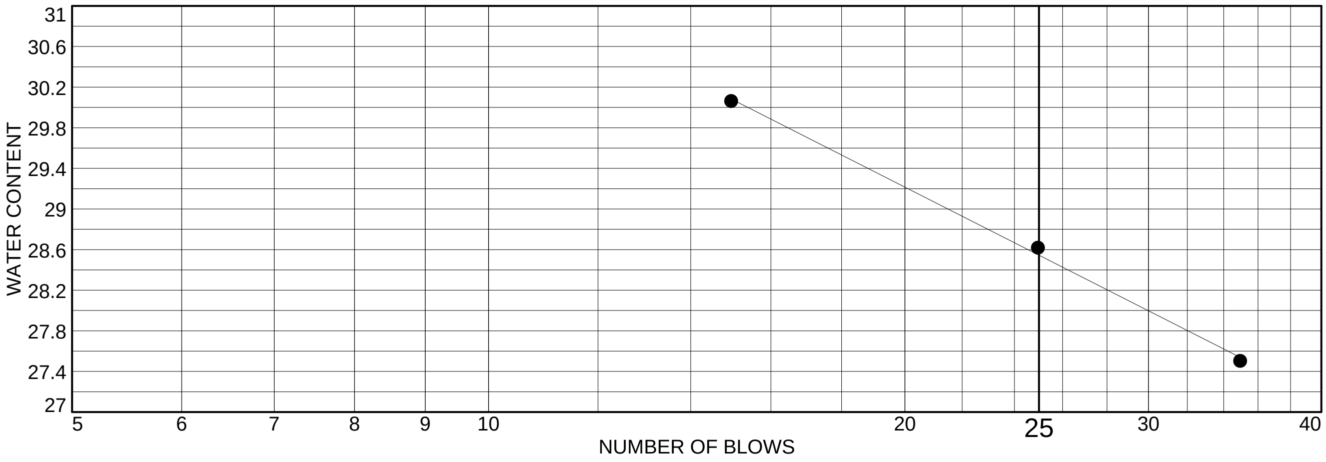
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silt	29	25	4		70.7	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

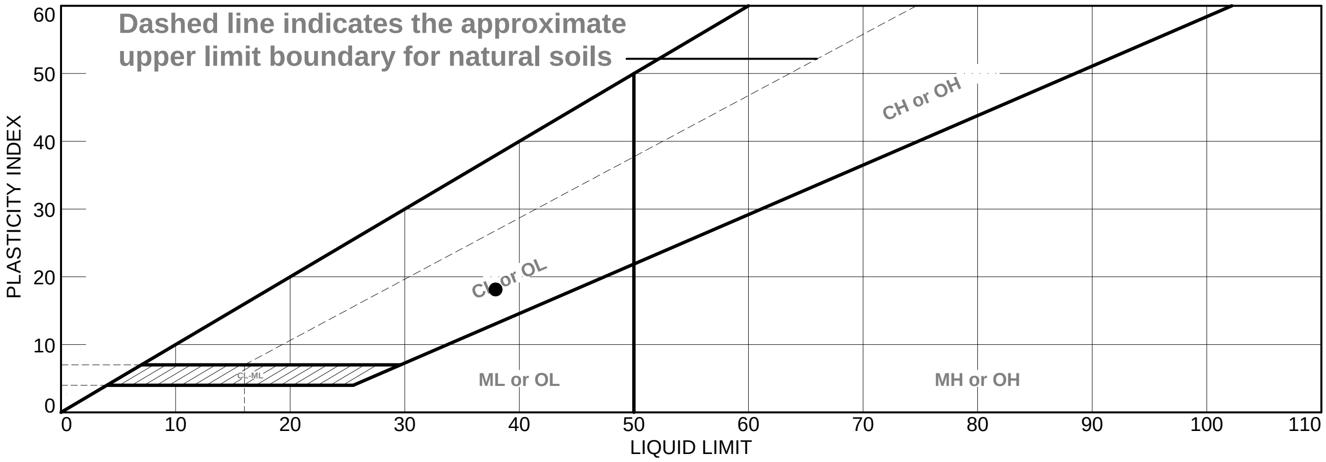
● **Source of Sample:** BH-175 **Depth:** 99 **Sample Number:** 33

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	38	20	18			CL

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

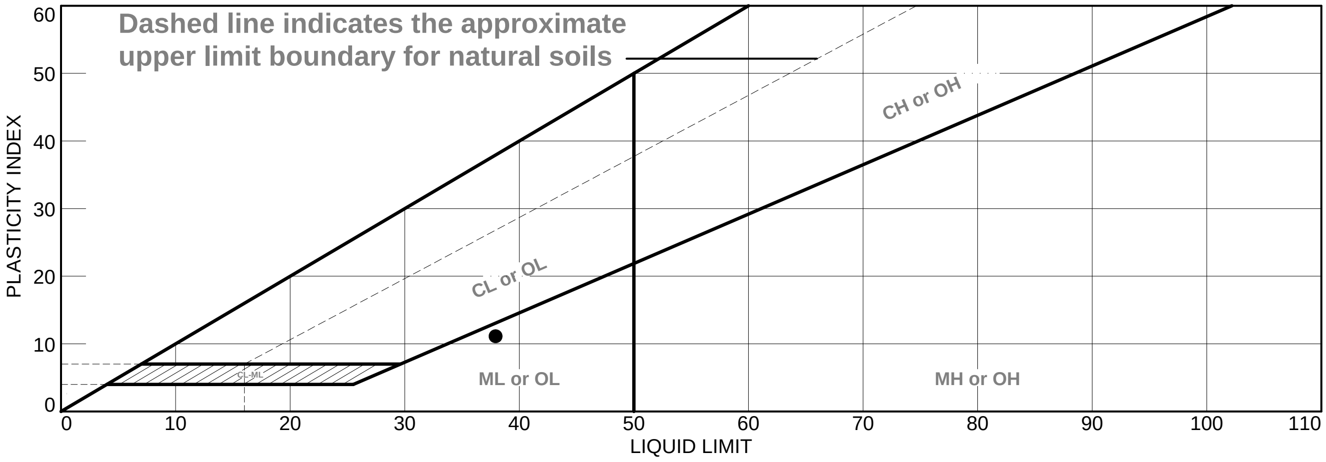
● **Source of Sample:** BH-175 **Depth:** 108.5 **Sample Number:** 37

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown silt	38	27	11		90.6	ML

Project No. 2966-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-175 **Depth:** 135 **Sample Number:** 46

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

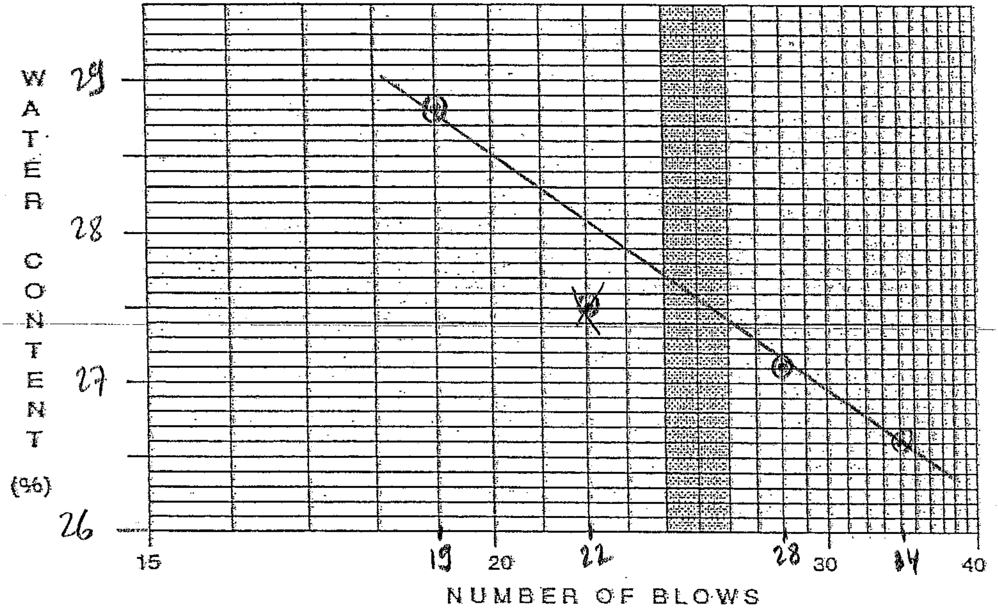
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702

Sample #: BH-175 #15A@55' Lab #: G910
Date: 05/12/2020

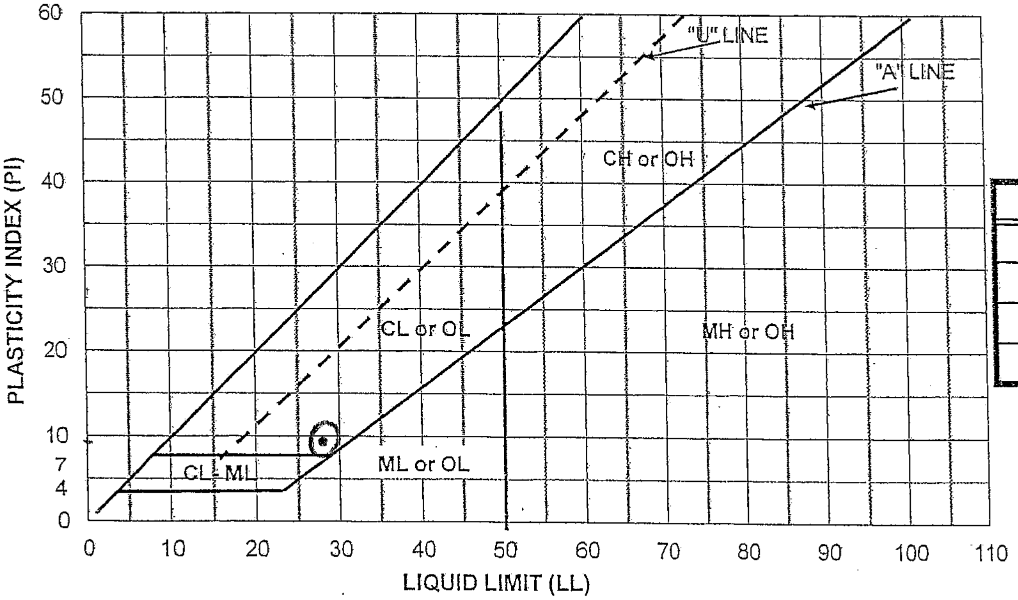
Sample Description: CLAYEY SAND, (SC), GREENISH-GRAY
Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	28	~~22~~	19	▨	▨	▨	▨
TARE NO.	G11	G4	~~V18~~	N2	G6	G7		
TARE + WET WT (gms)	37.05	38.20	~~39.49~~	40.40	17.83	17.69		
TARE + DRY WT (gms)	31.61	32.34	~~33.35~~	33.82	16.74	16.60		
TARE WT (gms)	11.13	10.68	~~11.04~~	10.99	10.96	10.74		
WT OF WATER (gms)	5.44	5.86	~~6.14~~	6.58	1.09	1.09		
DRY WT SOIL (gms)	20.48	21.66	~~22.31~~	22.83	5.78	5.86		
WATER CONTENT %	26.6	27.1	~~27.5~~	28.8	18.9	18.6		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	28 %
PL	19 %
PI	9 %
WC	20%

ATTERBERG LIMIT

ASTM D4318 or CAL 204

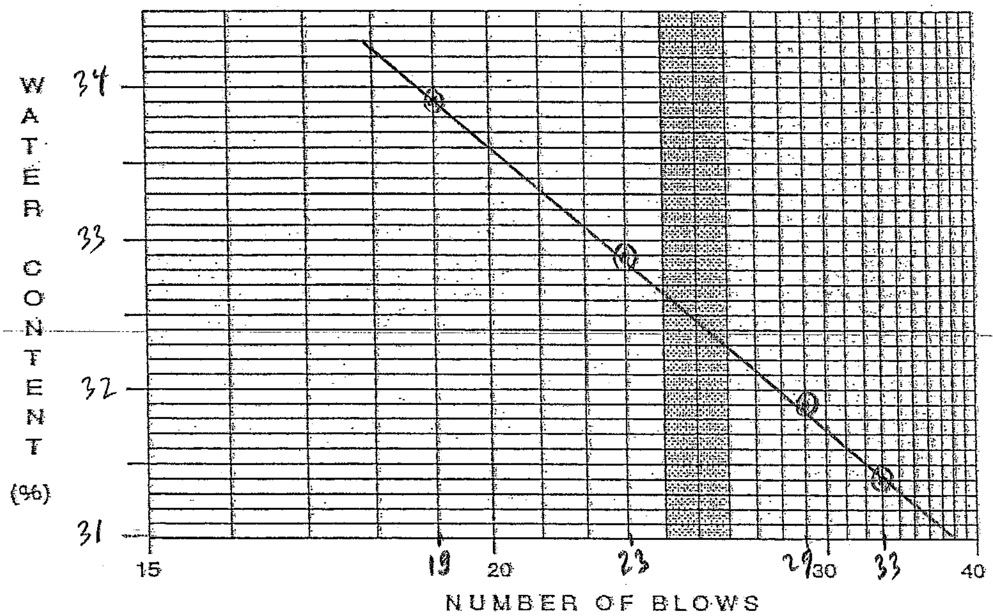
Project Name: BART TO SILICON VALLEY Project #: 2019-131-702

Sample #: BH-175 #36B@106.5' Lab #: G970 Date: 02/12/2020

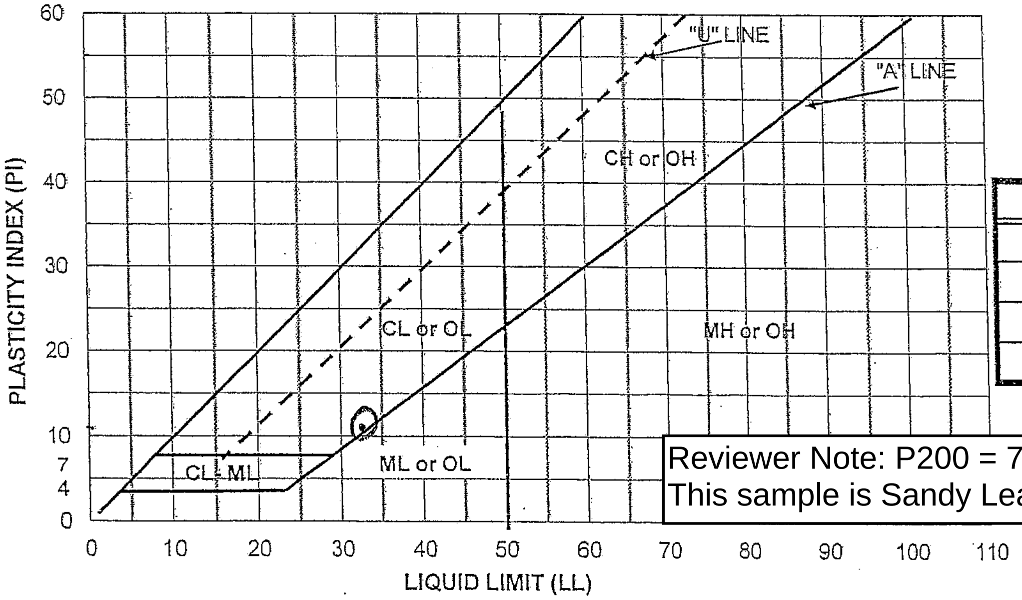
Sample Description: CLAYEY SAND , (SC), DARK GREENISH GRAY Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ SG

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	29	23	19				
TARE NO.	V4	V5	V3	V6	G1	V10		
TARE + WET WT (gms)	37.72	37.85	36.16	38.20	17.76	17.87		
TARE + DRY WT (gms)	31.35	31.36	29.95	31.32	16.56	16.62		
TARE WT (gms)	11.08	11.00	11.05	11.01	11.14	10.96		
WT OF WATER (gms)	6.37	6.49	6.21	6.88	1.2	1.25		
DRY WT SOIL (gms)	20.27	20.36	18.9	20.31	5.42	5.66		
WATER CONTENT %	31.4	31.9	32.9	33.9	22.1	22.1		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	33 %
PL	22 %
PI	11 %
WC	

Reviewer Note: P200 = 70%.
This sample is Sandy Lean Clay (CL).

ATTERBERG LIMIT

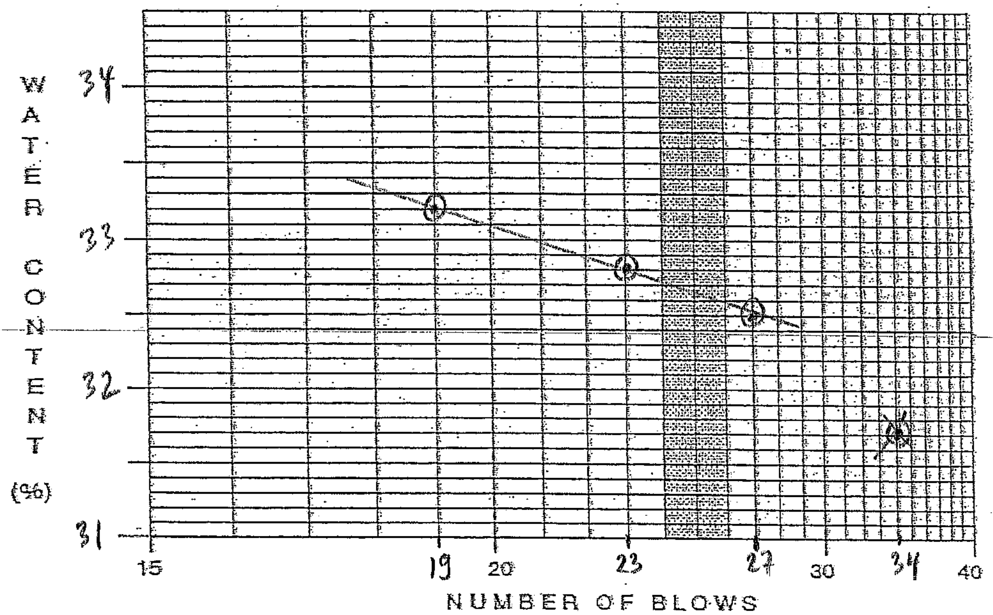
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-702
Sample #: BH-175 #41B @ 120.5
Lab #: G970
Date: 05/12/2020
Sample Description: LEAN CLAY(CL), DARK. GREENISH GRAY
Tested By: D. NGUYEN

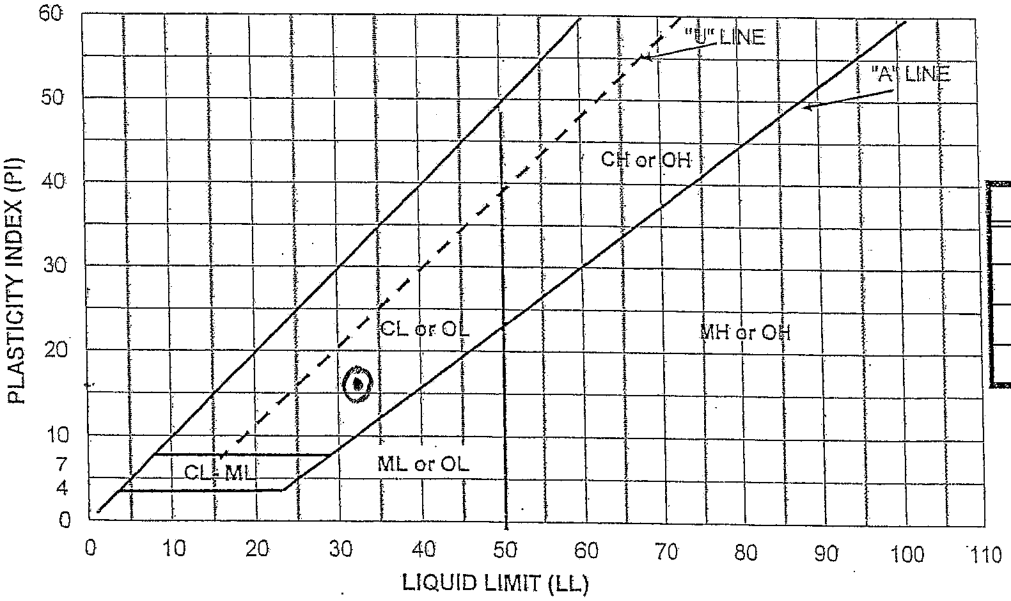
Estimate of % sample retain on #40 Sieve ☐

SH

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~34~~	27	23	19				
TARE NO.	~~V21~~	V12	V24	G9	W7	G5		
TARE + WET WT (gms)	~~39.99~~	39.73	42.32	42.64	18.73	18.95		
TARE + DRY WT (gms)	~~33.05~~	32.71	34.61	34.78	17.57	17.83		
TARE WT (gms)	~~11.13~~	11.13	11.12	11.11	10.93	11.21		
WT OF WATER (gms)	~~6.94~~	7.02	7.71	7.86	1.16	1.12		
DRY WT SOIL (gms)	~~21.92~~	21.58	23.49	23.67	6.64	6.62		
WATER CONTENT %	~~31.7~~	32.5	32.8	33.2	17.5	16.9		



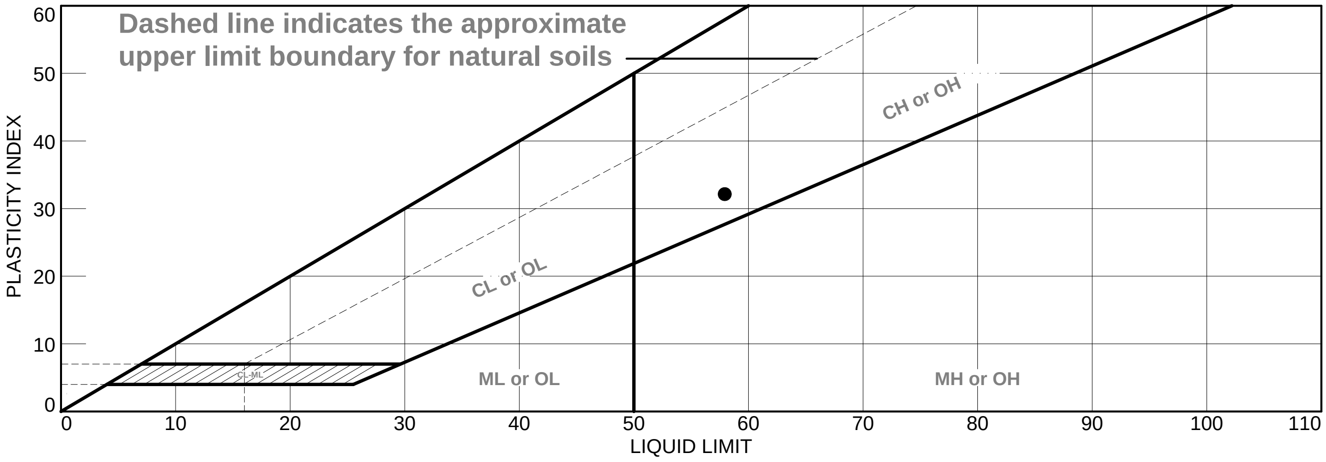
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	33%
PL	17%
PI	16%
WC	

PARIKH CONSULTANTS, INC.

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	58	26	32			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

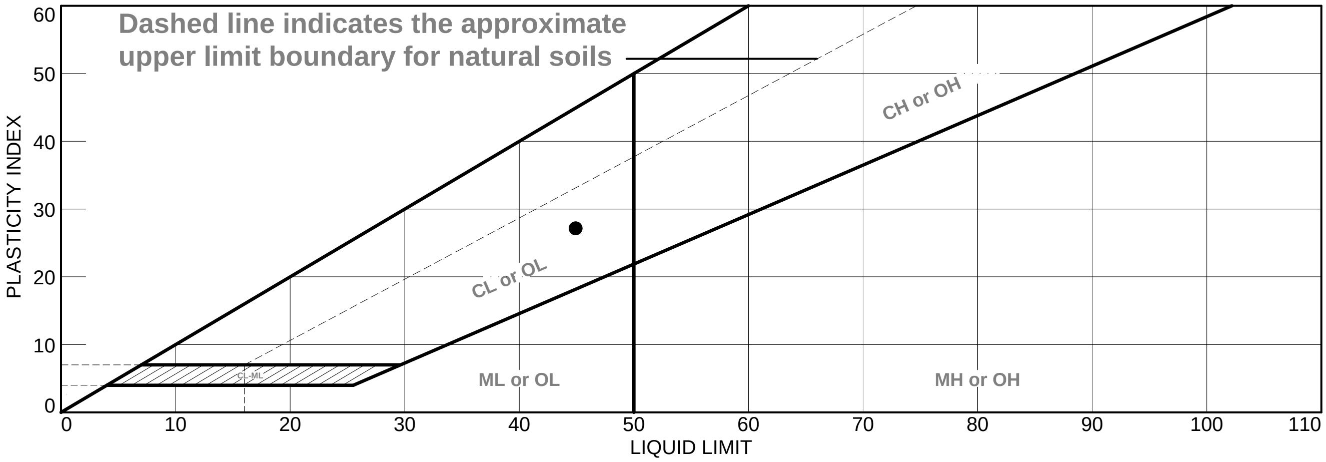
● **Source of Sample:** BH-176 **Depth:** 15 **Sample Number:** 5

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT


Dashed line indicates the approximate upper limit boundary for natural soils

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	45	18	27		85.6	CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

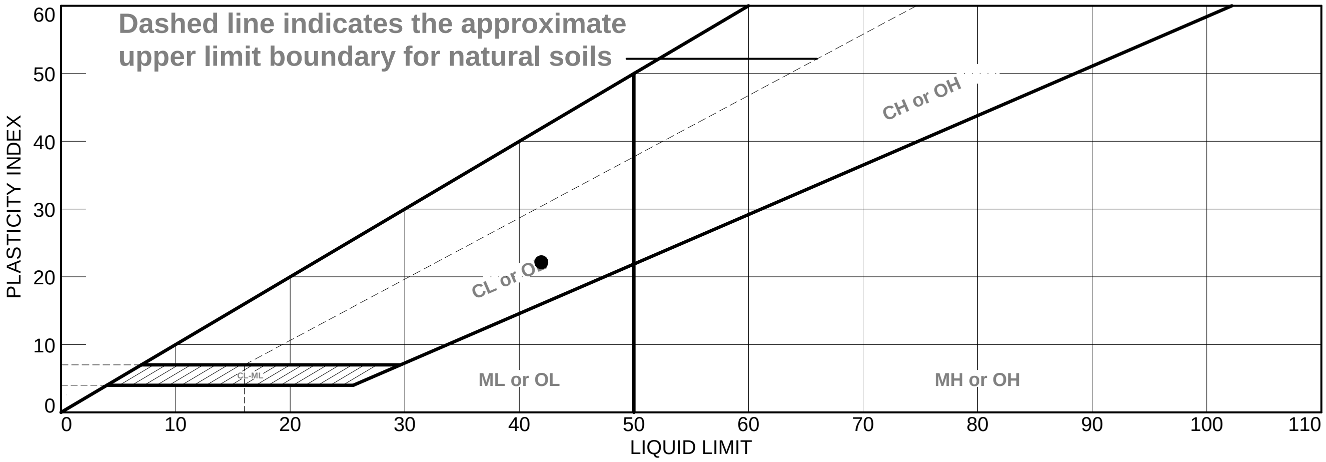
● **Source of Sample:** BH-176 **Depth:** 20 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT


Dashed line indicates the approximate upper limit boundary for natural soils

	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	42	20	22			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

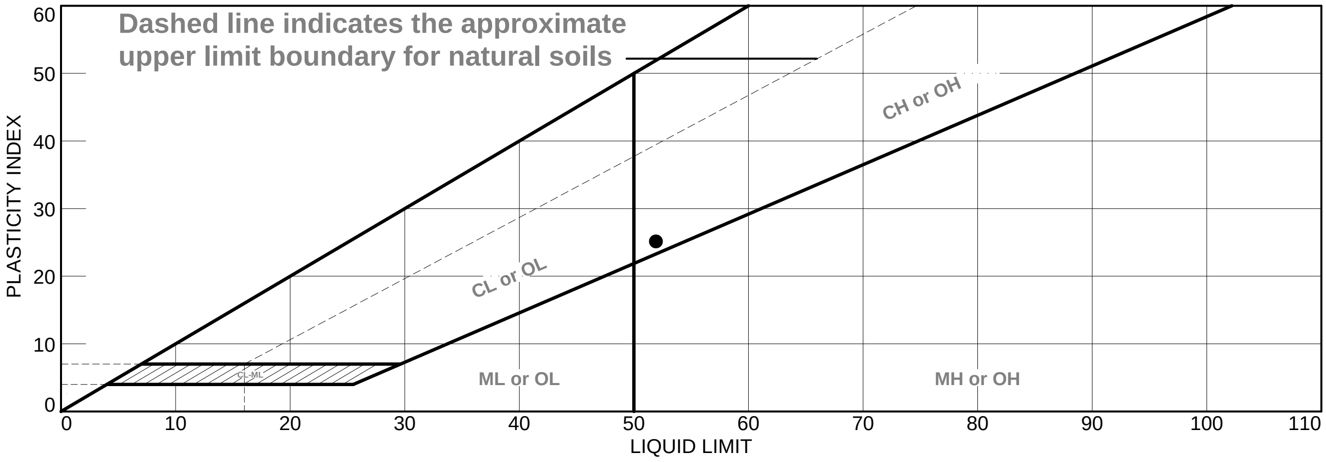
● **Source of Sample:** BH-176 **Depth:** 45 **Sample Number:** 11

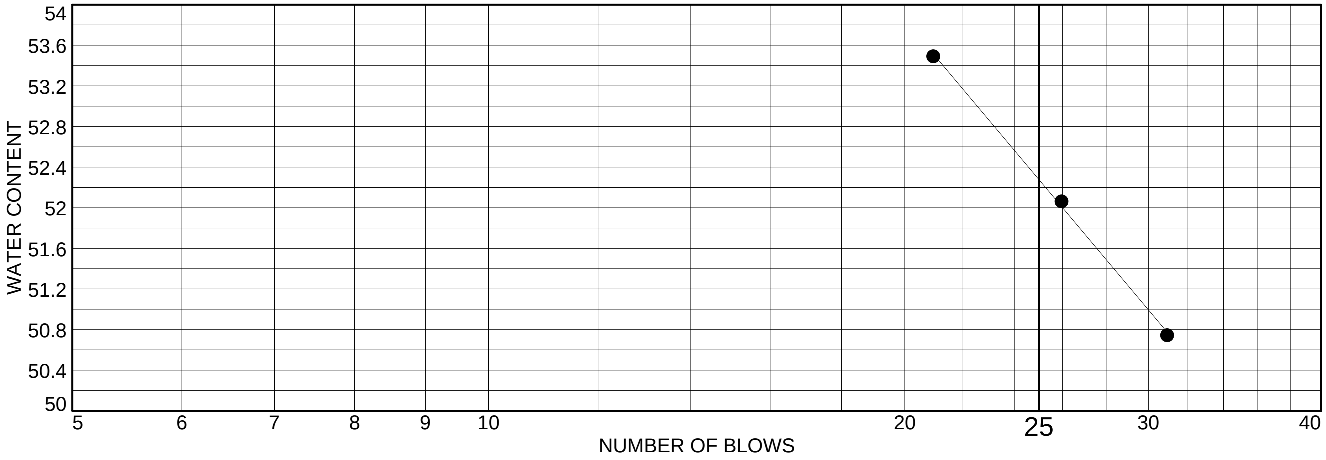
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	52	27	25			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

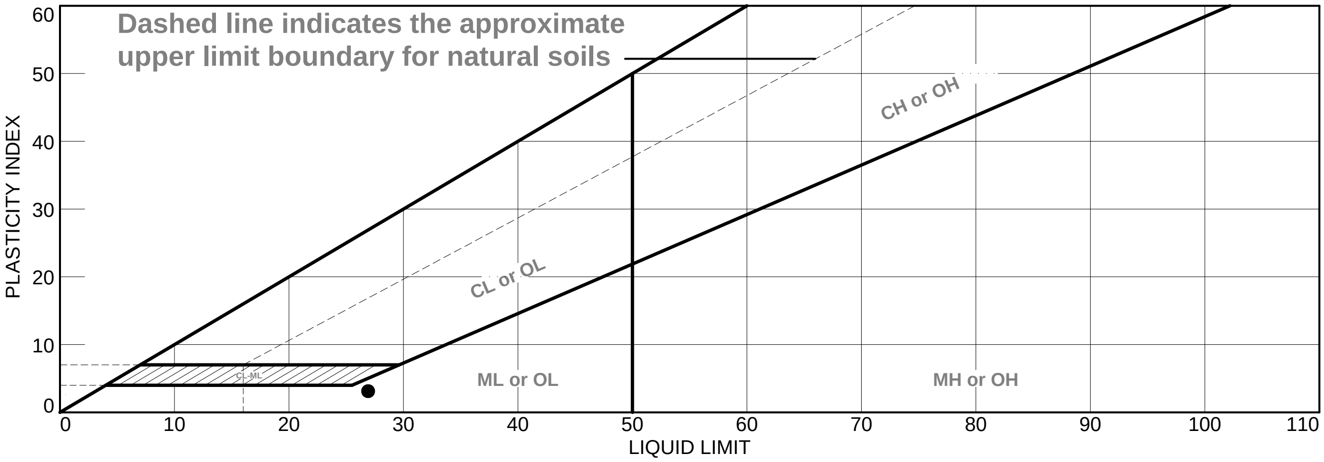
● **Source of Sample:** BH-176 **Depth:** 50 **Sample Number:** 12

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy silt	27	24	3		63.2	ML

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-176 **Depth:** 85 **Sample Number:** 19

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

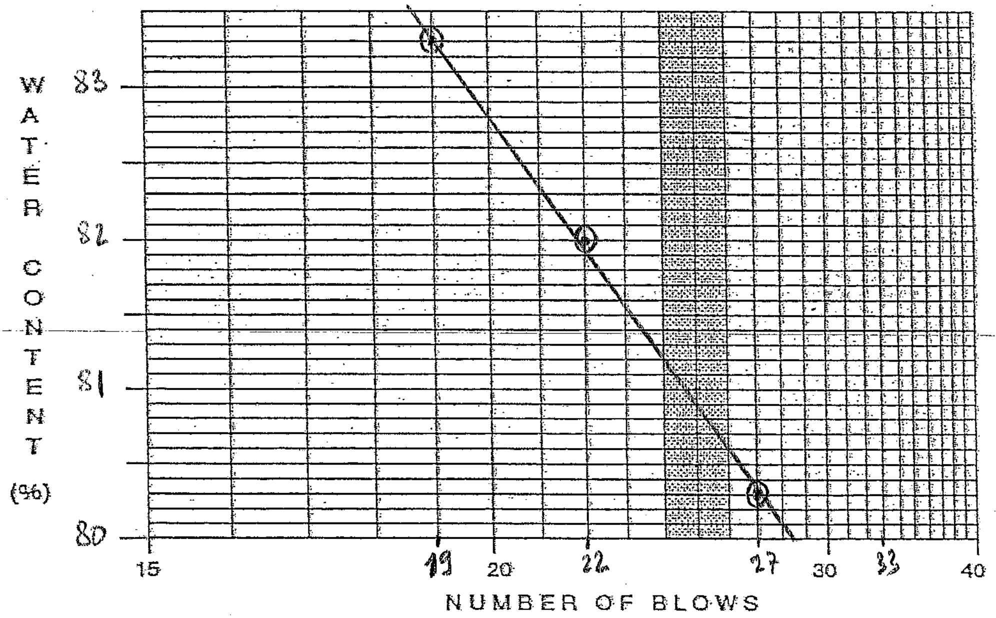
ASTM D4318 or CAL 204

Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-702
Sample #: BH-176 #2 @ 5'	Lab #: G970	Date:	05/22/2020
Sample Description:	FAT CLAY, (CH), VERY DARK GREENISH GRAY	Tested By:	D. NGUYEN

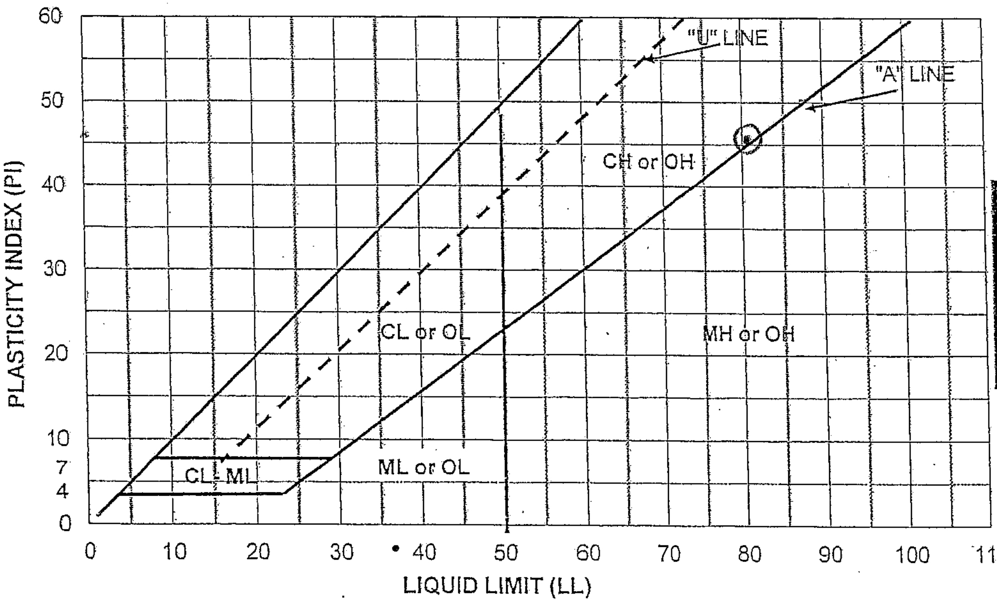
Estimate of % sample retain on #40 Sieve ☐

512

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~33~~	27	22	19				
TARE NO.	~~G5~~	N12	V12	V22	G7	G6		
TARE + WET WT (gms)	~~36.57~~	34.05	33.74	35.46	16.26	16.79		
TARE + DRY WT (gms)	~~25.55~~	23.84	23.55	24.33	14.81	15.33		
TARE WT (gms)	~~11.21~~	11.12	11.12	10.97	10.75	10.96		
WT OF WATER (gms)	~~11.02~~	10.21	10.19	11.13	1.45	1.46		
DRY WT SOIL (gms)	~~14.34~~	12.72	12.43	13.36	4.06	4.37		
WATER CONTENT %	~~76.8~~	80.3	82.0	83.3	35.7	33.4		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	81 %
PL	35 %
PI	46 %
WC	38 %

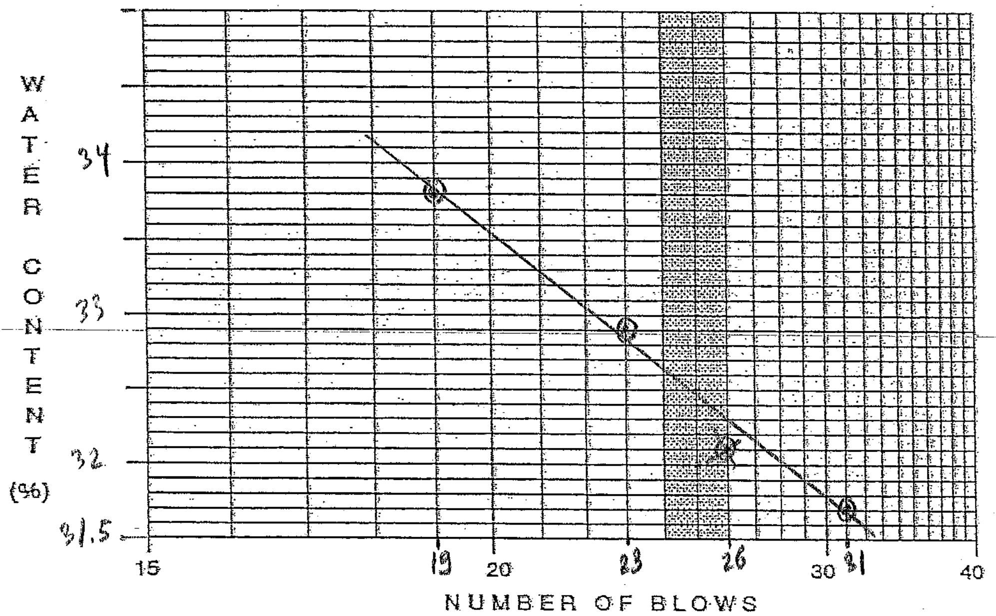
ATTERBERG LIMIT

ASTM D4318 or CAL 204

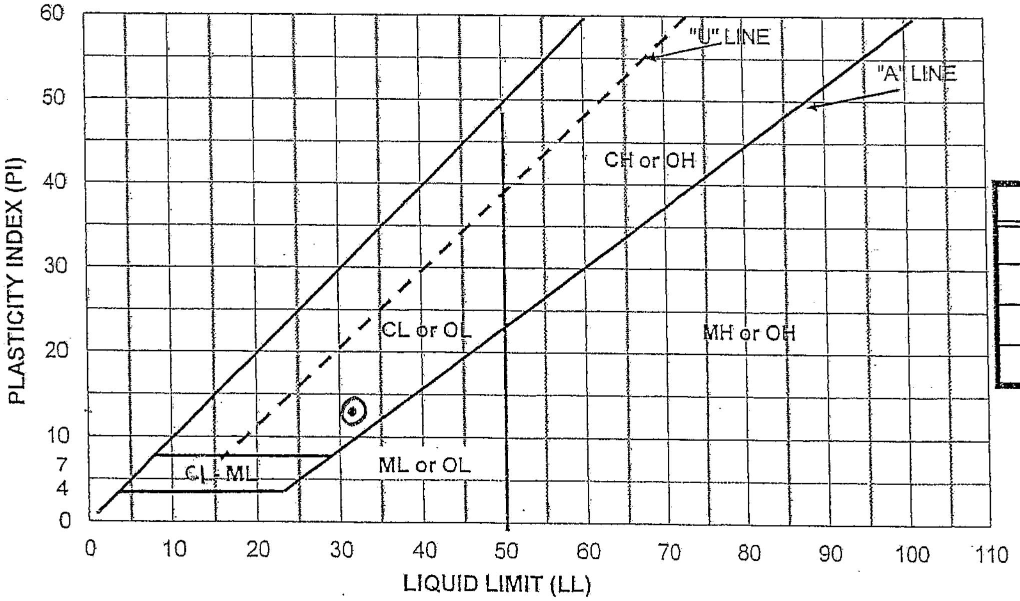
Project Name: BART TO SILICON VALLEY
Project #: 2019-131-TD2
Sample #: BH-176 #24R @ 110.5' Lab #: G970
Date: 05/26/2020
Sample Description: SANDY LEAN CLAY, (CL), GREENISH GRAY
Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 56

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	31	~~26~~	23	19				
TARE NO.	G1	~~A8~~	N10	V6	V3	V5		
TARE + WET WT (gms)	39.60	~~36.84~~	39.94	38.89	17.33	18.98		
TARE + DRY WT (gms)	32.75	~~30.55~~	32.81	31.85	16.31	17.68		
TARE WT (gms)	11.14	~~10.96~~	11.14	11.01	11.04	11.00		
WT OF WATER (gms)	6.85	~~6.29~~	7.13	7.04	1.02	1.3		
DRY WT SOIL (gms)	21.61	~~19.59~~	21.67	20.84	5.27	6.68		
WATER CONTENT %	31.7	~~32.1~~	32.9	33.8	19.4%	19.5%		

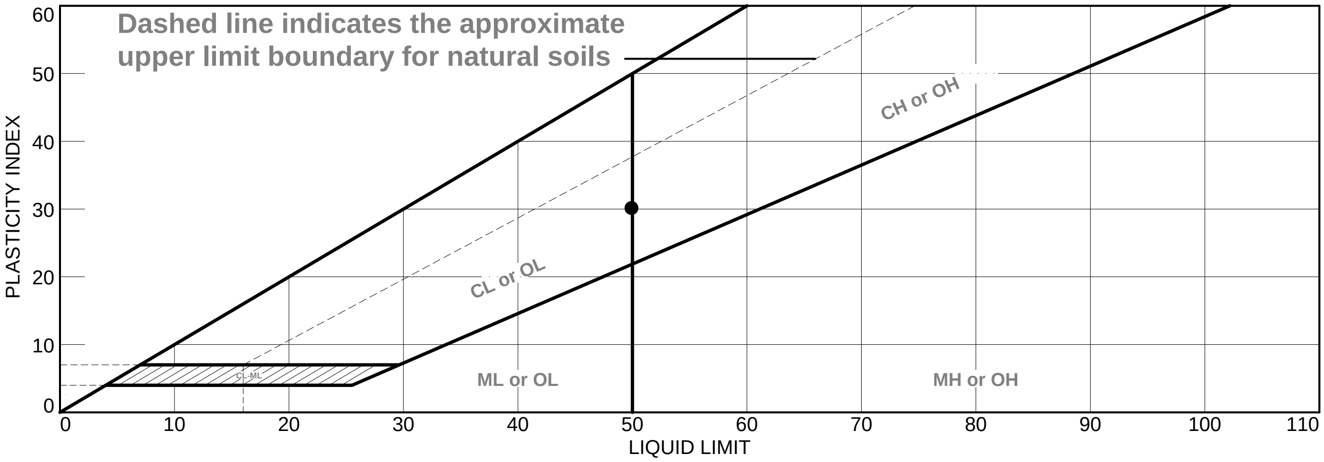


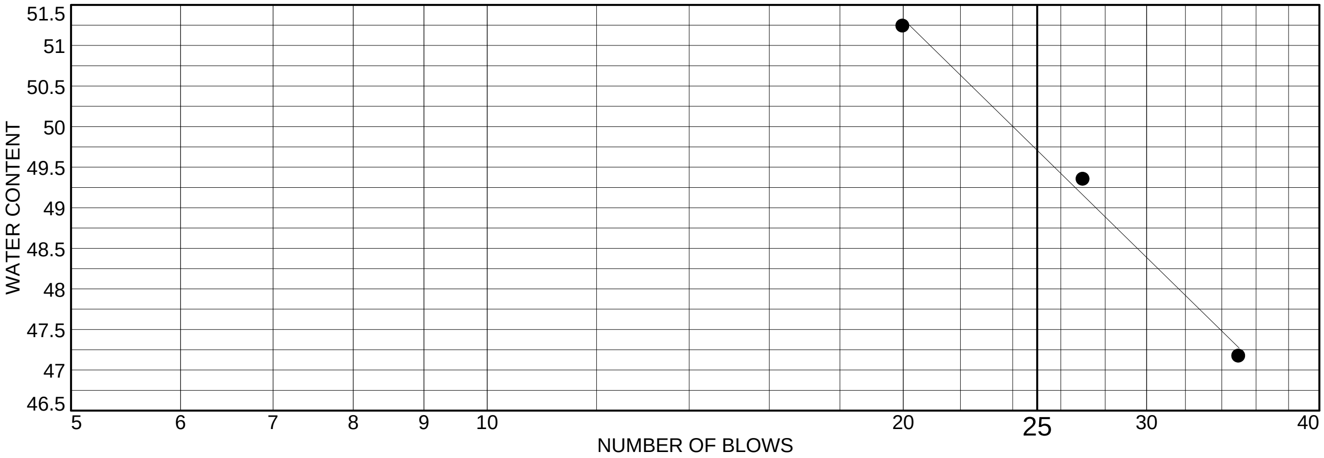
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	32 %
PL	19 %
PI	13 %
WC	

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	50	20	30			CL-CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

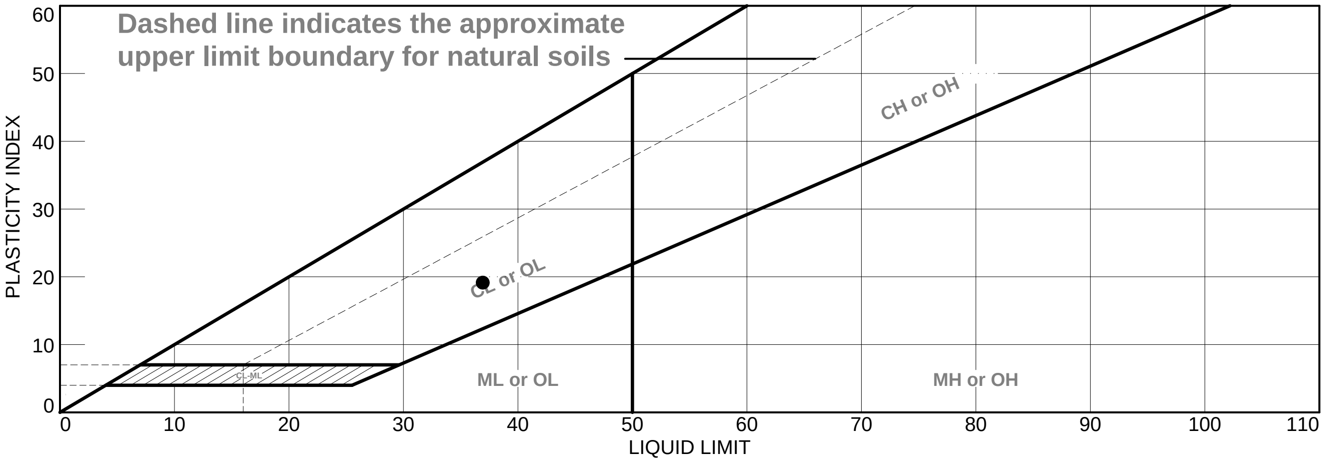
●**Source of Sample:** BH-177 **Depth:** 20 **Sample Number:** 6

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	37	18	19			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

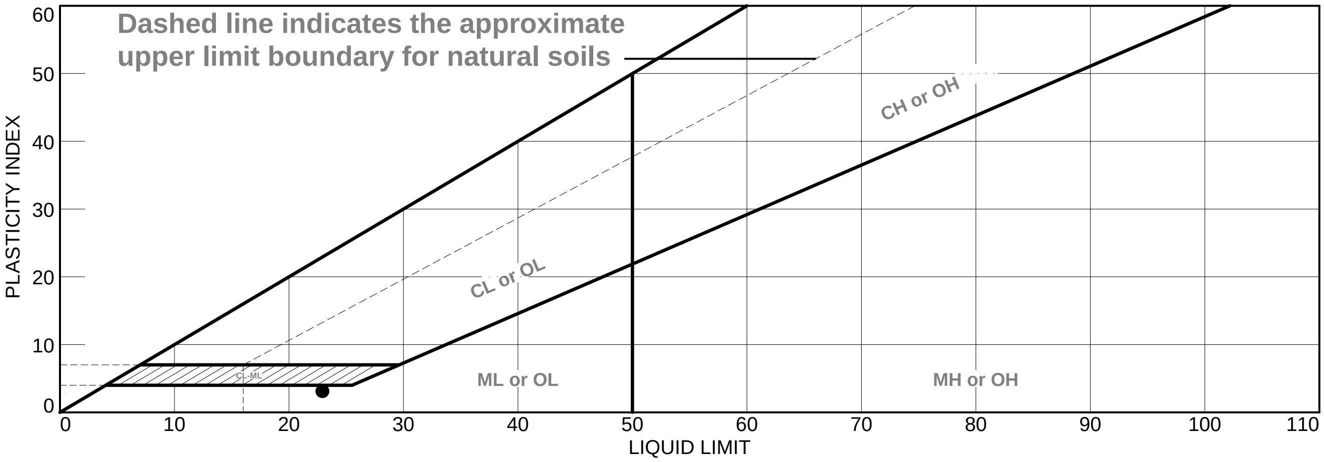
● **Source of Sample:** BH-177 **Depth:** 55 **Sample Number:** 13

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown silty sand	23	20	3		38.7	SM

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-177 **Depth:** 65 **Sample Number:** 15

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY

Project #: 2019-131-704

Sample #: BH-177 #3 @ 5.0'

Lab #: G990

Date: 05/26/2020

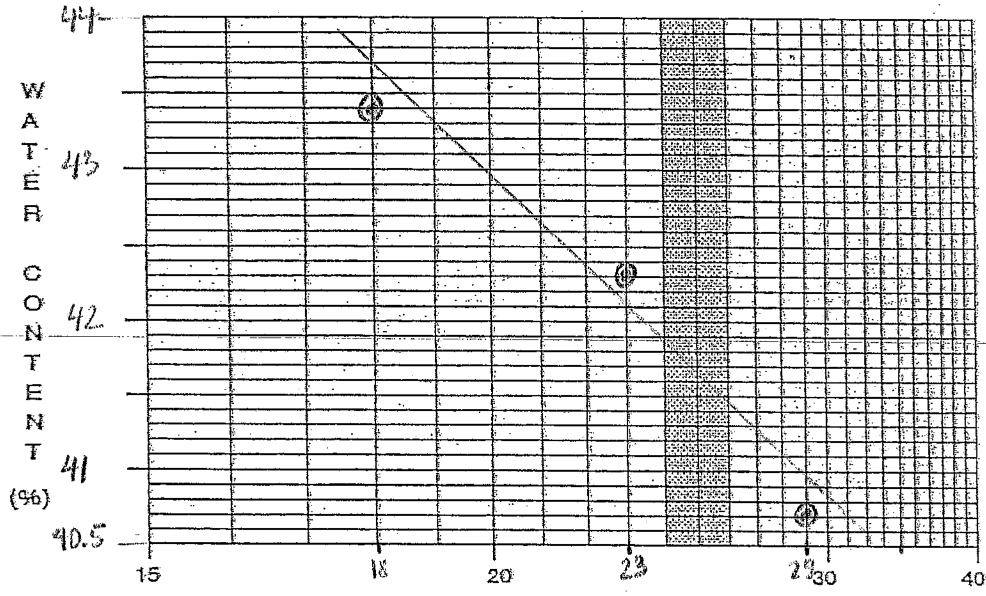
Sample Description: SANDY LEAN CLAY, (CL), BLACK,

Tested By: D. NGUYEN

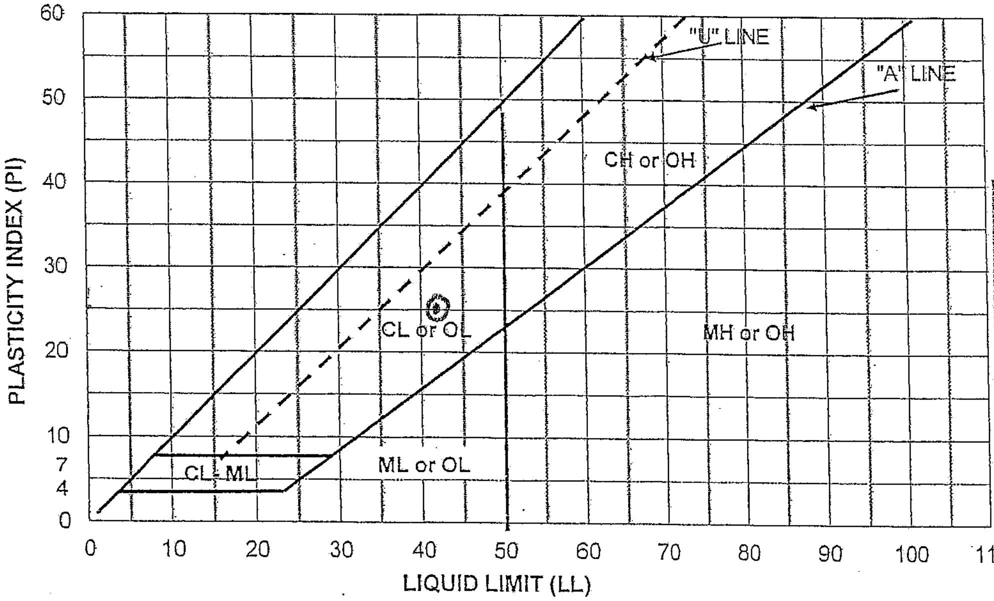
Estimate of % sample retain on #40 Sieve ☐

59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	34	29	23	18	▨	▨	▨	▨
TARE NO.	N1	G11	V17	N3	G12	N7		
TARE + WET WT (gms)	38.11	37.50	36.68	36.07	17.53	17.95		
TARE + DRY WT (gms)	30.40	29.87	29.07	28.52	16.54	16.93		
TARE WT (gms)	11.06	11.13	11.07	11.11	10.62	10.93		
WT OF WATER (gms)	7.71	7.63	7.61	7.55	0.99	1.02		
DRY WT SOIL (gms)	19.34	18.74	18	17.41	5.92	6.0		
WATER CONTENT %	39.9	40.7	42.3	43.4	16.7	17.0		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	42 %
PL	17 %
PI	25 %
WC	20 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT
ASTM D4318 or CAL 204

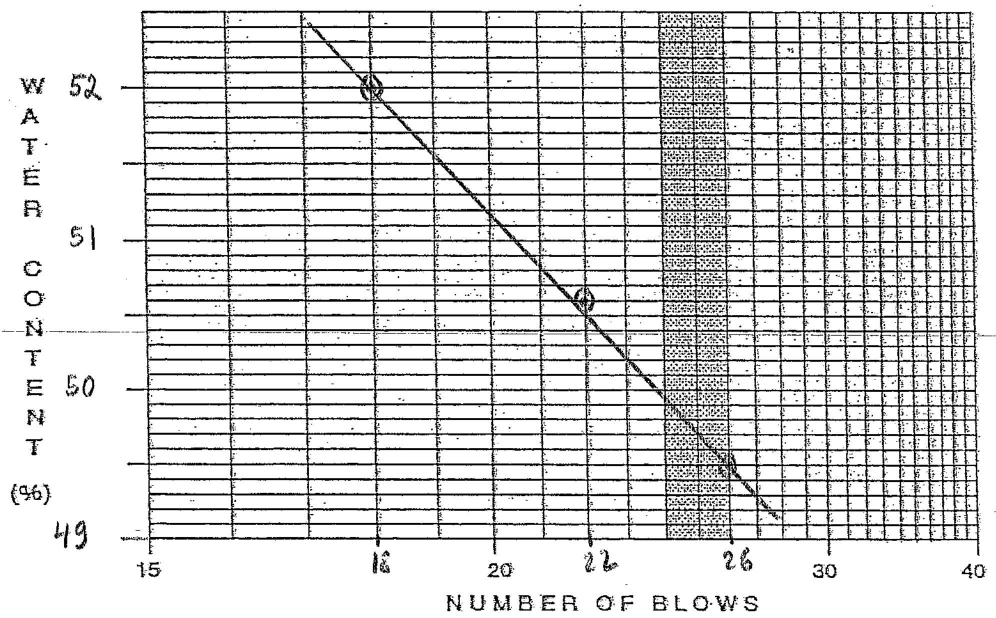
Project Name: BART TO SILICON VALLEY Project #: 2019-131-704

Sample #: BH-177 #4A @ 10.5' Lab #: 6970 Date: 05/26/2020

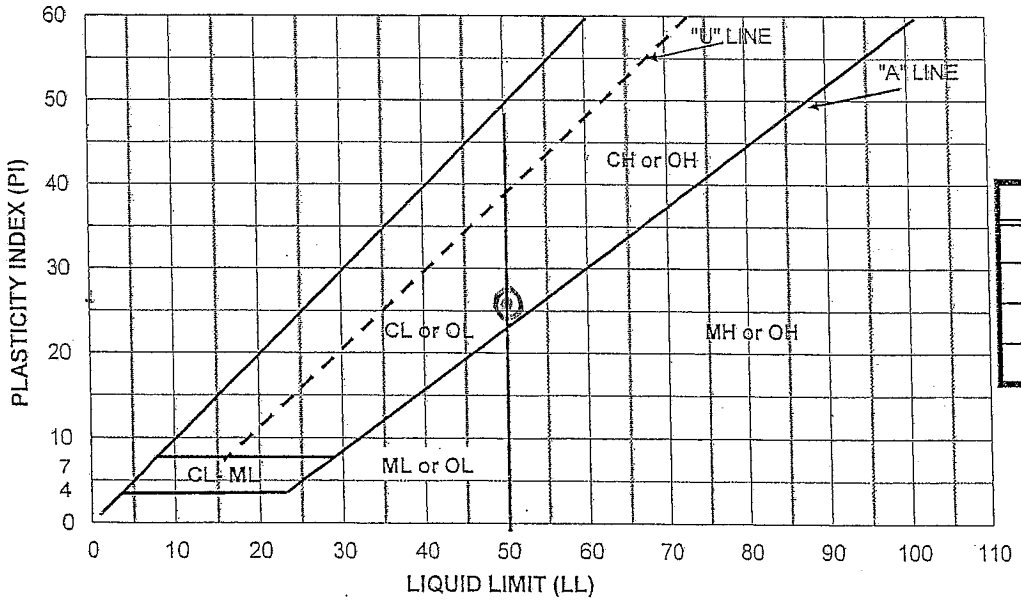
Sample Description: FAT CLAY, (CH), GRAYISH BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 56

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	33	26	22	18				
TARE NO.	V11	V4	V1	V10	V23	G7		
TARE + WET WT (gms)	37.55	39.79	37.62	38.51	17.18	17.37		
TARE + DRY WT (gms)	28.77	30.29	28.66	29.09	15.99	16.06		
TARE WT (gms)	10.80	11.08	10.95	10.96	10.96	10.75		
WT OF WATER (gms)	8.78	9.5	8.96	9.42	1.19	1.31		
DRY WT SOIL (gms)	17.97	19.21	17.71	18.13	5.03	5.31		
WATER CONTENT %	48.9	49.5	50.6	52.0	23.7	24.7		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	50 %
PL	24 %
PI	26 %
WC	

ATTERBERG LIMIT

ASTM D4318 or CAL 204

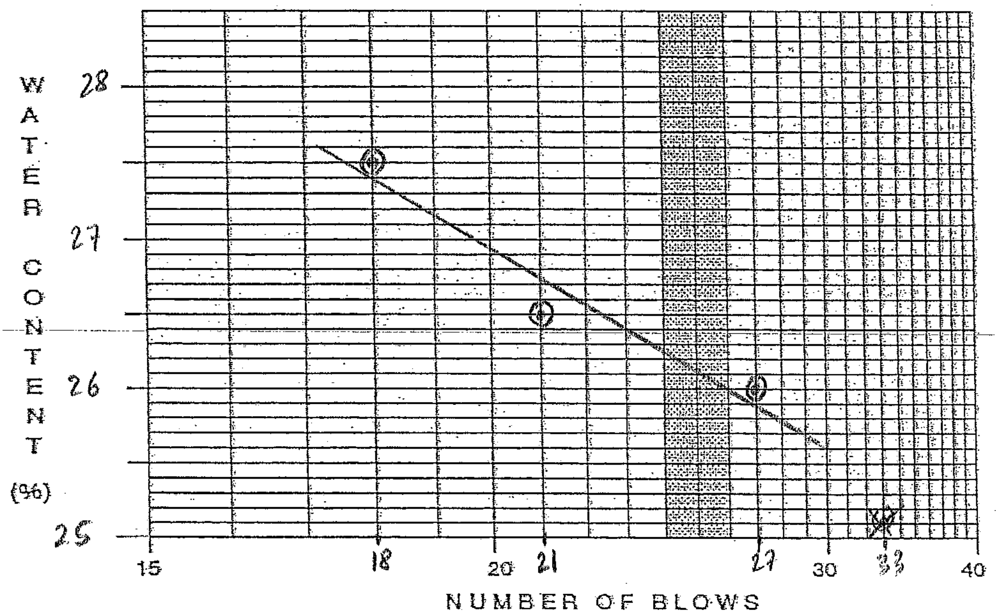
Project Name: BART TO SILICON VALLEY Project #: 2019-131-704

Sample #: BH-177 #9A @35.5' Lab #: G970 Date: 05/22/2020

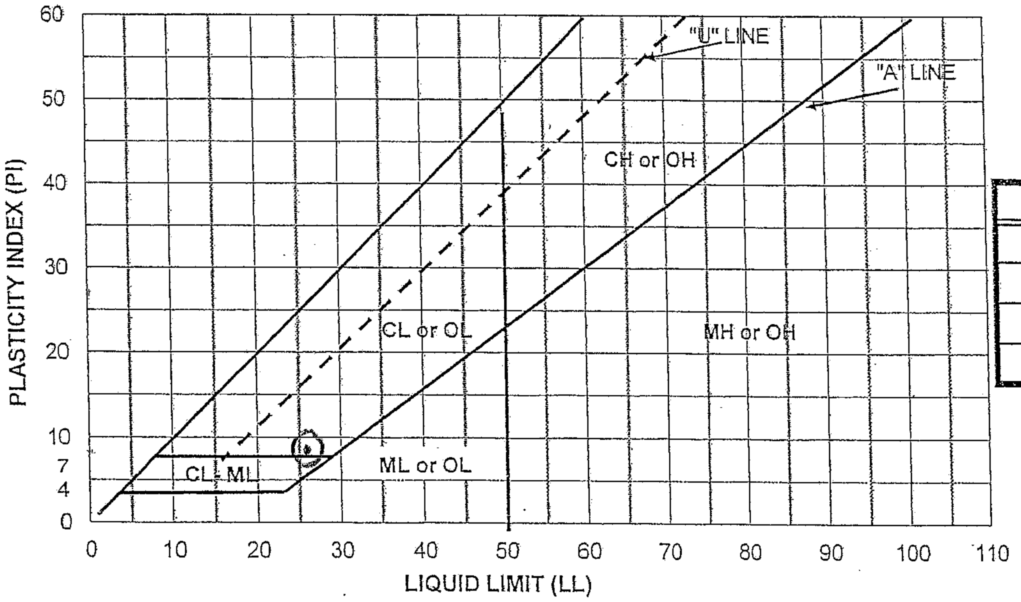
Sample Description: SANDY LEAN CLAY, LIGHT OLIVE BROWN Tested By: D.NGUYEN

Estimate of % sample retain on #40 Sieve ☐ S12

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	~~33~~	27	21	18	▨	▨	▨	▨
TARE NO.	~~V22~~	V12	G5	N12	G6	G7		
TARE + WET WT (gms)	~~38.10~~	37.70	37.14	40.05	16.51	17.57		
TARE + DRY WT (gms)	~~32.65~~	32.22	31.71	33.82	15.69	16.52		
TARE WT (gms)	~~10.98~~	11.12	11.21	11.13	10.96	10.76		
WT OF WATER (gms)	~~5.45~~	5.48	5.43	6.23	0.82	1.05		
DRY WT SOIL (gms)	~~21.67~~	21.1	20.5	22.69	4.73	5.76		
WATER CONTENT %	~~25.1~~	26.0	26.5	27.5	17.3	18.2		

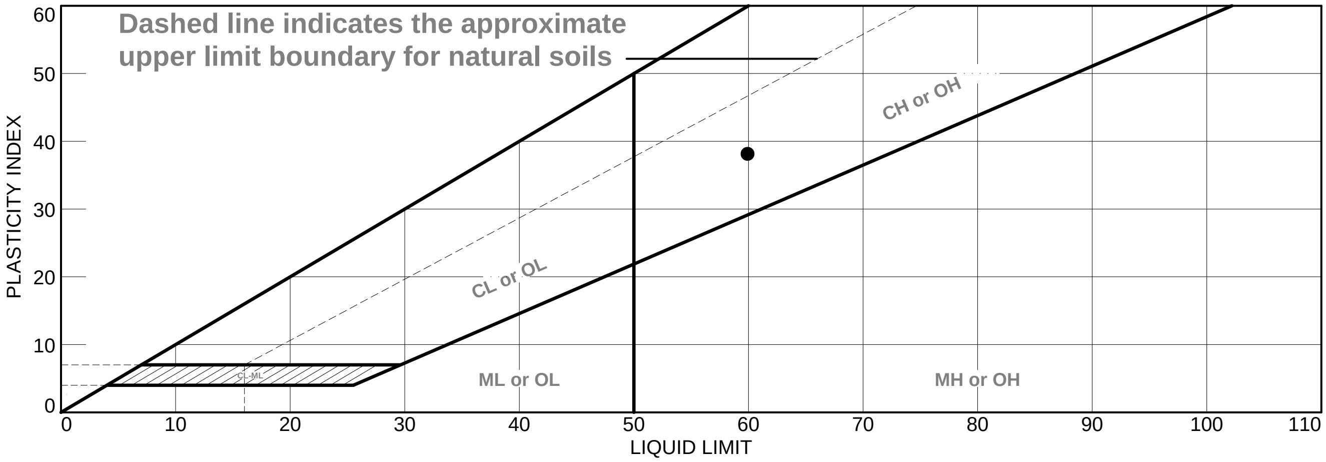


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	26 %
PL	18 %
PI	8 %
WC	20 %

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	60	22	38			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

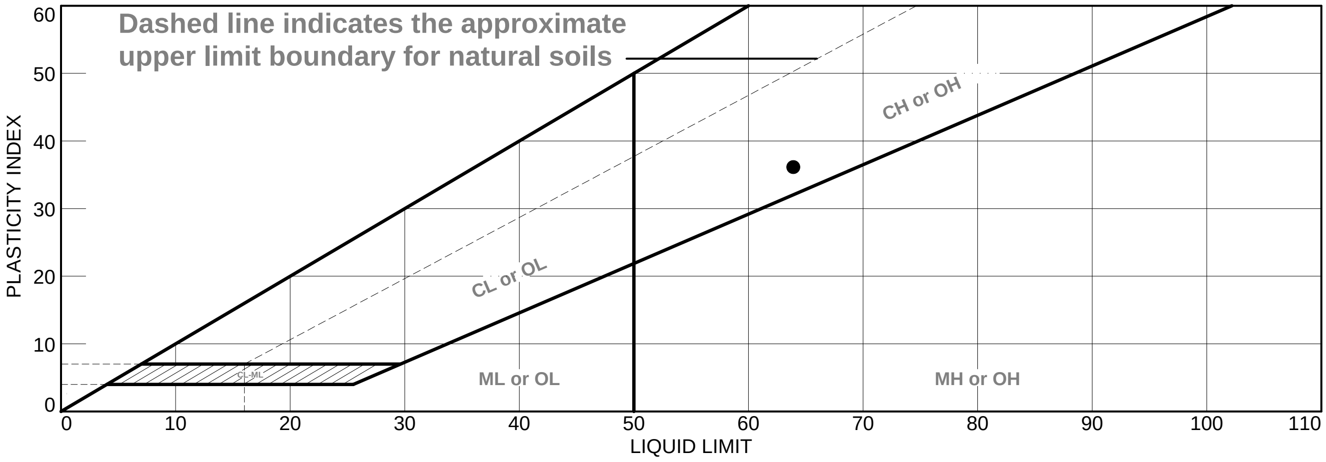
● **Source of Sample:** BH-178 **Depth:** 15 **Sample Number:** 4

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark gray clay	64	28	36			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

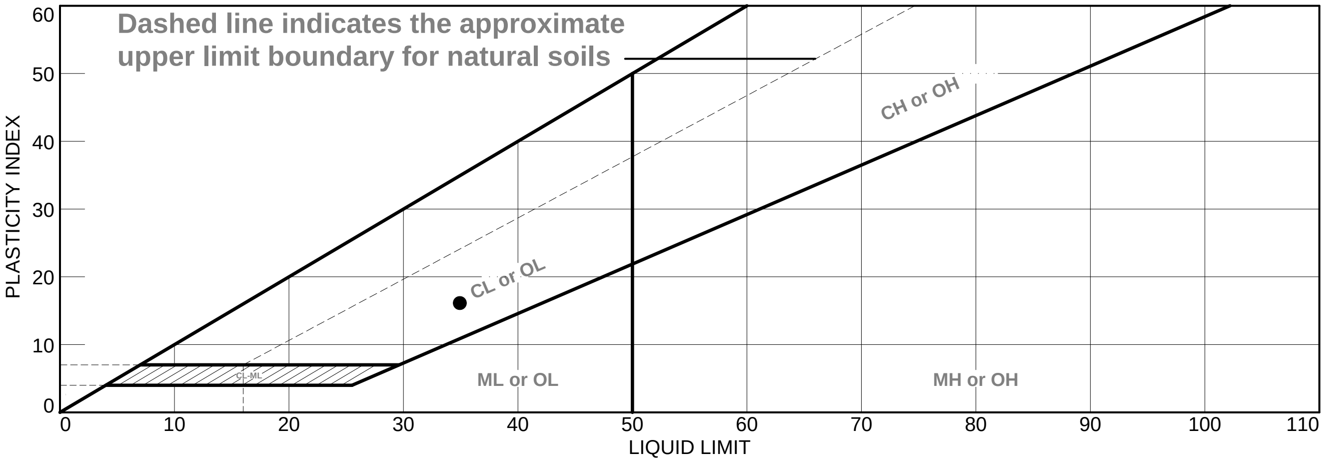
● **Source of Sample:** BH-178 **Depth:** 20 **Sample Number:** 5

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Gray clay	35	19	16			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

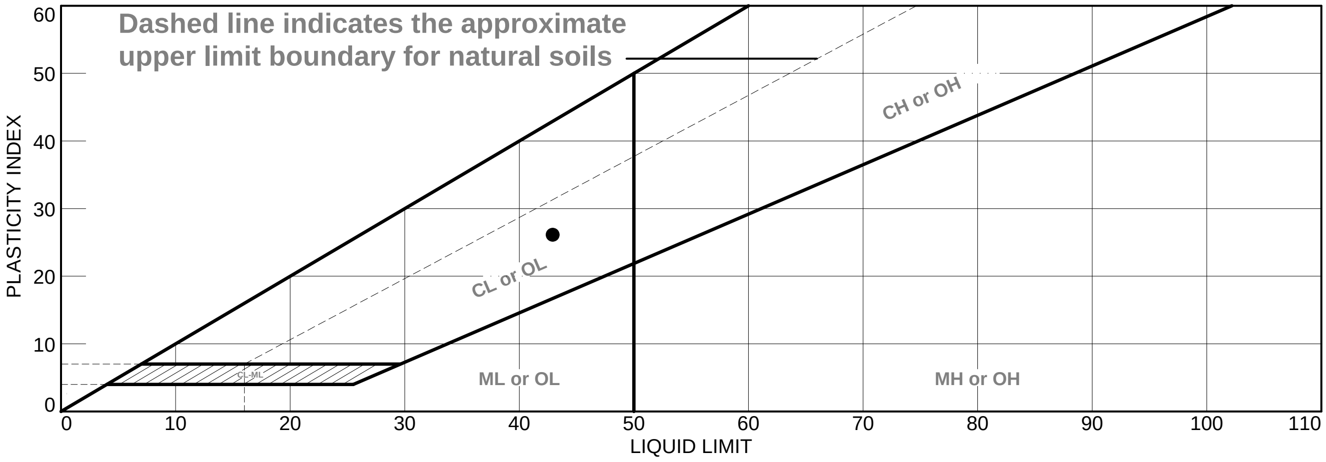
●**Source of Sample:** BH-178 **Depth:** 40 **Sample Number:** 9

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with sand	43	17	26		81.5	CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-178 **Depth:** 60 **Sample Number:** 13

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

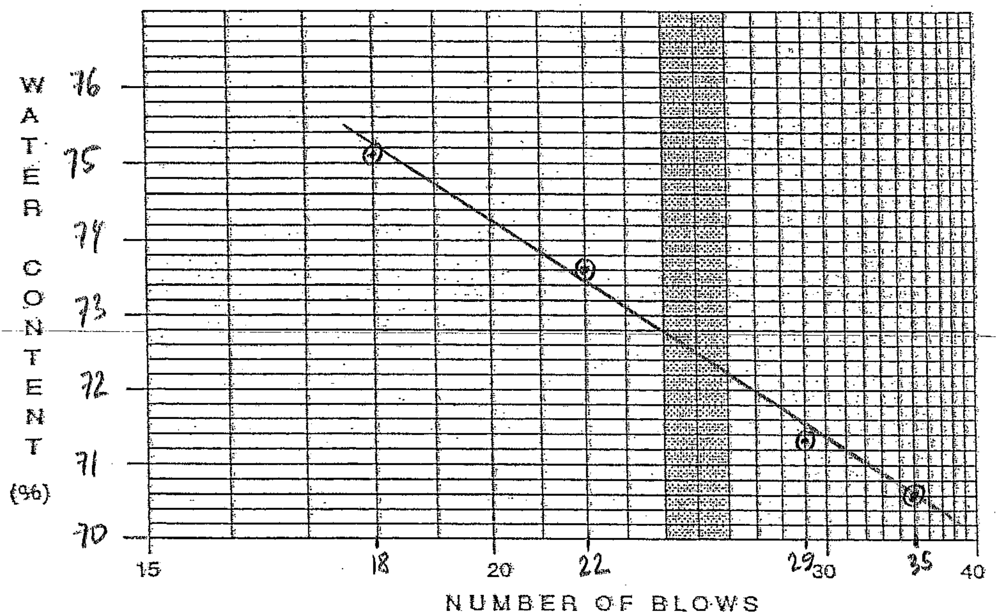
Project Name: BART TO SILICON VALLEY Project #: 2019-131-704

Sample #: BH-178 #2B @ 5' Lab #: G970 Date: 05/25/2020

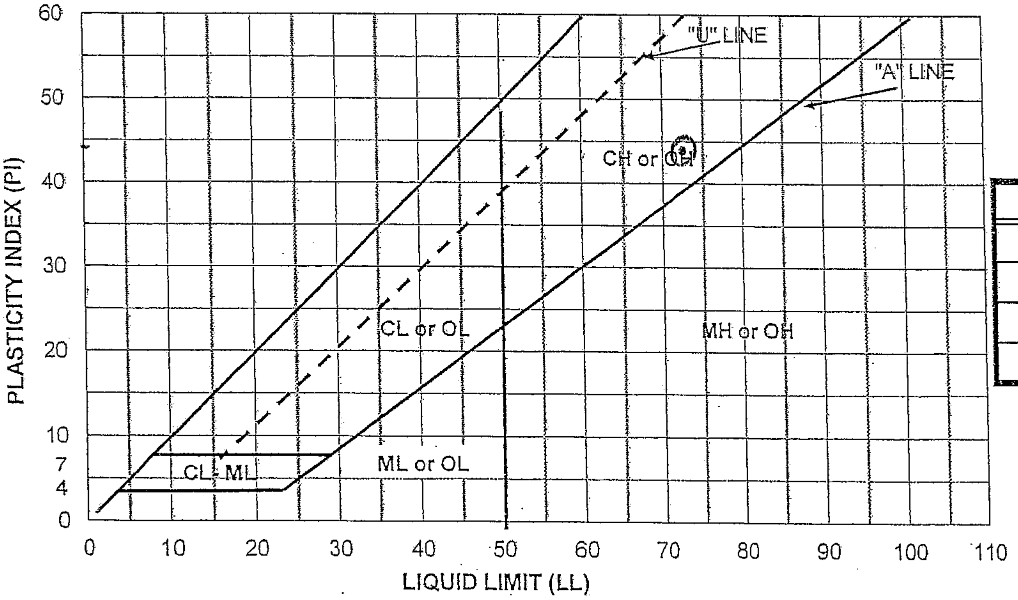
Sample Description: FAT CLAY, (CH) VERY DARK BROWN Tested By: D. NGUYEN

Estimate of % sample retain on #40 Sieve ☐ 59

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS	35	29	22	18	▨	▨	▨	▨
TARE NO.	N1	V17	G11	N7	N3	G12		
TARE + WET WT (gms)	37.13	35.75	35.46	34.29	17.20	16.36		
TARE + DRY WT (gms)	26.34	25.47	25.14	24.27	15.83	15.06		
TARE WT (gms)	11.06	11.05	11.12	10.93	11.11	10.62		
WT OF WATER (gms)	10.79	10.28	10.32	10.02	1.37	1.3		
DRY WT SOIL (gms)	15.28	14.42	14.02	13.34	4.72	4.44		
WATER CONTENT %	70.6	71.3	73.6	75.1	29.0	29.3		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022

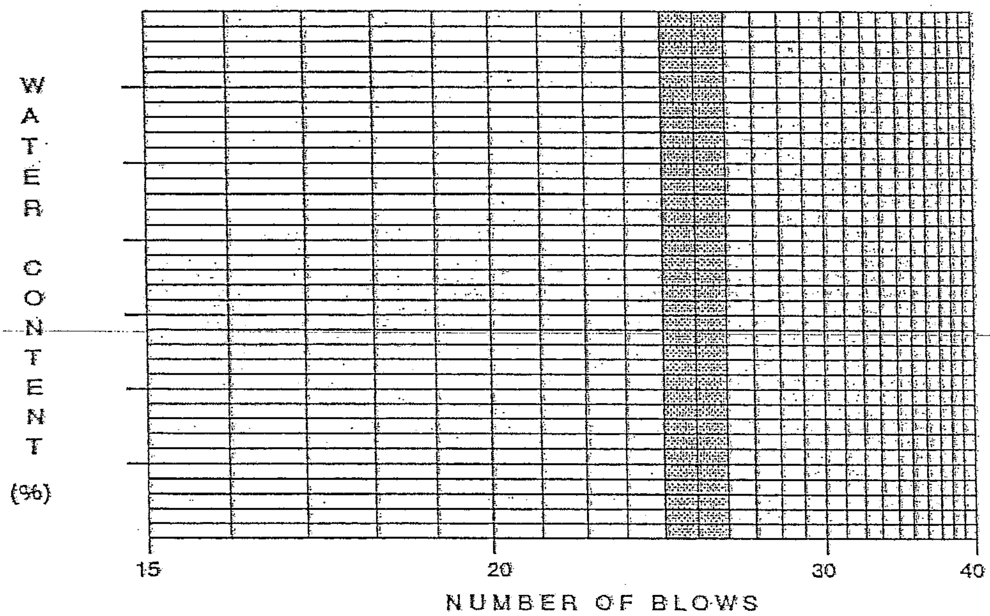


SUMMARY:	
LL	73 %
PL	29 %
PI	44 %
WC	33 %

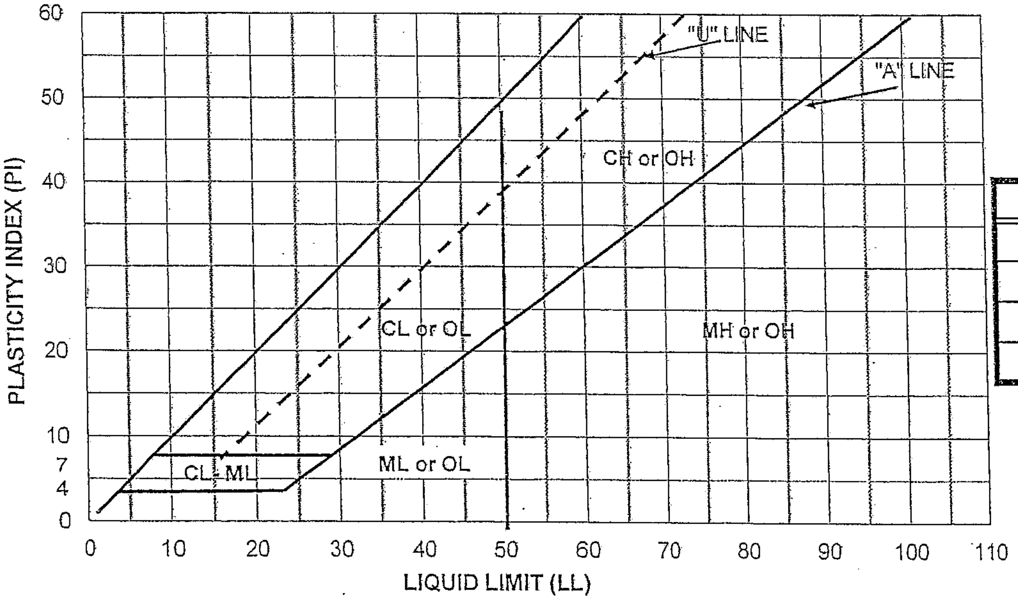
ATTERBERG LIMIT
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY Project #: 2019-131-704
Sample #: BH-178 # 6A @ 25.5' Lab #: G970 Date: 05/25/2020
Sample Description: SILTY SAND, (SM), (NON-PLASTIC) Tested By: D. NGUYEN
Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			WC
NUMBER OF BLOWS					▨	▨	▨	▨
TARE NO.								
TARE + WET WT (gms)								
TARE + DRY WT (gms)		NON - PLASTIC						
TARE WT (gms)								
WT OF WATER (gms)								
DRY WT SOIL (gms)								
WATER CONTENT %								

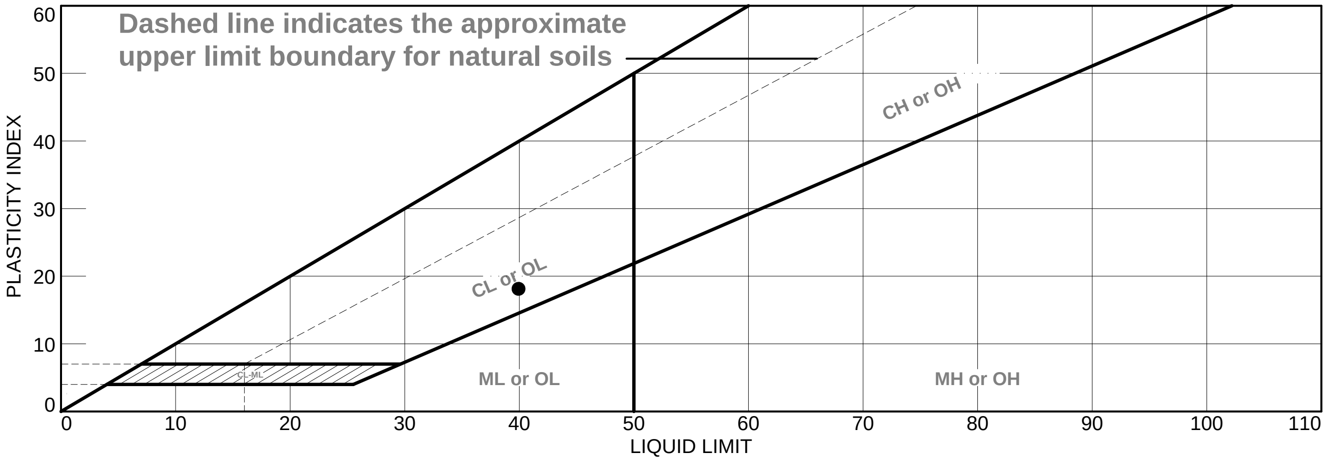


N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	
PL	
PI	
WC	23%

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	40	22	18			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII 507385606

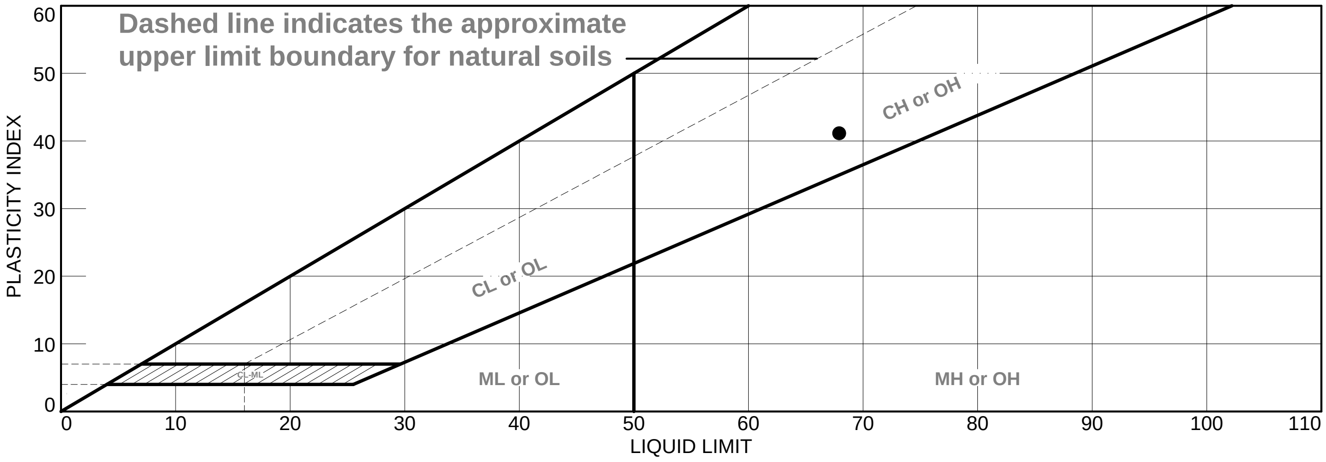
● **Source of Sample:** BH-179 **Depth:** 20 **Sample Number:** 5

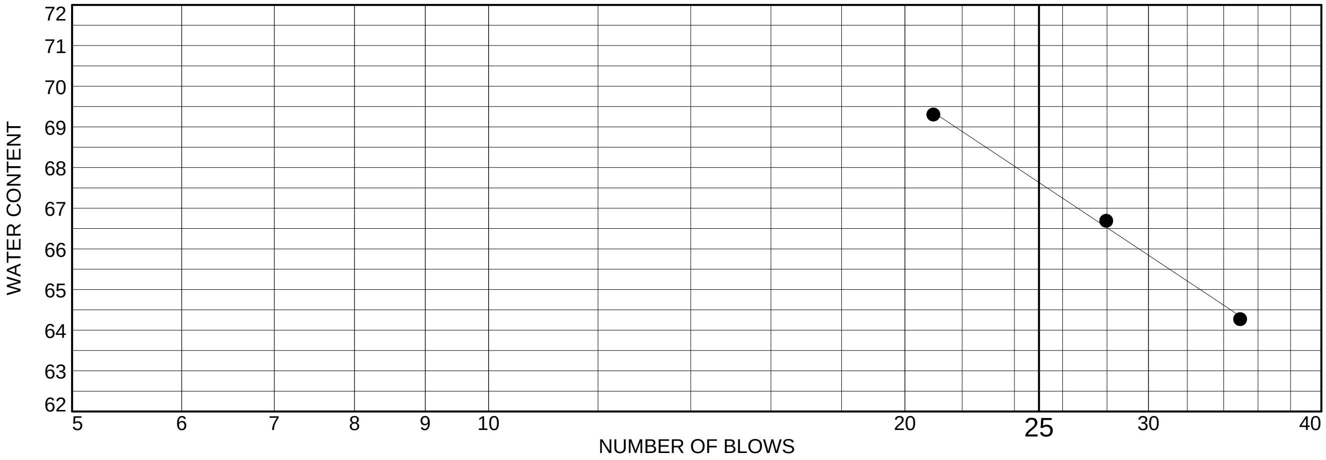
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	68	27	41			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII 507385606

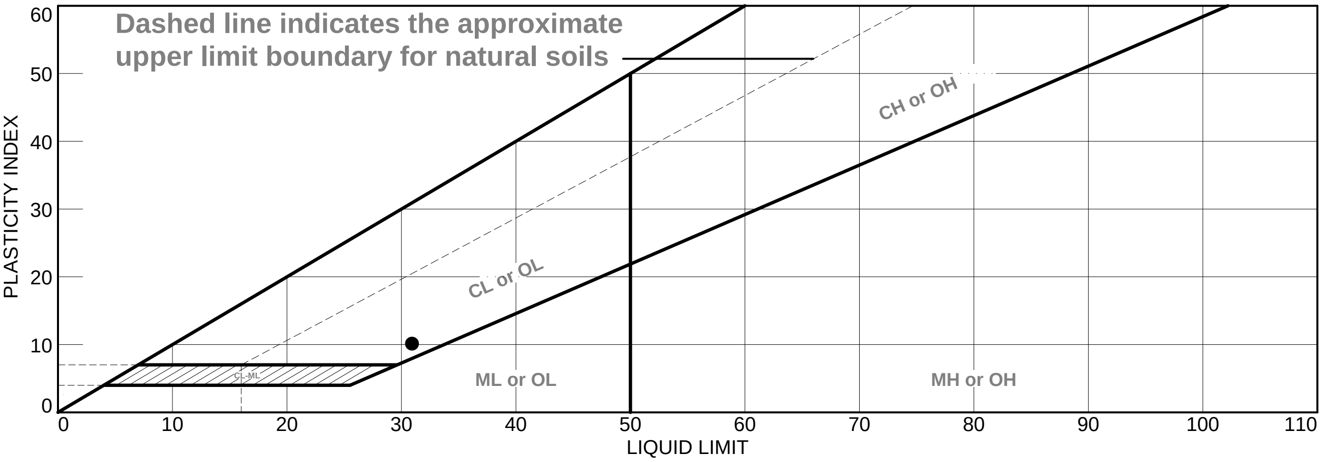
● **Source of Sample:** BH-179 **Depth:** 45 **Sample Number:** 10

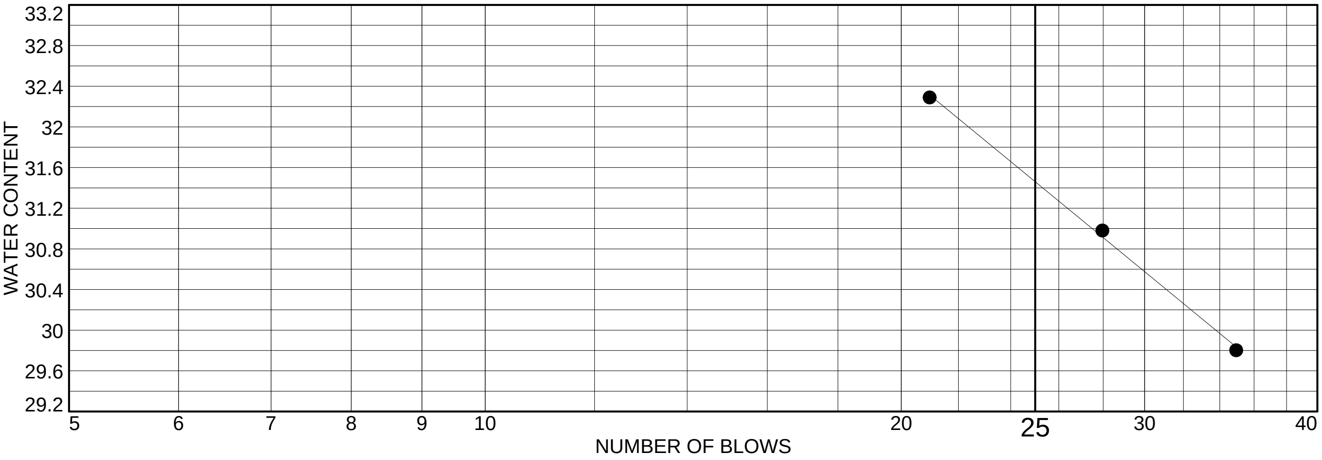
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	31	21	10			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII 507385606

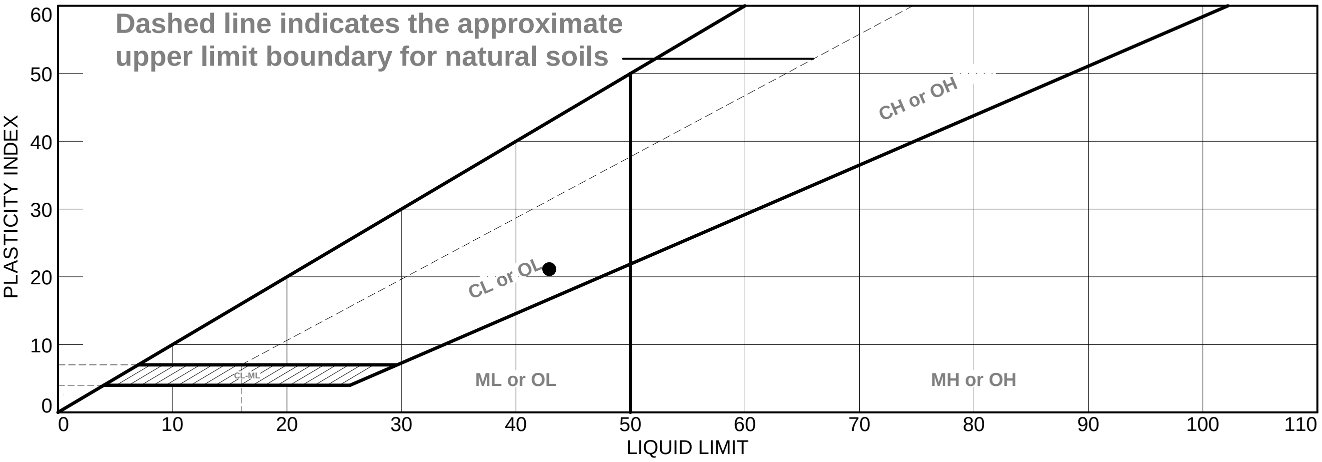
●**Source of Sample:** BH-179 **Depth:** 75 **Sample Number:** 16

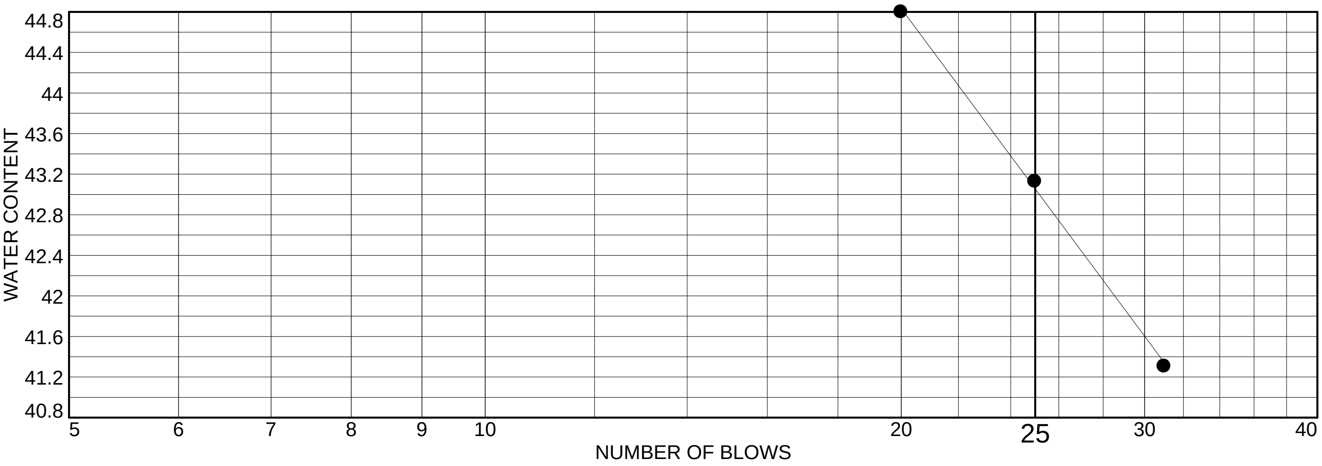
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay with organics	43	22	21			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII 507385606

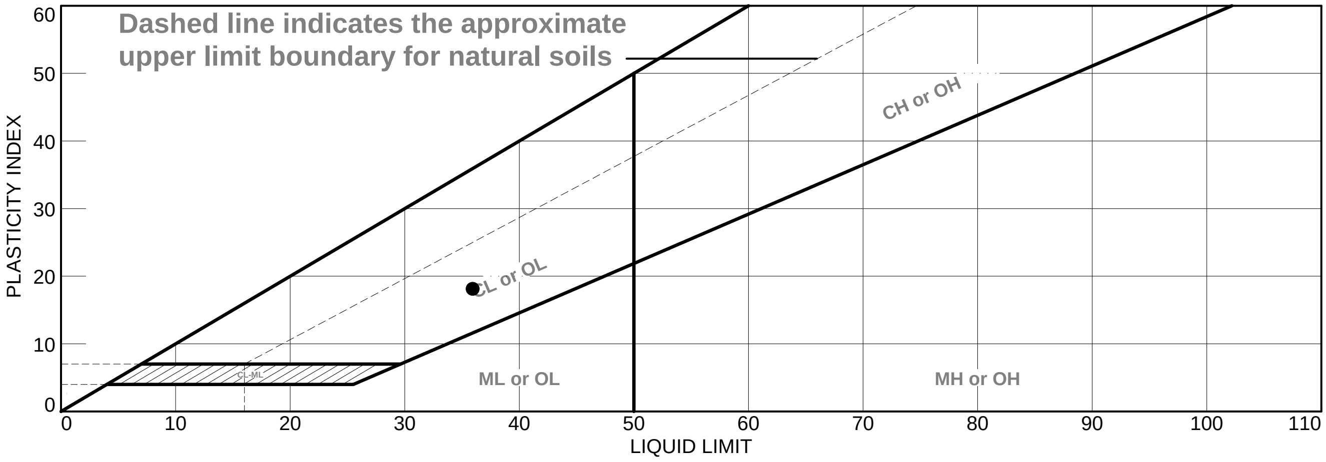
●**Source of Sample:** BH-179 **Depth:** 100 **Sample Number:** 21

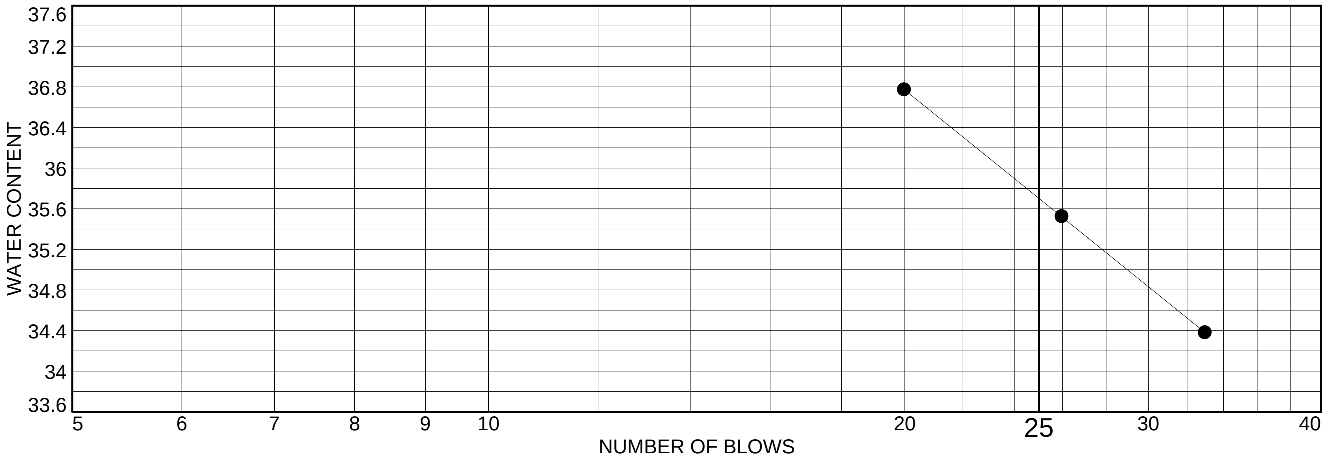
Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	36	18	18			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII 507385606

●**Source of Sample:** BH-179 **Depth:** 135 **Sample Number:** 28

Remarks:

Figure

Tested By: JH **Checked By:** JH

ATTERBERG LIMIT

ASTM D4318 or CAL 204

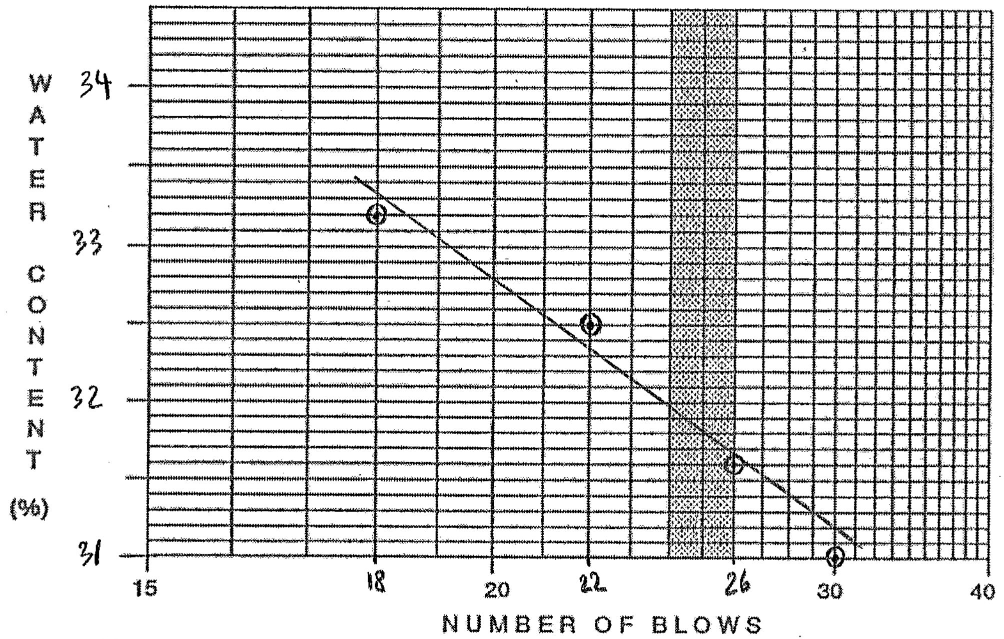
Project Name: BART TO SILICON VALLEY   Project #: 2019-131-TD5

Sample #: BH-179 #2A @ 6'   Lab #: G986   Date: 11/16/2020

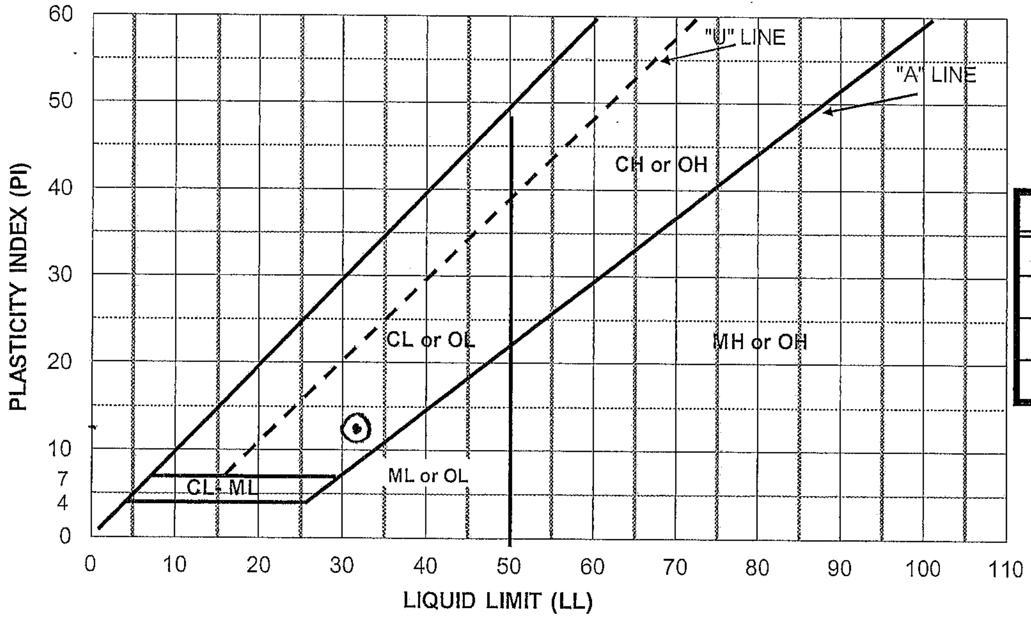
Sample Description: LEAN CLAY, (CL), DARK YELLOWISH BROWN   Tested By: DO NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS	30	26	22	18				
TARE NO.	N3	G1	V4	V18	V133	N12		
TARE + WET WT (gms)	39.05	37.14	37.16	37.86	18.76	18.00		
TARE + DRY WT (gms)	32.44	30.90	30.76	31.18	17.52	16.89		
TARE WT (gms)	11.10	11.15	11.08	11.04	11.02	11.13		
WT OF WATER (gms)	6.61	6.24	6.40	6.68	1.24	1.11		
DRY WT SOIL (gms)	21.34	19.75	19.68	20.14	6.5	5.76		
WATER CONTENT %	31.0	31.6	32.5	33.2	19.1	19.3		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	32 %
PL	19 %
PI	13 %
WC	

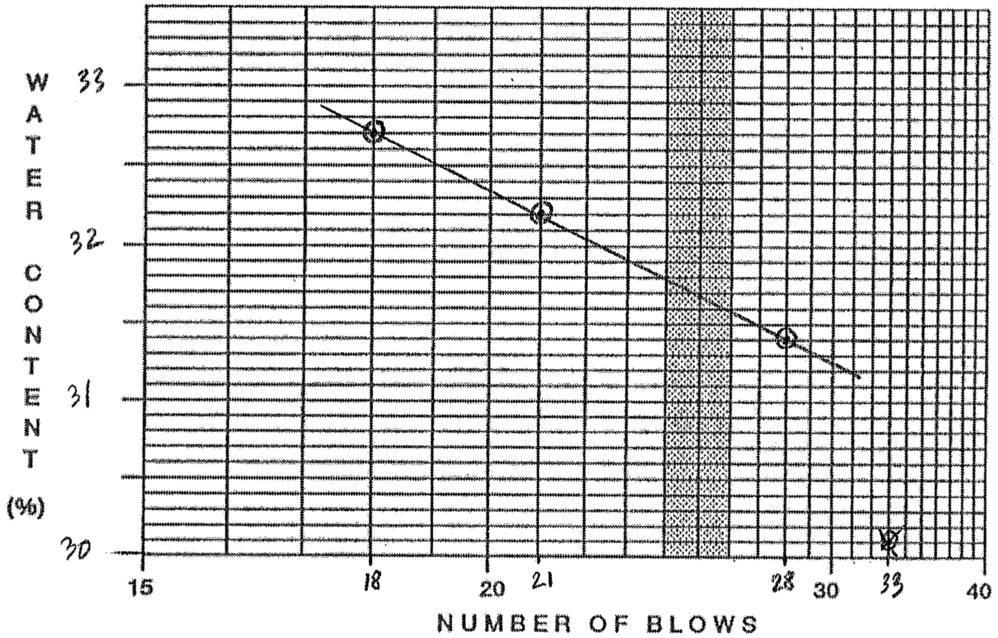
ATTERBERG LIMIT

ASTM D4318 or CAL 204

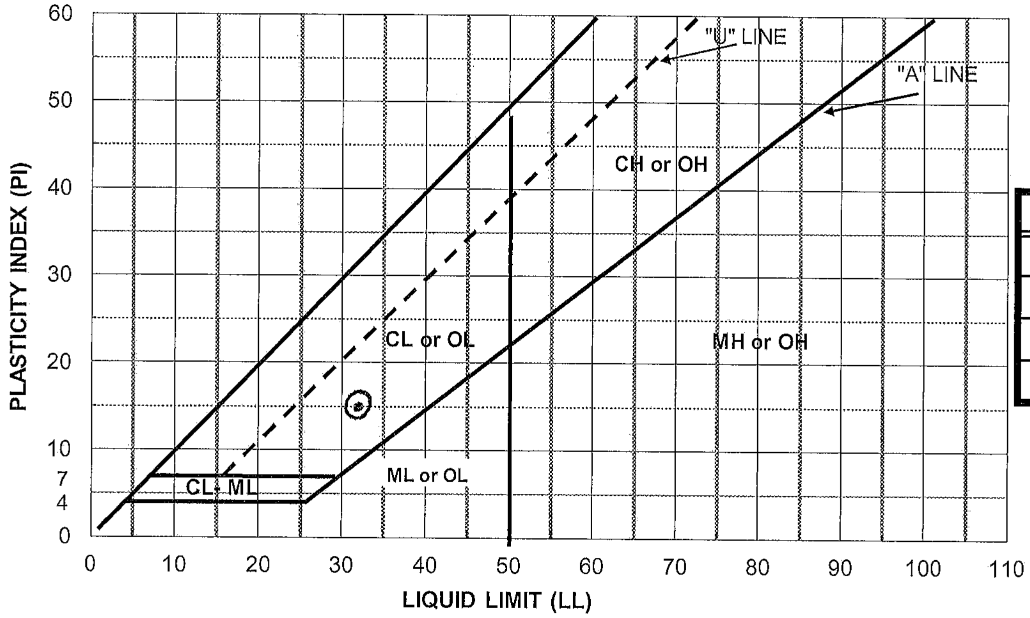
Project Name: BART TO SILICON VALLEY		Project #: 2019-131-T05	
Sample #: BH-179 #18A @86.3'	Lab #: G986	Date: 11/12/2020	
Sample Description: LEAN CLAY, (CL), GRAY		Tested By: DO NGUYEN	

Estimate of % sample retain on #40 Sieve ☐ S11

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS	~~33~~	28	21	18	▨	▨	▨	▨
TARE NO.	~~V18~~	N3	N12	G1	V133	V4		
TARE + WET WT (gms)	~~35.46~~	35.93	37.18	37.09	17.76	17.43		
TARE + DRY WT (gms)	~~29.81~~	30.00	30.84	30.70	16.77	16.49		
TARE WT (gms)	~~11.04~~	11.10	11.13	11.14	11.02	11.09		
WT OF WATER (gms)	~~5.65~~	5.93	6.34	6.39	0.99	0.94		
DRY WT SOIL (gms)	~~18.77~~	18.9	19.71	19.56	5.75	5.4		
WATER CONTENT %	~~30.1~~	31.4	32.2	32.7	17.2	17.4		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	32 %
PL	17 %
PI	15 %
WC	

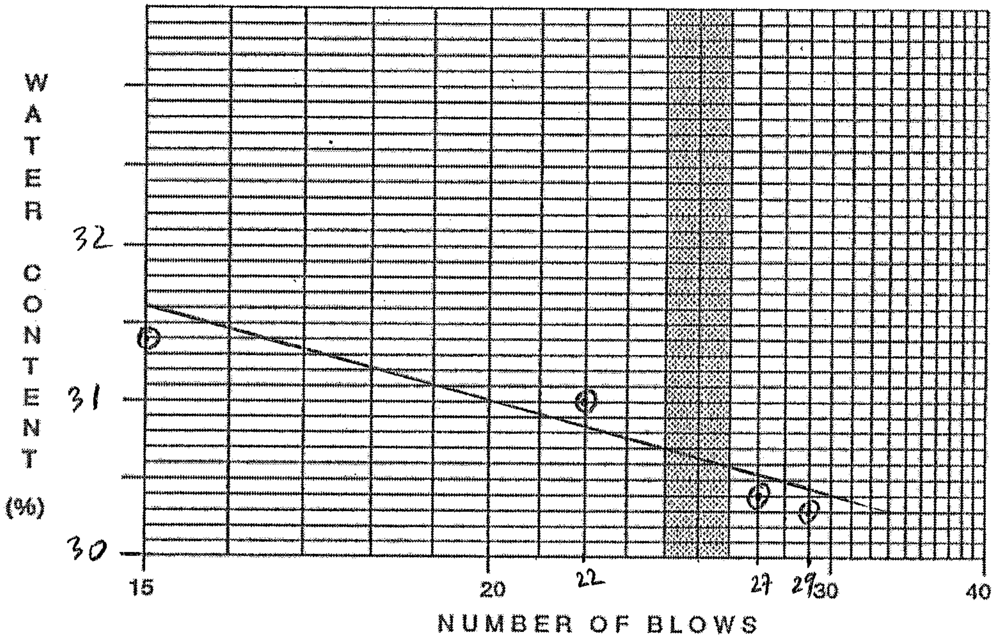
ATTERBERG LIMIT

ASTM D4318 or CAL 204

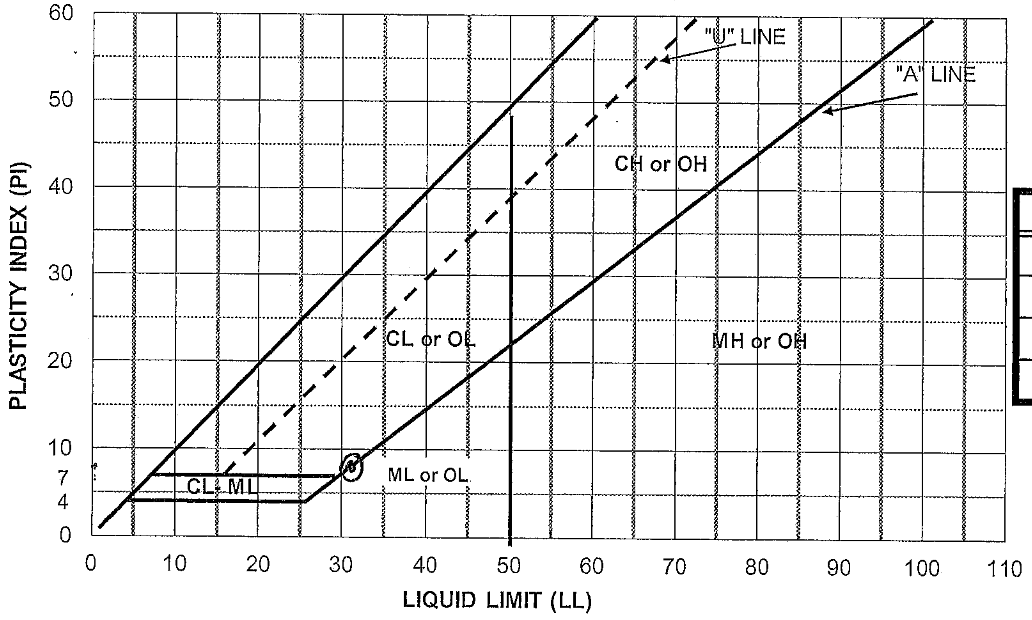
Project Name:	BART TO SILICON VALLEY	Project #:	2019 - 131-705
Sample #:	BH-179 #19A @ 90.5' Lab #: G986	Date:	11/13/2020
Sample Description:	LEAN CLAY, (CL), DARK YELLOWISH BROWN	Tested By:	DO NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS	29	27	22	15	▨	▨	▨	▨
TARE NO.	N3	V18	G1	V133	V4	N12		
TARE + WET WT (gms)	30.78	35.13	33.09	35.36	18.13	19.52		
TARE + DRY WT (gms)	26.20	29.51	27.90	29.55	16.81	17.91		
TARE WT (gms)	11.10	11.04	11.14	11.02	11.08	11.13		
WT OF WATER (gms)	4.58	5.62	5.19	5.81	1.32	1.61		
DRY WT SOIL (gms)	15.1	18.47	16.76	18.53	5.73	6.78		
WATER CONTENT %	30.3	30.4	31.0	31.4	23.0	23.7		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	31 %
PL	23 %
PI	8 %
WC	

ATTERBERG LIMIT

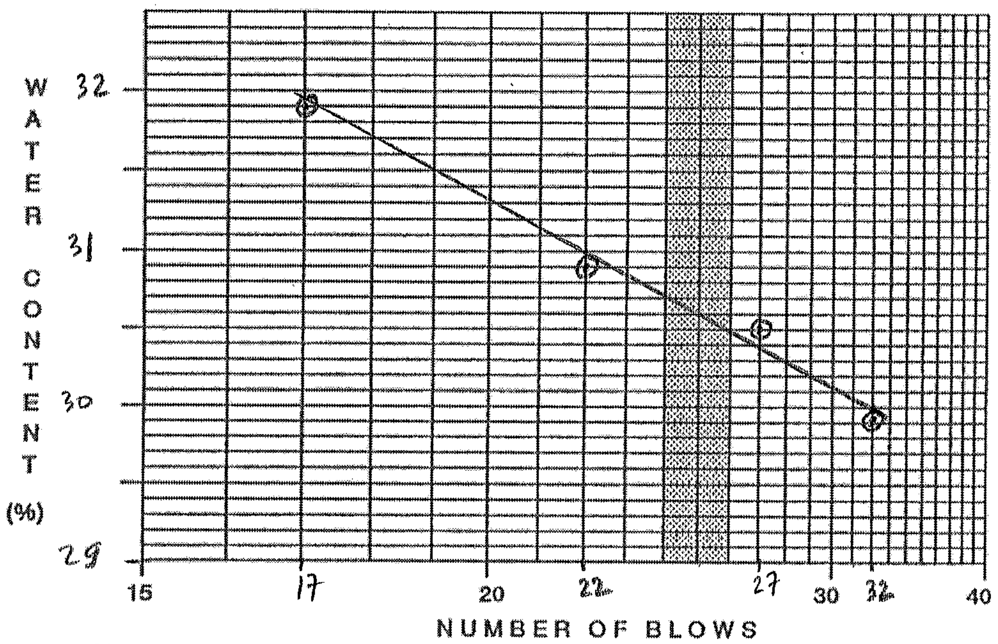
ASTM D4318 or CAL 204

Project Name:	BART TO SILICON VALLEY	Project #:	2019-131-705
Sample #: BH-179 #24A	Lab #: G986	Date:	11/13/2020
Sample Description:	LEAN CLAY, (CL), DARK YELLOWISH BROWN	Tested By:	DO NGUYEN

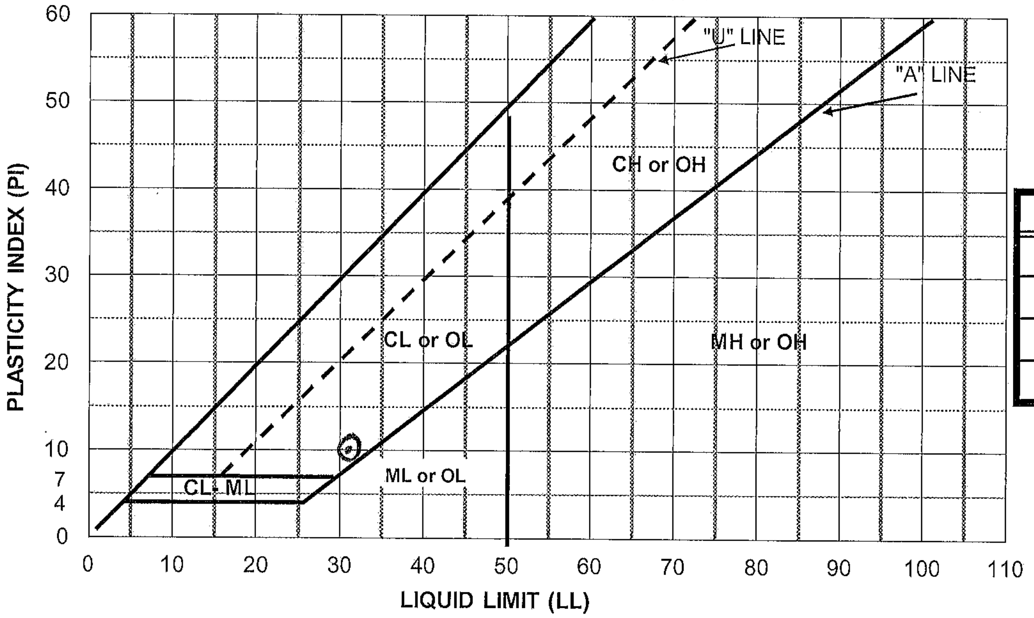
Estimate of % sample retain on #40 Sieve ☐

G133

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS	32	27	22	17	▨	▨	▨	▨
TARE NO.	V8	V2	V10	V23	A2	N9		
TARE + WET WT (gms)	35.60	35.45	36.98	38.51	18.71	17.54		
TARE + DRY WT (gms)	29.94	29.74	30.84	31.84	17.36	16.41		
TARE WT (gms)	11.02	10.99	10.96	10.96	11.08	11.07		
WT OF WATER (gms)	5.66	5.71	6.14	6.67	1.35	1.13		
DRY WT SOIL (gms)	18.92	18.75	19.88	20.88	6.28	5.34		
WATER CONTENT %	29.9	30.5	30.9	31.9	21.5	21.2		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	31 %
PL	21 %
PI	10 %
WC	22 %

PARIKH CONSULTANTS, INC.

ATTERBERG LIMIT

ASTM D4318 or CAL 204

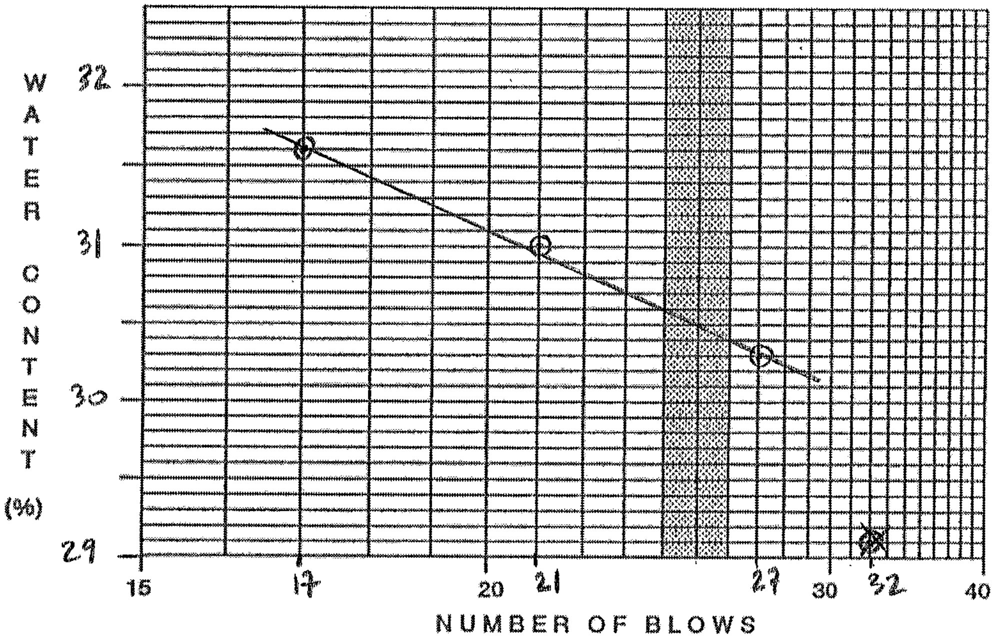
Project Name: BART TO SILICON VALLEY   Project #: 2019-131-705

Sample #: BH-179 #30A@146'   Lab #: G986   Date: 11/12/2020

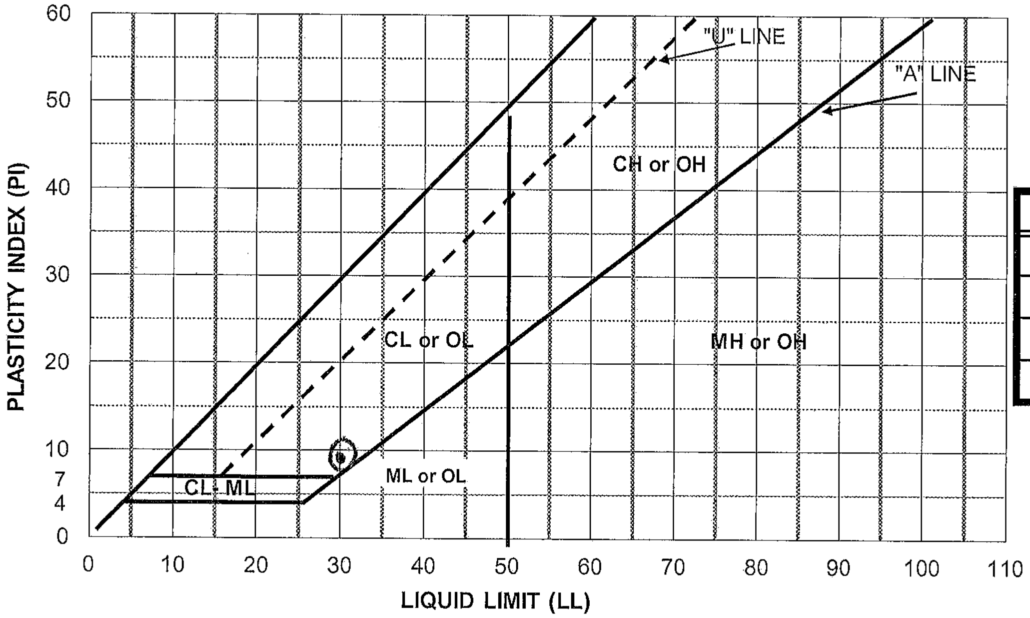
Sample Description: LEAN CLAY, (CL), GREENISH GRAY   Tested By: DO NGUYEN

Estimate of % sample retain on #40 Sieve ☐   S1

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS	~~32~~	27	21	17	▨	▨	▨	▨
TARE NO.	~~V12~~	N8	V21	G10	A4	V9		
TARE + WET WT (gms)	~~39.64~~	36.02	37.34	38.54	18.28	18.38		
TARE + DRY WT (gms)	~~33.23~~	30.22	31.13	31.96	16.98	17.11		
TARE WT (gms)	~~11.11~~	11.10	11.12	11.15	10.69	10.96		
WT OF WATER (gms)	~~6.44~~	5.8	6.21	6.58	1.3	1.27		
DRY WT SOIL (gms)	~~22.12~~	19.12	20.01	20.81	6.29	6.15		
WATER CONTENT %	~~29.1~~	30.3	31.0	31.6	20.7	20.7		



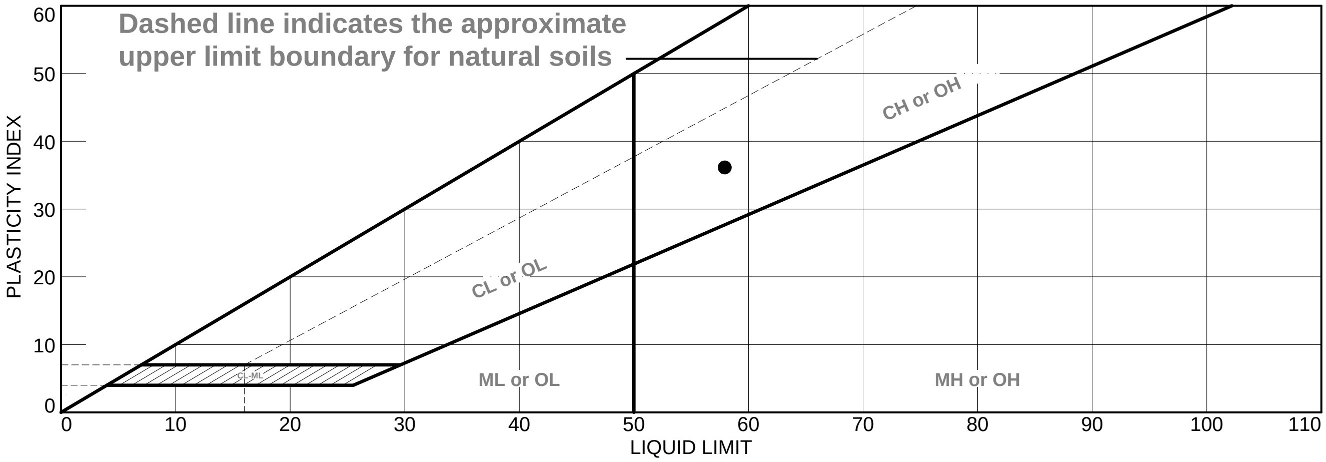
N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	30 %
PL	21 %
PI	9 %
WC	22 %

PARIKH CONSULTANTS, INC.

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	58	22	36		99.8	CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

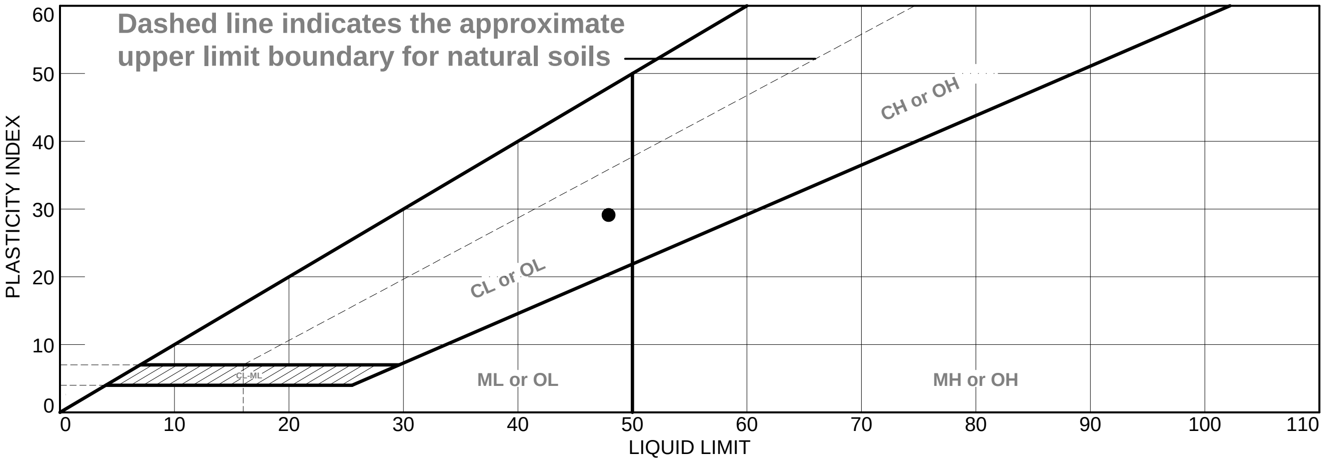
● **Source of Sample:** BH-180 **Depth:** 25 **Sample Number:** 7

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray clay	48	19	29			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

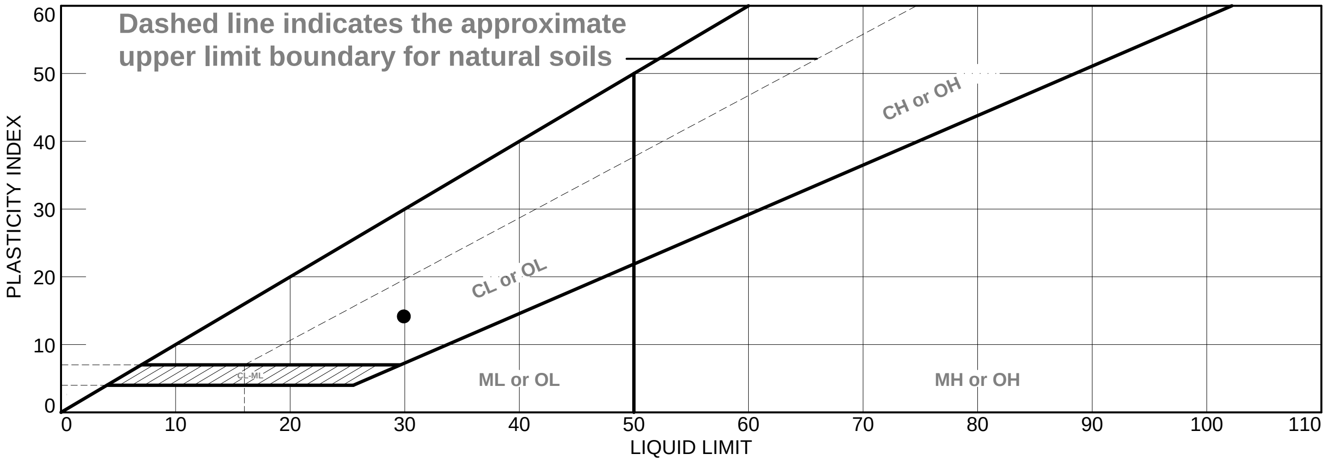
● **Source of Sample:** BH-180 **Depth:** 40 **Sample Number:** 10

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Greenish gray sandy clay	30	16	14		68.8	CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

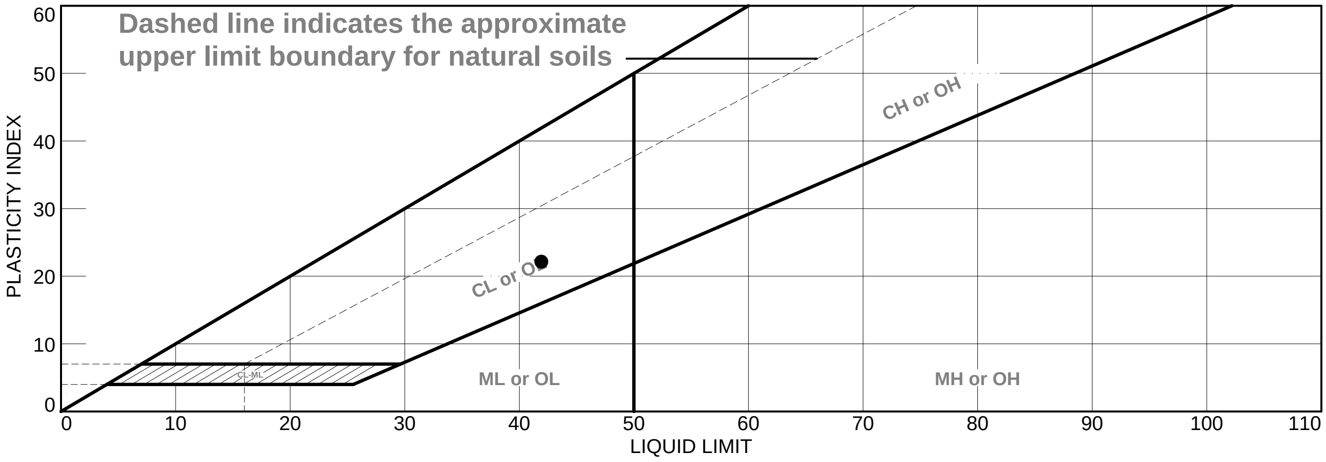
● **Source of Sample:** BH-180 **Depth:** 80 **Sample Number:** 18

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	42	20	22			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

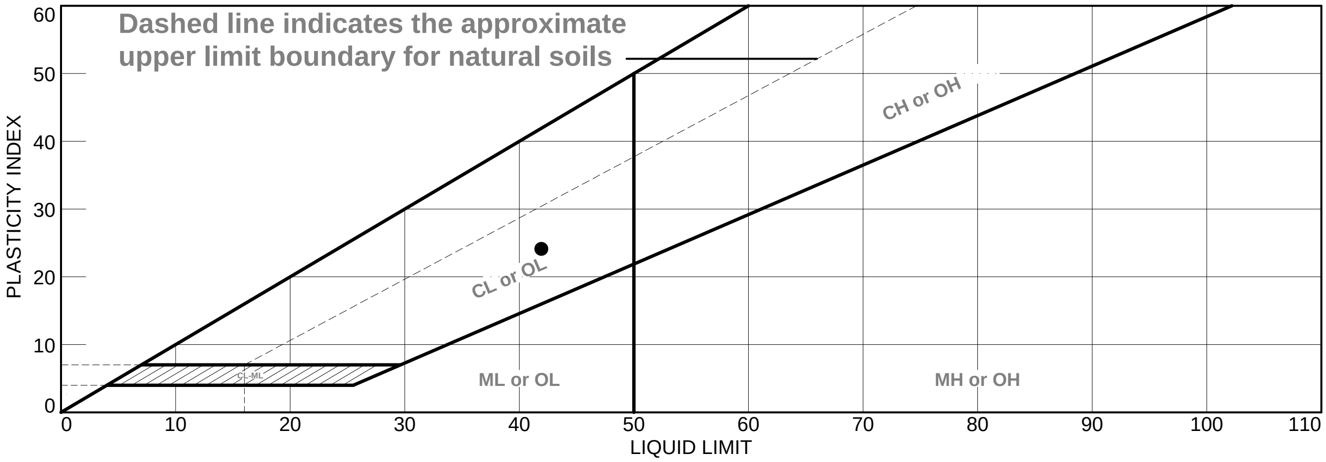
● **Source of Sample:** BH-180 **Depth:** 110 **Sample Number:** 24

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	42	18	24			CL

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

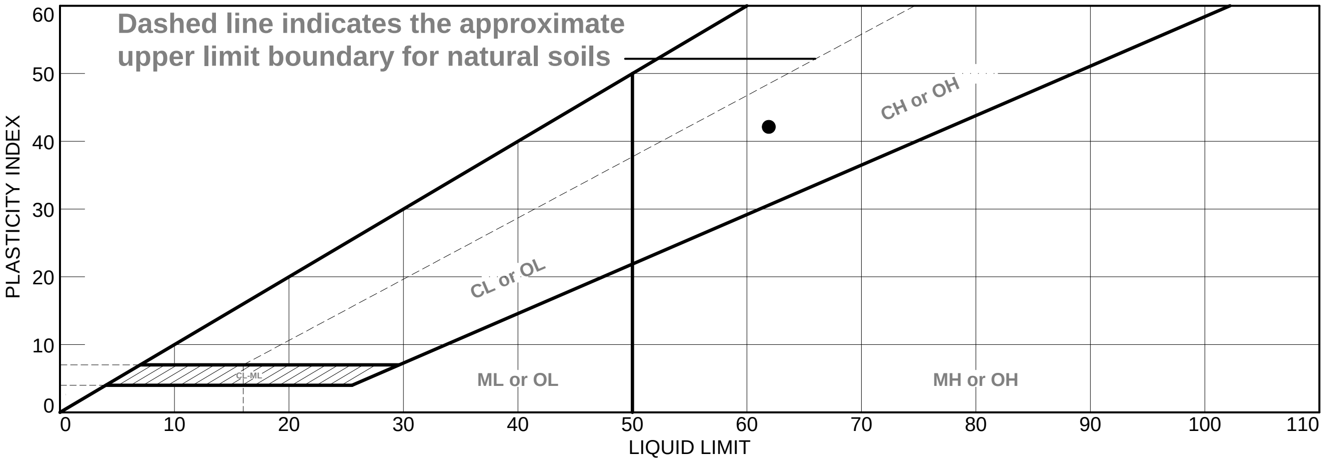
●**Source of Sample:** BH-180 **Depth:** 130 **Sample Number:** 28

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Grayish brown clay	62	20	42			CH

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

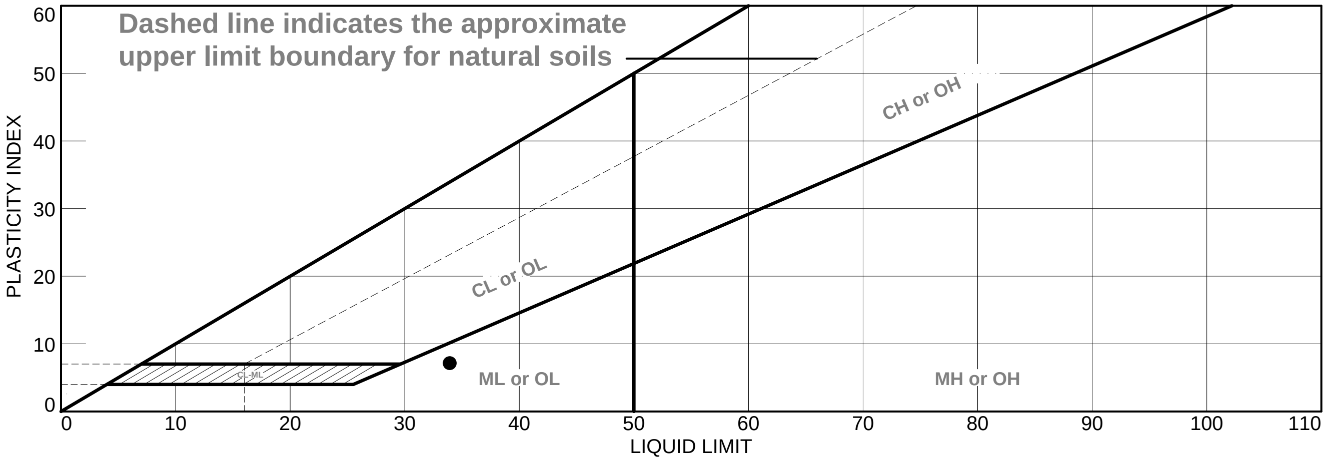
●**Source of Sample:** BH-180 **Depth:** 145 **Sample Number:** 31

Remarks:

Figure

Tested By: JH **Checked By:** JH

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown sandy silt	34	27	7			ML

Project No. 2973-001.0 **Client:** Mott MacDonald

Project: BSVII

507385606

● **Source of Sample:** BH-180 **Depth:** 175 **Sample Number:** 37

Remarks:

Figure

Tested By: JH **Checked By:** JH

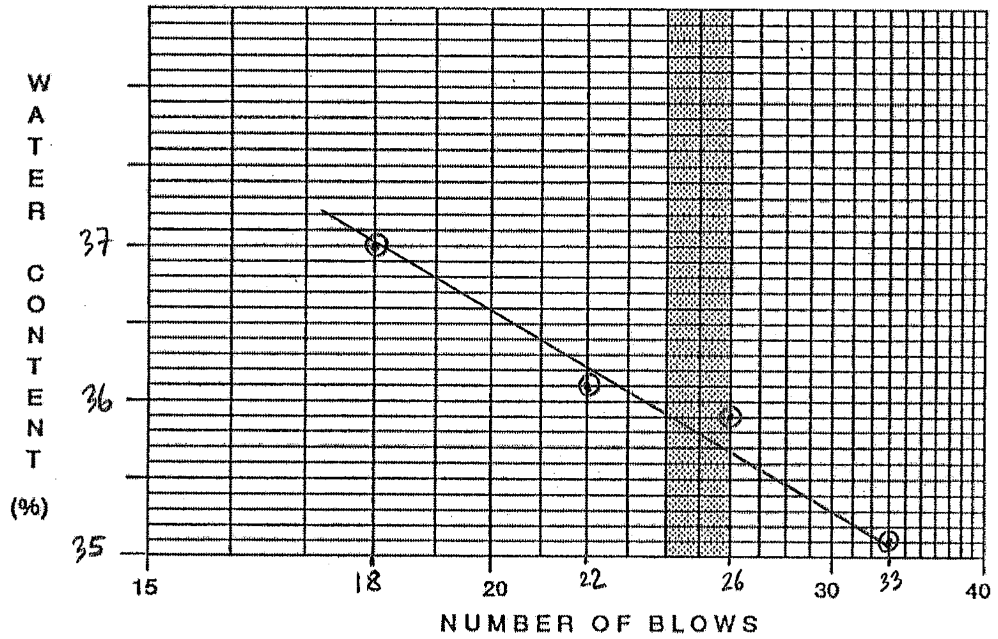
ATTERBERG LIMIT

ASTM D4318 or CAL 204

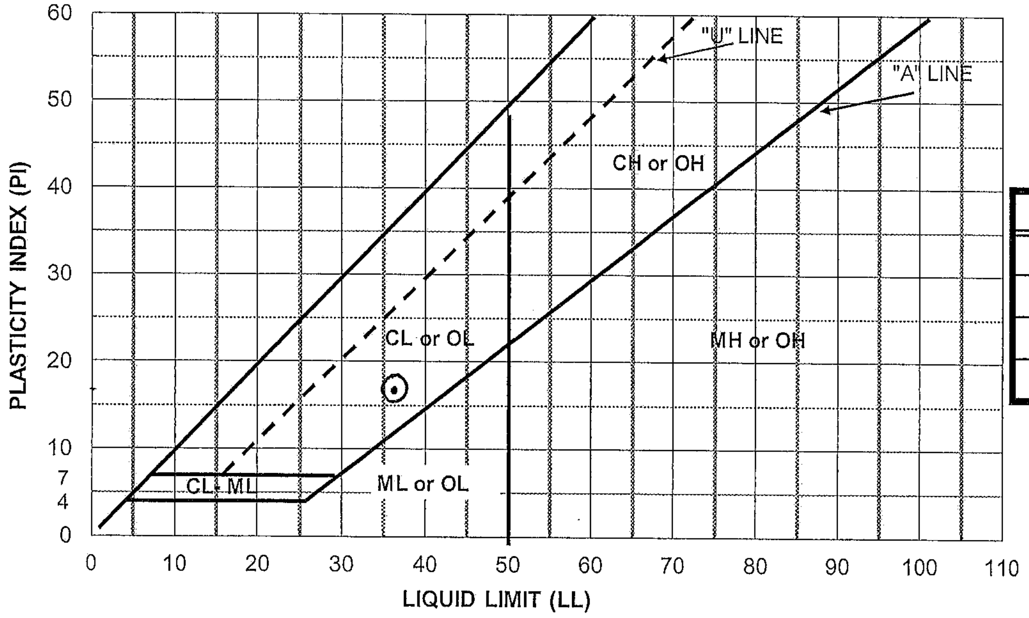
Project Name: BART TO SILICON VALLEY	Project #: 2019-131-TOY
Sample #: BH-180 #1 @ 0.5-1.5' Lab #: G981	Date: 08/17/2020
Sample Description: SANDY LEAN CLAY, (CL), BLACK	Tested By: DO NGUYEN

Estimate of % sample retain on #40 Sieve ☐

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS	33	26	22	18				
TARE NO.	V133	N10	G12	A10	V11	G11		
TARE + WET WT (gms)	36.43	40.16	37.49	36.99	17.86	17.94		
TARE + DRY WT (gms)	29.83	32.49	30.37	29.99	16.73	16.84		
TARE WT (gms)	11.02	11.13	10.62	11.07	10.80	11.13		
WT OF WATER (gms)	6.6	7.67	7.12	7.0	1.13	1.1		
DRY WT SOIL (gms)	18.81	21.36	19.75	18.92	5.93	5.71		
WATER CONTENT %	35.1	35.9	36.1	37.0	19.1	19.3		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	36 %
PL	19 %
PI	17 %
WC	19 %

ATTERBERG LIMIT

ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY

Project #: 2019-131-TO4

Sample #: BH-180 #4@11'

Lab #: G981

Date: 08/14/2020

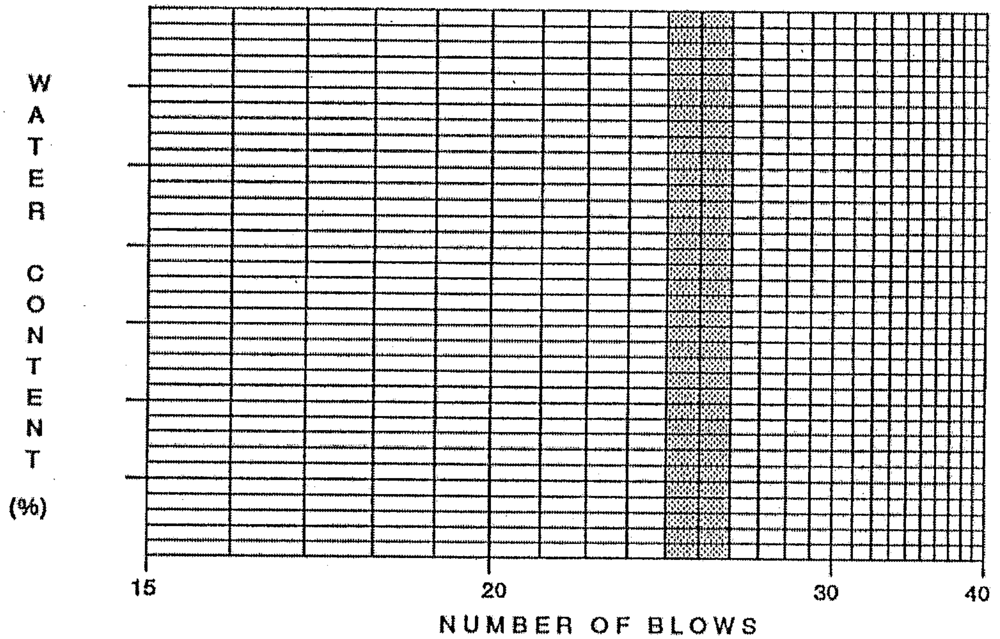
Sample Description: SILT, (ML), DARK YELLOWISH BROWN

Tested By: DO NGUYEN

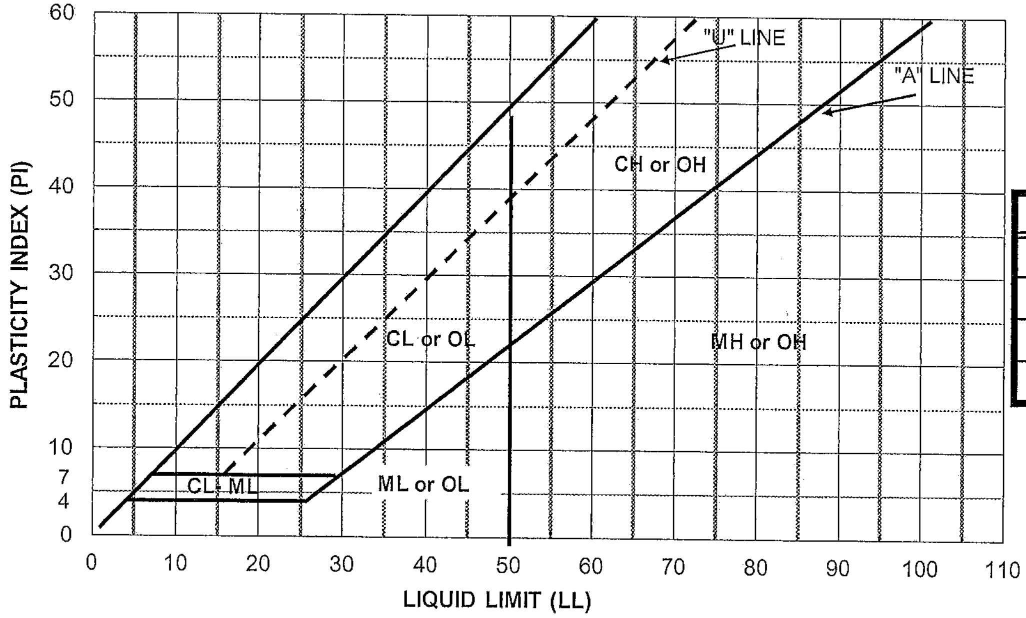
Estimate of % sample retain on #40 Sieve ☐

S10

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS								
TARE NO.								
TARE + WET WT (gms)								
TARE + DRY WT (gms)	NON-PLASTIC							
TARE WT (gms)								
WT OF WATER (gms)								
DRY WT SOIL (gms)								
WATER CONTENT %								



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:

LL	
PL	
PI	
WC	27%

ATTERBERG LIMIT

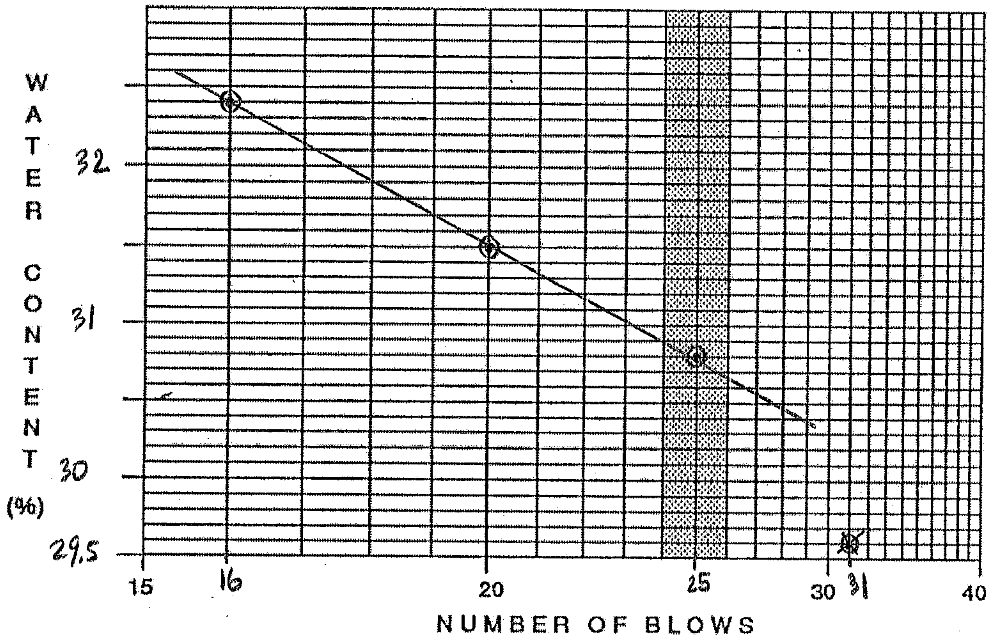
ASTM D4318 or CAL 204

Project Name: BART TO SILICON VALLEY
Project #: 2019-131-T04
Sample #: BH-180 #13 @ 56' Lab #: G981
Date: 08/14/2020
Sample Description: LEAN CLAY w/SAND, (CL), GREENISH GRAY
Tested By: DO NGUYEN

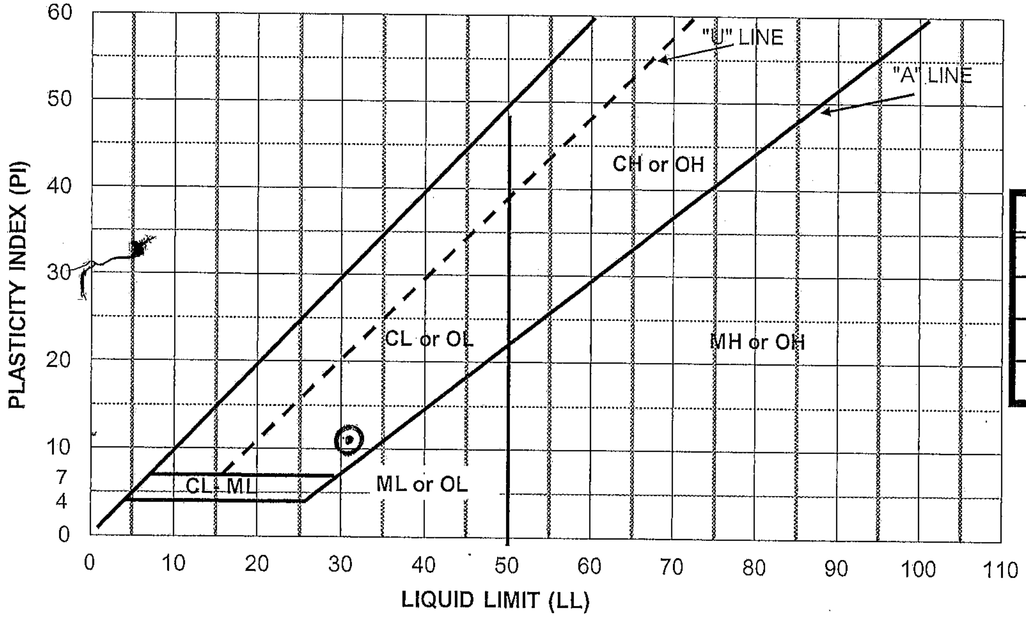
Estimate of % sample retain on #40 Sieve ☐

S10 / G43

	LIQUID LIMIT				PLASTIC LIMIT			
NUMBER OF BLOWS	31	25	20	16	▨	▨	▨	▨
TARE NO.	V11	A10	G12	V133	N10	G11		
TARE + WET WT (gms)	38.38	39.32	36.85	39.03	17.73	18.48		
TARE + DRY WT (gms)	32.08	32.66	30.57	32.18	16.69	17.29		
TARE WT (gms)	10.79	11.07	10.61	11.02	11.14	11.12		
WT OF WATER (gms)	6.3	6.66	6.28	6.85	1.04	1.19		
DRY WT SOIL (gms)	21.29	21.59	19.96	21.16	5.55	6.17		
WATER CONTENT %	29.6%	30.8%	31.5%	32.4	18.7	19.3		



N	K
20	0.974
21	0.979
22	0.985
23	0.990
24	0.995
25	1.000
26	1.005
27	1.009
28	1.014
29	1.018
30	1.022



SUMMARY:	
LL	31 %
PL	19 %
PI	12 %
WC	27 %

Appendix E
Laboratory Testing

Abrasion Test Results
Consolidation Test Results
Soil Corrosivity Test Results
TXUU Test Results
TXCU Test Results
TXCD Test Results
R-Value Test Results

Laboratory Testing

Table E-1. Summary of Laboratory Tests

Test Type	Standard	No. Tests Assigned (MMW)	No. Tests Assigned (HNTB/WSP)
Abrasion Testing	SINTEF	-	7
Consolidation	ASTM D2345	51	2
Unconsolidated Undrained Triaxial Tests (TXUU)	ASTM D2850	10	1
Consolidated Undrained Triaxial Tests (TXCU)	ASTM D4767	37	4
Consolidated Drained Triaxial Tests (TXCD)	ASTM D7181	4	-
Corrosion Testing	Soil[1]	20	7
R-Value Testing	C-301[2]	3	-

[1] Soil corrosivity analysis including ASTM G57, ASTM D1498, ASTM D4327, ASTM D4658M, and ASTM D4972.

[2] C-301, California Test Method 301 by Caltrans.

Abrasion Test Results

Abrasion Test Locations

Table E-2. Summary of Abrasion Tests

Borehole ID	Location	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Sample Depths (ft)
BH-112	28th Street / Little Portugal Station to East Emergency Stop	1,952,430.75	6,164,748.07	88.92	65.5, 66, 71, 76
BH-115	28th Street / Little Portugal Station to East Emergency Stop	1,950,855.94	6,162,732.11	95.06	80, 85, 90, 96
BH-116	East Emergency Stop	1,949,991.68	6,160,933.27	80.56	110, 115.8, 116.1
BH-124	DTSJ Station to Diridon Station	1,946,481.71	6,154,978.72	86.28	100.5, 101, 101.5
BH-137	West Emergency Stop	1,949,225.92	6,151,112.11	81.74	90, 95.5, 96
BH-140	West Emergency Stop to West Portal	1,951,348.06	6,149,290.51	71.53	85.5, 86, 90.5
BH-141	West Portal	1,951,929.04	6,148,085.81	68.83	30, 35, 40

Test report

Soil Abrasion Test™

Determination of abrasivity of soil samples from the BART Tunnel Project

Author(s)
Joakim Eggen, Kevin Aaserud Dahlen

SINTEF Building and Infrastructure
Rock and Soil Mechanics
2019-05-08

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KEYWORDS
Abrasion
Soil Testing

Test report

Soil Abrasion Test™

Determination of abrasivity of soil samples from the BART Tunnel Project

VERSION 2		**DATE** 2019-05-08
AUTHOR(S) Joakim Eggen, Kevin Aaserud Dahlen		
CLIENT(S) Parikh Consultants		**CLIENT'S REF.** Mark W. McKee
PROJECT NO. 102020257-026		**NUMBER OF PAGES/APPENDICES** 13
TEST OBJECT 7 soil samples		**TEST OBJECT RECEIVED** 2019-04-04
TEST PROGRAM SAT™	**TEST LOCATION** Geological Engineering Laboratory	**DATE OF TEST** From 2019-04-05 To 2019-04-10

ABSTRACT
The samples were analysed in order to determine soil abrasivity by the Soil Abrasion Test™ (SAT™).

The trademarked acronyms Soil Abrasion Test™ and SAT™ are unique for test results and calculated indices originating from the NTNU/SINTEF laboratory and can only be obtained by testing samples at our reference laboratory.

Soil Abrasion Test™ is performed in accordance with: *Nilsen, B., Dahl, F., Holzhäuser, J. and Raleigh, P. (2007): "New test methodology for estimating the abrasiveness of soils for TBM tunnelling", RETC Proceedings, 104 - 116.*

The test results relate only to the items tested

PREPARED BY Joakim Eggen	SIGNATURE Joakim Eggen Digitally signed by Eggen Joakim Date: 2019.05.08 11:11:19 +02'00'
APPROVED BY Filip Dahl	SIGNATURE Filip Dahl
REPORT NO. 19026IG	**CLASSIFICATION** Restricted

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3 SAT™ results presented as bar graph 4

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5 Comments and remarks on SAT™ testing and test results 5

6 Principle description and photos of the SAT™ test method, equipment and methodology 7

7 Photographs of the received soil samples 10

1 Table of soil samples received for testing

(Given by the Client)

Sample No. (Given by SINTEF)	Boring	Sample No. and Depth	Composite Sample Fraction Weights (g) -No. 4	+No.4	+3/4"	Total Weight (g)	-No. 4 Sieve Sample Weights sent to SINTEF (g)
1	BH-115	17 @ 80' 18 @ 85' 19 @ 90' 20 @ 96'	805.3	750.9	234.8	1791	805.3
2	BH-141	7 @ 30' 8 @ 35' 9 @ 40'	731.7	792	462.6	1986.3	731.7
3	BH-124	20B @ 100.5' 20C @ 101' 20D @ 101.5'	820.7	884.7	158.9	1864.3	820.7
4	BH-112	13A @ 65.5' 13B @ 66' 14 @ 71' 15 @ 76'	1261.8	1182	157	2600.8	855.8
5	BH-140	17A @ 85.5' 17B @ 86' 18 @ 90.5'	804.6	757	74.1	1635.7	804.6
6	BH-116	20 @ 110' 21A @ 115.8' 21B @ 116.1'	1036.9	905	19.8	1961.7	805.4
7	BH-137	18 @ 90' 19A @ 95.5' 19B @ 96'	1266	909.8	20.5	2196.3	813.7

2 Test results SAT™

Sample No. (Given by SINTEF)	1	2	3	4
SAMPLE ID (Given by the Client)	**BH-115**	**BH-141**	**BH-124**	**BH-112**
SAT™ Test 1 [mg]	8	8	9	5
SAT™ Test 2 [mg]	8	6	9	4
SAT™ mean [mg]	8.0	7.0	9.0	4.5
Percentage of the total sample < 4.75 mm after initial preparation1)	45 %	37 %	44 %	49 %

Sample No. (Given by SINTEF)	5	6	7
SAMPLE ID (Given by the Client)	**BH-140**	**BH-116**	**BH-137**
SAT™ Test 1 [mg]	11	8	13
SAT™ Test 2 [mg]	10	9	9
SAT™ mean [mg]	10.5	8.5	11.0
Percentage of the total sample < 4.75 mm after initial preparation1)	49 %	53 %	58 %

1)The initial preparation (sieving) was performed by the Client prior to shipment of the samples. The given percentages are hence indicating the fraction < 4.75 mm as a percentage of the total weight of the original sample.

3 SAT™ results presented as bar graph

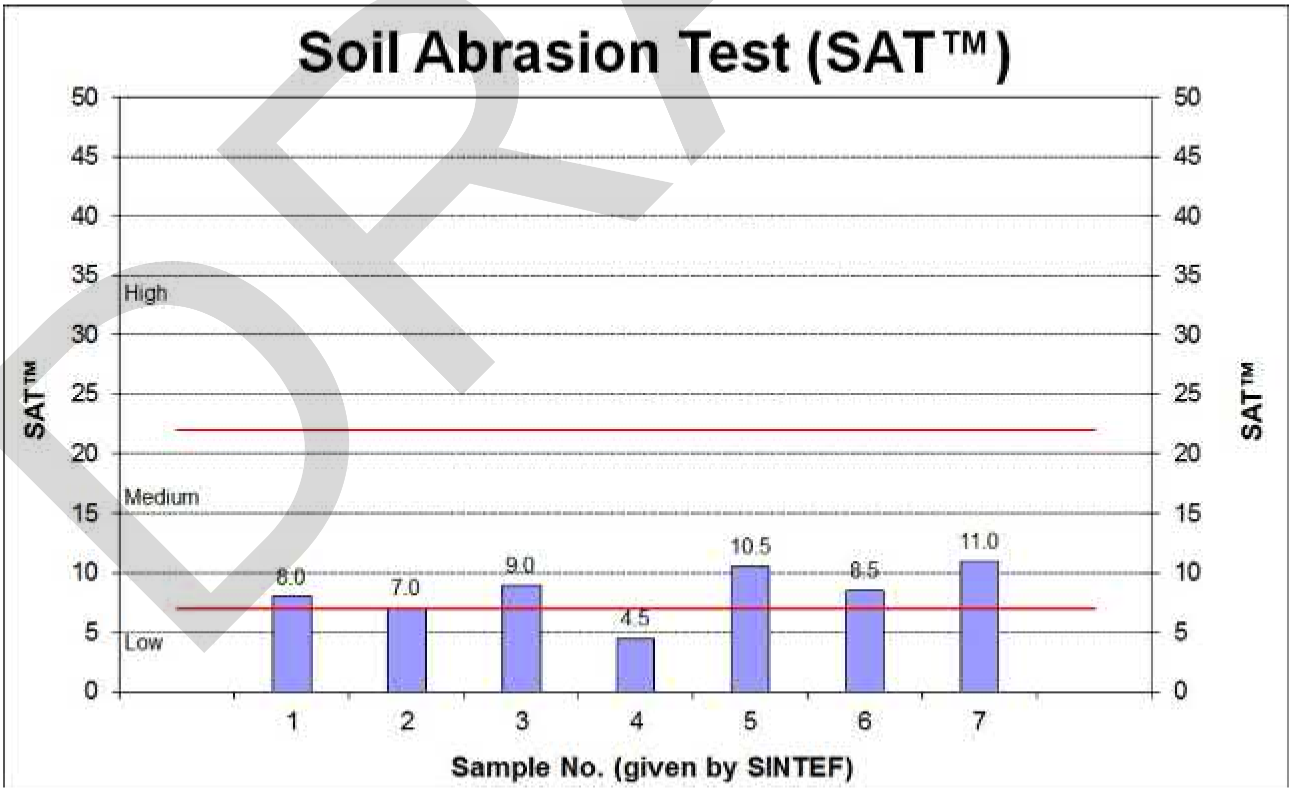

Figure 1

4 Classification of SAT™

Table 1, Classification of soil abrasivity according to Drevland Jakobsen. P., et al. "Review and assessment of the NTNU/SINTEF Soil Abrasion Test (SAT™) for determination of abrasiveness of soil and soft ground". TUST 37 (2013), 107 -114.

Category – Cutter Steel Abrasion	SAT™ [Weight loss in mg]
Low	≤ 7.0
Medium	7.1 – 21.9
High	≥ 22

5 Comments and remarks on SAT™ testing and test results

The initial preparation (sieving) of the original samples was performed by the Client prior to shipment of specimens consisting of representative sample material < 4.75 mm intended for determination of abrasivity by SAT™. The percentages of sample material < 4.75 mm, which are given in the tables on page 4, are hence only indicating the fraction < 4.75 mm as a percentage of the total weight of the original sample. The final preparation (separation of the portion < 4.0 mm) of the received sample material < 4.75 mm was performed by SINTEF upon receipt of the specimens.

The testing was according to the standard performed on the dried and sieved portion < 4.0 mm by use of SAT™ pieces *(see Figure 6).*

The tested samples have all a portion of particles < 4.0 mm after final preparation, which constitutes < 75 % of the total sample volume. The SAT™ value for the samples might hence possibly be somewhat different from what will be encountered in-situ.

The SAT™ is based on the Abrasion Value Cutter Steel (AVS) test which is used to determine the abrasiveness of rock. The classification *(see Table 2)* based on the so far 1747 recorded test results from this test is hence useful also for describing/evaluating the abrasiveness of soils.

Table 2. Classification of rock abrasivity or the ability to induce wear on cutter ring steel according to Dahl. F., et al. TUST 28 (2012) 150 -158.

Category – Cutter Steel Abrasion	AVS [Weight loss in mg]	Cumulative Percentag
Extremely low	≤ 1.0	0 – 5 %
Very low	1.1 – 3.9	5 – 15 %
Low	4.0 – 12.9	15 – 35 %
Medium	13.0 – 25.9	35 – 65 %
High	26.0 – 35.9	65 – 85 %
Very high	36.0 – 43.9	85 – 95 %
Extremely high	≥ 44.0	95 – 100 %

A summary of rock samples tested by use of AVS and soil samples tested by use of SAT™ is shown in Figure 2.

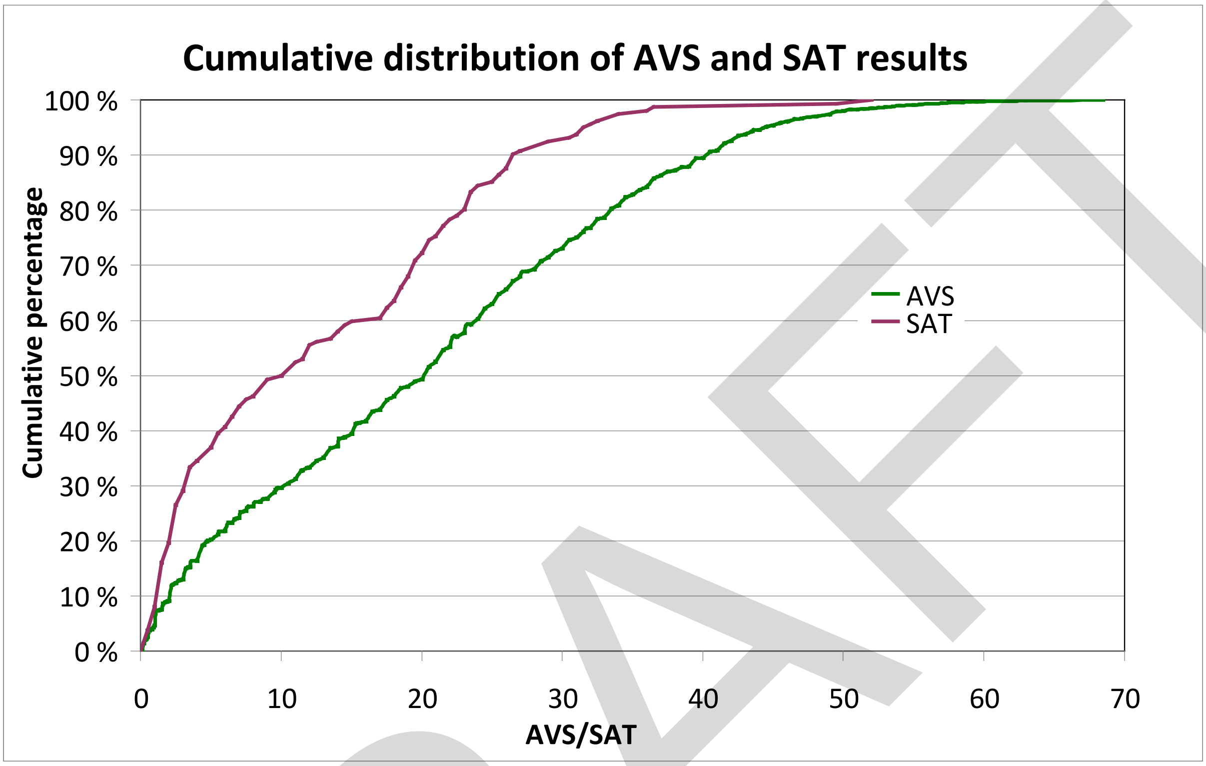

Figure 2. The cumulative distribution of the so far recorded AVS and SAT™ results in the NTNU/SINTEF database.

Based on rock testing, the content of quartz and other hard minerals like garnet and epidote have a major impact on the abrasion on the test pieces, but grain shape, grain size and grain binding may also contribute substantially.

In Table 3, AVS results for some sedimentary rocks tested at SINTEF are shown, illustrating that there is a considerable difference in AVS values between the softest (i.e. limestone) and hardest (i.e. quartzite) rocks. As also shown, the AVS value may vary significantly within one type of rock.

Table 3. AVS values for some sedimentary rock samples tested at SINTEF

Rock Type	Number of Samples	AVS [Weight loss in mg]
Limestone	17	0.2 – 1.4
Shale	17	0.4 – 10
Siltstone	4	0.4 – 44
Sandstone	36	0.4 – 52
Quartzite	20	17 – 63

6 Principle description and photos of the SAT™ test method, equipment and methodology

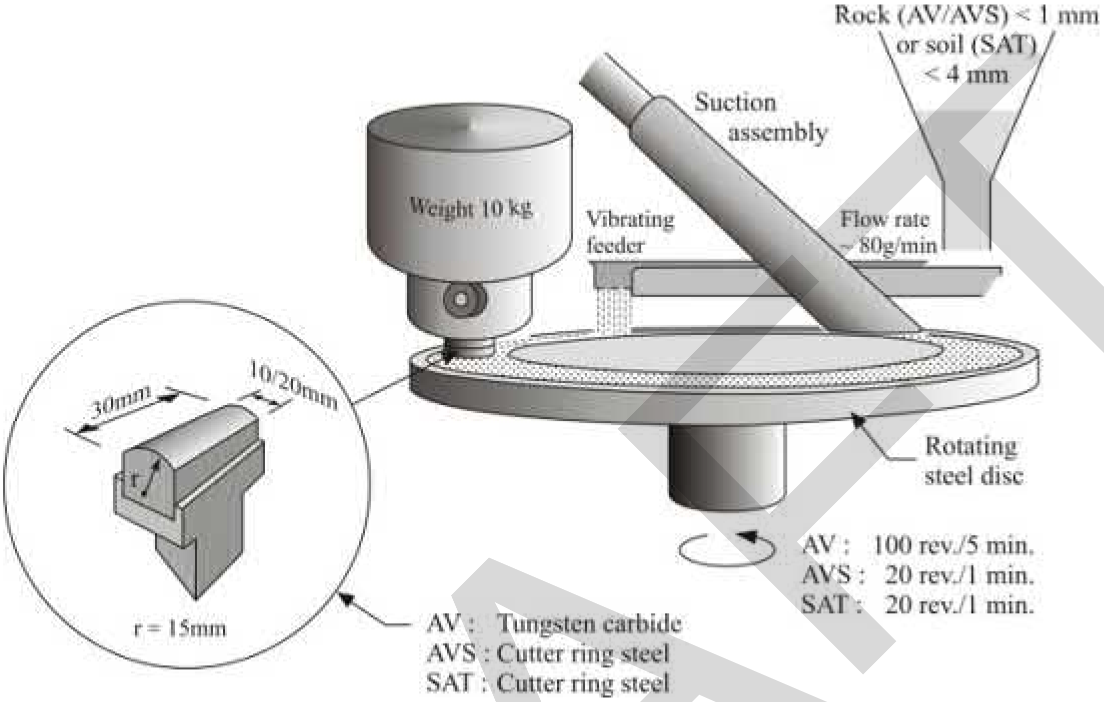

Figure 3. Principle drawing of the SINTEF/NTNU abrasion tests.

Figure 4. Photos of test equipment used to determine Abrasion Value Cutter Steel (AVS) and Soil Abrasion Test (SAT™).

Figure 5. Photo showing a part of a cutter ring, a 10 mm slice taken from the same ring and two prepared AVS test pieces which are cut out of the center of the slice.

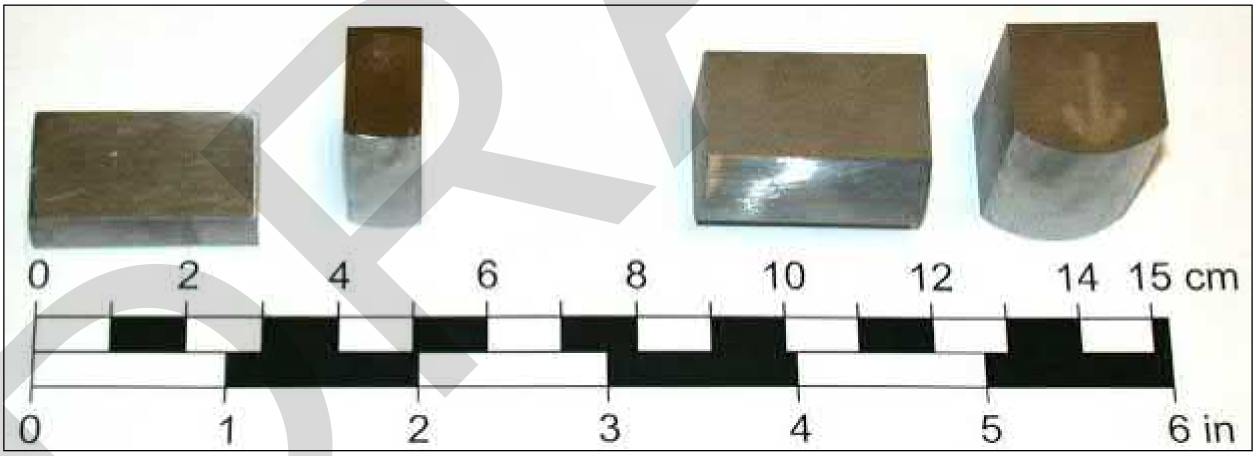

Figure 6. Photo showing two AVS (to the left) and two SAT ™ test pieces (to the right).

Figure 7. Close up taken during SAT™ testing, showing the test track on the rotating steel disc before the abrasion material has passed under the test piece.

Figure 8. Close up taken during SAT™ testing, showing the test track on the rotating steel disc after the abrasion material has passed under the test piece.

7 Photographs of the received soil samples

Sample No. 1, marked "BH-115". SAT™ powder was prepared by soft hammer and sieving with steel balls.

Sample No. 2, marked "BH-141". SAT™ powder was prepared by soft hammer and sieving with steel balls.

Sample No. 3, marked "BH-124" SAT™ powder was prepared by soft hammer and sieving with steel balls.

Sample No. 4, marked "BH-112" SAT™ powder was prepared by soft hammer and sieving with steel balls.

Sample No. 5, marked "BH-140". SAT™ powder was prepared by soft hammer and sieving with steel balls.

Sample No. 6, marked "BH-116". SAT™ powder was prepared by soft hammer and sieving with steel balls.

Sample No. 7, marked "BH-137". SAT™ powder was prepared by soft hammer and sieving with steel balls.

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Consolidation Test Results

One Dimensional Consolidation Properties
(Oedometer)

Client	Parikh Consultants	**Lab Ref**	
Project	Bart to Silicon Valley	**Job**	2017-144-T02
Borehole	BH-116	**Sample**	22
Location		**Depth**	121 feet

Test Details

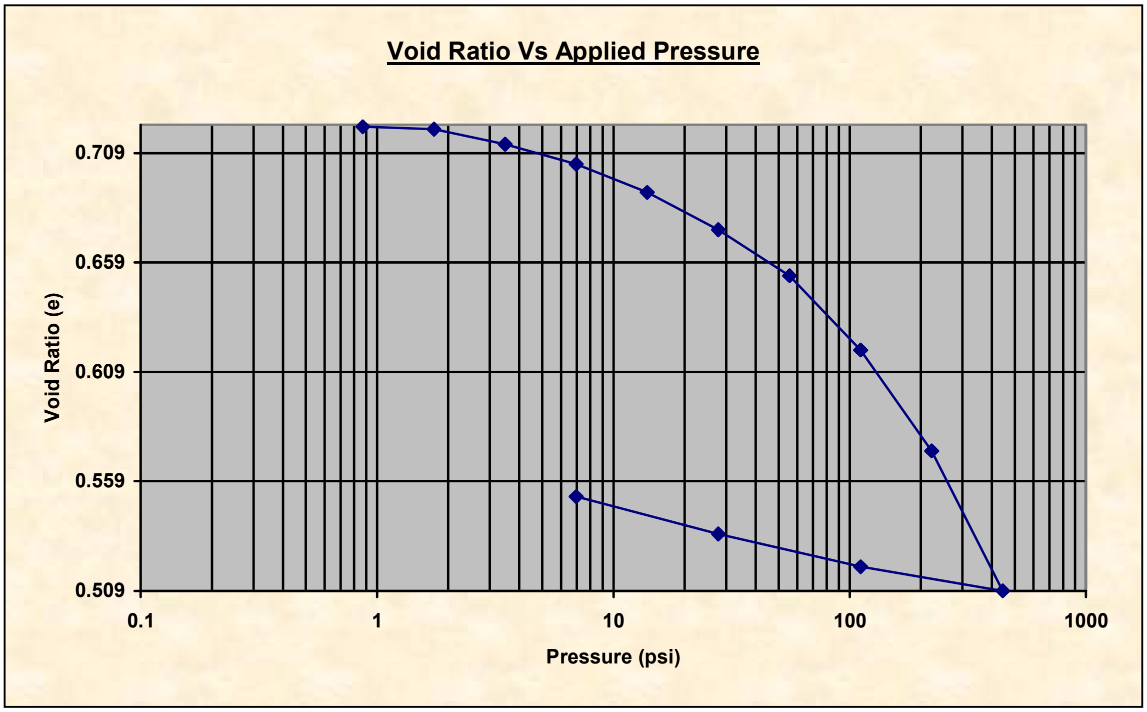
Standard	ASTM D2435-96 / AASHTO T216-94	**Particle Specific Gravity**	2.7
Sample Type	Shelby Sample	**Lab. Temperature**	70.0 deg.F
Method of Testing (A/B)	A		
Sample Description	SANDY SILTY CLAY (CL-ML), HARD, MOIST, FINE SAND		
Variations from Procedure	None		

Specimen Details

Specimen Reference	A	**Description**	
Depth within Sample	0.0000 in	**Orientation within Sample**	
Specimen Mass	0.1680 lb	**Condition**	Natural Moisture
Specimen Height	0.7500 in	**Preparation**	
Comments			

Apparatus

Ring Number	1	**Ring Diameter**	2.0000 in
Ring Height	0.7500 in	**Ring Weight**	0.1367 lb
Lever Ratio	1.00 : 1	**Drainage**	Double-Sided



One Dimensional Consolidation Properties
(Oedometer)

Client	Parikh Consultants	**Lab Ref**	
Project	Bart to Silicon Valley	**Job**	2017-144-T02
Borehole	BH-116	**Sample**	22
Location		**Depth**	121 feet

Initial Moisture Content*	25.8 %	**Final Moisture Content**	23.8 %
Initial Bulk Density	123.11 lb/ft3	**Final Bulk Density**	134.4 lb/ft3
Initial Dry Density	97.86 lb/ft3	**Final Dry Density**	108.6 lb/ft3
Initial Void Ratio	0.7216	**Final Void Ratio**	0.5524
Initial Degree of Saturation	96.50%	**Final Degree of Saturation**	116.3%
Pre-consolidation Pressure			

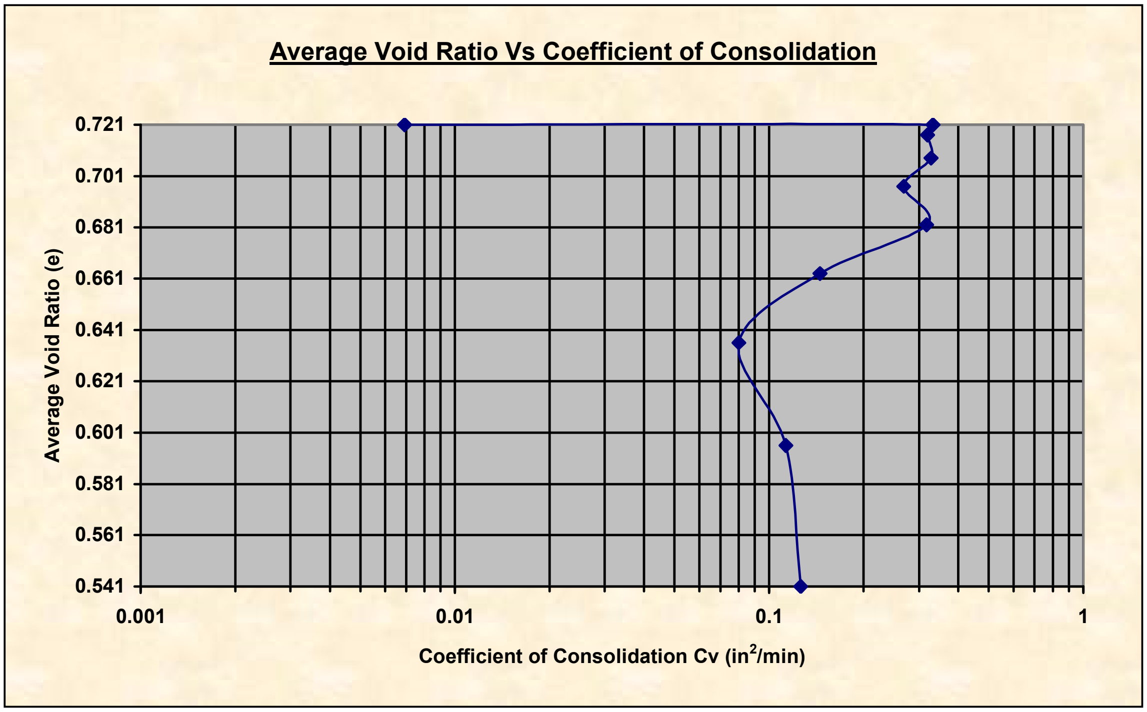
* Calculated from initial and dry weights of whole specimen

Pressure (Loading)	**Load Increment Duration**	**Deformation (Corrected)**	**d_{100} (Corrected)**	**Coefficient of Consolidation (c_v)**
0.00				
0.87 psi	4.000 min	0.0002 in	0.0004 in	0.00692 in2/min
1.74 psi	762.000 min	0.0007 in	0.0004 in	0.33215 in2/min
3.48 psi	480.000 min	0.0037 in	0.0022 in	0.31896 in2/min
6.96 psi	960.000 min	0.0077 in	0.0057 in	0.32773 in2/min
13.92 psi	480.000 min	0.0135 in	0.0110 in	0.26791 in2/min
27.85 psi	762.000 min	0.0208 in	0.0180 in	0.31715 in2/min
55.55 psi	1260.000 min	0.0299 in	0.0264 in	0.14525 in2/min
111.10 psi	4080.000 min	0.0448 in	0.0387 in	0.08021 in2/min
222.20 psi	1440.000 min	0.0649 in	0.0566 in	0.11303 in2/min
444.40 psi	1680.000 min	0.0926 in	0.0815 in	0.12611 in2/min
111.10 psi	1080.000 min	0.0876 in	---------	---------
27.85 psi	1080.000 min	0.0814 in	---------	---------
6.96 psi	4080.000 min	0.0737 in	---------	---------

Method of Time Fitting Used	Log Time

One Dimensional Consolidation Properties
(Oedometer)

Client	Parikh Consultants	**Lab Ref**	
Project	Bart to Silicon Valley	**Job**	2017-144-T02
Borehole	BH-116	**Sample**	22
Location		**Depth**	121 feet



Tested By and Date:	DO NGUYEN 3/25/2019
Checked By and Date:	
Approved By and Date:	

One Dimensional Consolidation Properties
(Oedometer)

Client	Parikh Consultant	**Lab Ref**	
Project	Bart to Silicon Valley	**Job**	2017-144-T02
Borehole	BH-141	**Sample**	4
Location		**Depth**	15 feet

Test Details

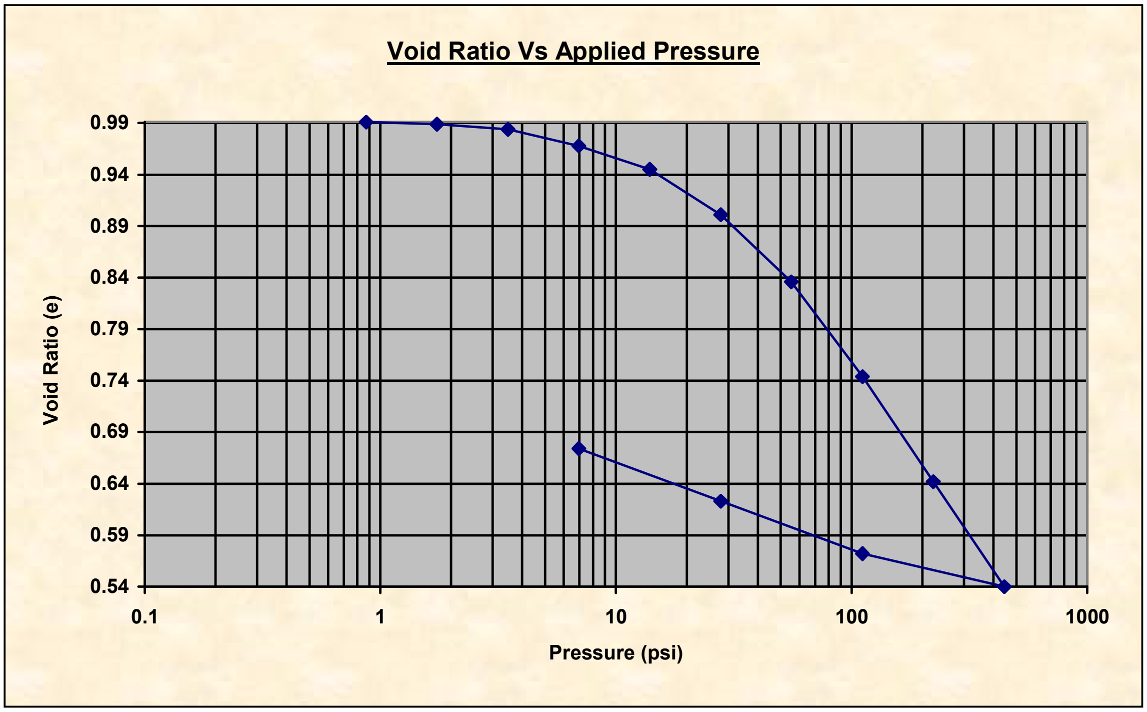
Standard	ASTM D2435-96 / AASHTO T216-94	**Particle Specific Gravity**	2.7
Sample Type	Shelby Sample	**Lab. Temperature**	72.0 deg.F
Method of Testing (A/B)	A		
Sample Description	Fat CLAY WITH SAND (CH), STIFF, BLACK		
Variations from Procedure	None		

Specimen Details

Specimen Reference	C	**Description**	
Depth within Sample	0.0000 in	**Orientation within Sample**	
Specimen Mass	0.1537 lb	**Condition**	Natural Moisture
Specimen Height	0.7500 in	**Preparation**	
Comments			

Apparatus

Ring Number	3	**Ring Diameter**	2.0000 in
Ring Height	0.7500 in	**Ring Weight**	0.1378 lb
Lever Ratio	1.00 : 1	**Drainage**	Double-Sided



One Dimensional Consolidation Properties
(Oedometer)

Client	Parikh Consultant	**Lab Ref**	
Project	Bart to Silicon Valley	**Job**	2017-144-T02
Borehole	BH-141	**Sample**	4
Location		**Depth**	15 feet

Initial Moisture Content*	35.7 %	**Final Moisture Content**	28.2 %
Initial Bulk Density	114.8 lb/ft3	**Final Bulk Density**	129.1 lb/ft3
Initial Dry Density	84.6 lb/ft3	**Final Dry Density**	100.7 lb/ft3
Initial Void Ratio	0.9910	**Final Void Ratio**	0.6736
Initial Degree of Saturation	97.3%	**Final Degree of Saturation**	113%
Pre-consolidation Pressure			

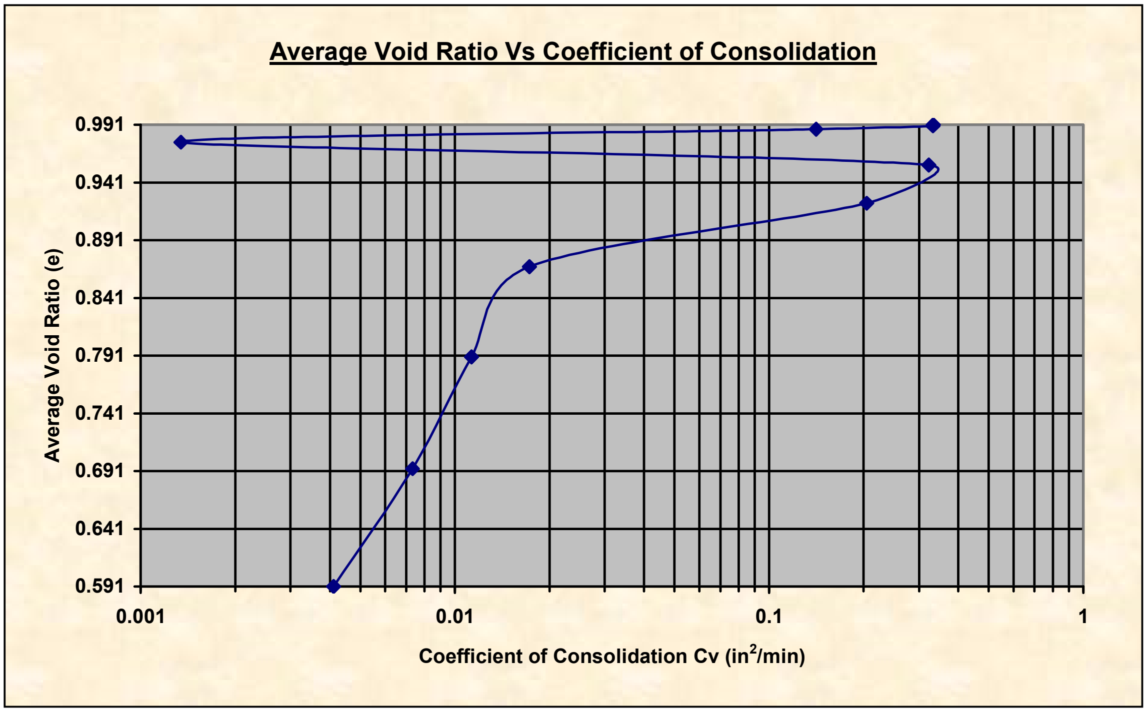
* Calculated from initial and dry weights of whole specimen

Pressure (Loading)	**Load Increment Duration**	**Deformation (Corrected)**	**d_{100} (Corrected)**	**Coefficient of Consolidation (c_v)**
0.00				
0.87 psi	12.000 min	0.0001 in	-0.0005 in	0.33268 in2/min
1.74 psi	762.000 min	0.0006 in	0.0004 in	0.33210 in2/min
3.48 psi	1260.000 min	0.0028 in	0.0017 in	0.14108 in2/min
6.96 psi	4080.000 min	0.0087 in	0.0086 in	0.00134 in2/min
13.92 psi	1260.000 min	0.0174 in	0.0117 in	0.32191 in2/min
27.85 psi	1920.000 min	0.0339 in	0.0254 in	0.20420 in2/min
55.55 psi	1440.000 min	0.0585 in	0.0547 in	0.01729 in2/min
111.10 psi	1440.000 min	0.0931 in	0.0879 in	0.01129 in2/min
222.20 psi	3600.000 min	0.1313 in	0.1258 in	0.00733 in2/min
444.40 psi	1920.000 min	0.1698 in	0.1642 in	0.00411 in2/min
111.10 psi	1080.000 min	0.1577 in	---------	---------
27.85 psi	1440.000 min	0.1388 in	---------	---------
6.96 psi	1260.000 min	0.1195 in	---------	---------

Method of Time Fitting Used	Log Time

One Dimensional Consolidation Properties
(Oedometer)

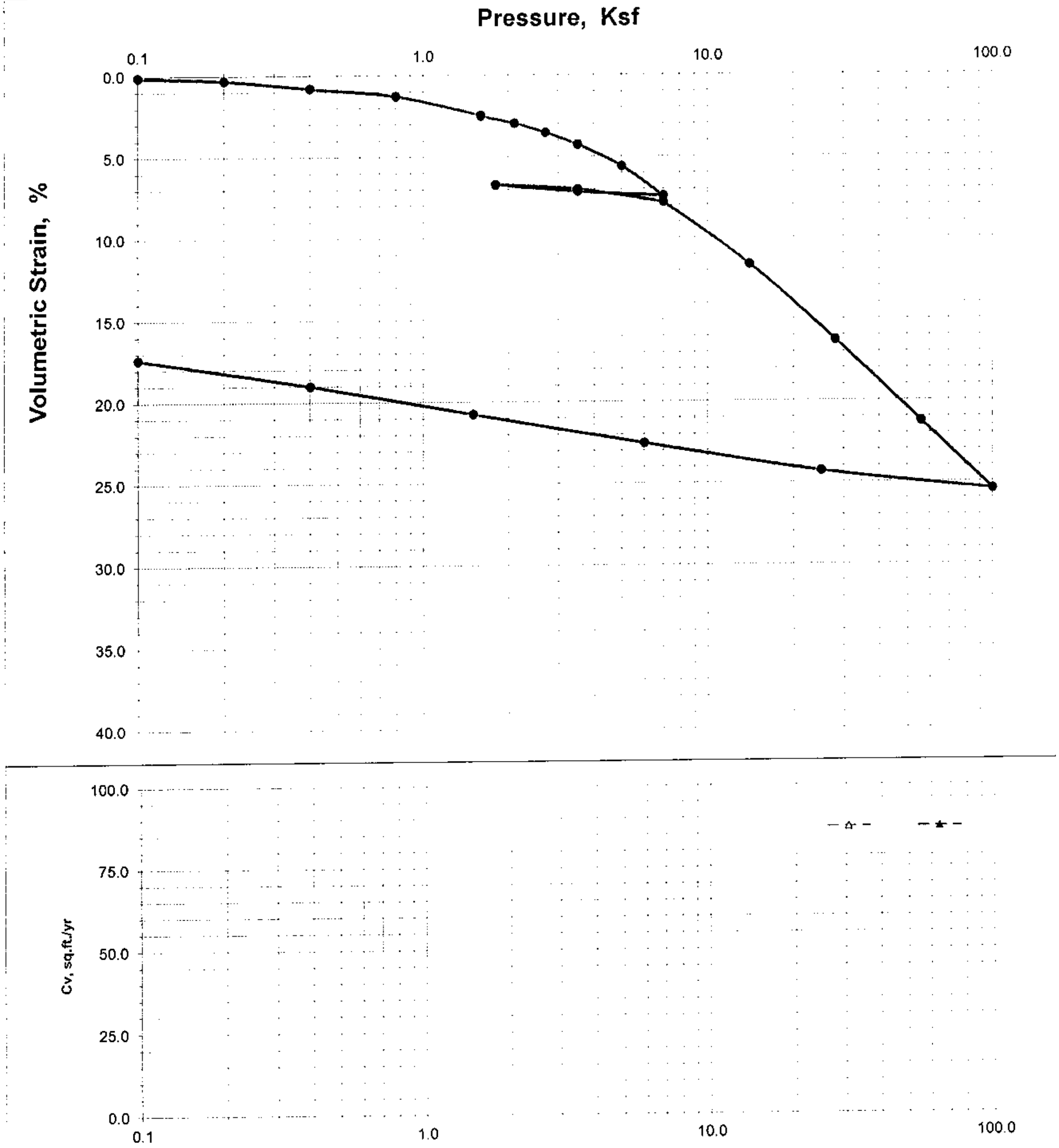
Client	Parikh Consultant	**Lab Ref**	
Project	Bart to Silicon Valley	**Job**	2017-144-T02
Borehole	BH-141	**Sample**	4
Location		**Depth**	15 feet



Tested By and Date:	Do Nguyen
Checked By and Date:	
Approved By and Date:	

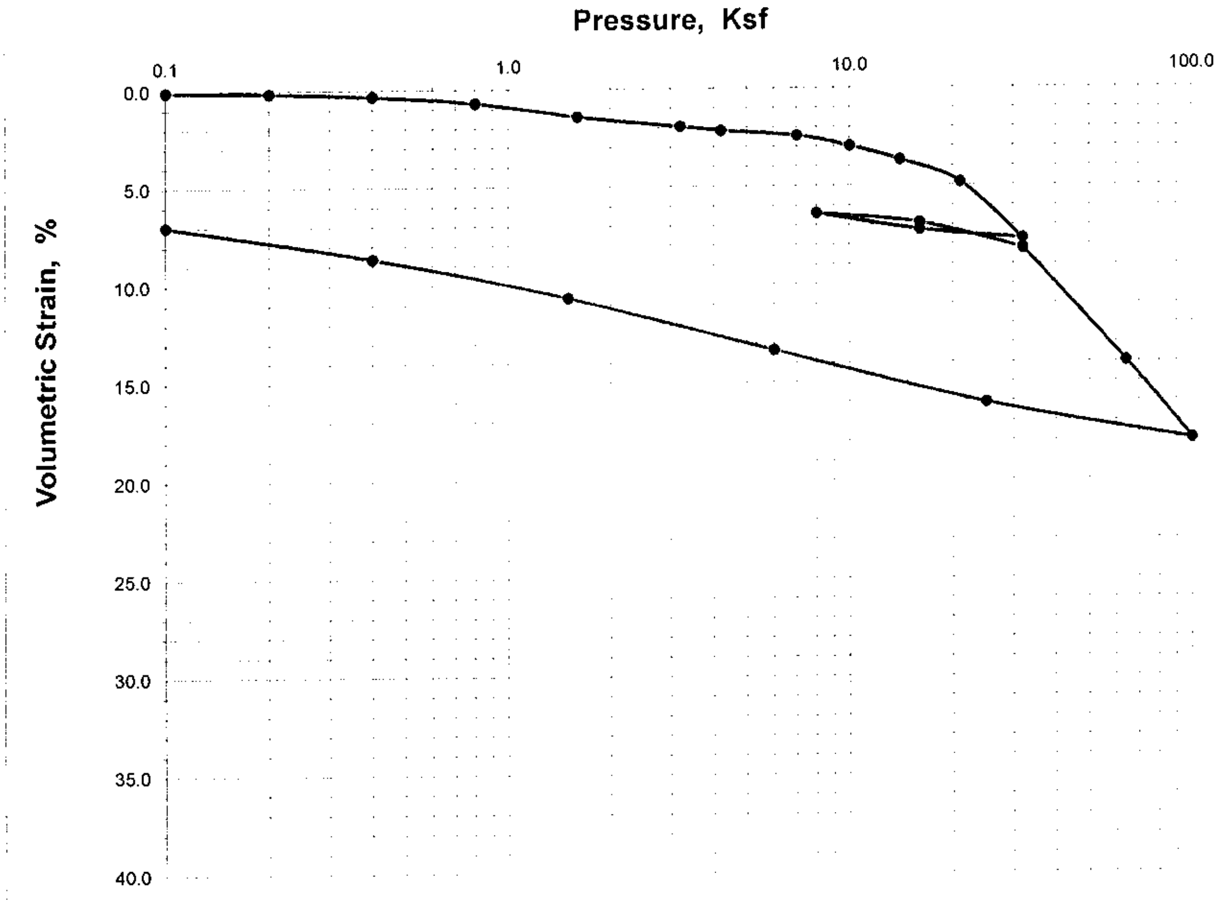
CONSOLIDATION TEST

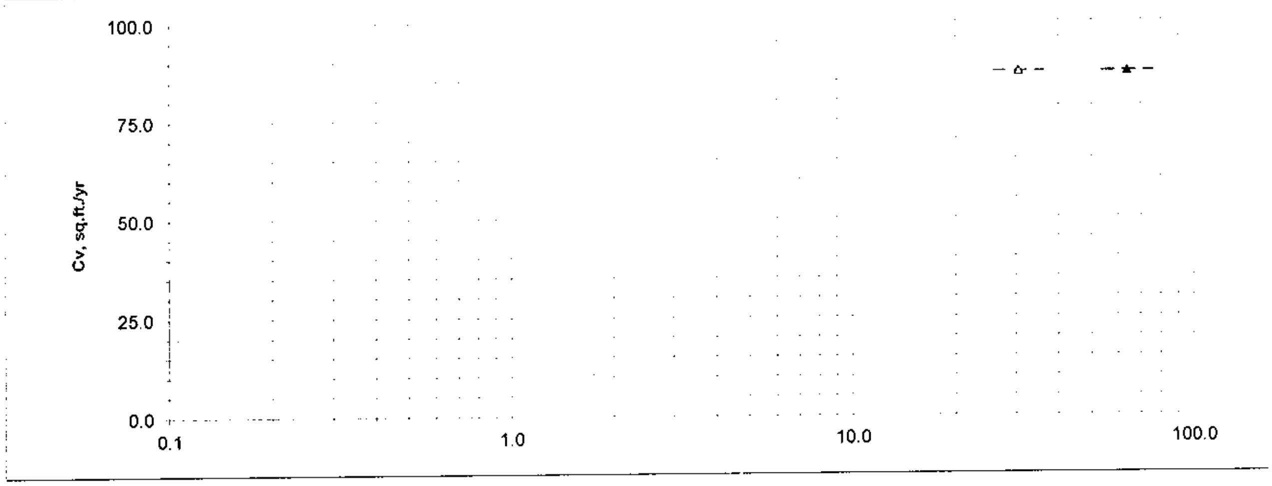
Boring Number	BH-150	Sample Number		6	Depth (ft)	40		
Soil Description	Gray clay with organics							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	36.1	113.0	1.030	94.6	1.00	2.420	(assumed) 2.70	61	34
Final	25.1	125.7	0.677	100.0	0.826				



CONSOLIDATION TEST

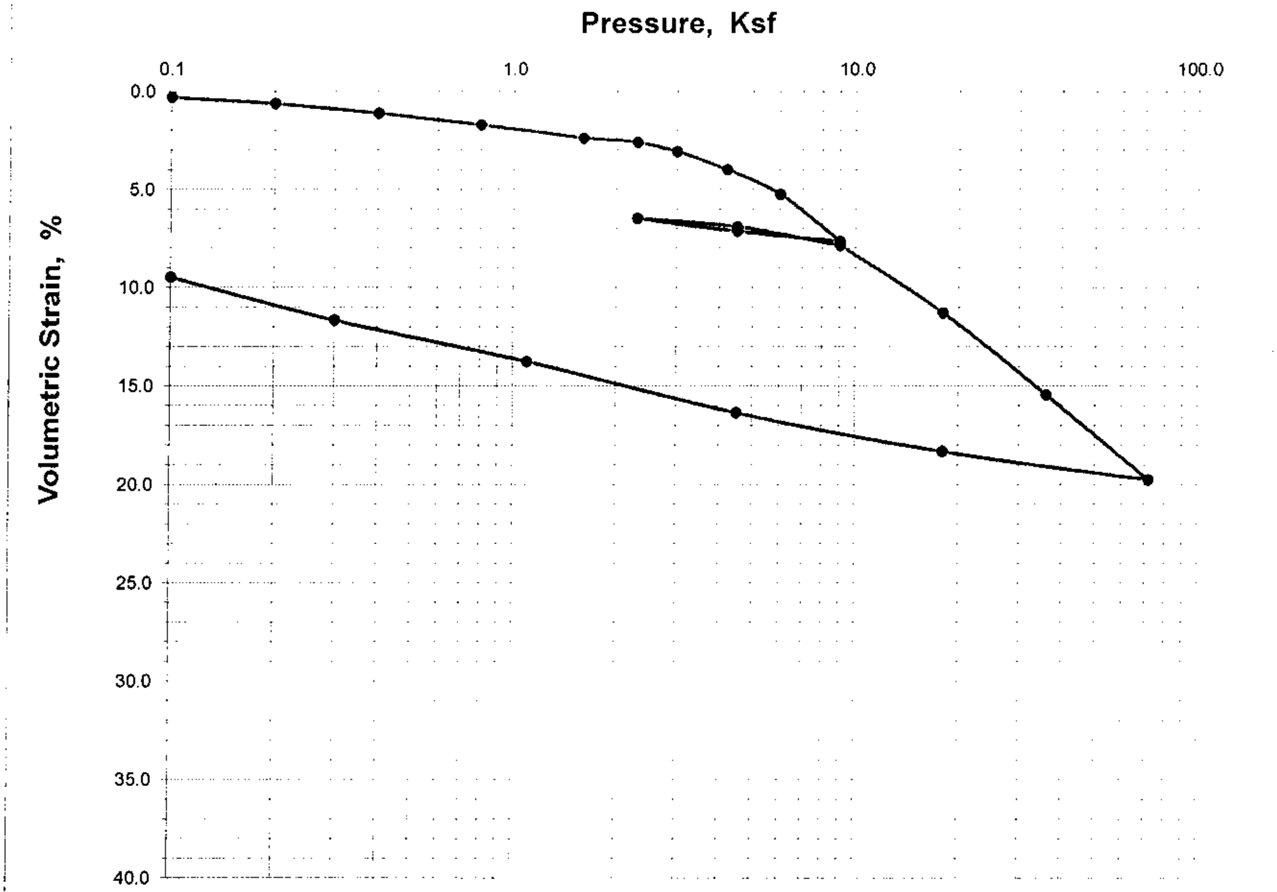
Boring Number	BH-150	Sample Number		48	Depth (ft)	147.5			
Soil Description	Grayish brown clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	28.1	120.4	0 782	96 4	1 00	2.420	2.68	54	30
Final	24.6	125.8	0.659	100.2	0.931				

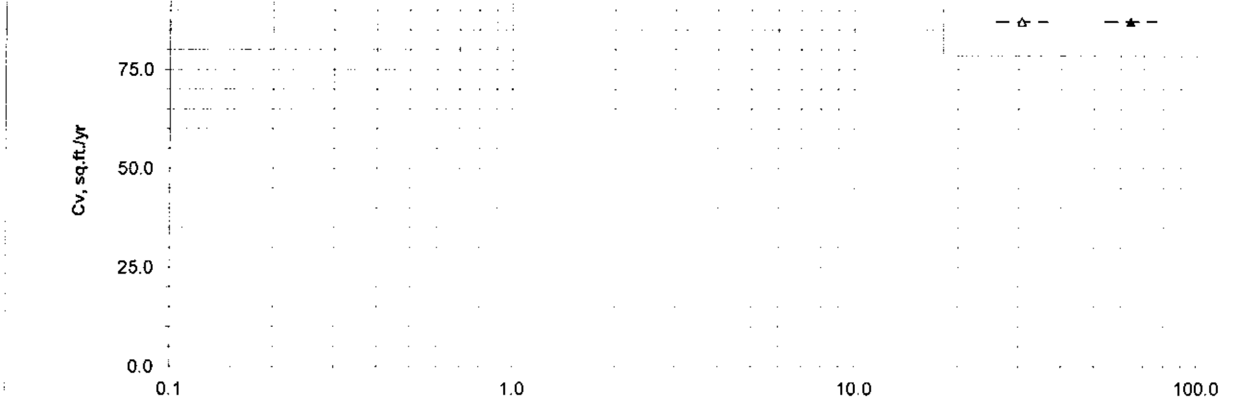




CONSOLIDATION TEST

Boring Number	BH-151		Sample Number	2	Depth (ft)	55.5			
Soil Description	Greenish gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	27.9	122.4	0.790	96.7	1.00	2.420	2.74	39	19
Final	22.7	129.8	0.620	100.5	0.905				





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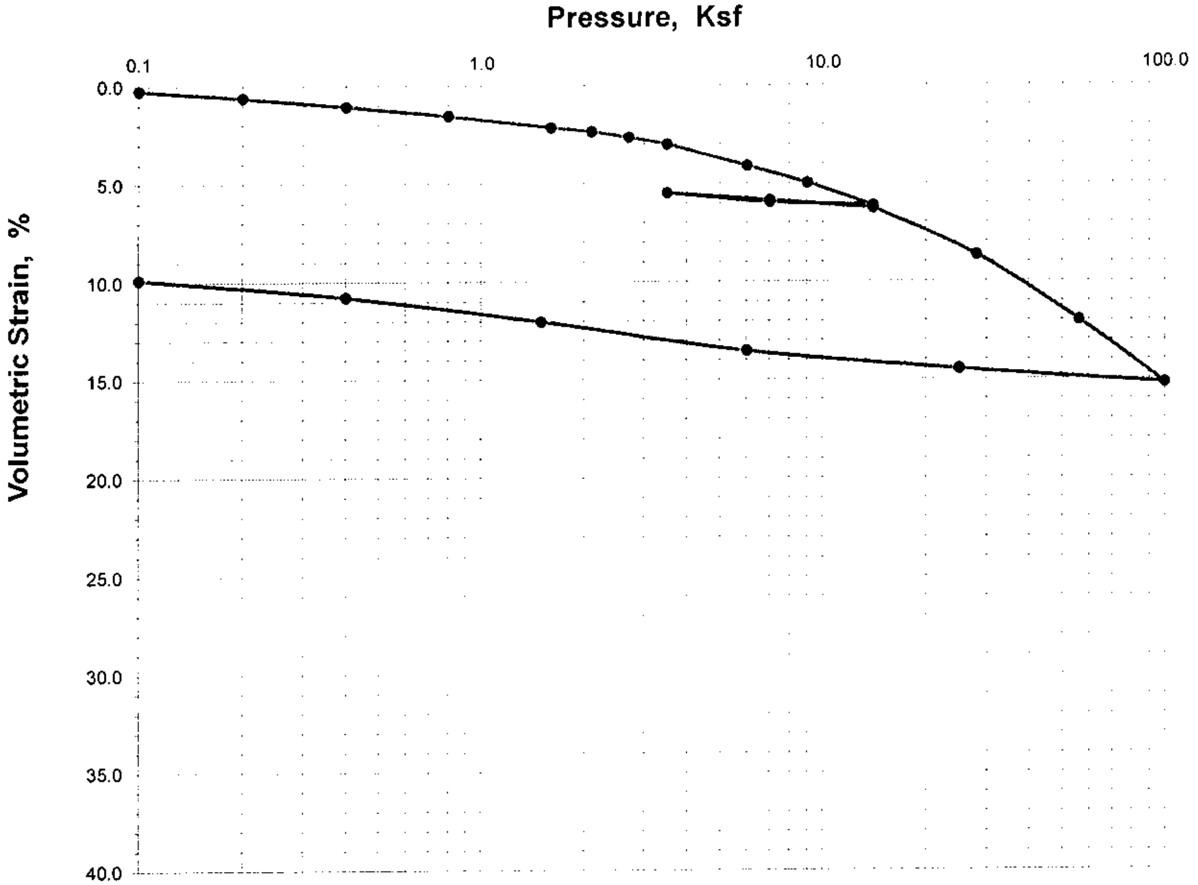
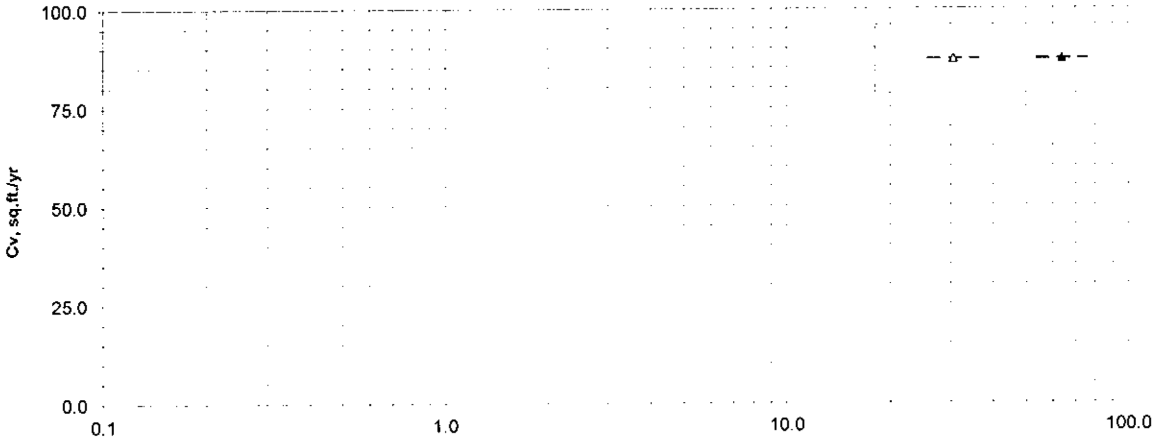
CONSOLIDATION TEST

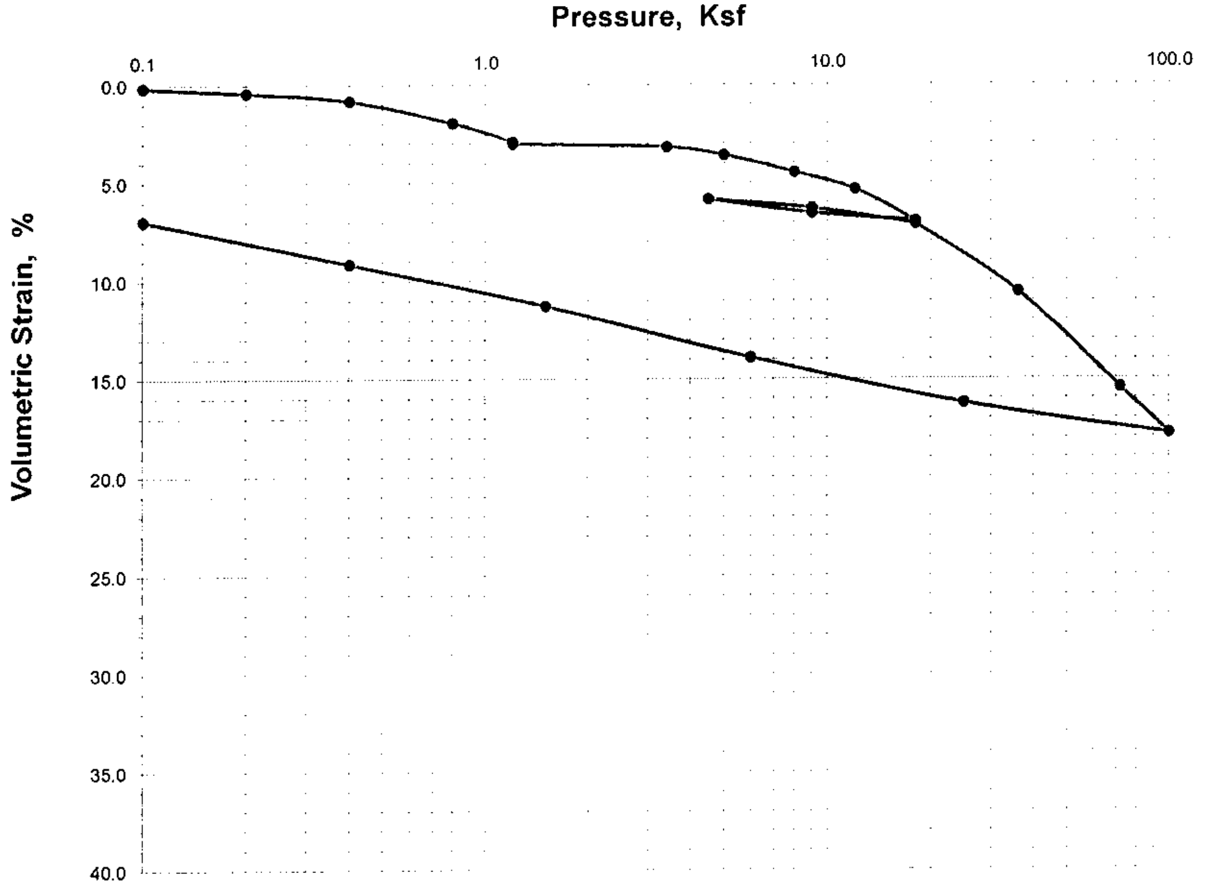
Boring Number	BH-151	Sample Number	18	Depth (ft)	103				
Soil Description	Greenish gray clay with sand								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	21.0	127.1	0.605	93.8	1.00	2.420	(assumed) 2.70	43	23
Final	16.7	135.8	0.448	100.4	0.902				

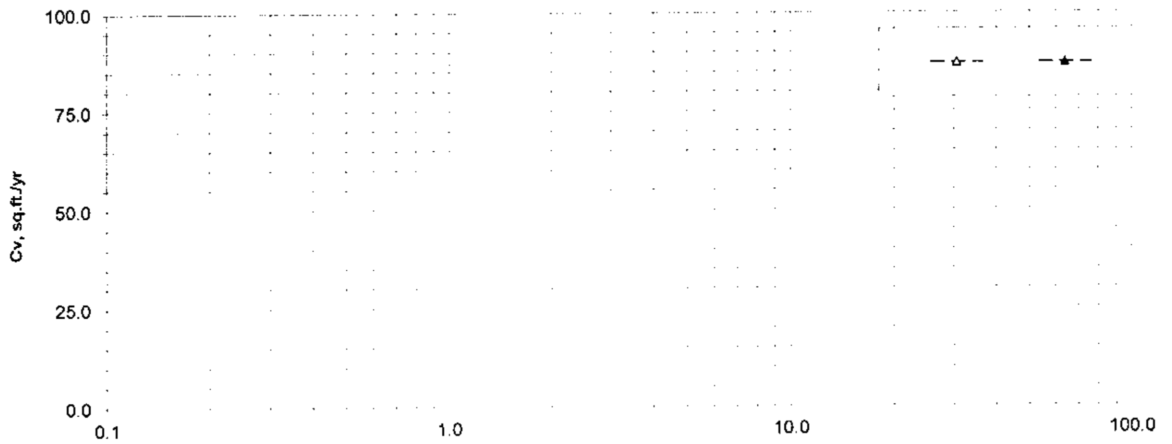




CONSOLIDATION TEST

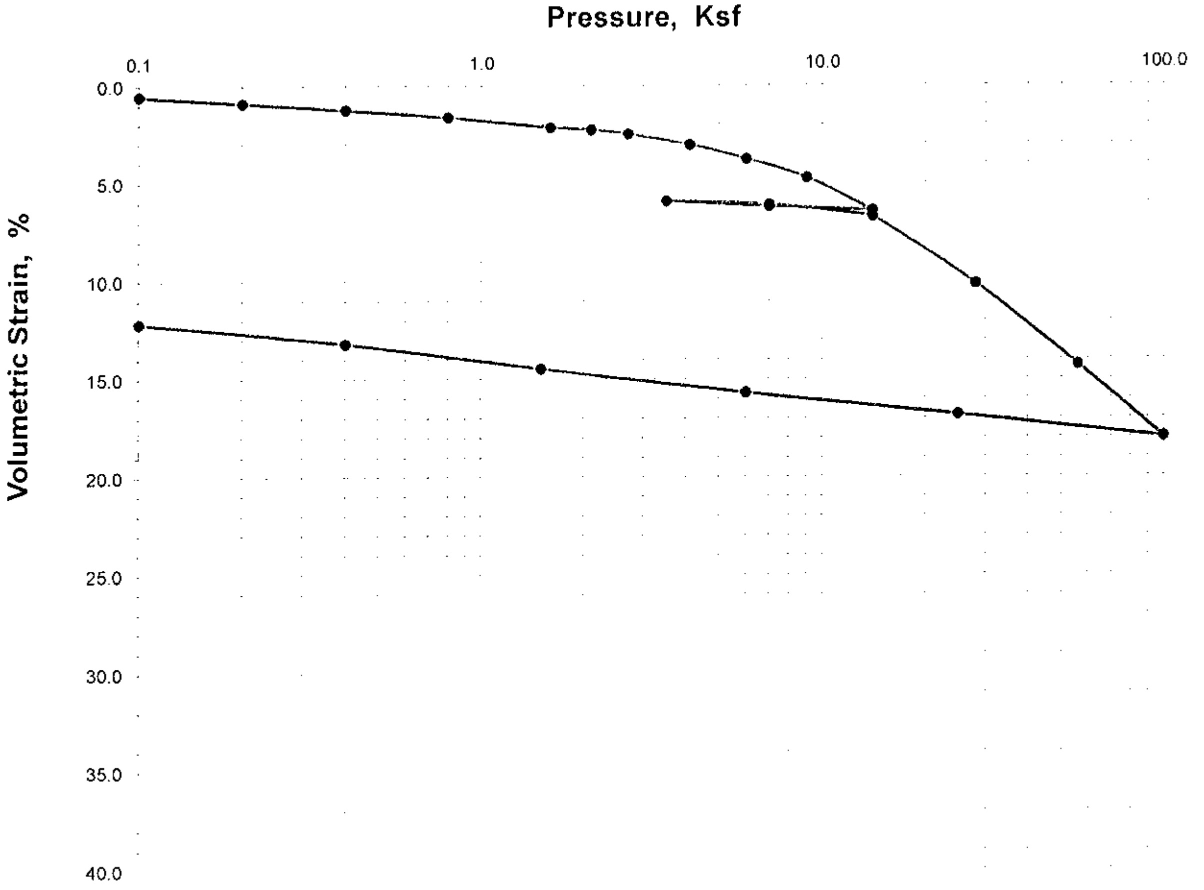
Boring Number	BH-151	Sample Number	30	Depth (ft)	125				
Soil Description	Gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	24.1	124.4	0.673	96.0	1.00	2.420	2.69	53	31
Final	20.8	130.1	0.558	100.2	0.931				

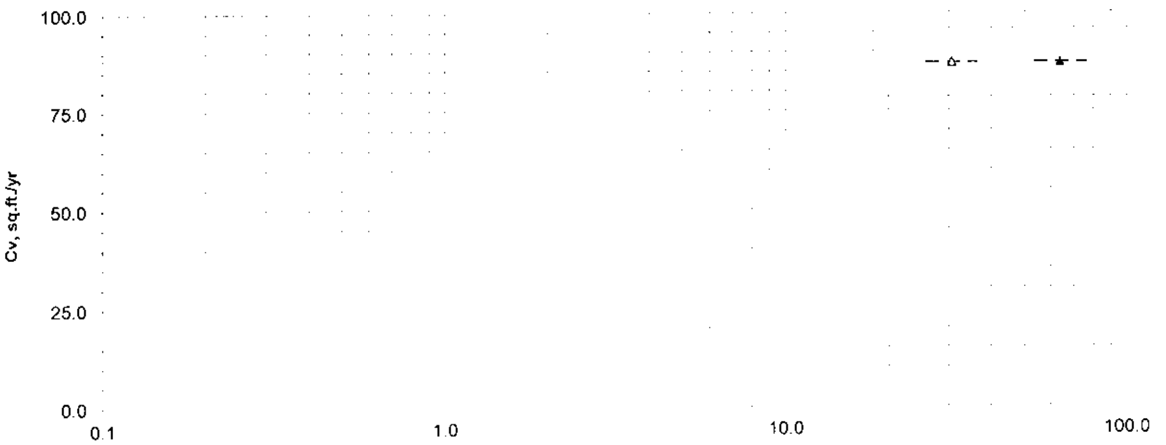




CONSOLIDATION TEST

Boring Number	BH-152	Sample Number		13	Depth (ft)	76.5			
Soil Description	Greenish gray clay with sand								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	30.8	122.2	0.831	101.6	1.00	2.420	2.74	36	18
Final	22.7	130.4	0.610	101.9	0.879				

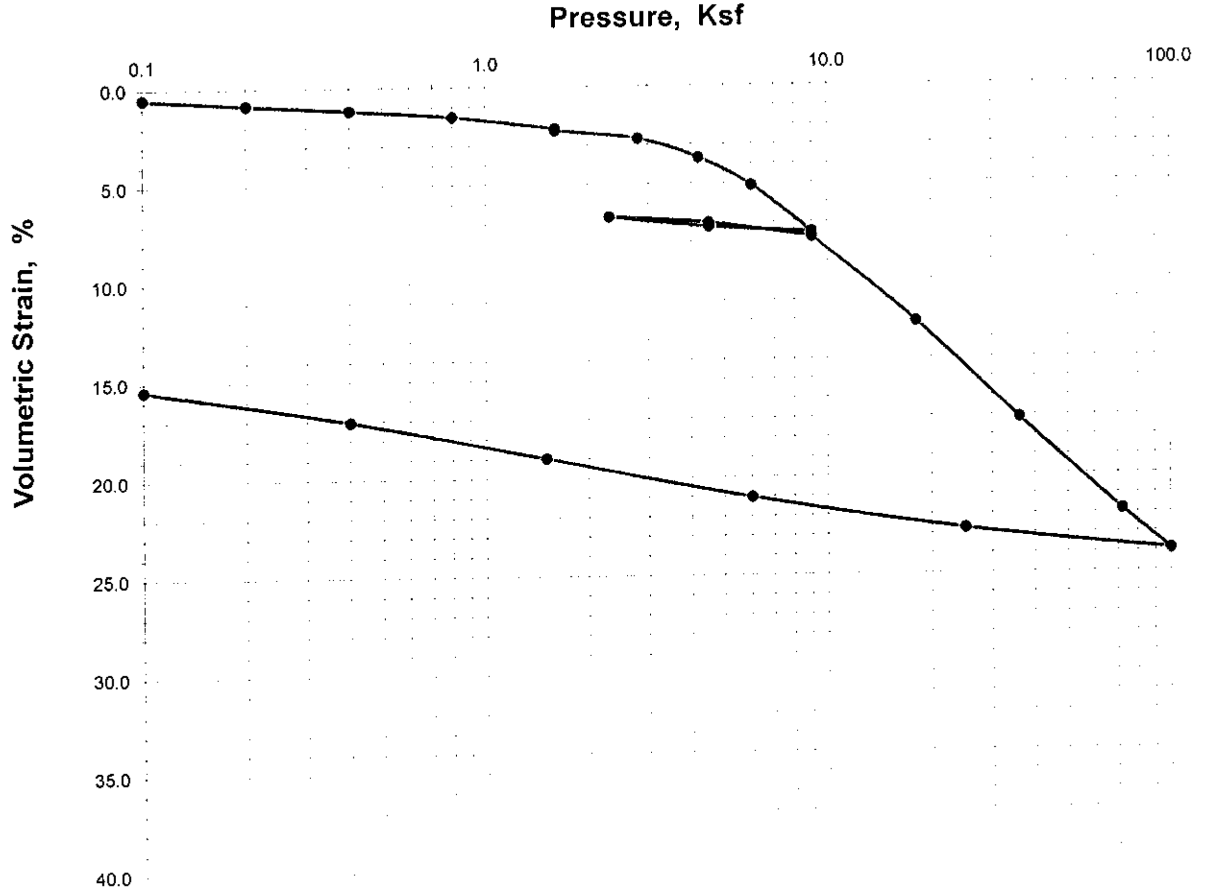


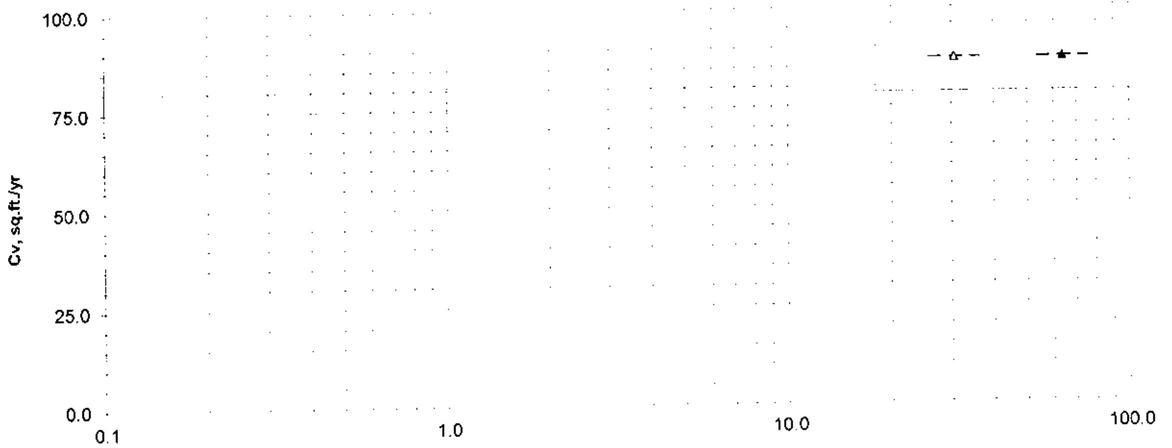


CONSOLIDATION TEST

Boring Number	BH-153	Sample Number	4	Depth (ft)	30	
Soil Description	Greenish gray clay					

	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	28.5	120.3	0.801	96.1	1.00	2.420	(assumed) 2.70	46	29
Final	19.6	132.0	0.527	100.1	0.848				

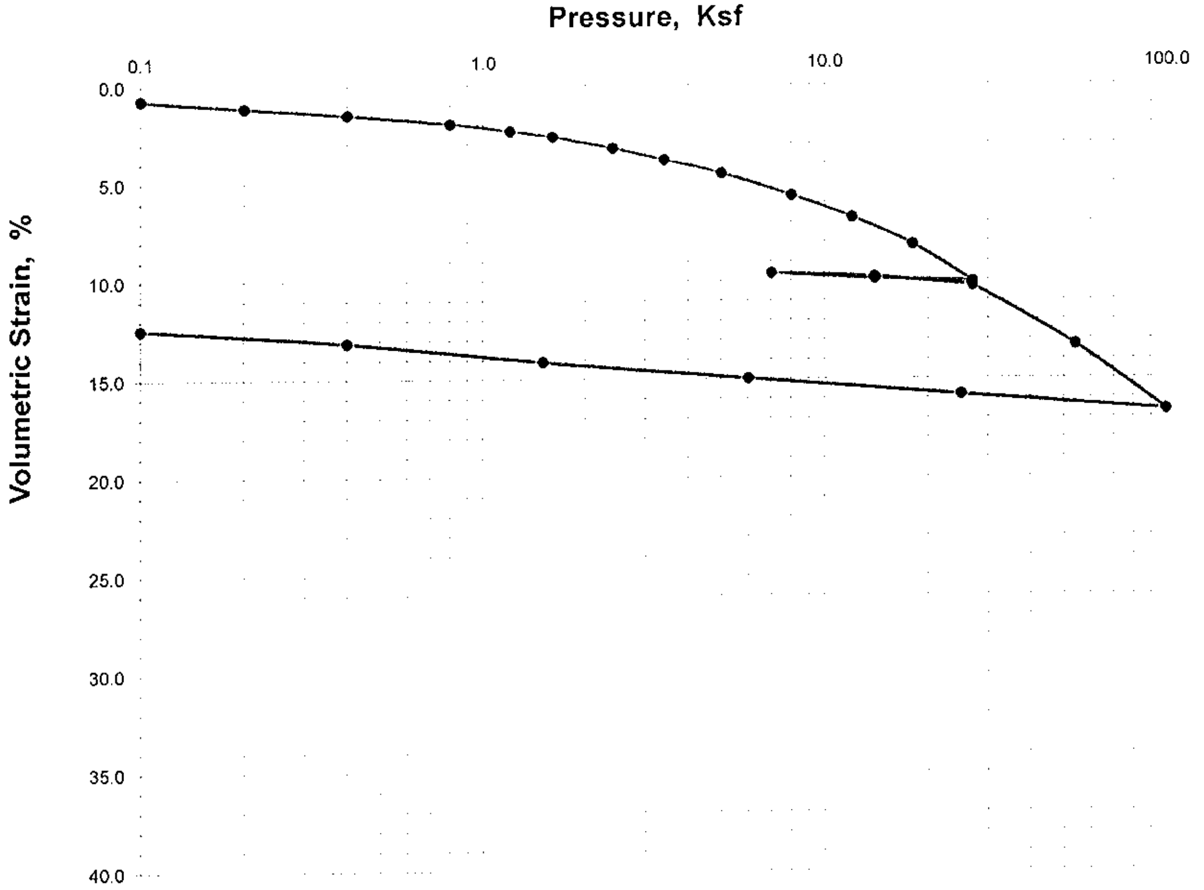


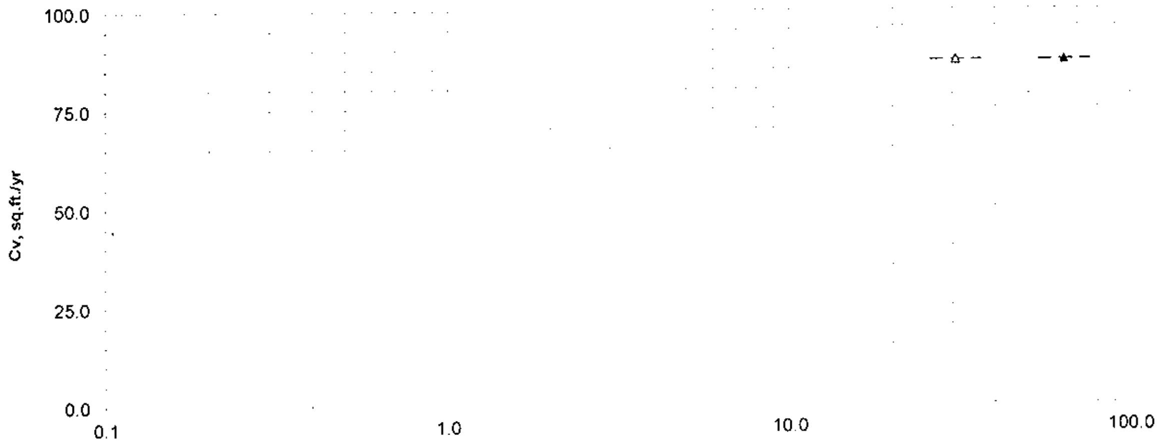


CONSOLIDATION TEST

Boring Number	BH-153	Sample Number	18	Depth (ft)	82
Soil Description	Greenish gray sandy clay				

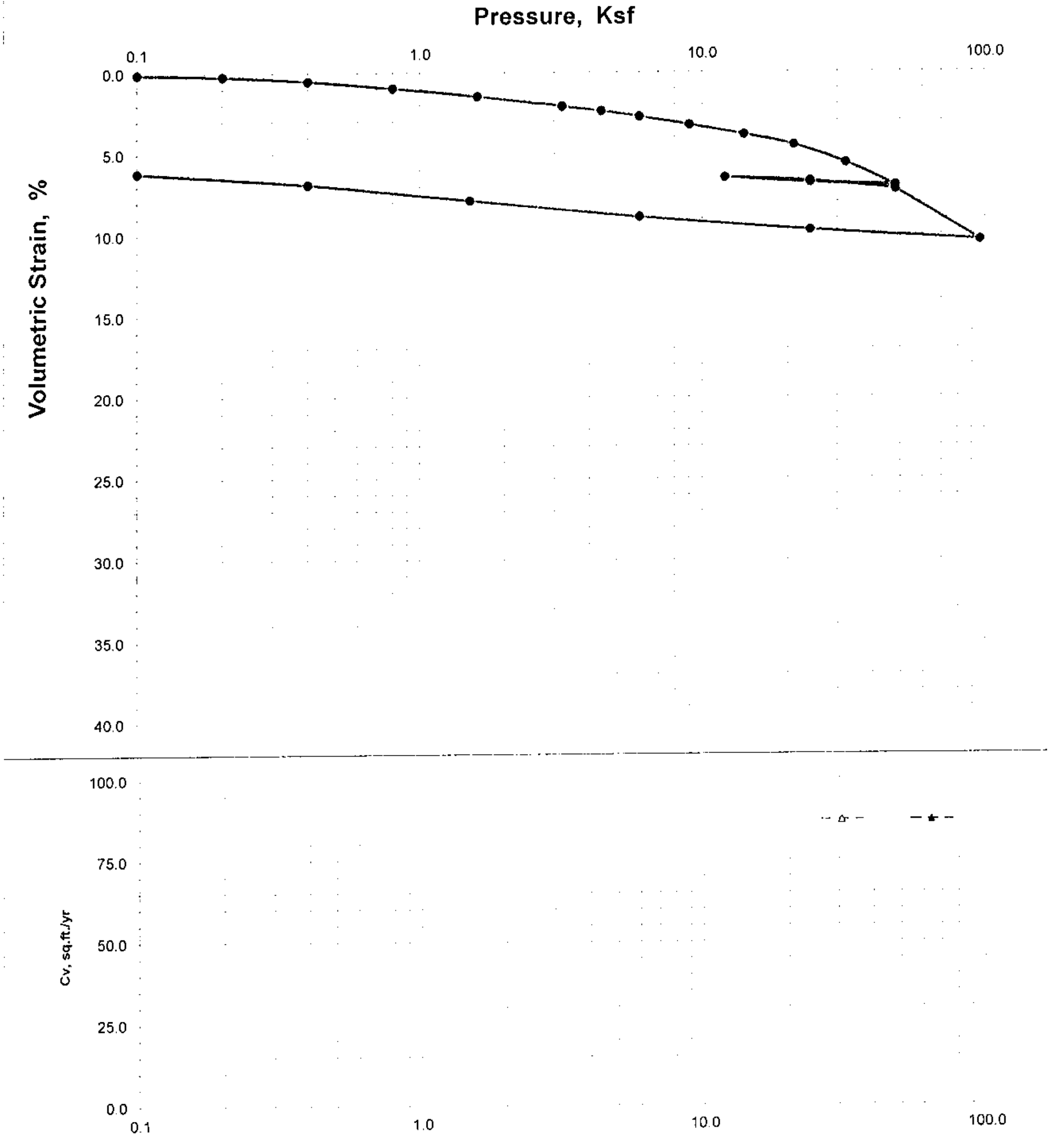
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	22.7	125.2	0.653	93.9	1.00	2.420	(assumed) 2.70	31	9
Final	16.7	135.8	0.448	100.3	0.876				





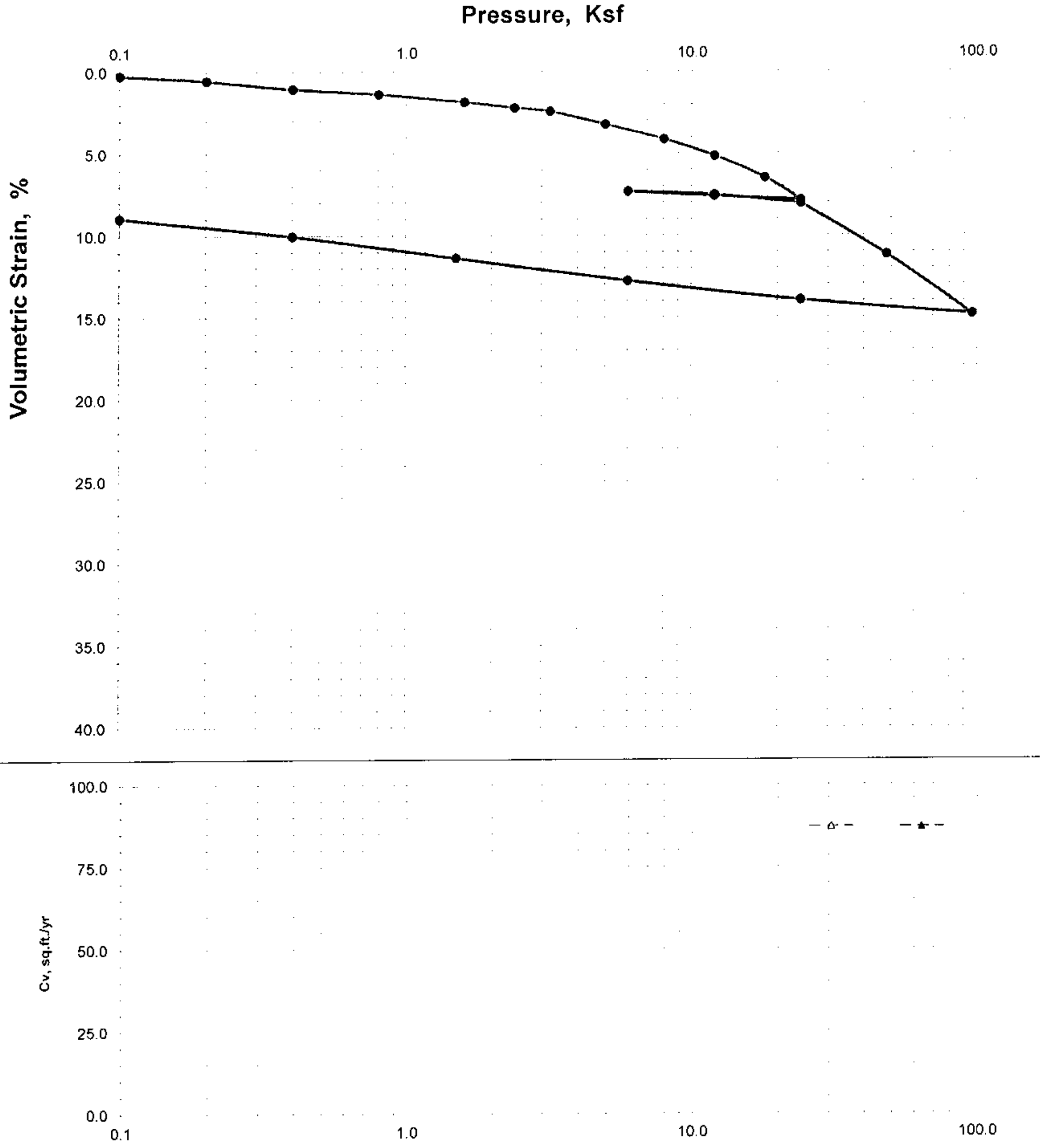
CONSOLIDATION TEST

Boring Number	BH-153		Sample Number	50	Depth (ft)	140			
Soil Description	Grayish brown clayey sand								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	20.1	123.3	0.648	83.9	1.00	2.420	2.71	36	12
Final	19.8	131.0	0.548	98.0	0.939				



CONSOLIDATION TEST

Boring Number	BH-155		Sample Number	7	Depth (ft)	67			
Soil Description	Brown clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	20.7	127.7	0.595	94.2	1.00	2.420	(assumed) 2.70	41	22
Final	16.8	135.6	0.453	100.2	0.911				



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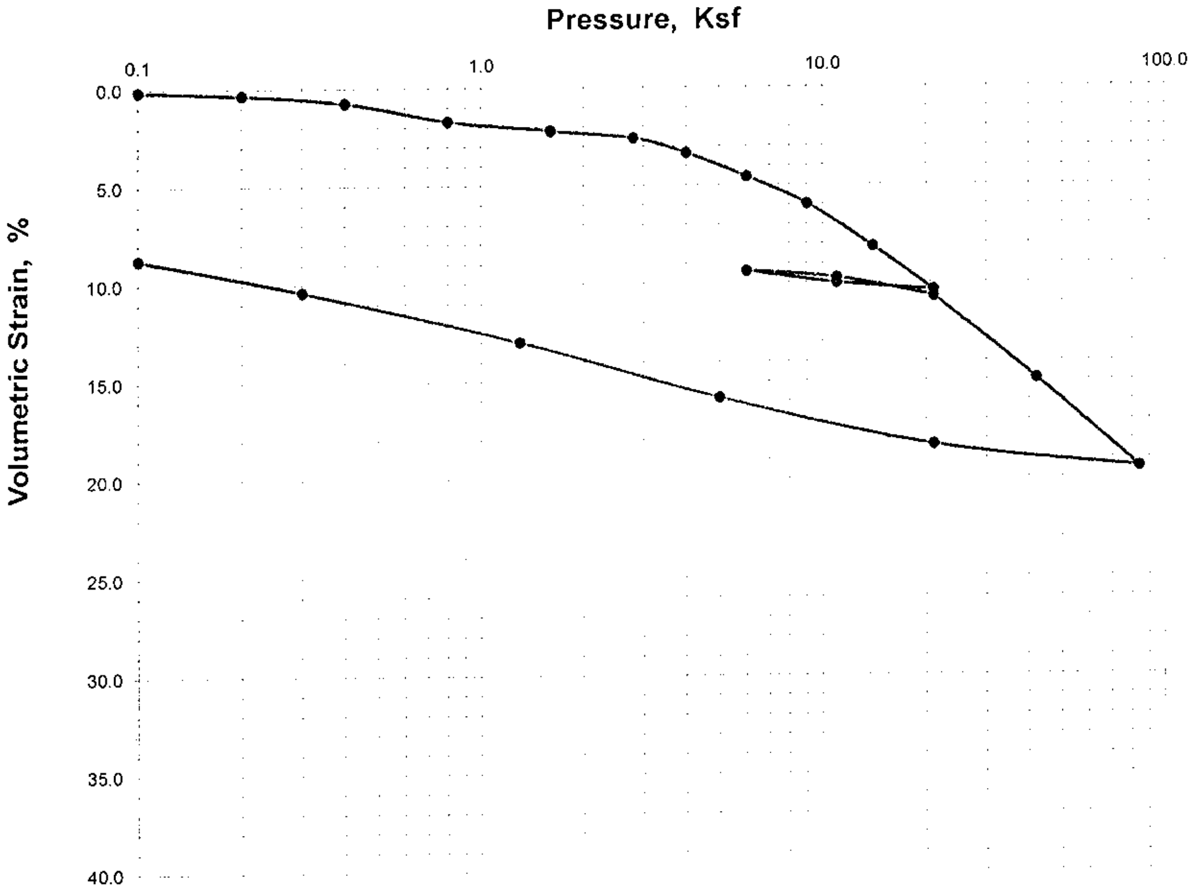
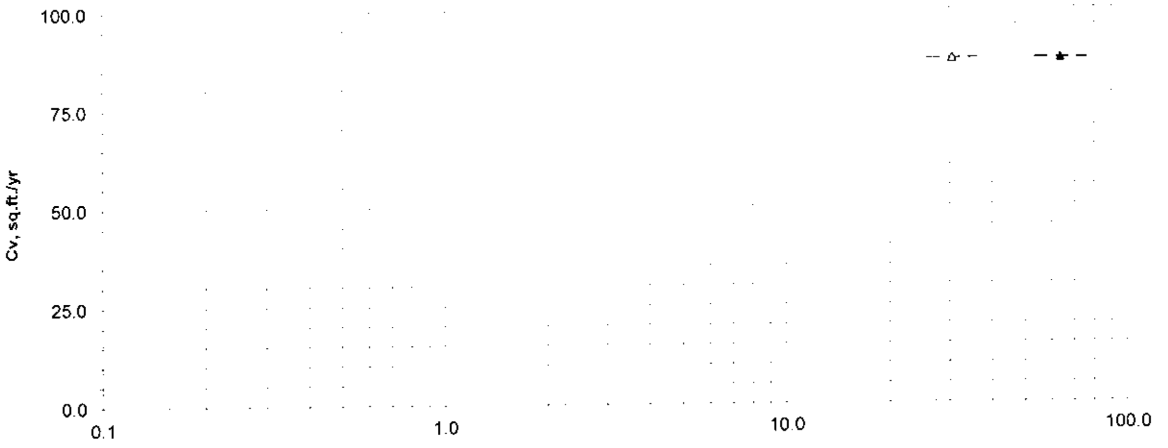
CONSOLIDATION TEST

Boring Number	BH-155	Sample Number	19	Depth (ft)	88
Soil Description	Greenish gray clay				

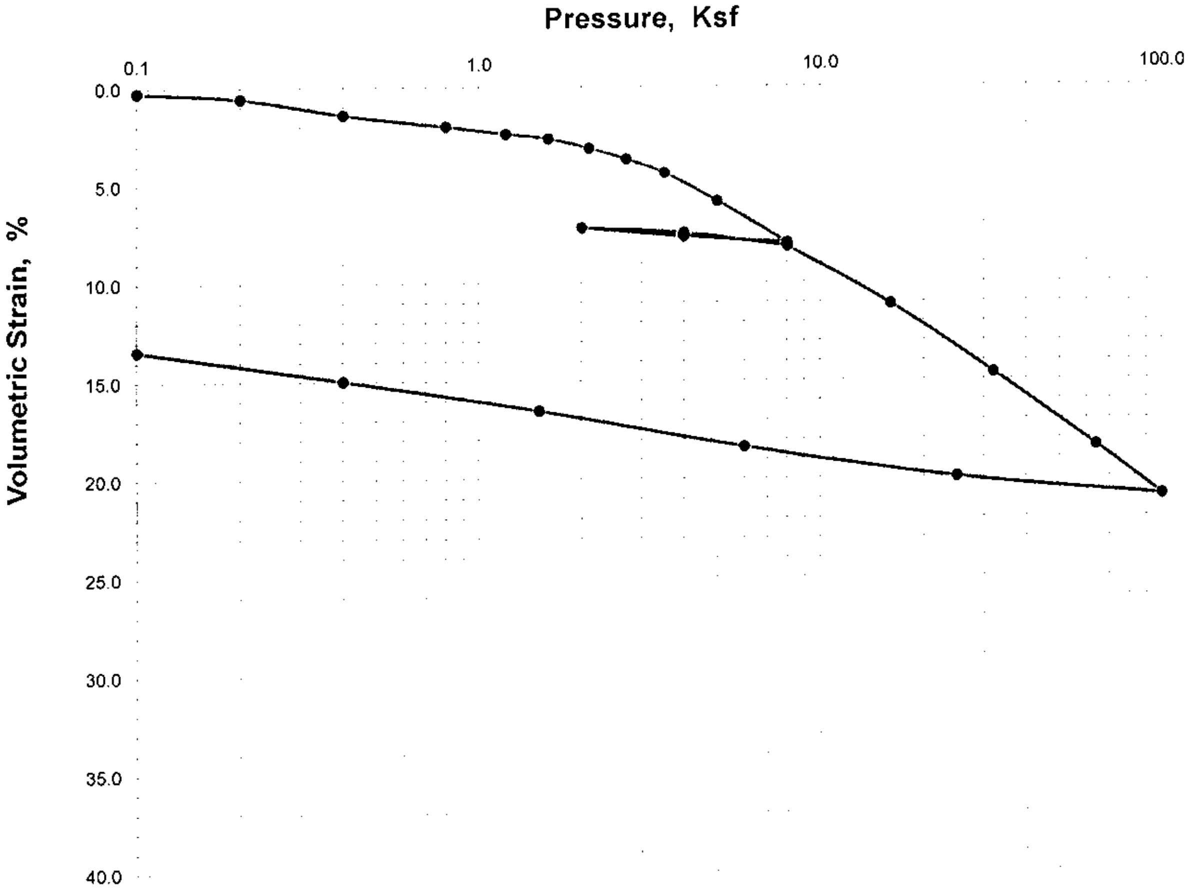
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	30.9	119.9	0.835	99.6	1.00	2.420	2.69	51	28
Final	25.2	125.7	0.676	100.5	0.913				

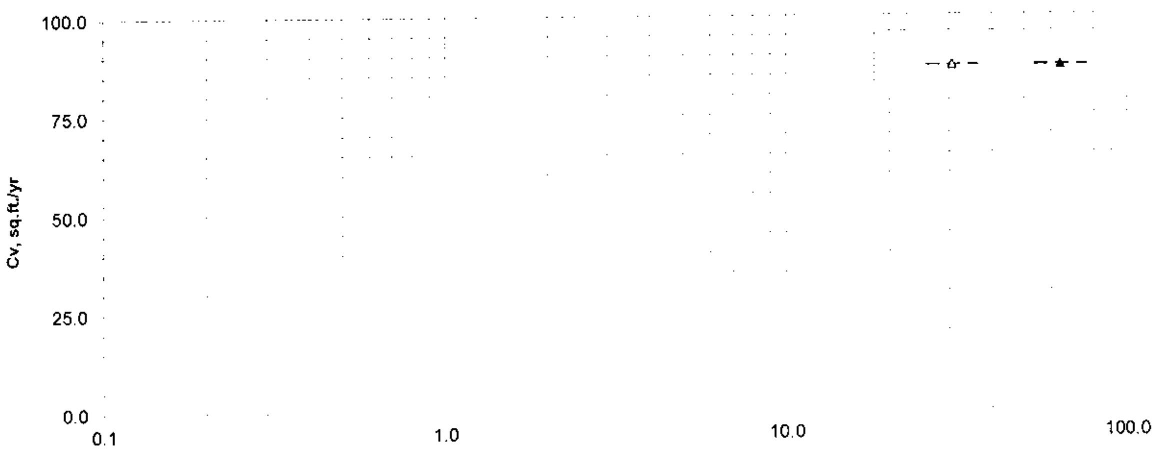




CONSOLIDATION TEST

Boring Number	BH-156	Sample Number	1	Depth (ft)	65				
Soil Description	Greenish gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	25.6	124.4	0.702	98.4	1.00	2.420	(assumed) 2.70	39	19
Final	17.6	134.6	0.474	100.3	0.866				

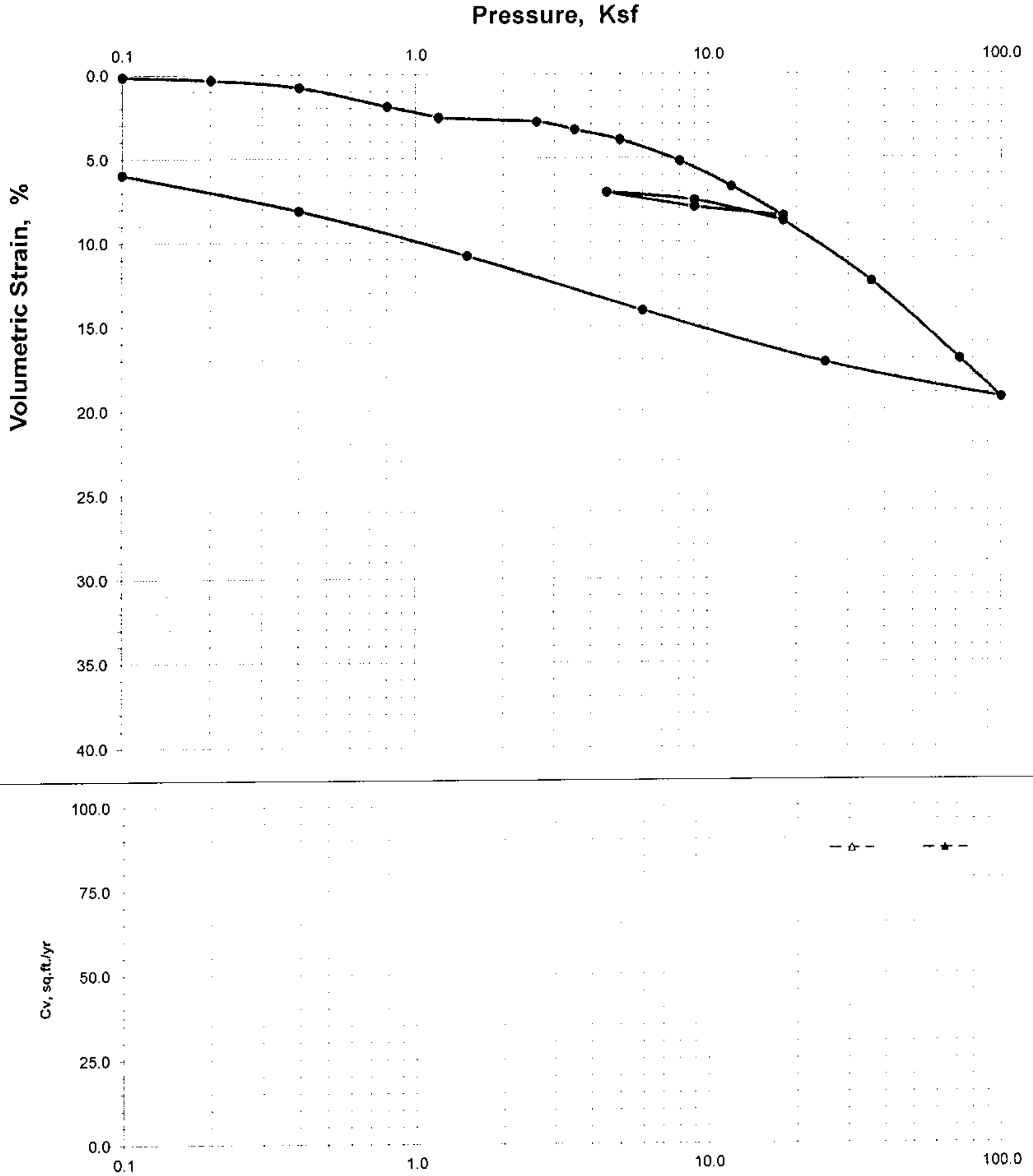




CONSOLIDATION TEST

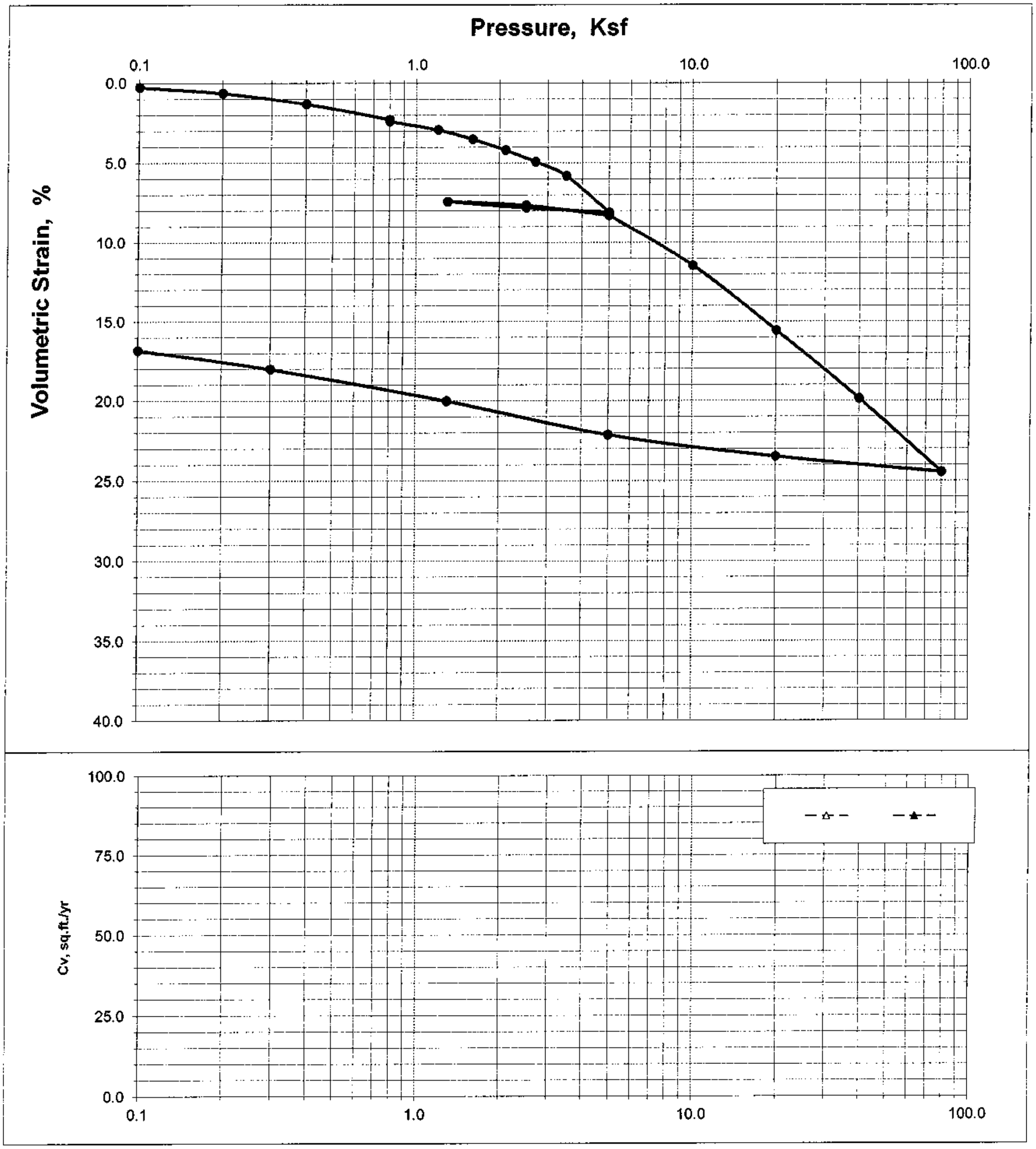
Boring Number	BH-156	Sample Number	13	Depth (ft)	86	
Soil Description	Greenish gray clay					

	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	29.8	120.0	0.823	97.8	1.00	2.420	(assumed) 2.70	70	43
Final	26.6	124.4	0.716	100.4	0.941				



CONSOLIDATION TEST

Boring Number	BH-157	Sample Number	2	Depth (ft)	30			
Soil Description	Grayish brown clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	33.3	115.1	0.953	94.4	1.00	2.420	(assumed) 2.70	34	12
Final	23.2	127.9	0.625	100.4	0.832				



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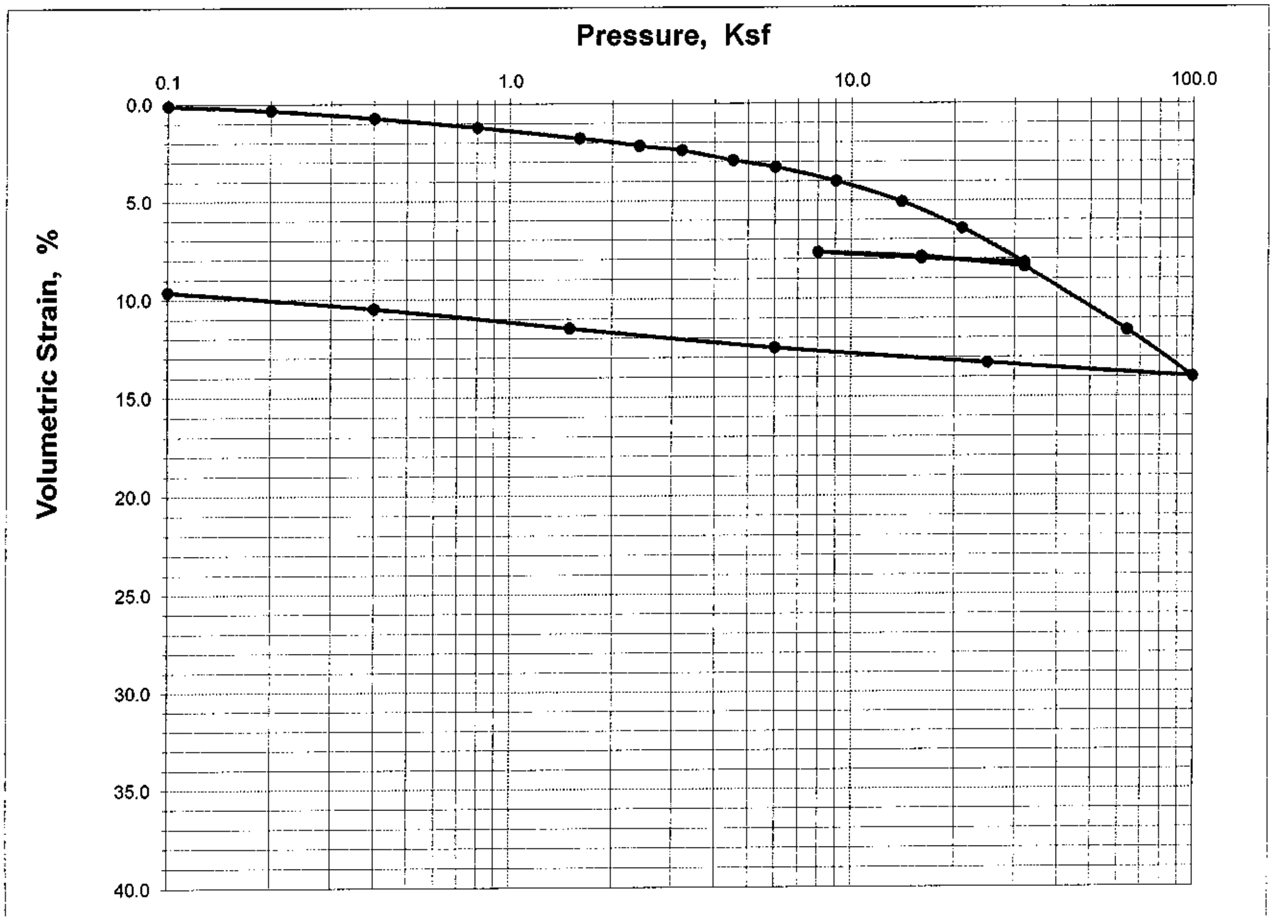
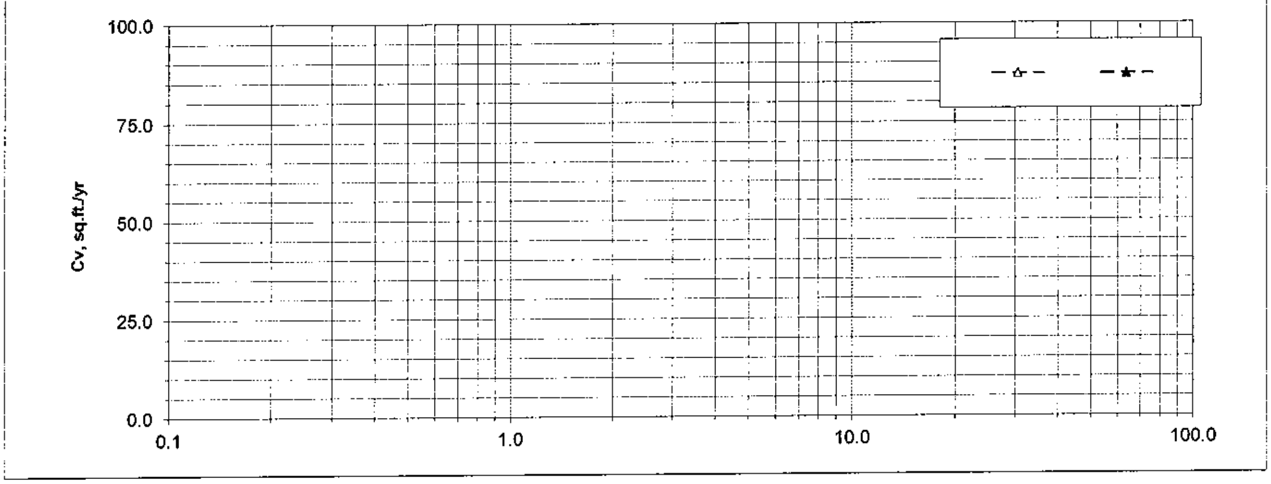
CONSOLIDATION TEST

Boring Number	BH-158	Sample Number	28	Depth (ft)	117			
Soil Description	Greenish gray sandy clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	21.5	125.6	0.632	91.9	1.00	2.420	(assumed) 2.70	31	13
Final	17.7	134.5	0.475	100.5	0.904				





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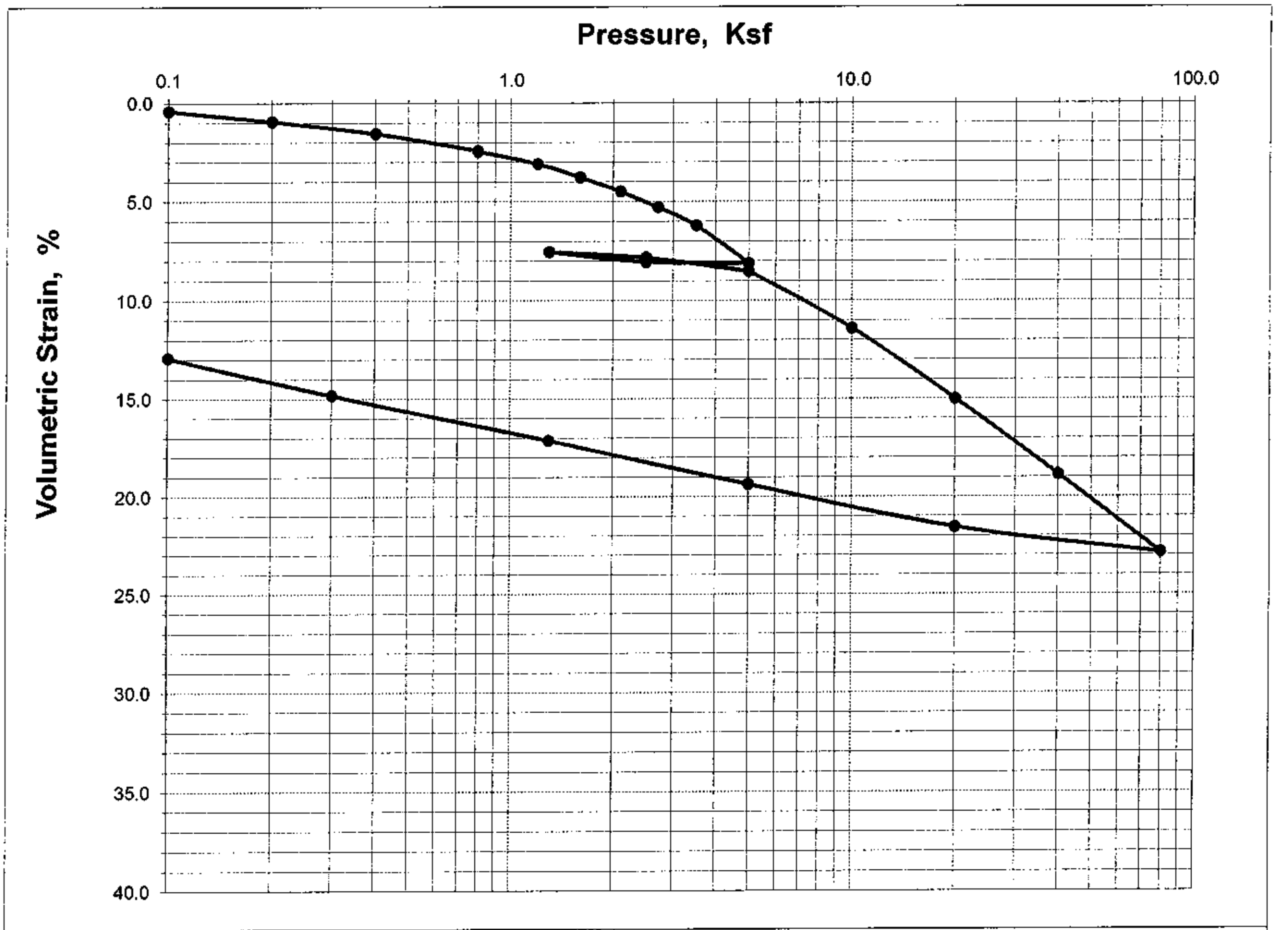
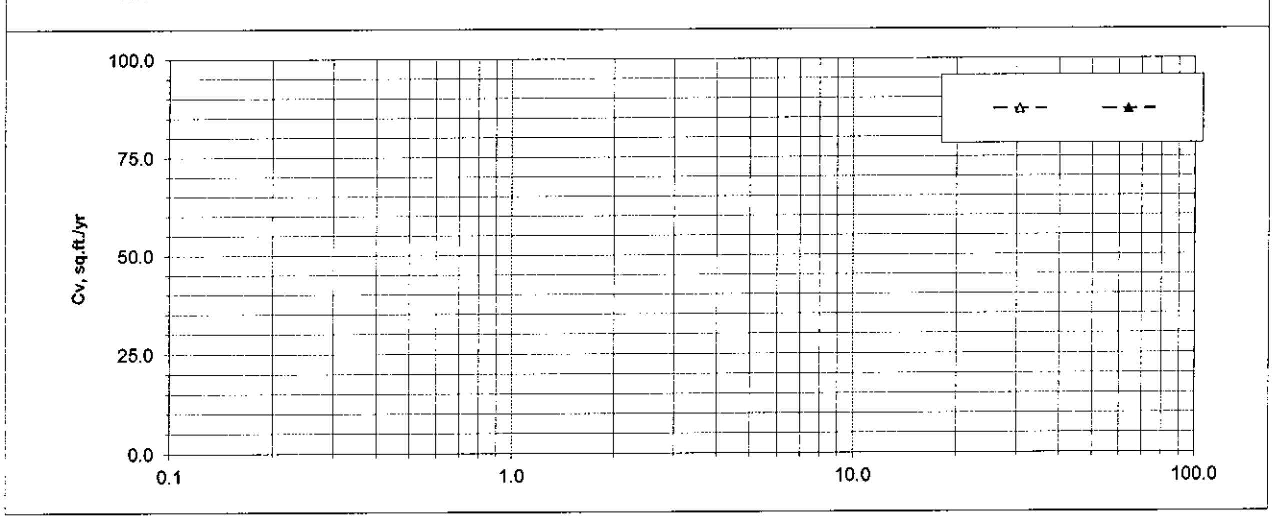
CONSOLIDATION TEST

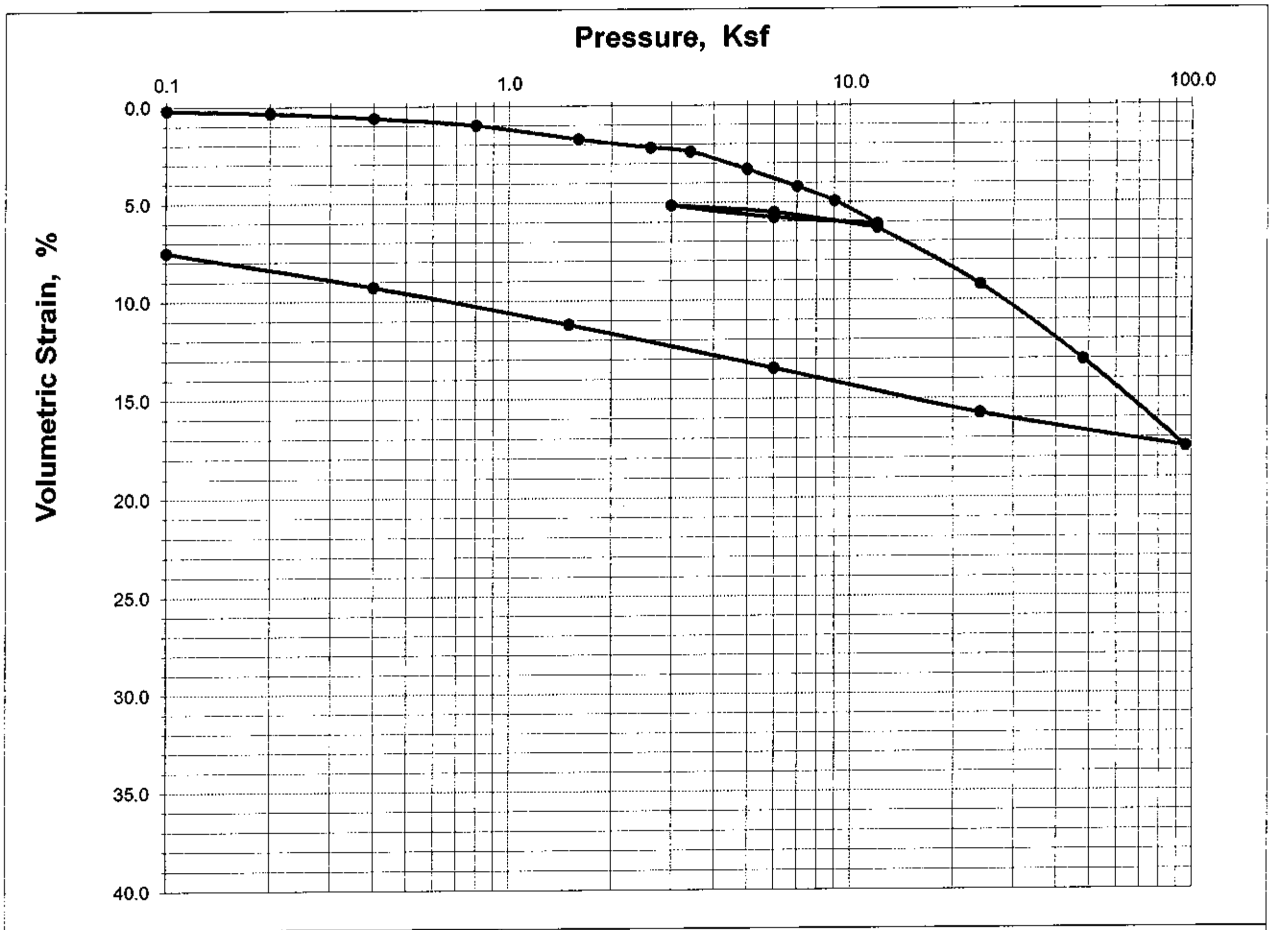
Boring Number	BH-159	Sample Number	2	Depth (ft)	20				
Soil Description	Greenish gray clay with organics								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	29.4	118.9	0.835	95.1	1.00	2.420	(assumed) 2.70	50	26
Final	22.3	128.9	0.599	100.4	0.871				

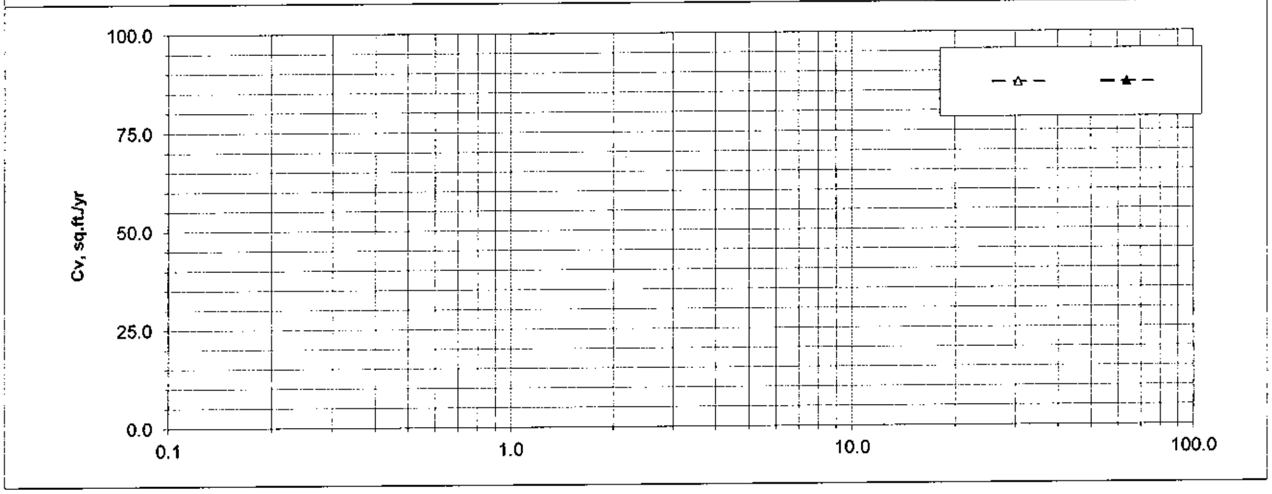




CONSOLIDATION TEST

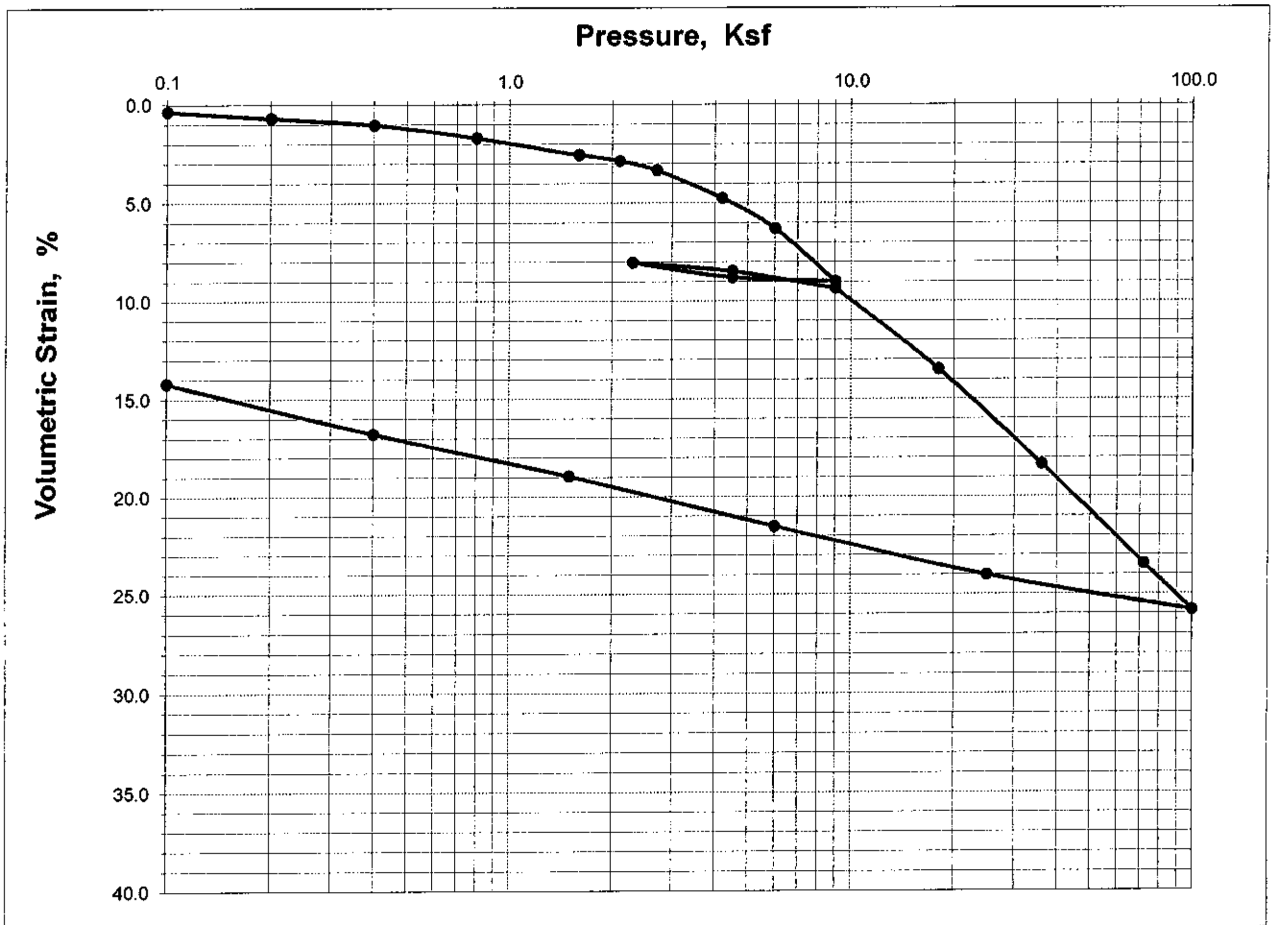
Boring Number		BH-159	Sample Number		18	Depth (ft)	90		
Soil Description		Gray clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	23.8	126.0	0.656	97.9	1.00	2.420	(assumed) 2.70	41	22
Final	19.8	131.8	0.532	100.4	0.925				

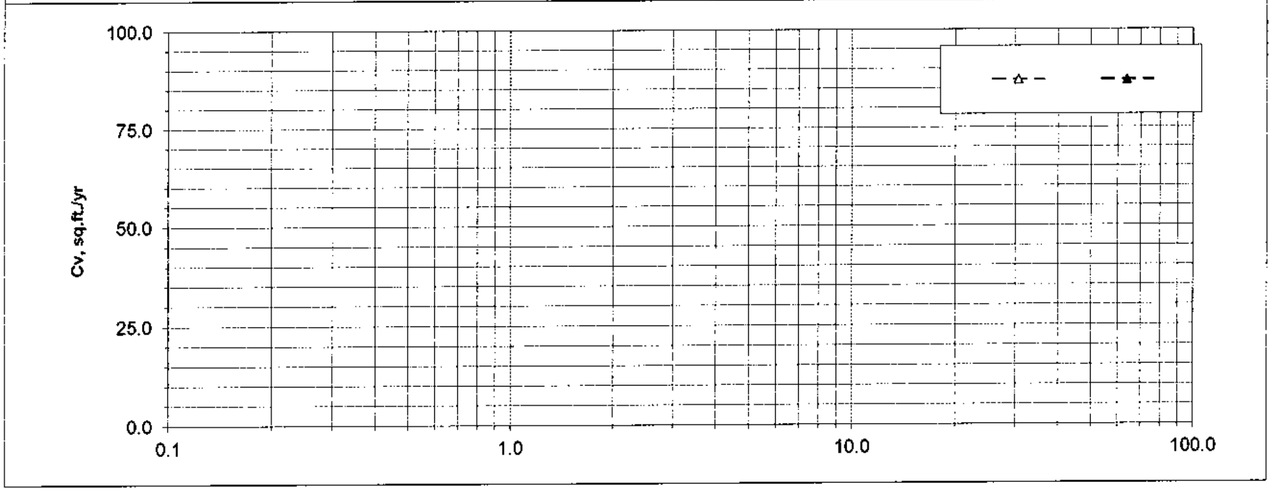




CONSOLIDATION TEST

Boring Number	BH-160	Sample Number		5	Depth (ft)	35		
Soil Description	Greenish gray clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	32.5	115.2	0.940	93.3	1.00	2.420	(assumed) 2.70	55	29
Final	24.7	126.3	0.665	100.4	0.858				





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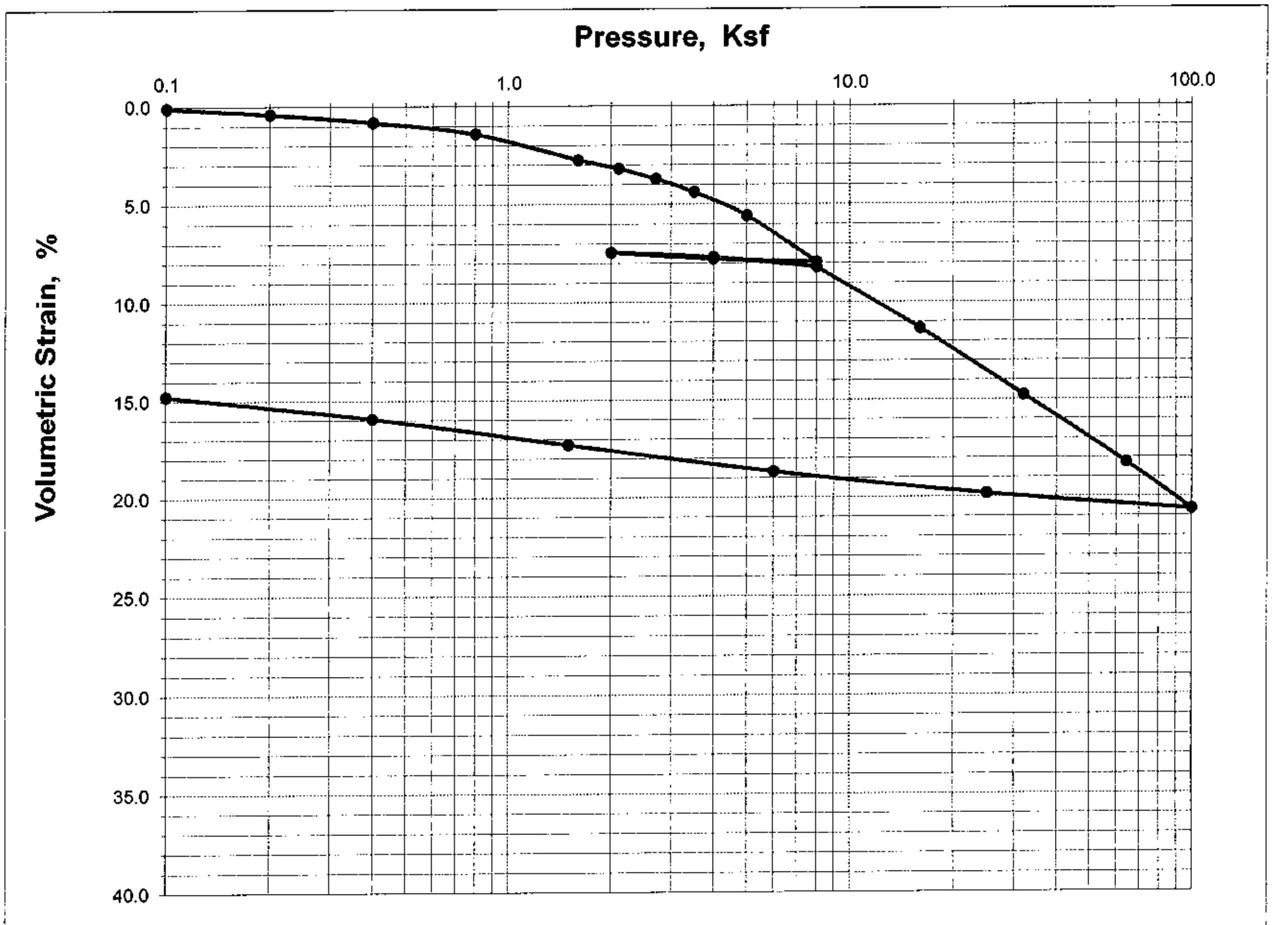
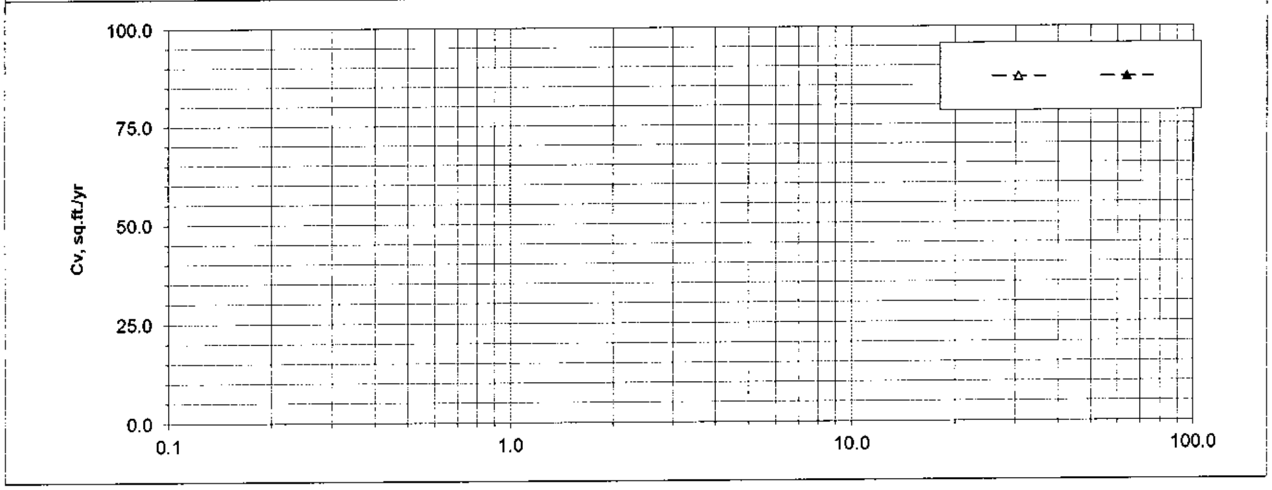
CONSOLIDATION TEST

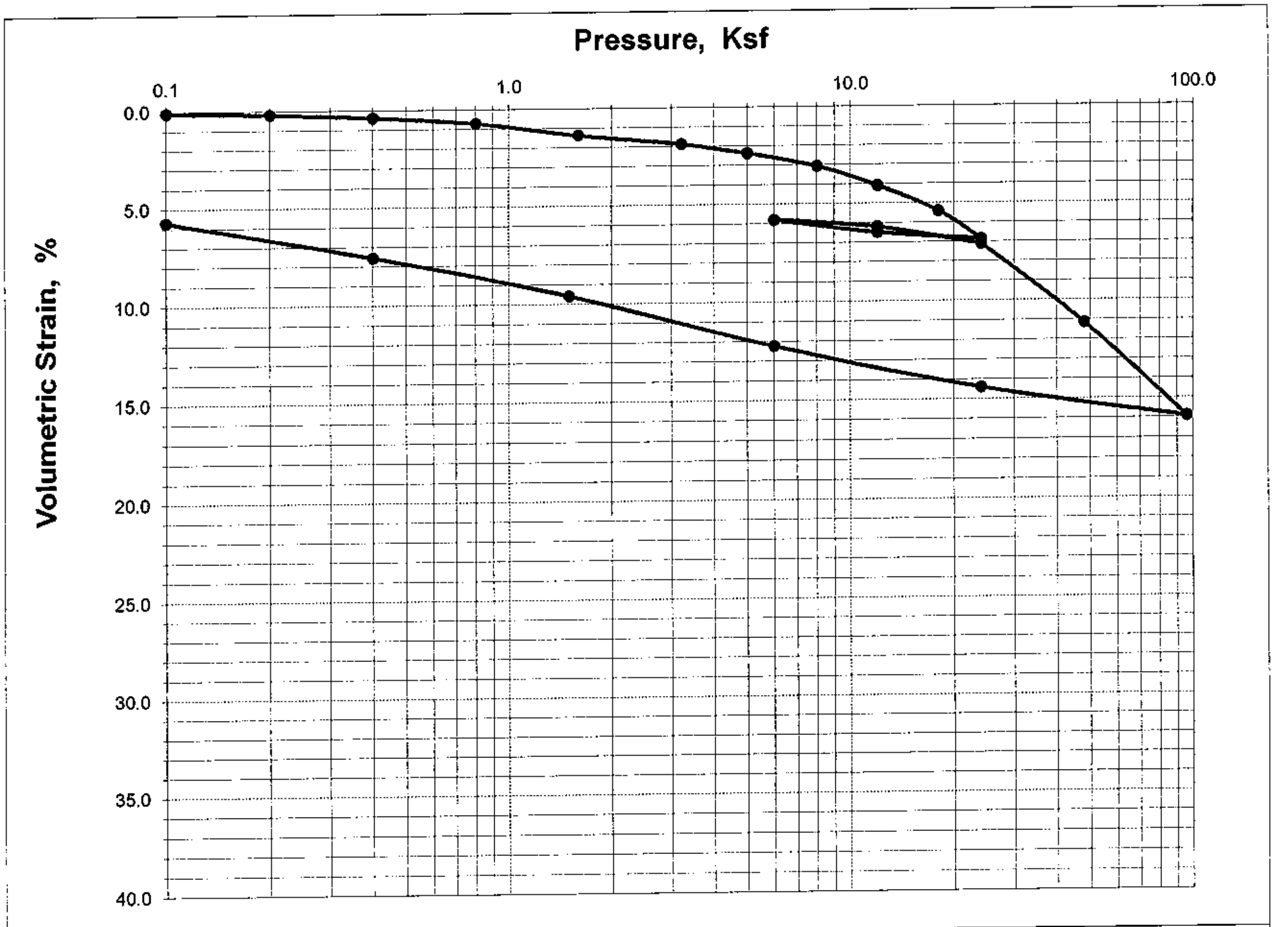
Boring Number	BH-161	Sample Number	2	Depth (ft)	20				
Soil Description	Gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	24.0	123.0	0.700	92.7	1.00	2.420	(assumed) 2.70	32	14
Final	16.8	135.8	0.449	100.7	0.853				

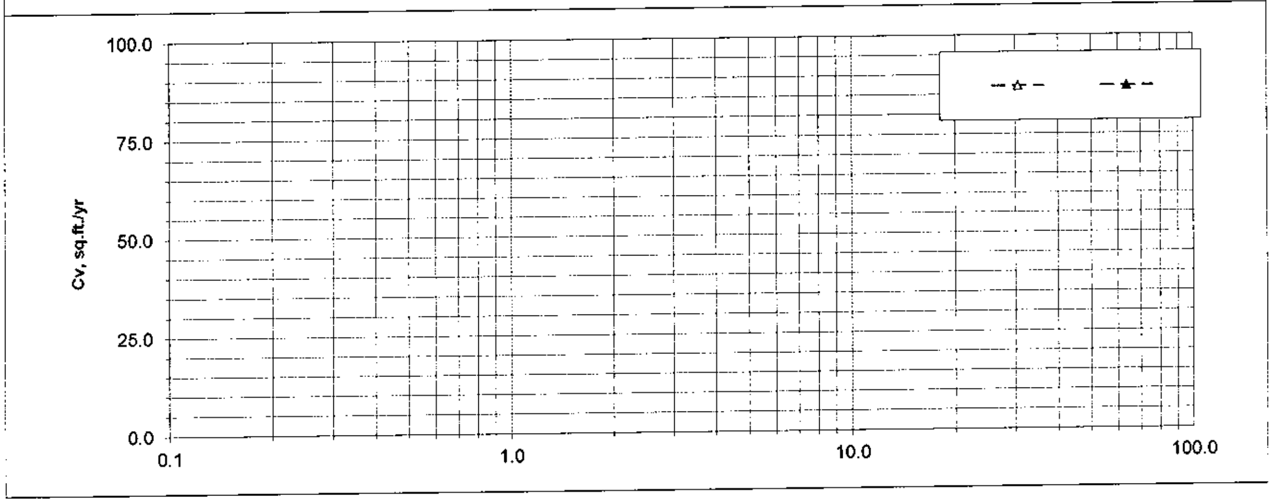




CONSOLIDATION TEST

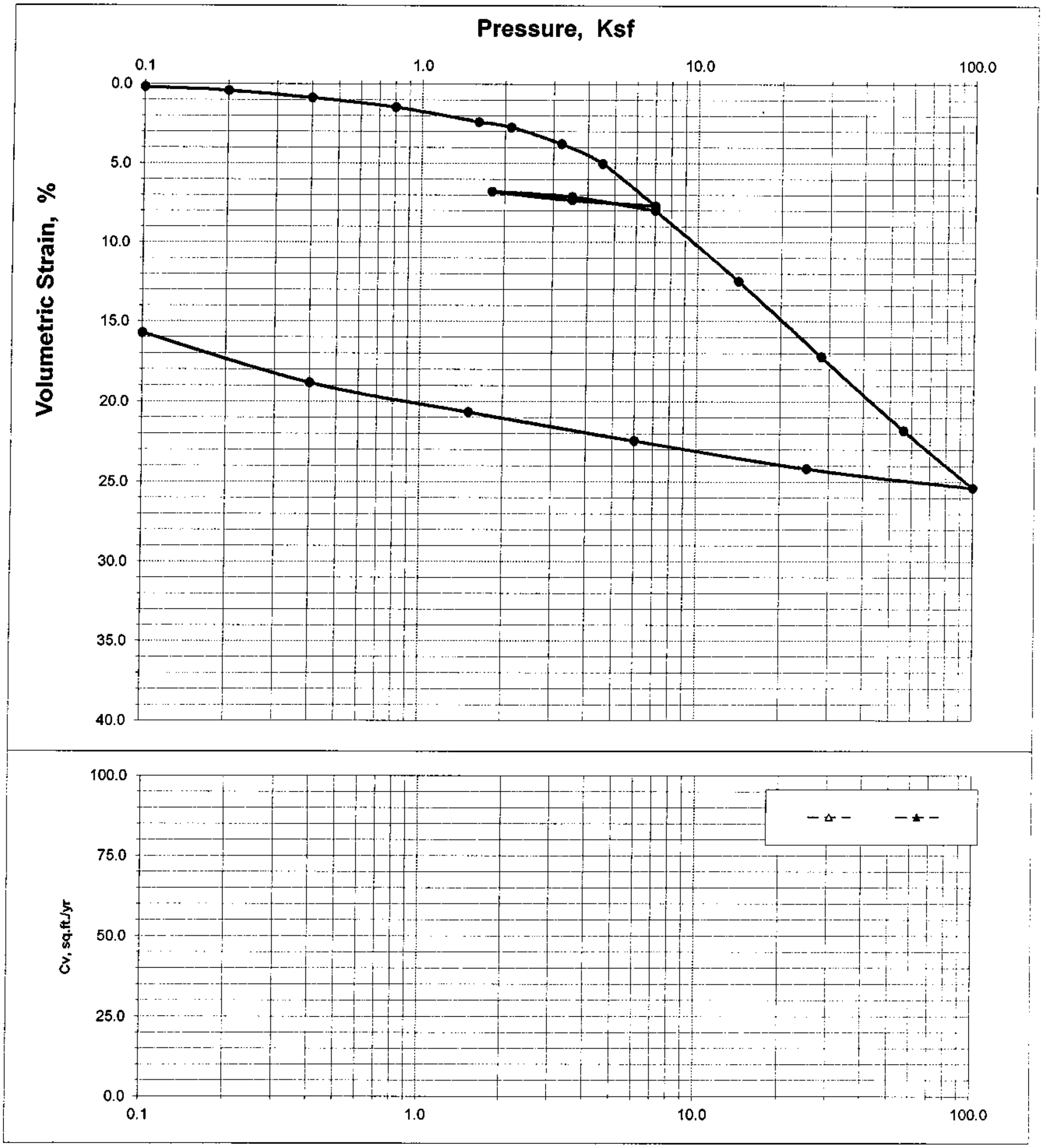
Boring Number	BH-161	Sample Number		29	Depth (ft)	135			
Soil Description	Greenish gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	25.3	121.8	0.734	93.0	1.00	2.420	(assumed) 2.70	56	35
Final	23.6	127.5	0.635	100.5	0.943				





CONSOLIDATION TEST

Boring Number	BH-162	Sample Number		4	Depth (ft)	25			
Soil Description	Greenish gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	28.6	117.2	0.850	90.8	1.00	2.420	(assumed) 2.70	49	32
Final	20.7	130.6	0.559	100.1	0.843				



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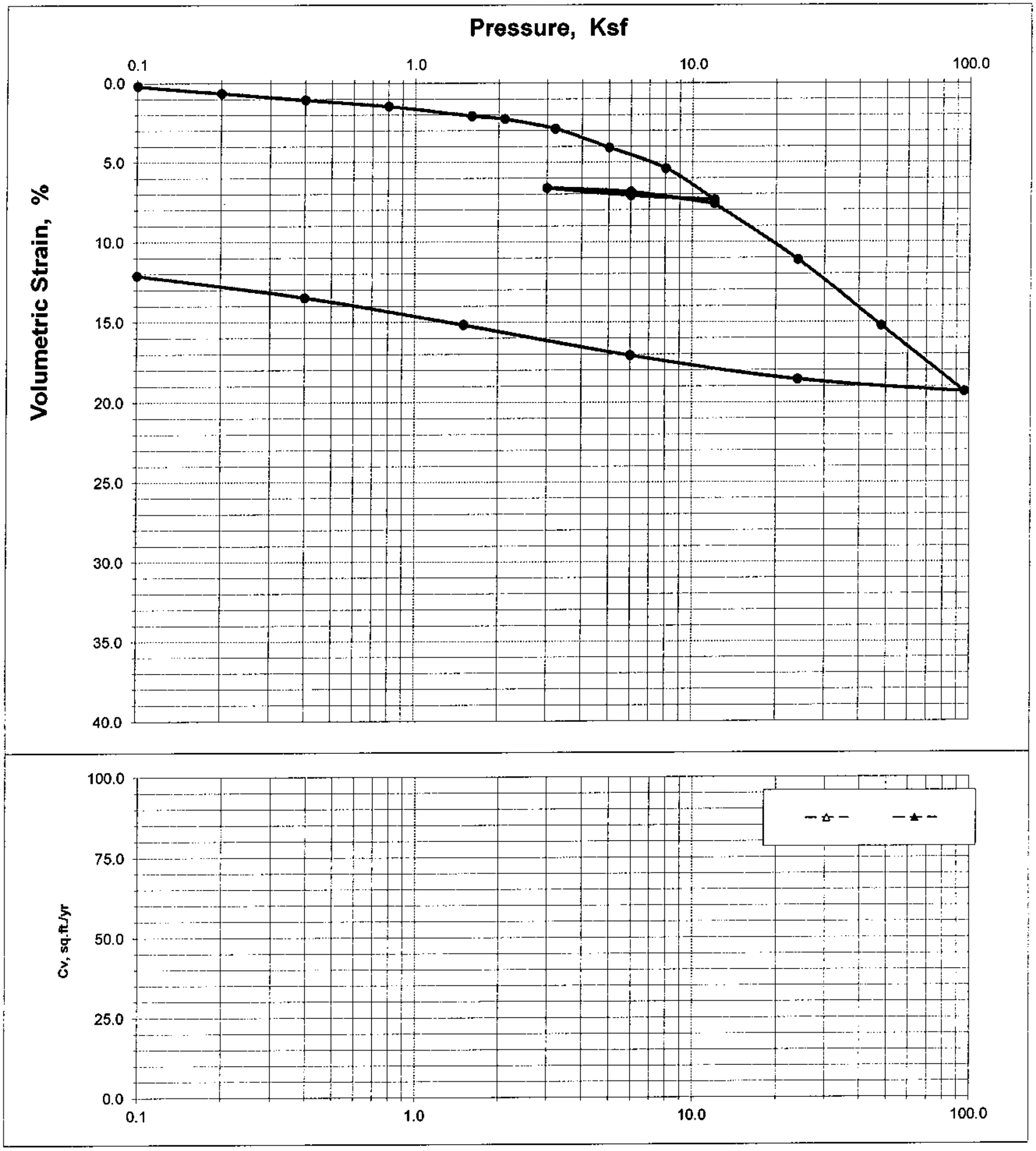
CONSOLIDATION TEST

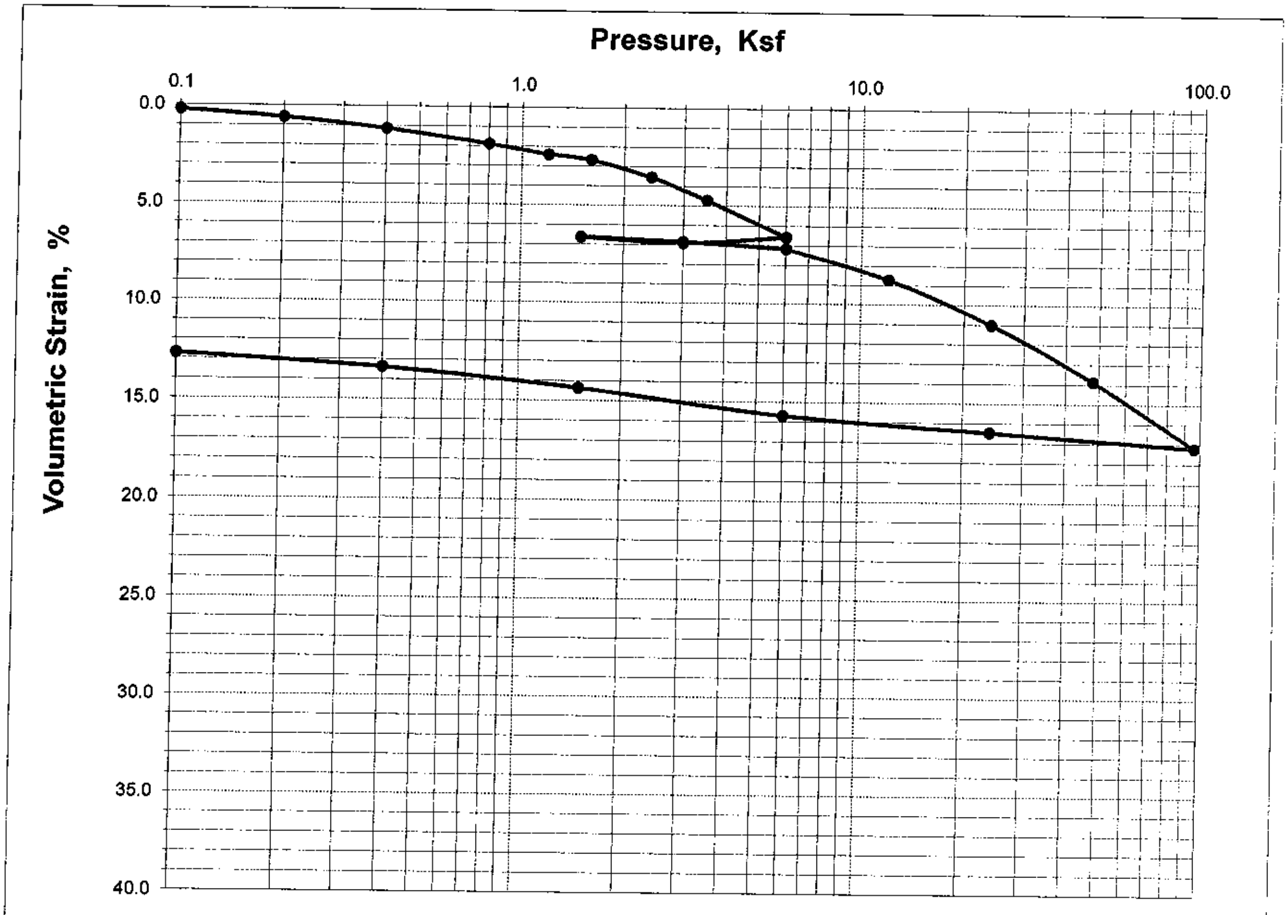
Boring Number	BH-162	Sample Number	10	Depth (ft)	55	
Soil Description	Greenish gray clay					

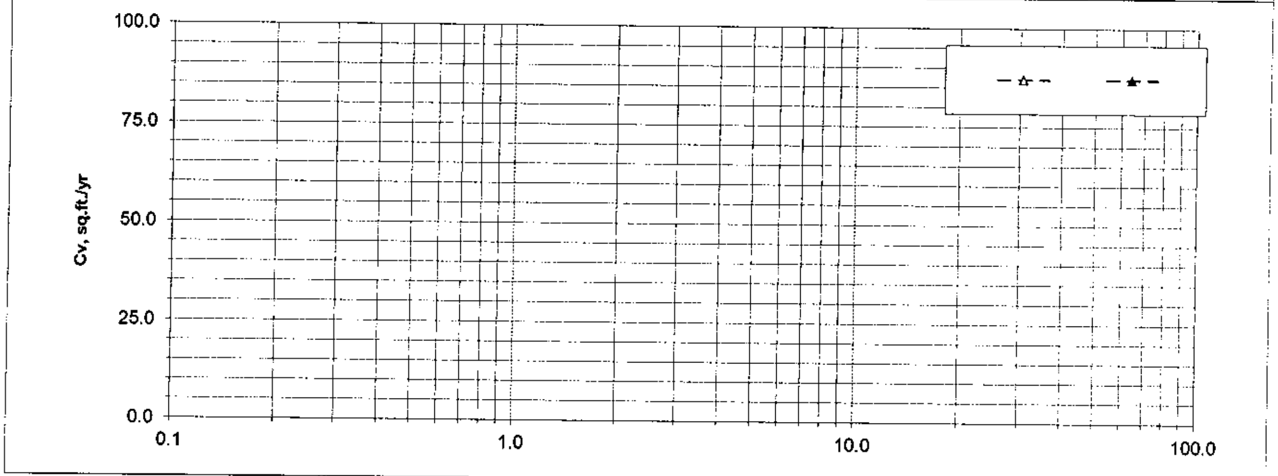
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	25.0	122.6	0.720	93.9	1.00	2.420	(assumed) 2.70	42	23
Final	19.0	132.7	0.512	100.3	0.879				



CONSOLIDATION TEST

Boring Number	BH-163	Sample Number		6	Depth (ft)	77.5			
Soil Description	Gray silt								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	20.8	127.9	0.593	94.7	1.00	2.420	(assumed)	28	4
Final	14.5	138.9	0.391	100.3	0.873		2.70		





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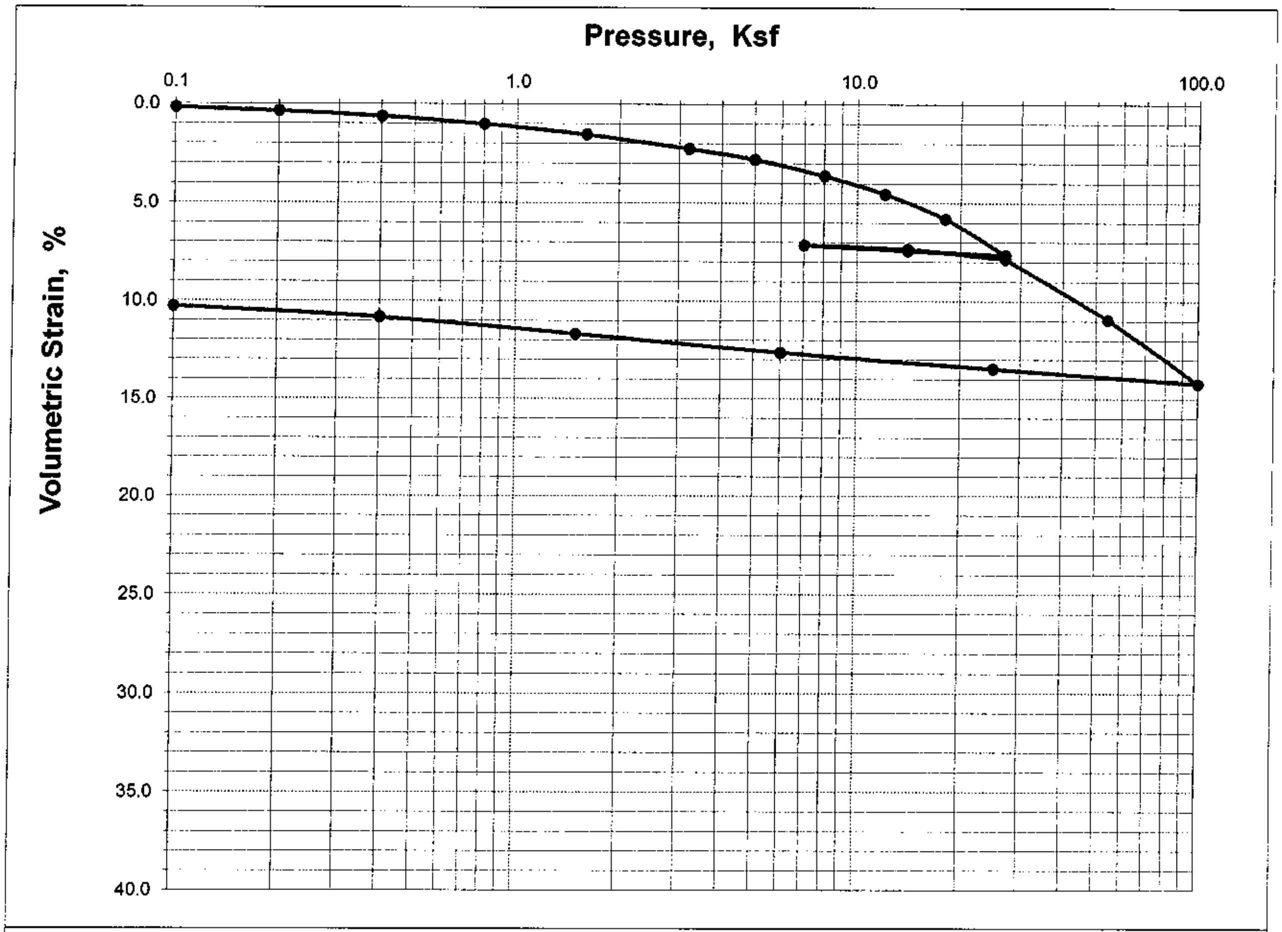
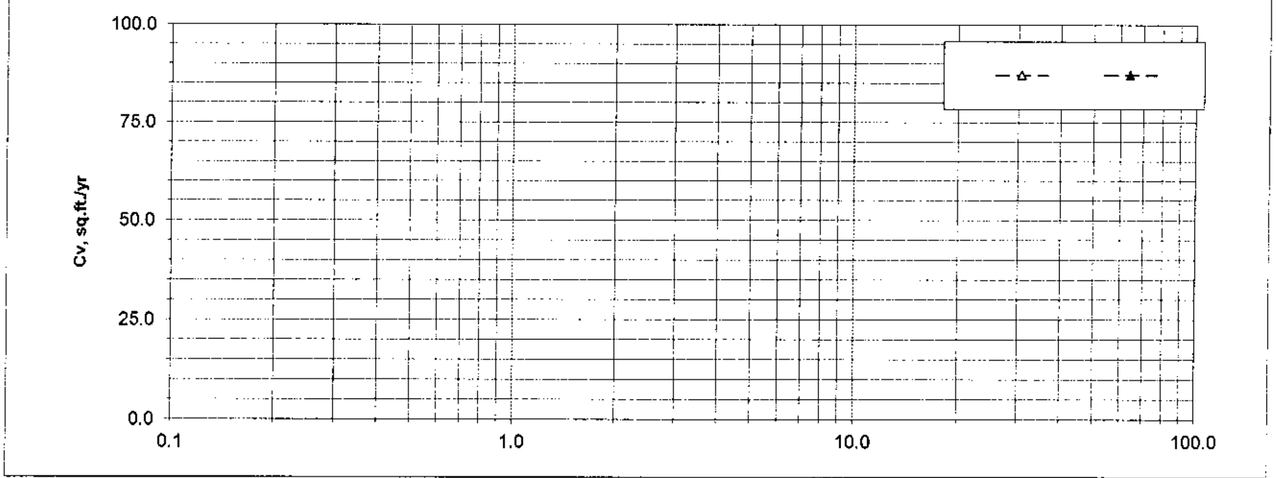
CONSOLIDATION TEST

Boring Number	BH-163	Sample Number		16	Depth (ft)	107			
Soil Description	Greenish gray sandy clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	21.9	126.0	0.631	93.6	1.00		(assumed)	30	12
Final	17.2	135.1	0.463	100.4	0.897	2.420	2.70		





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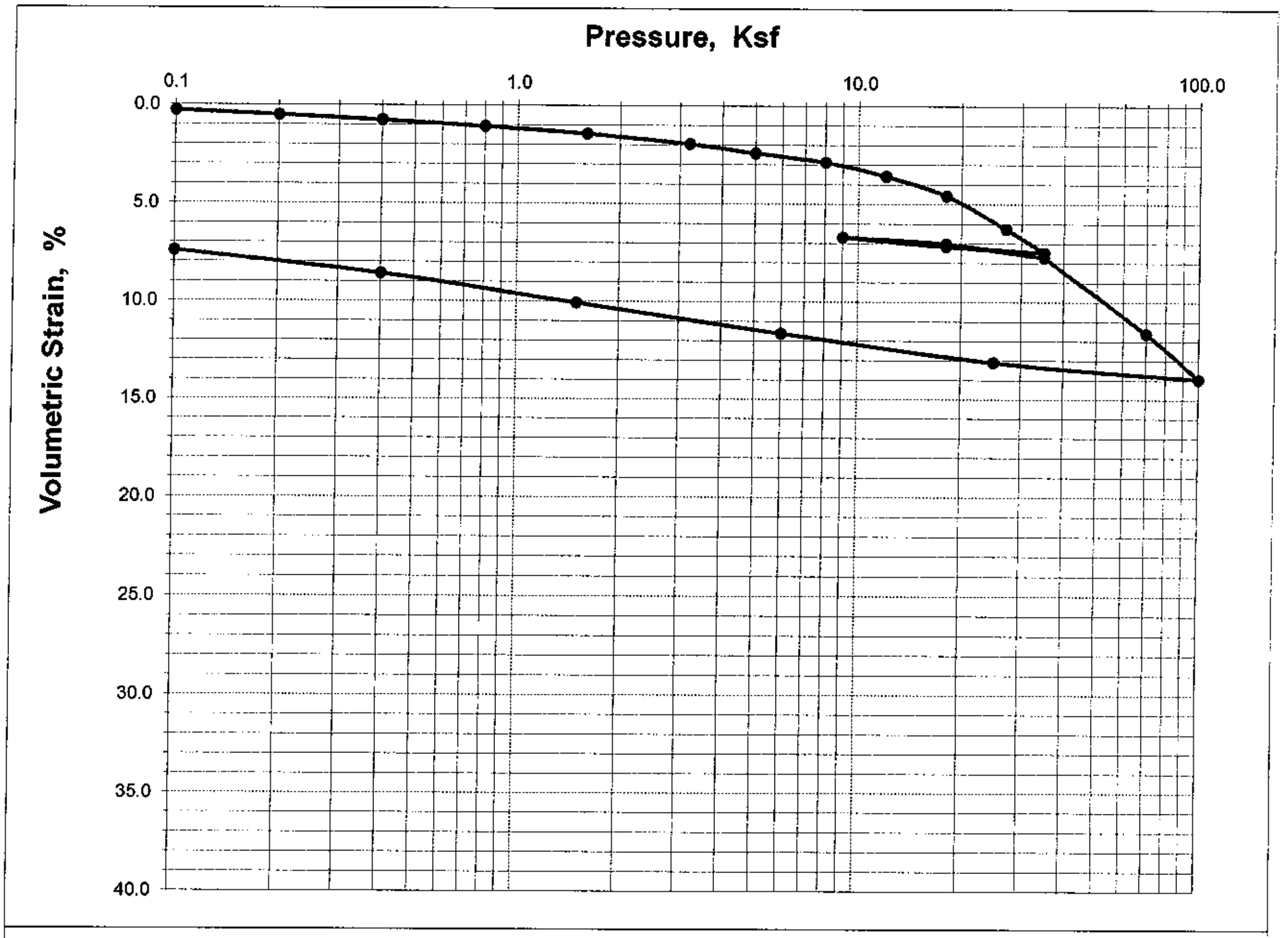
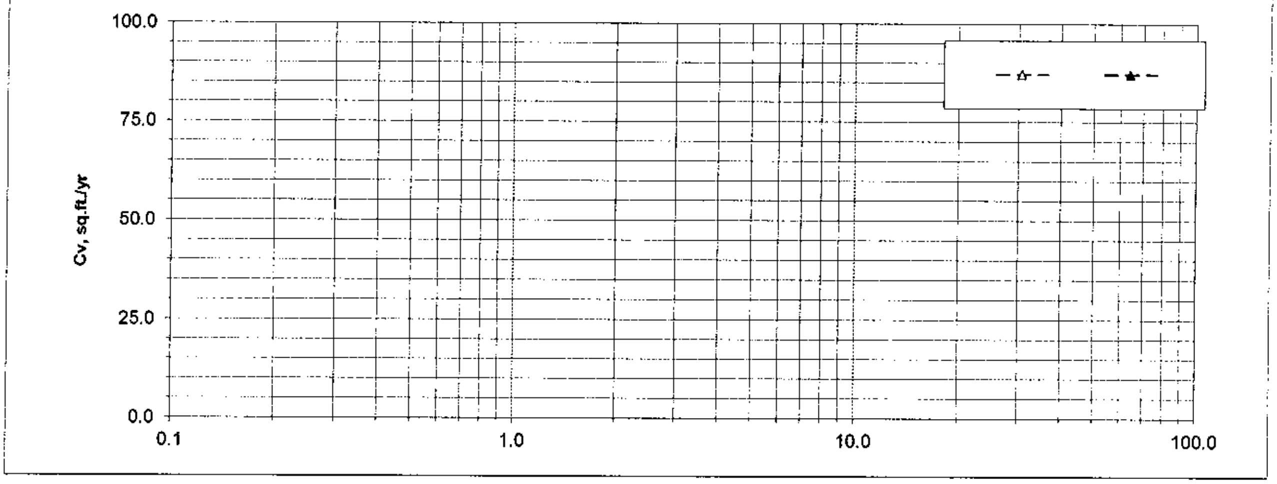
CONSOLIDATION TEST

Boring Number	BH-163	Sample Number		28	Depth (ft)	140			
Soil Description	Greenish gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	24.2	124.4	0.683	95.7	1.00	2.420	(assumed)	44	22
Final	20.7	130.6	0.558	100.0	0.926		2.70		

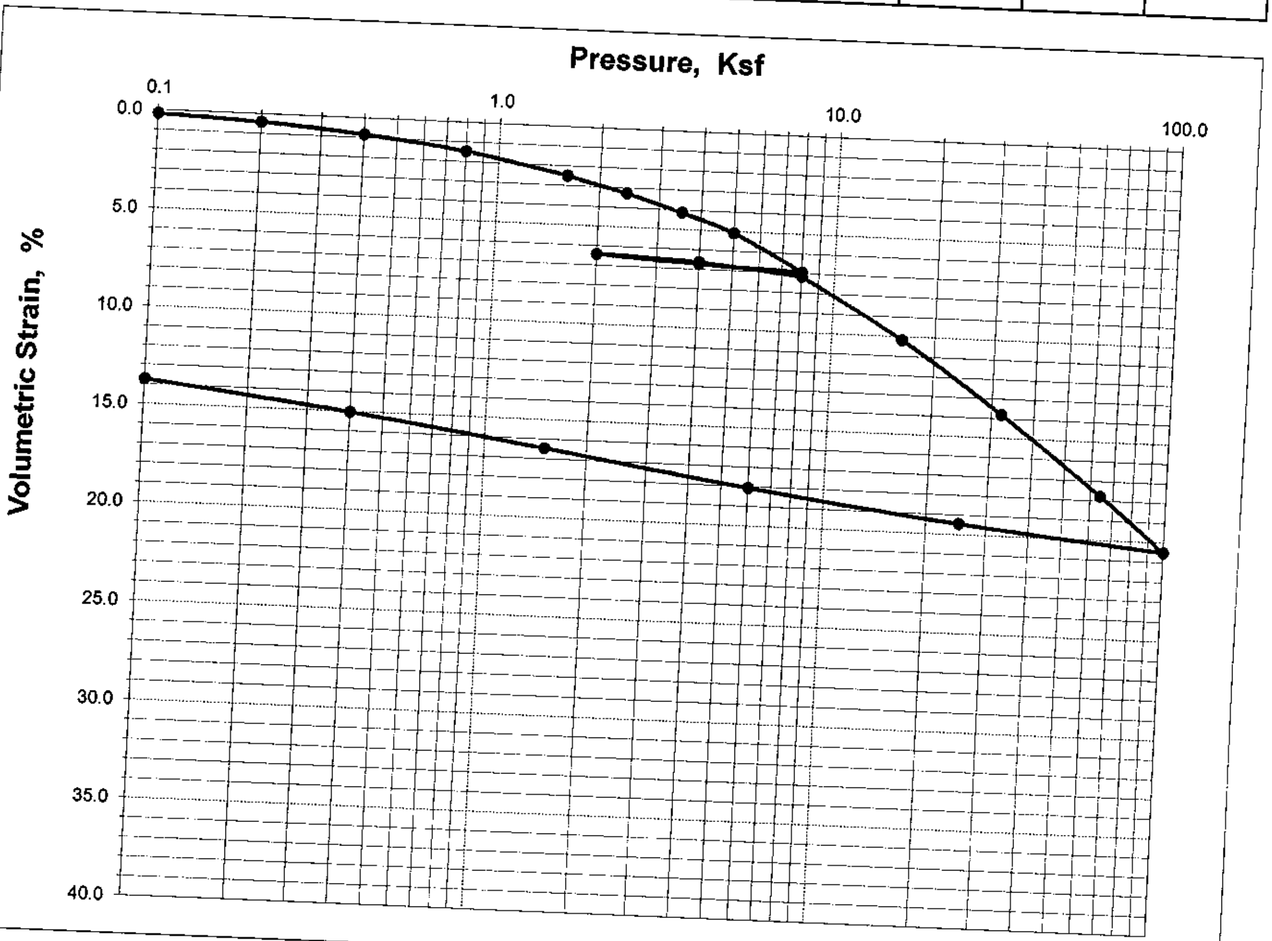


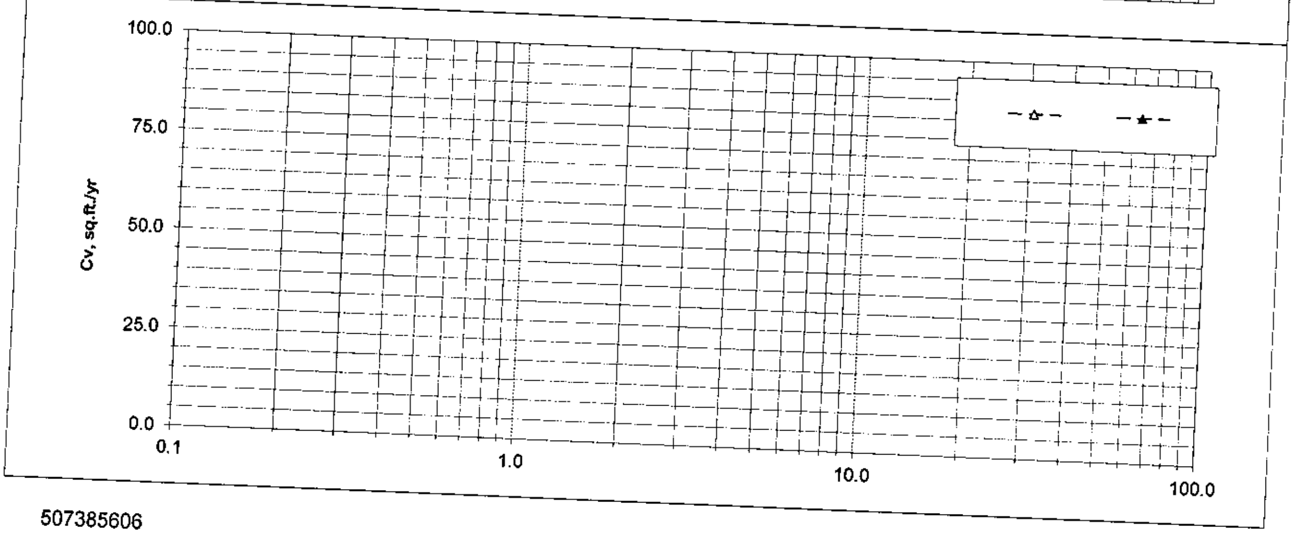


CONSOLIDATION TEST

Boring Number	BH-164	Sample Number	5	Depth (ft)	25
Soil Description	Grayish brown clay				

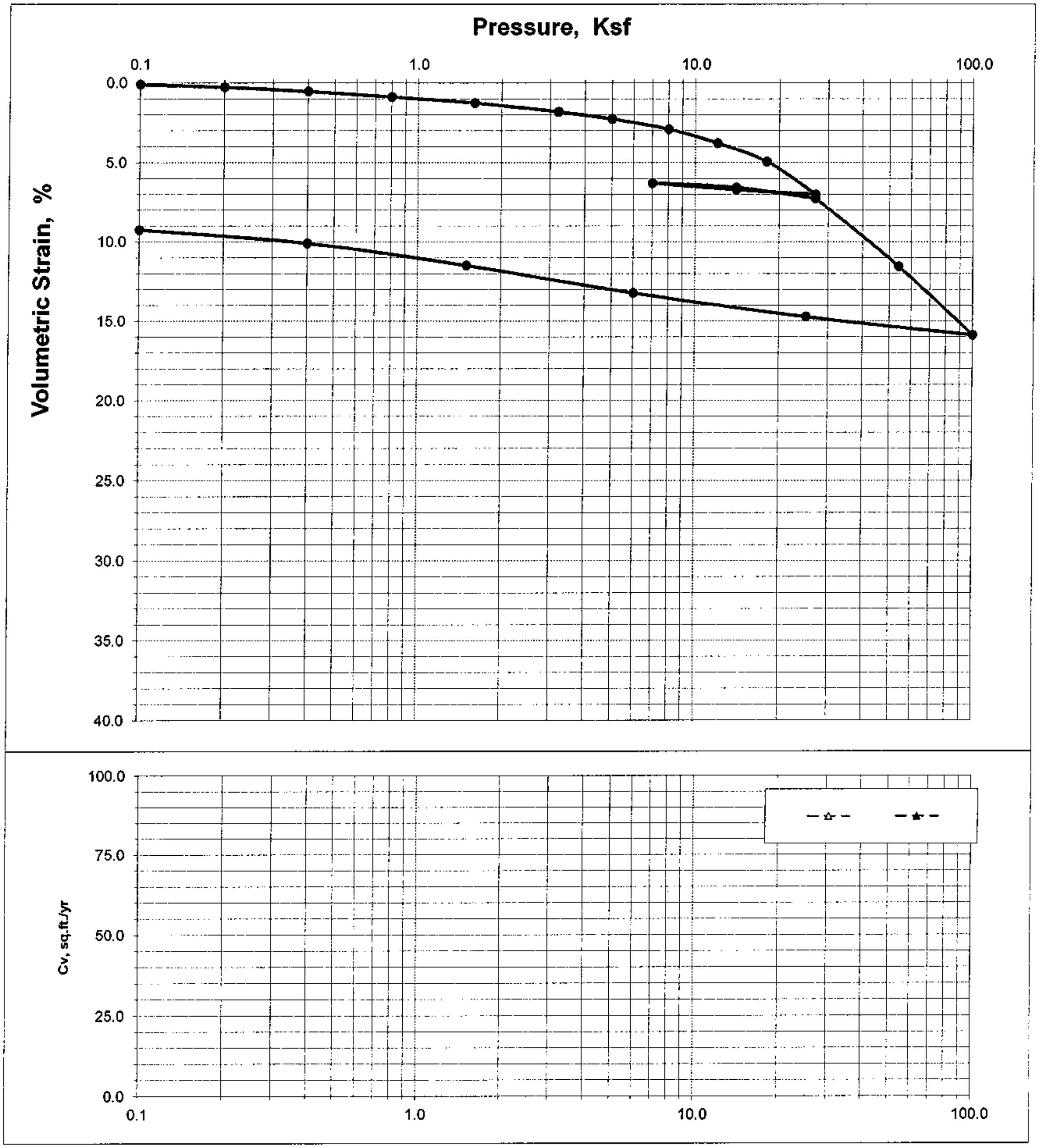
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	26.9	121.3	0.765	94.9	1.00	2.420	(assumed) 2.70	32	13
Final	19.4	132.2	0.523	100.1	0.863				





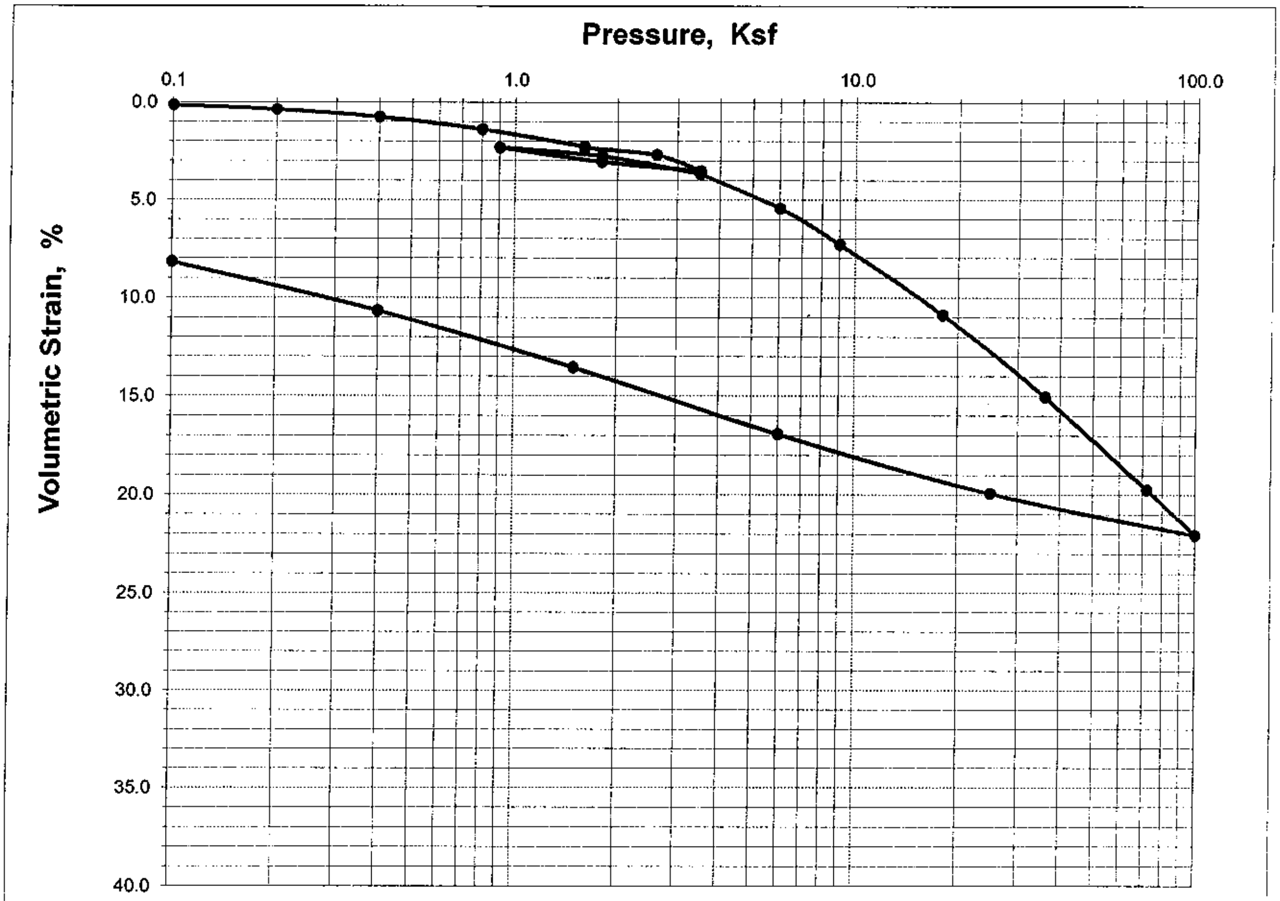
CONSOLIDATION TEST

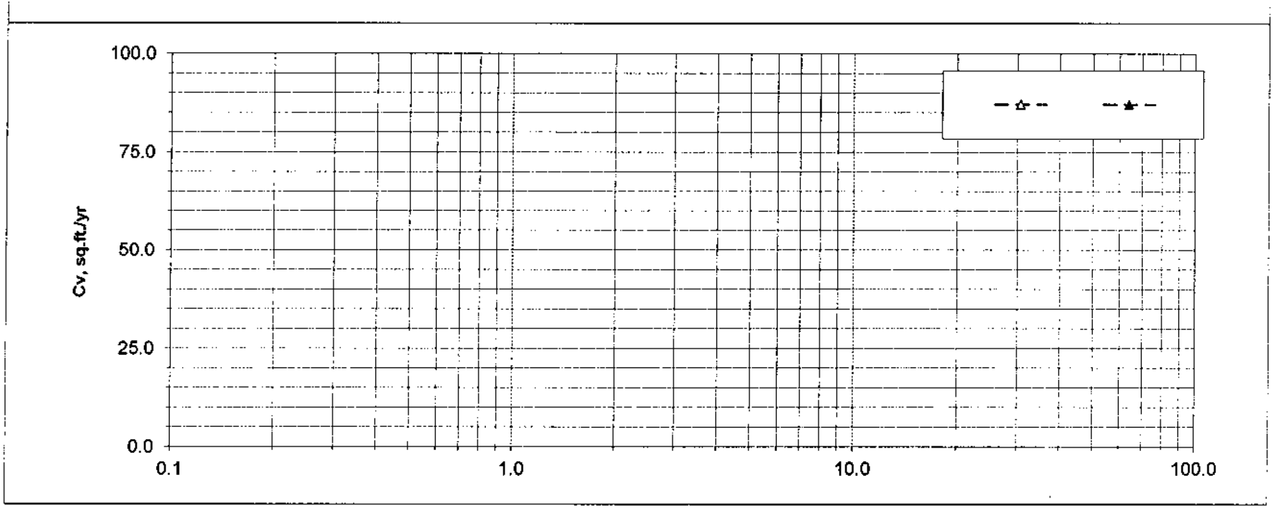
Boring Number	BH-164	Sample Number	43	Depth (ft)	134.5			
Soil Description	Greenish gray clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	23.2	126.7	0.641	97.9	1.00	2.420	(assumed) 2.70	40	20
Final	18.2	133.8	0.490	100.6	0.908				



CONSOLIDATION TEST

Boring Number	BH-165	Sample Number	3	Depth (ft)	22.5				
Soil Description	Greenish gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	33.4	117.7	0.911	99.0	1.00	2.420	(assumed) 2.70	60	36
Final	27.9	123.0	0.754	100.0	0.918				





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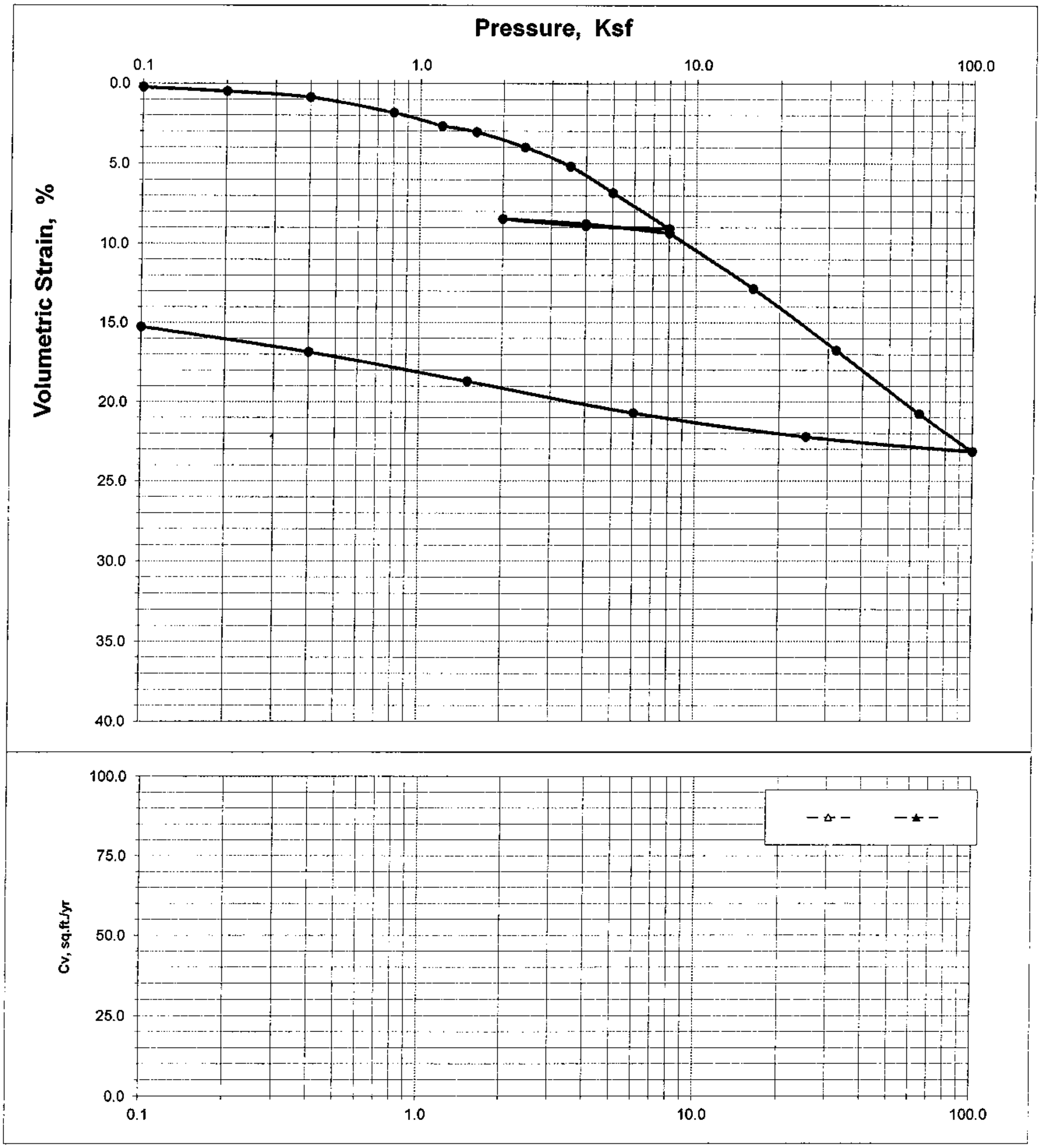
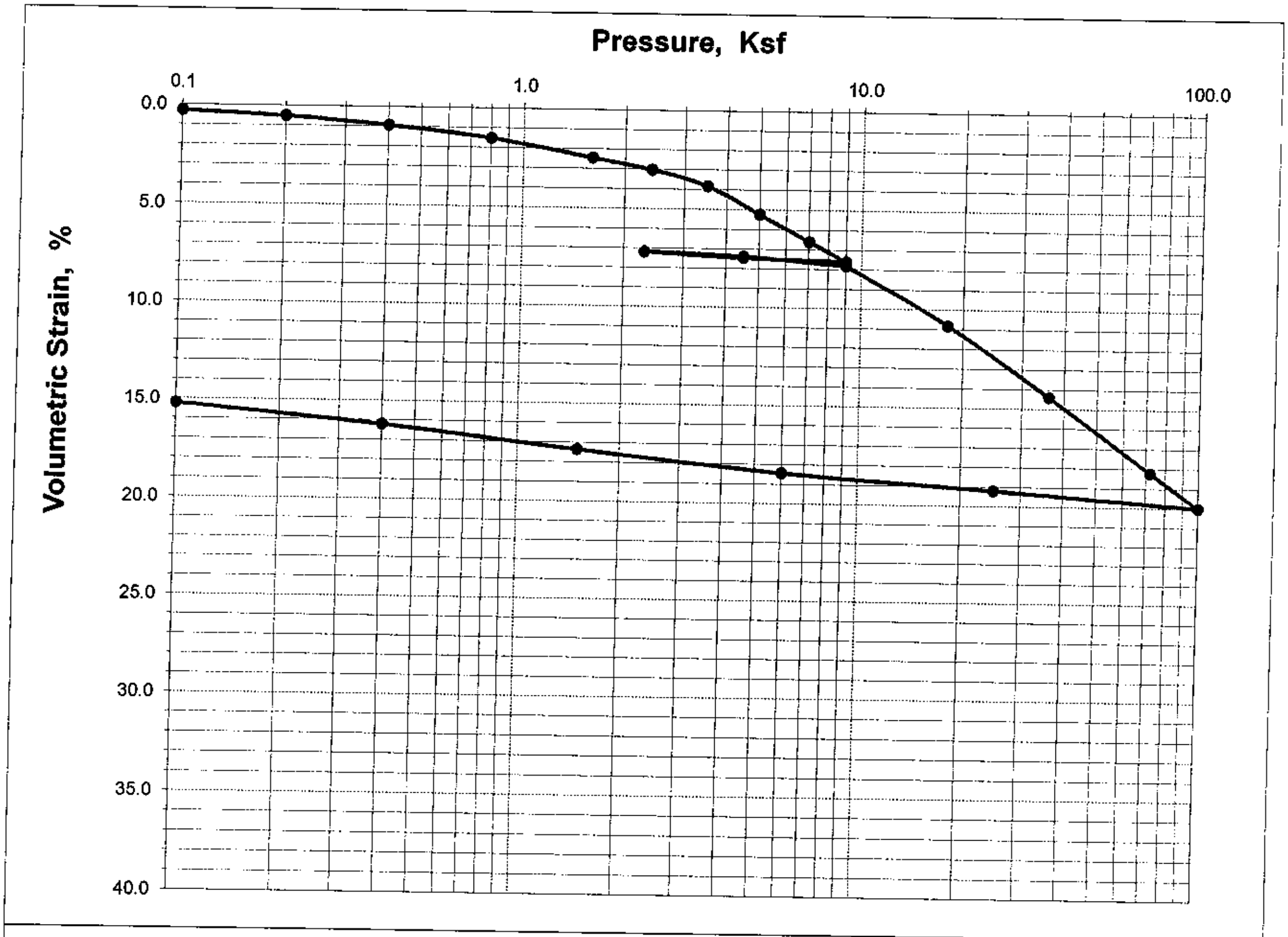
CONSOLIDATION TEST

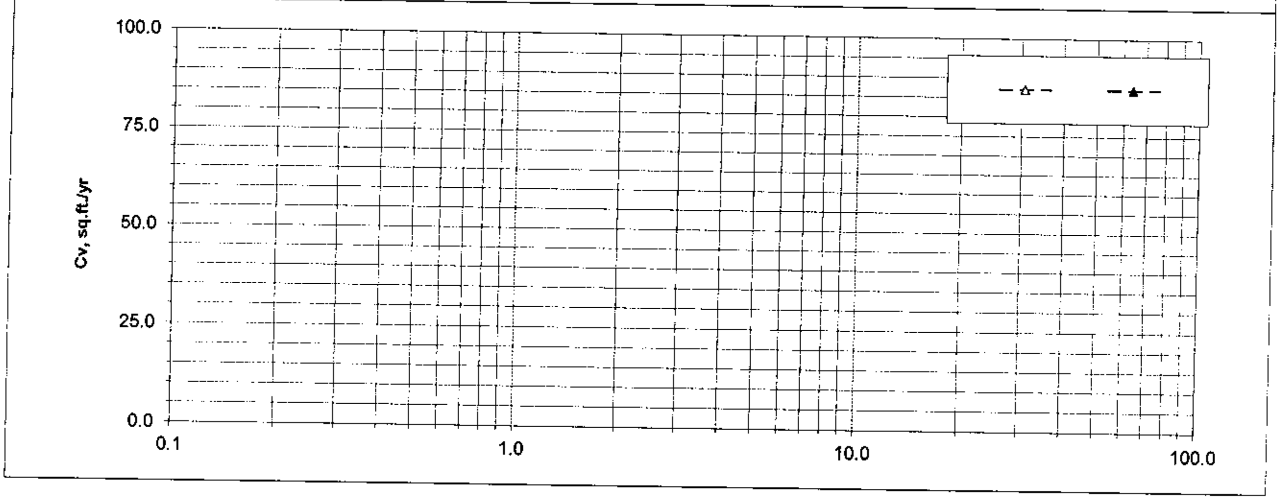
Boring Number	BH-165	Sample Number		7	Depth (ft)	32.5			
Soil Description	Gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	26.7	120.0	0.780	92.4	1.00	2.420	(assumed)	42	25
Final	19.0	132.9	0.509	100.5	0.848		2.70		



CONSOLIDATION TEST

Boring Number	BH-166	Sample Number	6	Depth (ft)	35				
Soil Description	Gray clay with sand								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	25.2	121.3	0.740	91.8	1.00	2.420	(assumed) 2.70	34	16
Final	17.8	134.5	0.476	100.8	0.848				





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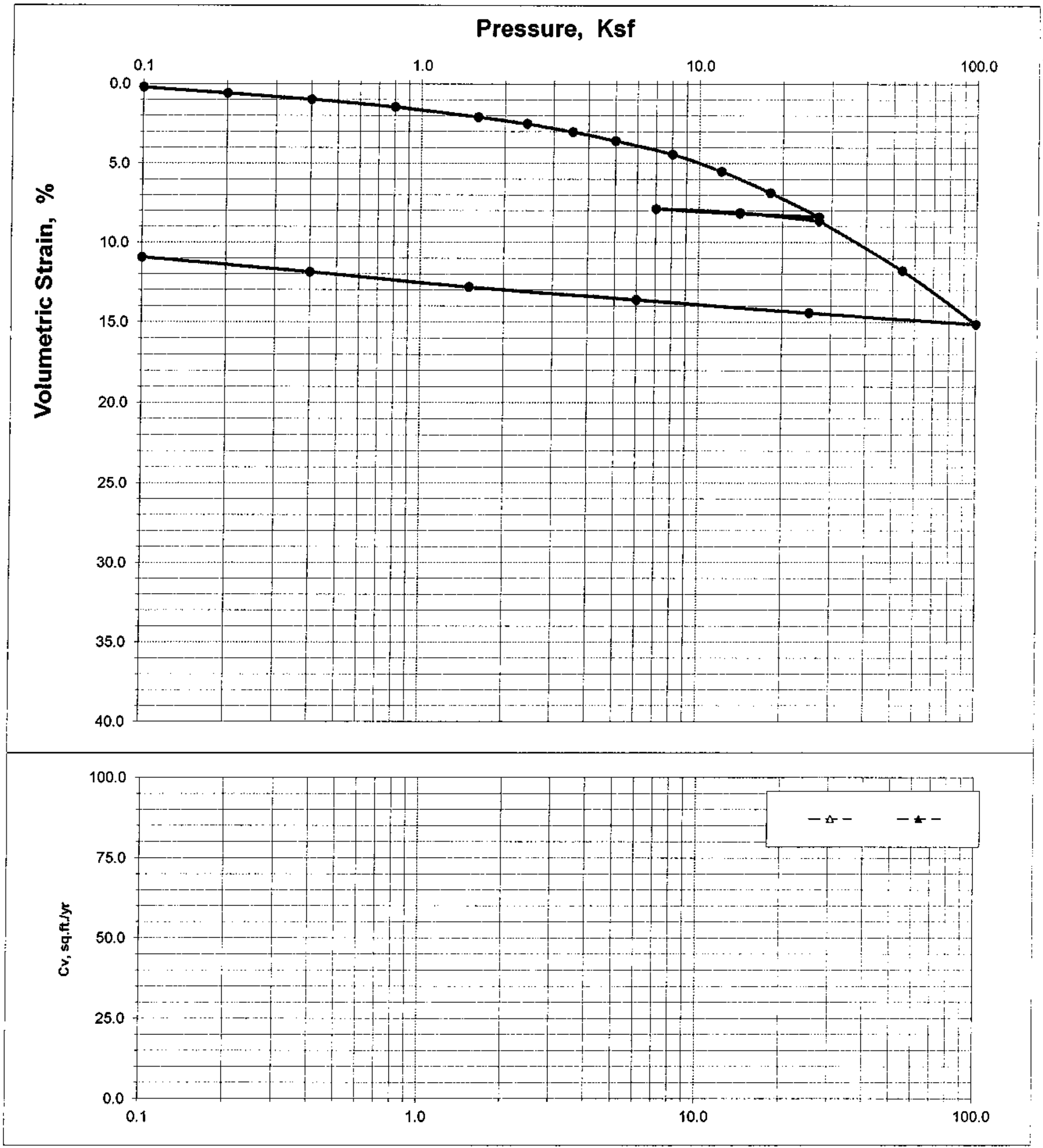
CONSOLIDATION TEST

Boring Number	BH-166	Sample Number		23	Depth (ft)	95.5			
Soil Description	Gray sandy clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	21.9	125.1	0.643	91.8	1.00	2.420	(assumed)	32	14
Final	17.3	135.1	0.464	100.4	0.891		2.70		



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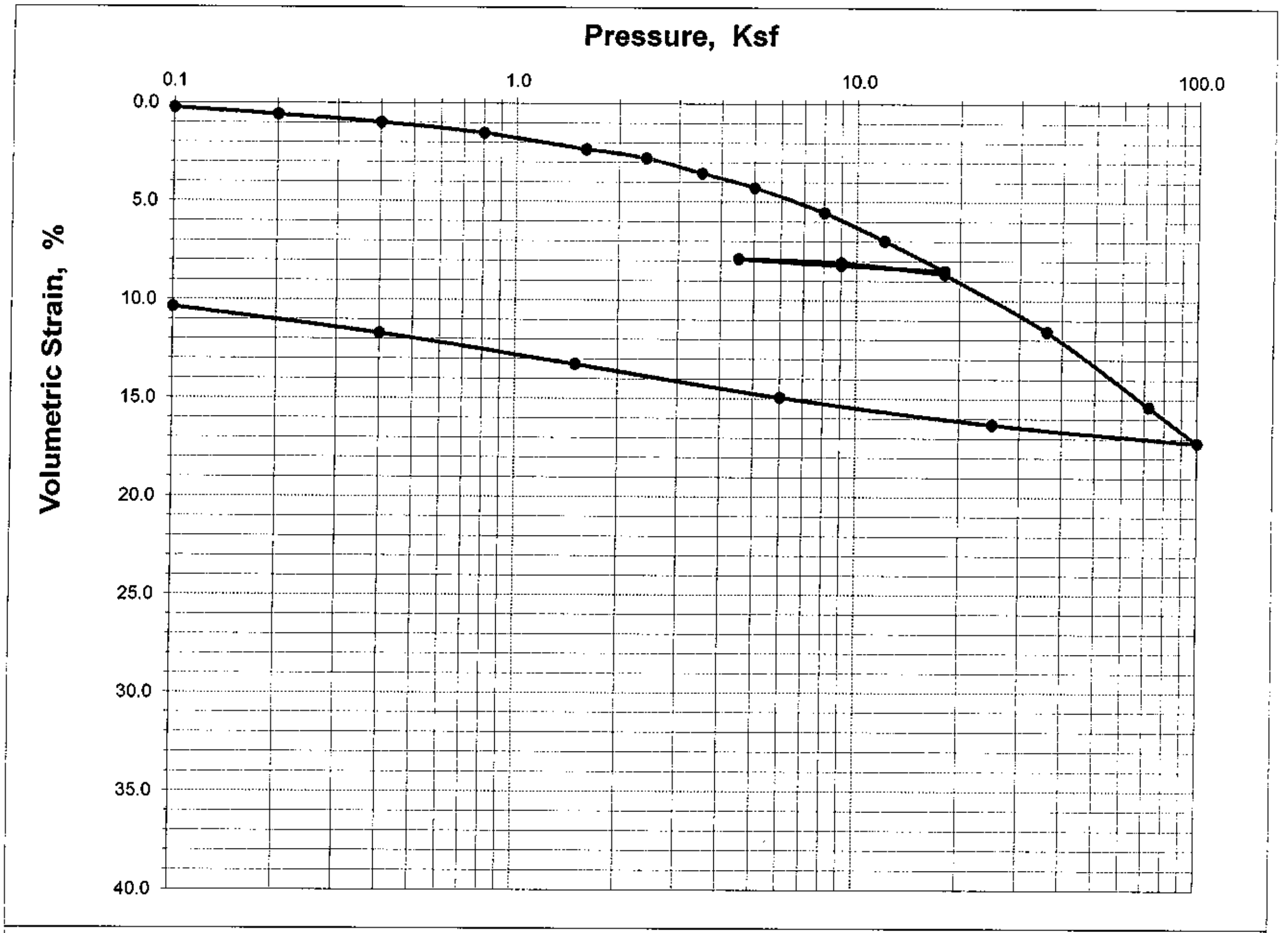
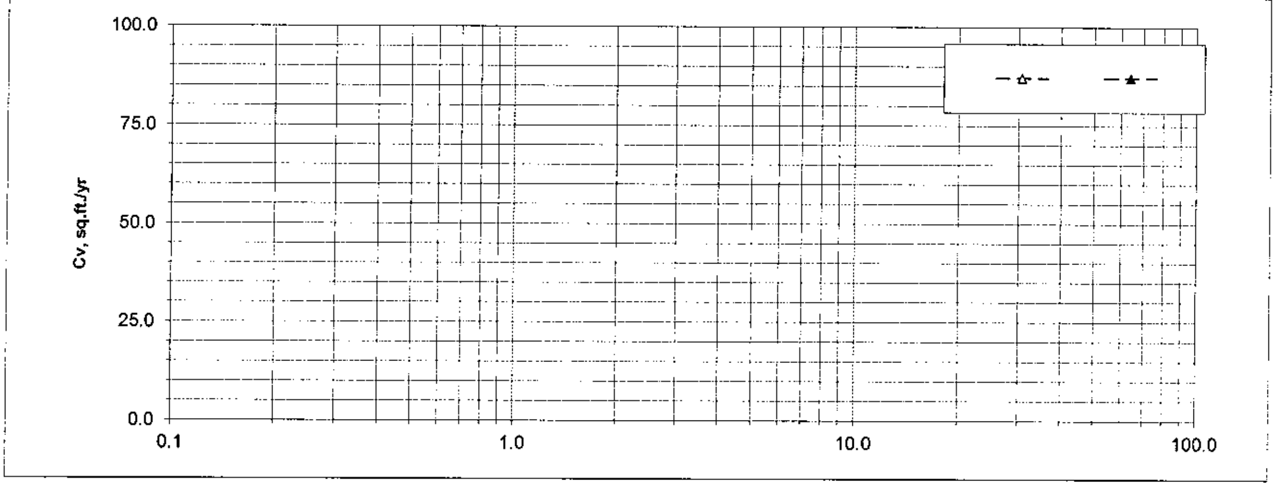
CONSOLIDATION TEST

Boring Number	BH-167	Sample Number		10	Depth (ft)	40			
Soil Description	Grayish brown clay with sand								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	23.2	125.4	0.658	95.4	1.00	2.420	(assumed)	34	14
Final	18.1	133.9	0.486	100.2	0.897		2.70		





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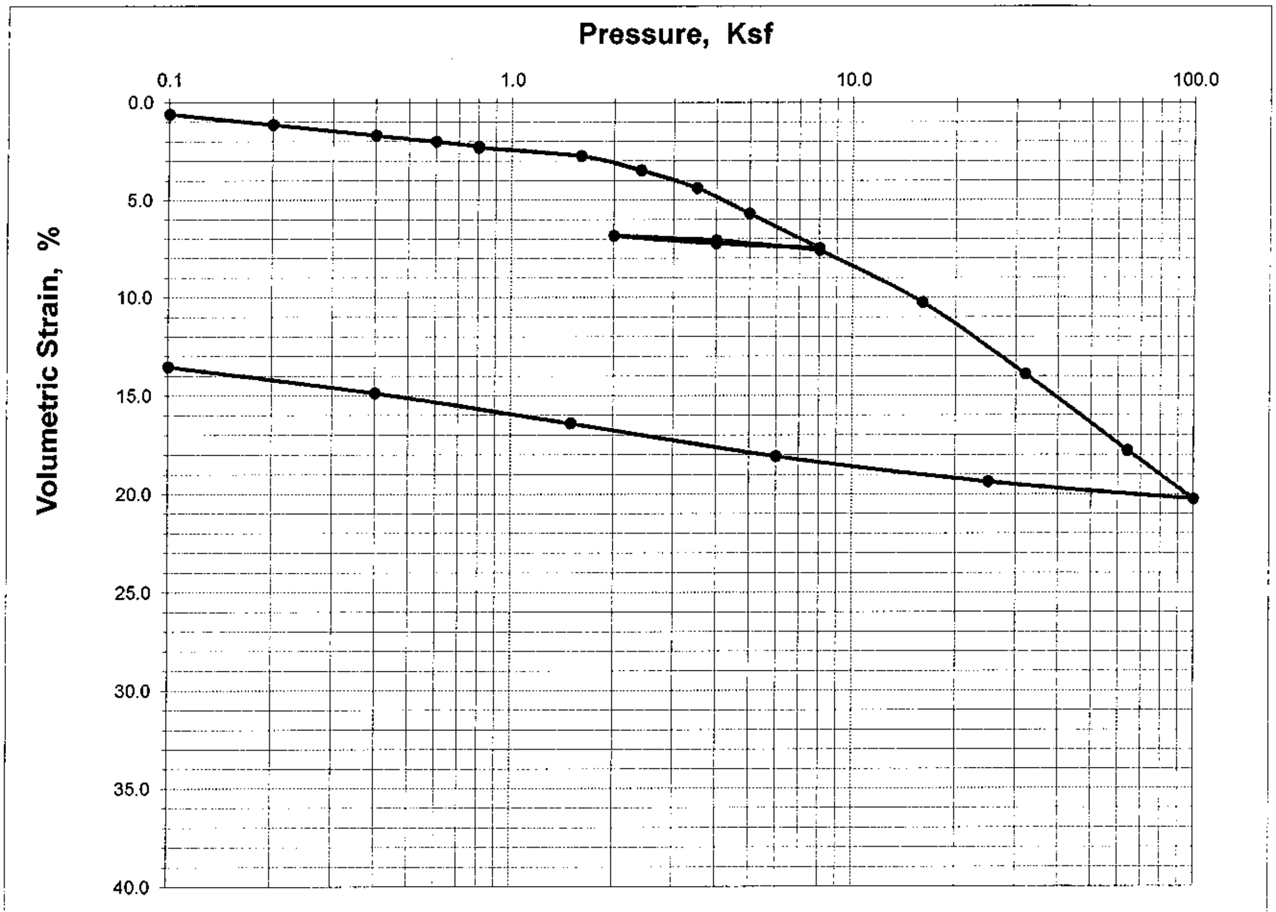
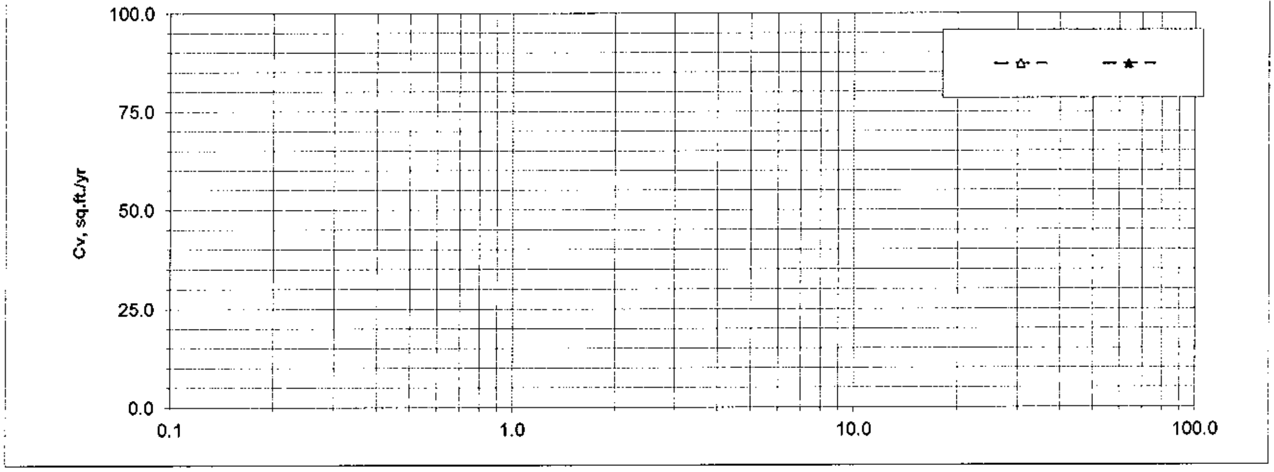
CONSOLIDATION TEST

Boring Number	BH-167	Sample Number	23	Depth (ft)	74			
Soil Description	Greenish gray clay with sand							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	23.4	124.1	0.676	93.4	1.00	2.420	(assumed) 2.70	36	20
Final	16.7	135.8	0.450	100.4	0.865				





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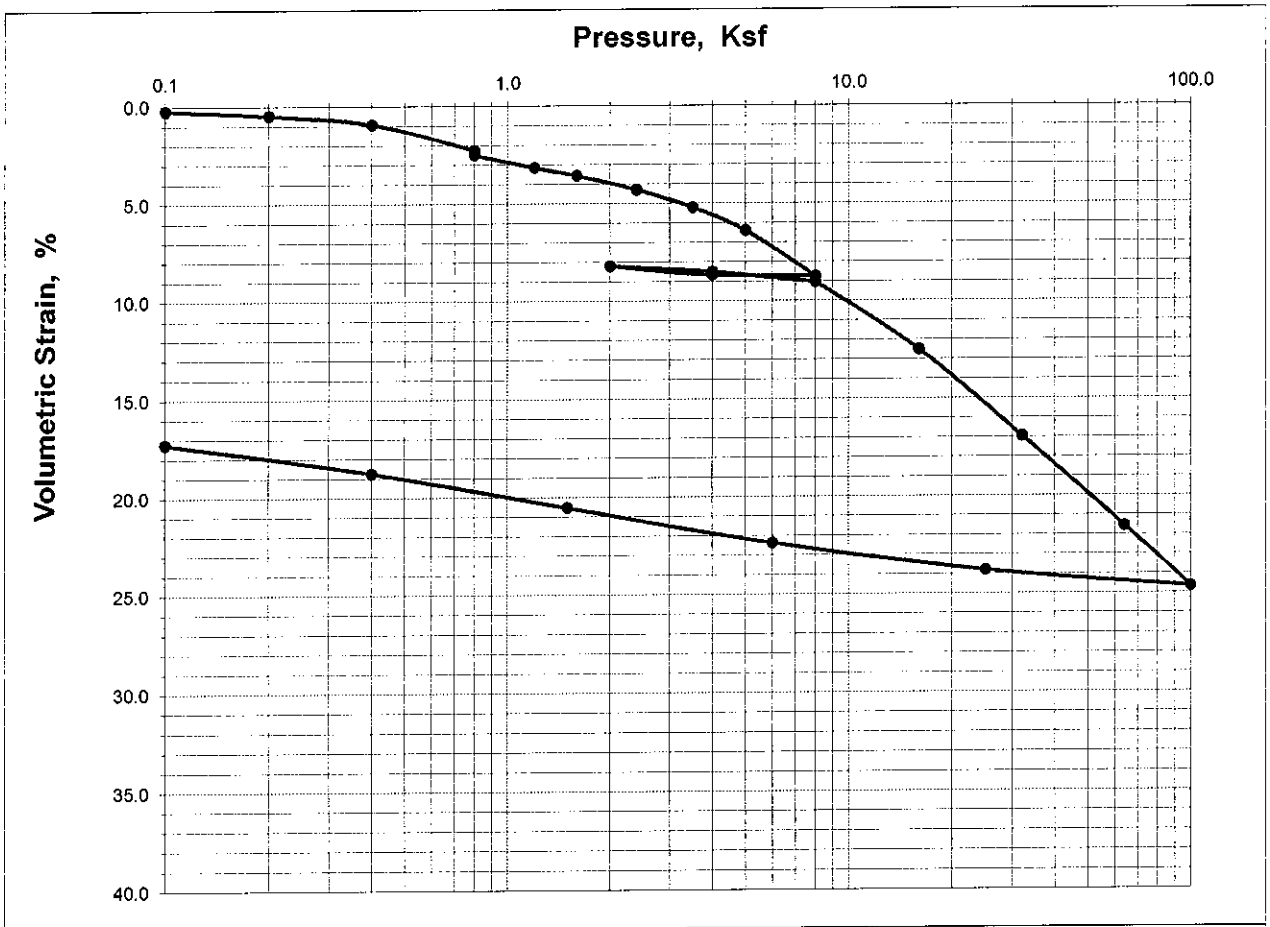
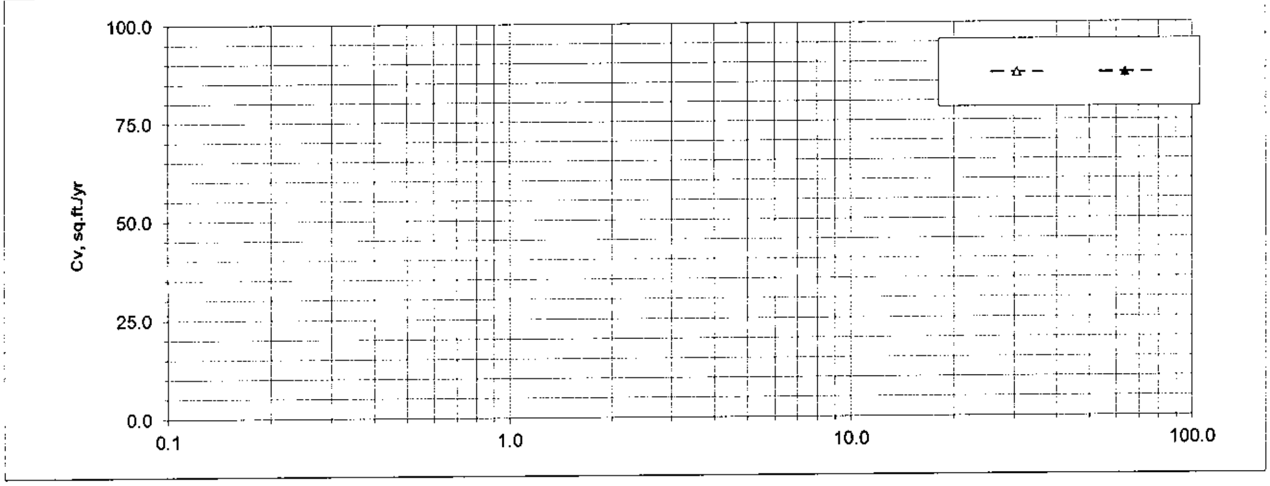
CONSOLIDATION TEST

Boring Number	BH-168	Sample Number	6	Depth (ft)	25			
Soil Description	Greenish gray clay with sand							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	32.9	114.3	0.961	92.5	1.00	2.420	(assumed) 2.70	49	27
Final	23.2	127.9	0.623	100.3	0.828				





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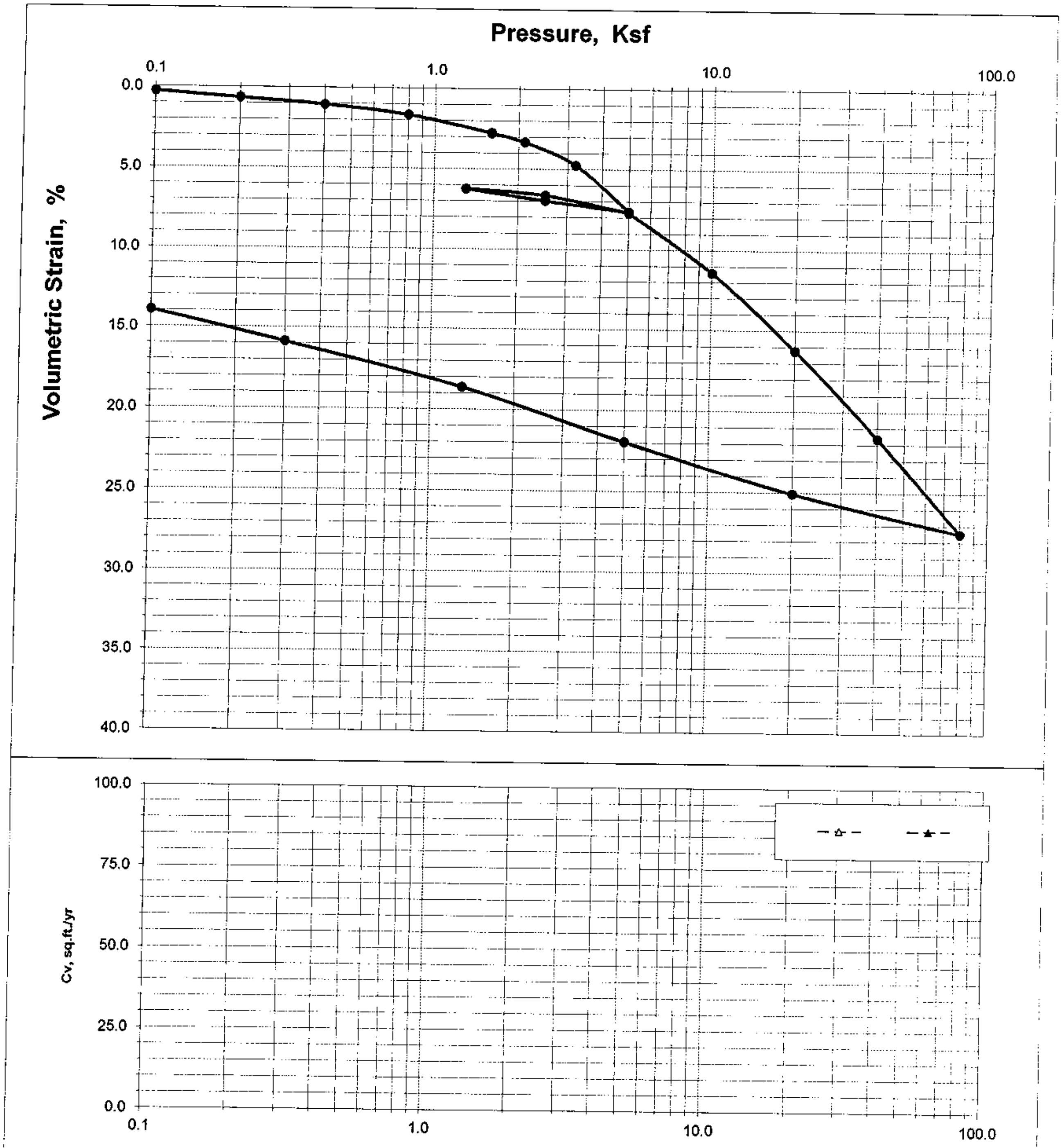
CONSOLIDATION TEST

Boring Number	BH-169		Sample Number	2	Depth (ft)	10			
Soil Description	Grayish brown clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	41.2	108.9	1.186	93.8	1.00		(assumed)	62	36
Final	32.9	119.0	0.882	100.6	0.861	2.420	2.70		



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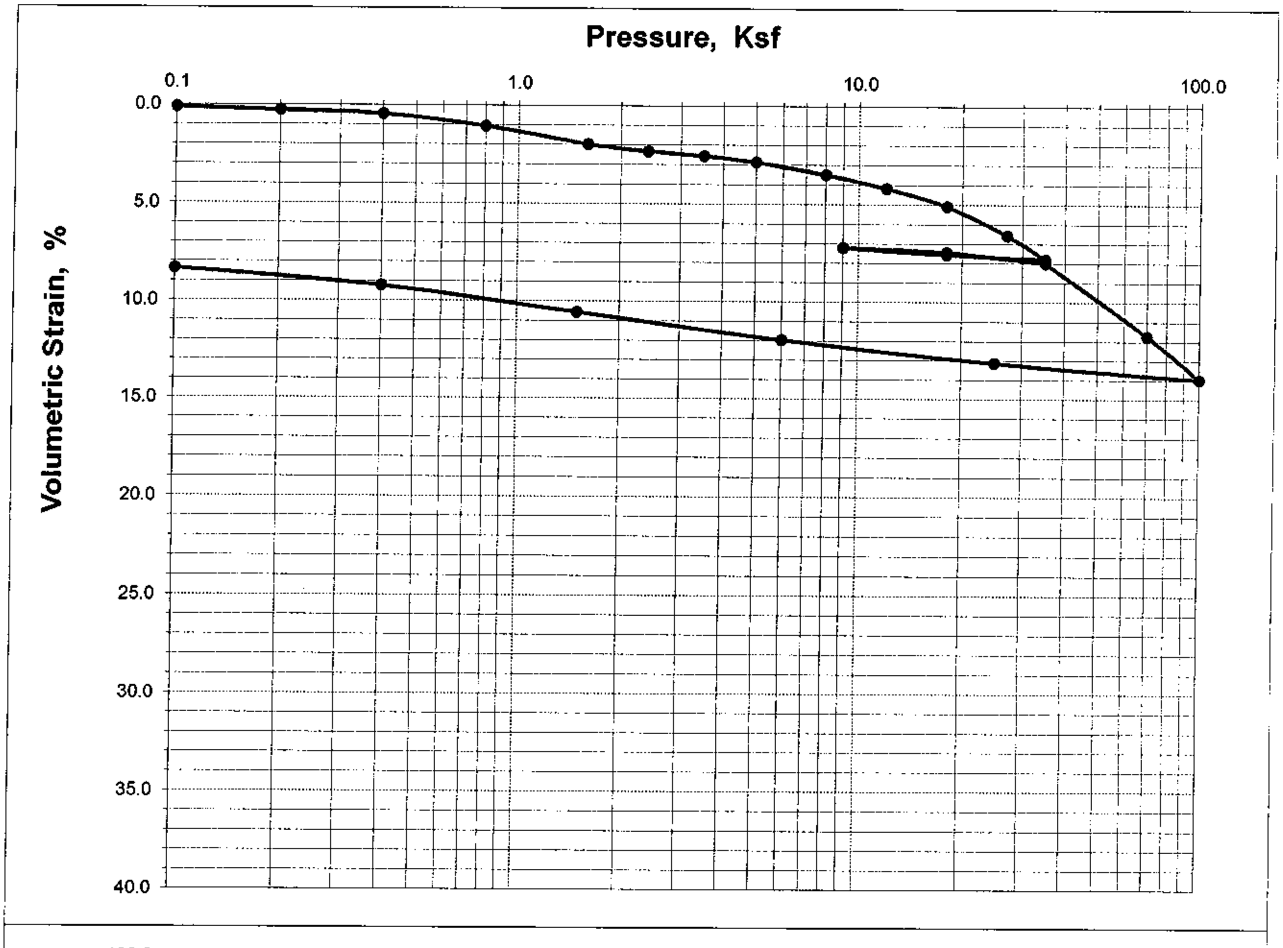
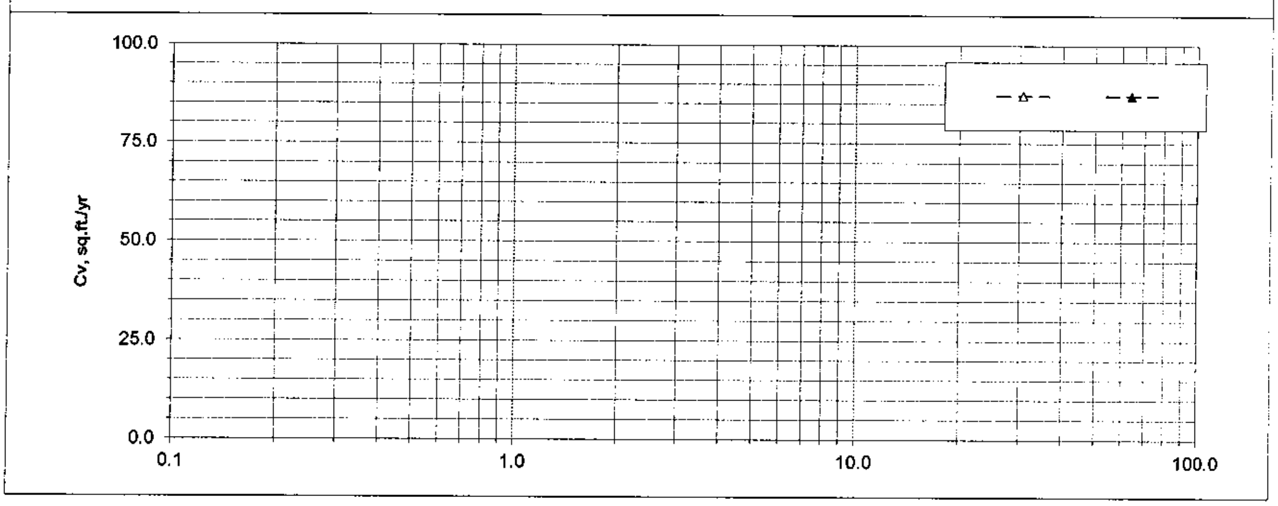
CONSOLIDATION TEST

Boring Number	BH-169		Sample Number		30	Depth (ft)	135		
Soil Description	Grayish brown clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	20.4	125.7	0.615	89.3	1.00		(assumed)	37	17
Final	17.9	134.2	0.481	100.5	0.917	2.420	2.70		

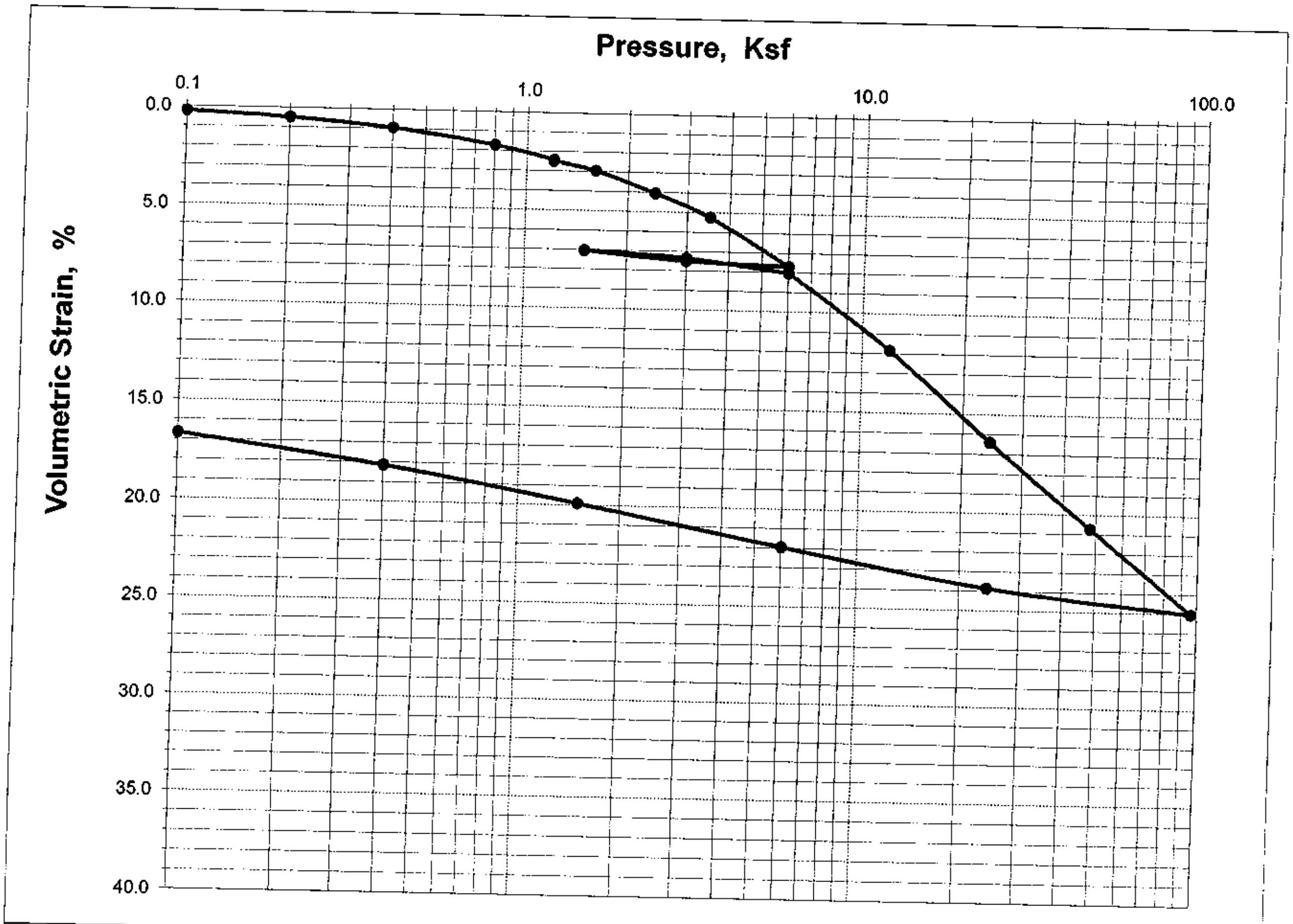


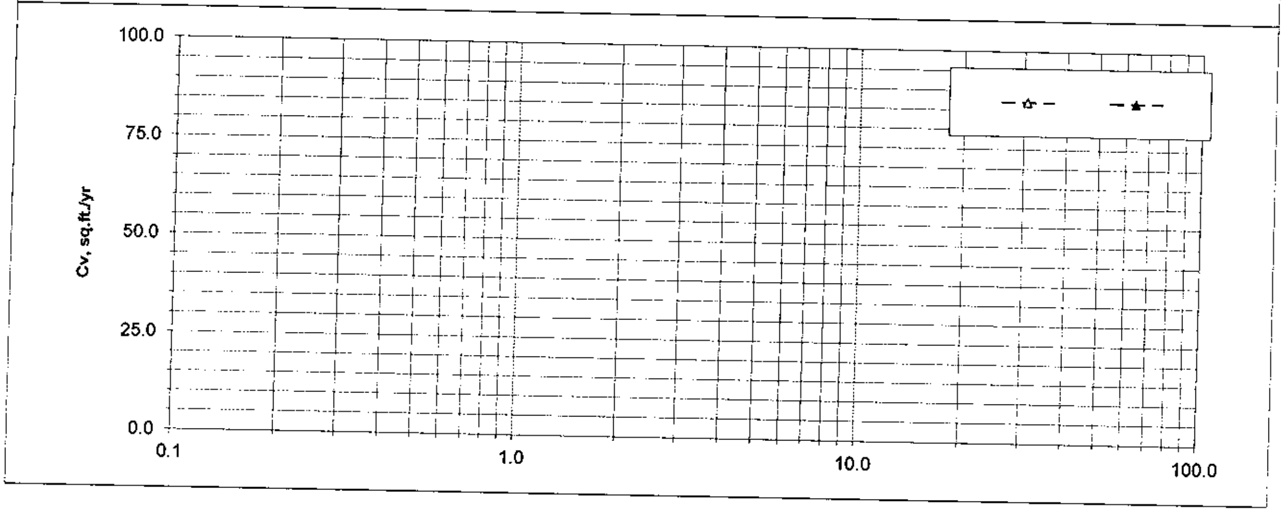


CONSOLIDATION TEST

Boring Number	BH-171	Sample Number	4	Depth (ft)	20	
Soil Description	Dark gray clay with sand					

	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	29.2	117.4	0.855	92.2	1.00	2.420	(assumed) 2.70	45	25
Final	20.3	131.2	0.546	100.4	0.833				

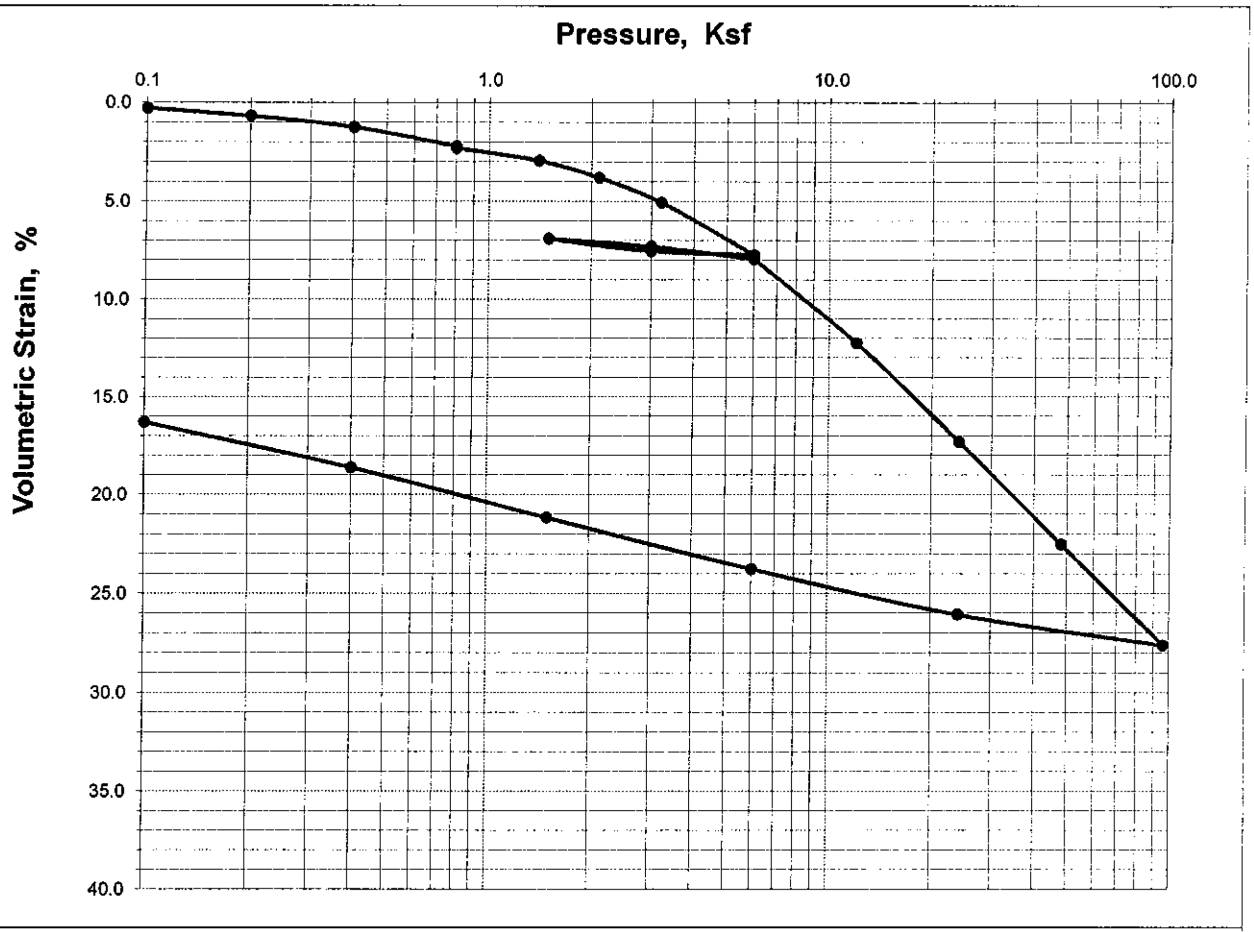


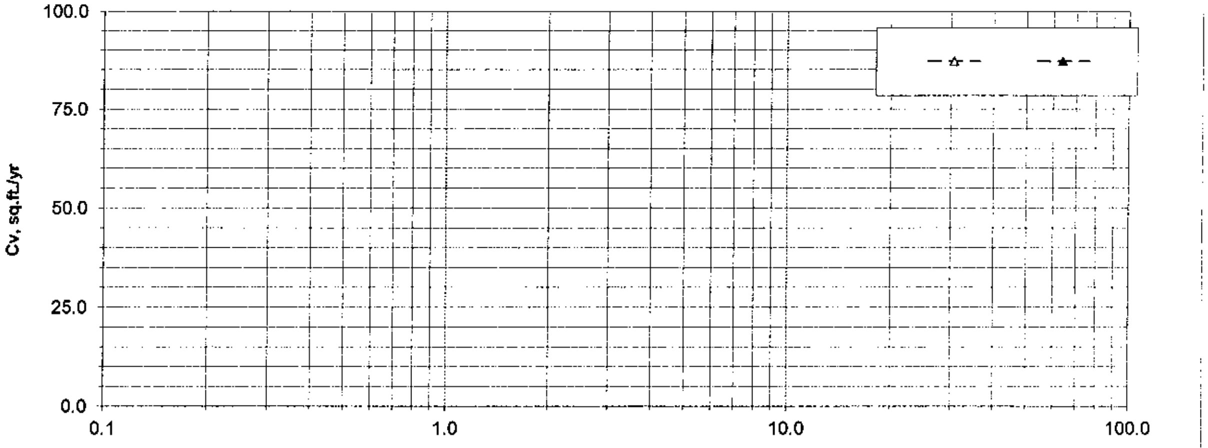


CONSOLIDATION TEST

Boring Number	BH-173	Sample Number	8	Depth (ft)	20	
Soil Description	Dark gray clay					

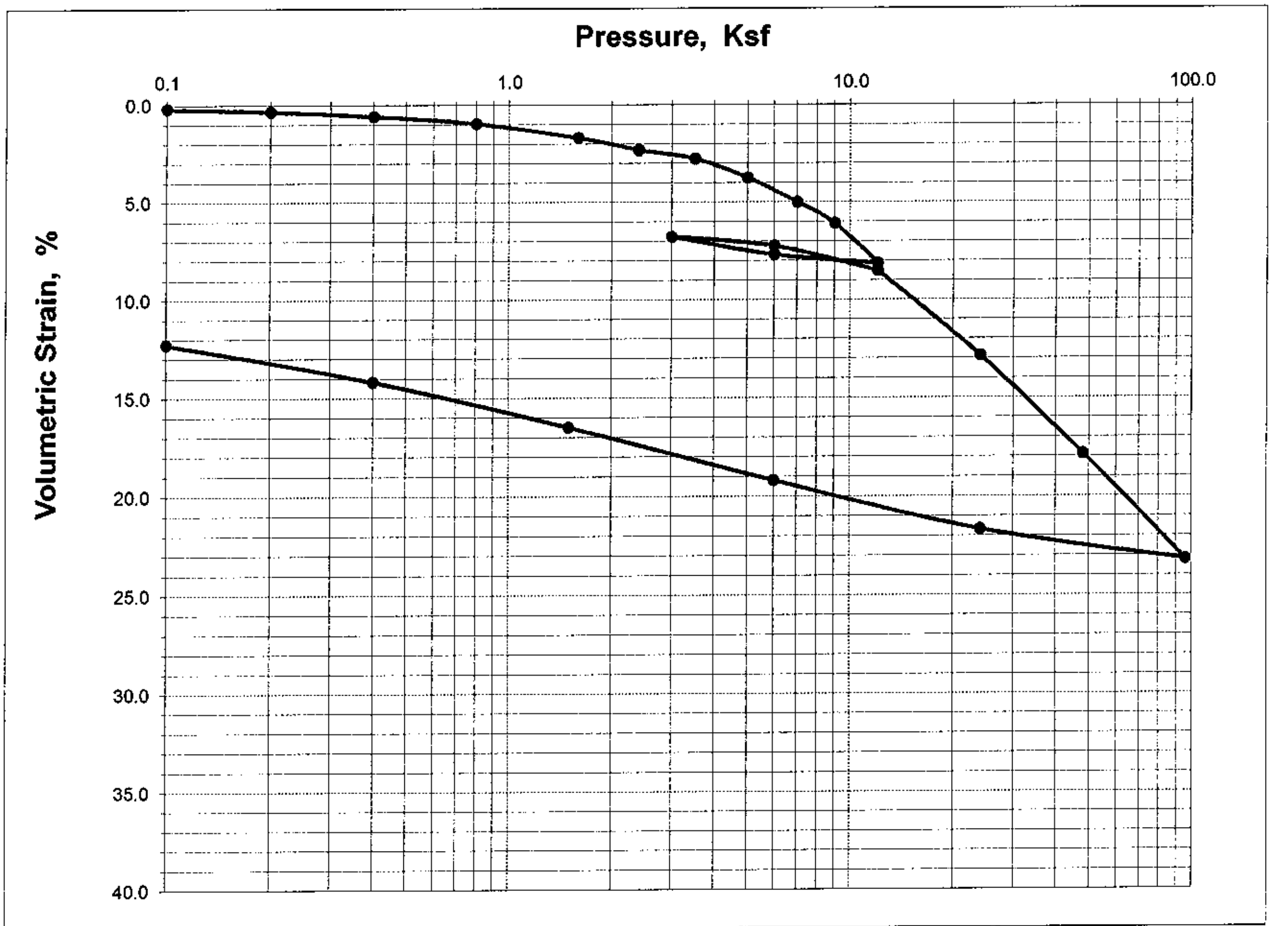
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	34.6	114.1	0.989	94.3	1.00	2.420	(assumed) 2.70	58	36
Final	24.8	126.4	0.665	100.6	0.837				

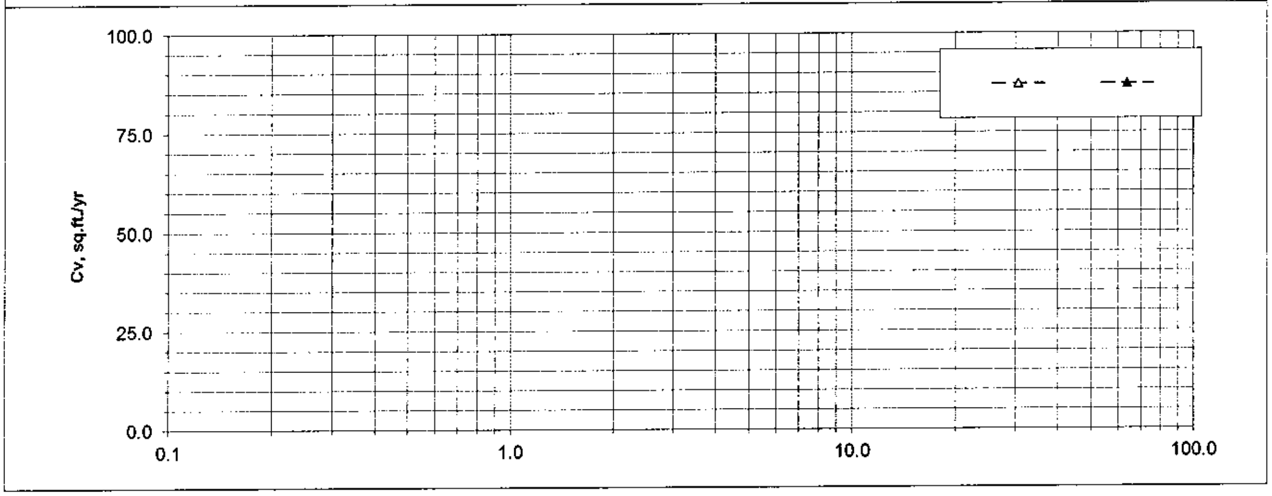




CONSOLIDATION TEST

Boring Number		BH-175	Sample Number		6	Depth (ft)	30		
Soil Description		Greenish gray clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	32.9	115.0	0.948	93.7	1.00	2.420	(assumed) 2.70	67	43
Final	26.3	124.6	0.709	100.1	0.877				

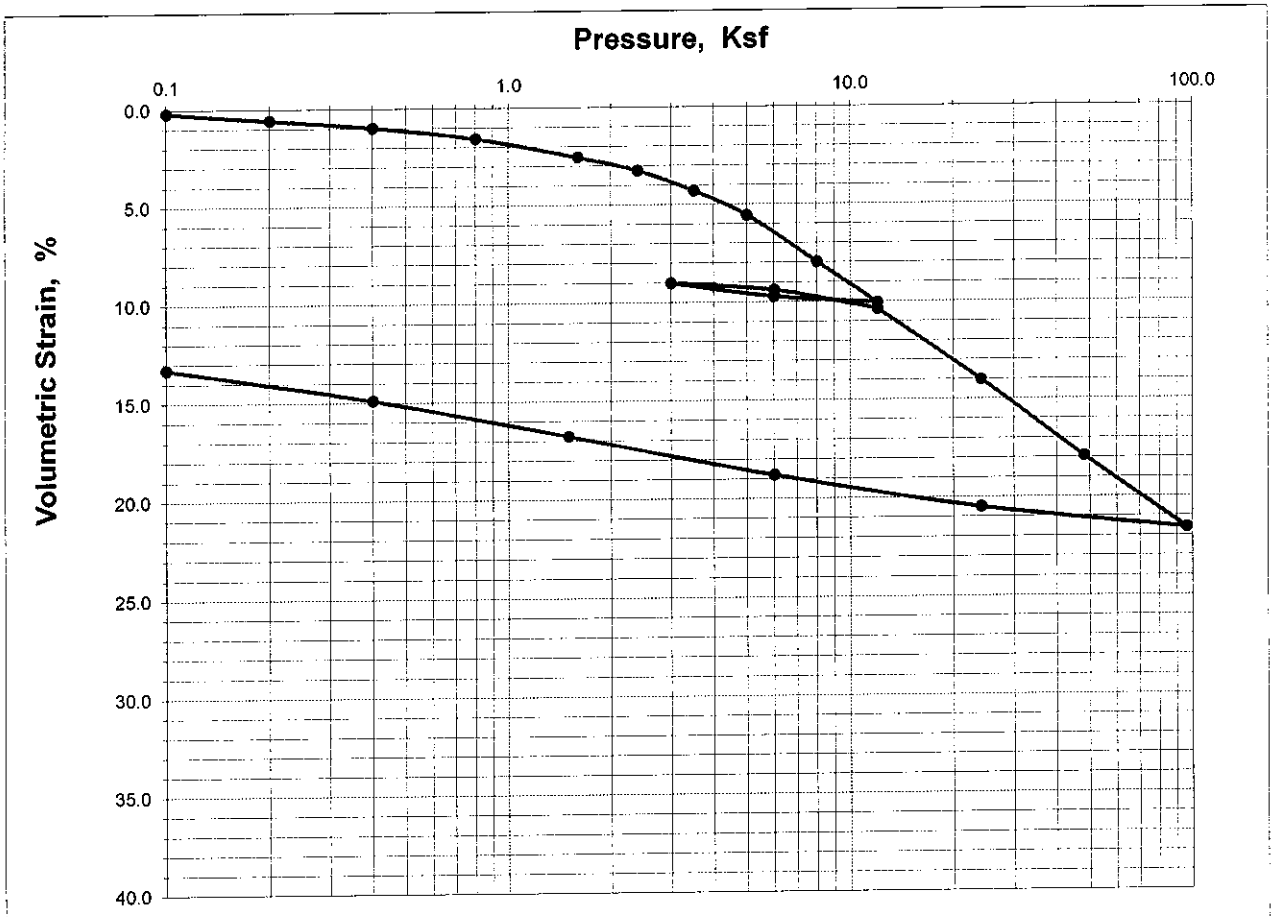


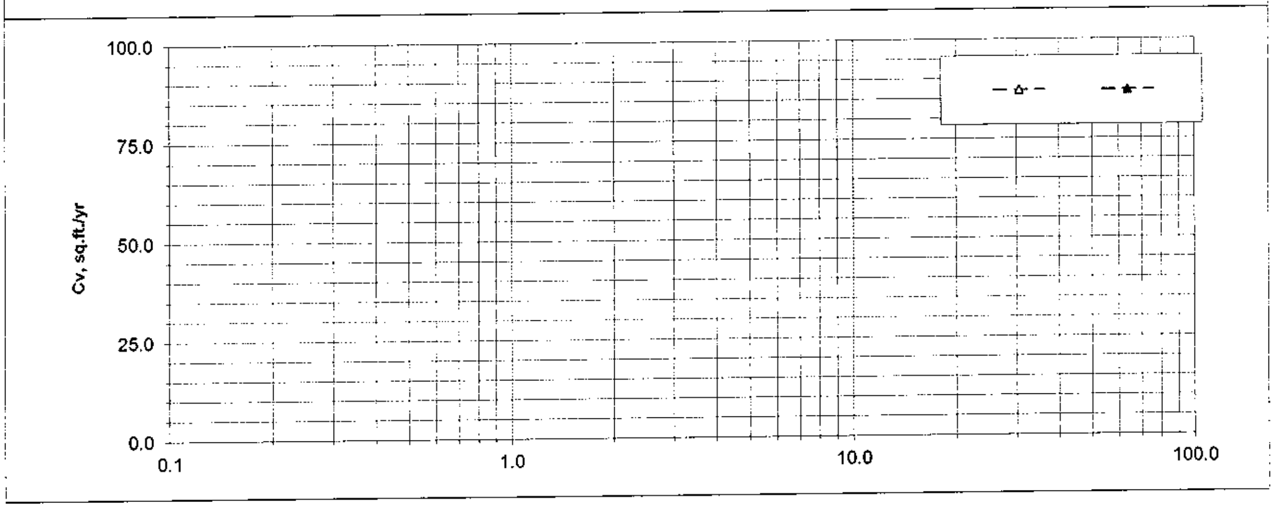


CONSOLIDATION TEST

Boring Number	BH-176	Sample Number	6	Depth (ft)	20	
Soil Description	Greenish gray clay with sand					

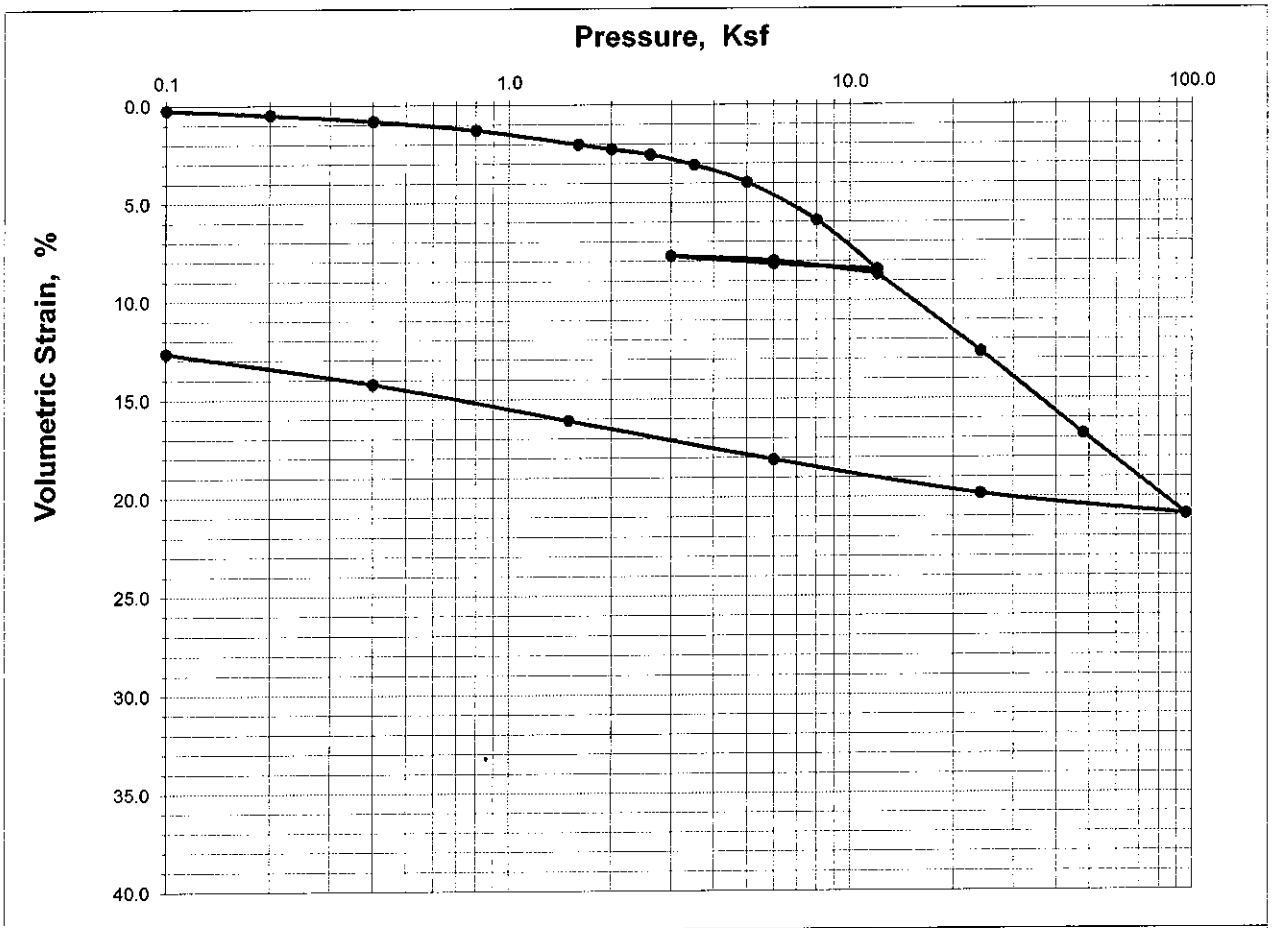
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	24.9	122.2	0.724	92.8	1.00	2.420	(assumed)	45	27
Final	18.4	133.5	0.494	100.2	0.867		2.70		

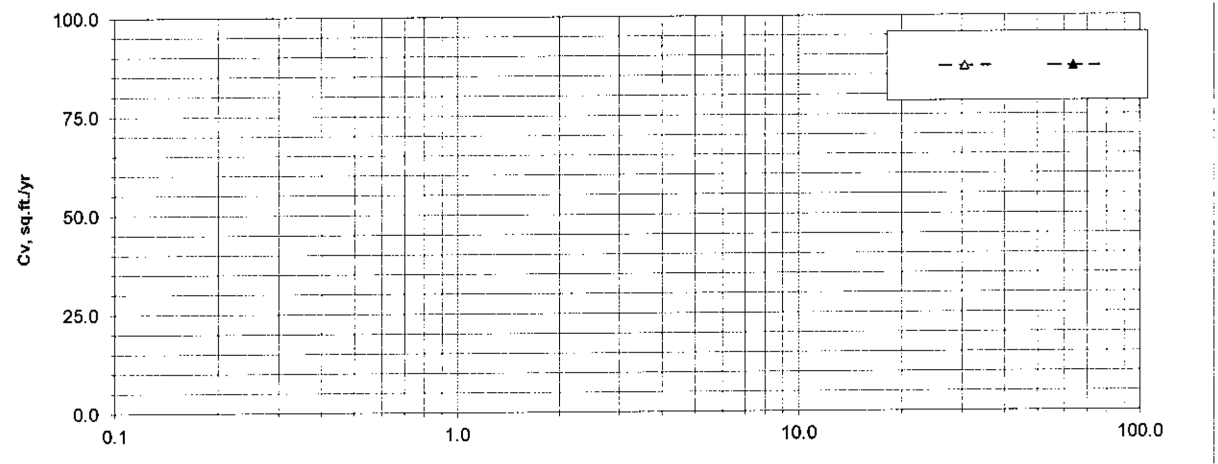




CONSOLIDATION TEST

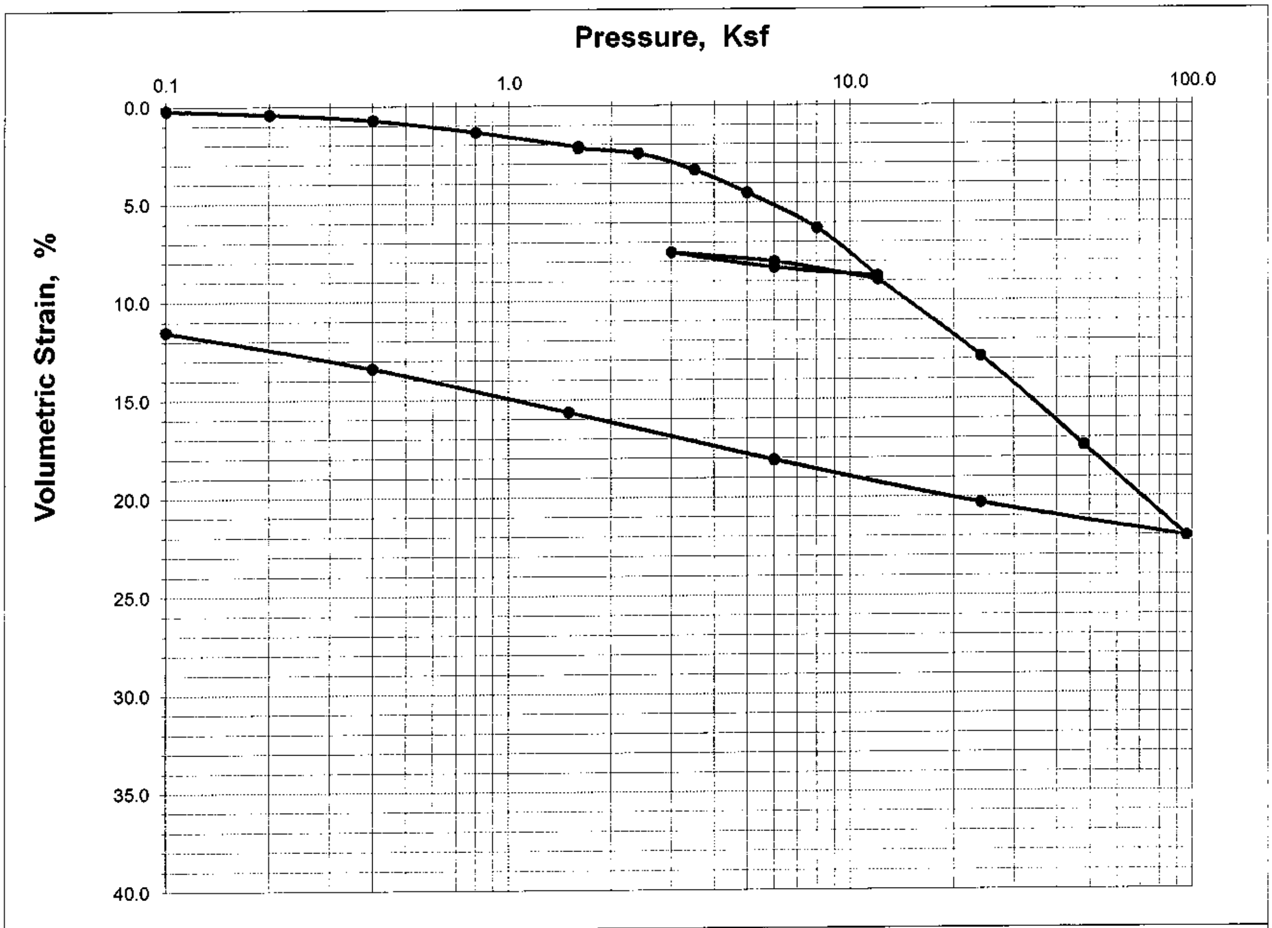
Boring Number	BH-176		Sample Number	10	Depth (ft)	40			
Soil Description	Greenish gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	25.3	122.1	0.730	93.6	1.00	2.420	(assumed) 2.70		
Final	19.0	132.7	0.512	100.2	0.874				

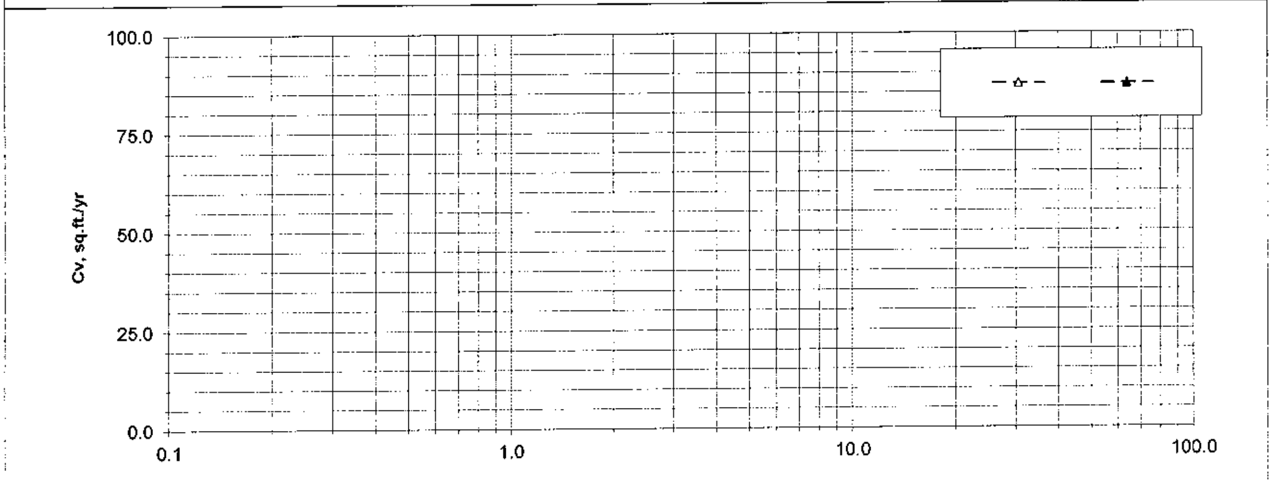




CONSOLIDATION TEST

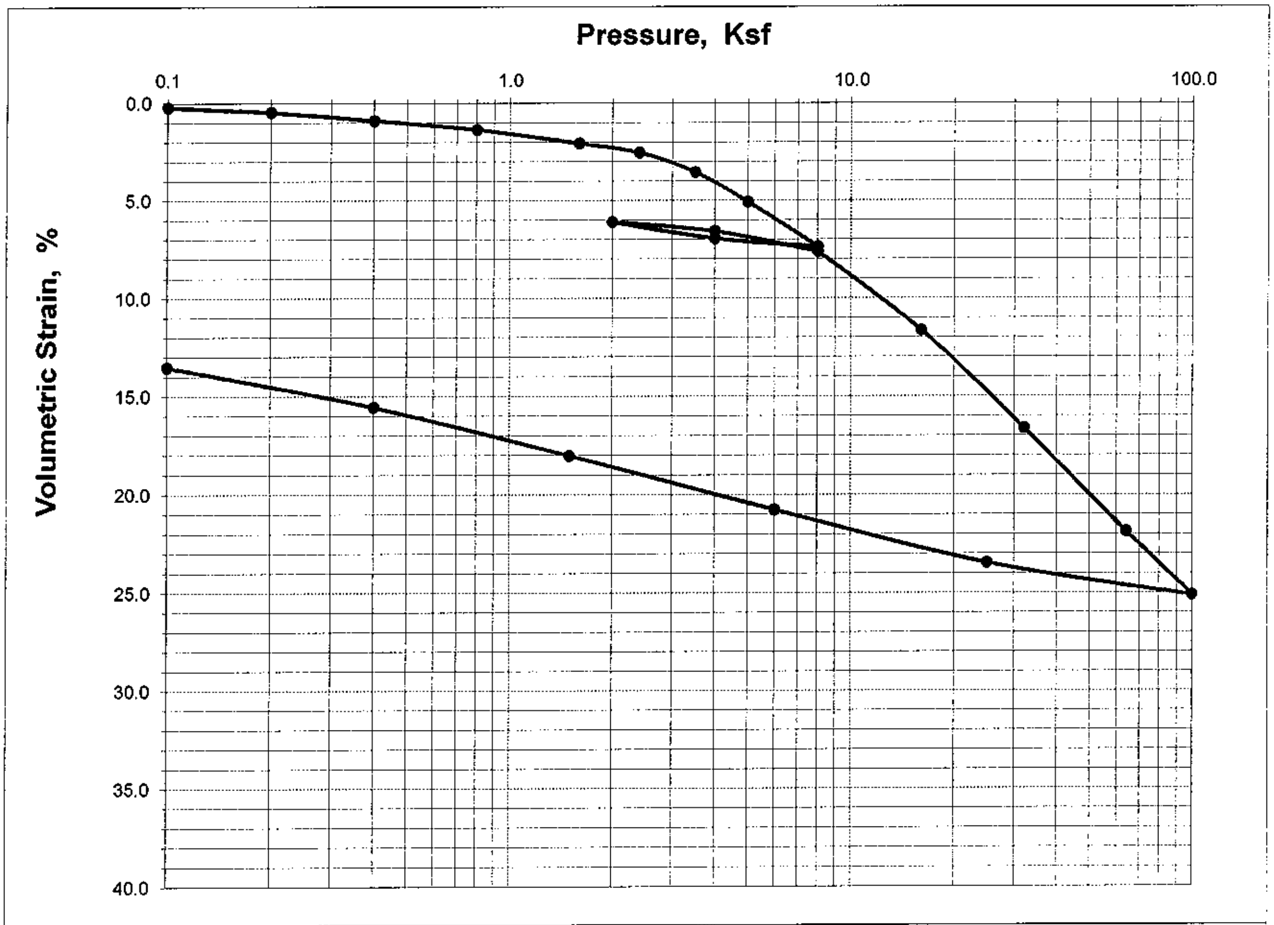
Boring Number	BH-177	Sample Number	6	Depth (ft)	20				
Soil Description	Grayish brown clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	27.8	118.9	0.811	92.4	1.00	2.420	(assumed)	50	30
Final	22.4	128.8	0.603	100.3	0.885		2.70		

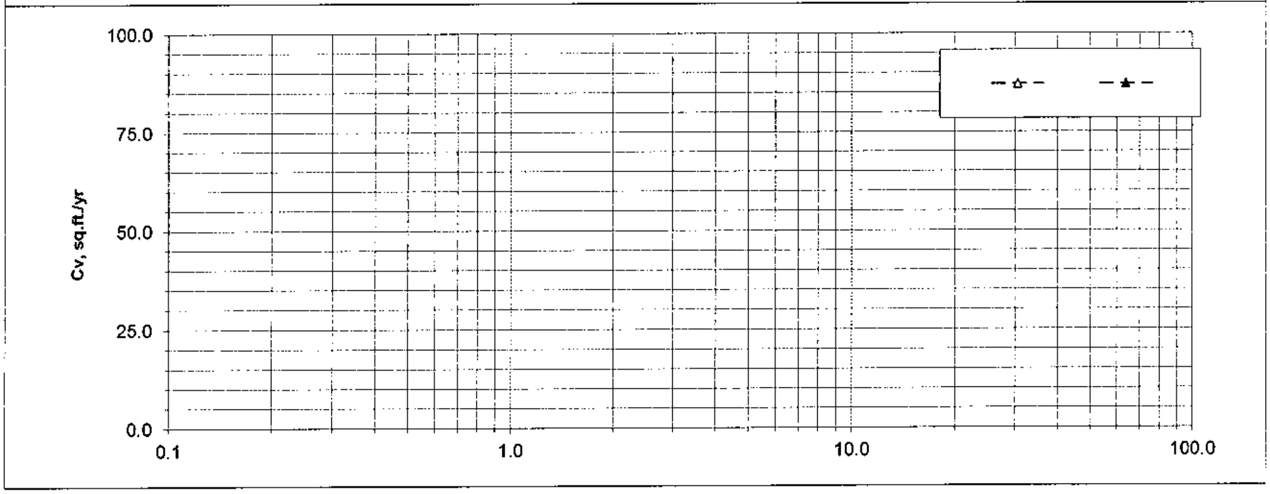




CONSOLIDATION TEST

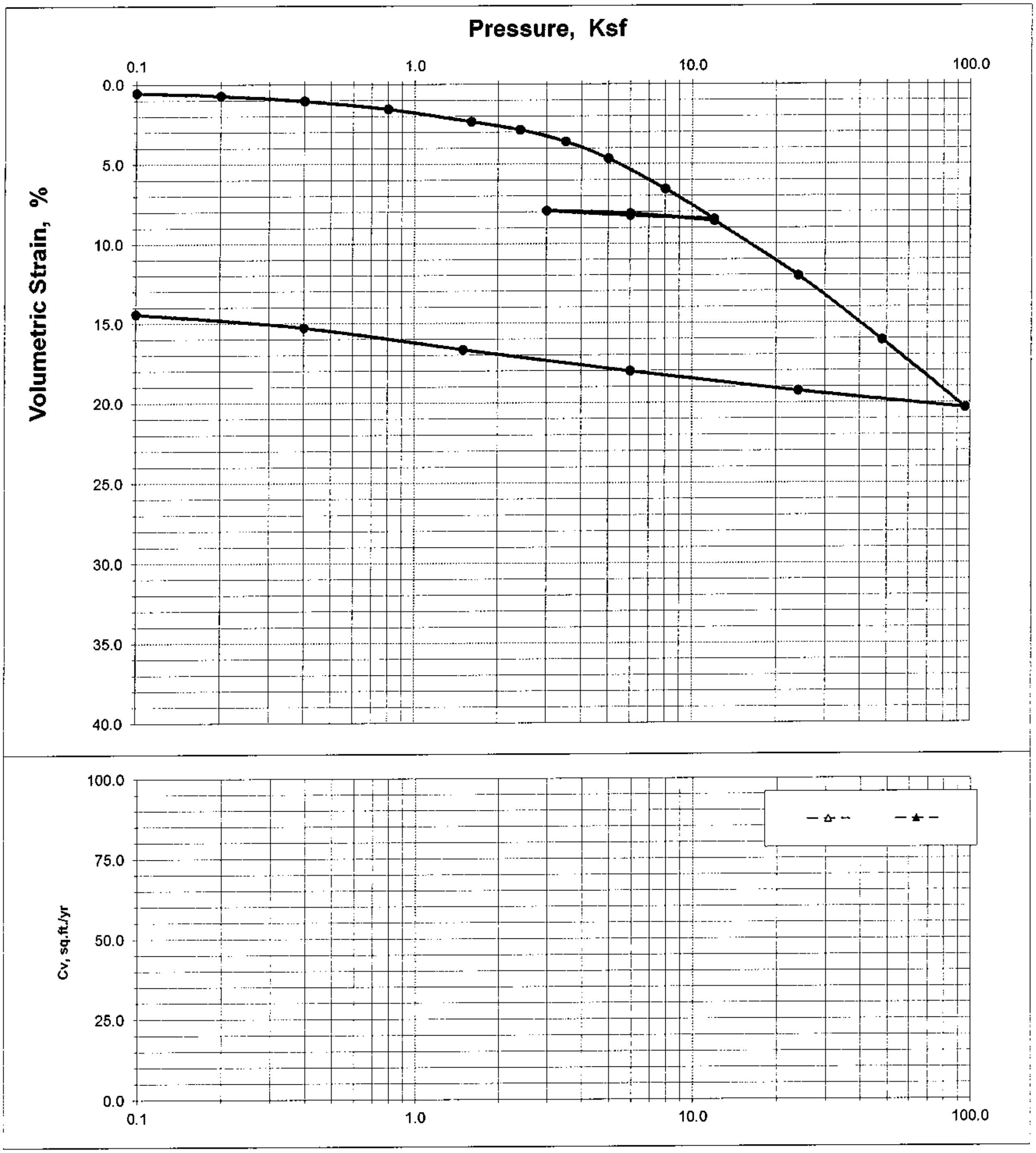
Boring Number	BH-178	Sample Number	4	Depth (ft)	15				
Soil Description	Grayish brown clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	33.9	114.6	0.969	94.4	1.00	2.420	(assumed)	60	38
Final	26.1	124.9	0.703	100.3	0.865		2.70		





CONSOLIDATION TEST

Boring Number	BH-178	Sample Number		9	Depth (ft)	40			
Soil Description	Gray clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	25.8	121.4	0.747	93.1	1.00		(assumed)	35	16
Final	18.4	133.5	0.496	100.2	0.856	2.420	2.70		



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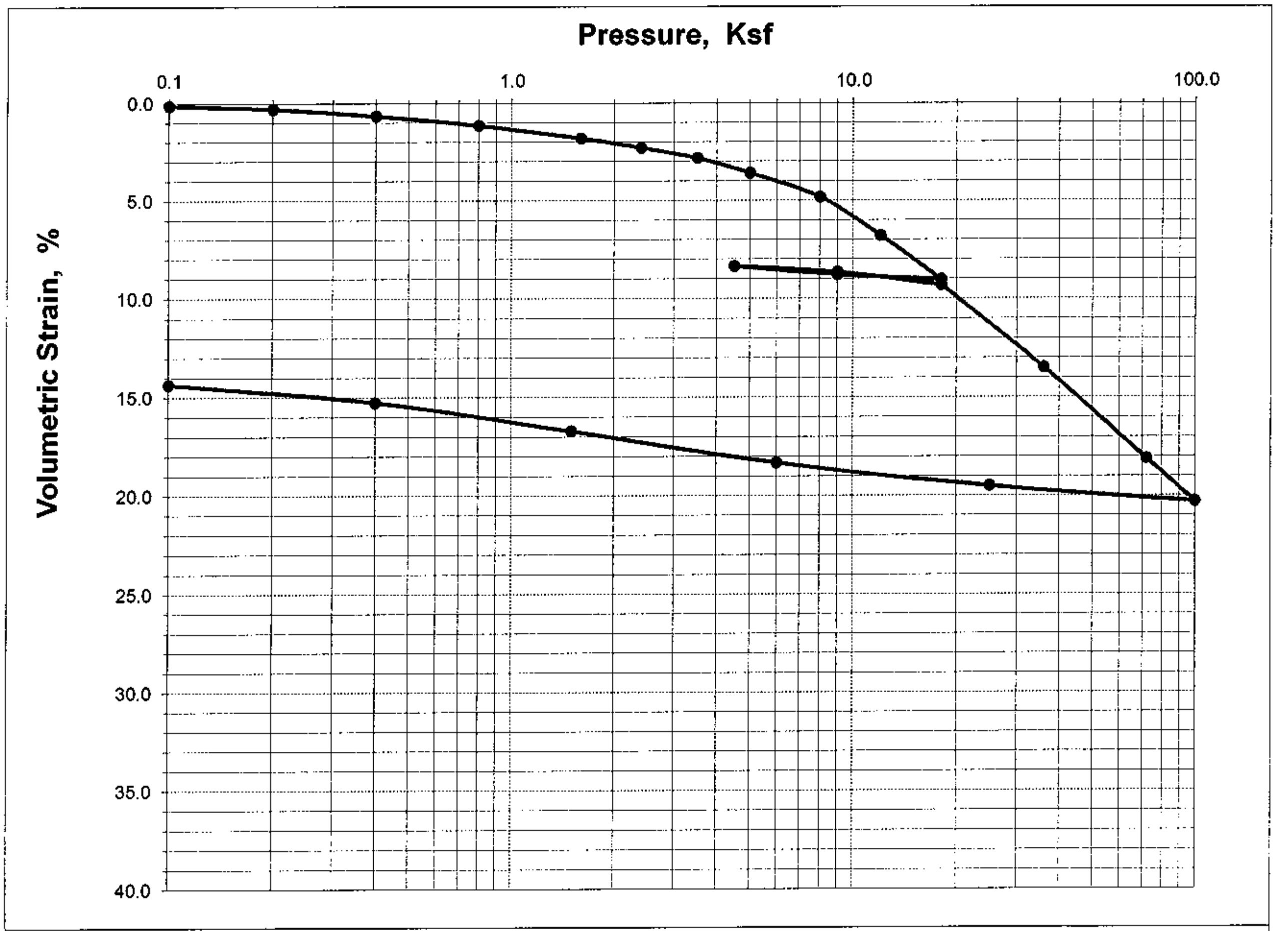
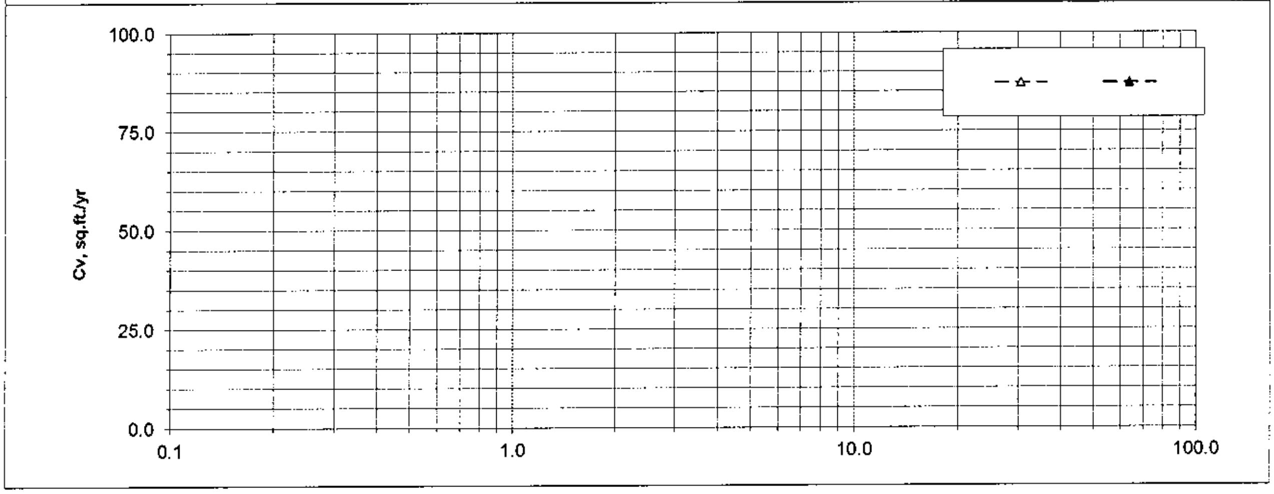
CONSOLIDATION TEST

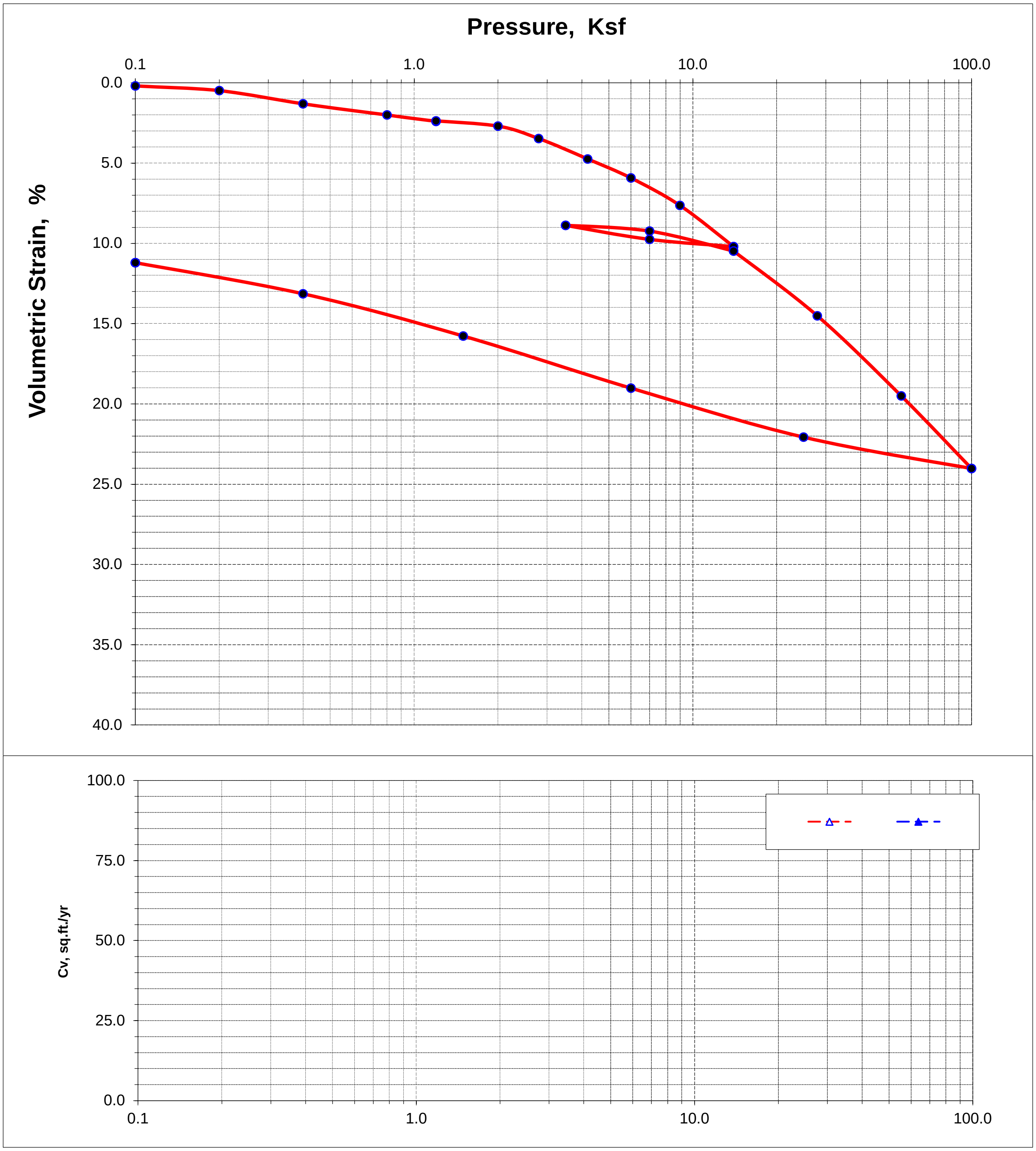
Boring Number	BH-178	Sample Number	13	Depth (ft)	60				
Soil Description	Greenish gray clay with sand								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	26.6	121.3	0.759	94.5	1.00	2.420	(assumed)	43	26
Final	18.9	133.0	0.508	100.5	0.857		2.70		





CONSOLIDATION TEST

Boring Number	BH-179		Sample Number	10	Depth (ft)	45		
Soil Description	Greenish gray clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	36.2	115.9	0.982	99.6	1.00	2.420	(assumed) 2.70	68	41
Final	28.2	122.8	0.760	100.3	0.888				



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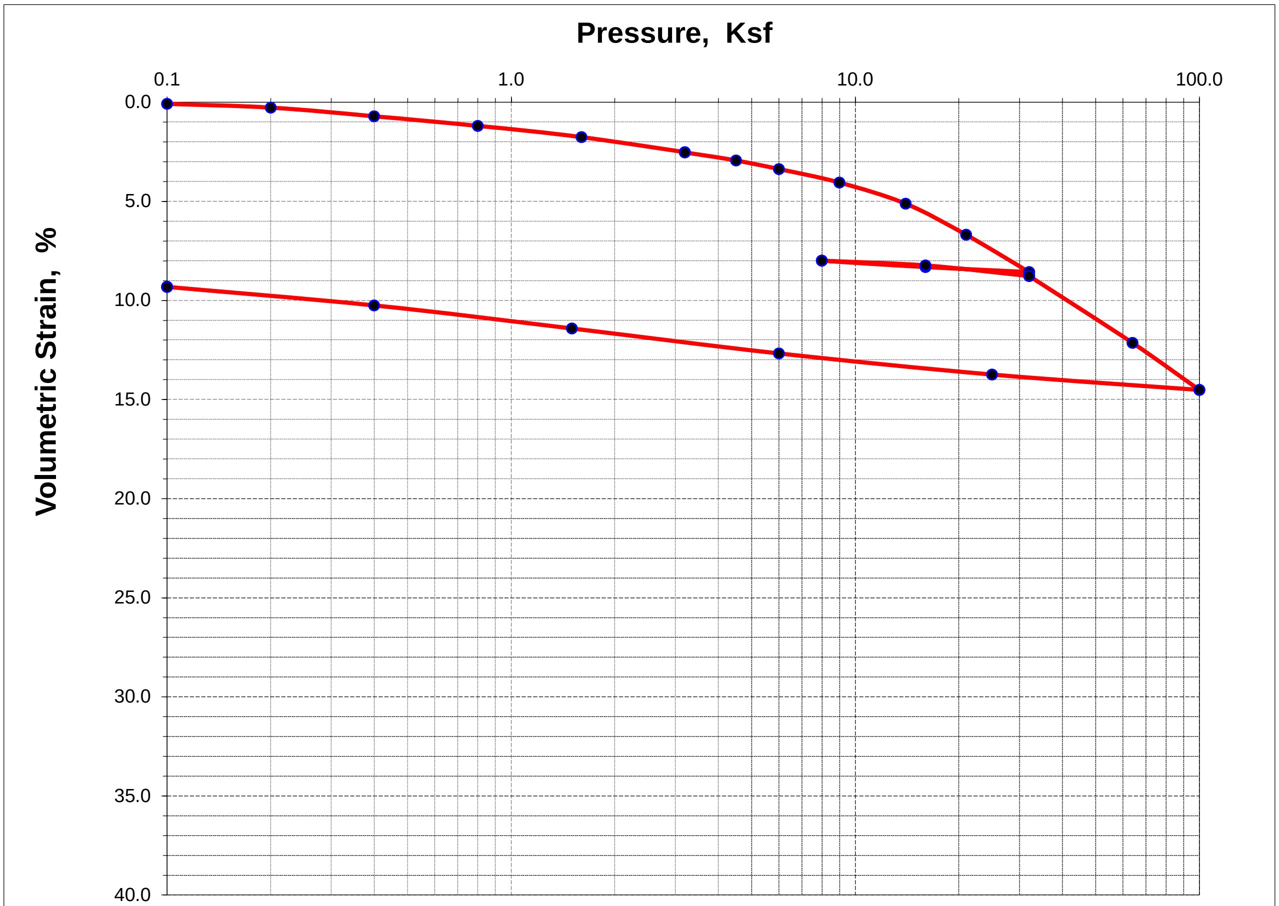
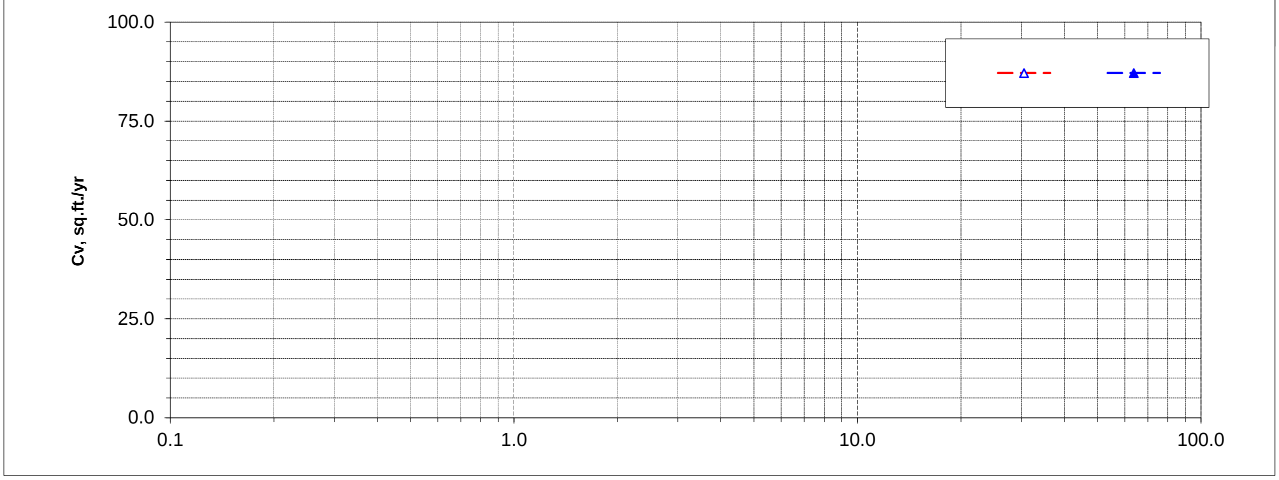
CONSOLIDATION TEST

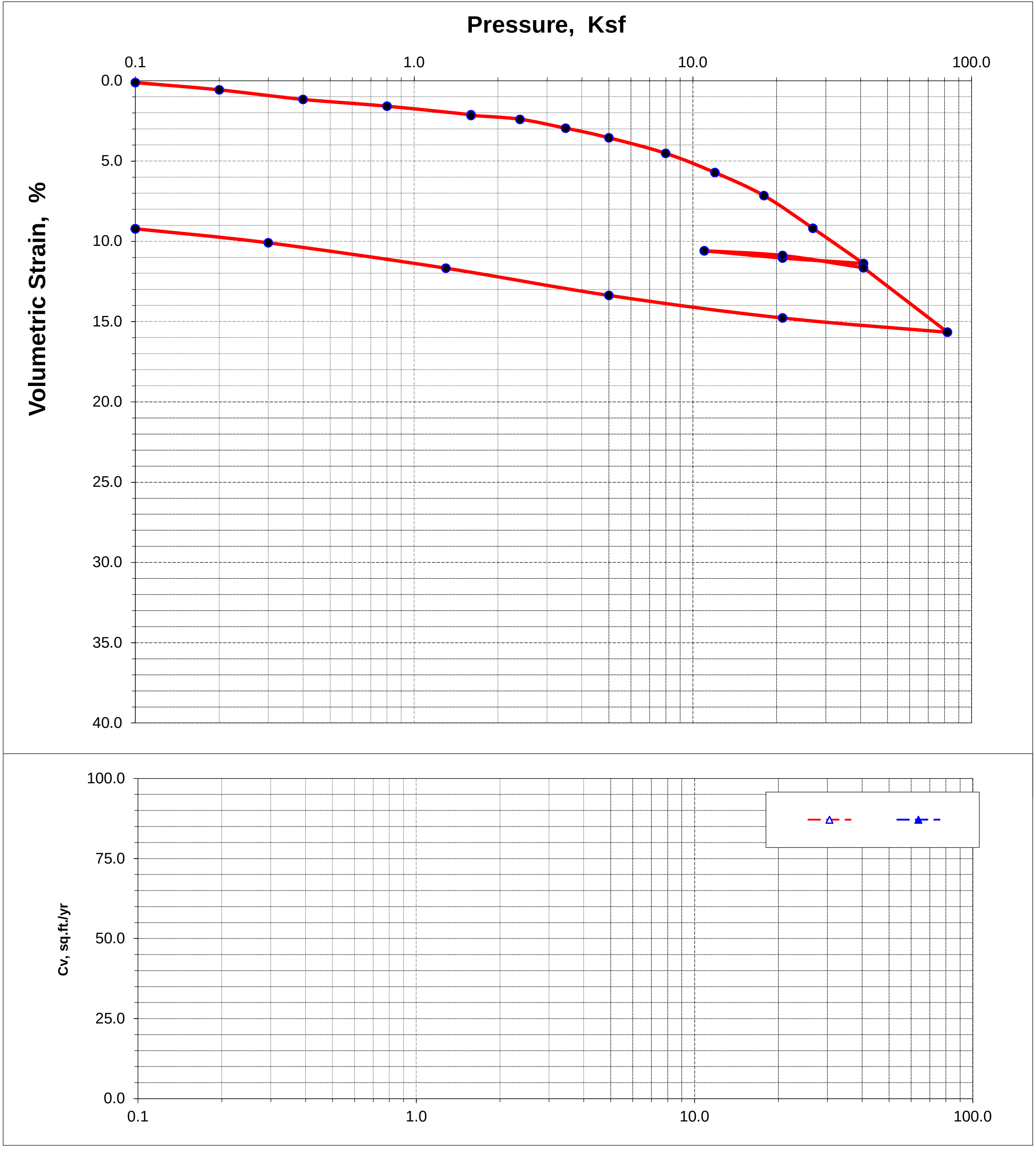
Boring Number		BH-179	Sample Number		16	Depth (ft)	75		
Soil Description		Greenish gray sandy clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	22.6	125.6	0.645	94.5	1.00	2.420	(assumed) 2.70	31	10
Final	18.2	133.6	0.492	100.1	0.907				





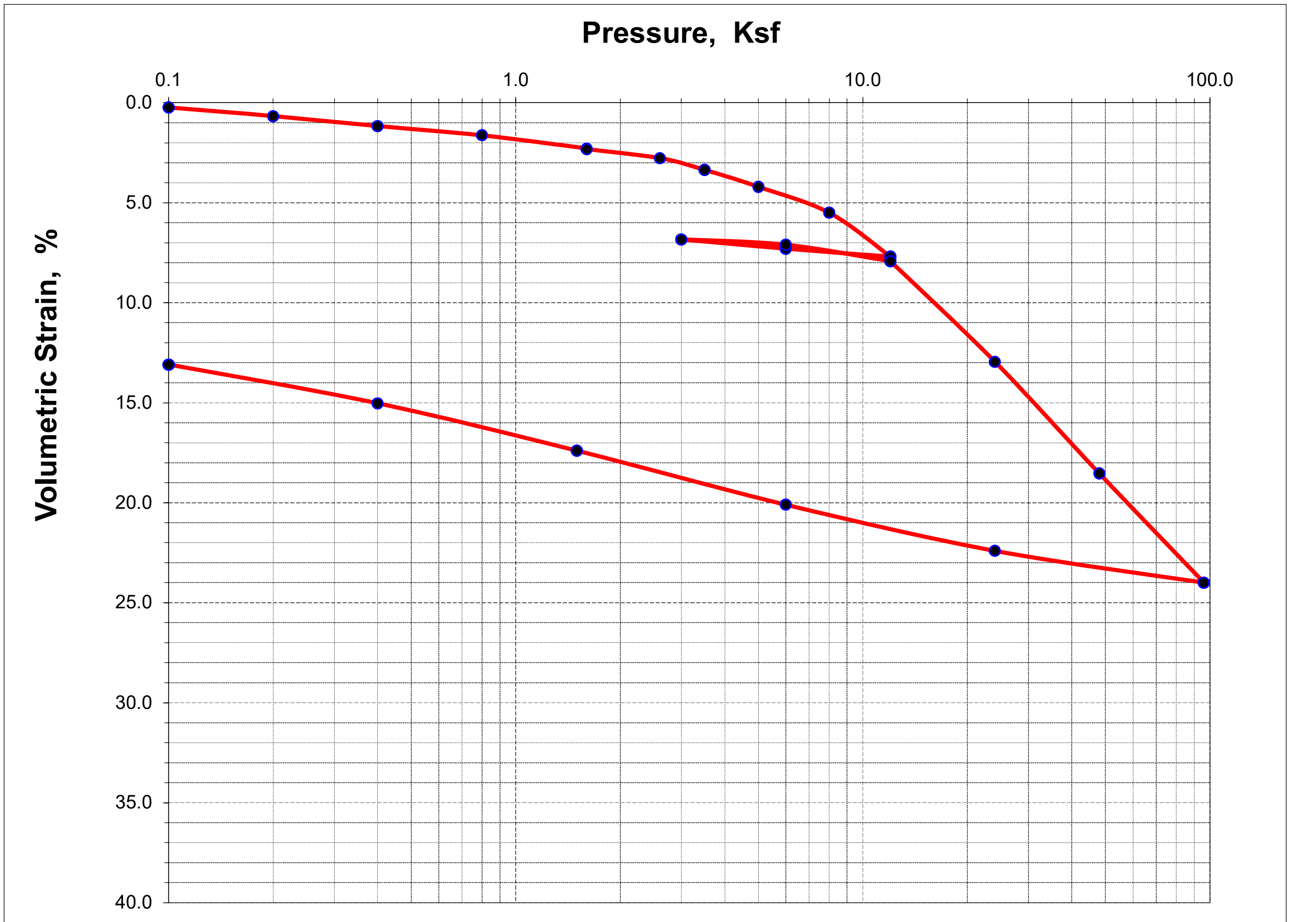
CONSOLIDATION TEST

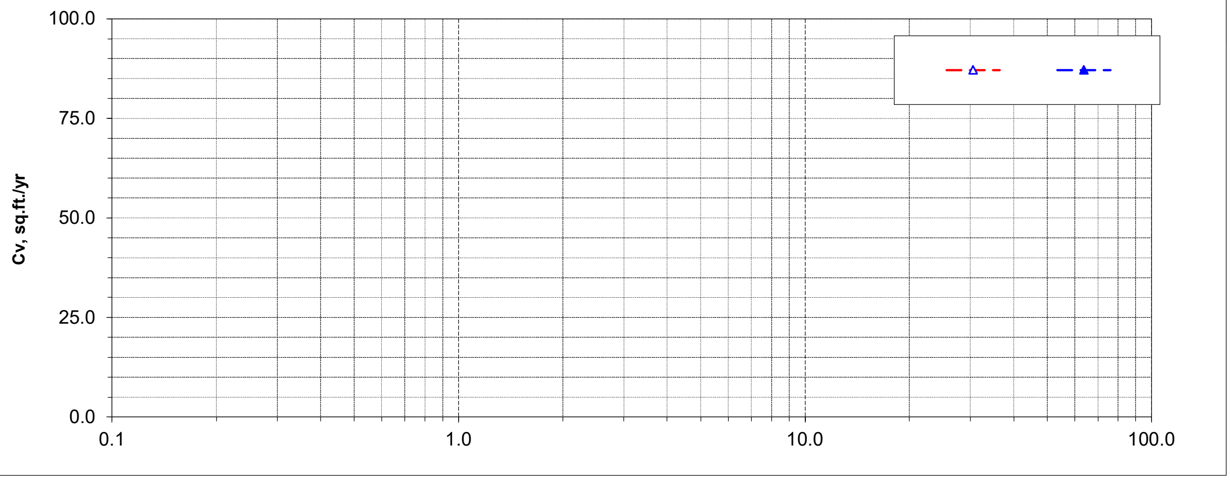
Boring Number		BH-179	Sample Number		28	Depth (ft)	135		
Soil Description		Greenish gray clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	24.2	124.8	0.679	96.4	1.00	2.420	(assumed) 2.70	36	18
Final	19.5	132.1	0.524	100.2	0.908				



CONSOLIDATION TEST

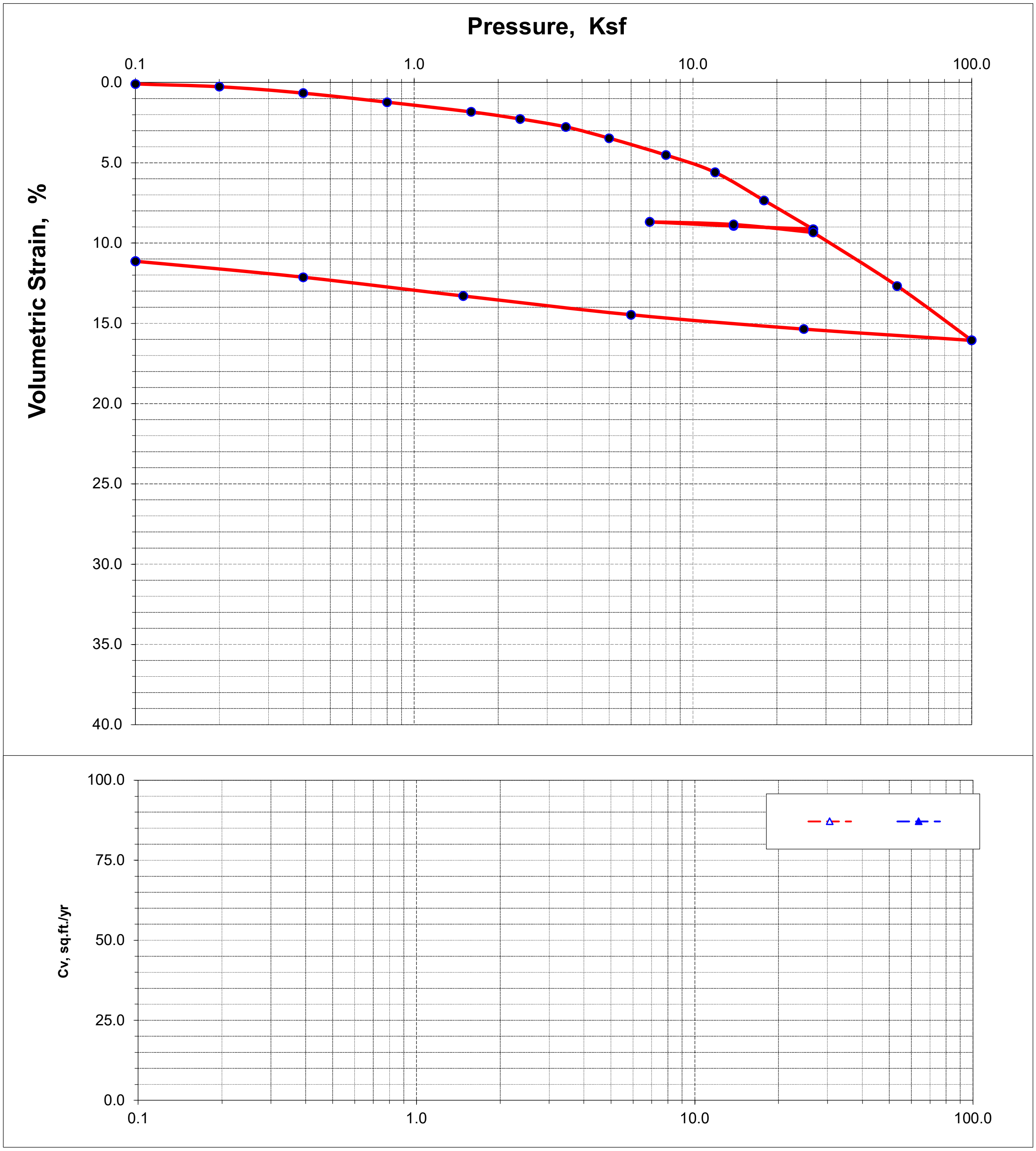
Boring Number	BH-180	Sample Number	7	Depth (ft)	25				
Soil Description	Grayish brown clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	32.6	114.5	0.951	92.4	1.00	2.420	(assumed) 2.70	58	36
Final	26.1	124.9	0.703	100.3	0.873				





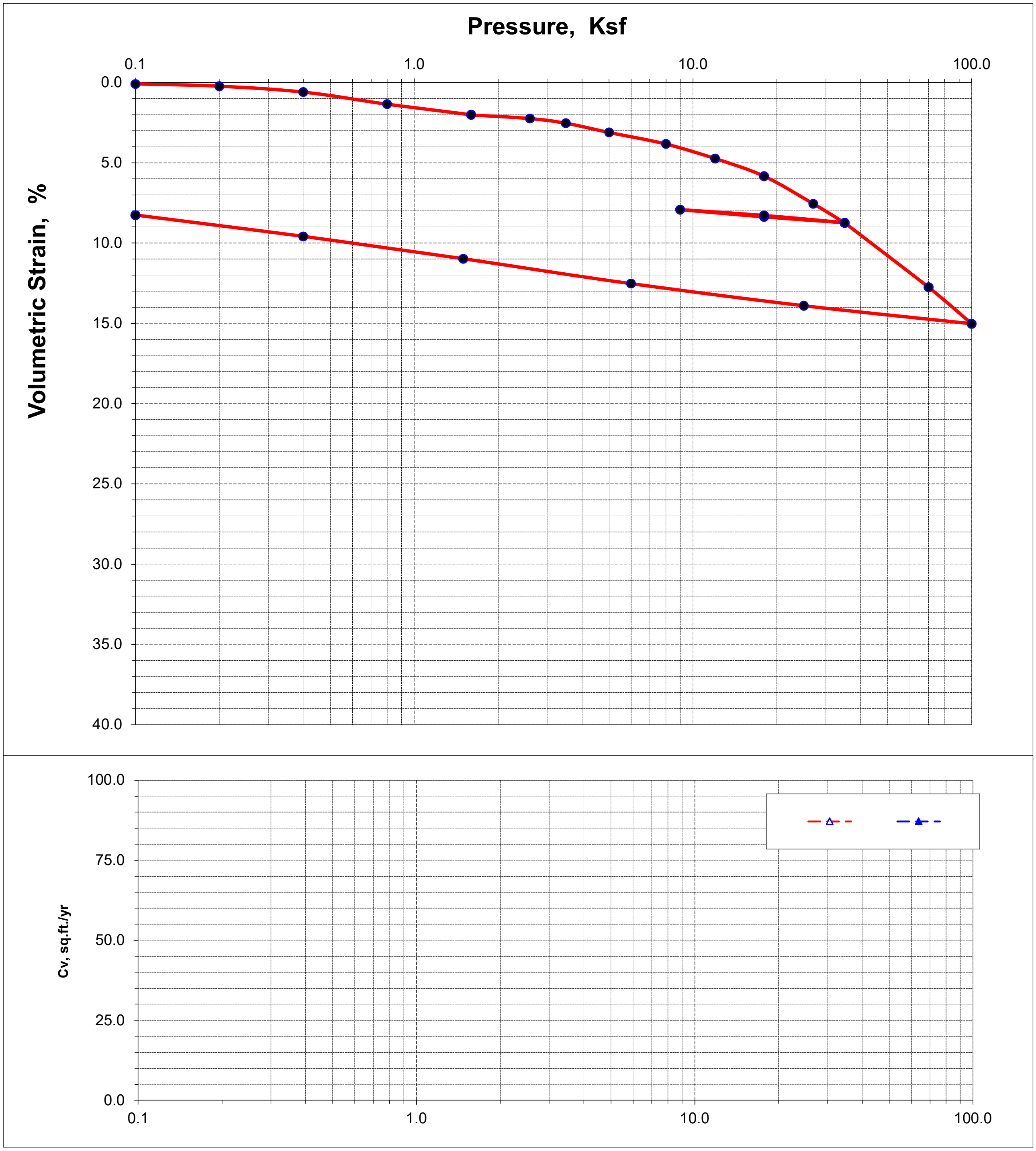
CONSOLIDATION TEST

Boring Number	BH-180	Sample Number		18	Depth (ft)	80			
Soil Description	Greenish gray sandy clay								
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	21.0	127.3	0.602	94.1	1.00	2.420	(assumed) 2.70	30	14
Final	15.8	137.1	0.424	100.5	0.889				



CONSOLIDATION TEST

Boring Number	BH-180	Sample Number	28	Depth (ft)	130			
Soil Description	Grayish brown clay							
	Water Content, %	Total Unit Weight, pcf	Void Ratio	Saturation %	Height in	Diameter in	Specific Gravity	Liquid Limit, %	Plasticity Index, %
Initial	20.5	123.2	0.650	85.3	1.00	2.420	(assumed) 2.70	42	24
Final	18.9	132.6	0.513	99.7	0.917				



507385606

Soil Corrosivity Test Results

Soil Corrosivity Tests

Table E-3. Summary of Corrosion Tests

Borehole ID	Location	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Sample Depth (ft)
BH-108	East Portal to 28th Street / Little Portugal Station	1,955,111.08	6,164,157.11	86.94	90.5
BH-114	28th Street / Little Portugal Station to East Emergency Stop	1,951,348.53	6,163,597.55	91.49	100.4
BH-116	East Emergency Stop	1,949,991.68	6,160,933.27	80.56	101
BH-123	DTSJ Station to Diridon Station	1,946,618.74	6,155,215.53	85.06	85.5
BH-125	Diridon Station	1,946,414.26	6,154,679.93	87.59	101
BH-137	West Emergency Stop	1,949,225.92	6,151,112.11	81.74	115.5
BH-139	West Emergency Stop to West Portal	1,950,684.30	6,149,891.07	76.29	110.5
BH-157	East Emergency Stop to DTSJ Station	1,948,522.71	6,158,579.09	79.84	80.5
BH-158	East Emergency Stop to DTSJ Station	1,949,055.54	6,159,642.43	81.67	94
BH-159	East Portal to 28th Street / Little Portugal Station	1,955,261.89	6,164,341.96	87.53	85.5
BH-160	DTSJ Station to Diridon Station	1,946,961.64	6,156,135.03	82.79	89.5
BH-161	Diridon Station	1,946,303.79	6,154,108.70	86.88	20, 109
BH-162	Diridon Station to West Emergency Stop	1,946,275.29	6,153,549.03	84.09	90

Borehole ID	Location	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Sample Depth (ft)
BH-163	Diridon Station to West Emergency Stop	1,946,385.72	6,153,183.61	87.75	112
BH-164	28th Street / Little Portugal Station	1,952,858.12	6,164,718.57	88.63	96.5
BH-165	East Portal	1,956,022.36	6,163,246.74	86.01	35.5
BH-166	Diridon Station to West Emergency Stop	1,947,127.36	6,152,114.80	86.58	113.5
BH-167	Diridon Station to West Emergency Stop	1,946,661.40	6,152,533.84	93.25	7.5
BH-168	Diridon Station to West Emergency Stop	1,947,476.89	6,152,114.41	84.54	97
BH-169	Diridon Station to West Emergency Stop	1,948,258.85	6,152,069.96	79.99	97
BH-173	West Emergency Stop to West Portal	1,951,887.92	6,148,847.62	67.63	85
BH-176	West Portal	1,952,544.54	6,147,277.17	65.35	15
BH-177	Santa Clara Station	1,954,420.17	6,144,531.57	64.39	10
BH-179	East Emergency Stop	1,950,048.34	6,160,894.58	80.71	40, 100
BH-180	West Emergency Stop	1,949,024.37	6,151,220.00	81.78	75

Corrosivity Tests Summary

CTL #	157-364	**Date:**	3/29/2019	**Tested By:**	PJ
Checked:	PJ				
Client:	Parikh Consulting	**Project:**	BART to Silicon Valley	**Proj. No:**	2017-144-T02
Remarks:					

Sample Location or ID			**Resistivity @ 15.5 °C (Ohm-cm)**			**Chloride**	**Sulfate**		**pH**	**ORP**		**Sulfide**	**Moisture**	**Soil Visual Description**
			As Rec.	**Min**	**Sat.**	**mg/kg**	**mg/kg**	**%**		(Redox)		Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	**%**	
Boring	**Sample, No.**	**Depth, ft.**	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
BH-108	18A&B	90.5-91.5	-	-	1,337	9	245	0.0245	7.9	-	-	-	27.3	Gray CLAY
BH-114	20A&B	100.4-101.3	-	-	1,996	7	59	0.0059	8.2	-	-	-	28.5	Gray CLAY
BH-116	18A	101-102	-	-	1,635	12	104	0.0104	8.2	-	-	-	28.8	Gray CLAY
BH-123	17A&B	85.5-86.5	-	-	4,235	10	47	0.0047	7.5	-	-	-	23.2	Yellowish Brown Sandy CLAY (Silty)
BH-125	20A&B	101-102	-	-	1,416	15	315	0.0315	7.6	-	-	-	22.6	Gray CLAY
BH-137	23A&B	115.5-116.5	-	-	2,293	13	40	0.0040	7.7	-	-	-	22.1	Olive Brown Sandy CLAY

Corrosivity Tests Summary

CTL # 157-366 **Date:** 4/17/2019 **Tested By:** PJ **Checked:** PJ

Client: Parikh Consultants **Project:** BART to Silicon Valley **Proj. No:** 2017-144-T02

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%		(Redox)		Qualitative	At Test	
						Dry Wt.	Dry Wt.	Dry Wt.		E_H (mv)	At Test	by Lead	%	
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
BH-139	42&43	110.5-111	-	-	2,338	7	113	0.0113	8.1	-	-	-	24.9	Gray CLAY

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25 February, 2020

Job No.2002054
Cust. No. 12259

Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Subject: Project No.: 507385606
Project Name: BSVII
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hunt:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on February 10, 2020. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity and conductivity measurements; samples -002, -003 and 005 are classified as "corrosive"; samples -004 and -006 are classified as "moderately corrosive"; and sample -001 is classified as "mildly corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations ranged from none detected to 120 mg/kg. Because the chloride ion concentrations are less than 300 mg/kg, they are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentration ranges from none detected to 170 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils ranged from 7.52 to 8.58 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials range from 230 to 290-mV which is indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl

California State Certified Laboratory No. 2153

CERCO
analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 **462 2771** Fax. 925 **462 2775**
www.cercoanalytical.com

Client: Inspection Services, Inc.
Client's Project No.: 507385606
Client's Project Name: BSVII
Date Sampled: 10-Feb-2020
Date Received: 10-Feb-2020
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 25-Feb-2020

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity** (As Received) (umhos/cm)	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2002054-001	BH-157 #10A @80.5'	290	7.84	110	-	-	N.D.	17
2002054-002	BH-158 #12 @94'	260	7.52	-	1,700		N.D.	170
2002054-003	BH-159 #16 @85.5'	240	7.98	-	1,100		120	36
2002054-004	BH-160 #20 @89.5'	230	8.58	-	3,200		N.D.	N.D.
2002054-005	BH-161 #2 @20'	240	8.23	-	940		40	150
2002054-006	BH-161 #21 @109'	240	8.15	210	-		N.D.	31

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	-	-	50	15	15
Date Analyzed:	21-Feb-2020	21-Feb-2020	24-Feb-2020	18-Feb-2020	-	21-Feb-2020	21-Feb-2020

Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. - None Detected
**Samples were rocky

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Chain of Custody

Page 1 of 1

Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775
CERCO analytical

Job No.	CU#	Client Project I.D.
200054	[illegible]	507385606

Schedule
Analyte
Date Sampled
Date Due

Full Name John Hunt
Phone X
Fax
Company and/or Mailing Address ISI Berkeley, CA
Cell 510-809-5130 ☒
Sample Source BSVII

ANALYSIS | ASTM

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qtv.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated	Brief Evaluation
①	BH-157 #10A 80.5'	2-10-20				[illegible]			X	X	X	X	X	X
②	BH-158 #12 94'								X	X	X	X	X	X
③	BH-159 #16 85.5'								X	X	X	X	X	X
④	BH-160 #20 89.5'								X	X	X	X	X	X
⑤	BH-161 #2 20'								X	X	X	X	X	X
⑥	BH-161 #21 109'								X	X	X	X	X	X

MATRIX
DW - Drinking Water
GW - Ground Water
SW - Surface Water
WW - Waste Water
Water
SL - Sludge
S - Soil
Product

ABBREVIATIONS
HB - Hosebib
PV - Petcock Valve
PT - Pressure Tank
PH - Pump House
RR - Restroom
GL - Glass
PL - Plastic
ST - Sterile

SAMPLE RECEIPT
Total No. of Containers
Rec'd Good Cond/Cold
Conforms to Record
Temp. a t Lab -°C
Sampler

	Date	Time
Relinquished By:	2/10/2020	1342
Received By:	2/10/20	1342
Relinquished By:		
Received By:		
Relinquished By:		
Received By:		

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address: jhunt@inspectionservices.net

California State Certified Laboratory No. 2153

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13 April, 2020

Job No. 2004035
Cust. No. 12259

Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Subject: Project No.: 507385606
Project Name: BSVII
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hunt:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on April 07, 2020. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.006 is classified as "severely corrosive", Samples No.003, No.004 & No.007 are classified as "corrosive". The remaining samples are classified as "moderately corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations ranged from none detected to 170 mg/kg and are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations ranged from none detected to 680 mg/kg and are determined to be sufficient to potentially be detrimental to reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, with a maximum water-to-cement ratio of 0.55.

The pH of the soils ranged from 7.21 to 8.23 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials ranged from 220 to 370-mV. All samples are indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

for

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

CERCO
analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 **462 2771** Fax. 925 **462 2775**
www.cercoanalytical.com

Client:	Inspection Services, Inc.
Client's Project No.:	507385606
Client's Project Name:	BSVII
Date Sampled:	6-Apr-2020
Date Received:	7-Apr-2020
Matrix:	Soil
Authorization:	Signed Chain of Custody

Date of Report: 13-Apr-2020

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Resistivity (As Received) (ohms-cm)	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2004035-001	BH-163 18 112'	220	8.23	-	2,500	-	N.D.	N.D.
2004035-002	BH-162 23B 90'	220	7.65	-	3,600	-	N.D.	N.D.
2004035-003	BH-164 27 96.5'	260	7.77	-	1,200	-	40	70
2004035-004	BH-173 33 85'	350	8.04	-	2,000	-	N.D.	N.D.
2004035-005	BH-166 30 113.5	370	7.21	-	3,400	-	N.D.	N.D.
2004035-006	BH-165 8B 35.5'	270	8.18	-	350	-	170	680
2004035-007	BH-169 18 97'	300	7.99	-	2,000	-	N.D.	N.D.

Method:	ASTM D1498	ASTM D4972	ASTM G57	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	-	-	50	15	15
Date Analyzed:	10-Apr-2020	10-Apr-2020	-	10-Apr-2020	-	10-Apr-2020	10-Apr-2020

* Results Reported on "As Received" Basis
N.D. - None Detected

Cheryl McMillen
Laboratory Director

<u>Quality Control Summary</u> - All laboratory quality control parameters were found to be within established limits

Chain of Custody

Page 1 of 1

Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775

Job No.	CU#		Client Project I.D.
~~2004035~~	12259		507385606

Schedule

Analyte

Date Sampled

Date Due

ASTM

Full Name John Hunt

Phone X

Fax

Company and/or Mailing Address ISI Berkeley, CA.

Cell 510 809-5130 ☒

Sample Source BSVII

ANALYSIS

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation						
1	BH-163 18 112'	4-6-20				Large			X	X	X	X	X			X						
2	BH-162 23B 90'	↓				↓			X	X	X	X	X			X						
3	BH-164 27 96.5'	↓				↓			X	X	X	X	X			X						
4	BH-173 33 85'	↓				↓			X	X	X	X	X			X						
5	BH-166 30 113.5'	↓				↓			X	X	X	X	X			X						
6	BH-165 8B 35.5'	↓				↓			X	X	X	X	X			X						
7	BH-169 18 97'	↓				↓			X	X	X	X	X			X						

MATRIX
- DW - Drinking Water
- GW - Ground Water
- SW - Surface Water
- WW - Waste Water
- Water
- SL - Sludge
- S - Soil
- Product

ABBREVIATIONS
- HB - Hosebib
- PV - Petcock Valve
- PT - Pressure Tank
- PH - Pump House
- RR - Restroom
- GL - Glass
- PL - Plastic
- ST - Sterile

SAMPLE RECEIPT
- Total No. of Containers
- Rec'd Good Cond/Cold
- Conforms to Record
- Temp. a t Lab -°C
- Sampler

Relinquished By:		Date 4/7/20	Time 4/10
Received By:		Date 4/7/20	Time 4/10
Relinquished By:		Date	Time
Received By:		Date	Time
Relinquished By:		Date	Time
Received By:		Date	Time

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address jhunt@inspectionservices.net

California State Certified Laboratory No. 2153

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31 July, 2020

Job No. 2007097
Cust. No. 12259

Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Subject: Project No.: 507385606
Project Name: BSVII
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hunt:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on July 16, 2020. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, this sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration reflects none detected with a reporting limit of 15 mg/kg

The sulfate ion concentration is 440 mg/kg and is determined to be sufficient to potentially be detrimental to reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, with a maximum water-to-cement ratio of 0.55.

The pH of the soil is 6.12 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential is 260-mV and is indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

Andrew Moore

for J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

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analytical
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Concord, CA 94520-1006
925 **462 2771** Fax. 925 **462 2775**
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Client: Inspection Services, Inc.
Client's Project No.: 507385606
Client's Project Name: BSVII
Date Sampled: 077/05/20
Date Received: 16-Jul-2020
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 31-Jul-2020

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Resistivity (As Received) (ohms-cm)	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2007097-001	BH-168, 27B 97'	260	6.12	-	660	-	N.D.	440

Method:	ASTM D1498	ASTM D4972	ASTM G57	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	-	-	50	15	15
Date Analyzed:	30-Jul-2020	30-Jul-2020	-	30-Jul-2020	-	30-Jul-2020	30-Jul-2020

Sherri Moore

for/ Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Chain of Custody

1100 Willow Pass Court
Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775

CERCO analytical

Page 1 of 1

Job No.	CU#		Client Project I.D.
2007097	12259		507385606

Schedule
Analyte

Date Sampled
Date Due

Full Name John Hunt
Phone X
Fax
Cell 510 809 5130 ☒
Company and/or Mailing Address ISI Berkeley, CA
Sample Source BSVII

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qtv.
①	BH-168 27B 97'	~~7-13~~ 7/15/20				Baggie		

ANALYSIS / **ASTM**

Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation						
X	X	X	X	X			X						

MATRIX
- DW - Drinking Water
- GW - Ground Water
- SW - Surface Water
- WW - Waste Water
- Water
- SL - Sludge
- S - Soil
- Product

ABBREVIATIONS
- HB - Hosebib
- PV - Petcock Valve
- PT - Pressure Tank
- PH - Pump House
- RR - Restroom
- GL - Glass
- PL - Plastic
- ST - Sterile

SAMPLE RECEIPT

Total No. of Containers	
Rec'd Good Cond/Cold	
Conforms to Record	
Temp. a t Lab -°C	
Sampler	

Relinquished By:	Date 7/16/20	Time 1400
Received By: Diana	Date 7/16/20	Time 1400
Relinquished By:	Date	Time
Received By:	Date	Time
Relinquished By:	Date	Time
Received By:	Date	Time

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address jhunt@inspectionservices.net

California State Certified Laboratory No. 2153

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analytical
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16 June, 2020

Job No. 2006006
Cust. No. 12259

Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Subject: Project No.: 507385606
Project Name: BSVII
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hunt:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on June 2, 2020. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, samples 001 & 003 are classified as "corrosive" and sample 002 is classified as "severely corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations range from none detected to 81 mg/kg. Because the chloride ion concentrations are less than 300 mg/kg, they are determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentrations range from 90 to 910 mg/kg and are determined to be sufficient to potentially be detrimental to reinforced concrete structures and cement mortar-coated steel at these locations. Therefore, concrete that comes into contact with this soil should use sulfate resistant cement such as Type II, with a maximum water-to-cement ratio of 0.55.

The pH of the soils range from 4.69 to 8.15. Any soils with a pH of <6.0 is considered to be corrosive to buried iron, steel, mortar-coated steel and reinforced concrete structures. Therefore, corrosion prevention measures need to be considered for structures to be placed in this acidic soil.

The redox potentials range from 220 to 260-mV which is indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President
JDH/jdl

California State Certified Laboratory No. 2153

CERCO
analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 **462 2771** Fax. 925 **462 2775**
www.cercoanalytical.com

Client: Inspection Services, Inc.
Client's Project No.: 507385606
Client's Project Name: BSVII
Date Sampled: 29-May-2020
Date Received: 2-Jun-2020
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 16-Jun-2020

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Resistivity (As Received) (ohms-cm)	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2006006-001	BH-167 22B 7.5'	220	8.15	-	1,200	-	N.D.	120
2006006-002	BH-176 5 15'	260	4.69	-	490	-	81	910
2006006-003	BH-177 4B 10'	250	7.47	-	1,700	-	N.D.	90

Method:	ASTM D1498	ASTM D4972	ASTM G57	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	-	-	50	15	15
Date Analyzed:	5-Jun-2020	5-Jun-2020	-	16-Jun-2020	-	5-Jun-2020	5-Jun-2020

* Results Reported on "As Received" Basis
N.D. - None Detected

Cheryl McMillen
Laboratory Director

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Chain of Custody

Page 1 of 1

Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775

CERCO analytical

Job No. 2006006
CU# 12254
Client Project I.D. 507385606

Schedule
Analyte

Date Sampled
Date Due

Full Name John Hunt

Phone X
Fax
Cell 510-859-5130 ☒

Company and/or Mailing Address ISI

Sample Source BSVII

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation						
001	BH-167 22B 21.5'	5-29				Baggie			x	x	x	x	x			X						
002	BH-176 5 15'	5-29				Baggie			X	X	X	X	X			X						
003	BH-177 4B 10'	5-29				Baggie			X	X	X	X	X			X						

ANALYSIS — ASTM

MATRIX
DW - Drinking Water
GW - Ground Water
SW - Surface Water
WW - Waste Water
Water
SL - Sludge
S - Soil
Product

ABBREVIATIONS
HB - Hosebib
PV - Petcock Valve
PT - Pressure Tank
PH - Pump House
RR - Restroom
GL - Glass
PL - Plastic
ST - Sterile

SAMPLE RECEIPT
Total No. of Containers ☐
Rec'd Good Cond/Cold ☐
Conforms to Record ☐
Temp. a t Lab -°C ☐
Sampler

Relinquished By:	Date 6/2/2020	Time 10:40
Received By:	Date 6/2/20	Time 1040
Relinquished By:	Date	Time
Received By:	Date	Time
Relinquished By:	Date	Time
Received By:	Date	Time

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address jhunt@inspectionservices.net

California State Certified Laboratory No. 2153

CERCO
analytical
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Concord, CA 94520-1006
925 **462 2771** Fax. 925 **462 2775**
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8 September, 2020

Job No. 2008120
Cust. No. 12259

Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Subject: Project No.: 507385606
Project Name: BSVII
Corrosivity Analysis –ASTM Test Methods

Dear Mr. Hunt:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on August 19, 2020. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurement, the sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration was 27 mg/kg. Because the chloride ion concentration is less than 300 mg/kg, it is determined to be insufficient to attack steel embedded in a concrete mortar coating.

The sulfate ion concentration was 150 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soil was 8.48 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potential was 130-mV which is indicative of potentially "moderately corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Inspection Services, Inc.
Client's Project No.: 507385606
Client's Project Name: BSVII
Date Sampled: 7-Aug-2020
Date Received: 19-Aug-2020
Matrix: Soil
Authorization: Signed Chain of Custody

Date of Report: 8-Sep-2020

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Resistivity (As Received) (ohms-cm)	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2008120-001	BH-180 17C @ 75'	130	8.48	-	1,700	-	27	150

Method:	ASTM D1498	ASTM D4972	ASTM G57	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	-	-	50	15	15
Date Analyzed:	3-Sep-2020	23-Sep-2020	-	1-Sep-2020	-	3-Sep-2020	3-Sep-2020

Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. - None Detected

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits**

Chain of Custody

Page 1 of 1

Concord, CA 94520-1006
925 462 2771
Fax: 925 462 2775

CERCO analytical

Job No.	CU#	Client Project I.D.
2008130	12249	507385606

Schedule
Analyte

Date Sampled

Date Due

Full Name John Hunt

Phone X

Fax

Cell 510 809 5130 ☒

Company and/or Mailing Address ISI Berkeley CA.

Sample Source BSVII

ANALYSIS

ASTM

Lab No.	Sample I.D.	Date	Time	Matrix	Contain.	Size	Preserv.	Qty.	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation
1	BH-180 17C 75'	8-7				Baggie			X	X	X	X	X			X

MATRIX
- DW - Drinking Water
- GW - Ground Water
- SW - Surface Water
- WW - Waste Water
- Water
- SL - Sludge
- S - Soil
- Product

ABBREVIATIONS
- HB - Hosebib
- PV - Petcock Valve
- PT - Pressure Tank
- PH - Pump House
- RR - Restroom
- GL - Glass
- PL - Plastic
- ST - Sterile

SAMPLE RECEIPT
- Total No. of Containers
- Rec'd Good Cond/Cold
- Conforms to Record
- Temp. a t Lab -°C
- Sampler

Relinquished By: Date 8-19-20 Time 1428
Received By: Date 8/19/20 Time 1435
Relinquished By: Date Time
Received By: Date Time
Relinquished By: Date Time
Received By: Date Time

Comments:

THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address: jhunt@inspectionservices.net

California State Certified Laboratory No. 2153

CERCO
analytical
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20 November, 2020

Job No. 2011073
Cust. No. 12259

Mr. John Hunt
Inspection Services Inc.
1798 University Avenue
Berkeley, CA 94703-1514

Subject: Project No.: 507385606
Project Name: BSVII
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hunt:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on November 09 2020. Based on the analytical results, this brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No.001 is classified as "corrosive" and Sample No.002 is classified as "mildly corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations reflect none detected with a reporting limit of 15 mg/kg.

The sulfate ion concentrations are 86 mg/kg & 140 mg/kg and are determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at these locations.

The pH of the soils are 7.63 & 7.95 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials are 230-mV & 260-mV. Both samples are indicative of potentially "slightly corrosive" soils resulting from anaerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

Cheryl McMillen for

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

CERCO
analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 **462 2771** Fax. 925 **462 2775**
www.cercoanalytical.com

Client:	Inspection Services, Inc.
Client's Project No.:	507385606
Client's Project Name:	BSVII
Date Sampled:	10/19 & 20/20
Date Received:	9-Nov-2020
Matrix:	Soil
Authorization:	Signed Chain of Custody

Date of Report: 20-Nov-2020

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Resistivity (As Received) (ohms-cm)	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2011073-001	BH-179 #9 40'	230	7.95	-	1,500	-	N.D.	140
2011073-002	BH-179 #21 100'	260	7.63	-	11,000	-	N.D.	86

Method:	ASTM D1498	ASTM D4972	ASTM G57	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	-	-	50	15	15
Date Analyzed:	19-Nov-2020	19-Nov-2020	-	19-Nov-2020	-	19-Nov-2020	19-Nov-2020

* Results Reported on "As Received" Basis
N.D. - None Detected

Cheryl McMillen
Laboratory Director

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits**

Chain of Custody

Page 1 of 1

Concord, CA 94520-1006
925 **462 2771**
Fax: 925 **462 2775**
CERCO analytical

Job No. 2011093
CU# 12259
Client Project I.D. 507385606

Schedule
Analyte

Date Sampled
Date Due

Full Name John Hunt
Phone X
Fax
Company and/or Mailing Address ISI Berkeley
Cell 510-809-5130 ☒
Sample Source BSVII

									ANALYSIS								ASTM					
Lab No.	**Sample I.D.**	**Date**	**Time**	**Matrix**	**Contain.**	**Size**	**Preserv.**	**Qty.**	Redox Potential	pH	Sulfate	Chloride	Resistivity-100% Saturated			Brief Evaluation						
①	BH-179 #9 40'	10-19-20				baggie			X	X	X	X	X			X						
②	BH-179 #21 100'	10-20-20				baggie			X	X	X	X	X			X						

MATRIX
- DW - Drinking Water
- GW - Ground Water
- SW - Surface Water
- WW - Waste Water
- Water
- SL - Sludge
- S - Soil
- Product

ABBREVIATIONS
- HB - Hosebib
- PV - Petcock Valve
- PT - Pressure Tank
- PH - Pump House
- RR - Restroom
- GL - Glass
- PL - Plastic
- ST - Sterile

SAMPLE RECEIPT
Total No. of Containers ☐
Rec'd Good Cond/Cold ☐
Conforms to Record ☐
Temp. a t Lab -°C ☐
Sampler

Relinquished By:	J H	Date	11/9/20	Time 426
Received By:	Diang Jud	Date	11/9/20	Time 1426
Relinquished By:		Date		Time
Received By:		Date		Time
Relinquished By:		Date		Time
Received By:		Date		Time

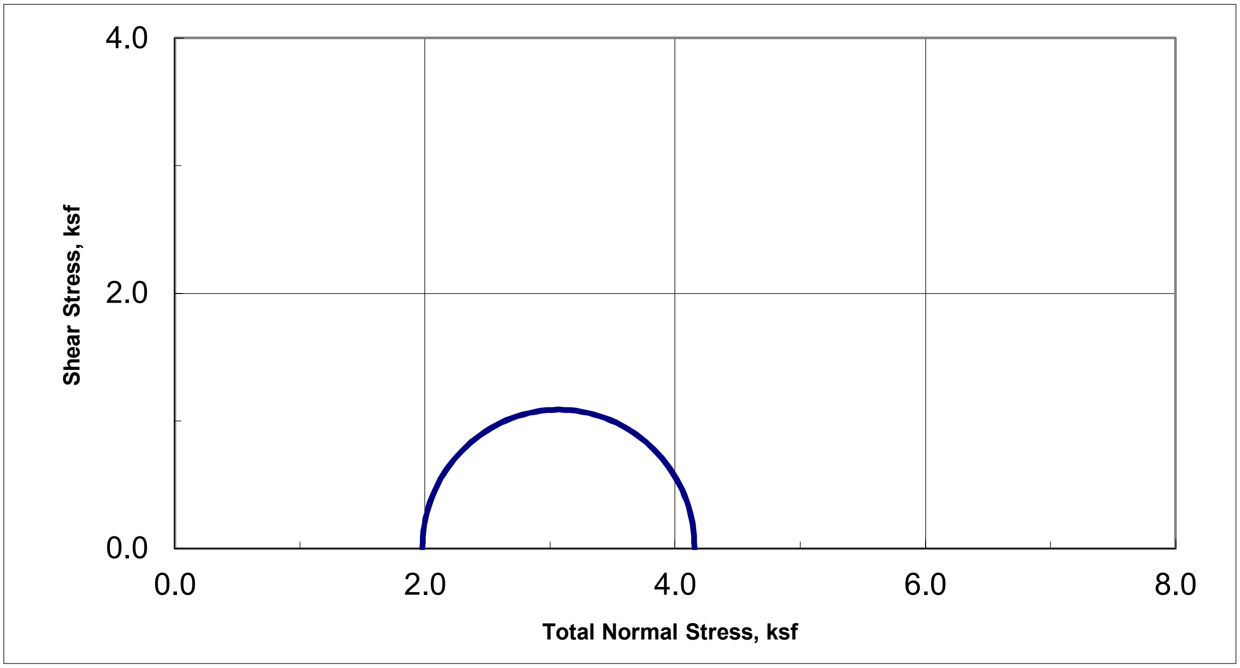
Comments:

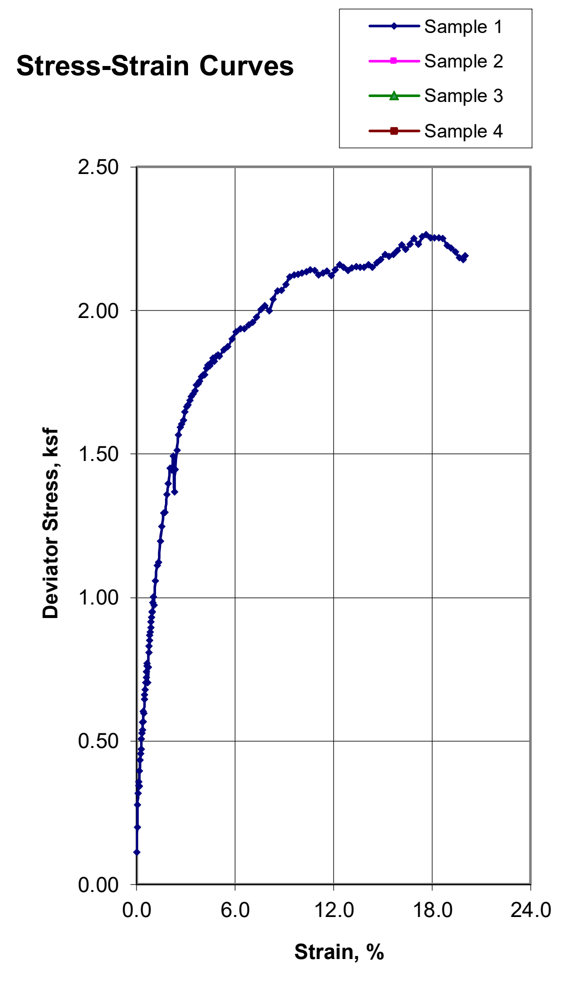
THERE IS AN ADDITIONAL CHARGE FOR EXTRUDING SOIL FROM METAL TUBES

Email Address: jhunt@inspectionservices.net

TXUU Test Results

Unconsolidated-Undrained Triaxial Test
ASTM D2850




Stress-Strain Curves

Sample Data

	1	2	3	4
Moisture %	31.2			
Dry Den,pcf	90.6			
Void Ratio	0.861			
Saturation %	97.9			
Height in	5.97			
Diameter in	2.87			
Cell psi	13.7			
Strain %	15.00			
Deviator, ksf	2.177			
Rate %/min	1.00			
in/min	0.060			
Job No.:	**157-367**			
Client:	**Parikh Consultants**			
Project:	**2017-144-T02**			
Boring:	BH-141			
Sample:	4			
Depth ft:	15			

Visual Soil Description

Sample #	
1	Olive Brown CLAY
2	
3	
4	

Remarks:

Note: Strengths are picked at the peak deviator stress or 15% strain which ever occurs first per ASTM D2850.

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-150
Sample # : 48A
Depth (ft) : 147.5
Date tested : 10/08/19
Soil : Grayish brown clay

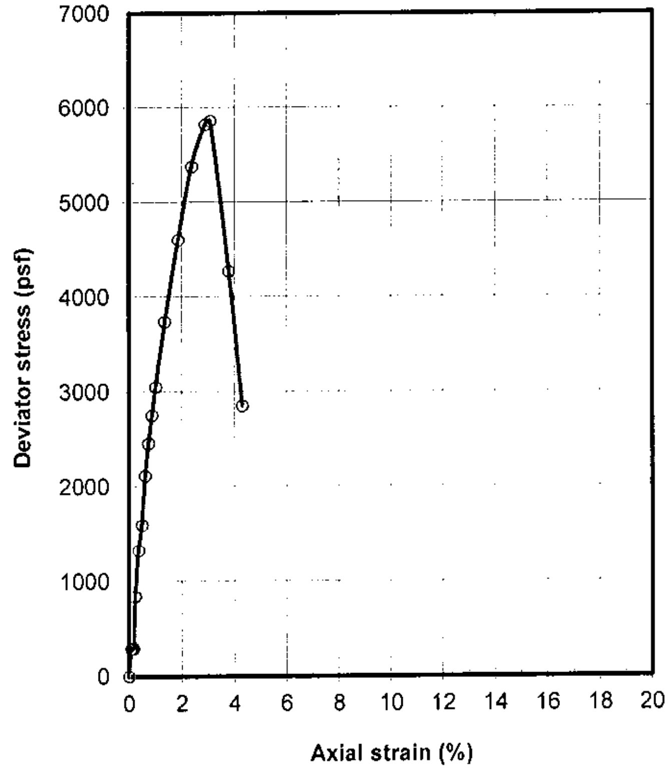
Specimen:
Total wt. = 1306.8 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.68

Test Report:
Void ratio = 0.640
Ht/Dia ratio = 2.13
Moisture = 24.4 %
Total density = 126.9 pcf
Dry density = 102.0 pcf
Saturation = 102.3 %
Chamber pressure = 3600 psf
Max. deviator stress = 5857 psf
Strain @ failure = 3.07 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	13.0	0.07	292.0
0.006	13.0	0.13	291.8
0.009	13.0	0.18	291.7
0.012	37.5	0.23	839.4
0.020	59.3	0.36	1323.7
0.028	71.4	0.48	1592.8
0.035	94.9	0.61	2114.3
0.043	110.4	0.74	2456.4
0.051	123.8	0.87	2750.8
0.059	137.6	1.00	3051.7
0.081	169.1	1.35	3737.5
0.111	209.2	1.86	4601.1
0.142	245.6	2.36	5373.7
0.173	267.3	2.87	5817.5
0.186	269.7	3.07	5857.0
0.229	198.2	3.78	4272.7
0.260	133.0	4.29	2852.0



UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-150
Sample # : 48B
Depth (ft) : 147.5
Date tested : 10/08/19
Soil : Grayish brown clay

Data Reduction:

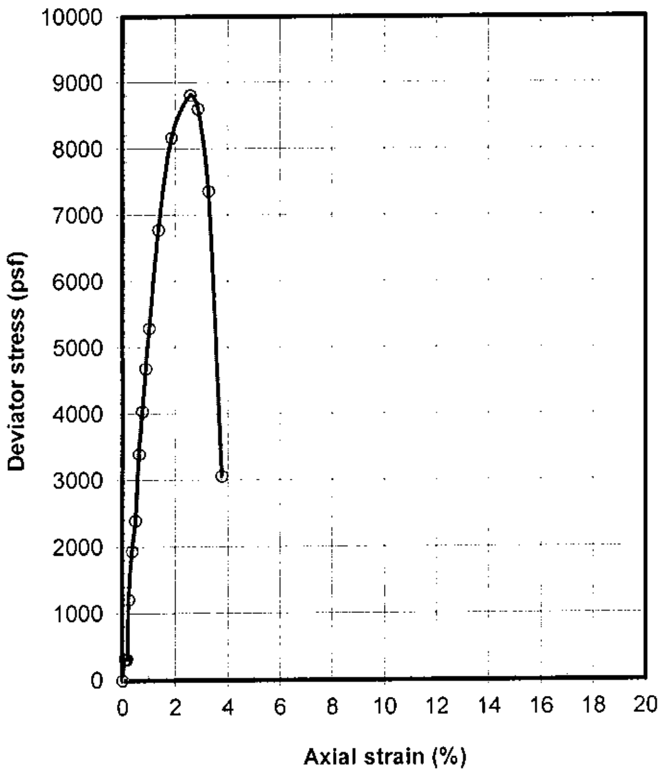
Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Specimen:			
Total wt.	=	1298.5	gms
Ht.	=	6.100	in
Ave dia.	=	2.860	in
Area	=	6.427	sq.in
Volume	=	642.4	c.c.
Shearing rate	=	0.03	inch/min
Shearing rate	=	0.5	%/min
Gs (assumed)	=	2.68	

Test Report:

Void ratio = 0.655
Ht/Dia ratio = 2.13
Moisture = 24.7 %
Total density = 126.1 pcf
Dry density = 101.1 pcf
Saturation = 101.3 %
Chamber pressure = 12960 psf
Max. deviator stress = 8805 psf
Strain @ failure = 2.56 %

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	14.0	0.08	312.7
0.006	14.0	0.13	312.6
0.009	14.0	0.18	312.4
0.012	54.0	0.23	1207.5
0.020	86.6	0.36	1933.5
0.028	107.3	0.49	2392.0
0.036	152.3	0.62	3391.1
0.044	181.7	0.75	4039.9
0.052	210.6	0.88	4677.4
0.060	238.4	1.01	5288.9
0.081	306.6	1.36	6777.2
0.112	371.3	1.86	8165.2
0.155	403.3	2.56	8804.9
0.173	395.1	2.87	8598.8
0.198	339.7	3.27	7361.8
0.228	141.8	3.77	3056.8

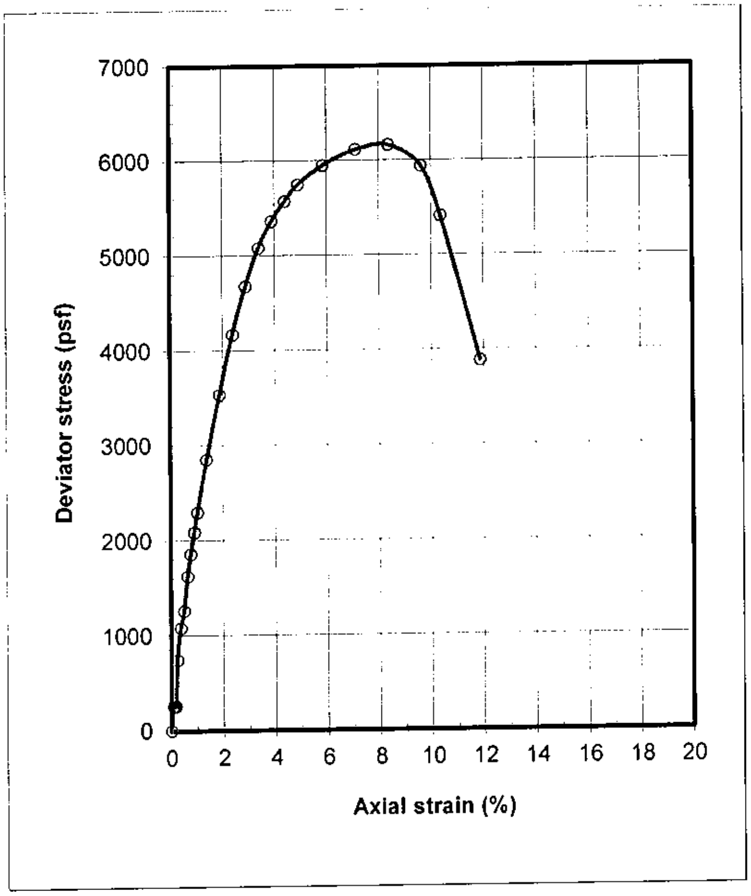


UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-151
Sample # : 18A
Depth (ft) : 103
Date tested : 10/11/19
Soil : Greenish gray clay with sand

Specimen:
Total wt. = 1298.0 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.681
Ht/Dia ratio = 2.13
Moisture = 25.8 %
Total density = 126.1 pcf
Dry density = 100.2 pcf
Saturation = 102.3 %
Chamber pressure = 2880 psf
Max. deviator stress = 6165 psf
Strain @ failure = 8.36 %



Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	11.5	0.07	256.8
0.006	11.5	0.13	256.7
0.009	11.5	0.17	256.5
0.012	33.3	0.23	745.3
0.020	48.4	0.36	1080.3
0.028	56.5	0.49	1259.2
0.036	72.8	0.62	1622.0
0.044	83.6	0.75	1858.4
0.052	94.1	0.88	2089.5
0.060	103.5	1.01	2295.4
0.081	128.9	1.36	2849.6
0.112	160.9	1.87	3538.7
0.143	190.7	2.37	4172.4
0.174	215.0	2.88	4678.1
0.204	234.6	3.38	5079.4
0.235	248.9	3.89	5360.1
0.266	260.1	4.40	5571.1
0.297	269.6	4.90	5744.4
0.355	282.0	5.85	5948.7
0.431	293.7	7.10	6113.6
0.508	300.2	8.36	6164.6
0.584	293.3	9.61	5940.0
0.630	269.3	10.36	5409.3
0.722	196.7	11.86	3884.7

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

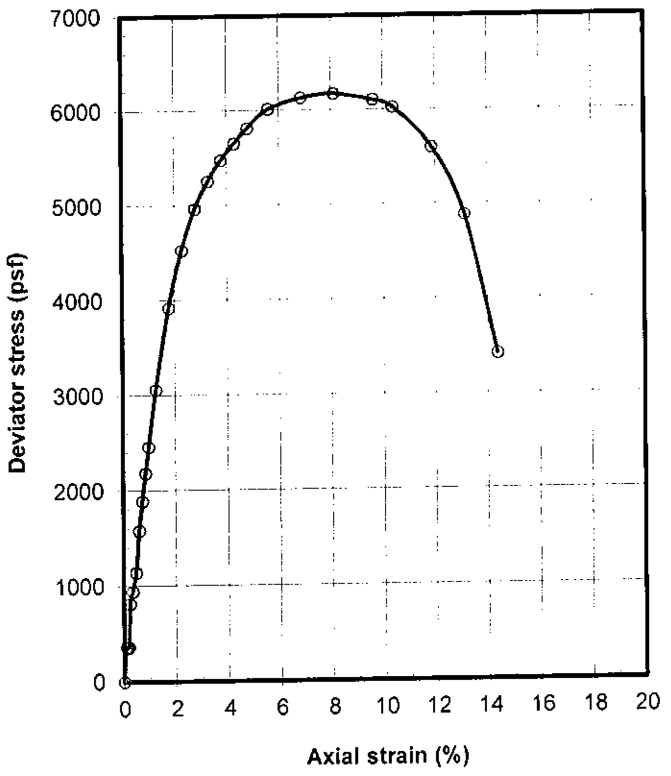
Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-151
Sample # : 18B
Depth (ft) : 103
Date tested : 10/11/19
Soil : Greenish gray clay with sand

Specimen:

Total wt. = 1296.2 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:

Void ratio = 0.679
Ht/Dia ratio = 2.13
Moisture = 25.5 %
Total density = 125.9 pcf
Dry density = 100.3 pcf
Saturation = 101.3 %
Chamber pressure = 11520 psf
Max. deviator stress = 6173 psf
Strain @ failure = 8.10 %



Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	16.0	0.08	358.7
0.006	16.0	0.13	358.5
0.009	16.0	0.18	358.3
0.012	36.3	0.23	811.7
0.018	42.2	0.33	942.8
0.027	51.1	0.47	1139.9
0.034	70.9	0.59	1578.9
0.042	84.7	0.72	1885.0
0.049	98.1	0.84	2180.7
0.057	110.8	0.97	2458.7
0.075	138.2	1.25	3058.7
0.106	178.1	1.76	3919.9
0.137	206.6	2.27	4524.3
0.167	227.9	2.78	4963.5
0.198	242.4	3.28	5252.7
0.229	254.1	3.78	5478.3
0.259	263.6	4.28	5652.7
0.290	272.4	4.79	5810.4
0.340	284.3	5.60	6013.9
0.416	293.7	6.85	6130.5
0.492	299.8	8.10	6172.8
0.584	301.4	9.60	6105.5
0.630	300.0	10.35	6025.5
0.721	283.5	11.85	5599.3
0.798	250.8	13.11	4882.1
0.874	177.9	14.35	3413.1

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-152
Sample # : 13A
Depth (ft) : 76.5
Date tested : 11/04/19
Soil : Greenish gray clay with sand

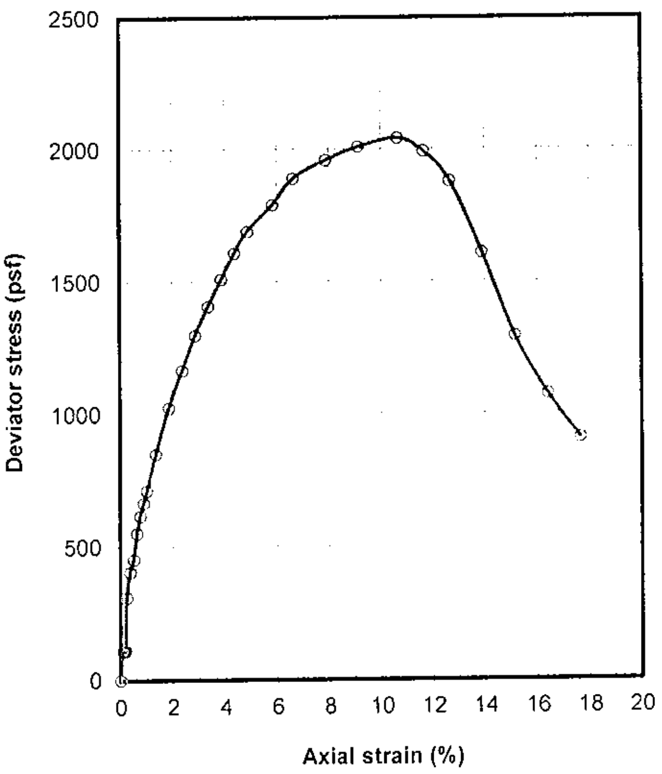
Specimen: Total wt. = 1254.5 gms
Ht. = 5.880 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 619.3 c.c.
Shearing rate = 0.04 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.74

Test Report: Void ratio = 0.669
Ht/Dia ratio = 2.06
Moisture = 23.4 %
Total density = 126.4 pcf
Dry density = 102.4 pcf
Saturation = 95.9 %
Chamber pressure = 2160 psf
Max. deviator stress = 2041 psf
Strain @ failure = 10.63 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	4.9	0.08	109.2
0.006	4.9	0.13	109.2
0.009	4.9	0.18	109.1
0.012	13.8	0.23	308.7
0.020	18.1	0.36	404.7
0.027	20.3	0.49	453.3
0.035	24.8	0.62	551.3
0.043	27.7	0.75	616.4
0.050	29.9	0.88	664.6
0.058	32.0	1.01	710.4
0.078	38.4	1.36	848.8
0.108	46.6	1.86	1024.4
0.137	53.2	2.37	1164.7
0.167	59.6	2.86	1297.0
0.196	65.0	3.36	1407.0
0.226	70.1	3.87	1509.7
0.255	74.9	4.37	1605.8
0.285	79.2	4.87	1687.5
0.341	84.8	5.82	1788.4
0.388	90.2	6.62	1888.0
0.462	94.9	7.88	1958.4
0.535	98.6	9.13	2007.3
0.624	101.9	10.63	2040.9
0.683	100.6	11.64	1991.3
0.742	95.9	12.64	1877.9
0.815	83.3	13.89	1607.6
0.889	67.9	15.14	1291.6
0.962	57.3	16.40	1073.2
1.036	49.1	17.65	906.7

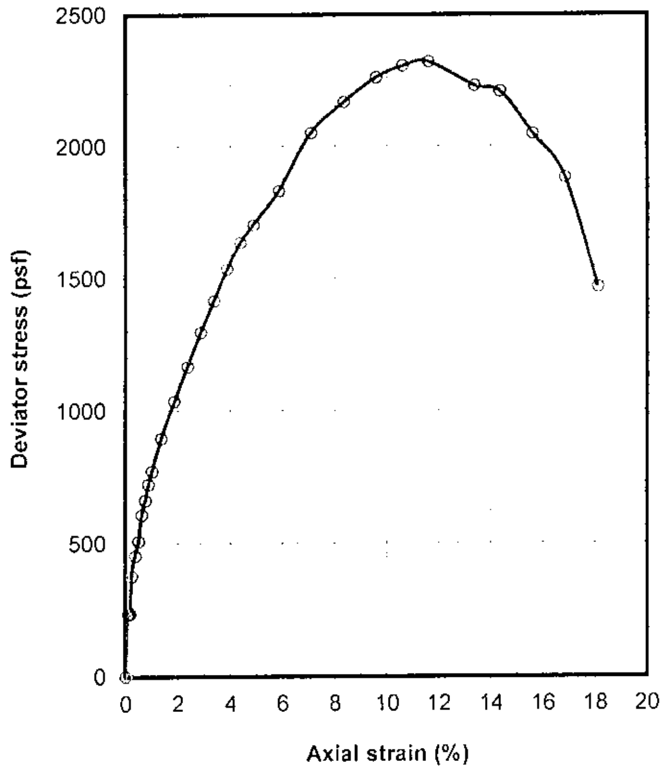


UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-152
Sample # : 13B
Depth (ft) : 76.5
Date tested : 11/05/19
Soil : Greenish gray clay with sand

Specimen:
Total wt. = 1300.7 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.74

Test Report:
Void ratio = 0.670
Ht/Dia ratio = 2.13
Moisture = 23.4 %
Total density = 126.3 pcf
Dry density = 102.4 pcf
Saturation = 95.8 %
Chamber pressure = 7200 psf
Max. deviator stress = 2320 psf
Strain @ failure = 11.59 %



Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	10.5	0.07	235.0
0.006	10.5	0.13	234.9
0.009	10.5	0.18	234.8
0.012	16.9	0.22	377.1
0.020	20.3	0.36	453.8
0.028	22.8	0.49	509.0
0.035	27.3	0.61	608.6
0.044	29.8	0.74	663.1
0.051	32.6	0.86	724.0
0.059	34.8	0.99	772.6
0.081	40.5	1.35	895.8
0.111	47.1	1.85	1035.4
0.142	53.3	2.35	1167.0
0.172	59.6	2.86	1296.4
0.204	65.4	3.36	1415.2
0.234	71.3	3.87	1535.5
0.265	76.4	4.38	1636.0
0.296	79.9	4.88	1703.6
0.354	86.8	5.83	1831.3
0.430	98.5	7.08	2051.1
0.507	105.6	8.34	2168.4
0.583	111.6	9.59	2261.2
0.644	115.0	10.59	2304.9
0.705	117.1	11.59	2320.4
0.812	114.9	13.34	2230.5
0.873	115.1	14.34	2208.5
0.950	108.3	15.59	2048.2
1.026	101.0	16.85	1881.5
1.102	80.0	18.10	1467.4

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-153
Sample # : 4A
Depth (ft) : 30
Date tested : 11/05/19
Soil : Greenish gray clay

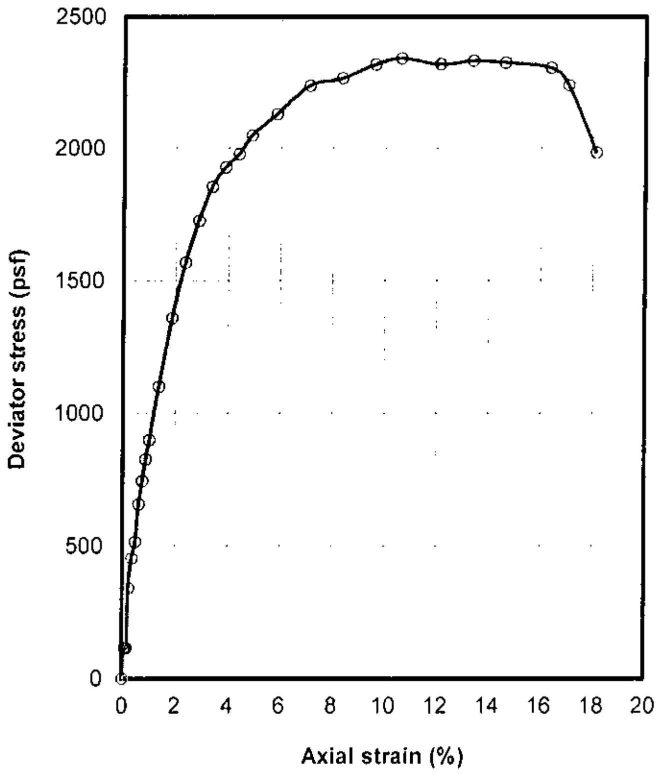
Specimen: Total wt. = 1268.5 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq in
Volume = 642.4 c.c.
Shearing rate = 0.03 inch/min
Shearing rate = 0.5 %/min
Gs (assumed) = 2.70

Test Report: Void ratio = 0.727
Ht/Dia ratio = 2.13
Moisture = 26.3 %
Total density = 123.2 pcf
Dry density = 97.6 pcf
Saturation = 97.6 %
Chamber pressure = 720 psf
Max. deviator stress = 2341 psf
Strain @ failure = 10.59 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.001		0.00	0.0
0.003	5.2	0.08	115.4
0.006	5.2	0.13	115.3
0.009	5.2	0.18	115.3
0.012	15.2	0.23	340.5
0.020	20.3	0.35	454.4
0.028	23.1	0.48	515.6
0.036	29.6	0.61	658.1
0.044	33.6	0.75	746.2
0.052	37.2	0.88	826.3
0.060	40.5	1.01	899.2
0.081	49.8	1.36	1100.4
0.112	61.8	1.86	1358.7
0.143	71.7	2.36	1568.1
0.173	79.3	2.86	1725.6
0.204	85.6	3.36	1853.8
0.234	89.5	3.87	1926.9
0.265	92.3	4.37	1977.5
0.296	96.1	4.88	2048.5
0.354	101.0	5.82	2130.3
0.430	107.5	7.08	2237.8
0.507	110.3	8.33	2266.1
0.583	114.4	9.58	2318.4
0.644	116.8	10.59	2340.9
0.736	117.7	12.09	2318.7
0.812	120.1	13.34	2332.5
0.889	121.5	14.60	2325.5
0.996	123.0	16.35	2305.9
1.038	120.5	17.04	2239.4
1.103	108.1	18.10	1983.4



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UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-153
Sample # : 4B
Depth (ft) : 30
Date tested : 11/05/19
Soil : Greenish gray clay

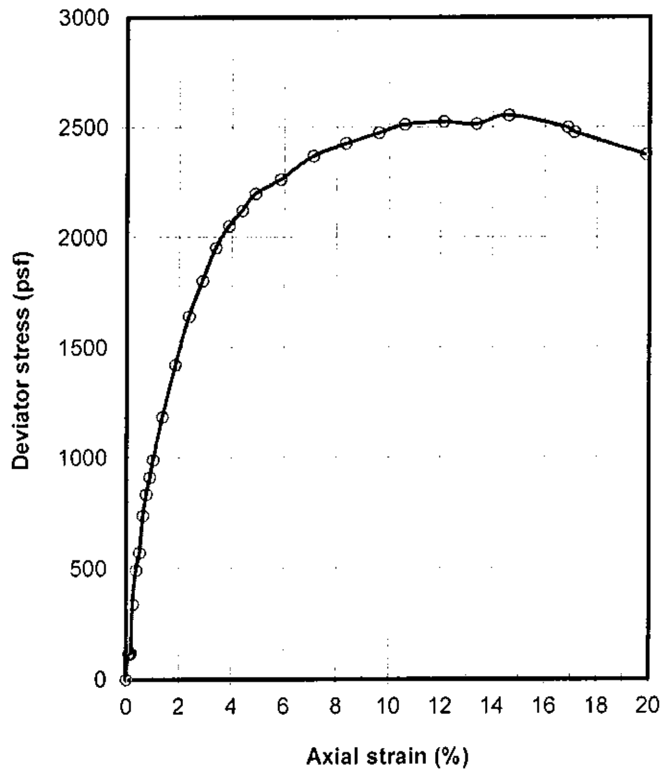
Specimen:
Total wt. = 1266.7 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.741
Ht/Dia ratio = 2.13
Moisture = 27.1 %
Total density = 123.0 pcf
Dry density = 96.8 pcf
Saturation = 98.9 %
Chamber pressure = 2880 psf
Max. deviator stress = 2554 psf
Strain @ failure = 14.60 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	5.2	0.08	117.1
0.006	5.2	0.13	117.0
0.009	5.2	0.18	116.9
0.012	15.1	0.23	338.4
0.020	22.1	0.36	493.0
0.028	25.7	0.49	572.0
0.036	33.3	0.61	740.8
0.043	37.6	0.74	835.9
0.051	41.1	0.87	911.8
0.059	44.6	0.99	990.1
0.081	53.7	1.35	1187.3
0.111	64.7	1.85	1421.8
0.142	75.0	2.35	1641.3
0.173	82.9	2.86	1803.3
0.204	90.2	3.37	1952.9
0.235	95.3	3.88	2051.5
0.265	99.1	4.38	2122.4
0.296	103.2	4.88	2200.0
0.354	107.3	5.84	2264.6
0.431	113.9	7.09	2370.5
0.507	118.2	8.34	2427.1
0.584	122.2	9.60	2475.3
0.645	125.5	10.60	2513.3
0.736	128.2	12.10	2525.0
0.813	129.6	13.35	2515.5
0.889	133.5	14.60	2554.1
1.027	134.2	16.86	2499.5
1.042	133.4	17.11	2478.4
1.210	132.3	19.86	2375.5



UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-155
Sample # : 7A
Depth (ft) : 67
Date tested : 11/06/19
Soil : Brown clay

Specimen:

Total wt.	=	1290.4	gms
Ht.	=	6.100	in
Ave dia.	=	2.860	in
Area	=	6.427	sq.in
Volume	=	642.4	c.c.
Shearing rate	=	0.05	inch/min
Shearing rate	=	0.75	%/min
Gs (assumed)	=	2.70	

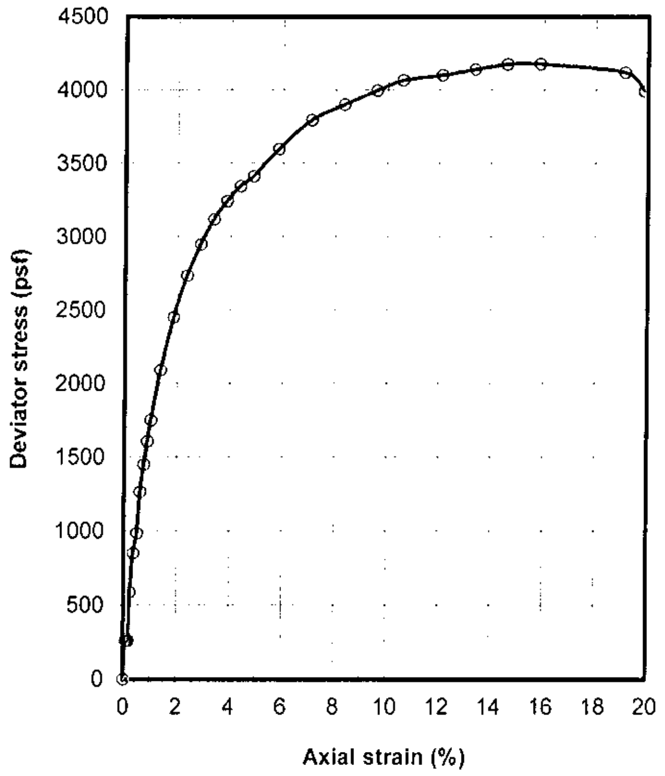
Test Report:

Void ratio =	0.639	
Ht/Dia ratio =	2.13	
Moisture =	21.9	%
Total density =	125.3	pcf
Dry density =	102.8	pcf
Saturation =	92.7	%
Chamber pressure =	2160	psf
Max. deviator stress =	4178	psf
Strain @ failure =	15.84	%

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	11.6	0.07	260.0
0.006	11.6	0.13	259.8
0.009	11.6	0.18	259.7
0.012	26.3	0.23	588.6
0.020	38.2	0.35	852.0
0.028	44.2	0.48	985.6
0.035	56.8	0.60	1265.7
0.043	65.2	0.73	1450.7
0.051	72.4	0.86	1608.9
0.059	79.0	0.99	1753.2
0.080	94.6	1.34	2091.1
0.111	111.4	1.85	2450.4
0.142	124.9	2.35	2732.8
0.172	135.4	2.85	2947.6
0.203	144.1	3.35	3120.1
0.233	150.6	3.85	3244.3
0.264	156.2	4.36	3346.4
0.295	160.1	4.87	3413.1
0.353	170.5	5.82	3598.4
0.430	182.3	7.07	3795.3
0.506	189.9	8.32	3901.3
0.582	197.3	9.58	3997.9
0.644	202.9	10.58	4066.3
0.735	208.2	12.08	4101.0
0.812	213.2	13.33	4141.0
0.888	218.2	14.59	4176.5
0.965	221.6	15.84	4178.1
1.163	227.3	19.10	4120.0
1.209	222.4	19.85	3993.5



UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-155
Sample # : 7B
Depth (ft) : 67
Date tested : 11/06/19
Soil : Brown clay

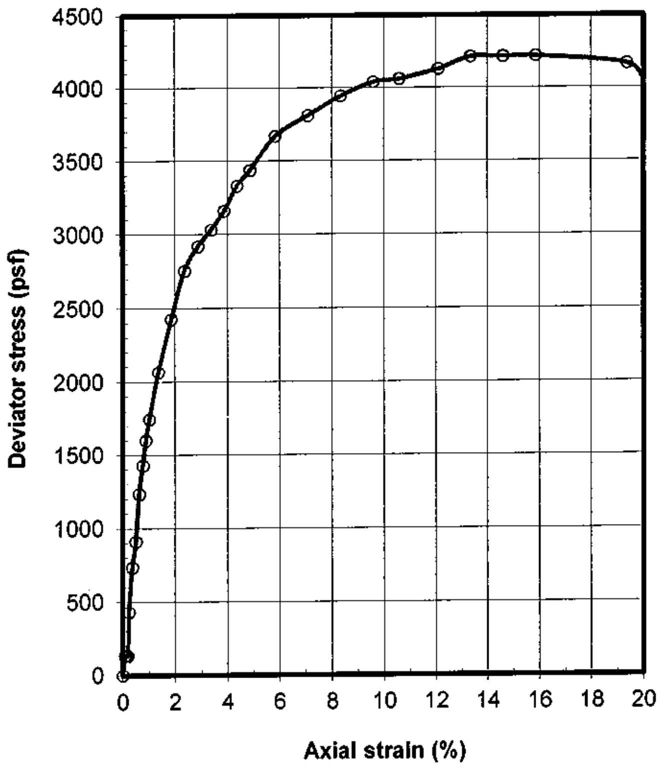
Specimen:
Total wt. = 1279.2 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.660
Ht/Dia ratio = 2.13
Moisture = 22.4 %
Total density = 124.2 pcf
Dry density = 101.5 pcf
Saturation = 91.7 %
Chamber pressure = 5760 psf
Max. deviator stress = 4218 psf
Strain @ failure = 15.84 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	5.9	0.07	133.2
0.006	5.9	0.13	133.1
0.009	5.9	0.18	133.1
0.012	19.3	0.23	430.4
0.020	33.0	0.35	737.4
0.028	40.9	0.49	911.0
0.035	55.3	0.61	1232.6
0.044	64.2	0.74	1428.0
0.051	72.1	0.87	1601.0
0.059	78.7	0.99	1746.3
0.081	93.5	1.35	2066.6
0.111	110.3	1.85	2425.4
0.142	125.9	2.35	2754.5
0.173	134.2	2.86	2919.9
0.204	140.0	3.36	3032.4
0.234	146.7	3.87	3160.1
0.265	155.5	4.37	3331.6
0.295	161.2	4.87	3436.8
0.354	173.8	5.83	3668.3
0.430	183.0	7.08	3810.8
0.506	192.0	8.33	3943.4
0.583	199.4	9.58	4039.7
0.644	202.7	10.59	4061.8
0.736	209.7	12.09	4130.3
0.812	217.0	13.34	4213.9
0.888	220.2	14.59	4214.6
0.965	223.7	15.84	4217.8
1.179	230.5	19.35	4165.2
1.221	225.1	20.05	4032.5



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UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-156
Sample # : 5A
Depth (ft) : 72
Date tested : 11/09/19
Soil : Grayish brown clay

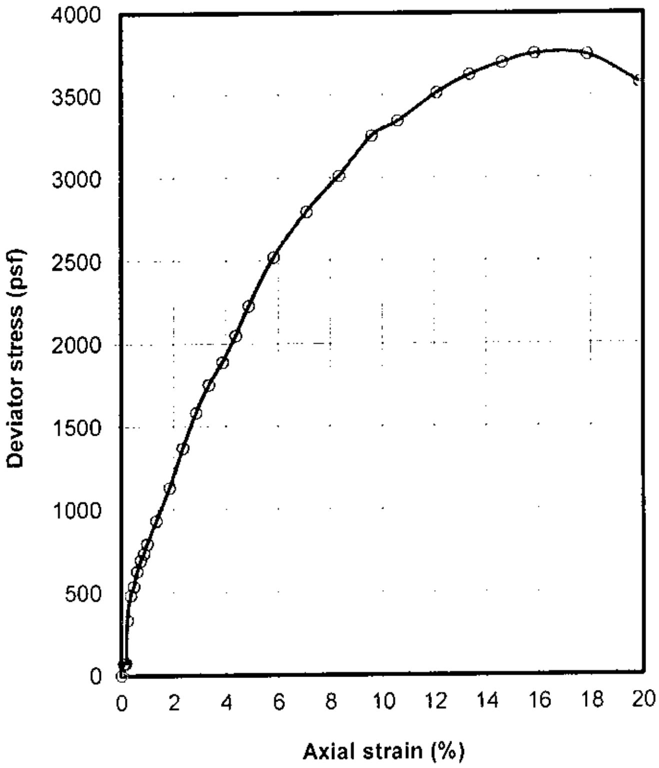
Specimen:
Total wt. = 1360.8 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq.in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.518
Ht/Dia ratio = 2.13
Moisture = 19.1 %
Total density = 132.2 pcf
Dry density = 111.0 pcf
Saturation = 99.6 %
Chamber pressure = 2160 psf
Max. deviator stress = 3751 psf
Strain @ failure = 15.84 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.001		0.00	0.0
0.003	3.3	0.07	73.1
0.006	3.3	0.12	73.1
0.009	3.3	0.18	73.0
0.012	14.9	0.22	333.9
0.020	21.7	0.35	483.5
0.028	24.2	0.48	540.0
0.035	28.3	0.60	629.2
0.044	31.2	0.74	694.4
0.051	33.1	0.86	735.7
0.059	35.8	0.99	793.6
0.081	42.2	1.34	932.4
0.111	51.5	1.84	1131.8
0.142	62.7	2.35	1371.1
0.173	72.8	2.86	1584.3
0.203	80.9	3.36	1752.3
0.234	87.6	3.86	1887.9
0.265	95.7	4.36	2050.1
0.295	104.5	4.86	2227.7
0.354	119.5	5.82	2522.0
0.430	134.3	7.07	2796.9
0.506	146.7	8.32	3013.0
0.583	160.6	9.58	3252.9
0.644	166.9	10.58	3343.4
0.736	178.4	12.08	3514.5
0.812	186.6	13.34	3624.0
0.889	193.2	14.59	3697.3
0.965	198.9	15.84	3751.2
1.087	203.4	17.84	3744.9
1.209	199.1	19.85	3574.9



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UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-156
Sample # : 5B
Depth (ft) : 72
Date tested : 11/09/19
Soil : Grayish brown clay

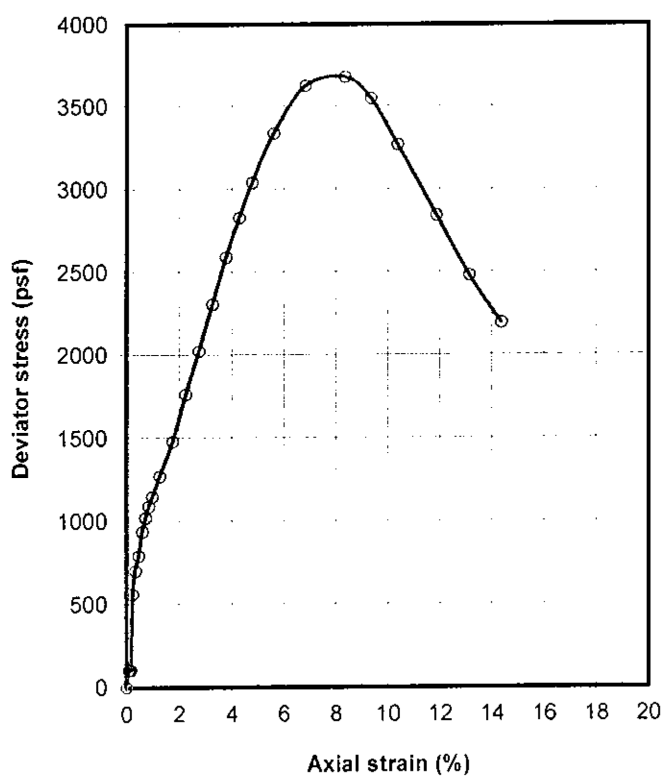
Specimen:
Total wt. = 1341.8 gms
Ht. = 6.100 in
Ave dia. = 2.860 in
Area = 6.427 sq in
Volume = 642.4 c.c.
Shearing rate = 0.05 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.550
Ht/Dia ratio = 2.13
Moisture = 19.9 %
Total density = 130.3 pcf
Dry density = 108.7 pcf
Saturation = 97.8 %
Chamber pressure = 7200 psf
Max. deviator stress = 3678 psf
Strain @ failure = 8.34 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	4.6	0.07	104.0
0.006	4.6	0.13	103.9
0.009	4.6	0.18	103.9
0.012	25.1	0.23	561.3
0.018	31.4	0.33	702.1
0.026	35.6	0.45	792.9
0.034	42.1	0.59	938.0
0.042	45.9	0.71	1020.2
0.049	49.0	0.84	1088.6
0.057	51.6	0.96	1145.1
0.074	57.3	1.25	1267.9
0.105	67.1	1.75	1477.3
0.136	80.5	2.25	1762.7
0.166	92.8	2.75	2022.3
0.197	106.3	3.26	2305.1
0.228	120.0	3.77	2587.7
0.259	131.8	4.28	2826.9
0.290	142.5	4.78	3039.7
0.339	157.7	5.59	3335.3
0.415	173.6	6.84	3624.4
0.507	179.1	8.34	3677.9
0.568	174.6	9.34	3547.0
0.630	162.7	10.35	3268.1
0.721	143.8	11.85	2840.8
0.798	127.3	13.10	2478.5
0.874	114.3	14.36	2192.9



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UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-176
Sample # : 5
Depth (ft) : 15
Date tested : 06/02/20
Soil : Grayish brown clay

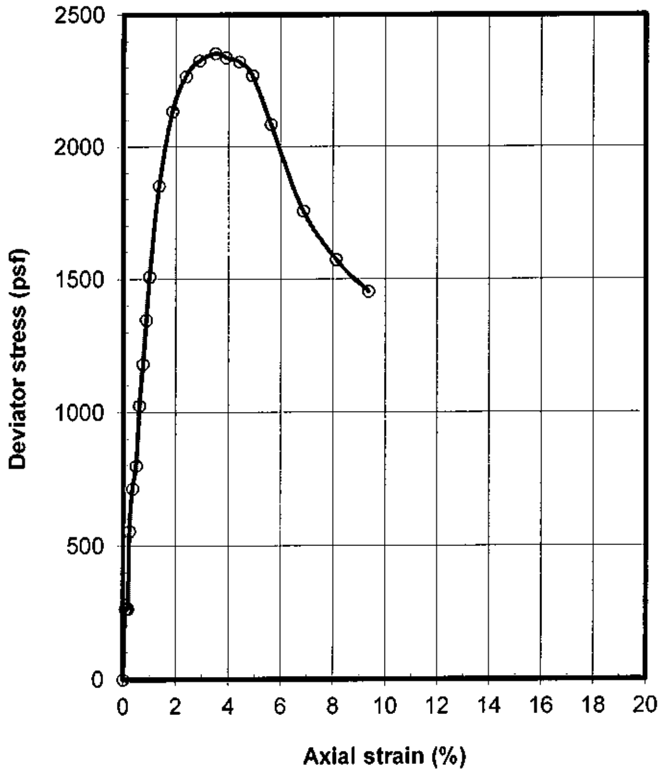
Specimen:
Total wt. = 819.6 gms
Ht. = 5.740 in
Ave dia. = 2.423 in
Area = 4.614 sq.in
Volume = 434.0 c.c.
Shearing rate = 0.04 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.857
Ht/Dia ratio = 2.37
Moisture = 29.9 %
Total density = 117.8 pcf
Dry density = 90.7 pcf
Saturation = 94.1 %
Chamber pressure = 1440 psf
Max. deviator stress = 2354 psf
Strain @ failure = 3.48 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	8.5	0.08	264.1
0.006	8.5	0.13	264.0
0.009	8.5	0.18	263.8
0.012	17.8	0.23	555.4
0.019	23.0	0.35	714.1
0.027	25.8	0.49	799.9
0.034	33.1	0.61	1025.7
0.041	38.1	0.74	1181.5
0.048	43.6	0.86	1348.5
0.055	48.9	0.99	1509.6
0.076	60.1	1.35	1851.4
0.105	69.6	1.86	2133.2
0.134	74.4	2.37	2266.4
0.163	76.8	2.87	2326.7
0.198	78.1	3.48	2353.7
0.222	78.0	3.89	2338.9
0.251	77.8	4.39	2322.3
0.280	76.5	4.90	2269.6
0.320	70.7	5.60	2084.1
0.392	60.4	6.85	1755.3
0.464	54.9	8.10	1573.6
0.535	51.4	9.35	1453.4



INSPECTION SERVICES, INC. BERKELEY, CA

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-178
Sample # : 5
Depth (ft) : 20
Date tested : 06/03/20
Soil : Dark gray clay

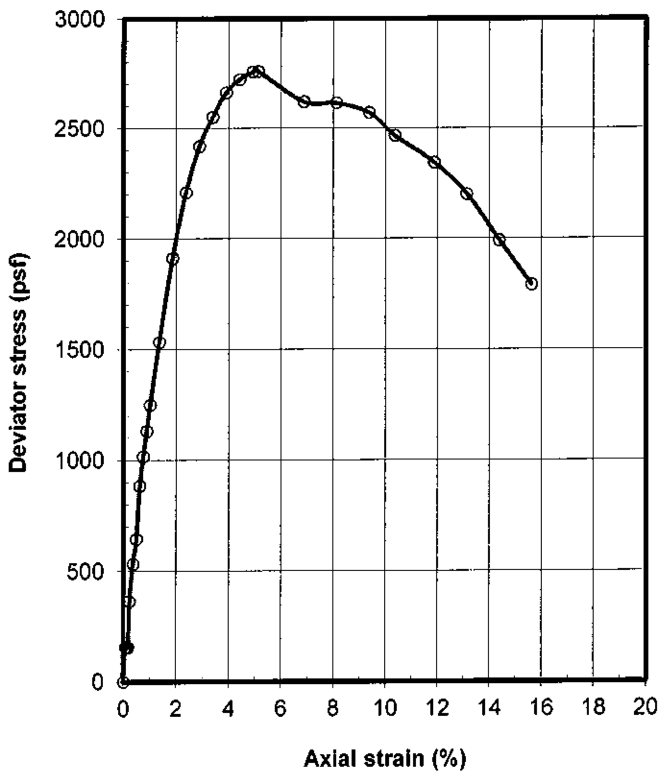
Specimen:
Total wt. = 813.1 gms
Ht. = 5.750 in
Ave dia. = 2.423 in
Area = 4.614 sq.in
Volume = 434.8 c.c.
Shearing rate = 0.04 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.891
Ht/Dia ratio = 2.37
Moisture = 31.0 %
Total density = 116.7 pcf
Dry density = 89.1 pcf
Saturation = 93.9 %
Chamber pressure = 1728 psf
Max. deviator stress = 2759 psf
Strain @ failure = 5.11 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	5.0	0.08	156.8
0.006	5.0	0.13	156.7
0.009	5.0	0.18	156.6
0.012	11.7	0.23	365.8
0.019	17.1	0.36	532.6
0.027	20.8	0.49	645.8
0.034	28.5	0.62	885.2
0.042	32.8	0.75	1016.2
0.049	36.6	0.88	1132.0
0.056	40.4	1.00	1248.5
0.076	49.8	1.36	1533.0
0.106	62.5	1.86	1913.2
0.135	72.5	2.37	2208.2
0.164	79.8	2.88	2418.6
0.193	84.6	3.38	2551.1
0.222	88.8	3.89	2662.2
0.251	91.2	4.40	2722.0
0.281	92.9	4.91	2756.5
0.292	93.2	5.11	2759.1
0.393	90.2	6.86	2620.8
0.464	91.2	8.10	2615.2
0.536	90.9	9.36	2571.2
0.594	88.2	10.36	2466.2
0.681	85.2	11.86	2343.3
0.753	81.2	13.12	2200.3
0.825	74.5	14.37	1990.7
0.897	68.0	15.63	1791.6



INSPECTION SERVICES, INC. BERKELEY, CA

UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-178
Sample # : 9
Depth (ft) : 40
Date tested : 06/03/20
Soil : Gray clay

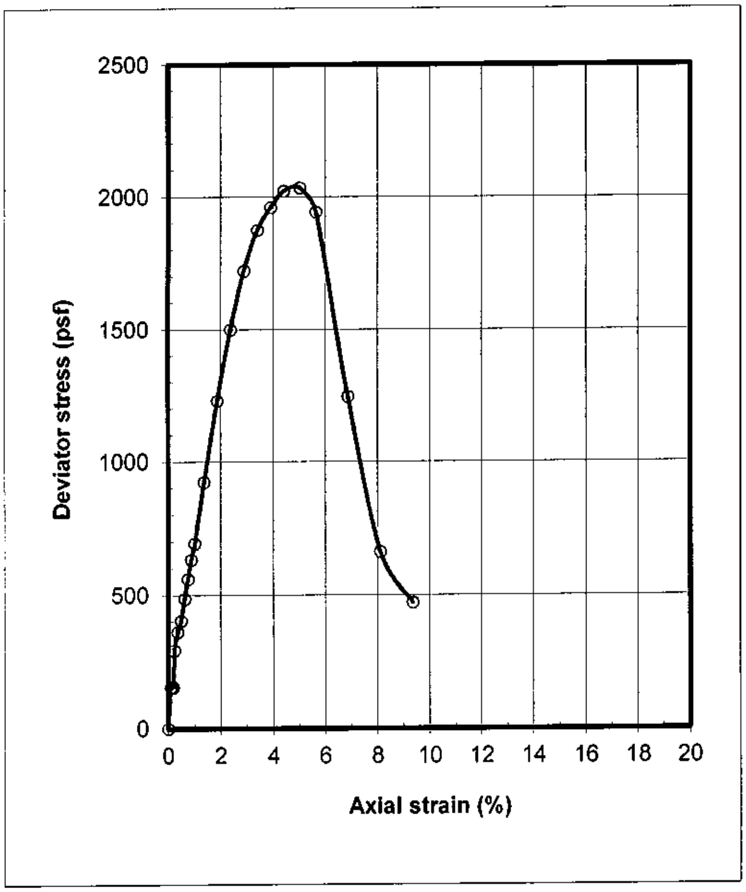
Specimen:			
Total wt. =	857.8	gms
Ht. =	5.740	in
Ave dia. =	2.420	in
Area =	4.601	sq.in
Volume =	432.8	c.c.
Shearing rate =	0.04	inch/min
Shearing rate =	0.75	%/min
Gs (assumed) =	2.70	

Test Report:		
Void ratio =	0.695	
Ht/Dia ratio =	2.37	
Moisture =	24.4	%
Total density =	123.7	pcf
Dry density =	99.4	pcf
Saturation =	94.9	%
Chamber pressure =	2880	psf
Max. deviator stress =	2034	psf
Strain @ failure =	5.00	%

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	5.0	0.08	155.5
0.006	5.0	0.13	155.4
0.009	5.0	0.19	155.3
0.012	9.4	0.23	293.3
0.019	11.6	0.36	361.3
0.026	13.0	0.48	404.1
0.034	15.7	0.62	487.3
0.041	18.1	0.74	560.8
0.048	20.4	0.87	633.9
0.056	22.4	1.00	693.5
0.076	29.9	1.35	923.5
0.105	40.0	1.86	1229.6
0.134	49.1	2.37	1499.8
0.163	56.7	2.87	1721.9
0.192	62.0	3.38	1874.8
0.221	65.2	3.89	1960.1
0.250	67.6	4.39	2022.2
0.285	68.4	5.00	2034.4
0.321	65.8	5.62	1942.1
0.392	42.7	6.85	1244.8
0.463	23.0	8.10	661.8
0.535	16.6	9.35	471.7



UNCONSOLIDATED UNDRAINED COMPRESSION TEST - ASTM D2850

Client : Mott MacDonald
Project : BSVII
Job # : 507385606
Boring # BH-178
Sample # : 13
Depth (ft) : 60
Date tested : 06/03/20
Soil : Greenish gray clay with sand

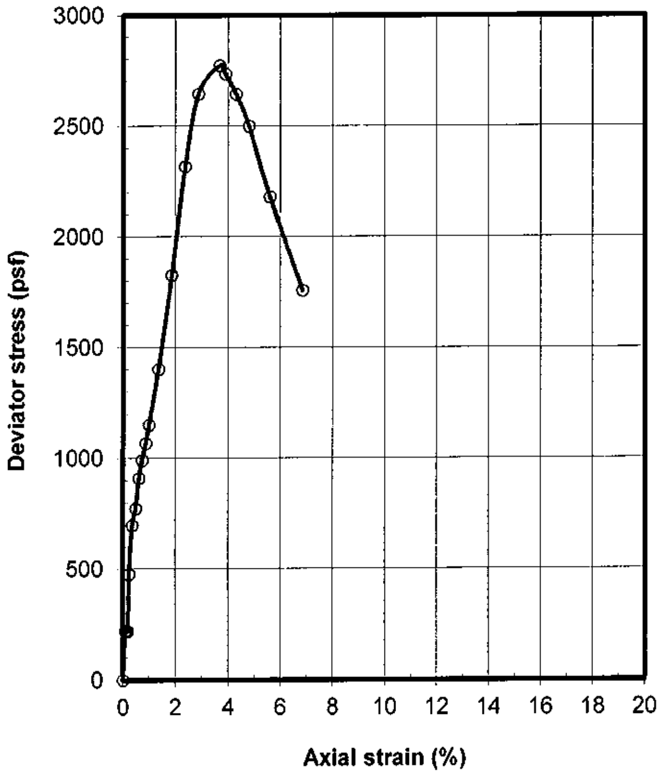
Specimen:
Total wt. = 819.7 gms
Ht. = 5.550 in
Ave dia. = 2.423 in
Area = 4.614 sq.in
Volume = 419.6 c.c.
Shearing rate = 0.04 inch/min
Shearing rate = 0.75 %/min
Gs (assumed) = 2.70

Test Report:
Void ratio = 0.748
Ht/Dia ratio = 2.29
Moisture = 26.5 %
Total density = 121.9 pcf
Dry density = 96.4 pcf
Saturation = 95.6 %
Chamber pressure = 4176 psf
Max. deviator stress = 2772 psf
Strain @ failure = 3.68 %

Data Reduction:

Dial factor = 1.0 in/unit
Load factor = 1.0 lb/unit

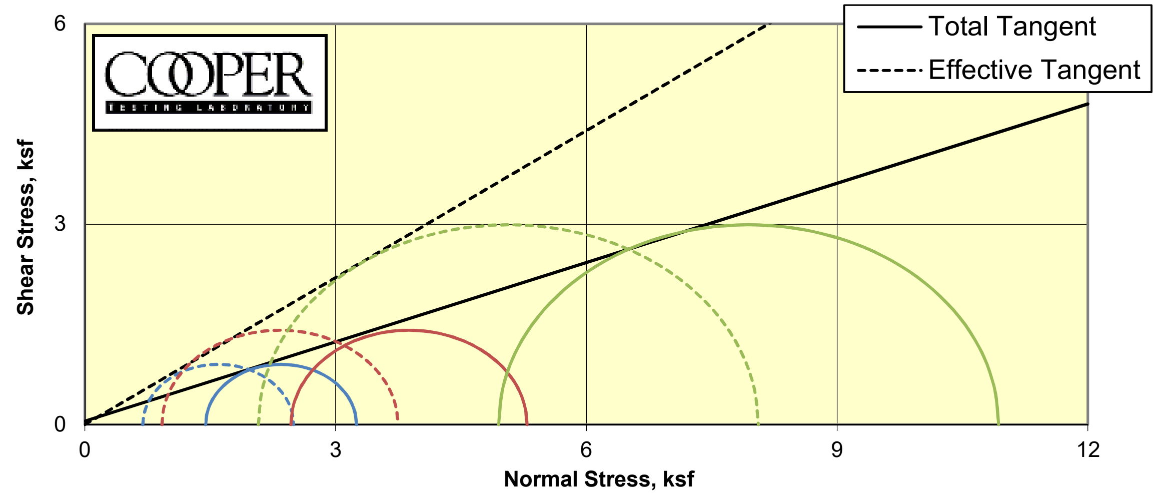
Dial Read.	Load Read.	Axial Strain (%)	Deviator Stress (psf)
-0.002		0.00	0.0
0.003	7.0	0.08	218.3
0.005	7.0	0.12	218.2
0.008	7.0	0.18	218.1
0.011	15.3	0.23	475.8
0.018	22.4	0.35	696.8
0.025	24.9	0.48	774.3
0.032	29.3	0.61	910.4
0.039	32.0	0.73	991.5
0.047	34.5	0.87	1066.8
0.054	37.3	0.99	1151.3
0.073	45.5	1.35	1401.5
0.101	59.7	1.85	1827.3
0.129	76.0	2.36	2316.1
0.158	87.2	2.87	2644.8
0.203	92.2	3.68	2771.7
0.214	91.2	3.88	2734.9
0.236	88.5	4.29	2643.3
0.265	84.1	4.79	2499.6
0.309	73.9	5.60	2178.2
0.378	60.5	6.85	1757.9

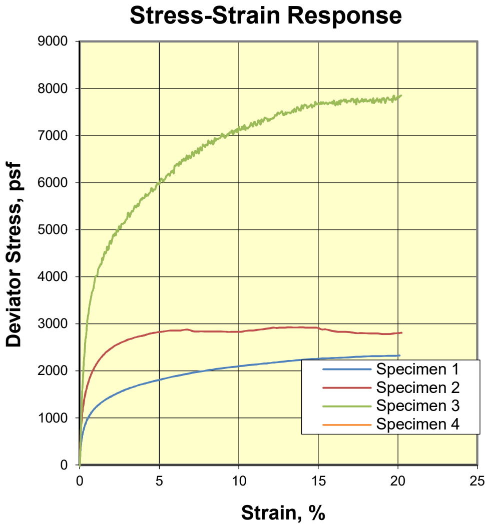


INSPECTION SERVICES, INC. BERKELEY, CA

TXCU Test Results

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767

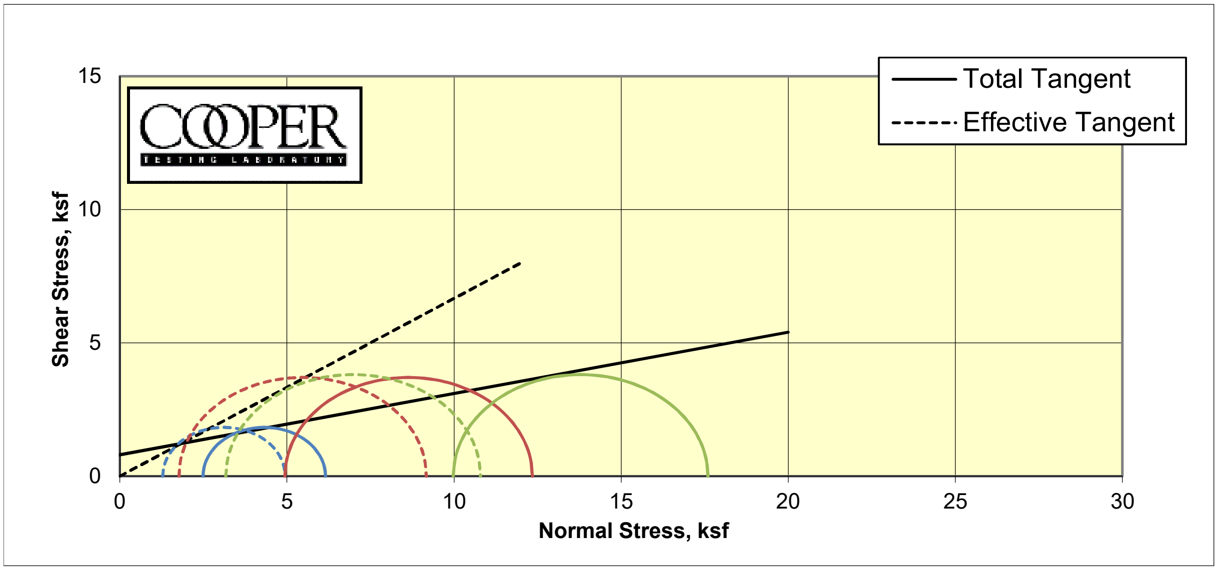


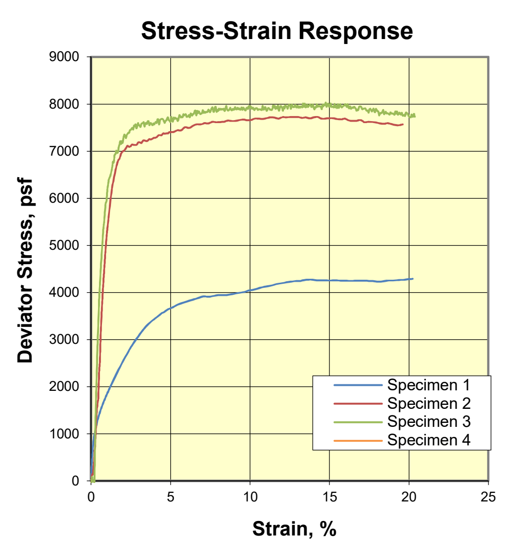


Specimen	1	2	3	4
Boring	BH-109	BH-109	BH-109	
Sample	6	6	6	
Depth	25.3 (Tip-15.5")	25.3 (Tip-8")	25.3 (Tip-2")	
Visual Description	Grayish Brown Sandy CLAY	Grayish Brown Sandy CLAY near Clayey SAND	Grayish Brown Sandy CLAY near Clayey SAND	
MC (%)	20.9	21.3	19.7	
Dry Density (pcf)	106.2	105.3	110.9	
Saturation (%)	93.4	93.0	99.1	
Void Ratio	0.616	0.631	0.548	
Diameter (in)	2.86	2.87	2.87	
Height (in)	5.95	5.94	5.94	
	Final			
MC (%)	18.8	19.9	18.1	
Dry Density (pcf)	113.2	111.0	114.7	
Saturation (%)	100.0	100.0	100.0	
Void Ratio	0.517	0.547	0.497	
Diameter (in)	2.78	2.81	2.84	
Height (in)	5.91	5.87	5.88	
Cell Pressure (psi)	70.3	77.5	94.5	
Back Pressure (psi)	60.3	60.3	60.1	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	1.803	2.824	5.982	
Excess PP (psi)	5.2	10.7	20.0	
Sigma 1 (ksf)	2.498	3.747	8.058	
Sigma 3 (ksf)	0.695	0.923	2.076	
P (ksf)	1.596	2.335	5.067	
Q (ksf)	0.902	1.412	2.991	
Stress Ratio	3.595	4.058	3.881	
Rate (in/min)	0.0005	0.0005	0.0005	

CTL Number:	157-370		
Client Name:	Parikh Consulting, Inc.		
Project Name:	BART to Silicon Valley		
Project Number:	2017-144-T02		
Date:	6/10/2019	By:	MD/DC
Total C	**0.050**	**ksf**	
Total phi	**21.6**	**degrees**	
Eff. C	**0.000**	**ksf**	
Eff. Phi	**36.3**	**degrees**	©

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767

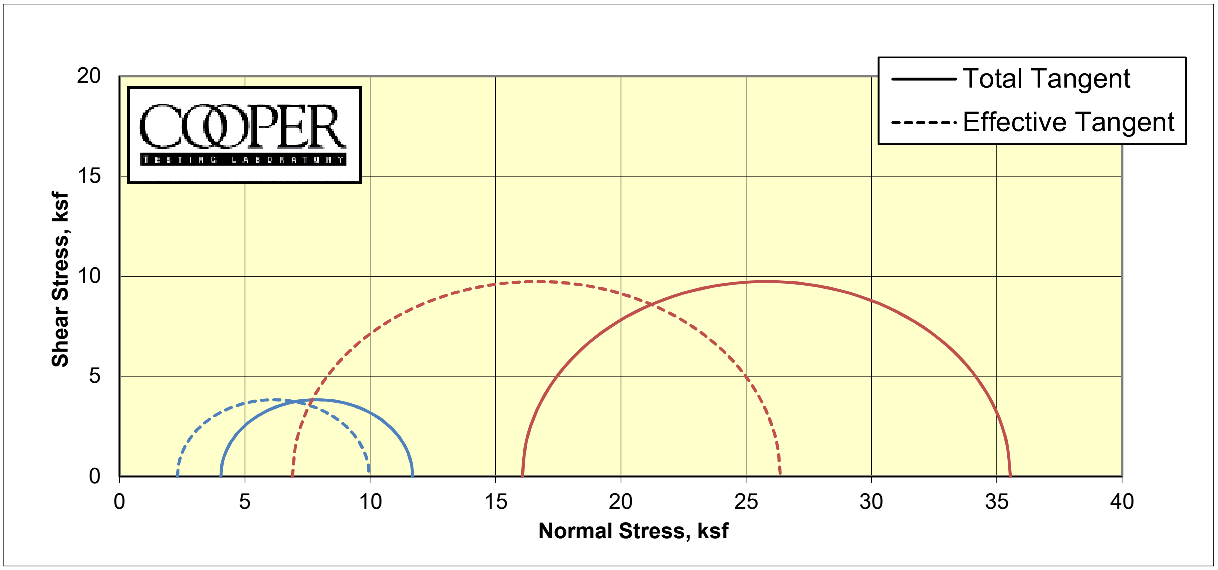


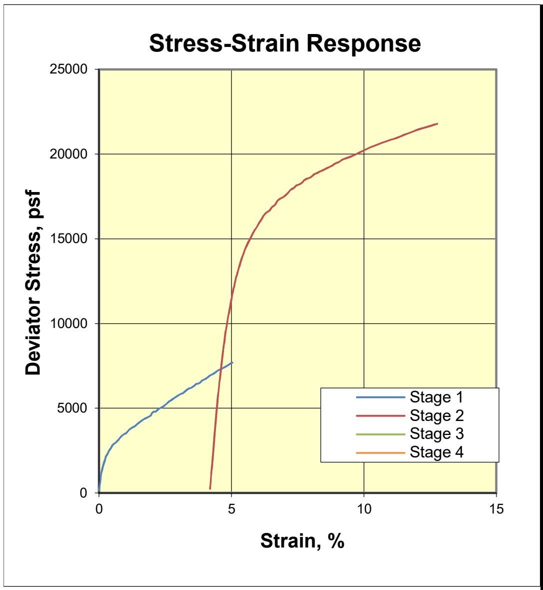


CTL Number:	157-370		
Client Name:	Parikh Consulting, Inc.		
Project Name:	BART to Silicon Valley		
Project Number:	2017-144-T02		
Date:	5/24/2019	By:	MD/DC
Total C	**0.800**	**ksf**	
Total phi	**13.0**	**degrees**	
Eff. C	**0.000**	**ksf**	
Eff. Phi	**33.7**	**degrees**	©

Specimen	**1**	**2**	**3**	**4**
Boring	BH-109	BH-109	BH-109	
Sample	14	14	14	
Depth	64(Tip-14.5")	64(Tip-7")	64(Tip-1")	
Visual Description	Greenish Gray CLAY (Silty) w/ Sand	Greenish Gray CLAY (Silty) w/ Sand	Greenish Gray Sandy CLAY/ CLAY w/ Sand	
MC (%)	22.9	21.5	21.9	
Dry Density (pcf)	105.3	107.2	106.1	
Saturation (%)	103.0	101.4	100.6	
Void Ratio	0.600	0.572	0.589	
Diameter (in)	2.87	2.87	2.87	
Height (in)	5.97	5.97	5.97	
	Final			
MC (%)	22.4	20.7	19.6	
Dry Density (pcf)	107.7	171.2	112.5	
Saturation (%)	106.9	-3629.2	106.3	
Void Ratio	0.566	-0.015	0.498	
Diameter (in)	2.86	2.29	2.81	
Height (in)	5.90	5.90	5.87	
Cell Pressure (psi)	76.7	94.7	130.1	
Back Pressure (psi)	59.4	60.3	60.8	
	Effective Stresses At:			
Strain (%)	5.0	5.0	5.0	
Deviator (ksf)	3.664	7.405	7.621	
Excess PP (psi)	8.4	22.0	47.3	
Sigma 1 (ksf)	4.950	9.175	10.795	
Sigma 3 (ksf)	1.286	1.770	3.173	
P (ksf)	3.118	5.473	6.984	
Q (ksf)	1.832	3.702	3.811	
Stress Ratio	3.848	5.183	3.402	
Rate (in/min)	0.0005	0.0005	0.0005	

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m

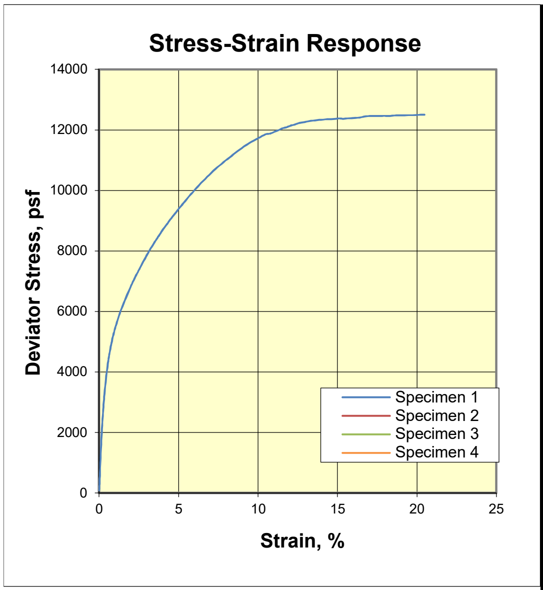




CTL Number:	157-367		
Client Name:	Parikh Consultants		
Project Name:	BART to Silicon Valley		
Project Number:	2017-144-T02		
Date:	4/30/2019	By:	MD/DC
Total C	**#DIV/0!**	**ksf**	
Total phi	**#DIV/0!**	**degrees**	
Eff. C	**#DIV/0!**	**ksf**	
Eff. Phi	**#DIV/0!**	**degrees**	©

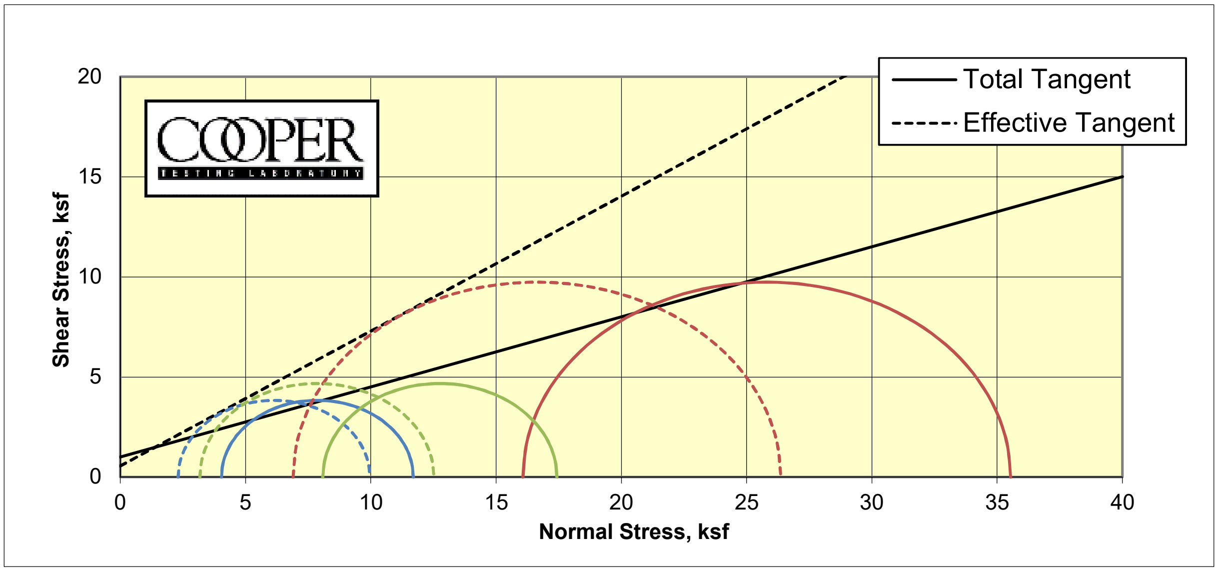
Stage	**1**	**2**	**3**	**4**
Boring	BH-116			
Sample	22			
Depth	120(Tip-1/2")			
Visual Description	Greenish Gray CLAY w/ Sand			
MC (%)	20.8			
Dry Density (pcf)	109.2			
Saturation (%)	99.9			
Void Ratio	0.572			
Diameter (in)	2.86			
Height (in)	5.74			
	Final			
MC (%)	18.0	18.0		
Dry Density (pcf)	114.8	114.8		
Saturation (%)	100.0	100.0		
Void Ratio	0.495	0.495		
Diameter (in)	2.80	2.87		
Height (in)	5.71	5.43		
Cell Pressure (psi)	87.4	172.3		
Back Pressure (psi)	59.3	60.7		
	Effective Stresses At:			
Strain (%)	5.0	5.0		
Deviator (ksf)	7.656	19.468		
Excess PP (psi)	12.0	63.7		
Sigma 1 (ksf)	9.966	26.367		
Sigma 3 (ksf)	2.310	6.900		
P (ksf)	6.138	16.634		
Q (ksf)	3.828	9.734		
Stress Ratio	4.314	3.821		
Rate (in/min)	0.0005	0.0005		

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767



CTL Number:	157-367		
Client Name:	Parikh Consultants		
Project Name:	BART to Silicon Valley		
Project Number:	2017-144-T02		
Date:	4/30/2019	By:	MD/DC
Total C	#DIV/0!	ksf	
Total phi	#DIV/0!	degrees	
Eff. C	#DIV/0!	ksf	
Eff. Phi	#DIV/0!	degrees	©

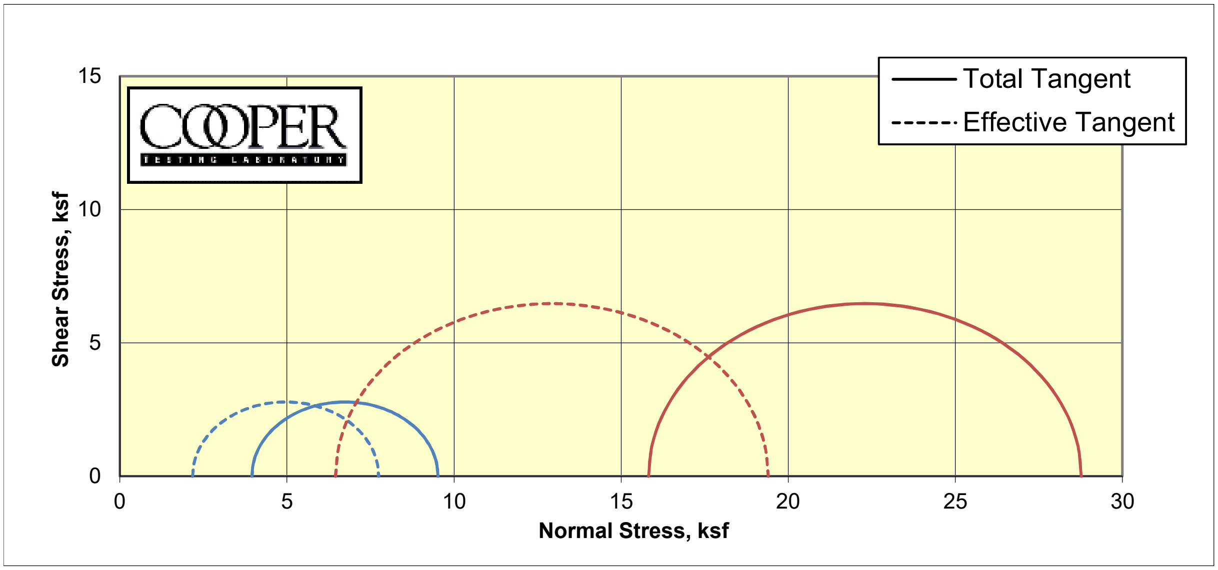
Specimen	**1**	**2**	**3**	**4**
Boring	BH-116			
Sample	22			
Depth	120(Tip-6.5")			
Visual Description	Dark Gray Sandy SILT (slightly plastic)			
MC (%)	25.0			
Dry Density (pcf)	101.6			
Saturation (%)	99.6			
Void Ratio	0.690			
Diameter (in)	2.86			
Height (in)	5.75			
	Final			
MC (%)	21.8			
Dry Density (pcf)	107.3			
Saturation (%)	100.0			
Void Ratio	0.599			
Diameter (in)	2.82			
Height (in)	5.61			
Cell Pressure (psi)	115.4			
Back Pressure (psi)	59.3			
	Effective Stresses At:			
Strain (%)	5.0			
Deviator (ksf)	9.342			
Excess PP (psi)	34.1			
Sigma 1 (ksf)	12.521			
Sigma 3 (ksf)	3.179			
P (ksf)	7.850			
Q (ksf)	4.671			
Stress Ratio	3.939			
Rate (in/min)	0.0005			

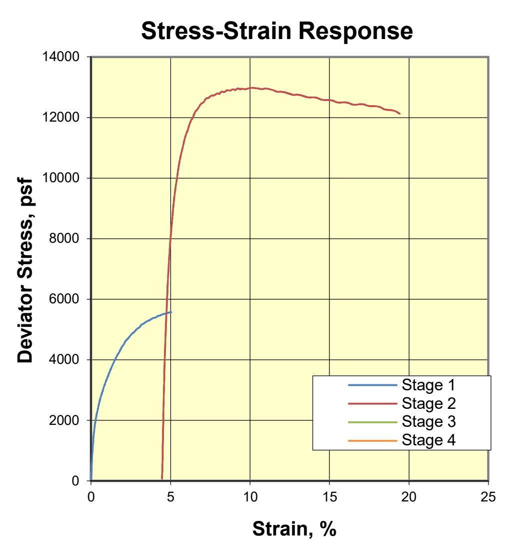


CTL Number:	157-367	**Total C**	**1.0**	**ksf**	**Date:**	6/21/2019
Client Name:	Parikh Consultants	**Total phi**	**19.3**	**degrees**	By:	MD/DC
Project Name:	BART to Silicon Valley	**Eff. C**	**0.6**	**ksf**		
Project Number:	2017-144-T02	**Eff. Phi**	**34.0**	**degrees**		©

	1	**2**	**3**					
Boring	BH-116	BH-116	BH-116					
Sample	22	22	22					
Depth	120(Tip-1/2")	120(Tip-1/2")	120(Tip-6.5")					
Visual Description	Greenish Gray CLAY w/ Sand	Greenish Gray CLAY w/ Sand	Dark Gray Sandy SILT (slightly plastic)					
MC (%)	20.8	20.8	25.0					
Dry Density (pcf)	109.2	109.2	101.6					
Saturation (%)	99.9	99.9	99.6					
Void Ratio	0.572	0.572	0.690					
Diameter (in)	2.86	2.86	2.86					
Height (in)	5.74	5.74	5.75					
Final								
MC (%)	18.0	18.0	21.8					
Dry Density (pcf)	114.8	114.8	107.3					
Saturation (%)	100.0	100.0	100.0					
Void Ratio	0.495	0.495	0.599					
Diameter (in)	2.80	2.87	2.82					
Height (in)	5.71	5.43	5.61					
Cell Pressure (psi)	87.4	172.3	115.4					
Back Pressure (psi)	59.3	60.7	59.3					
Effective Stresses At:								
Strain (%)	5.0	5.0	5.0					
Deviator (ksf)	7.656	19.468	9.342					
Excess PP (psi)	12.0	63.7	34.1					
Sigma 1 (ksf)	9.966	26.367	12.521					
Sigma 3 (ksf)	2.310	6.900	3.179					
P (ksf)	6.138	16.634	7.850					
Q (ksf)	3.828	9.734	4.671					
Stress Ratio	4.314	3.821	3.939					
Rate (in/min)	0.0005	0.0005	0.0005					

Staged Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767m

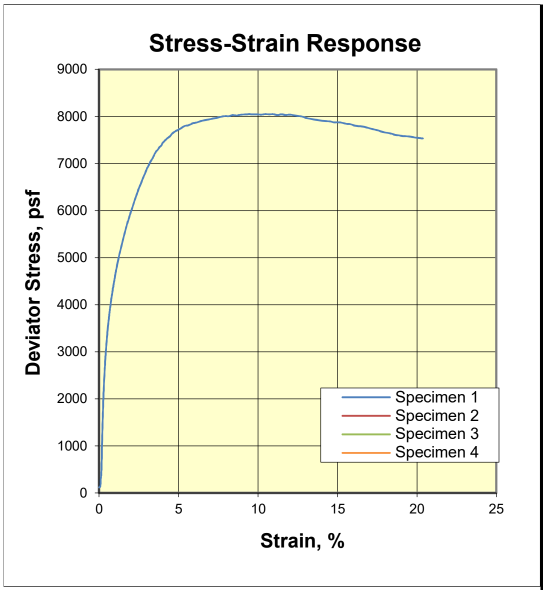




Stage	1	2	3	4
Boring	BH-141			
Sample	24			
Depth	115(Tip-1")			
Visual Description	Dark Greenish Gray CLAY			
MC (%)	22.6			
Dry Density (pcf)	105.0			
Saturation (%)	97.9			
Void Ratio	0.635			
Diameter (in)	2.87			
Height (in)	5.96			
	Final			
MC (%)	18.8	18.8		
Dry Density (pcf)	113.2	113.2		
Saturation (%)	100.0	100.0		
Void Ratio	0.517	0.517		
Diameter (in)	2.78	2.84		
Height (in)	5.90	5.64		
Cell Pressure (psi)	109.0	190.6		
Back Pressure (psi)	81.5	80.7		
	Effective Stresses At:			
Strain (%)	5.0	5.0		
Deviator (ksf)	5.568	12.947		
Excess PP (psi)	12.3	65.0		
Sigma 1 (ksf)	7.748	19.404		
Sigma 3 (ksf)	2.180	6.457		
P (ksf)	4.964	12.931		
Q (ksf)	2.784	6.474		
Stress Ratio	3.554	3.005		
Rate (in/min)	0.0005	0.0005		

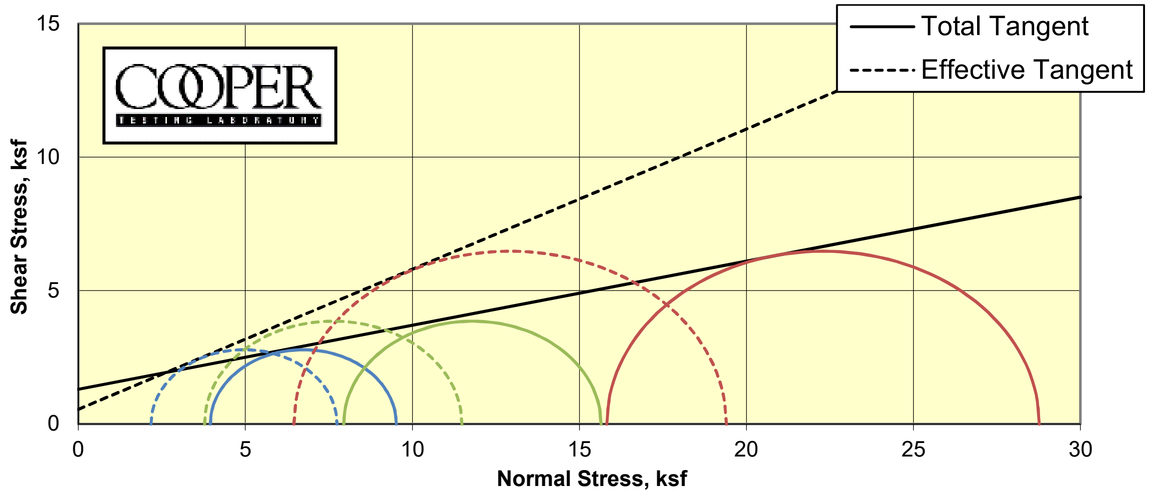
CTL Number:	157-367		
Client Name:	Parikh Consultants		
Project Name:	BART to Silicon Valley		
Project Number:	2017-144-T02		
Date:	4/30/2019	By:	MD/DC
Total C	**#DIV/0!**	**ksf**	
Total phi	**#DIV/0!**	**degrees**	
Eff. C	**#DIV/0!**	**ksf**	
Eff. Phi	**#DIV/0!**	**degrees**	©

Consolidated Undrained Triaxial Compression with Pore Pressure
ASTM D4767



Specimen	1	2	3	4
Boring	BH-141			
Sample	24			
Depth	115(Tip-7")			
Visual Description	Dark Greenish Gray CLAY			
MC (%)	23.0			
Dry Density (pcf)	104.9			
Saturation (%)	99.5			
Void Ratio	0.637			
Diameter (in)	2.87			
Height (in)	5.96			
	Final			
MC (%)	21.3			
Dry Density (pcf)	108.3			
Saturation (%)	100.0			
Void Ratio	0.586			
Diameter (in)	2.85			
Height (in)	5.85			
Cell Pressure (psi)	135.5			
Back Pressure (psi)	80.3			
	Effective Stresses At:			
Strain (%)	5.0			
Deviator (ksf)	7.705			
Excess PP (psi)	28.9			
Sigma 1 (ksf)	11.486			
Sigma 3 (ksf)	3.781			
P (ksf)	7.633			
Q (ksf)	3.852			
Stress Ratio	3.038			
Rate (in/min)	0.0005			

CTL Number:	157-367		
Client Name:	Parikh Consultants		
Project Name:	BART to Silicon Valley		
Project Number:	2017-144-T02		
Date:	4/30/2019	By:	MD/DC
Total C	#DIV/0!	ksf	
Total phi	#DIV/0!	degrees	
Eff. C	#DIV/0!	ksf	
Eff. Phi	#DIV/0!	degrees	©



CTL Number:	157-367			**Total C**	**1.3**	**ksf**	**Date:**	6/21/2019
Client Name:	Parikh Consultants			**Total phi**	**13.5**	**degrees**	By:	MD/DC
Project Name:	BART to Silicon Valley			**Eff. C**	**0.6**	**ksf**		
Project Number:	2017-144-T02			**Eff. Phi**	**27.7**	**degrees**		©
	1	**2**	**3**					
Boring	BH-141	BH-141	BH-141					
Sample	24	24	24					
Depth	115(Tip-1")	115(Tip-1")	115(Tip-7")					
Visual Description	Dark Greenish Gray CLAY	Dark Greenish Gray CLAY	Dark Greenish Gray CLAY					
MC (%)	22.6	22.6	23.0					
Dry Density (pcf)	105.0	105.0	104.9					
Saturation (%)	97.9	97.9	99.5					
Void Ratio	0.635	0.635	0.637					
Diameter (in)	2.87	2.87	2.87					
Height (in)	5.96	5.96	5.96					
Final								
MC (%)	18.8	18.8	21.3					
Dry Density (pcf)	113.2	113.2	108.3					
Saturation (%)	100.0	100.0	100.0					
Void Ratio	0.517	0.517	0.586					
Diameter (in)	2.78	2.84	2.85					
Height (in)	5.90	5.64	5.85					
Cell Pressure (psi)	109.0	190.6	135.5					
Back Pressure (psi)	81.5	80.7	80.3					
Effective Stresses At:								
Strain (%)	5.0	5.0	5.0					
Deviator (ksf)	5.568	12.947	7.705					
Excess PP (psi)	12.3	65.0	28.9					
Sigma 1 (ksf)	7.748	19.404	11.486					
Sigma 3 (ksf)	2.180	6.457	3.781					
P (ksf)	4.964	12.931	7.633					
Q (ksf)	2.784	6.474	3.852					
Stress Ratio	3.554	3.005	3.038					
Rate (in/min)	0.0005	0.0005	0.0005					

Boring Number	BH-150				BH-150	
Sample Number	46				46	
Depth (ft)	137				137	
Date Tested	10/19/19				10/23/19	
Description	Gray clay				Gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	6.00	5.95			6.00	5.88
Diameter (in)	2.86	2.83			2.86	2.81
Height/Diameter Ratio	2.10	▨		▨	2.10	▨
Total Weight (g)	1309.23	1306.88			1287.60	1280.03
Moisture Content (%)	21.84	21.62			22.31	21.59
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	129.39	133.12			127.26	133.70
Dry Density (pcf)	106.20	109.46			104.04	109.96
Area (cm^2)	41.45	40.53			41.45	40.05
Total Volume (cc)	631.65	612.85			631.65	597.65
Void Ratio	0.5871	0.5399			0.6201	0.5329
Saturation (%)	100.4	108.1			97.2	109.4
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.98	
Total Back Pressure (psf)	7200				7200	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.60				7.51	
Effective Consolidation Stress (psf)	4320				10080	
Major Effective Stress at Failure (psf) σ1	9554				15165	
Minor Effective Stress at Failure (psf) σ3	2642				5033	
Deviator Stress at Failure (psf)	6912				10133	
Pore Pressure at Failure (psf)	1678				5047	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	50					
Plastic Limit	20					
Remarks						

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**

Boring #: **BH-150**

Sample #: **46**

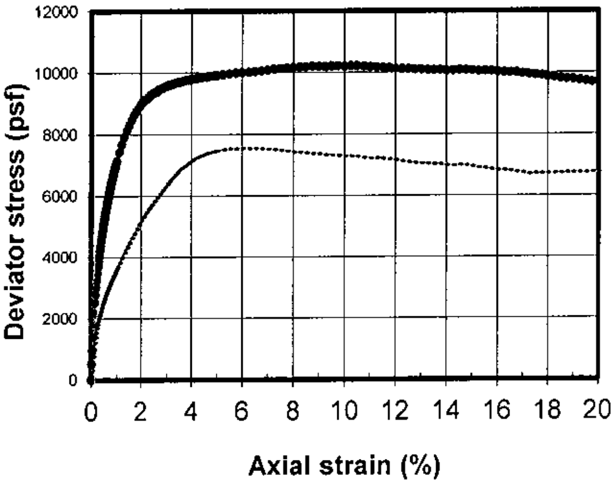
Project: **BSVII**

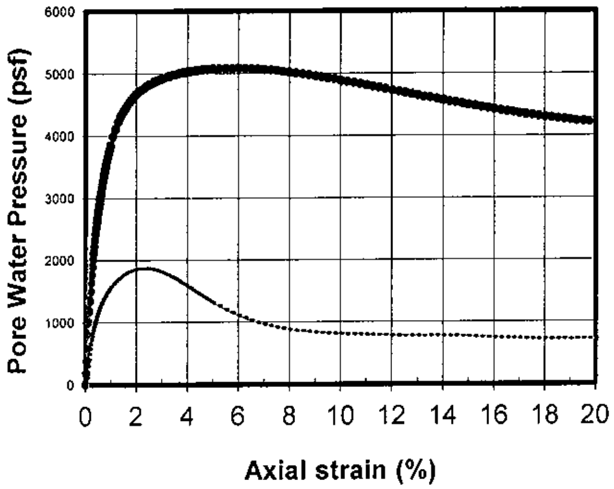
Depth (ft): **137**

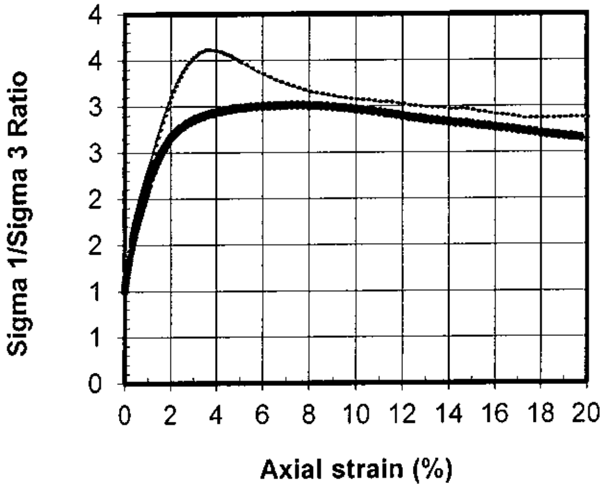
Project #: **507385606**

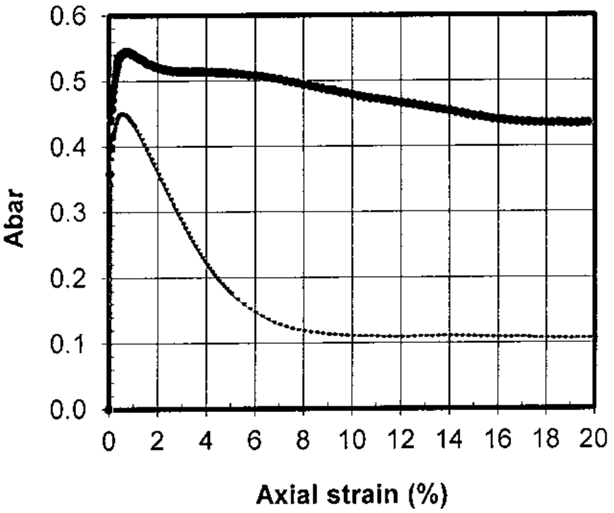
Soil: **Gray clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio


Abar

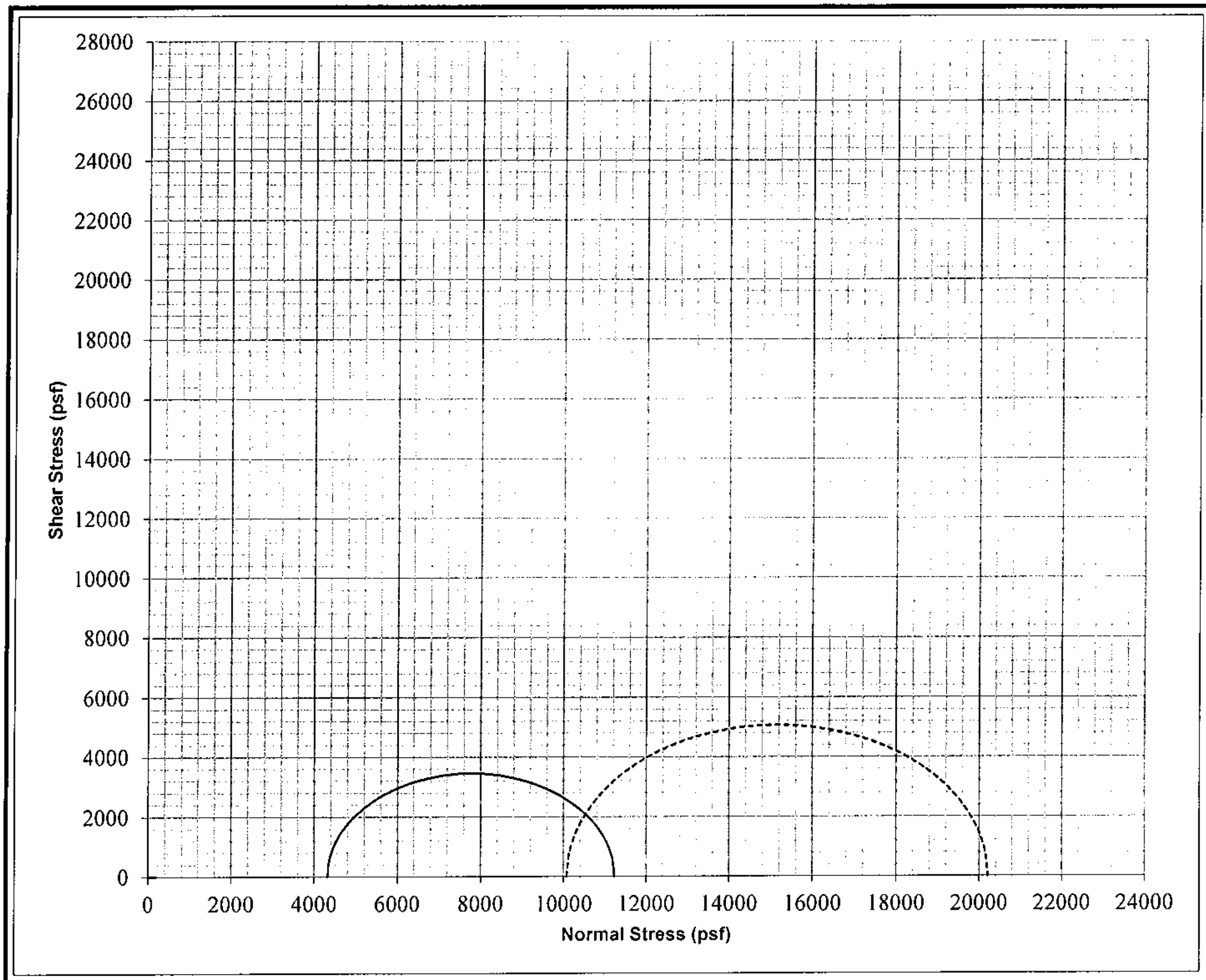
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6912	3.60	6.00	2.86	21.84	129.4	106.2	0.587	100.4	2.70	0.02	50	20	2.1
dot	10080	10133	7.51	6.00	2.86	22.31	127.3	104.0	0.620	97.2	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-150**	Sample #: **46**
Project: **BSVII**	Depth (ft): **137**	
Project #: **507385606**	Soil: **Gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

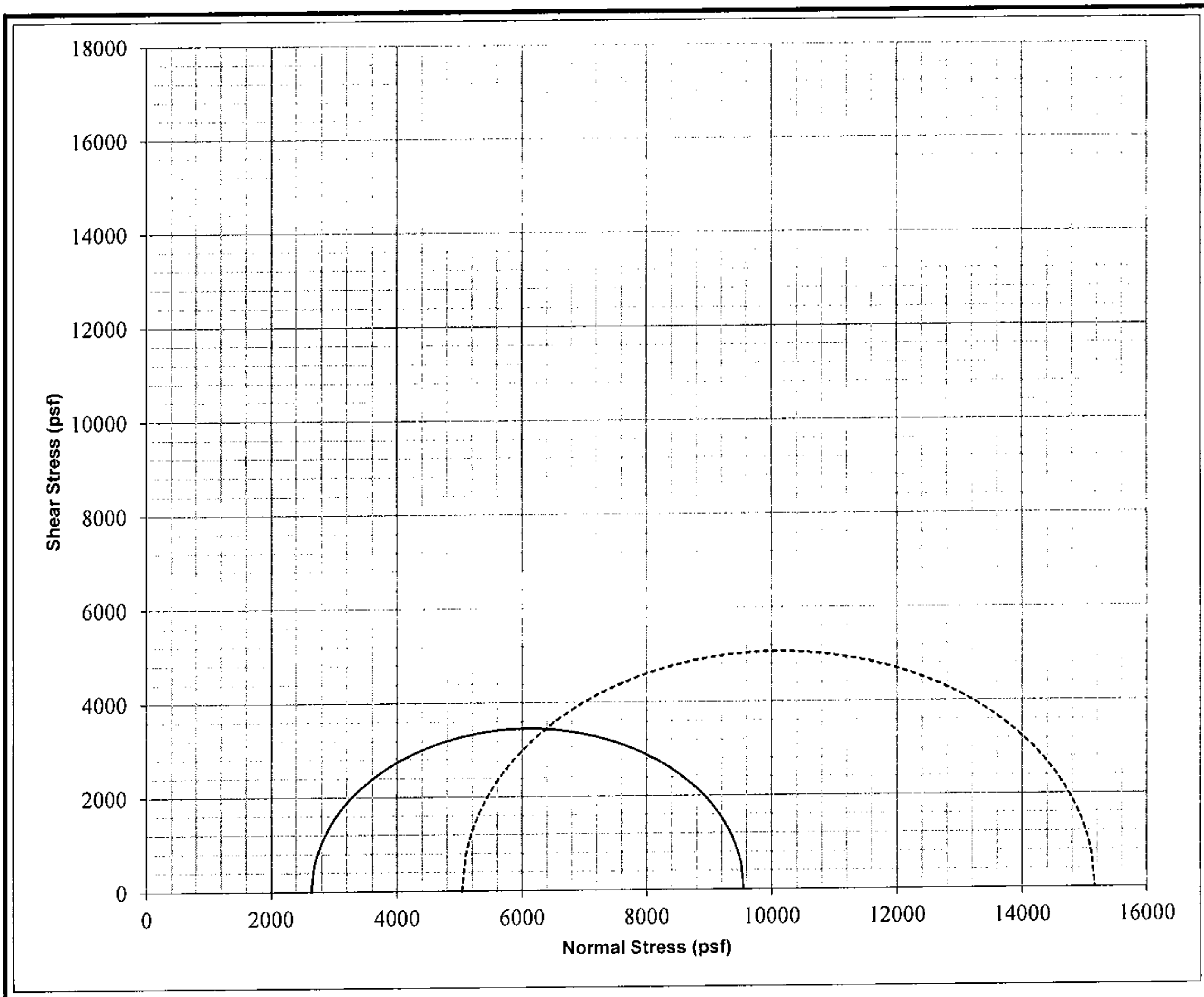
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6912	3.60	6.00	2.86	21.84	129.4	106.2	0.587	100.4	2.70	0.02	50	20	2.1
dot	10080	10133	7.51	6.00	2.86	22.31	127.3	104.0	0.620	97.2	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-150**	Sample #:	**46**
Project:	**BSVII**	Depth (ft):	**137**		
Project #:	**507385606**	Soil:	**Gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6912	3.60	6.00	2.86	21.84	129.4	106.2	0.587	100.4	2.70	0.02	50	20	2.1
dot	10080	10133	7.51	6.00	2.86	22.31	127.3	104.0	0.620	97.2	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-150**

Sample #: **46**

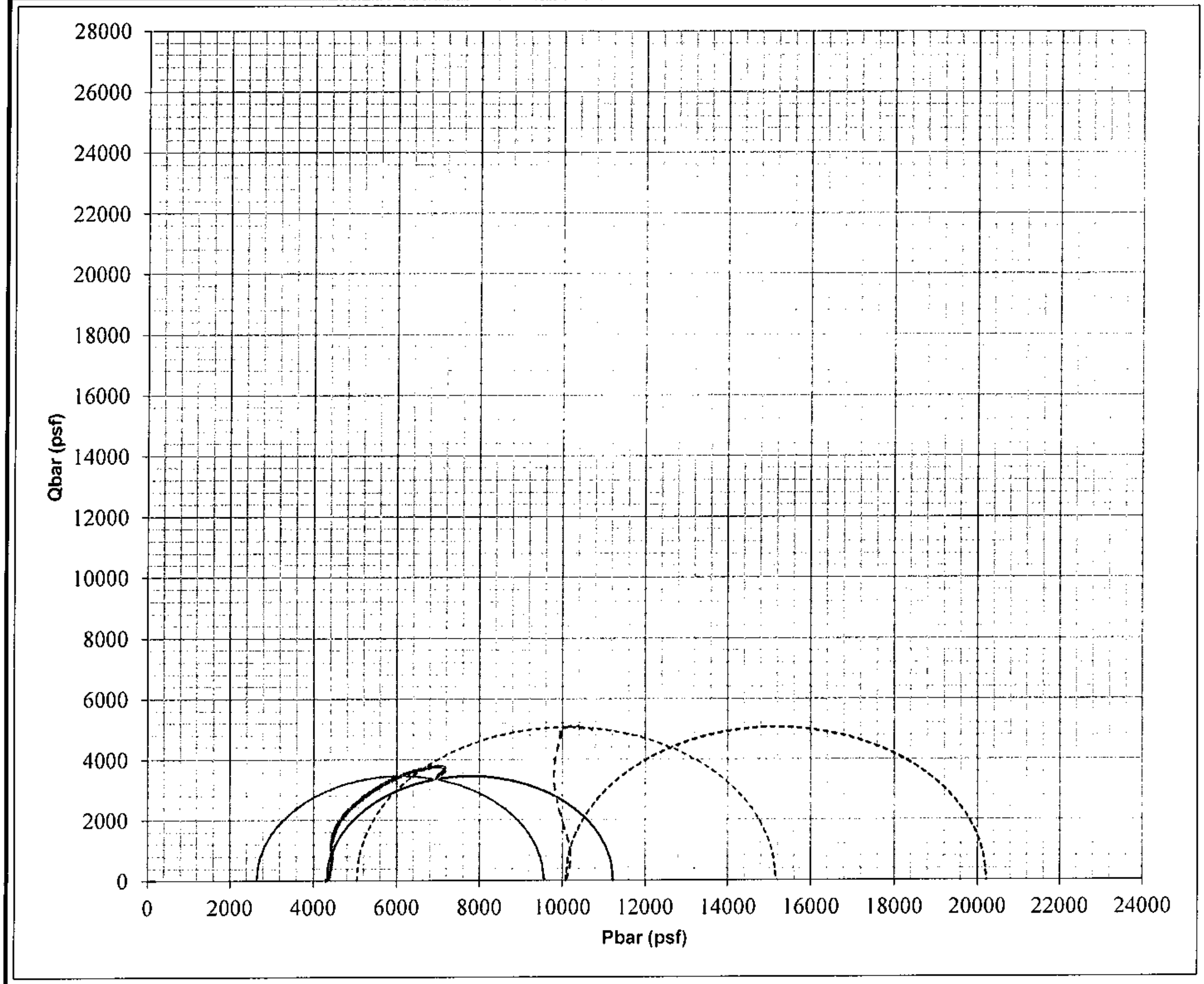
Project: **BSVII**

Depth (ft): **137**

Project #: **507385606**

Soil: **Gray clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective $\sigma1$ / $\sigma3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6912	3.60	6.00	2.86	21.84	129.4	106.2	0.587	100.4	2.70	0.02	50	20	2.1
dot	10080	10133	7.51	6.00	2.86	22.31	127.3	104.0	0.620	97.2	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-150**	Sample #:	**46**
Project:	**BSVII**	Depth (ft):	**137**		
Project #:	**507385606**	Soil:	**Gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC. **PLATE NUMBER________**

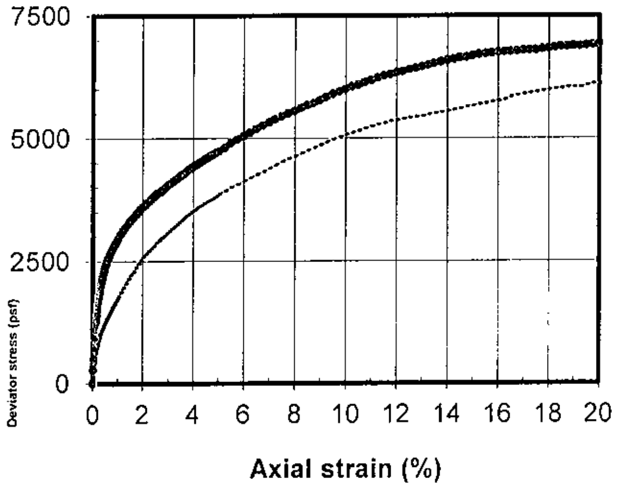
Boring Number	BH-152				BH-152	
Sample Number	5				5	
Depth (ft)	40				40	
Date Tested	11/26/19				11/30/19	
Description	Greenish gray sandy clay				Greenish gray sandy clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.95	5.93			5.98	5.93
Diameter (in)	2.86	2.85			2.86	2.83
Height/Diameter Ratio	2.08				2.09	
Total Weight (g)	1249.01	1252.71			1245.33	1237.23
Moisture Content (%)	24.56	24.93			23.73	22.92
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	124.64	126.27			123.49	126.34
Dry Density (pcf)	100.07	101.07			99.81	102.78
Area (cm^2)	41.37	41.09			41.45	40.56
Total Volume (cc)	625.55	619.35			629.54	611.34
Void Ratio	0.6843	0.6676			0.6887	0.6399
Saturation (%)	96.9	100.8			93.0	96.7
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.96				0.99	
Total Back Pressure (psf)	7200				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.70				9.50	
Effective Consolidation Stress (psf)	1440				3600	
Major Effective Stress at Failure (psf) σ1	4667				8193	
Minor Effective Stress at Failure (psf) σ3	1242				2293	
Deviator Stress at Failure (psf)	3425				5900	
Pore Pressure at Failure (psf)	198				1307	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	32				32	
Plastic Limit	22				22	
Remarks						

The following information is the same for all samples

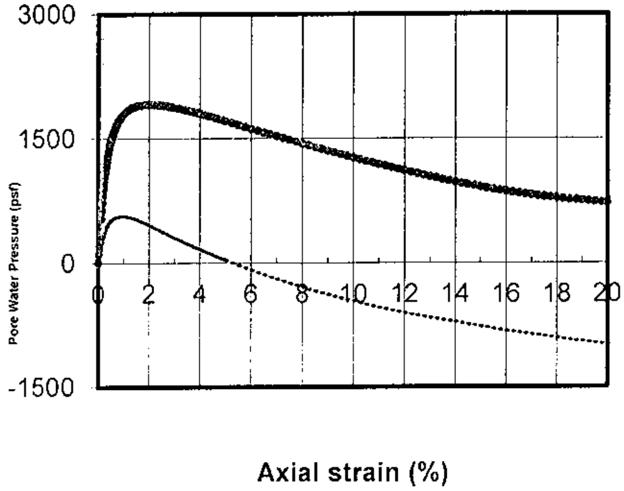
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-152**	Sample #: **5**
Project: **BSVII**	Depth (ft): **40**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

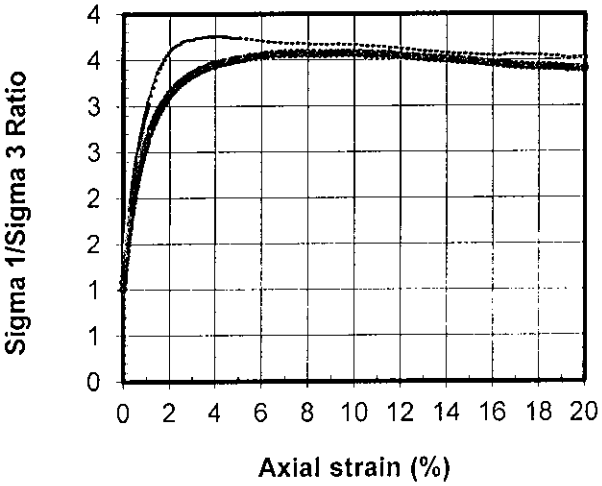
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



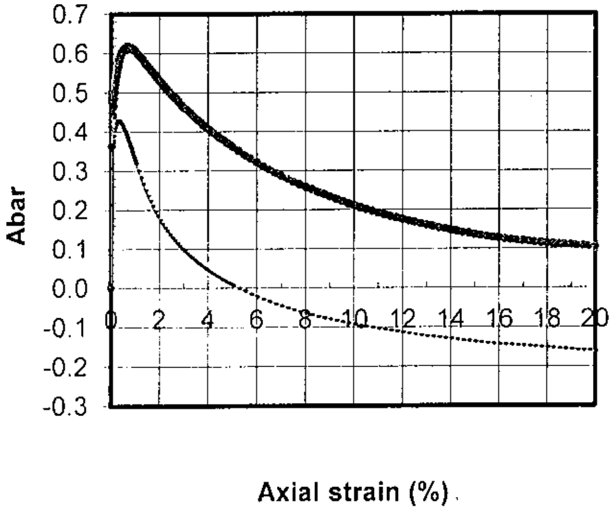
Deviator Stress



Pore Water Pressure



Sigma 1/Sigma 3 Ratio



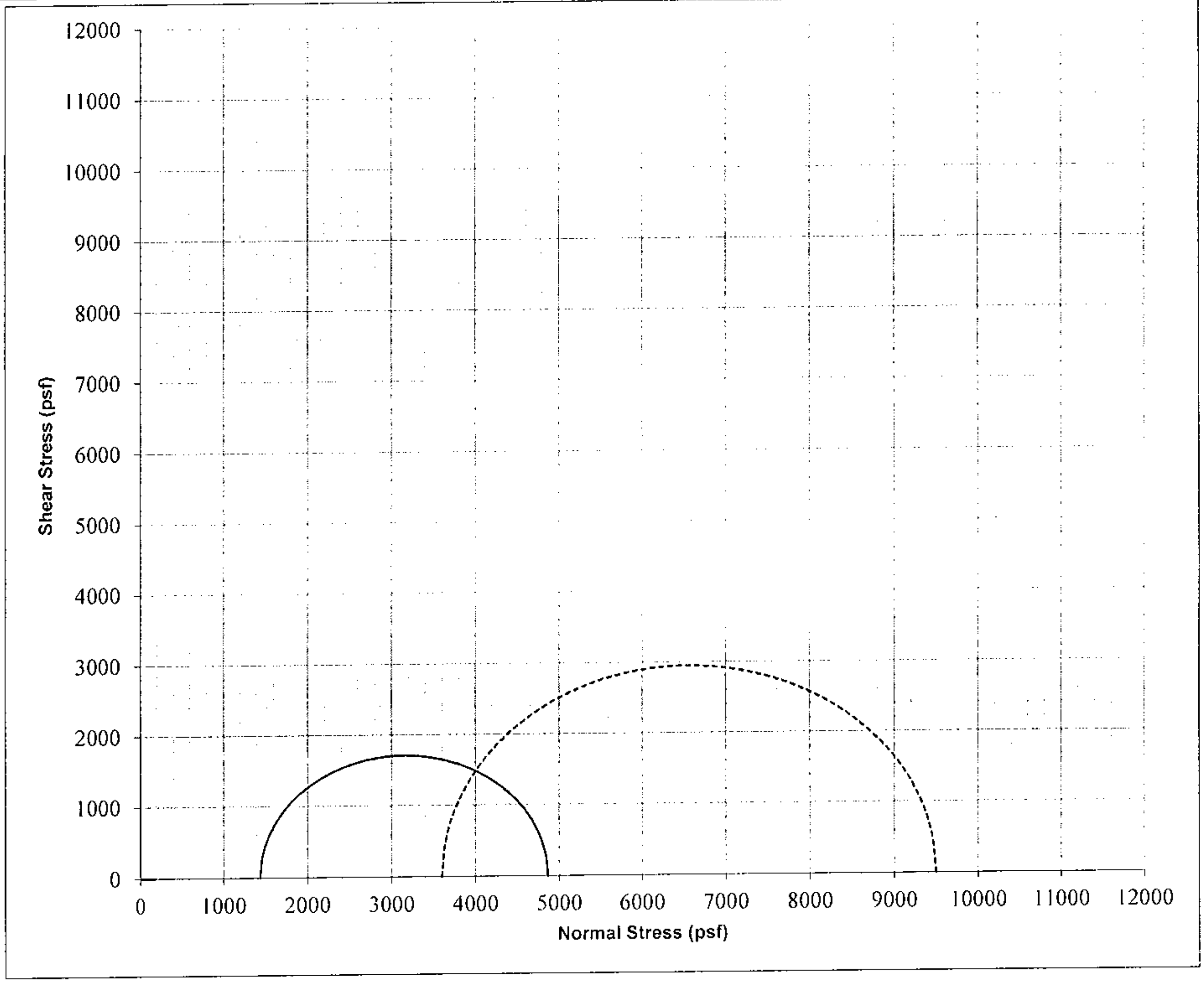
Abar

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3425	3.70	5.95	2.86	24.56	124.6	100.1	0.684	96.9	2.70	0.02	32	22	2.1
dot	3600	5900	9.50	5.98	2.86	23.73	123.5	99.8	0.689	93.0	2.70	0.02	32	22	2.1

Client:	**Mott MacDonald**	Boring #: **BH-152**	Sample #: **5**
Project:	**BSVII**	Depth (ft): **40**	
Project #:	**507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

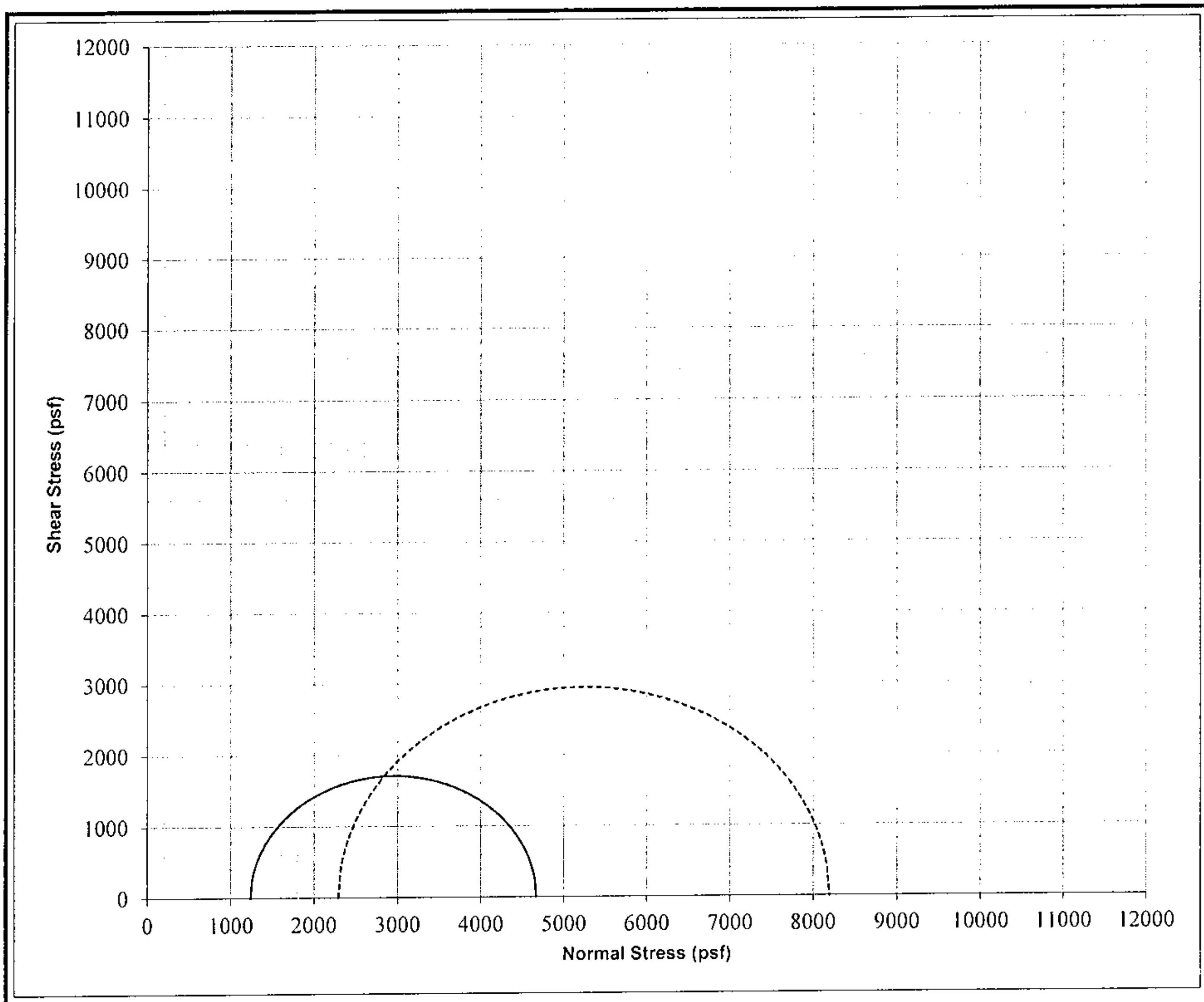
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3425	3.70	5.95	2.86	24.56	124.6	100.1	0.684	96.9	2.70	0.02	32	22	2.1
dot	3600	5900	9.50	5.98	2.86	23.73	123.5	99.8	0.689	93.0	2.70	0.02	32	22	2.1

Client: **Mott MacDonald**	Boring #: **BH-152**	Sample #: **5**
Project: **BSVII**	Depth (ft): **40**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



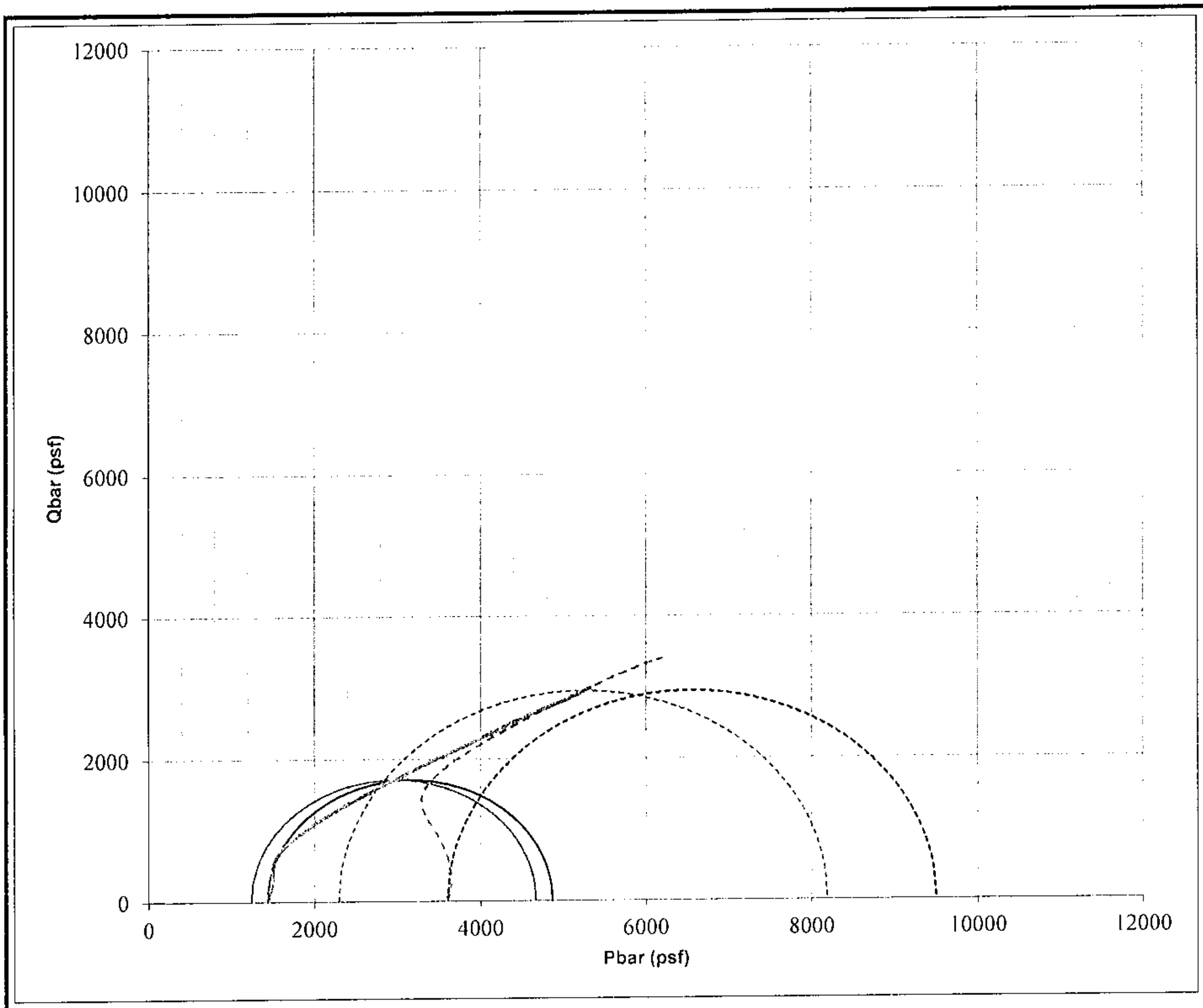
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3425	3.70	5.95	2.86	24.56	124.6	100.1	0.684	96.9	2.70	0.02	32	22	2.1
dot	3600	5900	9.50	5.98	2.86	23.73	123.5	99.8	0.689	93.0	2.70	0.02	32	22	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-152**	Sample #:	**5**
Project:	**BSVII**	Depth (ft):	**40**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



PQ MOHR GRAPHS

Failure Criteria Maximum Effective $\sigma1$ / $\sigma3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3425	3.70	5.95	2.86	24.56	124.6	100.1	0.684	96.9	2.70	0.02	32	22	2.1
dot	3600	5900	9.50	5.98	2.86	23.73	123.5	99.8	0.689	93.0	2.70	0.02	32	22	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-152**	Sample #:	**5**
Project:	**BSVII**	Depth (ft):	**40**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

Boring Number	BH-152				BH-152	
Sample Number	49				49	
Depth (ft)	135				135	
Date Tested	01/30/20				01/31/20	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	6.10	6.07			6.10	6.05
Diameter (in)	2.86	2.82			2.86	2.77
Height/Diameter Ratio	2.13				2.13	
Total Weight (g)	1320.96	1332.94			1325.38	1318.10
Moisture Content (%)	24.17	25.30			22.17	21.50
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	128.41	134.04			128.84	137.49
Dry Density (pcf)	103.41	106.98			105.46	113.16
Area (cm^2)	41.45	40.27			41.45	38.95
Total Volume (cc)	642.17	620.77			642.17	598.47
Void Ratio	0.6299	0.5756			0.5982	0.4895
Saturation (%)	103.6	118.7			100.1	118.6
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.96				0.97	
Total Back Pressure (psf)	5760				2880	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.20				4.80	
Effective Consolidation Stress (psf)	4320				10080	
Major Effective Stress at Failure (psf) σ1	9316				16943	
Minor Effective Stress at Failure (psf) σ3	2347				5693	
Deviator Stress at Failure (psf)	6969				11250	
Pore Pressure at Failure (psf)	1973				4387	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	39				39	
Plastic Limit	19				19	
Remarks						

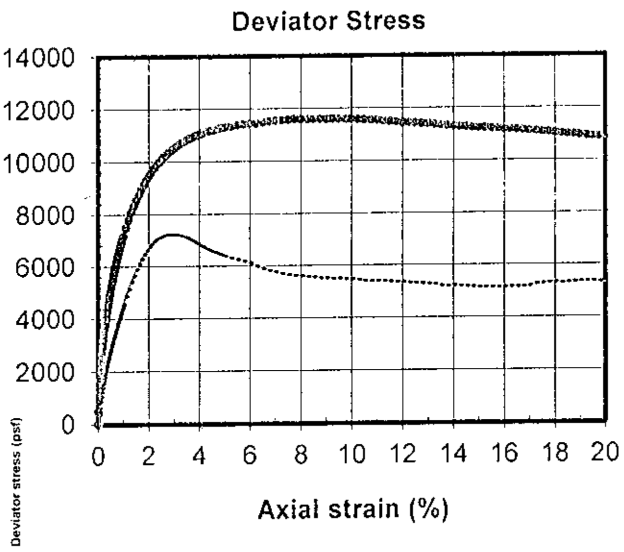
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-152**	Sample #: **49**
Project: **BSVII**	Depth (ft): **135**	
Project #: **507385606**	Soil: **Greenish gray clay**	

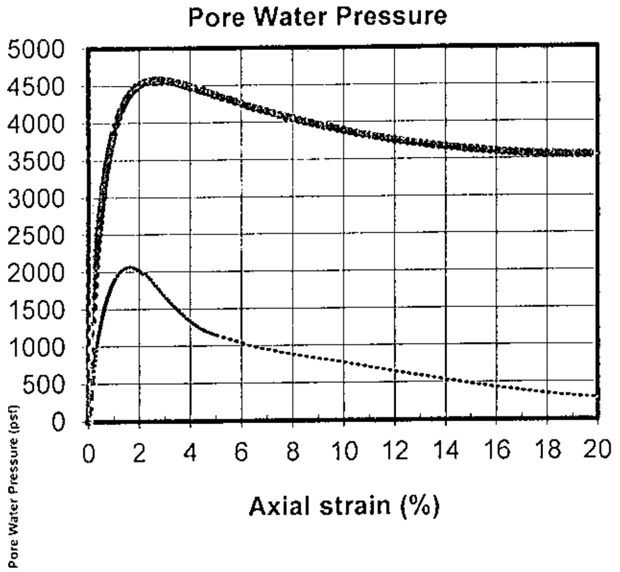
ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

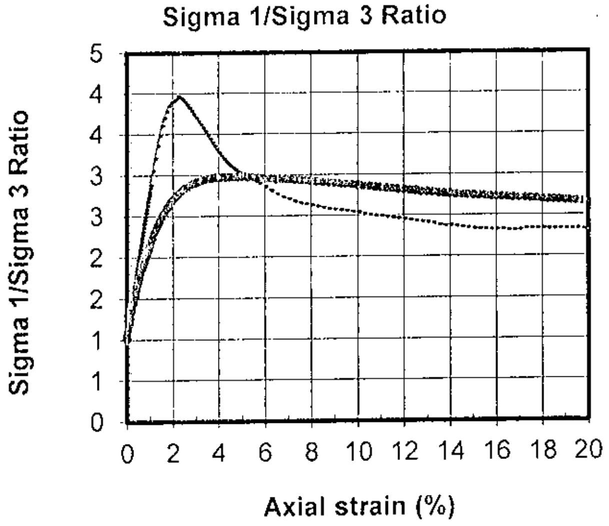
PLATE NUMBER ________



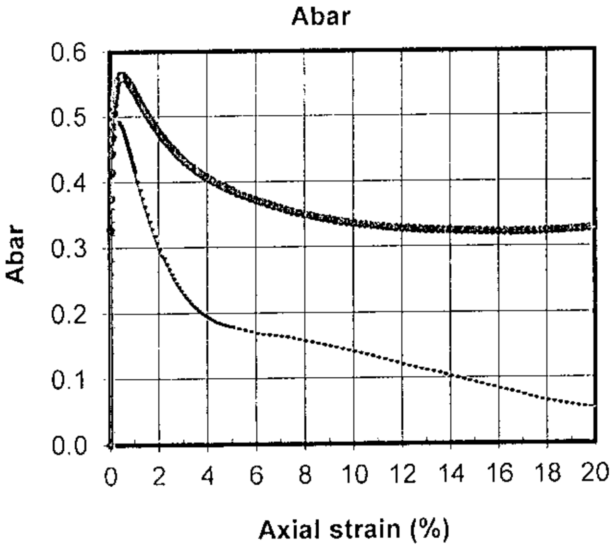
Deviator Stress



Pore Water Pressure



Sigma 1/Sigma 3 Ratio



Abar

Failure Criteria Maximum Effective σ1 / σ3 ratio

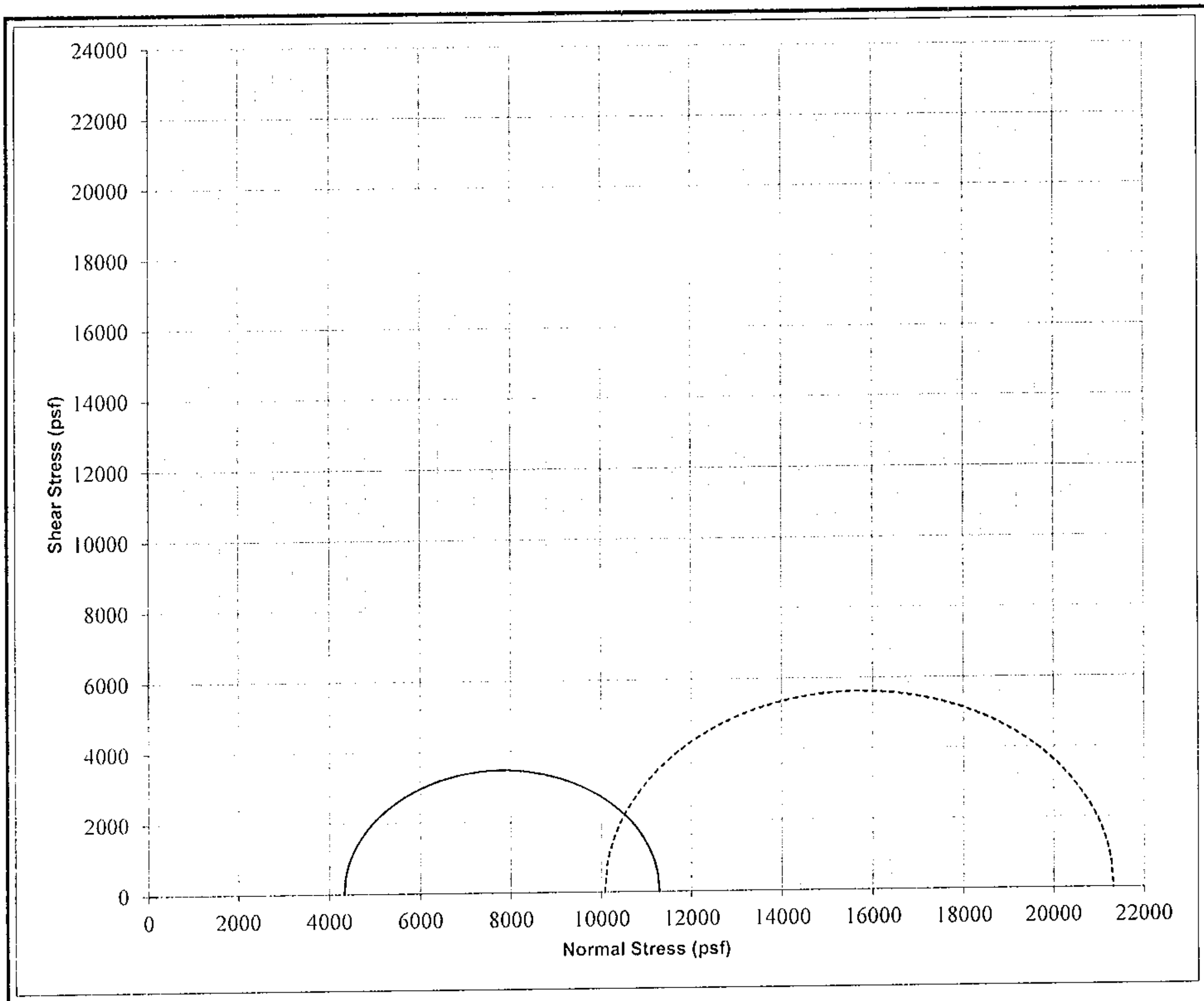
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6969	2.20	6.10	2.86	24.17	128.4	103.4	0.630	103.6	2.70	0.02	39	19	2.1
dot	10080	11250	4.80	6.10	2.86	22.17	128.8	105.5	0.598	100.1	2.70	0.02	39	19	2.1

Client:	**Mott MacDonald**	Boring #: **BH-152**	Sample #: **49**
Project:	**BSVII**	Depth (ft): **135**	
Project #:	**507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

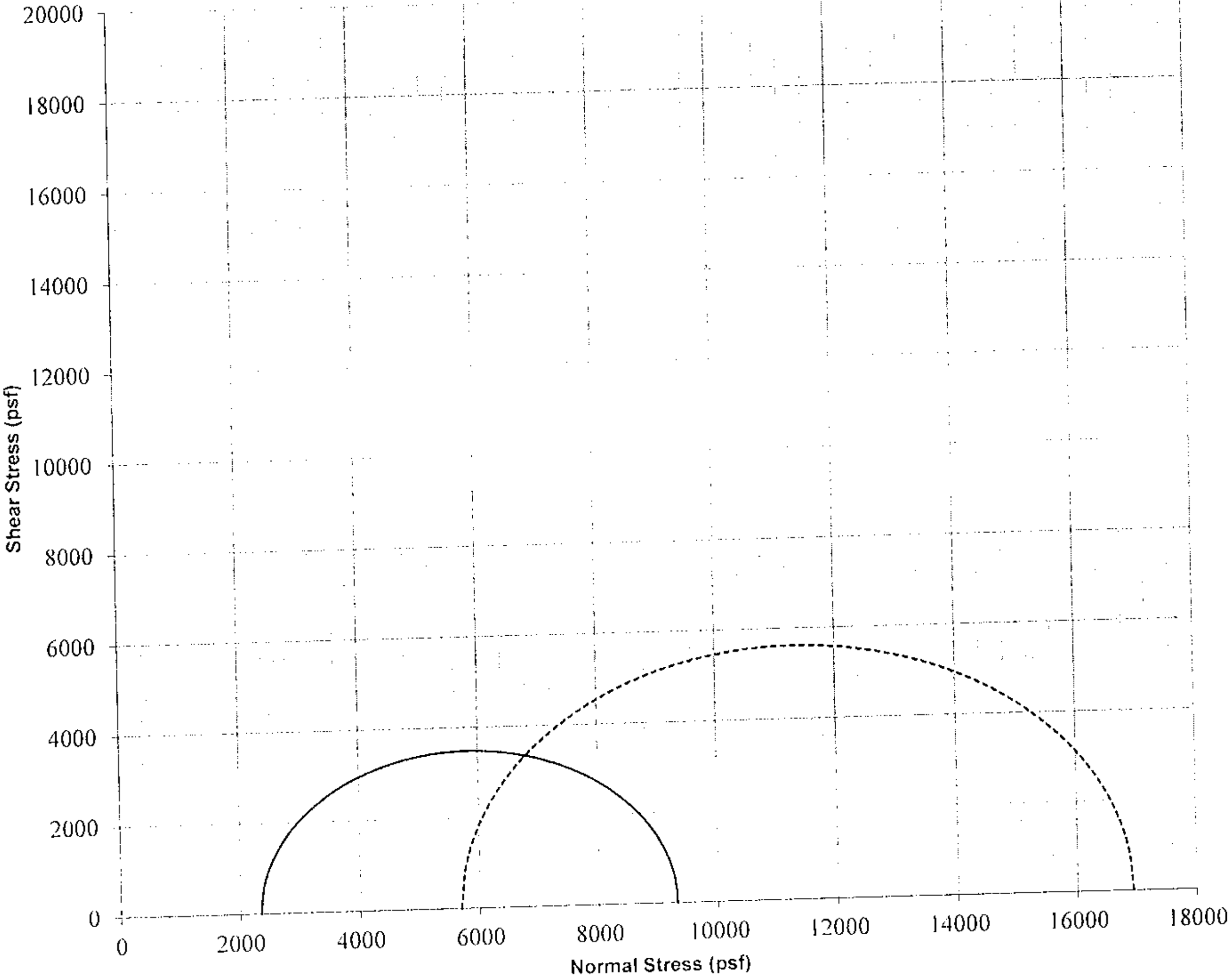
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6969	2.20	6.10	2.86	24.17	128.4	103.4	0.630	103.6	2.70	0.02	39	19	2.1
dot	10080	11250	4.80	6.10	2.86	22.17	128.8	105.5	0.598	100.1	2.70	0.02	39	19	2.1

Client:	**Mott MacDonald**	Boring #: **BH-152**	Sample #: **49**
Project:	**BSVII**	Depth (ft): **135**	
Project #:	**507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

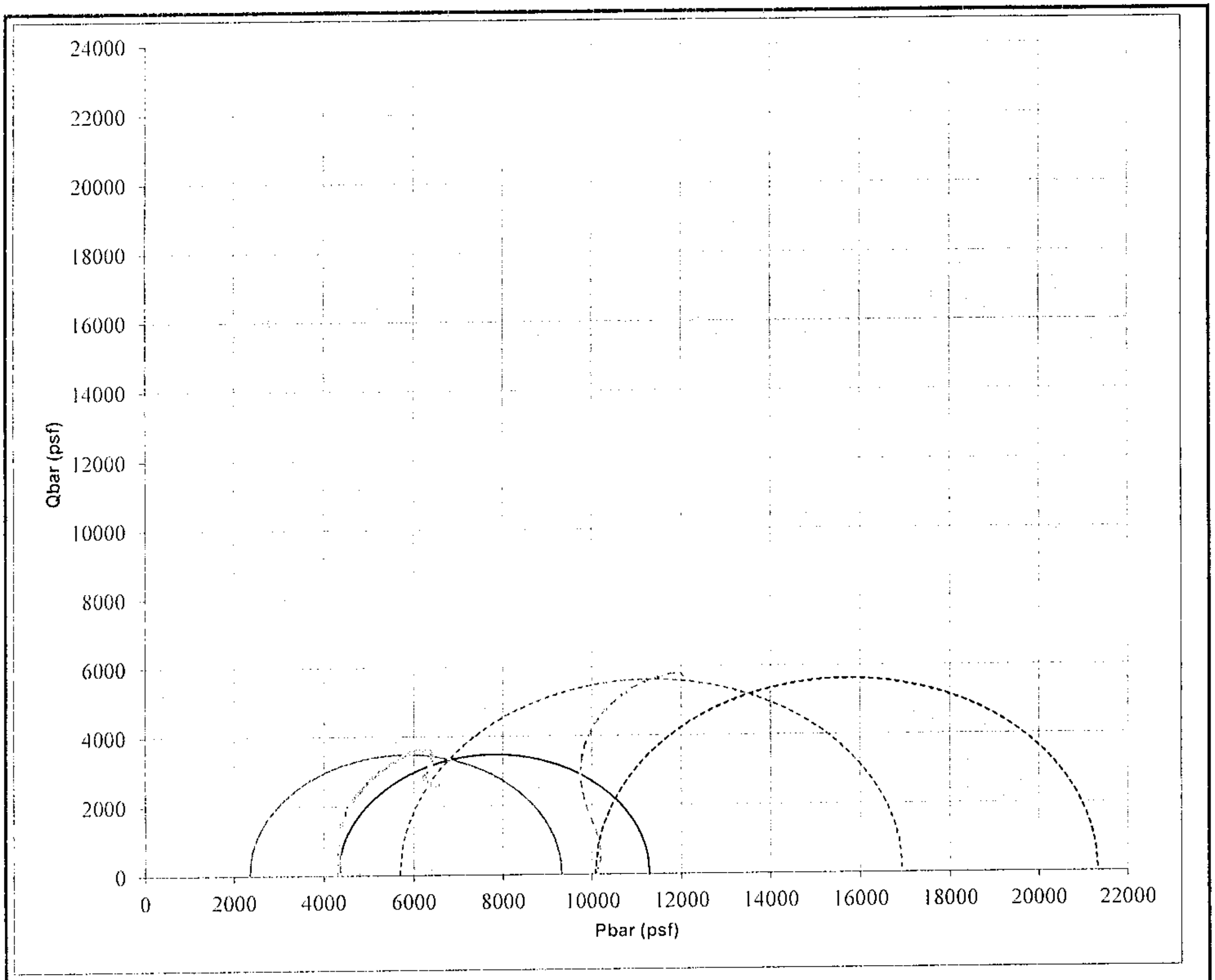
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6969	2.20	6.10	2.86	24.17	128.4	103.4	0.630	103.6	2.70	0.02	39	19	2.1
dot	10080	11250	4.80	6.10	2.86	22.17	128.8	105.5	0.598	100.1	2.70	0.02	39	19	2.1

Client:	**Mott MacDonald**	Boring #: **BH-152**	Sample #: **49**
Project:	**BSVII**	Depth (ft): **135**	
Project #:	**507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6969	2.20	6.10	2.86	24.17	128.4	103.4	0.630	103.6	2.70	0.02	39	19	2.1
dot	10080	11250	4.80	6.10	2.86	22.17	128.8	105.5	0.598	100.1	2.70	0.02	39	19	2.1

Client:	**Mott MacDonald**	Boring #: **BH-152**	Sample #: **49**
Project:	**BSVII**	Depth (ft): **135**	
Project #:	**507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________

Boring Number	BH-153				BH-153	
Sample Number	18				18	
Depth (ft)	82				82	
Date Tested	01/16/20				01/22/20	
Description	Greenish gray sandy clay				Greenish gray sandy clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.93	5.85			5.95	5.83
Diameter (in)	2.86	2.83			2.86	2.81
Height/Diameter Ratio	2.07				2.08	
Total Weight (g)	1230.81	1217.36			1275.68	1248.19
Moisture Content (%)	23.84	22.48			21.64	19.02
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	123.08	125.70			127.19	131.22
Dry Density (pcf)	99.39	102.63			104.56	110.25
Area (cm^2)	41.45	40.67			41.45	40.07
Total Volume (cc)	624.28	604.58			626.12	593.82
Void Ratio	0.6959	0.6424			0.6120	0.5288
Saturation (%)	92.5	94.5			95.5	97.1
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.98	
Total Back Pressure (psf)	5760				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	9.00				8.76	
Effective Consolidation Stress (psf)	2880				8640	
Major Effective Stress at Failure (psf) σ1	5521				13000	
Minor Effective Stress at Failure (psf) σ3	1520				3500	
Deviator Stress at Failure (psf)	4001				9500	
Pore Pressure at Failure (psf)	1360				5140	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	31				31	
Plastic Limit	22				22	
Remarks						

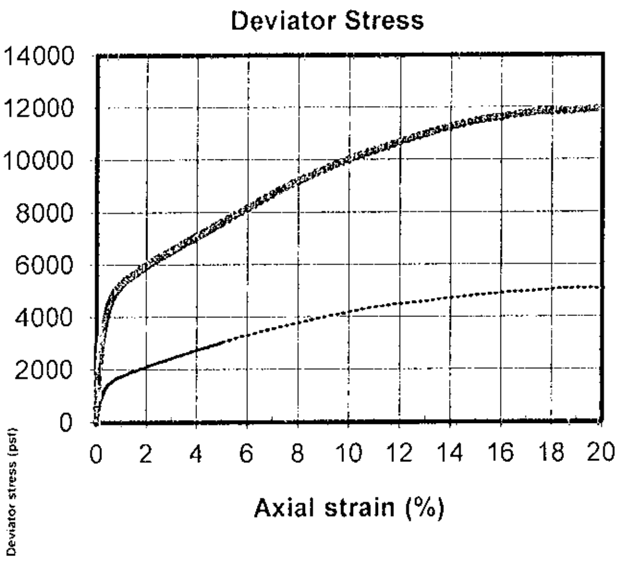
The following information is the same for all samples

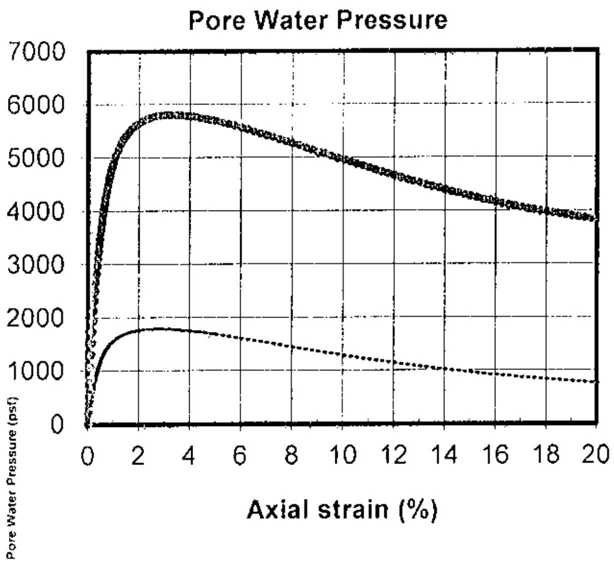
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

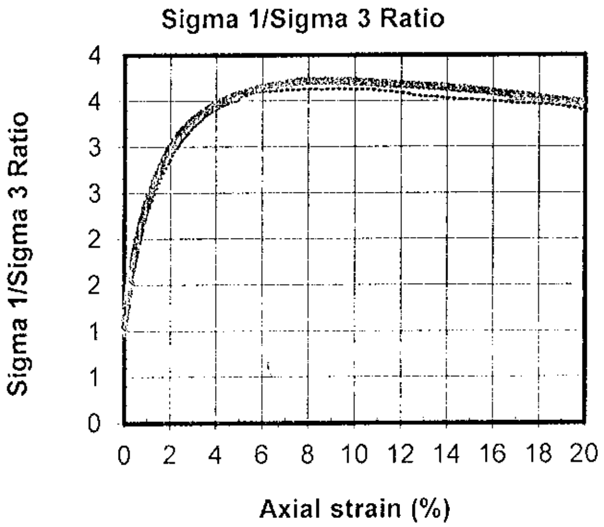
Client: **Mott MacDonald**	Boring #: **BH-153**	Sample #: **18**
Project: **BSVII**	Depth (ft): **82**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

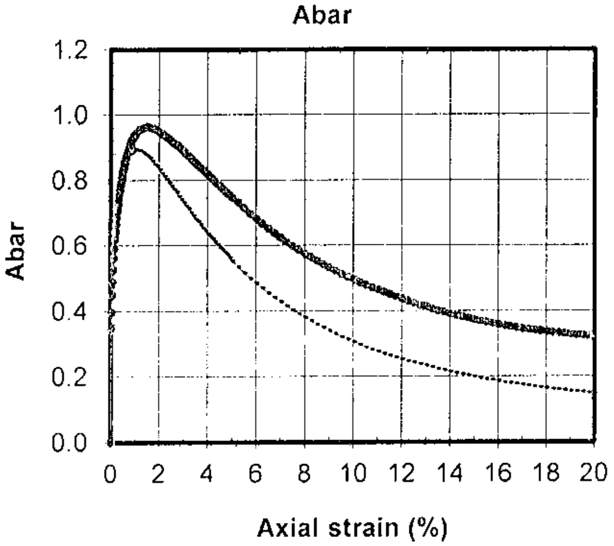
ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC. PLATE NUMBER ________


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio


Abar

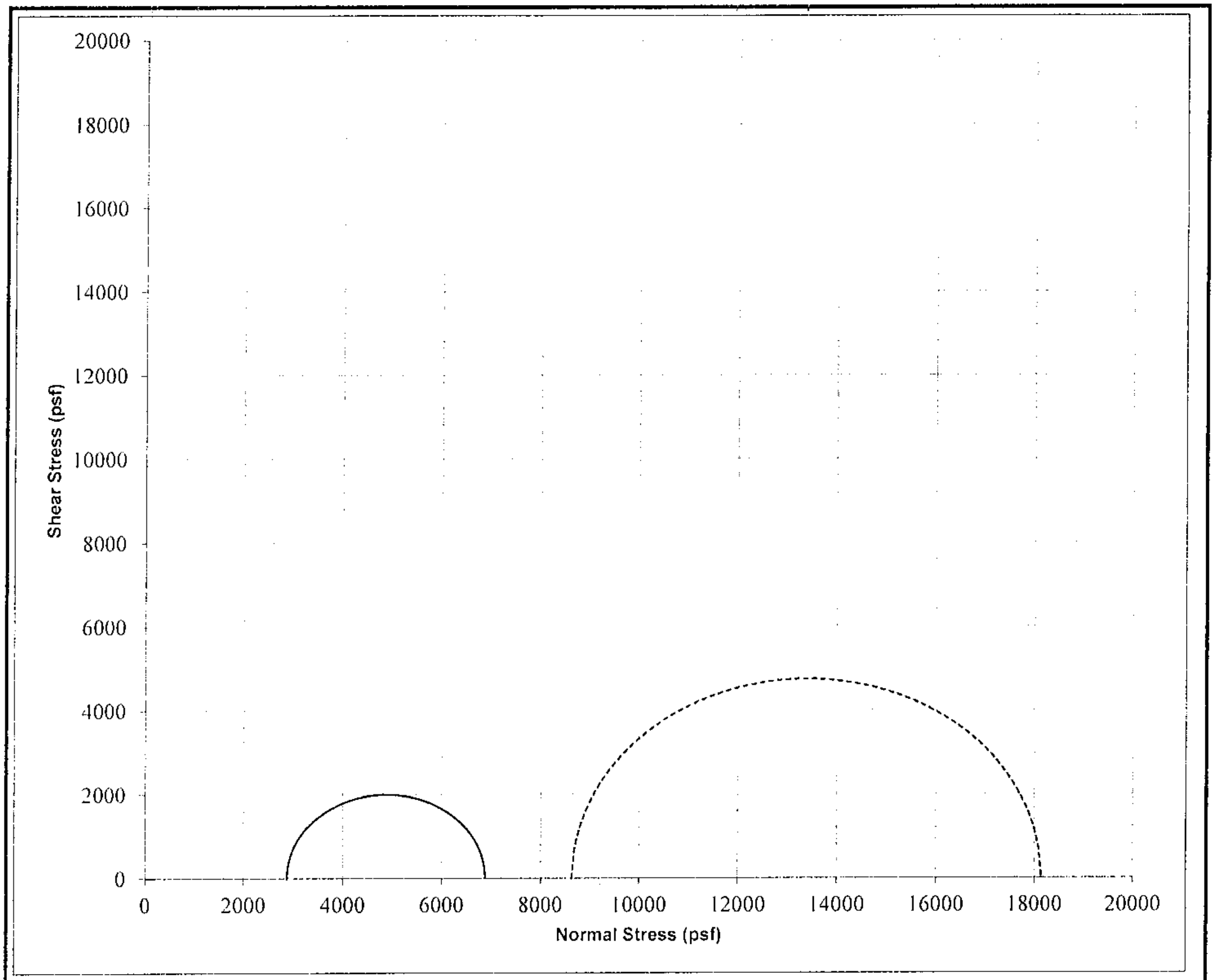
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4001	9.00	5.93	2.86	23.84	123.1	99.4	0.696	92.5	2.70	0.02	31	22	2.1
dot	8640	9500	8.76	5.95	2.86	21.64	127.2	104.6	0.612	95.5	2.70	0.02	31	22	2.1

Client:	**Mott MacDonald**	Boring #: **BH-153**	Sample #: **18**
Project:	**BSVII**	Depth (ft): **82**	
Project #:	**507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

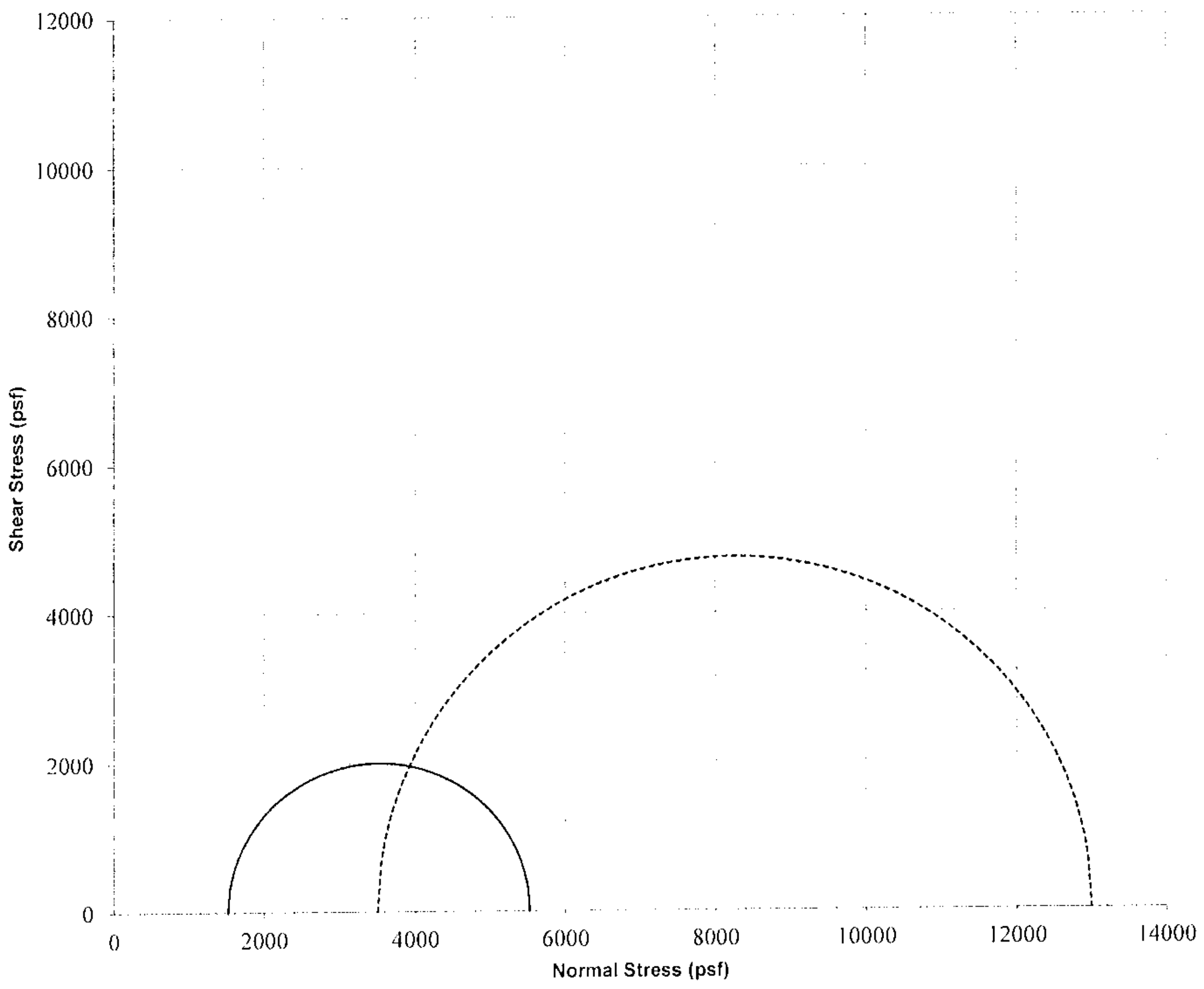
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4001	9.00	5.93	2.86	23.84	123.1	99.4	0.696	92.5	2.70	0.02	31	22	2.1
dot	8640	9500	8.76	5.95	2.86	21.64	127.2	104.6	0.612	95.5	2.70	0.02	31	22	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-153**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**82**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER_________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

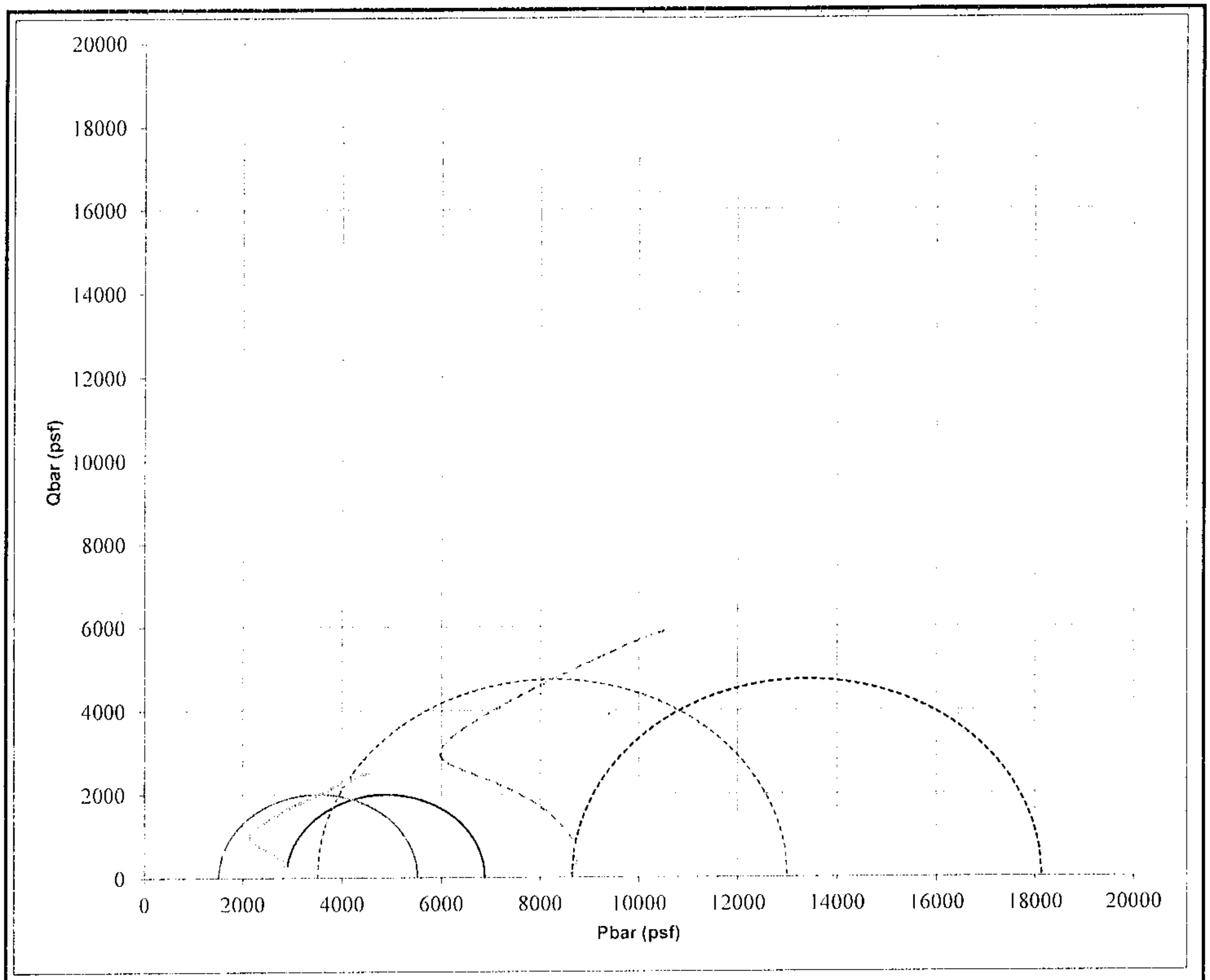
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4001	9.00	5.93	2.86	23.84	123.1	99.4	0.696	92.5	2.70	0.02	31	22	2.1
dot	8640	9500	8.76	5.95	2.86	21.64	127.2	104.6	0.612	95.5	2.70	0.02	31	22	2.1

Client:	**Mott MacDonald**	Boring #: **BH-153**	Sample #: **18**
Project:	**BSVII**	Depth (ft): **82**	
Project #:	**507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4001	9.00	5.93	2.86	23.84	123.1	99.4	0.696	92.5	2.70	0.02	31	22	2.1
dot	8640	9500	8.76	5.95	2.86	21.64	127.2	104.6	0.612	95.5	2.70	0.02	31	22	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-153**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**82**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

Boring Number	BH-155				BH-155	
Sample Number	19				19	
Depth (ft)	88				88	
Date Tested	01/17/20				01/20/20	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	After Consolidation	Initial	After Consolidation	Initial	After Consolidation
Height (in)	5.84	5.80			5.98	5.88
Diameter (in)	2.86	2.82			2.86	2.80
Height/Diameter Ratio	2.04				2.09	
Total Weight (g)	1182.87	1188.87			1240.52	1229.75
Moisture Content (%)	29.72	30.38			26.62	25.52
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	120.06	124.60			123.01	129.65
Dry Density (pcf)	92.55	95.57			97.15	103.29
Area (cm^2)	41.45	40.40			41.45	39.68
Total Volume (cc)	615.07	595.67			629.54	592.14
Void Ratio	0.8165	0.7592			0.7304	0.6276
Saturation (%)	98.0	107.8			98.1	109.5
Specific Gravity	2.69				2.69	
Specific Gravity From	ASTM D-854				ASTM D-854	
B value Before Consolidation	0.98				0.98	
Total Back Pressure (psf)	5760				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.40				6.01	
Effective Consolidation Stress (psf)	2880				8640	
Major Effective Stress at Failure (psf) $\sigma 1$	5606				13932	
Minor Effective Stress at Failure (psf) $\sigma 3$	1665				4640	
Deviator Stress at Failure (psf)	3941				9293	
Pore Pressure at Failure (psf)	1215				4000	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	51				51	
Plastic Limit	23				23	
Remarks						

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective $\sigma 1$ / $\sigma 3$ ratio

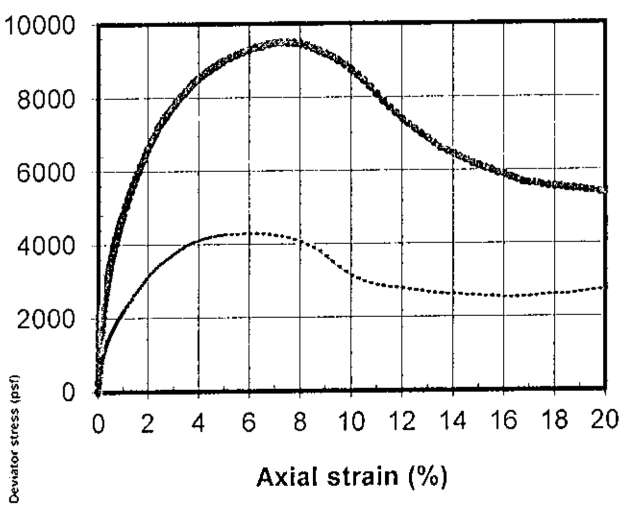
Client: **Mott MacDonald**	Boring #: **BH-155**	Sample #: **19**
Project: **BSVII**	Depth (ft): **88**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

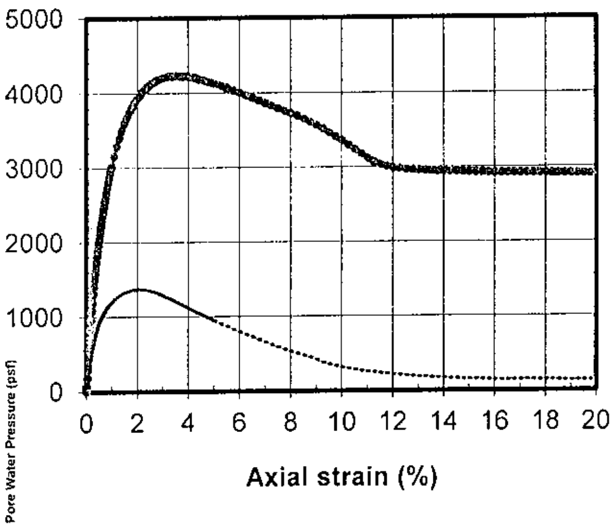
INSPECTION SERVICES INC.

PLATE NUMBER ________

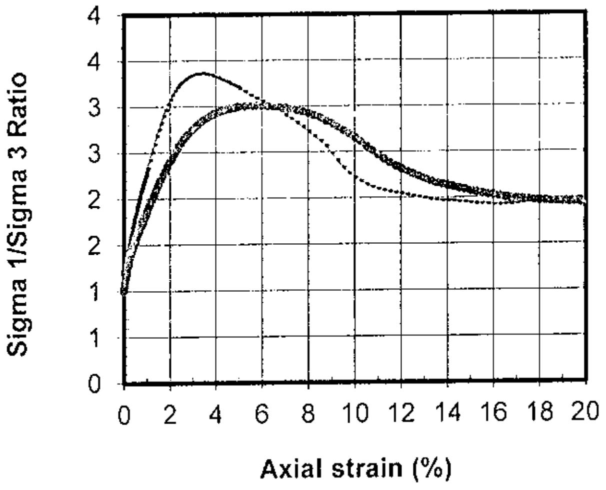
Deviator Stress



Pore Water Pressure



Sigma 1/Sigma 3 Ratio



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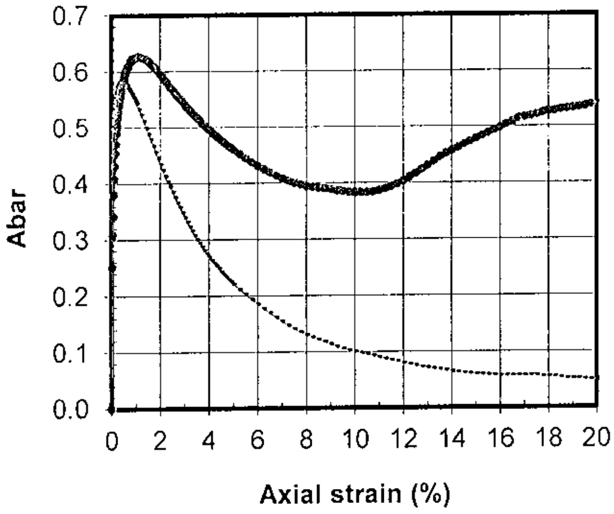
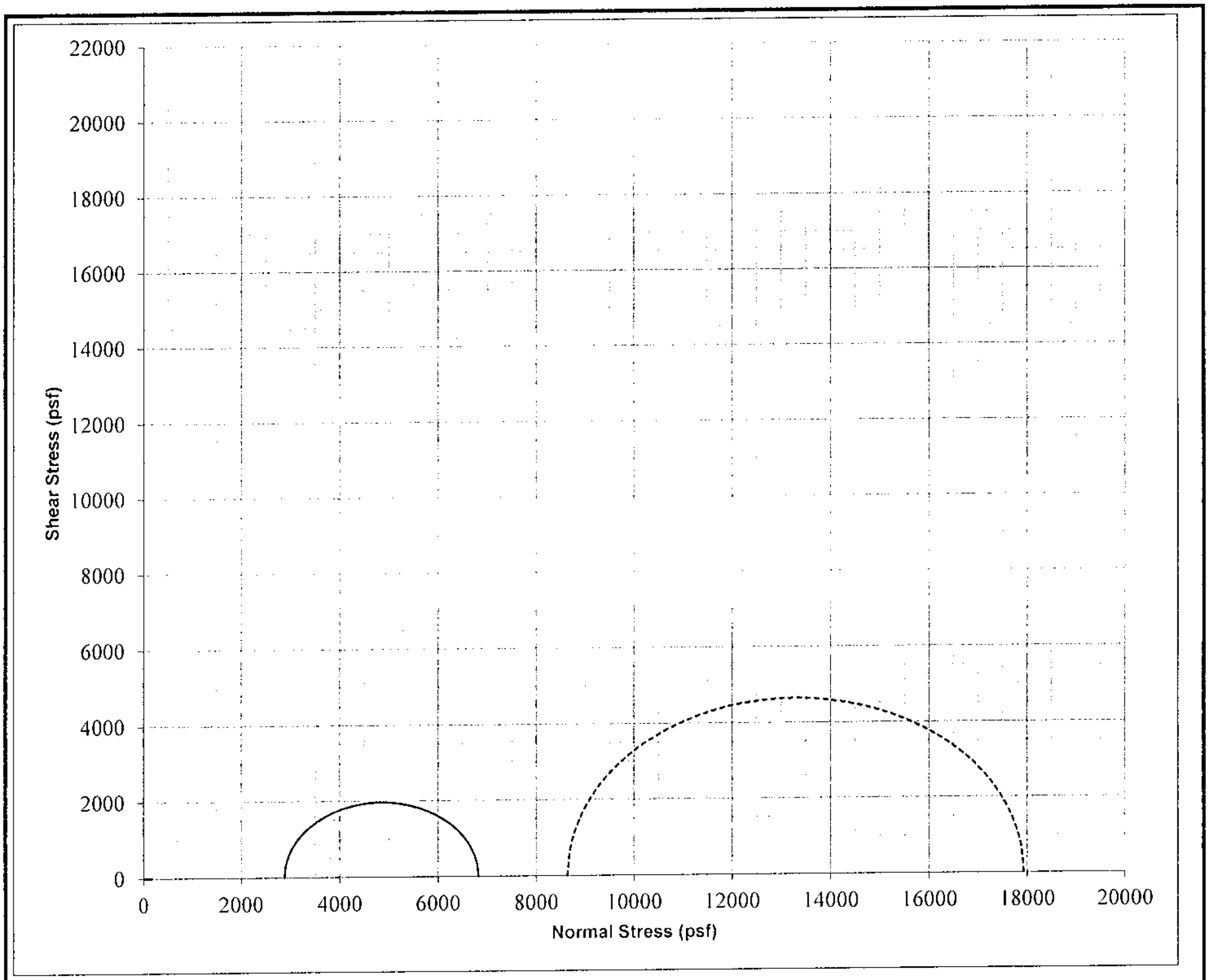


Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	3941	3.40	5.84	2.86	29.72	120.1	92.6	0.816	98.0	2.69	0.02	51	23	2.0
dot	8640	9293	6.01	5.98	2.86	26.62	123.0	97.2	0.730	98.1	2.69	0.02	51	23	2.1

Client: Mott MacDonald		Boring #: BH-155	Sample #: 19
Project: BSVII		Depth (ft): 88	
Project #: 507385606		Soil: Greenish gray clay	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



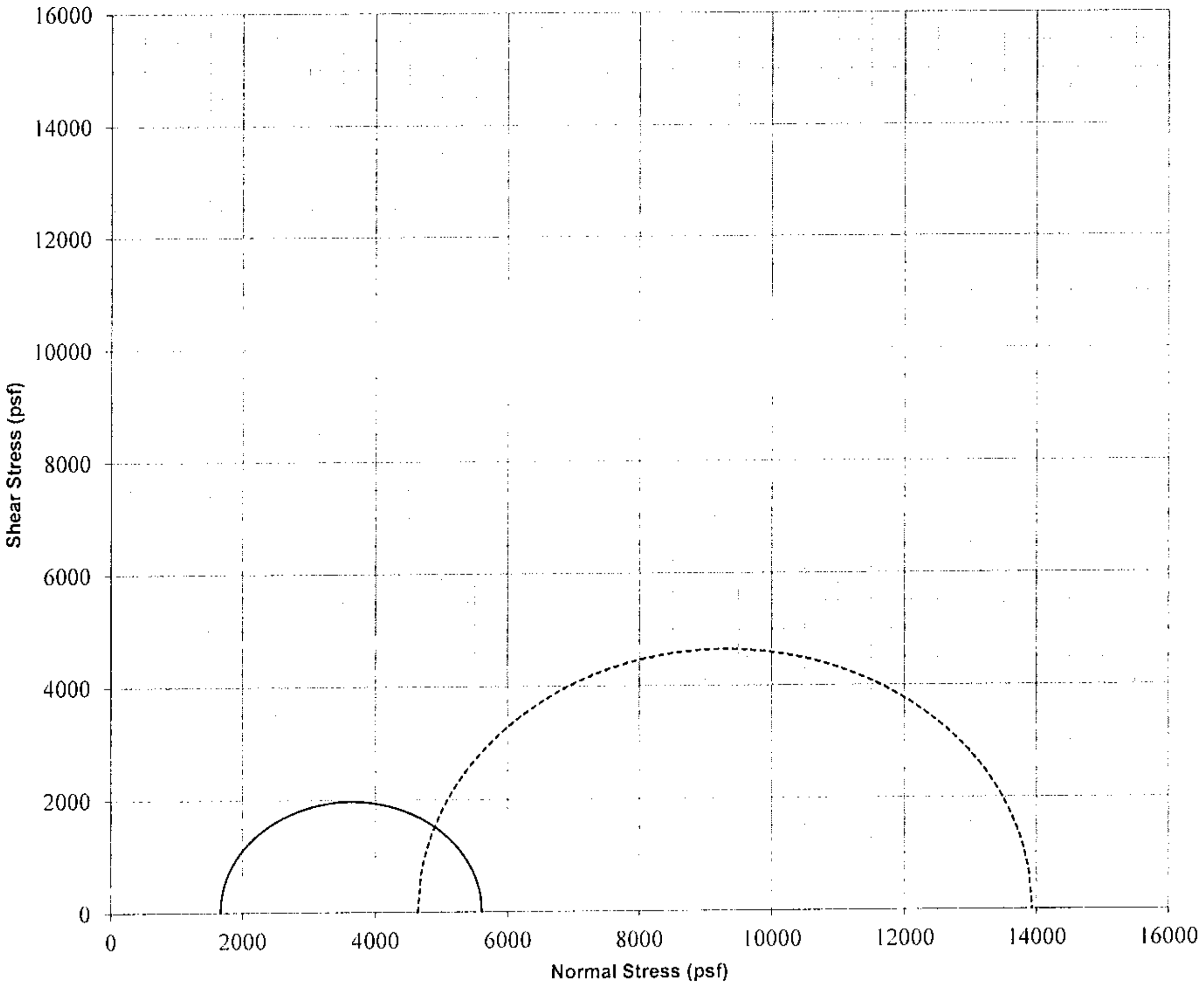
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective $\sigma 1$ / $\sigma 3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	3941	3.40	5.84	2.86	29.72	120.1	92.6	0.816	98.0	2.69	0.02	51	23	2.0
dot	8640	9293	6.01	5.98	2.86	26.62	123.0	97.2	0.730	98.1	2.69	0.02	51	23	2.1

Client: **Mott MacDonald**	Boring #: **BH-155**	Sample #: **19**	
Project: **BSVII**	Depth (ft): **88**		
Project #: **507385606**	Soil: **Greenish gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	3941	3.40	5.84	2.86	29.72	120.1	92.6	0.816	98.0	2.69	0.02	51	23	2.0
dot	8640	9293	6.01	5.98	2.86	26.62	123.0	97.2	0.730	98.1	2.69	0.02	51	23	2.1

Client: **Mott MacDonald**

Boring #: **BH-155**

Sample #: **19**

Project: **BSVII**

Depth (ft): **88**

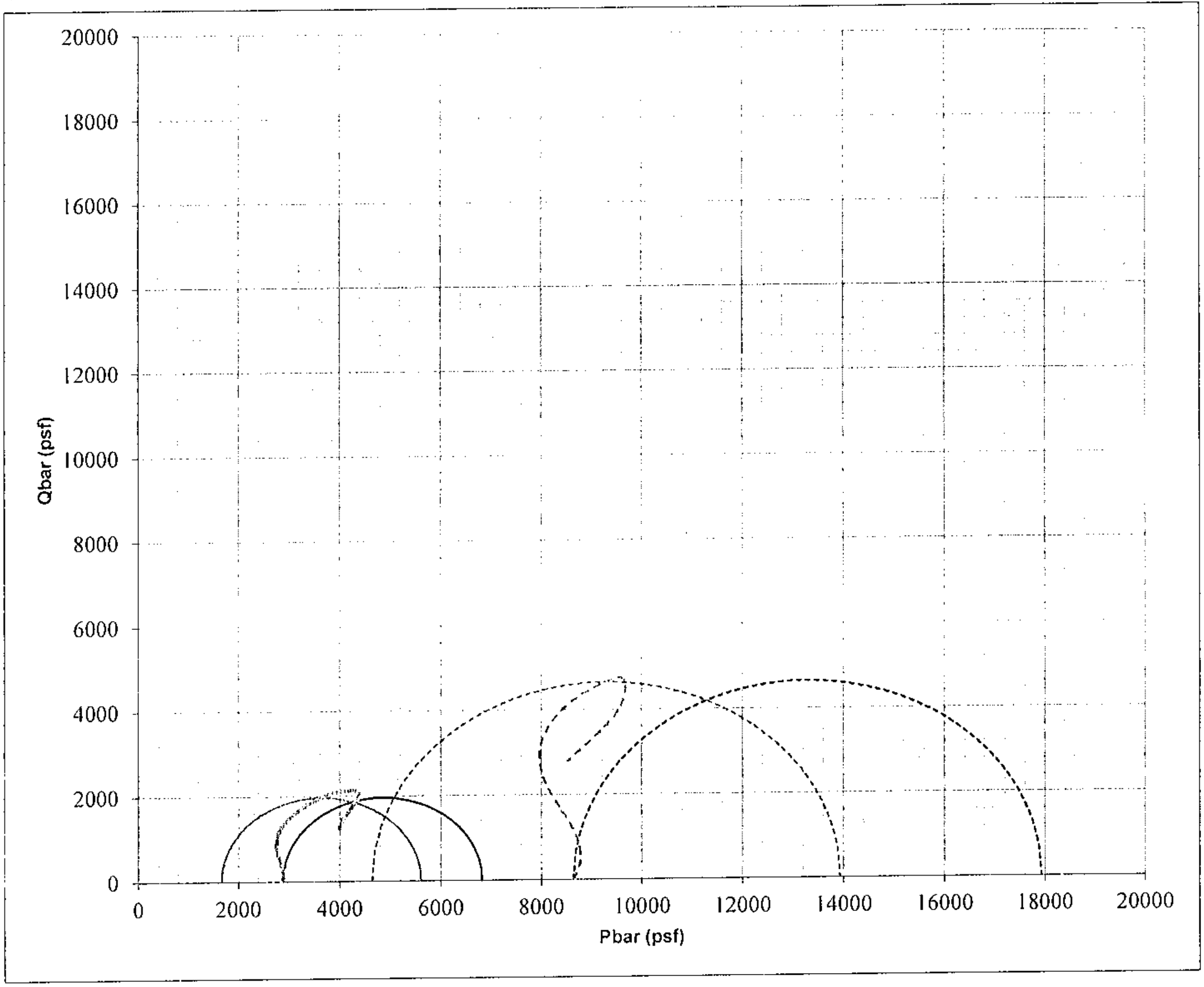
Project #: **507385606**

Soil: **Greenish gray clay**

ASTM
D-4767

TRIAXIAL COMPRESSION
CONSOLIDATED-UNDRAINED

TXCU



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	3941	3.40	5.84	2.86	29.72	120.1	92.6	0.816	98.0	2.69	0.02	51	23	2.0
dot	8640	9293	6.01	5.98	2.86	26.62	123.0	97.2	0.730	98.1	2.69	0.02	51	23	2.1

Client: **Mott MacDonald**	Boring #: **BH-155**	Sample #: **19**	
Project: **BSVII**	Depth (ft): **88**		
Project #: **507385606**	Soil: **Greenish gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________

Boring Number	BH-155				BH-155	
Sample Number	49				49	
Depth (ft)	150				150	
Date Tested	02/07/20				02/12/20	
Description	Grayish brown clay with sand				Grayish brown clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.98	5.92			5.97	5.82
Diameter (in)	2.86	2.83			2.86	2.81
Height/Diameter Ratio	2.09				2.09	
Total Weight (g)	1296.42	1293.64			1296.89	1272.10
Moisture Content (%)	19.96	19.70			20.33	18.03
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	128.56	132.40			128.82	134.17
Dry Density (pcf)	107.17	110.61			107.06	113.68
Area (cm^2)	41.45	40.58			41.45	40.07
Total Volume (cc)	629.54	609.94			628.49	591.89
Void Ratio	0.5728	0.5238			0.5744	0.4827
Saturation (%)	94.1	101.5			95.5	100.8
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	5.75				9.51	
Effective Consolidation Stress (psf)	4320				12960	
Major Effective Stress at Failure (psf) σ1	10123				19730	
Minor Effective Stress at Failure (psf) σ3	2892				5946	
Deviator Stress at Failure (psf)	7231				13784	
Pore Pressure at Failure (psf)	1428				7014	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	35				35	
Plastic Limit	20				20	
Remarks						

The following information is the same for all samples

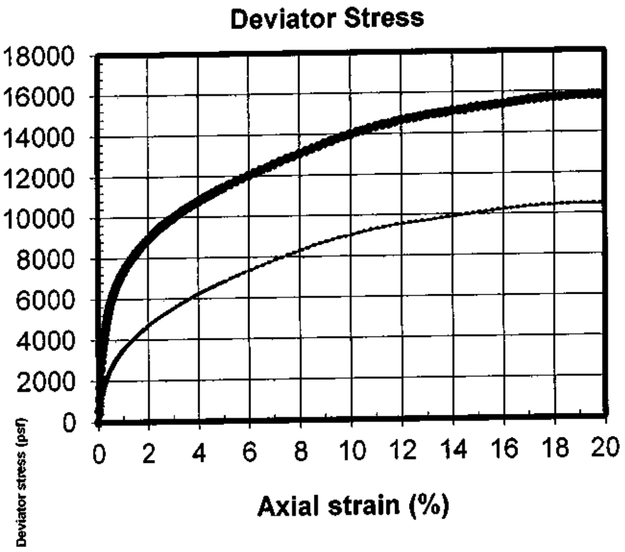
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

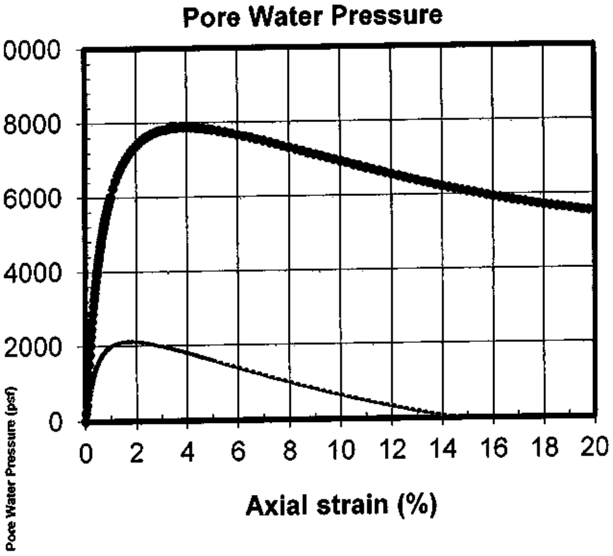
Client: **Mott MacDonald**	Boring #: **BH-155**	Sample #: **49**
Project: **BSVII**	Depth (ft): **150**	
Project #: **507385606**	Soil: **Grayish brown clay with sand**	

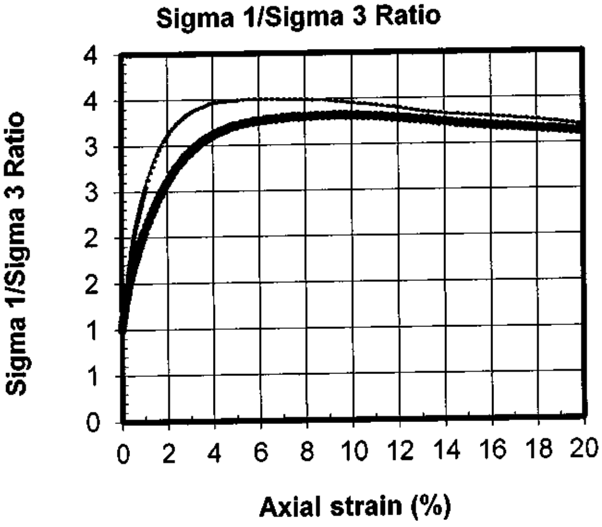
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

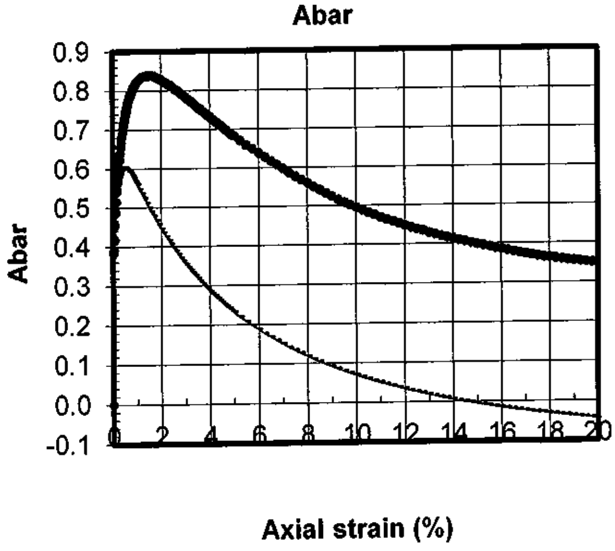
INSPECTION SERVICES INC.

PLATE NUMBER ________









Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7231	5.75	5.98	2.86	19.96	128.6	107.2	0.573	94.1	2.70	0.02	35	20	2.1
dot	12960	13784	9.51	5.97	2.86	20.33	128.8	107.1	0.574	95.5	2.70	0.02	35	20	2.1

Client: **Mott MacDonald**

Boring #: **BH-155** Sample #: **49**

Project: **BSVII**

Depth (ft): **150**

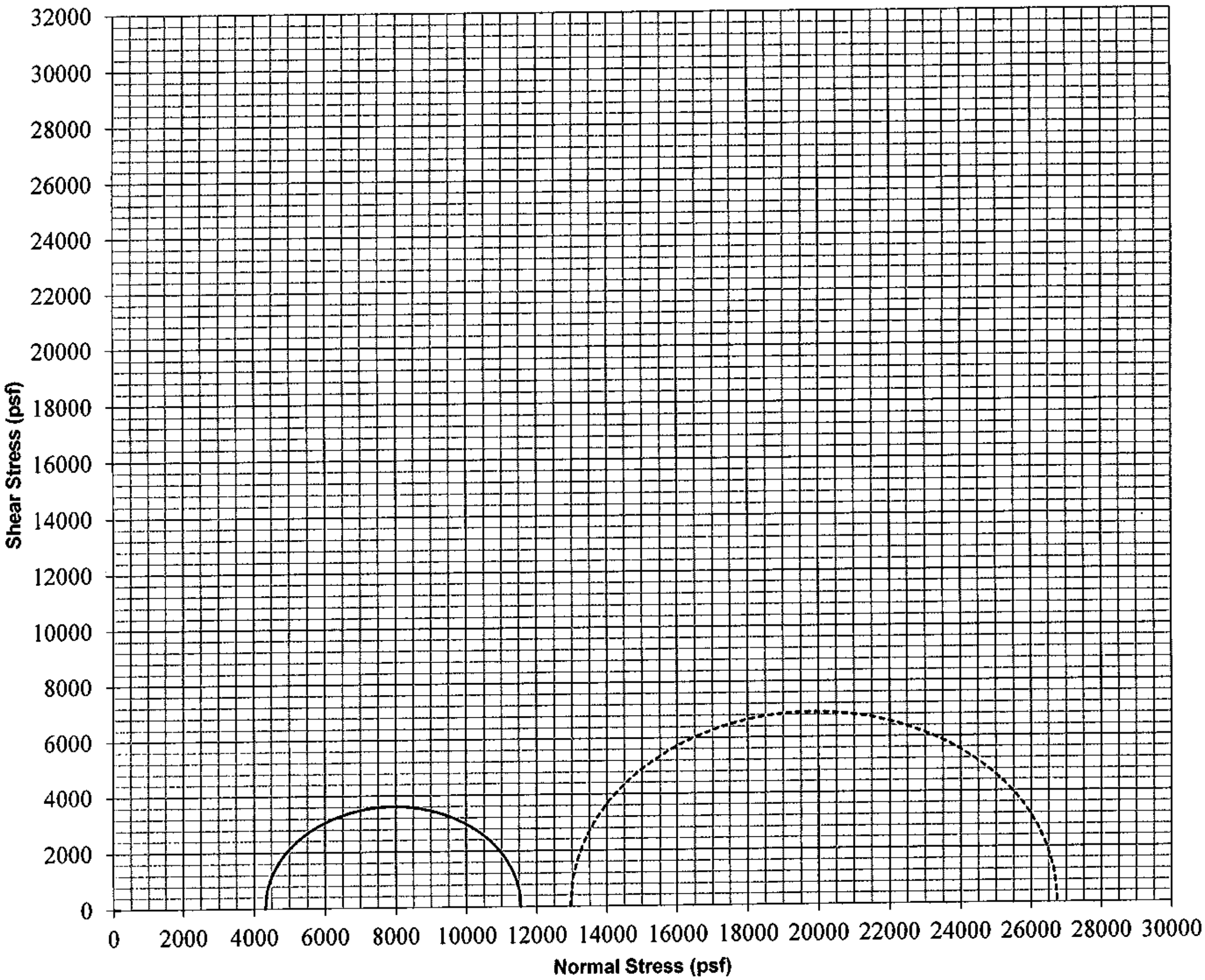
Project #: **507385606**

Soil: **Grayish brown clay with sand**

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

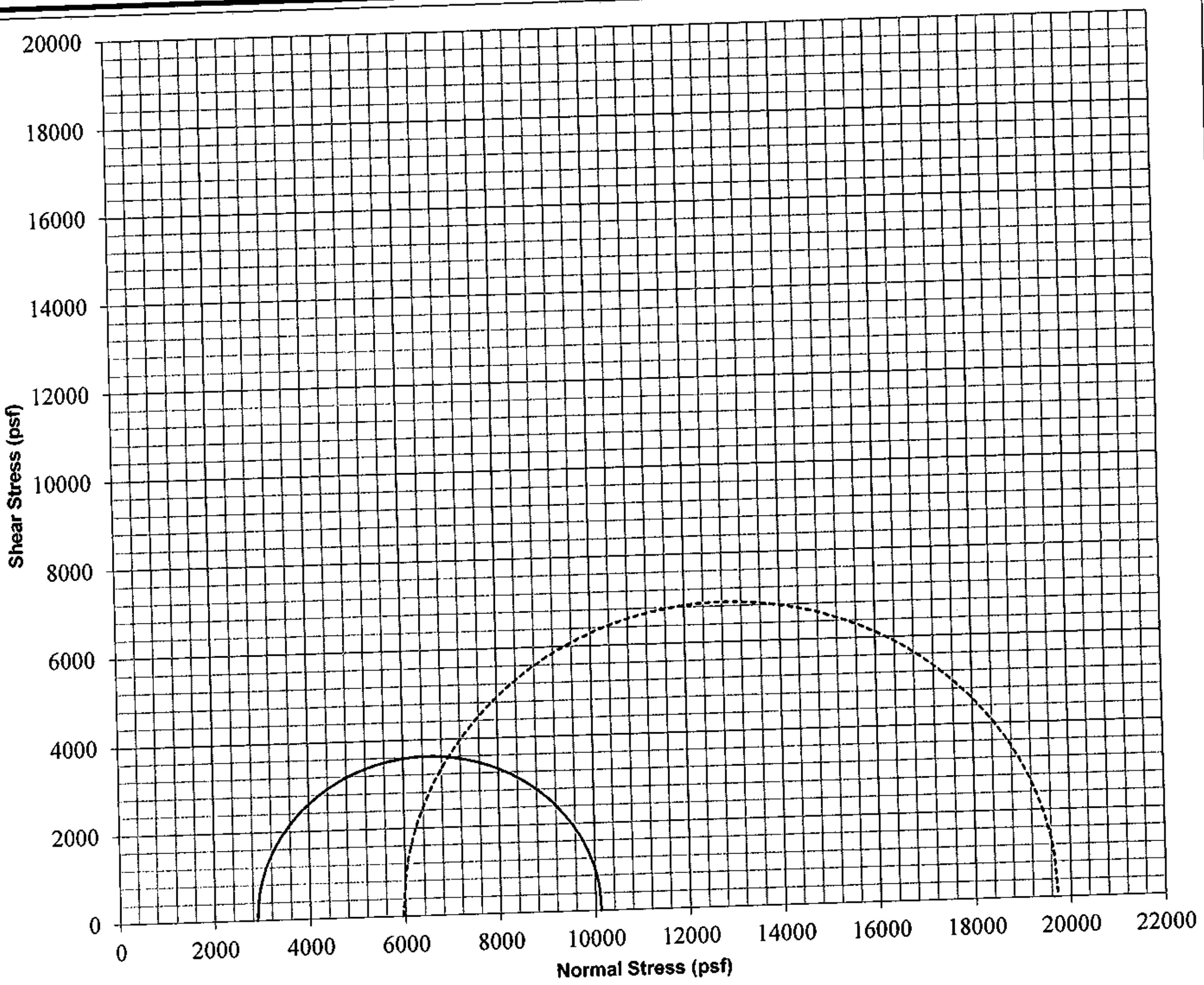
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7231	5.75	5.98	2.86	19.96	128.6	107.2	0.573	94.1	2.70	0.02	35	20	2.1
dot	12960	13784	9.51	5.97	2.86	20.33	128.8	107.1	0.574	95.5	2.70	0.02	35	20	2.1

Client: **Mott MacDonald**	Boring #: **BH-155**	Sample #: **49**	
Project: **BSVII**	Depth (ft): **150**		
Project #: **507385606**	Soil: **Grayish brown clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7231	5.75	5.98	2.86	19.96	128.6	107.2	0.573	94.1	2.70	0.02	35	20	2.1
dot	12960	13784	9.51	5.97	2.86	20.33	128.8	107.1	0.574	95.5	2.70	0.02	35	20	2.1

Client: **Mott MacDonald**

Boring #: **BH-155**

Sample #: **49**

Project: **BSVII**

Depth (ft): **150**

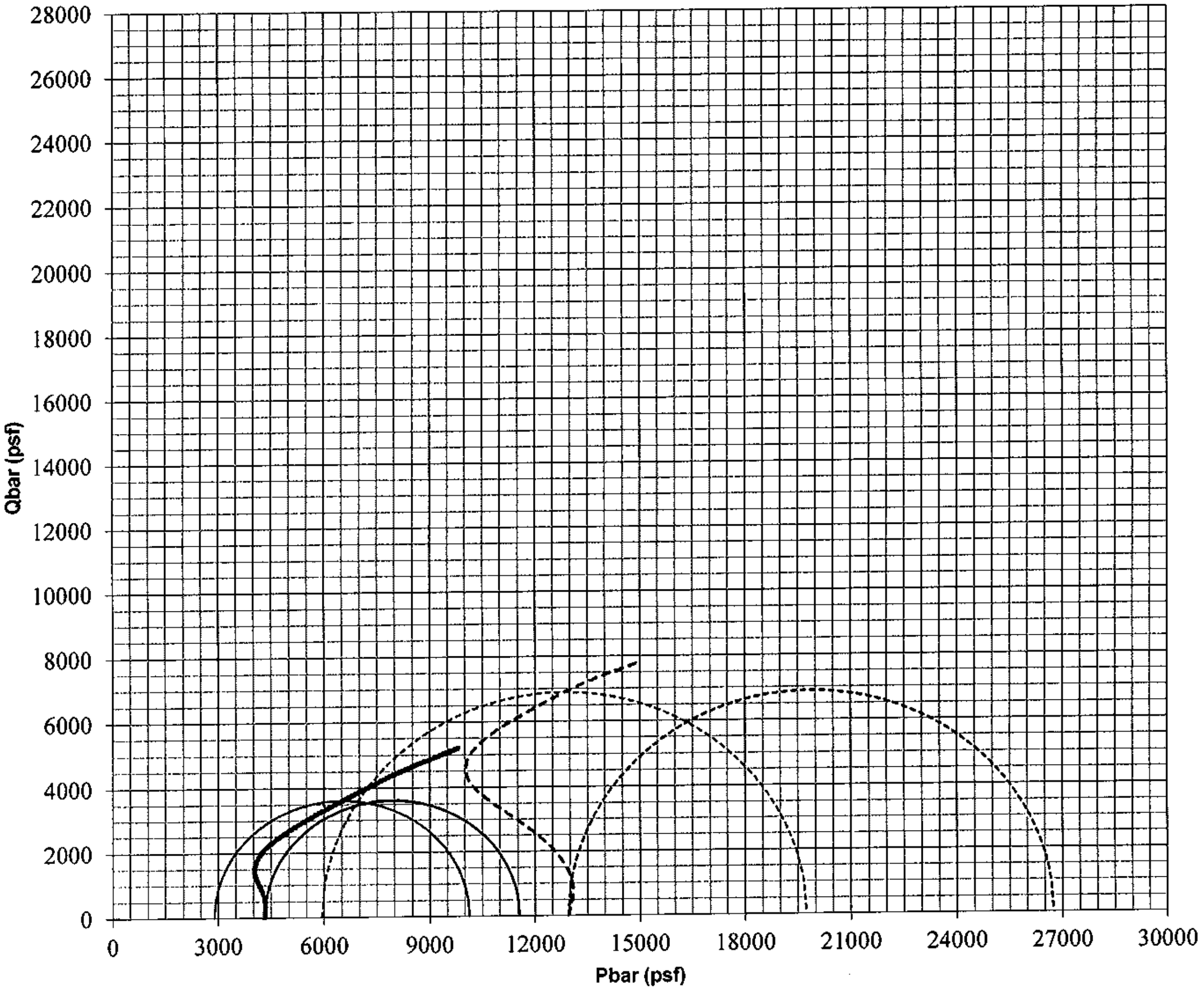
Project #: **507385606**

Soil: **Grayish brown clay with sand**

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

PLATE NUMBER________

INSPECTION SERVICES INC.



PQ MOHR GRAPHS

Failure Criteria Maximum Effective $\sigma 1$ / $\sigma 3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7231	5.75	5.98	2.86	19.96	128.6	107.2	0.573	94.1	2.70	0.02	35	20	2.1
dot	12960	13784	9.51	5.97	2.86	20.33	128.8	107.1	0.574	95.5	2.70	0.02	35	20	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-155**	Sample #:	**49**
Project:	**BSVII**	Depth (ft):	**150**		
Project #:	**507385606**	Soil:	**Grayish brown clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

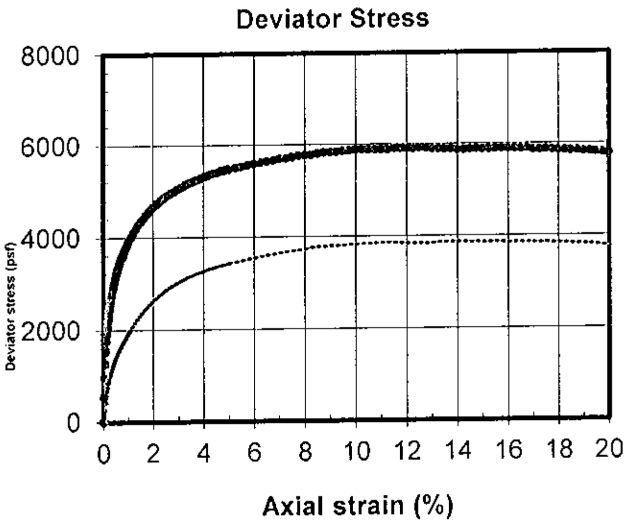
Boring Number	BH-156				BH-156	
Sample Number	1				1	
Depth (ft)	65				65	
Date Tested	11/22/19				11/25/19	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	6.00	5.94			6.00	5.87
Diameter (in)	2.86	2.84			2.86	2.82
Height/Diameter Ratio	2.10				2.10	
Total Weight (g)	1258.44	1248.18			1266.92	1241.70
Moisture Content (%)	27.26	26.22			25.31	22.81
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	124.37	126.26			125.21	129.27
Dry Density (pcf)	97.73	100.03			99.92	105.26
Area (cm^2)	41.45	40.92			41.45	40.20
Total Volume (cc)	631.65	617.15			631.65	599.65
Void Ratio	0.7246	0.6850			0.6868	0.6013
Saturation (%)	101.6	103.4			99.5	102.4
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.96	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.30				5.75	
Effective Consolidation Stress (psf)	2160				5760	
Major Effective Stress at Failure (psf) σ1	4258				7952	
Minor Effective Stress at Failure (psf) σ3	1128				2391	
Deviator Stress at Failure (psf)	3130				5561	
Pore Pressure at Failure (psf)	1032				3369	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	39				39	
Plastic Limit	20				20	
Remarks						

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-156**	Sample #: **1**
Project: **BSVII**	Depth (ft): **65**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**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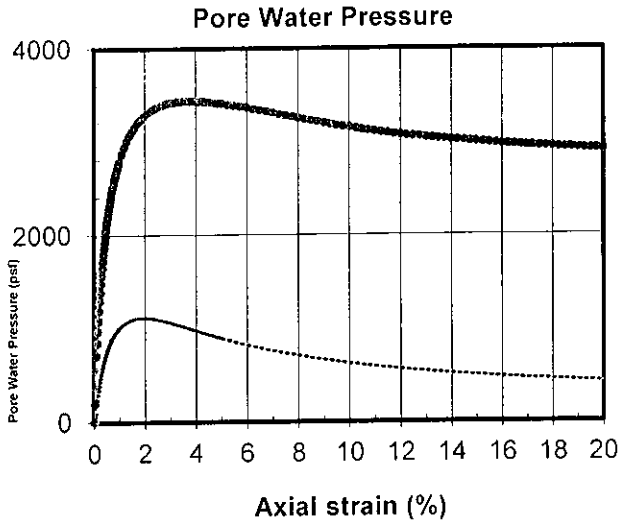
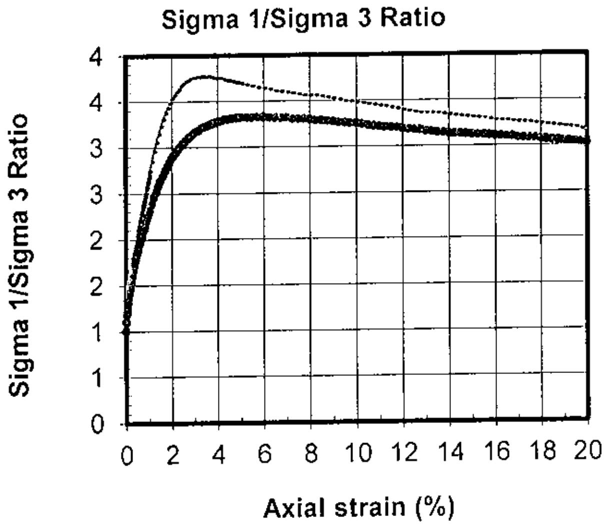
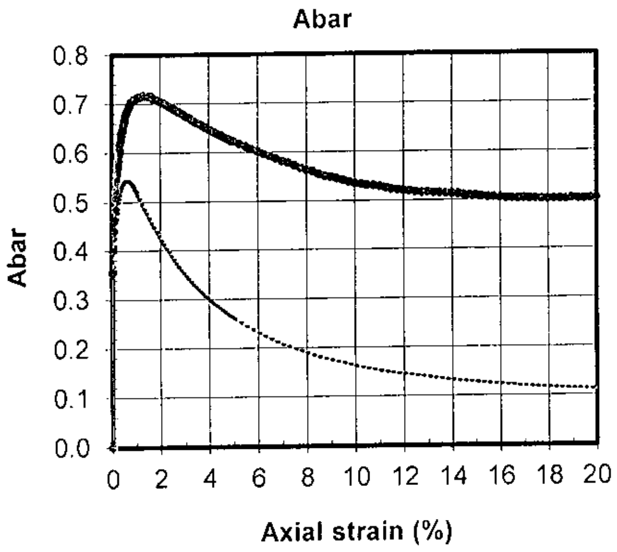

Pore Water Pressure


Sigma 1/Sigma 3 Ratio


Abar

Failure Criteria Maximum Effective σ1 / σ3 ratio

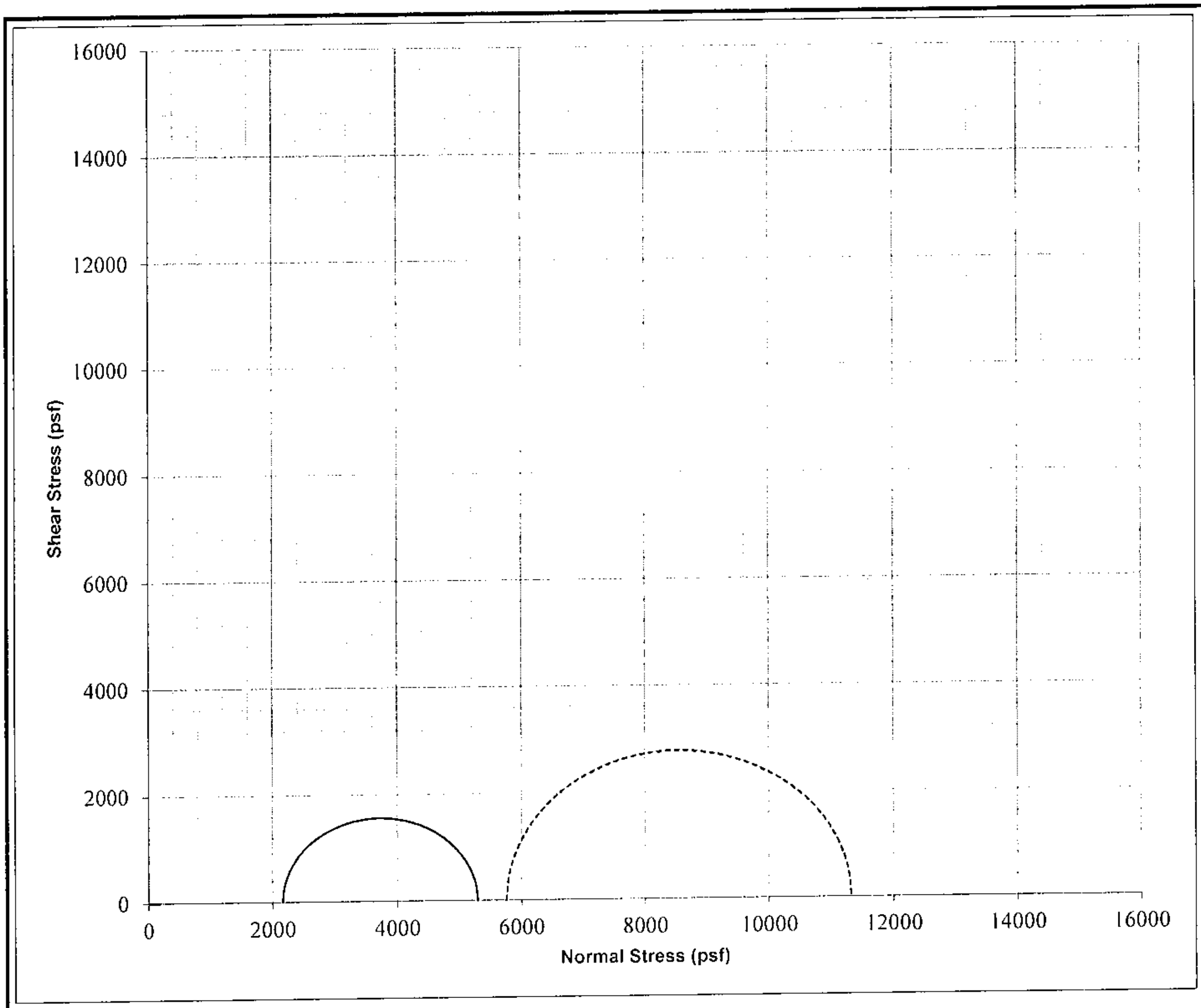
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3130	3.30	6.00	2.86	27.26	124.4	97.7	0.725	101.6	2.70	0.02	39	20	2.1
dot	5760	5561	5.75	6.00	2.86	25.31	125.2	99.9	0.687	99.5	2.70	0.02	39	20	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-156**	Sample #:	**1**
Project:	**BSVII**	Depth (ft):	**65**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER_________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

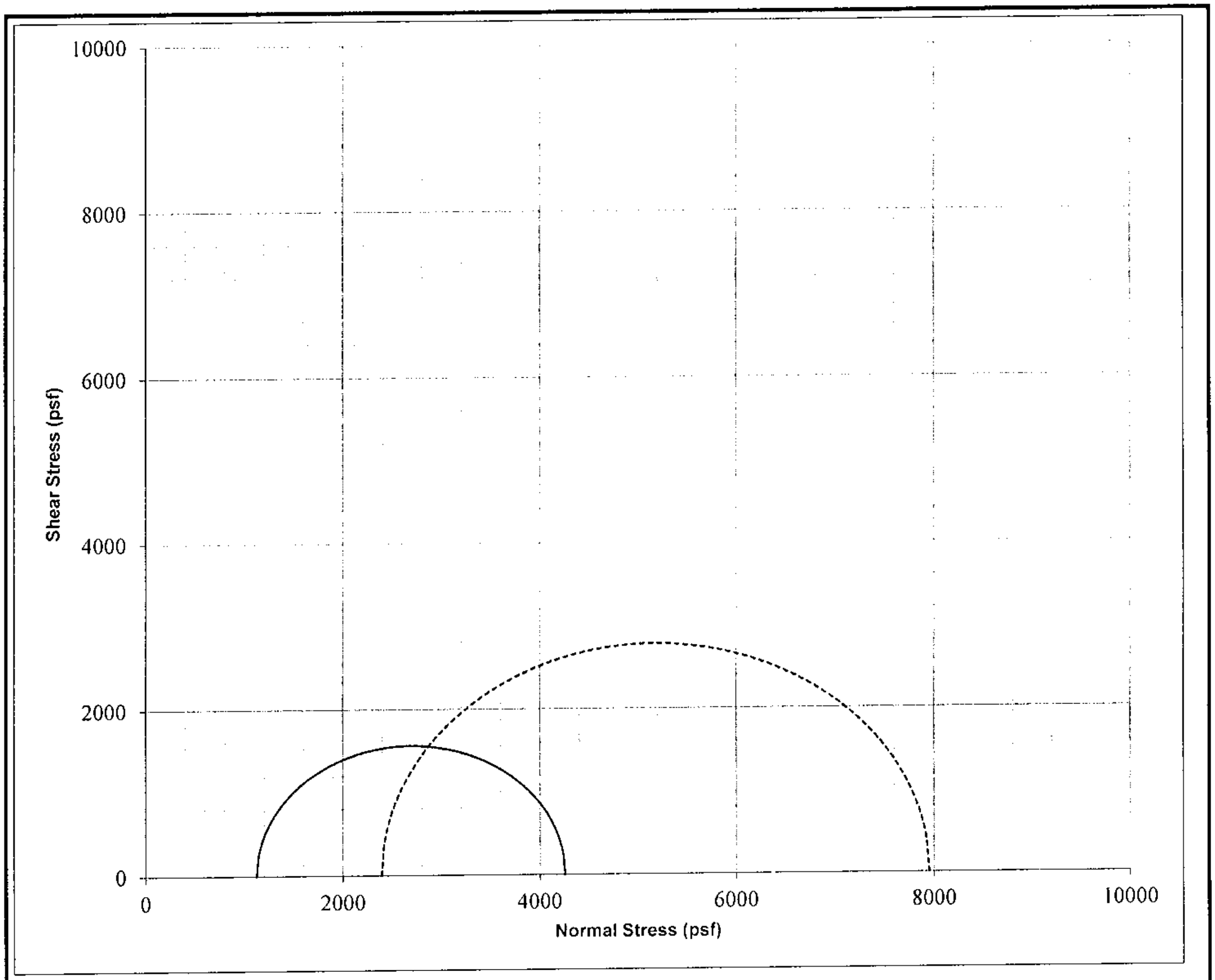
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3130	3.30	6.00	2.86	27.26	124.4	97.7	0.725	101.6	2.70	0.02	39	20	2.1
dot	5760	5561	5.75	6.00	2.86	25.31	125.2	99.9	0.687	99.5	2.70	0.02	39	20	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-156**	Sample #:	**1**
Project:	**BSVII**	Depth (ft):	**65**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

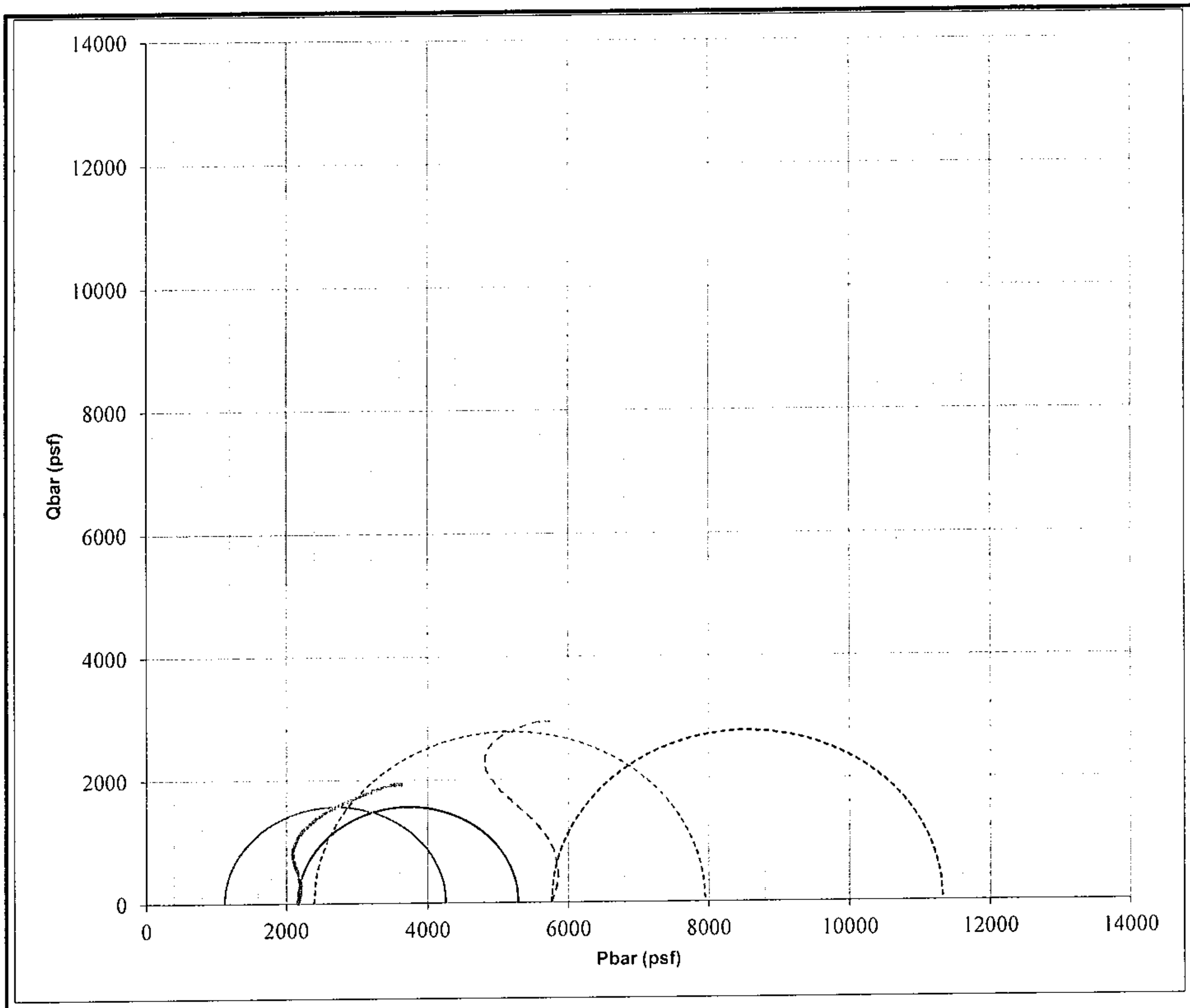
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3130	3.30	6.00	2.86	27.26	124.4	97.7	0.725	101.6	2.70	0.02	39	20	2.1
dot	5760	5561	5.75	6.00	2.86	25.31	125.2	99.9	0.687	99.5	2.70	0.02	39	20	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-156**	Sample #:	**1**
Project:	**BSVII**	Depth (ft):	**65**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3130	3.30	6.00	2.86	27.26	124.4	97.7	0.725	101.6	2.70	0.02	39	20	2.1
dot	5760	5561	5.75	6.00	2.86	25.31	125.2	99.9	0.687	99.5	2.70	0.02	39	20	2.1

Client:	**Mott MacDonald**	Boring #:	**BH-156**	Sample #:	1
Project:	**BSVII**	Depth (ft):	**65**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

Boring Number	BH-157		BH-157		BH-157	
Sample Number	29		29		29	
Depth (ft)	140		140		140	
Date Tested	03/03/20		03/04/20		03/11/20	
Description	Grayish brown clay		Grayish brown clay		Grayish brown clay	
Sample Condition	Undisturbed		Undisturbed		Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.74	5.69	5.98	5.92	6.10	6.01
Diameter (in)	2.86	2.84	2.86	2.83	2.86	2.79
Height/Diameter Ratio	2.01		2.09		2.13	
Total Weight (g)	1225.57	1228.14	1314.34	1311.56	1322.67	1310.54
Moisture Content (%)	22.25	22.51	21.46	21.20	22.35	21.22
Moisture Content From	entire sample		entire sample		entire sample	
Wet Density (pcf)	126.56	129.92	130.33	134.41	128.58	135.46
Dry Density (pcf)	103.52	106.05	107.31	110.90	105.10	111.74
Area (cm^2)	41.45	40.80	41.45	40.54	41.45	39.57
Total Volume (cc)	604.54	590.14	629.54	609.14	642.17	603.97
Void Ratio	0.6282	0.5894	0.5707	0.5198	0.6038	0.5084
Saturation (%)	95.6	103.1	101.5	110.1	99.9	112.7
Specific Gravity	2.70		2.70		2.70	
Specific Gravity From	Assumption		Assumption		Assumption	
B value Before Consolidation	0.95		0.95		0.97	
Total Back Pressure (psf)	5760		4320		5760	
Rate of Strain (%/min)	0.02		0.02		0.02	
Axial Strain at Failure (%)	2.80		4.71		6.76	
Effective Consolidation Stress (psf)	4320		8640		12960	
Major Effective Stress at Failure (psf) $\sigma1$	10695		17786		21130	
Minor Effective Stress at Failure (psf) $\sigma3$	2976		5144		6239	
Deviator Stress at Failure (psf)	7720		12641		14891	
Pore Pressure at Failure (psf)	1344		3496		6721	
Failure Sketch	Sketch on Worksheet		Sketch on Worksheet		Sketch on Worksheet	

	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767		
Classification Based On	Plasticity index,	Plasticity index,	Plasticity index,
Liquid Limit	36		
Plastic Limit	21		
Remarks			0

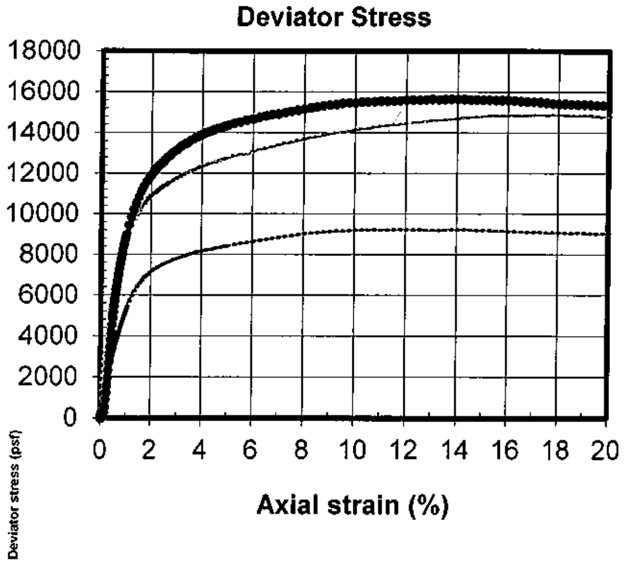
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective $\sigma1$ / $\sigma3$ ratio

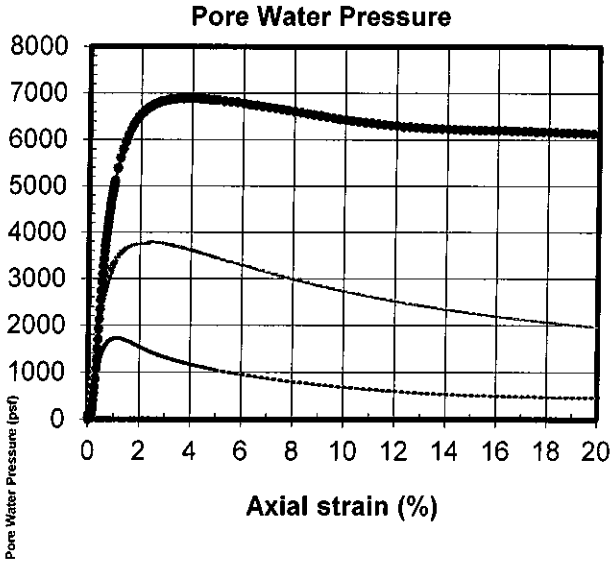
Client: **Mott MacDonald**	Boring #: **BH-157**	Sample #: **29**
Project: **BSVII**	Depth (ft): **140**	
Project #: **507385606**	Soil: **Grayish brown clay**	

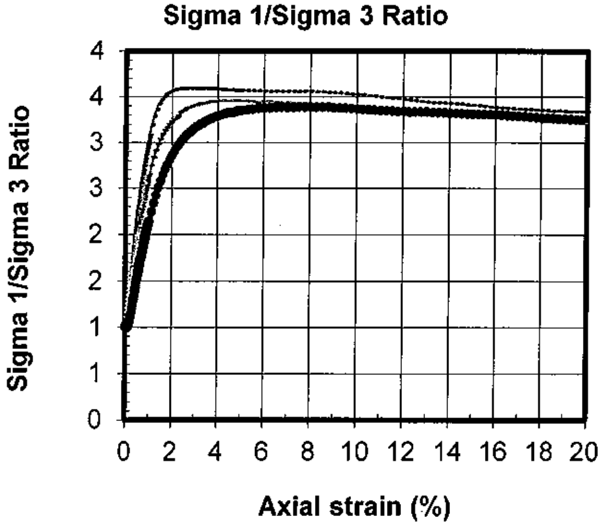
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

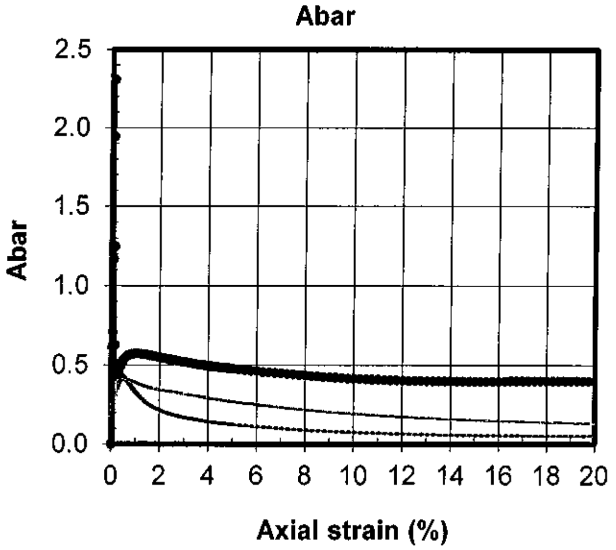
INSPECTION SERVICES INC.

PLATE NUMBER __________









Failure Criteria Maximum Effective σ1 / σ3 ratio

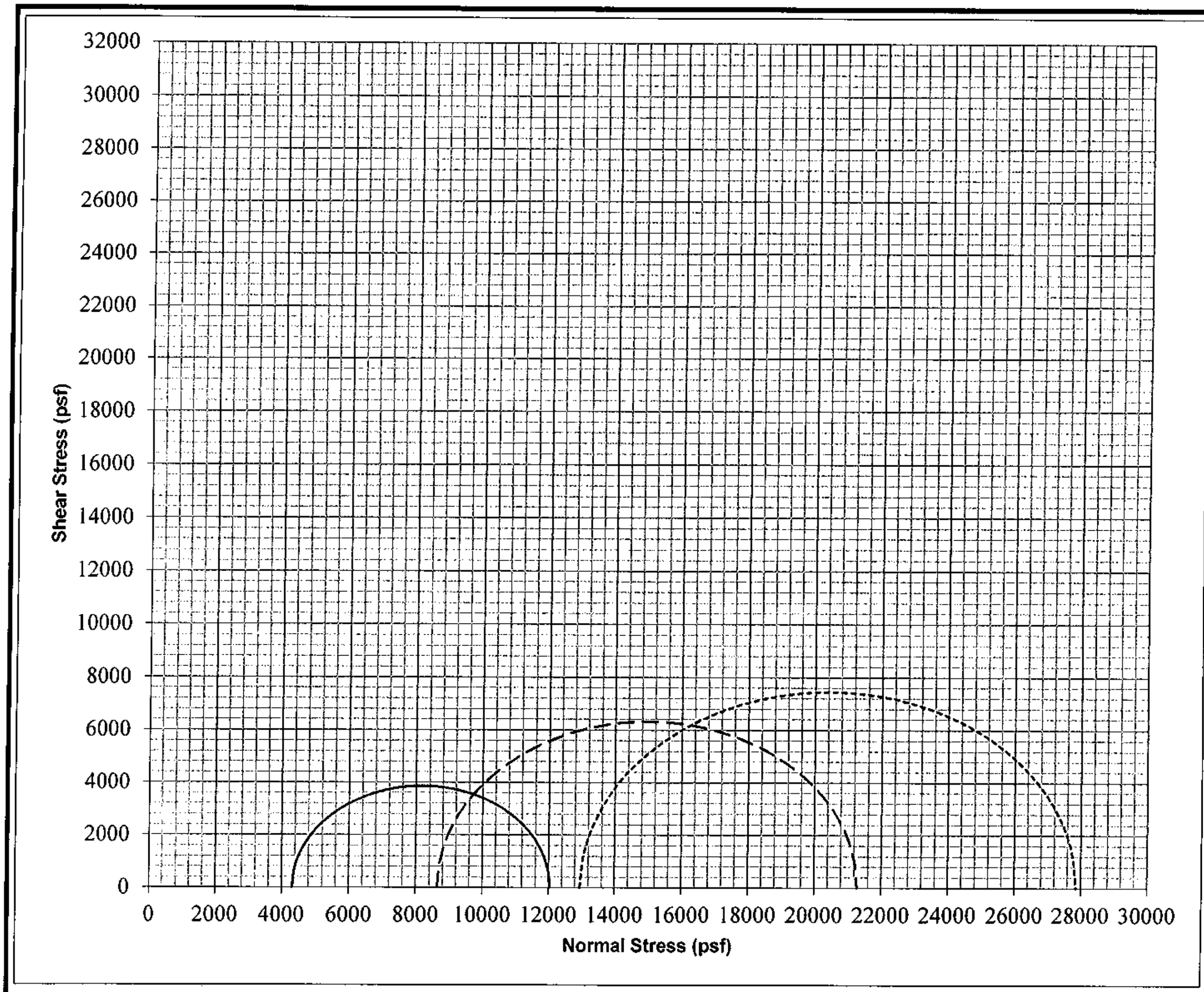
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7720	2.80	5.74	2.86	22.25	126.6	103.5	0.628	95.6	2.70	0.02	36	21	2.0
dash	8640	12641	4.71	5.98	2.86	21.46	130.3	107.3	0.571	101.5	2.70	0.02			2.1
dot	12960	14891	6.76	6.10	2.86	22.35	128.6	105.1	0.604	99.9	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-157**	Sample #:	**29**
Project:	**BSVII**	Depth (ft):	**140**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER__________



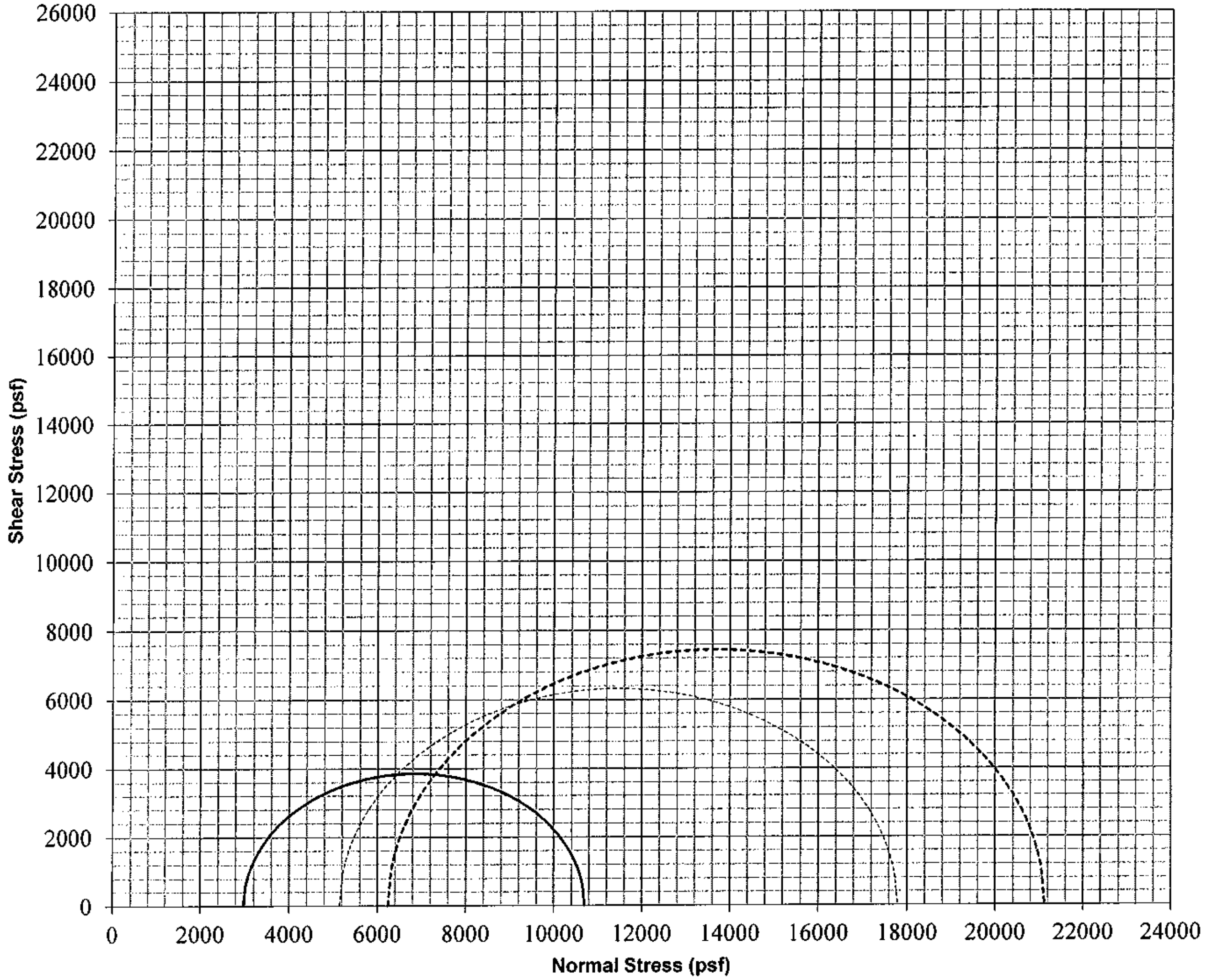
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7720	2.80	5.74	2.86	22.25	126.6	103.5	0.628	95.6	2.70	0.02	36	21	2.0
dot	12960	14891	6.76	6.10	2.86	22.35	128.6	105.1	0.604	99.9	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #: **BH-157**	Sample #: **29**
Project:	**BSVII**	Depth (ft): **140**	
Project #:	**507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

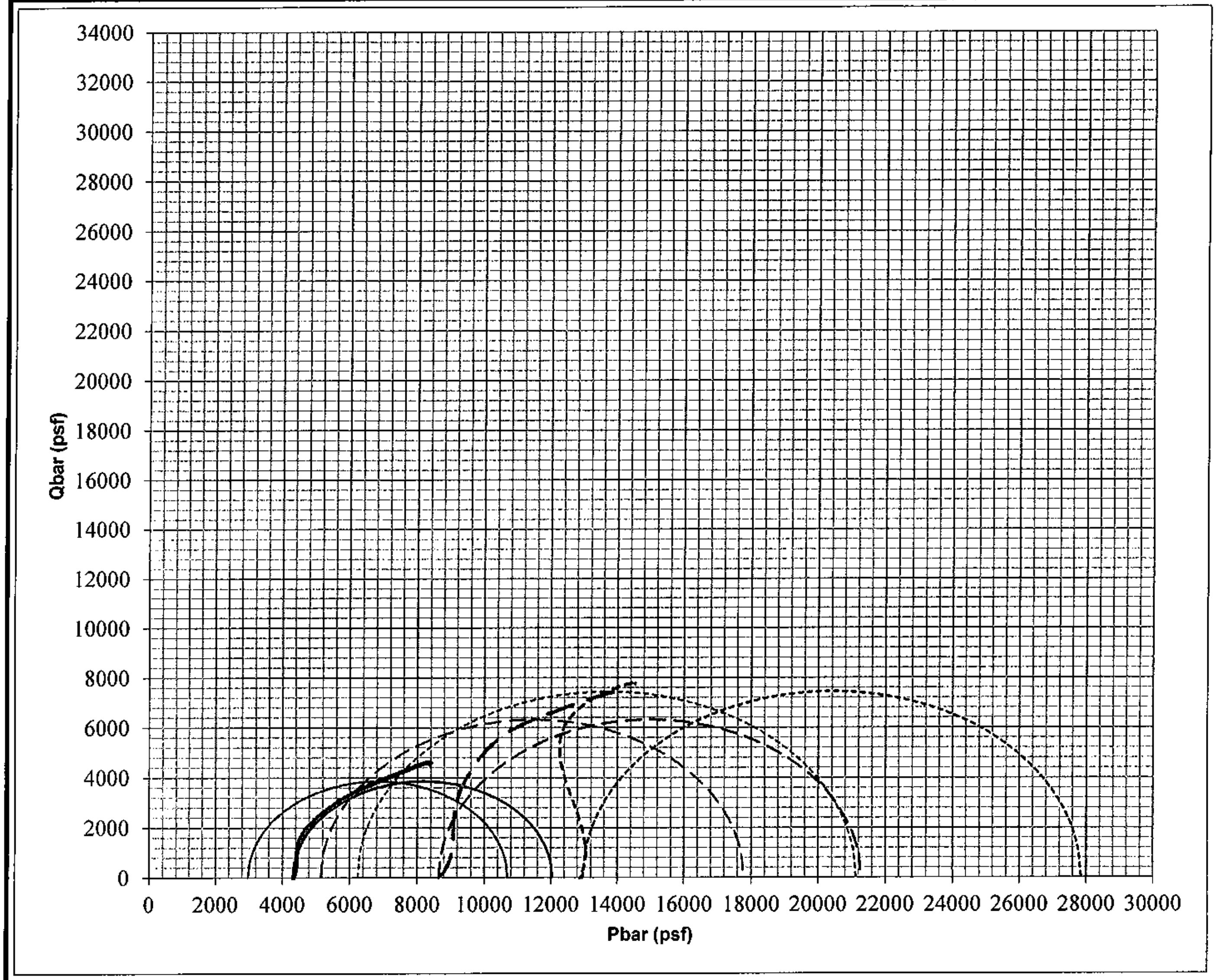
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7720	2.80	5.74	2.86	22.25	126.6	103.5	0.628	95.6	2.70	0.02	36	21	2.0
dash	8640	12641	4.71	5.98	2.86	21.46	130.3	107.3	0.571	101.5	2.70	0.02			2.1
dot	12960	14891	6.76	6.10	2.86	22.35	128.6	105.1	0.604	99.9	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-157**	Sample #: **29**
Project: **BSVII**	Depth (ft): **140**	
Project #: **507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7720	2.80	5.74	2.86	22.25	126.6	103.5	0.628	95.6	2.70	0.02	36	21	2.0
dash	8640	12641	4.71	5.98	2.86	21.46	130.3	107.3	0.571	101.5	2.70	0.02			2.1
dot	12960	14891	6.76	6.10	2.86	22.35	128.6	105.1	0.604	99.9	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-157**	Sample #: **29**
Project: **BSVII**	Depth (ft): **140**	
Project #: **507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

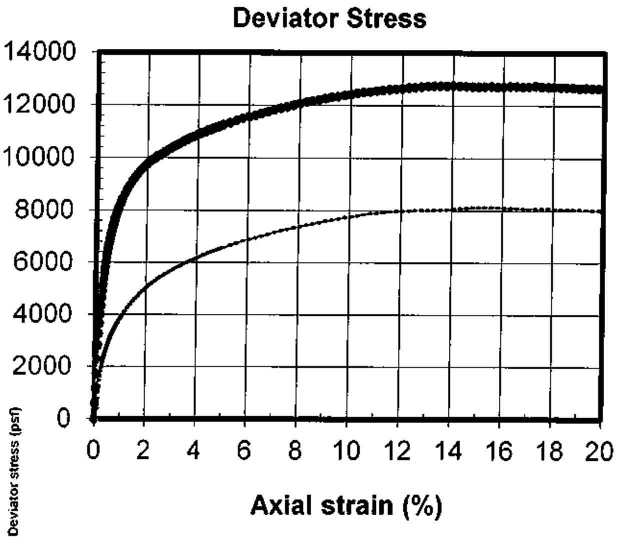
Boring Number	BH-158				BH-158	
Sample Number	28				28	
Depth (ft)	117				117	
Date Tested	03/02/20				03/07/20	
Description	Greenish gray sandy clay				Greenish gray sandy clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.97	5.91			6.10	6.00
Diameter (in)	2.86	2.83			2.86	2.80
Height/Diameter Ratio	2.09				2.13	
Total Weight (g)	1303.41	1292.98			1314.64	1290.01
Moisture Content (%)	21.79	20.82			22.34	20.05
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	129.52	132.30			127.80	132.79
Dry Density (pcf)	106.34	109.50			104.46	110.61
Area (cm^2)	41.45	40.65			41.45	39.82
Total Volume (cc)	628.23	610.13			642.17	606.47
Void Ratio	0.5850	0.5393			0.6136	0.5239
Saturation (%)	100.6	104.2			98.3	103.3
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.98	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	5.75				8.26	
Effective Consolidation Stress (psf)	4320				11520	
Major Effective Stress at Failure (psf) σ1	9322				16621	
Minor Effective Stress at Failure (psf) σ3	2505				4498	
Deviator Stress at Failure (psf)	6817				12123	
Pore Pressure at Failure (psf)	1815				7022	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	31					
Plastic Limit	18					
Remarks						

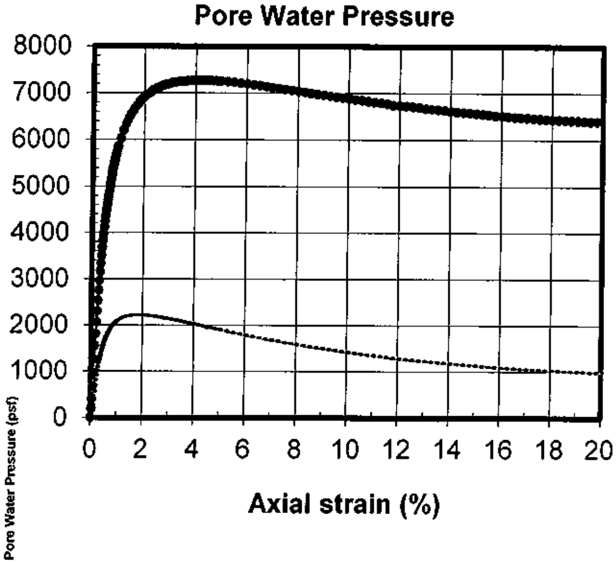
The following information is the same for all samples

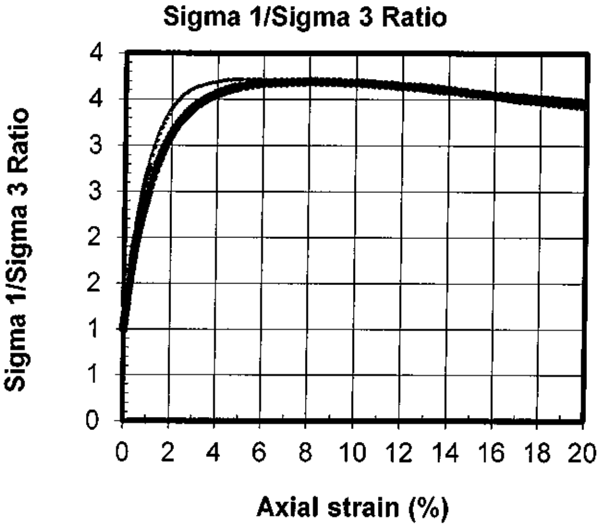
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

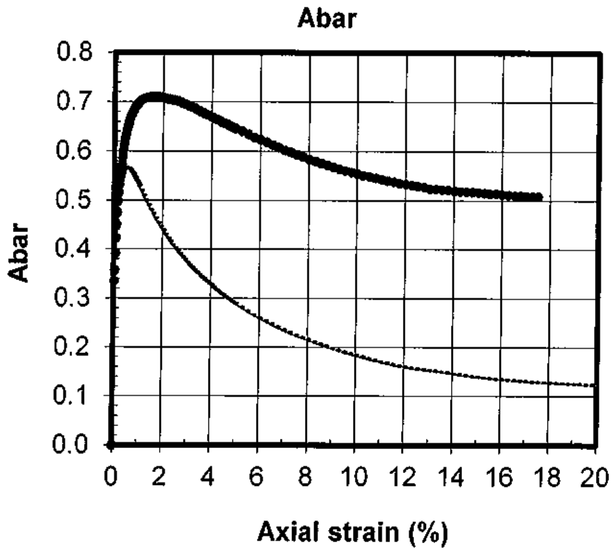
Client: **Mott MacDonald**	Boring #: **BH-158**	Sample #: **28**
Project: **BSVII**	Depth (ft): **117**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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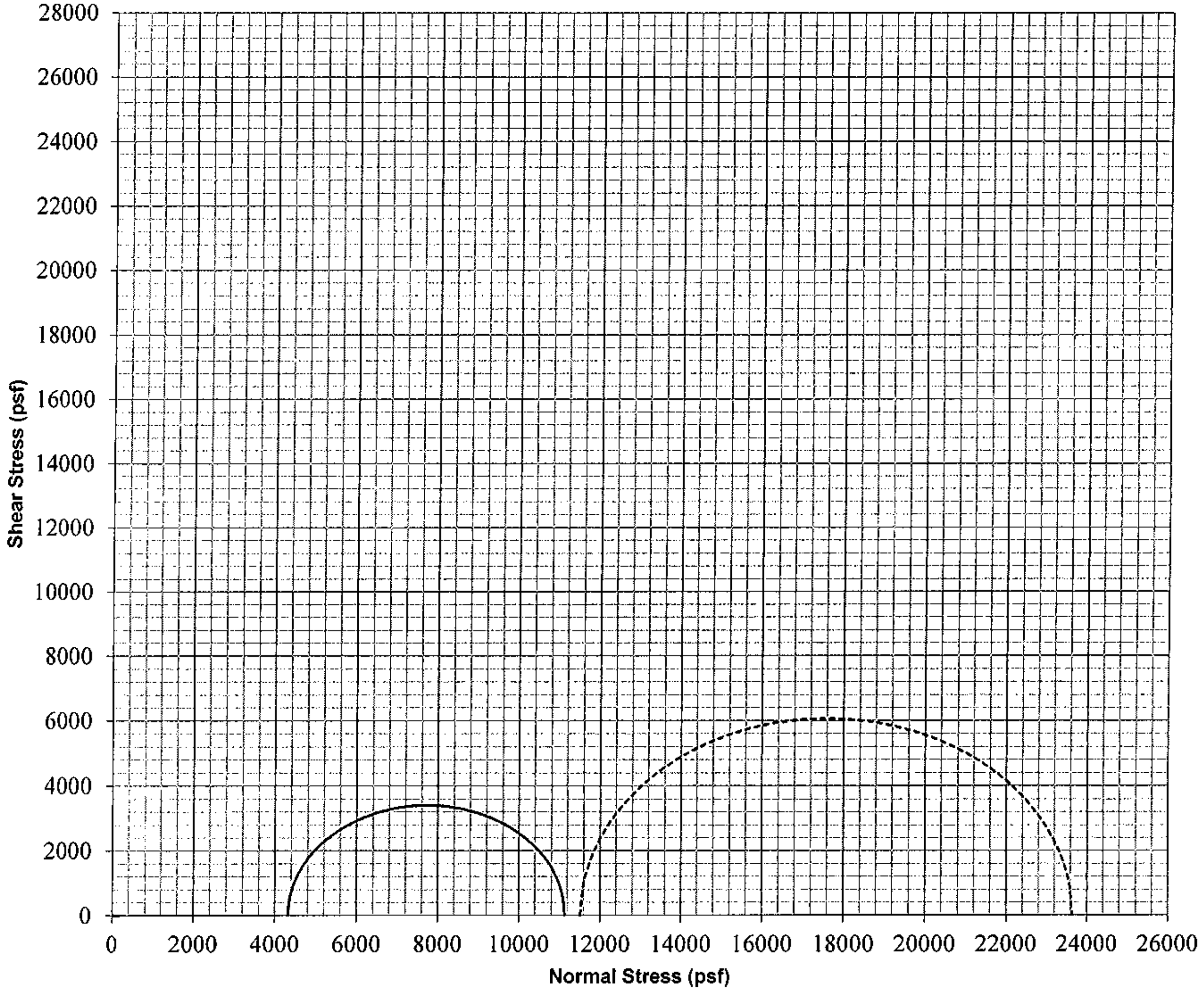
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6817	5.75	5.97	2.86	21.79	129.5	106.3	0.585	100.6	2.70	0.02	31	18	2.1
dot	11520	12123	8.26	6.10	2.86	22.34	127.8	104.5	0.614	98.3	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-158** Sample #: **28**
Project:	**BSVII**	Depth (ft):	**117**
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**__________



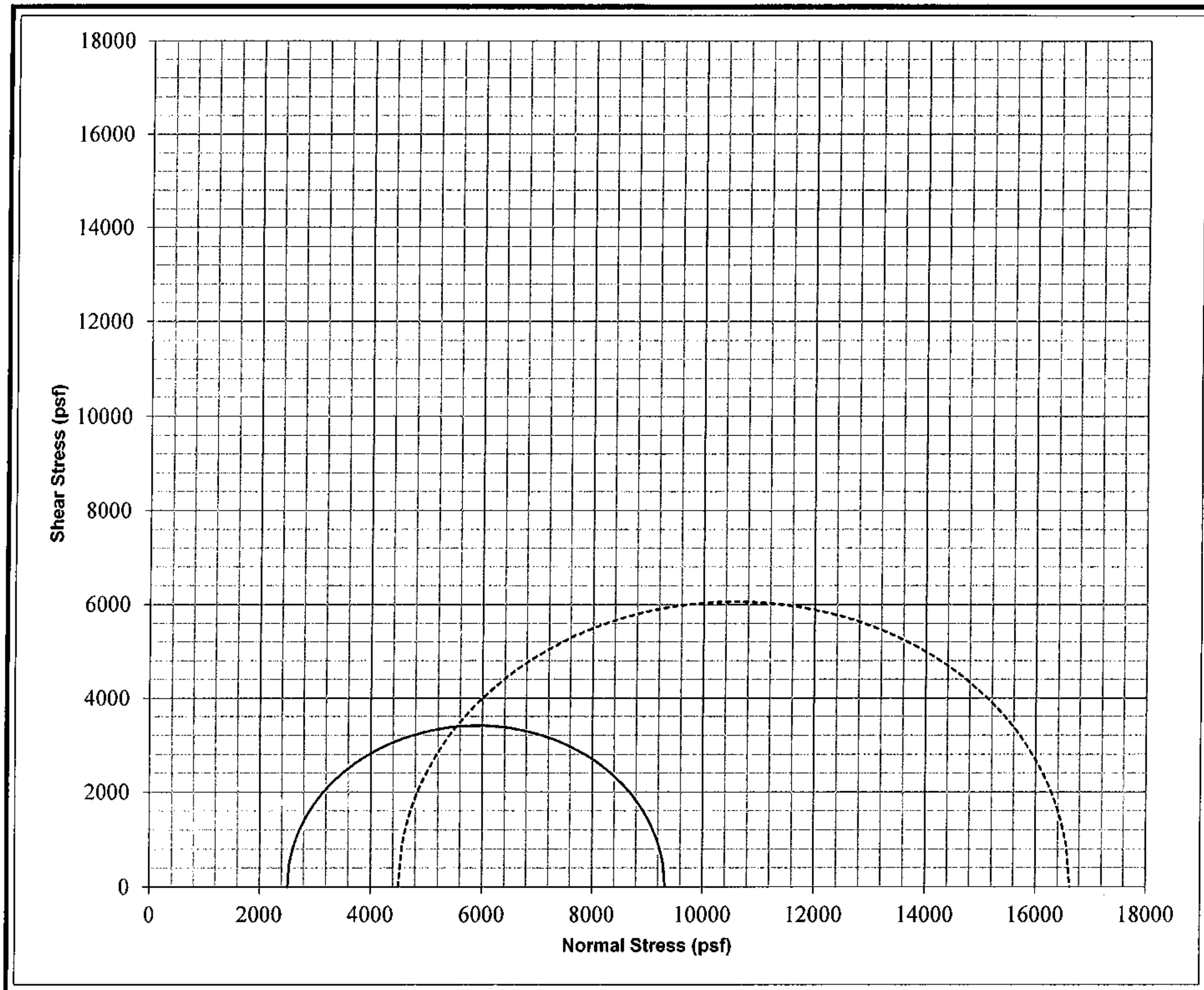
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective $\sigma 1 / \sigma 3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6817	5.75	5.97	2.86	21.79	129.5	106.3	0.585	100.6	2.70	0.02	31	18	2.1
dot	11520	12123	8.26	6.10	2.86	22.34	127.8	104.5	0.614	98.3	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-158**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**117**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective $\sigma 1$ / $\sigma 3$ ratio

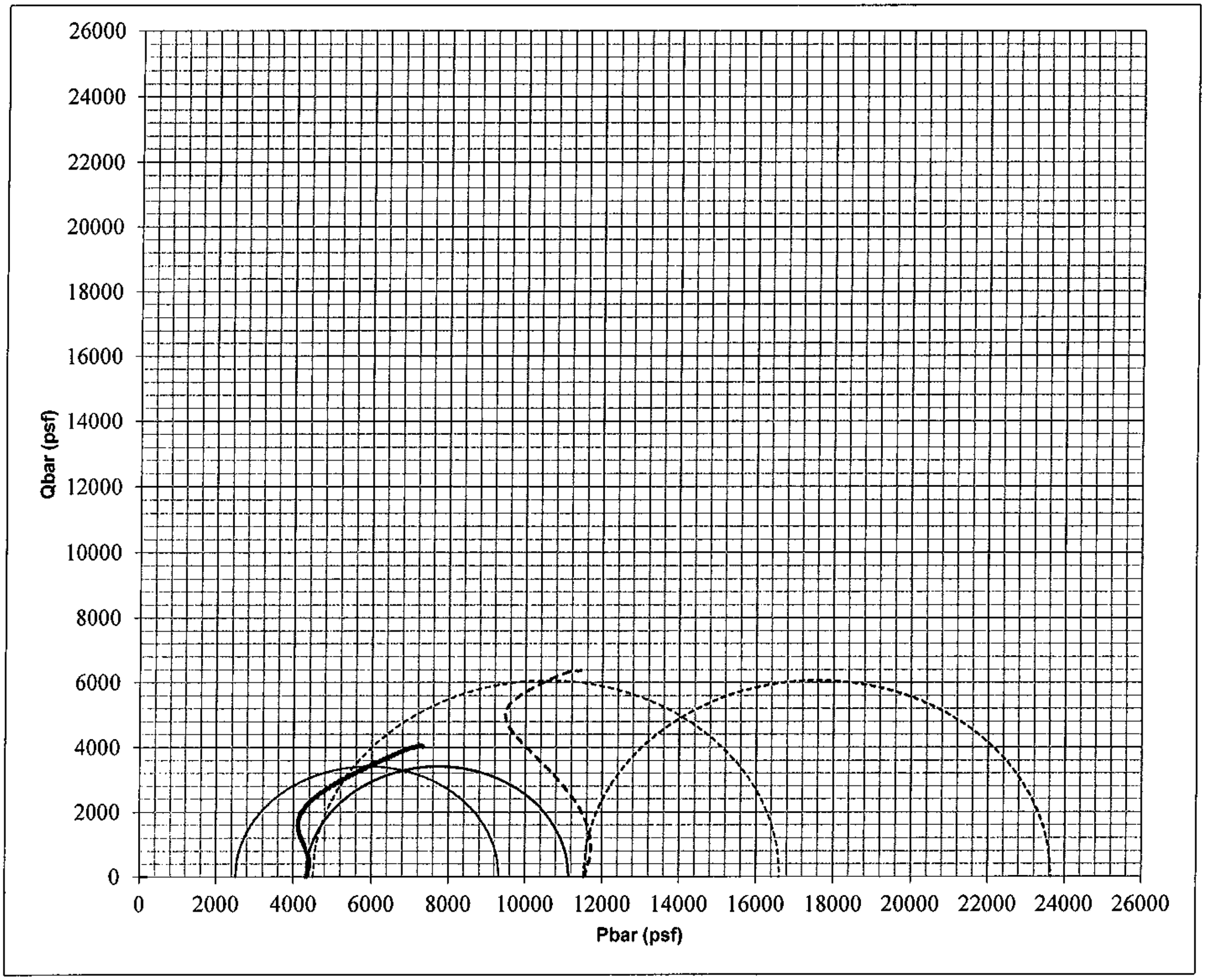
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6817	5.75	5.97	2.86	21.79	129.5	106.3	0.585	100.6	2.70	0.02	31	18	2.1
dot	11520	12123	8.26	6.10	2.86	22.34	127.8	104.5	0.614	98.3	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-158**	Sample #: **28**
Project: **BSVII**	Depth (ft): **117**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6817	5.75	5.97	2.86	21.79	129.5	106.3	0.585	100.6	2.70	0.02	31	18	2.1
dot	11520	12123	8.26	6.10	2.86	22.34	127.8	104.5	0.614	98.3	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-158**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**117**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

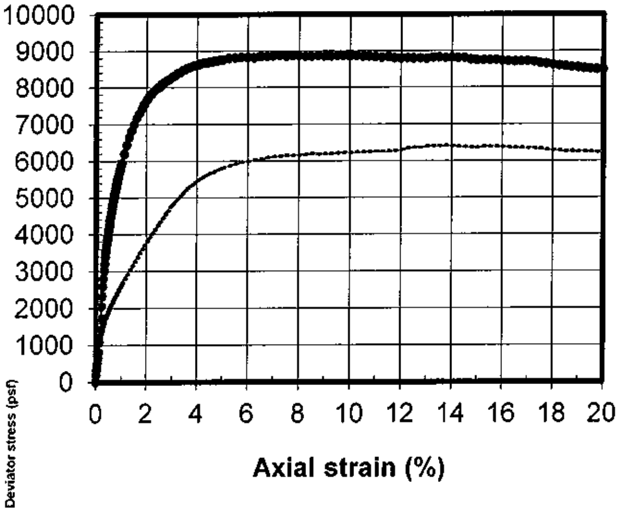
Boring Number	BH-159				BH-159	
Sample Number	18				18	
Depth (ft)	90				90	
Date Tested	03/12/20				03/16/20	
Description	Gray clay				Gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.12	5.06			5.20	5.13
Diameter (in)	2.43	2.40			2.43	2.38
Height/Diameter Ratio	2.11				2.14	
Total Weight (g)	796.90	795.58			808.33	798.50
Moisture Content (%)	22.63	22.42			22.57	21.08
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	127.85	132.09			127.63	132.93
Dry Density (pcf)	104.26	107.89			104.13	109.79
Area (cm^2)	29.92	29.23			29.92	28.77
Total Volume (cc)	389.11	376.01			395.38	374.98
Void Ratio	0.6167	0.5622			0.6187	0.5352
Saturation (%)	99.1	107.7			98.5	106.3
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.97	
Total Back Pressure (psf)	7200				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	4.70				7.25	
Effective Consolidation Stress (psf)	4320				10080	
Major Effective Stress at Failure (psf) σ1	8334				13581	
Minor Effective Stress at Failure (psf) σ3	2597				4697	
Deviator Stress at Failure (psf)	5736				8884	
Pore Pressure at Failure (psf)	1723				5383	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	41					
Plastic Limit	19					
Remarks						

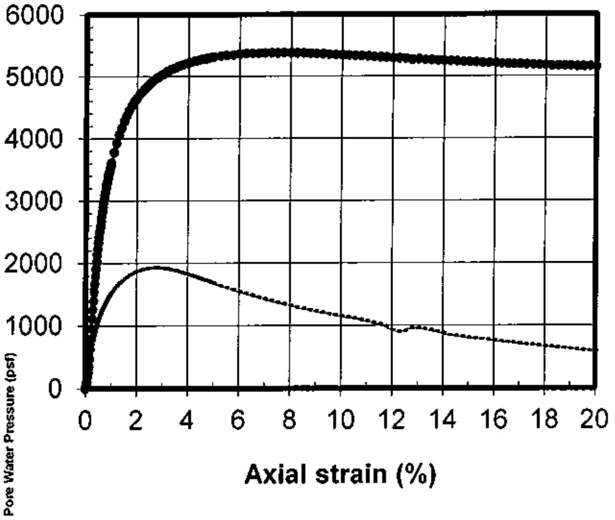
The following information is the same for all samples

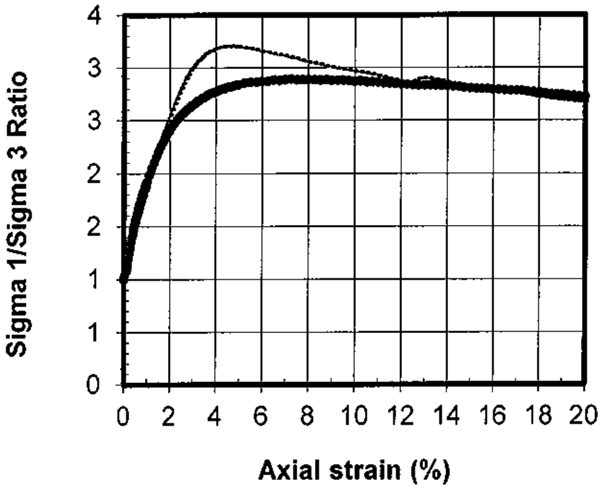
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

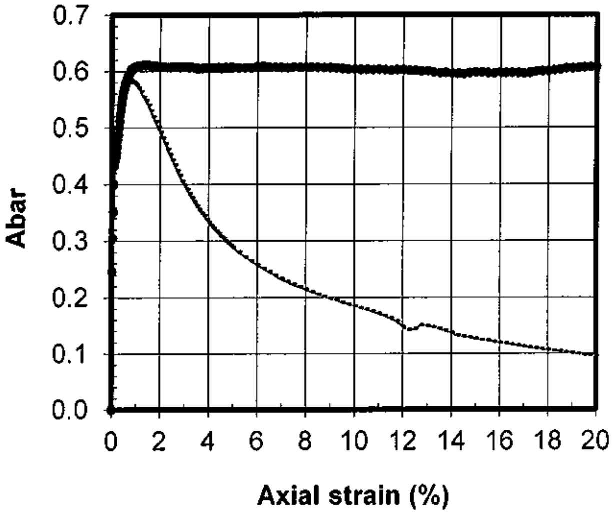
Client: **Mott MacDonald**	Boring #: **BH-159**	Sample #: **18**
Project: **BSVII**	Depth (ft): **90**	
Project #: **507385606**	Soil: **Gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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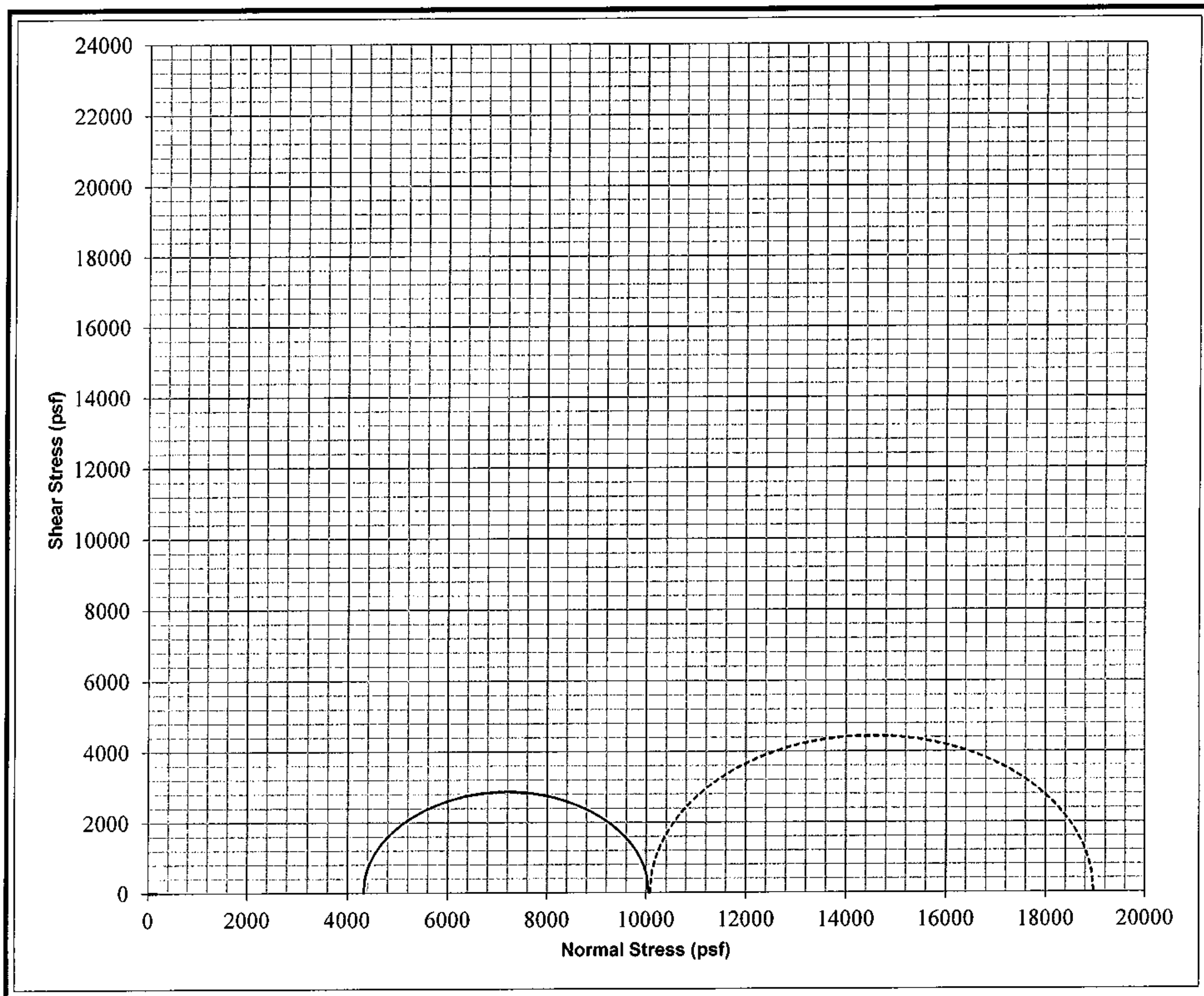
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5736	4.70	5.12	2.43	22.63	127.9	104.3	0.617	99.1	2.70	0.02	41	19	2.1
dot	10080	8884	7.25	5.20	2.43	22.57	127.6	104.1	0.619	98.5	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-159**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**90**		
Project #:	**507385606**	Soil:	**Gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



TOTAL MOHR CIRCLES

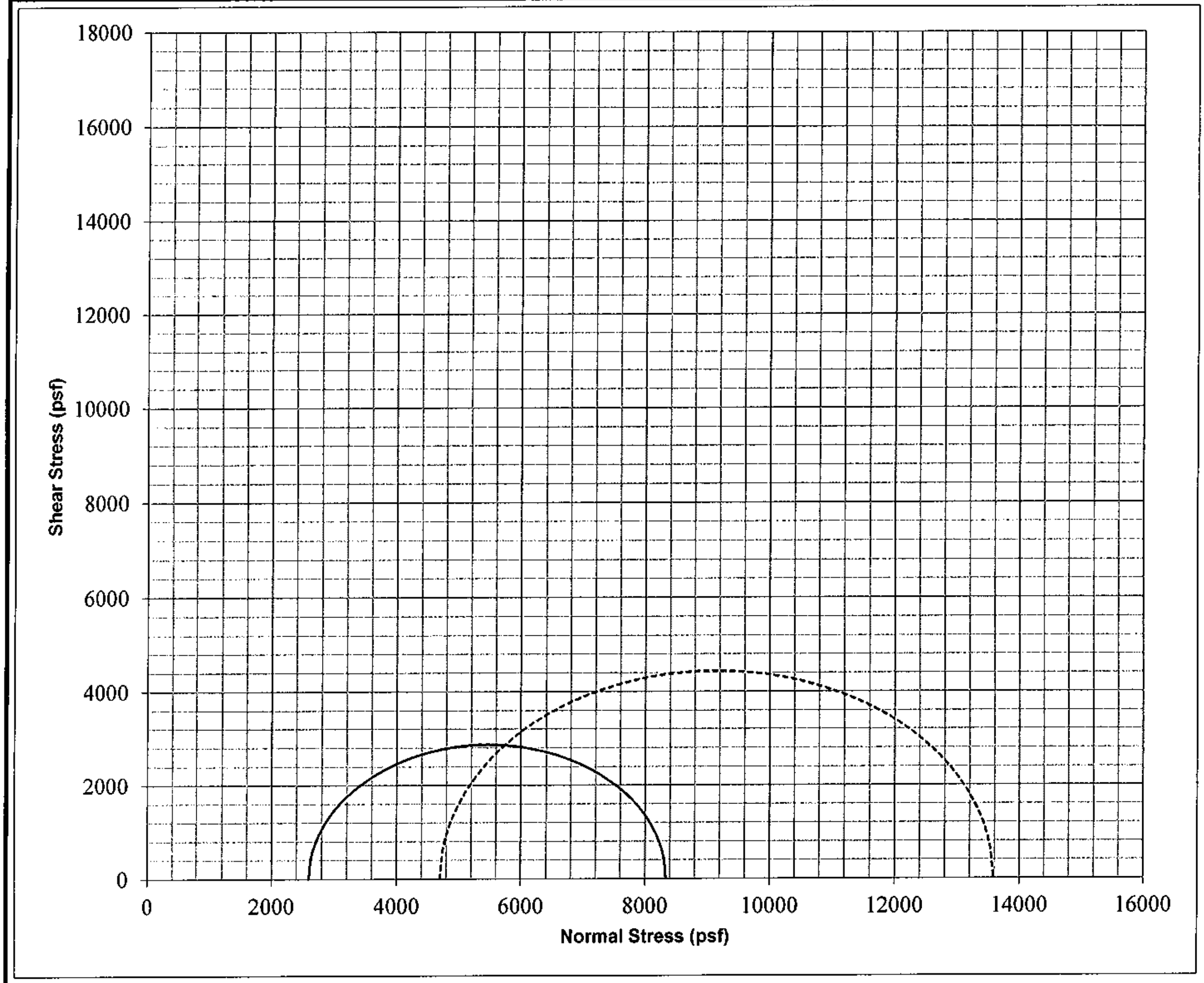
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5736	4.70	5.12	2.43	22.63	127.9	104.3	0.617	99.1	2.70	0.02	41	19	2.1
dot	10080	8884	7.25	5.20	2.43	22.57	127.6	104.1	0.619	98.5	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-159**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**90**		
Project #:	**507385606**	Soil:	**Gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER________**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

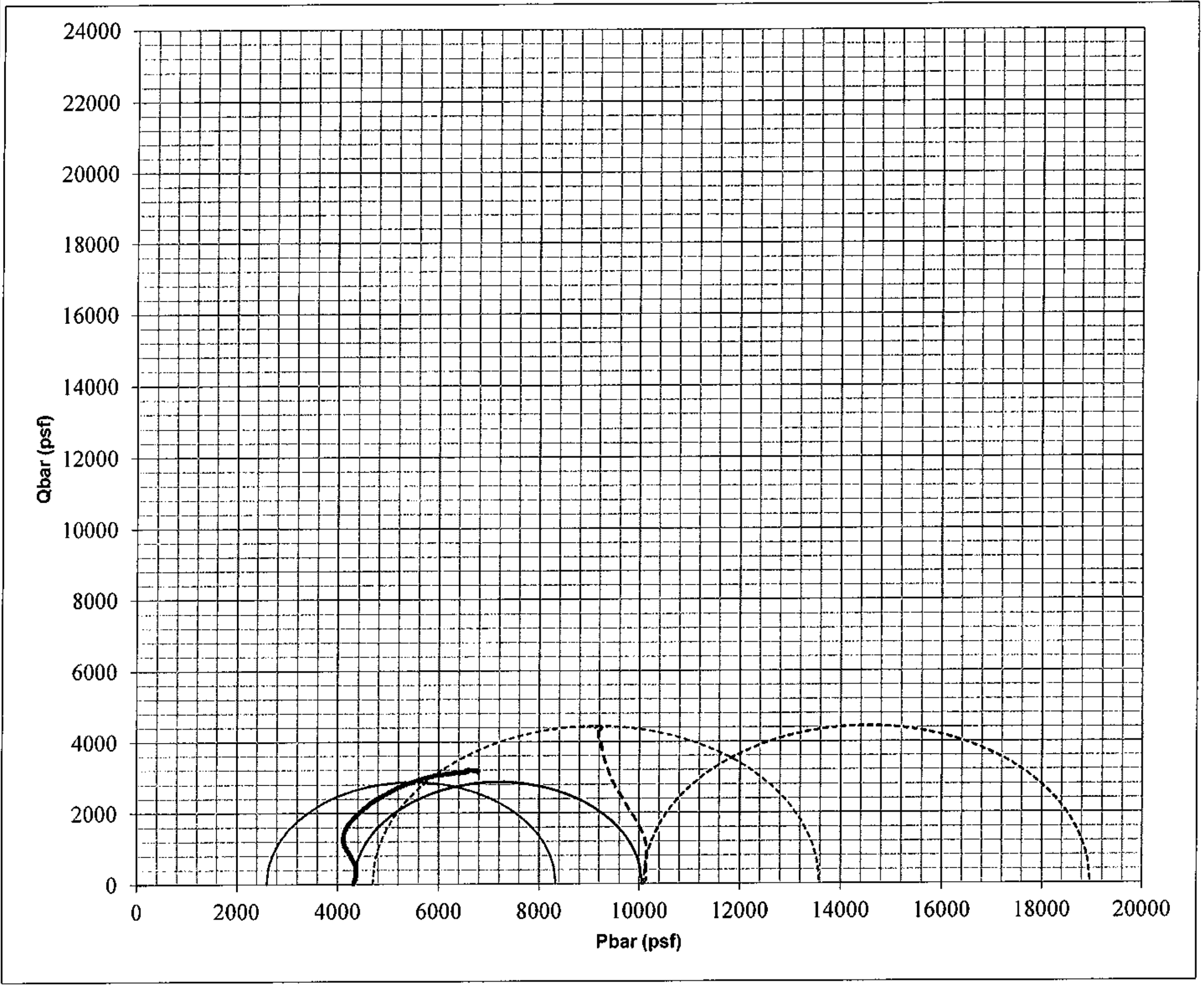
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5736	4.70	5.12	2.43	22.63	127.9	104.3	0.617	99.1	2.70	0.02	41	19	2.1
dot	10080	8884	7.25	5.20	2.43	22.57	127.6	104.1	0.619	98.5	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-159**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**90**		
Project #:	**507385606**	Soil:	**Gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5736	4.70	5.12	2.43	22.63	127.9	104.3	0.617	99.1	2.70	0.02	41	19	2.1
dot	10080	8884	7.25	5.20	2.43	22.57	127.6	104.1	0.619	98.5	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-159**	Sample #: **18**	
Project: **BSVII**	Depth (ft): **90**		
Project #: **507385606**	Soil: **Gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

Boring Number	BH-160				BH-160	
Sample Number	19				19	
Depth (ft)	87				87	
Date Tested	03/13/20				03/21/20	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.65	5.56			5.65	5.49
Diameter (in)	2.38	2.35			2.38	2.33
Height/Diameter Ratio	2.38				2.37	
Total Weight (g)	850.28	835.74			854.85	829.74
Moisture Content (%)	24.36	22.23			24.88	21.21
Moisture Content From	1/2 of sample, cut				entire sample	
Wet Density (pcf)	128.81	131.79			129.56	134.79
Dry Density (pcf)	103.58	107.82			103.75	111.20
Area (cm^2)	28.70	28.01			28.70	27.54
Total Volume (cc)	412.08	395.88			411.90	384.30
Void Ratio	0.6273	0.5633			0.6246	0.5158
Saturation (%)	104.9	106.6			107.5	111.0
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.99				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	9.25				4.70	
Effective Consolidation Stress (psf)	3600				10800	
Major Effective Stress at Failure (psf) σ1	6558				10426	
Minor Effective Stress at Failure (psf) σ3	1750				2035	
Deviator Stress at Failure (psf)	4808				8391	
Pore Pressure at Failure (psf)	1850				8765	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	35					
Plastic Limit	18					
Remarks						

The following information is the same for all samples

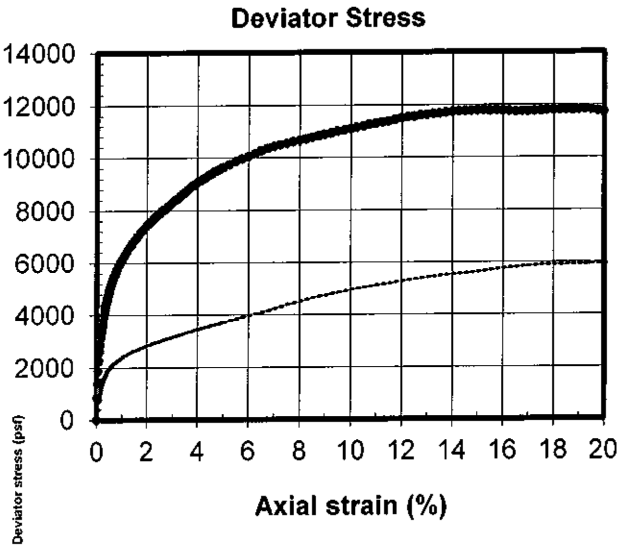
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

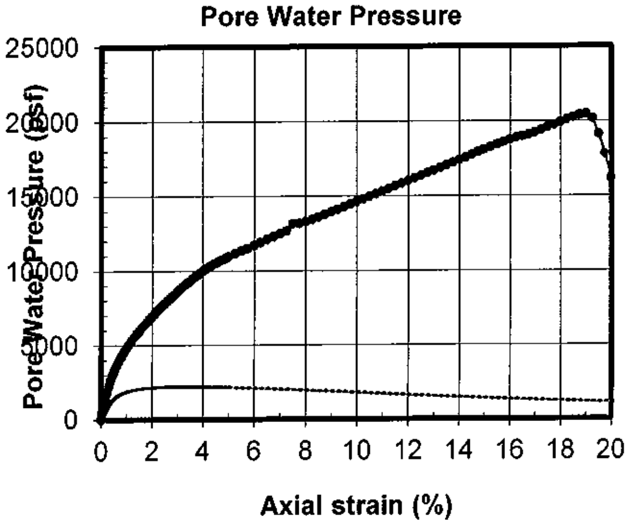
Client: **Mott MacDonald**	Boring #: **BH-160**	Sample #: **19**
Project: **BSVII**	Depth (ft): **87**	
Project #: **507385606**	Soil: **Greenish gray clay**	

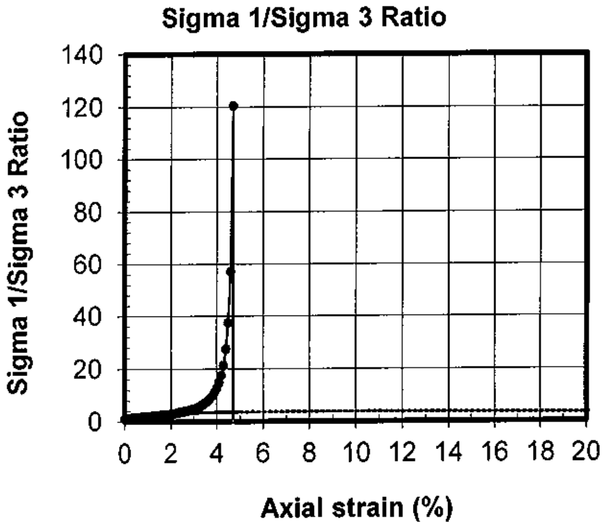
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

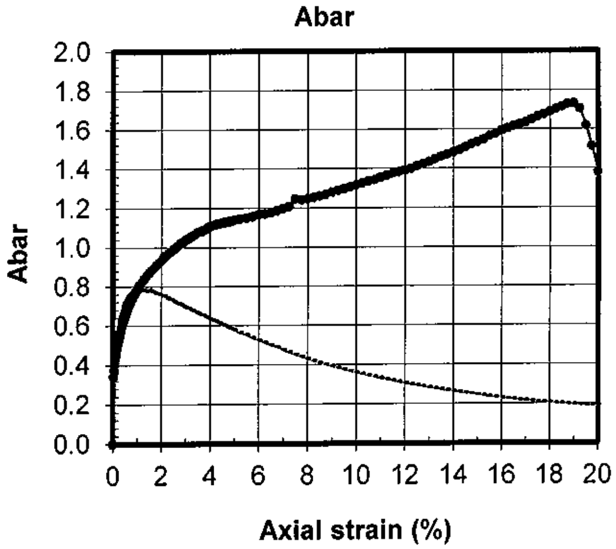
INSPECTION SERVICES INC.

PLATE NUMBER ________







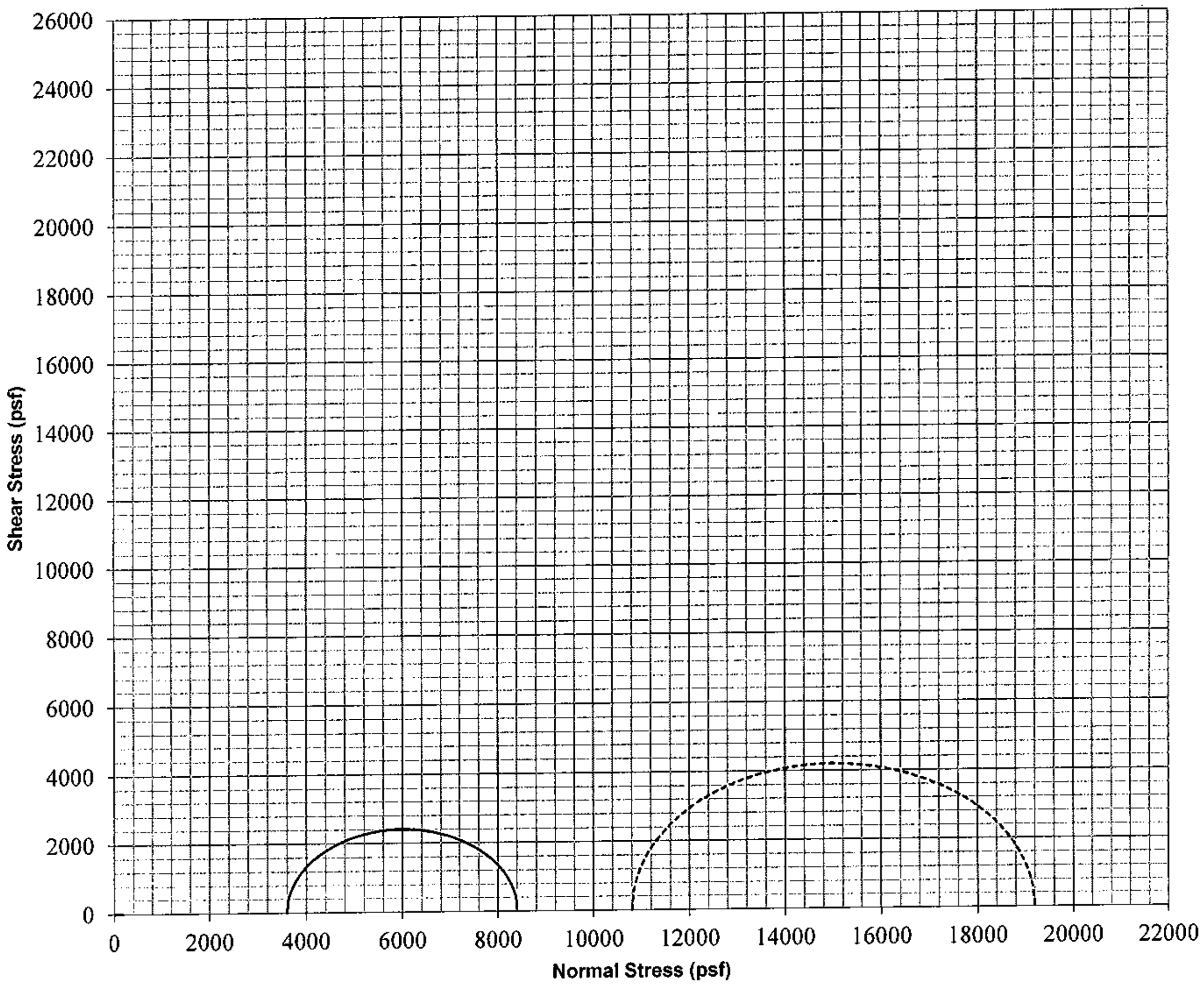


Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	3600	4808	9.25	5.65	2.38	24.36	128.8	103.6	0.627	104.9	2.70	0.02	35	18	2.4
dot	10800	8391	4.70	5.65	2.38	24.88	129.6	103.7	0.625	107.5	2.70	0.02			2.4

Client: **Mott MacDonald**	Boring #: **BH-160** Sample #: **19**
Project: **BSVII**	Depth (ft): **87**
Project #: **507385606**	Soil: **Greenish gray clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



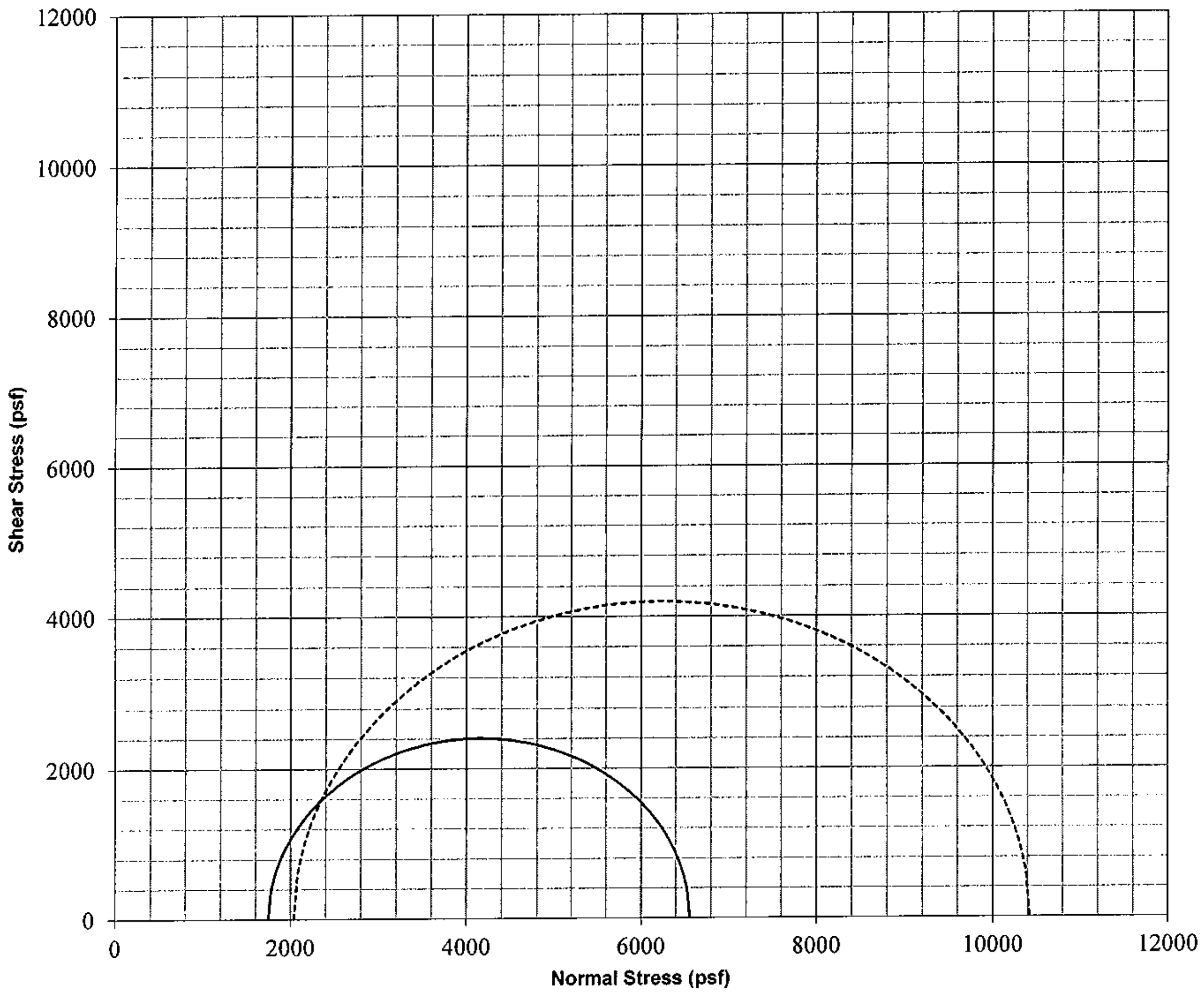
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	3600	4808	9.25	5.65	2.38	24.36	128.8	103.6	0.627	104.9	2.70	0.02	35	18	2.4
dot	10800	8391	4.70	5.65	2.38	24.88	129.6	103.7	0.625	107.5	2.70	0.02			2.4

Client: **Mott MacDonald**	Boring #: **BH-160**	Sample #: **19**
Project: **BSVII**	Depth (ft): **87**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



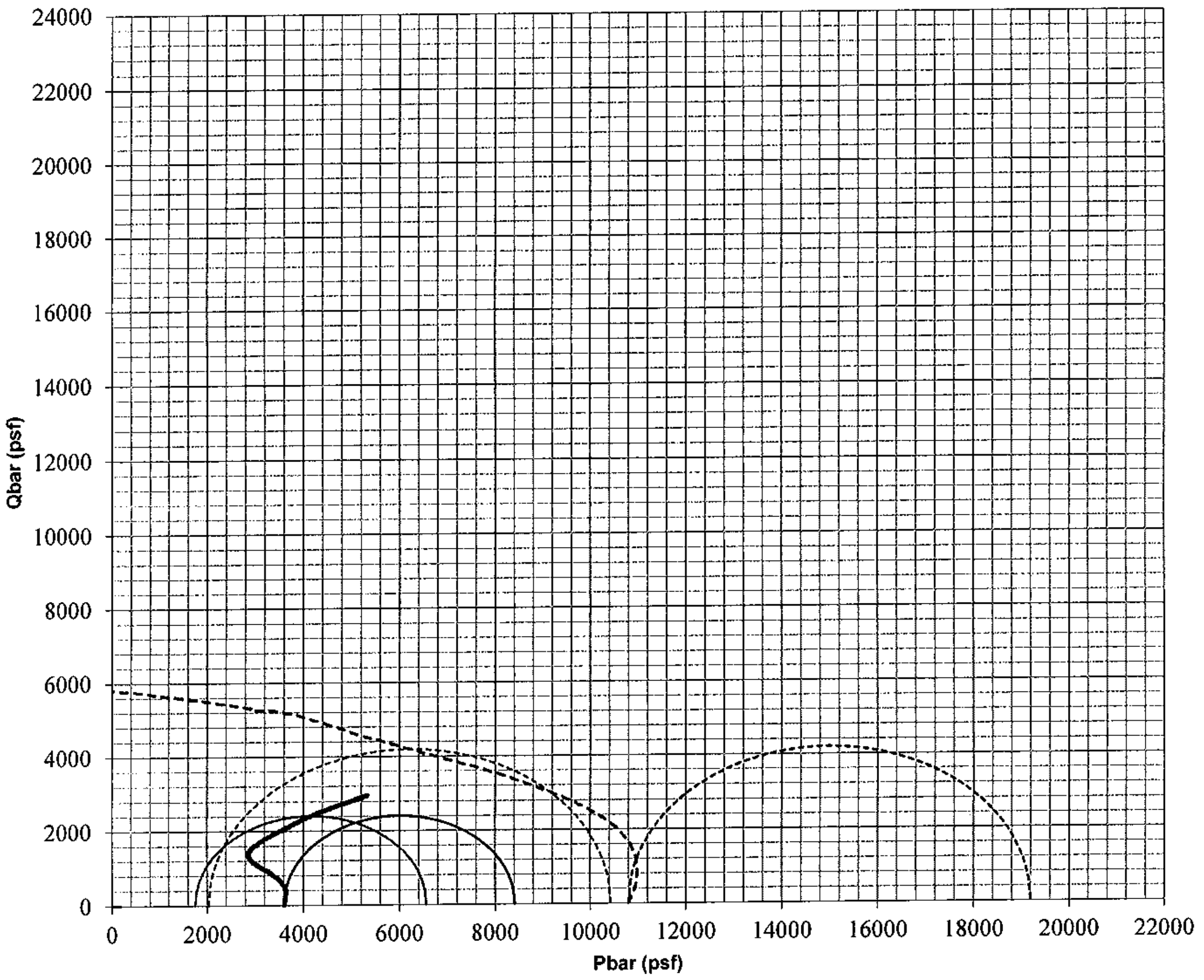
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	3600	4808	9.25	5.65	2.38	24.36	128.8	103.6	0.627	104.9	2.70	0.02	35	18	2.4
dot	10800	8391	4.70	5.65	2.38	24.88	129.6	103.7	0.625	107.5	2.70	0.02			2.4

Client: **Mott MacDonald**	Boring #: **BH-160**	Sample #: **19**
Project: **BSVII**	Depth (ft): **87**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	3600	4808	9.25	5.65	2.38	24.36	128.8	103.6	0.627	104.9	2.70	0.02	35	18	2.4
dot	10800	8391	4.70	5.65	2.38	24.88	129.6	103.7	0.625	107.5	2.70	0.02			2.4

Client:	**Mott MacDonald**	Boring #: **BH-160**	Sample #: **19**
Project:	**BSVII**	Depth (ft): **87**	
Project #:	**507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

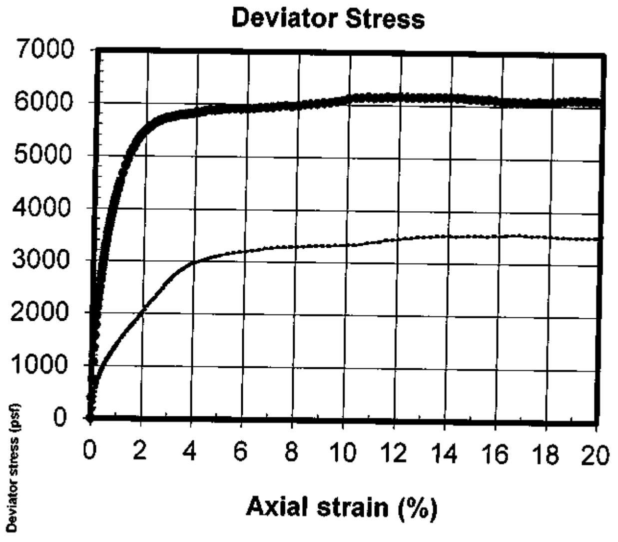
Boring Number	BH-162				BH-162	
Sample Number	10				10	
Depth (ft)	55				55	
Date Tested	05/04/20				05/05/20	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.03	5.00			5.12	5.04
Diameter (in)	2.38	2.36			2.40	2.37
Height/Diameter Ratio	2.12				2.14	
Total Weight (g)	748.90	749.68			765.53	758.70
Moisture Content (%)	26.04	26.17			25.09	23.98
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	127.70	130.21			126.17	130.49
Dry Density (pcf)	101.32	103.21			100.86	105.25
Area (cm^2)	28.64	28.28			29.13	28.36
Total Volume (cc)	366.11	359.41			378.77	362.97
Void Ratio	0.6636	0.6332			0.6711	0.6014
Saturation (%)	105.9	111.6			100.9	107.6
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.40				5.50	
Effective Consolidation Stress (psf)	1440				5760	
Major Effective Stress at Failure (psf) σ1	3579				8295	
Minor Effective Stress at Failure (psf) σ3	763				2380	
Deviator Stress at Failure (psf)	2816				5915	
Pore Pressure at Failure (psf)	677				3380	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	42					
Plastic Limit	19					
Remarks						

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-162**	Sample #: **10**
Project: **BSVII**	Depth (ft): **55**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU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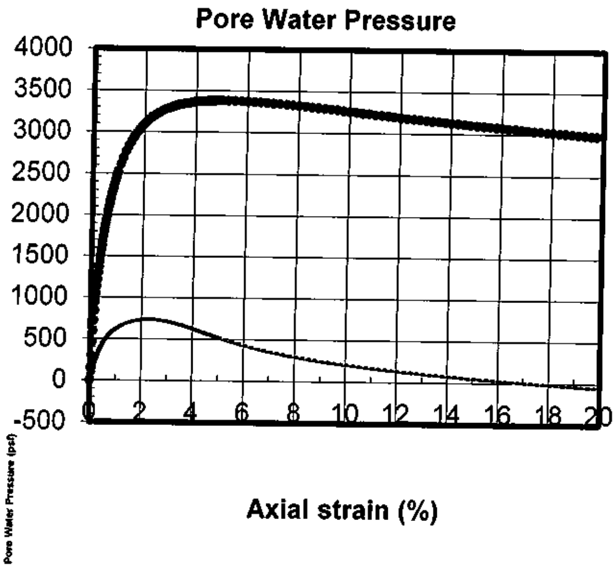
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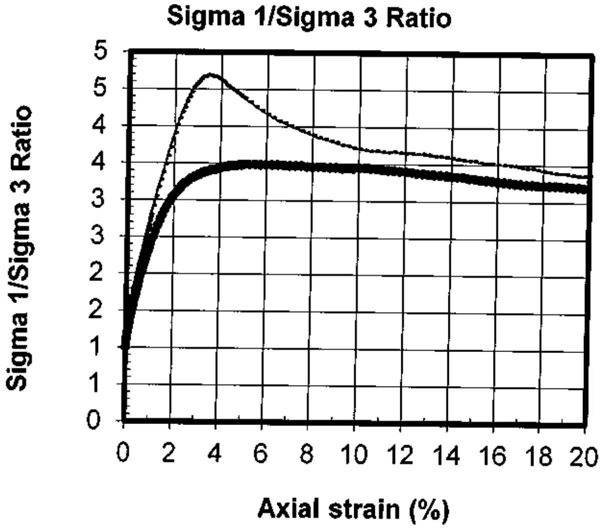
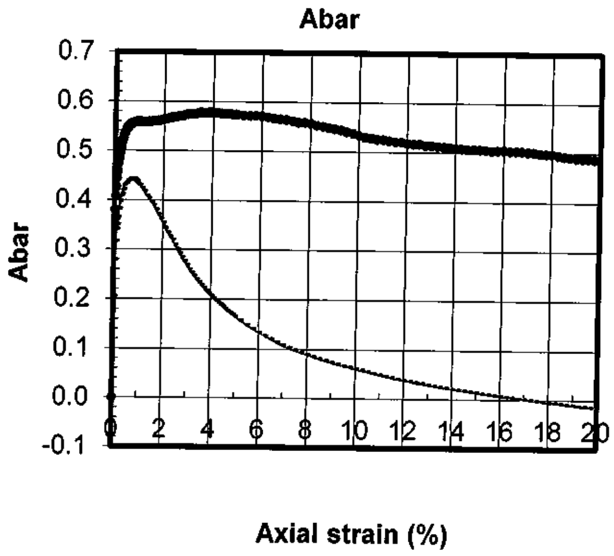

Sigma 1/Sigma 3 Ratio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Failure Criteria Maximum Effective σ1 / σ3 ratio

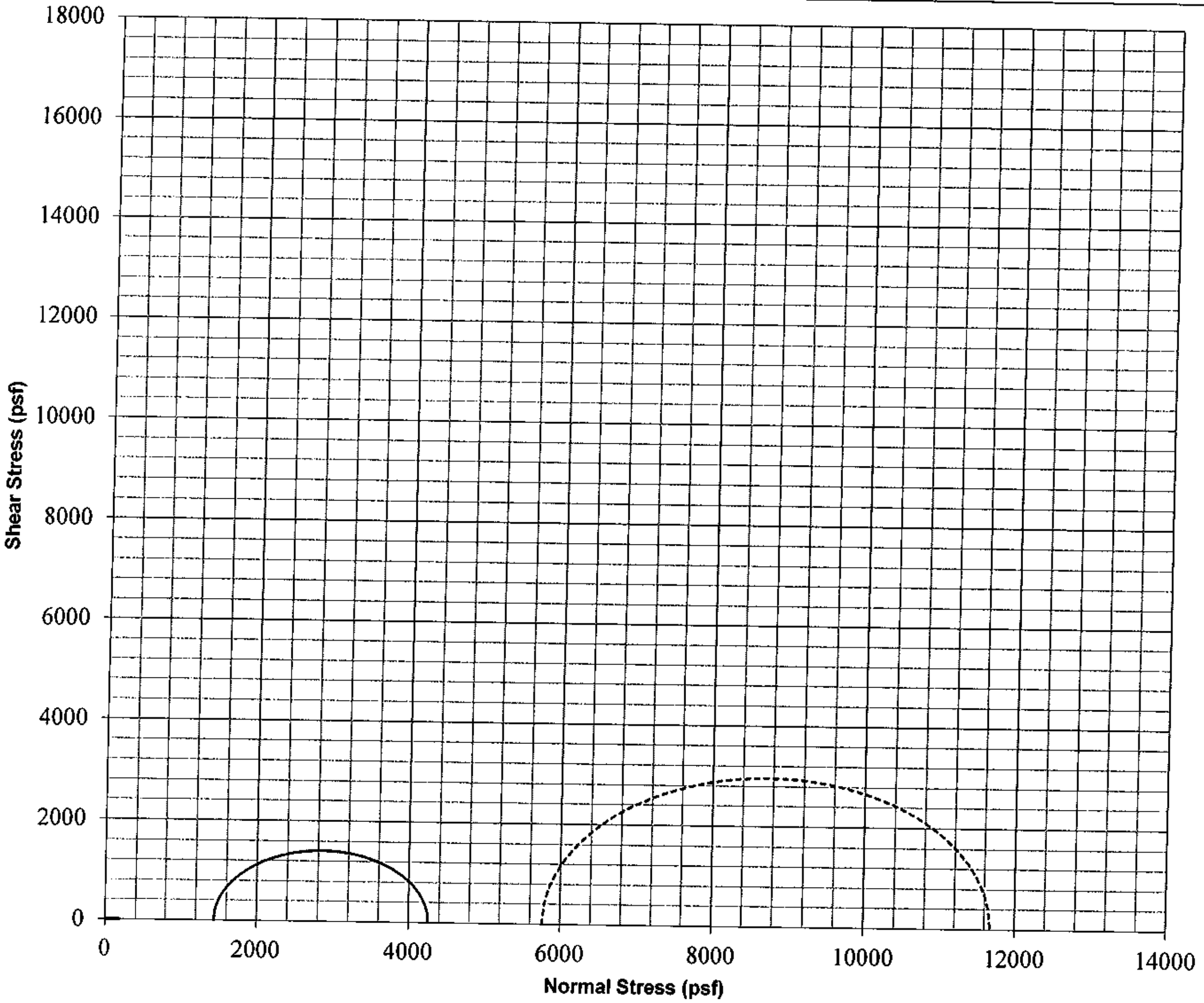
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2816	3.40	5.03	2.38	26.04	127.7	101.3	0.664	105.9	2.70	0.02	42	19	2.1
dot	5760	5915	5.50	5.12	2.40	25.09	126.2	100.9	0.671	100.9	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-162**	Sample #: **10**	
Project: **BSVII**	Depth (ft): **55**		
Project #: **507385606**	Soil: **Greenish gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ_1 / σ_3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2816	3.40	5.03	2.38	26.04	127.7	101.3	0.664	105.9	2.70	0.02	42	19	2.1
dot	5760	5915	5.50	5.12	2.40	25.09	126.2	100.9	0.671	100.9	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-162** Sample #: **10**

Project: **BSVII**

Depth (ft): **55**

Project #: **507385606**

Soil: **Greenish gray clay**

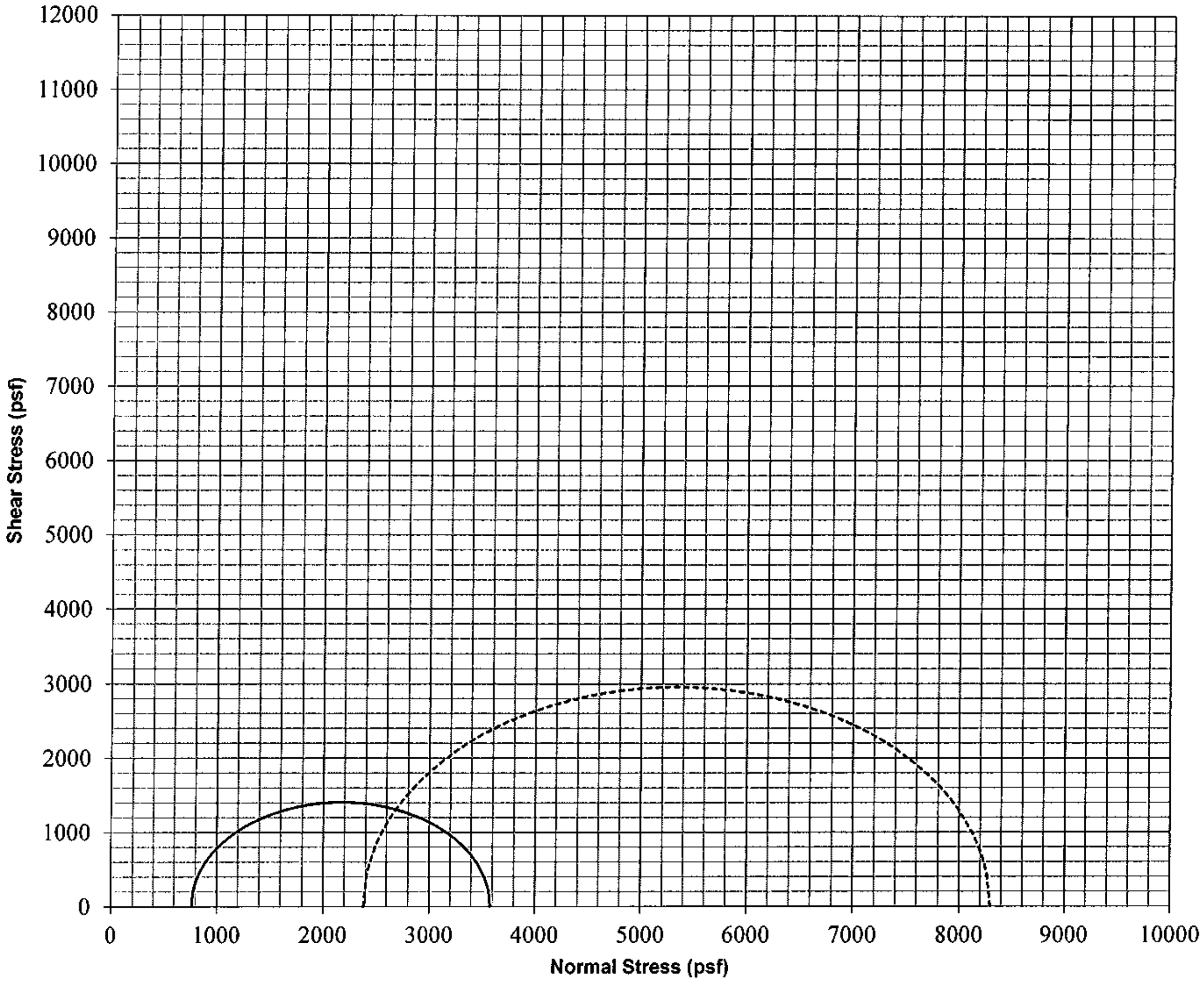
ASTM D-4767

TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU

INSPECTION SERVICES INC.

PLATE NUMBER_________



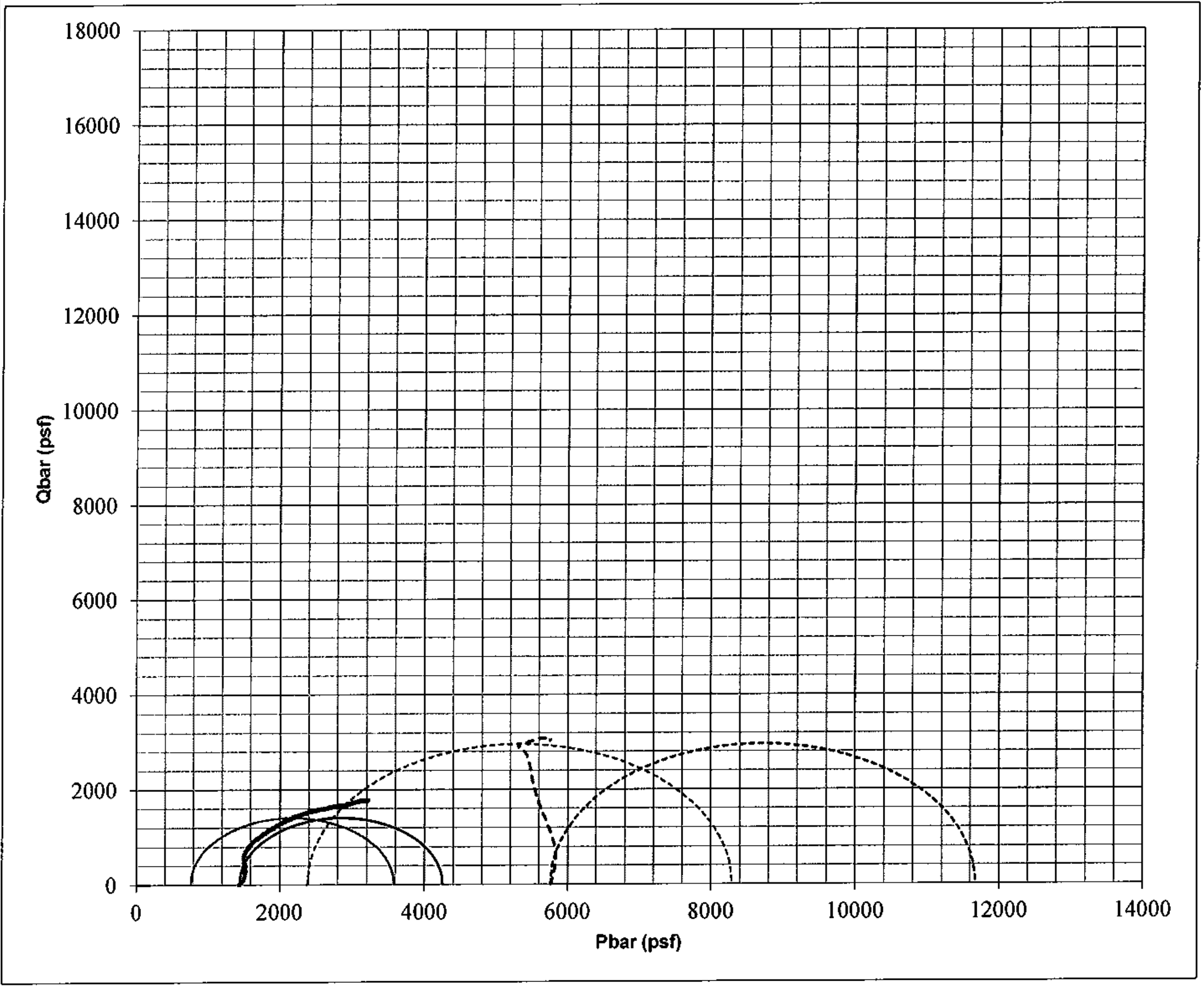
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2816	3.40	5.03	2.38	26.04	127.7	101.3	0.664	105.9	2.70	0.02	42	19	2.1
dot	5760	5915	5.50	5.12	2.40	25.09	126.2	100.9	0.671	100.9	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-162**	Sample #:	**10**
Project:	**BSVII**	Depth (ft):	**55**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2816	3.40	5.03	2.38	26.04	127.7	101.3	0.664	105.9	2.70	0.02	42	19	2.1
dot	5760	5915	5.50	5.12	2.40	25.09	126.2	100.9	0.671	100.9	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-162**	Sample #:	**10**
Project:	**BSVII**	Depth (ft):	**55**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________

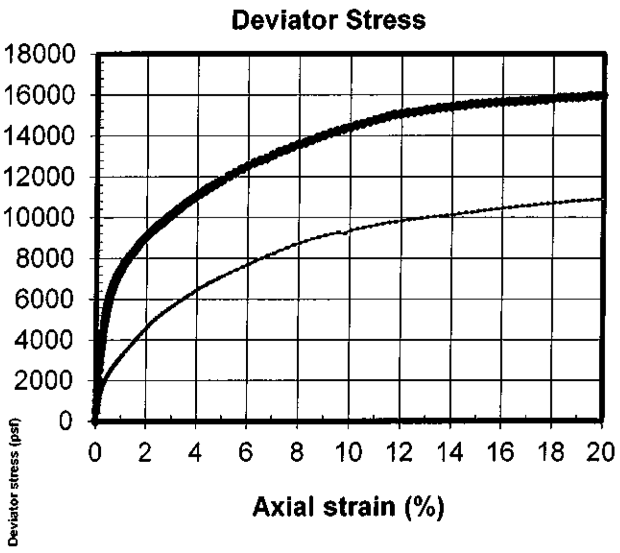
Boring Number	BH-163				BH-163	
Sample Number	16				16	
Depth (ft)	107				107	
Date Tested	05/16/20				05/17/20	
Description	Greenish gray sandy clay				Greenish gray sandy clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**			**Initial**	**After Consolidation**
Height (in)	5.12	5.09			4.91	4.84
Diameter (in)	2.40	2.38			2.39	2.36
Height/Diameter Ratio	2.14				2.06	
Total Weight (g)	798.02	794.27			766.19	755.64
Moisture Content (%)	20.89	20.32			20.25	18.60
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	131.74	133.66			132.72	136.57
Dry Density (pcf)	108.97	111.09			110.37	115.16
Area (cm^2)	29.06	28.70			28.88	28.12
Total Volume (cc)	378.17	370.97			360.40	345.40
Void Ratio	0.5467	0.5173			0.5272	0.4637
Saturation (%)	103.2	106.1			103.7	108.3
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.98	
Total Back Pressure (psf)	5760				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	4.10				5.24	
Effective Consolidation Stress (psf)	2880				9360	
Major Effective Stress at Failure (psf) σ1	8719				15930	
Minor Effective Stress at Failure (psf) σ3	2155				3907	
Deviator Stress at Failure (psf)	6564				12022	
Pore Pressure at Failure (psf)	725				5453	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	30					
Plastic Limit	18					
Remarks						

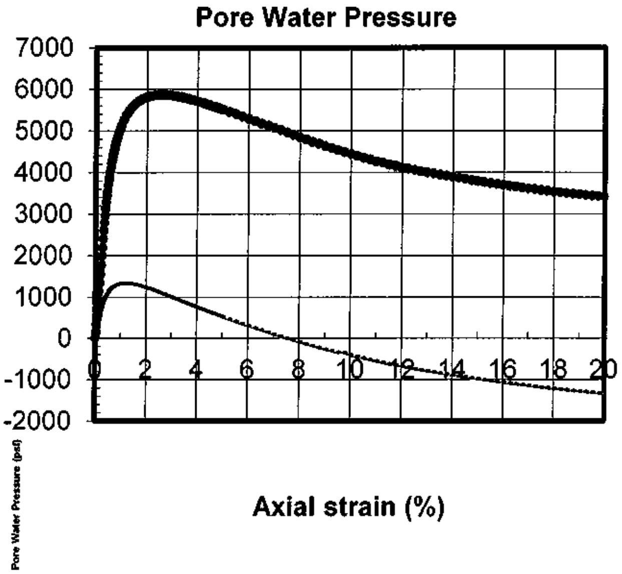
The following information is the same for all samples

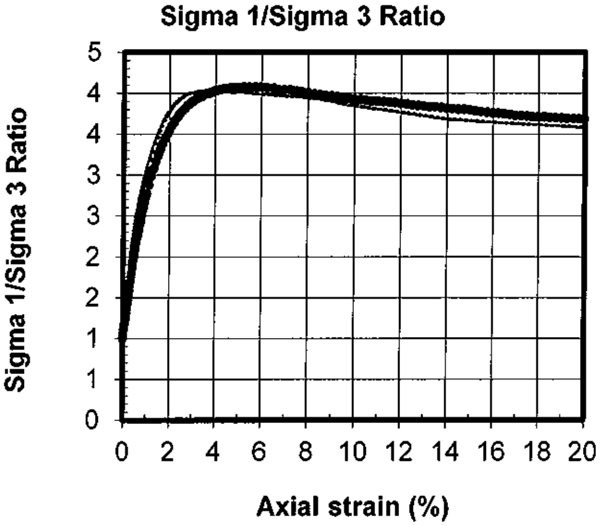
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

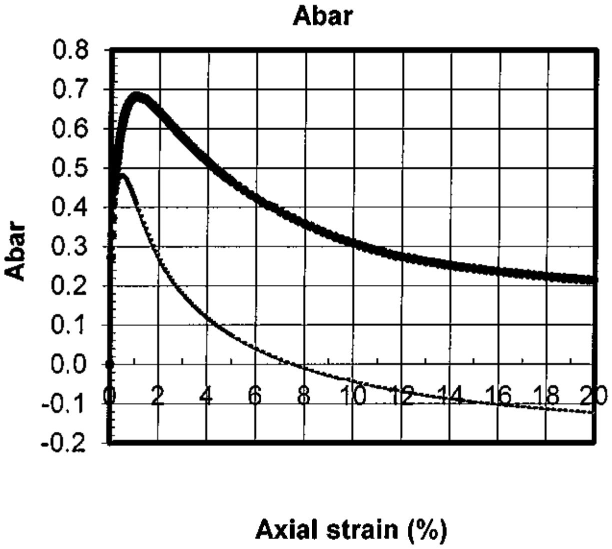
Client: **Mott MacDonald**	Boring #: **BH-163**	Sample #: **16**
Project: **BSVII**	Depth (ft): **107**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**









Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6564	4.10	5.12	2.40	20.89	131.7	109.0	0.547	103.2	2.70	0.02	30	18	2.1
dot	9360	12022	5.24	4.91	2.39	20.25	132.7	110.4	0.527	103.7	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-163**

Sample #: **16**

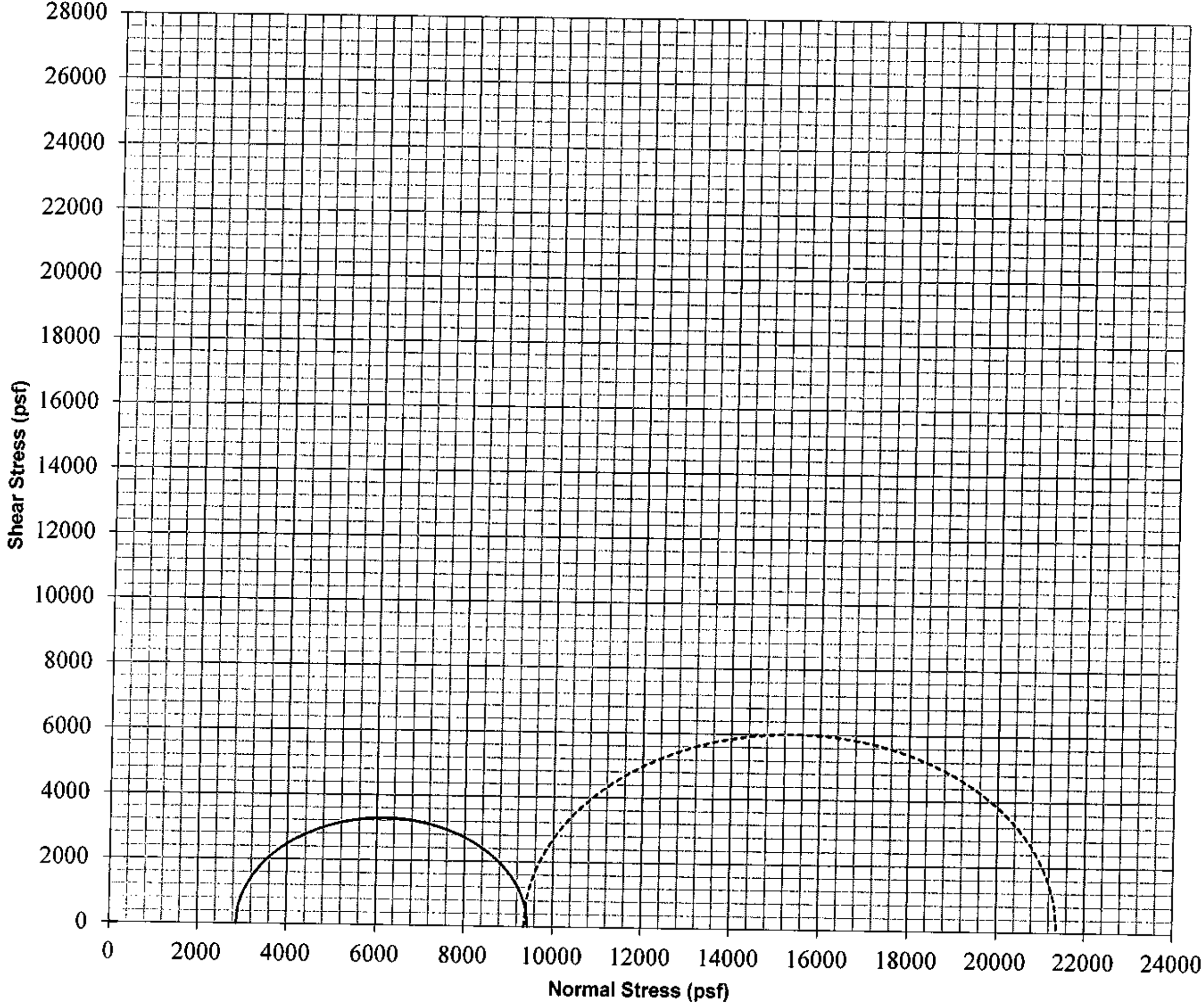
Project: **BSVII**

Depth (ft): **107**

Project #: **507385606**

Soil: **Greenish gray sandy clay**

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective $\sigma 1 / \sigma 3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6564	4.10	5.12	2.40	20.89	131.7	109.0	0.547	103.2	2.70	0.02	30	18	2.1
dot	9360	12022	5.24	4.91	2.39	20.25	132.7	110.4	0.527	103.7	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-163** Sample #: **16**

Project: **BSVII**

Depth (ft): **107**

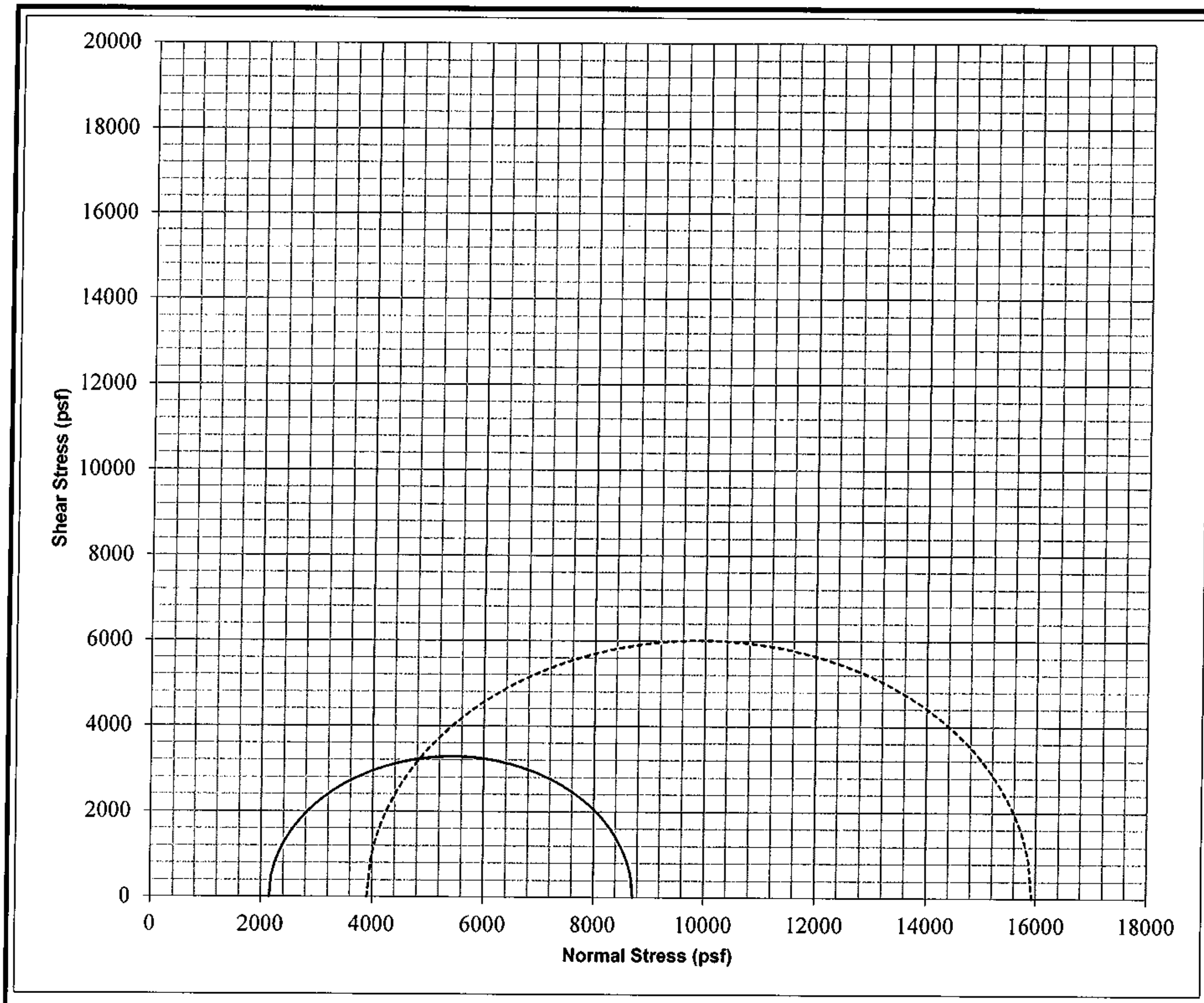
Project #: **507385606**

Soil: **Greenish gray sandy clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

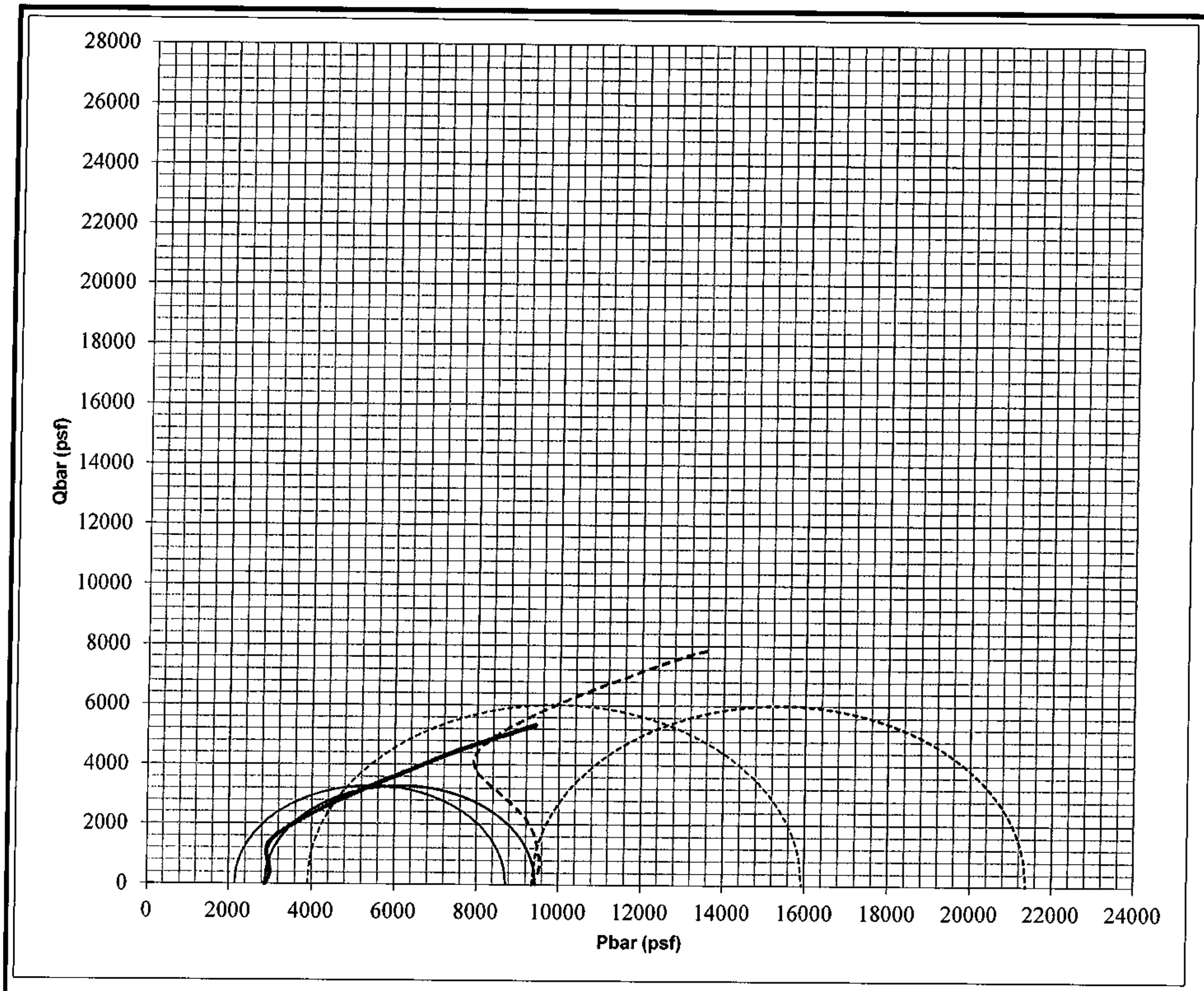
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6564	4.10	5.12	2.40	20.89	131.7	109.0	0.547	103.2	2.70	0.02	30	18	2.1
dot	9360	12022	5.24	4.91	2.39	20.25	132.7	110.4	0.527	103.7	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-163**	Sample #: **16**
Project: **BSVII**	Depth (ft): **107**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6564	4.10	5.12	2.40	20.89	131.7	109.0	0.547	103.2	2.70	0.02	30	18	2.1
dot	9360	12022	5.24	4.91	2.39	20.25	132.7	110.4	0.527	103.7	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-163**	Sample #: **16**
Project: **BSVII**	Depth (ft): **107**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________

Boring Number	BH-163				BH-163	
Sample Number	28				28	
Depth (ft)	140				140	
Date Tested	05/12/20				05/15/20	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**			**Initial**	**After Consolidation**
Height (in)	5.08	5.01			4.89	4.79
Diameter (in)	2.40	2.38			2.40	2.36
Height/Diameter Ratio	2.12				2.04	
Total Weight (g)	765.13	765.30			730.12	725.64
Moisture Content (%)	24.95	24.98			24.41	23.65
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	127.36	130.84			125.93	131.67
Dry Density (pcf)	101.93	104.69			101.22	106.49
Area (cm^2)	29.06	28.69			29.13	28.26
Total Volume (cc)	375.03	365.13			361.94	344.04
Void Ratio	0.6536	0.6099			0.6652	0.5828
Saturation (%)	103.1	110.6			99.1	109.5
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.95	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.50				11.00	
Effective Consolidation Stress (psf)	4320				12240	
Major Effective Stress at Failure (psf) σ1	9016				15883	
Minor Effective Stress at Failure (psf) σ3	2401				4561	
Deviator Stress at Failure (psf)	6615				11321	
Pore Pressure at Failure (psf)	1919				7679	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	

	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767		
Classification Based On	Plasticity index,		Plasticity index,
Liquid Limit	44		
Plastic Limit	22		
Remarks			

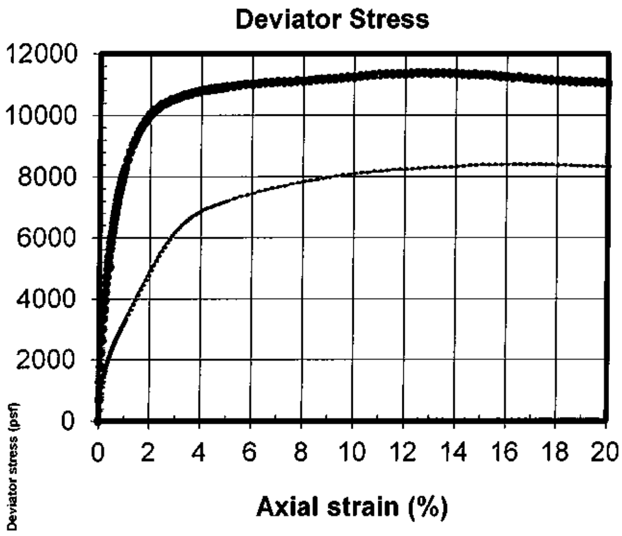
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

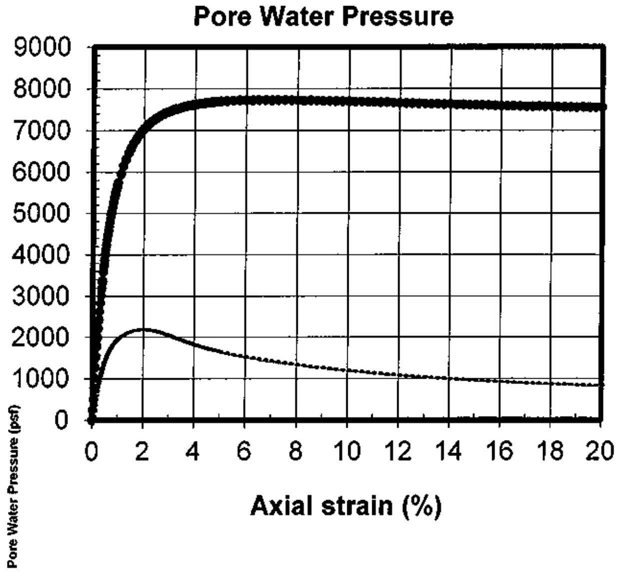
Client: **Mott MacDonald**	Boring #: **BH-163**	Sample #: **28**
Project: **BSVII**	Depth (ft): **140**	
Project #: **507385606**	Soil: **Greenish gray clay**	

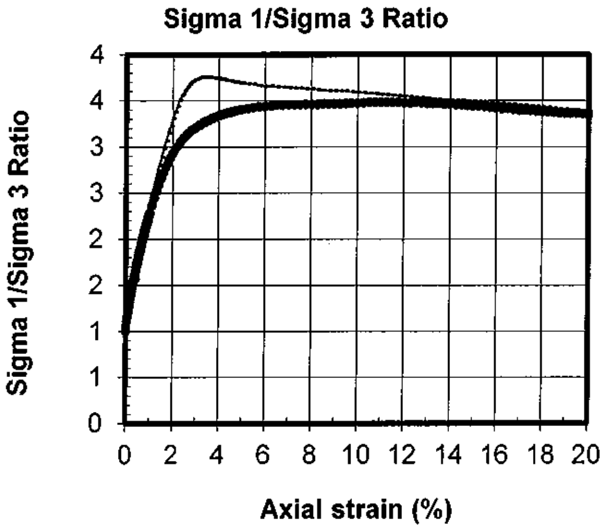
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

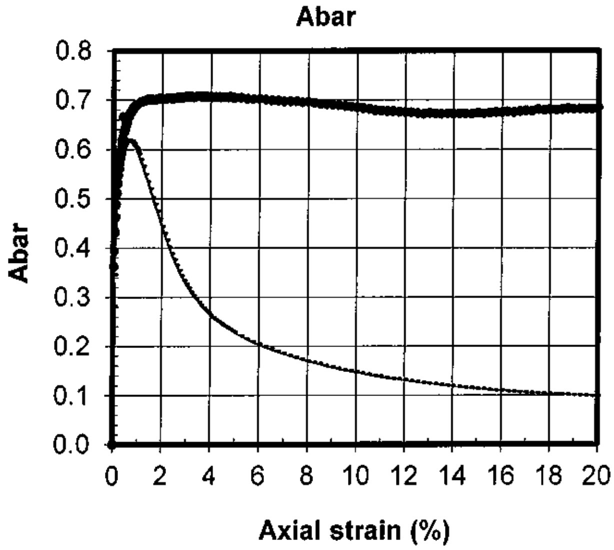
INSPECTION SERVICES INC.

PLATE NUMBER ________









Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6615	3.50	5.08	2.40	24.95	127.4	101.9	0.654	103.1	2.70	0.02	44	22	2.1
dot	12240	11321	11.00	4.89	2.40	24.41	125.9	101.2	0.665	99.1	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-163**

Sample #: **28**

Project: **BSVII**

Depth (ft): **140**

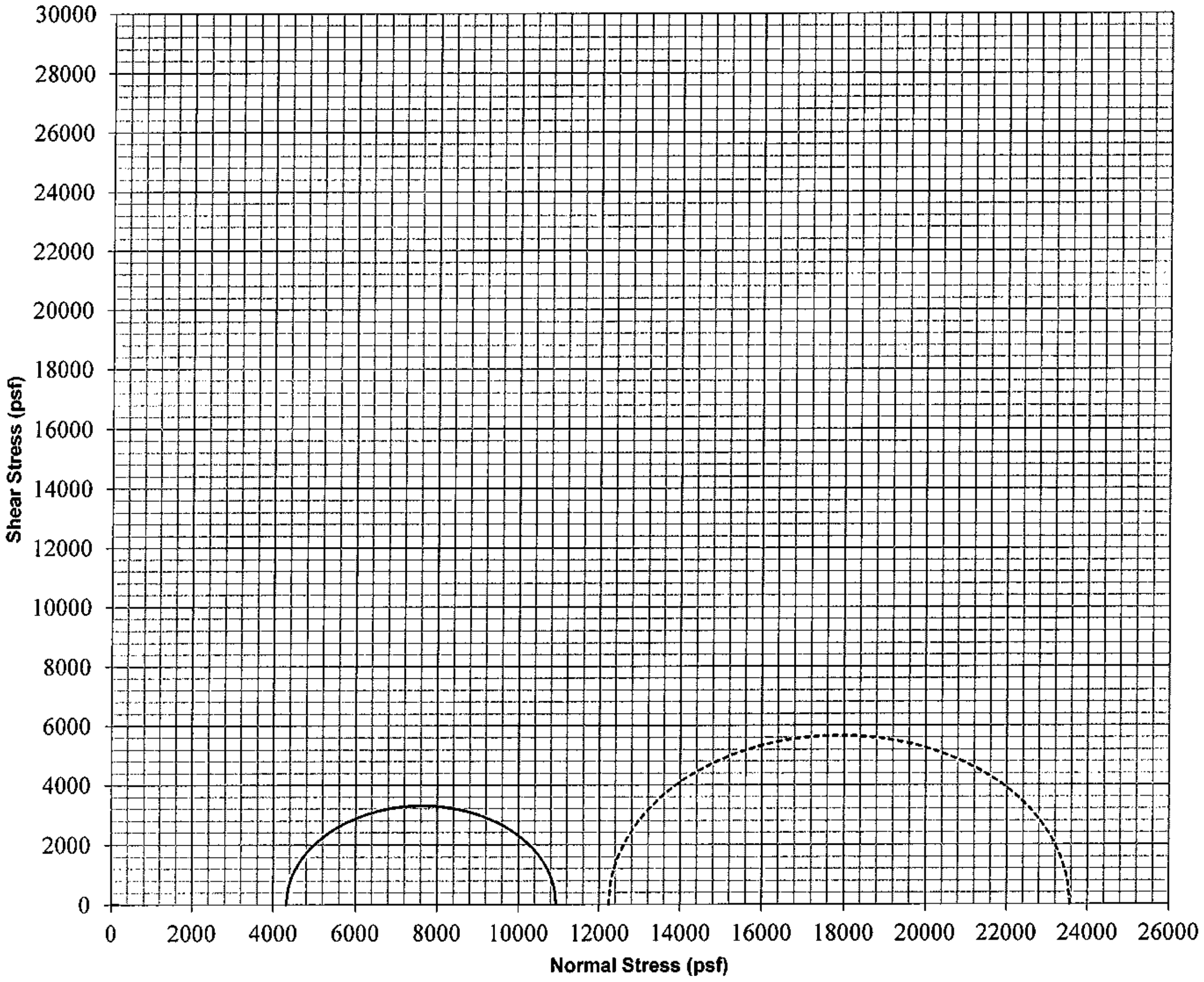
Project #: **507385606**

Soil: **Greenish gray clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6615	3.50	5.08	2.40	24.95	127.4	101.9	0.654	103.1	2.70	0.02	44	22	2.1
dot	12240	11321	11.00	4.89	2.40	24.41	125.9	101.2	0.665	99.1	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-163**

Sample #: **28**

Project: **BSVII**

Depth (ft): **140**

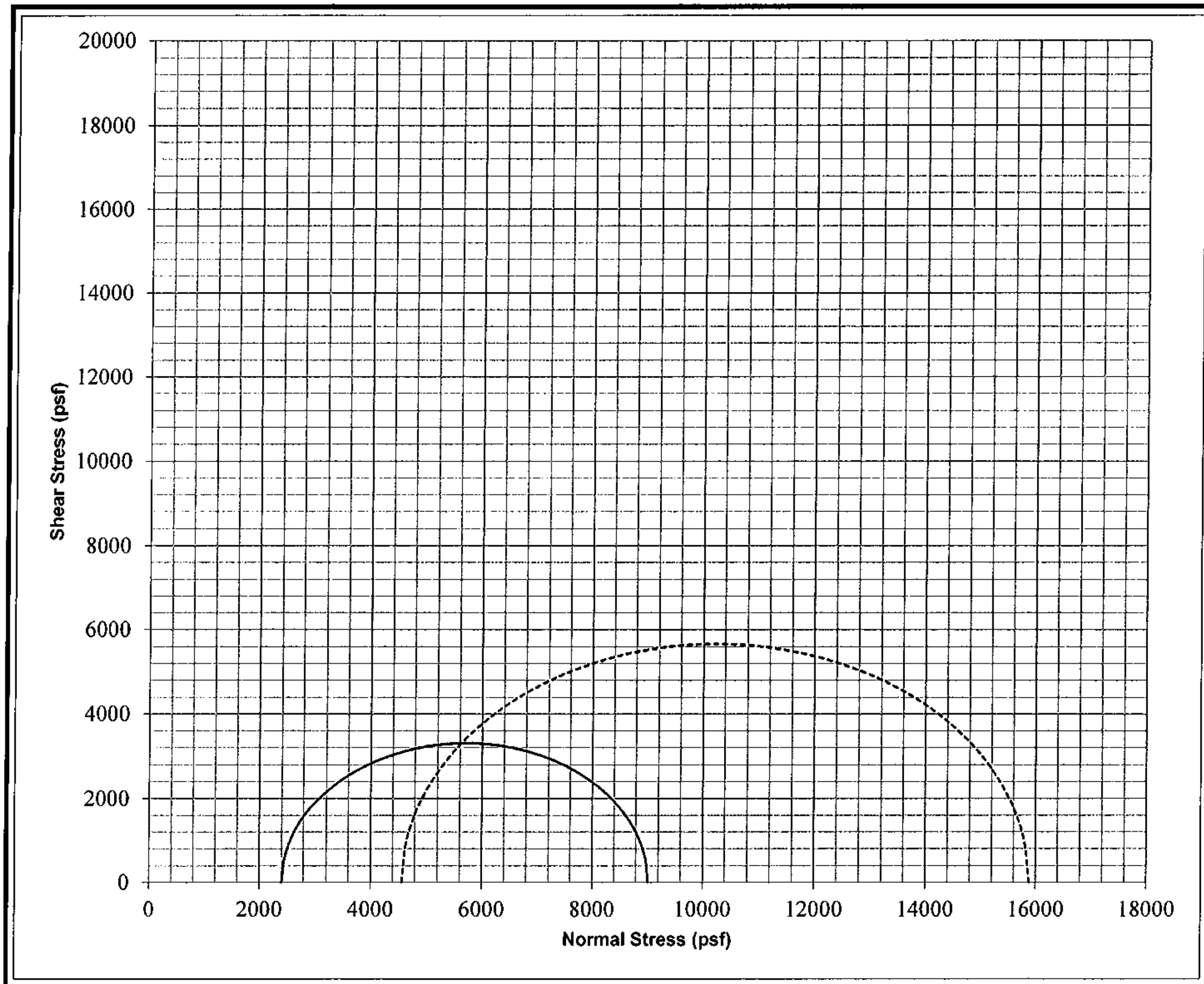
Project #: **507385606**

Soil: **Greenish gray clay**

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER_________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

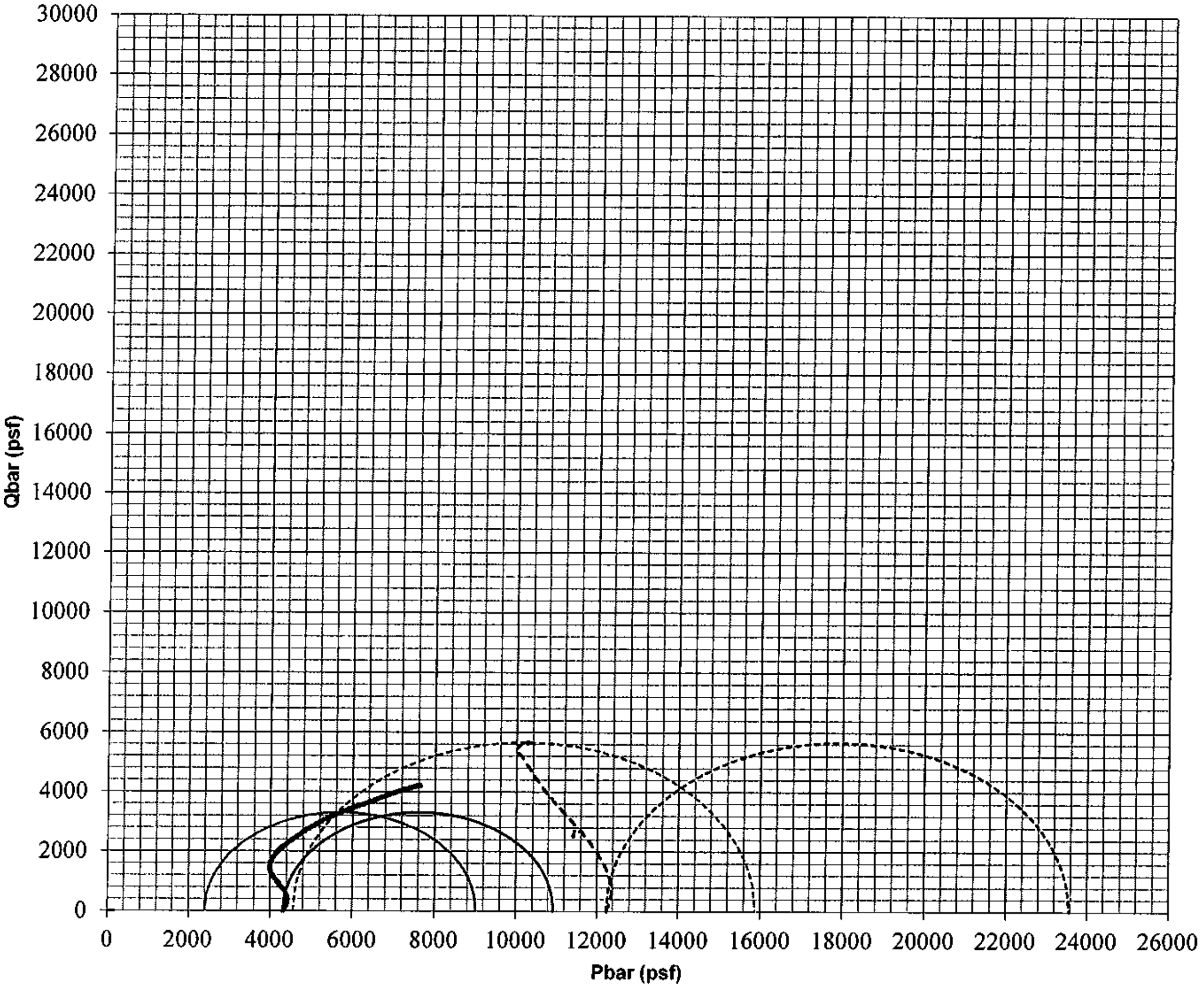
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6615	3.50	5.08	2.40	24.95	127.4	101.9	0.654	103.1	2.70	0.02	44	22	2.1
dot	12240	11321	11.00	4.89	2.40	24.41	125.9	101.2	0.665	99.1	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-163**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**140**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	6615	3.50	5.08	2.40	24.95	127.4	101.9	0.654	103.1	2.70	0.02	44	22	2.1
dot	12240	11321	11.00	4.89	2.40	24.41	125.9	101.2	0.665	99.1	2.70	0.02			2.0

Client: **Mott MacDonald**	Boring #: **BH-163**	Sample #: **28**	
Project: **BSVII**	Depth (ft): **140**		
Project #: **507385606**	Soil: **Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

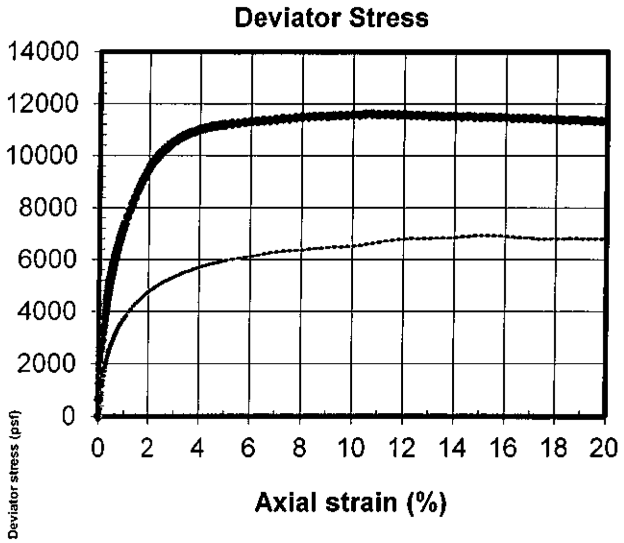
Boring Number	BH-164				BH-164	
Sample Number	43				43	
Depth (ft)	134.5				134.5	
Date Tested	05/18/20				05/21/20	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.27	5.22			5.06	4.96
Diameter (in)	2.39	2.37			2.40	2.37
Height/Diameter Ratio	2.20				2.11	
Total Weight (g)	806.87	800.51			782.07	774.07
Moisture Content (%)	22.08	21.12			21.98	20.73
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	129.74	132.75			130.09	134.87
Dry Density (pcf)	106.27	109.60			106.65	111.71
Area (cm^2)	29.00	28.40			29.19	28.44
Total Volume (cc)	388.24	376.44			375.30	358.30
Void Ratio	0.5860	0.5378			0.5805	0.5089
Saturation (%)	101.7	106.0			102.2	110.0
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	4.40				5.25	
Effective Consolidation Stress (psf)	4320				11520	
Major Effective Stress at Failure (psf) σ1	8049				15888	
Minor Effective Stress at Failure (psf) σ3	2216				4659	
Deviator Stress at Failure (psf)	5833				11229	
Pore Pressure at Failure (psf)	2104				6861	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	40					
Plastic Limit	20					
Remarks						

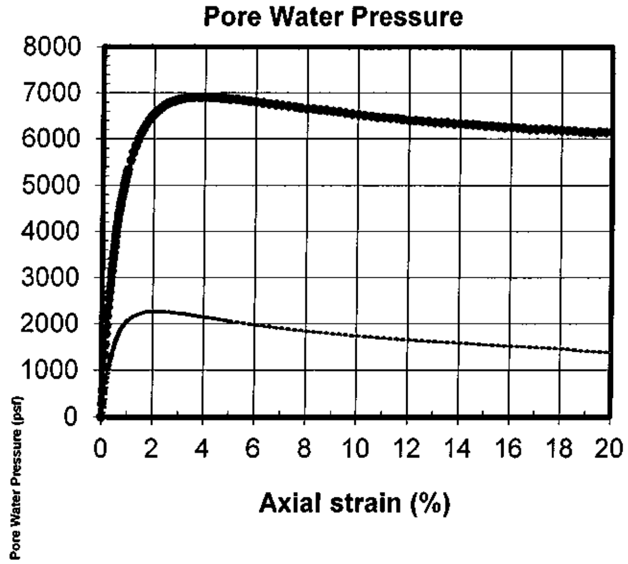
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

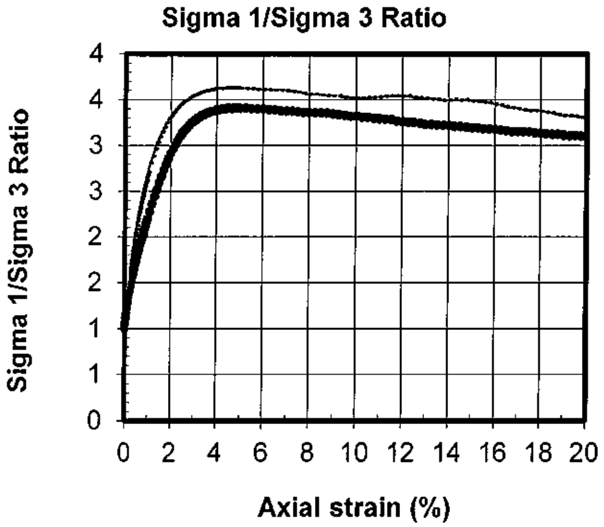
Client: **Mott MacDonald**	Boring #: **BH-164**	Sample #: **43**
Project: **BSVII**	Depth (ft): **134.5**	
Project #: **507385606**	Soil: **Greenish gray clay**	

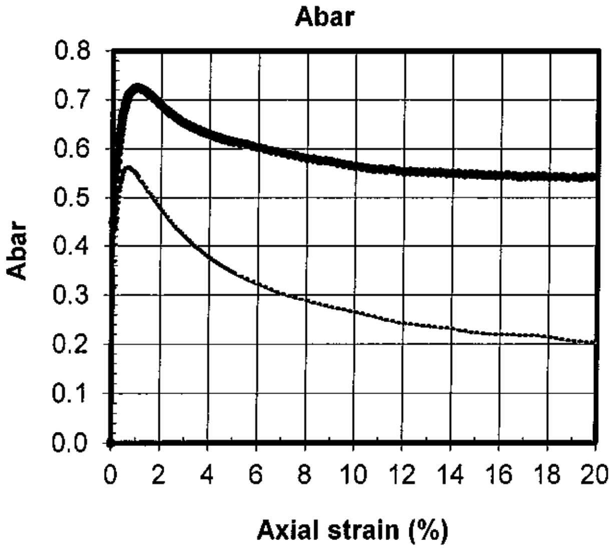
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER** __________







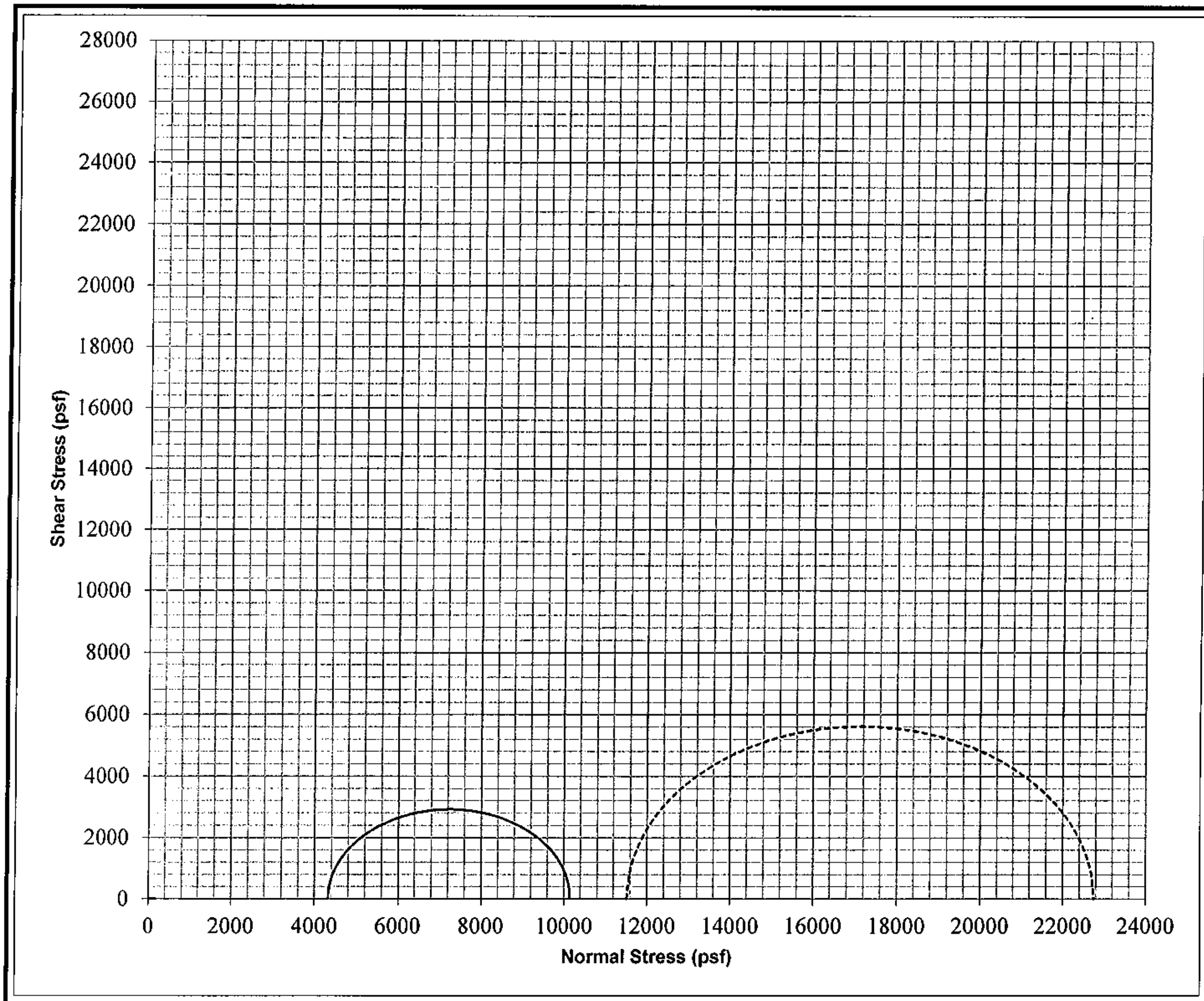


Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5833	4.40	5.27	2.39	22.08	129.7	106.3	0.586	101.7	2.70	0.02	40	20	2.2
dot	11520	11229	5.25	5.06	2.40	21.98	130.1	106.6	0.580	102.2	2.70	0.02			2.1

Client: **Mott MacDonald**		Boring #: **BH-164**	Sample #: **43**
Project: **BSVII**		Depth (ft): **134.5**	
Project #: **507385606**		Soil: **Greenish gray clay**	

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



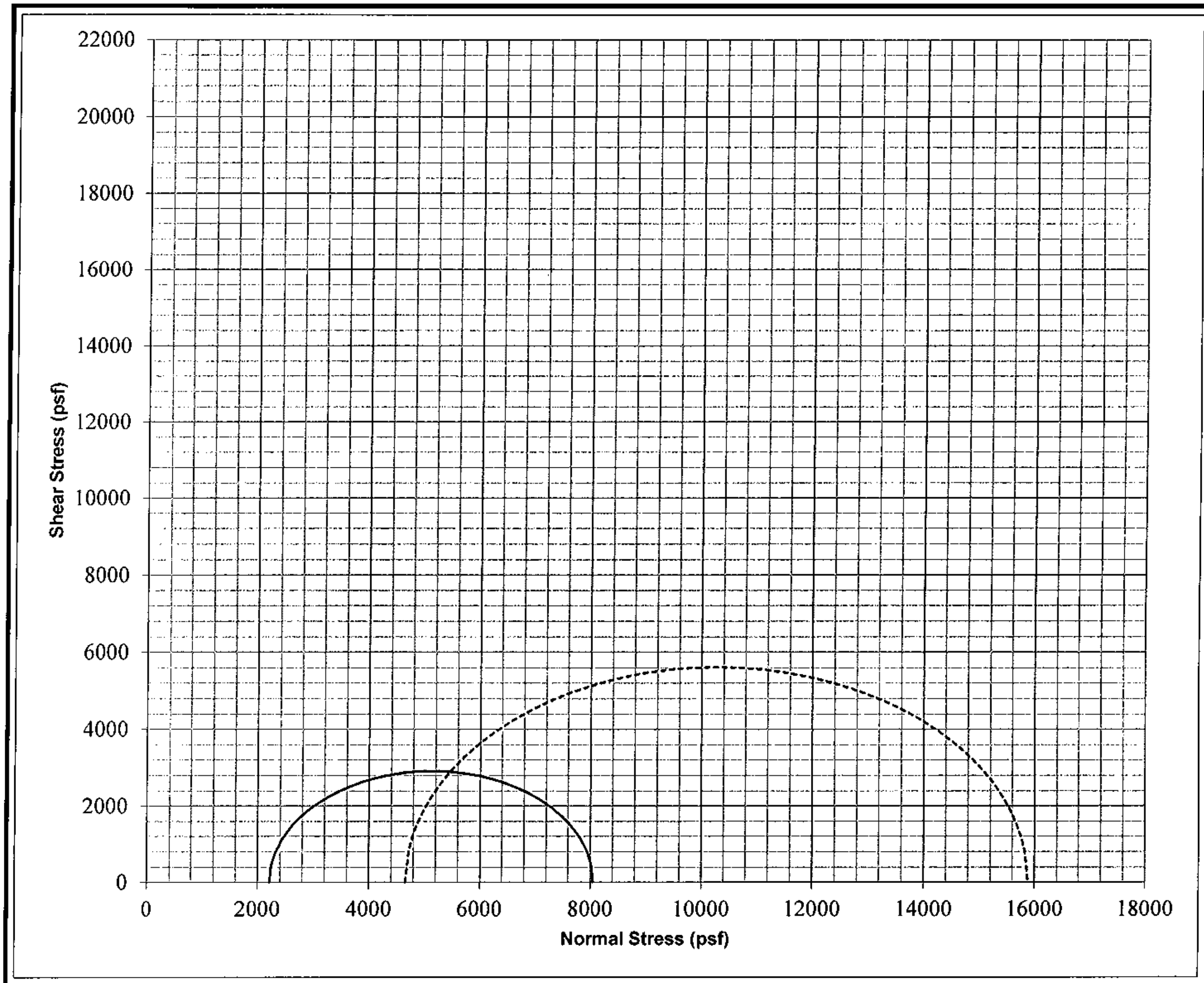
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5833	4.40	5.27	2.39	22.08	129.7	106.3	0.586	101.7	2.70	0.02	40	20	2.2
dot	11520	11229	5.25	5.06	2.40	21.98	130.1	106.6	0.580	102.2	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-164**	Sample #:	**43**
Project:	**BSVII**	Depth (ft):	**134.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

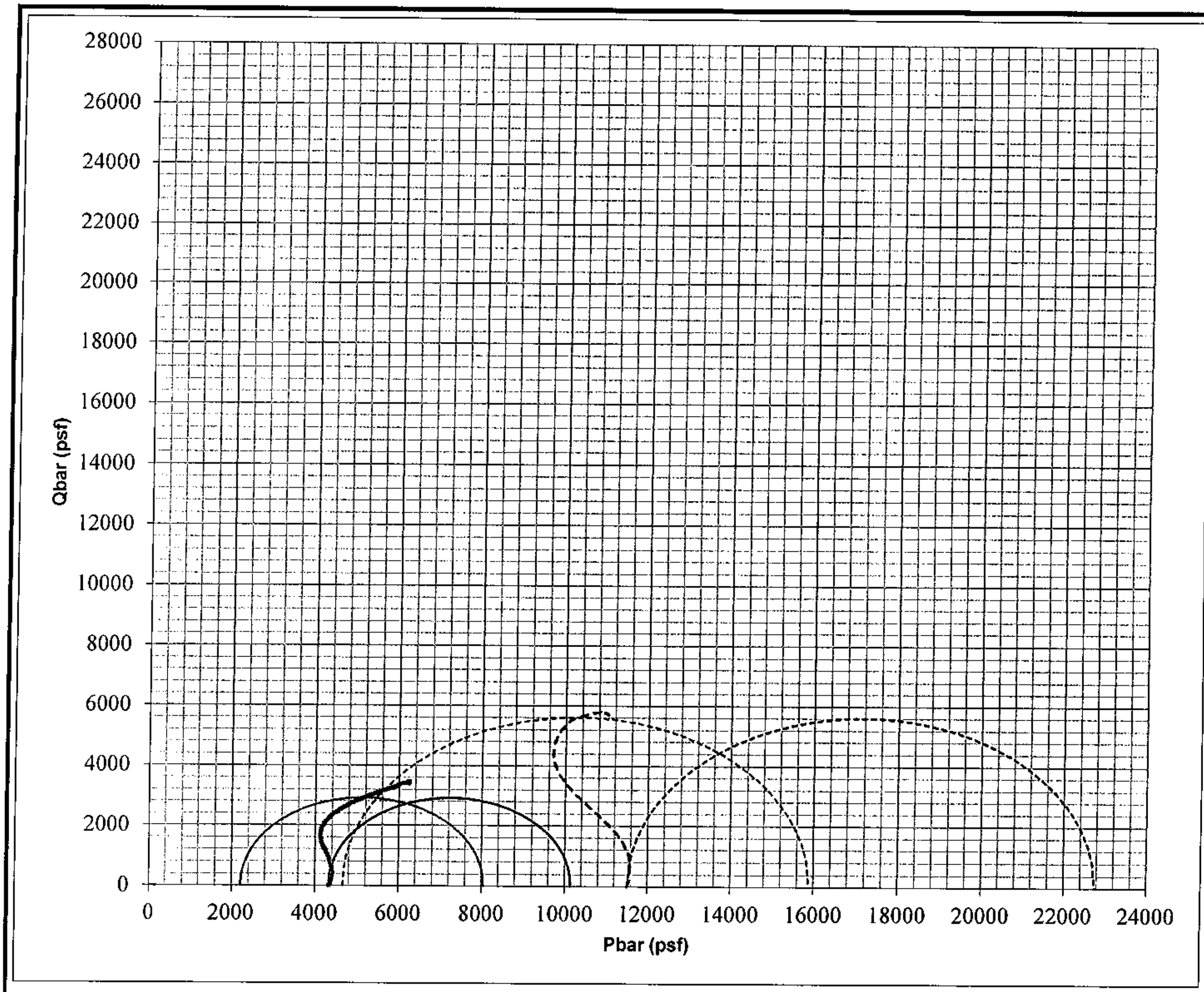
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5833	4.40	5.27	2.39	22.08	129.7	106.3	0.586	101.7	2.70	0.02	40	20	2.2
dot	11520	11229	5.25	5.06	2.40	21.98	130.1	106.6	0.580	102.2	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-164**	Sample #: **43**
Project: **BSVII**	Depth (ft): **134.5**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	5833	4.40	5.27	2.39	22.08	129.7	106.3	0.586	101.7	2.70	0.02	40	20	2.2
dot	11520	11229	5.25	5.06	2.40	21.98	130.1	106.6	0.580	102.2	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #: **BH-164**	Sample #: **43**
Project:	**BSVII**	Depth (ft): **134.5**	
Project #:	**507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

Boring Number	BH-165				BH-165	
Sample Number	7				7	
Depth (ft)	32.5				32.5	
Date Tested	05/06/20				05/07/20	
Description	Gray clay				Gray clay	
Sample Condition	Undisturbed		0		Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.01	4.97			4.88	4.80
Diameter (in)	2.40	2.38			2.39	2.35
Height/Diameter Ratio	2.09				2.04	
Total Weight (g)	755.02	750.82			740.23	728.17
Moisture Content (%)	25.37	24.68			24.36	22.33
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	127.23	129.28			128.74	133.41
Dry Density (pcf)	101.48	103.70			103.52	109.05
Area (cm^2)	29.13	28.71			28.94	27.92
Total Volume (cc)	370.45	362.55			358.95	340.75
Void Ratio	0.6609	0.6255			0.6282	0.5456
Saturation (%)	103.7	106.5			104.7	110.5
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.98	
Total Back Pressure (psf)	7200				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.50				7.50	
Effective Consolidation Stress (psf)	1440				4320	
Major Effective Stress at Failure (psf) σ1	3153				6177	
Minor Effective Stress at Failure (psf) σ3	852				1825	
Deviator Stress at Failure (psf)	2301				4352	
Pore Pressure at Failure (psf)	588				2495	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	42					
Plastic Limit	17					
Remarks						

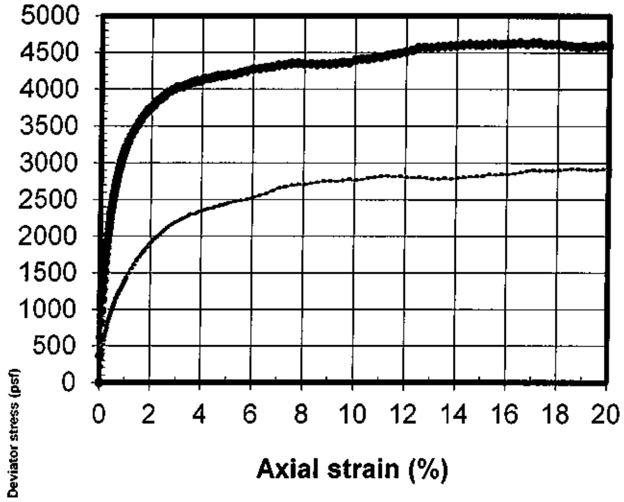
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

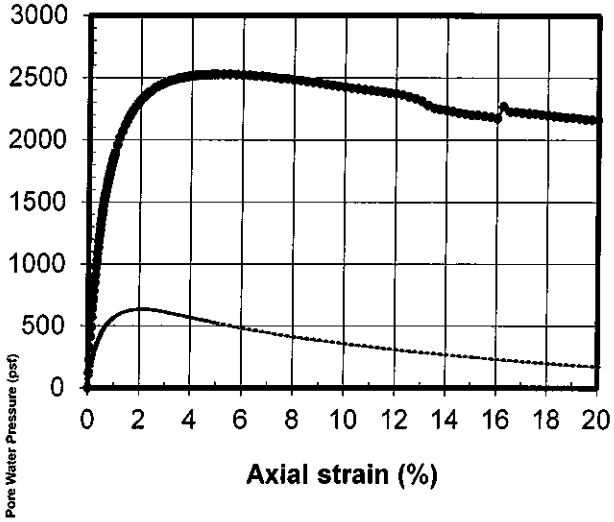
Client: **Mott MacDonald**	Boring #: **BH-165**	Sample #: **7**
Project: **BSVII**	Depth (ft): **32.5**	
Project #: **507385606**	Soil: **Gray clay**	

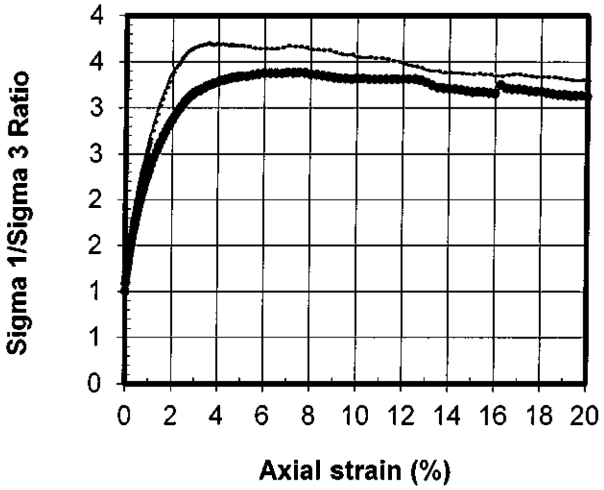
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

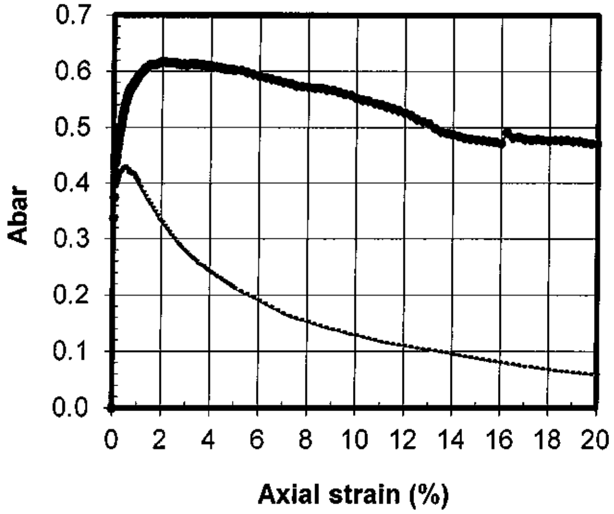
INSPECTION SERVICES INC.

PLATE NUMBER ________


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio

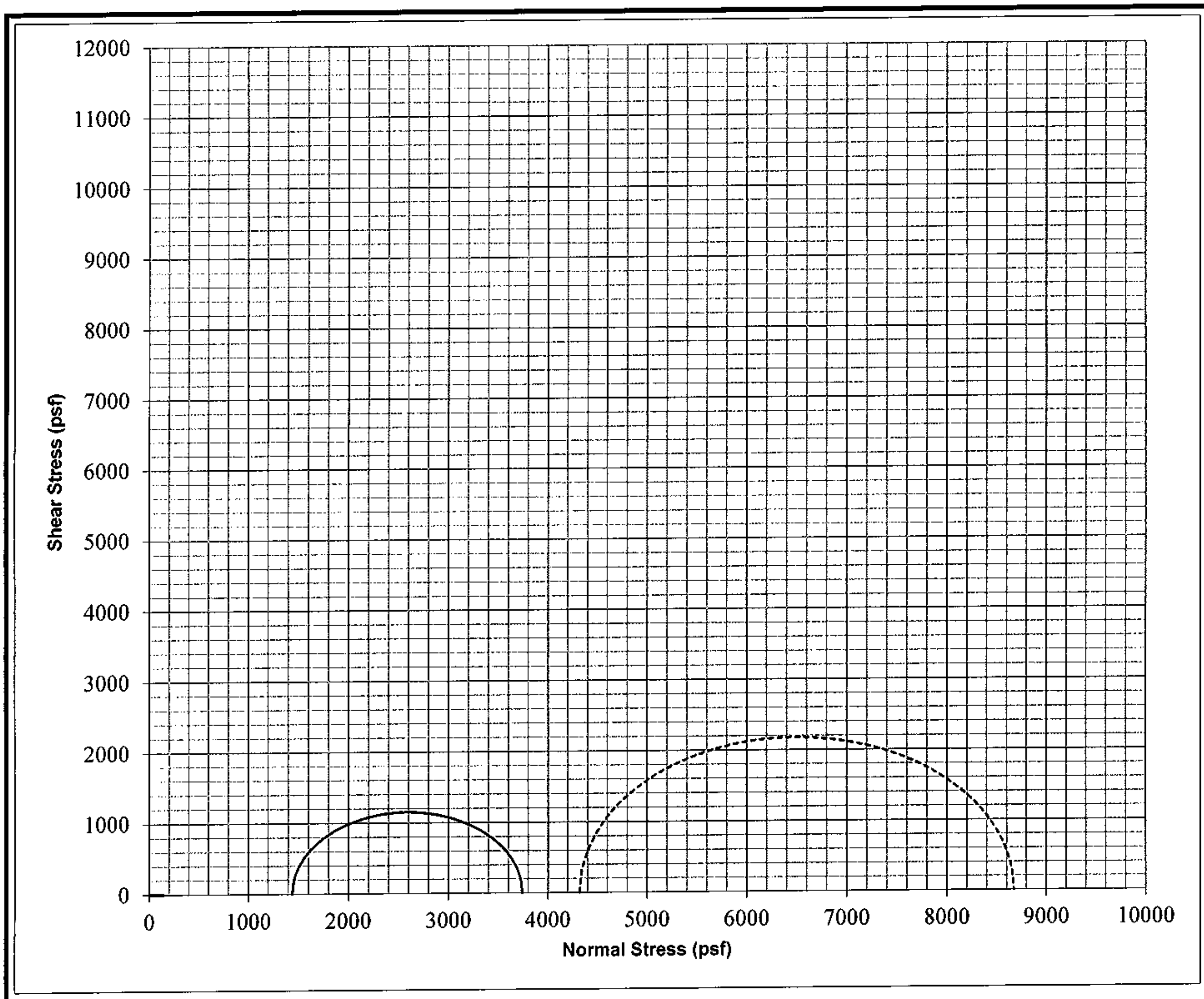

Abar

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2301	3.50	5.01	2.40	25.37	127.2	101.5	0.661	103.7	2.70	0.02	42	17	2.1
dot	4320	4352	7.50	4.88	2.39	24.36	128.7	103.5	0.628	104.7	2.70	0.02			2.0

Client: **Mott MacDonald**	Boring #: **BH-165**	Sample #: **7**	
Project: **BSVII**	Depth (ft): **32.5**		
Project #: **507385606**	Soil: **Gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
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dot	4320	4352	7.50	4.88	2.39	24.36	128.7	103.5	0.628	104.7	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-165** Sample #: **7**

Project: **BSVII**

Depth (ft): **32.5**

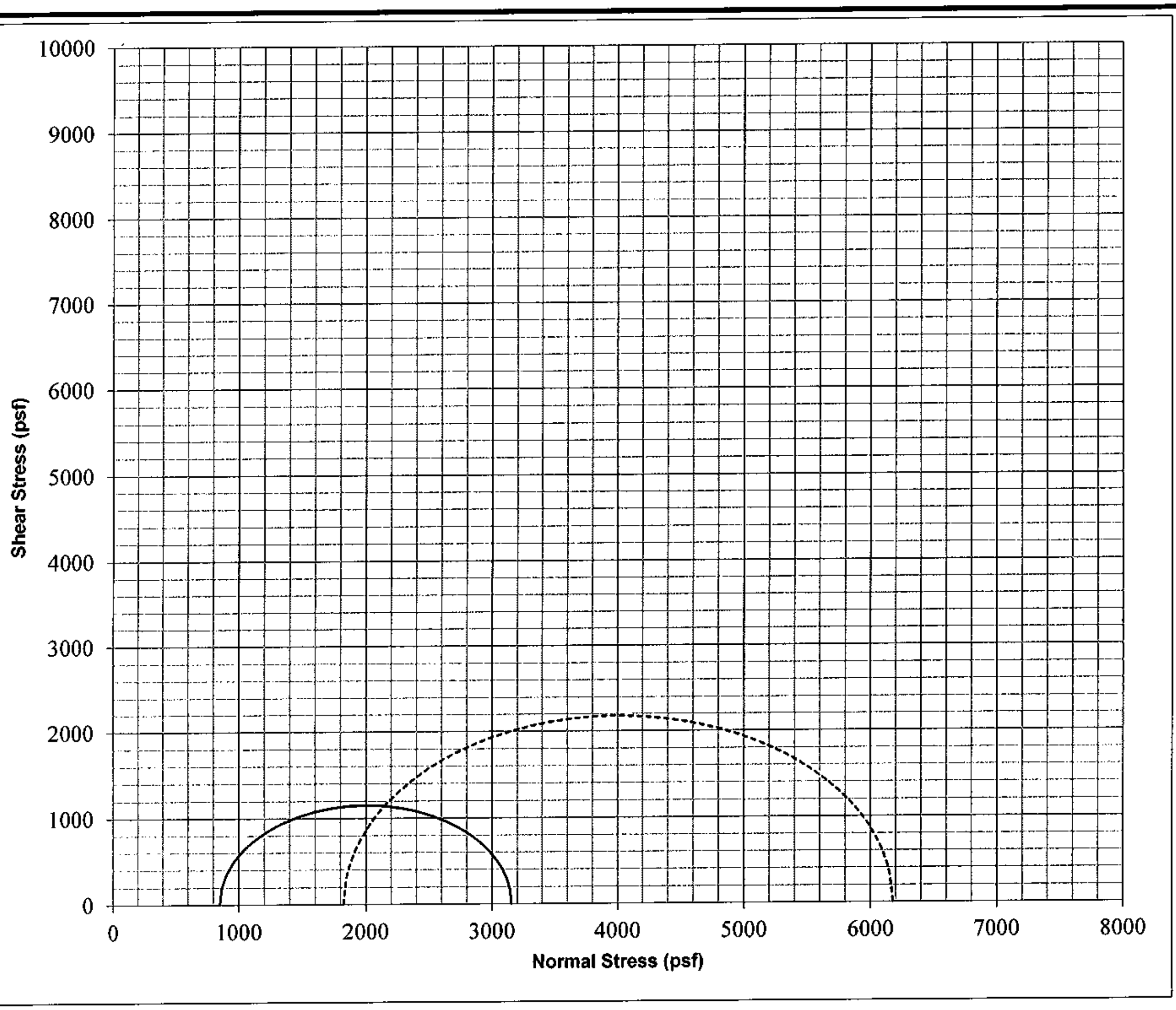
Project #: **507385606**

Soil: **Gray clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective $\sigma 1$ / $\sigma 3$ ratio

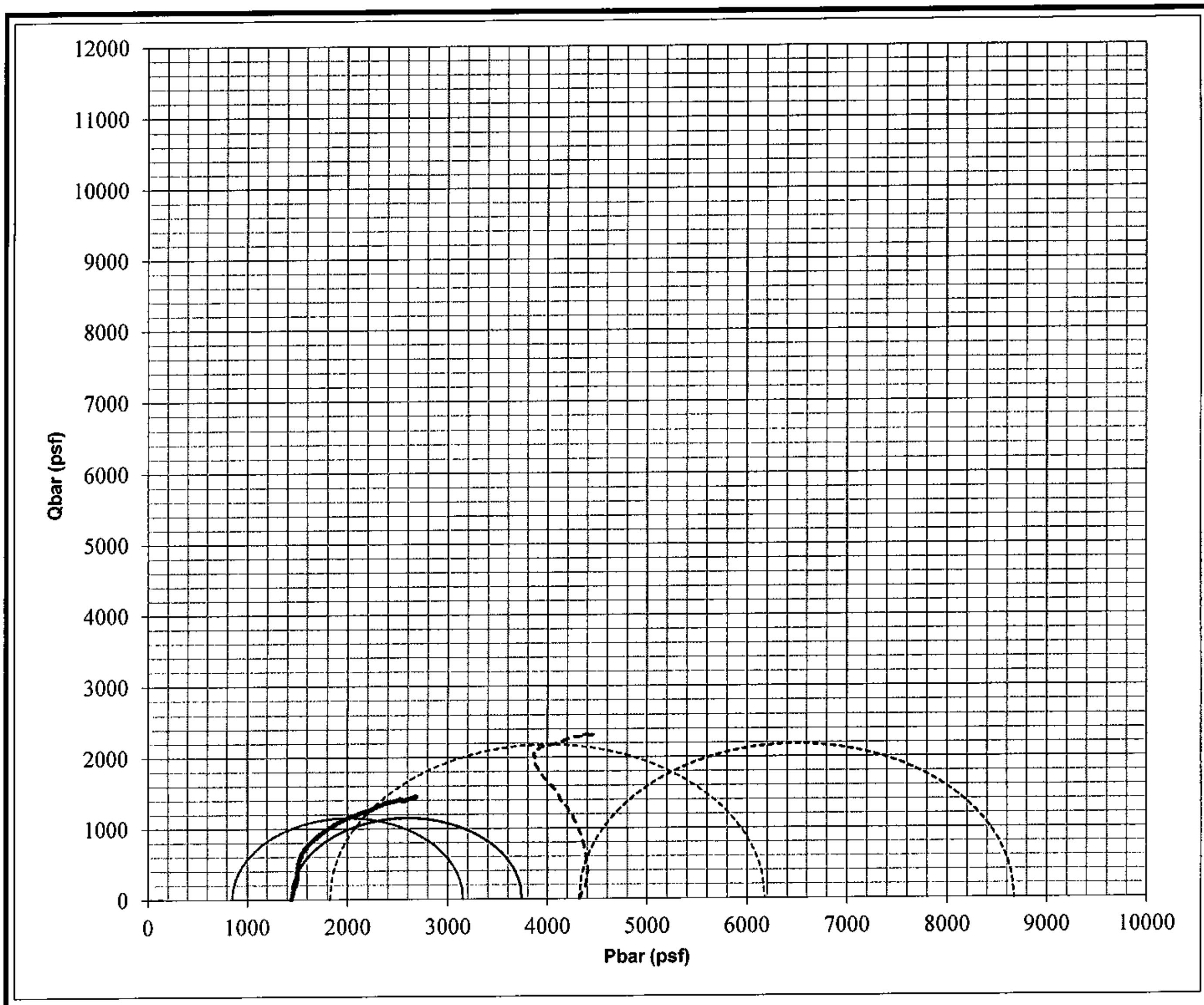
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2301	3.50	5.01	2.40	25.37	127.2	101.5	0.661	103.7	2.70	0.02	42	17	2.1
dot	4320	4352	7.50	4.88	2.39	24.36	128.7	103.5	0.628	104.7	2.70	0.02			2.0

Client: **Mott MacDonald**	Boring #: **BH-165**	Sample #: **7**
Project: **BSVII**	Depth (ft): **32.5**	
Project #: **507385606**	Soil: **Gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2301	3.50	5.01	2.40	25.37	127.2	101.5	0.661	103.7	2.70	0.02	42	17	2.1
dot	4320	4352	7.50	4.88	2.39	24.36	128.7	103.5	0.628	104.7	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-165**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**32.5**		
Project #:	**507385606**	Soil:	**Gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

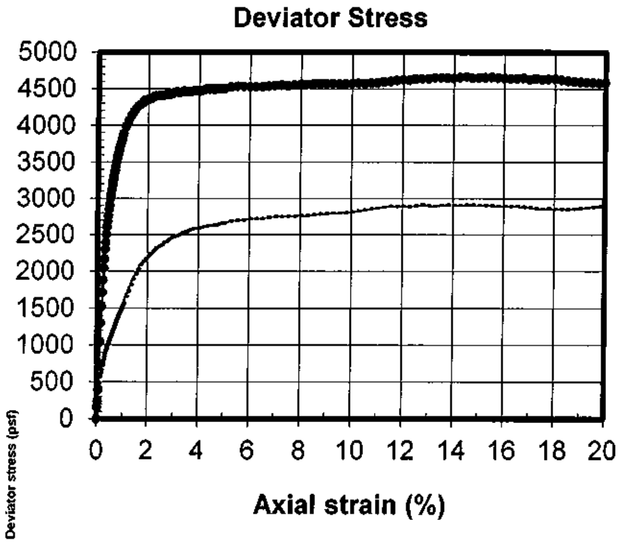
INSPECTION SERVICES INC. **PLATE NUMBER________**

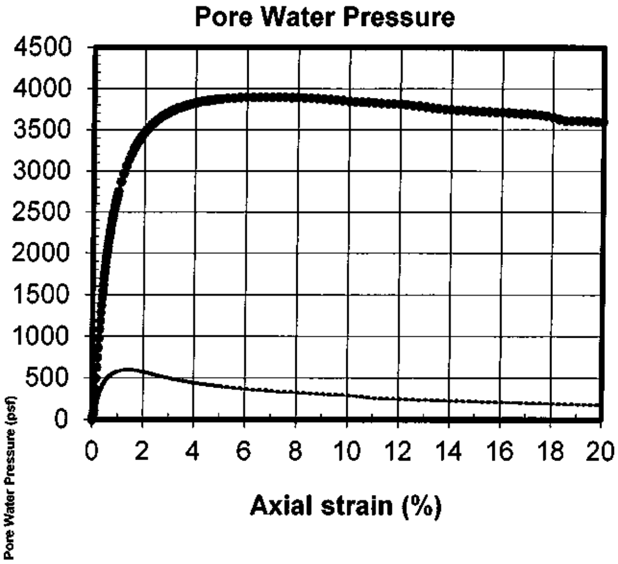
Boring Number	BH-165				BH-165	
Sample Number	12				12	
Depth (ft)	45				45	
Date Tested	06/18/20				06/19/20	
Description	Greenish gray sandy clay				Greenish gray sandy clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.12	5.10			5.13	5.03
Diameter (in)	2.40	2.39			2.40	2.37
Height/Diameter Ratio	2.14				2.14	
Total Weight (g)	753.97	762.43			755.41	750.92
Moisture Content (%)	25.22	26.62			26.62	25.87
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	124.46	127.17			124.00	128.40
Dry Density (pcf)	99.40	100.43			97.93	102.01
Area (cm^2)	29.06	28.89			29.19	28.55
Total Volume (cc)	378.17	374.27			380.30	365.10
Void Ratio	0.6957	0.6783			0.7211	0.6524
Saturation (%)	97.9	106.0			99.7	107.1
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.95	
Total Back Pressure (psf)	7200				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.90				7.25	
Effective Consolidation Stress (psf)	1440				5760	
Major Effective Stress at Failure (psf) σ1	3395				6415	
Minor Effective Stress at Failure (psf) σ3	938				1865	
Deviator Stress at Failure (psf)	2457				4551	
Pore Pressure at Failure (psf)	502				3895	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	40					
Plastic Limit	20					
Remarks						

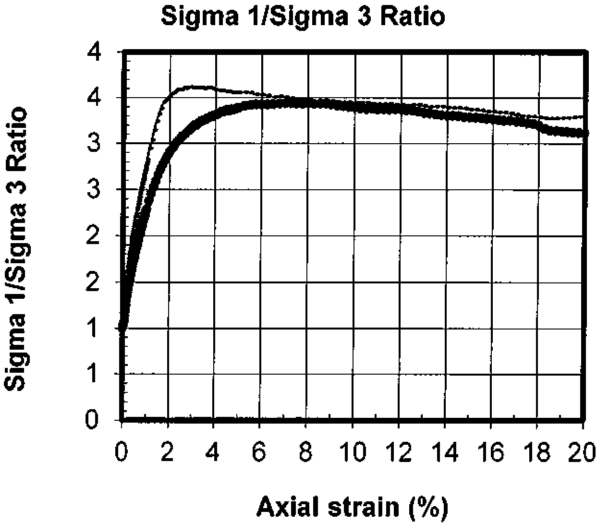
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

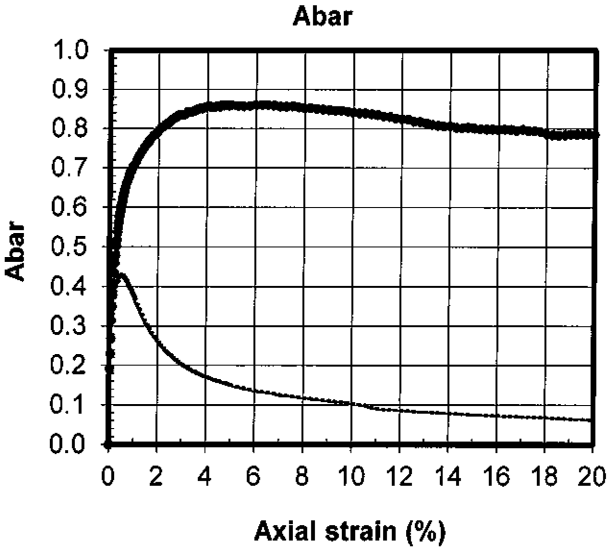
Client: **Mott MacDonald**	Boring #: **BH-165**	Sample #: **12**
Project: **BSVII**	Depth (ft): **45**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio

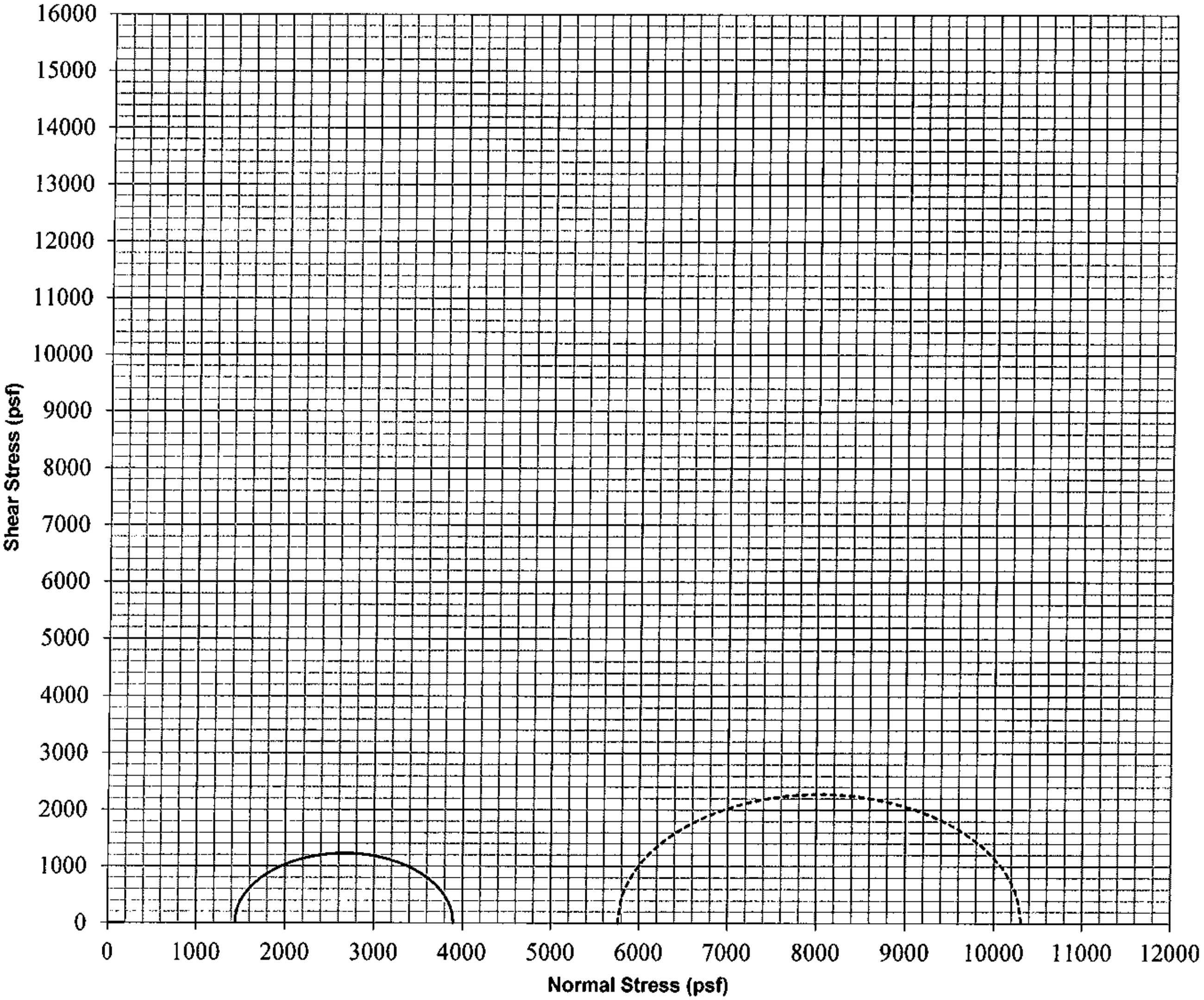

Abar

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2457	2.90	5.12	2.40	25.22	124.5	99.4	0.696	97.9	2.70	0.02	40	20	2.1
dot	5760	4551	7.25	5.13	2.40	26.62	124.0	97.9	0.721	99.7	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-165**	Sample #: **12**	
Project: **BSVII**	Depth (ft): **45**		
Project #: **507385606**	Soil: **Greenish gray sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
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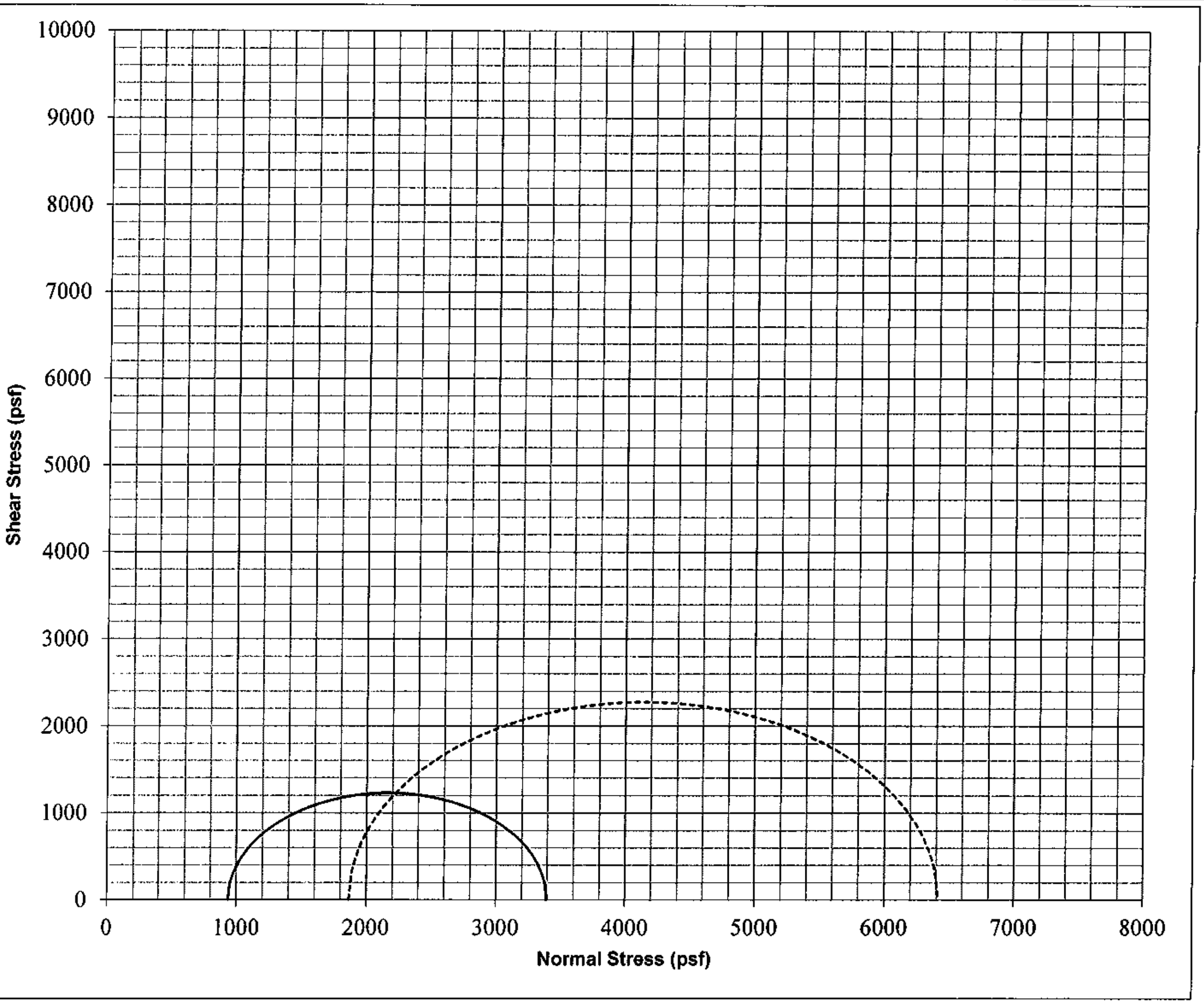
dot	5760	4551	7.25	5.13	2.40	26.62	124.0	97.9	0.721	99.7	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #: **BH-165**	Sample #: **12**
Project:	**BSVII**	Depth (ft): **45**	
Project #:	**507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



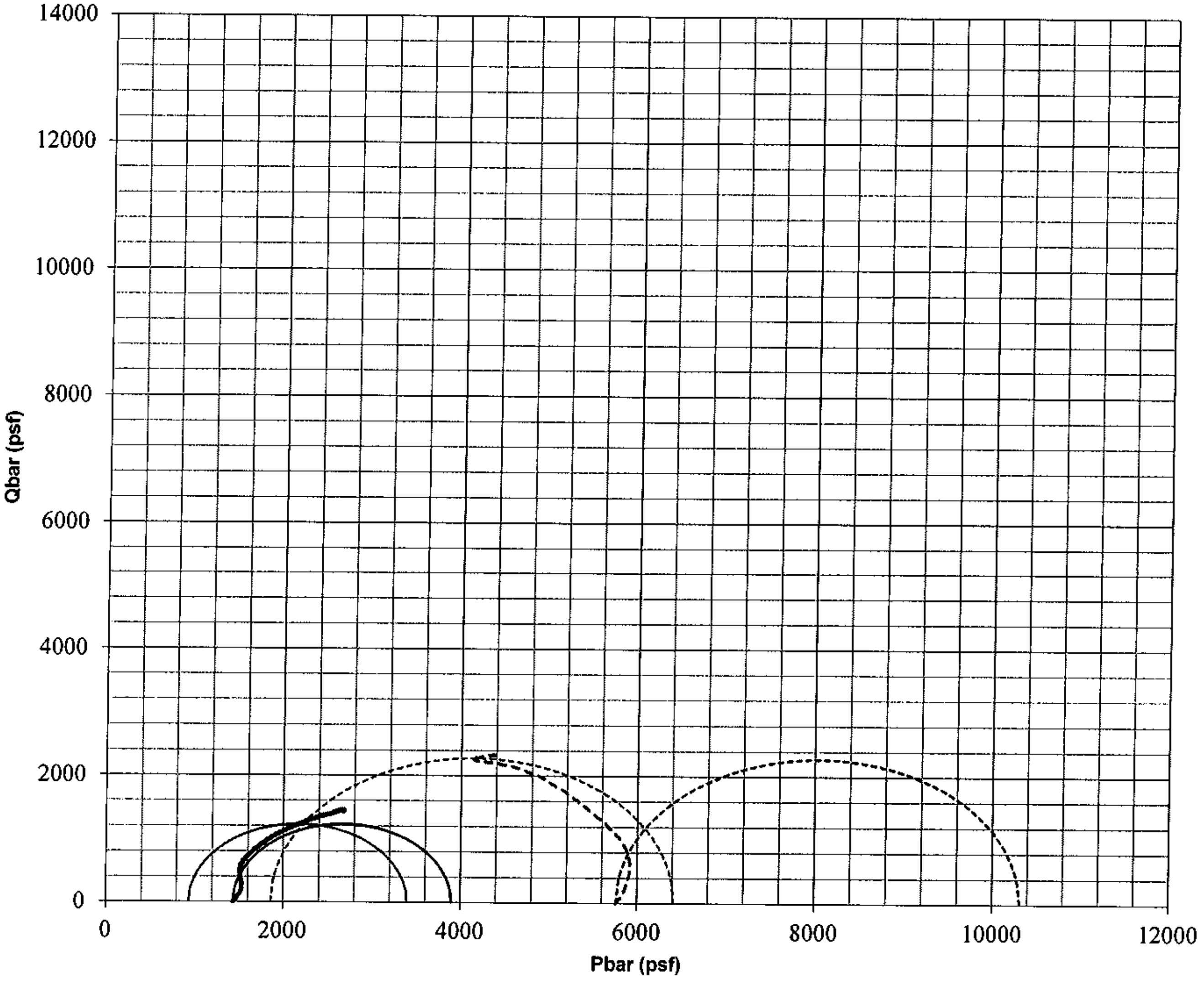
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2457	2.90	5.12	2.40	25.22	124.5	99.4	0.696	97.9	2.70	0.02	40	20	2.1
dot	5760	4551	7.25	5.13	2.40	26.62	124.0	97.9	0.721	99.7	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-165**	Sample #:	**12**
Project:	**BSVII**	Depth (ft):	**45**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2457	2.90	5.12	2.40	25.22	124.5	99.4	0.696	97.9	2.70	0.02	40	20	2.1
dot	5760	4551	7.25	5.13	2.40	26.62	124.0	97.9	0.721	99.7	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #: **BH-165**	Sample #: **12**
Project:	**BSVII**	Depth (ft): **45**	
Project #:	**507385606**	Soil: **Greenish gray sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

Boring Number	BH-167				BH-167	
Sample Number	10				10	
Depth (ft)	40				40	
Date Tested	07/27/20				07/28/20	
Description	Grayish brown clay with sand				Grayish brown clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.99	4.97			4.99	4.95
Diameter (in)	2.39	2.38			2.40	2.37
Height/Diameter Ratio	2.09				2.08	
Total Weight (g)	763.18	764.21			757.80	754.13
Moisture Content (%)	22.00	22.16			21.55	20.96
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	129.87	131.44			128.35	131.26
Dry Density (pcf)	106.45	107.60			105.59	108.51
Area (cm^2)	28.94	28.77			29.06	28.53
Total Volume (cc)	366.85	362.95			368.57	358.67
Void Ratio	0.5833	0.5665			0.5962	0.5534
Saturation (%)	101.8	105.6			97.6	102.3
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.98	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.60				5.75	
Effective Consolidation Stress (psf)	1440				5040	
Major Effective Stress at Failure (psf) σ1	4387				10134	
Minor Effective Stress at Failure (psf) σ3	1133				2717	
Deviator Stress at Failure (psf)	3253				7417	
Pore Pressure at Failure (psf)	307				2323	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	

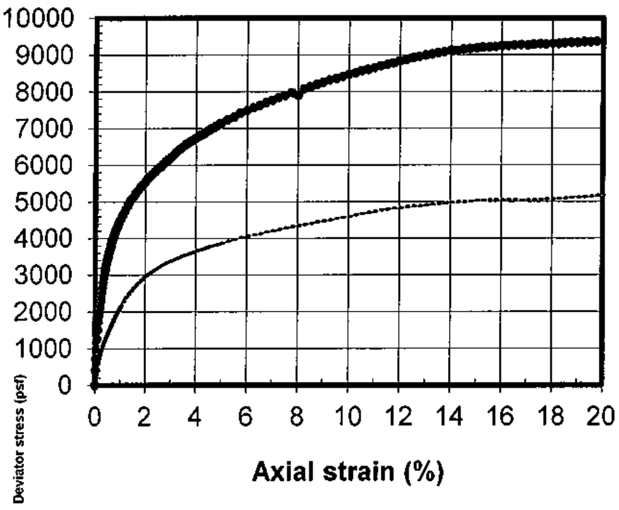
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767		
Classification Based On	Plasticity index, Percent		Plasticity index, Percent
Liquid Limit	34		
Plastic Limit	20		
Remarks			

The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

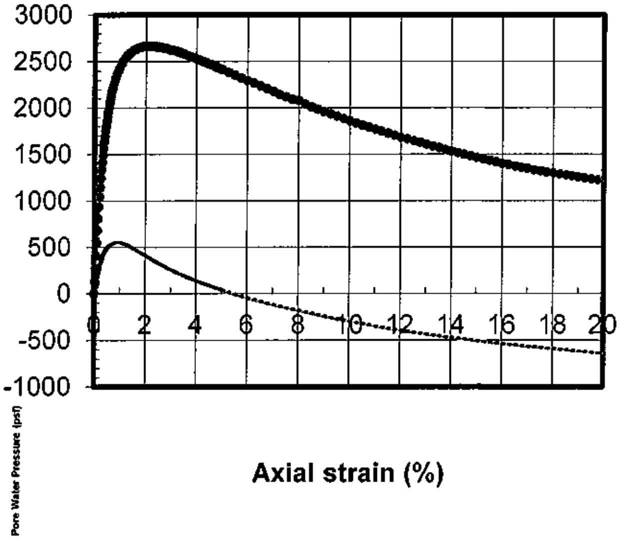
Client: **Mott MacDonald**	Boring #: **BH-167**	Sample #: **10**
Project: **BSVII**	Depth (ft): **40**	
Project #: **507385606**	Soil: **Grayish brown clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

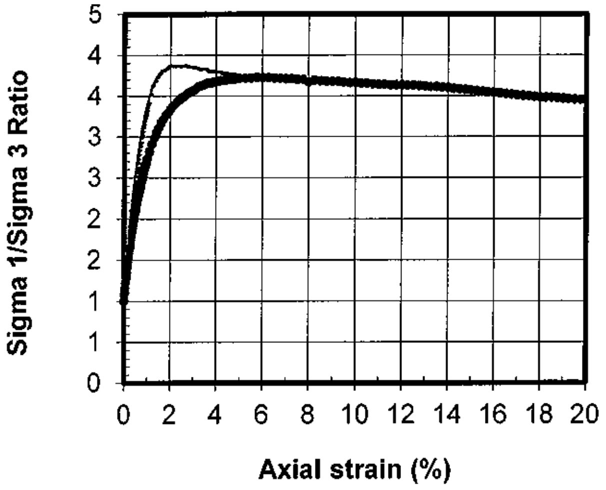
Deviator Stress



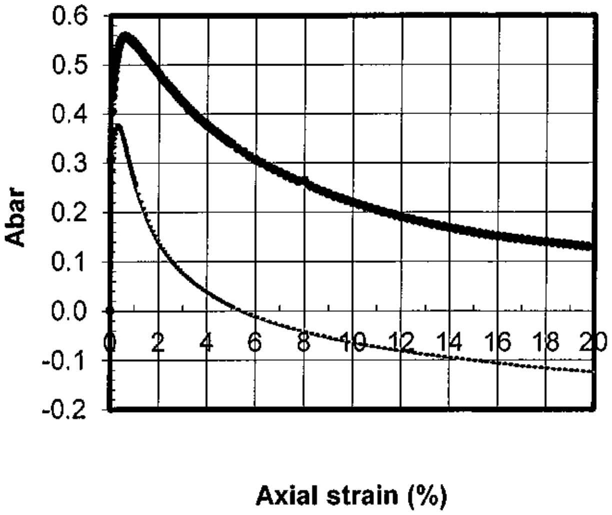
Pore Water Pressure



Sigma 1/Sigma 3 Ratio



Abar

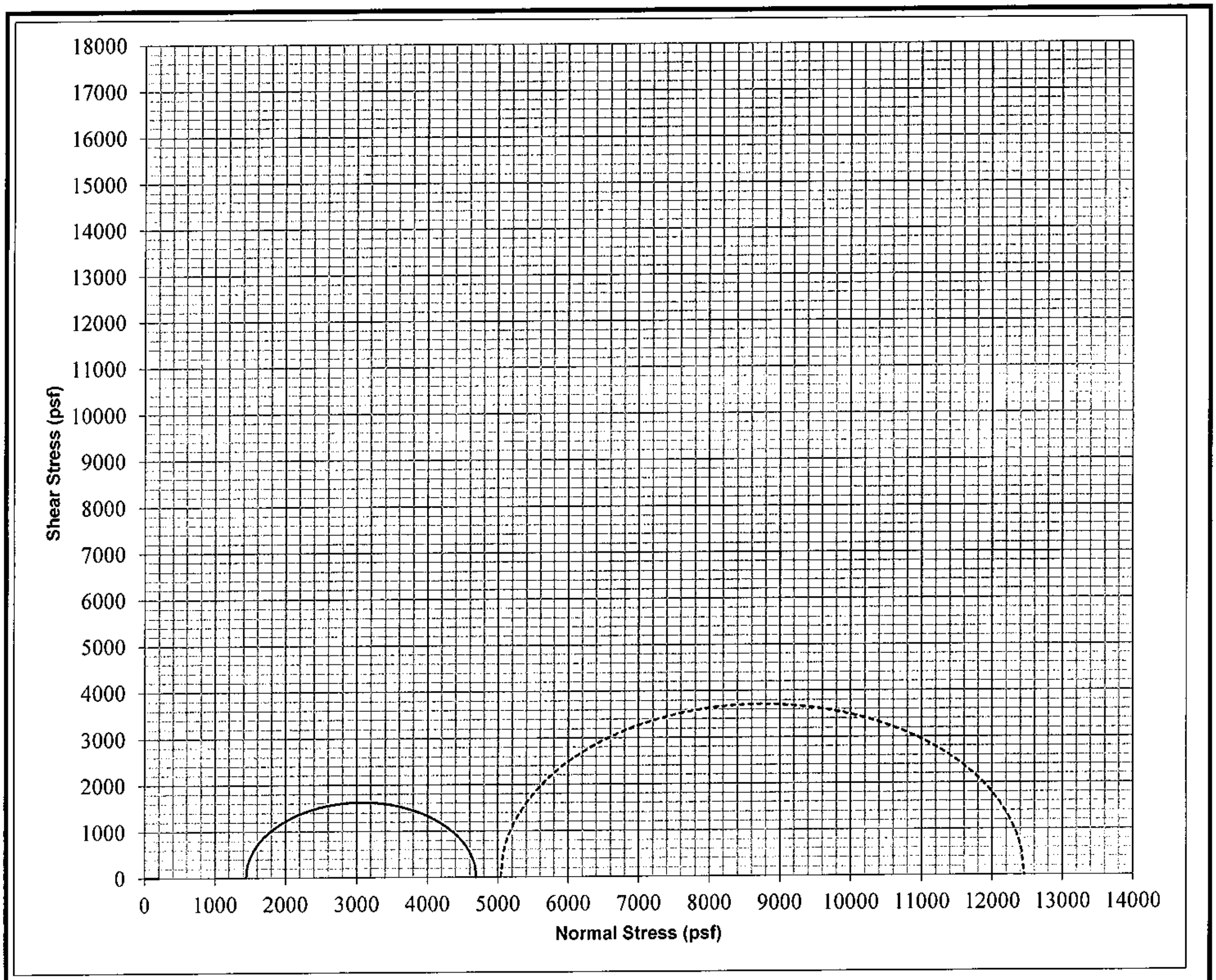


Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3253	2.60	4.99	2.39	22.00	129.9	106.5	0.583	101.8	2.70	0.02	34	20	2.1
dot	5040	7417	5.75	4.99	2.40	21.55	128.4	105.6	0.596	97.6	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-167**	Sample #: **10**	
Project: **BSVII**	Depth (ft): **40**		
Project #: **507385606**	Soil: **Grayish brown clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

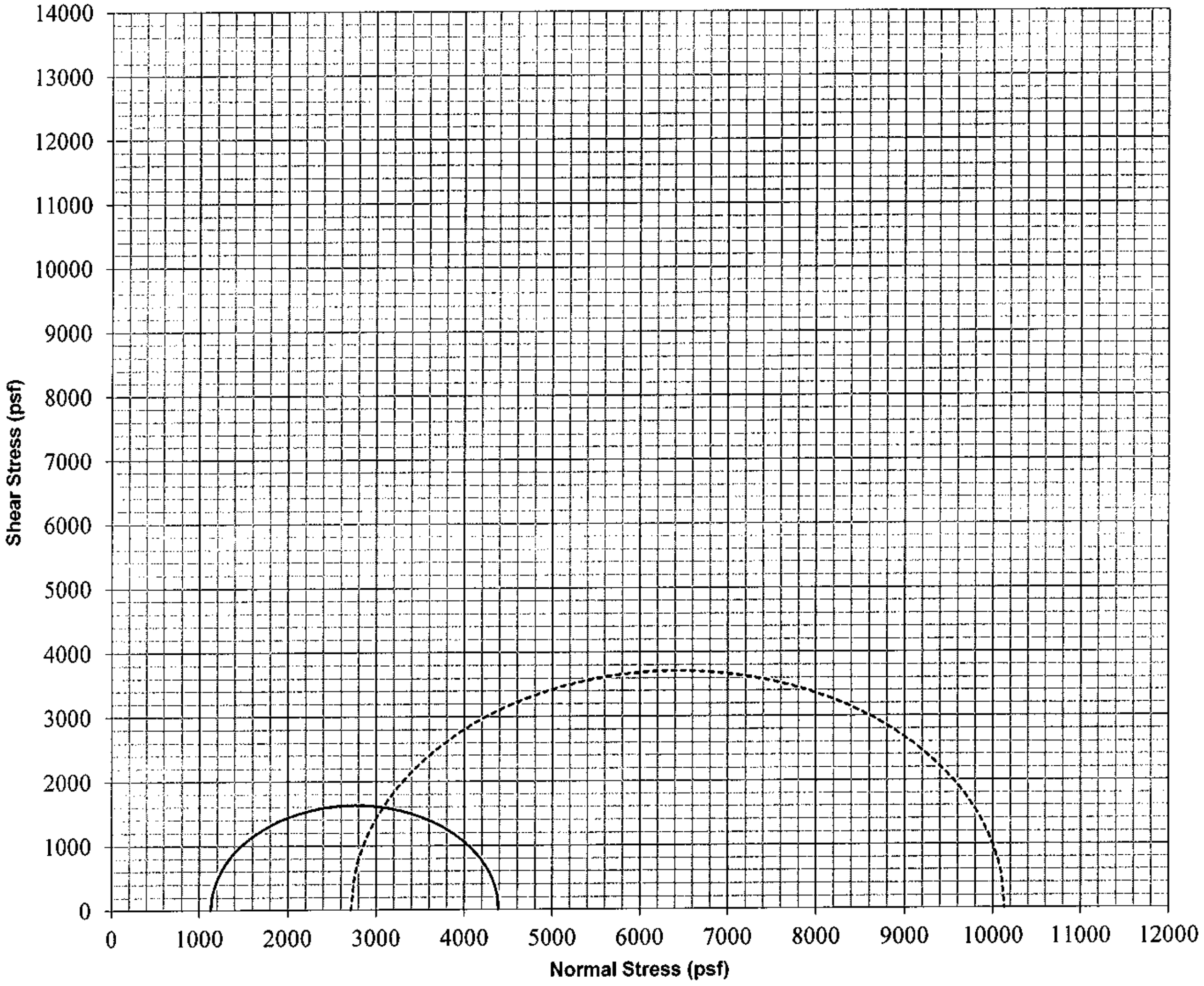
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3253	2.60	4.99	2.39	22.00	129.9	106.5	0.583	101.8	2.70	0.02	34	20	2.1
dot	5040	7417	5.75	4.99	2.40	21.55	128.4	105.6	0.596	97.6	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-167**	Sample #:	**10**
Project:	**BSVII**	Depth (ft):	**40**		
Project #:	**507385606**	Soil:	**Grayish brown clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

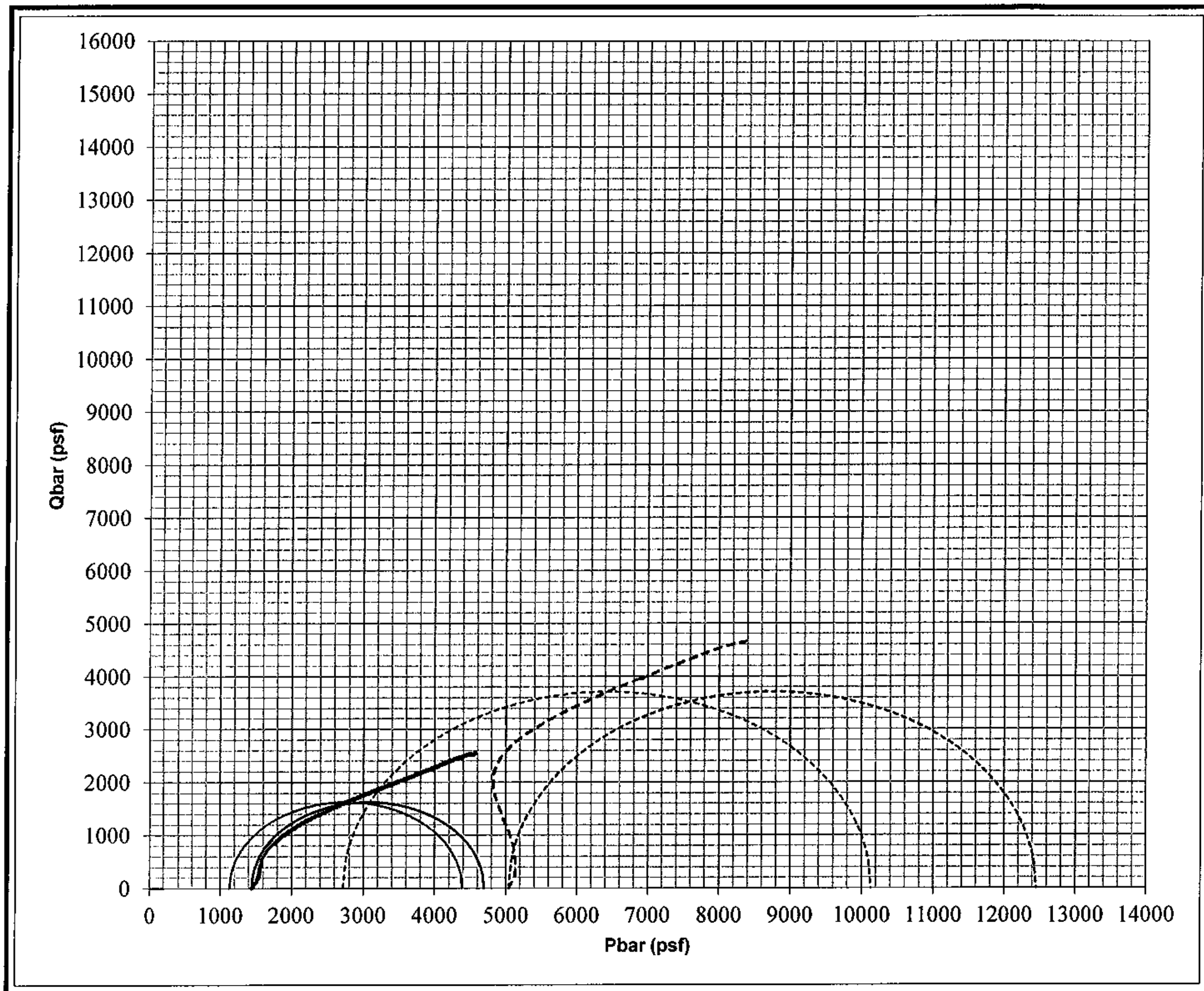
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3253	2.60	4.99	2.39	22.00	129.9	106.5	0.583	101.8	2.70	0.02	34	20	2.1
dot	5040	7417	5.75	4.99	2.40	21.55	128.4	105.6	0.596	97.6	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-167**	Sample #: **10**
Project: **BSVII**	Depth (ft): **40**	
Project #: **507385606**	Soil: **Grayish brown clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3253	2.60	4.99	2.39	22.00	129.9	106.5	0.583	101.8	2.70	0.02	34	20	2.1
dot	5040	7417	5.75	4.99	2.40	21.55	128.4	105.6	0.596	97.6	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-167**	Sample #:	**10**
Project:	**BSVII**	Depth (ft):	**40**		
Project #:	**507385606**	Soil:	**Grayish brown clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

Boring Number	BH-167				BH-167	
Sample Number	23				23	
Depth (ft)	74				74	
Date Tested	08/03/20				08/04/20	
Description	Greenish gray clay with sand				Greenish gray clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.99	4.97			4.98	4.93
Diameter (in)	2.40	2.38			2.39	2.35
Height/Diameter Ratio	2.08				2.09	
Total Weight (g)	766.07	767.41			756.31	750.83
Moisture Content (%)	21.73	21.94			22.44	21.55
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	129.75	132.39			129.23	133.90
Dry Density (pcf)	106.60	108.57			105.55	110.16
Area (cm^2)	29.06	28.68			28.88	27.98
Total Volume (cc)	368.57	361.87			365.35	350.05
Void Ratio	0.5812	0.5525			0.5969	0.5300
Saturation (%)	100.9	107.2			101.5	109.8
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.99				0.98	
Total Back Pressure (psf)	5760				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.50				10.01	
Effective Consolidation Stress (psf)	2160				7200	
Major Effective Stress at Failure (psf) σ1	4868				9188	
Minor Effective Stress at Failure (psf) σ3	1257				2830	
Deviator Stress at Failure (psf)	3611				6359	
Pore Pressure at Failure (psf)	903				4370	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	36					
Plastic Limit	16					
Remarks						

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

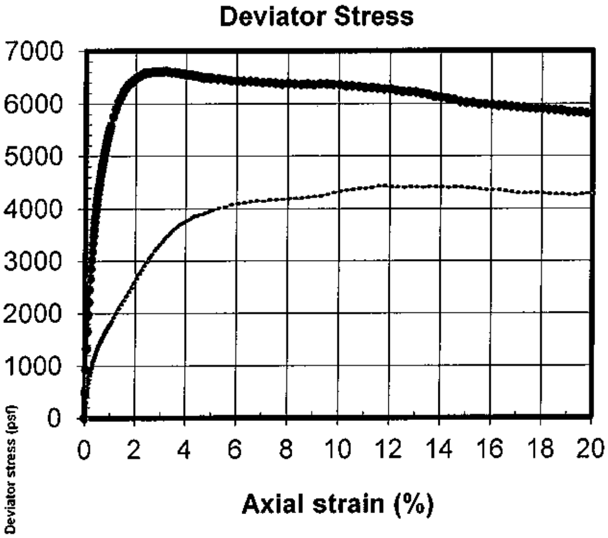
Client: **Mott MacDonald**	Boring #: **BH-167**	Sample #: **23**
Project: **BSVII**	Depth (ft): **74**	
Project #: **507385606**	Soil: **Greenish gray clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

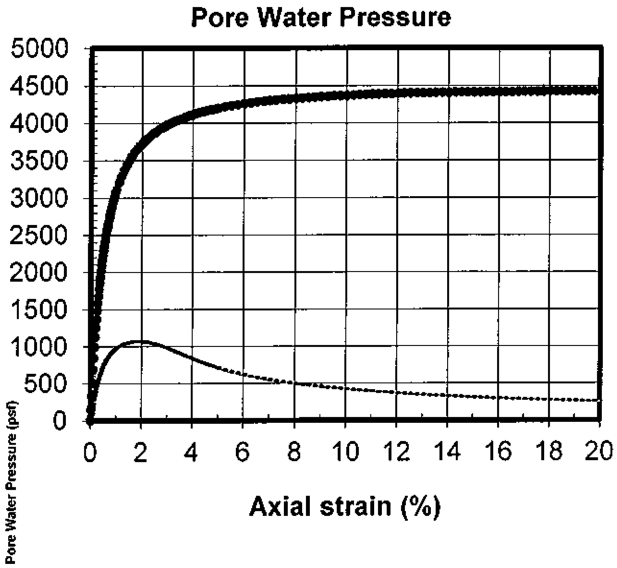
INSPECTION SERVICES INC.

PLATE NUMBER __________

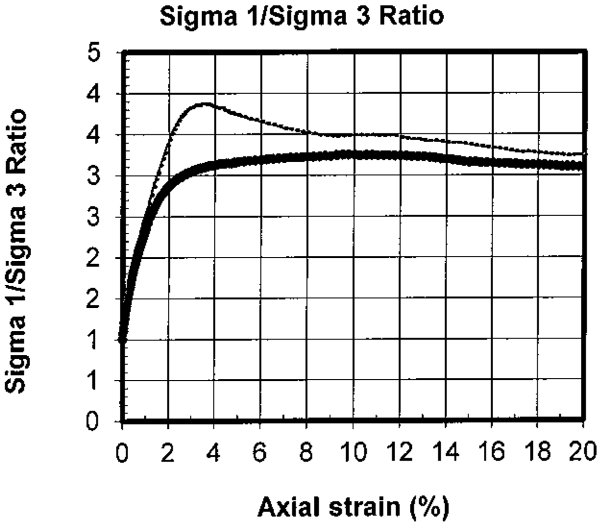
Deviator Stress



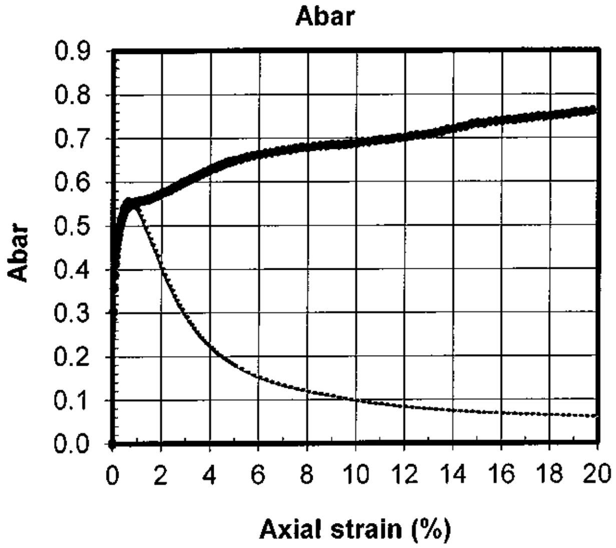
Pore Water Pressure



Sigma 1/Sigma 3 Ratio



Abar



Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3611	3.50	4.99	2.40	21.73	129.8	106.6	0.581	100.9	2.70	0.02	36	16	2.1
dot	7200	6359	10.01	4.98	2.39	22.44	129.2	105.5	0.597	101.5	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-167** Sample #: **23**

Project: **BSVII**

Depth (ft): **74**

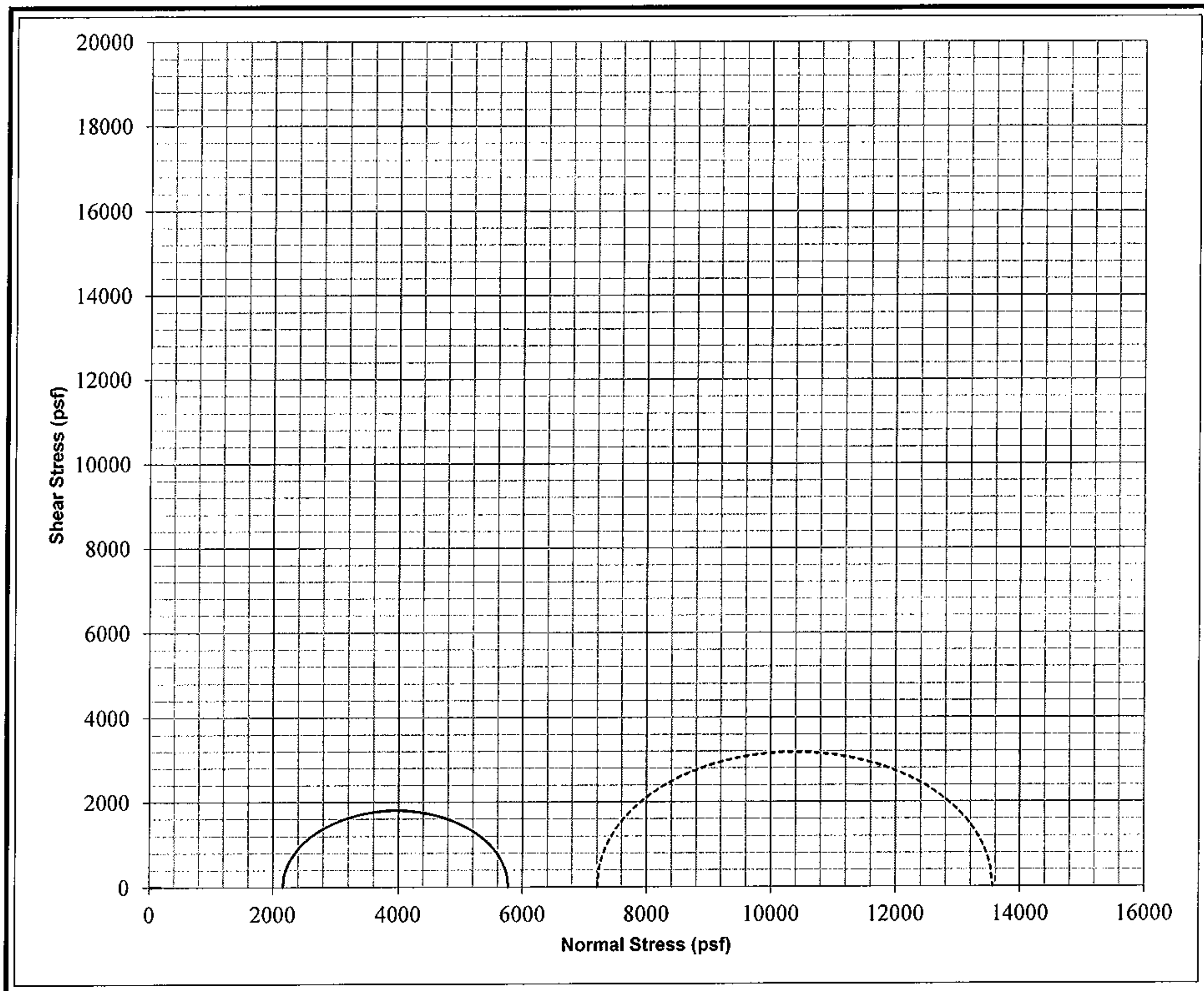
Project #: **507385606**

Soil: **Greenish gray clay with sand**

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

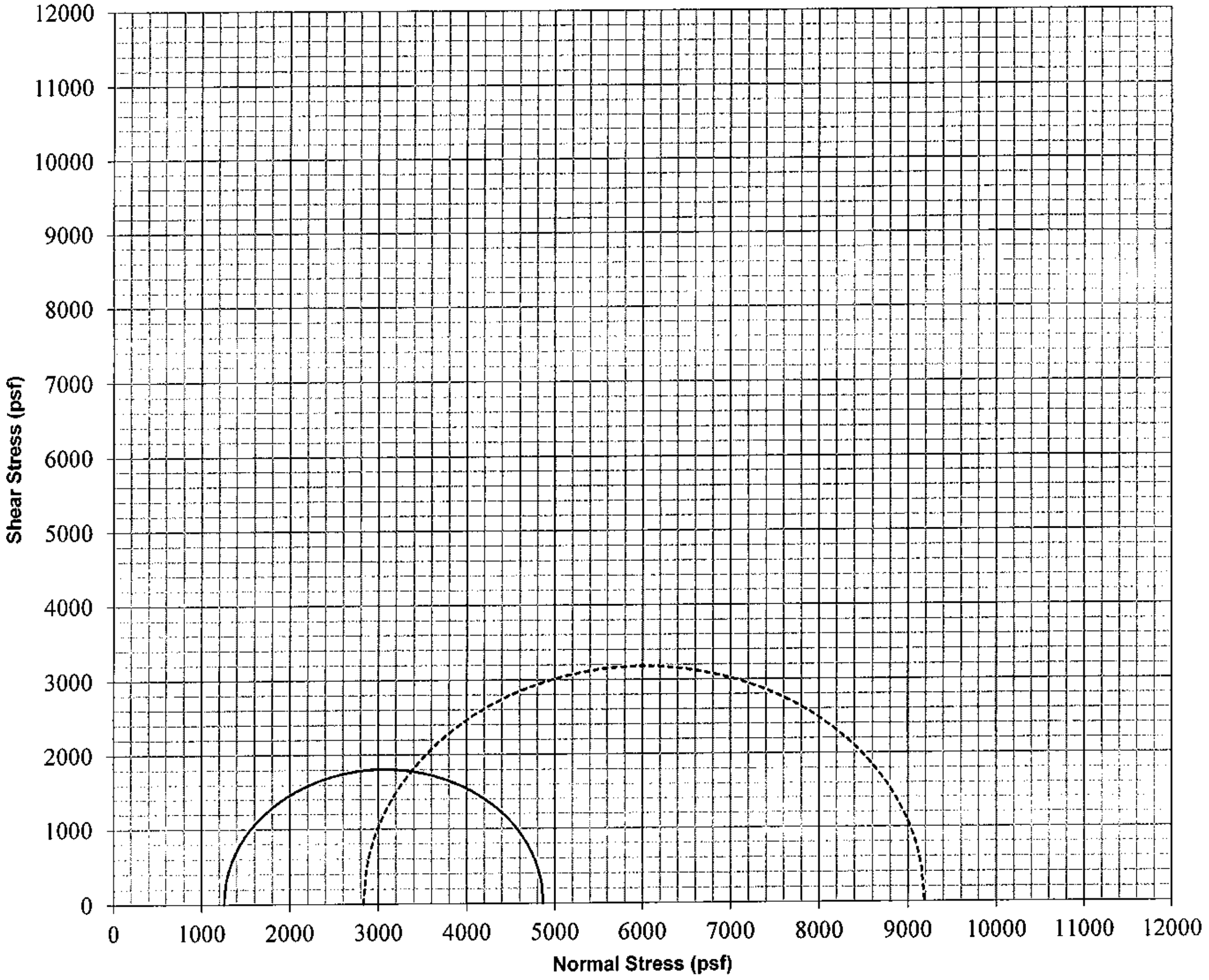
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3611	3.50	4.99	2.40	21.73	129.8	106.6	0.581	100.9	2.70	0.02	36	16	2.1
dot	7200	6359	10.01	4.98	2.39	22.44	129.2	105.5	0.597	101.5	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #: **BH-167**	Sample #: **23**
Project:	**BSVII**	Depth (ft): **74**	
Project #:	**507385606**	Soil: **Greenish gray clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3611	3.50	4.99	2.40	21.73	129.8	106.6	0.581	100.9	2.70	0.02	36	16	2.1
dot	7200	6359	10.01	4.98	2.39	22.44	129.2	105.5	0.597	101.5	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-167**

Sample #: **23**

Project: **BSVII**

Depth (ft): **74**

Project #: **507385606**

Soil: **Greenish gray clay with sand**

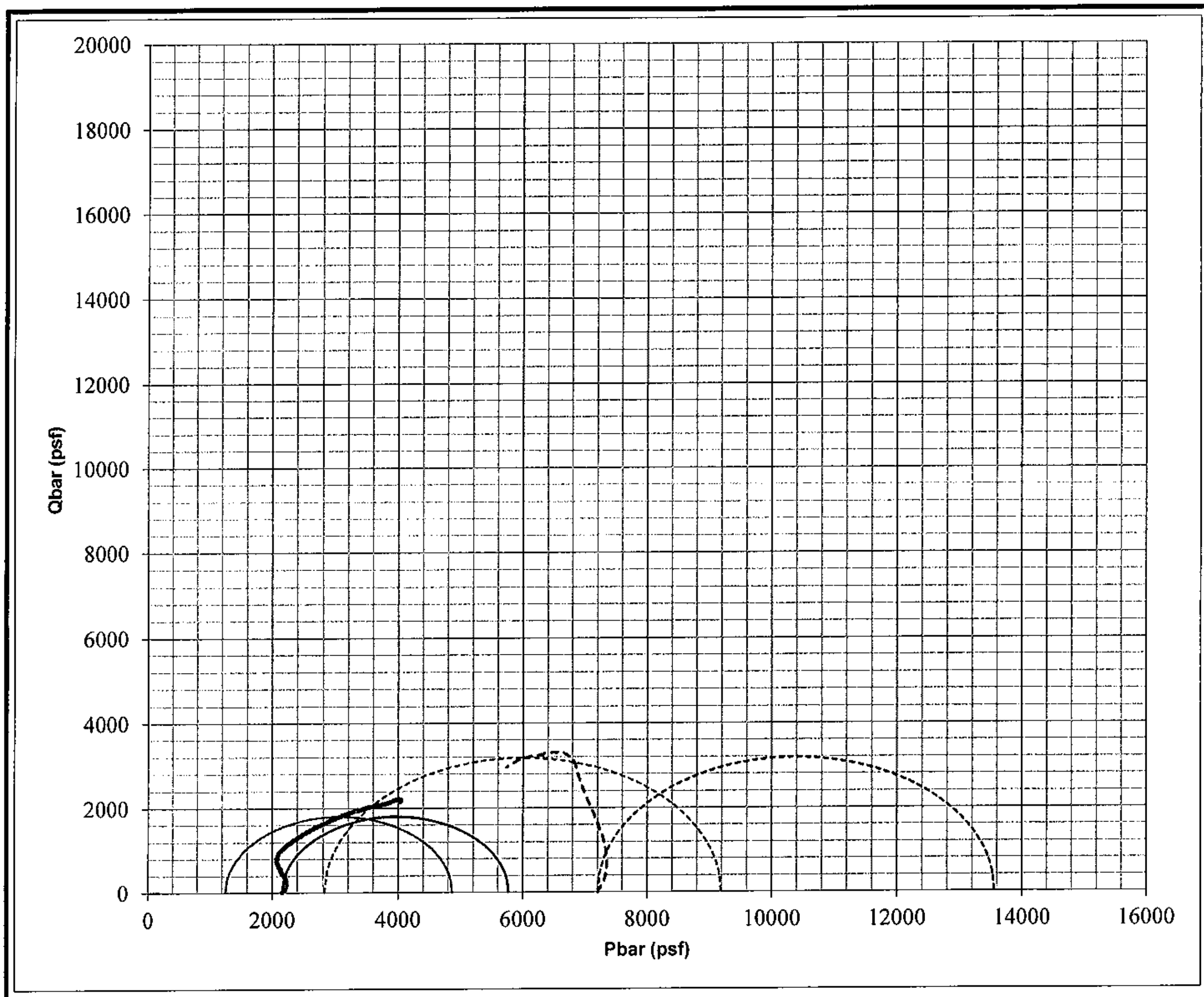
ASTM D-4767

TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3611	3.50	4.99	2.40	21.73	129.8	106.6	0.581	100.9	2.70	0.02	36	16	2.1
dot	7200	6359	10.01	4.98	2.39	22.44	129.2	105.5	0.597	101.5	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #: **BH-167**	Sample #: **23**
Project:	**BSVII**	Depth (ft): **74**	
Project #:	**507385606**	Soil: **Greenish gray clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**________

Boring Number	BH-168				BH-168	
Sample Number	6				6	
Depth (ft)	25				25	
Date Tested	08/21/20				08/22/20	
Description	Greenish gray clay with sand				Greenish gray clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.92	4.90			4.89	4.80
Diameter (in)	2.38	2.37			2.38	2.34
Height/Diameter Ratio	2.07				2.05	
Total Weight (g)	682.73	683.19			669.07	659.40
Moisture Content (%)	34.92	35.01			37.56	35.57
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	119.08	120.71			116.86	122.03
Dry Density (pcf)	88.26	89.41			84.95	90.01
Area (cm^2)	28.64	28.40			28.76	27.69
Total Volume (cc)	357.93	353.33			357.43	337.33
Void Ratio	0.9097	0.8852			0.9841	0.8725
Saturation (%)	103.6	106.8			103.0	110.1
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.30				7.99	
Effective Consolidation Stress (psf)	1440				4320	
Major Effective Stress at Failure (psf) σ1	3761				5905	
Minor Effective Stress at Failure (psf) σ3	950				1798	
Deviator Stress at Failure (psf)	2812				4108	
Pore Pressure at Failure (psf)	490				2522	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	

	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767		
Classification Based On	Plasticity index, Visual		Plasticity index, Visual
Liquid Limit	49		
Plastic Limit	27		
Remarks			

The following information is the same for all samples

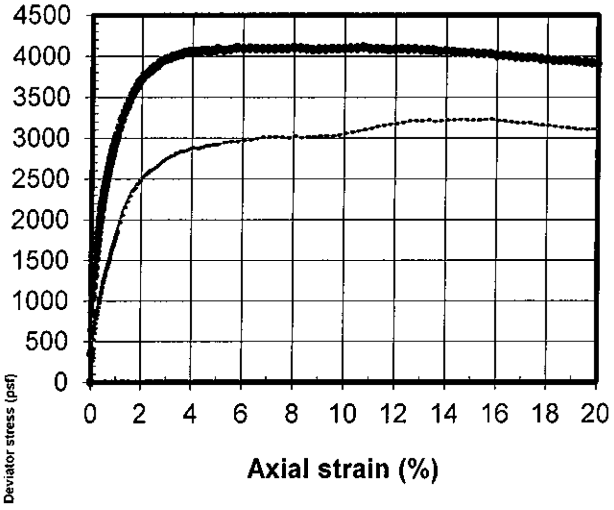
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-168**	Sample #: **6**
Project: **BSVII**	Depth (ft): **25**	
Project #: **507385606**	Soil: **Greenish gray clay with sand**	

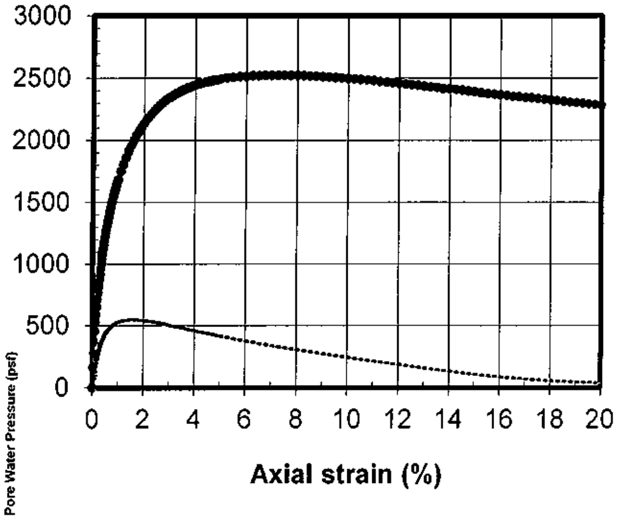
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER** ___________

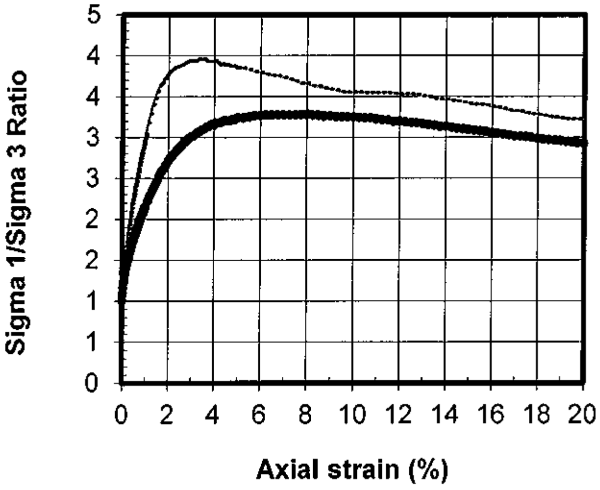
Deviator Stress



Pore Water Pressure



Sigma 1/Sigma 3 Ratio



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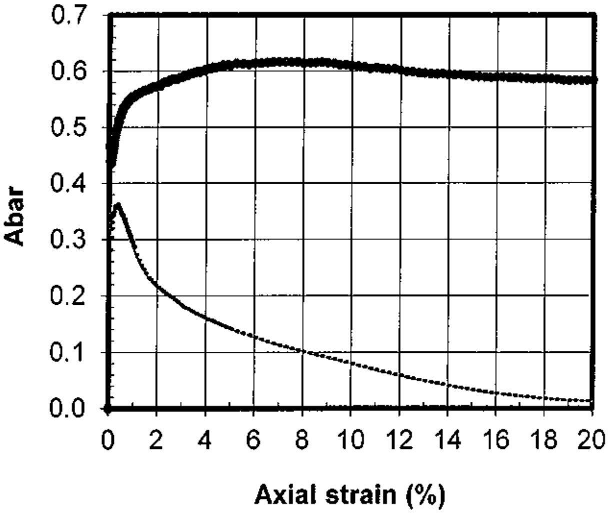
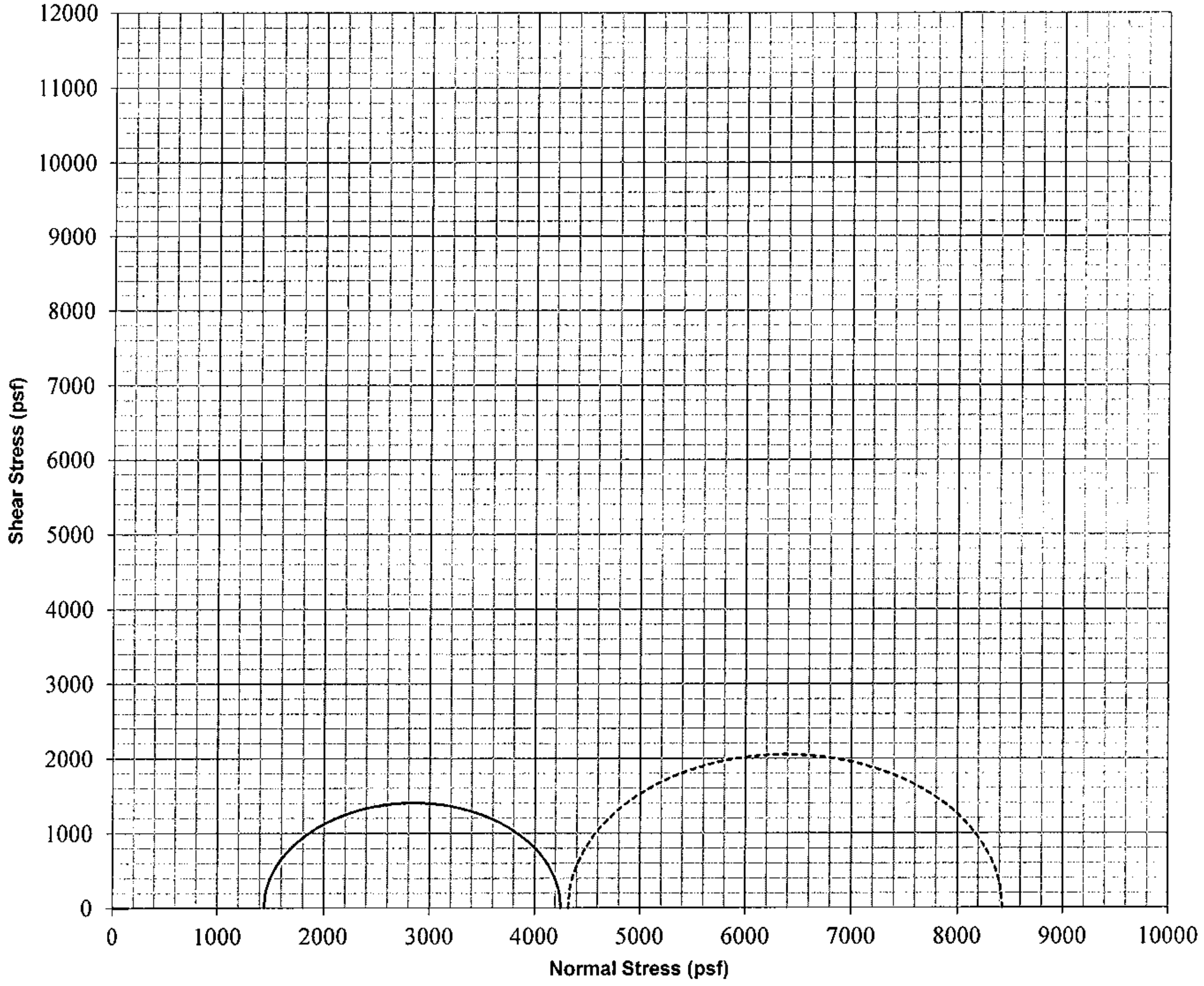


Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2812	3.30	4.92	2.38	34.92	119.1	88.3	0.910	103.6	2.70	0.02	49	27	2.1
dot	4320	4108	7.99	4.89	2.38	37.56	116.9	85.0	0.984	103.0	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-168**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**25**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



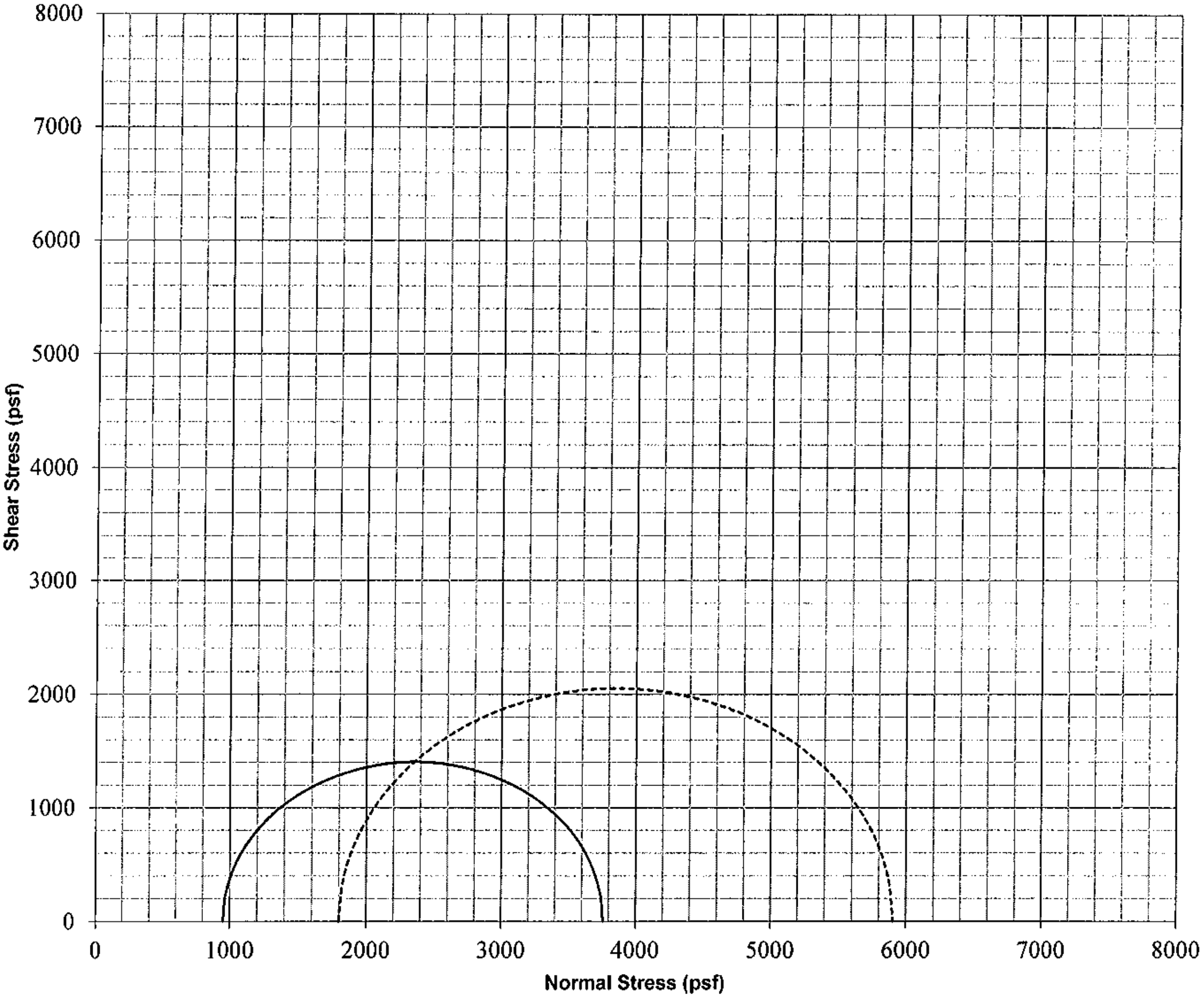
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2812	3.30	4.92	2.38	34.92	119.1	88.3	0.910	103.6	2.70	0.02	49	27	2.1
dot	4320	4108	7.99	4.89	2.38	37.56	116.9	85.0	0.984	103.0	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-168**	Sample #: **6**
Project: **BSVII**	Depth (ft): **25**	
Project #: **507385606**	Soil: **Greenish gray clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

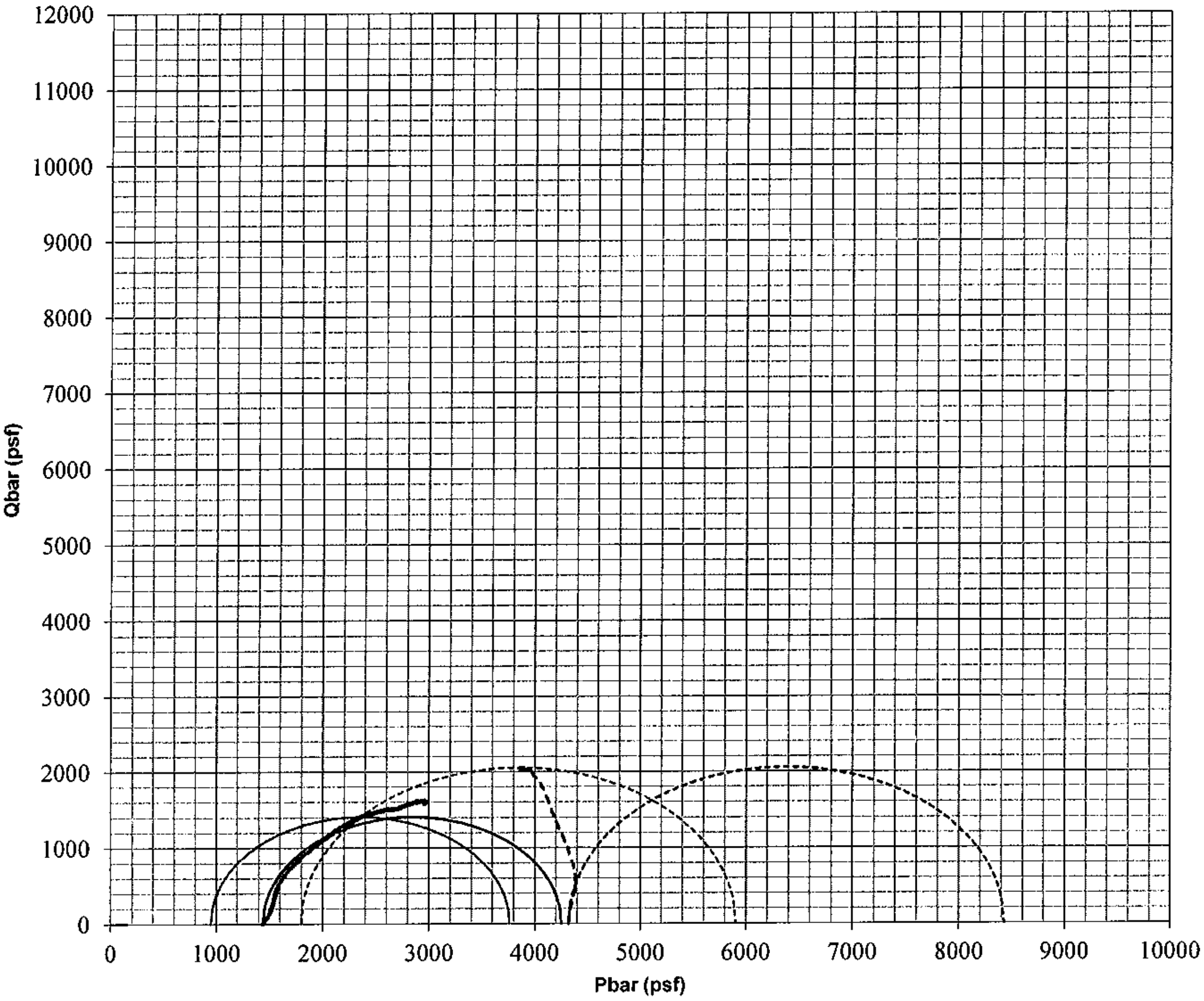
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2812	3.30	4.92	2.38	34.92	119.1	88.3	0.910	103.6	2.70	0.02	49	27	2.1
dot	4320	4108	7.99	4.89	2.38	37.56	116.9	85.0	0.984	103.0	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-168**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**25**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ_1 / σ_3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2812	3.30	4.92	2.38	34.92	119.1	88.3	0.910	103.6	2.70	0.02	49	27	2.1
dot	4320	4108	7.99	4.89	2.38	37.56	116.9	85.0	0.984	103.0	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-168**	Sample #: **6**	
Project: **BSVII**	Depth (ft): **25**		
Project #: **507385606**	Soil: **Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

Boring Number	BH-168				BH-168	
Sample Number	21				21	
Depth (ft)	81.5				81.5	
Date Tested	08/12/20				08/13/20	
Description	Greenish gray clay with sand				Greenish gray clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.96	4.92			4.95	4.86
Diameter (in)	2.39	2.38			2.40	2.37
Height/Diameter Ratio	2.08				2.07	
Total Weight (g)	738.35	737.53			735.11	729.38
Moisture Content (%)	24.66	24.52			24.72	23.74
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	126.41	128.66			125.25	130.03
Dry Density (pcf)	101.40	103.33			100.43	105.08
Area (cm^2)	28.94	28.63			29.13	28.36
Total Volume (cc)	364.64	357.84			366.38	350.18
Void Ratio	0.6622	0.6312			0.6783	0.6041
Saturation (%)	100.5	104.9			98.4	106.1
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.96				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.30				7.25	
Effective Consolidation Stress (psf)	2160				7200	
Major Effective Stress at Failure (psf) σ1	4551				7951	
Minor Effective Stress at Failure (psf) σ3	1142				2282	
Deviator Stress at Failure (psf)	3409				5669	
Pore Pressure at Failure (psf)	1018				4918	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	

	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767		
Classification Based On	Plasticity index, Percent		Plasticity index, Percent
Liquid Limit	44		
Plastic Limit	17		
Remarks			

The following information is the same for all samples

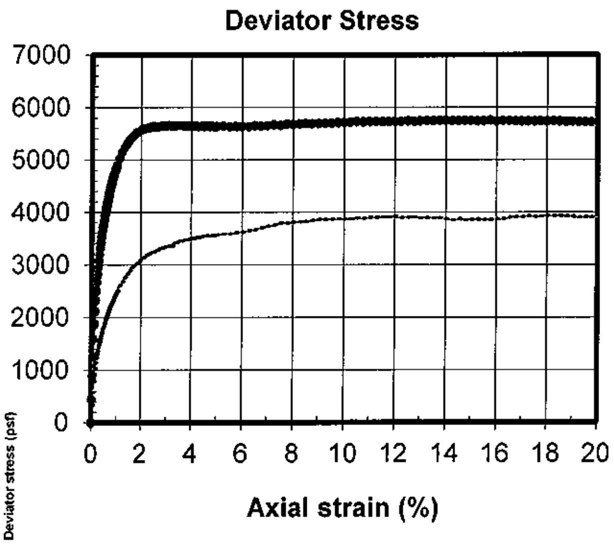
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

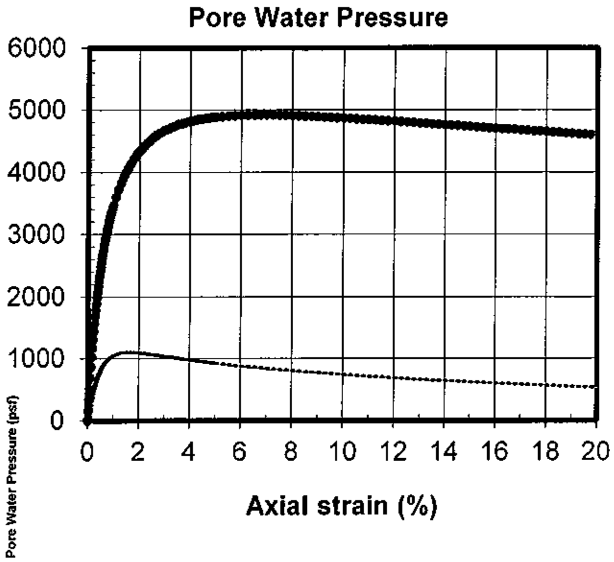
Client: **Mott MacDonald**	Boring #: **BH-168**	Sample #: **21**
Project: **BSVII**	Depth (ft): **81.5**	
Project #: **507385606**	Soil: **Greenish gray clay with sand**	

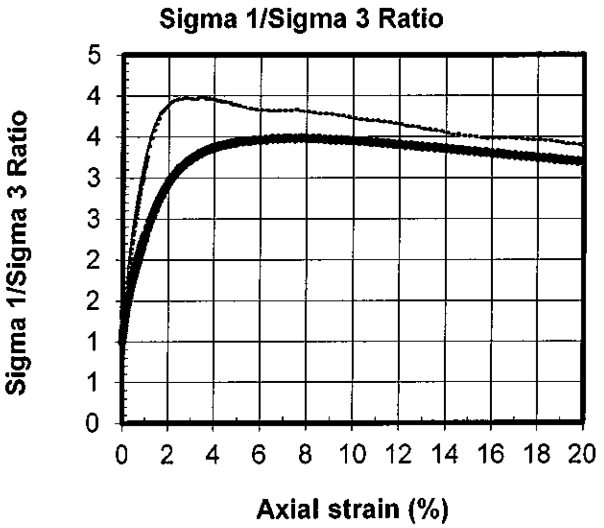
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

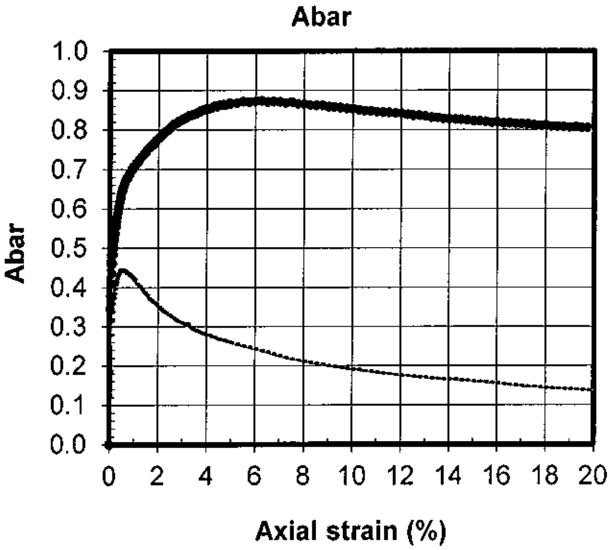
INSPECTION SERVICES INC.

PLATE NUMBER ________







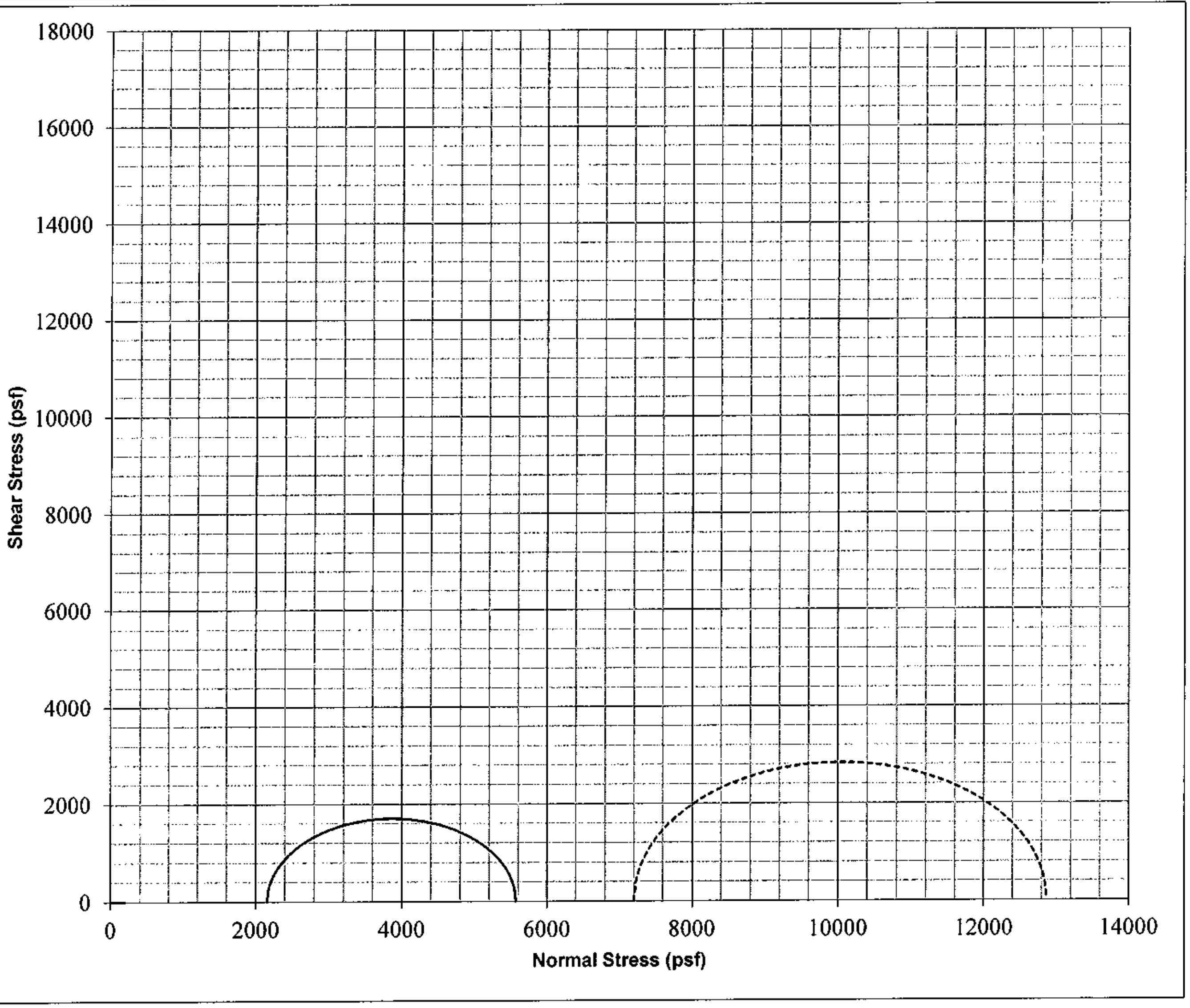


Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3409	3.30	4.96	2.39	24.66	126.4	101.4	0.662	100.5	2.70	0.02	44	17	2.1
dot	7200	5669	7.25	4.95	2.40	24.72	125.3	100.4	0.678	98.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-168**	Sample #:	**21**
Project:	**BSVII**	Depth (ft):	**81.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3409	3.30	4.96	2.39	24.66	126.4	101.4	0.662	100.5	2.70	0.02	44	17	2.1
dot	7200	5669	7.25	4.95	2.40	24.72	125.3	100.4	0.678	98.4	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-168**

Sample #: **21**

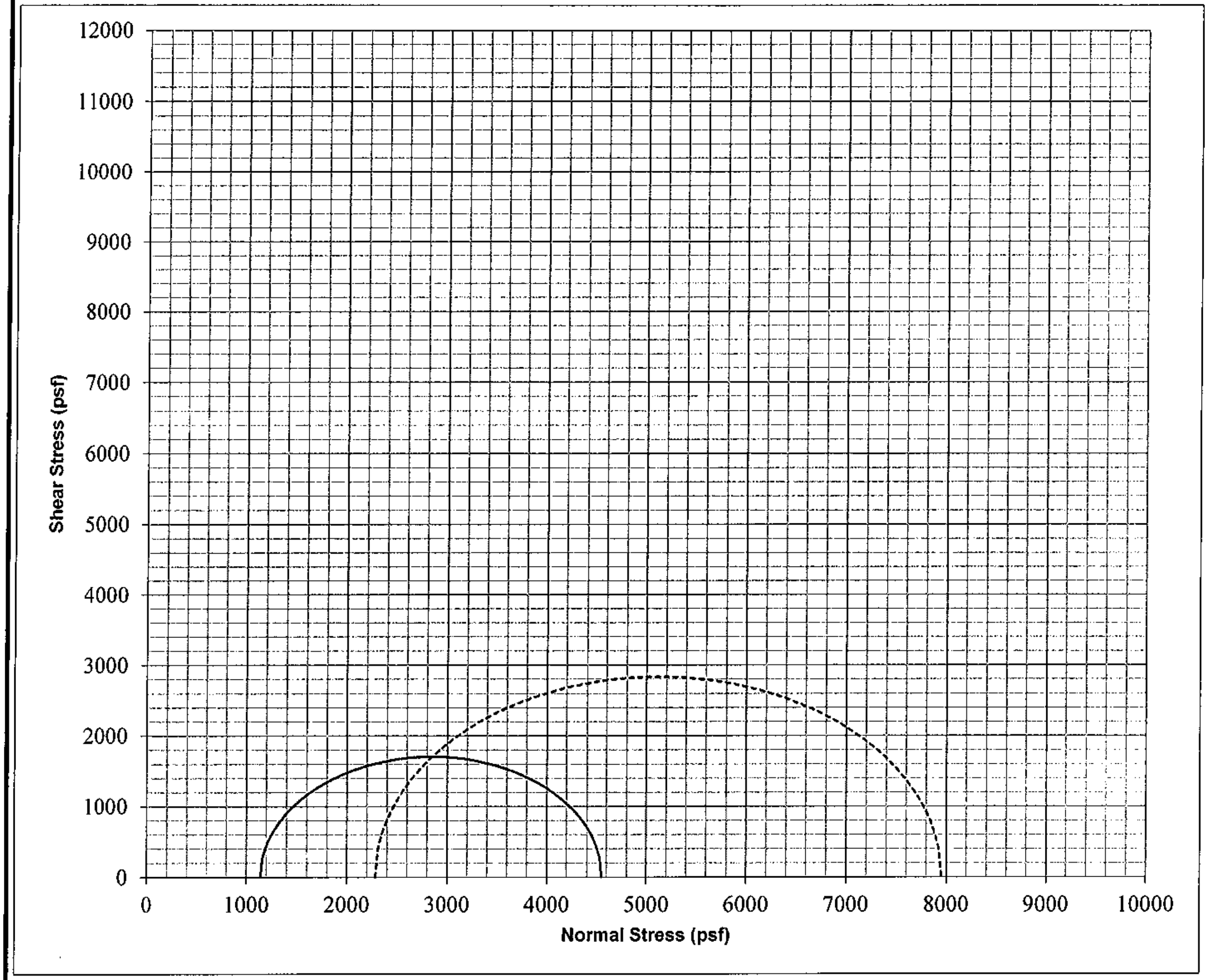
Project: **BSVII**

Depth (ft): **81.5**

Project #: **507385606**

Soil: **Greenish gray clay with sand**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



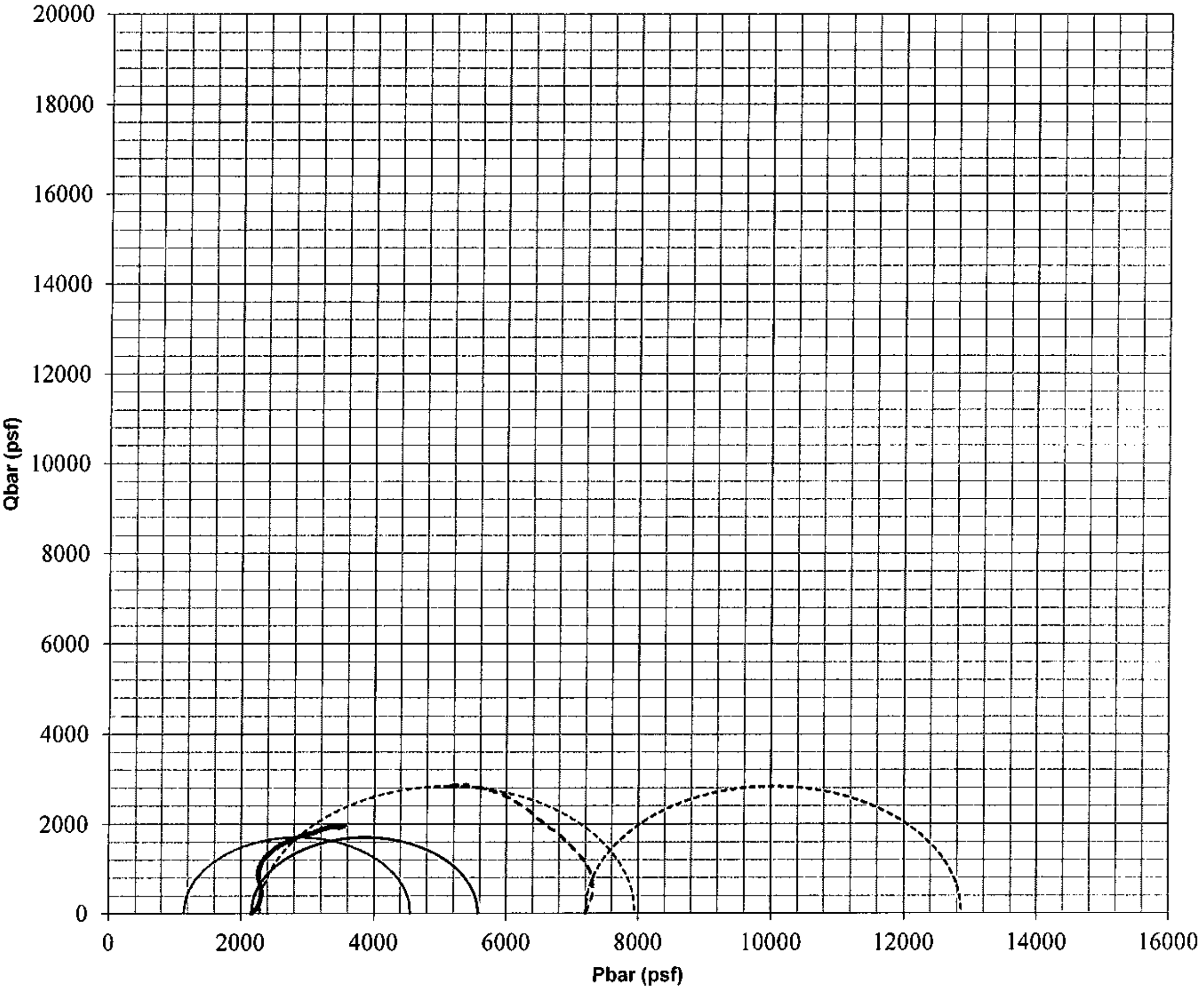
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3409	3.30	4.96	2.39	24.66	126.4	101.4	0.662	100.5	2.70	0.02	44	17	2.1
dot	7200	5669	7.25	4.95	2.40	24.72	125.3	100.4	0.678	98.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-168**	Sample #:	**21**
Project:	**BSVII**	Depth (ft):	**81.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3409	3.30	4.96	2.39	24.66	126.4	101.4	0.662	100.5	2.70	0.02	44	17	2.1
dot	7200	5669	7.25	4.95	2.40	24.72	125.3	100.4	0.678	98.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-168**	Sample #:	**21**
Project:	**BSVII**	Depth (ft):	**81.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________

Boring Number	BH-168				BH-168	
Sample Number	25				25	
Depth (ft)	92.5				92.5	
Date Tested	08/14/20				08/15/20	
Description	Greenish gray clay with sand				Greenish gray clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.95	4.91			5.02	4.95
Diameter (in)	2.38	2.36			2.38	2.34
Height/Diameter Ratio	2.08				2.11	
Total Weight (g)	762.48	760.95			761.20	749.93
Moisture Content (%)	21.19	20.95			22.36	20.55
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	131.62	134.45			130.12	134.76
Dry Density (pcf)	108.61	111.16			106.34	111.79
Area (cm^2)	28.76	28.34			28.64	27.63
Total Volume (cc)	361.63	353.33			365.20	347.40
Void Ratio	0.5519	0.5163			0.5850	0.5077
Saturation (%)	103.7	109.5			103.2	109.3
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.98	
Total Back Pressure (psf)	5760				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.60				8.25	
Effective Consolidation Stress (psf)	2880				7920	
Major Effective Stress at Failure (psf) σ1	6578				11391	
Minor Effective Stress at Failure (psf) σ3	1797				3197	
Deviator Stress at Failure (psf)	4781				8194	
Pore Pressure at Failure (psf)	1083				4723	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	34					
Plastic Limit	17					
Remarks						

The following information is the same for all samples

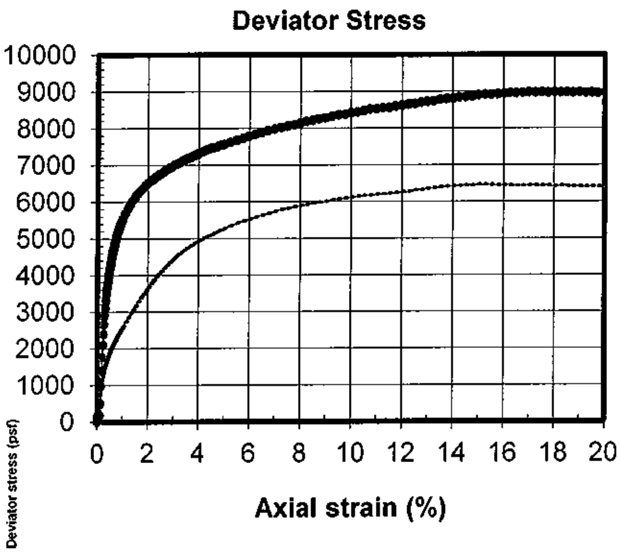
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

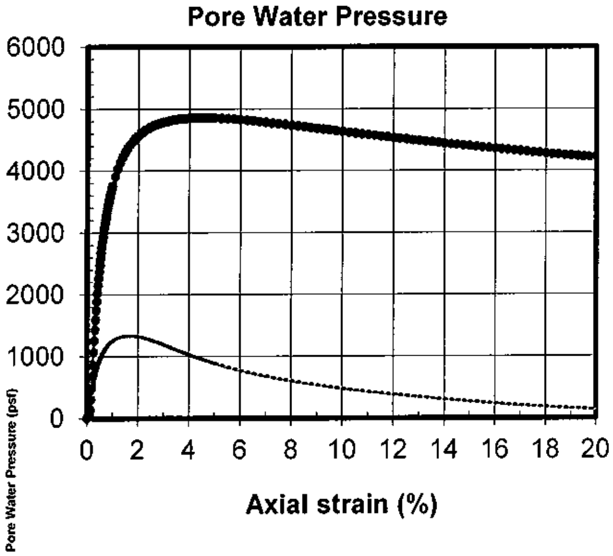
Client: **Mott MacDonald**	Boring #: **BH-168**	Sample #: **25**
Project: **BSVII**	Depth (ft): **92.5**	
Project #: **507385606**	Soil: **Greenish gray clay with sand**	

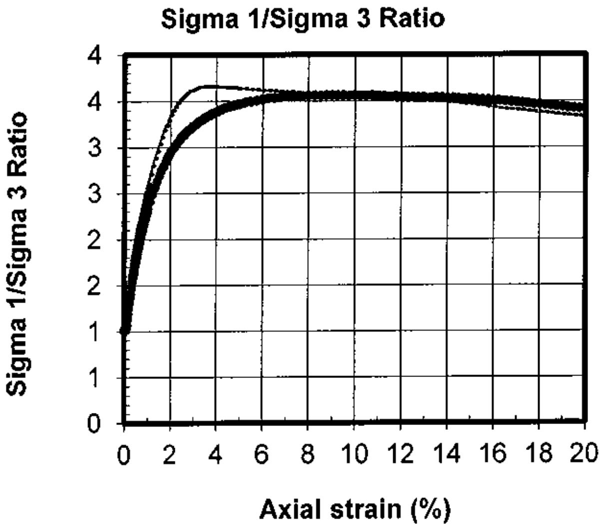
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

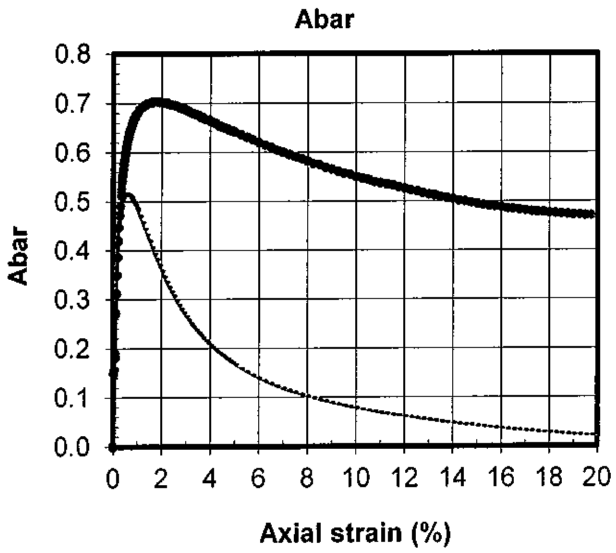
INSPECTION SERVICES INC.

PLATE NUMBER ________


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4781	3.60	4.95	2.38	21.19	131.6	108.6	0.552	103.7	2.70	0.02	34	17	2.1
dot	7920	8194	8.25	5.02	2.38	22.36	130.1	106.3	0.585	103.2	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-168**

Sample #: **25**

Project: **BSVII**

Depth (ft): **92.5**

Project #: **507385606**

Soil: **Greenish gray clay with sand**

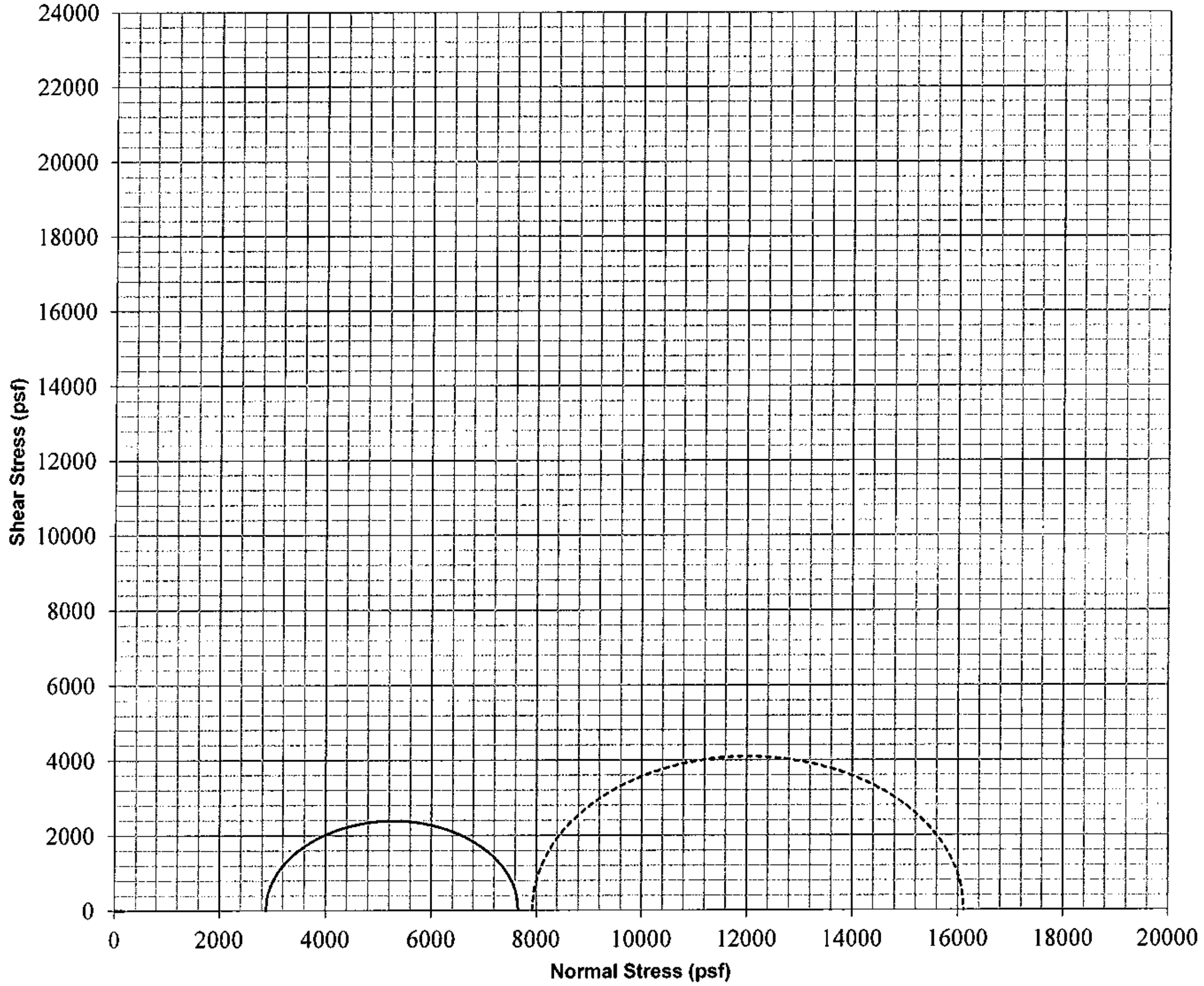
ASTM D-4767

TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

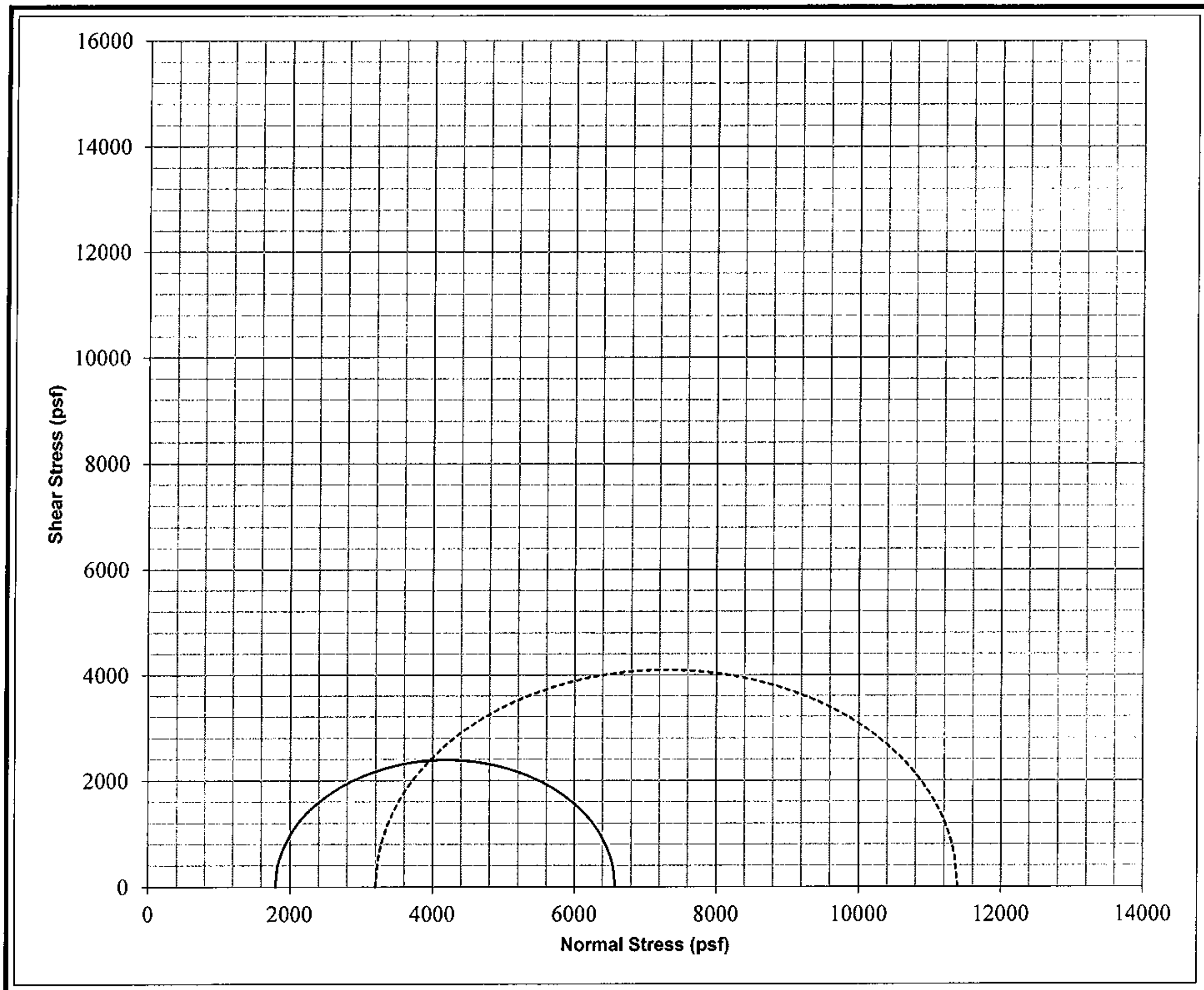
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4781	3.60	4.95	2.38	21.19	131.6	108.6	0.552	103.7	2.70	0.02	34	17	2.1
dot	7920	8194	8.25	5.02	2.38	22.36	130.1	106.3	0.585	103.2	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-168**	Sample #:	**25**
Project:	**BSVII**	Depth (ft):	**92.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**_________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

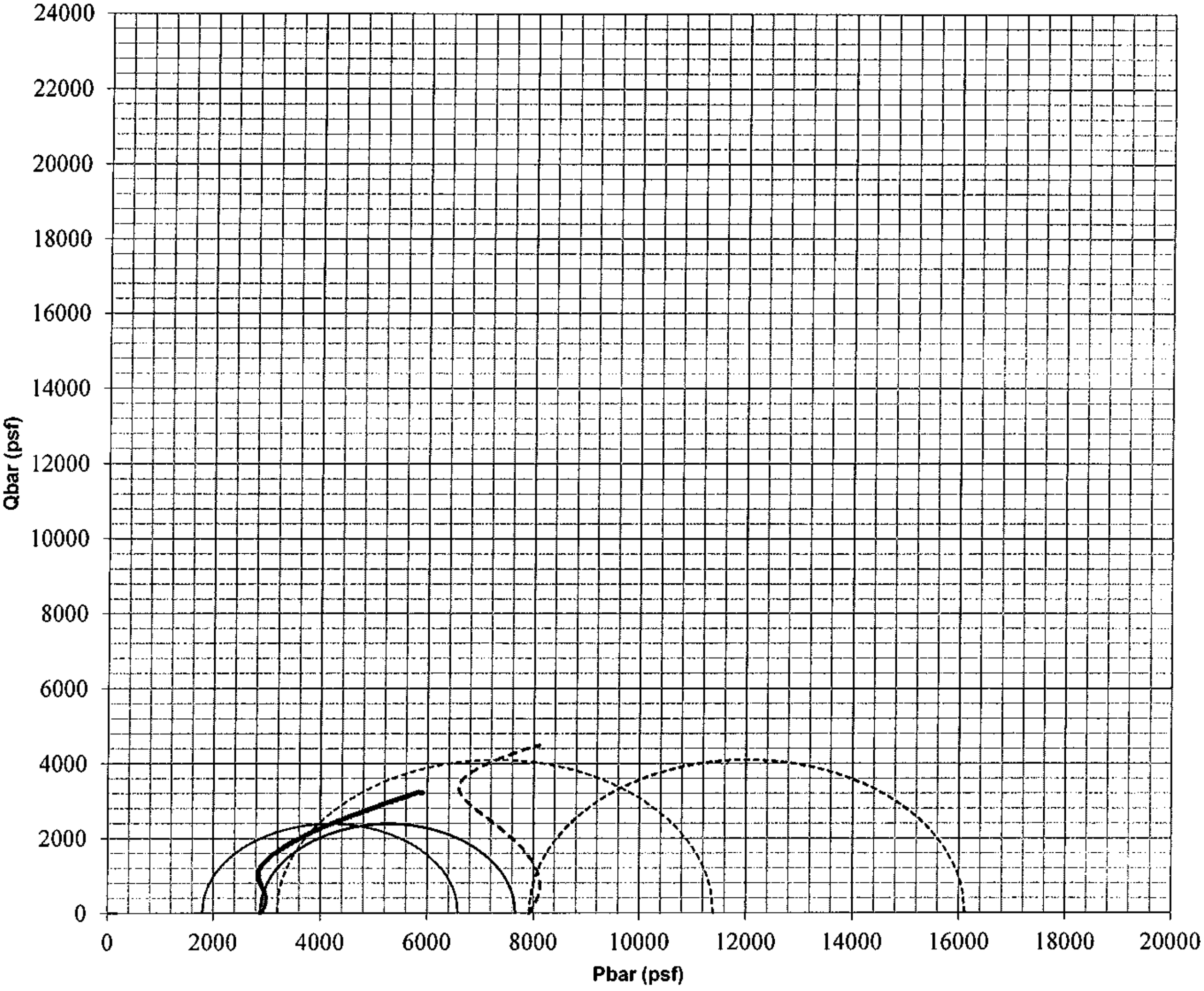
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4781	3.60	4.95	2.38	21.19	131.6	108.6	0.552	103.7	2.70	0.02	34	17	2.1
dot	7920	8194	8.25	5.02	2.38	22.36	130.1	106.3	0.585	103.2	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-168**	Sample #: **25**	
Project: **BSVII**	Depth (ft): **92.5**		
Project #: **507385606**	Soil: **Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	4781	3.60	4.95	2.38	21.19	131.6	108.6	0.552	103.7	2.70	0.02	34	17	2.1
dot	7920	8194	8.25	5.02	2.38	22.36	130.1	106.3	0.585	103.2	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-168**	Sample #:	**25**
Project:	**BSVII**	Depth (ft):	**92.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

Boring Number	BH-169				BH-169	
Sample Number	12				12	
Depth (ft)	74.5				74.5	
Date Tested	06/11/20				06/12/20	
Description	Gray clay				Gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.87	5.84			5.88	5.80
Diameter (in)	2.85	2.84			2.85	2.79
Height/Diameter Ratio	2.06				2.07	
Total Weight (g)	1255.89	1258.06			1250.26	1229.60
Moisture Content (%)	23.26	23.47			22.98	20.95
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	127.99	129.88			127.47	132.33
Dry Density (pcf)	103.84	105.20			103.65	109.41
Area (cm^2)	41.09	40.74			41.01	39.41
Total Volume (cc)	612.57	604.67			612.28	580.08
Void Ratio	0.6232	0.6023			0.6261	0.5406
Saturation (%)	100.8	105.2			99.1	104.6
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.99	
Total Back Pressure (psf)	5760				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	1.90				8.76	
Effective Consolidation Stress (psf)	1440				7200	
Major Effective Stress at Failure (psf) σ1	4020				10792	
Minor Effective Stress at Failure (psf) σ3	903				3075	
Deviator Stress at Failure (psf)	3117				7717	
Pore Pressure at Failure (psf)	537				4125	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	32					
Plastic Limit	18					
Remarks						

The following information is the same for all samples

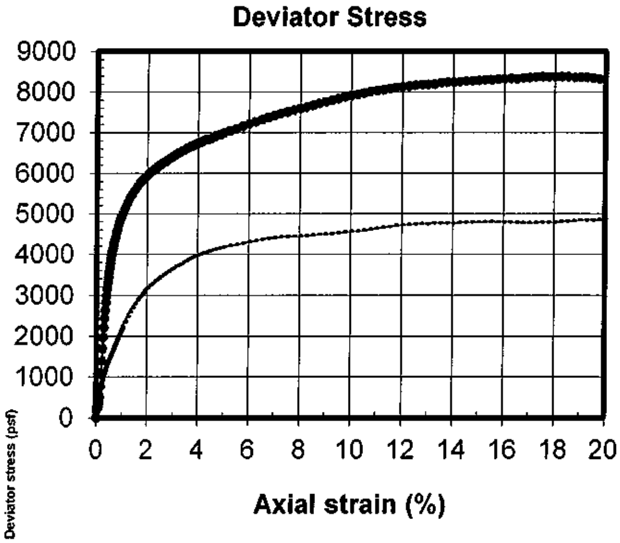
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

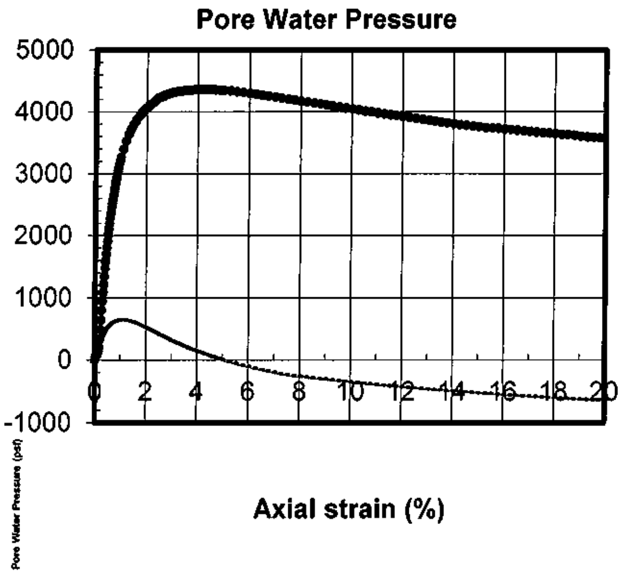
Client: **Mott MacDonald**	Boring #: **BH-169**	Sample #: **12**
Project: **BSVII**	Depth (ft): **74.5**	
Project #: **507385606**	Soil: **Gray clay**	

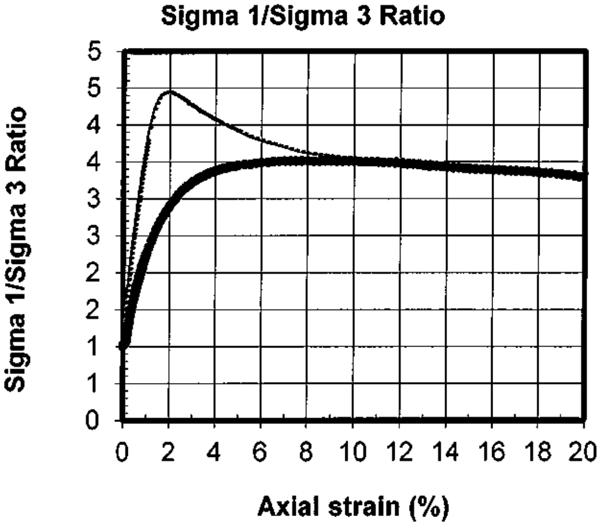
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

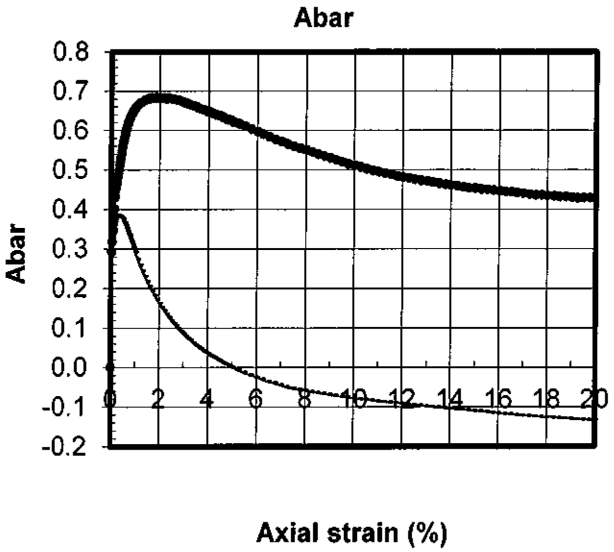
INSPECTION SERVICES INC.

PLATE NUMBER ________


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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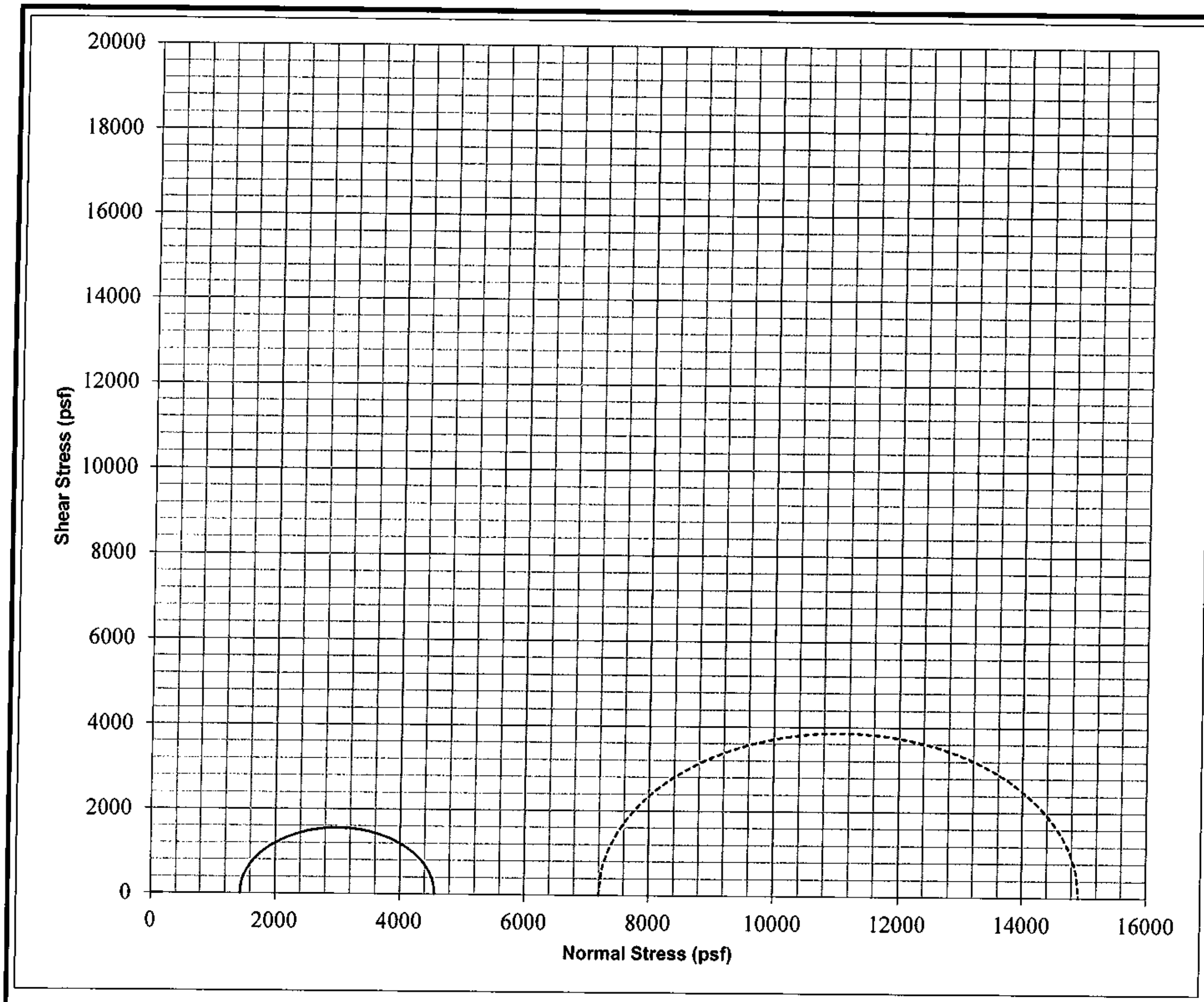
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3117	1.90	5.87	2.85	23.26	128.0	103.8	0.623	100.8	2.70	0.02	32	18	2.1
dot	7200	7717	8.76	5.88	2.85	22.98	127.5	103.7	0.626	99.1	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-169**	Sample #:	**12**
Project:	**BSVII**	Depth (ft):	**74.5**		
Project #:	**507385606**	Soil:	**Gray clay**		

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

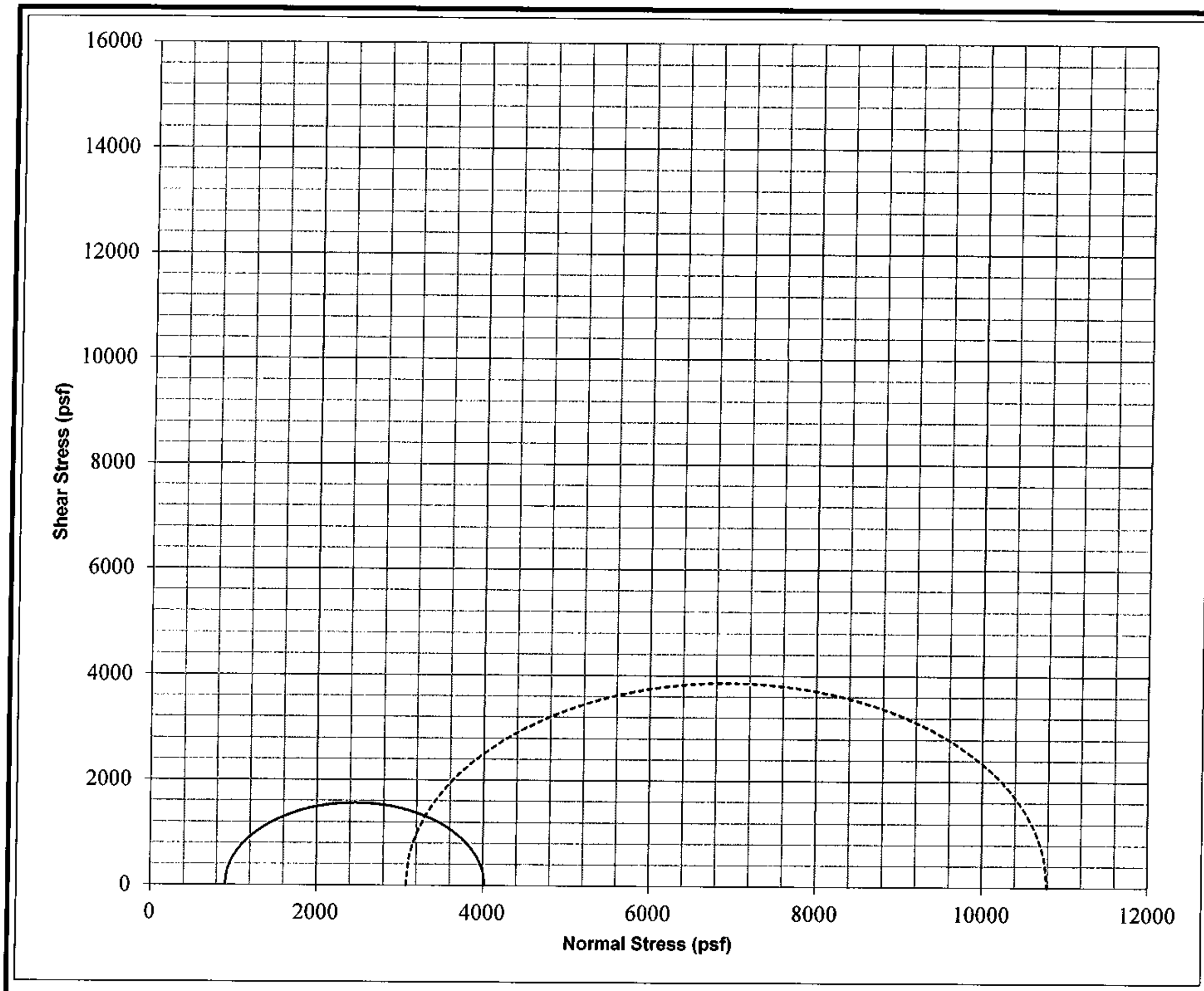
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3117	1.90	5.87	2.85	23.26	128.0	103.8	0.623	100.8	2.70	0.02	32	18	2.1
dot	7200	7717	8.76	5.88	2.85	22.98	127.5	103.7	0.626	99.1	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-169**	Sample #: **12**	
Project: **BSVII**	Depth (ft): **74.5**		
Project #: **507385606**	Soil: **Gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

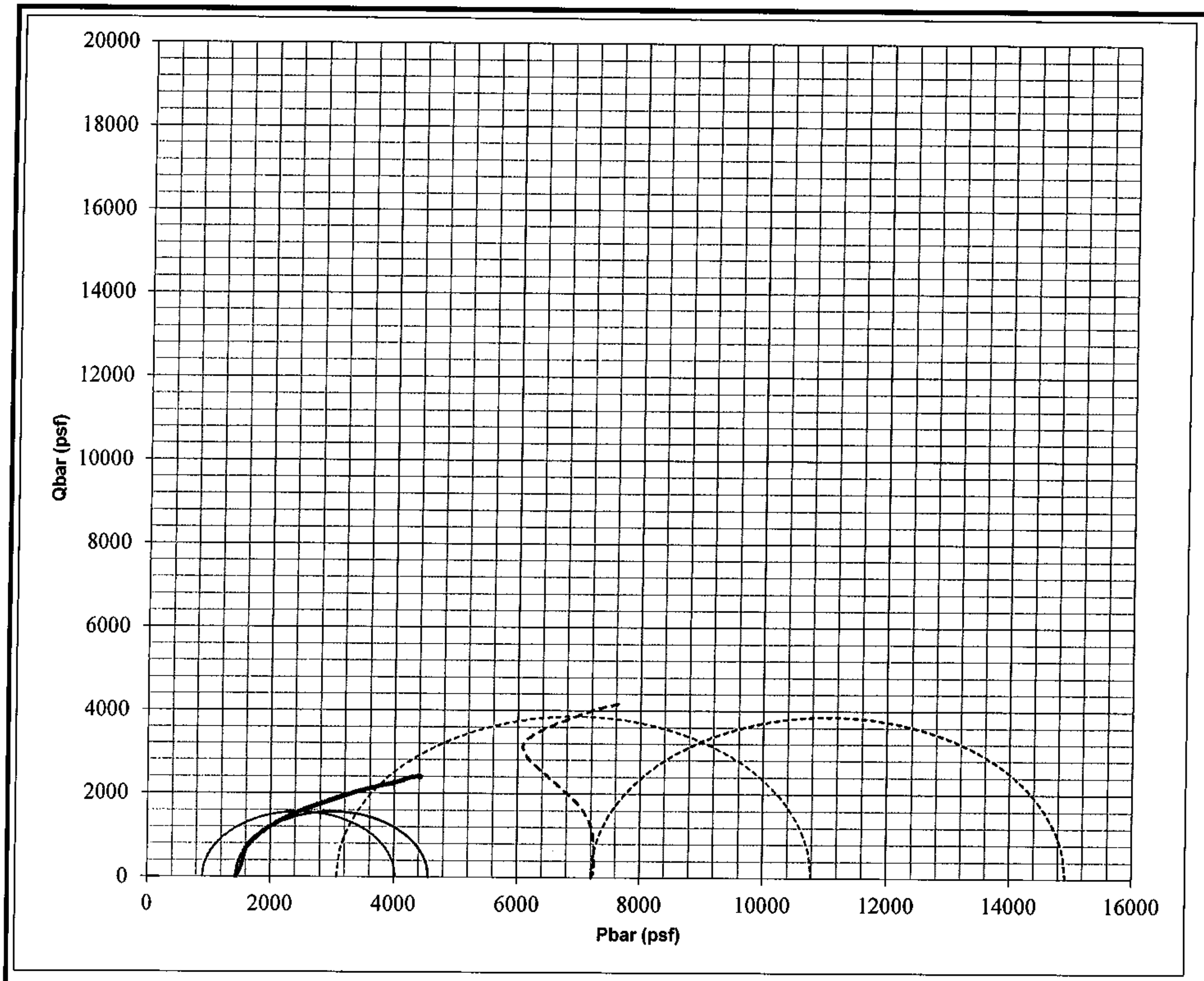
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3117	1.90	5.87	2.85	23.26	128.0	103.8	0.623	100.8	2.70	0.02	32	18	2.1
dot	7200	7717	8.76	5.88	2.85	22.98	127.5	103.7	0.626	99.1	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-169**	Sample #: **12**
Project: **BSVII**	Depth (ft): **74.5**	
Project #: **507385606**	Soil: **Gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3117	1.90	5.87	2.85	23.26	128.0	103.8	0.623	100.8	2.70	0.02	32	18	2.1
dot	7200	7717	8.76	5.88	2.85	22.98	127.5	103.7	0.626	99.1	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-169** Sample #: **12**
Project: **BSVII**	Depth (ft): **74.5**
Project #: **507385606**	Soil: **Gray clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

Boring Number	BH-169				BH-169	
Sample Number	30				30	
Depth (ft)	135				135	
Date Tested	05/29/20				06/01/20	
Description	Grayish brown clay				Grayish brown clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.97	5.90			5.96	5.84
Diameter (in)	2.85	2.83			2.87	2.82
Height/Diameter Ratio	2.10				2.08	
Total Weight (g)	1305.48	1304.10			1297.80	1292.13
Moisture Content (%)	23.14	23.01			22.56	22.03
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	130.87	134.18			128.67	134.77
Dry Density (pcf)	106.28	109.08			104.99	110.44
Area (cm^2)	41.09	40.52			41.59	40.33
Total Volume (cc)	622.75	606.75			629.63	598.53
Void Ratio	0.5860	0.5453			0.6055	0.5262
Saturation (%)	106.6	113.9			100.6	113.0
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.30				6.00	
Effective Consolidation Stress (psf)	4320				11520	
Major Effective Stress at Failure (psf) σ1	9009				18452	
Minor Effective Stress at Failure (psf) σ3	1842				5642	
Deviator Stress at Failure (psf)	7167				12811	
Pore Pressure at Failure (psf)	2478				5878	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	

ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767

Classification Based On	Plasticity index, Visual		Plasticity index, Visual
Liquid Limit	37		
Plastic Limit	20		
Remarks			

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

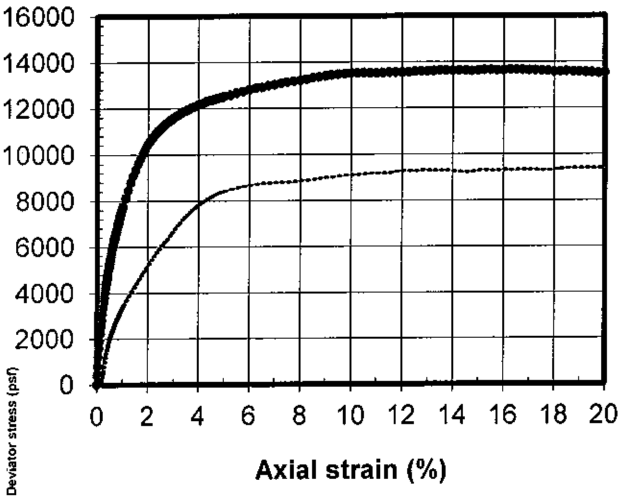
Client: **Mott MacDonald**	Boring #: **BH-169**	Sample #: **30**
Project: **BSVII**	Depth (ft): **135**	
Project #: **507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

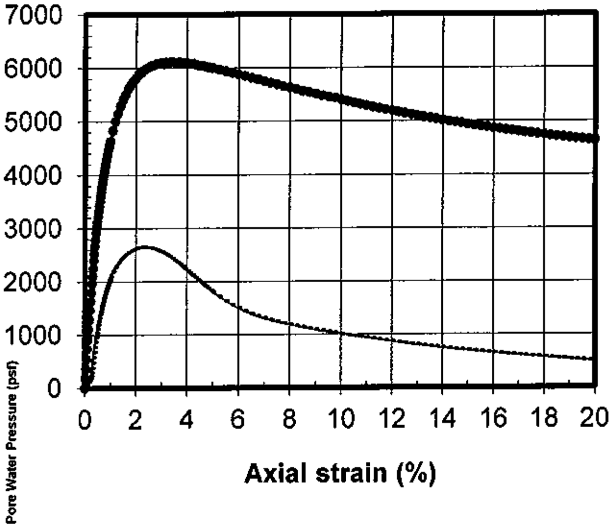
INSPECTION SERVICES INC.

PLATE NUMBER ________

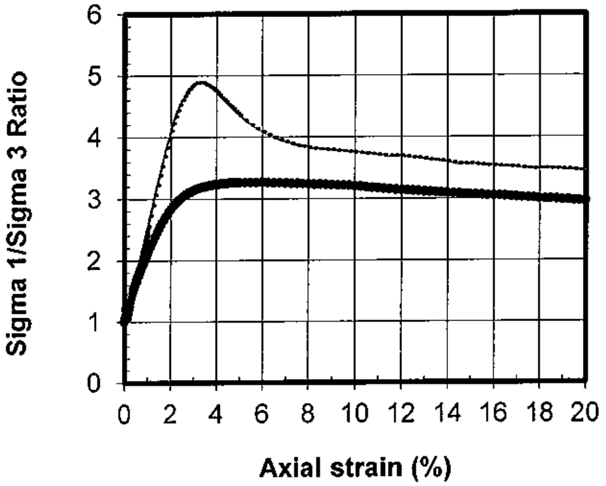
Deviator Stress



Pore Water Pressure



Sigma 1/Sigma 3 Ratio



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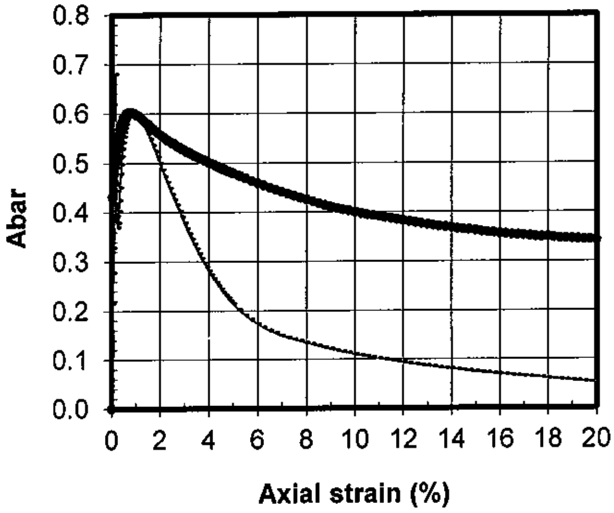


Failure Criteria Maximum Effective σ1 / σ3 ratio

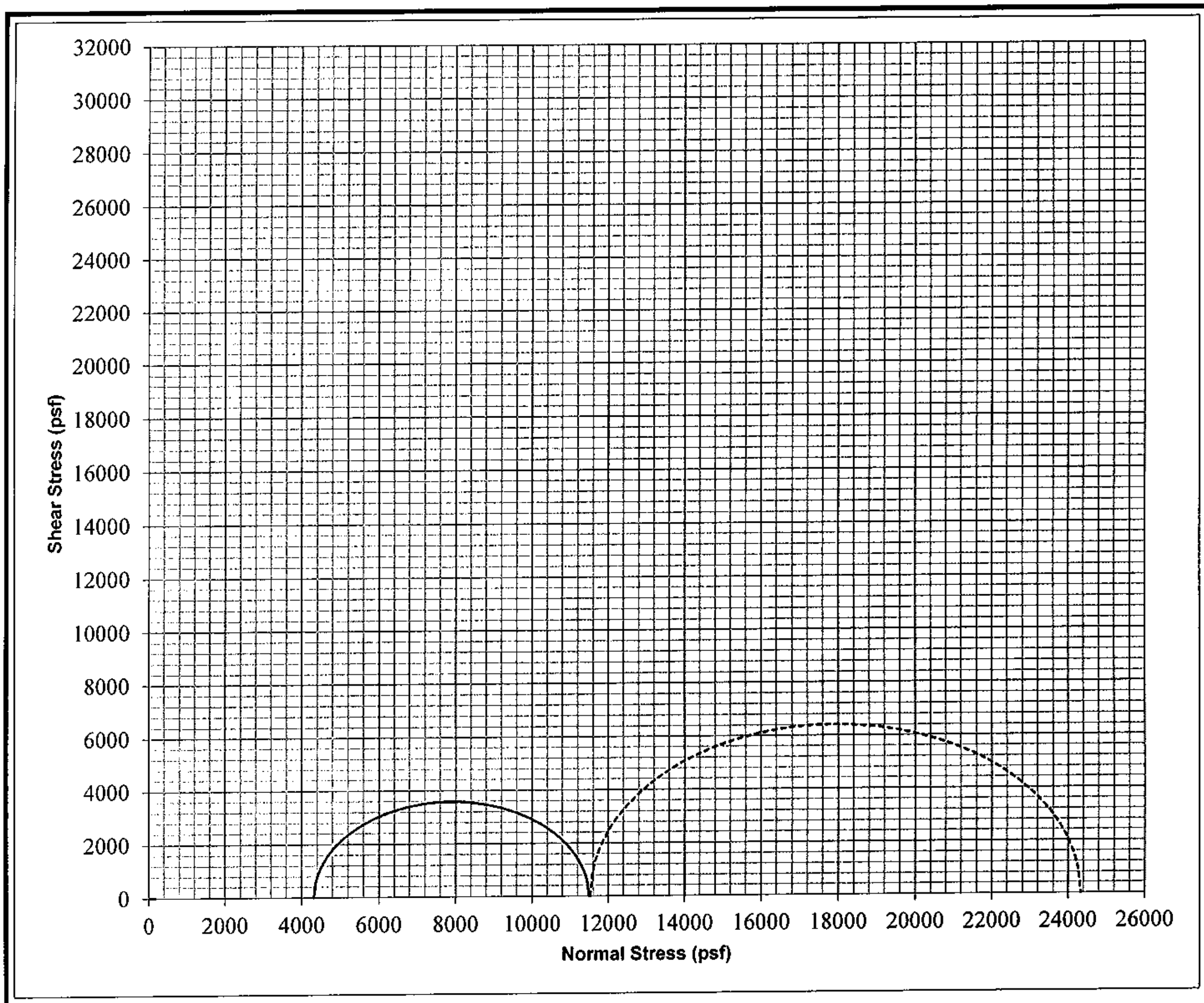
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7167	3.30	5.97	2.85	23.14	130.9	106.3	0.586	106.6	2.70	0.02	37	20	2.1
dot	11520	12811	6.00	5.96	2.87	22.56	128.7	105.0	0.605	100.6	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-169**	Sample #:	**30**
Project:	**BSVII**	Depth (ft):	**135**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER__________



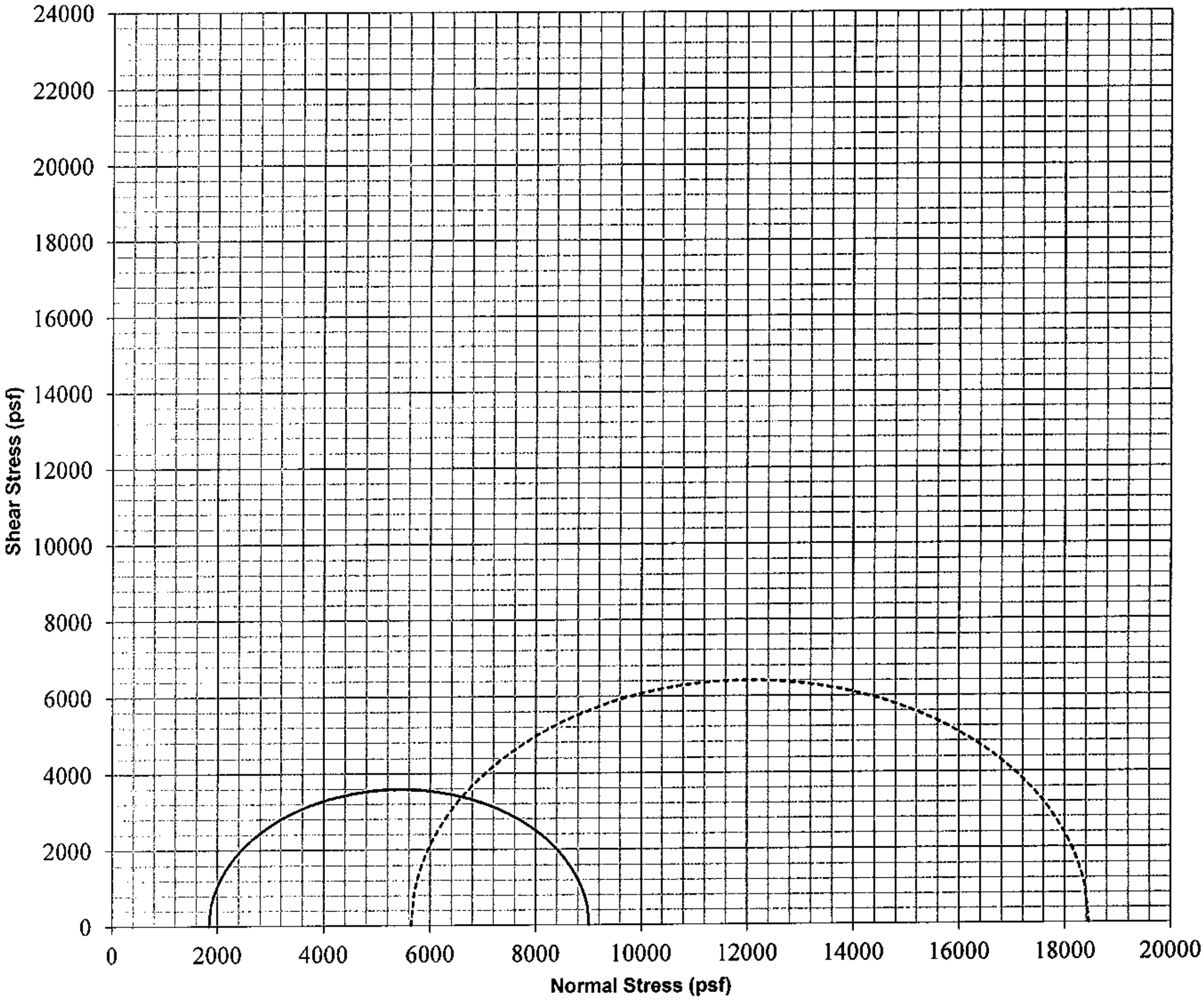
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7167	3.30	5.97	2.85	23.14	130.9	106.3	0.586	106.6	2.70	0.02	37	20	2.1
dot	11520	12811	6.00	5.96	2.87	22.56	128.7	105.0	0.605	100.6	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-169**	Sample #: **30**	
Project: **BSVII**	Depth (ft): **135**		
Project #: **507385606**	Soil: **Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



EFFECTIVE MOHR CIRCLES

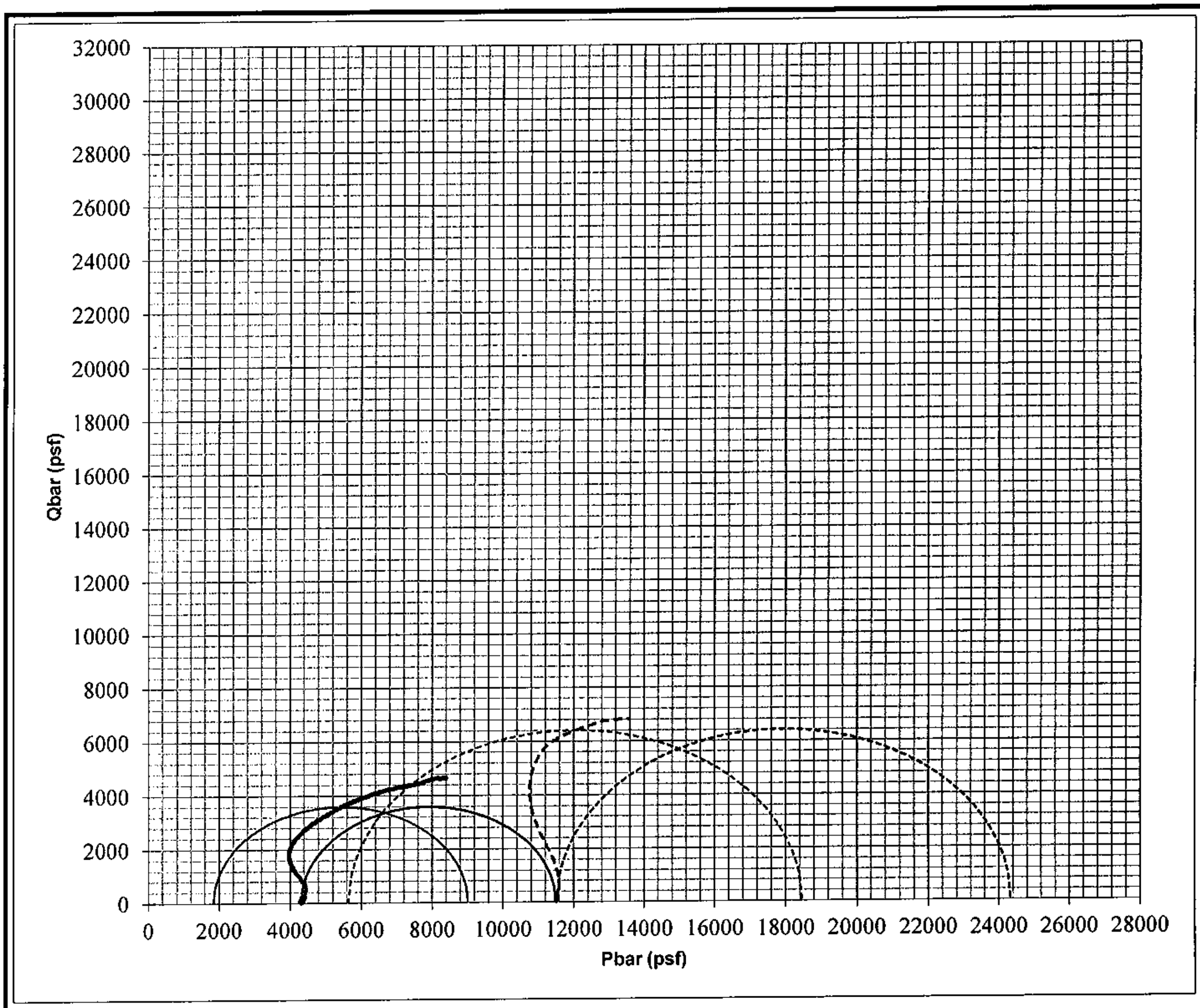
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7167	3.30	5.97	2.85	23.14	130.9	106.3	0.586	106.6	2.70	0.02	37	20	2.1
dot	11520	12811	6.00	5.96	2.87	22.56	128.7	105.0	0.605	100.6	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-169**	Sample #: **30**
Project: **BSVII**	Depth (ft): **135**	
Project #: **507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	4320	7167	3.30	5.97	2.85	23.14	130.9	106.3	0.586	106.6	2.70	0.02	37	20	2.1
dot	11520	12811	6.00	5.96	2.87	22.56	128.7	105.0	0.605	100.6	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-169**	Sample #:	**30**
Project:	**BSVII**	Depth (ft):	**135**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

Boring Number	BH-171				BH-171	
Sample Number	30				30	
Depth (ft)	114				114	
Date Tested	05/26/20				05/28/20	
Description	Grayish brown sandy clay				Grayish brown sandy clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.92	4.87			4.83	4.76
Diameter (in)	2.40	2.39			2.40	2.37
Height/Diameter Ratio	2.05				2.02	
Total Weight (g)	757.07	757.77			740.38	736.52
Moisture Content (%)	22.39	22.51			21.78	21.14
Moisture Content From	1/2 of sample, cut				1/2 of sample, cut	
Wet Density (pcf)	129.85	132.59			129.28	133.00
Dry Density (pcf)	106.09	108.23			106.16	109.79
Area (cm^2)	29.13	28.84			29.13	28.57
Total Volume (cc)	363.98	356.78			357.50	345.70
Void Ratio	0.5888	0.5573			0.5877	0.5353
Saturation (%)	102.7	109.0			100.1	106.7
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.96	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	4.20				4.90	
Effective Consolidation Stress (psf)	2880				10080	
Major Effective Stress at Failure (psf) σ1	7840				18745	
Minor Effective Stress at Failure (psf) σ3	1745				4898	
Deviator Stress at Failure (psf)	6095				13847	
Pore Pressure at Failure (psf)	1135				5182	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	35					
Plastic Limit	20					
Remarks						

The following information is the same for all samples

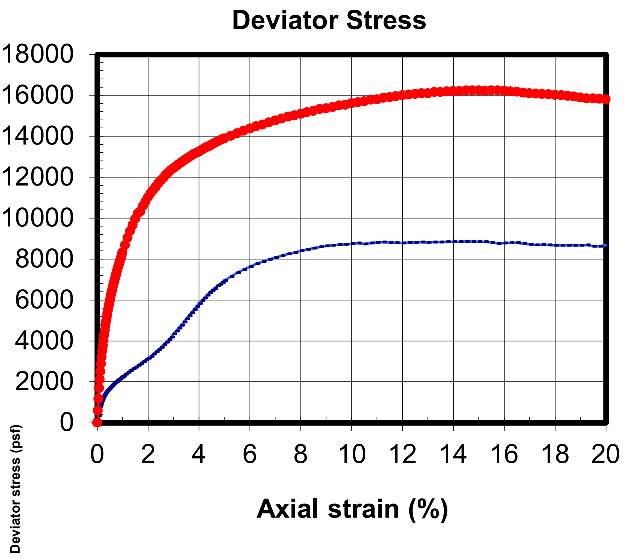
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

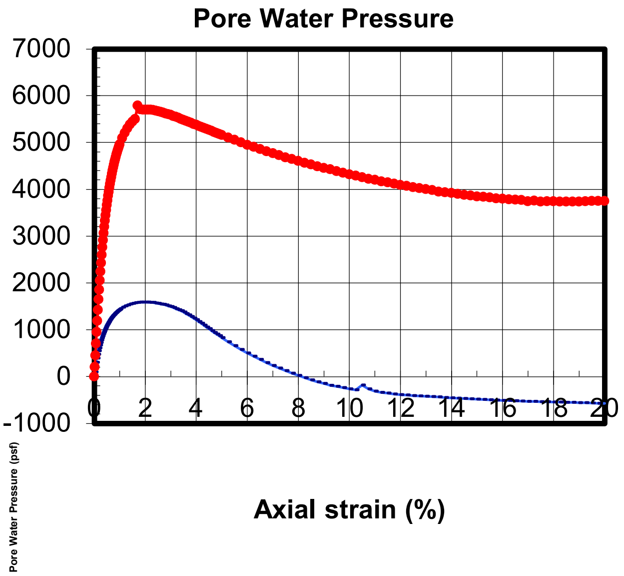
Client: **Mott MacDonald**	Boring #: **BH-171**	Sample #: **30**
Project: **BSVII**	Depth (ft): **114**	
Project #: **507385606**	Soil: **Grayish brown sandy clay**	

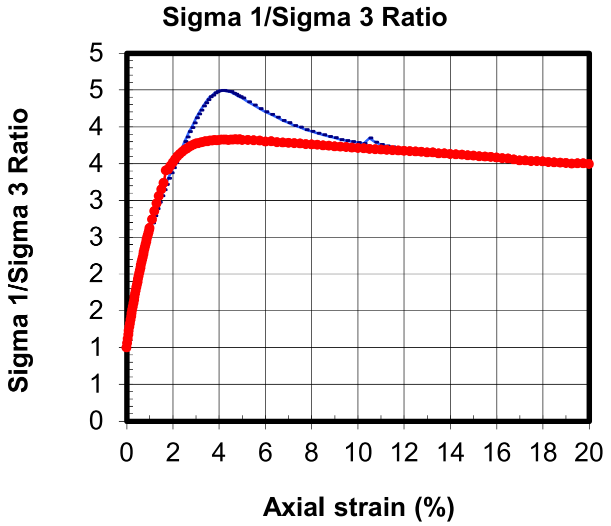
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

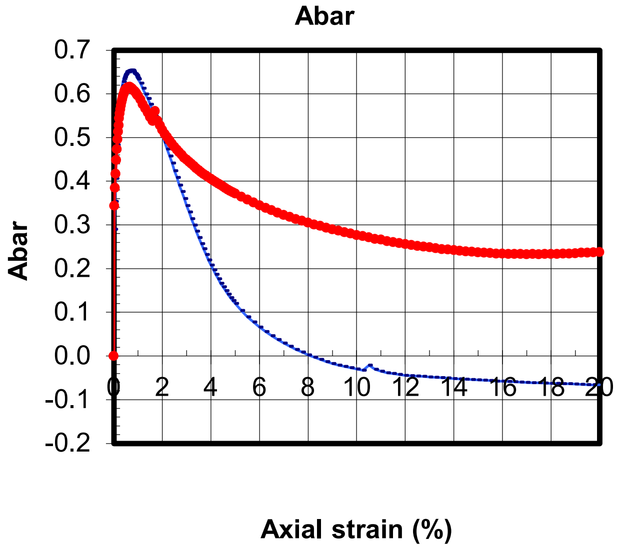
INSPECTION SERVICES INC.

PLATE NUMBER ________


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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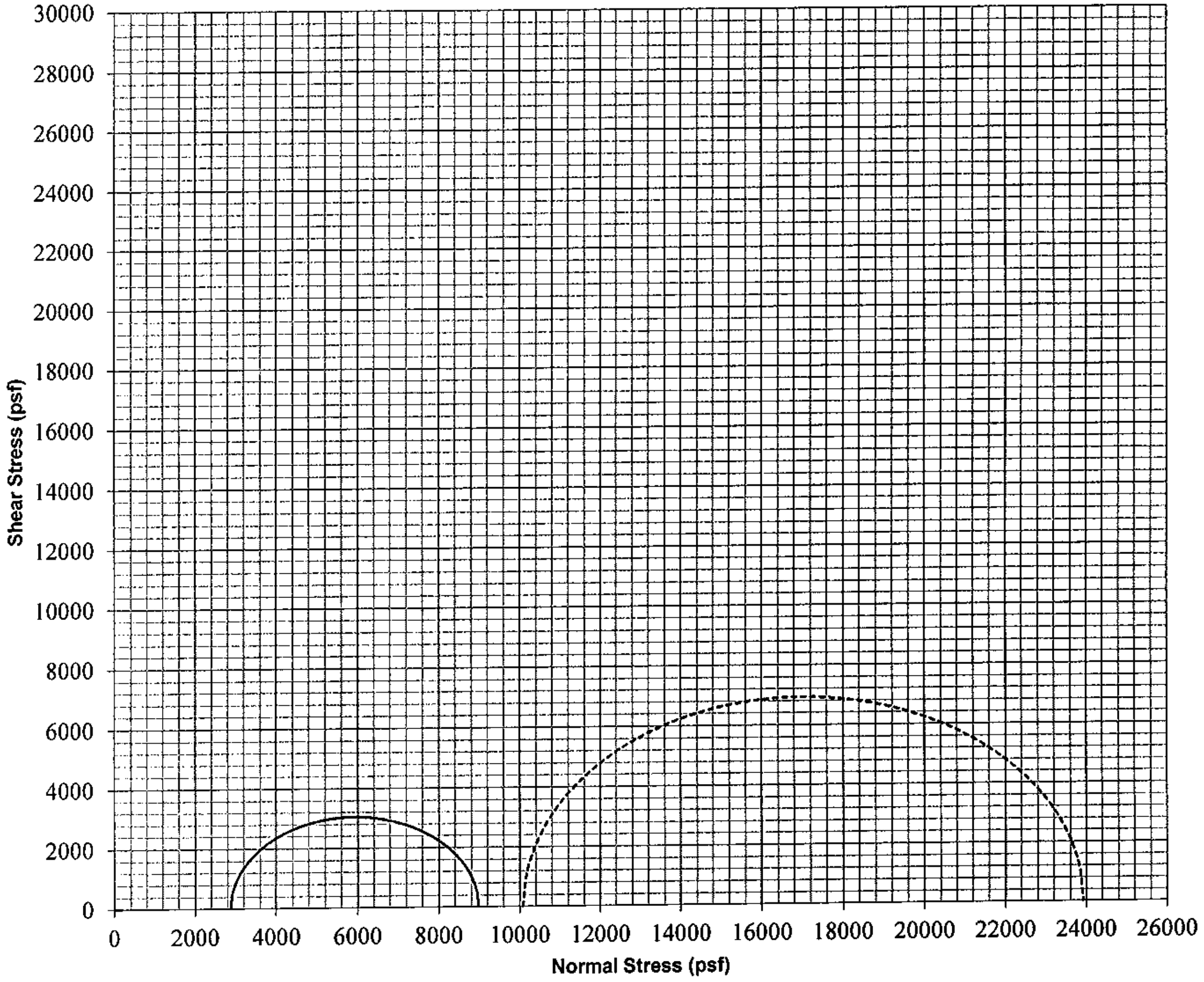
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6095	4.20	4.92	2.40	22.39	129.8	106.1	0.589	102.7	2.70	0.02	35	20	2.1
dot	10080	13847	4.90	4.83	2.40	21.78	129.3	106.2	0.588	100.1	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-171**	Sample #:	**30**
Project:	**BSVII**	Depth (ft):	**114**		
Project #:	**507385606**	Soil:	**Grayish brown sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

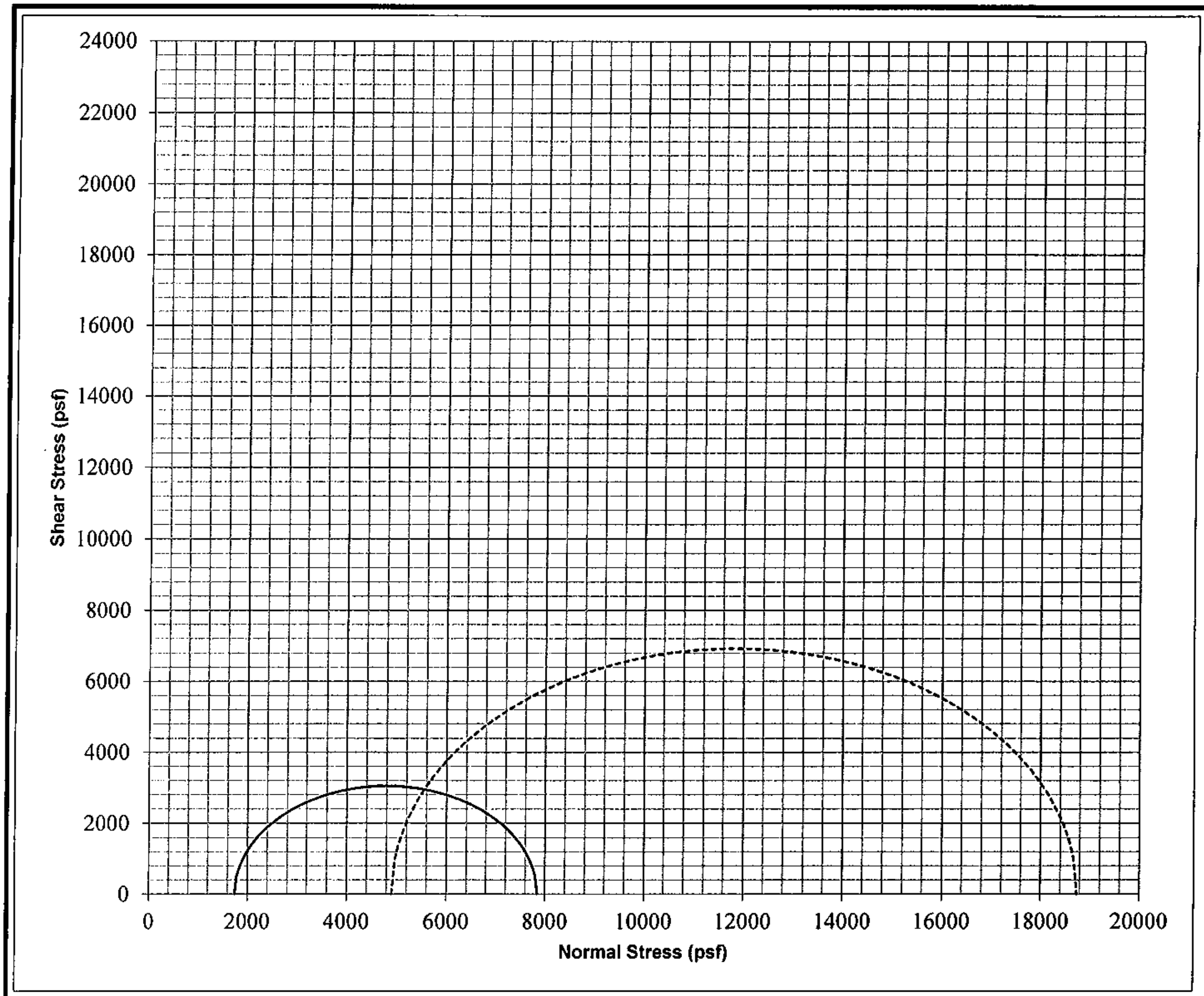
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6095	4.20	4.92	2.40	22.39	129.8	106.1	0.589	102.7	2.70	0.02	35	20	2.1
dot	10080	13847	4.90	4.83	2.40	21.78	129.3	106.2	0.588	100.1	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-171**	Sample #:	**30**
Project:	**BSVII**	Depth (ft):	**114**		
Project #:	**507385606**	Soil:	**Grayish brown sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

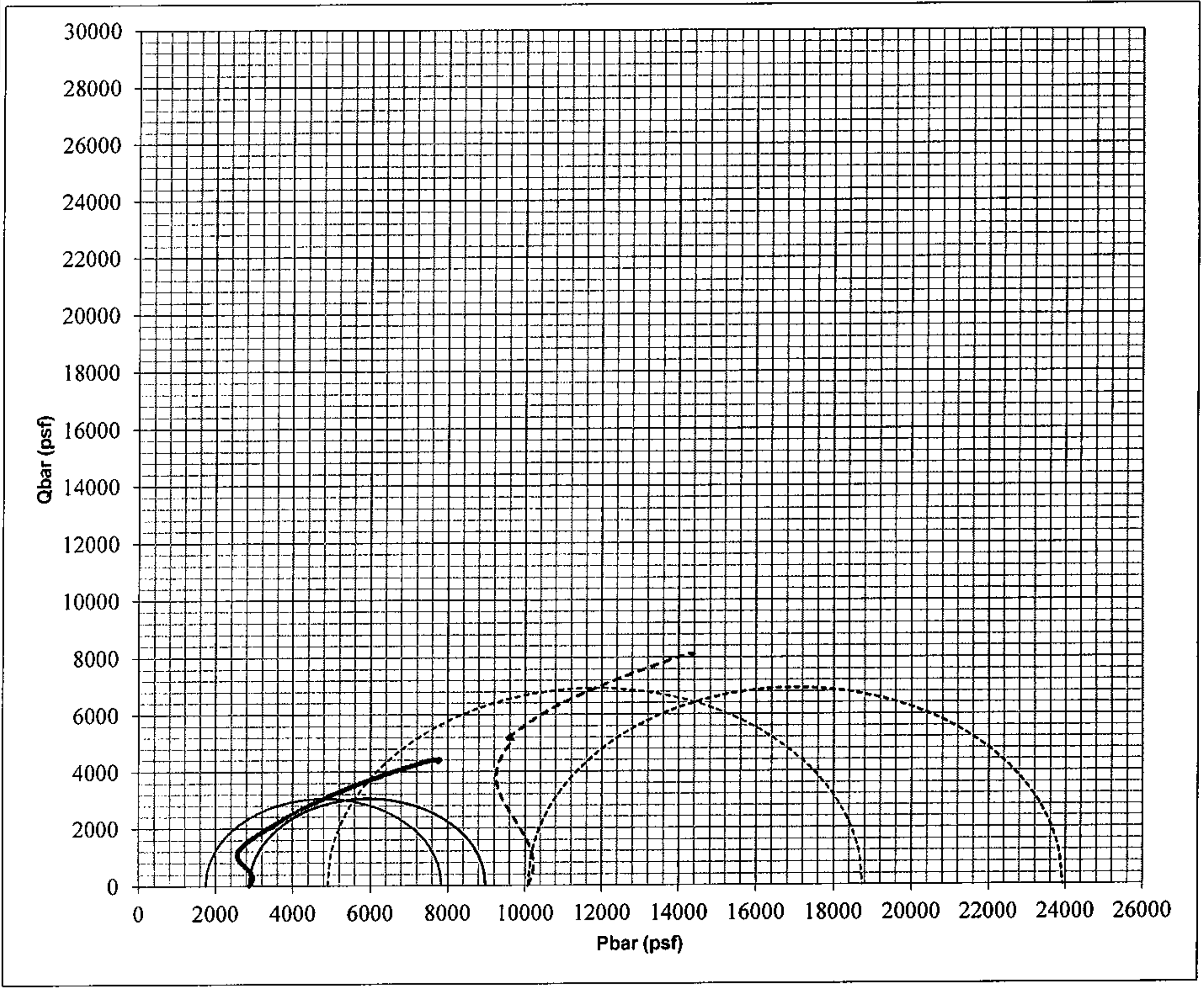
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6095	4.20	4.92	2.40	22.39	129.8	106.1	0.589	102.7	2.70	0.02	35	20	2.1
dot	10080	13847	4.90	4.83	2.40	21.78	129.3	106.2	0.588	100.1	2.70	0.02			2.0

Client: **Mott MacDonald**	Boring #: **BH-171**	Sample #: **30**	
Project: **BSVII**	Depth (ft): **114**		
Project #: **507385606**	Soil: **Grayish brown sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6095	4.20	4.92	2.40	22.39	129.8	106.1	0.589	102.7	2.70	0.02	35	20	2.1
dot	10080	13847	4.90	4.83	2.40	21.78	129.3	106.2	0.588	100.1	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #: **BH-171**	Sample #: **30**
Project:	**BSVII**	Depth (ft): **114**	
Project #:	**507385606**	Soil: **Grayish brown sandy clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

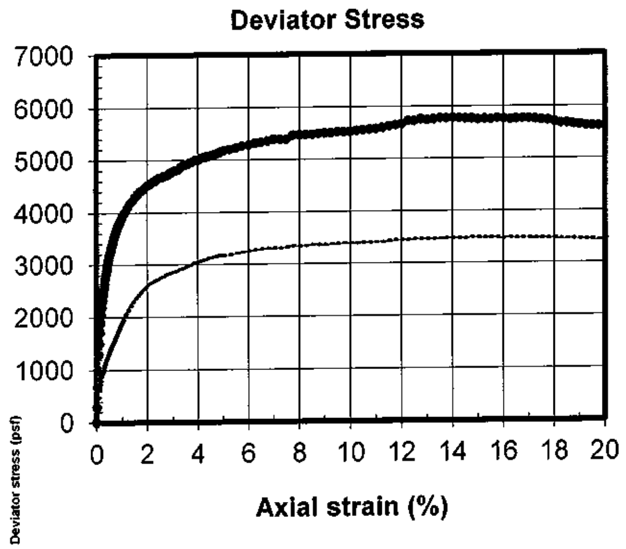
Boring Number	BH-173				BH-173	
Sample Number	17				17	
Depth (ft)	42.5				42.5	
Date Tested	06/25/20				06/26/20	
Description	Gray clay				Gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.82	4.80			4.83	4.78
Diameter (in)	2.40	2.39			2.40	2.37
Height/Diameter Ratio	2.01				2.01	
Total Weight (g)	724.80	729.89			749.71	747.31
Moisture Content (%)	20.05	20.89			21.41	21.02
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	126.63	128.67			130.98	134.98
Dry Density (pcf)	105.48	106.44			107.88	111.53
Area (cm^2)	29.19	29.03			29.13	28.49
Total Volume (cc)	357.32	354.12			357.32	345.62
Void Ratio	0.5979	0.5836			0.5624	0.5112
Saturation (%)	90.5	96.6			102.8	111.0
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.99				0.99	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.00				7.76	
Effective Consolidation Stress (psf)	1440				5040	
Major Effective Stress at Failure (psf) σ1	3491				7533	
Minor Effective Stress at Failure (psf) σ3	884				2074	
Deviator Stress at Failure (psf)	2607				5459	
Pore Pressure at Failure (psf)	556				2966	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	34					
Plastic Limit	17					
Remarks						

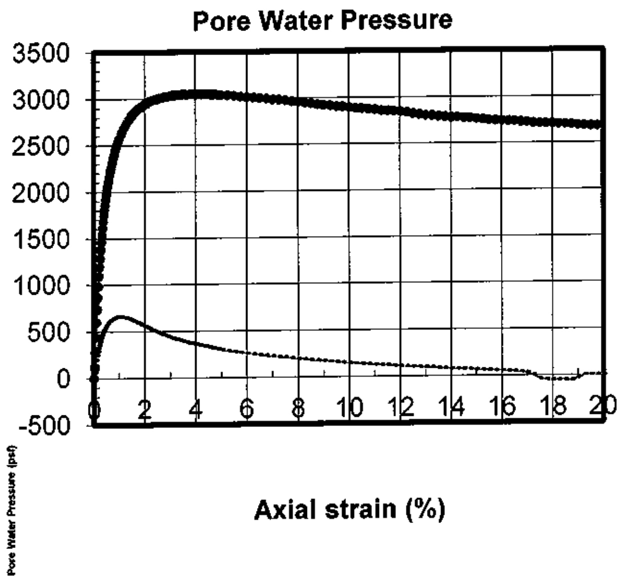
The following information is the same for all samples

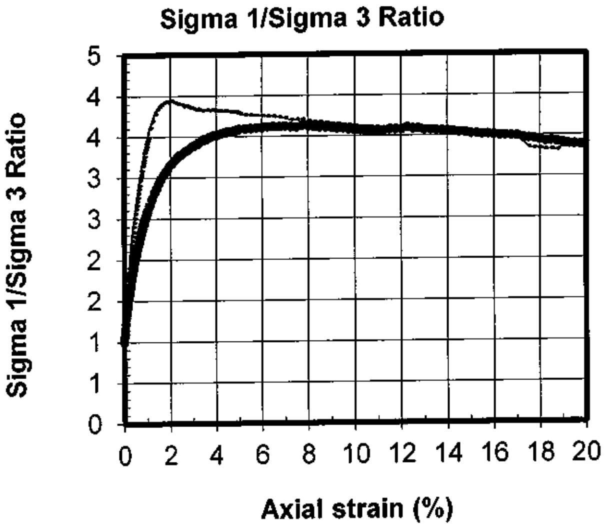
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

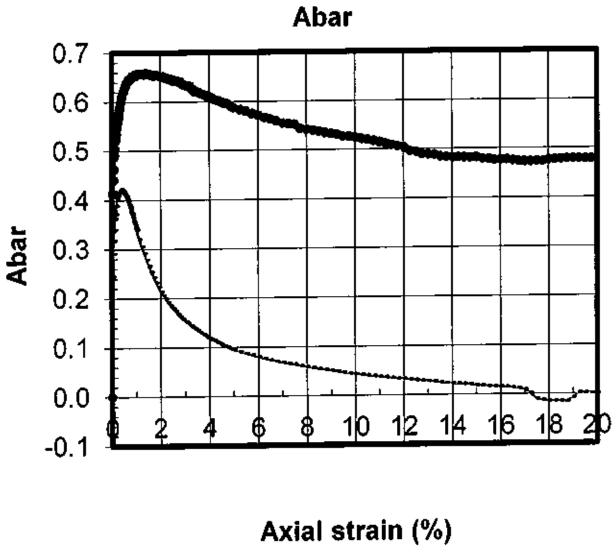
Client: **Mott MacDonald**	Boring #: **BH-173**	Sample #: **17**
Project: **BSVII**	Depth (ft): **42.5**	
Project #: **507385606**	Soil: **Gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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Failure Criteria Maximum Effective σ1 / σ3 ratio

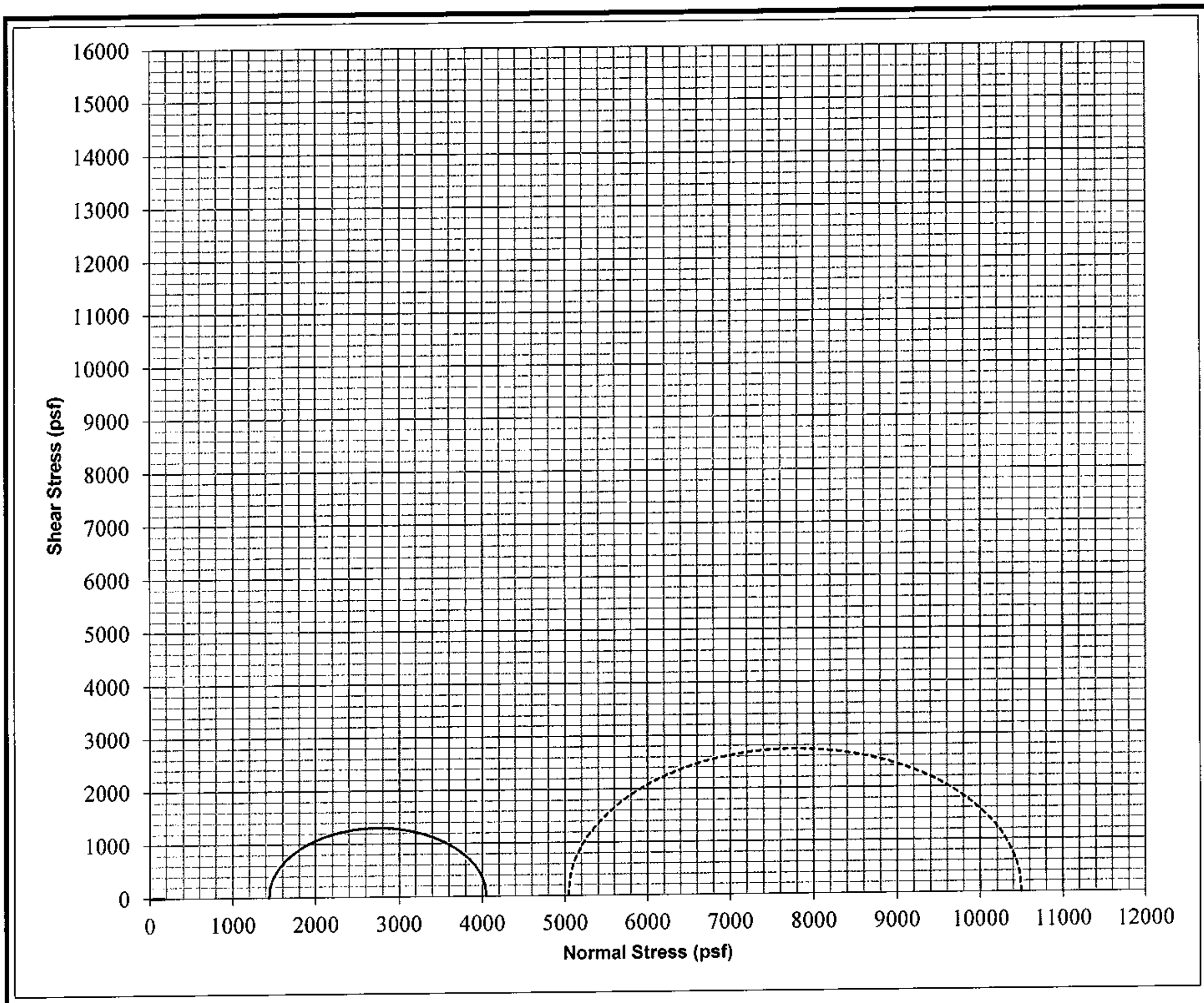
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2607	2.00	4.82	2.40	20.05	126.6	105.5	0.598	90.5	2.70	0.02	34	17	2.0
dot	5040	5459	7.76	4.83	2.40	21.41	131.0	107.9	0.562	102.8	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #: **BH-173**	Sample #: **17**
Project:	**BSVII**	Depth (ft): **42.5**	
Project #:	**507385606**	Soil: **Gray clay**	

ASTM D-4767

TRIAXIAL COMPRESSION
CONSOLIDATED-UNDRAINED

TXCU



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

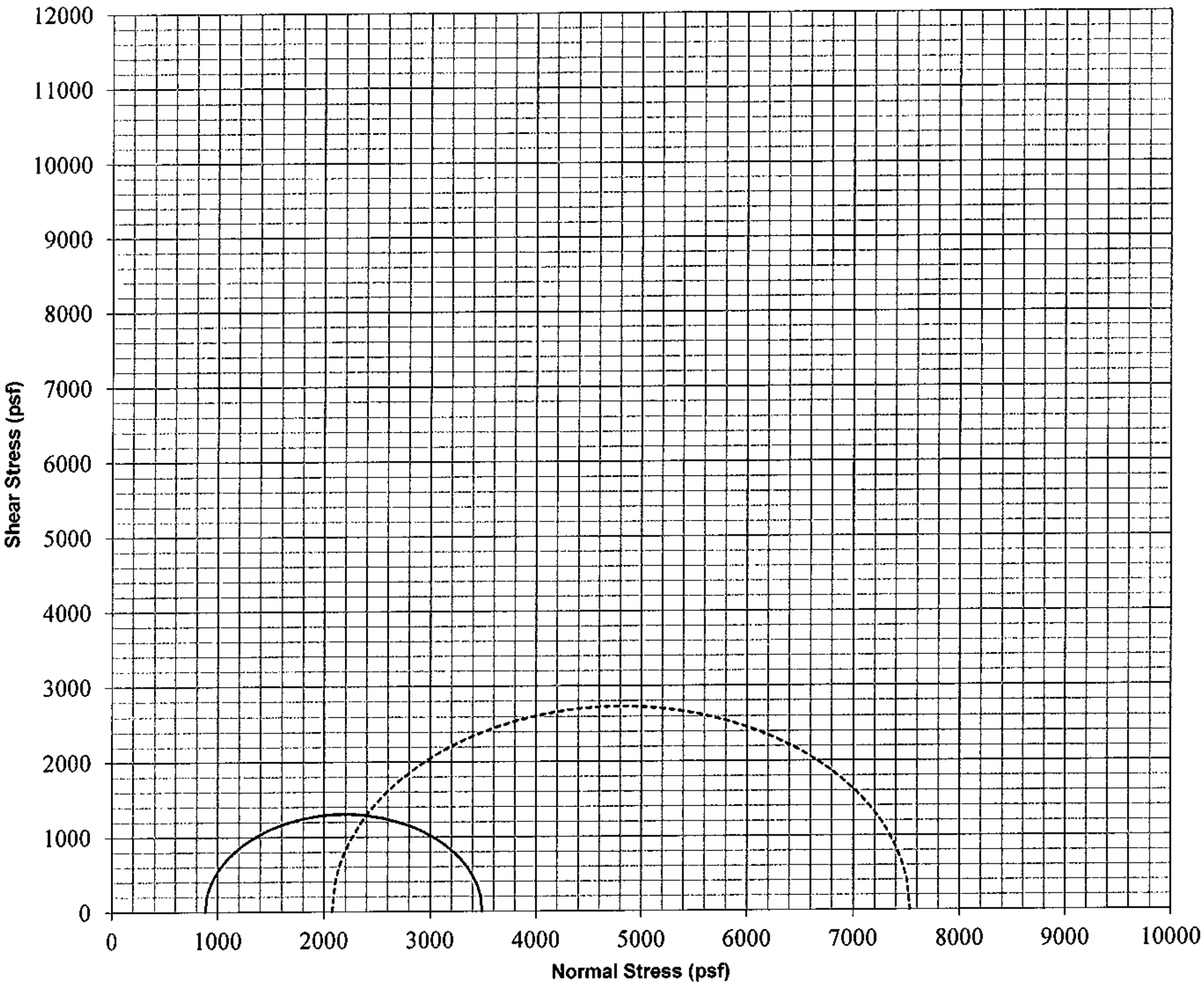
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2607	2.00	4.82	2.40	20.05	126.6	105.5	0.598	90.5	2.70	0.02	34	17	2.0
dot	5040	5459	7.76	4.83	2.40	21.41	131.0	107.9	0.562	102.8	2.70	0.02			2.0

Client: **Mott MacDonald**	Boring #: **BH-173**	Sample #: **17**	
Project: **BSVII**	Depth (ft): **42.5**		
Project #: **507385606**	Soil: **Gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2607	2.00	4.82	2.40	20.05	126.6	105.5	0.598	90.5	2.70	0.02	34	17	2.0
dot	5040	5459	7.76	4.83	2.40	21.41	131.0	107.9	0.562	102.8	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-173** Sample #: **17**

Project: **BSVII**

Depth (ft): **42.5**

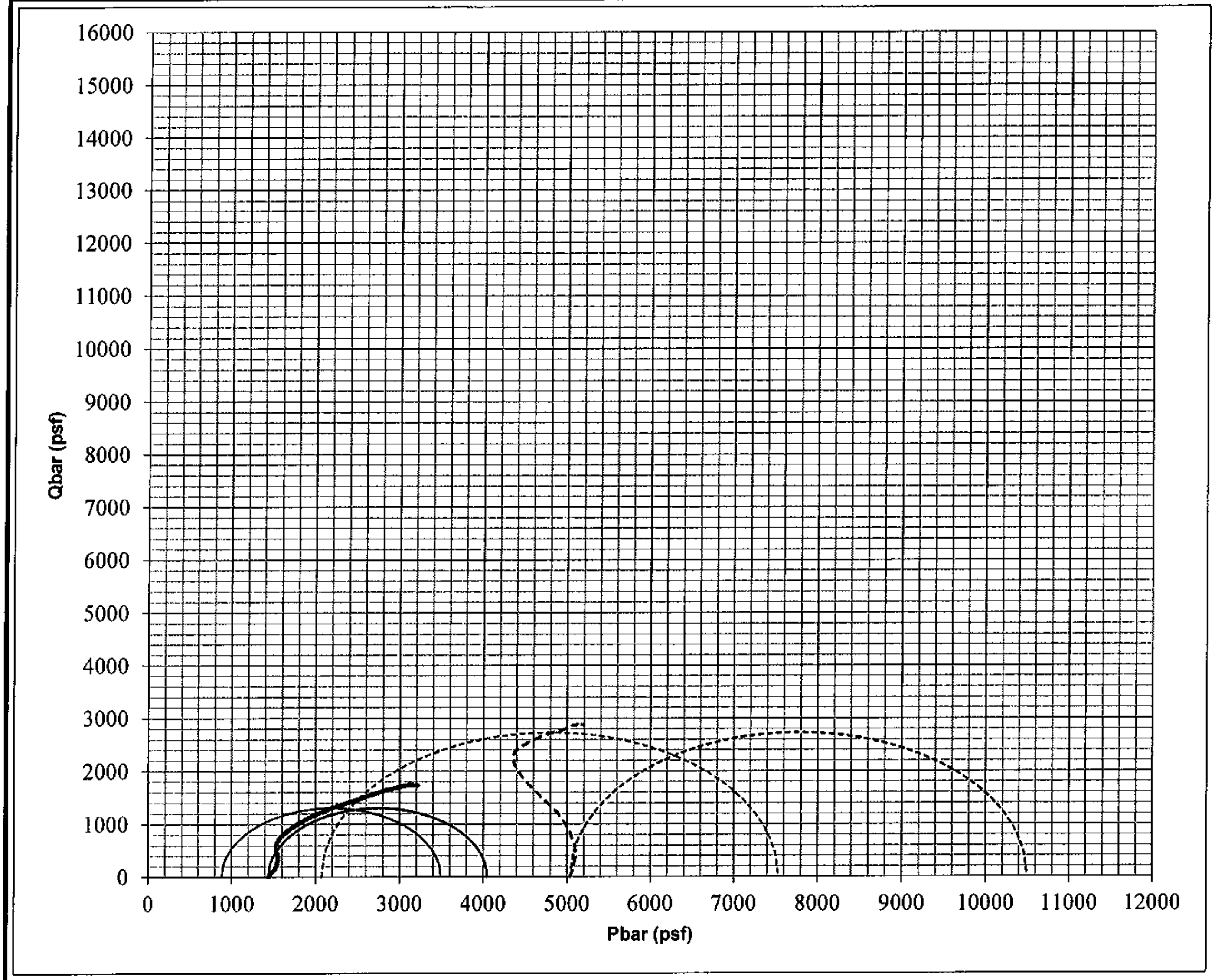
Project #: **507385606**

Soil: **Gray clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2607	2.00	4.82	2.40	20.05	126.6	105.5	0.598	90.5	2.70	0.02	34	17	2.0
dot	5040	5459	7.76	4.83	2.40	21.41	131.0	107.9	0.562	102.8	2.70	0.02			2.0

Client: **Mott MacDonald**	Boring #: **BH-173**	Sample #: **17**
Project: **BSVII**	Depth (ft): **42.5**	
Project #: **507385606**	Soil: **Gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________

Boring Number	BH-175				BH-175	
Sample Number	7				7	
Depth (ft)	32.5				32.5	
Date Tested	05/08/20				05/09/20	
Description	Greenish gray clay with sand				Greenish gray clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.02	4.99			5.22	5.14
Diameter (in)	2.38	2.37			2.39	2.36
Height/Diameter Ratio	2.11				2.19	
Total Weight (g)	764.98	764.33			796.08	784.27
Moisture Content (%)	22.43	22.32			23.18	21.35
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	130.42	132.37			129.44	132.85
Dry Density (pcf)	106.53	108.22			105.08	109.47
Area (cm^2)	28.70	28.44			28.94	28.21
Total Volume (cc)	366.15	360.45			383.94	368.54
Void Ratio	0.5822	0.5576			0.6040	0.5397
Saturation (%)	104.0	108.1			103.6	106.8
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				#N/A	
B value Before Consolidation	0.96				0.99	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.10				8.75	
Effective Consolidation Stress (psf)	1440				4320	
Major Effective Stress at Failure (psf) σ1	3337				7111	
Minor Effective Stress at Failure (psf) σ3	812				1959	
Deviator Stress at Failure (psf)	2525				5153	
Pore Pressure at Failure (psf)	628				2361	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Visual				Visual	
Liquid Limit						
Plastic Limit						
Remarks						

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

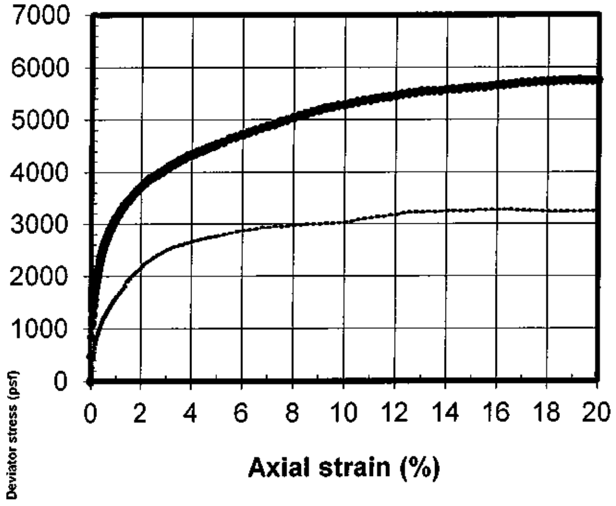
Client: **Mott MacDonald**	Boring #: **BH-175**	Sample #: **7**
Project: **BSVII**	Depth (ft): **32.5**	
Project #: **507385606**	Soil: **Greenish gray clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

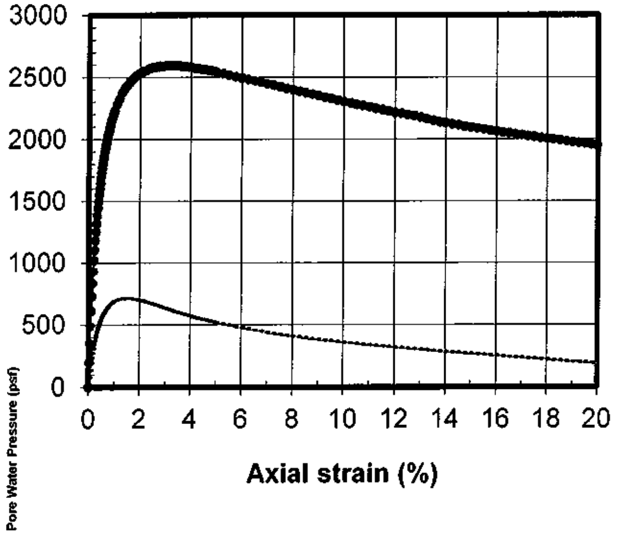
INSPECTION SERVICES INC.

PLATE NUMBER ________

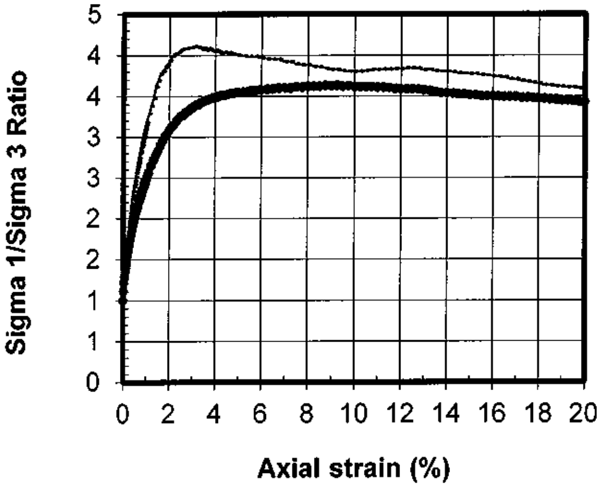
Deviator Stress



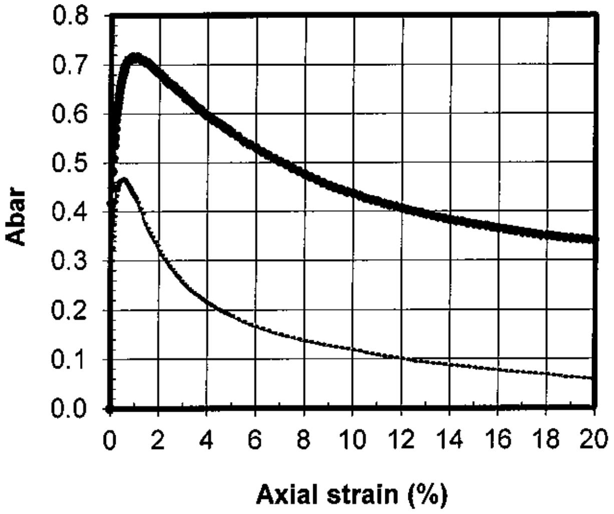
Pore Water Pressure



Sigma 1/Sigma 3 Ratio



Abar



Failure Criteria Maximum Effective σ1 / σ3 ratio

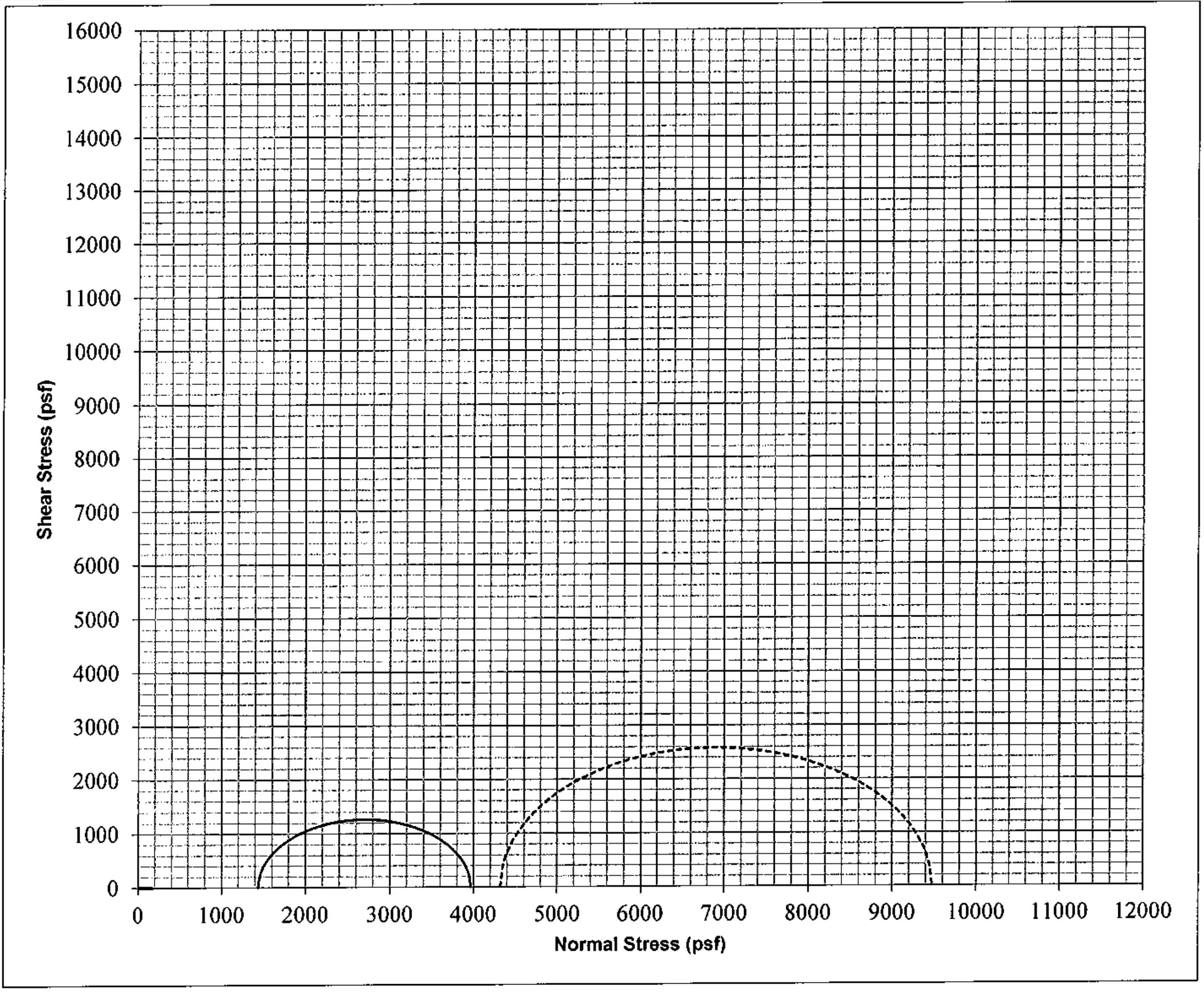
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2525	3.10	5.02	2.38	22.43	130.4	106.5	0.582	104.0	2.70	0.02			2.1
dot	4320	5153	8.75	5.22	2.39	23.18	129.4	105.1	0.604	103.6	2.70	0.02			2.2

Client:	**Mott MacDonald**	Boring #:	**BH-175**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**32.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

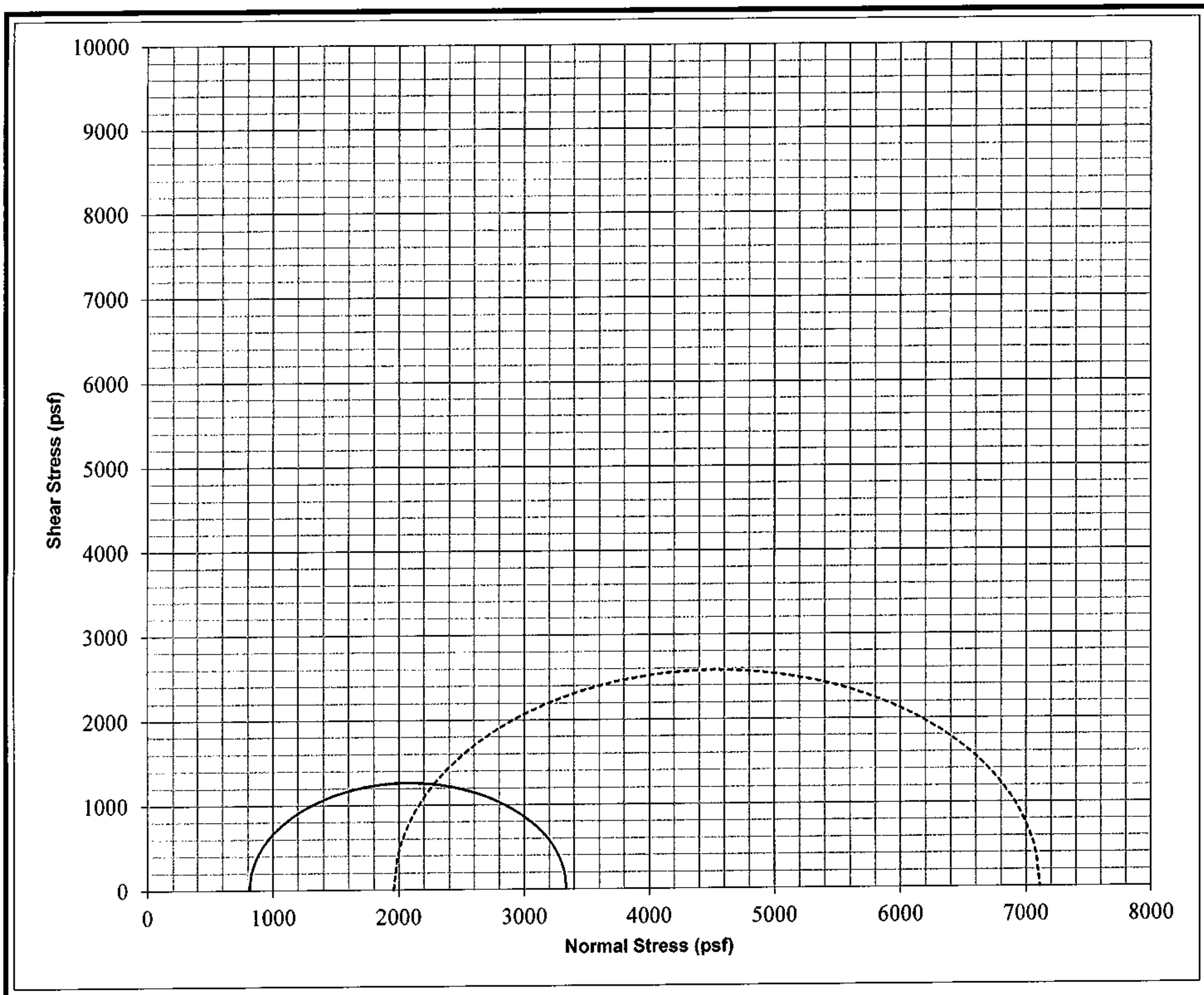
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2525	3.10	5.02	2.38	22.43	130.4	106.5	0.582	104.0	2.70	0.02			2.1
dot	4320	5153	8.75	5.22	2.39	23.18	129.4	105.1	0.604	103.6	2.70	0.02			2.2

Client:	**Mott MacDonald**	Boring #:	**BH-175**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**32.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



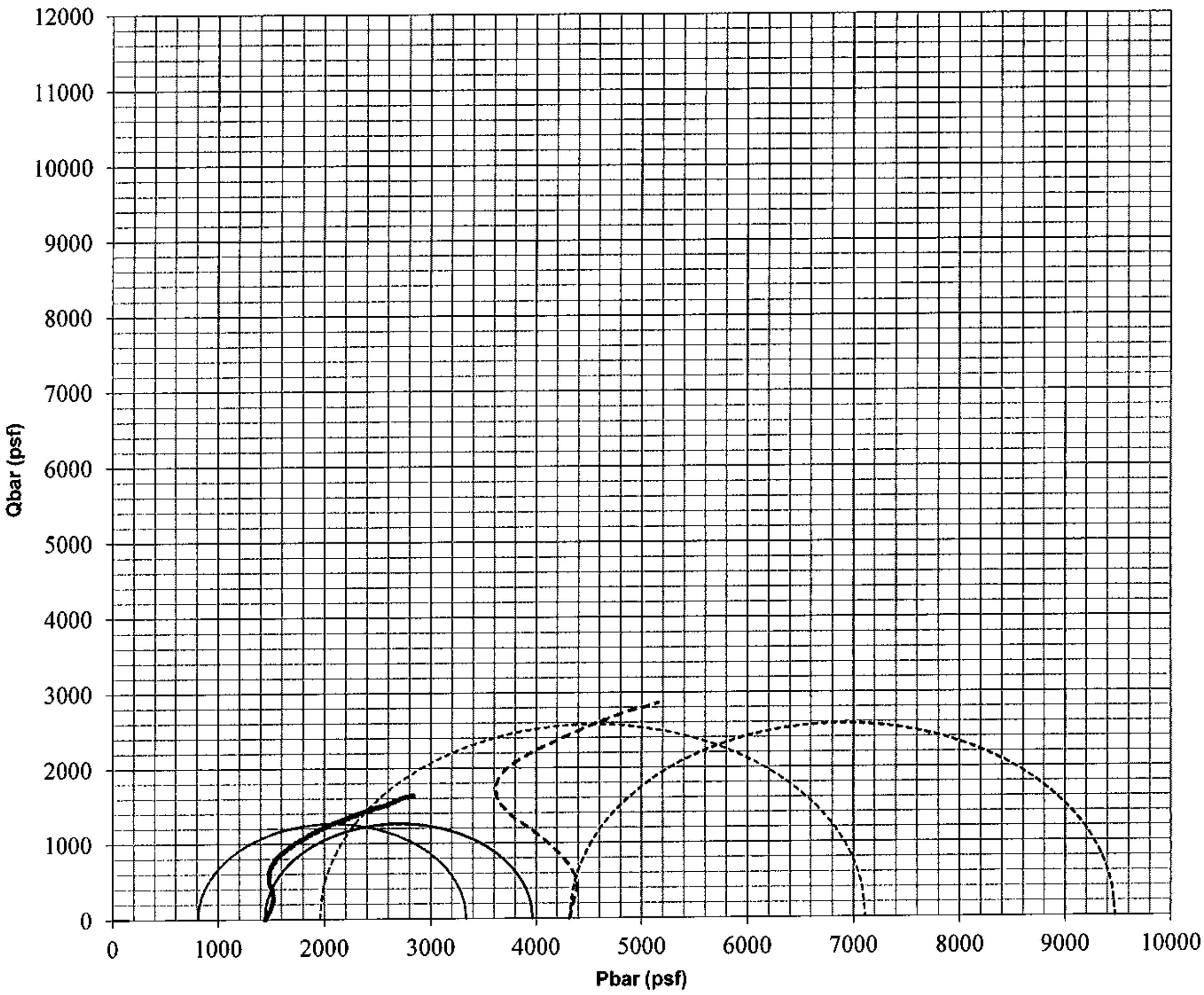
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2525	3.10	5.02	2.38	22.43	130.4	106.5	0.582	104.0	2.70	0.02			2.1
dot	4320	5153	8.75	5.22	2.39	23.18	129.4	105.1	0.604	103.6	2.70	0.02			2.2

Client:	**Mott MacDonald**	Boring #:	**BH-175**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**32.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2525	3.10	5.02	2.38	22.43	130.4	106.5	0.582	104.0	2.70	0.02			2.1
dot	4320	5153	8.75	5.22	2.39	23.18	129.4	105.1	0.604	103.6	2.70	0.02			2.2

Client:	**Mott MacDonald**	Boring #:	**BH-175**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**32.5**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________

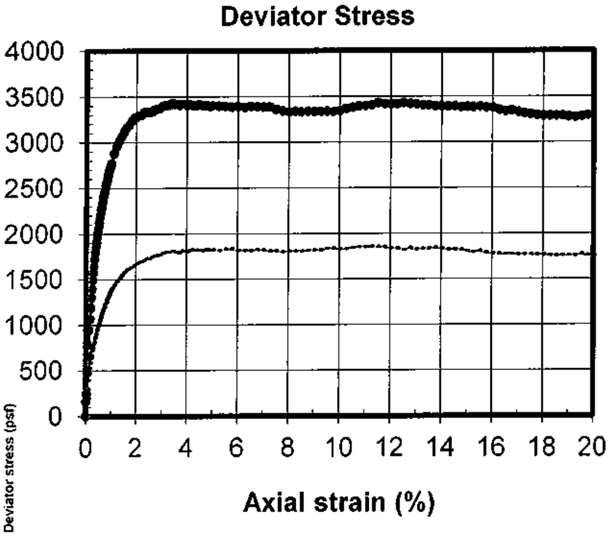
Boring Number	BH-176				BH-176	
Sample Number	6				6	
Depth (ft)	20				20	
Date Tested	07/20/20				07/21/20	
Description	Greenish gray clay with sand				Greenish gray clay with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.90	4.87			5.00	4.94
Diameter (in)	2.39	2.37			2.39	2.36
Height/Diameter Ratio	2.06				2.09	
Total Weight (g)	698.21	696.74			736.97	731.09
Moisture Content (%)	29.53	29.25			24.81	23.81
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	121.44	123.84			125.16	129.44
Dry Density (pcf)	93.76	95.81			100.28	104.55
Area (cm^2)	28.82	28.37			28.94	28.13
Total Volume (cc)	358.91	351.21			367.58	352.58
Void Ratio	0.7977	0.7592			0.6808	0.6122
Saturation (%)	99.9	104.0			98.4	105.0
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.98	
Total Back Pressure (psf)	8640				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.40				6.01	
Effective Consolidation Stress (psf)	1440				3600	
Major Effective Stress at Failure (psf) σ1	2562				4838	
Minor Effective Stress at Failure (psf) σ3	753				1442	
Deviator Stress at Failure (psf)	1809				3395	
Pore Pressure at Failure (psf)	687				2158	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	45					
Plastic Limit	18					
Remarks						

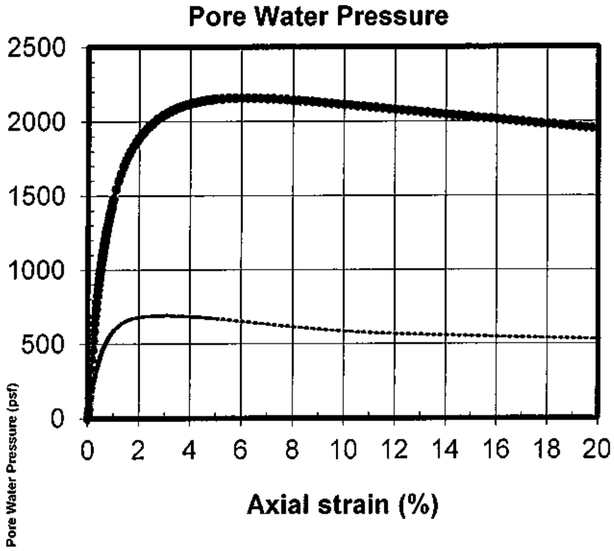
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

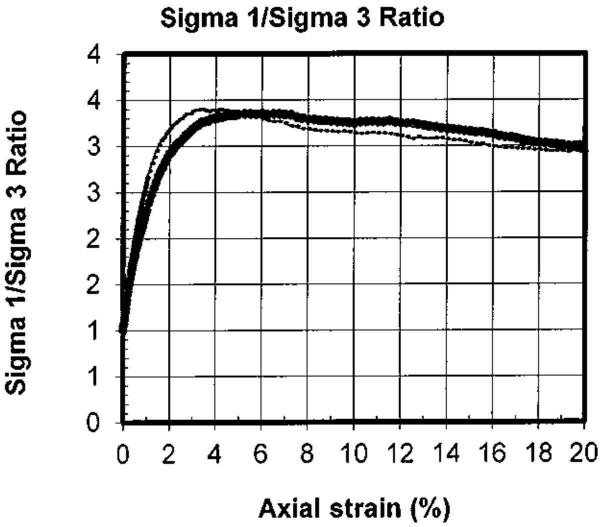
Client: **Mott MacDonald**	Boring #: **BH-176**	Sample #: **6**
Project: **BSVII**	Depth (ft): **20**	
Project #: **507385606**	Soil: **Greenish gray clay with sand**	

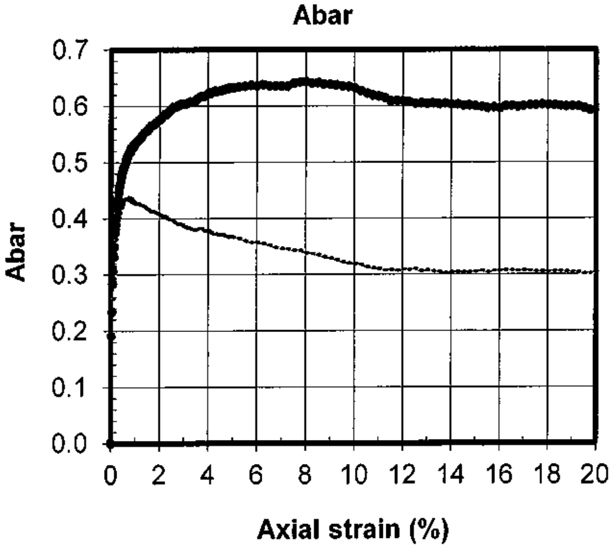
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER __________**









Failure Criteria Maximum Effective σ1 / σ3 ratio

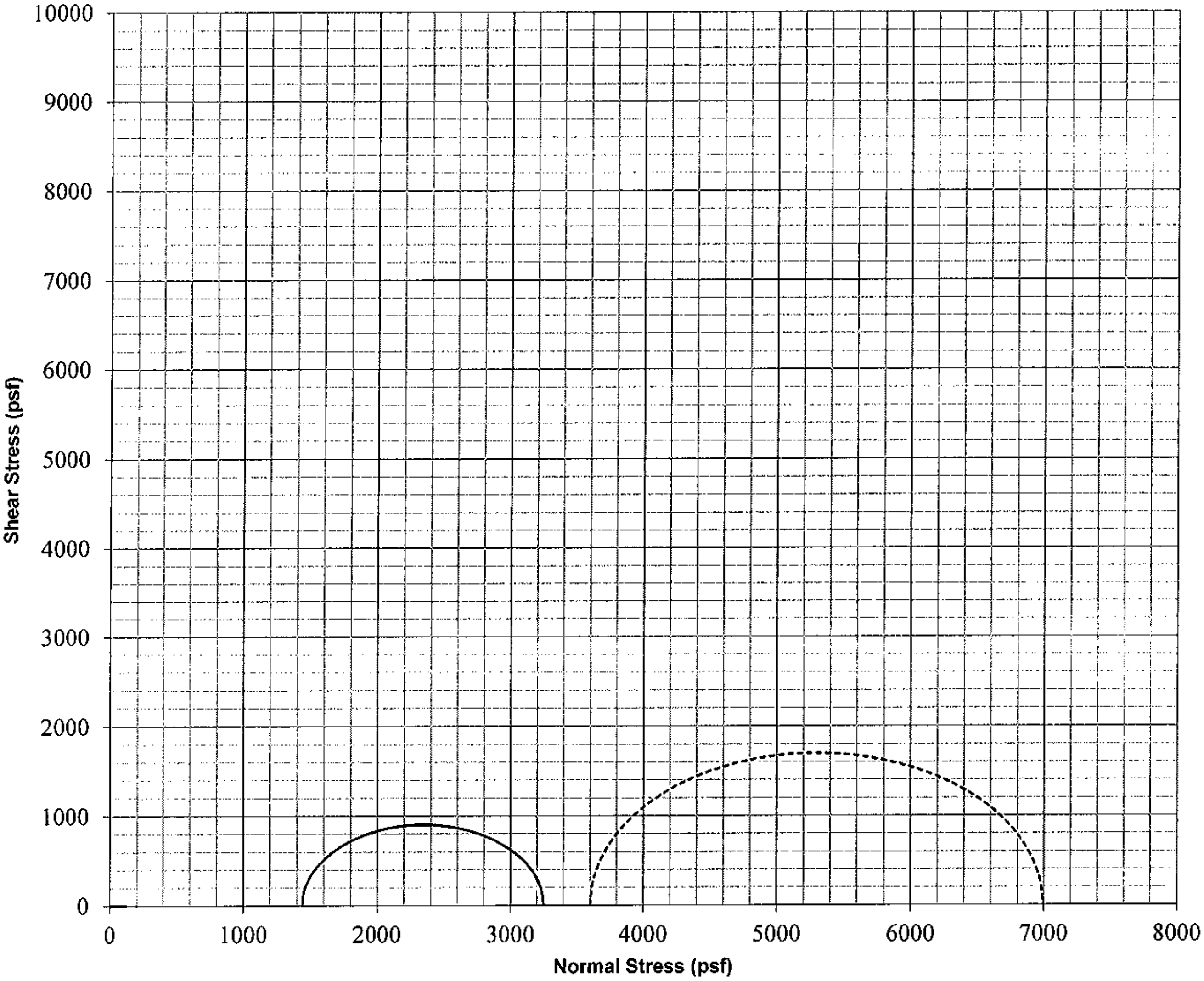
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	1809	3.40	4.90	2.39	29.53	121.4	93.8	0.798	99.9	2.70	0.02	45	18	2.1
dot	3600	3395	6.01	5.00	2.39	24.81	125.2	100.3	0.681	98.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-176**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**20**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

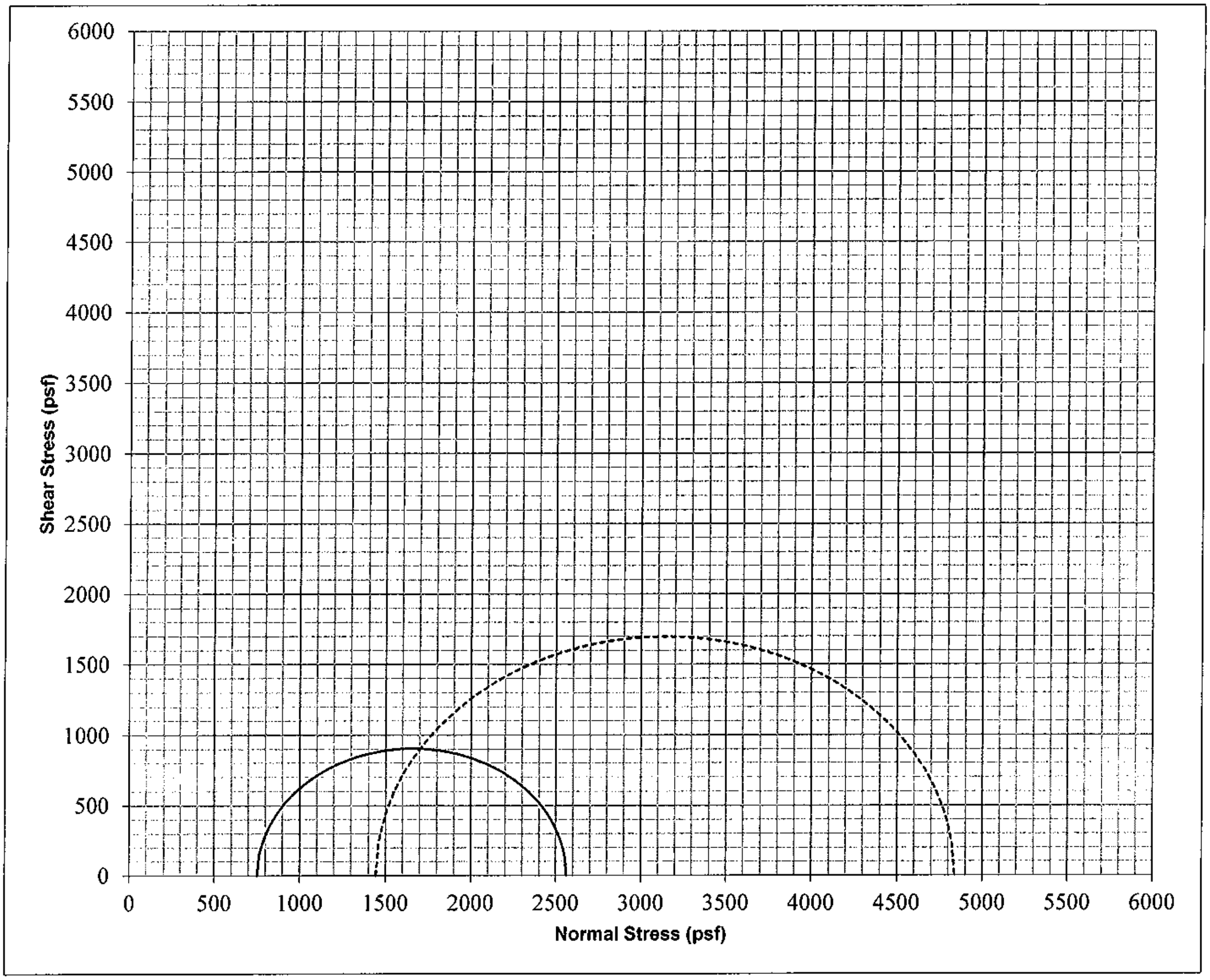
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	1809	3.40	4.90	2.39	29.53	121.4	93.8	0.798	99.9	2.70	0.02	45	18	2.1
dot	3600	3395	6.01	5.00	2.39	24.81	125.2	100.3	0.681	98.4	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-176**	Sample #: **6**	
Project: **BSVII**	Depth (ft): **20**		
Project #: **507385606**	Soil: **Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**_________



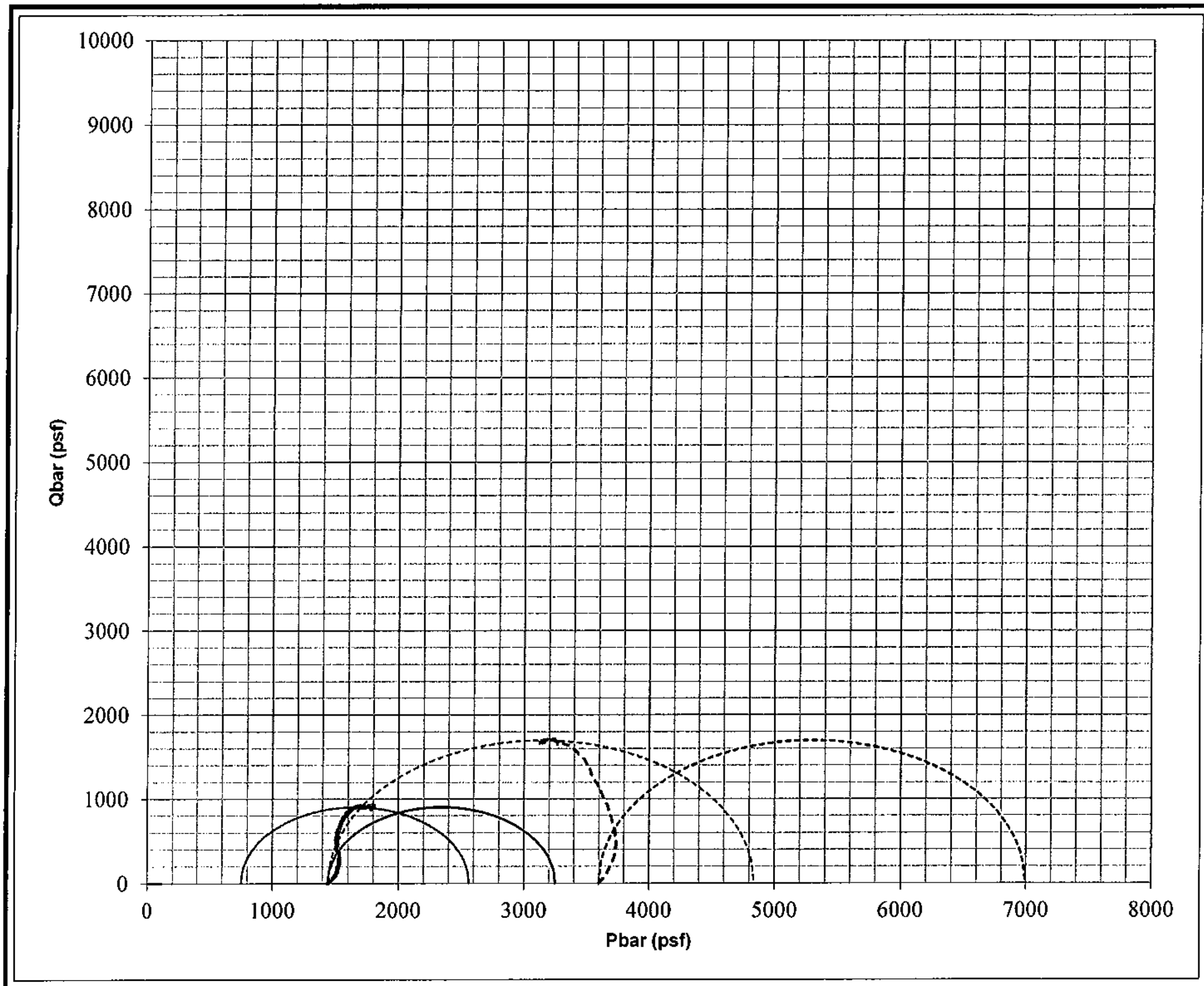
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	1809	3.40	4.90	2.39	29.53	121.4	93.8	0.798	99.9	2.70	0.02	45	18	2.1
dot	3600	3395	6.01	5.00	2.39	24.81	125.2	100.3	0.681	98.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-176**	Sample #: **6**
Project:	**BSVII**	Depth (ft):	**20**	
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	1809	3.40	4.90	2.39	29.53	121.4	93.8	0.798	99.9	2.70	0.02	45	18	2.1
dot	3600	3395	6.01	5.00	2.39	24.81	125.2	100.3	0.681	98.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-176**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**20**		
Project #:	**507385606**	Soil:	**Greenish gray clay with sand**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

Boring Number	BH-176				BH-176	
Sample Number	12				12	
Depth (ft)	50				50	
Date Tested	07/17/20				07/19/20	
Description	Grayish brown clay				Grayish brown clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.99	4.96			4.99	4.93
Diameter (in)	2.39	2.38			2.39	2.37
Height/Diameter Ratio	2.09				2.09	
Total Weight (g)	698.10	703.56			696.49	695.07
Moisture Content (%)	32.97	34.01			33.72	33.45
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	118.74	121.15			118.46	122.08
Dry Density (pcf)	89.30	90.41			88.59	91.48
Area (cm^2)	28.94	28.80			28.94	28.41
Total Volume (cc)	367.03	362.53			367.03	355.43
Void Ratio	0.8876	0.8644			0.9026	0.8425
Saturation (%)	100.3	106.2			100.9	107.2
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.96	
Total Back Pressure (psf)	7200				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.90				4.60	
Effective Consolidation Stress (psf)	1440				4320	
Major Effective Stress at Failure (psf) σ1	3380				6658	
Minor Effective Stress at Failure (psf) σ3	681				1925	
Deviator Stress at Failure (psf)	2699				4733	
Pore Pressure at Failure (psf)	759				2395	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	52					
Plastic Limit	27					
Remarks						

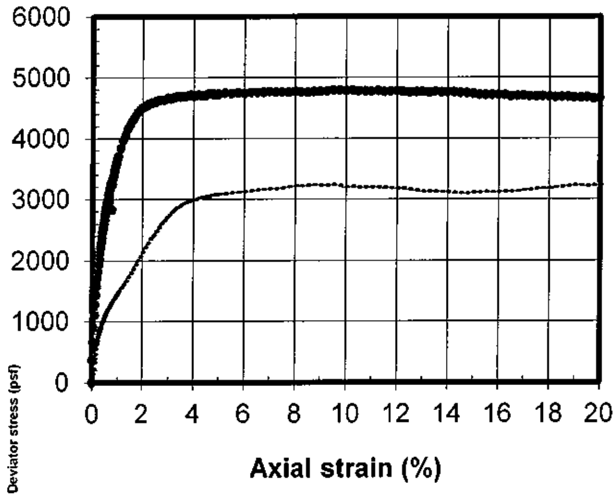
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

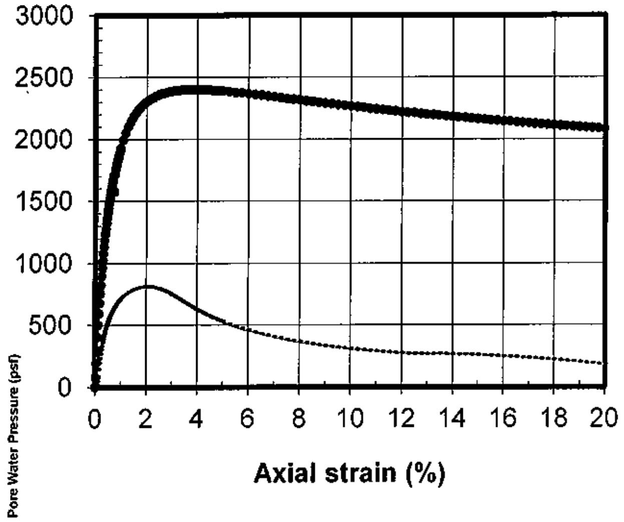
Client: **Mott MacDonald**	Boring #: **BH-176**	Sample #: **12**
Project: **BSVII**	Depth (ft): **50**	
Project #: **507385606**	Soil: **Grayish brown clay**	

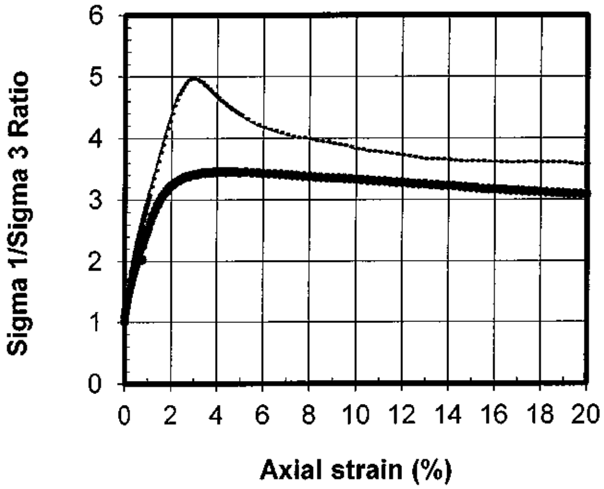
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

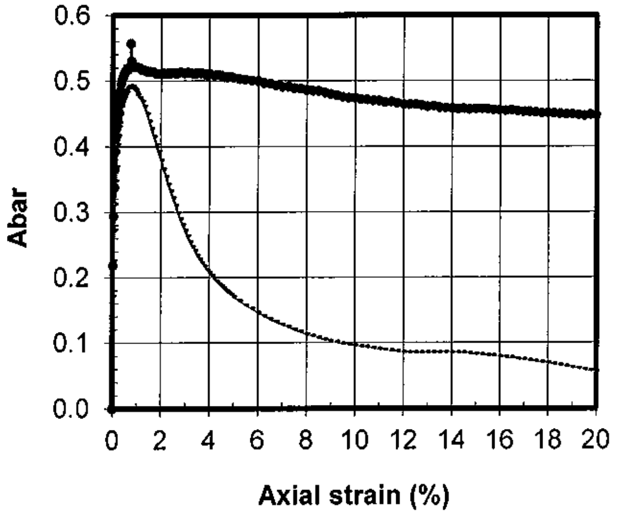
INSPECTION SERVICES INC.

PLATE NUMBER ____________


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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Failure Criteria Maximum Effective $\sigma1$ / $\sigma3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2699	2.90	4.99	2.39	32.97	118.7	89.3	0.888	100.3	2.70	0.02	52	27	2.1
dot	4320	4733	4.60	4.99	2.39	33.72	118.5	88.6	0.903	100.9	2.70	0.02			2.1

Client: **Mott MacDonald**

Boring #: **BH-176**

Sample #: **12**

Project: **BSVII**

Depth (ft): **50**

Project #: **507385606**

Soil: **Grayish brown clay**

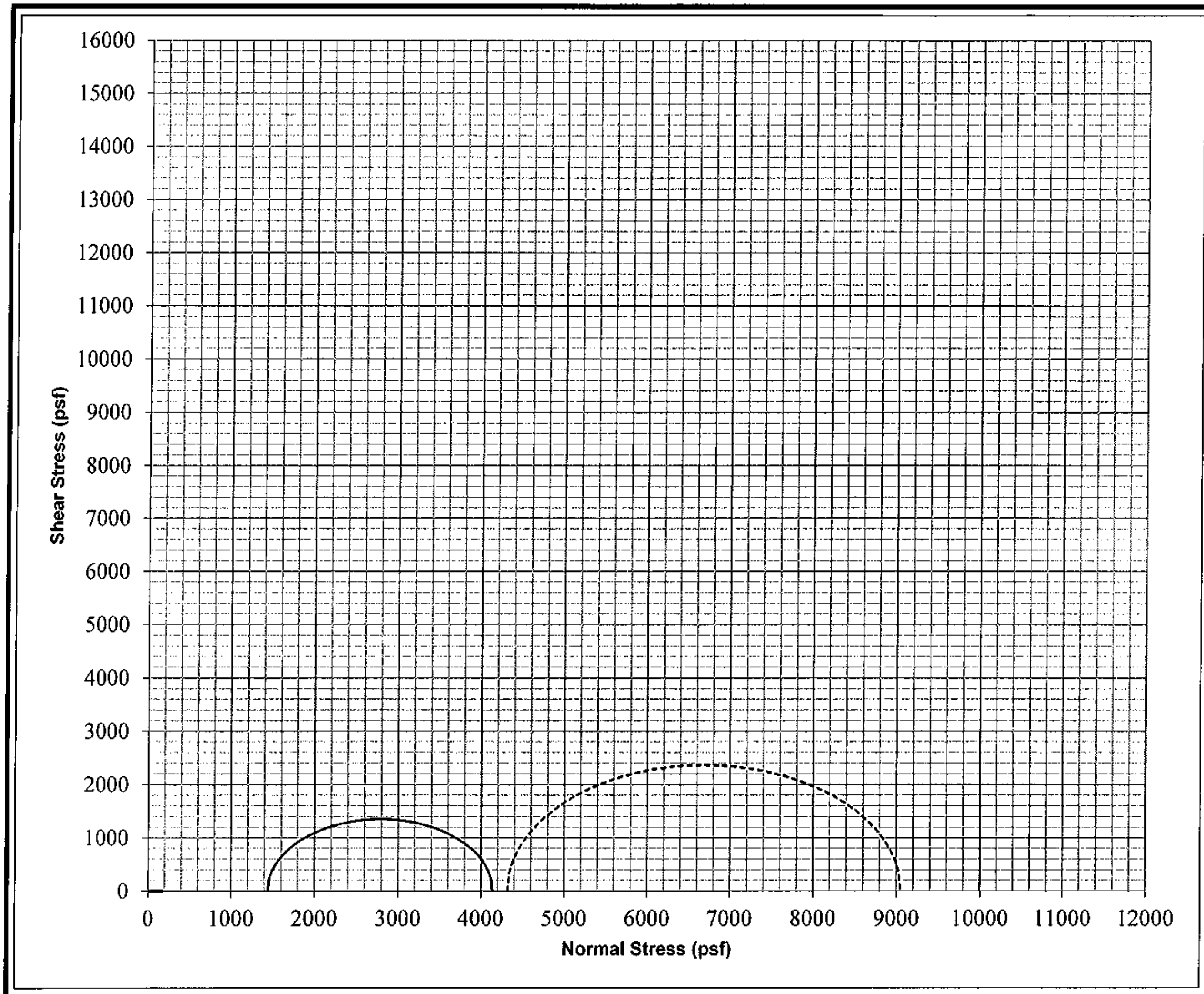
ASTM D-4767

TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU

INSPECTION SERVICES INC.

PLATE NUMBER__________



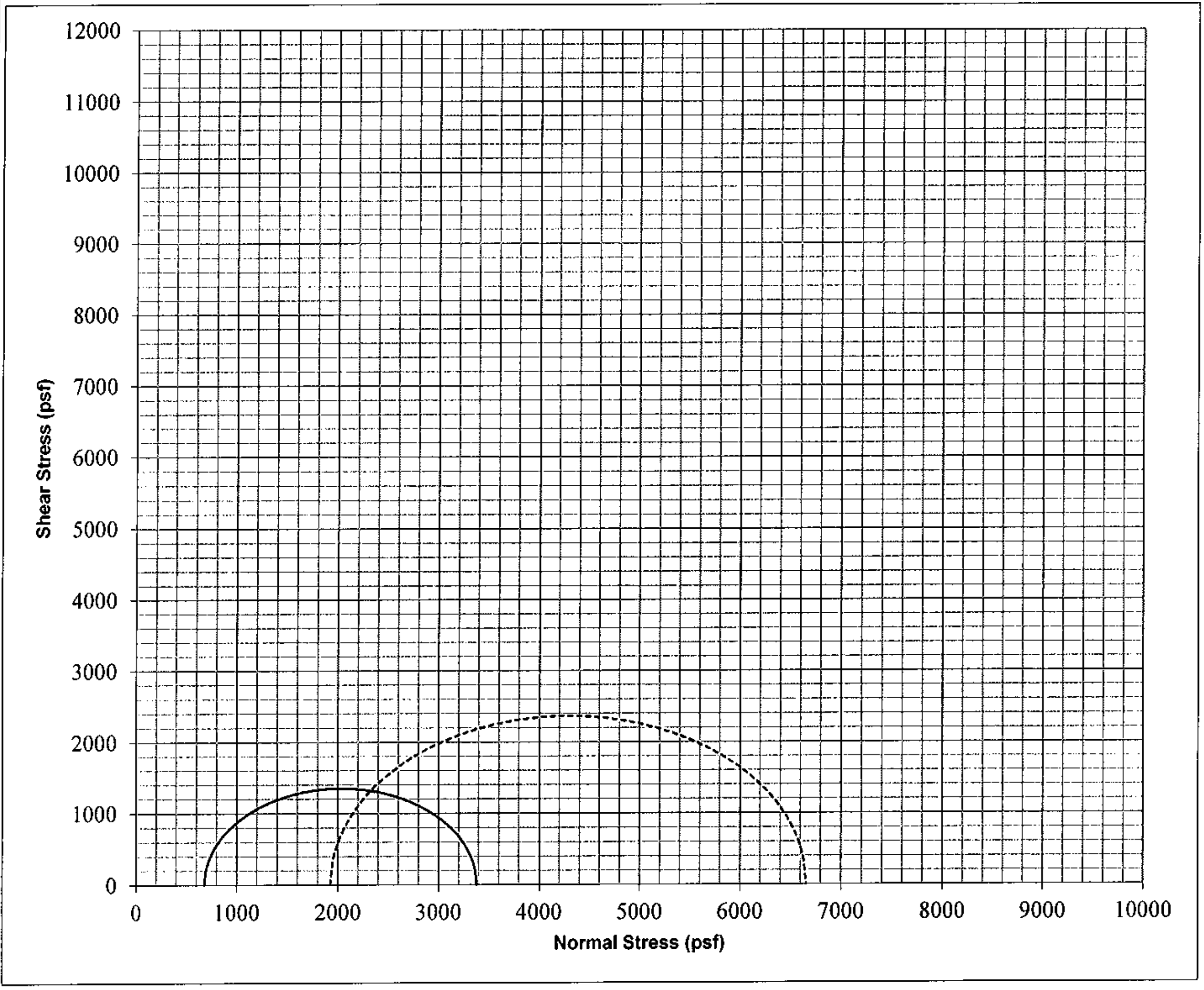
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2699	2.90	4.99	2.39	32.97	118.7	89.3	0.888	100.3	2.70	0.02	52	27	2.1
dot	4320	4733	4.60	4.99	2.39	33.72	118.5	88.6	0.903	100.9	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-176**	Sample #:	**12**
Project:	**BSVII**	Depth (ft):	**50**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



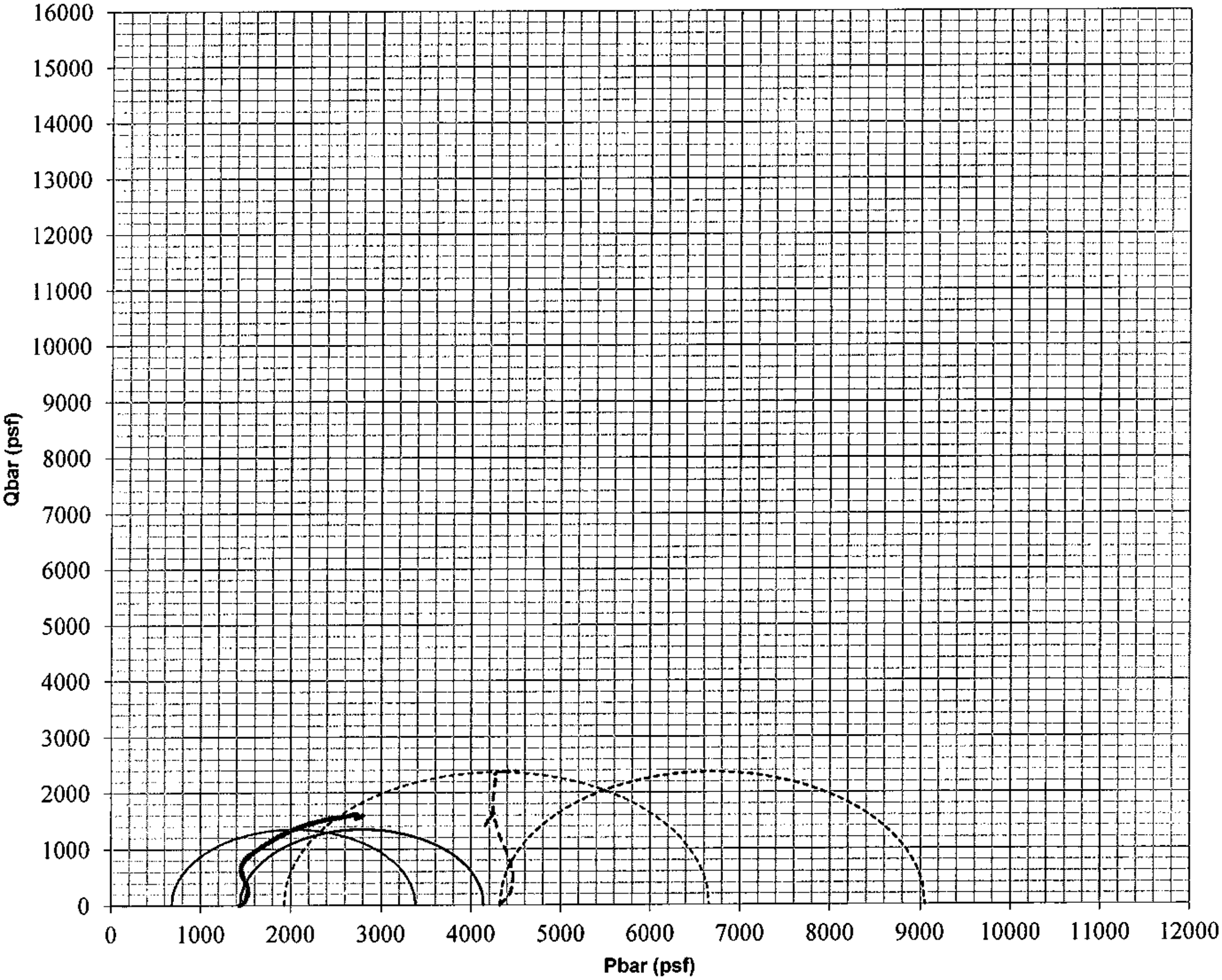
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2699	2.90	4.99	2.39	32.97	118.7	89.3	0.888	100.3	2.70	0.02	52	27	2.1
dot	4320	4733	4.60	4.99	2.39	33.72	118.5	88.6	0.903	100.9	2.70	0.02			2.1

Client: **Mott MacDonald**	Boring #: **BH-176**	Sample #: **12**
Project: **BSVII**	Depth (ft): **50**	
Project #: **507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2699	2.90	4.99	2.39	32.97	118.7	89.3	0.888	100.3	2.70	0.02	52	27	2.1
dot	4320	4733	4.60	4.99	2.39	33.72	118.5	88.6	0.903	100.9	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-176**	Sample #:	**12**
Project:	**BSVII**	Depth (ft):	**50**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

Boring Number	BH-177				BH-177	
Sample Number	6				6	
Depth (ft)	20				20	
Date Tested	07/16/20				07/15/20	
Description	Grayish brown clay				Grayish brown clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.94	4.93			4.80	4.76
Diameter (in)	2.39	2.37			2.39	2.37
Height/Diameter Ratio	2.07				2.01	
Total Weight (g)	725.37	736.62			685.61	684.98
Moisture Content (%)	24.64	26.57			26.67	26.55
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	125.01	129.23			121.23	124.72
Dry Density (pcf)	100.30	102.10			95.70	98.55
Area (cm^2)	28.88	28.41			28.94	28.37
Total Volume (cc)	362.23	355.83			353.06	342.86
Void Ratio	0.6806	0.6509			0.7612	0.7103
Saturation (%)	97.8	110.2			94.6	100.9
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.96				0.98	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	6.50				5.50	
Effective Consolidation Stress (psf)	1440				3600	
Major Effective Stress at Failure (psf) $\sigma 1$	3664				6850	
Minor Effective Stress at Failure (psf) $\sigma 3$	1012				1826	
Deviator Stress at Failure (psf)	2653				5024	
Pore Pressure at Failure (psf)	428				1774	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	50					
Plastic Limit	20					
Remarks						

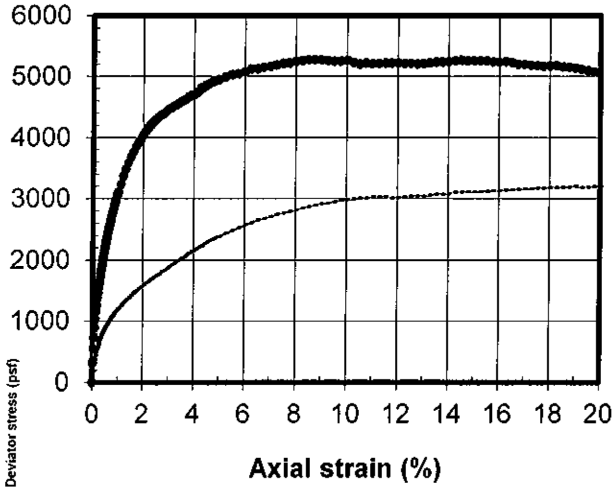
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective $\sigma 1$ / $\sigma 3$ ratio

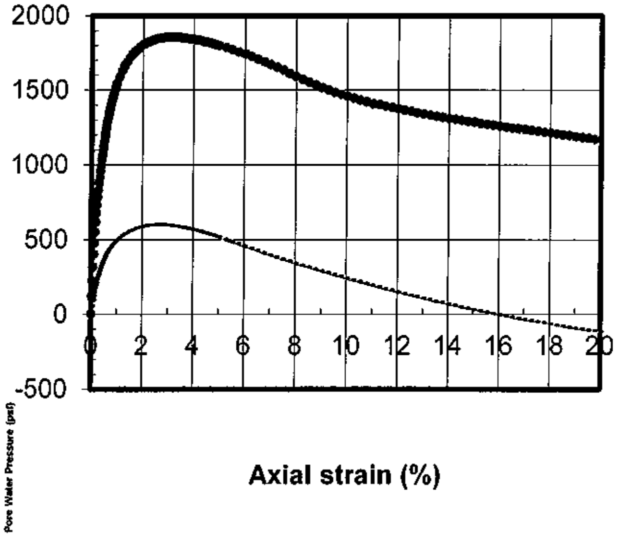
Client: **Mott MacDonald**	Boring #: **BH-177**	Sample #: **6**
Project: **BSVII**	Depth (ft): **20**	
Project #: **507385606**	Soil: **Grayish brown clay**	

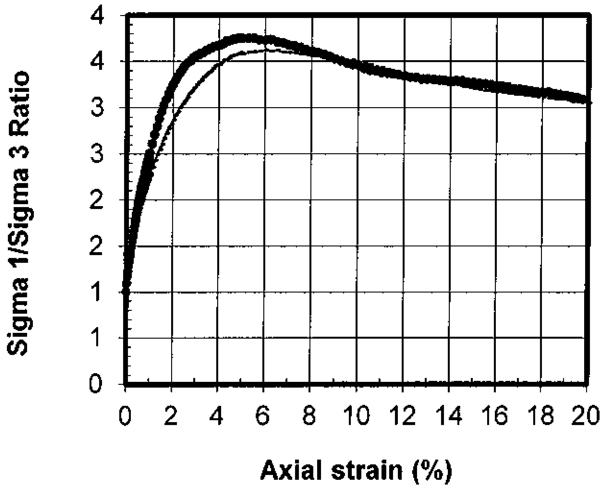
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

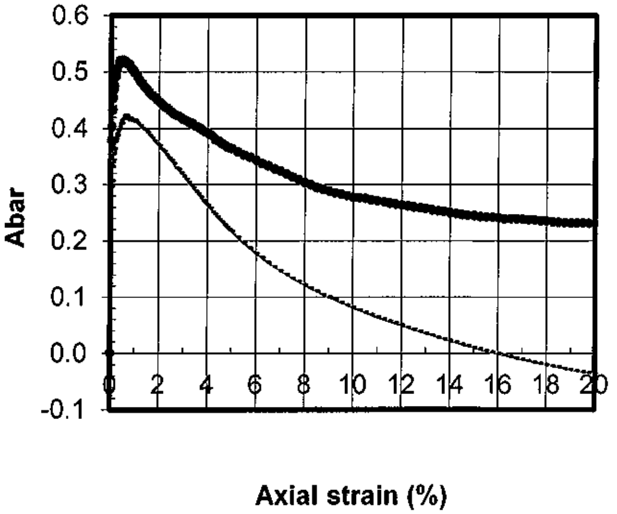
INSPECTION SERVICES INC.

PLATE NUMBER __________


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2653	6.50	4.94	2.39	24.64	125.0	100.3	0.681	97.8	2.70	0.02	50	20	2.1
dot	3600	5024	5.50	4.80	2.39	26.67	121.2	95.7	0.761	94.6	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-177**

Sample #: **6**

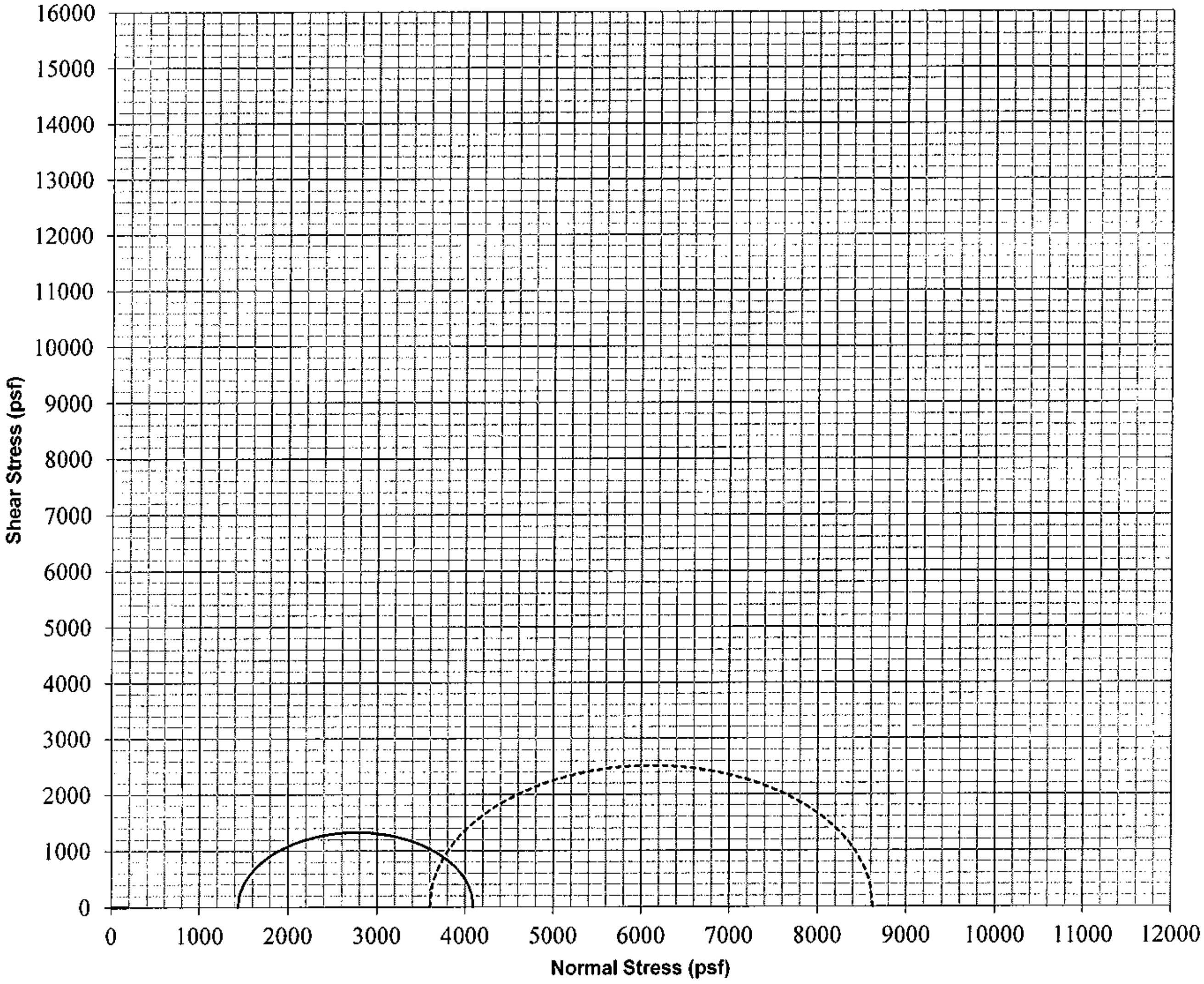
Project: **BSVII**

Depth (ft): **20**

Project #: **507385606**

Soil: **Grayish brown clay**

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



TOTAL MOHR CIRCLES

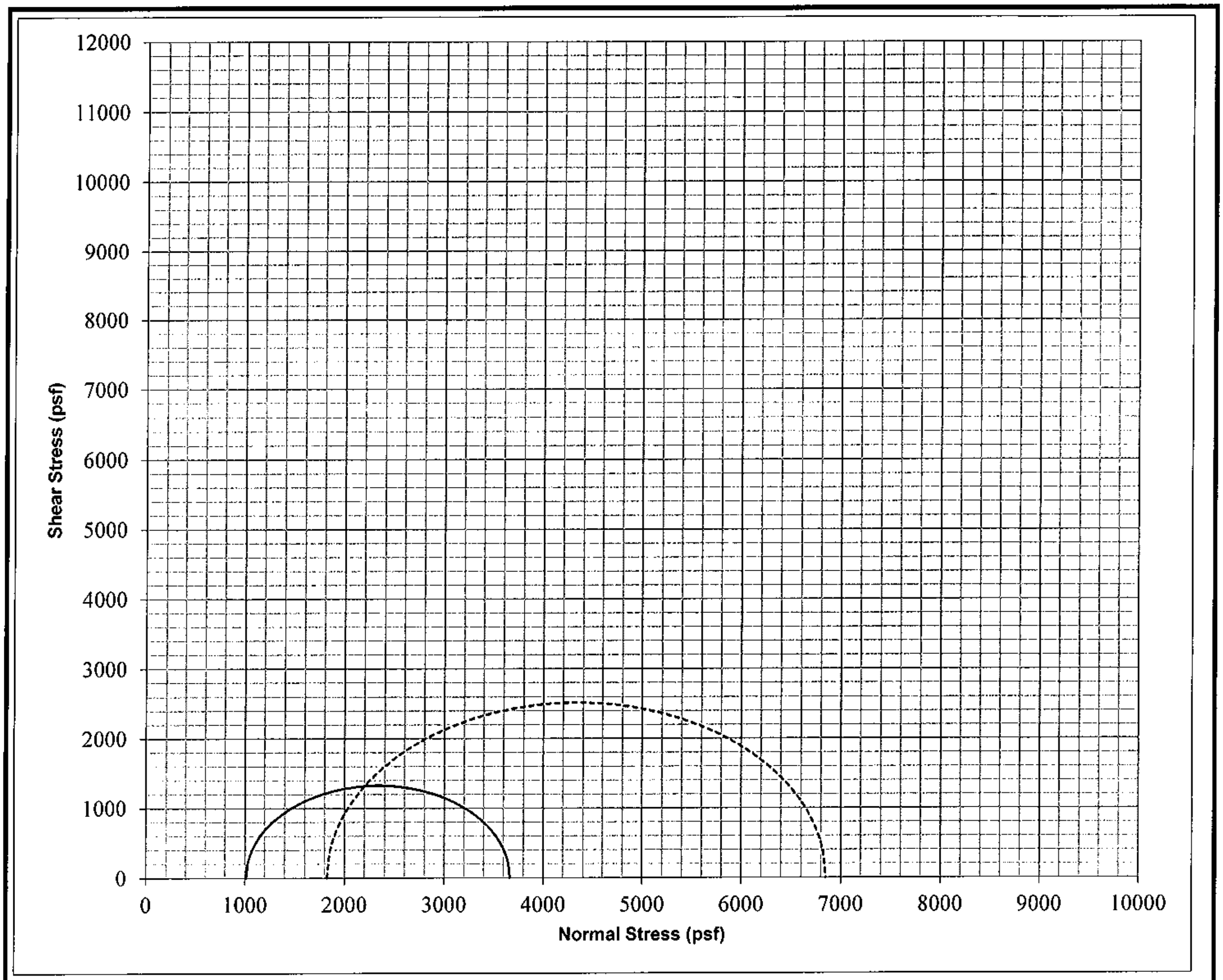
Failure Criteria Maximum Effective $\sigma1 / \sigma3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2653	6.50	4.94	2.39	24.64	125.0	100.3	0.681	97.8	2.70	0.02	50	20	2.1
dot	3600	5024	5.50	4.80	2.39	26.67	121.2	95.7	0.761	94.6	2.70	0.02			2.0

Client: **Mott MacDonald**	Boring #: **BH-177**	Sample #: **6**
Project: **BSVII**	Depth (ft): **20**	
Project #: **507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER________**



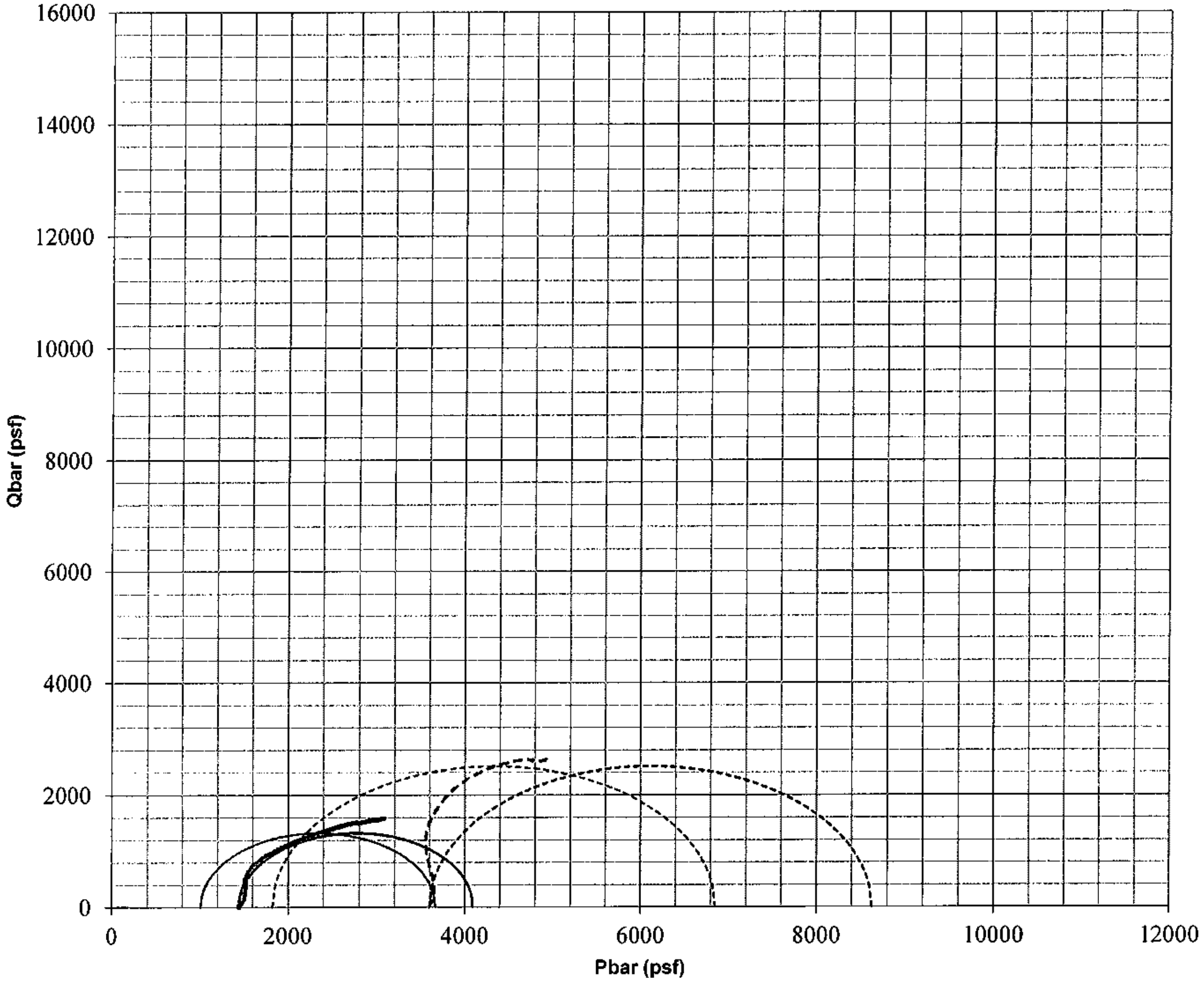
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2653	6.50	4.94	2.39	24.64	125.0	100.3	0.681	97.8	2.70	0.02	50	20	2.1
dot	3600	5024	5.50	4.80	2.39	26.67	121.2	95.7	0.761	94.6	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-177**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**20**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2653	6.50	4.94	2.39	24.64	125.0	100.3	0.681	97.8	2.70	0.02	50	20	2.1
dot	3600	5024	5.50	4.80	2.39	26.67	121.2	95.7	0.761	94.6	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-177**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**20**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________

Boring Number	BH-178				BH-178	
Sample Number	4				4	
Depth (ft)	15				15	
Date Tested	07/29/20				07/30/20	
Description	Grayish brown clay				Grayish brown clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**			**Initial**	**After Consolidation**
Height (in)	4.90	4.88			4.88	4.83
Diameter (in)	2.39	2.37			2.39	2.35
Height/Diameter Ratio	2.05				2.04	
Total Weight (g)	698.94	703.22			698.94	700.96
Moisture Content (%)	30.36	31.16			28.38	28.75
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	121.32	124.34			121.56	127.11
Dry Density (pcf)	93.06	94.80			94.69	98.73
Area (cm^2)	28.88	28.48			28.94	28.07
Total Volume (cc)	359.66	353.06			358.95	344.25
Void Ratio	0.8112	0.7780			0.7801	0.7072
Saturation (%)	101.1	108.1			98.2	109.8
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.97	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.80				7.01	
Effective Consolidation Stress (psf)	1440				3600	
Major Effective Stress at Failure (psf) σ1	3707				6325	
Minor Effective Stress at Failure (psf) σ3	935				1899	
Deviator Stress at Failure (psf)	2772				4426	
Pore Pressure at Failure (psf)	505				1701	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	60					
Plastic Limit	22					
Remarks						

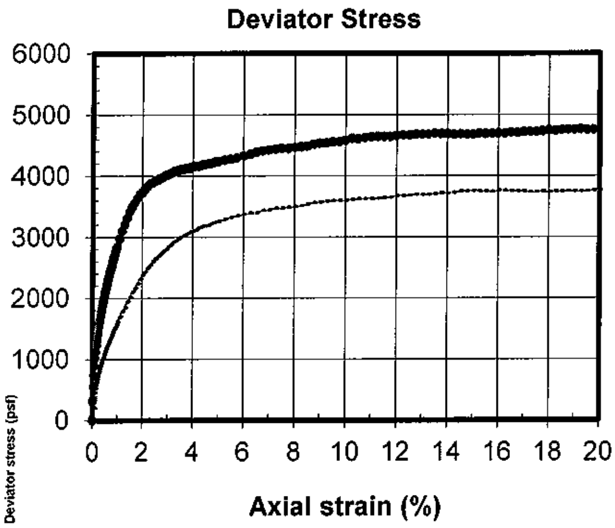
The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

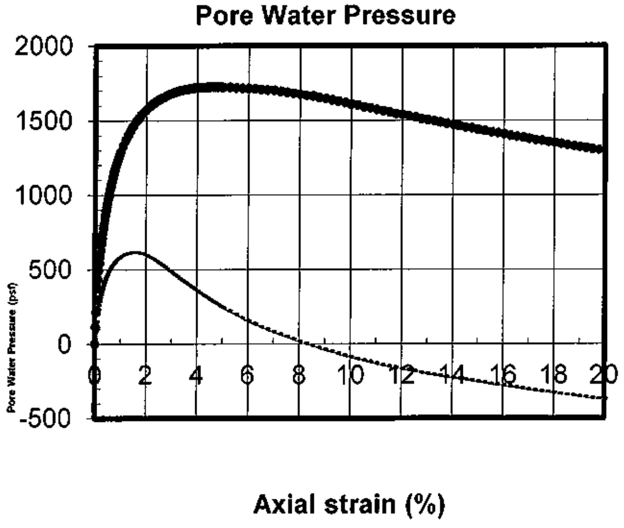
Client: **Mott MacDonald**	Boring #: **BH-178**	Sample #: **4**
Project: **BSVII**	Depth (ft): **15**	
Project #: **507385606**	Soil: **Grayish brown clay**	

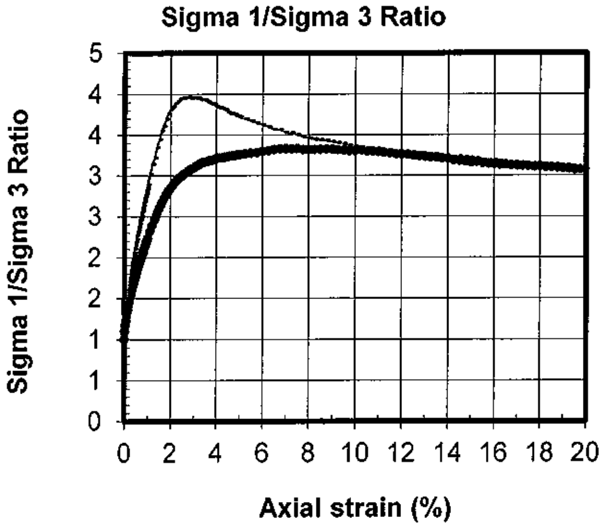
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

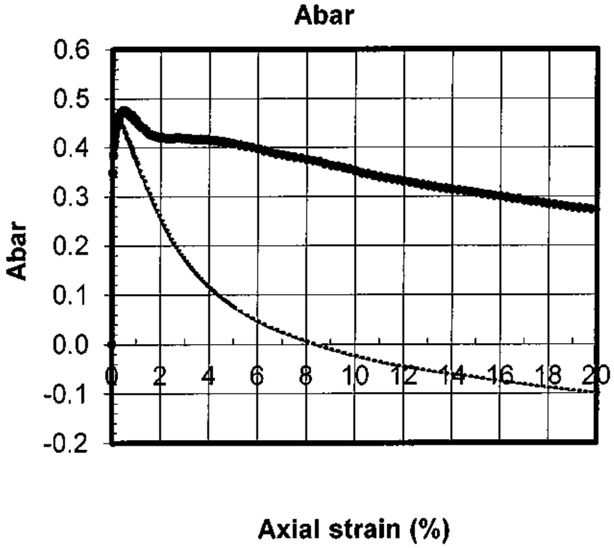
INSPECTION SERVICES INC.

PLATE NUMBER __________









Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2772	2.80	4.90	2.39	30.36	121.3	93.1	0.811	101.1	2.70	0.02	60	22	2.1
dot	3600	4426	7.01	4.88	2.39	28.38	121.6	94.7	0.780	98.2	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-178**

Sample #: **4**

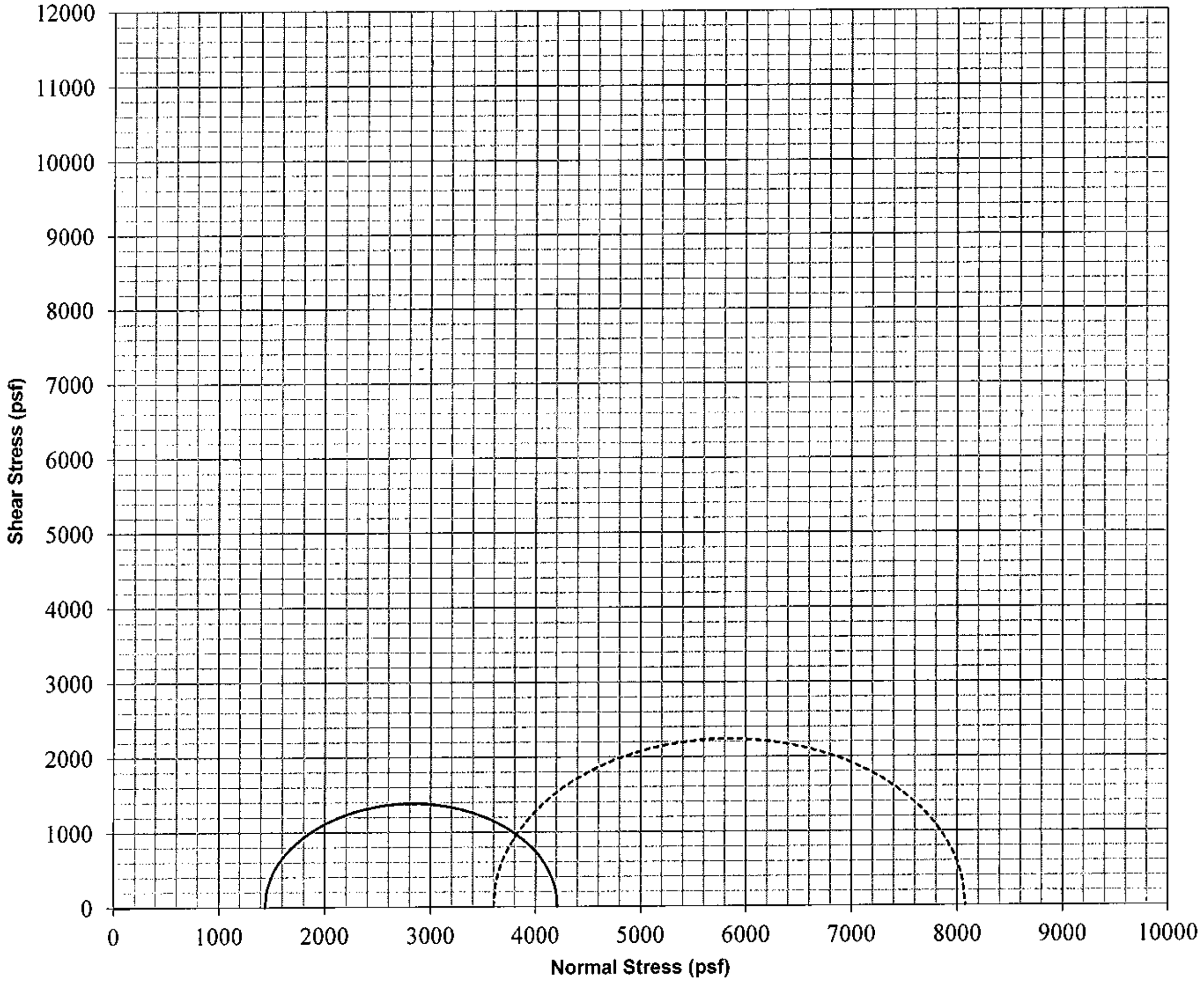
Project: **BSVII**

Depth (ft): **15**

Project #: **507385606**

Soil: **Grayish brown clay**

ASTM D-4767	TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED	TXCU



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

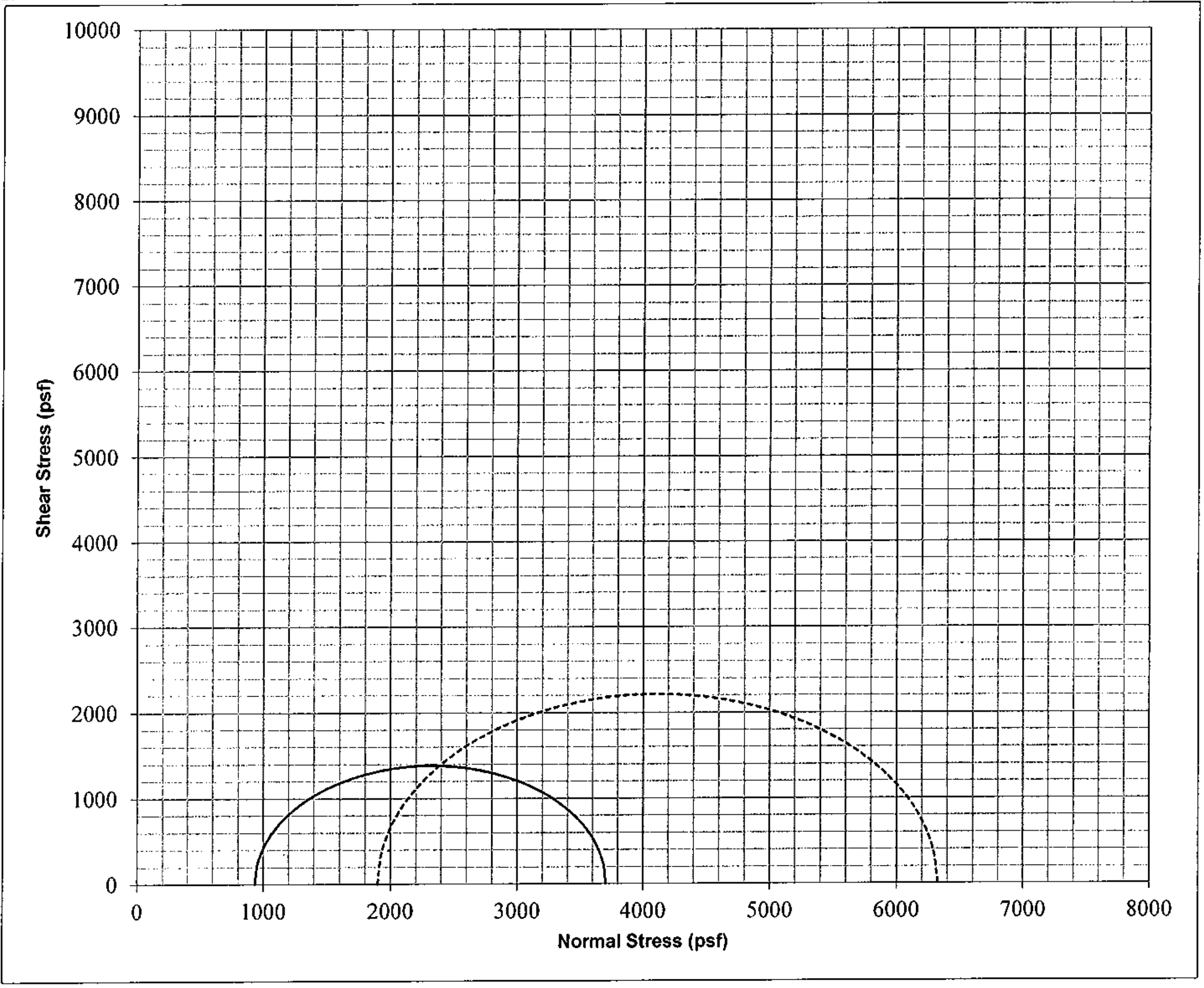
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2772	2.80	4.90	2.39	30.36	121.3	93.1	0.811	101.1	2.70	0.02	60	22	2.1
dot	3600	4426	7.01	4.88	2.39	28.38	121.6	94.7	0.780	98.2	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-178**	Sample #:	**4**
Project:	**BSVII**	Depth (ft):	**15**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

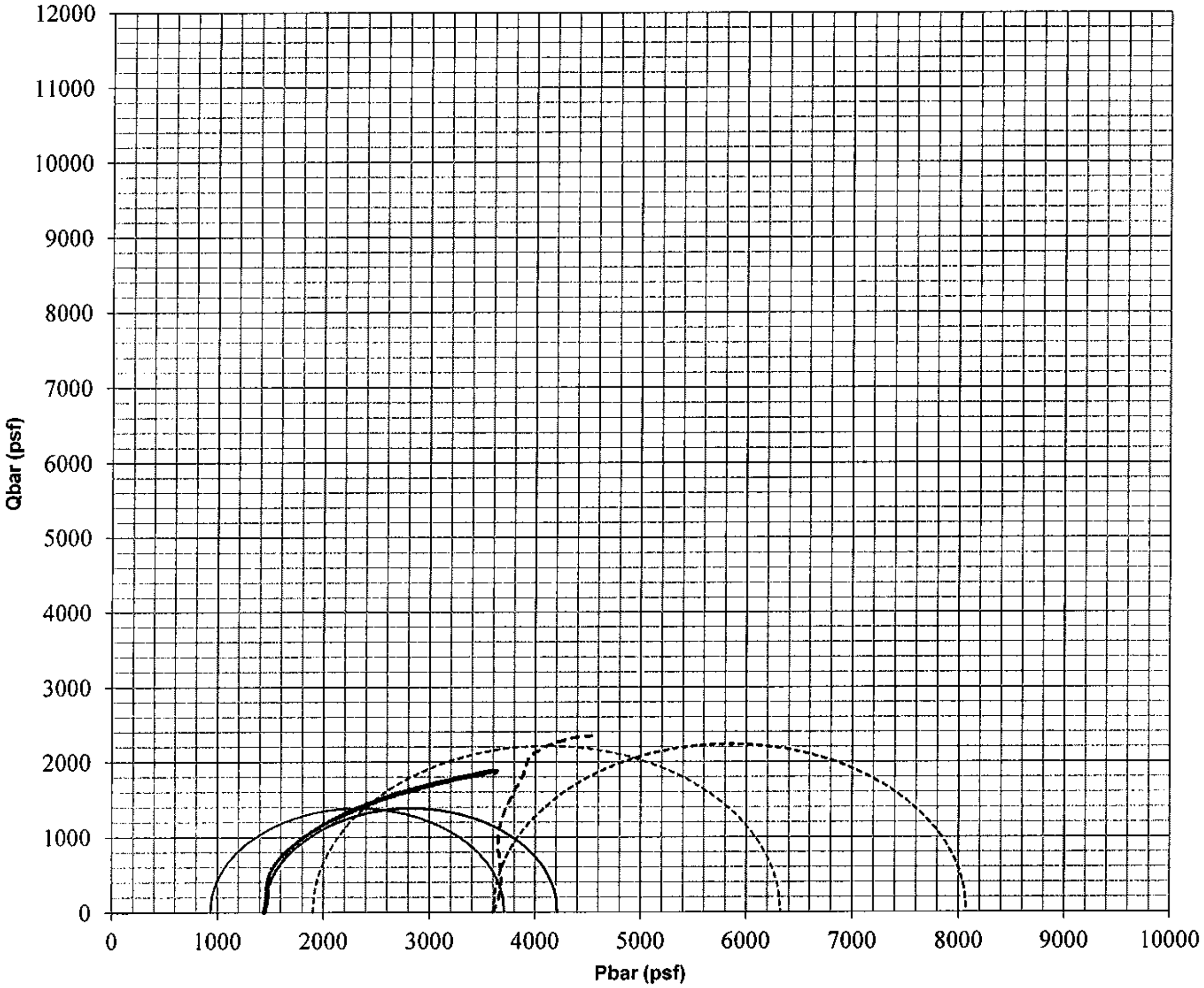
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2772	2.80	4.90	2.39	30.36	121.3	93.1	0.811	101.1	2.70	0.02	60	22	2.1
dot	3600	4426	7.01	4.88	2.39	28.38	121.6	94.7	0.780	98.2	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-178**	Sample #:	**4**
Project:	**BSVII**	Depth (ft):	**15**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER_________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2772	2.80	4.90	2.39	30.36	121.3	93.1	0.811	101.1	2.70	0.02	60	22	2.1
dot	3600	4426	7.01	4.88	2.39	28.38	121.6	94.7	0.780	98.2	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-178**	Sample #:	**4**
Project:	**BSVII**	Depth (ft):	**15**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

Boring Number	BH-179		BH-179
Sample Number	10		10
Depth (ft)	45		45
Date Tested	11/16/20		11/17/20
Description	Greenish gray clay		Greenish gray clay
Sample Condition	Undisturbed		Undisturbed

	Initial	After Consolidation			Initial	After Consolidation
Height (in)	4.82	4.81			4.89	4.82
Diameter (in)	2.40	2.38			2.41	2.37
Height/Diameter Ratio	2.01				2.03	
Total Weight (g)	677.87	680.97			700.30	694.01
Moisture Content (%)	33.25	33.86			32.00	30.82
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	118.24	121.09			119.91	124.43
Dry Density (pcf)	88.74	90.46			90.84	95.11
Area (cm^2)	29.25	28.76			29.37	28.41
Total Volume (cc)	357.88	351.08			364.59	348.19
Void Ratio	0.8994	0.8633			0.8556	0.7721
Saturation (%)	99.8	105.9			101.0	107.8
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	

B value Before Consolidation	0.95		0.99
Total Back Pressure (psf)	5760		5760
Rate of Strain (%/min)	0.02		0.02
Axial Strain at Failure (%)	2.40		4.31
Effective Consolidation Stress (psf)	1440		4320
Major Effective Stress at Failure (psf) σ1	3188		7159
Minor Effective Stress at Failure (psf) σ3	860		2321
Deviator Stress at Failure (psf)	2328		4838
Pore Pressure at Failure (psf)	580		1999
Failure Sketch	Sketch on Worksheet		#N/A
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767		
Classification Based On	Plasticity index, Visual		Plasticity index, Visual
Liquid Limit	68		
Plastic Limit	27		
Remarks			

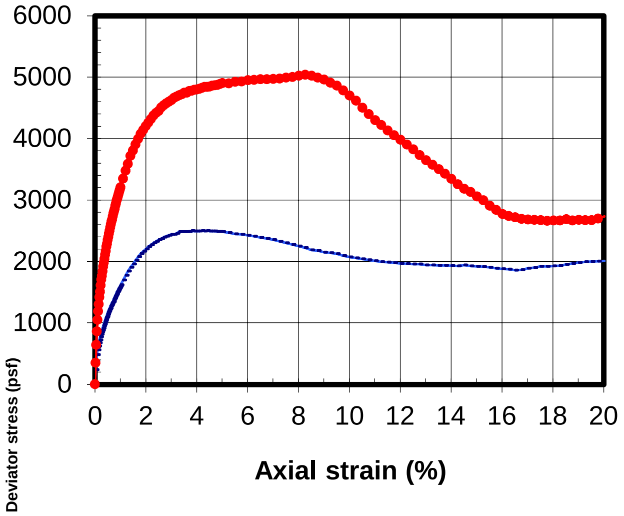
The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

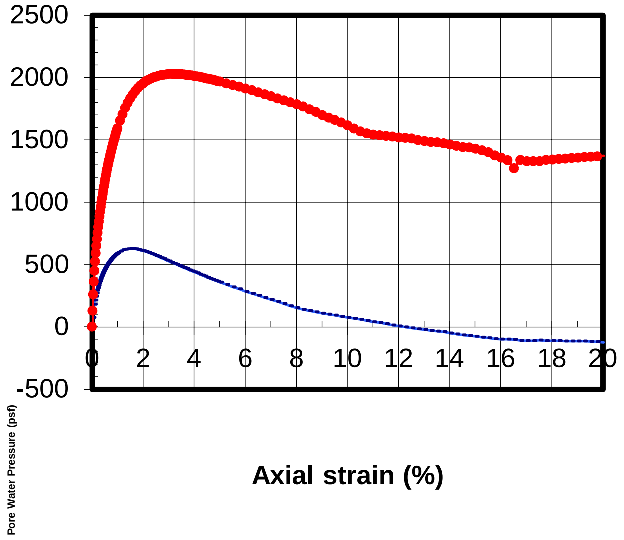
Client: **Mott MacDonald**	Boring #: **BH-179**	Sample #: **10**
Project: **BSVII**	Depth (ft): **45**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

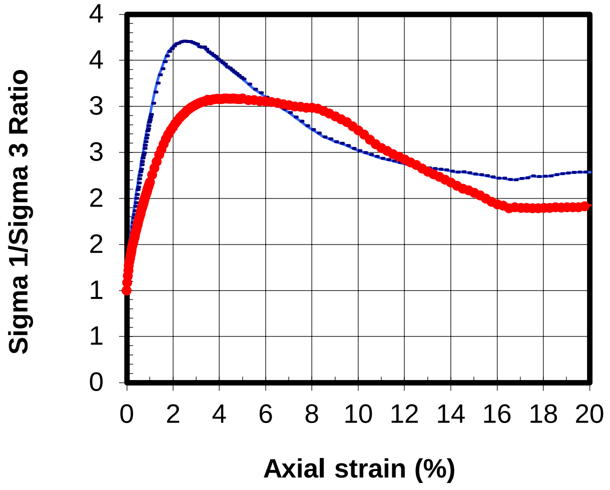
Deviator Stress



Pore Water Pressure



Sigma 1/Sigma 3 Ratio



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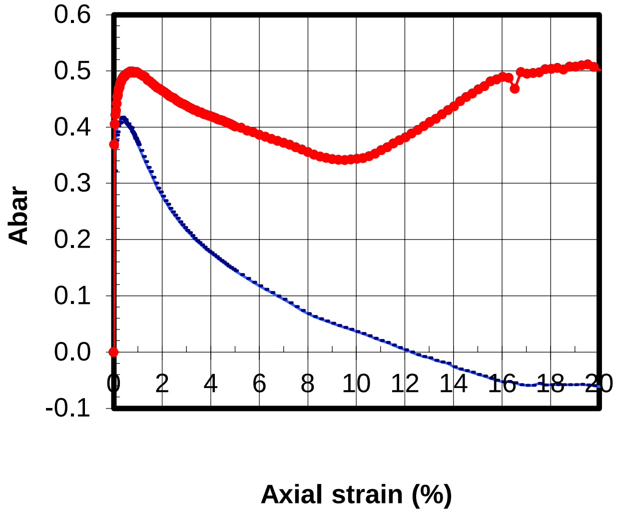


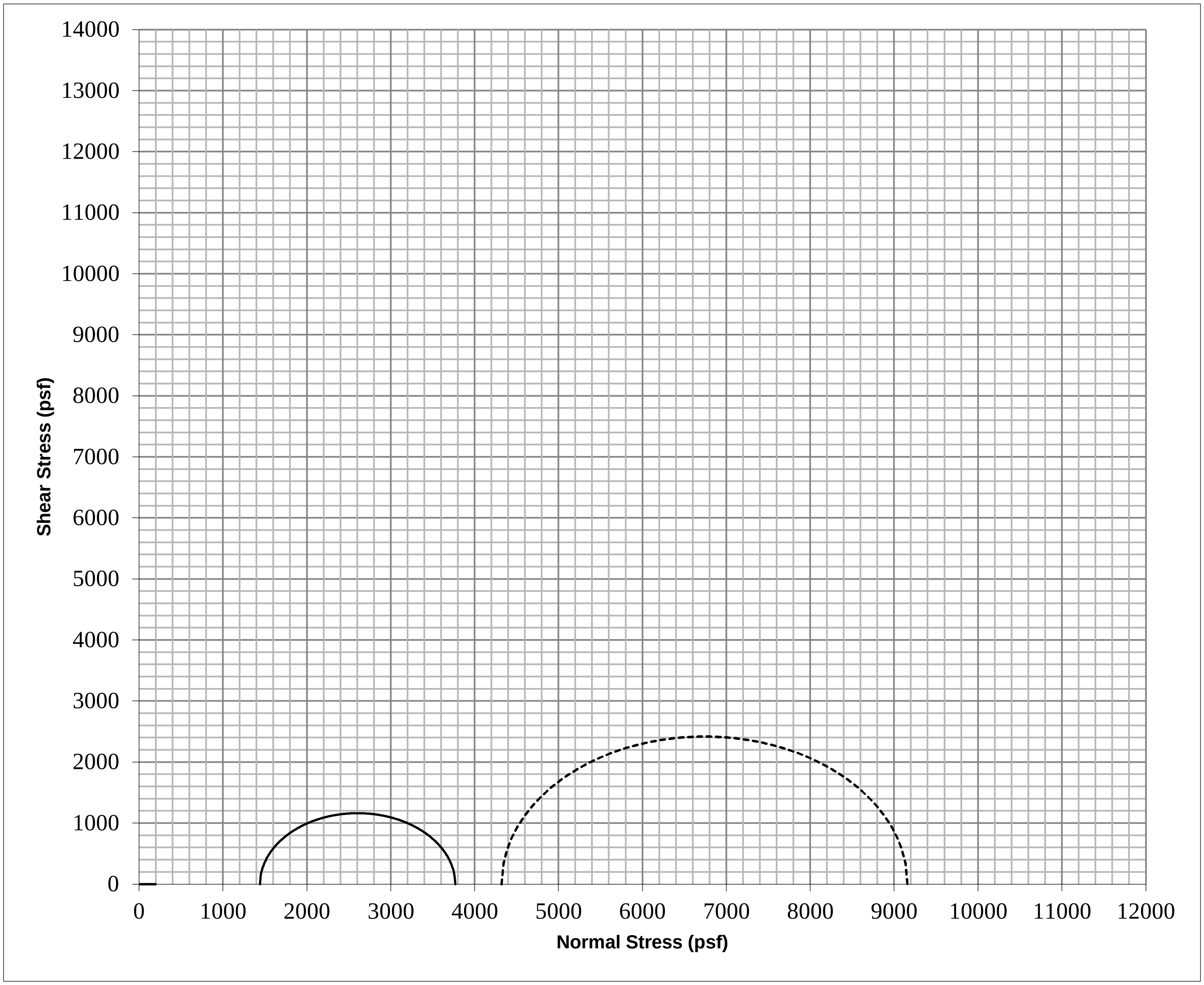
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2328	2.40	4.82	2.40	33.25	118.2	88.7	0.899	99.8	2.70	0.02	68	27	2.0
dot	4320	4838	4.31	4.89	2.41	32.00	119.9	90.8	0.856	101.0	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**10**
Project:	**BSVII**	Depth (ft):	**45**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**___________



TOTAL MOHR CIRCLES

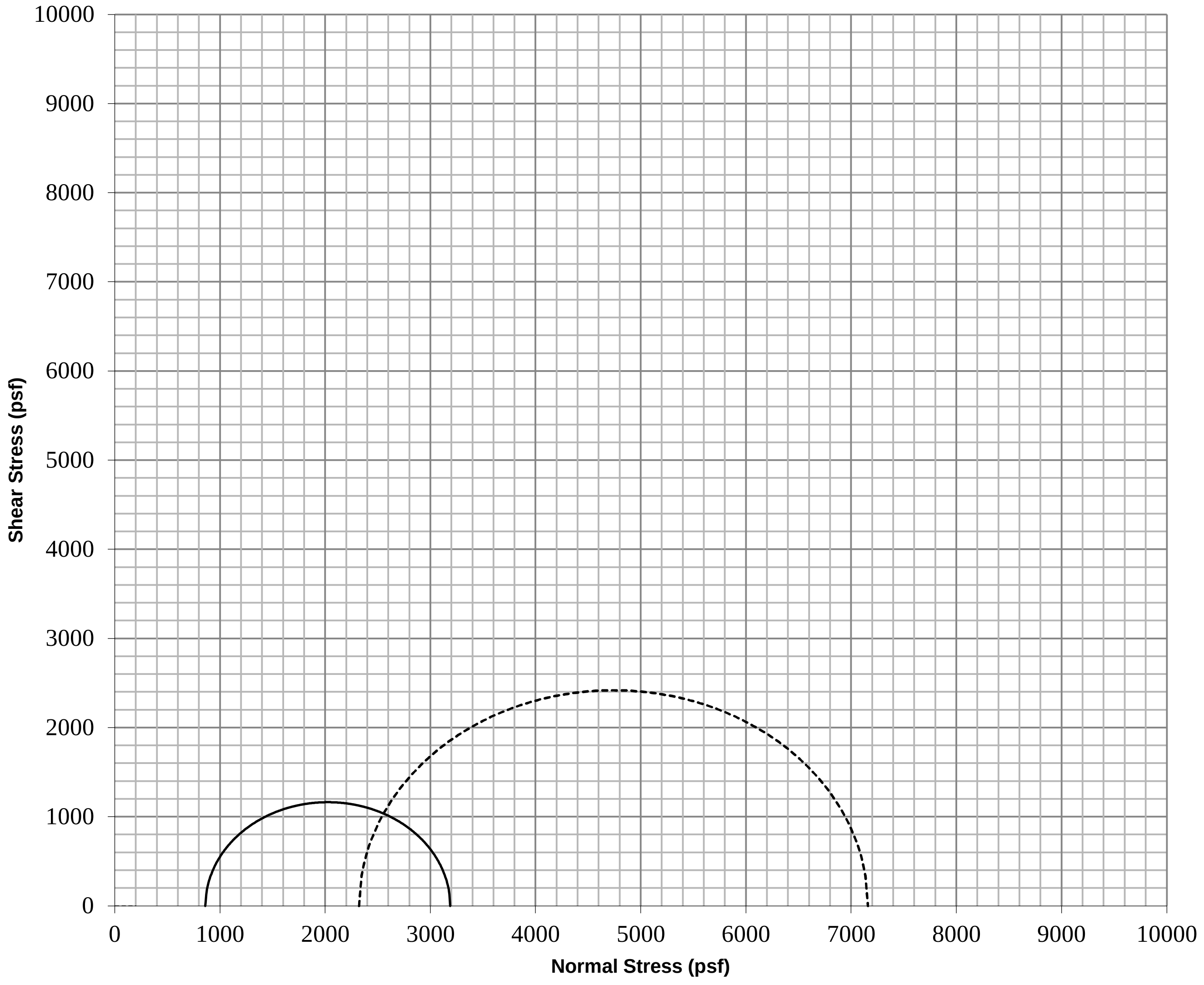
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2328	2.40	4.82	2.40	33.25	118.2	88.7	0.899	99.8	2.70	0.02	68	27	2.0
dot	4320	4838	4.31	4.89	2.41	32.00	119.9	90.8	0.856	101.0	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**10**
Project:	**BSVII**	Depth (ft):	**45**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER__________**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2328	2.40	4.82	2.40	33.25	118.2	88.7	0.899	99.8	2.70	0.02	68	27	2.0
dot	4320	4838	4.31	4.89	2.41	32.00	119.9	90.8	0.856	101.0	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-179**

Sample #: **10**

Project: **BSVII**

Depth (ft): **45**

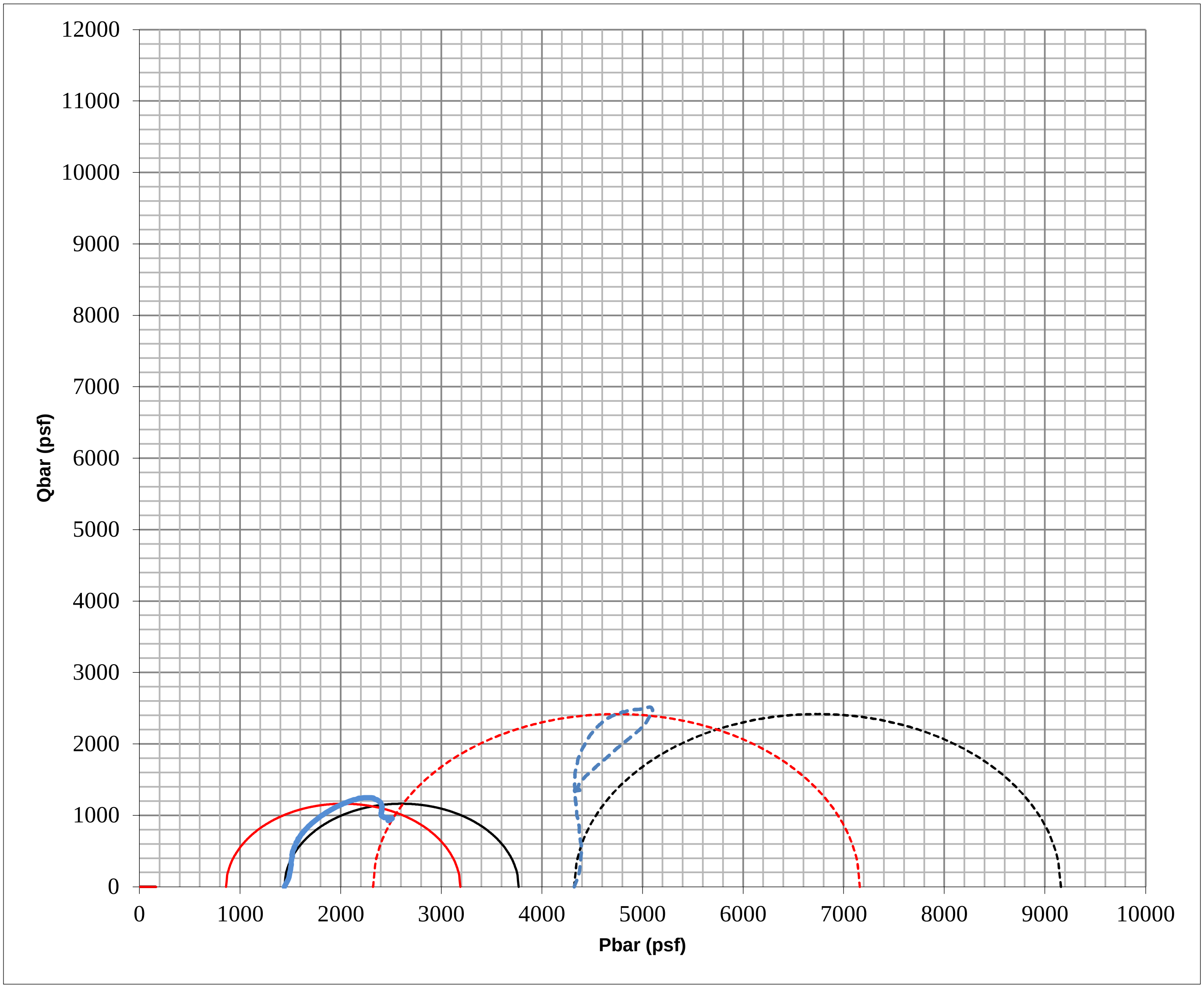
Project #: **507385606**

Soil: **Greenish gray clay**

ASTM
D-4767

TRIAXIAL COMPRESSION
CONSOLIDATED-UNDRAINED

TXCU



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2328	2.40	4.82	2.40	33.25	118.2	88.7	0.899	99.8	2.70	0.02	68	27	2.0
dot	4320	4838	4.31	4.89	2.41	32.00	119.9	90.8	0.856	101.0	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**10**
Project:	**BSVII**	Depth (ft):	**45**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**__________

Boring Number	BH-179				BH-179	
Sample Number	21				21	
Depth (ft)	100				100	
Date Tested	11/13/20				11/14/20	
Description	Greenish gray clay with organics				Greenish gray clay with organics	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**			**Initial**	**After Consolidation**
Height (in)	4.91	4.88			4.90	4.82
Diameter (in)	2.41	2.39			2.41	2.37
Height/Diameter Ratio	2.04				2.03	
Total Weight (g)	728.34	731.41			726.21	716.98
Moisture Content (%)	26.93	27.46			26.42	24.81
Moisture Content From	1/2 of sample, cut				entire sample	
Wet Density (pcf)	123.88	126.96			123.77	128.51
Dry Density (pcf)	97.60	99.61			97.90	102.96
Area (cm^2)	29.43	29.00			29.43	28.45
Total Volume (cc)	367.03	359.63			366.29	348.29
Void Ratio	0.7270	0.6922			0.7216	0.6370
Saturation (%)	100.0	107.1			98.9	105.2
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.95	
Total Back Pressure (psf)	7200				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	3.30				9.25	
Effective Consolidation Stress (psf)	2160				8640	
Major Effective Stress at Failure (psf) σ1	6099				12778	
Minor Effective Stress at Failure (psf) σ3	1774				3958	
Deviator Stress at Failure (psf)	4325				8820	
Pore Pressure at Failure (psf)	386				4682	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	43					
Plastic Limit	22					
Remarks					0	

The following information is the same for all samples

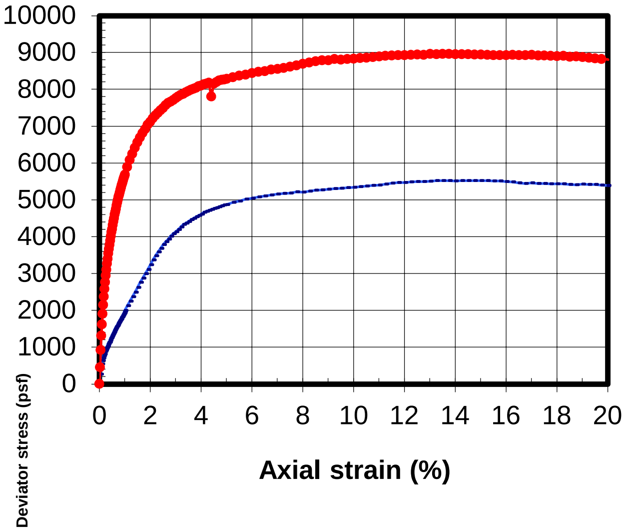
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

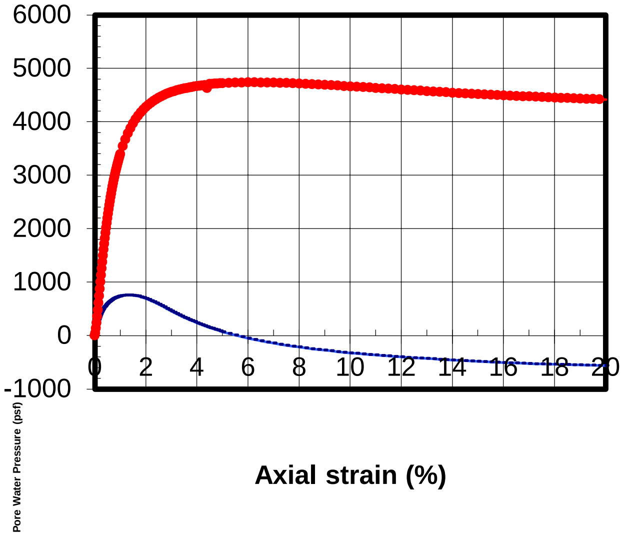
Client: **Mott MacDonald**
Boring #: **BH-179**
Sample #: **21**
Project: **BSVII**
Depth (ft): **100**
Project #: **507385606**
Soil: **Greenish gray clay with organics**

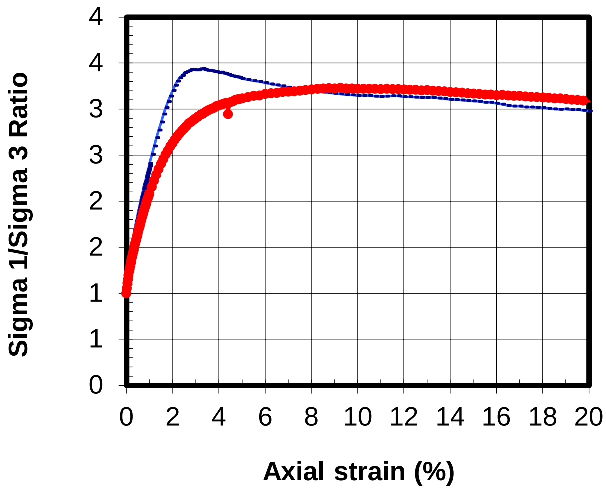
ASTM D-4767

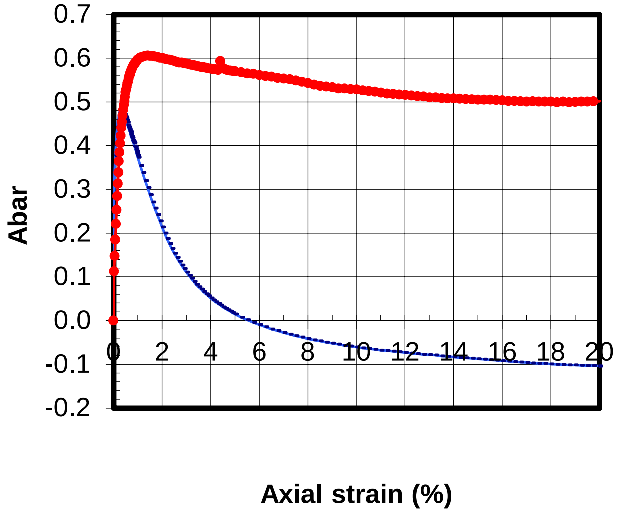
TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	4325	3.30	4.91	2.41	26.93	123.9	97.6	0.727	100.0	2.70	0.02	43	22	2.0
dot	8640	8820	9.25	4.90	2.41	26.42	123.8	97.9	0.722	98.9	2.70	0.02			2.0

Client: **Mott MacDonald**

Boring #: **BH-179**

Sample #: **21**

Project: **BSVII**

Depth (ft): **100**

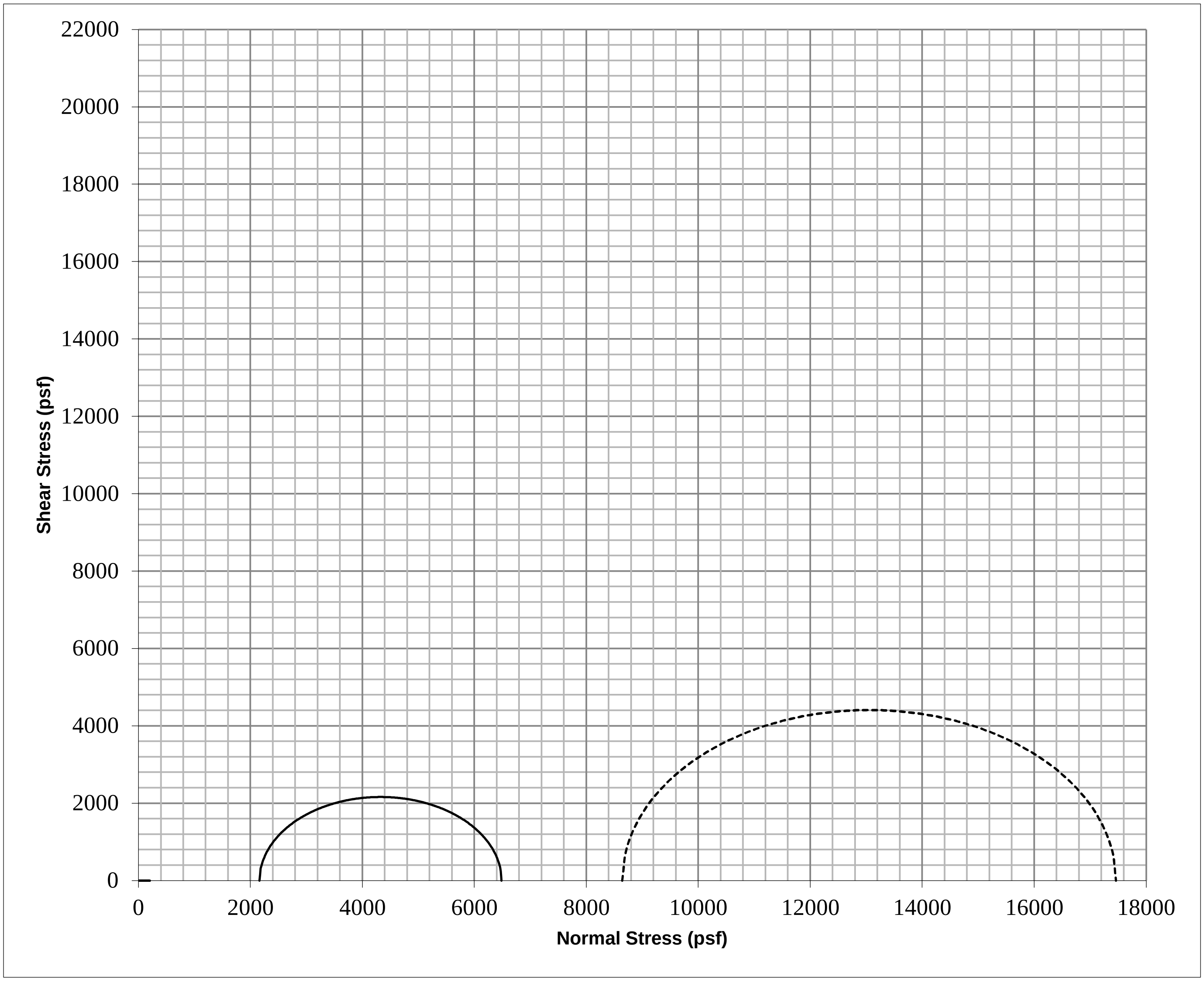
Project #: **507385606**

Soil: **Greenish gray clay with organics**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC.

PLATE NUMBER___________



TOTAL MOHR CIRCLES

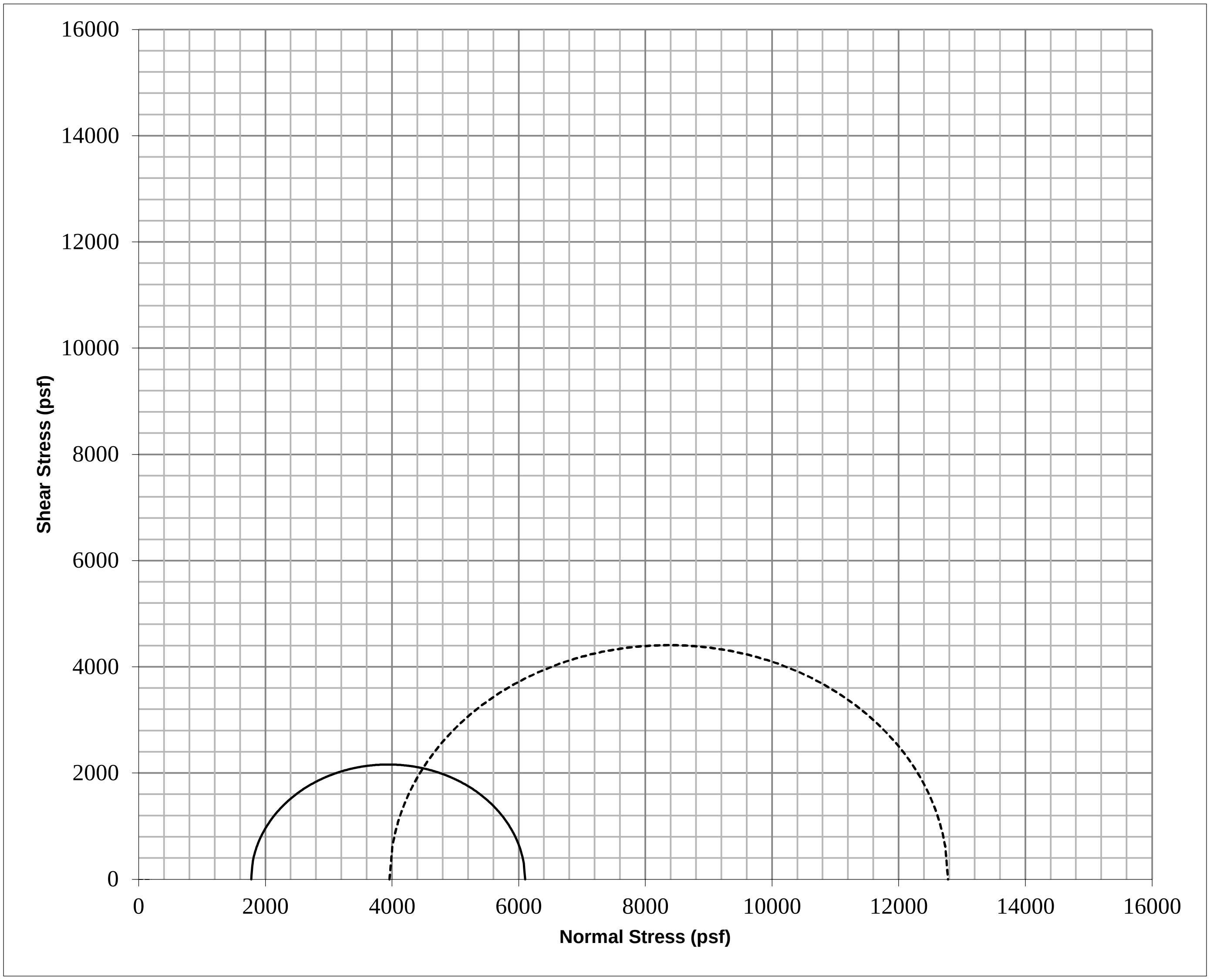
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	4325	3.30	4.91	2.41	26.93	123.9	97.6	0.727	100.0	2.70	0.02	43	22	2.0
dot	8640	8820	9.25	4.90	2.41	26.42	123.8	97.9	0.722	98.9	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**21**
Project:	**BSVII**	Depth (ft):	**100**		
Project #:	**507385606**	Soil:	**Greenish gray clay with organics**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER_________**



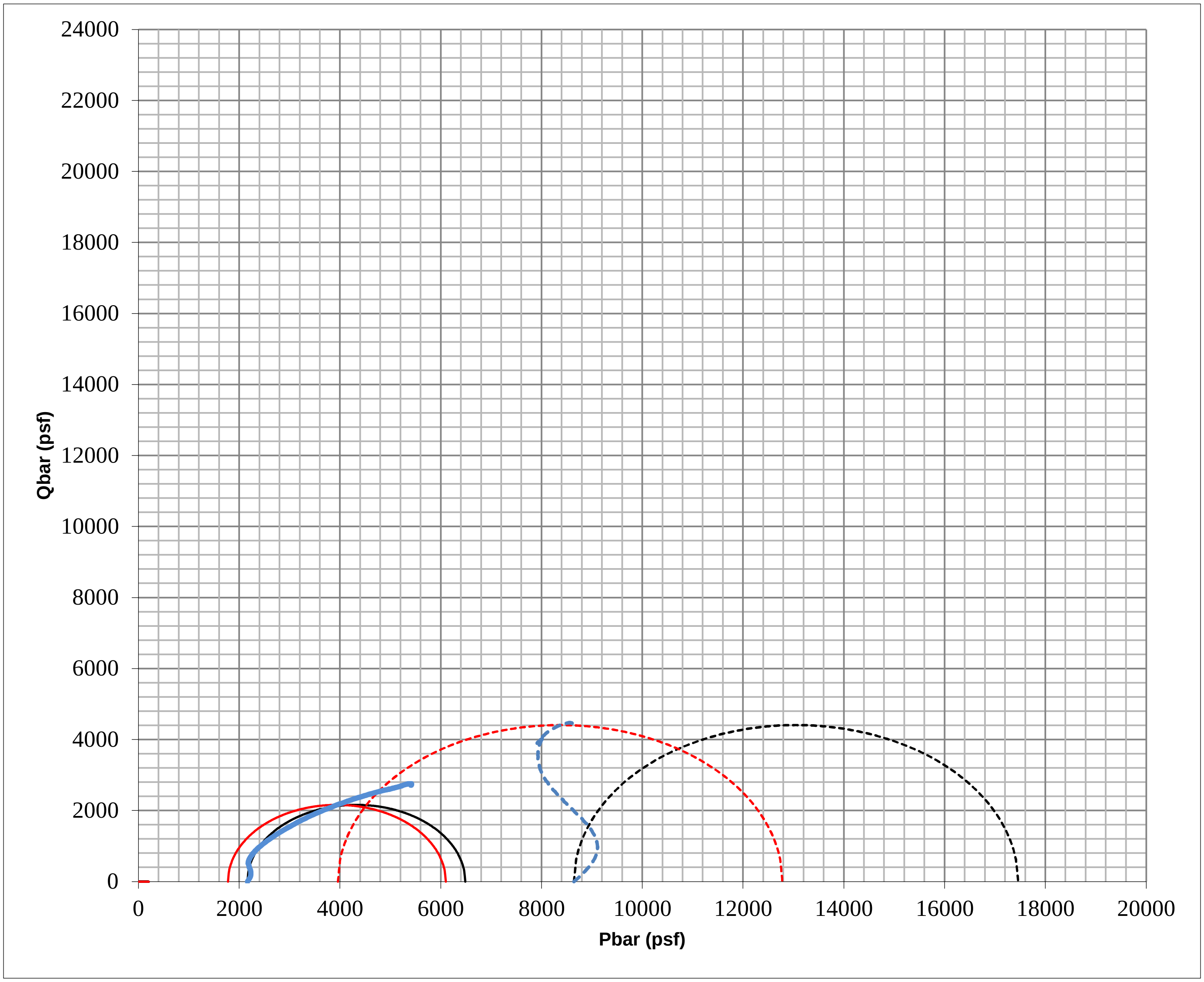
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	4325	3.30	4.91	2.41	26.93	123.9	97.6	0.727	100.0	2.70	0.02	43	22	2.0
dot	8640	8820	9.25	4.90	2.41	26.42	123.8	97.9	0.722	98.9	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**21**
Project:	**BSVII**	Depth (ft):	**100**		
Project #:	**507385606**	Soil:	**Greenish gray clay with organics**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	4325	3.30	4.91	2.41	26.93	123.9	97.6	0.727	100.0	2.70	0.02	43	22	2.0
dot	8640	8820	9.25	4.90	2.41	26.42	123.8	97.9	0.722	98.9	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**21**
Project:	**BSVII**	Depth (ft):	**100**		
Project #:	**507385606**	Soil:	**Greenish gray clay with organics**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

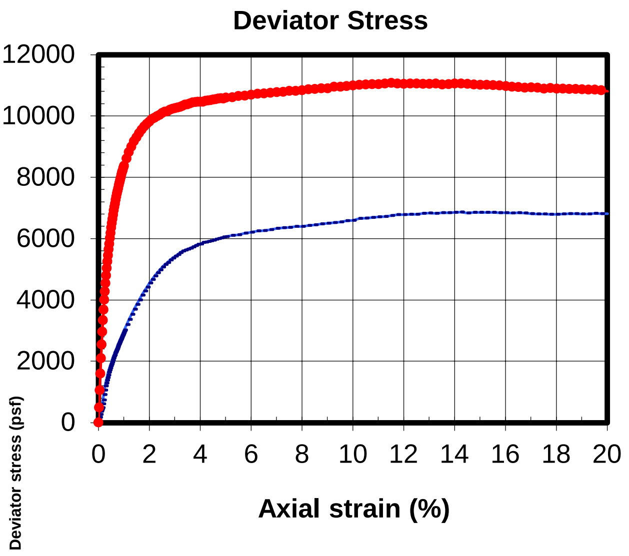
Boring Number	BH-179				BH-179	
Sample Number	28				28	
Depth (ft)	135				135	
Date Tested	11/24/20				11/25/20	
Description	Greenish gray clay				Greenish gray clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	4.89	4.86			4.88	4.81
Diameter (in)	2.39	2.37			2.38	2.35
Height/Diameter Ratio	2.05				2.05	
Total Weight (g)	768.20	769.52			775.35	767.99
Moisture Content (%)	19.87	20.07			18.21	17.09
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	133.89	136.83			135.77	140.06
Dry Density (pcf)	111.70	113.96			114.85	119.62
Area (cm^2)	28.82	28.45			28.76	28.02
Total Volume (cc)	358.18	351.08			356.51	342.31
Void Ratio	0.5090	0.4791			0.4676	0.4091
Saturation (%)	105.4	113.1			105.2	112.8
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.95	
Total Back Pressure (psf)	5760				2880	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.90				6.75	
Effective Consolidation Stress (psf)	2880				10800	
Major Effective Stress at Failure (psf) σ1	7227				15207	
Minor Effective Stress at Failure (psf) σ3	1861				4458	
Deviator Stress at Failure (psf)	5366				10749	
Pore Pressure at Failure (psf)	1019				6342	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	36					
Plastic Limit	18					
Remarks						

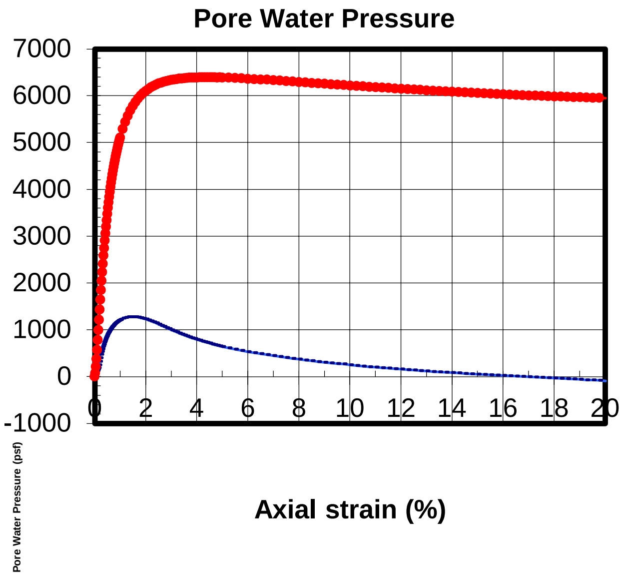
The following information is the same for all samples

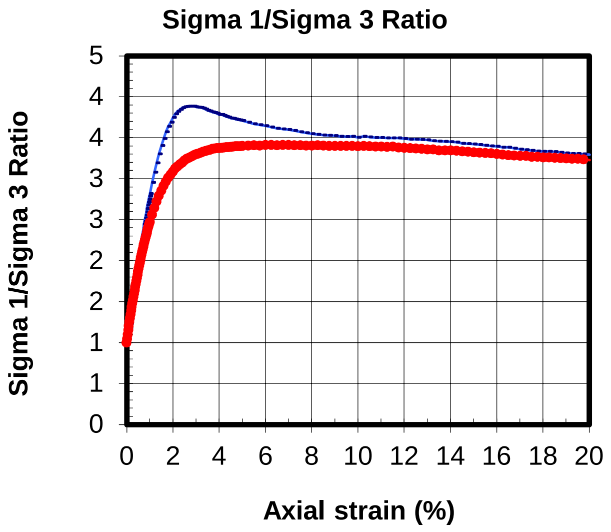
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

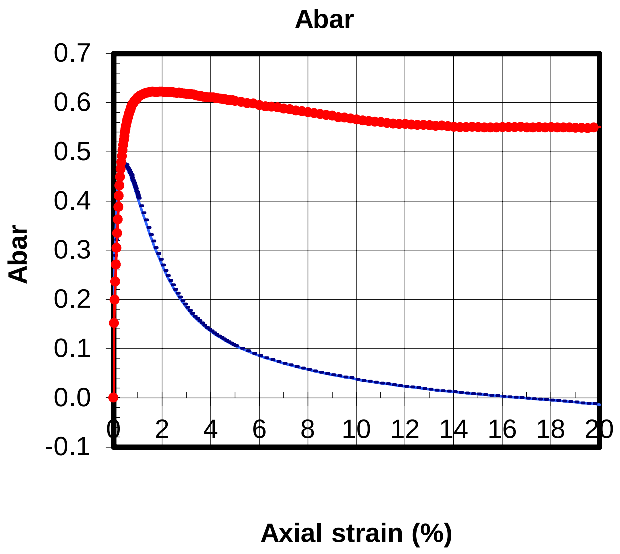
Client: **Mott MacDonald**	Boring #: **BH-179**	Sample #: **28**
Project: **BSVII**	Depth (ft): **135**	
Project #: **507385606**	Soil: **Greenish gray clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**


Deviator Stress


Pore Water Pressure


Sigma 1/Sigma 3 Ratio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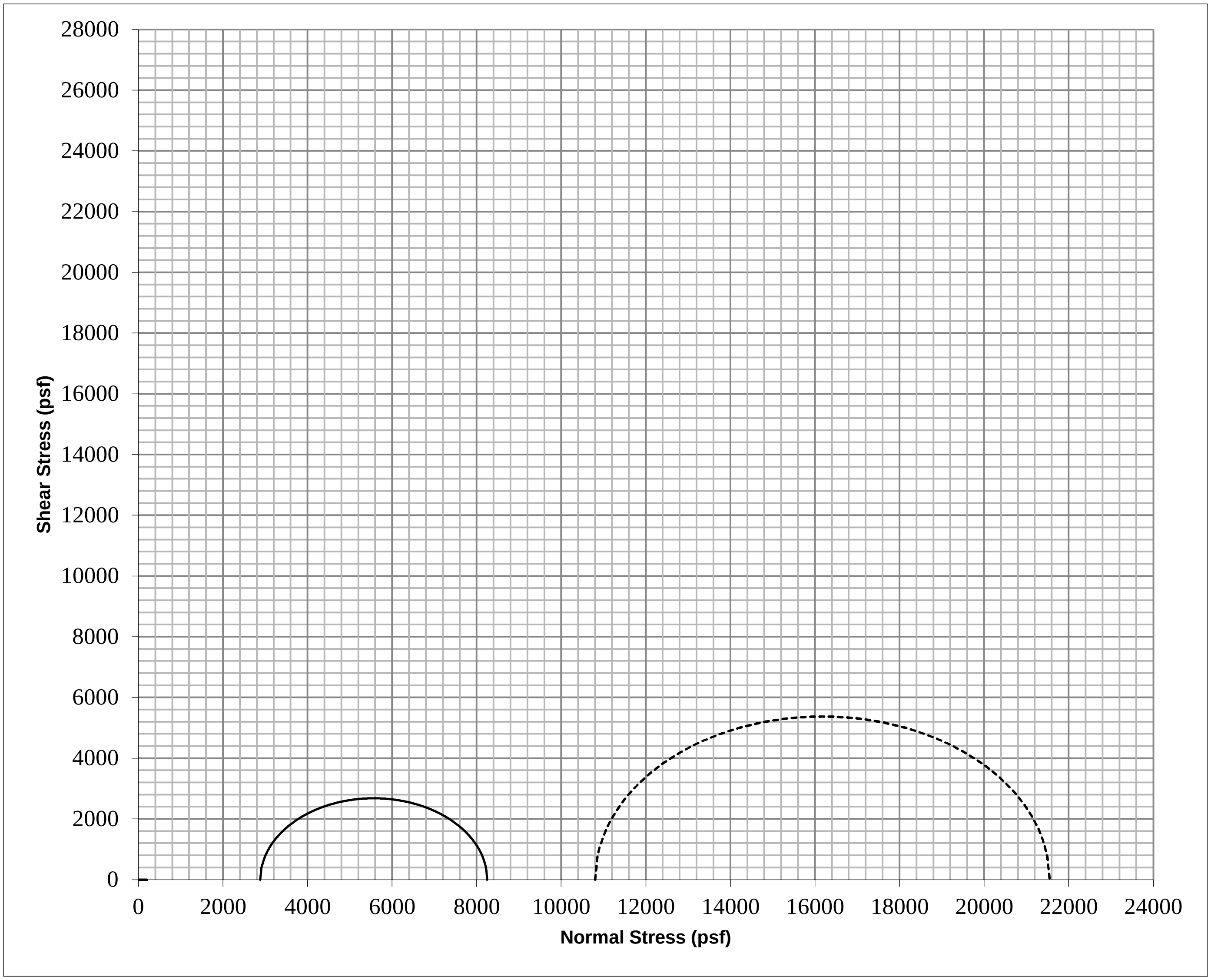
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	5366	2.90	4.89	2.39	19.87	133.9	111.7	0.509	105.4	2.70	0.02	36	18	2.1
dot	10800	10749	6.75	4.88	2.38	18.21	135.8	114.9	0.468	105.2	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**135**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**___________



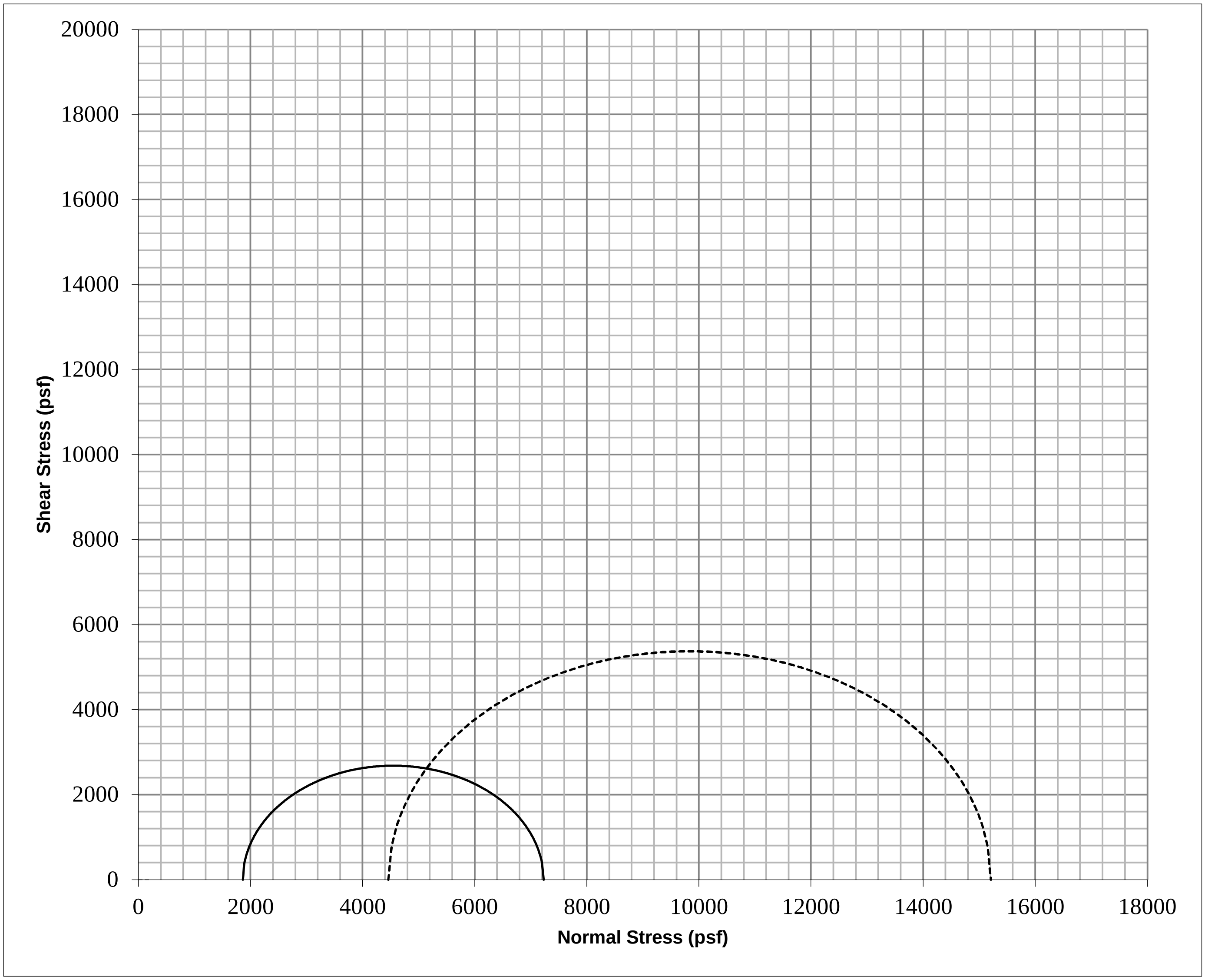
TOTAL MOHR CIRCLES

Failure Criteria **Maximum Effective σ1 / σ3 ratio**

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	5366	2.90	4.89	2.39	19.87	133.9	111.7	0.509	105.4	2.70	0.02	36	18	2.1
dot	10800	10749	6.75	4.88	2.38	18.21	135.8	114.9	0.468	105.2	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**135**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



EFFECTIVE MOHR CIRCLES

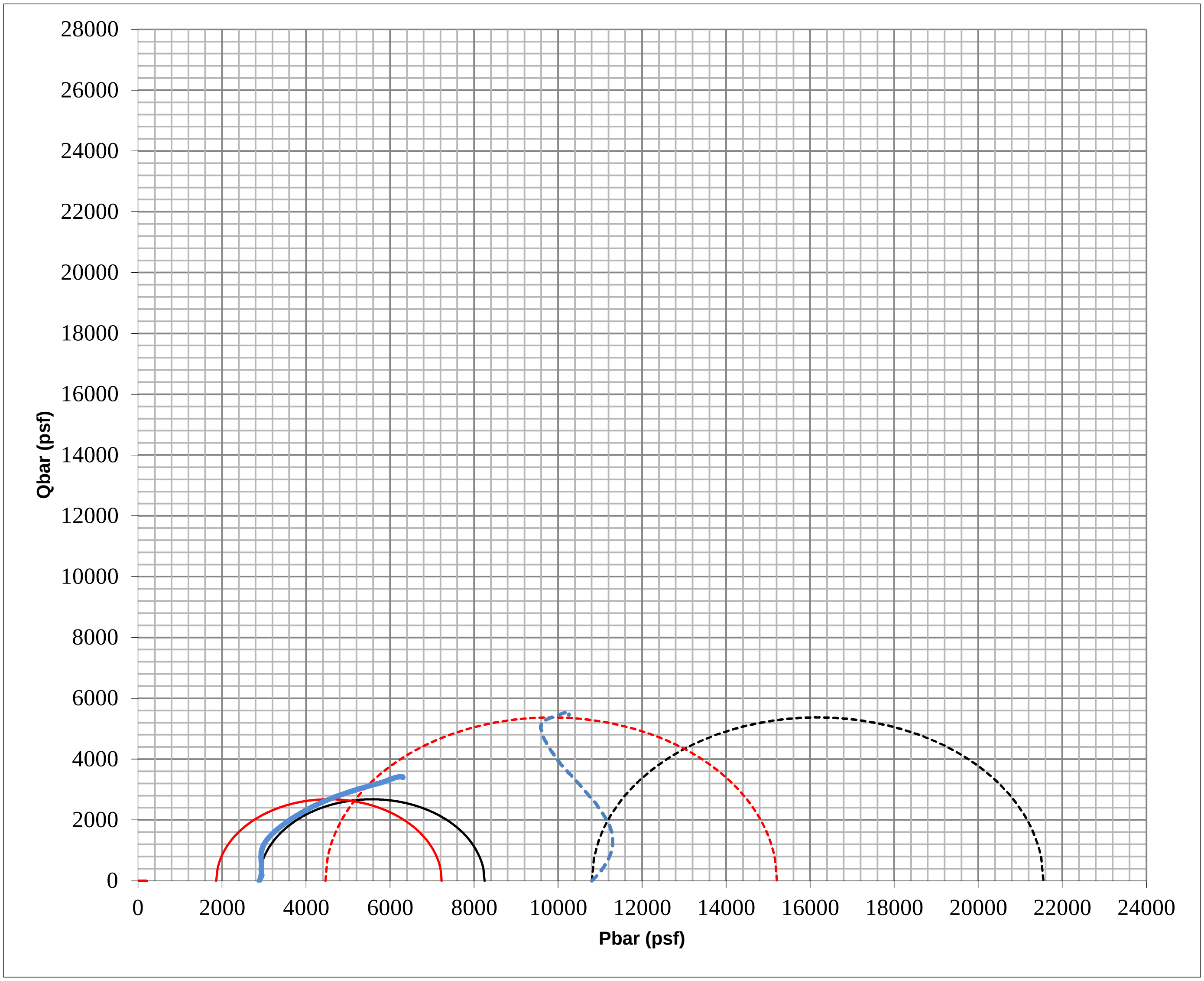
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	5366	2.90	4.89	2.39	19.87	133.9	111.7	0.509	105.4	2.70	0.02	36	18	2.1
dot	10800	10749	6.75	4.88	2.38	18.21	135.8	114.9	0.468	105.2	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**135**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER__________**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	5366	2.90	4.89	2.39	19.87	133.9	111.7	0.509	105.4	2.70	0.02	36	18	2.1
dot	10800	10749	6.75	4.88	2.38	18.21	135.8	114.9	0.468	105.2	2.70	0.02			2.0

Client:	**Mott MacDonald**	Boring #:	**BH-179**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**135**		
Project #:	**507385606**	Soil:	**Greenish gray clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**__________

Boring Number	BH-180				BH-180	
Sample Number	7				7	
Depth (ft)	25				25	
Date Tested	08/25/20				08/26/20	
Description	Grayish brown clay				Grayish brown clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.11	5.09			5.11	5.06
Diameter (in)	2.39	2.37			2.39	2.35
Height/Diameter Ratio	2.14				2.14	
Total Weight (g)	719.19	719.19			708.66	710.28
Moisture Content (%)	32.89	32.89			33.47	33.77
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	119.76	121.97			117.82	122.90
Dry Density (pcf)	90.12	91.79			88.27	91.87
Area (cm^2)	28.88	28.45			28.94	28.09
Total Volume (cc)	374.89	368.09			375.49	360.79
Void Ratio	0.8703	0.8363			0.9094	0.8347
Saturation (%)	102.0	106.2			99.4	109.3
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.98	
Total Back Pressure (psf)	5760				5760	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.80				5.00	
Effective Consolidation Stress (psf)	1440				3600	
Major Effective Stress at Failure (psf) σ1	3753				6512	
Minor Effective Stress at Failure (psf) σ3	1047				2070	
Deviator Stress at Failure (psf)	2705				4442	
Pore Pressure at Failure (psf)	393				1530	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	58					
Plastic Limit	22					
Remarks						

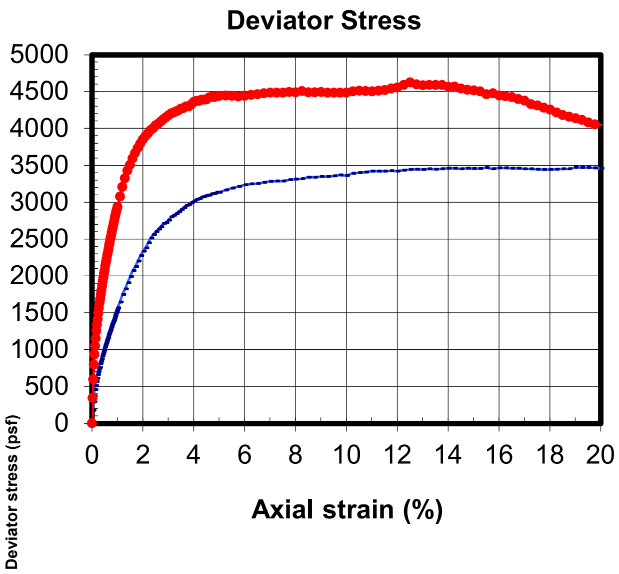
The following information is the same for all samples

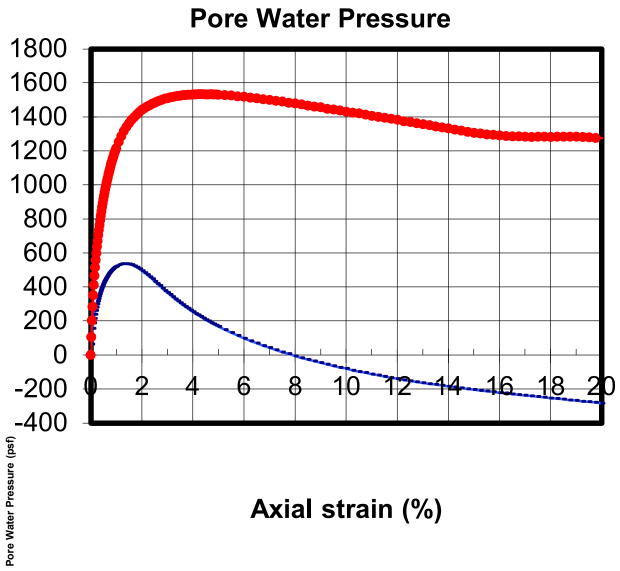
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

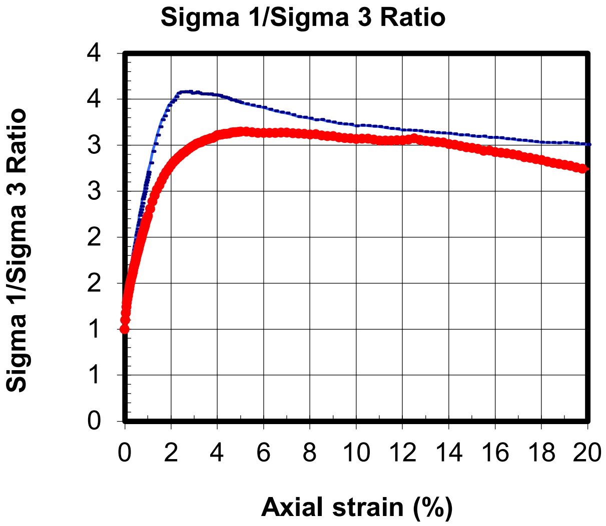
Client: **Mott MacDonald**	Boring #: **BH-180**	Sample #: **7**
Project: **BSVII**	Depth (ft): **25**	
Project #: **507385606**	Soil: **Grayish brown clay**	

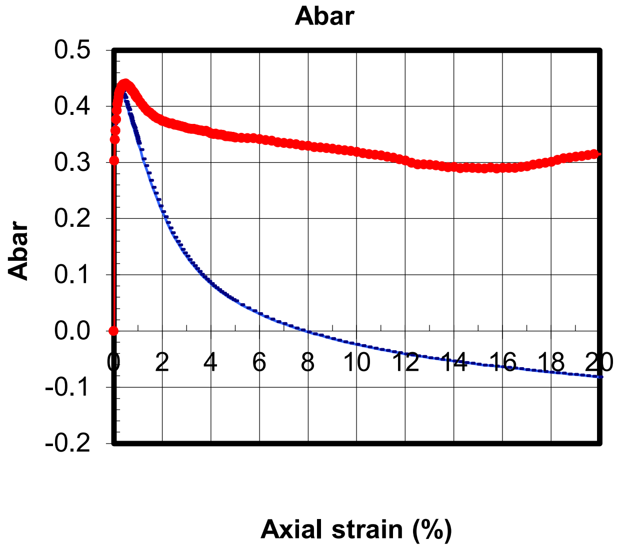
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER __________**









Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2705	2.80	5.11	2.39	32.89	119.8	90.1	0.870	102.0	2.70	0.02	58	22	2.1
dot	3600	4442	5.00	5.11	2.39	33.47	117.8	88.3	0.909	99.4	2.70	0.02			2.1

Client: **Mott MacDonald**
Boring #: **BH-180**
Sample #: **7**

Project: **BSVII**
Depth (ft): **25**

Project #: **507385606**
Soil: **Grayish brown clay**

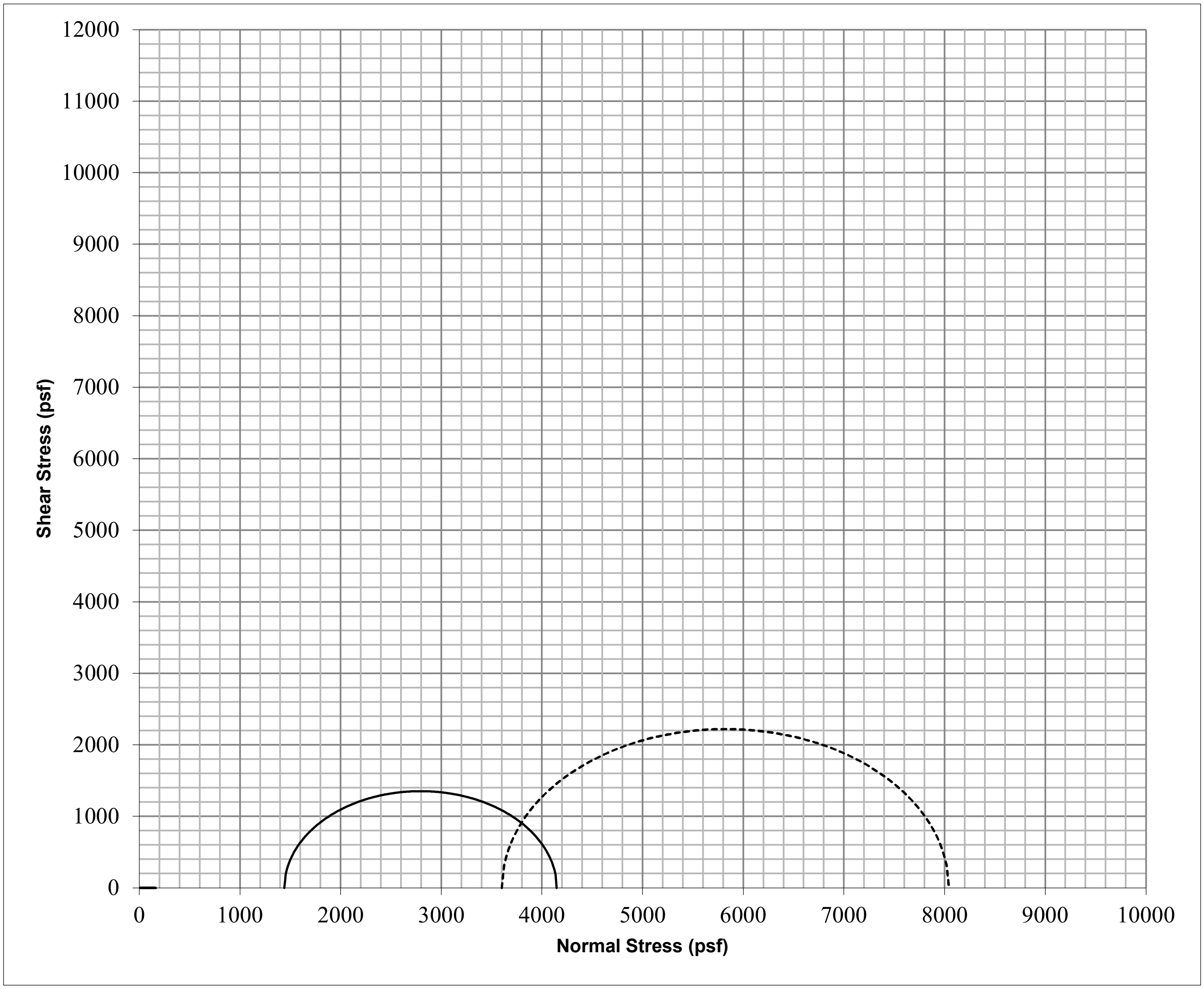
ASTM D-4767

TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU

INSPECTION SERVICES INC.

PLATE NUMBER__________



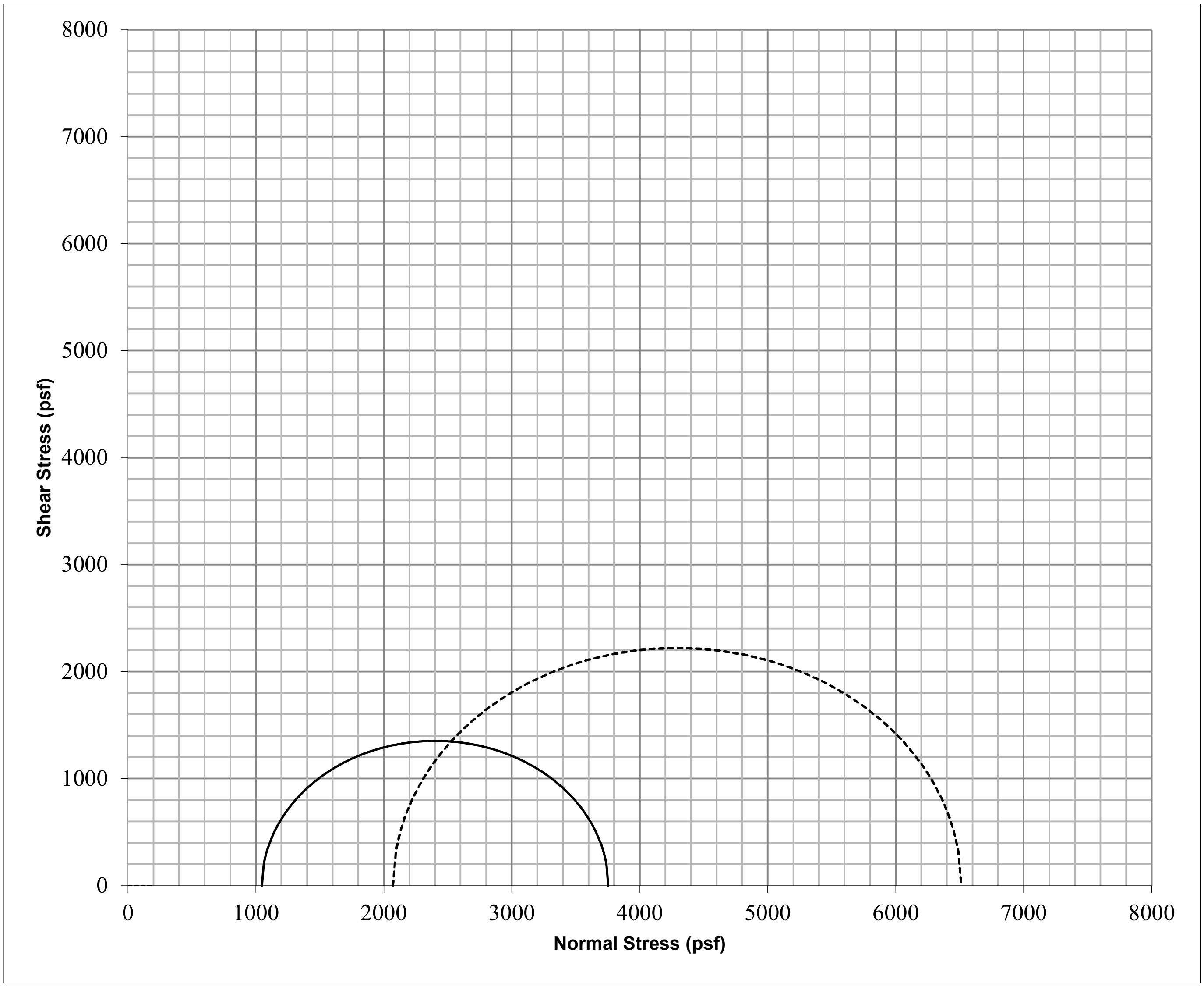
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2705	2.80	5.11	2.39	32.89	119.8	90.1	0.870	102.0	2.70	0.02	58	22	2.1
dot	3600	4442	5.00	5.11	2.39	33.47	117.8	88.3	0.909	99.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**25**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



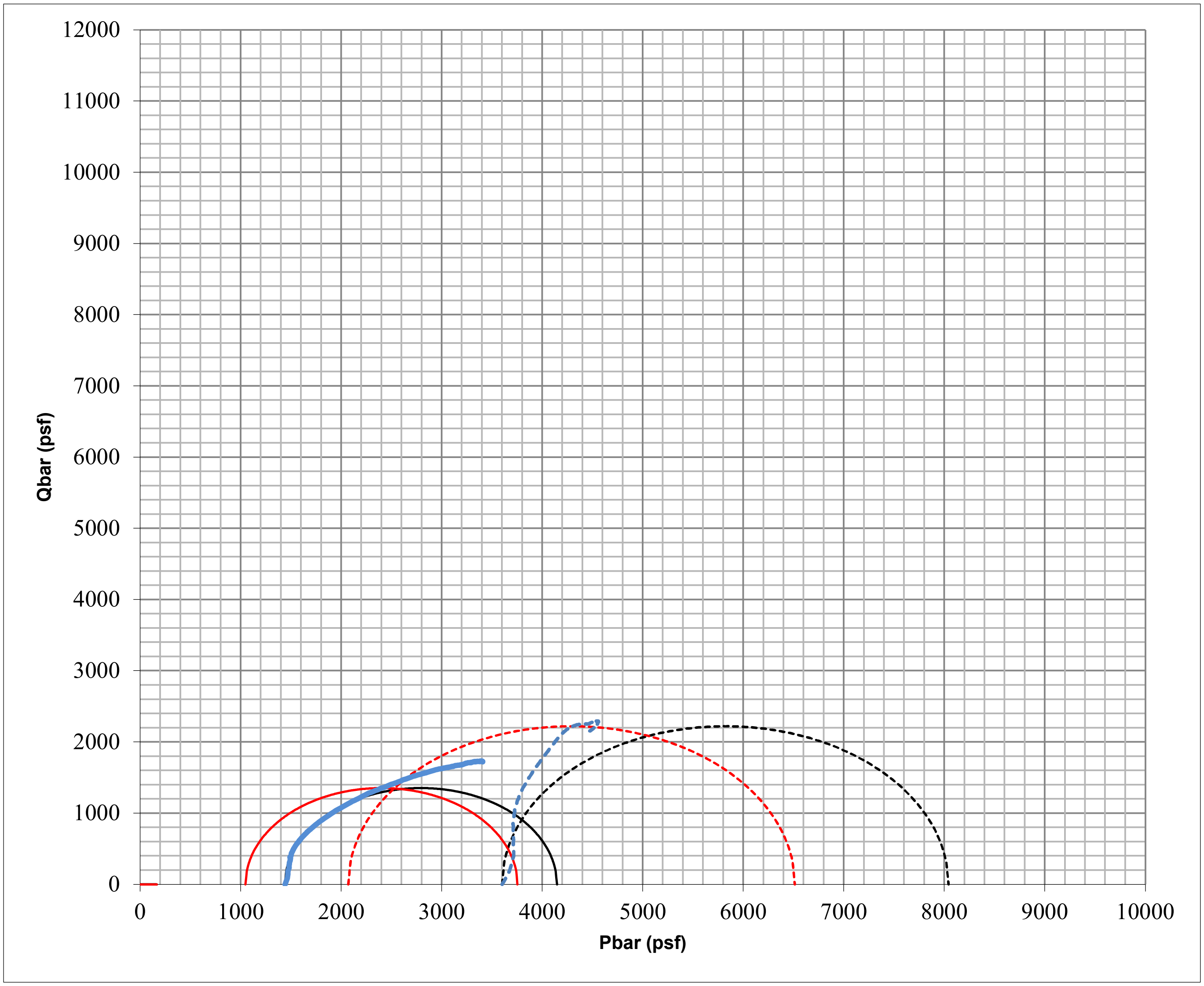
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2705	2.80	5.11	2.39	32.89	119.8	90.1	0.870	102.0	2.70	0.02	58	22	2.1
dot	3600	4442	5.00	5.11	2.39	33.47	117.8	88.3	0.909	99.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**25**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	2705	2.80	5.11	2.39	32.89	119.8	90.1	0.870	102.0	2.70	0.02	58	22	2.1
dot	3600	4442	5.00	5.11	2.39	33.47	117.8	88.3	0.909	99.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**7**
Project:	**BSVII**	Depth (ft):	**25**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER__________**

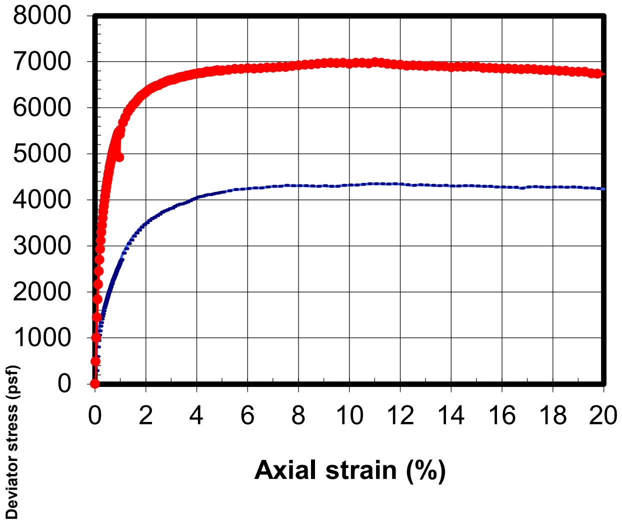
Boring Number	BH-180				BH-180	
Sample Number	18				18	
Depth (ft)	80				80	
Date Tested	08/30/20				08/31/20	
Description	Greenish gray sandy clay				Greenish gray sandy clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.24	5.22			5.23	5.17
Diameter (in)	2.40	2.38			2.39	2.36
Height/Diameter Ratio	2.19				2.19	
Total Weight (g)	809.33	809.56			807.65	799.35
Moisture Content (%)	20.34	20.37			20.32	19.08
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	130.54	132.43			130.86	134.94
Dry Density (pcf)	108.48	110.02			108.76	113.32
Area (cm^2)	29.06	28.79			29.00	28.16
Total Volume (cc)	387.03	381.63			385.30	369.80
Void Ratio	0.5537	0.5320			0.5498	0.4875
Saturation (%)	99.2	103.4			99.8	105.7
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.98				0.95	
Total Back Pressure (psf)	5760				4320	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	2.10				5.50	
Effective Consolidation Stress (psf)	2160				7200	
Major Effective Stress at Failure (psf) σ1	4835				9724	
Minor Effective Stress at Failure (psf) σ3	1287				2881	
Deviator Stress at Failure (psf)	3548				6843	
Pore Pressure at Failure (psf)	873				4319	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Percent				Plasticity index, Percent	
Liquid Limit	30					
Plastic Limit	16					
Remarks					0	

The following information is the same for all samples

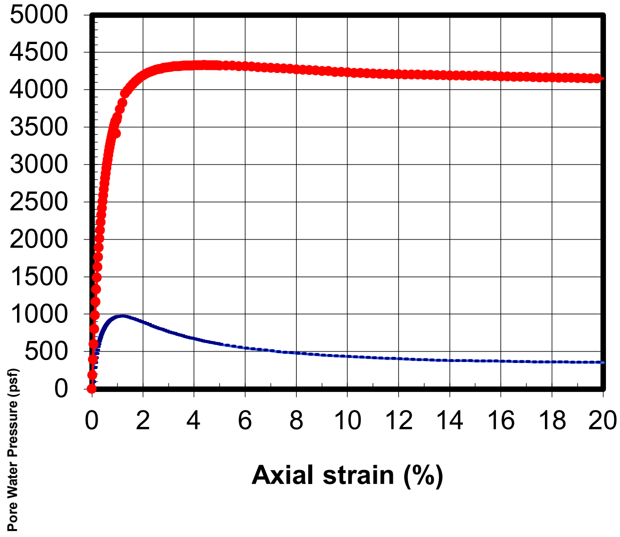
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-180**	Sample #: **18**
Project: **BSVII**	Depth (ft): **80**	
Project #: **507385606**	Soil: **Greenish gray sandy clay**	

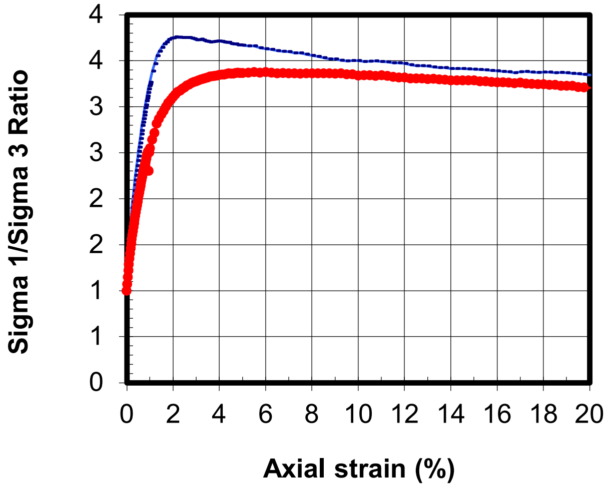
ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



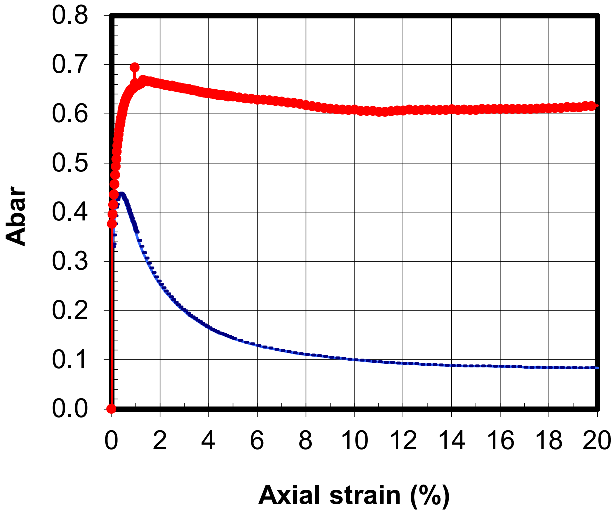
Deviator Stress



Pore Water Pressure



Sigma 1/Sigma 3 Ratio



Abar

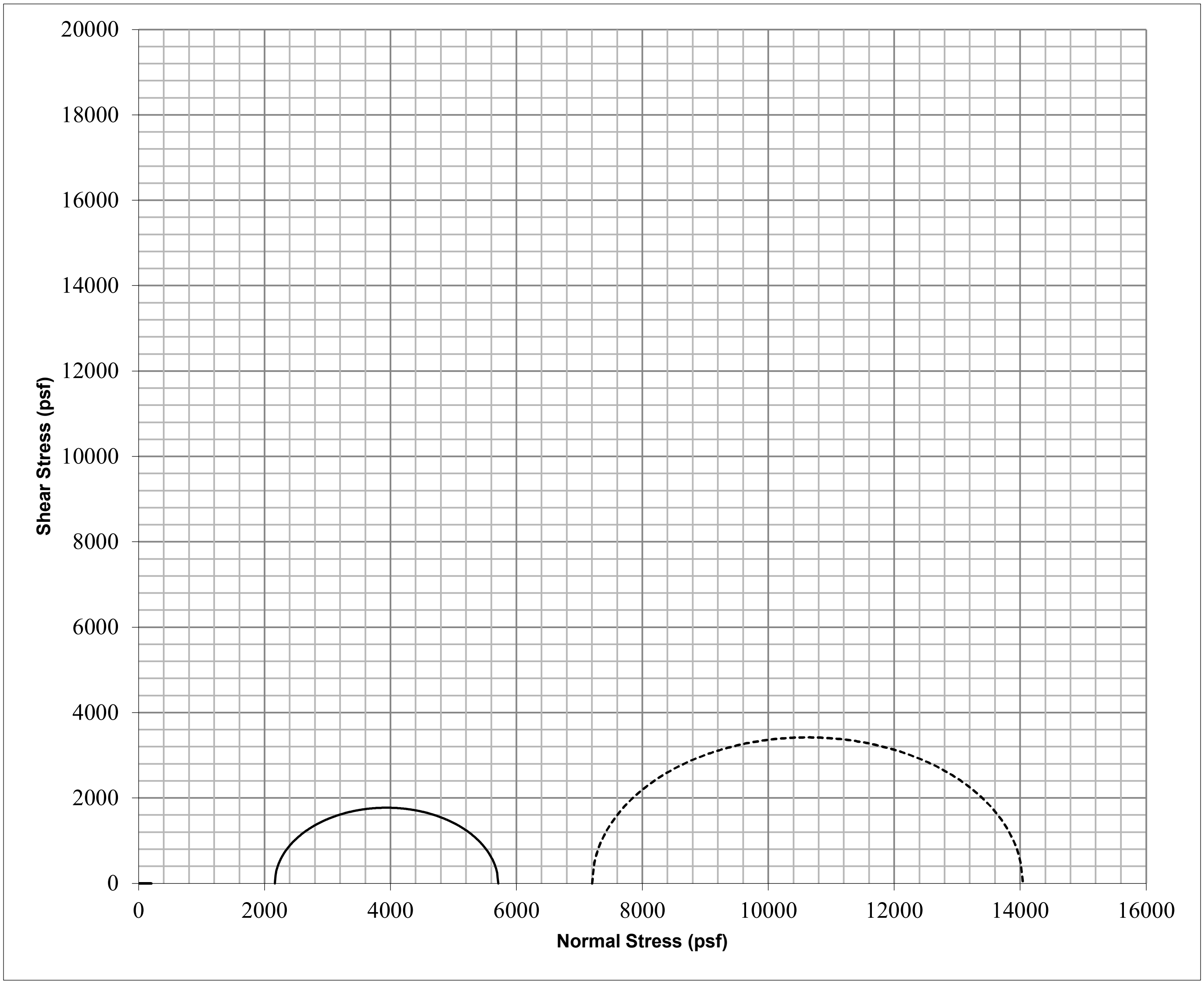
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3548	2.10	5.24	2.40	20.34	130.5	108.5	0.554	99.2	2.70	0.02	30	16	2.2
dot	7200	6843	5.50	5.23	2.39	20.32	130.9	108.8	0.550	99.8	2.70	0.02			2.2

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**80**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER**__________



TOTAL MOHR CIRCLES

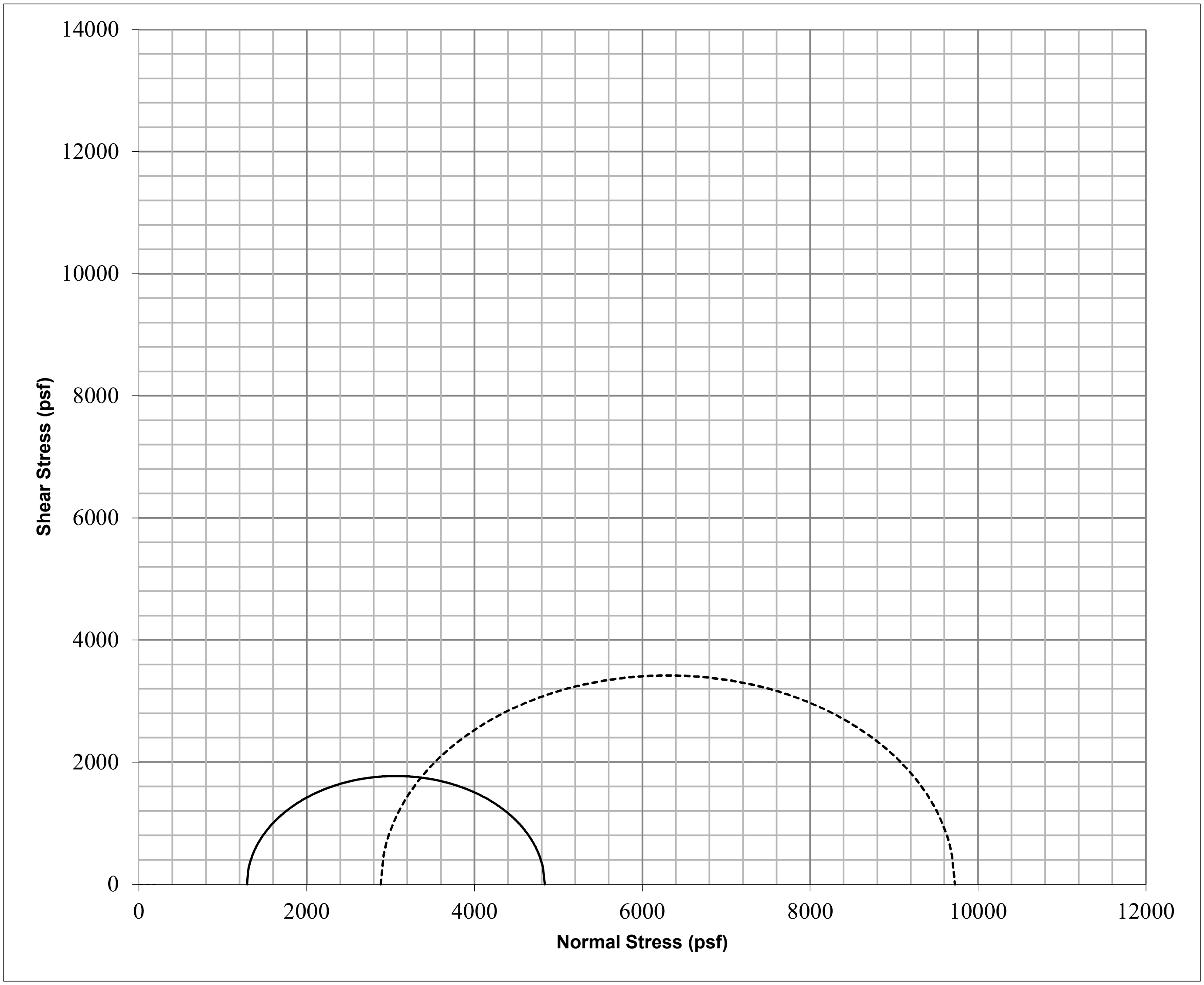
Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3548	2.10	5.24	2.40	20.34	130.5	108.5	0.554	99.2	2.70	0.02	30	16	2.2
dot	7200	6843	5.50	5.23	2.39	20.32	130.9	108.8	0.550	99.8	2.70	0.02			2.2

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**80**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

INSPECTION SERVICES INC. **PLATE NUMBER_________**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3548	2.10	5.24	2.40	20.34	130.5	108.5	0.554	99.2	2.70	0.02	30	16	2.2
dot	7200	6843	5.50	5.23	2.39	20.32	130.9	108.8	0.550	99.8	2.70	0.02			2.2

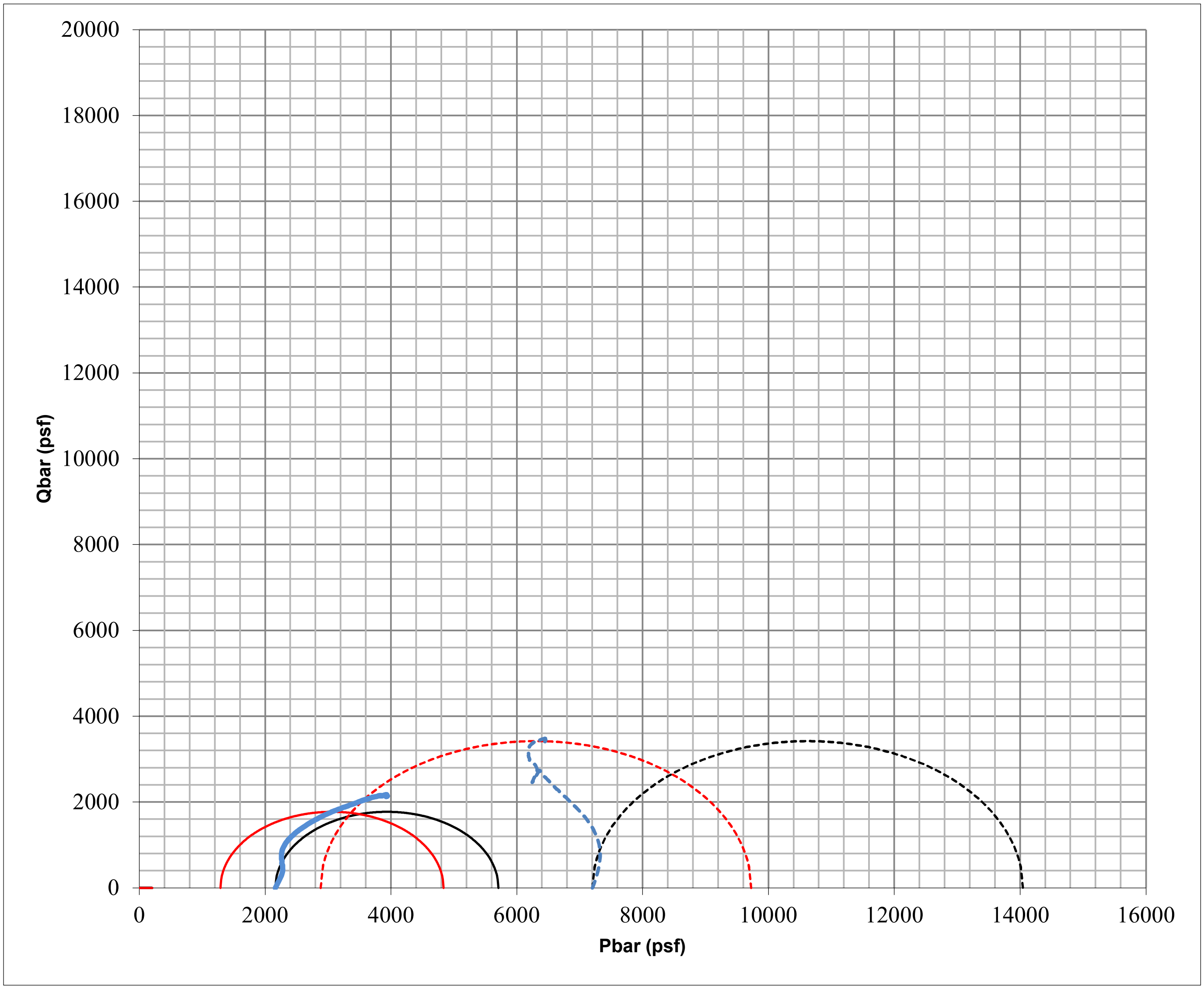
Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**18**
Project:	**BSVII**	Depth (ft):	**80**		
Project #:	**507385606**	Soil:	**Greenish gray sandy clay**		

ASTM D-4767

TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU

INSPECTION SERVICES INC. **PLATE NUMBER__________**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	3548	2.10	5.24	2.40	20.34	130.5	108.5	0.554	99.2	2.70	0.02	30	16	2.2
dot	7200	6843	5.50	5.23	2.39	20.32	130.9	108.8	0.550	99.8	2.70	0.02			2.2

Client: **Mott MacDonald**

Boring #: **BH-180**

Sample #: **18**

Project: **BSVII**

Depth (ft): **80**

Project #: **507385606**

Soil: **Greenish gray sandy clay**

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

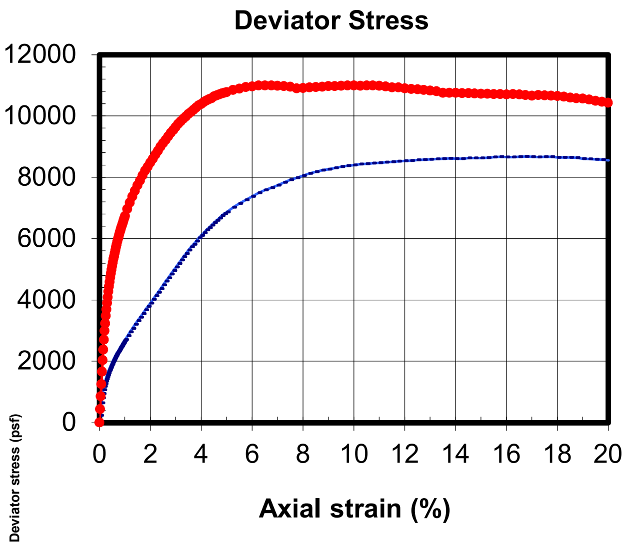
Boring Number	BH-180				BH-180	
Sample Number	28				28	
Depth (ft)	130				130	
Date Tested	09/08/20				09/09/20	
Description	Grayish brown clay				Grayish brown clay	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	6.00	5.95			5.87	5.73
Diameter (in)	2.86	2.84			2.86	2.82
Height/Diameter Ratio	2.10				2.05	
Total Weight (g)	1284.63	1295.12			1227.51	1212.35
Moisture Content (%)	22.35	23.35			25.50	23.95
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	126.96	130.90			123.95	129.41
Dry Density (pcf)	103.77	106.12			98.76	104.40
Area (cm^2)	41.45	40.88			41.45	40.17
Total Volume (cc)	631.65	617.65			618.22	584.82
Void Ratio	0.6243	0.5883			0.7066	0.6144
Saturation (%)	96.7	107.2			97.4	105.3
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.97				0.99	
Total Back Pressure (psf)	5760				2880	
Rate of Strain (%/min)	0.02				0.02	
Axial Strain at Failure (%)	4.10				5.25	
Effective Consolidation Stress (psf)	2880				10080	
Major Effective Stress at Failure (psf) σ1	8109				15048	
Minor Effective Stress at Failure (psf) σ3	1923				4198	
Deviator Stress at Failure (psf)	6186				10850	
Pore Pressure at Failure (psf)	957				5882	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 4767					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	42					
Plastic Limit	18					
Remarks						

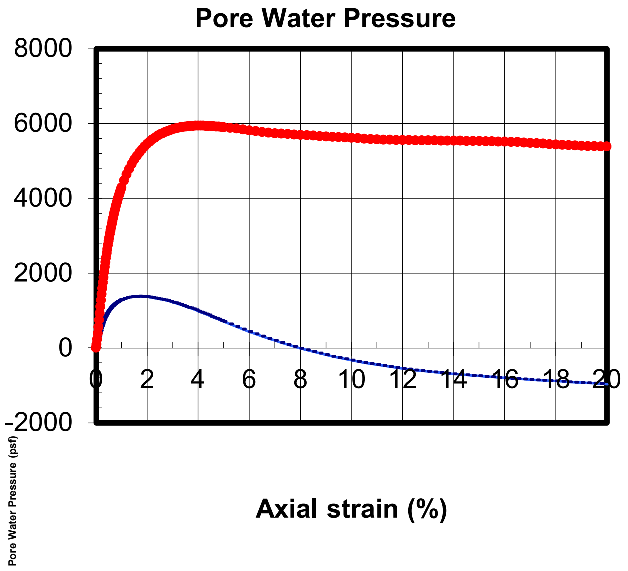
The following information is the same for all samples

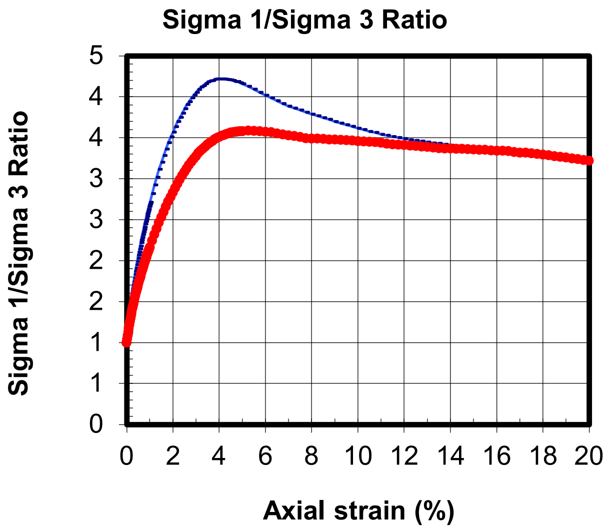
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

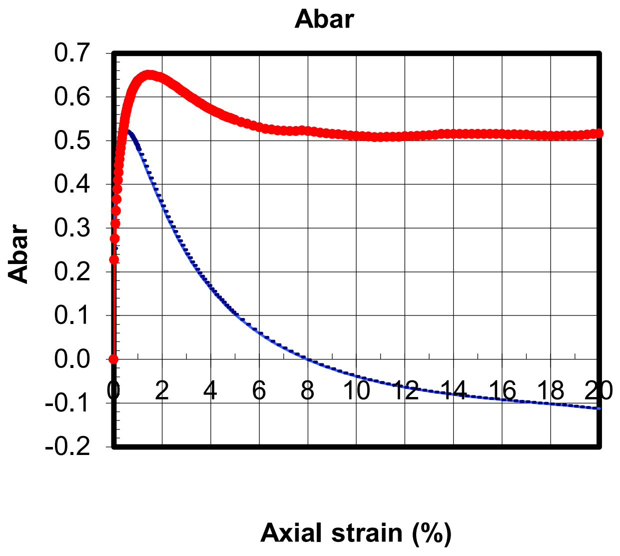
Client: **Mott MacDonald**	Boring #: **BH-180**	Sample #: **28**
Project: **BSVII**	Depth (ft): **130**	
Project #: **507385606**	Soil: **Grayish brown clay**	

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**









Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6186	4.10	6.00	2.86	22.35	127.0	103.8	0.624	96.7	2.70	0.02	42	18	2.1
dot	10080	10850	5.25	5.87	2.86	25.50	124.0	98.8	0.707	97.4	2.70	0.02			2.1

Client: **Mott MacDonald**
Boring #: **BH-180**
Sample #: **28**

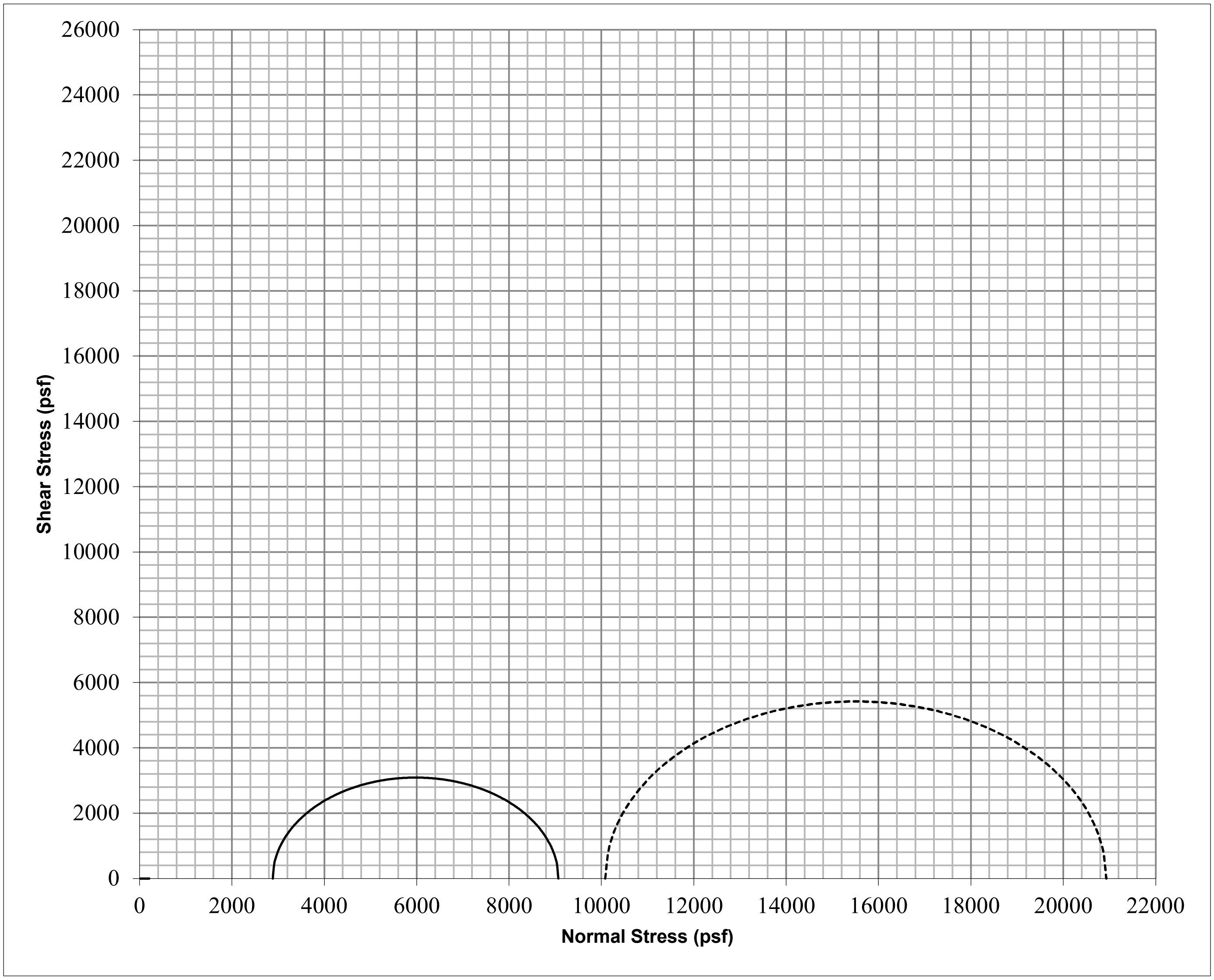
Project: **BSVII**
Depth (ft): **130**

Project #: **507385606**
Soil: **Grayish brown clay**

ASTM D-4767

TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED

TXCU



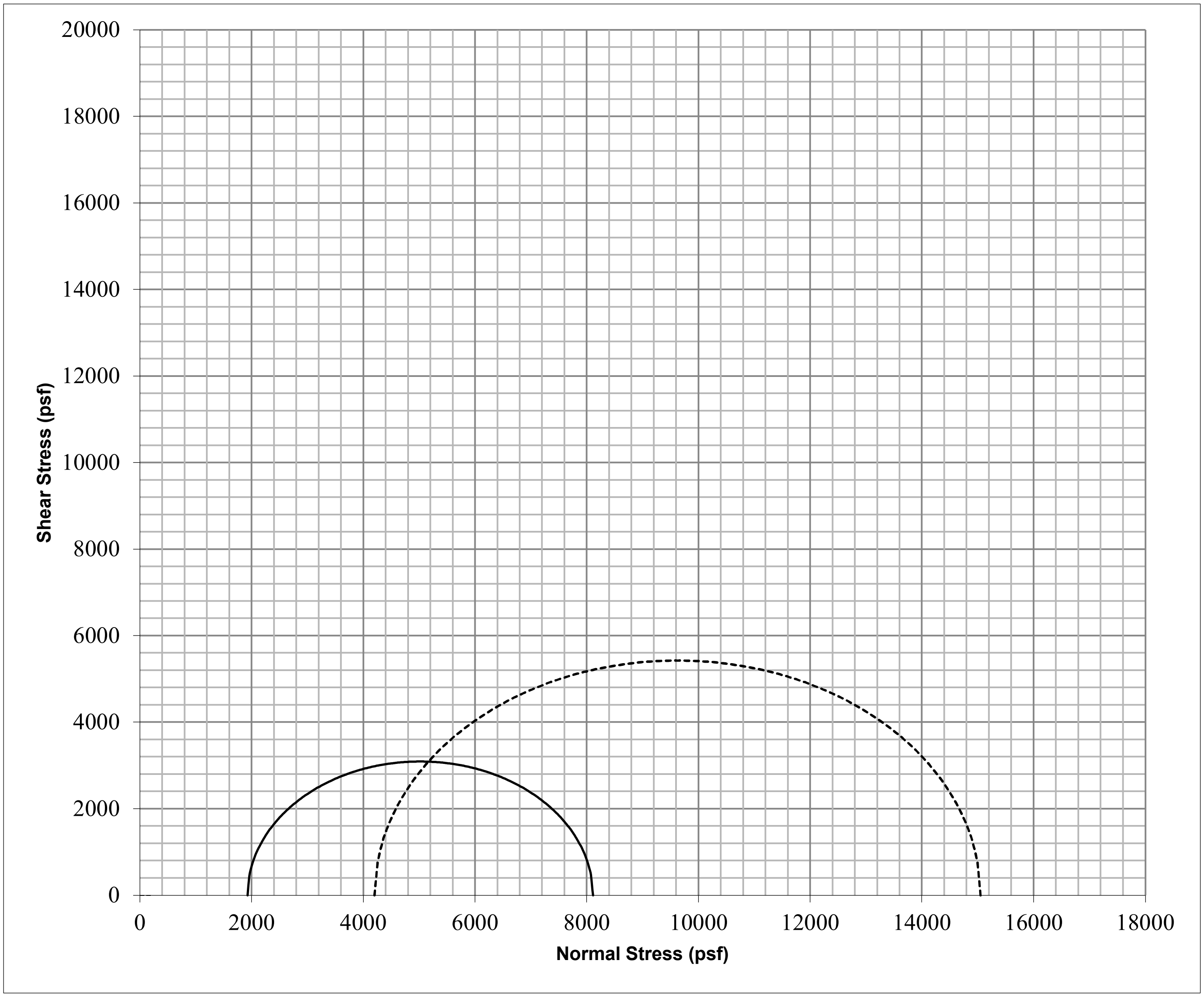
TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6186	4.10	6.00	2.86	22.35	127.0	103.8	0.624	96.7	2.70	0.02	42	18	2.1
dot	10080	10850	5.25	5.87	2.86	25.50	124.0	98.8	0.707	97.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**130**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



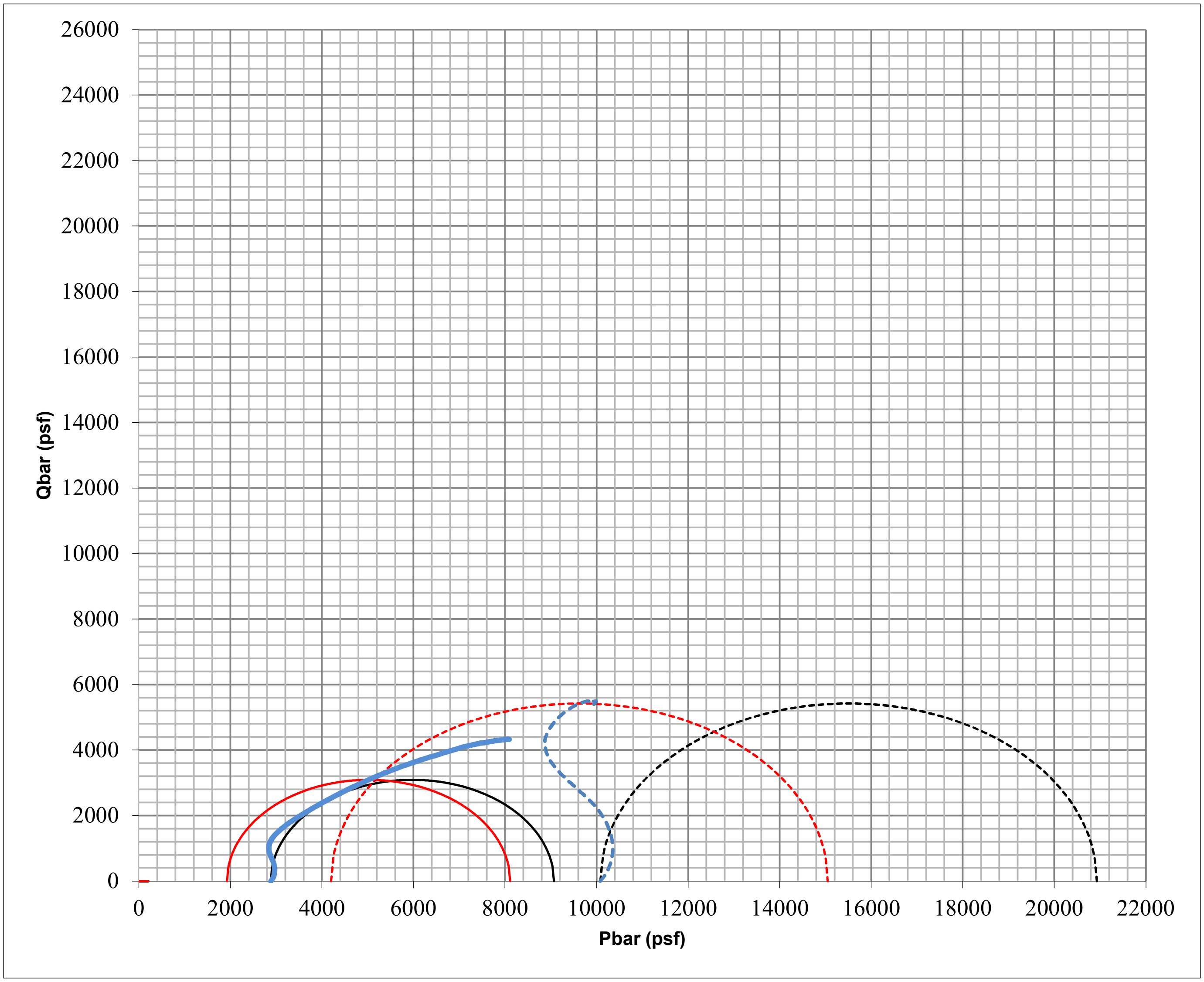
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6186	4.10	6.00	2.86	22.35	127.0	103.8	0.624	96.7	2.70	0.02	42	18	2.1
dot	10080	10850	5.25	5.87	2.86	25.50	124.0	98.8	0.707	97.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**130**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	6186	4.10	6.00	2.86	22.35	127.0	103.8	0.624	96.7	2.70	0.02	42	18	2.1
dot	10080	10850	5.25	5.87	2.86	25.50	124.0	98.8	0.707	97.4	2.70	0.02			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-180**	Sample #:	**28**
Project:	**BSVII**	Depth (ft):	**130**		
Project #:	**507385606**	Soil:	**Grayish brown clay**		

ASTM D-4767	**TRIAXIAL COMPRESSION CONSOLIDATED-UNDRAINED**	**TXCU**

TXCD Test Results

Boring Number	BH-153				BH-153	
Sample Number	6				6	
Depth (ft)	50.5				50.5	
Date Tested	04/11/20				04/13/20	
Description	Greenish gray sandy silt				Greenish gray sandy silt	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.64	5.62			5.44	5.37
Diameter (in)	2.38	2.36			2.38	2.35
Height/Diameter Ratio	2.37				2.29	
Total Weight (g)	866.27	859.92			833.77	816.84
Moisture Content (%)	20.79	19.91			22.16	19.68
Moisture Content From	1/2 of sample, cut				1/2 of sample, cut	
Wet Density (pcf)	131.80	133.50			131.24	133.04
Dry Density (pcf)	109.11	111.34			107.43	111.16
Area (cm^2)	28.64	28.17			28.70	28.09
Total Volume (cc)	410.31	402.11			396.59	383.29
Void Ratio	0.5448	0.5139			0.5689	0.5163
Saturation (%)	103.1	104.6			105.2	102.9
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.96				0.96	
Total Back Pressure (psf)	7200				8640	
Rate of Strain (%/min)	0.04				0.05	
Axial Strain at Failure (%)	9.76				13.01	
Effective Consolidation Stress (psf)	2160				4320	
Major Effective Stress at Failure (psf) σ1	9283				16360	
Minor Effective Stress at Failure (psf) σ3	2169				4333	
Deviator Stress at Failure (psf)	7113				12027	
Pore Pressure at Failure (psf)	-9				-13	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 7161					
Classification Based On	Plasticity index,				Plasticity index,	
Liquid Limit	28					
Plastic Limit	23					
Remarks						

The following information is the same for all samples

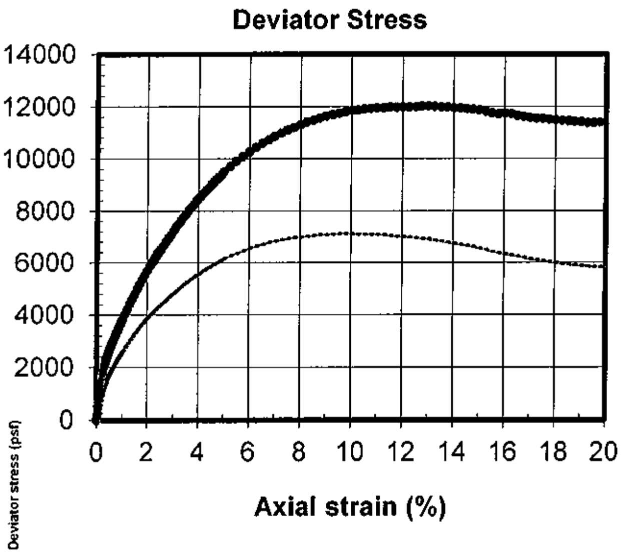
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

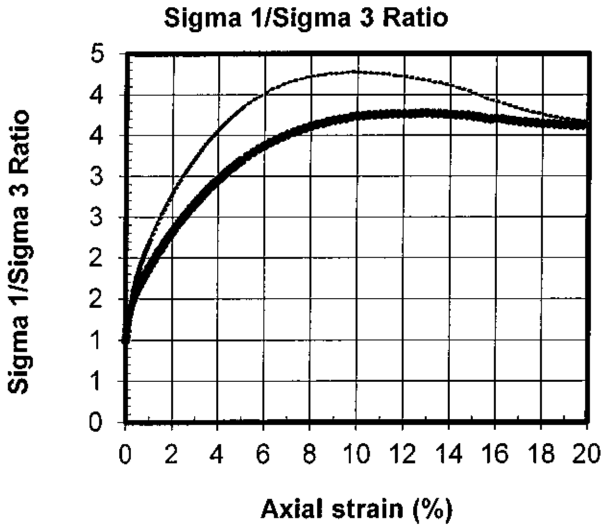
Client: **Mott MacDonald**	Boring #: **BH-153**	Sample #: **6**
Project: **BSVII**	Depth (ft): **50.5**	
Project #: **507385606**	Soil: **Greenish gray sandy silt**	

ASTM D-7161

TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED

TXCD



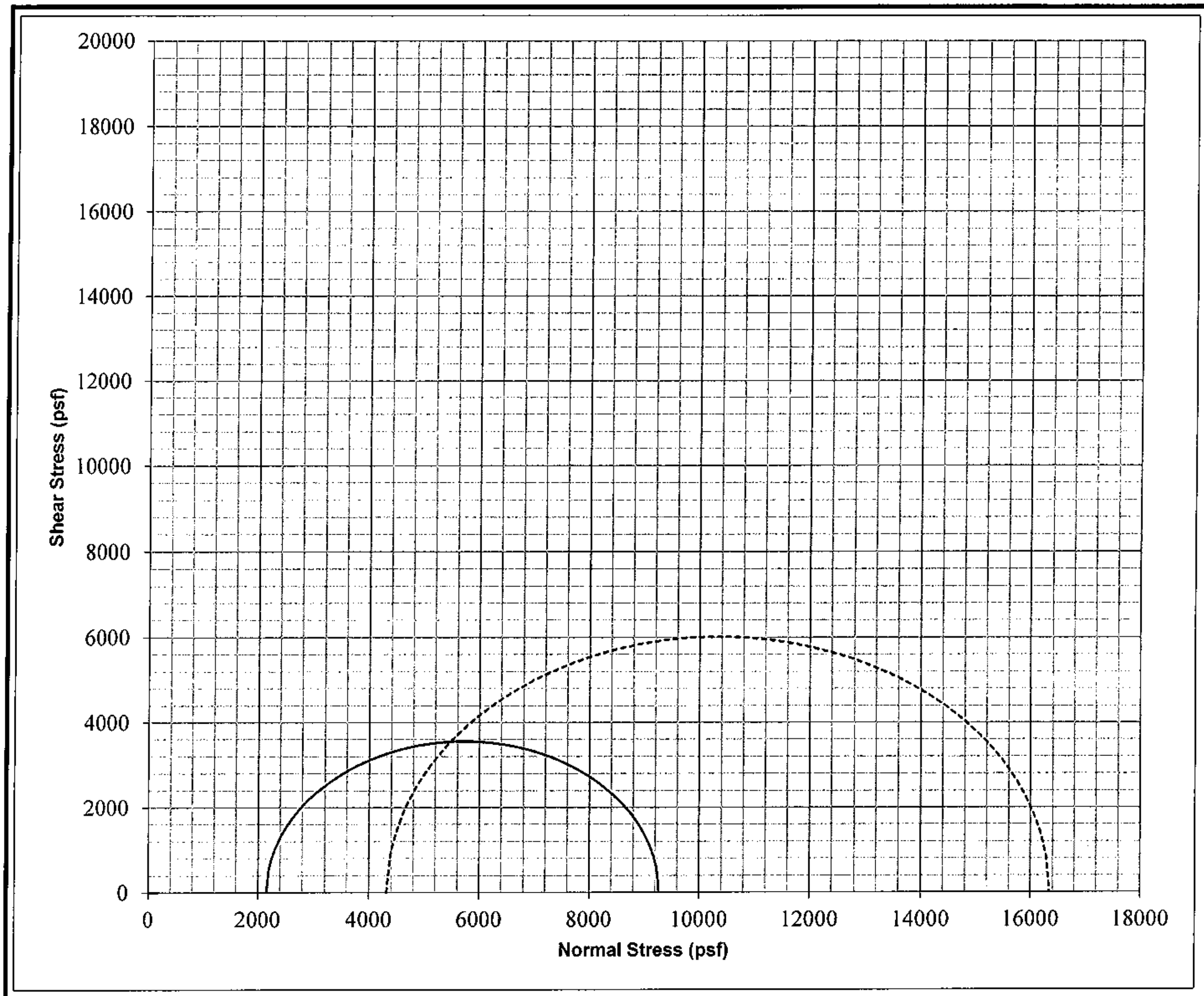


Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	7113	9.76	5.64	2.38	20.79	131.8	109.1	0.545	103.1	2.70	0.04	28	23	2.4
dot	4320	12027	13.01	5.44	2.38	22.16	131.2	107.4	0.569	105.2	2.70	0.05			2.3

Client:	**Mott MacDonald**	Boring #:	**BH-153**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**50.5**		
Project #:	**507385606**	Soil:	**Greenish gray sandy silt**		

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

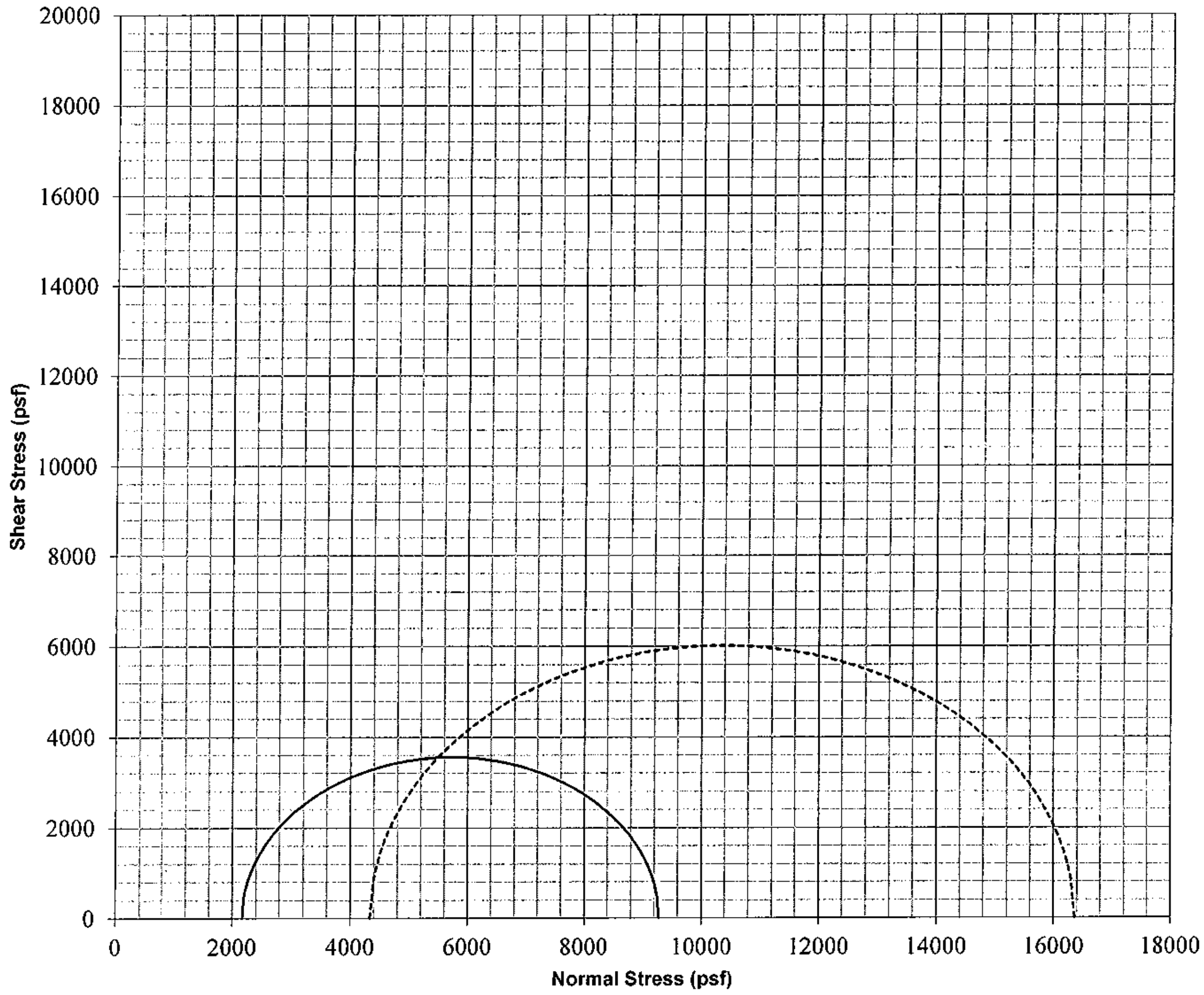
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	7113	9.76	5.64	2.38	20.79	131.8	109.1	0.545	103.1	2.70	0.04	28	23	2.4
dot	4320	12027	13.01	5.44	2.38	22.16	131.2	107.4	0.569	105.2	2.70	0.05			2.3

Client:	**Mott MacDonald**	Boring #:	**BH-153**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**50.5**		
Project #:	**507385606**	Soil:	**Greenish gray sandy silt**		

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER_________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

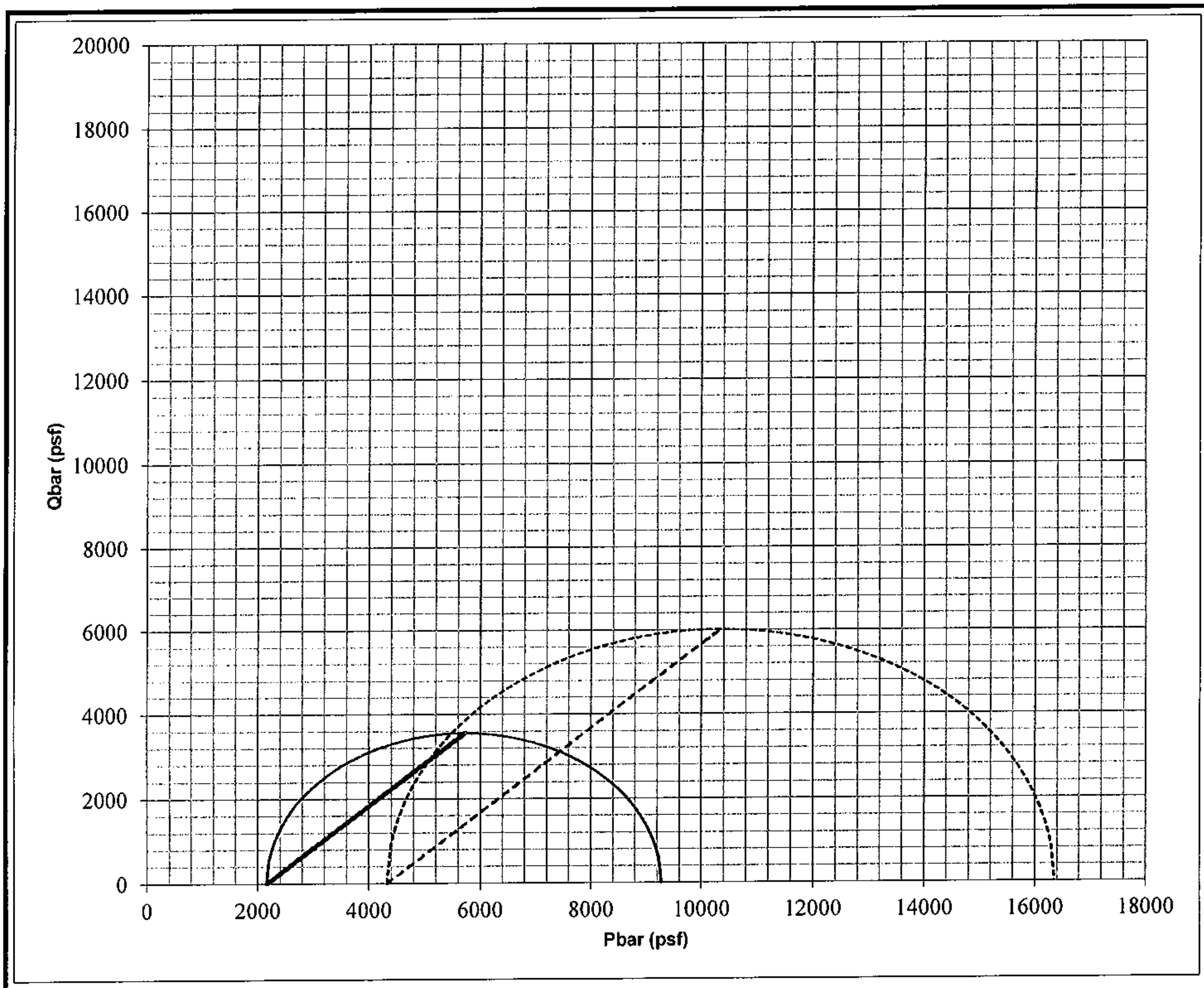
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	7113	9.76	5.64	2.38	20.79	131.8	109.1	0.545	103.1	2.70	0.04	28	23	2.4
dot	4320	12027	13.01	5.44	2.38	22.16	131.2	107.4	0.569	105.2	2.70	0.05			2.3

Client:	**Mott MacDonald**	Boring #:	**BH-153**	Sample #:	**6**
Project:	**BSVII**	Depth (ft):	**50.5**		
Project #:	**507385606**	Soil:	**Greenish gray sandy silt**		

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2160	7113	9.76	5.64	2.38	20.79	131.8	109.1	0.545	103.1	2.70	0.04	28	23	2.4
dot	4320	12027	13.01	5.44	2.38	22.16	131.2	107.4	0.569	105.2	2.70	0.05			2.3

Client: **Mott MacDonald**	Boring #: **BH-153**	Sample #: **6**
Project: **BSVII**	Depth (ft): **50.5**	
Project #: **507385606**	Soil: **Greenish gray sandy silt**	

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER_________

Laboratory Test Data

Client: Mott MacDonald **LAB NO:** G-64351
Project: BSVII **Job No.:** 507385606
Boring No. BH-153 **Sample No.** 6 **Depth:** 50.5
Classification: Greenish gray sandy silt **Type of test:** TXCD
Cell No. ______ **SigC (psi)** 15

		FROM COMPUTER				STATION: SHEARING STATION			
		Applied Pressure (psi)				Burette Readings (c.c.)			Valves Closed ? NO
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
11-Apr	917	65.23	50.24		0	13	21	21	
	924	65.24	50.24		0.25	13.2	20.8	20.8	
	930	65.23	50.24		0.5	13.5	20.6	20.7	
	936	65.22	50.24		0.75	13.9	20.3	20.6	
	942	65.21	50.24		1	14.3	20.1	20.4	
	954	65.2	50.24		1.5	14.9	19.6	20.2	
	1006	65.18	50.24		2	15.4	19.3	20	
	1018	65.16	50.25		2.5	15.7	19	19.8	
	1030	65.15	50.25		3	16	18.8	19.6	
	1042	65.15	50.24		3.5	16.2	18.5	19.5	
	1055	65.14	50.24		4	16.3	18.5	19.5	
	1108	65.13	50.23		4.5	16.3	18.5	19.4	
	1119	65.13	50.23		5	16.3	18.5	19.4	
	1142	65.12	50.22		6	16	18.5	19.4	
	1206	65.12	50.22		7	15.5	18.8	19.5	
	1232	65.12	50.2		8	15	19.2	19.5	
	1255	65.13	50.19		9	14.3	19.5	19.6	
	1319	65.13	50.19		10	13.6	20	19.8	
	1518	65.1	50.17		15	11.5	21.2	21.4	
	1720	65.1	50.16		20	9.8	22.8	22.8	

END OF SHEAR RECORD INFO IN ALL GRAY BOXES

11-Apr	1720	65.1	50.16	20	9.8	22.8	22.8	
		LOAD =	185.6					
		DISTANCE =	1.1249					

Draft computerized by______

Inspection Services, Inc.

Checked By ________

Laboratory Test Data

Client: Mott MacDonald
LAB NO: G-64351
Project: BSVII
Job No.: 507385606
Boring No. BH-153
Sample No. 6
Depth: 50.5
Classification: Greenish gray sandy silt
Type of test: TXCD
Cell No.
SigC (psi) 30

		FROM COMPUTER Applied Pressure (psi)				STATION: SHEARING STATION Burette Readings (c.c.)			Valves Closed ? NO
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
13-Apr	9	90.25	60.2		0	13.9	12.6	13.5	
	907	90.25	60.2		0.25	14.1	12.5	13.2	
	913	90.25	60.2		0.5	14.5	12.4	12.8	
	918	90.25	60.19		0.75	15	12.2	12.5	
	924	90.22	60.19		1	15.4	12	12.1	
	934	90.19	60.19		1.5	16.2	11.8	11.6	
	946	90.17	60.19		2	16.9	11.4	11	
	957	90.16	60.18		2.5	17.5	11.3	10.5	
	1008	90.13	60.18		3	18	11.1	10.1	
	1018	90.11	60.17		3.5	18.4	11	9.8	
	1030	90.1	60.17		4	18.7	10.8	9.5	
	1040	90.1	60.17		4.5	19	10.7	9.3	
	1051	90.08	60.17		5	19.2	10.6	9.1	
	1113	90.07	60.16		6	19.4	10.5	8.8	
	1145	90.04	60.15		7	19.4	10.3	8.6	
	1157	90.04	60.15		8	19.3	10.4	8.6	
	1219	90.04	60.14		9	19.2	10.4	8.6	
	1240	90.03	60.14		10	18.9	10.4	8.6	
	1430	90.02	60.1		15	16.8	10.8	9.3	
	1616	89.92	60.06		20	15.7	11	9.7	
END OF SHEAR RECORD INFO IN ALL GRAY BOXES									
13-Apr	1616	89.92	60.06		20	15.7	11	9.7	
		LOAD =	352.4						
		DISTANCE =	1.0748						

Draft computerized by______

Inspection Services, Inc.

Checked By _________

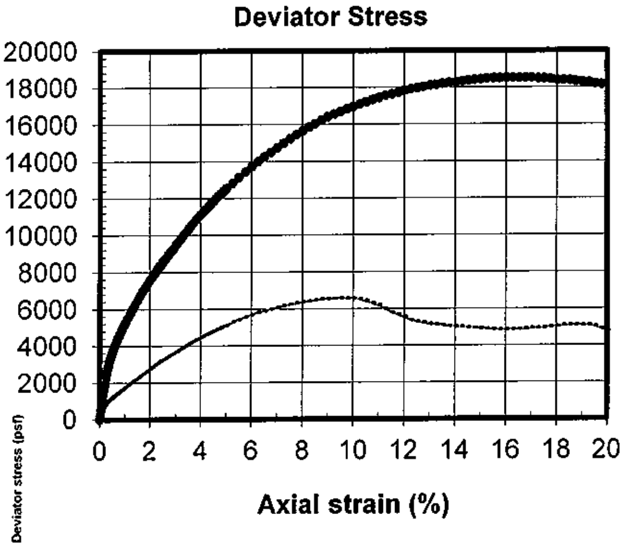
Boring Number	BH-161				BH-161	
Sample Number	8				8	
Depth (ft)	72				72	
Date Tested	04/22/20				04/23/20	
Description	Greenish gray silt with sand				Greenish gray silt with sand	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.49	5.46			5.49	5.40
Diameter (in)	2.39	2.38			2.39	2.36
Height/Diameter Ratio	2.30				2.30	
Total Weight (g)	844.27	846.99			845.08	822.87
Moisture Content (%)	21.02	21.41			21.51	18.32
Moisture Content From	1/2 of sample, cut				entire sample	
Wet Density (pcf)	130.86	132.96			130.71	133.32
Dry Density (pcf)	108.13	109.51			107.57	112.68
Area (cm^2)	28.88	28.66			28.94	28.11
Total Volume (cc)	402.76	397.66			403.61	385.31
Void Ratio	0.5588	0.5391			0.5669	0.4958
Saturation (%)	101.6	107.2			102.4	99.7
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.98	
Total Back Pressure (psf)	11520				5760	
Rate of Strain (%/min)	0.05				0.05	
Axial Strain at Failure (%)	9.51				16.78	
Effective Consolidation Stress (psf)	1440				7200	
Major Effective Stress at Failure (psf) σ1	8042				25715	
Minor Effective Stress at Failure (psf) σ3	1460				7188	
Deviator Stress at Failure (psf)	6582				18526	
Pore Pressure at Failure (psf)	-20				12	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	

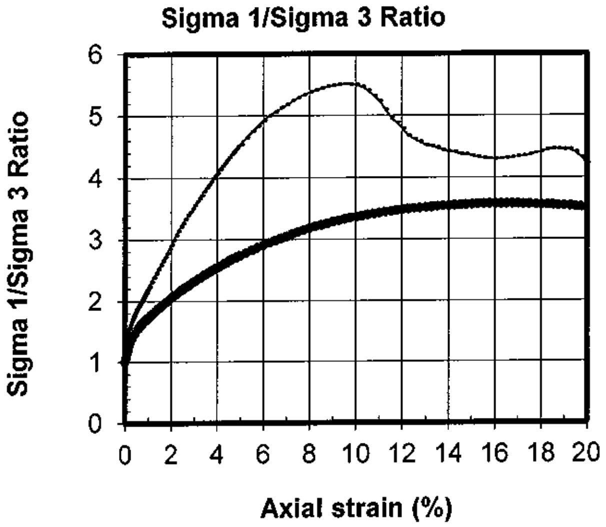
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 7161		
Classification Based On	Plasticity index,		Plasticity index,
Liquid Limit	33		
Plastic Limit	26		
Remarks			

The following information is the same for all samples	
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-161**	Sample #: **8**
Project: **BSVII**	Depth (ft): **72**	
Project #: **507385606**	Soil: **Greenish gray silt with sand**	

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**





Failure Criteria Maximum Effective $\sigma1 / \sigma3$ ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	6582	9.51	5.49	2.39	21.02	130.9	108.1	0.559	101.6	2.70	0.05	33	26	2.3
dot	7200	18526	16.78	5.49	2.39	21.51	130.7	107.6	0.567	102.4	2.70	0.05			2.3

Client: **Mott MacDonald**

Boring #: **BH-161**

Sample #: **8**

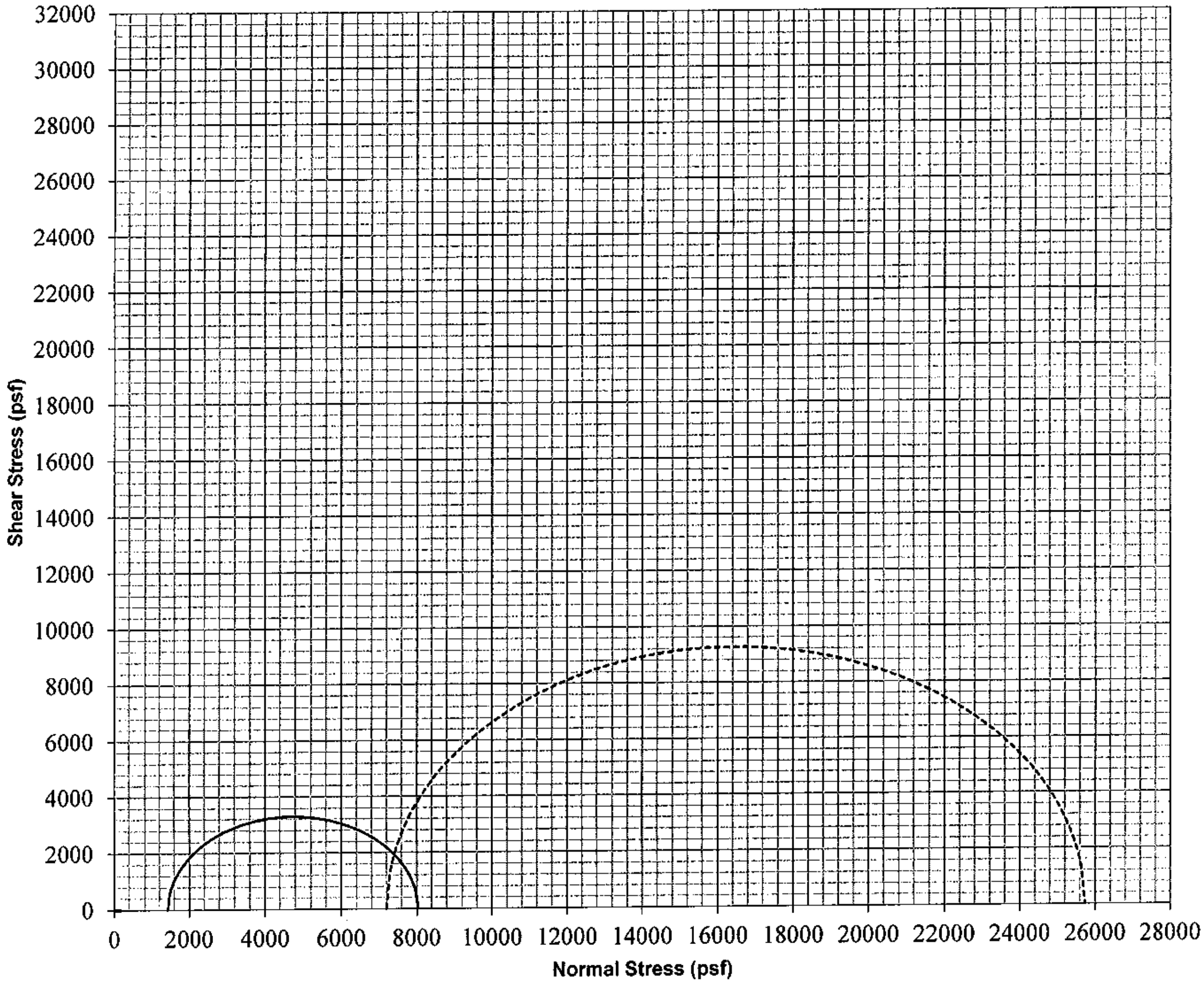
Project: **BSVII**

Depth (ft): **72**

Project #: **507385606**

Soil: **Greenish gray silt with sand**

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
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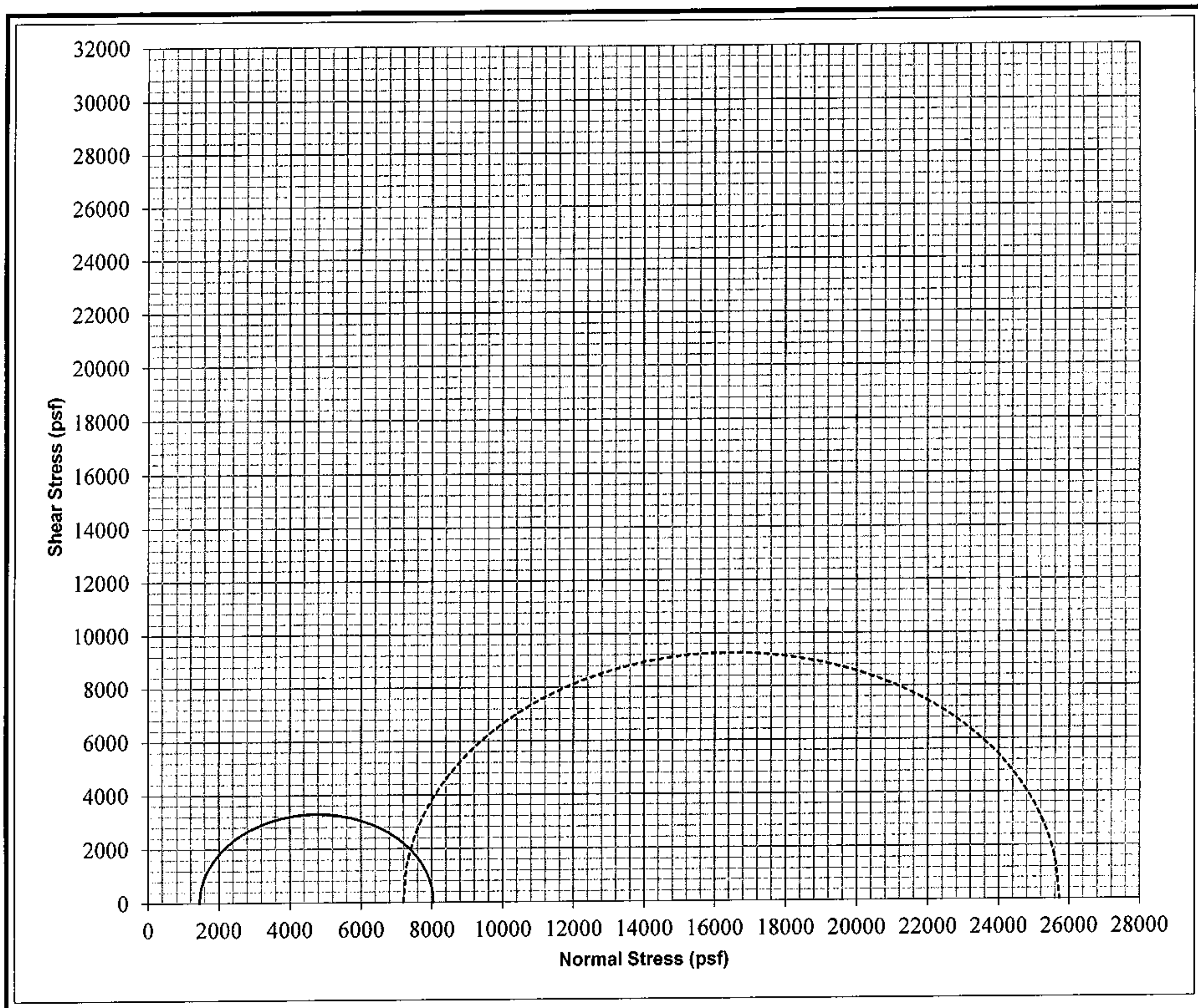
dot	7200	18526	16.78	5.49	2.39	21.51	130.7	107.6	0.567	102.4	2.70	0.05			2.3

Client:	**Mott MacDonald**	Boring #:	**BH-161**	Sample #:	**8**
Project:	**BSVII**	Depth (ft):	**72**		
Project #:	**507385606**	Soil:	**Greenish gray silt with sand**		

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
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dot	7200	18526	16.78	5.49	2.39	21.51	130.7	107.6	0.567	102.4	2.70	0.05			2.3

Client: **Mott MacDonald**	Boring #: **BH-161**	Sample #: **8**	
Project: **BSVII**	Depth (ft): **72**		
Project #: **507385606**	Soil: **Greenish gray silt with sand**		

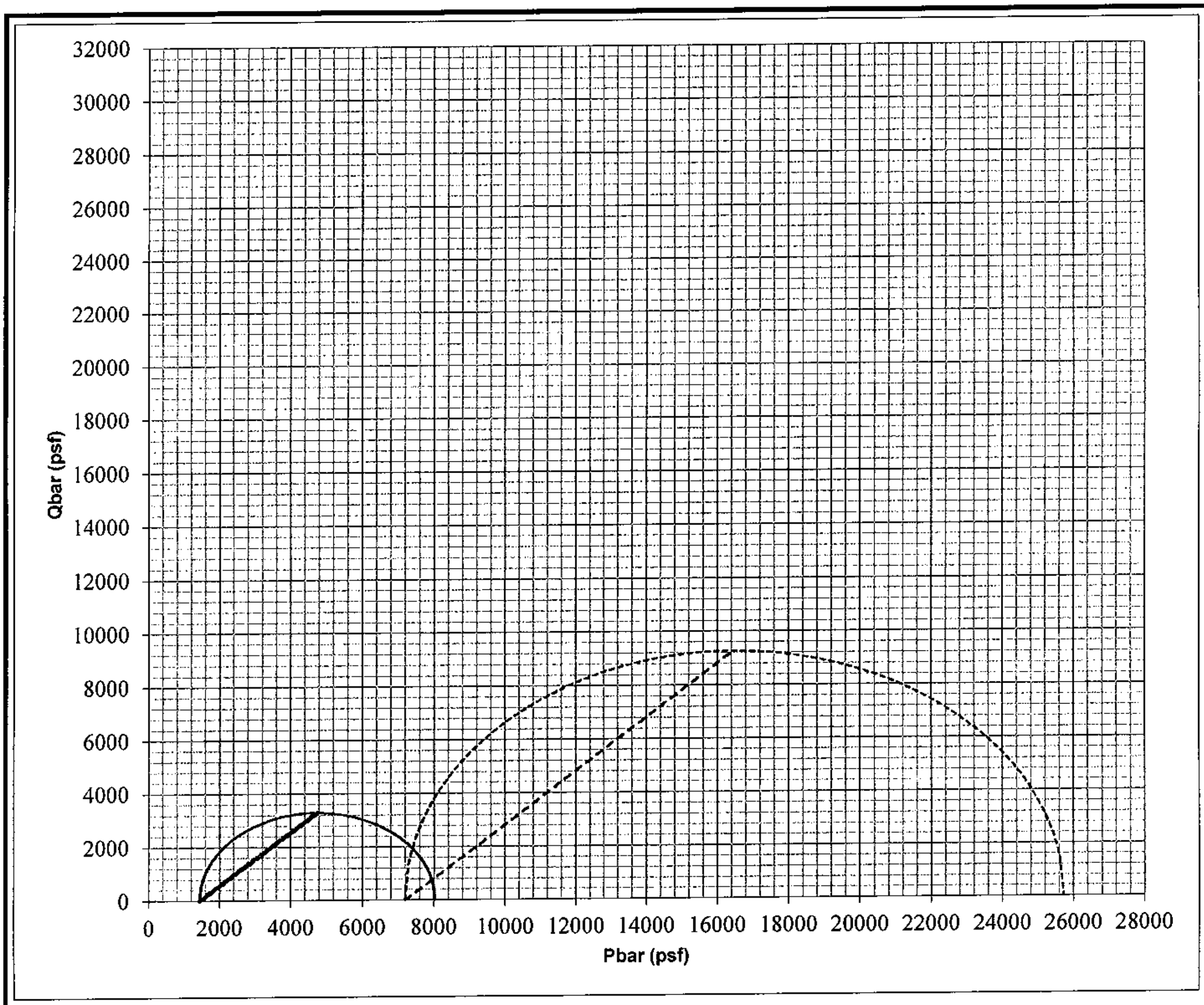
ASTM D-7161

TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED

TXCD

INSPECTION SERVICES INC.

PLATE NUMBER________



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	6582	9.51	5.49	2.39	21.02	130.9	108.1	0.559	101.6	2.70	0.05	33	26	2.3
dot	7200	18526	16.78	5.49	2.39	21.51	130.7	107.6	0.567	102.4	2.70	0.05			2.3

Client:	**Mott MacDonald**	Boring #:	**BH-161** Sample #: **8**
Project:	**BSVII**	Depth (ft):	**72**
Project #:	**507385606**	Soil:	**Greenish gray silt with sand**

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER________

Laboratory Test Data

Client: Mott MacDonald

LAB NO: G-64351

Project: BSVII

Job No.: 507385606

Boring No. BH-161 **Sample No.** 8 **Depth:** 72

Classification: Greenish gray silt with sand

Type of test: TXCD

Cell No. ______

SigC (psi) 10

		FROM COMPUTER				STATION: SHEARING STATION			
		Applied Pressure (psi)				Burette Readings (c.c.)			Valves Closed ? NO
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
4/22/2020	854	90.22	80.17		0	12.9	15.4	15.8	
	900	90.21	80.17		0.25	13	15.3	15.6	
	906	90.21	80.17		0.5	13.2	15.1	15.5	
	912	90.21	80.16		0.75	13.4	15	15.3	
	917	90.2	80.15		1	13.6	15	15.2	
	929	90.19	80.14		1.5	14	14.8	14.9	
	938	90.17	80.14		2	14.2	14.6	14.8	
	949	90.16	80.13		2.5	14.3	14.5	14.6	
	1000	90.15	80.13		3	14.3	14.5	14.5	
	1011	90.14	80.11		3.5	14.4	14.4	14.4	
	1023	90.14	80.1		4	14.4	14.4	14.4	
	1035	90.13	80.1		4.5	14.2	14.4	14.5	
	1046	90.12	80.1		5	14.1	14.4	14.5	
	1100	90.12	80.08		6	13.5	14.6	14.7	
	1129	90.12	80.07		7	13	14.7	14.9	
	1152	90.12	80.06		8	12.2	15	15.2	
	1212	90.13	80.04		9	11.4	15.4	15.5	
	1234	90.13	80.02		10	10.3	15.9	16	
	1432	90.13	80.00		15	7	17.2	17	
	1612	89.94	79.97		20	4.7	18.2	17.9	
4/22/2020	1612	89.94	79.97		20	4.7	18.2	17.9	
		LOAD =		158.2					
		DISTANCE =		1.092					

Draft computerized by______

Inspection Services, Inc.

Checked By ________

Laboratory Test Data

Client: Mott MacDonald **LAB NO:** G-64351

Project: BSVII **Job No.:** 507385606

Boring No. BH-161 **Sample No.** 8 **Depth:** 72

Classification: Greenish gray silt with sand **Type of test:** TXCD

Cell No. ______ **SigC (psi)** 50

		FROM COMPUTER Applied Pressure (psi)				STATION: SHEARING STATION Burette Readings (c.c.)			Valves Closed ? NO
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
4/23/2020	840	90.17	40.23		0	12	14	14	
	845	90.17	40.24		0.25	12.7	13.8	13.5	
	851	90.14	40.25		0.5	13.1	13.6	13.1	
	857	90.13	40.26		0.75	13.5	13.5	12.9	
	902	90.13	40.26		1	14	13.3	12.5	
	914	90.1	4.28		1.5	14.9	12.9	11.9	
	923	90.08	40.29		2	15.5	12.6	11.5	
	936	90.08	40.29		2.5	16.3	12.3	10.9	
	945	90.07	40.3		3	16.8	12	10.5	
	958	90.06	40.3		3.5	17.5	11.8	10.1	
	1010	90.04	40.31		4	17.9	11.5	9.8	
	1019	90.03	40.32		4.5	18.3	11.3	9.4	
	1032	90.02	40.32		5	18.7	11.2	9.1	
	1052	90.01	40.32		6	19.3	10.8	8.6	
	1113	90	40.32		7	19.8	10.6	8.3	
	1137	90	40.32		8	20	10.4	8	
	1203	89.97	40.33		9	20.2	10.2	7.7	
	1222	89.96	40.33		10	20.2	10.2	7.7	
	1409	89.95	40.31		15	19.3	10.2	7.7	
	1601	89.93	40.32		20	18.7	10.4	7.9	
4/23/2020	1601	89.93	40.32		20	18.7	10.4	7.9	
		LOAD =	1559.8						
		DISTANCE =	1.0803						

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Inspection Services, Inc.

Checked By __________

Boring Number	BH-175				BH-175	
Sample Number	33				33	
Depth (ft)	99				99	
Date Tested	06/13/20				06/29/20	
Description	Greenish gray sandy silt				Greenish gray sandy silt	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**	**Initial**	**After Consolidation**	**Initial**	**After Consolidation**
Height (in)	5.19	5.16			5.12	5.05
Diameter (in)	2.39	2.37			2.40	2.36
Height/Diameter Ratio	2.18				2.14	
Total Weight (g)	793.54	800.02			816.21	792.55
Moisture Content (%)	22.65	23.66			18.10	14.68
Moisture Content From	1/2 of sample, cut				entire sample	
Wet Density (pcf)	130.38	134.23			134.52	136.91
Dry Density (pcf)	106.30	108.55			113.91	119.39
Area (cm^2)	28.82	28.37			29.13	28.19
Total Volume (cc)	379.96	372.06			378.77	361.37
Void Ratio	0.5857	0.5527			0.4798	0.4118
Saturation (%)	104.4	115.6			101.9	96.2
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.95				0.97	
Total Back Pressure (psf)	7200				4320	
Rate of Strain (%/min)	0.05				0.05	
Axial Strain at Failure (%)	11.50				14.02	
Effective Consolidation Stress (psf)	2880				8640	
Major Effective Stress at Failure (psf) σ1	11225				30710	
Minor Effective Stress at Failure (psf) σ3	2888				8643	
Deviator Stress at Failure (psf)	8337				22068	
Pore Pressure at Failure (psf)	-8				-3	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 7161					
Classification Based On	Plasticity index, Visual				Plasticity index, Visual	
Liquid Limit	29					
Plastic Limit	25					
Remarks						

The following information is the same for all samples

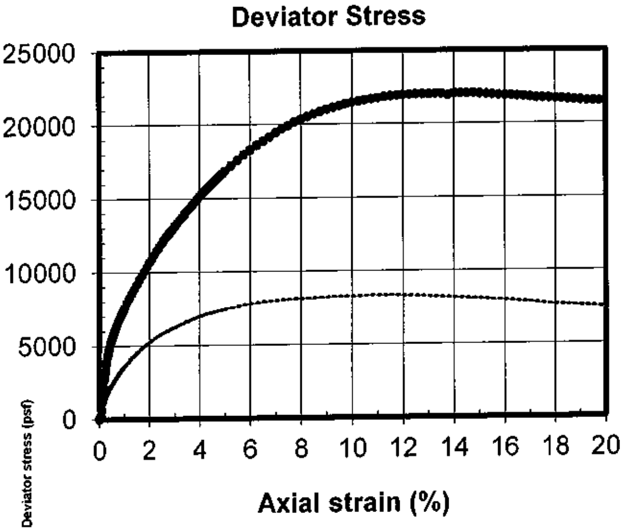
Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

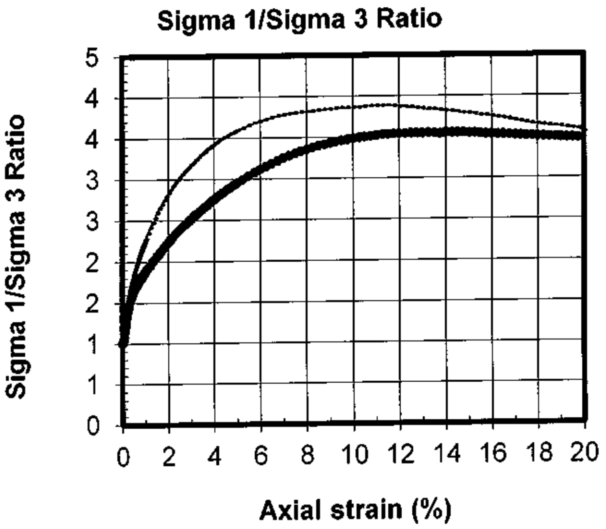
Client: **Mott MacDonald**	Boring #: **BH-175**	Sample #: **33**
Project: **BSVII**	Depth (ft): **99**	
Project #: **507385606**	Soil: **Greenish gray sandy silt**	

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER ________





Failure Criteria Maximum Effective σ1 / σ3 ratio

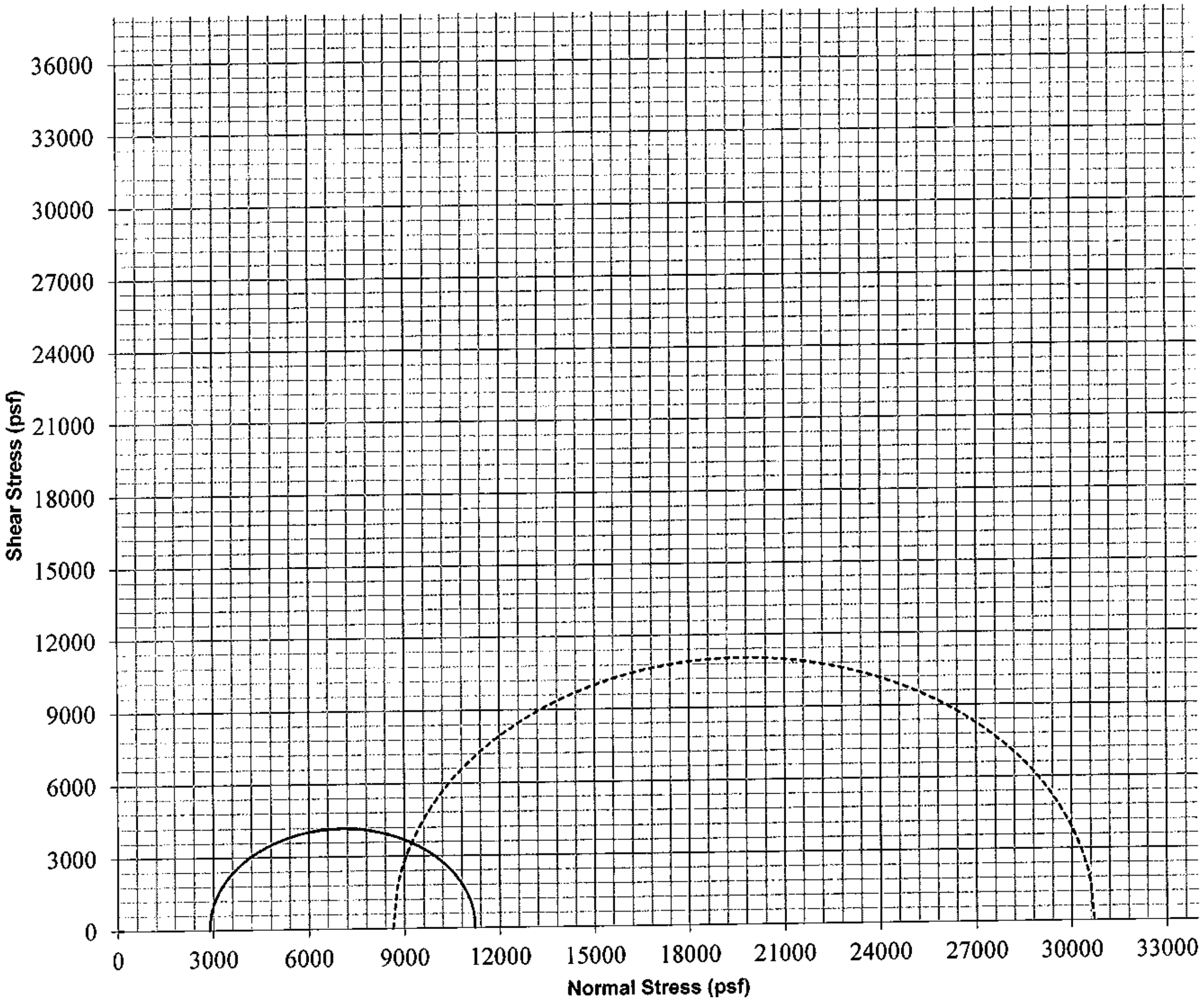
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	8337	11.50	5.19	2.39	22.65	130.4	106.3	0.586	104.4	2.70	0.05	29	25	2.2
dot	8640	22068	14.02	5.12	2.40	18.10	134.5	113.9	0.480	101.9	2.70	0.05			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-175**	Sample #:	**33**
Project:	**BSVII**	Depth (ft):	**99**		
Project #:	**507385606**	Soil:	**Greenish gray sandy silt**		

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

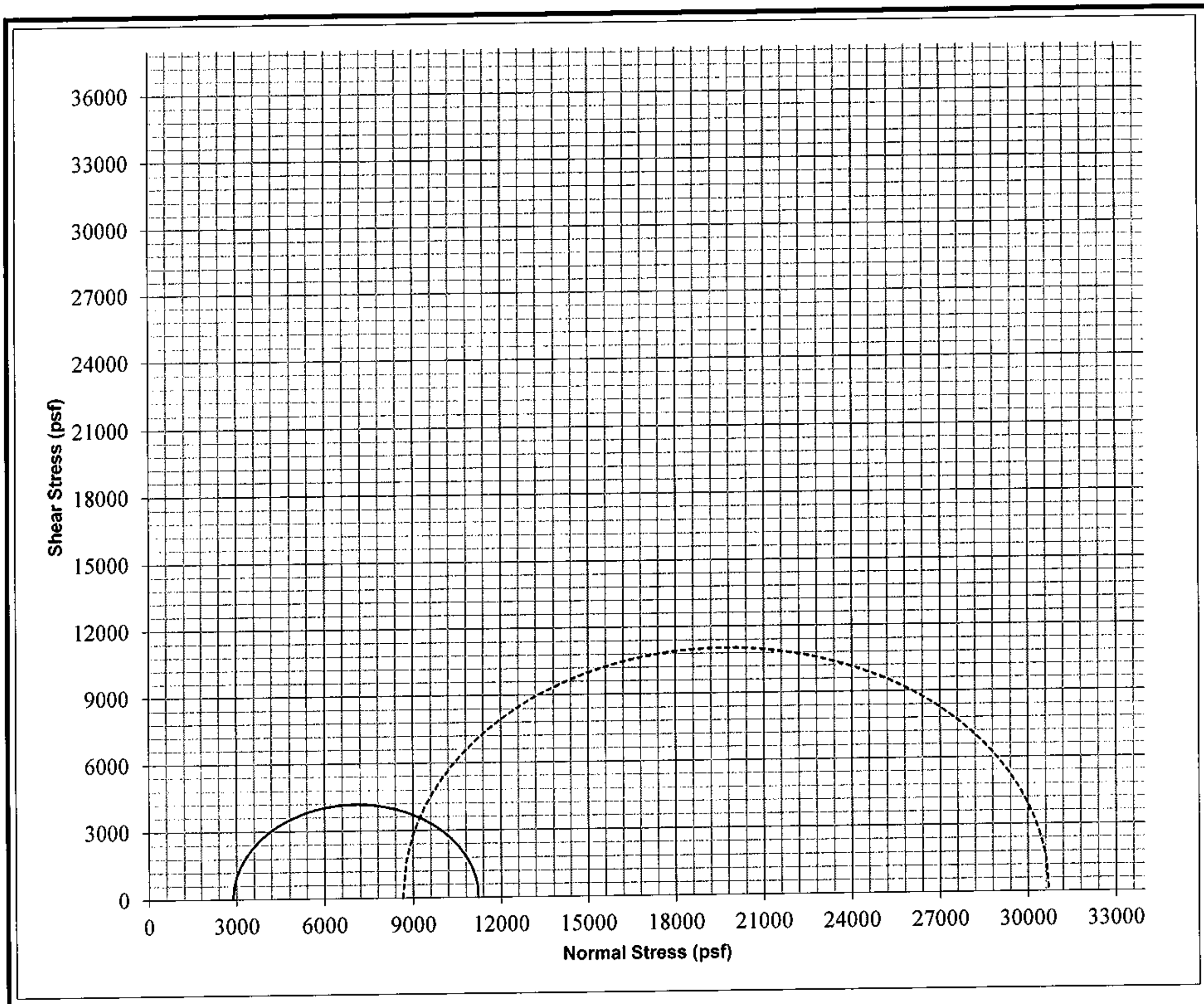
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	8337	11.50	5.19	2.39	22.65	130.4	106.3	0.586	104.4	2.70	0.05	29	25	2.2
dot	8640	22068	14.02	5.12	2.40	18.10	134.5	113.9	0.480	101.9	2.70	0.05			2.1

Client: **Mott MacDonald**	Boring #: **BH-175** Sample #: **33**
Project: **BSVII**	Depth (ft): **99**
Project #: **507385606**	Soil: **Greenish gray sandy silt**

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER________



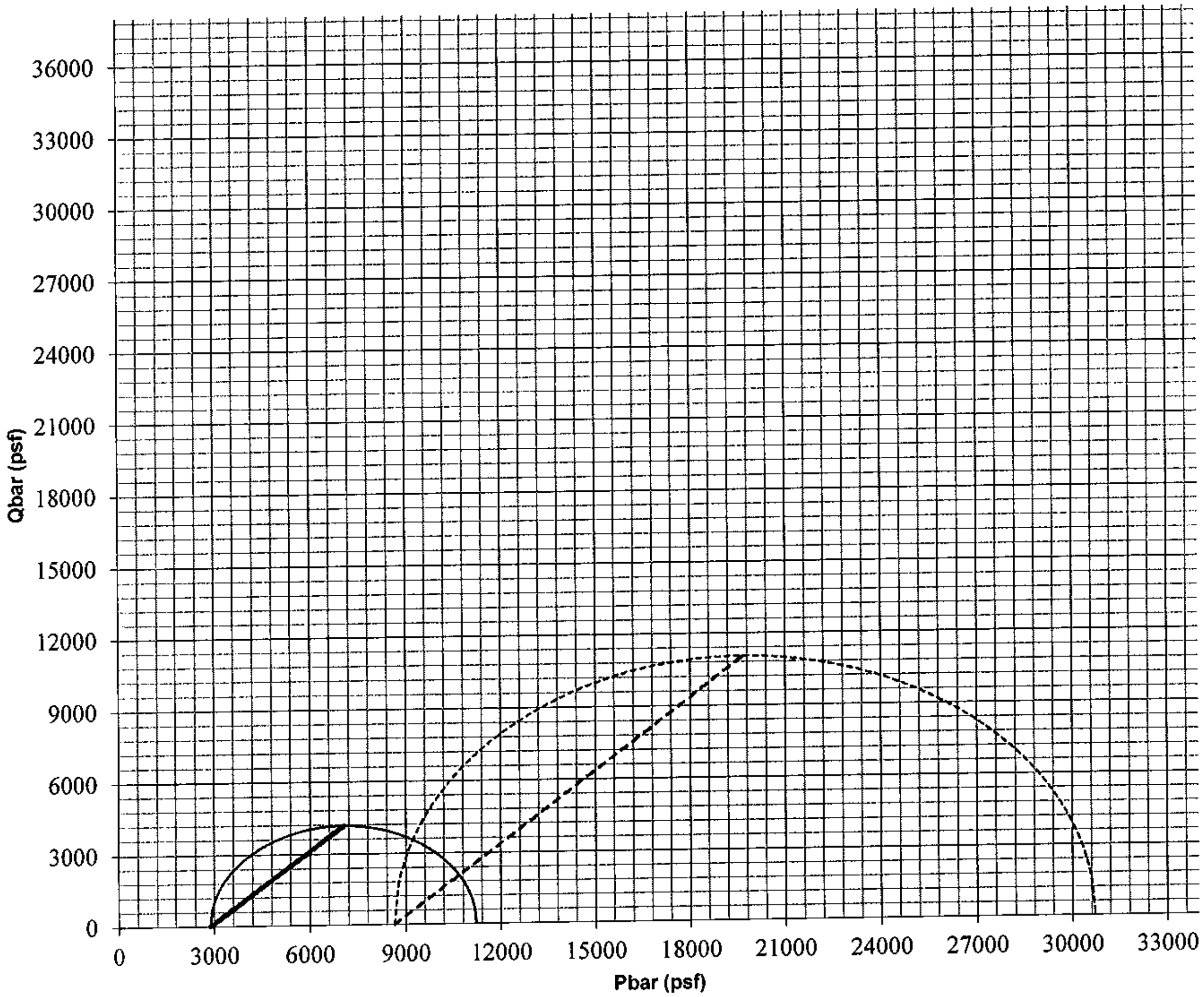
EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	8337	11.50	5.19	2.39	22.65	130.4	106.3	0.586	104.4	2.70	0.05	29	25	2.2
dot	8640	22068	14.02	5.12	2.40	18.10	134.5	113.9	0.480	101.9	2.70	0.05			2.1

Client: **Mott MacDonald**	Boring #: **BH-175**	Sample #: **33**
Project: **BSVII**	Depth (ft): **99**	
Project #: **507385606**	Soil: **Greenish gray sandy silt**	

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	2880	8337	11.50	5.19	2.39	22.65	130.4	106.3	0.586	104.4	2.70	0.05	29	25	2.2
dot	8640	22068	14.02	5.12	2.40	18.10	134.5	113.9	0.480	101.9	2.70	0.05			2.1

Client: **Mott MacDonald**

Boring #: **BH-175** Sample #: **33**

Project: **BSVII**

Depth (ft): **99**

Project #: **507385606**

Soil: **Greenish gray sandy silt**

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER________

Laboratory Test Data

Client: Mott MacDonald
LAB NO: G-64461
Project: BSVII
Job No.: 507385606
Boring No. BH-175 **Sample No.** 33 **Depth:** 99
Classification: Greenish gray sandy silt **Type of test:** TXCD
SigC (psi) 20
Cell No. ______

		FROM COMPUTER Applied Pressure (psi)				STATION: SHEARING STATION Burette Readings (c.c.)			Valves Closed ? N
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
6/13/2020	907	70.09	50.06		0	13	14	13.8	
	913	70.08	50.06		0.25	13.3	13.9	13.5	
	917	70.07	50.06		0.5	13.7	13.7	13.2	
	922	70.07	50.06		0.75	14	13.5	13	
	927	70.06	50.06		1	14.3	13.4	12.8	
	938	70.06	50.05		1.5	14.9	13.2	12.4	
	947	70.04	50.05		2	15.2	13	12.1	
	956	70.04	50.06		2.5	15.4	13	12	
	1007	70.03	50.05		3	15.6	12.9	11.8	
	1017	70.03	50.05		3.5	15.7	12.8	11.6	
	1027	70.03	50.04		4	15.7	12.7	11.6	
	1036	70.03	50.05		4.5	15.6	12.7	11.5	
	1047	70.03	50.04		5	15.5	12.7	11.6	
	1110	70.03	50.03		6	15.2	12.7	11.8	
	1127	70.03	50.03		7	14.9	12.7	11.9	
	1149	70.04	50.02		8	14.4	12.9	12.2	
	1207	70.04	50.02		9	14	13	12.4	
	1229	70.04	50.01		10	13.5	13	12.6	
	1407	70.07	50.00		15	10.8	13.5	14	
	1547	70.08	49.96		20	9.5	13.8	14.5	

END OF SHEAR RECORD INFO IN ALL GRAY BOXES

6/13/2020	1547	70.08	49.96		20	9.5	13.8	14.5	
		LOAD =	236.3						
		DISTANCE =	1.032						

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Inspection Services, Inc.

Checked By _________

Laboratory Test Data

Client: Mott MacDonald

LAB NO: G-64461

Project: BSVII

Job No.: 507385606

Boring No. BH-175 **Sample No.** 33 **Depth:** 99

Classification: Greenish gray sandy silt **Type of test:** TXCD

SigC (psi) 60

Cell No. ______

		FROM COMPUTER				STATION: SHEARING STATION			
		Applied Pressure (psi)				Burette Readings (c.c.)			Valves Closed ? N
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
6/29/2020	702	90.17	30.1		0	14.5	15.7	15	
	708	90.16	30.1		0.25	14.6	15.6	14.9	
	713	90.16	30.1		0.5	14.9	15.5	14.6	
	718	90.14	30.1		0.75	15.2	15.3	14.4	
	723	90.12	30.1		1	15.5	15.1	14.2	
	730	90.1	30.1		1.5	16.2	14.7	13.6	
	744	90.1	30.1		2	17	14.3	13.3	
	753	90.1	30.1		2.5	17.7	14	12.8	
	804	90.07	30.11		3	18.4	13.5	12.3	
	815	90.07	30.11		3.5	18.9	13.3	12.1	
	826	90.03	30.11		4	19.5	13.1	11.8	
	837	90.02	30.11		4.5	20	12.9	11.5	
	848	90.01	30.11		5	20.4	12.7	11.2	
	905	90	30.1		6	20.8	12.5	11	
	924	89.97	30.1		7	21.2	12.3	10.6	
	946	89.94	30.1		8	21.5	12	10.4	
	1007	89.94	30.1		9	21.5	12	10.3	
	1035	89.91	30.1		10	21.5	11.9	10.2	
	1237	89.88	30.07		15	20.7	12	10.2	
	1348	89.87	30.06		20	20.2	12.1	10.3	
END OF SHEAR RECORD INFO IN ALL GRAY BOXES									
6/29/2020	1348	89.87	30.06		20.01	20.2	12.1	10.3	
		LOAD =	761.8						
		DISTANCE =	1.01						

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Inspection Services, Inc.

Checked By ________

Boring Number	BH-176				BH-176	
Sample Number	8				8	
Depth (ft)	30				30	
Date Tested	08/06/20				08/07/20	
Description	Greenish gray sandy silt				Greenish gray sandy silt	
Sample Condition	Undisturbed				Undisturbed	
	Initial	**After Consolidation**			**Initial**	**After Consolidation**
Height (in)	4.97	4.93			4.97	4.91
Diameter (in)	2.39	2.38			2.40	2.38
Height/Diameter Ratio	2.08				2.07	
Total Weight (g)	739.21	728.05			776.80	766.58
Moisture Content (%)	24.96	23.07			19.77	18.20
Moisture Content From	entire sample				entire sample	
Wet Density (pcf)	126.03	126.48			131.62	133.77
Dry Density (pcf)	100.86	102.77			109.89	113.18
Area (cm^2)	29.00	28.67			29.19	28.70
Total Volume (cc)	366.14	359.34			368.44	357.74
Void Ratio	0.6712	0.6401			0.5339	0.4893
Saturation (%)	100.4	97.3			100.0	100.4
Specific Gravity	2.70				2.70	
Specific Gravity From	Assumption				Assumption	
B value Before Consolidation	0.96				0.95	
Total Back Pressure (psf)	7200				5760	
Rate of Strain (%/min)	0.05				0.05	
Axial Strain at Failure (%)	19.24				20.02	
Effective Consolidation Stress (psf)	1440				3600	
Major Effective Stress at Failure (psf) σ1	4641				9447	
Minor Effective Stress at Failure (psf) σ3	1445				3599	
Deviator Stress at Failure (psf)	3196				5848	
Pore Pressure at Failure (psf)	-5				1	
Failure Sketch	Sketch on Worksheet				Sketch on Worksheet	
	ADDITIONAL INFORMATION REQUIRED BY ASTM D 7161					
Classification Based On	Hydrometer, Visual				Hydrometer, Visual	
Liquid Limit						
Plastic Limit						
Remarks						

The following information is the same for all samples

Method for Specimen Saturation	Wet
Method used to determine Area after Consolidation	Method A
Failure Criteria	Maximum Effective σ1 / σ3 ratio

Client: **Mott MacDonald**	Boring #: **BH-176**	Sample #: **8**
Project: **BSVII**	Depth (ft): **30**	
Project #: **507385606**	Soil: **Greenish gray sandy silt**	

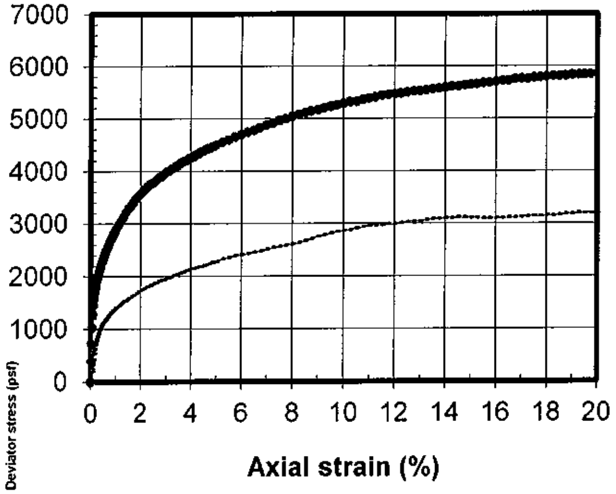
ASTM D-7161

TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED

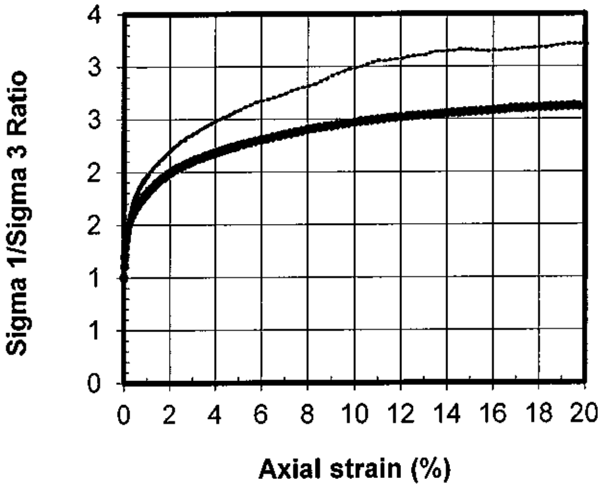
TXCD

INSPECTION SERVICES INC.

PLATE NUMBER ________



Deviator Stress



Sigma 1/Sigma 3 Ratio

Failure Criteria Maximum Effective σ1 / σ3 ratio

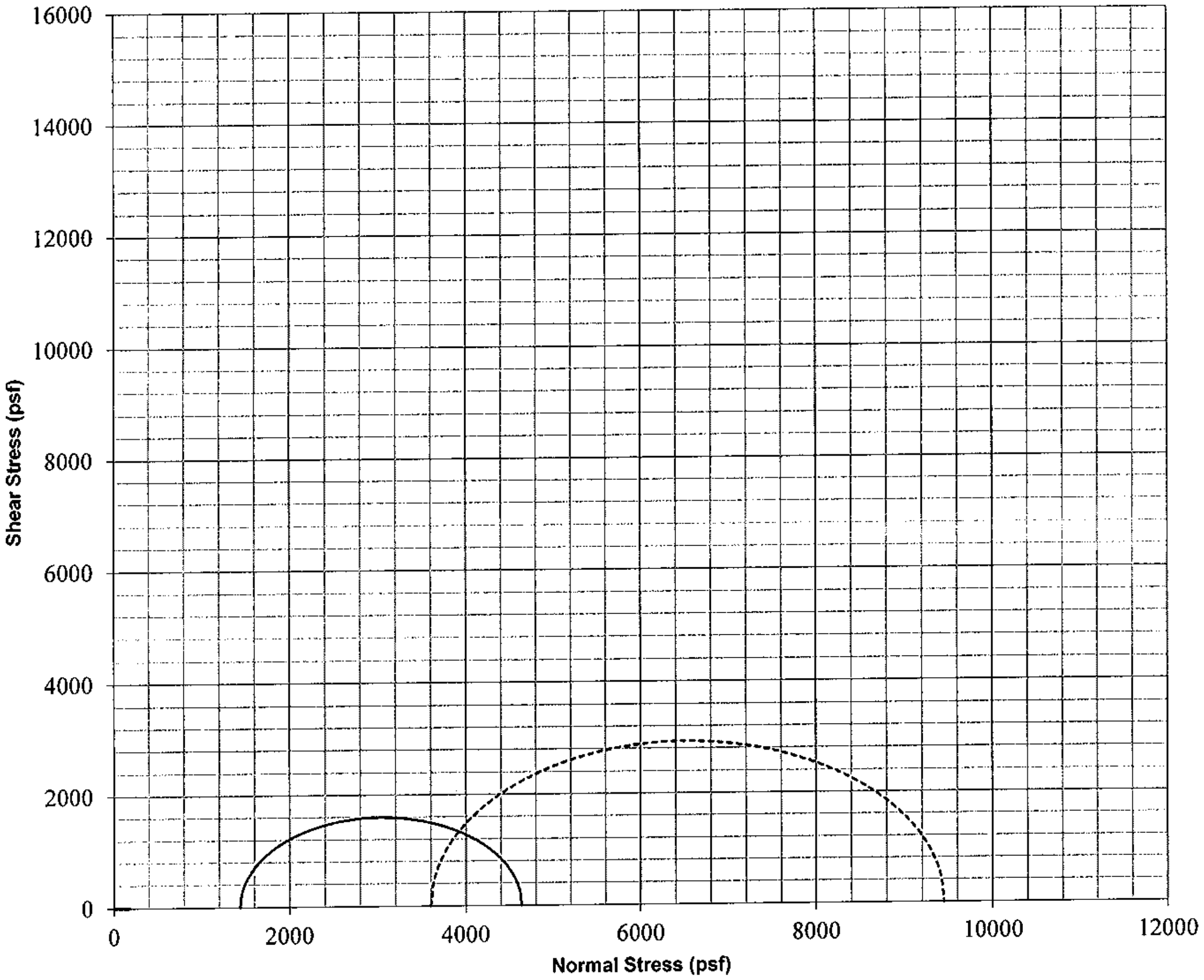
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3196	19.24	4.97	2.39	24.96	126.0	100.9	0.671	100.4	2.70	0.05			2.1
dot	3600	5848	20.02	4.97	2.40	19.77	131.6	109.9	0.534	100.0	2.70	0.05			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-176**	Sample #:	**8**
Project:	**BSVII**	Depth (ft):	**30**		
Project #:	**507385606**	Soil:	**Greenish gray sandy silt**		

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER__________



TOTAL MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

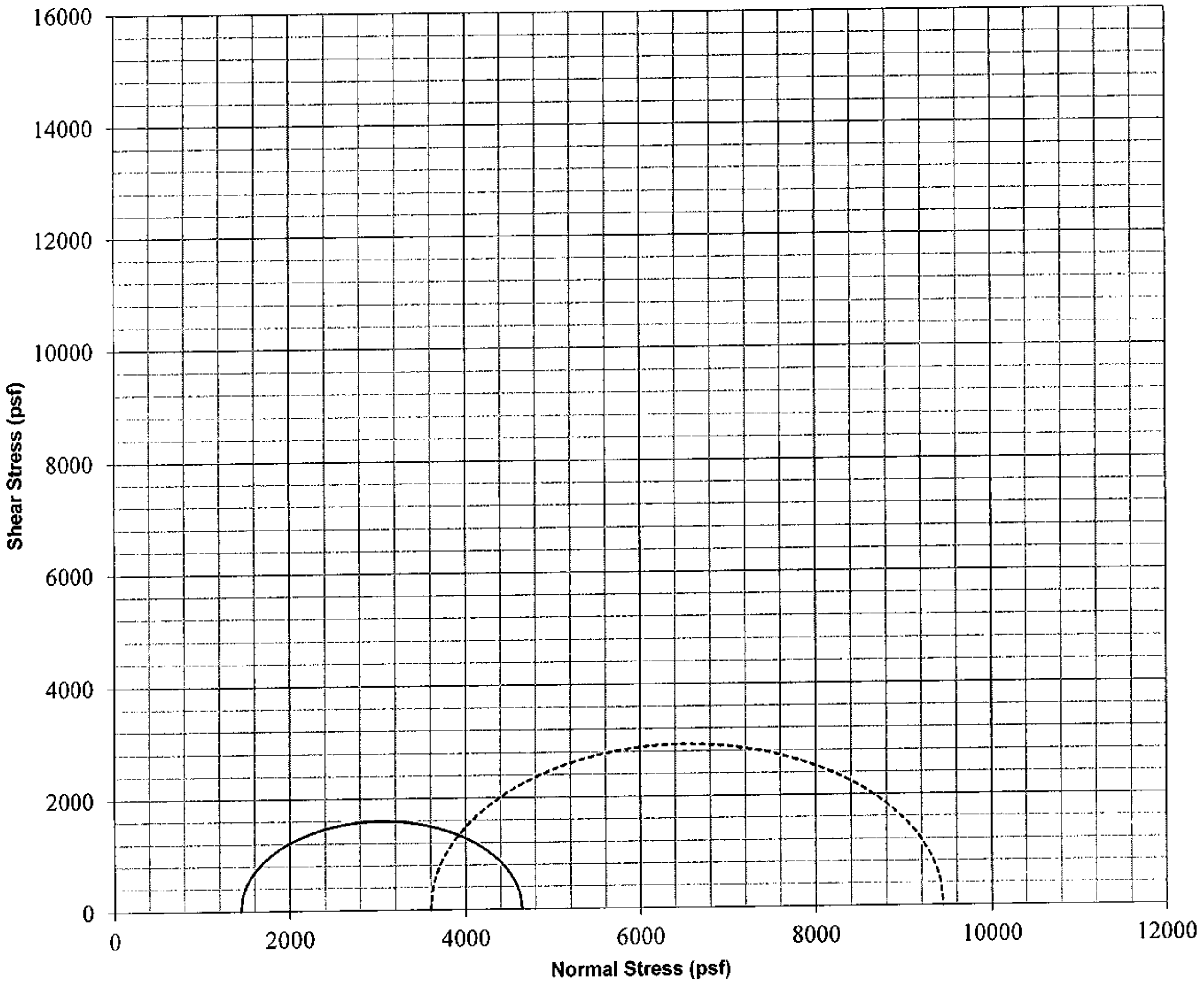
Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3196	19.24	4.97	2.39	24.96	126.0	100.9	0.671	100.4	2.70	0.05			2.1
dot	3600	5848	20.02	4.97	2.40	19.77	131.6	109.9	0.534	100.0	2.70	0.05			2.1

Client:	**Mott MacDonald**	Boring #:	**BH-176**	Sample #:	**8**
Project:	**BSVII**	Depth (ft):	**30**		
Project #:	**507385606**	Soil:	**Greenish gray sandy silt**		

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER_________



EFFECTIVE MOHR CIRCLES

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Saturation (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3196	19.24	4.97	2.39	24.96	126.0	100.9	0.671	100.4	2.70	0.05			2.1
dot	3600	5848	20.02	4.97	2.40	19.77	131.6	109.9	0.534	100.0	2.70	0.05			2.1

Client: **Mott MacDonald**

Boring #: **BH-176**

Sample #: **8**

Project: **BSVII**

Depth (ft): **30**

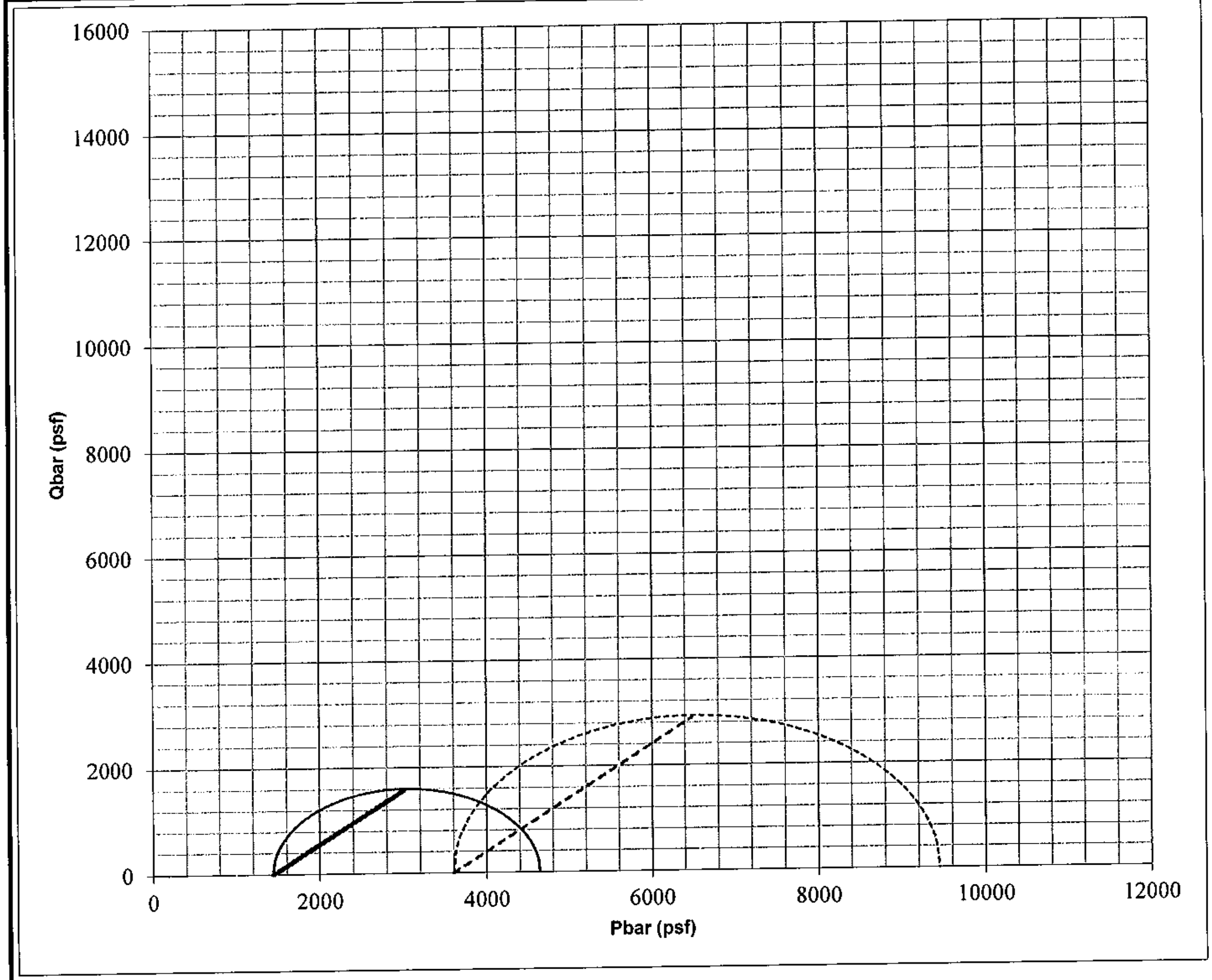
Project #: **507385606**

Soil: **Greenish gray sandy silt**

ASTM D-7161

TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED

TXCD



PQ MOHR GRAPHS

Failure Criteria Maximum Effective σ1 / σ3 ratio

Line Type	Minor Principal Stress at failure (psf) σ_3	Maximum Deviator Stress at failure (psf)	Axial Strain at Failure (%)	Initial Height (in.)	Initial Diam. (in.)	Initial Moisture Content (%)	Initial Wet Density (pcf)	Initial Dry Density (pcf)	Initial Void Ratio	Initial Satura-tion (%)	Specific Gravity (assumed)	Rate of Strain (%/min)	Liquid Limit	Plastic Limit	Height to Diameter Ratio
solid	1440	3196	19.24	4.97	2.39	24.96	126.0	100.9	0.671	100.4	2.70	0.05			2.1
dot	3600	5848	20.02	4.97	2.40	19.77	131.6	109.9	0.534	100.0	2.70	0.05			2.1

Client:	**Mott MacDonald**	Boring #: **BH-176**	Sample #: **8**
Project:	**BSVII**	Depth (ft): **30**	
Project #:	**507385606**	Soil: **Greenish gray sandy silt**	

ASTM D-7161	**TRIAXIAL COMPRESSION CONSOLIDATED-DRAINED**	**TXCD**

INSPECTION SERVICES INC.

PLATE NUMBER________

Laboratory Test Data

Client: Mott MacDonald **LAB NO:** G-64677

Project: BSVII **Job No.:** 507385606

Boring No. BH-176 **Sample No.** 8 **Depth:** 30

Classification: Greenish gray sandy silt **Type of test:** TXCD

Cell No. ______ **SigC (psi)** 10

		FROM COMPUTER				STATION: SHEARING STATION			
		Applied Pressure (psi)				Burette Readings (c.c.)			Valves Closed ? N
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
6-Aug	705	60.14	50.16		0	13	15.2	15.2	
	710	60.14	50.16		0.25	13	15	15.1	
	715	60.14	50.16		0.5	13.3	14.9	15	
	720	60.13	50.16		0.75	13.5	14.8	14.9	
	725	60.12	50.16		1	13.6	14.7	14.8	
	735	60.11	50.16		1.5	13.9	14.5	14.7	
	745	60.1	50.15		2	14.3	14.3	14.5	
	755	60.1	50.15		2.5	14.6	14	14.3	
	805	60.09	50.15		3	14.9	13.7	14.2	
	816	60.08	50.16		3.5	15.1	13.5	14.2	
	826	60.06	50.15		4	15.3	13.4	14	
	836	60.06	50.16		4.5	15.5	13.2	14	
	848	60.05	50.16		5	15.7	13	13.9	
	903	60.04	50.16		6	15.9	12.8	13.7	
	925	60.03	50.16		7	16.2	12.5	13.5	
	945	60.02	50.16		8	16.5	12.2	13.4	
	1006	60.01	50.15		9	16.6	12	13.4	
	1027	60.01	50.15		10	16.7	11.8	13.2	
	1207	59.97	50.14		15	17	11.2	13	
	1347	59.92	50.1		20	17.3	10.6	12.7	

END OF SHEAR RECORD INFO IN ALL GRAY BOXES

6-Aug	1347	59.92	50.1		20	17.3	10.6	12.7	
		LOAD =	105.3						
		DISTANCE =	0.9867						

Draft computerized by______

Inspection Services, Inc.

Checked By __________

Laboratory Test Data

Client: Mott MacDonald

LAB NO: G-64677

Project: BSVII

Job No.: 507385606

Boring No. BH-176 **Sample No.** 8 **Depth:** 30

Classification: Greenish gray sandy silt

Type of test: TXCD

Cell No. ______

SigC (psi) 25

		FROM COMPUTER				STATION: SHEARING STATION			
		Applied Pressure (psi)				Burette Readings (c.c.)			Valves Closed ? N
Date	Time	Cell	Back (bot.)	Back (top)	% STRAIN	Cell	Head	Tail	NOTES
7-Aug	658	65.15	40.14		0	10.8	18.2	18.1	
	703	65.15	40.14		0.25	11	18	17.8	
	708	65.15	40.14		0.5	11.2	18	17.6	
	712	65.14	40.15		0.75	11.5	17.9	17.4	
	717	65.14	40.15		1	11.7	17.9	17.3	
	729	65.12	40.15		1.5	12.1	17.8	17	
	740	65.12	40.15		2	12.4	17.6	16.7	
	751	65.11	40.15		2.5	12.7	17.5	16.5	
	802	65.1	40.15		3	13	17.4	16.2	
	809	65.09	40.15		3.5	13.1	17.3	16.1	
	819	65.08	40.15		4	13.3	17.2	16	
	830	65.07	40.15		4.5	13.5	17.1	15.9	
	843	65.07	40.15		5	13.7	17	15.6	
	903	65.06	40.16		6	13.9	16.8	15.4	
	920	65.06	40.15		7	14	16.7	15.3	
	940	65.05	40.16		8	14.2	16.5	15	
	1000	65.05	40.16		9	14.3	16.4	14.9	
	1020	65.04	40.16		10	14.5	16.2	14.7	
	1201	65.02	40.16		15	14.8	15.8	14.2	
	1438	64.96	40.16		20	16.3	14.8	13.1	
END OF SHEAR RECORD INFO IN ALL GRAY BOXES									
7-Aug	1438	64.96	40.16		20	16.3	14.8	13.1	
		LOAD =	181.6						
		DISTANCE =	0.9827						

Draft computerized by______

Inspection Services, Inc.

Checked By ________

R-Value Test Results

R-Value Test Locations

Table E-4. Summary of R-Value Tests

Borehole ID	Location	Northing, NAD83 (ft)	Easting, NAD83 (ft)	Elevation, NAVD88 (ft)	Sample Depth (ft)
BH-176	West Portal	1,952,544.54	6,147,277.17	65.35	2.5
BH-178	NYMF	1,953,176.32	6,146,431.66	62.43	2.5
BH-179	East Emergency Stop	1,950,048.34	6,160,894.58	80.71	3.0

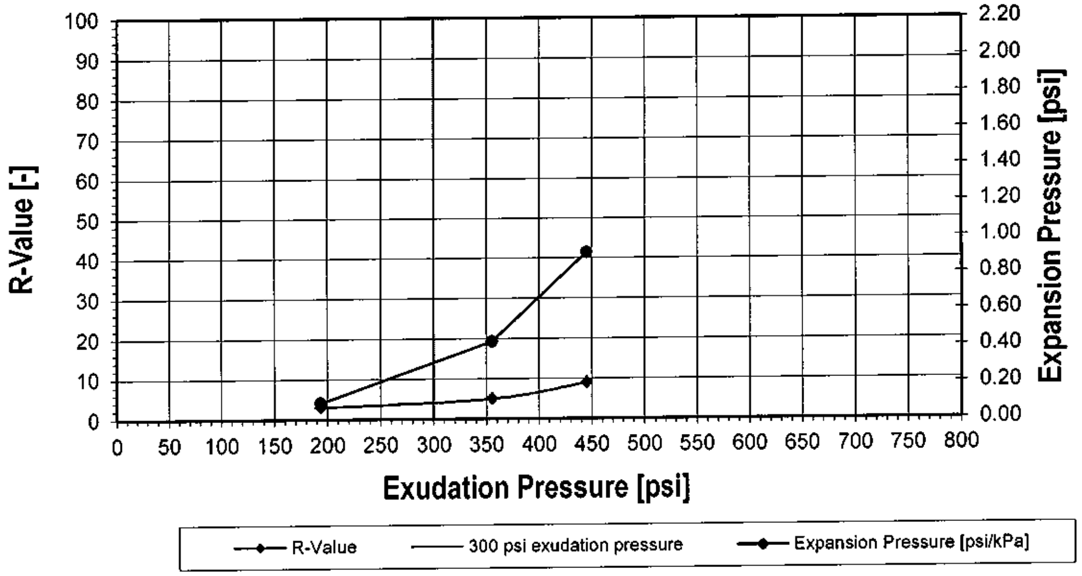
R-Value ASTM D2844 / CT301

Clients Project No.: 507385606
ISI Project No.: 2973-001.0
ISI Lab No.: G-64677

Project Name: BSVII
Client Name: Mott MacDonald
Descripton (Visual): Grayish brown clay
Boring: BH-176
Sample No.: 1
Depth (ft): 2.5

Test Date: 7/7/20
Run By: JH
Checked By: JH

Specimen #	1		2		3	
Compaction Pressure [psi/kPa]	**50**	345	**80**	552	**120**	827
Total Moisture [%]	26.2		24.0		22.2	
Density[pcf]	94.0		99.5		102.4	
Expansion Pressure [psi/kPa]	**0.09**	0.63	**0.42**	2.93	**0.91**	6.28
Horizontal Pressure at 160 psi [psi/kPa]	**151**	1041	**144**	993	**137**	945
Number of Turns D [-]	**5.40**		**5.17**		**4.96**	
Sample Height [in./mm]	**2.66**	67.6	**2.66**	67.6	**2.66**	67.6
Exudation Pressure [psi/kPa]	**194**	1335	**355**	2451	**445**	3068
R-Value [-]	2.7		5.1		7.8	
Corrected R-Value [-]	3		5		9	



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure = 5

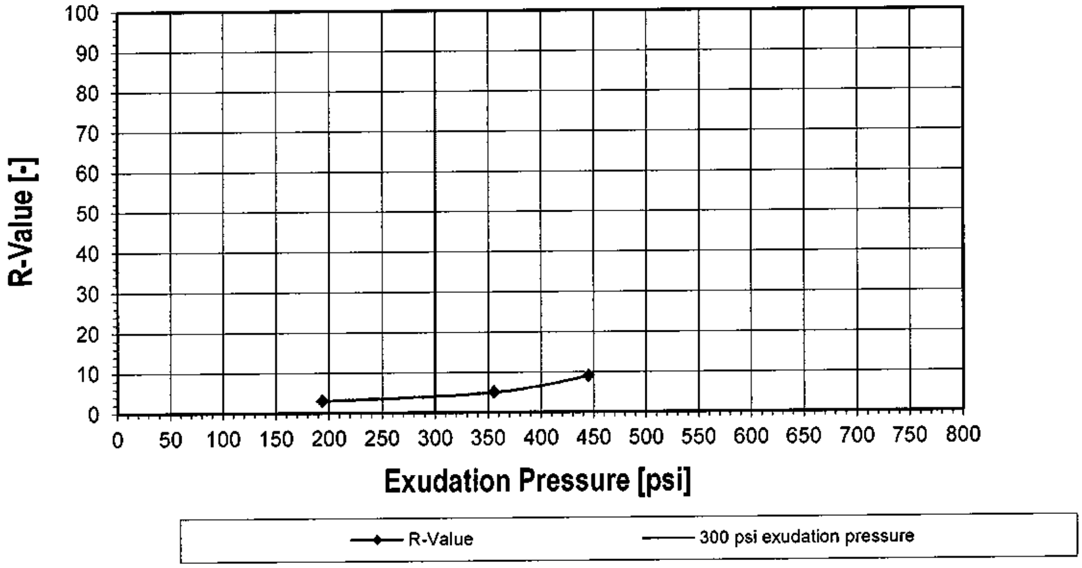
R-Value ASTM D2844 / CT301

Clients Project No.: 507385606
ISI Project No.: 2973-001.0
ISI Lab No.: G-64677

Project Name:	BSVII
Client Name:	Mott MacDonald
Descripton (Visual):	Grayish brown clay
Boring:	BH-176
Sample No.:	1
Depth (ft):	2.5

Test Date:	7/7/20
Run By:	JH
Checked By:	JH

Specimen #	1		2		3	
Compaction Pressure [**psi**/kPa]	**50**	345	**80**	552	**120**	827
Total Moisture [%]	26.2		24.0		22.2	
Density[pcf]	94.0		99.5		102.4	
Expansion Pressure [**psi**/kPa]	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00
Horizontal Pressure at 160 psi [**psi**/kPa]	**151**	1041	**144**	993	**137**	945
Number of Turns D [-]	**5.40**		**5.17**		**4.96**	
Sample Height [**in.**/mm]	**2.66**	67.6	**2.66**	67.6	**2.66**	67.6
Exudation Pressure [**psi**/kPa]	**194**	1335	**355**	2451	**445**	3068
R-Value [-]	2.7		5.1		7.8	
Corrected R-Value [-]	3		5		9	



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure = 5

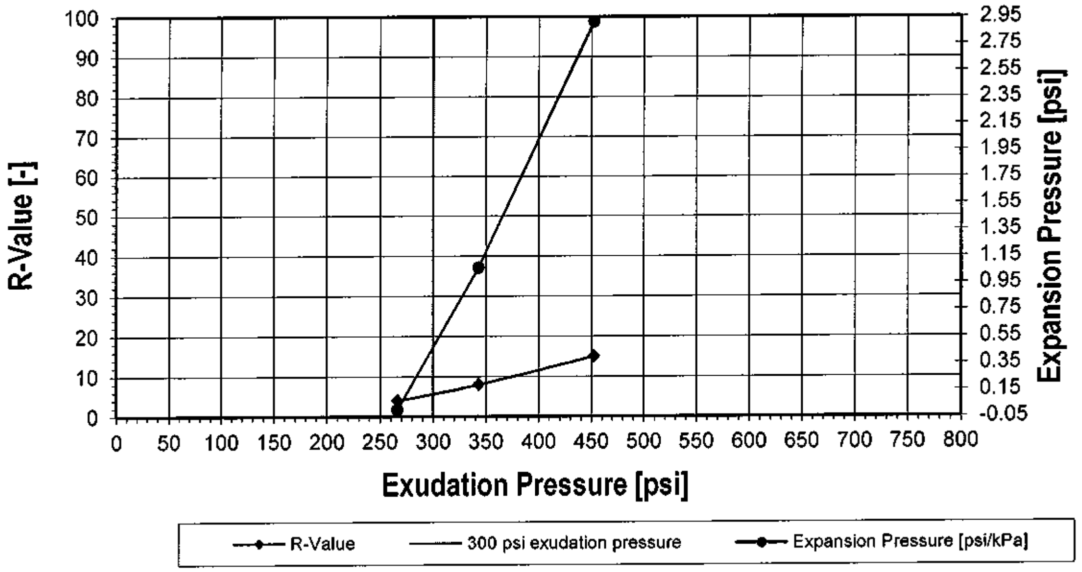
R-Value ASTM D2844 / CT301

Clients Project No.: 507385606
ISI Project No.: 2973-001.0
ISI Lab No.: G-64677

Project Name: BSVII
Client Name: Mott MacDonald
Descripton (Visual): Grayish brown clay
Boring: BH-178
Sample No.: 1
Depth (ft): 2.5

Test Date: 7/9/20
Run By: JH
Checked By: JH

Specimen #	1		2		3	
Compaction Pressure [**psi**/kPa]	**70**	483	**120**	827	**180**	1241
Total Moisture [%]	23.8		21.7		19.9	
Density[pcf]	99.2		102.3		105.2	
Expansion Pressure [**psi**/kPa]	**0.00**	0.00	**1.06**	7.32	**2.91**	20.09
Horizontal Pressure at 160 psi [**psi**/kPa]	**148**	1020	**142**	979	**126**	869
Number of Turns D [-]	**4.65**		**4.21**		**3.77**	
Sample Height [in./mm]	**2.58**	65.5	**2.60**	66.0	**2.48**	63.0
Exudation Pressure [**psi**/kPa]	**266**	1835	**343**	2365	**452**	3118
R-Value [-]	4.2		7.0		15.2	
Corrected R-Value [-]	4		8		15	



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure = **6**

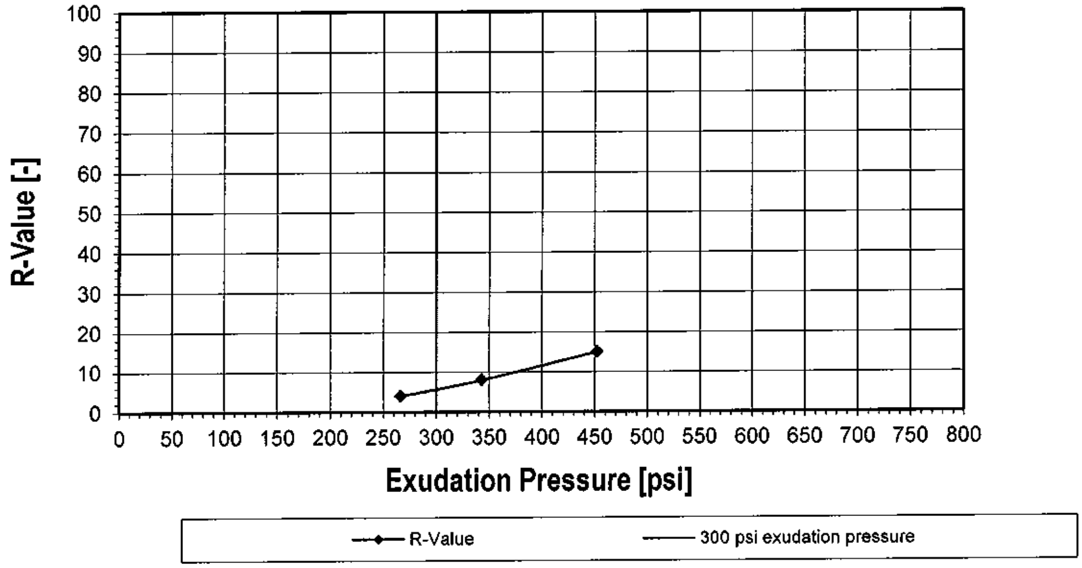
R-Value ASTM D2844 / CT301

Clients Project No.: 507385606
ISI Project No.: 2973-001.0
ISI Lab No.: G-64677

Project Name: BSVII
Client Name: Mott MacDonald
Descripton (Visual): Grayish brown clay
Boring: BH-178
Sample No.: 1
Depth (ft): 2.5

Test Date: 7/9/20
Run By: JH
Checked By: JH

Specimen #	1		2		3	
Compaction Pressure [**psi**/kPa]	**70**	483	**120**	827	**180**	1241
Total Moisture [%]	23.8		21.7		19.9	
Density[pcf]	99.2		102.3		105.2	
Expansion Pressure [**psi**/kPa]	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00
Horizontal Pressure at 160 psi [**psi**/kPa]	**148**	1020	**142**	979	**126**	869
Number of Turns D [-]	**4.65**		**4.21**		**3.77**	
Sample Height [in./mm]	**2.58**	65.5	**2.60**	66.0	**2.48**	63.0
Exudation Pressure [**psi**/kPa]	**266**	1835	**343**	2365	**452**	3118
R-Value [-]	4.2		7.0		15.2	
Corrected R-Value [-]	4		8		15	



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure = 6

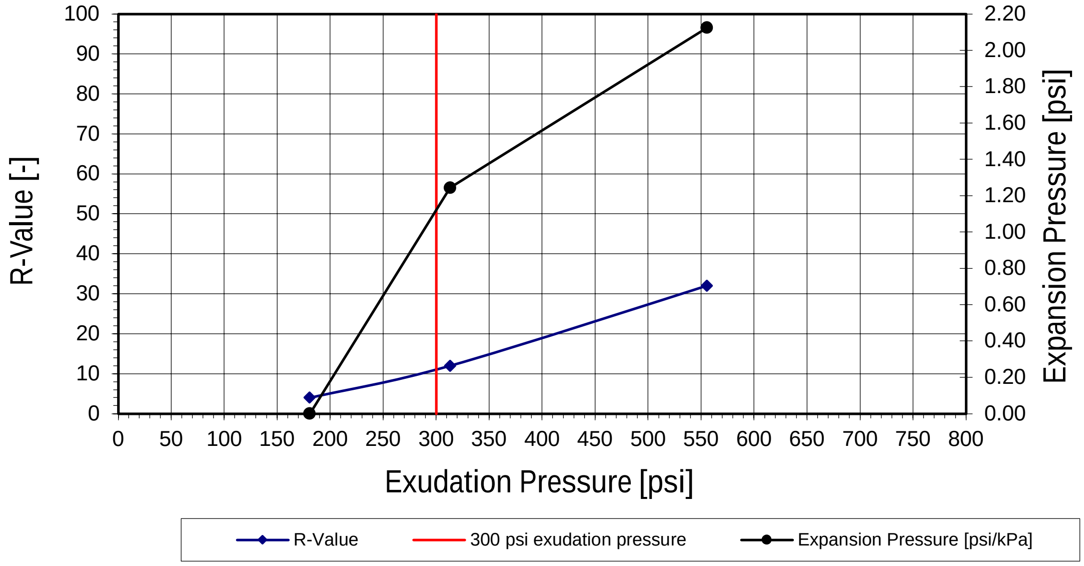
R-Value ASTM D2844 / CT301

Clients Project No.: 507385606
ISI Project No.: 2973-001.0
ISI Lab No.: G-65158

Project Name: BSVII
Client Name: Mott MacDonald
Descripton (Visual): Brown clay
Boring: BH-179
Sample No.: 1
Depth (ft): 3

Test Date: 11/19/20
Run By: JH
Checked By: JH

Specimen #	1		2		3	
Compaction Pressure [psi/kPa]	70	483	130	896	230	1586
Total Moisture [%]	17.5		15.3		14.2	
Density[pcf]	109.8		111.7		115.0	
Expansion Pressure [psi/kPa]	0.00	0.00	1.24	8.58	2.12	14.65
Horizontal Pressure at 160 psi [psi/kPa]	148	1020	132	910	98	676
Number of Turns D [-]	4.47		3.87		3.34	
Sample Height [in./mm]	2.57	65.3	2.53	64.3	2.44	62.0
Exudation Pressure [psi/kPa]	181	1246	313	2159	555	3830
R-Value [-]	4.3		12.1		32.1	
Corrected R-Value [-]	4		12		32	

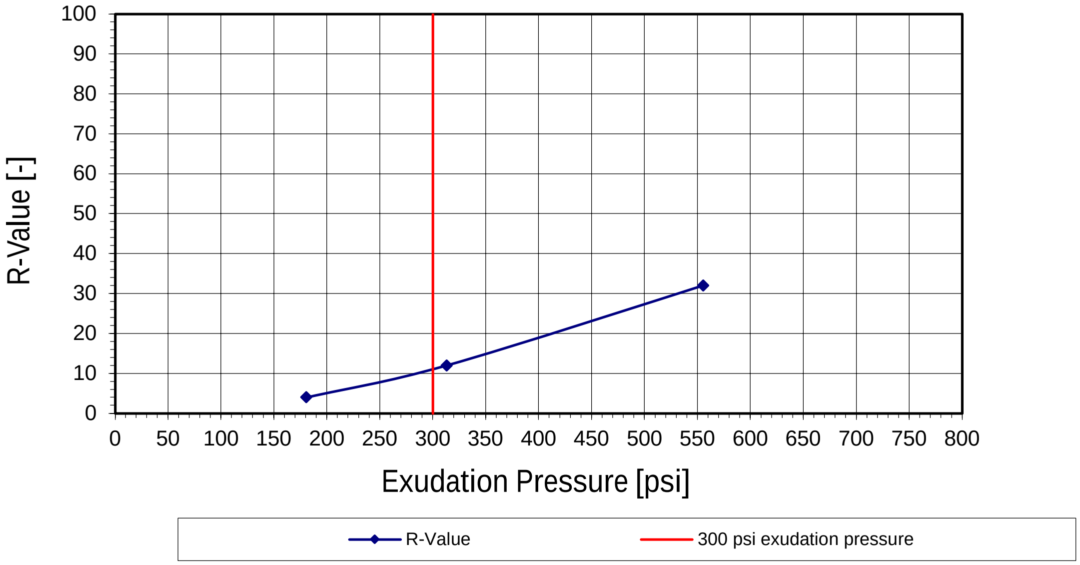


Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure = 11

R-Value ASTM D2844 / CT301

		Clients Project No.:	507385606
Project Name:	BSVII	ISI Project No.:	2973-001.0
Client Name:	Mott MacDonald	ISI Lab No.:	G-65158
Descripton (Visual):	Brown clay		
Boring:	BH-179	Test Date:	11/19/20
Sample No.:	1	Run By:	JH
Depth (ft):	3	Checked By:	JH

Specimen #	1		2		3	
Compaction Pressure [psi/kPa]	70	483	130	896	230	1586
Total Moisture [%]	17.5		15.3		14.2	
Density[pcf]	109.8		111.7		115.0	
Expansion Pressure [psi/kPa]	0.00	0.00	0.00	0.00	0.00	0.00
Horizontal Pressure at 160 psi [psi/kPa]	148	1020	132	910	98	676
Number of Turns D [-]	4.47		3.87		3.34	
Sample Height [in./mm]	2.57	65.3	2.53	64.3	2.44	62.0
Exudation Pressure [psi/kPa]	181	1246	313	2159	555	3830
R-Value [-]	4.3		12.1		32.1	
Corrected R-Value [-]	4		12		32	



Corrected R-Value at 300 psi / 2.07 MPa Exudation Pressure = 11