PRELIMINARY GEOTECHNICAL EXPLORATION

ALAMEDA POINT DEVELOPMENT

ALAMEDA, CALIFORNIA

SUBMITTED

TO

ALAMEDA POINT COMMUNITY PARTNERS, LLC

ALAMEDA, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 5687.1.001.02

APRIL 8, 2003

ENGEO INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
5687.1.001.02

April 8, 2003

Mr. Aidan Barry
Alameda Point Community Partners, LLC
950 West Mall Square
Alameda, CA 94501

Subject: Alameda Point Development
Alameda, California

PRELIMINARY GEOTECHNICAL EXPLORATION

Dear Mr. Barry:

With your authorization, we conducted a preliminary geotechnical and geologic exploration at the Alameda Point Development in Alameda, California. The purpose of our scope of work was to compile and summarize existing data for the site as well as to conduct a field exploration to identify potential geotechnical constraints and opportunities significant to the project.

In our opinion, the site development as proposed for the portion of the former Naval Air Station as shown in Figure 1 is feasible from a geotechnical standpoint. More detailed studies will be necessary at specific locations depending on the individual nature of each development area.

We are pleased to be of service to you on this project and will continue to consult with you and your design team as project planning progresses.

Very truly yours,

ENGEO INCORPORATED

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INTRODUCTION

Project Description

Alameda Point is an area located on the westerly portion of Alameda Island in the City of Alameda. Alameda Island lies along the eastern side of the San Francisco Bay, adjacent to the City of Oakland as depicted on Figure 1. The site is a portion of a former Naval Air Station that is rectangular in shape and is approximately 2 miles long and 1 mile wide. Within the Station is a major airfield (inactive), a deepwater port, ship maintenance facilities, single-family and barracks-type housing, and industrial, warehouse and recreational facilities. It is our understanding that Alameda Point Community Partners and the City of Alameda currently intend to redevelop the site approximately in accordance with the Base Re-use Plan with a mixture of housing, commercial, retail, marine-related facilities, and open space uses. A conceptual plan for public transportation in the form of a gondola system connecting Alameda Point with the BART system in Oakland is currently under study by others.

The area encompassing Alameda Point was historically a combination of submerged lands, tideland, and dry land. Much of this portion of Alameda Island was formerly part of San Francisco Bay until the early 1900s when reclamation began in the area. The site was gradually filled using hydraulically-placed dredge spoils from the surrounding San Francisco Bay, the current Seaplane lagoon, and the Oakland Channel. Figure 3 illustrates the major reclamation events that occurred in the creation of the landmass. The area was commissioned by the Navy at the onset of World War II but later decommissioned in 1997. Because of the industrial nature of activities performed at the former Naval Air Station, an environmental effort is currently underway by the Navy, including soil and groundwater remediation activities, which will be completed before the Navy permanently abandons the site.

Scope of Services

The scope of our services included the following:

- Review of relevant geotechnical and geological data from previous reports prepared for the Alameda Point site (approximately 100 documents) that included historical information, subsurface data, maps, and boring logs.
- Conducting 20 cone penetration soundings and 6 soil borings to supplement existing data in several site-specific areas of interest (Figure 4), as well as performing laboratory test work to characterize soil properties from the given soil borings.
- Compilation of subsurface geotechnical data consisting of tabulating pertinent geotechnical data from each boring or monitoring well location (e.g. fill thickness, depth to top and bottom of Bay Mud, rate of consolidation of compressible material, and any other data that appeared to be significant).
- Comparison of newly acquired information with previous findings.
- Development of a series of maps, overlays, and cross sections of the relevant data for the proposed project depicting important opportunities and constraints.
- Providing preliminary assessments and recommendations based on the currently proposed development plans.

Report Review

ENGEO Incorporated reviewed approximately 100 engineering reports furnished by the United States Navy covering much of the original military development of the site from 1947. These reports were stored and catalogued by the Naval Facilities Engineering Command.

Each report was reviewed for pertinent information such as boring log and laboratory test data. In order to develop an understanding of the subsurface conditions and possible geotechnical constraints across the island, we segregated subsurface data into the following three general categories: (1) thickness of fill; (2) thickness of young Bay Mud; and (3) thickness of other older bay deposits.

SITE GEOLOGY AND SEISMICITY

Various historical processes have formed the recent geology of the Alameda Point area and the topographic configuration and lithological variation of the landmass. A relatively thorough appreciation of the complex geological history of the site is important in trying to interpret and correlate between relatively widely spaced subsurface borings. A summary of the regional and local geology of Alameda Point follows.

Regional Geology

The San Francisco Bay Valley and the peripheral hill system which encloses it, in association with two main fault structures (the San Andreas and Hayward rift zones), make up the main geological features of the bay region. Diverse crustal movements within this system control the morphology and structural stability of the area.

Because of its close proximity to the Pacific Ocean, the Bay Area's hydrologic, and thus, sedimentologic, conditions are dominated by relative sea level fluctuations and changes in the rate of precipitation. The Bay Area has experienced four episodes of intense erosion followed by four periods of massive deposition in recent geologic history. This process has resulted in the removal of large amounts of bedrock that have been subsequently covered by Pleistocene sediments to considerable depths. We are currently in an interglacial period in which the earth is warming. During this warming period, relative sea level has risen and heavy sedimentation has occurred in the bay valley (the well-documented Bay Mud).

The Bay Area can thus be described as a region of depositional and erosional cyclisity with stratigraphic beds that increase in age with depth. The youngest deposits should be expected to be soft and unconsolidated, while the older horizons will be more indurated due to overburden pressure and severe in-situ weathering.

Local Geology

Alameda Point is relatively level ranging in elevation from 0 to 20 feet above mean sea level (MSL). Regional geologic mapping by Crane (1988, Figure 5) indicates that the site is underlain by Holocene alluvial deposits. Regional mapping by Helley and Lajoie (1979) maps most of the site as Holocene Bay Mud and a small area in the eastern portion of the site as Pleistocene beach sand and dune sand (Merritt Sand). In general, the stratigraphy of Alameda Point from youngest to oldest consists of (1) artificial fill, (2) Bay Mud deposits, (3) Merritt Sands, and (4) Alameda Formation. Each of these units is discussed in subsequent sections of this report.

Site Seismicity

The site is not within a State of California Earthquake Fault Hazard Zone (1982). No faults are shown on published geologic maps crossing the site (Crane, 1988; Blake, et al., 1974; Jennings, 1994; Wahrhaftig, et al., 1993; and Kahle and Goldman, 1966).

Major active faults in the region include the San Andreas and San Gregorio faults located about 12 and 17 miles to the southwest, respectively, and the Hayward and Calaveras faults located about 5 and 16 miles to the northeast, respectively, Figure 6.

The site is located within a State of California Seismic Hazard Zone (2002) as shown on Figure 7. The site is within an area mapped as having liquefaction potential.

As shown on Figure 8, portions of Alameda Point along the shoreline are mapped as having the potential for inundation by a tsunami (Ritter and Dupre, 1972). This map is based on a 20-foot-high wave runup at the Golden Gate Bridge which would be of similar size to the tsunami that struck Crescent City, California, in 1964. It should be understood that this tsunami wave would dissipate as it moves through the bay so that the wave height at the shoreline of the site would be considerably smaller and projected to impact only that area indicated on the map.

Besides inundation, tsunamis also have the potential for causing erosion and undermining trees and other vegetation. Other risks include contamination of drinking water, fires from ruptured tanks or gas lines, loss of vital infrastructure, etc.

Ground Accelerations

Ground shaking at a particular site resulting from an earthquake can be estimated from relationships between ground acceleration, earthquake magnitude, and distance from the causative fault.

For this study, a probabilistic seismic hazard evaluation has been conducted. In this analysis, a computer program (EZ-FRISK, version 4.03) was used to model the seismic setting of the region and is able to explicitly account for uncertainty relating to the following factors:

- Earthquake magnitude
- Rupture length
- Location of rupture
- Maximum possible earthquake magnitude
- Attenuation relationship

The program calculates, by summation from earthquake sources, the total average annual expected number of occurrences of an acceleration greater than each of several specified values. Once the annual probability is obtained, the probability of the level of ground acceleration being exceeded over a specified time period can be calculated by the following equation:

$$P = 1 - e^{-pT}$$

in which P is the probability of the level of ground acceleration being exceeded in T years and p is the annual probability of exceedance.

The peak horizontal ground accelerations calculated from the probabilistic seismic hazard evaluation are presented on Figure 9 where the annual frequency of exceedence (p) on the ordinate is the inverse of the average return period. Attenuation relationships developed by Boore, Joyner,

and Fumal for soft soil sites were used in our analysis. The equations give ground motion in terms of moment magnitude, distance, and site conditions for strike-slip, reverse slip, or unspecified faulting mechanisms. Site conditions are represented by the shear velocity averaged over the upper 30 meters; recommended values of average shear velocity are given for typical rock and soil sites and for site categories used in the National Earthquake Hazard Reduction Program's recommended seismic provisions. Using the relationship depicted on Figure 9, the probability of exceedence for various accelerations can be calculated for a 50- or 100-year design life using the above equation. This calculation has been made with the results presented on Figure 10. As shown on Figure 10, a horizontal ground acceleration of 0.35g is predicted to have a 10 percent probability of exceedance for a 50-year design life. Similarly, for a 100-year exposure period, a horizontal ground acceleration of 0.48g is predicted to have a 10 percent probability of exceedance. These relationships may be used for preliminary analysis. However, a site response analysis which accounts for specific Bay Mud thicknesses may be appropriate for final design.

GEOTECHNICAL EXPLORATION

Field Exploration

In addition, a limited field exploration was conducted consisting of both exploratory borings and cone penetration tests. After reviewing copies of the Navy geotechnical reports for the locations of previous exploratory borings, we selected locations for our proposed eight test borings. The two borings planned for the seaplane lagoon were replaced by two cone penetration soundings. The borings were advanced using rotary-wash auger and split-spoon sampling techniques. In cases where Bay Mud was encountered, an Osterberg-type sampler was used. Samples from the borings were tested to verify our field classifications and for a variety of properties such as moisture content, plasticity, and, in cases of Bay Mud, consolidation and shear strength characteristics. The approximate locations of the exploratory borings from the Navy's reports and from our field exploration are depicted on the Site Plan, Figure 4. Five different color symbols have been used to represent the boring locations and depths throughout the site. The data from each boring or monitoring well was manually refined to create a series of contour maps that were plotted on the current base map for the project. The logs of the six ENGEO soil borings and geotechnical test results are included in Appendix A. The borings were performed on December 11, 13, 16, 17, and 18, 2002.

Twenty Cone Penetration Test (CPT) soundings were advanced to depths between 20 and 120 feet to explore subsurface conditions. Two of the CPTs were located in the seaplane lagoon and required a barge-mounted rig. The locations of the CPT soundings were also chosen based on our review of the previous Navy exploration locations. The soundings were performed on December 3, 4, 5, 6, 9, 18, and 20, 2002. The CPT logs are presented in Appendix B.

Laboratory Testing

Following drilling, we reexamined the samples in our laboratory to confirm field classifications. Representative driven samples and bulk samples recovered from our borings were tested for the following physical characteristics:

CHARACTERISTIC	TEST METHOD	LOCATION OF RESULTS WITHIN THIS REPORT
Natural Unit Weight	ASTM D-2216	Appendix A
Natural Moisture Content	ASTM D-2216	Appendix A
Atterberg Limits	ASTM D-4318	Appendix B
Grain Size Analysis	ASTM D-422	Appendix B
Consolidation	ASTM D-4186	Appendix B
Direct Shear Strength	ASTM D-3080	Appendix B
Unconfined Compressive Strength	ASTM D-2166	Appendix B
Triaxial Test - UU	ASTM D-2850	Appendix B

Laboratory test results from samples recovered within the Alameda Point site are included in Appendices A and B as noted above.

Subsurface Stratigraphy

In general, artificial fill was encountered throughout the Alameda Point site. The fill generally varies in thickness throughout the site. The fill thickness was greatest in the southeastern and northwestern portions of the site. Young Bay Mud was encountered beneath the fill to the north of the seaplane lagoon with the greatest thickness, approximately 100 feet, occurring in an east-west direction in the vicinity of West Midway Avenue (Section A-A', Figure 15). A thin lens of Young Bay Mud was also observed beneath the fill in the southeastern corner of the site.

Merritt Sands and the San Antonio formation sands were found directly beneath the fill in the southeastern portion of the site (approximately 60 to 70 feet in thickness) and dipping beneath the Young Bay Mud to the north and the west. As can be seen in Section B-B' on Figure 15, the

Yerba Buena Mud lies beneath the San Antonio formation. A brief description of each of these materials is included as follows.

Artificial Fill. As a consequence of the land reclamation and prior construction activities at Alameda Point, a highly heterogeneous surficial layer of fill material exists on the surface. The fill material is composed of a mixture of sand, gravel, and clayey materials, much of which was dredged from San Francisco Bay and placed on an existing marshland. This layer can be characterized by abrupt and unpredictable changes in lithology, both laterally and vertically, in the soil profile.

In some areas, the true thickness of fill material at Alameda Point is difficult to determine because of the similarities between the fill, dredge spoils, and the underlying sedimentary deposits. Nonetheless, it is estimated that the thickness of fill material within the project ranges from 4 to 20 feet.

The density of the fill material also varies throughout the site from loose to medium dense. Because groundwater is found very close to the surface throughout the site, a significant geologic hazard is the high potential for ground failure due to soil liquefaction during large earthquakes. This could potentially occur in loosely placed sandy fill material lying below the groundwater table. As noted above, the entire site lies within areas shown to have liquefaction potential on the State of California Seismic Hazard Zone Map (2002), Figure 7. Liquefaction occurred during the 1989 Loma Prieta earthquake in numerous sites throughout the San Francisco Bay Area that were underlain by similarly loose, sandy, saturated fill materials.

Prior to the placement of the fill in the early 1900s, nearby oil refineries and manufactured gas plant operations contributed to contamination in marshlands that were located historically at the western end of Alameda Island. The placement of fill over existing vegetation in these marshlands created a thin organic-rich peat layer known locally as the "marsh crust" (Figure 11) containing elevated levels of petroleum-related chemicals such as polycyclic aromatic

hydrocarbons. Excavation in this subsurface layer is regulated by City of Alameda Ordinance 2824, dated February 16, 2002. It appears from the review of boring logs completed as part of this project that the majority of peat material found in the site stratigraphy is located in this horizon.

Bay Mud. In most portions of the Alameda Point project, Bay Mud lies directly underneath the artificial fill. The Bay Mud Deposits consist of greenish gray to blue gray soft, plastic clay and silt as well as clayey and silty sand.

The Bay Mud can be separated into two distinct units, Older Bay Mud and Younger Bay Mud. Stratigraphically, above the Older Bay Mud (sometimes separated by a thin sand interval) is Younger Bay Mud. This material is traditionally referred to as Bay Mud and is characterized by silty clay that is highly compressible existing in a soft state. This upper unit of Bay Mud is lithologically similar to the dredge spoils in the overlying horizons. Our estimate of the depth to the bottom of the Young Bay Mud is illustrated in Figure 12. Older Bay Mud, the lower unit, is characterized by being partially preconsolidated and fairly stiff due to the overburden of Younger Bay Mud and artificial fill. The Older Bay Mud is thought to have been deposited during a previous interglacial period and was preconsolidated during the following glacial stage when sea levels were lowered (CDMG, 1969).

Differential settlement problems have developed to various degrees in structures constructed at the site that are either supported directly on the fill overlying the Young Bay Mud, or by deep foundations systems that extend into the Young Bay Mud but do not penetrate into the stiffer supporting materials. These problems include the cracking of walls and slabs as well as the tilting or sagging of buildings. In the case of structures built using pile foundations supported on firmer strata below the Bay Mud layer, the ground surrounding the building has subsided. Many of the single-family residences built on the northeasterly portion of the site have reportedly been particularly affected by Bay Mud-related settlement problems.

Merritt Formation. Quaternary deposits known locally as Merritt Sand underlie the Bay Mud. This material is a beach or near-shore deposit of fine-grained clean to slightly clayey or silty sand. Many of the more heavily loaded structures on the site are supported on pile foundations founded in Merritt Sand because of its favorable strength and settlement characteristics.

San Antonio Formation. This formation is composed of alluvium deposited in environments ranging from alluvial fans and flood plains to lakes and beaches. The unit is generally moderately dense to very dense sand and stiff to hard silt and clay. At Alameda Point, the upper part of the San Antonio Formation consists of medium-grained sand containing varying amounts of silt and clay, suggesting deposition in a deltaic environment (Foster Wheeler Environmental Corp., 2002).

Yerba Buena Mud. The Yerba Buena Mud was deposited during an interglacial period and traditionally has been referred to as the Old Bay Mud, a homogeneous, widespread stratigraphic marker of the erosional surface of the underlying Alameda Formation, developed during previous glacial periods. In the vicinity of Alameda Point, the unit consists of dark greenish-gray silty clay. The clay is generally very plastic and commonly very stiff to hard. However, there is a wide range of blow counts indicating local softer zones. The unit is estimated to be 55 to 90 feet thick at Alameda Point (Atwater et al., 1977, Rogers and Figures, 1991).

Alameda Formation. Beneath the Yerba Buena Mud and extending to the bedrock are quaternary alluvial deposits of the Alameda Formation composed of continental and marine gravels, sands, silts, and clays. This formation includes both marine and non-marine deposits ranging from dense sand with lenses of gravel to lean hard clay. Regional projections suggest that the formation may be about 200 to 300 feet thick below the site area.

Franciscan Formation. Alameda Point is underlain by Jurassic and Cretaceous age Franciscan bedrock including greenstone, chert, sandstone, and shale, with serpentinite as the predominant rock type. Bedrock is estimated at approximately 400 feet below the ground surface.

Groundwater

Since a rotary wash drill was used for the borings on this project, the actual depth to groundwater was determined only where drilling was discontinued in the evening and completed the following morning at the same location where water levels were allowed to stabilize. In general, we estimate the depth to groundwater to be approximately 4 feet. Groundwater levels are expected to vary depending on factors such as weather conditions, irrigation practices, and tidal influence.

CONCLUSIONS AND RECOMMENDATIONS

Based on our interpretation of the site's subsurface conditions, the following geotechnical issues have been identified and should be addressed in a site-specific manner during the project development:

- Consolidation and settlement of the Bay Mud Layer.
- Liquefaction and seismic hazards.
- Groundwater control and corrosivity.
- Structural stability of shoreline treatments.
- Installation and design of subsurface utilities.
- Requirements for a deep foundation system for a proposed aerial tramway across the site and other heavily loaded structures.

In addition, it is our understanding that portions of the site will have to be raised in elevation to address areas within the 100-year flood plain identified by the Federal Emergency Management Agency (FEMA).

Since development plans have not been finalized for the site, the types and locations of new structures to be built are not yet known. The foundation design for future buildings and facilities, however, will have to account for the subsurface conditions described herein.

Consolidation and Settlement of the Bay Mud Layer

Portions of the project are below the 100-year flood plain and will require additional fill material in order to meet FEMA requirements. Although the exact delineation of this area has not yet been determined, the preliminary study is shown on Figure 13. Most of this area is underlain by highly compressible Young Bay Mud material. As previously mentioned, the Young Bay Mud deposits are considered highly susceptible to compression from loads imposed by fill and structures. Because the Bay Mud thickness varies, the settlement will be differential in nature and all structural design will need to accommodate the anticipated total and differential

settlements. Based on surcharge loads estimated solely from additional fills placed above existing site grades for various thicknesses of Young Bay Mud, we estimate the following total settlement below:

TOTAL ESTIMATED SETTLEMENT
RESULTING FROM NEW FILL PLACEMENT
(Settlement in inches)

Additional Fill Material (feet)	Thickness of Bay Mud (feet)				
	20	40	60	80	100
1	2	4	5	6	7
2	5	7	10	11	13
4	9	14	18	21	25
6	12	20	26	31	36

Structural loads created by proposed buildings placed on top of the additional fill material will create further settlement not represented in the above table.

Without mitigation, consolidation of the Young Bay Mud deposits will continue for a long duration (20 years or greater). To mitigate long-term total and differential settlement, a number of mitigation measures may be considered appropriate depending on the critical nature of the site improvements, as well as the magnitude of anticipated settlements. One approach that has been successfully performed on many sites in the San Francisco Bay Area is "preconsolidation" of the compressible Bay Mud layer prior to site development to reduce the future long-term settlements. In general, preconsolidation of compressible soils can be achieved by the use of a surcharge fill-loading program. A surcharge program would involve the placement of temporary fills uniformly blanketing over future building areas until the desired degree of consolidation in these areas has occurred as determined by a site-specific settlement monitoring program.

The duration period required to achieve the desired degree of settlement (typically approximately 90 percent consolidation) could vary significantly across different areas of the site. In order to

accelerate the period required for consolidation of compressible soils, the release of pore pressures in the Bay Mud can be accelerated. One approach that is employed to accelerate pore pressure dissipation is the installation of closely spaced vertical permeable drains, i.e. "wick drains," extending through the compressible Young Bay Mud layer. This approach is used in combination with the surcharge program. The actual rate of consolidation for such a program will depend on actual surcharge loads and spacing of the wick drains. The actual height of the required surcharge fill for individual building sites is dependent on the total anticipated areal loads in the building areas, including proposed fill depths and the anticipated building loads. In order to develop uniform surcharge pressure, monitoring during surcharge construction is necessary. To establish a uniform stress distribution in the Young Bay Mud, the surcharge fill should extend beyond the actual building footprints. After the desired degree of consolidation has occurred, the surcharge fill above building pad grades is removed. If special measures are performed to adequately mitigate and accelerate Bay Mud settlements, then the use of shallow foundation systems for structural support of buildings may be appropriate for smaller building footprints with light to moderate loads. For heavy building loads, the use of a deep foundation system, such as driven piles, is anticipated.

Other alternates to the surcharge and wick drain approaches to reduce the impact of consolidation on the proposed future improvements and foundations may include one of the following:

1. Supporting building foundation loads upon deep foundations (i.e. driven pile systems with structural floor systems). However, although the structural support of the building is provided by the deep foundations, near-surface elements under and surrounding the building will remain susceptible to the effects of future settlements due to increased loads. Such movements may impact utilities servicing the building, finished grades and drainage of the building site, and the performance of slabs-on-grade, pavements, and other surficial improvements at the site.

2. If nominal additional surcharge loads or only minor loads are anticipated to be imposed over areas underlain by Young Bay Mud, long-term total and differential settlements may be within tolerable limits. Such measures may include employing lightweight compensation loads to reduce potential settlements.

3. Deep Dynamic Compaction (DDC): Deep dynamic compaction is accomplished by dropping heavy weights on the ground surface to densify soils at depth, above and below the groundwater level, eliminating the need to remove and replace. The effectiveness of DDC increases with the particle size of the material to be densified and the amount of energy applied. In general, coarse-grained soils, e.g., sands, will densify more easiliy and with less weight than fine-grained soils such as clays. Soils with not more than 35 percent silt tend to be good candidates for DDC.

   The depth of improvement is related to the tamper weight and drop height, with improvement depths of 10 to 30 feet. Dynamic compaction is typically performed over a pre-determined grid pattern, with multiple passes over the grid on an offset grid common. Since grid spacing, number of drops per impact point, applied energy and number of passes depend upon soil conditions, ground response, and the dissipation of pore water pressure, comprehensive field monitoring and engineering judgment of ground response is imperative.

To determine the appropriate mitigation measures and suitable foundations, site-specific design-level geotechnical explorations should be performed to determine the local depths and extent of the Young Bay Mud deposits and the location and thickness and engineering characteristics of the supporting material.

Seismic Hazards

Large (>M7) earthquakes have historically occurred in the Bay Area and many earthquakes of low magnitude occur every year. Ground shaking from an earthquake within the design life of the structures should be expected at Alameda Point. Seismic hazards can generally be classified as primary and secondary. The primary effect is ground rupture also called surface faulting. The common secondary seismic hazards include ground shaking, liquefaction, lurch cracking, lateral spreading, and tsunamis.

Ground Rupture. The site is not within a State of California Earthquake Fault Hazard Zone and no known faults have been mapped within the site; therefore, the potential for ground rupture is considered low.

Ground Shaking. An earthquake of moderate to high magnitude generated within the San Francisco Bay Region could cause considerable ground shaking at the site. The presence of Bay Mud indicates a potential for significant ground motion amplification. Most buildings and other structures at Alameda Point were constructed prior to implementation of current seismic codes. Existing underground utility lines may be damaged from previous earthquake-generated ground motions. These hazards should be thoroughly evaluated and new facilities should be designed to current seismic standards.

To mitigate the ground-shaking effects, all structures should be designed using sound engineering judgment and the latest Uniform Building Code (UBC) requirements as a minimum. Seismic design provisions of current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead-and-live loads. The prescribed lateral forces are generally considered to be substantially smaller than the actual peak forces that would be associated with a major earthquake. Consequently, structures should be able to (1) resist minor earthquakes without damage, (2) resist moderate earthquakes without structural damage but with some nonstructural damage, and (3) resist major earthquakes without collapse but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a well-designed and well-constructed structure will not collapse or cause loss of life in a major earthquake.

Liquefaction Potential. Soil liquefaction is a phenomenon under which saturated, cohesionless, loose soils experience a temporary loss of shear strength when subjected to the cyclic shear stresses caused by earthquake ground shaking. In our opinion, the potential for liquefaction at the site ranges from low to high and correlates well with the thickness of artificial fill which is shown in Figure 15. The greater the thickness of artificial fill beneath the groundwater level, the greater the likelihood of liquefaction. We are aware of liquefaction occurrences at the former NAS Alameda resulting from the 1989 Loma Prieta. In the western portion of the former Naval Air Station, i.e.,

within the limits of the airfield, settlements of approximately several inches to a foot were reported. However, relatively little liquefaction occurred to the east of the airfield in the area occupied by most of the buildings and other related base facilities.

Mitigation of liquefaction can be accomplished by densification of the fill soils through deep dynamic compaction, particularly where the fill lies directly over the Merritt sands. Alternatively, large or heavy structures can be supported on deep foundations that extend through the potentially liquefiable soils. Smaller, lightly loaded structures such as single-family residential structures can be supported on thickened mat foundations. In the event that single-family homes are adversely impacted by differential settlement, leveling of foundations may be required. This type of leveling is generally performed using mud-jacking systems. Liquefaction could also result in damage to other improvements such as roadways and underground utilities. Without mitigation of liquefaction, repair of this type of damage should be anticipated.

Lurching. Ground lurching is a result of the rolling motion imparted to the ground surface during energy released by an earthquake. Such rolling motion can cause ground cracks to form in weaker soil materials. Proposed construction of engineered fills underlying all developed portions of the project is expected to mitigate this potential hazard.

Earthquake-Induced Densification. Densification of loose sand above and below the groundwater level during earthquake shaking could cause settlement of the ground surface. In general, the mitigation measures described under the liquefaction section are expected to address this potential hazard.

Lateral Spreading. Lateral spreading is a failure within weaker soil material that causes the soil mass to move towards a free face or down a gentle slope during earthquake shaking. Review of shoreline protection plans indicates that the shoreline may be subject to lateral spreading during a major earthquake. Our analyses indicate that approximately two feet of cumulative lateral

spreading displacement is possible along the southerly seawall and the seawall on the northerly shore of the seaplane lagoon if special stabilization methods to densify the sand or containment methods are not utilized. These analyses were based on an empirical relationship from Youd, 1993. To reduce the potential for adverse impacts from lateral spreading, we recommend that all improvements be set back at least 100 feet from the top of bank along the shoreline. Alternatively, lateral spreading mitigation should be performed such as deep dynamic compaction which has been used successfully for similar subsurface conditions on bay front sites. Other methods such as removal and replacement incorporating geogrid reinforcing have also been used to mitigate lateral spreading. Additional site specific exploration and analyses will need to be conducted to assess the viability of these proposed methods.

Tsunamis. Maps showing areas of potential tsunami inundation (Ritter and Dupre, 1972) indicate that portions of the site are within the area that would be impacted by tsunami waves having a 20-foot-high run up at the Golden Gate Bridge. The potential for tsunami impacts can be reduced by raising site grades or by constructing protective berms and sea walls. Generally, residential development is considered acceptable within a potential tsunami impact area provided warning systems and evacuation plans are developed. Improvements, such as schools, fire stations, and police stations, should not be located within a potential tsunami impact area. Additional recommendations for site planning can be found in "Designing for Tsunamis: Background Papers, March 2001 from the National Tsunami Hazard Mitigation Program (NTHMP)".

Groundwater, Dewatering, and Corrosivity

Shallow groundwater exists throughout the site. Underground utility construction and demolition of existing underground utilities will likely require dewatering. The presence of sand deposits could result in difficult dewatering conditions. In addition, the bottom and sides of deep excavations may become unstable as a result of the high groundwater level. The actual method

of stabilization will need to be determined in the field based upon the conditions encountered. In cases where dewatering is conducted above Bay Mud deposits, the removal of groundwater may cause the Bay Mud to consolidate rapidly and potentially cause uncontrolled settlements. For this situation, dewatering should be kept to a minimum and be performed as quickly as possible.

Groundwater quality may be a concern that could influence the measures that will be required for discharge of excavation dewatering. It is our understanding that contaminated groundwater exists on the site and that remedial treatment is in progress. Off hauling or on-site treatment of contaminated water could be very costly. The groundwater quality and appropriate measures for discharge of water will require further evaluation.

Lastly, Bay Mud and sand are known to be very corrosive to ferrous metals and slightly corrosive to concrete. In general, below-grade metals and concrete should be protected. The degree and method of protection should be based on pH, resistivity, chloride, and sulfate content conditions tested on samples of soil that will come in contact with these construction materials.

Shoreline Treatments

The perimeter of Alameda Point is protected by rubble-mound sea walls and rock slope revetments which require periodic maintenance and repair to maintain the integrity of shoreline protection. Three major shoreline elements exist within the project limits: the south shoreline, the bulkhead and rock slope revetments at the seaplane lagoon, and the northern shoreline.

South Shoreline. The south shoreline is approximately 2,000 feet in length. According to a report prepared by Geomatrix Consultants in 1986 for the Naval Facilities Engineering Command, no plans for the initial construction of this seawall could be located, but repairs to the wall have taken place occasionally, most notably in 1978 and 1981. It appears from reviewing this report that the westerly 500 feet of seawall are more susceptible to damage than the easterly 1500 feet due to the recurrence of repair work in this part of the wall that has taken place since

its construction. While Figure 16 shows a cross section of typical repair work recommended for the seawall in a 1986 Geomatrix report in an area outside the subject site, the sections depicts the typical shoreline conditions which occur along the shorelines within the project limits.

North Shoreline. Of the northerly shoreline, approximately 5,000 linear feet lie within the Alameda Point project limits and represent the southern limit of the Oakland Inner Harbor channel. Navy construction plans for the repair of the estuary storm sewer outfall system R1-71, dated 1977, were found in the vault storage at Alameda City Hall West. The plans illustrate general shoreline repairs consisting of placement of additional rip rap in a trapezoidal configuration, 6 feet in width at the top and averaging about 5 feet in height to protect the shoreline. Repairs at abandoned Pier 5 consisted of a sheet pile installation. Further east of Pier 5, repairs also included construction of a concrete headwall and extension of the sewer with a new 54-inch-diameter outfall pipe.

In our opinion, both shorelines will require detailed exploration and analysis to further define their current stability with respect to modern seismic criteria. Various mitigation measures are available: removing and replacing the existing bank material while reinforcing with geogrid; sheetpiles; and buried slurry walls.

Seaplane Lagoon. The seaplane lagoon consists of a rectangular basin approximately 3,000 feet by 1,600 feet. It is bordered on the north by a concrete and steel sheet pile bulkhead and on the east and west by a rock slope revetment. Four seaplane ramps extend from the north bulkhead. According to a report prepared by Moffatt and Nichol (M&N) in 2001, the northern bulkhead was reportedly in fair condition, but the need for repair work was documented. Specific maintenance issues included broken batter piles, spalling of the concrete cap, and cracking in a portion of the wall. In some sections, a separation between the wall from the upland area it supports was noted. The cost of partial demolition and repair, as described in the M&N report, was estimated at $1,000,000.

Tramway Foundation

As part of our subsurface exploration, two CPT soundings were conducted in the seaplane lagoon along the proposed alignment of the aerial tramway using a barge-mounted rig. Both of the soundings met refusal at approximately 20 feet below the bottom of the seaplane lagoon in dense sandy material. Therefore, further exploration consisting of deep rotary wash test borings will need to take place after the aerial tramway structural engineer has furnished actual design loads for the project. The subsurface conditions in Boring B7, just east of the seaplane lagoon, indicate that dense to very dense sands occur beneath the fill to depth of at least 95 feet. We anticipate that deep foundations for the tramway facilities will be founded in these deep competent deposits.

Section C-C' on Figure 14 shows a cross-section of the subsurface along the route of the proposed aerial tramway. It should be noted that any tower built next to the estuary would require a foundation system penetrating below the nearly 100 feet of Bay Mud situated at that location along the proposed tramway route. This constraint should be discussed in detail with the structural engineer for the tramway project as part of the preliminary planning process.

Utilities

It is our understanding that the existing wet and dry utilities at the site will be replaced with utilities meeting current standards. The construction of the new utilities will need to be coordinated with the mitigation of the geotechnical issues at the site. For example, portions of the site need to be raised due to potential flooding. The additional fill required to raise the site will result in settlement due of consolidation of the Young Bay mud deposits beneath portions of the site. The fill placement and consolidation should take place prior to final utility construction.

As discussed earlier, portions of the site will also require mitigation of potential liquefaction. As deep dynamic compaction is being considered as a means of mitigation, DDC should also be performed prior to final utility construction.

Additional Exploration

The currently available geotechnical data should allow the developers to proceed with the planning phases and simultaneously undertake focused, supplemental site-specific subsurface explorations requiring additional subsurface exploration in order to complete the foundation design and land development plans.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

This report is issued with the understanding that it is the responsibility of the owner to transmit the information and recommendations of this report to developers, contractors, buyers, architects, engineers, and designers for the project so that the necessary steps can be taken by the contractors and subcontractors to carry out such recommendations in the field. The conclusions and recommendations contained in this report are solely professional opinions.

The professional staff of ENGEO Incorporated strives to perform its services in a proper and professional manner with reasonable care and competence but is not infallible. There are risks of earth movement and property damages inherent in land development. We are unable to eliminate all risks or provide insurance; therefore, we are unable to guarantee or warrant the results of our work.

This report is based upon field and other conditions discovered at the time of preparation of ENGEO's work. This document must not be subject to unauthorized reuse, that is, reuse without written authorization of ENGEO. Such authorization is essential because it requires ENGEO to evaluate the document's applicability given new circumstances, not the least of which is passage of time. Actual field or other conditions will necessitate clarifications, adjustments, modifications or other changes to ENGEO's work. Therefore, ENGEO must be engaged to prepare the necessary clarifications, adjustments, modifications or other changes before construction activities commence or further activity proceeds. If ENGEO's scope of services does not include on-site construction observation, or if other persons or entities are retained to provide such services, ENGEO cannot be held responsible for any or all claims, including, but not limited to claims arising from or resulting from the performance of such services by other persons or entities, and any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

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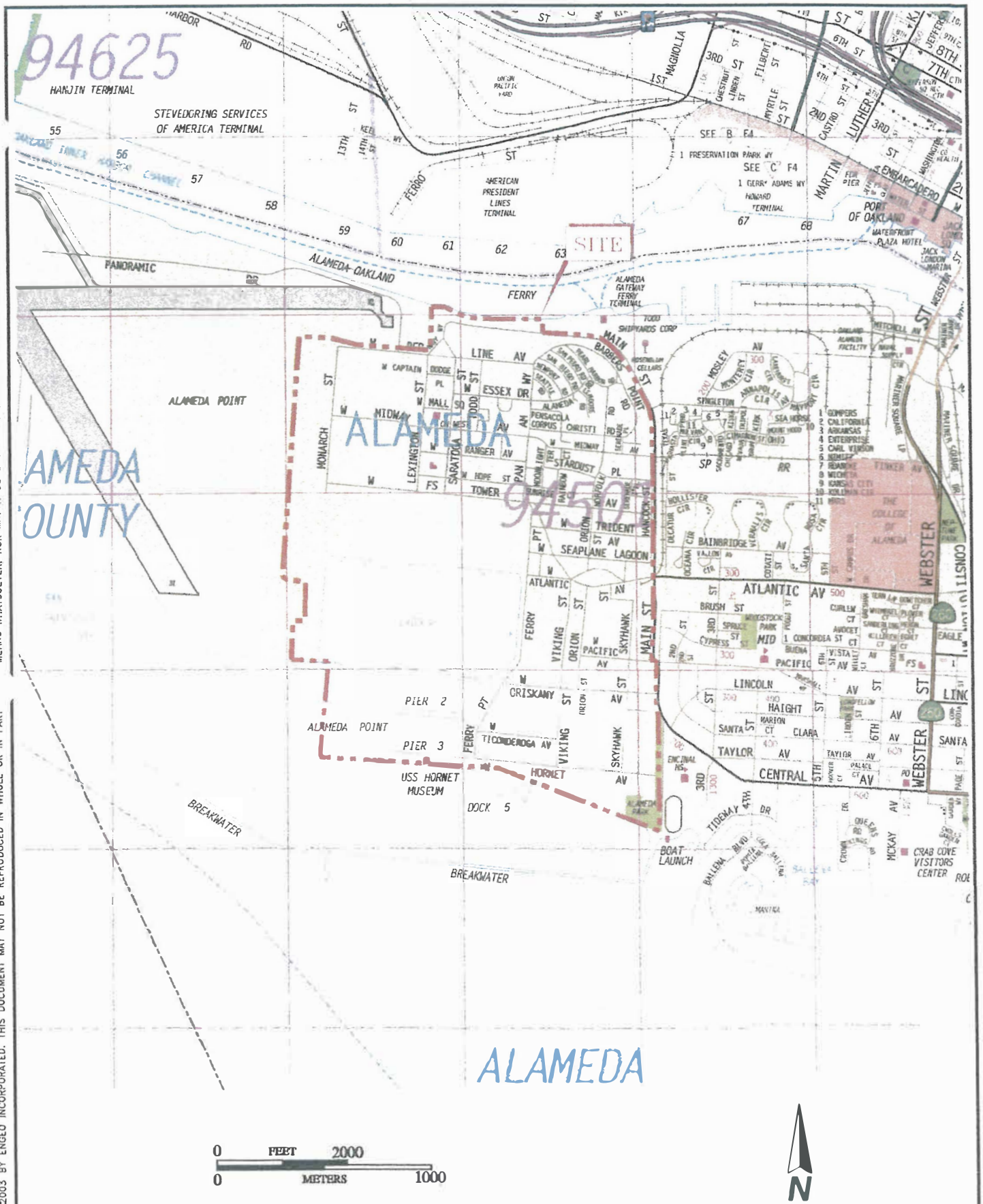
LIST OF FIGURES



BASE MAP SOURCE: THOMAS BROTHERS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE VICINITY MAP
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02	FIGURE NO. 1
DATE: APRIL 2003	
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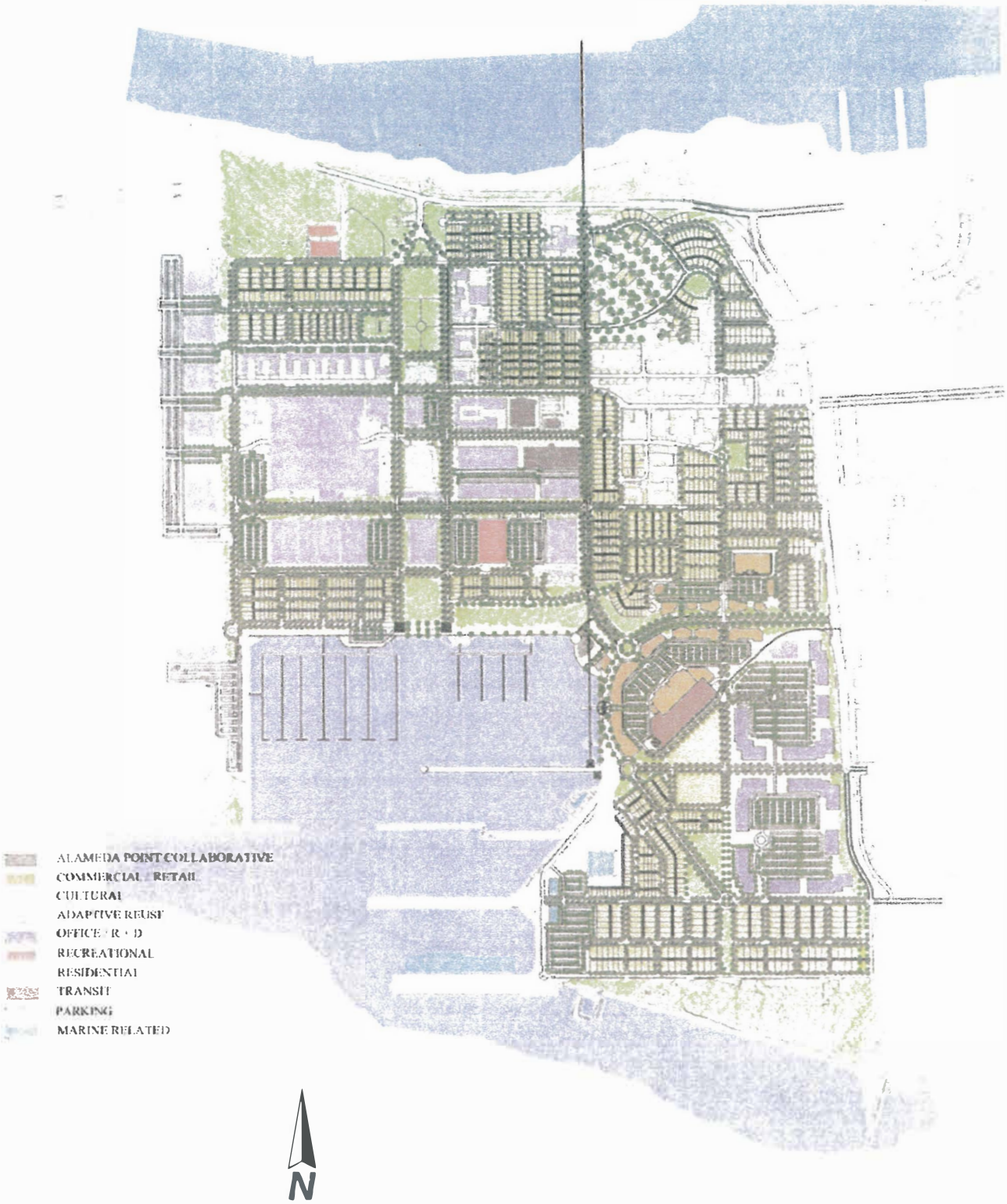

BASE MAP SOURCE: THE DAHLIN GROUP

NO SCALE

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MASTER CONCEPT PLAN

ALAMEDA POINT

ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02		FIGURE NO. 2
DATE: APRIL 2003		
DRAWN BY: CLL	CHECKED BY: DSH	

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EXPLANATION

- ORIGINAL LIMITS OF ALAMEDA ISLAND
  SOURCE: U.S COAST AND GEODEDIC SURVEY, 1859
- ORIGINAL LIMITS OF TIDAL MARSH
  SOURCE: U.S COAST AND GEODEDIC SURVEY, 1859
- FILLED LAND CIRCA 1911
  SOURCE: U.S COAST AND GEODEDIC SURVEY, 1911
- FILLED LAND, 1911–1918
  SOURCE: VAN DER NAILEN ENGINEERING, 1918
- FILLED LAND, 1918–1930
  SOURCE: MARY BETH BRANNAN, RECONSTRUCTED IN 1956
- FILLED LAND 1930–1935
  SOURCE: U.S COAST AND GEODEDIC SURVEY, 1935
- FILLED LAND, 1935–1950
  SOURCE: PRELIMINARY GEOLOGIC MAP AND ENGINEERING GEOLOGIC INFORMATION OAKLAND VICINITY, CALIFORNIA, COMPILED 1965–66, REDBRUCH AND CAV
- FILLED LAND, 1950–1960
  SOURCE: AERIAL PHOTO, 1947
- FILLED LAND, 1960–PRESENT
  SOURCE: AERIAL PHOTO, 1960

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

HISTORIC FILL MAP
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02		FIGURE NO. 3
DATE: APRIL 2003		
DRAWN BY: DLB	CHECKED BY: DSH	

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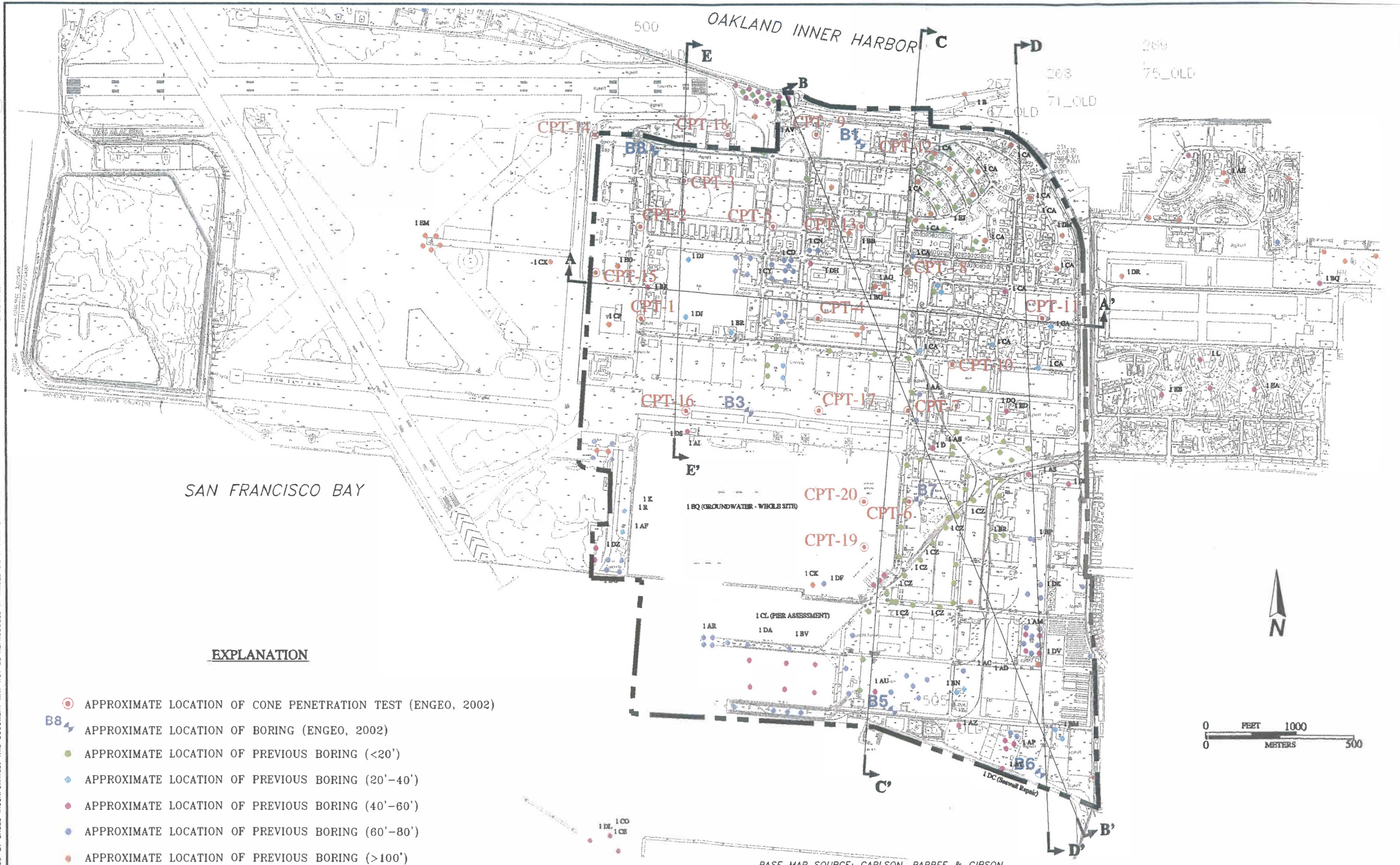

EXPLANATION

- APPROXIMATE LOCATION OF CONE PENETRATION TEST (ENGEO, 2002)
- B8 APPROXIMATE LOCATION OF BORING (ENGEO, 2002)
- APPROXIMATE LOCATION OF PREVIOUS BORING (<20')
- APPROXIMATE LOCATION OF PREVIOUS BORING (20'–40')
- APPROXIMATE LOCATION OF PREVIOUS BORING (40'–60')
- APPROXIMATE LOCATION OF PREVIOUS BORING (60'–80')
- APPROXIMATE LOCATION OF PREVIOUS BORING (>100')
- 1 AB APPROXIMATE LOCATION OF EXISTING NAVY GEX REPORT
- APPROXIMATE LOCATION OF CROSS SECTION

NOTE: BORINGS 2 AND 4 NOT DRILLED

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE PLAN WITH BORING LOCATIONS
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02
DATE: APRIL 2003
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FIGURE NO. 4

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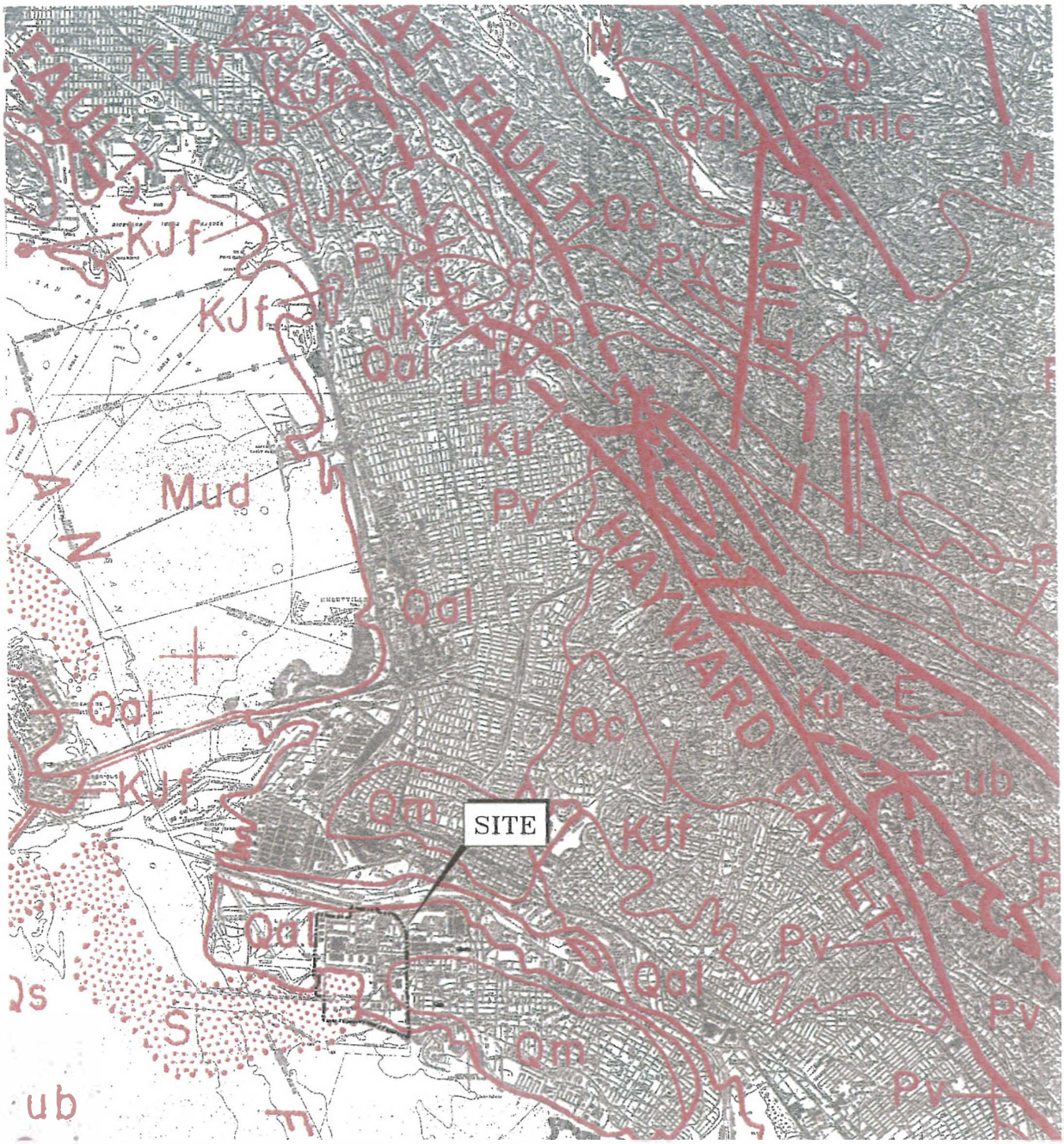

EXPLANATION

Qm — MERRITT SAND

Qal — ALLUVIUM

GEOLOGIC CONTACT (APPROXIMATE)

N

0 FEET 10000

0 METERS 5000

BASE MAP SOURCE: CRANE, 1988

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL GEOLOGY MAP

ALAMEDA POINT

ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02	FIGURE NO. 5
DATE: APRIL 2003	
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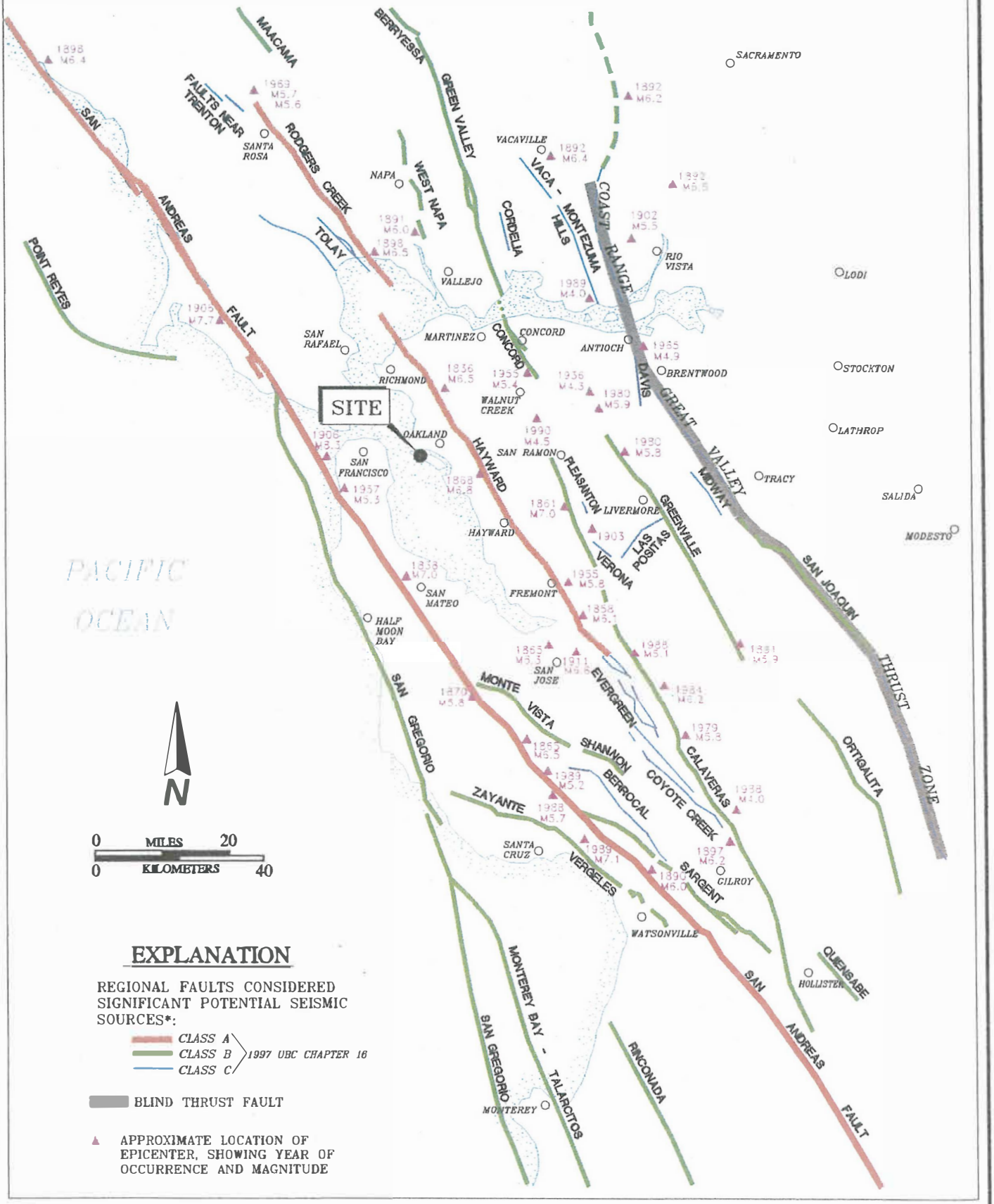

EXPLANATION

REGIONAL FAULTS CONSIDERED SIGNIFICANT POTENTIAL SEISMIC SOURCES*:

- CLASS A
- CLASS B
- CLASS C

1997 UBC CHAPTER 16

BLIND THRUST FAULT

▲ APPROXIMATE LOCATION OF EPICENTER, SHOWING YEAR OF OCCURRENCE AND MAGNITUDE

*BASED ON USGS OPEN FILE 96-706

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

REGIONAL FAULTING AND SEISMICITY

ALAMEDA POINT

ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02

DATE: APRIL 2003

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FIGURE NO. 6

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EXPLANATION

Liquefaction

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

N

NOTE: Seismic Hazard Zones identified on this map may include developed land where delineated hazards have already been mitigated to city or county standards. Check with your local building/planning department for information regarding the location of such mitigated areas.

0 FEET 5000

0 METERS 2500

BASE MAP SOURCE: CGS, 2002

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SEISMIC HAZARD ZONE MAP
ALAMEDA POINT
ALAMEDEA, CALIFORNIA

PROJECT NO.: 5687.1.001.02		FIGURE NO. 7
DATE: APRIL 2003		
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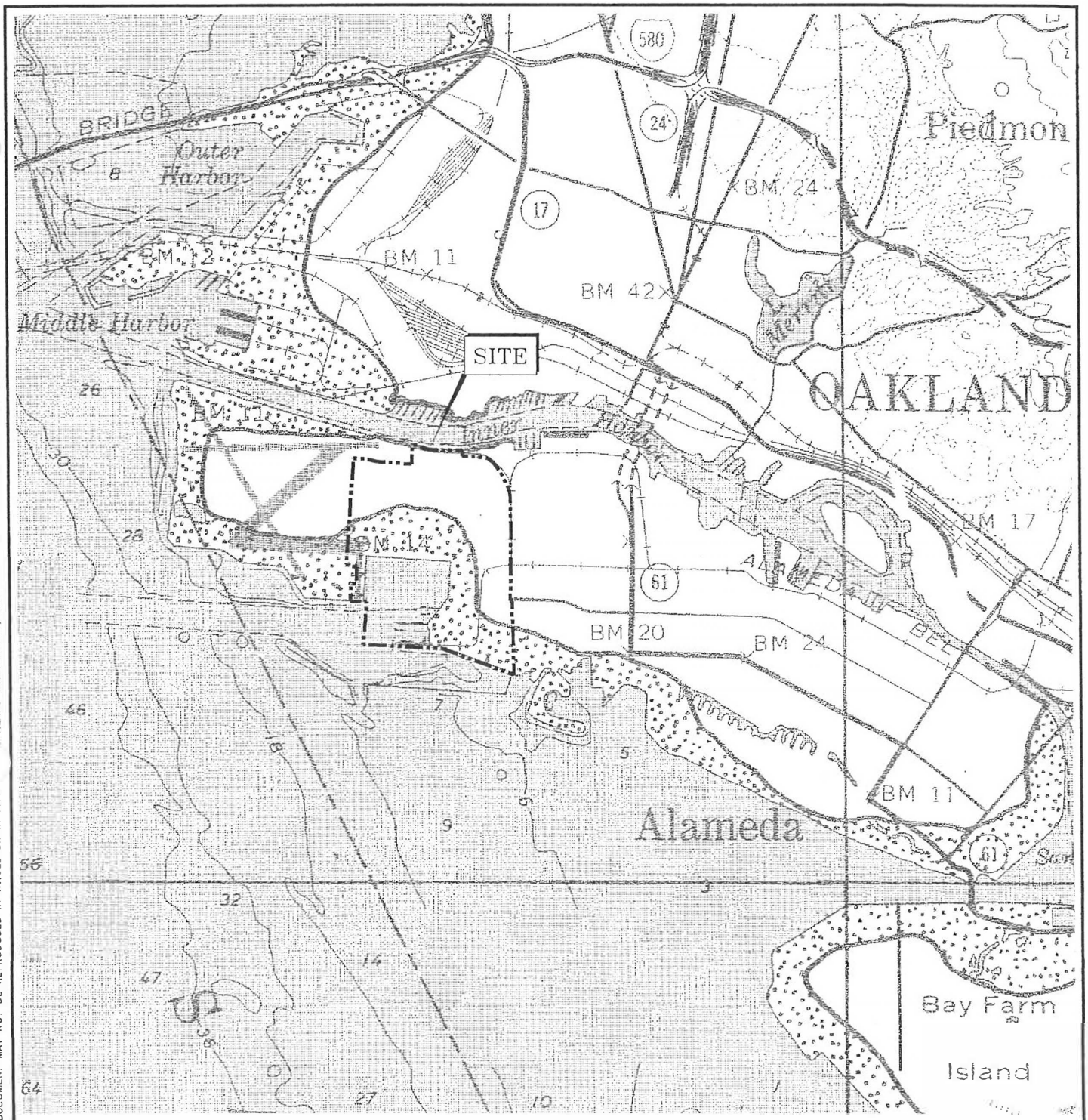

EXPLANATION

APPROXIMATE AREA OF POTENTIAL TSUNAMI INUNDATION BASED ON A 20' WAVE RUNUP AT THE GOLDEN GATE

N

0 FEET 5000

0 METERS 2500

BASE MAP SOURCE: RITTER AND DUPRE, 1972

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

TSUNAMIS HAZARD ZONE MAP

ALAMEDA POINT

ALAMEDEA, CALIFORNIA

PROJECT NO.: 5687.1.001.02		FIGURE NO. 8
DATE: APRIL 2003		
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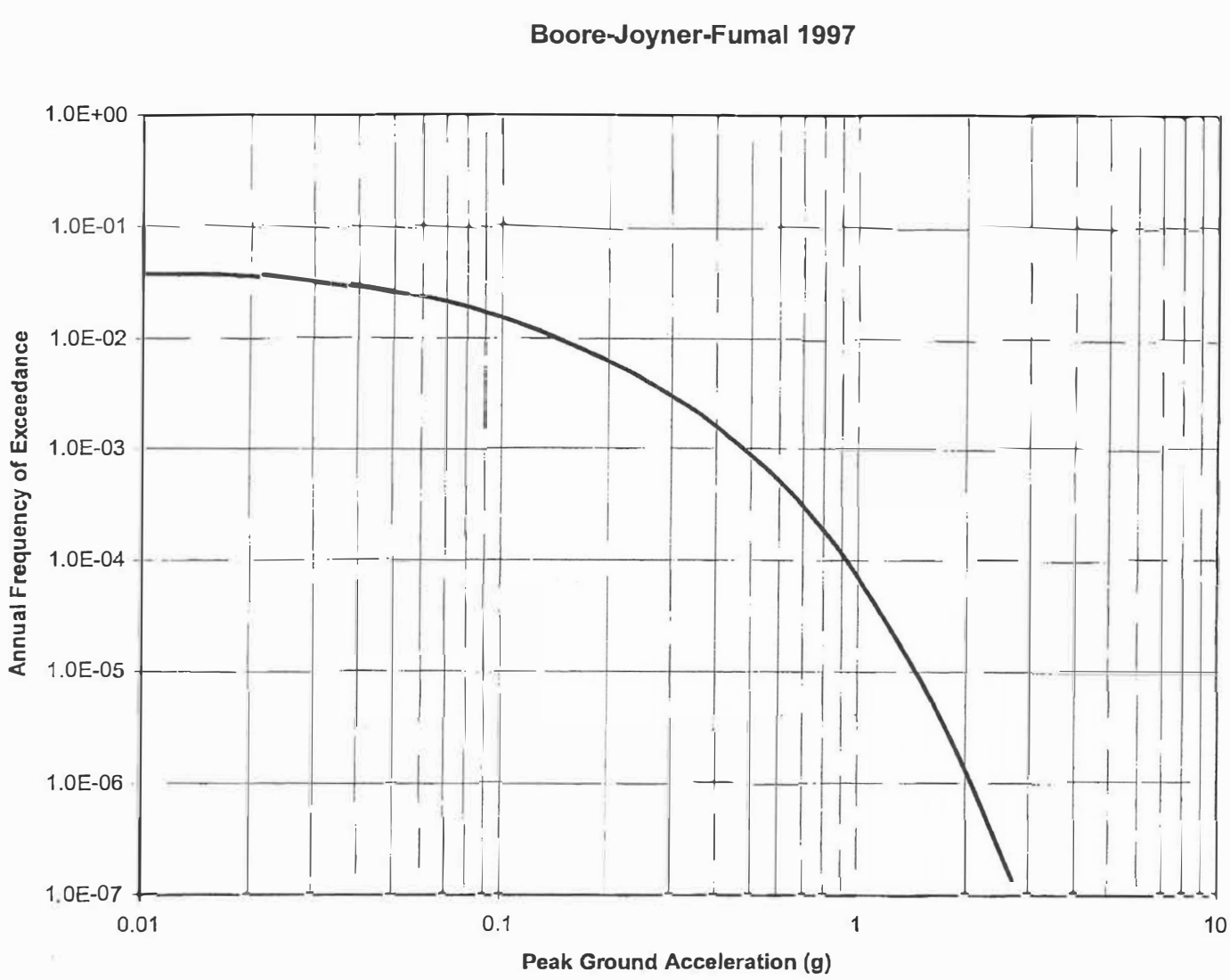

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	ANNUAL PROBABILITY OF EXCEEDENCE vs. PEAK GROUND ACCELERATION ALAMEDA POINT ALAMEDA, CALIFORNIA	PROJECT NO.: 5687.1.001.02 DATE: APRIL 2003 DRAWN BY: CLL CHECKED BY: DSH	FIGURE NO. 9

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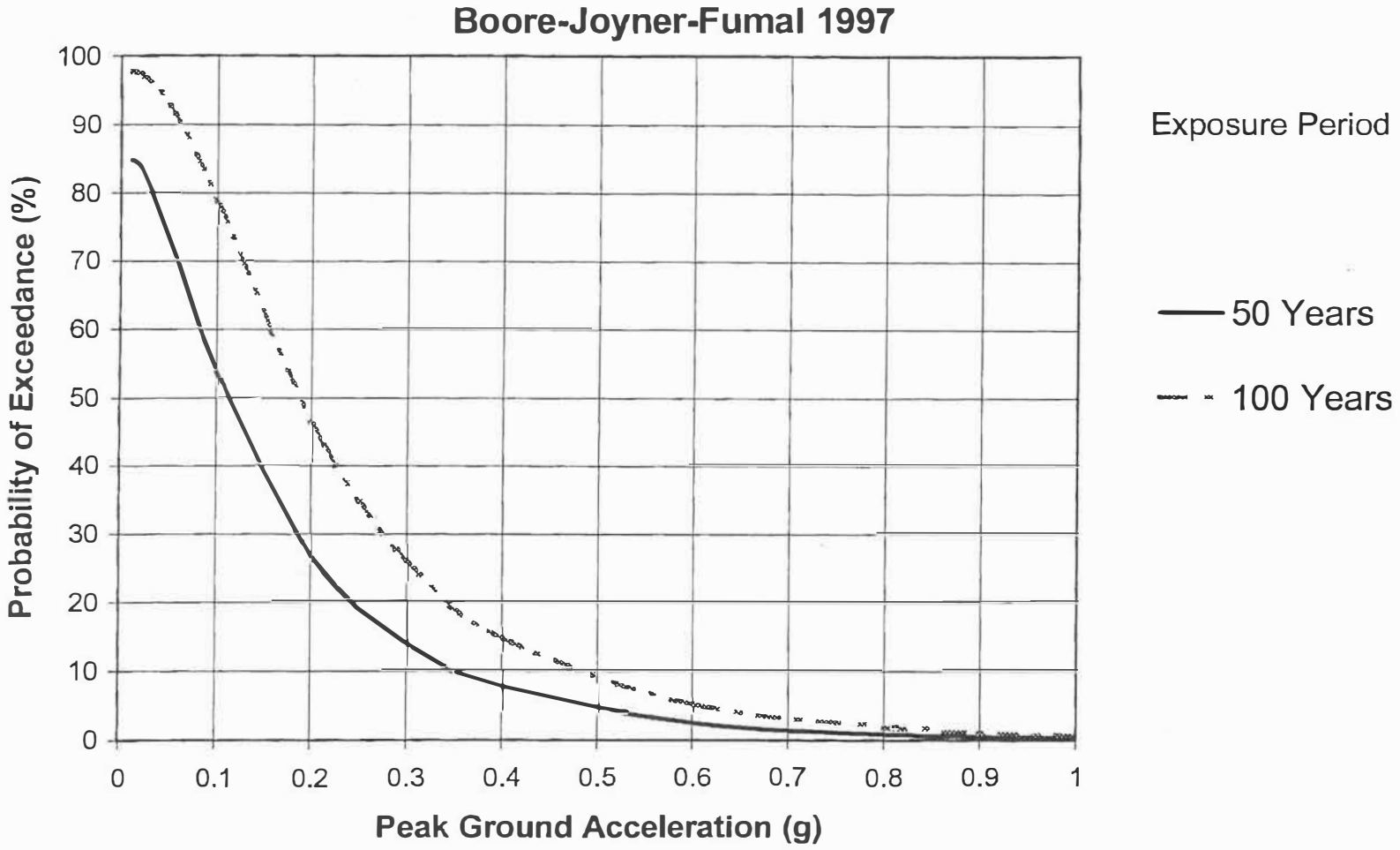
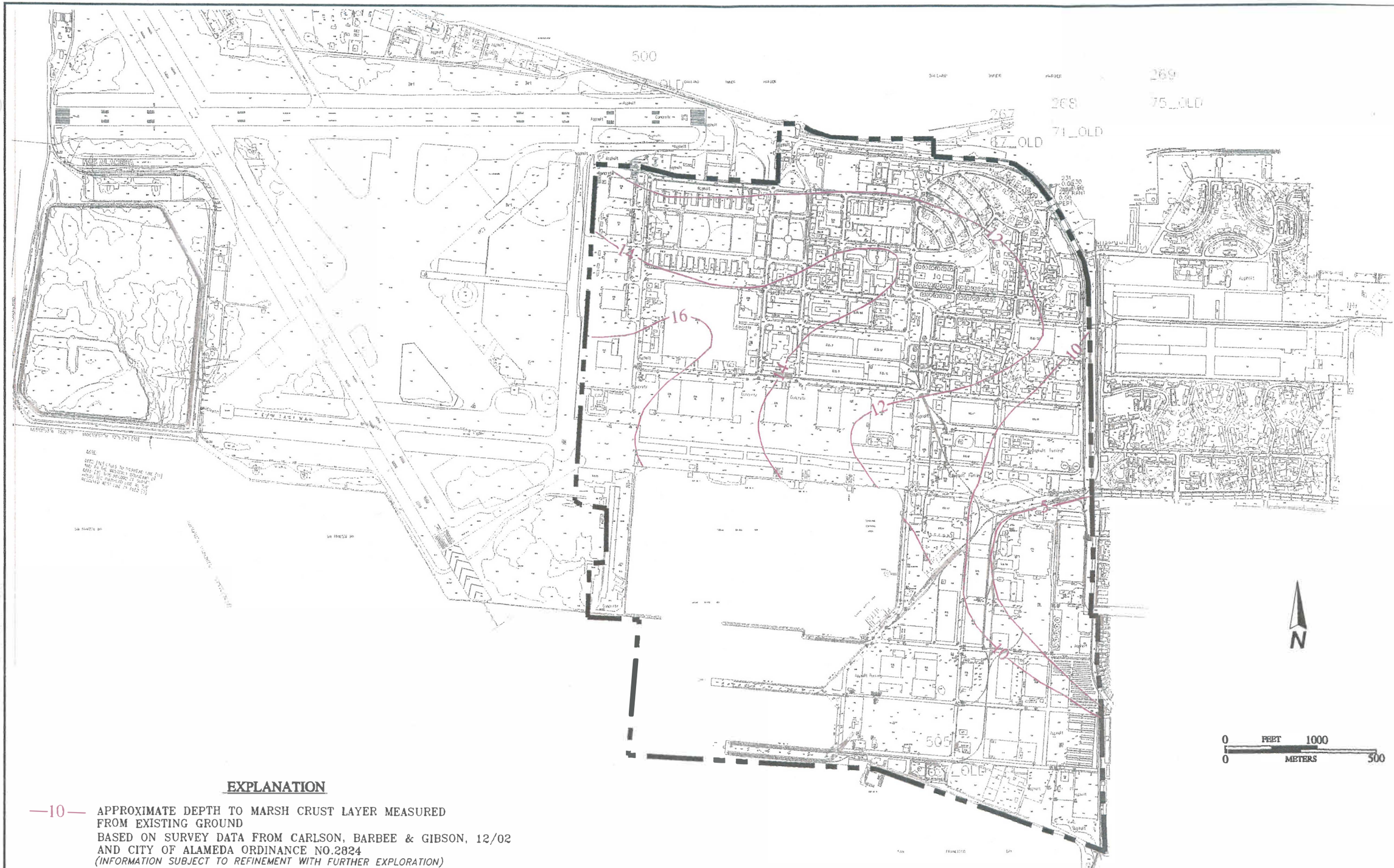


ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PROBABILITY OF EXCEEDENCE vs. PEAK GROUND ACCELERATION
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02	FIGURE NO. 10
DATE: APRIL 2003	
DRAWN BY: CLL	CHECKED BY: DSH



EXPLANATION

—10— APPROXIMATE DEPTH TO MARSH CRUST LAYER MEASURED FROM EXISTING GROUND
BASED ON SURVEY DATA FROM CARLSON, BARBEE & GIBSON, 12/02 AND CITY OF ALAMEDA ORDINANCE NO.2824
(INFORMATION SUBJECT TO REFINEMENT WITH FURTHER EXPLORATION)

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON AND CITY OF ALAMEDA ORDINANCE NO. 2824

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

DEPTH TO MARSH CRUST LAYER
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02
DATE: APRIL 2003
DRAWN BY: CLL | CHECKED BY: DSH

FIGURE NO. 11

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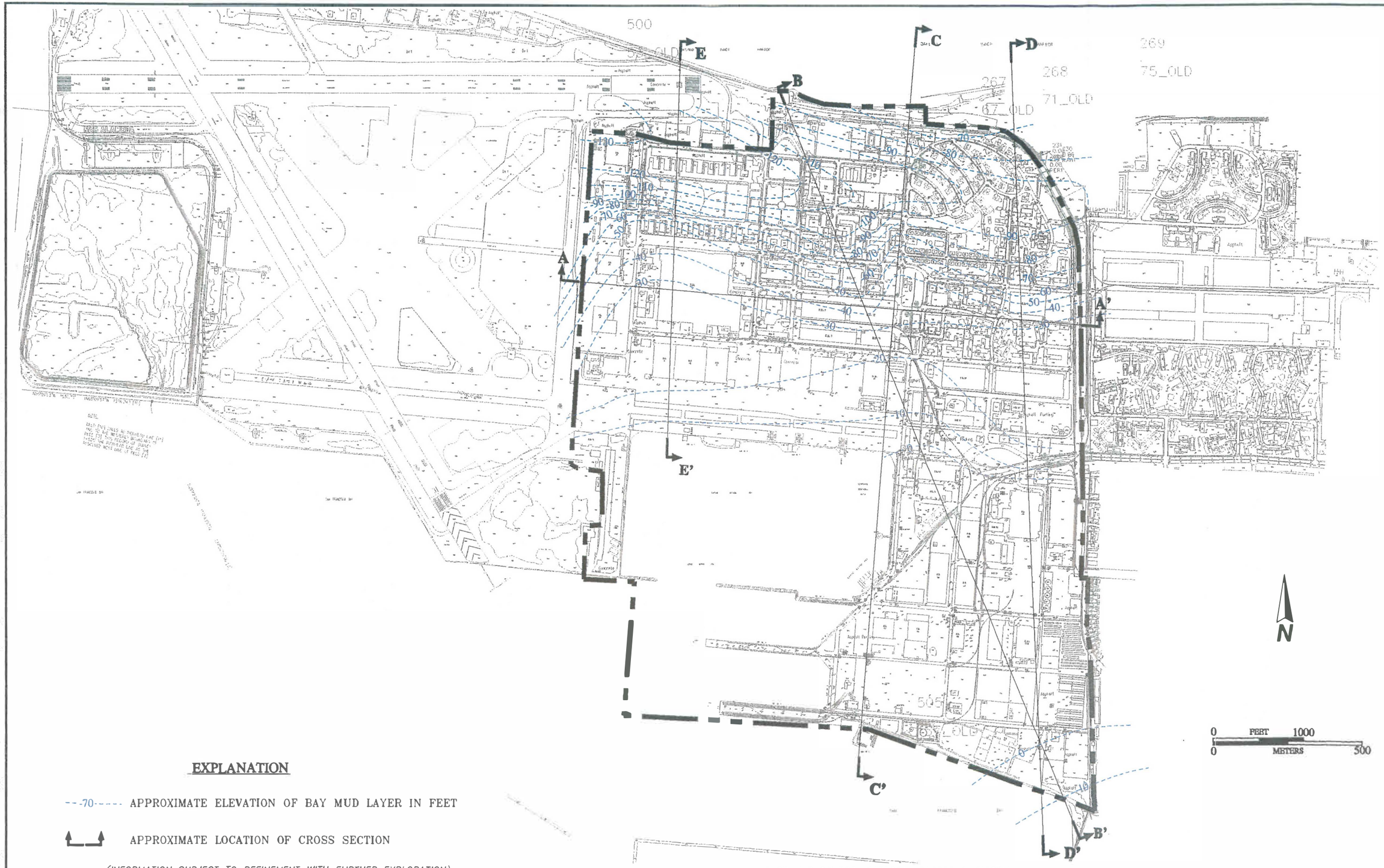

EXPLANATION

---70----- APPROXIMATE ELEVATION OF BAY MUD LAYER IN FEET

APPROXIMATE LOCATION OF CROSS SECTION

(INFORMATION SUBJECT TO REFINEMENT WITH FURTHER EXPLORATION)

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

ELEVATION OF BASE OF YOUNG BAY MUD LAYER
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.01	FIGURE NO. 12
DATE: APRIL 2003	
DRAWN BY: CLL	CHECKED BY: DSH

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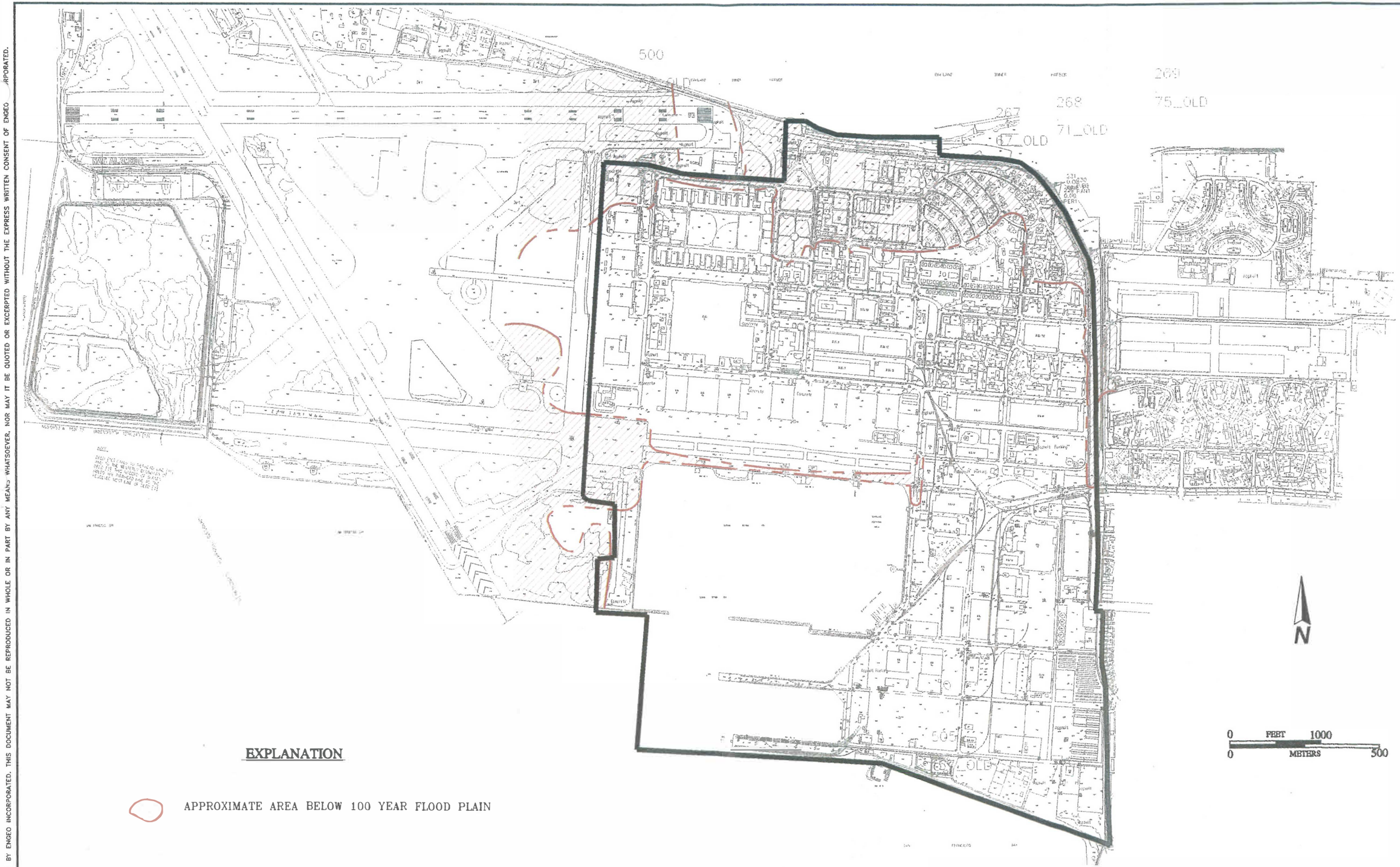

EXPLANATION

APPROXIMATE AREA BELOW 100 YEAR FLOOD PLAIN

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

AREA BELOW 100 YEAR FLOOD PLAIN
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.01	FIGURE NO. 13
DATE: APRIL 2003	
DRAWN BY: CLL	CHECKED BY: DSH

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EXPLANATION

- B-7 — APPROXIMATE LOCATION OF BORING (ENGEO, 2002)
- CPT-1 — APPROXIMATE LOCATION OF CONE PENETRATION TEST (ENGEO, 2002)
- FILL
- YOUNG BAY MUD
- SAND LENSE, BAY MUD
- MERRITT SAND/SAN ANTONIO FORMATION
- YERBA BUENA MUD
- APPROXIMATE MEAN SEA LEVEL
- 1D1 — APPROXIMATE LOCATION OF PREVIOUS BORINGS (SEE FIGURE 4)

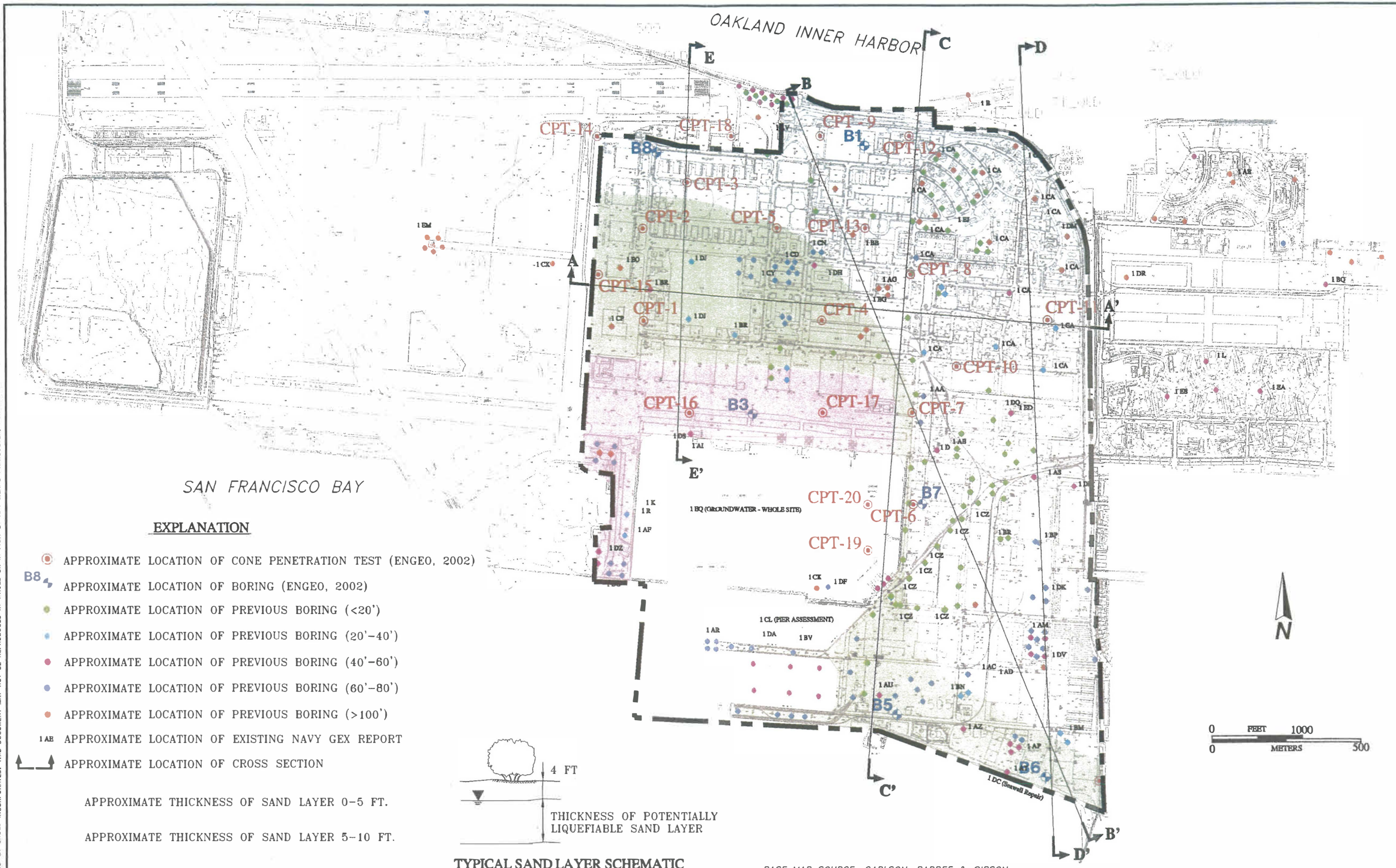
(INFORMATION SUBJECT TO REFINEMENT WITH FURTHER EXPLORATION)

ENGEO INCORPORATED

GEOLOGIC CROSS SECTIONS
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO. 3687.1.001.01
DATE APRIL 2003
DRAWN BY CLL CHECKED BY DSH

FIGURE NO. 14



EXPLANATION

- APPROXIMATE LOCATION OF CONE PENETRATION TEST (ENGEO, 2002)
- B8 APPROXIMATE LOCATION OF BORING (ENGEO, 2002)
- APPROXIMATE LOCATION OF PREVIOUS BORING (<20')
- APPROXIMATE LOCATION OF PREVIOUS BORING (20'–40')
- APPROXIMATE LOCATION OF PREVIOUS BORING (40'–60')
- APPROXIMATE LOCATION OF PREVIOUS BORING (60'–80')
- APPROXIMATE LOCATION OF PREVIOUS BORING (>100')
- 1 AE APPROXIMATE LOCATION OF EXISTING NAVY GEX REPORT
- APPROXIMATE LOCATION OF CROSS SECTION

APPROXIMATE THICKNESS OF SAND LAYER 0–5 FT.

APPROXIMATE THICKNESS OF SAND LAYER 5–10 FT.

APPROXIMATE THICKNESS OF SAND LAYER 10–15 FT.

(INFORMATION SUBJECT TO REFINEMENT WITH FURTHER EXPLORATION)

TYPICAL SAND LAYER SCHEMATIC
NO SCALE

BASE MAP SOURCE: CARLSON, BARBEE & GIBSON

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

THICKNESS OF POTENTIALLY LIQUEFIABLE SAND LAYER
ALAMEDA POINT
ALAMEDA, CALIFORNIA

PROJECT NO.: 5687.1.001.02	FIGURE NO. 15
DATE: APRIL 2003	
DRAWN BY: CLL	CHECKED BY: DSH

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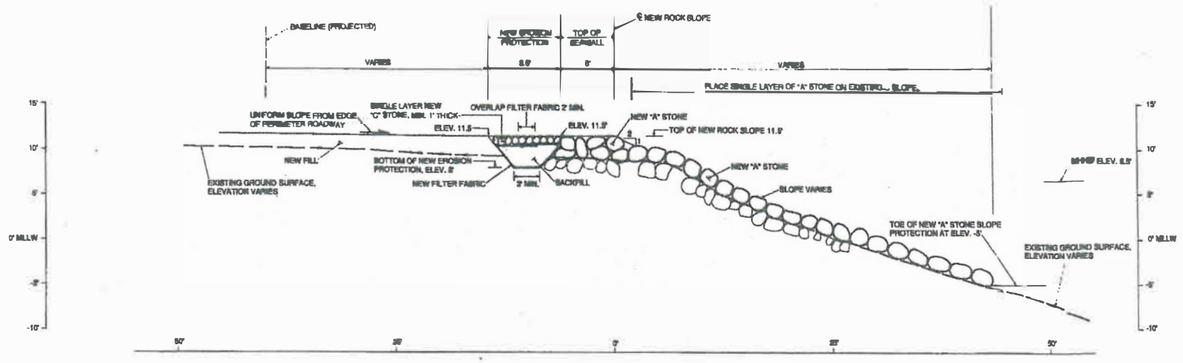
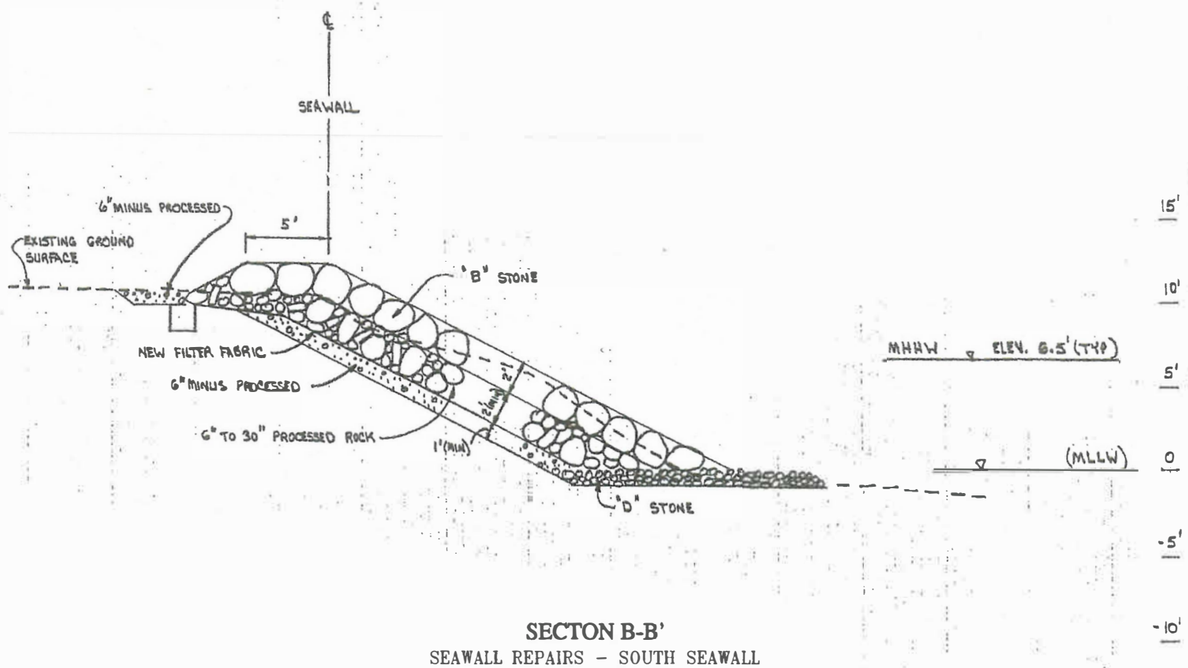


SECTON A-A'
SEAWALL REPAIRS - WEST SEAWALL
GEOMATRIX CONSULTANTS, 1992



SECTON B-B'
SEAWALL REPAIRS - SOUTH SEAWALL
GEOMATRIX CONSULTANTS, JUNE 1986

SOURCE: AERIAL PHOTO DATED, 1947

N

ENGEO INCORPORATED *EXCELLENT SERVICE SINCE 1971*	**TYPICAL SEAWALL SECTION** ALAMEDA POINT ALAMEDA, CALIFORNIA	PROJECT NO.: 5687.1.001.02	FIGURE NO. 16
		DATE: APRIL 2003	
		DRAWN BY: SRP CHECKED BY: DSH	

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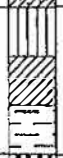
ORIGINAL FIGURE PRINTED IN COLOR

APPENDIX A

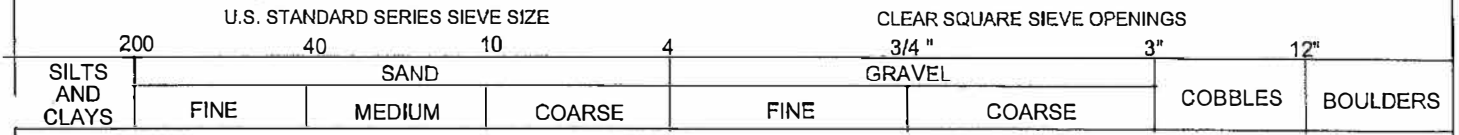
ENGEO INCORPORATED

Boring Logs

KEY TO BORING LOGS

	MAJOR TYPES			DESCRIPTION
COARSE-GRAINED SOILS MORE THAN HALF OF MAT'L LARGER THAN #200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES		GW - Well graded gravels or gravel-sand mixtures GP - Poorly graded gravels or gravel-sand mixtures
		GRAVELS WITH OVER 12 % FINES		GM - Silty gravels, gravel-sand and silt mixtures GC - Clayey gravels, gravel-sand and clay mixtures
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES		SW - Well graded sands, or gravelly sand mixtures SP - Poorly graded sands or gravelly sand mixtures
		SANDS WITH OVER 12 % FINES		SM - Silty sand, sand-silt mixtures SC - Clayey sand, sand-clay mixtures
FINE-GRAINED SOILS MORE THAN HALF OF MAT'L SMALLER THAN #200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50 % OR LESS			ML - Inorganic silt with low to medium plasticity CL - Inorganic clay with low to medium plasticity OL - Low plasticity organic silts and clays
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50 %			MH - Inorganic silt with high plasticity CH - Inorganic clay with high plasticity OH - Highly plastic organic silts and clays
	HIGHLY ORGANIC SOILS			PT - Peat and other highly organic soils

GRAIN SIZES



RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT (S.P.T.)
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	STRENGTH*	BLOWS/FOOT (S.P.T.)
VERY SOFT	0-1/4	0-2
SOFT	1/4-1/2	2-4
MEDIUM STIFF	1/2-1	4-8
STIFF	1-2	8-15
VERY STIFF	2-4	15-30
HARD	OVER 4	OVER 30

MOISTURE CONDITION

DRY	Absence of moisture, dusty, dry to touch
MOIST	Damp but no visible water
WET	Visible freewater
SATURATED	Below the water table

SAMPLER SYMBOLS

- Modified California (3" O.D.) sampler
- California (2.5" O.D.) sampler
- S.P.T. - Split spoon sampler
- Shelby Tube
- Continuous Core
- Bag Samples
- Grab Samples
- NR No Recovery

MINOR CONSTITUENT QUANTITIES (BY WEIGHT)

TRACE	Particles are present, but estimated to the less than 5%
SOME	5 to 15%
WITH	15 to 30%
.....Y	30 to 50%

LINE TYPES

- ——— Solid - Layer Break
- – – – – Dashed - Gradational or approximate layer break

GROUND-WATER SYMBOLS

- ▽ Groundwater level during drilling
- ▼ Stabilized groundwater level

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

(S.P.T.) Number of blows of 140 lb. hammer falling 30" to drive a 2-inch O.D. (1-3/8 inch I.D.) sampler

* Unconfined compressive strength in tons/sq. ft., asterisk on log means determined by pocket penetrometer

DATE OF BORING: December 11, 2002

SURFACE ELEVATION: Approx. 5 feet (2 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				SAND (SP), brown, medium dense, fine to medium grained.				
	1	1-1		▽	26			
5				SILTY CLAY (CH), gray, medium stiff, wet, highly plastic. Wet, some shells. (Bay Mud)				
	2	1-2			7	+1.0*		
10	3							
	4	1-4		Poorly-graded SAND (SP), gray, medium dense to dense, fine to medium grained.				
		1-5			35			24.2
15	5			Percent Passing Sieve No. 200 = 8.1				
				Poorly-graded SAND (SP), gray, medium dense, fine to medium grained.				
	6	1-6		Percent Passing Sieve No. 200 = 7.5	14			24.4
20				SILTY CLAY (CH), gray to olive gray, saturated, highly plastic, shells present. (Bay Mud)				
	7							
		1-7			PUSH			
25	8							
	9							
30								
	10							
		1-8		Consolidation test see sheet C1 TxUU = 630 (1700)	PUSH			
35	11							
	12							
40								

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ENGEO BC

ENGEO INCORPORATED

1971 2001 • 30 YEARS OF EXCELLENCE

ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-1

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY

FIGURE NO.

DATE OF BORING: December 11, 2002

SURFACE ELEVATION: Approx. 5 feet (2 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
45	13	1-9		Some sand lenses.	PUSH			
50	14							
	15							
	16			Torvane = .1 (TSF) Very soft. Less shells.				
55		1-10		TxUU = 440 (2710)	PUSH			
	17							
	18							
60								
	19							
65								
	20			Torvane = .08 to .1 (TSF)				
		1-11		Very soft.	PUSH			
	21							
70								
	22							
		1-12			PUSH			
75	23			Torvane = .1 to .14 (TSF) Consolidation test see sheet C2 Very soft to soft. TxUU = 1150 (3700)				
	24							
80								

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-1

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.

DATE OF BORING: December 11, 2002

SURFACE ELEVATION: Approx. 5 feet (2 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
85	26	1-13		Torvane = .12 to .14 (TSF) Soft.	PUSH			
	27							
90	28							
95	29	1-14		More sand. TxUU = 2065 (4690)	PUSH	+2.5*		
	30			Becoming very stiff.				
100		1-15		More sand. From 100 to 120 feet. (Bay Mud)	35	2.5*		28.7
	31							
				Torvane = .3 (TSF)				
105	32	1-16		Medium stiff.	20	+1.0*		
	33							
110	34							
				Torvane = .25 (TSF)				
115	35	1-17		Medium stiff to stiff.	30	+1.0*		
	36							
120	37			From 120 to 139 $^{1}/_{2}$ feet.				

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-1

LOGGED BY: J. Buck

PROJ. NO. 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.

DATE OF BORING: December 11, 2002

SURFACE ELEVATION: Approx. 5 feet (2 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
125	38	1-18		Torvane = .25 (TSF) Medium stiff.	29	+1.0*		
	39							
130	40			More silt.				
	41	1-19		SILTY CLAY to CLAY (CH), gray, very stiff, moist, plastic. P I = 43	63	+4.0*		43.0
135	42			SILTY CLAY to CLAY (CH), very stiff. P I = 46				
140	43	1-20			40	+2.5*		43.9
				Bottom of boring at approximately 139 1/2 feet. Groundwater encountered at 4 1/2 feet during drilling. (Measured 12/11/02) TxUU = Unconsolidated Undrained Triaxial Shear Stress (psf) = 3800 Confining Pressure (psf) = (4200) P I = Plasticity Index				
145	44							
	45							
150	46							
	47							
155	48							
160	49							

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-1

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.

DATE OF BORING: December 16, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0								
	1	3-1		Poorly-graded SAND (SP), brown, medium dense, wet, fine to medium grained, some silt. ▽ Percent Passing Sieve No.200 = 4.0	17			3.7
5								
	2							
		3-2		Poorly-graded SAND (SP), brown, loose, wet, trace silt, with intermittent lenses of Bay Mud. Percent Passing Sieve No. 200 = 4.7	7			26.1
10	3							
	4							
15								
	5							
		3-3		SILTY SAND (SM), gray, medium dense, wet, fine to medium grained. Percent Passing Sieve No. 200 = 20.8	22		106	19.7
20	6							
	7							
		3-4		Poorly-graded SAND to SILTY SAND (SP-SM), brown, very dense, wet, fine to medium grained, some clay, silt.	50/6"			
25	8							
	9							
30		3-5			45			23.6
	10							
35				Same as above.				
	11							
	12							
40		3-6			27			19.1

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-3

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.

DATE OF BORING: December 16, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
45	13			Poorly-graded SAND to SILTY SAND (SP-SM), continued.				
	14							
	15							
50		3-7			60			22.6
	16							
55								
	17							
	18							
60		3-8		Same as above.	50/5"			22.6
	19							
65								
	20							
	21							
70		3-9			64			19.6
	22							
75								
	23							
	24							
80		3-10			50/3.5"			22.9

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-3

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY

FIGURE NO.

DATE OF BORING: December 16, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
85	26			Trace Bay Mud.				
90	27	3-11		Old Bay Mud. SILTY CLAY (CH), olive gray, stiff, moist, highly plastic.	35			40.7
95	28							
100	29							
	30	3-12		SILTY SAND (SM), olive grey, very dense, wet, medium to fine grained.	50/4"			22.0
105	31							
110	32							
	33	3-13			50/4"			20.3
115	34							
120	35							
	36			Possible Bay Mud lens.				
	37	3-14			60			21.3
				Bottom of boring at approximately 120 1/2 feet. Groundwater encountered at 4 feet during drilling. (Measured 12/16/02)				

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-3

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.

DATE OF BORING: December 17, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				8 inches of ASPHALT pavement.				
				Poorly-graded SAND (SP), brown, dense, moist, fine to medium grained.				
5	1	5-1			31			20.0
	2							
		5-2		Saturated, medium dense. Percent Passing Sieve No. 200 = 3.8	15			23.1
10	3							
		5-3		SILTY SAND (SM), gray, medium dense, saturated, fine to medium grained.	13			
15	5			Brown sand.				
		5-4		Black with organics (silty sand). Grey. Percent Passing Sieve No. 200 = 5.3	16			24.9
20	6			Brown sand/grey sand.				
	7	5-5			16			24.0
25	8							
	9			Brown sand.				
30		5-6			47			22.8
	10							
35	11							
	12							
40		5-7			61			24.0

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-5

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.

DATE OF BORING: December 17, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
45	13			SILTY SAND (SM), continued.				
	14			More clay (but brownish color)				
50	15	5-8			52			19.5
	16							
55	17							
	18							
60	19	5-9			50/6"			27.1
65	20			Old Bay Mud. SILTY CLAY (CH), gray.				
	21			SILTY SAND (SM), gray, dense, saturated, fine to medium grained.				
70		5-10			50/5"			
	22			Bottom of boring at approximately 70 feet. Groundwater not recorded.				
75	23							
	24							
80								

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-5

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

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FIGURE NO.

ENGEO_BOR 5687100102 ALAMEDAPOINT.GPJ 3/20/03

DATE OF BORING: December 18, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0								
	1	6-1		Poorly-graded SAND (SM), brown, medium dense, moist, saturated, with some silt. Percent Passing Sieve No. 200 = 40.8	37			
5								
	2	6-2		Dense, saturated, trace shells. Percent Passing Sieve No. 200 = 5.0	16			
10	3							
	4	6-3		SILTY SAND (SM), gray to olive, loose, saturated. Percent Passing Sieve No. 200 = 38.4	5			
15								
	5	6-4		Poorly-graded SAND (SP), brown, dense, saturated, fine to medium grained. Percent Passing Sieve No. 200 = 24.0	45			
20	6	6-5		More dense. Percent Passing Sieve No. 200 = 12.1	52			
25	7							
	8							
30	9	6-6		SILTY SAND to SAND (SP-SM), olive brown, very dense.	73			
	10							
35	11			SILTY SAND (SM), gray to olive, very dense, saturated, fine to medium grained.				
	12			Percent Passing Sieve No. 200 = 15.1				
40		6-7			72			

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ENGEO BORING LOG

ENGEO INCORPORATED
1971 2001 30 YEARS OF EXCELLENCE

ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-6

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY

FIGURE NO.

DATE OF BORING: December 18, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
45	13			SILTY SAND (SM), continued.				
	14							
50	15	6-8		SAND with some silt (SM), olive brown, very dense.	50/6"			
	16							
55	17							
	18							
60		6-9			72			
	19							
65	20							
	21							
70		6-10		SILTY CLAYEY SAND (SM), dark greenish gray, dense.	38			
	22			Bottom of boring at approximately 70 1/2 feet. Groundwater not recorded.				
75	23							
	24							
80								

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-6

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DrH

FIGURE NO.

DATE OF BORING: December 13, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				Poorly-graded SAND (SW-SM), black, moist, dense, medium to fine grained, some silt.				
	1	7-1			31			6.2
5								
	2			Poorly-graded SAND (SW-SM), gray, saturated, loose, fine grained.				
		7-2		Percent Passing Sieve No. 200 = 8.6	4			20.9
10	3							
	4	7-3		Poorly-graded SAND (SP), brown, dense, saturated, fine to medium grained, trace silt.	31			17.9
15								
	5							
		7-4		Becomes (SP-SM) Percent Passing Sieve No. 200 = 11.2	64			21.6
20	6							
	7	7-5			67			19.5
25								
	8							
		7-6			46			22.9
30	9							
	10							
35		7-7			36			19.7
	11							
	12							
40		7-8			60			16.9

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ENGEO_BC

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-7

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY

FIGURE NO.

DATE OF BORING: December 13, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
45	13			Poorly-graded SAND (SP-SM), continued.				
	14							
	15	7-9			50/5"			21.3
50								
	16							
55								
	17							
	18							
60		7-10			50/4"			21.1
	19							
65								
	20							
	21							
70		7-11			50/4"			21.8
	22							
75								
	23							
	24			Poorly-graded SAND to CLAYEY SAND (SW-SC), gray, very dense, saturated, fine to medium grained, some clay.				
80		7-12			50/6"			37.9

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ENGEO BC

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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-7

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY

FIGURE NO.

DATE OF BORING: December 13, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
85	26							
	27	7-13		Poorly-graded SAND (SW), olive gray, saturated, very dense, medium grained.	50/6"			22.5
90	28							
95	29							
	30	7-14		SILTY CLAY (CL), olive gray, very stiff, saturated, highly plastic. (Old Bay Mud) P I = 18	30			32.4
100	31							
105	32							
	33	7-15		Poorly-graded SAND (SP-SM), gray, saturated, medium to fine grained with silt.	50/6"			31.3
110	34							
115	35			SILTY CLAY (CH), olive gray, medium stiff, saturated, highly plastic. (Old Bay Mud)				
	36	7-16			42			
120	37			Bottom of boring at approximately 120 1/2 feet. Groundwater not recorded.				

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ENGEO INCORPORATED
1971 - 2001 30 YEARS OF EXCELLENCE

ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-7

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY

FIGURE NO.

DATE OF BORING: December 13, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
0				4 inches of ASPHALT over 8 inches of BASEROCK.				
				Poorly-graded SAND (SP-SW), brown, medium dense, with some black rocks (1/4 inch), and some red/brown coloration, medium to fine grained.				
	1	8-1		▽	27			11.3
5								
	2			Poorly-graded SAND to SILTY SAND (SP-SM), gray, dense, saturated, fine to medium grained.				
		8-2			33			26.1
10	3							
	4	8-3			10			25.9
15				SILTY CLAY (CH), gray to olive gray, saturated, highly plastic, trace shells.				
	5			Torvane = .06 (TSF)				
		8-4		Very soft. TxUU = 662 (907)	PUSH			
20	6							
	7							
25								
	8			Torvane =.06 (TSF) Very soft				
		8-5			PUSH			
30	9							
	10							
35								
	11			Many shells.				
		8-6		Very soft. TxUU = 1008 (1843.2)	PUSH			
40	12							

G 5687100102 ALAMEDAPOINT.GPJ 3/20/03

ENGEO BC

ENGEO INCORPORATED
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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-8

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.20

CHECKED BY: DCH

FIGURE NO.

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
				DATE OF BORING: December 13, 2002 SURFACE ELEVATION: Approx. 4 feet (1 meters)				
45	13							
	14	8-7		Torvane = .2 (TSF) Soft. Consolidation test see sheet C3	PUSH			
50	15							
	16							
55	17							
		8-8			PUSH			
60	18							
	19							
65	20							
		8-9			PUSH			
70	21							
	22							
75	23							
		8-10		Torvane = .1 (TSF) Very soft.	PUSH			
80	24							

J 5687100102 ALAMEDAPOINT.GPJ 3/20/03

ENGEO BC

ENGEO INCORPORATED
1971 - 2001 • 30 YEARS OF EXCELLENCE

ALAMEDA POINT

ALAMEDA, CALIFORNIA

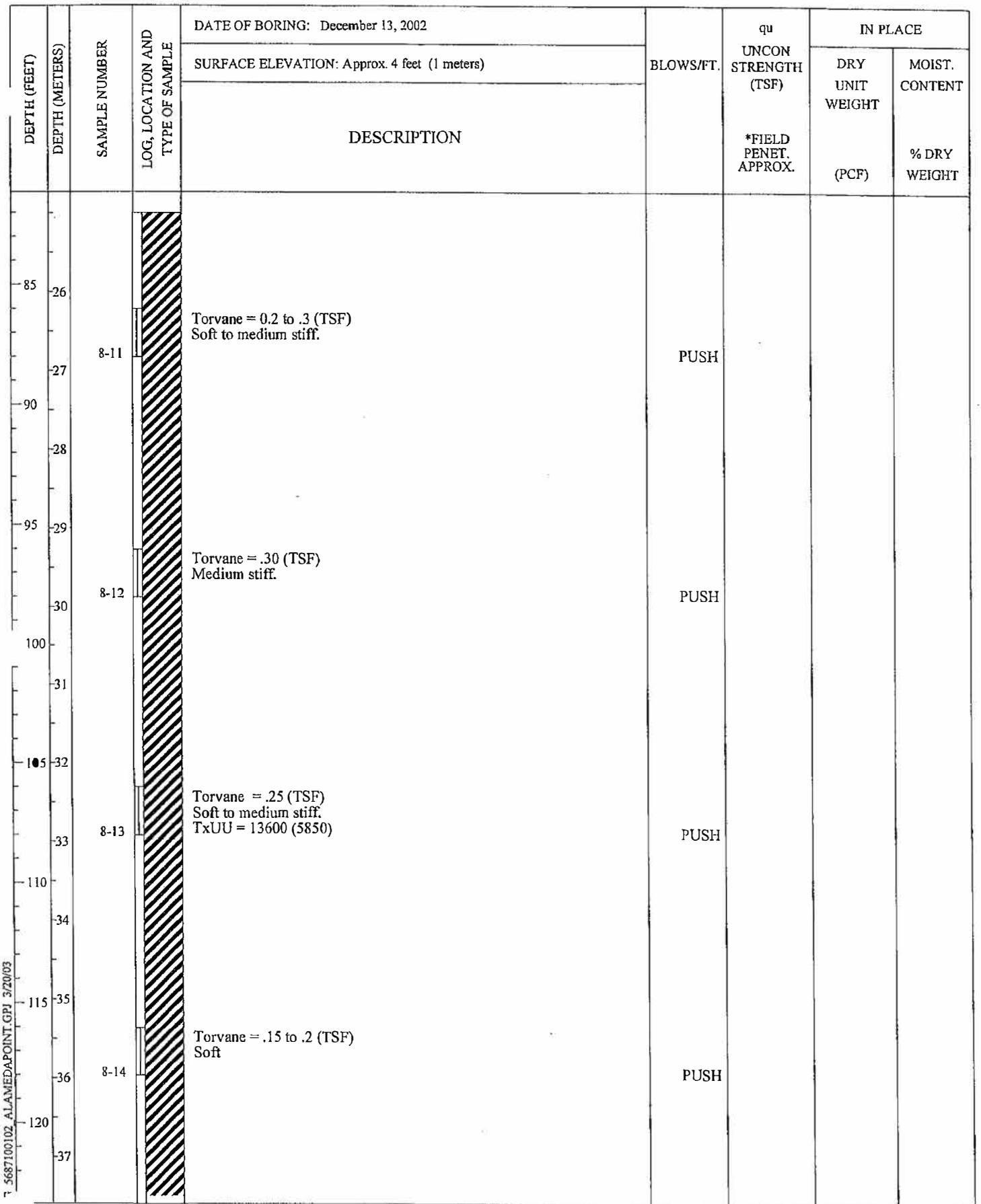
BORING NO.: B-8

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.



ENGEO INCORPORATED
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ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-8

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

CHECKED BY: DSH

FIGURE NO.

ENGEO BOP 7_5687100102_ALAMEDAPOINT.GPJ 3/20/03

DATE OF BORING: December 13, 2002

SURFACE ELEVATION: Approx. 4 feet (1 meters)

DEPTH (FEET)	DEPTH (METERS)	SAMPLE NUMBER	LOG, LOCATION AND TYPE OF SAMPLE	DESCRIPTION	BLOWS/FT.	qu UNCON STRENGTH (TSF) *FIELD PENET. APPROX.	IN PLACE DRY UNIT WEIGHT (PCF)	IN PLACE MOIST. CONTENT % DRY WEIGHT
125	38							
	39							
130	40			Much more sand.				
	41							
135		8-15		SILTY CLAY (CL-ML), gray to olive, stiff, plastic, with some sand.	50/6"	+4.0*		
	42							
140		8-16			78			
	43			Bottom of boring at approximately 140 1/2 feet. Groundwater encountered at 4 feet during drilling. (Measured 12/13/02) TxUU = Unconsolidated Undrained Triaxial Test Shear Stress (psf) = 3800 Confining Pressure (psf) = (4200)				
	44							
145								
	45							
150								
	46							
	47							
155								
	48							
160								
	49							

5687100102 ALAMEDAPOINT.GPJ 3/20/03

ENGEO BOI

ENGEO INCORPORATED
1971 - 2001 • 30 YEARS OF EXCELLENCE

ALAMEDA POINT

ALAMEDA, CALIFORNIA

BORING NO.: B-8

LOGGED BY: J. Buck

PROJ. NO.: 5687.1.001.02

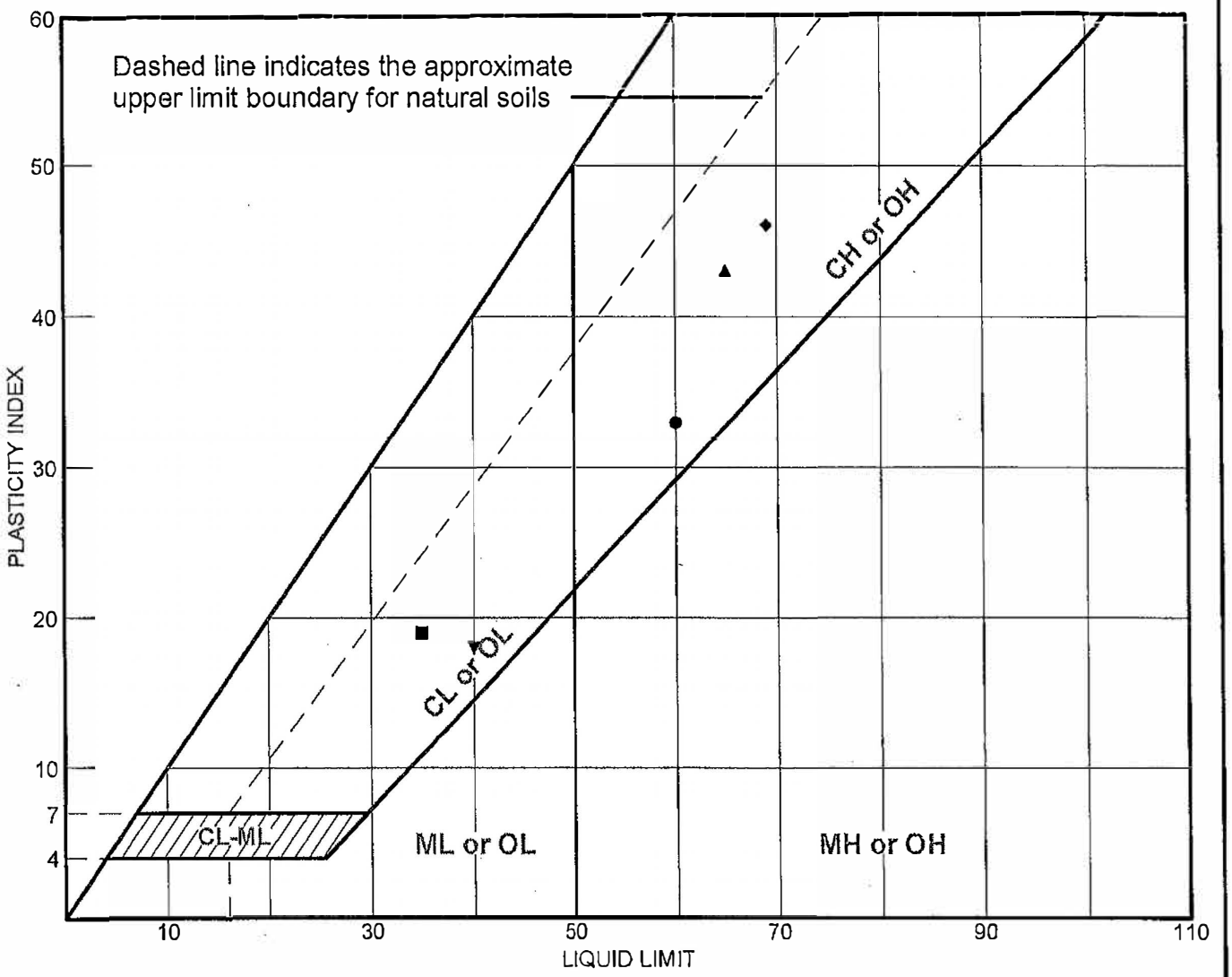
CHECKED BY: DSH

FIGURE NO.

APPENDIX B

Laboratory Test Results

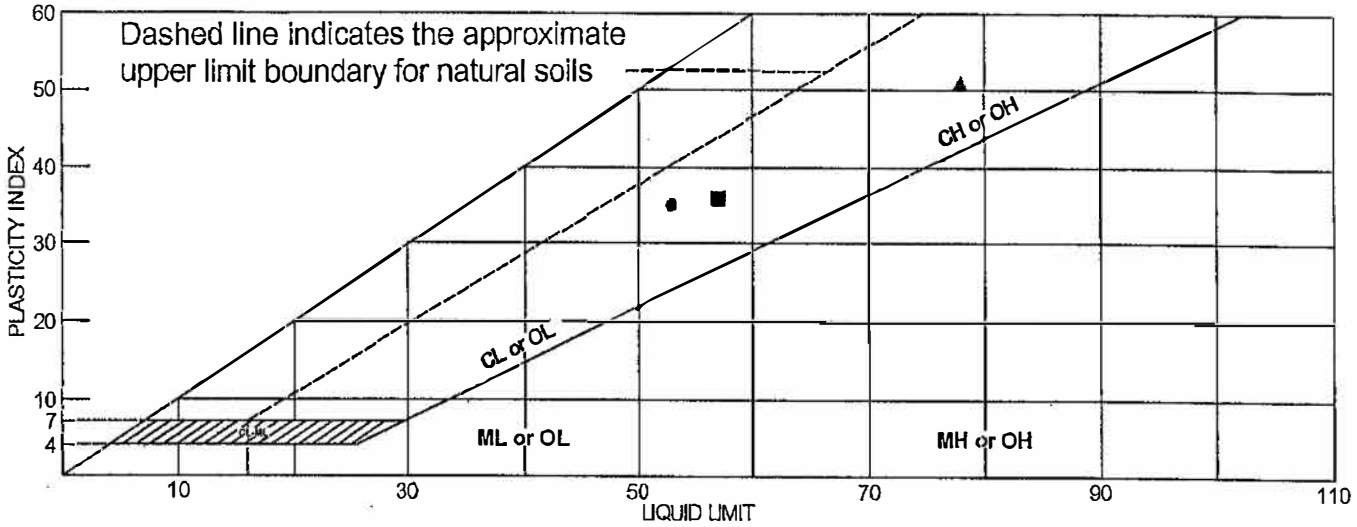
LIQUID AND PLASTIC LIMITS TEST REPORT

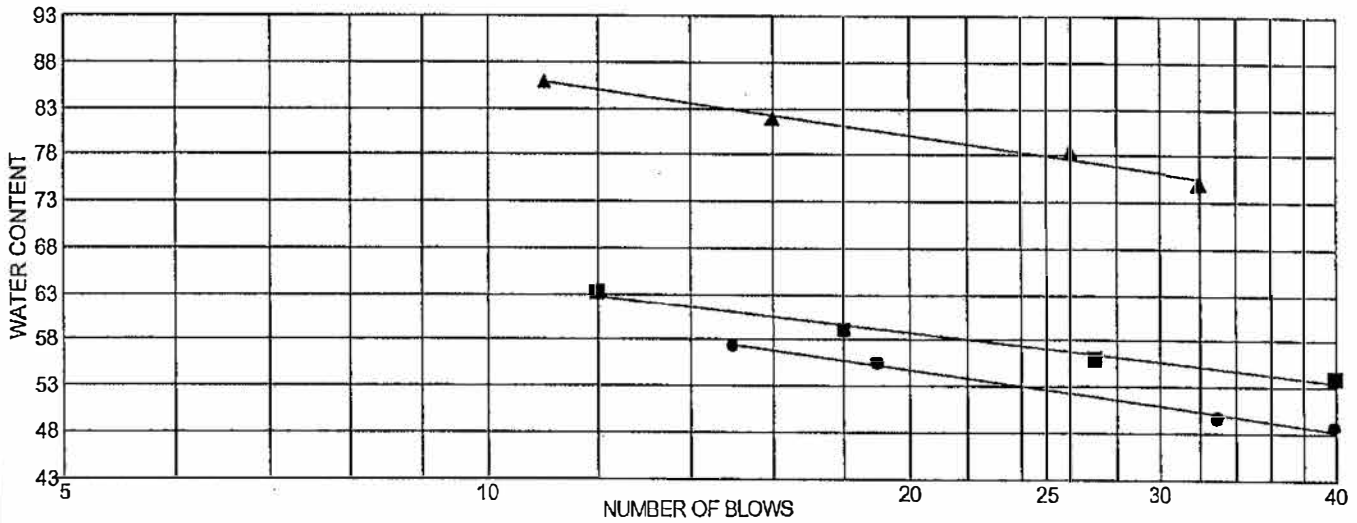


SOIL DATA								
SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	NATURAL WATER CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	USCS
●		B1-2	7 feet		27	60	33	CH
■		B1-15	99 feet	28.7	16	35	19	CL
▲		B1-19	134 feet	43.0	22	65	43	CH
◆		B1-20	138 feet	43.9	23	69	46	CH
▼		B7-14	99 feet	32.4	22	40	18	CL

LIQUID AND PLASTIC LIMITS TEST REPORT **ENGEO INCORPORATED**	**Client:** **Project:** Alameda Point Alameda, CA **Project No.:** 5687.1.001.02 **Figure**

LIQUID AND PLASTIC LIMITS TEST REPORT





	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	gray CLAY, bay mud	53	18	35			
■	olive gray CLAY	57	21	36			
▲	gray CLAY w/trace shells, sand & organics, bay mud	78	27	51			

Project No. 414-013 **Client:** Engeo

Project: 5687.1.001.02

● **Source:** 1	**Sample No.:** 10	**Elev./Depth:** 53-55'
■ **Source:** 1	**Sample No.:** 14	**Elev./Depth:** 93-95'
▲ **Source:** 8	**Sample No.:** 7	**Elev./Depth:** 46-48'

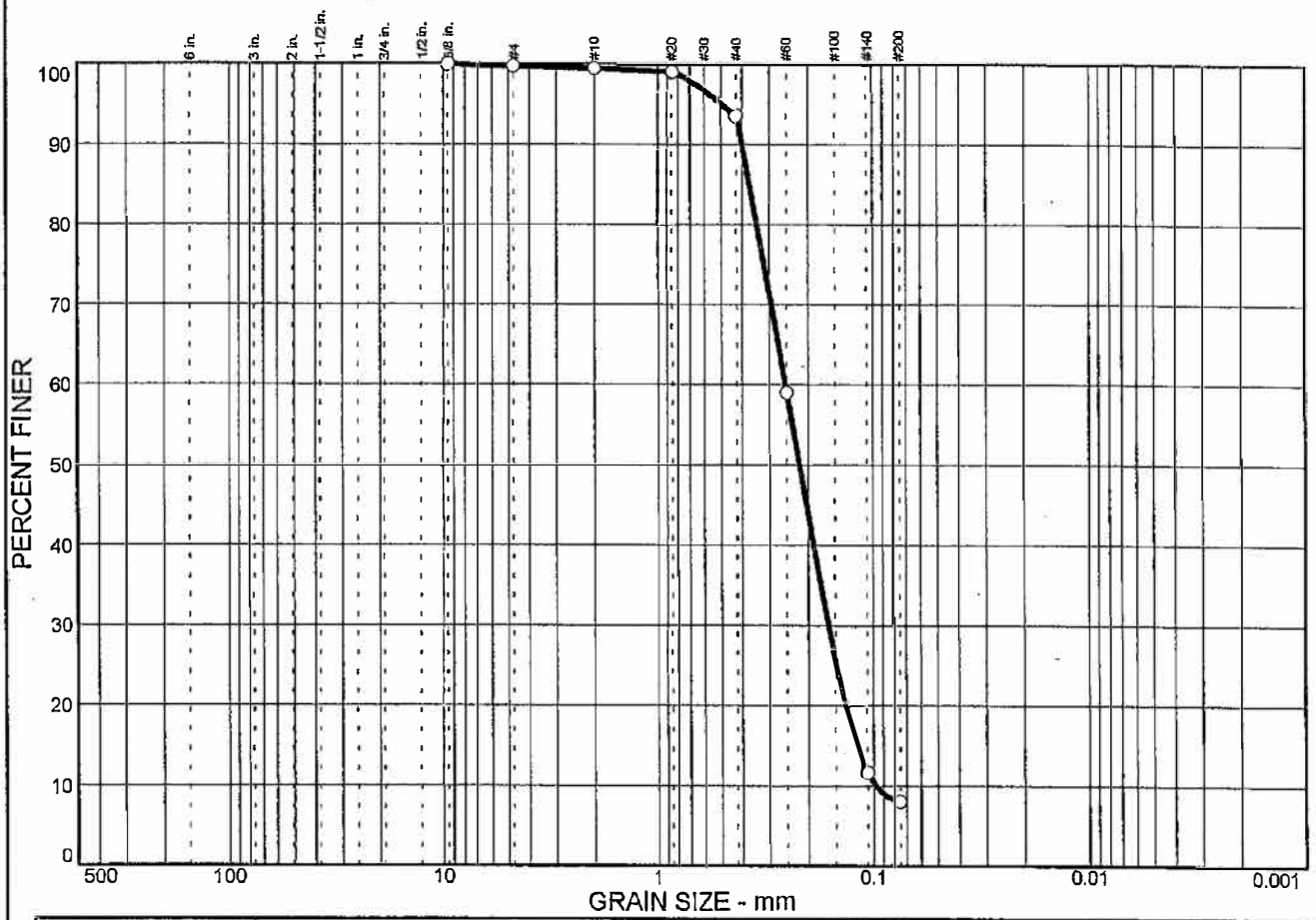
Remarks:
● Method A
■
▲

LIQUID AND PLASTIC LIMITS TEST REPORT

COOPER TESTING LABORATORY

Plate

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.3	91.6	8.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.7		
#10	99.4		
#20	99.0		
#40	93.6		
#60	59.0		
#140	11.7		
#200	8.1		

* (no specification provided)

Soil Description

Gray poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.371 D_{60}= 0.254 D_{50}= 0.219
D_{30}= 0.161 D_{15}= 0.118 D_{10}= 0.0969
C_u= 2.62 C_c= 1.06

Classification

USCS= SP-SM AASHTO=

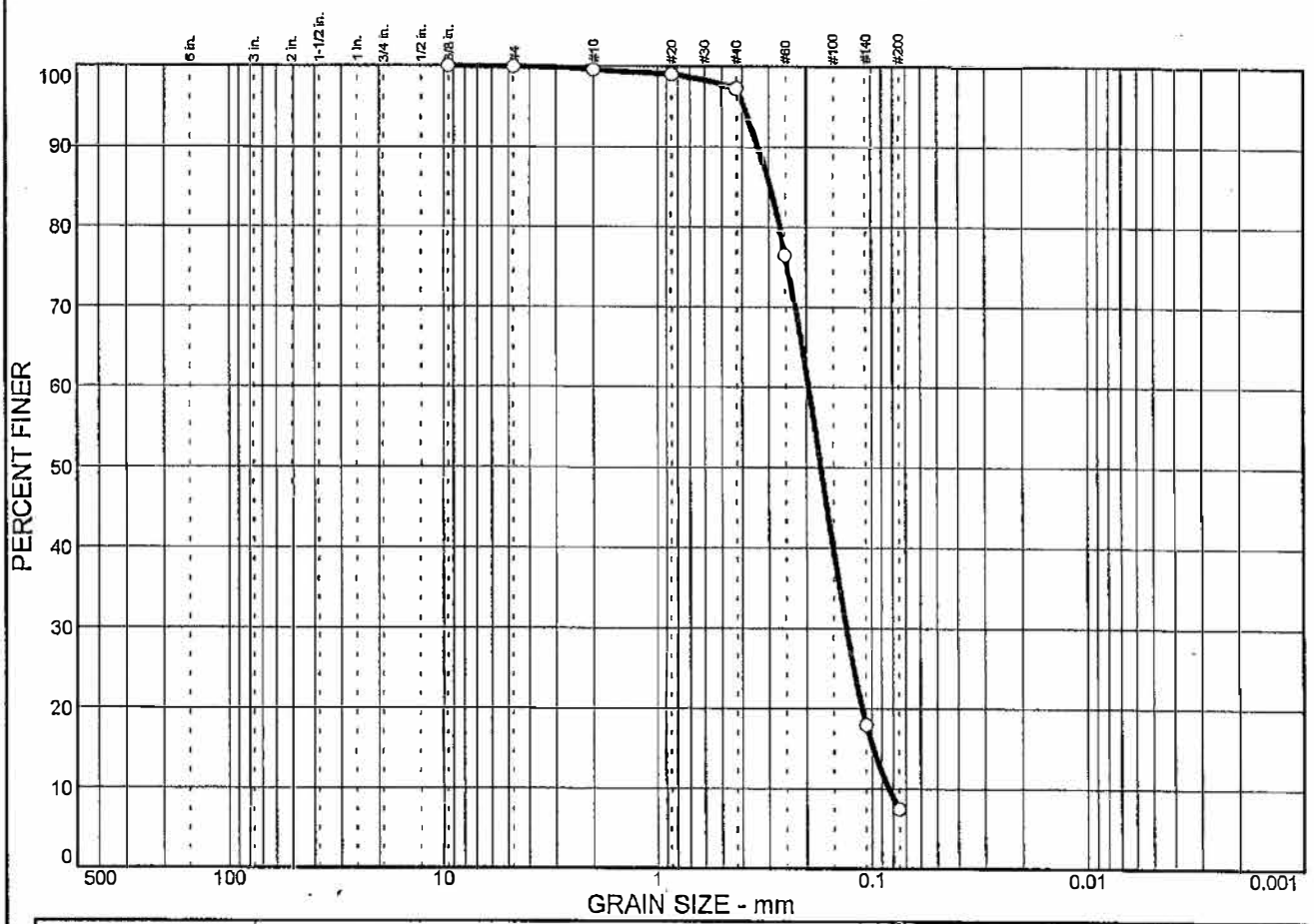
Remarks

Sample No.: B1-5 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 13 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.1	92.4	7.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.375 in.	100.0		
#4	99.9		
#10	99.5		
#20	99.0		
#40	97.3		
#60	76.6		
#140	18.0		
#200	7.5		

* (no specification provided)

Soil Description

Gray poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.296 D_{60}= 0.195 D_{50}= 0.171
D_{30}= 0.131 D_{15}= 0.0985 D_{10}= 0.0834
C_u= 2.34 C_c= 1.05

Classification

USCS= SP-SM AASHTO=

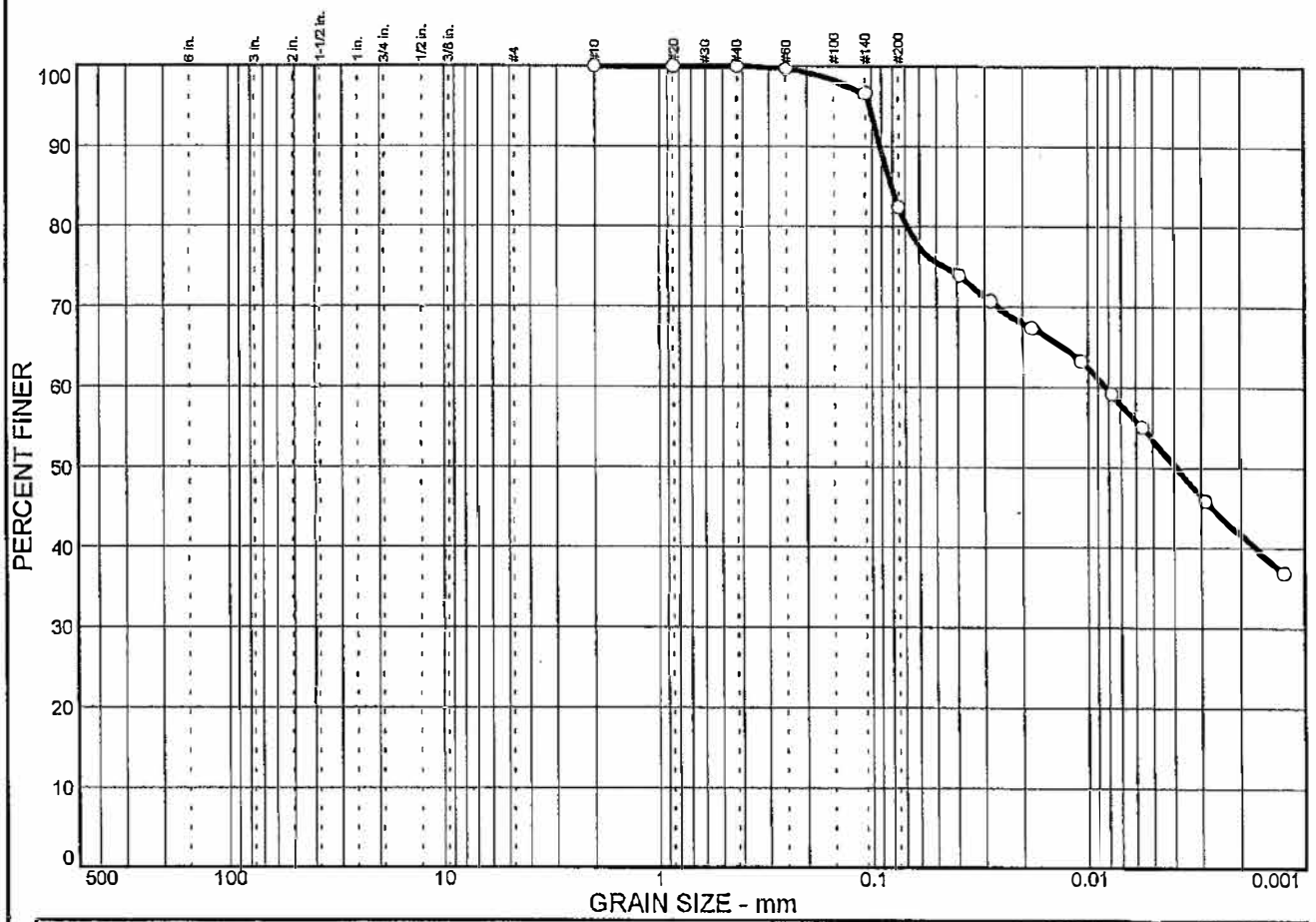
Remarks

Sample No.: B1-6 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 18 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	17.6	28.8	53.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	100.0		
#40	100.0		
#60	99.7		
#140	96.7		
#200	82.4		

* (no specification provided)

Soil Description

Gray silty clay with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.0810 D_{60}= 0.0082 D_{50}= 0.0038
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= CL AASHTO=

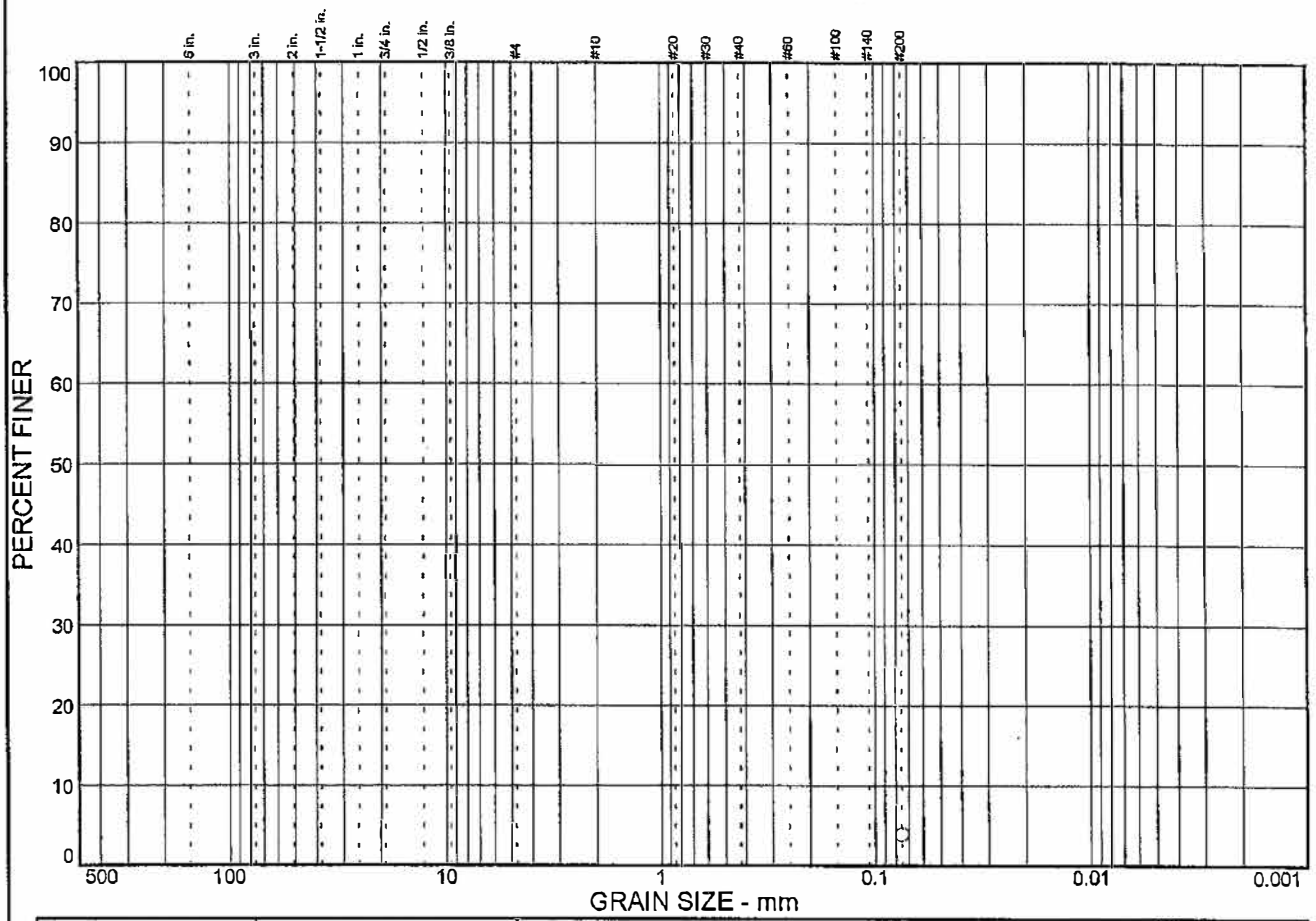
Remarks

Sample No.: B1-16 Source of Sample: Date: 1/9/03
Location: Elev./Depth: 104 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			4.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.0		

* (no specification provided)

Soil Description

Brown poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP AASHTO=

Remarks

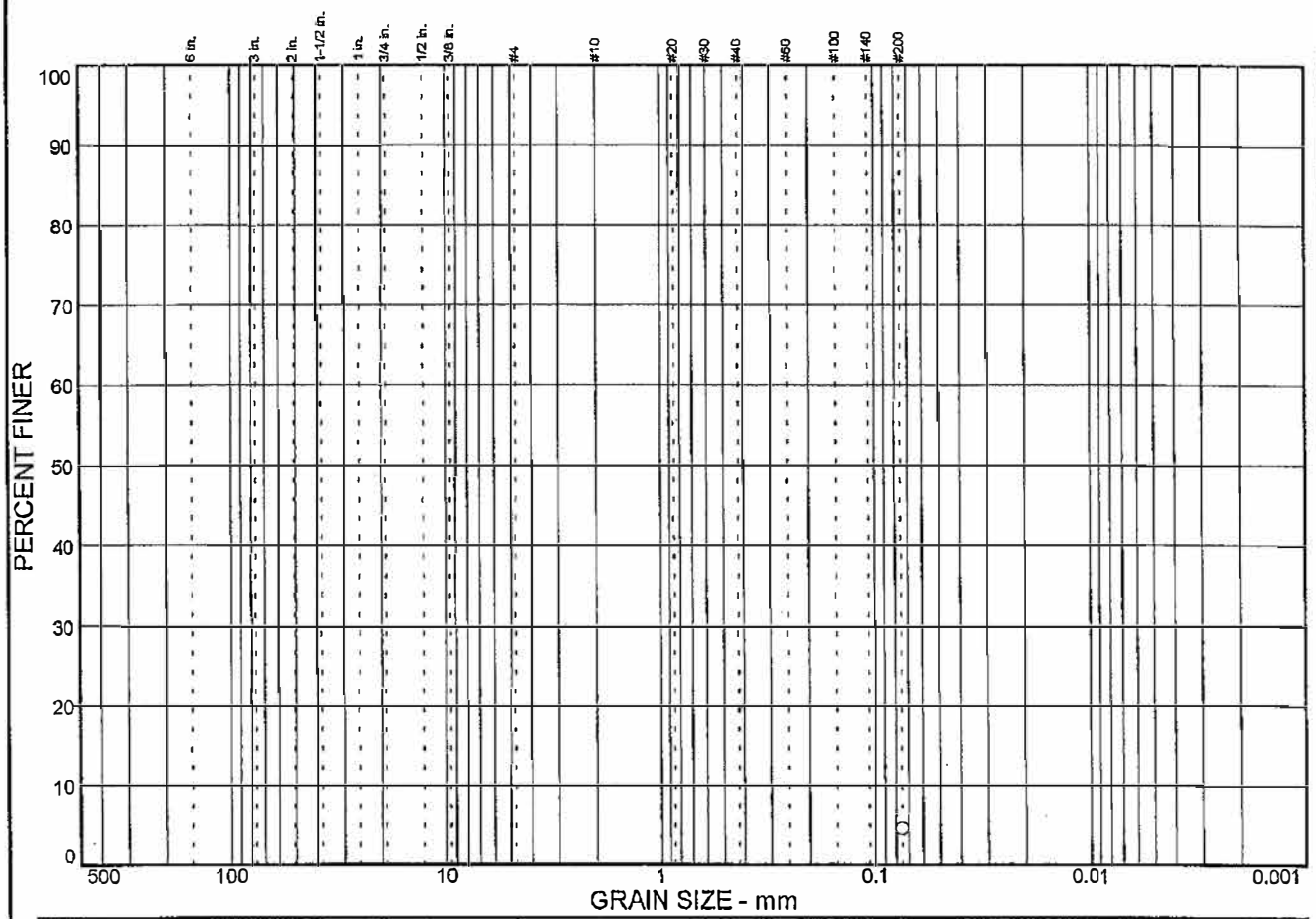
Minus #200 wash only

Sample No.: B3-1 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 2 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.7		

* (no specification provided)

Soil Description

Brown poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP AASHTO=

Remarks

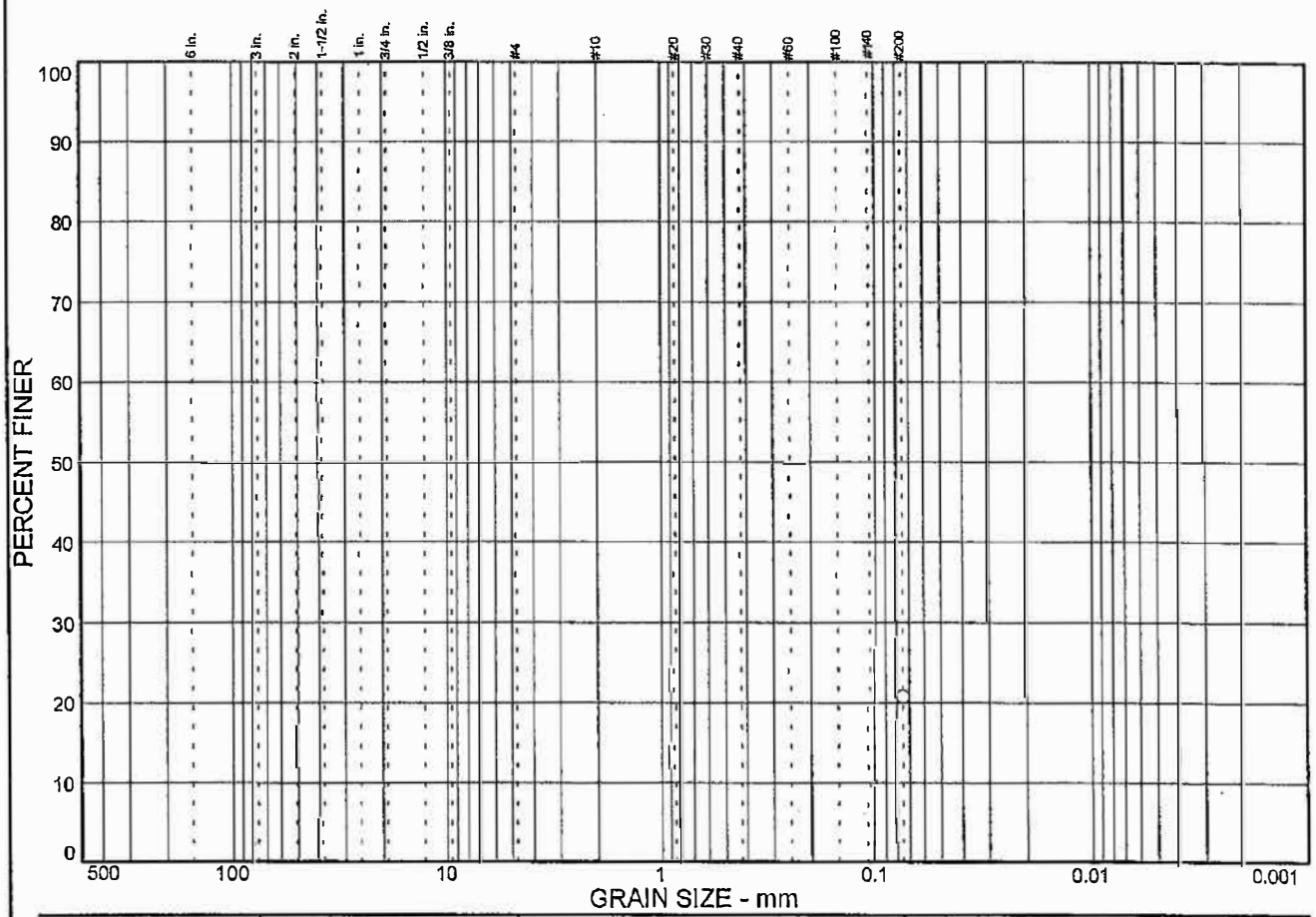
Minus #200 wash only

Sample No.: B3-2 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 7 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			20.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	20.8		

* (no specification provided)

Soil Description

Gray silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

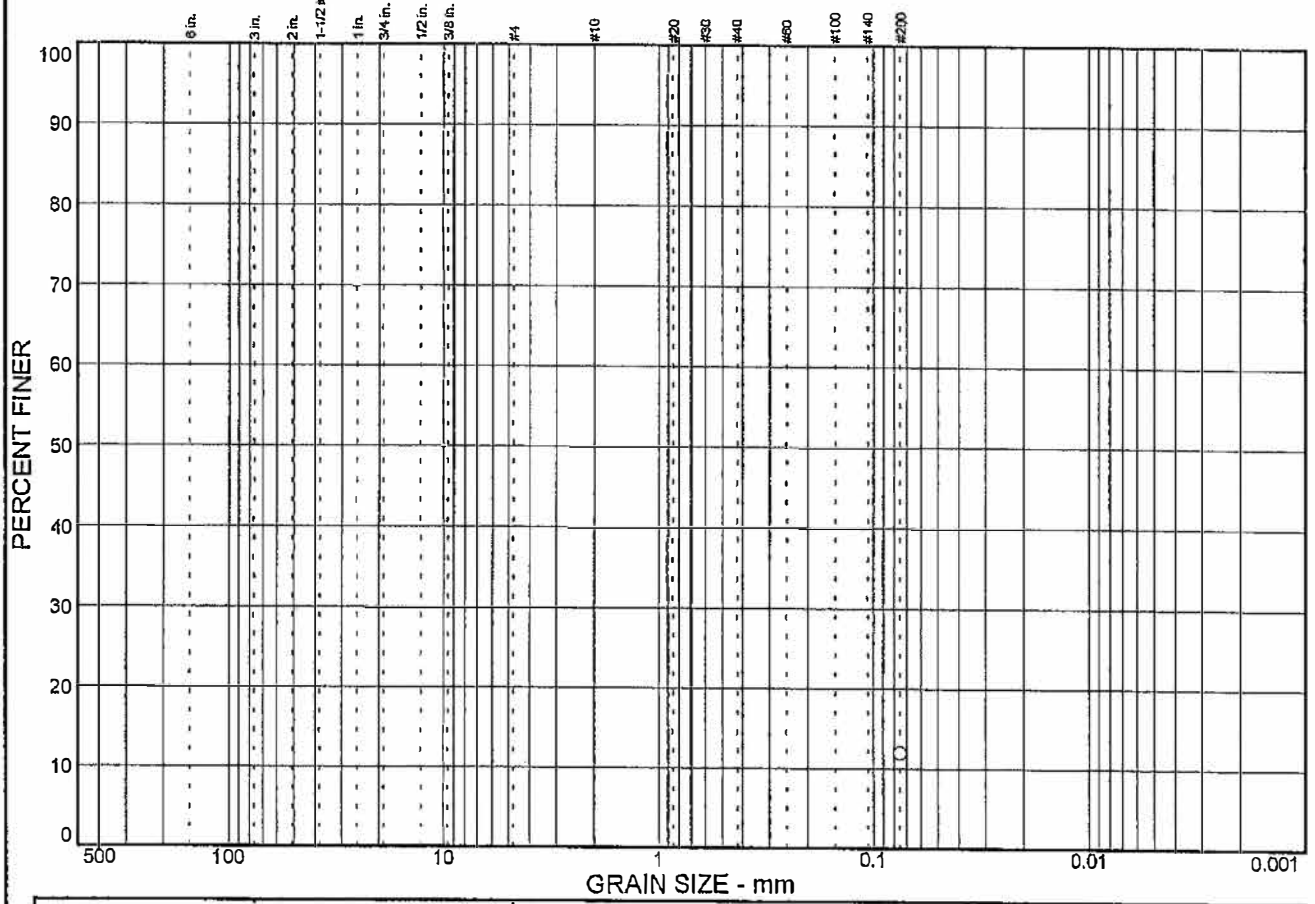
Minus #200 wash only

Sample No.: B3-3 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 18 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			12.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	12.0		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

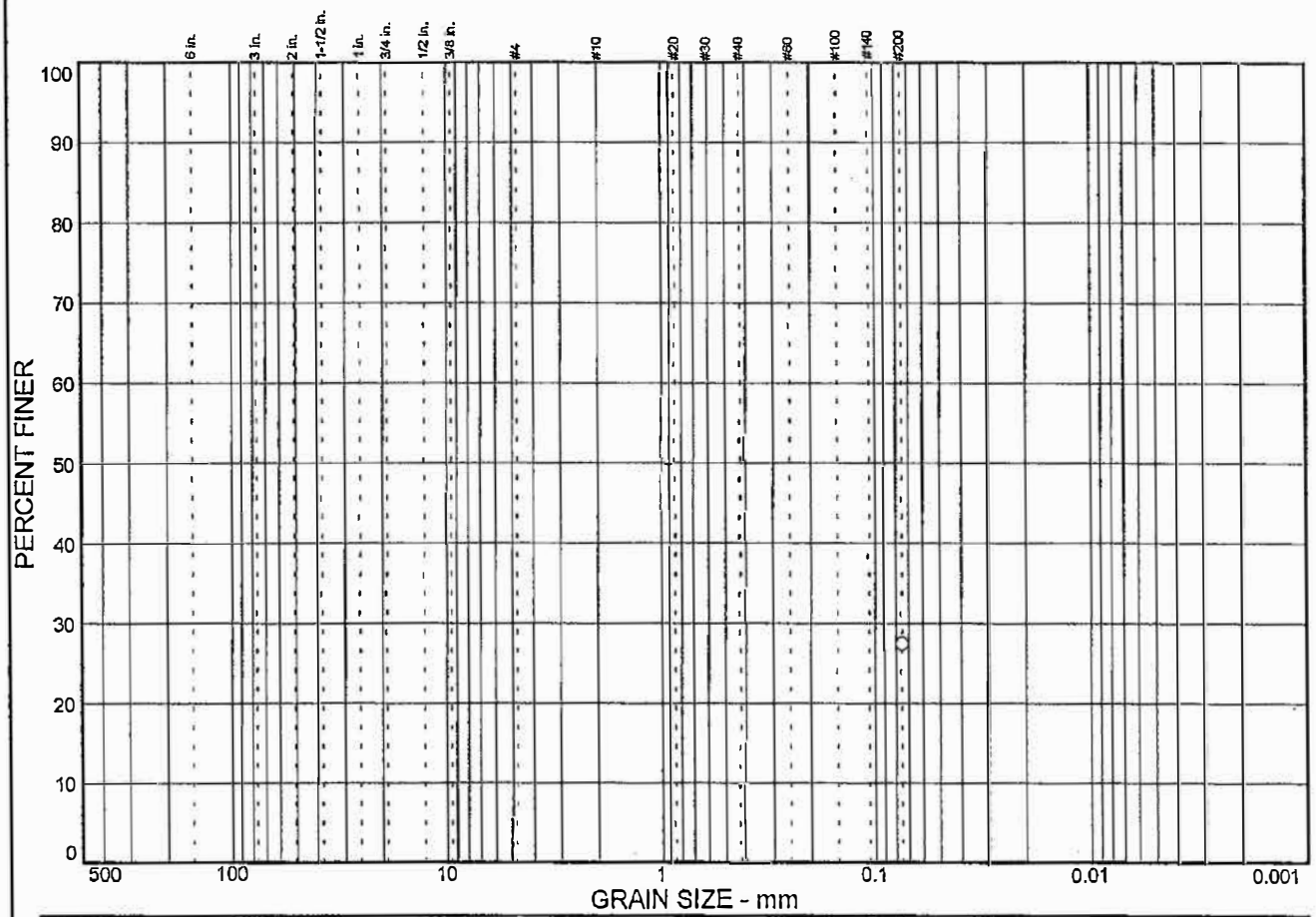
Minus #200 wash only

Sample No.: B3-5 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 29 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			27.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	27.5		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

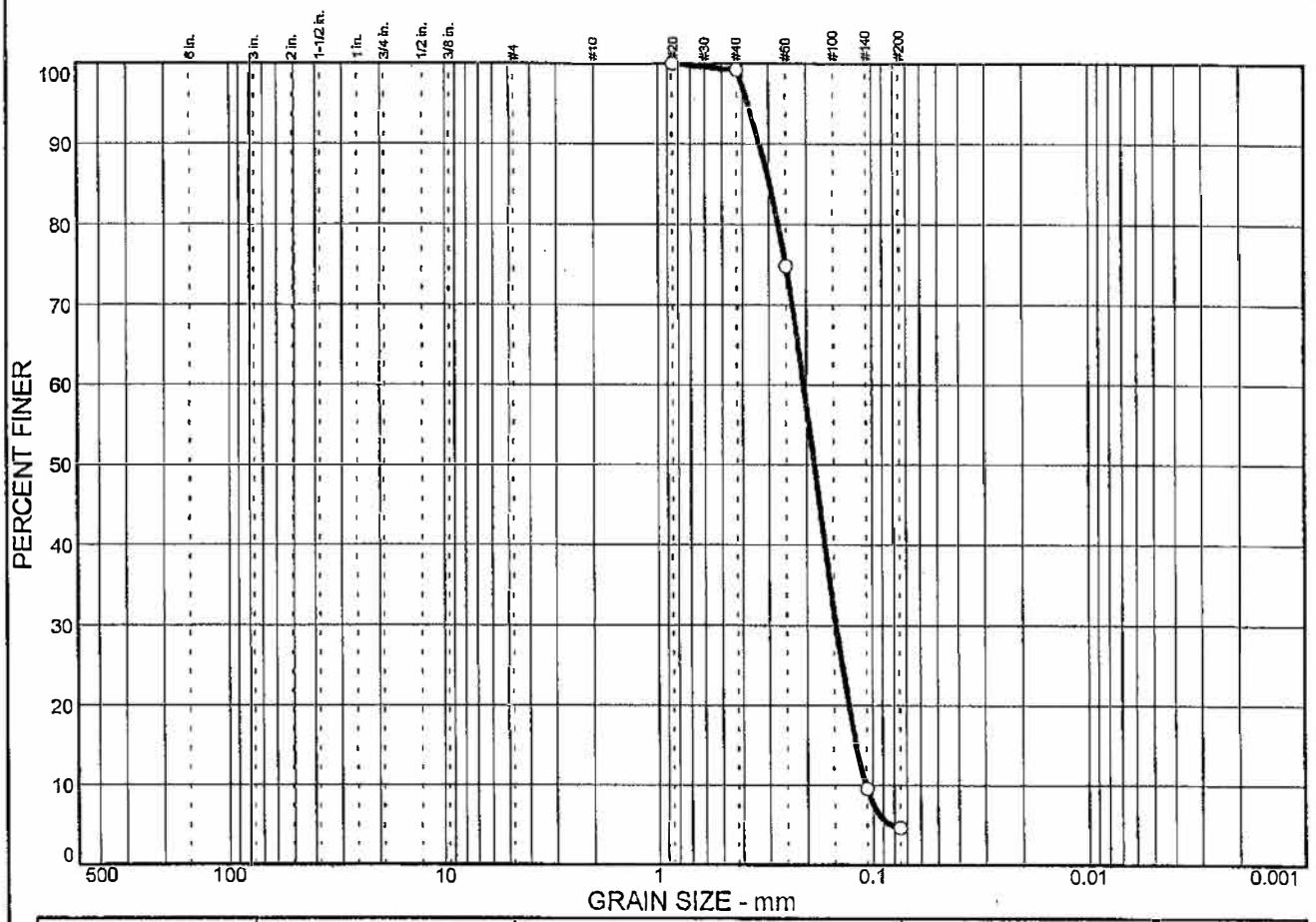
Minus #200 wash only

Sample No.: B3-6 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 39 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	95.3	4.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#20	100.0		
#40	99.2		
#60	74.8		
#140	9.6		
#200	4.7		

* (no specification provided)

Soil Description

Brown poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.298 D_{60}= 0.207 D_{50}= 0.185
D_{30}= 0.147 D_{15}= 0.119 D_{10}= 0.107
C_u= 1.93 C_c= 0.97

Classification

USCS= SP AASHTO=

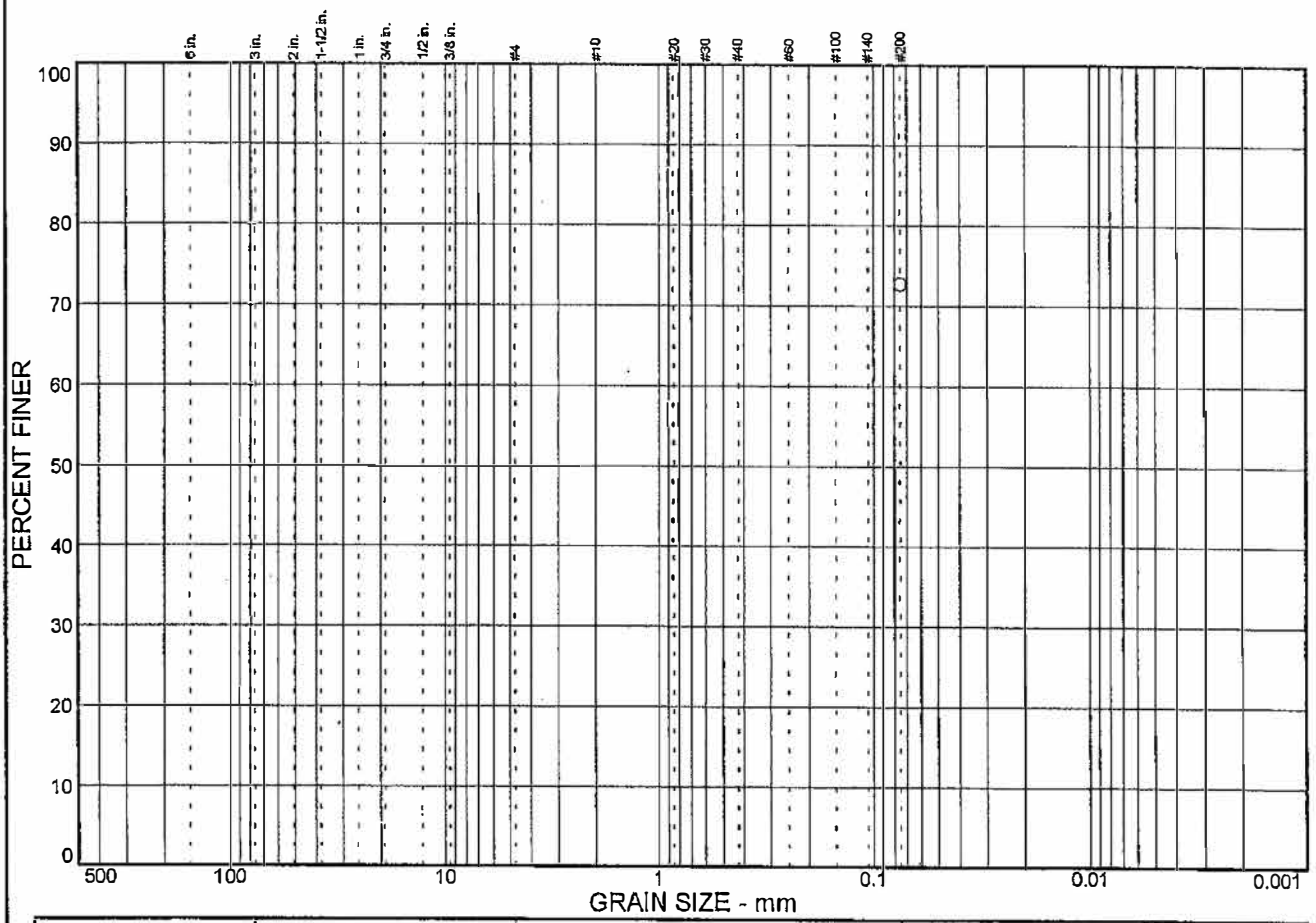
Remarks

Sample No.: B3-8 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 59 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			72.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	72.7		

* (no specification provided)

Soil Description

Brown silt with sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= ML AASHTO=

Remarks

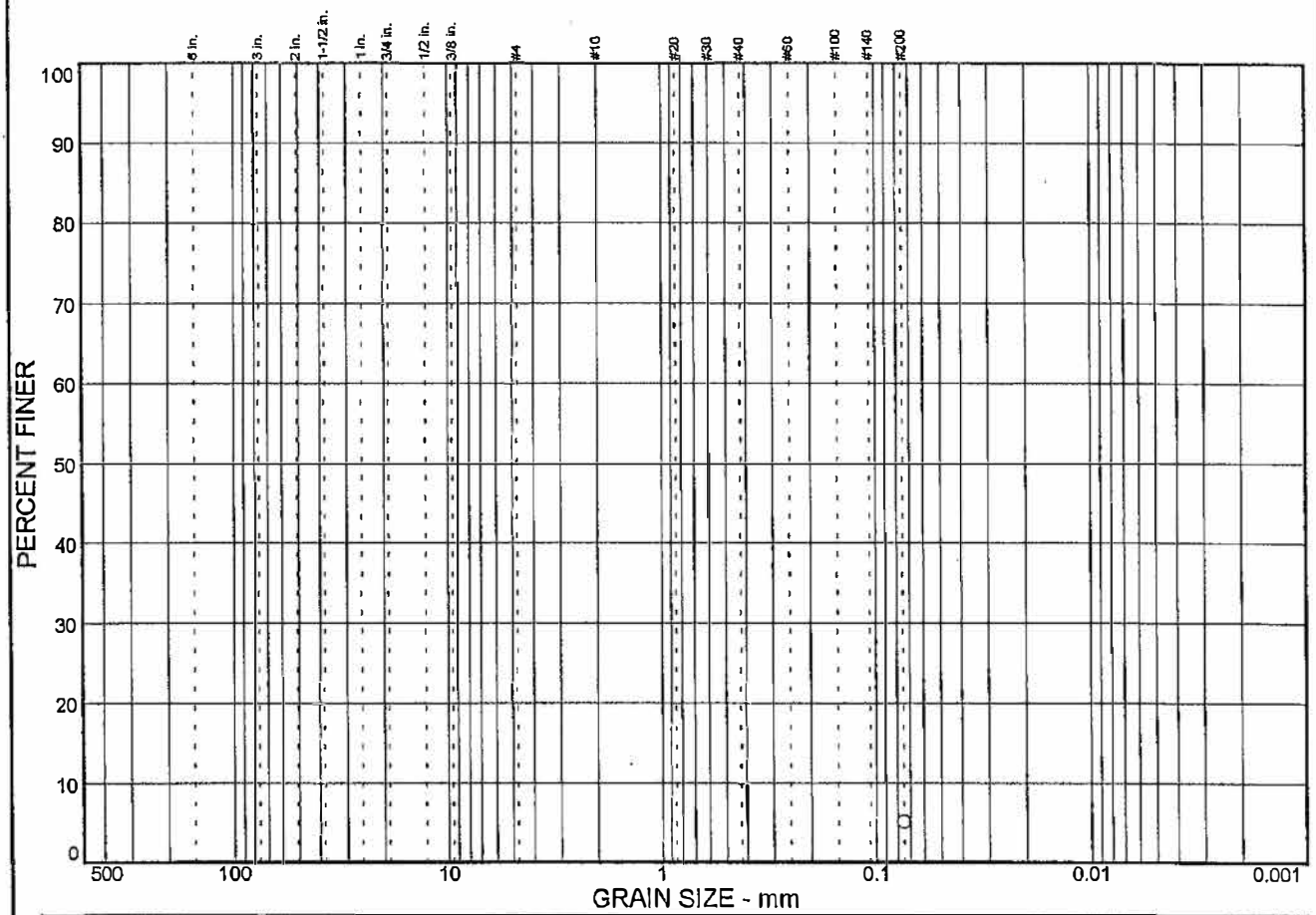
Minus #200 wash only

Sample No.: B3-11 Source of Sample: Date: 1/13/03
Location: Elev./Depth: 89 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			5.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	5.2		

* (no specification provided)

Soil Description

Olive gray silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

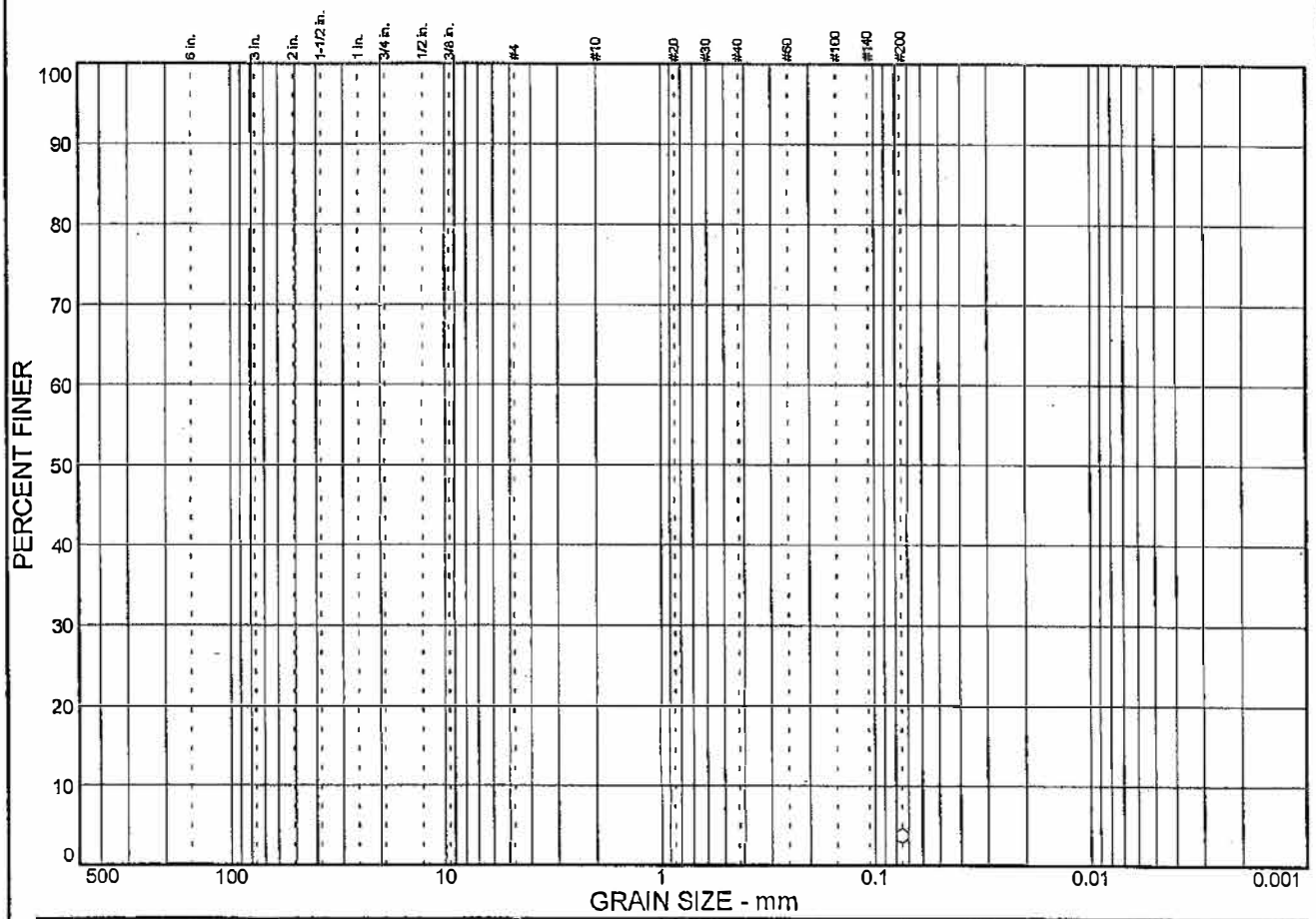
Minus #200 wash only

Sample No.: B3-12 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 99 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			3.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	3.8		

* (no specification provided)

Soil Description

Brown poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP AASHTO=

Remarks

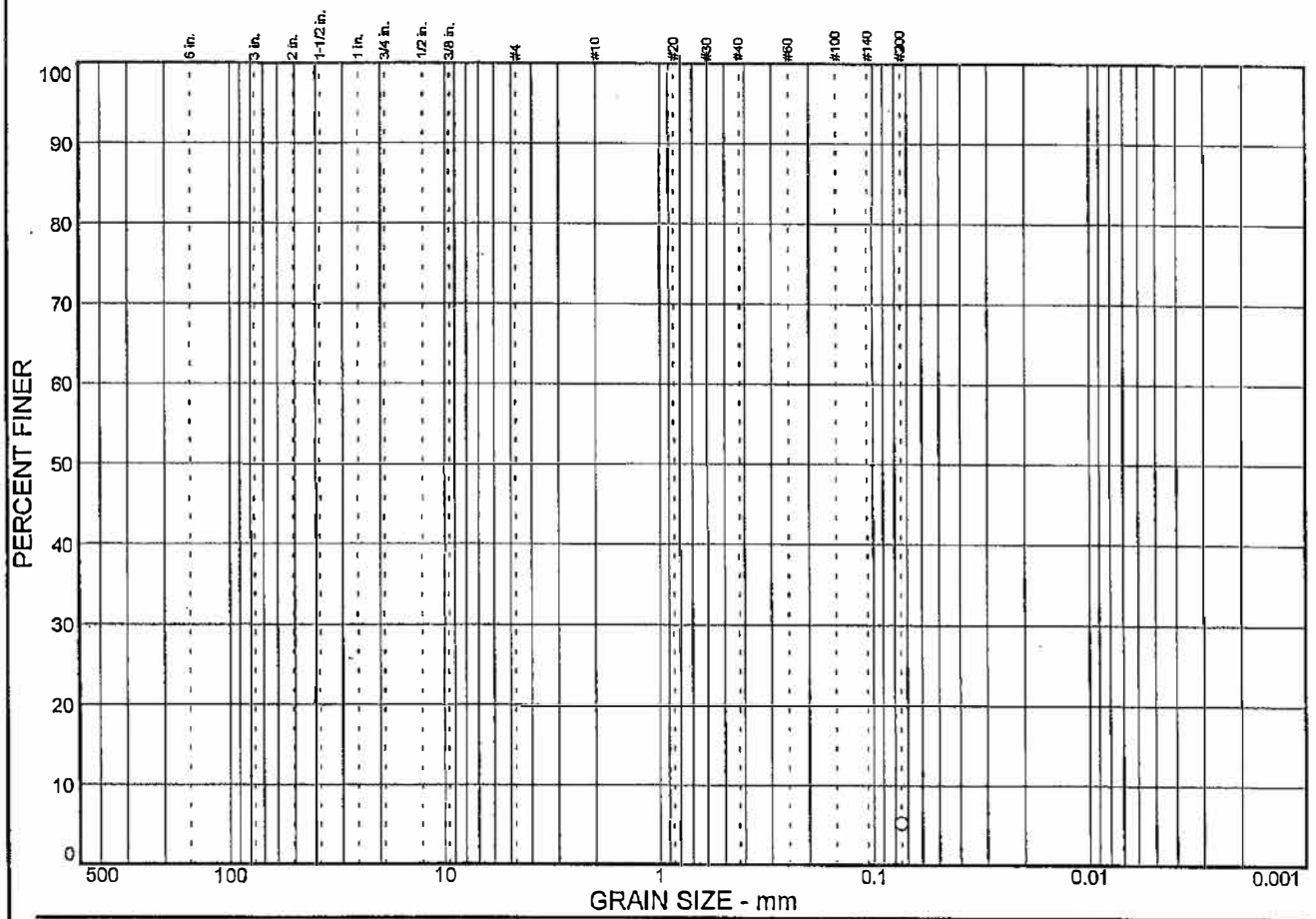
Minus #200 wash only

Sample No.: B5-2 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 7 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			5.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	5.3		

* (no specification provided)

Soil Description

Gray poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

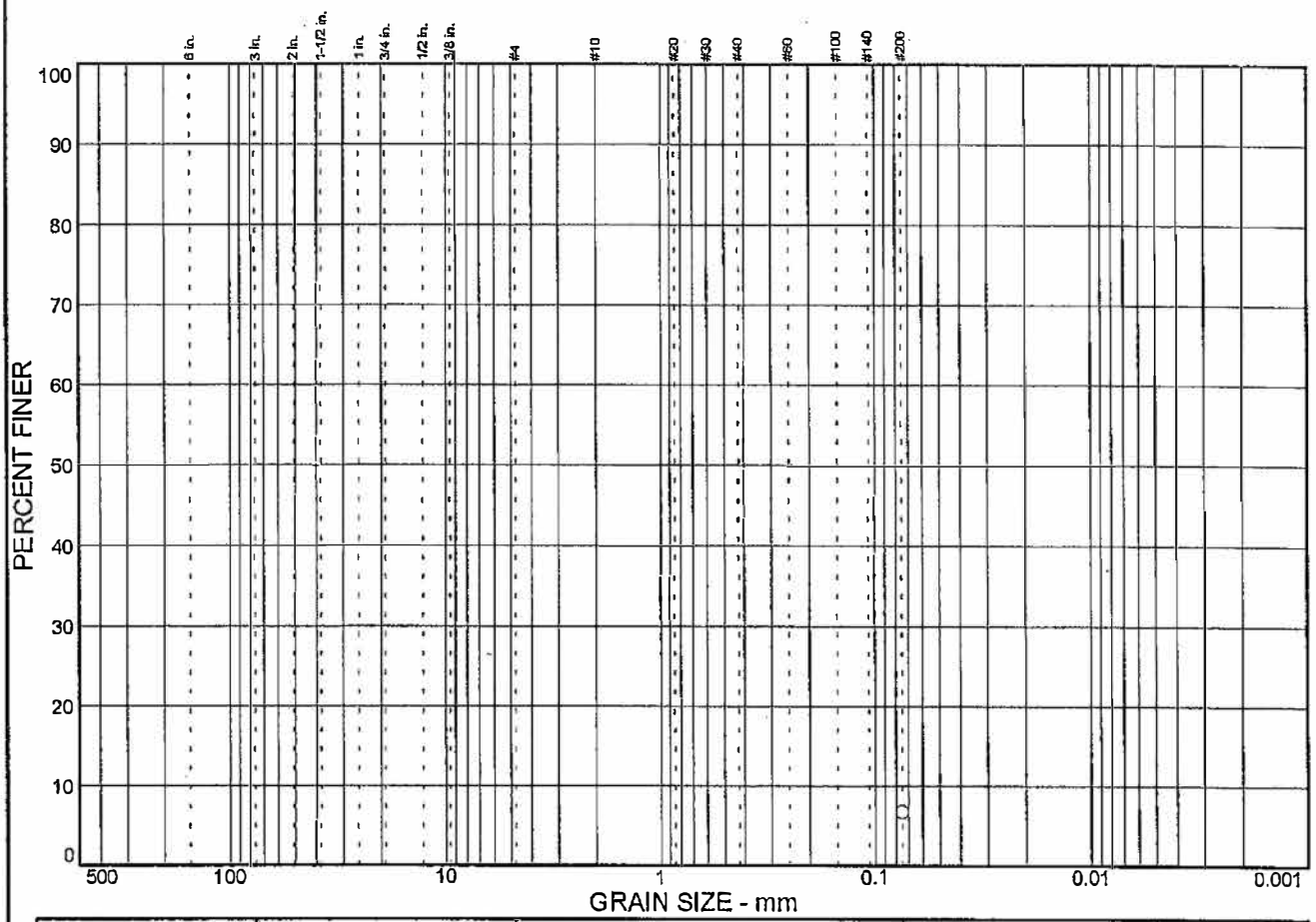
Minus #200 wash only

Sample No.: B5-4 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 17 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			6.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	6.8		

* (no specification provided)

Soil Description

Brown and gray silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

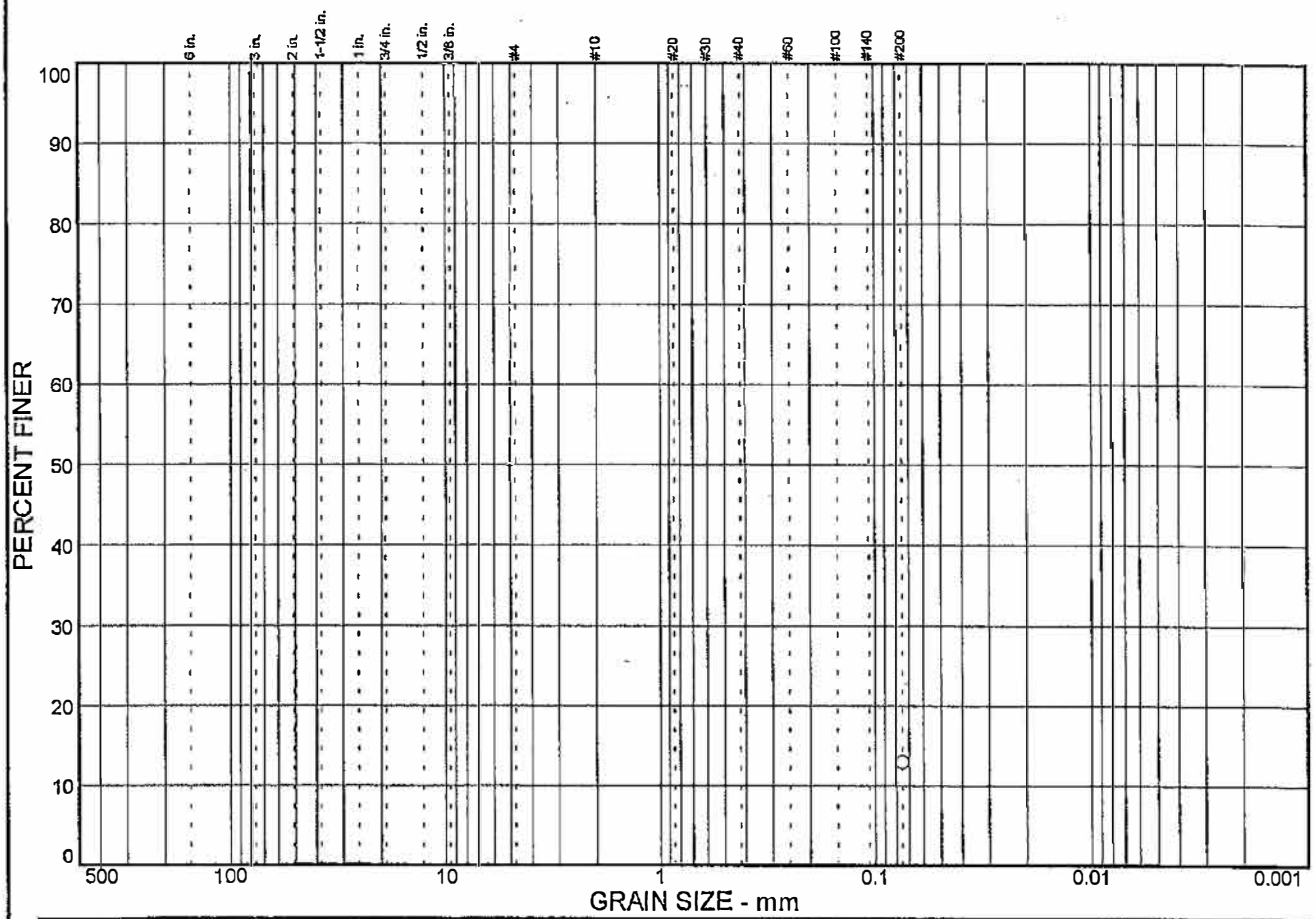
Minus #200 wash only

Sample No.: B5-5 Source of Sample: Date: 1/9/03
Location: Elev./Depth: 22 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			13.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	13.0		

* (no specification provided)

Soil Description

Brown silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

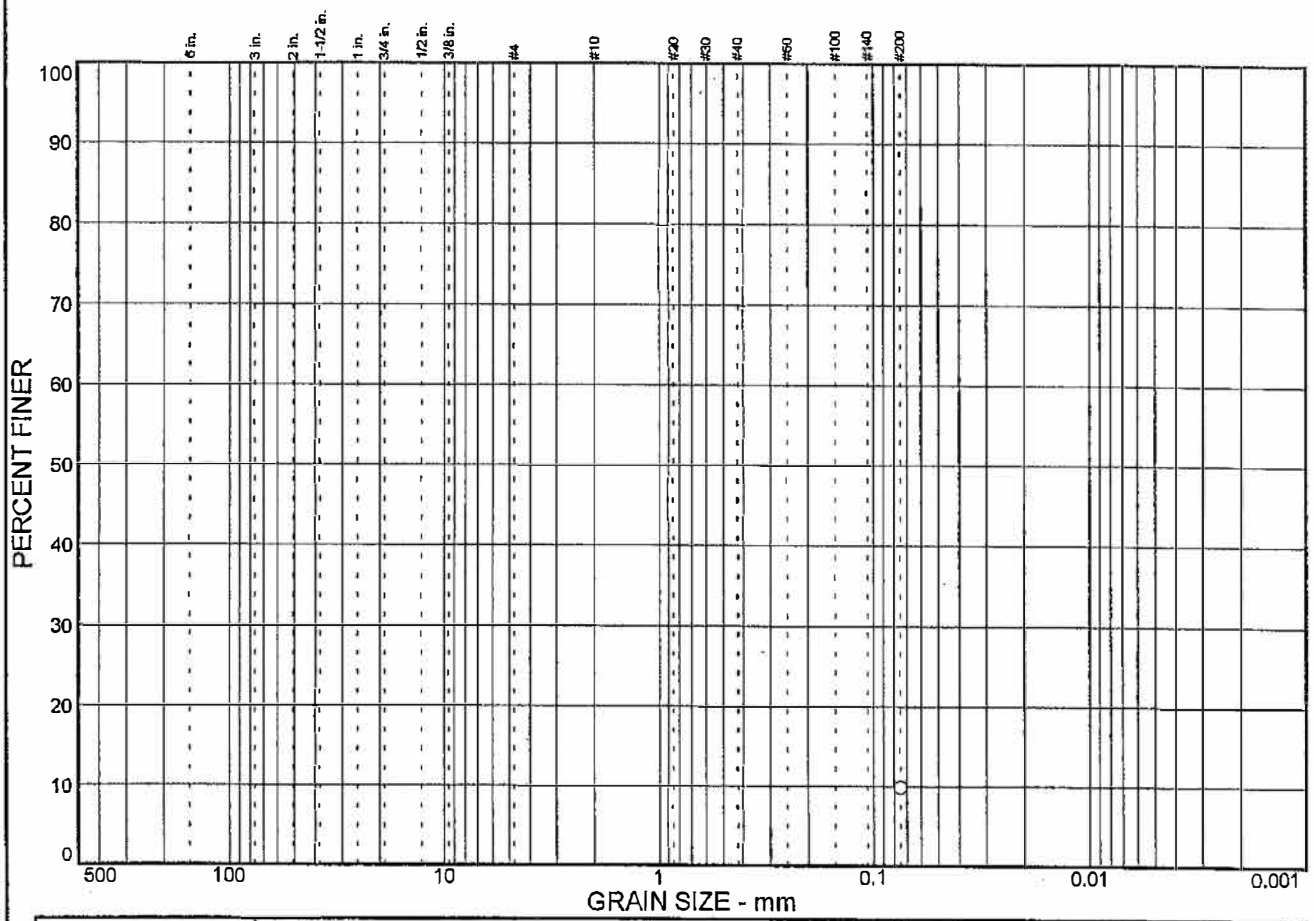
Minus #200 wash only

Sample No.: B5-6 Source of Sample: Date: 1/9/03
Location: Elev./Depth: 29 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			9.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	9.9		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

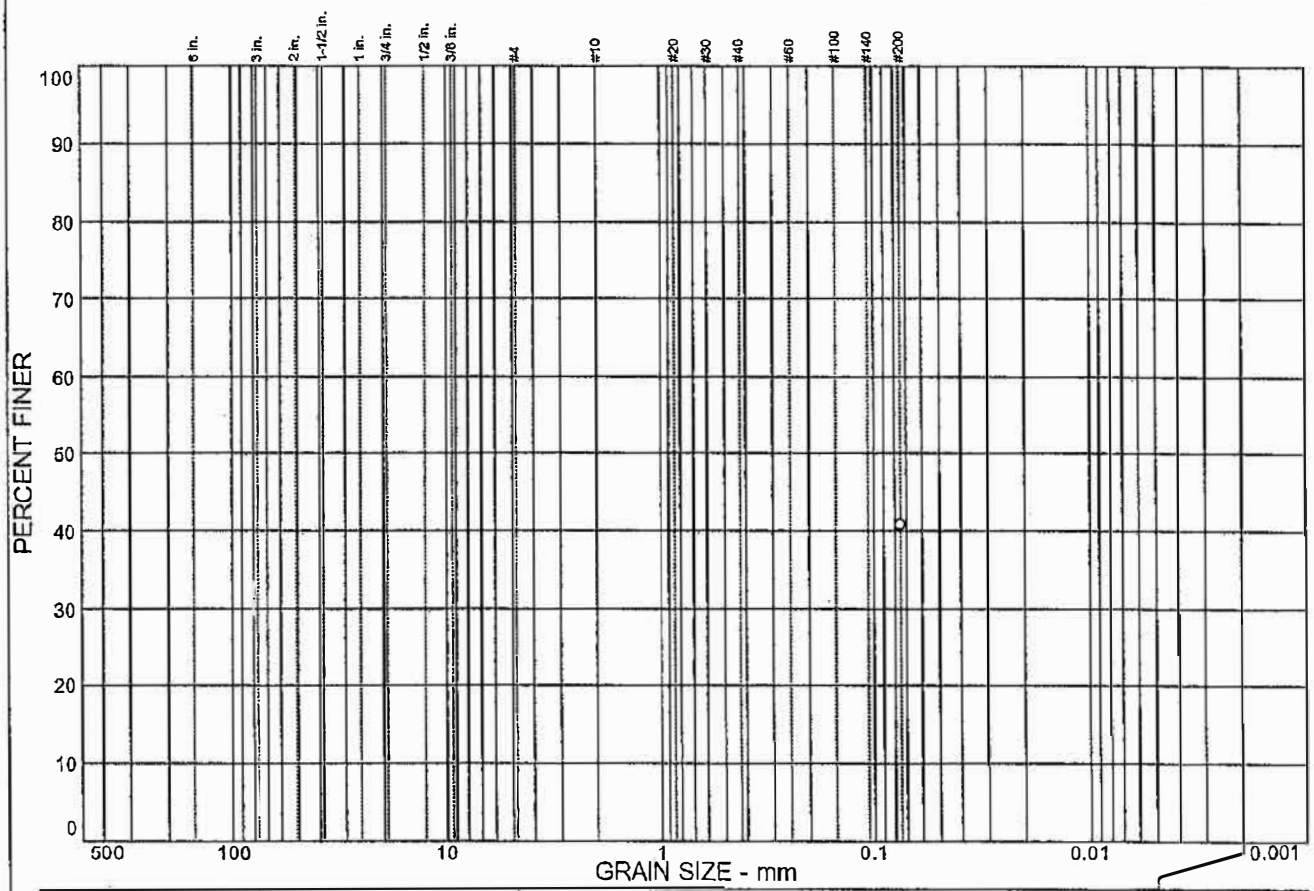
Minus #200 wash only

Sample No.: B5-7 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 39 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
						40.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	40.8		

* (no specification provided)

Soil Description

Olive brown silty clayey Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

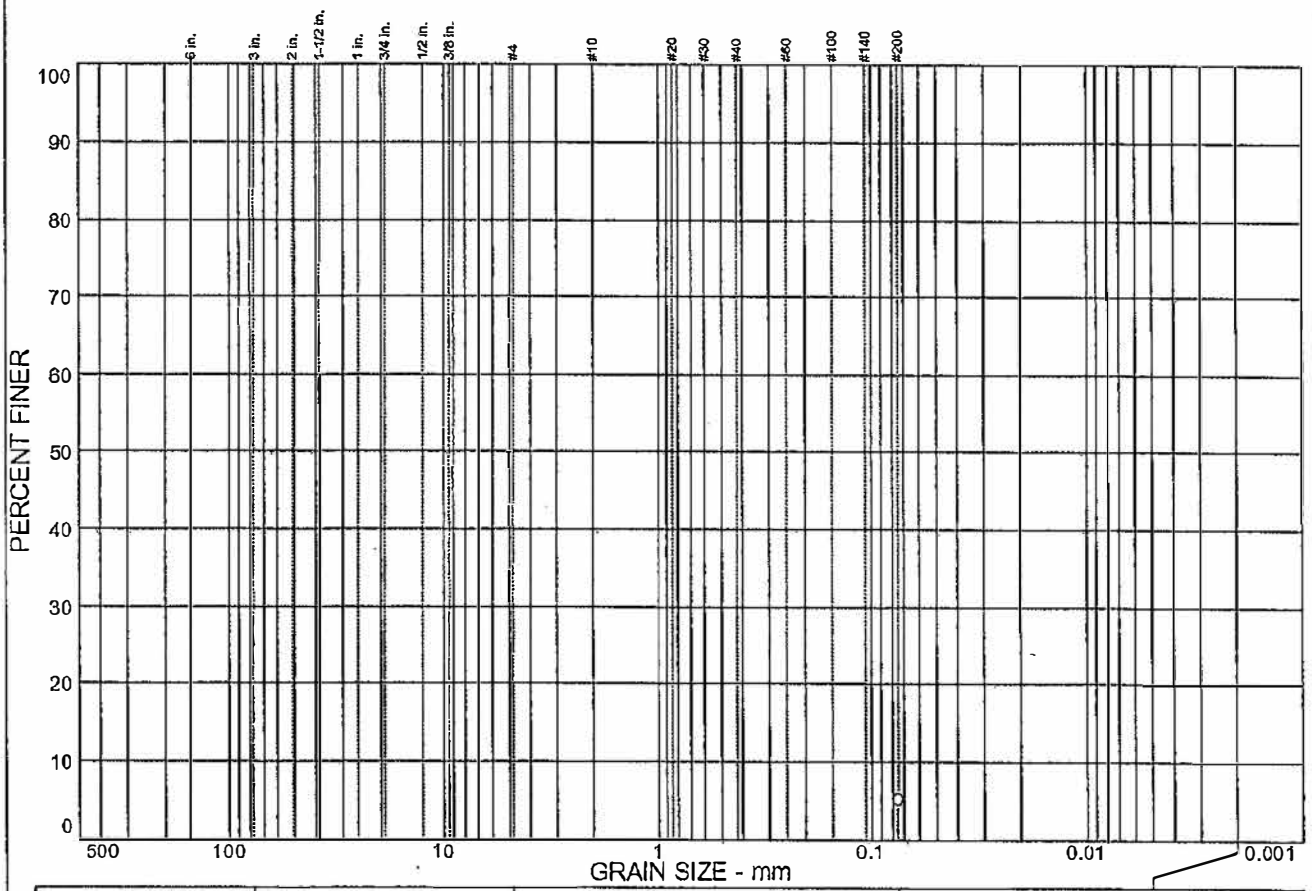
Remarks

Sample No.: 6-1 Source of Sample: %200 Date: 01/06/03
Location: Elev./Depth: 2 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client: 5687.1.001.02
Project: Alameda Point, Alameda, Ca.
Project No: 5687 Plate

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
						5.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	5.0		

* (no specification provided)

Soil Description

Olive gray sand with some silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

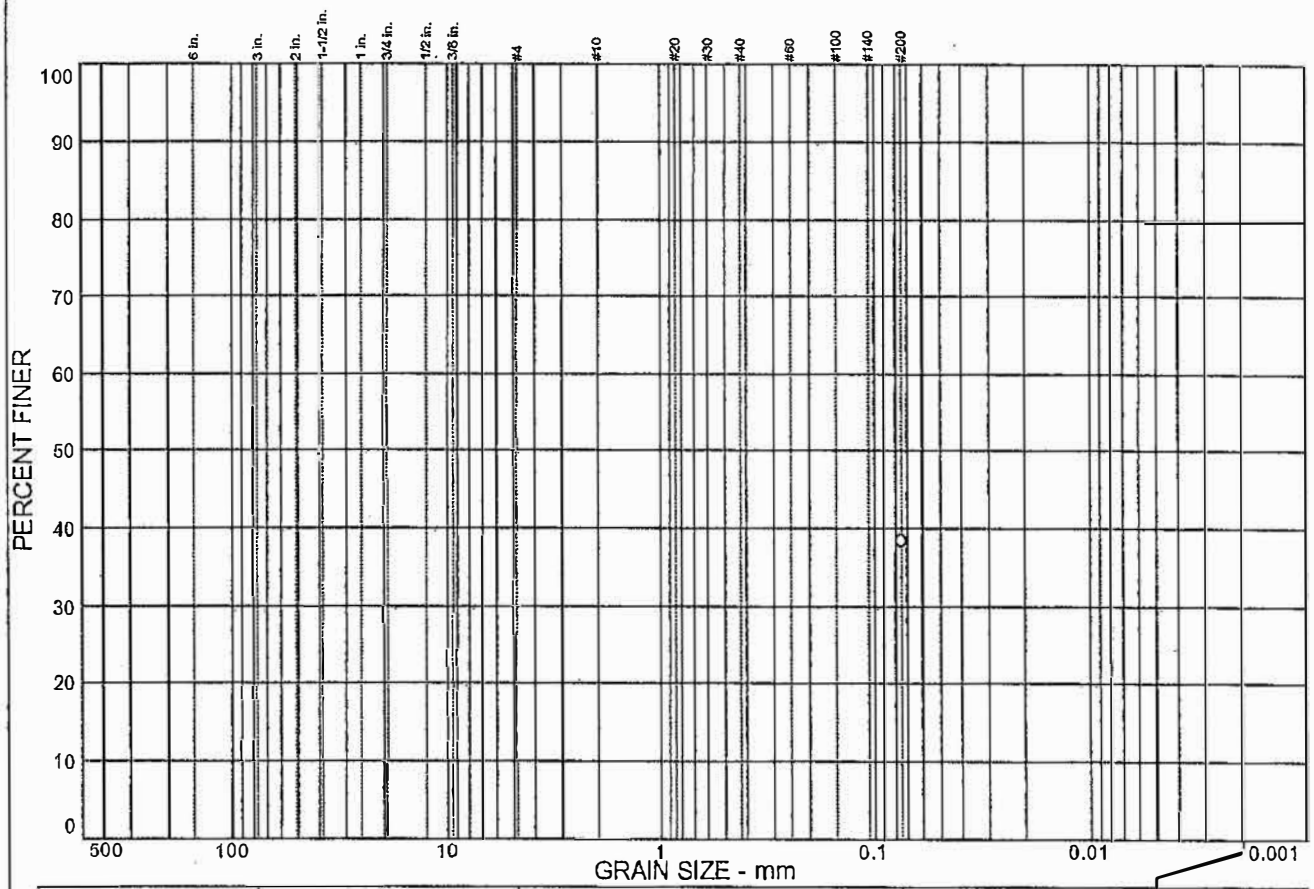
Remarks

Sample No.: 6-2 **Source of Sample:** %200 **Date:** 01/06/03
Location: **Elev./Depth:** 7.0-8.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client: 5687.1.001.02
Project: Alameda Point, Alameda, Ca.
Project No: 5687 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
						38.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	38.4		

* (no specification provided)

Soil Description

Dark greenish gray silty clayey fine Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

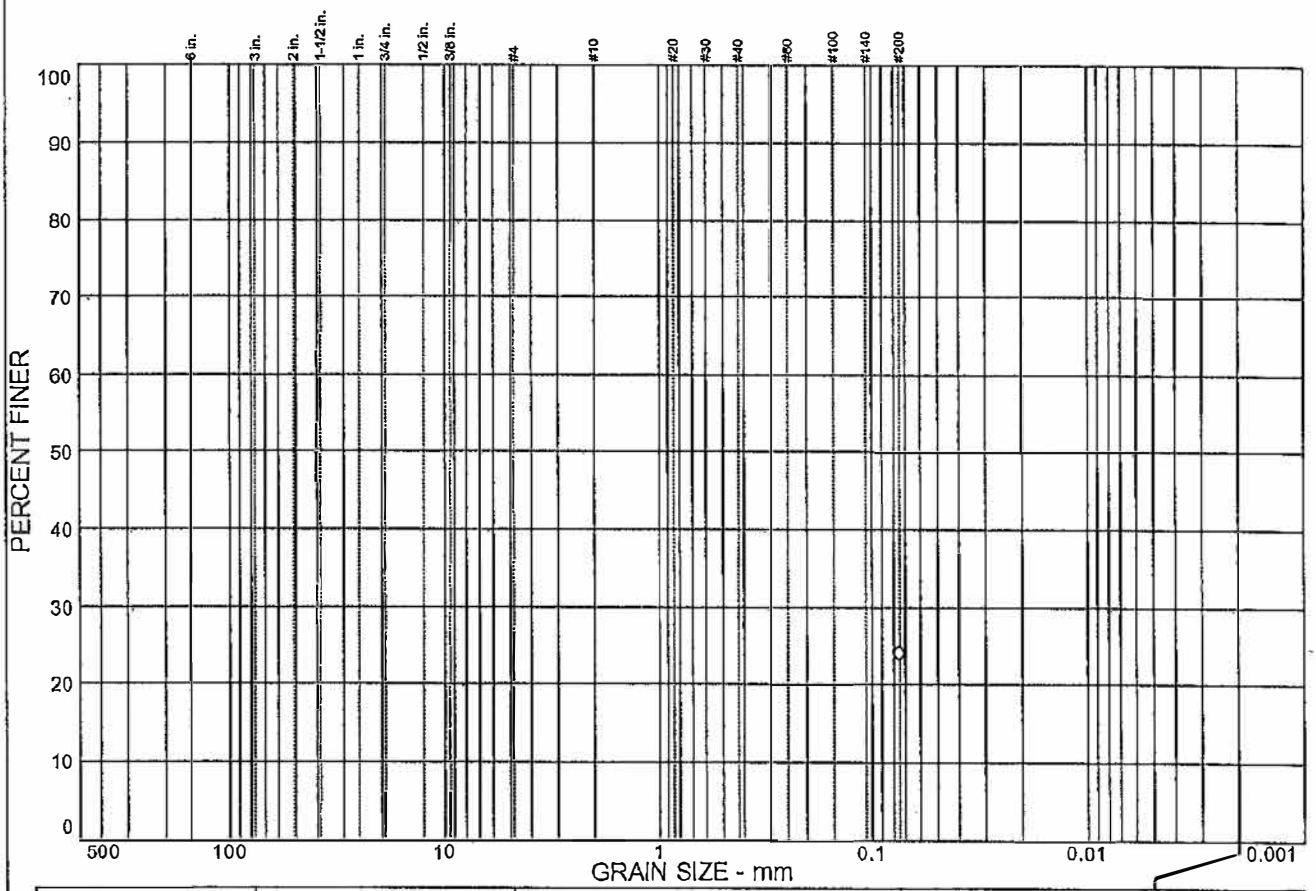
Sample No.: 6-3 **Source of Sample:** %200 **Date:** 01/06/03
Location: **Elev./Depth:** 12.0-13.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client: 5687.1.001.02
Project: Alameda Point, Alameda, Ca.

Project No: 5687 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
						24.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	24.0		

* (no specification provided)

Soil Description

Olive brown silty Sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

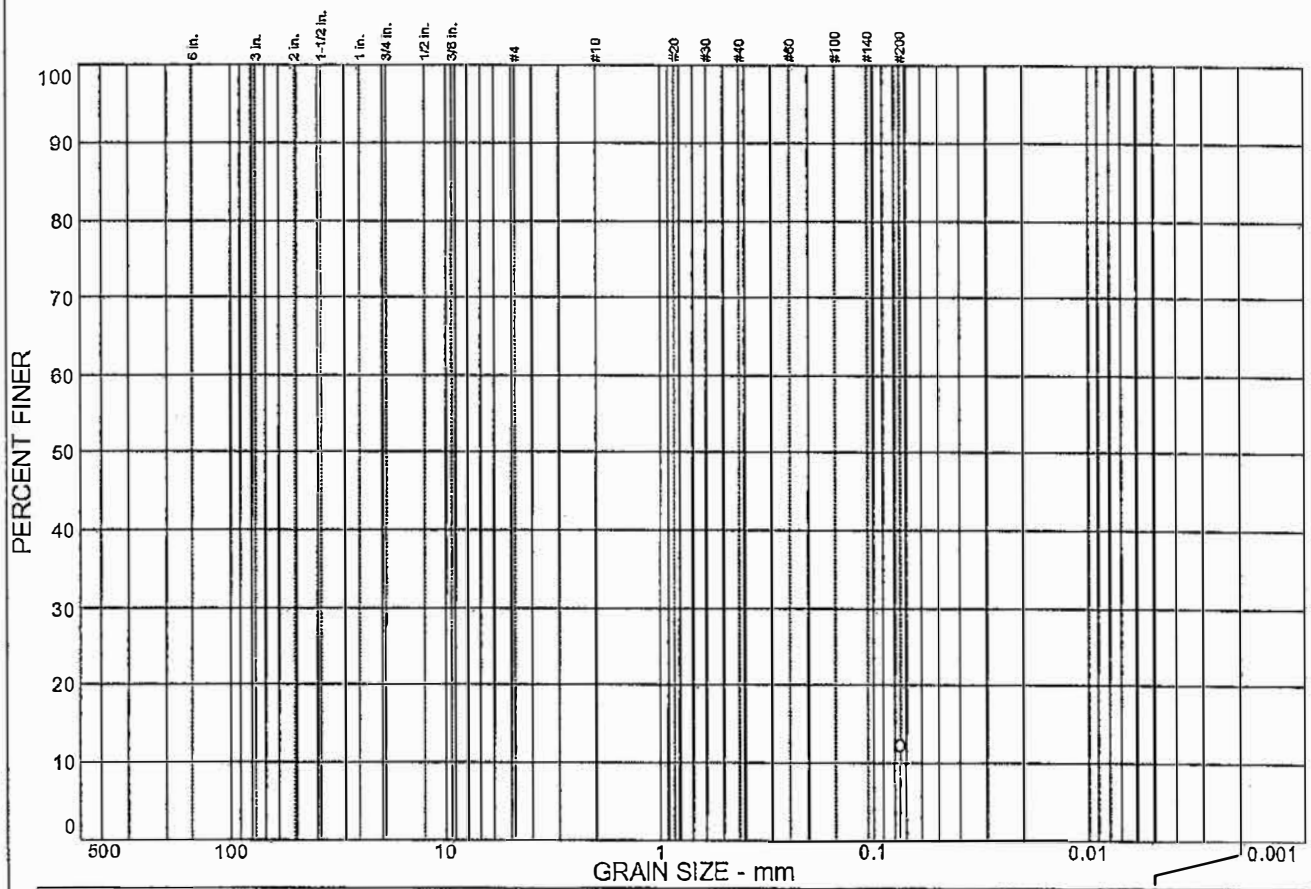
Remarks

Sample No.: 6-4 **Source of Sample:** %200 **Date:** 01/06/03
Location: **Elev./Depth:** 17.0-18.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client: 5687.1.001.02
Project: Alameda Point, Alameda, Ca.
Project No: 5687 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
						12.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	12.1		

* (no specification provided)

Soil Description

Olive brown Sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

Remarks

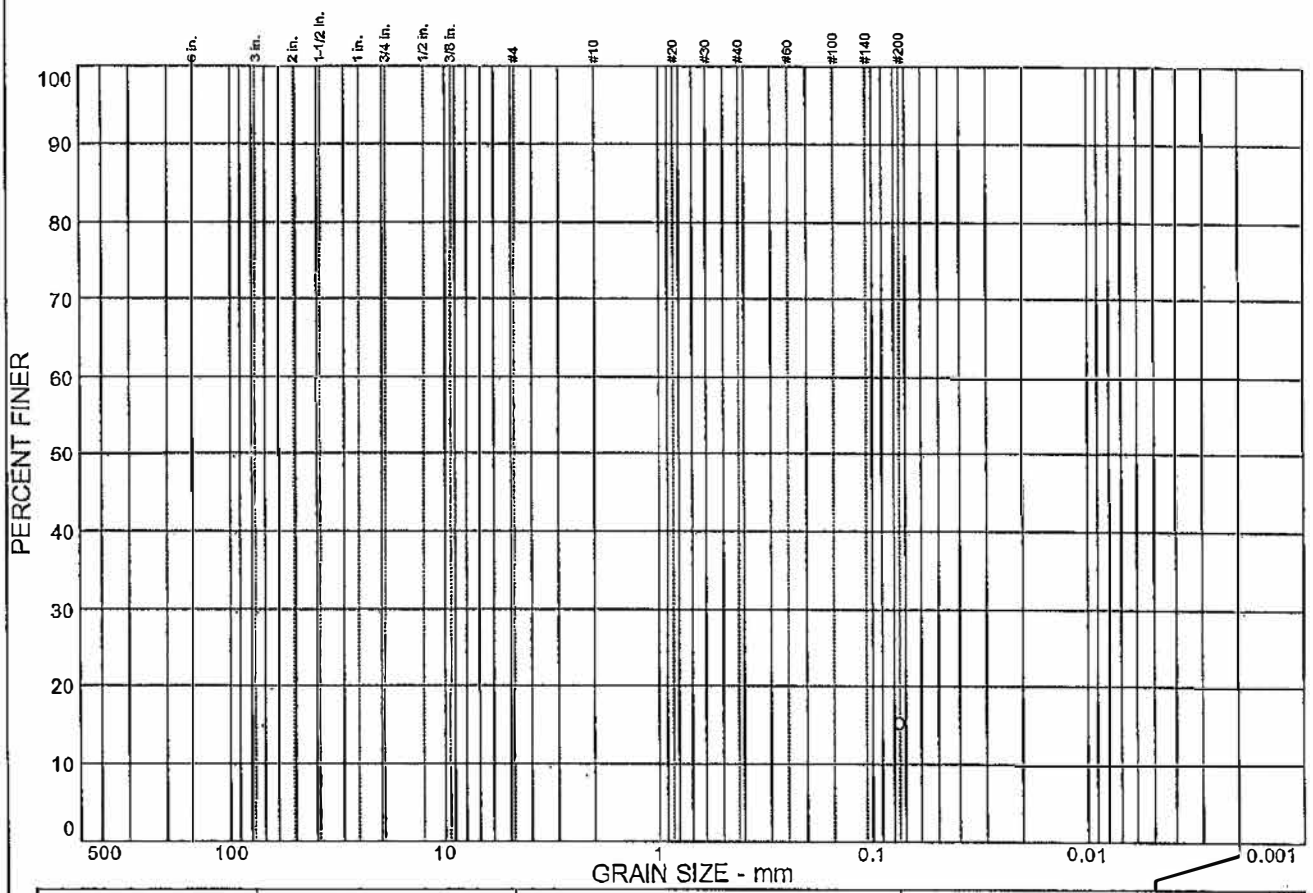
Sample No.: 6-5 **Source of Sample:** %200 **Date:** 01/06/03
Location: **Elev./Depth:** 22.0-23.5

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client: 5687.1.001.02
Project: Alameda Point, Alameda, Ca.

Project No: 5687 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL		% SAND			% FINES	
	CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
						15.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	15.1		

* (no specification provided)

Soil Description

Light olive brown Sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= AASHTO=

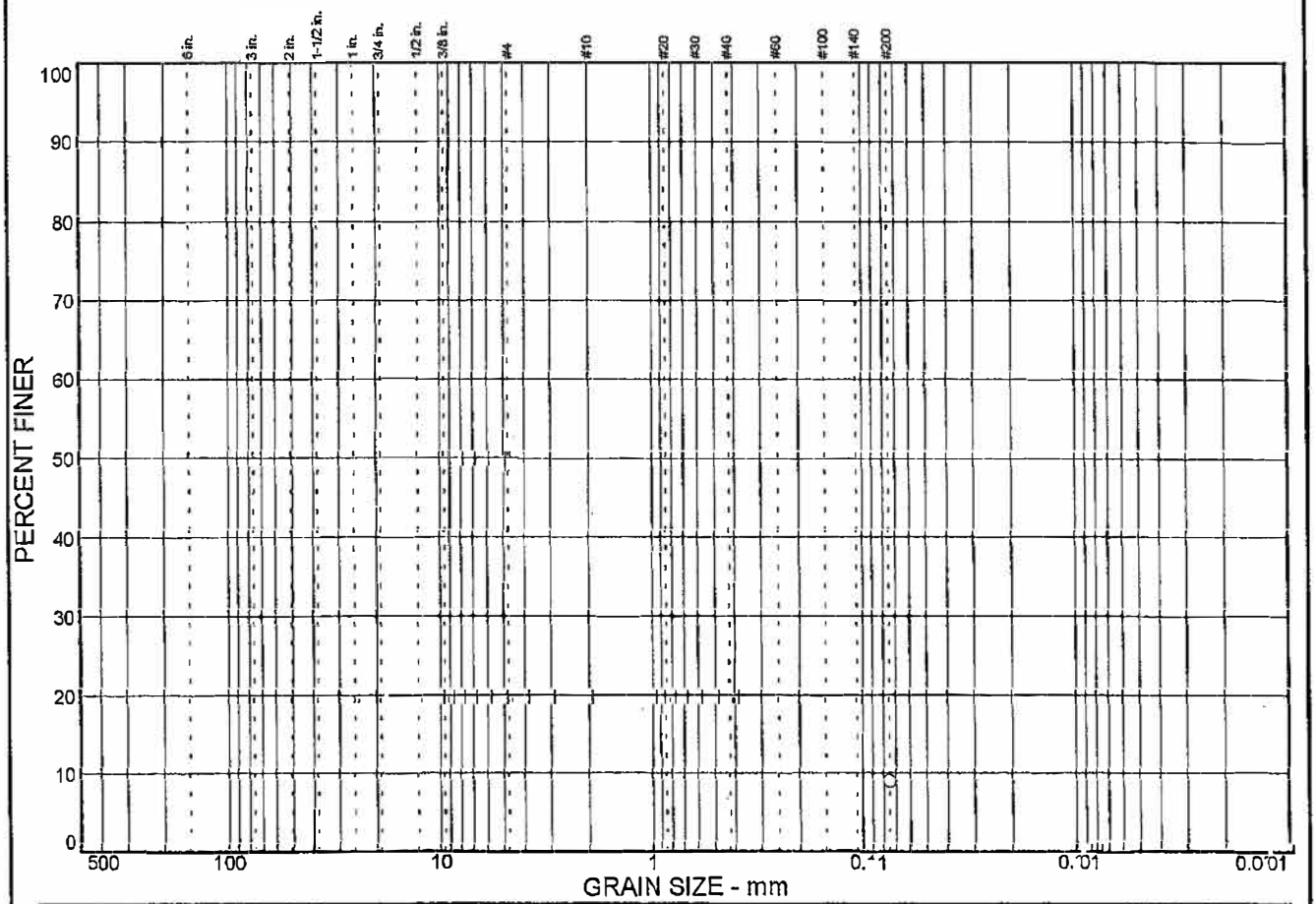
Remarks

Sample No.: 6-7 Source of Sample: %200 Date: 01/06/03
Location: Elev./Depth: 39.0-40.5 ft.

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS MATERIALS TESTING

Client: 5687.1.001.02
Project: Alameda Point, Alameda, Ca.
Project No: 5687 Plate

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			9.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	9.0		

* (no specification provided)

Soil Description

Black poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP AASHTO=

Remarks

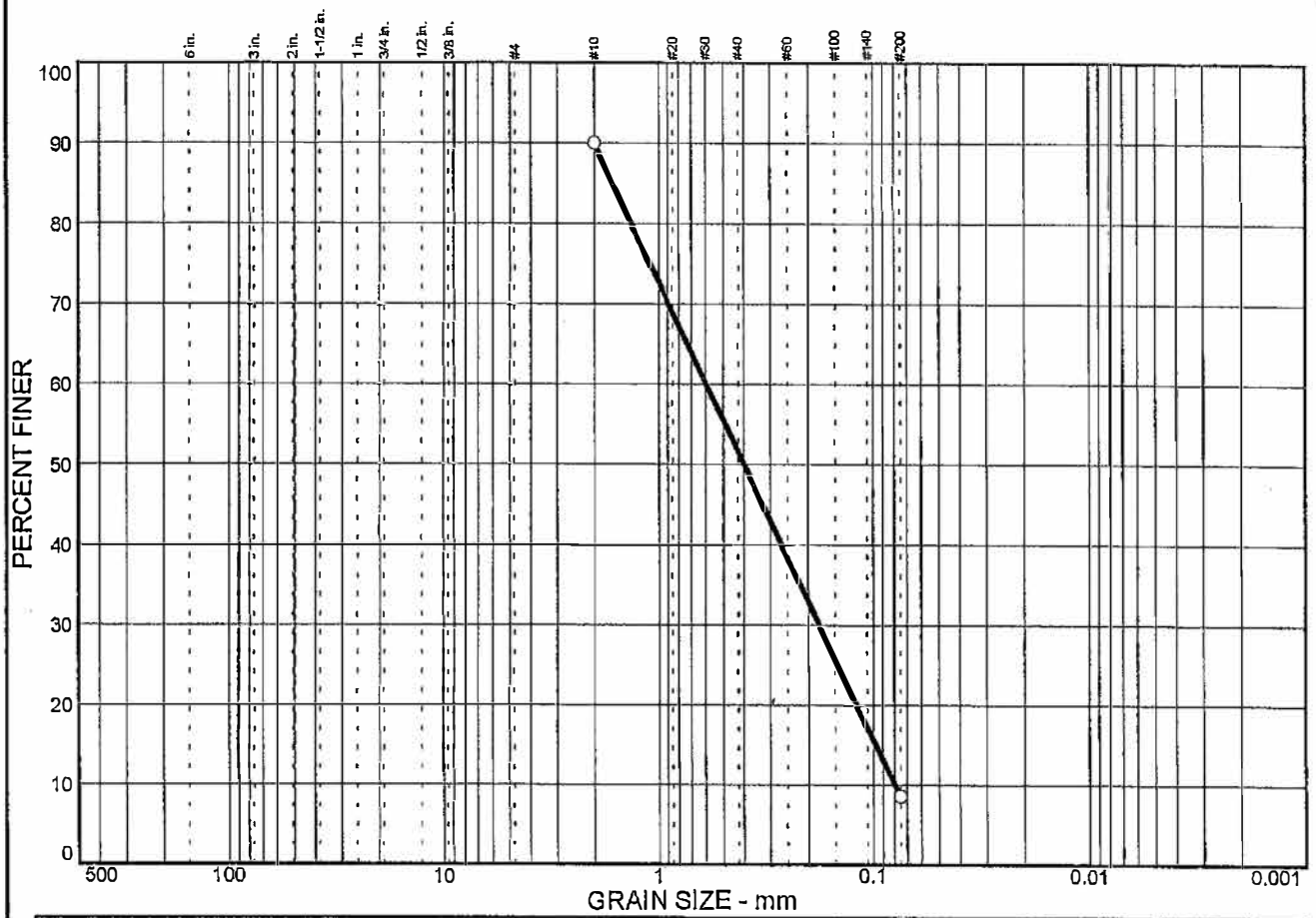
Minus #200 wash only

Sample No.: B7-1 Source of Sample: Date: 1/9/03
Location: Elev./Depth: 2 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			8.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	90.0		
#200	8.6		

* (no specification provided)

Soil Description

Gray poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 1.63 D_{60}= 0.596 D_{50}= 0.398
D_{30}= 0.178 D_{15}= 0.0971 D_{10}= 0.0794
C_u= 7.51 C_c= 0.67

Classification

USCS= SP-SM AASHTO=

Remarks

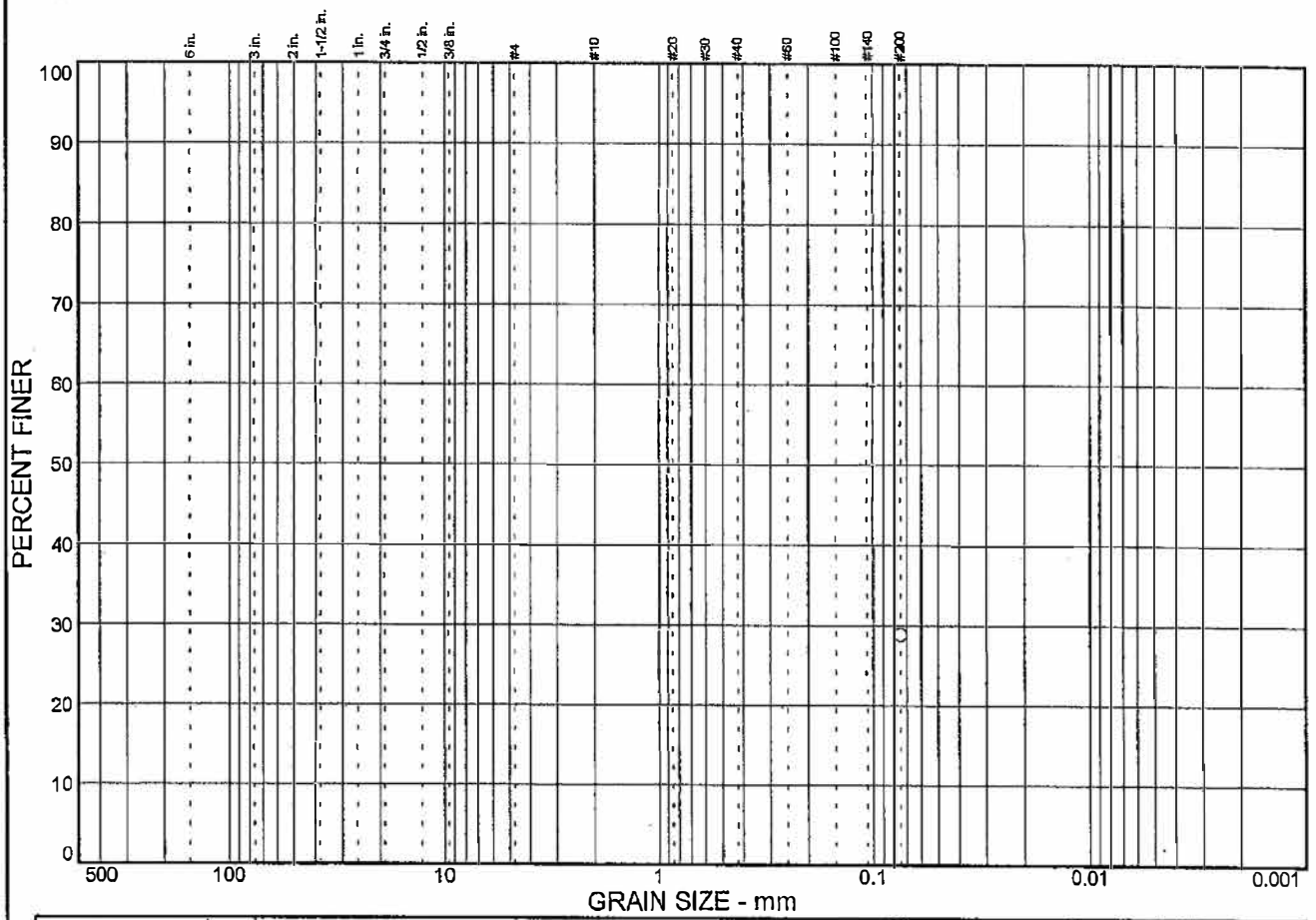
Minus #200 wash only

Sample No.: B7-2 Source of Sample: Date: 1/7/03
Location: Elev./Depth: 7 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			28.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	28.9		

* (no specification provided)

Soil Description

Brown silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

Remarks

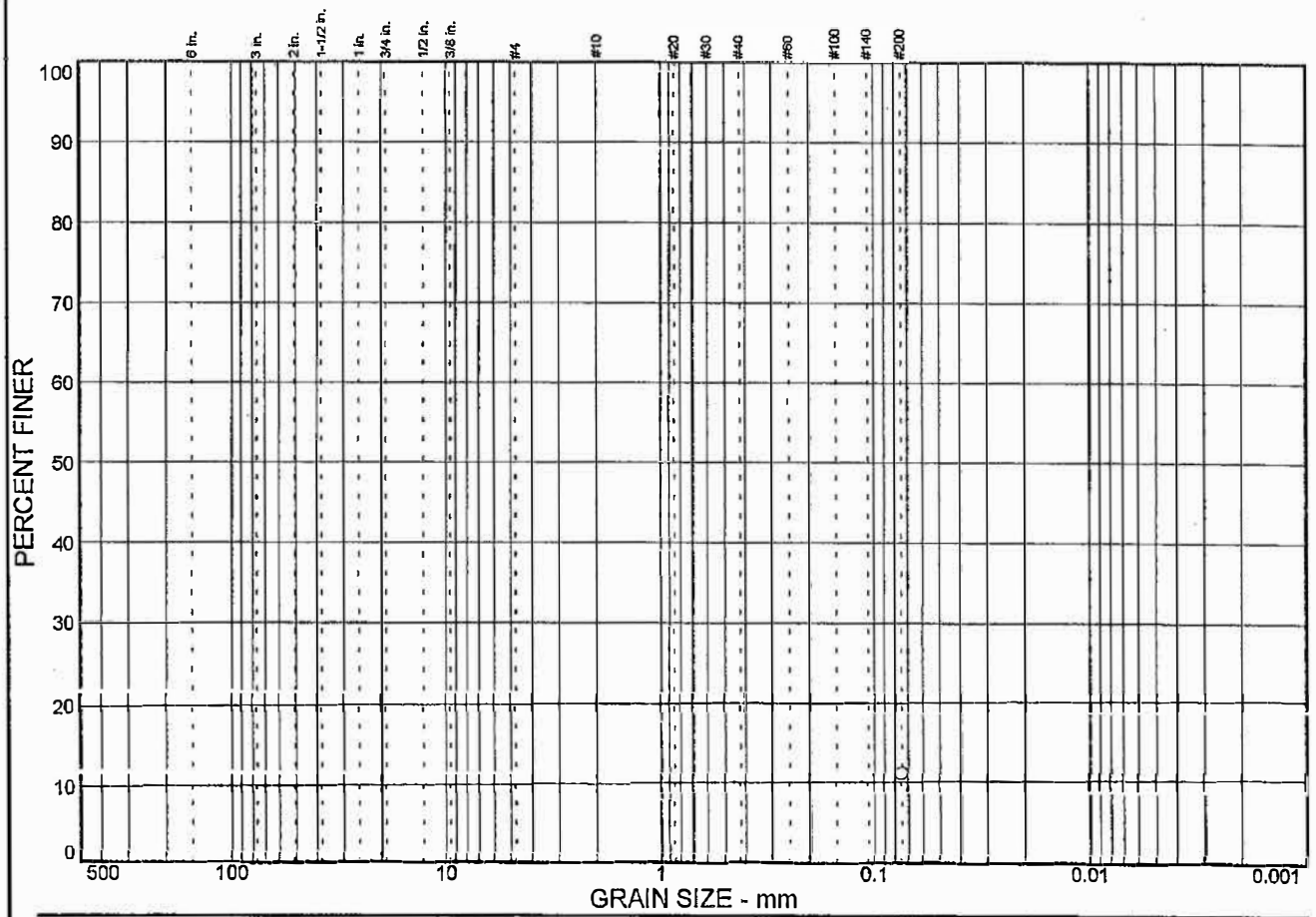
Minus #200 wash only

Sample No.: B7-3 Source of Sample: Date: 1/9/03
Location: Elev./Depth: 12

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			11.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.2		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

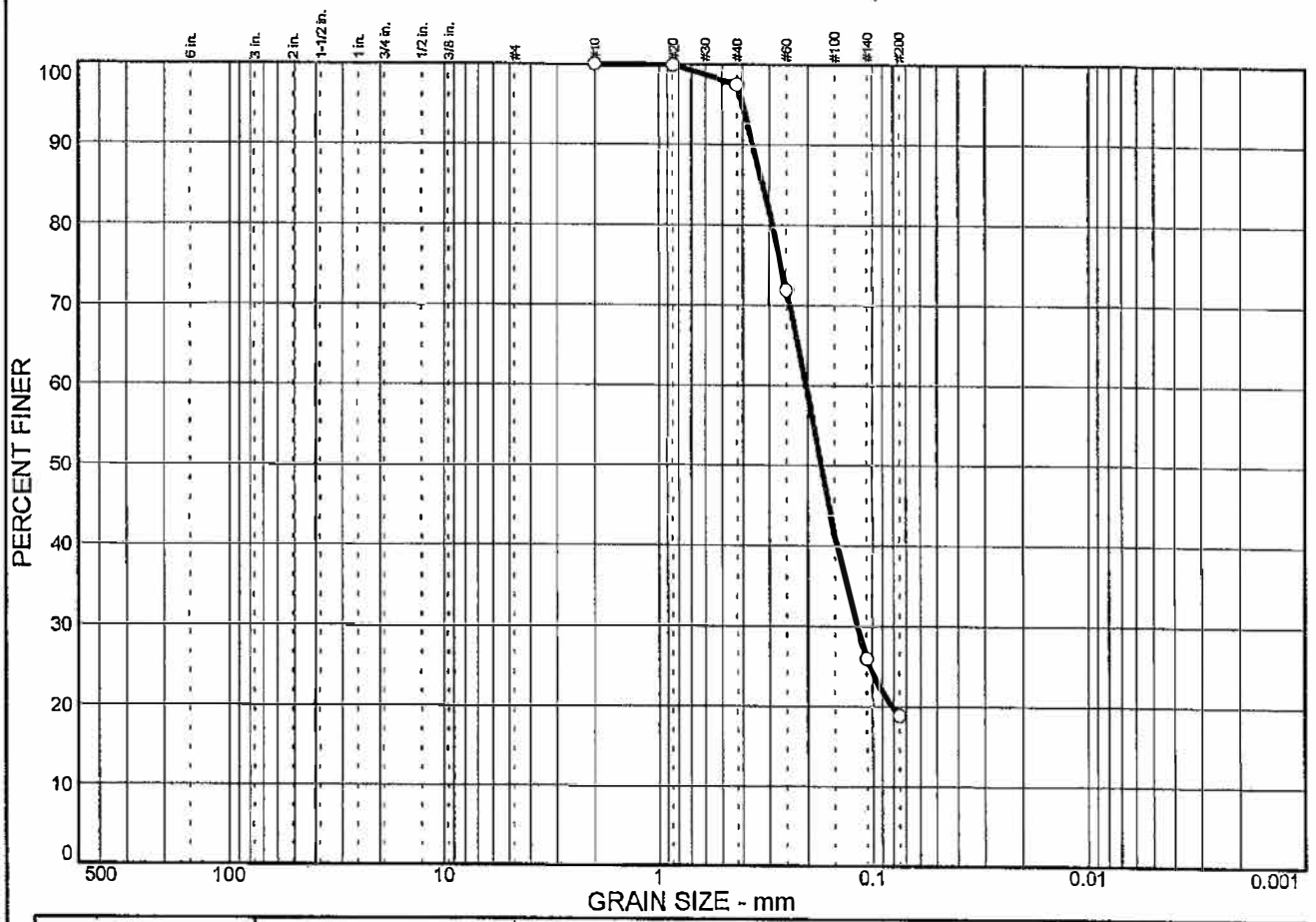
Minus #200 wash only

Sample No.: B7-4 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 17 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	81.1	18.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.9		
#40	97.6		
#60	72.0		
#140	26.0		
#200	18.9		

* (no specification provided)

Soil Description

Brown silty sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.322 D_{60}= 0.204 D_{50}= 0.173
D_{30}= 0.118 D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO=

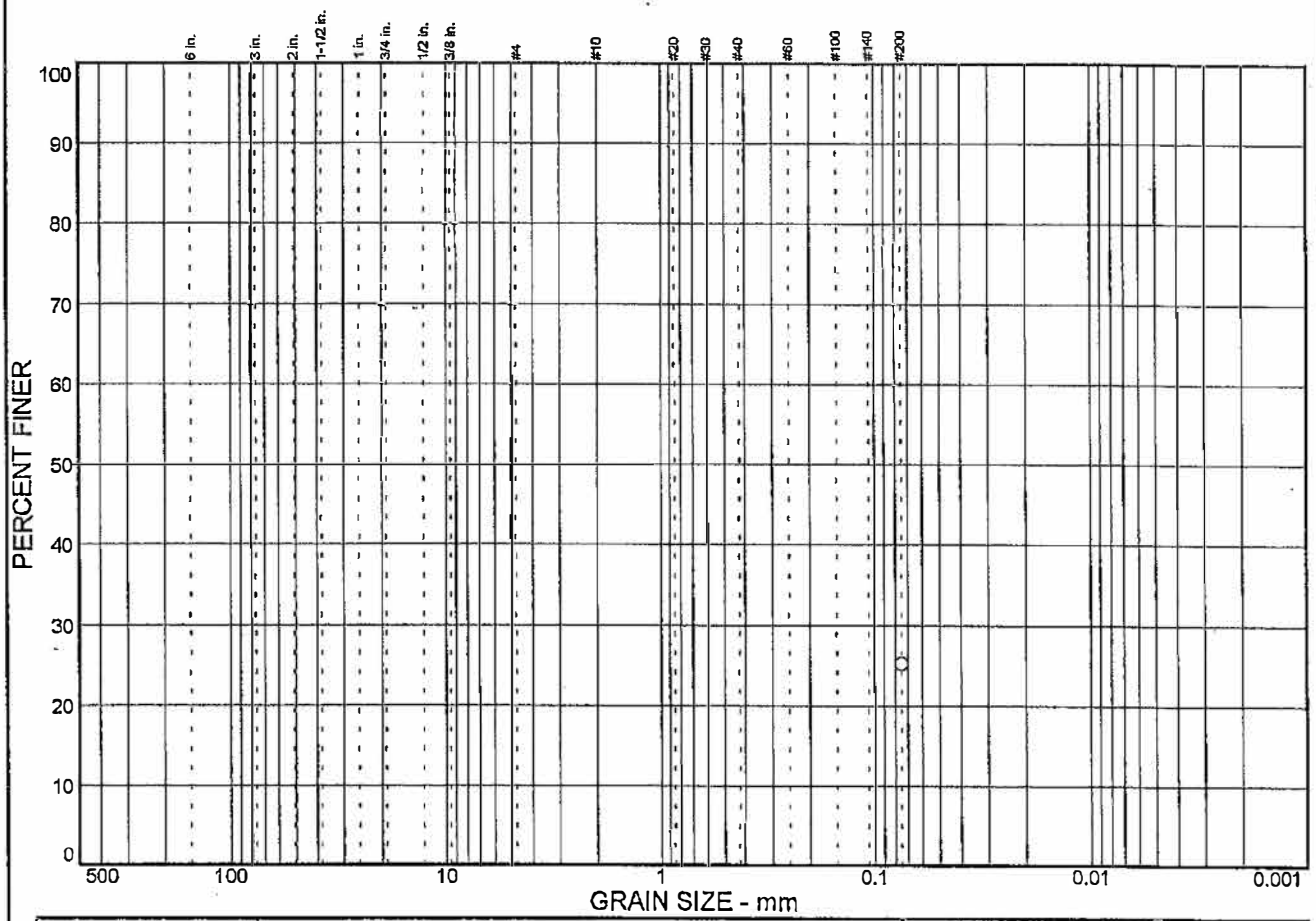
Remarks

Sample No.: B7-5 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 22 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			25.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	25.3		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

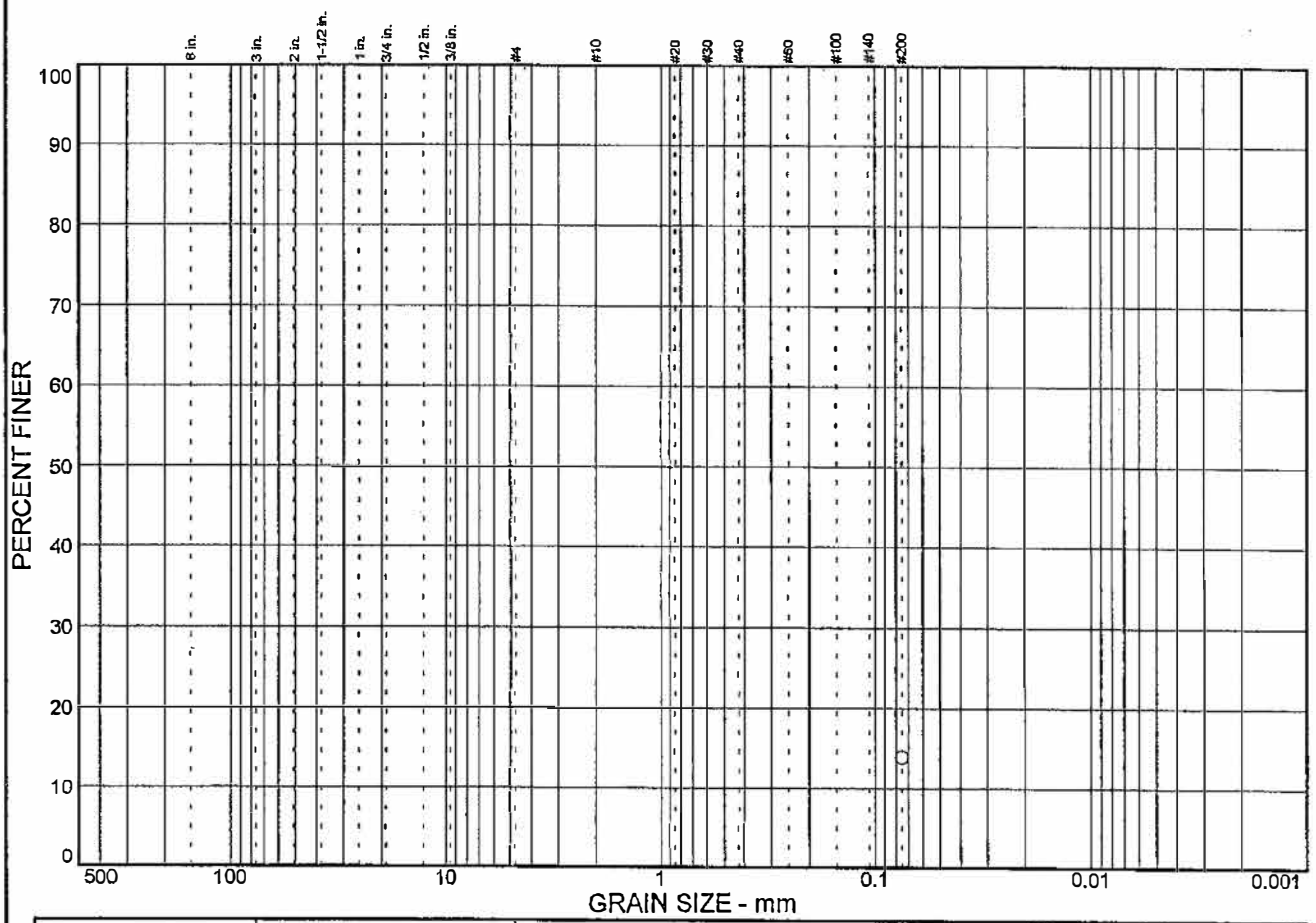
Minus #200 wash only

Sample No.: B7-8 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 39 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			13.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	13.9		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

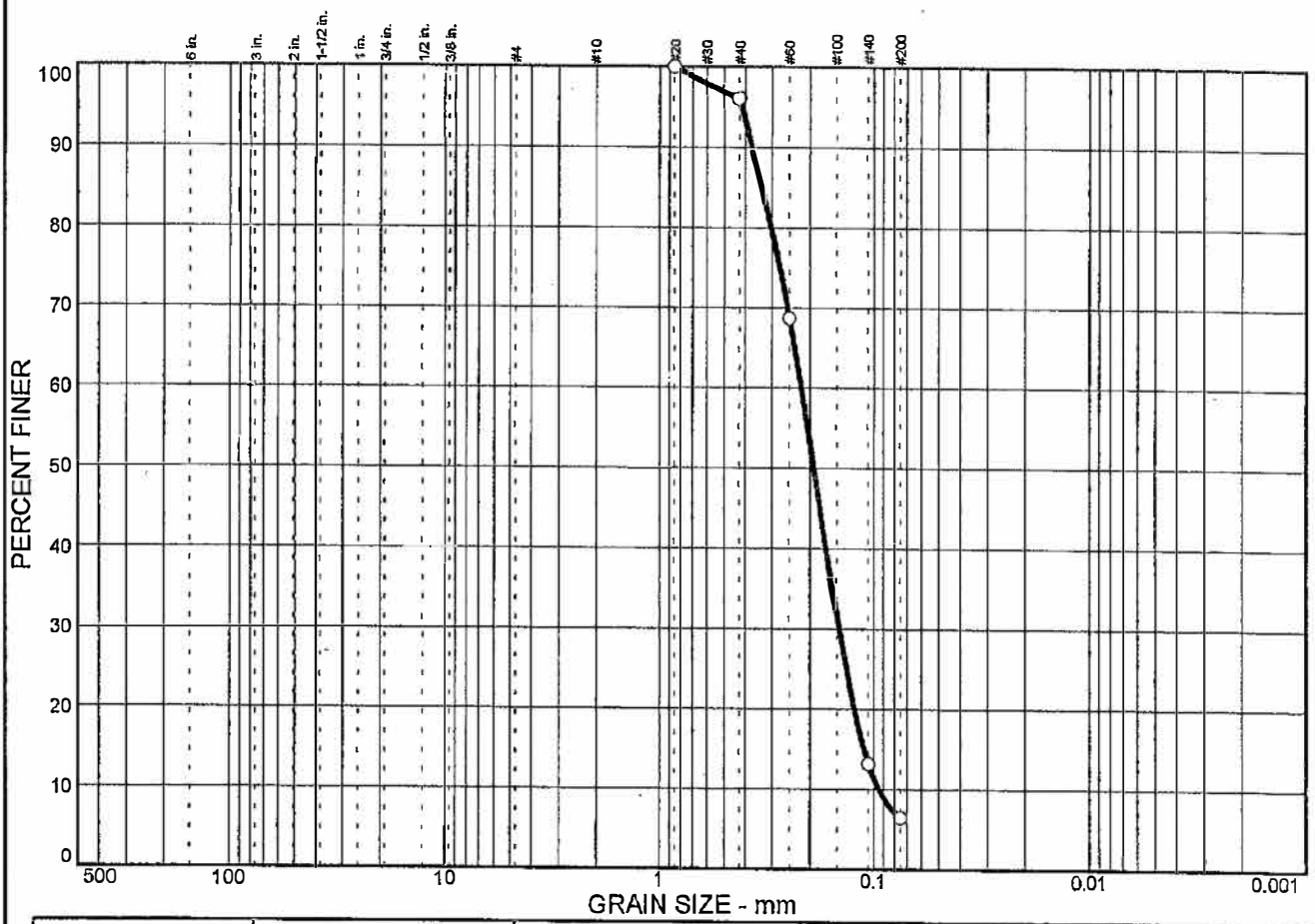
Minus #200 wash only

Sample No.: B7-9 Source of Sample: Date: 1/8/03
Location: Elev./Depth: 49 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	93.5	6.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#20	100.0		
#40	96.1		
#60	68.7		
#140	13.2		
#200	6.5		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.335 D_{60}= 0.220 D_{50}= 0.192
D_{30}= 0.145 D_{15}= 0.111 D_{10}= 0.0947
C_u= 2.32 C_c= 1.02

Classification

USCS= SP-SM AASHTO=

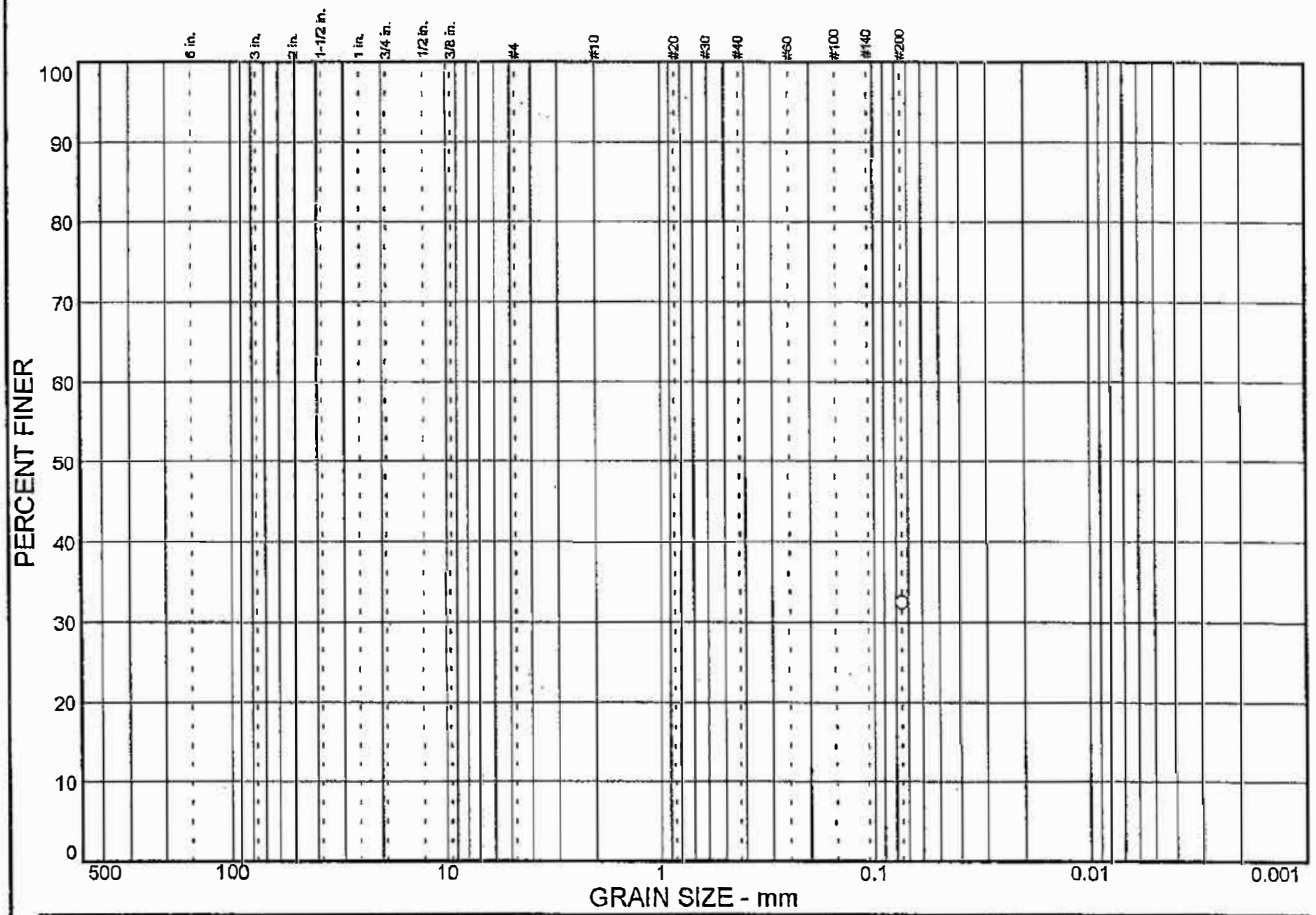
Remarks

Sample No.: B7-10 Source of Sample: Date: 1/13/03
Location: Elev./Depth: 59 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			32.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	32.5		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

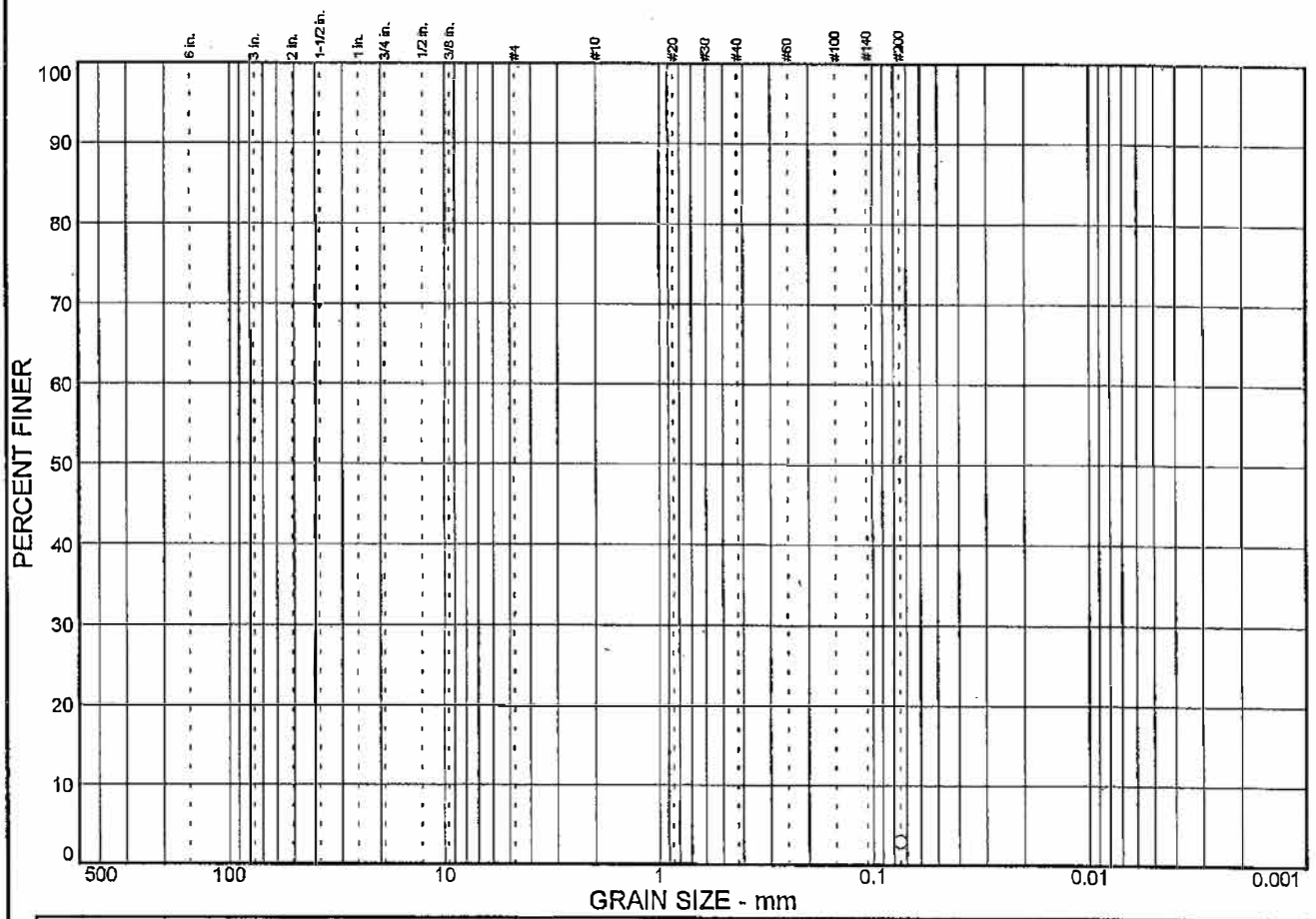
Minus #200 wash only

Sample No.: B7-11 **Source of Sample:** **Date:** 1/8/03
Location: **Elev./Depth:** 69 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 **Figure**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			3.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	3.0		

* (no specification provided)

Soil Description

Olive gray poorly graded sand

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP AASHTO=

Remarks

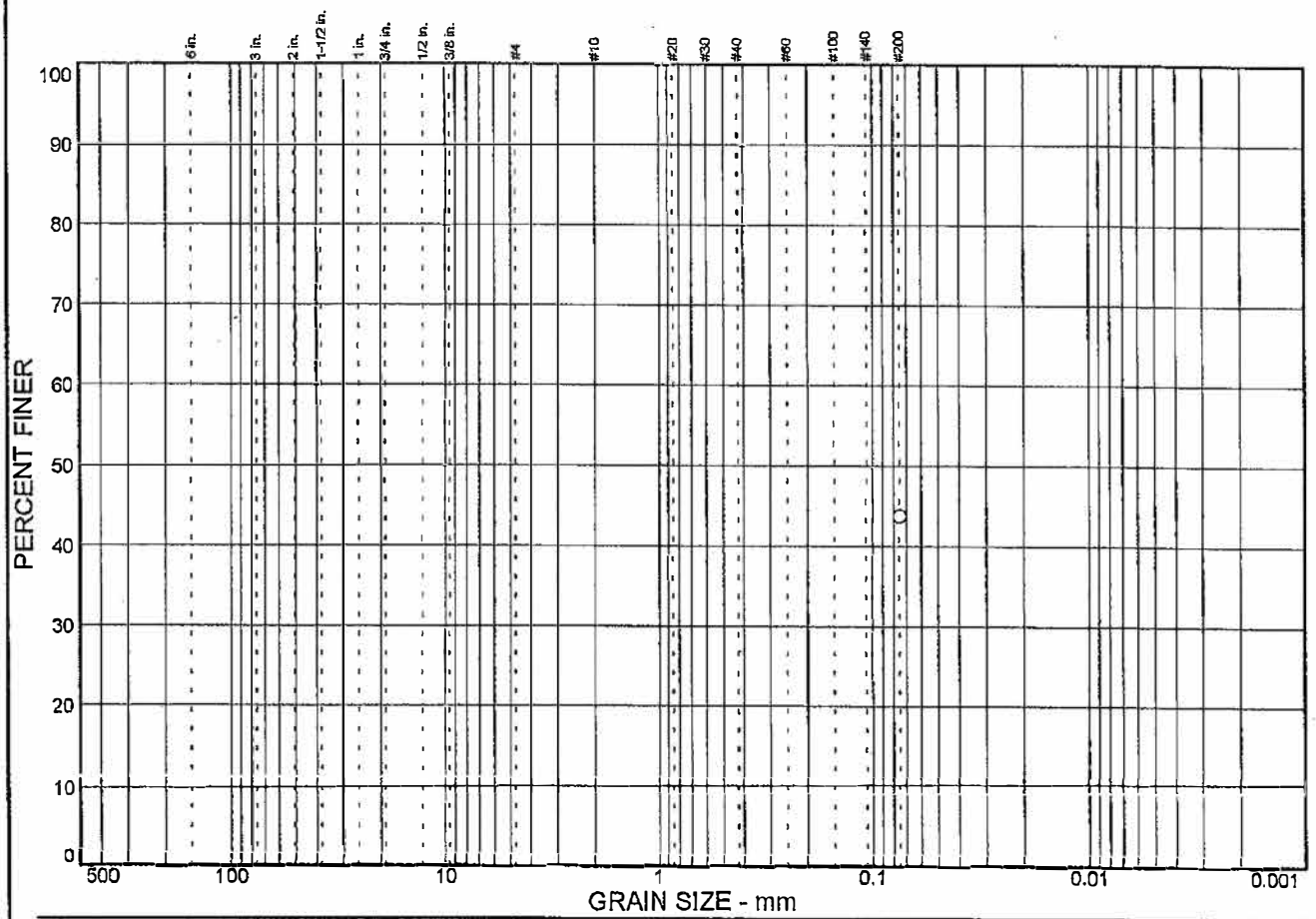
Minus #200 wash only

Sample No.: B7-13 Source of Sample: Date: 1/9/03
Location: Elev./Depth: 89 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			43.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	43.8		

* (no specification provided)

Soil Description

Brown poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= D_{60}= D_{50}=
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

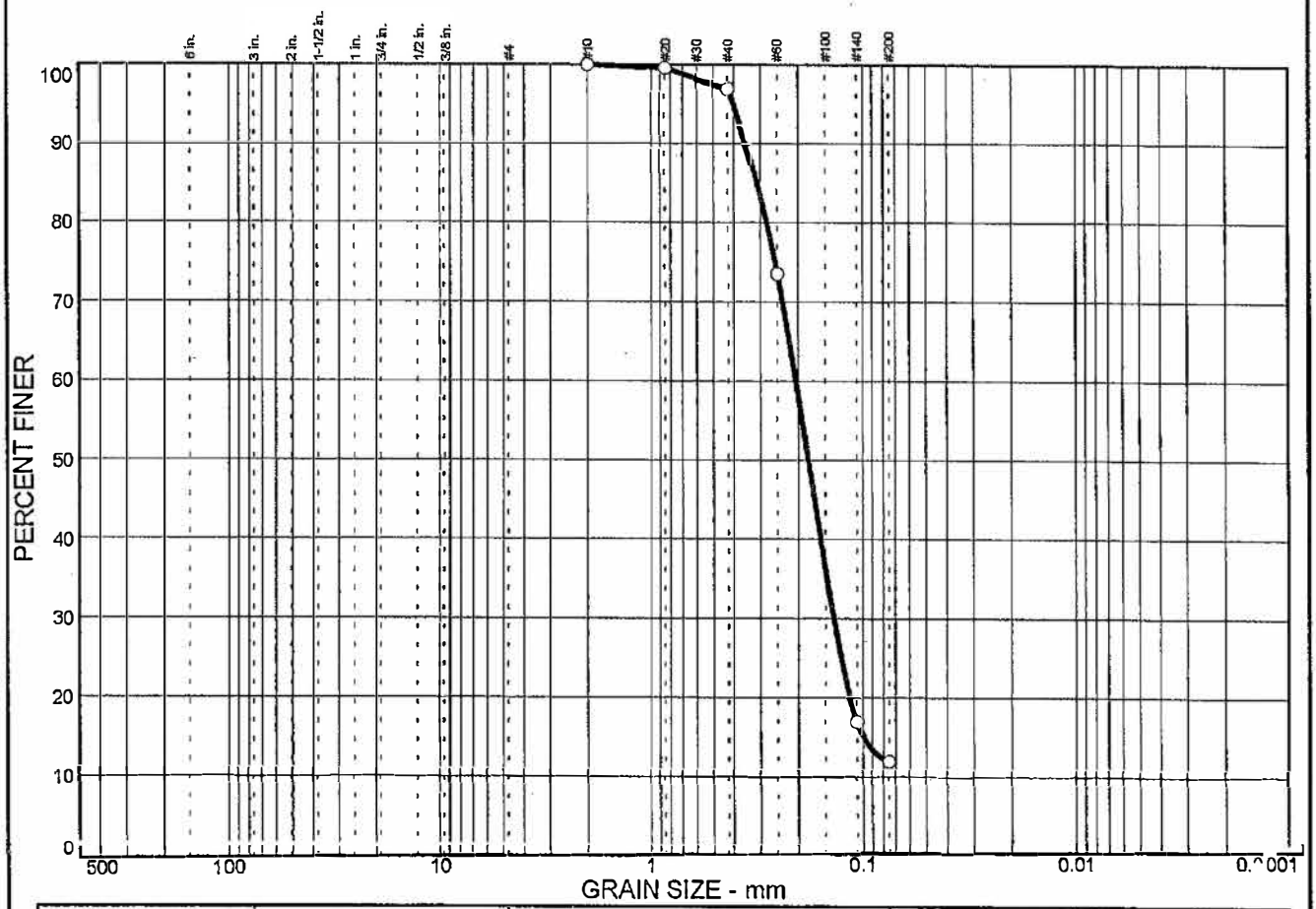
Minus #200 wash only

Sample No.: B7-15 Source of Sample: Date: 1/13/03
Location: Elev./Depth: 109 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	88.1	11.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#20	99.6		
#40	97.0		
#60	73.5		
#140	17.0		
#200	11.9		

* (no specification provided)

Soil Description

Gray poorly graded sand with silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.312 D_{60}= 0.206 D_{50}= 0.180
D_{30}= 0.137 D_{15}= 0.0987 D_{10}=
C_u= C_c=

Classification

USCS= SP-SM AASHTO=

Remarks

Sample No.: B8-2 Source of Sample: Date: 1/3/03
Location: Elev./Depth: 7 feet

ENGEO INCORPORATED

Client:
Project: Alameda Point
Alameda, CA
Project No: 5687.1.001.02 Figure

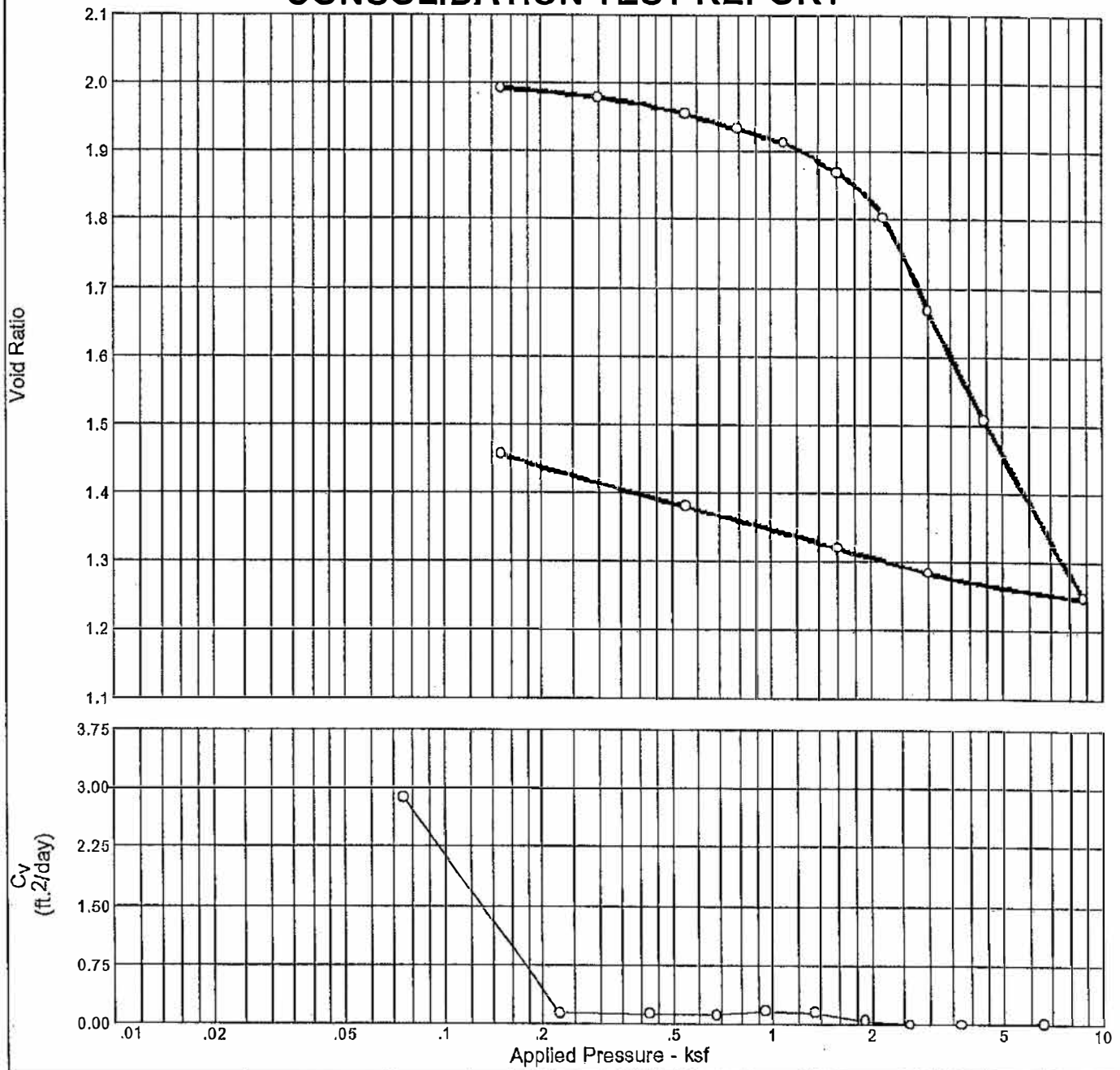
COOPER TESTING LABORATORY

#200 Sieve Wash Analysis
ASTM D 1140

Job No.:	414-013		**Project:**	5687.1.001.02		**Run By:**	
Client:	Engeo		**Date:**	4/8/2003		**Checked By:**	
Boring:	8						
Sample:	6						
Depth, ft.:	36-38'						
Soil Type:	gray silty SAND w/shells & clay lenses						
Wt of Dish & Dry Soil, gm	370.0						
Weight of Dish, gm	82.2						
Weight of Dry Soil, gm	287.8						
Wt. Ret. on #4 Sieve, gm	0.0						
Wt. Ret. on #200 Sieve, gm	201.0						
% Gravel	**0.0**						
% Sand	**69.8**						
% Silt & Clay	**30.2**						

Remarks: As an added benefit to our clients, the gravel fraction may be included in this report. Whether or not it is included is dependent upon both the technicians time available and if there is a significant enough amount of gravel. The gravel is always included in the percent retained on the #200 sieve but may

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.8 %	73.2 %	56.9			2.75			2.017

MATERIAL DESCRIPTION

gray CLAY w/trace shells & organics, bay mud

Project No. 414-013 **Client:** Engeo

Project: 5687.1.001.02

Remarks:

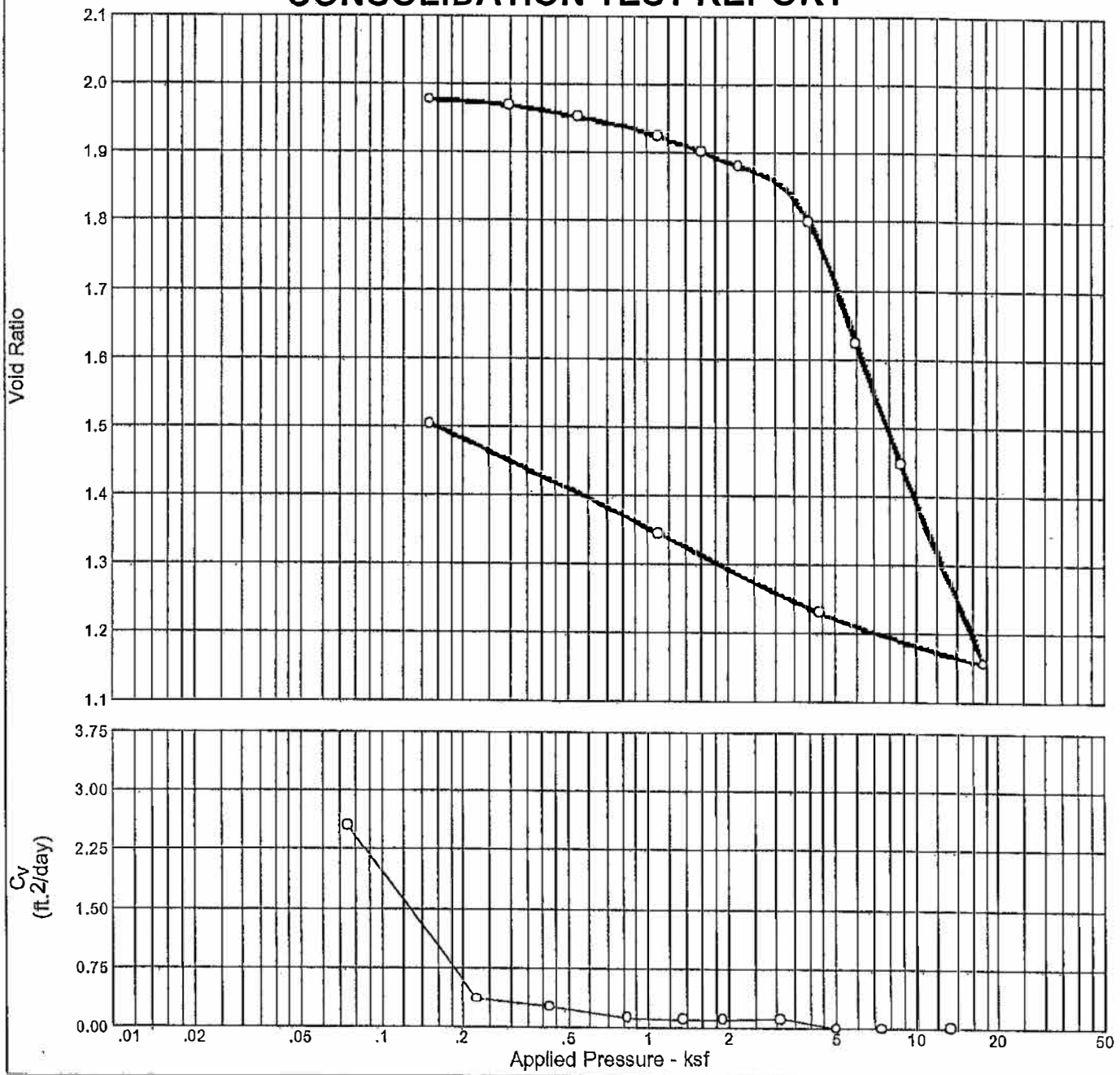
Source: 1 **Sample No.:** 8 **Elev./Depth:** 33-35'

CONSOLIDATION TEST REPORT

COOPER TESTING LABORATORY

Plate

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
98.7 %	72.3 %	56.6			2.7			1.980

MATERIAL DESCRIPTION

Gray Bay Mud

Project No. 414-013 **Client:** Engeo

Project: 5687.1.001.02

Source: 1 **Sample No.:** 12 **Elev./Depth:** 73-75

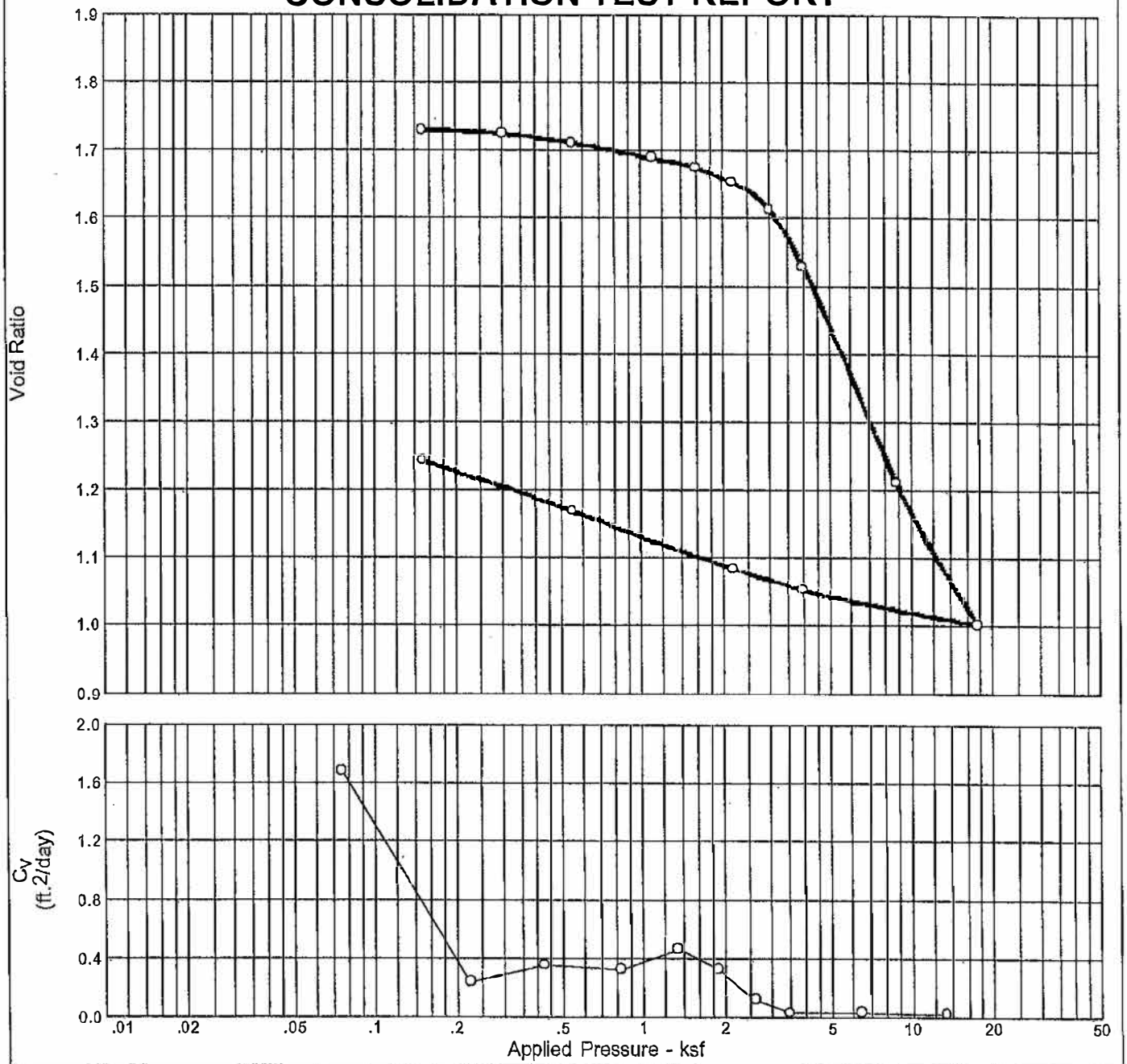
CONSOLIDATION TEST REPORT

COOPER TESTING LABORATORY

Remarks:

Plate

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	USCS	AASHTO	Initial Void Ratio
Saturation	Moisture							
99.3 %	62.8 %	62.7	78	51	2.75			1.738

MATERIAL DESCRIPTION

gray CLAY w/trace shells, sand & organics, bay mud

Project No. 414-013 **Client:** Engeo

Project: 5687.1.001.02

Source: 8 **Sample No.:** 7 **Elev./Depth:** 46-48'

Remarks:

CONSOLIDATION TEST REPORT

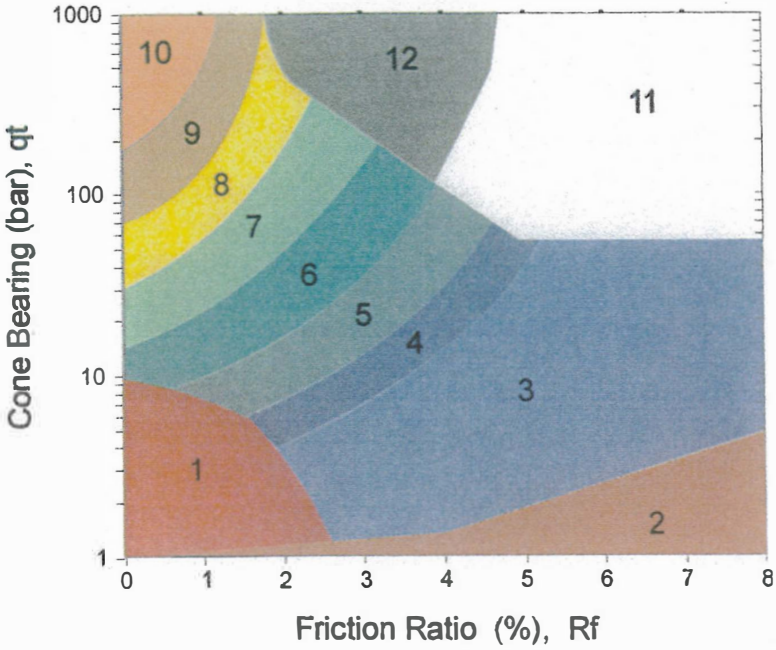
COOPER TESTING LABORATORY

Plate

APPENDIX C

Cone Penetration Sounding Logs

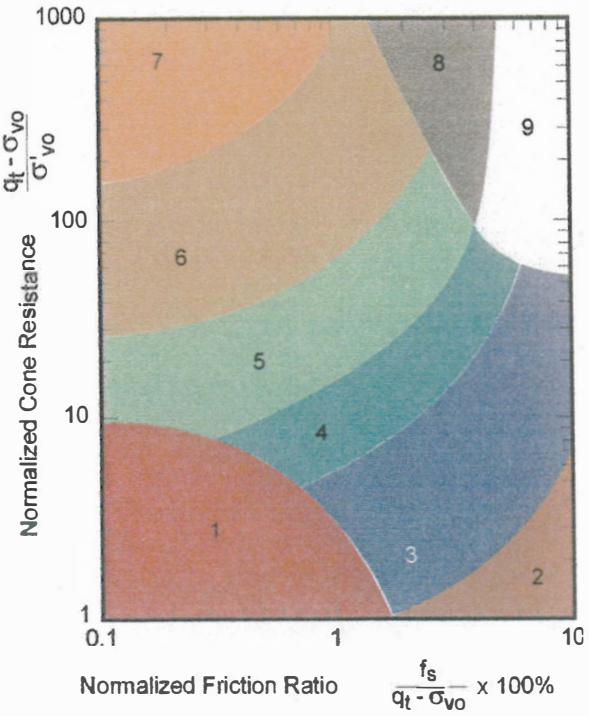
Figure 1
Non-Normalized Behavior Type Classification Chart



Zone	qt / N	Soil Behavior Type
1	2	sensitive fine grained
2	1	organic material
3	1	clay
4	1.5	silty clay to clay
5	2	clayey silt to silty clay
6	2.5	sandy silt to clayey silt
7	3	silty sand to sandy silt
8	4	sand to silty sand
9	5	sand
10	6	gravelly sand to sand
11	1	very stiff fine grained *
12	2	sand to clayey sand *

* overconsolidated or cemented

Figure 2
Normalized Behavior Type Classification Chart



Zone	Normalized Soil Behavior Type
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 sands to silty sands
7	gravelly sand to sand
8	very stiff sand to clayey sand
9	very stiff fine grained

Table 2
References

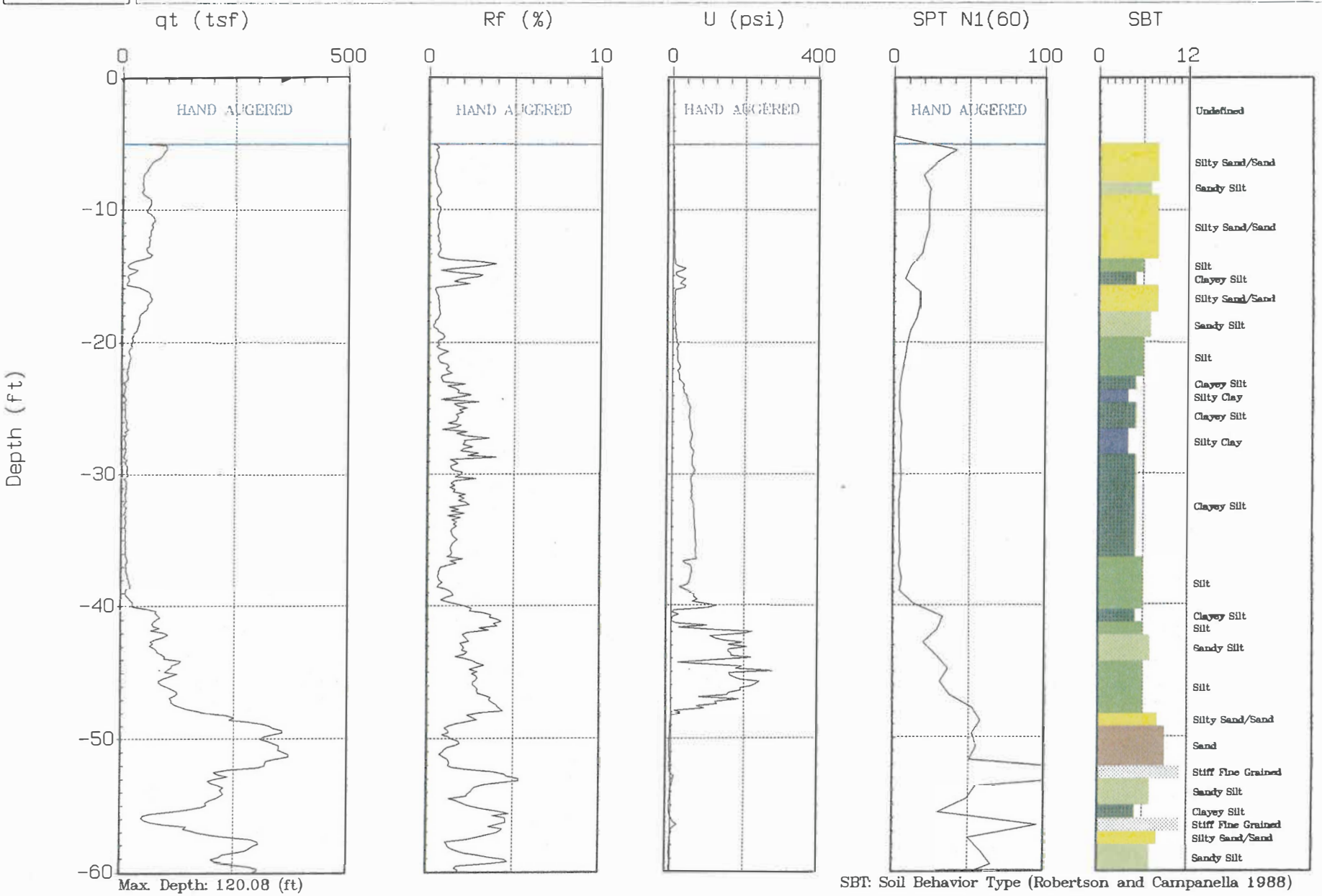
No.	References
1	Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, "Use of Piezometer Cone Data", Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.
2	Robertson, P.K., 1990, "Soil Classification Using the Cone Penetration Test", Canadian Geotechnical Journal, Volume 27.
3	Robertson, P.K. and Fear, C.E., 1998, "Evaluating cyclic liquefaction potential using the cone penetration test", Canadian Geotechnical Journal, 35: 442-459.
4	Robertson, P.K. and Wride, C.E., 1998, "Cyclic Liquefaction and its Evaluation Based on SPT and CPT", NCEER Workshop Paper, January 22, 1997
5	Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, " Cone Penetration Testing in Geotechnical Practice," Blackie Academic and Professional.
6	GREGG IN SITU Internal Report
7	Plewes, H.D., Davies, M.P. and Jefferies, M.G., 1992, "CPT Based Screening Procedure for Evaluating Liquefaction Susceptibility", 45th Canadian Geotechnical Conference, Toronto, Ontario, October 1992.
8	Jefferies, M.G. and Davies, M.P., 1993. "Use of CPTu to Estimate equivalent N_{60}", Geotechnical Testing Journal, 16(4): 458-467.
9	Been, K. and Jefferies, M.P., 1985, "A state parameter for sands", Geotechnique, 35(2), 99-112.
10	Frank Syms, Bechtel Corp (Savannah River Site), 2001, "CPTU Fines Content Determination", Calculation No. K-CIC-G-00065 Revision 0.
11	Frank Syms, Bechtel Corp (Savannah River Site) – personal communication

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-01

Engineer : JOHN BUCK
Date : 12:03:02 09:06



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

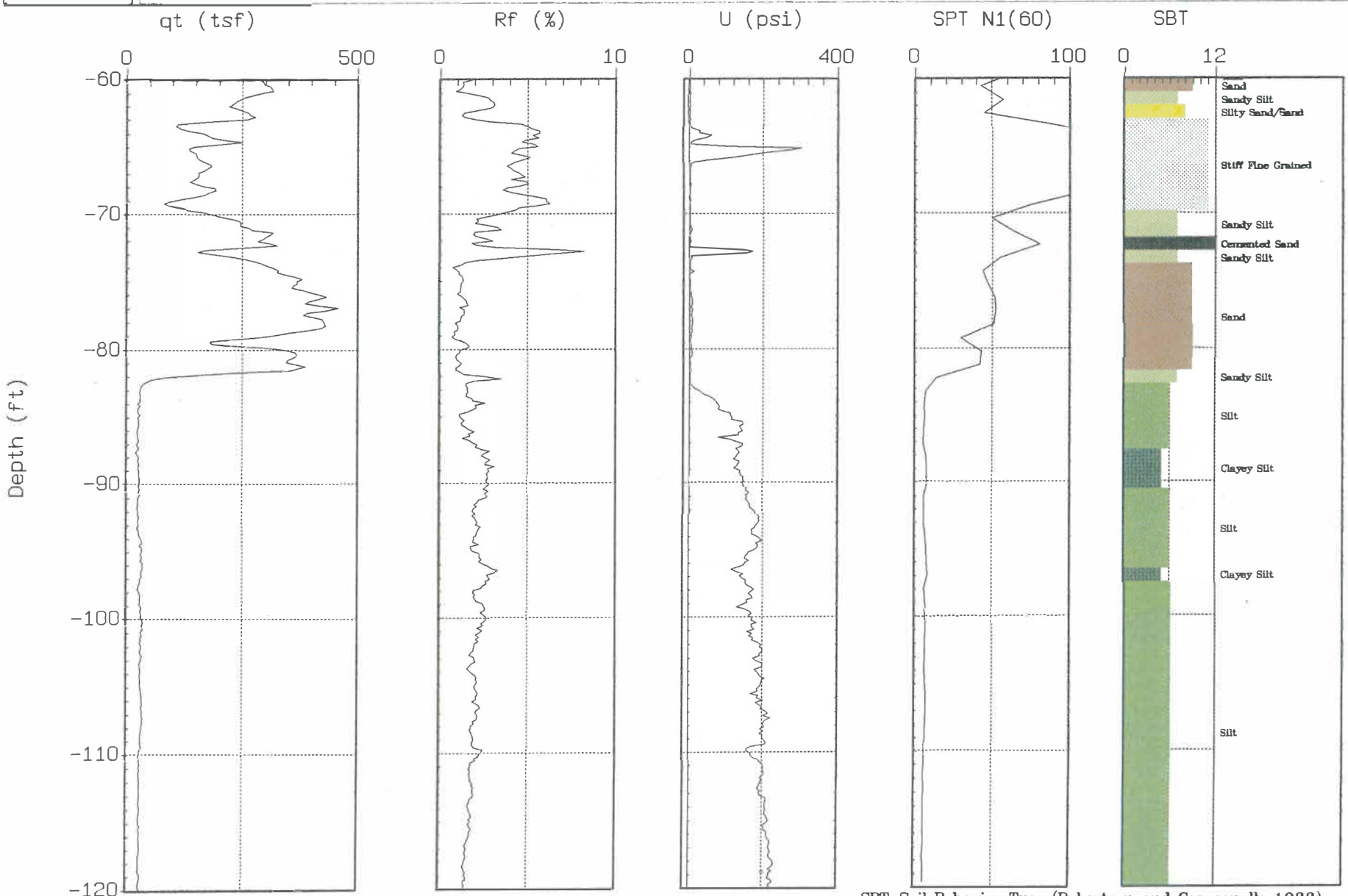
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-01

Engineer : JOHN BUCK
Date : 12:03:02 09:06



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

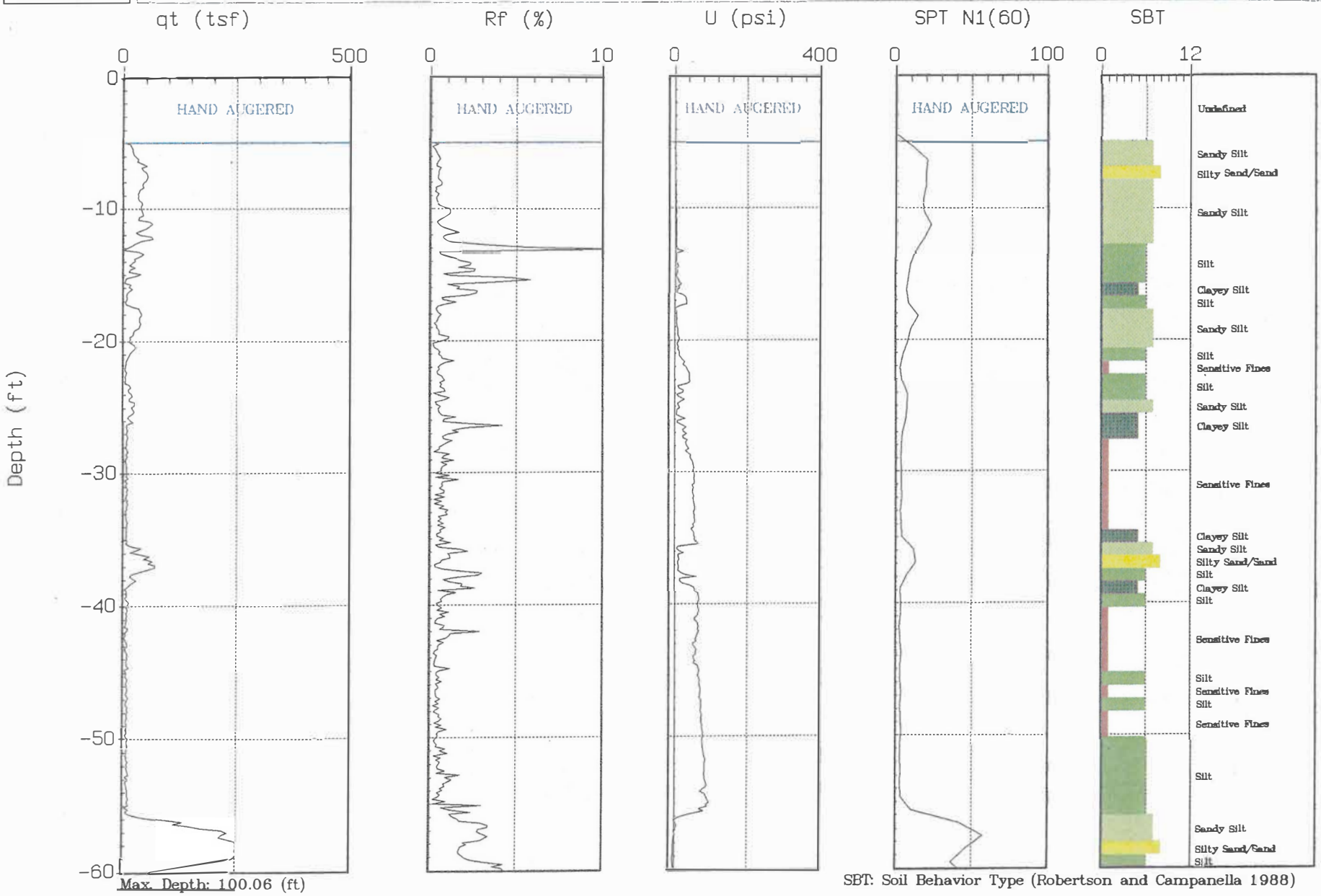
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-02

Engineer : JOHN BUCK
Date : 12:03:02 10:45



Max. Depth: 100.06 (ft)

Depth Inc.: 0.164 (ft)

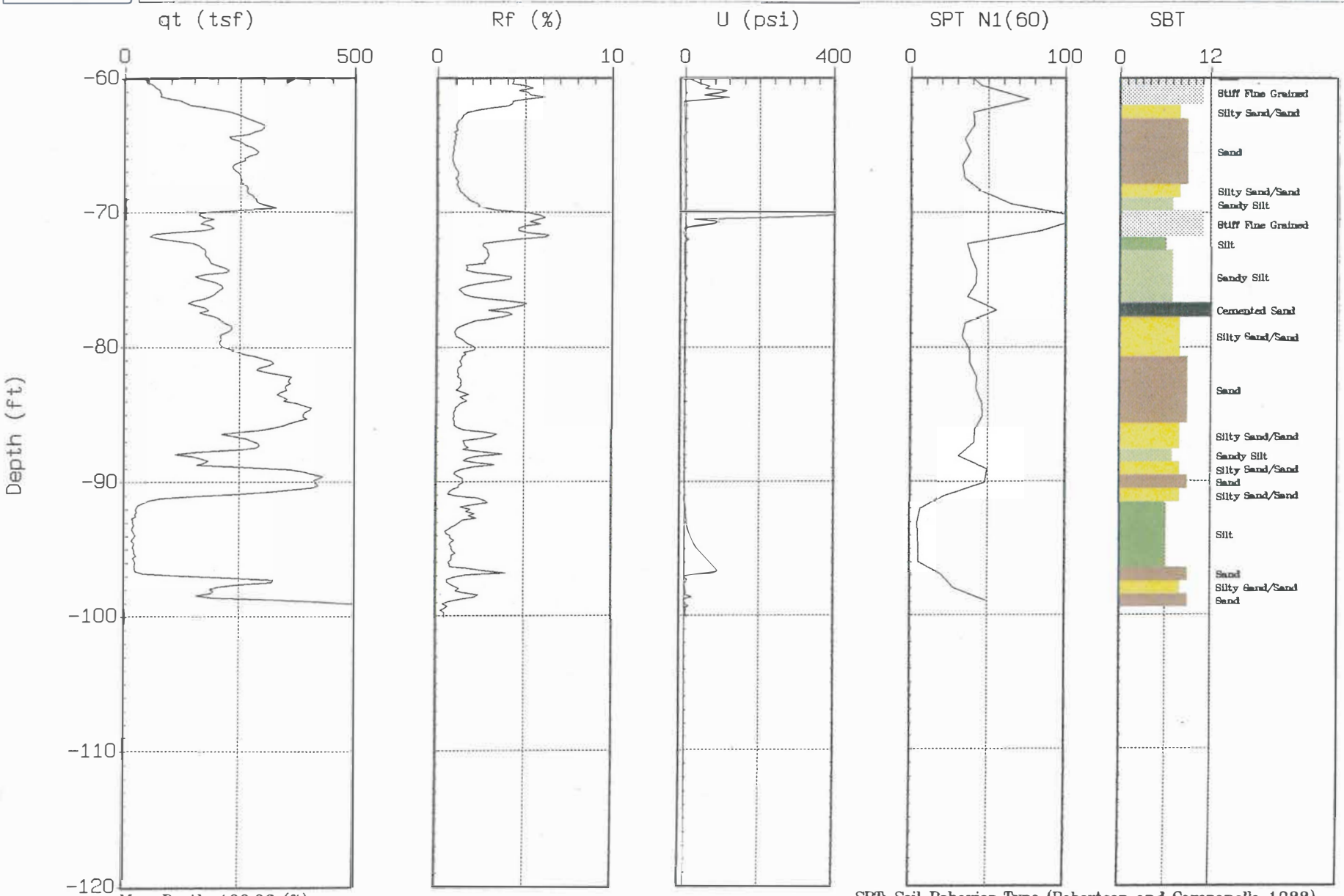
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-02

Engineer : JOHN BUCK
Date : 12:03:02 10:45



Max. Depth: 100.06 (ft)

Depth Inc.: 0.164 (ft)

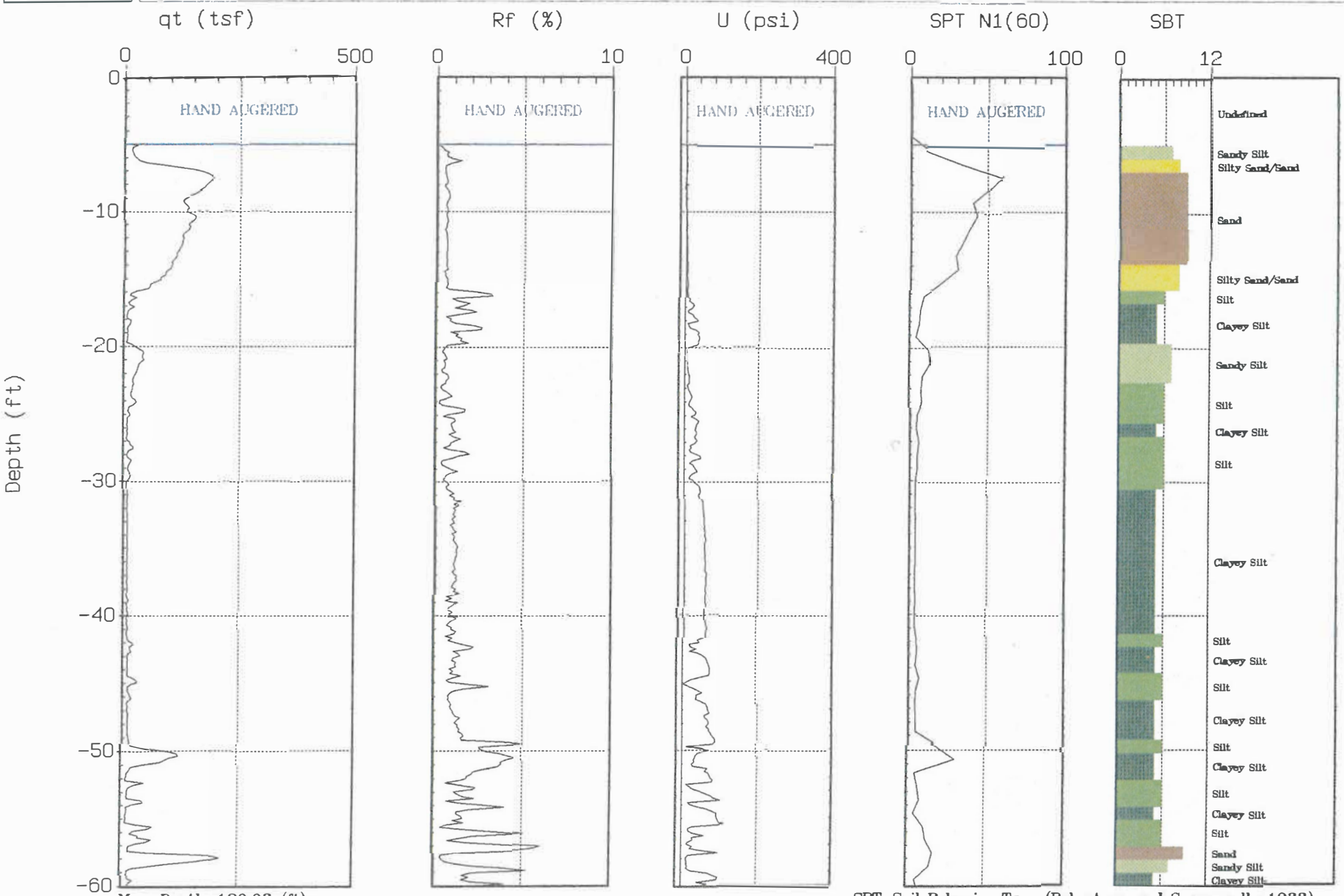
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-03

Engineer : JOHN BUCK
Date : 12:03:02 13:13



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

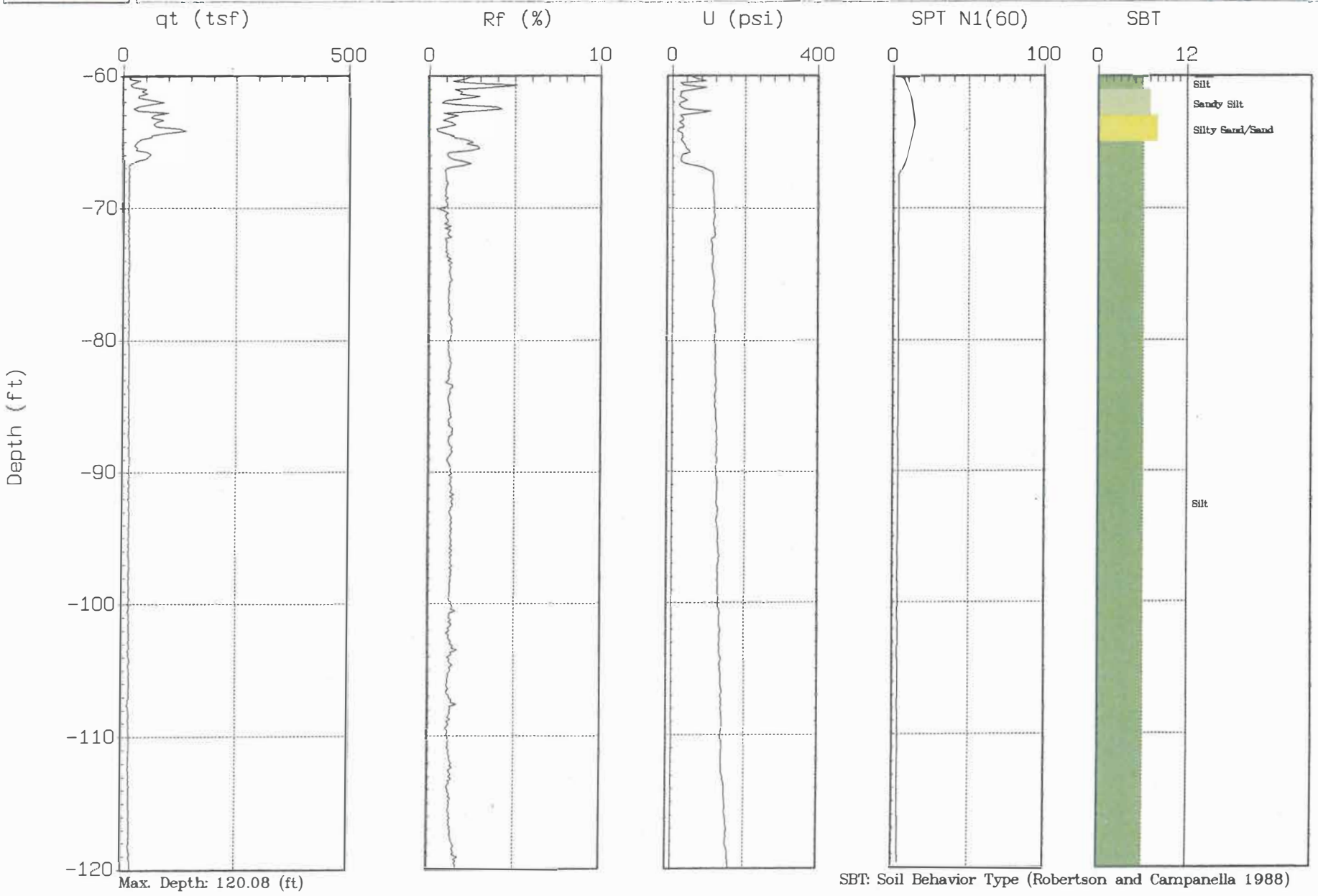
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-03

Engineer : JOHN BUCK
Date : 12:03:02 13:13



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

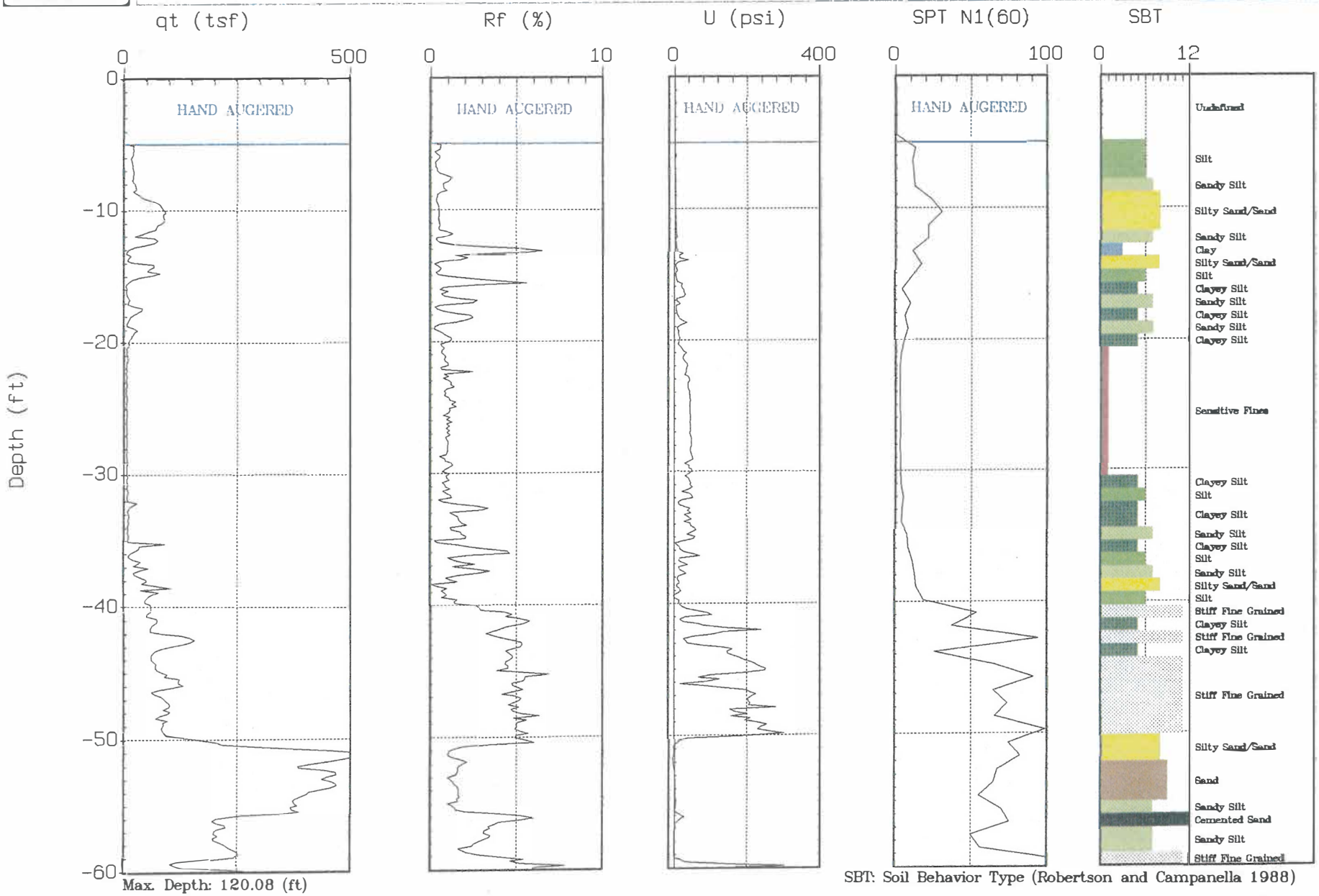
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-04

Engineer : JOHN BUCK
Date : 12:03:02 14:21



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

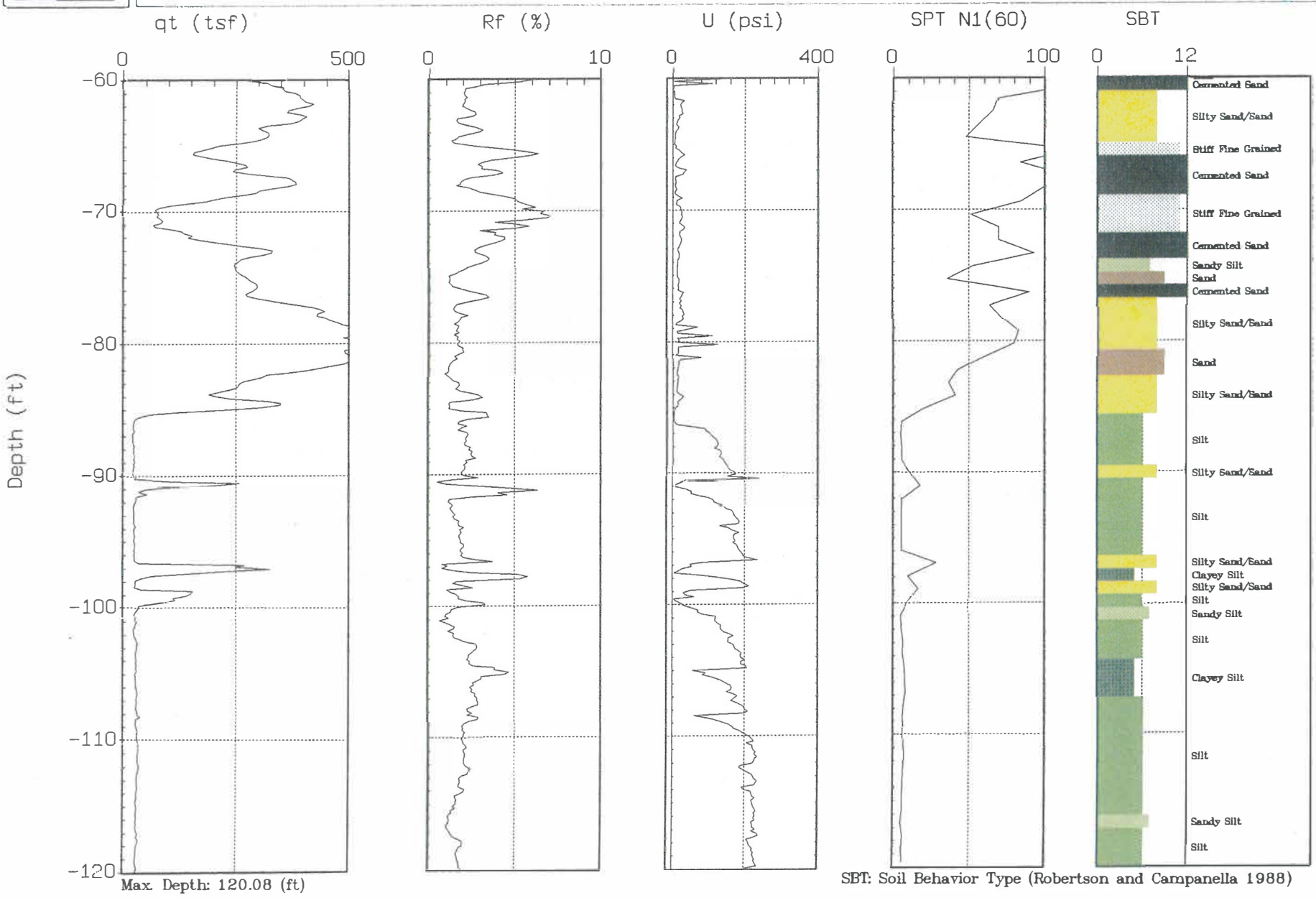
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-04

Engineer : JOHN BUCK
Date : 12:03:02 14:21



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

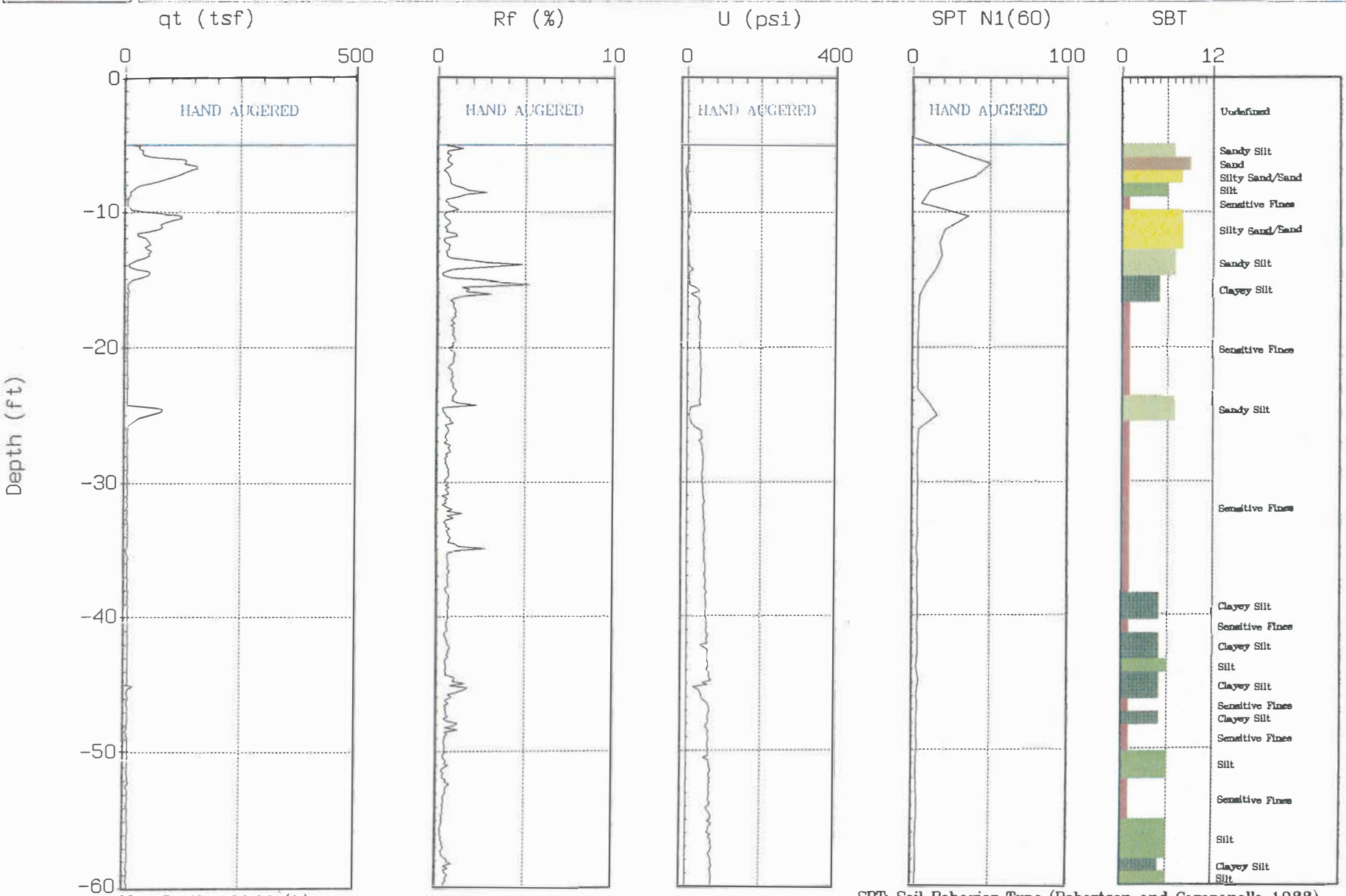
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-05

Engineer : JOHN BUCK
Date : 12:04:02 13:17



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

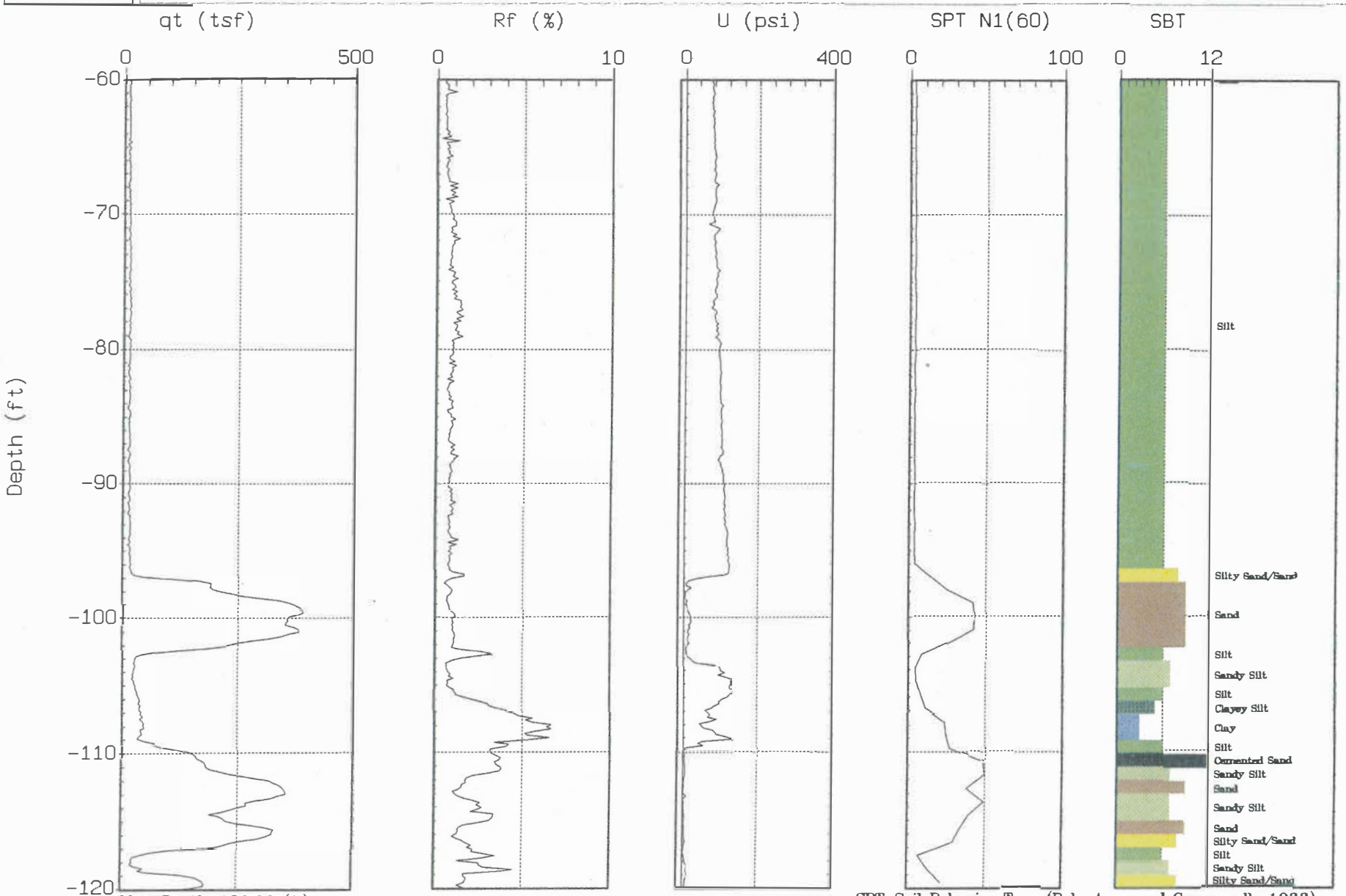
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-05

Engineer : JOHN BUCK
Date : 12:04:02 13:17



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

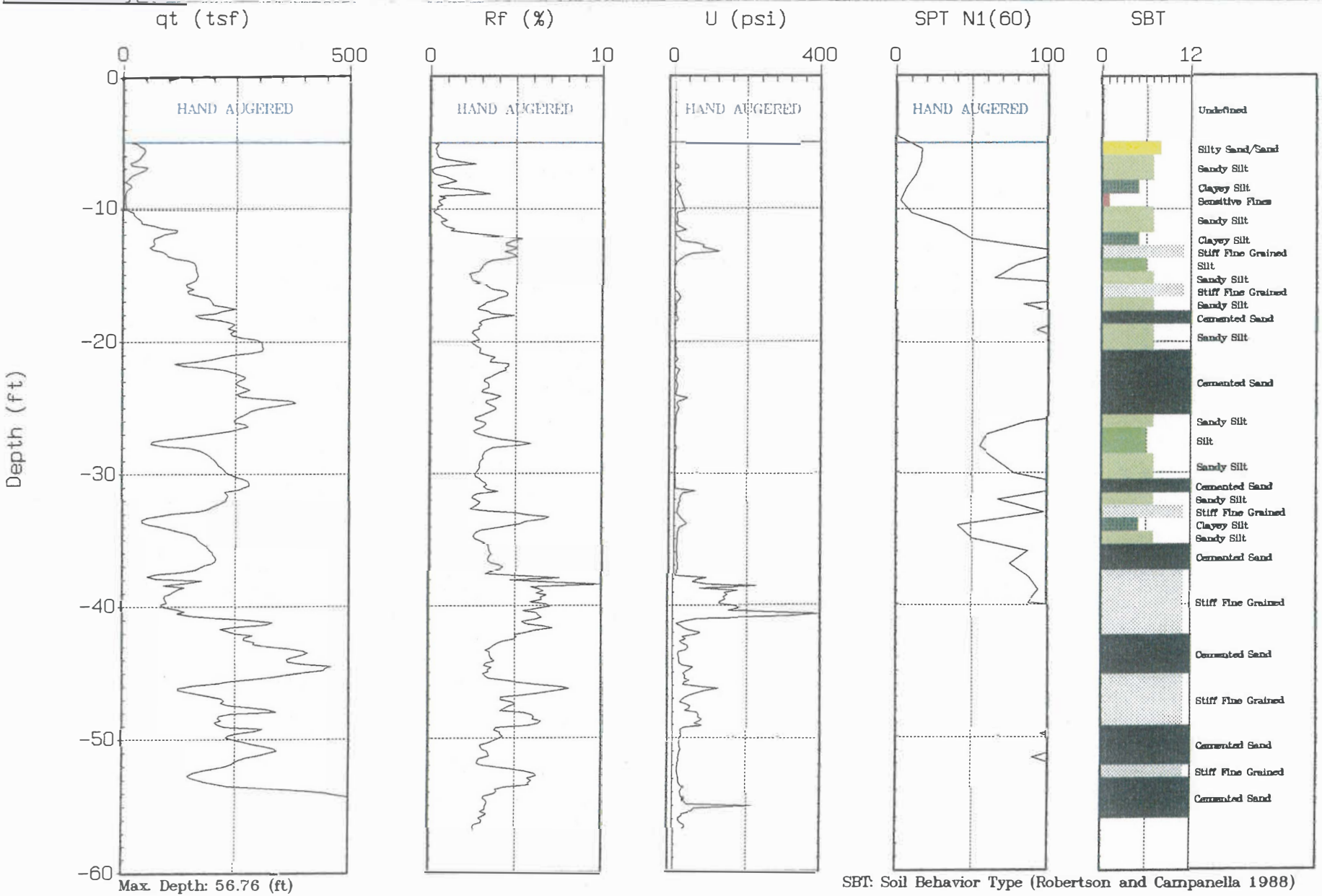
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-06

Engineer : JOHN BUCK
Date : 12:09:02 09:55



Max. Depth: 56.76 (ft)

Depth Inc.: 0.164 (ft)

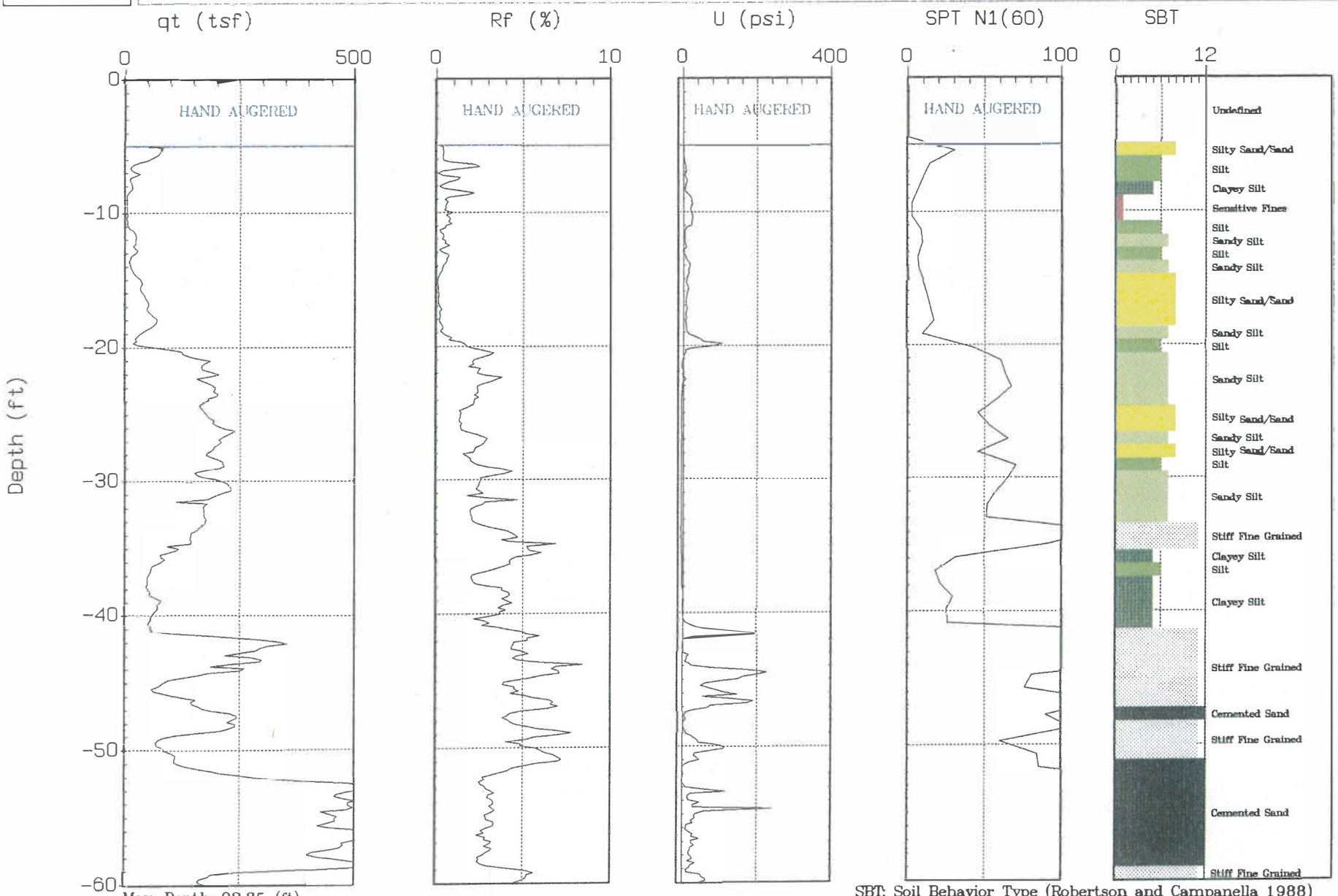
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-07

Engineer : JOHN BUCK
Date : 12:09:02 08:22



Max. Depth: 92.35 (ft)

Depth Inc.: 0.164 (ft)

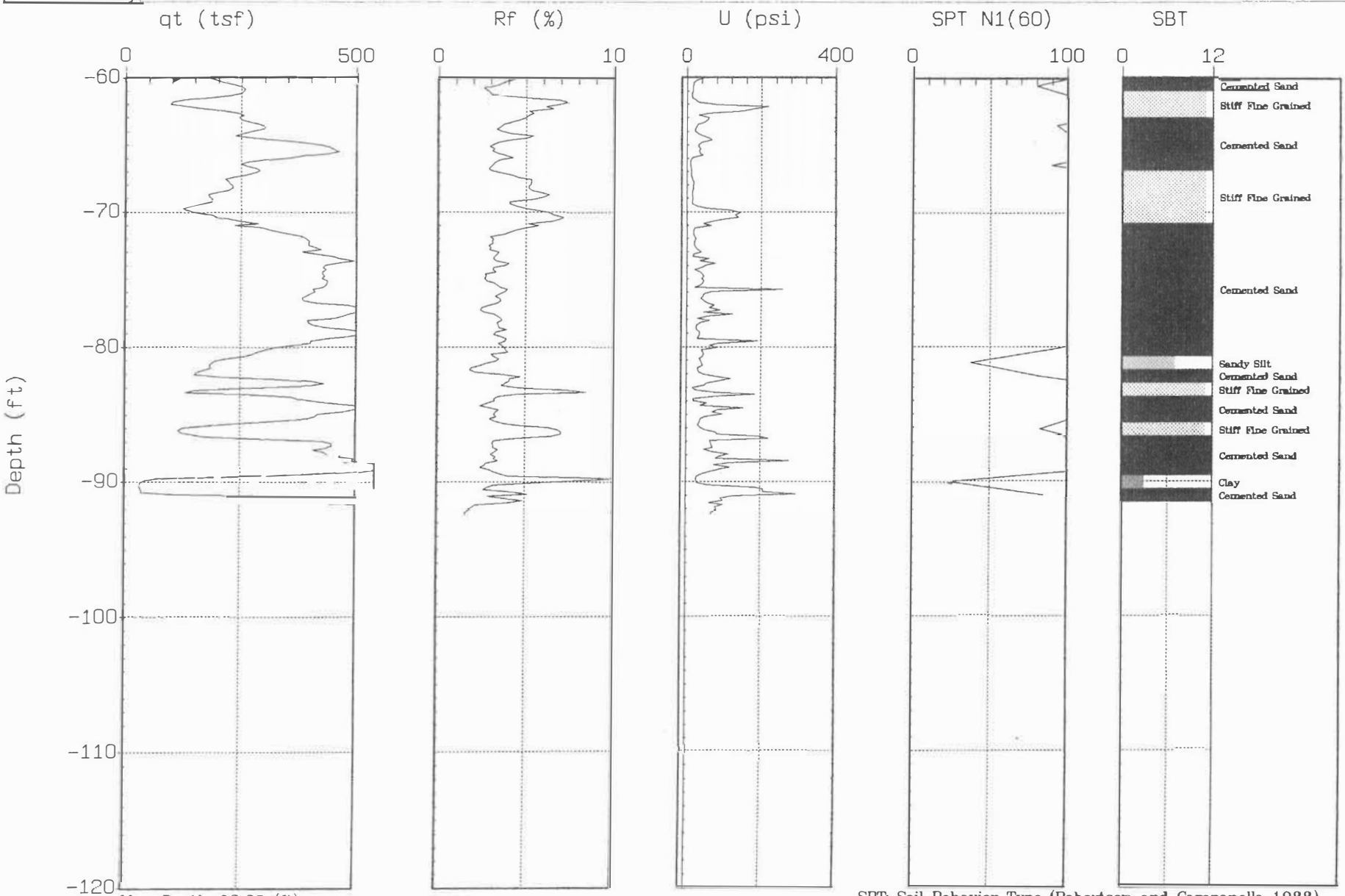
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-07

Engineer : JOHN BUCK
Date : 12:09:02 08:22



Max. Depth: 92.35 (ft)

Depth Inc.: 0.164 (ft)

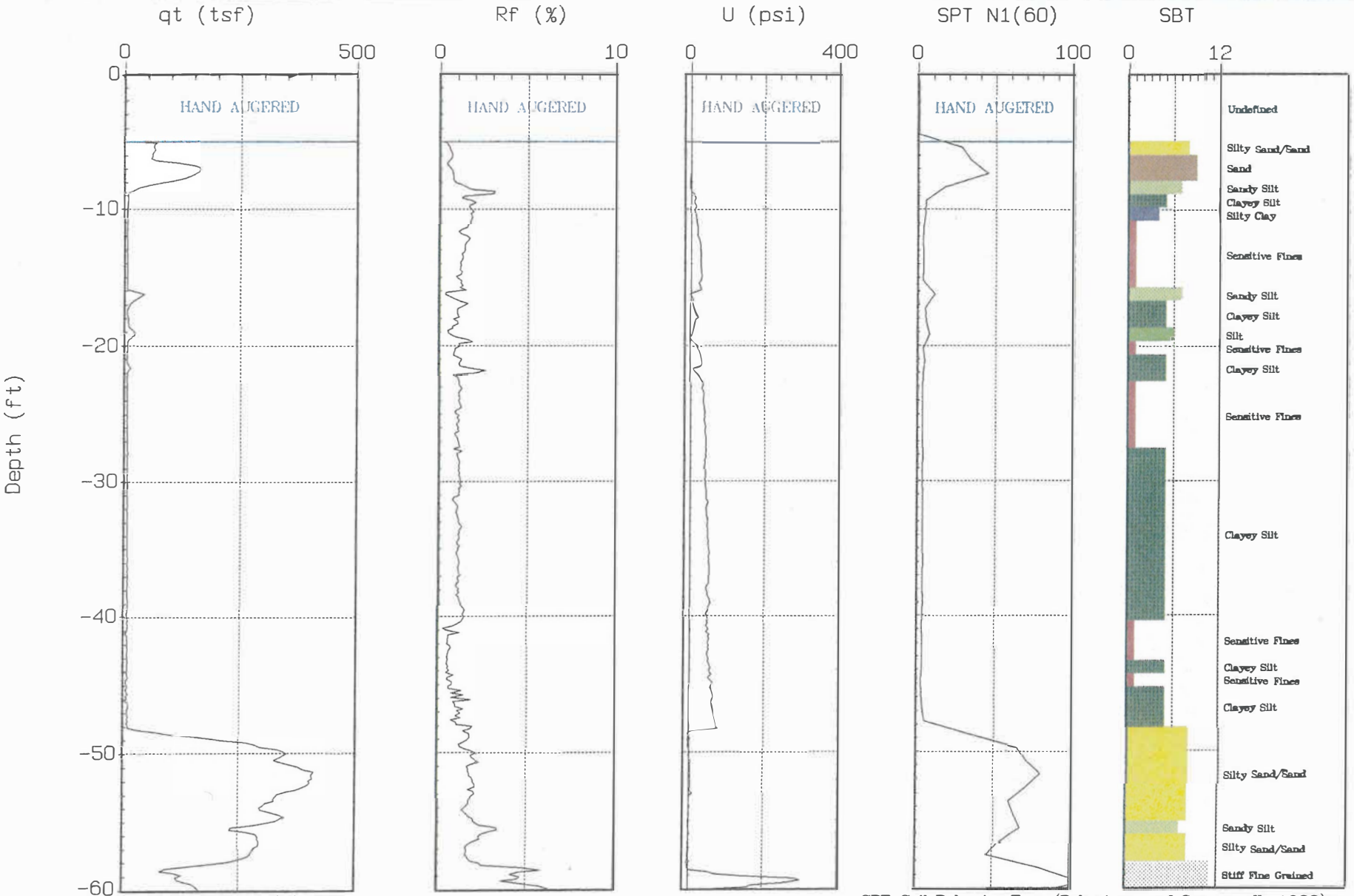
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-08

Engineer : JOHN BUCK
Date : 12:04:02 15:18



Max. Depth: 88.09 (ft)

Depth Inc.: 0.164 (ft)

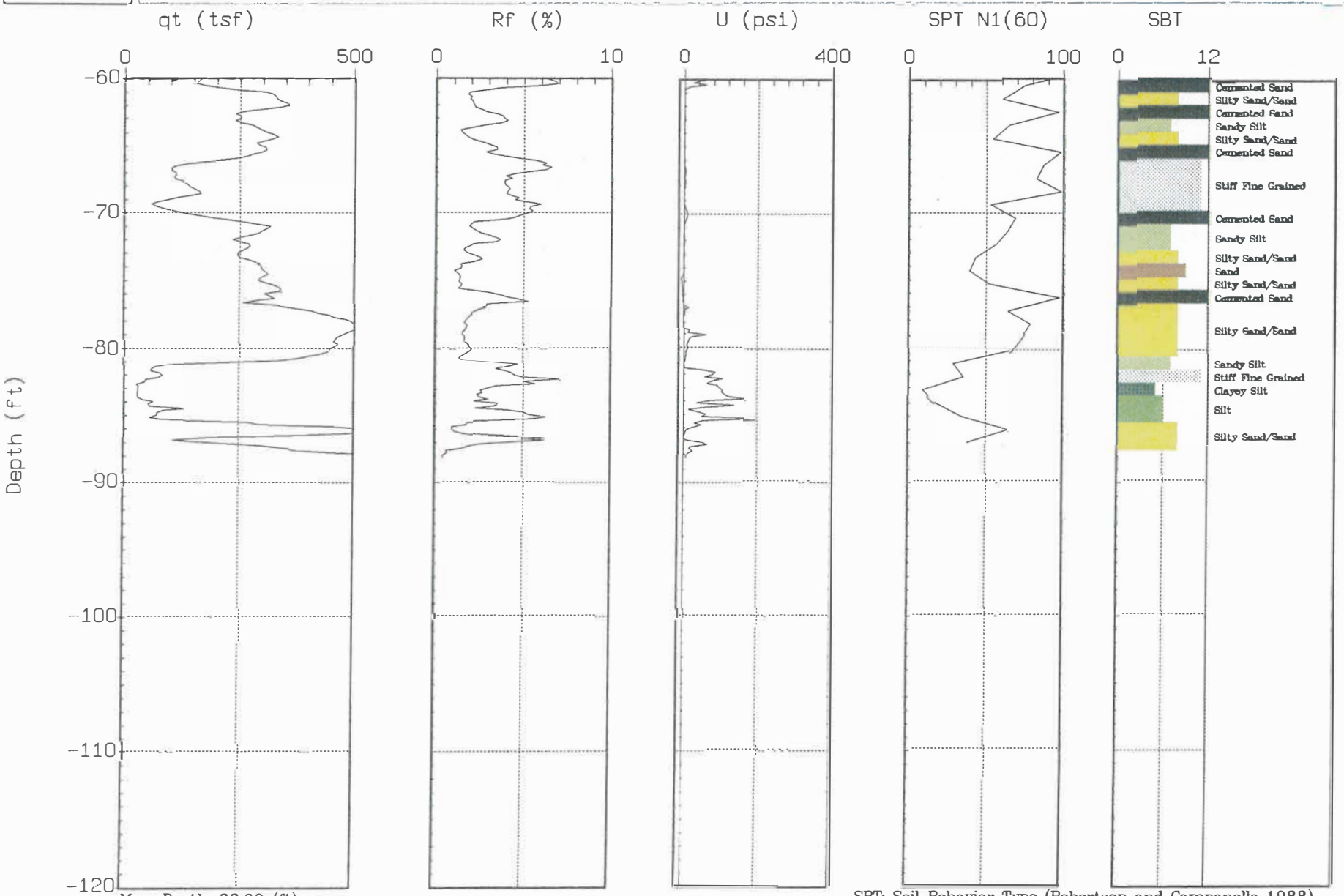
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-08

Engineer : JOHN BUCK
Date : 12:04:02 15:18



Max. Depth: 88.09 (ft)

Depth Inc.: 0.164 (ft)

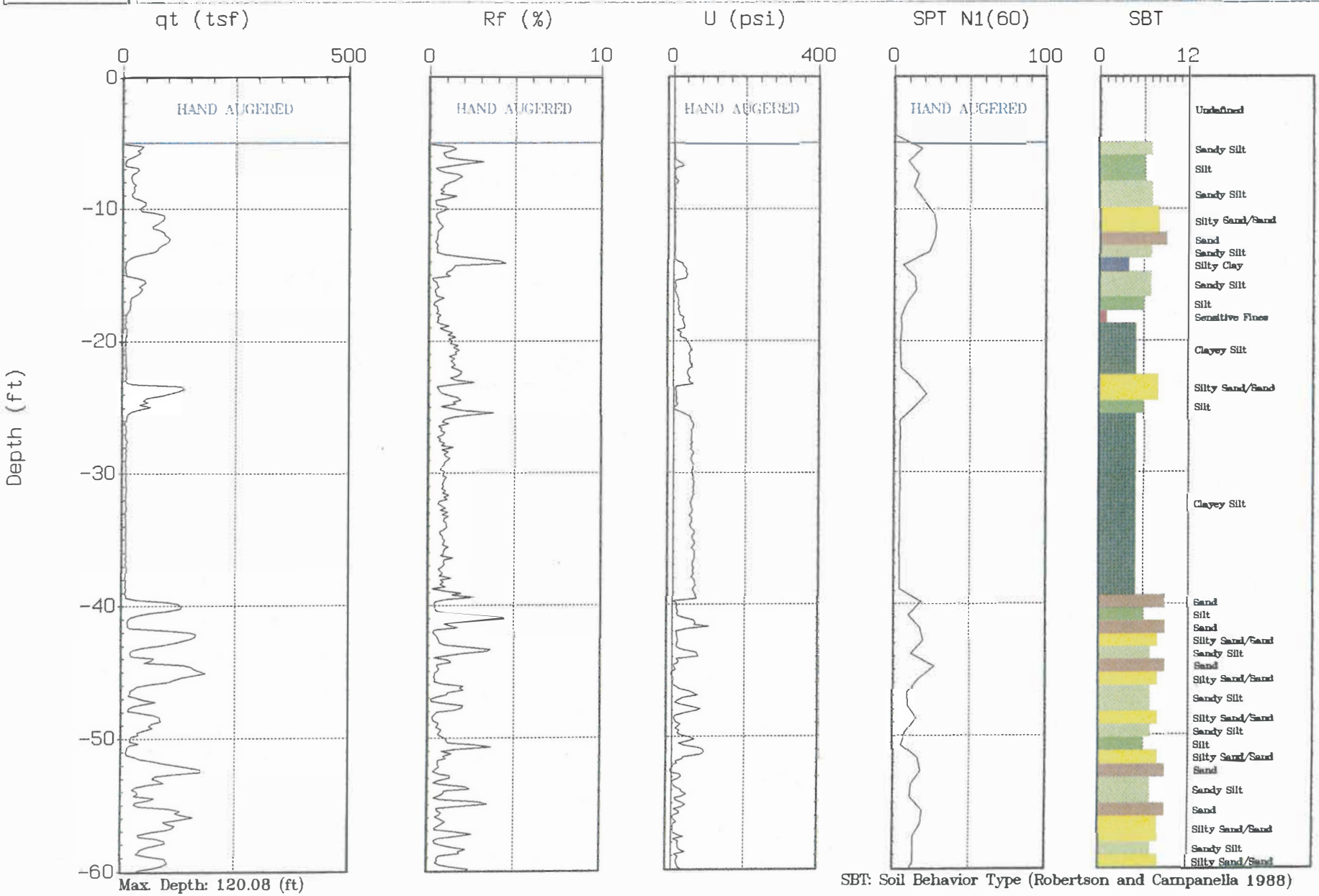
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-09

Engineer : JOHN BUCK
Date : 12:04:02 10:38



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

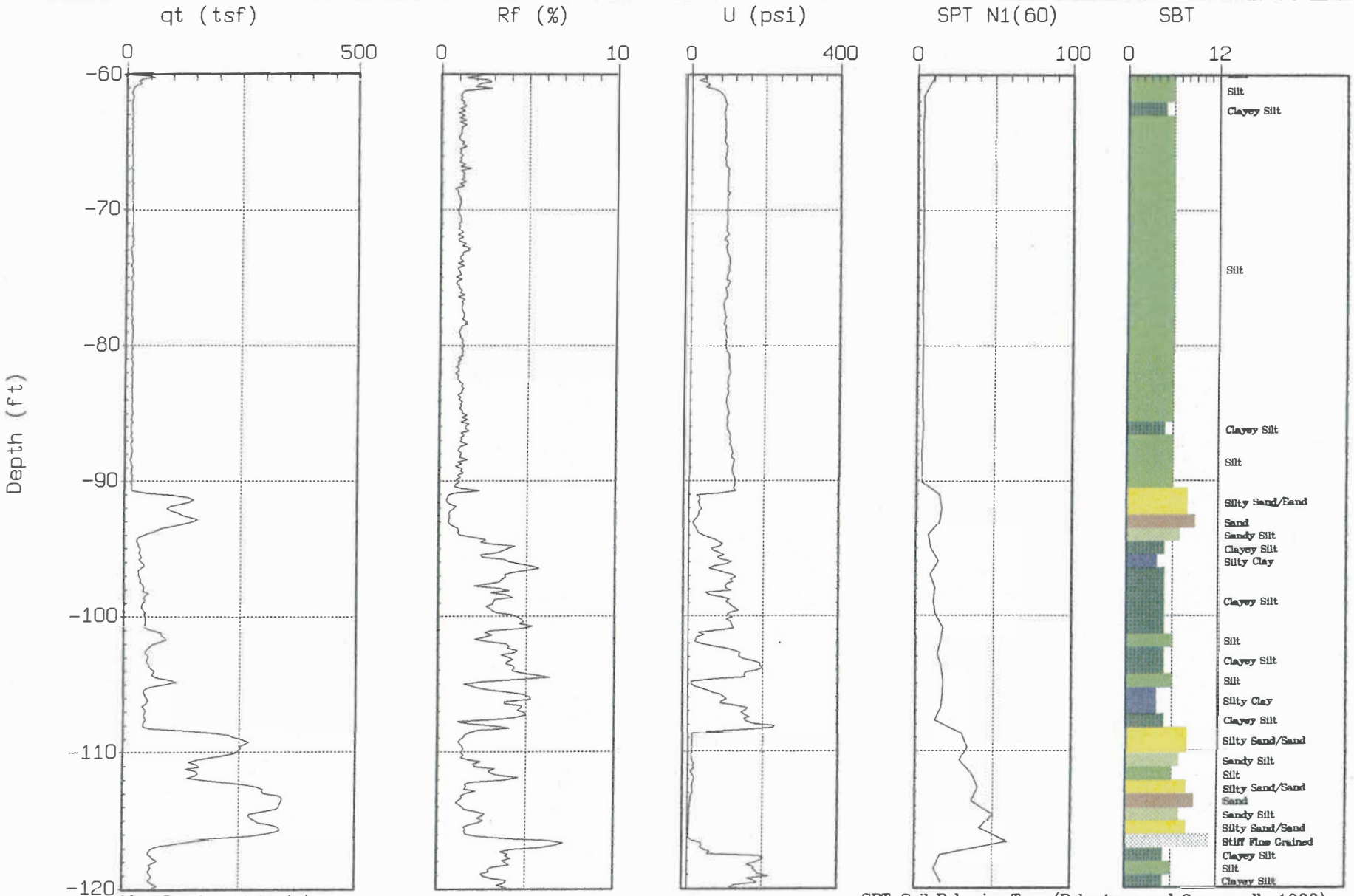
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-09

Engineer : JOHN BUCK
Date : 12:04:02 10:38



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

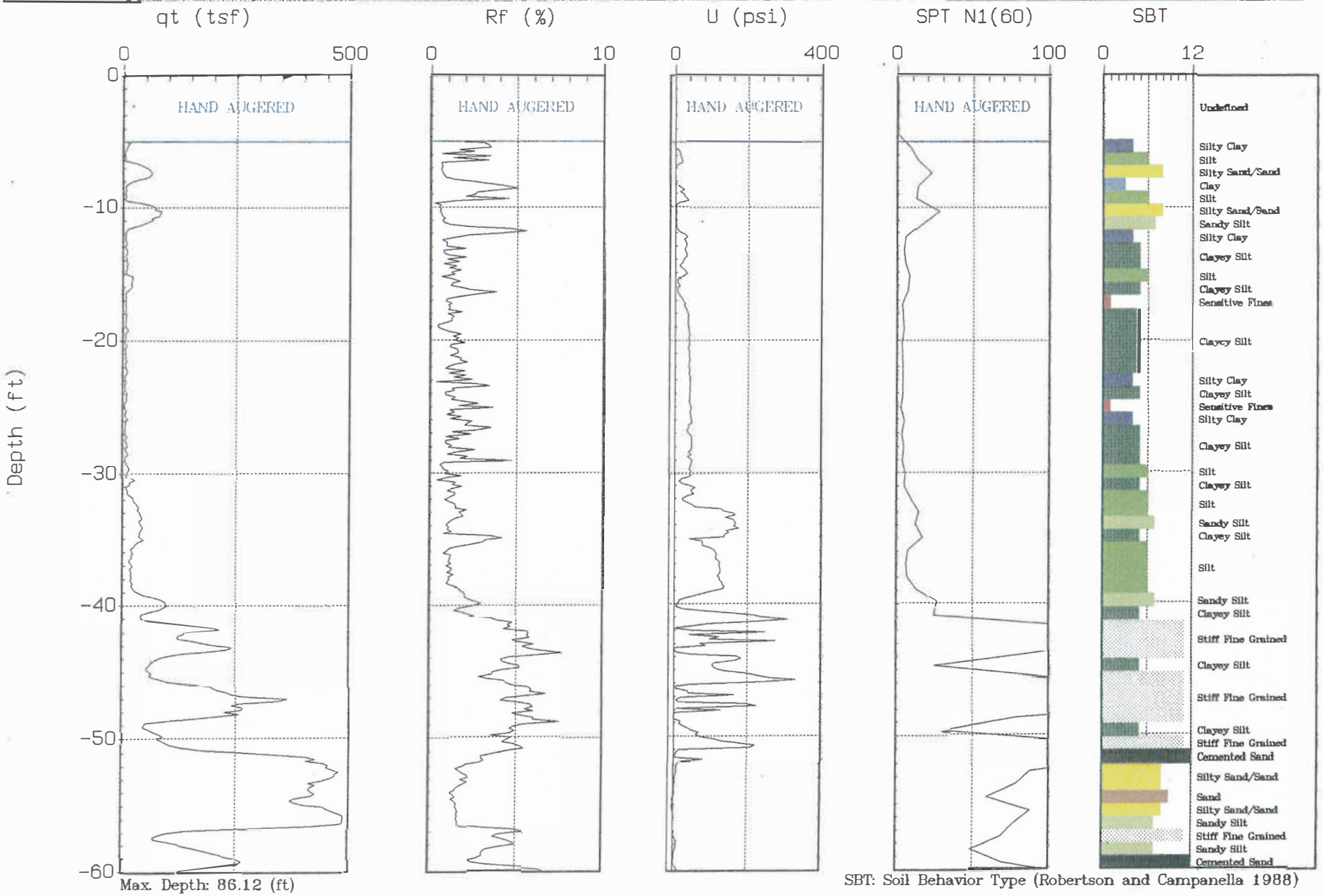
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-10

Engineer : JOHN BUCK
Date : 12:05:02 08:26



Max. Depth: 86.12 (ft)

Depth Inc.: 0.164 (ft)

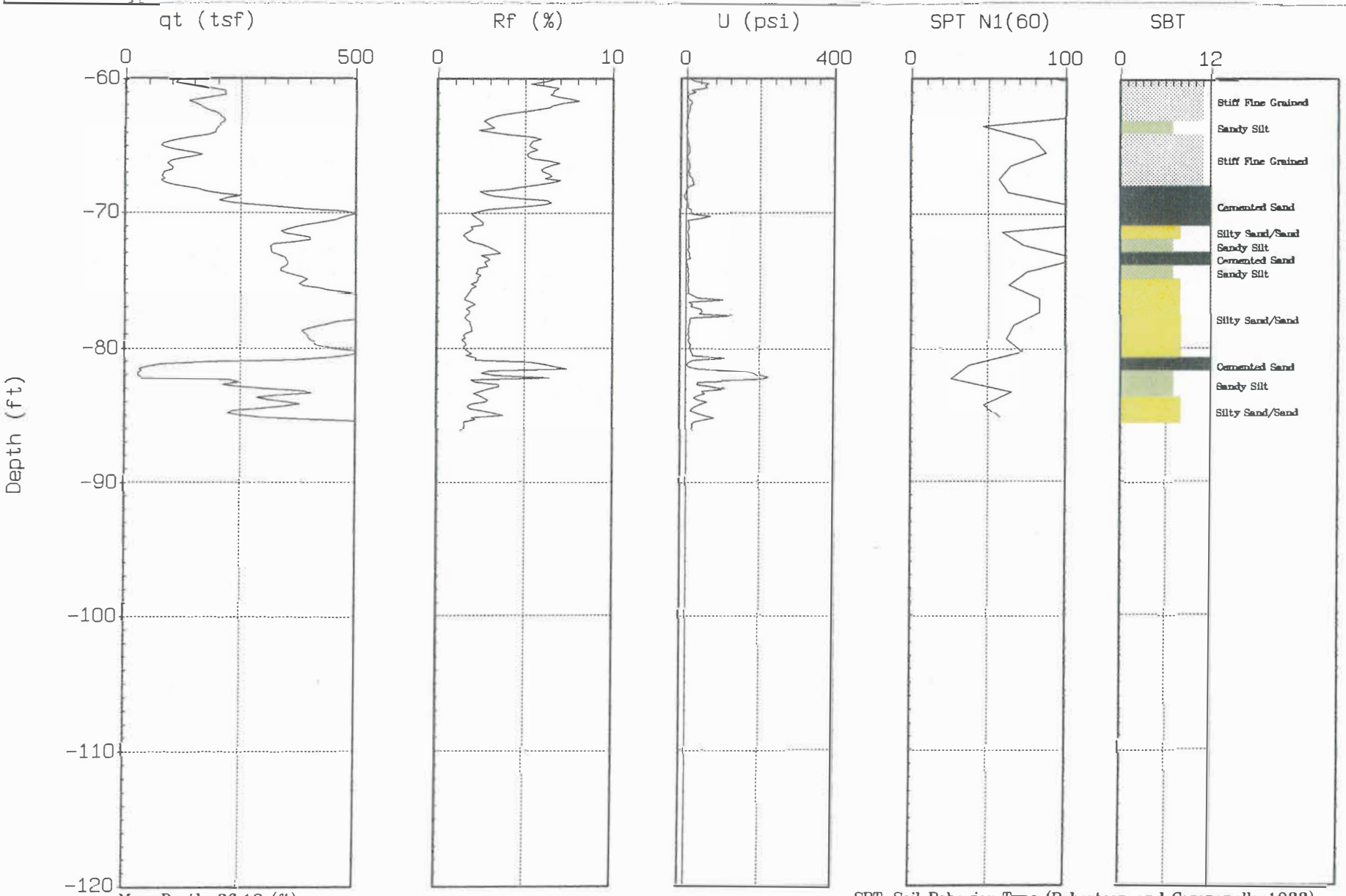
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-10

Engineer : JOHN BUCK
Date : 12:05:02 08:26



Max. Depth: 86.12 (ft)

Depth Inc.: 0.164 (ft)

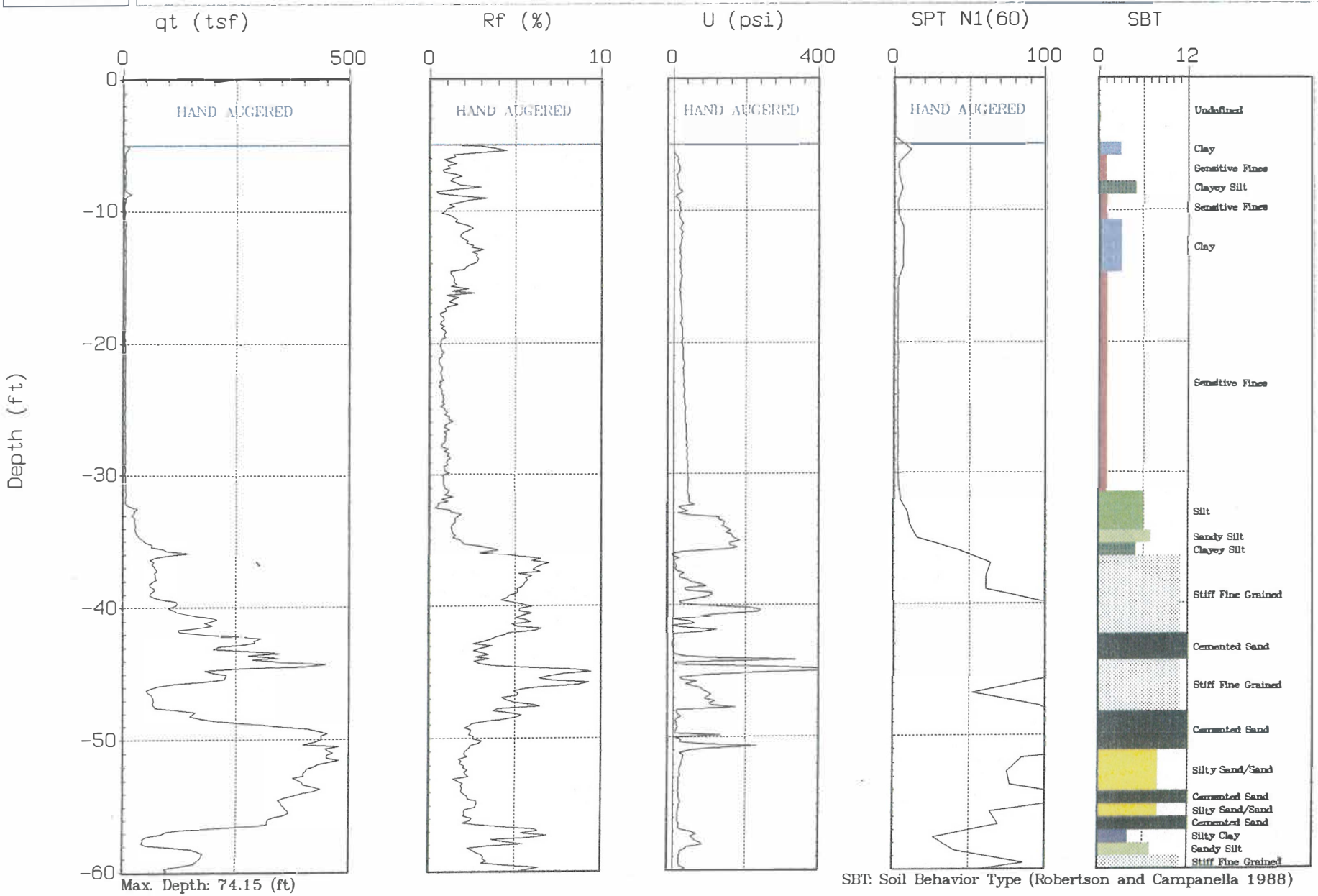
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-11

Engineer : JOHN BUCK
Date : 12:05:02 10:51



Max. Depth: 74.15 (ft)

Depth Inc.: 0.164 (ft)

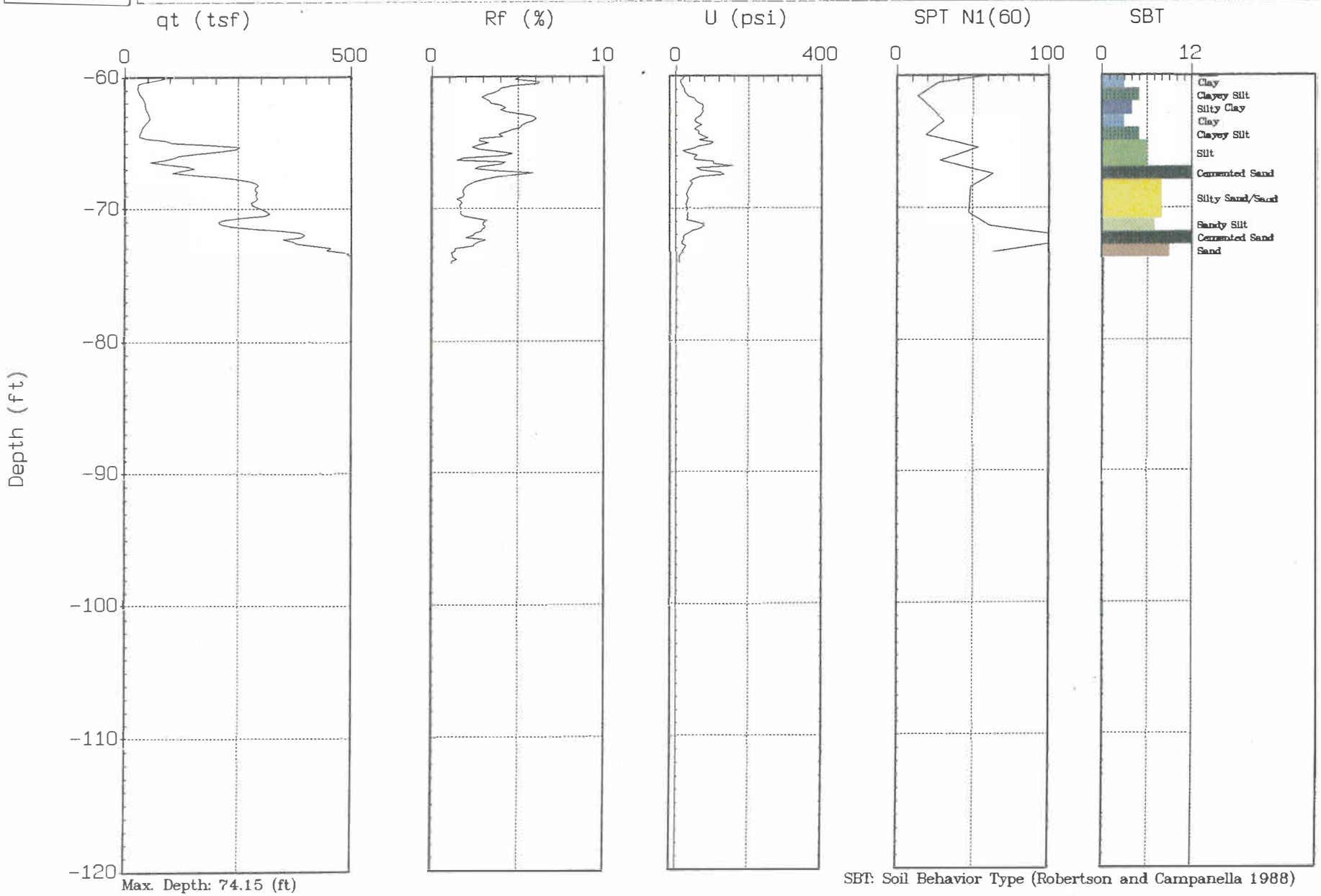
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-11

Engineer : JOHN BUCK
Date : 12:05:02 10:51



Max. Depth: 74.15 (ft)

Depth Inc.: 0.164 (ft)

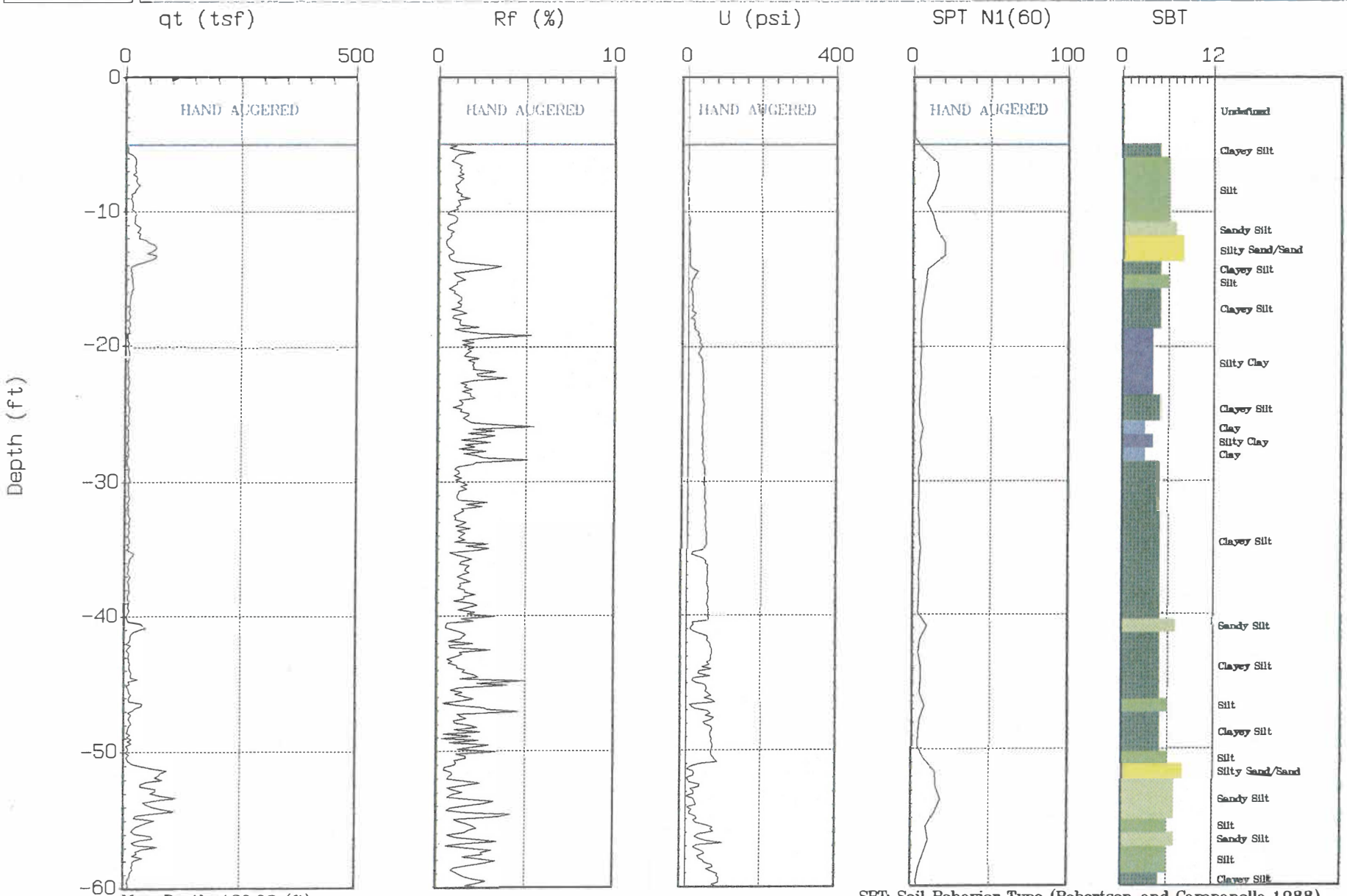
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-12

Engineer : JOHN BUCK
Date : 12:04:02 08:21



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

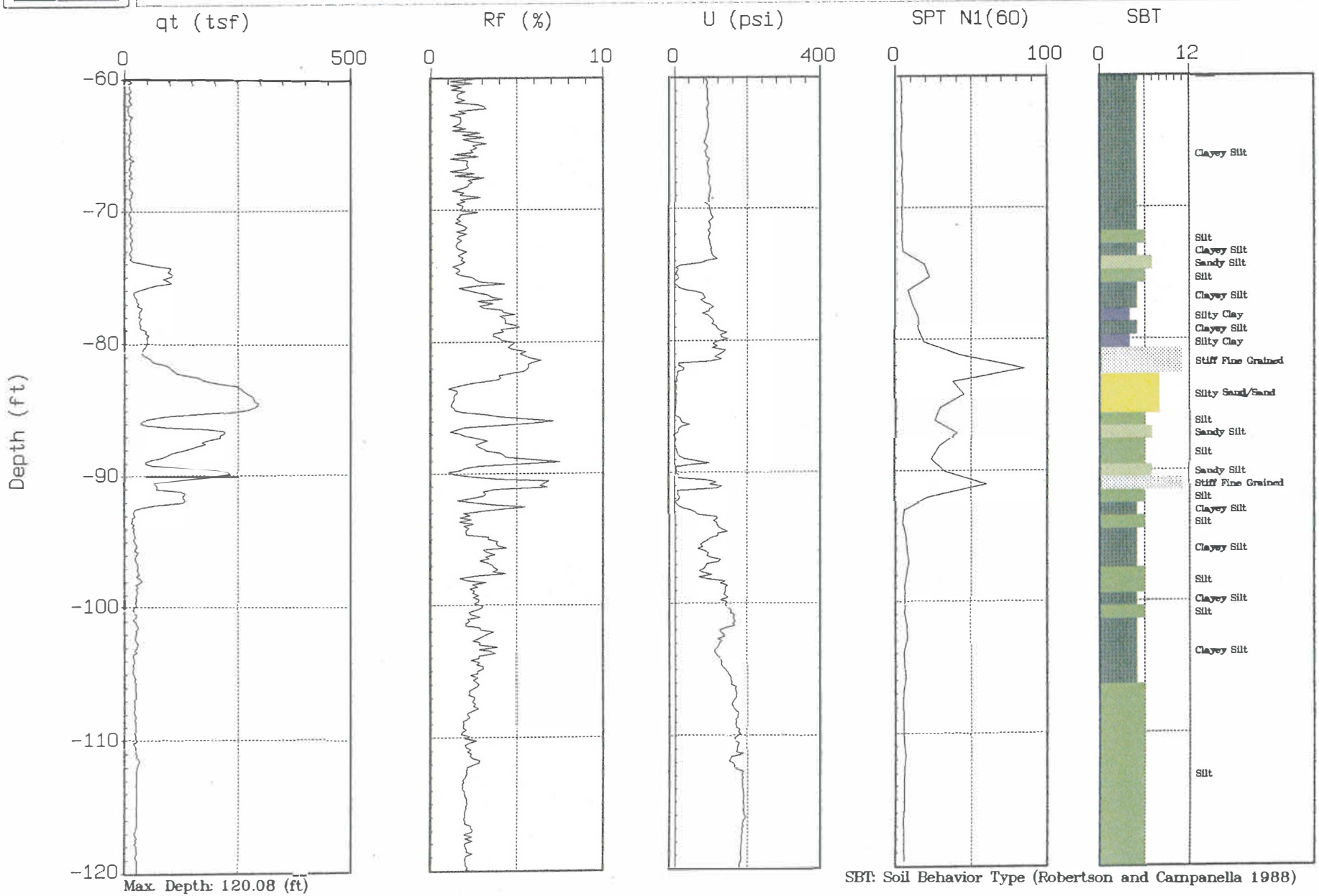
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-12

Engineer : JOHN BUCK
Date : 12:04:02 08:21



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

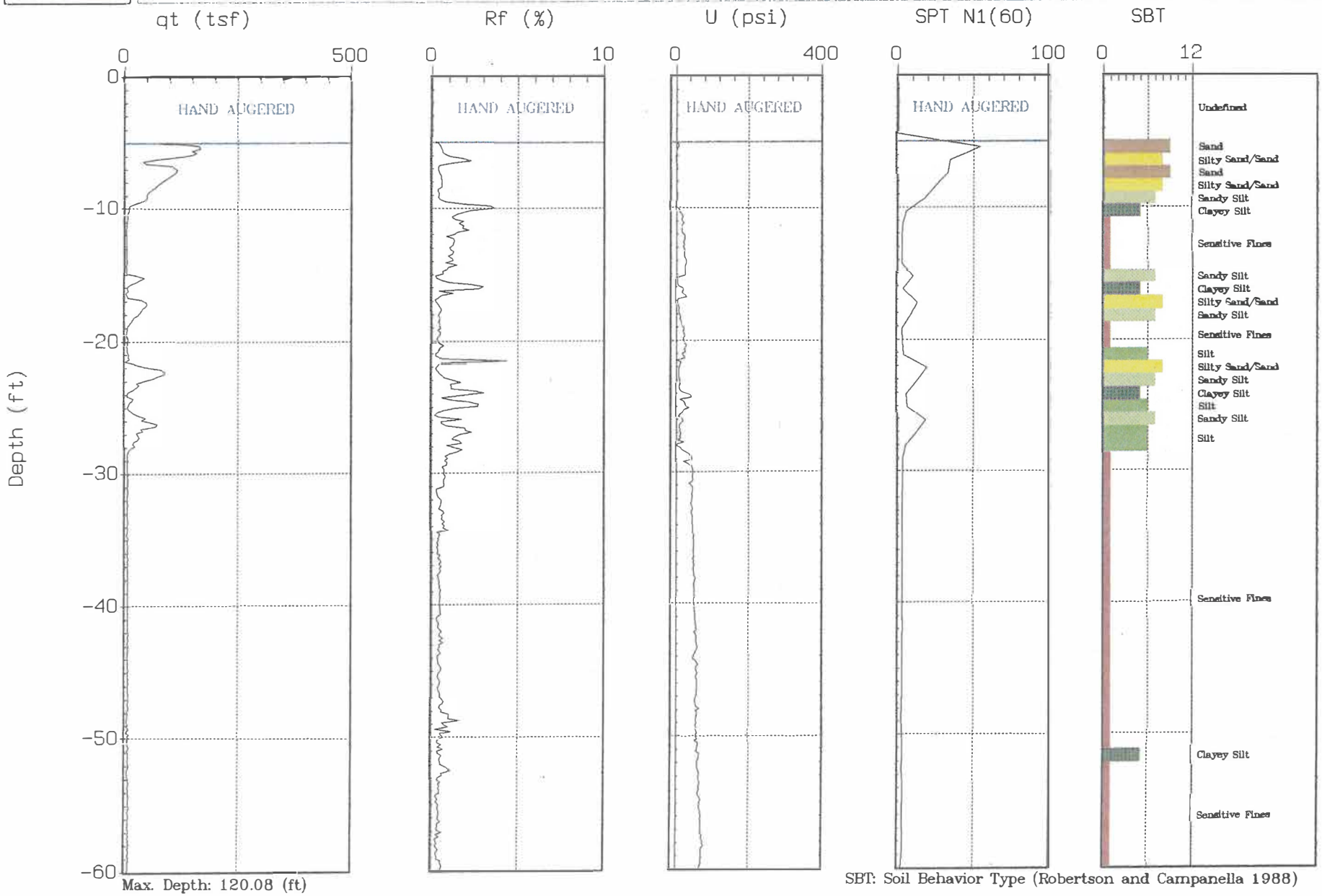
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-13

Engineer : JOHN BUCK
Date : 12:05:02 13:27



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

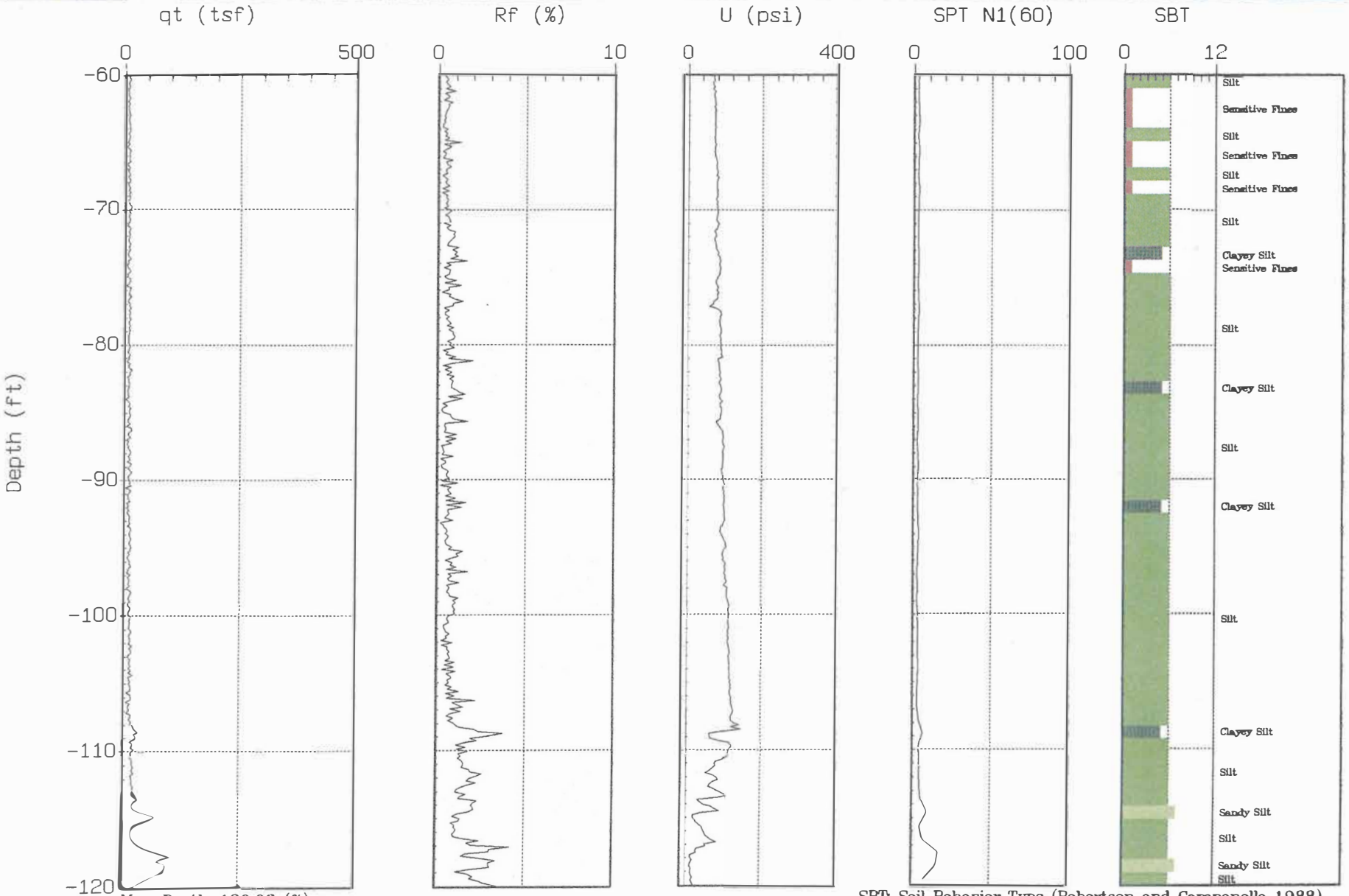
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-13

Engineer : JOHN BUCK
Date : 12:05:02 13:27



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

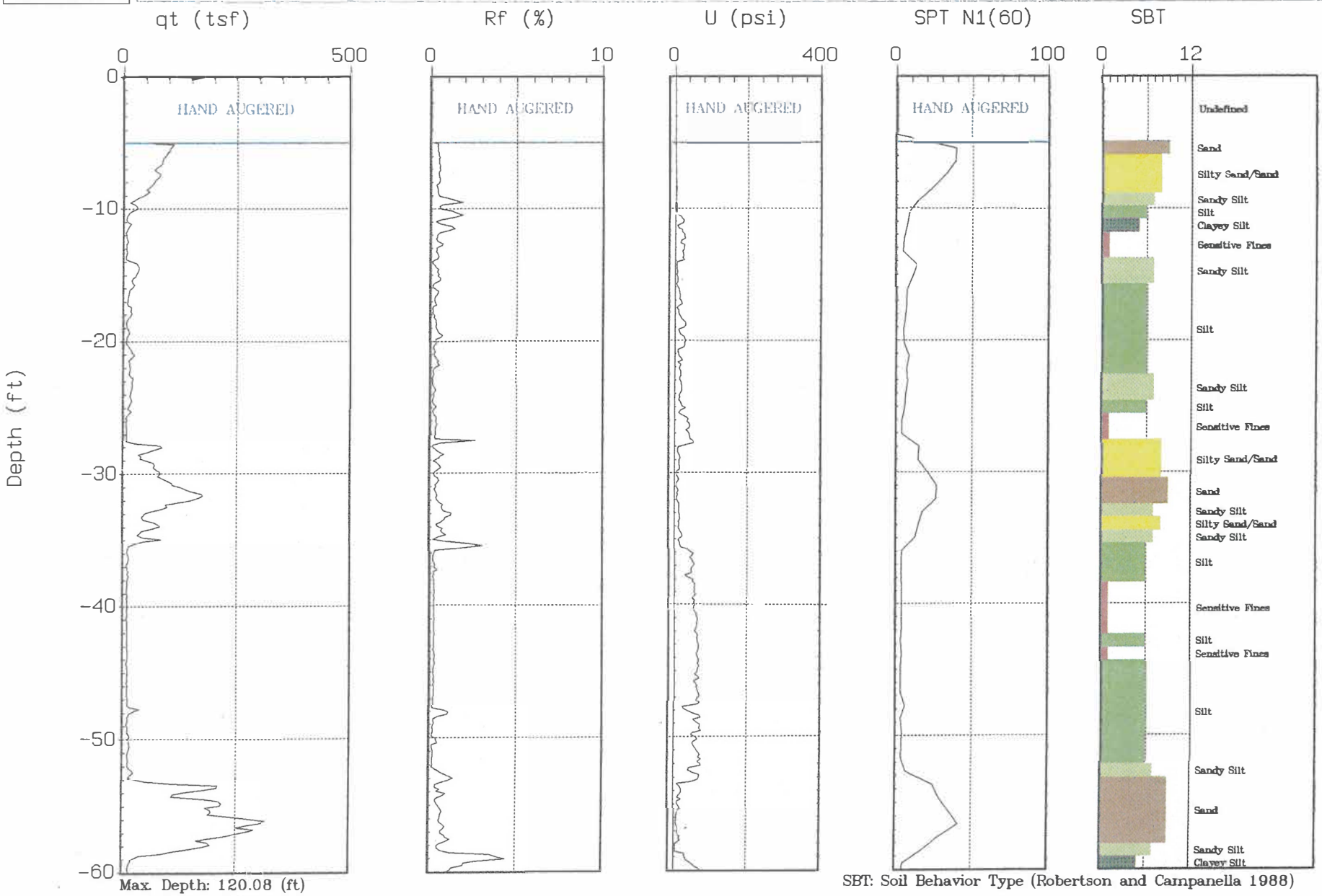
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-14

Engineer : JOHN BUCK
Date : 12:06:02 14:02



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

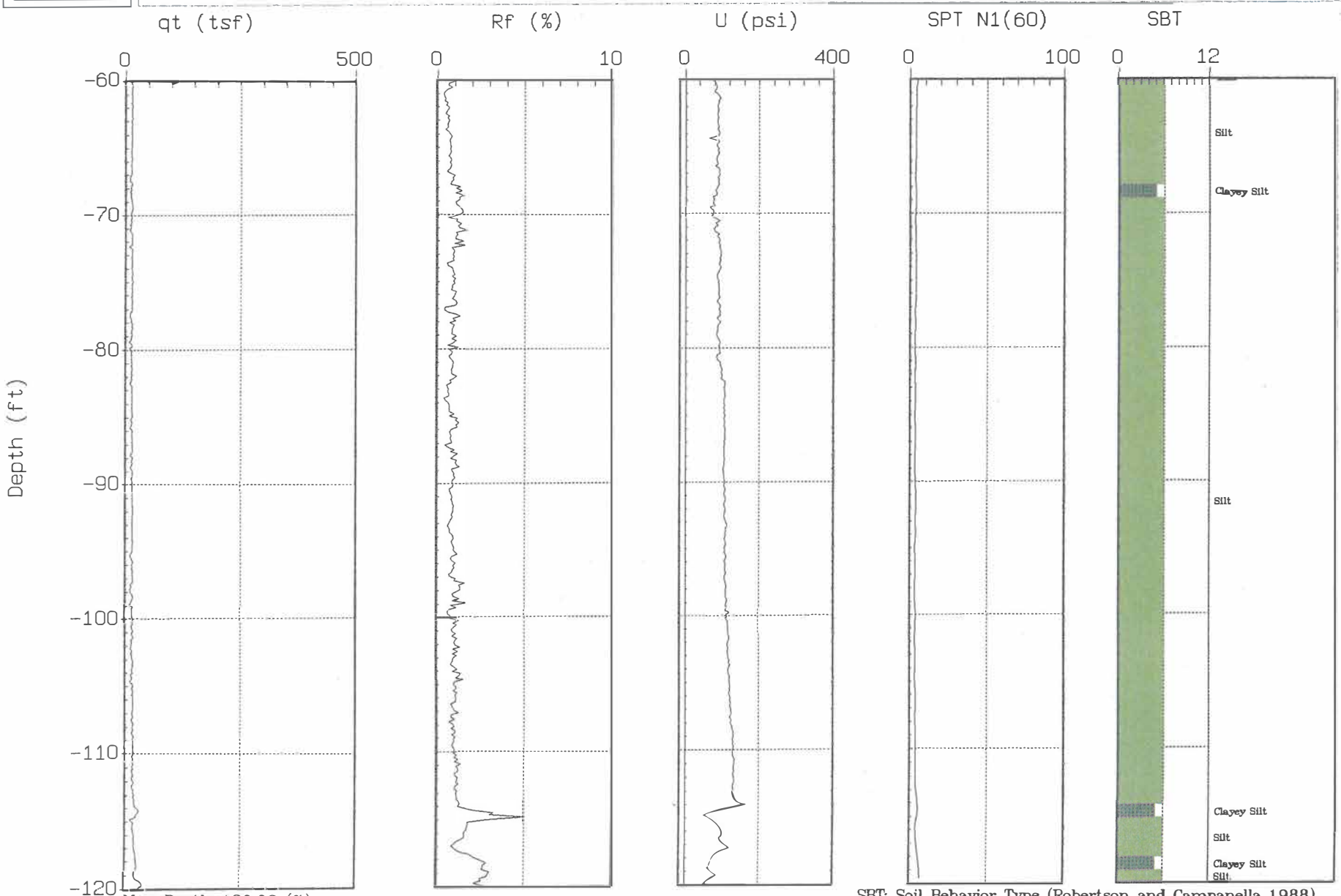
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-14

Engineer : JOHN BUCK
Date : 12:06:02 14:02



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

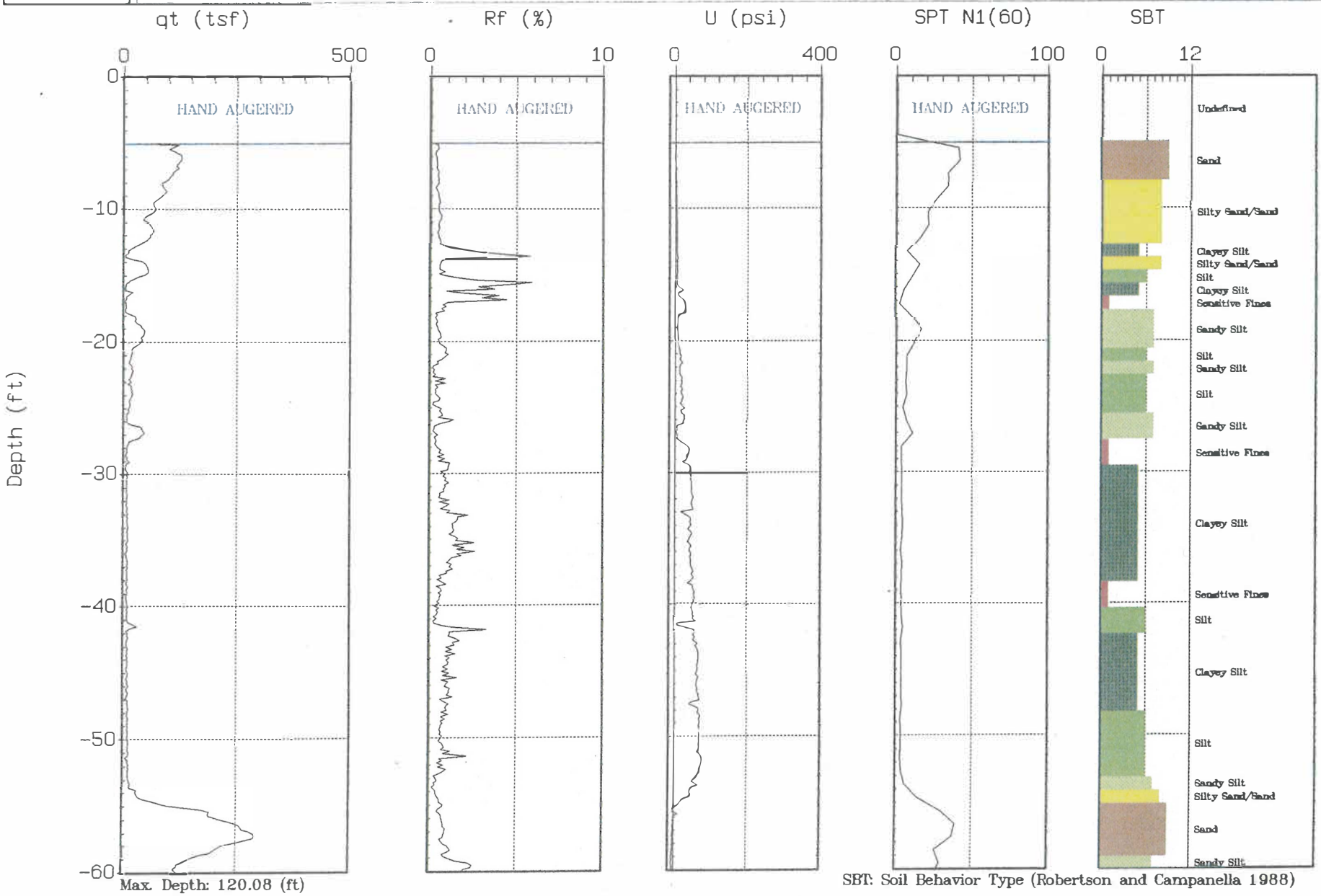
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-15

Engineer : JOHN BUCK
Date : 12:06:02 12:35



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

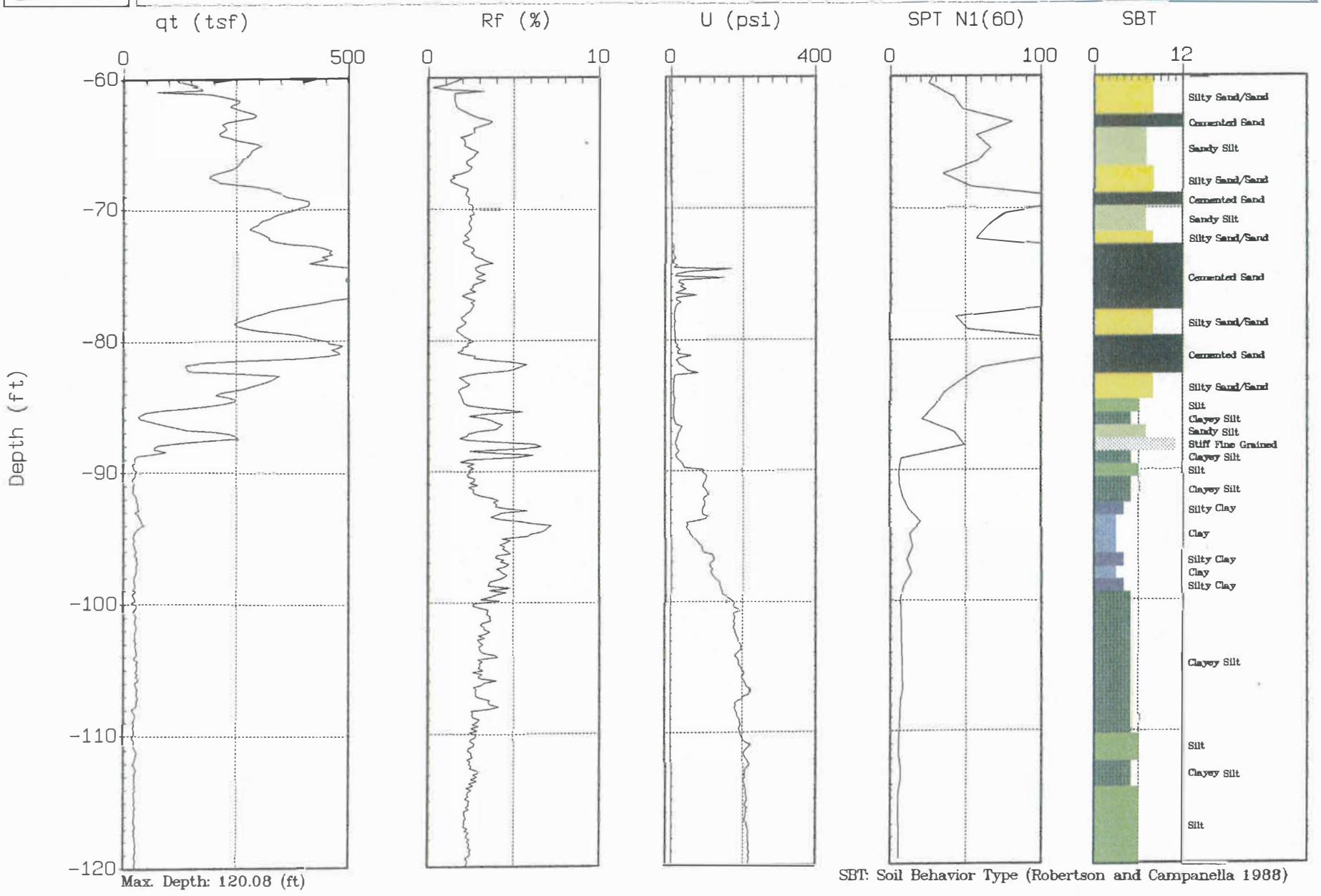
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-15

Engineer : JOHN BUCK
Date : 12:06:02 12:35



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

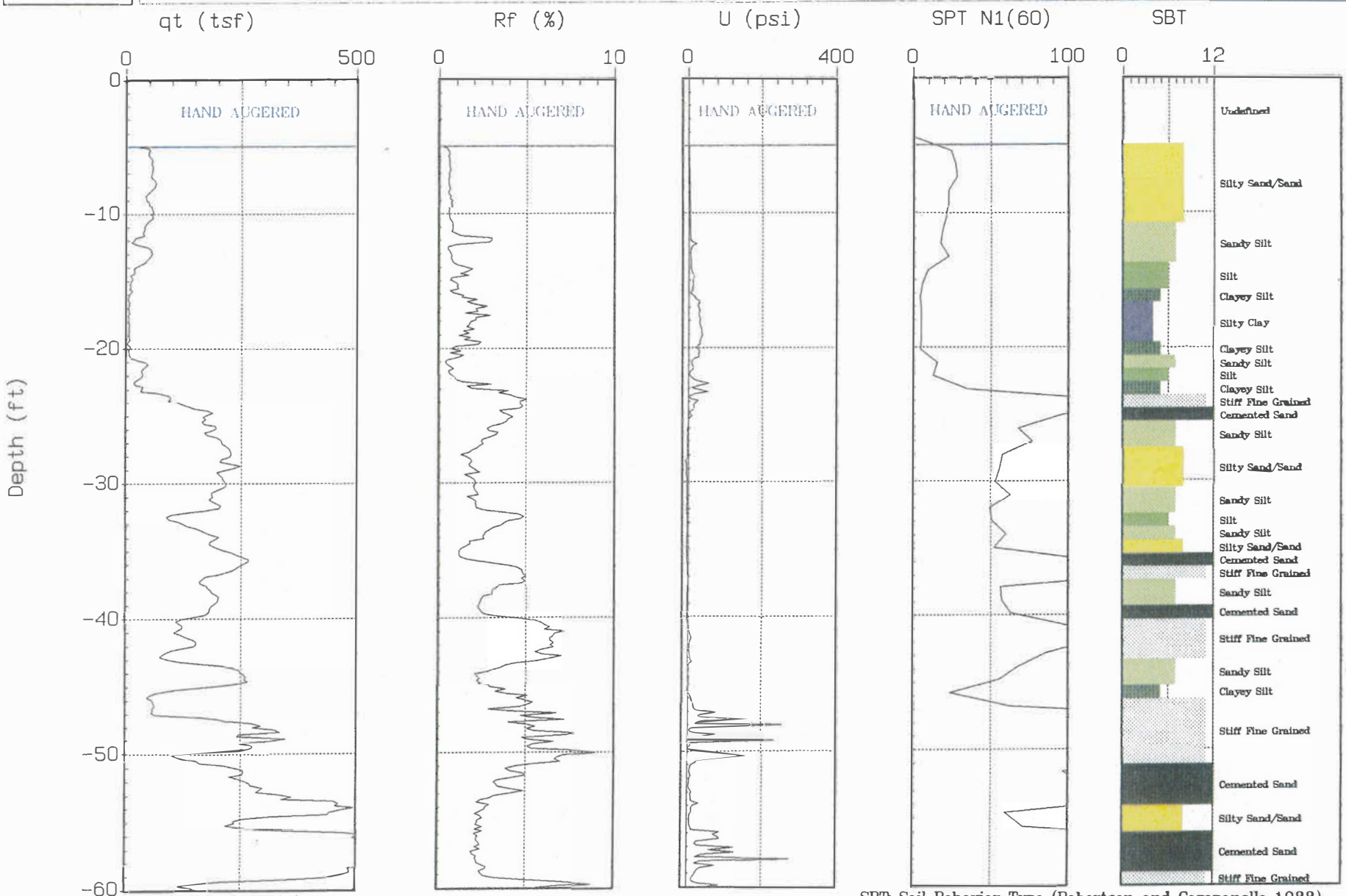
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-16

Engineer : JOHN BUCK
Date : 12:06:02 08:05



Max. Depth: 80.22 (ft)

Depth Inc.: 0.164 (ft)

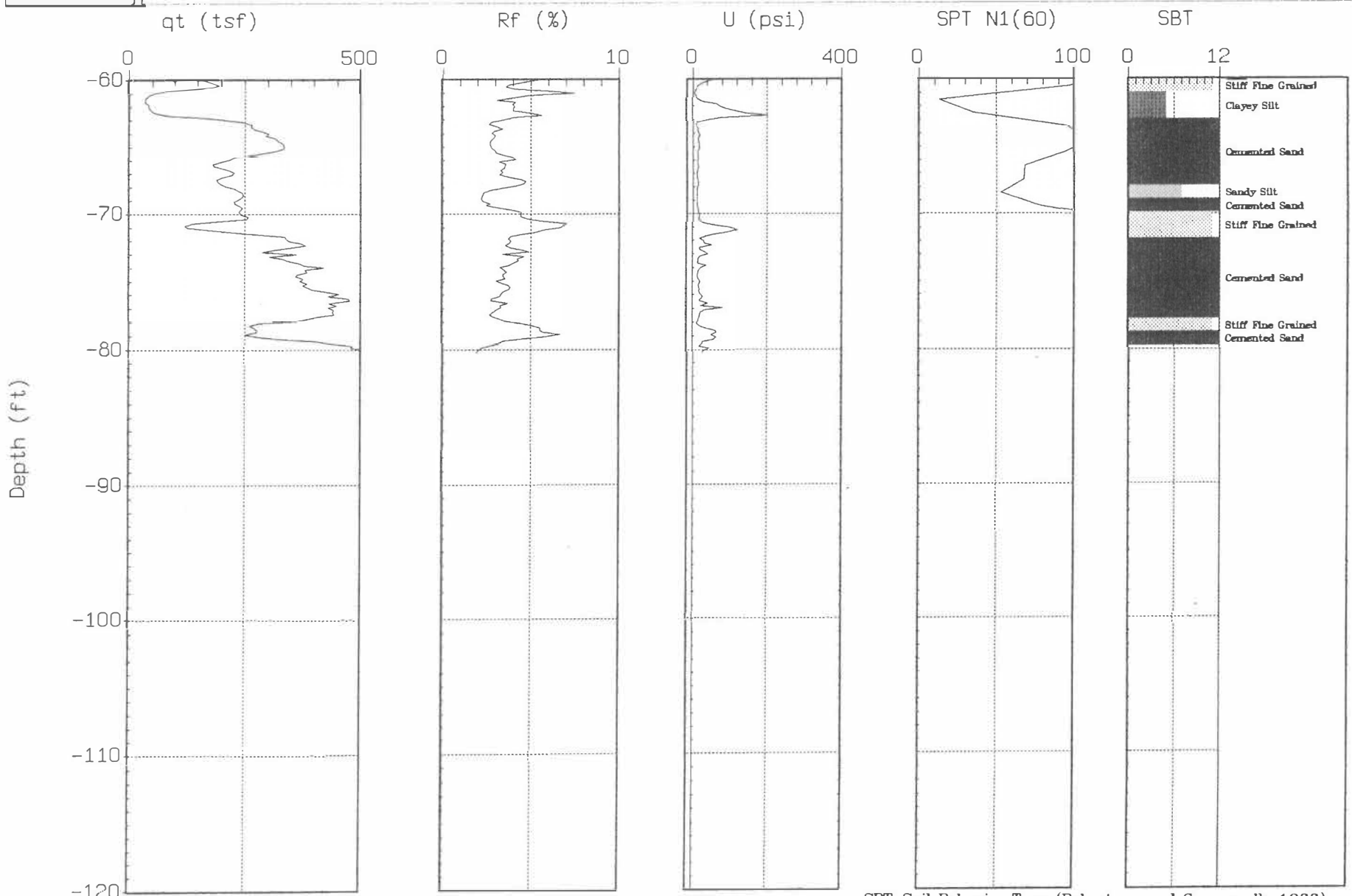
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-16

Engineer : JOHN BUCK
Date : 12:06:02 08:05



Max. Depth: 80.22 (ft)

Depth Inc.: 0.164 (ft)

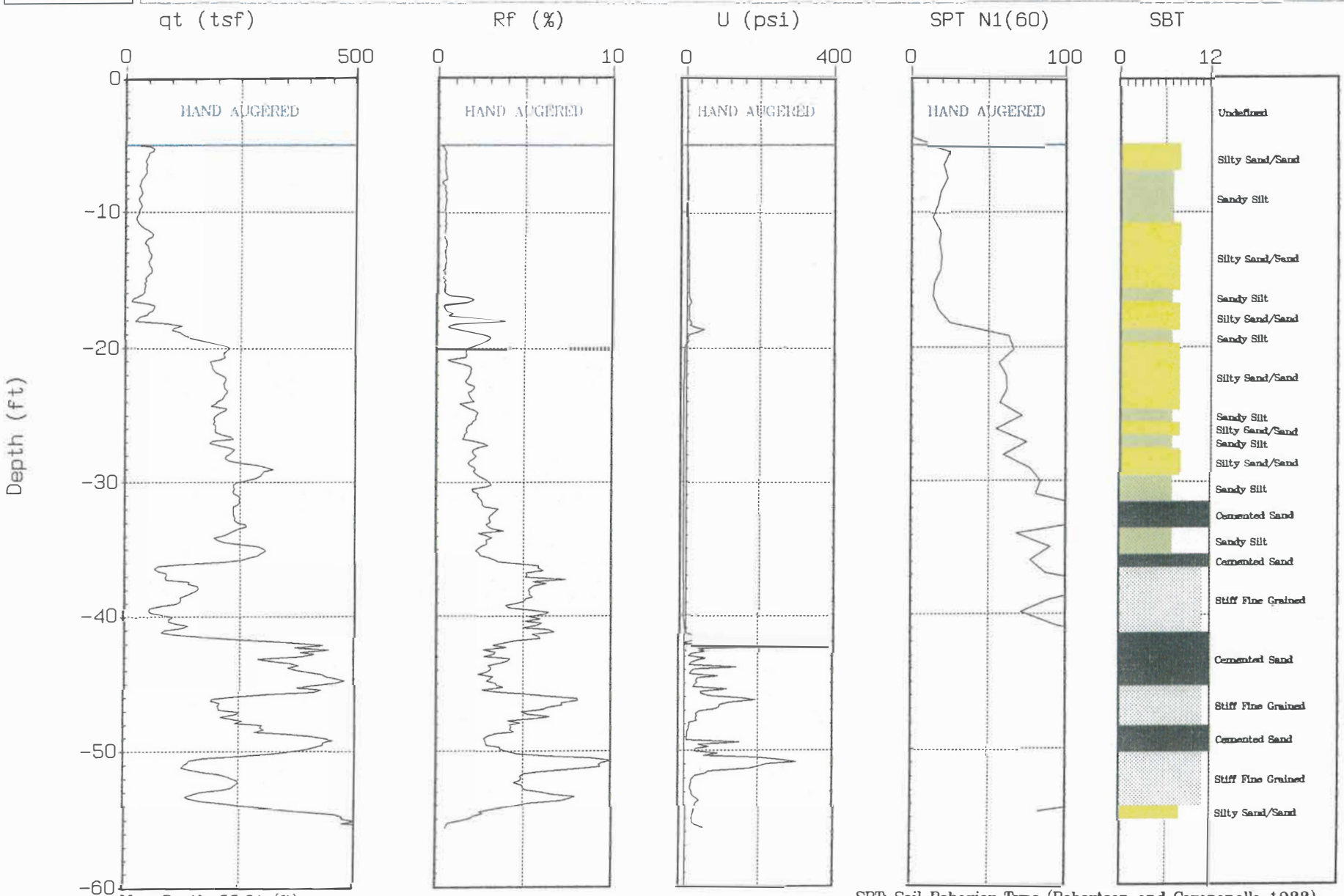
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-17

Engineer : JOHN BUCK
Date : 12:06:02 09:34



Max. Depth: 55.61 (ft)

Depth Inc.: 0.164 (ft)

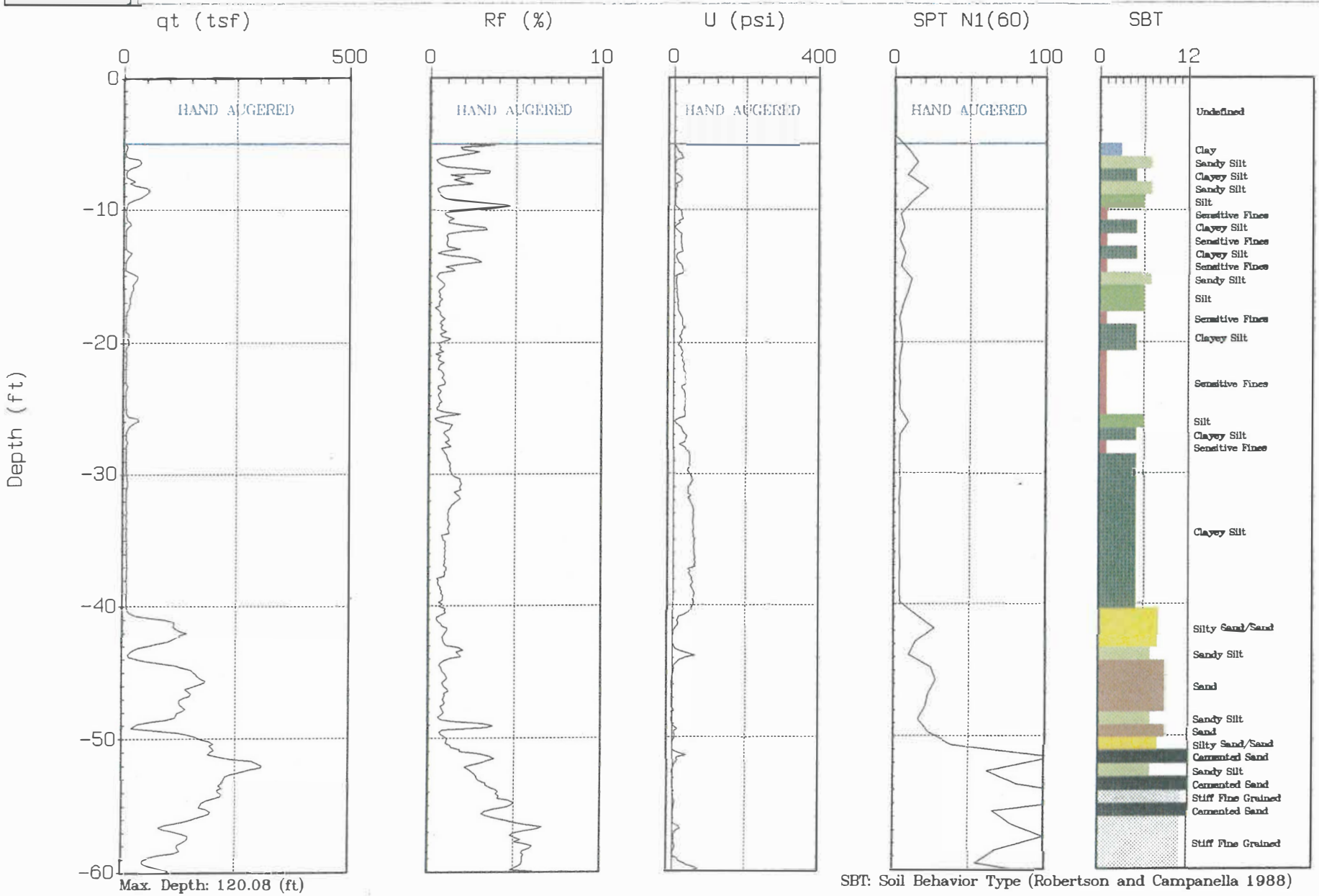
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-18

Engineer : JOHN BUCK
Date : 12:05:02 14:42



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

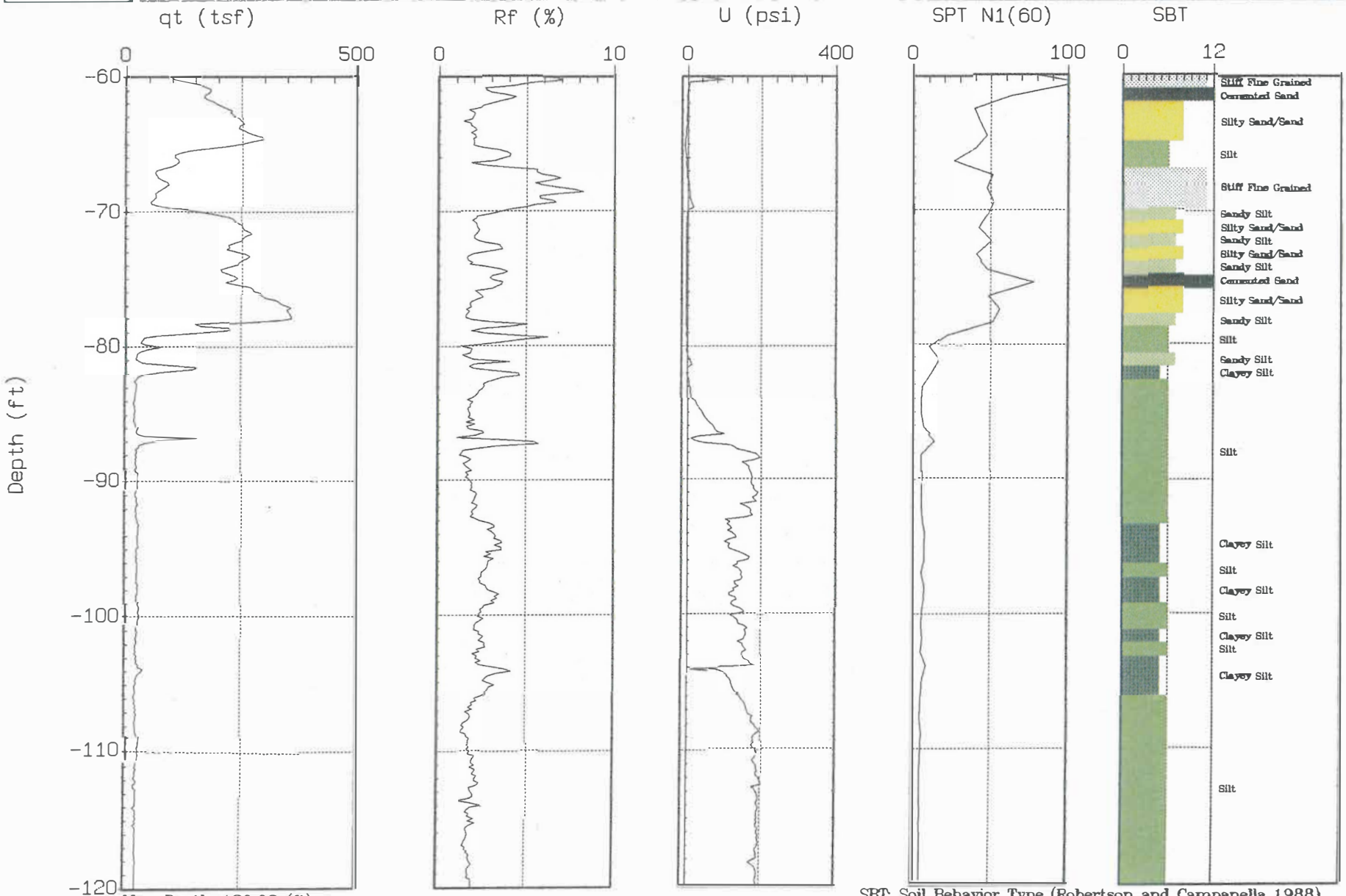
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : A.N.A.S. ALAMEDA
Location : CPT-18

Engineer : JOHN BUCK
Date : 12:05:02 14:42



Max. Depth: 120.08 (ft)

Depth Inc.: 0.164 (ft)

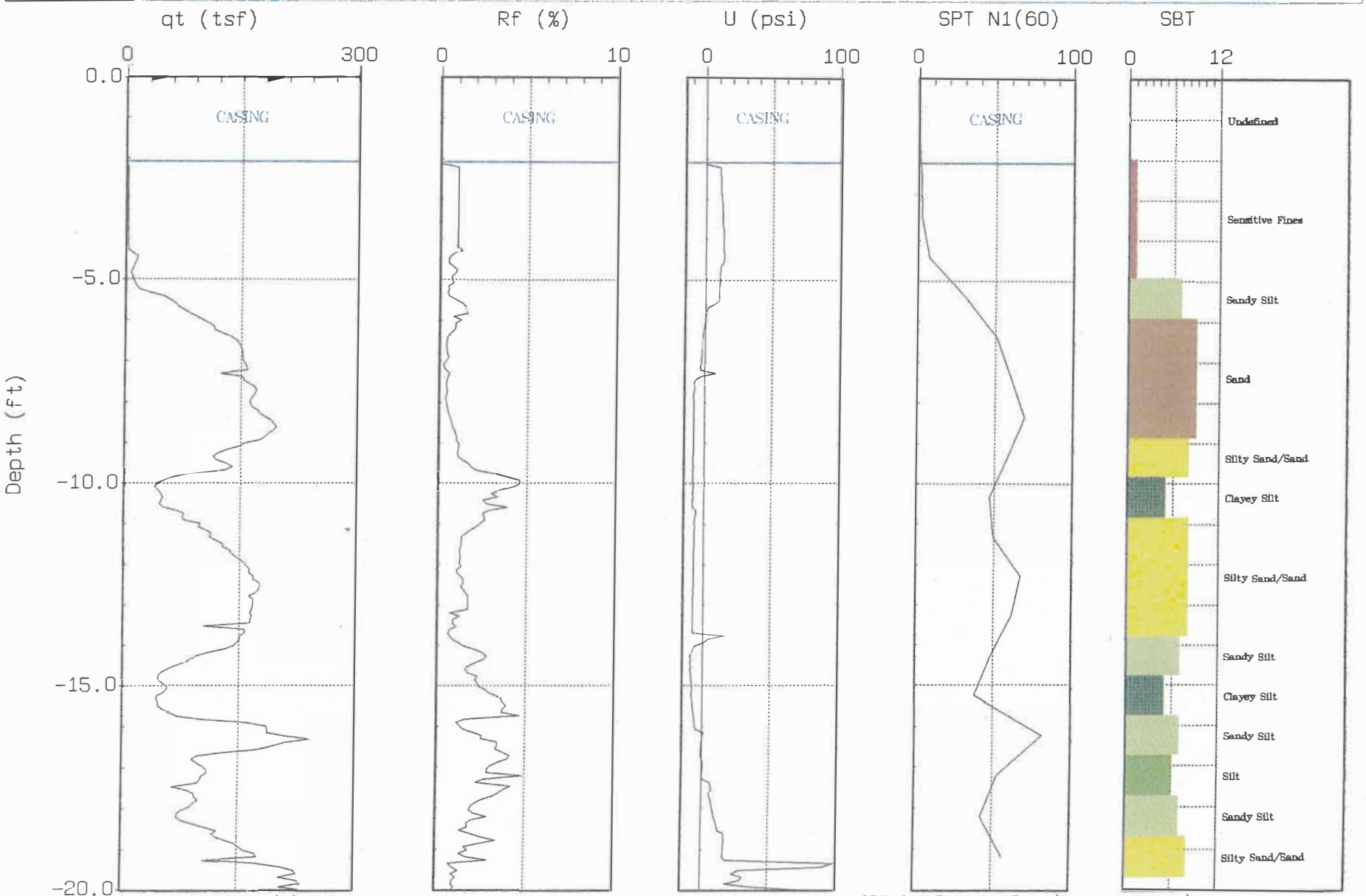
SBT: Soil Behavior Type (Robertson and Campanella 1988)

GREGG

ENGEO

Site : ALAMEDA POINT
Location : C-19

Engineer : JOHN BUCK
Date : 12:20:02 10:57



Max. Depth: 20.09 (ft)

Depth Inc.: 0.082 (ft)

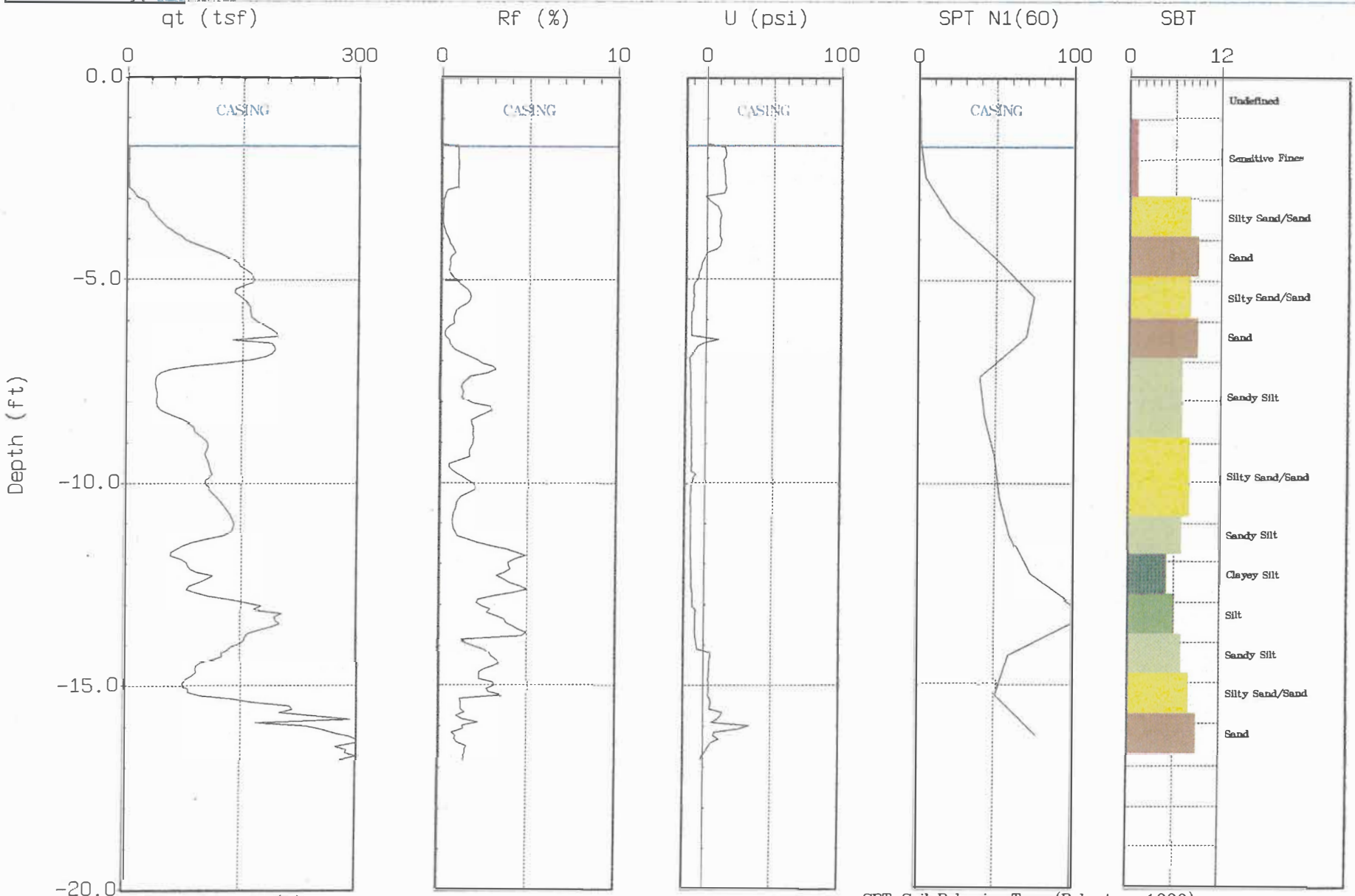
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site : ALAMEDA POINT
Location : C-20

Engineer : JOHN BUCK
Date : 12:20:02 13:14



Max. Depth: 16.81 (ft)

Depth Inc.: 0.082 (ft)

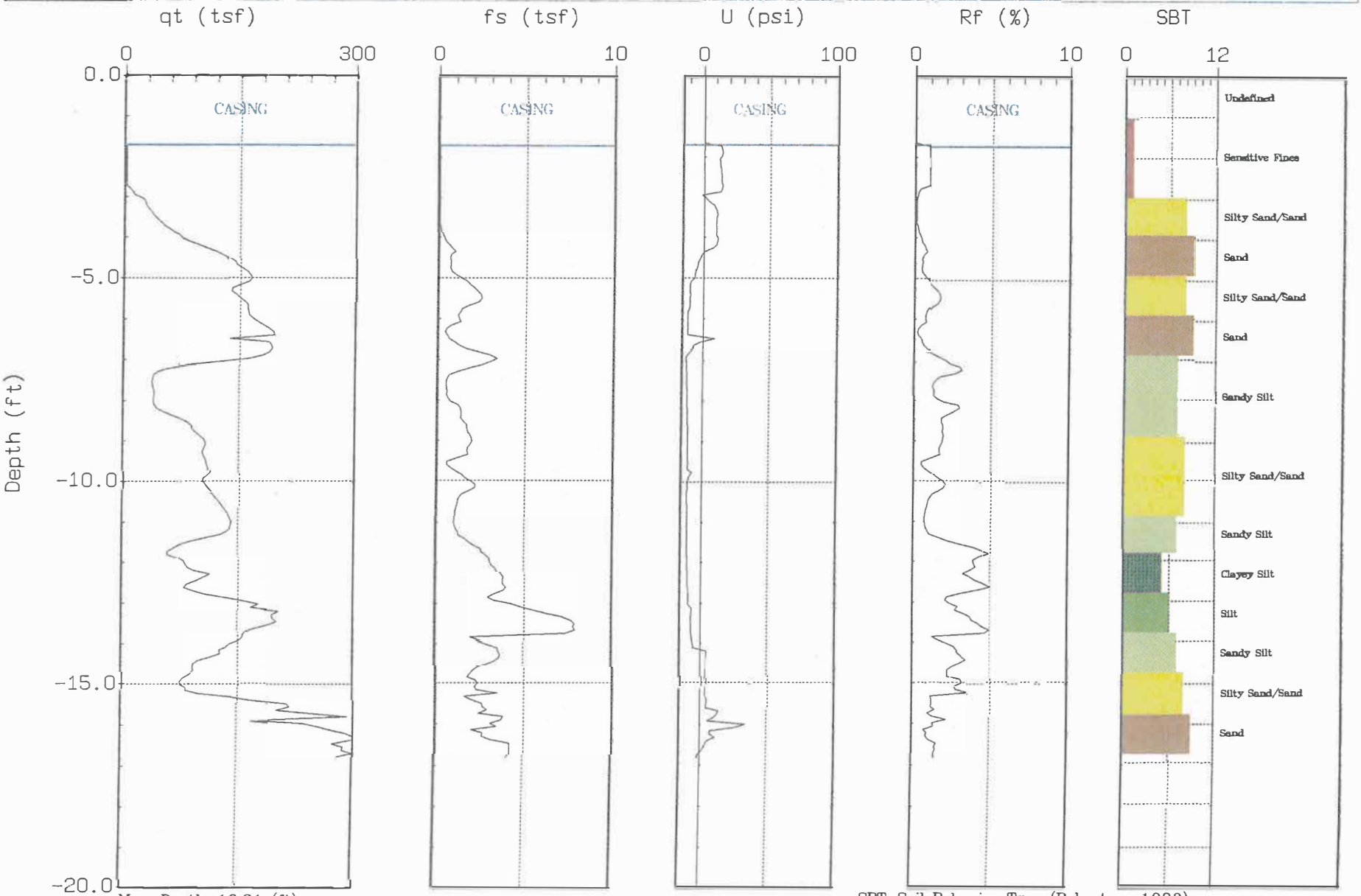
SBT: Soil Behavior Type (Robertson 1990)

GREGG

ENGEO

Site : ALAMEDA POINT
Location : C-20

Engineer : JOHN BUCK
Date : 12:20:02 13:14



Max. Depth: 16.81 (ft)

Depth Inc.: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

APPENDIX D

Select Borelogs from Existing Navy Reports

RPT	ACTIVITY	PROJECT	LOGS	SOURCEID
01 A	ALAMEDA	2ND INCREMENT-CAPEHART HOUSING	32	
01 B	ALAMEDA	EXPANSION OF SHIP REPAIR FACILITY		
01 C	ALAMEDA	FOUNDATION INV FOR NAS ALAMEDA	12	
01 D	ALAMEDA	TURBO JET ENGINE TEST CELLS	5	5303
01 E	ALAMEDA	AIR TURBINE OVERHAUL & TEST BUILDING		
01 F	ALAMEDA	EXTENSION OF RUNWAY 13-31	15	
01 G	ALAMEDA	PAVEMENT THICKNESS DESIGN		
01 H	ALAMEDA	ADVANCE UNDERSEAS WEAPON SHOP	2	1687.1
01 I	ALAMEDA	PLATE LOAD TESTS RUNWAYS 7-25, 13-31	0	
01 J	ALAMEDA	SEISMIC REFRACTION SURVEY	0	
01 K	ALAMEDA	MAINTENANCE APRON	38	4787
01 L	ALAMEDA	ADDITION TO 2ND INCREMENT CAPEHART HOUSING	42	5495
01 M	ALAMEDA	CORROSION SURVEY CAPEHART HOUSING	0	
01 N	ALAMEDA	COR SURVEY CAPEHART OFF STATION	0	
01 O	ALAMEDA	INERTIAL GUIDANCE TEST INSTALLATION	0	4056(1)
01 P	ALAMEDA	2ND INCREMENT CAPEHART HOUSING	11	5097
01 Q	ALAMEDA	EXTENSION OF TAXIWAYS 1 & 2	29	E119-1
01 R	ALAMEDA	POWER CHECK FACILITY	6	E119-1
01 S	ALAMEDA	SEISMIC NOISE LEVEL MEASUREMENTS	0	
01 T	ALAMEDA	INERTIAL GUIDANCE SUP TEST FACILITY		
01 U	ALAMEDA	N&MC TRAINING CENTER B ILDINGS		5811
01 V	ALAMEDA	300 UNITS QUARTERS	2	5890
01 W	ALAMEDA	LOGS & FIGURES FOR REPORT 1V	41	5890
01 X	ALAMEDA	DRAINAGE FOR 300 UNITS QUARTERS	0	
01 Y	ALAMEDA	FY65 APPROPRIATED FUNDS QUARTERS	34	2437
01 Z	ALAMEDA	AIRFIELD LIGHTING FACILITY	1	6007
01AA	ALAMEDA	PCE GROUND SUPPORT EQUIPMENT SHOP	2	S-11092
01AB	ALAMEDA	OVERHAUL & REPAIR TURBINE SHOP	9	GEO 2127
01AC	ALAMEDA	MISSILE REWORK BUILDING (INTERIM)	5	0015
01AD	ALAMEDA	MISSILE REWORK BUILDING	11	GEO 2849
01AE	ALAMEDA	364 UNITS QUARTERS	19	1175-A
01AF	ALAMEDA	AIRCRAFT MAINTENANCE APRON	38	23-24
01AG	ALAMEDA	AIRCRAFT SYSTEMS TRAINING BLDG	2	S-11399
01AH	ALAMEDA	ROAD RATER DEMONSTRATION	0	
01AI	ALAMEDA	AIRCRAFT PAINTING & SHIPPING FACILITIES	2	2176.11
01AJ	ALAMEDA	LAND MANAGEMENT PLAN SOIL & WATER CONSERVATIO	0	
01AK	ALAMEDA	WATER POLLUTION ABATEMENT FACILITY	23	114-2, PA1559
01AL	ALAMEDA	200 UNIT CAPEHART HOUSING PROJECT		5006
01AM	ALAMEDA	MISSILE REWORK BUILDING	9	L&A 4028
01AN	ALAMEDA	TEMP LODGING ACCOMODATIONS	7	70157
01AO	ALAMEDA	DEMO OF PAVEMENT EVALUATION	0	
01AP	ALAMEDA	FLEET RECREATION COMPLEX	12	297-7106
01AQ	ALAMEDA	NOT USED		
01AR	ALAMEDA	PIER 2 EXTENSION	4	2176,020.04
01AS	ALAMEDA	ELECTRICAL DIST SYSTEM	8	5866,002.04
01AT	ALAMEDA	SHIP WASTEWATER COLLECTION ASHORE SYSTEM	0	S-12818
01AU	ALAMEDA	PIER UTILITIES, PIER 3	3	5928,002.04
01AV	ALAMEDA	SHIP WASTEWATER COLLECTION SYSTEM	0	S-12632

01AW	ALAMEDA	NAVY/MARINE CORPS RESERVE TRAINING CENTER, SPE	8	72-C-0329, R1
01AX	ALAMEDA	RUNWAY REPAIRS 13-31 AND 7-25	17	JS 13069, 1033
01AY	ALAMEDA	STORM WATER PUMP STATIONS	4	JS 13129
01AZ	ALAMEDA	NEW BOILER PLANT	2	5928,006.04
01BA	ALAMEDA	NOT USED		
01BB	ALAMEDA	CHIEF PETTY OFFICERS MESS OPEN	5	380-4,0 6026
01BC	ALAMEDA	REACTION FORCE FACILITY	6	5451 5235
01BD	ALAMEDA	FIELD EXPLORATION OF PAVEMENT TAXIWAY 4	18	JS 13188, 74-C
01BE	ALAMEDA	SUBSURFACE INVEST NEAR PIER 1	0	
01BF	ALAMEDA	NOT USED		
01BG	ALAMEDA	HOBBY SHOP	3	0124-125
01BH	ALAMEDA	RUNWAY REPAIRS 13-31, 7-25	17	JS 13069
01BI	ALAMEDA	SANITARY LANDFILL SITE STUDY	20	76-C-7543
01BJ	ALAMEDA	PHYSICAL SECURITY FACILITY	11	
01BK	ALAMEDA	METHANE GAS PROBLEMS AT PHYSICAL SEC FAC	0	
01BL	ALAMEDA	FINAL ON PHYSICAL SEC FAC	7	2176,037.01
01BM	ALAMEDA	NEW AUTO HOBBY SHOP	2	8157,002.03
01BN	ALAMEDA	HOSE MAINTENANCE BUILDING	2	14092A
01BO	ALAMEDA	COMNAVAIRPAC AF PAVEMENT MOD STUDY UPDATE	0	
01BP	ALAMEDA	HIGH SPEED GRIND FACILITY	2	136.6
01BQ	ALAMEDA	DEFENSE PROPERTY DISPOSAL OFFICE	9	L-675
01BR	ALAMEDA	HAZARDOUS MATERIAL STOREHOUSES	6	726-30
01BS	ALAMEDA	FIELD & LAB DATA RUNWAY 7-25 SHOULDER	11	14408 A
01BT	ALAMEDA	TYPE I ROTARY WING AIRCRAFT RINSE FACILITY	7	V78128
01BU	ALAMEDA	PAVEMENT EVALUATION HANGAR 39	4	5831,003.04
01BV	ALAMEDA	IMPROVEMENTS ON PIERS 2 & 3	4	5866,006.04
01BW	ALAMEDA	FINAL SUBSURFACE FUEL CONTAMINATION STUDY	16	79-C-5320
01BX	ALAMEDA	NOT USED		
01BY	ALAMEDA	STORM SEWER REPAIR, 8TH ST & AVE L	5	4401,002.04
01BZ	ALAMEDA	FAMILY SERVICE CENTER	3	9137,005.04
01CA	ALAMEDA	HOUSING UNITS	23	K529-31,01852
01CB	ALAMEDA	AIRFIELD R/W PAVEMENT SURVEY	0	WESTDIV 1CB
01CC	ALAMEDA	REPAIR OF ACCESS/PARKING APRONS R18-79	5	13010,001.04
01CD	ALAMEDA	MATERIAL TESTING LAB	5	13078,001.04
01CE	ALAMEDA	BREAKWATER CLOSURE	2	B-1138-2
01CF	ALAMEDA	CHILD CARE CENTER	4	2176,055.14
01CG	ALAMEDA	AIRCRAFT CORROSION CONTROL FACILITY	0	3645,005.04
01CH	ALAMEDA	NON-DESTRUCTIVE PAVEMENT EVALUATION	0	
01CI	ALAMEDA	REPAIR AIRCRAFT PARKING APRON 3	3	WESTDIV 1CI
01CJ	ALAMEDA	AIRFIELD CONDITION SURVEY	0	WESTDIV 1CJ
01CK	ALAMEDA	SEAPLANE BASIN OVERWATER SOIL EXPLORATION & SA	1	B-1259-2
01CL	ALAMEDA	BERTHING REQUIREMENTS FOR PIERS 2 & 3	16	13134,001.04
01CM	ALAMEDA	TELEPHONE DUCTS & MANHOLES	0	3269-8
01CN	ALAMEDA	MATERIALS TESTING LAB RE-SITING	6	13078,003.04
01CO	ALAMEDA	DREDGING/BREAKWATER CLOSURE	17	8068,014.03
01CP	ALAMEDA	PAINT AND FINISHING HANGAR	11	13078,004.04
01CQ	ALAMEDA	BORROW PIT EVALUATION FOR SOLID WASTE DISPOSAL	0	2176,060.01
01CR	ALAMEDA	REPAIR OF AIRFIELD STORM SEWERS	0	MK1/166-2
01CS	ALAMEDA	REPAIR E-W TAXIWAY E1-84	3	PC110/85010

01CT	ALAMEDA	MAINTENANCE DREDGING LOGS	7	PC110/85023
01CU	ALAMEDA	AC OVERLAYS R/W 13-31, R/W 7-25	4	81141,039.03
01CV	ALAMEDA	NOT USED		
01CW	ALAMEDA	GEOTECH SERVICES/DATA RPT AIRFIELD PAVEMENT INV	11	B-1138-3
01CX	ALAMEDA	INTERMEDIATE MAINTENANCE FACILITY	5	17978,001.04
01CY	ALAMEDA	NARF PLATING FACILITY	3	8015,013.03
01CZ	ALAMEDA	PIER UTILITY IMPROVEMENTS	12	8015,014.03
01DA	ALAMEDA	MOORING PLATFORM AT PIER 2	3	8015,012.03
01DB	ALAMEDA	CBR TEST RESULTS & PAVEMENT DESIGN RECOMMEND	4	86158.10
01DC	ALAMEDA	R2-85, REPAIR SEAWALLS, PHASE I	8	1151A
01DC	ALAMEDA	R2-85, REPAIR SEAWALLS, PHASE I ADDENDUM	6	1151A ADDEND
01DD	ALAMEDA	FAMILY HOUSING PROJECT		84-C-4627
01DE	ALAMEDA	AIRFIELD RUNWAY SURVEY	0	WESTDIV 1DE
01DF	ALAMEDA	PILE 7 DOLPHIN INSTALLATION PIER 1	8	P87050 & 078
01DG	ALAMEDA	REVISED SLAB RECOMMENDATIONS AIRCRAFT ACCOUS	4	11-1769-01
01DH	ALAMEDA	ELEC DISTRIB SYS AT PLATING SHOP FAC	11	8015,016.03
01DI	ALAMEDA	PAVEMENT REPAIRS A AVENUE		4895-E
01DJ	ALAMEDA	RAMP IMPROVEMENTS BLDGS 4 & 5		4894-E
01DK	ALAMEDA	RELOCATION OF INTERMEDIATE MAINTENANCE FACILIT	2	17978,003.04
01DL	ALAMEDA	BREAKWATER CLOSURE	3	K-529-7
01DM	ALAMEDA	TEMP LODGING FACILITY	5	K215-29A,1553
01DN	ALAMEDA	DISEASE VECTOR ECOLOGY & CONTROL CENTER FOUN	6	L-866
01DO	ALAMEDA	DISEASE VECTOR ECOLOGY & CONTROL CENTER SOIL C	6	L-866
01DP	ALAMEDA	CONFIRMATION STUDY SANITARY LANDFILL	11	2176,059.01
01DQ	ALAMEDA	EXCHANGE/COMMISSARY COMPLEX	10	18857,002.04
01DR	ALAMEDA	FAMILY HOUSING PROJECT	29	
01DS	ALAMEDA	OIL CONTAINMENT STORM SEWER OUTFALL STRUCTUR	2	1010-40
01DT	ALAMEDA	SUBSOIL INVEST & PILE DRIVING & LOADING TESTS	0	674.1
01DU	ALAMEDA	NEW ADMIN BUILDING	4	
01DV	ALAMEDA	HOMEPORT AQUIFER STUDY FOR NAS ALAMEDA, NSC O	9	7748,006.04
01DW	ALAMEDA	MOTEL SITES	5	
01DX	ALAMEDA	SOIL CONTAMINATION ASSESSMENT		15160.1-0-7
01DY	ALAMEDA	PAVEMENT RESURFACING EVALUATION FOR FLEET PAR	14	1042-40
01DZ	ALAMEDA	GUN TEST FACILITY	4	K450-6,03289,4
01EA	ALAMEDA	SUPPL GEOTECH INVEST FOR 300 FAMILY HOUSING UNI	21	1234-01-01
01EB	ALAMEDA	EAST HOUSING REPAIRS	9	K891-6-172
01EC	ALAMEDA	AIRFIELD RUNWAY SURVEY	0	WESTDIV 1EC
01ED	ALAMEDA	EXCHANGE/COMMISSARY COMPLEX	10	18857,002.04
01EF	ALAMEDA	SEISMIC DESIGN CRITERIA FOR BUILDING 10	0	17734,019.04
01EG	ALAMEDA	PARTIAL PRELIM IR SITE IR-1 INVEST DATA	8	CTO 107
01EH	ALAMEDA	GEOCHEM INVEST CONTROL TOWER	6	15219.1-0-3
01EI	ALAMEDA	CONTROL TOWER COST CERTIFICATION EVALUATI ON		20748,007 .04
01EJ	ALAMEDA	HOUSING EARTHQUAKE DAMAGE	4	848.022
01EK	ALAMEDA	GEOTECH STUDY REPAIRS SEAWALLS	5	1864
01EL	ALAMEDA	CLOSURE & POST CLOSURE MAINENANCE PLAN FOR LA	0	2176,060.01
01EM	ALAMEDA	CONTROL TOWER & FIRE STATION	8	3712.036.04
01EN	ALAMEDA	CORE DRILL STUDY HANGAR 11 & 12	0	P92010.1
01EO	ALAMEDA	470 FOOT DEEP SOIL BORING	1	
01EP	ALAMEDA	AIRFIELD CONDITION SURVEY & FRICTION MEASUREME	0	WESTDIV 1EP

APPENDIX D

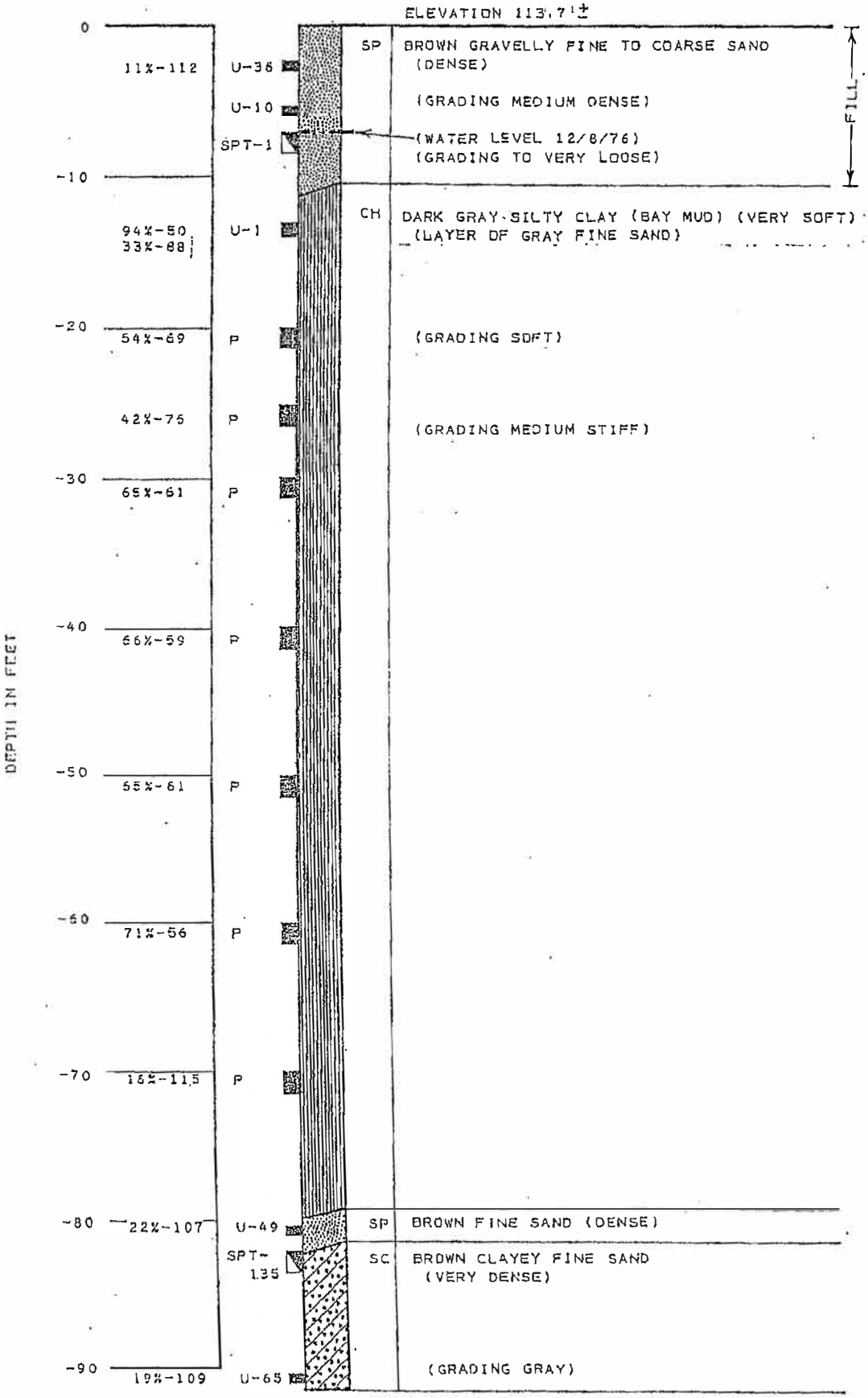
SECTION A-A'

Borelogs

BORING 2

DRILLED 12/8/76

ELEVATION 113.7'±



LOG OF BORING

DAMES & MOORE

SECTION A-BG

PLATE 2B

BORING LOG HS1A

JOB NO: 726-30 DATE DRILLED: 2/6/79

JOB NAME: Hazard Storage, NAS, Alameda SURFACE ELEV.: 113

EQUIPMENT: DRILLING Rotary Wash DATUM: Project

SAMPLER TYPE	DRIVE WEIGHT-LB	HEIGHT OF FALL-IN
Standard Pen. (SPT)	140	30
Osterberg	push	--

Sample Depth ft.	Blows per ft	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	USCS Classification	Description
						5½ inches of Asphalt Concrete
						8 inches of Base Rock
2 SPT	20	--	--		SP	Sand, fine-grained, brown, moist, dense, with occasional sea shells
5 SPT	22	--	--	5	▽	Free water surface at 5½ feet.
8 SPT	14	--	--		SP	Sand, fine-grained, gray-brown, saturated, medium dense with occasional layering of sea shells.
11 SPT	4			10		
					SP-CH	Interbedded layers of fine bluish-gray sand and soft "Bay Mud"
15 OS	--	--	--	15		
				20		

SECTION A BR

Equipment Rotary Wash

Elevation 112 Feet Date 10/22-23/86

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
				0		8-inch concrete slab
						BROWN SAND (SP) medium dense, wet Saturated below 3 feet
	25*			5		
	17*			10		
						Loose SAND (SP) at 14 feet
				15		
	12	62	63			DARK GRAY SILTY CLAY (CH) soft, saturated
						DARK GRAY SAND (SP) loose, saturated, fine-grained, with shells
	7*			20		
						DARK GRAY SILTY SAND (SM) loose, saturated, fine-grained with clay lenses and shells
	5			25		
	push			30		
	55*					GRAY SAND (SP) dense, saturated, fine-grained
				35		DARK GRAY SILTY CLAY (CH) firm, saturated (Bay Mud)
	push	58	69			
				40		

SECTION A CX

(Continuation of Log)

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
	46*			40		GRAY SAND (SP) dense, saturated fine-grained
				45		GRAY SILTY CLAY (CH) with sand (Bay Mud)
	push			50		Increased silt content, decreased sand content, and firmer at 52 feet
				55		
Consol, Plate A10	push	67	60	60		Becomes stiff at 60 feet
TxUU 1567 (2000)		62	88	65		
				70		
				75		
	push			80		

Harding Lawson Associates
Engineers, Geologists & Geophysicists

Log of Boring 4

Intermediate Maintenance Facility
Alameda Naval Air Station
Alameda, California

PLATE A4a

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
Shields	17978.001.04	C. Shields	11/86		

Project No. 4894-E
6 May 1982

LOGGED BY DK DATE DRILLED 4/2/82 BORING DIAMETER 6" BORING NO. 4

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
			Asphaltic concrete & Baserock						
5	4-1		▽ (W.L. 4/2/82) Dark grey Silty SAND, loose	SM	5 5		48	95	▽ No Recovery LL=83 PI=53
	4-2		Grey gravelly CLAY (BAY MUD)	CH	42		108	20	
10									
15	4-3		Brown Silty SAND, dense, wet	SM					
			Grey Sandy CLAY, (BAY MUD)	CL					
25			Boring terminated at 25 feet. Water at 5 feet.						

TERRA SEARCH INC.

FIGURE NO. 5 - LOG OF TEST BORING

SECTION A DJ

Project No. 4894-E
6 May 1982

LOGGED BY DK DATE DRILLED 4/2/82 BORING DIAMETER 6" BORING NO. 3

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
			A.C.						
	3-1		Tan & rust Silty Sandy GRAVEL, dense	GW	77			44	
			(W.L. 4/2/82						
5	3-2		Dark brown Silty CLAY w/Sand & Gravel (FILL) Bay Mud w/Sand lenses, soft to stiff	CH	4		72	48	
10									
15	3-3				10		107	21	
20									
25			Boring terminated at 25 feet. Water at 5 feet.						

TERRA SEARCH INC.

FIGURE NO. 4 - LOG OF TEST BORING

SECTION A DJ

FIELD LOG

LOCATION: Alameda Naval Air Station

DATE: 5/20/91

DEPTH	S. #	LITH	DESCRIPTION.
0			dk brown 10YR 3/3 moderately well sorted SAND VF ⇒ Fine
			yellowish brown 10YR 5/4 well sorted SAND VF ⇒ Fine grained
			moist
4			
	2		yellowish brown 10YR 5/4 well sorted SAND VF ⇒ Fine grained
	2		
	1		
			Few Pebbles
8			
	8		olive 5Y 4/3 SAND well sorted VF ⇒ F
	13		
	19		wet
12			
16			

standard penetration

standard penetration

FIELD LOG

LOCATION DATE:

DEPTH	S.#	LITH	DESCRIPTION.
16			vdk gray 5Y 3/1 clay v soft and olive
			vdk greenish gray 5GY 3/1
20		Shelby tube	no recovery vdk greenish gray loamy sand VF = M grained abundant shells
			vdk greenish gray 5GY 3/1 clay some abundant shells fine sand, clay
24		Shelby Tube	
			vdk greenish gray 5GY 3/1 vfine sandy loam
28			
		Shelby tube	
32			vdk greenish gray 5GY 3/1 clay v soft

FIELD LOG

LOCATION

DATE:

DEPTH	S. #	LITH	DESCRIPTION.
32			
			dk olive 5Y 3/3 to brown clay silt peaty
36			
40			
			vdk greenish gray 5GY 3/1 silty clay soft
44			
			sand
48			

Shelby tube

FIELD LOG

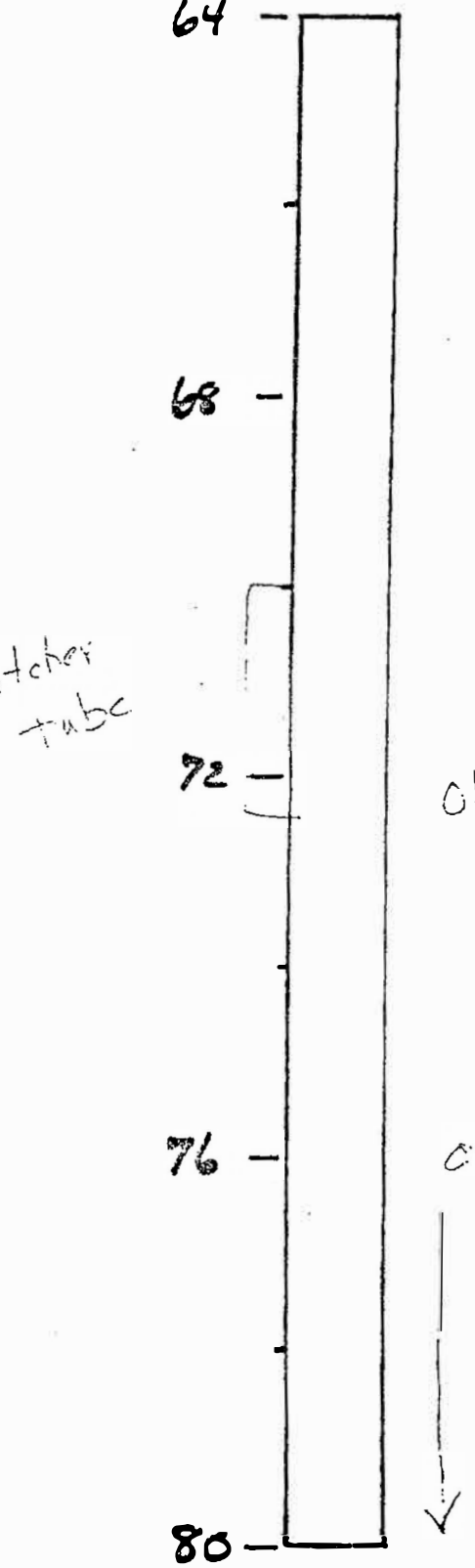
LOCATION | DATE:

DEPTH	S. #	LITH	DESCRIPTION.
48			
	shelby tube		olive brown 2.5Y 4/4 well sorted SAND VF to Fine grained
52			pushed tube 1½'
56			dk olive brown loamy VFine sand
60	15 4/1 00/5"		Standard penetration olive brown . 2.5Y . 4/4 loamy sand VF → Fine
64			

FIELD LOG

LOCATION DATE:

DEPTH	S. #	LITH	DESCRIPTION.
64			
68			
72			olive 5Y 4/3 sand moderately well sorted VF → fine
76			olive 5Y 5/3 loamy sand VF → fine grained
80			

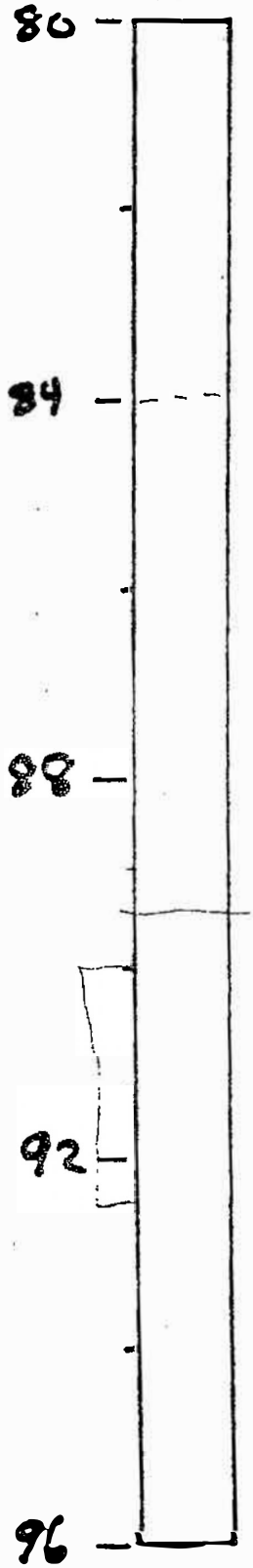


FIELD LOG

LOCATION

DATE:

DEPTH S.# LITH DESCRIPTION.



dk greenish grey 5GY 4/1 Some Sand VF ⇒ F.

dk greenish grey 5G 4/1 Sand VF → Medium Grained

vdk greenish grey 5GY 3/1 clay stiff

with shell tube

dk greenish grey 5G 4/1 Loamy sand VF ⇒ Fine grained

some thin beds of silty clay

FIELD LOG

LOCATION | DATE:

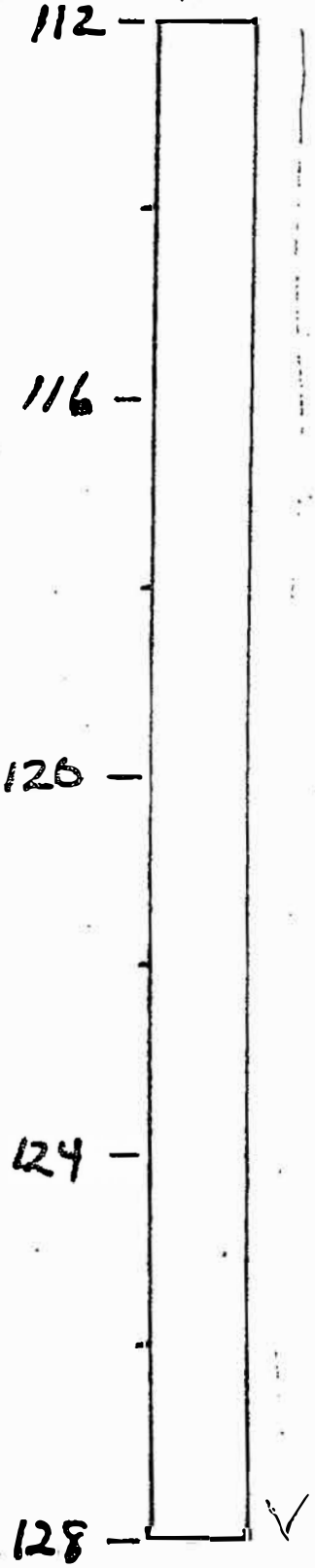
DEPTH	S.#	LITH	DESCRIPTION.
96			vdk greenish grey 5G 3/1 silty clay loam
100			
			split spoon tube
			vdk greyish green 5G 3/2 silty clay v stiff
104			
			seam
108			
			shelby tube
112			vdk greenish grey 5G 3/1 clay v stiff

FIELD LOG

LOCATION

DATE:

DEPTH S.# LITH DESCRIPTION.



Softer

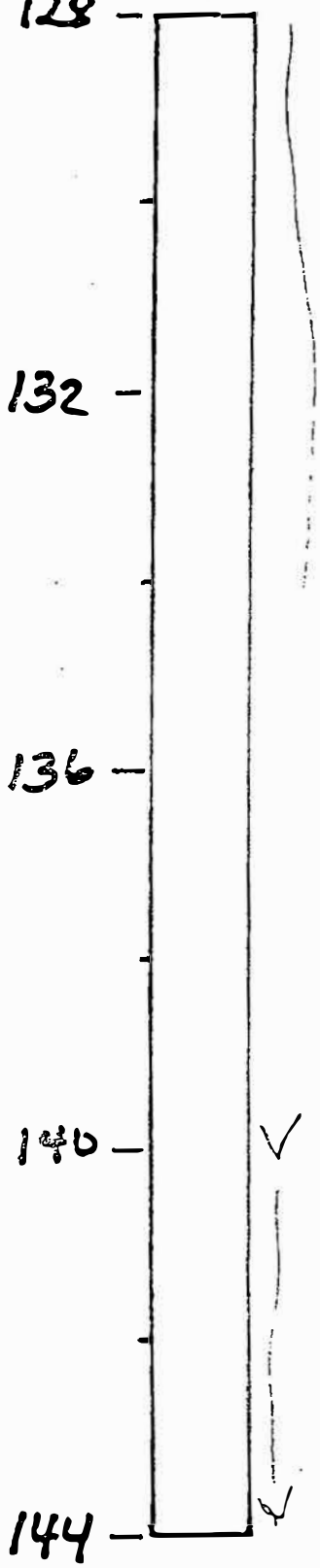
drilling with rock bit
using water

FIELD LOG

LOCATION

DATE:

DEPTH	S. #	LITH	DESCRIPTION.
128			
132			
136			
140			
144			

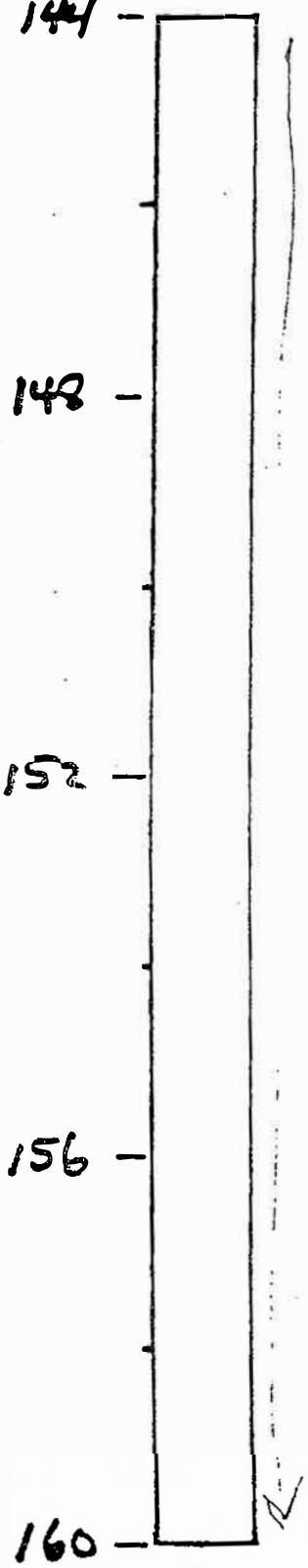


FIELD LOG

LOCATION

DATE:

DEPTH S.# LITH DESCRIPTION.



FIELD LOG

LOCATION

DATE:

DEPTH	S. #	LITH	DESCRIPTION.
160			Stiffer dk greenish grey 5G 4/1
			Clay
			Yc silty clay loam
			sand is v-fine
164			
168			
172			
176			

FIELD LOG

LOCATION

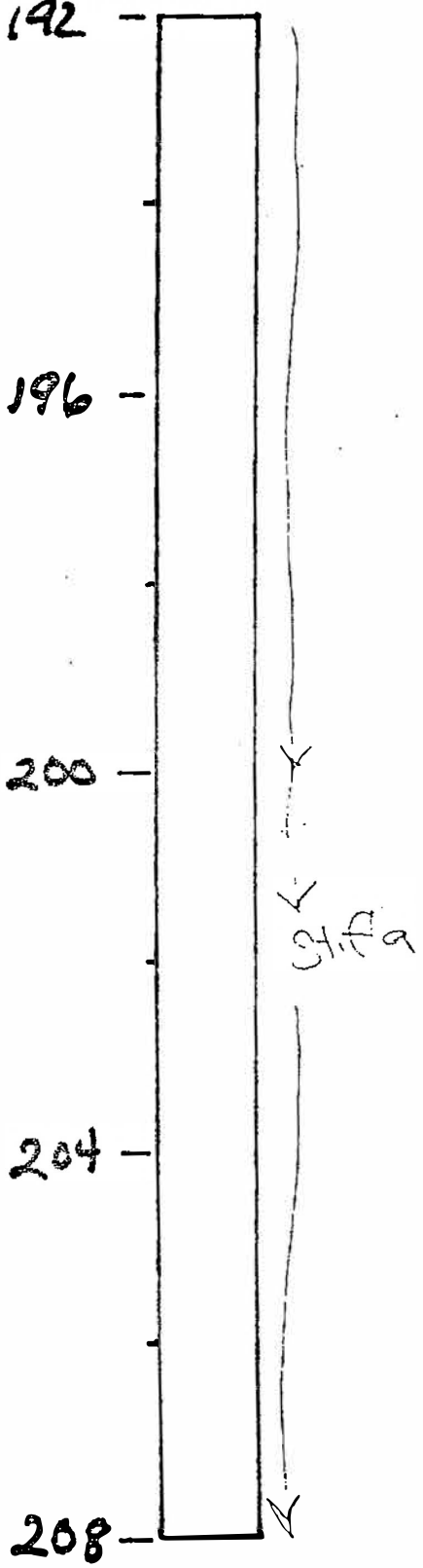
DATE:

DEPTH	S. #	LITH	DESCRIPTION.
176			
180			
184			silver very dark grey 5Y 3/1 clay
188			
192			

FIELD LOG

LOCATION DATE:

DEPTH S.# LITH DESCRIPTION.

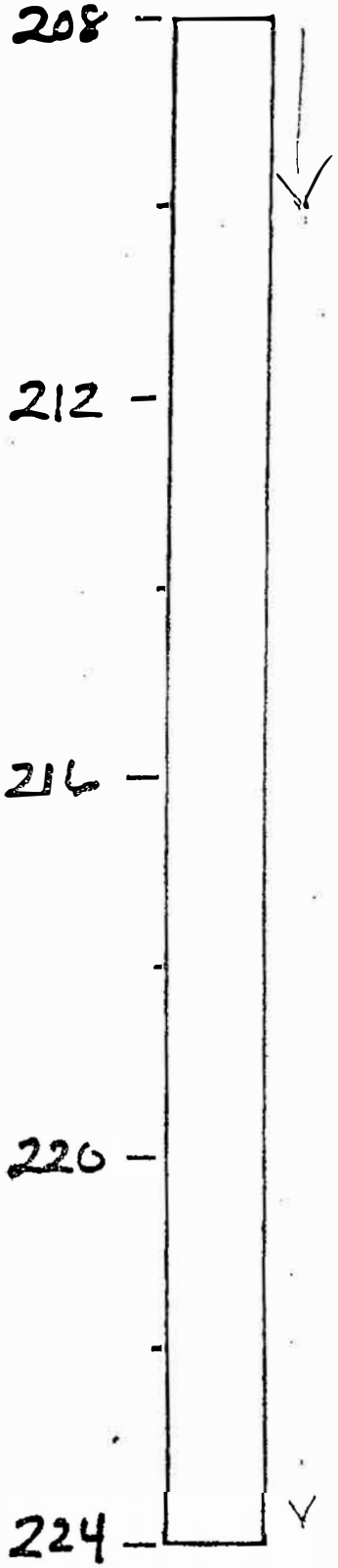


FIELD LOG

LOCATION

DATE:

DEPTH	S. #	LITH	DESCRIPTION.
208			
212			
216			
220			
224			



FIELD LOG

LOCATION

DATE:

DEPTH	S. #	LITH	DESCRIPTION.
224			
			softer dk olive grey 5Y 3/2 clay abundant wood fragments
228			
232			
			stiffer dk greenish grey 5G 4/1 silty clay possible clay loam
236			dk. olive grey 5Y 5/2
			gravelly sand mostly quartz, dk greenish grey to black fine sandstone, reddish brown chert
240			

FIELD LOG

LOCATION

DATE:

DEPTH	S.#	LITH	DESCRIPTION.
240			fine gravelly sand
			dk greenish grey 5 GY 4/1
			fine sandy loam to fine sandy clay loam
244			drilling moderately fast without pull down
248			V. stiff - slow drilling dk greenish grey 5 GY 4/1 fine sandy clay loam
252			Gravelly sand
			mostly quartz, black shale dk greenish grey & black fine sandstone
256			

FIELD LOG

LOCATION DATE:

DEPTH	S. #	LITH	DESCRIPTION.
256			
			v stiff dk greenish gray fine sandy clay
260			
264			
268			v dk greenish gray 5GY 3/1 silty clay v stiff
272			

FIELD LOG

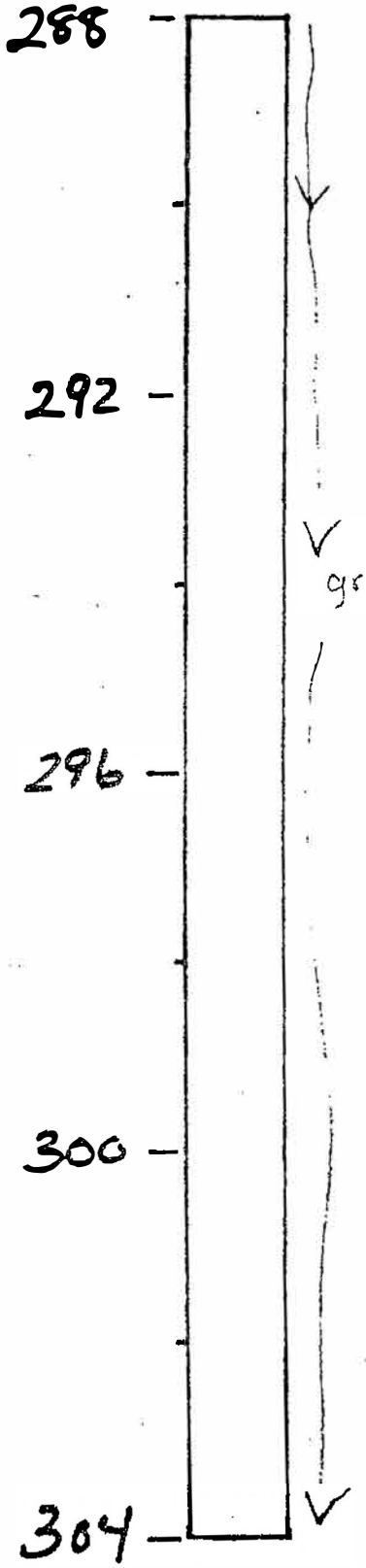
LOCATION

DATE:

DEPTH	S.#	LITH	DESCRIPTION.
272			
			v/k greyish brown 2.5Y 3/2 to black 2.5Y 2.5/2 clay loam
276			
280			v/dk greenish grey 5GY 3/1 clay v stiff
284		sandier	dk greenish grey 5G 4/1 clay loam sand is v fine
288			

OCATION DATE:

EPTH S.# LITH DESCRIPTION.



v stiff - slow drilling

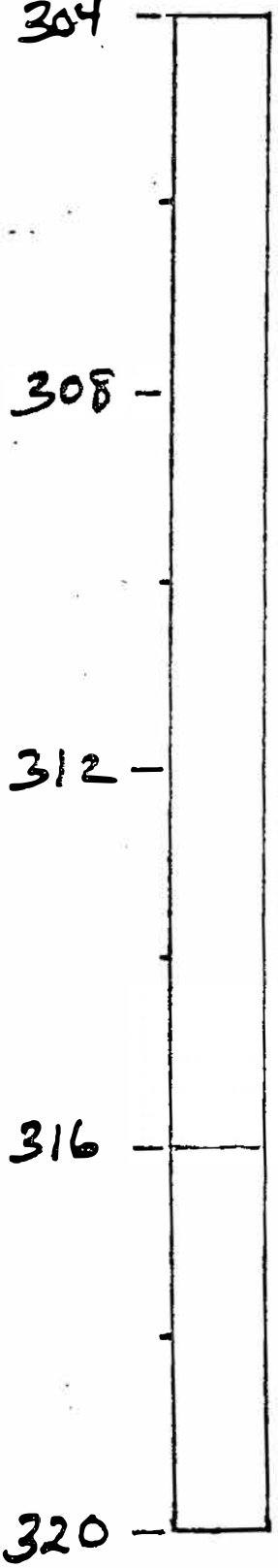
greenish olive 5 6Y 5/1 clay with lenses of fine sandy clay loam

FIELD LOG

LOCATION

DATE:

DEPTH S.# LITH DESCRIPTION.



hard clay v slow drilling

softer olive grey 5Y 4/2 clay

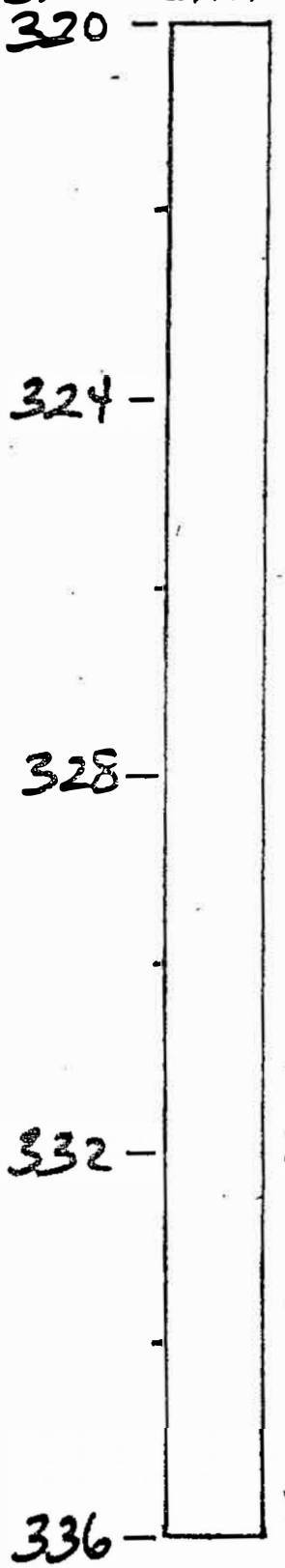
drilling without pulldown

FIELD LOG

LOCATION

DATE:

DEPTH S.# LITH DESCRIPTION.



1

H olive brown 2.5Y 5/4 clay loam to vfine sandy clay loam

stiff drilling slowly with 150 ps. pulldown

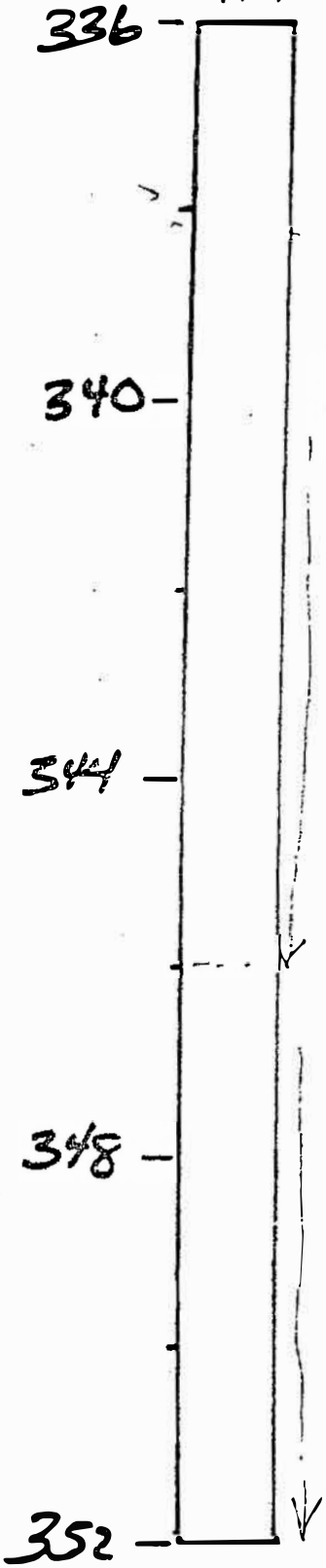
H yellowish brown 2.5Y 6/4 clay loam to vfine sandy clay loam

yellowish brown 10YR 5/4

FIELD LOG

LOCATION DATE:

DEPTH S.# LITH DESCRIPTION.



yellowish brown 10YR 5/6. clay → cla_loam
firm 200 psi

softer greenish grey 5GY 5/1 clay

FIELD LOG

LOCATION

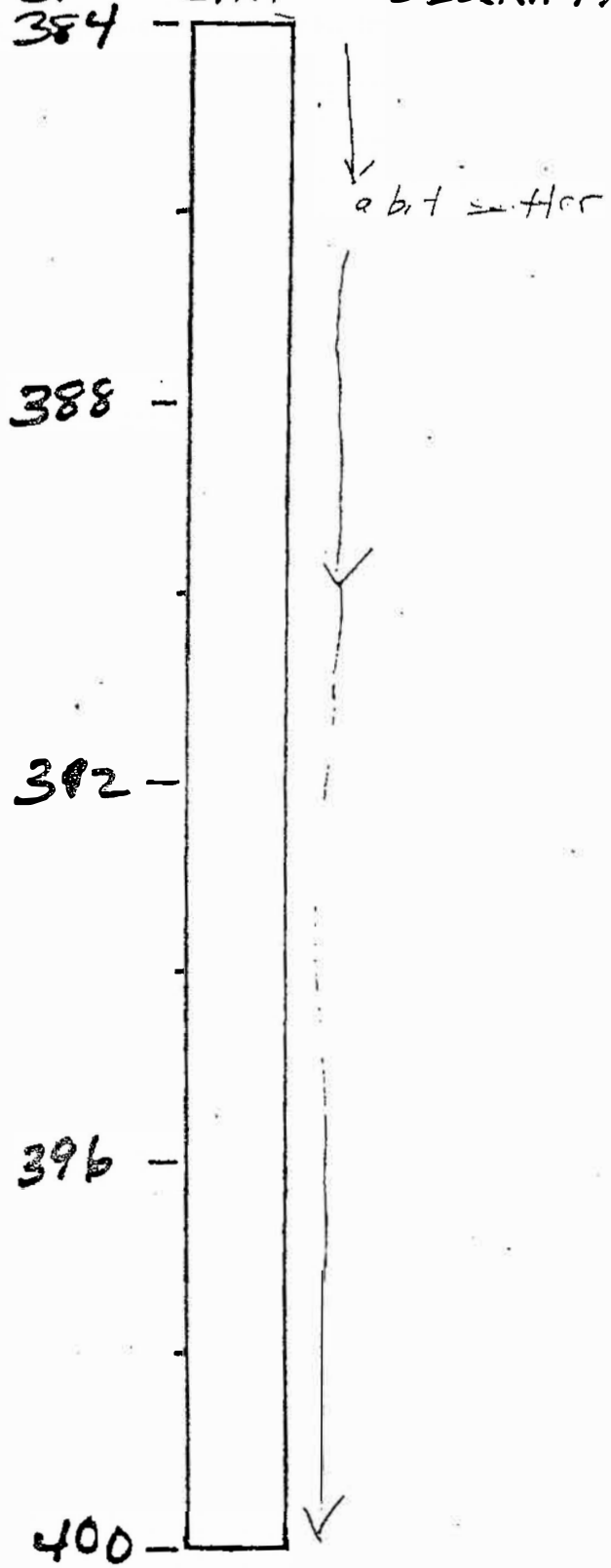
DATE:

DEPTH	S. #	LITH	DESCRIPTION.
352			stiffer clay loam sand is medium grained
356			
360			greyish brown 2.5Y 5/2 clayloam
364			
368			dk greenish grey 5GY 4/1

FIELD LOG

LOCATION DATE:

DEPTH S. # LITH DESCRIPTION.



FIELD LOG

LOCATION

DATE:

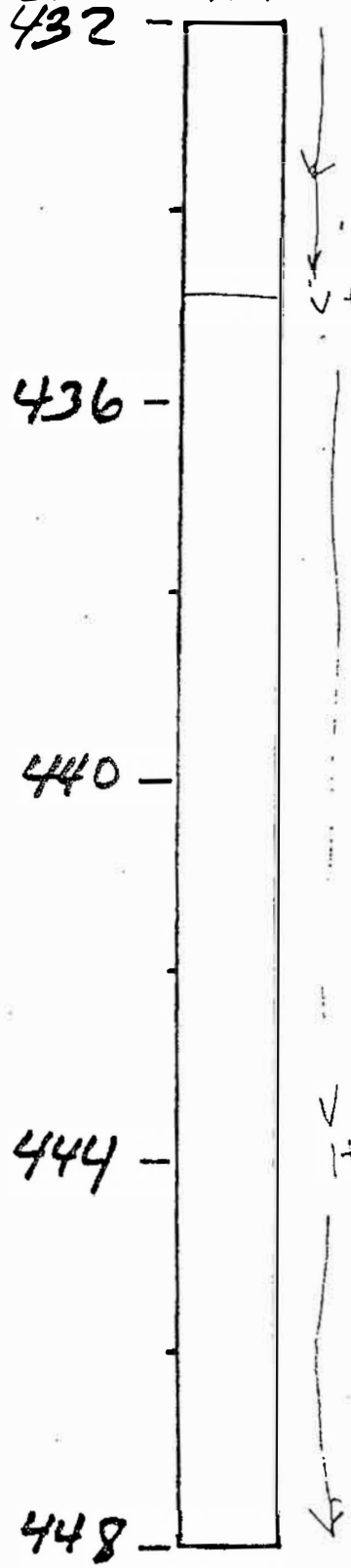
DEPTH	S. #	LITH	DESCRIPTION.
400			
			dk greenish grey 5GY 4/1 to greenish grey 5GY 6/1 clay loam sand to medium size
404			
408			
412			
416			

LOCATION DATE:

DEPTH	S. #	LITH	DESCRIPTION.
416			
420			
			sand rapid drilling without Drilldown to v coarse size all grey
424			
428			
432			

LOCATION | DATE:

DEPTH | S.# | LITH | DESCRIPTION.



v firm olive 5Y 4/3

using Pulldown - v slow drilling

V lt olive brown 2.5Y 5/4 texture is fine sandy clay loam

FIELD LOG

LOCATION | DATE:

DEPTH	S.#	LITH	DESCRIPTION.
448			
452			Gravelly sand olive grey 5Y 4/2.
456			
460			
464			

Well as well system

LOCATION

DATE :

DEPTH	S.#	LITH	DESCRIPTION.
464			
			↓ hard — v slow drilling 200 psi
			black shale
468			
			↓ bottom of hole
472			
476			
480			

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 114.5 Feet±	LOGGED BY F.M.
DEPTH TO GROUNDWATER 5' (see Note 3)	BORING DIAMETER 8 Inches	DATE DRILLED 10/29/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with sand (fine-grained)	brown	very stiff	CL	1		39			
2" A.C. over BASE									
SAND (fine-grained) with some silt (FILL)	brown	dense medium dense	SM	5		9	▽		
CLAY, silty with lenses of sand with some silt (Bay Mud)	grey	very soft	CH-SM-SP			1			
				10		1			
(grading without sand lenses and with organics)				15		push 250 psi			
(grading with traces of organics)				20		push 300 psi			
				25		1			
				30		push 300 psi			
		soft		35		3			
SAND (fine-grained) with clay and silt	grey	medium dense	SC	40		50*			

Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	13

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 114.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER 5' (see Note 3)	BORING DIAMETER 8 Inches	DATE DRILLED 10/29/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
SAND (fine-grained) with clay and silt (continued)	grey brown	medium dense very dense	SC	41 45		51			
Bottom of Boring = 45 Feet				50 55 60 65 70 75 80					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual.
2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.
3. Groundwater level measured at time of drilling and 3 days after drilling.

Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	13

Equipment Rotary Wash

Elevation 115 Feet** Date 10/6/86

Laboratory Tests	* Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
				0		Asphalt BROWN GRAVELLY SAND (SW) medium dense, slightly moist, coarse sand (Fill)
pH = 8.18 MA (See Plate 6)	25	5	102	5		BROWN SILTY SAND (SP), medium dense, dry, fine-grained
	22					trace silt, medium dense, very moist, pea gravel
	16			10		color change to gray
						gravel lens
	10			15		color change to brown, loose, medium-to fine-grained
MA (See Plate 7)	3	30	92	20		color change to gray, very loose, with broken shells and clay present
						DARK GRAY CLAYEY SILT (ML) soft, saturated, with broken seashells
	3	54	66	25		
TxUU 618 (1000) (See Plate 13)		60	63	30		GRAY SILTY CLAY (CL) very soft, saturated
Consol (See Plate 18)	push	46	73			
				35		soft
						increased stiffness
				40		

*Converted to Standard Blow Counts (N-values)

**Alameda NAS Datum : MLLW ELEV. 0' ± 100'±

(Continuation of Log)

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
MA (See Plate 8)	19	19	112	40		GRAY SILTY SAND & SANDY SILT (SP/ML) medium dense, saturated, very fine-grained, clay present
				45		
	65			50		becomes brown, very dense, medium-grained
				55		
	45/11"			60		very dense
				65		
	81			70		Bottom of Boring 70.5 Feet
				75		
				80		

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING 1
NARF Plating Facility
Alameda, California

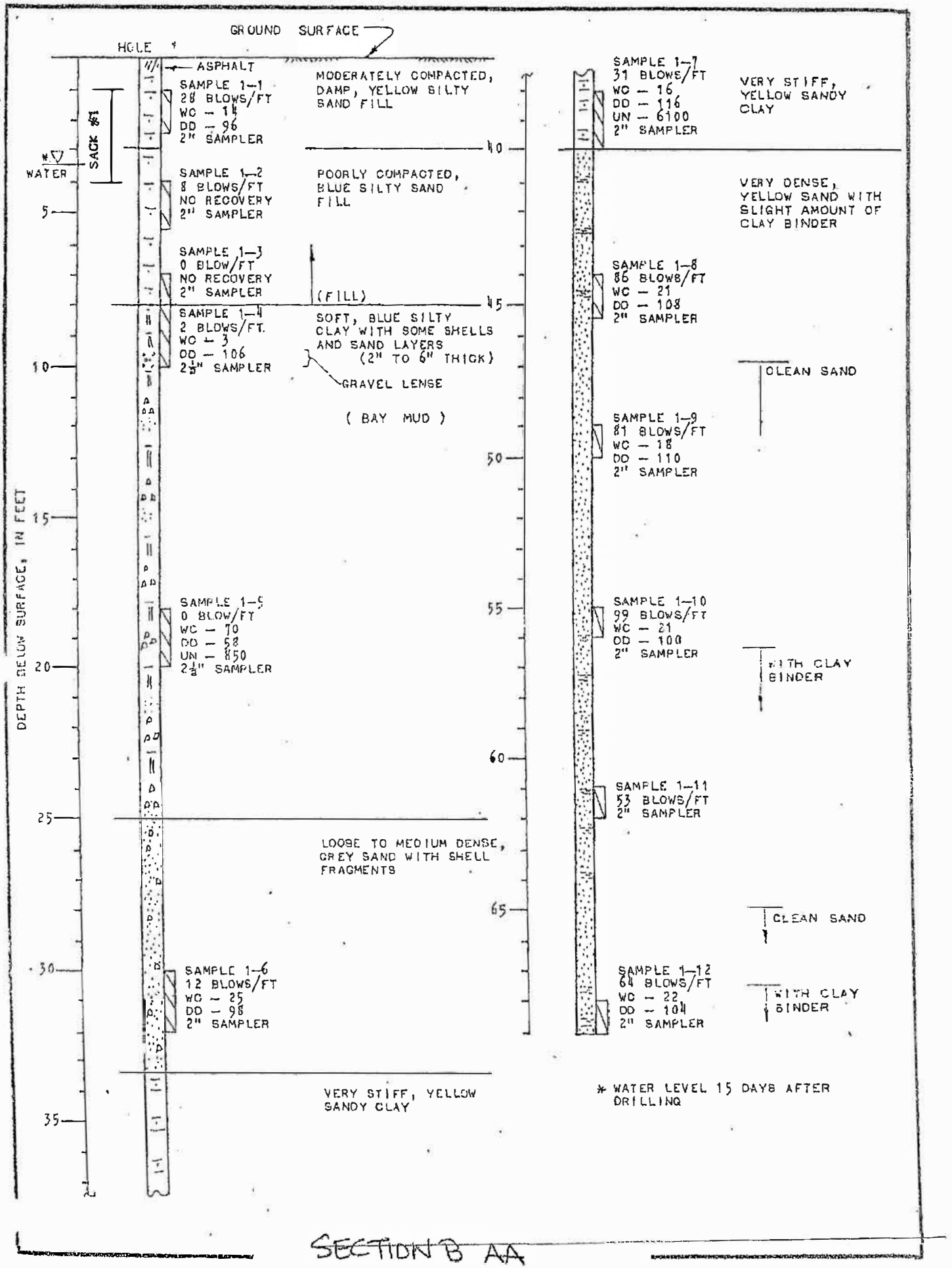
PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AC	8015.013.03	AG	10/86		

APPENDIX D

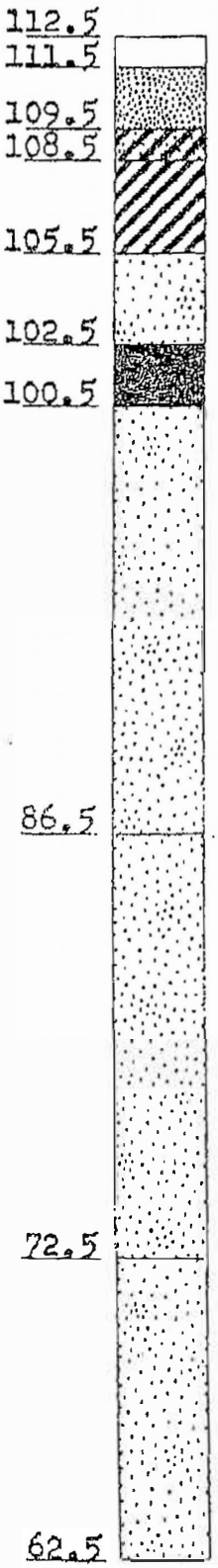
SECTION B-B'

Borelogs


GROUND SURFACE
HOLE
ASPHALT
SAMPLE 1–1
28 BLOWS/FT
WC – 14
DD – 96
2" SAMPLER
MODERATELY COMPACTED, DAMP, YELLOW SILTY SAND FILL
SACK #1
WATER
SAMPLE 1–2
8 BLOWS/FT
NO RECOVERY
2" SAMPLER
POORLY COMPACTED, BLUE SILTY SAND FILL
SAMPLE 1–3
0 BLOW/FT
NO RECOVERY
2" SAMPLER
(FILL)
SAMPLE 1–4
2 BLOWS/FT.
WC – 3
DD – 106
2½" SAMPLER
SOFT, BLUE SILTY CLAY WITH SOME SHELLS AND SAND LAYERS (2" TO 6" THICK)
GRAVEL LENSE
(BAY MUD)
SAMPLE 1–5
0 BLOW/FT
WC – 70
DD – 58
UN – 850
2½" SAMPLER
LOOSE TO MEDIUM DENSE, GREY SAND WITH SHELL FRAGMENTS
SAMPLE 1–6
12 BLOWS/FT
WC – 25
DD – 98
2" SAMPLER
VERY STIFF, YELLOW SANDY CLAY
DEPTH BELOW SURFACE, IN FEET
0
5
10
15
20
25
30
35
40
45
50
55
60
65
SAMPLE 1–7
31 BLOWS/FT
WC – 16
DD – 116
UN – 6100
2" SAMPLER
VERY STIFF, YELLOW SANDY CLAY
VERY DENSE, YELLOW SAND WITH SLIGHT AMOUNT OF CLAY BINDER
SAMPLE 1–8
86 BLOWS/FT
WC – 21
DD – 108
2" SAMPLER
CLEAN SAND
SAMPLE 1–9
81 BLOWS/FT
WC – 18
DD – 110
2" SAMPLER
SAMPLE 1–10
99 BLOWS/FT
WC – 21
DD – 100
2" SAMPLER
WITH CLAY BINDER
SAMPLE 1–11
53 BLOWS/FT
2" SAMPLER
CLEAN SAND
SAMPLE 1–12
64 BLOWS/FT
WC – 22
DD – 104
2" SAMPLER
WITH CLAY BINDER
* WATER LEVEL 15 DAYS AFTER DRILLING

SECTION B AA

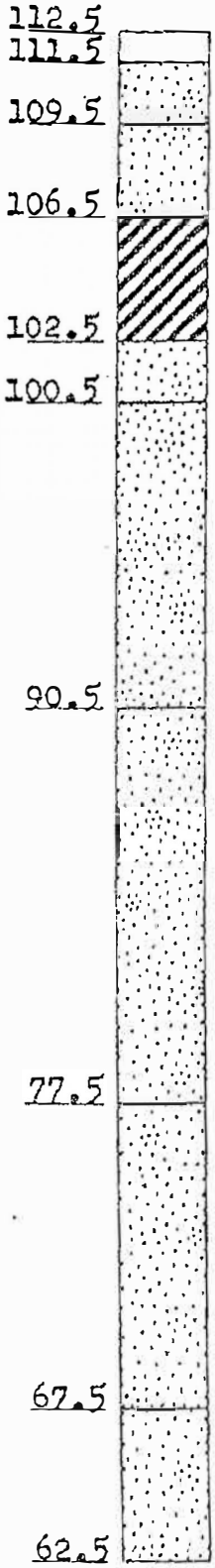
LOG OF TEST HOLE NO. 4



112.5
111.5 Fill
Brownish gray fine sand
109.5
108.5 Clay-sand and shells
"Bay mud"
105.5
Dark gray medium sand
102.5
100.5 Brownish gray very fine sand-Trace of clay.
Grayish brown fine to medium sand
86.5
Brown fine to medium sand
112.5
109.5
3.0
72.5
Brown medium sand
62.5

SECTION B 1D

LOG OF TEST HOLE NO. 5



SECTION B 1D

SECTION B DJ

Project No. 4894-E
6 May 1982

LOGGED BY DK DATE DRILLED 4/2/82 BORING DIAMETER 6" BORING NO. 4

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
			Asphaltic concrete & Baserock						
5	4-1		▽ (W.L. 4/2/82) Dark grey Silty SAND, loose	SM	5 5		48	95	▽ No Recovery LL=83 PI=53
	4-2		Grey gravelly CLAY (BAY MUD)	CH					
10					42		108	20	
15	4-3		Brown Silty SAND, dense, wet	SM					
			Grey Sandy CLAY, (BAY MUD)	CL					
25			Boring terminated at 25 feet. Water at 5 feet.						

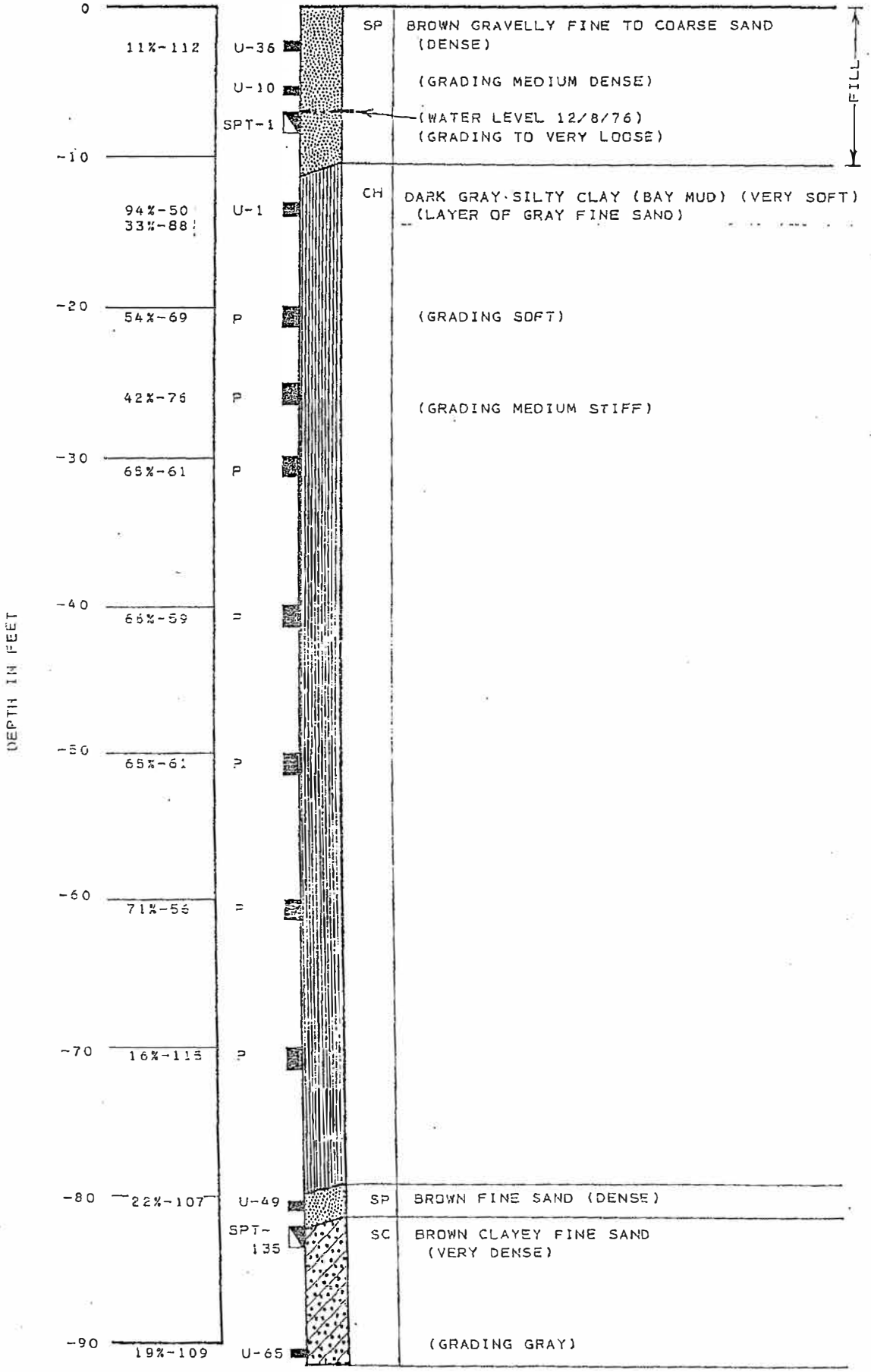
TERRA SEARCH INC.

FIGURE NO. 5 - LOG OF TEST BORING

BORING 2

DRILLED 12/8/76

ELEVATION 113.7'±



LOG OF BORING

DAMES & MOORE

SECTION B BG

PLATE 28

Project No. 4894-E
6 May 1982

LOGGED BY DK DATE DRILLED 4/2/82 BORING DIAMETER 6" BORING NO. 1

Depth, ft.	Sample No. and type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	Blows/foot 350 ft-lbs.	Qu - t. s. f. Penetrometer	Dry Density p.c.f.	Moisture % dry wt.	MISC. LAB RESULTS
			A.C. W/BASE						
	1-1		Tan Silty SAND w/Gravel, dense, damp	SM	29		113	9	
5			Dark grey & tan Silty SAND w/some Clay & Gravel	SM					
			(W.L. 4/2/82)						
10	1-2		Large gravel to 2" clasts		9				No Recovery
15			Grading Clayey						
20			Grey Bay Mud w/Sand lenses, wet, medium stiff	CH					Qu=111 p.s.f
25	1-3				5		89	26	LL=57 PI=31
			Boring terminated at 25 feet. Water encountered at 9 feet.						

TERRA SEARCH INC.

FIGURE NO. 2-LOG OF TEST BORING

SECTION B DJ

LOG OF BORING 1

Equipment CME550, 8-inch Auger

Elevation 112 Feet Date 10/7/86

Laboratory Tests	Blows/foot *	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
	29	7	107			0	
LL=57 PI=30.2	3					5	
						10	
						15	

5-inch Concrete Slab
BROWN SAND (SP)
medium dense, slightly moist, trace fines, fine-grained sand (Fill)
DARK GRAY CLAYEY SILT (MH)
very soft, wet, (Bay Mud)
interbedded with GRAY SAND (SP)
loose, wet, petroleum contamination
organic lenses
hit something hard, sounded hollow
Bottom of Boring 9.5 Feet

*Converted to Standard Blow Counts (N-values)
**Elevations based on Alameda NAS Datum

LOG OF BORING 2

Equipment CME550, 8-inch Auger

Elevation 112 Feet Date 10/8/86

Laboratory Tests	Blows/foot *	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
	29	5	114			0	
NA (See Plate 10)	7					5	
	2					10	
	20					15	

7-inch Concrete Slab
RED-BROWN GRAVELLY SAND (SW)
dense, moist, some clay (Fill)
BROWN SAND WITH CLAY (SP-SC)
medium dense to loose, moist, fine grained, uniform (Fill)
loose, saturated
GRAY CLAYEY SILT (ML)
very soft, saturated, (Old Bay Mud)
BROWN SAND (SP)
medium dense, saturated, medium-grained
BROWN SILTY SAND (SM)
medium dense, wet, fine-grained
Bottom of Boring 16.0 Feet

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORINGS 1 & 2
Pier Utility Improvements
Naval Air Station - Alameda, California

PLATE 2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AC	8015,014.03	AG	10/86		

SECTION B C2

Equipment Dual Tube with Casing Hammer

Elevation 13.11 ft* Date 3/11/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						0	

CEMENT 8"

BROWN SAND (SP) dry fill

moist at 2.0 ft

saturated at 3.0 ft

DARK GRAY SILTY CLAY (CL) bay mud, interbedded layers of silty clay and silty sand, occasional shell fragments and dark black organic material

ORANGE-BROWN SILTY SAND (SM) moist

top of Merritt Sand/Posey Formation

Water level at 26.0 ft, 3-12-87

K25 C at 26.0 ft = 33,600 μmhos

K25 C at 26.0 ft = 35,000 μmhos, 3-11-87

increased silt content at 32.0 ft

DRAFT

Harding Lawson Associates
Engineers and Geoscientists

Log of Boring NAS-2

Homeport Aquifer Study

Alameda County, California

PLATE 21

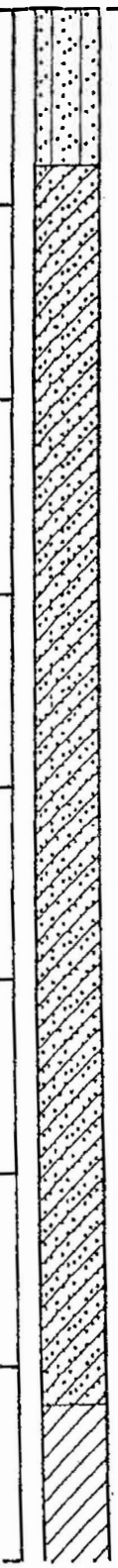
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

SECTION B DV

Equipment Dual Tube with Casing Hammer

Elevation 13.11 ft* Date 3/11/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						40	
						45	
						50	
						55	
						60	
						65	
						70	
						75	
						80	



BROWN SILTY CLAYEY SAND (SC)

increased silt content at 54.0 ft

K25 C at 57.0 ft = 41,340 μmhos 3-11-87

increased clay content at 61.0 ft

increased silt content at 64.0 feet

DARK GRAY CLAY (CL) hard

DRAFT

Harding Lawson Associates
Engineers and Geoscientists

Log of Boring NAS-2 Continued
Homeport Aquifer Study
Alameda County, California

PLATE
22

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

SECTION B DV

0204

Equipment Dual Tube with Casing Hammer

Elevation 13.11 ft* Date 3/11/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						80	
						85	
						90	
						95	
						100	
						105	
						110	
						115	
						120	

increased sand content at 80.0 ft

DARK GRAY SILTY CLAYEY SAND (SC)

K25 C at 87.0 ft = 38,500 μmhos 3-11-87

DARK GRAY SILTY SAND (SM)

base of Merrit Sand/Posey Formation

DARK GRAY SILTY CLAY (CL) hard
top of San Antonio Formation

increased sand content at 111.0 ft

total depth of boring is 117.0 ft

DRAFT

Harding Lawson Associates
Engineers and Geoscientists

Log of Boring NAS-2 Continued
Homeport Aquifer Study
Alameda County, California

PLATE 23

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

SECTION B DV

LOG OF BORING 2

Equipment 8" Hollow Auger

Elevation 113.0 Date 4/27/77

Shear Strength (lbs/sq ft)	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample
Particle Size Analysis	18	10.5	101	0	
	19			5	
	6			10	
	9			15	
	33	20.0	108	20	
	29			25	
	16/3"	18.2	108	30	
				35	
				40	

BROWN SILTY SAND (SP)
loose to medium dense, dry,
with occasional gravel
shells at 3'
color change to gray
at 5'

saturated below 7'

FILL

DARK GRAY CLAYEY SILT (MH)
soft, saturated

GRAY SILTY SAND (SM)
medium dense, saturated,
with occasional shell fragments

BROWN CLAYEY SAND (SC)
medium dense, saturated

SECTION B BM

(Boring caved to 5' depth)

HARDING - LAWSON ASSOCIATES
Consulting Engineers and Geologists

Job No. 8157,002.03 Appr: C.B.W. Date 5/10/77

LOG OF BORING 2

Auto Hobby Shop
Naval Air Station - Alameda, California

PLATE 3

GEO-ENGINEERING CONSULTANTS

BORING LOG

PROJECT Missile Rework Building	Project No. 2849	Boring No.	B3
LOCATION OF BORING See Plate 1.		Sheet No.	1/2
		Date Drilled	8/25-28/67

DEPTH FT.	ELEV. FT.	DRIVE NO.	Blows per Foot	Dry Unit Weight P.C.F	Natural Moist %	Compr. Str. T.S.F	LOG OF MATERIAL
0	114.9						Oiled surface, 6" treated sand base.
		1	35	107	4.1	-	Gray brown medium to fine sand, dry at surface, moist with depth; medium dense to dense. SP-SM.
5	110	2	30				—Some shells.
		3	40	112	18.4	-	
10		4	20	106	21.6	-	
		5S	-				Finely bedded, dark gray clayey to clean sand with 1" - 4" seams of soft clay and silt. SP-SC-CH-ML
15	100	6	28	103	23.4	-	Green-gray clayey sand, medium-dense. SP-SC.
20		7	55	111	20.2	-	Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC.
25	90	8	74				
30		9	60				
							See sheet 2.

1AC

1AC3B1

G/E Form 1 9/63

PLATE No.

GEO-ENGINEERING CONSULTANTS

BORING LOG

PROJECT Missile Rework Building — Project No. 2849 — Boring No. B3

Sheet No. 2/2

LOCATION OF BORING See Plate 1.

Date Drilled 8/25-28/67

DEPTH FT.	ELEV. FT.	DRIVE NO.	Blows per Foot	Dry Unit Weight P·C·F	Natural Moist %	Compr. Str. T·S·F	LOG OF MATERIAL
							Continued.
							Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC
35		10	24				Gray brown clayey sand, dense to very dense. SC.
40		11	87				Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC.
45		12	100+				Gray brown clayey sand, dense to very dense. SC.
50		13	77				Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC.
55		14	100+				
60		15	100+				Bottom of boring, 61.0'

1AC3B2

G/E Form 1 9/63

PLATE No.

Project: Alameda Naval Recreation Complex

LOG OF BORING No. 1

Date: 6/14/71

Hammer Weight: See Note

Type of Boring 5" Rotary

Remarks:

Note: DH - Down Hole Hammer 300 lbs., 30" drop
SH - California Sampler 140 lbs., 30" drop
STP- Standard Penetration Sampler 140 lbs., 30" drop

depth, ft.	samples No.	samples diam.	blows, ft.	dry density p.c.f.	moisture content, %	unconfined compression strength p.s.f.	other tests
Surface Elevation							
2" Asphalt & Dense Dark Brown Silty Sand	1	2"	16	104	15		SH
Medium Dense Light Grey Brown Silty Sand w/shells	2	2"	12				SH
Loose to Medium Dense Light Brown Silty Sand ▽	3	2"	10				SH
10	4	2"	7				SH
	5	2"	16	106	21	1840	DH
Soft Green Grey Silty Clay							
Medium Dense Blue Grey Silty Sand		2-1/2"					
20 Medium Dense to Dense Orange Brown to Red Brown Silty Sand	6	2"	34	113	19	1330	SH
	7	2"	32	106	20	960	DH
30	8	2"	59	110	20	610	SH
Dense to Very Dense Brown w/Orange Brown Silty Sand w/Some Clay	9	2"	52	107	22	640	DH
40	10	2"	60/6"				SH
Very Dense Grey Brown Fine Silty Sand							
Medium Dense Blue Grey Clayey Sand							
50	11	2"	19	112	18		SH
Dense to Very Dense Blue Grey Silty Sand to Clayey Sand							
AP. Bottom of Boring	12	2"	47	110	20	670	DH
60							

#297-7106 | HALLENBECK McKAY and ASSOCIATES | Figure 2

GEO-ENGINEERING CONSULTANTS

BORING LOG

PROJECT	Missile Rework Building	Project No	2849	Boring No.	B3
LOCATION OF BORING	See Plate 1.			Sheet No.	1/2
				Date Drilled	8/25-28/67

DEPTH FT.	ELEV FT.	DRIVE NO.	Blows per Foot	Dry Unit Weight P.C.F	Natural Moist %	Compr. Str. T.S.F	LOG OF MATERIAL
0	114.9						Oiled surface, 6" treated sand base.
		1	35	107	4.1	-	Gray brown medium to fine sand, dry at surface, moist with depth; medium dense to dense. SP-SM.
5	110	2	30	107	16.4	D.S. M.A.	— Some shells.
		3	40	112	18.4	-	
10		4	20	106	21.6	-	
		5S	-	87	35.5	M.A.	Finely bedded, dark gray clayey to clean sand with 1" - 4" seams of soft clay and silt.
15	100			74	48.2	C	
				61	65.5	C,P.I.	SP-SC-CH-ML
		6	28	103	23.4	-	Green-gray clayey sand, medium-dense. SP-SC.
20		7	55	111	20.2	-	
							Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC.
25	90	8	74				
30		9	60	112	18.1	-	AD
							See sheet 2.

100361

GEO-ENGINEERING CONSULTANTS

BORING LOG

PROJECT Missile Rework Building	Project No 2849	Boring No.	B3
LOCATION OF BORING See Plate 1.		Sheet No.	2/2
		Date Drilled	8/25-28/67

DEPTH FT.	ELEV. FT.	DRIVE NO	Blows per Foot	Dry Unit Weight P.C.F.	Natural Moist %	Compr. Str. T.S.F.	LOG OF MATERIAL
							Continued.
							Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC
35		10	24				Gray brown clayey sand, dense to very dense. SC.
40		11	87	112	18.1	-	Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC.
45		12	100+	113	18.7	-	Gray brown clayey sand, dense to very dense. SC.
50		13	77	113	18.6	-	Tan-brown fine sand with rust mottling, trace of clay; dense to very dense. SP-SC.
55		14	100+				
60		15	100+	107	21.0	-	Bottom of boring, 61.0'

1AD3B2

G/E Form 1 9/63

Laboratory Tests	Blows/foot *	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)
	29	7	107		
LL=57 PI=30.2	3				

*Converted to Standard Blow Counts (N-values)
**Elevations based on Alameda NAS Datum

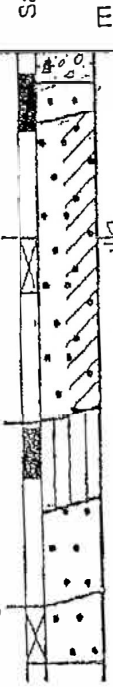
↑ only

LOG OF BORING 1
Equipment CME550, 8-inch Auger
Elevation 112 Feet Date 10/7/86

5-inch Concrete Slab
BROWN SAND (SP)
medium dense, slightly moist, trace fines, fine-grained sand (Fill)
DARK GRAY CLAYEY SILT (MH)
very soft, wet, (Bay Mud)
interbedded with GRAY SAND (SP)
loose, wet, petroleum contamination
organic lenses
hit something hard, sounded hollow
Bottom of Boring 9.5 Feet

Laboratory Tests	Blows/foot *	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)
	29	5	114		
NA (See Plate 10)	7				
	2				
	20				

LOG OF BORING 2
Equipment CME550, 8-inch Auger
Elevation 112 Feet Date 10/8/86



7-inch Concrete Slab
RED-BROWN GRAVELLY SAND (SW)
dense, moist, some clay (Fill)
BROWN SAND WITH CLAY (SP-SC)
medium dense to loose, moist, fine grained, uniform (Fill)
loose, saturated
GRAY CLAYEY SILT (ML)
very soft, saturated, (Old Bay Mud)
BROWN SAND (SP)
medium dense, saturated, medium-grained
BROWN SILTY SAND (SM)
medium dense, wet, fine-grained
Bottom of Boring 16.0 Feet

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORINGS 1 & 2
Pier Utility Improvements
Naval Air Station - Alameda, California

PLATE 2

AWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AC	8015.014.03	AG	10/86		

SECTION B C2

APPENDIX D

SECTION C-C'

Borelogs

SECTION C CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 112.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/24/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine-grained) with some silt and pockets of clay	brown	dense	SM	1					
brown & grey				5		31			
(FILL)									
CLAY, silty with traces of organics and shells (Bay Mud)	grey	very soft	CH	10		push 250 psi	106		
SAND (fine-grained) with traces of silt, clay, organics and shells	grey	medium dense	SP-SM-SC	15		20*	26	97	
CLAY, silty with traces of shells and organics (Bay Mud)	grey	very soft	CH	20		4			
SAND (fine-grained) with silt and traces of clay	grey	medium dense	SC						
CLAY, silty with traces of shells and organics (Bay Mud)	grey	very soft	CH	25		push 250 psi			
(grading sandy in places)				30		2			
(grading without sand)		soft		35		7*			
				40					

Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	6

SECTION C CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 12.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/24/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, silty with traces of organics and shells (Bay Mud) (continued)	grey	very soft	CH	41		2			
				45					
		soft		50		push 350 psi			
				55		push 350 psi			
		firm		60		push 350 psi			
				65					
				70					
				75		14*			
				80					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	6

SECTION C CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 112.5 Feet±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/24/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, silty with traces of organics and shells (Bay Mud) (continued)	grey	firm	CH	81					
				85					
				90					
SAND (fine-grained) with silt and traces of clay and organics	blue-green	dense	SC	95		40			
Bottom of Boring = 97 Feet				100					
				105					
				110					
				115					
				120					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual.
2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	6

SECTION C CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 112.5 Feet±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/27/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
3½" A.C. over 5" BASE				1					
CLAY, silty, sandy (fine- to coarse-grained)	brown	very stiff	CL			33			
SAND (fine-grained) with silt	brown	dense	SM						
SAND (fine-grained) with silt (FILL)	grey	medium dense	SM	5		19*	16	109	
CLAY, silty (Bay Mud)	dark grey	very soft	CH	10		1	74		
SAND (fine-grained) with shells	grey	very loose	SP	15		6*			
CLAY, silty (Bay Mud) (grading with lenses of fine-grained sand with silt and shells)	grey	firm	CH-SM	20		5			
				25		push 350 psi			
				30		push 300 psi			
				35		push 300 psi	52		
				40		push 350 psi			

Liquid Limit = 55%
Plasticity Index = 28%
Passing #200 Sieve = 89%

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	7

SECTION C. CA.

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 112.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/27/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, silty (Bay Mud) with lenses of fine-grained sand with silt and shells (continued)	grey	firm	CH-SM	41					
				45					
		soft				7*	38	81	
				50					
						push 350-600 psi			
SAND (fine-grained) with silt and some clay	blue-green	very dense	SM-SC	55					
						67			
				60					
Bottom of Boring = 60 Feet									
Notes: 1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual. 2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.				65					
				70					
				75					
				80					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	7

SECTION C CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 111.0 Feet. ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/27/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine-grained) with some silt and pockets of clay	brown	loose	SM	1		14*			
		medium dense		5		11			
(FILL)									
SAND (fine-grained) with traces of silt and shells	grey	very loose	SP	10		5*			
						1			
CLAY, silty (Bay Mud)	grey	very soft	CH			5*			
SAND (fine-grained) with traces of silt and shells	grey	loose	SP-SM	15					
CLAY, silty with lenses of sand with silt and shells (Bay Mud)	grey	very soft	CH-SM	20		2			
(grading shelly without sand)			CH-Pt	25		2*			
				30		push 250 psi			
		soft		35		3			
		firm		40		8*			

Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	8

SECTION C. CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 111.0 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/27/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty, shelly (Bay Mud) (continued)	grey	firm	CH-Pt	41					
(grading with shells)			CH	45		4	48		
				50					
				55		4	61		
				60					
		soft		65		push 300 psi			
				70		push 300 psi			
(grading with traces of shells)				75		3			
		firm		80		push 400 psi			

Peter Kaldveer and Associates

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	8

SECTION C - CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 111.0 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/27/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with traces of shells (Bay Mud) (continued)	grey	firm	CH	81					
Liquid Limit = 67% Plasticity Index = 36% Passing #200 Sieve = 97%				85		push 400 psi	73		
Notes: 1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual. 2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.	dark grey	stiff		90		8			
				95					
				100					
				105					
				110					
SAND (fine-grained), clayey with silt Passing #200 Sieve = 44%	blue-green	very dense	SC			56/6"	19		
Bottom of Boring = 114.5 Feet				115					
				120					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	8

SECTION C. CA

DRILL RIG	Hollow Stem Auger	SURFACE ELEVATION	114.5 Feet ±	LOGGED BY	F.M.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	8 Inches	DATE DRILLED	10/28/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine-grained) with traces of silt	tan	medium dense	SM-SP	1		17			
				5		17			
	grey-brown	loose		10		9*			
(FILL)									
CLAY, silty with lenses of sand with some silt (Bay Mud)	grey	very soft	CH-SM	15		1			
(grading without sand lenses) Liquid Limit = 66% Plasticity Index = 34% Passing #200 Sieve = 100%			CH	20		push 250 psi	72		
				25		2			
(grading with traces of organics)		soft		30		4*			
						push 450 psi			
SAND (fine-grained) with silt and clay	brown	medium dense	SC	35					
						12			
Bottom of Boring = 40 Feet				40					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	10

SECTION C CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 109.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/31/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSI)
CLAY, silty with sand	dark brown	stiff	CL	1		13			
SAND (fine- to coarse-grained), with some silt and clay	brown	medium dense	SC						
SAND (fine-grained) with some silt and pockets of clay (FILL)	grey	loose	SM	5		9*	21	104	
SAND (fine-grained) with traces of shells and lenses of silty clay	grey	loose	SP-CH	10		13*			
		very loose		15		1			
				20		2	26		
CLAY, silty (Bay Mud)	grey	soft	CH	25		5*	81	52	
(grading shelly)			CH-Pt	30		3	52		
				35		5*	58	63	
(grading with traces of shells with sand in places)			CH	40		2	39		

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	18

SECTION C-C'

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 109.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/31/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, silty with traces of shells (Bay Mud) (continued)	grey	soft	CH	41					
				45					
		firm		50		8*			
				55					
				60		push 350 psi			
				65					
				70		push 300 psi			
				75					
				80		6	66		

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	18

SECTION C CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 109.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 8 Inches	DATE DRILLED 10/31/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with traces of shells (Bay Mud) (continued)	grey	firm	CH	81					
				85					
(grading with some organics)		stiff		90	⊠	18*	66	58	0.5
				95					
				100					
SAND (fine-grained) with clay and silt	grey	very dense	SC	105		72/6"	16		
Bottom of Boring = 108.5 Feet				110					
Notes: 1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual. 2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.				115					
				120					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	18

LOG OF BORING 5

Equipment CME550, 8-inch Auger

Elevation 114 Feet Date 10/8/86

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample	
						0		9-inch Concrete
	20							BROWN SAND (SP) loose, moist, medium-grained, trace fines, trace gravel (Fill)
	6					5		2-inch gravel
								▽
	14					10		saturated
	4					15		GRAY SILTY SAND (SM) very loose, saturated, medium- to coarse-grained, uniform with shell pieces, interbedded with rocks

Bottom of Boring 15.5 Feet

SECTION C C2
B-6 only

LOG OF BORING 6

Equipment CME550, 8-inch Auger

Elevation 115 Feet Date 10/8/86

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample	
						0		9-inch Concrete
pH=8.6	39	10	99					BROWN SAND (SP) dense to loose, slightly moist, medium-grained (Fill)
	13					5		trace fines, saturated
								▽
	33					10		GRAY SAND (SP) loosed to medium dense, medium-grained sand, saturated
	12					15		gray-brown, more silt, shells

Bottom of Boring 16.5 Feet

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING 5 & 6
Pier Utility Improvements
Naval Air Station - Alameda, California

PLATE 4

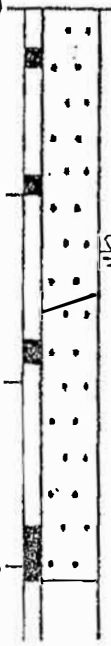
DWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AC	8015.014.03	AG	10/86		

LOG OF BORING 7

Equipment CME550, 8-inch Auger

Elevation 115 Feet Date 10/8/86

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						0	
						5	
	22					10	
						15	



BROWN SAND (SP)
medium dense to loose, moist, trace gravel, fine- to medium-grained sand (Fill)

GRAY SAND (SP) with silt, medium dense, saturated, fine to medium sand

Bottom of Boring 15.5 Feet

SECTION C C2

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING 7
Pier Utility Improvements
Naval Air Station - Alameda, California

PLATE 5

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AC	B015.014.03	AG	10/86		

Equipment CME 550, 8-inch Auger

Elevation 115 Feet Date 10/8/86

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample
	31			0	
	27	3	104	5	
	33			10	
	3			15	
	6			20	
	60				
				25	
				30	
				35	
				40	

9-inch Concrete

RED-BROWN GRAVELLY SAND (SP)
medium dense, slightly moist, subangular to angular gravel up to 2-inches (Fill)

BROWN SAND (SP)
medium dense, moist, medium-grained, uniform, trace gravel (Fill)

GRAY SAND (SP)
dense to loose, saturated, medium-grained

BROWN SILTY SAND (SM)
loose to medium-dense, saturated, medium to fine sand

Bottom of Boring 22.0 Feet

SECTION C C2

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORING 8
Pier Utility Improvements
Naval Air Station - Alameda, California

PLATE 6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AC	8015,014.03	AG	10/86		

LOG OF BORING 9

Equipment CME550, 8-inch Auger

Elevation 115 Feet Date 10/8/86

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pct)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
	17	5	107			0	
	20					5	
	9						
	3					10	
	33						
	9					15	

6-inch Concrete
BROWN SAND (SP) medium-dense, moist, medium-grained, with shells (Fill)
trace clay

BROWN SILTY SAND (SM) loose to medium dense, saturated, medium- to fine-grained (Fill)

GRAY SILTY SAND (SM) loose to medium dense, medium- to fine-grained, saturated

Bottom of Boring 16.5 Feet

SECTION C C2
B-9 only

LOG OF BORING 10

Equipment CME 550, 8-inch Auger

Elevation 115 Feet Date 10/8/86

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pct)	Depth (ft)	Sample
	44			0	
pH=7.5	17	6	103	5	
	8			10	
	3			15	

4-inch Concrete
DARK BROWN GRAVELLY SAND (SP) medium dense, dry, gravel up to 1-inch (Fill)
BROWN SAND (SP) dense, slightly moist, medium grained (Fill)
ORANGE/BROWN GRAVELLY SAND (SW) trace clay, dense, slightly moist medium to coarse-grained gravel up to 3/4-inch round to angular
VARICOLORED SAND (SP) medium dense, moist, medium grained, shells (Fill)
GRAY-BROWN SILTY SAND (SM) loose, saturated, fine sand
GRAY-BROWN SILT (ML) trace clay, trace sand, very soft, saturated
BLACK SILTY SAND (SM) loose, saturated, with shell pieces, medium grained, uniform
Bottom of Boring 16.5 Feet

Harding Lawson Associates
Engineers, Geologists & Geophysicists

LOG OF BORINGS 9 & 10
Pier Utility Improvements
Naval Air Station - Alameda, California

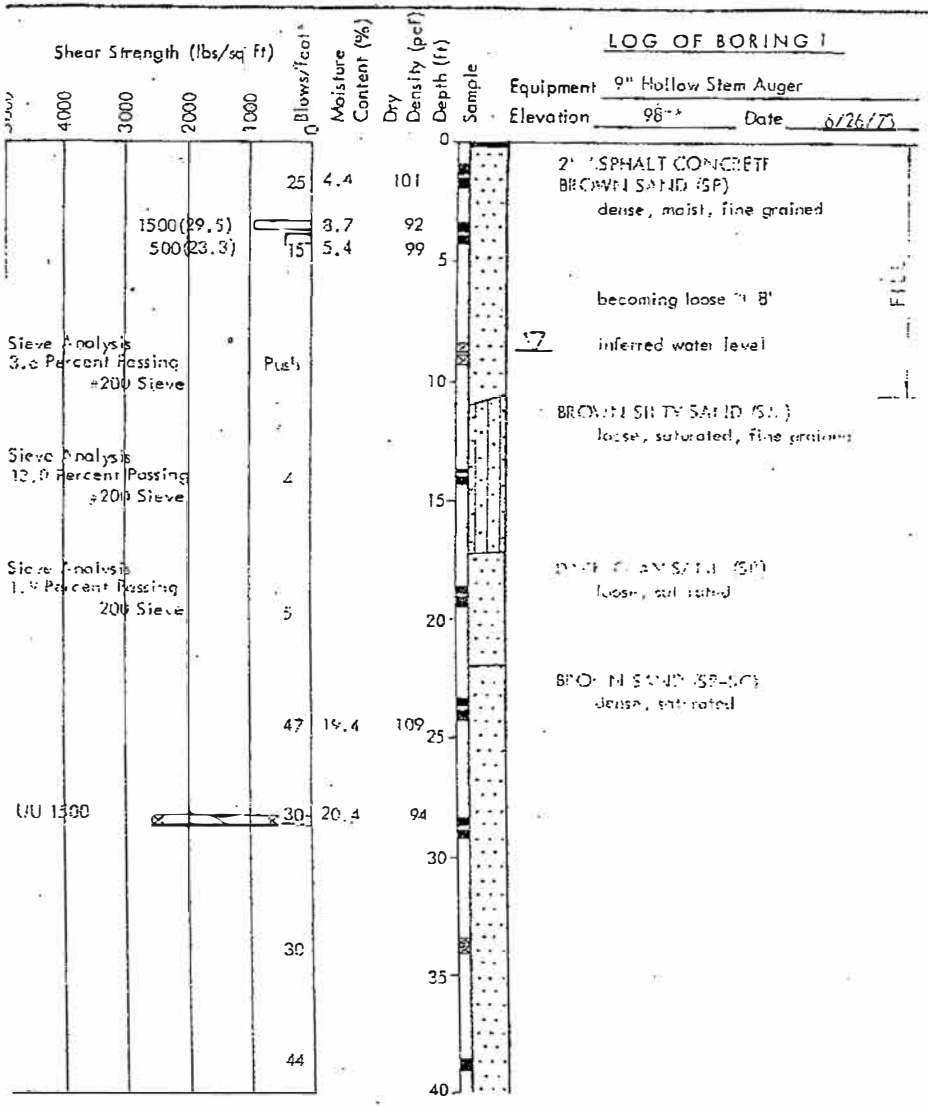
PLATE 7

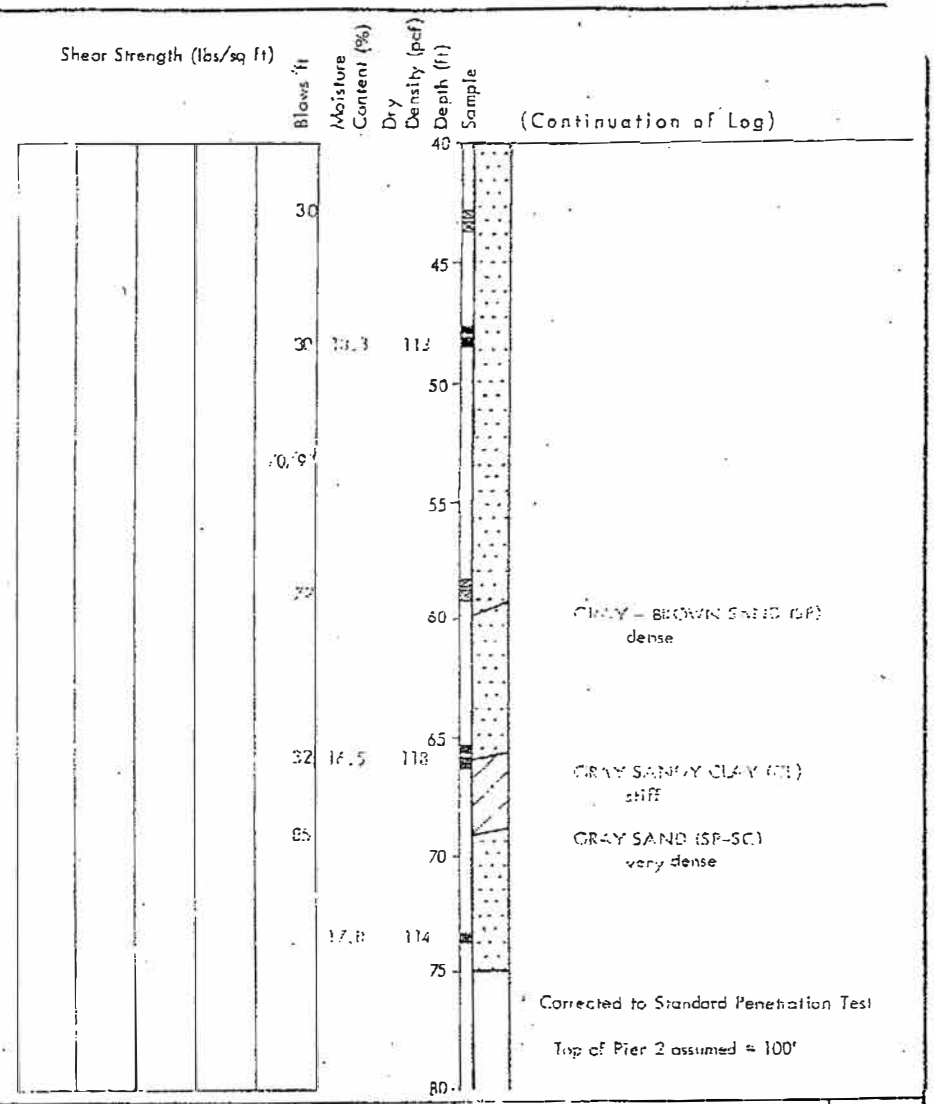
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
AC	8015,014.03	AG	10/86		

LOG OF BORING 1

Equipment 9" Hollow Stem Auger

Elevation 98'± Date 6/26/73





SECTION C AU

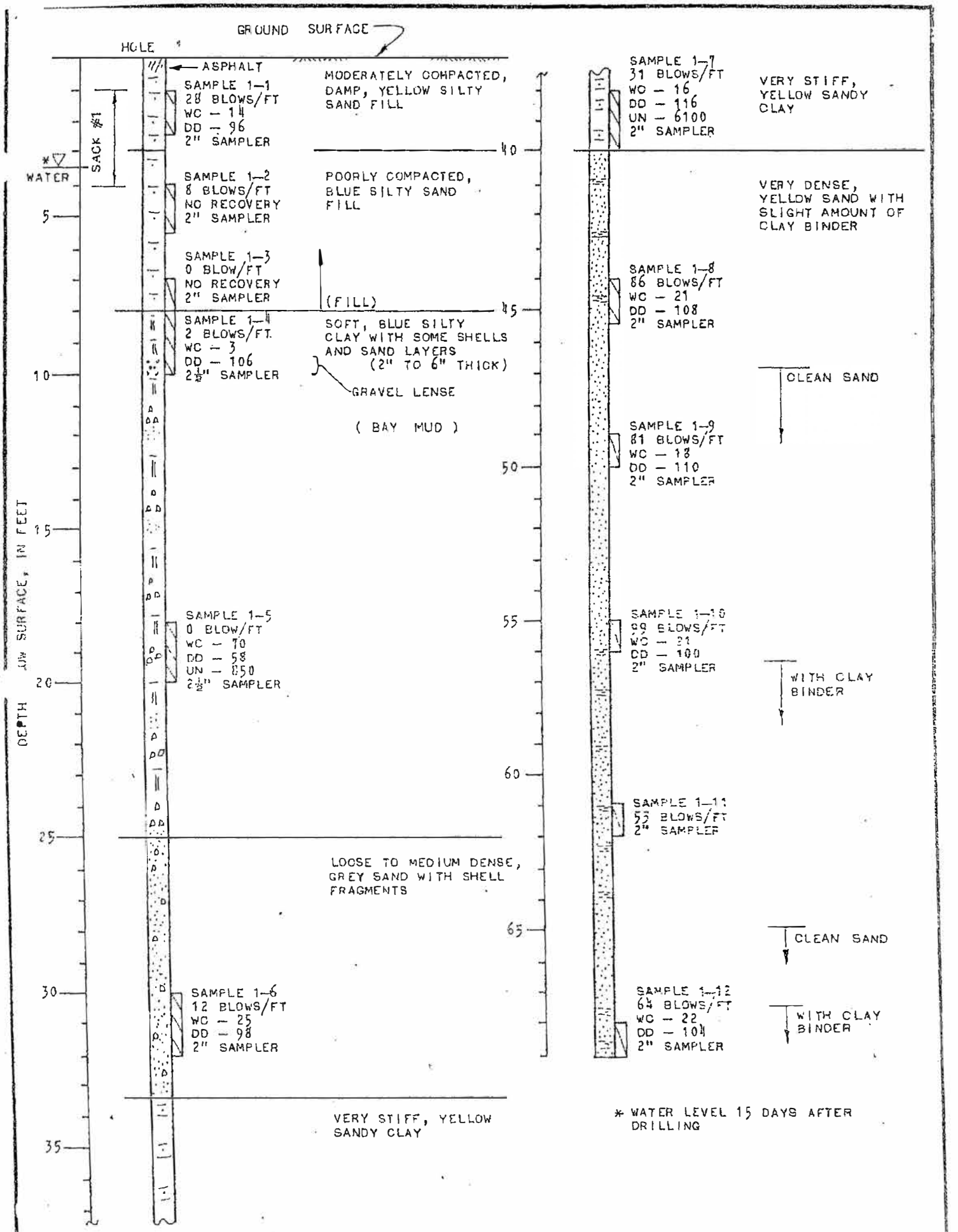
HARDING - LAWSON ASSOCIATES
Consulting Engineers and Geologists

Job No. 5928,002.04 Approved Date 7/31/73

LOG OF BORING 1

Addition to Pier 3
Alameda N.A.S. California

PLATE 2


GROUND SURFACE
HOLE
ASPHALT
SAMPLE 1–1
28 BLOWS/FT
WC – 14
DD – 96
2" SAMPLER
MODERATELY COMPACTED, DAMP, YELLOW SILTY SAND FILL
SACK #1
WATER
SAMPLE 1–2
8 BLOWS/FT
NO RECOVERY
2" SAMPLER
POORLY COMPACTED, BLUE SILTY SAND FILL
SAMPLE 1–3
0 BLOW/FT
NO RECOVERY
2" SAMPLER
(FILL)
SAMPLE 1–4
2 BLOWS/FT.
WC – 3
DD – 106
2½" SAMPLER
SOFT, BLUE SILTY CLAY WITH SOME SHELLS AND SAND LAYERS (2" TO 6" THICK)
GRAVEL LENSE
(BAY MUD)
SAMPLE 1–5
0 BLOW/FT
WC – 70
DD – 58
UN – 850
2½" SAMPLER
LOOSE TO MEDIUM DENSE, GREY SAND WITH SHELL FRAGMENTS
SAMPLE 1–6
12 BLOWS/FT
WC – 25
DD – 98
2" SAMPLER
VERY STIFF, YELLOW SANDY CLAY
DEPTH BELOW SURFACE, IN FEET
0
5
10
15
20
25
30
35
40
45
50
55
60
65
SAMPLE 1–7
31 BLOWS/FT
WC – 16
DD – 116
UN – 6100
2" SAMPLER
VERY STIFF, YELLOW SANDY CLAY
VERY DENSE, YELLOW SAND WITH SLIGHT AMOUNT OF CLAY BINDER
SAMPLE 1–8
86 BLOWS/FT
WC – 21
DD – 108
2" SAMPLER
CLEAN SAND
SAMPLE 1–9
81 BLOWS/FT
WC – 18
DD – 110
2" SAMPLER
SAMPLE 1–10
99 BLOWS/FT
WC – 21
DD – 100
2" SAMPLER
WITH CLAY BINDER
SAMPLE 1–11
55 BLOWS/FT
2" SAMPLER
CLEAN SAND
SAMPLE 1–12
64 BLOWS/FT
WC – 22
DD – 101
2" SAMPLER
WITH CLAY BINDER
* WATER LEVEL 15 DAYS AFTER DRILLING

SECTION C AA

LOG OF BORING 4

(Substation # 6)

Equipment 8" Hollow Auger

Elevation 111.7 Date 10/3/72

Depth (ft)	Sample	Blows/ft	Moisture Content (%)	Dry Density (pcf)	Shear Strength (lbs/sq ft)
0		7			
		16	17.5	110	
5	▽				
*		6			
10		Push			
15		Push	23.9	99	
20					
25					
30					
35					
40					

2" GRASS (Lawn)
DARK GRAY-BROWN SAND (SP)
medium dense, wet, with occasional rock fragments
water level 10/3/72
becoming loose & saturated below 5'

FILL

BLUE-GRAY SILTY SAND (SM)
loose

GRAY SANDY SILT (MH)
soft, with shells (Bay Mud)

*Sieve Analysis
% passing # 200 sieve
= 4.6

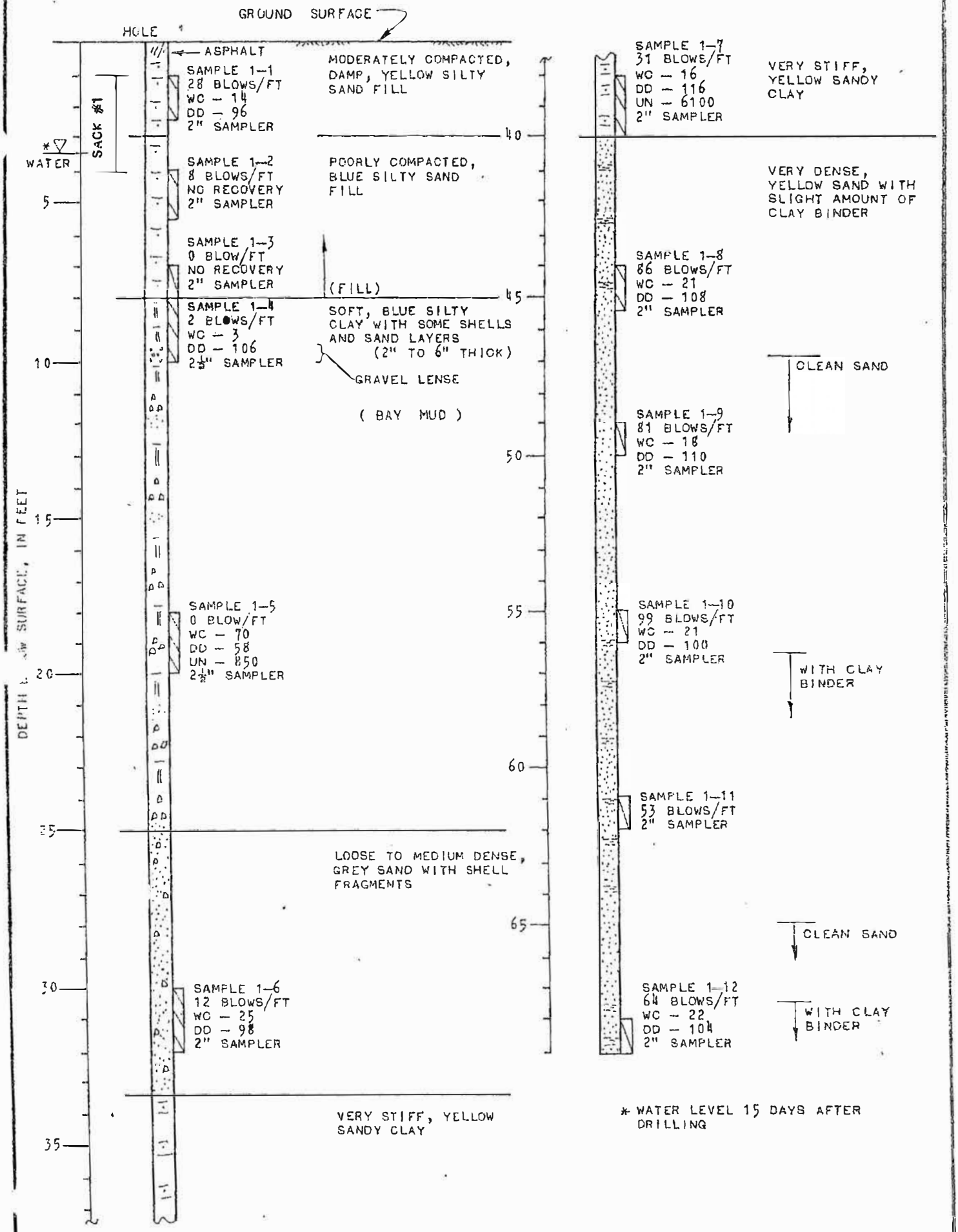
1AS

HARDING, MILLER, LAWSON & ASSOCIATES
Consulting Engineers

Job No: 5866,002.04 Appr: CHV mr Date 10/17/72

LOG OF BORING 4
Electrical Distribution System
Alameda Naval Air Station
Alameda, California

PLATE 5


GROUND SURFACE
HOLE
ASPHALT
SAMPLE 1–1
28 BLOWS/FT
WC – 14
DD – 96
2" SAMPLER
MODERATELY COMPACTED, DAMP, YELLOW SILTY SAND FILL
SACK #1
* WATER
SAMPLE 1–2
8 BLOWS/FT
NO RECOVERY
2" SAMPLER
POORLY COMPACTED, BLUE SILTY SAND FILL
SAMPLE 1–3
0 BLOW/FT
NO RECOVERY
2" SAMPLER
(FILL)
SAMPLE 1–4
2 BLOWS/FT
WC – 3
DD – 106
2½" SAMPLER
SOFT, BLUE SILTY CLAY WITH SOME SHELLS AND SAND LAYERS (2" TO 6" THICK)
GRAVEL LENSE
(BAY MUD)
SAMPLE 1–5
0 BLOW/FT
WC – 70
DD – 58
UN – 850
2½" SAMPLER
LOOSE TO MEDIUM DENSE, GREY SAND WITH SHELL FRAGMENTS
SAMPLE 1–6
12 BLOWS/FT
WC – 25
DD – 98
2" SAMPLER
VERY STIFF, YELLOW SANDY CLAY
SAMPLE 1–7
31 BLOWS/FT
WC – 16
DD – 116
UN – 6100
2" SAMPLER
VERY STIFF, YELLOW SANDY CLAY
VERY DENSE, YELLOW SAND WITH SLIGHT AMOUNT OF CLAY BINDER
SAMPLE 1–8
86 BLOWS/FT
WC – 21
DD – 108
2" SAMPLER
CLEAN SAND
SAMPLE 1–9
81 BLOWS/FT
WC – 18
DD – 110
2" SAMPLER
SAMPLE 1–10
99 BLOWS/FT
WC – 21
DD – 100
2" SAMPLER
WITH CLAY BINDER
SAMPLE 1–11
53 BLOWS/FT
2" SAMPLER
CLEAN SAND
SAMPLE 1–12
64 BLOWS/FT
WC – 22
DD – 104
2" SAMPLER
WITH CLAY BINDER
* WATER LEVEL 15 DAYS AFTER DRILLING
DEPTH BELOW SURFACE, IN FEET
0
5
10
15
20
25
30
35
40
45
50
55
60
65

SECTION C AA

APPENDIX D

SECTION D-D'

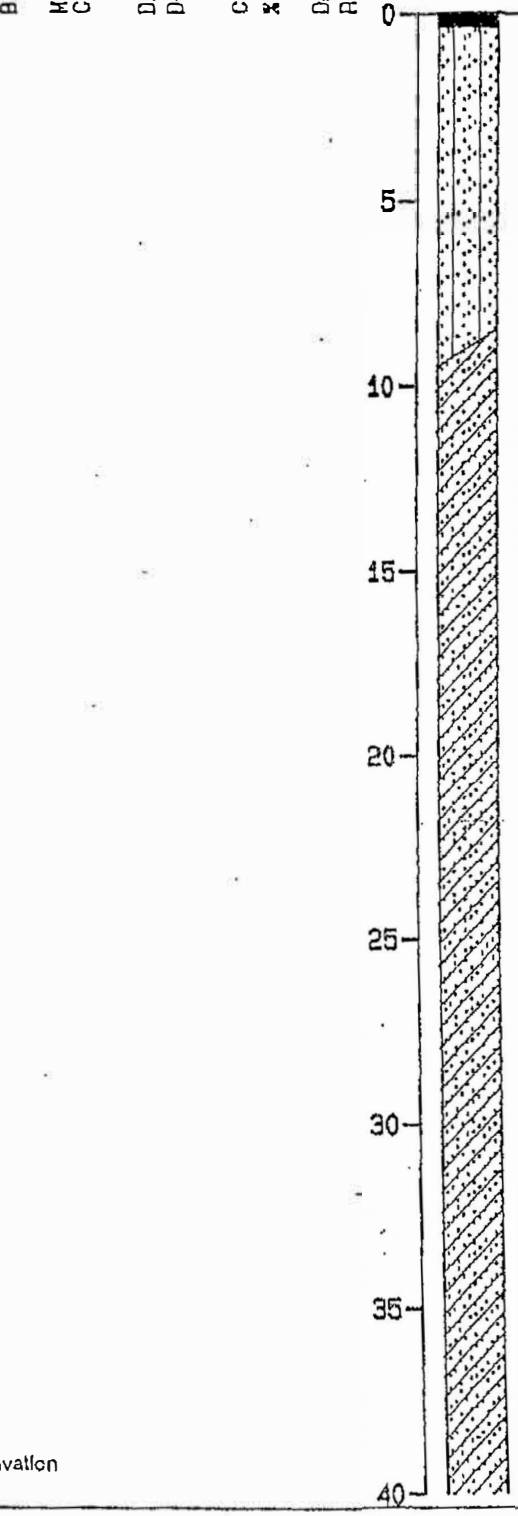
Borelogs

0205

Equipment Dual Tube with Casing Hammer

Elevation 11.61 ft* Date 2/14/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						0	
						5	
						10	
						15	
						20	
						25	
						30	
						35	
						40	



ASPHALT
ORANGE-BROWN SILTY SAND (SM)
with clay and gravel, dry fill
shell fragments observed to approximately 20.0 ft

water level at 6.0 ft, 2-25-87

GREEN-BROWN CLAYEY SAND (SC)
with silt
water level at 9.5 ft, 2-12-87
top of the Merritt Sand/Posey Formation

color change to orange-brown at 19.0 ft

formation is producing large quantity of water at 25.0 ft

K25 C at 28.0 ft = 1400 μmhos

DRAFT

* Top of casing elevation

Harding Lawson Associates
Engineers and Geoscientists

Log of Boring NAS-1
Homeport Aquifer Study
Alameda County, California

PLATE 15

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

SECTION D DV

0206

Equipment Dual Tube with Casing Hammer

Elevation 11.61 ft* Date 2/14/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						40	

K25 C at 40.0 ft = 900 μmhos

45

50

55

60

increasing clay content
color change to gray-brown at 60.0 ft

65

70

DRAFT

75

DARK GRAY SANDY CLAY (CL.) very dense

K25 C at 78.0 ft = 1600 μmhos

80

Harding Lawson Associates
Engineers and Geoscientists

Log of Boring NAS-1 Continued
Homeport Aquifer Study
Alameda County, California

PLATE 16

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

SECTION D DV

0207

Equipment Dual Tube with Casing Hammer

Elevation 11.61 ft* Date 2/14/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						80	
						85	
						90	
						95	
						100	
						105	
						110	
						115	
						120	

GRAY CLAYEY SAND (SC) with silt
GRAY SILTY SAND (SM) with clay

decreasing clay content at 95.0 ft

DRAFT

base of Merrit Sand/Posey Formation
GRAY SILTY CLAY (CL) very stiff
no sand observed
top of San Antonio Formation

Harding Lawson Associates
Engineers and Geoscientists

Log of Boring NAS-1 Continued
Homeport Aquifer Study
Alameda County, California

PLATE 17

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

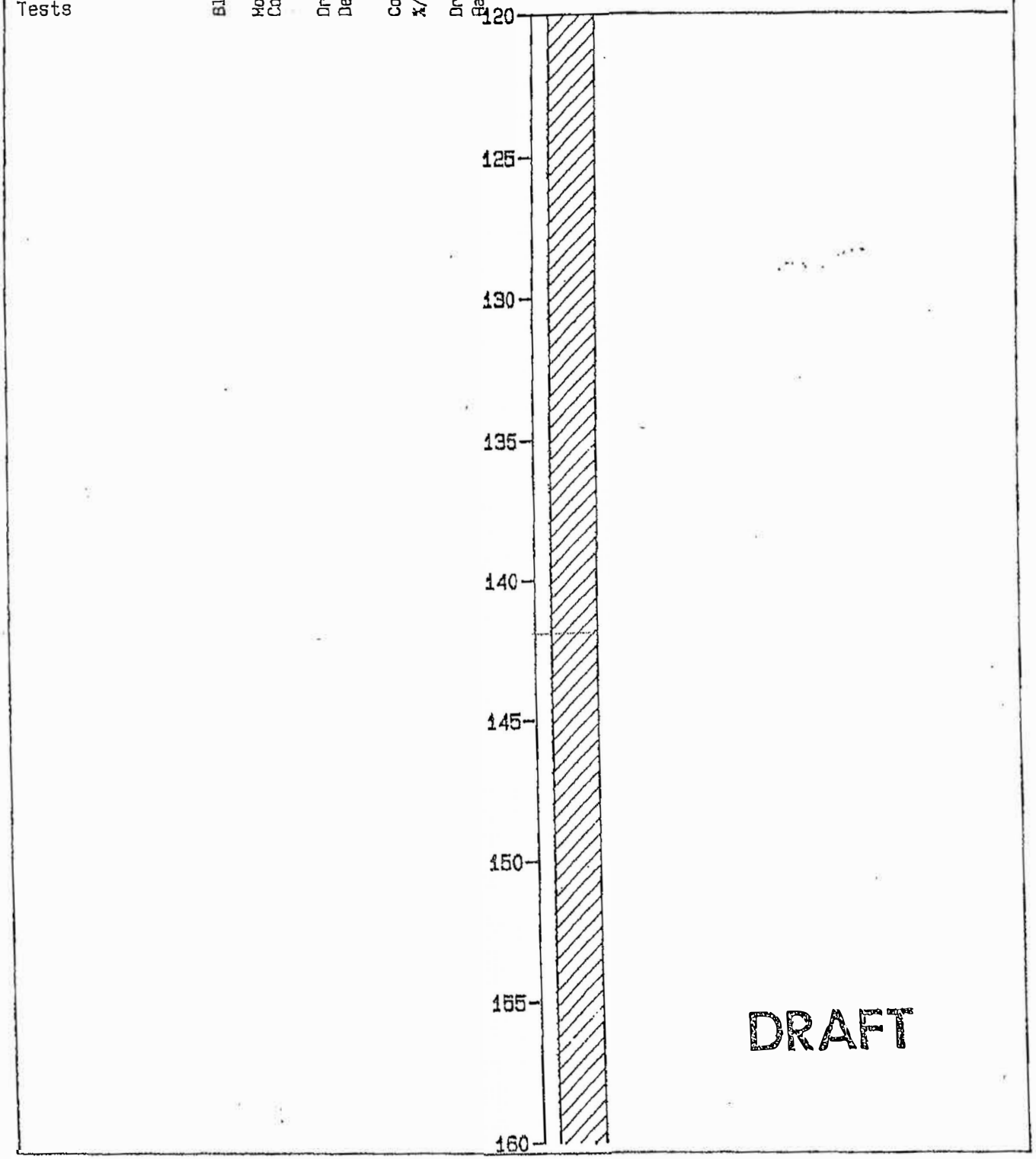
SECTION D DV

0208

Equipment Dual Tube with Casing Hammer

Elevation 11.61 ft* Date 2/14/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						120	
						125	
						130	
						135	
						140	
						145	
						150	
						155	
						160	



DRAFT

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Log of Boring NAS-1 Continued
Homeport Aquifer Study
Alameda County, California

PLATE
18

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

SECTION D DV

0209

Equipment Dual Tube with Casing Hammer

Elevation 11.61 ft* Date 2/14/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						160	
						165	
						170	
						175	
						180	
						185	
						190	
						195	
						200	

GRAY SANDY CLAY (CL) with gravel
increasing gravel content
color change to brown at 162.0 ft
GRAY SANDY GRAVEL (GP) with clay
GRAY SANDY CLAY (CL)
color change to bright green at 167.0 ft
base of San Antonio Formation
bottom of boring at 170.0 ft

DRAFT

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Log of Boring NAS-1 Continued
Homeport Aquifer Study
Alameda County, California

PLATE 19

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
DM	7,748,006.04		6/87		

SECTION D DV

0202

Equipment Dual Tube with Casing Hammer

Elevation 13.11 ft* Date 3/11/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						0	
						5	
						10	
						15	
						20	
						25	
						30	
						35	
						40	

CEMENT 8"
BROWN SAND (SP) dry fill
moist at 2.0 ft

saturated at 3.0 ft

DARK GRAY SILTY CLAY (CL) bay mud, interbedded layers of silty clay and silty sand, occasional shell fragments and dark black organic material

ORANGE-BROWN SILTY SAND (SM)
moist
top of Merritt Sand/Posey Formation

water level at 26.0 ft, 3-12-87
K25 C at 26.0 ft = 33,600 μmhos
K25 C at 26.0 ft = 35,000 μmhos, 3-11-87

increased silt content at 32.0 ft

DRAFT

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Log of Boring NAS-2
Homeport Aquifer Study
Alameda County, California

PLATE 21

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JM	7,748,006.04		6/87		

SECTION D DV

0203

Equipment Dual Tube with Casing Hammer

Elevation 13.11 ft* Date 3/11/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample
						40	
						45	
						50	
						55	
						60	
						65	
						70	
						75	
						80	

BROWN SILTY CLAYEY SAND (SC)

increased silt content at 54.0 ft

K25 C at 57.0 ft = 41,340 μmhos 3-11-87

increased clay content at 61.0 ft

increased silt content at 64.0 feet

DARK GRAY CLAY (CL) hard

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Log of Boring NAS-2 Continued
Homeport Aquifer Study
Alameda County, California

PLATE 22

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JM	7,748,006.04		6/87		

SECTION D DV

0204

Equipment Dual Tube with Casing Hammer

Elevation 13.11 ft* Date 3/11/87

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Core Recov. %/RQD	Drilling Rate (min/ft)	Depth (ft)	Sample	
						80		increased sand content at 80.0 ft
								DARK GRAY SILTY CLAYEY SAND (SC)
						85		K25 C at 87.0 ft = 38,500 μmhos 3-11-87
						90		DARK GRAY SILTY SAND (SM)
						95		base of Merrit Sand/Posey Formation
						100		DARK GRAY SILTY CLAY (CL) hard top of San Antonio Formation
						105		
						110		increased sand content at 111.0 ft
						115		total depth of boring is 117.0 ft
						120		

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Log of Boring NAS-2 Continued
Homeport Aquifer Study
Alameda County, California

PLATE 23

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
JM	7,748,006.04		6/87		

SECTION D DV

BORING 1

Equipment 5 INCH ROTARY WASH

Elevation ----- Date 10/04/78

Laboratory Tests	Blows/foot *	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample **	
				0	concrete slab, 6 inches thick
	(14)			NR	BROWN FINE SAND (SP), moist, medium dense (probably fill)
	(7)			5 NR	BLACK FINE SAND (SP), moist to wet loose
					ground water level at 5.6 feet measured 16 hours after drilling completed
	(45)	20	109	10	GRAY-BROWN CLAYEY FINE SAND (SC), wet, medium dense
					BROWN FINE SAND (SP), wet, dense to very dense
	43			15 NR	
SA					
DS 1260 (1000)		20	104	20	
DS 2050 (2000)		19	106		
DS 3230 (4000)	(50)	19	104		
	(51)			25 NR	
				30	
	75				
				35 NR	SECTION D BP
	(55)				GRAY-BROWN CLAYEY FINE SAND (SC), moist, dense
				40	

* 44 standard penetration blow count
(44) equivalent standard penetration blow count

** NR denotes no recovery

R.C. Harlan AND ASSOCIATES
San Francisco, California

Proj. No. 136.6 Appr. RHY Date 10/78

LOG OF BORING 1
HIGH SPEED GRIND FACILITY
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

FIGURE 2

BORING 1 (continued)

Equipment ---

Elevation --- Date 10/04/78

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample	
	(35)	17	119	40	BROWN FINE SAND (SP), very dense
	(71)			45	
	53/6"			50 NR	GRAY-BROWN CLAYEY FINE SAND (SC), moist, very dense
	(66)	18	115	55 NR	
	(64)/11"			60	BROWN FINE SAND (SP), wet, very dense
	(66)	21	110	65 NR	GRAY SILTY CLAY (CH), damp (?) hard (?)
	(77)			70	BROWN FINE SAND (SP), wet, very dense
	50/5"			75	SECTION D BP
	(69)	20	110	80 NR	bottom of hole 81.0 feet

R.C. Harlan AND ASSOCIATES
San Francisco, California

Proj. No. 136.6 Appr. RHY Date 10/78

HIGH SPEED GRIND FACILITY
LOG OF BORING 1
(continued)

FIGURE 3

BORING 2

Equipment 5 INCH ROTARY WASH

Elevation _____ Date 10/05/78

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
				0		concrete slab, 6 inches thick
	37					BROWN FINE SAND (SP), moist, dense (probably fill)
				5		BLACK-BROWN FINE SAND (SP), wet, loose
	(4)				NR	
	4					BROWN FINE SAND (SP), wet, loose
	(50)/10"	18	115	10		GRAY-BROWN SANDY CLAY (CL), moist, very stiff
						BROWN, FINE SAND (SP), dense to very dense
	85					ground water level at 6.5 feet, measured 15 minutes after drilling completed
				15		
	(31)	19	113	20		
					NR	
	(64)					
				25		
					NR	
	59			30		
					NR	
	(72)	21	110	35		GRAY-BROWN CLAYEY FINE SAND (SC), medium to very dense
					NR	
	(29)	18	117	40		

SECTION D BP

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San Francisco, California

Proj. No. 136.6 Appr. RHY Date 10/78

LOG OF BORING 2
HIGH-SPEED GRIND FACILITY
ALAMEDA NAVAL AIR STATION
ALAMEDA, CALIFORNIA

FIGURE 4

BORING 2 (continued)

Equipment _____

Elevation _____ Date 10/05/78

Laboratory Tests	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft) Sample	
				40	
	86				
				45	BROWN FINE SAND (SP), wet, very dense
	(71)/11"	21	110		
				50	
				NR	
	(75)				
				55	
	88				
				60	
	(81)/11"				
				65	
				NR	GRAY SILTY CLAY (CH), damp, hard
	(35)	24	103		
				70	
	60/5"				BROWN FINE SAND (SP), wet, very dense
					SECTION D BP
				75	
	(67)/11"				bottom of hole 77.9 feet
				NR	
				80	

R.C. Harlan AND ASSOCIATES
San Francisco, California

Proj. No. 136.6 Appr. RHY Date 10/78

HIGH SPEED GRIND FACILITY
LOG OF BORING 2
(continued)

FIGURE 5

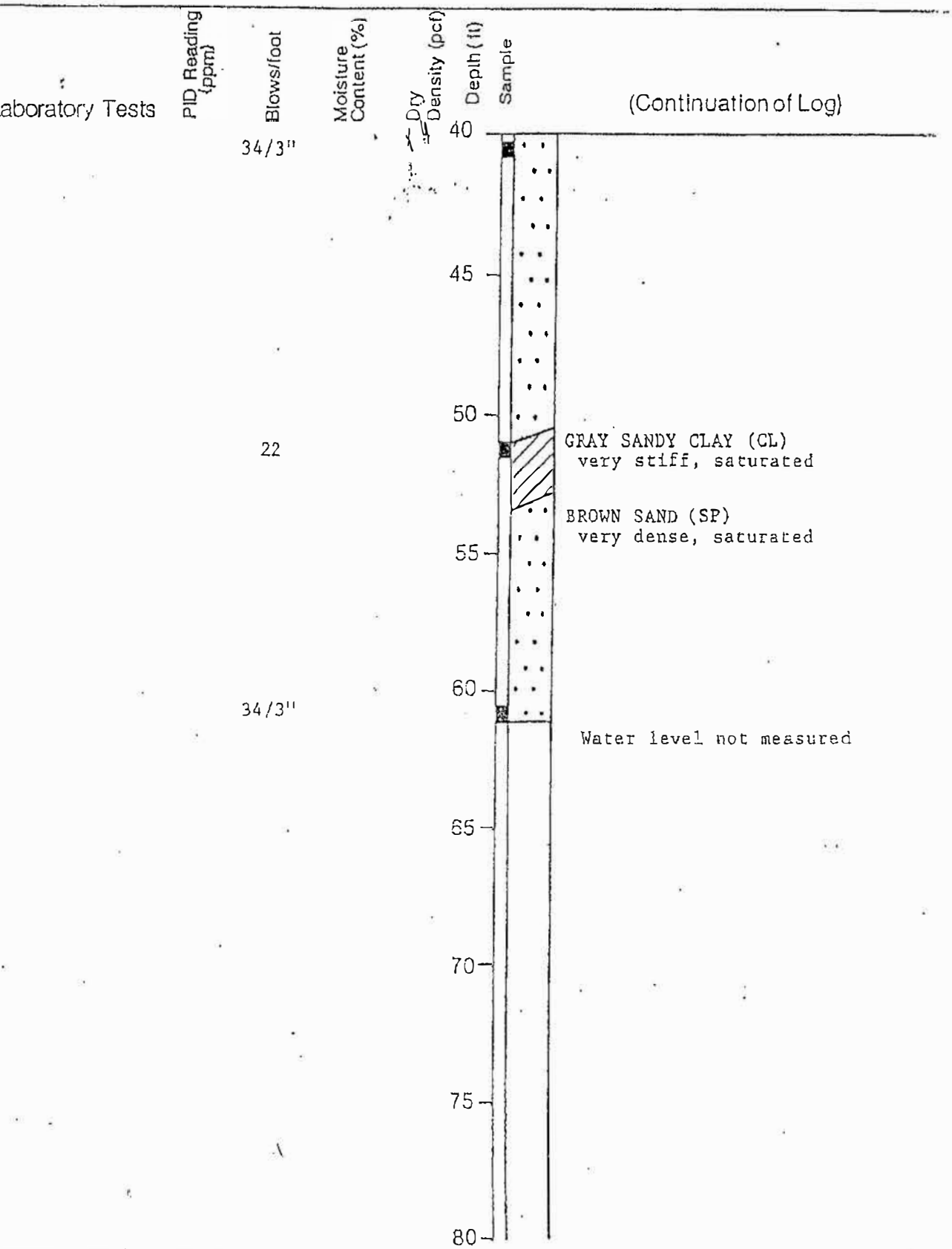
Equipment FAILING 750 ROTARY WASH

Elevation 113 feet Date 9/23/88

Laboratory Tests	PID Reading (ppm)	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample
					0	8"-thick concrete slab BROWN SILTY SAND (SM)
		27				GRAY SAND (SP) dense, moist.
					5	FILL
		2				GRAY SILTY CLAY (CH) soft to medium stiff, saturated (bay mud)
		push			10	
		push			15	
					20	
UU 381 (2700) Plate 11		push	56	65	25	
					30	
		9			35	GRAY CLAYEY SAND (SC) medium dense, saturated
					40	BROWN SAND (SP) very dense, saturated

SECTION D ED

B-2



Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Log of Boring 2
Commissary/Exchange Facilities
Naval Air Station
Alameda, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
RS	18857,002.04		10/88		

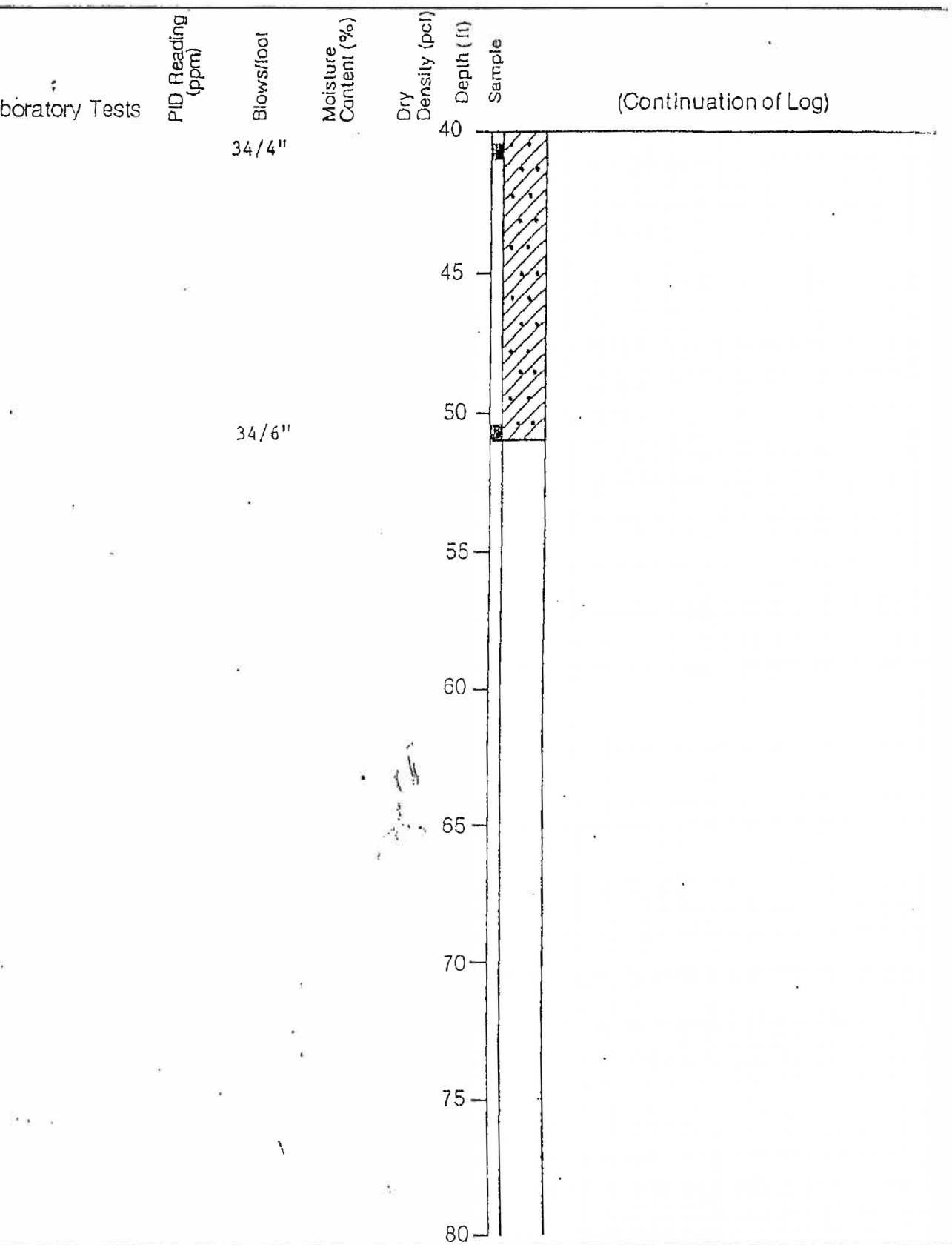
SECTION D ED

Equipment FAILING 750 ROTARY WASH

Elevation 114 feet Date 9/26/88

Laboratory Tests	PID Reading (ppm)	Blows/foot	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample	
					0		2"-thick asphalt concrete BROWN SANDY GRAVEL (GP) FILL
	0	7					GRAY SILT (MH) soft to medium stiff, moist to wet (fill?)
	100	3			5		petroleum odor at 6 feet ▽ water level on 9/26/88
UU 237 (1100) e Plate 12 nsol e Plate 14 = 6.9 sistivity = 70 ohm-cm lfate content = 21 ppm			80	48	10		GRAY SILTY CLAY (CH) soft to medium stiff, saturated (bay mud)
		Push					
		Push			20		GRAY CLAYEY SAND (SC) medium dense, saturated, with some shells
		3			25		GRAY SANDY CLAY (CH) soft to medium stiff, saturated (bay mud)
		Push			30		
					35		BROWN CLAYEY SAND (SC) medium dense to very dense, saturated
					40		

SECTION D ED B-3



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Log of Boring 3
Commissary/Exchange Facilities
Naval Air Station
Alameda, California

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
RS	18857.002.04		10/88		

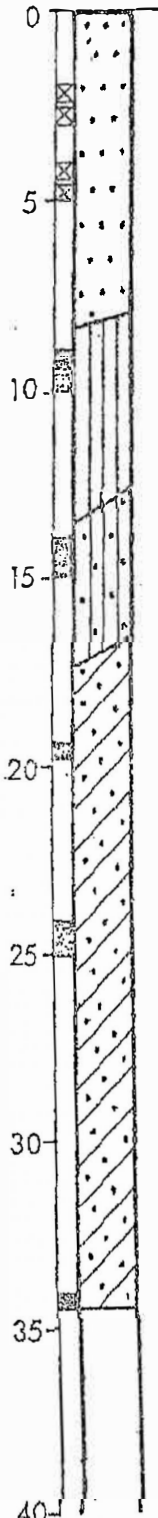
SECTION D 2D

LOG OF BORING 1

Equipment 8" Hollow Auger

Elevation 112.2* Date 4/27/77

Shear Strength (lbs/sq ft)	Blows/foot**	Moisture Content (%)	Dry Density (pcf)
	20		
Particle Size Analysis	11		
Consolidation Test	9	94.2	48
Particle Size Analysis	27	19.8	110
	32/5"	19.1	108
	45	19.1	108



BROWN SILTY SAND (SP)
loose to medium dense, dry

FILL

color change to gray
below 6-1/2'
saturated below 7'

GREEN-GRAY CLAYEY SILT (MH)
soft, saturated

GRAY-GREEN SILTY SAND (SM)
medium dense, saturated, with
occasional shell fragments

BROWN CLAYEY SAND (SC)
dense, saturated

SECTION D BM

(Boring caved to 4.5' depth)

*Naval Air Station Datum
(MLLW plus 101.2')

**Standard penetration resistance
converted from field blow counts

HARDING-LAWSON ASSOCIATES
Consulting Engineers and Geologists

Job No. 8157,002.03 Appr: CBW Date 5/10/77

LOG OF BORING 1
Auto Hobby Shop
Naval Air Station - Alameda, California

PLATE 2

SECTION D CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 114.5 Feet±	LOGGED BY F.M.
DEPTH TO GROUNDWATER 5' (see Note 3)	BORING DIAMETER 8 Inches	DATE DRILLED 10/29/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with sand (fine-grained)	brown	very stiff	CL	1		39			
2" A.C. over BASE									
SAND (fine-grained) with some silt (FILL)	brown	dense medium dense	SM	5		9	▽		
CLAY, silty with lenses of sand with some silt (Bay Mud)	grey	very soft	CH-SM-SP			1			
				10		1			
(grading without sand lenses and with organics)				15		push 250 psi			
(grading with traces of organics)				20		push 300 psi			
				25		1			
				30		push 300 psi			
		soft		35		3			
SAND (fine-grained) with clay and silt	grey	medium dense	SC	40		50*			

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	13

SECTION D CA

DRILL RIG Hollow Stem Auger	SURFACE ELEVATION 114.5 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER 5' (see Note 3)	BORING DIAMETER 8 Inches	DATE DRILLED 10/29/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
SAND (fine-grained) with clay and silt (continued)	grey brown	medium dense very dense	SC	41 45		51			
Bottom of Boring = 45 Feet				50 55 60 65 70 75 80					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual.
2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.
3. Groundwater level measured at time of drilling and 3 days after drilling.

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	13

SECTION D-CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 12.0 Feet ±	LOGGED BY F.M./M.B.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/30/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine- to coarse-grained), silty with some gravel	brown	dense	SM	1		31			
SAND (fine-grained) with some silt	tan	loose medium dense	SM	5		15*			
						21			
						51*	29	94	
SAND (fine-grained), clayey with some silt and shells	grey	medium dense	SC	10		20			
SAND (fine-grained) with some silt and traces of clay	grey	medium dense	SM						
CLAY, with some sand (fine-grained)	grey	stiff	CH						
SAND (fine-grained) with some silt	grey	dense	SM	15		81*	20	109	
(FILL)									
CLAY, silty (Bay Mud)	grey	firm	CH	20		5			
				25		9*			
(grading with some shells)				30		5			
		soft		35		5*			
				40		2			

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	16

SECTION D CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 112.0 Feet ±	LOGGED BY F.M./M.B.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/30/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with some shells (Bay Mud) (continued).	grey	soft	CH	41					
				45					
Liquid Limit = 69% Plasticity Index = 40% Passing #200 Sieve = 98%				50		push 300 psi	69		
				55					
(grading with more silt)		firm		60		9*			
				65					
				70		push 350 psi			
				75					
.(grading with organics)				80		7			

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	16

SECTION D CA

DRILL RIG	Rotary Wash	SURFACE ELEVATION	112.0 Feet ±	LOGGED BY	F.M. /M.R.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	10/30/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with organics (Bay Mud) (continued)	grey	firm	CH	81					
				85					
Notes: 1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual. 2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.		stiff		90					
				95					
				100	☒	31*	61	61	1.1
				105					
SAND (fine-grained) with silt and clay	grey	dense	SC						
	brown			110					
				115					
SILT, clayey	blue-green	very stiff	ML			28			
Bottom of Boring = 118.5 Feet				120					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	16

SECTION D CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 111.0 Feet ±	LOGGED BY F.M./M.B.
DEPTH TO GROUNDWATER 5' (see Note 3)	BORING DIAMETER 6 Inches	DATE DRILLED 10/31/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine- to coarse-grained), silty with some gravel	brown	medium dense	SM	1		15			
						27*			
SILT, clayey with traces of sand (fine-grained) (FILL)	mottled grey-brown	stiff	ML	5			▽		
CLAY with some silt and traces of shells (Bay Mud)	mottled grey-black	very soft	CL	10		1			
SAND (fine-grained) with some silt, clay and shells	grey	medium dense	SP	15		41*	21	106	
				20					
		very dense		25		30			
CLAY, silty with traces of shells (Bay Mud)	grey	soft	CL	30					
				35		5*			
				40					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	17

SECTION D CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 111.0 Feet ±	LOGGED BY F.M./M.B.
DEPTH TO GROUNDWATER 5' (see Note 3)	BORING DIAMETER 6 Inches	DATE DRILLED 10/31/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
.CLAY, silty with traces of shells (Bay Mud) (continued)	grey	firm	CH	41					
						push 300 psi			
				45					
				50					
(grading with less shells)		soft				2			
				55					
				60					
(grading with organics)		stiff				16*			
				65					
				70					
(grading with traces of organics)		firm		75		7			
				80					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	17

SECTION D CA

DRILL RIG Rotary Wash	SURFACE ELEVATION 111.0 Feet ±	LOGGED BY F.M./M.B.
DEPTH TO GROUNDWATER 5' (see Note 3)	BORING DIAMETER 6 Inches	DATE DRILLED 10/31/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with traces of organics (Bay Mud) (continued)	grey	firm	CH	81					
SAND (fine-grained) with silt, clayey	grey	medium dense	SC	85					
				90	⊠	53*			
				95					
SILT, clayey with sand (fine-grained)	blue-green	very stiff	ML	100		17			
Bottom of Boring = 100 Feet				105					
				110					
				115					
				120					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual.
2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.
3. Groundwater level measured 3 days after drilling.

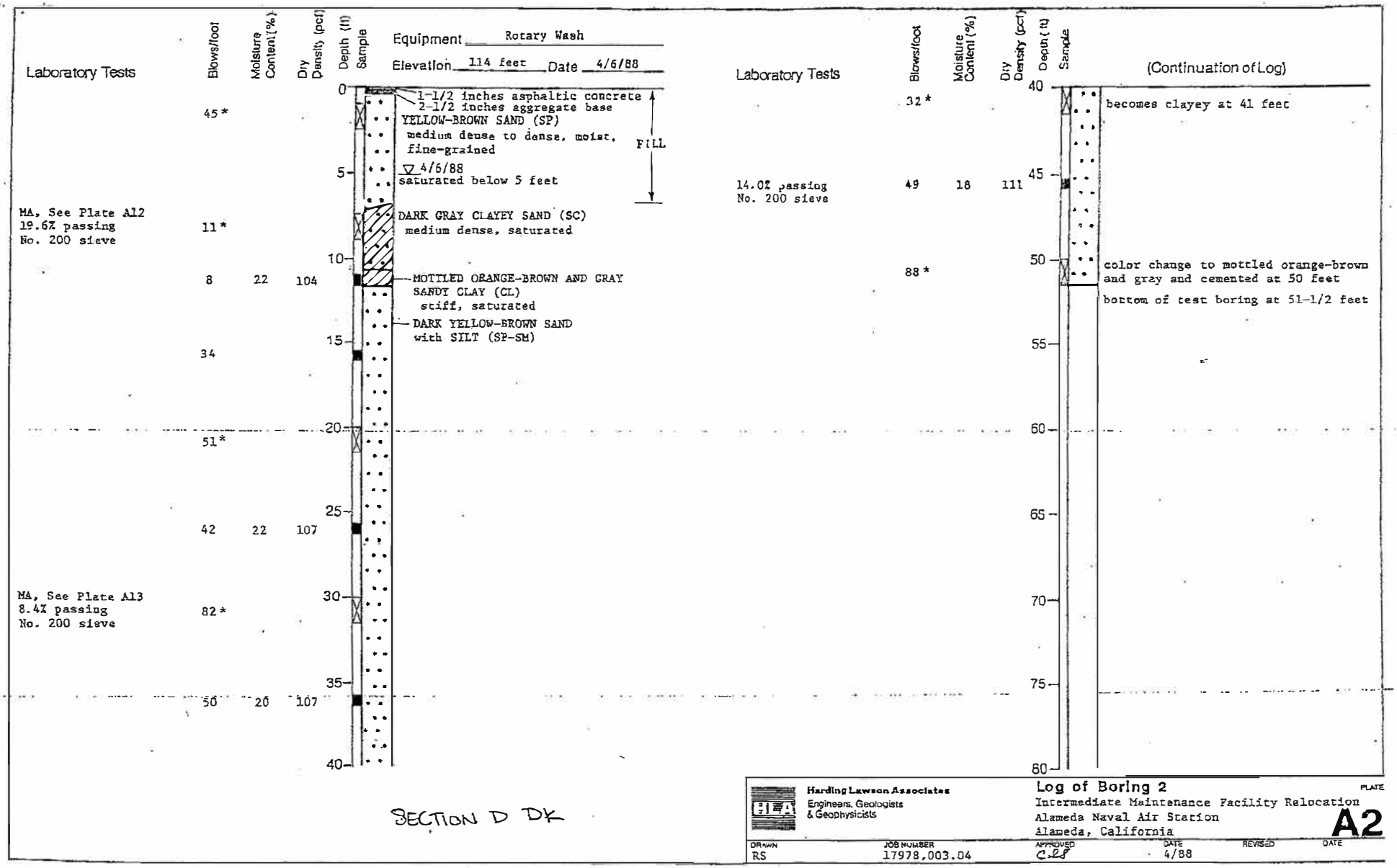
Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	17

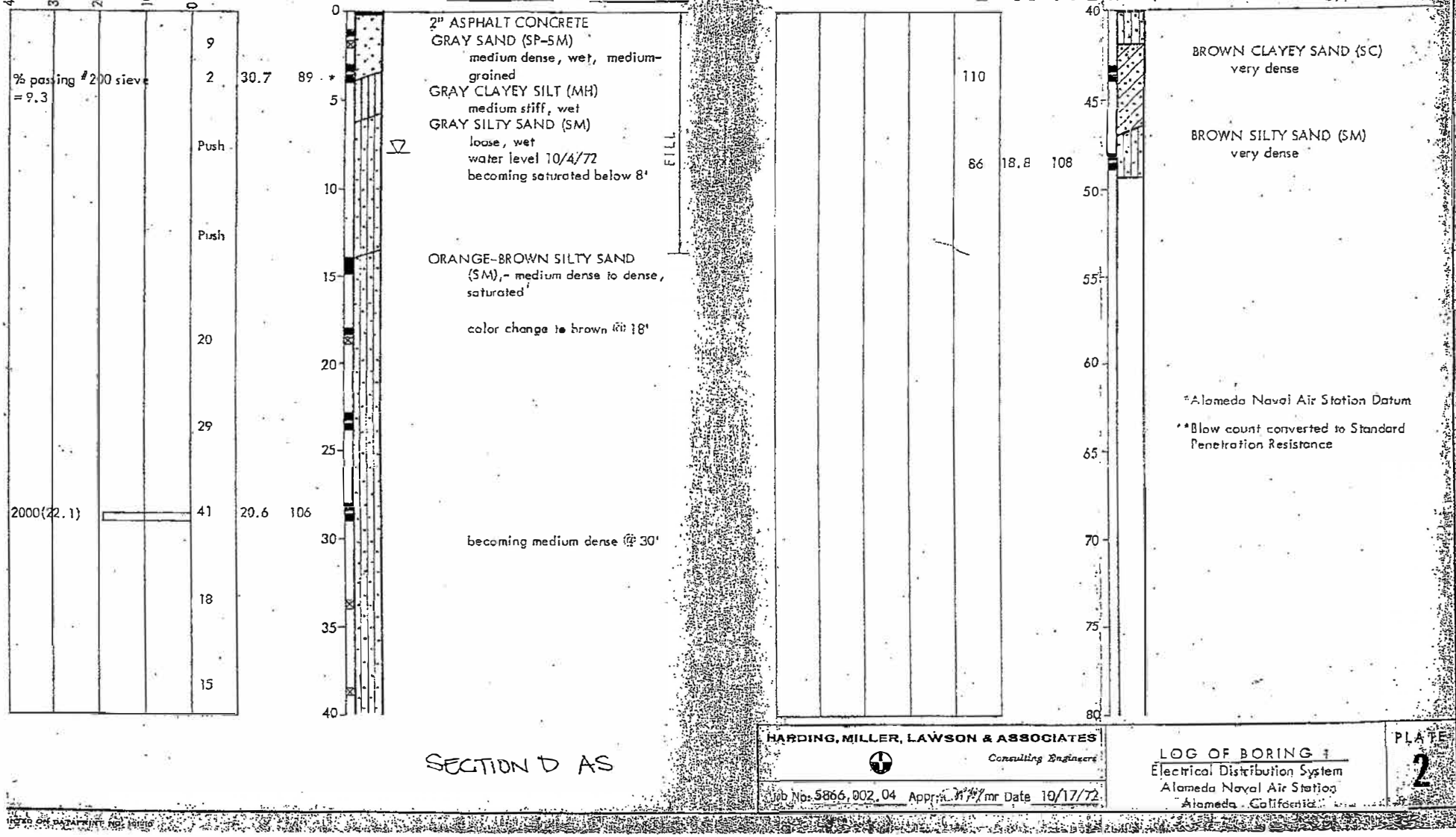

Laboratory Tests
Blows/foot
Moisture Content (%)
Dry Density (pcf)
Depth (ft)
Sample
Equipment Rotary Wash
Elevation 114 feet Date 4/6/88
45 *
1-1/2 inches asphaltic concrete
2-1/2 inches aggregate base
YELLOW-BROWN SAND (SP)
medium dense to dense, moist, fine-grained
FILL
4/6/88
saturated below 5 feet
MA, See Plate A12
19.6% passing
No. 200 sieve
11 *
DARK GRAY CLAYEY SAND (SC)
medium dense, saturated
8
22
104
MOTTLED ORANGE-BROWN AND GRAY SANDY CLAY (CL)
stiff, saturated
DARK YELLOW-BROWN SAND with SILT (SP-SM)
34
51 *
42
22
107
MA, See Plate A13
8.4% passing
No. 200 sieve
82 *
50
20
107
SECTION D DK
Laboratory Tests
Blows/foot
Moisture Content (%)
Dry Density (pcf)
Depth (ft)
Sample
(Continuation of Log)
32 *
14.0% passing
No. 200 sieve
49
18
111
becomes clayey at 41 feet
88 *
color change to mottled orange-brown and gray and cemented at 50 feet
bottom of test boring at 51-1/2 feet
Harding Lawson Associates
Engineers, Geologists & Geophysicists
Log of Boring 2
Intermediate Maintenance Facility Relocation
Alameda Naval Air Station
Alameda, California
PLATE
A2
DRAWN RS
JOB NUMBER 17978,003.04
APPROVED C.P.
DATE 4/88
REVISED
DATE

LOG OF BORING 1

(Main Substation)

Equipment 8" Hollow Auger

Elevation 113.3* Date 10/4/72



*Alameda Naval Air Station Datum

**Blow count converted to Standard Penetration Resistance

SECTION D AS

HARDING, MILLER, LAWSON & ASSOCIATES
Consulting Engineers

Job No. 5866.002.04 Appr. JFF/mr Date 10/17/72

LOG OF BORING 1
Electrical Distribution System
Alameda Naval Air Station
Alameda, California

PLATE 2

LOG OF BORING 2

(Main Substation)

Equipment 8" Hollow Auger

Elevation 113.7 Date 10/5/72

Shear Strength (lbs/sq ft)

Depth (ft)	Sample	Blows/ft	Moisture Content (%)	Dry Density (pcf)
0				
		10	6.7	98
5		2		
	▽			
*10		4		
15		24		
20		12		
25		54		
30		19		
35				
40				

*Sieve Analysis
% passing #200 sieve
= 14.5

2" ASPHALT CONCRETE
GRAY-BROWN SILTY SAND (SM)
medium dense

becoming very loose below 4'

inferred water level
saturated below 8'

FILL

ORANGE-BROWN SILTY SAND
(SM) - medium dense

becoming dense @ 24'

becoming medium dense @ 29'

hole caved to depth 7'

stabilized water level not recorded

SECTION D AS

HARDING, MILLER, LAWSON & ASSOCIATES
Consulting Engineers

Job No: 5866,002.04 Appr: FW/mr Date 10/17/72

LOG OF BORING 2
Electrical Distribution System
Alameda Naval Air Station
Alameda, California

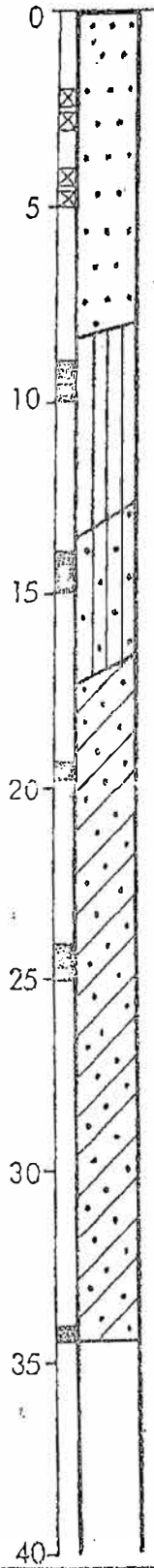
PLATE 3

LOG OF BORING 1

Equipment 8" Hollow Auger

Elevation 112.2* Date 4/27/77

Shear Strength (lbs/sq ft)	Blows/foot**	Moisture Content (%)	Dry Density (pcf)	Depth (ft)	Sample
	20			0	
Particle Size Analysis	11			5	
Consolidation Test	9	94.2	48	10	
Particle Size Analysis	27	19.8	110	15	
	32/5"	19.1	108	20	
	45	19.1	108	25	
				30	
				35	
				40	



BROWN SILTY SAND (SP)
loose to medium dense, dry

FILL

color change to gray
below 6-1/2'
saturated below 7'

GREEN-GRAY CLAYEY SILT (MH)
soft, saturated

GRAY-GREEN SILTY SAND (SM)
medium dense, saturated, with occasional shell fragments

BROWN CLAYEY SAND (SC)
dense, saturated

SECTION D BM

(Boring caved to 4.5' depth)

*Naval Air Station Datum (MLLW plus 101.2')

**Standard penetration resistance converted from field blow counts

HAPDING - LAWSON ASSOCIATES
Consulting Engineers and Geologists

Job No. 8157,002.03 Appr: CLW Date 5/10/77

LOG OF BORING 1
Auto Hobby Shop
Naval Air Station - Alameda, California

PLATE 2

DRILL RIG Rotary Wash	SURFACE ELEVATION 113.0 Feet±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/21/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
SAND (fine-grained) with silt and traces of clay	brown	very dense	SM	1		71			
		medium dense							
SAND (fine-grained) with some silt and pockets of clay (FILL) ↑	grey	medium dense	SM	5		18			
CLAY, silty (Bay Mud)	grey	firm	CH			68*	20	109	
SAND (fine-grained) with traces of silt	grey	dense	SP-SM	10					
SAND (fine-grained) with silt	grey	very loose	SM			4			
CLAY, silty with some organics and shells and sandy lenses (Bay Mud)	grey	very soft	CH	15		push 250 psi			
				20		push 250 psi			
(grading without sandy lenses and traces of organics and shells)				25		push 250 psi			
		soft		30		push 300 psi			
				35		4			
				40					

CA

Peter Kaldveer and Associates

Geotechnical Consultants

EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	2

DRILL RIG Rotary Wash	SURFACE ELEVATION 113.0 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/21/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with traces of organics and shells (Bay Mud) (continued)	grey	firm	CH	41		10			
		soft		45		push 300 psi			
		firm		50					
				55		5			
CLAY, silty, peaty (Bay Mud)	mottled grey-brown	firm	CH-Pt	60					
				65		push 400 psi			
				70					
SAND (fine-grained) with some silt and traces of clay	blue-green	dense	SM	75		24* / 2"			
CLAY, silty, peaty (Old Bay Mud)	mottled grey-green	stiff	CH-Pt	80					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	2

DRILL RIG Rotary Wash	SURFACE ELEVATION 113.0 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/21/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty, peaty (Old Bay Mud) (continued)	mottled grey-brown	stiff	CH-Pt	81					
CLAY, silty, peaty (Old Bay Mud)	mottled grey-brown	very stiff	CH	85		26			
CLAY, silty with some sand (fine-grained)	blue-green	very stiff	CL	90					
Bottom of Boring = 91 Feet				95					
				100					
				105					
				110					
				115					
				120					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual.
2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	2

DRILL RIG	Rotary Wash	SURFACE ELEVATION	13.0 Feet ±	LOGGED BY	F.M.
DEPTH TO GROUNDWATER	Not Established	BORING DIAMETER	6 Inches	DATE DRILLED	10/22/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with sand (fine-grained)	mottled browns	very stiff	CL	1		23			
SAND (fine-grained) with some silt and traces of clay (grading with pockets of clay) (FILL)	brown	medium dense	SM	5		26			
SAND (fine-grained) with traces of silt	grey	medium dense	SP	10		17			
CLAY, silty with traces of shells and organics (Bay Mud)	grey	very soft	CH	15		push 250 psi			
						push 250 psi			
				20					
				25		push 250 psi	50 71	58	
				30		2			
(grading with less shells and organics)		soft		35		push 300 psi			
				40					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	3

DRILL RIG Rotary Wash	SURFACE ELEVATION 113.0 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/22/80

DESCRIPTION AND CLASSIFICATION				DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE						
CLAY, silty with traces of shells and organics (Bay Mud) (continued)	grey	soft	CH	41		3			
				45		push 300 psi			
				50					
				55		push 350 psi			
		firm		60					
				65		push 350 psi			
(grading with organics)				70					
				75		push 350 psi			
				80					

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-11	January 1981	3

DRILL RIG Rotary Wash	SURFACE ELEVATION 113.0 Feet ±	LOGGED BY F.M.
DEPTH TO GROUNDWATER Not Established	BORING DIAMETER 6 Inches	DATE DRILLED 10/22/80

DESCRIPTION AND REMARKS	COLOR	CONSIST.	SOIL TYPE	DEPTH (FEET)	SAMPLER	PENETRATION RESISTANCE (BLOWS/FT.)	WATER CONTENT (%)	DRY DENSITY (PCF)	UNCONFINED COMPRESSIVE STRENGTH (KSF)
CLAY, silty with organics (Bay Mud) (continued)	grey	firm	CH	81					
CLAY, silty (Bay Mud)	grey	stiff	CH	85	⊠	18*	61	61	
				90					
				95					
				100					
CLAY, silty with some sand (fine-grained)	black	very stiff	CL	105					
Bottom of Boring = 106 Feet									
				110					
				115					
				120					

Notes:
1. The stratification lines represent the approximate boundaries between soil types and the transitions may be gradual.
2. For an explanation of penetration resistance values marked with an asterisk (*), see page A-1.

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EXPLORATORY BORING LOG

ALAMEDA NAVAL AIR STATION HOUSING
Alameda, California

PROJECT NO.	DATE	BORING NO.
K529-31	January 1981	3

Project: Alameda Naval Recreation Complex

LOG OF BORING No. 1

Date: 6/14/71

Hammer Weight: See Note

Type of Boring: 5" Rotary

Remarks:

te: DH - Down Hole Hammer
300 lbs., 30" drop
SH - California Sampler
140 lbs., 30" drop
STP- Standard Penetration Sampler
140 lbs., 30" drop

Surface Elevation

depth, ft.	samples No.	samples diam.	blows, ft.	dry density p.c.f.	moisture content, %	unconfined compression strength p.s.f.	other tests
	1	2"	16	104	15		SH
	2	2"	12				SH
	3	2"	10				SH
10	4	2"	7				SH
	5	2"	16	106	21	1840	DH
20	6	2-1/2"	34	113	19	1330	SH
	7	2"	32	106	20	960	DH
30	8	2"	59	110	20	610	SH
	9	2"	52	107	22	640	DH
40	10	2"	60/6"				SH
50	11	2"	19	112	18		SH
60	12		47	110	20	670	DH

2" Asphalt & Dense Dark Brown Silty Sand

Medium Dense Light Grey Brown Silty Sand w/shells

Loose to Medium Dense Light Brown Silty Sand

Soft Green Grey Silty Clay

Medium Dense Blue Grey Silty Sand

Medium Dense to Dense Orange Brown to Red Brown Silty Sand

Dense to Very Dense Brown w/Orange Brown Silty Sand w/Some Clay

Very Dense Grey Brown Fine Silty Sand

Medium Dense Blue Grey Clayey Sand

Dense to Very Dense Blue Grey Silty Sand to Clayey Sand

AP.

Bottom of Boring

#297-7106 | HALLENBECK McKAY and ASSOCIATES | Figure 2

APPENDIX D

SECTION E-E'

Borelogs

BORING LOG HS1B

JOB NO: 726-30 DATE DRILLED: 2/6/79

JOB NAME: Hazard Storage, NAS, Alameda SURFACE ELEV.: 113

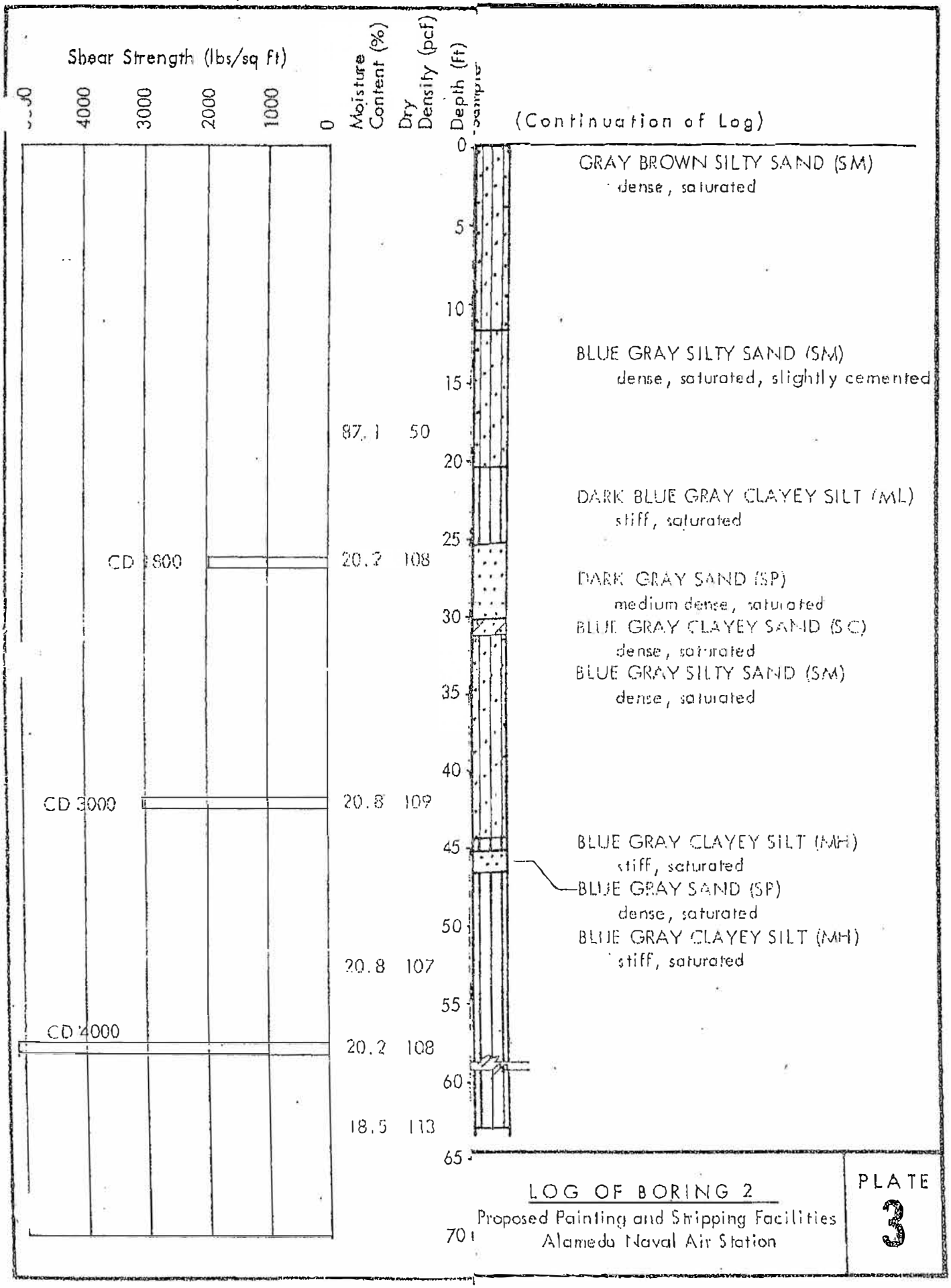
EQUIPMENT: DRILLING Rotary Wash DATUM: M.S.L.

SAMPLER TYPE	DRIVE WEIGHT-LB	HEIGHT OF FALL-IN
Split Spoon, 2½" I.D.	380	18

Sample Depth ft.	Blows per ft	Moisture Content %	Dry Unit Weight p.c.f.	Depth in feet	USCS Classification	Description
						1 inch of Asphalt Concrete 8 inches of Base Rock
1½	65	7	113		SP	Sand, fine-grained, brown, dense, damp
4	26	17	103	5		Free water surface at 5½ feet.
7½	36	20	110			
10½	29	21	108	10		Grades grayish-brown
14	--	63	62			
				15	SP-CH	Interbedded layers of fine bluish-gray sand and soft "Bay Mud"
						Total Depth 15½ feet

SECTIONS AA E BB

SECTION B A-I



LOG OF BORING 2

Proposed Painting and Stripping Facilities
Alameda Naval Air Station

PLATE 3