GEOTECHNICAL EXPLORATION

MARINA COAST WATER DISTRICT
REGIONAL URBAN WATER AUGMENTATION
PROJECT – 100 PERCENT DESIGN

MARINA, CALIFORNIA

SUBMITTED

TO

RMC WATER AND ENVIRONMENT

SAN JOSE, CALIFORNIA

PREPARED

BY

ENGEO INCORPORATED

PROJECT NO. 7496.1.001.01

AUGUST 7, 2007

ENGEO
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
7496.1.001.01

August 7, 2007

Ms. Stephanie Hughes
RMC Water and Environment
2290 North First Street, Suite 212
San Jose, California 95131

Subject: Marina Coast Water District
Regional Urban Water Augmentation Project – 100 percent Design
Marina, California

GEOTECHNICAL EXPLORATION

Dear Ms. Hughes:

With your authorization, ENGEO Incorporated conducted a geotechnical exploration the proposed Regional Urban Water Augmentation Recycled Water Pipeline project in Marina, California. The accompanying report contains our exploration data, gathered existing data, and findings with recommendations for design. It is our opinion that the proposed development is feasible from a geotechnical standpoint, provided the recommendations included in this report are followed.

We are pleased to be of service to you on this project. If you have any questions regarding the contents of this report, please contact us.

Very truly yours,

ENGEO INCORPORATED

Douglas Wahl
dw/smc

R. William Rudolph, GE

cc: Mr. Brad Hamada, RMC Water and Environment

2010 Crow Canyon Place • Suite 250 • San Ramon, CA 94583-4634 • (925) 866-9000 • Fax (888) 279-2698
www.engeo.com

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

INTRODUCTION

Purpose and Scope

The purpose of this geotechnical exploration is to characterize subsurface conditions along the alignment of the proposed trunk pipeline, associated laterals, and at the pump station and water tank locations. The pipeline sections addressed in this report are indicated on Figures 1 and 2. The report also includes conclusions and recommendations regarding geotechnical aspects of pipeline construction including temporary slope stability, pipe bedding and backfill, existing pavement conditions, soil corrosion potential, and foundation design criteria for the proposed structures.

The scope of our work included a review of available literature and reports, as well as geologic maps for the immediate area, gathering existing geotechnical data, exploratory drilling and sampling as well as test pit excavation and observation, destructive pavement coring, laboratory testing of subsurface materials collected from the boreholes, analysis of the geotechnical data, and preparation of this report with recommendations for design and construction. This report addresses the following:

- Physical properties of the soils encountered along the subject pipeline alignment.
- Assessment of geological hazards on the subject pipeline alignment, structure sites, and in the general project area.
- Construction considerations, including trenching.
- Foundation design recommendations.
- Pavement design recommendations.

This report was prepared for the exclusive use of RMC Water and Environment and their design team consultants. In the event that any changes are made in the character, design, or layout of the development, the conclusions and recommendations contained in this report must be reviewed by ENGEO to determine whether modifications to the report are necessary. This document may not be reproduced in whole or in part by any means whatsoever, nor may it be quoted or excerpted without the express written consent of ENGEO Incorporated.

Site Location and Description

This report presents the results of the geotechnical exploration performed by ENGEO Incorporated for the Marina Coast Water District (MCWD) Regional Urban Water Augmentation Project located in the cities of Marina, Seaside, and the former Fort Ord military base. The overall project location is shown on the Vicinity Map, Figure 1. The project has two major components, a recycled water system and a proposed desalination plant. This report is limited to the recycled water distribution system portion of the project.

In order to augment existing urban water supply, the MCWD proposes to construct an urban recycled water distribution system consisting of trunk pipelines, pump stations, and operational storage to meet a demand of approximately 1500 acre-feet per year (AFY). The recycled water source will be the Monterey Regional Water Pollution Control Agency (MRWPCA) Regional Treatment Plant (RTP) located north of Marina. Effluent from the RTP receives tertiary treatment at the Salinas Valley Reclamation Plant (SVRP) where the pipeline is expected to originate.

Proposed Development

Ultimately, the project is expected to include about 121,000 linear feet of trunk and lateral pipelines, approximately 78,000 feet of which is assessed in this geotechnical report. Other

project features will include the 1.5-million-gallon Blackhorse Reservoir and the 5th Avenue Pump Station which are included in this report. The project will also include a 2-million-gallon earthen reservoir and pump station near the existing SVRP. The developments of the earthen reservoir and pump station at the SVRP are not within the scope of our services for this report. In addition a geotechnical investigation was previously conducted for the Blackhorse Reservoir by others and we understand that the previous report will be used as the basis of geotechnical design for that portion of the project (Kleinfelder 2005).

The Recycled Water Pipeline alignment, as shown on the attached Figure 2, Project Alignment, generally runs along existing roadways and MCWD rights-of-way. The trunk pipeline begins at the SVRP and continues along easements in the area known as "Armstrong Ranch" south toward the north terminus of Crescent Avenue. A lateral proceeds west along Beach Road out to Highway 1. The trunk proceeds south on Crescent Avenue to Carmel Avenue with a lateral going off to the west on Reservation Road.

The trunk then proceeds to Vaughn Avenue and goes south to Reindollar Avenue. A lateral extends from Vaughn on Carmel Avenue to the east. The trunk continues east on Reindollar, then turns south on California Avenue, continues on 5th Avenue into the California State University, Monterey Bay (CSUMB) campus and proceeds to 3rd Street. Laterals proceed from 5th Avenue west onto 9th Street and north on 2nd Avenue; however, these laterals are not within our scope. Another set of laterals proceeds east along Abrams Drive from California Avenue until Imjin Road and splits into two sections, one along Imjin to the north and one continuing along Abrams. Portions of the Abrams Drive lateral are within our scope; however, the Imjin Road lateral is not.

The trunk continues from 3rd Street east until it reconnects with 5th Avenue and heads south into unpaved areas of the campus. The trunk then connects with General Jim Moore Boulevard and proceeds south. Laterals extend east at Ardennes Circle heading up to Blackhorse Reservoir and

beyond, and west at Coe Avenue. The trunk pipeline is expected to be 16 to 20 inches in diameter and lateral pipelines are expected to vary from 12 to 4 inches in diameter. Typically the pipelines will have 4 foot minimum cover and trench depth will be approximately 6 to 7 feet below finish grades.

The only areas where the pipeline alignment appears to be located on undeveloped land are in "Armstrong Ranch", at the north end of the alignment by the SVRP pump station, on CSUMB property between 5th Avenue and General Jim Moore Boulevard, and near Blackhorse Reservoir. At the north end of the alignment, near the SVRP, the ground surface elevations are around 100 feet (msl datum). As the alignment progresses to the south, surface elevations slope downward to a minimum elevation of around 15 feet near the intersection of Beach Road and Highway 1. The elevation rises again as the alignment progresses to the south through the former Fort Ord military base. The highest elevation (about 485 feet) is near the Blackhorse reservoir, located east of the General Jim Moore Boulevard main trunk alignment. The main alignment then descends and is at about elevation 100 feet at the south end of General Jim Moore Boulevard.

Line E and Ardennes Laterals

Subsequent to our completion of the initial phase of work for this project, we were asked to evaluate two additional laterals named the Line E and Ardennes laterals respectively. The Line E lateral originates on West Blanco Road on the eastern side of a research park in north Marina, proceeds south along West Blanco to Reservation Road, turns east and proceeds along Reservation until terminating at the intersection of Reservation Road and Inter-Garrison Road.

The Ardennes Lateral originates near the intersection of Normandy Road and General Jim Moore Boulevard, proceeds east off road behind an existing elementary school, turns southeast going up a hill along a paved walking path, and ends at the Blackhorse Reservoir at the top of the hill.

GEOLOGIC CONDITIONS

Geologic Setting

The regional geology for the project was characterized in a report by Geomatrix Consultants, Inc. titled, "*Feasibility-Level Geologic and Geotechnical Study Carmel River Plan B*," dated April 2001. According to this report, the geology of the area is characterized by Quaternary beach, alluvial, and dune deposits overlying Tertiary sedimentary rocks and Mesozoic granitic rocks. The Mesozoic granitic rocks are part of the Salinian Block, an elongate, northwest-southeast trending tectonic sliver bounded on the northeast by the San Andreas Fault and on the southwest by the San Gregorio Fault. These basement rocks, along with Paleozoic metamorphic rocks, form the core of the local Santa Cruz Mountains. The overlying Tertiary sequence is locally more than 10,000 meters thick (Clark, 1981). This characterization is consistent with our review of regional geologic maps.

Project Alignment Geology

Review of existing geologic maps shows that the entire proposed alignment is underlain by Older Stabilized Dune Deposits as depicted in Figure 3 (Wagner 2002) consisting of clean to silty sands, which are loose to medium dense in the upper 10 feet or so. The sands have varying moisture content, depending on the surfacing, local hydrology, and the time of year.

Regional Seismicity

The entire project area lies within a region of active faulting and high seismicity associated with the San Andreas Fault system. The San Andreas Fault system comprises a zone of major, northwest-trending active strike-slip faults that includes from east to west, the Calaveras, Hayward, San Andreas, and San Gregorio-Hosgri faults (Figure 4). The San Andreas Fault

system has been the source of numerous moderate- to large-magnitude historical earthquakes that caused strong ground shaking in the project area, including the 1906 San Francisco earthquake and the 1989 Loma Prieta earthquake. Future strong ground shaking from nearby large magnitude earthquakes is a certainty and should be a consideration in the design of the new project facilities and components.

At its closest point relative to the project area (Salinas Valley Reclamation Plant), the San Andreas Fault lies approximately 17 miles to the northeast; however, several other active and potentially active faults occur within the project limits. These include the potentially active King City, Chupines, Navy, and Tularcitos faults, and the active Monterey Bay fault zone. The Monterey Bay fault zone lies offshore along the northwest projection of the Navy Tularcitos and Chupines faults, and is considered active based on offset seafloor sediments of Holocene age (Jennings, 1994). The Navy-Tularcitos and Chupines faults are considered potentially active by the California Division of Mines and Geology, based on documented Pleistocene displacements along all or part of their mapped lengths (Jennings, 1994); however, Rosenberg and Clark (1994) have identified possible evidence of Holocene displacement on the Navy-Tularcitos and Chupines faults. Other nearby active faults include the Palo Colorado fault (part of the San Gregorio - Hosgri fault zone) and the Cypress Point fault, both of which lie about 3 miles from the project area.

Three site locations were chosen to determine distances from active faults in the area. These include the Blackhorse Reservoir, the SVRP Pump Station, and the proposed location for the 5th Avenue Pump Station. The distance from each site location to active faults within 100 kilometers (km) and estimated maximum Moment magnitude[1,2] events are summarized in Tables 1 through 3.

[1] Moment magnitude is an energy-based scale and provides a physically meaningful measure of the size of a faulting event. Moment magnitude is directly related to average slip and fault rupture area.

Table 1
Regional Faults and Seismicity – Blackhorse Reservoir

Fault Name	Distance (km)	Direction from Site	Maximum Moment Magnitude
Rinconada	5.6	Northeast	7.3
Monterey Bay - Tularcitos	8.1	Southwest	7.1
San Gregorio South	20.3	West	7.1
Zayante-Vergeles	25.9	Northeast	6.8
San Andreas - 1906 Rupture	32.9	Northeast	7.9
San Andreas - Santa Cruz Mnts.	32.9	Northeast	7.2
San Gregorio North	36.6	Northwest	7.3
Sargent	39.8	Northeast	6.8
Southern Calaveras	41.2	Northeast	6.1
Central Calaveras	49.0	Northeast	6.6
Quien Sabe	50.0	Northeast	6.4
Hosgri	54.0	South	7.3
Monte Vista	61.2	North	6.8
San Andreas - Peninsula	63.4	North	7.2
Hayward - South East Extension	71.8	North	6.4
Ortigalita	75.1	Northeast	6.9
Great Valley - 8	78.4	Northeast	6.6
Great Valley - 9	78.8	Northeast	6.6
Great Valley - 10	84.7	East	6.4
Hayward - Total	90.4	North	7.1

[2] California Division of Mines and Geology, 1996, *Probabilistic Seismic Hazard Assessment for the State of California*, CDMG Open-File Report 96-08.

Table 2
Regional Faults and Seismicity – SVRP Pump Station

Fault Name	Distance (km)	Direction from Site	Maximum Moment Magnitude
Rinconada	3.4	South	7.3
Monterey Bay - Tularcitos	13.6	Southwest	7.1
Zayante-Vergeles	18.7	Northeast	6.8
San Gregorio South	25.3	West	7.1
San Andreas - 1906 Rupture	25.4	Northeast	7.9
San Andreas - Santa Cruz Mnts.	25.5	Northeast	7.2
Sargent	32.2	Northeast	6.8
San Gregorio North	34.7	West	7.3
Southern Calaveras	35.5	Northeast	6.1
Central Calaveras	41.2	Northeast	6.6
Quien Sabe	43.6	Northeast	6.4
Monte Vista	53.3	North	6.8
San Andreas - Peninsula	56.4	North	7.2
Hosgri	61.9	South	7.3
Hayward - South East Extension	63.6	North	6.4
Ortigalita	69.3	Northeast	6.9
Great Valley - 8	72.0	Northeast	6.6
Great Valley - 9	72.7	Northeast	6.6
Great Valley - 10	81.7	East	6.4
Hayward - Total	82.4	North	7.1

Table 3
Regional Faults and Seismicity –5th Avenue Pump Station

Fault Name	Distance (km)	Direction from Site	Maximum Moment Magnitude
Rinconada	4.7	East	7.3
Monterey Bay - Tularcitos	8.4	Southwest	7.1
San Gregorio South	20.4	West	7.1
Zayante-Vergeles	24.5	Northeast	6.8
San Andreas - 1906 Rupture	31.4	Northeast	7.9
San Andreas - Santa Cruz Mnts.	31.4	Northeast	7.2
San Gregorio North	34.0	Northwest	7.3
Sargent	38.2	Northeast	6.8
Southern Calaveras	40.6	Northeast	6.1
Central Calaveras	47.2	Northeast	6.6
Quien Sabe	49.2	Northeast	6.4
Hosgri	57.1	South	7.3
Monte Vista	58.1	North	6.8
San Andreas - Peninsula	60.2	North	7.2
Hayward - South East Extension	69.0	North	6.4
Ortigalita	74.6	Northeast	6.9
Great Valley - 8	77.5	Northeast	6.6
Great Valley - 9	78.1	Northeast	6.6
Great Valley - 10	85.4	East	6.4
Hayward - Total	87.4	North	7.1

GEOTECHNICAL EXPLORATION

Existing Data Review

As part of our investigation, we reviewed the results of previous geotechnical investigations conducted by others at or in the vicinity of the project. A list of the reports we reviewed is presented in Appendix C.

Interviews

Our staff conducted several interviews with people familiar with the area to gather information regarding trenching conditions in the area. These interviews were conducted with representatives of local and regional contractors, local agencies, and people with experience relevant to the project. We issued a preliminary trenching evaluation letter dated October 23, 2006 (ENGEO 2006), containing opinions expressed by others regarding trenching conditions in the area, as well as our own preliminary recommendations regarding trench construction and design for the project. A copy of this letter is included in Appendix D.

Field Exploration

The first sequence of field exploration for this study was conducted in October 2006, and consisted of drilling 20 exploratory boreholes to typical depths of approximately 13.5 to 16.5 feet below the existing ground surface, at the approximate locations shown on Figure 5. Two exceptions were the boring at the intersection of Crescent Avenue and Reservation Road which was drilled to a depth of 31.5 feet, and the boring at the 5th Avenue Pump Station which was drilled to a depth of 26.5 feet. The borings were approximately located by pacing from existing features, and topographic elevations were taken from the tentative plans dated October 20, 2006, provided by Carollo Engineers at the time of our study. The locations were selected based on an

approximate spacing of 2,000 feet between borings and the useful existing information previously collected.

Exploratory test borings were drilled using a truck-mounted, drill rig equipped with 4-inch-diameter solid flight augers. An ENGEO engineer logged the boreholes in the field and collected soil samples using either a 3-inch O.D. California-type split-spoon sampler fitted with 6-inch-long brass liners or a 2-inch O.D. Standard Penetration Test (SPT) split-spoon sampler.

The standard penetration test (SPT) requires a 2-inch-diameter split-spoon sampler advanced by a 140-pound hammer with a 30-inch drop. The penetration of the 2-inch-diameter sampler into the native materials is field recorded as the number of blows needed to drive the sampler 18 inches in 6-inch increments. SPT results on the boring logs are recorded as the number of blows required for the last one foot of penetration. Where the California-type split-spoon sampler was used, the hammer weight and drop were the same as for the SPT and penetration into native materials is recorded in the same manner as for the SPT. No correction factors have been applied to the number of blows; thus, the blow-counts given on the borelogs represent "raw data" for either the SPT or the California-type sampler.

The field logs were used to develop the report borelogs (Appendix A). The logs depict subsurface conditions within the borings for the date of drilling; however, subsurface conditions may vary with time. The boreholes were backfilled with site soil up to the ground surface on the day of the field exploration and patched with cold-mix asphalt concrete or cement grout at the surface as appropriate to match the existing surface treatment. Cold-mix asphalt concrete was later replaced with hot-mix asphalt at a convenient time.

The second sequence of field exploration for this study was conducted on March 6, 2007, and consisted of excavating two test pits. The exploratory test pits were excavated using a backhoe excavator and an ENGEO Engineer logged the test pits in the field in accordance with the

Unified Soil Classification System. The test pits were loosely backfilled during our exploration. The locations of the exploratory test pits are shown on Figure 5.

The boring and test pit logs present specific soil and groundwater conditions at each exploration location and we include the logs in Appendix A. The logs contain the soil/rock type, color, consistency, and visual classification in general accordance with the Unified Soil Classification System.

Laboratory Testing

Representative samples of on-site soils were selected for laboratory testing to determine the following soil characteristics:

Soil Characteristic	Test Method	Report Location
Natural Unit Weights	ASTM D-2216	Table 4 and Appendix A
Moisture Contents	ASTM D-2216	Table 4 and Appendix A
Percent Fines	ASTM D-422	Table 4 and Appendix B

Laboratory data results are presented on the borelogs (Appendix A) with individual laboratory test results shown in Appendix B.

Subsurface Soil Conditions

Subsurface soil conditions are depicted on the borelogs. In general, the subsurface soils encountered were clean to silty sands, with varying moisture from dry to moist and wet in areas where the water table was encountered. Some borings along the alignment encountered a layer of silty sand with fines content on the order of 10 percent directly beneath the pavement section or graded dirt road. This layer extended to depths varying from 4 to 7 feet below grade. This

upper silty layer was found in Borings B-1, B-8, and B-19; however, it does not appear to be consistent along the alignment.

The section of the alignment that runs beneath graded dirt roads on CSUMB property, where Borings B-5 and B-6 were drilled, has a layer of this silty sand with fines content on the order of 10 percent; however, this soil is extremely dry and caused difficulty in drilling because the hole would tend to collapse.

The soils, in general, appear to vary in fines content from approximately 1 percent up to 15 percent passing the No. 200 sieve, but a consistent geospatial pattern is not present. The soils encountered were sands and silty sands or sands with silt to the extent of the depths explored. No clays or clayey sands were encountered. References by others to "more clayey spots" may in fact be referring to areas where silty sands or higher fines content may be present in the upper soil profile.

Test Pits

Two test pits which we excavated on March 6, 2007. Test pit 2-TP1 was initially about 8 feet deep and 4 feet wide with vertical side walls. Approximately 10 minutes after excavation the pit caved to approximately 8 feet wide at the surface and the walls regressed at an angle of approximately 1:1 (horizontal:vertical) before backfilling.

Test pit 2-TP2 was dug to approximately the same initial dimensions as 1-TP1 (4 feet wide, by 8 feet deep) and did not experience significant caving. The sides were left vertical for approximately 30 minutes until backfilling.

Groundwater

Groundwater was not encountered in any borings to the depths explored. Previous field exploration done by LandMarine Geotechnics showed shallow groundwater at approximately 10 feet below the ground surface near the intersection of Reservation Road and Beach Road. This area shows evidence of shallow groundwater and surface water with relatively low surface elevations of approximately 15 to 25 feet above mean sea level. Groundwater throughout the rest of the project alignment according to a hydrologic study of the region (MCWD 2005) is expected to lie well below the proposed trenching excavations, in most cases by 100 feet or more.

The groundwater regionally is characterized as belonging to two aquifers, the 180-Foot Aquifer and the 400-Foot Aquifer with the names referring to the depths where groundwater can be encountered. Both are protected from contamination by clayey aquitards. Locally perched conditions could occur throughout the project alignment and vicinity, however, due to the high hydraulic conductivity of the encountered soils, perched conditions should not persist over a reasonable amount of time (i.e. hours).

Fluctuations in groundwater levels may occur seasonally and over a period of years because of precipitation, perched aquifer zones, changes in drainage patterns, and other various factors. In addition, future irrigation could cause an overall rise in the local groundwater levels and future pumping could result in regional subsidence.

Pavement Coring

In addition to our exploratory borings, we also utilized destructive pavement coring in order to characterize the thicknesses of pavements throughout the project limits. Pavement cores were drilled at 33 locations along the proposed pipeline alignment (Figure 6). The coring process consisted of drilling through the asphalt concrete and through the underlying aggregate base

section to the top of subgrade. The cores did not penetrate beyond the bottom of the pavement section in any case (where the pavement section includes the pavement material and the sub-base).

No samples were retained and the holes were temporarily patched with cold-mix asphalt. Hot-mix asphalt was later used to replace the temporary patches. All cores were taken as close to the shoulder as possible without compromising the integrity of the sampling. The layer thicknesses of both the surface treatment and the base section were recorded.

In general, the newer pavements were more consistent in section thickness and quality, with older pavements, particularly those found within the former Fort Ord, generally being of lower quality and varying thickness. The thickest section was found near the intersection of Crescent Avenue and Reservation Road with up to 9 inches of asphalt and 3 inches of aggregate base. The thinnest section was found on California Avenue just south of Imjin Avenue where 5 inches of asphalt was found with no aggregate base. Typical thicknesses were 3 to 4 inches of asphalt over 4 to 6 inches of aggregate base. Figure 7 presents the results of our pavement coring survey.

CONCLUSIONS AND DISCUSSION

Based on our review of existing geotechnical information, the findings of the subsurface exploration, laboratory test results, and engineering analyses, we conclude that the proposed pipeline and associated structures are feasible from a geotechnical standpoint. The primary geotechnical concerns for the proposed project are caving sands throughout the pipeline alignment and cyclic densification of loose sands beneath structures and the pipeline. In addition, liquefaction is possible near the intersection of Reservation Road and Beach Road due to the shallow groundwater table in this vicinity. Recommendations for mitigation of these concerns are discussed in the Recommendations section of this report. We also discuss conclusions regarding trenching conditions and corrosion in this section.

Seismic Hazards

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary effect is ground rupture, also called surface faulting. Secondary seismic hazards include ground shaking, lurch cracking, soil liquefaction, lateral spreading, landslides, tsunamis and seiches. These hazards are discussed in the following sections.

Based on topographic and lithologic information, the risks of regional subsidence or uplift, landslides, lateral spreading, tsunamis or seiches are considered low for the project.

Ground Rupture

The site is not located within a State of California Earthquake Fault Zone for active faults and no known active faults are shown on regional geologic maps covering the site. It is our opinion that the ground rupture hazard for the project is low.

Ground Shaking

The hazard of ground shaking can best be mitigated with quality construction. Seismic design provisions in current building codes generally prescribe minimum lateral forces, applied statically to the structure, combined with the gravity forces of dead and live loads. The code-prescribed lateral forces are generally considered to be substantially smaller than the peak forces that are associated with a major earthquake. Therefore, structures should be designed 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.

Liquefaction

Liquefaction is a phenomenon in which saturated cohesionless soils are subject to a temporary loss of shear strength because of pore pressure build-up under the cyclic shear stresses associated with earthquakes.

Geomatrix Consultants, as part of their report titled *Feasibility-Level Geologic and Geotechnical Study Carmel River Plan B,* evaluated liquefaction risk in the project area. The results of their assessment were reported in the Preliminary Geotechnical Report completed by LandMarine Geotechnics. Most of the project area was classified as having low liquefaction hazard. This is primarily due to the fact that the groundwater level is deep and the potentially susceptible loose sands are limited to the upper 10 to 20 feet; however, there is a portion of the proposed alignment near the intersection of Reservation and Beach Roads where liquefaction potential is characterized as moderate. This is due in large part to the lower elevation and, hence, shallower groundwater in the vicinity. The only area within the project limits where a shallow groundwater table was encountered is in the vicinity of the intersection of Reservation and Beach Roads. The rest of the alignment and structure sites are not susceptible to liquefaction due to the

absence of saturated conditions; however, dry, loose, sand can densify in strong seismic shaking. This type of hazard is discussed in a separate section.

Based on the findings of our exploratory borings and CPTs in the vicinity of Reservation and Beach Roads, combined with laboratory test results on soils recovered from this area, the subsurface soils in this area appear to be susceptible to liquefaction. The potential ground surface settlement due to liquefaction in this vicinity is on the order of 1 inch. Differential movement could be on the order of 0.5 inch in 50 feet.

In summary, the liquefaction hazard along most of the alignment is low. There is a moderate hazard potential near the intersection of Reservation Road and Beach Road. Liquefaction in this area could potentially result in differential movement of the pipeline during a major seismic event.

Densification Due to Earthquake Shaking

Densification of the sandy soils both above and below the groundwater level can cause settlement during an earthquake. The sands encountered along the pipeline alignment and at the sites of the proposed pump station and reservoir range from loose to very dense. We estimate that in general, very strong earthquake shaking will cause up to 1 inch of settlement of the ground surface for the majority of the pipeline. Ground settlement in a large seismic event at the proposed 5th Avenue Pump Station is expected to be on the order of ¾ inch with differential movement on the order of 0.5 inch in 50 feet.

Lurching and Lateral Spreading

Movement of weaker soils on slopes or adjacent to open channels or slopes during strong ground shaking is referred to as lurching, which is often accompanied by the development of ground cracking. Lurching typically occurs in more clayey soils and not in sands due to the tendency of

sands to slough down the affected slope rather than slide or move in a cohesive block. Based on the encountered soils, lurching is unlikely along the project alignment.

Lateral spreading refers to the movement of surficial soils downslope or toward an open face over the top of liquefied zones beneath. This movement is driven by gravity and the sudden loss of strength of the underlying materials causing blocks or masses of soil to displace. Based on the current proposed development concept, we do not anticipate open channels, significant slopes, or open faces within the project limits. On that basis, lateral spreading is unlikely at this site.

Building Code Seismic Information

Based on the subsurface soil conditions encountered and local seismic sources, the 5th Avenue Pump Station may be designed based on Chapter 16 of the 1997 UBC using the following information.

UBC Seismic Factors

Categorization/Coefficient	Design Value
Soil Profile Type (Table 16-J)	S_D
Seismic Zone (Figure 16A-2)	4
Seismic Zone Factor (Table 16-I)	0.4
Seismic Source Type (Table 16-U)	A
Near Source Factor N_a (Table 16-S)	1.6
Near Source Factor N_v (Table 16-T)	1.2
Seismic Coefficient C_a (Table 16-Q)	0.44 N_a
Seismic Coefficient C_v (Table 16-R)	0.64 N_v

Trenching

Soil conditions along the chosen project alignment appear to be relatively uniform and not favorable for unsupported vertical trench cuts more than approximately 5 feet deep. Review of

the available data indicates that there is no easily discernible pattern to the occurrence of silty soils which are more favorable to trench stand-up time. A good example of this is from the geotechnical investigation we reviewed for General Jim Moore Boulevard where borings drilled at approximately 1,000-foot spacing revealed sands with fines content varying from 3 to 10 percent and moisture contents generally less than 5 percent. At the north end of the alignment an investigation for the Regional Wastewater management system yielded similar results. It is interesting to note that this latter investigation included test pits. The pits encountered essentially the same material type. One pit caved, and one did not.

Recent construction related to the recycled water pipeline encountered varying soil conditions with both dry clean flowing sands and moist relatively silty sands present in these trenches. Figures 8 through 10 present photos taken by others at construction sites in the area during trenching or grading activities.

At this time we can not differentiate different reaches of the project where flowing sand will or will not be encountered. Due to the nature of the sand deposition, there likely are local areas historically dominated by transient dunes where loose, dry, clean sand exists. There are also historic low areas where more silty sands may have accumulated. Also, areas likely exist where grading for the development of the streets and the military base has altered the natural deposition. We attempt to identify areas of varying conditions; however, for construction purposes, conditions likely will vary over short distances and are difficult to characterize. One area that seems to consistently have a layer of problematic dry caving soils is near the locations of Borings B-5 and B-6. These borings found a layer of dry, silty sand, which was prone to caving, even within our small diameter borings. This section of the pipeline alignment appears to lie entirely beneath graded dirt roads with limited existing utility conflicts; however, the exact extents of this layer can not be determined at this time and it may potentially extend beneath adjacent paved roads (i.e. near CSUMB and the north end of General Jim Moore Boulevard) where utility conflicts and asphalt replacement may be more problematic.

As a general guide, the color appears to be indicative of silt and fines content in the encountered soils. Soil with higher silt and fines content (on the order of 10 percent) was generally slightly darker (brown to olive brown) than the cleaner sands which tended to be yellowish brown in color. In addition, soil with brown to olive-brown color tended to have higher moisture content, on the order of 3 to 5 percent higher than the yellowish brown soils encountered. This moisture will aid in stand-up time; however, it should not be counted upon by the contractor for temporary slopes.

Corrosion Potential

An evaluation of possible corrosion impacts to the pipeline was conducted by JDH Corrosion Consultants Inc. Their findings were based upon samples taken from our field exploration and delivered to Serco Labs.

In general, the analysis by JDH found low corrosion potential for soils throughout the project alignment. Soils found in the "Armstrong Ranch" portion of the pipeline alignment tend to be slightly siltier than those along the rest of the alignment and have a slightly higher corrosion potential. Please refer to the JDH report for specific conclusions and recommendations regarding corrosive soils.

RECOMMENDATIONS

General

It is our opinion that the proposed development is feasible from a geotechnical standpoint, provided the recommendations included in this report are followed.

Structures

The project will include a pump station serving the recycled water line near the intersection of 3rd Street and 5th Avenue. Design recommendations for the pump station are presented in the following sections.

Grading. In general, grading for the pump station will consist of minor cuts and fills. Areas where improvement will be constructed or paved should be stripped to remove surface vegetation and organic topsoil or existing paving as applicable. Native soil from these sites may be stockpiled for subsequent use as structural fill or backfill, if needed. Excess over-sized material should be wasted off-site or, if so required by the Project (Landscape) Architect, stockpiled for subsequent use in the construction of landscape features. Trees (and shrubs) designated for removal on the Project Plans should be felled and their stumps and roots should be grubbed. Utility lines, (leach lines, sanitary sewers and storm drains) designated for abandonment on the Project Plans, should be dug out, removed, and the resulting voids backfilled.

5th Avenue Pump Station Foundations. We conclude that a structural mat foundation can be used to support the proposed pump station at 5th Avenue and 3rd Street. A minimum slab thickness of 8 inches is recommended. The perimeter should be thickened to at least 20 inches, and the

minimum backfill height of soil against the slab at the perimeter should be 12 inches. An above-grade waffle mat with voids between the ribs would also be appropriate at the site.

The structural slab should be designed to impose a maximum allowable bearing pressure of 2,500 pounds per square foot (psf) for dead-plus-live loads. This value may be increased by one-third when considering total loads including wind or seismic loads. The subgrade material under the structural mat should be uniform. The top 12 inches of pad subgrade should be moisture conditioned to a moisture content of at least optimum and compacted to 90 percent relative compaction. Where floor coverings are anticipated, we recommend that the concrete be underlain by a tough, vaporproof membrane at least 10 mils thick to minimize moisture condensation under the floor coverings.

Lateral loads can be resisted by a combination of passive pressure acting on the vertical faces of the footings and friction along the bases of the footings. Passive resistance may be calculated using an equivalent fluid weight (triangular distribution) of 350 pounds per cubic foot (pcf). The upper one foot of soil should be ignored unless it is confined by slabs or pavement. Frictional resistance should be computed using a base friction coefficient of 0.40 (0.2 if waterproofing membrane is placed below the mat). These values include a factor of safety of about 1.5. Footings located adjacent to utility trenches should bear below an imaginary 1.5:1 (horizontal:vertical) plane projected upward from the bottom edge of the adjacent trench.

Pump support pads may be designed using an equivalent modulus of elasticity (E_s) of 900,000 psf, and a Poisson's ratio of 0.3.

We should observe mat subgrade prior to placement of reinforcing steel. The excavation for the mat should be free of standing water, debris, and disturbed materials prior to placing concrete. The final foundation plans should be reviewed by the Geotechnical Engineer when they become available to check for conformance with these recommendations.

Surface Drainage. Areas adjacent to the improvements should be positively graded at all times to provide for rapid removal of surface water runoff away from the foundation systems and open trenches and to prevent ponding of water under floors or seepage toward foundation systems or open trenches at any time during or after construction. Excessive water could cause trench slope instability. Care should be exercised to ensure that landscape mounds or walkways will not interfere with this requirement.

As a minimum requirement, finished grades should have slopes of at least 5 percent within 5 feet from exterior walls and at right angles to them to allow surface water to drain positively away from structures. For paved areas, the slope gradient can be reduced to 2 percent. All surface water should be collected and discharged into the storm drain system.

All improvements should be protected against the surface run-off from adjacent uphill property; the Civil Engineer should be consulted on this matter. No water should be allowed to discharge in a concentrated manner over downhill slopes as this could cause erosion.

Retaining Walls and Basement Walls. The native excavated soil can be reused as backfill material behind retaining walls. Import backfill material should be non-expansive, defined as soil having a liquid limit less than 40 and a plasticity index less than 12. Backfill should be placed in layers less than 8 inches thick prior to compaction, and compacted to at least 90 percent relative compaction. Light compaction equipment should be used within 5 feet of the walls. Prior to installation of any basement retaining walls, the site should be open cut at a slope of at least 1.5:1, or temporarily shored.

Walls that are restrained from rotation at the top, such as basement walls, should be designed using at-rest pressures corresponding to an equivalent fluid unit weight of 55 pcf. Where walls

are not restrained from rotation at the top, such as roadside retaining walls, they should be designed using active earth pressures corresponding to an equivalent fluid unit weight of 35 pcf. Passive resistance at the toe of the wall may be calculated using an equivalent fluid unit weight of 350 pcf. Where traffic is expected within a distance equal to the height of the walls, they should be designed for an additional uniform lateral pressure of 100 psf to be applied over the entire height of the wall or 10 feet, whichever is less.

For seismic conditions, the incremental dynamic force along the face of a retaining wall or basement wall should be calculated as follows:

$$\Delta P = 12 \times H^2$$

Where H is the design height of the wall (in feet) and ΔP is the incremental seismic force in pounds per foot of wall. This force has a horizontal direction and should be applied at 0.6 x H from the base of the wall.

The lateral earth pressures recommended are for walls without hydrostatic pressure, that is they are back drained to prevent the buildup of hydrostatic pressure. We expect that all backfill will be native, free-draining sand, which will be acceptable to assume a drained wall.

Pipeline Design

The pipe should be designed to resist loads imposed on overlying soil cover and from vehicle or construction traffic. Soil loads may be calculated using a total unit weight of 110 pounds per cubic foot. Where the pipeline changes direction, thrust will tend to move the pipe. These movements can be resisted by friction between the pipe and the surrounding fill, with restrained joints, and/or with thrust blocks. We recommend that frictional resistance be calculated using a friction coefficient of 0.4 for ductile iron pipe or concrete. Frictional resistance for steel pipe can be calculated using a coefficient of 0.3.

Where hydraulic forces tend to move the pipe in an upward direction, as at vertical curves or vertically bent fittings, movement can be resisted by the weight of the pipe, its contents, and the overlying soils. To determine weight of the overlying soils, use an effective total unit weight of 110 pounds per cubic foot for soil above the water table.

We do not anticipate that the pipeline will be installed below the groundwater table in any section of the alignment. Soils in the vicinity of Reservation and Beach Roads are in an area of known liquefaction hazard due to the shallow groundwater table in this area (approximately 10 feet below grade at the western extreme of the pipeline design reach). In the event that portions of the pipeline are installed below groundwater, portions of the pipeline could become buoyant due to liquefaction. Uplift due to liquefaction could cause some pipeline deflection.

In addition, some limited amount of seismic settlement is likely to occur along the pipeline alignment in a seismic event due to 1) densification of loose, dry to slightly moist, poorly graded dune sands beneath and around the proposed pipeline and 2) liquefaction in the areas described above. Densification/liquefaction of the sands could result in seismically induced settlement of the pipeline up to 1 inch. Differential settlement on the order of 0.5 inch in 50 feet is possible.

It is our understanding that the standard MCWD trenching and backfilling specifications as found on the official website will be used for this project. In addition, native soils will be used for trench back fill as much as possible. We recommend no changes to the Standard Specification Section 02223 and conclude that 95 percent relative compaction within the street zone should be appropriate. Native materials should be suitable backfill material in virtually all areas of the alignment. If import material is used for pipe zone backfill, we recommend it consist of fine- to medium-grained sand or a well-graded mixture of sand and gravel.

Based on the conditions encountered in the test borings we have estimated the range of the modulus of soil reaction E' for checking the load-deflection behavior of flexible pipe. In practice E' values for pipeline design should consider a number of factors including soil type, native soil density, trench backfill type and compaction, pipe size, cover depth, trench width and other factors. The range of E'n (the modulus of soil reaction for the native soil) is estimated to be between 1,000 and 1,500 psi. These values should be modified for trench width and bedding conditions and other factors, as appropriate.

Trench Excavation and Shoring

It is our opinion that the pipeline construction can be accomplished using sloped open cuts and a hybrid trapezoidal trench backfill section. This may result in conflicts where adjacent utilities exist within the trench influence zone and will result in a larger area of street reconstruction than would vertical trenches. In some areas, particularly where shallow trenches are feasible, trenches may stand open vertically a sufficient amount of time to allow for the use of internal shoring (plywood and speed shores/cribbing). This configuration will likely be unacceptable where utilities are located within the influence zone of the trench. This hybrid trench section is anticipated to be necessary in paved areas, whereas a typical fully sloped back section can be used in unpaved areas, provided utility conflicts are not present.

The Marina Coast Water District's standard specifications for recycled water pipelines prescribe minimum cover of 48 inches above the pipe (including an assumed 12-inch pavement section). This implies a trench depth of 6 to 7 feet to the bottom of pipe bedding. Based on these dimensions and approximately 6 inches of clearance on either side of the pipe, we anticipate that an open cut hybrid trench section with sides sloped at 1.5:1, as prescribed by OSHA for type C soils, can be constructed with a minimum saw cut of approximately 11 feet, edge to edge. This would include an approximately 3 to 4 foot vertical cut from the bottom of the trench to the beginning of the side slopes.

In turn, existing utilities should have at least 1 foot of cover in the temporary cut, meaning that utilities with adequate vertical cover could be unaffected within 2 to 3 feet of the trench walls, and not have to be replaced. This would, of course, be dependent on the soils remaining in place and not sloughing into the excavation, which is possible throughout the alignment. For planning purposes, we anticipate that an 8-foot zone clear of existing utilities centered along the pipeline will be sufficient to avoid significant removal and replacement activity due to disturbance by trenching activity.

In areas where sloped open cuts utilizing internal shoring at the contractor's risk is not feasible, there are several options:

- Sheet piling could be driven utilizing a trench shield as cross bracing. The sheeting could be driven using a vibratory attachment for an excavator and would not require mobilization of large driving equipment. Sheeting would only have to be driven to the depth of the trench bottom. This may prove more cost effective than removal and replacement, and its use should be evaluated by the design team based on the anticipated areas and extent of utility conflicts.
- Remove and replace or relocate selected utilities and use sloped open cuts.
- Selected reaches of trenchless construction, as needed (i.e. bore-and-jack construction).

Trenchless construction will have the same constraints on the bore-and-jack pit in terms of sloughing and temporary slopes as would open cut trenches.

It is recommended that pipeline trench backfilling be done under the observation of a Geotechnical Engineer or their qualified representative. Trenches should be kept open only long enough to properly install the pipe and backfill. All trenches and construction slopes should be backfilled as soon as possible. The design excavation depth should include an additional 6 inches below the pipe invert to account for bedding material requirements. Shoring design

calculations, plans, and specifications should be reviewed by the project Geotechnical Engineer prior to final design and construction.

Trenching conducted during wet weather with significant rainfall will be difficult and the trench walls will tend to collapse if left open. All surface water should be diverted away from the trench and the trench should be covered. Soil stockpiles should also be covered.

It should be noted that where the pipeline trench is planned to enter areas with a high groundwater table, dewatering may be necessary. Dewatering will likely produce relatively high flow rates due to the high permeability of the native soil (on the order of 10^{-1} to 10^{-3} cm/s). In addition, the bottom of deep utility trenches may heave and cause the trench to collapse as a result of the high groundwater level. In some cases, groundwater control systems will need to be installed and operated outside of the limits of the bore-and-jack and trench excavations. The groundwater control system(s) should be designed by an experienced specialty contractor experienced with similar subsurface conditions. In addition, the contractor should evaluate the possible effects of the selected groundwater control method on the stability of the shoring systems.

Care should be exercised where trenches are located adjacent to existing foundation areas. Utility trenches constructed parallel to foundations should be located entirely above a plane extending down from the lower edge of the footing at an angle of 45 degrees.

Utility trenches in areas to be paved in the future should be constructed in accordance with the requirements of the appropriate jurisdictions. Identified jurisdictions that the alignment passes through include the City of Marina, the City of Seaside, the Base Realignment and Closure commission (BRAC), CSUMB, and private owners in the Armstrong Ranch area and the Fitch Park area. Compaction of native trench backfill by jetting should not be allowed at the site. If there appears to be a conflict between City or other jurisdictional requirements and the

recommendations contained in this report, this should be brought to the Marina Coast Water District's attention for resolution prior to submitting bids.

Pavement Design Recommendations

Based on the soil conditions encountered in the exploratory borings, an R-value of 50 may be assumed for the sandy soils encountered along the proposed alignment. The Traffic Index should be determined by the Civil Engineer or appropriate public agency. Actual pavement sections to be used should be based on R-value tests performed on samples of actual subgrade materials recovered at the time of grading.

Pavement materials and construction should conform to the specifications and requirements of the appropriate regulatory and local agencies, and the following minimum requirements.

- Sandy subgrades should be compacted to at least 95 percent relative compaction at or above optimum moisture content.
- All soil should be placed as engineered fill at project specifications during grading. If the site soil is found to be loose, it may have been disturbed by utility installation. All structural subgrade soils should be returned to project compaction and moisture specifications prior to placement of aggregate base.
- Aggregate baserock materials should meet current requirements for Class 2 aggregate baserock in the appropriate jurisdictions (City of Marina, City of Seaside, CalTrans, BRAC, CSUMB, etc.) and should be compacted to at least 95 percent of maximum dry density at optimum water content or higher. The CalTrans specification should be adequate where jurisdictional requirements are unknown.
- Asphalt paving materials should meet current Caltrans specifications for asphalt concrete.

LIMITATIONS AND UNIFORMITY OF CONDITIONS

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 general insurance; therefore, we are unable to guarantee or warrant the results of our work. Our services consist of professional opinions, conclusions, and recommendations that are made in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

Variations may exist and conditions not observed or described in this report could be encountered during construction. Our conclusions and recommendations are based on the observed conditions. If conditions other than those described in this report are encountered, we should be notified so that additional recommendations, if warranted, can be provided. 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 arising from or resulting from the performance of such services by other persons or entities, and from any or all claims arising from or resulting from clarifications, adjustments, modifications, discrepancies or other changes necessary to reflect changed field or other conditions.

This report has been prepared for the exclusive use of RMC Water and Environment, Inc, and the Marina Coast Water District, and its agents for the specific application to the Marina Coast Recycled Water Pipeline Project as referenced. In the event that there are any changes in the project design team, nature, design, or location of the project, or if any future modifications are planned, the conclusions and recommendations contained in this report should not be considered valid unless (1) the project changes are reviewed by ENGEO Incorporated, and (2) conclusions

and recommendations presented in this report are modified or verified in writing. Reliance on this report by others must be at their risk, unless we are consulted on its use or limitations. We cannot be responsible for the impacts of any changes in geotechnical standards, practice, or regulations subsequent to the performance of our services without our further consultation. We can neither vouch for the accuracy of information supplied by others, nor accept consequences for un-consulted use of segregated portions of this report.

SELECTED REFERENCES

Blake, T. F., 1996, EQFAULT, A Computer Program for the Deterministic Prediction of Peak Horizontal Acceleration from Digitized California Faults.

Clark J.C., Dupre, W.R., and Rosenberg, L. I., 1997, Monterey Quadrangle, USGS, OFR 97-30.

Clark J.C., Dupre, W.R., and Rosenberg, L. I., 1997, Seaside Quadrangle, USGS, OFR 97-30.

Dibblee, T.W., 1973, Geologic Map of the Monterey Quadrangle, California, USGS, OFR 74-1021.

Idriss, I. M., 1994, Procedures for Selecting Earthquake Ground Motions at Rock Sites, National Institute of Standards and Technology, GCR 93-625.

Ishihara, K., 1985, stability of Natural deposits during Earthquakes; Proceedings of the Eleventh International Conference on Soil Mechanics and Foundation Engineering.

JDH Inc., 2006; Soil Corrosivity Evaluation & Recommendations for Corrosion Control, Regional Urban Water Augmentation Project, Ph. 2, Marina Coast Water District, prepared for Carollo Engineers, Dated January 3, 2007.

Kleinfelder, 2005; Geotechnical Investigation Proposed East Garrison, "B" Zone Tanks, "D" Zone Reservoirs, "E" Zone Hydropneumatic Pump Station, and Transmission Mains, Marina Coast Water District, Marina, California, Prepared by Kleinfelder Inc., September 28, 2005.

MCWD, 2005, Urban Water Management Plan, prepared by Byron Buck and Associates.

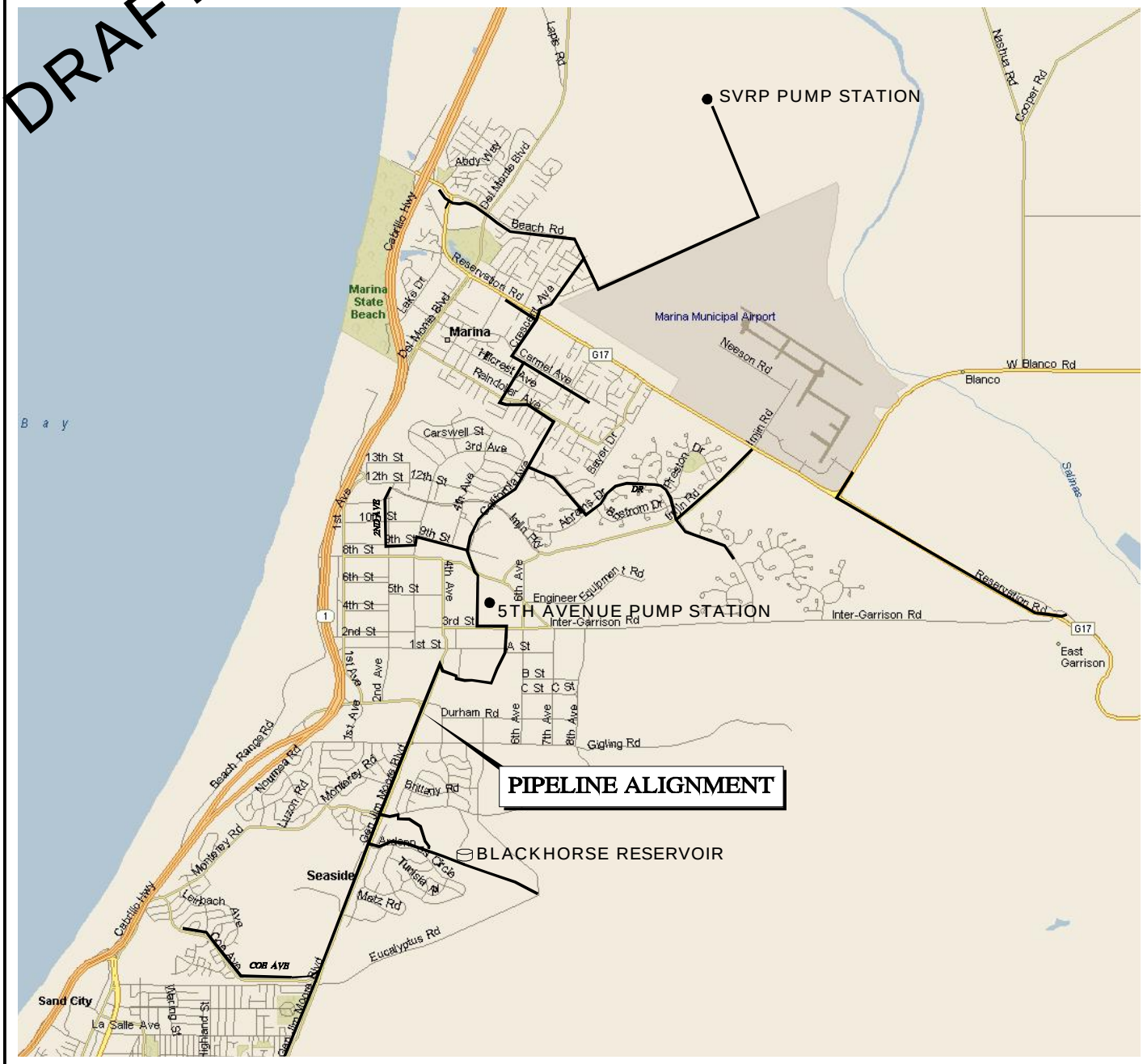
Seed, H. B., K. Tokimatsu, L. F. Harder and R. M. Chung, 1985, Influence of SPT Procedures in Soil Liquefaction Resistance Evaluations, Journal of Geotechnical Engineering, ASCE.

Tokimatsu, K. and H. B. Seed, 1987, Evaluation of Settlements in Sands due to Earthquake Shaking, Journal of Geotechnical Engineering, American Society of Civil engineers, Vol. 113, No. 8, pp. 861-878.

Wagner, D., 2002, Geologic Map of the Monterey 30' x 60' Quadrangle and Adjacent Areas, California, California Geologic Survey.

LIST OF FIGURES AND TABLES

DRAFT



N

0 MILES 1
0 KILOMETERS 2

DRAFT

BASE MAP SOURCE: MS STREETS AND TRIPS

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

VICINITY MAP
MARINA COAST RECYCLING WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.: 7496.1.003.01		FIGURE NO
DATE: AUGUST 2007		1
DRAWN BY: PC	CHECKED BY:	

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-1-VicMap-0807.dwg 8-07-07 01:33:06 PM

ORIGINAL FIGURE PRINTED IN COLOR

EXPLANATION

- DESIGNED BY OTHERS
- EXISTING RW PIPELINE
- TRANSMISSION MAIN
- LATERALS

N

0 FEET 2500
0 METERS 1250

BASE MAP SOURCE: USGS, TERRASERVER, 1998

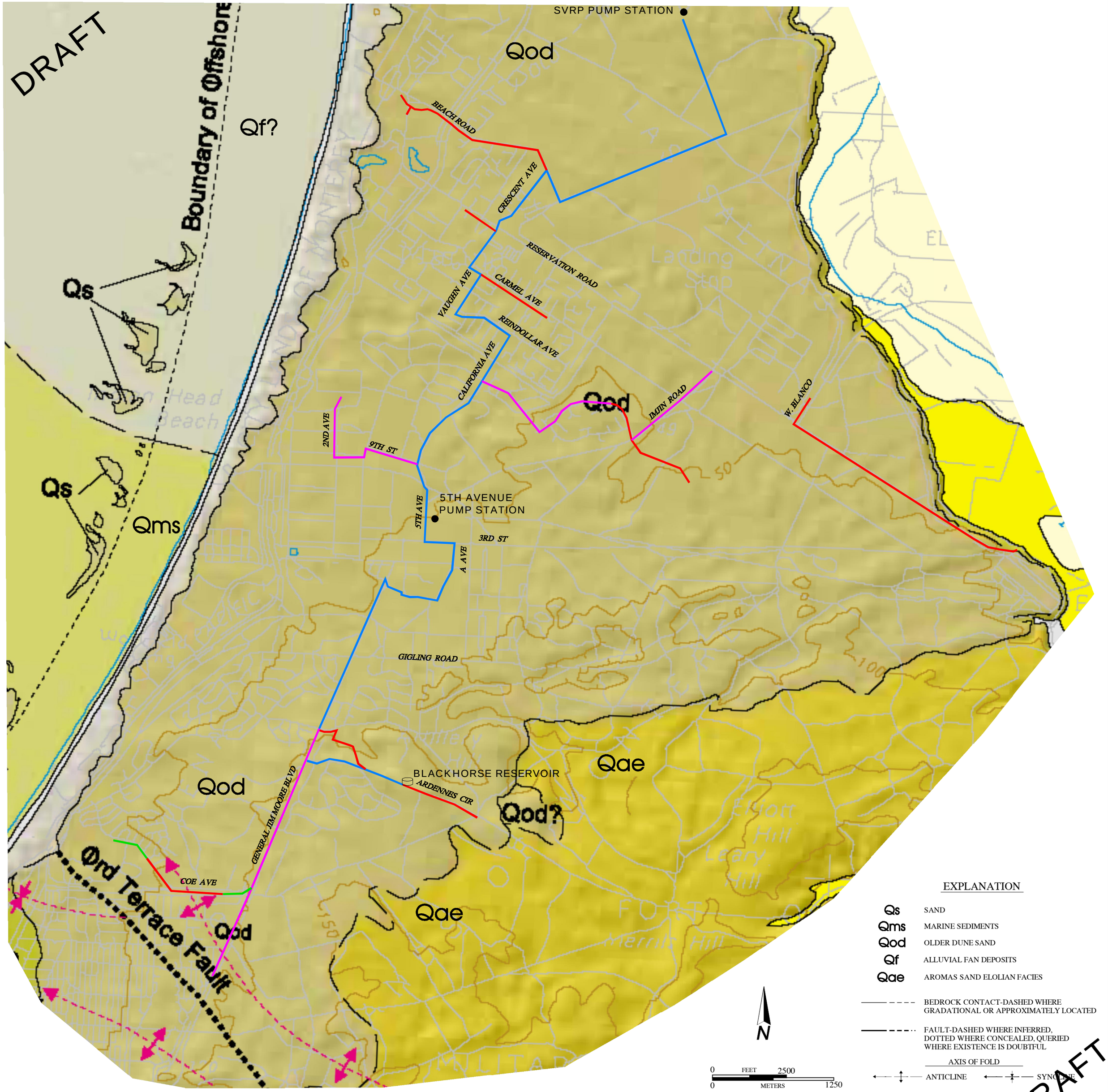
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PROJECT ALIGNMENT
MARINA COAST RECYCLED WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.:	7496.1.003.01
DATE:	AUGUST 2007
DRAWN BY: PC	CHECKED BY:

FIGURE NO. 2

ORIGINAL FIGURE PRINTED IN COLOR

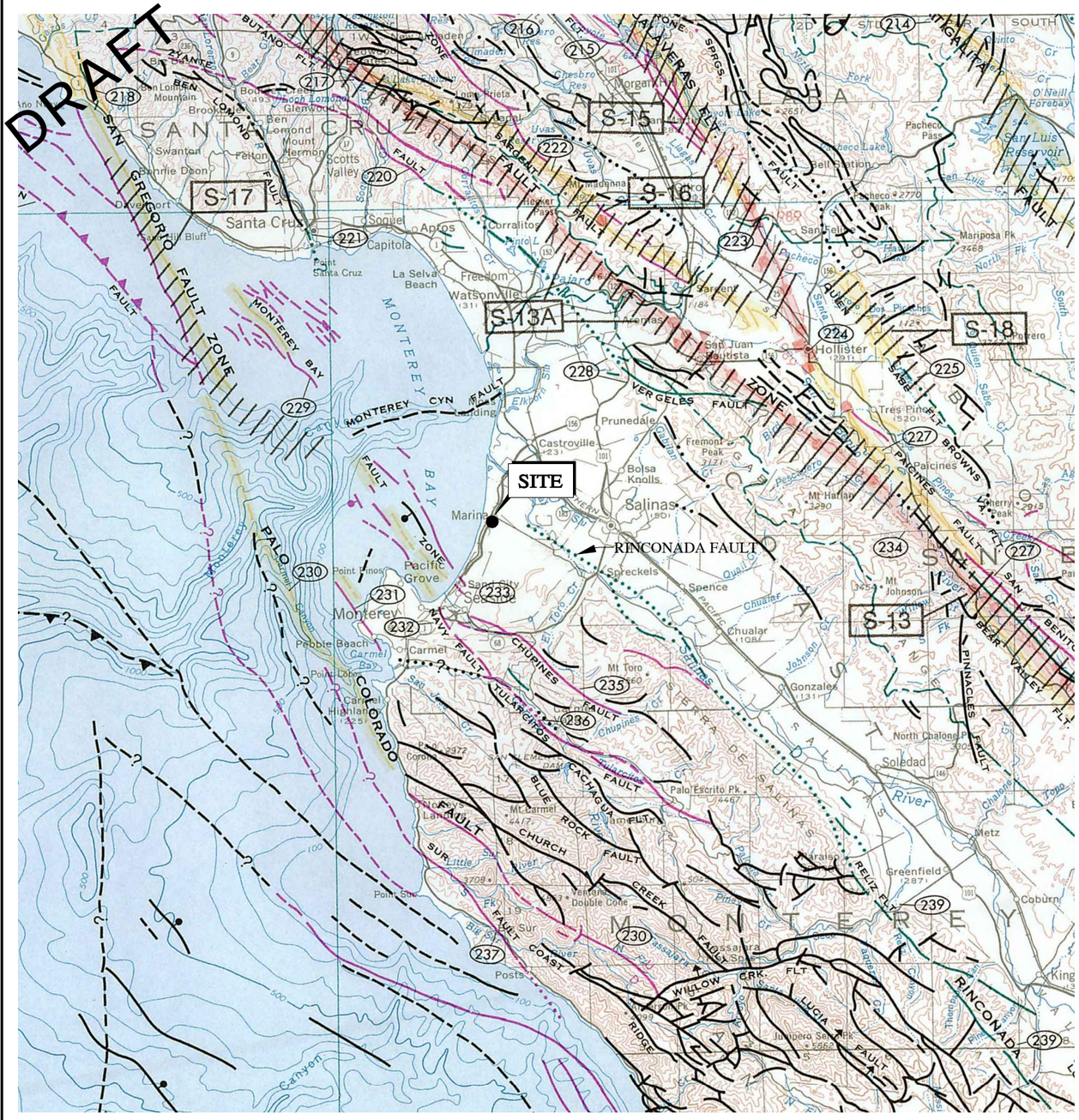


BASE MAP SOURCE: WAGNER, 2002

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	REGIONAL GEOLOGIC MAP MARINA COAST RECYCLED WATER PIPELINE MARINA, CALIFORNIA	PROJECT NO.: 7496.1003.01 DATE: AUGUST 2007 DRAWN BY: PC CHECKED BY:	FIGURE NO. 3

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-3-GeologicMap-080707.dwg 8-07-07 03:36:01 PM



EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. Concealed faults in the Great Valley are based on maps of selected subsurface horizons, so locations shown are approximate and may indicate structural trend only. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE
(Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred and is associated with one or more of the following:

(a) a recorded earthquake with surface rupture. (Also included are some well-defined surface breaks caused by ground shaking during earthquakes, e.g. extensive ground breakage, not on the White Wolf fault, caused by the Arvin-Tehachapi earthquake of 1952). The date of the associated earthquake is indicated. Where repeated surface ruptures on the same fault have occurred, only the date of the latest movement may be indicated, especially if earlier reports are not well documented as to location of ground breaks.

(b) fault creep slippage – slow ground displacement usually without accompanying earthquakes.

(c) displaced survey lines.

Pink band added to emphasize location of historic fault displacement.

SPECIAL NOTATIONS

A triangle to the right or left of the date indicates termination point of observed surface displacement.

1951▶ ◀1951

Date bracketed by triangles indicates local fault break.

No triangle by date indicates an intermediate point along fault break. 1906

Dot on fault indicates location where fault creep slippage has been observed and recorded.

Square on fault indicates where fault creep slippage has occurred that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate terminal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points). 1968 ■ ■ 1969 ■ 1968

Holocene fault displacement (during past 10,000 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridges, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting. Pale orange band added to emphasize location of Holocene fault displacement.

Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults except features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.

Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement sometime during the past 1.6 million years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age. Unnumbered Quaternary faults were based on Fault Map of California, 1975. See Bulletin 201, Appendix D for source data.

Late Cenozoic faults within the Sierra Nevada including, but not restricted to, the Foothills fault system. Faults show stratigraphic and/or geomorphic evidence for displacement of late Miocene and Pliocene deposits. By analogy, late Cenozoic faults in this system that have been investigated in detail may have been active in Quaternary time. (Data from PG&E, 1993).

Pre-Quaternary fault (older than 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissance nature, or was not done with the object of dating fault displacements. Faults in this category are not necessarily inactive.

//////////////// S-25 Fault segment associated with a significant linear trend of accurately located earthquake epicenters (magnitude 0.2 or greater). Generally aligned along strike slip faults having Quaternary displacement, but not necessarily with historic surface rupture. Lack of seismic activity along any fault is no indication that the fault may not be active in the future (e.g. San Andreas fault north of San Francisco). Epicenter data are derived from closely spaced seismic stations and include either continuing microseismicity or aftershocks associated with relatively large earthquakes.

Aligned seismicity on fault segments are referenced in Appendices C and E .

ADDITIONAL FAULT SYMBOLS

U = Upthrown side (relative or apparent)
D = Downthrown side (relative or apparent)

Bar and ball on downthrown side (used where space is limited).

Arrows along fault indicate relative or apparent direction of lateral movement.

Arrow on fault indicates direction of dip.

Low angle fault (barbs on upper plate). Fault surface generally dips less than 45° but locally may have been subsequently steepened. On offshore faults, barbs simply indicate a reverse fault regardless of steepness of dip.

OTHER SYMBOLS

(529) Numbers refer to annotations listed in the Appendices of the accompanying report. Annotations include fault name, age of fault movement, and pertinent references including Earthquake Fault Zone maps where a fault has been zoned by the Alquist-Priolo Earthquake Fault Zoning Act. This Act requires the State Geologist to delineate zones to encompass all potentially and recently active faults.

✱ Cinder cone and other types of volcanoes. Most were active in Pleistocene time, some are Holocene, a few are historic.

21 (8) Number in box or circle refers to Table 4 (Recent Volcanic Eruptions) in accompanying report. (Box refers to California, circle to Nevada.)

(1786 A.D.) = Date of historic volcanic eruption.

(9,500 B.P.) = Eruption occurrence in years before present (B.P.).

★ (0.5 m.y.) = Age of volcanic flow or eruption in million years (m.y.).

N

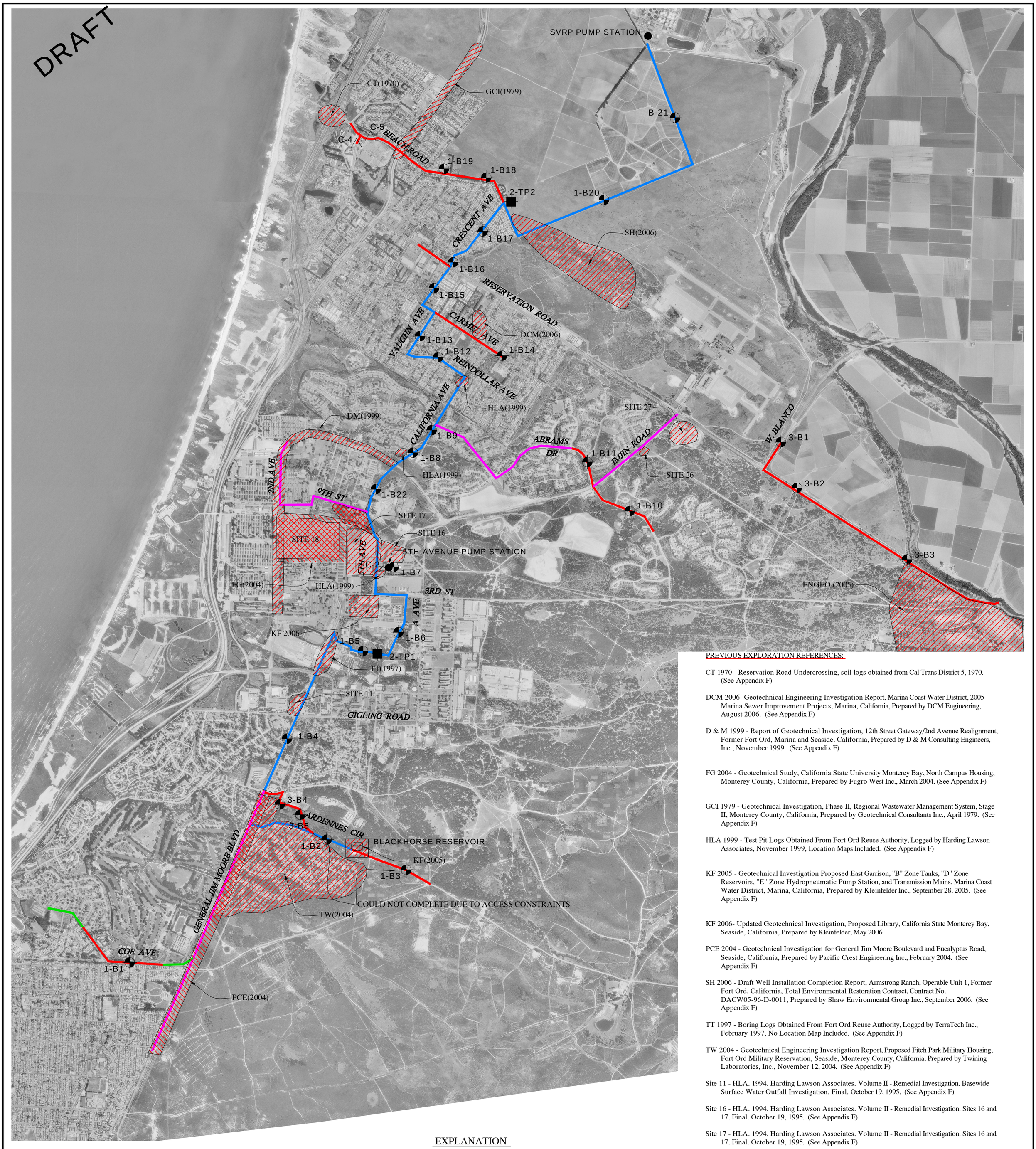
0 MILES 10
0 KILOMETERS 20

BASE MAP SOURCE: JENNINGS, 1994

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	REGIONAL FAULT MAP MARINA COAST RECYCLED WATER PIPELINE MARINA, CALIFORNIA	PROJECT NO.: 7496.1.003.01 DATE: AUGUST 2007 DRAWN BY: PC	FIGURE NO. 4 CHECKED BY:

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-4-RegFaultSeis-0807.dwg 8-07-07 01:39:03 PM



PREVIOUS EXPLORATION REFERENCES:

CT 1970 - Reservation Road Undercrossing, soil logs obtained from Cal Trans District 5, 1970. (See Appendix F)

DCM 2006 -Geotechnical Engineering Investigation Report, Marina Coast Water District, 2005 Marina Sewer Improvement Projects, Marina, California, Prepared by DCM Engineering, August 2006. (See Appendix F)

D & M 1999 - Report of Geotechnical Investigation, 12th Street Gateway/2nd Avenue Realignment, Former Fort Ord, Marina and Seaside, California, Prepared by D & M Consulting Engineers, Inc., November 1999. (See Appendix F)

FG 2004 - Geotechnical Study, California State University Monterey Bay, North Campus Housing, Monterey County, California, Prepared by Fugro West Inc., March 2004. (See Appendix F)

GCI 1979 - Geotechnical Investigation, Phase II, Regional Wastewater Management System, Stage II, Monterey County, California, Prepared by Geotechnical Consultants Inc., April 1979. (See Appendix F)

HLA 1999 - Test Pit Logs Obtained From Fort Ord Reuse Authority, Logged by Harding Lawson Associates, November 1999, Location Maps Included. (See Appendix F)

KF 2005 - Geotechnical Investigation Proposed East Garrison, "B" Zone Tanks, "D" Zone Reservoirs, "E" Zone Hydropneumatic Pump Station, and Transmission Mains, Marina Coast Water District, Marina, California, Prepared by Kleinfelder Inc., September 28, 2005. (See Appendix F)

KF 2006- Updated Geotechnical Investigation, Proposed Library, California State Monterey Bay, Seaside, California, Prepared by Kleinfelder, May 2006

PCE 2004 - Geotechnical Investigation for General Jim Moore Boulevard and Eucalyptus Road, Seaside, California, Prepared by Pacific Crest Engineering Inc., February 2004. (See Appendix F)

SH 2006 - Draft Well Installation Completion Report, Armstrong Ranch, Operable Unit 1, Former Fort Ord, California, Total Environmental Restoration Contract, Contract No. DACW05-96-D-0011, Prepared by Shaw Environmental Group Inc., September 2006. (See Appendix F)

TT 1997 - Boring Logs Obtained From Fort Ord Reuse Authority, Logged by TerraTech Inc., February 1997, No Location Map Included. (See Appendix F)

TW 2004 - Geotechnical Engineering Investigation Report, Proposed Fitch Park Military Housing, Fort Ord Military Reservation, Seaside, Monterey County, California, Prepared by Twining Laboratories, Inc., November 12, 2004. (See Appendix F)

Site 11 - HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Basewide Surface Water Outfall Investigation. Final. October 19, 1995. (See Appendix F)

Site 16 - HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Sites 16 and 17. Final. October 19, 1995. (See Appendix F)

Site 17 - HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Sites 16 and 17. Final. October 19, 1995. (See Appendix F)

Site 18 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

Site 25 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

Site 26 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

Site 27 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

ENGO 2005 - ENGEO Incorporated Geotechnical Exploration, East Garrison, Fort Ord, Monterey,California, Project NO. 5866.3.001.01, July 28, 2005

EXPLANATION

- DESIGNED BY OTHERS
- EXISTING RW PIPELINE
- TRANSMISSION MAIN (16-20"Ø)
- LATERALS (4-12"Ø)
- 2-TP2 — TEST PIT (ENGEO, 2006)- TO BE COMPLETED
- C-5 — CPT (LAND MARINE GEOTECHNICS, 2006)
- 1-B22 — SOIL BORING
- APPROXIMATE EXTENT OF PREVIOUS EXPLORATION

N

0 FEET 2000
0 METERS 1000

BASE MAP SOURCE: USGS, TERRASERVER, 1998

DRAFT

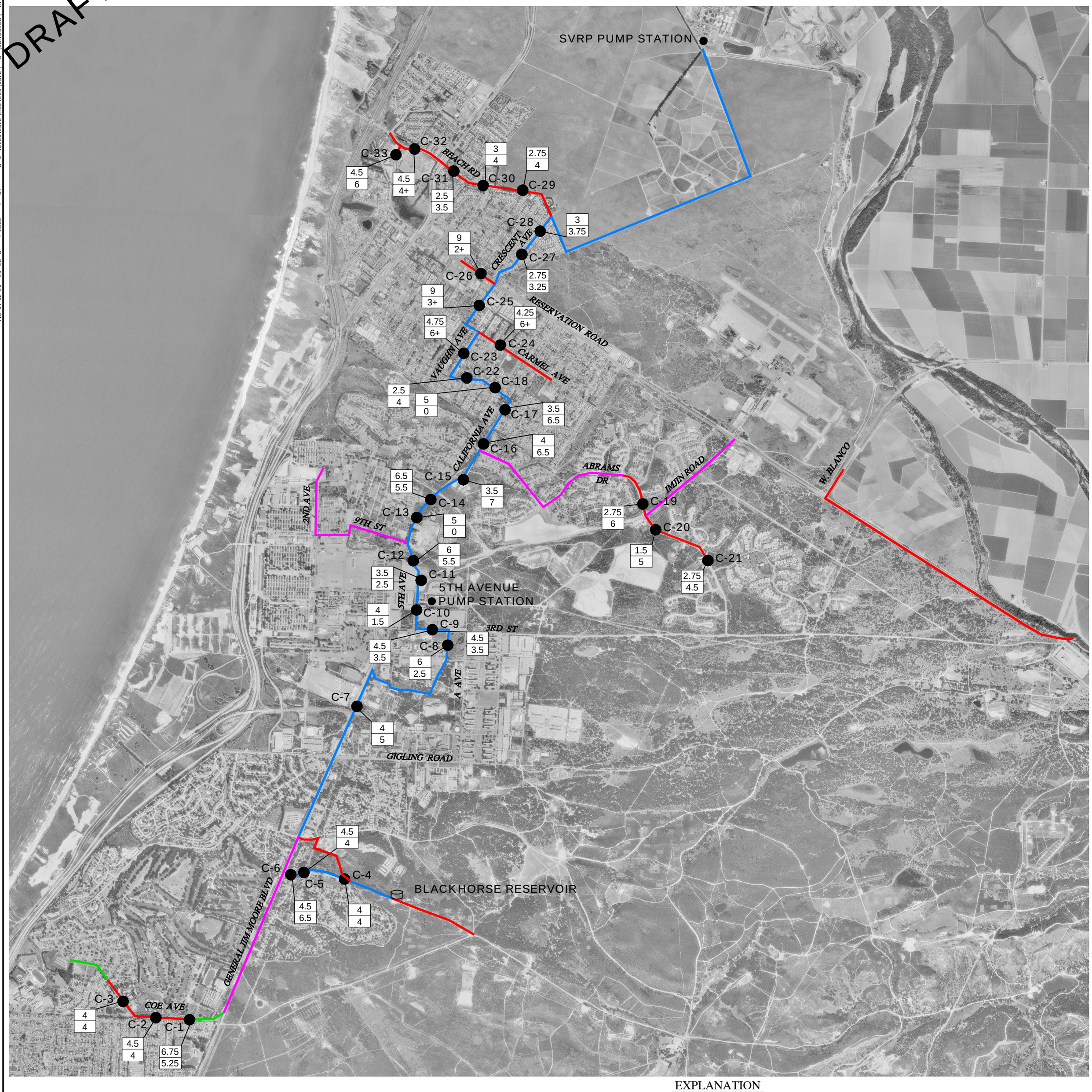
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

GEOTECHNICAL INVESTIGATION
MARINA COAST RECYCLED WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.: 7496.1.003.01	FIGURE NO. 5
DATE: AUGUST 2007	
DRAWN BY: PC	CHECKED BY:

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-5-ExistGeotech-0807.dwg 8-07-07 03:37:38 PM

ORIGINAL FIGURE PRINTED IN COLOR



EXPLANATION

- DESIGNED BY OTHERS
- EXISTING RW PIPELINE
- TRANSMISSION MAIN
- LATERALS

C-33 ● APPROXIMATE LOCATION OF PAVEMENT CORING

6.75 — INCHES OF ASPHALT CONCRETE
5.85 — INCHES OF AGGREGATE BASE

N

0 FEET 2500
0 METERS 1250

BASE MAP SOURCE: USGS, TERRASERVER, 1998

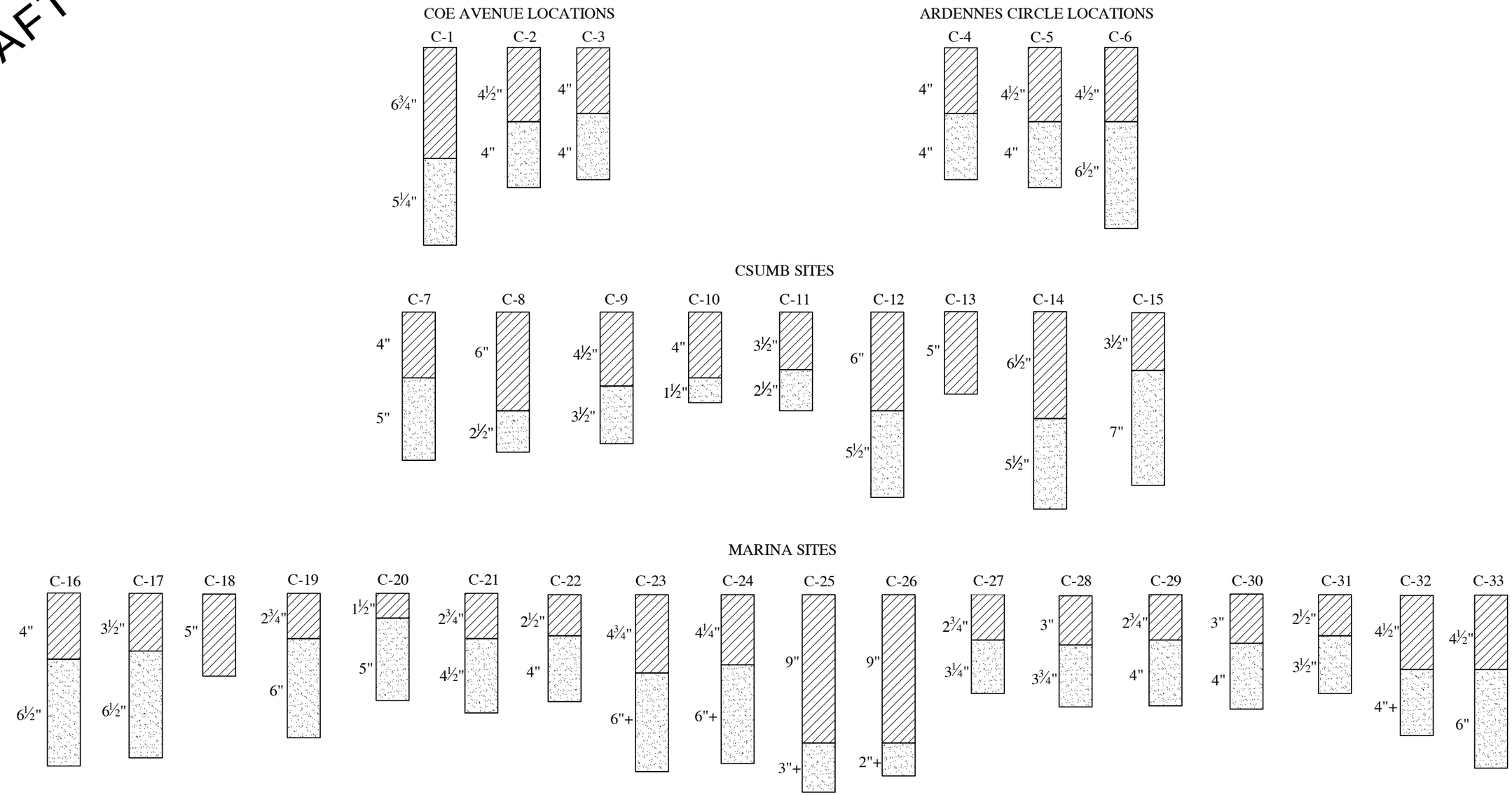
ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

PAVEMENT CORE LOCATIONS
MARINA COAST RECYCLED WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.: 7496.1.003.01	FIGURE NO. 6
DATE: AUGUST 2007	
DRAWN BY: PC	CHECKED BY:

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-6-PavementCore.dwg 8-07-07 03:39:18 PM



EXPLANATION

ASPHALT

AGGREGATE BASE

NO SCALE

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

RESULTS OF PAVEMENT CORING
MARINA COAST RECYCLED WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.: 7496.1.003.01	FIGURE NO
DATE: AUGUST 2007	7
DRAWN BY: PC	CHECKED BY:

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-7-PavementCoring-0807.dwg 8-07-07 02:09:40 PM

CALIFORNIA AVENUE INTERSECTION #1

CALIFORNIA AVENUE INTERSECTION #2

RESERVATION ROAD CONSTRUCTION #1

RESERVATION ROAD CONSTRUCTION #2

PHOTO SOURCE: MARINA COAST WATER DISTRICT

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE PHOTOGRAPHS
MARINA COAST RECYCLED WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.: 7496.1.004.01		FIGURE NO.
DATE: AUGUST 2007		8
DRAWN BY: PC	CHECKED BY:	

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-8-SitePhotographs-0807.dwg 8-07-07 02:10:32 PM

ORIGINAL FIGURE PRINTED IN COLOR

CRESCENT AVENUE CONSTRUCTION #1

CRESCENT AVENUE CONSTRUCTION #2

CRESCENT AVENUE CONSTRUCTION #3

CRESCENT AVENUE CONSTRUCTION #4

PHOTO SOURCE: MARINA COAST WATER DISTRICT

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	SITE PHOTOGRAPHS MARINA COAST RECYCLED WATER PIPELINE MARINA, CALIFORNIA	PROJECT NO.: 7496.1.003.01 DATE: AUGUST 2007 DRAWN BY: PC CHECKED BY:	FIGURE NO. 9

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-9-SitePhotographs-0807.dwg 8-07-07 02:11:16 PM

ORIGINAL FIGURE PRINTED IN COLOR

GENERAL JIM MOORE BOULEVARD CONSTRUCTION #1

GENERAL JIM MOORE BOULEVARD CONSTRUCTION #2

GENERAL JIM MOORE BOULEVARD CONSTRUCTION #3

PHOTO SOURCE: MARINA COAST WATER DISTRICT

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

SITE PHOTOGRAPHS
MARINA COAST RECYCLED WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.: 7496.1.003.01		FIGURE NO. 10
DATE: AUGUST 2007		
DRAWN BY: PC	CHECKED BY:	

G:\Drafting\DRAFTING2_Dwg\7496\003\GEX\7496100301-10-SitePhotographs-0807.dwg 8-07-07 02:12:12 PM

ORIGINAL FIGURE PRINTED IN COLOR

TABLE 4
SUMMARY OF LABORATORY TEST RESULTS

Boring	Depth [ft]	N_{field}[3] [b/ft]	$N_{1(60)}$[4] [b/ft]	Moisture Content [percent]	Dry Density [lb/ft^3]	Percent Passing No. 200 Sieve [percent]
1-B1	3.0	32	39	3	104	12
	6.0	24	21	2	102	3
	8.0	28	21	3	102	2
	11.0	55	36	3	103	3
	16.0	46	41	5	103	-
1-B4	3.0	27	33	5	103	16
	6.0	43	37	6	104	4
	8.0	30	22	-	-	-
	10.5	84	55	6	104	3
	16.0	73	38	-	-	-
1-B5	3.0	25	32	3	97	5
	6.0	26	23	3	106	13
	8.0	29	22	6	98	5
	11.0	33	21	6	101	4
	16.0	46	25	7	103	-
1-B6	3.0	81	97	3	111	9
	6.0	40	34	3	107	16
	8.0	45	33	4	104	6
	11.0	28	18	4	99	5
	16.0	47	25	-	-	-
1-B7	2.0	55	76	6	122	10
	6.0	65	54	7	108	4
	8.0	51	37	-	-	-
	11.0	40	25	5	101	3
	16.0	23	12	-	-	-
	21.0	18	8	-	-	-
	26.0	59	24	5	104	3
1-B8	3.0	59	72	2	105	3
	5.5	39	36	2	103	2
	7.5	39	31	3	102	2
	10.5	42	28	2	104	2
	16.0	47	25	3	101	1
1-B9	3.0	47	58	2	106	1

[3] Field blowcounts were almost exclusively using the California Modified Sampler
[4] $N_{1(60)}$ blowcounts are the field blowcounts corrected for sampler type, drill rod length, type of hammer, overburden, and borehole diameter.

TABLE 4
SUMMARY OF LABORATORY TEST RESULTS

Boring	Depth [ft]	N_{field}[3] [b/ft]	$N_{1(60)}$[4] [b/ft]	Moisture Content [percent]	Dry Density [lb/ft^3]	Percent Passing No. 200 Sieve [percent]
	5.5	35	32	2	106	1
	7.5	48	37	2	106	1
	11.0	60	39	2	103	2
	16.0	42	22	-	-	-
1-B10	3.0	44	52	5	110	10
	5.5	16	14	5	106	11
	7.5	25	19	3	102	1
	13.0	51	30	3	104	2
1-B11	3.0	36	46	2	98	1
	5.5	30	28	2	99	0
	7.5	41	33	2	103	1
	13.0	64	38	-	-	-
1-B12	3.0	17	21	3	101	2
	6.0	32	28	3	104	2
	7.5	45	35	-	-	-
	11.0	72	46	3	103	2
	16.0	79	42	-	-	-
1-B13	3.0	60	74	2	104	1
	5.5	39	35	-	-	-
	8.0	62	47	3	105	2
	11.0	59	38	2	103	1
	16.0	80	42	-	-	-
1-B14	3.0	25	31	4	105	4
	6.0	38	33	2	99	1
	8.0	70	53	-	-	-
	11.0	59	38	2	102	3
	16.0	63	34	-	-	-
1-B15	3.0	42	52	2	102	23
	6.0	58	51	2	101	21
	8.0	55	42	-	-	-
	10.5	73	49	2	103	25
	16.0	76	41	-	-	-
1-B16	3.0	28	36	2	96	0
	6.0	35	31	-	-	-
	8.0	51	39	-	-	-
	11.0	87	56	3	101	1
	16.0	88	47	8	100	0

TABLE 4
SUMMARY OF LABORATORY TEST RESULTS

Boring	Depth [ft]	N_{field}[3] [b/ft]	$N_{1(60)}$[4] [b/ft]	Moisture Content [percent]	Dry Density [lb/ft^3]	Percent Passing No. 200 Sieve [percent]
	21.0	55	26	-	-	-
	26.0	86	36	4	105	3
1-B17	3.0	82	92	7	122	13
	5.5	77	65	8	112	26
	8.0	42	30	-	-	-
	11.0	20	12	7	108	24
	16.0	37	19	-	-	-
1-B18	3.0	39	48	3	106	26
	5.5	36	33	1	98	2
	8.0	32	24	-	-	-
	11.0	24	16	1	103	3
	16.0	36	19	-	-	-
1-B19	3.0	25	31	4	105	10
	6.0	6	5	4	99	11
	8.0	33	25	-	-	-
	11.0	26	17	5	111	12
	16.0	57	30	-	-	-
1-B20	3.0	10	12	5	106	30
	6.0	26	22	7	110	31
	8.0	27	20	-	-	-
	11.0	47	29	4	107	24
	16.0	83	43	-	-	-
1-B21	3.0	33	40	3	108	36
	6.0	32	28	3	103	23
	8.0	36	27	-	-	-
	11.0	52	33	4	103	22
	16.0	53	28	-	-	-
1-B22	3.0	33	40	3	109	21
	6.0	35	30	3	105	25
	8.0	35	26	-	-	-
	11.0	41	26	-	-	-
	16.0	28	15	3	102	9
2-TP1	2.5	-	-	7.1	-	8.7
	6.0	-	-	4.4	-	3.5
2-TP2	2.5	-	-	9.3	-	4.4
	6.0	-	-	3.2	-	3.5
3-B1	3.0	53	107	5.3	-	8.3

TABLE 4
SUMMARY OF LABORATORY TEST RESULTS

Boring	Depth [ft]	N_{field}[3] [b/ft]	$N_{1(60)}$[4] [b/ft]	Moisture Content [percent]	Dry Density [lb/ft^3]	Percent Passing No. 200 Sieve [percent]
	6.0	8	11	5.7	-	14.3
	11.0	15	16	3.9	-	5.2
3-B2	3.0	11	22	4.4	-	6.0
	6.0	14	20	4.3	-	4.0
	11.0	20	21	4.3	-	5.6
3-B3	3.0	16	32	3.9	-	7.9
	6.0	21	30	5.9	-	9.1
	11.0	34	36	5.2	-	14.8
3-B4	3.0	18	36	1.9	-	16.9
	8.0	13	16	8.6	-	12.1
	11.0	30	32	4.9	-	4.1
3-B5	3.0	15	30	1.9	-	8.7
	6.0	17	24	1.5	-	7.9
	11.0	24	25	3.8	-	3.6

APPENDIX A

ENGEO, INCORPORATED

Boring Logs

7496.1.001.01
August 7, 2007

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

U.S. STANDARD SERIES SIEVE SIZE: 200, 40, 10, 4

CLEAR SQUARE SIEVE OPENINGS: 3/4 ", 3", 12"

SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

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

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%

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

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

LOG OF BORING 1-B1

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/27/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 245 ft.

LOGGED / REVIEWED BY: D. WAHL/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		4" of Asphalt Concrete over 6" of Aggregate Base.						
			SAND with SILT (SW), light tan, dry, dense, fine to medium grained.						
	1					32	2.8	104	11.9
5			SAND (SP), light yellowish brown, moist, medium dense to dense, coarse grained.			24	2.0	102	2.6
	2					28	2.8	102	2.2
10	3					55	3.4	103	2.8
			Grades fine to medium grained.						
	4								
15						46			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B1.bor

LOG OF BORING 1-B4

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 16 ft
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 205 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		4" of Asphalt Concrete over 5" of Aggregate Base.						
			SAND (SP), light brown, slightly moist, medium dense, fine to medium grained, well rounded.						
						27	4.5	103	16.3
	1								
5						43	6.0	104	3.8
	2								
						30			
10	3					84	5.7	104	2.9
	4								
15						73			
	5		Bottom of boring at approximately 16.0' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

LOG OF BORING 1-B5

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/27/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 250 ft.

LOGGED / REVIEWED BY: D. WAHL/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Finer - #200
0	0		12 to 18 inches of Aggregate Base.						
		■	SAND with SILT (SW), brown to dark brown, dry to moist, medium dense, fine grained, some rootlets.			25	3.3	97	5.3
5	1	■				26	3.2	106	13.2
	2	■	SAND (SP), light yellowish brown, moist, medium dense to dense, fine to medium grained.			29	5.7	98	4.9
10	3	■				33	5.6	101	4.4
	4								
15	5	■				46	7.3	103	
			Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

LOG OF BORING 1-B6

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
MARINA, CA
7496100101

DATE DRILLED: 10/27/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 245 ft.

LOGGED / REVIEWED BY: D. WAHL/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		12 to 18 inches of Aggregate Base.						
			SAND with SILT (SW), brown, moist, very dense, fine to medium grained, some organics, some oxidation, some clayey nodules.			50/6"	2.6	111	9.0
	1		Light tan brown, slightly moist, dense, very fine grained.						
5						40	3.2	107	15.6
	2								
			SAND (SP), light yellowish brown, moist, medium dense to dense, fine to medium grained.			45	3.5	104	5.5
10	3					28	3.9	99	5.2
	4								
15						47			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

LOG OF BORING 1-B7

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/31/2006
HOLE DEPTH (FT): Approx. 26 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 200 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		3" of Asphalt Concrete over 6" of Aggregate Base.						
			SAND (SP), light yellowish-brown damp, very dense, fine to medium grained, well rounded.						
						55	5.6	122	10.1
	1								
5						65	6.5	108	4.3
	2								
						51			
10	3					40	5.3	101	2.5
	4								
15									
	5		SAND with SILT (SW), dark brown, very moist, medium dense, fine to medium grained, well rounded.			23			
	6								
20			SAND (SP), yellowish-brown, very moist, medium dense, fine to medium grained, well rounded.			18			
	7								
25									
	8					59	5.0	104	3.1
			Bottom of boring at approximately 26.5' below ground surface. No groundwater encountered.						
30	9								

LOG OF BORING 1-B8

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/27/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 125 ft.

LOGGED / REVIEWED BY: D. WAHL/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Passing - #200
0	0		3" of Asphalt Concrete over 6" of Aggregate Base.						
			SAND with SILT (SW), brown to dark brown, moist, dense, gravel to 1" diameter.						
		■	SAND (SP), light yellowish brown, moist, dense, medium to coarse grained.			59	2.3	105	2.9
	1								
5		■				39	2.2	103	1.9
	2		Grades medium grained.						
		■				39	2.7	102	1.8
10	3		Grades coarse grained.						
		■				42	2.2	104	1.5
	4								
15		■				47	2.7	101	1.4
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B8.bor

LOG OF BORING 1-B9

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/27/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 130 ft.

LOGGED / REVIEWED BY: D. WAHL/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		3" of Asphalt Concrete over 6" of Aggregate Base.						
			SAND (SP), light yellowish tan, moist, dense, coarse grained.						
						47	1.6	106	0.9
	1								
5						35	1.7	106	0.8
	2								
						48	1.9	106	0.9
			Grades medium grained.						
10	3								
						60	2.3	103	2.3
	4								
15									
	5					42			
			Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B9.bor

LOG OF BORING 1-B10

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/27/2006
HOLE DEPTH (FT): Approx. 13 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 195 ft.

LOGGED / REVIEWED BY: D. WAHL/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		2" of Asphalt Concrete over 4" of Aggregate Base.						
			SAND (SP), light yellowish tan, moist, dense, coarse grained.						
	1	■				44	5.2	110	10.1
5		■				16	5.2	106	10.5
	2	■				25	3.1	102	1.1
			Grades medium grained.						
10	3								
	4	■				51	2.9	104	1.8
15									
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B10.bor

LOG OF BORING 1-B11

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/27/06
HOLE DEPTH (FT): Approx. 13 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 165 ft.

LOGGED / REVIEWED BY: D. WAHL/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		2" of Asphalt Concrete over 8" of Aggregate Base.						
			SAND (SP), light yellowish tan, slightly moist, medium dense, fine grained.						
	1					36	2.1	98	1.2
5						30	2.4	99	0.3
	2					41	2.4	103	0.6
10	3								
	4					64			
15	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
25	7								
30	8								
	9								

LOG OF BORING 1-B12

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 120 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		3" of Asphalt Concrete over 4" of Aggregate Base.						
			SAND (SP), light yellowish-brown, slightly moist, medium dense, fine to medium grained, well rounded.						
		■				17	2.6	101	2.0
	1								
5		■				32	2.8	104	1.6
	2	■							
		■				45			
10	3	■				72	2.6	103	1.7
	4								
15		■				79			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B12.bor

LOG OF BORING 1-B13

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 13 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 100 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		5" of Asphalt Concrete over 6" of Aggregate Base.						
			SAND (SP), light yellowish-brown, slightly moist, very dense, fine to medium grained, well rounded.						
						60	1.8	104	0.6
	1								
5						39			
	2								
			Grades fine to course grained.			62	2.6	105	2.2
10	3					59	2.4	103	1.1
	4								
15						80			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B13.bor

LOG OF BORING 1-B14

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 125 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		5" of Asphalt Concrete over 6" of Aggregate Base.						
			SAND (SP), dark yellowish-brown, slightly moist, medium dense, fine to medium grained, well rounded.						
						25	4.0	105	4.4
	1								
5						38	1.5	99	0.8
	2								
						70			
10	3					59	1.8	102	2.9
	4								
15						63			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B14.bor

LOG OF BORING 1-B15

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 75 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		9" Asphalt						
			4" of Aggregate Base.						
			SILTY SAND (SM), pale yellow, moist, dense, fine to medium grained, well rounded sand, some gravel to 1/4" diameter, well rounded gravel.						
	1					42	1.9	102	23.1
5						58	1.7	101	21.2
	2					55			
10	3					73	2.4	103	25.2
	4								
15						76			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

LOG OF BORING 1-B16

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 11/3/2006
HOLE DEPTH (FT): Approx. 31 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 70 ft.

LOGGED / REVIEWED BY: P.Najar/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		2" of Asphalt Concrete over 6" of Aggregate Base.						
			SAND (SP), light yellowish-brown, damp, dense, fine to medium grained, well rounded sand.						
	1					28	1.9	96	0.3
5						35			
	2					51			
10	3					87	2.8	101	1.4
	4								
15						88	7.7	100	0.0
	5								
20	6					55			
	7								
25	8		Grades fine to course grained, moist.			86	4.0	105	2.7
30	9					70			
	10		Bottom of boring at approximately 31.5' below ground surface. No groundwater encountered.						
35									

LOG OF BORING 1-B17

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 105 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		3" Asphalt						
			4" of Aggregate Base.						
		■	SAND (SP), dark yellowish-brown, moist, very dense, fine to medium grained, well rounded sand, trace silt.			82	7.1	122	13.0
	1								
5			Grades some silt, dark brown.						
		■	SILTY SAND (SM), dark brown, moist, dense, fine to medium grained, well rounded.			77	7.8	112	25.9
	2	■				42			
10	3	■				20	6.8	108	24.2
			SAND (SP), dark yellowish-brown, moist, medium dense, fine to medium grained, well rounded, trace silt.						
	4								
15		■	Becomes light yellowish-brown.			37			
	5								
			Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
25	7								
	8								
30	9								

LOG OF BORING 1-B18

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 95 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		3" Asphalt						
			4" of Aggregate Base.						
			SILTY SAND (SM), light yellowish-brown, moist, dense, fine to medium grained, well rounded.			39	2.5	106	26.0
	1								
5			SAND (SP), light yellowish-brown, moist, dense, fine to medium grained, well rounded.			36	1.4	98	1.7
	2					32			
10	3					24	1.3	103	3.2
	4								
15						36			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B18.bor

LOG OF BORING 1-B19

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/30/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 80 ft.

LOGGED / REVIEWED BY: P.NAJAR/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		3" Asphalt						
			4" of Aggregate Base.						
			SAND with SILT (SW), dark brown, moist, loose to medium dense, fine to medium grained, well rounded.						
						25	3.6	105	10.2
5	1								
						6	4.0	99	10.8
	2								
			SAND (SP), dark yellowish-brown, moist, medium dense, fine to medium grained, well rounded, some silt.			33			
10	3								
						26	4.8	111	11.5
	4								
15									
	5					57			
			Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
	7								
25	8								
	9								
30									

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B19.bor

LOG OF BORING 1-B20

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/31/2006
HOLE DEPTH (FT): Approx. 16 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 115 ft.

LOGGED / REVIEWED BY: P.Najar/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		Grassy surface SILTY SAND (SM), dark yellowish-brown, loose, slightly moist, fine to medium grained, well rounded.						
			Becomes reddish-yellow, loose, slightly moist, fine to medium grained, well-rounded.			10	4.5	106	29.5
5	1					26	6.9	110	30.9
	2					27			
10	3					47	4.0	107	24.1
	4								
15	5					83			
			Bottom of boring at approximately 16.0' below ground surface. No groundwater encountered.						
20	6								
25	7								
	8								
30	9								

LOG OF BORING 1-B21

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 10/31/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 110 ft.

LOGGED / REVIEWED BY: P.Najar/B.R.
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		Grassy surface SILTY SAND (SM), light yellowish-brown, slightly moist, medium dense, fine to medium grained, well rounded.						
		■				33	3.2	108	36.0
	1								
5		■				32	3.0	103	22.9
	2								
		■				36			
10	3		Grades dense.						
		■				52	4.1	103	22.0
	4								
15		■				53			
	5		Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
25	7								
	8								
30	9								

08-07-2007 G:\Active Projects\7496\7496100101 GEX\Boring Logs\7496100101-B21.bor

LOG OF BORING 1-B22

ENGEO INCORPORATED

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100101

DATE DRILLED: 11/3/2006
HOLE DEPTH (FT): Approx. 16 1/2 ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): 130 ft.

LOGGED / REVIEWED BY: P.Najar/B.R
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count / Foot	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Percent Fines - #200
0	0		3" of Asphalt Concrete over 6" of Aggregate Base.						
			SILTY SAND (SM), olive-brown, slightly moist, medium dense, fine to medium grained, well rounded.						
						33	3.1	109	20.6
	1								
5			Becomes dark yellowish brown.			35	2.9	105	25.0
	2								
						35			
			SAND (SP), light yellowish-brown, slightly damp, medium dense, fine to medium grained, well rounded.						
10	3								
						41			
	4								
15			Becomes dark yellowish-brown.			28	2.5	102	9.0
	5								
			Bottom of boring at approximately 16.5' below ground surface. No groundwater encountered.						
20	6								
25	7								
	8								
30	9								

LOG OF BORING 3-B1

ENGEO — Expect Excellence

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100301

DATE DRILLED: 7/23/2007
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): Approx. 141 ft.

LOGGED / REVIEWED BY: A. Schuetze /
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			Pavement Surface										
			AGGREGATE BASE (AB)										
	1		WELL GRADED SAND (SW), yellowish brown, very dense, moist, some silt, trace gravel			59				8	5.3		
5	2		WELL GRADED SAND (SW), dark yellowish brown, loose, moist, some silt, trace gravel, trace coarse-grained sand			8				14	5.7		
	3		WELL GRADED SAND (SW), yellowish red, loose, moist, some silt, trace gravel			7							
10	4		WELL GRADED SAND (SW), reddish yellow, medium dense, moist, with silt			15				5	3.9		
15	5		WELL GRADED SAND (SW), reddish yellow, medium dense, moist, with silt, Bottom of boring at 16.5'. GW not encountered during drilling.			30							
			Bottom of boring at 16.5'. GW not encountered during drilling.										

LOG OF BORING 3-B2

ENGEO — Expect Excellence

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100301

DATE DRILLED: 7/23/2007
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): Approx. 148 ft.

LOGGED / REVIEWED BY: A. Schuetze /
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			WELL GRADED SAND (SW), dark yellowish brown, medium dense, moist, some silt										
	1					11				6	4.4		
5			WELL GRADED SAND (SW), reddish yellow, medium dense, moist, some silt			14				4	4.3		
	2		Lighter yellow-brown lens										
			WELL GRADED SAND (SW), light yellow, medium dense, moist, some silt alternating dark-to-light brown fine sands			16							
			alternating dark-to-light brown fine sands										
10	3		WELL GRADED SAND (SW), reddish yellow, medium dense, moist, some silt			20				6	4.3		
	4												
15			WELL GRADED SAND (SW), reddish yellow, dense, moist, some silt, Bottom of boring at 16.5'. GW not encountered during drilling.			36							
	5		Bottom of boring at 16.5'. GW not encountered during drilling.										

LOG OF BORING 3-B3

ENGEO — Expect Excellence

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100301

DATE DRILLED: 7/23/2007
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): Approx. 129 ft.

LOGGED / REVIEWED BY: A. Schuetze /
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			WELL GRADED SAND (SW), dark yellowish brown, medium dense, moist, some silt										
	1					16				8	3.9		
5			WELL GRADED SAND (SW), yellowish red, medium dense, moist, some silt										
	2					21				9	5.9		
						25							
10	3		light yellowish red fine grained sand lens. Approx. 1/4".										
			WELL GRADED SAND (SW), yellowish red, dense, moist, some silt			34				15	5.2		
	4												
15			WELL GRADED SAND (SW), yellowish red, dense, moist, some silt, Bottom of boring at 16.5'. GW not encountered during drilling.			42							
	5		Bottom of boring at 16.5'. GW not encountered during drilling.										

LOG OF BORING 3-B4

ENGEO — Expect Excellence

Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100301

DATE DRILLED: 7/23/2007
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 4.0 in.
SURF ELEV (FT-MSL): Approx. 330 ft.

LOGGED / REVIEWED BY: A. Schuetze /
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 140 lb. Rope and Cathead

Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
	1		WELL GRADED SAND (SW), yellowish brown, medium dense, moist, some silt, trace roots			18				17	1.9		
5	2		WELL GRADED SAND (SW), light yellowish, medium dense, moist, some silt			15							
			WELL GRADED SAND (SW), reddish yellow, medium dense, moist, some silt			13				12	8.6		
10	3		WELL GRADED SAND (SW), light yellowish brown, medium dense, moist, some silt, Bottom of boring at 16.5'. GW not encountered during drilling.			30				4	4.9		
	4												
15	5					47							
			Bottom of boring at 16.5'. GW not encountered during drilling.										

LOG OF BORING 3-B5

ENGEO — Expect Excellence

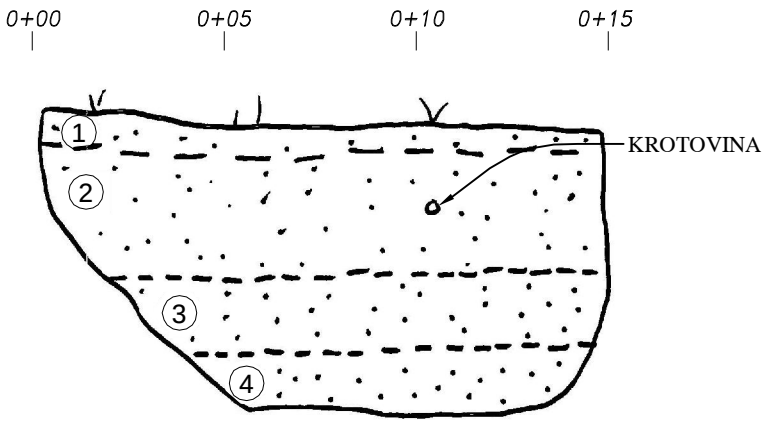
Geotechnical Exploration
Marina Coast R/W 100%
Marina, CA
7496100301

DATE DRILLED: 7/23/2007
HOLE DEPTH: Approx. 16½ ft.
HOLE DIAMETER: 3.0 in.
SURF ELEV (FT-MSL): Approx. 380 ft.

LOGGED / REVIEWED BY: A. Schuetze /
DRILLING CONTRACTOR: Ram Geotechnical
DRILLING METHOD: Solid Flight Auger
HAMMER TYPE: 70 lb. Rope and Cathead

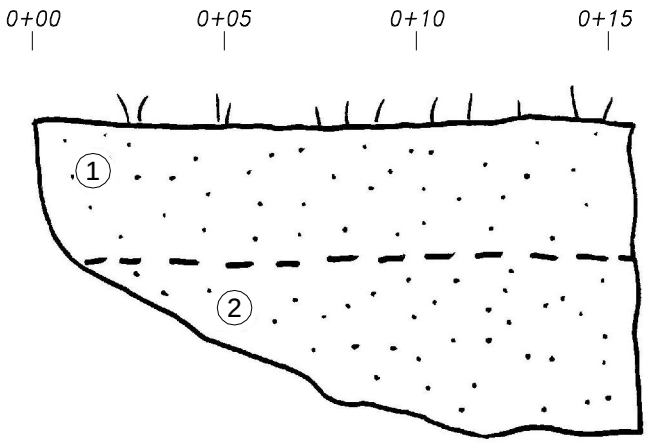
Depth in Feet	Depth in Meters	Sample Type	DESCRIPTION	Log Symbol	Water Level	Blow Count/Foot	Atterberg Limits: Liquid Limit	Atterberg Limits: Plastic Limit	Atterberg Limits: Plasticity Index	Fines Content (% passing #200 sieve)	Moisture Content (% dry weight)	Dry Unit Weight (pcf)	Unconfined Strength (tsf) *field approx
			Asphalt										
			WELL GRADED SAND (SW), dark brown, medium dense, dry to moist, with silt, trace roots										
	1					15				9	1.9		
5			WELL GRADED SAND (SW), light yellowish brown, medium dense, dry to moist, some silt										
	2					17				8	1.5		
			WELL GRADED SAND (SW), reddish yellow, medium dense, moist, some silt, reddish-brown clay lenses										
						16							
10	3		WELL GRADED SAND (SW), yellowish brown, medium dense, moist, some silt										
						24				4	3.8		
	4												
15			WELL GRADED SAND (SW), yellowish brown, medium dense, moist, some silt, Bottom of boring at 16.5'. GW not encountered during drilling.										
	5					15							
			Bottom of boring at 16.5'. GW not encountered during drilling.										

2-TP1



1. Sand (SW), dark brown, loose, slightly moist, trace silt, fine to medium grained sand, trace rootlets
2. Sand (SW), dark reddish brown, loose moist, trace silt, fine to medium grained sand
3. Sand (SW), dark yellowish brown, loose, very moist, fine to coarse-grained sand
4. Sand (SW), reddish yellow, loose, very moist, fine to coarse-grained sand

2-TP2



1. Silty SAND (SM), very dark brown, loose to medium dense, dry, fine to medium-grained sand, trace rootlets
2. Sand (SW), dark reddish brown, medium dense to dense, dry, fine to medium-grained sand with silt, trace rootlets

1"=5'

ENGEO INCORPORATED EXCELLENT SERVICE SINCE 1971	TEST PIT LOGS MARINA COAST WATER DISTRICT MARINA, CALIFORNIA	PROJECT NO.: 7496.1.001.01 DATE: AUGUST 2007 DRAWN BY: SRP CHECKED BY:	FIGURE NO. A1

G:\Drafting\DRAFTING2_Dwg\7496\001\7694100101-1-TestPit-0807.dwg 8-07-07 09:22:36 AM spatters

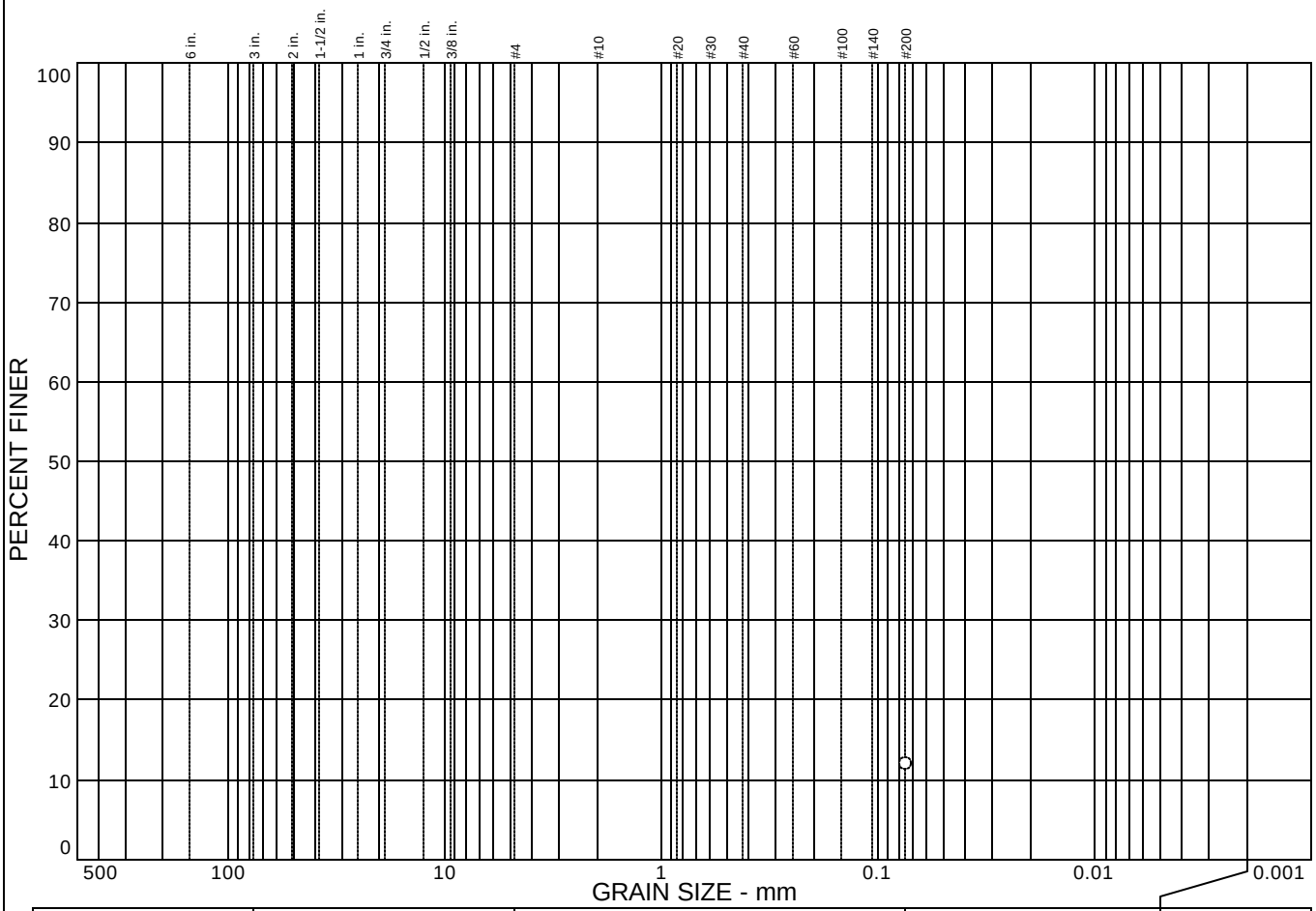
APPENDIX B

ENGEO, INCORPORATED

Laboratory Test Data

7496.1.001.01
August 7, 2007

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			11.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.9		

* (no specification provided)

Soil Description

Brownish yellow 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=

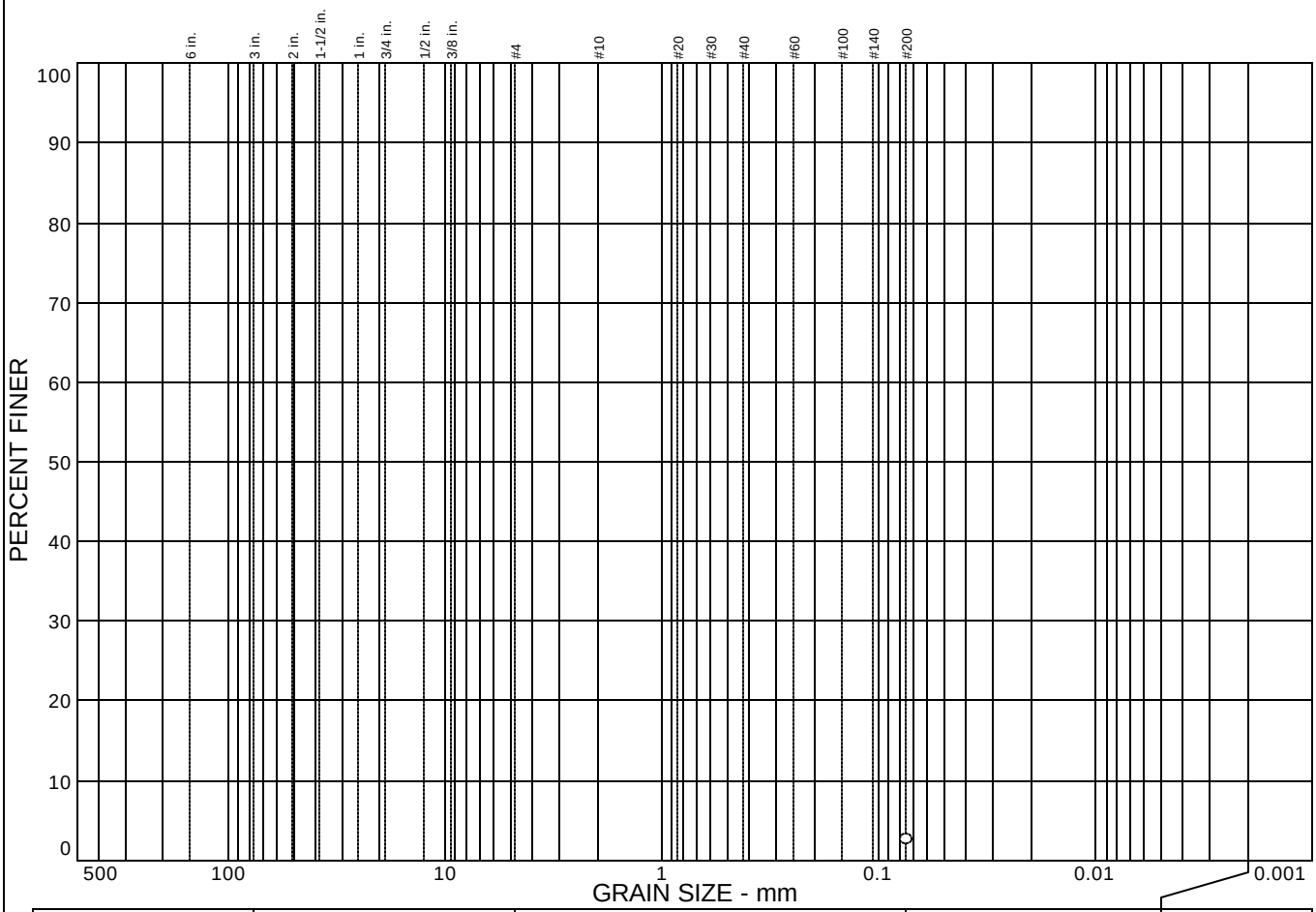
Remarks

Sample No.: B1 @ 2.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 2.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.6		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

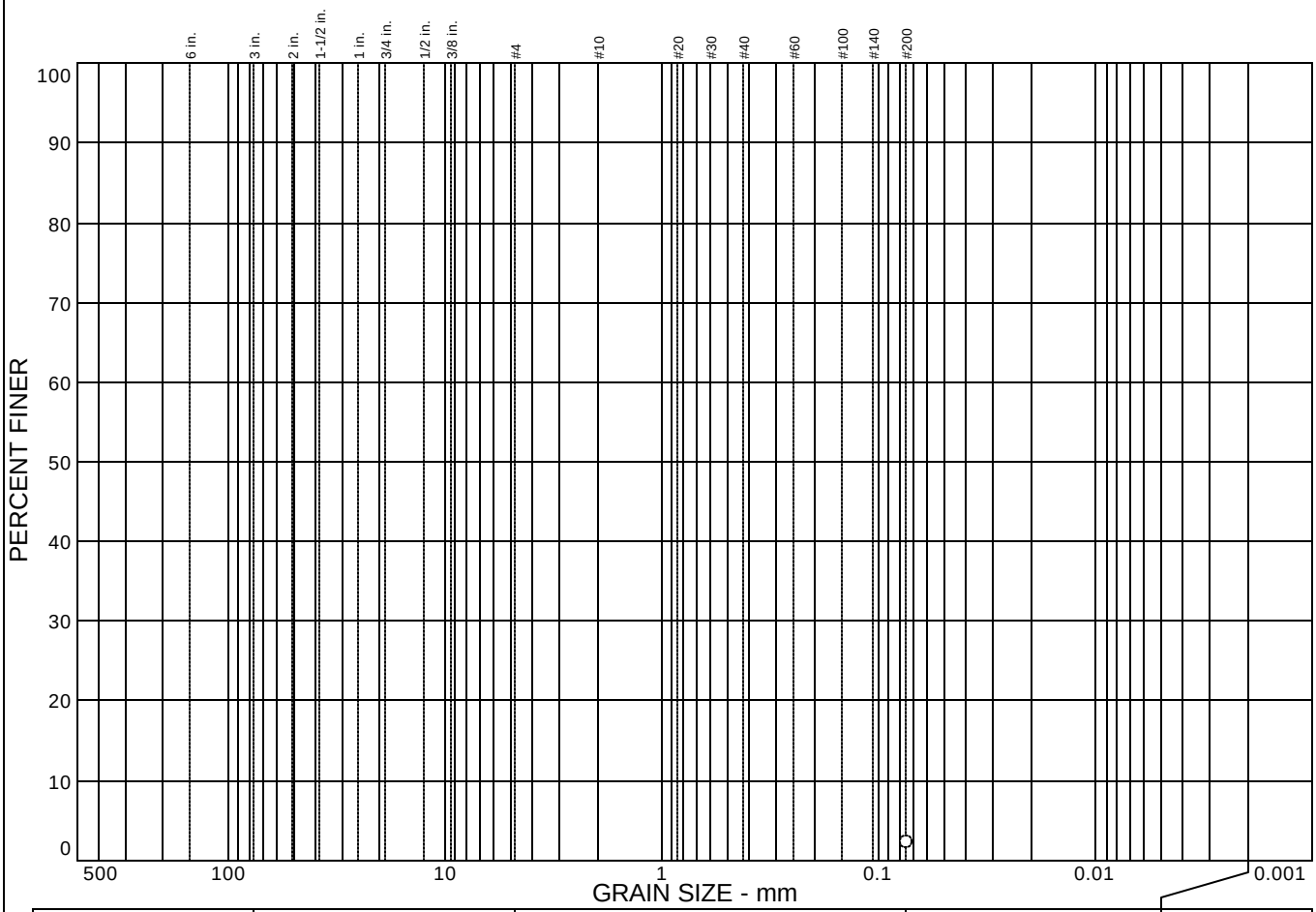
Remarks

Sample No.: B1 @ 6.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.2		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

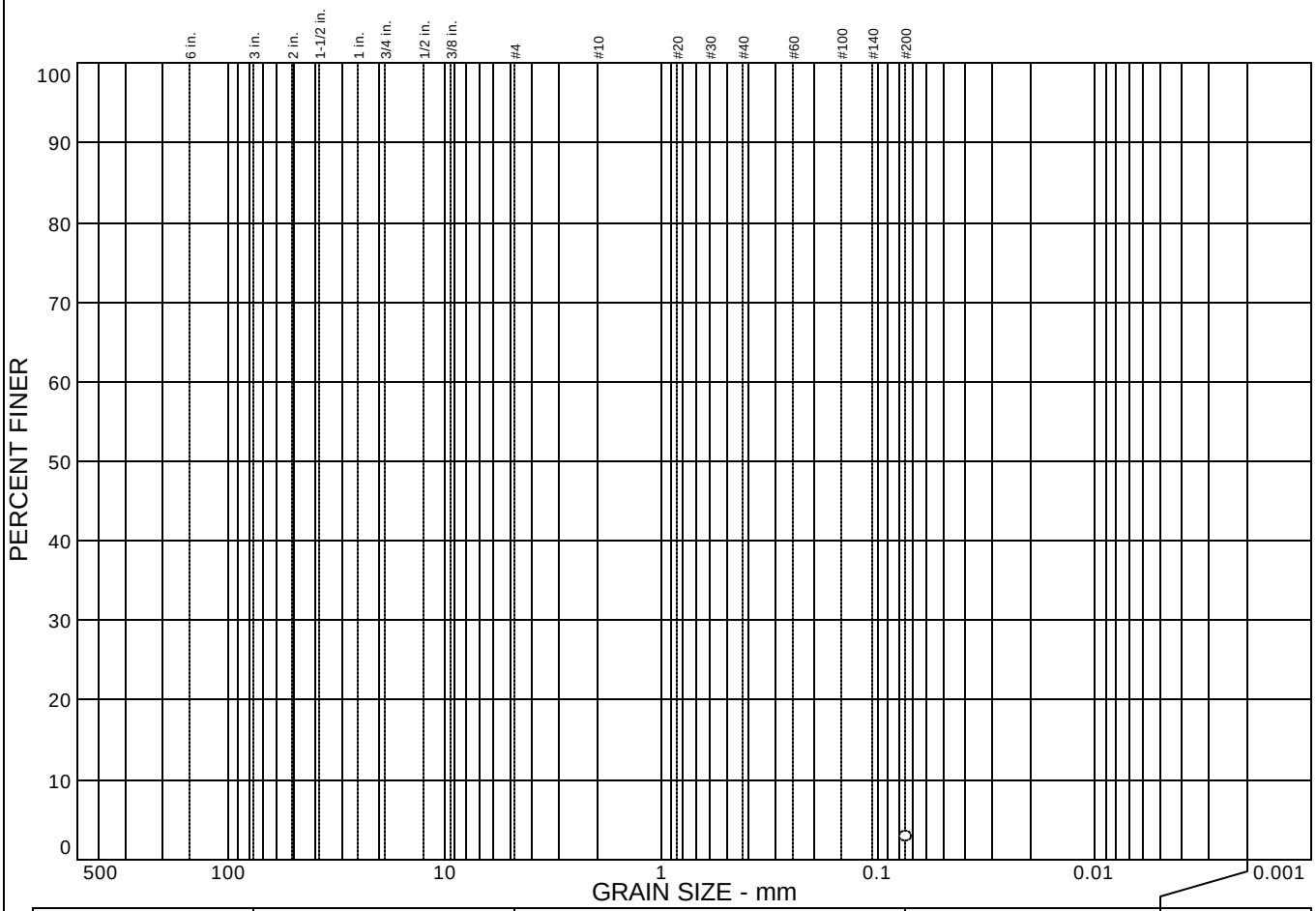
Remarks

Sample No.: B1 @ 8.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 8.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.8		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

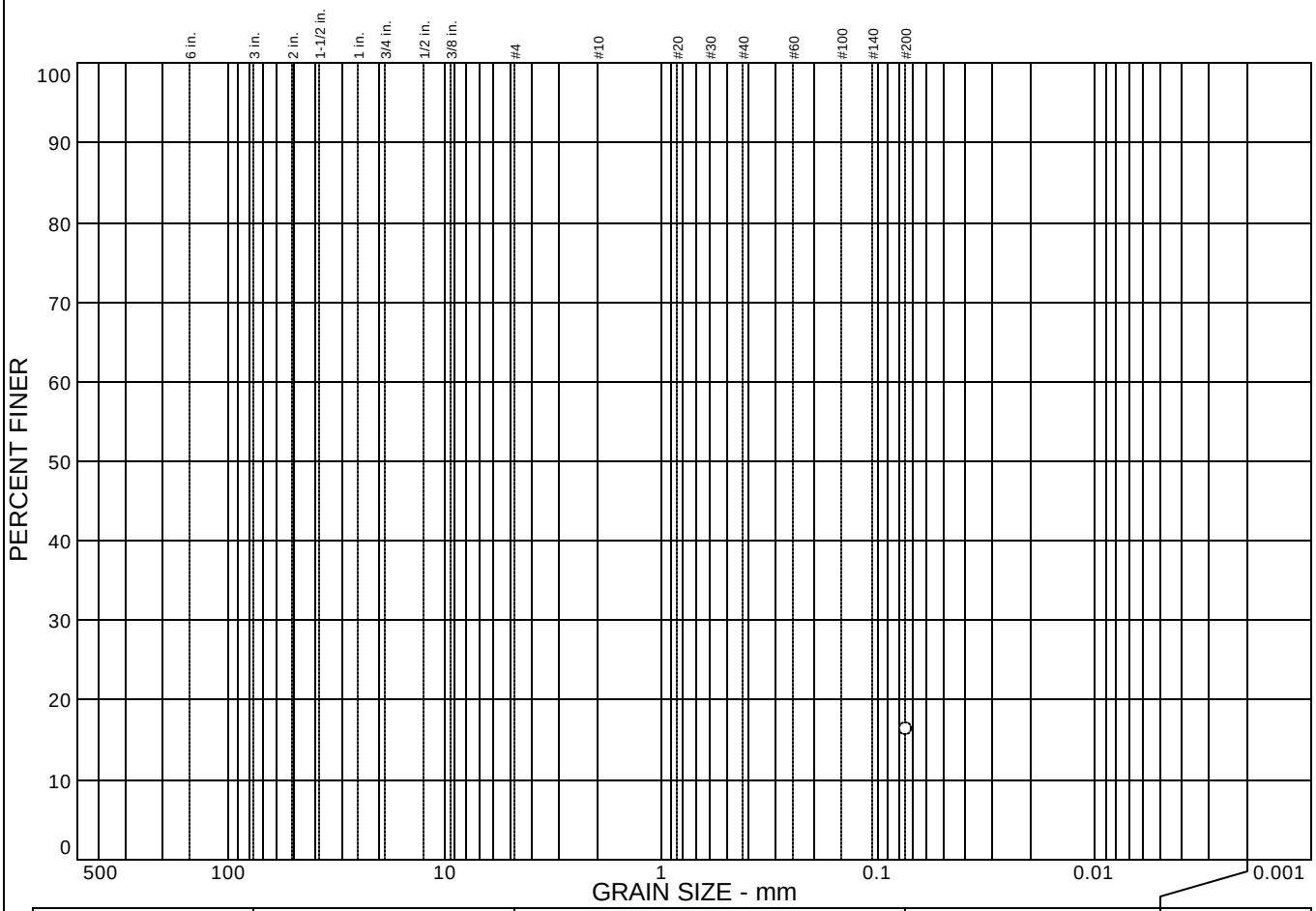
Remarks

Sample No.: B1 @ 11.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			16.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	16.3		

* (no specification provided)

Soil Description

Mix of dark brown and yellowish 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=

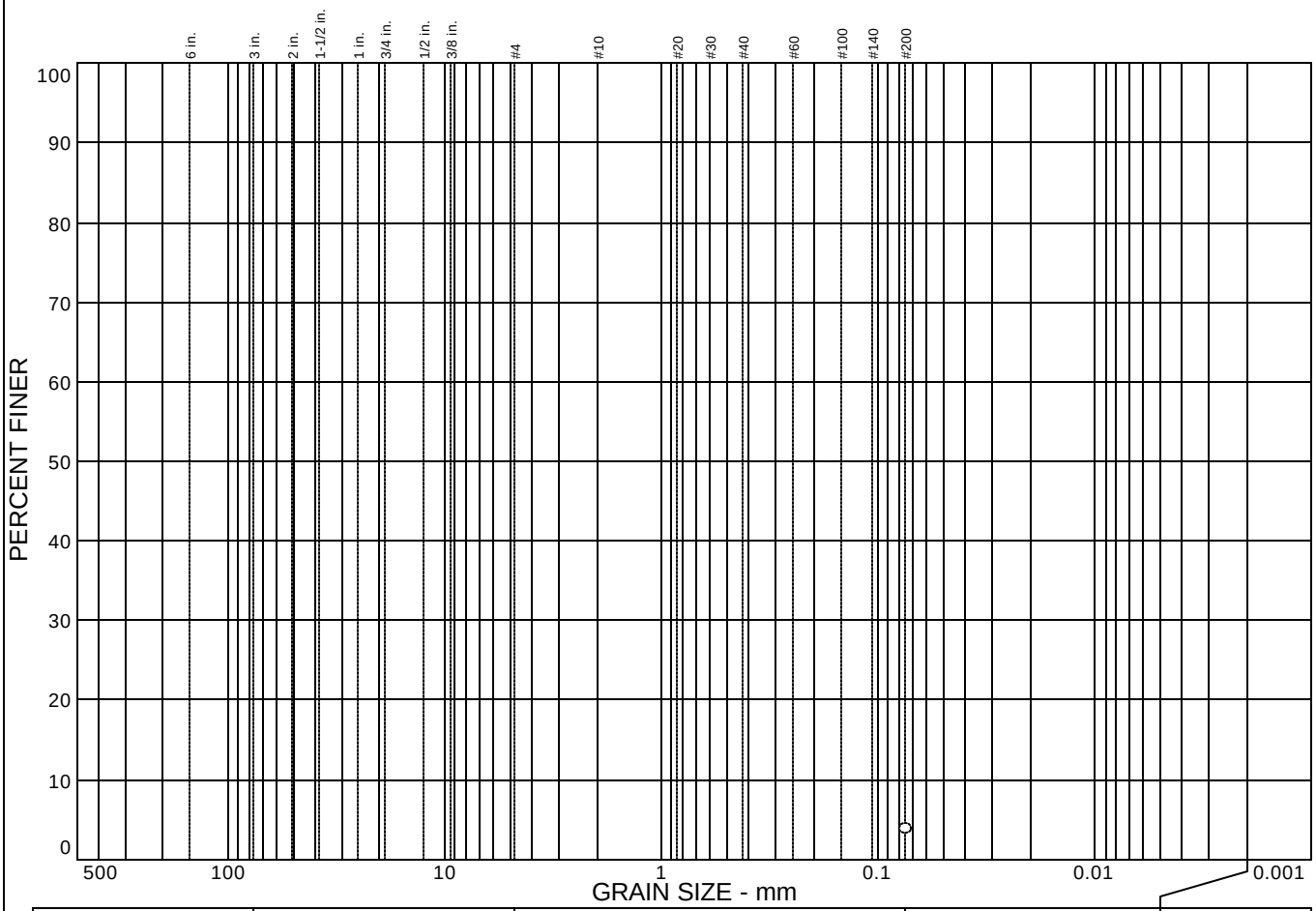
Remarks

Sample No.: B4 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

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

Light yellowish brown SAND. Trace 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=

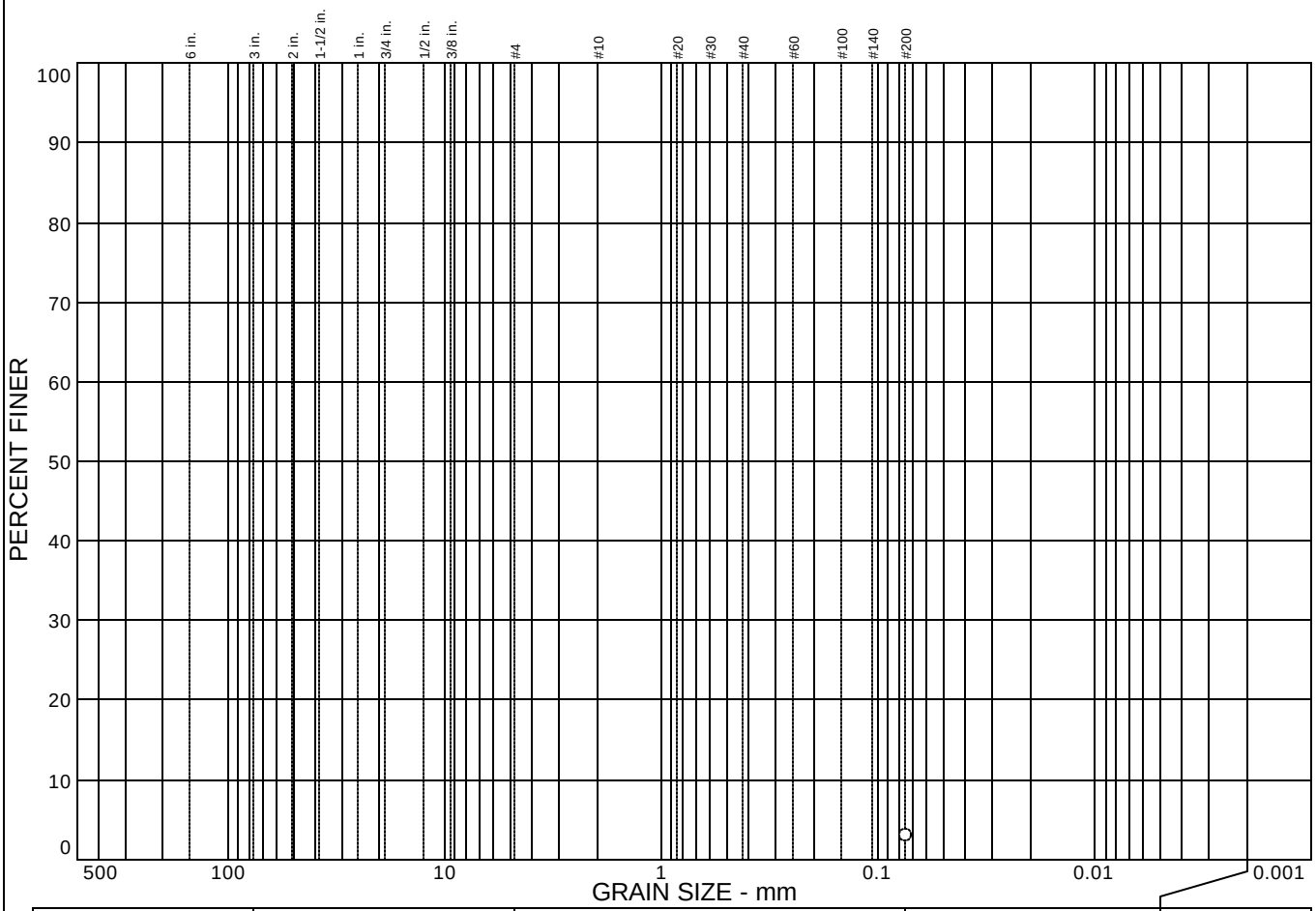
Remarks

Sample No.: B4 @ 6.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.9		

* (no specification provided)

Soil Description

Light yellowish brown SAND. Trace 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=

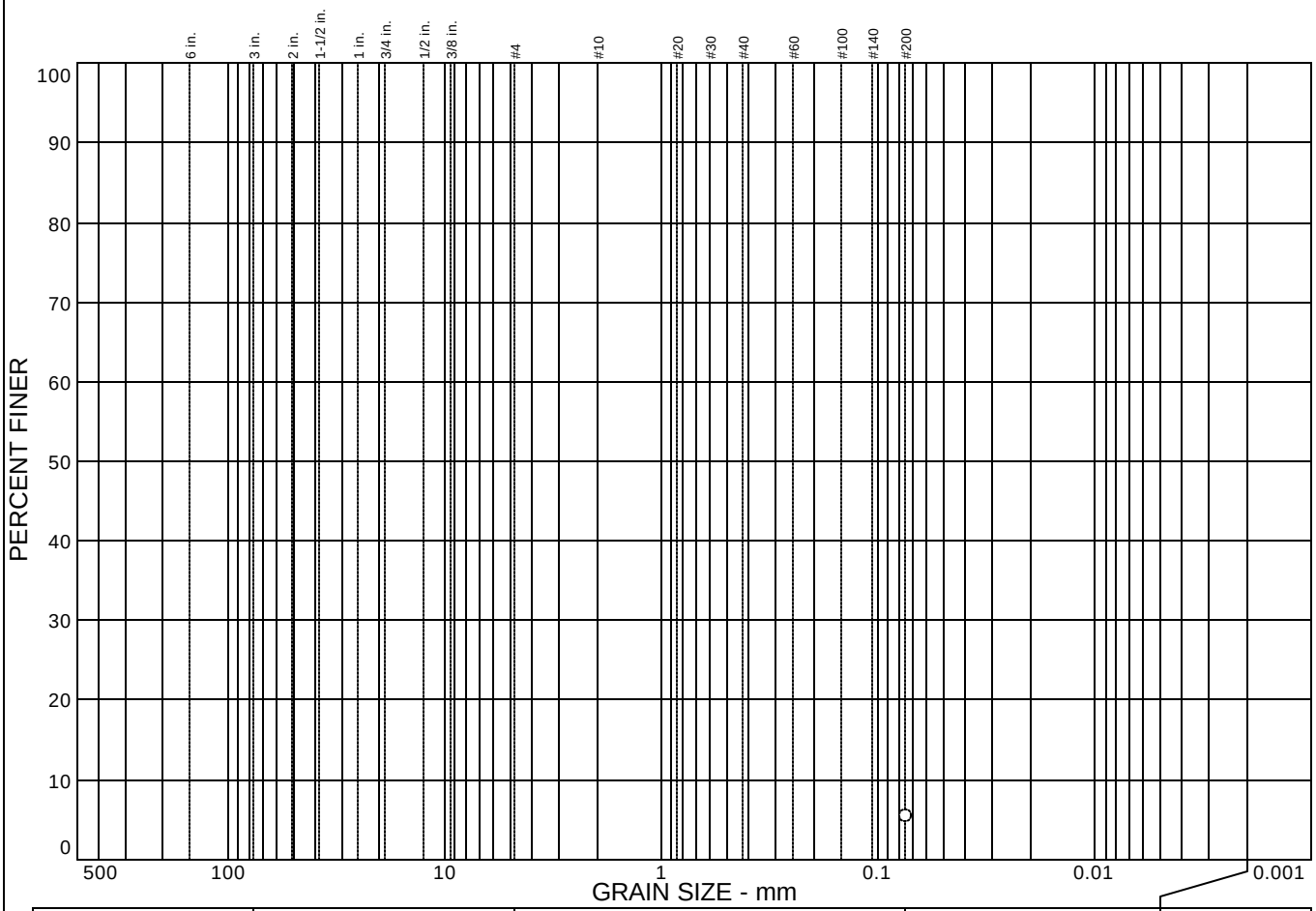
Remarks

Sample No.: B4 @ 10.5' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 10.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

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

Very dark grayish brown SAND. Trace 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=

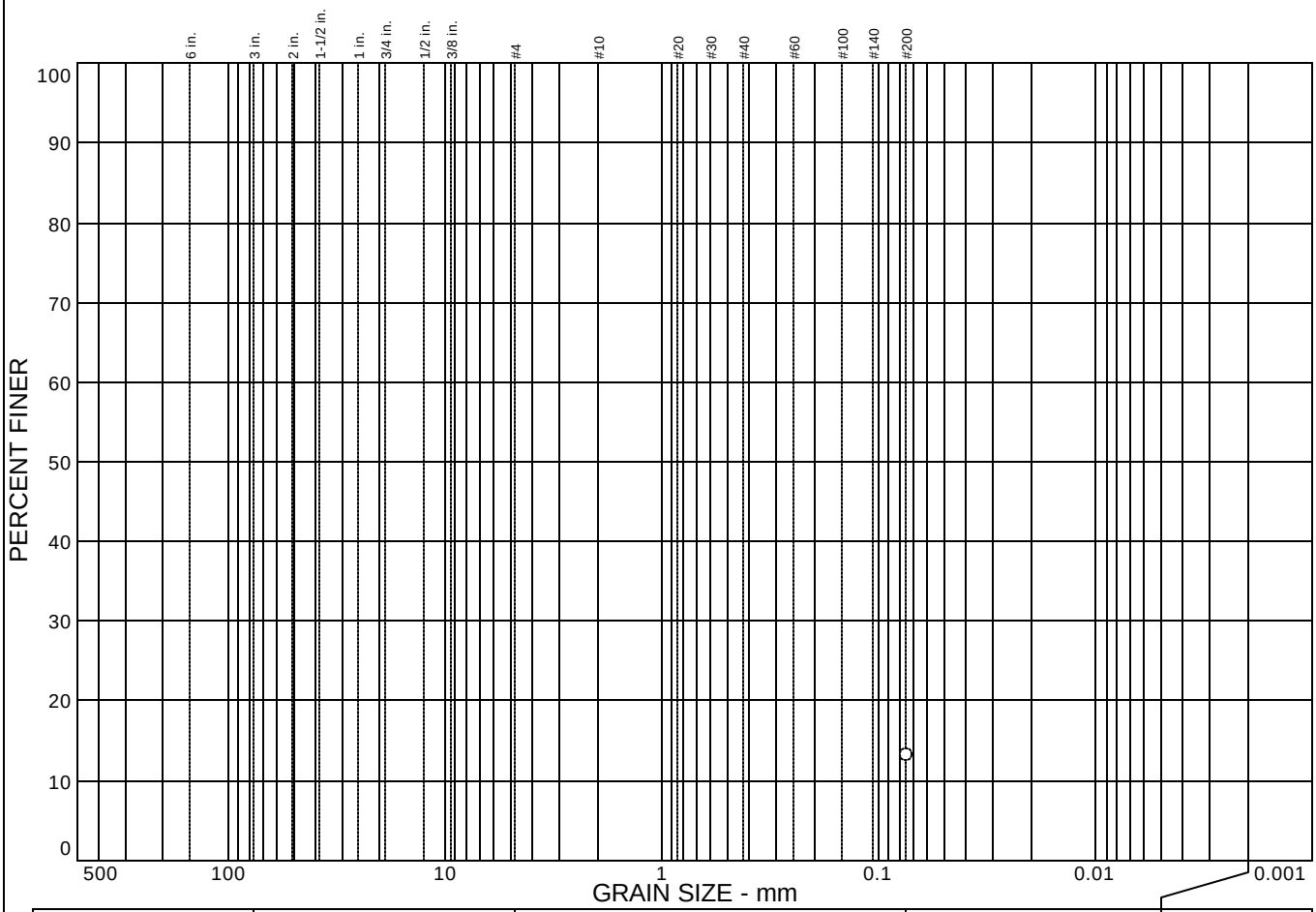
Remarks

Sample No.: B5 @ 3.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			13.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	13.2		

* (no specification provided)

Soil Description

Very dark grayish brown SAND with gravel and 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=

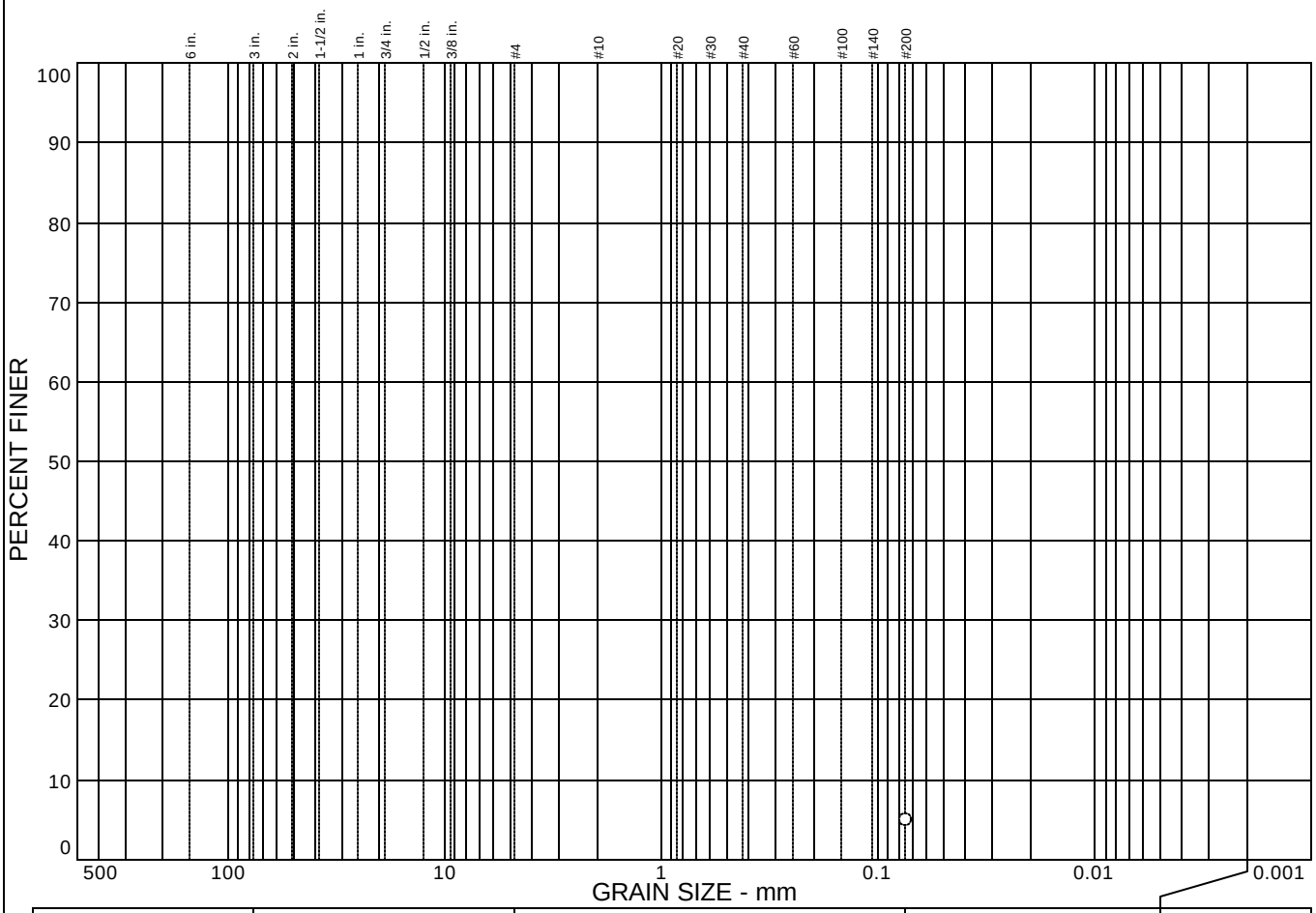
Remarks

Sample No.: B5 @ 6.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			4.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.9		

* (no specification provided)

Soil Description

Dark yellowish brown SAND with trace 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=

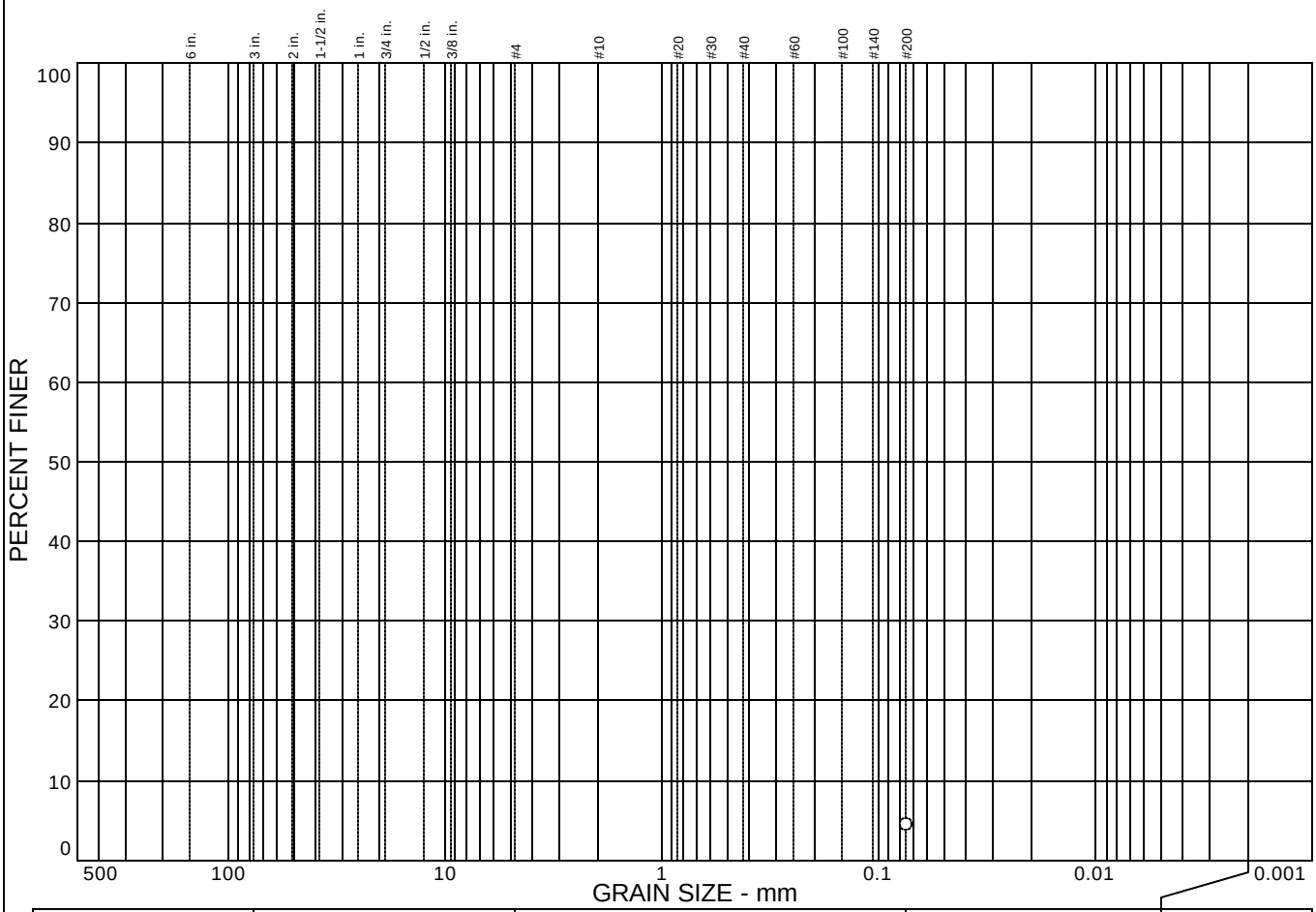
Remarks

Sample No.: B5 @ 8.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 8.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.4		

* (no specification provided)

Soil Description

Olive yellowish SAND. Trace 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=

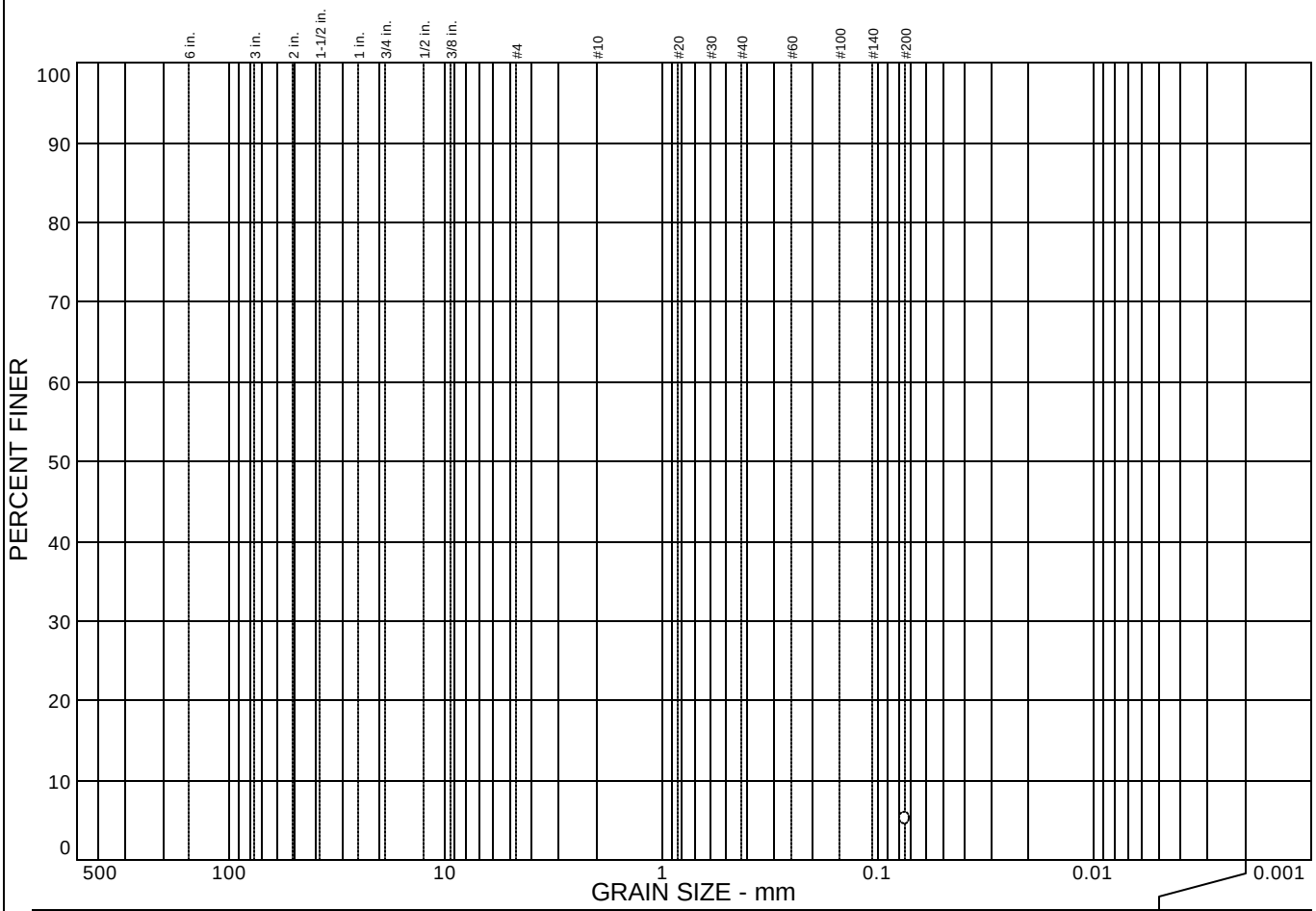
Remarks

Sample No.: B5 @ 11' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

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 yellow SAND. Trace 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=

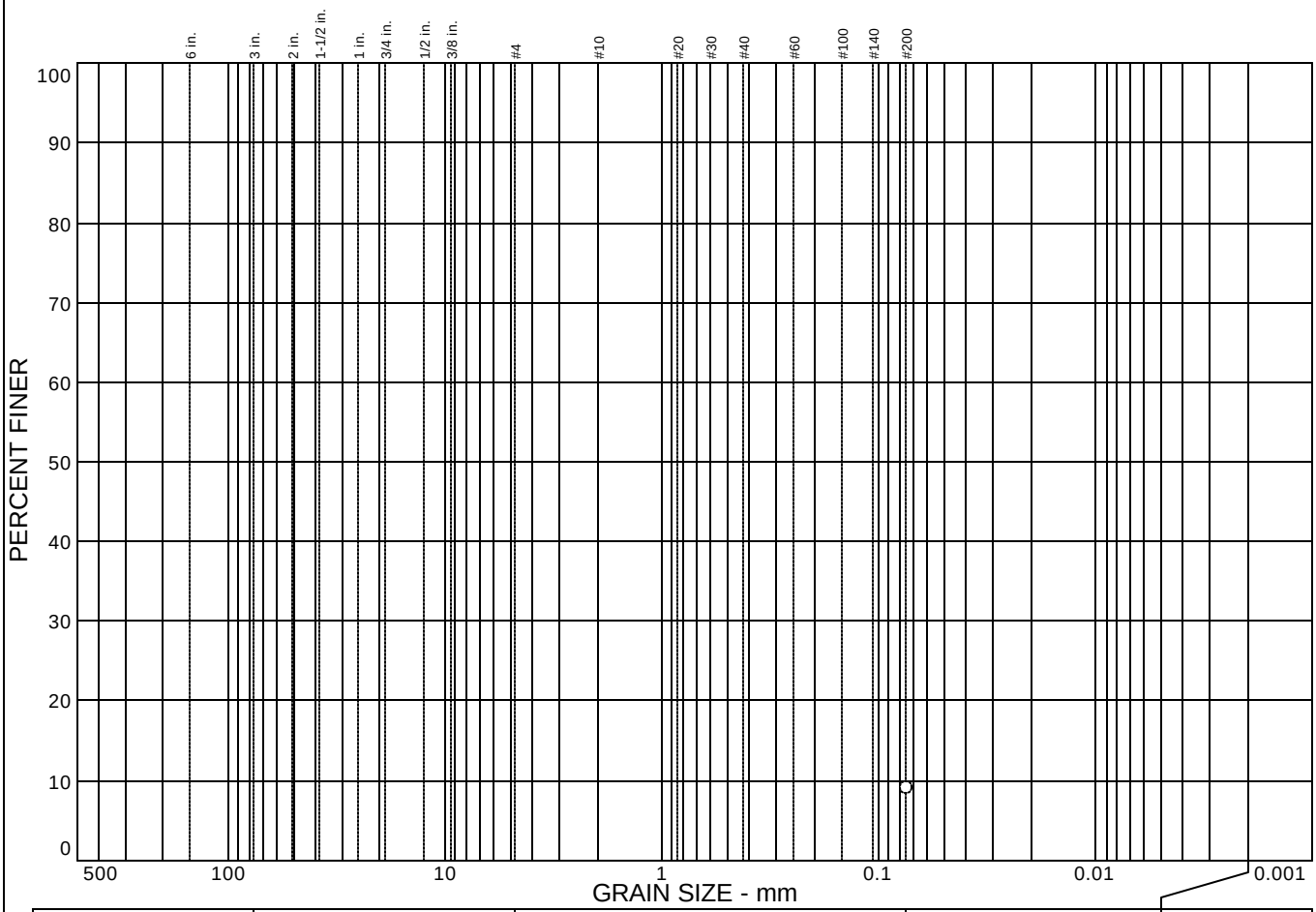
Remarks

Sample No.: B5 @ 16.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 16.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01 **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

Dark yellowish brown 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=

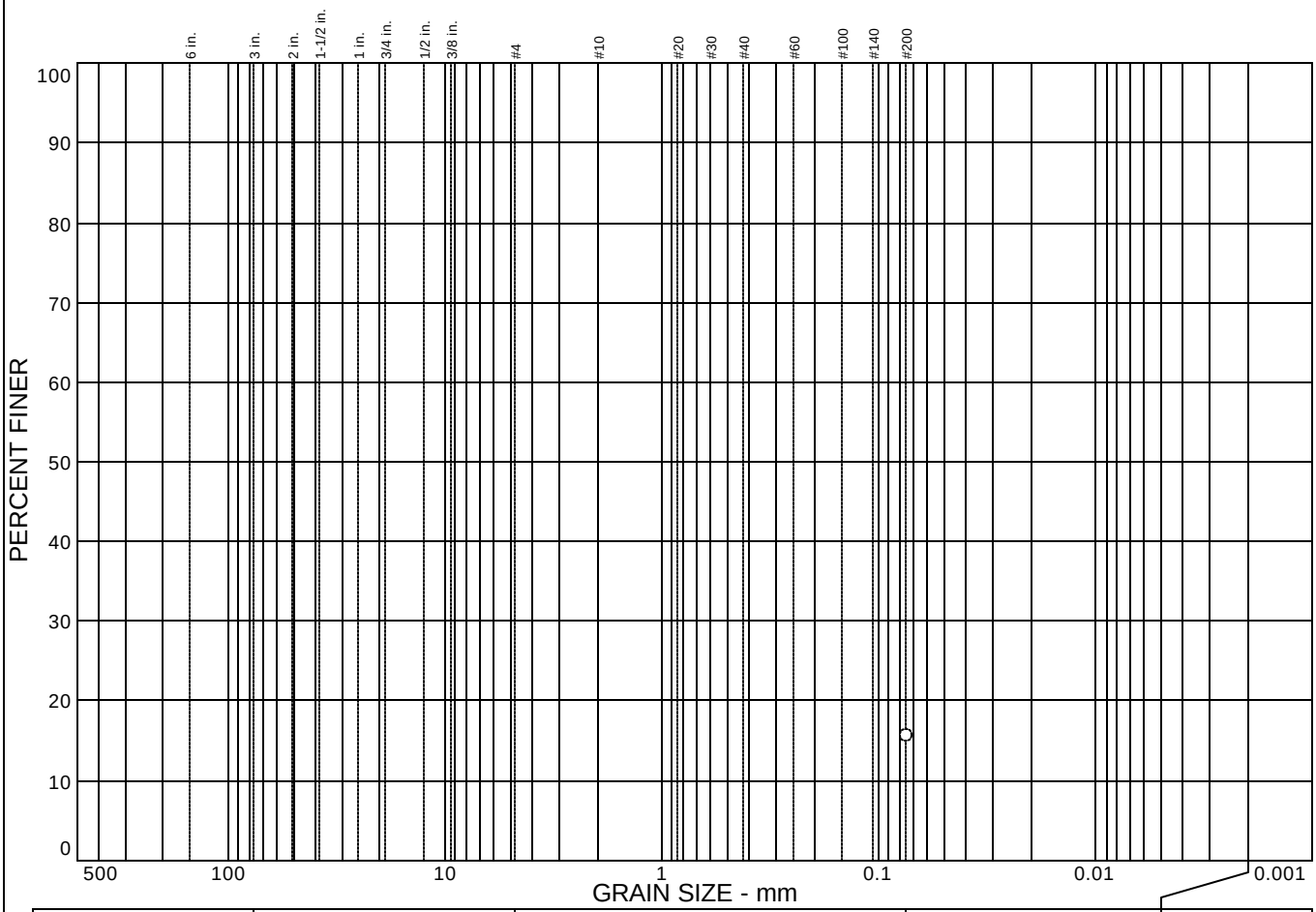
Remarks

Sample No.: B6 @ 3.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			15.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	15.6		

* (no specification provided)

Soil Description

Dark yellowish 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=

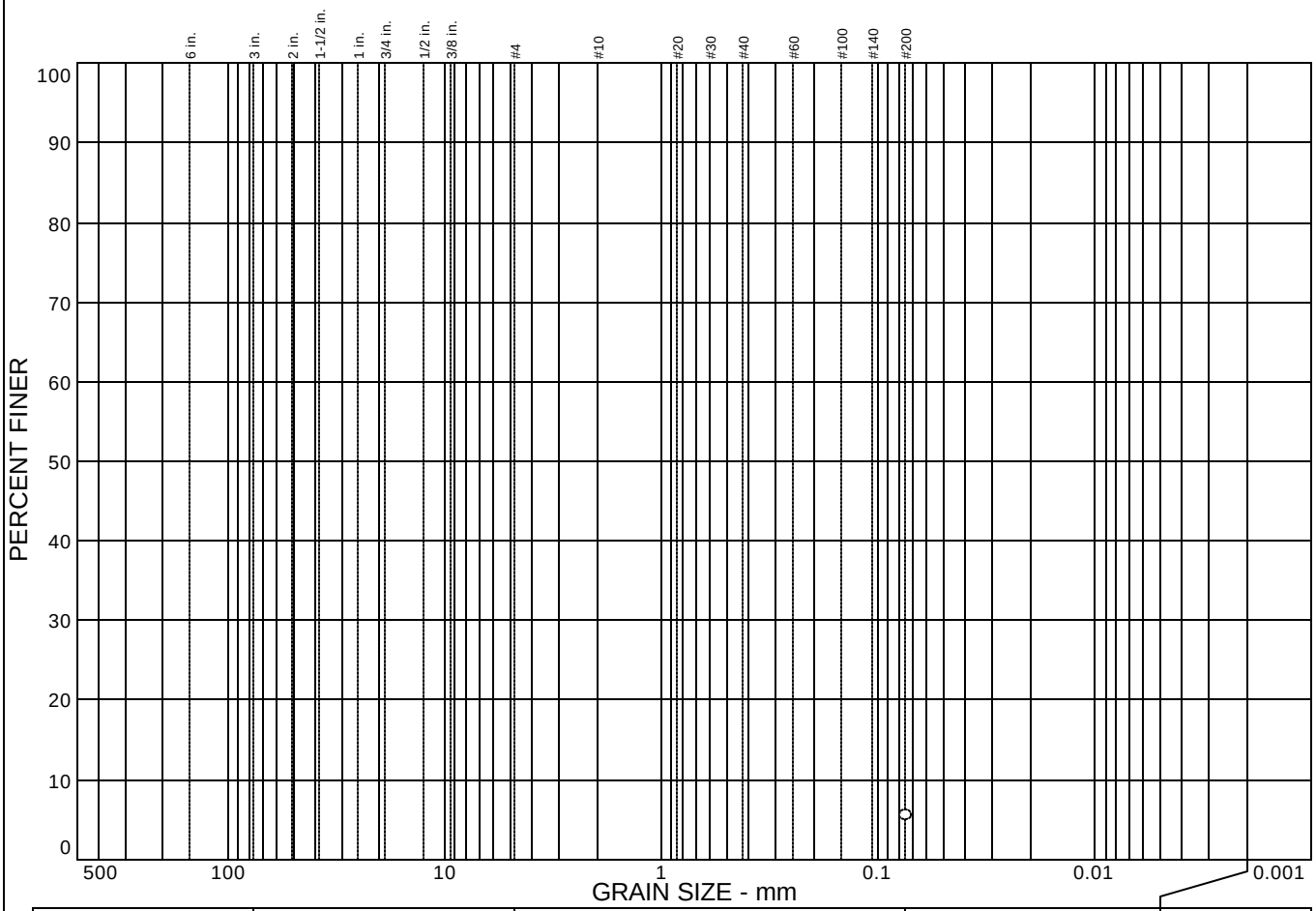
Remarks

Sample No.: B6 @ 6.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			5.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	5.5		

* (no specification provided)

Soil Description

Yellowish brown 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=

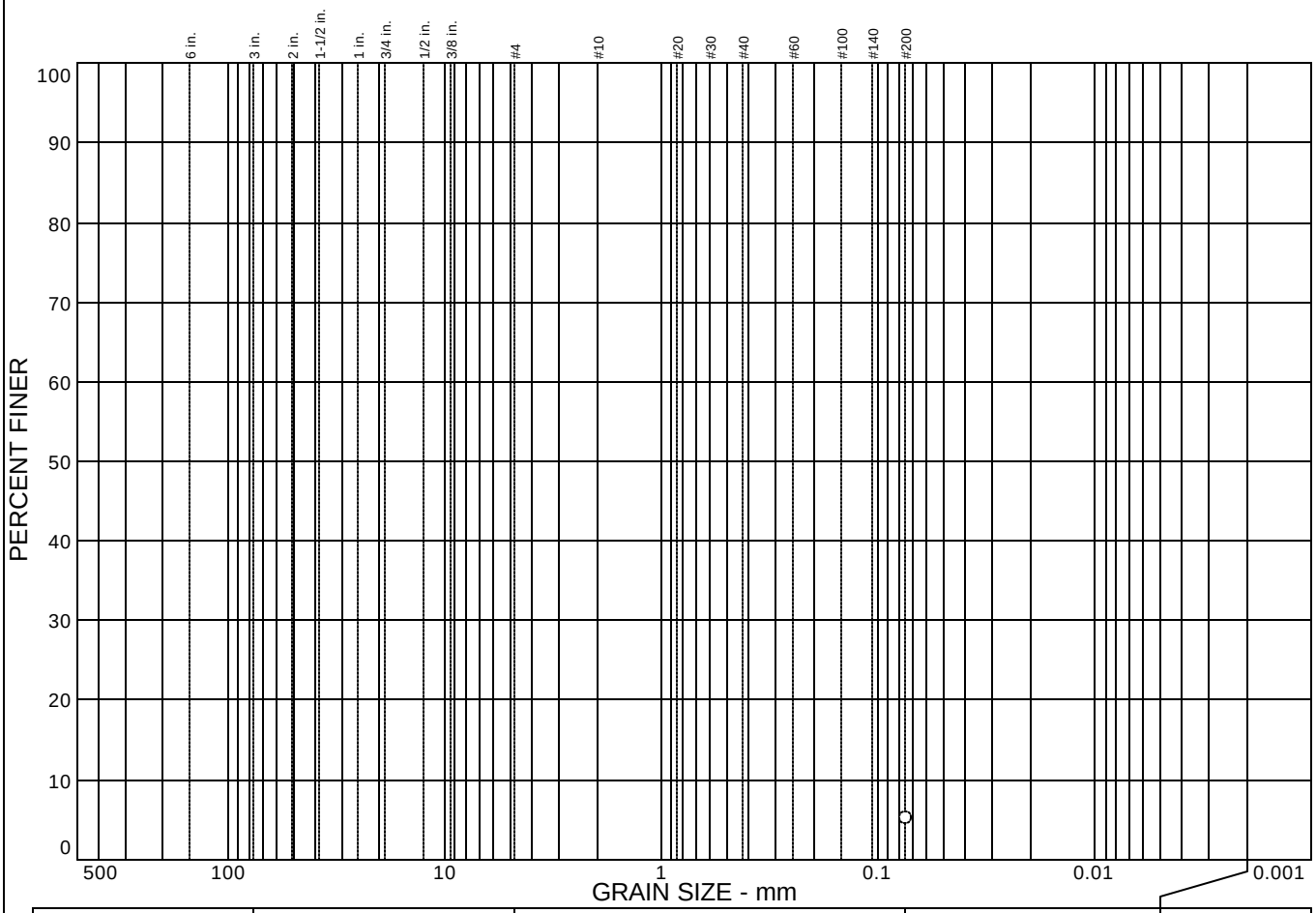
Remarks

Sample No.: B6 @ 8.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 8.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

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

Yellowish brown 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=

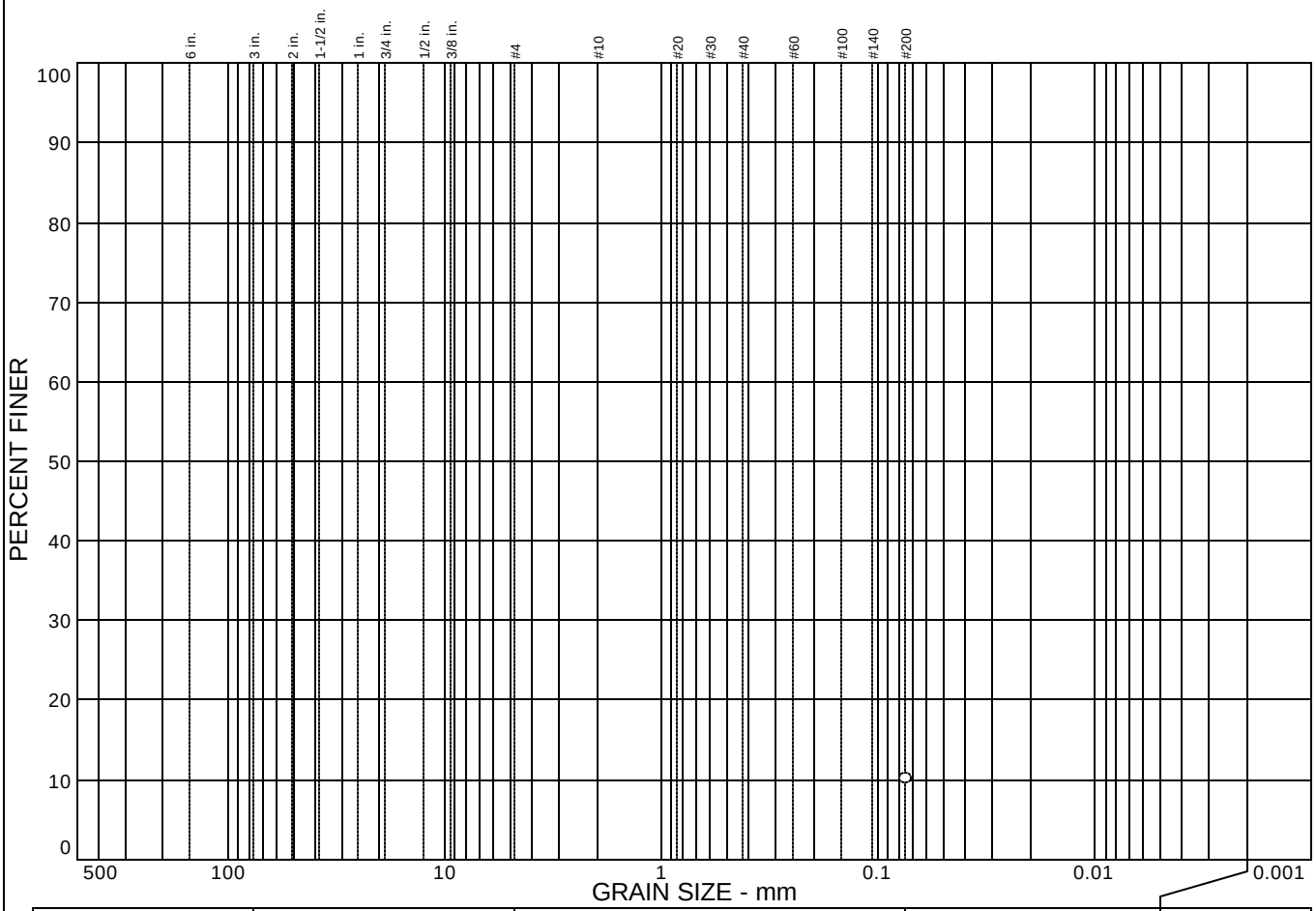
Remarks

Sample No.: B6 @ 11.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			10.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	10.1		

* (no specification provided)

Soil Description

Dark olive brown 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=

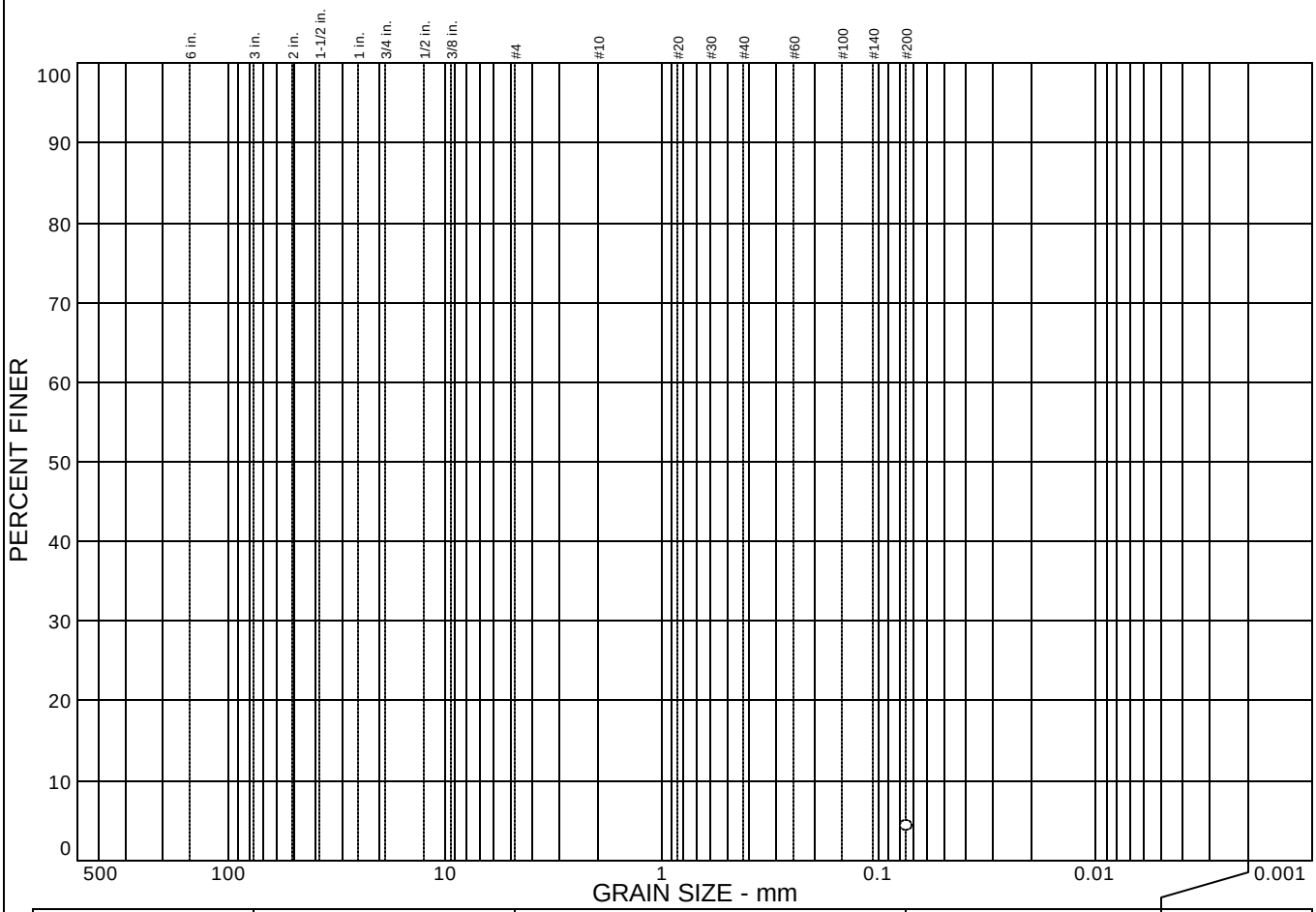
Remarks

Sample No.: B7 @ 2.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 2.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			4.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.3		

* (no specification provided)

Soil Description

Light yellowish brown SAND. Trace 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=

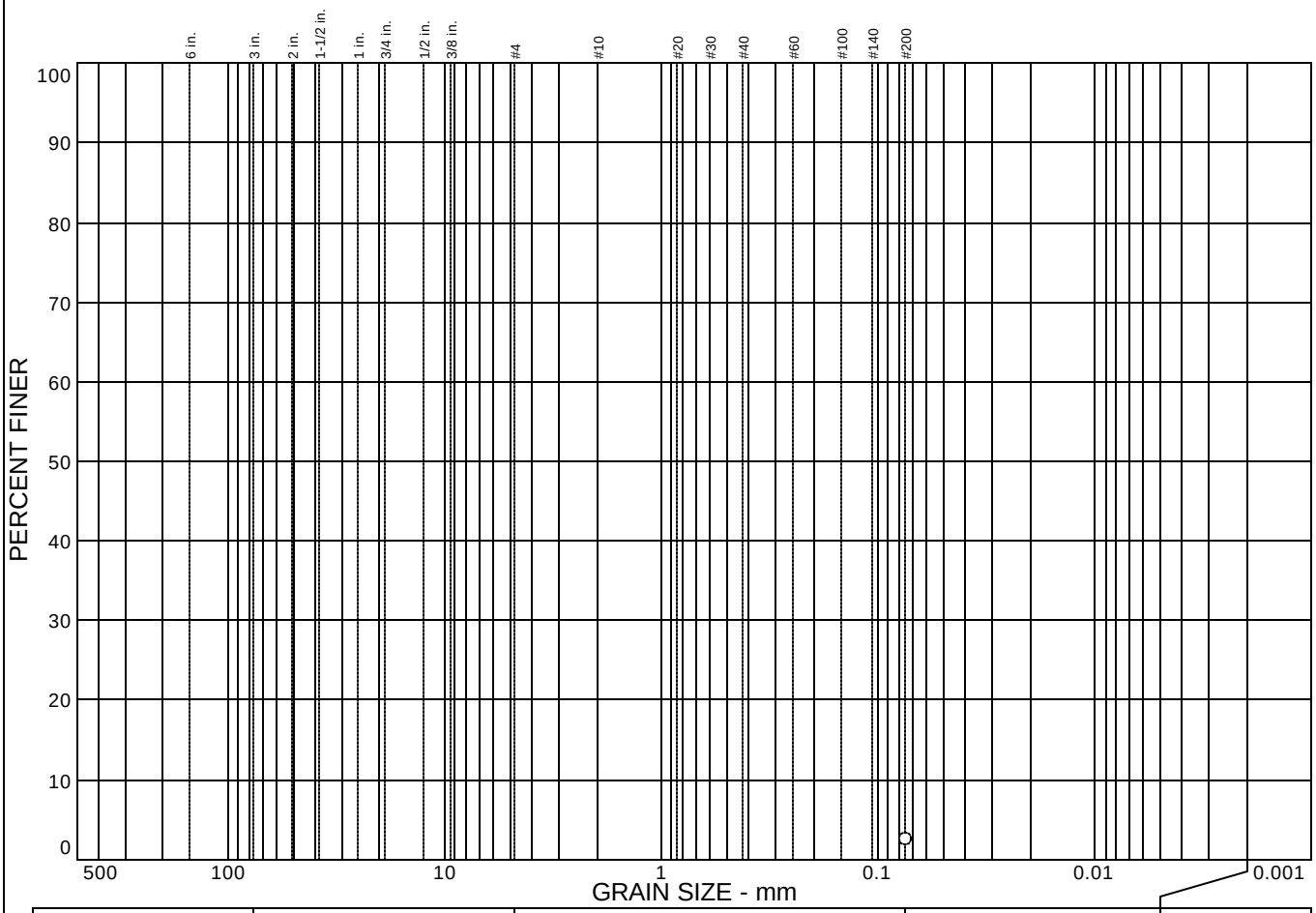
Remarks

Sample No.: B7 @ 6.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.5		

* (no specification provided)

Soil Description

Light yellowish brown SAND. Trace 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=

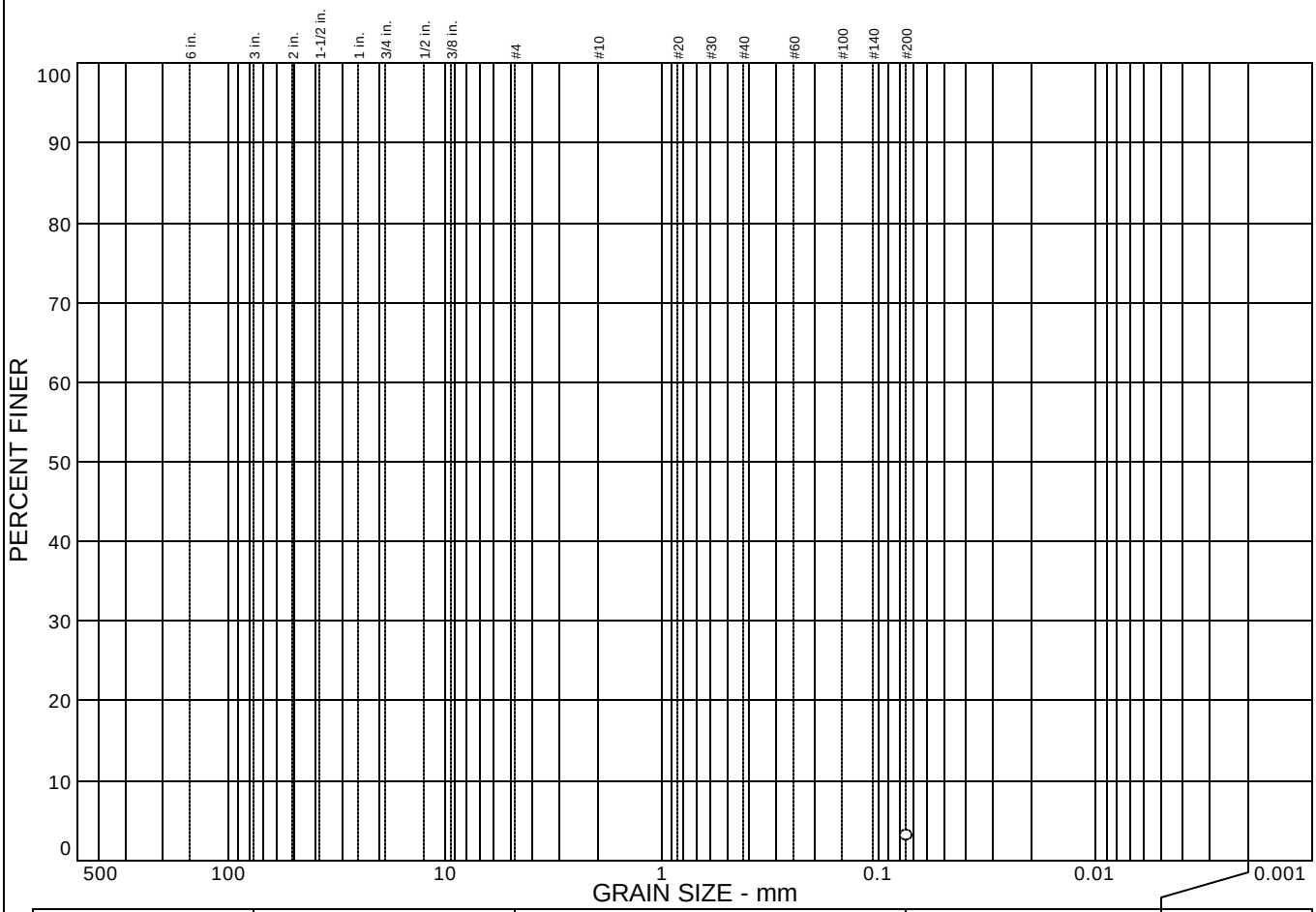
Remarks

Sample No.: B7 @ 11.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			3.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	3.1		

* (no specification provided)

Soil Description

Light yellowish brown SAND. Trace 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=

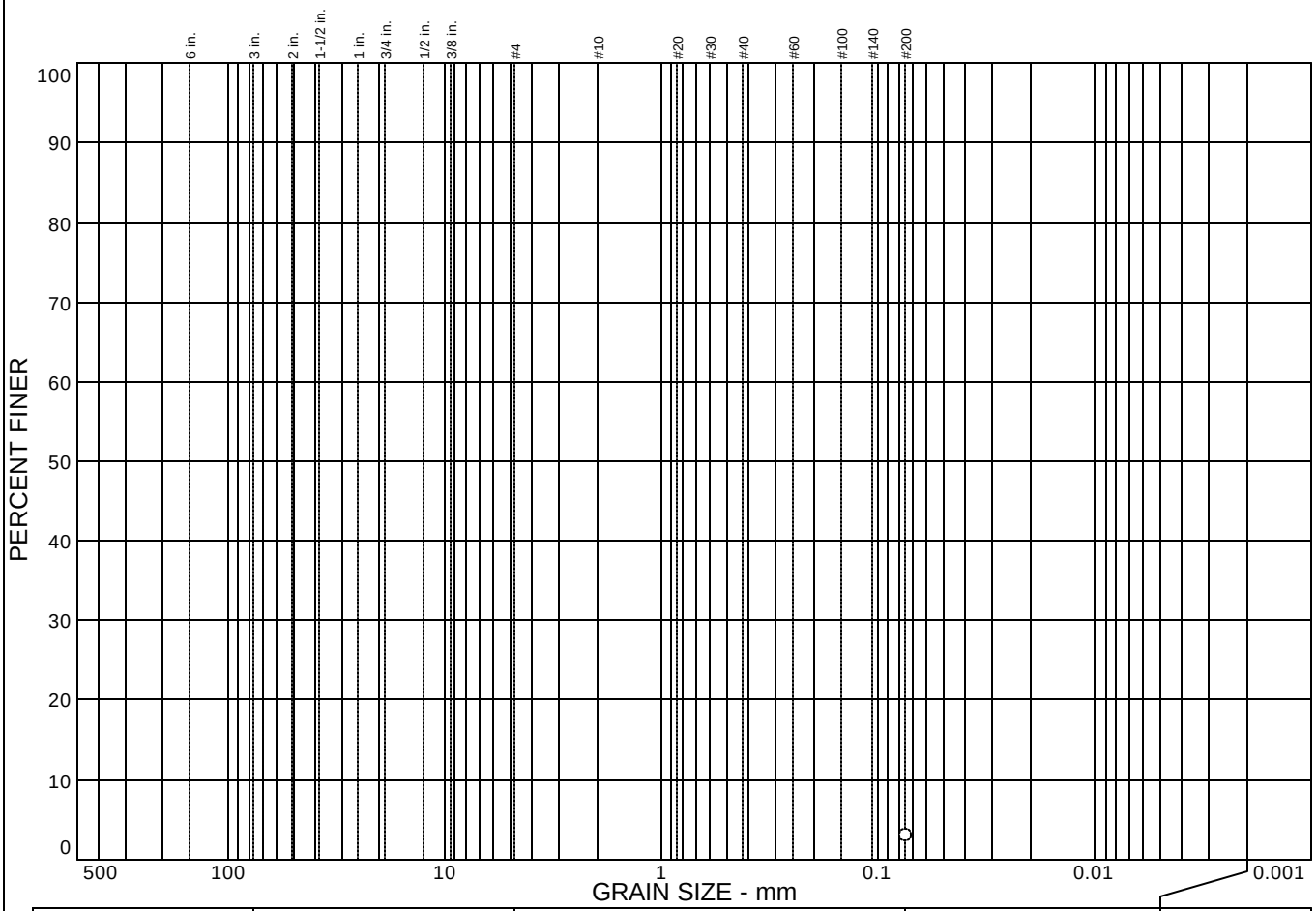
Remarks

Sample No.: B7 @ 26.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 26.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.9		

* (no specification provided)

Soil Description

Brownish yellow SAND. Trace 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=

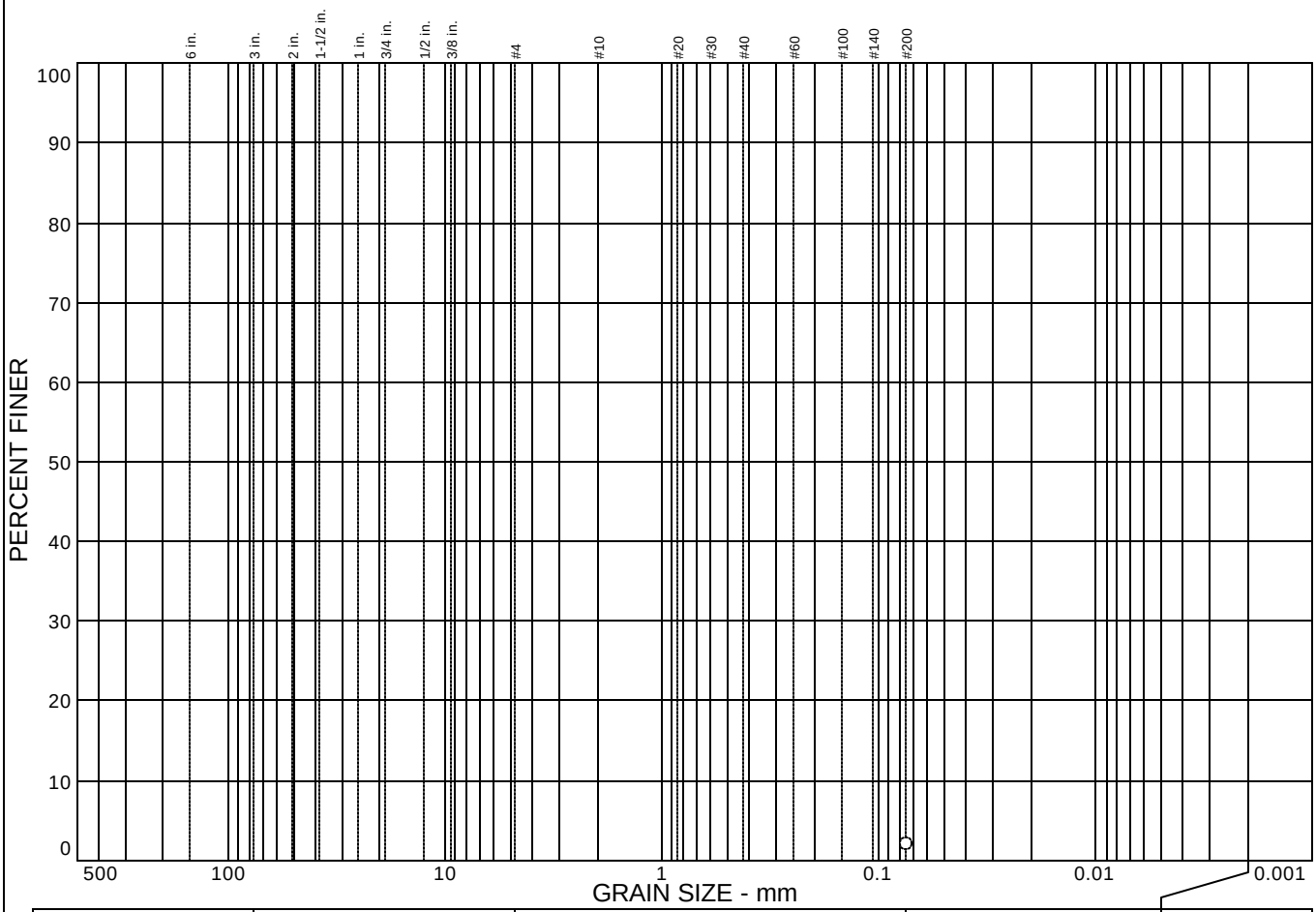
Remarks

Sample No.: B8 @ 3.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.9		

* (no specification provided)

Soil Description

Brownish yellow SAND. Trace 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=

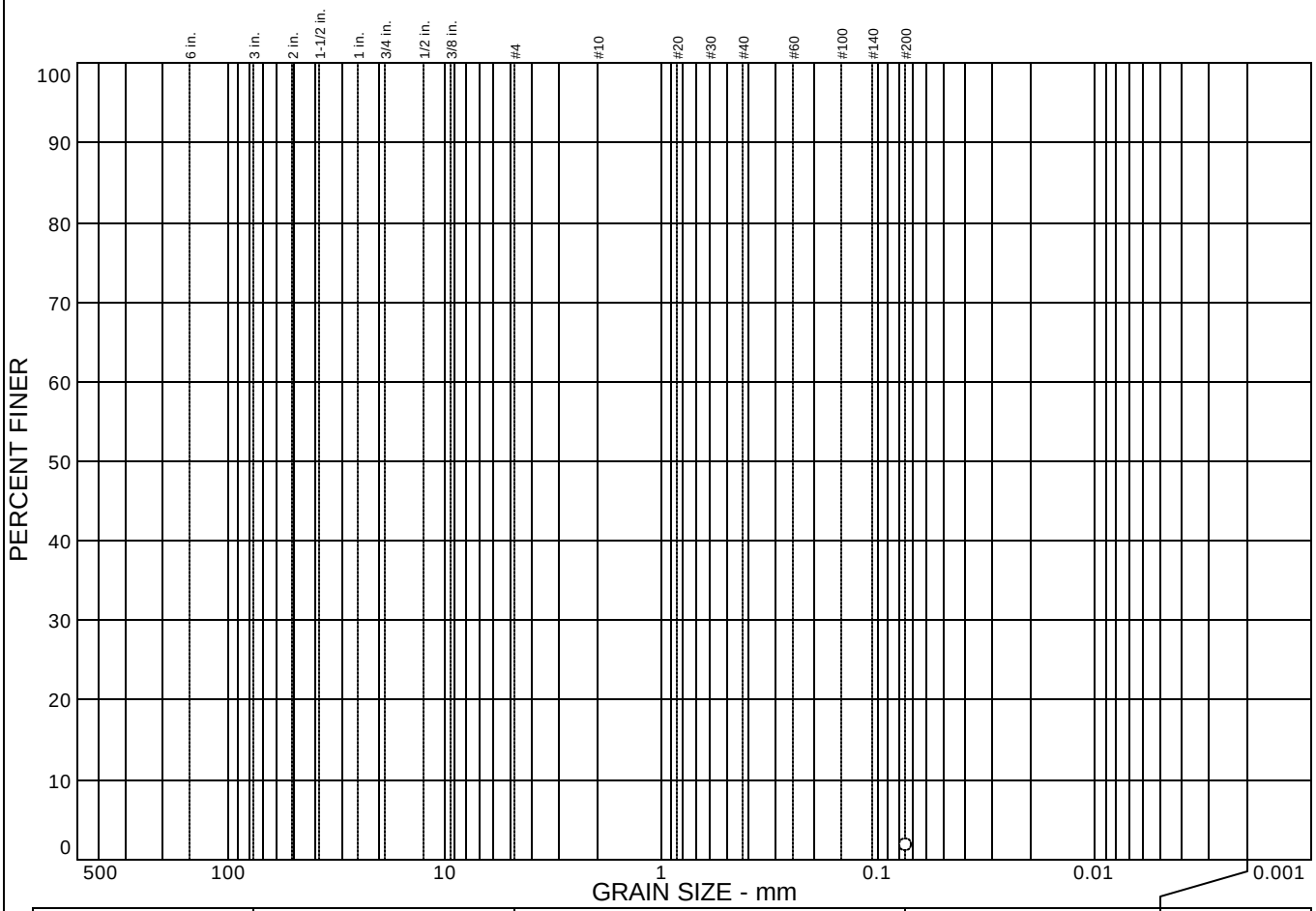
Remarks

Sample No.: B8 @ 5.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 5.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.8		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

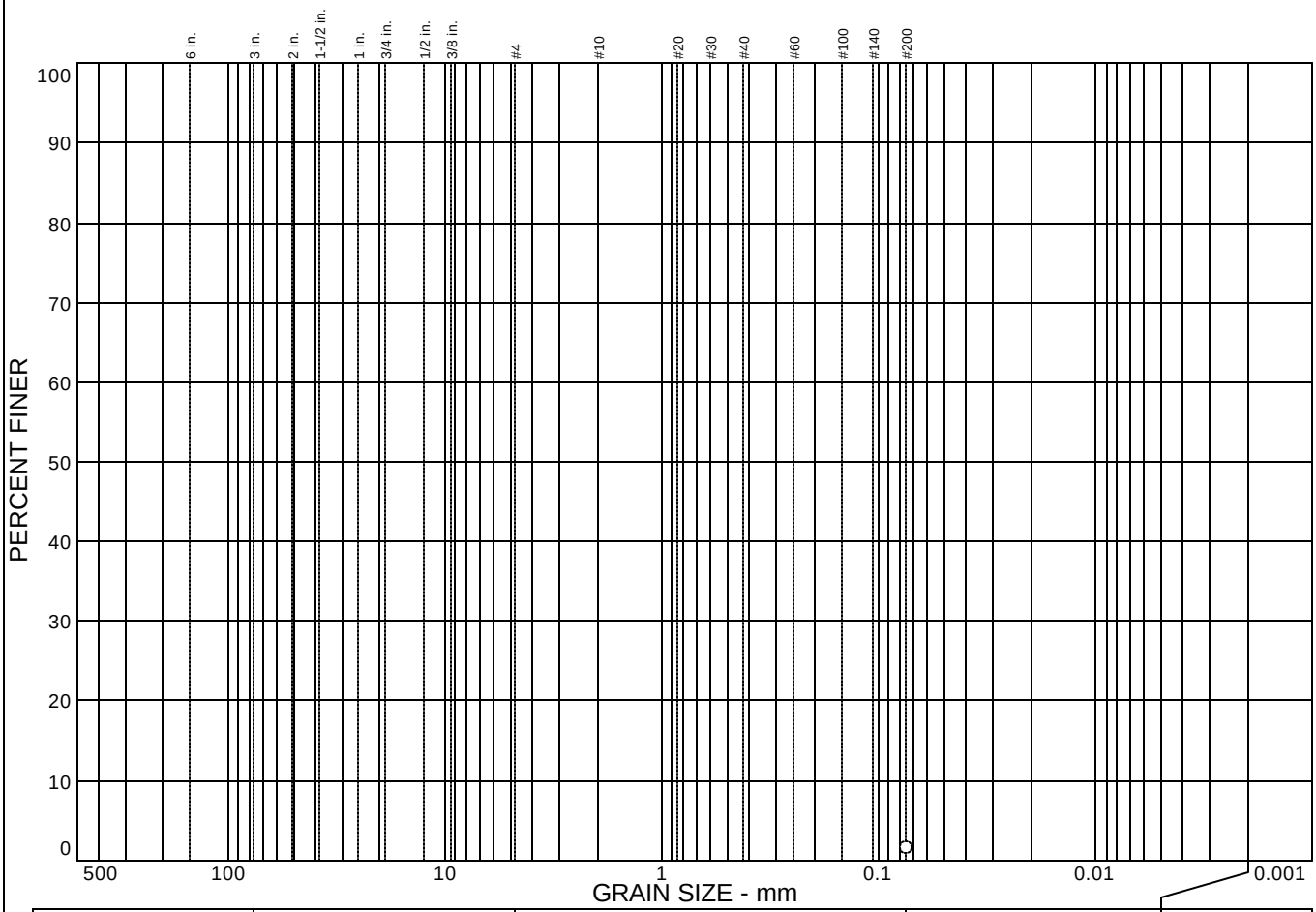
Remarks

Sample No.: B8 @ 7.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 7.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.5		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

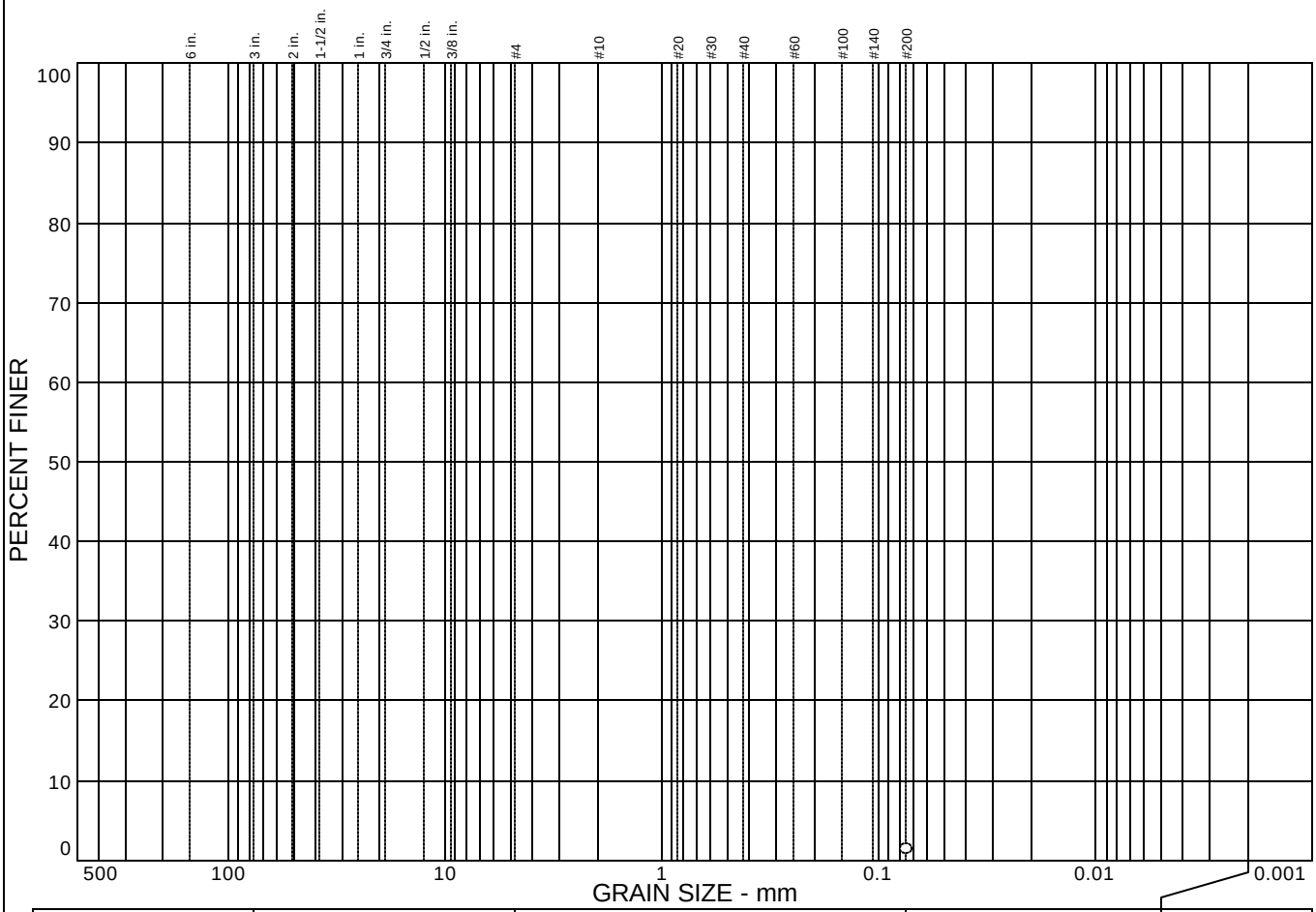
Remarks

Sample No.: B8 @ 10.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 10.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.4		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

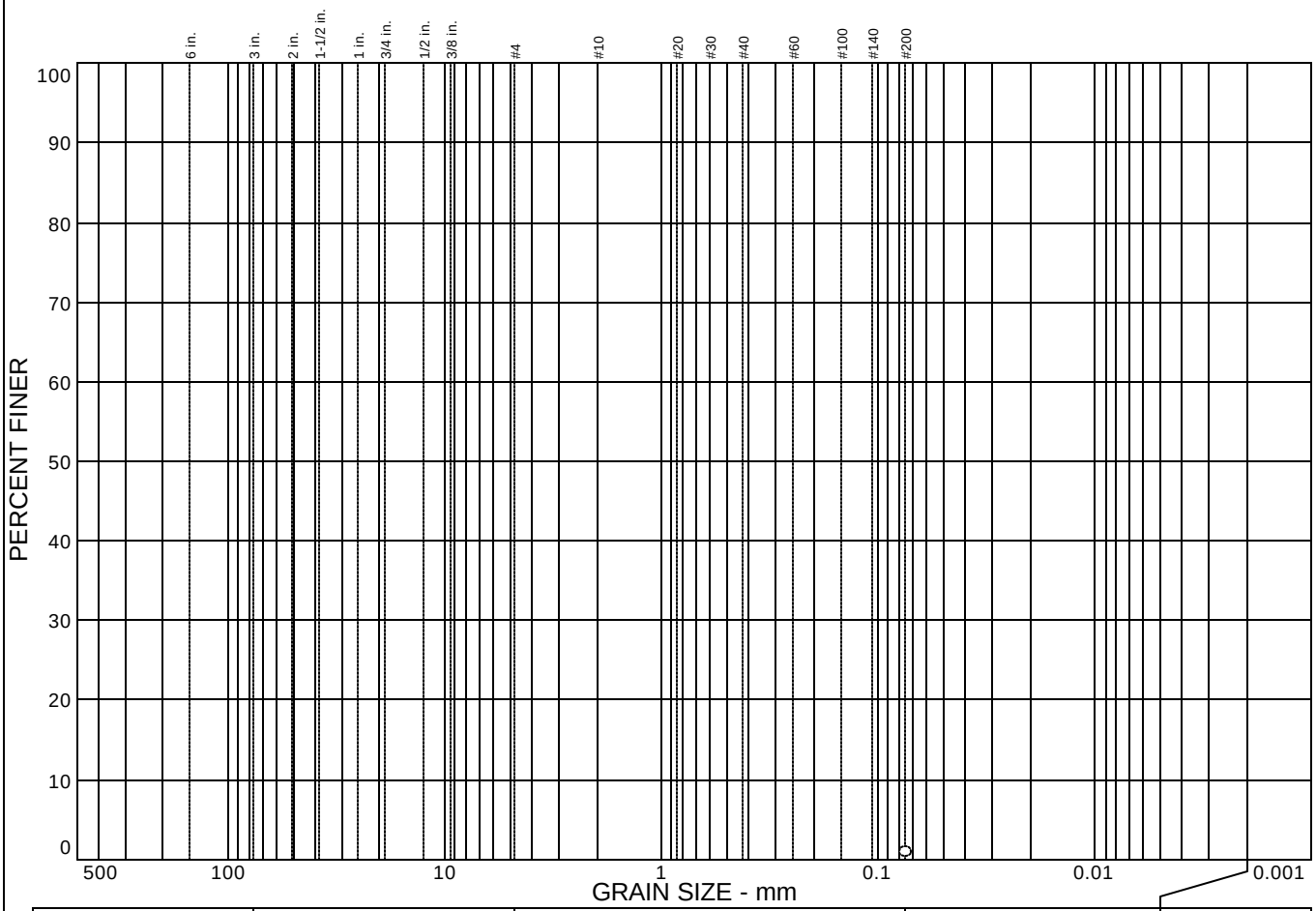
Remarks

Sample No.: B8 @ 16' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 16.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.9		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

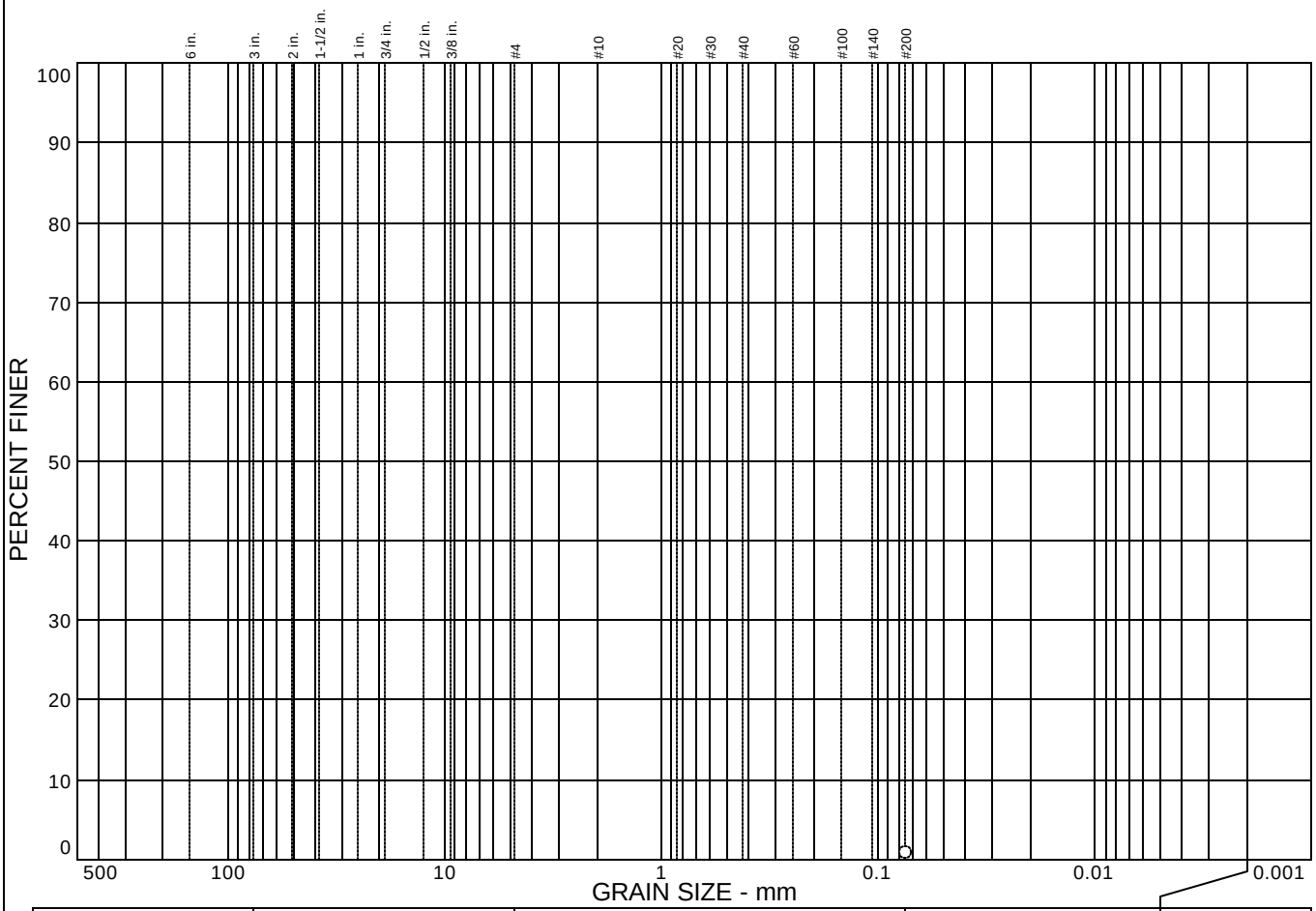
Remarks

Sample No.: B9 @ 3.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.8		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

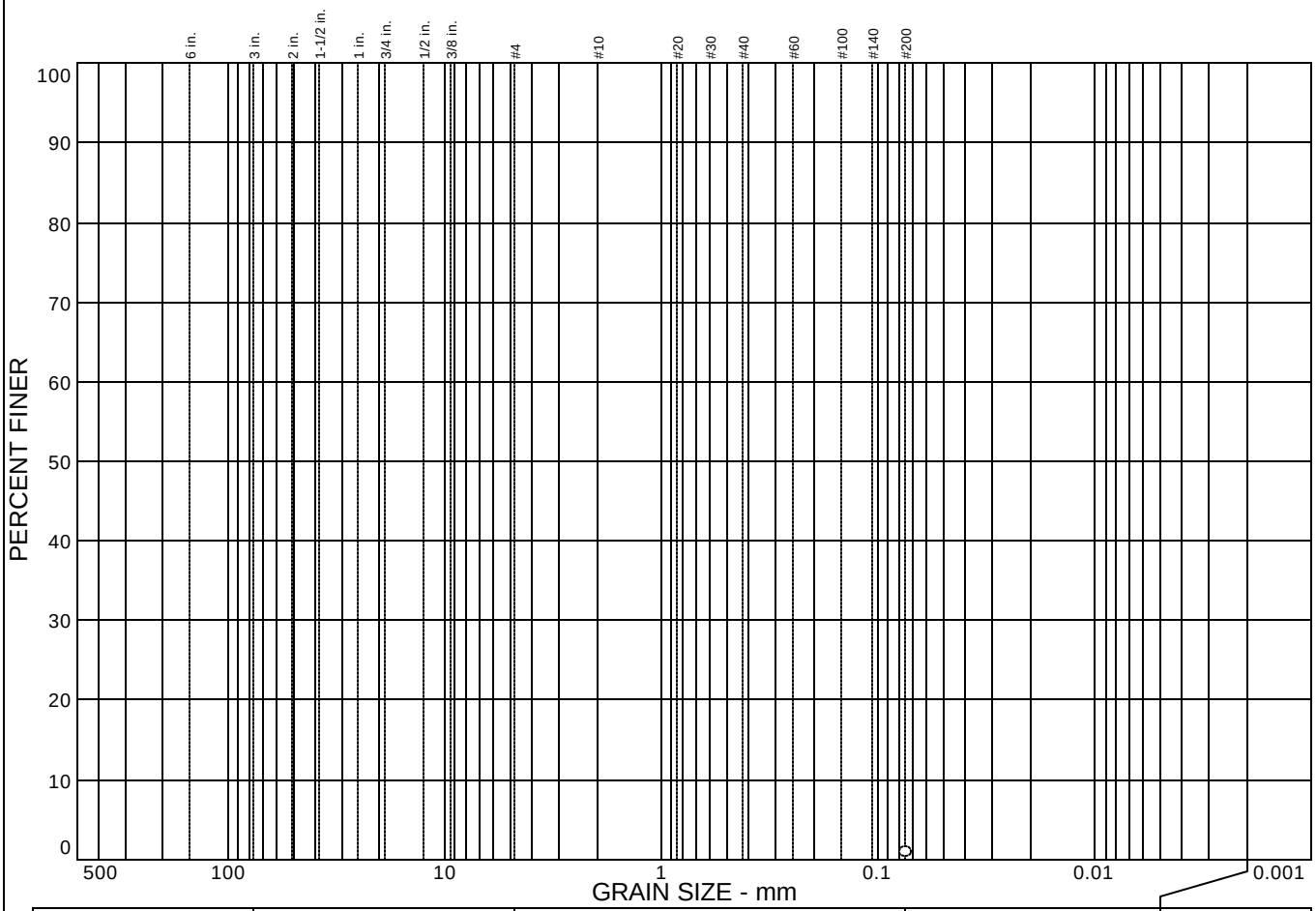
Remarks

Sample No.: B9 @ 5.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 5.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.9		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

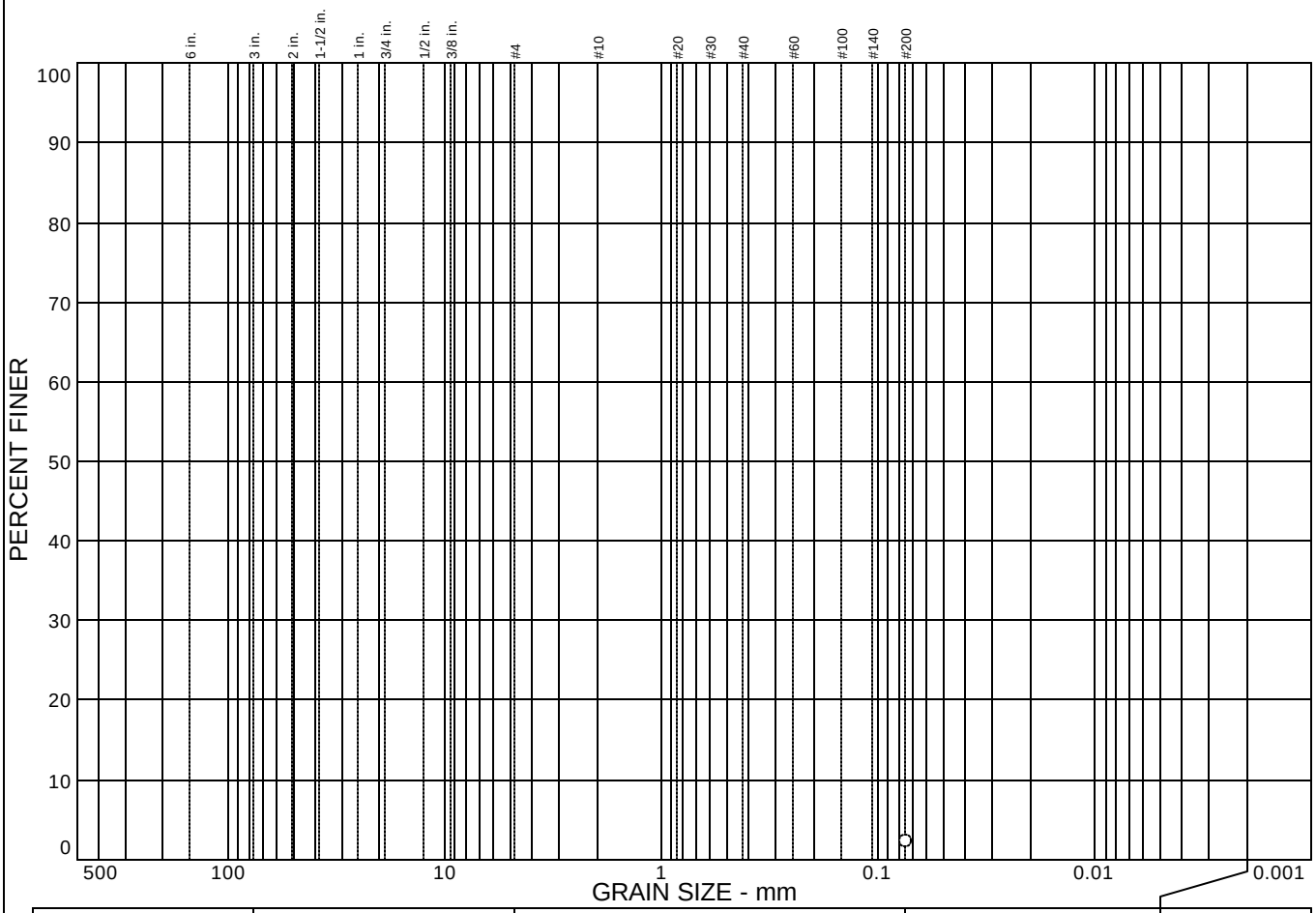
Remarks

Sample No.: B9 @ 7.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 7.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.3		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

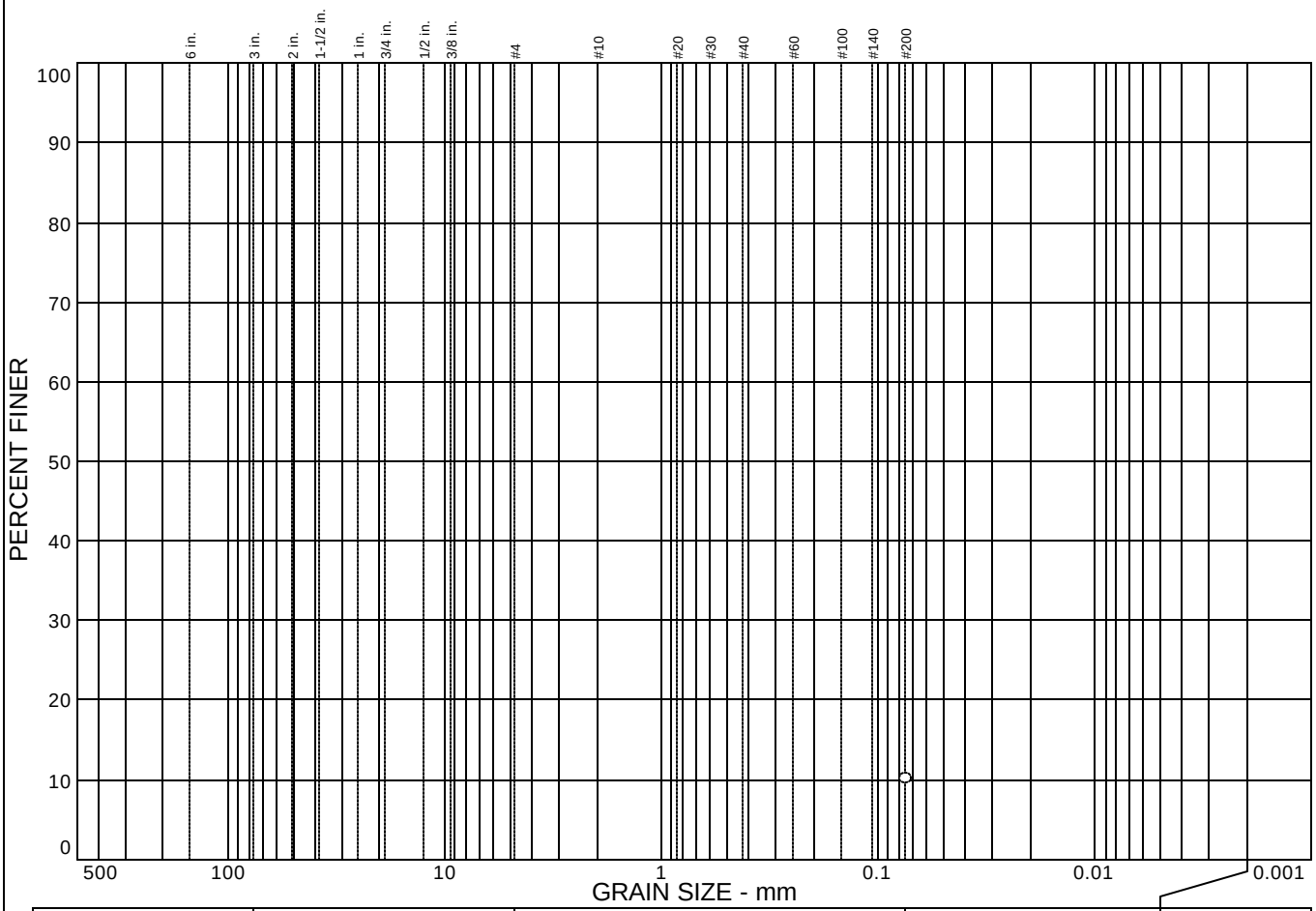
Remarks

Sample No.: B9 @ 11.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			10.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	10.1		

* (no specification provided)

Soil Description

Very dark brown 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=

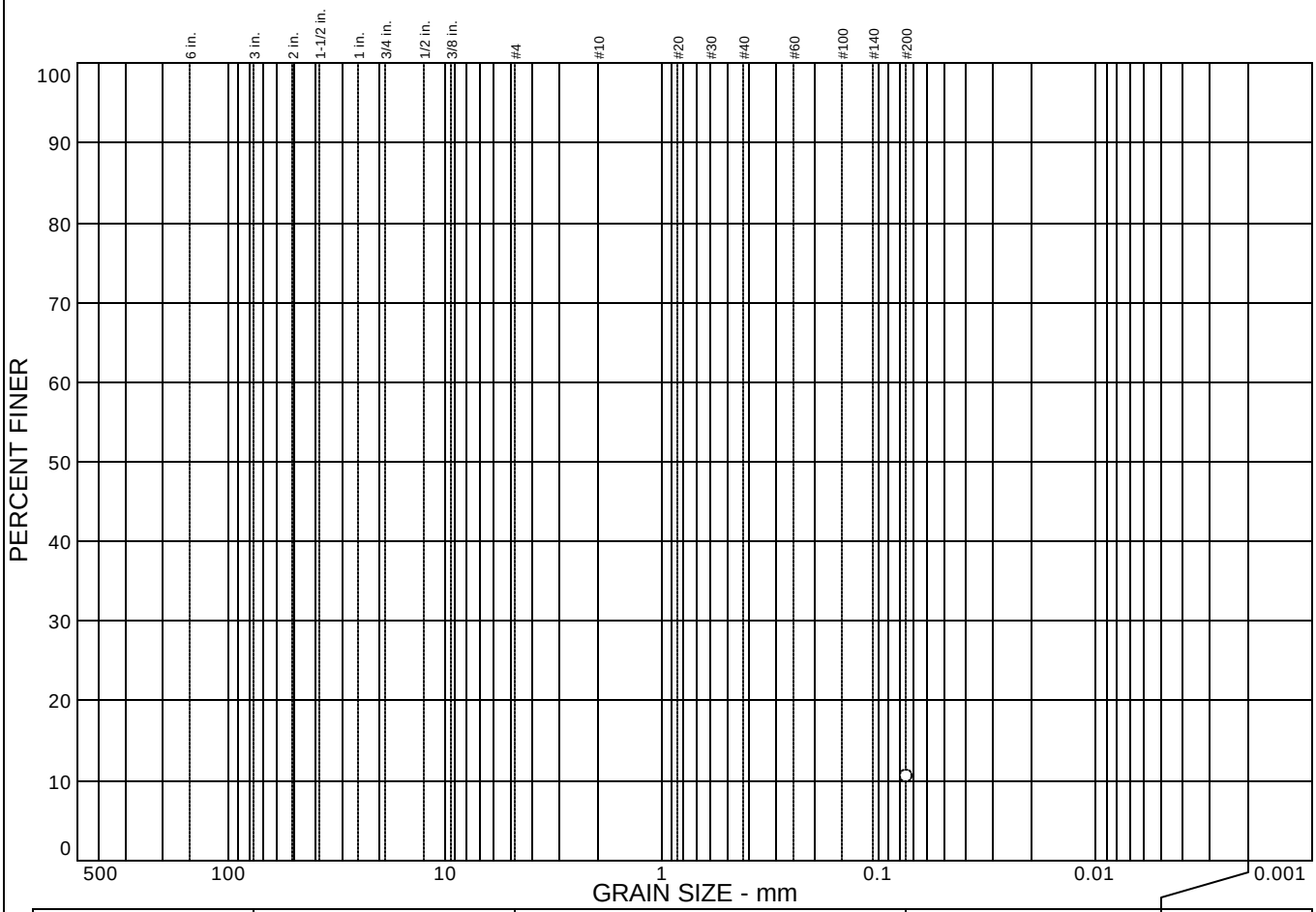
Remarks

Sample No.: B10 @ 3.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			10.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	10.5		

* (no specification provided)

Soil Description

Dark yellowish brown 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=

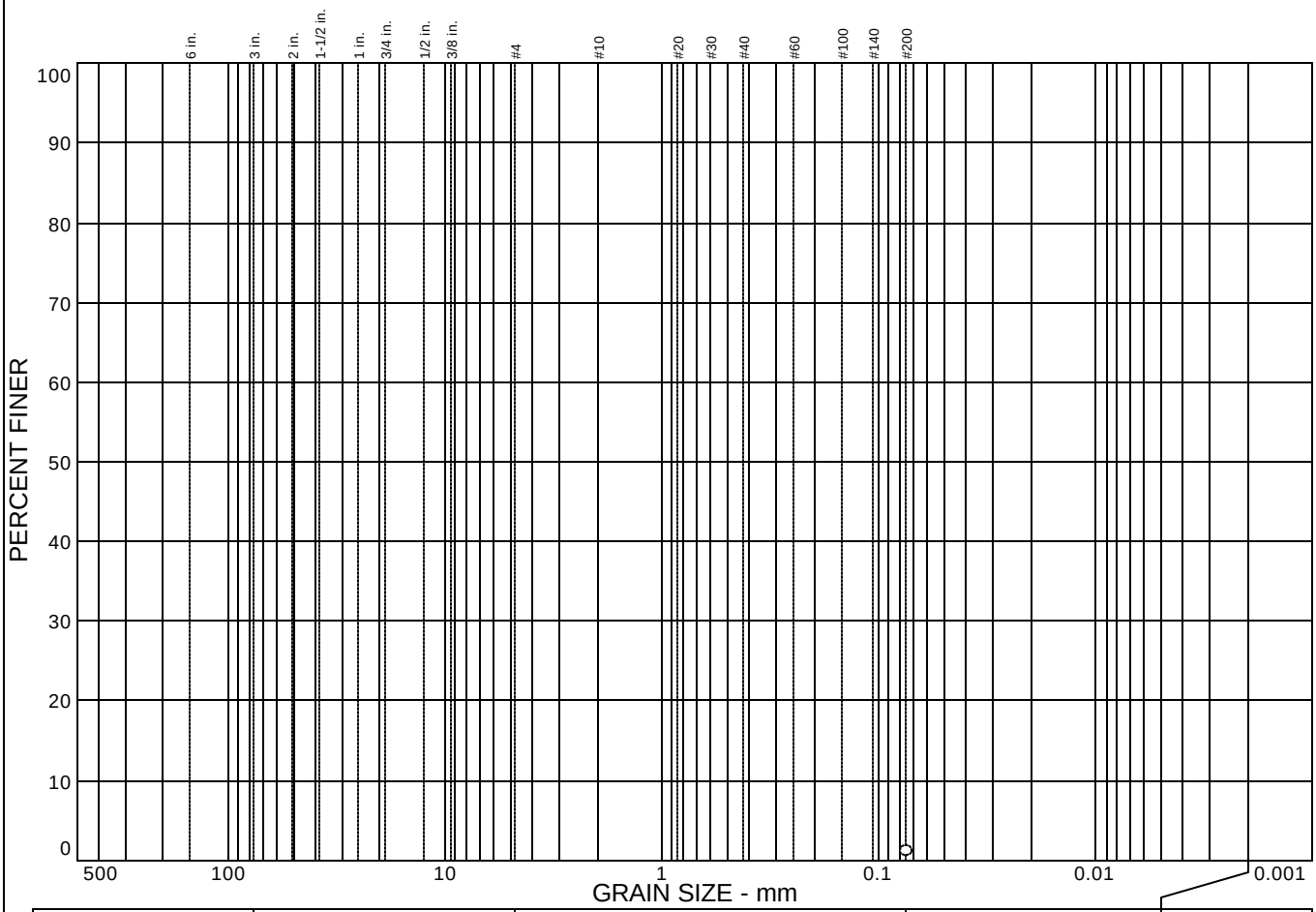
Remarks

Sample No.: B10 @ 5.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 5.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.1		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

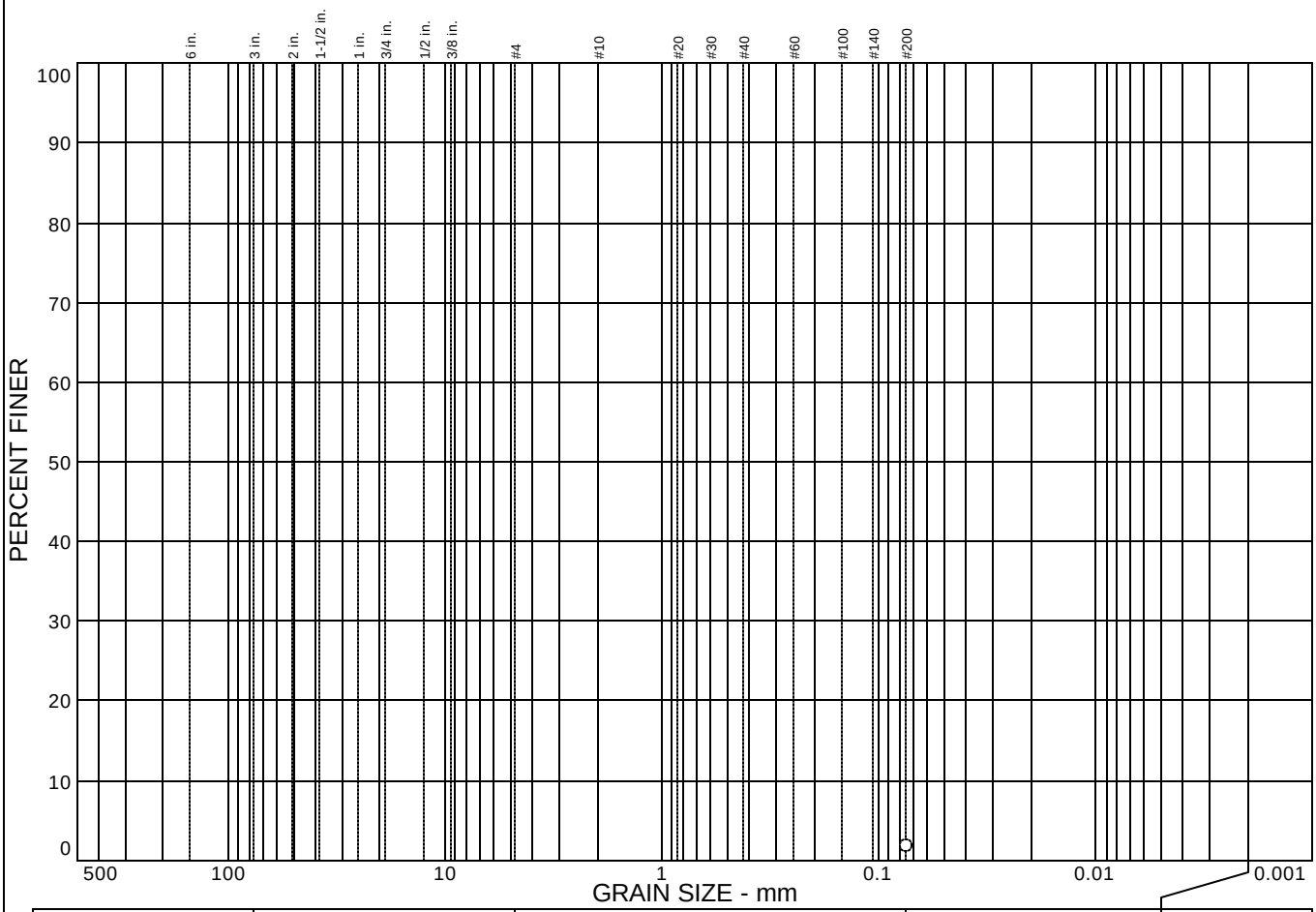
Remarks

Sample No.: B10 @ 7.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 7.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.8		

* (no specification provided)

Soil Description

Olive yellow SAND. Trace 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=

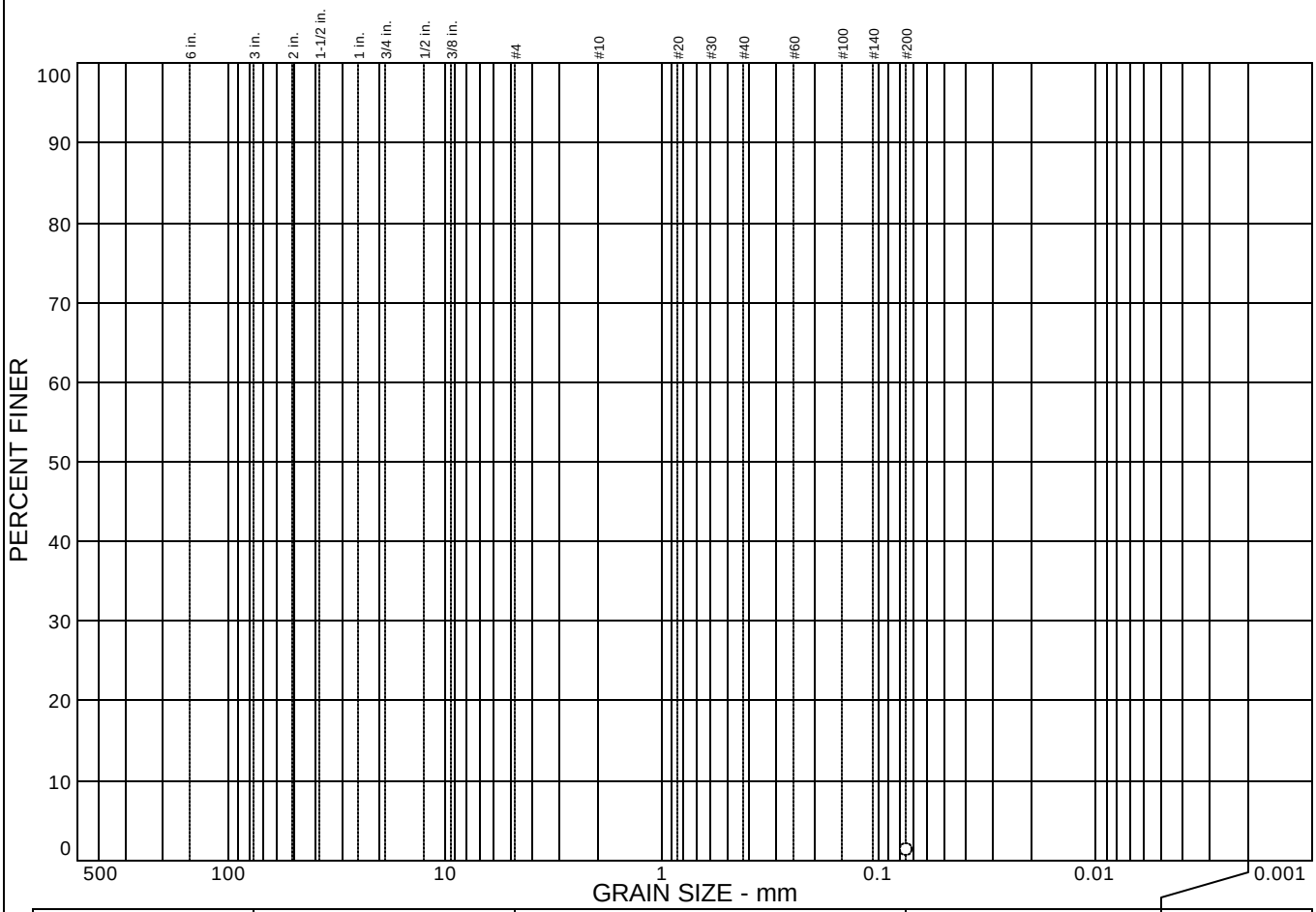
Remarks

Sample No.: B10 @ 13.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 13.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.2		

* (no specification provided)

Soil Description

Olive yellow SAND. trace 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=

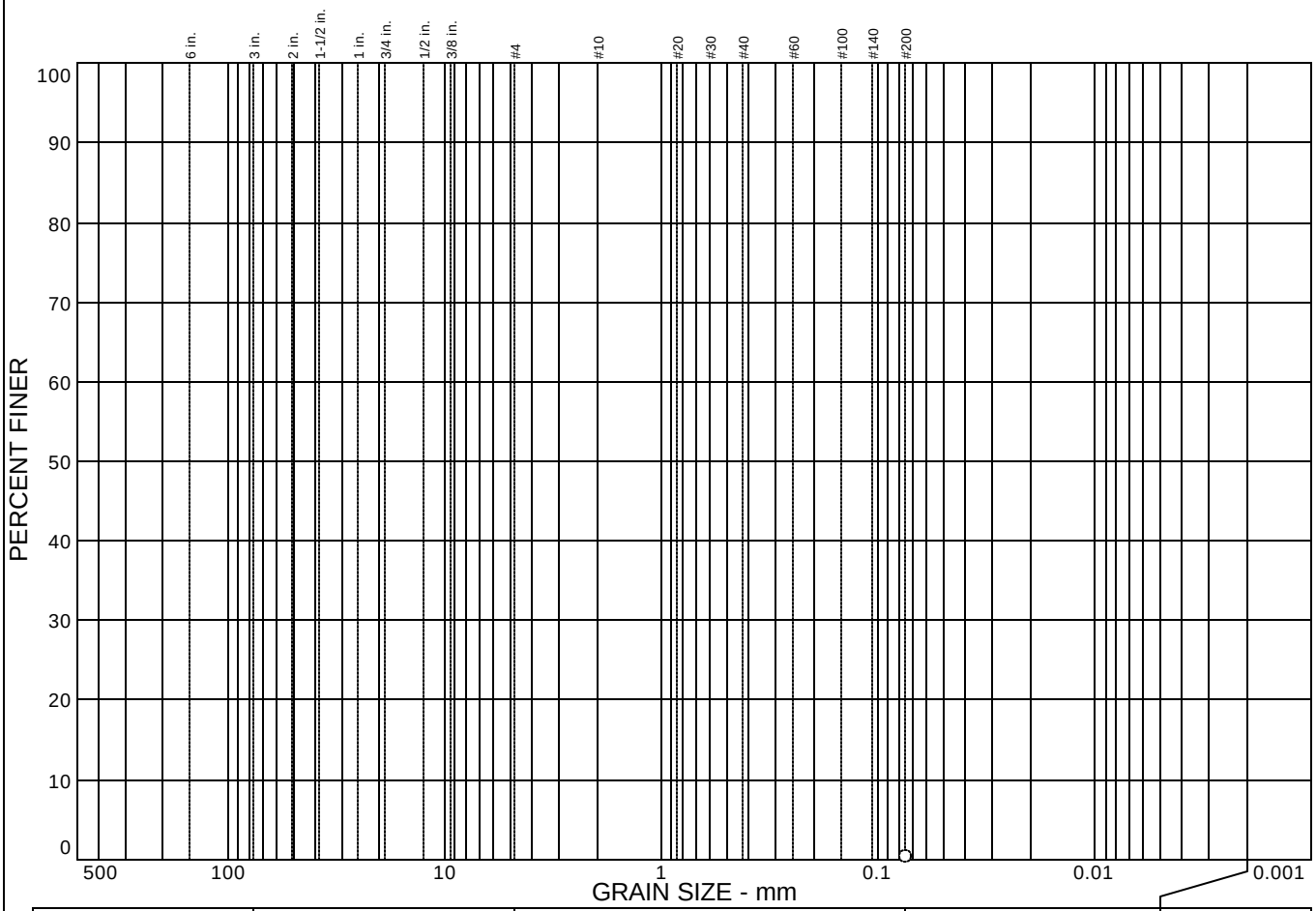
Remarks

Sample No.: B11 @ 3.0' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.3		

* (no specification provided)

Soil Description

Olive yellow 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=

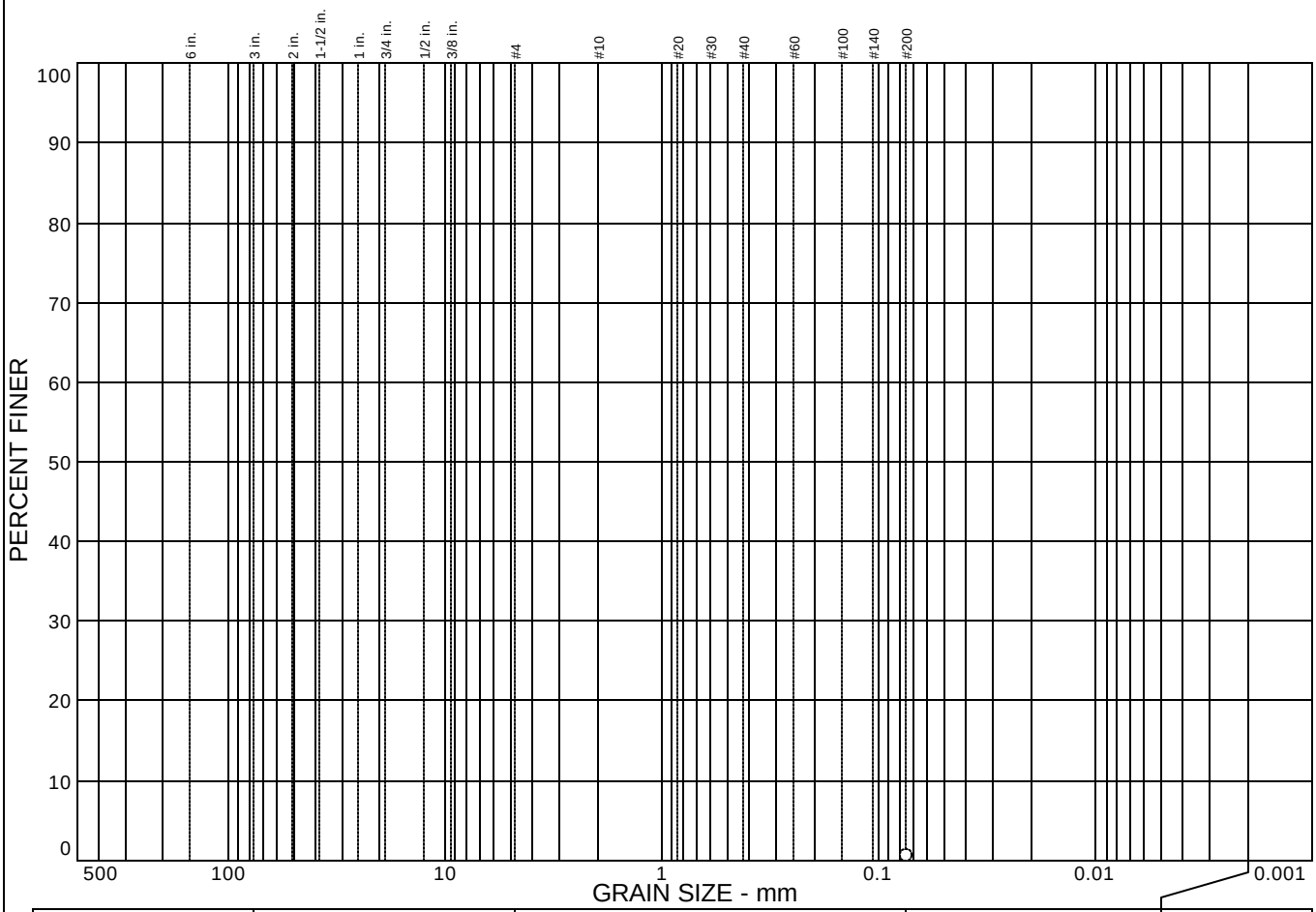
Remarks

Sample No.: B11 @ 5.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 5.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.6		

* (no specification provided)

Soil Description

Olive yellow 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

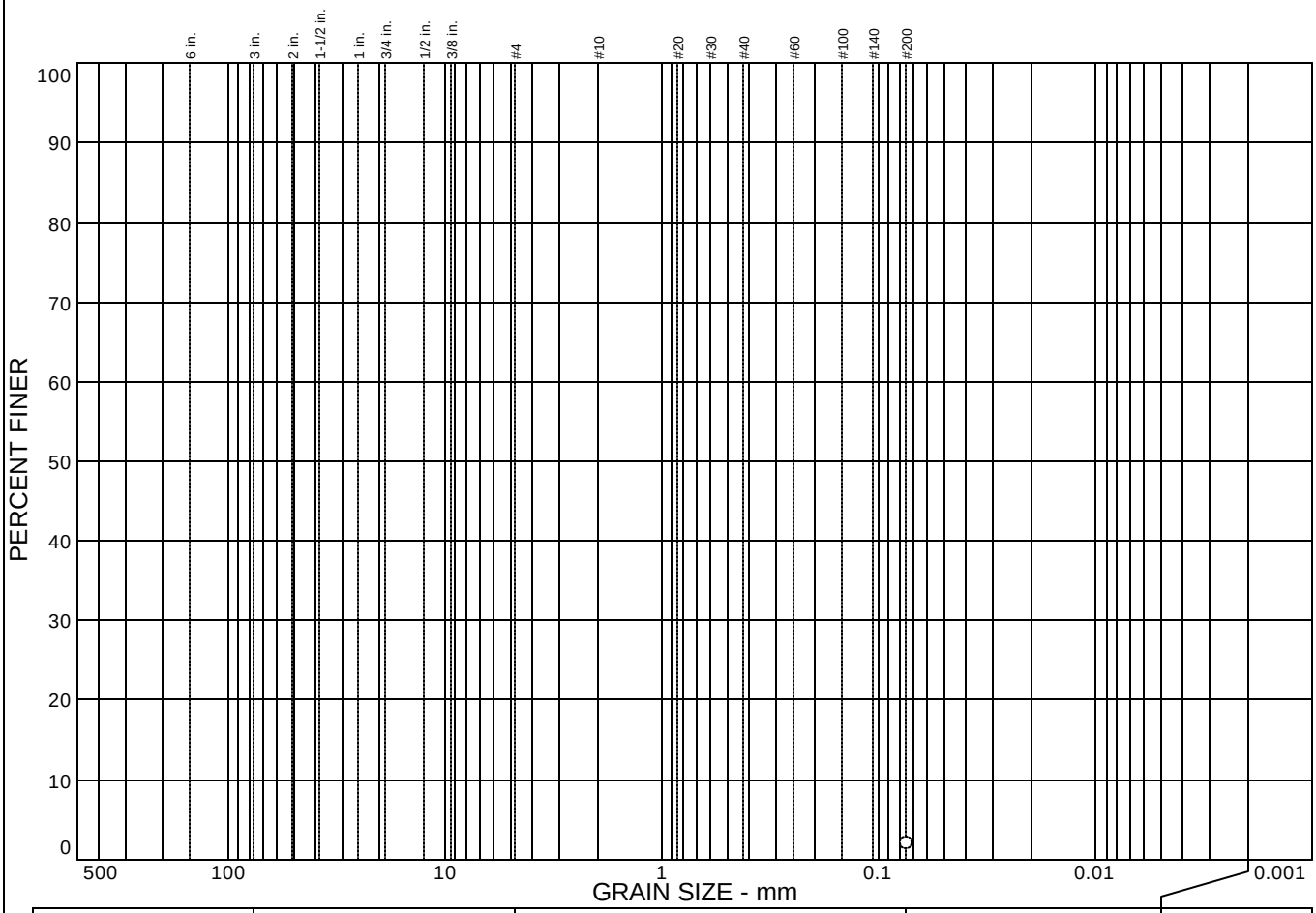
Sample No.: B11 @ 7.5' **Source of Sample:** **Date:** 11/08/06
Location: **Elev./Depth:** 7.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Coast Recycled Water Pipeline - Marina, CA

Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.0		

* (no specification provided)

Soil Description

Light yellowish brown SAND. Trace 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=

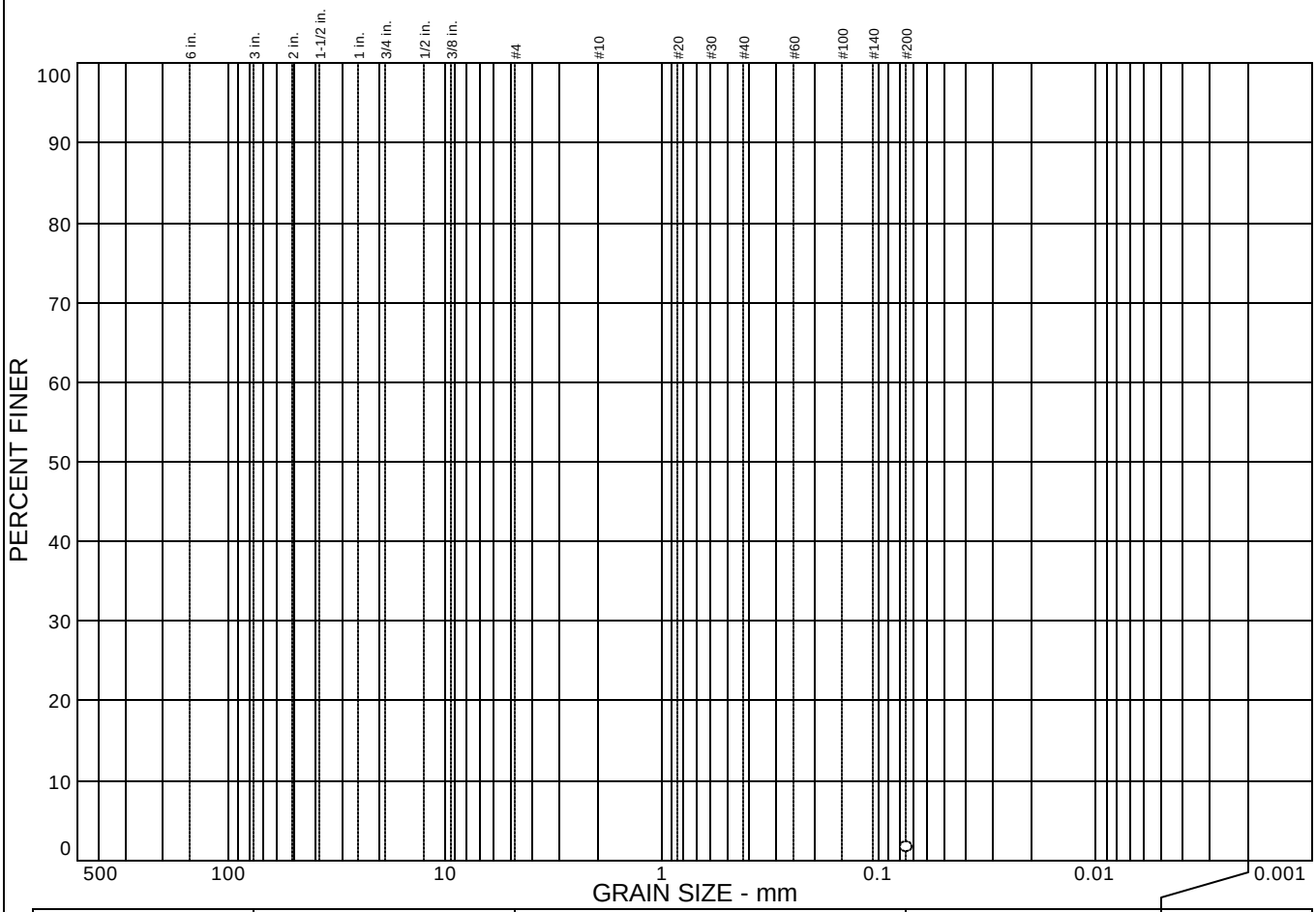
Remarks

Sample No.: B12 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.6		

* (no specification provided)

Soil Description

Light yellowish brown SAND. Trace 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=

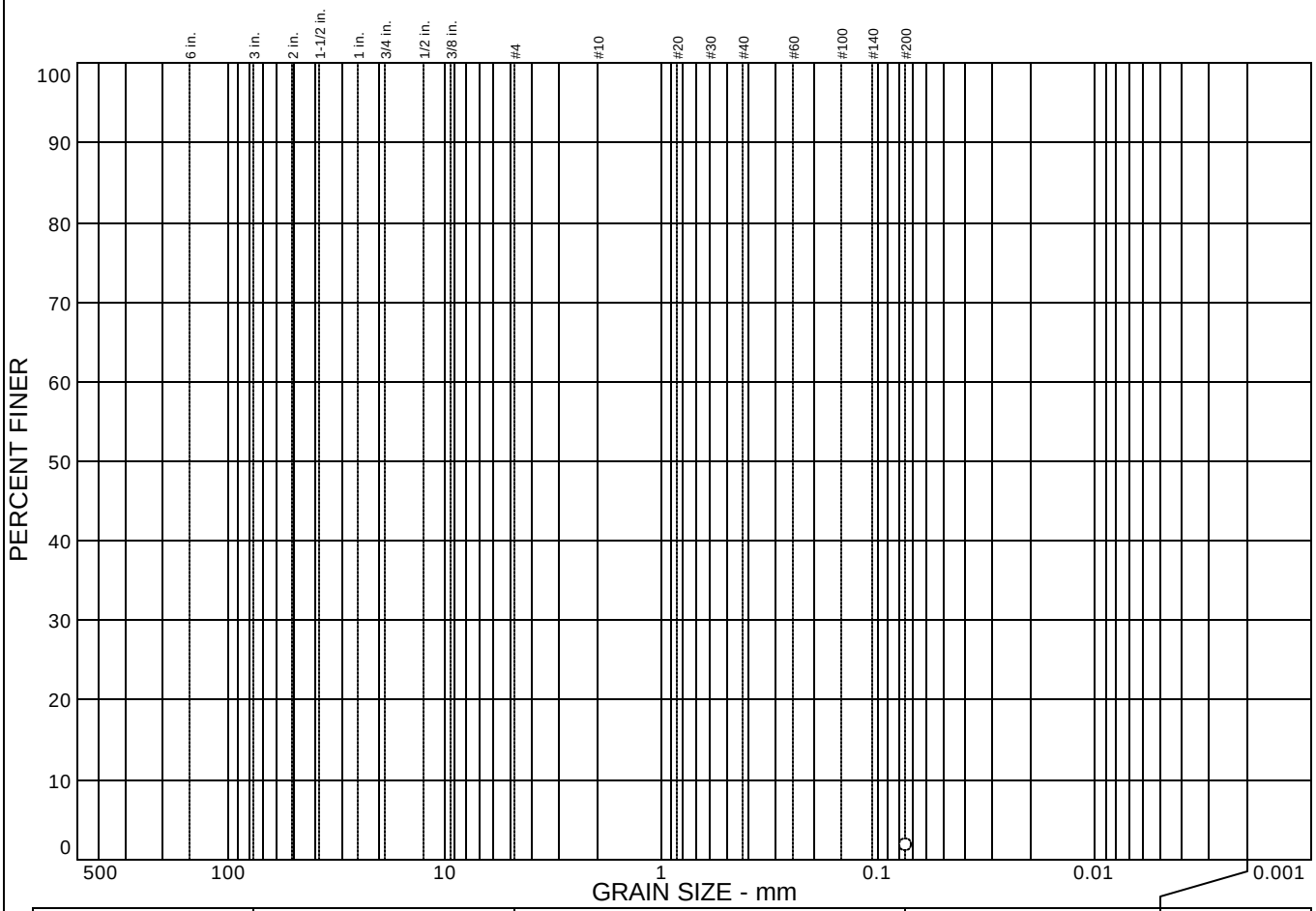
Remarks

Sample No.: B12 @ 6.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.7		

* (no specification provided)

Soil Description

Light yellowish brown SAND. Trace 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=

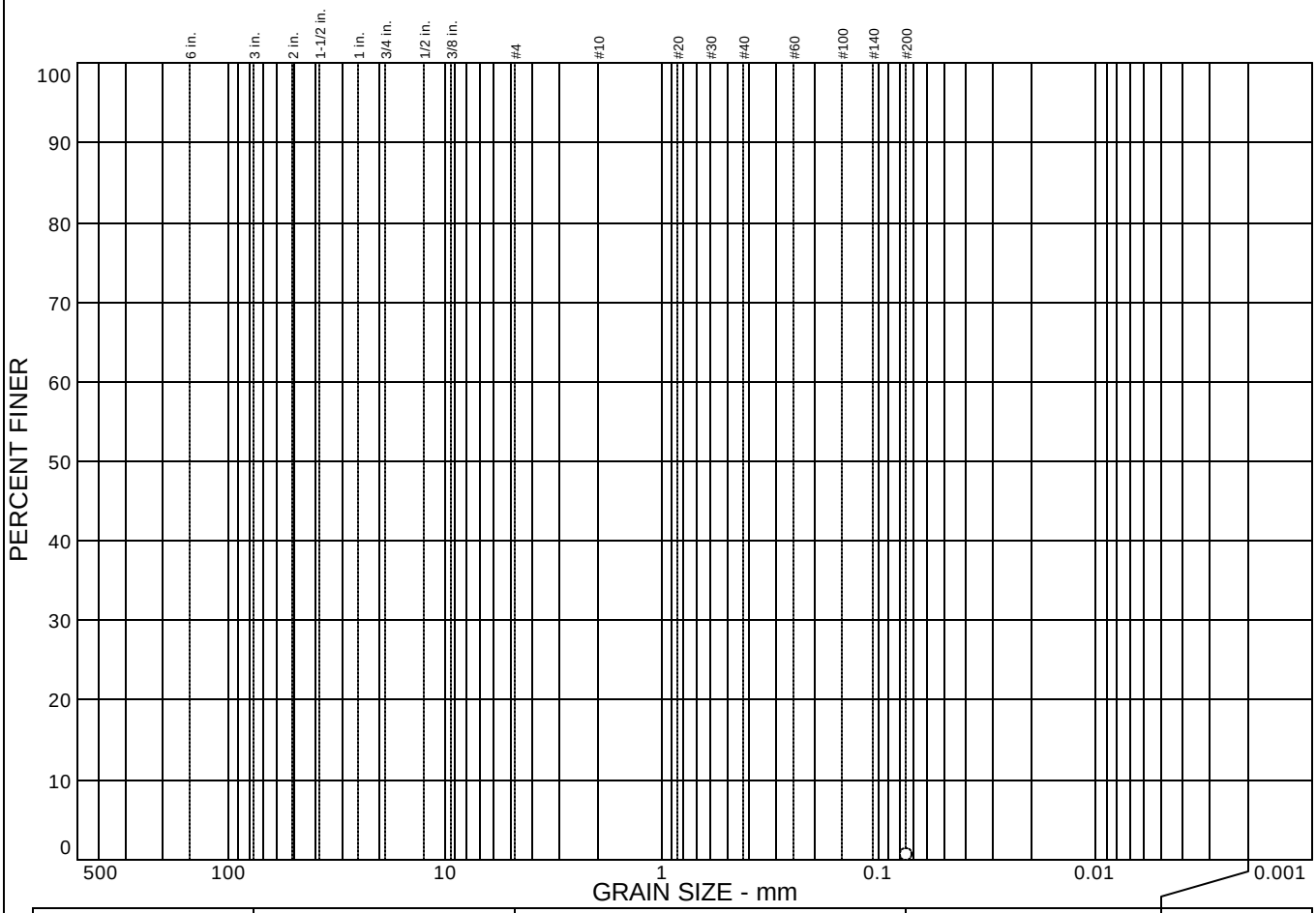
Remarks

Sample No.: B12 @ 11.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.6		

* (no specification provided)

Soil Description

Yellow 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=

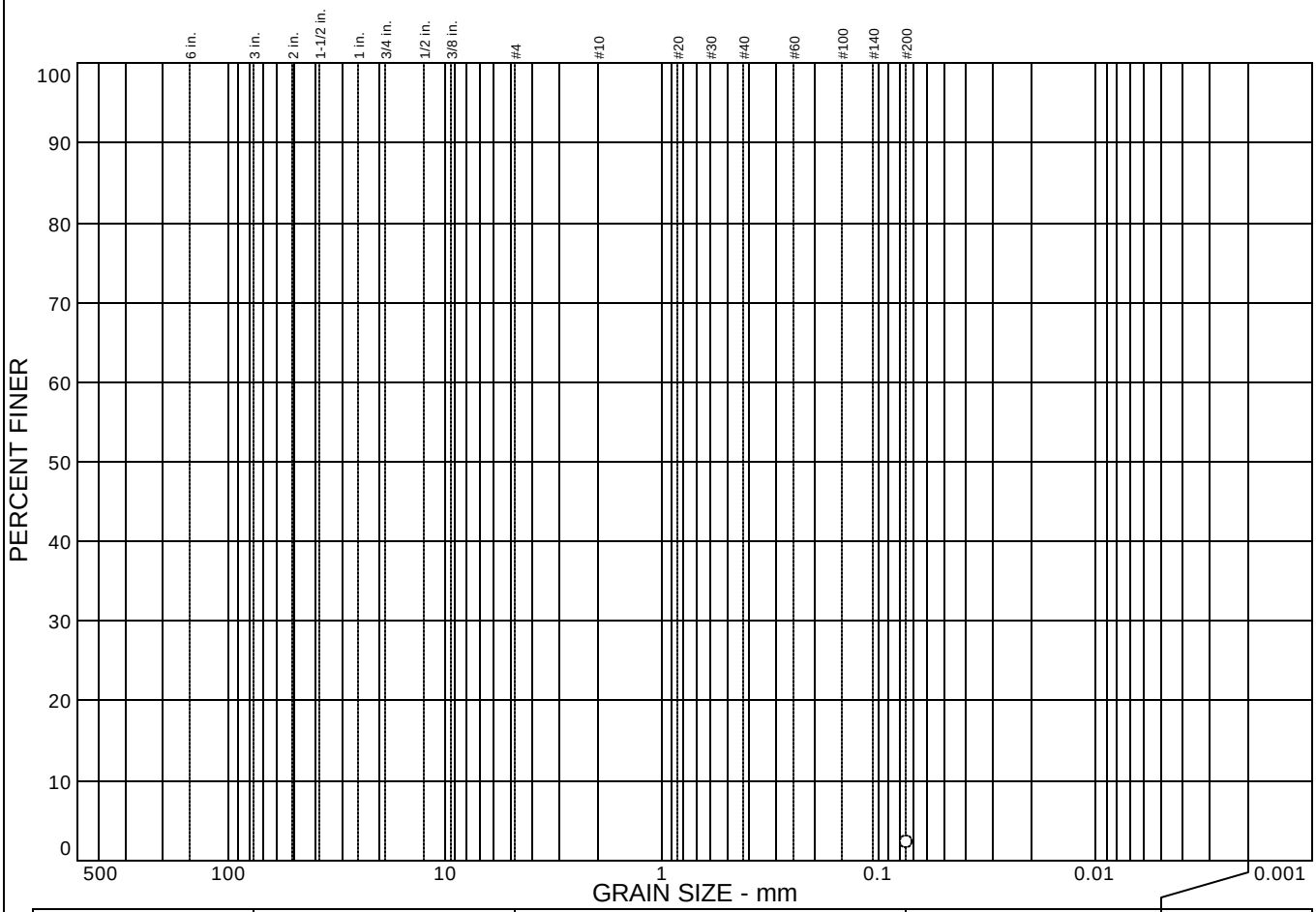
Remarks

Sample No.: B13 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.2		

* (no specification provided)

Soil Description

Yellow medium to coarse SAND. Trace 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=

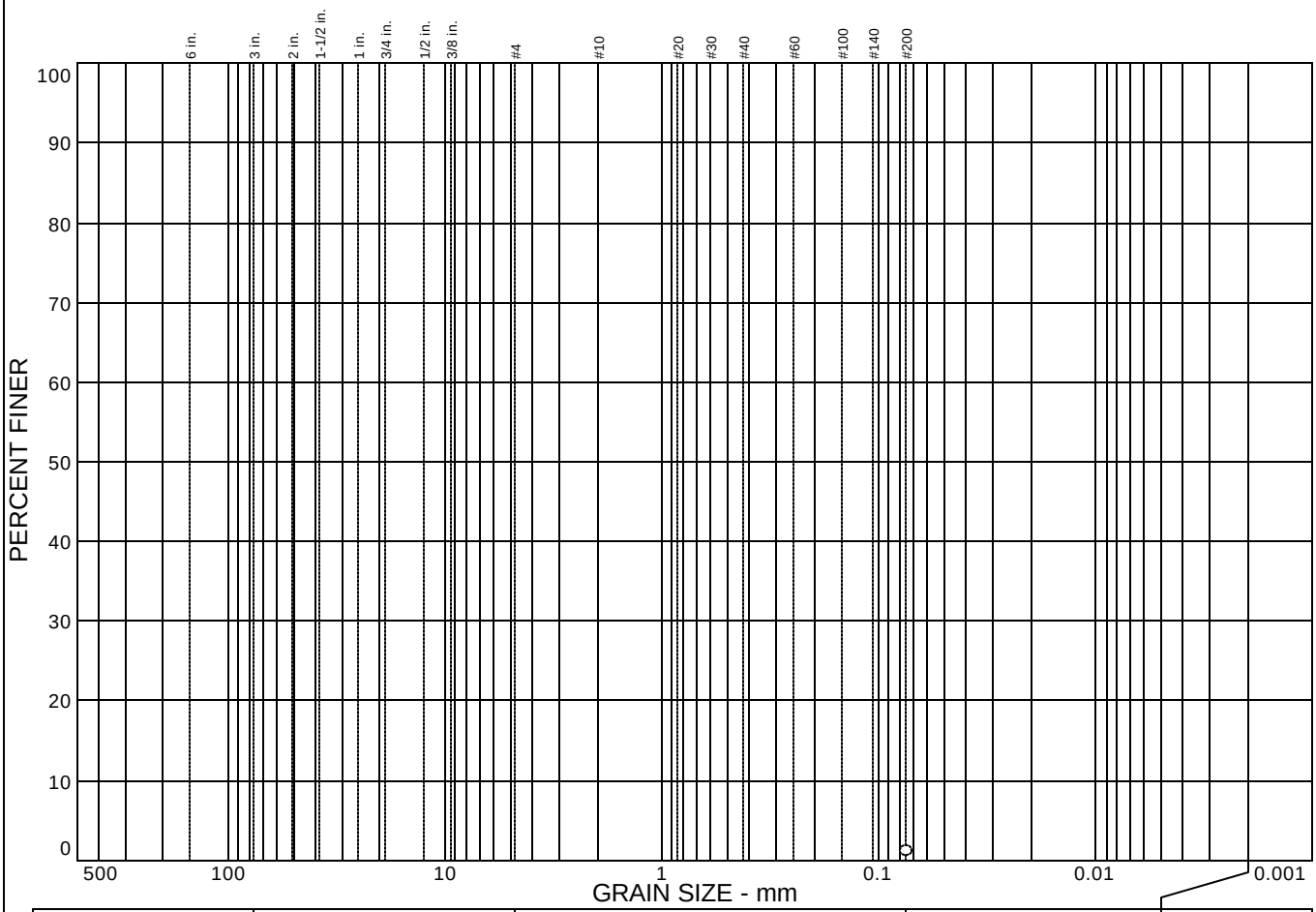
Remarks

Sample No.: B13 @ 8.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 8.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.1		

* (no specification provided)

Soil Description

Yellow medium to coarse 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=

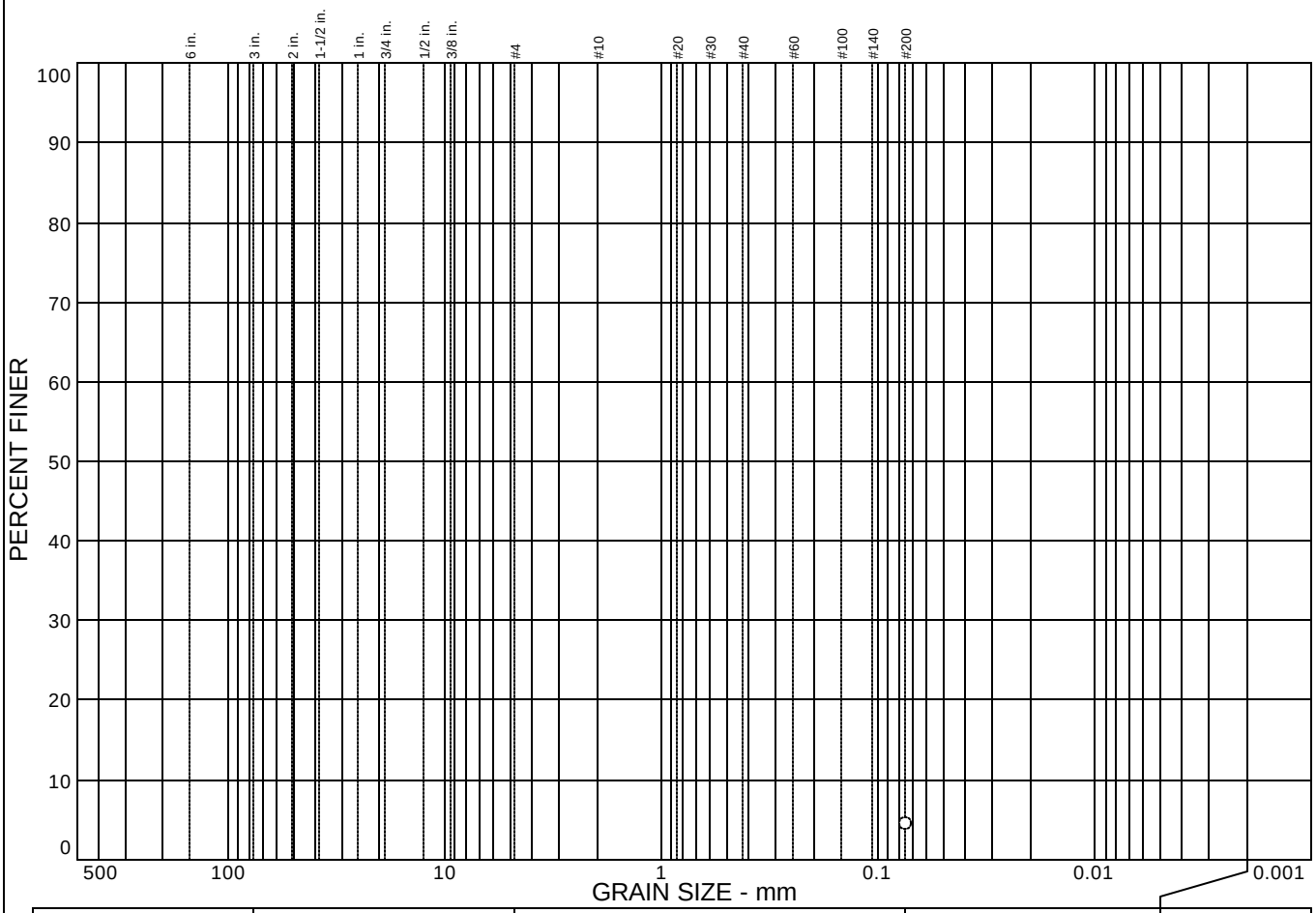
Remarks

Sample No.: B13 @ 11.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.4		

* (no specification provided)

Soil Description

Reddish brown SAND. Trace 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=

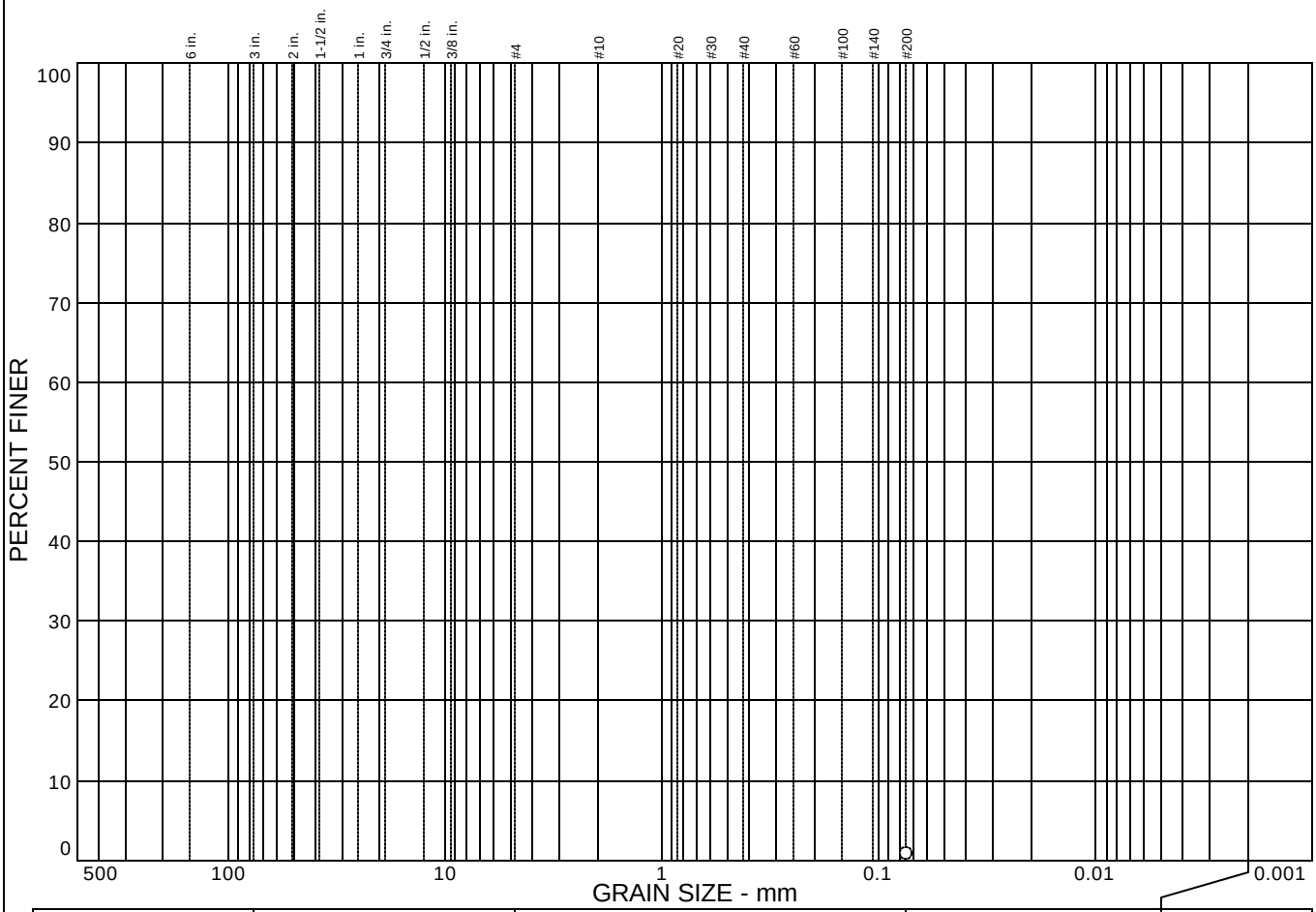
Remarks

Sample No.: B14 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.8		

* (no specification provided)

Soil Description

Yellow 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=

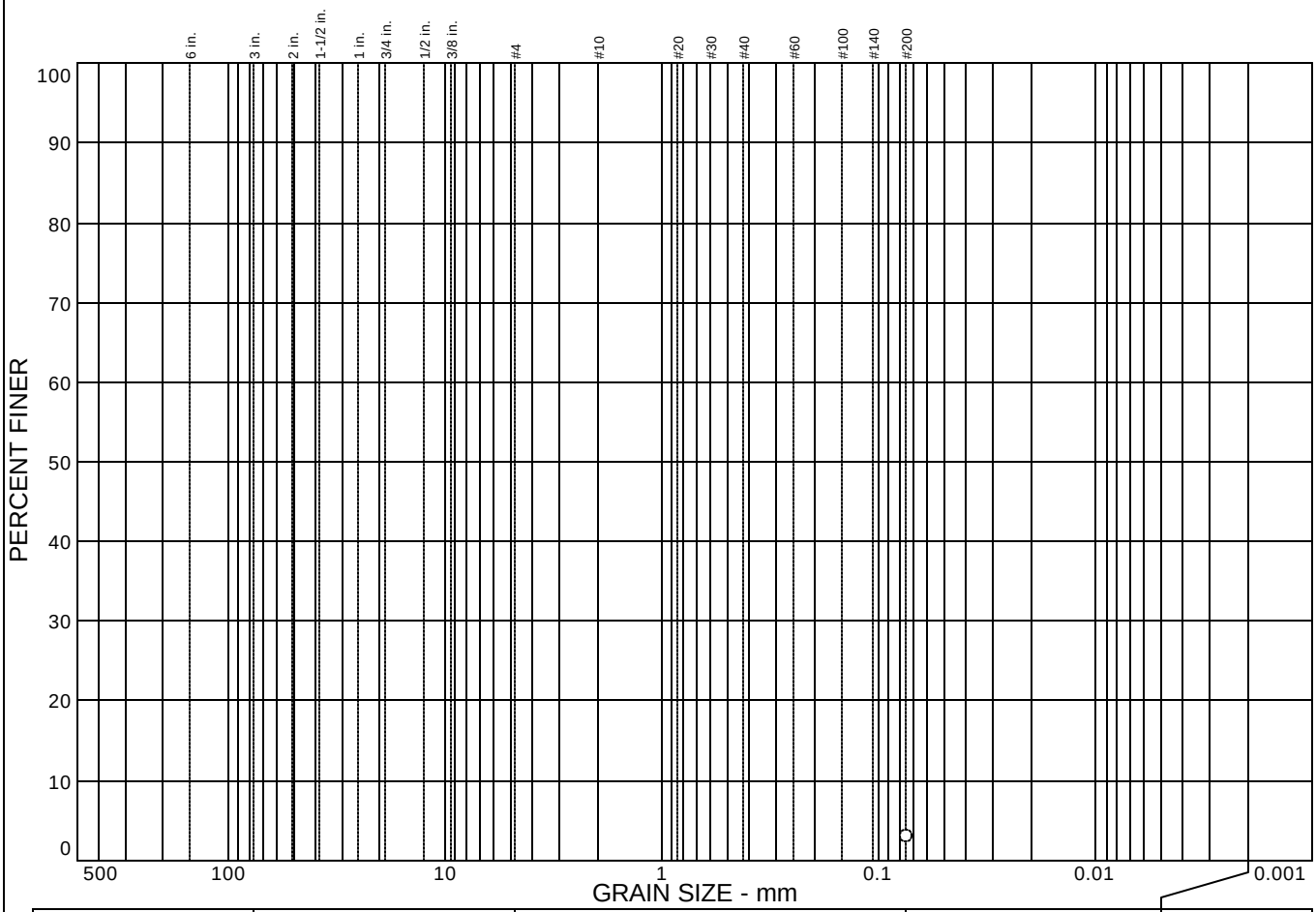
Remarks

Sample No.: B14 @ 6.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.9		

* (no specification provided)

Soil Description

Yellow SAND. Trace 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=

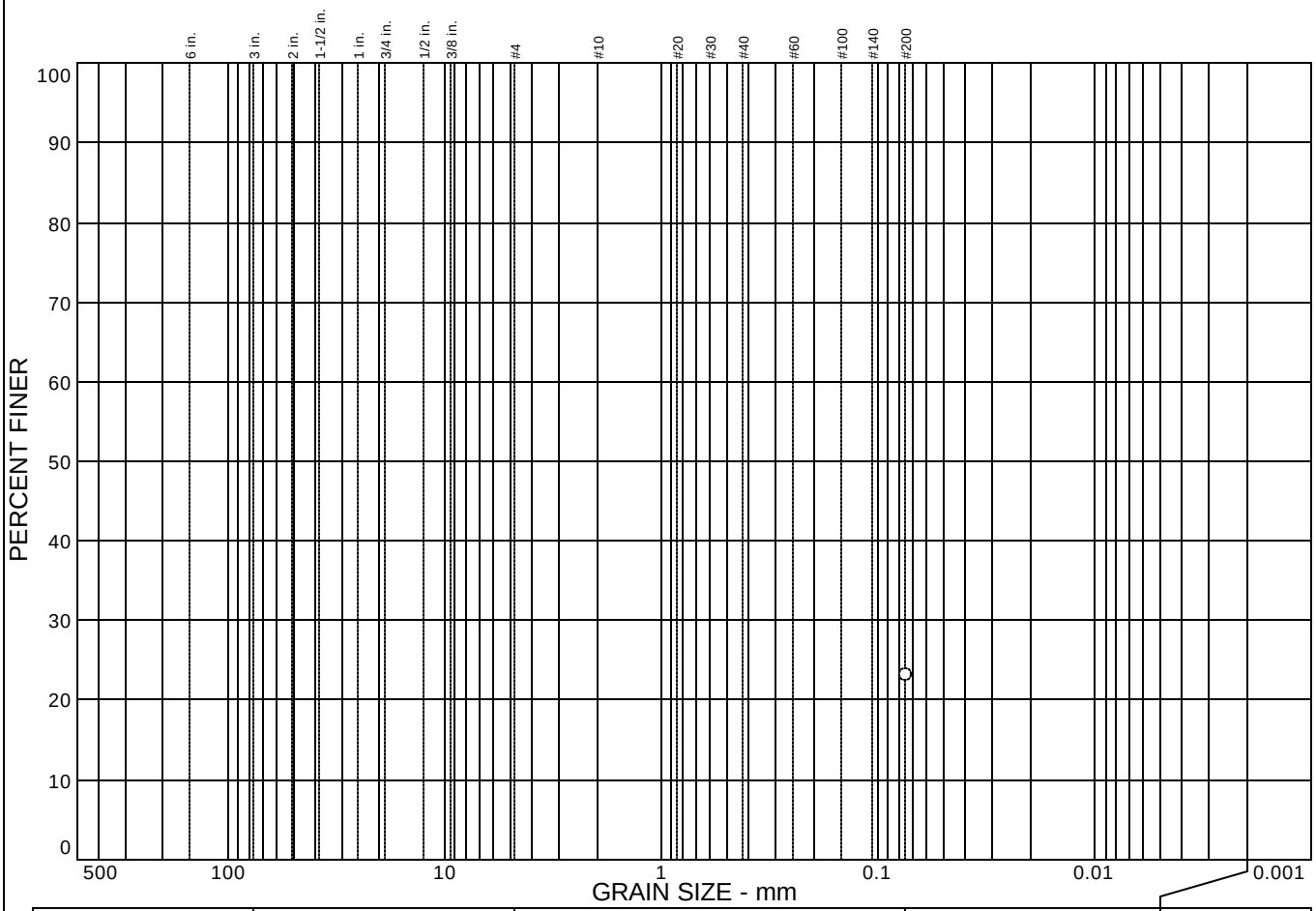
Remarks

Sample No.: B14 @ 11.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			23.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	23.1		

* (no specification provided)

Soil Description

Yellow 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=

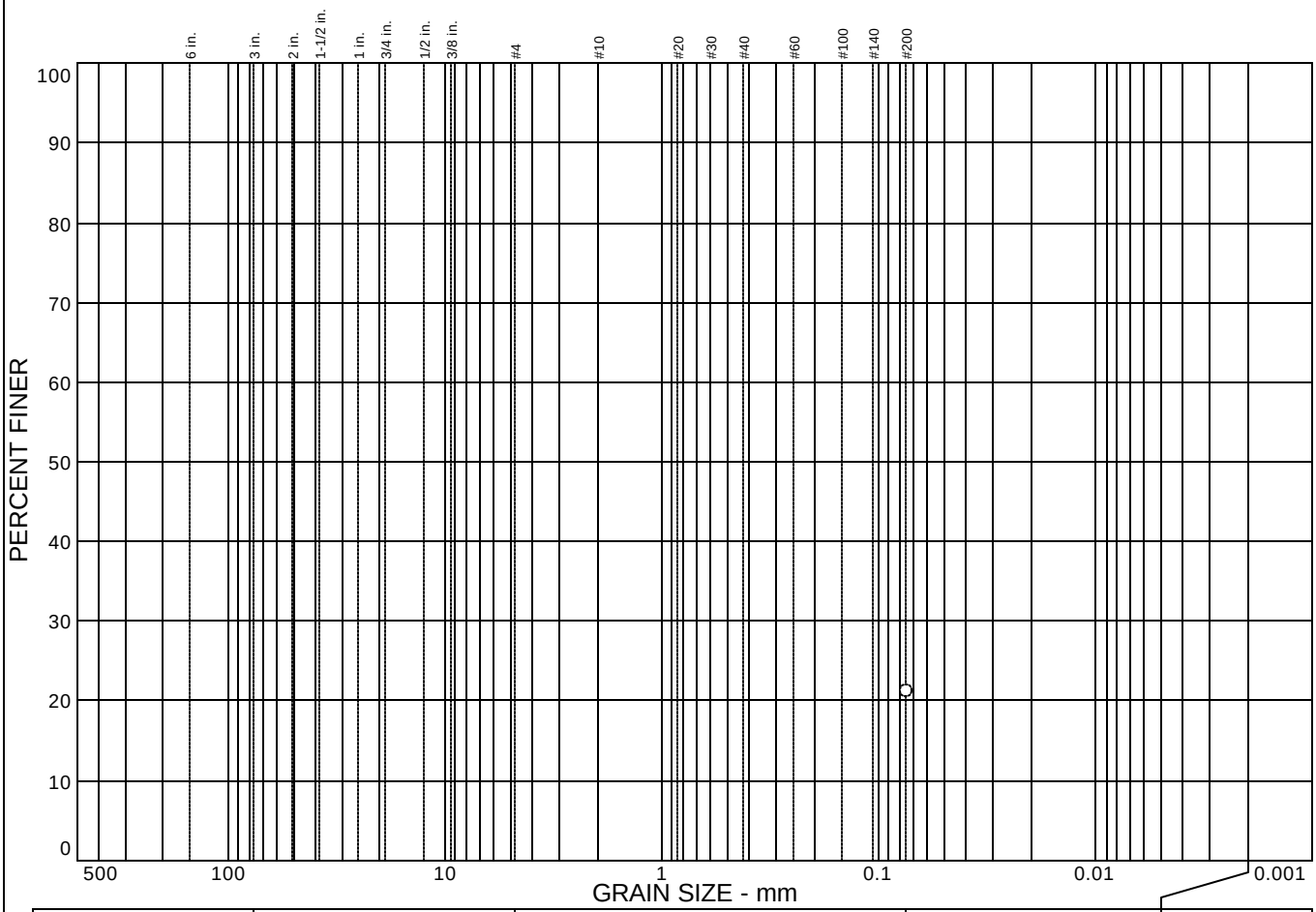
Remarks

Sample No.: B15 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			21.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	21.2		

* (no specification provided)

Soil Description

Yellow 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=

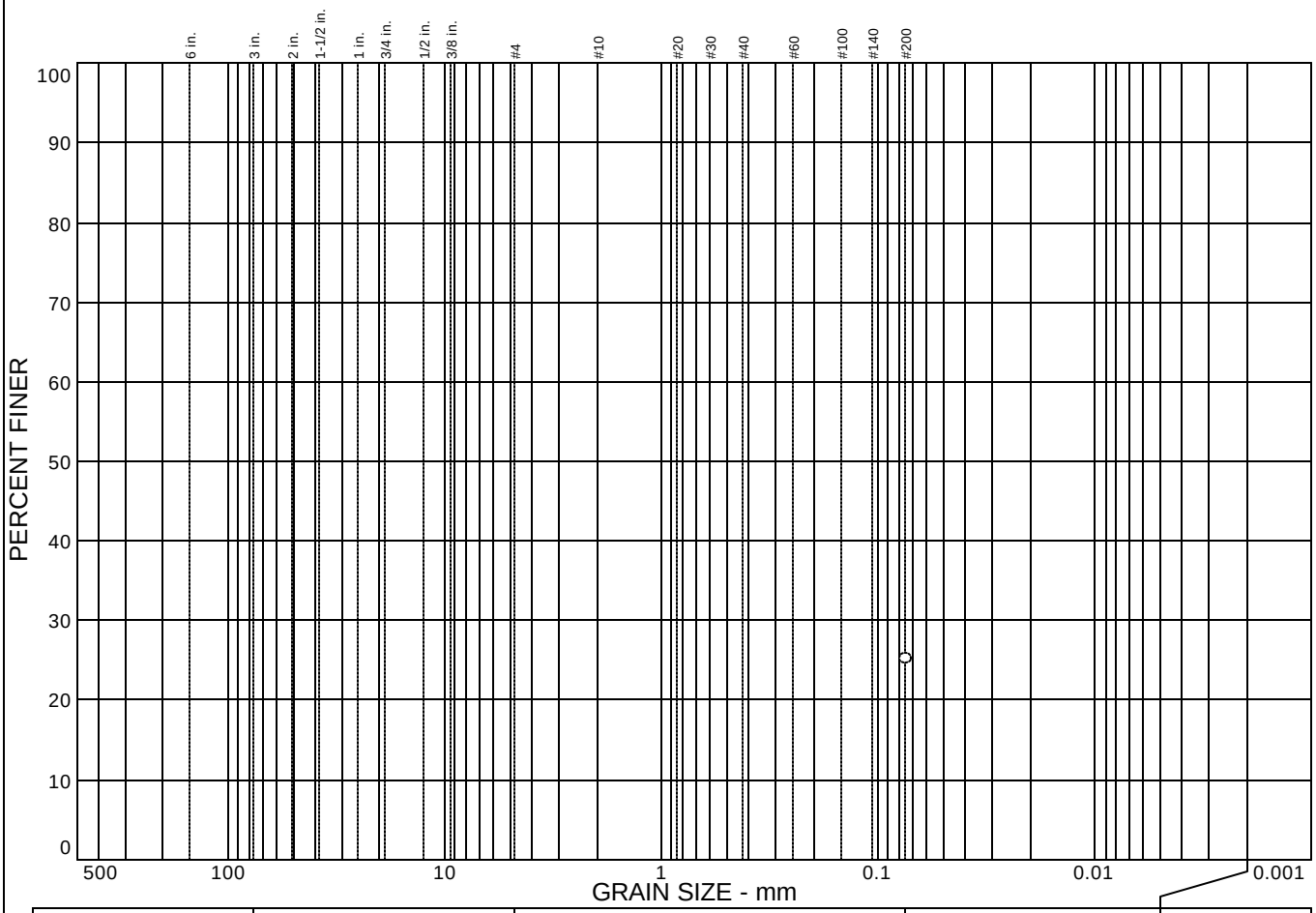
Remarks

Sample No.: B15 @ 6.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			25.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	25.2		

* (no specification provided)

Soil Description

Yellow 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=

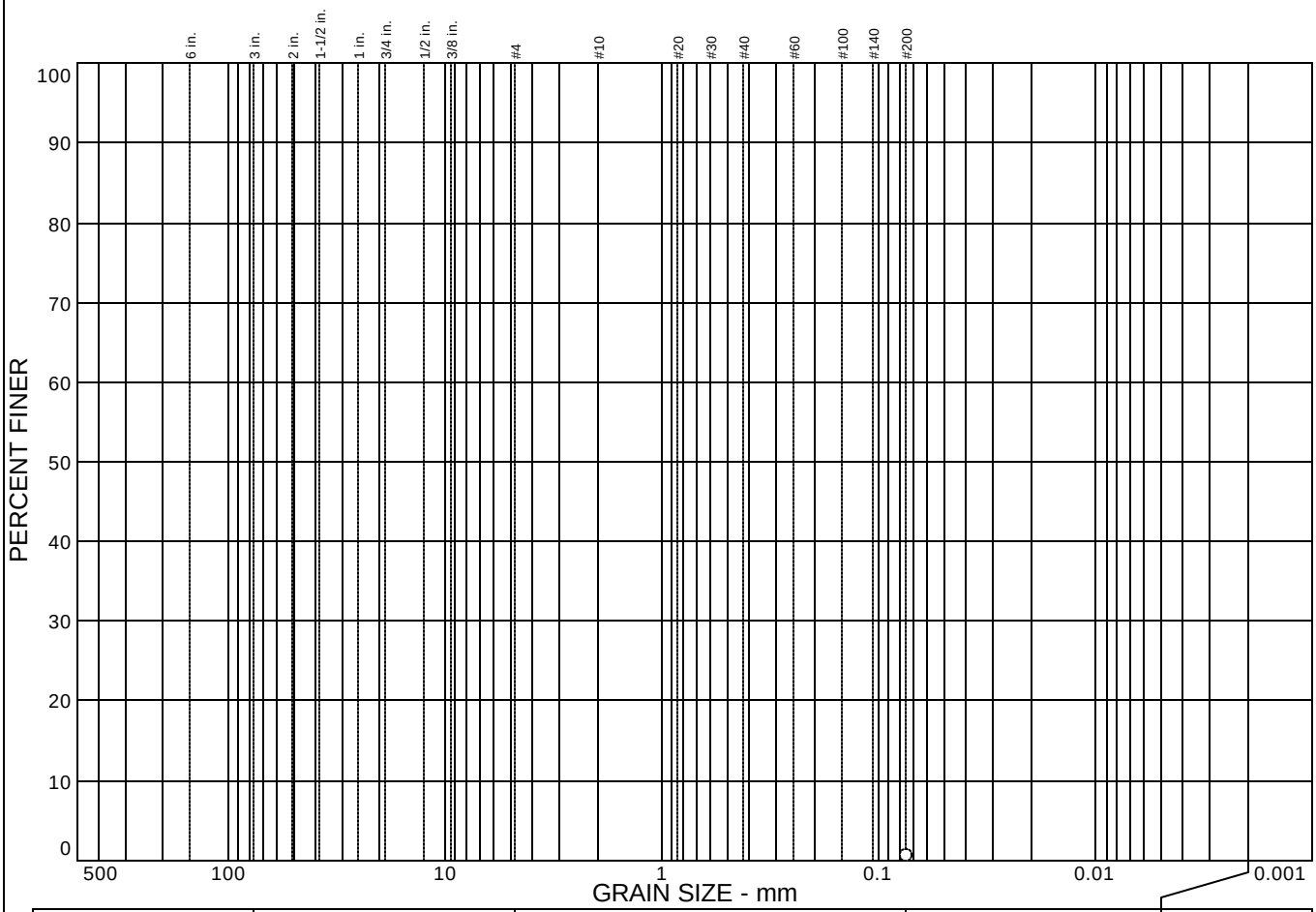
Remarks

Sample No.: B15 @ 10.5' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 10.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.6		

* (no specification provided)

Soil Description

Light yellowish brown 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=

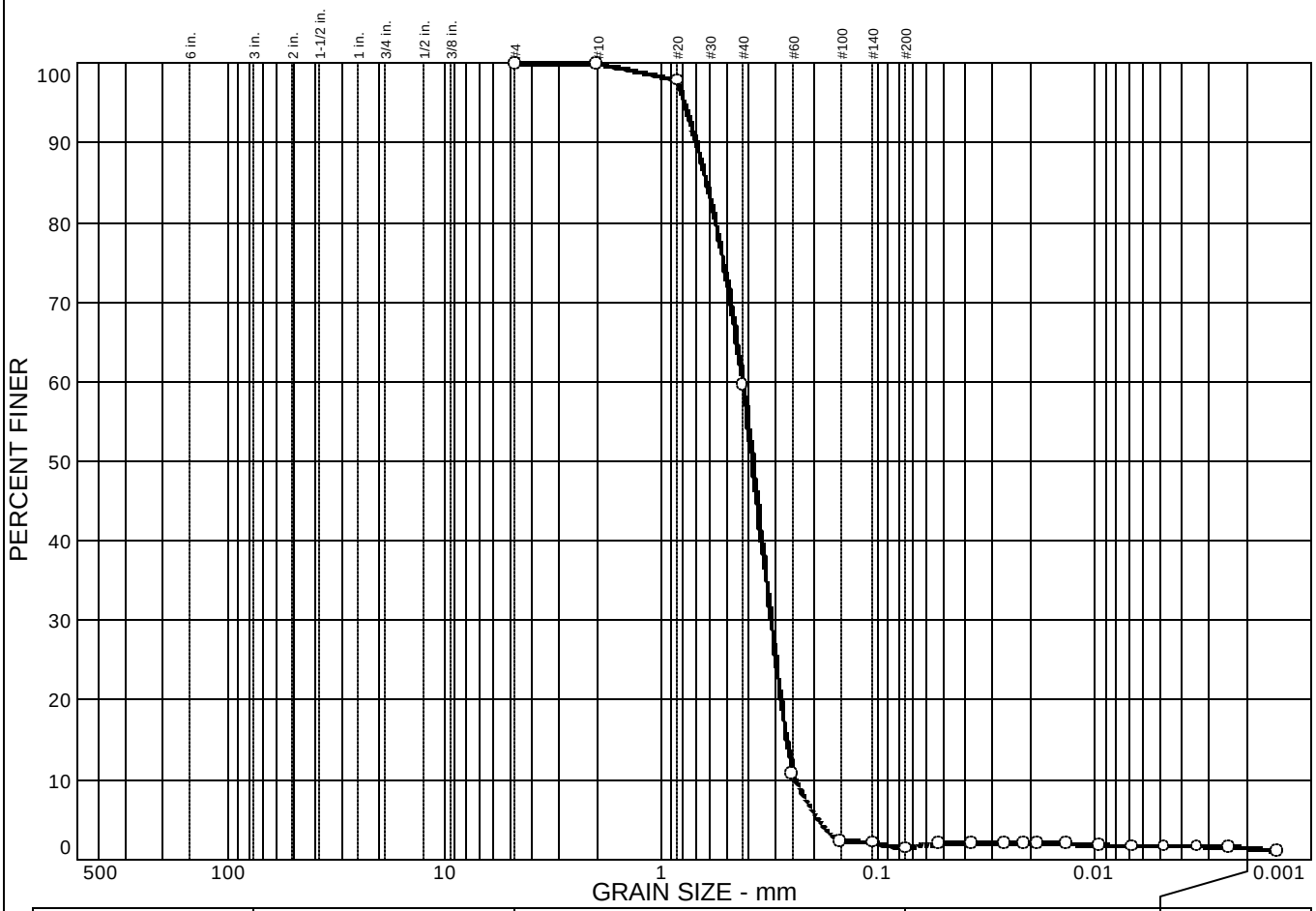
Remarks

Sample No.: B16 @ 3.0' **Source of Sample:** **Date:** 12/04/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	98.6	0.0	1.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	97.9		
#40	59.5		
#60	10.8		
#100	2.2		
#140	2.1		
#200	1.4		

* (no specification provided)

Soil Description

Light yellowish brown poorly graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.625 D_{60}= 0.427 D_{50}= 0.385
D_{30}= 0.316 D_{15}= 0.266 D_{10}= 0.242
C_u= 1.76 C_c= 0.96

Classification

USCS= SP AASHTO=

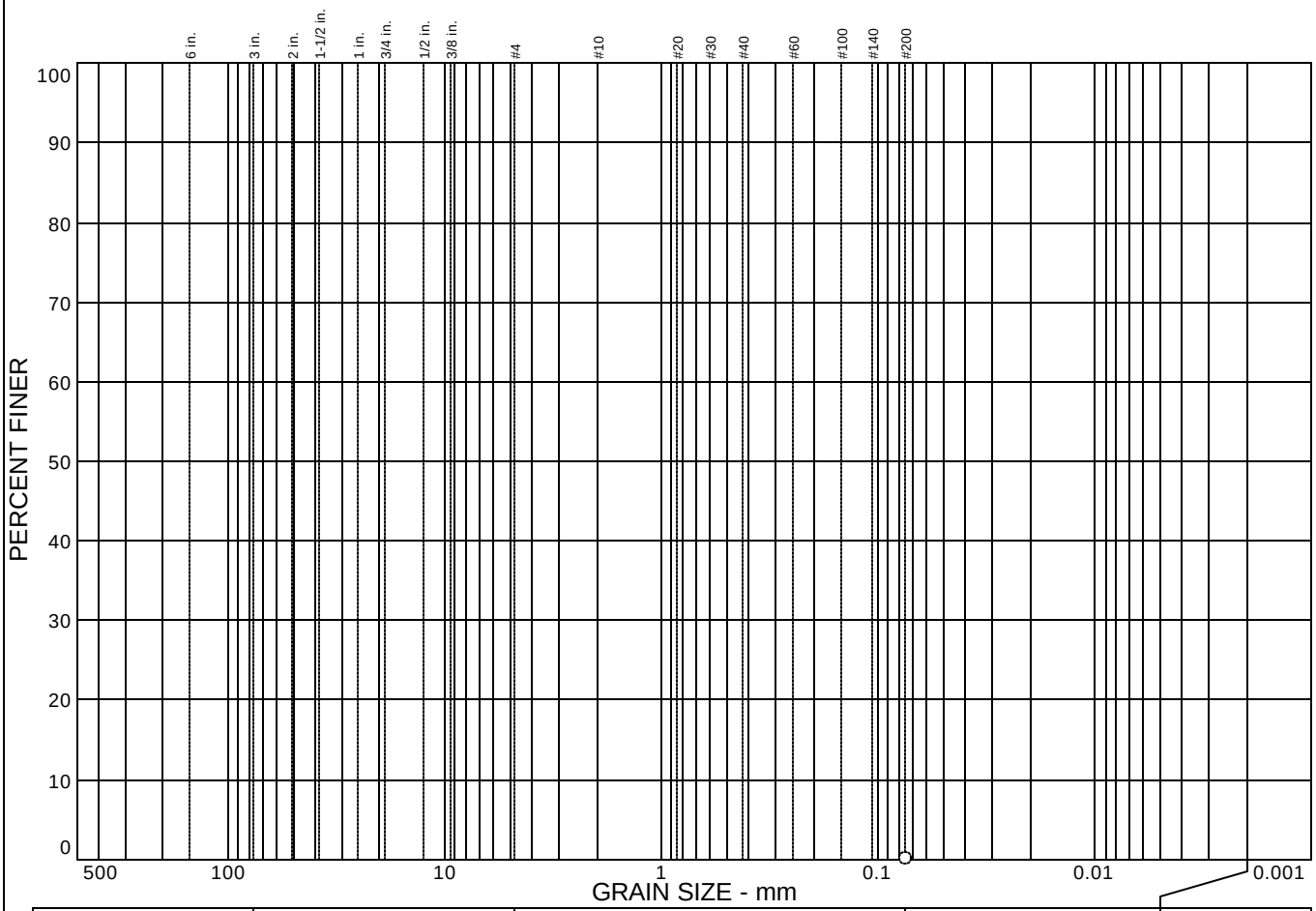
Remarks

Sample No.: B16 @ 11.0' **Source of Sample:** **Date:** 12/01/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			0.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	0.0		

* (no specification provided)

Soil Description

Light yellowish brown 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=

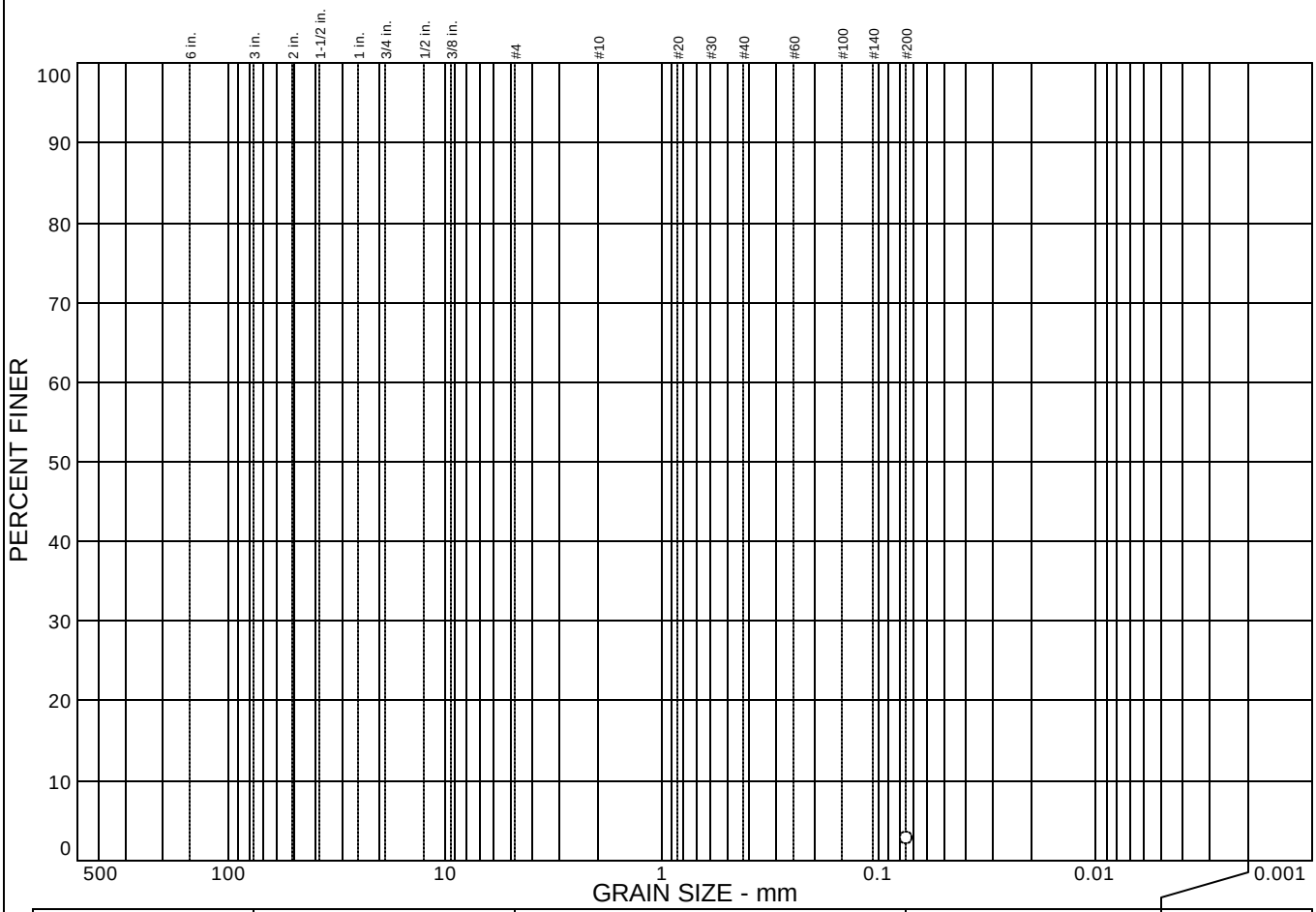
Remarks

Sample No.: B16 @ 16.0' **Source of Sample:** **Date:** 12/04/06
Location: **Elev./Depth:** 16.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			2.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	2.7		

* (no specification provided)

Soil Description

Light yellowish brown 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=

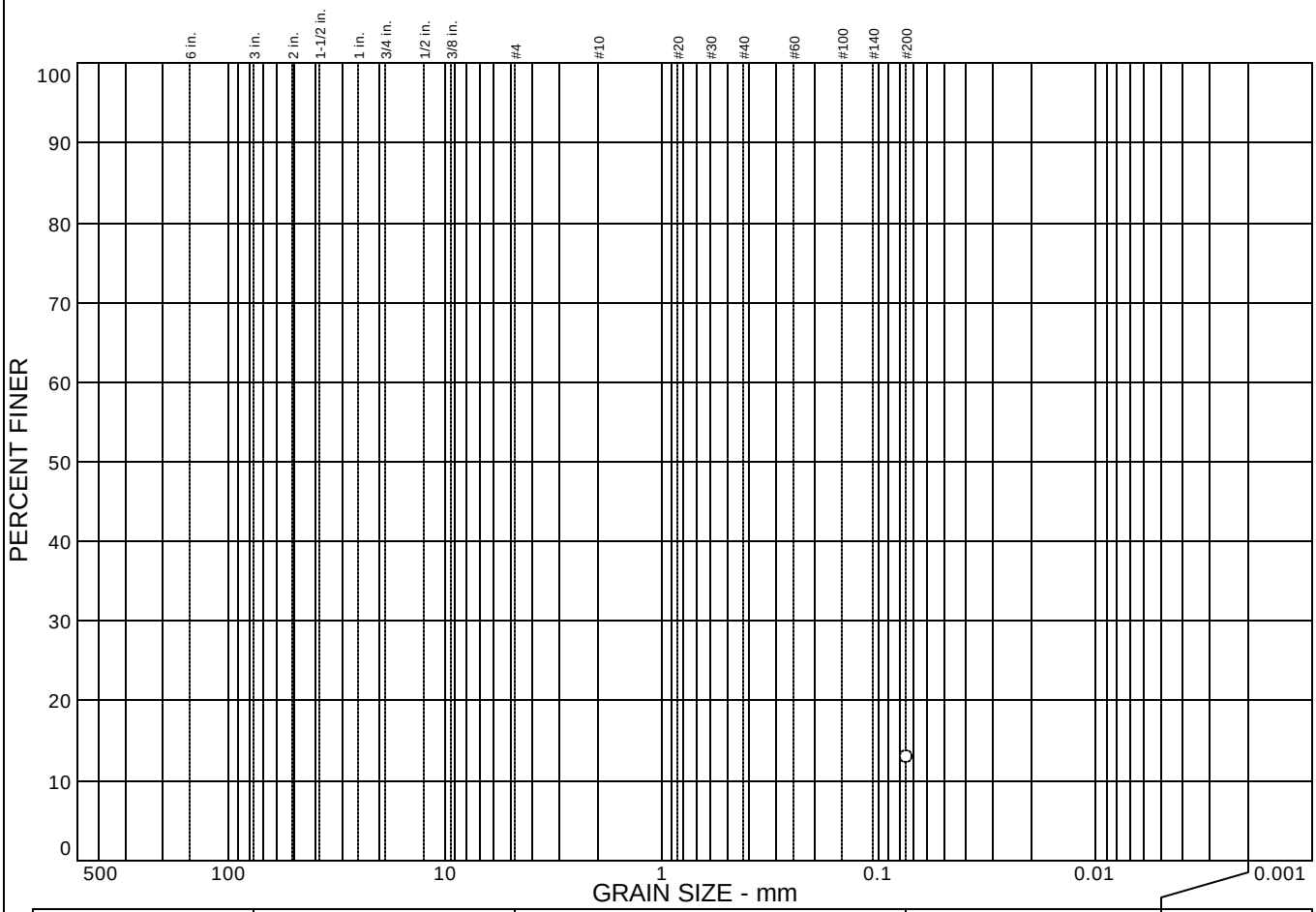
Remarks

Sample No.: B16 @ 26.0' **Source of Sample:** **Date:** 12/04/06
Location: **Elev./Depth:** 26.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

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

Dark 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=

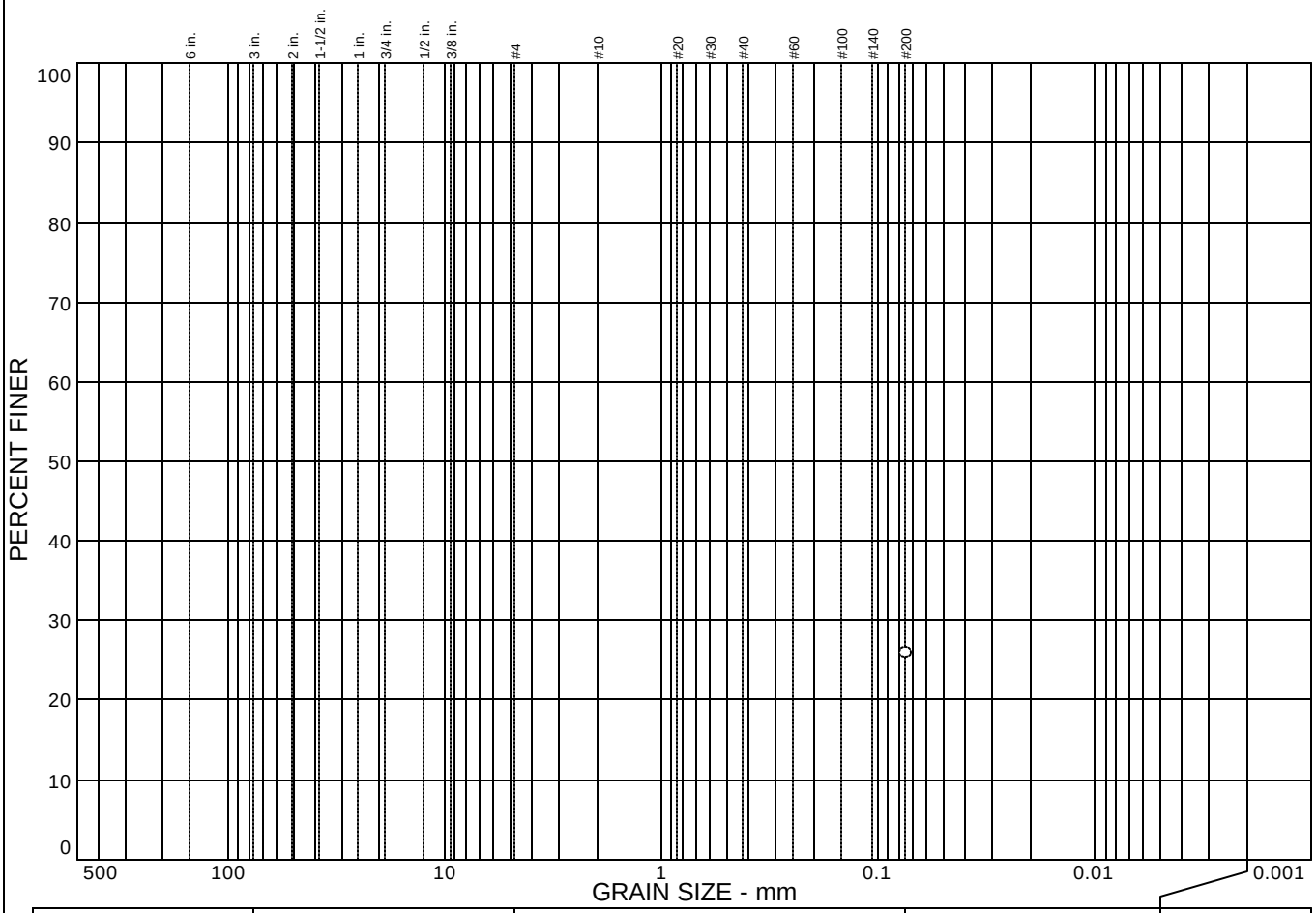
Remarks

Sample No.: B17 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			25.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	25.9		

* (no specification provided)

Soil Description

Dark 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=

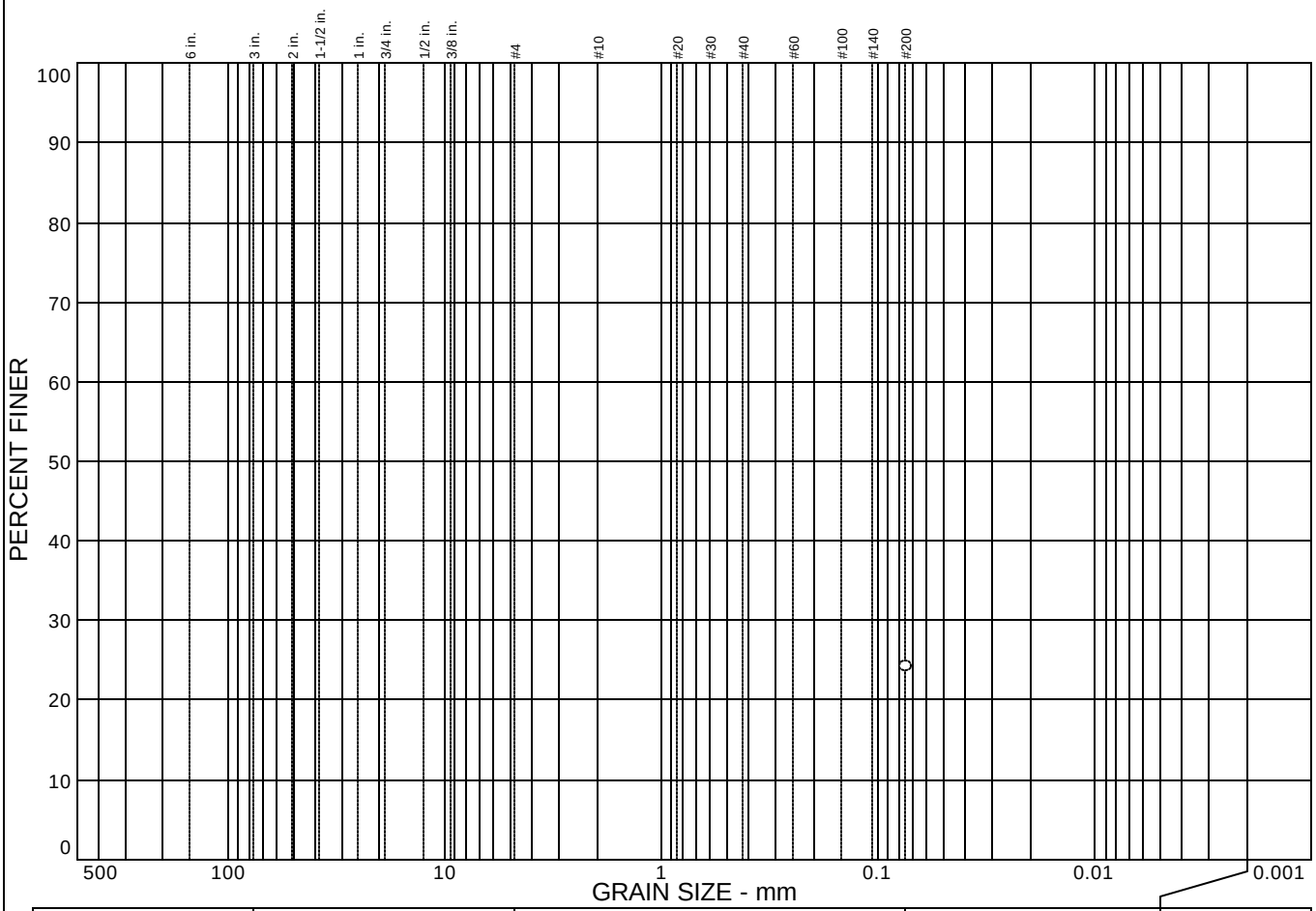
Remarks

Sample No.: B17 @ 5.5' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 5.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			24.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	24.2		

* (no specification provided)

Soil Description

Dark 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=

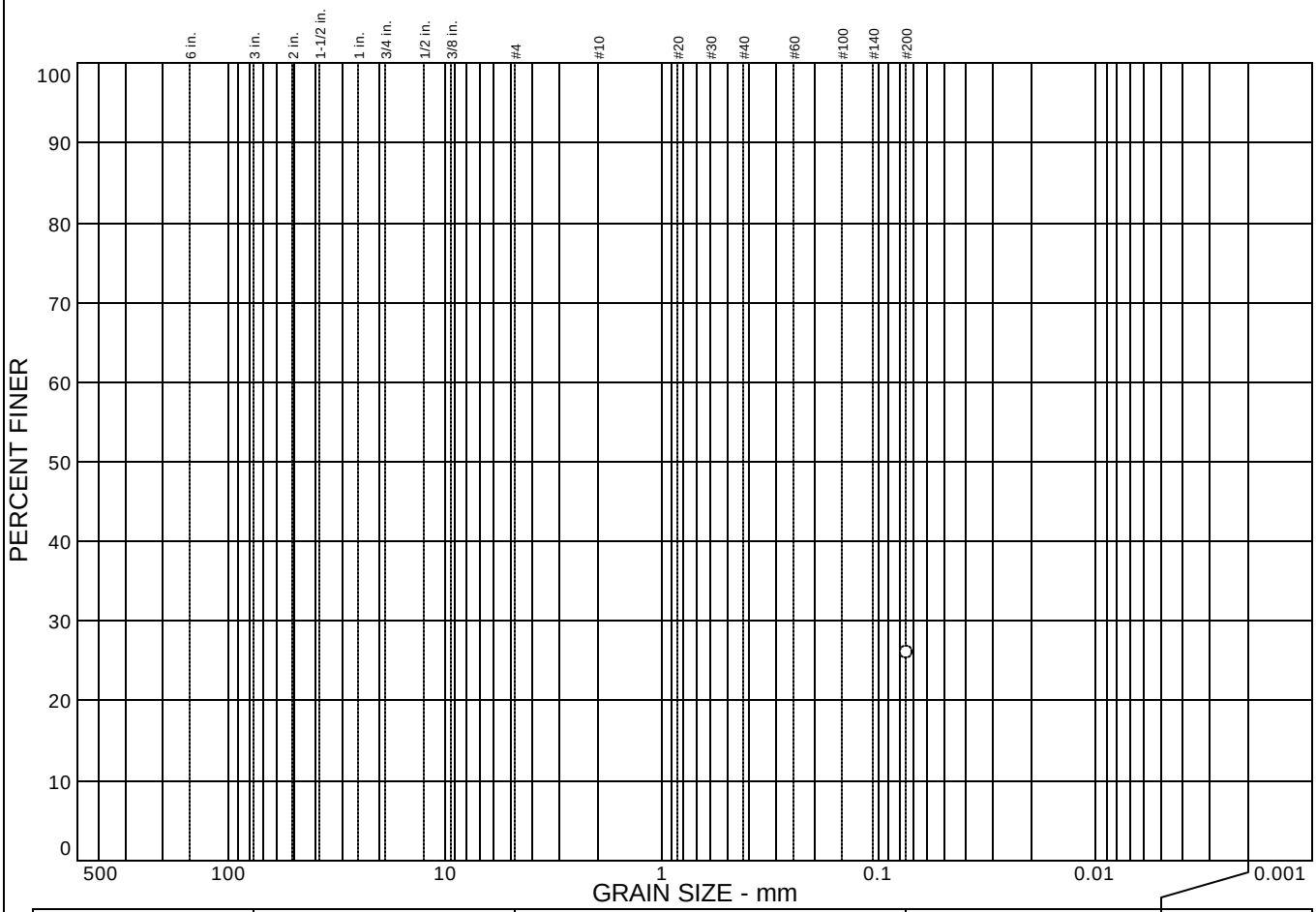
Remarks

Sample No.: B17 @ 11.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			26.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	26.0		

* (no specification provided)

Soil Description

Yellowish 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=

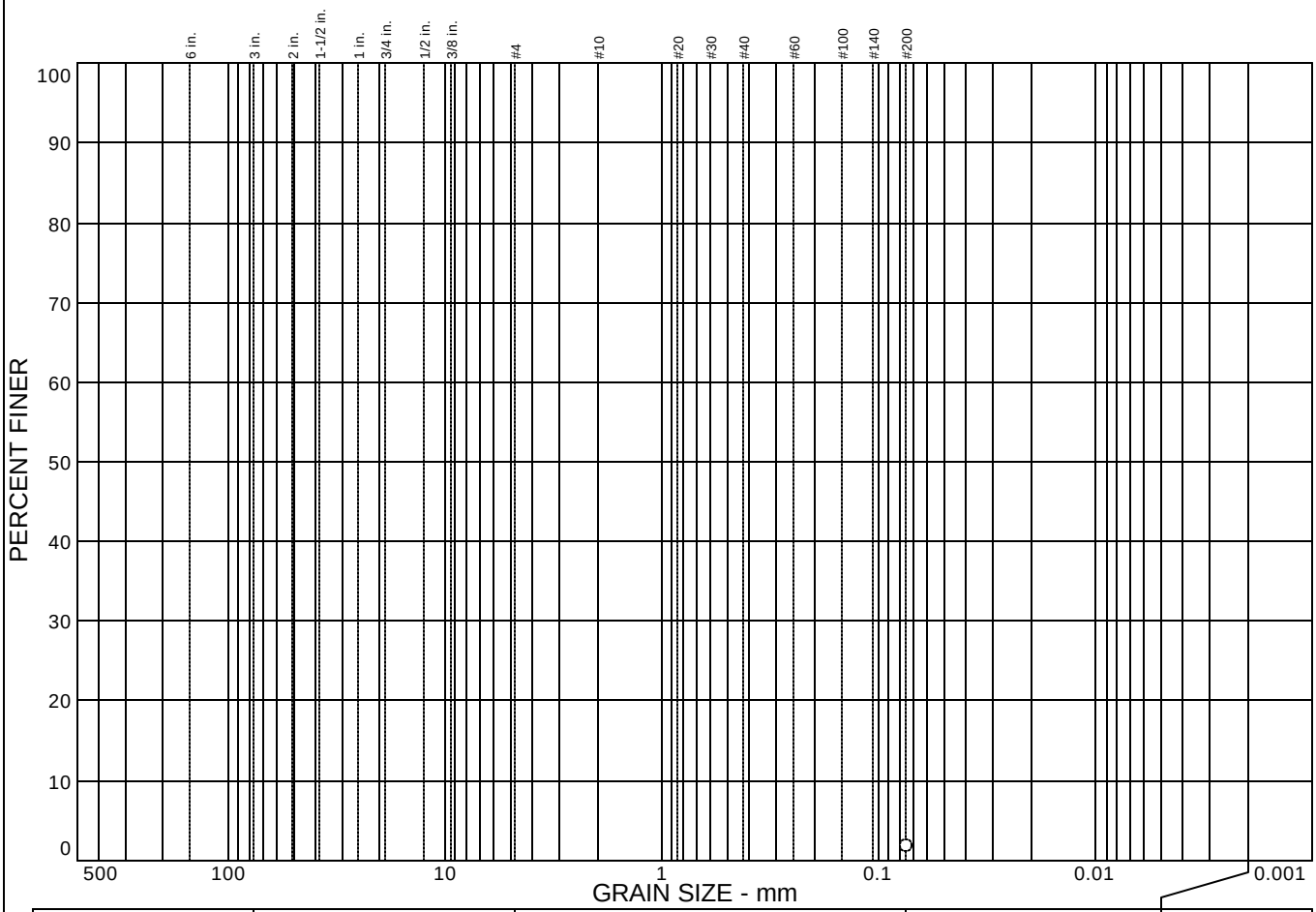
Remarks

Sample No.: B18 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			1.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	1.7		

* (no specification provided)

Soil Description

Yellow SAND. Trace 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=

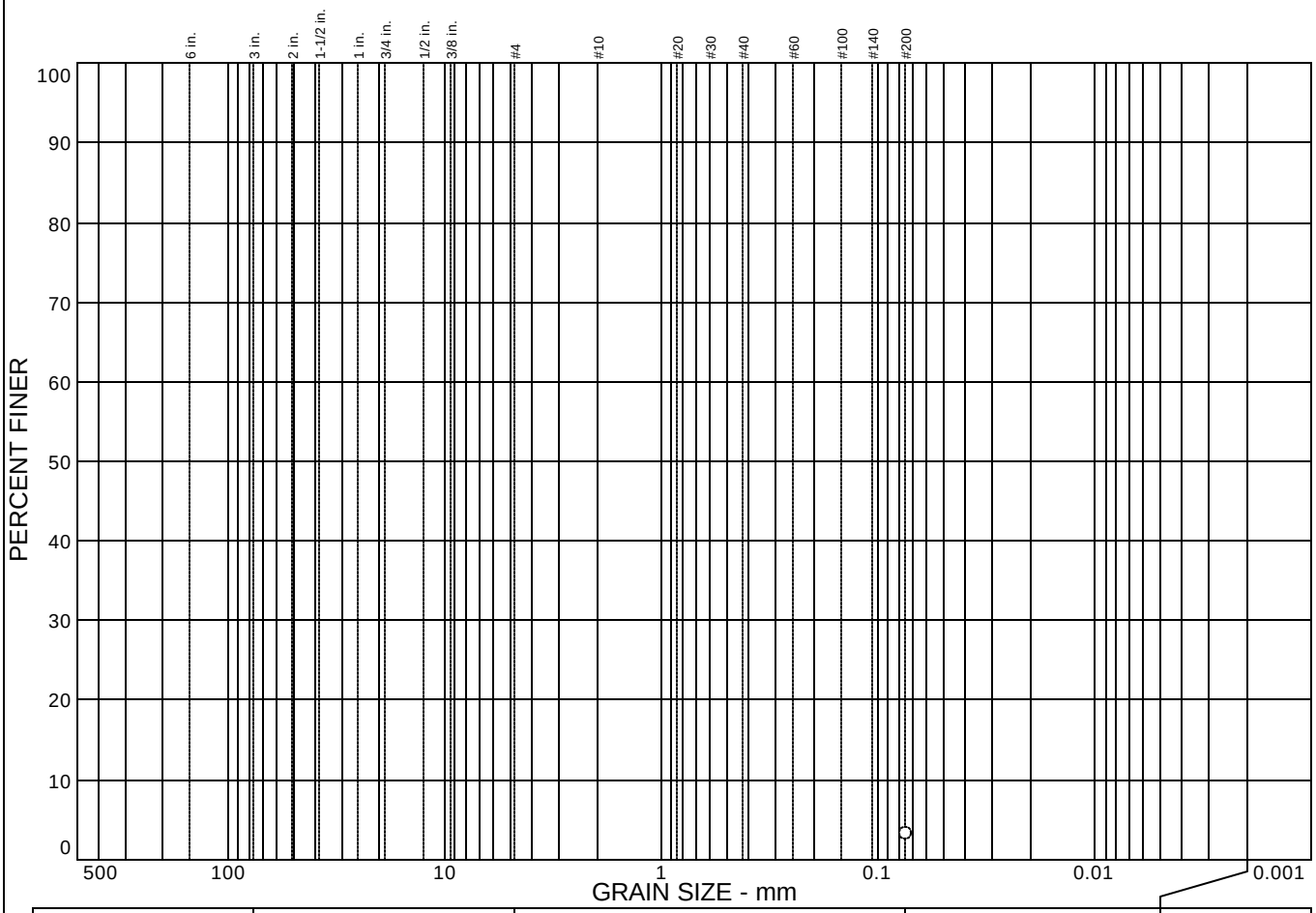
Remarks

Sample No.: B18 @ 5.5' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 5.5 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			3.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	3.2		

* (no specification provided)

Soil Description

Yellow SAND. Trace 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=

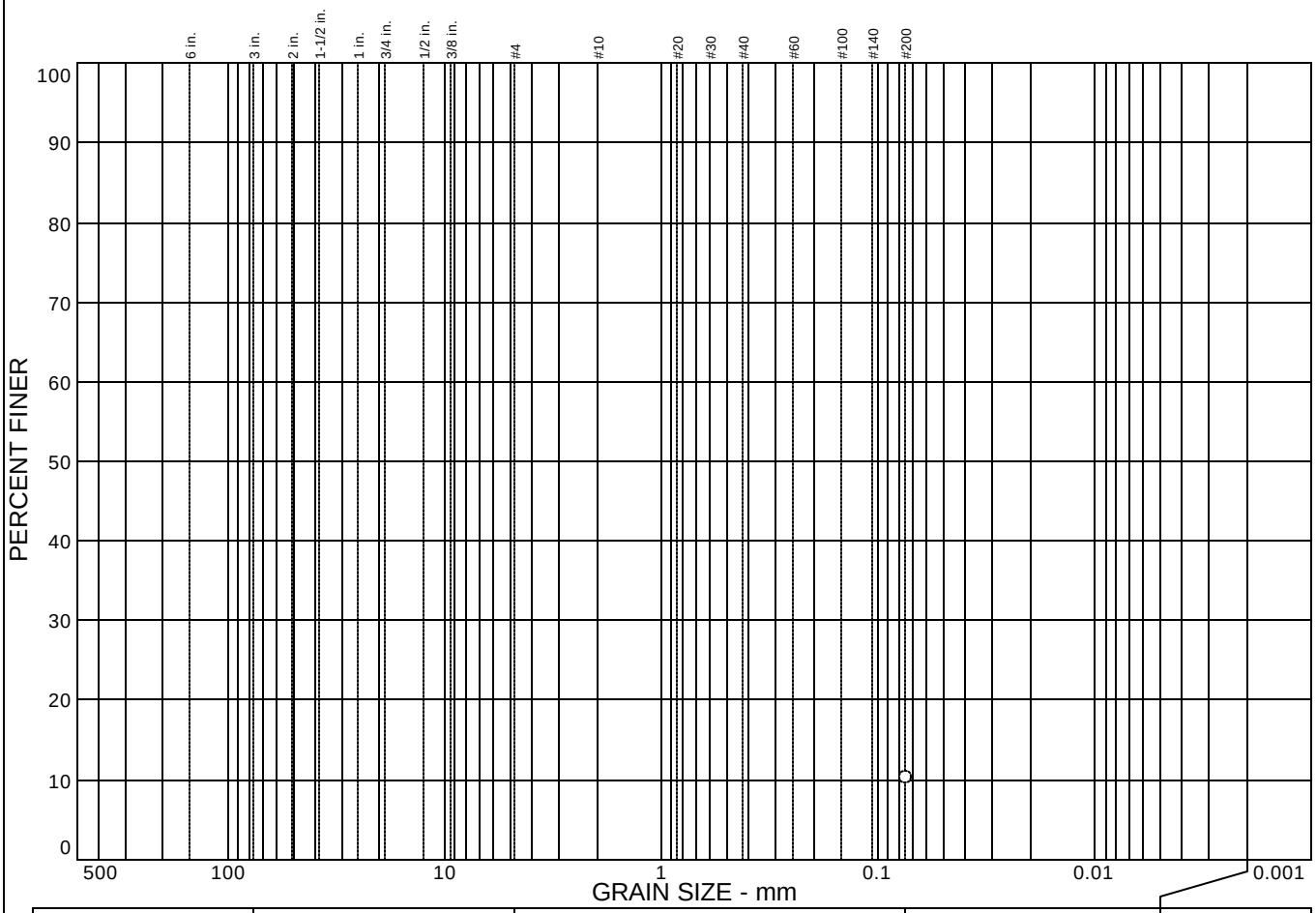
Remarks

Sample No.: B18 @ 11.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			10.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	10.2		

* (no specification provided)

Soil Description

Dark brown 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=

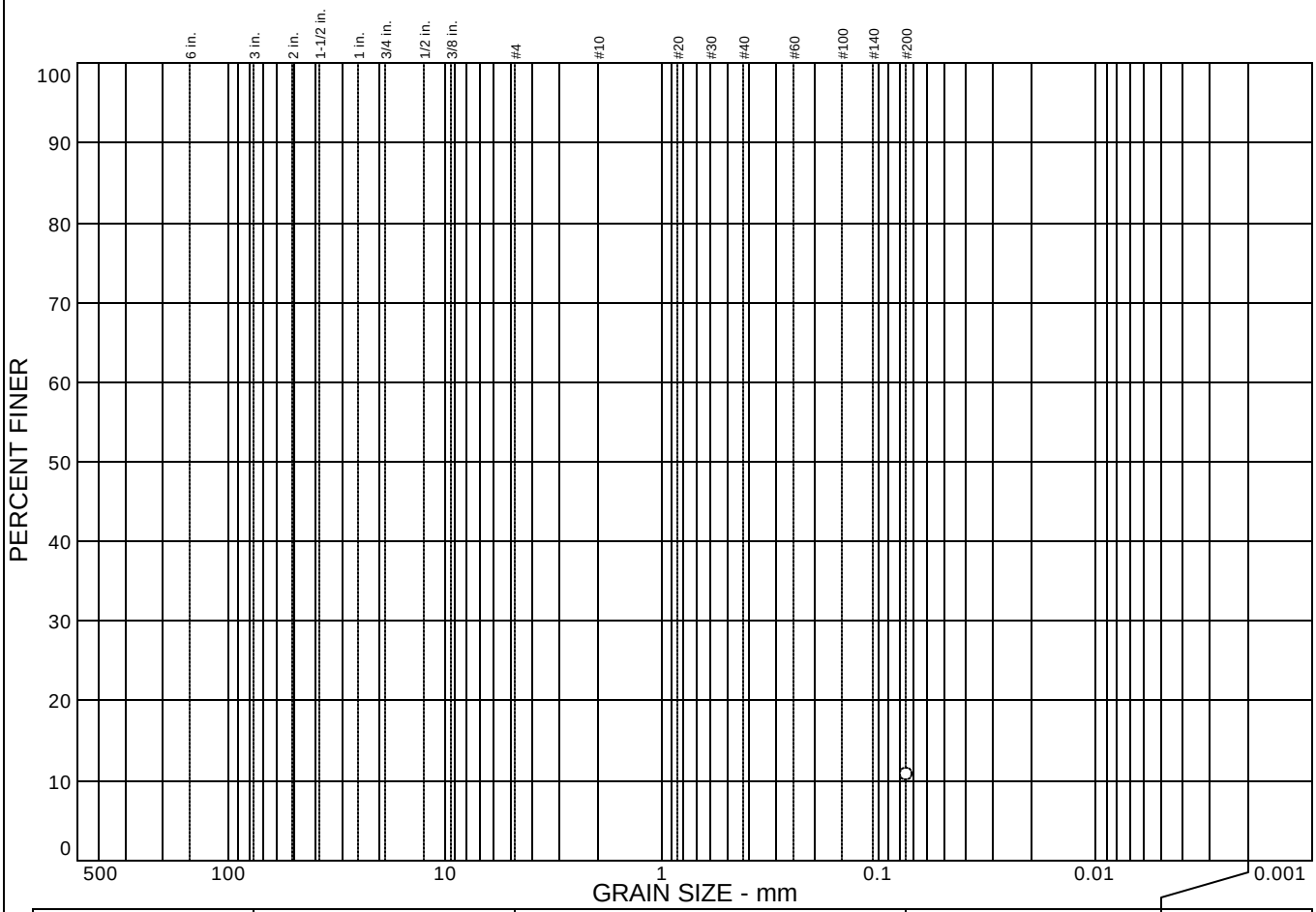
Remarks

Sample No.: B19 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			10.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	10.8		

* (no specification provided)

Soil Description

Dark brown 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=

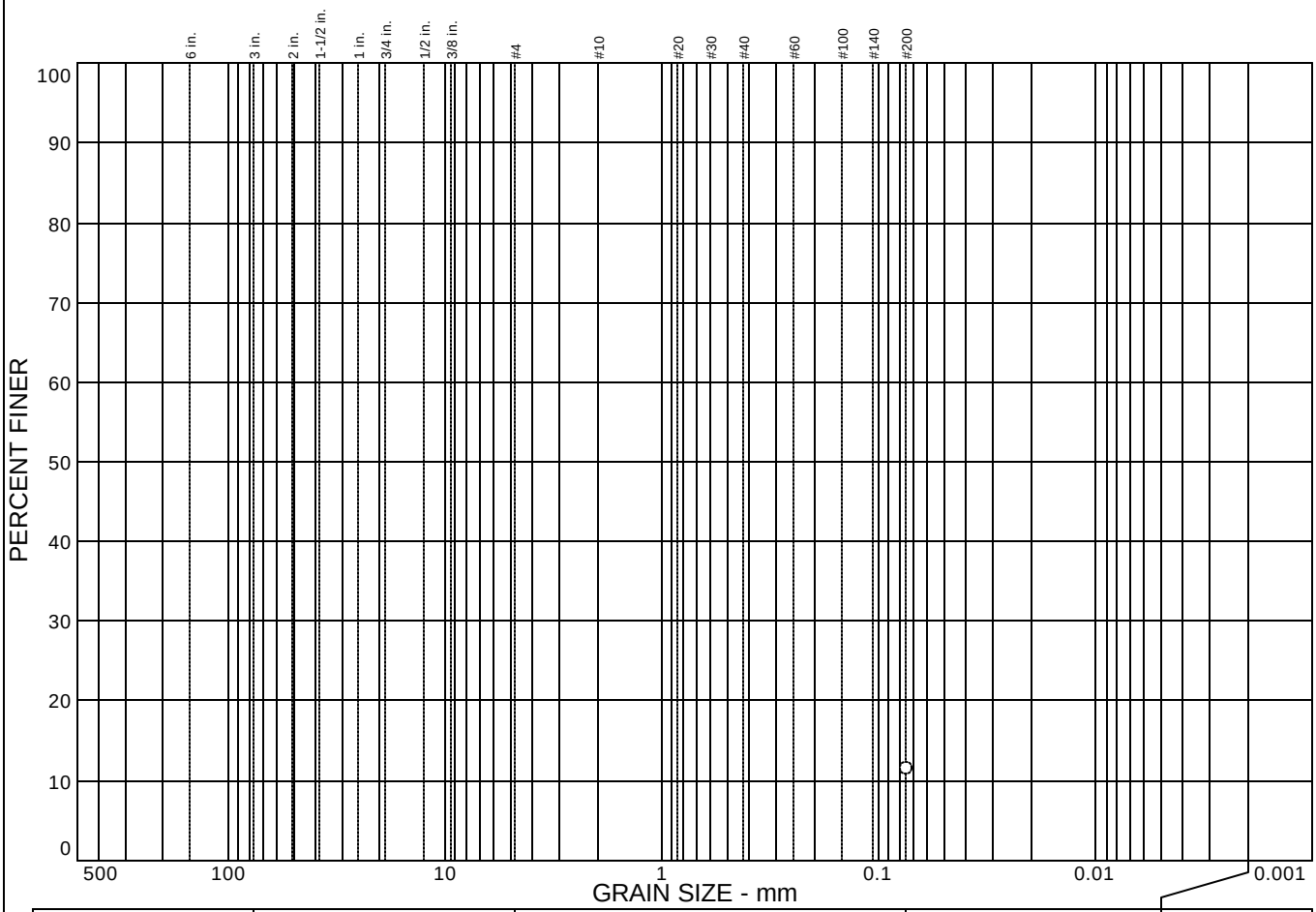
Remarks

Sample No.: B19 @ 6.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			11.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	11.5		

* (no specification provided)

Soil Description

Yellowish brown 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=

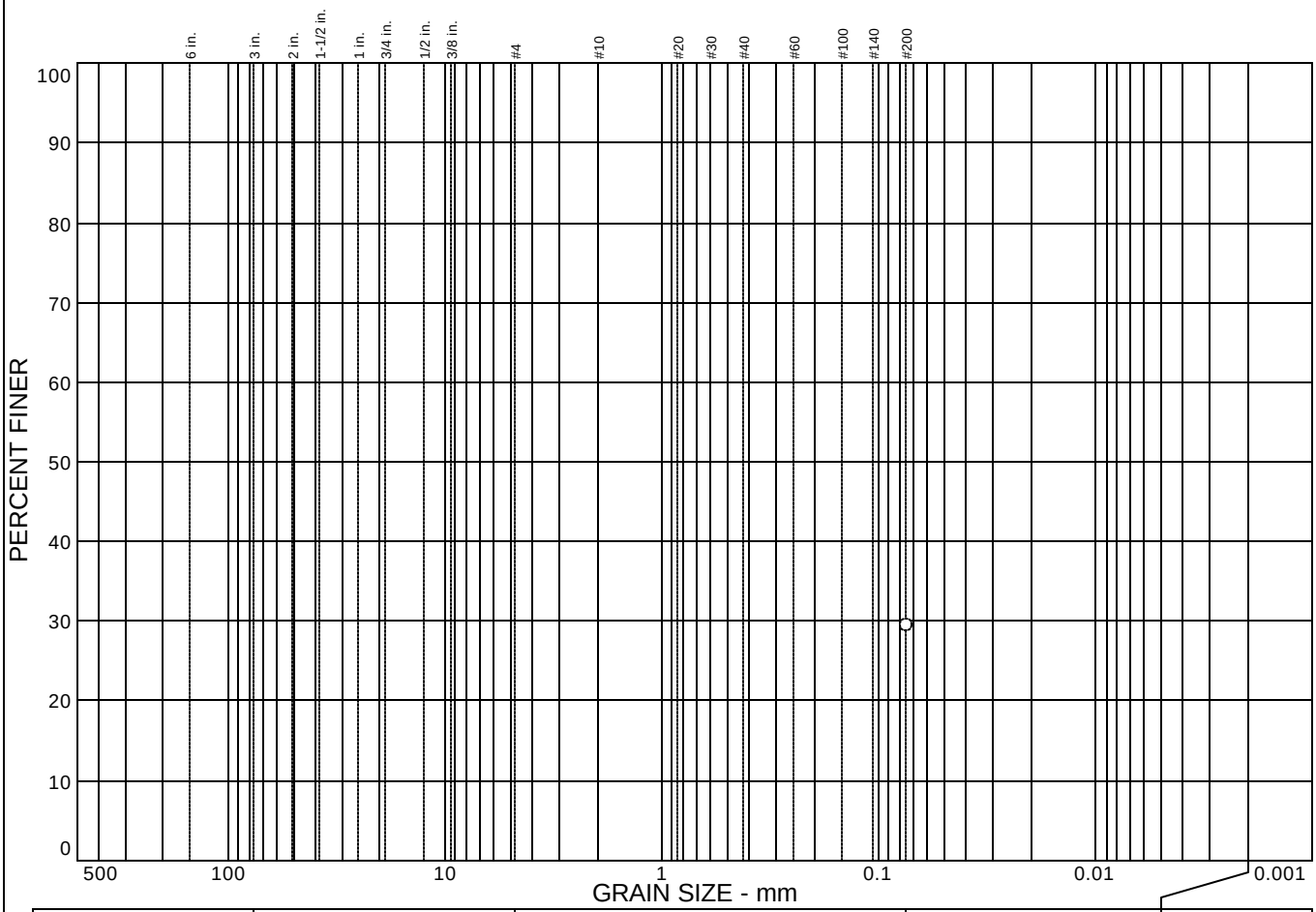
Remarks

Sample No.: B19 @ 11.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			29.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	29.5		

* (no specification provided)

Soil Description

Yellowish 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=

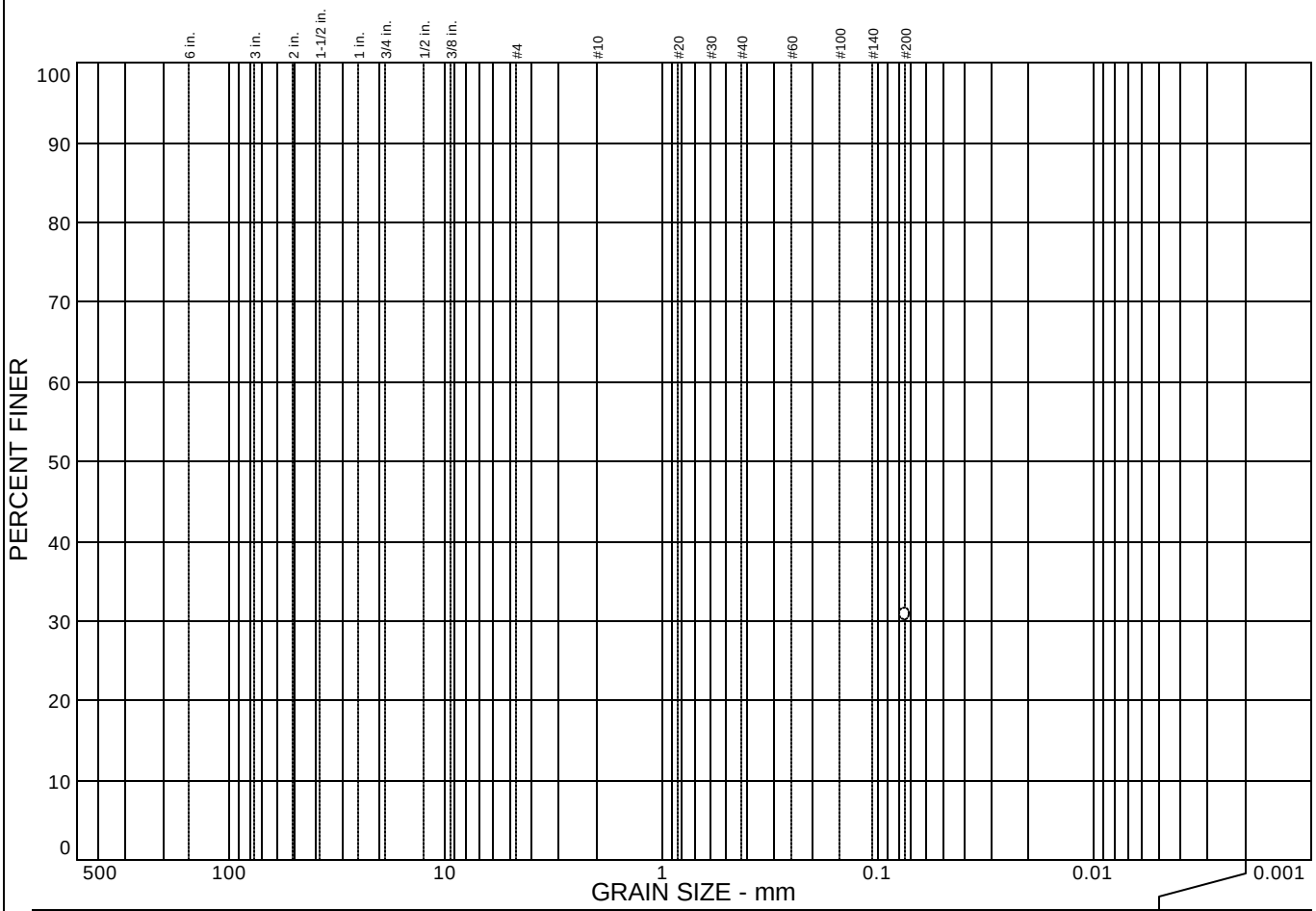
Remarks

Sample No.: B20 @ 3.0' **Source of Sample:** **Date:** 11/09/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			30.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	30.9		

* (no specification provided)

Soil Description

Yellowish 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=

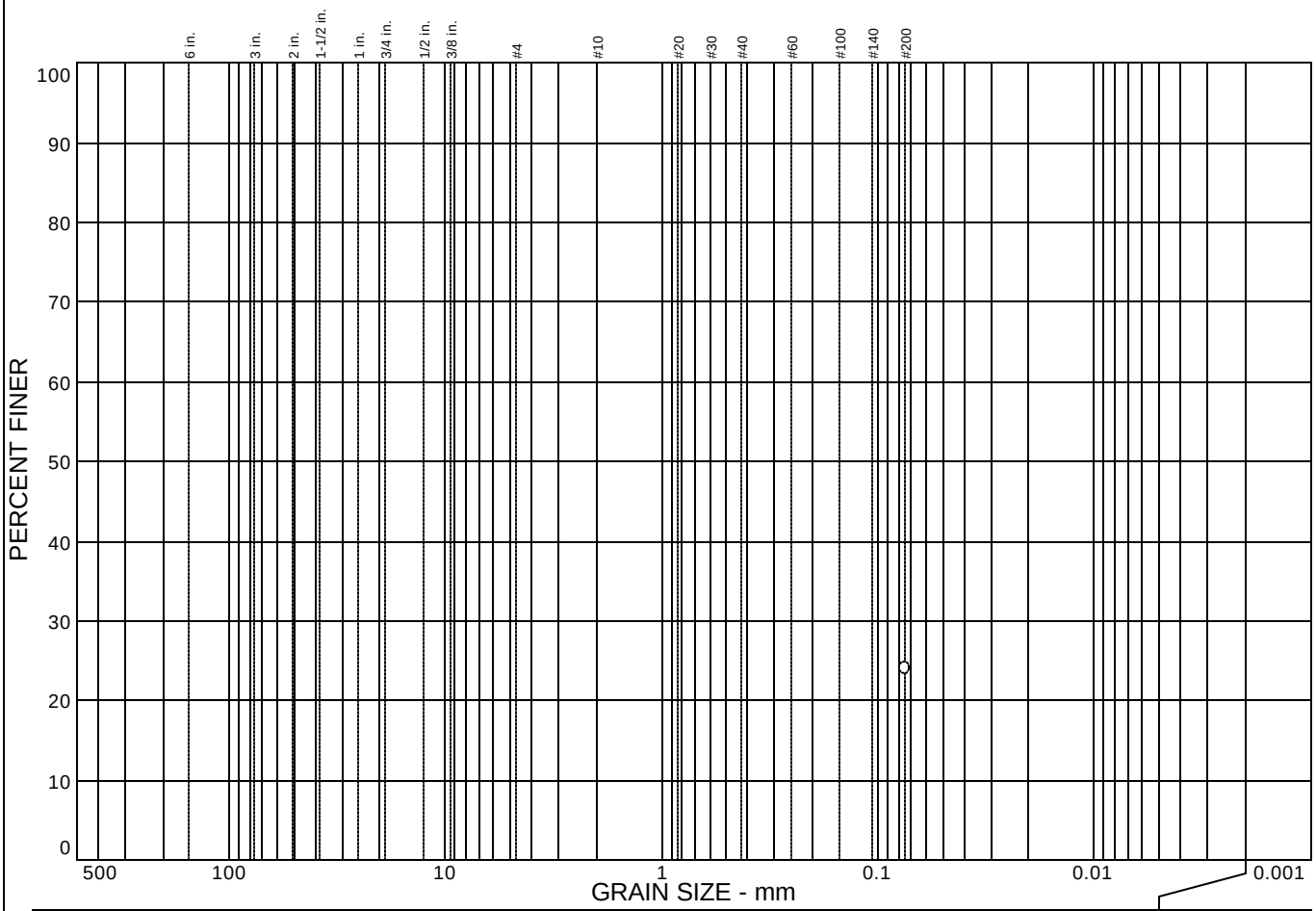
Remarks

Sample No.: B20 @ 6.0' **Source of Sample:** **Date:** 11/10/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			24.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	24.1		

* (no specification provided)

Soil Description

Yellowish brown 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=

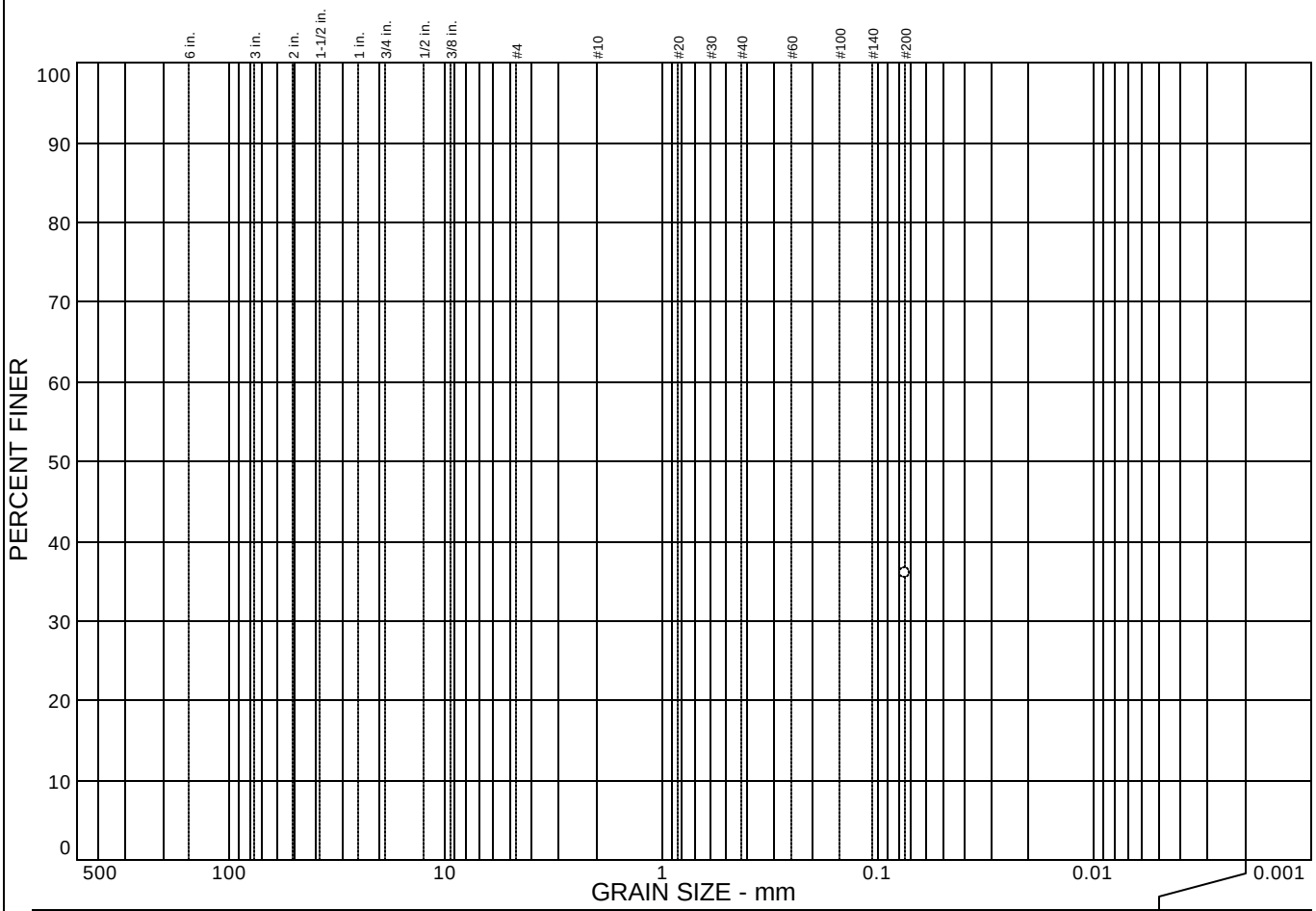
Remarks

Sample No.: B20 @ 11.0' **Source of Sample:** **Date:** 11/10/06
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			36.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	36.0		

* (no specification provided)

Soil Description

Yellowish 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=

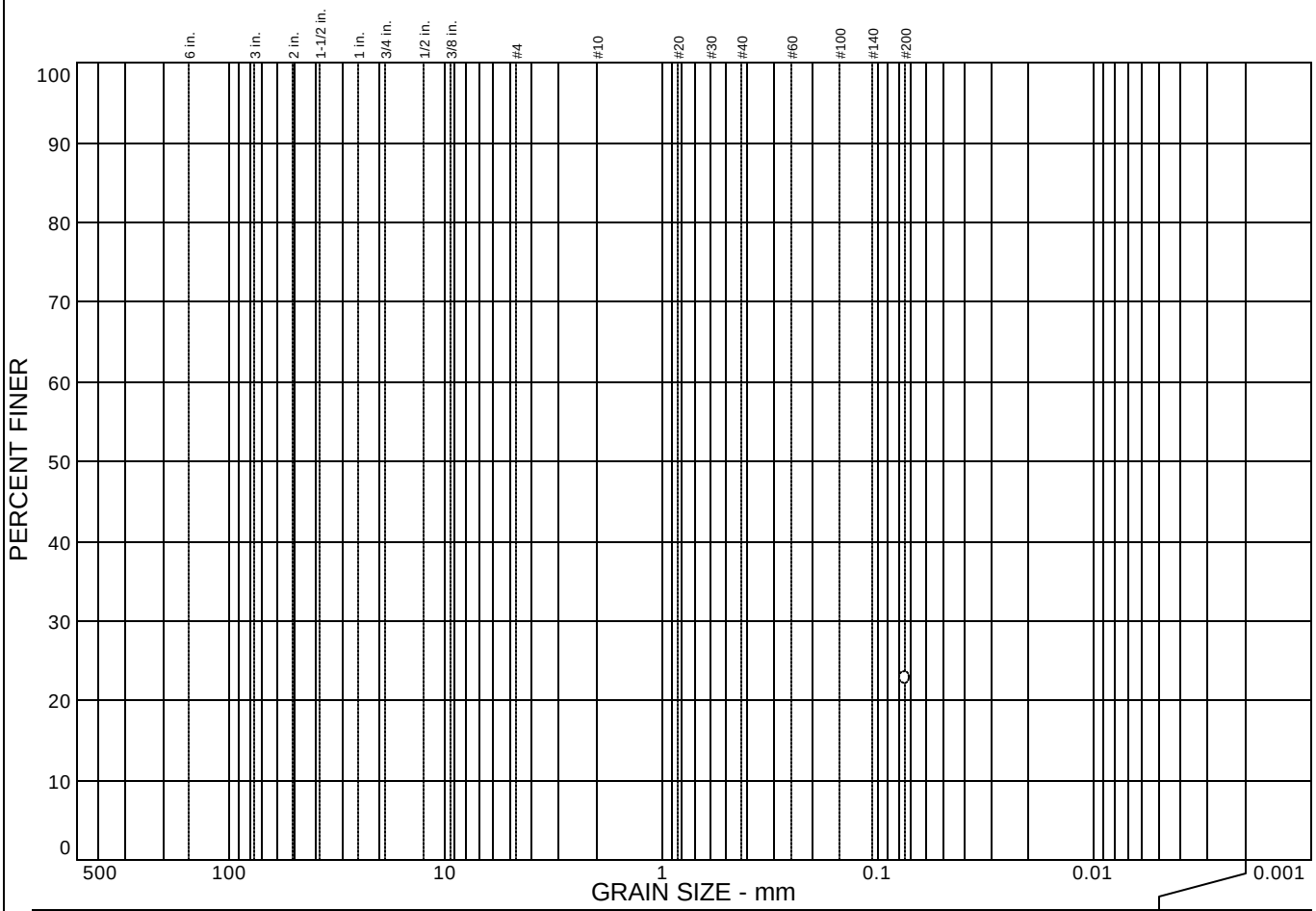
Remarks

Sample No.: B21 @ 3.0' **Source of Sample:** **Date:** 11/10/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			22.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	22.9		

* (no specification provided)

Soil Description

Yellowish brown 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=

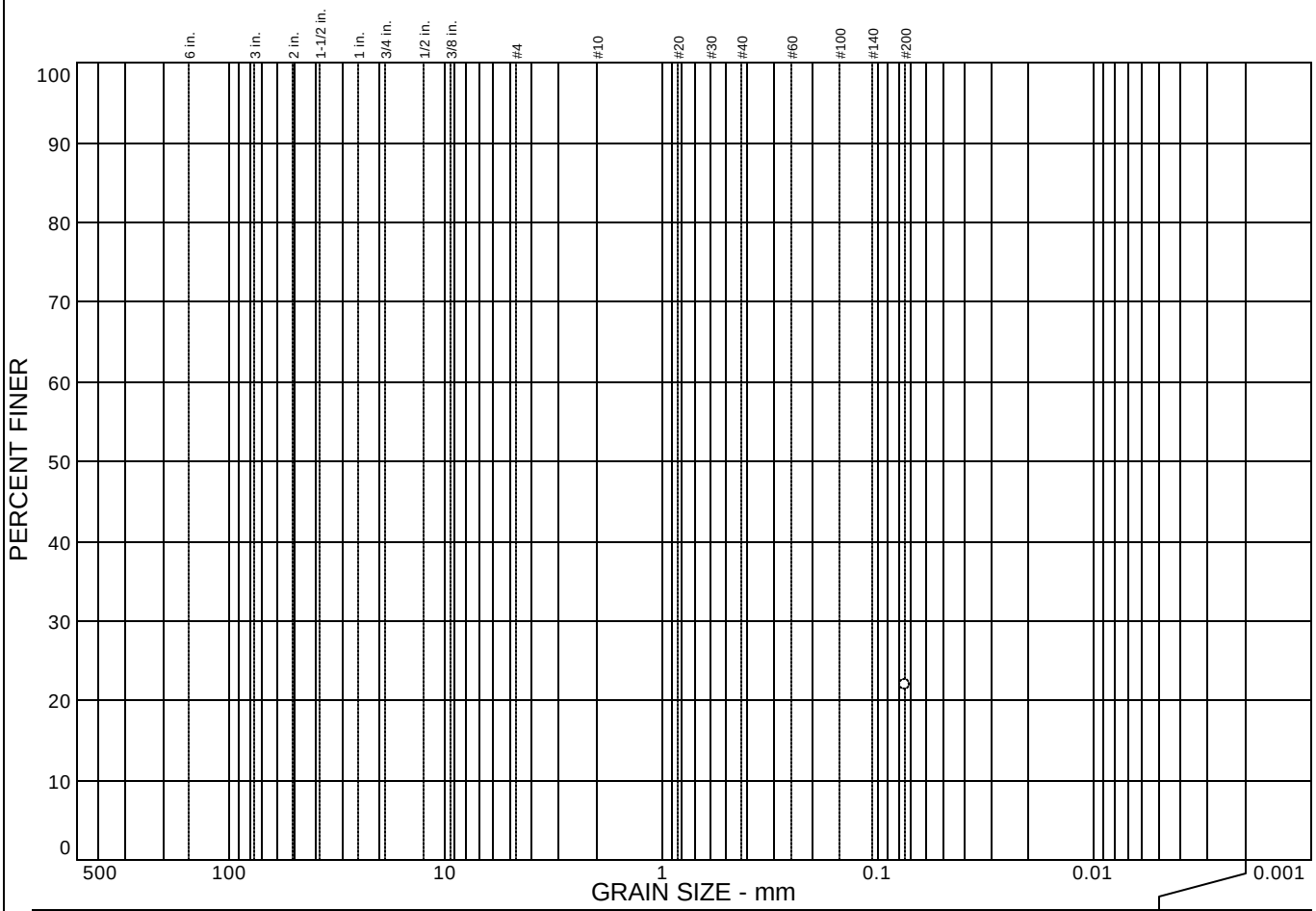
Remarks

Sample No.: B21 @ 6.0' **Source of Sample:** **Date:** 11/10/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			22.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	22.0		

* (no specification provided)

Soil Description

Yellowish brown 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=

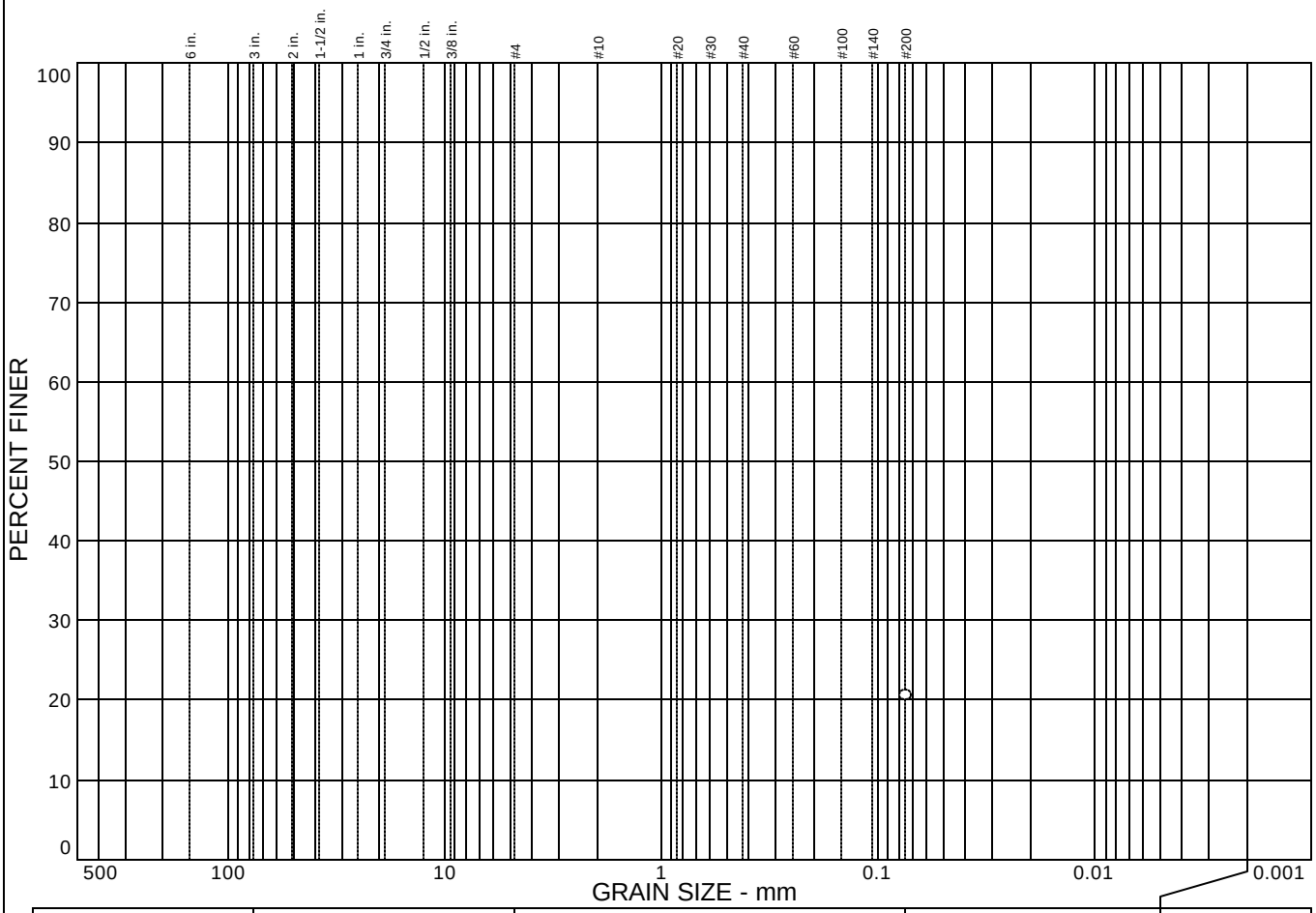
Remarks

Sample No.: B21 @ 11.0' **Source of Sample:** **Date:** 11/10/09
Location: **Elev./Depth:** 11.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
			20.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	20.6		

* (no specification provided)

Soil Description

Dark yellowish 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=

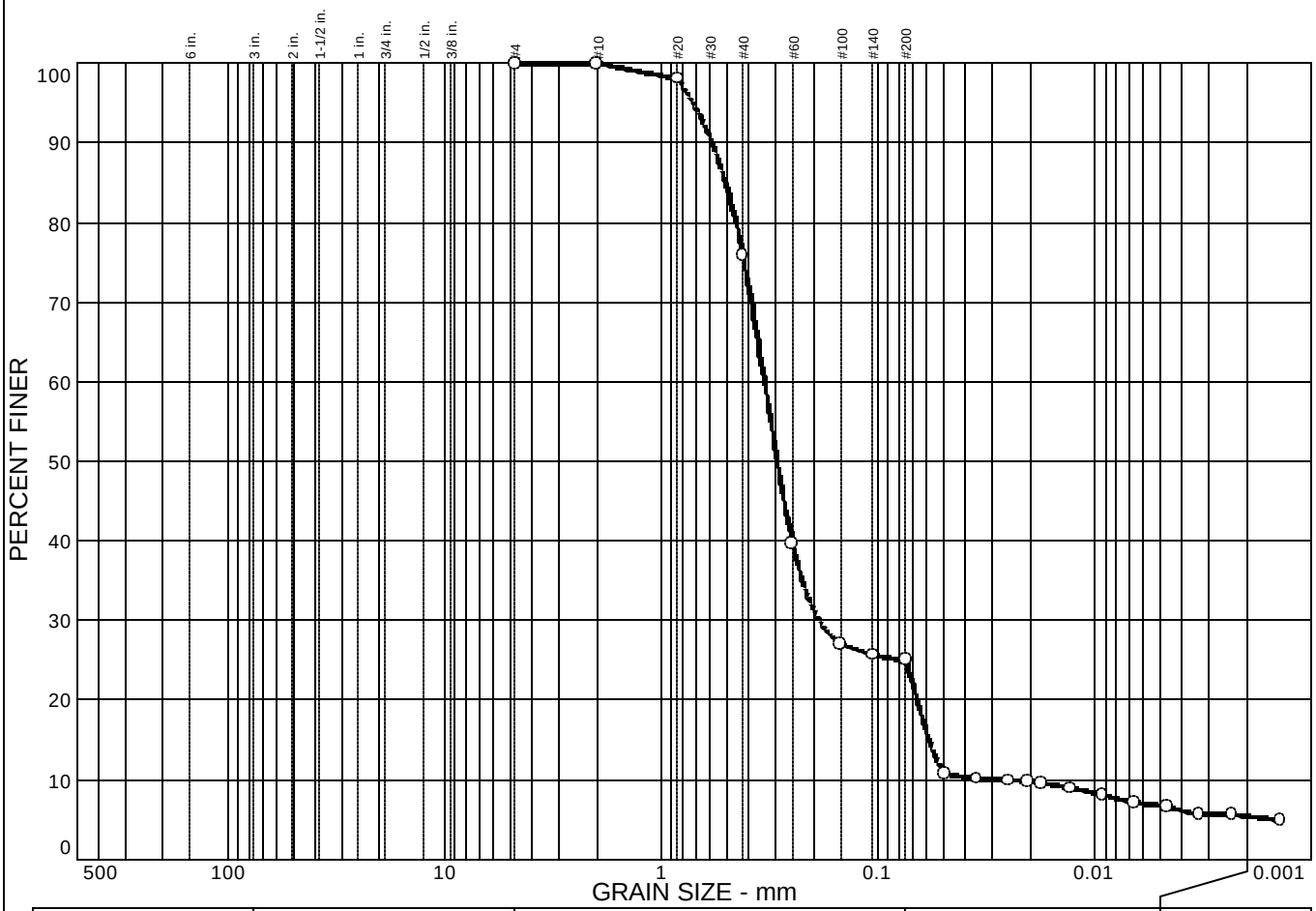
Remarks

Sample No.: B22 @ 3.0' **Source of Sample:** **Date:** 12/04/06
Location: **Elev./Depth:** 3.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% COBBLES	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.0	75.0	19.6	5.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#10	100.0		
#20	98.1		
#40	75.8		
#60	39.6		
#100	27.1		
#140	25.7		
#200	25.0		

* (no specification provided)

Soil Description

Yellowish brown silty SAND.

Atterberg Limits

PL= LL= PI=

Coefficients

D_{85}= 0.511 D_{60}= 0.339 D_{50}= 0.295
D_{30}= 0.188 D_{15}= 0.0587 D_{10}= 0.0316
C_u= 10.73 C_c= 3.30

Classification

USCS= SM AASHTO=

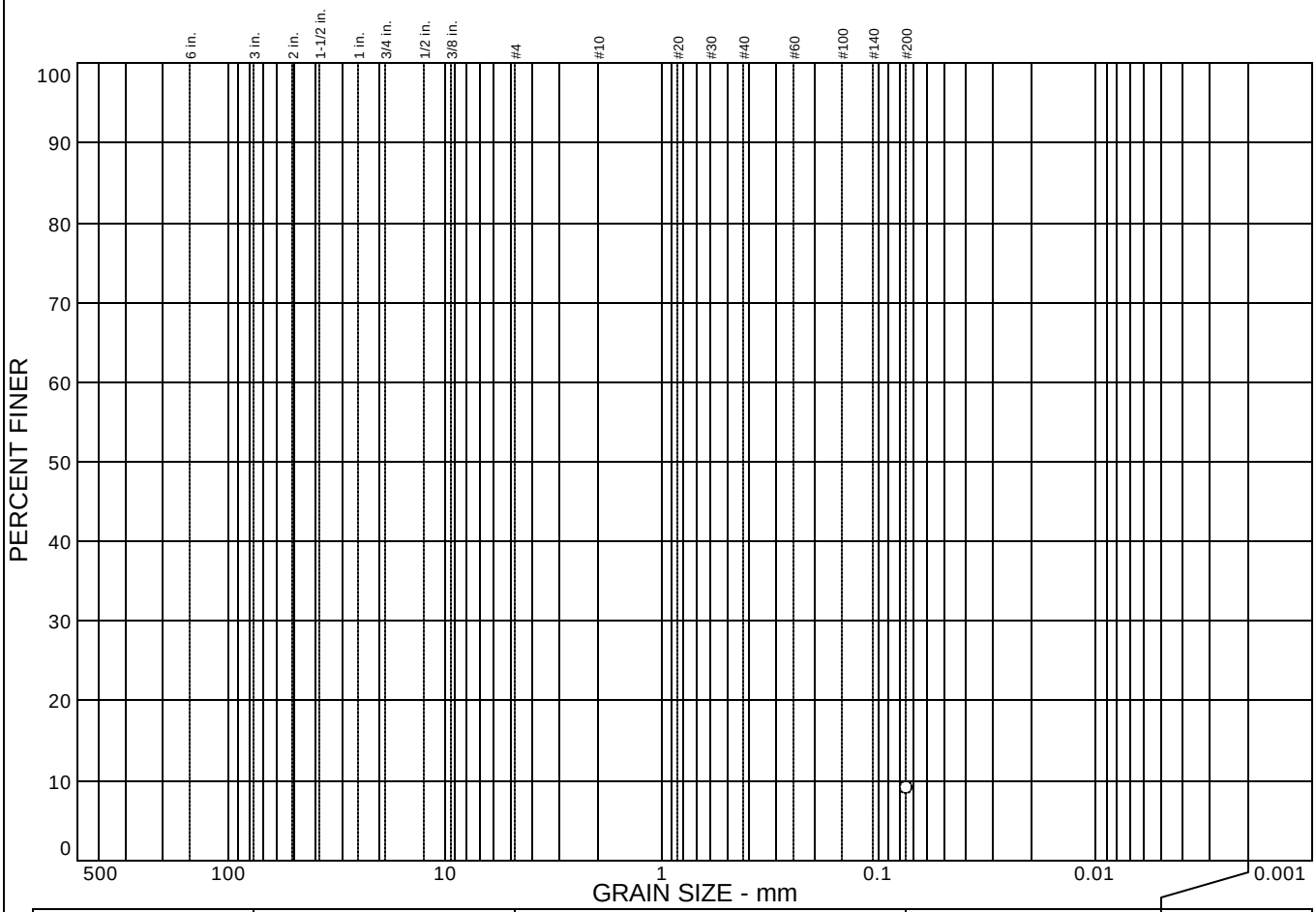
Remarks

Sample No.: B22 @ 6.0' **Source of Sample:** **Date:** 12/01/06
Location: **Elev./Depth:** 6.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

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

Brownish yellow to brown SAND with trace 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=

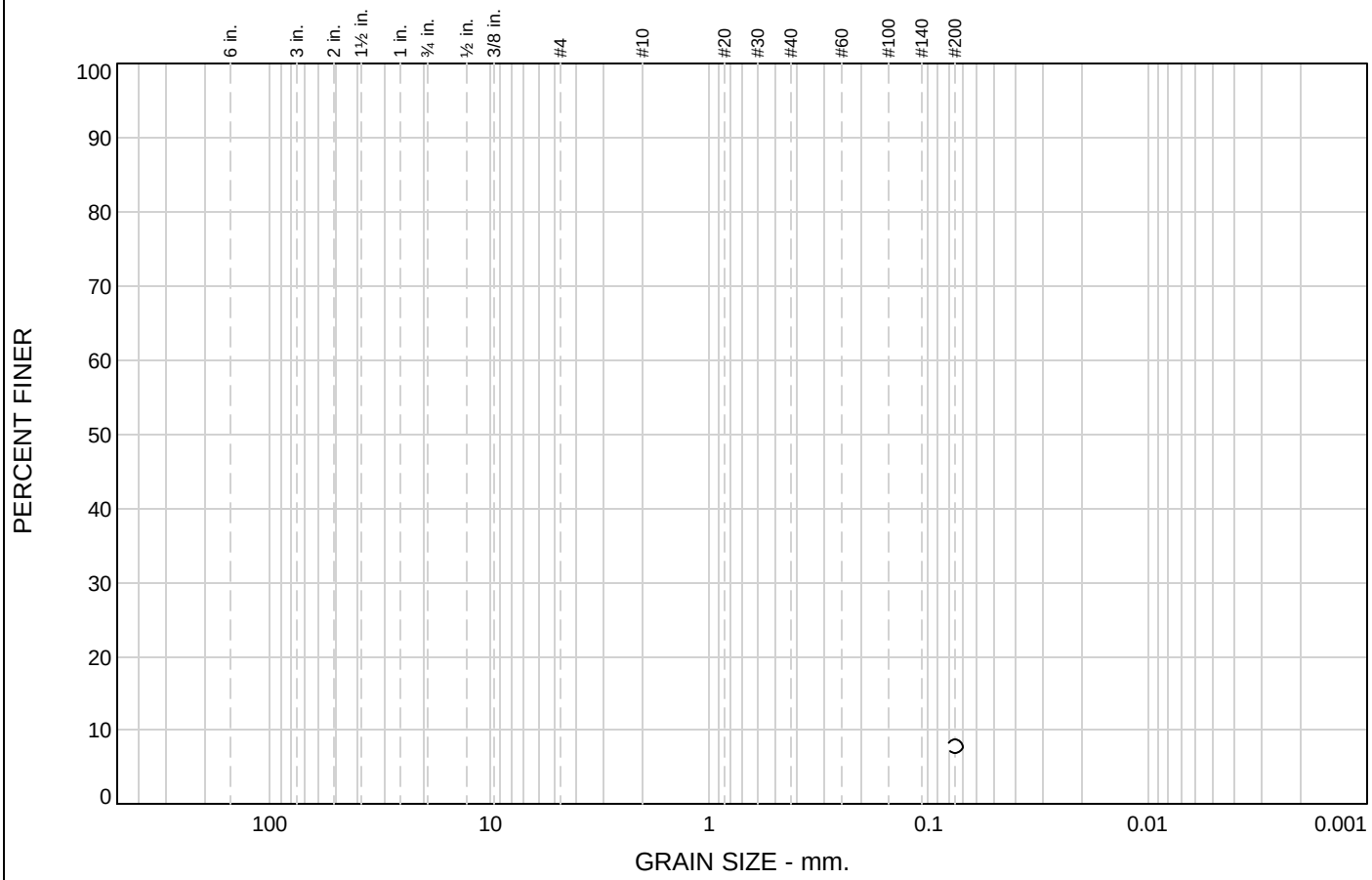
Remarks

Sample No.: B22 @ 16.0' **Source of Sample:** **Date:** 12/04/06
Location: **Elev./Depth:** 16.0 feet

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Recycled Water Pipeline - Marina, CA
Project No: 7496.1.001.01

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.9		

* (no specification provided)

Material Description

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 Number: B5 @ 5.5-6.5' **Depth:** 5.5-6.5 feet **Date:** 08/02/07

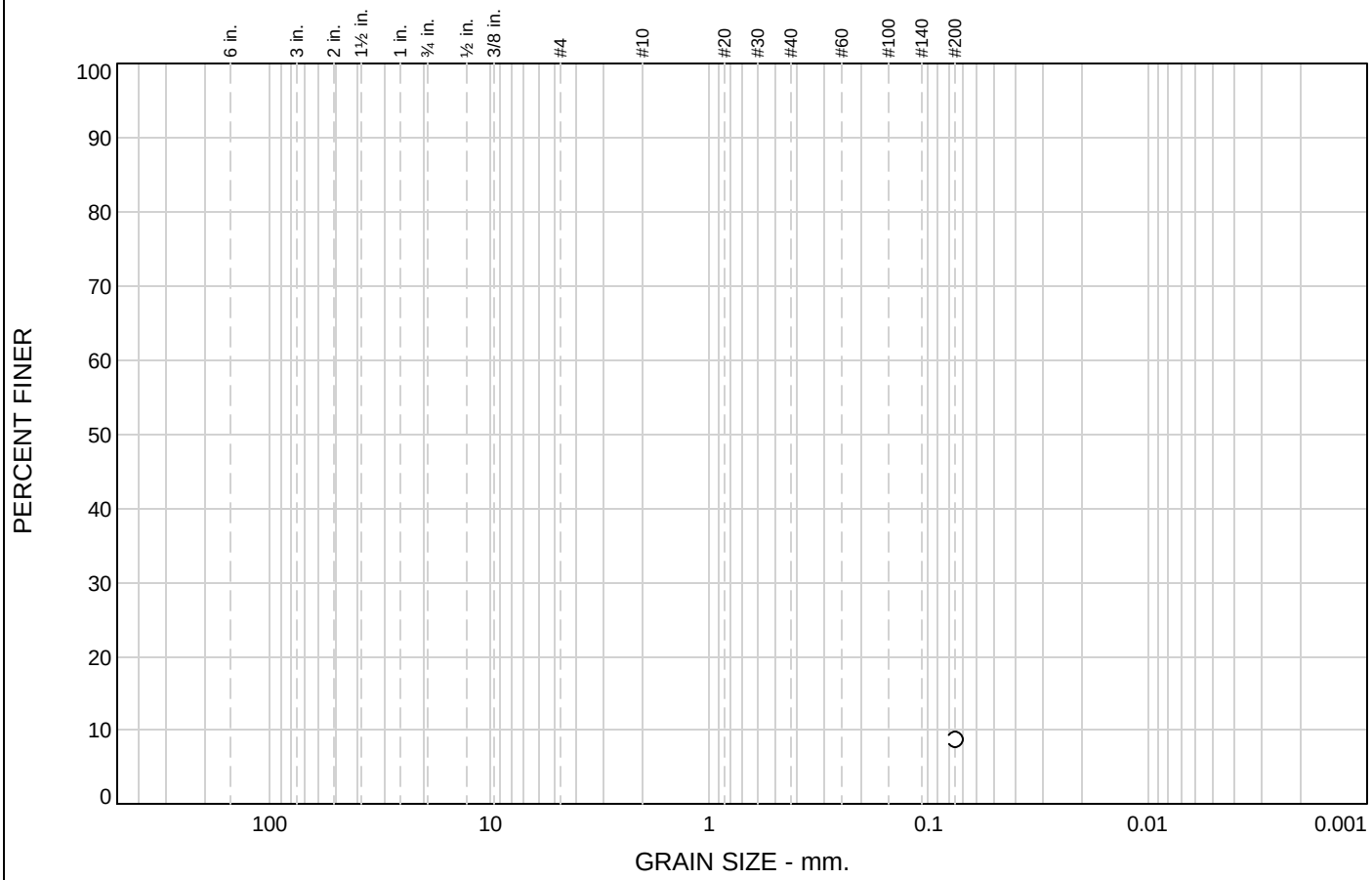
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						8.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	8.7		

* (no specification provided)

Material Description

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 Number: B5 @ 2.5-3.5' **Depth:** 2.5-3.5 feet **Date:** 08/02/7

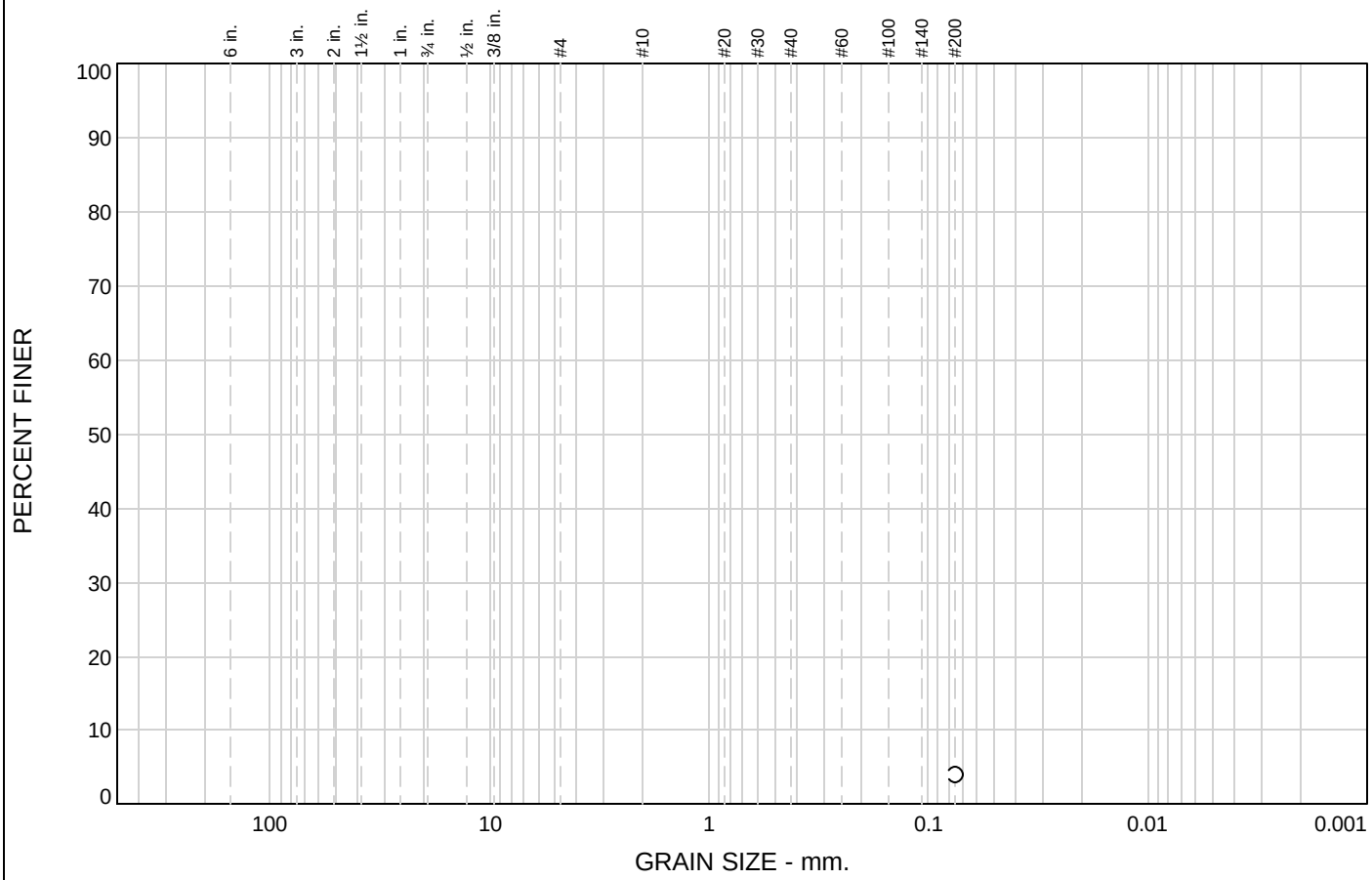
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						4.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.1		

* (no specification provided)

Material Description

Light yellowish brown SAND. Trace 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 Number: B4 @ 10.5-11.5' **Depth:** 10.5-11.5 feet **Date:** 08/02/07

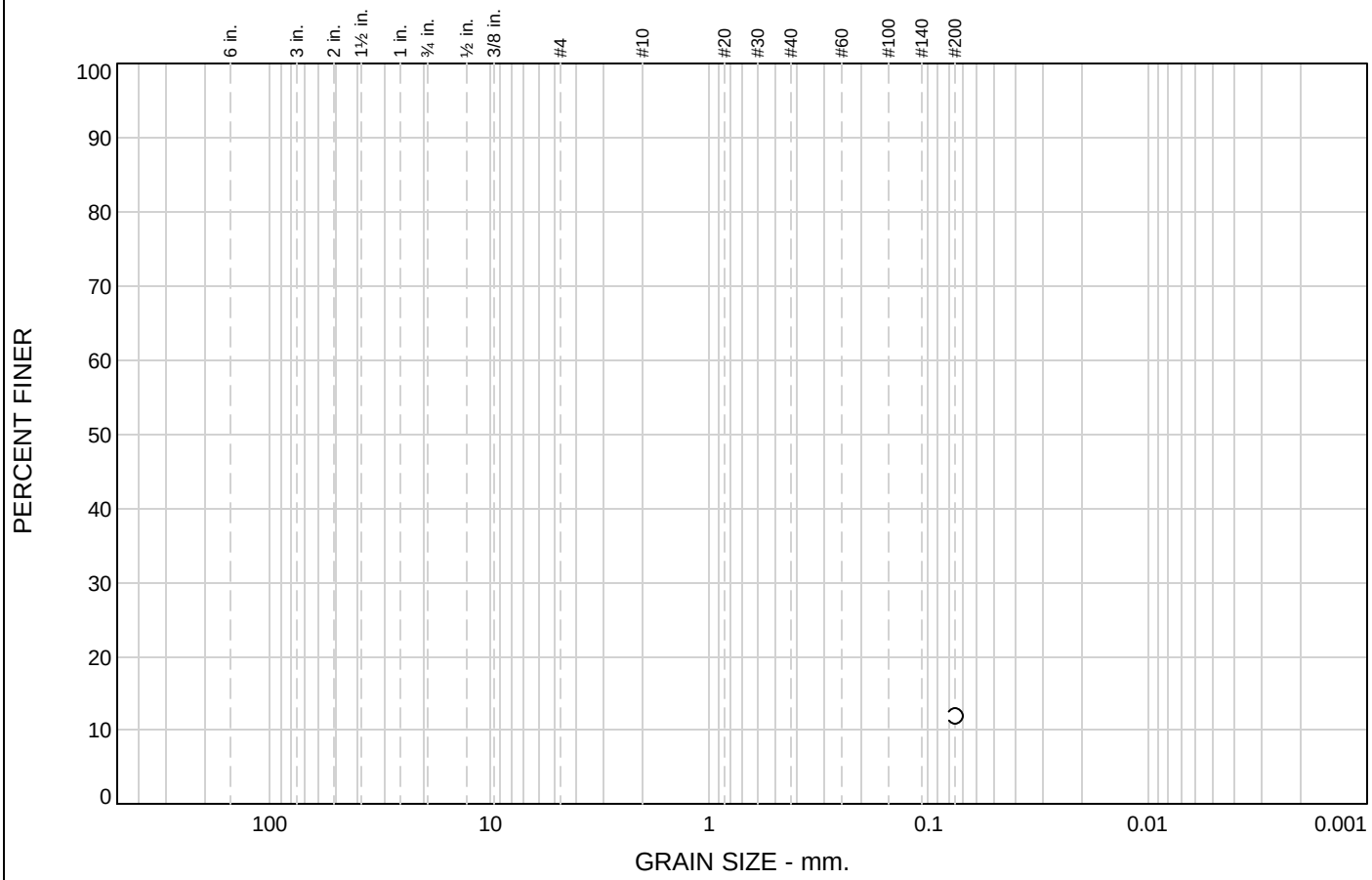
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						12.1	

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

* (no specification provided)

Material Description

Strong 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

Sample Number: B4 @ 7.5-8.5' **Depth:** 7.5-8.5 feet **Date:** 08/02/07

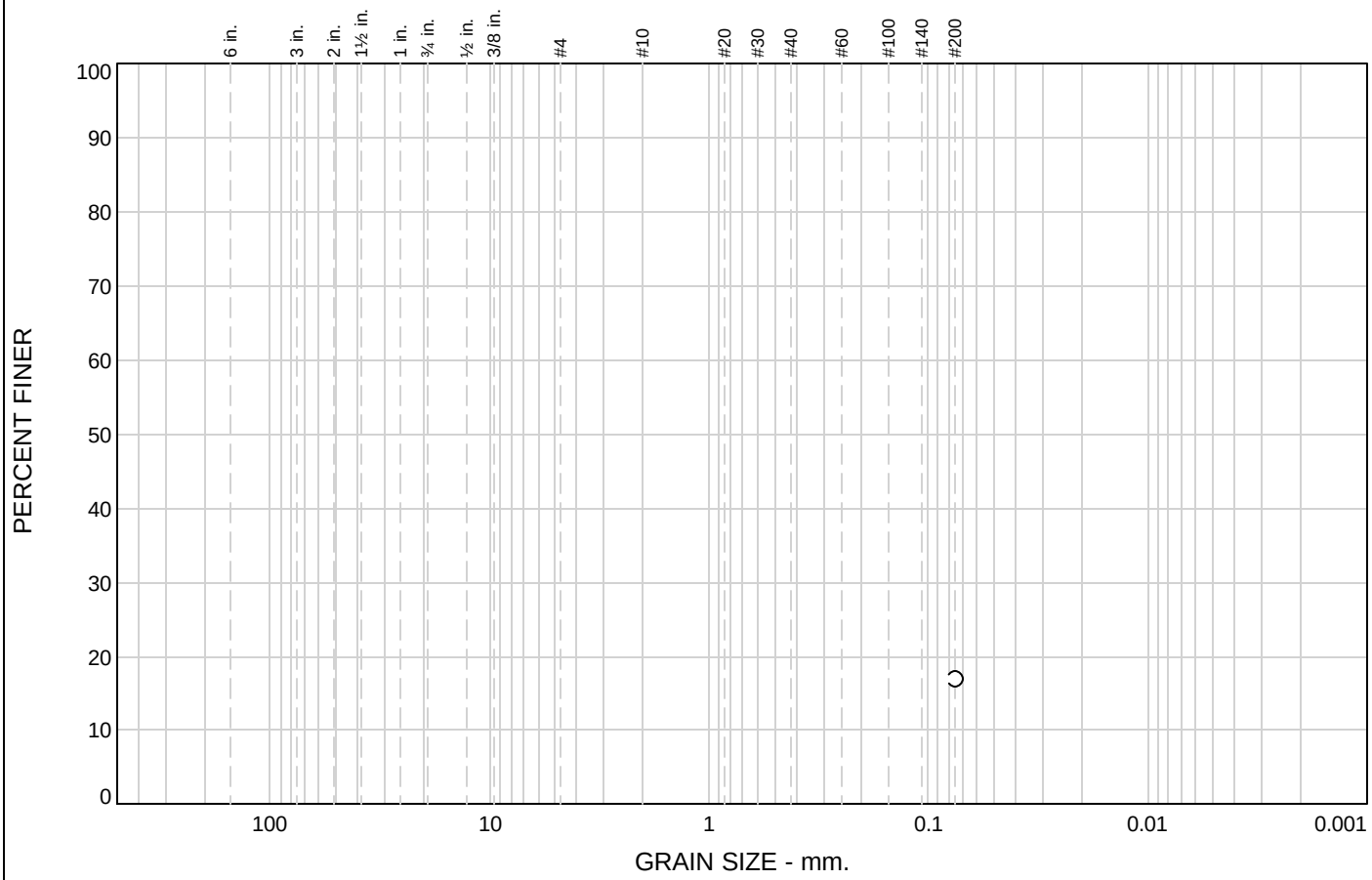
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						16.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	16.9		

* (no specification provided)

Material 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

Sample Number: B4 @ 2.5-3.5' **Depth:** 2.5-3.5 feet **Date:** 08/02/07

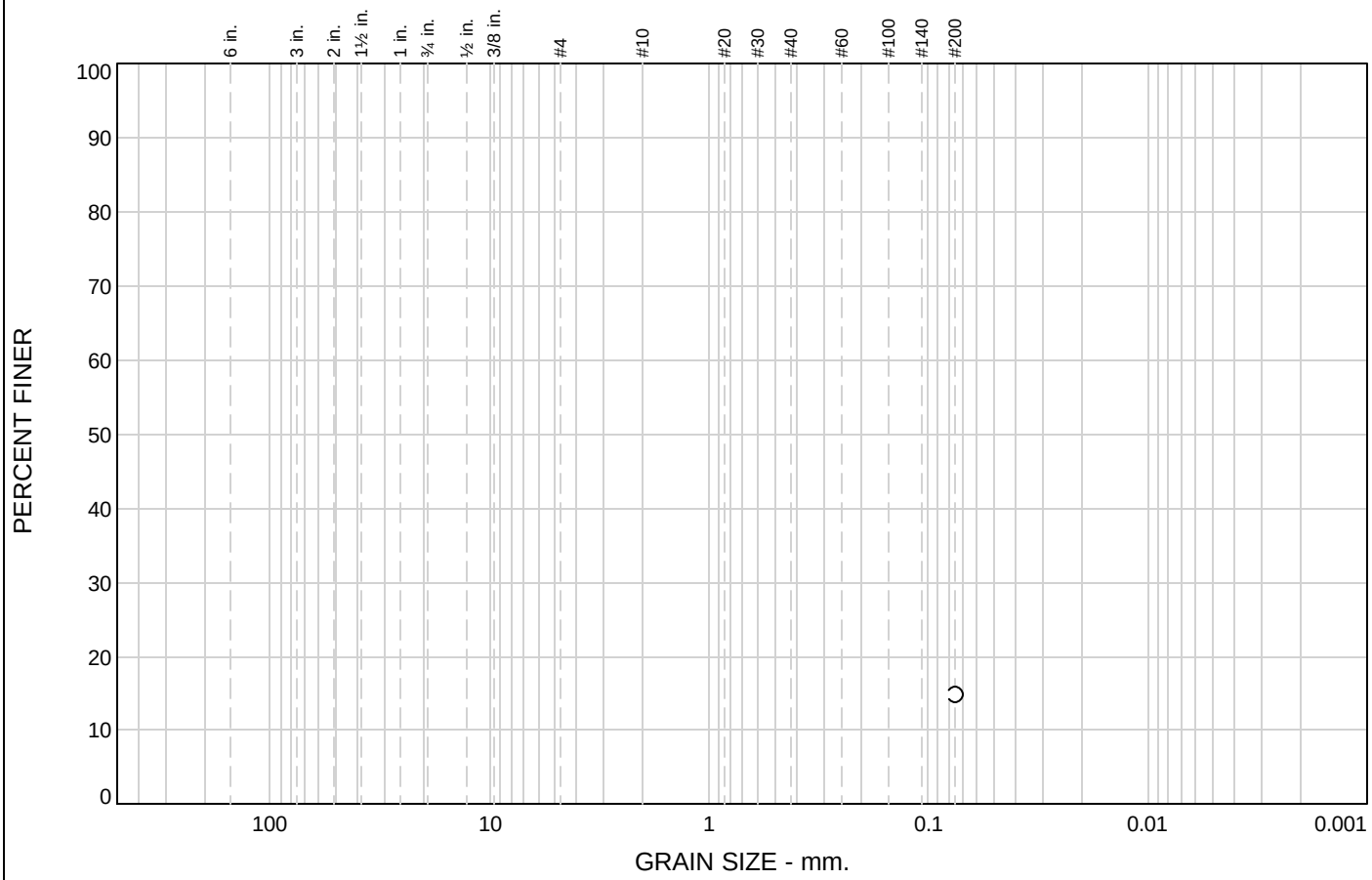
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						14.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	14.8		

* (no specification provided)

Material Description

Strong 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

Sample Number: B3 @ 10.5-11.5' **Depth:** 10..5-11.5 feet **Date:** 08/02/07

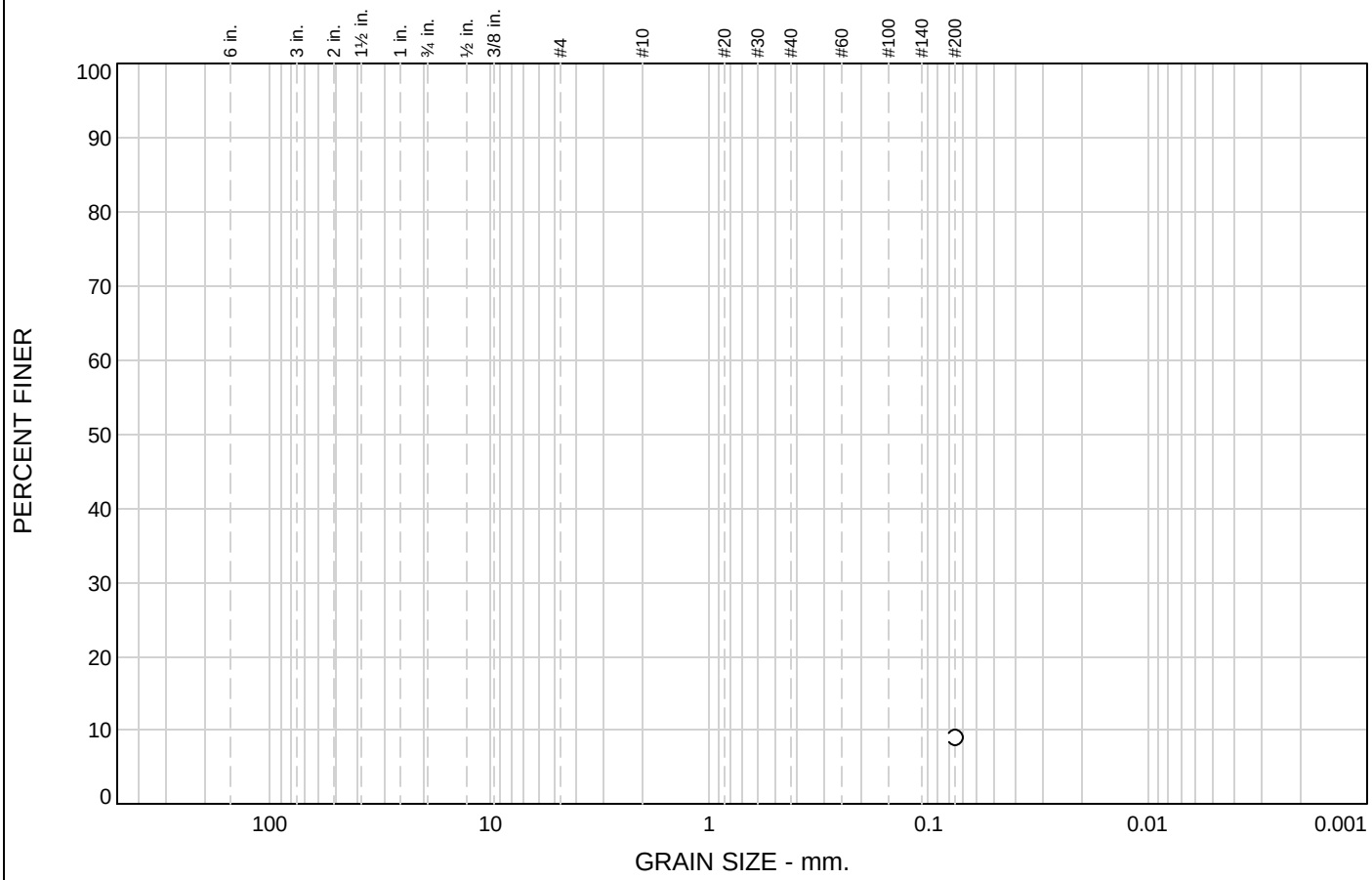
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						9.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	9.1		

* (no specification provided)

Material Description

Yellowish 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 Number: B3 @ 5.5-6.5' **Date:** 08/02/07

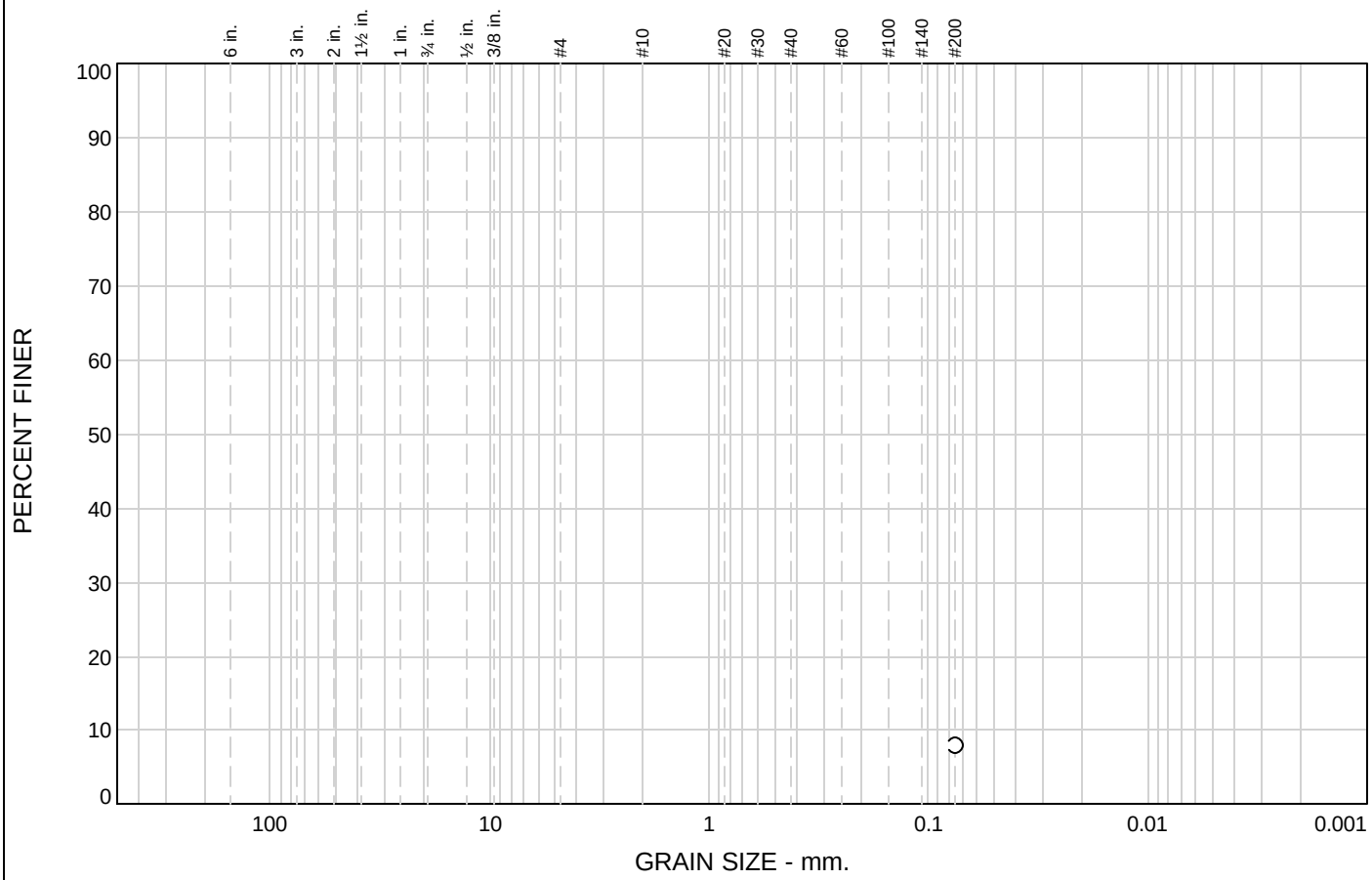
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						7.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	7.9		

* (no specification provided)

Material Description

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 Number: B3 @ 2.5-3.5' **Depth:** 2.5-3.5' **Date:** 08/02/07

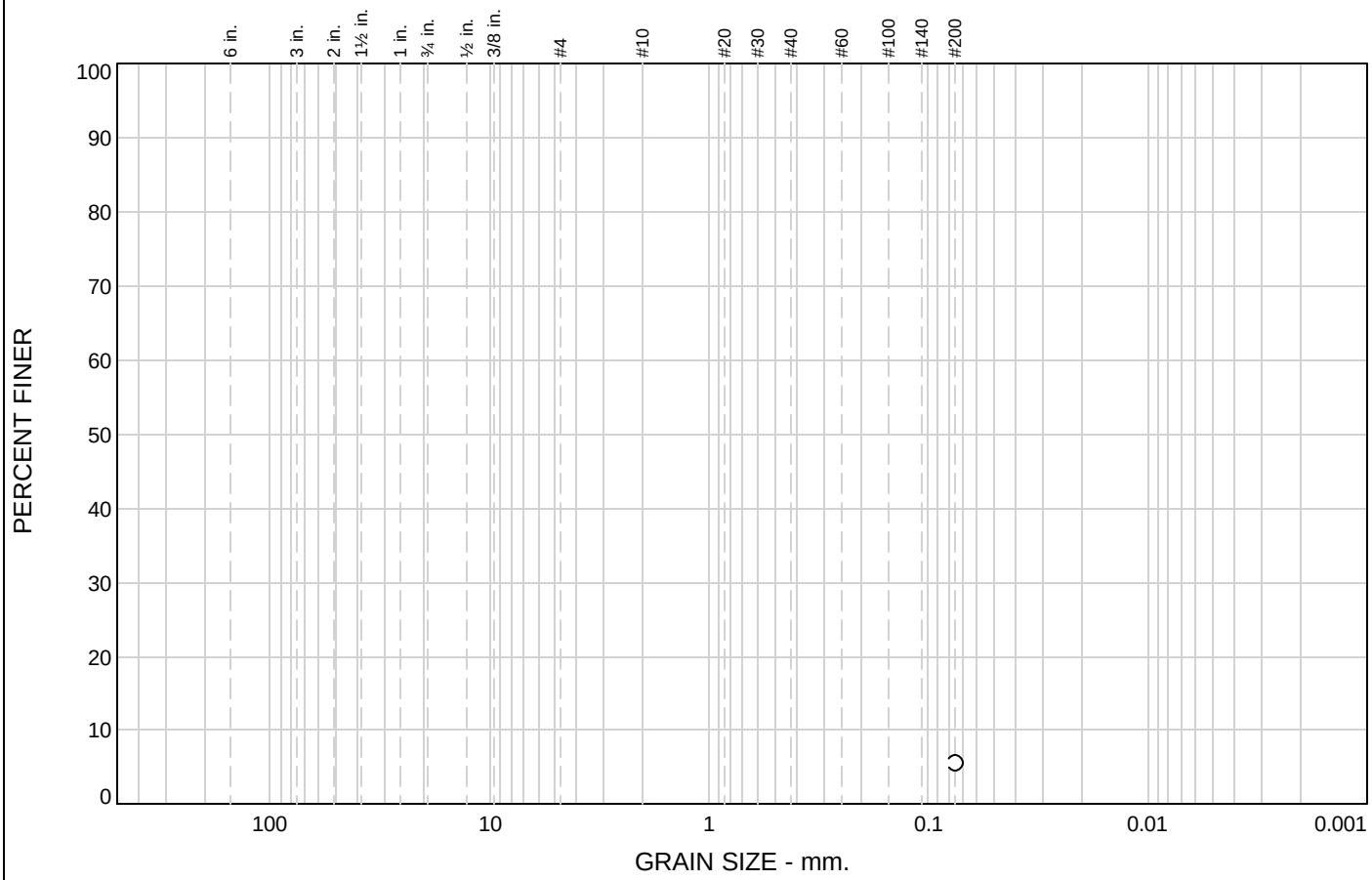
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						5.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	5.6		

* (no specification provided)

Material Description

Yellow 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 Number: B2 @ 10.5-11.5' **Depth:** 10.5-11.5 feet **Date:** 08/02/07

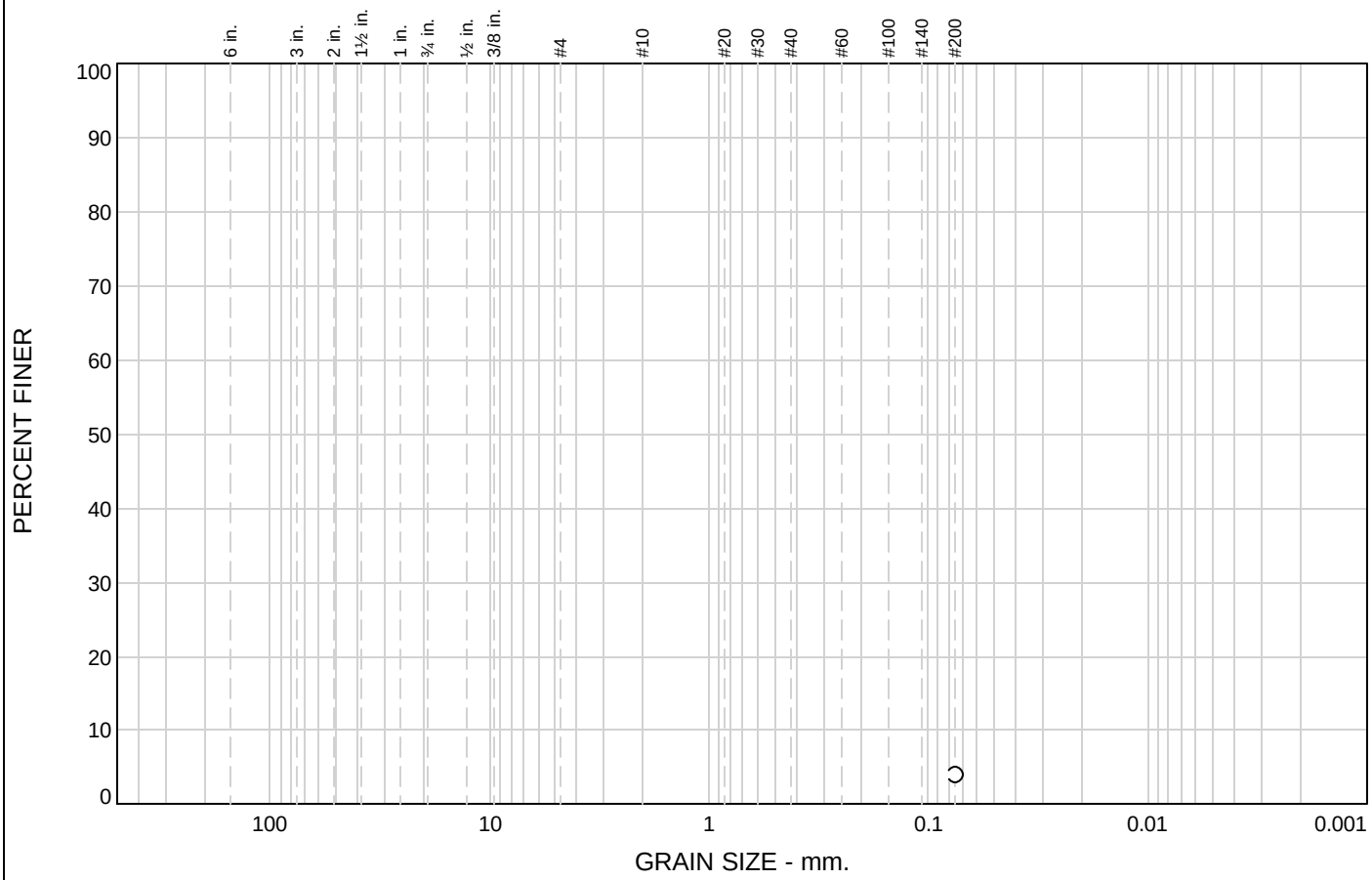
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						4.0	

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

* (no specification provided)

Material Description

Brown 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 Number: B2 @ 5.5-6.5' **Depth:** 5.5-6.5 feet **Date:** 08/02/07

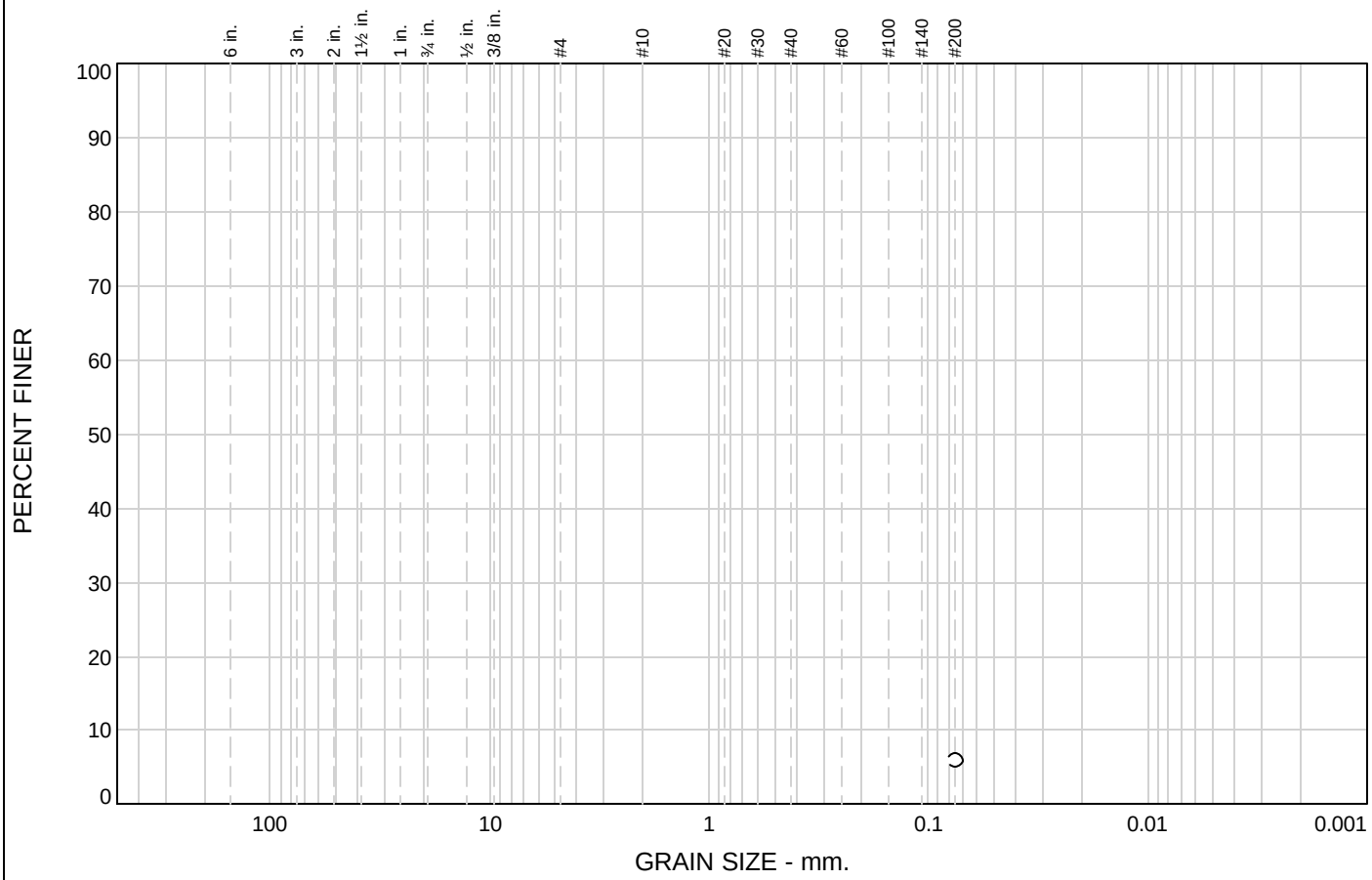
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						6.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	6.0		

* (no specification provided)

Material Description

Very dark 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 Number: B2 @ 2.5-3.5' **Depth:** 2.5-3.5 feet **Date:** 08/02/07

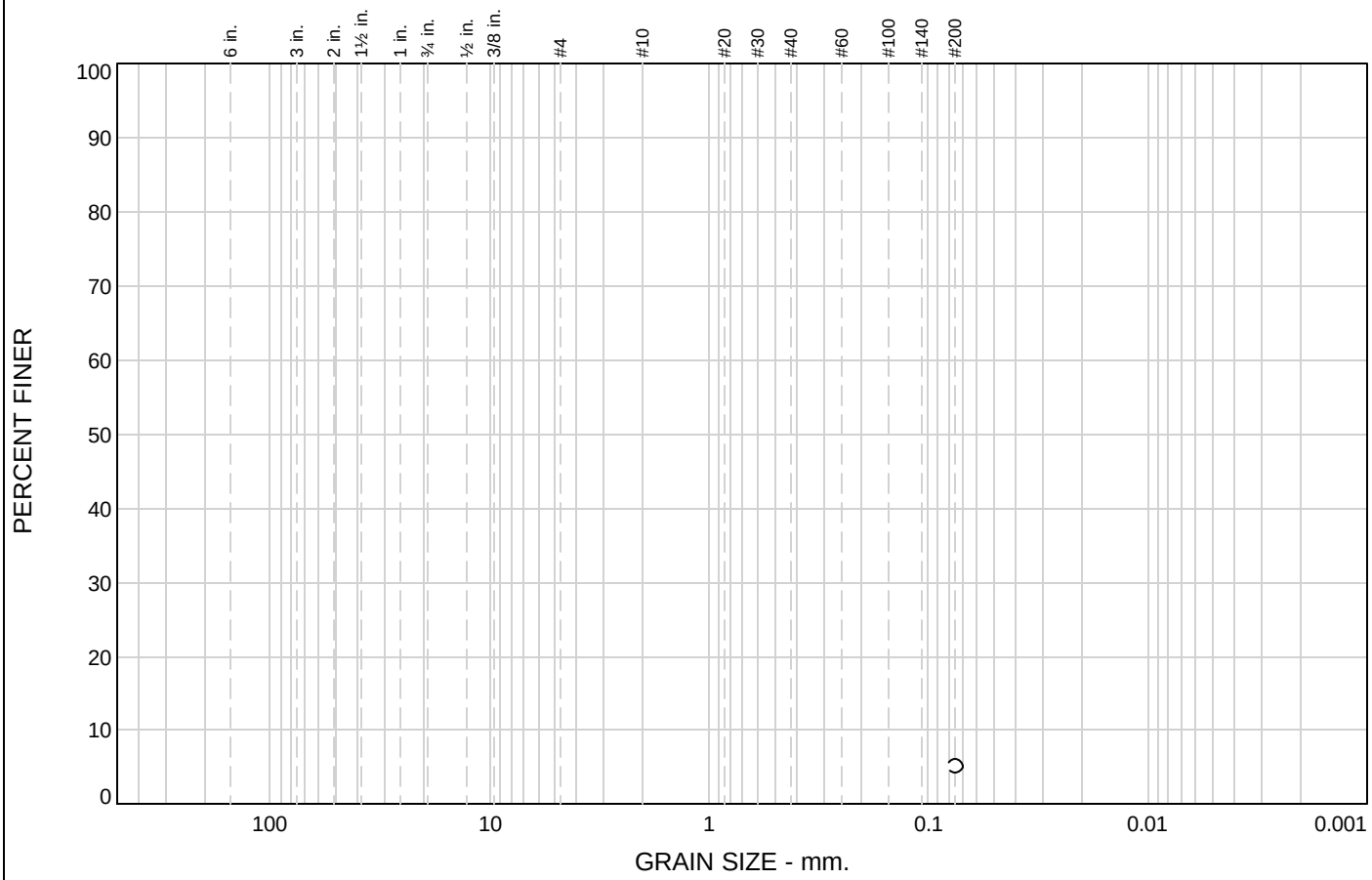
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						5.2	

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

* (no specification provided)

Material Description

Strong 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 Number: B1 @ 10.5-11.5' **Date:** 08/02/07

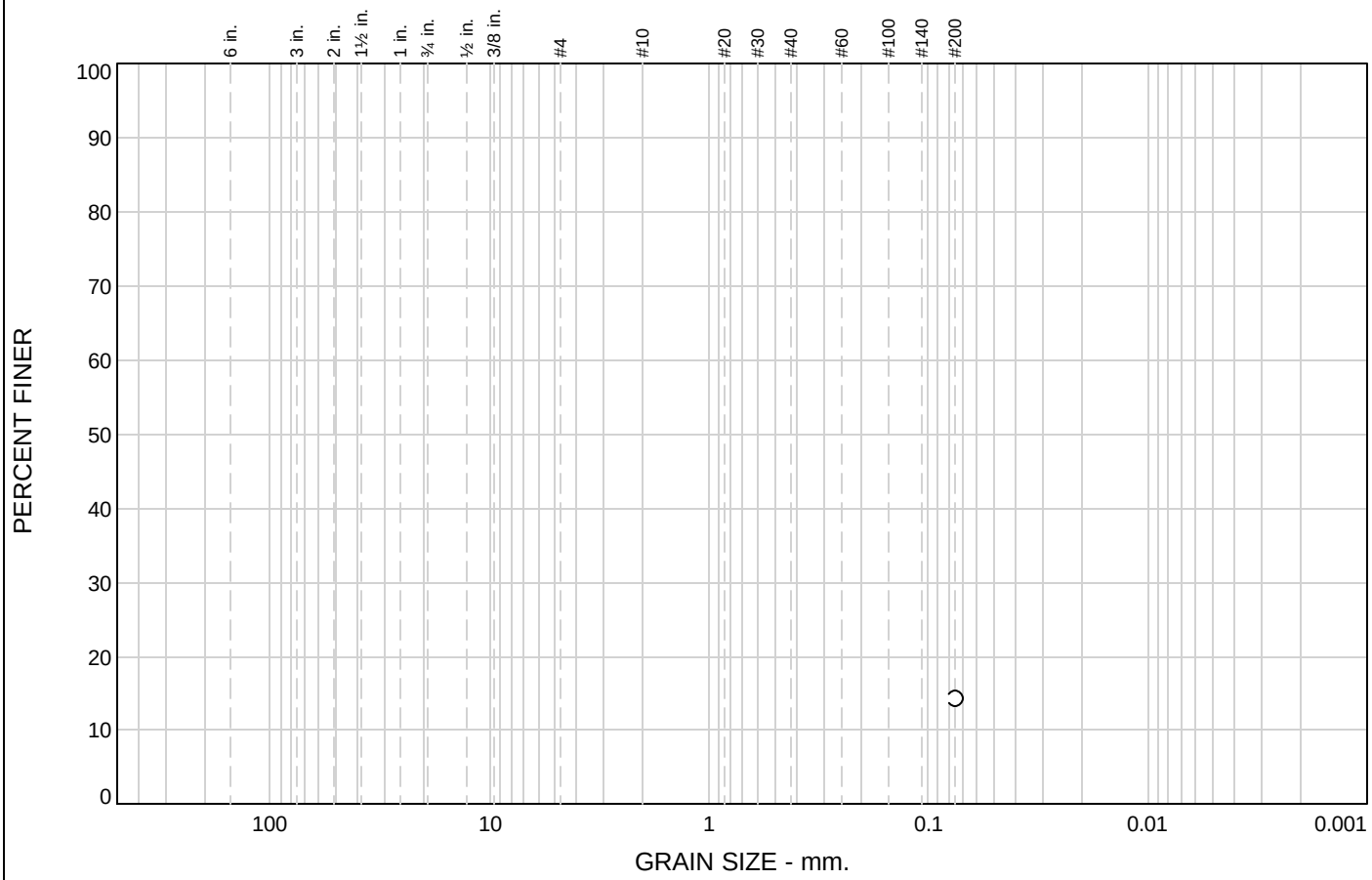
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						14.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	14.3		

* (no specification provided)

Material Description

Dark 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

Sample Number: B1 @ 5.5-6.5' **Date:** 08/02/07

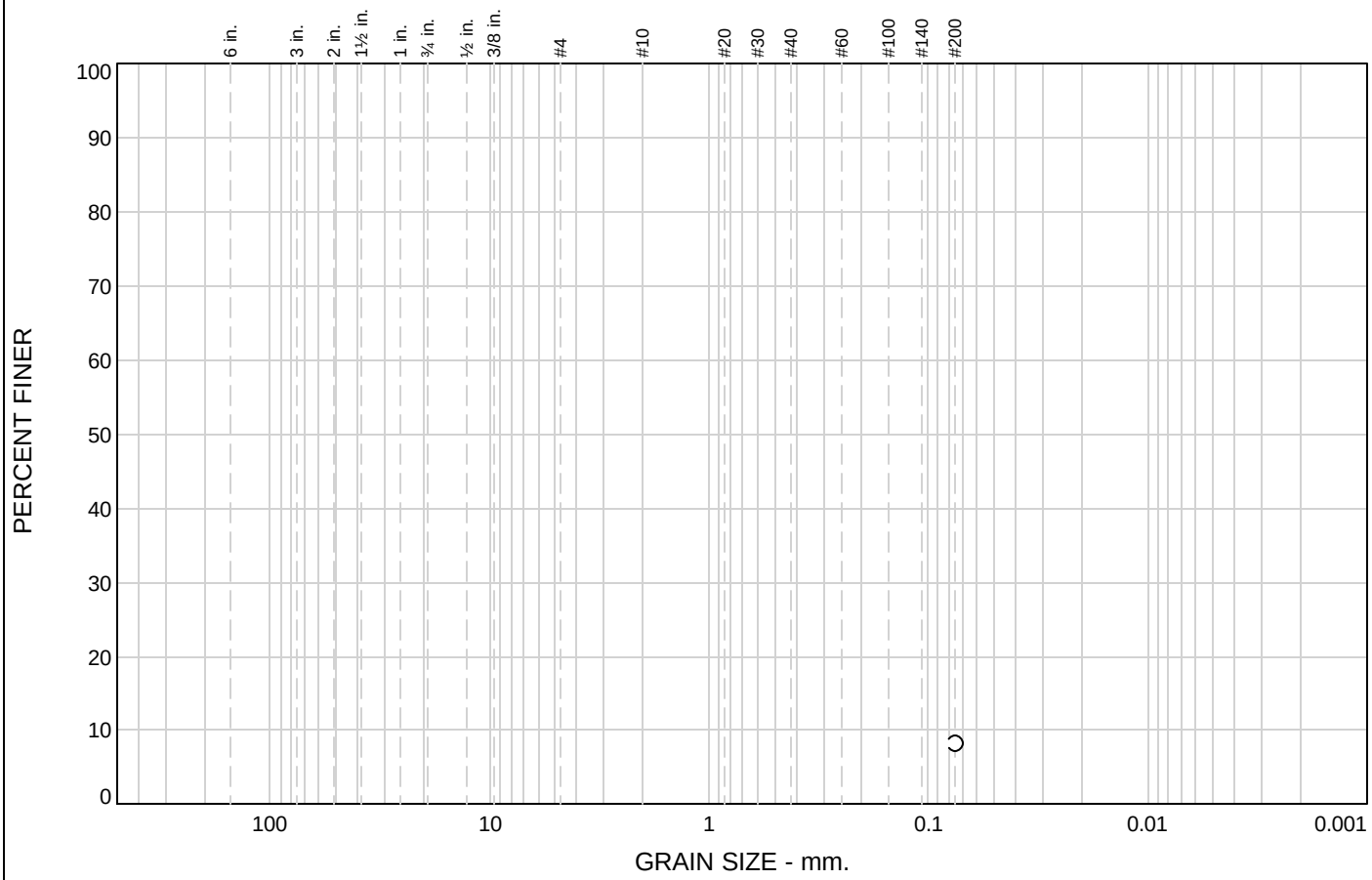
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						8.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	8.3		

* (no specification provided)

Material Description

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 Number: B1 @ 2.5-3.5' **Depth:** 2.5-3.5 feet **Date:** 08/02/07

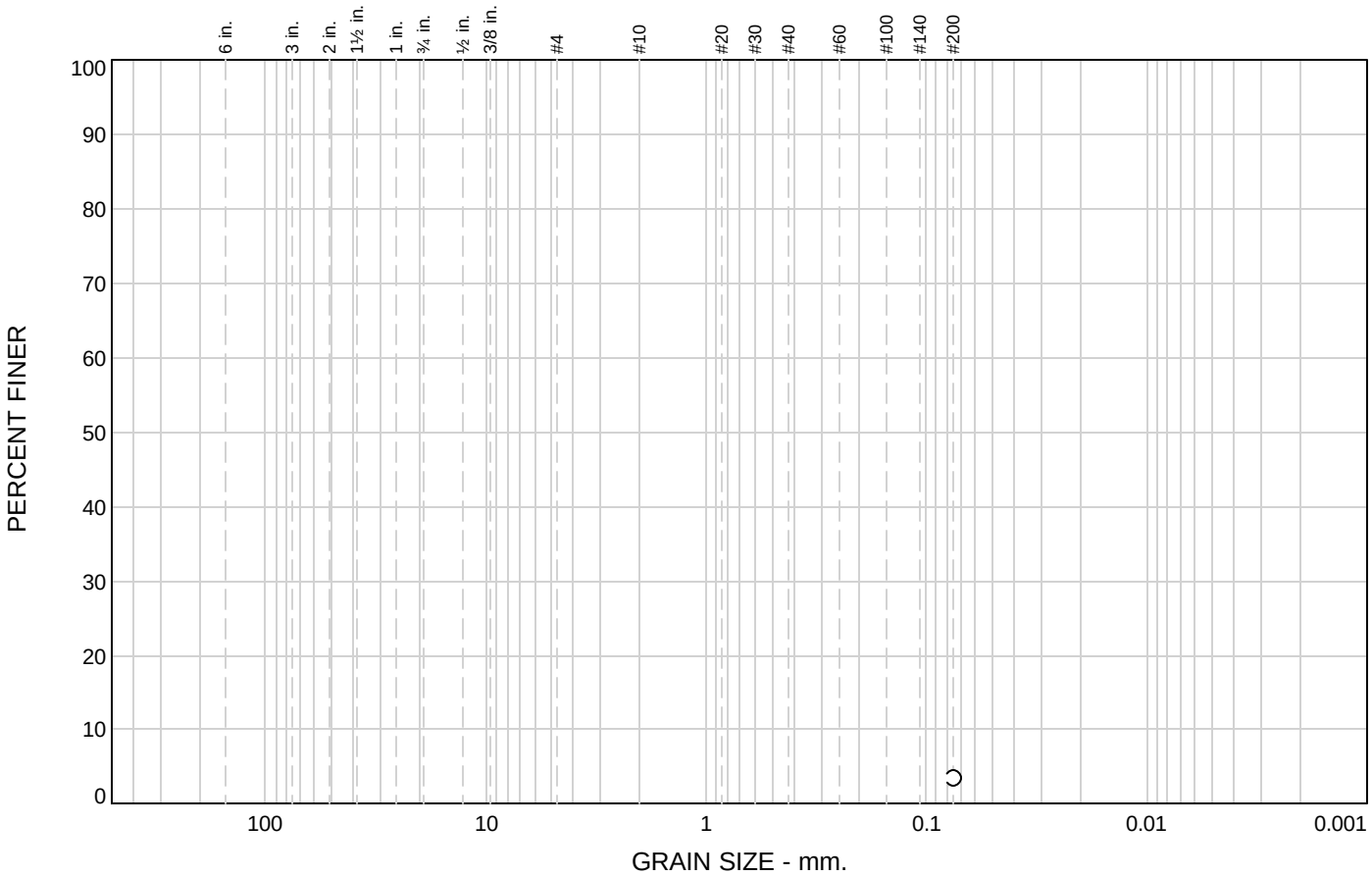
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						3.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	3.6		

* (no specification provided)

Material Description

Strong brown SAND. Trace 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 Number: B5 @ 10.5-11.5' **Depth:** 10.5-11.5 feet **Date:** 08/02/07

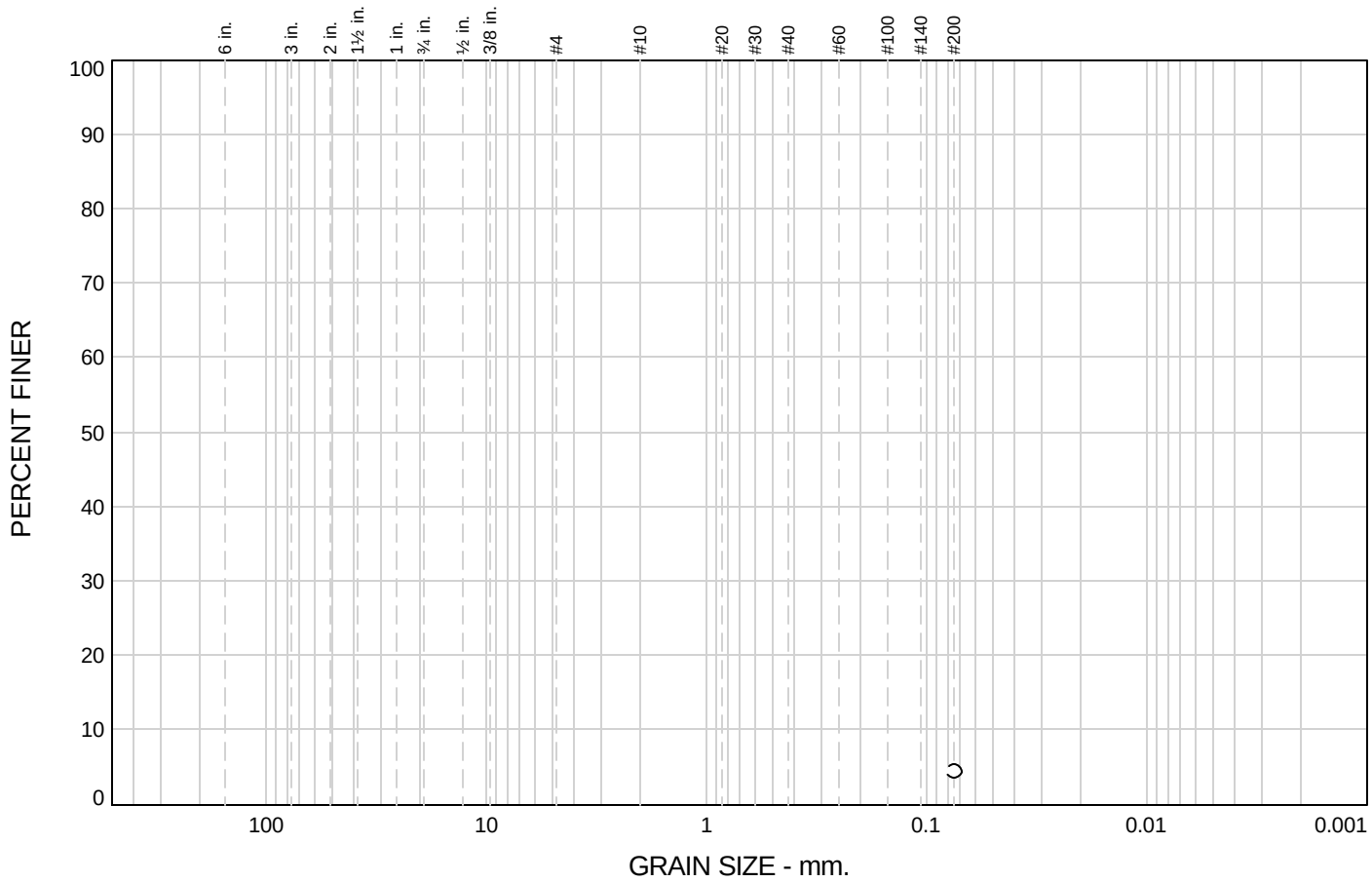
ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:

Project: MCWD (Line E and Ardenne Lateral) - Fort Ord

Project No: 7496.1.003.01 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						4.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	4.4		

* (no specification provided)

Material Description

Very dark gray brown SAND. Trace 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=

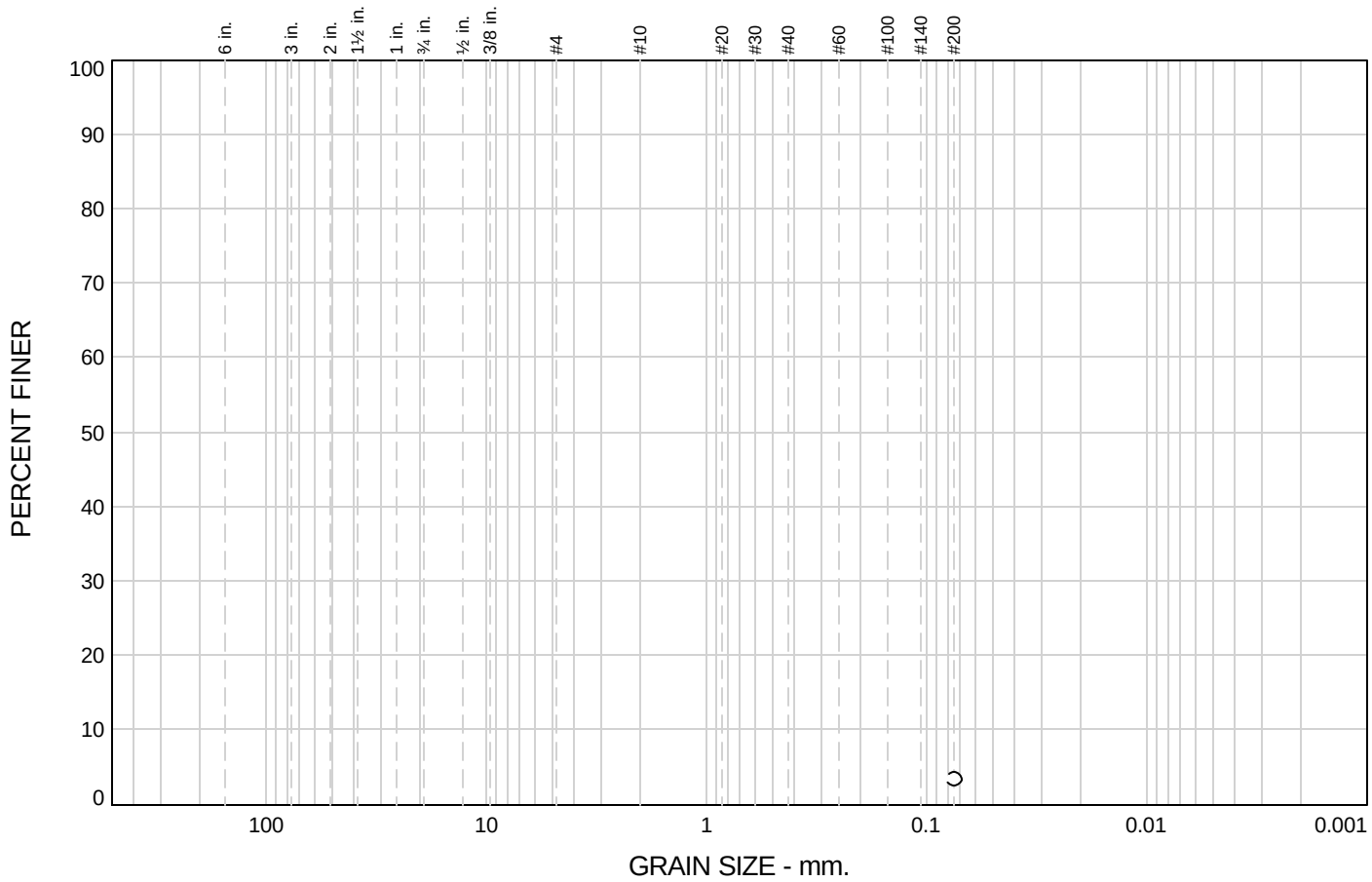
Remarks

Sample Number: TP2 @ S-1 **Date:** 03/09/07

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Water District
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						3.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	3.5		

* (no specification provided)

Material Description

Yellowish brown SAND. Trace 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=

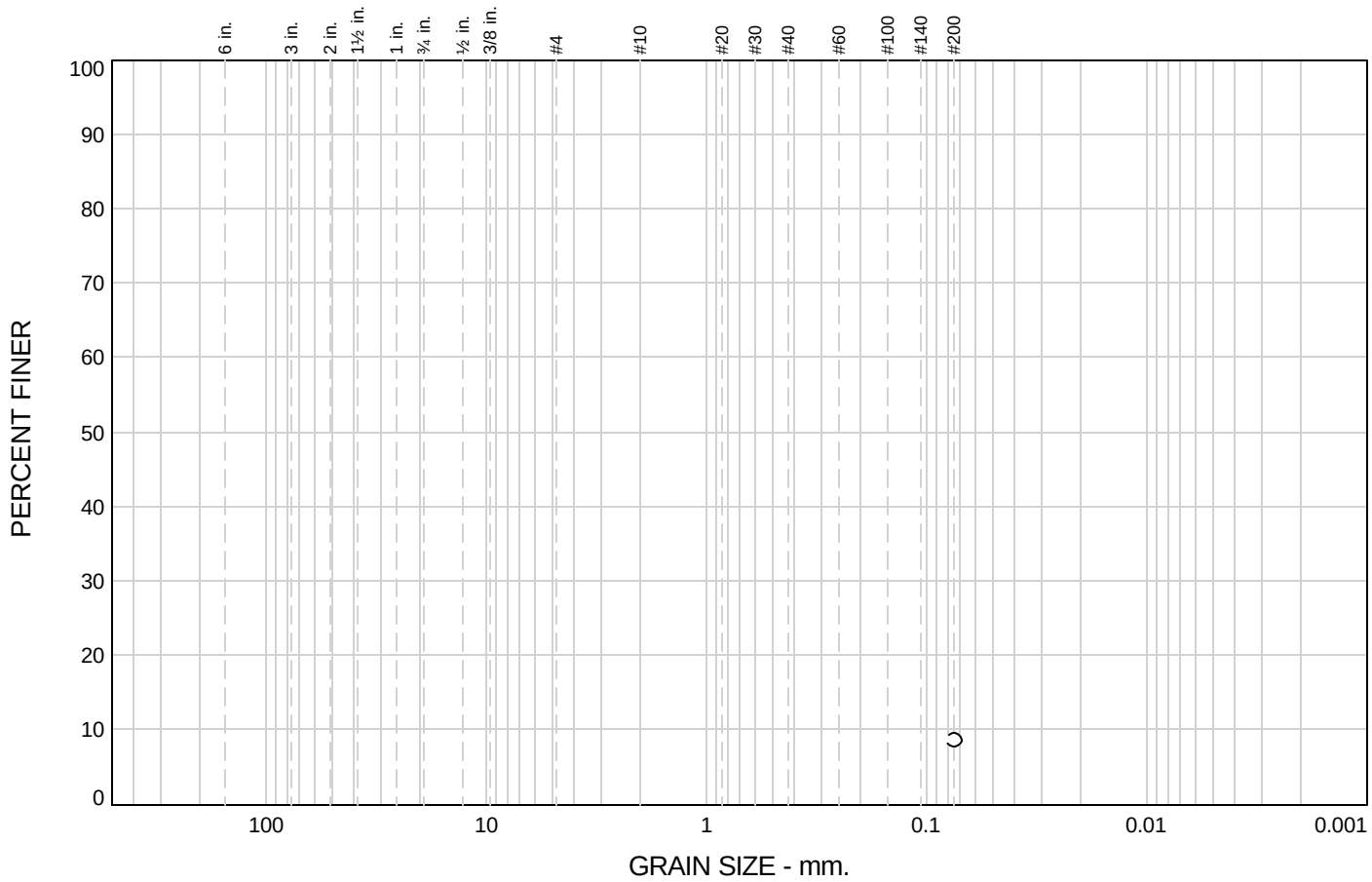
Remarks

Sample Number: TP1 @ S-2 **Date:** 03/09/07

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Water District
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						8.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	8.7		

* (no specification provided)

Material Description

Dark brown 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=

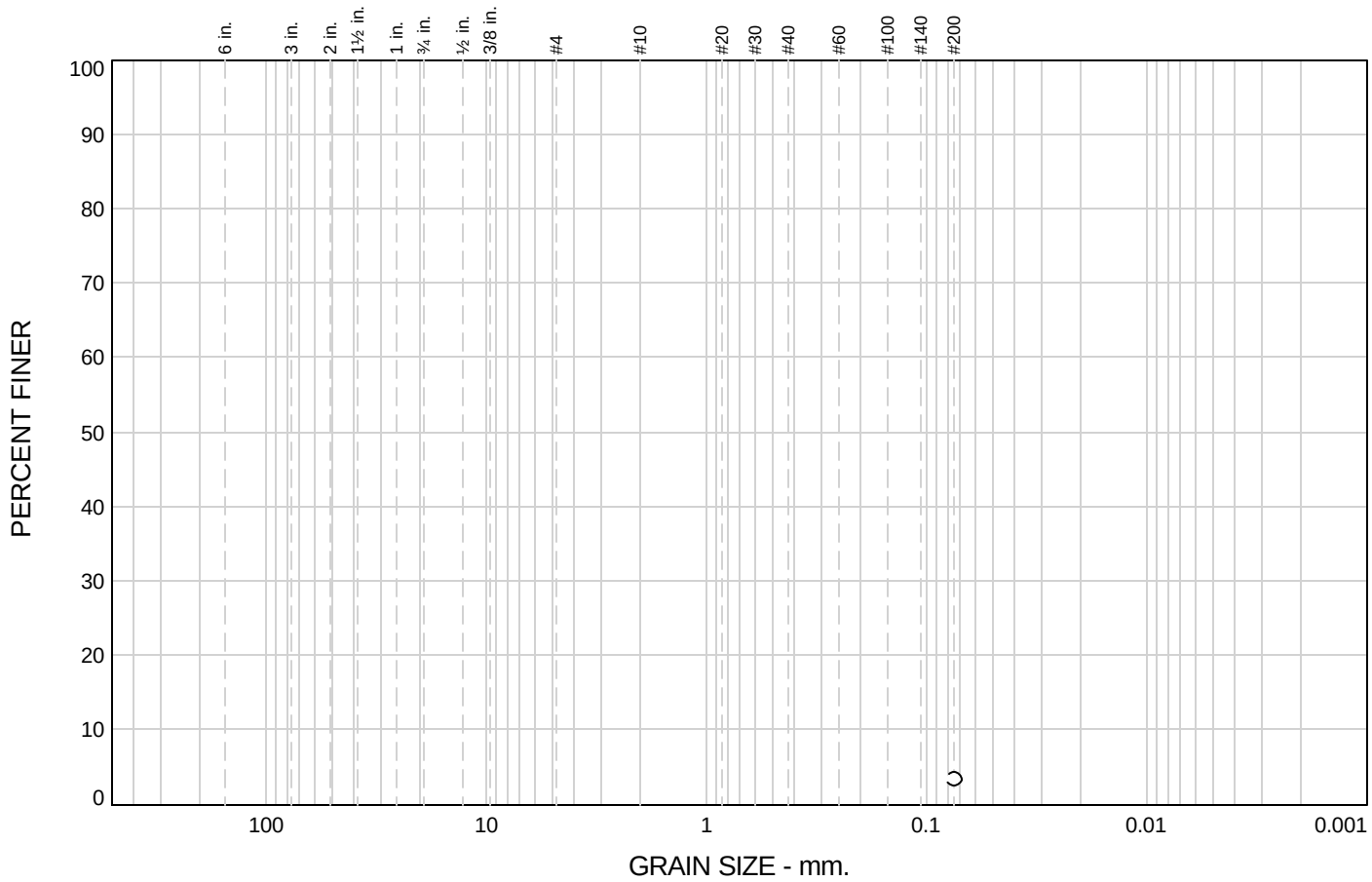
Remarks

Sample Number: TP1 @ S-1 **Date:** 03/09/07

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Water District
Project No: 7496.1.001.01 **Plate**

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
						3.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#200	3.5		

* (no specification provided)

Material Description

Brown SAND. Trace 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 Number: TP2 @ S-2 **Date:** 03/09/07

ENGEO INCORPORATED
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
MATERIALS TESTING

Client:
Project: Marina Coast Water District
Project No: 7496.1.001.01 **Plate**

E N G E O
INCORPORATED

JOB NAME:	**Marina Coast Water District**
JOB NO.	**7496.1.001.01**
DATE:	**03/09/07**
BY:	**KM**

MOISTURE CONTENT DETERMINATION

SAMPLE NO:	**TP1 @ S1**	**TP1 @ S2**	**TP2 @ S1**	**TP2 @ S2**				
TARE NUMBER	BUZZ	GXW	JKL	ABC				
GROSS WET WT.	1034.8	1214.7	1005.6	1086.6				
GROSS DRY WT.	980.5	1173.1	938.6	1060.1				
TARE WEIGHT	218.4	225.0	216.7	222.1				
NET DRY WT.	762.1	948.1	721.9	838.0				
WT. OF WATER	54.3	41.6	67.0	26.5				
% MOISTURE	**7.1%**	**4.4%**	**9.3%**	**3.2%**				

ENGEO INCORPORATED

Job name:	**MCWD (Line E & Ardenne Lateral**
Job number:	**7496.1.003.01**
Date:	**August 1, 2007**

Moisture Content Determination

Sample number:	B1@3.5	B1@6.5	B1@11.5	B2@3.5	B2@6.5	B2@11.5	B3@3.5	B3@6.5
% Moisture:	**5.3**	**5.7**	**3.9**	**4.4**	**4.3**	**4.3**	**3.9**	**5.9**

Sample number:	B3@11.5	B4@3.5	B4@8.5	B4@11.5	B5@3.5	B5@6.5	B5@11.5	
% Moisture:	**5.2**	**1.9**	**8.6**	**4.9**	**1.9**	**1.5**	**3.8**	

APPENDIX C

Existing Information on Enclosed CD

CT 1970 – Reservation Road Undercrossing, soil logs obtained from Cal Trans District 5, 1970.

D & M 1999 – Report of Geotechnical Investigation, 12th Street Gateway/2nd Avenue Realignment, Former Fort Ord, Marina and Seaside, California, Prepared by D & M Consulting Engineers, Inc., November 1999.

DCM 2006 – Geotechnical Engineering Investigation Report, Marina Coast Water District, 2005 Marina Sewer Improvement Projects, Marina, California, Prepared by DCM Engineering, August 2006.

FG 2004 – Geotechnical Study, California State University Monterey Bay, North Campus Housing, Monterey County, California, Prepared by Fugro West Inc., March 2004.

GCI 1979 – Geotechnical Investigation, Phase II, Regional Wastewater Management System, Stage II, Monterey County, California, Prepared by Geotechnical Consultants Inc., April 1979.

HLA 1999 – Test Pit Logs Obtained From Fort Ord Reuse Authority, Logged by Harding Lawson Associates, November 1999, Location Maps Included.

KF 2005 – Geotechnical Investigation Proposed East Garrison, "B" Zone Tanks, "D" Zone Reservoirs, "E" Zone Hydropneumatic Pump Station, and Transmission Mains, Marina Coast Water District, Marina, California, Prepared by Kleinfelder Inc., September 28, 2005.

KF 2006 Updated Geotechnical Investigation, Proposed Library, California State University Monterey Bay, Seaside, California, Prepared by Kleinfelder Inc., May 18, 2006.

PCE 2004 – Geotechnical Investigation for General Jim Moore Boulevard and Eucalyptus Road, Seaside, California, Prepared by Pacific Crest Engineering Inc., February 2004.

APPENDIX D (Continued)

Existing Information on Enclosed CD

SH 2006 – Draft Well Installation Completion Report, Armstrong Ranch, Operable Unit 1, Former Fort Ord, California, Total Environmental Restoration Contract, Contract No. DACW05-96-D-0011, Prepared by Shaw Environmental Group Inc., September 2006.

Site 11 – HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Basewide Surface Water Outfall Investigation. Final. October 19, 1995.

Site 16 & 17 – HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Sites 16 and 17. Final. October 19, 1995.

Site 18 – HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995.

Site 25 – HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995.

Site 26 – HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995.

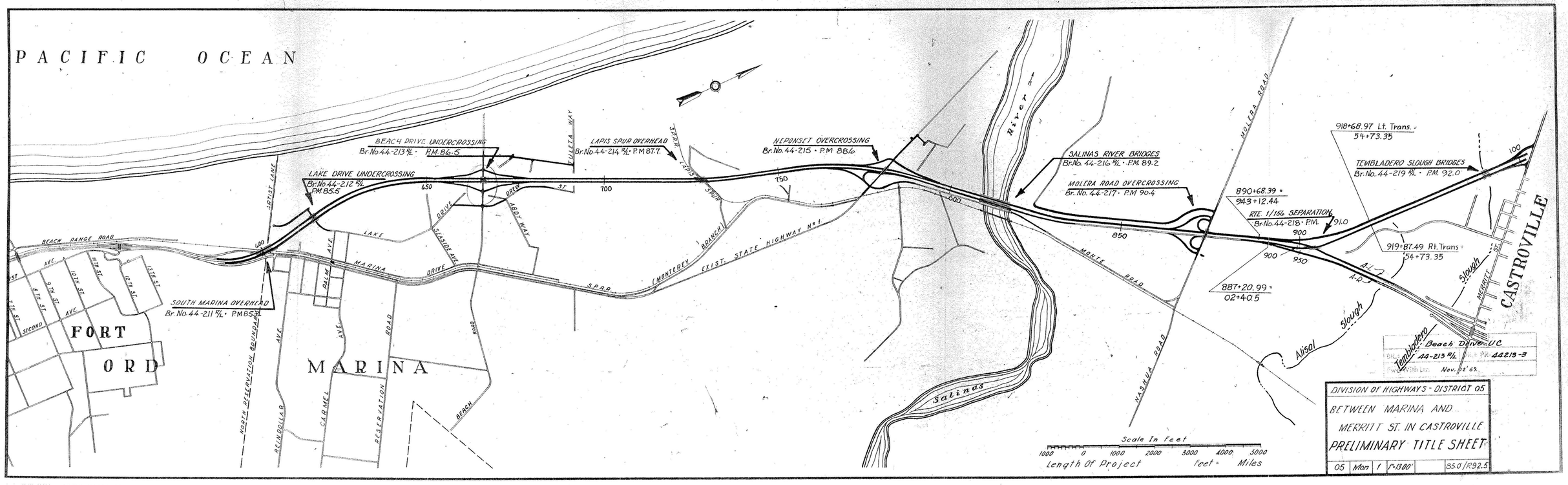
Site 27 – HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995.

TT 1997 – Boring Logs Obtained From Fort Ord Reuse Authority, Logged by TerraTech Inc., February 1997, Location maps unavailable.

TW 2004 – Geotechnical Engineering Investigation Report, Proposed Fitch Park Military Housing, Fort Ord Military Reservation, Seaside, Monterey County, California, Prepared by Twining Laboratories, Inc., November 12, 2004.

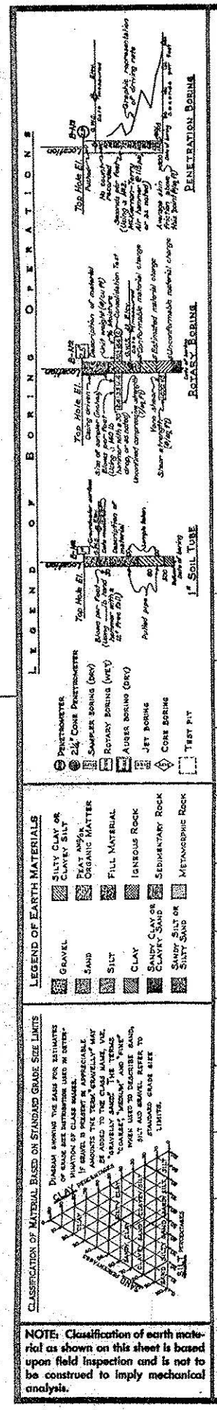
Cal Trans 1970[1]

[1] Please See Figure 5 for full Citation


PACIFIC OCEAN
BEACH DRIVE UNDERCROSSING
Br. No. 44-213 R/L - P.M. 86.5
LAKE DRIVE UNDERCROSSING
Br. No. 44-212 R/L
P.M. 85.5
LAPIS SPUR OVERHEAD
Br. No. 44-214 R/L · P.M. 87.7
NEPONSET OVERCROSSING
Br. No. 44-215 · P.M. 88.6
SALINAS RIVER BRIDGES
Br. No. 44-216 R/L · P.M. 89.2
MOLERA ROAD OVERCROSSING
Br. No. 44-217 · P.M. 90.4
RTE. 1/156 SEPARATION
Br. No. 44-218 · P.M.
TEMBLADERO SLOUGH BRIDGES
Br. No. 44-219 R/L · P.M. 92.0
918+68.97 Lt. Trans. =
54+73.35
890+68.39 =
943+12.44
919+87.49 Rt. Trans =
54+73.35
887+20.99 =
02+40.5
EXIST. STATE HIGHWAY No. 1
S.P.R.R.
MONTEREY BRANCH
SOUTH MARINA OVERHEAD
Br. No. 44-211 R/L · P.M. 85.3
NORTH RESERVATION BOUNDARY
FORT ORD
MARINA
CASTROVILLE
Salinas River
Alisal Slough
Tembladero Slough
MOLERA ROAD
MONTE ROAD
NASHUA ROAD
BEACH RANGE ROAD
LAKE DRIVE
SEASIDE AVE.
MARINA DRIVE
PALM AVE.
REYNOLDS AVE.
CARMEL AVE.
RESERVATION ROAD
BEACH ROAD
ABDY WAY
OREN ST.
CULLETA WAY
MERRITT ST.
SECOND AVE.
Scale In Feet
1000 0 1000 2000 3000 4000 5000
Length Of Project feet = Miles
Tembladero Beach Drive U.C.
Br. No. 44-213 R/L
Nov. 12' 69.
DIVISION OF HIGHWAYS - DISTRICT 05
BETWEEN MARINA AND
MERRITT ST. IN CASTROVILLE
PRELIMINARY TITLE SHEET
05 Mon 1 1"=1300' 35.0/R92.5

DIST.	COUNTY	ROUTE	POST MILES—TOTAL PROJECT	SHEET No.	TOTAL SHEETS
05	Mon	1	R85.0/R92.2	129	177

A. P. Cinzone
OPTION SECTION SUPERVISOR — REGISTERED CIVIL ENGINEER NO. 11144
DATE APPROVED December 17, 1973



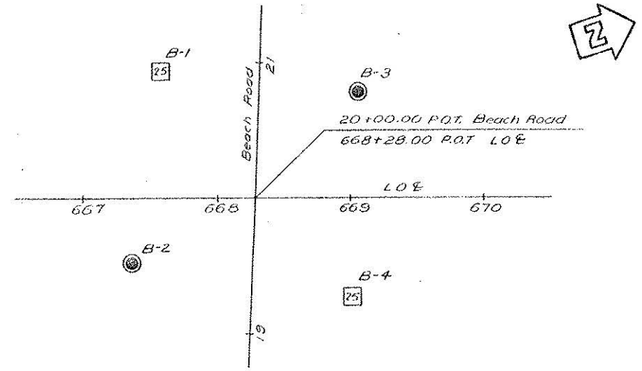
NOTE: Classification of earth material as shown on this sheet is based upon field inspection and is not to be construed to imply mechanical analysis.

FIELD STUDY	V. A. Williams 1-70
DRAWN	R. E. Bancroft 1-70
CHECKED	V. A. Williams 1-70

Approval Recommended by: [signature] Engineering Geologist

129

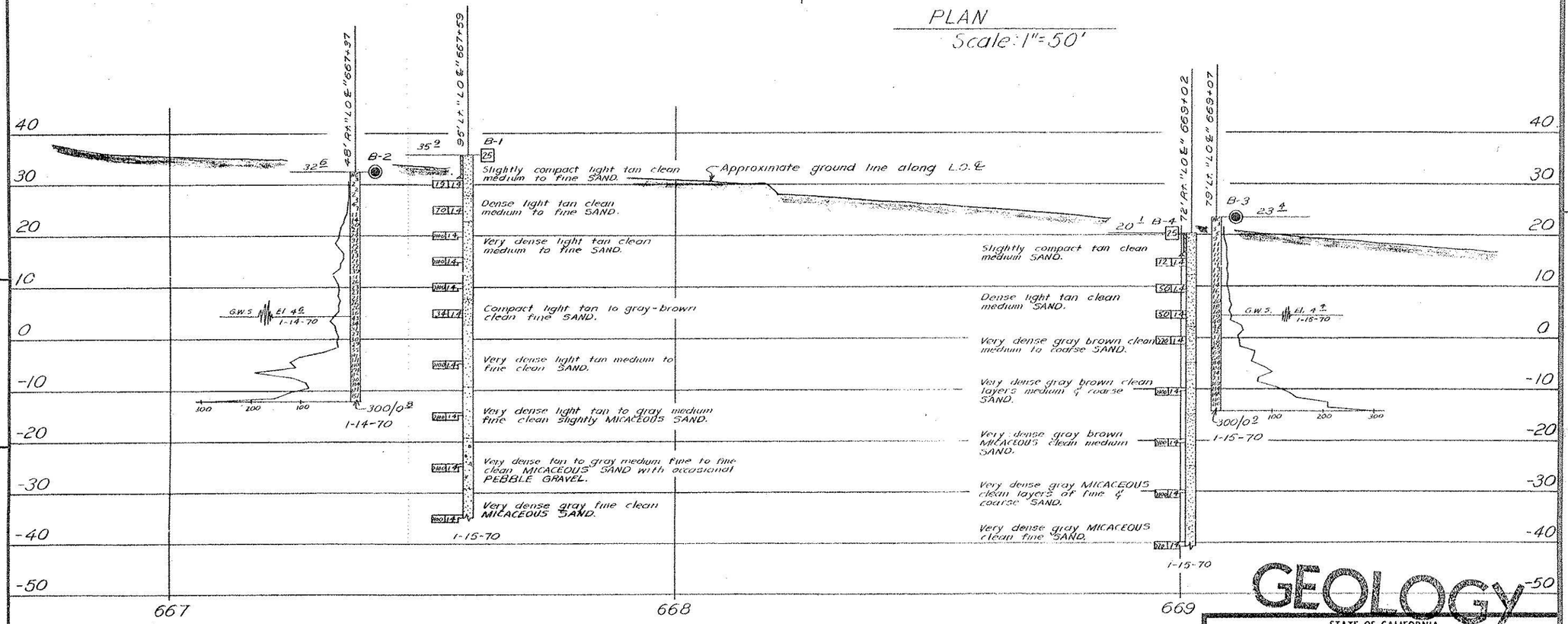
BRIDGE DEPARTMENT
ENGINEERING GEOLOGY SECTION



PLAN
Scale: 1" = 50'

REDUCED PLAN
USE SCALE BELOW
0 2 3
3 INCHES ON ORIGINAL PLAN

B.M. # M-4A
1" I.P. at edge of A.C.
Approx. 89' Lt. "L.O.E." 668+47±
Elev. 29.67



PROFILE
Scale: 1" = 10'

GEOLOGY
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

RESERVATION ROAD UNDERCROSSING

LOG OF TEST BORINGS

BRIDGE NO.	POST MILE	DRAWING NO.	SHEET	OF
44-213 R/L	86.5		8	8

REVISION DATES (PRELIMINARY STAGE ONLY)

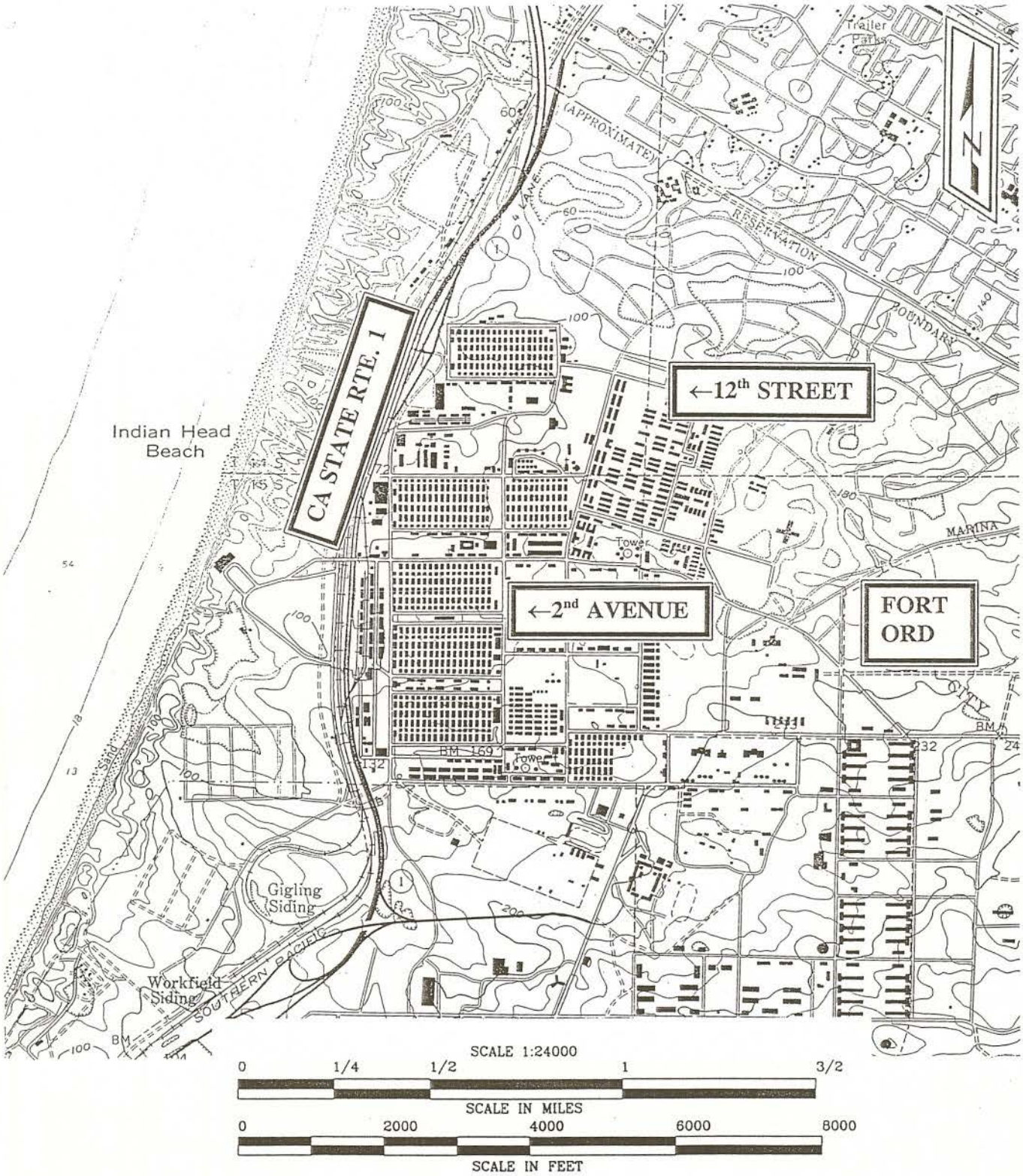
7/29/70	10/5/73						

WO 022011
CU 05201

Disregard prints bearing earlier revision dates

D & M 1999[1]

[1] Please See Figure 5 for full Citation



NOVEMBER 1999

D&M CONSULTING ENGINEERS

A URS CORPORATION COMPANY

SITE LOCATION MAP

12th STREET GATEWAY / 2nd AVENUE REALIGNMENTS

FORT ORD, CALIFORNIA

FIGURE 1

PROJECT 201148

LOG OF TEST BORING

No. B-1

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 7/13/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; medium to light brown, moist, loose; poorly graded	SP	2	1-1 M	11								
		3	1-2									
medium dense		4	T	14								
		5										
		6	1-3 M	29								
		7										
		8										
		9										
		10										
		11	1-4 T	15								
Boring terminated at 11 1/2 feet.		12										
		13										
		14										
		15										
		16										
		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-2

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 7/13/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; medium brown, damp, loose; fine, some organic material	SP	2	2-1 M	7				3		101		
		3	2-2 T	9								
		4										
		5										
medium to light brown, moist, medium dense		6	2-3 M	16				3		103		
		7										
		8										
		9										
		10										
dense		11	2-4 T	35								
Boring terminated at 11 1/2 feet.		12										
		13										
		14										
		15										
		16										
		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-3

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 7/13/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; medium to light brown, damp, dense;	SP											
poorly graded		2										
(No recovery from this sample.)			M	40								
medium dense		3	3-1									
		4	M	21								
		5										
			3-2									
		6										
			T	17								
		7										
		8										
		9										
		10										
moist			3-3									
		11										
			T	20								
Boring terminated at 11 1/2 feet.		12										
		13										
		14										
		15										
		16										
		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-4

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 7/13/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; medium to light brown, damp, medium dense; poorly graded	SP	2	4-1 M	13				3		106		
		3	4-2 T	14								
		4										
		5										
moist		6	4-3 M	28				3		98		
		7										
		8										
		9										
		10										
		11	4-4 T	26								
Boring terminated at 11 1/2 feet.		12										
		13										
		14										
		15										
		16										
		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-5

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 7/13/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; dark brown, damp, medium dense; fine, some organics	SP	2	5-1 M	18				3		104		
		3	5-2									
		4	T	11								
		5										
light brown		6	5-3 M	30				3		105		
		7										
		8										
		9										
		10										
darker layer (thin)		11	5-4 T	32								
Boring terminated at 11 1/2 feet.		12										
		13										
		14										
		15										
		16										
		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-6

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 7/13/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; medium to light brown, damp, medium dense; fine, poorly graded	SP	2	6-1 M	19								
		3	6-2 T	9								
loose, coarser grains		4										
		5										
medium dense		6	6-3 M	14								
		7										
		8										
		9										
moist		10										
		11	6-4 T	20								
Boring terminated at 11 1/2 feet.		12										
		13										
		14										
		15										
		16										
		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-7

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 8/25/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; med. to dark brown, damp, medium dense; poorly graded, some gravel	SP	2	7-1 M	13								
		3	7-2									
		4	T	15								
		5										
		6	7-3									
		7	M	25								
		8										
light brown		9										
		10										
		11	7-4									
dark-medium brown		12	T	26								
		13										
		14										
		15										
		16	7-5									
			T	40								
Boring terminated at 16 1/2 feet.		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-8

PROJECT: 12th Street Gateway / 2nd Ave. Realignment
DATE: 8/25/99
LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger
HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered
HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; dark brown, damp, medium dense; poorly graded	SP	2	8-1 M	18								
		3	8-2 T	15								
		4										
		5										
		6	8-3 M	23								
		7										
		8										
		9										
		10										
moist		11	8-4 T	28								
		12										
		13										
		14										
		15										
very dense		16	8-5 T	58								
Boring terminated at 16 1/2 feet.		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-9

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 8/25/99 | LOGGED BY: JS

DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; dark brown, moist, medium dense	SP		9-1									
poorly graded		2										
			M	27								
dark brown		3	9-2									
		4	T	6								
		5										
			9-3									
		6										
			M	10								
		7										
		8										
		9										
		10										
light brown			9-4									
		11										
			T	17								
		12										
		13										
		14										
		15										
			9-5									
		16										
			T	30								
Boring terminated at 16 1/2 feet.		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

LOG OF TEST BORING

No. B-10

PROJECT: 12th Street Gateway / 2nd Ave. Realignment | DATE: 8/25/99 | LOGGED BY: JS

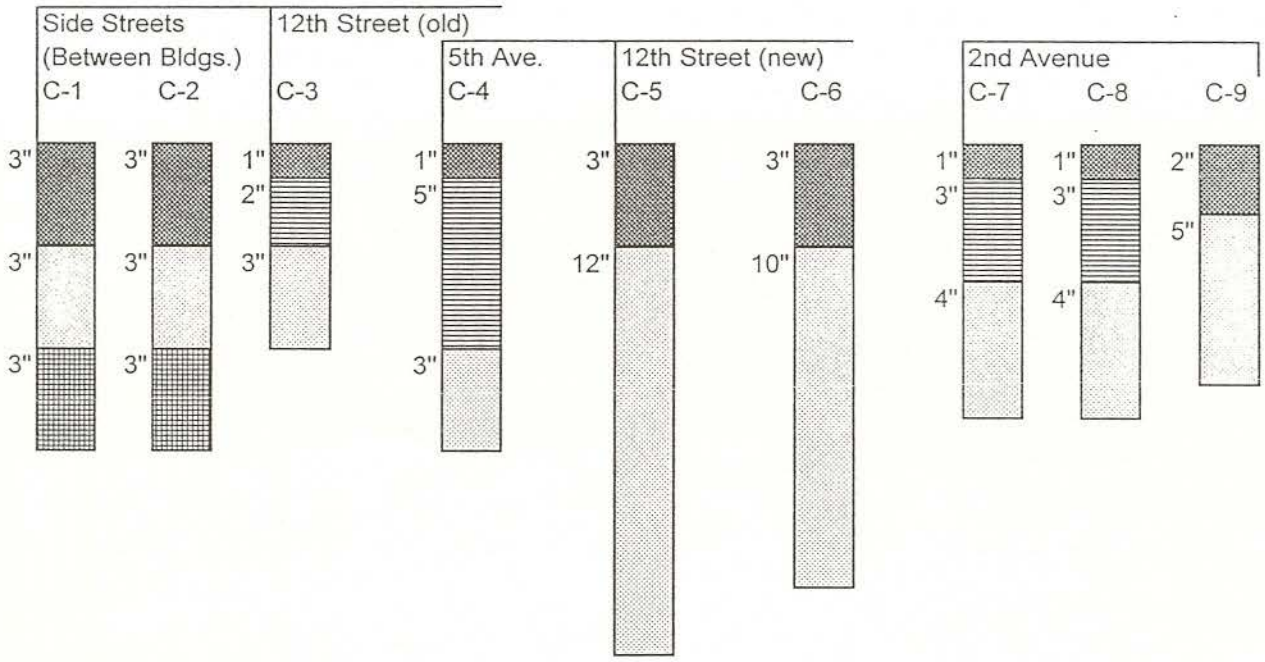
DRILL RIG: Truck Mounted Solid Flight Auger | HOLE DIA.: 4.5"

SAMPLER: T = SPT Sampler; M = Mod. Cal.

GROUND WATER DEPTH: Not Encountered | HOLE ELEVATION: --

Description	Soil Type	Depth	Sample	Blows per foot	Pocket Pen (tsf)	% Passing #200	Liquid Limit	Water Content	Plastic Limit	Dry Density (pcf)	Failure Strain (pcf)	Unconfined Shear Strength (psf)
		1										
SAND; light brown, dry, loose; poorly graded	SP		10-1									
MACADAM PAVEMENT; some gravel		2										
			M	64								
SAND; dark to medium brown, damp, medium dense	SP	3	10-2									
		4	T	19								
		5										
			10-3									
		6										
light brown			T	15								
		7										
		8										
		9										
		10										
			10-4									
		11										
			T	18								
Boring terminated at 11 1/2 feet.		12										
		13										
		14										
		15										
		16										
		17										
		18										
		19										
		20										
		21										
		22										
		23										
		24										
		25										
		26										

RESULTS OF PAVEMENT CORING



= Asphalt Concrete (AC)

= AC (large aggregate, approx. 2" max))

= Aggregate base (AB; poor quality and variable)

= Macadam Pavement (asphalt treated aggregate)

NOVEMBER 1999

D&M CONSULTING ENGINEERS

A URS CORPORATION COMPANY

EXISTING PAVEMENT SECTIONS

12th STREET GATEWAY / 2nd AVENUE REALIGNMENTS

FORT ORD, CALIFORNIA

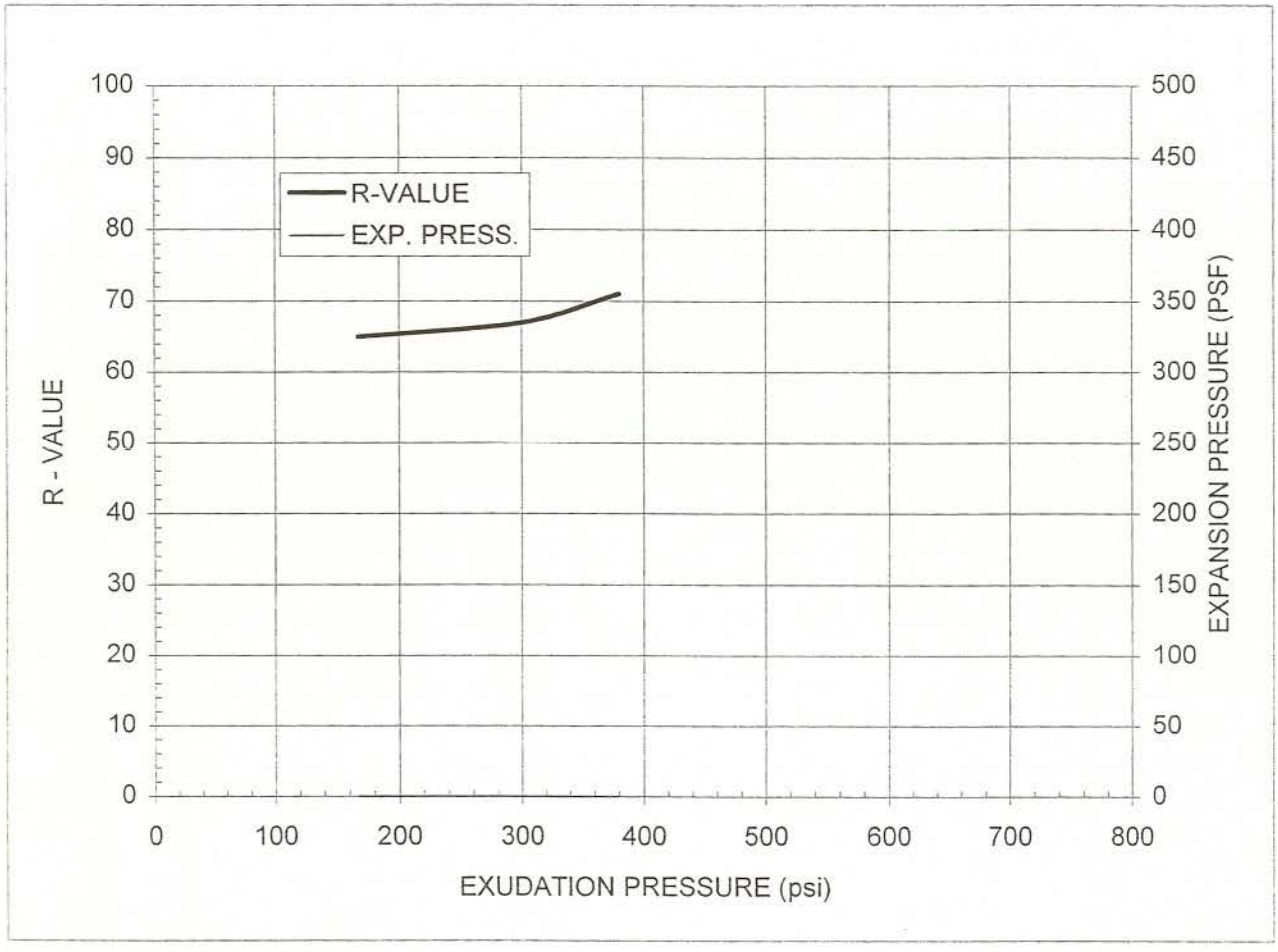
FIGURE 2

PROJECT 201148

R-VALUE REPORT

Terratech, Inc. **ASTM D2844** (408) 372-3716

Project:	12th Street Gateway	Date:	7/29/99
Client:	Bestor Engineers	Project #:	201148
		Lab #:	L5054
Sample #:	R-1 (Bulk)	Sample Date:	7/21/99
Material Description:	SAND; dark brown		



Specimen No.	A	B	C
Exudation Pressure, psi	167	300	380
Expansion Pressure, psf	0	0	0
R-Value	65	67	71
Moisture Content at Test, %	14.8	13.9	11.4
Dry Density at Test, pcf	108.1	108.4	109.9

R-Value @ 300 psi Exudation Pressure = 67

Expansion Pressure @300 psi Exudat'n, psf = **0**

Comments:

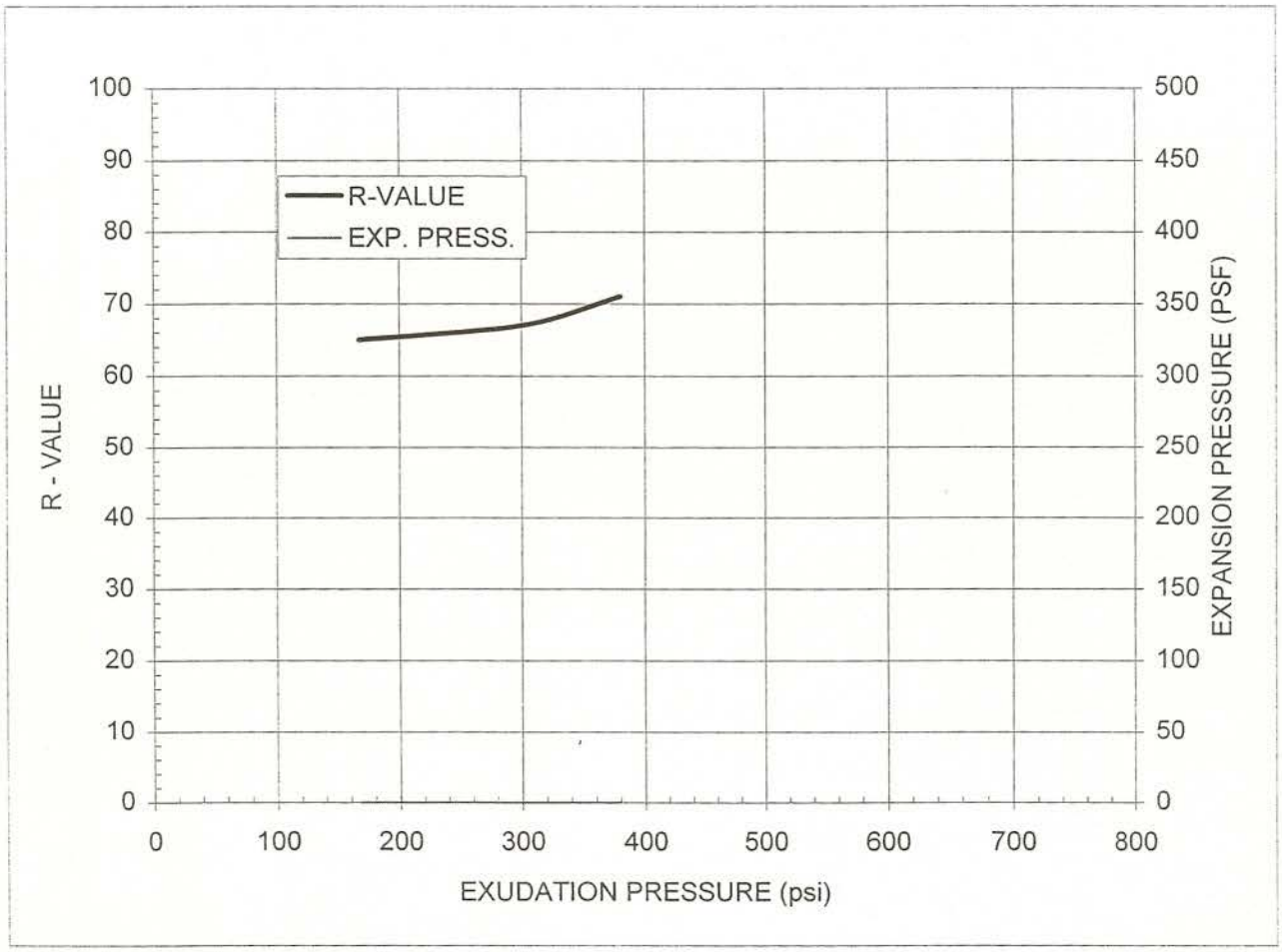
Report By: Gary A. Bomberger, Laboratory Manager

R0000421 rev.12/04/96

R-VALUE REPORT

Terratech, Inc. **ASTM D2844** (408) 372-3716

Project:	12th Street Gateway	Date:	7/29/99
Client:	Bestor Engineers	Project #:	201148
		Lab #:	L5054
Sample #:	R-2 (Bulk)	Sample Date:	7/21/99
Material Description:	SAND; tan		



Specimen No.	A	B	C
Exudation Pressure, psi	280	380	440
Expansion Pressure, psf	0	0	0
R-Value	59	63	68
Moisture Content at Test, %	16.3	14.2	12.5
Dry Density at Test, pcf	103.6	104.6	110.2

R-Value @ 300 psi Exudation Pressure = 60 | Expansion Pressure @300 psi Exudat'n, psf = **0**

Comments:

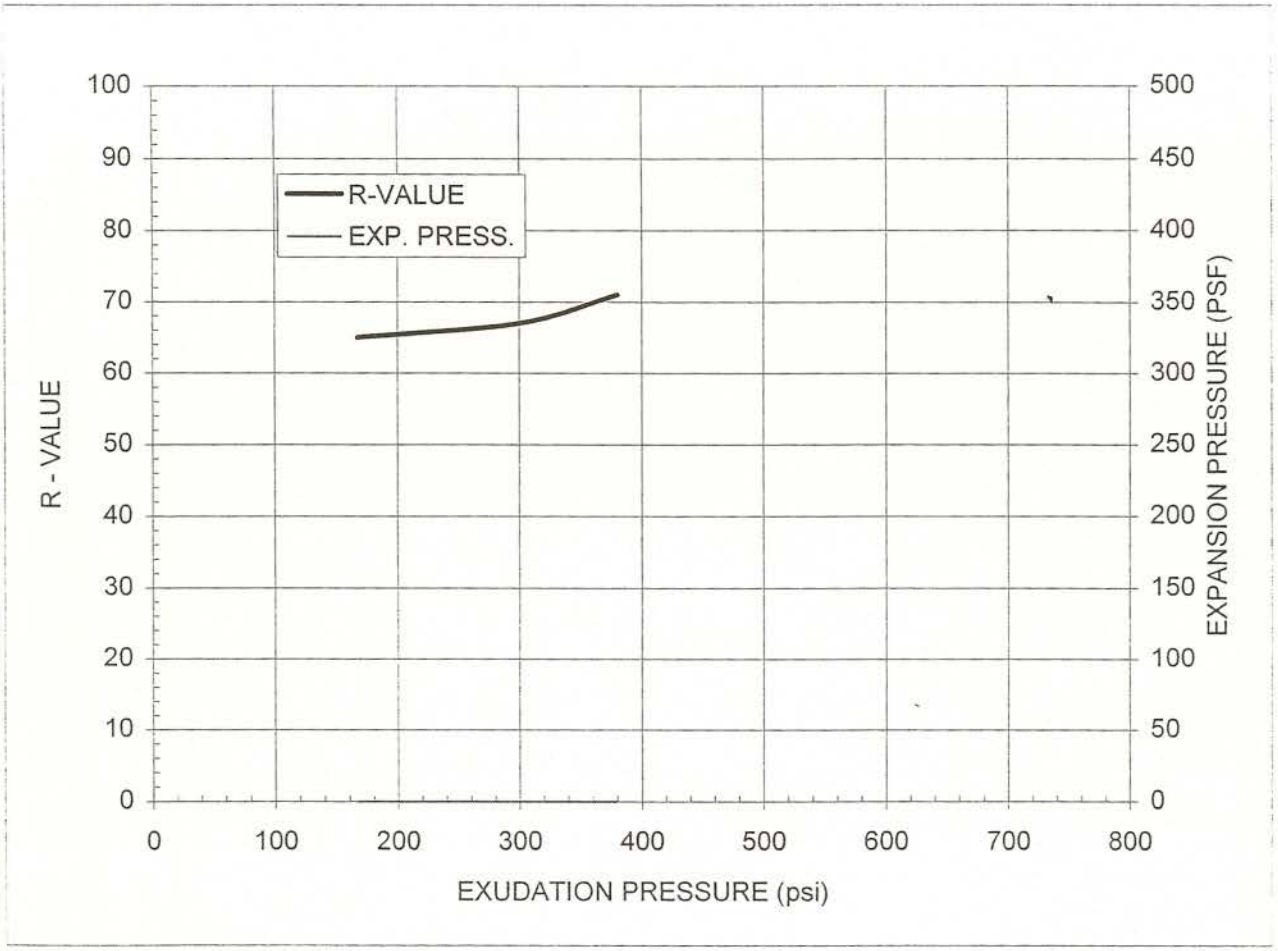
Report By: Gary A. Bomberger, Laboratory Manager

R0000421 rev.12/04/96

R-VALUE REPORT

Terratech, Inc. — ASTM D2844 — (408) 372-3716

Project:	12th Street Gateway	Date:	7/29/99
Client:	Bestor Engineers	Project #:	201148
		Lab #:	L5054
Sample #:	R-3 (Bulk)	Sample Date:	7/21/99
Material Description:	SAND; tan		



Specimen No.	A	B	C
Exudation Pressure, psi	220	300	600
Expansion Pressure, psf	0	0	0
R-Value	37	45	57
Moisture Content at Test, %	15.2	14.4	1.8
Dry Density at Test, pcf	102.6	105.4	105.9

R-Value @ 300 psi Exudation Pressure = 40

Expansion Pressure @300 psi Exudat'n, psf = 0

Comments:

Report By: Gary A. Bomberger, Laboratory Manager

D&M Consulting Engineers, Inc.

LAB RESULTS

(831) 372-3716

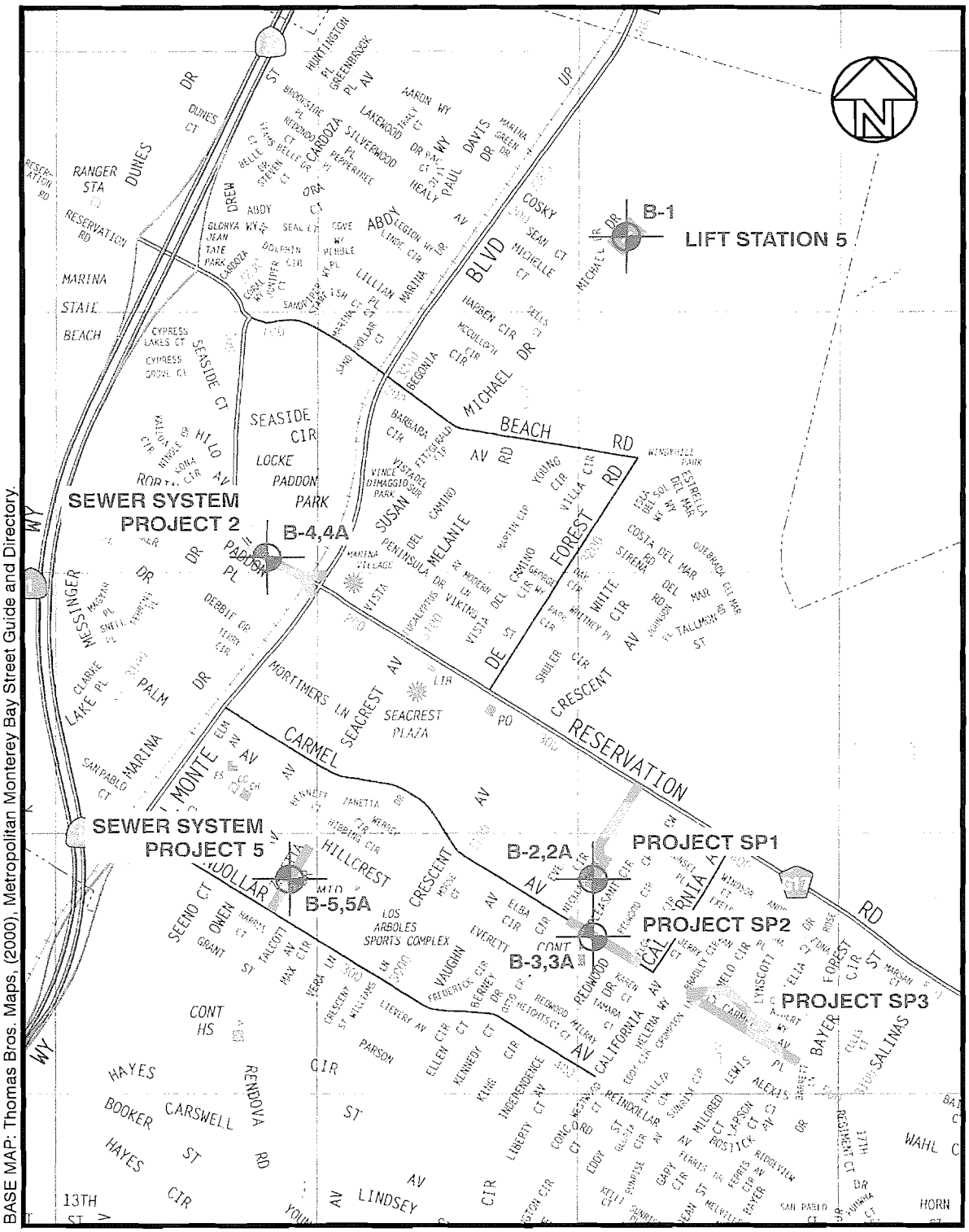
Project: 12th Street Gateway
Client: Bestor Engineers

Date: 08/17/99
Project #: 201148
Lab #: 3676

Sample Number	Sulfates	Chlorides	pH	Resistivity	Soil Description
1-2	<50 ppm	25-50 ppm	7.7	6337 ohms-cm	Fine SAND with Silt, yellow
3-2	<50 ppm	25-50 ppm	7.5	6137 ohms-cm	Fine SAND with Silt, yellow

DCM Engineering 2006[1]

[1] Please see Figure 5 for full citation.



LEGEND:

B-1 - Approximate location of project geotechnical borings

- Approximate project alignments/site locations

DCM Engineering		WINZLER & KELLY Marina Coast Water District 2005 Marina Sewer Improvement Projects Marina, California BORING LOCATION MAP	PLATE NO. 2
FILE NO. J-4962-1	APRIL 2006		

KEY TO BORING LOG

- Shelby tube sample
- Grab sample
- 1.4" I.D./2" O.D. Standard Penetration Test (ASTM D1586) sampler (SPT)
- 2.5" I.D./3" O.D. Modified California sampler (MCS) with brass liners
- 2" I.D./2.5" O.D. Split Spoon sampler (SSS)

NSR No sample recovery

PP Pocket Penetrometer (tsf = tons per square foot)

- Groundwater level observed in boring at end of drilling unless noted otherwise. Not to be interpreted as the equilibrium groundwater level.
- Groundwater seepage encountered during drilling
- Planned pipeline I.D. (projected to boring)

RELATIVE DENSITY		CONSISTENCY		
SANDS AND GRAVELS	SPT, N	SILTS AND CLAYS	SPT, N	UNCONFINED COMPRESSIVE STRENGTH, tsf
VERY LOOSE	0-4	VERY SOFT	0-2	0-0.25
LOOSE	4-10	SOFT	2-4	0.25-0.50
MEDIUM DENSE	10-30	MEDIUM STIFF	4-8	0.50-1.00
DENSE	30-50	STIFF	8-15	1.00-2.00
VERY DENSE	50+	VERY STIFF	15-30	2.00-4.00
		HARD	30+	>4.00

Reference: Terzaghi, K. and Peck, R., SOIL MECHANICS IN ENGINEERING PRACTICE, 2nd ed., John Wiley and Sons, New York, 1967. Page 341 Table 45.1 and pp. 347 Table 45.2.

MOISTURE CONDITION

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp but no visible water
WET	Visible free water, usually soil is below water table

Reference: ASTM D2488, Table 3 - Criteria for Describing Moisture Condition

CONSTITUENT DESCRIPTIONS

DESCRIPTION	CRITERIA
TRACE	less than 5%
FEW	5% to 10%
LITTLE	15% to 25%
SOME	30% to 45%
MOSTLY	50% to 100%

Reference: ASTM D2488, Note 15

NOTES:

1. Lines separating strata in the logs represent approximate boundaries only and are dashed where strata change depth is less certain and queried where strata change depth is not known. Actual strata change may be gradual. No warranty is provided as to the continuity of strata between borings. Logs represent the subsurface section observed at the boring location on the date of drilling only.
2. Penetration Resistance (blows/ft.) are the last 12" of an 18" drive or the middle 12" of a 24" drive using a 140-pound hammer falling 30 inches per blow unless noted otherwise. The Penetration Resistance values noted on the logs are actual blows per foot of penetration for the respective sampler type (i.e., MCS and SSS sampler Penetration Resistance has not been correlated to an equivalent SPT sampler "N" value).
3. All borings were made with a truck mounted Mobile B-24 drill rig using 4-inch diameter continuous flight solid stem augers unless noted otherwise.
4. Where noted on the boring logs, slough is defined as material from the bore hole walls which collapses into and partially fills the open bore hole on removal of the solid flight augers for sampling. The presence of slough within the borehole can contaminate the sampled soils or render drive sampling impossible (samplers fill entirely with slough).

UNIFIED SOIL CLASSIFICATION SYSTEM

CRITERIA FOR ASSIGNING GROUP SYMBOLS AND GROUP NAMES[A]				GROUP SYMBOL	GROUP NAME[B]
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	**GRAVELS** More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels < 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$[E]	GW	Well-graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3$[E]	GP	Poorly graded gravel[F]
		Gravels with Fines > 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	SANDS 50% or more of coarse fraction passes No. 4 sieve	Clean Sands < 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$[E]	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3$[E]	SP	Poorly graded sand[I]
		Sands with Fines > 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	**SILTS AND CLAYS** Liquid limit ≤ 50	Inorganic	PI > 7 plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 plots below "A" line[J]	ML	Silt[K,L,M]
		Organic	$\frac{\text{Liquid limit-oven dried}}{\text{Liquid limit-not dried}} < 0.75$	OL	Organic Clay[K,L,M,N]
					Organic Silt[K,L,M,O]
	SILTS AND CLAYS Liquid limit > 50	Inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		Organic	$\frac{\text{Liquid limit-oven dried}}{\text{Liquid limit-not dried}} < 0.75$	OH	Organic Clay[K,L,M,P]
					Organic Silt[K,L,M,Q]
HIGHLY ORGANIC SOILS		Primarily organic matter, dark color and organic odor		PT	Peat

NOTES:

A Based on the material passing the 3-in. (75mm) sieve.

B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

C Gravels with 5% to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

D Sands with 5% to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

E $Cu = \frac{D_{60}}{D_{10}}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

F If soil contains ≥ 15% sand, add "with sand" to group name.

G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

H If fines are organic, add "with organic fines" to group name.

I If soil contains ≥ 15% gravel, add "with gravel" to group name.

J If Atterberg limits plot in hatched area, soil is a CL-ML (silty clay).

K If soil contains 15% to 29% plus No. 200,add "with sand" or "with gravel", whichever is predominant.

L If soil contains ≥ 30% plus No.200, predominantly sand, add "sandy" to group name.

M If soil contains ≥ 30% plus No.200, predominantly gravel, add "gravelly" to group name.

N PI ≥ 4 and plots on or above "A" line.

O PI < 4 or plots below "A" line.

P PI plots on or above "A" line.

Q PI plots below "A" line.

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California

BORING LOG LEGEND

PLATE NO.
A-1
(2 of 2)

TUNNELMAN'S GROUND CLASSIFICATION FOR SOILS

Classification		Behavior	Typical Soil Types
FIRM		Heading can be advanced without initial support and final lining can be constructed before ground starts to move.	Loess above water table; hard clay, marl, cemented sand and gravel when not highly overstressed.
RAVELING	Slow Raveling Fast Raveling	Chunks or flakes of material begin to drop out of the arch or walls sometime after the ground has been exposed due to loosening or to overstress and "brittle" fracture (ground separates or breaks along distinct surfaces, opposed to squeezing ground). In fast raveling ground, the process starts within a few minutes, otherwise the ground is slow raveling.	Residual soils or sand with small amounts of binder may be fast raveling below the water table, slow raveling above. Stiff fissured clays may be slow or fast raveling depending upon degree of overstress.
SQUEEZING		Ground squeezes or extrudes plastically into tunnel, without visible fracturing or loss of continuity, and without perceptible increase in water content. Ductile, plastic yield and flow due to overstress.	Ground with low frictional strength. Rate of squeeze depends on degree of overstress. Occurs at shallow to medium depth in clay of very soft to medium consistency. Stiff to hard clay under high cover may move in combination of raveling at excavation surface and squeezing at depth behind surface.
RUNNING	Cohesive, running Running	Granular materials without cohesion are unstable at a slope greater than their angle of repose (±30-35°). When exposed at steeper slopes, they run like granulated sugar or dune sand until the slope flattens to the angle of repose.	Clean, dry granular materials. Apparent cohesion in moist sand, or weak cementation in any granular soil may allow the material to stand for brief period of raveling before it breaks down and runs. Such behavior is cohesive-running.
FLOWING		A mixture of soil and water flows into the tunnel like a viscous fluid. The material can enter the tunnel from the invert as well as from the face, crown, and walls, and can flow for great distances, completely filling the tunnel in some cases.	Below the water table in silt, sand, or gravel without enough clay content to give significant cohesion and plasticity. May also occur in highly sensitive clay when such material is disturbed.
SWELLING		Ground absorbs water, increases in volume, and expands slowly into the tunnel.	Highly preconsolidated clay with plasticity index in excess of about 30, generally containing significant percentages of montmorillonite.

REFERENCE: Heuer, R.E., 1974, Important ground parameters in soft ground tunneling, Subsurface exploration for underground excavation and heavy construction, New England College, Henniker, New Hampshire, American Society of Civil Engineers, New York, P. 41-55.

LOG OF BORING B-1

LOCATION: South and west of existing Lift Station No. 5 (outside fence; approximately 4' west of fence and 4' north of gate).

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	% MOISTURE	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (>#4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
					POORLY GRADED SAND WITH CLAY (SP-SC) - brown - predominantly fine-grained sand - trace ¼ to ½ inch gravel near surface - trace organics (roots) - very little cohesion - loose - dry										
5	1		9			2	91			0	92	8			
	2		10			2	101			CORROSION TEST See Plate C-6				60	32°
10	3		9		**POORLY GRADED SAND (SP)** - light olive brown to yellowish brown - predominantly fine-grained sand - very little cohesion - loose to medium dense - dry to moist										
	4		25			2	102								
15	5		18							0	96	4			
	6		6		**ORGANIC CLAY (OH)** - pale brown and olive yellow mottled with light olive brown streaks - high plasticity - medium stiff - moist to wet	134	36	199	153	LL RATIO O.D./N.D. = 0.35			1.92		
20	7		33		**POORLY GRADED SAND WITH CLAY (SP-SC)** - olive brown - predominantly fine-grained sand - high plasticity clay - dense - wet										
	8		50 (6")	②		13	121			0	88	12	FINES 6% Silt 6% Clay		
25	9		46												
					BOTTOM OF BORING AT 25.5 FEET										

REMARKS:
① Boring drilled on October 20, 2005. See Plate A-1 in Appendix A for definitions of terms.
② Groundwater level shown on log was recorded during drilling. At the end of drilling, the borehole collapsed to a depth of 22 feet with no free groundwater on top of collapsed portion.

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-1

PLATE NO.
B-1

LOG OF BORING B-2

LOCATION: In front of #3102 Nicklas Lane (see Plate 2).

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	% MOISTURE	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (> #4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (< #200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
				②	**POORLY GRADED SAND (SP)** - very dark grayish brown - predominantly fine-grained sand - very little cohesion - dry										
	1		16		**POORLY GRADED SAND (SP)** - dark yellowish brown to light olive brown - predominantly fine-grained sand - very little cohesion - medium dense - dry	3	103								
5	2		13							0	99	1			
	3		21		**POORLY GRADED SAND (SP)** - light olive brown - predominantly fine-grained sand - very little cohesion - medium dense - dry	③ 3	102								
10	4		18							1	97	2			
	5		31			2	103								
15	6		23												
	7		19			3									
20					**BOTTOM OF BORING AT 19.5 FEET**										
25															

REMARKS:
① Boring drilled on October 20, 2005. See Plate A-1 in Appendix A for definitions of terms.
② No free groundwater encountered during drilling.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-2

PLATE NO.
B-2

LOG OF BORING B-2A

LOCATION: In front of #3102 Nicklas Lane (see Plate 2). Boring is within backfill for existing sanitary sewer.

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	% MOISTURE	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (> #4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (< #200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
					NICKLAS LANE - approximately 1 inch asphalt over 5 inches aggregate base										
	1	X			**FILL - POORLY GRADED SAND** - very dark grayish brown to dark brown - predominantly fine grained sand - little to no cohesion - dry										
5	2	■	4	②	**FILL - POORLY GRADED SAND** - dark brown and light olive brown intermixed - predominantly fine grained sand - trace gravel - very loose - dry to moist	3	98			CORROSION TEST See Plate C-6					
					BOTTOM OF BORING AT 5.5 FEET										
					③										
10															
15															
20															
25															

REMARKS:
① Boring drilled on October 20, 2005. See Plate A-1 in Appendix A for definitions of terms.
② No free groundwater encountered during drilling.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-2A

PLATE NO.
B-2A

LOG OF BORING B-3

LOCATION: Carmel Avenue at intersection with Pleasant Circle (see Plate 2).

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	% MOISTURE	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (> #4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (< #200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
				②	**CARMEL AVENUE** - approximately 3 inches asphalt over 10 inches aggregate base										
					POORLY GRADED SAND (SP) - very dark grayish brown - predominantly fine-grained sand - trace gravel - very little cohesion - dry										
5	1		12		**POORLY GRADED SAND (SP)** - dark yellowish brown - predominantly fine-grained sand - very little cohesion - loose - dry ③	4	106			0	96	4			
	2		18		**POORLY GRADED SAND (SP)** - light olive brown to brownish yellow - predominantly fine-grained sand - very little cohesion - loose, becoming medium dense with depth - dry	3	102								
10	3		13							0	99	1			
	4		32			4	101								
15	5		26												
	6		23			3									
20					**BOTTOM OF BORING AT 19.5 FEET**										
25															

REMARKS:
① Boring drilled on October 20, 2005. See Plate A-1 in Appendix A for definitions of terms.
② No free groundwater encountered during drilling.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-3

PLATE NO.
B-3

LOG OF BORING B-3A

LOCATION: Carmel Avenue at intersection with Pleasant Circle (see Plate 2). Boring is within backfill for existing sanitary sewer.

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	% MOISTURE	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (> #4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (< #200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
				②	**CARMEL AVENUE** - approximately 3 inches asphalt over 10 inches aggregate base										
	1				**FILL - POORLY GRADED SAND** - dark brown - very loose - predominantly fine grained sand - dry to moist - very little cohesion										
	2		4			5	96								
5					**BOTTOM OF BORING AT 4.5 FEET** ③										
10															
15															
20															
25															

MOISTURE-DENSITY RELATIONSHIP
Using Sample 1 from Boring B-3A
Maximum Dry Density = 118 pcf
Optimum Moisture = 10%
See Plate C-5

REMARKS:
① Boring drilled on October 20, 2005. See Plate A-1 in Appendix A for definitions of terms.
② No free groundwater encountered during drilling.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-3A

PLATE NO.
B-3A

LOG OF BORING B-4

LOCATION: Reservation Road, approximately 450 feet west of Del Monte Boulevard (see Plate 2).

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	% MOISTURE	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (> #4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (< #200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
					RESERVATION RD. - approximately 1 inch asphalt over 6 inches aggregate base										
	1		6		**POORLY GRADED SAND (SP)** - dark grayish brown and brownish yellow marbled - fine-grained sand - very little cohesion - loose - moist	7	96								
5	2		13		**POORLY GRADED SAND (SP)** - brownish yellow grading to yellowish brown with depth - fine-grained sand - very little cohesion - medium dense - moist to wet										
	3		25			17	107			0	98	2			
10	4		17												
	5		26			25	99								
15	6		30												
					BOTTOM OF BORING AT 16 FEET										
20															
25															

② Borehole sloughing below 7' (see table below)

③

CORROSION TEST
See Plate C-5

SLOUGH DEPTHS ON SAMPLING ②

Sample No.	Slough Depth*
4-5	4'
4-6	3.5'

*- slough depth measured from intended sample depth

REMARKS:
① Boring drilled on March 23, 2006. See Plate A-1 in Appendix A for definitions of terms.
② Upon completion of drilling, borehole filled with slough to a depth of 7 feet below ground surface.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-4

PLATE NO.
B-4

LOG OF BORING B-4A

LOCATION: Reservation Road, approximately 450 feet west of Del Monte Boulevard (see Plate 2). Boring is within backfill for existing sanitary sewer.

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	MOISTURE %	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (>#4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
				②	**RESERVATION RD.** - approximately 1 inch asphalt over 6 inches aggregate base										
	1		15		**FILL - POORLY GRADED SAND** - brown - fine-grained sand - very little cohesion - medium dense to loose - moist	4	101								
5	2		4							0	96	4			
					BOTTOM OF BORING AT 6 FEET										
10					**MOISTURE-DENSITY RELATIONSHIP** Using drilled cuttings from Boring B-4A **Maximum Dry Density** = 116 pcf **Optimum Moisture** = 11% ③										
15															
20															
25															

REMARKS:
① Boring drilled on March 23, 2006. See Plate A-1 in Appendix A for definitions of terms.
② No free groundwater encountered during drilling.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-4A

PLATE NO.
B-4A

LOG OF BORING B-5

LOCATION: Zanetta Drive, approximately 340 feet north of Reindollar Avenue (see Plate 2).

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION ①	MOISTURE %	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (>#4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
				②	**ZANETTA DRIVE** - approximately 2 inch asphalt over 6 inches aggregate base										
					POORLY GRADED SAND (SP) - dark brown and light olive brown marbled - very little cohesion - moist - fine-grained sand										
	1		20			2	102								
5	2		13		**POORLY GRADED SAND (SP)** - light olive brown - fine-grained sand - very little cohesion - medium dense - moist										
	3		21		③	4	104			0	99	1			
10	4		11												
	5		26			2									
15	6		30		Borehole sloughing below 16' (see table below)										
	7		24			4									
20					**BOTTOM OF BORING AT 19.5 FEET**										
25															

SLOUGH DEPTHS ON SAMPLING

Sample No.	Slough Depth*
5-7	2'

*- slough depth measured from intended sample depth

REMARKS:
① Boring drilled on March 23, 2006. See Plate A-1 in Appendix A for definitions of terms.
② No free groundwater encountered during drilling.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-5

PLATE NO.
B-5

LOG OF BORING B-5A

LOCATION: Zanetta Drive, approximately 340 feet north of Reindollar Avenue (see Plate 2). Boring is within backfill for existing sanitary sewer.

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft	GROUNDWATER	DESCRIPTION ①	% MOISTURE	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (>#4 sieve) %	GRAIN SIZE Sand (#4 to #200 sieve) %	GRAIN SIZE Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	DIRECT SHEAR Internal Friction Angle
				②	**ZANETTA DRIVE** - approximately 2 inch asphalt over 6 inches aggregate base										
	1		5		**FILL - POORLY GRADED SAND** - brown to dark browd - fine-grained sand - very little cohesion - very loose - moist	4	98								
5	2		2							7	90	1			
					BOTTOM OF BORING AT 6 FEET										
					③										
10															
15															
20															
25															

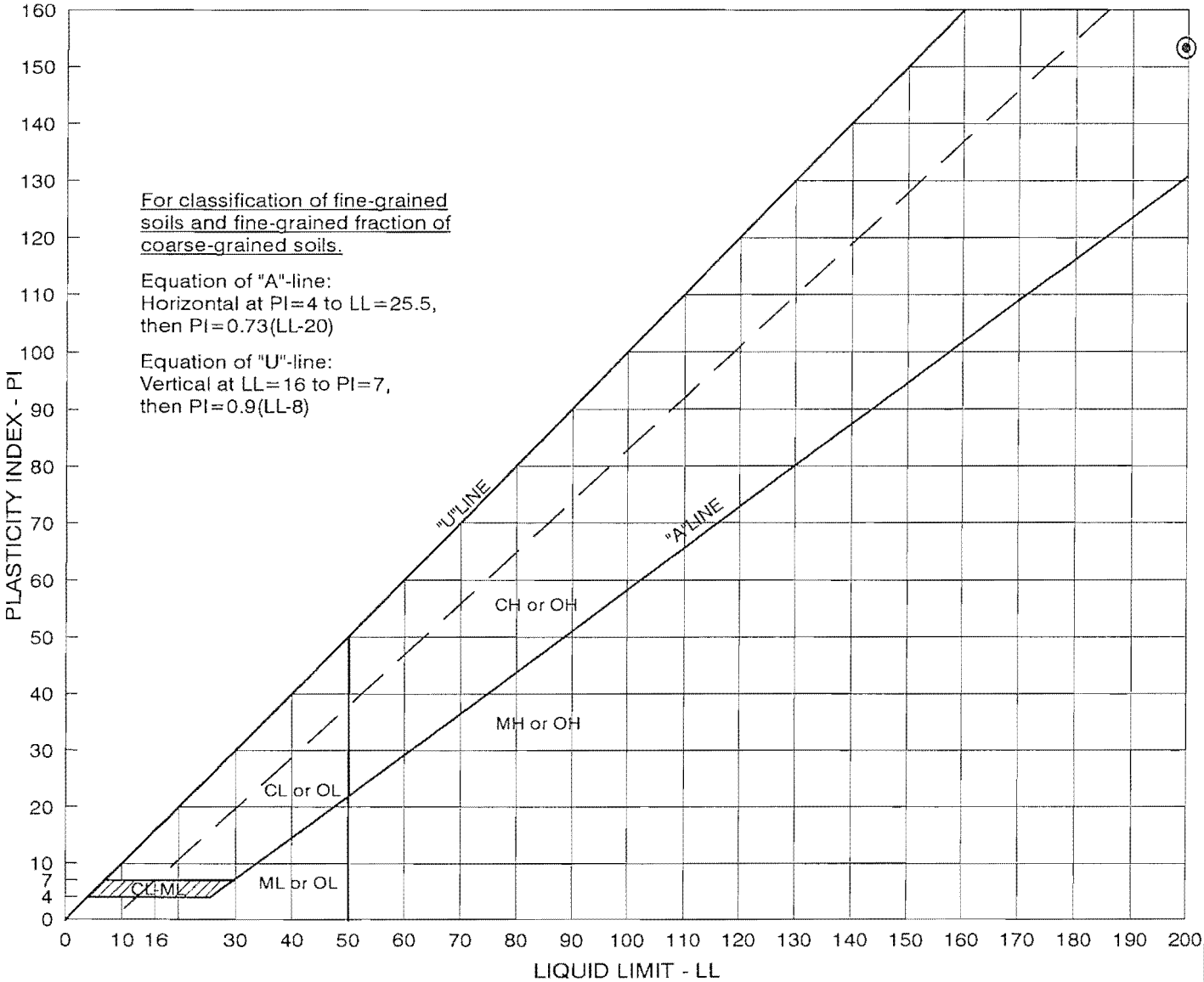
REMARKS:
① Boring drilled on March 23, 2006. See Plate A-1 in Appendix A for definitions of terms.
② No free groundwater encountered during drilling.
③ Projected existing pipeline depth from Winzler & Kelly 50% Submittal Drawings (2006).

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
LOG OF BORING B-5A

PLATE NO.
B-5A



TEST SYMBOL	BORING SAMPLE NO.	DEPTH (ft)	LIQUID LIMIT - LL	PLASTICITY INDEX - PI	RATIO ①	GROUP SYMBOL ②
◉	B-1-6B	18½-19	199	153	0.35	OH

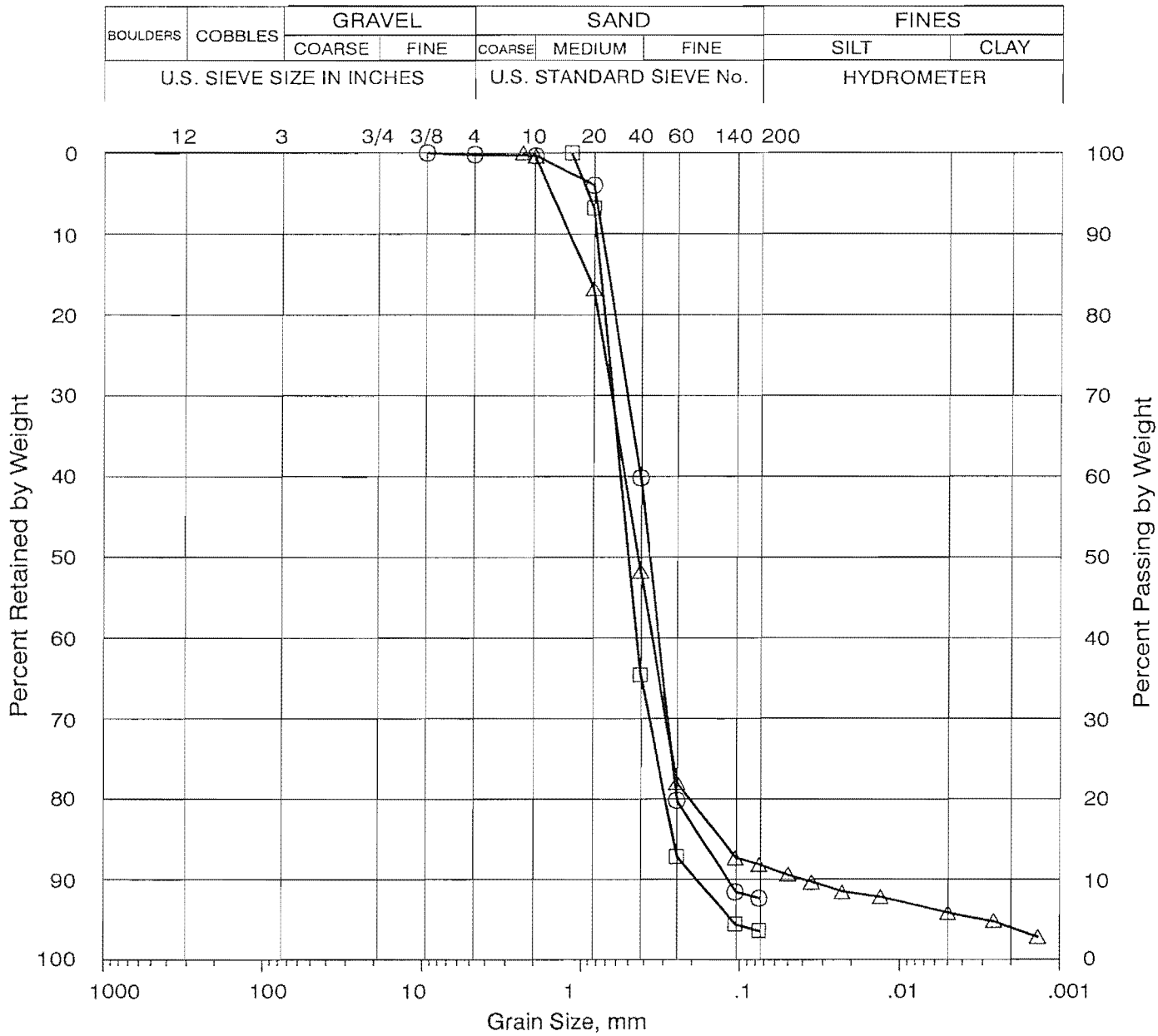
① If ratio of Liquid Limit (oven dried) to Liquid Limit (not dried) is less than 0.75, specimen classifies as organic
② Classification of fines < 0.425mm

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
PLASTICITY INDEX

PLATE NO.
C-1



TEST SYMBOL	BORING SAMPLE NO.	DEPTH (feet)	GROUP SYMBOL	DESCRIPTION (based on grain size)
○	B-1-1A	6-6½	SP-SC	poorly graded sand with clay
□	B-1-5	14½-16	SP	poorly graded sand
△	B-1-8A	24-24½	SP-SC	poorly graded sand with clay

NOTE:
The largest particle (grain) size that could have been sampled from our borings by our sample barrels is a function of the inside diameter of the sample barrels used (see Plate A-1). Therefore, there may be larger particles (e.g., coarse gravel, cobbles or boulders) in the soils sampled than reflected on the boring logs and grain size distribution curves provided in this report.

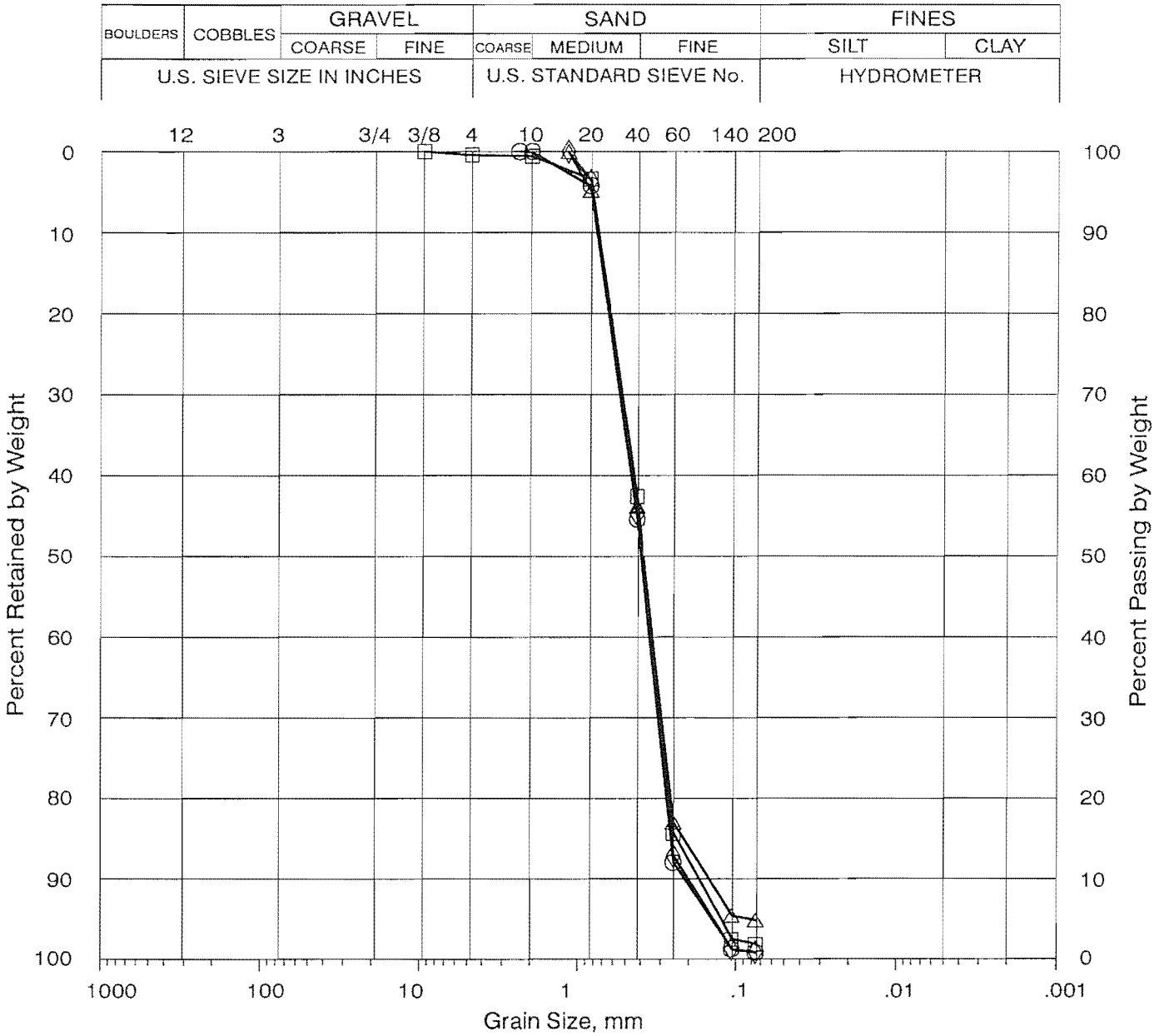
DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California

GRAIN SIZE ANALYSIS

PLATE NO.
C-2
(1 of 3)



TEST SYMBOL	BORING SAMPLE NO.	DEPTH (feet)	GROUP SYMBOL	DESCRIPTION (based on grain size)
○	B-2-2	4½-6	SP	poorly graded sand
□	B-2-4	9½-11	SP	poorly graded sand
△	B-3-1A	6-6½	SP	poorly graded sand
◊	B-3-3	9½-11	SP	poorly graded sand

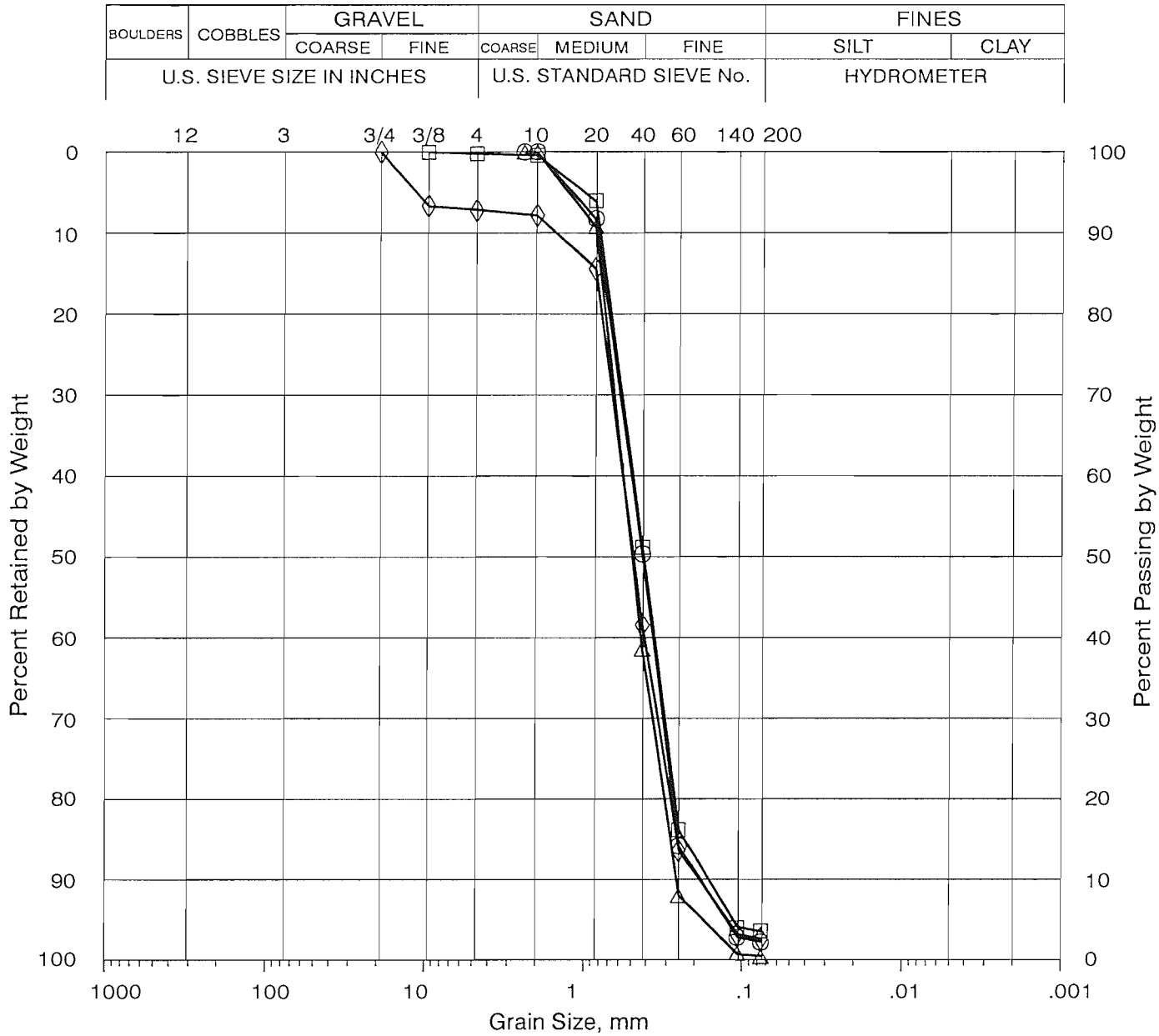
NOTE:
The largest particle (grain) size that could have been sampled from our borings by our sample barrels is a function of the inside diameter of the sample barrels used (see Plate A-1). Therefore, there may be larger particles (e.g., coarse gravel, cobbles or boulders) in the soils sampled than reflected on the boring logs and grain size distribution curves provided in this report.

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
GRAIN SIZE ANALYSIS

PLATE NO.
C-2
(2 of 3)



TEST SYMBOL	BORING SAMPLE NO.	DEPTH (feet)	GROUP SYMBOL	DESCRIPTION (based on grain size)
○	B-4-3	9-9½	SP	poorly graded sand
□	B-4A-2	4½-6	SP	poorly graded sand
△	B-5-3	9-9½	SP	poorly graded sand
◊	B-5A-2	4½-6	SP	poorly graded sand

NOTE:
The largest particle (grain) size that could have been sampled from our borings by our sample barrels is a function of the inside diameter of the sample barrels used (see Plate A-1). Therefore, there may be larger particles (e.g., coarse gravel, cobbles or boulders) in the soils sampled than reflected on the boring logs and grain size distribution curves provided in this report.

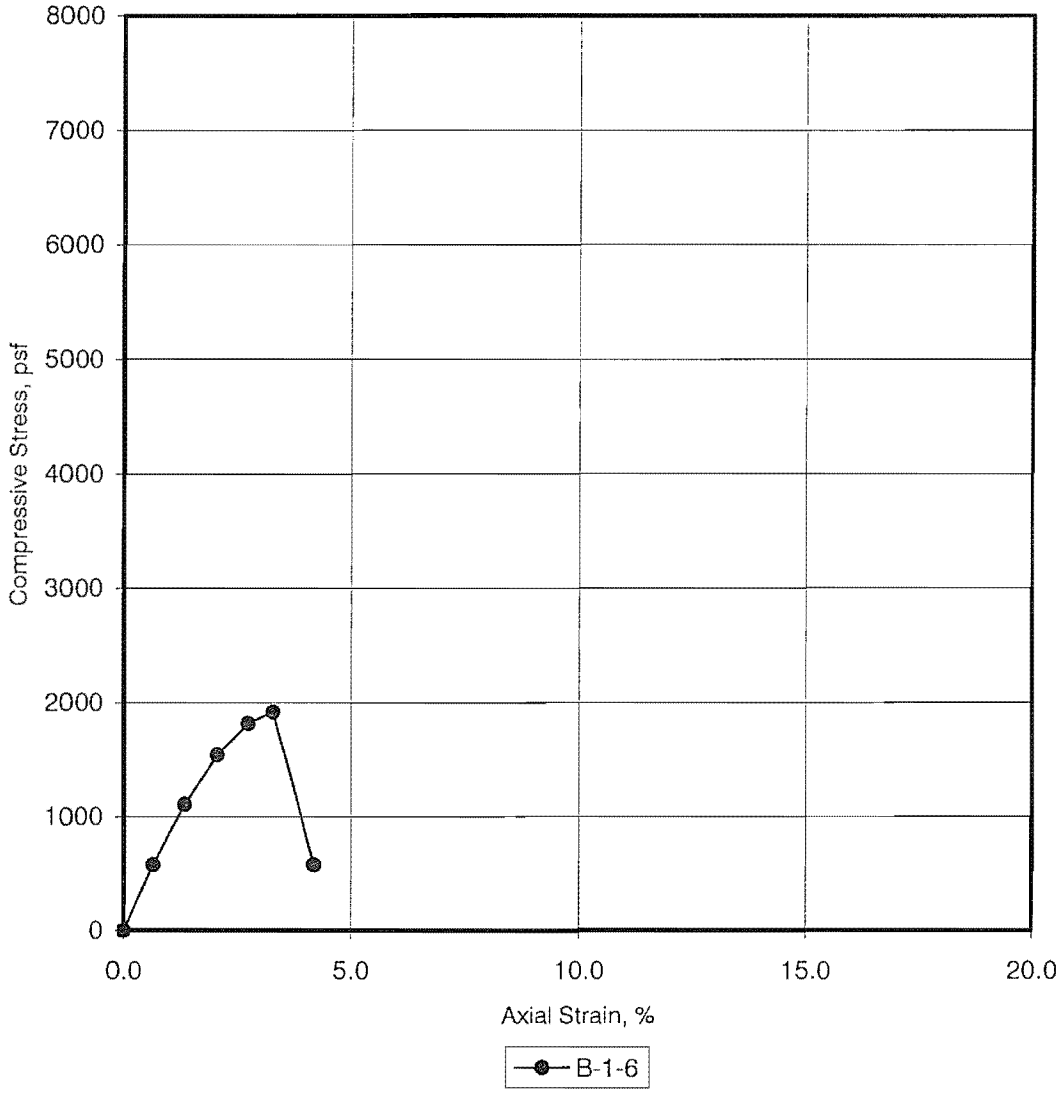
DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
GRAIN SIZE ANALYSIS

PLATE NO.
C-2
(3 of 3)

UNCONFINED COMPRESSION TEST



BORING SAMPLE NO.	B-1-6
MAXIMUM UNCONFINED STRESS, psf	1920
% STRAIN @ PEAK STRESS	3.3
DEPTH, ft.	19-19½
WATER CONTENT, %	134
DRY DENSITY, pcf	36
SATURATION, %	97

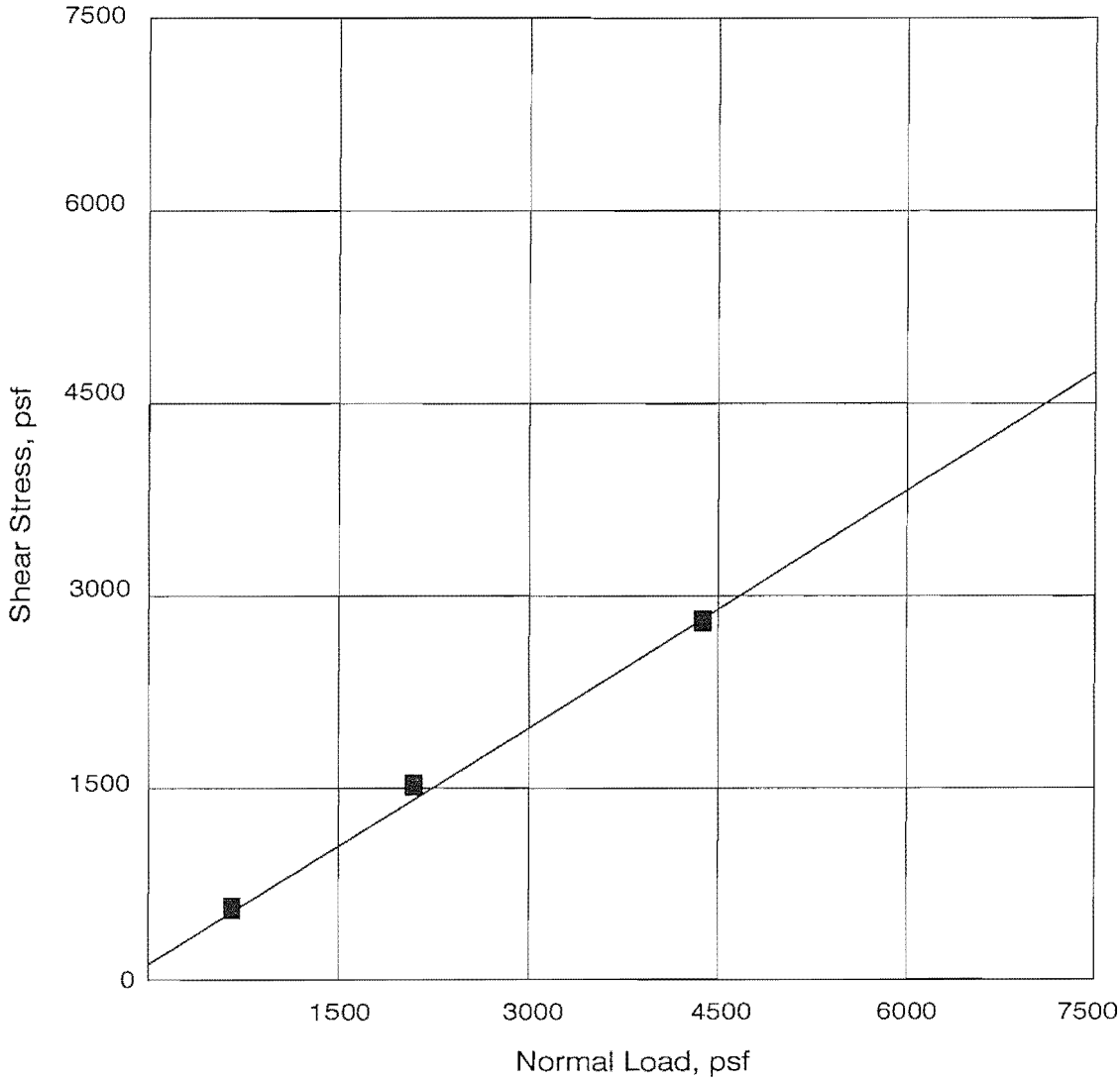
Maximum Unconfined Stress cut-off = 15% strain
Average Strain Rate = 0.07 in/min.

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
UNCONFINED COMPRESSION

PLATE NO.
C-3



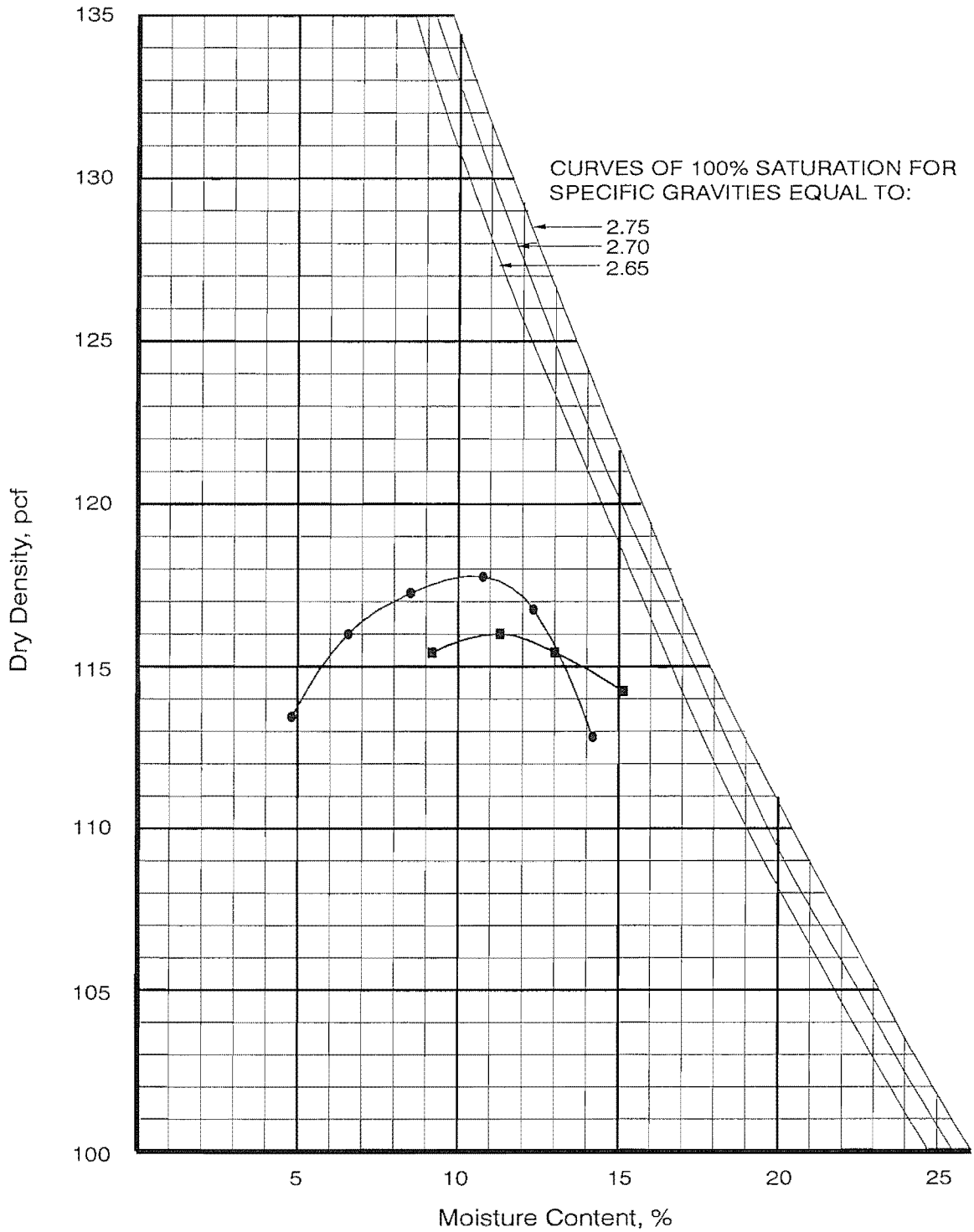
TEST SYMBOL	GRAPH LINE	BORING SAMPLE NO.	DEPTH (ft)	COHESION (p.s.f.)	INTERNAL FRICTION ANGLE (degrees)	AVE. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	
						BEFORE TEST	AFTER TEST
■	———	B-1-2B	8½-9	60	32	101/2	104/18

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
DIRECT SHEAR

PLATE NO.
C-4



TEST SYMBOL	SAMPLE NO.	DESCRIPTION	MAXIMUM DRY DENSITY (pcf)	OPTIMUM MOISTURE CONTENT (%)
●	B-3A-1	poorly graded sand	117.8	10.2
■	B-4A	poorly graded sand	116.0	11.3

TEST METHOD A.S.T.M. D1557-91 Procedure

DCM Engineering

FILE NO. J-4962-1 | APRIL 2006

WINZLER & KELLY
Marina Coast Water District
2005 Marina Sewer Improvement Projects
Marina, California
MOISTURE-DENSITY RELATIONSHIP

PLATE NO.
C-5

CORROSION TESTS and RESULTS

BORING SAMPLE NO.	RESISTIVITY (ohm-cm)		REDOX (mv)	pH	SULFIDES	SULFATES (ppm)	CHLORIDES (ppm)
	as-received	saturated					
B-1-2B	>54,814	15,801	+265	6.19	Nil	61.1	46.1
B-2-1	>54,814	7,728	+336	5.66	Nil	58.7	35.3
B-4-3	n/a	20,000	+450	6.9	Not Detected	Not Detected	Not Detected

Test Notes:

1. Appendix A of ANSI/AWWA C105/A215, TABLE A, provides soil test methods and evaluation for conditions corrosive to gray or ductile-cast iron pipe and fittings.

2. The above tests (excluding redox and sulfides) were performed in accordance with the following Caltrans Test Methods:

   a. California Test 643 (1993): METHOD FOR ESTIMATING THE SERVICE LIFE OF STEEL CULVERTS

   b. California Test 532 (1993): METHOD FOR ESTIMATING THE TIME TO CORROSION OF REINFORCED CONCRETE SUBSTRUCTURES

   c. California Test 422 (1978): METHOD OF TESTING SOILS AND WATERS FOR CHLORIDE CONTENT

   d. California Test 417 (1986): METHOD OF TESTING SOILS AND WATERS FOR SULFATE CONTENT

3. ASTM D4568: METHOD OF TESTING SOILS FOR SULFIDE CONTENT.

4. Testing for samples B-1-2B and B-2-1 provided by ConCeCo/Matcor Engineering, Inc.

5. Testing for sample B-4-3 provided by Cerco Analytical Inc.

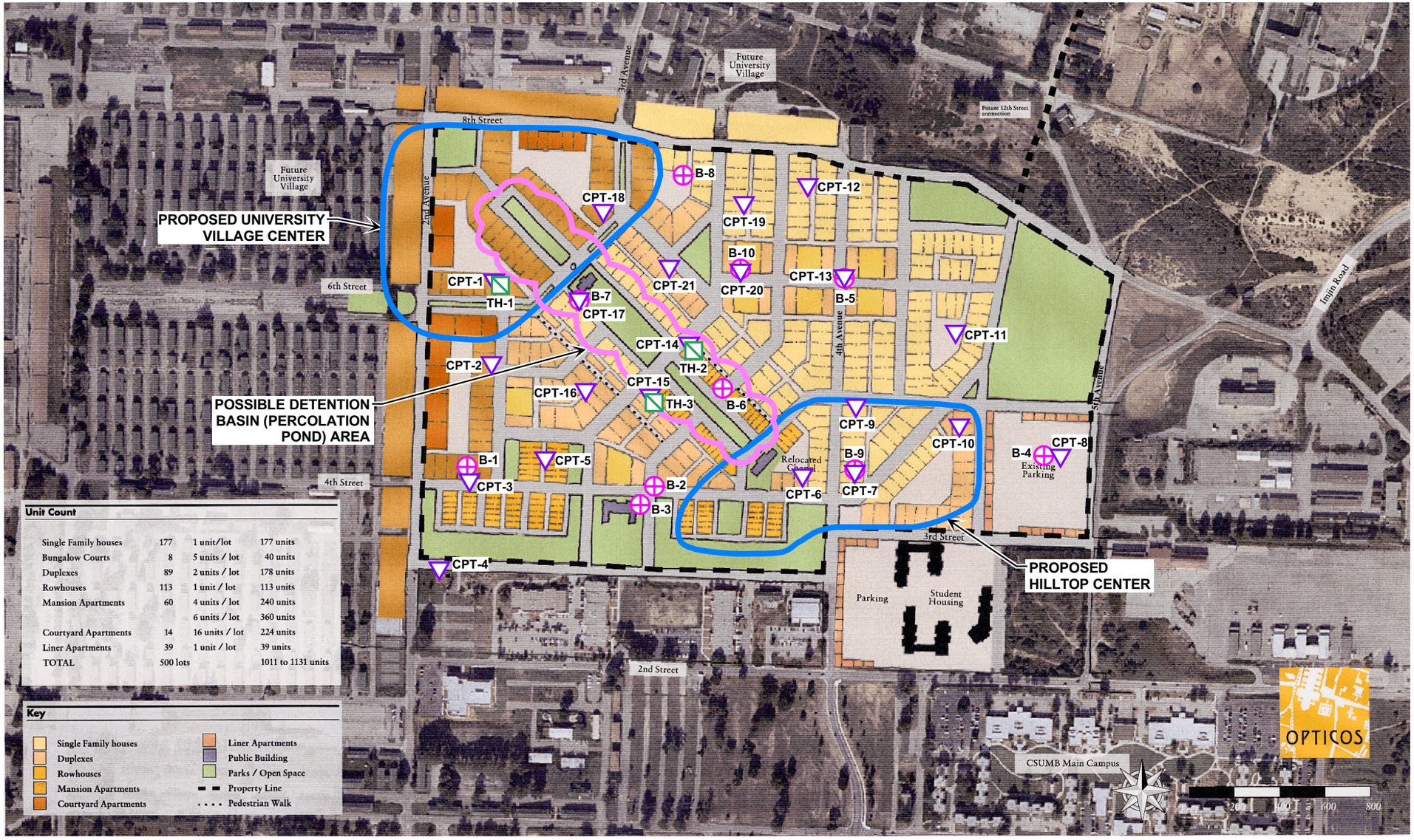
Fugro 2004[1]

[1] Please see Figure 5 for full citation.

Draft: 10-31-03

Opticos Design

North Campus Community Plan



Unit Count

Single Family houses	177	1 unit/lot	177 units
Bungalow Courts	8	5 units / lot	40 units
Duplexes	89	2 units / lot	178 units
Rowhouses	113	1 unit / lot	113 units
Mansion Apartments	60	4 units / lot	240 units
		6 units / lot	360 units
Courtyard Apartments	14	16 units / lot	224 units
Liner Apartments	39	1 unit / lot	39 units
TOTAL	500 lots		1011 to 1131 units

Key

- Single Family houses
- Duplexes
- Rowhouses
- Mansion Apartments
- Courtyard Apartments
- Liner Apartments
- Public Building
- Parks / Open Space
- Property Line
- Pedestrian Walk

20041335.0.001\3350.001site.dsf(1-6)

Cal State University at Monterey Bay

1.1

BASE MAP SOURCE: Denise Duffy & Associates, Inc. (2004).

LEGEND

- B-1 — Approximate boring location
- CPT-1 — Approximate CPT location
- TH-1 — Approximate percolation test hole location

Notes: 1. Locations shown are approximate.

2. Adjacent boring/CPT ( ) for correlative purposes.

NORTH

0 500 1000
FEET

SITE LAYOUT AND EXPLORATION PLAN
North Campus Housing
California State University
Monterey Bay

PLATE C-1

APPENDIX A
FIELD EXPLORATION

The field exploration for this geotechnical study consisted of advancing 21 Cone Penetration Test (CPT) soundings on March 2, 2004 and drilling ten hollow-stem-auger borings on March 8 through 10, 2004. The approximate locations of the CPT soundings and borings performed for this study are shown on Plate 2 – Exploration Location Plan. The locations of the CPT soundings and borings were determined with a GPS beacon receiver. The resulting locations have an estimated horizontal accuracy of about 10 feet.

Ground surface elevations at CPT and boring locations were estimated from the elevations shown on Plate 2. Elevations are referenced to mean sea level (msl).

BORINGS

Hollow-stem-auger drilling services were performed by Fugro Geosciences of Oakland, California. The borings were advanced using a truck-mounted CME 75 drilling rig equipped with 8-inch-diameter hollow-stem-augers. The drilling was performed under the observation of a Fugro staff engineer, who prepared field logs of the soil conditions and obtained soil samples for laboratory observation and testing. The soils were classified in the field in general accordance with ASTM D2487. Borings B-1 through B-8 were excavated to depths between about 30 and 50 feet below the ground surface. Borings B-9 and B-10 were excavated to depths of about 6½ feet and 10 feet below the ground surface (respectively), primarily to extract Shelby tube samples of silty sand materials encountered in adjacent CPT soundings CPT-7 and CPT-20. Upon completion, the borings were backfilled with cuttings and where appropriate, cold asphalt patch in the upper several inches.

Sampling

During drilling operations, drive samples were obtained from the borings using either a modified California or Standard Penetration Test (SPT) sampler. The modified California sampler has a 3-inch outside diameter and a 2-3/8-inch inside diameter. The samplers were driven 18 inches into the material at the bottom of the boring using a 140-pound automatic trip hammer with a 30-inch drop. The number of blows required to drive the California or SPT sampler the last 12 inches was recorded on the boring logs. Additionally, Shelby push-tube samples were extracted from Borings B-9 and B-10. Recovered samples were placed in transport containers and returned to the laboratory for further classification and testing.

Boring Logs

Logs of the borings, showing depths and descriptions of soils encountered, geologic structure where applicable, vertical locations of samples, sampler blow counts, and results of density and moisture content tests, are presented on Plates A-1 through A-10 - Log of Boring. A legend of symbols typically used on the boring logs is presented on Plate A-11 - Key to Terms and Symbols Used on Logs. The logs represent the interpretation of field logs and tests, interpolation between samples, and the results of laboratory observation and tests. The stratification lines are approximate boundaries between soil types; the transitions can be gradual.

CONE PENETRATION TEST SOUNDINGS

CPT soundings were performed by Fugro Geosciences, Inc., of Santa Fe Springs, California. The cone penetrometer is mounted on a 20-ton truck and consists of a 38-millimeter-diameter rod with a 10-square-centimeter, 60-degree-apex-angle cone at the base. The cone is equipped with electronic load cells that measure both point resistance and frictional resistance between the soils and the cylinder side of the cone. The primary purpose of performing CPTs was to provide a nearly continuous log of the earth materials and soil stratigraphy between boring locations and sample depths.

Although many factors influence CPT profiles, including: physical cone properties, vertical effective stress, pore pressure, soil compressibility and fabric, and depositional characteristics, the classifications are generally consistent with the laboratory classification data and with the visual descriptions made during the soil borings (Plate A.33 presents one example of soil classification using CPT data).

CPT soundings were advanced to depths between about 30 and 50 feet below the ground surface. Upon completion, the CPT soundings were backfilled with bentonite pellets. Data results of CPT soundings consisting of plots of sleeve friction, tip resistance, and friction ratio versus depth are presented on Plates A-12 through A-32- Log of CPT. A soil classification chart is presented on Plate A-33 - CPT Correlation Chart.

LOCATION: Per Plate 2
N 2,134,401.09594 E 5,738,070.41674
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 147 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
146			B		(22)	Fine to Medium SAND with silt (SP-SM): dense, dark brown, moist							
	2		1							11			
			2				109	99	10				
144			3		12								
			4										
	4		5		(9)	- loose locally, from 4' to 5.5'							
142			6			- mottled with light brown, from 4.5' to 5'							
			7				110	101	8				
	6												
140													
	8												
138													
	10		8		48								
136			9			Fine SAND with silt (SP-SM): very dense, light brown, damp to dry			3	20			
	12												
134													
	14												
132													
	16		10		(22)								
			11			Fine SAND (SP): dense, light brown, dry	111	107	4	3			
130													
	18												
128													
	20					- very dense, at 21'							
126			12		(36)								
			13										
	22												
124													
	24												
122			14		30								
	26					- very dense, at 26'							
120													
	28												
118													
	30												
116			15		(39)								
			16										
	32												
114													
	34												
112			17		34								
	36					- very dense, at 36'							
110													
	38												
108													

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.5 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 8, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-1

North Campus Housing
California State University
Monterey Bay

PLATE A-1a

LOCATION: Per Plate 2
N 2,134,401.09594 E 5,738,070.41674
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 147 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
106			18 19 20		(41)	Fine to Medium SAND (SP): dense, light brown, dry							
	42												
104													
	44												
102			21		59								
	46					- very dense, at 46'							
100													
	48												
98													
	50		22 23		(56)								
96						- very dense, grades to fine grained, at 51'							
	52												
94													
	54												
92													
	56												
90													
	58												
88													
	60												
86													
	62												
84													
	64												
82													
	66												
80													
	68												
78													
	70												
76													
	72												
74													
	74												
72													
	76												
70													
	78												
68													

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.5 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 8, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-1

North Campus Housing
California State University
Monterey Bay

PLATE A-1b

LOCATION: Per Plate 2
N 2,134,316.01760 E 5,738,904.25227
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 159 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
158			1		(15)	Fine SAND with silt (SP): medium dense, dark brown, damp to moist							
	2		2				107	100	6				
156			3		(17)								
	4		4				102	96	6				
154			5		(14)	- locally grades to brown, at 4.5'	106	100	5				
	6		6										
152			7										
	8		8										
150			9										
	10		10		(25)	Fine SAND (SP): dense, light brown, damp							
148			11				105	99	5				
	12		12										
146													
	14												
144			13		(37)								
	16		14			- very dense, at 16'							
142													
	18												
140													
	20		15		(51)	- very dense, at 20'							
138			16										
	22												
136													
	24												
134			17		28								
	26												
132													
	28												
130													
	30		18		31								
128													
	32												
126													
	34												
124													
	36												
122													
	38												
120													

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 31.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 8, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-2

North Campus Housing
California State University
Monterey Bay

PLATE A-2

LOCATION: Per Plate 2
N 2,134,232.82076 E 5,738,843.13181
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 157 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
156			B			Fine to Medium SAND (SP): medium dense to dense, dark brown, damp							
	2		1		(14)					6			
			2				115	107	8				
154			3		(17)								
	4		4				120	115	4				
152			5		(17)	Fine SAND (SP): dense, light brown, damp to moist, trace silt							
			6				105	99	6	4			
	6												
150													
	8												
148													
	10		7		(21)								
146			8			- fine to medium grained, at 10.5'	102	96	6				
	12												
144													
	14												
142			9		27								
	16					- very dense, at 15'							
140													
	18												
138													
	20		10		(38)								
136			11										
	22												
134													
	24												
132			12		42	- very dense, at 25'							
	26												
130													
	28												
128													
	30		13		(54)								
126			14			- very dense, at 31'							
	32												
124													
	34												
122			15		53								
	36					- very dense, at 36'							
120													
	38												
118													
			16		(54)								

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-3

North Campus Housing
California State University
Monterey Bay

PLATE A-3a

LOCATION: Per Plate 2
N 2,134,232.82076 E 5,738,843.13181
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 157 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
116			17 18			Fine SAND (SP): very dense, light brown, damp to moist							
	42												
114													
	44												
112			19		62								
	46												
110													
	48												
108													
	50		20		35	- dense, at 50'							
106													
	52												
104													
	54												
102													
	56												
100													
	58												
98													
	60												
96													
	62												
94													
	64												
92													
	66												
90													
	68												
88													
	70												
86													
	72												
84													
	74												
82													
	76												
80													
	78												
78													

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-3

North Campus Housing
California State University
Monterey Bay

PLATE A-3b

LOCATION: Per Plate 2
N 2,134,447.47676 E 5,740,639.41804
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 162 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
					ARTIFICIAL FILL (af)							
		B		(23)	Fine to Medium SAND with silt and gravel (SP-SM): dense, dark brown, damp to moist, trace pieces of glass	122	111	10	10			
160	2	1				118	112	6				
		2										
		3		(18)	- mottled rusty brown and olive, some gravel, at 3'							
		4										
158	4	5				99	87	14				
		6		(18)								
		7				92	85	9				
156	6				Fine SAND (SP): dense, light brown, damp to moist							
154	8											
		8		16								
152	10							4	2			
150	12											
148	14											
		9		(28)	- fine to medium grained, at 15'							
146	16	10										
144	18											
142	20	11		34	- very dense, at 20'							
140	22											
138	24											
		12		(72)	- very dense, at 25'							
136	26											
134	28											
132	30	13		26								
130	32											
128	34											
126	36											
124	38											

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 31.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-4

North Campus Housing
California State University
Monterey Bay

PLATE A-4

LOCATION: Per Plate 2
N 2,135,345.64545 E 5,739,814.64435
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 171 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
						1.5" Asphalt Concrete							
						5" Base							
170			B			Fine SAND (SP): dense, brown, moist, trace silt							
	2		1		(27)	- grades to light brown, damp to moist, at 2'	102	99	3	4			
168			2		(37)								
	4		3			- locally fine to medium grained, from 3' to 3.5'	97	95	3				
166			4		(23)								
	6		5				106	104	2				
164			6										
	8		7										
162													
	10		8		21								
160										4			
	12												
158													
	14												
156			9		(33)								
	16		10										
			11										
154													
	18												
152													
	20		12		32								
150						- very dense, at 21'							
	22												
148													
	24												
146			13		(48)								
			14										
	26		15			- very dense, fine to medium grained, at 26'							
144													
	28												
142													
	30		16		50								
140						- very dense, at 31'							
	32												
138													
	34												
136			17		(57)								
			18			- very dense, fine to medium grained, from 35' to 36'							
	36		19										
134													
	38												
132													
			20		45								

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-5

North Campus Housing
California State University
Monterey Bay

PLATE A-5a

LOCATION: Per Plate 2
N 2,135,345.64545 E 5,739,814.64435
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 171 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
130						Fine SAND (SP): very dense, brown, moist, trace silt							
	42												
128													
	44												
126			21		(80)								
			22										
	46		23										
124													
	48												
122													
	50		24		57								
120													
	52												
118													
	54												
116													
	56												
114													
	58												
112													
	60												
110													
	62												
108													
	64												
106													
	66												
104													
	68												
102													
	70												
100													
	72												
98													
	74												
96													
	76												
94													
	78												
92													

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-5

North Campus Housing
California State University
Monterey Bay

PLATE A-5b

LOCATION: Per Plate 2
N 2,134,750.19892 E 5,739,210.38080
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 163 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
					3" Asphalt Concrete							
					4" Base							
162		B			Silty Fine SAND (SM): loose to medium dense, dark brown, moist, fine to medium grained	118	107	11	13			
	2	1		(3)								
		2				95	90	6				
160		3		(6)								
	4	4				18	17	5				
158		5		(12)								
		6				105	100	6				
	6											
156												
	8											
154												
	10	7		(17)	Fine SAND (SP): dense, light brown, moist, trace to some silt							
		8										
152		9				106	102	4	2			
	12											
150												
	14											
148		10		22								
	16											
146												
	18											
144												
	20	11		(49)	- colors to brown, at 19.5'							
		12			- very dense, at 20'							
142		13				109	102	7				
	22											
140												
	24											
138		14		26								
	26				- very dense, at 26'							
136												
	28											
134												
	30	15		(41)								
		16			- grades to light brown, at 30'							
132		17										
	32											
130												
	34											
128		18		37								
	36				- very dense, at 36'							
126												
	38											
124												

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 9, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-6

North Campus Housing
California State University
Monterey Bay

PLATE A-6a

LOCATION: Per Plate 2
N 2,134,750.19892 E 5,739,210.38080
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 163 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
122			19 20		(41)	Fine to Medium SAND (SP): dense, light brown, moist - dense, fine to medium grained, at 41'							
	42												
120													
	44												
118			21		38								
	46					- very dense, at 46'							
116													
	48												
114													
	50		22 23 24		(42)								
112													
	52												
110													
	54												
108													
	56												
106													
	58												
104													
	60												
102													
	62												
100													
	64												
98													
	66												
96													
	68												
94													
	70												
92													
	72												
90													
	74												
88													
	76												
86													
	78												
84													

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 9, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-6

North Campus Housing
California State University
Monterey Bay

PLATE A-6b

LOCATION: Per Plate 2
N 2,135,145.22070 E 5,738,571.46435
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 138 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
					2" Asphalt Concrete			4				
					4" Base							
		B		(30)	Fine to Medium SAND (SP): dense, brown, moist	106	98	8	4			
136	2	1			- grades to light brown, at 1.5'	100	96	4				
		2										
		3		(21)								
134	4	4				99	95	5				
		5										
		6		(26)								
		7				107	102	5				
132	6				- grades to fine grained, at 5.5'							
130	8											
128	10	8		(29)								
		9				97	93	4	1			
126	12											
124	14											
		10		21								
122	16								3			
120	18											
118	20	11		(36)								
		12										
116	22											
114	24											
		13		28								
112	26											
110	28											
108	30	14		(36)								
		15										
106	32											
104	34											
		16		52								
102	36				very dense, at 36'							
100	38											

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-7

North Campus Housing
California State University
Monterey Bay

PLATE A-7a

LOCATION: Per Plate 2
N 2,135,145.22070 E 5,738,571.46435
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 138 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
			17 18		(39)	Fine to Medium SAND (SP): dense, brown, moist							
96	42												
94	44												
			19		33								
92	46												
90	48												
88	50		20		41	- very dense, at 50'							
86	52												
84	54												
82	56												
80	58												
78	60												
76	62												
74	64												
72	66												
70	68												
68	70												
66	72												
64	74												
62	76												
60	78												

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 51.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-7

North Campus Housing
California State University
Monterey Bay

PLATE A-7b

LOCATION: Per Plate 2
N 2,135,696.27309 E 5,739,032.61182
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 147 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
						2.5" Asphalt Concrete	107	101	6				
						4" Base							
146			1		(23)	Fine SAND (SP): dense, light brown, moist, trace silt							
	2		2										
			3										
144			4		(23)								
	4		5										
			6		(24)								
142			7										
			8			- mottled with olive color, at 5'							
	6		9										
140													
	8												
138													
	10		10		21								
136													
	12												
134													
	14												
132			11		(40)								
	16		12				102	98	4				
130													
	18												
128													
	20		13		41								
126						- very dense, at 20'							
	22												
124													
	24												
122			14		(56)								
			15			- very dense, at 25'							
	26		16										
120													
	28												
118													
	30		17		38	- very dense, at 30'							
116													
	32												
114													
	34												
112													
	36												
110													
	38												
108													

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 31.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 9, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-8

North Campus Housing
California State University
Monterey Bay

PLATE A-8

LOCATION: Per Plate 2
N 2,134,380.36323 E 5,739,804.05826
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 176 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
						2" Asphalt Concrete							
						5" Base							
174	2					Silty Fine SAND (SM): brown, damp							
			B			- grades to dark brown, at 2'							
172	4		1							15			
170	6												
168	8												
166	10												
164	12												
162	14												
160	16												
158	18												
156	20												
154	22												
152	24												
150	26												
148	28												
146	30												
144	32												
142	34												
140	36												
138	38												

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 6.5 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 10, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-9

North Campus Housing
California State University
Monterey Bay

PLATE A-9

LOCATION: Per Plate 2
N 2,135,276.00074 E 5,739,289.31671
NAD83, State Plane, CA Zone 4, Feet

SURFACE EL: 156 ft +/- (rel. MSL datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	SAMPLERS	SAMPLER BLOW COUNT	MATERIAL DESCRIPTION	UNIT WET WEIGHT, pcf	UNIT DRY WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX, %	UNDRAINED SHEAR STRENGTH, S_u, ksf
						2" Asphalt Concrete							
						4" Base							
154	2					Fine SAND (SP): brown, damp to moist							
152	4					Silty Fine SAND (SM): dark brown, damp to moist							
150	6		1										
148	8		B							16			
146	10												
144	12												
142	14												
140	16												
138	18												
136	20												
134	22												
132	24												
130	26												
128	28												
126	30												
124	32												
122	34												
120	36												
118	38												

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

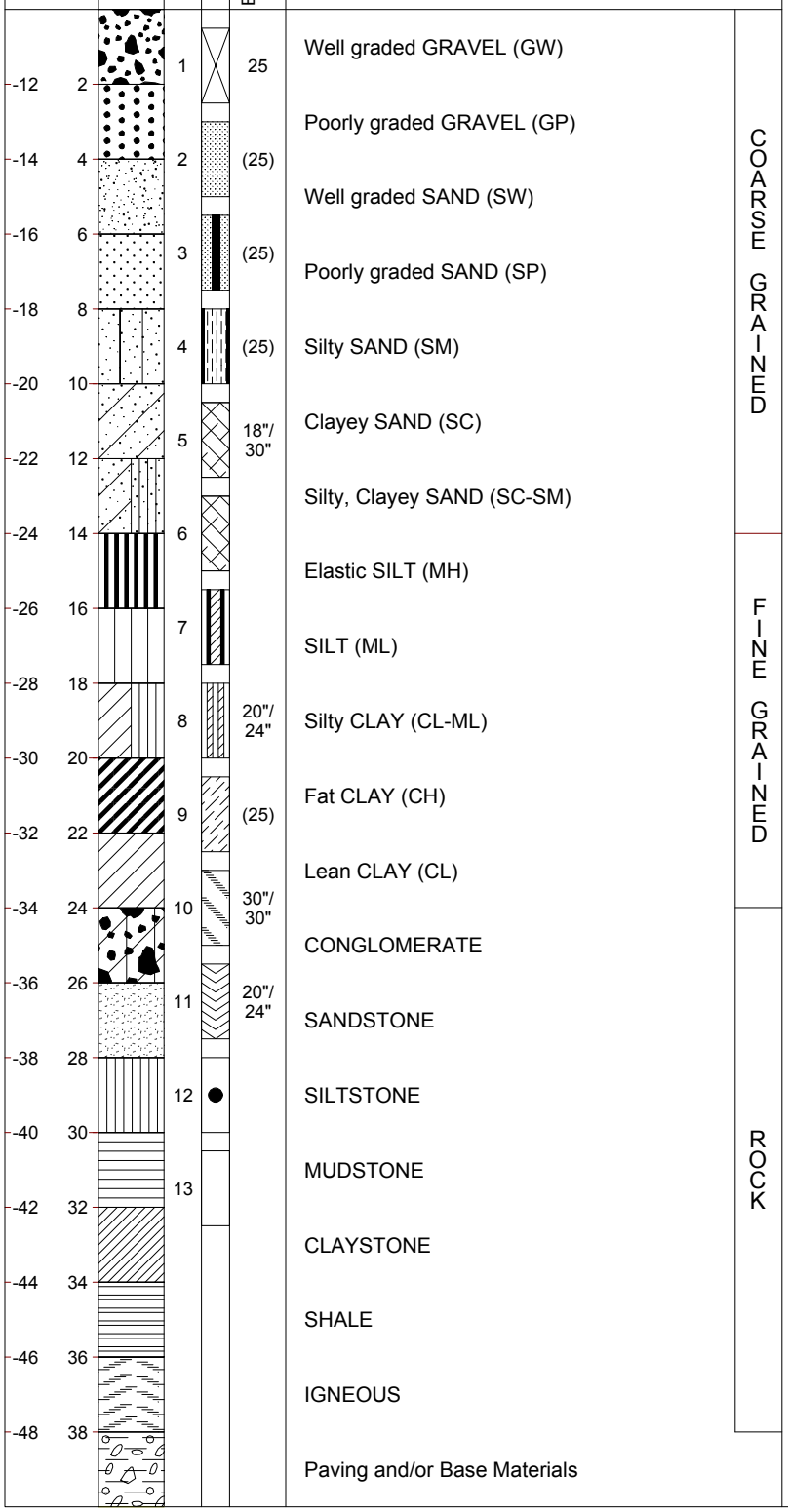
COMPLETION DEPTH: 10.0 ft
DEPTH TO WATER: Not encountered
BACKFILLED WITH: Cuttings
DRILLING DATE: March 9, 2004

DRILLING METHOD: 8-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Fugro Geosciences
LOGGED BY: N Song
CHECKED BY: C A Wockner

LOG OF BORING NO. B-10

North Campus Housing
California State University
Monterey Bay

PLATE A-10



LOCATION: The drill hole location referencing local landmarks or coordinates

SURFACE EL: Using local, MSL, MLLW or other datum

MATERIAL DESCRIPTION

COARSE GRAINED	Well graded GRAVEL (GW)
	Poorly graded GRAVEL (GP)
	Well graded SAND (SW)
	Poorly graded SAND (SP)
	Silty SAND (SM)
	Clayey SAND (SC)
	Silty, Clayey SAND (SC-SM)
FINE GRAINED	Elastic SILT (MH)
	SILT (ML)
	Silty CLAY (CL-ML)
	Fat CLAY (CH)
	Lean CLAY (CL)
ROCK	CONGLOMERATE
	SANDSTONE
	SILTSTONE
	MUDSTONE
	CLAYSTONE
	SHALE
	IGNEOUS
	Paving and/or Base Materials

General Notes

Soil Texture Symbol

Sloped line in symbol column indicates transitional boundary

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

Symbol for:

1	SPT Sampler, driven 1-3/8" ID, 2" OD
2	CA Liner Sampler, driven 2-3/8" ID, 3" OD
3	CA Liner Sampler, disturbed 2-3/8" ID, 3" OD
4	Thin-walled Tube, pushed 2-7/8" ID, 3" OD
5	Bulk Bag Sample (from cuttings)
6	CA Liner Sampler, Bagged
7	Hand Auger Sample
8	CME Core Sample
9	Pitcher Sample
10	Lexan Sample
11	Vibracore Sample
12	No Sample Recovered
13	Sonic Soil Core Sample

Sampler Driving Resistance

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

Blows/ft	Description
25	25 blows drove sampler 12" after initial 6" of seating
86/11"	After driving sampler the initial 6" of seating, 36 blows drove sampler through the second 6" interval, and 50 blows drove the sampler 5" into the third interval
50/6"	50 blows drove sampler 6" after initial 6" of seating
Ref/3"	50 blows drove sampler 3" during initial 6" seating interval

Blow counts for California Liner Sampler shown in ( )

Length of sample symbol approximates recovery length

Classification of Soils per ASTM D2487 or D2488

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

Strength Legend

Q = Unconfined Compression
u = Unconsolidated Undrained Triaxial
t = Torvane
p = Pocket Penetrometer
m = Miniature Vane

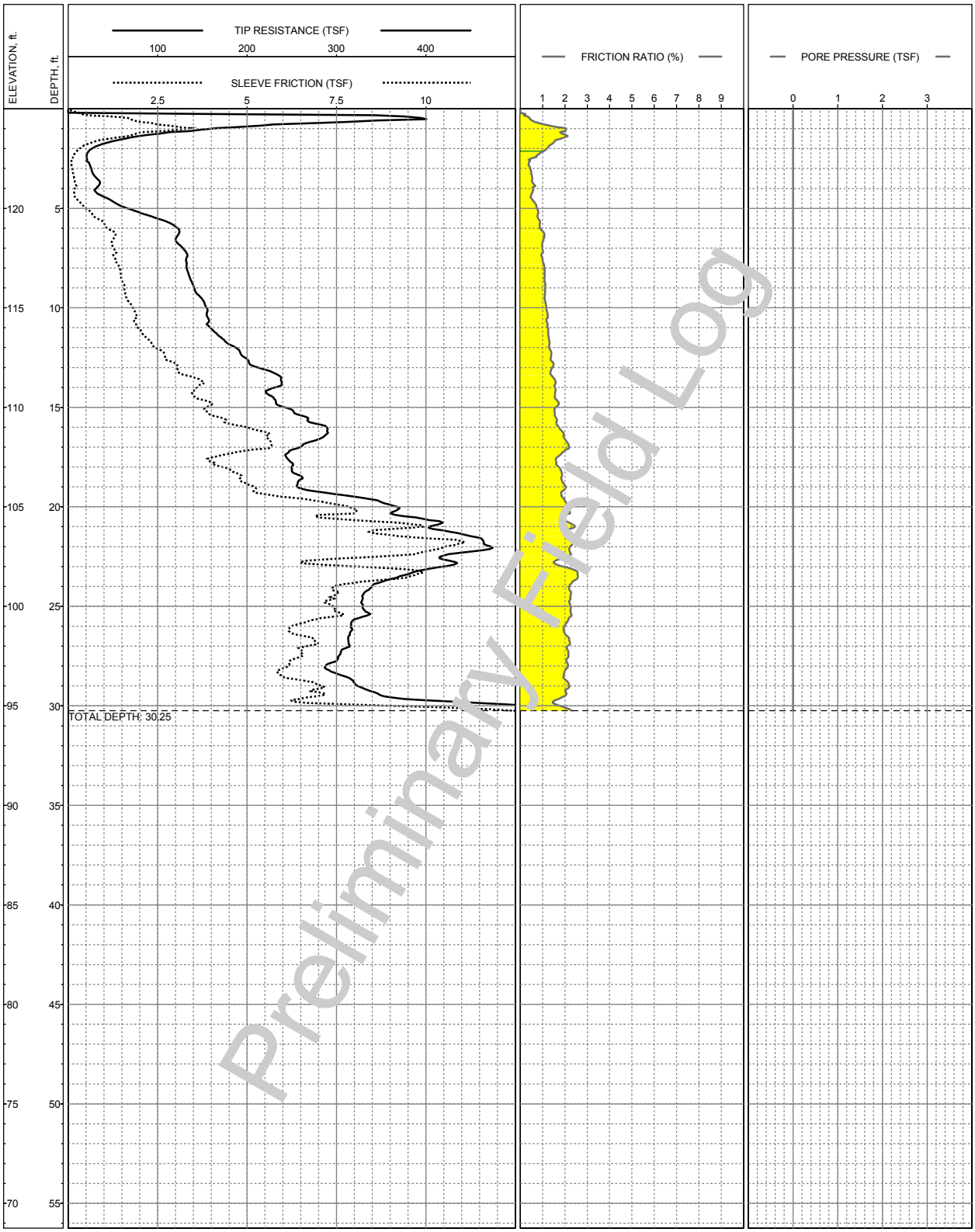
Water Level Symbols

- Initial or perched water level
- Final ground water level
- Seepages encountered

Rock Quality Designation (RQD) is the sum of recovered core pieces greater than 4 inches divided by the length of the cored interval.

KEY TO TERMS & SYMBOLS USED ON LOGS

PLATE A-11

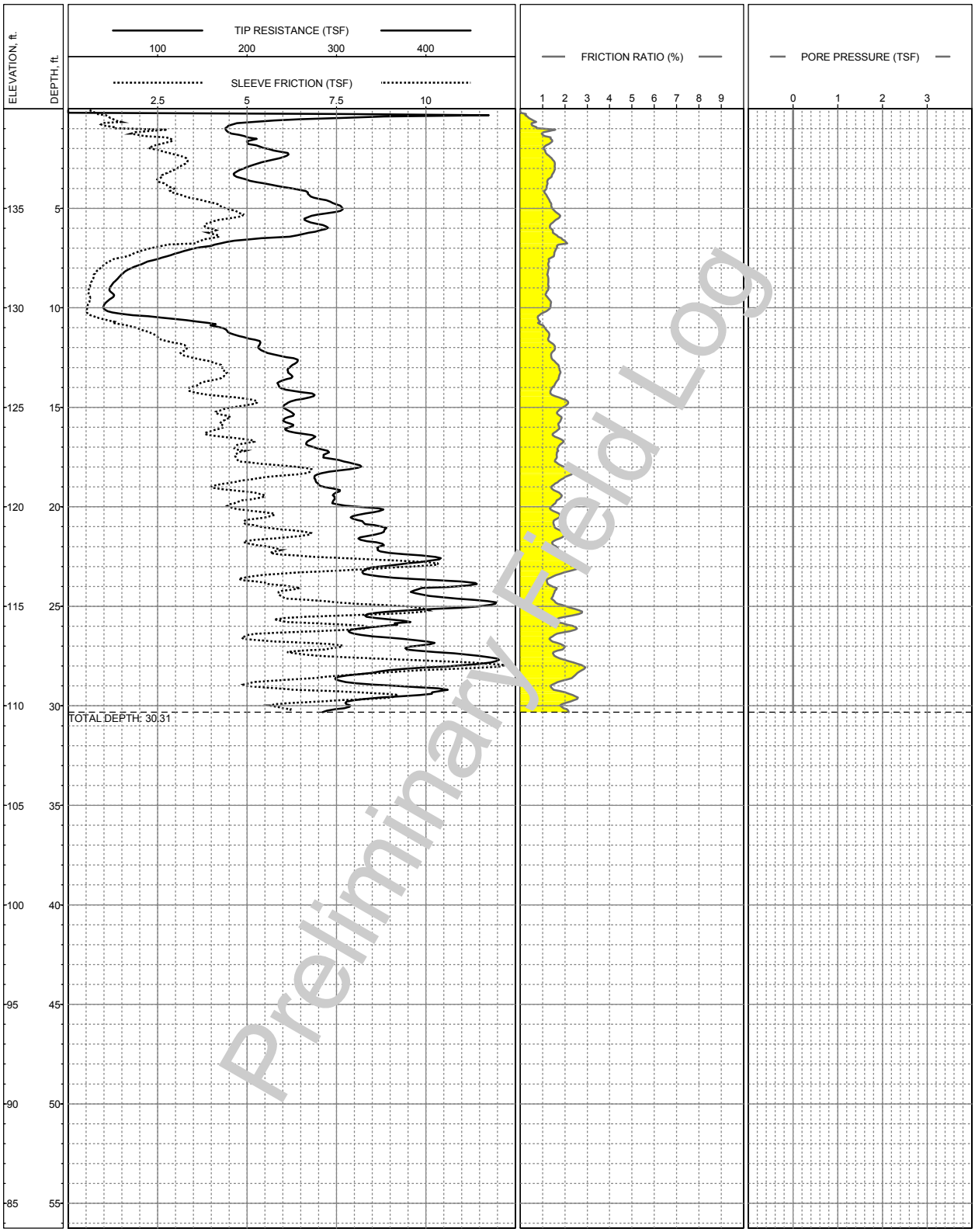


LOCATION: E5738192.63 N2135235.21 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 125ft +/- (MSL)
COMPLETION DEPTH: 30.25ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-1

North Campus Housing
California State University
Monterey Bay

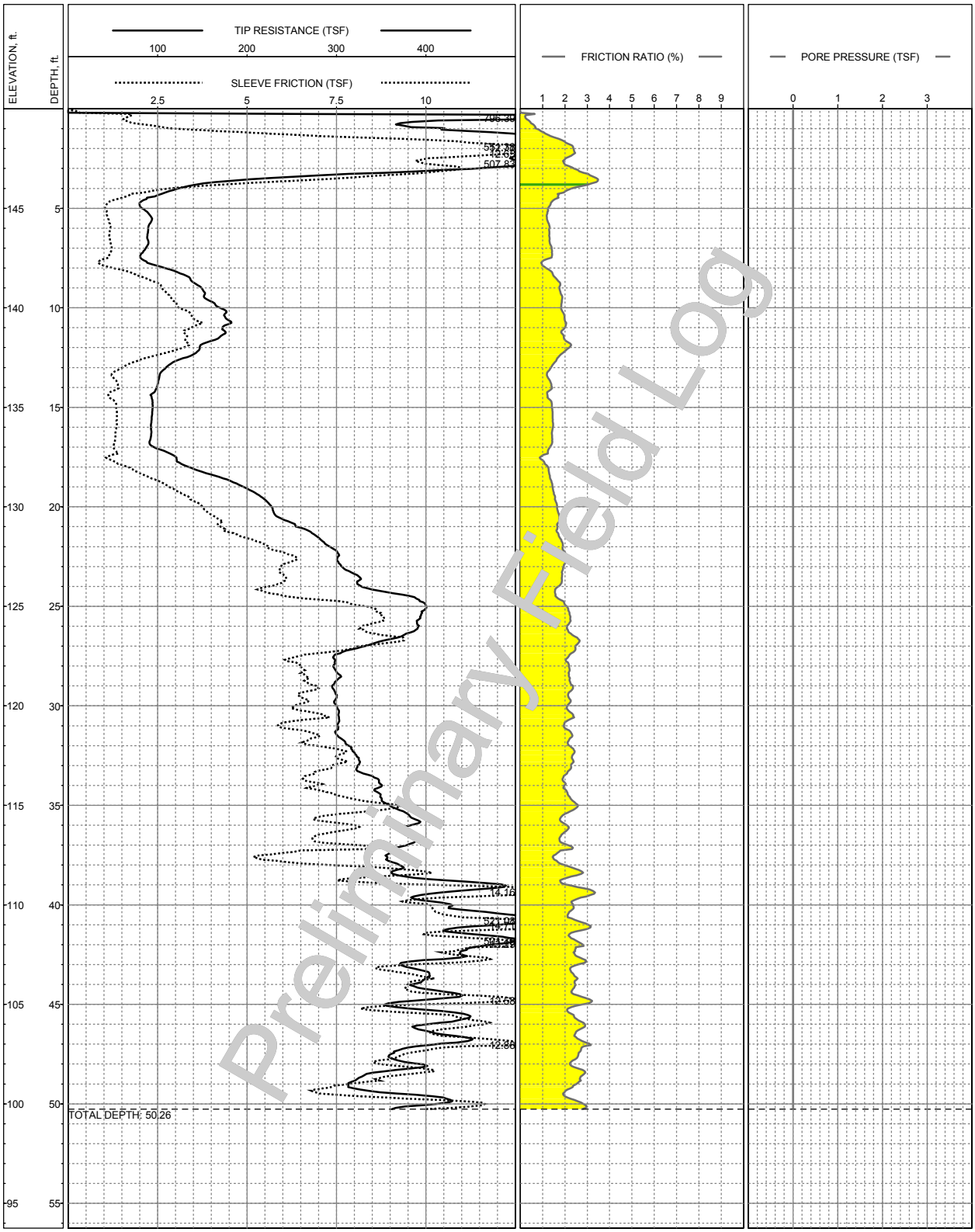


LOCATION: E5738176.92 N2134865.39 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 140ft +/- (MSL)
COMPLETION DEPTH: 30.31ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-2

North Campus Housing
California State University
Monterey Bay

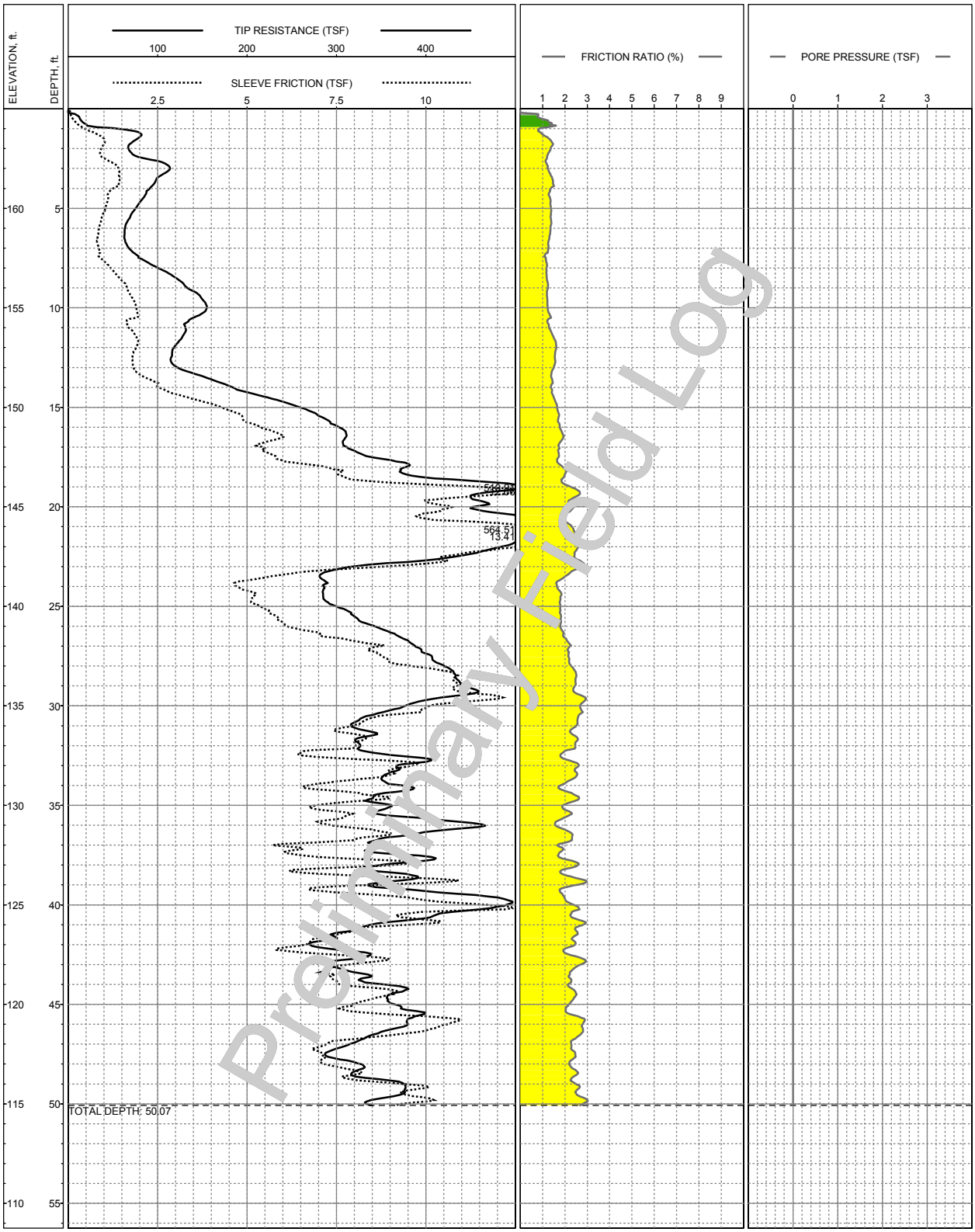


LOCATION: E5738064.64 N2134370.91 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 150ft +/- (MSL)
COMPLETION DEPTH: 50.26ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-3

North Campus Housing
California State University
Monterey Bay

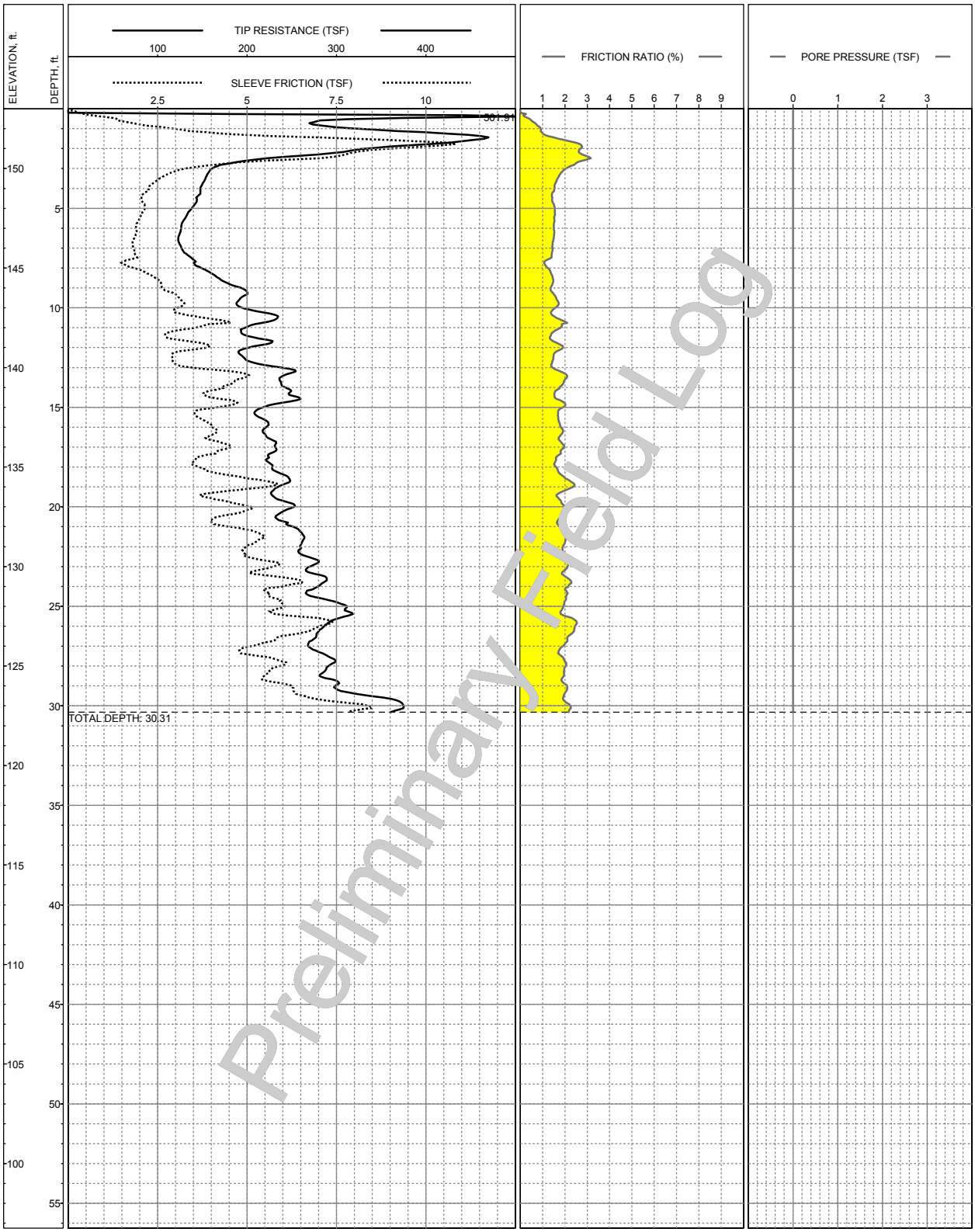


LOCATION: E5737944.36 N2133939.34 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 165ft +/- (MSL)
COMPLETION DEPTH: 50.07ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-4

North Campus Housing
California State University
Monterey Bay

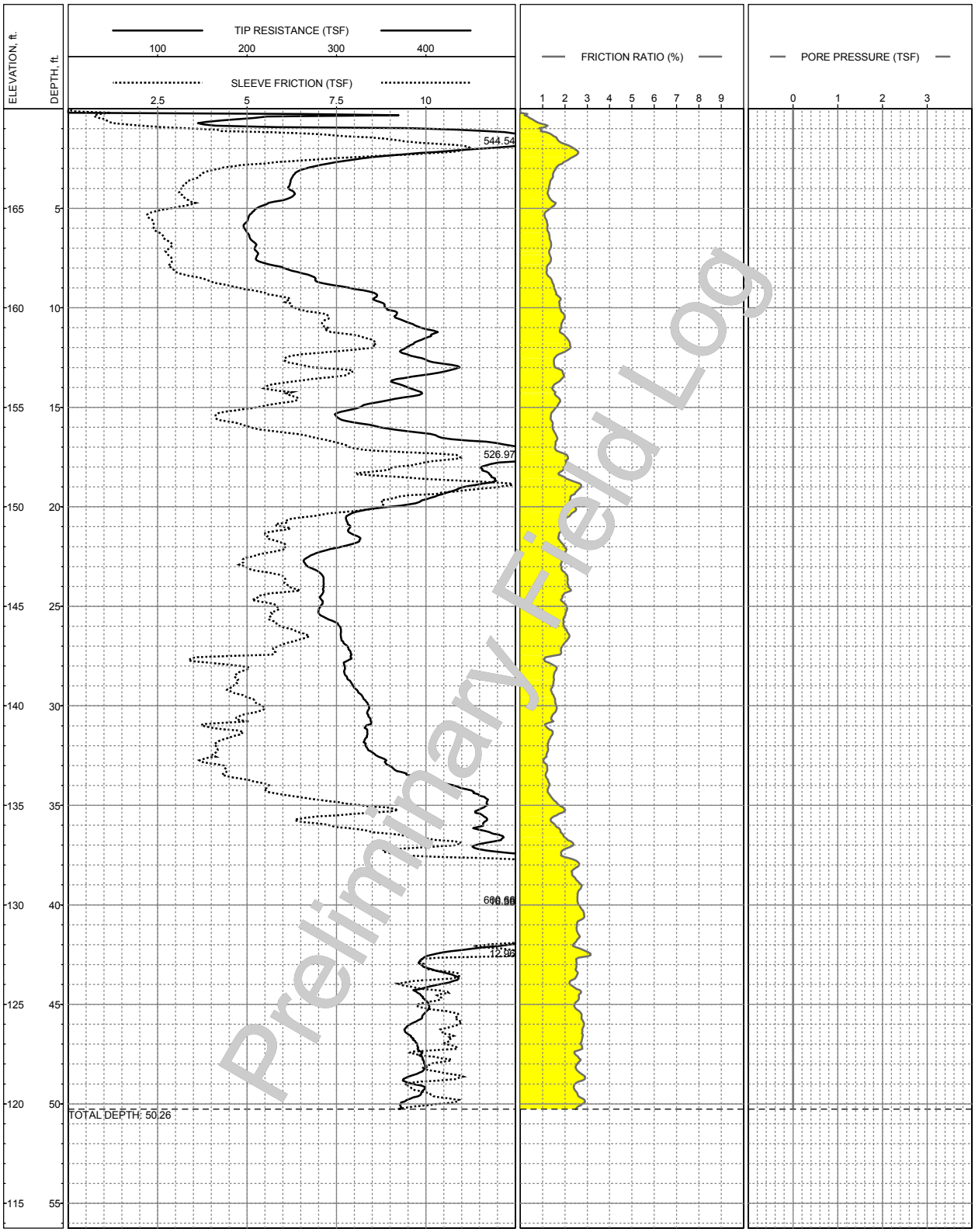


LOCATION: E5738418.78 N2134439.47 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 153ft +/- (MSL)
COMPLETION DEPTH: 30.31ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-5

North Campus Housing
California State University
Monterey Bay

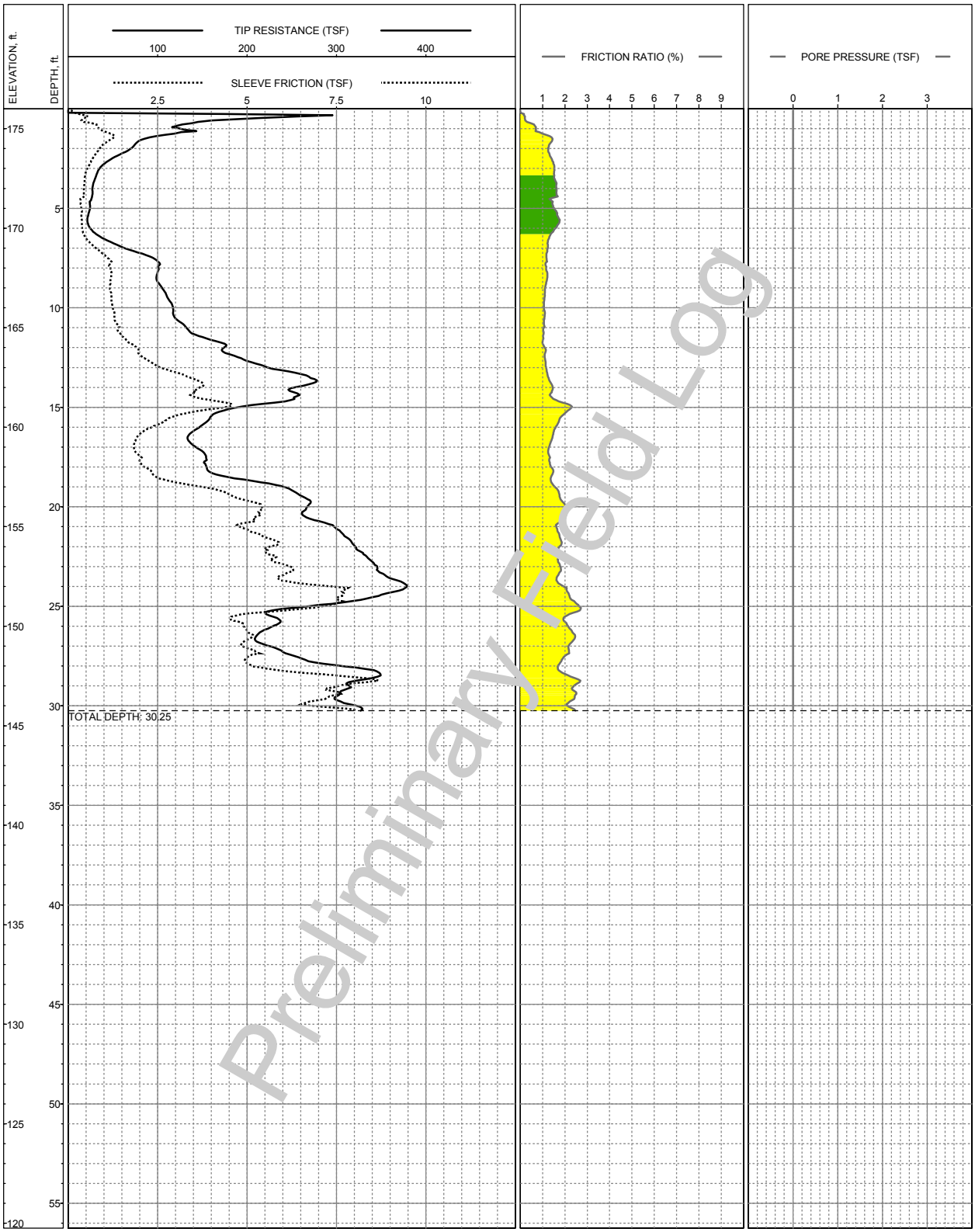


LOCATION: E5739565.89 N2134363.46 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 170ft +/- (MSL)
COMPLETION DEPTH: 50.26ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-6

North Campus Housing
California State University
Monterey Bay

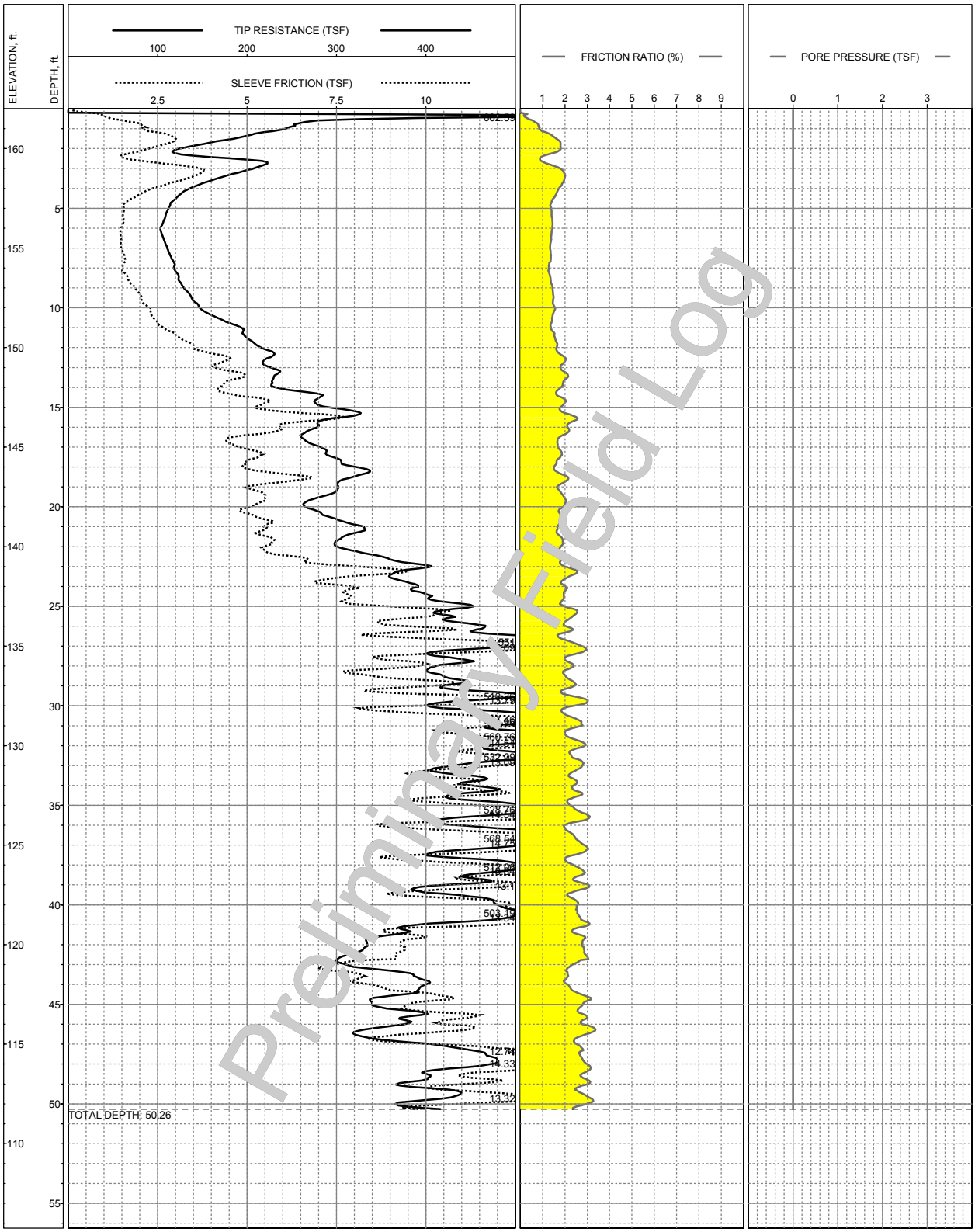


LOCATION: E5739804.06 N2134380.36 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 176ft +/- (MSL)
COMPLETION DEPTH: 30.25ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-7

North Campus Housing
California State University
Monterey Bay

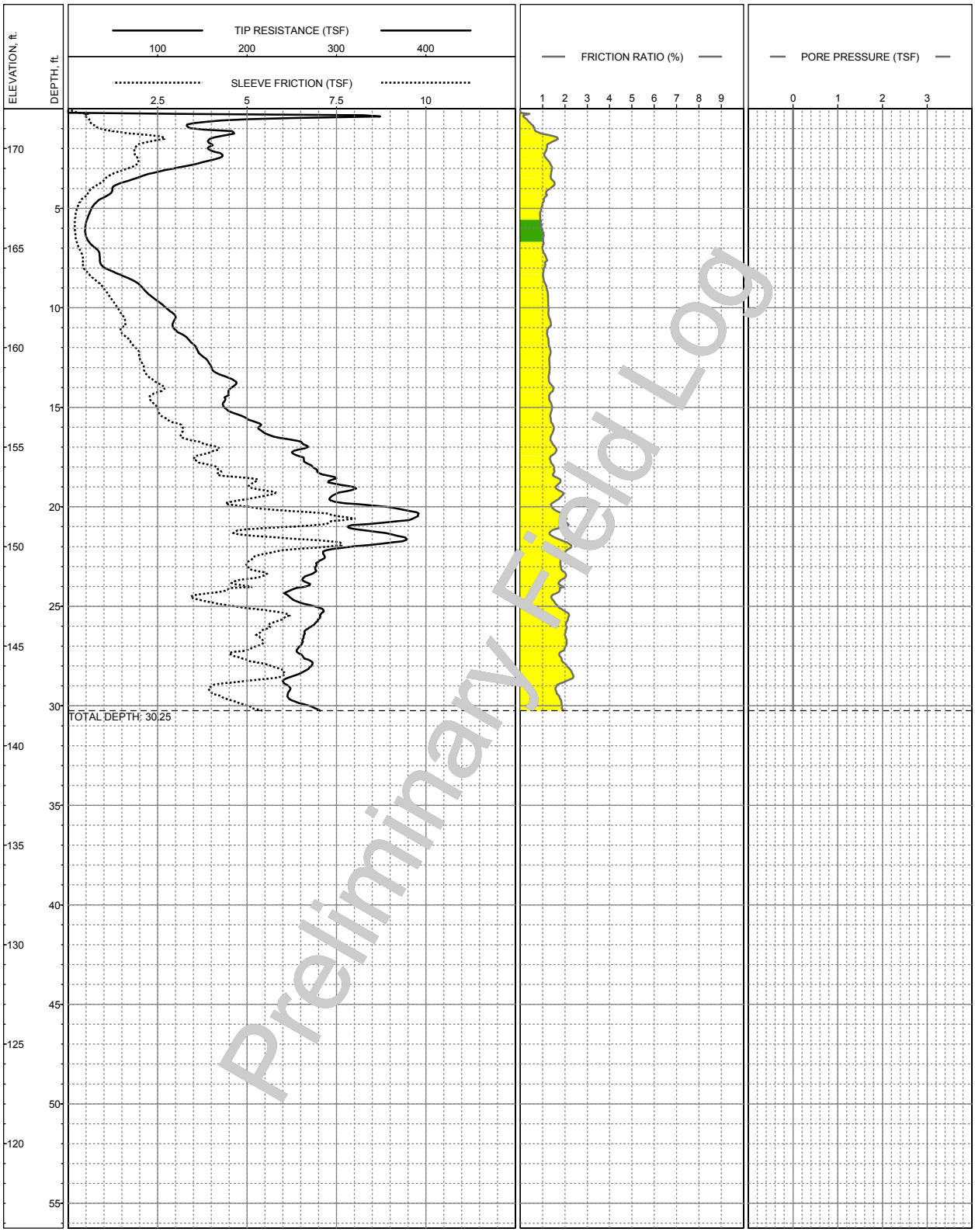


LOCATION: E5740717.76 N2134451.26 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 162ft +/- (MSL)
COMPLETION DEPTH: 50.26ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-8

North Campus Housing
California State University
Monterey Bay

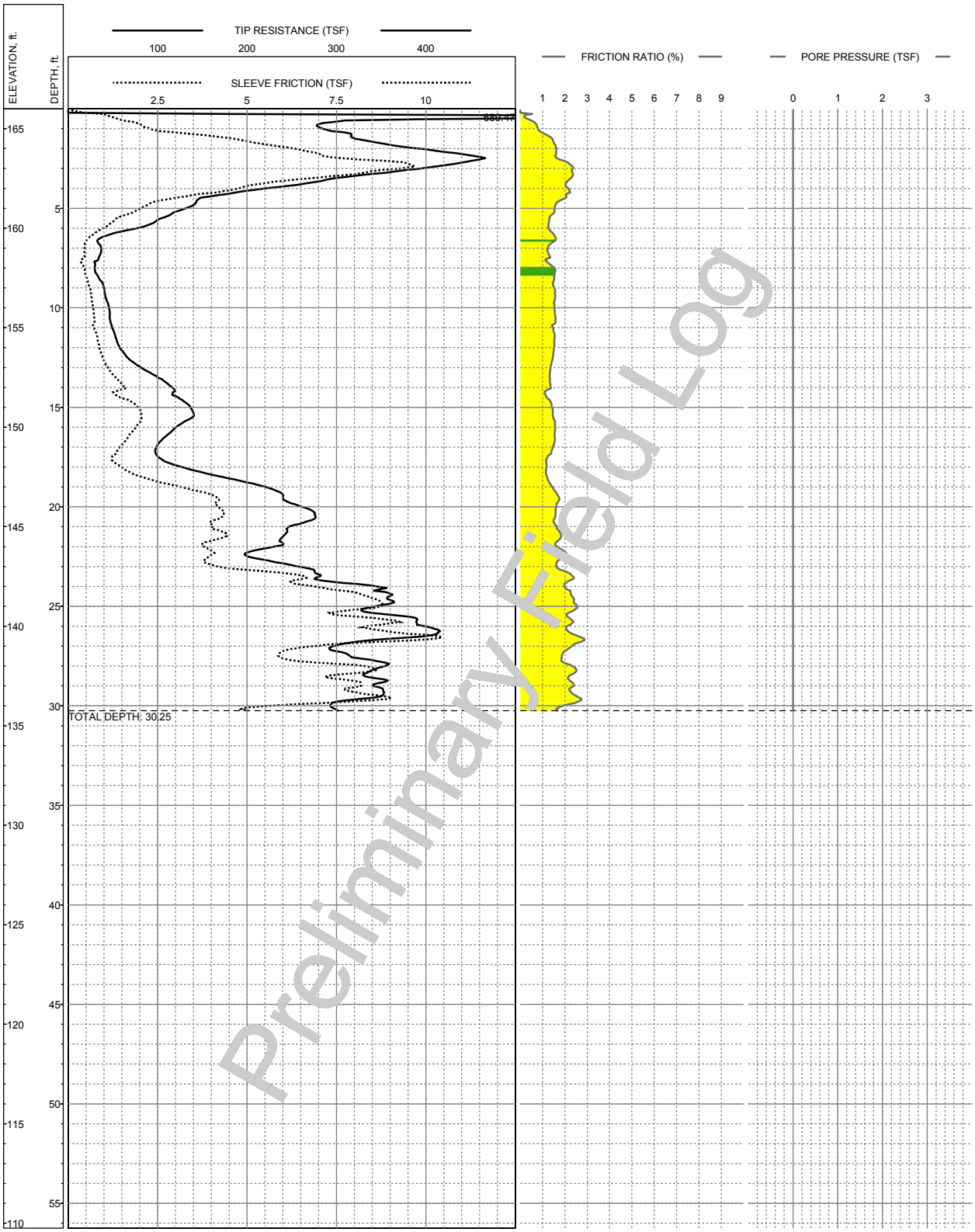


LOCATION: E5739804.77 N2134672.14 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 172ft +/- (MSL)
COMPLETION DEPTH: 30.25ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-9

North Campus Housing
California State University
Monterey Bay

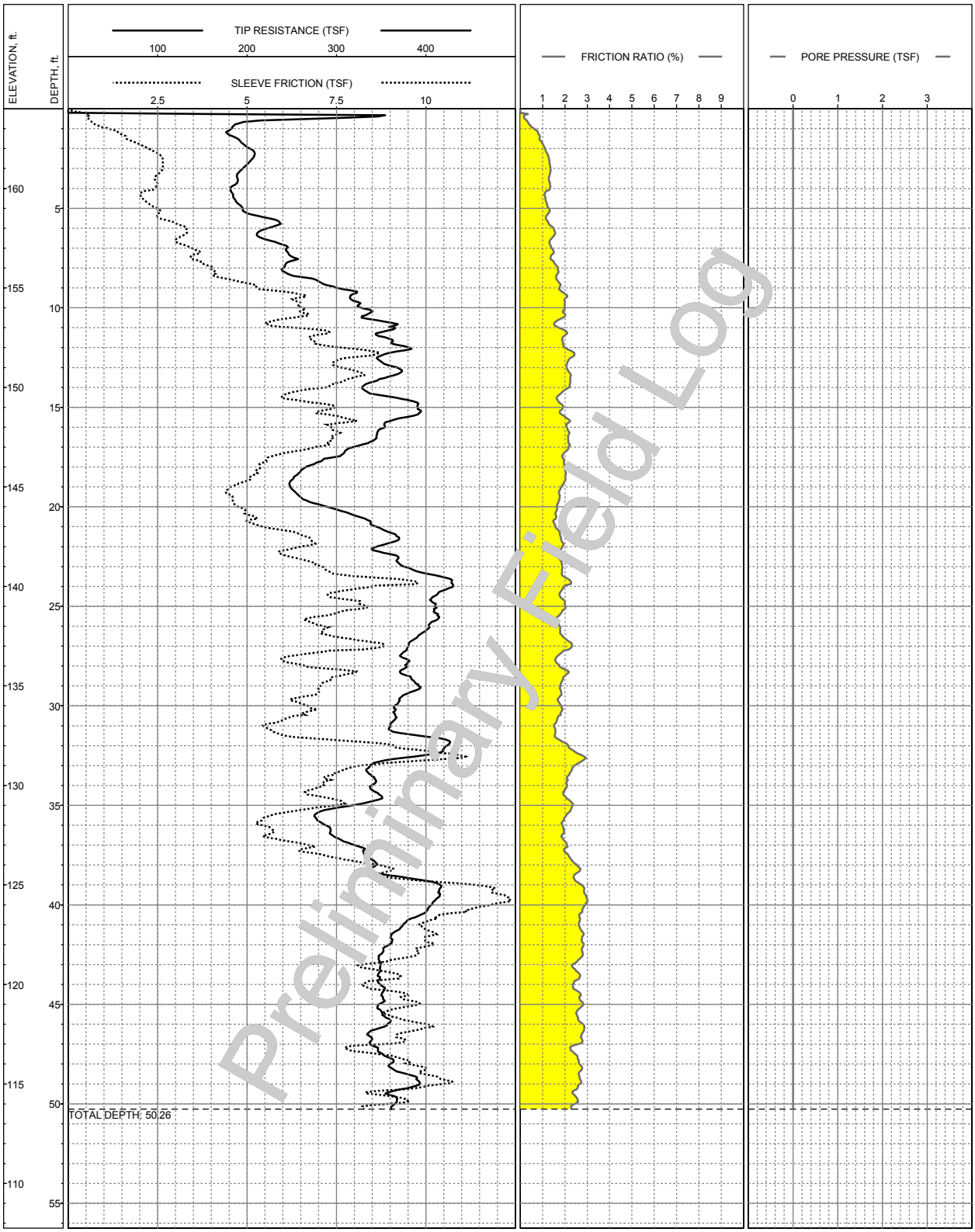


LOCATION: E5740266.87 N2134585.82 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 166ft +/- (MSL)
COMPLETION DEPTH: 30.25ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-10

North Campus Housing
California State University
Monterey Bay



LOCATION: E5740249.76 N2135005.16 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 164ft +/- (MSL)
COMPLETION DEPTH: 50.26ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-11

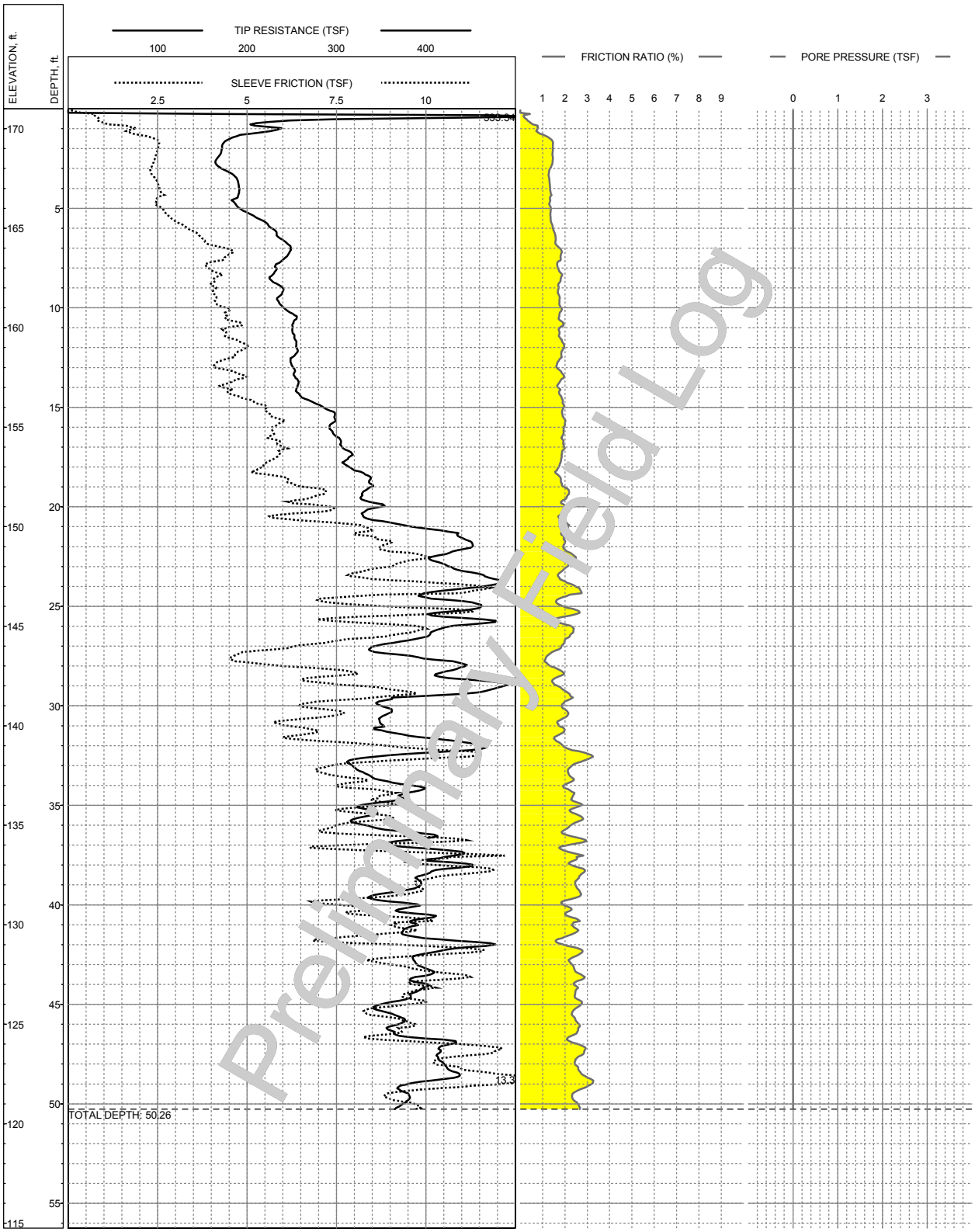
North Campus Housing
California State University
Monterey Bay

LOCATION: E5739614.44 N2135691.42 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 167ft +/- (MSL)
COMPLETION DEPTH: 50.26ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-12

North Campus Housing
California State University
Monterey Bay

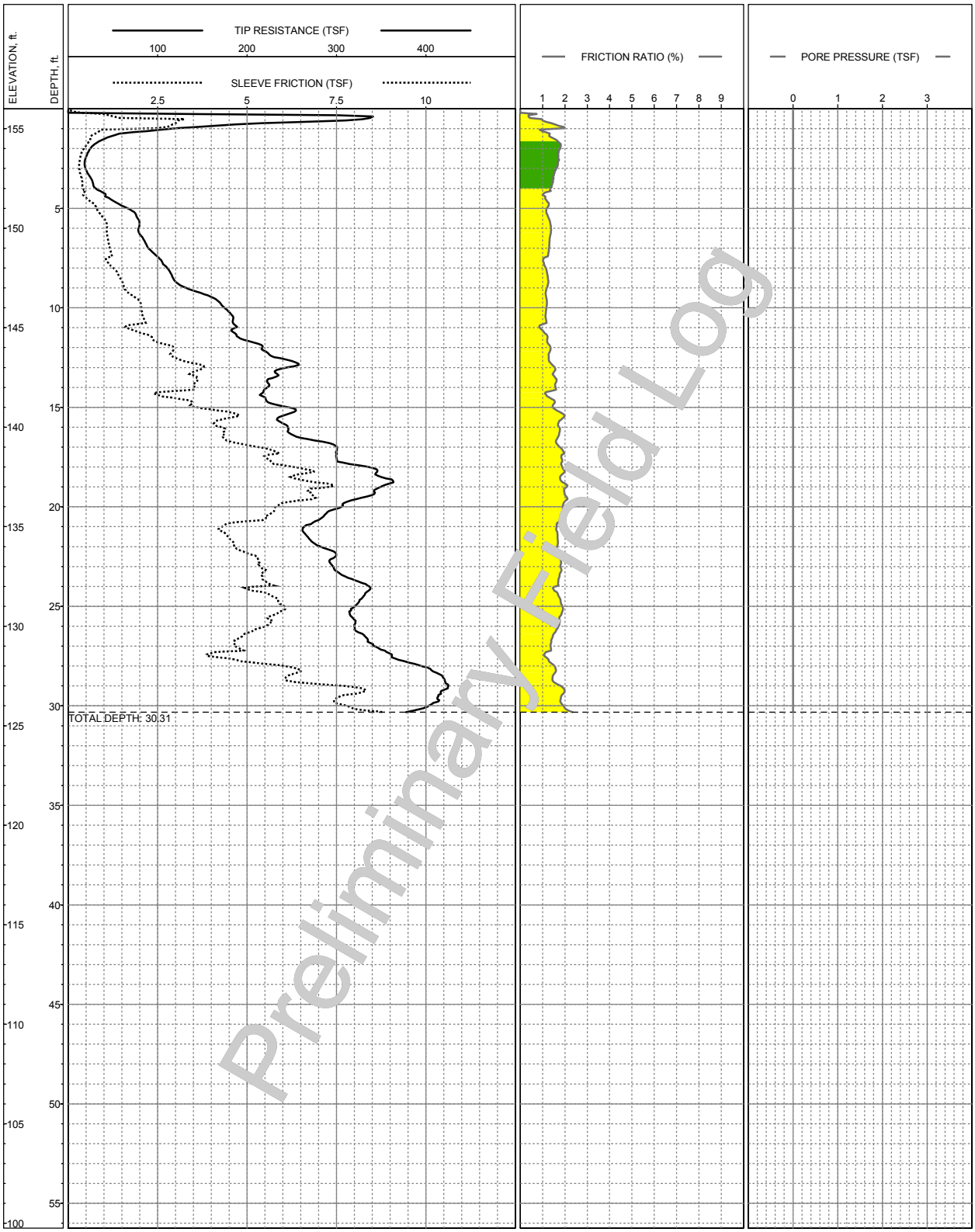


LOCATION: E5739839.43 N2135357.06 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 171ft +/- (MSL)
COMPLETION DEPTH: 50.26ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-13

North Campus Housing
California State University
Monterey Bay

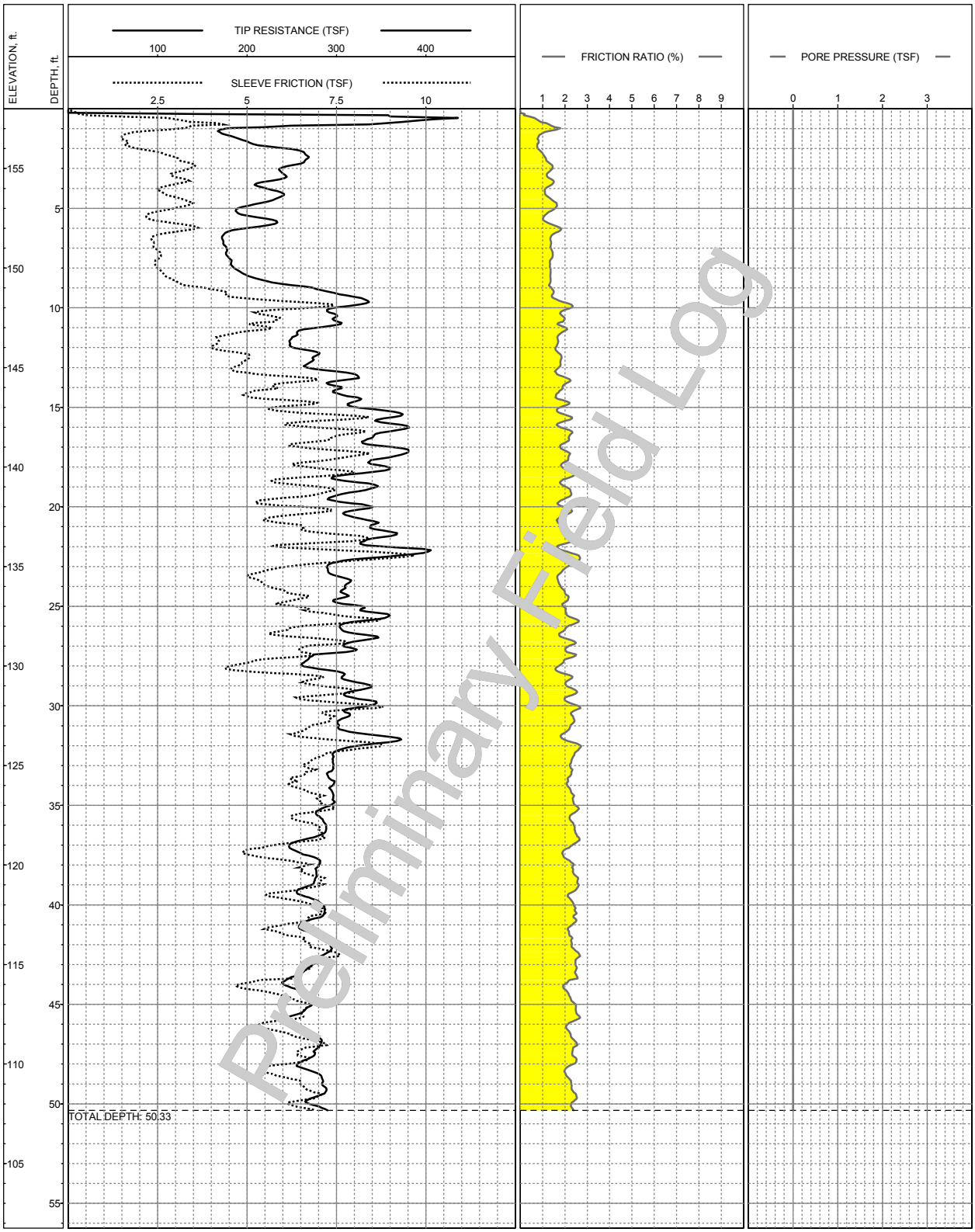


LOCATION: E5739059.68 N2134948.85 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 156ft +/- (MSL)
COMPLETION DEPTH: 30.31ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-14

North Campus Housing
California State University
Monterey Bay

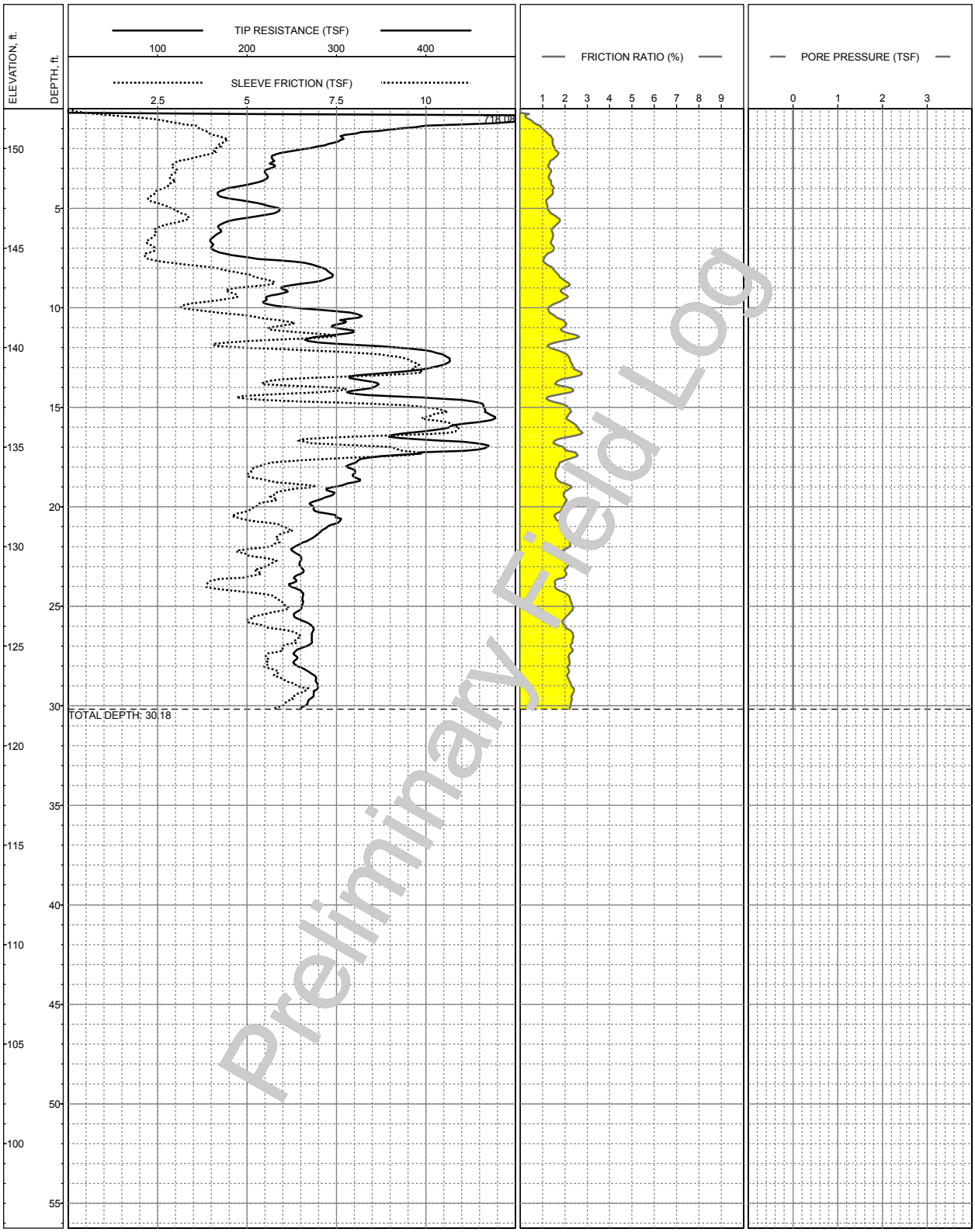


LOCATION: E5738886.63 N2134717.17 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 158ft +/- (MSL)
COMPLETION DEPTH: 50.33ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-15

North Campus Housing
California State University
Monterey Bay

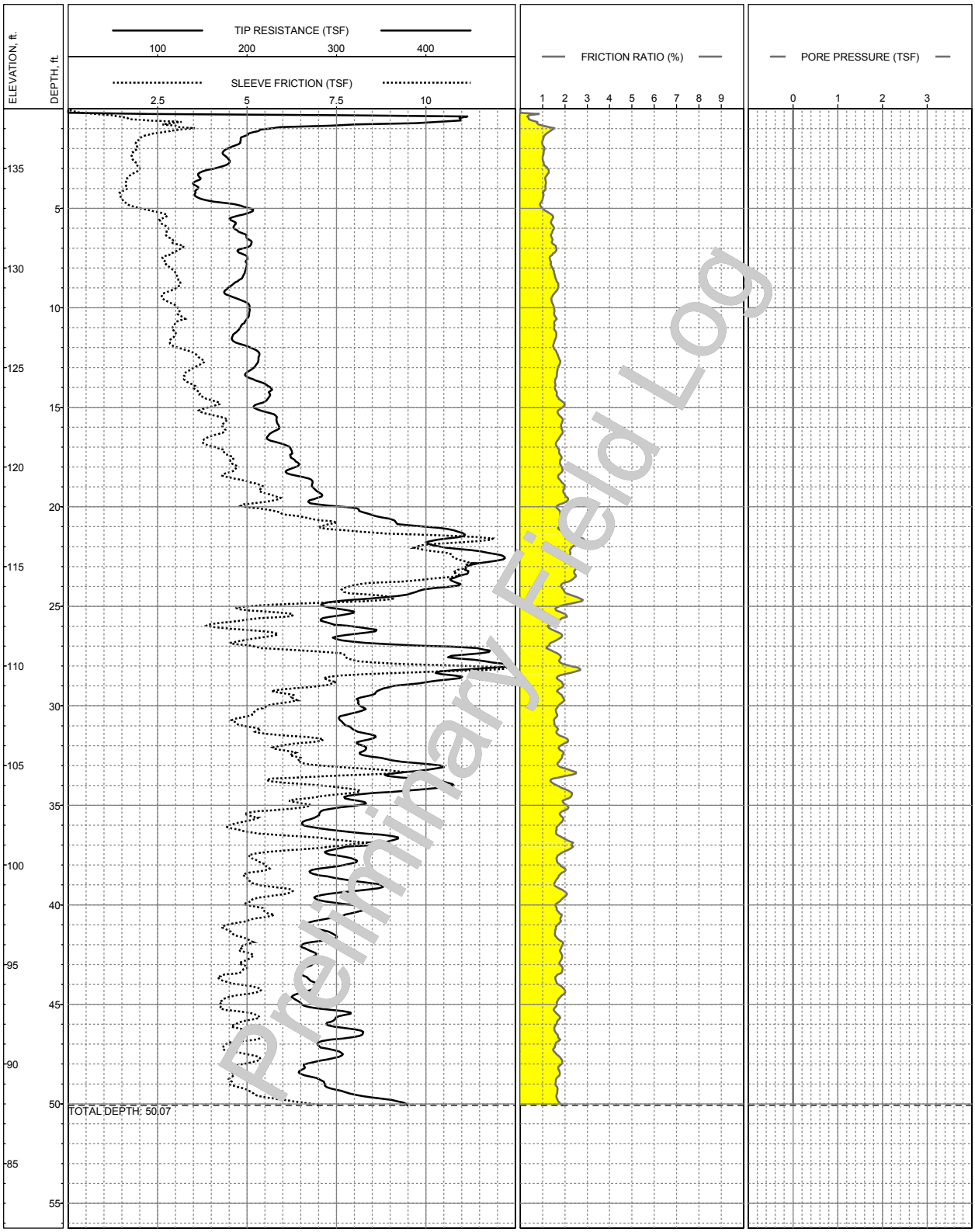


LOCATION: E5738598.86 N2134743.79 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 152ft +/- (MSL)
COMPLETION DEPTH: 30.18ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-16

North Campus Housing
California State University
Monterey Bay

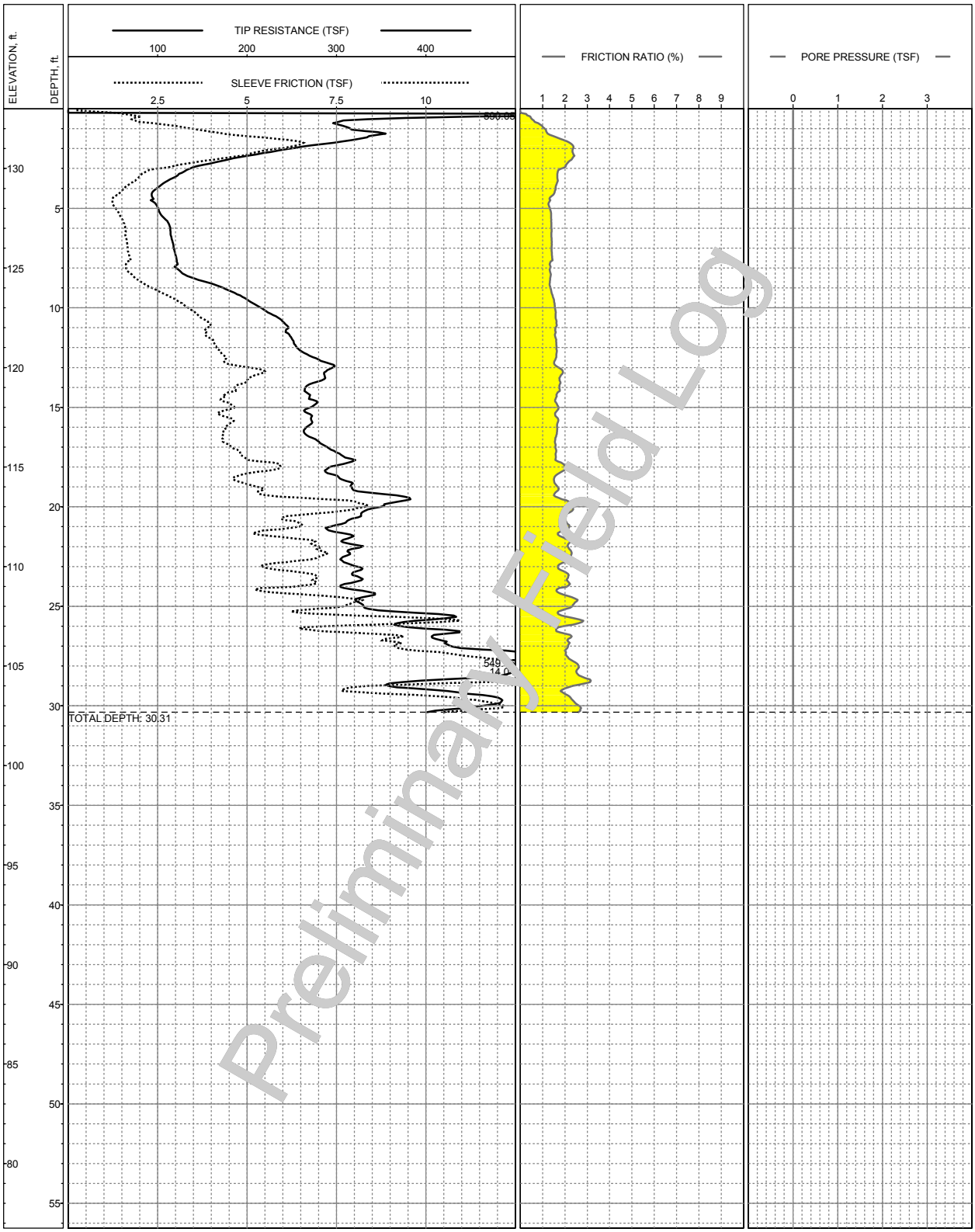


LOCATION: E5738571.46 N2135145.22 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 138ft +/- (MSL)
COMPLETION DEPTH: 50.07ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-17

North Campus Housing
California State University
Monterey Bay

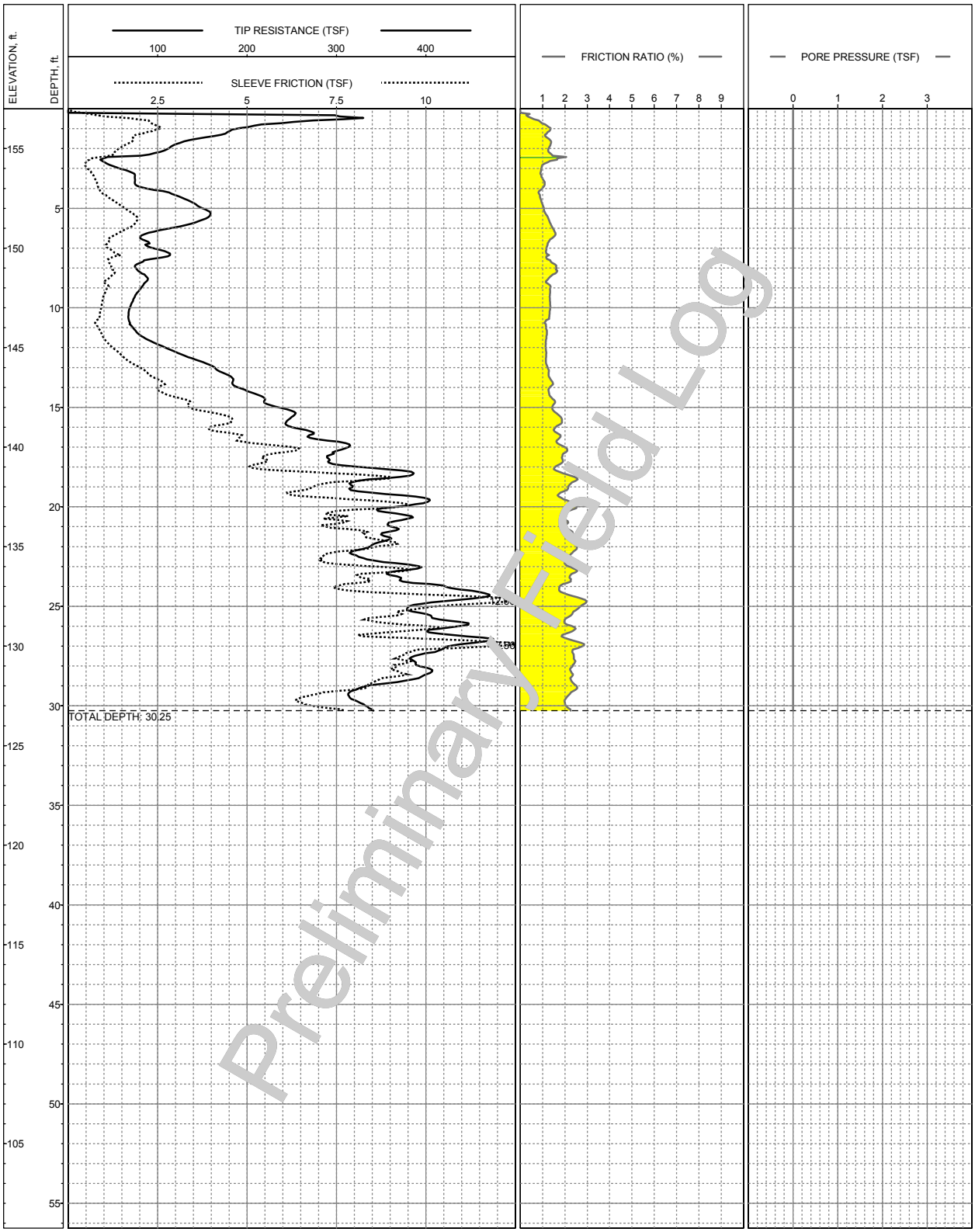


LOCATION: E5738676.01 N2135542.8 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 133ft +/- (MSL)
COMPLETION DEPTH: 30.31ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-18

North Campus Housing
California State University
Monterey Bay

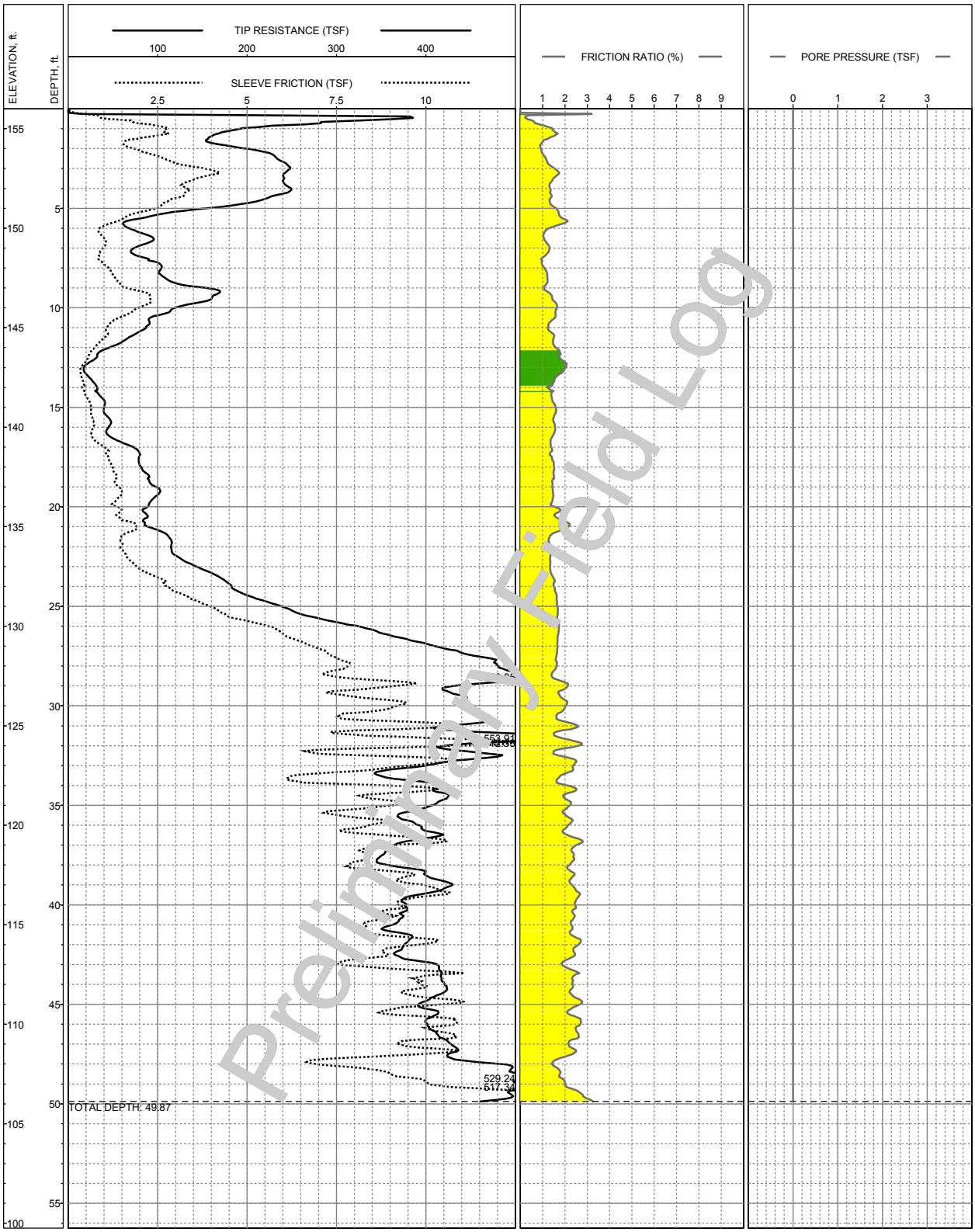


LOCATION: E5739303.06 N2135579.11 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 157ft +/- (MSL)
COMPLETION DEPTH: 30.25ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-19

North Campus Housing
California State University
Monterey Bay

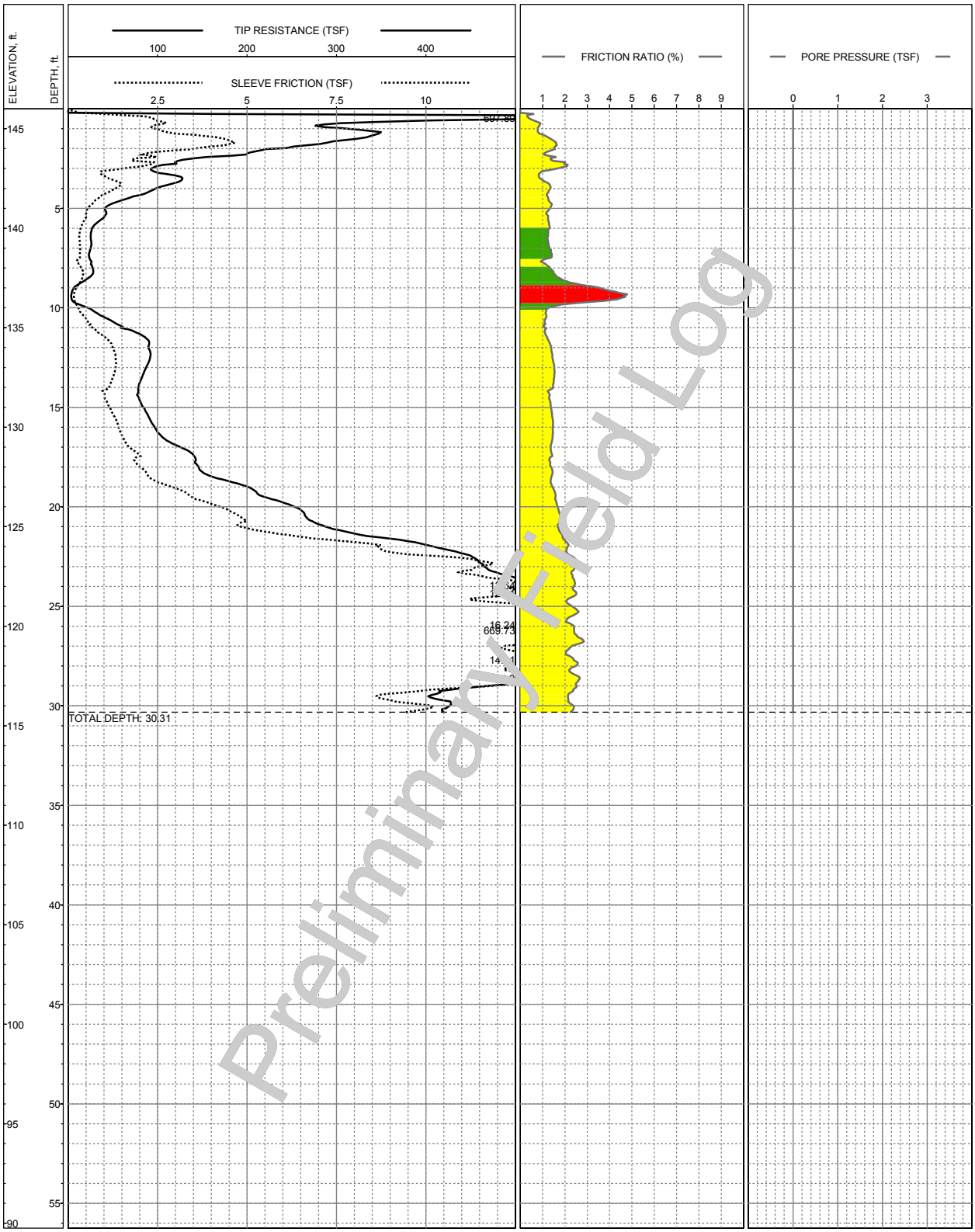


LOCATION: E5739289.32 N2135276 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 156ft +/- (MSL)
COMPLETION DEPTH: 49.87ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-20

North Campus Housing
California State University
Monterey Bay



LOCATION: E5738972.05 N2135297.41 (Stateplane, CA Z4, NAD 83, Feet)
SURFACE EL: 146ft +/- (MSL)
COMPLETION DEPTH: 30.31ft
TESTDATE: 3/2/2004

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Fugro Geosciences
REVIEWED BY: C A Wockner

LOG OF CPT-21

North Campus Housing
California State University
Monterey Bay

APPENDIX B
LABORATORY TESTING

Laboratory tests were performed on selected California liner and bulk soil samples to estimate engineering characteristics of the various earth materials encountered. Testing was performed in accordance with ASTM Standards for Soil Testing, latest revision or as noted otherwise. Laboratory test results are summarized on Plate B-1 - Summary of Laboratory Test Results.

Laboratory Moisture and Density Determinations

Moisture content and dry density determinations were performed on selected samples. The results are presented on the boring logs and Plate B-1.

Expansion Index Test

An expansion index test was performed on a sample of near-surface soil to estimate expansion characteristics. The test was performed in general accordance with ASTM D4329. The result is presented on Plate B-1.

Grain-Size Distribution

Grain size distribution was determined in general accordance with standard test method ASTM D422. In addition, we performed tests to determine the amount of material in soils finer than the No. 200 Sieve in accordance with ASTM test method D1140. The grain-size curves are presented on Plate B-2 - Grain Size Curves, and the results of percent passing the No. 200 sieve (or fines content) are presented on the boring logs and Plate B-1.

Compaction Tests

Compaction tests were performed on selected bulk samples of native materials to assess compaction characteristics. The tests were performed in general accordance with ASTM D1557. Compaction curves are presented on Plates B-3a through B-3c - Compaction Test Results. Maximum dry densities and optimum moisture contents are tabulated on Plate B-1.

Direct Shear Tests

Direct shear strength tests were performed on soil specimens compacted to about 90 percent of the maximum dry density at about optimum moisture content. The samples were pre-loaded with a confining pressure and then flooded with water for at least twenty-four hours. The samples were sheared horizontally at a controlled strain rate, allowing partial drainage. The shear stress on the samples was recorded at regular strain intervals. The results of the direct shear tests are tabulated on Plate B-1, and presented on Plates B-4a through B-4c - Direct Shear Test Results.

Hydroconsolidation Tests

Limited one-dimensional consolidation tests were performed on selected liner samples in general accordance with ASTM Test Method 2435 to estimate the hydroconsolidation (collapse) potential of the sandy native soils. The samples were loaded to the approximate overburden pressure and then inundated with water. The collapse potential was measured after the samples had achieved equilibrium after inundation. The results of the hydroconsolidation tests are presented on Plates B-5a through B-5d - Hydroconsolidation Test Results.

Soil Chemistry Tests/Corrosion Tests

Samples of soil in the upper 5 feet at three locations were tested for resistivity, pH, sulfate, and chloride content to assess corrosion potential by Health Science Associates, Inc., of Los Alamitos, California. The results of the tests are presented on Plate B-6 - Laboratory Report (Health Science Associates' report), and are summarized on Plate B-1.

R-Value Test

R-value tests were performed samples of near-surface soil at three locations on the site. The tests were performed in accordance with standard test method ASTM D2844 and results of the tests are summarized on Plate B-1.

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC %	FINES %	ATTERBERG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	TEST LISTING
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4				
B-1	1.5		Fine to Medium SAND with silt (SP-SM)				11																S
B-1	2.0		Fine to Medium SAND with silt (SP-SM)	109	99	10																	T
B-1	5.0		Fine to Medium SAND with silt (SP-SM)	110	101	8																	T
B-1	10.5		Fine SAND with silt (SP-SM)			3	20																M, FC
B-1	16.0		Fine SAND (SP)	111	107	4	3																T, C, FC
B-2	2.0		Fine SAND with silt (SP-SM)	107	100	6																	T
B-2	3.5		Fine SAND with silt (SP-SM)	102	96	6																	T
B-2	5.0		Fine SAND with silt (SP-SM)	106	100	5																	T, C
B-2	10.5		Fine SAND (SP)	105	99	5																	T
B-3	1.5		Fine to Medium SAND (SP)				6																S
B-3	2.0		Fine to Medium SAND (SP)	115	107	8																	T
B-3	3.5		Fine to Medium SAND (SP)	120	115	4																	T
B-3	5.0		Fine SAND (SP)	105	99	6	4																T, FC
B-3	10.5		Fine SAND (SP)	102	96	6																	T
B-4	1.0		Fine to Medium SAND with silt and gravel (SP-SM)	122	111	10	10			124.0	8.5	0.3	37			410	8.53	<25	0.317	78			T, P, D, S, Co, R
B-4	2.0		Fine to Medium SAND with silt and gravel (SP-SM)	118	112	6																	T
B-4	3.5		Fine to Medium SAND with silt and gravel (SP-SM)	99	87	14																	T
B-4	5.0		Fine to Medium SAND with silt and gravel (SP-SM)	92	85	9																	T
B-4	9.5		Fine SAND (SP)			4	2																M, FC
B-5	1.5		Fine SAND (SP)				4																S
B-5	2.0		Fine SAND (SP)	102	99	3																	T
B-5	3.5		Fine SAND (SP)	97	95	3																	T
B-5	5.0		Fine SAND (SP)	106	104	2																	T
B-5	10.5		Fine SAND (SP)				4																FC
B-6	1.0		Silty Fine SAND (SM)	118	107	11	13			120.0	9.0	0.1	35			3800	7.53	<25	0.004	72	0		T, P, D, S, Co,
																							R, EI
B-6	2.0		Silty Fine SAND (SM)	95	90	6																	T
B-6	3.5		Silty Fine SAND (SM)	18	17	5																	T
B-6	5.0		Silty Fine SAND (SM)	105	100	6																	T
B-6	10.5		Fine SAND (SP)	106	102	4	2																T, FC

Classification Tests
UWW = Unit Wet Weight
UDW = Unit Dry Weight
MC = Moisture Content
Fines = % Passing #200 Sieve
LL = Liquid Limit
PI = Plasticity Index

Direct Shear Test
C = Assigned Cohesion, ksf
PHI = Assigned Friction Angle, degrees

Compaction Test
MAX DD = Maximum Dry Density
OPT MC = Optimum Moisture Content

Compressive Strength Tests
Qu = Unconfined Compression
Su = Undrained Shear Strength
u = Unconsolidated Undrained
p = Pocket Penetrometer
t = Torvane
m = Miniature Vane

Corrosivity Tests
R = Resistivity, ohm-cm, satur.
pH = pH
Cl = Chloride, ppm
SO_4 = Sulfate, % by weight

Test Listing Abbreviations
M = Moisture Content
T = Total & Dry Unit Weight
S = Sieve Analysis
FC = % Passing #200 Sieve
H = Hydrometer Analysis
A = Atterberg Limits
P = Compaction Test
D = Direct Shear Test
C = Consolidation Test
Co = Corrosivity Tests
CU = CU Triaxial
U = UU Triaxial
R = R-Value
SE = Sand Equivelant

SUMMARY OF LABORATORY TEST RESULTS

North Campus Housing
California State University
Monterey Bay

DRILL HOLE	DEPTH, ft	SAMPLE NUMBER	MATERIAL DESCRIPTION	UWW pcf	UDW pcf	MC %	FINES %	ATTERBERG LIMITS		COMPACTION TEST		DIRECT SHEAR		COMPRESSIVE STRENGTH TESTS		CORROSIVITY TESTS				R-VALUE	EXPANSION INDEX	SAND EQUIVALENT (SE)	TEST LISTING
								LL	PI	MAX DD pcf	OPT MC %	C ksf	PHI deg	Qu, ksf	S_u (Cell Prs.) ksf	R	pH	Cl	So_4				
B-6	20.5		Fine SAND (SP)	109	102	7																	T, C
B-7	0.0		AC			4																	M
B-7	1.0		Fine to Medium SAND (SP)	106	98	8	4			110.0	7.0	0.0	46			6400	6.89	<25	<.003	72			T, P, D, S, Co, R
B-7	2.0		Fine to Medium SAND (SP)	100	96	4																	T
B-7	3.5		Fine to Medium SAND (SP)	99	95	5																	T
B-7	5.0		Fine to Medium SAND (SP)	107	102	5																	T
B-7	10.5		Fine to Medium SAND (SP)	97	93	4	1																T, FC
B-7	16.0		Fine to Medium SAND (SP)				3																S
B-8	0.0		AC	107	101	6																	T
B-8	1.5		Fine SAND (SP)																				□
B-8	15.5		Fine SAND (SP)	102	98	4																	T, C
B-9	3.5		Silty Fine SAND (SM)				15																S
B-10	8.5		Silty Fine SAND (SM)				16																S

Classification Tests
UWW = Unit Wet Weight
UDW = Unit Dry Weight
MC = Moisture Content
Fines = % Passing #200 Sieve
LL = Liquid Limit
PI = Plasticity Index

Direct Shear Test
C = Assigned Cohesion, ksf
PHI = Assigned Friction Angle, degrees

Compaction Test
MAX DD = Maximum Dry Density
OPT MC = Optimum Moisture Content

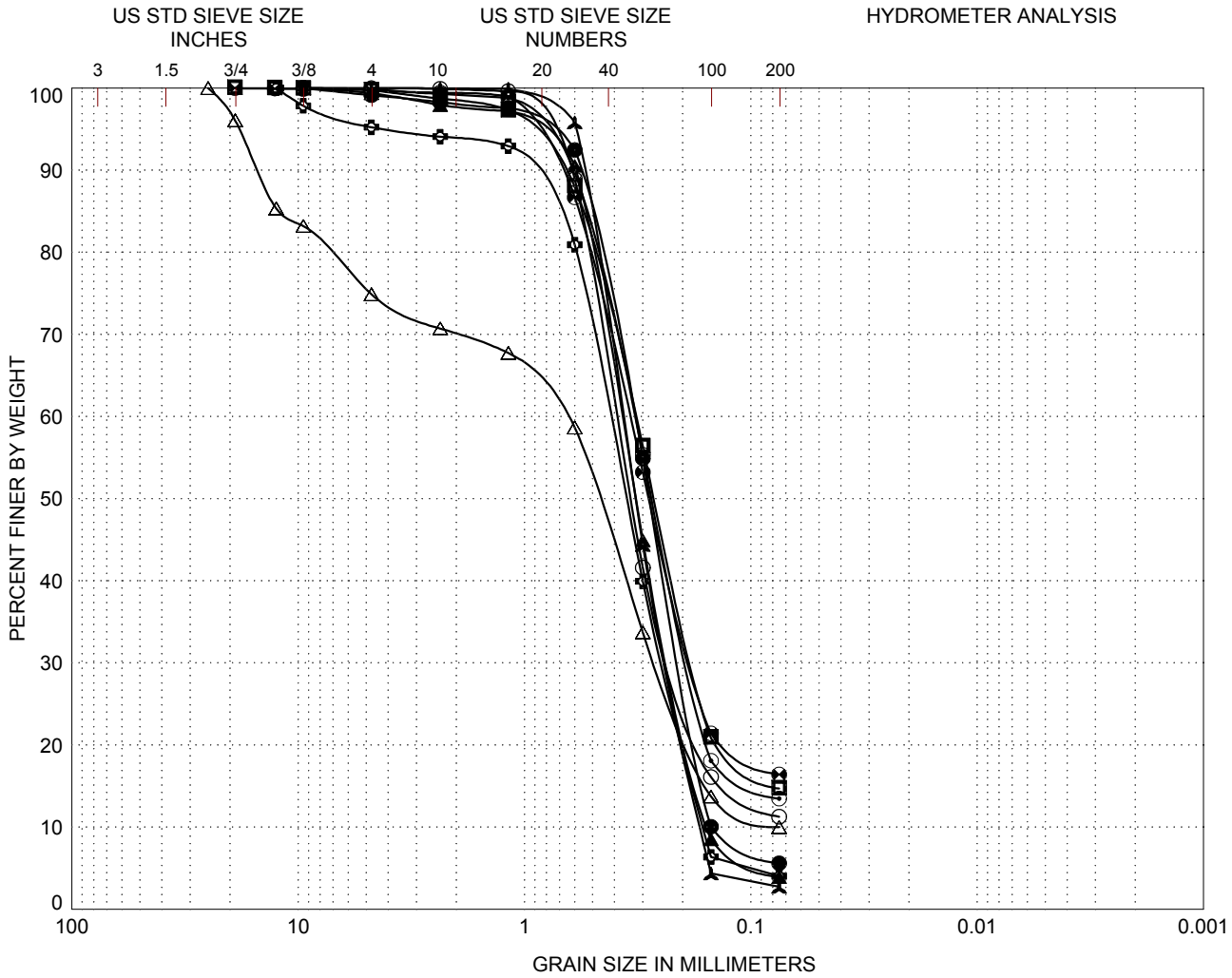
Compressive Strength Tests
Qu = Unconfined Compression
Su = Undrained Shear Strength
u = Unconsolidated Undrained
p = Pocket Penetrometer
t = Torvane
m = Miniature Vane

Corrosivity Tests
R = Resistivity, ohm-cm, satur.
pH = pH
Cl = Chloride, ppm
SO_4 = Sulfate, % by weight

Test Listing Abbreviations
M = Moisture Content
T = Total & Dry Unit Weight
S = Sieve Analysis
FC = % Passing #200 Sieve
H = Hydrometer Analysis
A = Atterberg Limits
P = Compaction Test
D = Direct Shear Test
C = Consolidation Test
Co = Corrosivity Tests
CU = CU Triaxial
U = UU Triaxial
R = R-Value
SE = Sand Equivelant

SUMMARY OF LABORATORY TEST RESULTS

North Campus Housing
California State University
Monterey Bay

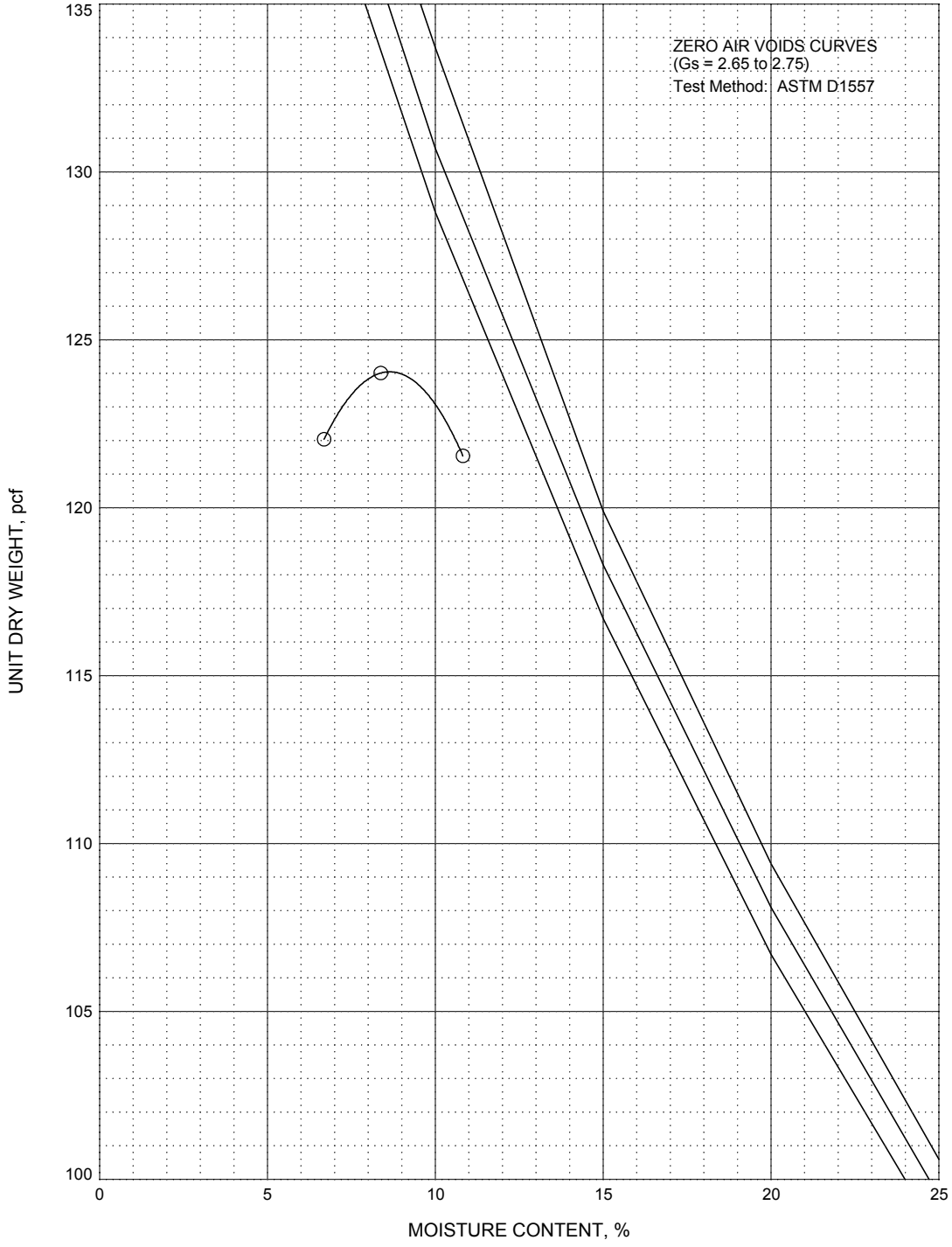


GRAVEL		SAND			SILT or CLAY
Coarse	Fine	Coarse	Medium	Fine	

LEGEND	(location)	(depth,ft)	CLASSIFICATION	Cc	Cu
○	B-1	1.5'	Fine to Medium SAND with silt (SP-SM)	1.9	6.3
●	B-3	1.5'	Fine to Medium SAND (SP)	0.8	2.2
△	B-4	1-5'	Fine to Medium SAND with silt and gravel (SP-SM)	1.4	8.8
▲	B-5	1.5'	Fine SAND (SP)	0.9	2.4
⊙	B-6	1-5'	Silty Fine SAND (SM)		
✿	B-7	1-5'	Fine to Medium SAND (SP)	0.9	2.6
⅄	B-7	16'	Fine to Medium SAND (SP)	0.9	2.2
◘	B-9	2.5-3.5'	Silty Fine SAND (SM)		
⊛	B-10	8.5-10'	Silty Fine SAND (SM)		

GRAIN SIZE CURVES
North Campus Housing
California State University
Monterey Bay

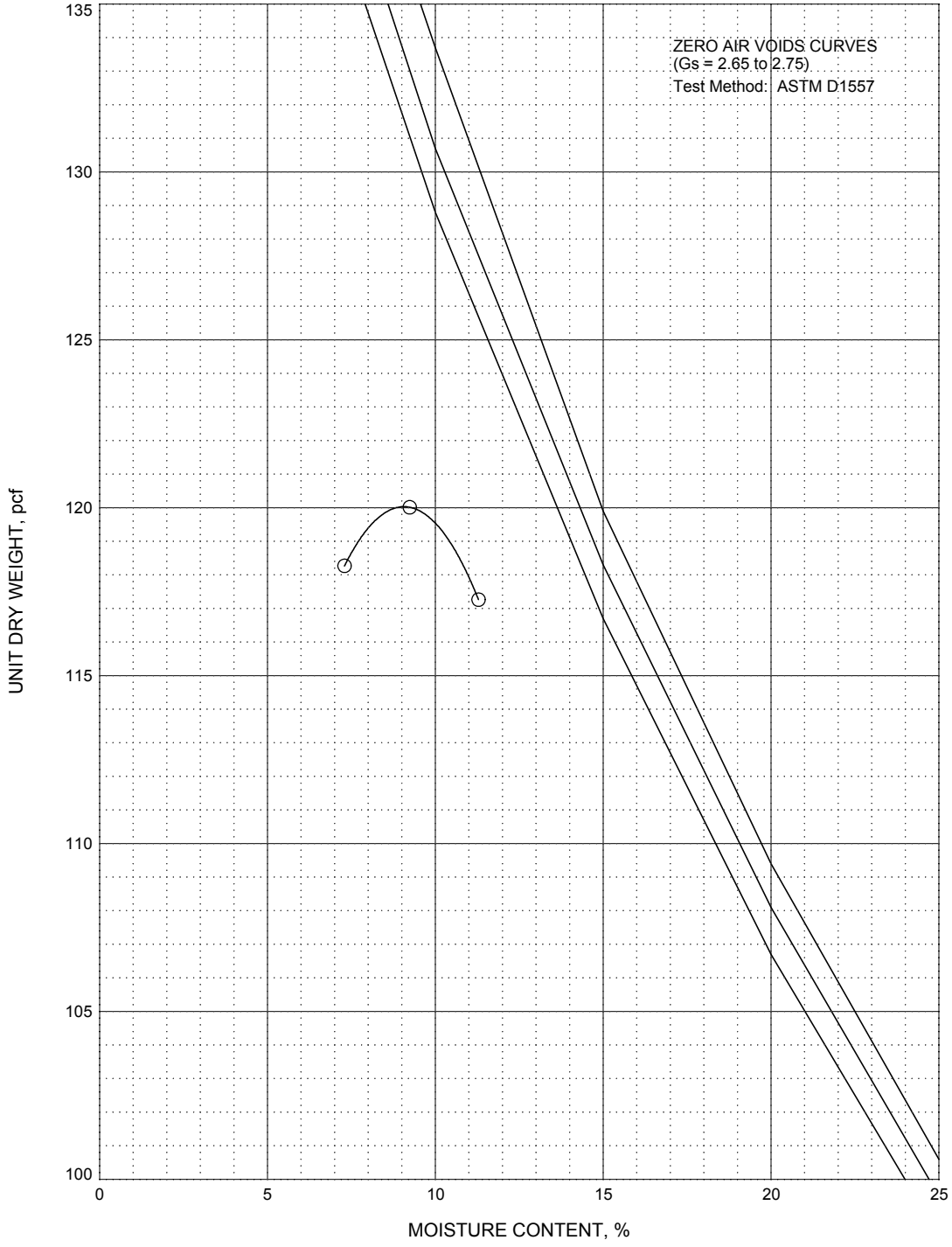
PLATE B-2



LEGEND (location)	depth, ft	CLASSIFICATION	MAXIMUM UNIT DRY WEIGHT, pcf	OPTIMUM WATER CONTENT, %
○ B-4	1-5	Fine to Medium SAND with silt and gravel (SP-SM)	124.0	8.5

COMPACTION TEST RESULTS
North Campus Housing
California State University
Monterey Bay

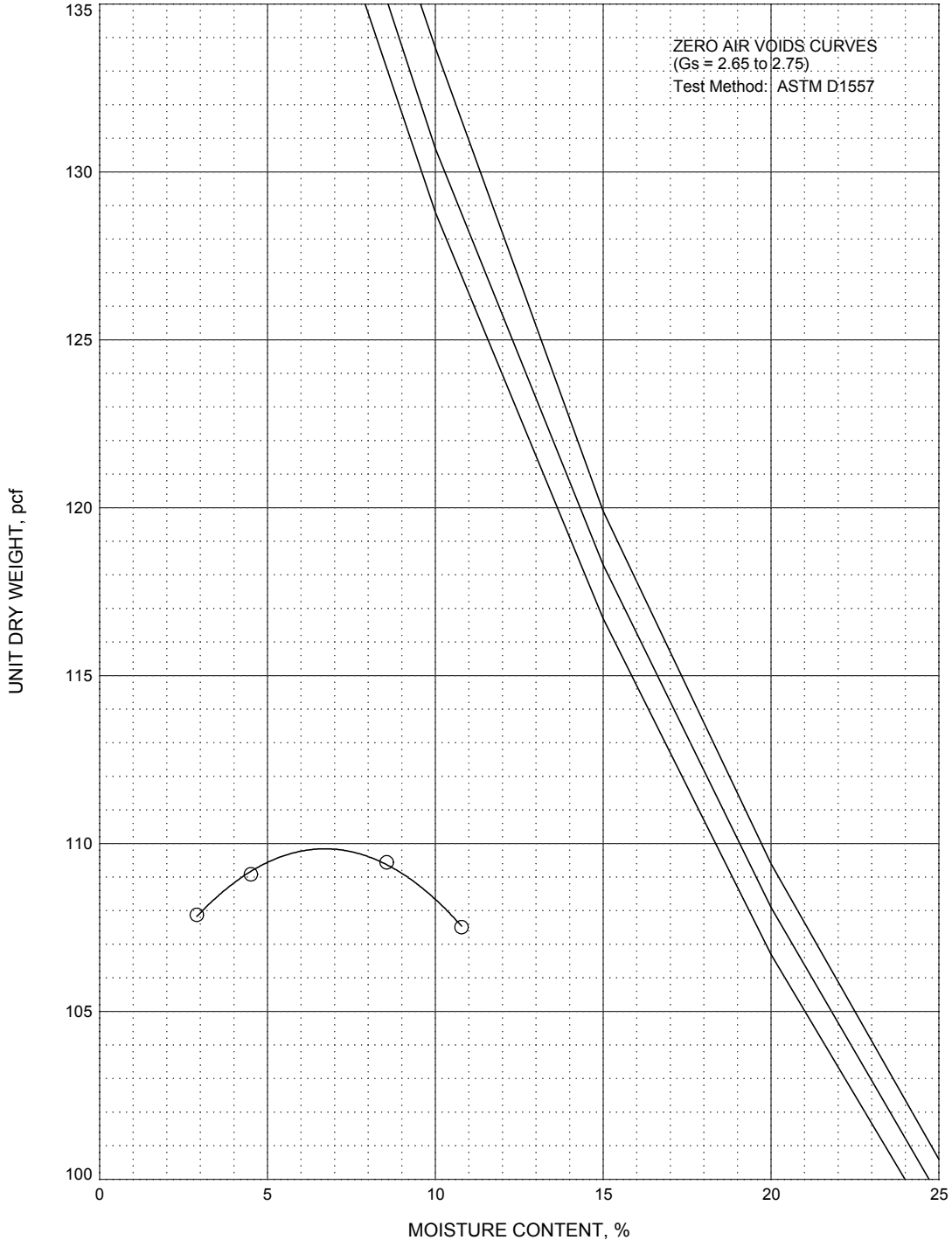
PLATE B-3a



LEGEND (location)	depth, ft	CLASSIFICATION	MAXIMUM UNIT DRY WEIGHT, pcf	OPTIMUM WATER CONTENT, %
○ B-6	1-5	Silty Fine SAND (SM)	120.0	9.0

COMPACTION TEST RESULTS
North Campus Housing
California State University
Monterey Bay

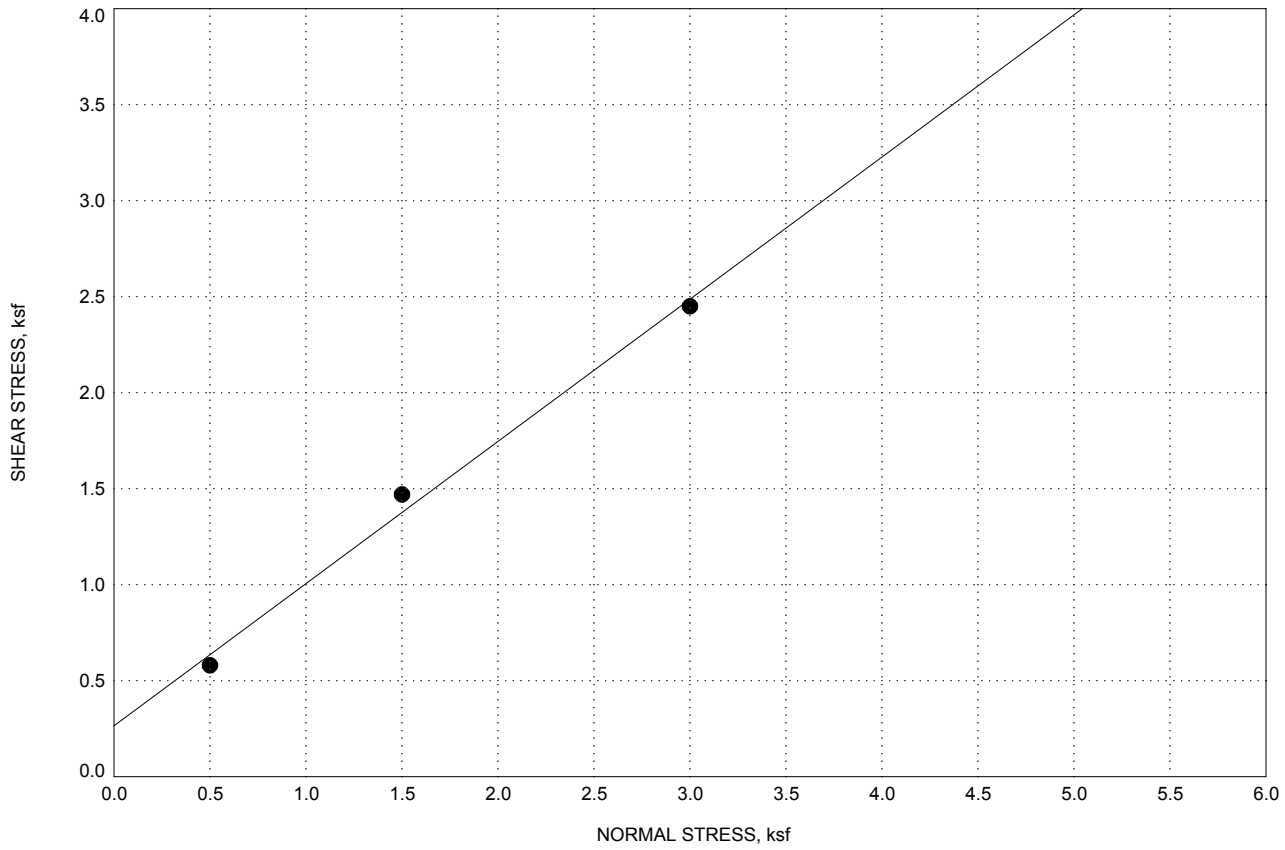
PLATE B-3b



LEGEND (location)	depth, ft	CLASSIFICATION	MAXIMUM UNIT DRY WEIGHT, pcf	OPTIMUM WATER CONTENT, %
○ B-7	1-5	Fine to Medium SAND (SP)	110.0	7.0

COMPACTION TEST RESULTS
North Campus Housing
California State University
Monterey Bay

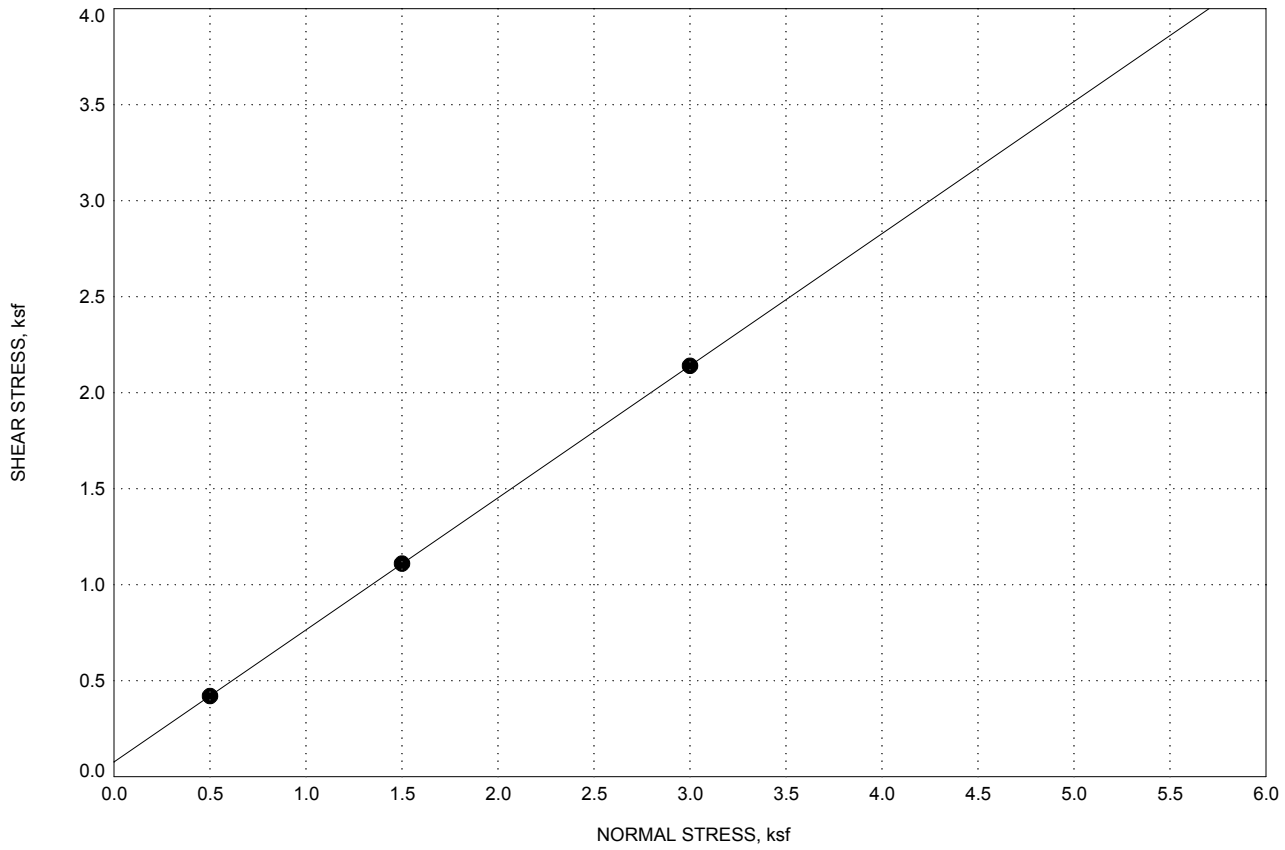
PLATE B-3c



COHESION, ksf	0.3
ANGLE OF INTERNAL FRICTION, deg	37
LOCATION	B-4
DEPTH, ft	1-5
MOISTURE CONTENT, %	10
UNIT DRY WEIGHT, pcf	111
MATERIAL DESCRIPTION	Fine to Medium SAND with silt and gravel (SP-SM)
SAMPLE CONDITION	Sample compacted to ~90% relative compaction

DIRECT SHEAR TEST RESULTS
North Campus Housing
California State University
Monterey Bay

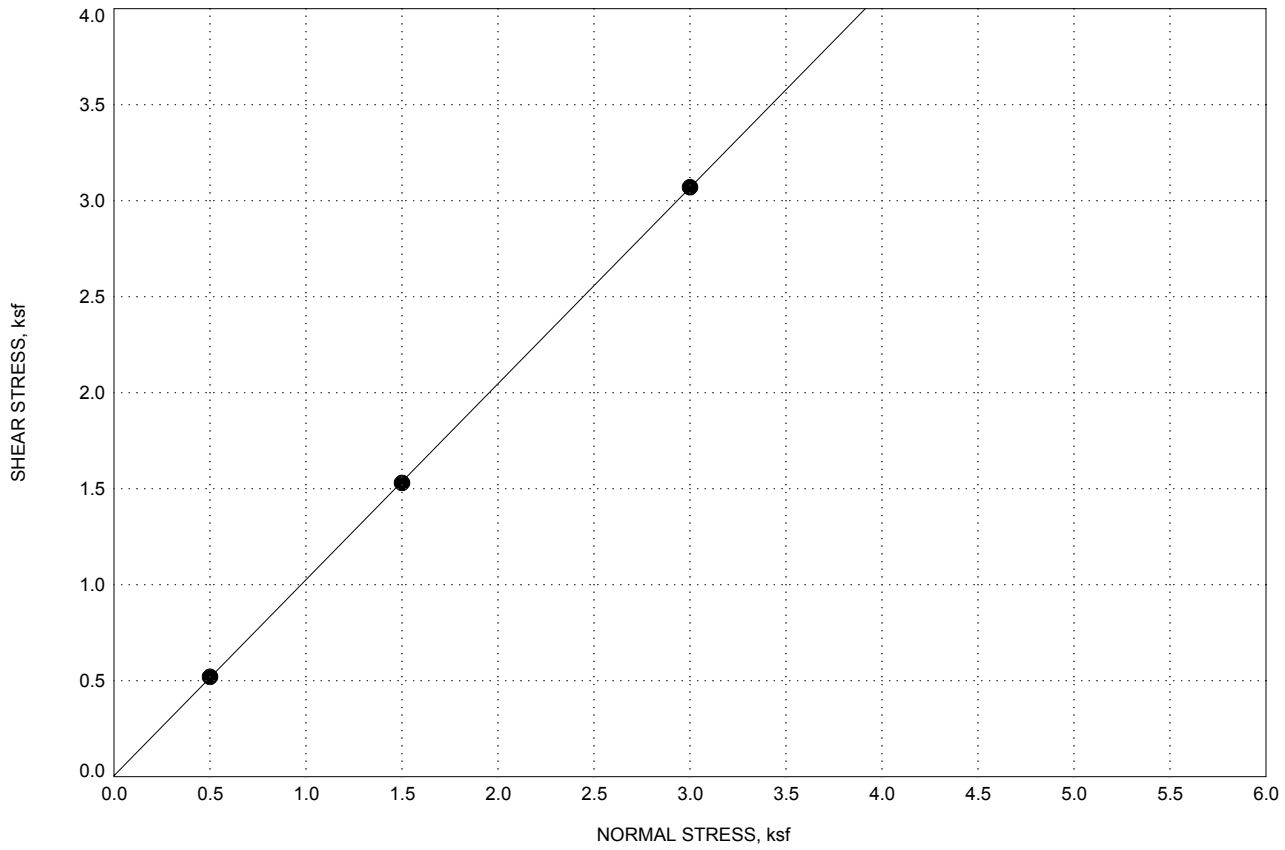
PLATE B-4a



COHESION, ksf	0.1
ANGLE OF INTERNAL FRICTION, deg	35
LOCATION	B-6
DEPTH, ft	1-5
MOISTURE CONTENT, %	11
UNIT DRY WEIGHT, pcf	107
MATERIAL DESCRIPTION	Silty Fine SAND (SM)
SAMPLE CONDITION	Sample compacted to ~90% relative compaction

DIRECT SHEAR TEST RESULTS
North Campus Housing
California State University
Monterey Bay

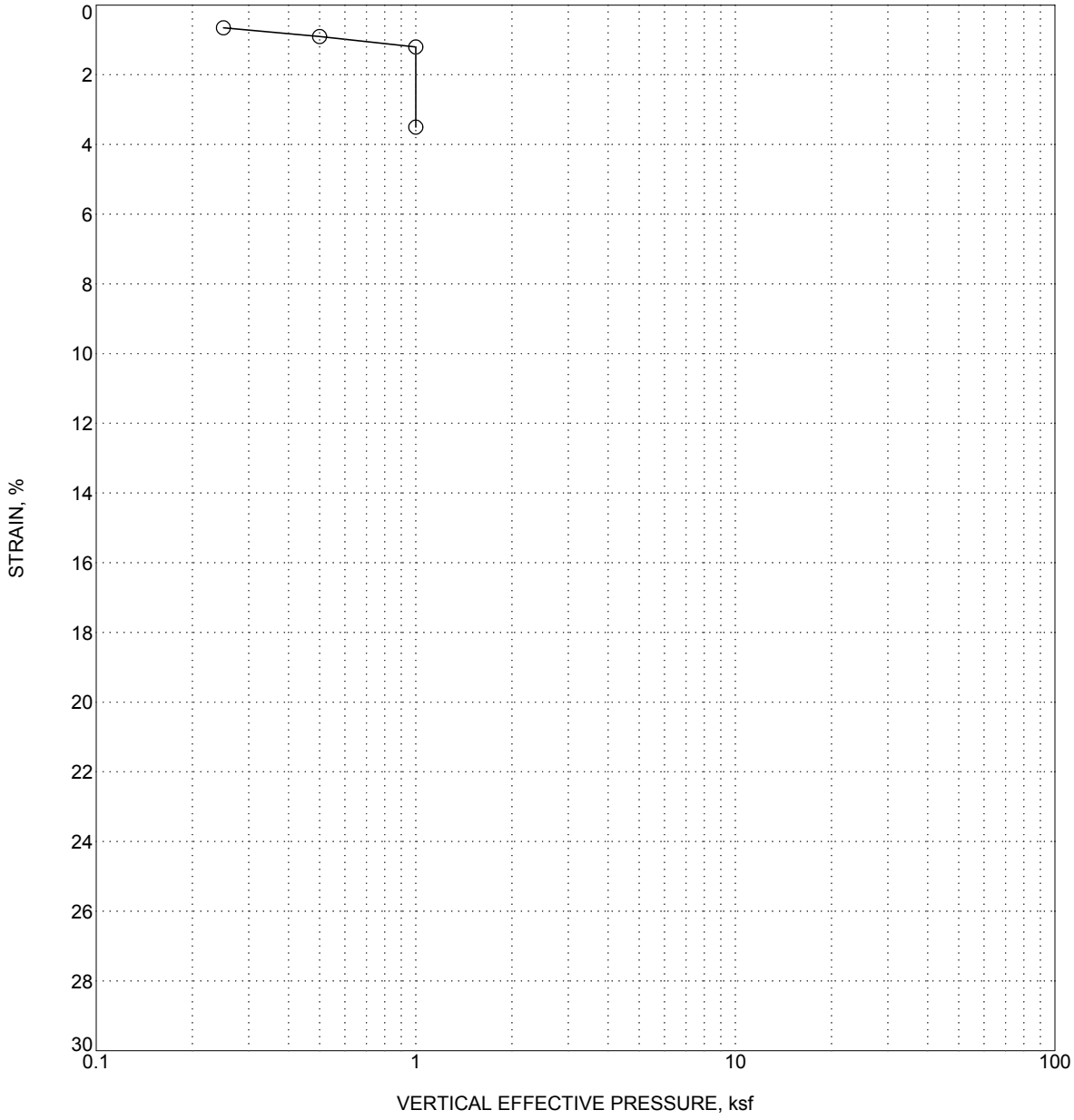
PLATE B-4b



COHESION, ksf	0.0
ANGLE OF INTERNAL FRICTION, deg	46
LOCATION	B-7
DEPTH, ft	1-5
MOISTURE CONTENT, %	8
UNIT DRY WEIGHT, pcf	98
MATERIAL DESCRIPTION	Fine to Medium SAND (SP)
SAMPLE CONDITION	Sample compacted to ~90% relative compaction

DIRECT SHEAR TEST RESULTS
North Campus Housing
California State University
Monterey Bay

PLATE B-4c

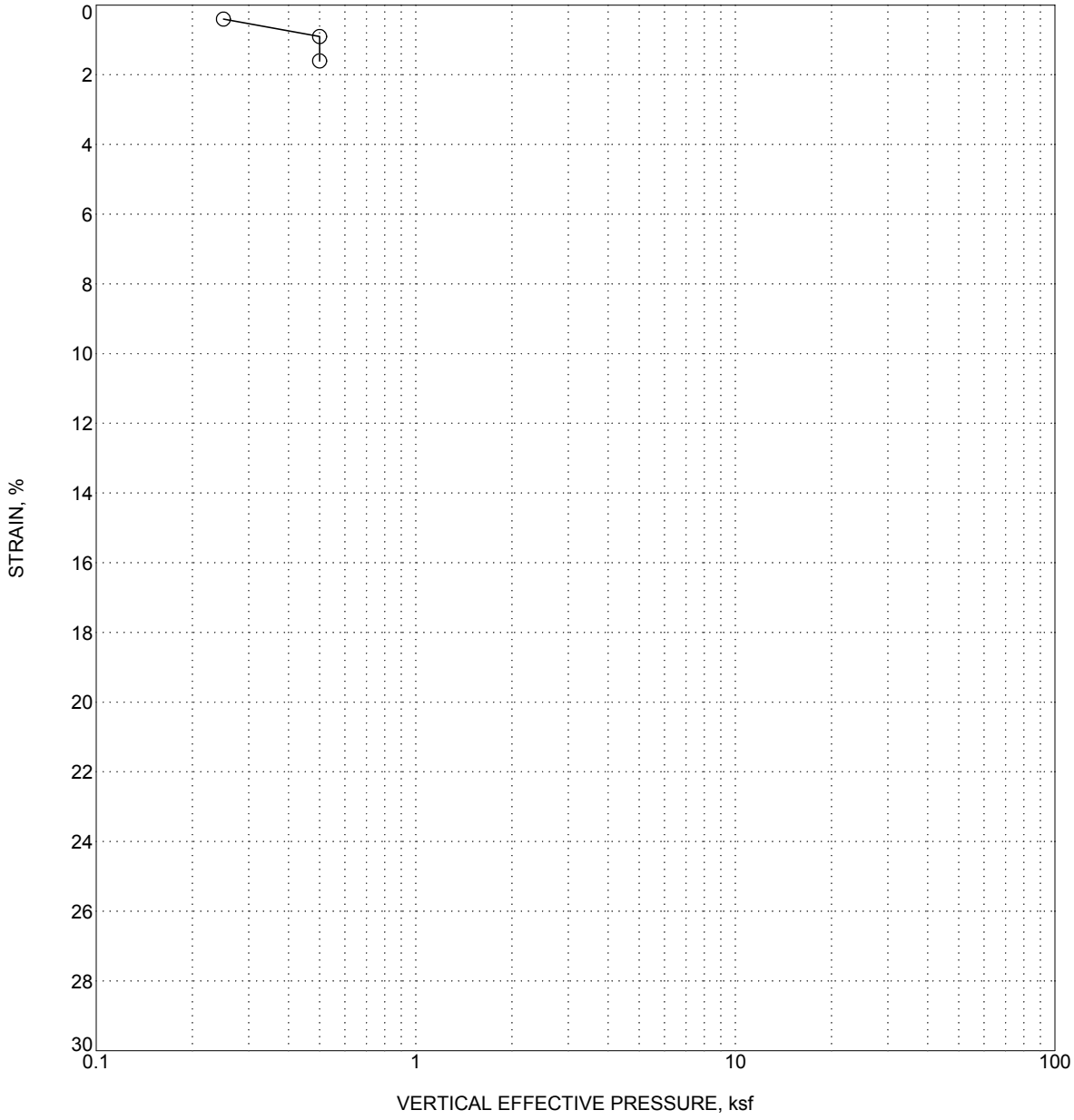


LOCATION	B-1
DEPTH, ft	16
INITIAL MOISTURE CONTENT, %	4
UNIT DRY WEIGHT, pcf	107
MATERIAL DESCRIPTION	Fine SAND (SP)
SAMPLE CONDITION	Liner Sample

HYDROCONSOLIDATION TEST RESULTS

North Campus Housing
California State University
Monterey Bay

PLATE B-5a

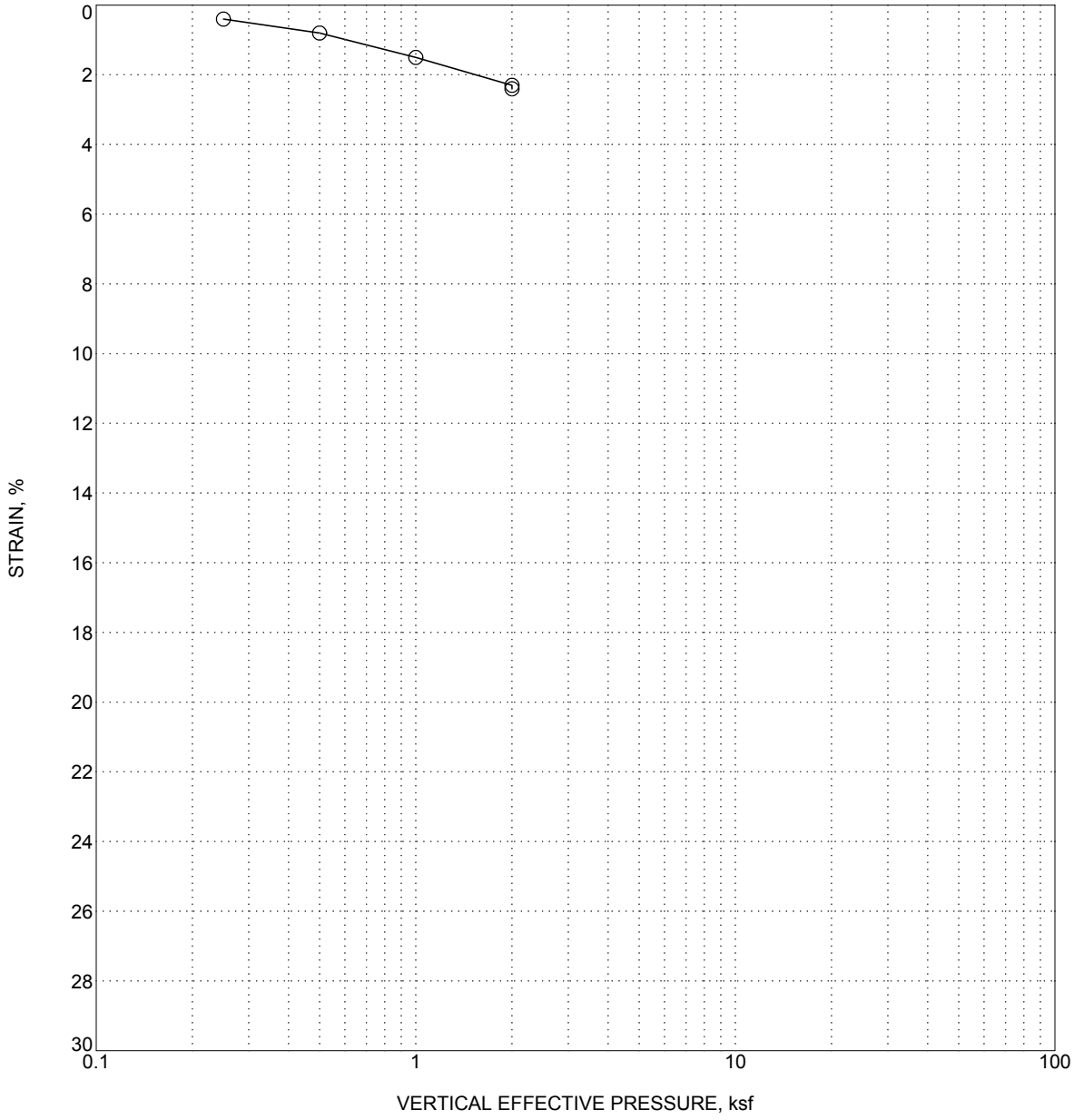


LOCATION	B-2
DEPTH, ft	5
INITIAL MOISTURE CONTENT, %	5
UNIT DRY WEIGHT, pcf	100
MATERIAL DESCRIPTION	Fine SAND with silt (SP-SM)
SAMPLE CONDITION	Liner Sample

HYDROCONSOLIDATION TEST RESULTS

North Campus Housing
California State University
Monterey Bay

PLATE B-5b

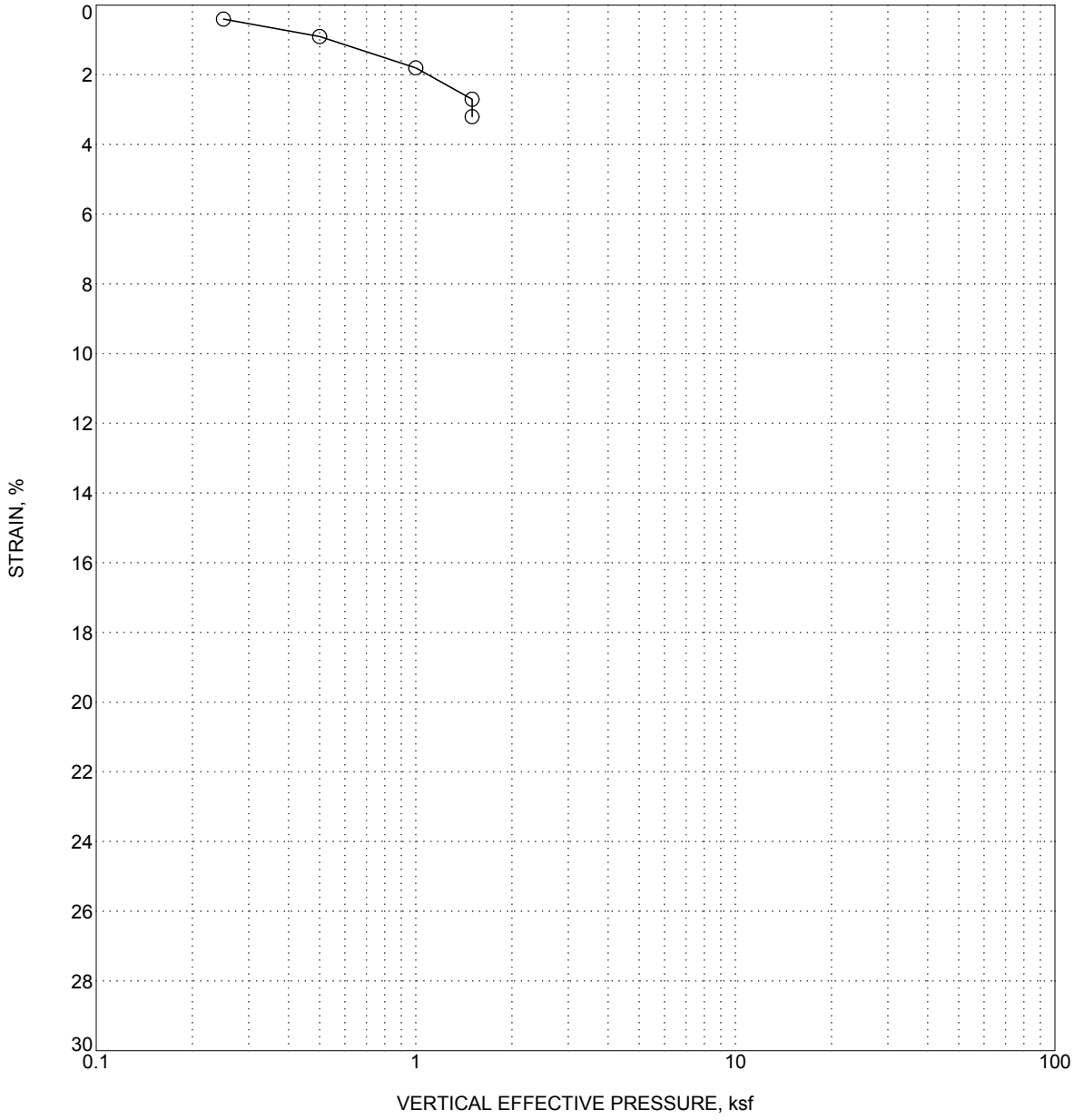


LOCATION	B-6
DEPTH, ft	20.5
INITIAL MOISTURE CONTENT, %	7
UNIT DRY WEIGHT, pcf	102
MATERIAL DESCRIPTION	Fine SAND (SP)
SAMPLE CONDITION	Liner Sample

HYDROCONSOLIDATION TEST RESULTS

North Campus Housing
California State University
Monterey Bay

PLATE B-5c



LOCATION	B-8
DEPTH, ft	15.5
INITIAL MOISTURE CONTENT, %	4
UNIT DRY WEIGHT, pcf	98
MATERIAL DESCRIPTION	Fine SAND (SP)
SAMPLE CONDITION	Liner Sample

HYDROCONSOLIDATION TEST RESULTS

North Campus Housing
California State University
Monterey Bay

PLATE B-5d

Health Science Associates

LABORATORY REPORT

Report Number : 142139.fin
Purchase Order : 9700.032/
Job No.

CAROL WOCKNER
FUGRO WEST INC.
4820 MC GRATH ST.
VENTURA, CA. 93003

Date Received : 16-MAR-04
Date Completed : 24-MAR-04
Date Sent : 24-MAR-04
Page # 1 of 1

Sample Description : 4- Bulk Soils

California Test Methods : 532,643

Auto No.	Submitter Sample Number	Resistivity ohms/cm	pH Units	Chloride ppm	Water Soluble Sulfate in Soil wt%
320599	DH-4	410	8.53	<25	0.317
320600	DH-6	3800	7.53	<25	0.0037
320601	DH-7	6400	6.89	<25	<0.0025

Milliliters Water Added	50	100	150	200	250	300	350	400
	Resistivity Ohm-cm							
Sample No.								
320599		880	760	430	410	410		
320600		5100	4200	4000	3800	3800		
320601		8200	7900	6800	6400	6400		

Remarks : Sample(s) and sampling data as provided :
by : G. Godinez

Analyst(s) : DL/WS

Ref :

California ELAP No.: 1406
AIHA Accreditation No.: 172
NVLAP Accreditation No.: 101384
AIHA ELLAP Accreditation No.: 10985
LACSD Lab No.: 10125

Reviewed by: Michael Chapman

Technical Approval: Laboratory Director, Jamie Steedman-Lyde

10771 Noel St., Los Alamitos, CA 90720 714/220-3922 Fax 714/220-2081 e-mail hsa@healthscience.com

PLATE B-6

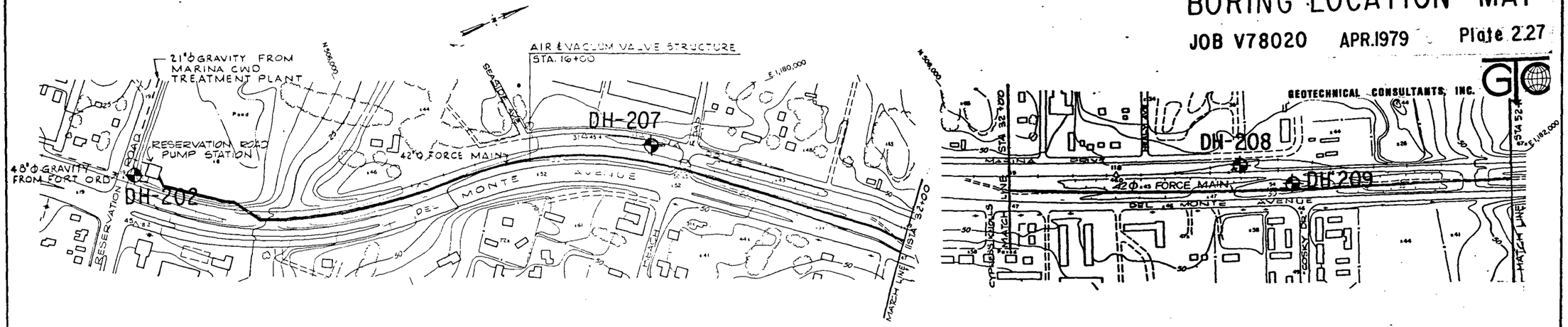
Geotechnical Consultants Inc. 1979[1]

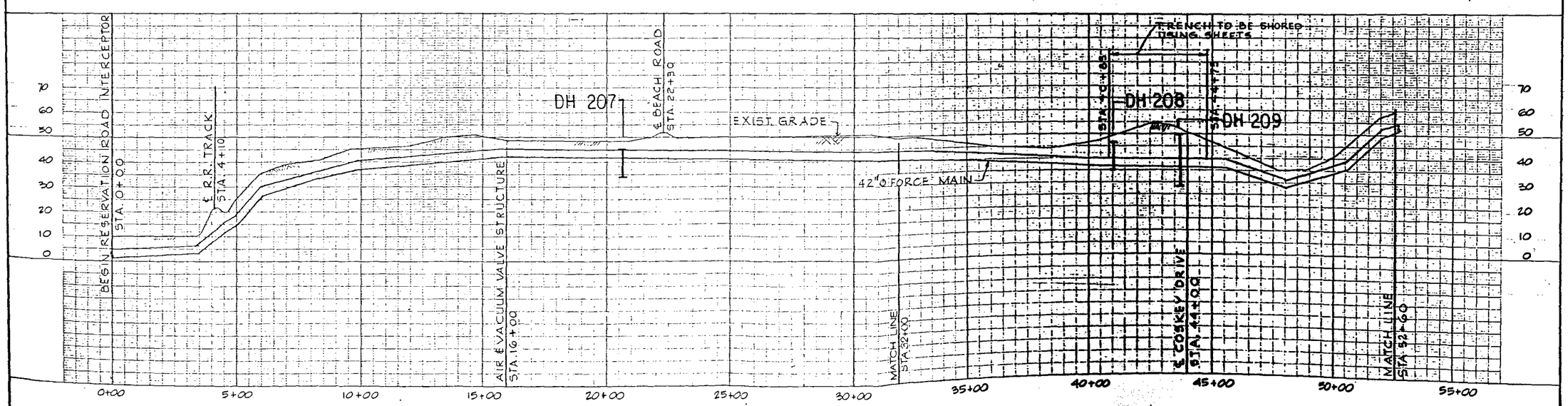
[1] Please see Figure 5 for full citation.

RESERVATION ROAD BRANCH
BORING LOCATION MAP

JOB V78020 APR.1979 Plate 2.27

GEOTECHNICAL CONSULTANTS, INC.





NO.	DATE	DESCRIPTION	BY
		REVISIONS	

PROJECT NO.	
DESIGNED BY	D E B
DRAWN BY	B N B
CHECKED BY	M S C
HORIZONTAL	1" = 200'
VERTICAL	1" = 20'

DATE

SCALES

PHOTOGRAMMETRY BY GREENWOOD AERIAL MAPPING CO.
FROM ...

ENGINEERING-SCIENCE, INC.
ENGINEERS AND CONSULTANTS
600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 548-7970

SUBMITTED BY _____ DATE _____
C.E. R.E. NO.

MONTEREY PENINSULA
WATER POLLUTION CONTROL AGENCY
MONTEREY COUNTY, CALIFORNIA

STAGE 2 – REGIONAL INTERCEPTORS AND OUTFALL PROJECT

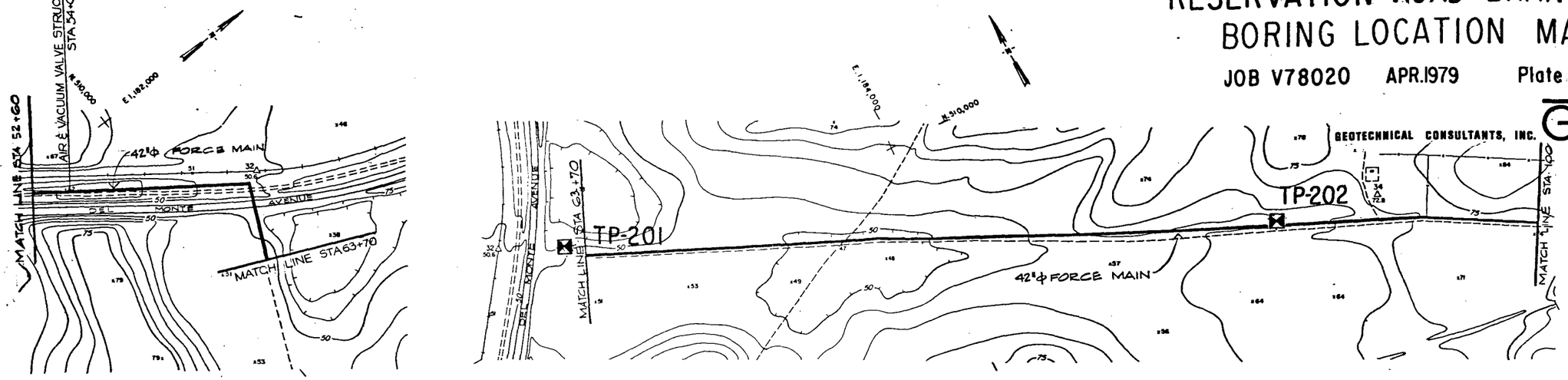
RESERVATION ROAD INTERCEPTOR
STATION 0+00 TO 52+60

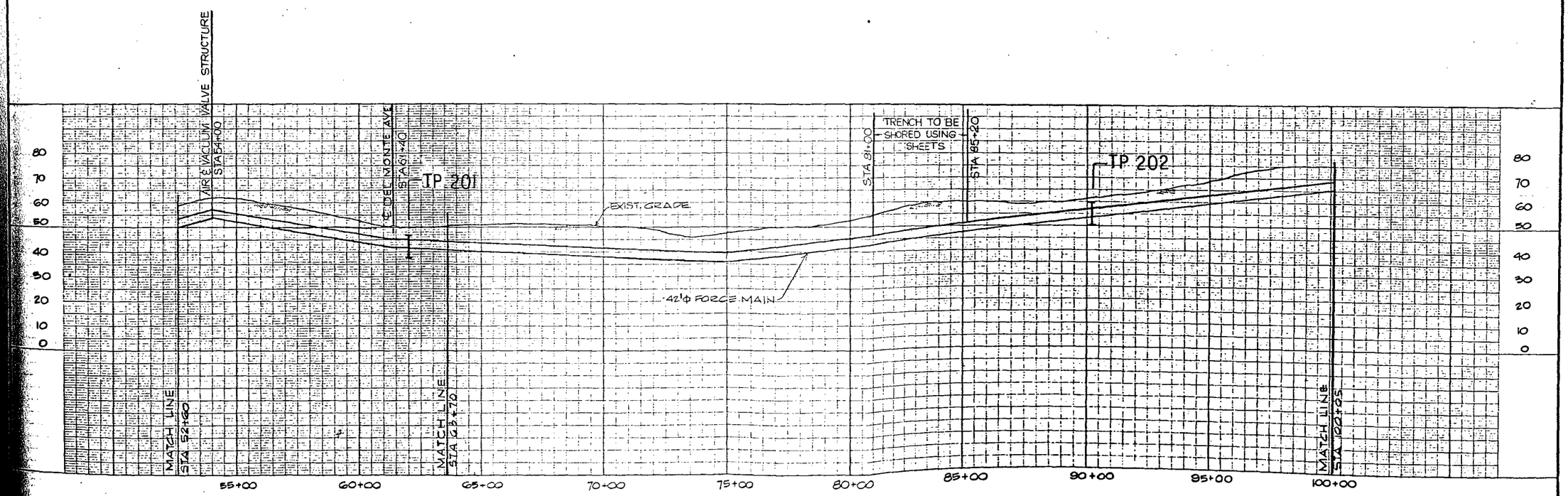
SHEET P-0.11

RESERVATION ROAD BRANCH
BORING LOCATION MAP

JOB V78020 APR.1979 Plate 2.28

GEOTECHNICAL CONSULTANTS, INC.





DATE	DESCRIPTION	BY
	REVISIONS	

PHOTOGRAMMETRY BY GREENWOOD AERIAL MAPPING CO.
PHOTOS DATED 1-25-78

PROJECT NO.	DATE
DESIGNED BY REB.	
DRAWN BY AD	
CHECKED BY M.S.C.	
HORIZONTAL 1" = 200'	
VERTICAL 1" = 20'	
SCALES	

ENGINEERING-SCIENCE, INC.
ENGINEERS AND CONSULTANTS
600 BANCROFT WAY BERKELEY, CALIFORNIA 94710 (415) 548-7970

SUBMITTED BY _____ C.E. _____ R.E. NO. _____ DATE _____

MONTEREY PENINSULA
WATER POLLUTION CONTROL AGENCY
MONTEREY COUNTY, CALIFORNIA

STAGE 2 – REGIONAL INTERCEPTORS AND OUTFALL PROJECT

RESERVATION ROAD INTERCEPTOR
STA. 52+60 TO 100+05

SHEET P-0.12

LOG OF DRILL HOLE

DRILLED May 16, 1978 WITH Flight Auger
DIAMETER OF DRILL HOLE IN INCHES 6
LOGGED BY T. Huber

DH-207

SURFACE ELEVATION IN FEET 45 DATUM

GEOLOGICAL CLASSIFICATION DESCRIPTION	ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLES	ENGINEERING CLASSIFICATION AND DESCRIPTION	TEST DATA M-D-O (RC)
OLDER SAND DUNE DEPOSITS (Qod)					SAND (SP), brown, fine to medium grained, medium dense to dense.	
					light yellow-brown	
	40	5				
			(15)	4 7 8		
					fine to coarse grained	
	35	10				
			23			4-107-DS (3)
					Bottom of drill hole at a depth of 11 feet. No ground water. Minimal caving. Drill hole backfilled.	
		15				
		20				
		25				
		30				
		35				

LOG OF DRILL HOLE

DRILLED May 16, 1978 WITH Flight Auger
DIAMETER OF DRILL HOLE IN INCHES 6
LOGGED BY T. Huber

DH-208

SURFACE ELEVATION IN FEET 44 DATUM

GEOLOGICAL CLASSIFICATION DESCRIPTION	ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLES	ENGINEERING CLASSIFICATION AND DESCRIPTION	TEST DATA M – D (RC) – O
FILL (af)					SILTY SAND (SM-SP), with gray, gray-green, medium dense.	
OLDER SAND DUNE DEPOSITS (Qod)	40	5			SAND (SP), brown, fine to medium grained, medium dense.	
			5	■	orange-brown	5-106 - DS
	35	10			medium dense to dense	
			(28)	5 12 16 ■		
		15			Bottom of drill hole at a depth of 11½ feet. No ground water. Minimal caving. Drill hole backfilled.	
		20				
		25				
		30				
		35				

LOG OF DRILL HOLE

DRILLED May 16, 1978 WITH Flight Auger
DIAMETER OF DRILL HOLE IN INCHES 7
LOGGED BY T. Huber

DH 209

SURFACE ELEVATION IN FEET 50 DATUM

GEOLOGICAL CLASSIFICATION DESCRIPTION	ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLES	ENGINEERING CLASSIFICATION AND DESCRIPTION	TEST DATA M – D (RC) – O
OLDER SAND DUNE DEPOSITS (Qod)					SILTY SAND (SM-SP), brown to dark brown, fine to coarse grained, medium dense.	
	45	5			brown to orange-brown	
			9			10-112
	40	10			orange-brown to yellow-brown	
			8 (87) 11 16		medium dense to dense	
	35	15				
			30			4-98
	30	20				
			11 (43) 21 22			
		25			Bottom of drill hole at 21½ feet. No ground water. Minimal caving. Drill hole backfilled.	
		30				
		35				

LEGEND ON PLATE A-2

V78020

Plate A-1.74

LOG OF TEST PIT

EXCAVATED May 26, 1978 WITH Backhoe

TP-201

PIT DIMENSIONS IN FEET W 2 L 18 D 8

SURFACE ELEVATION IN FEET 46 DATUM

GEOLOGICAL CLASSIFICATION DESCRIPTION	ELEVATION IN FEET	DEPTH IN FEET	SYMBOL	SAMPLES	ENGINEERING CLASSIFICATION AND DESCRIPTION	TEST DATA M - D (RC) - O
OLDER SAND DUNE DEPOSITS (Qod)	45				SILTY SAND (SM), brown, fine to coarse grained, medium dense. orange-brown	
	40	5			SAND (SP), orange-brown, fine to coarse grained, medium dense.	
		10			Bottom of test pit at 8 feet. No ground water. Caving from 4 to 8 feet.	
		15				

PIT DIMENSIONS IN FEET W 2 L 18 D 9

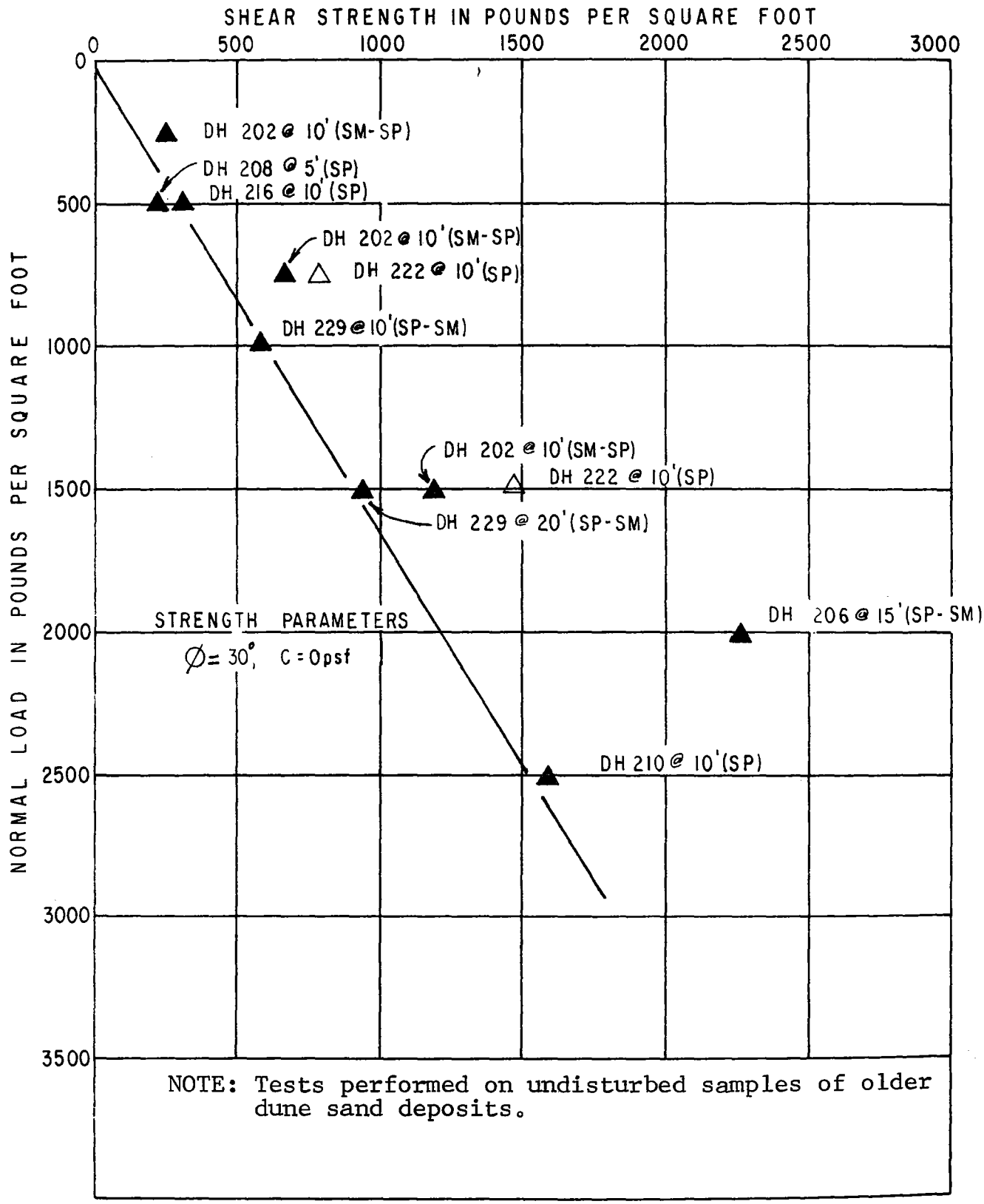
TP-202

SURFACE ELEVATION IN FEET 60

OLDER SAND DUNE DEPOSITS (Qod)					SILTY SAND (SM-SP), brown, fine to coarse grained, medium dense.	
	55	5			SAND (SP), brown to orange-brown, fine to coarse grained, medium dense to dense.	
	50	10			Bottom of test pit at 9 feet. No ground water. Minimal caving.	
		15				

LEGEND ON PLATE A-2

SHEAR TEST DATA

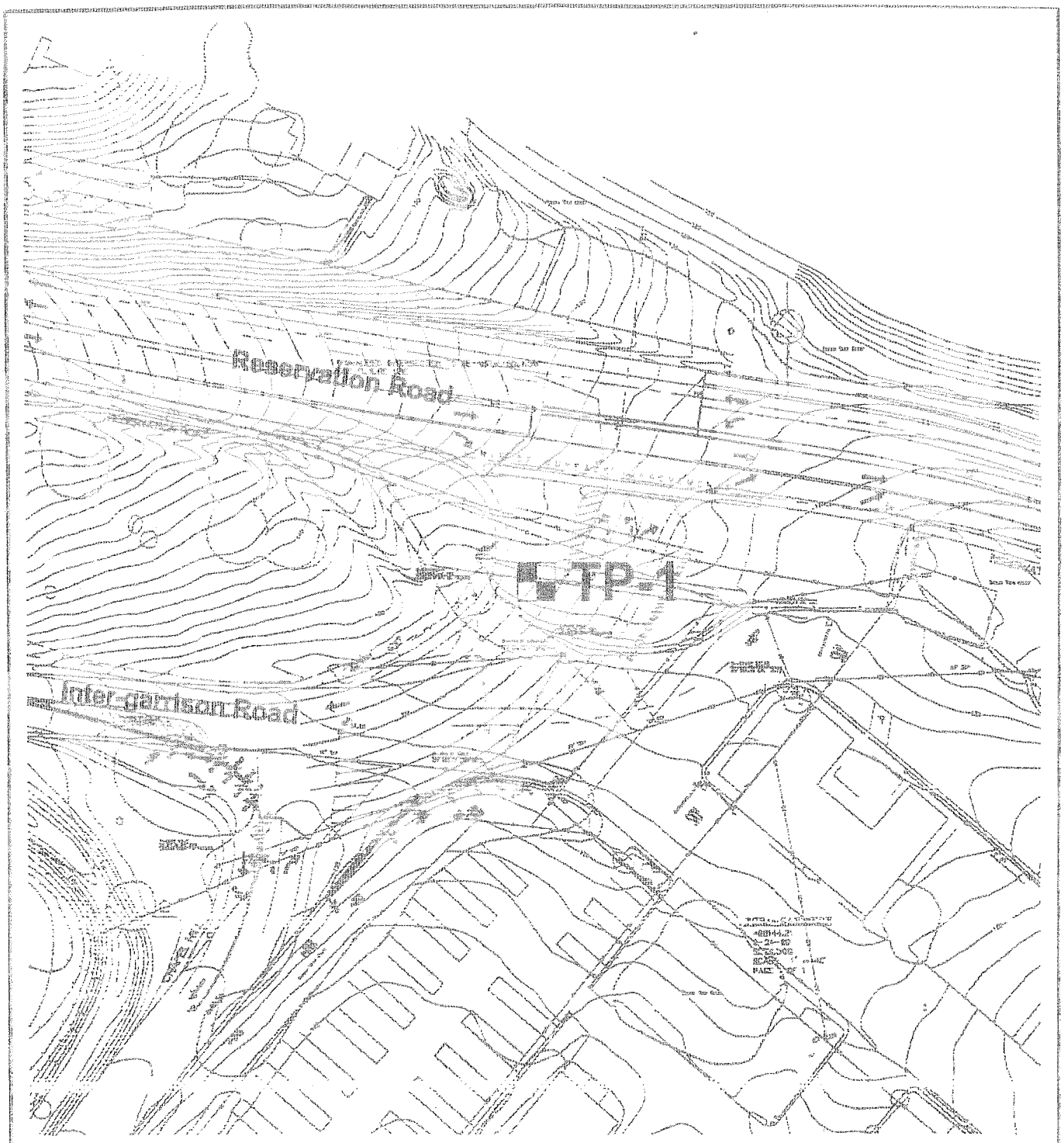


NOTE: Tests performed on undisturbed samples of older dune sand deposits.

LEGEND ON PLATE A-

HLA 1999[1]

[1] Please see Figure 5 for full citation.



LEGEND

TP-1 Approximate test pit location

0 80
Scale in feet

BASE: Topographic Drawing Provided by Sandia Humber Jones

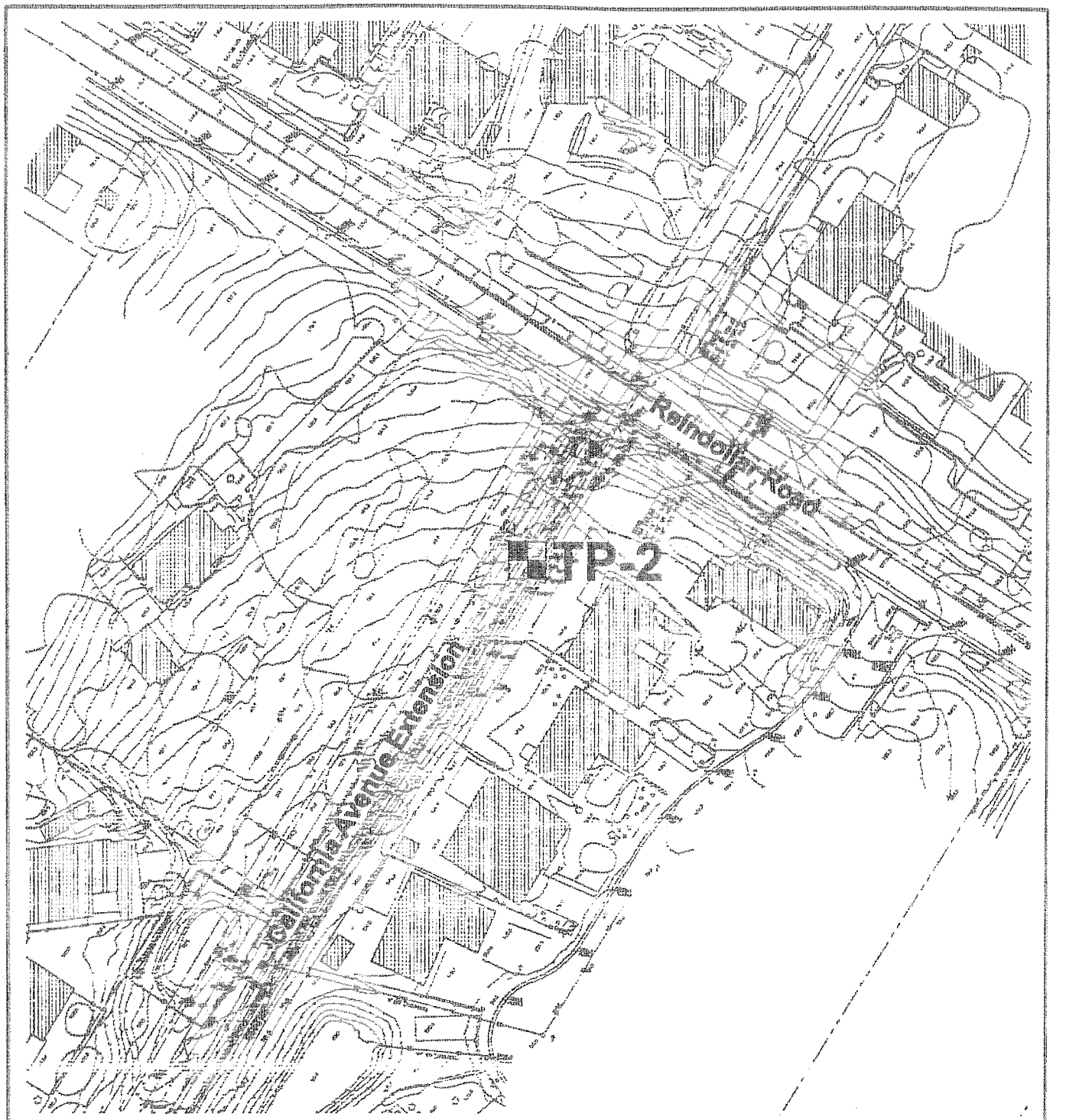
Harding Lawson Associates
Engineering and
Environmental Services

TP-1 Approximate Location

Proposed Roadway Improvements
Fort Ord Reuse Authority
Former Fort Ord and Vicinity

PLATE 1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BRZ	42354		11/99	



N

0 80

Scale in feet

LEGEND

TP-1 Approximate test pit location

BASE: Topographic Drawing Provided by Sandis Humber Jones

Harding Lawson Associates

Engineering and
Environmental Services

TP-2 Approximate Location

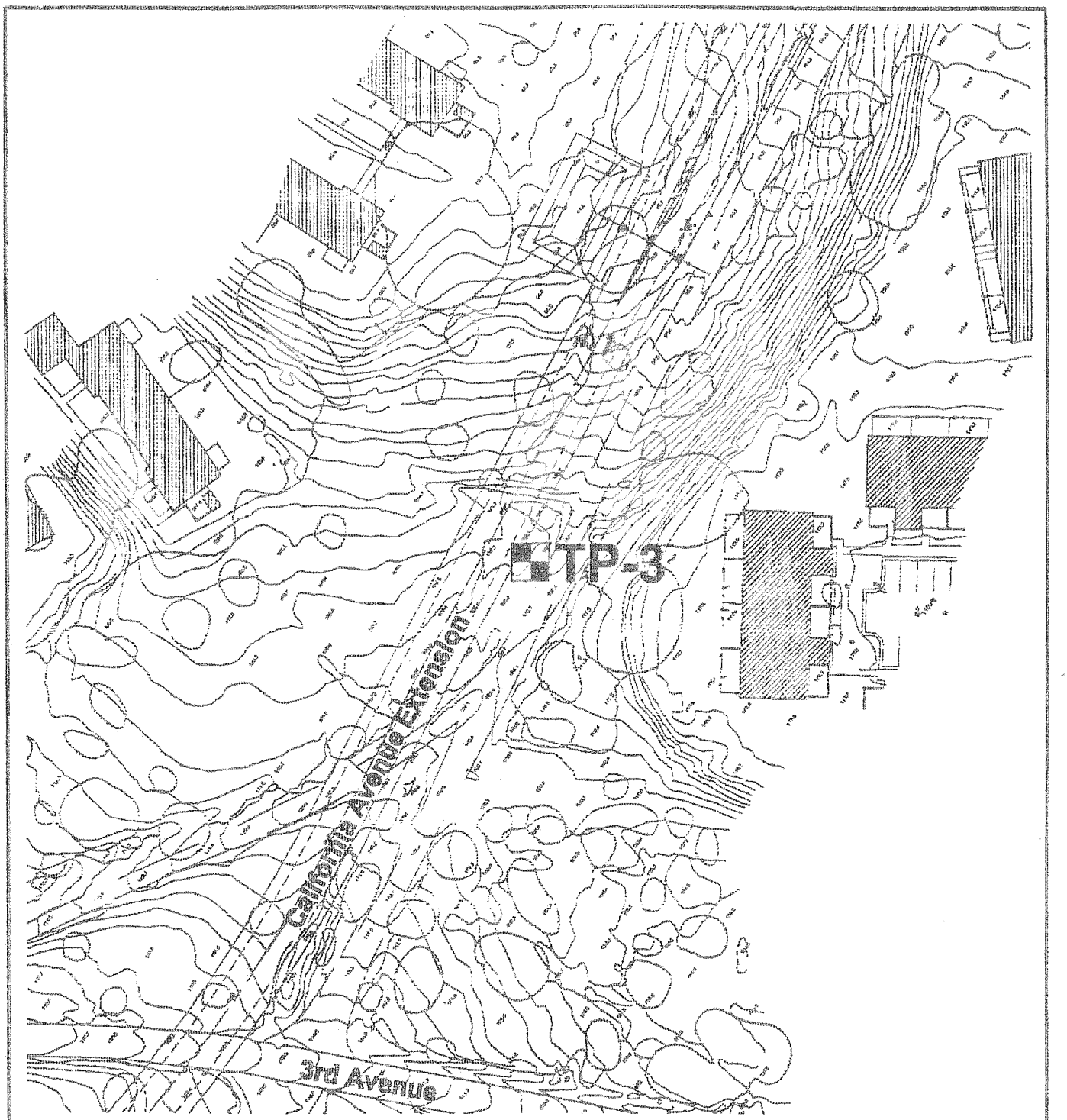
Proposed Roadway Improvements
Fort Ord Reuse Authority
Former Fort Ord and Vicinity

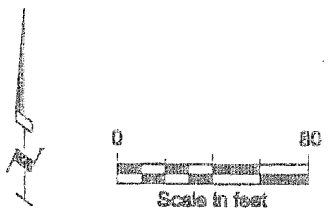
PLATE

2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BRZ	46354		11/98	

co_base.dwg





LEGEND

TP-1 Approximate test pit location

BASE: Topographic Drawing Provided by Sandia Humber Jones

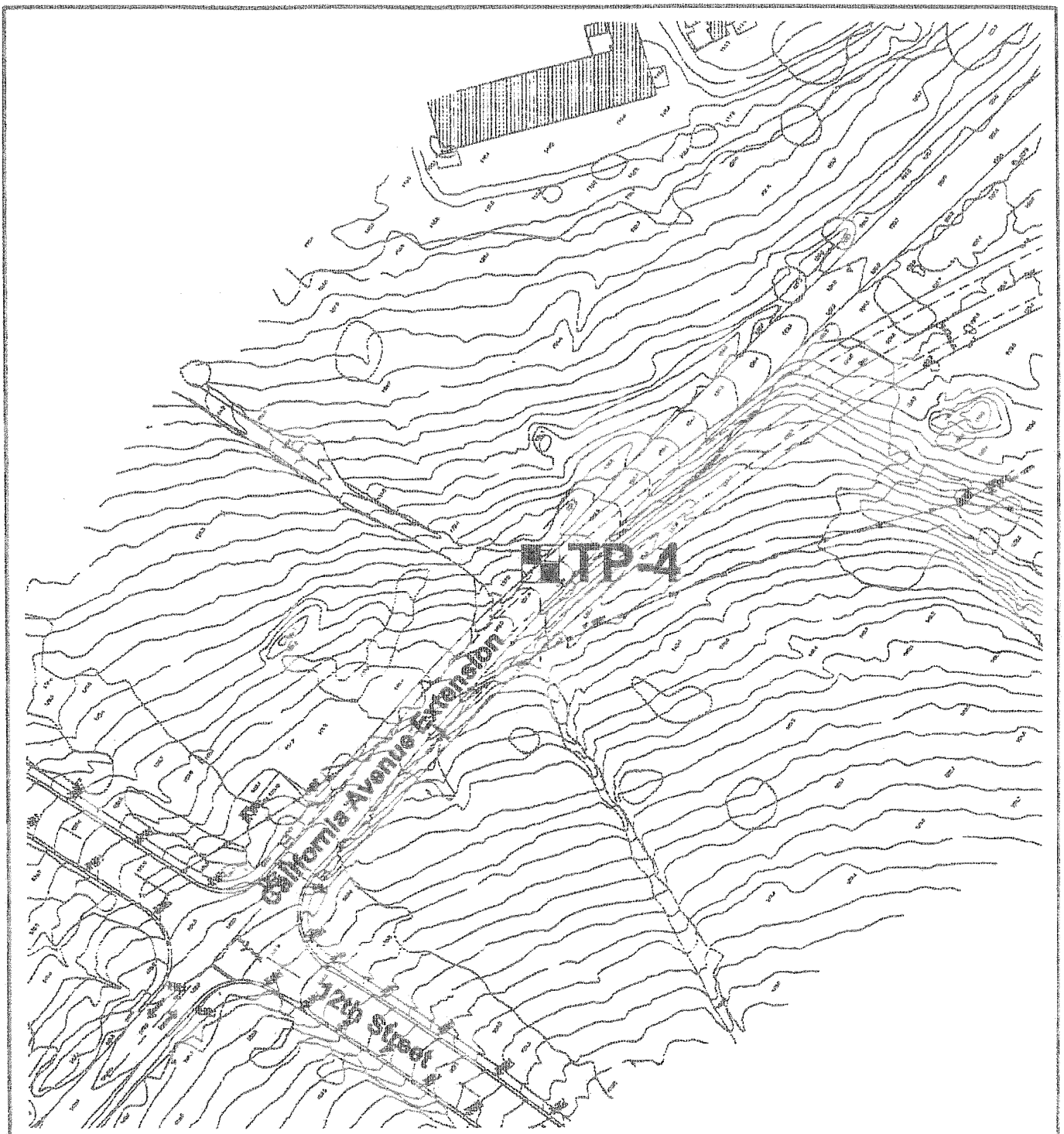
Harding Lawson Associates
Engineering and Environmental Services

TP-3 Approximate Location

Proposed Roadway Improvements
Fort Ord Reuse Authority
Former Fort Ord and Vicinity

PLATE **3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BRZ	46354		11/98	



N

0 80

Scale in feet

LEGEND

TP-1 Approximate test pit location

BASE: Topographic Drawing Provided by Sandis Humber Jones

Harding Lawson Associates

Engineering and Environmental Services

TP-4 Approximate Location

Proposed Roadway Improvements
Fort Ord Reuse Authority
Former Fort Ord and Vicinity

PLATE 4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BRZ	46354		11/98	

cd_base.dwg

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS OVER 50% > No.200 SIEVE SIZE	GRAVELS MORE THAN 1/2 OF COARSE FRACTION > No.4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH OVER 15% FINES	GM	Silty gravels, gravel-sand mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS MORE THAN 1/2 OF COARSE FRACTION < No.4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW	Well-graded sand or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH OVER 15% FINES	SM	Silty sand, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS OVER 50% < No.200 SIEVE SIZE	SILTS & CLAYS LIQUID LIMIT 50% OR LESS		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488-93

- Bulk or classification sample
- Sample preserved for possible laboratory analysis
- Lost Sample
- First encountered groundwater

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No. 4	76.2 to 4.75
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No. 4	19.1 to 4.75
SAND	No. 4 to No. 200	4.75 to 0.075
coarse	No. 4 to No. 10	4.75 to 2.00
medium	No. 10 to No. 40	2.00 to 0.425
fine	No. 40 to No. 200	0.425 to 0.075
SILT & CLAY	Below No. 200	Below 0.075

KEY TO TEST DATA*

Source: ASTM D 2488-90, based on United Soil Classification system
*. Not part of ASTM Classification System

SOIL_CLASS_GEOL2 46354.GPJ HLA_NOVA.GDT 11/15/99

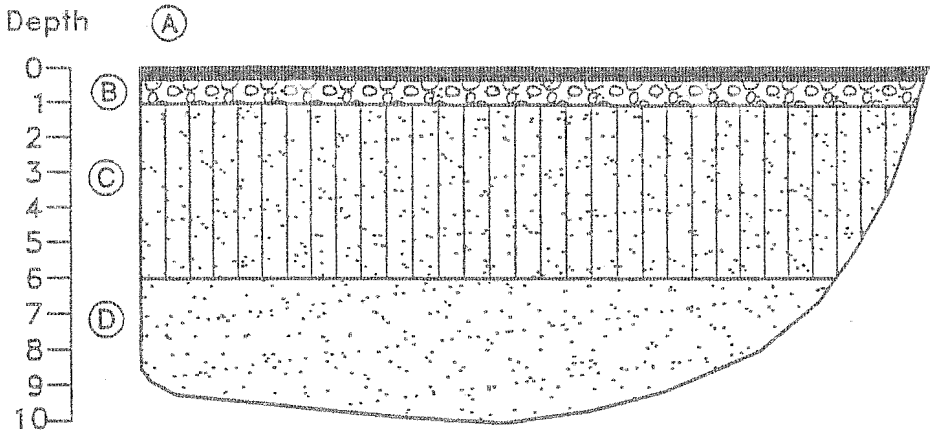
Harding Lawson Associates
Engineering and Environmental Services

Soil Classification Chart and Key to Test Data

FORA
Fort Ord, California

PLATE A-1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
PCB	46354		11/99	



(A) ASPHALT, 3 inches thick:

(B) LIGHT GREENISH GRAY WELL GRADED GRAVEL WITH SILT (GW-GM):
Loose, dry, 70% fine to coarse gravel, 20% fine to coarse sand, 10% silt, baserock

(C) YELLOWISH BROWN SILTY SAND (SM):
Loose, moist, 80% fine to medium sand, 20% silt

(D) at 6 ft., change to WELL GRADED SAND (SW), 5% silt

at 8 ft., color change to dark yellowish brown

Notes:
Trenching on 9/22/99
Samples at 2.5, 5, 7.5 and 10 ft. BGS

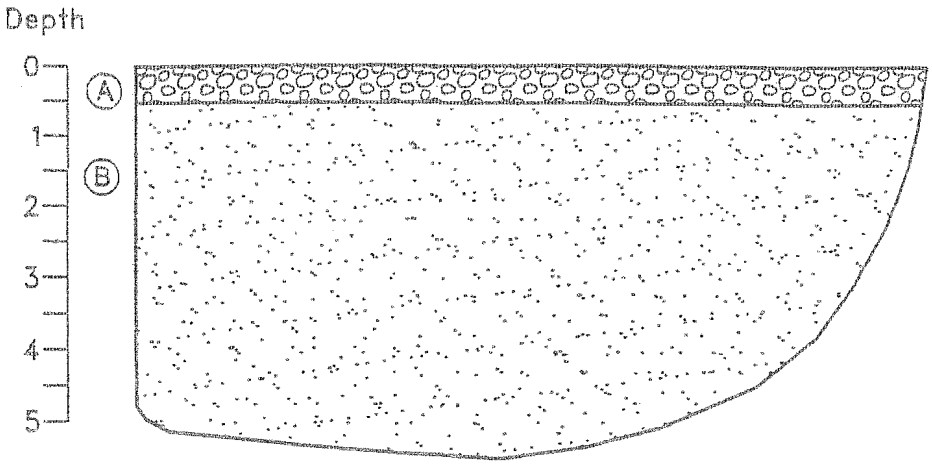
46354001.DWG 1.0
19991112.1450

Harding Lawson Associates
Engineering and
Environmental Services

Log of Test Pit #1
East Garrison & Reservation Rd.
FORA
Fort Ord, California

FIGURE
TP-1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
PCB	46354 3		11/99	



(A) LIGHT GREENISH GRAY WELL GRADED GRAVEL WITH SILT (GW–GM):
Loose, dry, 70% fine to coarse gravel, 20% fine to coarse sand, 10% silt, baserock

(B) YELLOWISH BROWN POORLY GRADED SAND WITH SILT AND GRAVEL (SP–SW) (10YR 5/6):
Loose, dry, 90% fine to coarse sand, 10% silt, roots from 1 to 5.5 ft. deep

Notes:
Trenching on 9/22/99
Samples at 2.5 and 5 ft. BGS

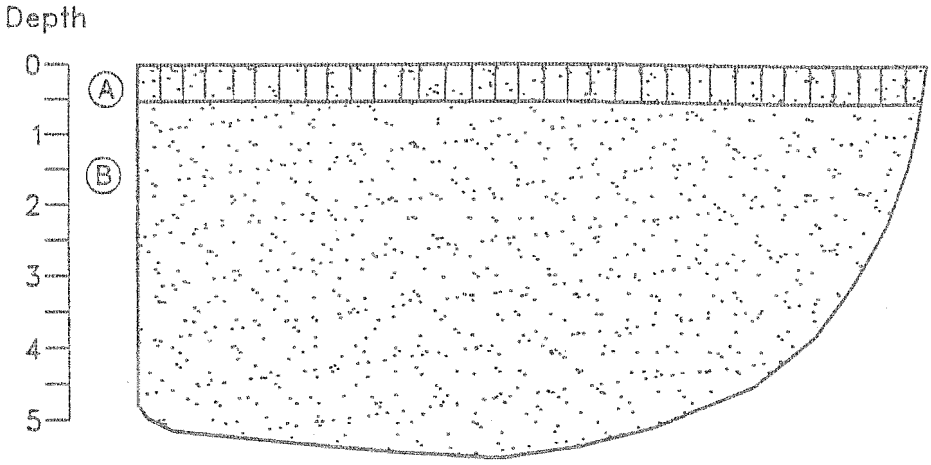
46354002.DWG 1.0
19991104.1005

Harding Lawson Associates
Engineering and
Environmental Services

Log of Test Pit #2
California St. Extension
FORA
Fort Ord, California

FIGURE
TP-2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
PCB	46354 3		11/99	



(A) LIGHT OLIVE BROWN SILTY SAND (SM) (2.5Y 5/4):
Loose, dry, 75% sand, 25% silt.

(B) LIGHT YELLOWISH BROWN POORLY GRADED SAND (SP) (10YR 6/4):
Loose, dry, fine to coarse sand, <5% silt

@ 5 ft.: change to 100% fine to coarse sand

Notes:
Trenching on 9/22/99
Samples at 2.5 and 5 ft. BGS

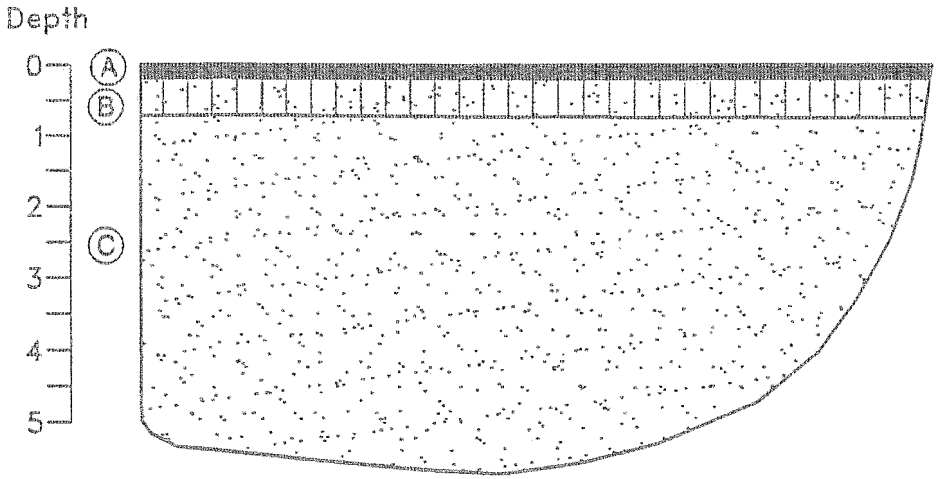
46354003.DWG 1.0
19991112.1458

Harding Lawson Associates
Engineering and
Environmental Services

Log of Test Pit #3
East of 12th Avenue
FORA
Fort Ord, California

FIGURE
TP-3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
PCB	46354 3		11/99	



(A) ASPHALT, 1 in.

(B) BROWN SILTY SAND (SM) (10YR 4/3):
Loose, dry, 75% fine to coarse sand, 25% silt.

(C) LIGHT YELLOWISH BROWN WELL GRADED SAND (SW-SM) (10YR 6/4):
Loose, dry, 90% fine to coarse sand, 10% silt

@ 5 ft.: change to 100% fine to coarse sand

Notes:
Trenching on 9/22/99
Samples at 2.5 and 5 ft. BGS

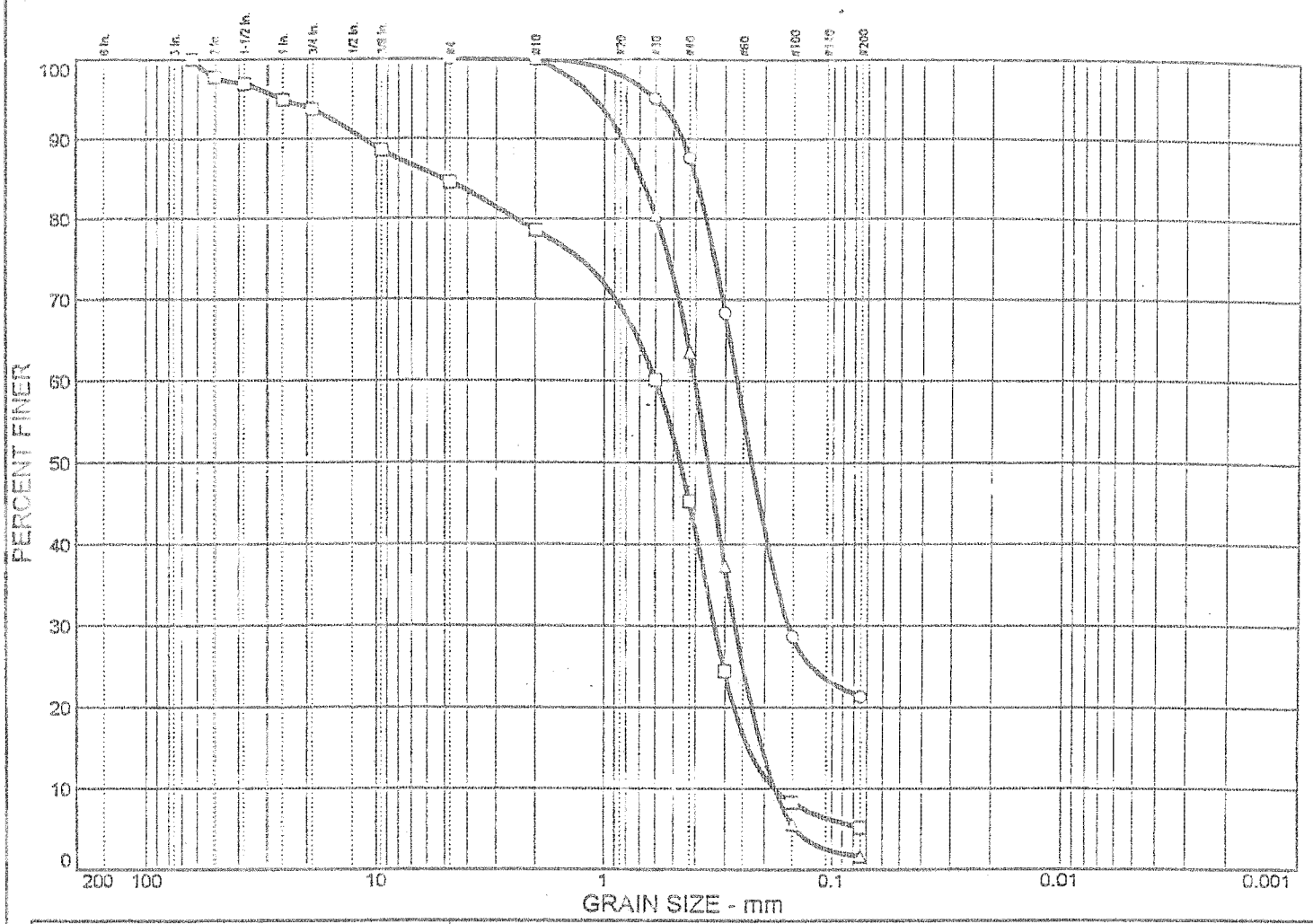
4635A004.DWG 1.0
19991112.1500

Harding Lawson Associates
Engineering and
Environmental Services

Log of Test Pit #4
California Extension
FORA
Fort Ord, California

FIGURE
TP-4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
PCB	46354 3		11/99	



	% COBBLES	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	0.0	0.1	12.3	66.3	21.3	
□	0.0	6.3	9.1	6.0	33.4	40.0	5.2	
△	0.0	0.0	0.0	0.0	36.5	61.9	1.6	

X	LL	PL	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.400	0.265	0.229	0.156				
□			5.09	0.598	0.466	0.331	0.235	0.180	1.02	3.32
△			0.687	0.404	0.354	0.270	0.204	0.179	1.01	2.26

MATERIAL DESCRIPTION	USCS	AASHTO
○ orange brown silty SAND □ brown SAND w/gravel △ light brown SAND	SP-SM	

Project No. 179-161 Client: HLA

Project: 46354.1

○ Source: 1 (TP-1) Elev./Depth: 1.5'

□ Source: 2 (TP-2) Elev./Depth: 1.5'

△ Source: 3 (TP-3) Elev./Depth: 1.5'

Remarks:

○

□

△

PARTICLE SIZE DISTRIBUTION CURVES

COOPER TESTING LABORATORY

Plate

COOPER TESTING LABORATORIES

R-VALUE TEST

JOB #: 179-161b
DATE: 10/08/1999
CLIENT: HLA
SAMPLE #: 46354.1, TP2 @ 1.5'
SOIL TYPE: brown SAND w/gravel and silt

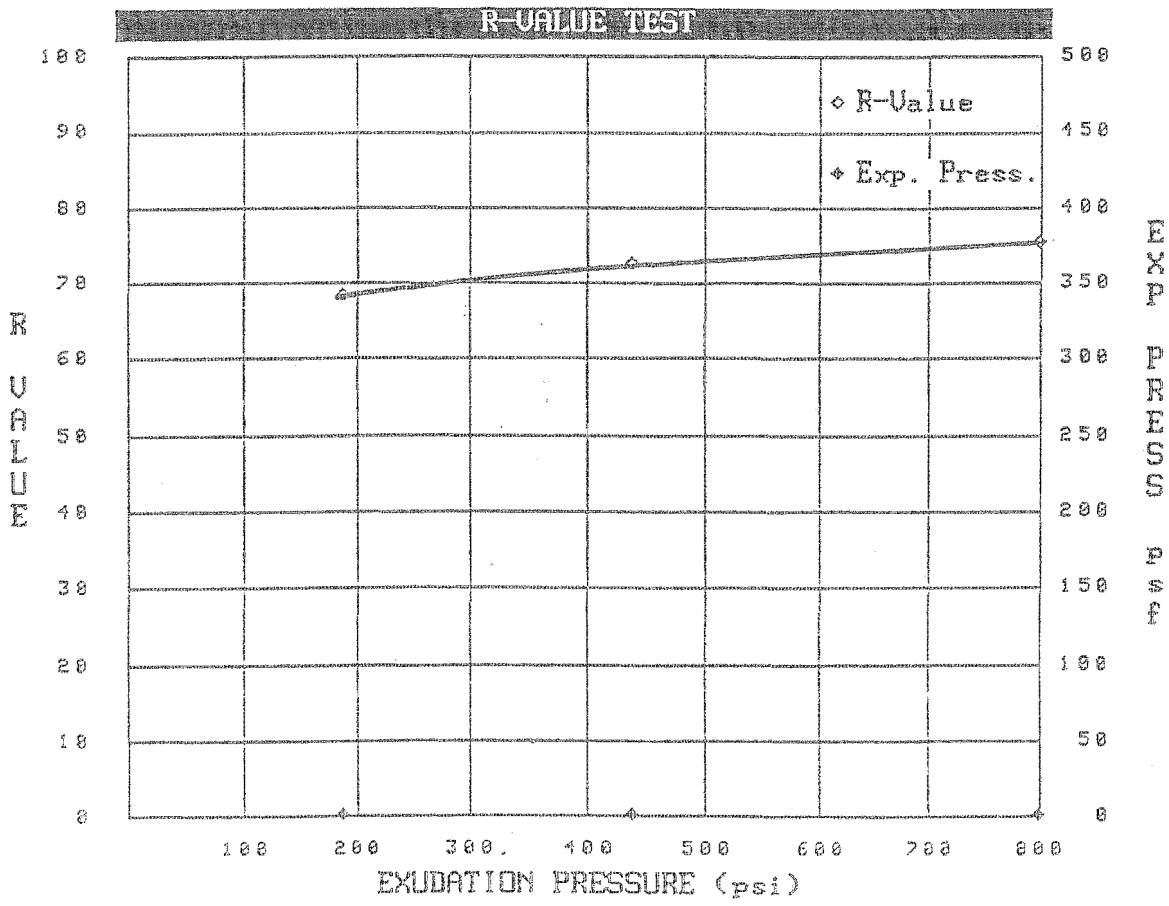
DISH WEIGHT: 53.8
WET: 366.5
DRY: 355.1
INITIAL MOSITURE: 0.0378

SPECIMEN	A	B	C	D
EXUDATION PRESSURE (psi)	190	800	439	0
PREPARED WEIGHT (gm)	1200	1200	1200	1200
FINAL WATER ADDED (gm)	80	60	70	0
WEIGHT, SOIL & MOLD (gm)	3185	3144	3110	0
WEIGHT, MOLD (gm)	2106	2104	2110	0
HEIGHT (in)	2.61	2.52	2.35	0.00
MOISTURE CONTENT (%)	10.7	9.0	9.8	0.0
DRY DENSITY (pcf)	113.1	114.7	117.3	0.0
EXPANSION DIAL	0	0	0	0
EXPANSION PRESSURE (psf)	0	0	0	0
STABILOMETER @ 2000 lb	38	28	28	0
TURNS DISPLACEMENT	3.85	3.83	3.78	0.00
R-VALUE	68	75	76	0
R-VALUE (corrected)	68	75	73	0

VALUES AT 300 EXUDATION

R-VALUE: 71
EXP. PRESSURE: 0

REMARKS



COOPER TESTING LABORATORIES

R-VALUE TEST

JOB #: 179-161a
DATE: 10/05/1999
CLIENT: HLA
SAMPLE #: 46354.1,TP1 @ 1.5'
SOIL TYPE: orange brown silty SAND

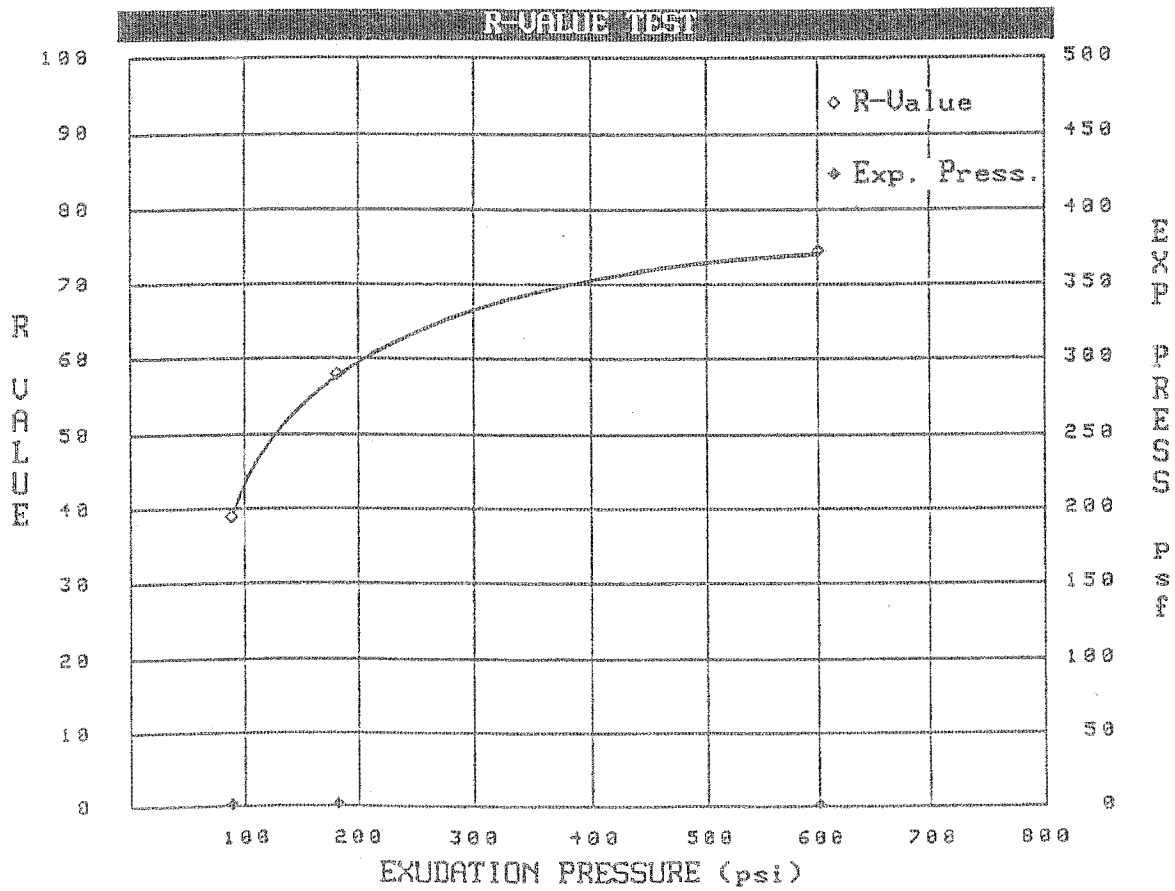
DISH WEIGHT: 43.6
WET: 319.8
DRY: 305.7
INITIAL MOSITURE: 0.0538

SPECIMEN	A	B	C	D
EXUDATION PRESSURE (psi)	89	184	602	0
PREPARED WEIGHT (gm)	1200	1200	1200	1200
FINAL WATER ADDED (gm)	100	60	50	0
WEIGHT, SOIL & MOLD (gm)	3163	3159	3135	0
WEIGHT, MOLD (gm)	2070	2117	2108	0
HEIGHT (in)	2.53	2.37	2.30	0.00
MOISTURE CONTENT (%)	14.2	10.6	9.8	0.0
DRY DENSITY (pcf)	114.6	120.3	123.2	0.0
EXPANSION DIAL	0	0	0	0
EXPANSION PRESSURE (psf)	0	0	0	0
STABILOMETER @ 2000 lb	74	46	27	0
TURNS DISPLACEMENT	4.57	3.85	3.65	0.00
R-VALUE	39	62	77	62
R-VALUE (corrected)	39	58	74	10

VALUES AT 300 EXUDATION

R-VALUE: 65
EXP. PRESSURE: 0

REMARKS



COOPER TESTING LABORATORIES

R-VALUE TEST

JOB #: 179-161
DATE: 10/05/1999
CLIENT: HLA
SAMPLE #: 46354.1,TP3 @ 1.5'
SOIL TYPE: yellow brown silty SAND

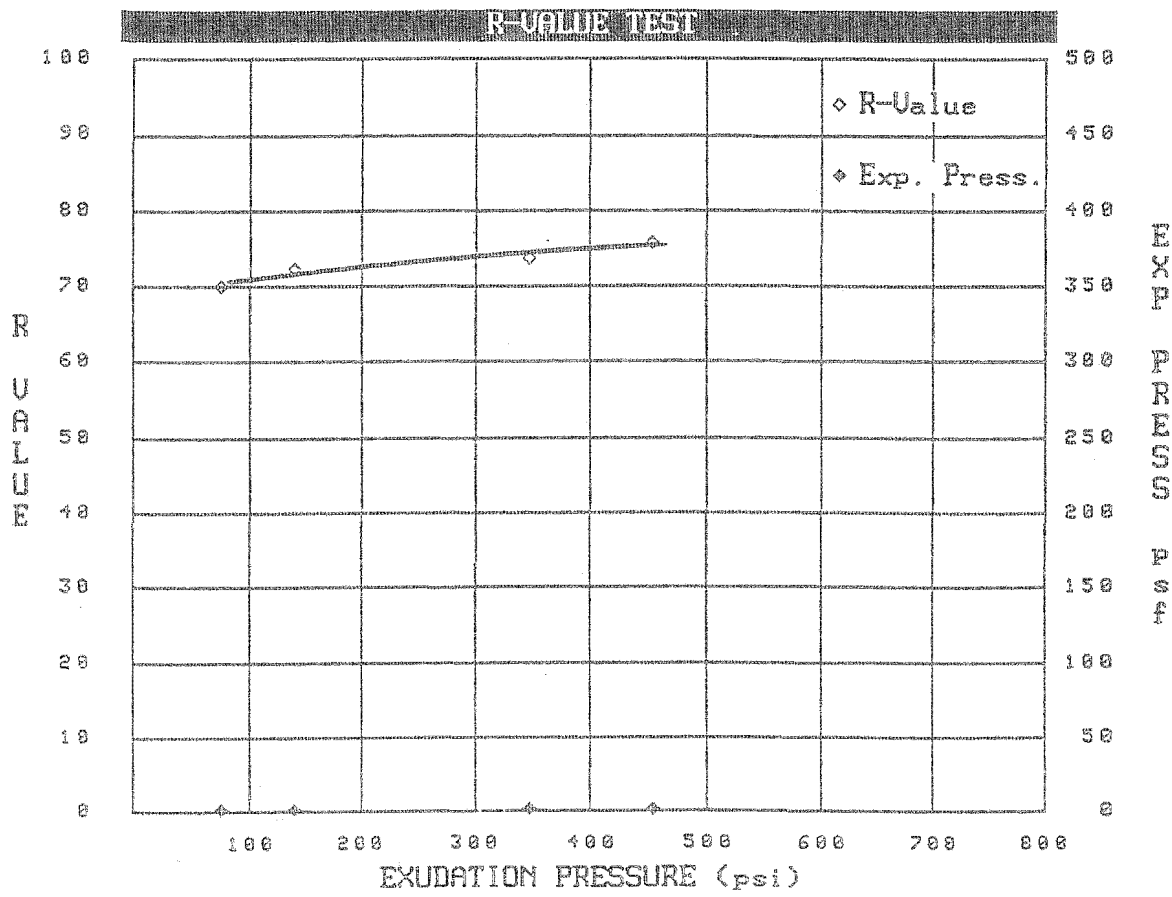
DISH WEIGHT: 53.8
WET: 381.8
DRY: 365.9
INITIAL MOSITURE: 0.0509

SPECIMEN	A	B	C	D
EXUDATION PRESSURE (psi)	456	76	350	141
PREPARED WEIGHT (gm)	1200	1200	1200	1200
FINAL WATER ADDED (gm)	90	110	100	105
WEIGHT, SOIL & MOLD (gm)	3073	3085	3057	3104
WEIGHT, MOLD (gm)	2125	2139	2131	2138
HEIGHT (in)	2.42	2.46	2.42	2.53
MOISTURE CONTENT (%)	13.0	14.7	13.9	14.3
DRY DENSITY (pcf)	105.0	101.5	101.8	101.2
EXPANSION DIAL	0	0	0	0
EXPANSION PRESSURE (psf)	0	0	0	0
STABILOMETER @ 2000 lb	28	35	32	34
TURNS DISPLACEMENT	3.43	3.52	3.28	3.57
R-VALUE	77	72	75	72
R-VALUE (corrected)	76	70	74	72

VALUES AT 300 EXUDATION

R-VALUE: 73
EXP. PRESSURE: 0

REMARKS



1343 Redwood Way
Petaluma, CA 94954
(707) 795-9605/FAX 795-9384

Environmental Technical Services

Soil, Water & Air Testing & Monitoring
Analytical Labs
Technical Support

Serving people and the environment so that both benefit.

COMPANY: Harding Lawson Associates, 90 digital Drive, Novato, CA 94949
ATTN: Joe Phaby
OJECT NAME: Fort Ord
Monterey, California
OB NUMBER: 46354.1

			DATE COLLECTED	DATE RECEIVED	DATE of COMPLETION	ANALYST(S)	SUPERVISOR
			9/22/99	9/28/99	10/12/99	C. Lawrence J. Garibay	D. Jacobson LAB DIRECTOR G.S. Conrad PhD
LAB AMPLE UMBER	SAMPLE ID	DESCRIPTION of SOIL and/or SEDIMENT	SOIL pH -log[H+]	SINGLE POINT RESISTIVITY ohm-cm	ELECTRICAL CONDUCTIVITY µmhos/cm	SULFATE SO4 ppm	CHLORIDE Cl ppm
9-0361	9938EG1	TP-1 @ 2.5'	5.94	8620	[116]	72	54
9-0362	9938CE2	TP-2 @ 2.5'	4.94	8850	[113]	51	60
ethod	Detection	Limits --->	---	1	0.1	1	1

LAB AMPLE UMBER	SAMPLE ID	DESCRIPTION of SOIL and/or SEDIMENT	SALINITY ECe mmhos/cm	SOLUBLE SULFIDES (S=) ppm	SOLUBLE CYANIDES (CN=) ppm	REDOX mV	PERCENT MOISTURE %
ethod	Detection	Limits --->	---	0.1	0.1	1	0.1

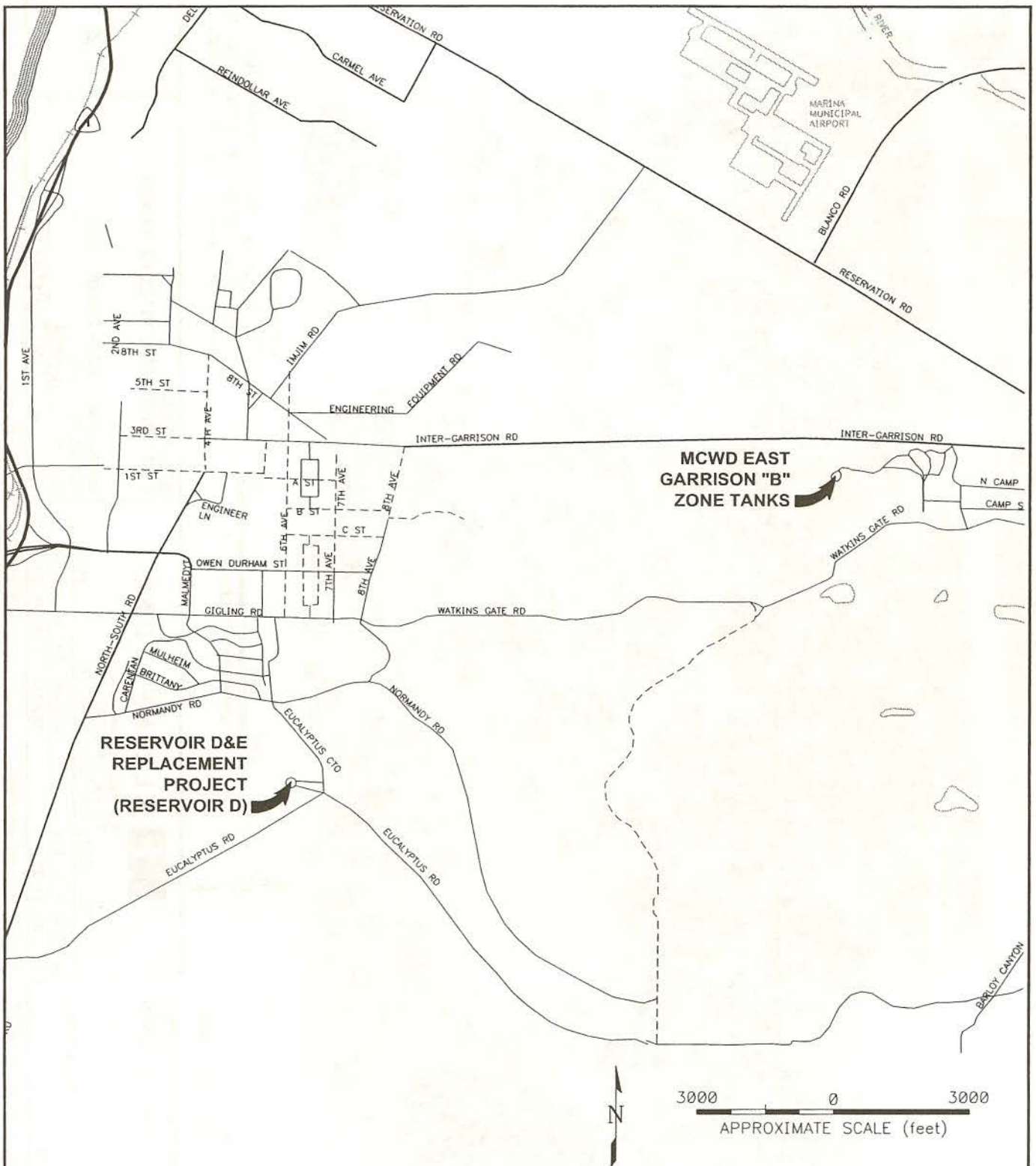
COMMENTS

While the resistivities were approaching 10,000 ohm-cm in both samples, both pHs were very acidic; chloride & sulfate levels were low in both. The CalTrans times to perforation would be as follows: for 9938EG and 18 ga it is 21.6 yrs, & for 12 ga it would be 47.6 yrs; and for 9938CE is at 18.1 yrs, and for 12 ga it would be 39.8 yrs. These times are not very good, are pretty decent, and might be characterized as "average" to good. The sulfate and chloride concentrations are not high enough to be of any concern as they relate to potential impact on grouts, mortars and cements, and on ferrous reinforcement in construction materials. Finally, the times to perforation would be dramatically increased by liming these soils to the 7.5-8 pH range especially since acidity is their only problem - resistivities are very high, much higher than typical which accounts for good perf times; (e.g. 18 ga times would increase to about 60+ years for the two).

NOTES: Methods are from the following sources: extractions by Cal Trans protocols as per Method 417 (SO4), 422 (Cl), 32/643 (pH & resistivity); and/or by ASTM Vol. 4.08 & ASTM Vol. 11.01 (=EPA Meth Chem Anal, or Standard Methods); ASTM G 51; Specific Cond. - ASTM D 1125; resistivity - ASTM G 57; redox - Pt probe/ISE; sulfate - extraction Title 22, ion ASTM D 516 (=EPA 375.4); chloride - extraction Title 22, detection ASTM D 512 (=EPA 325.3); sulfides - extraction 22, detection EPA 376.2 (=SMEWW 4500-S D); cyanides - extraction Title 22, detection ASTM D 4374 (=EPA 335.2).

Kleinfelder Inc. 2005[1]

[1] Please see Figure 5 for full citation.



KLEINFELDER
365 Victor Street, Suite L
Salinas, CA 93907-2024
TEL: (831) 755-7900 FAX: (831) 755-7909

DRAFTED BY: L. Sue	CHECKED BY: R. Hasseler	**SITE VICINITY MAP**	PLATE
DATE: 08/26/05	REVISION DATE:	MARINA COAST WATER DISTRICT TANKS FORMER FORT ORD MONTEREY, CALIFORNIA PROJECT NO. 59012-PWGEO	1

XRef: TB_A-port
ATTACHED XREFS:
ATTACHED IMAGES:

Ple-L:\2005\05PROJ CAD FILE: D:_PROJECTS\59012\PWGEO\SITE-VIC.dwg
LAYOUT: Layout1
PLOTTED: 26 Aug 2005, 10:46am

LEGEND

● SOIL BORING (by Kleinfelder, Aug. 2005)

▲ CONE PENETROMETER TEST (by Kleinfelder, Aug. 2005)

NOTE: Locations are approximate.

N

200 100 0 200

APPROXIMATE SCALE (feet)

REFERENCE:
RBF Consulting, "Marina Coast Water District, East Garrison 'B' Zone Tanks, Soil Boring Locations," dated 28 July 2005.

KLEINFELDER
365 Victor Street, Suite L
Salinas, CA 93907-2024
TEL: (831) 755-7900 FAX: (831) 755-7909

DRAFTED BY: L. Sue	CHECKED BY: R. Hasseler
DATE: 09/21/05	REVISION DATE: 09/02/05

SITE PLAN:
EAST GARRISON "B" ZONE TANKS

MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

PROJECT NO. 59012-PWGEO

PLATE 2

Ple-L:\2005\05PROJ CAD FILE: L:\2005\05Projects\59012\GRAPHICs\PWGEO\SP_east garrison.dwg
LAYOUT: Layout1
PLOTTED: 21 Sep 2005, 3:27pm

ATTACHED XREFS: XRef: TB_A-land
ATTACHED IMAGES: Images: East Garrison B Zone Tanks.jpg

LEGEND

- ● SOIL BORING (by Kleinfelder, Aug. 2005)
- ▲ CONE PENETROMETER TEST (by Kleinfelder, Aug. 2005)

N

60 30 0 60
APPROXIMATE SCALE (feet)

REFERENCE:
RBF Consulting, "Reservoir D Site Boring Locations," dated 15 July 2005.

NOTE: Locations are approximate.

KLEINFELDER
365 Victor Street, Suite L
Salinas, CA 93907-2024
TEL: (831) 755-7900 FAX: (831) 755-7909

DRAFTED BY: L. Sue	CHECKED BY: R. Hasseler
DATE: 09/21/05	REVISION DATE:

SITE PLAN:
RESERVOIR D SITE

MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

PROJECT NO. 59012-PWGEO

PLATE
3

Ple-L:\2005\05PROJ CAD FILE: L:\2005\05Projects\59012\GRAPHICs\PWGEO\SP_Reservoir D.dwg
LAYOUT: Layout1
PLOTTED: 23 Sep 2005, 10:20am

ATTACHED XREFS: XRef: TB_A-land
ATTACHED IMAGES: Images: Reservoir D Site.jpg

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY	GW		Well-graded gravels or gravel with sand, little or no fines.
		GP		Poorly-graded gravels or gravel with sand, little or no fines.
		GM		Silty gravels, silty gravel with sand mixture.
		GC		Clayey gravels, clayey gravel with sand mixture.
	SAND AND SANDY	SW		Well-graded sands or gravelly sands, little or no fines.
		SP		Poorly-graded sands or gravelly sands, little or no fines.
		SM		Silty sand.
		SC		Clayey sand.

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
FINE GRAINED SOILS	SILTS AND CLAYS	ML		Inorganic silts and very fine sands, rock flour or clayey silts with slight plasticity.
		CL		Inorganic lean clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL		Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS	MH		Inorganic elastic silts, micaceous or diatomaceous or silty soils.
		CH		Inorganic fat clays (high plasticity).
		OH		Organic clays of medium high to high plasticity.
HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic soils.

Standard Penetration Split Spoon Sampler 2.0 inch O.D., 1.4 inch I.D.

Modified California Sampler 2.5 inch O.D., 2.0 inch I.D.

Bulk Sample

California Sampler, 3.0 inch O.D., 2.5 inch I.D.

Shelby Tube 3.0 inch O.D.

0745, 5/31 — Approximate water level first observed in boring. Time recorded in reference to a 24 hour clock.

0800, 5/31 — Approximate water level observed in boring following drilling

PEN — Pocket Penetrometer reading, in tsf

TV:Su — Torvane shear strength, in ksf

LL	LIQUID LIMIT	TX	TRIAXIAL SHEAR
PI	PLASTICITY INDEX	CONSOL	CONSOLIDATION
%-#200	SIEVE ANALYSIS (#200 SCREEN)	R-Value	RESISTANCE VALUE
DS	DIRECT SHEAR	SE	SAND EQUIVALENT
C	COHESION (PSF)	EI	EXPANSION INDEX
PHI	FRICTION ANGLE	FS	FREE SWELL (U.S.B.R.)

Notes: Blow counts represent the number of blows a 140-pound hammer falling 30 inches required to drive a sampler through the last 12 inches of an 18 inch penetration, unless otherwise noted.

The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

KLEINFELDER

PROJECT NO. 59012-PWGEO

BORING LOG LEGEND

MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

PLATE

A-1

8/24/05 10:18:29 AM

Date Completed:	8/5/05	Drilling method:	8" Hollow Stem Auger
Logged By:	P. Llewellyn	Hammer Wt:	140 lbs., 30" drop
Total Depth:	100.0 ft	Notes:	Sand

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION Surface Elevation: Estimated feet (MSL)
								POORLY GRADED SAND with SILT (SM) - brown, damp, loose, fine grained sand
		8				Passing #200 =11%		
								- dark yellowish-brown, moist
5		4						
								POORLY GRADED SAND (SP) - yellowish-brown, moist, loose
10		9						
15		9						
								- medium dense
20		18						
								- brownish-yellow, fine grained sand
25		25				Passing #200 =2%		

KLEINFELDER

PROJECT NO. 59012-PWGEO

LOG OF BORING NO. B-7

MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

PLATE

A-8

L:\2005\05PROJECTS\59012\59012.GPJ

9/21/05 2:43:05 PM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
30		31						- dense
35		40						
40		46				Passing #200 =32%		**SILTY SAND (SM)** - grayish-brown, moist, dense, fine grained sand
45		36						**POORLY GRADED SAND with SILT (SP-SM)** - yellowish-brown, moist, dense, fine grained sand
50		62				Passing #200 =8%		- very dense
55		61						

KLEINFELDER

PROJECT NO. 59012-PWGEO

LOG OF BORING NO. B-7

MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

PLATE

A-8
(cont'd)

L:\2005\05PROJECTS\59012\59012.GPJ

9/21/05 2:43:06 PM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
60		59						- dark brown, very dense
65		62				Passing #200 =11%		
								POORLY GRADED SAND (SP) - yellowish-brown, moist, very dense, fine grained sand
70		56						
75		61						
80		59						- brownish-yellow
85		40				Passing #200 =5%		**POORLY GRADED SAND with SILT (SP-SM)** -brownish-yellow, moist, dense, fine grained sand

KLEINFELDER

PROJECT NO. 59012-PWGEO

LOG OF BORING NO. B-7

MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

PLATE

A-8
(cont'd)

L:\2005\05PROJECTS\59012\59012.GPJ

9/21/05 2:43:07 PM

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
								- very dense
90		51						
95		59						
100		53						
								Boring terminated at 100 feet, below ground surface. No free water encountered. Boring backfilled with drilling spoils.
105								
110								
115								

KLEINFELDER

PROJECT NO. 59012-PWGEO

LOG OF BORING NO. B-7

MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

PLATE

A-8
(cont'd)

L:\2005\05PROJECTS\59012\59012.GPJ

9/21/05 2:43:08 PM

Date Completed:	8/5/05	Drilling method:	8" Hollow Stem Auger
Logged By:	P. Llewellyn	Hammer Wt:	140 lbs., 30" drop
Total Depth:	20.0 ft	Notes:	Sand

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION (Surface Elevation: Estimated feet (MSL))
		11						**SILTY SAND (SM)** - brown, damp, medium dense, fine grained sand
5		12						**POORLY GRADED SAND with SILT (SP-SM)** - light yellowish-brown, medium dense
10		17		8.0				
15		18						**POORLY GRADED SAND (SP)** - yellowish-brown, moist, medium dense, fine grained sand
20		22						Boring terminated at 20 feet, below ground surface. No free water encountered. Boring backfilled with drilling spoils.
25								

KLEINFELDER

PROJECT NO. 59012-PWGEO

LOG OF BORING NO. B-8

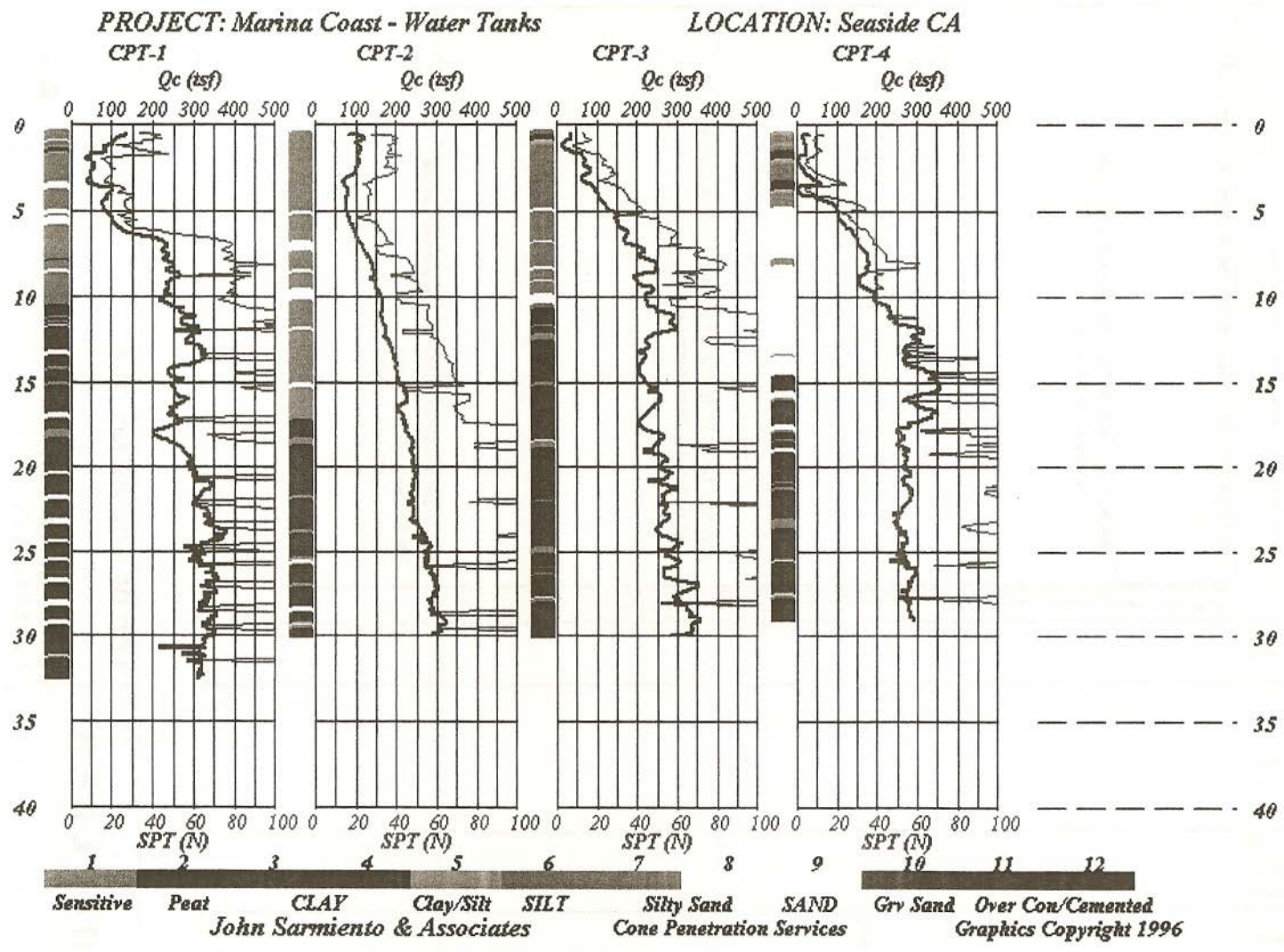
MARINA COAST WATER DISTRICT TANKS
FORMER FORT ORD
MONTEREY, CALIFORNIA

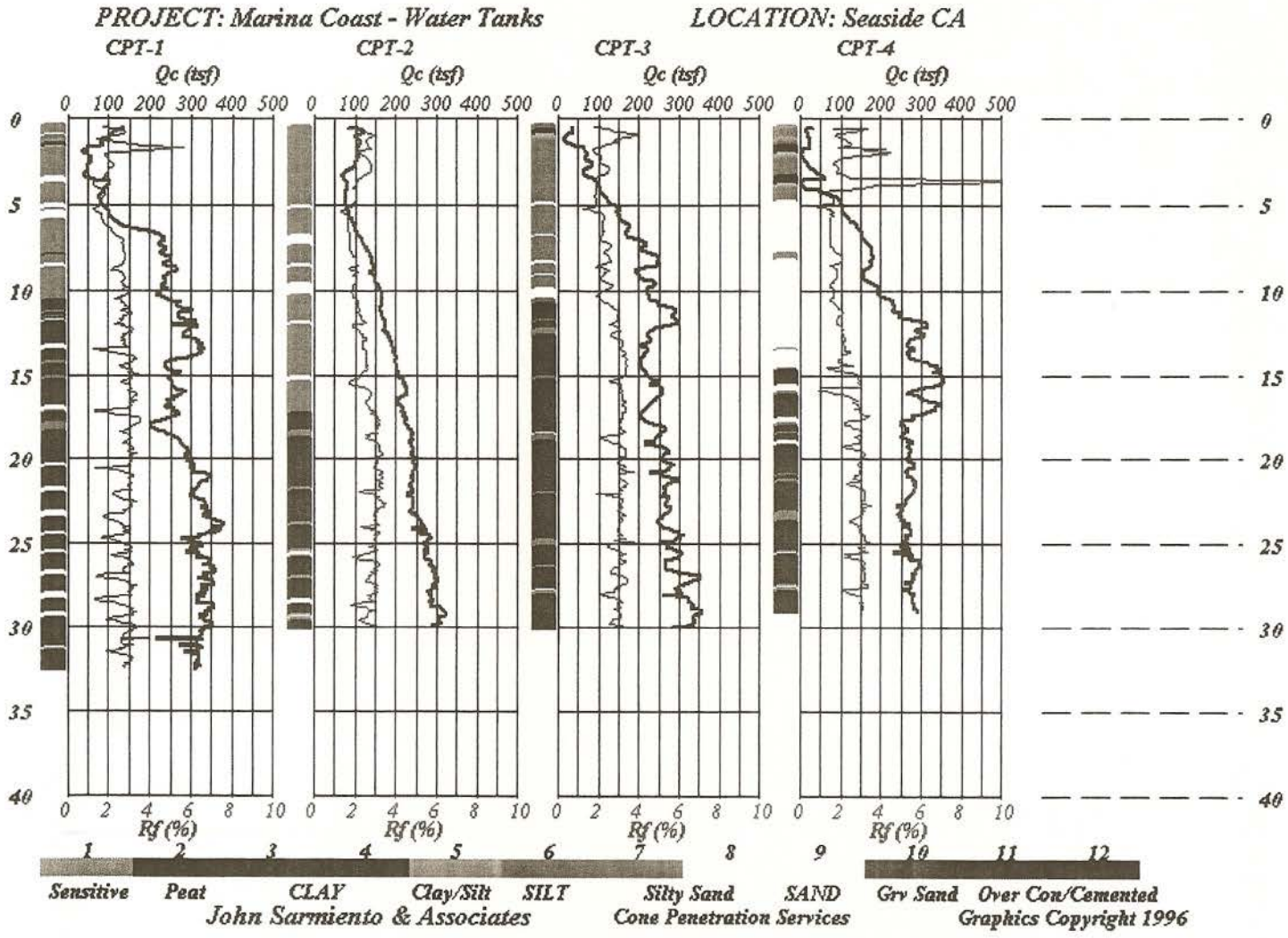
PLATE

A-9

L:\2005\05PROJECTS\59012\59012.GPJ

9/21/05 2:43:11 PM


PROJECT: Marina Coast - Water Tanks
LOCATION: Seaside CA
CPT-1
CPT-2
CPT-3
CPT-4
Qc (tsf)
0 100 200 300 400 500
0 5 10 15 20 25 30 35 40
0 20 40 60 80 100
SPT (N)
1 2 3 4 5 6 7 8 9 10 11 12
Sensitive
Peat
CLAY
Clay/Silt
SILT
Silty Sand
SAND
Grv Sand
Over Con/Cemented
John Sarmiento & Associates
Cone Penetration Services
Graphics Copyright 1996

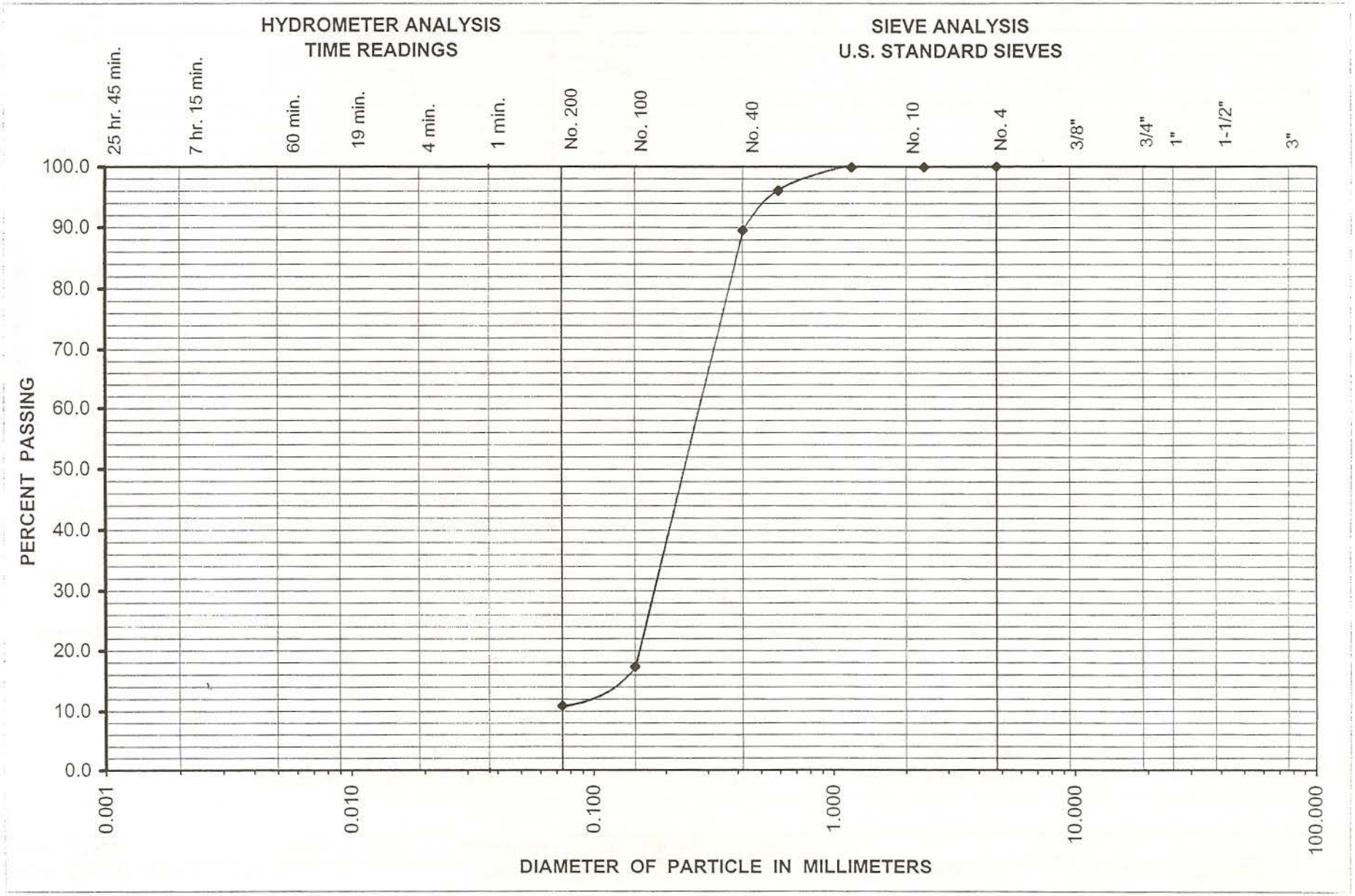

PROJECT: Marina Coast - Water Tanks
LOCATION: Seaside CA
CPT-1
CPT-2
CPT-3
CPT-4
Qc (tsf)
0 100 200 300 400 500
0 5 10 15 20 25 30 35 40
0 2 4 6 8 10
Rf (%)
1 2 3 4 5 6 7 8 9 10 11 12
Sensitive
Peat
CLAY
Clay/Silt
SILT
Silty Sand
SAND
Grv Sand
Over Con/Cemented
John Sarmiento & Associates
Cone Penetration Services
Graphics Copyright 1996

SIEVE ANALYSIS

KLEINFELDER, INC.

Project Marina Coast WD Tank Proj. No. 59012/pwgeo Lab No. 5298 Tested by NA Test date 8/23/2005

Boring B7-1 Depth, ft 1' Descritpion Poorly Graded Sand With Silt (SP-SM)

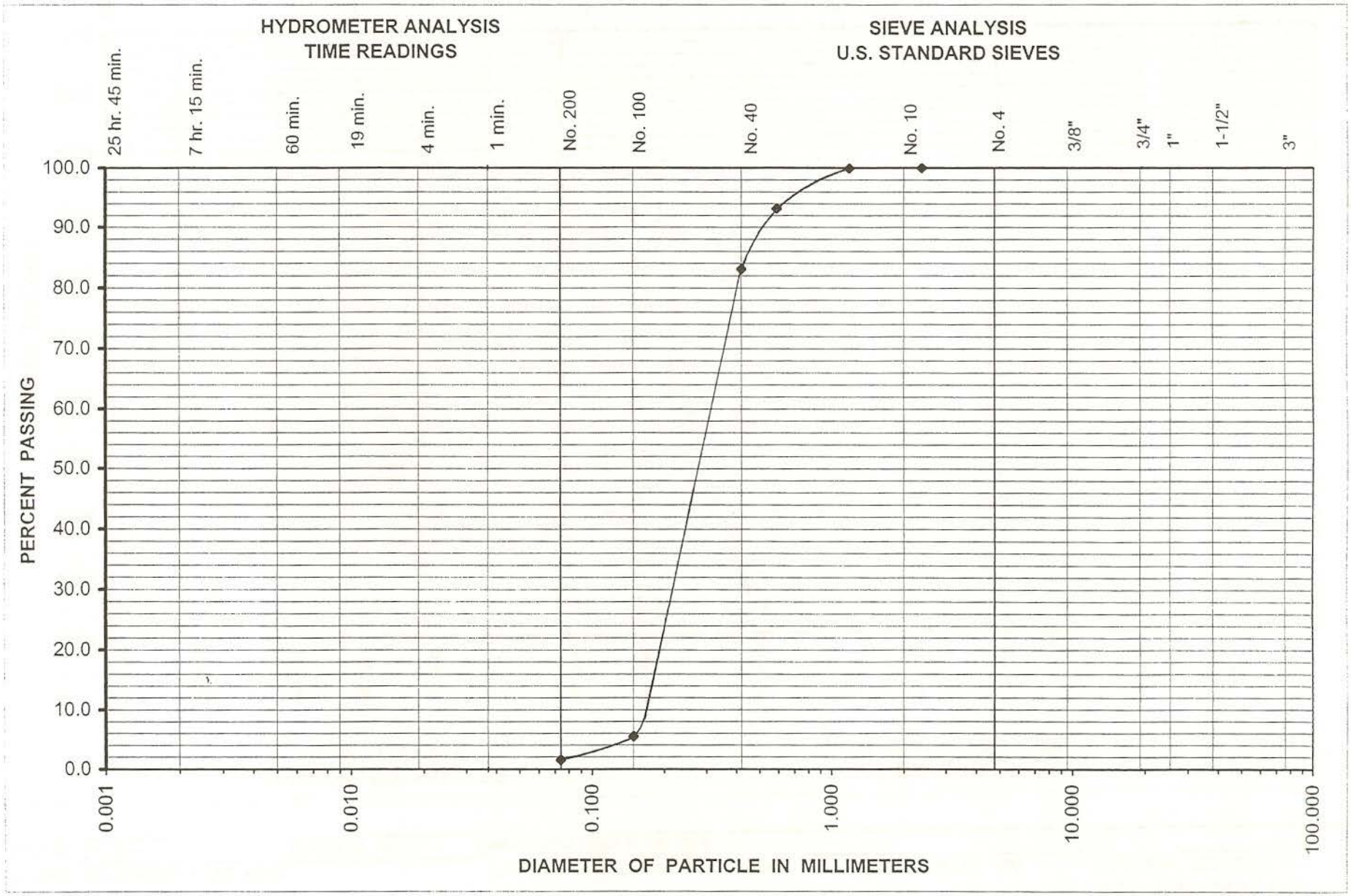


SIEVE ANALYSIS

KLEINFELDER, INC.

Project Marina Coast WD Tank Proj. No. 59012/pwgeo Lab No. 5298 Tested by NA Test date 8/23/2005

Boring B7-6 Depth, ft 23.5' Descritpion Poorly Graded Sand (SP)

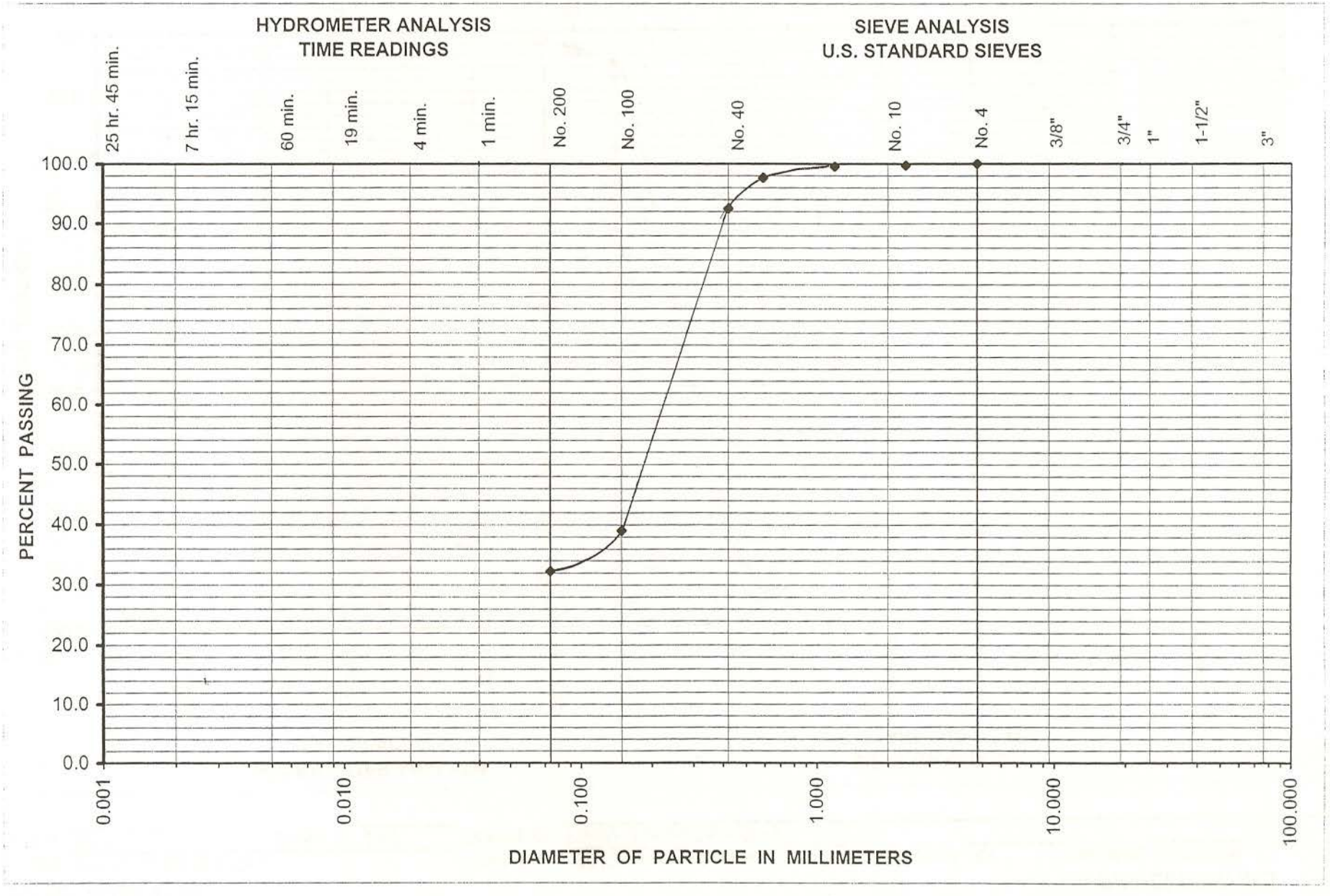


SIEVE ANALYSIS

KLEINFELDER, INC.

Project Marina Coast WD Tank Proj. No. 59012/pwgeo Lab No. 5298 Tested by NA Test date 8/23/2005

Boring B7-9 Depth, ft 38.5' Descritpion Silty Sand (SM)

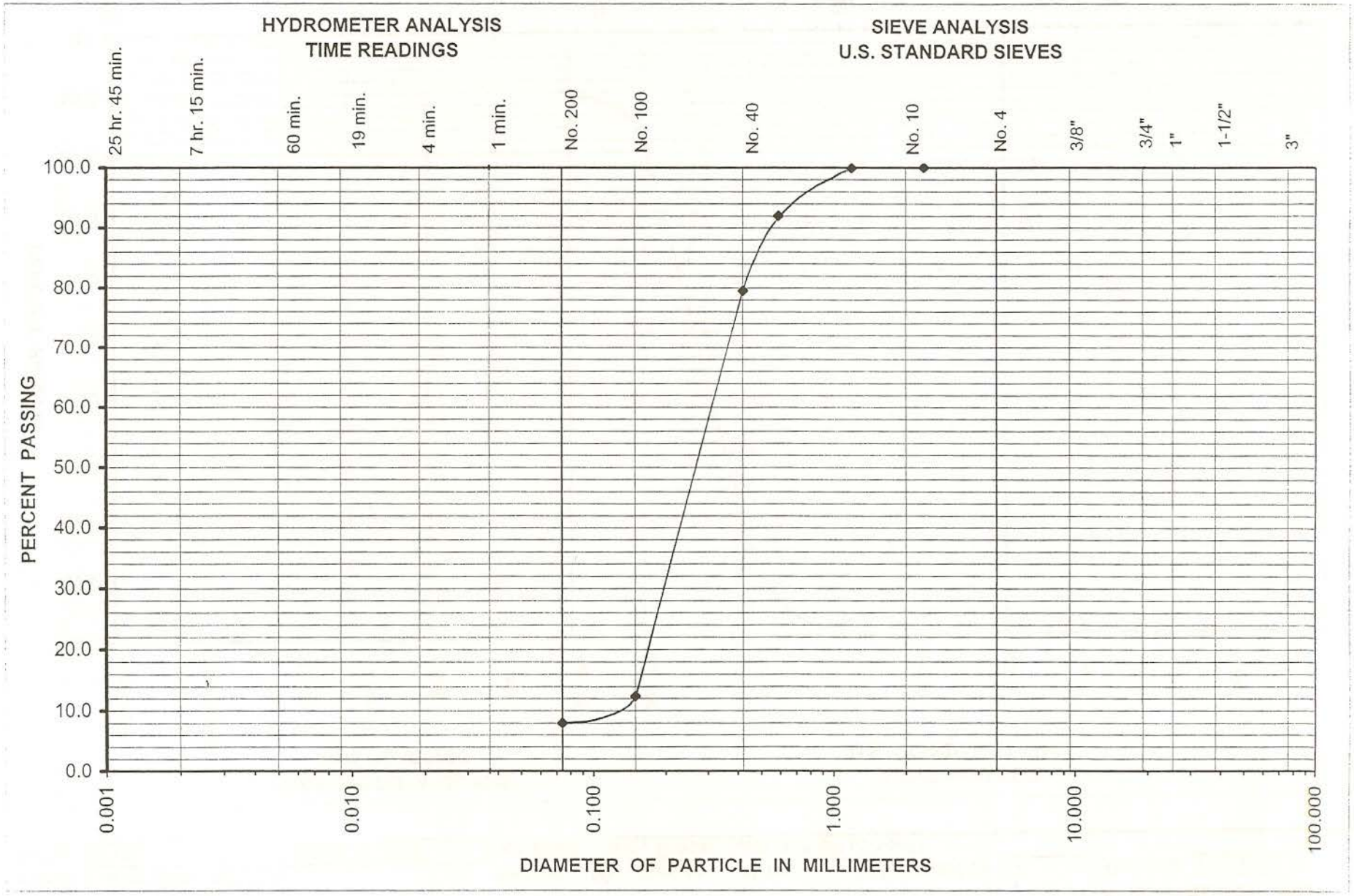


SIEVE ANALYSIS

KLEINFELDER, INC.

Project Marina Coast WD Tank Proj. No. 59012/pwgeo Lab No. 5298 Tested by NA Test date 8/23/2005

Boring B7-11 Depth, ft 48.5' Descritpion Poorly Graded Sand With Silt (SP-SM)

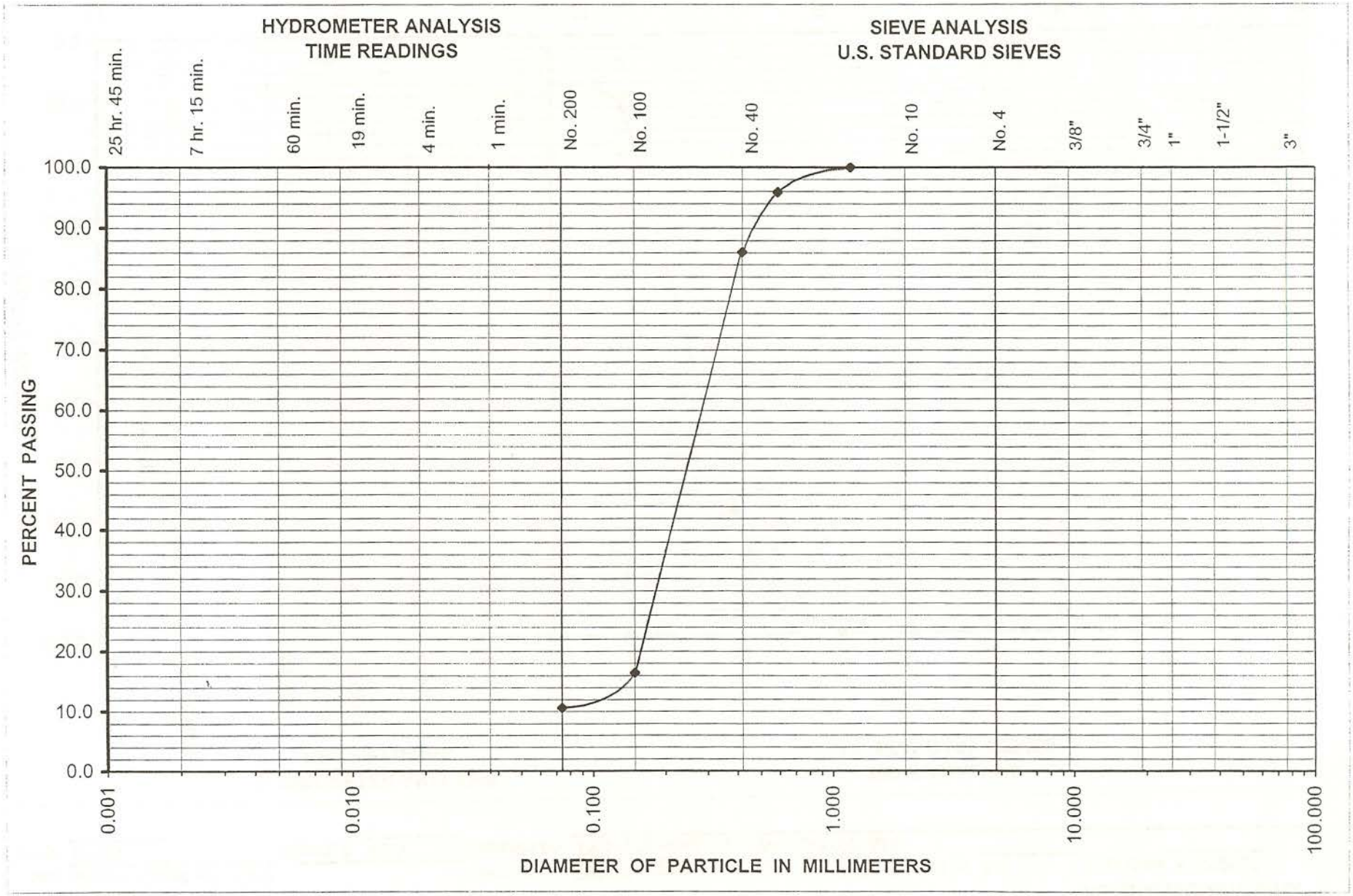


SIEVE ANALYSIS

KLEINFELDER, INC.

Project Marina Coast WD Tank Proj. No. 59012/pwgeo Lab No. 5298 Tested by NA Test date 8/23/2005

Boring B7-14 Depth, ft 63.5' Descritpion Poorly Graded Sand With Silt (SP-SM)

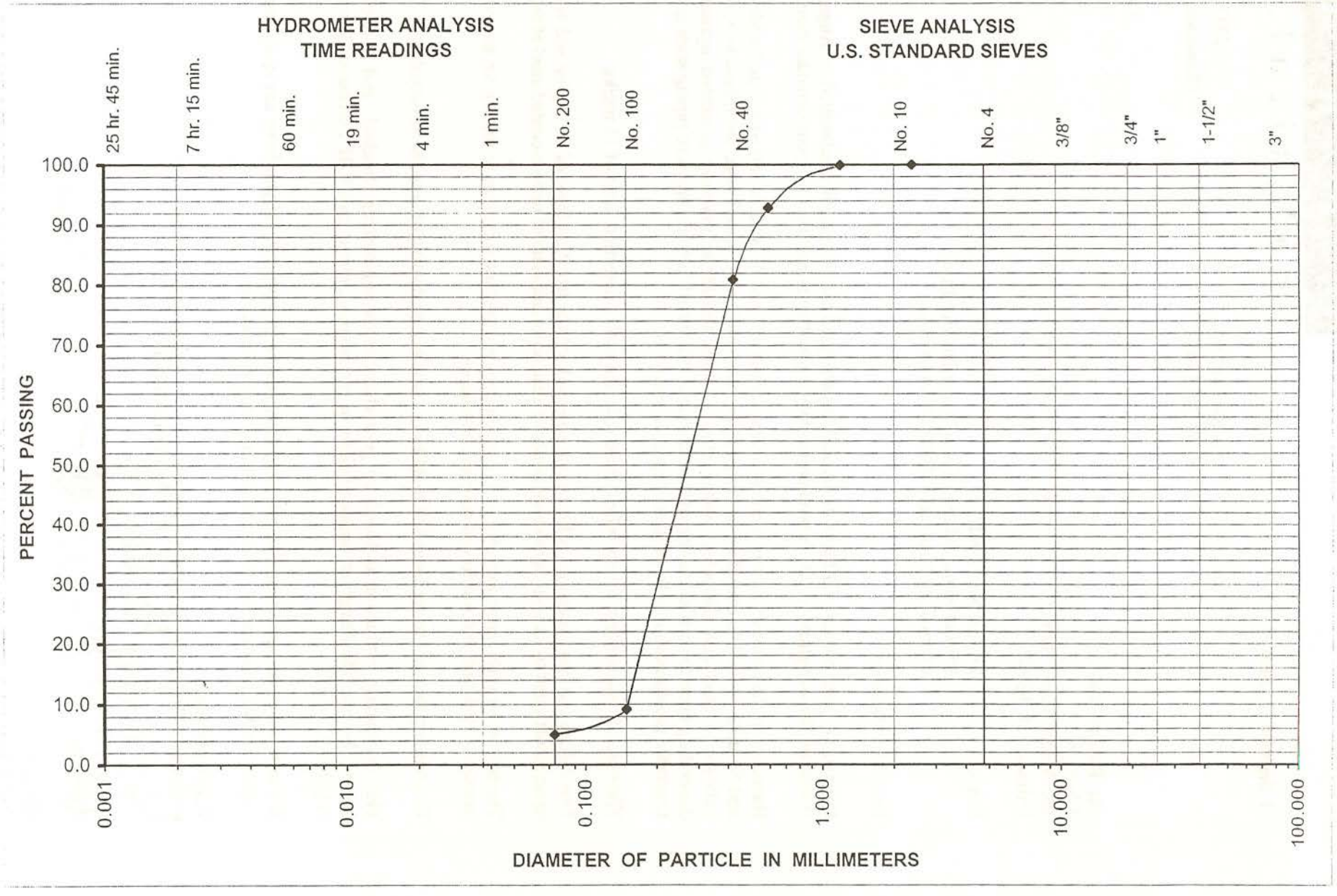


SIEVE ANALYSIS

KLEINFELDER, INC.

Project Marina Coast WD Tank Proj. No. 59012/pwgeo Lab No. 5298 Tested by NA Test date 8/23/2005

Boring B7-18 Depth, ft 83.5' Descritpion Poorly Graded Sand With Silt (SP-SM)



California State Certified Laboratory No.2153

C E R C O
analytical, inc.

1 September, 2005

Job No.0508155
Cust. No.11454

3942-A Valley Avenue
Pleasanton, CA 94566-4715
Tel: 925.462.2771
Fax: 925.462.2775

Mr. Robert Hasseler
Kleinfelder
365 Victor Street, Suite L
Salinas, CA 93907

Subject: Project No.: 59012
Project Name: Marina Coast Water District Tanks
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hasseler:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on August 19, 2005. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Samples No.001 and No.002 are classified as "mildly corrosive" and Sample No.003 is classified as "negligibly corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations reflect none detected with a detection limit of 15 mg/kg.

The sulfate ion concentrations reflect none detected with a detection limit of 15 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soils range from 6.9 to 7.3 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials range from 430 to 450-mV, which is indicative of aerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific design recommendations or consultation, please call JDH Corrosion Consultants, Inc. at (925) 927-6630.

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

CERCO Analytical, Inc.

3942-A Valley Avenue, Pleasanton, CA 94566-4715 (925) 462-2771 Fax (925) 462-2775

FINAL RESULTS

Client:	Kleinfelder	Date Sampled:	08/04-05/05
Client's Project No.:	59012	Date Received:	19-Aug-2005
Client's Project Name:	Marina Coast Water District Tanks	Date of Report:	31-Aug-2005
Authorization:	Signed Chain of Custody	Matrix:	Soil

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
0508155-001	B1-2 @ 5'	440	7.2	-	18,000	-	N.D.	N.D.
0508155-002	B4-2 @ 5'	450	7.3	-	10,000	-	N.D.	N.D.
0508155-003	B7-2 @ 5'	430	6.9	-	>80,000	-	N.D.	N.D.

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Detection Limit:	-	-	10	-	50	15	15
Date Analyzed:	29-Aug-2005	30-Aug-2005	-	31-Aug-2005	-	30-Aug-2005	30-Aug-2005

Sherri Moore

for Cheryl McMillen

Laboratory Director

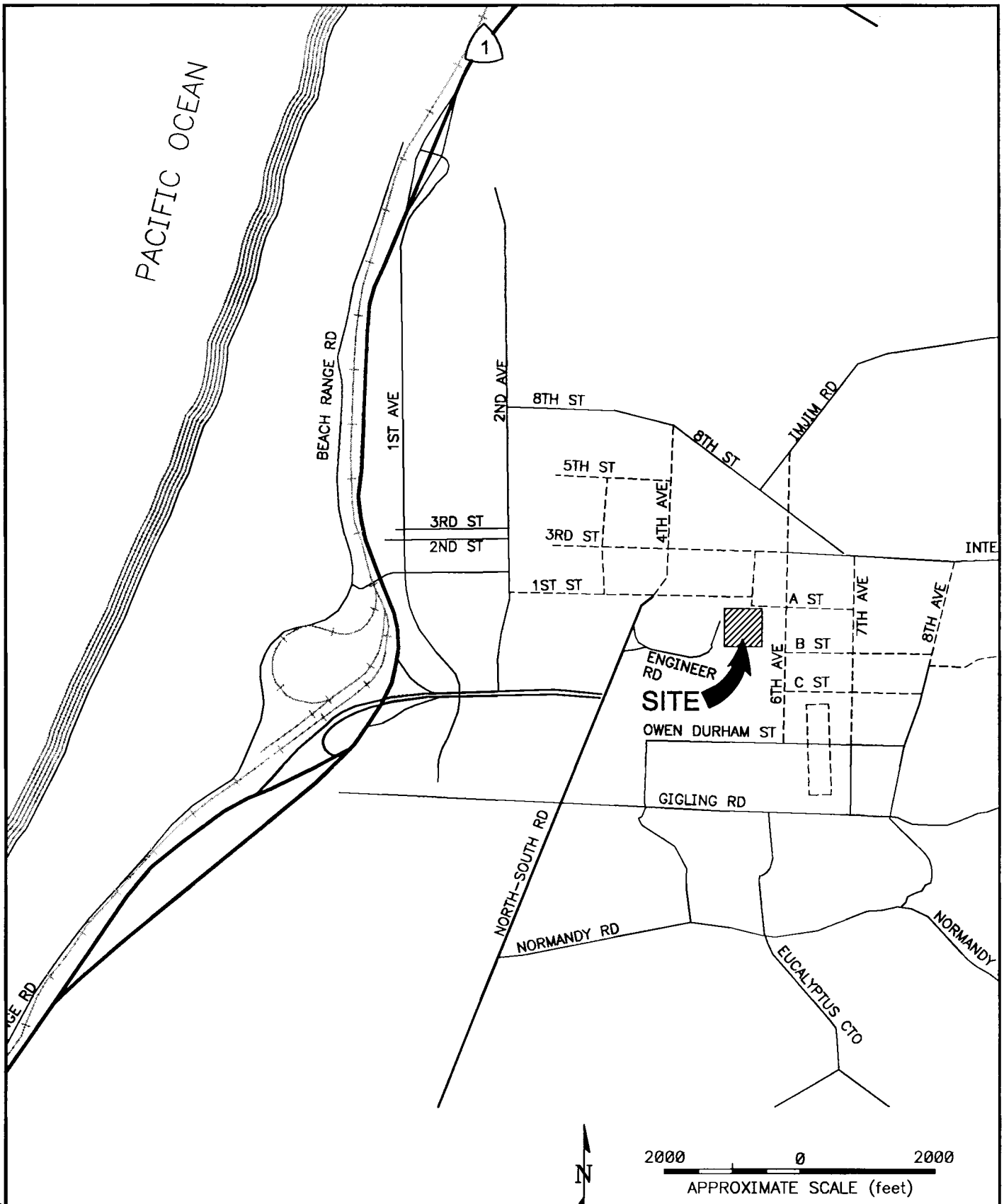
* Results Reported on "As Received" Basis

N.D. - None Detected

Quality Control Summary - All laboratory quality control parameters were found to be within established limits

Kleinfelder Inc. 2006[1]

[1] Please see Figure 5 for full citation.



KLEINFELDER
365 Victor Street, Suite L
Salinas, CA 93907
PH. (831) 755-7900 FAX. (831) 755-7909

DRAFTED BY: L. Sue	CHECKED BY: B. Rinker	
DATE: 04-18-03	REVISION DATE:	

SITE VICINITY MAP

CSUMB CAMPUS – LIBRARY PROJECT
FIRST STREET AND FIFTH AVENUE
SEASIDE, CALIFORNIA

PROJECT NO. 28624-GEO

PLATE 1

ATTACHED XREFS: XRef: TBLA-portrait

CAD FILE: D:_PROJECTS\28624\GEO\SITE-VIC.dwg LAYOUT: Layout1
PLOTTED: 18 Apr 2003, 11:58am

LEGEND

— - - — LIMITS OF PROJECT SITE

● B-6 SOIL BORING (by Kleinfelder, 2003)

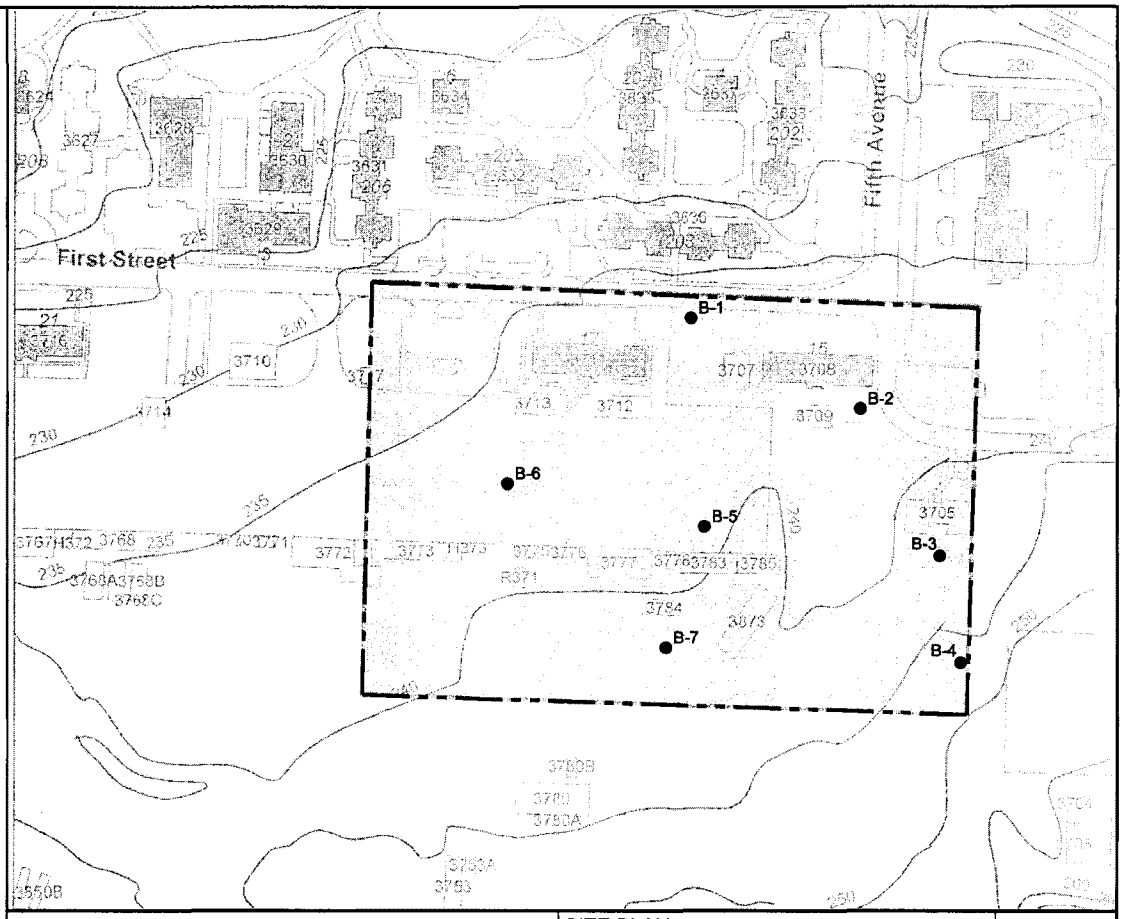
NOTE: Locations are approximate.

N

200 100 0 200

APPROXIMATE SCALE (feet)

REFERENCE:
California State University Monterey Bay, Library Site, not dated.



KLEINFELDER
365 Victor Street, Suite L
Salinas, CA 93907
PH. (831) 755-7900 FAX. (831) 755-7909

DRAFTED BY: L.Sue	CHECKED BY: B. Hasseler	SITE PLAN	PLATE
DATE: 04-18-03	REVISION DATE:	CSUMB CAMPUS – LIBRARY PROJECT FIRST STREET AND FIFTH AVENUE SEASIDE, CALIFORNIA PROJECT NO. 28624-GEO	2

CAD FILE: D:_PROJECTS\28624\GEO\SITEPLAN.dwg
LAYOUT: Layout1

ATTACHED XREFS: XRef: TB_A-landscape
PLOTTED: 18 Apr 2003, 12:43pm

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY	GW		Well-graded gravels or gravel with sand, little or no fines.
		GP		Poorly-graded gravels or gravel with sand, little or no fines.
		GM		Silty gravels, silty gravel with sand mixture.
		GC		Clayey gravels, clayey gravel with sand mixture.
	SAND AND SANDY	SW		Well-graded sands or gravelly sands, little or no fines.
		SP		Poorly-graded sands or gravelly sands, little or no fines.
		SM		Silty sand.
		SC		Clayey sand.

MAJOR DIVISIONS		LTR	ID	DESCRIPTION
FINE GRAINED SOILS	SILTS AND CLAYS	ML		Inorganic silts and very fine sands, rock flour or clayey silts with slight plasticity.
		CL		Inorganic lean clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
		OL		Organic silts and organic silt-clays of low plasticity.
	SILTS AND CLAYS	MH		Inorganic elastic silts, micaceous or diatomaceous or silty soils.
		CH		Inorganic fat clays (high plasticity).
		OH		Organic clays of medium high to high plasticity.
HIGHLY ORGANIC SOILS		Pt		Peat and other highly organic soils.

Standard Penetration Split Spoon Sampler 2.0 inch, 1.4 inch I.D.

Modified California Sampler 2.5 inch O.D., 2.0 inch I.D.

Bulk Sample

California Sampler, 3.0 inch O.D., 2.5 inch I.D.

Shelby Tube 3.0 inch O.D.

0745, 5/31 — Approximate water level first observed in boring. Time recorded in reference to a 24 hour clock.

0800, 5/31 — Approximate water level observed in boring following drilling

PEN — Pocket Penetrometer reading, in tsf

TV:Su — Torvane shear strength, in ksf

LL	LIQUID LIMIT	TX	TRIAXIAL SHEAR
PI	PLASTICITY INDEX	CONSOL	CONSOLIDATION
%-#200	SIEVE ANALYSIS (#200 SCREEN)	R-Value	RESISTANCE VALUE
DS	DIRECT SHEAR	SE	SAND EQUIVALENT
C	COHESION (PSF)	EI	EXPANSION INDEX
PHI	FRICTION ANGLE	FS	FREE SWELL (U.S.B.R.)

Notes: Blow counts represent the number of blows a 140-pound hammer falling 30 inches required to drive a sampler through the last 12 inches of an 18 inch penetration, unless otherwise noted.

The lines separating strata on the logs represent approximate boundaries only. The actual transition may be gradual. No warranty is provided as to the continuity of soil strata between borings. Logs represent the soil section observed at the boring location on the date of drilling only.

KLEINFELDER

PROJECT NO. 28624/GEO

BORING LOG LEGEND

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-1

4/17/03 2:02:55 PM

Date Completed:	4/10/03	*Drilling method:*	8" Hollow Stem Auger
Logged By:	R. Hasseler	*Hammer Wt:*	140 lbs., 30" drop
Total Depth:	51.5 ft	*Notes:*	

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION (*Surface Elevation:* Estimated feet (MSL))
								SILTY SAND (SM) - dark brown, moist, loose, fine grained sand
5		9				-#200 = 28%		- red brown
10		13		7				**POORLY GRADED SAND (SP)** – yellow brown, moist, medium dense, fine grained sand, trace silt
15		20				-#200 = 2%		
20		36		6				- dense
25		36						
30								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-1

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-2

L:\2003\03PROJECTS\28286\28264.GPJ

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		62						- medium grained sand - very dense
35		62						
40		43						- dense
45		56						- very dense
50		49						- dense
								End of Boring at 51.5 No free water observed Boring backfilled with drilling spoils
55								
60								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-1

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-2
(cont'd)

L:\2003\03PROJECTS\28284\28284.GPJ

Date Completed:	4/9/03	*Drilling method:*	8" Hollow Stem Auger
Logged By:	R. Hasseler	*Hammer Wt:*	140 lbs., 30" drop
Total Depth:	36.5 ft	*Notes:*	

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated feet (MSL)
		25		7				**SILTY SAND (SM)** - dark brown, moist, medium dense, fine grained sand - decomposed granite inclusions
5		26	102	5				**POORLY GRADED SAND (SP)** – yellow brown, moist, medium dense, fine grained sand, trace silt
10		20						- orange-brown, moist to damp
15		24						
20		30						- dense
25		45						
30								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-2

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-3

L:\2003\03PROJECTS\28284\28284.GPJ

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		43						- no recovery
35		40						
								End of Boring at 36.5 No free water observed Boring backfilled with drilling spoils
40								
45								
50								
55								
60								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-2

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-3
(cont'd)

L:\2003\03PROJECTS\28264\28264.GPJ

Date Completed:	**4/9/03**	*Drilling method:*	**8" Hollow Stem Auger**
Logged By:	**R. Hasseler**	*Hammer Wt:*	**140 lbs., 30" drop**
Total Depth:	**36.5 ft**	*Notes:*	

Depth,ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated feet (MSL)**
		43	5					**SILTY SAND (SM)** - dark brown, moist, dense, fine grained sand
5		9						- red-brown - loose
10		25	6					**POORLY GRADED SAND (SP)** – yellow brown, damp, medium dense, fine grained sand, trace silt
15		20						
20		29						
25		35						
30								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-3

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-4

L:\2003\03PROJECTS\28264\28264.GPJ

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		44						
35		41						
								End of Boring at 36.5
								No free water observed
								Boring backfilled with drilling spoils
40								
45								
50								
55								
60								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-3

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-4
(cont'd)

L:\2003\03PROJECTS\28284\28284.GPJ

Date Completed:	4/9/03	*Drilling method:*	8" Hollow Stem Auger
Logged By:	R. Hasseler	*Hammer Wt:*	140 lbs., 30" drop
Total Depth:	36.5 ft	*Notes:*	

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION (*Surface Elevation:* Estimated feet (MSL))
		5		6				**SILTY SAND (SM)** - dark brown, moist, loose, fine grained sand
5		27						- red-brown, medium dense
10		25		5				**POORLY GRADED SAND (SP)** – yellow brown, moist, medium dense, fine grained sand, trace silt
15		24						
20		22						
25		22						- red-brown
30								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-4

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-5

L:\2003\03PROJECTS\28264\28264.GPJ

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		50						- very dense
35		58						
								End of Boring at 36.5 No free water observed Boring backfilled with drilling spoils
40								
45								
50								
55								
60								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-4

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-5
(cont'd)

L:\2003\03PROJECTS\28284\28284.GPJ

Date Completed:	4/9/03	*Drilling method:*	8" Hollow Stem Auger
Logged By:	R. Hasseler	*Hammer Wt:*	140 lbs., 30" drop
Total Depth:	36.5 ft	*Notes:*	

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: Estimated feet (MSL)
								1" AC overlay on 3" AC on 3.5" AB
		6						**SILTY SAND (SM)** - dark brown, moist, loose, fine grained
5		16	101	5				- medium dense
								POORLY GRADED SAND (SP) – yellow brown, moist, medium dense, fine grained sand, trace silt
10		15		4				
15		40						- dense
20		46						
25		36						
30								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-5

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-6

L:\2003\03PROJECTS\28264\28264.GPJ

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		51						- very dense
35		57						
								End of Boring at 36.5 No free water observed Boring backfilled with drilling spoils
40								
45								
50								
55								
60								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-5

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-6
(cont'd)

L:\2003\03PROJECTS\28264\28264.GPJ

Date Completed:	4/9/03	*Drilling method:*	8" Hollow Stem Auger
Logged By:	R. Hasseler	*Hammer Wt:*	140 lbs., 30" drop
Total Depth:	36.5 ft	*Notes:*	

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION (*Surface Elevation:* Estimated feet (MSL))
								1" AC on 3.5" AC over 3" AB
		25						**POORLY GRADED SAND with SILT (SP-SM)** - orange-brown, moist, medium dense, fine grained sand
5		26	103	6				
								SILTY SAND (SM) - dark brown, moist - loose fine grained sand
10		9		5				
								POORLY GRADED SAND (SP) – yellow brown, moist, medium dense, fine grained sand, trace silt
15		48						
20		45						
25		38						
30								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-6

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-7

L:\2003\03PROJECTS\28264\28264.GPJ

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		49						
35		55						- very dense
								End of Boring at 36.5
								No free water observed
								Boring backfilled with drilling spoils
40								
45								
50								
55								
60								

KLEINFELDER

PROJECT NO. 28624/GEO

LOG OF BORING NO. B-6

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-7
(cont'd)

L:\2003\03PROJECTS\28264\28264.GPJ

Date Completed:	4/10/03	*Drilling method:*	8" Hollow Stem Auger
Logged By:	R. Hasseler	*Hammer Wt:*	140 lbs., 30" drop
Total Depth:	51.5 ft	*Notes:*	

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION *Surface Elevation:* Estimated feet (MSL)
		26						**SILTY SAND (SM)** - dark brown, moist, medium dense, fine grained sand
5		38	105	8		-#200 = 10%		**POORLY GRADED SAND with SILT (SP-SM)** - yellow-brown, moist, dense, fine grained sand
10		12		9				**SILTY SAND (SM)** - dark brown, moist, medium dense, fine grained sand
15		9						- loose
20		15		7				**POORLY GRADED SAND (SP)** – orange brown, moist, medium dense, fine grained sand, trace silt
25		32						- dense
30								

KLEINFELDER

PROJECT NO. *28624/GEO*

LOG OF BORING NO. B-7

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-8

L:\2003\03PROJECTS\28264\28264.GPJ

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength tsf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								(Continued from previous plate)
		38		5				
35		41				-#200 = 4%		- grading to medium grained sand
40		52						- very dense
45		33						- dense
50		50						
								End of Boring at 51.5 No free water observed Boring backfilled with drilling spoils
55								
60								

KLEINFELDER

PROJECT NO. 28624/GEO

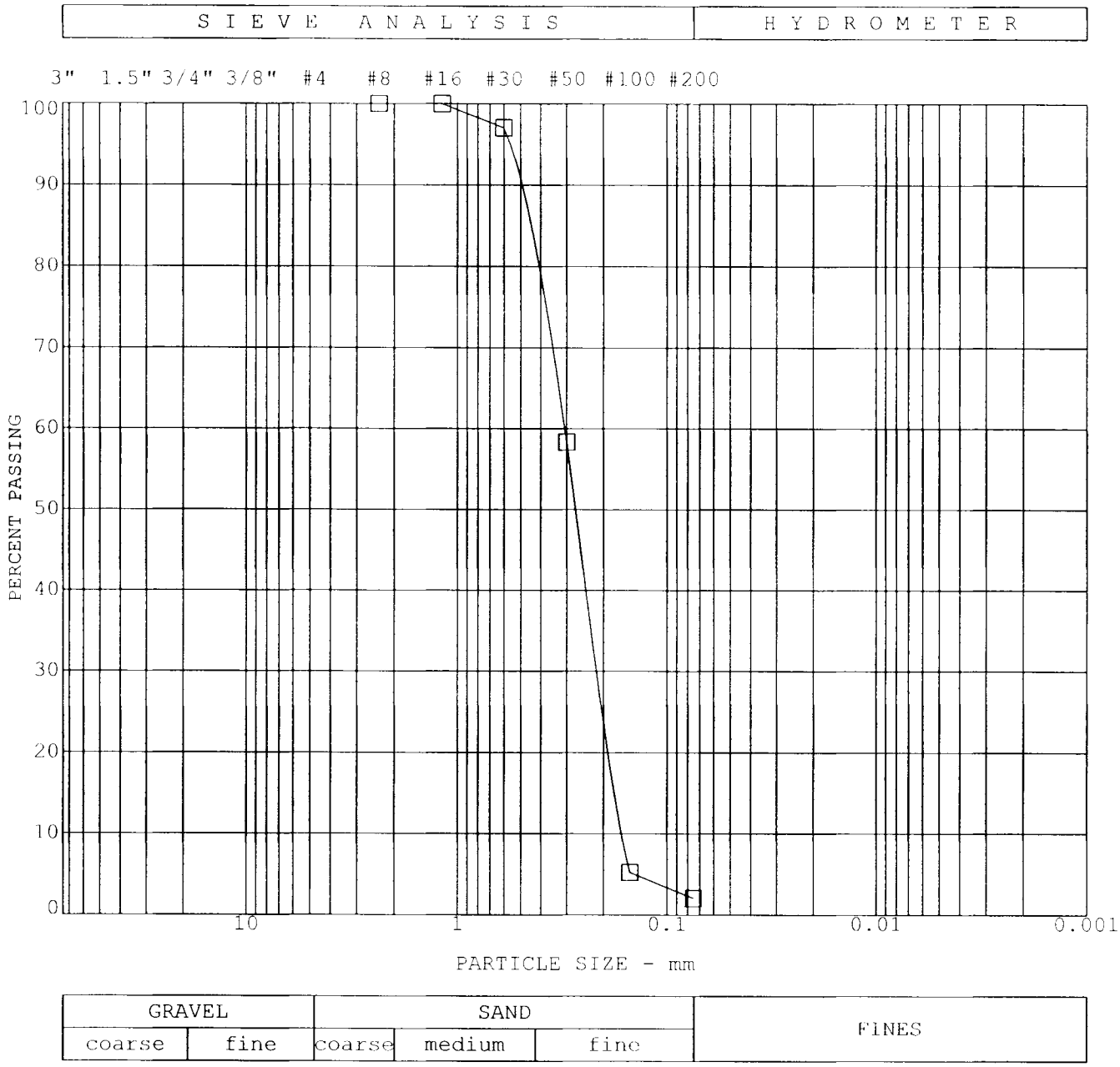
LOG OF BORING NO. B-7

CSUMB Campus - Library Project
First Street and Fifth Avenue
Seaside, California

PLATE

A-8
(cont'd)

L:\2003\03PROJECTS\28264\28264.GPJ



SYMBOL	BORING	DEPTH (ft)	CLASSIFICATION
□	B-1	15.0	Yellow Brown Poorly Graded Sand, trace silt

KLEINFELDER

PROJECT NO. 28324-GEO

GRAIN SIZE DISTRIBUTION

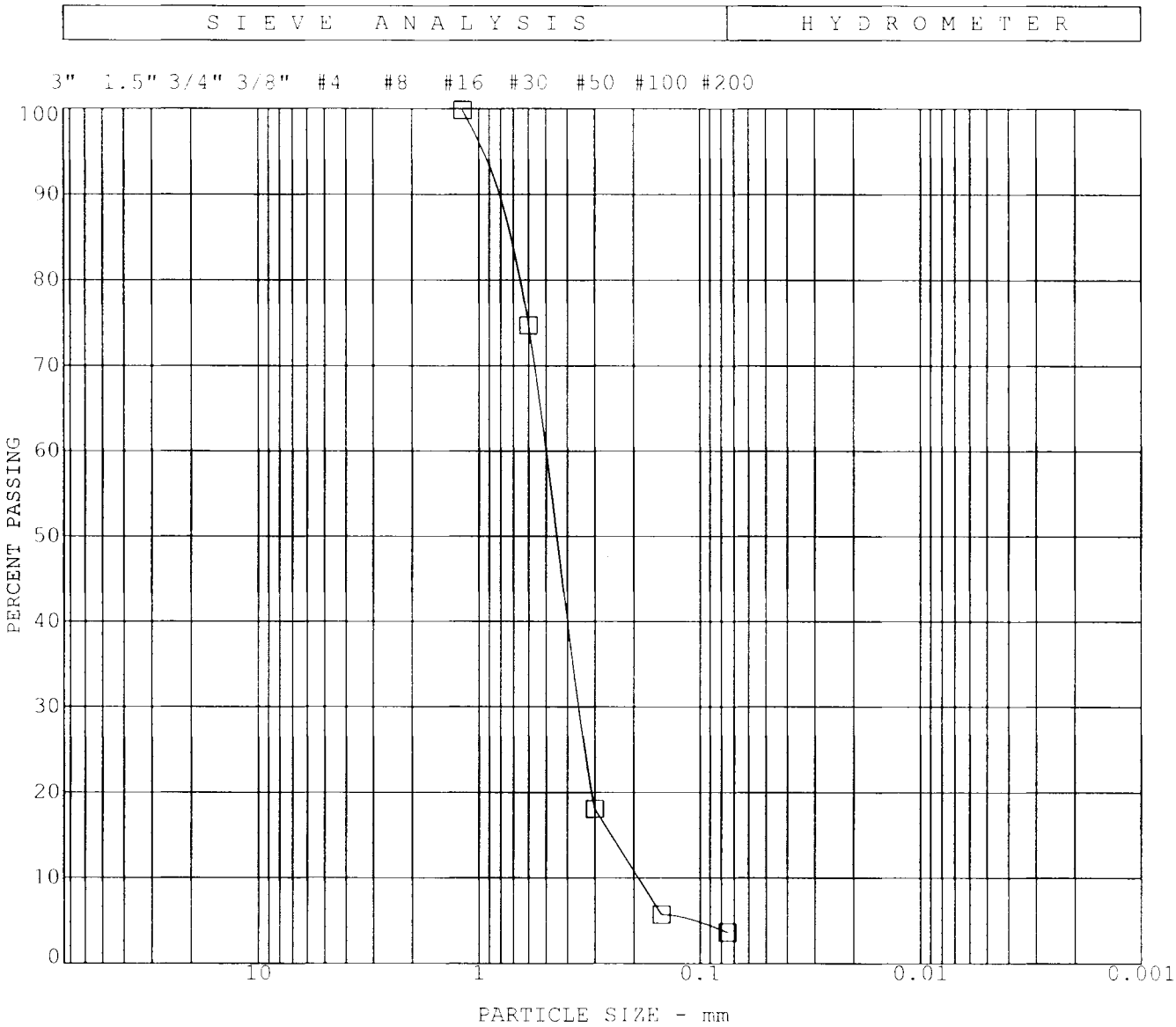
CSUMB Library

PLATE

B-1

L:\2003\03PROJECTS\28624\28624.GPJ

4/23/03 3:32:47 PM



GRAVEL		SAND			FINES
coarse	fine	coarse	medium	fine	

SYMBOL	BORING	DEPTH (ft)	CLASSIFICATION
□	B-7	35.0	Yellow Brown Poorly Graded Sand, trace silt

KLEINFELDER

PROJECT NO. 28624-GEO

GRAIN SIZE DISTRIBUTION

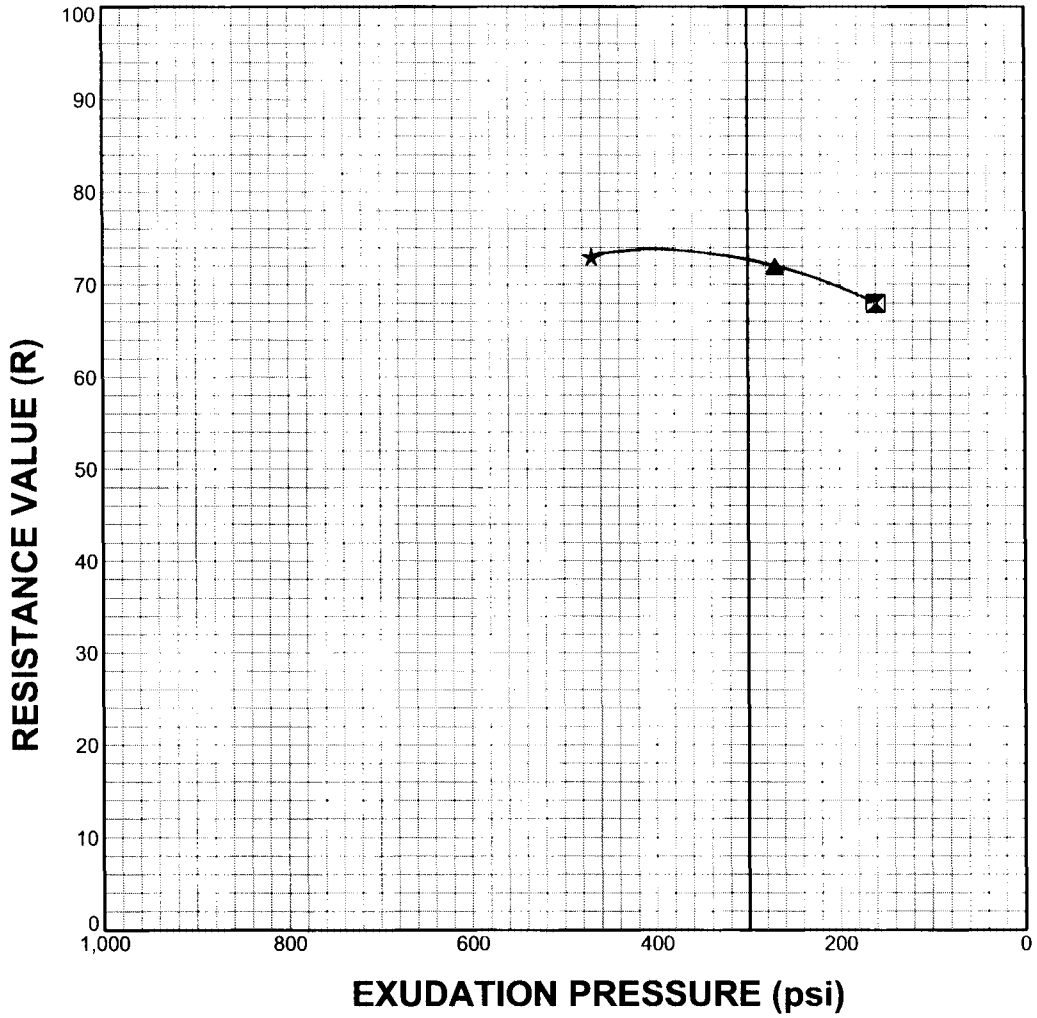
CSUMB Library

PLATE

B-2

L:\2003\03PROJECTS\28624\28624.GPJ

4/25/03 8:49:46 AM



SPECIMEN NO.	⊠	▲	★
MOISTURE CONTENT (%)	18.2	17.3	16.3
DRY DENSITY (PCF)	114.0	118.3	116.3
EXUDATION PRESSURE (PSI)	160	270	470
EXPANSION PRESSURE (PSF)	0	17	26
RESISTANCE VALUE (R)	68	72	73

Date Received: 4/18/03

SAMPLE SOURCE	CLASSIFICATION	SAND EQUIVALENT	EXPANSION PRESSURE	R-VALUE
(PL6180) Bulk #1, Surface	Dark Brown Silty Sand	---	19 psf	73

ASTM D 2844, Cal Test 301

KLEINFELDER

RESISTANCE VALUE TEST DATA

CSUMB Library

PLATE

B-3

PROJECT NO. 28624-GEO

L:\2003\03\PROJECTS\28624\28624.GPJ

5/2/03 2:48:40 PM

California State Certified Laboratory No.2153

C E R C O
analytical, inc.

7 May, 2003

Job No.0304184
Cust. No.11454

3942-A Valley Avenue
Pleasanton, CA 94566-4715
Tel: 925.462.2771
Fax: 925.462.2775

Mr. Robert G. Hasseler, P.E.
Kleinfelder
365 Victor Street, Suite L
Salinas, CA 93907

Subject: Project No.: 28624-GEO
Project Name: CSUMB Library
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Hasseler:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on April 18, 2003. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, this sample is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentration reflects none detected with a detection limit of 15 mg/kg.

The sulfate ion concentration is 27 mg/kg and is determined to be insufficient to damage reinforced concrete structures and cement mortar-coated steel at this location.

The pH of the soil is 5.7 which does present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures. Any soils with a pH of <6.0 is considered to be corrosive to buried iron, steel, mortar-coated steel and reinforced concrete structures. Therefore, corrosion prevention measures need to be considered for structures to be placed in this acidic soil.

The redox potential is 410-mV, which is indicative of aerobic soil conditions.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call JDH Corrosion Consultants, Inc. at (925) 927-6630.

We appreciate the opportunity of working with you on this project. If you have any questions, or if you required further information, please do not hesitate to contact us.

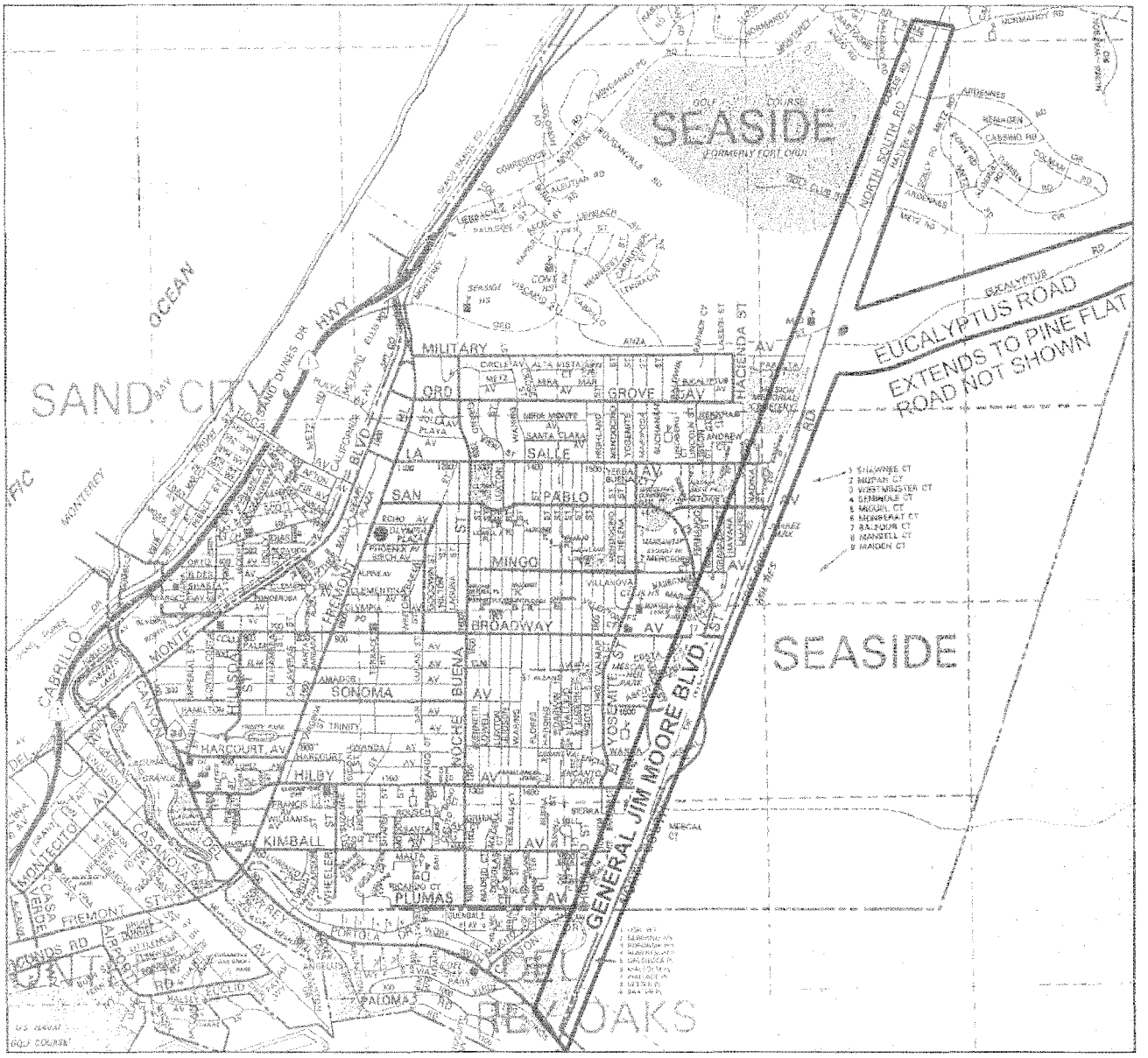
Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

Pacific Crest Engineering 2004[1]

[1] Please see Figure 5 for full citation.

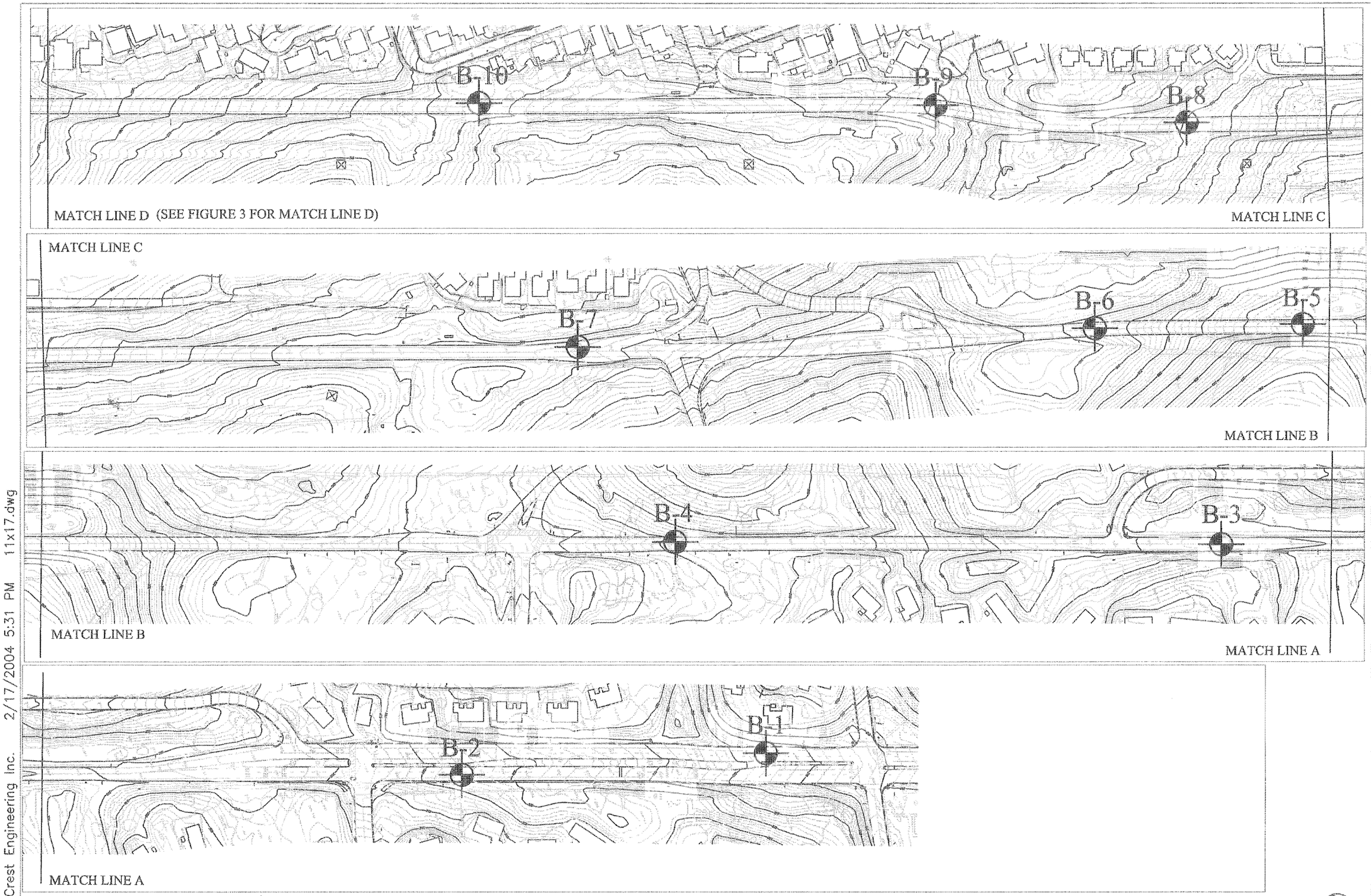


0 1/2 mi.

N

Base Map from Thomas Bros. Maps

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Regional Site Plan** FORA Road Improvements Seaside, California	Figure No. 1 Project No. 03102 Date: 02/26/04



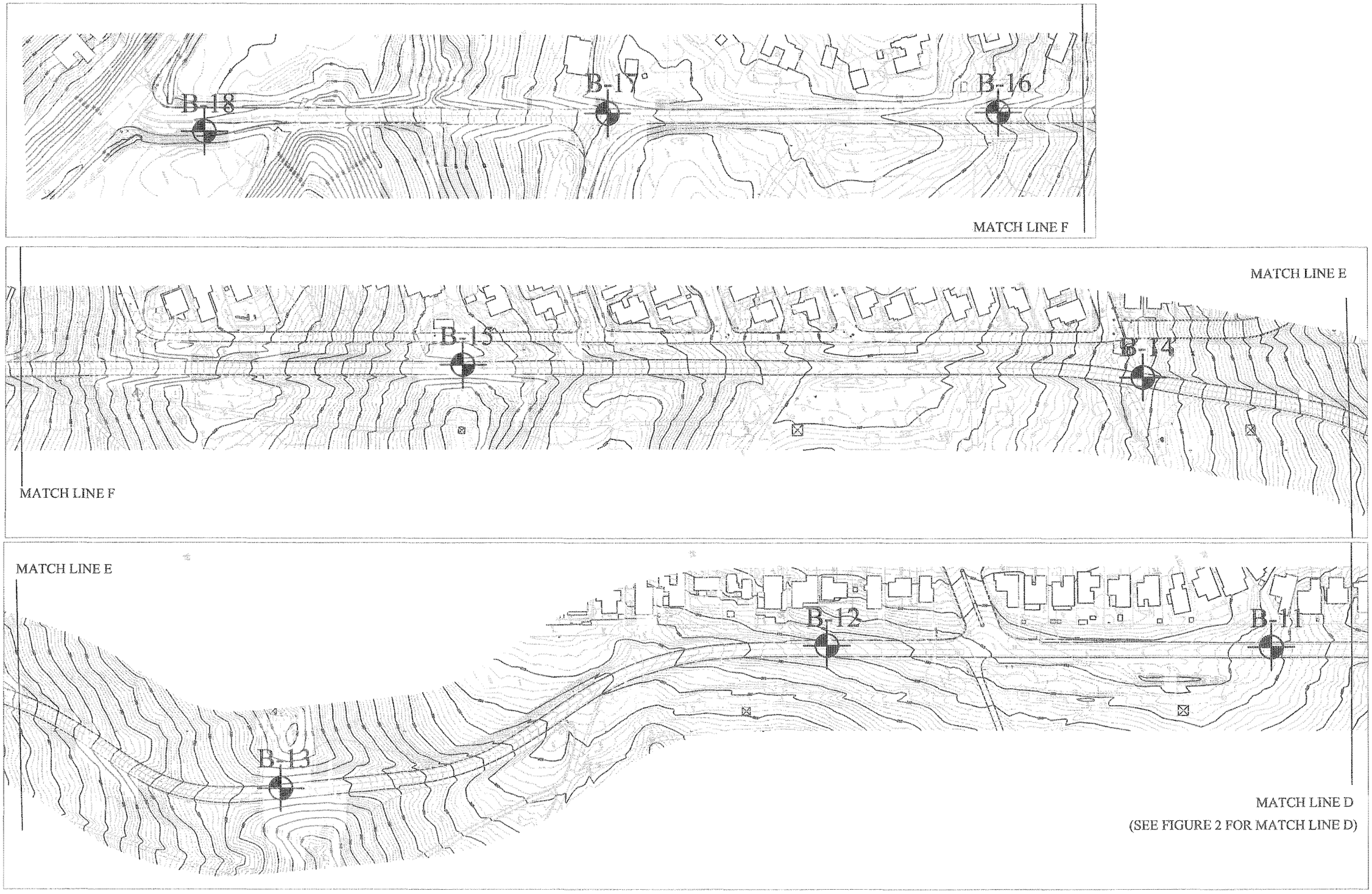
2/26/04 REV. 0 03102 DME

FIGURE 2

FORA ROAD IMPROVEMENTS
SEASIDE, CALIFORNIA

SITE PLAN SHOWING TEST BORINGS

PACIFIC CREST ENGINEERING INC.
444 AIRPORT BLVD, SUITE 106
WATSONVILLE, CA 95076
TEL (831) 722-9446
FAX (831) 722-9158



0 100' 200' 400'
GRAPHIC SCALE: 1"=200'

= APPROXIMATE LOCATION OF TEST BORING
BASE MAP FROM BESTOR ENGINEERS, INC.

GENERAL JIM MOORE BLVD.

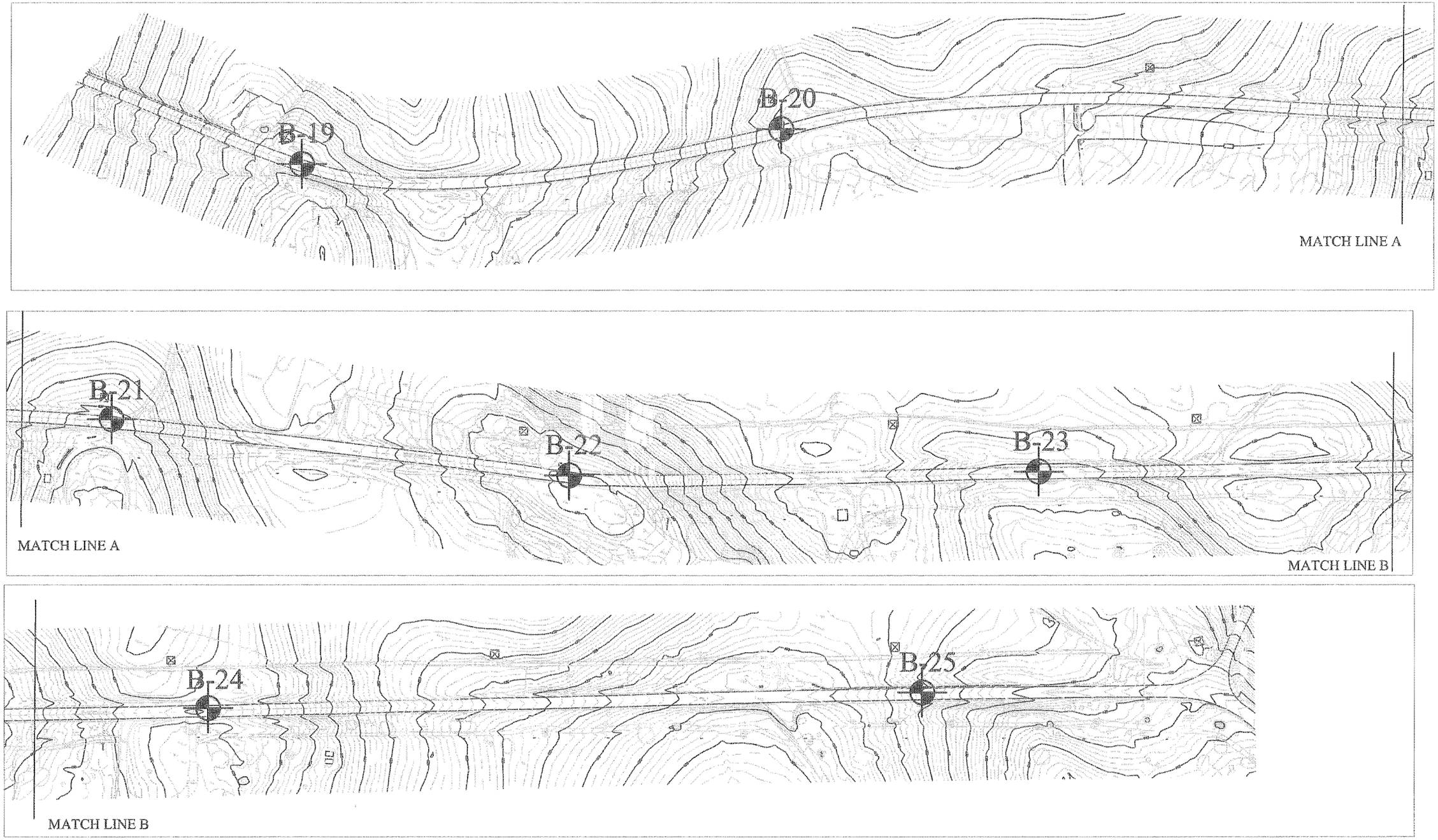
2/26/04 03102
REV. 0 DME

FIGURE 3

FORA ROAD IMPROVEMENTS
SEASIDE, CALIFORNIA

SITE PLAN SHOWING TEST BORINGS

PACIFIC CREST ENGINEERING INC.
444 AIRPORT BLVD, SUITE 106
WATSONVILLE, CA 95076
TEL (831) 722-9446
FAX (831) 722-9158



0 100' 200' 400'
GRAPHIC SCALE: 1"=200'

= APPROXIMATE LOCATION OF TEST BORING

BASE MAP FROM BESTOR ENGINEERS, INC.

EUCALYPTUS ROAD

N

2/26/04 03102
REV. 0 DME

FIGURE 4

FORA ROAD IMPROVEMNETS
SEASIDE, CALIFORNIA

SITE PLAN SHOWING TEST BORINGS

PACIFIC CREST ENGINEERING INC.
444 AIRPORT BLVD SUITE 106
WATSONVILLE, CA 95076
TEL (831) 722-9446
FAX (831) 722-9158

UNIFIED SOIL CLASSIFICATION SYSTEM - ASTM D2488 (Modified)

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravels-sand mixtures, little or no fines
		GRAVELS (MORE THAN 12% FINES)	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS (MORE THAN 12% FINES)	SM	Silty sands, sand-silt mixtures, non-plastic fines
			SC	Clayey sands, sand-clay mixtures, plastic fines
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 35%		ML	Inorganic silts and very fine clayey sand silty sands, with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly, sand, silty or lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS LIQUID LIMIT IS BETWEEN 35% AND 50%		MI	Inorganic silts, clayey silts and silty fine sands of intermediate plasticity
			CI	Inorganic clays, gravelly/sandy clays and silty clays of intermediate plasticity
			OI	Organic clays and silty clays of intermediate plasticity
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Organic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

BORING LOG EXPLANATION

LOGGED BY_____ DATE DRILLED_____ BORING DIAMETER_____ BORING NO.____

Depth, ft.	Sample No. and Type	Symbol	SOIL DESCRIPTION	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density, p.c.f.	Moisture % of Dry Wt.	MISC. LAB RESULTS
1			← Ground water elevation		NOTE: All blows/foot are normalized to 2" outside diameter sampler size				
2	1-1 L		← Soil Sample Number ← Soil Sampler Size/Type L = 3" Outside Diameter M = 2.5" Outside Diameter T = 2" Outside Diameter ST = Shelby Tube BAG = Bag Sample						
3									
4									
5									

RELATIVE DENSITY

SANDS AND GRAVELS	BLOWS/FOOT
VERY LOOSE	0-4
LOOSE	4-10
MEDIUM DENSE	10-30
DENSE	30-50
VERY DENSE	OVER 50

CONSISTENCY

SILTS AND CLAYS	BLOWS/FOOT
VERY SOFT	0-2
SOFT	2-4
FIRM	4-8
STIFF	8-16
VERY STIFF	16-32
HARD	OVER 32

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Boring Log Explanation** FORA Road Improvements Seaside, California	Figure No. 5 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 1

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			3" AC						
			5" Baserock						
1				SP-SM					
2	1-1 L		Yellowish brown Silty SAND, fine grained sand, moist, medium dense						
3					30		107.9	6.4	12% Passing #200 Sieve
4									
5	1-2 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
6					28		113.5	4.4	
7									
8									
9									
10	1-3 T		Dark yellowish brown SAND, fine grained sand, damp medium dense						
11					13			2.9	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 6 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 2

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			3" AC						
			5" Baserock						
1	2-1 T		Dark yellowish brown SAND, fine grained sand, damp, medium dense	SP					
2					17			4.8	
3									
4									
5	2-2 T		Yellowish brown SAND, fine grained sand, damp, medium dense						
6					16			5.2	
7									
8									
9									
10	2-3 T		Yellowish brown SAND, medium grained sand, moist, medium dense						
11					13			4.9	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 7 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 3

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			5" AC						
1			7" Baserock						
2	3-1 T		Yellowish brown SAND, fine grained sand	SP					
3					28			10.9	
4									
5	3-2 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
6					19		104.5	9.5	5% Passing #200 Sieve
7									
8									
9									
10	3-3 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
11					15		99.1	3.9	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 8 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 4

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			4" AC						
			5" Baserock						
1	4-1 L		No Sample Recovered Dark yellowish brown Silty SAND, very fine grained sand, damp, very dense	SM	50/4"				
2									
3									
4				SP					
5	4-2 L		Yellowish brown SAND, fine grained sand, damp, dense						
6					32		112.1	6.2	
7									
8									
9									
10	4-3 T		Yellowish brown SAND, fine grained sand, moist medium dense						
11					16			2.6	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 9 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 5

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of11 feet)	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			6 1/2" AC						
1	5-1 L		Light yellowish brown SAND, fine grained sand, moist, medium dense	SP					
2					29		104.5	2.9	4% Passing #200 Sieve
3									
4									
5	5-2 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
6					13		106.1	2.6	
7									
8									
9									
10	5-3 L		Material consistent						
11					16		99.1	2.3	
12									
13									
14									
15	5-4 T		Yellowish brown SAND, medium grained sand, moist, medium dense						
16					25			2.8	
17			Boring Terminated at 16 1/2'						
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 10 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 6

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			7" AC						
1	6-1 L		Yellowish brown SAND with silt, fine grained sand, moist, dense	SP					
2					34		105.1	2.8	6% Passing #200 Sieve
3									
4				SP-SM					
5	6-2 L		Brown Silty SAND, fine grained sand, moist, loose						
6					9		109.5	4.0	
7									
8									
9									
10	6-3 T		Light yellowish brown SAND, fine grained sand, moist, medium dense						
11					20			2.4	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 11 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 7

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			4" AC						
1			8" Baserock						
2	7-1 L		Brown SAND with silt, fine grained sand, damp, loose	SP-SM					
3					6		106.5	5.7	10% Passing #200 Sieve
4									
5	7-2 L		Light yellowish brown SAND, fine grained sand, moist, loose						
6					8		98.3	3.6	
7									
8									
9									
10	7-3 T		Light yellowish brown SAND, fine grained sand, moist, medium dense						
11					16			3.0	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 12 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 8

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			4" AC, 2" Basecrock						
1	8-1 L		Yellowish brown SAND, fine grained sand, moist, dense	SP					
2					34		103.6	3.0	
3									
4									
5	8-2 L		Light yellowish brown SAND, fine grained sand, moist, loose						
6					10		98.3	2.1	3% Passing #200 Sieve
7									
8									
9									
10	8-3 T		Light yellowish brown SAND, fine grained sand, moist, medium dense						
11					21			6.1	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 13 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 9

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC, 4" Baserock						
1				SP					
2	9-1 L		Light yellowish brown SAND, fine grained sand, moist, medium dense						
3					13		105.1	1.9	
4									
5	9-2 L		Light yellowish brown SAND, fine grained sand, moist, loose						
6					8		104.5	1.9	
7									
8									
9									
10	9-3 T		Light yellowish brown SAND, very fine grained sand, moist, medium dense						
11					17			2.4	
12									
13									
14									
15	9-4 T		Material consistent						
16					24			2.0	
17			Boring Terminated at 16 1/2'						
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 14 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 10

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC, 2" Baserock						
1	10-1 L		Brown SAND, fine grained sand, moist, medium dense	SP					
2					13		107.9	5.3	4% Passing #200 Sieve
3									
4									
5	10-2 L		Brown SAND with silt, fine grained sand, moist, medium dense						
6					16		106.3	4.4	
7									
8									
9									
10	10-3 T		Light yellowish brown SAND, fine grained sand, moist, medium dense						
11					14			2.0	
12									
13									
14									
15	10-4 T		Material consistent						
16					15			2.0	
17			Boring Terminated at 16 1/2'						
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 15 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 11

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			4" AC, 3" Baserock						
1	11-1 L		Brown SAND with silt, fine grained sand, moist, medium dense	SP					
2					13		103.4	3.9	
3									
4									
5	11-2 L		Brown SAND with silt, fine grained sand, moist, loose						
6					5		94.0	3.6	
7									
8									
9									
10	11-3 L		Brown SAND with silt, fine grained sand, moist, loose						
11					10		103.7	2.7	
12			Boring Terminated 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 16 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 12

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			3" AC, 4" Baserock						
1				SP					
2	12-1 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
3					12		103.9	4.0	
4									
5	12-2 L		Yellowish brown SAND, fine grained sand, moist, loose						
6					6		101.2	4.5	4% Passing #200 Sieve
7									
8									
9									
10	12-3 T		Light yellowish brown SAND, fine grained sand, moist, medium dense						
11					17			2.1	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 17 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 13

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Prosposed Roadway Cut of 20')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC, 1" Baserock						
1				SP					
2									
3									
4									
5	13-1 T		Light yellowish brown SAND, fine grained sand, moist, loose						
6					10			2.8	
7									
8									
9									
10	13-2 L		Light yellowish brown SAND, fine grained sand, moist, loose						
11					10		105.0	1.9	
12									
13									
14									
15	13-3 T		Light yellowish brown SAND, fine grained sand, moist, medium dense						
16					25			4.2	
17									
18									
19									
20	13-4 T		Light yellowish brown SAND, fine grained sand, moist, medium dense						
21					26			4.1	4% Passing #200 Sieve
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 18 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 13

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	13-5 T		Light yellowish brown SAND, fine grained sand, moist, dense	SP	31			4.4	
26									
27			Boring Terminated at 26 1/2'						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 19 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 14

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			5" AC						
			3" Basecrock						
1	14-1 L		Dark yellowish brown SAND, fine grained sand, moist, medium dense	SP					
2					19		104.0	4.7	
3									
4									
5	14-2 L		Light yellowish brown SAND, fine grained sand, moist, loose						
6					8		95.0	4.8	
7									
8									
9									
10	14-3 T		Yellowish brown SAND, fine grained sand, moist, medium dense						
11					20			3.1	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 20 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 15

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 15')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			3" AC, 2" Baserock						
1				SP					
2									
3									
4									
5	15-1 T		Yellowish brown SAND, fine grained sand, moist, medium dense						
6					14			4.4	
7									
8									
9									
10	15-2 T		Yellowish brown SAND, fine grained sand, moist, medium dense						
11					23			3.5	
12									
13									
14									
15	15-3 T		Yellowish brown SAND, fine grained sand, moist, medium dense						
16					25			3.7	
17									
18									
19									
20	15-4 T		Yellowish brown SAND with silt, fine grained sand, moist, medium dense						
21					27			4.5	11% Passing #200 Sieve
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 21 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 15

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	15-5 T		Light yellowish brown SAND, fine grained sand, moist, dense	SP	31			5.0	
26									
27			Boring Terminated at 26 1/2'						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 22 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 16

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC, 2 1/2" Baserock						
1	16-1 L		Yellowish brown SAND with silt, fine grained sand, moist, medium dense	SP					
2					16		106.7	5.1	10% Passing #200 Sieve
3									
4									
5	16-2 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
6					12		99.1	4.0	
7									
8									
9									
10	16-3 T		Yellowish brown SAND, fine grained sand, moist, medium dense						
11					15			2.9	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 23 Project No. 03102 Date: 02/26/04

LOGGED BY DB DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 17

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			3" AC, 4" Baserock						
1	17-1 L		Light yellowish brown SAND, fine grained sand, moist, medium dense	SP					
2					13		104.9	9.5	
3									
4									
5	17-2 L		Light yellowish brown SAND with silt, fine grained sand, moist, medium dense						
6					27		108.9	6.9	12% Passing #200 Sieve
7									
8									
9									
10	17-3 T		Light yellowish brown SAND, fine grained sand, moist, dense						
11					33			4.4	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 24 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 1/23/04 BORING DIAMETER 6" SS BORING NO. 18

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			3 1/2" AC						
			5 1/2" Baserock						
1	18-1 L		Yellowish brown Silty SAND, fine grained sand, moist, medium dense	SM-SP					
2					12		122.8	9.9	17% Passing #200 Sieve
3									
4									
5	18-2 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
6					26		118.1	10.7	
7									
8									
9									
10	18-3 L		Yellowish brown SAND, fine grained sand, moist, medium dense						
11					21		102.5	6.1	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 25 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 19

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 20')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC						
1			11" Baserock						
2			Yellowish brown SAND, fine grained sand, damp	SP					
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15	19-1 L		Light yellowish brown SAND, medium grained sand, damp, medium dense						
16					13		103.9	6.1	
17									
18									
19									
20	19-2 L		Light yellowish brown SAND, medium grained sand, moist, medium dense						
21					17		94.8	3.6	3% Passing #200 Sieve
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 26 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 19

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	19-3 L		Light yellowish brown SAND, medium grained sand, moist, medium dense	SP	17		96.1	3.8	
26									
27			Boring Terminated at 26 1/2'						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 27 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 20

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 11')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			1 1/2" AC, 4 1/2" Baserock						
1				SP					
2			Yellowish brown SAND with silt, fine grained sand, damp						
3									
4									
5									
6									
7									
8									
9									
10	20-1 T		Yellowish brown SAND, fine grained sand, damp, medium dense						
11					16			3.9	
12									
13									
14									
15	20-2 L		Yellowish brown SAND, fine grained sand, damp, medium dense						
16					17		98.6	4.8	2% Passing #200 Sieve
17									
18									
19									
20	20-3 L		Yellowish brown SAND, fine grained sand, damp, medium dense						
21					19		100.9	5.5	
22			Boring Terminated at 21 1/2'						
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 28 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 21

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 13')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC, 4" Baserock						
1				SP					
2			Yellowish brown SAND with silt, fine grained sand, damp						
3									
4									
5									
6									
7									
8									
9									
10	21-1 L		Light yellowish brown SAND, fine grained sand, damp, medium dense						
11					18		105.8	4.3	
12									
13									
14									
15	21-2 L		Light yellowish brown SAND, fine grained sand, damp, medium dense						
16					18		101.1	3.5	3% Passing #200 Sieve
17									
18									
19									
20	21-3 L		Light yellowish brown SAND, fine grained sand, damp, medium dense						
21					18		94.2	3.9	
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 29 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 21

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	21-4 T		Light yellowish brown SAND, fine grained sand, damp, dense	SP	34			3.1	
26									
27			Boring Terminated at 26 1/2'						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 30 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 22

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 18')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC, 4" Basecrock						
1			Yellowish brown SAND, fine grained sand, damp	SP					
2									
3									
4									
5									
6									
7									
8									
9			Yellowish brown Silty SAND, fine grained sand, damp, dense	SM-SP					
10	22-1 T								
11					39			5.8	12% Passing #200 Sieve
12									
13									
14									
15									
16									
17									
18									
19									
20	22-2 T		Yellowish brown SAND, fine grained sand, damp, medium dense						
21					28			4.5	
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 31 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 22

Depth (feet)	Sample No. and Type	Symbol	Soil Description	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
25	22-3 T		Yellowish brown SAND, fine grained sand, damp, dense	SP	33			4.2	
26									
27			Boring Terminated at 26 1/2'						
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 32 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 23

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 7')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			1 1/2" AC, 3" Baserock						
1				SP					
2									
3									
4									
5	23-1 L		Yellowish brown SAND, fine grained sand, damp, medium dense						
6					13		96.5	2.5	
7									
8									
9									
10	23-2 L		Yellowish brown SAND, fine grained sand, damp, medium dense						
11					22		104.6	3.9	
12									
13									
14									
15	23-3 L		Yellowish brown SAND, fine grained sand, damp, medium dense						
16					21		107.8	3.7	
17			Boring Terminated at 16 1/2'						
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 33 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 24

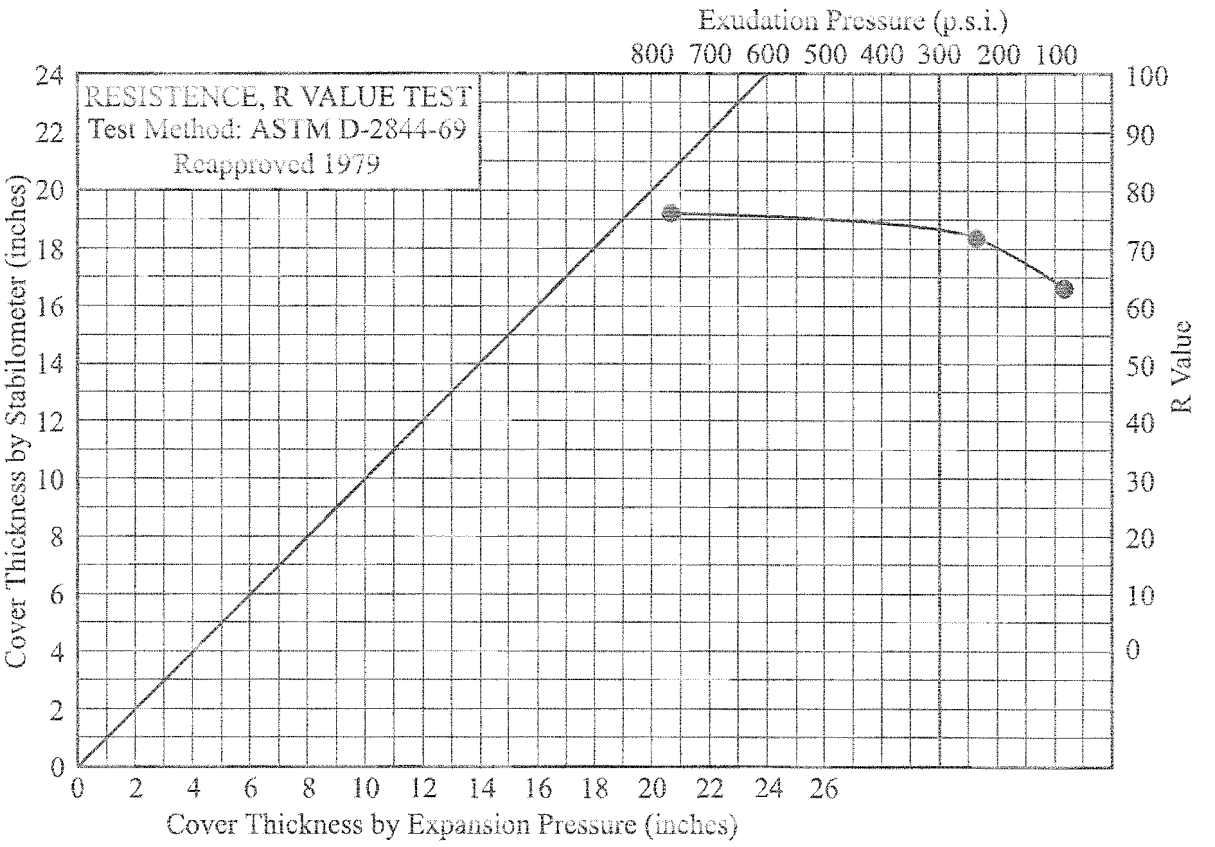
Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 13')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			2" AC, 4" Baserock						
1			Yellowish brown SAND, fine grained sand, damp	SP					
2									
3									
4									
5									
6									
7									
8									
9			Yellowish brown Silty SAND, fine grained sand, damp, medium dense	SM					
10	24-1 L								
11					18		109.5	7.8	24% Passing #200 Sieve
12									
13			Yellowish brown SAND, fine grained sand, damp, medium dense	SP					
14									
15	24-2 L								
16					19		106.3	6.9	
17			Boring Terminated at 16 1/2'						
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 34 Project No. 03102 Date: 02/26/04

LOGGED BY DE DATE DRILLED 2/6/04 BORING DIAMETER 6" SS BORING NO. 25

Depth (feet)	Sample No. and Type	Symbol	Soil Description (Proposed Roadway Cut of 3')	Unified Soil Classification	SPT "N" Value	Plasticity Index	Dry Density (pcf)	Moisture % of Dry Wt.	Misc. Lab Results
			4 1/2" AC, 2" Baserock						
1				SM					
2	25-1 T		Yellowish brown Silty SAND, fine grained sand, damp, medium dense						
3					27			4.7	12% Passing #200 Sieve
4				SP					
5	25-2 T		Yellowish brown SAND, fine grained sand, damp, medium dense						
6					16			4.2	
7									
8									
9									
10	25-3 T		Yellowish brown SAND, fine grained sand, damp, medium dense						
11					18			3.3	
12			Boring Terminated at 11 1/2'						
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**Log of Test Borings** FORA Road Improvements Seaside, California	Figure No. 35 Project No. 03102 Date: 02/26/04

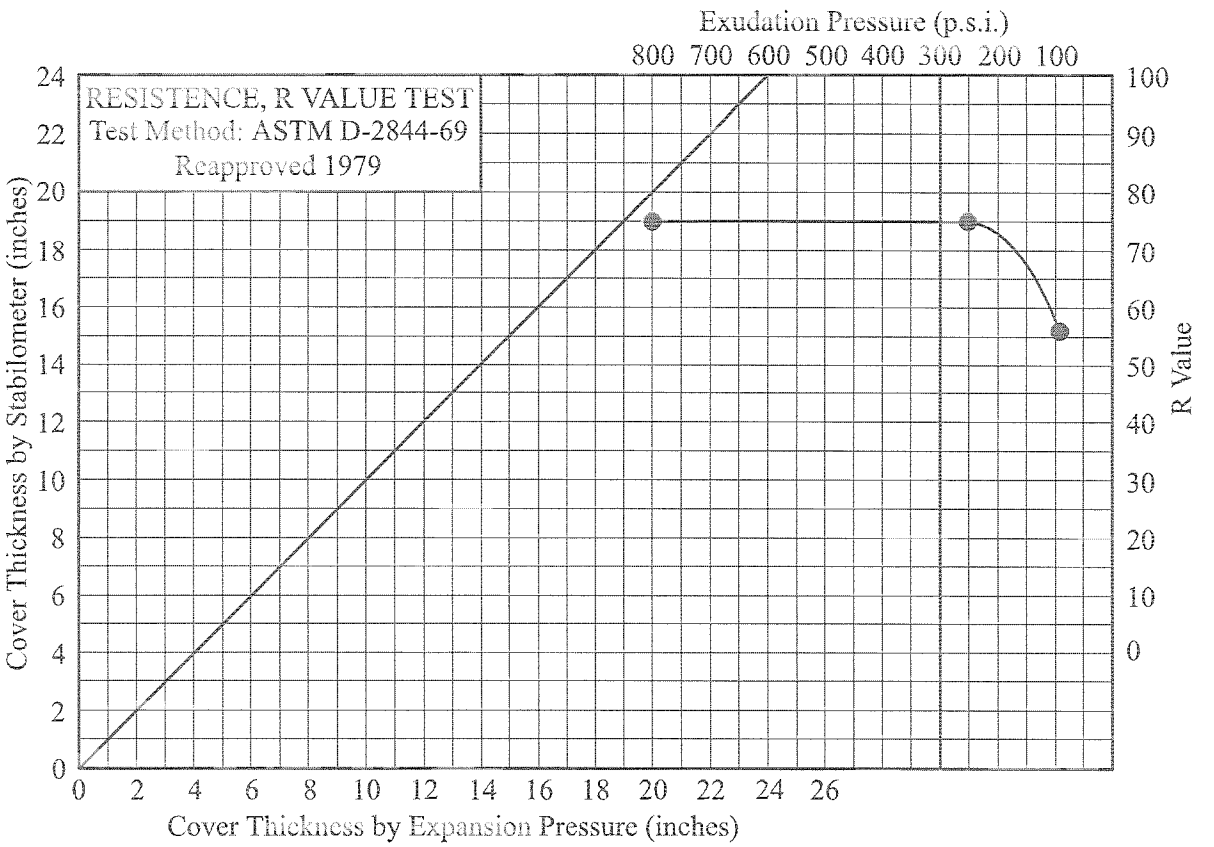


Sample Number: R-1

Sample Description: Brown SAND with silt

Specimen	A	B	C
Exudation Pressure, p.s.i.	81	234	765
Resistance Value, "R"	63	72	76
% Moisture at Test	12.6	10.4	9.5
Dry Density at Test, p.c.f.	115.7	118.6	116.3
R Value at 300 p.s.i. Exudation Pressure	= (73)		

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 36 Project No. 03102 Date: 02/26/04

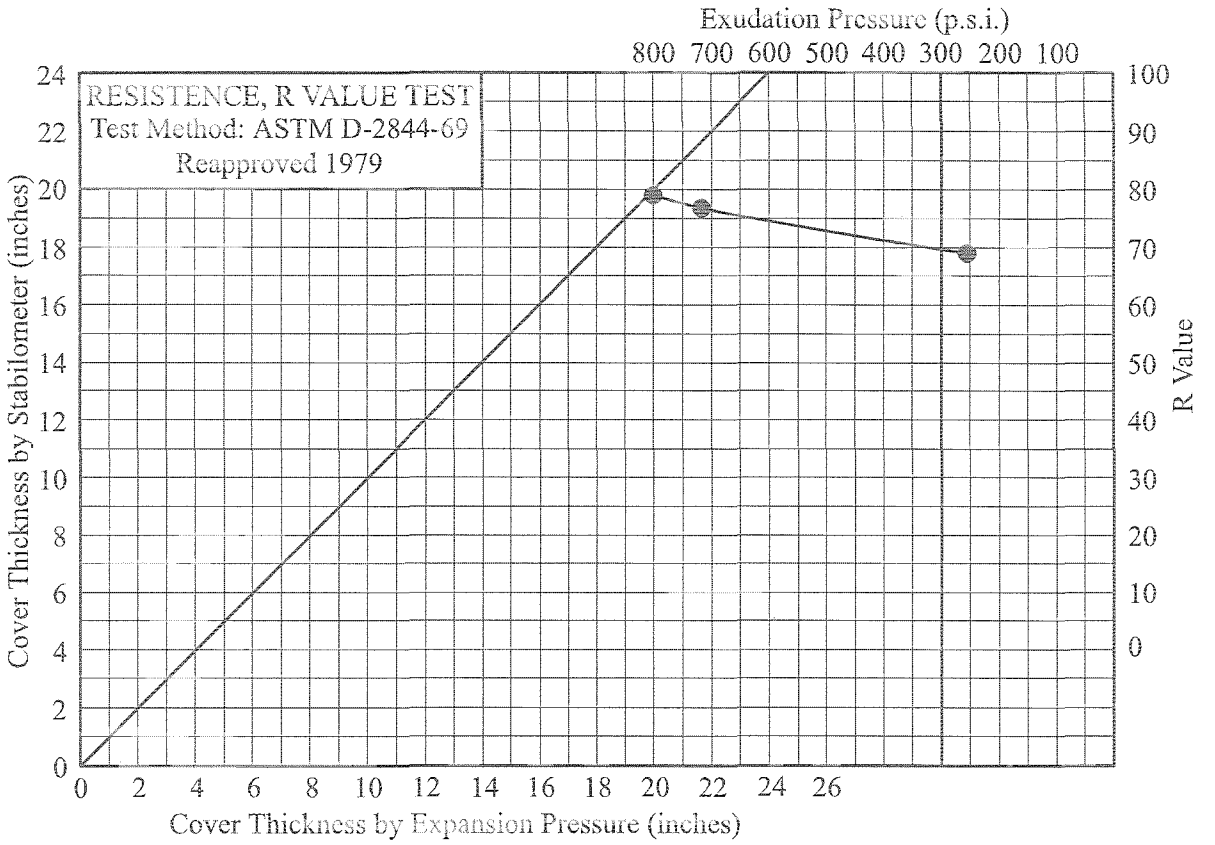


Sample Number: R-2

Sample Description: Brown SAND with silt

Specimen	A	B	C
Exudation Pressure, p.s.i.	91	255	800
Resistance Value, "R"	56	75	75
% Moisture at Test	12.5	10.3	8.9
Dry Density at Test, p.c.f.	116.4	120.2	119.0
R Value at 300 p.s.i. Exudation Pressure	= (75)		

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 37 Project No. 03102 Date: 02/26/04

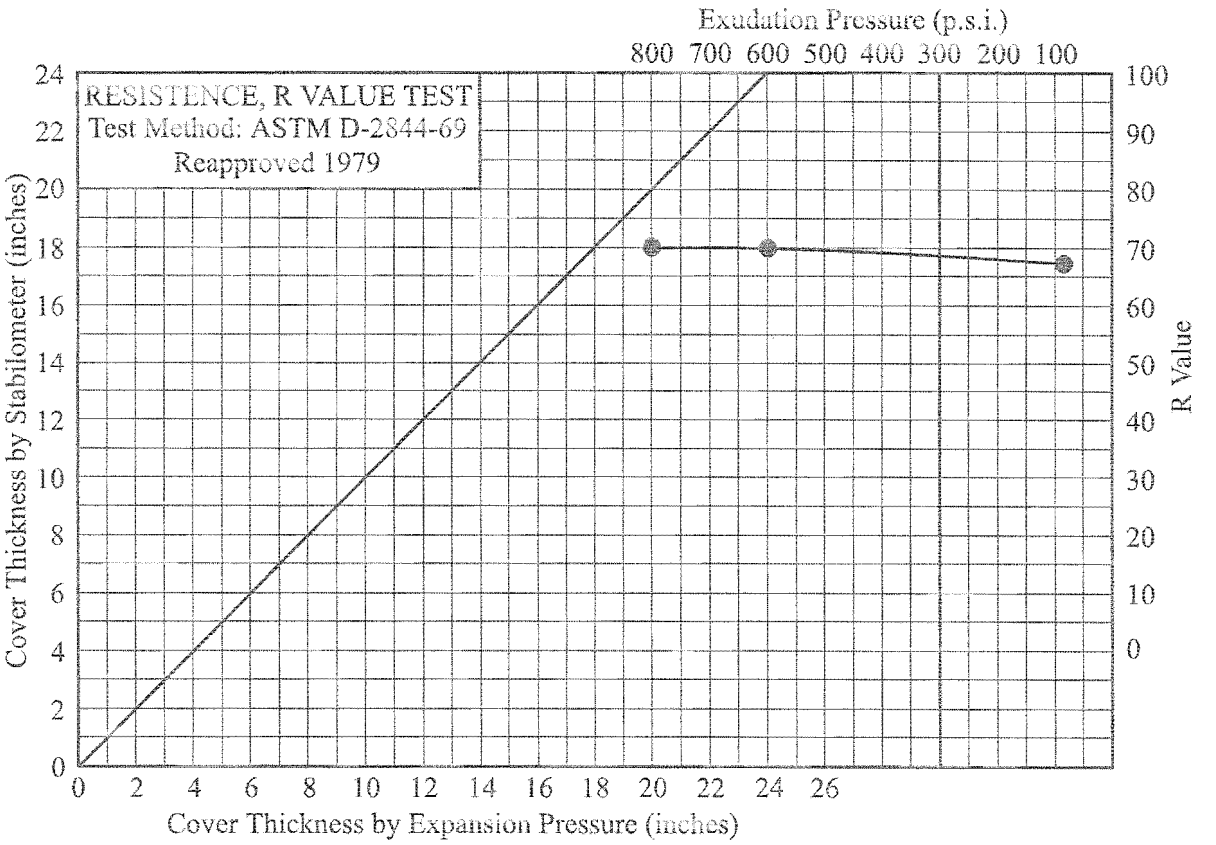


Sample Number: R-3

Sample Description: Yellowish brown SAND with silt

Specimen	A	B	C
Exudation Pressure, p.s.i.	800	254	719
Resistance Value, "R"	79	69	77
% Moisture at Test	9.3	11.1	10.2
Dry Density at Test, p.c.f.	114.0	114.4	113.2
R Value at 300 p.s.i. Exudation Pressure	= (70)		

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 38 Project No. 03102 Date: 02/26/04

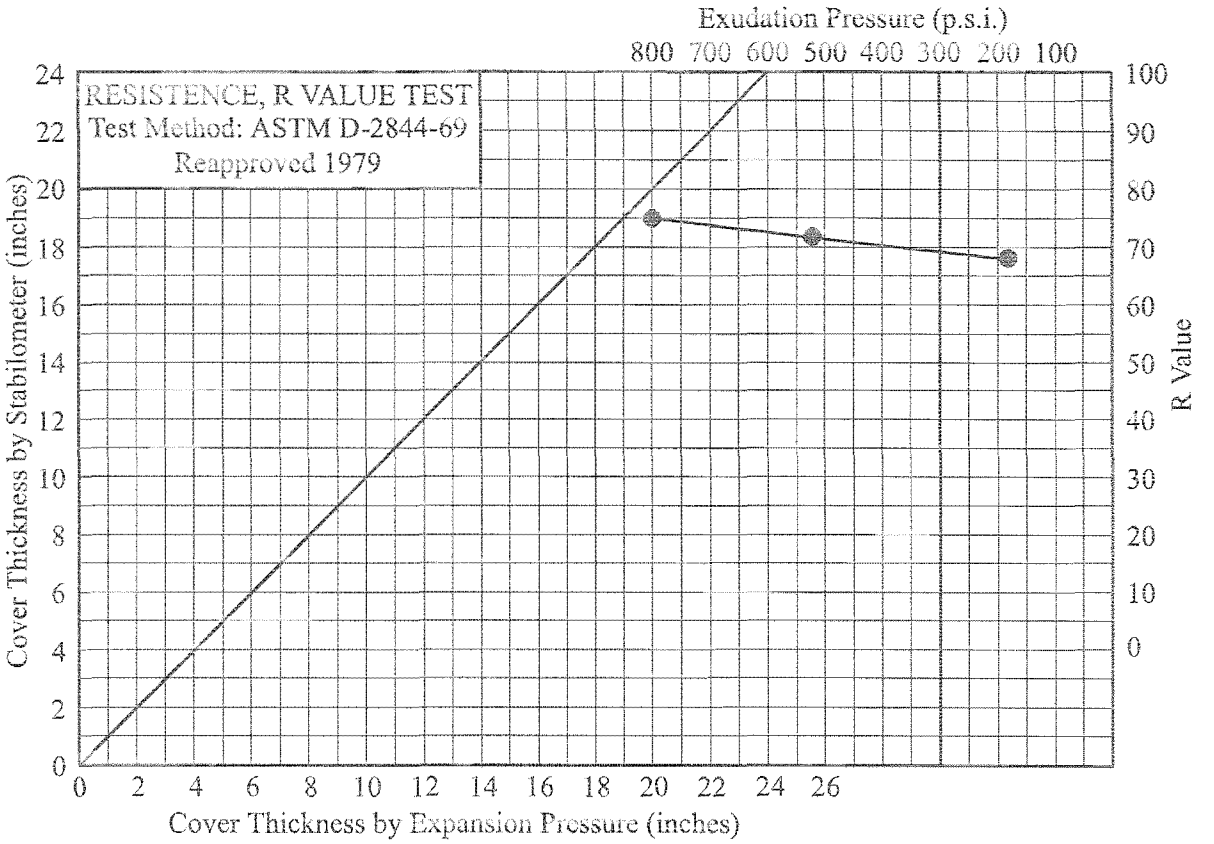


Sample Number: R-4

Sample Description: Orange brown SAND with silt

Specimen	A	B	C
Exudation Pressure, p.s.i.	84	599	800
Resistance Value, "R"	67	70	70
% Moisture at Test	15.7	13.1	11.3
Dry Density at Test, p.c.f.	105.1	106.5	105.5
R Value at 300 p.s.i. Exudation Pressure	= (68)		

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 39 Project No. 03102 Date: 02/26/04

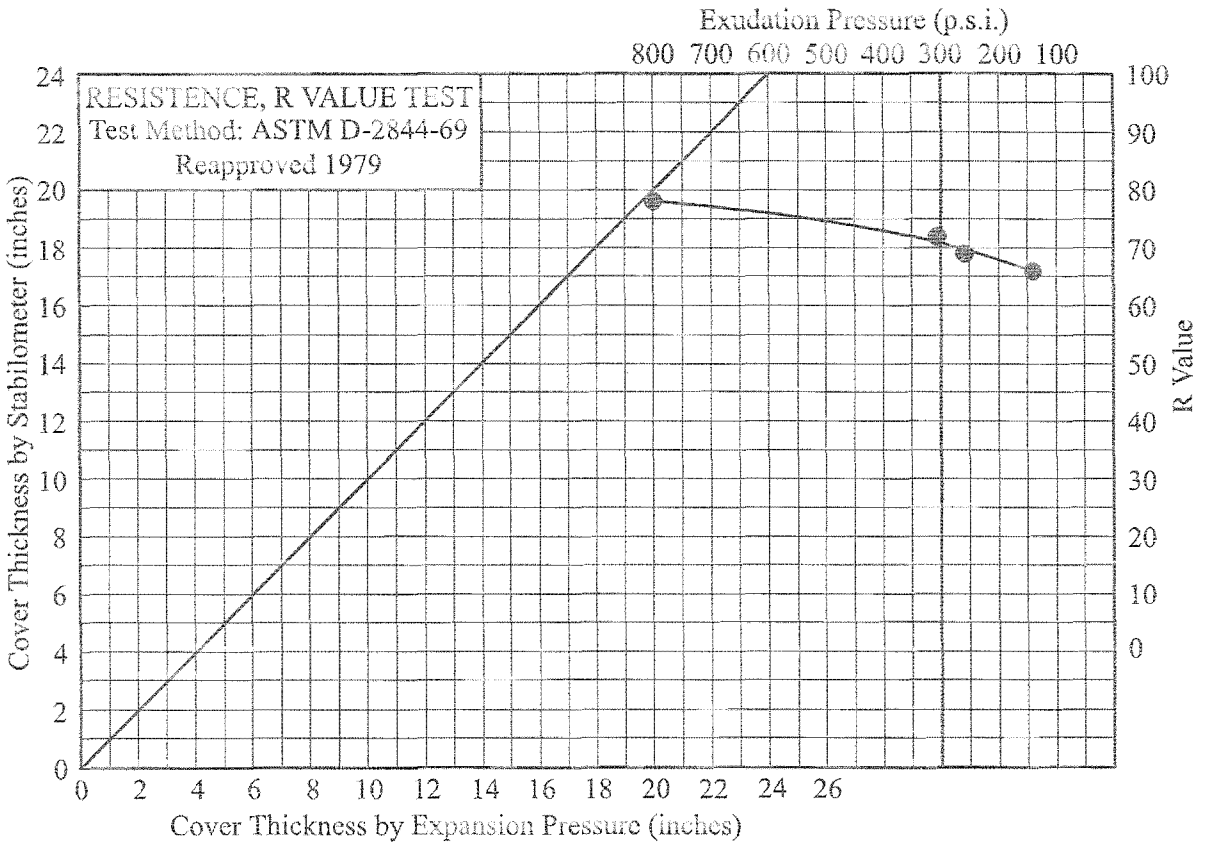


Sample Number: R-5

Sample Description: Yellowish brown SAND with silt

Specimen	A	B	C
Exudation Pressure, p.s.i.	800	521	180
Resistance Value, "R"	75	72	68
% Moisture at Test	13.0	14.4	15.7
Dry Density at Test, p.c.f.	102.8	103.7	102.9
R Value at 300 p.s.i. Exudation Pressure	= (69)		

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 40 Project No. 03102 Date: 02/26/04

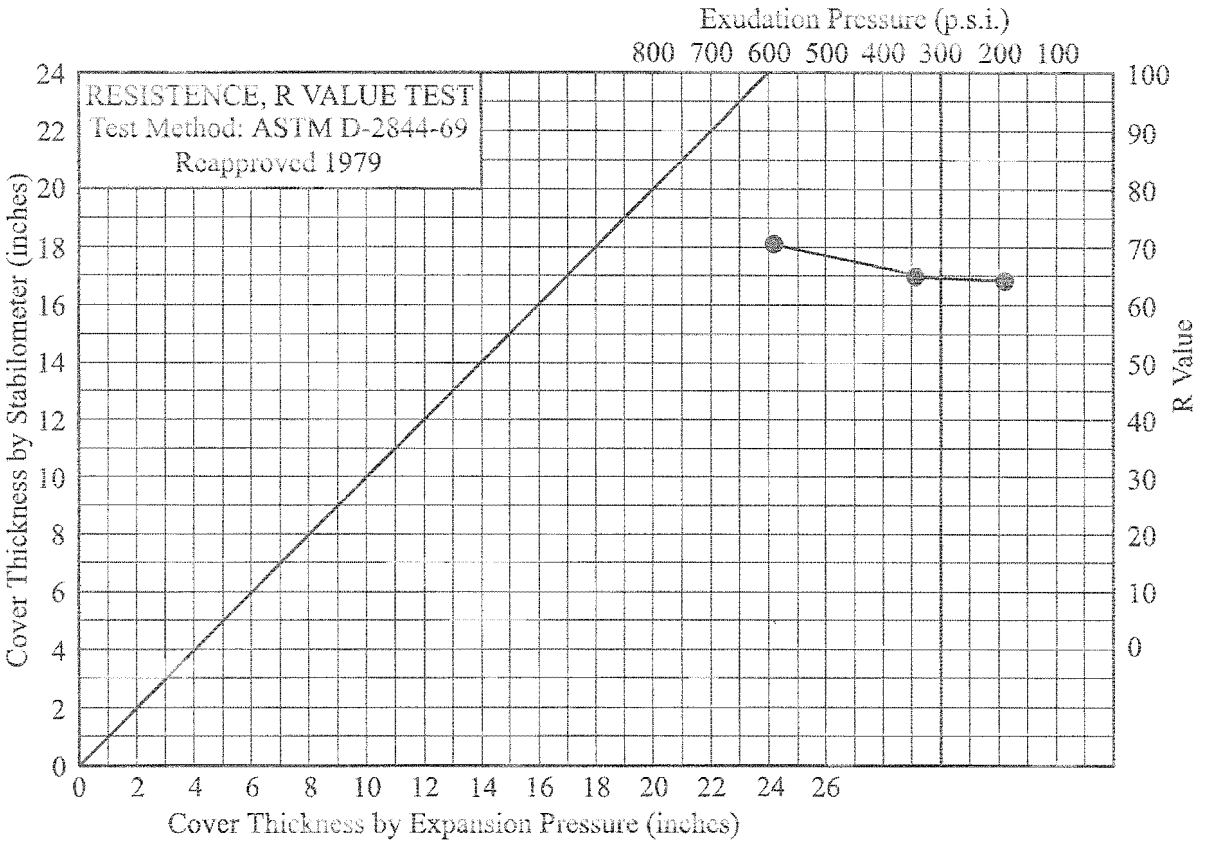


Sample Number: R-6

Sample Description: Yellowish brown SAND with silt

Specimen	A	B	C	D
Exudation Pressure, p.s.i.	139	258	303	800
Resistance Value, "R"	66	69	72	78
% Moisture at Test	14.9	14.0	13.1	12.2
Dry Density at Test, p.c.f.	108.3	107.8	109.1	108.7
R Value at 300 p.s.i. Exudation Pressure	= (71)			

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 41 Project No. 03102 Date: 02/26/04

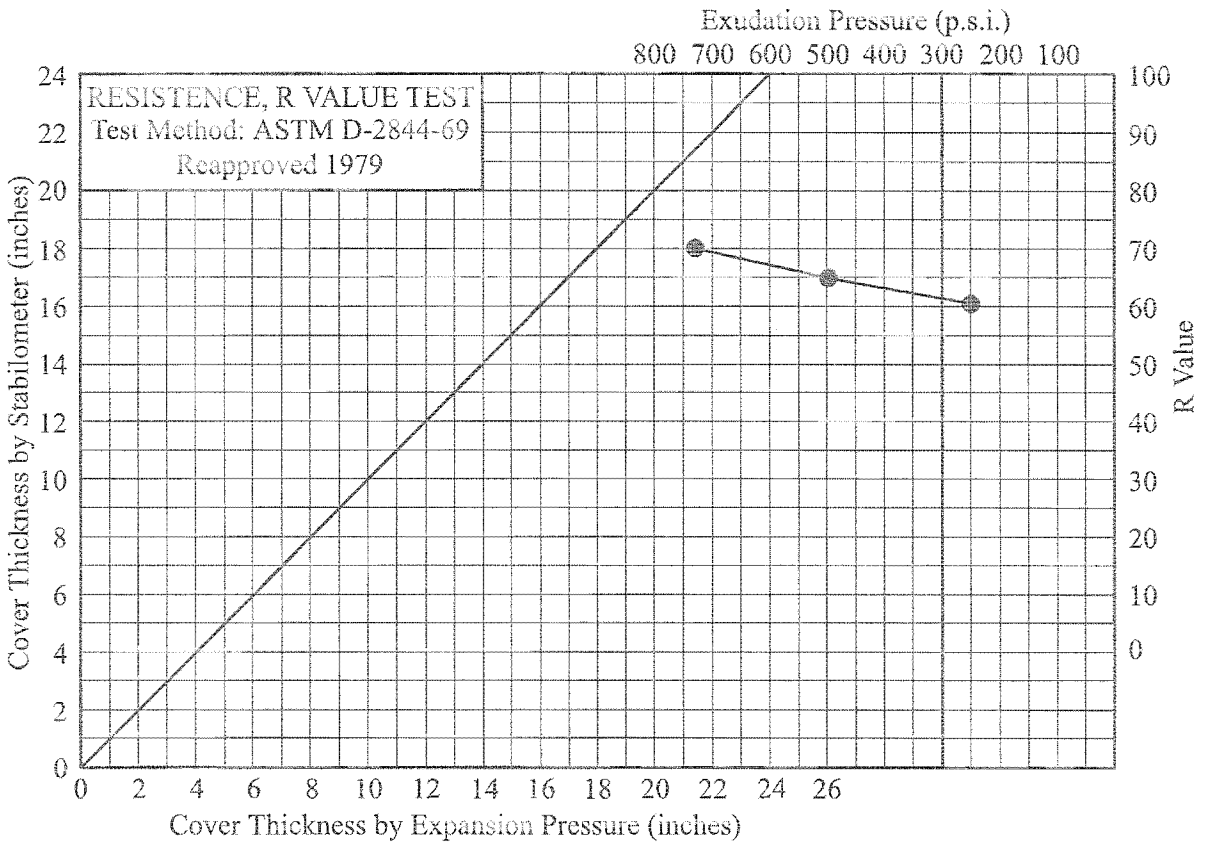


Sample Number: R-7

Sample Description: Tan SAND with silt

Specimen	A	B	C
Exudation Pressure, p.s.i.	185	589	348
Resistance Value, "R"	64	71	65
% Moisture at Test	12.5	11.6	11.9
Dry Density at Test, p.c.f.	101.5	104.7	101.2
R Value at 300 p.s.i. Exudation Pressure	= (64)		

Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 42 Project No. 03102 Date: 02/26/04



Sample Number: R-8

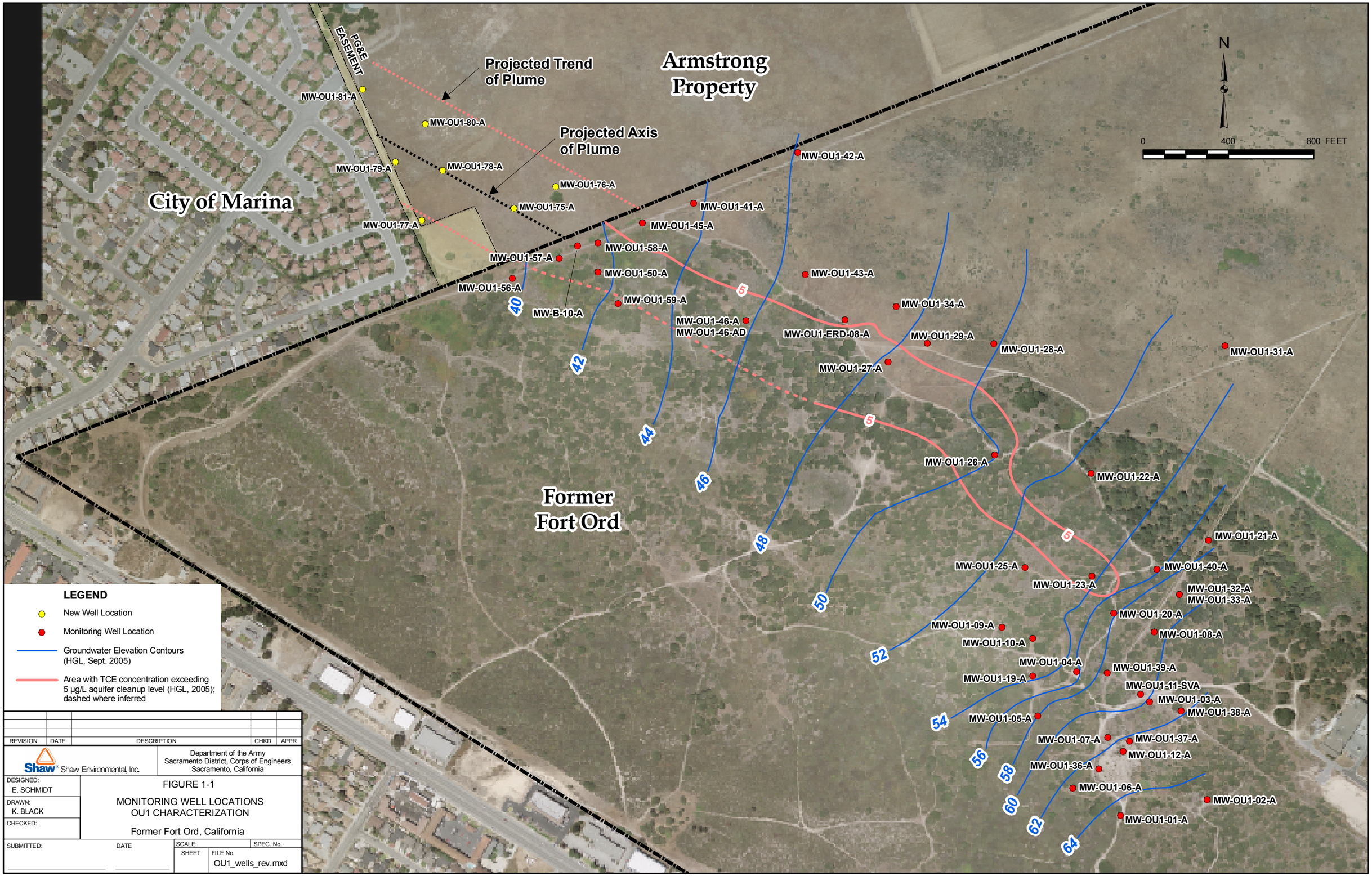
Sample Description: Tan SAND with silt

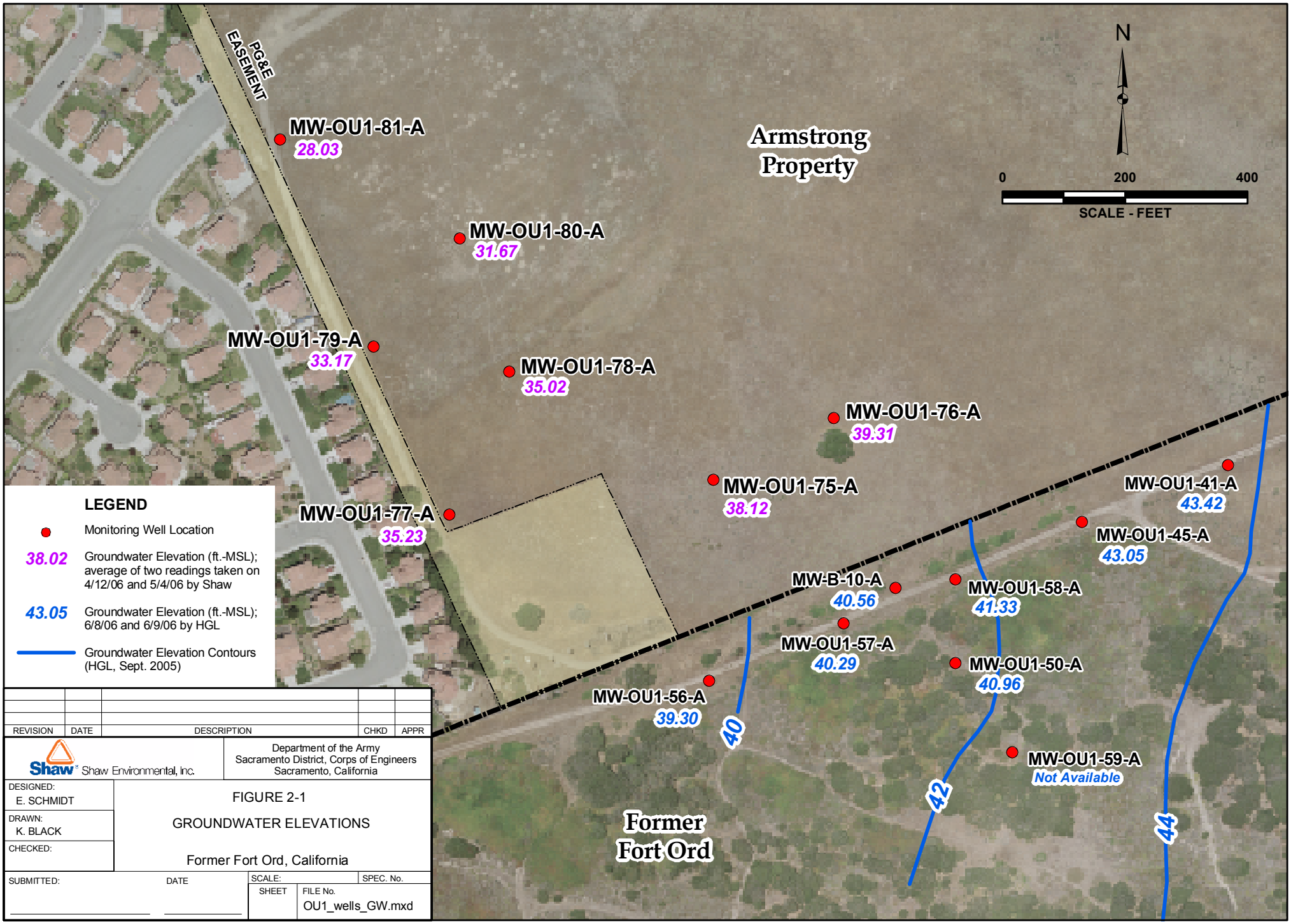
Specimen	A	B	C
Exudation Pressure, p.s.i.	727	252	500
Resistance Value, "R"	70	60	65
% Moisture at Test	11.7	12.4	12.0
Dry Density at Test, p.c.f.	105.7	105.8	104.3
R Value at 300 p.s.i. Exudation Pressure	= (61)		

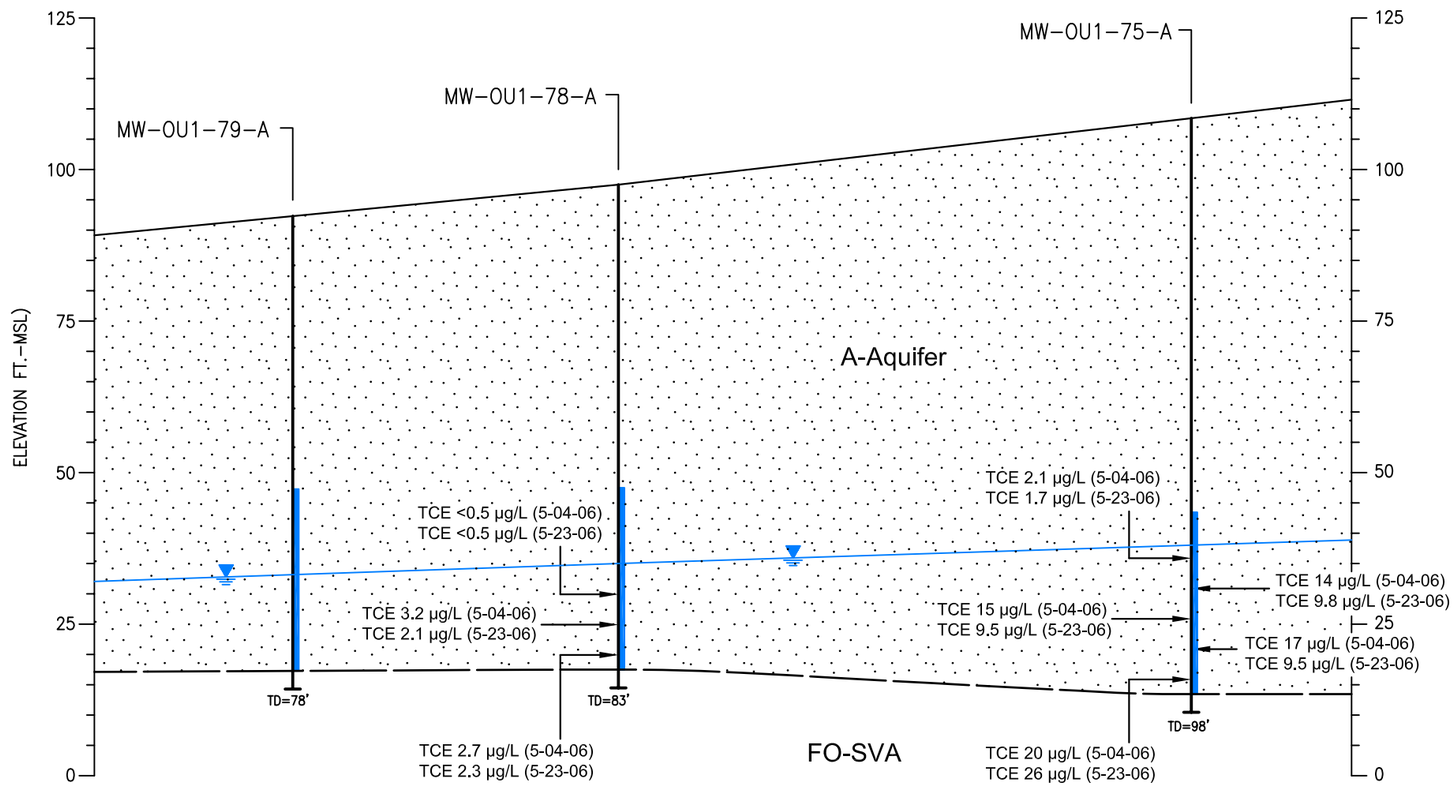
Pacific Crest Engineering Inc. 444 Airport Blvd., Suite 106 Watsonville, CA 95076	**R Value Results** FORA Road Improvements Seaside, California	Figure No. 43 Project No. 03102 Date: 02/26/04

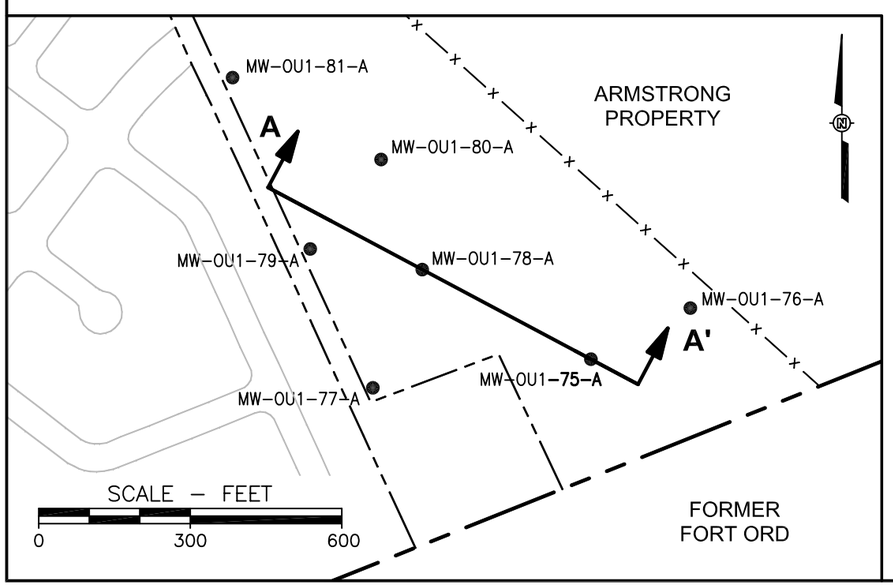
Shaw Group Environmental 2006[1]

[1] Please see Figure 5 for full citation.


PG&E EASEMENT
Projected Trend of Plume
Armstrong Property
Projected Axis of Plume
City of Marina
Former Fort Ord
N
0
400
800 FEET
MW-OU1-81-A
MW-OU1-80-A
MW-OU1-79-A
MW-OU1-78-A
MW-OU1-76-A
MW-OU1-75-A
MW-OU1-77-A
MW-OU1-42-A
MW-OU1-41-A
MW-OU1-45-A
MW-OU1-58-A
MW-OU1-57-A
MW-OU1-50-A
MW-OU1-56-A
MW-OU1-43-A
MW-OU1-59-A
MW-B-10-A
MW-OU1-34-A
MW-OU1-46-A
MW-OU1-46-AD
MW-OU1-ERD-08-A
MW-OU1-29-A
MW-OU1-28-A
MW-OU1-31-A
MW-OU1-27-A
MW-OU1-26-A
MW-OU1-22-A
MW-OU1-21-A
MW-OU1-25-A
MW-OU1-40-A
MW-OU1-23-A
MW-OU1-32-A
MW-OU1-33-A
MW-OU1-20-A
MW-OU1-09-A
MW-OU1-08-A
MW-OU1-10-A
MW-OU1-04-A
MW-OU1-39-A
MW-OU1-19-A
MW-OU1-11-SVA
MW-OU1-03-A
MW-OU1-38-A
MW-OU1-05-A
MW-OU1-07-A
MW-OU1-37-A
MW-OU1-12-A
MW-OU1-36-A
MW-OU1-06-A
MW-OU1-02-A
MW-OU1-01-A
40
42
44
46
48
50
52
54
56
58
60
62
64
5
LEGEND
New Well Location
Monitoring Well Location
Groundwater Elevation Contours (HGL, Sept. 2005)
Area with TCE concentration exceeding 5 µg/L aquifer cleanup level (HGL, 2005); dashed where inferred
REVISION
DATE
DESCRIPTION
CHKD
APPR
Shaw Environmental, Inc.
Department of the Army
Sacramento District, Corps of Engineers
Sacramento, California
DESIGNED: E. SCHMIDT
DRAWN: K. BLACK
CHECKED:
FIGURE 1-1
MONITORING WELL LOCATIONS
OU1 CHARACTERIZATION
Former Fort Ord, California
SUBMITTED:
DATE
SCALE:
SPEC. No.
SHEET
FILE No.
OU1_wells_rev.mxd


PG&E EASEMENT
MW-OU1-81-A
28.03
Armstrong Property
N
0
200
400
SCALE - FEET
MW-OU1-80-A
31.67
MW-OU1-79-A
33.17
MW-OU1-78-A
35.02
MW-OU1-76-A
39.31
MW-OU1-75-A
38.12
MW-OU1-41-A
43.42
MW-OU1-77-A
35.23
MW-OU1-45-A
43.05
MW-B-10-A
40.56
MW-OU1-58-A
41.33
MW-OU1-57-A
40.29
MW-OU1-50-A
40.96
MW-OU1-56-A
39.30
40
MW-OU1-59-A
Not Available
42
44
Former Fort Ord
LEGEND
Monitoring Well Location
38.02
Groundwater Elevation (ft.-MSL); average of two readings taken on 4/12/06 and 5/4/06 by Shaw
43.05
Groundwater Elevation (ft.-MSL); 6/8/06 and 6/9/06 by HGL
Groundwater Elevation Contours (HGL, Sept. 2005)
REVISION
DATE
DESCRIPTION
CHKD
APPR
Shaw Environmental, Inc.
Department of the Army
Sacramento District, Corps of Engineers
Sacramento, California
DESIGNED:
E. SCHMIDT
DRAWN:
K. BLACK
CHECKED:
FIGURE 2-1
GROUNDWATER ELEVATIONS
Former Fort Ord, California
SUBMITTED:
DATE
SCALE:
SPEC. No.
SHEET
FILE No.
OU1_wells_GW.mxd





VERTICAL SCALE

0 25 50 FEET

HORIZONTAL SCALE

0 100 200 FEET

REVISION	DATE	DESCRIPTION	CHKD	APPR

Shaw® Shaw Environmental, Inc.

DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT, CORPS OF ENGINEERS
SACRAMENTO, CALIFORNIA

DESIGNED: E. SCHMIDT
DRAWN: K. BLACK
CHECKED:

FIGURE 2-2

CROSS SECTION
OF NEW OU1 WELLS

FORMER FORT ORD, CALIFORNIA

SUBMITTED:
DATE APPROVED:
SCALE:
SPEC. No.
SHEET –
FILE No. 783751SJ-B178

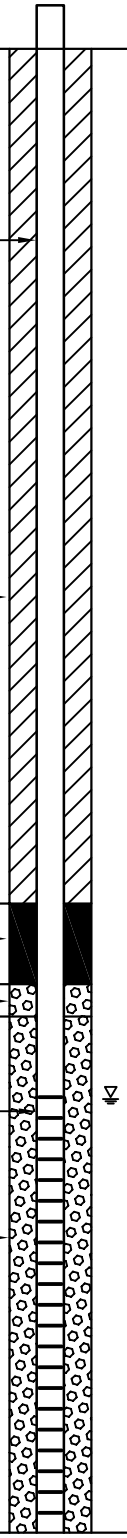
MONITORING WELL NO. MW-OU1-75-A

COORDINATES: N 2145297.76
E 5745706.69

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 98 ft.

DATE BEGAN 3/14/06
DATE FINISHED 3/15/06
SURFACE ELEV. 108.45
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0			SM		@ 0.5' SILTY SAND: very dark gray (10YR 3/1); 85% fine to coarse sand; 15% silt; loose; moist
					@ 5' As above
			SW		@ 7' WELL GRADED SAND: yellowish brown (10YR 5/4); 90% fine to coarse sand; 10% silt; loose; moist
10		3" Dia. Sch. 80 PVC Solid Casing			@ 10' As above
					@ 15' As above; loose; dry
20					@ 20' As above
					@ 25' As above
30					@ 30' As above
		Bentonite Cement Seal			@ 35' As above
40					@ 40' As above
					@ 45' As above
50					@ 50' As above
		Bentonite Chips			@ 55' As above; loose; moist
60		#60 Sand			@ 60' As above
		3" Dia. Sch. 80 PVC 0.010" slot screen			@ 65' As above; loose; wet
70					@ 70' As above
		#1/20 Lonestar Sand			@ 75' As above
80					@ 80' As above
					@ 85' As above
90					@ 90' As above



DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW-OU1-75-A
DATE	4/18/06	APPROVED BY			

Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW-OU1-75-A

COORDINATES: N 2145297.76
E 5745706.69

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 98 ft.

DATE BEGAN 3/14/06
DATE FINISHED 3/15/06
SURFACE ELEV. 108.45
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
90		End Cap	SW		◎ 92' As above
			CH		◎ 95' FAT CLAY: grayish brown (2.5Y 5/2); 90% clay; 10% silt; soft; moist; driller notes a change ◎ 97' As above; dark greenish gray (5GY 4/1)
100					Bottom of Boring = 98' Logged by cuttings
110					
120					
130					
140					
150					
160					
170					
180					

DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW-OU1-75-A
DATE	4/18/06	APPROVED BY			

Shaw® Shaw Environmental, Inc.

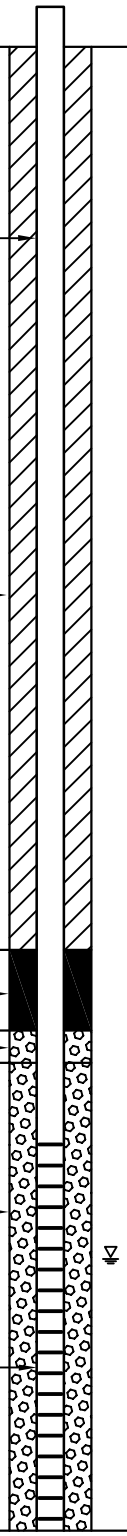
MONITORING WELL NO. MW–OU1–76–A

COORDINATES: N 2145395.27
E 5745912.29

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 100 ft.

DATE BEGAN 3/13/06
DATE FINISHED 3/14/06
SURFACE ELEV. 107.41
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0			SW		0.5' WELL GRADED SAND: dark grayish brown (10YR 3/2); 90% fine to coarse sand; 10% silt; loose; moist
					7' As above; dark yellowish brown (10YR 4/4)
10		3" Dia. Sch. 80 PVC Solid Casing			10' As above
					15' As above; 95% fine to coarse sand; 5% silt; loose; dry
20					20' As above
					25' As above; yellowish brown (10YR 5/4)
30					
		Bentonite Cement Seal			35' As above; dark yellowish brown (10YR 4/4); loose; dry
40					40' As above
					45' As above
50					50' As above
					55' As above; yellowish brown (10YR 5/4)
		Bentonite Chips			
60					60' As above
		#60 Sand			
					65' As above
70					70' As above
		#1/20 Lonestar Sand			
					75' As above; yellowish brown (10YR 5/4); 90% fine to coarse sand; 10% silt; loose; wet
80		3" Dia. Sch. 80 PVC 0.010" slot screen			80' As above
					85' As above
90					90' As above



DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW–OU1–76–A
DATE	4/18/06	APPROVED BY			

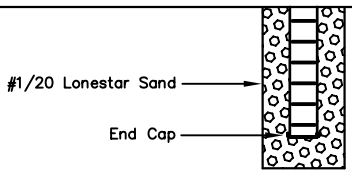
Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW-OU1-76-A

COORDINATES: N 2145395.27
E 5745912.29

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 100 ft.

DATE BEGAN 3/13/06
DATE FINISHED 3/14/06
SURFACE ELEV. 107.41
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
90			SW		@ 95' As above
			CH		@ 97.5' FAT CLAY: grayish brown (2.5Y 5/2); 90% clay; 10% silt; soft; moist; driller notes a change
100					Bottom of Boring = 100' Logged by cuttings
110					
120					
130					
140					
150					
160					
170					
180					

DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW-OU1-76-A
DATE	4/18/06	APPROVED BY			

Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW–OU1–77–A

COORDINATES: N 2145243.17
E 5745276.13

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 76 ft.

DATE BEGAN 3/22/06
DATE FINISHED 3/22/06
SURFACE ELEV. 90.68
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0			SM		@ 0.5' SILTY SAND: very dark gray (10YR 3/1); 80% fine to coarse sand; 20% silt; loose; moist
					@ 5' As above
			SW		@ 6' WELL GRADED SAND: dark yellowish brown (10YR 4/4); 90% fine to coarse sand; 10% silt; loose; moist
10		3" Dia. Sch. 80 PVC Solid Casing			@ 10' As above
					@ 15' As above
20		Bentonite Cement Seal			@ 20' As above
30					@ 30' As above
		Bentonite Chips			@ 35' As above; dark yellowish brown (10YR 4/4); loose; dry
		#60 Sand			
40					@ 40' As above; yellowish brown (10YR 5/4)
		#1/20 Lonestar Sand			
50					@ 50' As above
					@ 55' As above
		3" Dia. Sch. 80 PVC 0.010" slot screen			
60					@ 60' As above; dark yellowish brown (10YR 4/4); loose; wet
70					@ 70' As above
		End Cap	CH		@ 74' FAT CLAY: olive gray (5Y 5/2); 95% clay; 5% silt; soft; moist; driller notes a change
80					Bottom of Boring = 76' Logged by cuttings
90					

DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW–OU1–77–A
DATE	4/18/06	APPROVED BY			

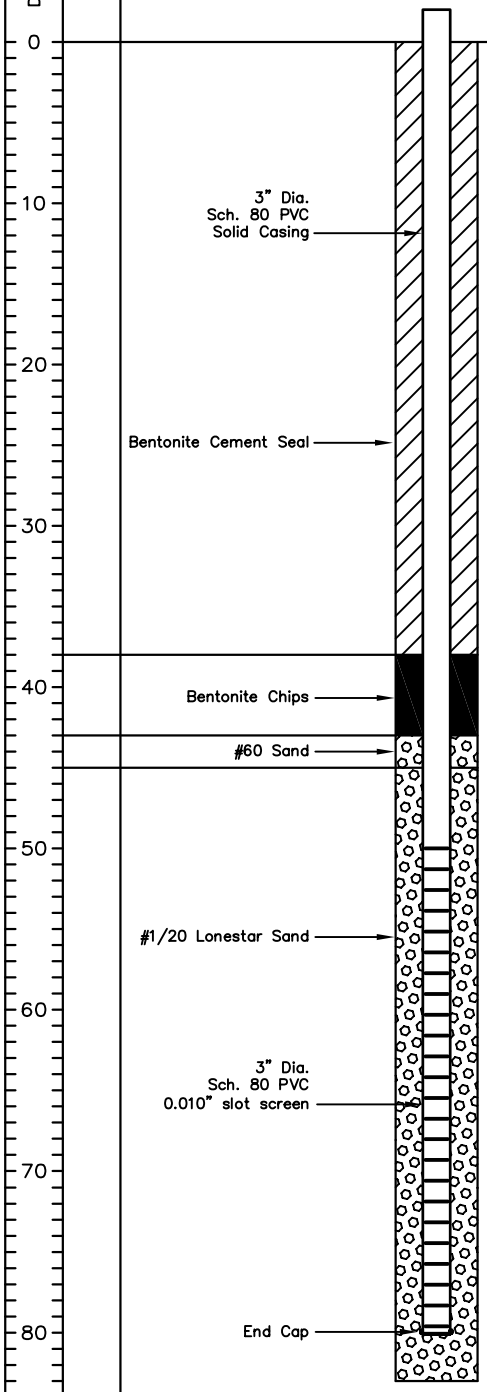
Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW-OU1-78-A

COORDINATES: N 2145477.85
E 5745372.49

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 83 ft.

DATE BEGAN 3/15/06
DATE FINISHED 3/16/06
SURFACE ELEV. 97.49
CORE SIZE N/A



USCS	DESCRIPTION
SM	0.5' SILTY SAND: dark grayish brown (10YR 4/2); 85% fine to coarse sand; 15% silt; loose; moist
	6' As above; dark yellowish brown (10YR 4/4)
SW	9' WELL GRADED SAND: yellowish brown (10YR 5/6); 90% fine to coarse sand; 10% silt; loose; moist
	15' As above
	20' As above
	25' As above
	30' As above
	35' As above
	40' As above
	45' As above; dark yellowish brown (10YR 4/4)
	50' As above
	55' As above
	60' As above
	65' As above
	70' As above
	75' As above
CH	80' FAT CLAY: dark greenish gray (5GY 4/1); 95% clay; 5% silt; soft; moist; driller notes a change
	Bottom of Boring = 83' Logged by cuttings

DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW-OU1-78-A
DATE	4/18/06	APPROVED BY			

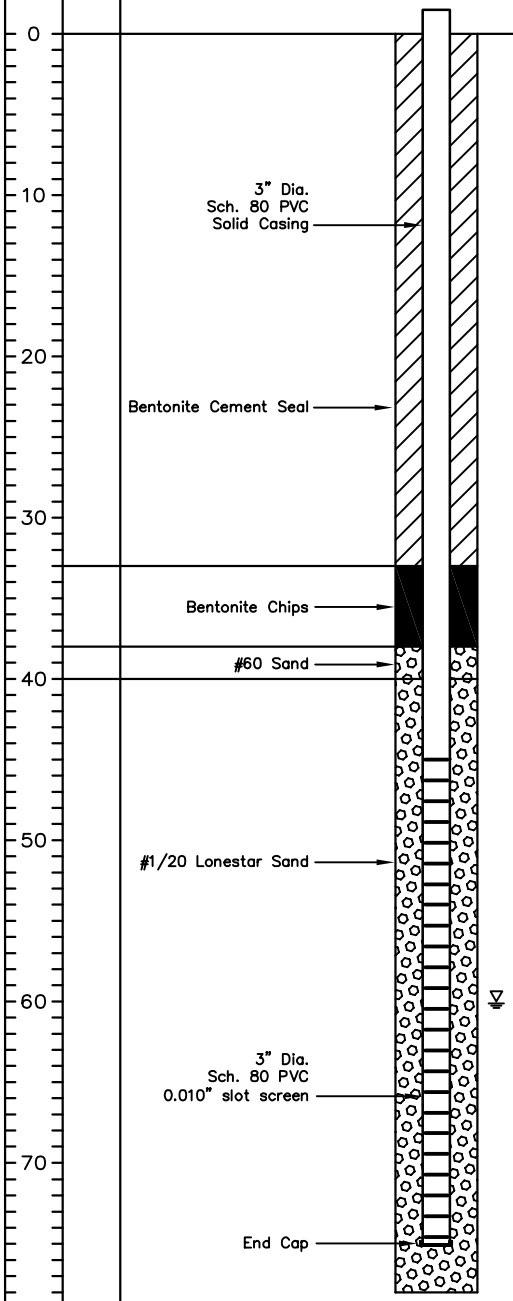
Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW–OU1–79–A

COORDINATES: N 2145515.23
E 5745150.03

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 78 ft.

DATE BEGAN 3/21/06
DATE FINISHED 3/21/06
SURFACE ELEV. 92.30
CORE SIZE N/A



DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0			SM		@ 0.5' SILTY SAND: very dark gray (10YR 3/1); 80% fine to coarse sand; 20% silt; loose; wet
					@ 6' As above; dark yellowish brown (10YR 4/4); loose; moist
10			SW		@ 10' WELL GRADED SAND: yellowish brown (10YR 5/6); 90% fine to coarse sand; 10% silt; loose; moist
					@ 15' As above
20					@ 20' As above; yellowish brown (10YR 5/8); loose; dry
30					@ 30' As above
					@ 35' As above; yellowish brown (10YR 5/4)
40					@ 40' As above
50					
					@ 55' As above; dark yellowish brown (10YR 4/4); loose; moist
60					@ 60' As above; loose; wet
70					@ 70' As above
			CH		@ 75' FAT CLAY: olive gray (5Y 5/2); 95% clay; 5% silt; soft; moist; driller notes a change
80					Bottom of Boring = 78' Logged by cuttings
90					

DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW–OU1–79–A
DATE	4/18/06	APPROVED BY			

Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW–OU1–80–A

COORDINATES: N 2145694.84
E 5745290.96

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 91 ft.

DATE BEGAN 3/20/06
DATE FINISHED 3/20/06
SURFACE ELEV. 95.90
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0			SW		@ 0.5' WELL GRADED SAND: yellowish brown (10YR 5/4); 90% fine to coarse sand; 10% silt; loose; moist
					@ 5' As above
10		3" Dia. Sch. 80 PVC Solid Casing			@ 10' As above
					@ 15' As above
20					@ 20' As above
					@ 25' As above
30					@ 30' As above
					@ 32' As above; dark yellowish brown (10YR 4/4)
		Bentonite Cement Seal			@ 35' As above
40					@ 40' As above; yellowish brown (10YR 5/4)
					@ 45' As above
		Bentonite Chips			
50					@ 50' As above
		#60 Sand			
					@ 55' As above; dark yellowish brown (10YR 4/4); loose; moist
60					@ 60' As above
		#1/20 Lonestar Sand			
					@ 65' As above
70					@ 70' As above
		3" Dia. Sch. 80 PVC 0.010" slot screen			@ 75' As above
80					@ 80' As above
					@ 85' As above
		End Cap	CH		@ 88' FAT CLAY: driller notes a change; none observed on auger
90					

Bottom of Boring = 91'
Logged by cuttings

DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW–OU1–80–A
DATE	4/18/06	APPROVED BY			

Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW–OU1–81–A

COORDINATES: N 2145857.34
E 5744997.04

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 95 ft.

DATE BEGAN 3/21/06
DATE FINISHED 3/21/06
SURFACE ELEV. 91.97
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
0			SM		@ 0.5' SILTY SAND: dark grayish brown (10YR 4/2); 85% fine to coarse sand; 15% silt; loose; moist
			SW		@ 6' WELL GRADED SAND: dark yellowish brown (10YR 4/4); 90% fine to coarse sand; 10% silt; loose; moist
10		3" Dia. Sch. 80 PVC Solid Casing			@ 10' As above; yellowish brown (10YR 5/4)
					@ 15' As above; yellowish brown (10YR 5/6); loose; dry
20					
					@ 25' As above
30					@ 30' As above
		Bentonite Cement Seal			@ 35' As above; yellowish brown (10YR 5/4)
40					
					@ 45' As above
50					@ 50' As above; dark yellowish brown (10YR 4/4)
		Bentonite Chips			@ 55' As above; dark yellowish brown (10YR 5/4); loose; dry
		#60 Sand			
60					@ 60' As above
		#1/20 Lonestar Sand			
70					@ 70' As above; loose; moist
					@ 75' As above; dark yellowish brown (10YR 4/4); loose; wet
80		3" Dia. Sch. 80 PVC 0.010" slot screen			
					@ 85' As above
90					@ 90' As above

DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW–OU1–81–A
DATE	4/18/06	APPROVED BY			

Shaw® Shaw Environmental, Inc.

MONITORING WELL NO. MW-OU1-81-A

COORDINATES: N 2145857.34
E 5744997.04

FIELD GEOLOGIST D. Browne
CHECKED BY E. Schmidt
APPROVED BY J. Moser
TOTAL DEPTH 95 ft.

DATE BEGAN 3/21/06
DATE FINISHED 3/21/06
SURFACE ELEV. 91.97
CORE SIZE N/A

DEPTH IN FEET	SAMPLE TYPE & NO.	WELL SUMMARY AND DRILLING REMARKS	USCS	PROFILE	DESCRIPTION
90		End Cap 	SW		
			CH		@ 93' FAT CLAY: olive gray (5Y 5/2); 95% clay; 5% silt; medium stiff; moist; driller notes a change
					Bottom of Boring = 95' Logged by cuttings
100					
110					
120					
130					
140					
150					
160					
170					
180					

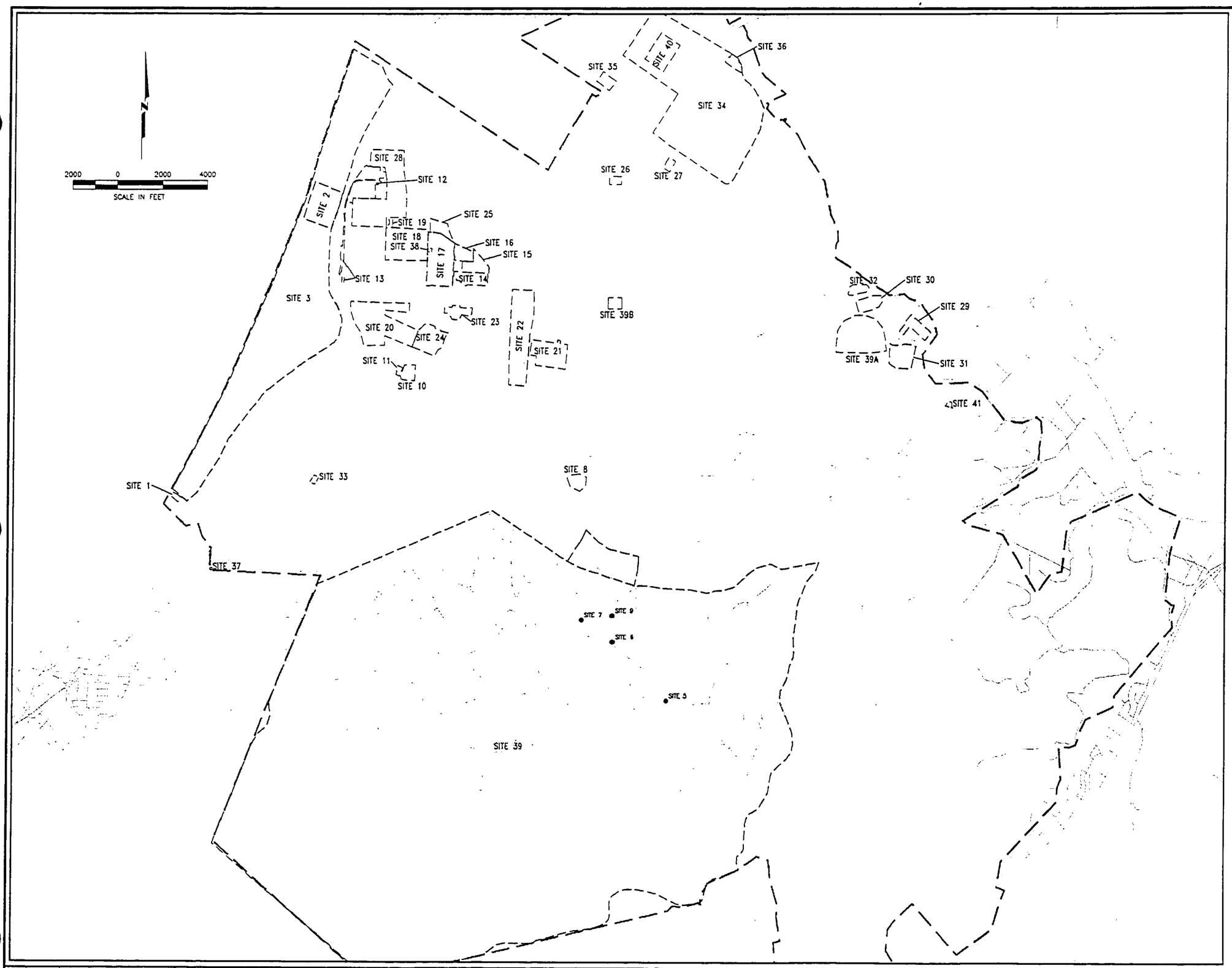
DRILLING CO. : Woodward Drilling
DRILLING METHOD : 10" Hollow Stem Auger
LOCATION : OU1 Armstrong Ranch, Former Fort Ord, California
PROJECT NO. : 783751

DRAWN BY	K. Black	CHECKED BY		FILE NAME & DISK NUMBER	MW-OU1-81-A
DATE	4/18/06	APPROVED BY			

Shaw® Shaw Environmental, Inc.

HLA Remedial Investigation Sites[1] - Overview

[1] Overview map of 1995 Remedial Investigation Sites of Concern. Please see Figure 5 for full individual site citations.



EXPLANATION

RI SITES

NPL SITE BOUNDARY

FORT ORD SITE BOUNDARY

If this image is not as legible as this overlay, it's due to the poor quality of the original document

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366489	23366 041711			KF
2	12/94	DRAFT FINAL	23366489	23366 041721	BPF	11/22/94	KF

Harding Lawson Associates
Engineering and Environmental Services

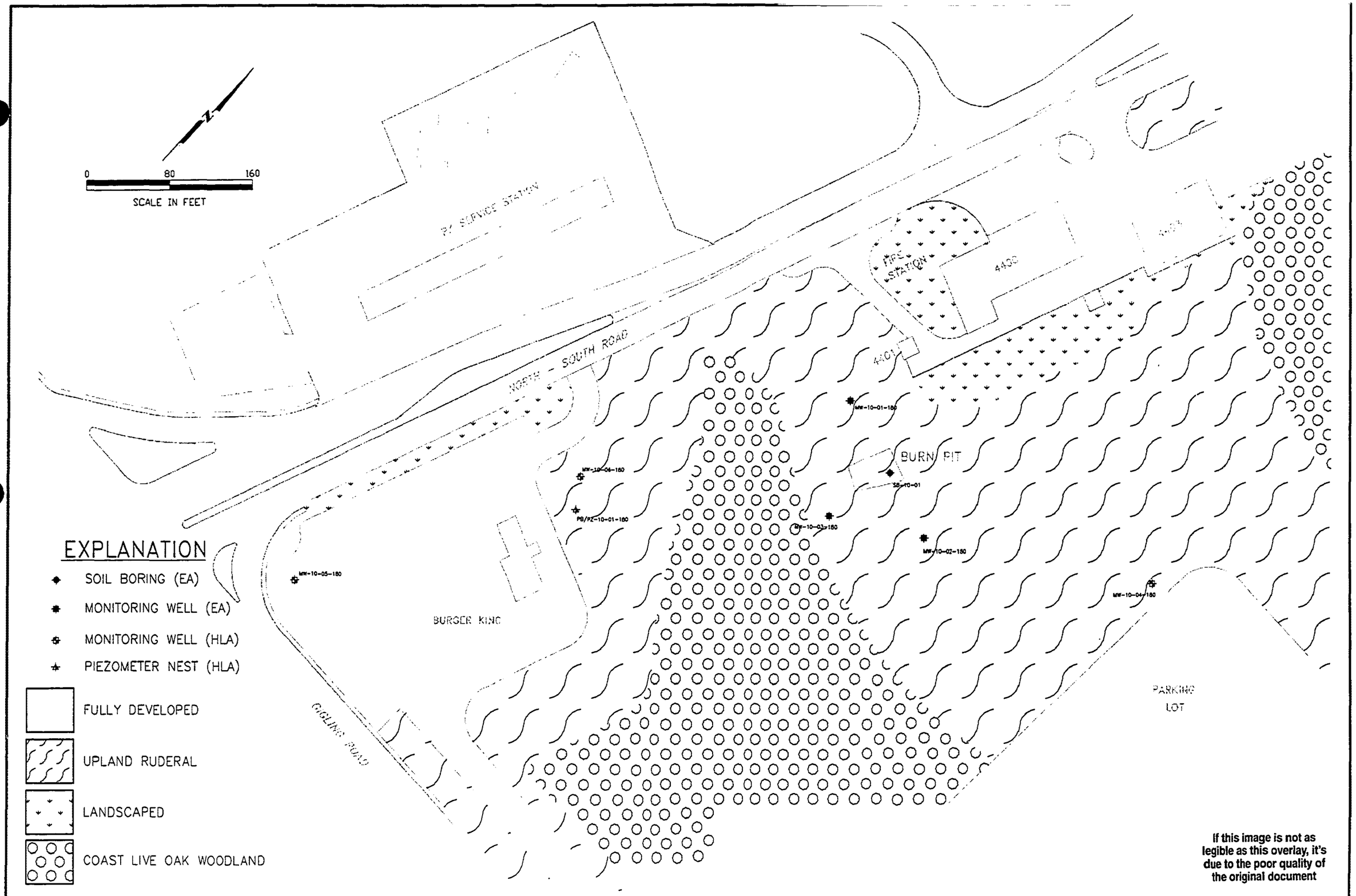
Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Location of RI Sites
Introduction to Volume II

PLATE: 1

Site 10[1,2]

[1] Please see Figure 5 for full citation.
[2] Boring logs could not be located for this site. Boring locations are provided for reference.



If this image is not as legible as this overlay, it's due to the poor quality of the original document

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/11/94	DRAFT	23366288	23366 041714			PH
2	12/94	DRAFT FINAL	23366288	23366 041724	MES	11/17/94	PH

Harding Lawson Associates
Engineering and Environmental Services

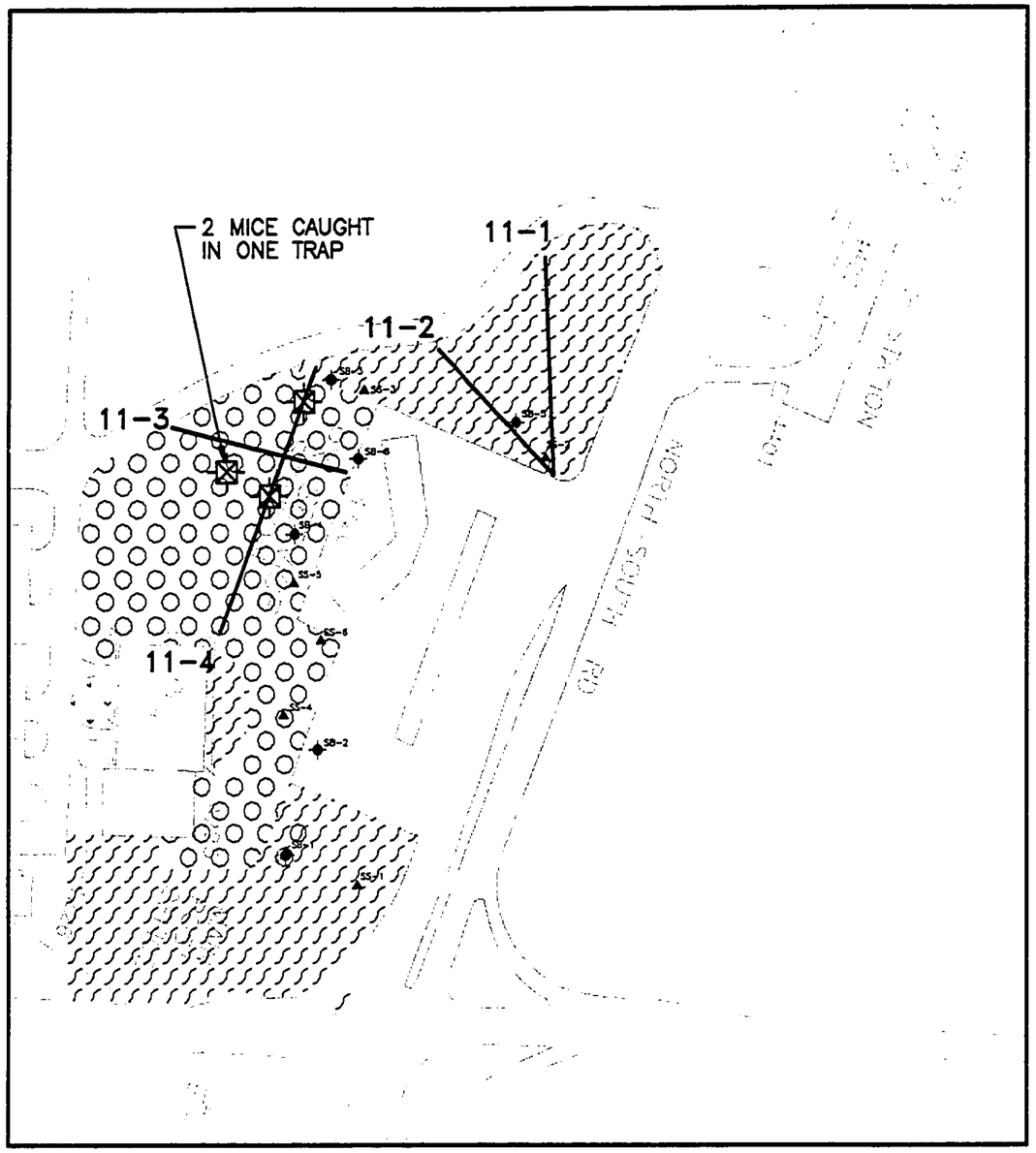
Volume IV – Ecological Risk Assessment
Basewide RI/FS
Fort Ord, California

Plant Communities and Sampling Locations
Site 10 – Burn Pit

PLATE: 3.3

Site 11[1]

[1] Please see Figure 5 for full citation.



EXPLANATION

SS-1 ▲ SURFACE SOIL SAMPLE (JMM)

SB-1 ✦ SOIL BORING (JMM)

RODENT COLLECTION

FULLY DEVELOPED/NOT SURVEYED

UPLAND RUDERAL

LANDSCAPED

COAST LIVE OAK WOODLAND

11-1 BIOTA SAMPLING TRANSECT (OATS/ICEPLANT, SOIL, RODENT)

N

0 150 300

SCALE IN FEET

If this image is not as legible as this overlay, it's due to the poor quality of the original document

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/08/94	DRAFT	23366289	23366 041714			AED
2	12/94	DRAFT FINAL	23366289	23366 041724	MES	11/12/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume IV - Ecological Risk Assessment
Basewide RI/FS
Fort Ord, California

Plant Communities and Sampling Locations
Site 11 - AAFES Fueling Facility

PLATE: 4.6

31742

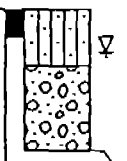
Recovery (inches)	OVA Reading (ppm)
6	NA

Depth (ft.) | Sample

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-12-92

0



DARK GRAY SILTY SAND (SM): loose, moist

ROCKS, COBBLES FOR EROSION CONTROL (?): water seeping in boring

@ 2.5': standing water, boring terminated

Bottom of boring at 2.5 ft.
Groundwater encountered

5

10

15

20

25

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-11-01
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE
A12

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 10-18-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9342LBWS	0		ROCKS AND COBBLES WITH A MATRIX OF DARK GRAY TO BLACK SAND (GW), high organic content
						@ 3 feet: dark brown sand (10YR 3/3), no organic content
			008F	5		OLIVE BROWN SILTY SAND (SM) (2.5Y 4/3). 6% silt and clay
						Bottom of boring at 5.5 feet.
				10		
				15		
				20		
				25		

FTO

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-11-01
Basewide Surface Water Investigation
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
A38

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 01834	JDM	02/94	

31743

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-12-92

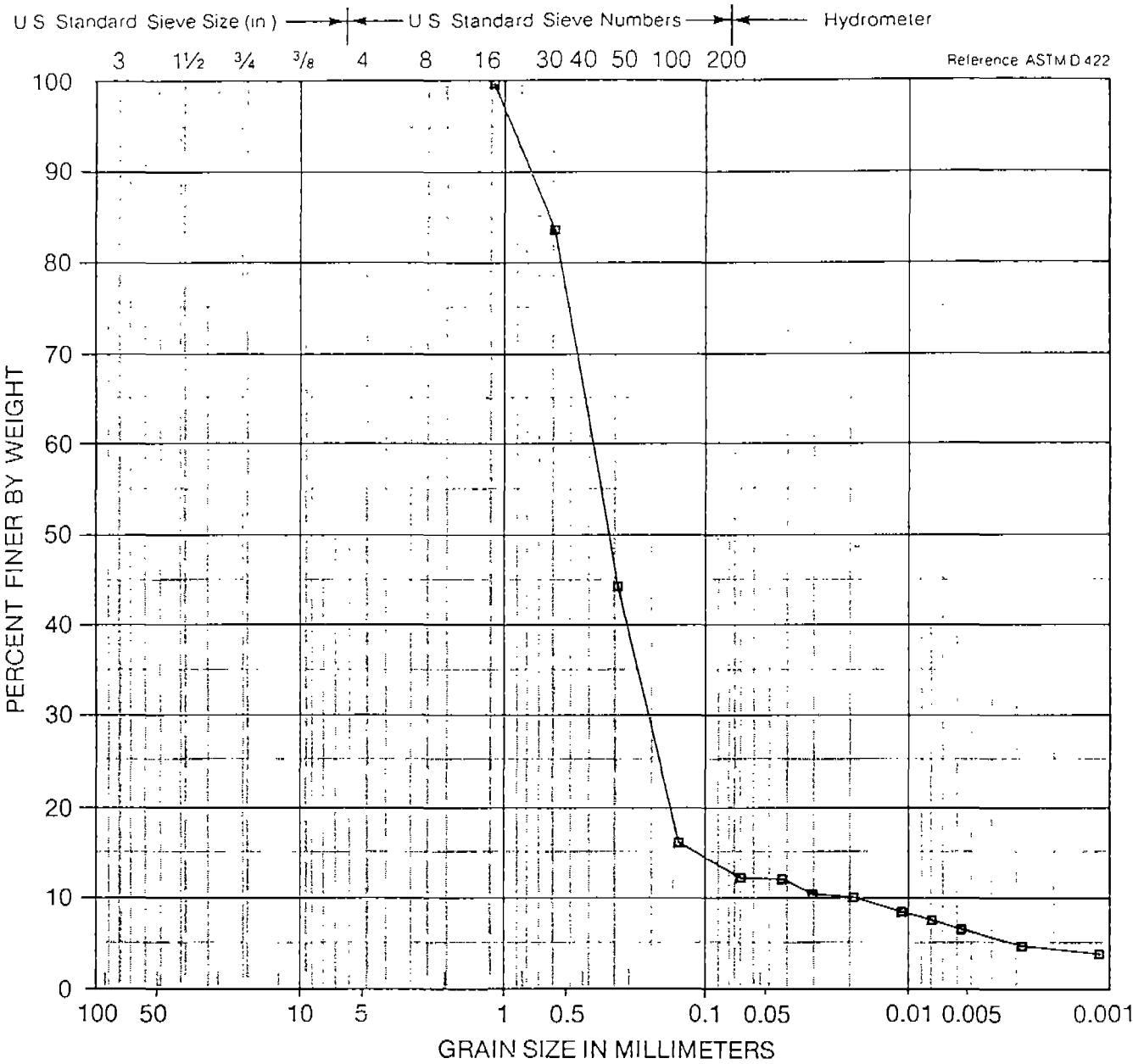
Recovery (inches)	OVA Reading (ppm)	Depth (ft.)	Sample	
6	NA	0		DARK GRAY SILTY SAND (SM): medium dense, moist
				ROCKS, COBBLE FOR EROSION CONTROL (?)
				BROWN SAND TO SILTY SAND (SP-SM): medium dense, fine-grained, 10-15% fines
6	1.5-4.0			
6	NA	5		
				Bottom of boring at 5.5 ft.
				No groundwater encountered
		10		
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring OF-11-02
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A13

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
▫	0F-11-01 @ 5.0 FT	OLIVE-BROWN SILTY SAND (SM)

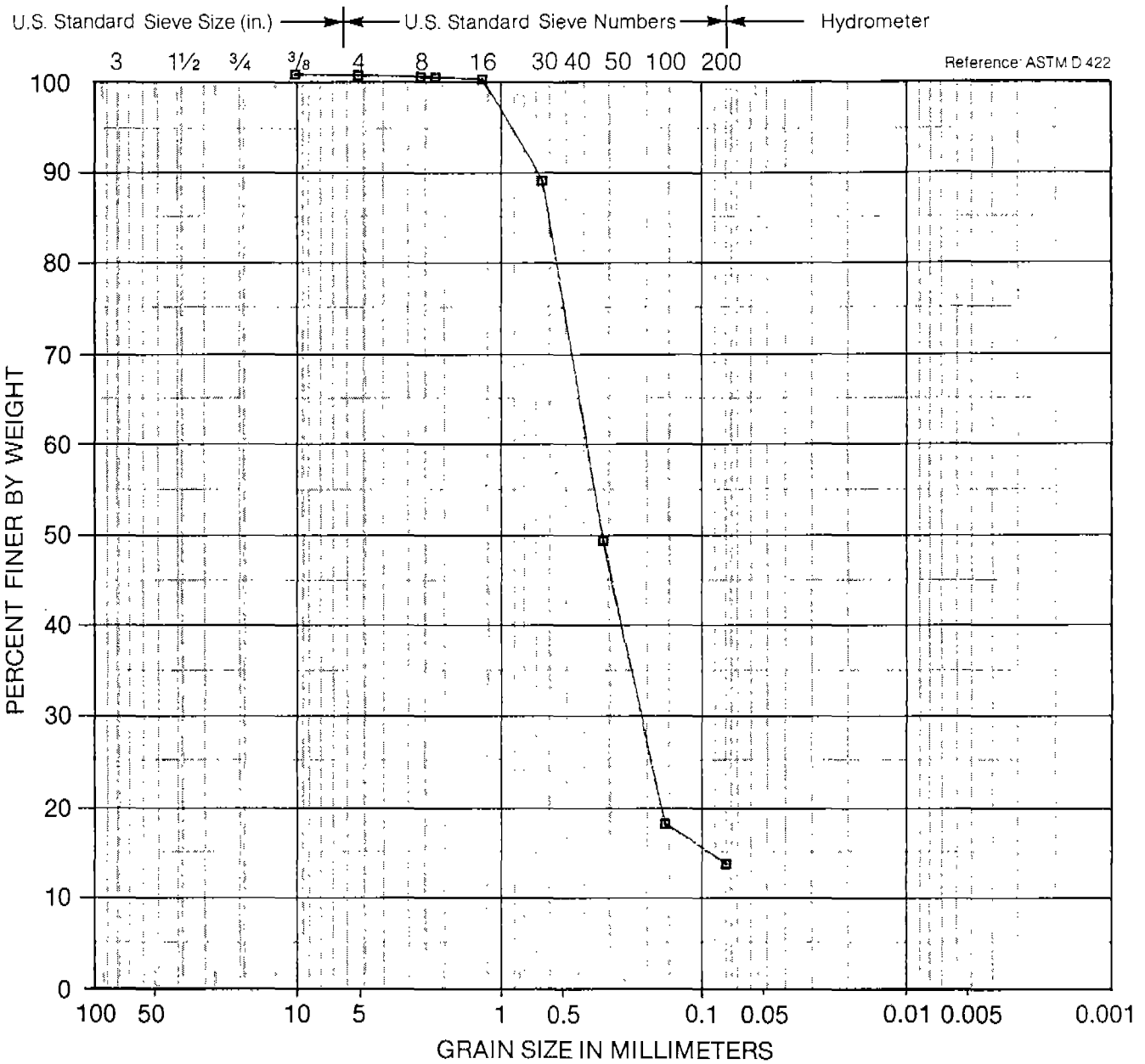
Harding Lawson Associates
Engineering and Environmental Services

Particle Size Analysis - Station 0F-11-01
Basewide Surface Water Outfall Investigation
Volume II - Basewide RI/FS
Fort Ord, California

PLATE **B13**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366 041712		11-12-1993		

29054



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
▫	BW-SG-11-2 @ 0.0 FT	DARK BROWN CLAYEY SAND (SC)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

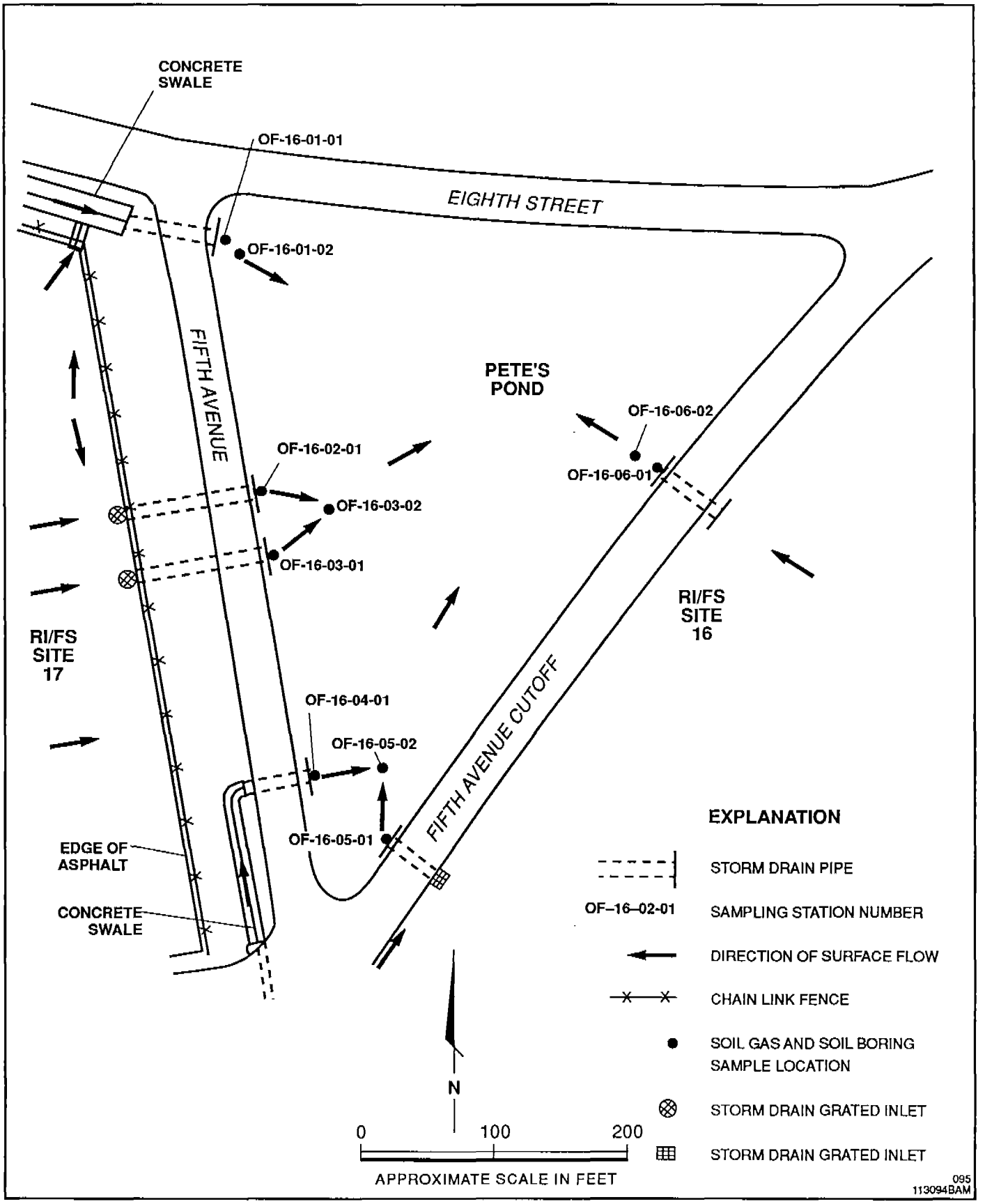
Particle Size Analysis - Station OF-11-02
Basewide Surface Water Outfall Investigation
Remedial Investigation/ Feasibility Study
Fort Ord, California

PLATE
B6

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.534.02		04-23-1992		

Site 16 & 17[1]

[1] Please see Figure 5 for full citation.

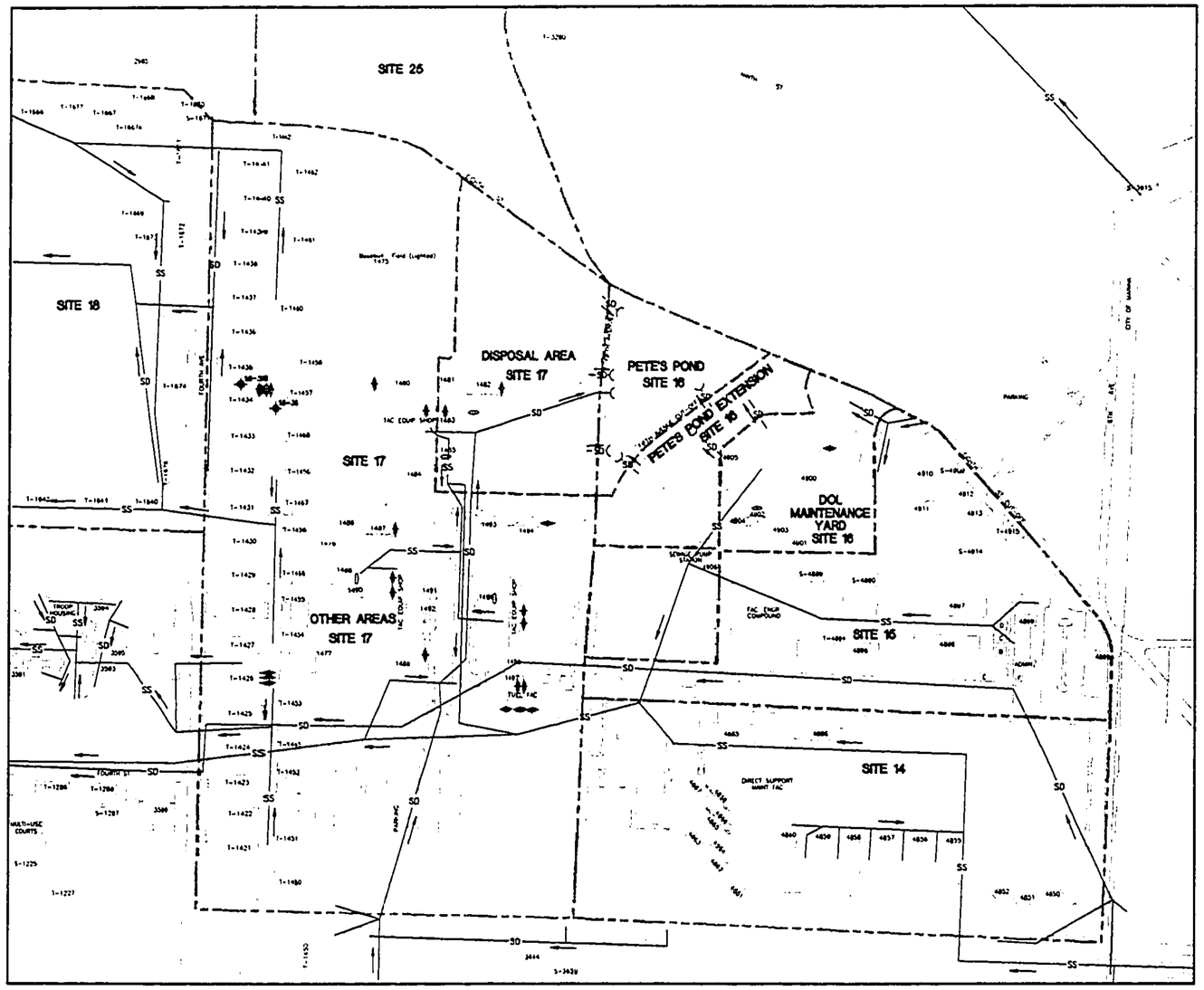


Harding Lawson Associates
Engineering and Environmental Services

Detail of Pete's Pond-Sampling Location 16
Basewide Surface Water Outfall Investigation
Volume II - Remedial Investigation, Basewide RI/FS
Fort Ord, California

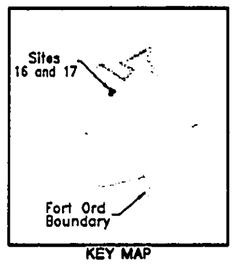
PLATE **12**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
SPc	23366 041722	JDM	12/94	



EXPLANATION

- SOIL BORING (BY OTHERS)
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- —SD— STORM DRAIN LINE
- —SS— SANITARY SEWER LINE



KEY MAP

N

200 0 200 400

SCALE IN FEET

If this image is not as legible as this overlay, it's due to the poor quality of the original document

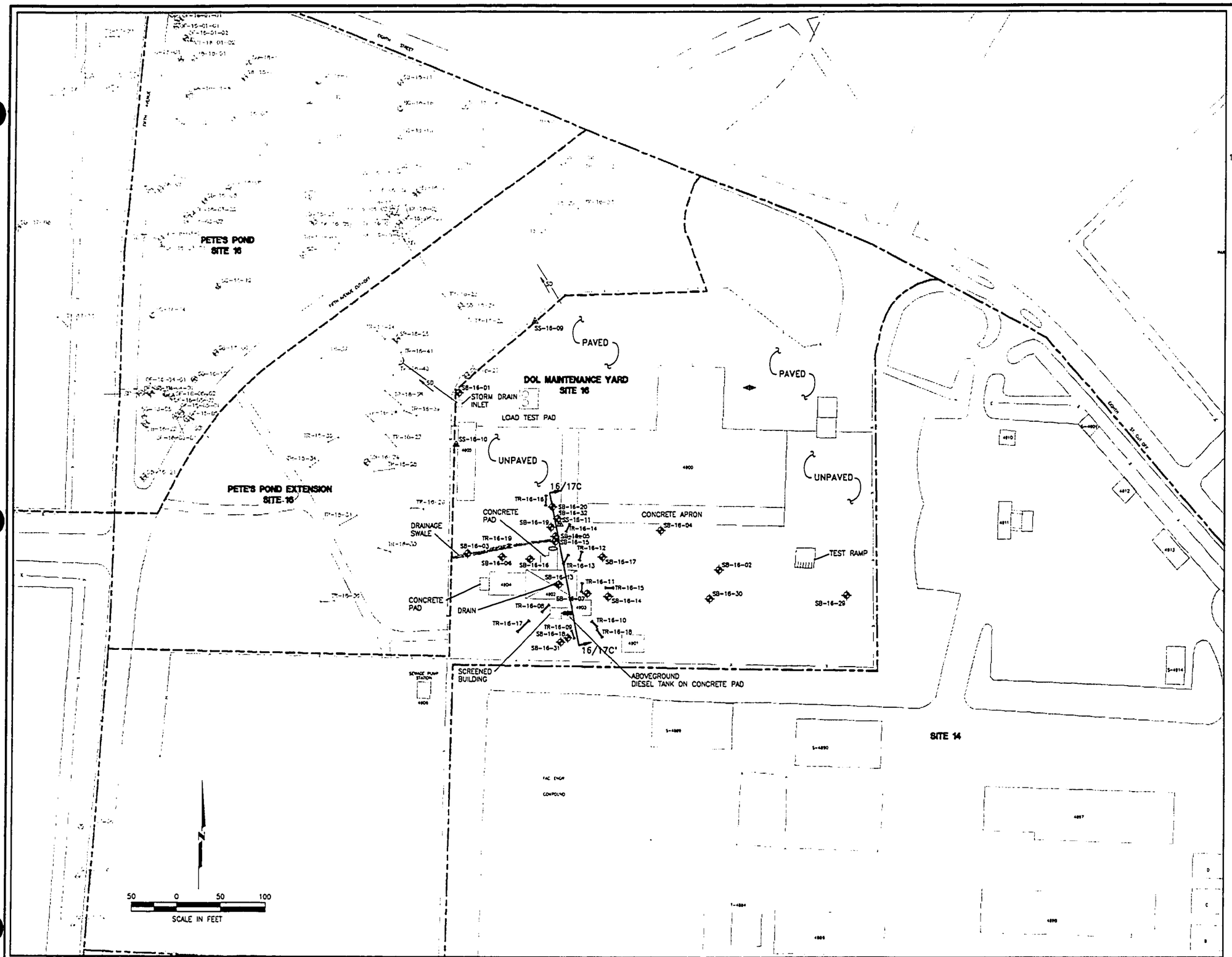
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366099	23366 041711			PH
2	12/94	DRAFT FINAL	23366099	23366 041721	RGM	11/23/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Site Map
Sites 16 and 17

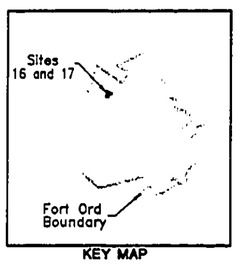
PLATE: 1



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- 16/17C 16/17C' CROSS-SECTION LINE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD STORM DRAIN LINE

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

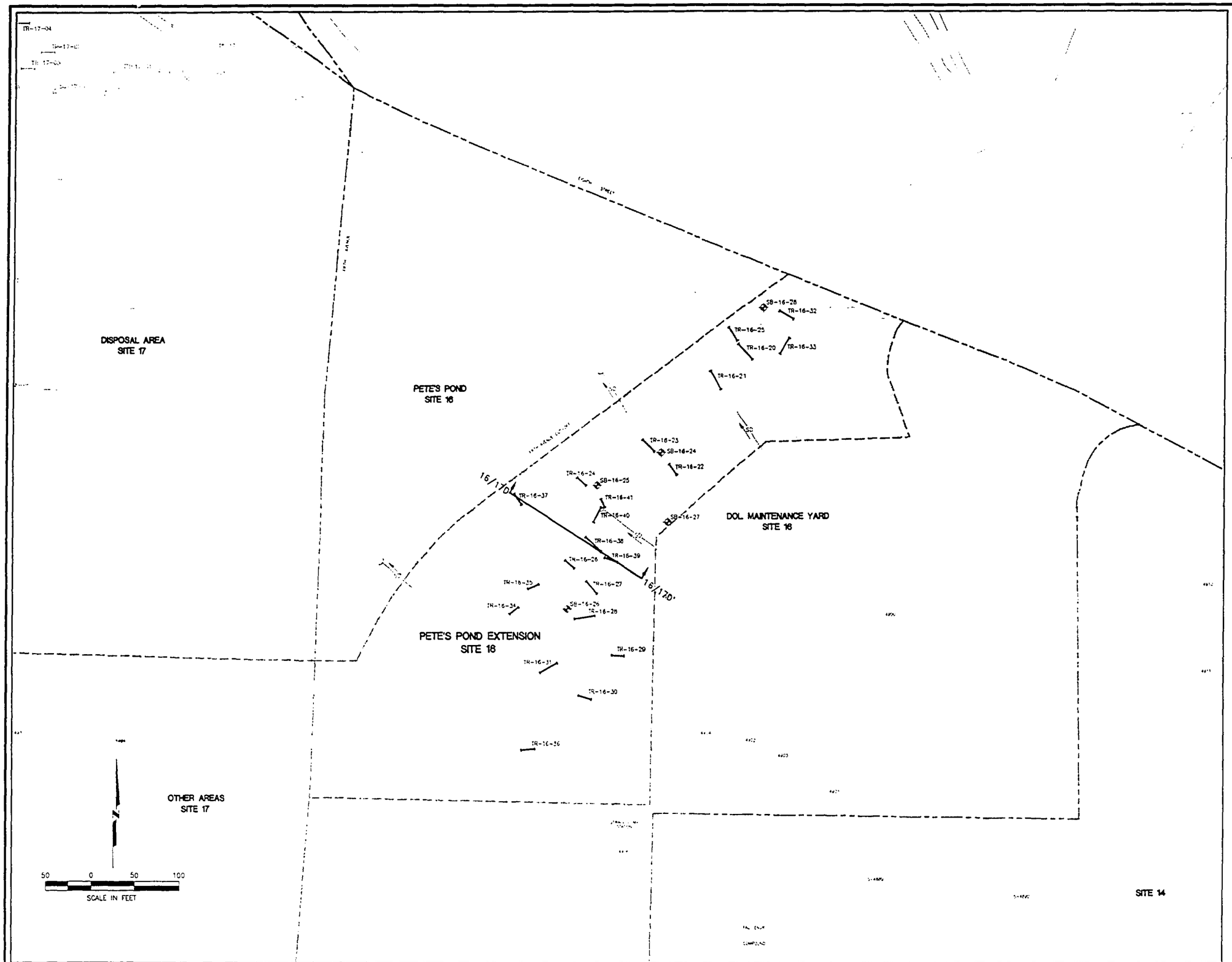
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366120	23366 041711			PH
2	12/94	DRAFT FINAL	23366120	23366 041721	KFM	4/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Sample Location Map
Site 16 – DOL Maintenance Yard

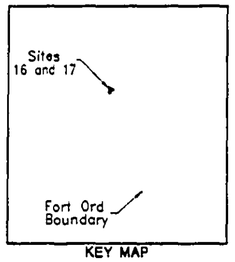
PLATE: 2



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- 16/17D 16/17D' CROSS-SECTION LINE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD STORM DRAIN LINE
- GROUND SURFACE CONTOUR (FEET ABOVE MEAN SEA LEVEL, CONTOUR INTERVAL 1 FOOT)

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

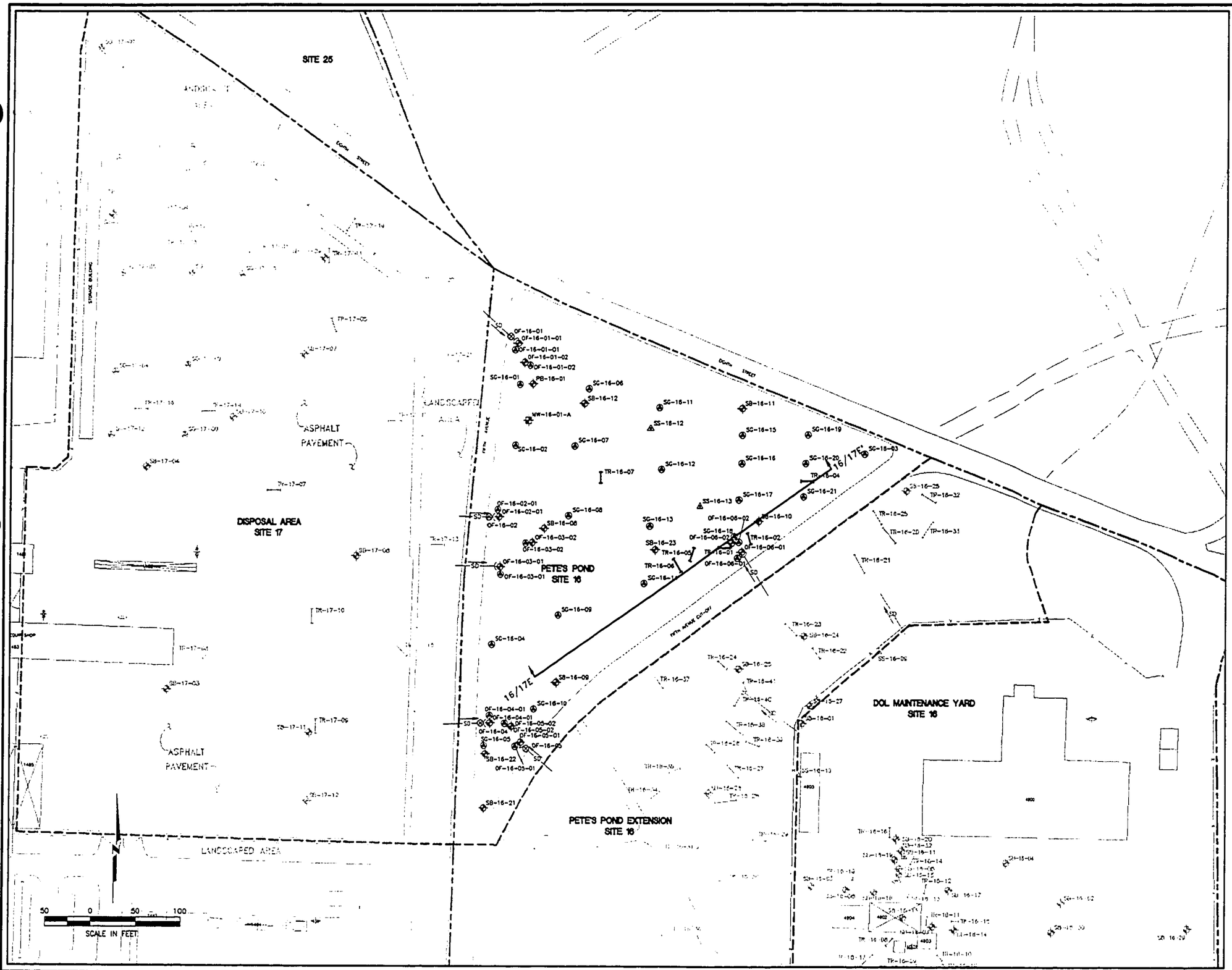
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366121	23366 041711			PH
2	12/94	DRAFT FINAL	23366121	23366 041721	RBM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Sample Location Map
Site 16 – Pete's Pond Extension

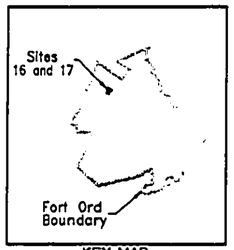
PLATE: 3



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- 16/17E 16/17E' CROSS-SECTION LINE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD STORM DRAIN LINE

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

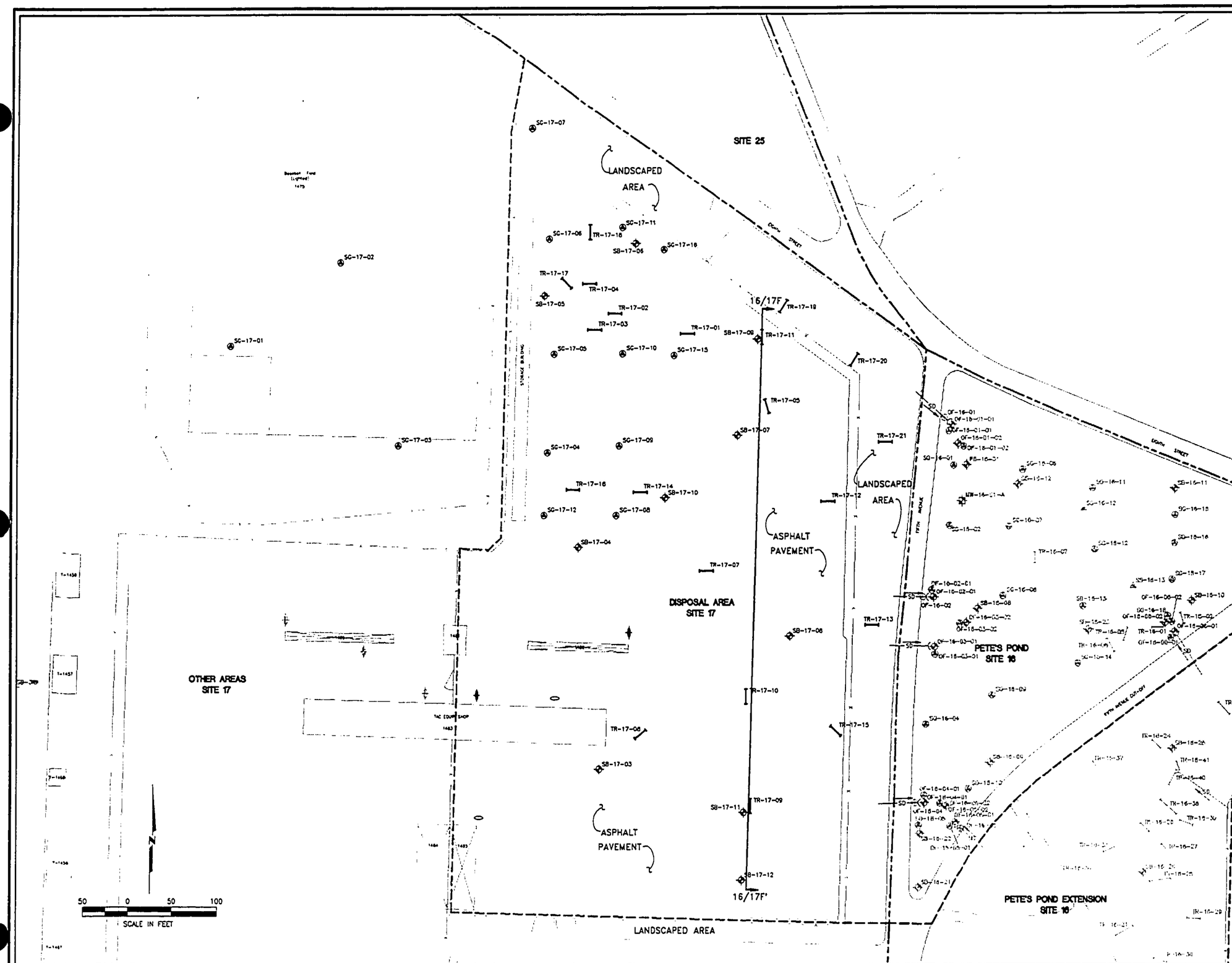
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366122	23366 041711			PH
2	12/94	DRAFT FINAL	23366122	23366 041721	RFM	11/14/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Sample Location Map
Site 16 – Pete's Pond

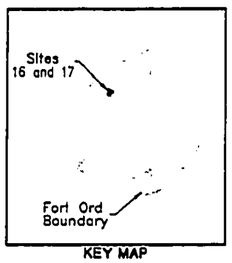
PLATE: 4



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- 16/17F 16/17F' CROSS-SECTION LINE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD STORM DRAIN LINE

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

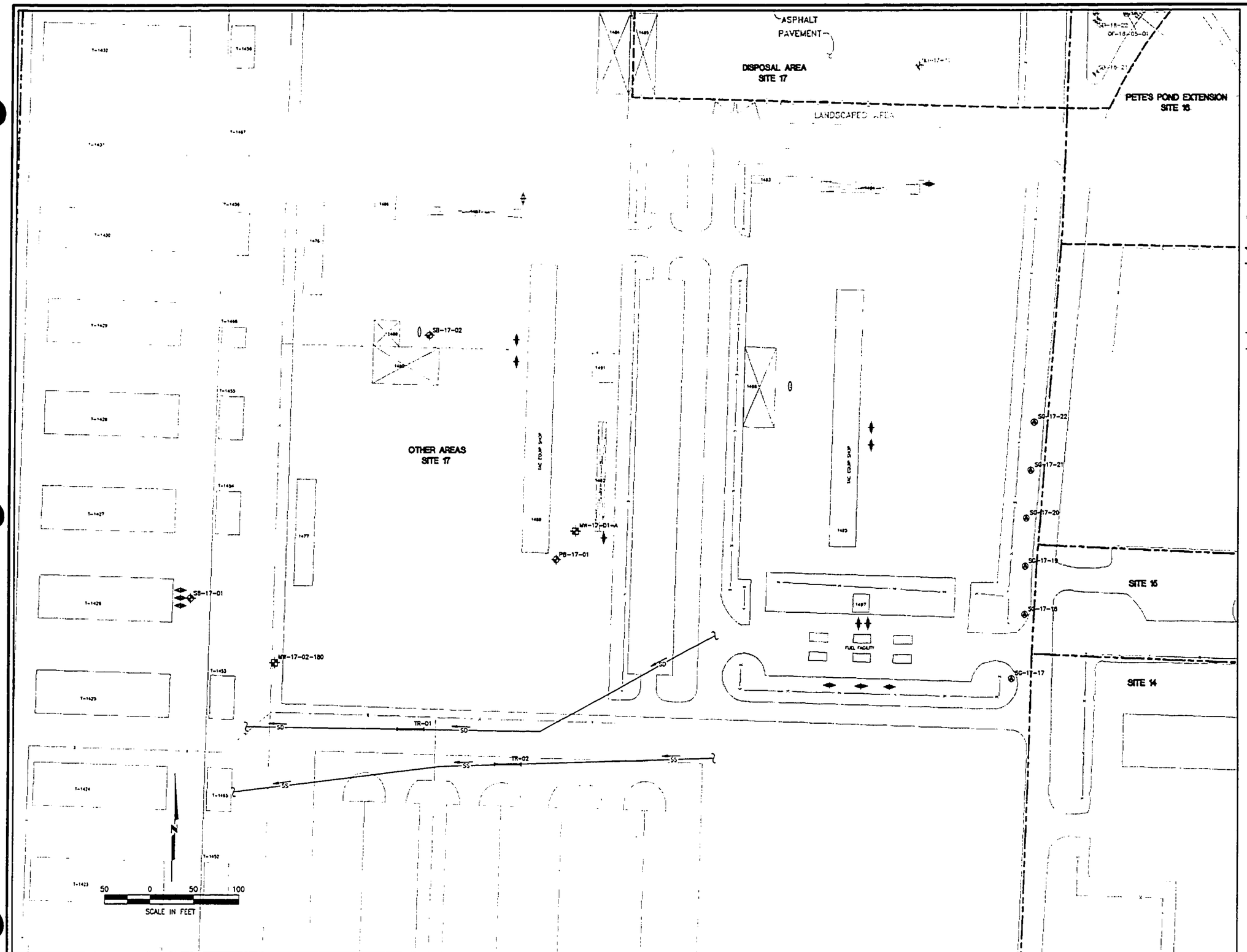
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366123	23366 041711			AED
2	12/94	DRAFT FINAL	23366123	23366 041721	RGM	11/21/94	AED

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Sample Location Map
Site 17 – Disposal Area

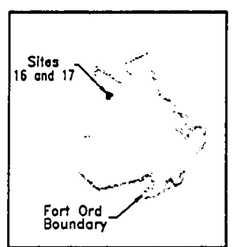
PLATE: 5



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- —SD— STORM DRAIN LINE
- —SS— SANITARY SEWER LINE

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

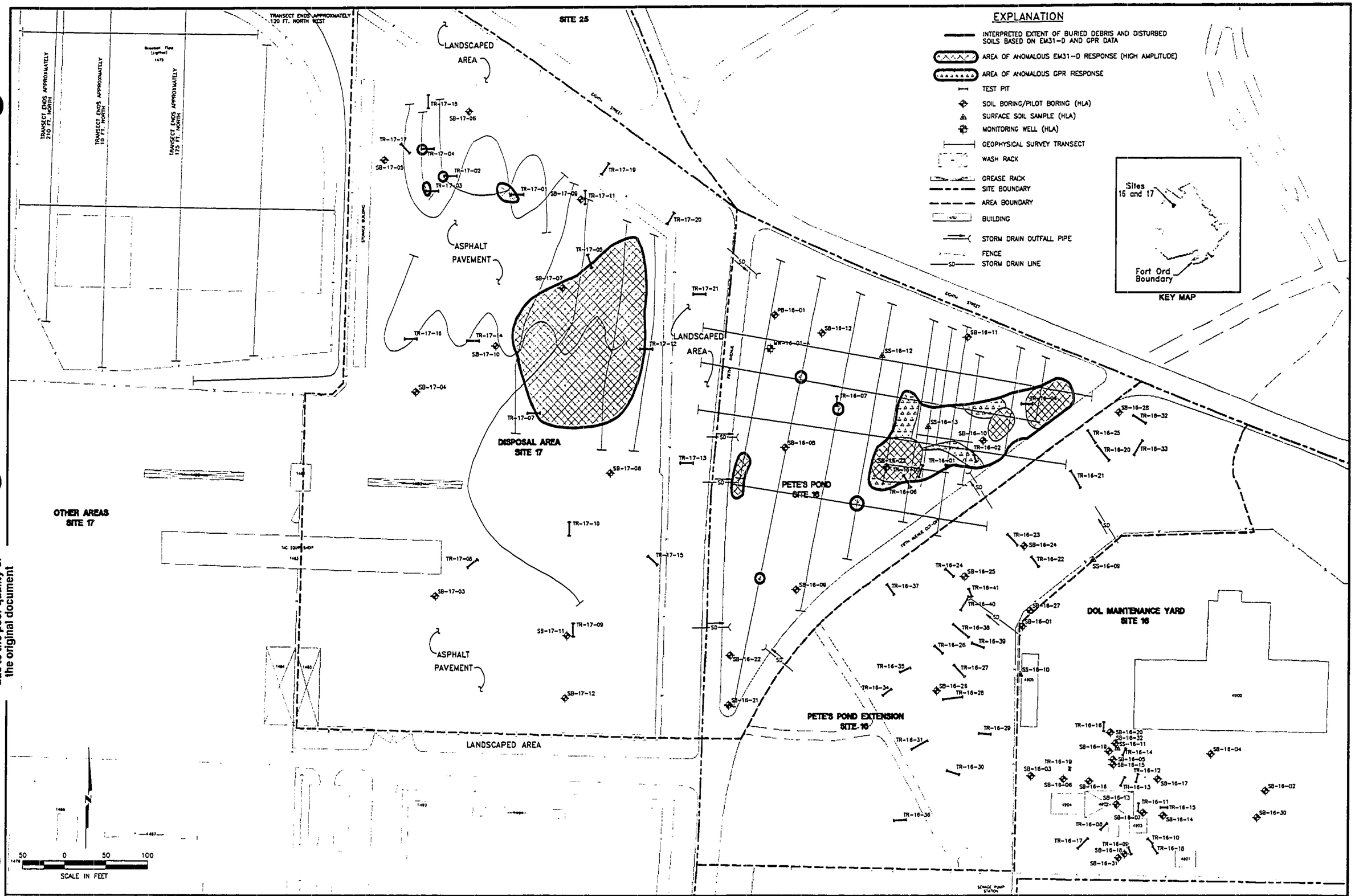
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366134	23366 041711			PH
2	12/94	DRAFT FINAL	23366134	23366 041721	RFM	12/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Sample Location Map
Site 17 – Other Areas

PLATE: 6



If this image is not as legible as this overlay, it's due to the poor quality of the original document

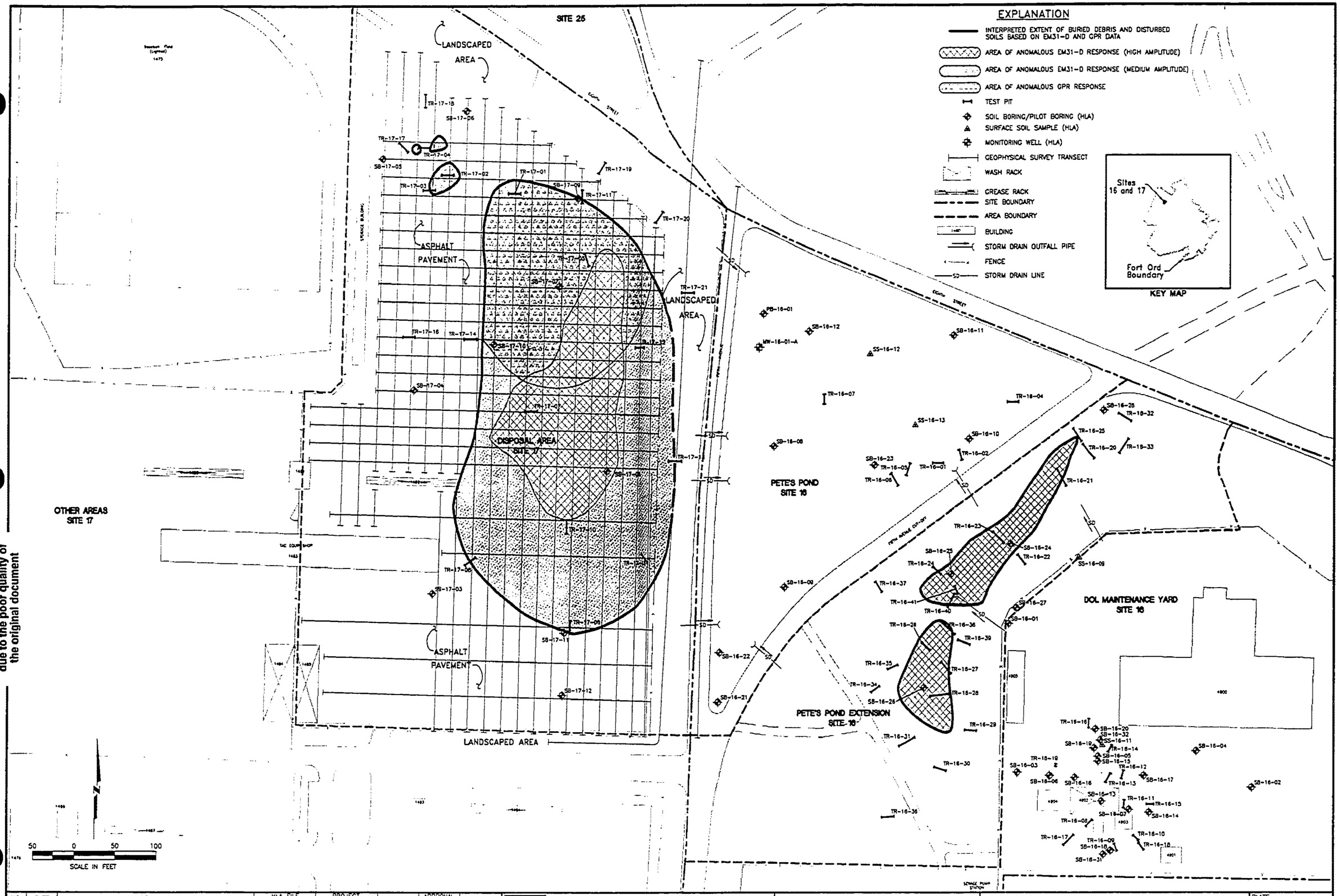
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366116	23366 041711			PH
2	12/94	DRAFT FINAL	23366116	23366 041721	RFM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Geophysical Survey – Phase 1
Sites 16 and 17

PLATE: 7



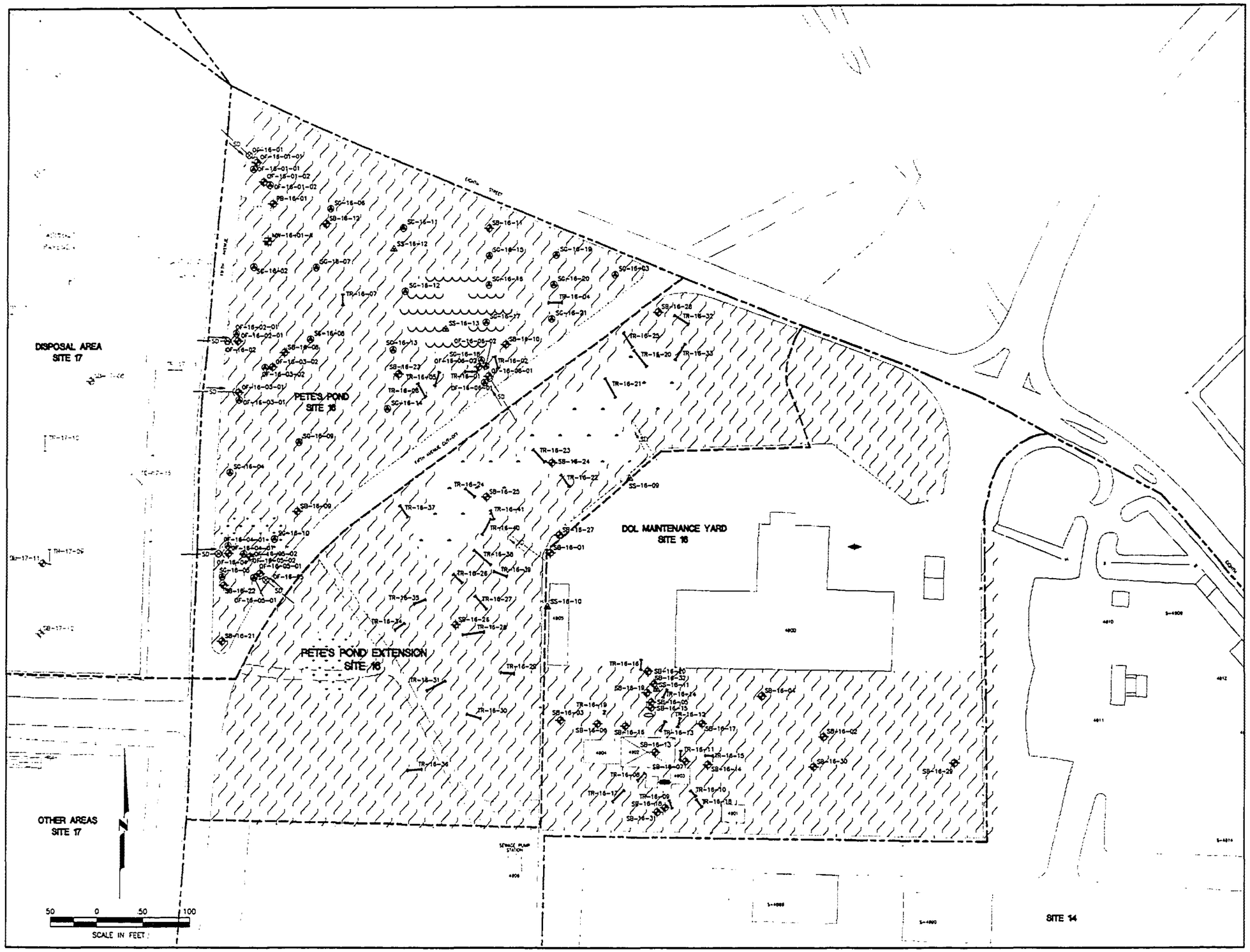
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366117	23366 041711			AED
2	12/94	DRAFT FINAL	23366117	23366 041721	RPM	11/21/94	AED

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Geophysical Survey – Phase 2
Sites 16 and 17

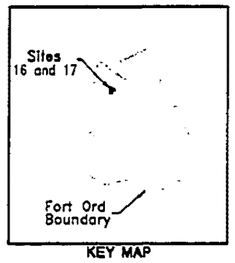
PLATE: 8



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- EXISTING ABOVEGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD — STORM DRAIN LINE
- FULLY DEVELOPED/NOT SURVEYED
- UPLAND RUDERAL
- WET RUDERAL
- CENTRAL MARITIME CHAPARRAL
- LANDSCAPED

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

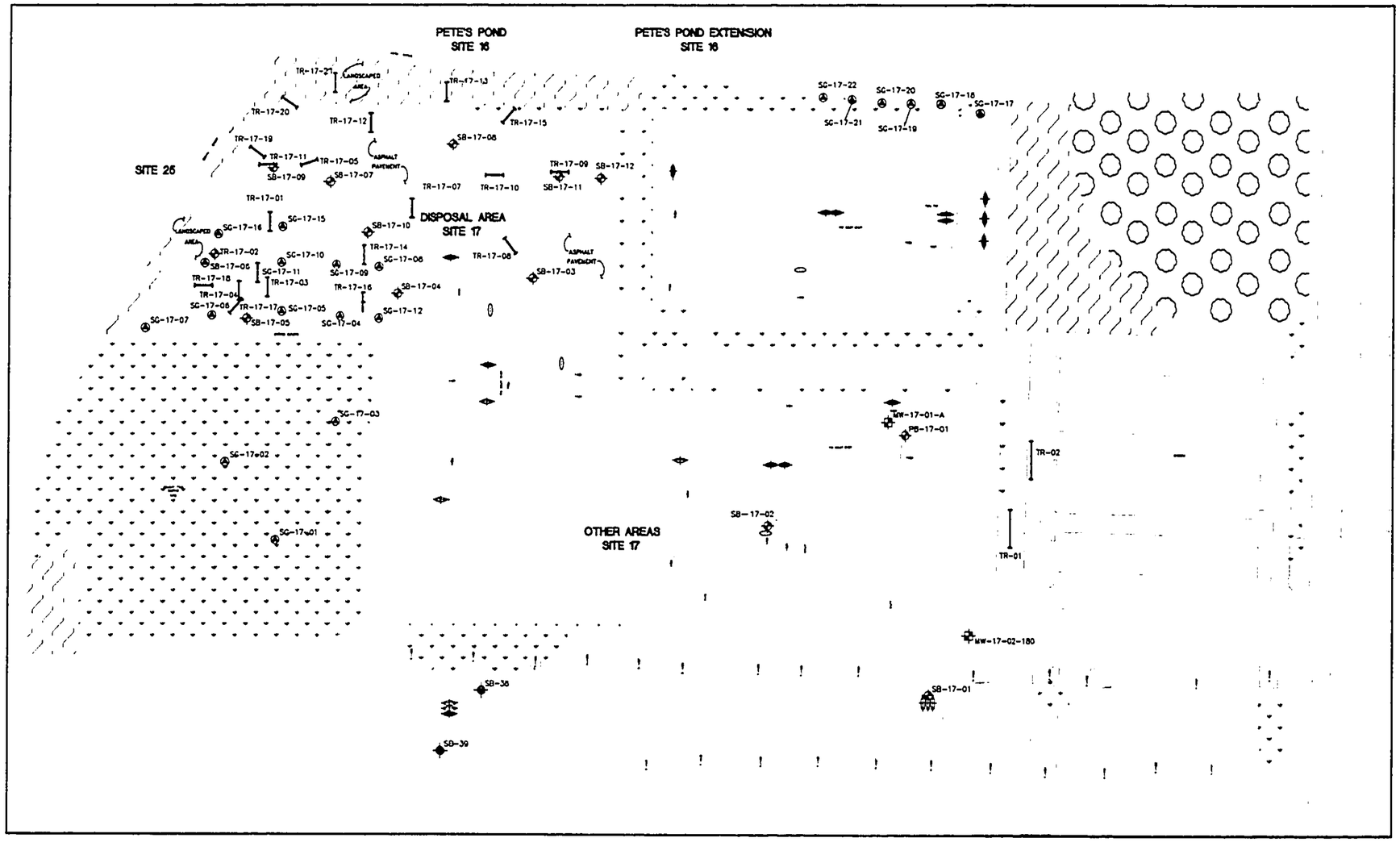
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366388	23366 041711			AED
2	12/94	DRAFT FINAL	23366388	23366 041721	RFm	11/4/94	AED

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

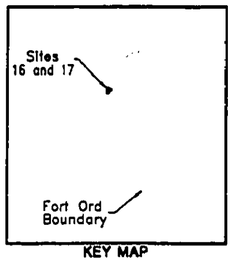
Plant Community Map
Site 16

PLATE: 9



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD — STORM DRAIN LINE
- FULLY DEVELOPED/NOT SURVEYED
- UPLAND RUDERAL
- LANDSCAPED
- COAST LIVE OAK WOODLAND



KEY MAP

N

0 200 400

SCALE IN FEET

If this image is not as legible as this overlay, it's due to the poor quality of the original document

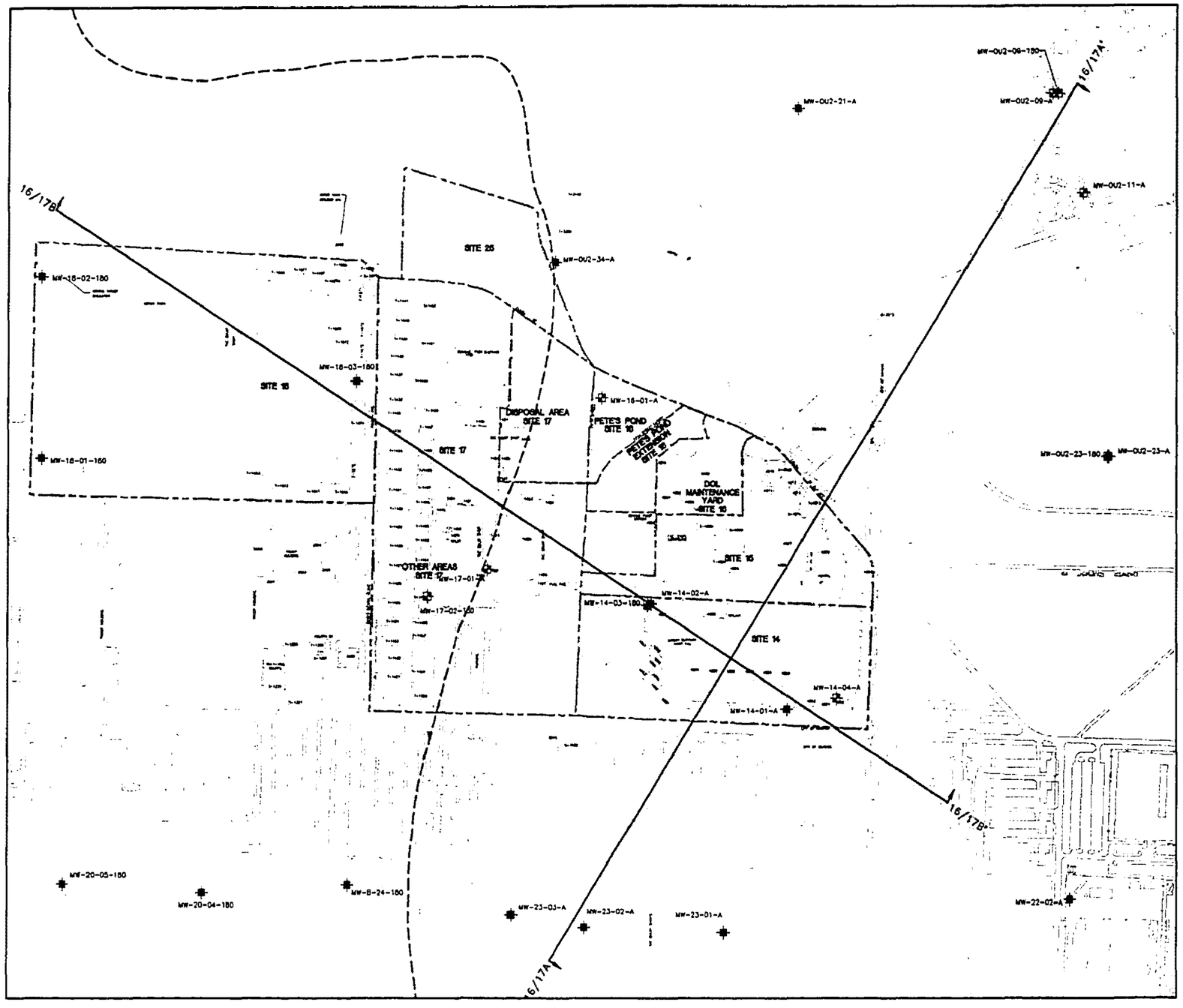
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366389	23366 041711			AED
2	12/94	DRAFT FINAL	23366389	23366 041721		11/21/94	AED

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Plant Community Map
Site 17

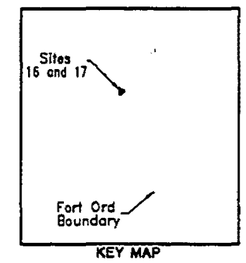
PLATE: 10



EXPLANATION

- MONITORING WELL (HLA)
- MONITORING WELL (EA)
- 16/17A 16/17A' CROSS-SECTION LINE
- WASH RACK
- GREASE RACK
- SITE BOUNDARY
- AREA BOUNDARY
- APPROXIMATE WEST EDGE OF FORT ORD-SALINAS VALLEY AQUICLUDE (FO-SVA).
- BUILDING

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

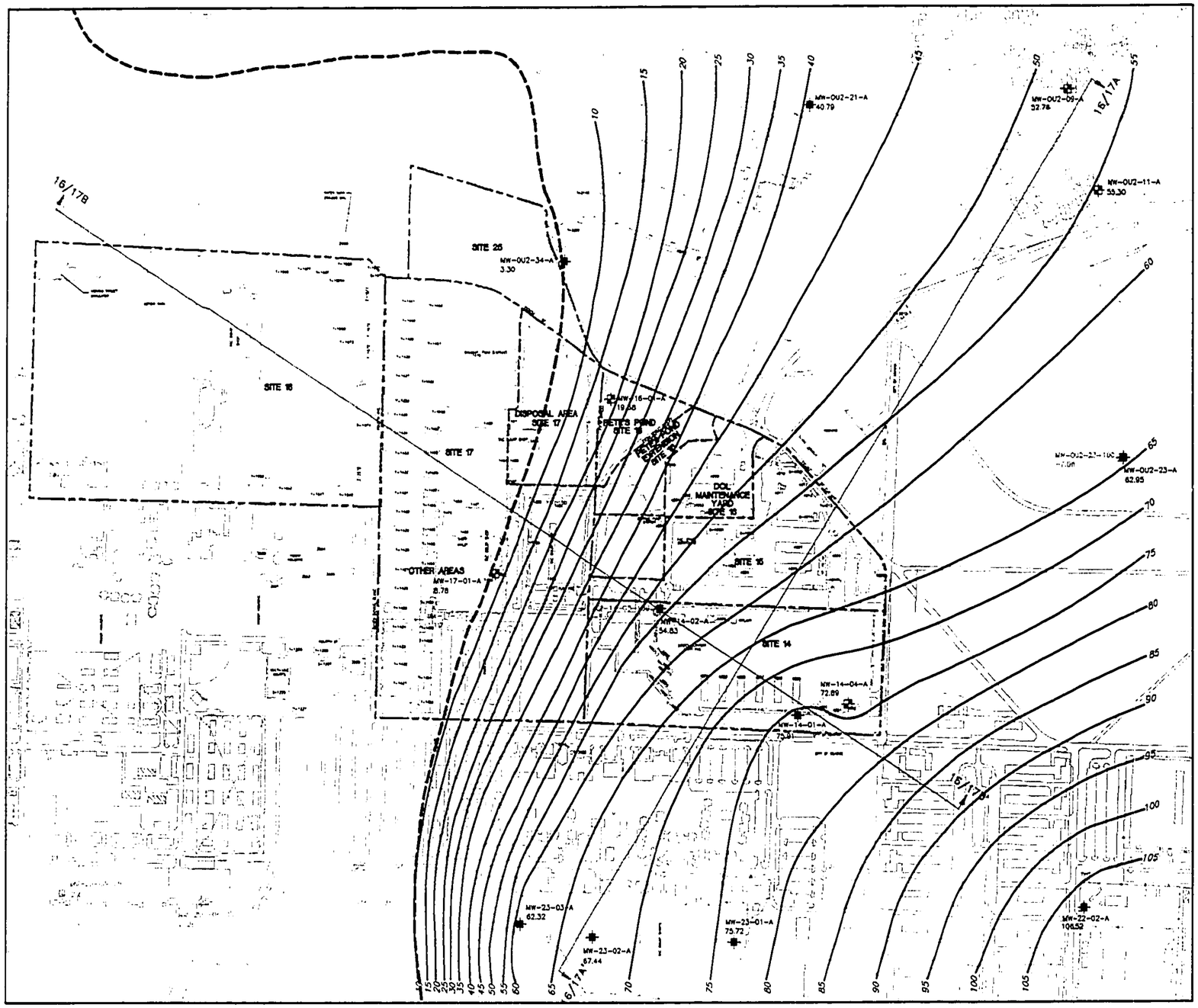
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366159	23366 041711			PH
2	12/94	DRAFT FINAL	23366159	23366 041721	RFM	11/23/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Monitoring Well Location Map
Sites 16 and 17

PLATE: 11



EXPLANATION

- MONITORING WELL (HLA)
- MONITORING WELL (EA)
- 16/17A 16/17A' CROSS-SECTION LINE
- WASH RACK
- GREASE RACK
- SITE BOUNDARY
- AREA BOUNDARY
- APPROXIMATE WEST EDGE OF FORT ORD-SALINAS VALLEY AQUICLUDE (FO-SVA)
- 62.95 WATER-LEVEL ELEVATION (IN FEET MEAN SEA LEVEL)
- NM NOT MEASURED
- 80 WATER-LEVEL ELEVATION CONTOUR (IN FEET ABOVE MEAN SEA LEVEL, CONTOUR INTERVAL 5 FEET)
- BUILDING
- FENCE

NOTE:

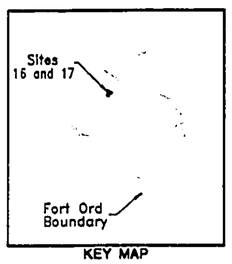
ALL WATER LEVELS WERE MEASURED ON FEBRUARY 16 AND 17, 1994

N

300 0 300 600

SCALE IN FEET

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

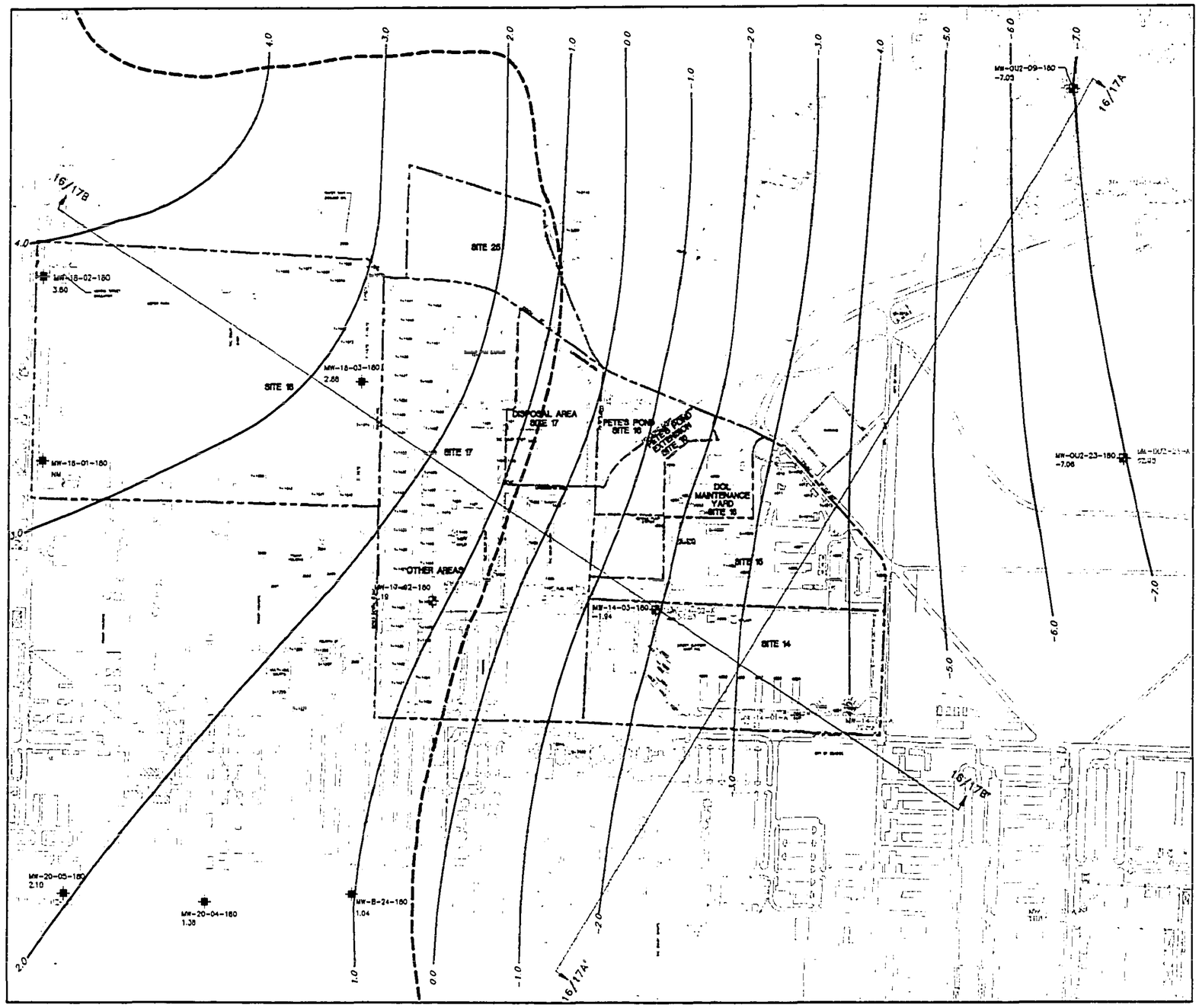
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366155	23366 041711			PH
2	12/94	DRAFT FINAL	23366155	23366 041721	RFm	11/28/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Water-Level Elevation Map
A-Aquifer, February 1994
Sites 16 and 17

PLATE: 14



EXPLANATION

- MONITORING WELL (HLA)
- MONITORING WELL (EA)
- 16/17A 16/17A' CROSS-SECTION LINE
- WASH RACK
- GREASE RACK
- SITE BOUNDARY
- AREA BOUNDARY
- APPROXIMATE WEST EDGE OF FORT ORD-SALINAS VALLEY AQUICLUDE (FO-SVA)
- 62.95 WATER-LEVEL ELEVATION (IN FEET MEAN SEA LEVEL)
- NM NOT MEASURED
- 80 WATER-LEVEL ELEVATION CONTOUR (IN FEET MEAN SEA LEVEL, CONTOUR INTERVAL 1 FOOT)
- BUILDING
- FENCE

NOTE:

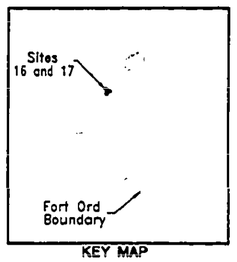
ALL WATER LEVELS WERE MEASURED ON FEBRUARY 16 AND 17, 1994

If this image is not as legible as this overlay, it's due to the poor quality of the original document

N

300 0 300 600

SCALE IN FEET



KEY MAP

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366144	23366 041711			PH
2	12/94	DRAFT FINAL	23366144	23366 041721	KFM	11/21/94	PH

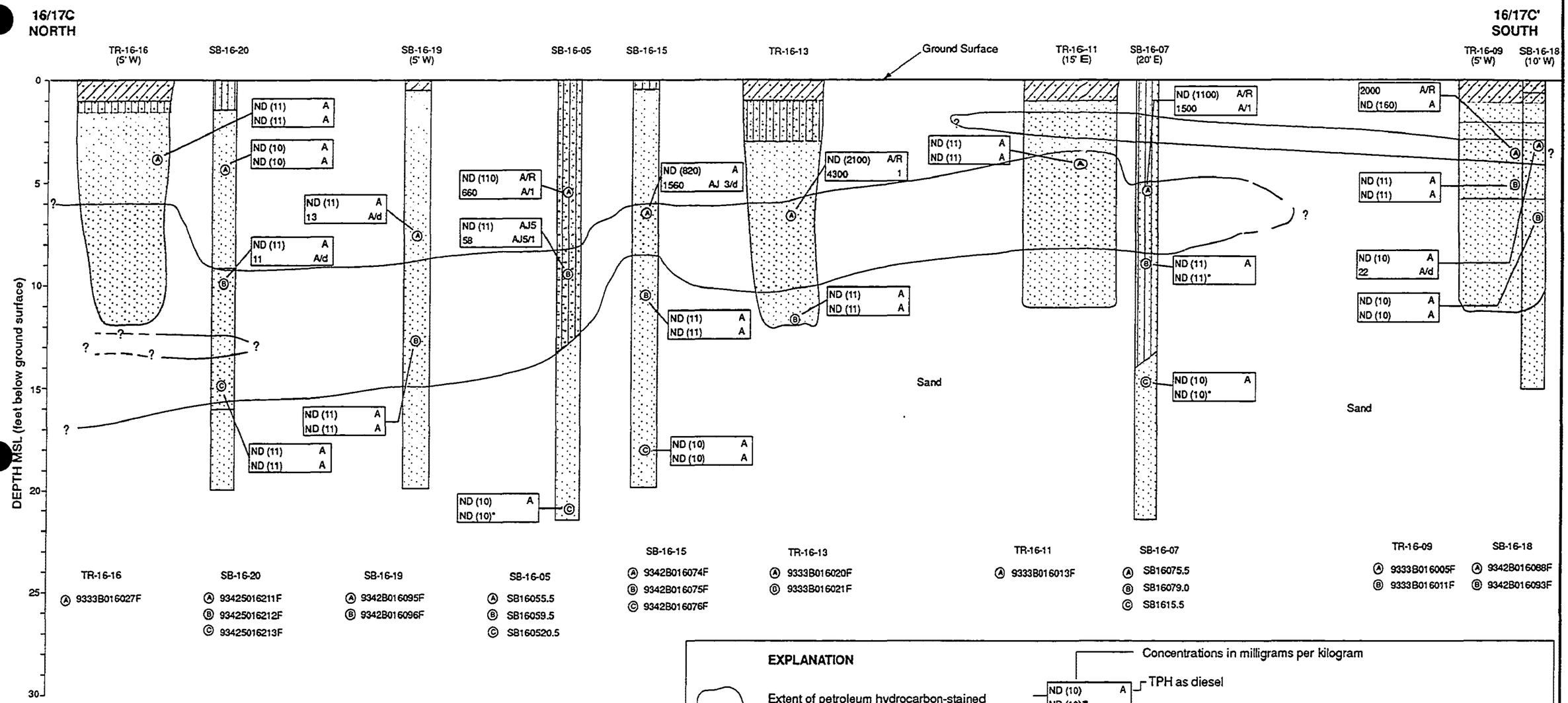
Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Water-Level Elevation Map
Upper 180-Foot Aquifer, February 1994
Sites 16 and 17

PLATE: 15

If this image is not as legible as this overlay, it's due to the poor quality of the original document



Notes:

1. See Plate A1 in Appendix A for key to patterns

2. Location of cross section shown on Plate 2

3. The topography along the cross-section line is relatively flat at an approximate elevation of 165 feet MSL and has been shown as level. Elevations of soil borings and test pits were not surveyed.

Vertical Scale: 1" = 5'
Horizontal Scale: 1" = 10'
Vertical Exaggeration 2:1

EXPLANATION

Extent of petroleum hydrocarbon-stained soil; dashed where inferred and queried where uncertain

SB-31-15
- Type designation
  SB - Soil Boring
  TR - Test Pit
- Soil Boring or Test Pit number
- Site number

(20' E) Distance and direction from cross-section line

ND (10) A
ND (10)*

- Concentrations in milligrams per kilogram
- TPH as diesel
- Unknown TPH as diesel
- Project and laboratory qualifiers; qualifiers are defined in Tables 41a and 41b.

ND (11) Not detected at the reporting limit shown in parentheses.

ND (10)* Unknown TPH as diesel was not specified as a target compound for Phase 1 sample analyses and when not detected was reported as NOT ANALYZED (NA). To be consistent with Phase 2 reporting standards, if unknown TPH as diesel was not detected, it is presented here as NOT DETECTED (ND) with the corresponding reporting limit for TPH as diesel.

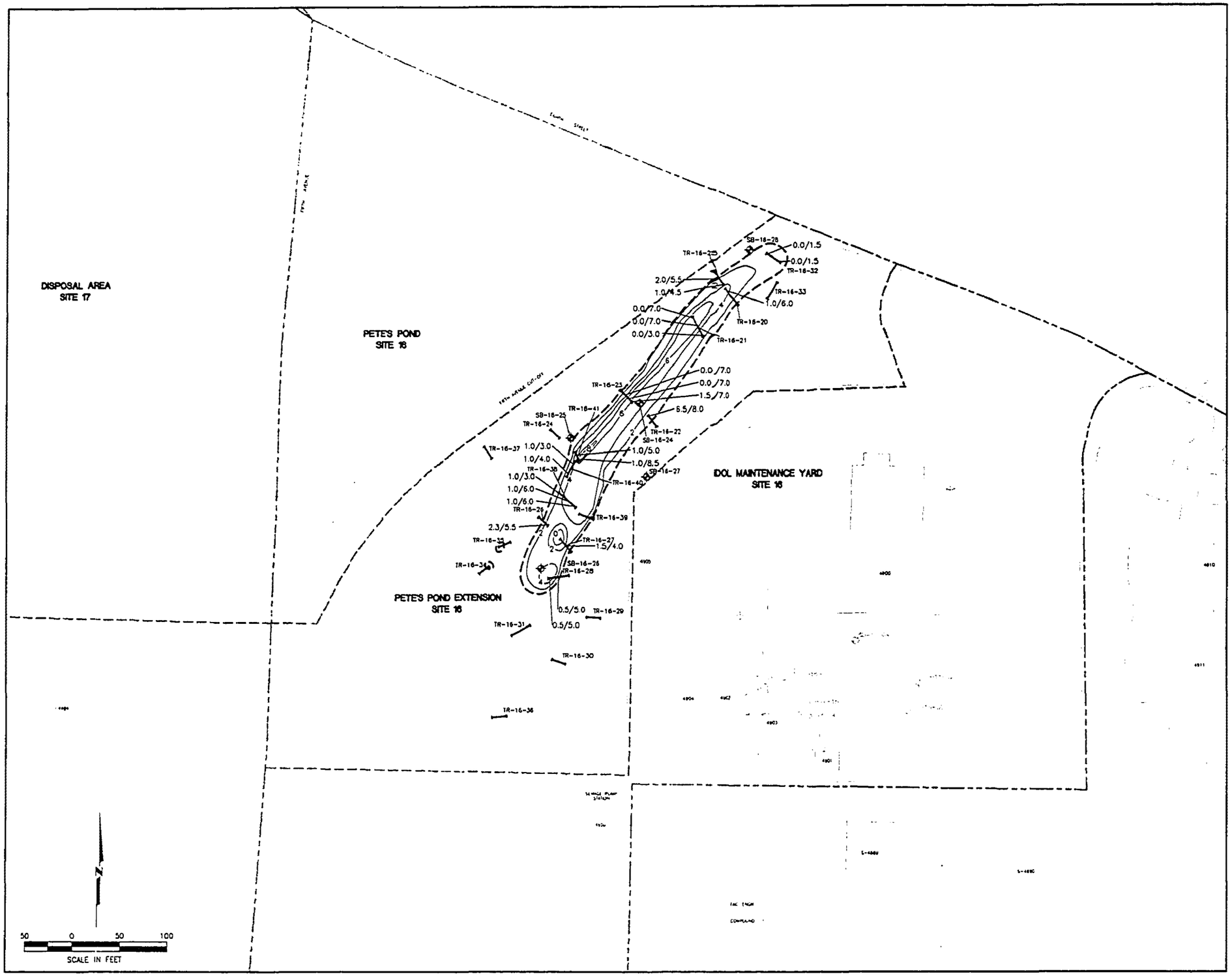
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
	7/94	DRAFT	071494AG	23366 041711			AG
2	12/94	DRAFT FINAL	mo112294LFD	23366 041721	RFSa	11/21/94	

Harding Lawson Associates
Engineering and Environmental Services

Volume II - Remedial Investigation
Basewide RI/FS
Fort Ord, California

Geologic Cross Section 16/17C - 16/17C'
Site 16 - DOL Maintenance Yard

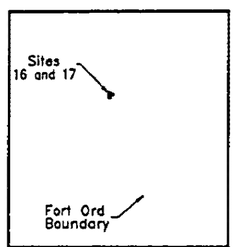
PLATE: 17



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD — STORM DRAIN LINE
- APPROXIMATE EXTENT OF SUBSURFACE INCINERATED AND UNINCINERATED DEBRIS IN SAND MATRIX; DEBRIS CONSISTS OF BROKEN, WHOLE, AND MELTED GLASS BOTTLES; METAL PIECES; ENGINE PARTS; BUCKETS AND CRATES; POSSIBLE MEDICAL MATERIAL; ORDNANCE; AND OTHER MISCELLANOUS ITEMS.
- 2 — DEBRIS THICKNESS CONTOUR (CONTOUR INTERVAL 2 FEET)
- 1.0/5.0 — DEPTH TO TOP OF DEBRIS (FEET) /DEPTH TO BOTTOM OF DEBRIS (FEET)

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

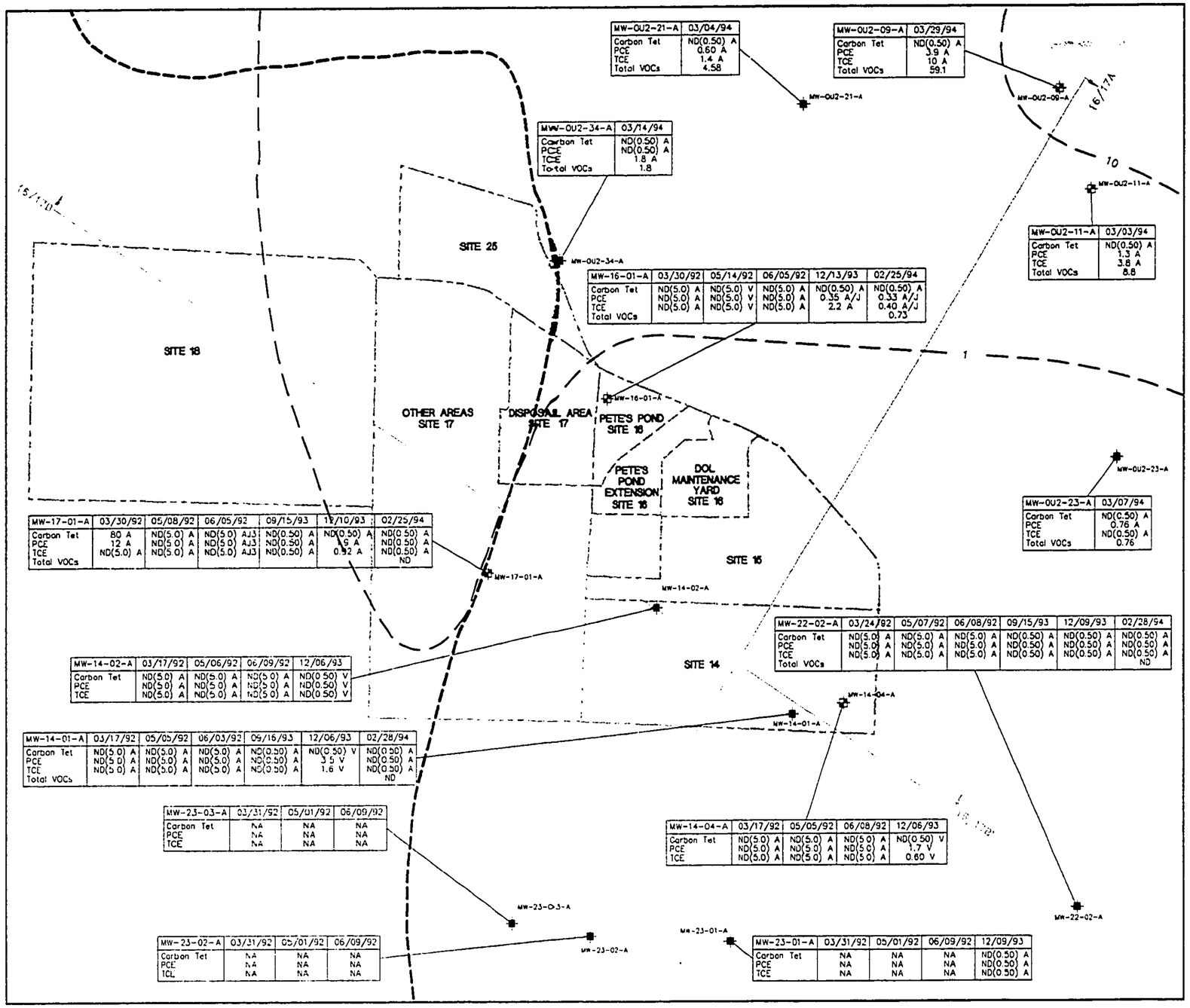
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366191	23366 041711			PH
2	12/94	DRAFT FINAL	23366191	23366 041721	RFM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Debris Thickness Map
Site 16 – Pete's Pond Extension

PLATE: 19



MW-0U2-21-A	03/04/94
Carbon Tet	ND(0.50) A
PCE	0.60 A
TCE	1.4 A
Total VOCs	4.58

MW-0U2-09-A	03/29/94
Carbon Tet	ND(0.50) A
PCE	3.9 A
TCE	10 A
Total VOCs	59.1

MW-0U2-34-A	03/14/94
Carbon Tet	ND(0.50) A
PCE	ND(0.50) A
TCE	1.8 A
Total VOCs	1.8

MW-0U2-11-A	03/03/94
Carbon Tet	ND(0.50) A
PCE	1.3 A
TCE	3.8 A
Total VOCs	8.8

MW-16-01-A	03/30/92	05/14/92	06/05/92	12/13/93	02/25/94
Carbon Tet	ND(5.0) A	ND(5.0) V	ND(5.0) A	ND(0.50) A	ND(0.50) A
PCE	ND(5.0) A	ND(5.0) V	ND(5.0) A	0.35 A/J	0.33 A/J
TCE	ND(5.0) A	ND(5.0) V	ND(5.0) A	2.2 A	0.40 A/J
Total VOCs					0.73

MW-0U2-23-A	03/07/94
Carbon Tet	ND(0.50) A
PCE	0.76 A
TCE	ND(0.50) A
Total VOCs	0.76

MW-17-01-A	03/30/92	05/08/92	06/05/92	09/15/93	12/10/93	02/25/94
Carbon Tet	80 A	ND(5.0) A	ND(5.0) AJ3	ND(0.50) A	ND(0.50) A	ND(0.50) A
PCE	12 A	ND(5.0) A	ND(5.0) AJ3	ND(0.50) A	1.9 A	ND(0.50) A
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) AJ3	ND(0.50) A	0.92 A	ND(0.50) A
Total VOCs						ND

MW-22-02-A	03/24/92	05/07/92	06/08/92	09/15/93	12/09/93	02/28/94
Carbon Tet	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) A	ND(0.50) A	ND(0.50) A
PCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) A	ND(0.50) A	ND(0.50) A
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) A	ND(0.50) A	ND(0.50) A
Total VOCs						ND

MW-14-02-A	03/17/92	05/06/92	06/09/92	12/06/93
Carbon Tet	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) V
PCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) V
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) V

MW-14-01-A	03/17/92	05/05/92	06/03/92	09/16/93	12/06/93	02/28/94
Carbon Tet	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) A	ND(0.50) V	ND(0.50) A
PCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) A	3.5 V	ND(0.50) A
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) A	1.6 V	ND(0.50) A
Total VOCs						ND

MW-23-03-A	03/31/92	05/01/92	06/09/92
Carbon Tet	NA	NA	NA
PCE	NA	NA	NA
TCE	NA	NA	NA

MW-14-04-A	03/17/92	05/05/92	06/08/92	12/06/93
Carbon Tet	ND(5.0) A	ND(5.0) A	ND(5.0) A	ND(0.50) V
PCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	1.7 V
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) A	0.60 V

MW-23-02-A	03/31/92	05/01/92	06/09/92
Carbon Tet	NA	NA	NA
PCE	NA	NA	NA
TCE	NA	NA	NA

MW-23-01-A	03/31/92	05/01/92	06/09/92	12/09/93
Carbon Tet	NA	NA	NA	ND(0.50) A
PCE	NA	NA	NA	ND(0.50) A
TCE	NA	NA	NA	ND(0.50) A

300 0 300 600
SCALE IN FEET

EXPLANATION

MONITORING WELL (HLA)
MONITORING WELL (EA)
16/17A 16/17A' CROSS-SECTION LINE
WASH RACK
GREASE RACK
FORMER HAZARDOUS WASTE STORAGE AREA
SITE BOUNDARY
AREA BOUNDARY
BUILDING
FENCE

SAMPLE LOCATION
SAMPLE COLLECTION DATE

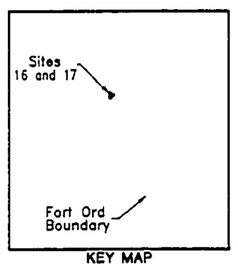
SS-12-03	03/03/94
PCE	26.Z A
TCE	16.3 NJ

PROJECT AND LABORATORY QUALIFIERS; QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.
CONCENTRATIONS IN MICROGRAMS PER LITER
ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTES.

ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES
NA NOT ANALYZED
APPROXIMATE WESTERN EDGE OF FORT ORD-SALINAS VALLEY AQUICLUDE (FO-SVA).
TOTAL VOC CONCENTRATION CONTOUR IN MICROGRAMS PER LITER; FEBRUARY-MARCH 1994 SAMPLING ROUND.

NOTES:

1. CONTOURS REPRESENT CONCENTRATIONS OF TOTAL VOCS DETECTED USING EPA METHODS 8010/8020 IN BOTH THE A-AQUIFER AND THE UPPER 180-FOOT AQUIFER AS MODIFIED FROM PLATE D6, VOLUME II – RI, BASEWIDE HYDROGEOLOGIC CHARACTERIZATION SECTION.
2. THE AQUIFER DOES NOT EXIST WEST OF THE SVA, AND CONTOURS EXTENDING THROUGH THIS AREA REPRESENT CONCENTRATIONS OF TOTAL VOC'S IN THE UPPER 180-FOOT AQUIFER.
3. THE CHEMICAL CONCENTRATION CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA AVAILABLE WHEN THIS REPORT WAS PREPARED; OTHER INTERPRETATIONS MAY BE POSSIBLE.



KEY MAP

If this image is not as legible as this overlay, it's due to the poor quality of the original document

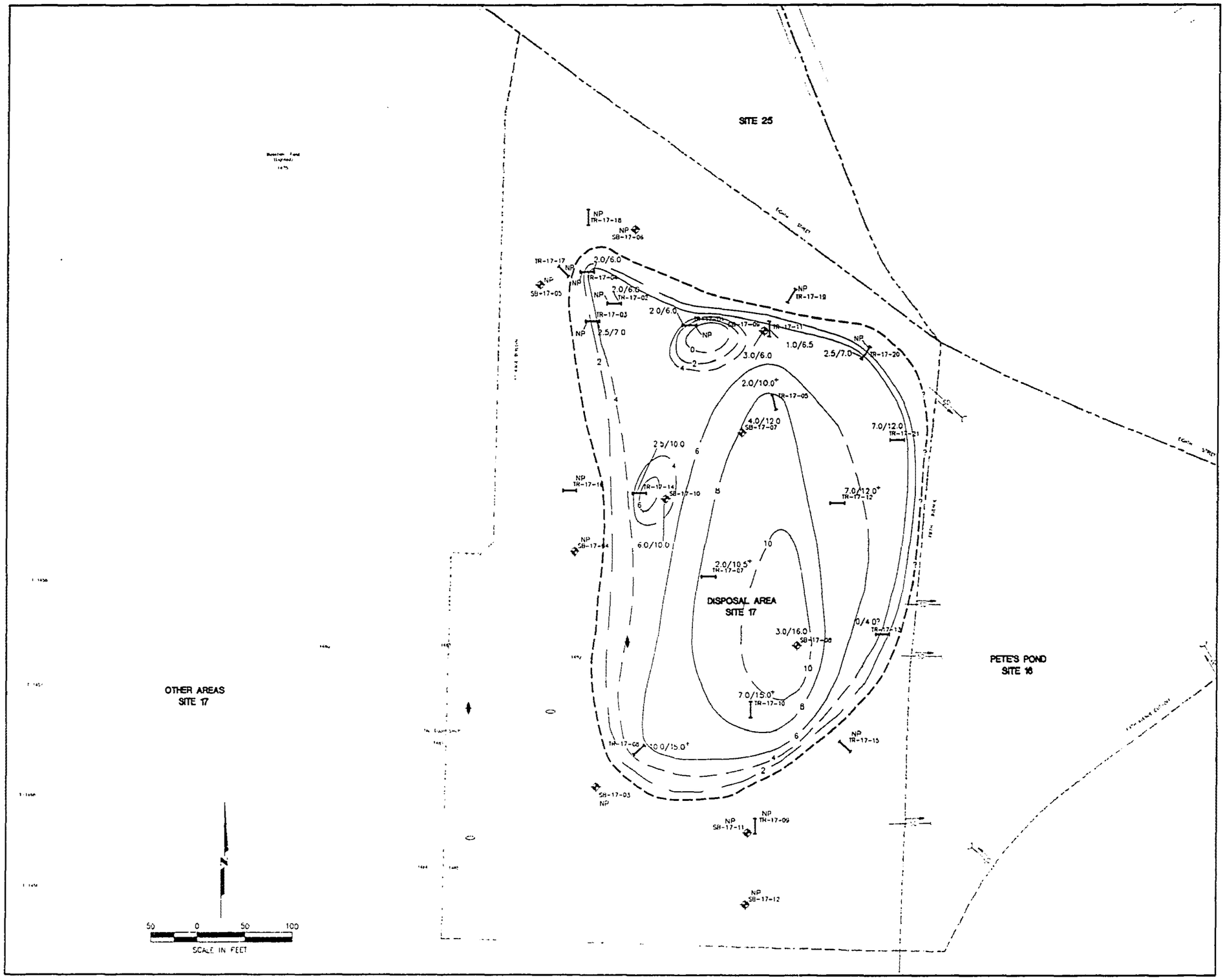
NO	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366189	23366 041711			PH
2	12/94	DRAFT FINAL	23366189	23366 041721	REM	12/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Selected VOCs and Total VOCs Detected in Groundwater of A-Aquifer Sites 16 and 17

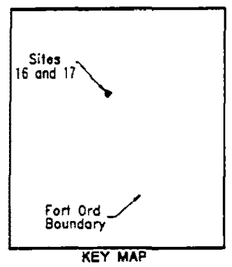
PLATE: 32



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- APPROXIMATE EXTENT OF SUBSURFACE DEBRIS, DASHED WHERE INFERRED AND QUERIED WHERE UNCERTAIN.
- 2 — DEBRIS THICKNESS CONTOUR (CONTOUR INTERVAL 2 FEET)
- 2.0/6.0 — DEPTH TO TOP OF DEBRIS /DEPTH TO BOTTOM OF DEBRIS (FEET)
- NP — SUBSURFACE DEBRIS NOT PRESENT

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

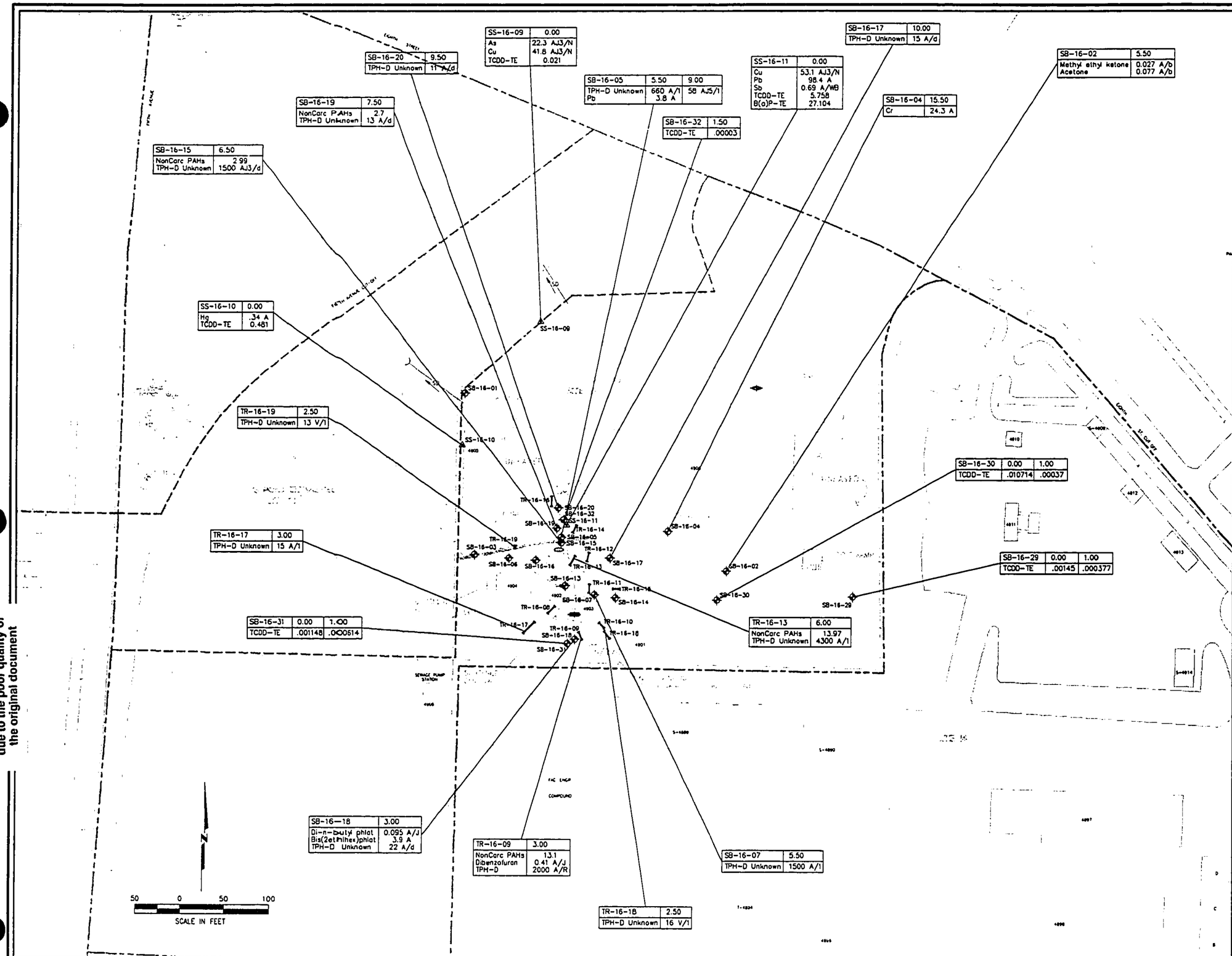
NO	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366135	23366 041711			PH
2	12/94	DRAFT FINAL	23366135	23366 041721	RFM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Debris Thickness Map
Site 17 – Disposal Area

PLATE: 22



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- CROSS-SECTION LINE
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD — STORM DRAIN LINE

SAMPLE LOCATION

SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SS-12-03	0.5
Pb	26.Z A
Zn	16.3 NJ

PROJECT AND LABORATORY QUALIFIERS: QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.

CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM EXCEPT FOR TCDD-TE (IN MICROGRAMS PER KILOGRAM)

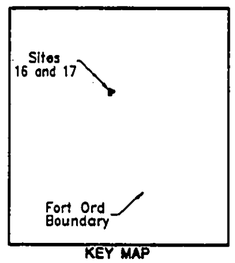
ANALYTES-- ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTES.

ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTES:

1. INCLUDES ALL INORGANICS EXCEEDING MAXIMUM BACKGROUND CONCENTRATIONS, DETECTED CONCENTRATIONS OF INORGANICS FOR WHICH BACKGROUND CONCENTRATIONS ARE NOT AVAILABLE, AND ALL DETECTED ORGANICS.
2. NONCARCINOGENIC PAHS ARE PRESENTED AS A SUMMED TOTAL, DIOXINS AND FURANS AS A TCDD TOXIC EQUIVALENT (TCDD-TE) AND CARCINOGENIC PAHS AS A BENZO(a)PYRENE TOXIC EQUIVALENT (B(a)-TE).



KEY MAP

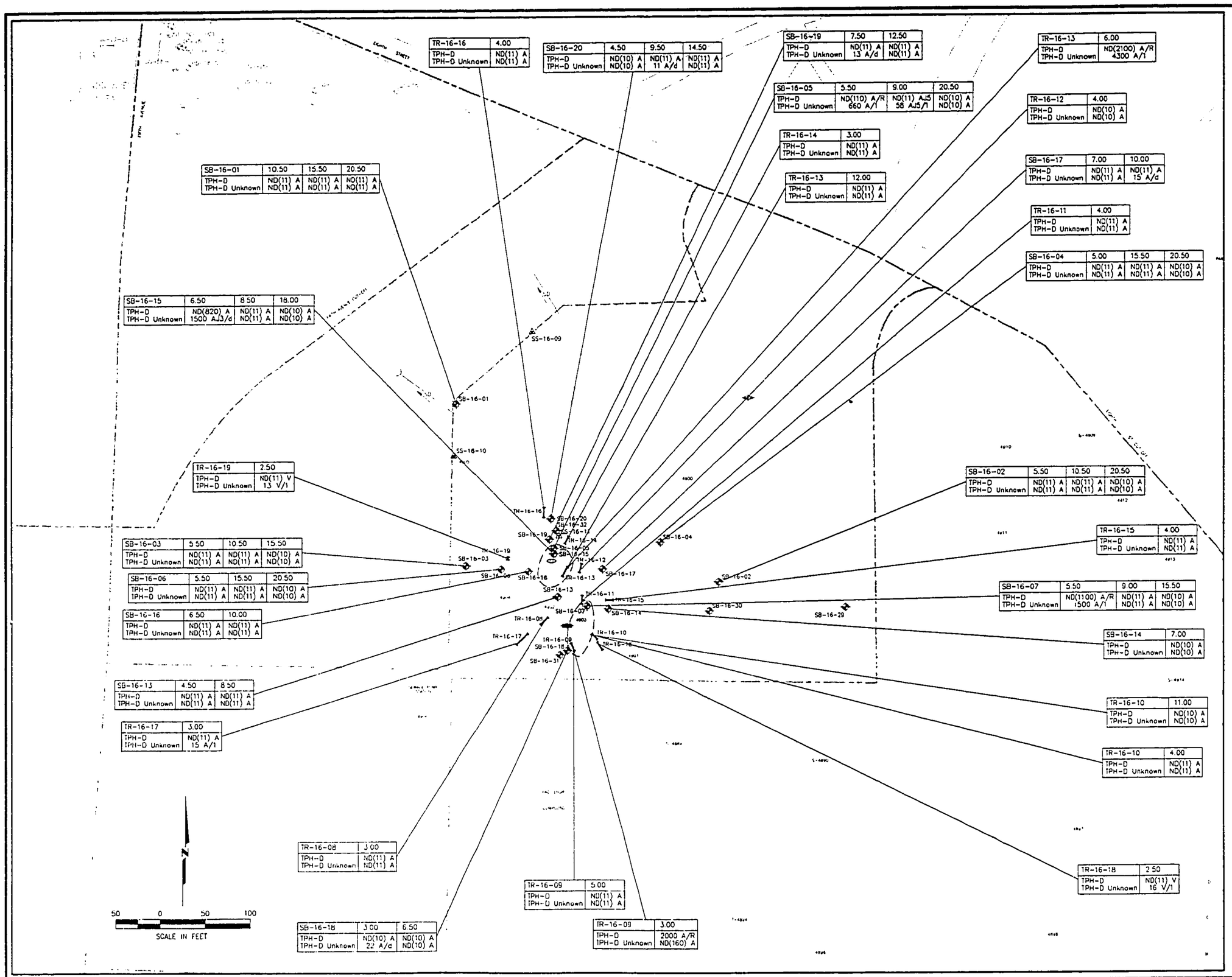
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366321	23366 041711			PH
2	12/94	DRAFT FINAL	23366321	23366 041721	RFM	11/23/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Organic and Inorganic Compounds Detected In Soil
Site 16 – DOL Maintenance Yard

PLATE: 23



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING (BY OTHERS)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- CROSS-SECTION LINE
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD — STORM DRAIN LINE
- APPROXIMATE EXTENT OF TPH CONCENTRATIONS (TPH AS DIESEL AND AS UNKNOWN TPH AS DIESEL) GREATER THAN 500 mg/kg

SAMPLE LOCATION — SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SS-12-03	0.5
Pb	26.Z A
Zn	16.3 NJ

PROJECT AND LABORATORY QUALIFIERS: QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.

CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM

ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS SEE NOTES.

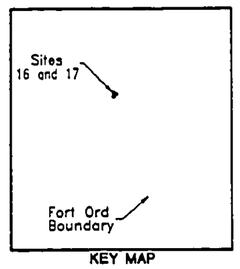
ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTES:

1. CHEMICAL CONCENTRATION CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA AVAILABLE WHEN THIS REPORT WAS PREPARED; OTHER INTERPRETATIONS MAY BE POSSIBLE.

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

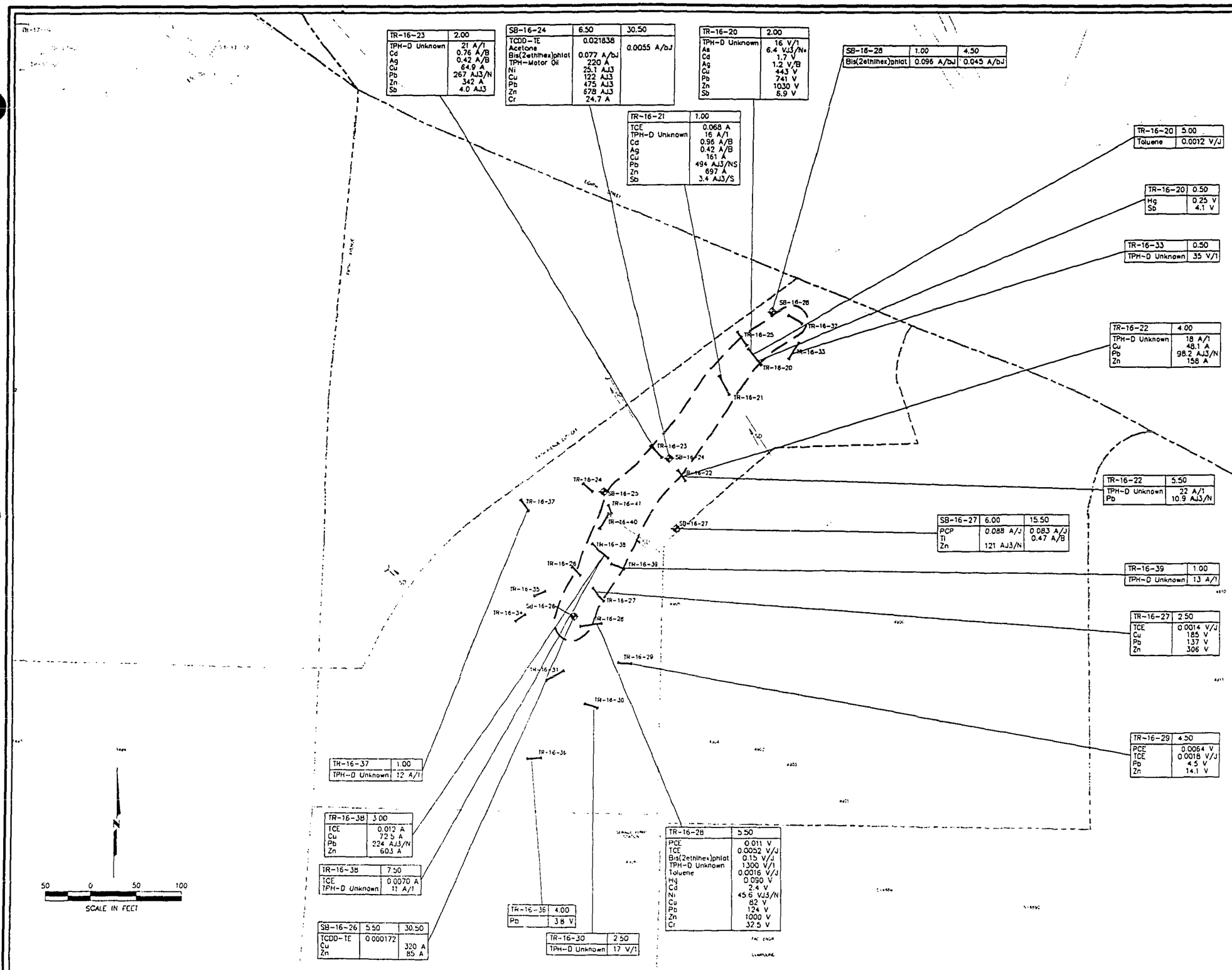
NO	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366333	23366 041711			PH
2	12/94	DRAFT FINAL	23366333	23366 041721	RFM	11/23/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of TPH Concentrations Detected in Soil
Site 16 – DOL Maintenance Yard

PLATE: 24



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- CROSS-SECTION LINE
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- STORM DRAIN LINE
- EXTENT OF SUBSURFACE DEBRIS

SAMPLE LOCATION

SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SS-12-03	0.5
Pb	26.Z A
Zn	16.3 NJ

PROJECT AND LABORATORY QUALIFIERS; QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.

CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM EXCEPT FOR TCDD-TE (IN MICROGRAMS PER KILOGRAM)

ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTES.

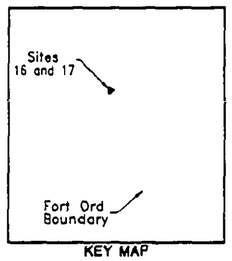
ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTES:

1. INCLUDES ALL INORGANICS EXCEEDING MAXIMUM BACKGROUND CONCENTRATIONS, DETECTED CONCENTRATIONS OF INORGANICS FOR WHICH BACKGROUND CONCENTRATIONS ARE NOT AVAILABLE, AND ALL DETECTED ORGANICS.
2. NONCARCINOGENIC PAHS ARE PRESENTED AS A SUMMED TOTAL, DIOXINS AND FURANS AS A TCDD TOXIC EQUIVALENT (TCDD-TE).

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

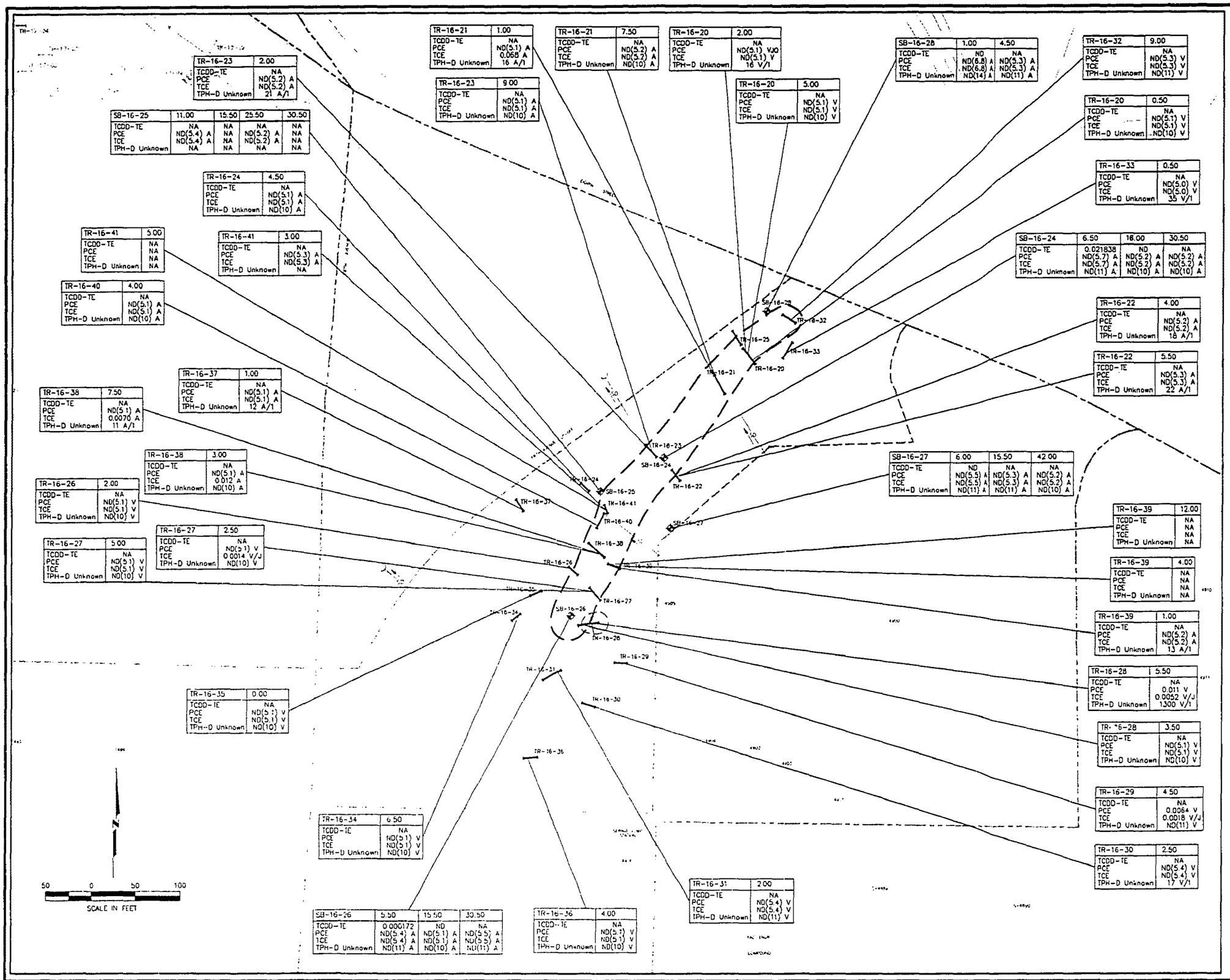
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366328	23366 041711			PH
2	12/94	DRAFT FINAL	23366328	23366 041721	RFM	11/22/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Organic and Inorganic Compounds Detected in Soil
Site 16 – Pete's Pond Extension

PLATE: 25



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- CROSS-SECTION LINE
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- STORM DRAIN LINE
- APPROXIMATE EXTENT OF TPH CONCENTRATIONS (UNKNOWN TPH AS DIESEL) GREATER THAN 500 mg/kg
- EXTENT OF SUBSURFACE DEBRIS

SAMPLE LOCATION — SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SS-12-03	0.5
Pb	26.Z A
Zn	16.3 NJ

PROJECT AND LABORATORY QUALIFIERS: QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.

CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM EXCEPT FOR TCDD-TE (IN MICROGRAMS PER KILOGRAM)

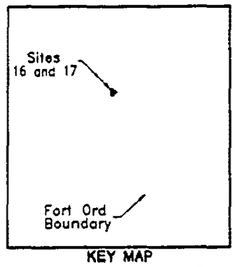
ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTES.

ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTES:

1. DIOXINS AND FURANS ARE PRESENTED AS A TCDD TOXIC EQUIVALENT (TCDD-TE).
2. CHEMICAL CONCENTRATION CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA AVAILABLE WHEN THIS REPORT WAS PREPARED. OTHER INTERPRETATIONS MAY BE POSSIBLE.



KEY MAP

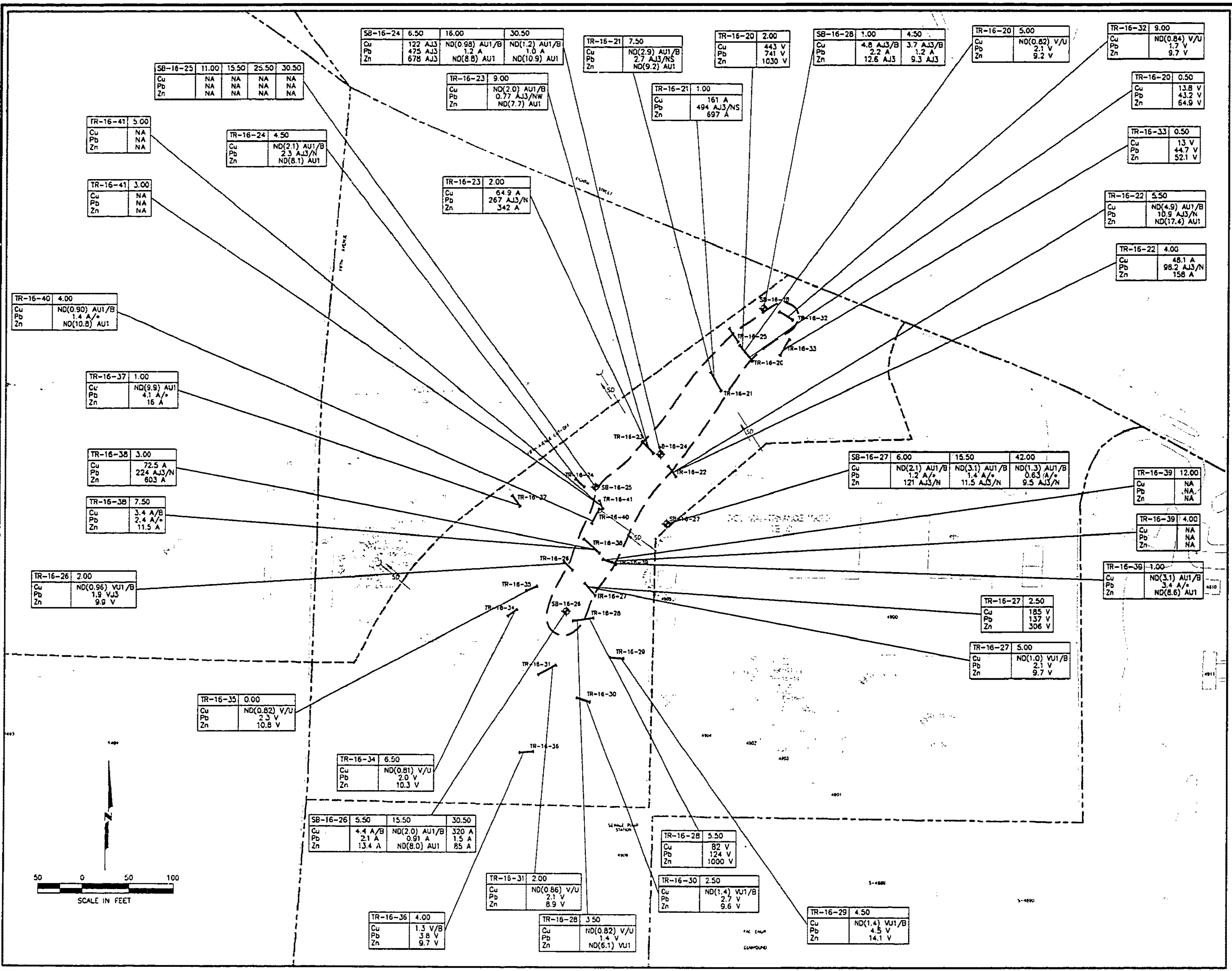
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366334	23366 041711			PH
2	12/94	DRAFT FINAL	23366334	23366 041721	RFM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Selected Organic Compounds Detected in Soil
Site 16 – Pete's Pond Extension

PLATE: 26



EXPLANATION

⊢	TEST PIT
	SOIL GAS SAMPLING POINT (HLA)
	SURFACE SOIL SAMPLE (HLA)
◈	SOIL BORING/PILOT BORING (HLA)
	MONITORING WELL (HLA)
	SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
	CROSS-SECTION LINE
	FORMER UNDERGROUND STORAGE TANK
	EXISTING ABOVEGROUND STORAGE TANK
	WASH RACK
	OIL/WATER SEPARATOR
— - - —	SITE BOUNDARY
— — —	AREA BOUNDARY
	BUILDING
	STORM DRAIN OUTFALL PIPE
	FENCE
——SD——	STORM DRAIN LINE
	EXTENT OF SUBSURFACE DEBRIS

SAMPLE LOCATION

SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SS-12-03	0.5
Pb	26.2 A
Zn	16.3 NJ

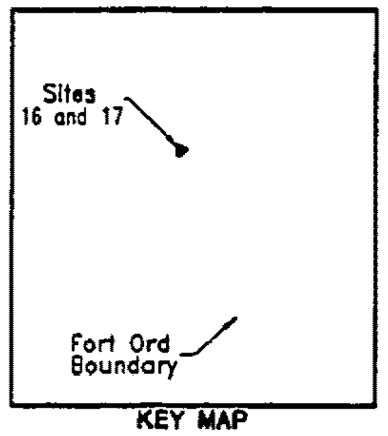
PROJECT AND LABORATORY QUALIFIERS; QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.

CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM

ANALYTES- ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS.

ND(1.0)	NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES
NA	NOT ANALYZED

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

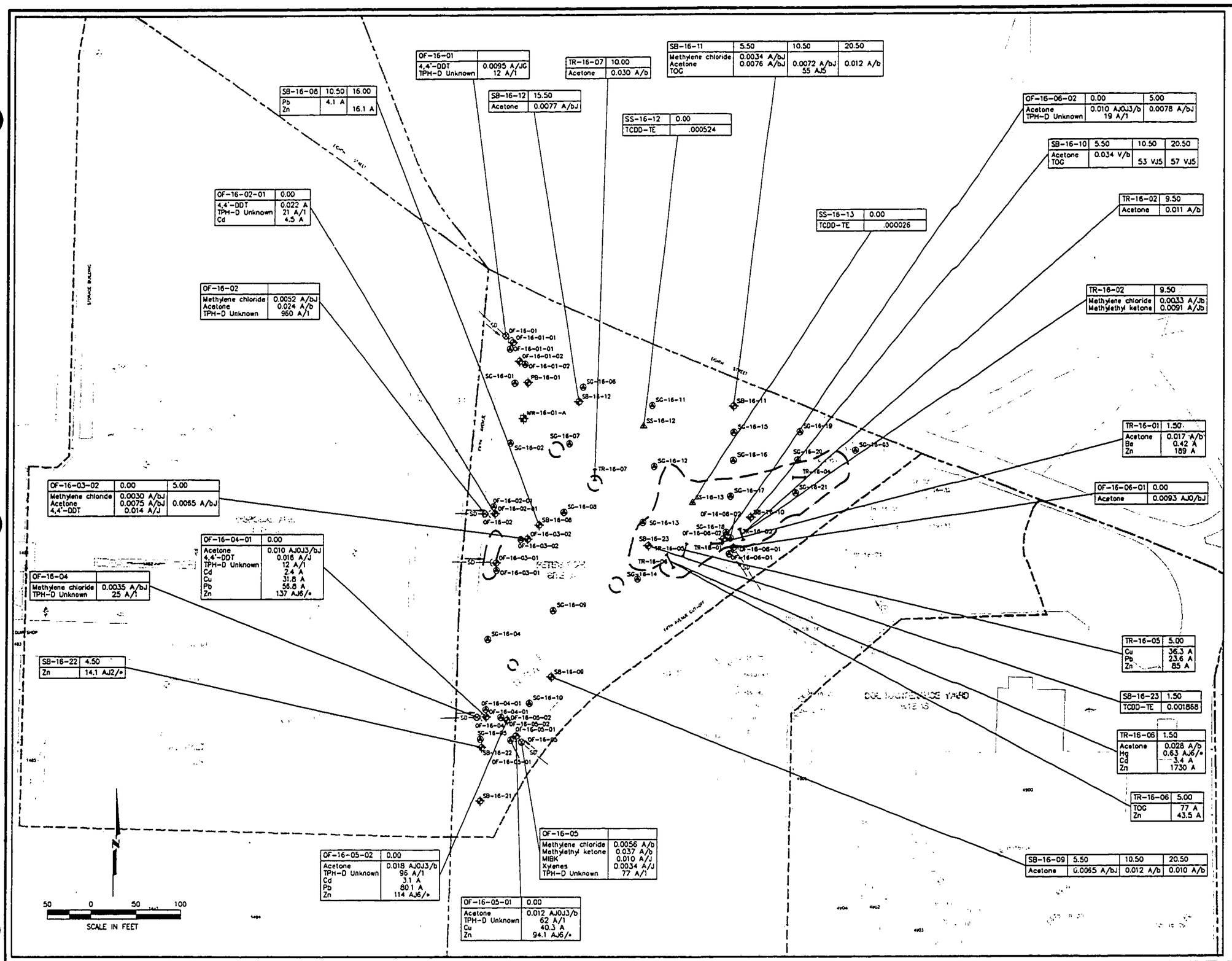
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366335	23366 041711			PH
2	12/94	DRAFT FINAL	23366335	23366 041721	RFM	11/21/94	PH

Harding Lawson Associates
Engineering and
Environmental Services

Volume II - Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Selected Inorganic
Compounds Detected In Soil
Site 16 - Pete's Pond Extension

PLATE:
27



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- CROSS-SECTION LINE
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- —SD— STORM DRAIN LINE
- EXTENT OF SUBSURFACE DEBRIS AS DEFINED WITH GEOPHYSICAL ANOMALIES

SAMPLE LOCATION — SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SS-12-03	0.5
Pb	26.2 A
Zn	16.3 NJ

PROJECT AND LABORATORY QUALIFIERS: QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.

CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM EXCEPT FOR TCDD-TE (IN MICROGRAMS PER KILOGRAM)

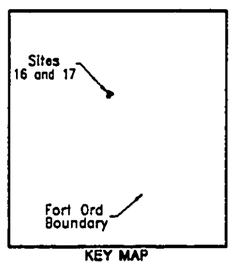
ANALYTES— ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTES.

ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTES:

1. INCLUDES ALL INORGANICS EXCEEDING MAXIMUM BACKGROUND CONCENTRATIONS, DETECTED CONCENTRATIONS OF INORGANICS FOR WHICH BACKGROUND CONCENTRATIONS ARE NOT AVAILABLE, AND ALL DETECTED ORGANICS.
2. NONCARCINOGENIC PAHS ARE PRESENTED AS A SUMMED TOTAL, DIOXINS AND FURANS AS A TCDD TOXIC EQUIVALENT (TCDD-TE), AND CARCINOGENIC PAHS AS A BENZO(A)PYRENE TOXIC EQUIVALENT (B(a)P-TE).



KEY MAP

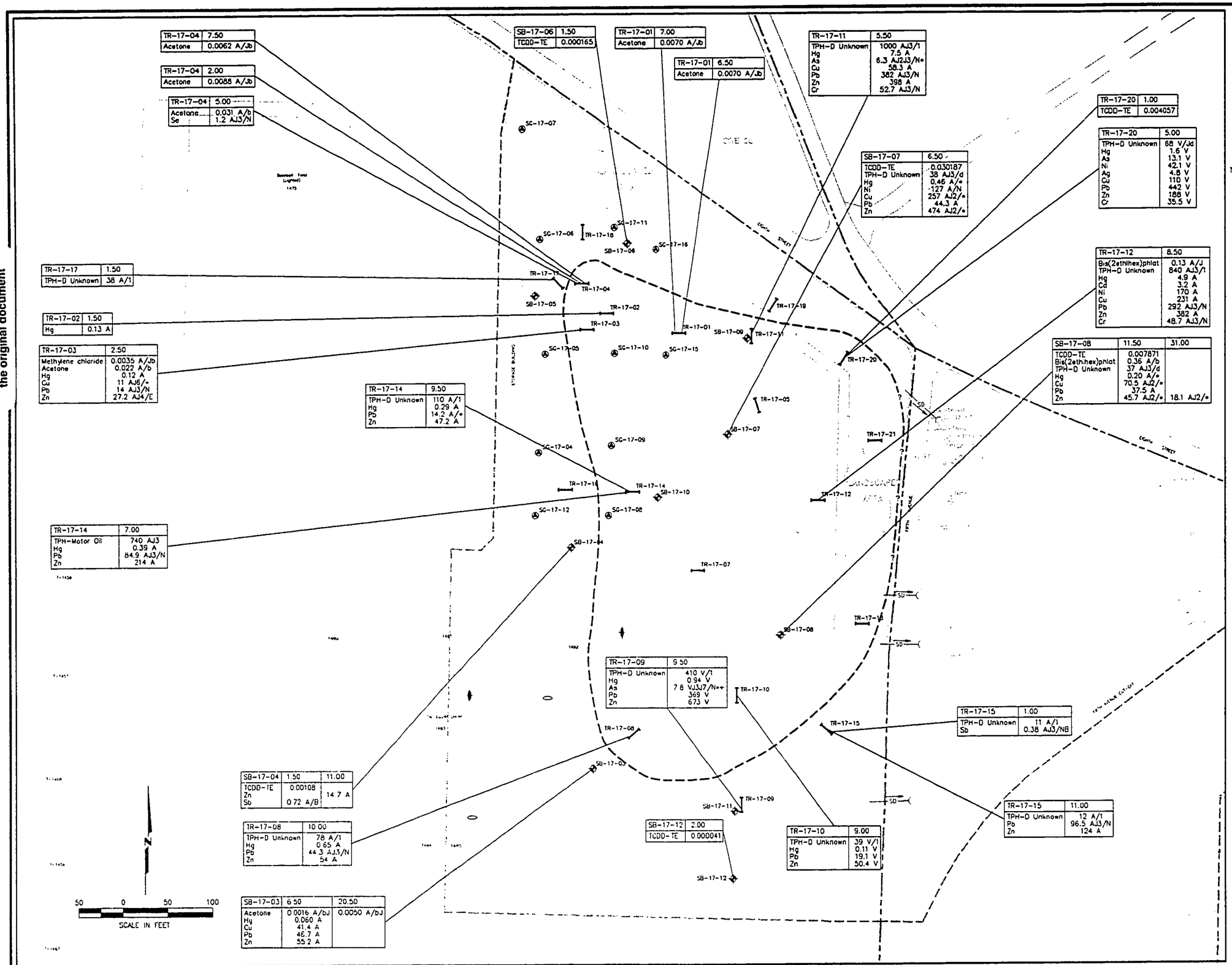
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366486	23366 041711			PH
2	12/94	DRAFT FINAL	23366486	23366 041721	REM	11/23/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Organic and Inorganic Compounds Detected in Soil and Sediment
Site 16 – Pete's Pond

PLATE: 28



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- CROSS-SECTION LINE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- STORM DRAIN LINE
- EXTENT OF SUBSURFACE DEBRIS

SAMPLE LOCATION

SAMPLE DEPTH IN FEET BELOW GROUND SURFACE

SS-12-03	0.5
Pb	26.2 A
Zn	16.3 NJ

PROJECT AND LABORATORY QUALIFIERS; QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.

CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM EXCEPT FOR TCDD-TE (IN MICROGRAMS PER KILOGRAM)

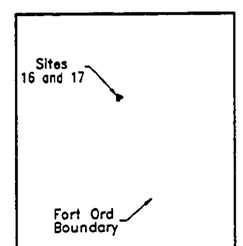
ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTES.

ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTES:

1. INCLUDES ALL INORGANICS EXCEEDING MAXIMUM BACKGROUND CONCENTRATIONS, DETECTED CONCENTRATIONS OF INORGANICS FOR WHICH BACKGROUND CONCENTRATIONS ARE NOT AVAILABLE, AND ALL DETECTED ORGANICS.
2. NONCARCINOGENIC PAHS ARE PRESENTED AS A SUMMED TOTAL. DIOXINS AND FURANS AS A TCDD TOXIC EQUIVALENT (TCDD-TE) AND CARCINOGENIC PAHS AS A BENZO(A)PYRENE TOXIC EQUIVALENT (B(a)P-TE).



KEY MAP

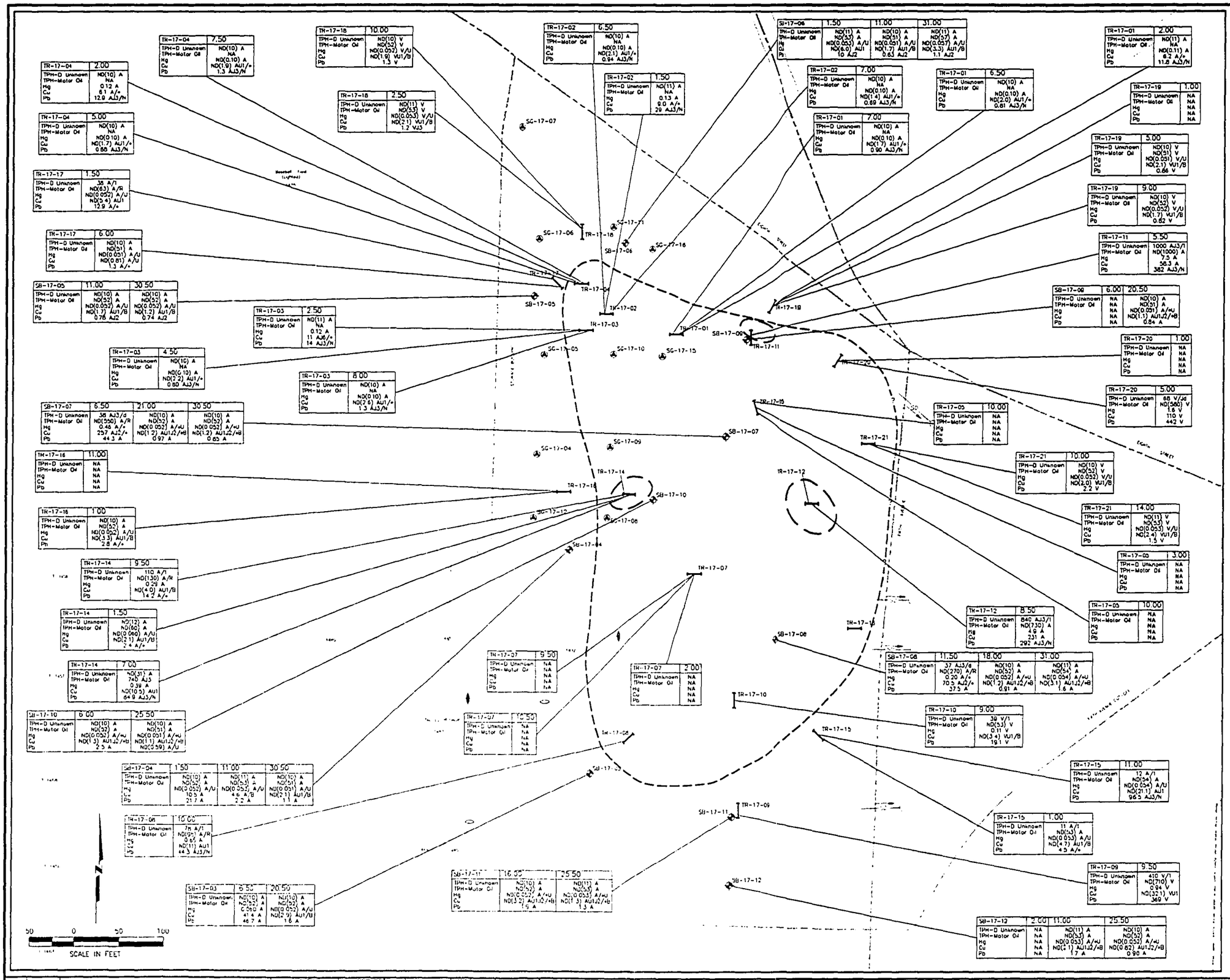
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366329	23366 041711			PH
2	12/94	DRAFT FINAL	23366329	23366 041721	RGM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Organic and Inorganic Compounds Detected in Soil
Site 17 – Disposal Area

PLATE: 29



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SURFACE SOIL SAMPLE (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- CROSS-SECTION LINE
- FORMER UNDERGROUND STORAGE TANK
- EXISTING ABOVEGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD — STORM DRAIN LINE
- APPROXIMATE EXTENT OF TPH (AS DIESEL AND UNKNOWN TPH AS DIESEL) IN SOIL ABOVE 500 mg/kg
- APPROXIMATE EXTENT OF SUBSURFACE DEBRIS; DASHED WHERE INFERRED, QUERRIED WHERE UNCERTAIN

SS-12-03	0.5
Pb	26.2 A
Zn	16.3 NJ

- SAMPLE LOCATION
- SAMPLE DEPTH IN FEET BELOW GROUND SURFACE
- PROJECT AND LABORATORY QUALIFIERS; QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.
- CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM
- ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTE.

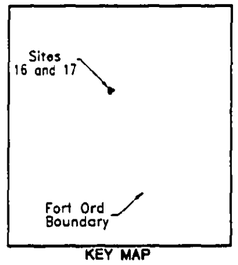
ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTE:

1. CHEMICAL CONCENTRATION CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA AVAILABLE WHEN THIS REPORT WAS PREPARED. OTHER INTERPRETATIONS MAY BE POSSIBLE

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

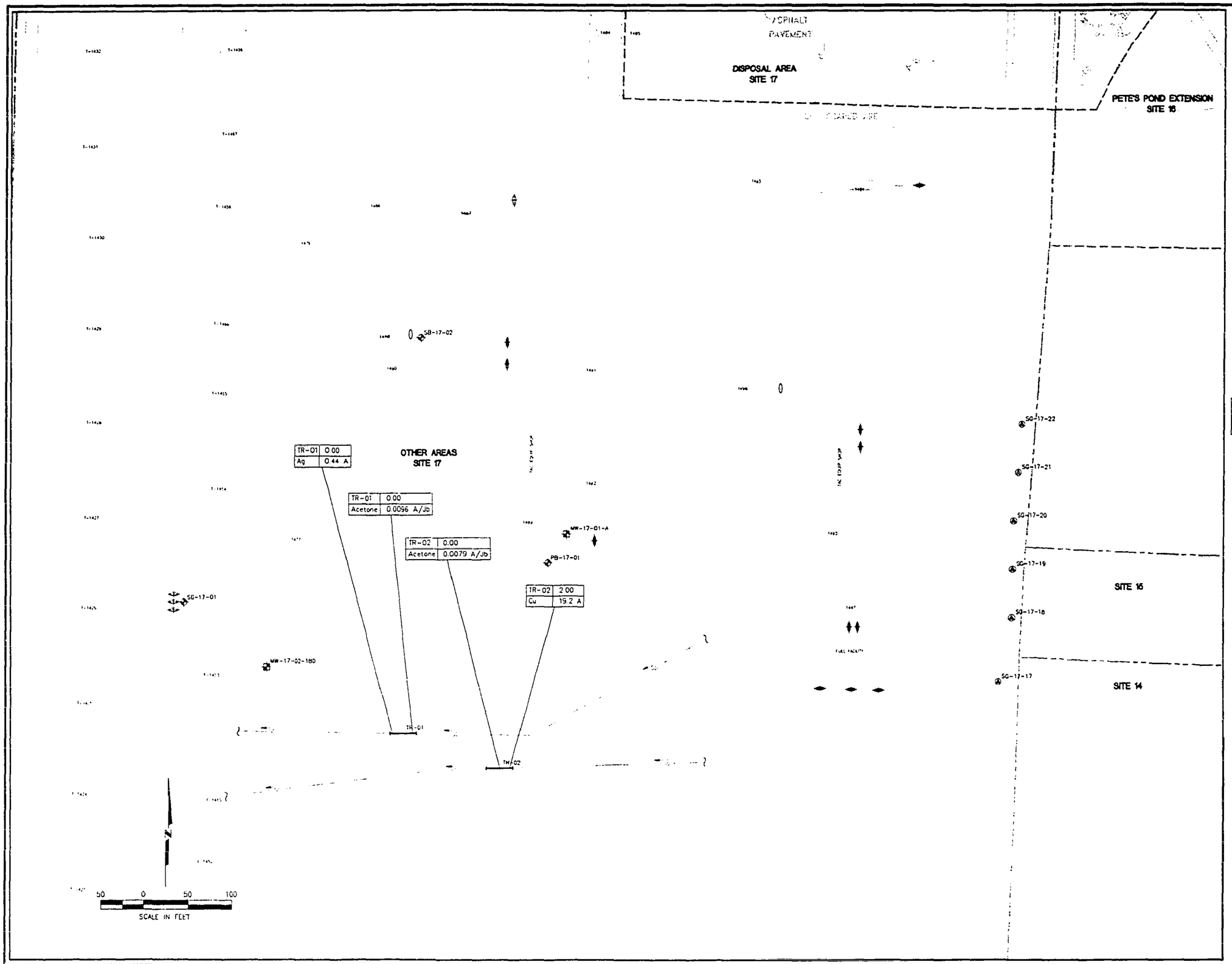
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366336	23366 041711			PH
2	12/94	DRAFT FINAL	23366336	23366 041721	RFM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Selected Organic and Inorganic Compounds Detected in Soil
Site 17 – Disposal Area

PLATE: 30



EXPLANATION

- TEST PIT
- SOIL GAS SAMPLING POINT (HLA)
- SOIL BORING/PILOT BORING (HLA)
- MONITORING WELL (HLA)
- SEDIMENT SAMPLE FROM STORM DRAIN OUTFALL PIPE
- EXISTING UNDERGROUND STORAGE TANK
- FORMER UNDERGROUND STORAGE TANK
- WASH RACK
- GREASE RACK
- OIL/WATER SEPARATOR
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- STORM DRAIN OUTFALL PIPE
- FENCE
- SD — STORM DRAIN LINE
- SS — SANITARY SEWER LINE

SS-12-03	0.5
Pb	26.2 A
Zn	16.3 NJ

- SAMPLE LOCATION
- SAMPLE DEPTH IN FEET BELOW GROUND SURFACE
- PROJECT AND LABORATORY QUALIFIERS; QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b.
- CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM
- ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTE.

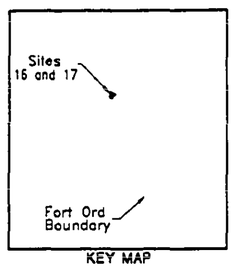
ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

NOTE:

1. INCLUDES ALL INORGANICS EXCEEDING MAXIMUM BACKGROUND CONCENTRATIONS, DETECTED CONCENTRATIONS OF INORGANICS FOR WHICH BACKGROUND CONCENTRATIONS ARE NOT AVAILABLE, AND ALL DETECTED ORGANICS.

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

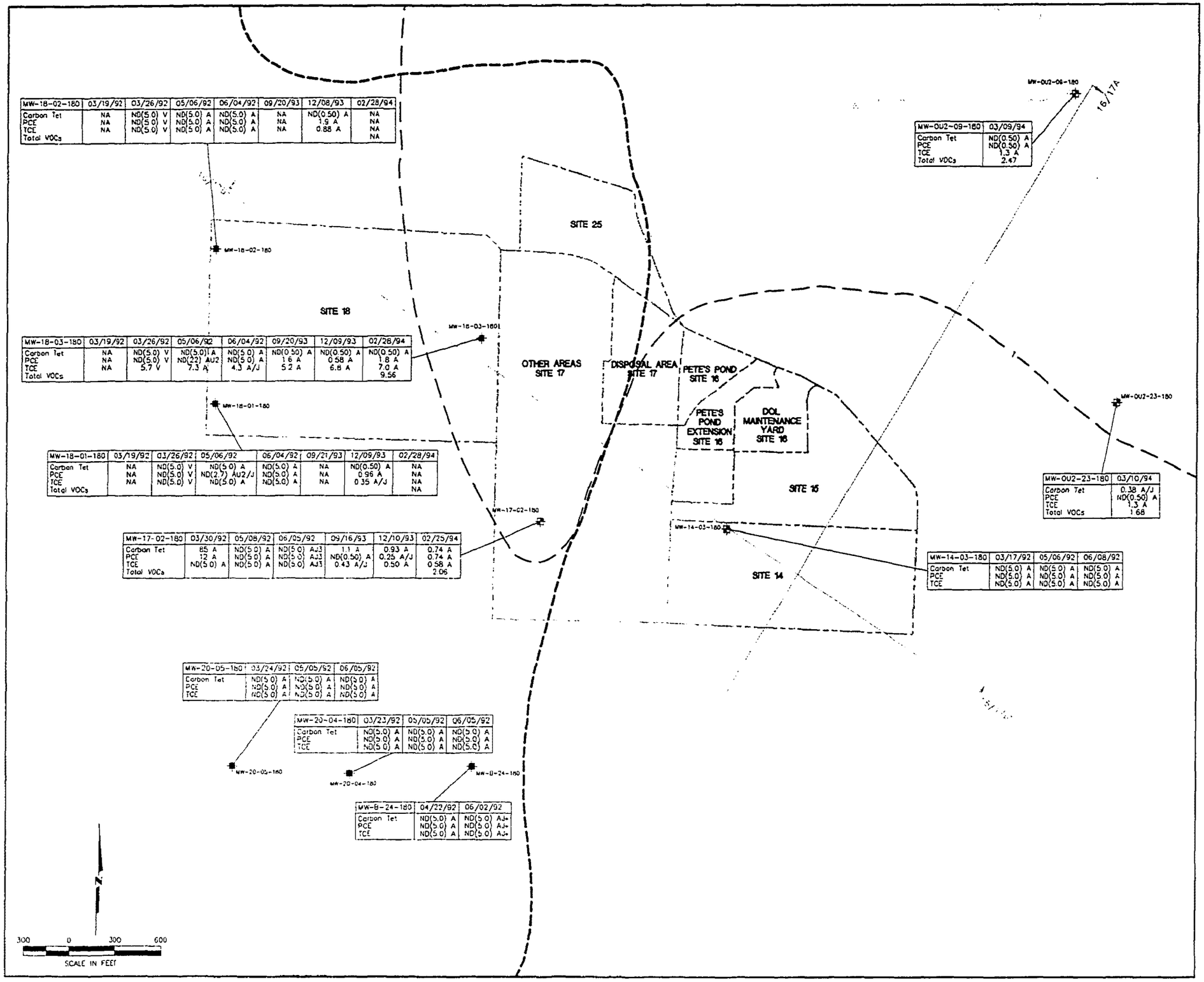
NO.	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366323	23366 041711			AED
2	12/94	DRAFT FINAL	23366323	23366 041721	RFM	11/21/94	AED

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Organic and Inorganic Compounds Detected in Soil
Site 17 – Other Areas

PLATE: 31



MW-18-02-180	03/19/92	03/26/92	05/06/92	06/04/92	09/20/93	12/08/93	02/28/94
Carbon Tet	NA	ND(5.0) V	ND(5.0) A	ND(5.0) A	NA	ND(0.50) A	NA
PCE	NA	ND(5.0) V	ND(5.0) A	ND(5.0) A	NA	1.9 A	NA
TCE	NA	ND(5.0) V	ND(5.0) A	ND(5.0) A	NA	0.88 A	NA
Total VOCs							NA

MW-18-03-180	03/19/92	03/26/92	05/06/92	06/04/92	09/20/93	12/09/93	02/28/94
Carbon Tet	NA	ND(5.0) V	ND(5.0) A	ND(5.0) A	ND(0.50) A	ND(0.50) A	ND(0.50) A
PCE	NA	ND(5.0) V	ND(22) AU2	ND(5.0) A	1.6 A	0.58 A	1.8 A
TCE	NA	5.7 V	7.3 A	4.3 A/J	5.2 A	6.8 A	7.0 A
Total VOCs							9.56

MW-18-01-180	03/19/92	03/26/92	05/06/92	06/04/92	09/21/93	12/09/93	02/28/94
Carbon Tet	NA	ND(5.0) V	ND(5.0) A	ND(5.0) A	NA	ND(0.50) A	NA
PCE	NA	ND(5.0) V	ND(2.7) AU2/J	ND(5.0) A	NA	0.96 A	NA
TCE	NA	ND(5.0) V	ND(5.0) A	ND(5.0) A	NA	0.35 A/J	NA
Total VOCs							NA

MW-17-02-180	03/30/92	05/08/92	06/05/92	09/16/93	12/10/93	02/25/94
Carbon Tet	85 A	ND(5.0) A	ND(5.0) AJ3	1.1 A	0.93 A	0.74 A
PCE	12 A	ND(5.0) A	ND(5.0) AJ3	ND(0.50) A	0.25 A/J	0.74 A
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) AJ3	0.43 A/J	0.50 A	0.58 A
Total VOCs						2.06

MW-OU2-09-180	03/09/94
Carbon Tet	ND(0.50) A
PCE	ND(0.50) A
TCE	1.3 A
Total VOCs	2.47

MW-OU2-23-180	03/10/94
Carbon Tet	0.38 A/J
PCE	ND(0.50) A
TCE	1.3 A
Total VOCs	1.68

MW-14-03-180	03/17/92	05/06/92	06/08/92
Carbon Tet	ND(5.0) A	ND(5.0) A	ND(5.0) A
PCE	ND(5.0) A	ND(5.0) A	ND(5.0) A
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) A

MW-20-05-180	03/24/92	05/05/92	06/05/92
Carbon Tet	ND(5.0) A	ND(5.0) A	ND(5.0) A
PCE	ND(5.0) A	ND(5.0) A	ND(5.0) A
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) A

MW-20-04-180	03/23/92	05/05/92	06/05/92
Carbon Tet	ND(5.0) A	ND(5.0) A	ND(5.0) A
PCE	ND(5.0) A	ND(5.0) A	ND(5.0) A
TCE	ND(5.0) A	ND(5.0) A	ND(5.0) A

MW-B-24-180	04/22/92	06/02/92
Carbon Tet	ND(5.0) A	ND(5.0) AJ+
PCE	ND(5.0) A	ND(5.0) AJ+
TCE	ND(5.0) A	ND(5.0) AJ+

EXPLANATION

- MONITORING WELL (HLA)
- MONITORING WELL (EA)
- 16/17A 16/17A' CROSS-SECTION LINE
- WASH RACK
- GREASE RACK
- FORMER HAZARDOUS WASTE STORAGE AREA
- SITE BOUNDARY
- AREA BOUNDARY
- BUILDING
- FENCE

SS-12-03	03/10/94
PCE	26.Z A
TCE	16.3 NJ

- SAMPLE LOCATION
- SAMPLE COLLECTION DATE
- PROJECT AND LABORATORY QUALIFIERS; QUALIFIERS ARE DEFINED IN TABLES 41a AND 41b
- CONCENTRATIONS IN MICROGRAMS PER LITER
- ANALYTES– ABBREVIATIONS ARE DEFINED IN THE LIST OF ACRONYMS AND ABBREVIATIONS. SEE NOTES.

ND(1.0) NOT DETECTED AT THE REPORTING LIMIT SHOWN IN PARENTHESES

NA NOT ANALYZED

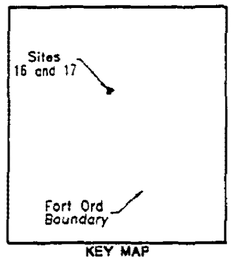
APPROXIMATE WESTERN EDGE OF FORT ORD-SALINAS VALLEY AQUICLUD (FO-SVA).

TOTAL VOC CONCENTRATION CONTOUR IN MICROGRAMS PER LITER; FEBRUARY-MARCH 1994 SAMPLING ROUND.

NOTES:

1. CONTOURS REPRESENT CONCENTRATIONS OF TOTAL VOC'S DETECTED USING EPA METHOD 8010/8020 IN BOTH THE A-AQUIFER AND THE UPPER 180-FOOT AQUIFER AS MODIFIED FROM PLATE D6, VOLUME II – RI, BASEWIDE HYDROGEOLOGIC CHARACTERIZATION SECTION
2. THE CHEMICAL CONCENTRATION CONTOURS ARE BASED ON ONE INTERPRETATION OF THE DATA AVAILABLE WHEN THIS REPORT WAS PREPARED; OTHER INTERPRETATIONS MAY BE POSSIBLE.

If this image is not as legible as this overlay, it's due to the poor quality of the original document



KEY MAP

NO	DATE	REVISIONS	HLA FILE NO	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/94	DRAFT	23366190	23366 041711			PH
2	12/94	DRAFT FINAL	23366190	23366 041721	RFM	11/21/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume II – Remedial Investigation
Basewide RI/FS
Fort Ord, California

Distribution of Selected VOCs and Total VOCs Detected in Groundwater of Upper 180-Foot Aquifer
Sites 16 and 17

PLATE: 33

SOIL BORING LOGS AND WELL CONSTRUCTION DETAILS

The appendix contains the soil boring logs for Sites 16 and 17. These borings were logged during drilling by HLA geologists or engineers using ASTM D 2488-90, which is based on the Unified Soil Classification System (USCS), the HLA Sampling and Analysis Plan (*HLA, 1991b*) and standard geologic techniques. Selected soil samples were submitted to either the HLA Soil Laboratory (Phase 1) or SOLEA geotechnical laboratory (Phase 2) in Concord, California, for physical testing summarized in Table 9; Appendix C contains the results of these analyses. SOLEA also visually classified these soil samples using the USCS.

Variations have been observed among the field and laboratory classifications of some of the soil samples. This is a result of the natural descriptive variation among individuals performing the classifications. For example, most of the soil at Fort Ord is composed of fine- to medium-grained sand. The fines content (silt- and clay-sized particles that pass the U.S. Standard No. 200 sieve) generally varies from 0 to 25 percent, with many soil samples containing 3 to 15 percent fines. Visual or manual classification of these fines as silt, clay, or a mixture of both can be subjective. In addition, the 3 to 15 percent fines content covers a range of up to nine different soil classifications; in this range, the material composition and hydraulic behavior may vary little. Quantitative assessment of the silt and clay percentages requires the use of other tests, such as the hydrometer test, which were outside the scope of work.

Because of the descriptive variation, a field log may describe a soil sample as sand to silty sand, whereas the sieve analysis for that same sample results in classification as sand to clayey sand. This does not mean that one classification is erroneous; rather, it suggests that the fines content is probably a variable mixture of clay and silt. It is important to note that when the hydraulic behavior of a particular material becomes important, its behavior is defined by aquifer testing as well as visual classification. Such aquifer tests are representative of a larger volume of soil than are laboratory or field classification of individual samples. For the Fort Ord reports, the particle size analyses are used to quantify the percentage of fines. In some borderline cases, the field classification has been changed to take the actual fines content into account. In general, the text discusses the classification drawn from the field logs.

Some variations in the soil classification abbreviations between boring logs and the particle size analyses are the result of a small difference between the USCS and ASTM D 2488-90. The ASTM method, used by the field geologists and engineers, classifies sand with more than 15 percent fines as silty or clayey sand. The USCS method, used by the geotechnical laboratory, uses 12 percent fines content as the threshold. The boring logs and the text use the ASTM method.

Density descriptions for sand and gravel and consistency descriptions for clay and silt are drawn from the sample hammer blow counts, if available. For soil intervals that were not sampled, field personnel made quantitative estimates on the basis of drilling rate or pressure; descriptions should not be converted to quantitative measurements.

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS OVER 50%>No.200 SIEVE SIZE	GRAVELS MORE THAN 1/2 OF COARSE FRACTION> No.4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW	Well-graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
		GRAVELS WITH OVER 15% FINES	GM	Silty gravels, gravel-sand mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS MORE THAN 1/2 OF COARSE FRACTION< No.4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW	Well-graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
		SANDS WITH OVER 15% FINES	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS OVER 50%<No.200 SIEVE SIZE	SILTS & CLAYS LIQUID LIMIT 50% OR LESS		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils
DEBRIS ZONE[1]				Metal, concrete, plastic, brick, wood, etc.
CONSTRUCTION DEBRIS[1]				Concrete, wood, rebar, asphalt

SYMBOLS KEY

☒	Bulk or classification sample
■	Sample preserved for possible laboratory analysis
▨	Hydropunch sample
▽	First-encountered groundwater level
▼	Static groundwater level
(10YR 4/4)	Munsell soil color 1990 edition
NA	Not available
ND	Not detected

GRAIN SIZE CHART

CLASSIFICATION	RANGE OF GRAIN SIZES	
	U.S. Standard Sieve Size	Grain Size in Millimeters
BOULDERS	Above 12"	Above 305
COBBLES	12" to 3"	305 to 76.2
GRAVEL	3" to No.4	76.2 to 4.75
coarse	3" to 3/4"	76.2 to 19.1
fine	3/4" to No.4	19.1 to 4.75
SAND	No.4 to No.200	4.75 to 0.075
coarse	No.4 to No.10	4.75 to 2.00
medium	No.10 to No.40	2.00 to 0.425
fine	No.40 to No.200	0.425 to 0.075
SILT & CLAY	Below No.200	Below 0.075

Source: ASTM D 2488-90, based on Unified Soil Classification System
1. Not part of ASTM Classification System

FIG-LEG

PLATE

Harding Lawson Associates
Engineering and Environmental Services

Soil Classification Chart
Volume II-RI, Basewide RI/FS
Fort Ord, California

A1

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	23366 041711	RFM	07/94	

31944

Equipment Backhoe
30" Bucket

Elevation 124.71 (grnd) Date 1-31-92

OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
		0		TOP SOIL WITH VEGETATION COVER (GRASS)
ND	none			VERY DARK BROWN SILTY SAND TO CLAYEY SAND (SM-SC) (FILL) (10YR 2/2): moist, fine-grained, 20% silt and clay, drum pieces. TR-16-01-01 collected at 1.5'.
0.5	none			
				@ 2', muffler pieces
				@ 2 to 6": scrap metal
				below 2': ceramic shards, corrugated sheet metal
ND	none	5		DARK YELLOWISH-BROWN SILTY SAND TO SAND (SM-SP) (10YR 3/4): moist, fine-grained, 10-15% silt
ND	none			YELLOWISH-BROWN SAND (SP) (10YR 5/6): moist, fine-grained
				below 7.5', caved in
2.6	none	10		TR-16-01-02 and TR-16-01-03 collected at 9.5'.
				Trench dimensions = 13' long, 10' deep, 30" wide.
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Trench TR-16-01
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **A2**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711		12/92	

31945

Equipment Backhoe
30" Bucket

Elevation 125.16 (grnd) Date 1-31-92

OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
		0		VERY DARK BROWN SILTY SAND TO CLAYEY SAND (SM-SC) (FILL) (10YR 2/2): moist, fine-grained, 15-20% fines @ 2' pieces of scrap metal, rubber wiper blade
ND	none	5		DARK YELLOWISH-BROWN SAND TO SILTY SAND (SP-SM) (10YR 3/4): moist, fine-grained, 10-15% silt
ND	none			YELLOW SAND (SP) (10YR 6/8): moist, fine-grained below 7.5': caved in
1.8	none	10		TR-16-02-01, TR-16-02-02, and TR-16-02-03 collected at 9.5'. *Trench dimensions = 13' long, 10' deep, 30" wide.*
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Trench TR-16-02
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **A3**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711		12/92	

31946

Equipment Backhoe
30" Bucket

Elevation 128.16 (grnd) Date 02-01-92

OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
		0		DARK YELLOWISH-BROWN SILTY SAND TO CLAYEY SAND (SM-SC) (10YR 3/4): moist, fine-grained, 15-20% fines @ 1', small pieces of scrap metal
ND	none			
		5		BROWNISH-YELLOW SAND (SP) (10YR 6/8): moist, fine-grained
0.2	none	10		TR-16-04-01, TR-16-04-02, and TR-16-04-03 collected at 10.0'. *Trench dimensions = 14' long, 10.5' deep, 30" wide.*
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Trench TR-16-04
Site Characterization
Site 16 – DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **A4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711		12/92	

31947

Equipment Backhoe
30" Bucket

Elevation 124.46 (grnd) **Date** 01-30-92

OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
3.5	none	0		2" VEGETATION COVER (WEEDS AND GRASS)
ND	none			VERY DARK BROWN SILTY SAND TO CLAYEY SAND (SM-SC) (10YR 2/2), moist, fine- to medium-grained, 15-20% silt and clay
2.0	none	5		TR-16-05-03 collected at 5.0'.
ND	none			BROWNISH-YELLOW SAND (SP) (10YR 6/8); moist, fine-grained
				@ 7.5': trench western wall caved in
				below 8.5': trench eastern wall caved in
2.2	none	10		TR-16-05-01 and TR-16-05-02 collected at 10.0'.
				Trench dimensions = 16' long, 10.5' deep, 30" wide (cave in side walls)
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Trench TR-16-05
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **A5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711		12/92	

31949

Equipment Backhoe
30" Bucket
Elevation 126.77 (grnd) Date 02-01-92

OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
ND	none	0		DARK YELLOWISH-BROWN SILTY SAND TO CLAYEY SAND (SM-SC) (10YR 3/4): fine-grained, 15-20% silt and clay
				@ 1.5' to 2': small pieces of scrap metal
				STRONG BROWN SILTY SAND TO SAND (SM/SP) (7.5YR 4/6): moist, fine-grained, 10-15% silt
ND	none	5		BROWNISH-YELLOW SAND (SP) (10YR 6/8): moist, fine-grained
1.3	none	10		TR-16-07-01, TR-16-07-02, and TR-16-07-03 collected at 10.0'.
				Trench dimensions = 13.5' long, 10.5' deep, 30" wide.
		15		
		20		
		25		

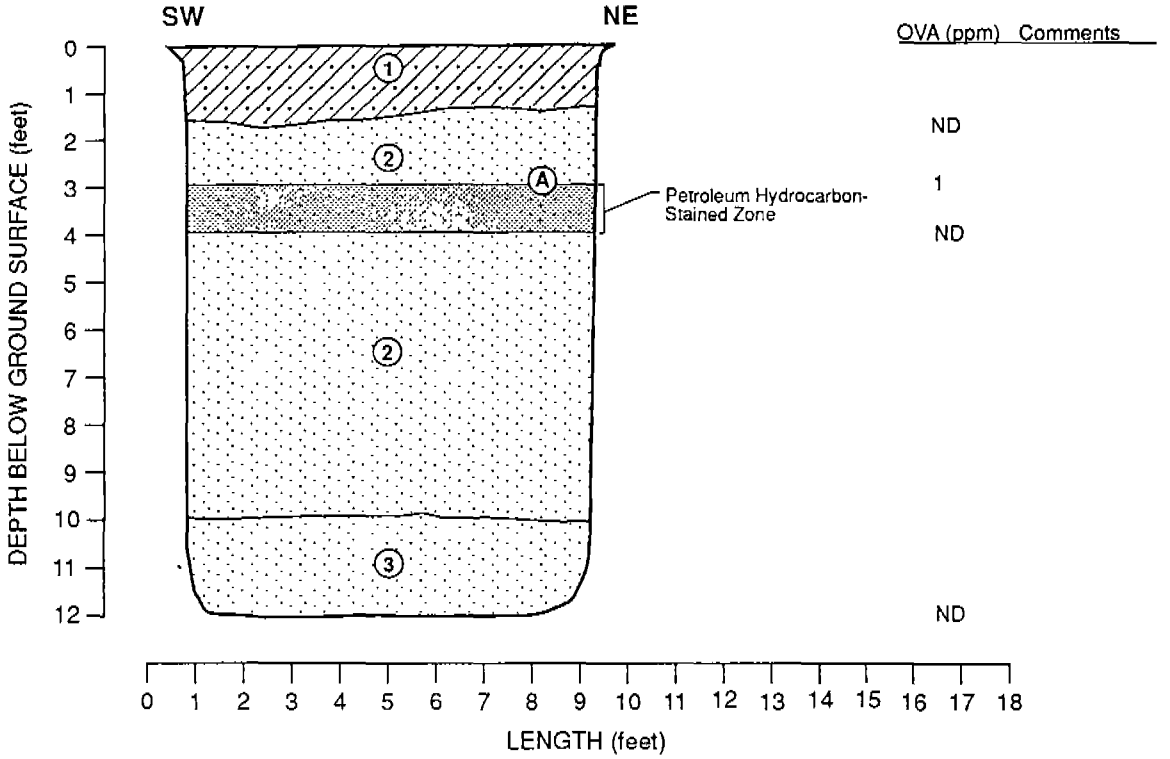
Harding Lawson Associates
Engineering and Environmental Services

Log of Trench TR-16-07
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **A7**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711		12/92	

Test Pit #: TR-16-08
Date Started: 8-16-93
Date Completed: 8-16-93
Orientation: N40E
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) dense, dry fine to medium sand, 25% clay, 20% fine to coarse subrounded gravel, fill

(2) DARK BROWN SAND (SP) medium dense, moist, fine sand, 10% silt Color change to black (2.5Y 2.5/1) between 3 and 4 feet

(3) LIGHT YELLOWISH BROWN SAND (SP) medium dense, moist, fine sand, 10% silt

(A) SAMPLE: 9333B016004F

070694AG

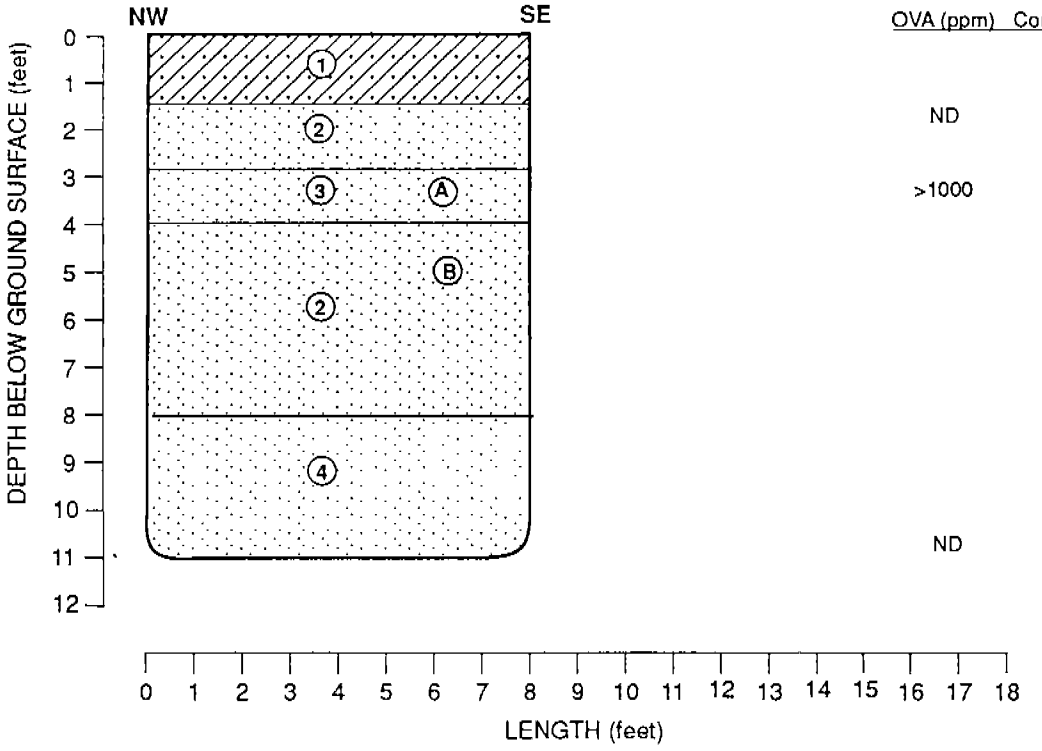
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-08
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-09
Date Started: 8-16-93
Date Completed: 8-16-93
Orientation: N21W
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 3/2)
dense, dry, fine to medium sand, 25% clay,
20% fine to coarse subrounded gravels, concrete chips, fill

(2) DARK BROWN SAND (SP) (7.5YR 3/3)
medium dense, moist, fine sand,10% silt

(3) VERY DARK GRAY SAND (SP) (7.5YR 3/1)
medium dense, dry, fine sand, 10% silt

(4) LIGHT YELLOWISH BROWN SAND (SP) (10YR 6/4)
medium dense, moist, fine sand, 10% silt

(A) SAMPLE: 9333B016005F
(B) SAMPLE: 9333B016011F

070694AG

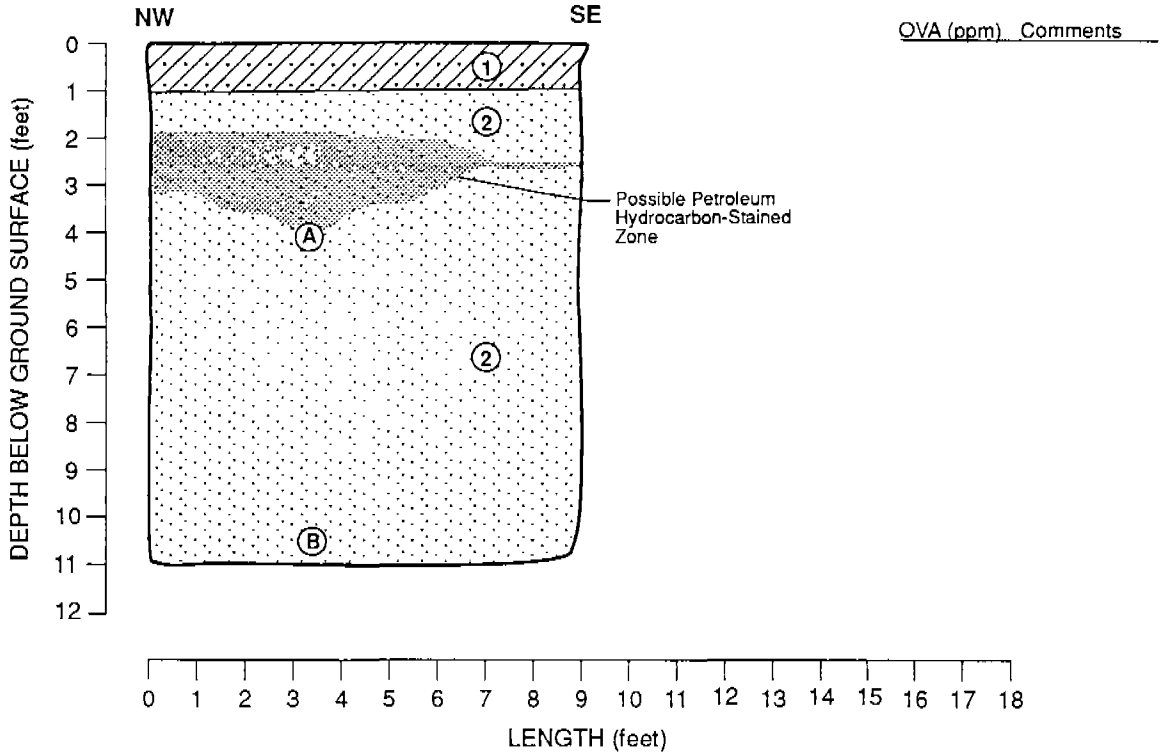
Harding Lawson Associates
Engineering and
Environmental Services

Log of Test Pit TR-16-09
Site 16-DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE
A9

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-10
Date Started: 8-16-93
Date Completed: 8-16-93
Orientation: N50W
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2), dense, dry, fine to medium sand, 25% clay, 20% fine to coarse gravel, fill

(2) DARK BROWN SAND (SP) (7.5YR 3/3), medium dense, moist, fine sand, 10% silt, 5% roots between 1 and 2 feet depth
Color change to very dark gray (2.5YR 3/1) between 2 and 4 feet

(A) SAMPLE: 9333B016009F
(B) SAMPLE: 9333B016010F

070694AG

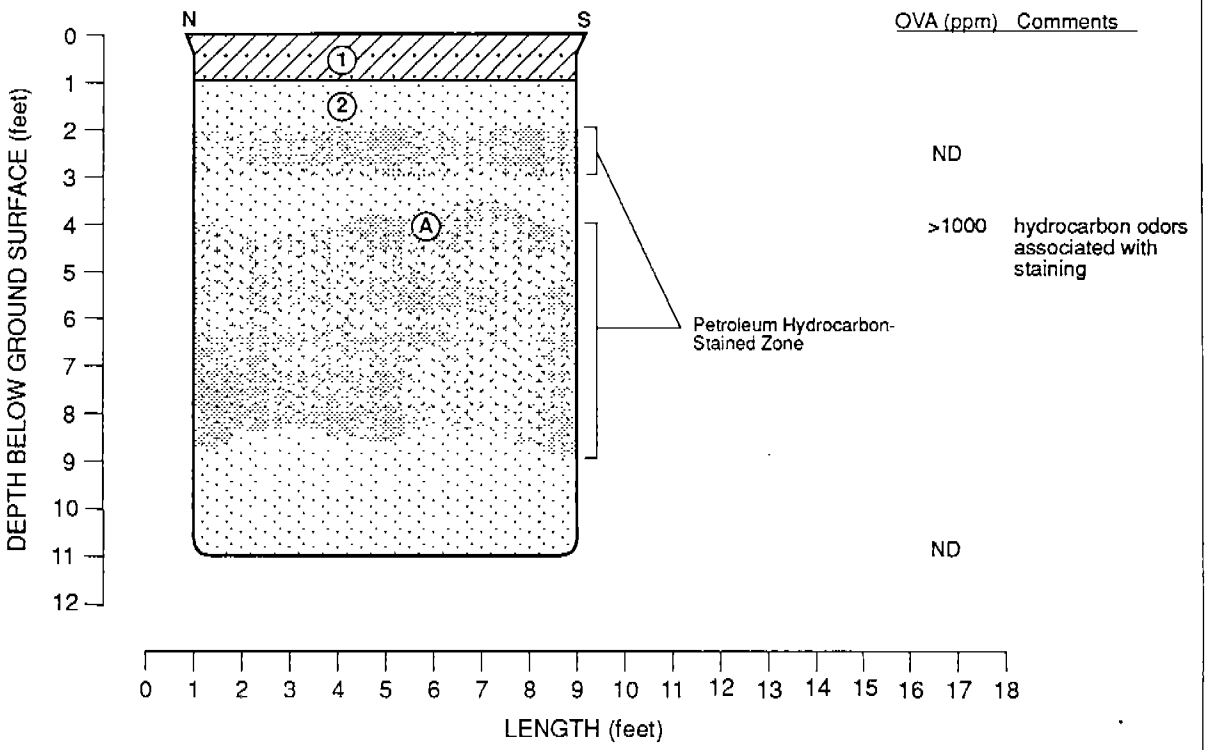
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-10
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE
A10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RPM	10/93	

Test Pit #: TR-16-11
Date Started: 8-16-93
Date Completed: 8-17-93
Orientation: N02W
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2), dense, dry, fine to medium sand, 25% clay, 20% fine to coarse subrounded gravels and concrete fragments, fill

(2) DARK BROWN SAND (SP) (7.5YR 3/3), medium dense, moist, fine sand, 10% silt
Color change to very dark gray (2.5YR 3/1) between 2 and 3 feet and 4 and 9 feet

(A) SAMPLE: 9333B016013F

070694AG

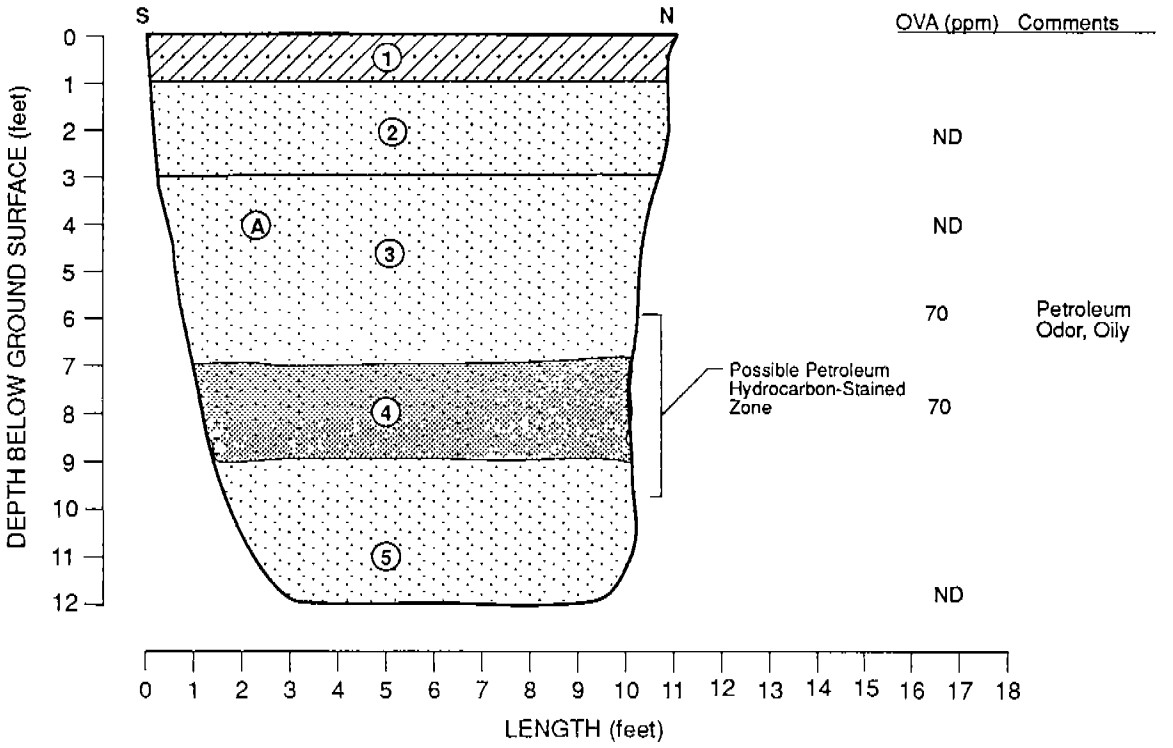
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-11
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-12
Date Started: 8-17-93
Date Completed: 8-17-93
Orientation: N10E
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2), dense, dry, fine to medium sand, 25% clay, 20% fine to coarse subrounded grave, fill

(2) YELLOWISH BROWN SAND (SP) (10YR 5/6), medium dense, dry, fine sand, 5% silt

(3) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4), medium dense, moist , fine sand, 5% silt

(4) BLACK SAND (SP) (10YR), medium dense, dry to moist, fine sand, 5% silt, possibly petroleum hydrocarbon stained

(5) YELLOWISH BROWN SAND (SP) (10YR 5/8), loose, dry to moist, fine sand, 5% silt

(A) SAMPLE: 9333B016016F

070694AG

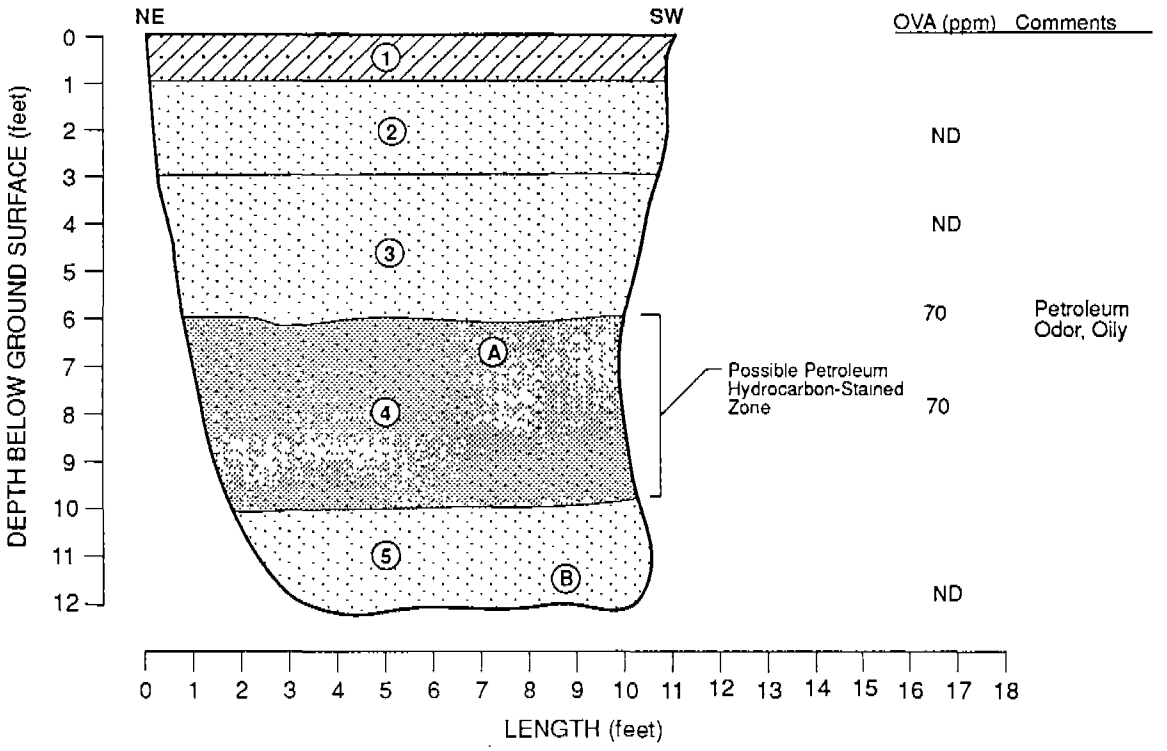
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-12
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A12**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-13
Date Started: 8-17-93
Date Completed: 8-17-93
Orientation: N25E
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2), dense, dry, fine to medium sand, 25% clay, 20% fine to coarse subrounded gravel and concrete fragments, fill

(2) YELLOWISH BROWN SAND (SW) (10YR 5/6), loose, dry, fine sand, 10% silt

(3) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4), medium dense, moist to dry, fine sand, 5% silt

(4) VERY DARK GREY SAND (SP) (10YR 3/1), loose, moist to wet, fine sand, 5% silt

(5) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4), loose, dry to moist, fine sand, 5% silt

(A) SAMPLE: 9333B016020F
(B) SAMPLE: 9333B016021F

070694AG

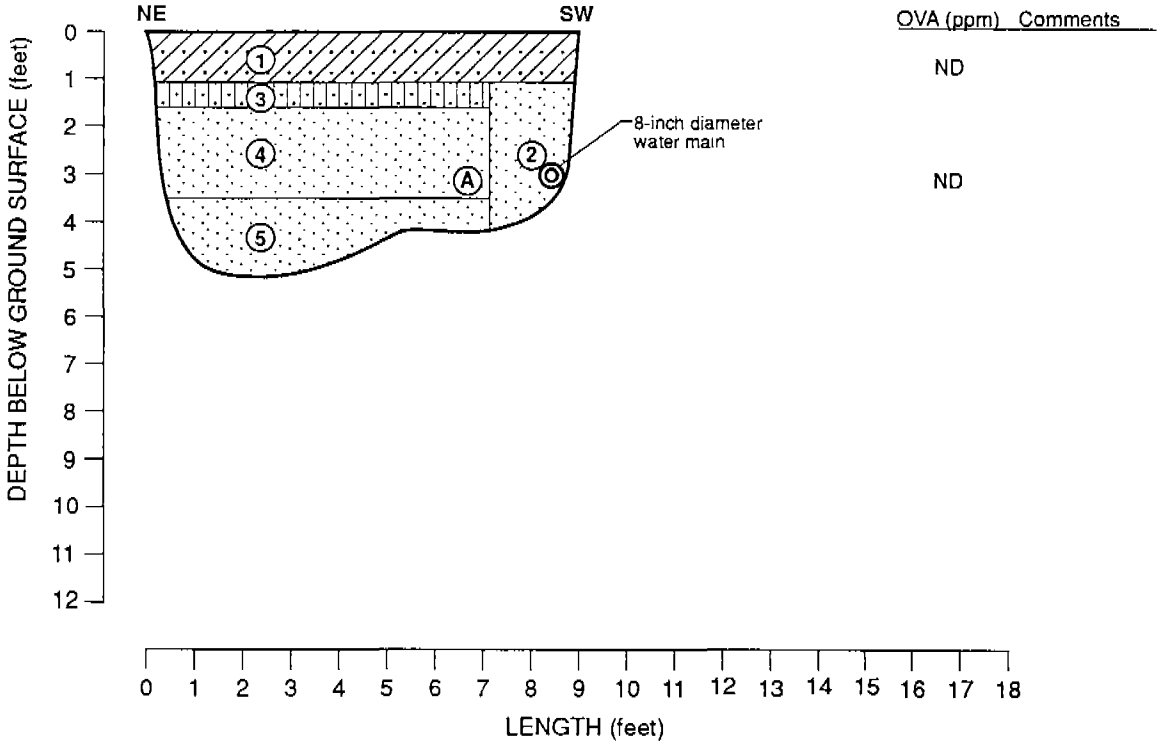
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-13
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A13**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-14
Date Started: 8-17-93
Date Completed: 8-18-93
Orientation: N21E
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) 2.5Y 5/2, dense, dry, fine to medium sand, 25% clay, 20% fine to coarse subrounded gravel, fill

(2) DARK YELLOWISH BROWN SAND (SP) (10YR 4/4,) medium dense, moist, fine sand, 5% silt, backfill for water main

(3) VERY DARK GRAYISH BROWN SILTY SAND (SM) (10YR 3/2,) dense, dry, fine sand, 20% silt

(4) YELLOWISH BROWN SAND (SP) (10YR 5/6) moist to dry, fine sand, 5% silt

(5) DARK YELLOWISH BROWN SAND (SP) (10YR 4/4) medium dense, moist, fine sand, 5% silt

(A) SAMPLE: 9333B016030F

070694AG

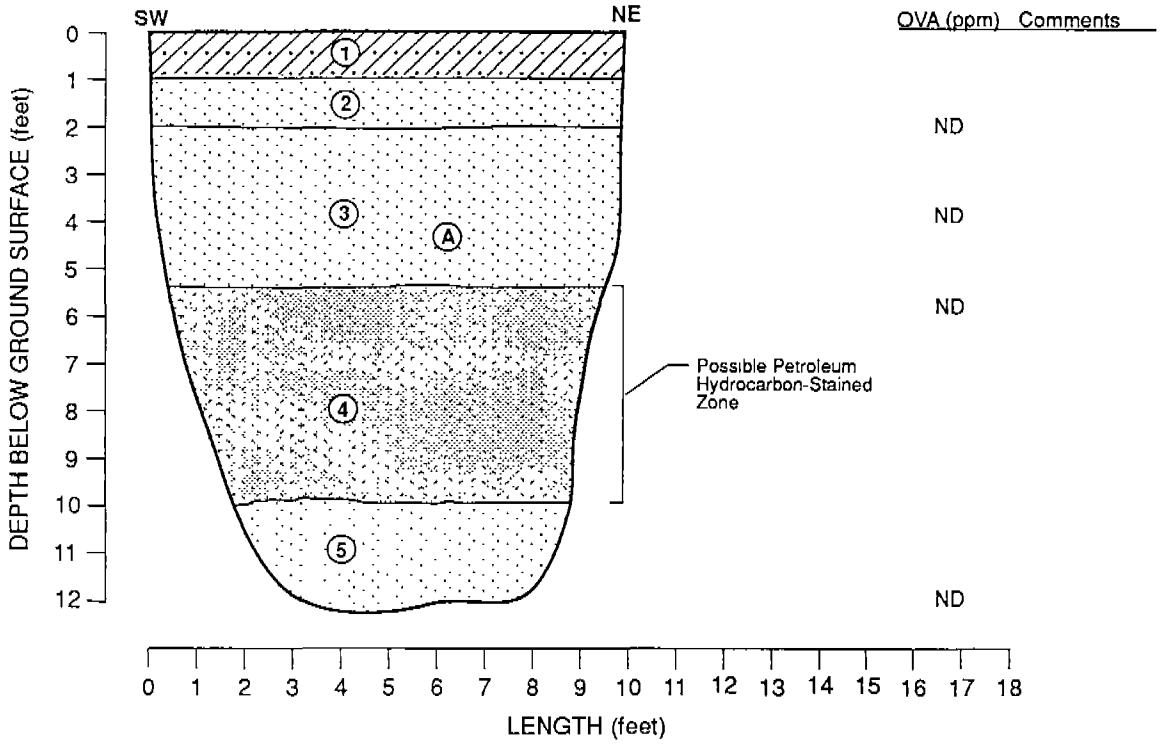
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-14
Site 16-DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A14**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-15
Date Started: 8-17-93
Date Completed: 8-17-93
Orientation: N70E
Elevation:



EXPLANATION:

1. GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2), dense, dry, fine to medium sand, 25% clay, 20% fine to coarse subrounded gravel, fill
2. YELLOWISH BROWN SAND (SP) (10YR 5/6), medium dense, moist to dry, fine sand, 10% silt
3. DARK YELLOWISH BROWN SAND (SP) medium dense, moist to dry, fine sand, 5% silt
4. VERY DARK GREY SAND (SP) (10YR 3/1), medium dense, dry to moist, fine sand, 5% silt
5. YELLOWISH BROWN SAND (SP) (10YR 5/6), loose, dry, fine sand, 5% silt

Ⓐ SAMPLE: 9333B016023F

070694AG

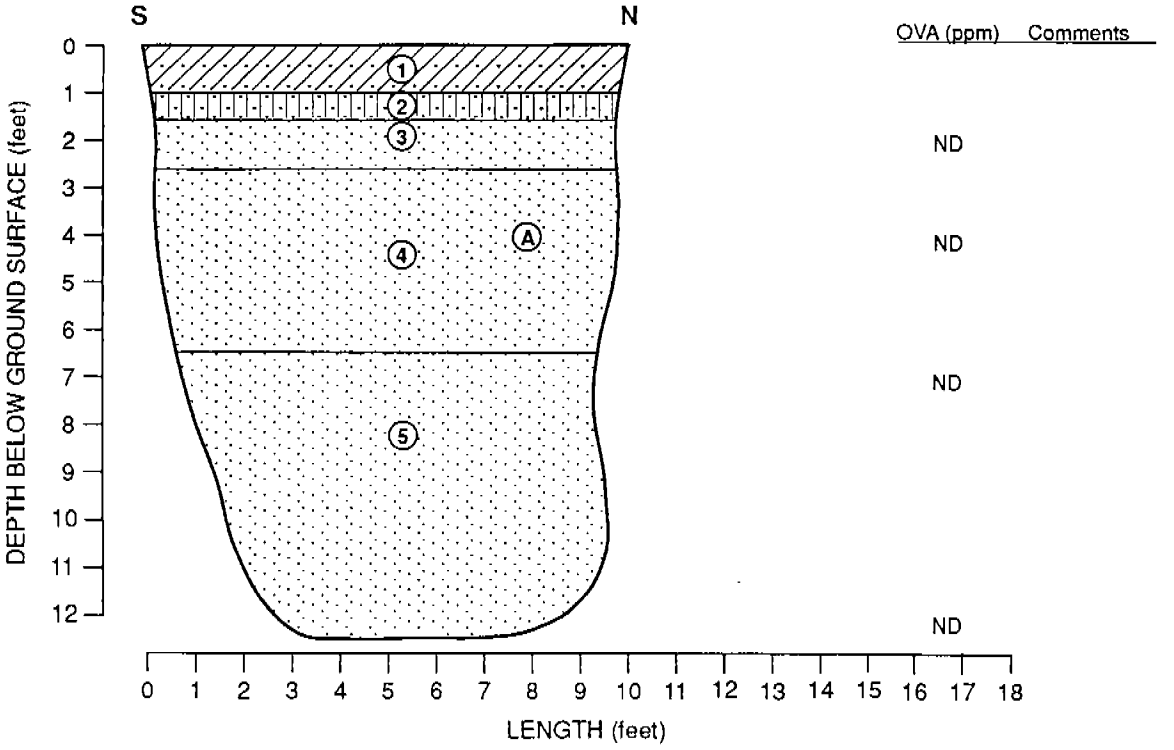
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-15
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A15**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-16
Date Started: 8-17-93
Date Completed: 8-17-93
Orientation: N22W
Elevation:



EXPLANATION:

1. GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2) dense, dry, fine to medium sand, 25% clay, 20% fine to coarse subrounded gravel, fill
2. VERY DARK GRAYISH BROWN SILTY SAND (SM) 10YR 3/2) dense, dry, fine sand, 20% silt, fill
3. YELLOWISH BROWN SAND (SP) (10YR 5/6) loose, dry, fine sand, 10% silt
4. DARK YELLOWISH BROWN SAND (SP) (10YR 4/4) medium dense, moist to dry, fine sand, 5% silt, color varies
   Color change to yellowish brown between 5 and 6.5 feet
5. VERY DARK GRAY SAND (SP) (10YR 3/1) medium dense, moist, fine sand, 5-10% silt, >5% roots, musty smell

(A) SAMPLE: 9333B016027F

070694AG

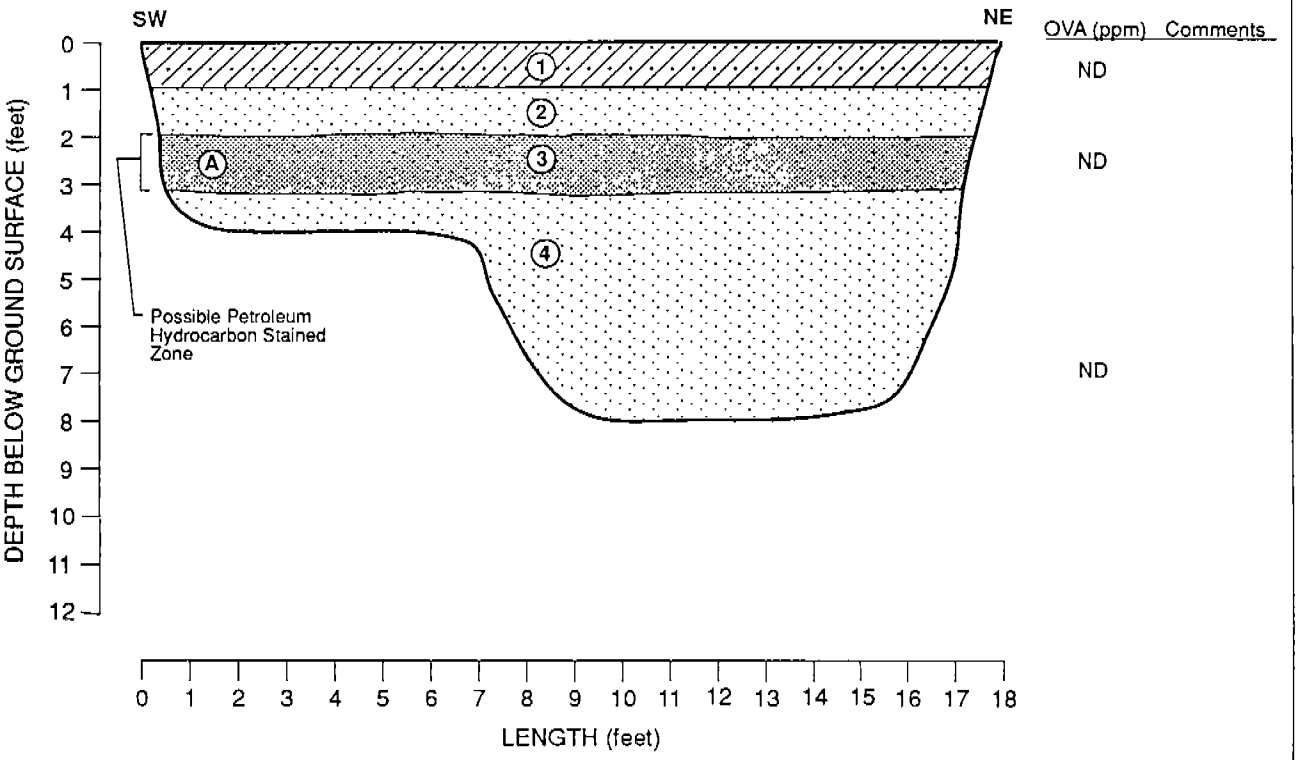
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-16
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A16**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-17
Date Started: 8-18-93
Date Completed: 8-18-93
Orientation: N38E
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2) dense, dry, fine to medium sand, 25% clay, 20% fine to coarse subrounded gravels and concrete fragments, fill

(2) YELLOWISH BROWN SAND (SP) (10YR 5/6) loose, dry, fine sand, 5% silt

(3) VERY DARK GRAYISH BROWN SAND (SP) (10YR 3/2) medium dense, dry to moist, fine sand, 5% silt, apparent hydrocarbon staining

(4) DARK YELLOWISH BROWN SAND (SP) (10YR 4/4) medium dense, dry to moist, fine sand, 5% silt

(A) SAMPLE: 9333B016034F

070694AG

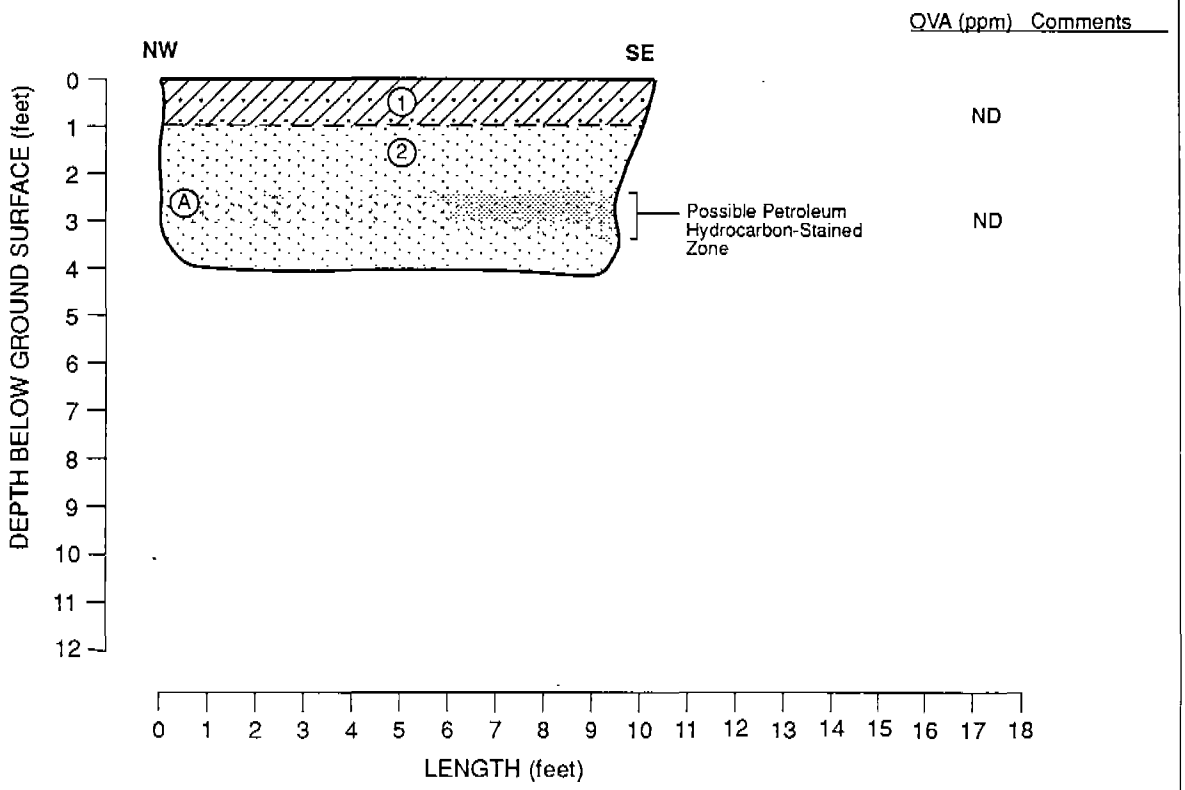
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-17
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A17**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-18
Date Started: 8-18-93
Date Completed: 8-18-93
Orientation: N45W
Elevation:



EXPLANATION:

(1) GRAYISH BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/2)
dense, dry, fine to medium sand, 25% clay,
20% fine to coarse subrounded gravels, fill

(2) DARK YELLOWISH BROWN SAND (SP) (10YR 3/6)
loose, dry to moist, fine sand, 5% silt
Color change to very dark brown (10YR 2/2) between 2.5 and 3 feet, petroleum hydrocarbon staining

(A) SAMPLE: 9333B016035F

070694AG

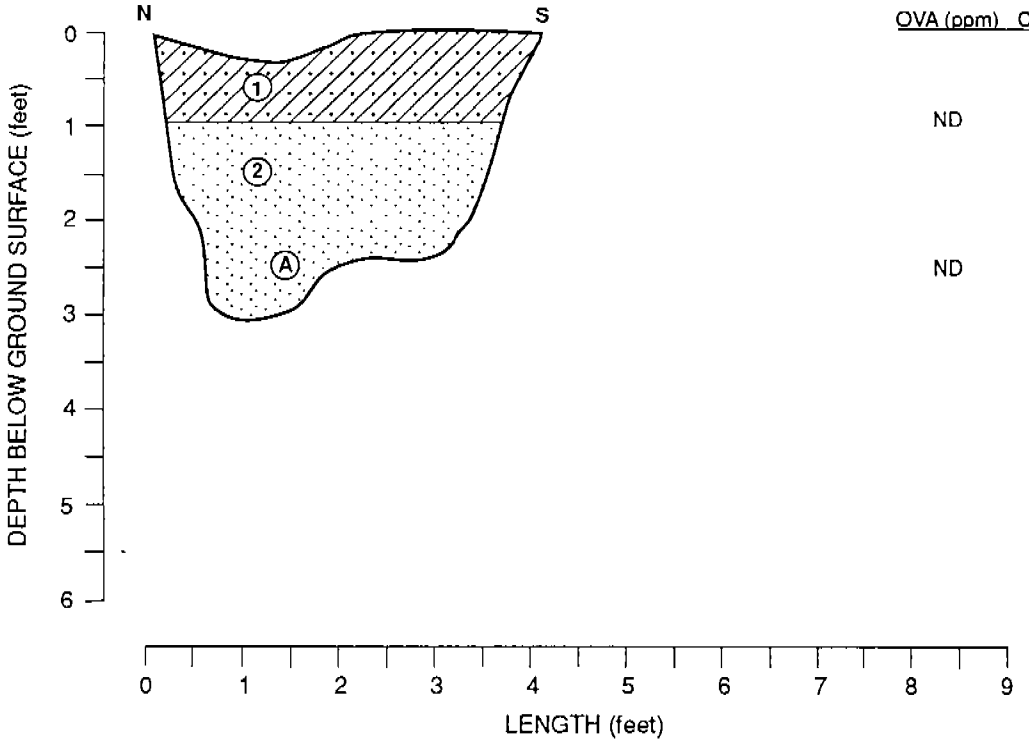
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-18
Site 16-DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A18**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-19
Date Started: 8-18-93
Date Completed: 8-18-93
Orientation: N05W
Elevation:



OVA (ppm)	Comments
ND	
ND	

EXPLANATION:

(1) DARK OLIVE BROWN CLAYEY SAND WITH GRAVEL (SC) (25Y 3/3) medium dense, moist, fine to medium sand, 25% clay, 20% fine to coarse gravel, fill

(2) DARK YELLOWISH BROWN SAND (SP) loose, moist, fine sand, 5% silt
Color change at 2 feet to mixed yellowish brown (10YR 5/6) and dark yellowish brown, swirls

(A) SAMPLE: 9333B016036F

070694AG

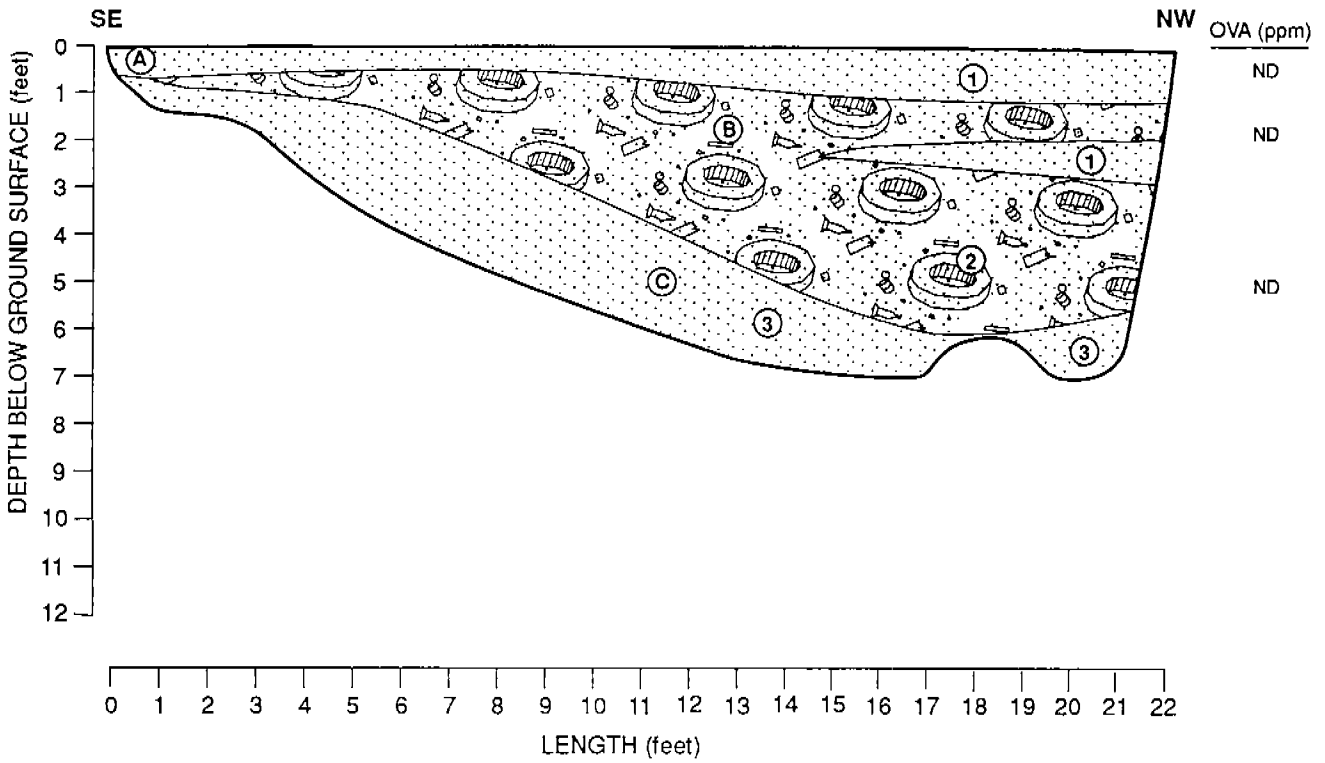
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-19
Site 16–DOL Maintenance Yard
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A19**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-20
Date Started: 8-16-93
Date Completed: 8-18-93
Orientation: N34W
Elevation: 141 feet



EXPLANATION:

(1) DARK BROWN SAND (SP) (10YR 3/3) very loose, dry, fine to medium sand, 5-10% silt, trace roots, fill

(2) LAMINATED BROWNISH YELLOW TO DARK YELLOWISH BROWN SAND (SP) (10YR 6/6 to 10 YR 3/4) very loose, dry, fine to medium sand, trace silt, 5-10% gravel (up to 1/4"), 10-20% debris (bazooka shell, 1945 shell casing, burnt wood, broken and melted glass [Delaware Punch bottle], metal pieces [can lids, nails, wire]), fill

(3) DARK YELLOWISH BROWN SAND (SP) (10YR 4/4) loose, dry, fine to grained sand, trace silt, laminated with lighter colored layers of sand

(A) SAMPLE: 9333A016038F
(B) SAMPLE: 9333A016037F
(C) SAMPLE: 9333A016039F

070694AG

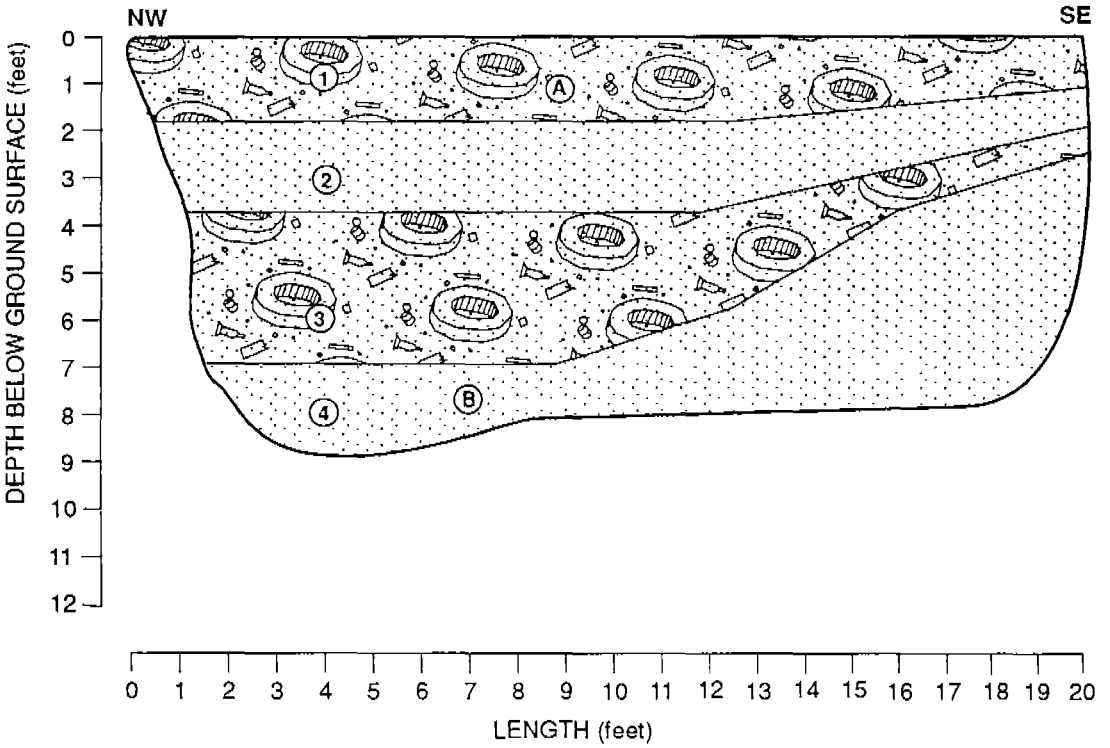
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-20
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE
A20

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-21
Date Started: 8-16-93
Date Completed: 8-16-93
Orientation: N36W
Elevation: 141 feet



OVA (ppm)	Comments
ND	
ND	
ND	

EXPLANATION:

(1) PALE BROWN SAND (SP) (10YR 6/3), very loose, dry, fine to medium sand, 5-10% silt, 10-15% debris (primarily metal pieces and glass, trace charcoal), fill

(2) PALE BROWN AND YELLOW BROWN SAND (SP) (10YR 6/3&10YR 5/8), very loose, dry, fine to medium sand, trace silt, trace debris, stratified, fill

(3) BROWN SAND (SP) (10YR 4/3), very loose, dry, fine to medium sand, 5% silt, 25% debris (ammunition crate/ foot locker, glass [i.e., 1952 soda bottle], metal pieces), fill

(4) DARK YELLOWISH BROWN SAND (SP) (10YR 3/6), loose, dry, fine to medium-grained sand, 5-10% silt

(A) SAMPLE: 9333A016033F
(B) SAMPLE: 9333A016031F

070694AG

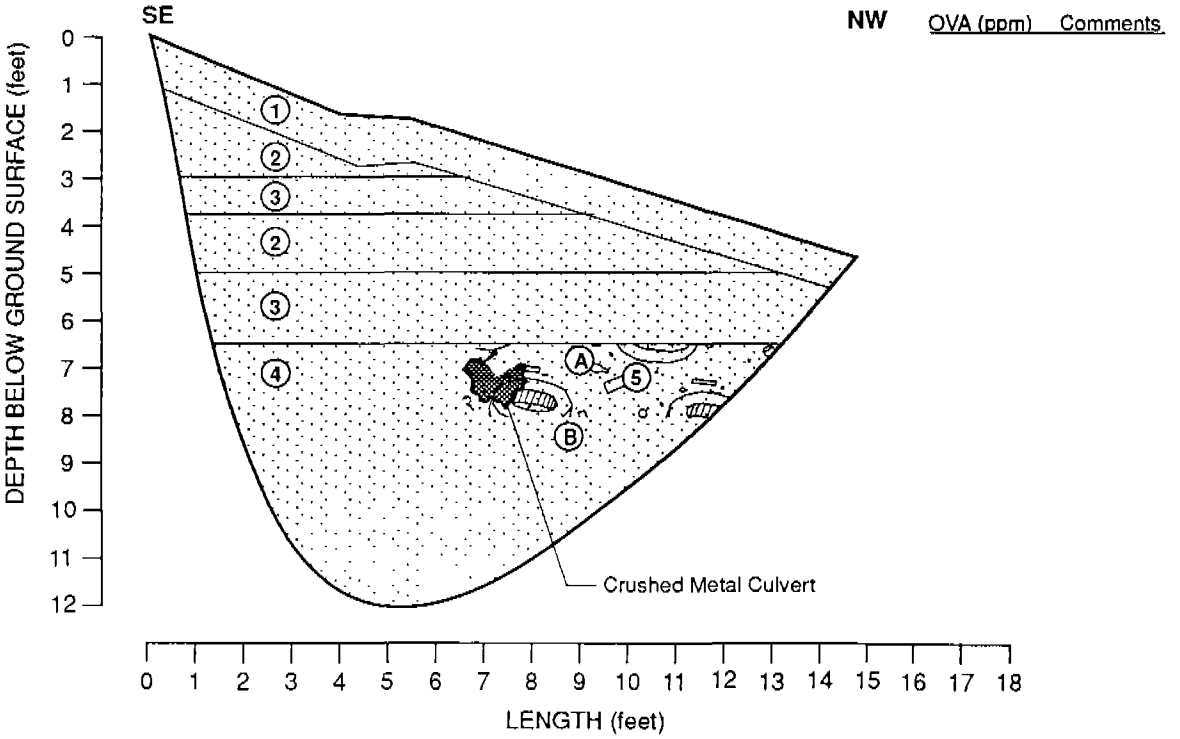
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-21
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A21**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-22
Date Started: 8-17-93
Date Completed: 8-17-93
Orientation: N 40W
Elevation: 151 feet at SE end



EXPLANATION:

(1) PALE BROWN SAND (SP) (10YR 6/3) very loose, dry fine to medium sand, 5-10% silt, trace roots, fill

(2) VERY DARK GREYISH BROWN SAND (SP) (10YR 3/2) loose, dry, fine to medium sand, 10-15% silt, fill

(3) DARK YELLOW BROWN SAND (SP) (10YR 4/4) loose, dry, fine to medium sand, 5-10% silt, trace roots, fill

(4) VERY DARK GREYISH BROWN SAND (SP) (10YR 3/2) loose, dry, fine to medium sand, 10-15% silt, trace roots, fill

(5) DEBRIS LAYER including scrap metal, glass, ceramic culvert pieces, melted glass, burnt wood, shell casing (1944), wires, metal cup

(A) SAMPLE: 9333C016004F
(B) SAMPLE: 9333C016005F

070694AG

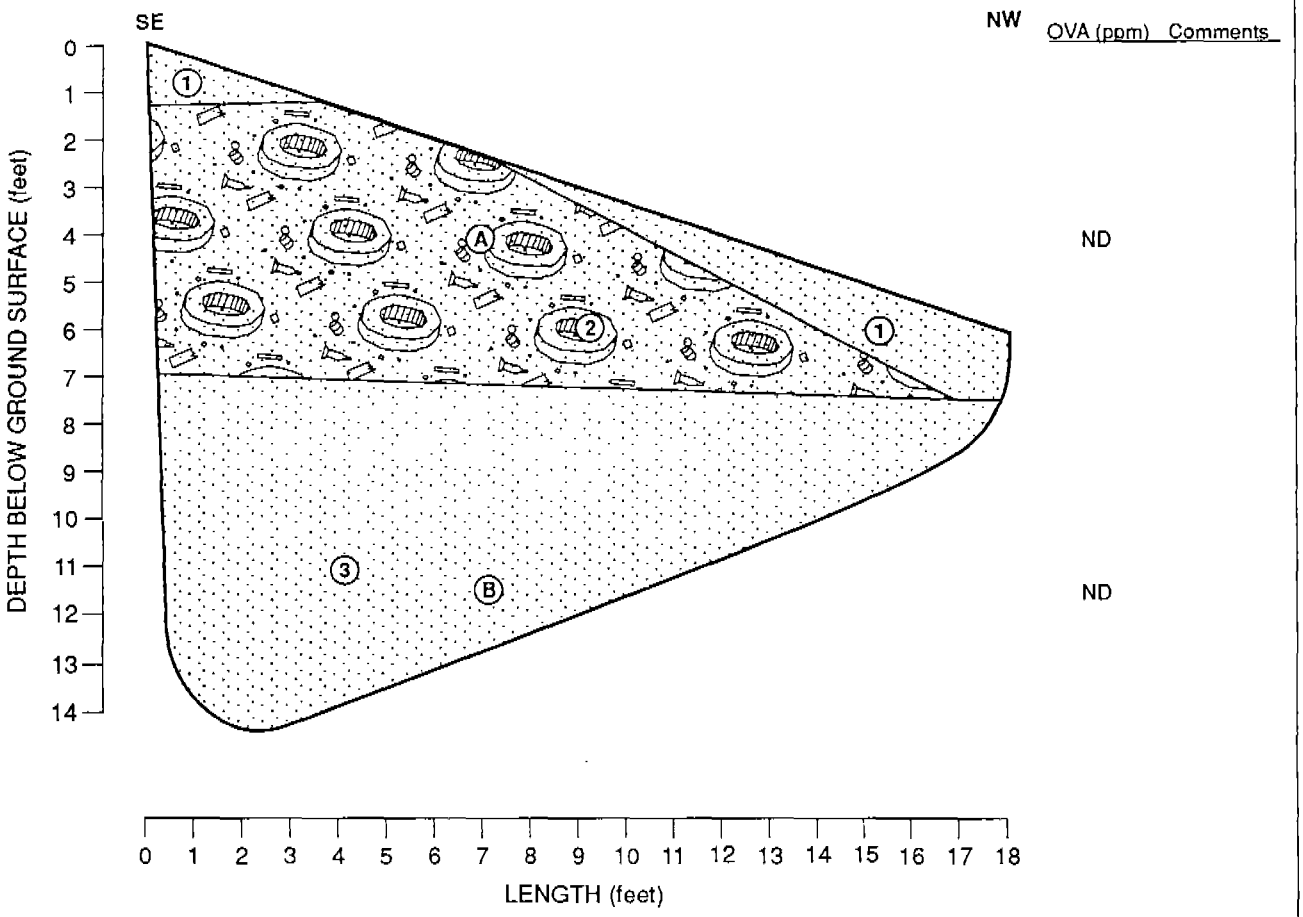
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-22
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A22**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-23
Date Started: 8-17-93
Date Completed: 8-17-93
Orientation: N40E
Elevation: 145 feet at SE end



EXPLANATION:

(1) BROWN SAND (SP) (10YR 4/3), very loose, dry, fine to medium sand, 5-15% silt, trace plant roots, fill

(2) DARK BROWN SAND (SP) (10YR 3/3), very loose, dry, fine to medium sand, trace gravel (up to 1/4" diameter), trace silt, 5-25% debris (mostly rusted metal, metal cans, cot frame, leaf spring, window regulator, 1" pipe section [2' long], engine flywheel, both whole and broken glass jars and bottles, melted shampoo jar, medical jars), fill

(3) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4), loose, dry, fine to medium sand, trace silt

(A) SAMPLE: 9333C016007F
(B) SAMPLE: 9333C016006F

070649AG

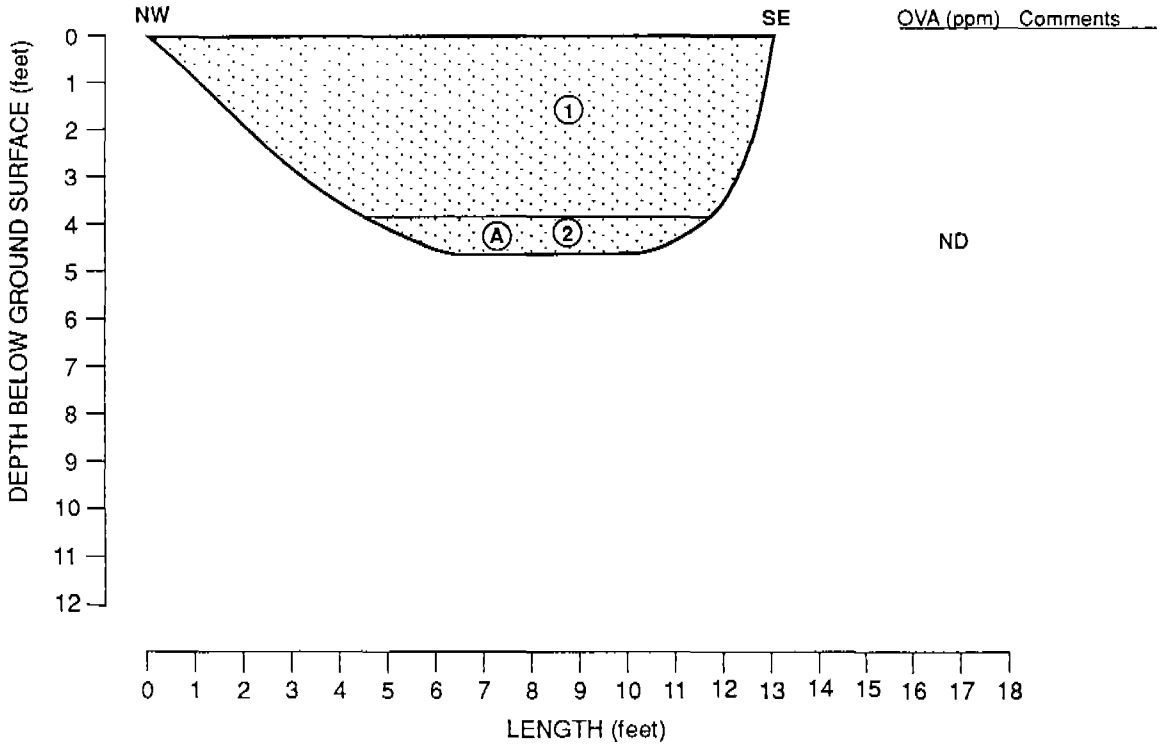
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-23
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A23**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-24
Date Started: 8-17-93
Date Completed: 8-17-93
Orientation: N47W
Elevation:



EXPLANATION:

1 DARK BROWN SAND (SP) (10YR 4/3)
very loose, dry, fine to medium sand,
5-10% silt, trace roots to 1.5 feet, fill

2 DARK YELLOWISH BROWN SAND (SP) (10YR 4/6)
very loose, dry, fine to medium sand

A SAMPLE: 9333A016034F

070694AG

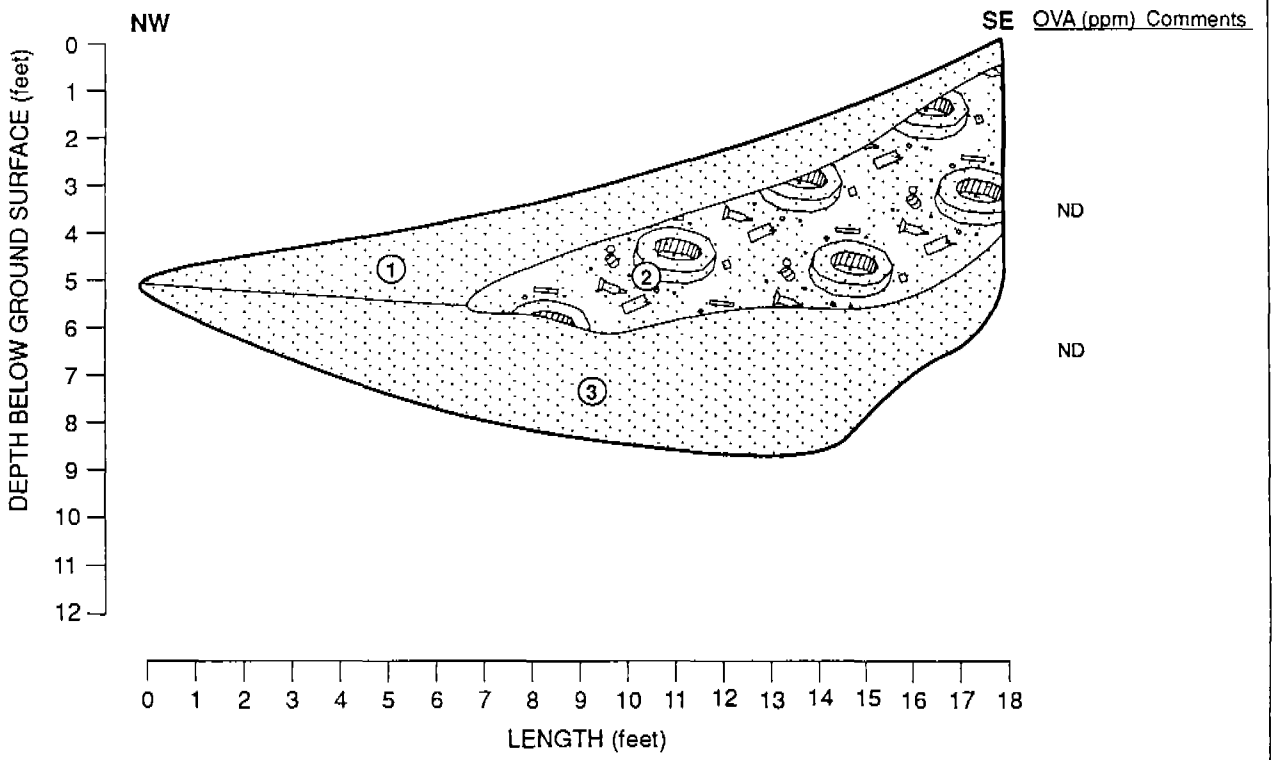
Harding Lawson Associates
Engineering and
Environmental Services

Log of Test Pit TR-16-24
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE
A24

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-25
Date Started: 8-18-93
Date Completed: 8-18-93
Orientation: N30W
Elevation: 141 feet at SE end



EXPLANATION:

(1) VERY DARK YELLOWISH BROWN SAND (SP) 10YR 3/4, very loose, dry, fine- to medium sand, 5-10% silt, trace roots, fill

(2) BROWN SAND WITH GRAVEL (SP) 10YR 4/3, very loose, dry, fine to medium sand, 5-10% gravel (up to 1/4"), 15-20% debris (mostly metal and glass, half pint whisky bottle, broken Coke bottles, metal lids, fuse box, nails, washers, bottle with cotton inside [medical?], charcoal/burnt wood) trace roots, fill

(3) BROWN POORLY GRAINED SAND (SP) 10YR 4/3, loose, dry, fine- to medium sand, 5% silt

070694AG

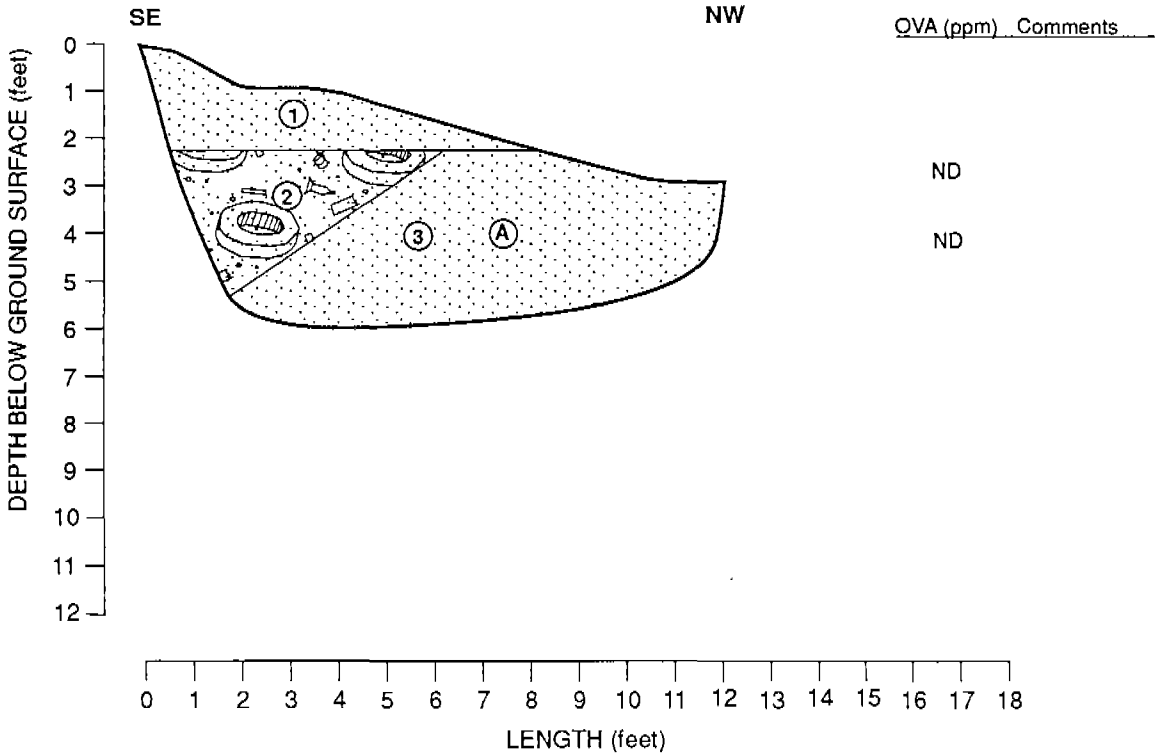
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-25
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A25**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-26
Date Started: 8-18-93
Date Completed: 8-18-93
Orientation: N44W
Elevation: 144 feet at SE end



EXPLANATION:

(1) BROWN SAND (SP) (10YR 4/3) very loose, dry, fine to medium sand, 5-10% silt, trace roots, fill

(2) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4) very loose, dry to slightly moist, fine to medium sand, 25-30% metal debris (bedframe, bucket, water pipe, empty ammo container?, cable, 1945 smoke grenade), fill

(3) YELLOWISH BROWN SAND (SP) (10YR 5/6) loose, dry, fine to medium sand, trace silt

(A) SAMPLE: 9333A016040F

070694AG

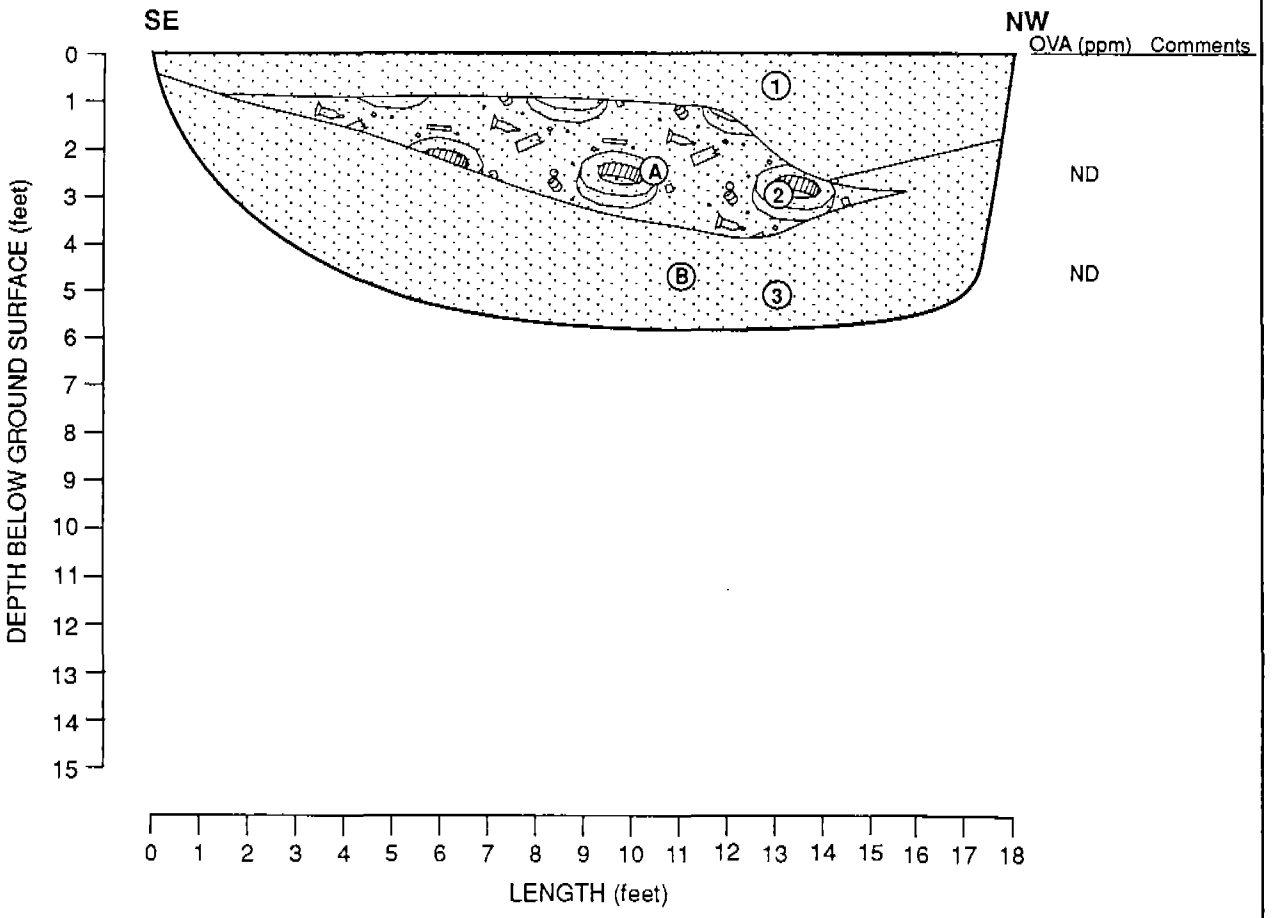
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-26
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A26**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-27
Date Started: 8-18-93
Date Completed: 8-18-93
Orientation: N44W
Elevation: 149 feet



EXPLANATION:

(1) BROWNISH YELLOW AND DARK YELLOWISH BROWN SAND (SP), (10YR 6/6 and 10YR 3/4), very loose, dry, fine to medium sand, trace silt, laminations, fill

(2) BROWN SAND (SP) (10YR 5/3), very loose, dry, fine to medium sand, 5-10% silt, 10-20% metal debris (pipe, egg beater, can lids) and broken glass, fill

(3) DARK YELLOWISH BROWN SAND (SP) 10YR 4/4, loose, dry, fine to medium sand, 5-10% silt

(A) SAMPLE: 9333A016043F
(B) SAMPLE: 9333A016042F

070694AG

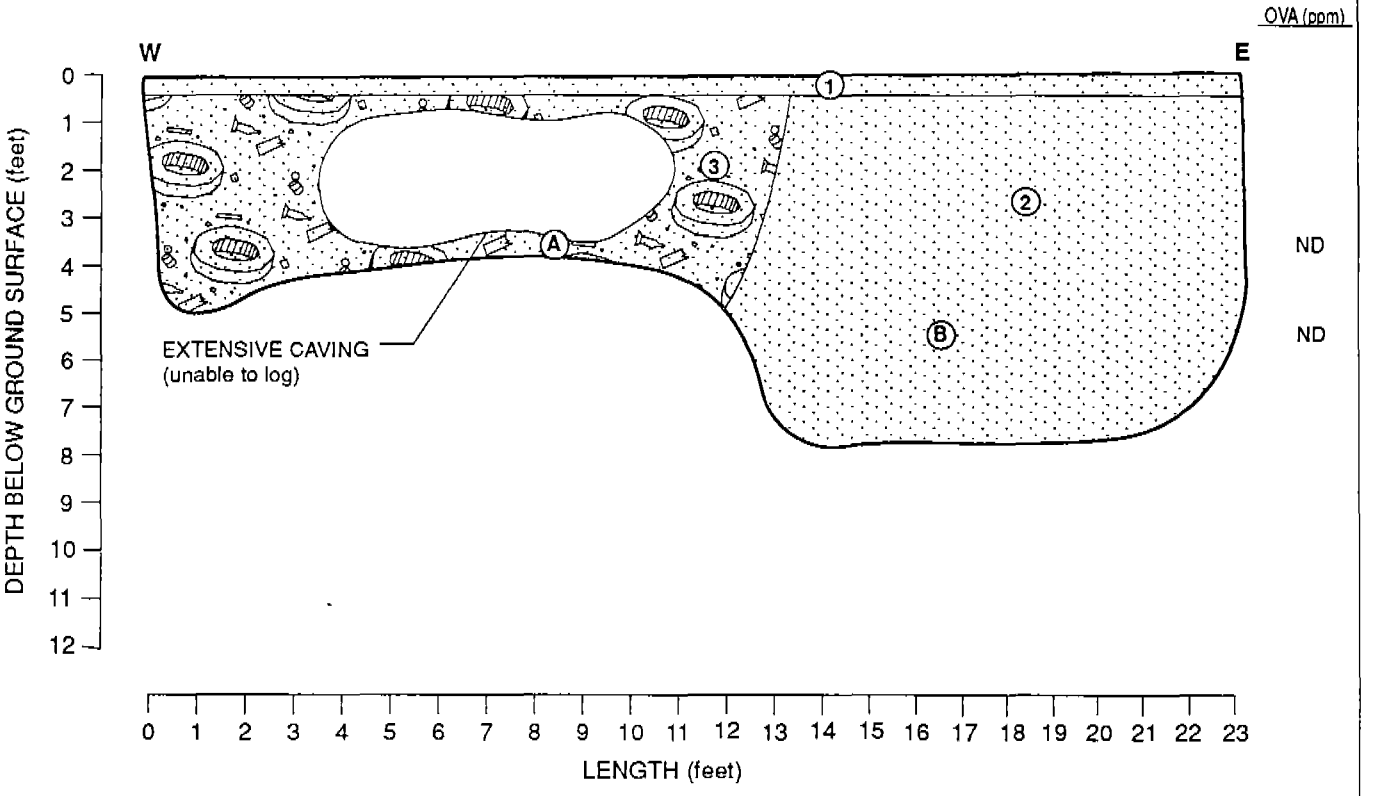
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-27
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A27**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-28
Date Started: 8-19-93
Date Completed: 8-19-93
Orientation: N70E
Elevation: 149 feet at E end



EXPLANATION:

(1) BROWNISH YELLOW SAND (SP) (10YR 4/3 & 10YR 6/6), very loose, dry, fine to medium sand, trace to 10% silt, trace roots, laminated

(2) DARK YELLOWISH BROWN SAND (SP) (10YR 4/6), very loose to loose, dry to slightly moist, fine to medium sand, trace silt

(3) DARK BROWN SAND (SP) (10YR 3/3), very loose, dry, fine to medium sand, trace silt, 25-30% debris (wire mesh [screen], piston, pullies, drive line with bearing housing, 55 gallon drum [4 ppm], metal pipe, chain link fence), fill

(A) SAMPLE: 9333A016047F
(B) SAMPLE: 9333A016046F

Note: Unable to excavate deeper in west portion of test pit due to extensive debris

070694AG

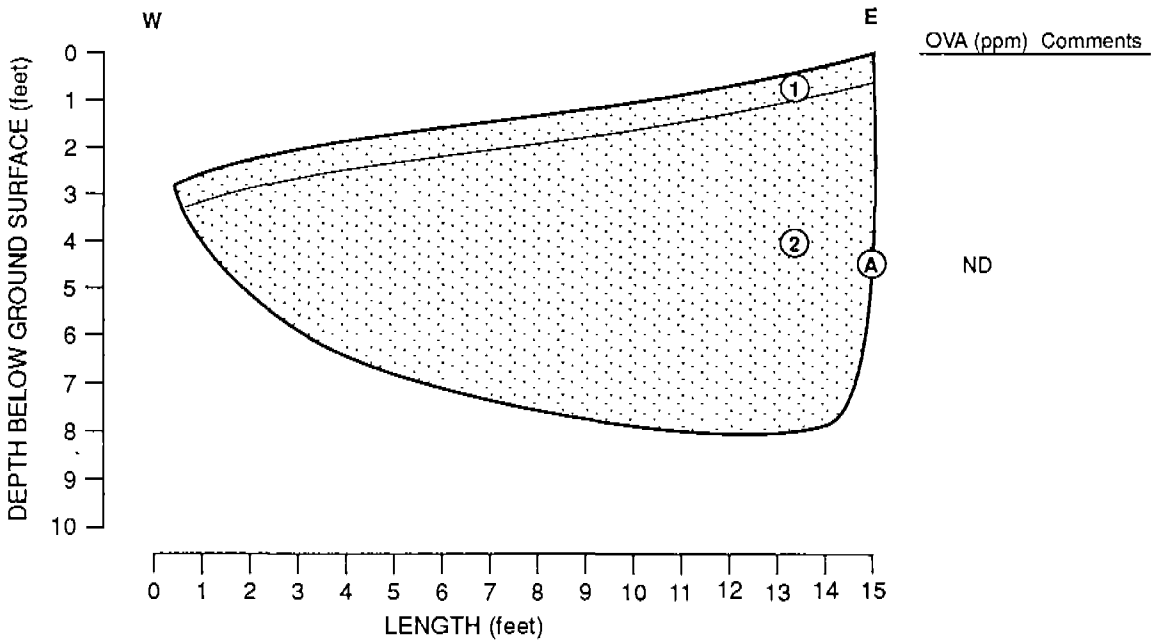
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-28
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A28**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-29
Date Started: 8-19-93
Date Completed: 8-19-93
Orientation: N75E
Elevation: 156 feet at E end



EXPLANATION:

(1) BROWN SAND (SP) (10YR 5/3), very loose, dry, fine to medium sand, trace to 10% silt, trace roots (iceplant), fill

(2) VERY DARK BROWN AND DARK YELLOWISH BROWN SAND (SP) (10YR 2/2, 10YR 3/4 and 10YR 4/6), loose, slightly moist, fine to medium sand, trace silt, laminated, fill

(A) SAMPLE: 9333A016048F

070694AG

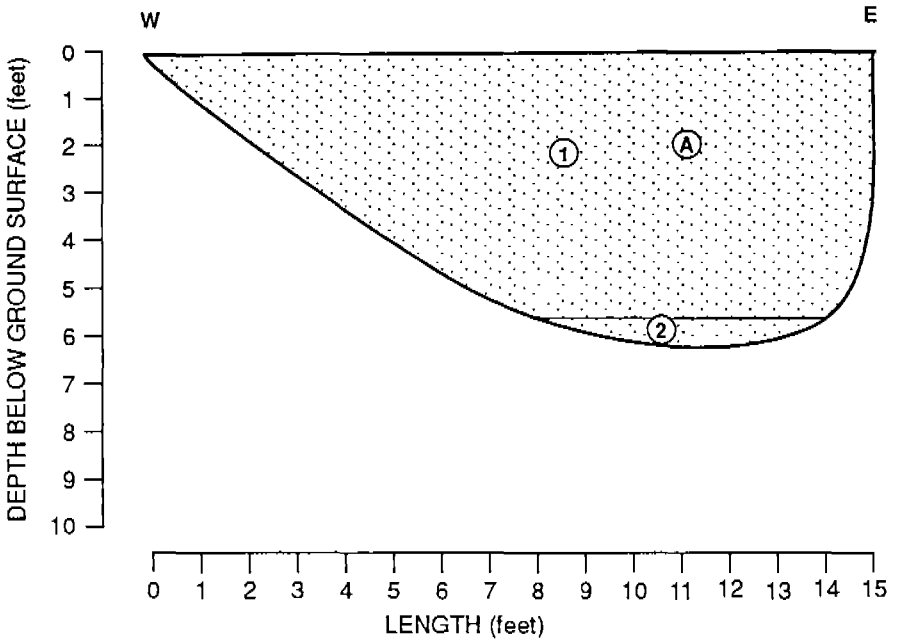
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-29
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A29**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJP	23366 041711	RFM	10/93	

Test Pit #: TR-16-30
Date Started: 8-19-93
Date Completed: 8-19-93
Orientation: N79W
Elevation: 152 feet



OVA (ppm)	Comments
ND	
ND	

EXPLANATION:

(1) DARK BROWN SAND (SP) (10YR 3/3), very loose, moist, fine to medium sand, 5-10% silt, trace roots

(2) DARK YELLOWISH BROWN SAND (SP) (10YR 4/6), very loose, moist, fine to medium sand, trace silt

(A) SAMPLE: 9333A016049F

070694AG

Harding Lawson Associates
Engineering and Environmental Services

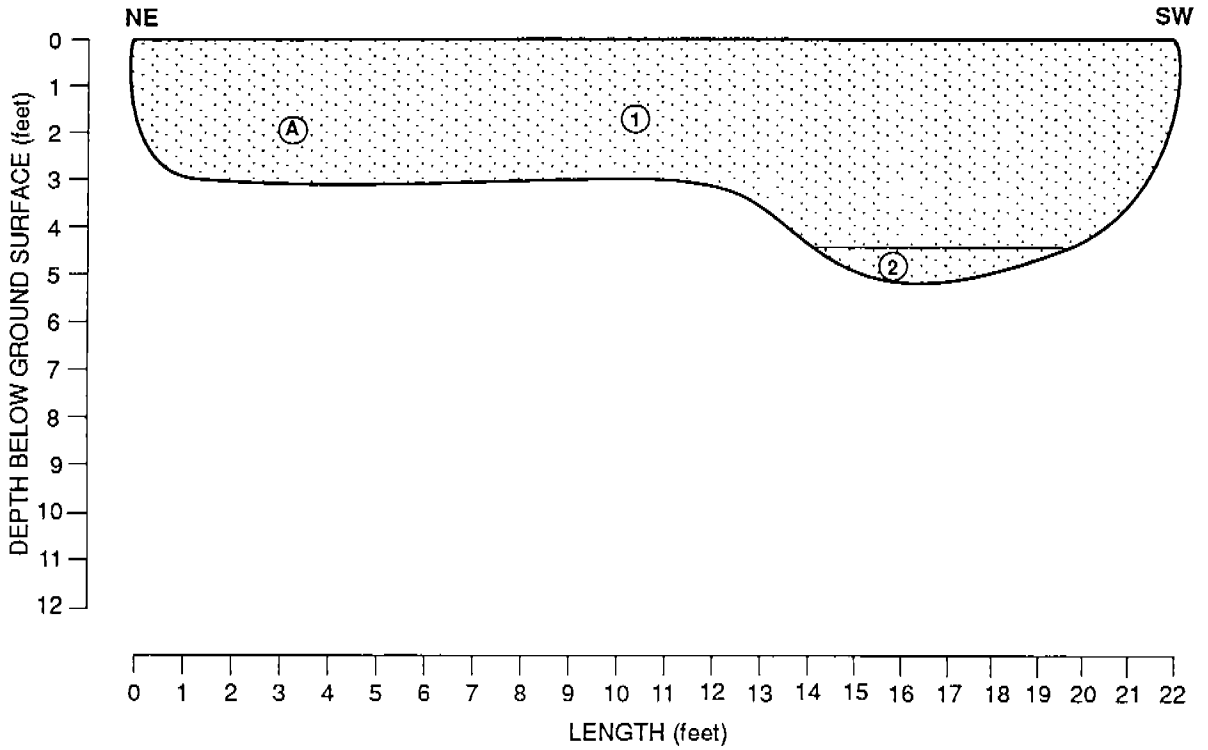
Log of Test Pit TR-16-30
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A30**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJP	23366 041711	RFM	10/93	

Test Pit #: TR-16-31
Date Started: 8-19-93
Date Completed: 8-20-93
Orientation: N60E
Elevation: 148 feet

OVA (ppm) Comments



EXPLANATION:

(1) DARK BROWN SAND (SP) (10YR 3/3), very loose, moist, fine to medium sand, 5-10% silt, up to 5% roots in upper 1', steel cable at surface

(2) DARK YELLOW BROWN SAND (SP) (10YR 4/4), very loose, moist, fine to medium sand, trace silt

(A) SAMPLE: 9333A016051F

070694AG

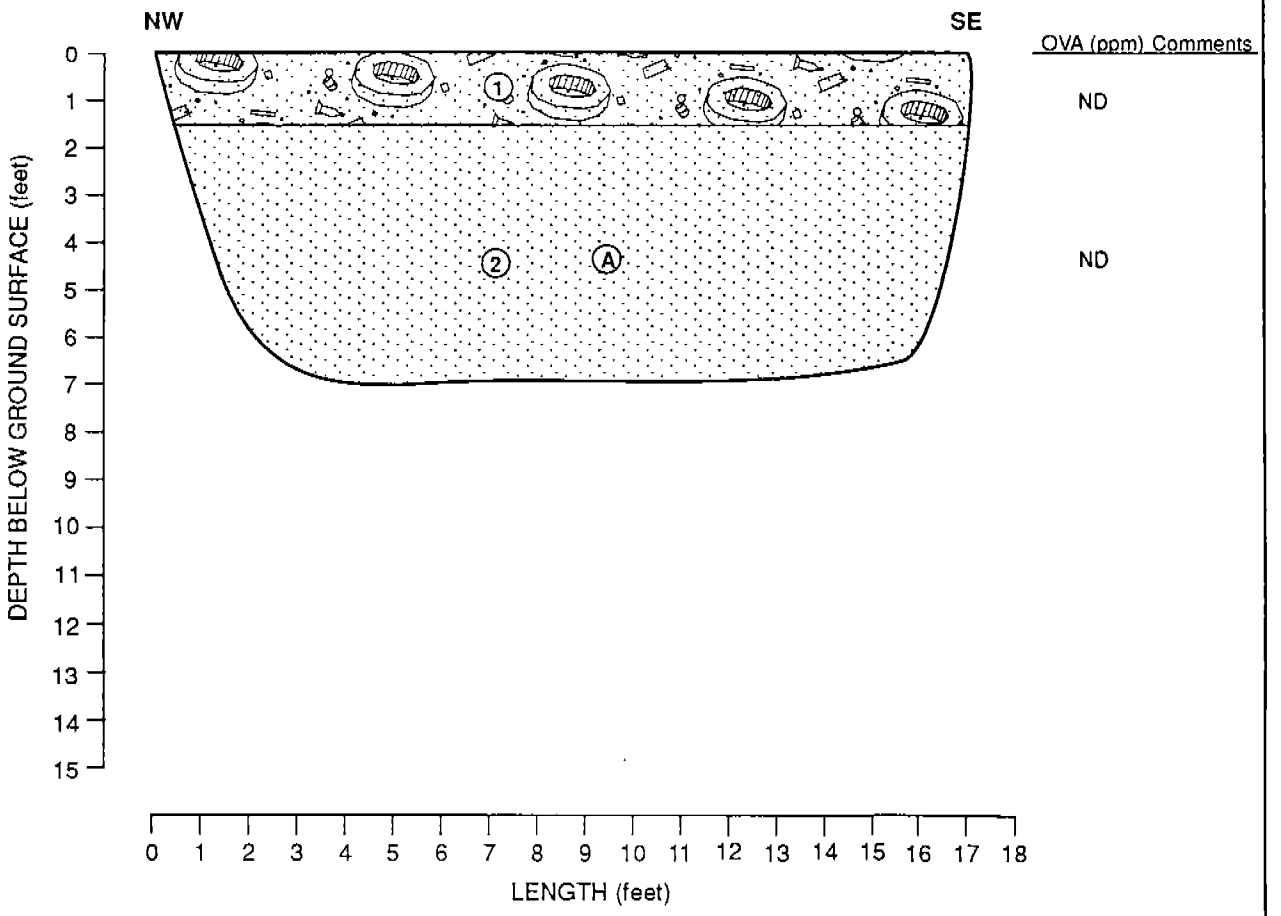
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-31
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A31**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-32
Date Started: 8-20-93
Date Completed: 8-20-93
Orientation: N45W
Elevation: 138 feet



EXPLANATION:

(1) BROWN SAND (SP) (10YR 4/3), very loose, dry, fine to medium sand, 5-10% silt, trace debris (rusted metal/rust colored soil, burnt wood, broken glass, gravel), fill

(2) VERY DARK BROWN SAND (SP) (10YR 2/2), very loose, moist, fine to medium sand, 5-10% silt

(A) SAMPLE: 9333A016055F

070694AG

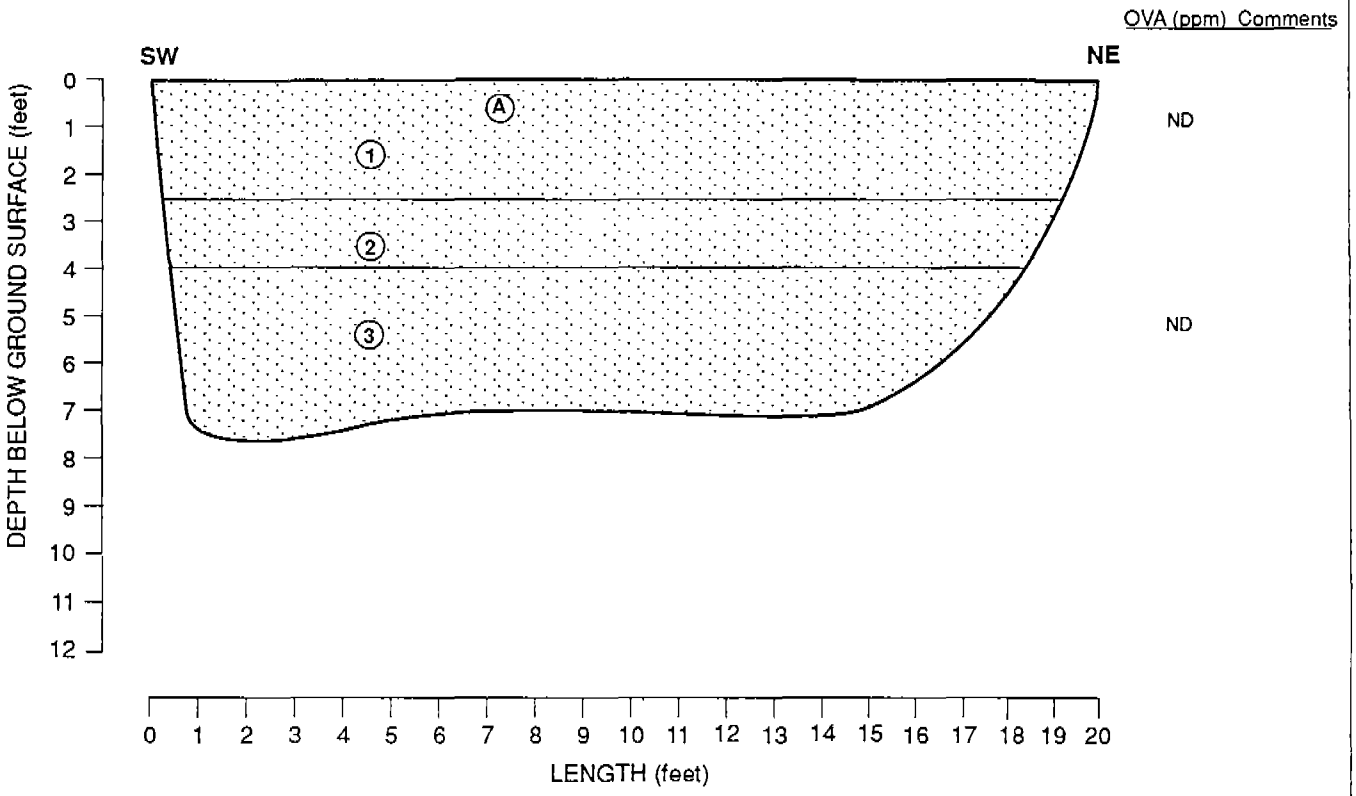
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-32
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A32**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-33
Date Started: 8-20-93
Date Completed: 8-20-93
Orientation: N40E
Elevation: 140 feet



EXPLANATION:

1. DARK BROWN SAND (SP) (10YR 3/3) very loose, moist, fine to medium sand, 5-10% silt, trace roots (in upper 6" only)

2. LIGHT YELLOWISH BROWN AND DARK YELLOWISH BROWN SAND (SP) (10YR 6/4 TO 10YR 3/6), very loose, moist, fine to medium sand, trace silt, laminated

3. DARK BROWN SAND (SP) (10YR 3/3), very loose, moist, fine to medium sand, 5-10% silt

A SAMPLE: 9333A016056F

070694AG

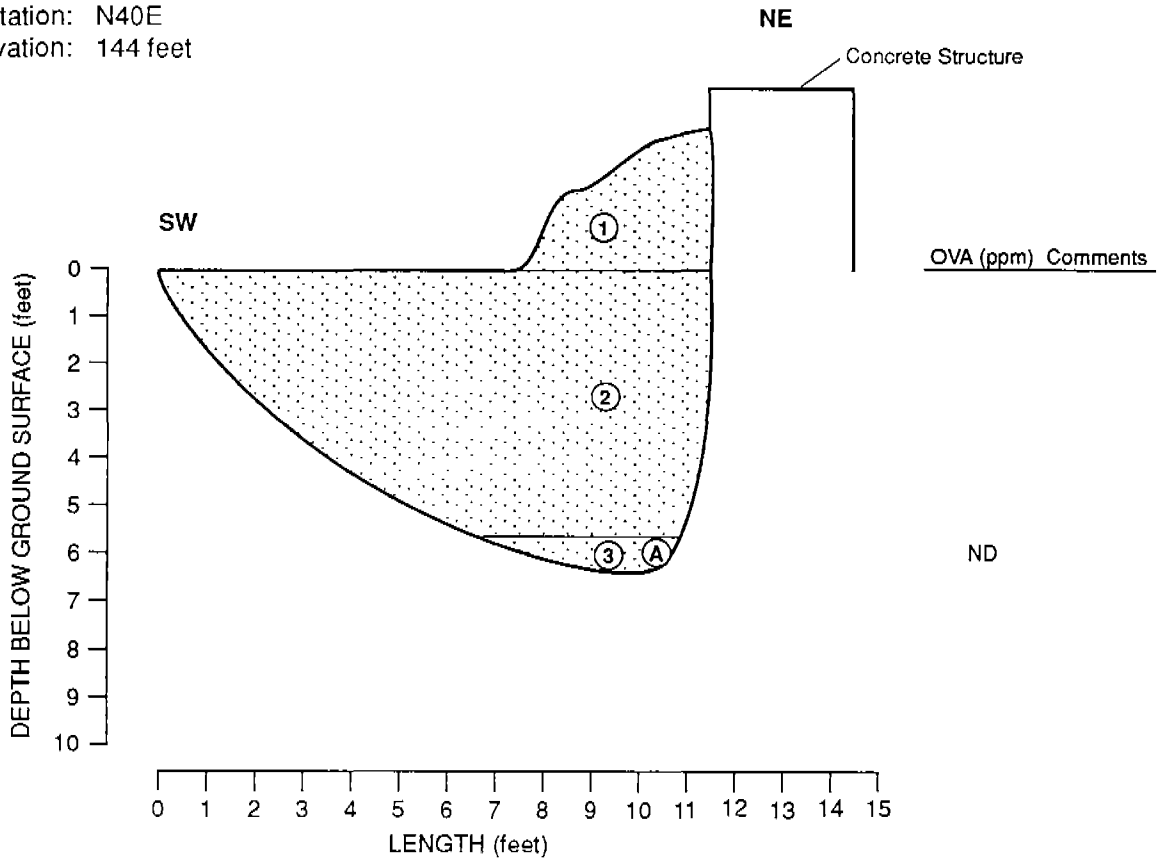
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-33
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A33**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-34
Date Started: 8-20-93
Date Completed: 8-20-93
Orientation: N40E
Elevation: 144 feet



EXPLANATION:

1. MIXED BROWNISH YELLOW TO DARK YELLOWISH BROWN SAND (SP) (10YR 6/6 to 10YR 3/4), very loose, dry, fine to medium sand, trace to 10% silt, 2.36" rocket bazooka round, fill

2. DARK YELLOWISH BROWN SAND (SP) (10YR 3/4), very loose, moist, fine to medium sand, 5-10% silt, 5% roots within upper 1'

3. YELLOWISH BROWN SAND (SP) (10YR 5/6), very loose, moist, fine to medium sand, trace silt

A SAMPLE: 9333A016058F

070694AG

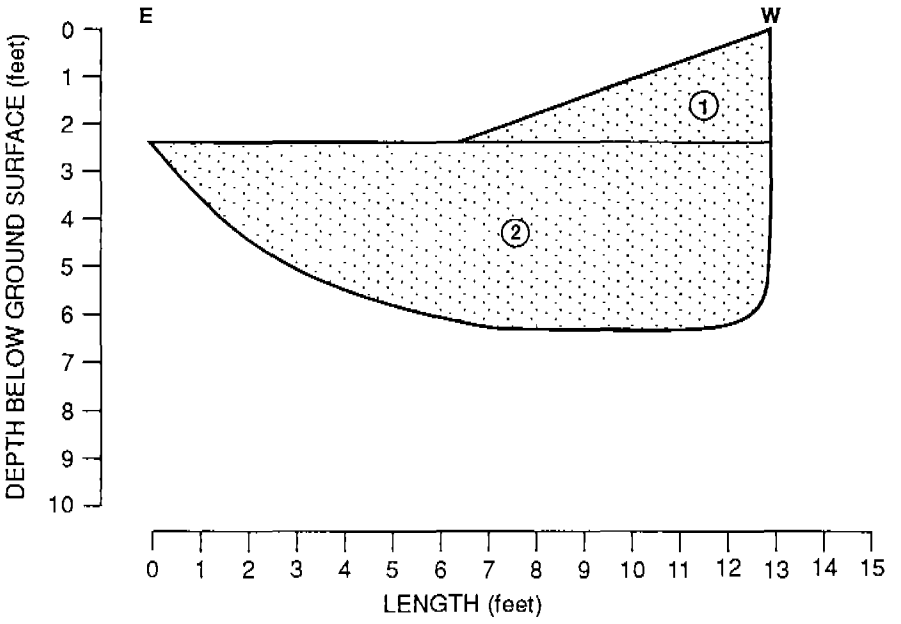
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-34
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A34**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-35
Date Started: 8-20-93
Date Completed: 8-20-93
Orientation: N65E
Elevation: 144 feet at E end



EXPLANATION:

(1) DARK GRAYISH BROWN SAND TO SILTY SAND (SP-SM) (10YR 4/2) very loose, dry, fine to medium sand, 10-15% silt, 5-10% roots and dead plants, bazooka round (2.36" rocket), fill

(2) DARK YELLOWISH BROWN SAND (SP) (10YR 4/4) very loose, slightly moist, fine to medium sand, 5-10% silt, trace roots

(A) SAMPLE: 9333A0016059F (Exact sampling location not known)

070694AG

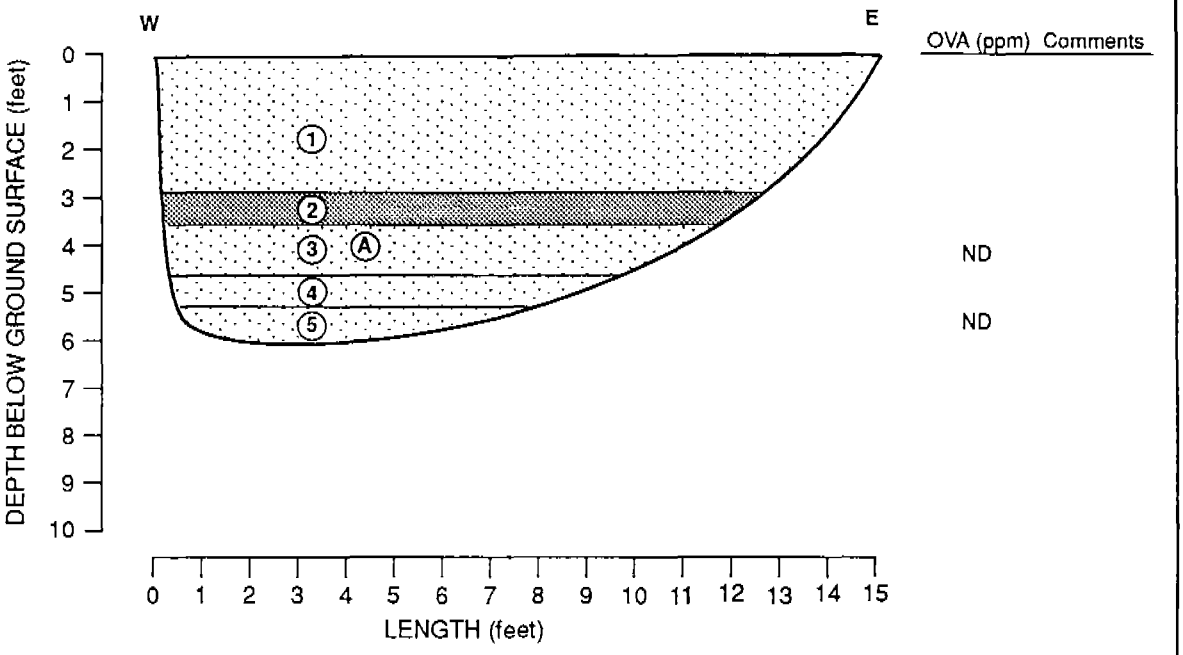
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-35
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A35**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJP	23366 041711	RFM	10/93	

Test Pit #: TR-16-36
Date Started: 8-20-93
Date Completed: 8-20-93
Orientation: N90E
Elevation: 154 feet



EXPLANATION:

(1) VERY DARK GRAYISH BROWN SAND (SP) (10YR 3/2)
very loose, dry, fine to medium sand, 10-15% silt, trace gravel to 1/4", 5% roots in upper 1', fill

(2) ASPHALT AND BASEROCK LAYER, broken pieces of asphalt with bluish baserock

(3) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4)
very loose, moist, fine to medium sand, 5-10% silt, laminated

(4) VERY DARK BROWN SAND (SP) (10YR 2/2)
loose, moist, fine- to medium-grained sand, trace silt

(5) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4)
loose, moist, fine to medium sand, trace silt

(A) SAMPLE: 9333A016060F

070694AG

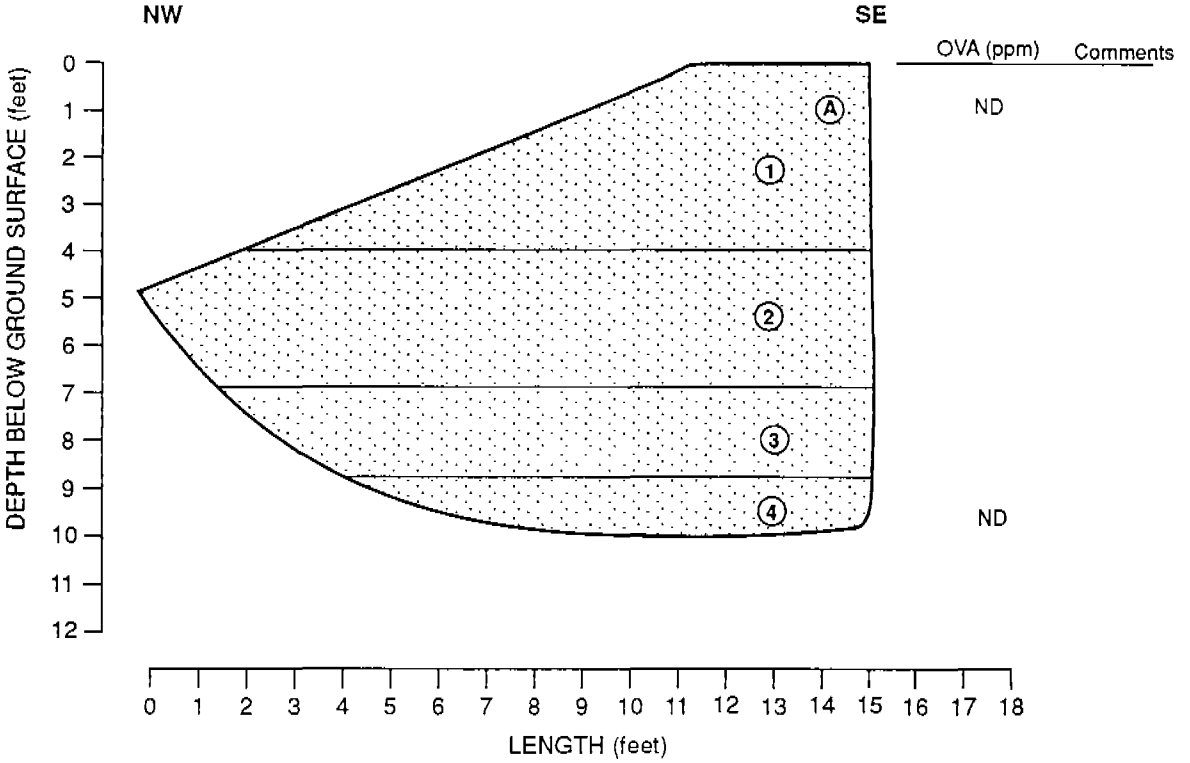
Harding Lawson Associates
Engineering and
Environmental Services

Log of Test Pit TR-16-36
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE
A36

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJP	23366 041711	RFM	10/93	

Test Pit #: TR-16-37
Date Started: 8-25-93
Date Completed: 8-25-93
Orientation: N32W
Elevation: 139 feet at SE end



EXPLANATION:

1. BROWN SAND (SP) (10YR 4/3) very loose, dry, fine to medium sand, 5-10% silt, trace plant roots, trace gravel to 3", trace glass fragments, fill
2. DARK BROWN SAND (SP) (10YR 3/3) very loose, moist, fine to medium sand, trace to 10% silt, trace roots
3. BROWN SAND (SP) (10YR 4/3) very loose, moist, fine to medium sand, trace to 10% silt, trace plant roots
4. BROWNISH YELLOW SAND (SP) (10YR 6/6) very loose, moist, fine to medium sand

A SAMPLE: 9334016A076F

070694AG

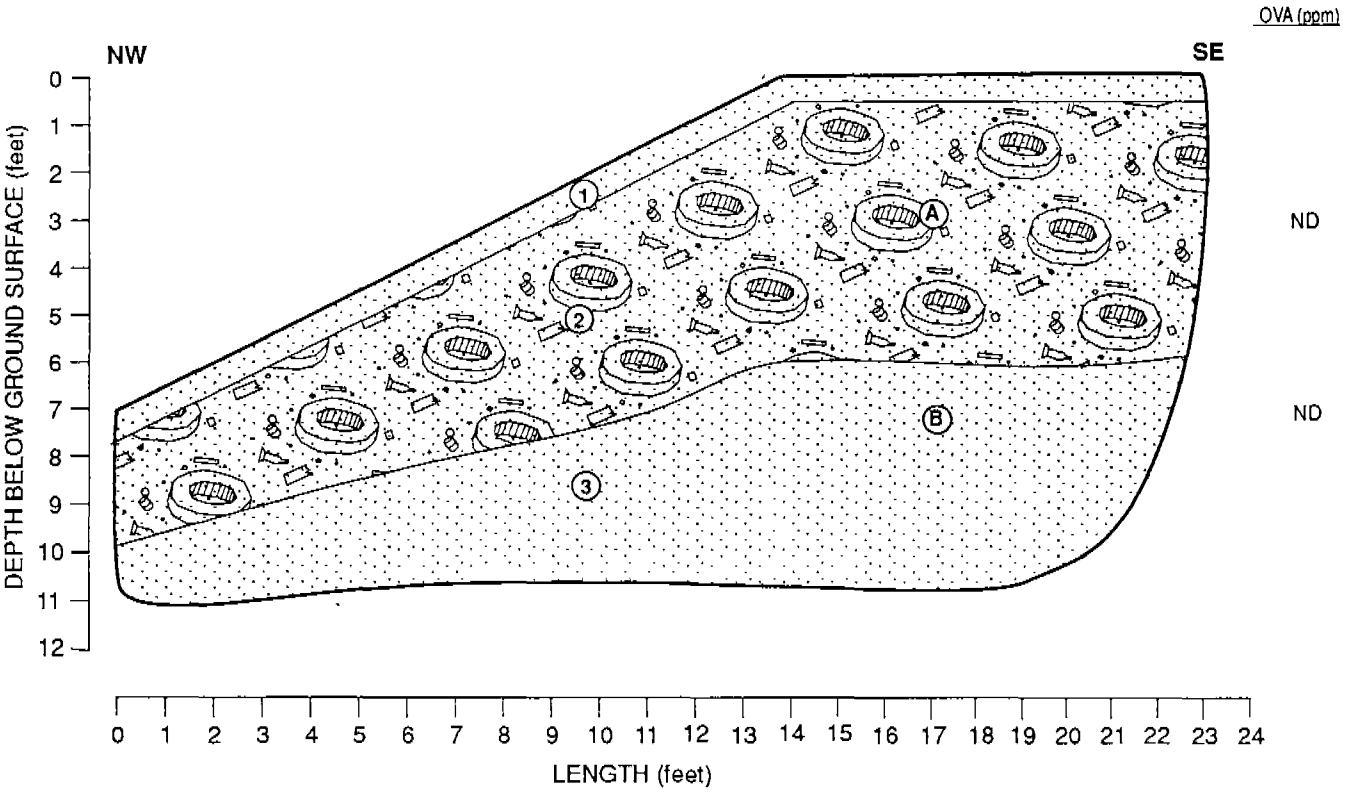
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-37
Site 16-Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A37**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJP	23366 041711	RFM	10/93	

Test Pit #: TR-16-38
Date Started: 8-26-93
Date Completed: 8-26-93
Orientation: N47W
Elevation: 150 feet at SE end



EXPLANATION:

(1) BROWN SAND (SP) (10YR 5/3), very loose, dry, fine to medium sand, trace silt, trace roots, fill

(2) DARK GRAYISH BROWN SAND (SP) (10YR 4/2), very loose, dry, fine to medium sand, 5-10% silt, 5-10% debris (abalone shells, melted glass, metal band, ceramic plate, metal fence posts, wire, cable, shoes, burnt wood, can lids), fill

(3) DARK YELLOWISH BROWN SAND (SP) (10YR 4/6), very loose, dry, fine to medium sand

(A) SAMPLE: 9334016A080F
(B) SAMPLE: 9334016A081F

070694AG

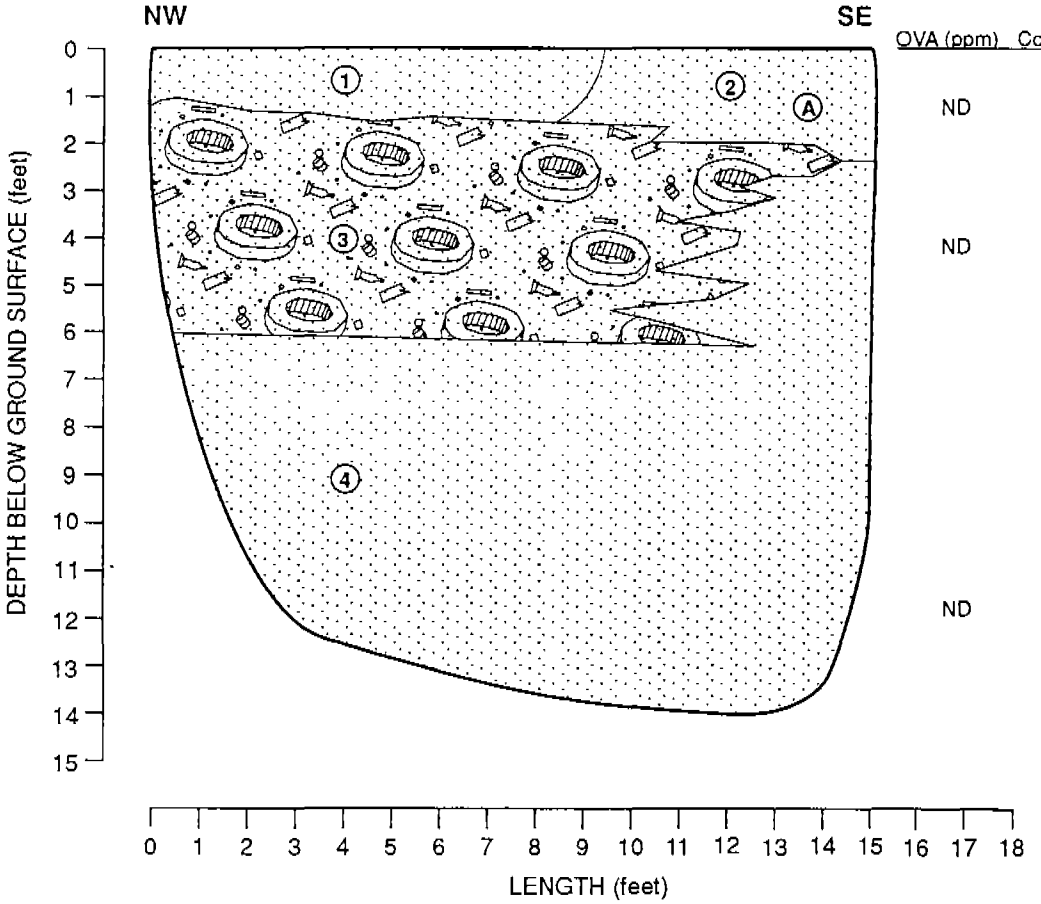
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-38
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A38**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-16-39
Date Started: 8-26-93
Date Completed: 8-26-93
Orientation: N70W
Elevation: 151 feet



EXPLANATION:

1. BROWN SAND (SP) (10YR 5/3), very loose, dry, fine to medium sand, 5-10% silt, trace roots, fill
2. DARK BROWN SAND (SP) (10YR 3/3), loose, dry, fine to medium sand, 5-10% silt, appears to be more compacted than 1 above, fill
3. BROWN SAND (SP) (10YR 4/3), very loose, dry, fine to medium sand, 5-10% silt, 10-15% debris (wire, nails, brake drum, burnt wood, small springs, broken glass, rusted metal), fill
4. BROWN SAND (SP) (10YR 4/3), very loose, dry to slightly moist, fine to medium sand, trace to10% silt

Ⓐ SAMPLE: 9334016A084F

070694AG

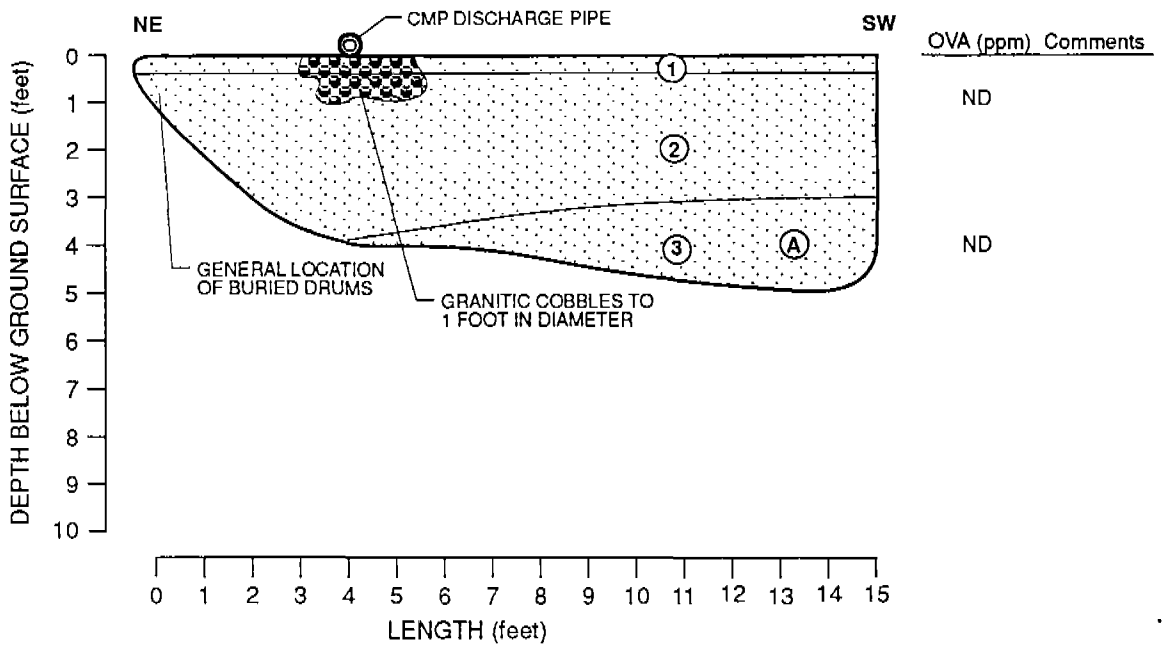
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-39
Site 16--Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A39**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	9/93	

Test Pit #: TR-16-40
Date Started: 8-26-93
Date Completed: 8-27-93
Orientation: N28E
Elevation:



EXPLANATION:

(1) DARK GRAYISH BROWN SAND (SP) (10YR 4/2), very loose, dry, fine to medium sand, 5-10% silt, 5-10% roots, fill

(2) BROWN SAND (SP) (10YR 4/3), very loose, dry, fine to medium sand, 5-10% silt, two 55-gallon drums (one filled with sand and one empty at NE end of test pit, one drum may have been used to store mustard agent based on drum type identification), fill

(3) YELLOWISH BROWN SAND (SP) (10YR 5/6), very loose, dry, fine to medium sand

(A) SAMPLE: 9334A016088F

070694AG

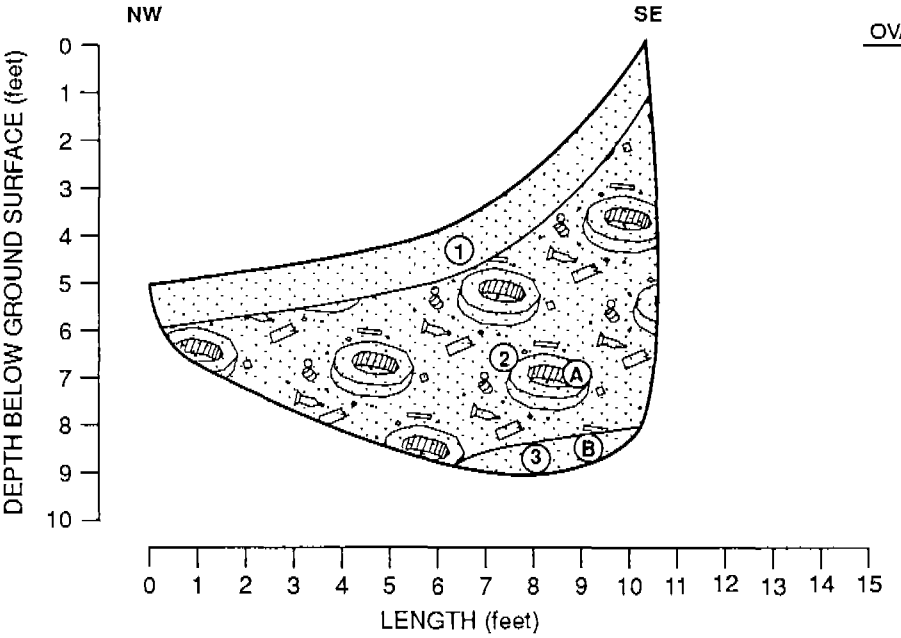
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-40
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A40**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-16-41
Date Started: 3-14-94
Date Completed: 3-14-94
Orientation: N52W
Elevation:



OVA (ppm)	Comments
ND	
ND	
ND	

EXPLANATION:

(1) DARK YELLOWISH BROWN SAND (SP) (10YR 3/4), loose, moist, fine sand, 10-15% silt, trace debris and root hairs, fill

(2) DEBRIS AND DARK YELLOWISH BROWN SAND (SP) (10YR 3/4), loose, moist, 60% debris (glass fragments, bottles, chain link fence, 5/8" steel cable, bacon tins, film plates, flashlight, bulb, vehicle axle, gray unidentified liquid, vehicle bumper, assorted plastic-lined 5-gallon buckets, ammo boxes, ordnance parts to rifle grenades, reinforcement rings [as seen on mustard drums], long cylindrical object - potential 500-lb bomb per UXB guess before wall cave-in), 35% fine sand, 5% silt, fill

(3) YELLOWISH BROWN SAND (SP) (10YR 5/6), loose, moist, fine sand, 35% debris (see above)

(A) SAMPLE: 9411G016146F
(B) SAMPLE: 9411G016147F

070694AG

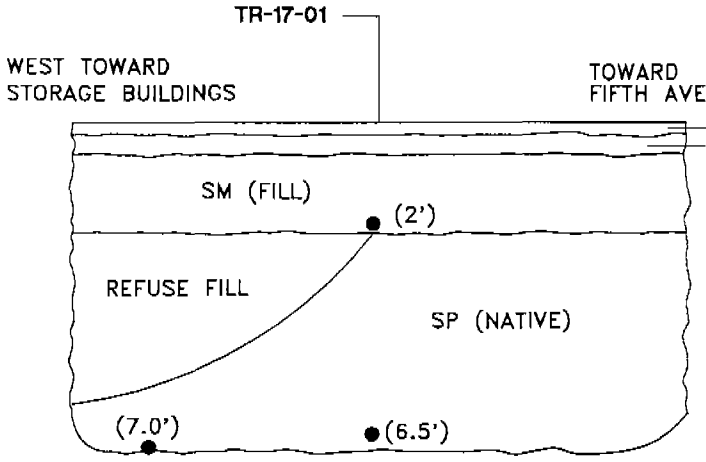
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-16-41
Site 16–Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A41**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

31644

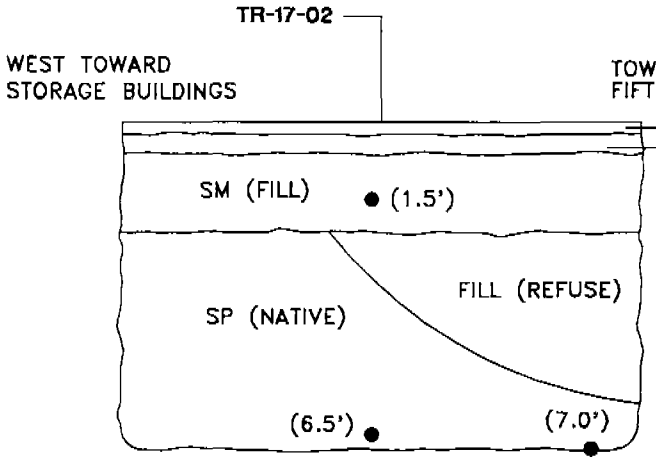


SM DARK YELLOWISH BROWN SILTY SAND (SM) (10YR4/4) LOOSE, MOIST, 85% FINE-TO MEDIUM-GRAINED SAND, 15% SILT

SP YELLOW SAND (SP) (10YR7/6) LOOSE, MOIST, 95% FINE-TO MEDIUM-GRAINED SAND, 5% SILT

FILL SCRAP METAL, HEAT-DEFORMED GLASS, NAILS, ~50 ml OF GREEN CRUMBLY MATERIAL (BAG SAMPLE COLLECTED)

NO SOIL OVA READINGS DETECTED



SM DARK YELLOWISH BROWN SILTY SAND (SM) (10YR4/4) LOOSE, MOIST, 85% FINE-TO MEDIUM-GRAINED SAND, 15% SILT

SP YELLOW SAND (SP) (10YR7/6) LOOSE, MOIST, 95% FINE-TO MEDIUM-GRAINED SAND, 5% SILT

FILL SCRAP METAL, PORCELAIN, ASPHALT, HEAT-DEFORMED GLASS, NAILS, CHARRED WOOD

NO SOIL OVA READINGS DETECTED

EXPLANATION

● TRENCH SAMPLE LOCATION

0 2 4
SCALE IN FEET

7579131 2.0

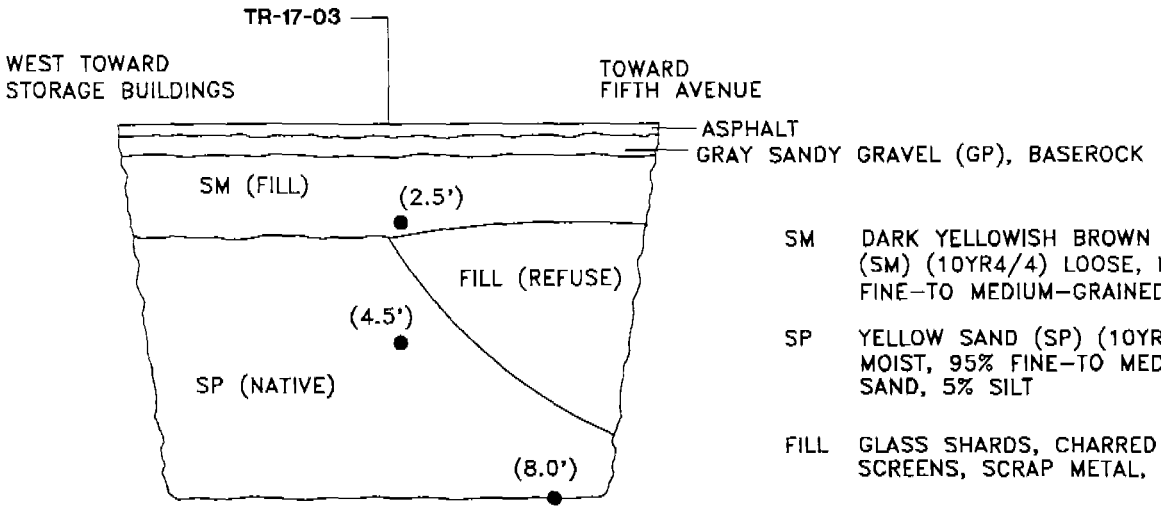
Harding Lawson Associates
Engineering and Environmental Services

Exploratory Trenches - TR-17-01 and TR-17-02
Site 17 -- 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE
A42

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	23366 041711		4/93	

31645

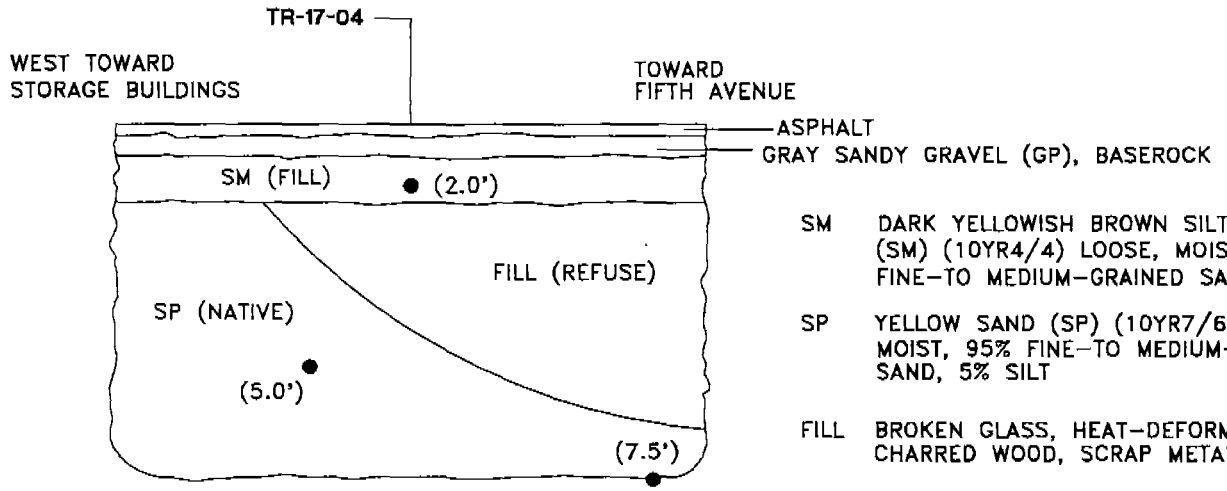


SM DARK YELLOWISH BROWN SILTY SAND (SM) (10YR4/4) LOOSE, MOIST, 85% FINE-TO MEDIUM-GRAINED SAND, 15% SILT

SP YELLOW SAND (SP) (10YR7/6) LOOSE, MOIST, 95% FINE-TO MEDIUM-GRAINED SAND, 5% SILT

FILL GLASS SHARDS, CHARRED WOOD, WINDOW SCREENS, SCRAP METAL, SPRINGS, NAILS

NO SOIL OVA READINGS TAKEN OR DETECTED



SM DARK YELLOWISH BROWN SILTY SAND (SM) (10YR4/4) LOOSE, MOIST, 85% FINE-TO MEDIUM-GRAINED SAND, 15% SILT

SP YELLOW SAND (SP) (10YR7/6) LOOSE, MOIST, 95% FINE-TO MEDIUM-GRAINED SAND, 5% SILT

FILL BROKEN GLASS, HEAT-DEFORMED GLASS, CHARRED WOOD, SCRAP METAL

NO SOIL OVA READINGS TAKEN OR DETECTED

EXPLANATION

● TRENCH SAMPLE LOCATION

0 2 4

SCALE IN FEET

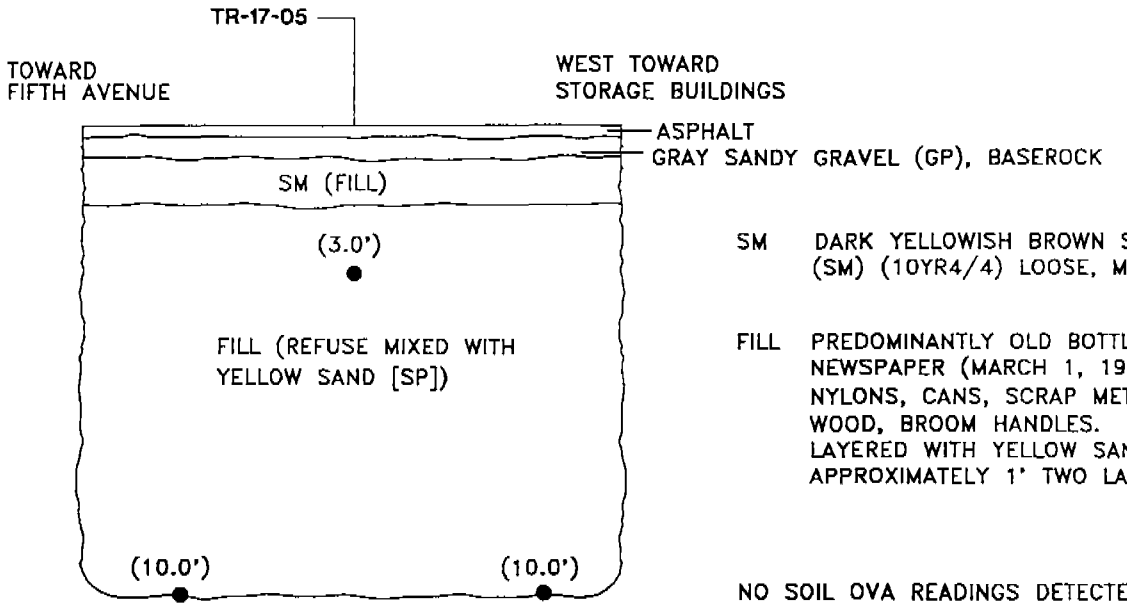
7579132 2.0

Harding Lawson Associates
Engineering and
Environmental Services

Exploratory Trenches - TR-17-03 and TR-17-04
Site 17 - 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE **A43**

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	23366 041711		4/93	



SM DARK YELLOWISH BROWN SILTY SAND (SM) (10YR4/4) LOOSE, MOIST

FILL PREDOMINANTLY OLD BOTTLES, NEWSPAPER (MARCH 1, 1950), NYLONS, CANS, SCRAP METAL, CHARRED WOOD, BROOM HANDLES. LAYERED WITH YELLOW SAND (SP) APPROXIMATELY 1' TWO LAYERS

NO SOIL OVA READINGS DETECTED. ONE READING OF 10ppm DETECTED INSIDE LIQUOR BOTTLE

EXPLANATION

● TRENCH SAMPLE LOCATION

0 1 2
SCALE IN FEET

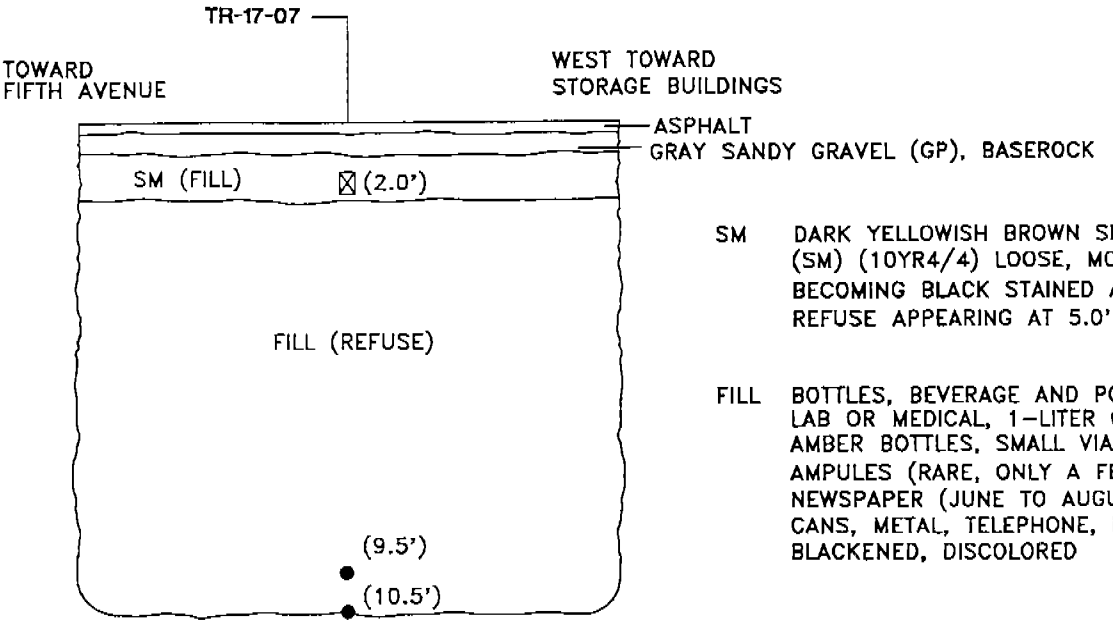
7579133 2.0
19930401.1010

Harding Lawson Associates
Engineering and
Environmental Services

Exploratory Trench - TR-17-05
Site 17 – 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE
A44

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	23366 041711	RFM	4/93	



SM DARK YELLOWISH BROWN SILTY SAND (SM) (10YR4/4) LOOSE, MOIST, BECOMING BLACK STAINED AT 4.5', REFUSE APPEARING AT 5.0'

FILL BOTTLES, BEVERAGE AND POSSIBLE LAB OR MEDICAL, 1-LITER CLEAR GLASS AND AMBER BOTTLES, SMALL VIALS AND AMPULES (RARE, ONLY A FEW), LUMBER, NEWSPAPER (JUNE TO AUGUST 1949), CANS, METAL, TELEPHONE, BOOT, BLACKENED, DISCOLORED

MAXIMUM OVA = 100 ppm

EXPLANATION

● TRENCH SAMPLE LOCATION

0 1 2
SCALE IN FEET

7579134 2.0
19930409.1106

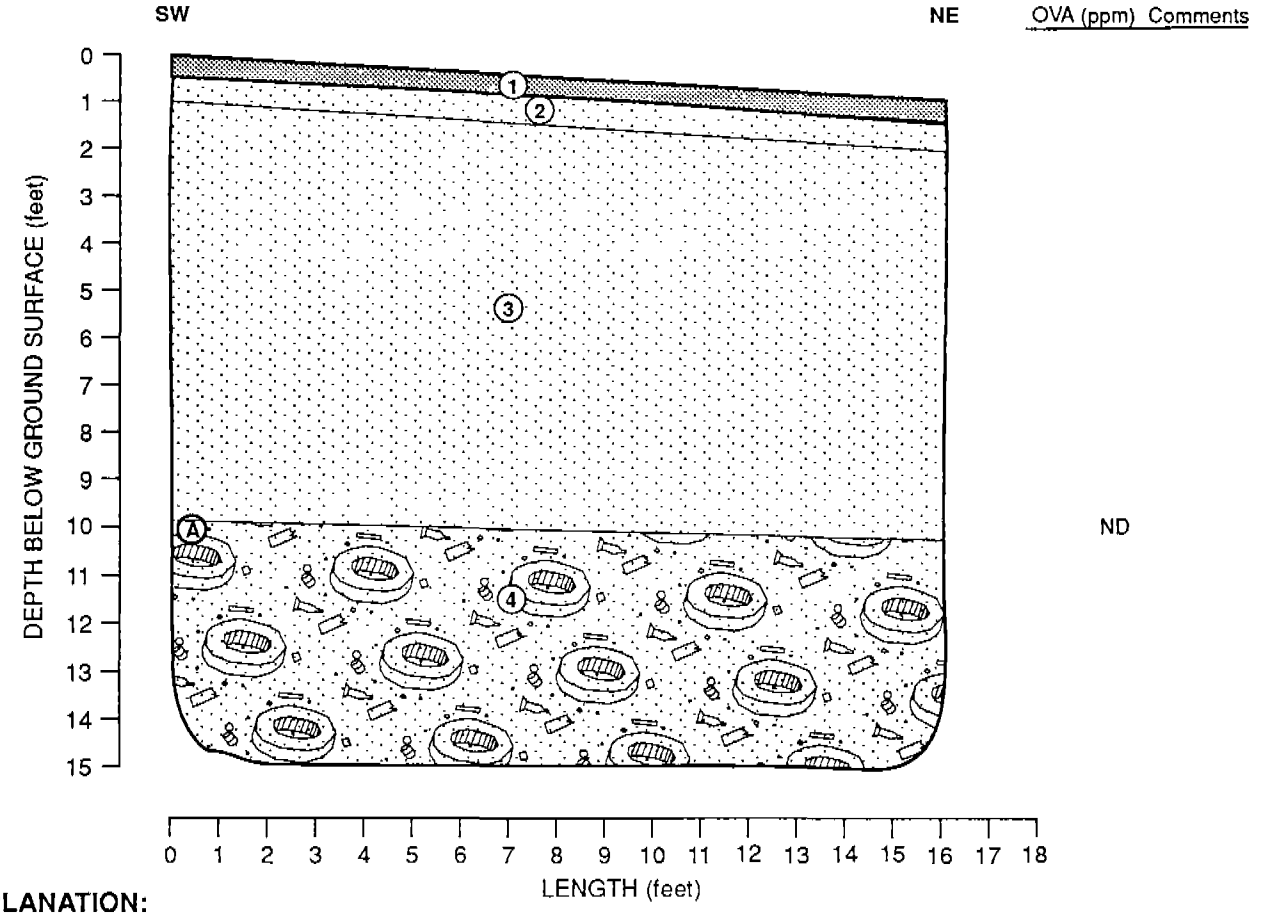
Harding Lawson Associates
Engineering and
Environmental Services

Exploratory Trench TR-17-07
Site 17 - 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE
A45

DRAWN	PROJECT NUMBER	APPROVED	DATE	REVISED DATE
YG	23366 041711	RFM	4/93	

Test Pit #: TR-17-08
Date Started: 8-23-93
Date Completed: 8-24-93
Orientation: N41E
Elevation:



EXPLANATION:

(1) ASPHALT AND BASEROCK

(2) DARK BROWN SAND (SP) (10YR 3/3), loose, moist, fine to medium sand, 0-5% silt, fill

(3) VERY DARK GRAYISH BROWN AND DARK YELLOWISH BROWN SAND (SP) (10YR 3/2 and 10YR 4/6), loose, moist, fine to medium sand, 0-5% silt, laminations/bedding up to 3" thick, trace debris (metal pipe at 2 feet, Coke bottle [1946] and wood at 6 feet, mess kit lid [1942]), fill, laminated, bedded

(4) LAYERED SAND AND DEBRIS - DARK BROWN SAND (SP) (10YR 3/3), loose, moist, fine to medium sand, 5-10% silt, debris layers (40%-60% debris) vary from 2" to 1 foot thick and include soda/beer cans, wood ammo boxes, half filled medical bottles, bleach bottles, wooden pallets, shoes, nylons, paper, "dank" can, bottle dates: 1935 (catsup bottle), 1946, 1947 (cola bottles), and 1949 (medical bowl or cup), fill

(A) SAMPLE: 9334017A066F

071294AG

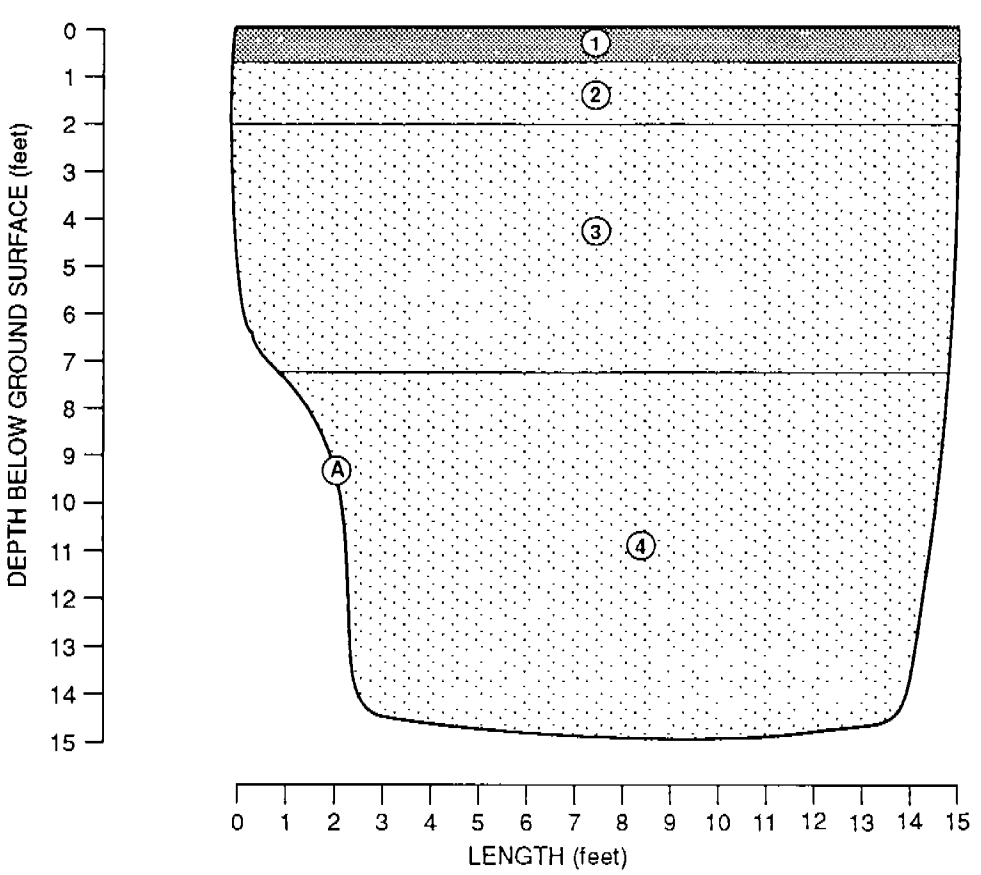
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-08
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A46**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-17-09
Date Started: 8-23-93
Date Completed: 8-24-93
Orientation: N6E
Elevation:



OVA (ppm)	Comments
ND	
ND	
ND	

EXPLANATION:

1. ASPHALT AND BASEROCK, 4" asphalt, 4" baserock
2. STRONG BROWN AND DARK BROWN SAND (SP) (7.5 YR 4/6 and 7.5 YR 3/3), loose, moist, fine to medium sand, 0-5% silt, upper 4-5" is strong brown and lower 6-7" is dark brown, fill
3. DARK BROWN AND YELLOWISH BROWN SAND (SP) (10YR 3/3 and 10YR 5/6), loose, moist, fine to medium sand, 0-5% silt, alternating beds and laminations, trace debris (boot heel) at 6', fill
4. DARK BROWN SAND (SP) (10YR 3/3), loose, moist, fine to medium sand, 0-5% silt, trace debris (wire, wood, and rock) present to12 feet, fill

A 9334017A065F

041294LZ

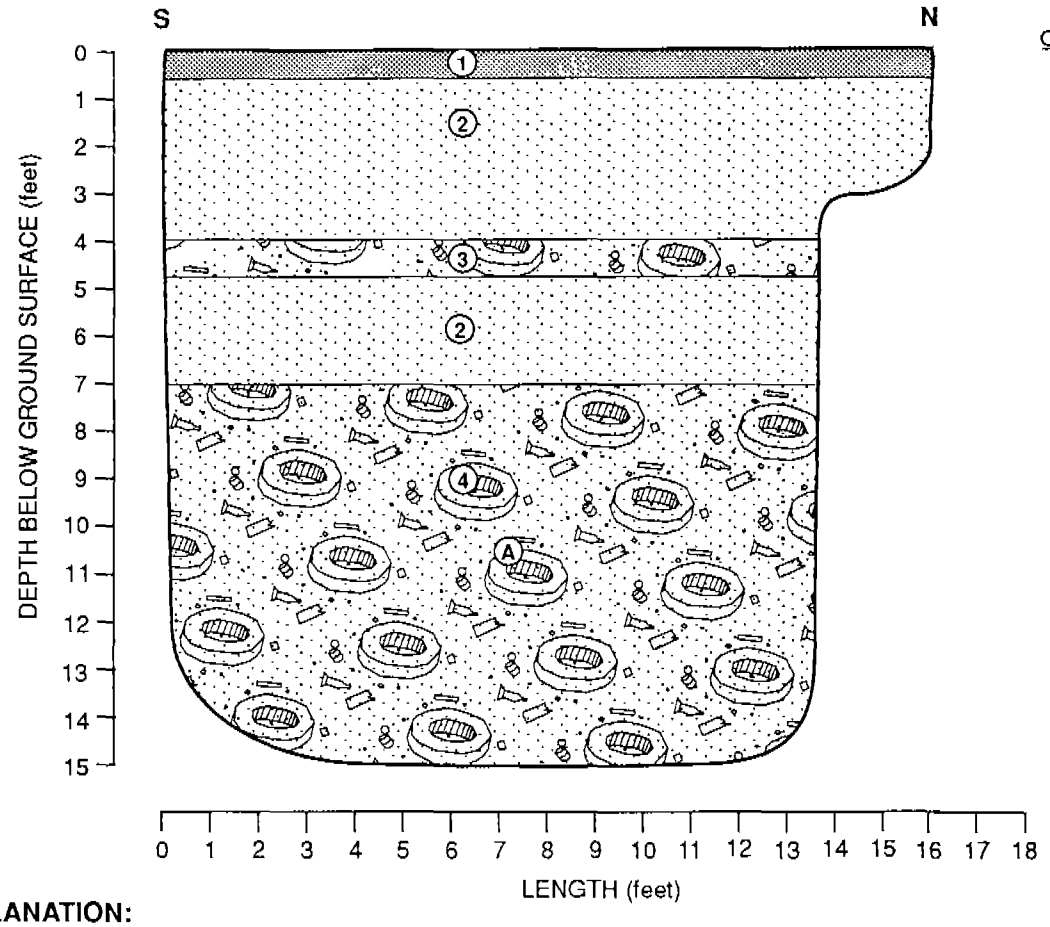
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-09
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A47**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-17-10
Date Started: 8-23-93
Date Completed: 8-24-93
Orientation: N
Elevation:



OVA (ppm)	Comments
ND	
ND	

EXPLANATION:

(1) ASPHALT AND BASEROCK, 4" asphalt, 4" baserock

(2) DARK BROWN AND DARK YELLOWISH BROWN SAND (SP)(10YR 3/3 & 10YR 4/6), loose, moist, fine to medium sand, 0-5% silt, alternating laminations/beds 4" to 1' thick, trace debris (at 1.5 feet, shoe lace, plate fragment, broken glass), fill

(3) METAL DEBRIS LAYER, DARK BROWN SAND (SP) (10YR 3/3), 30-50% metal debris (rusted tin, steel), fill

(4) DEBRIS LAYER AND VERY DARK GRAYISH BROWN SAND (SP) (10YR 3/2), very loose, moist, fine to medium sand, 5% silt, 35-45% debris (glass, tin cans, boots, metal, wood, medical waste, 1951 glass jar, cold cream/shampoo jars, 1949 Coke bottle, boot), less debris, if present, below 12 feet, fill

(A) SAMPLE: 9334017A064F

041294LZ

Harding Lawson Associates
Engineering and Environmental Services

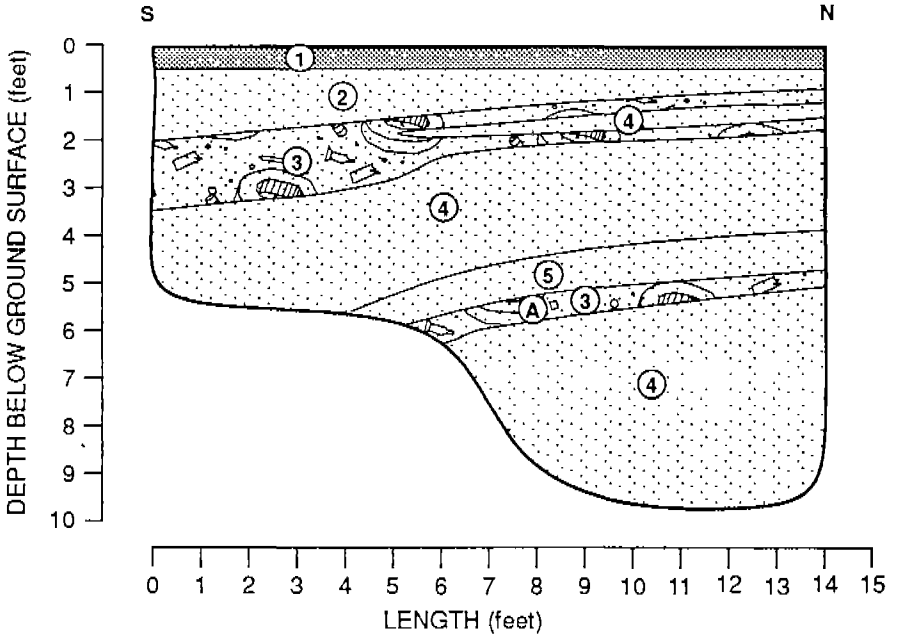
Log of Test Pit TR-17-10
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A48**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	11/93	

Test Pit #: TR-17-11
Date Started: 8-24-93
Date Completed: 8-24-93
Orientation: N1W
Elevation:

OVA (ppm) Comments



EXPLANATION:

(1) ASPHALT AND BASEROCK, 3" asphalt, 3" asphalt baserock

(2) DARK BROWN SAND (SP) (10YR 3/3), loose, moist, fine to medium sand, 5% silt, with discontinuous light yellowish brown (10YR 6/4) sand lens, fill

(3) DEBRIS LAYER AND SAND 40 to 60% debris, 40-60% light yellowish brown sand (SP) (10YR 6/4), loose, dry, fine to medium sand, debris includes rusted metal, glass bottles, Coke bottles (1941, 1948, 1949), test tube, syringe, vial with cotton ball in the bottom, cans, "dank" can, vials, light bulb, fill

(4) LIGHT YELLOWISH BROWN SAND (SP) (10YR 6/4), loose, dry, fine to medium sand, fill

(5) DARK BROWN SAND (SP) (10YR 3/3), loose, dry, fine to medium sand, 5% silt

(A) 9334017A067F

071294AG

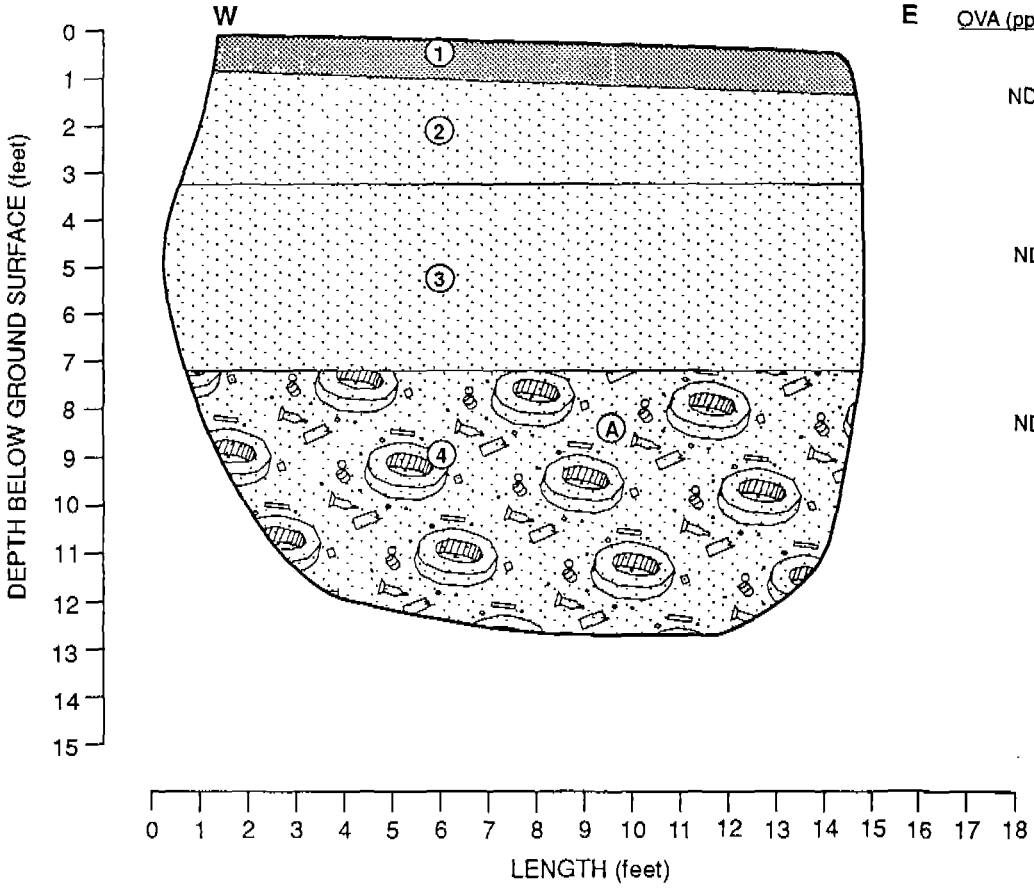
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-11
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A49**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJP	23366 041711	RFM	11/93	

Test Pit #: TR-17-12
Date Started: 8-24-93
Date Completed: 8-25-93
Orientation: N86E
Elevation:



OVA (ppm)	Comments
ND	
ND	
ND	

EXPLANATION:

1 ASPHALT AND BASEROCK, 4" ASPHALT, 9" BASEROCK

2 BROWN AND YELLOWISH BROWN SAND (SP) (10YR 4/3 & 10YR 5/6), very loose, moist, fine to medium sand, 0-5% silt

3 DARK BROWN, BROWN, DARK YELLOWISH BROWN AND YELLOWISH BROWN SAND (SP) (10YR 3/3, 10YR 4/3, 10YR 4/6 & 10YR 5/6), loose, moist, fine to medium sand, 0-10% silt, laminated fill

4 DARK BROWN SAND (SP) (10YR 3/3), very loose, moist, fine to medium sand, 5-10% silt, 35%-40% debris consisting of wood, metal (cans, drum lid, pipe, wire, coffee pot), glass (1947 Coke bottle, beer bottles, old spice bottle, Pepto Bismal bottle complete with pink fluid), comb, newspaper (no date), fill

A SAMPLE: 9334017A068F

032494DJP

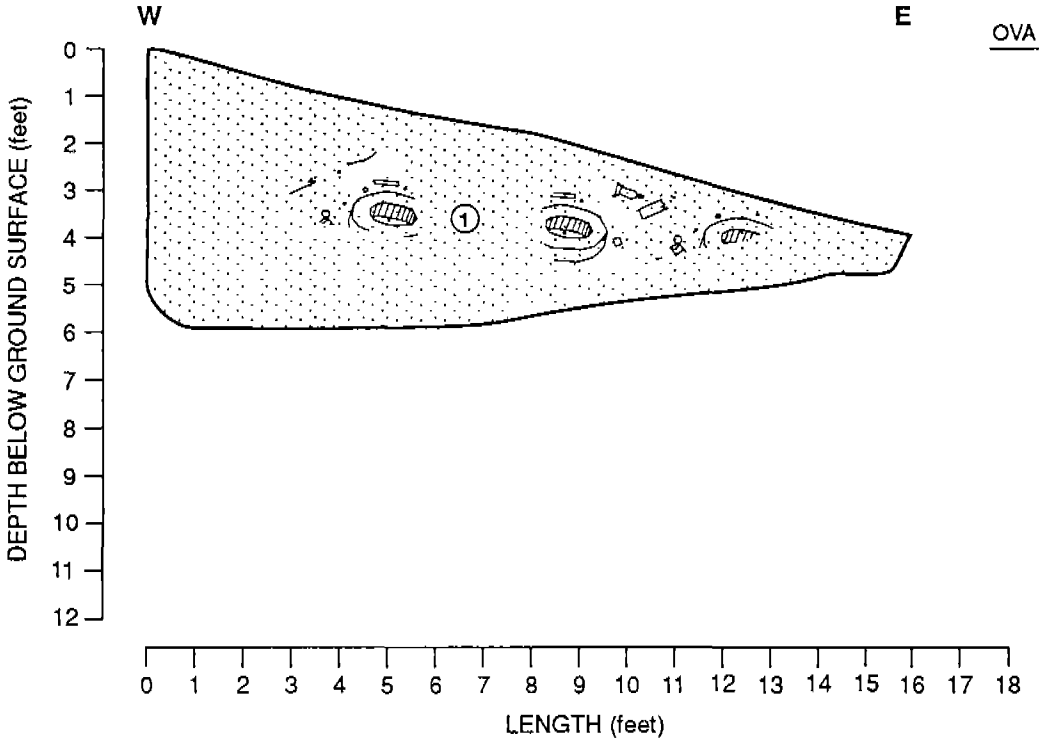
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-12
Site 17-Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A50**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-17-13
Date Started: 8-25-93
Date Completed: 8-25-93
Orientation: N85W
Elevation:



EXPLANATION:

(1) VERY DARK GRAYISH BROWN SAND (SP) (10YR 3/2), very loose, moist, fine to medium sand, 3-10% silt, localized debris make up trace to 10%, debris includes concrete chunks, metal pans, nylons, beer bottle, light bulb (G.E. 2400), glass jars and metal hinge, fill

Note: Test pit was halted due to concern of possible utility lines and was logged after the test pit was partially backfilled; the limits of the debris was not defined.

071294AG

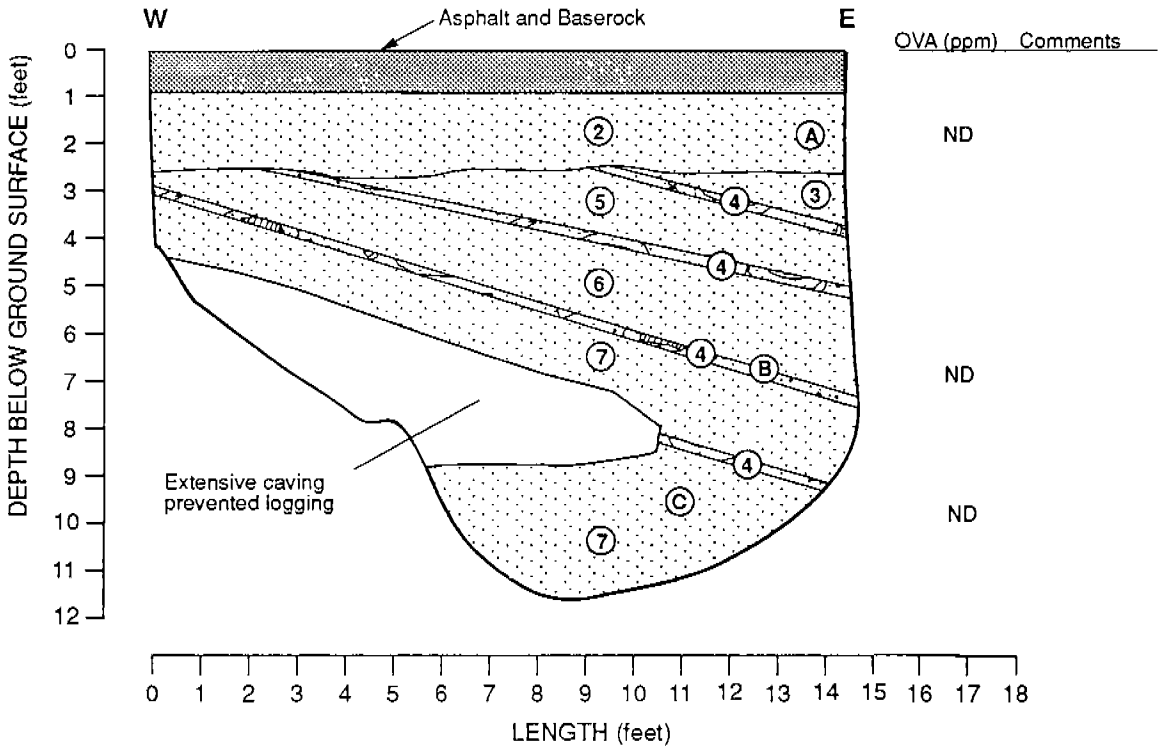
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-13
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A51**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-17-14
Date Started: 8-25-93
Date Completed: 8-26-93
Orientation: N87W
Elevation:



EXPLANATION:

1. ASPHALT AND BASEROCK
2. DARK GRAYISH BROWN SAND (SP) (10YR 3/2), loose, moist, fine to medium sand, trace silt, fill
3. BROWN SAND (SP) (10YR 4/3), very loose, dry, fine to medium sand, trace to 10% silt, fill
4. DEBRIS LAYER (>50%) including medical vials with stoppers, metal cans, milk bottles, Coke bottles (1940, 1944, 1946, and 1947), Belfast bottles (1949), hand crank wench, fill
5. YELLOWISH BROWN SAND (SP) (10YR 5/6), very loose, dry, fine to medium sand, 0-5% silt, fill
6. DARK BROWN AND YELLOWISH BROWN SAND (SP) (10YR 3/3 & 10YR 5/6), very loose, moist, fine to medium sand, 0-5% silt, laminated, fill
7. DARK BROWN SAND (SP) (10YR 3/3), very loose, moist, fine to medium sand, 5-10% silt, possibly undisturbed below last debris layer, less loose at depth

Ⓐ SAMPLE: 9334017A070F
Ⓑ SAMPLE: 9334017A071F
Ⓒ SAMPLE: 9334017A072F

071294AG

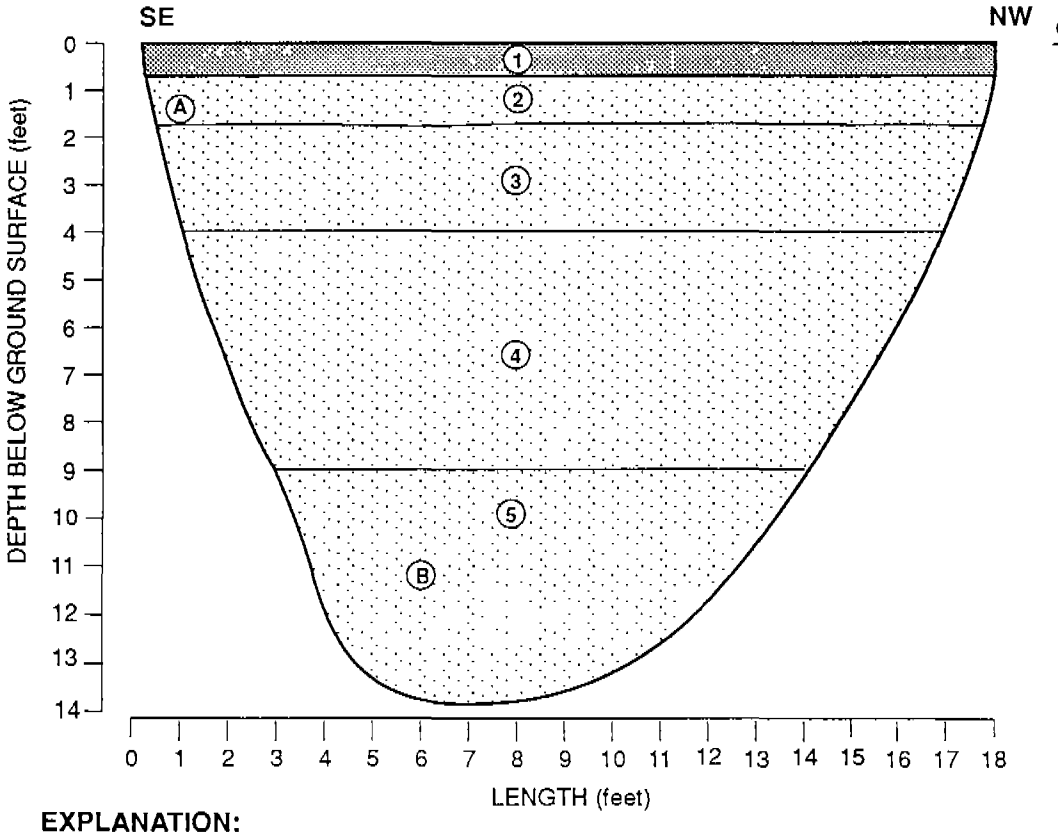
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-14
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A52**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJP	23366 041711	RFM	11/93	

Test Pit #: TR-17-15
Date Started: 8-25-93
Date Completed: 8-27-93
Orientation: N62W
Elevation:



OVA (ppm)	Comments
ND	
ND	

EXPLANATION:

1. ASPHALT AND BASEROCK
2. BROWN, YELLOWISH BROWN & DARK BROWN SAND (SP) (10YR 4/2, 10YR 5/6 & 10YR 3/3), very loose, moist, fine to medium sand, 0-10% silt, compacted fill is in 3-4" lifts in color order, fill
3. BROWN AND YELLOWISH BROWN SAND (SP) (10YR 4/3 & 10YR 5/6), very loose, moist, fine to medium sand, 0-10% silt, laminated, fill
4. BROWN SAND (SP) (10YR 4/3), loose, moist, fine to medium sand, trace to 10% silt, trace debris (Coke bottles [1947], steel cable, chunks of concrete), fill
5. DARK BROWN SAND (SP) (10YR 3/3), loose, moist, fine to medium sand, trace to 10% silt

A SAMPLE: 9334017A074F
B SAMPLE: 9334017A073F

071294AG

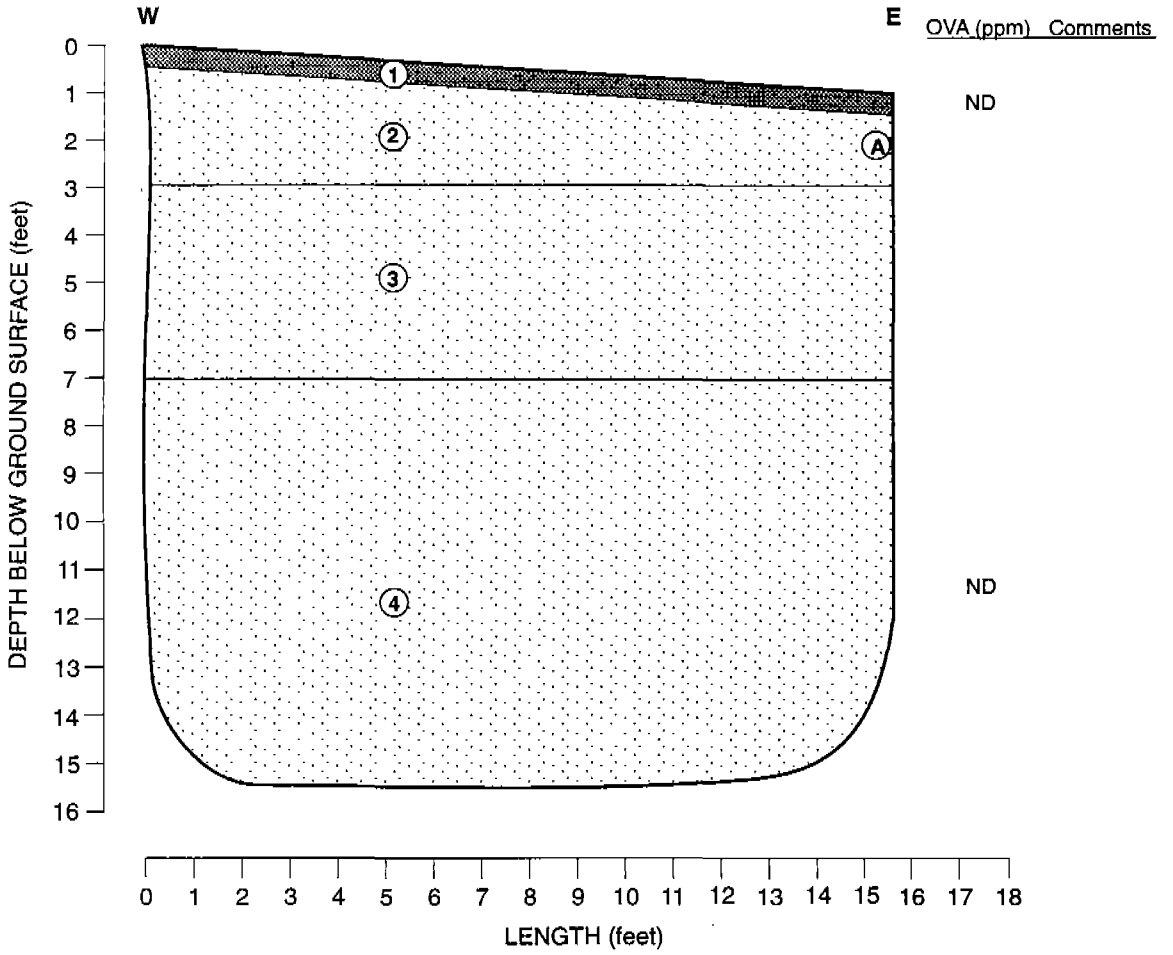
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-15
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A53**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-17-16
Date Started: 8-26-93
Date Completed: 8-27-93
Orientation: E-W
Elevation:



EXPLANATION:

1. ASPHALT AND BASEROCK
2. VERY DARK GRAYISH BROWN SAND (SP) (10YR 3/2), very loose, moist, fine to medium sand, trace to 10% silt, fill
3. STRATIFIED YELLOWISH BROWN AND BROWN SAND (SP) (10YR 5/6 & 10YR 4/3), very loose, moist, fine to medium sand, 0-10% silt
4. BROWN SAND (SP) (10YR 4/3), very loose, moist, fine to medium sand, trace to 10% silt

A SAMPLE: 9334017A07F

071294AG

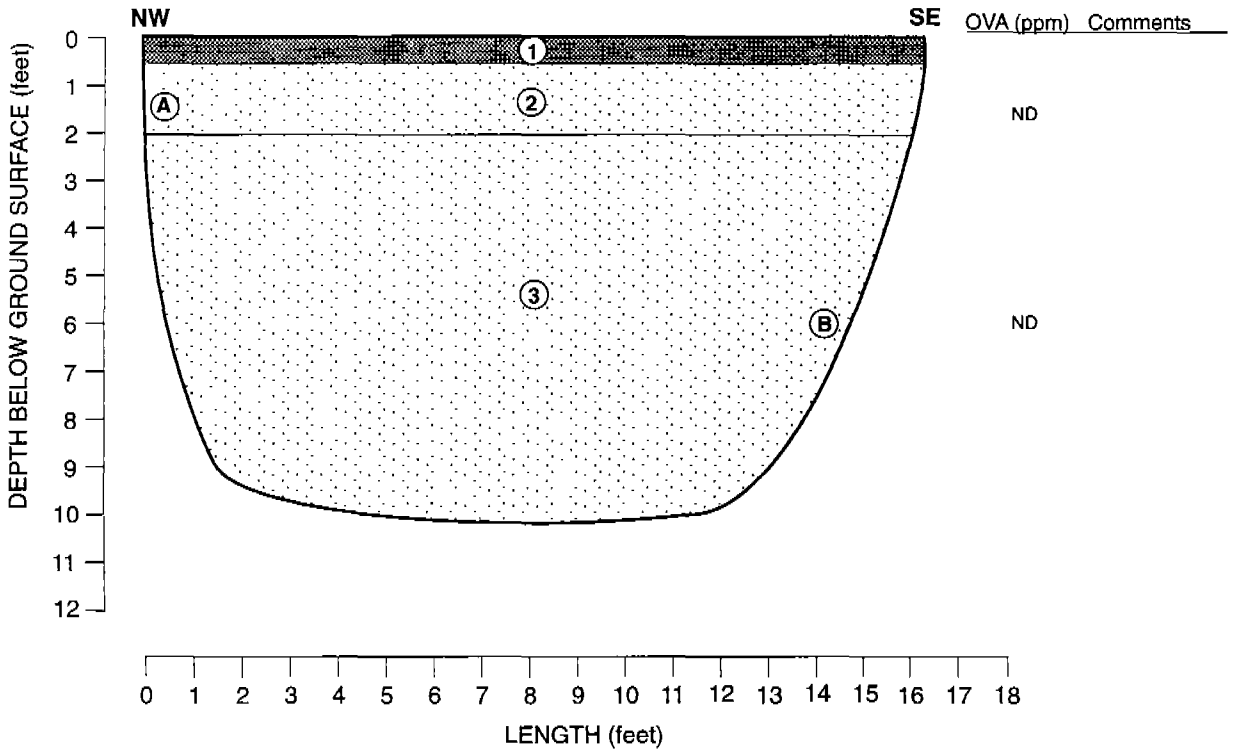
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-16
Site 17-Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A54**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-17-17
Date Started: 8-26-93
Date Completed: 8-27-93
Orientation: N59W
Elevation:



EXPLANATION:

1 ASPHALT AND BASEROCK

2 DARK BROWN SAND (SP) (10YR 3/3)
loose, moist, fine to medium sand, trace to 10% silt, fill

3 YELLOWISH BROWN SAND (SP) (10YR 5/6)
very loose, moist, fine to medium sand

A SAMPLE: 9334017A085F
B SAMPLE: 9334017A086F

071294AG

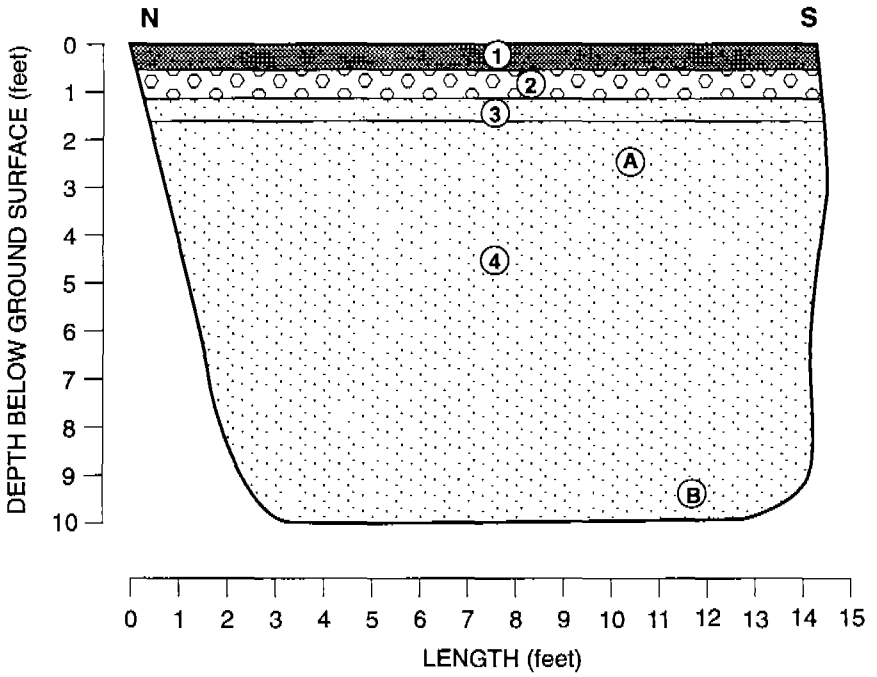
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-17
Site 17-Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A55**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFM	10/93	

Test Pit #: TR-17-18
Date Started: 2-22-94
Date Completed: 2-22-94
Orientation: N5E
Elevation:



OVA (ppm)	Comments
ND	
ND	
ND	

EXPLANATION:

1. ASPHALT
2. OLIVE GRAVEL WITH SAND (GP) (5Y 5/3), dense, moist, subangular fine gravel, 15% fine sand
3. DARK YELLOWISH BROWN SAND (SP) (10YR 3/6), medium dense, moist, fine sand
4. BROWNISH YELLOW SAND (SP) (10YR 6/6), loose, moist, fine to medium sand

A SAMPLE: 9408G017079F
B SAMPLE: 9408G017081F

071394AG

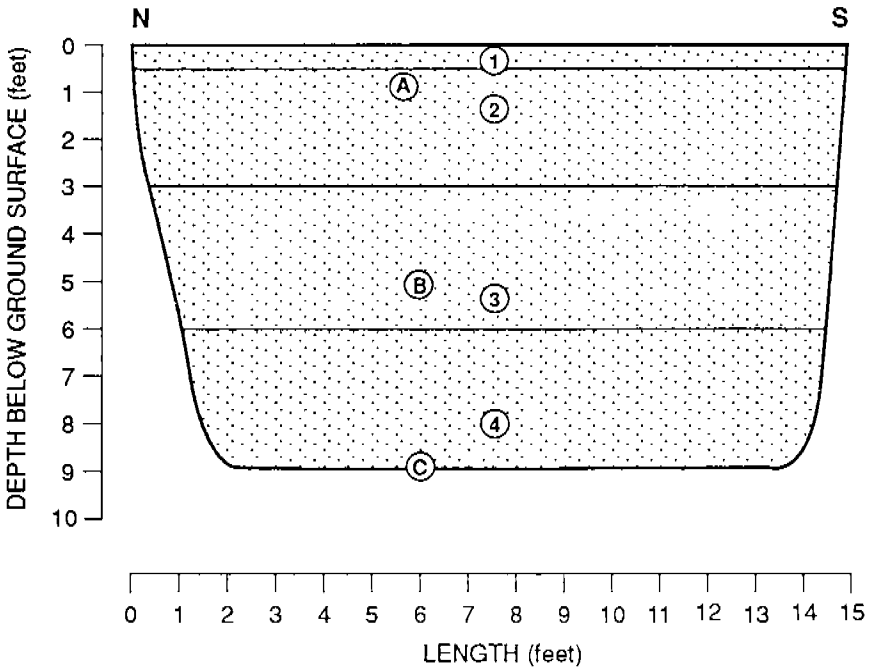
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-18
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A56**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LZc	23366 041711	RFM	4/94	

Test Pit #: TR-17-19
Date Started: 2-23-94
Date Completed: 2-23-94
Orientation: N10E
Elevation:



OVA (ppm)	Comments
ND	
ND	
ND	

EXPLANATION:

1. DARK BROWN SAND (SP) (10YR 3/3), loose, dry, fine to medium sand
2. DARK YELLOWISH BROWN SAND (SP) (10YR 4/6), loose, dry, fine to medium sand
3. YELLOWISH BROWN SAND (SP) (10YR 3/6), medium dense, moist, fine to medium sand
4. YELLOWISH BROWN SAND (SP) (10YR 3/6), medium dense, moist, fine to medium sand

A SAMPLE: 9408Y017002F
B SAMPLE: 9408Y017003F
C SAMPLE: 9408Y017004F

0504DJP

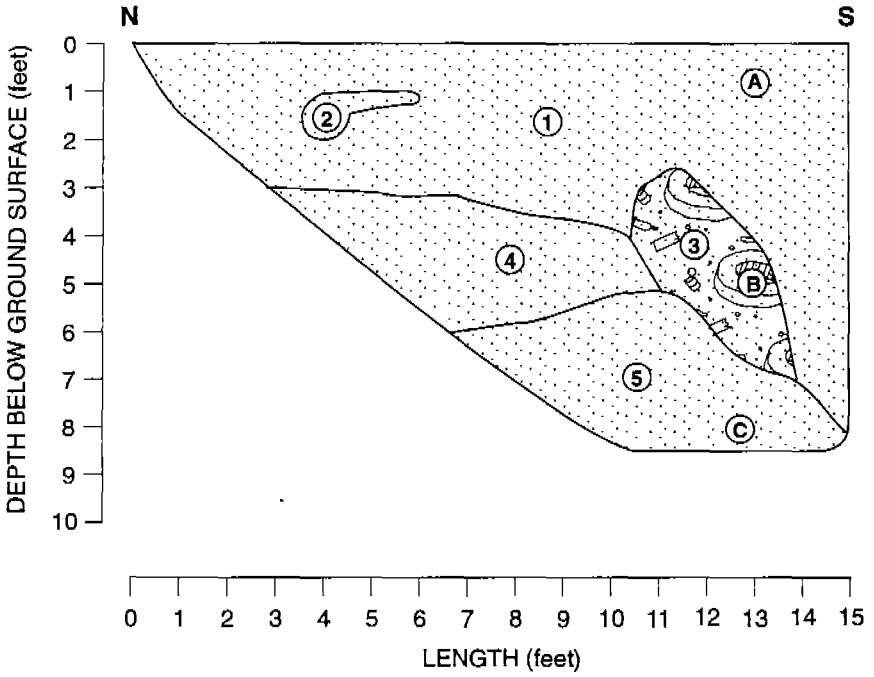
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-19
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A57**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LZc	23366 041711	RFM	4/94	

Test Pit #: TR-17-20
Date Started: 2-23-94
Date Completed: 2-23-94
Orientation: N12E
Elevation:



OVA (ppm)	Comments
ND	
ND	
ND	
ND	

EXPLANATION:

(1) DARK BROWN SAND (SP) (7.5YR 3/4), loose, moist, fine sand

(2) DARK GRAY SAND (SP) (10YR 4/1), moist, fine sand

(3) DARK YELLOWISH BROWN SAND WITH DEBRIS
loose, moist, fine sand, 15% debris (pieces of tin cans, bottles, serum bottles [*medical waste], gauze, partially burnt cardboard, hangers, shoe frame?)

(4) YELLOWISH BROWN SAND (SP) (10YR 5/6), moist, fine sand

(5) YELLOW SAND (SP) moist, fine sand

(A) SAMPLE: 9408G017082F
(B) SAMPLE: 9408G017083F
(C) SAMPLE: 9408G017085F

071394AG

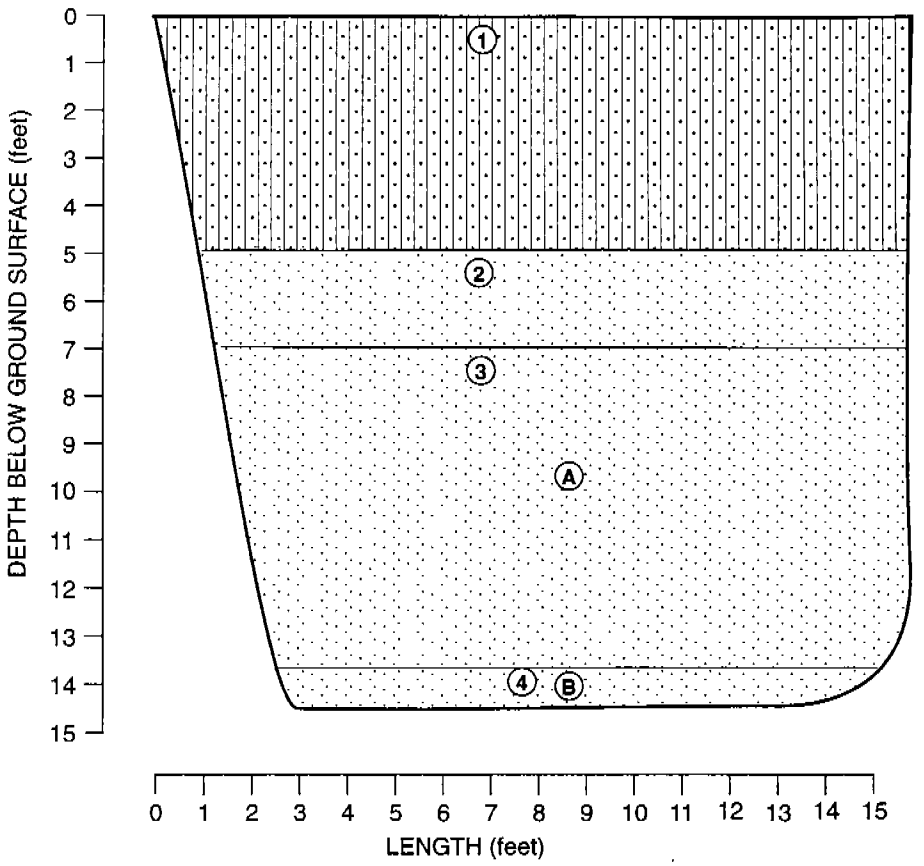
Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-20
Site 17–Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A58**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LZc	23366 041711	RFM	4/94	

Test Pit #: TR-17-21
Date Started: 2-24-94
Date Completed: 2-24-94
Orientation: N82E
Elevation:



OVA (ppm)	Comments
ND	
ND	
ND	
ND	
ND	

EXPLANATION:

(1) DARK BROWN SILTY, SAND (SM) 10YR 3/3, loose, moist, medium sand, 15% silt, vegetation at surface, some roots at 1 to 1.5 ft, a drum ring (rusted), wood pieces, glass pieces from 1 to 1.5 feet

(2) YELLOWISH BROWN SAND (SP) 10YR 3/6, medium dense, moist, medium to fine sand

(3) DARK BROWN SAND (SP) 10YR 3/3, medium dense, moist, medium to fine sand, 0-5% debris (wood, bottles, broken glass, ceramic bottles, rubber soles) observed, but intermittent and not continuous

(4) YELLOWISH BROWN SAND (SP) 10Y3/6, medium dense, moist, medium to fine sand

(A) 9408Y017008F
(B) 9408Y017009F

071394AG

Harding Lawson Associates
Engineering and Environmental Services

Log of Test Pit TR-17-21
Site 17-Disposal Area
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE **A59**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
DJPc	23366 041711	RFm	5/94	

31926

Equipment Hollow-Stem Auger
8"-diameter

Elevation 165.00 (grnd) Date 1-17-92

Blows/foot	Recovery (inches)	OVA (ppm)	OVM (ppm)	Odor	Depth (ft.)	Sample	
					0		ASPHALTIC CONCRETE GRAVELLY BASE DARK BROWN SILTY SAND (SP) (7.5YR 3/3): very dense, moist, fine- to medium-grained, 15-20% silt
60	16	0.7	ND	none	5		@ 5': as above
33	15	0.5	ND	none	10		STRONG BROWN SAND (SP) (7.5YR 5/6): dense, moist, fine-grained
24	16	8.0	ND	none	15		@ 15': moist to wet VERY DARK BROWN SILTY SAND TO SAND (SM-SP): very dense, moist to wet, fine-grained, 10-15% silt
31	17	0.5	ND	none	20		@ 20': dense, moist *Bottom of boring at 21.5 feet.*
					25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-01
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B2**

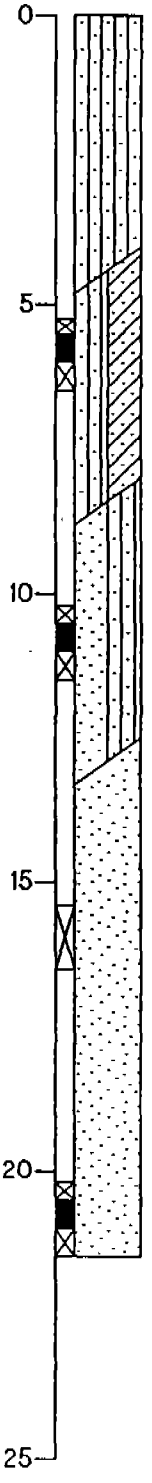
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

31927

Equipment Hollow-Stem Auger
8"-diameter

Elevation 165.94 (grnd) Date 1-18-92

Blows/foot	Recovery (inches)	OVM Reading (ppm)	Odor	Depth (ft.)	Sample	
				0		DARK BROWN SILTY SAND WITH GRAVEL (SM) (10YR 3/3): moist, fine-grained, 15-20% silt
70	15	NA	none	5		BLACK SILTY CLAYEY SAND (SM-SC) (10YR 2/1): very dense, moist to wet, very fine- to fine-grained, 10-15% silt, 5-10% clay
17	16	ND	none	10		STRONG BROWN SILTY SAND TO SAND (SM-SP) (10YR 4/6): medium dense, moist, fine-grained, 5-10% silt, trace decayed organic and rootlets below 10'
38	14	ND	none	15		BROWNISH-YELLOW SAND (SP) (10YR 6/8): dense, moist, very fine- to fine-grained
45	15	ND	none	20		@ 20': fine- to medium-grained
				25		*Bottom of boring at 21.5 feet.*



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-02
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B3**

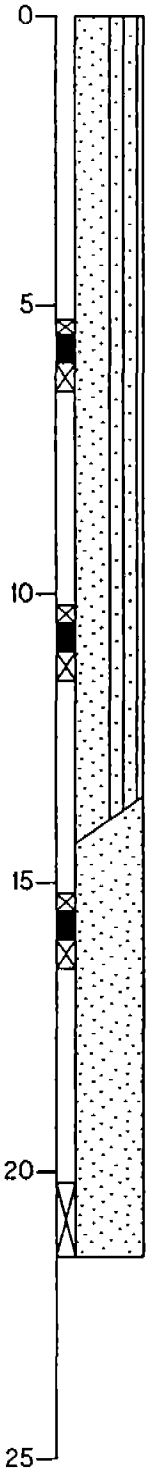
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687	EM	12/92	

31928

Equipment Hollow-Stem Auger
8"-diameter

Elevation 164.65 (grnd) Date 1-18-92

Blows/foot	Recovery (inches)	OVA (ppm)	OVM (ppm)	Odor	Depth (ft.)	Sample	
					0		DARK BROWN SILTY SAND WITH GRAVEL (SM-SP)
							@ 2.5': dark yellowish-brown, very fine- to fine-grained, 10-15% silt, no gravel
					5		@ 5': dense, moist
40	15	1.8	ND	none			@ 6': very dark brown (10YR 2/2), trace clay
					10		@ 9.5': very dark grayish-brown (2.5Y 3/2), medium dense
19	16	1.2	ND	none			
					15		BROWNISH-YELLOW SAND (SP) (10YR 6/8): dense, moist, fine- to medium-grained
33	16	0.5	ND	none			
					20		@ 20': fine-grained
38	17	0.5	ND	none			
					25		*Bottom of boring at 21.5 feet.*



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-03
Site Characterization
Site 16 – DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B4**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

31929

Equipment Hollow-Stem Auger
8"-diameter

Elevation 164.93 (grnd) Date 1-18-92

Blows/foot	Recovery (inches)	OVA (ppm)	OVM (ppm)	Odor	Depth (ft.)	Sample	
					0		DARK BROWN SILTY SAND WITH GRAVEL (SM-SP)
83	9	0.4	ND	none	5		VERY DARK YELLOWISH-GRAY SILTY SAND (SM) (10YR 3/2): very dense, moist, fine-grained, 15-20% silt
11	16	0.9	ND	none	10		DARK YELLOWISH-BROWN SAND TO SILTY SAND (SP-SM) (10YR 3/6): medium dense, moist, fine-grained, 10-15% silt
25	17	NA	ND	none	15		@ 15': as above BROWNISH-YELLOW SAND (SP) (10YR 6/8): medium dense, moist, fine-grained
48	16	NA	ND	none	20		@ 20': dense @ 20.5': becomes more medium-grained *Bottom of boring at 21.5 feet.*
					25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-04
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

31930

Equipment Hollow-Stem Auger
8"-diameter

Elevation 164.88 (grnd) Date 1-18-92

Blows/foot	Recovery (inches)	OVA (ppm)	OVM (ppm)	Odor	Depth (ft.)	Sample	
					0		BROWN SILTY SAND WITH GRAVEL (SM-SP)
20	17	98	52	none to slight	5		@ 5': dark brown (7.5YR 3/2), medium dense, moist, fine-grained, 10-15% silt, no gravel
19	16	0.2 1.2	.25 ND	slight none	10		below 8' driller reported diesel odor from cuttings @ 8.5': sampler hammer wet with diesel-like fluid
33	15	0.5	ND	none	15		YELLOWISH-BROWN SAND (SP) (10YR 5/8): dense, moist, fine- to medium-grained
50	16	1.5	ND	none	20		@ 20': very dense, medium-grained
					25		*Bottom of boring at 21.5 feet.*

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-05
Site Characterization
Site 16 – DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B6**

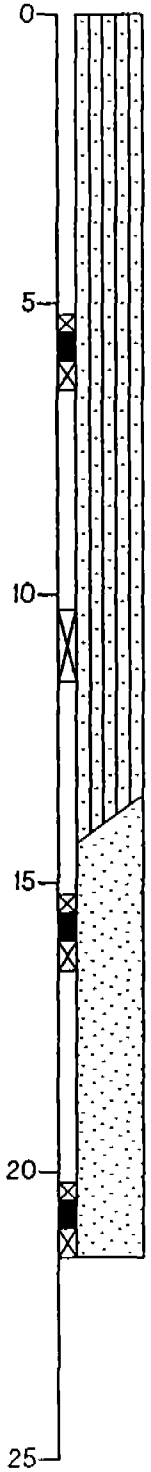
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

31931

Equipment Hollow-Stem Auger
8"-diameter

Elevation 165.15 (grnd) Date 1-17-92

Blows/foot	Recovery (inches)	OVA (ppm)	OVM (ppm)	Odor	Depth (ft.)	Sample	
					0		DARK BROWN SILTY SAND (SM) (7.5YR 4/4): fine- to medium-grained, 10-15% silt
52	16	2.0	ND	none	5		@ 5': very dense, moist
22	16	1.0	ND	none	10		@ 10': medium dense
33	16	0.5	ND	none	15		YELLOWISH-BROWN SAND (SP) (10YR 5/8): dense, moist, medium-grained
54	17	0.7	ND	none	20		@ 20': very dense
					25		*Bottom of boring at 21.5 feet.*



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-08
Site Characterization
Site 16 – DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B7**

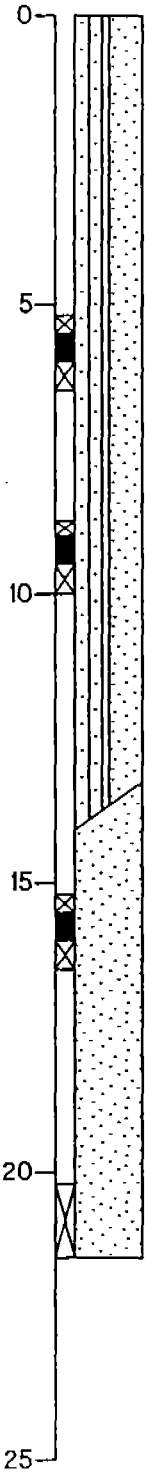
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

31932

Equipment Hollow-Stem Auger
8"-diameter

Elevation 165.38 (grnd) Date 1-18-92

Blows/foot	Recovery (inches)	OVA (ppm)	OVM (ppm)	Odor	Depth (ft.)	Sample	
					0		DARK BROWN SILTY SAND TO SAND (SM-SP): fine-grained, 10-15% silt
					5		
41	16	4.0 2.0	NA ND	slight slight			@ 5': very dark brown to black (10YR 2/2 to 2/1), dense, moist, heavily stained, (hydrocarbons) smelled below 7'
19	17	0.8	ND	none			@ 8.5': dark brown (7.5YR 3/4), 5-10% silt, top 6" has black stains
					10		
					15		
39	17	0.4	ND	none			YELLOWISH-BROWN SAND (SP) (10YR 5/8): dense, moist, fine- to medium-grained
					20		
39	16	ND	ND	none			@ 20': as above
					25		*Bottom of boring at 21.5 feet.*



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-07
Site Characterization
Site 16 – DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

31933

Equipment Hollow-Stem Auger
8"-diameter

Elevation 130.37 (grnd) Date 02-01-92

Blows/foot	Recovery (inches)	OVA Reading* (ppm)	Odor	Depth (ft.)	Sample	
				0		
				5		
30	16	ND	none	10		VERY DARK GRAYISH-BROWN SAND TO CLAYEY SAND (SP-SC) (10YR 3/2): medium dense, moist, fine to medium sand, 5-10% clay BROWNISH-YELLOW SAND (SP) (10YR 6/6): medium dense, moist, fine- to medium-grained
85	14	ND	mild chem	15		@ 15': very dense
59	17	ND	none	20		@ 20': yellow (2.5Y 7/6), very fine sand, up to 10% silt *Bottom of boring at 21.5 feet.* *Water running into hole from surface.*
				25		

NOTES: Boring previously hand augered to 8 ft. for UXB clearance
** OVA may not have been operating properly*

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-08
Site Characterization
Site 16 – DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B9**

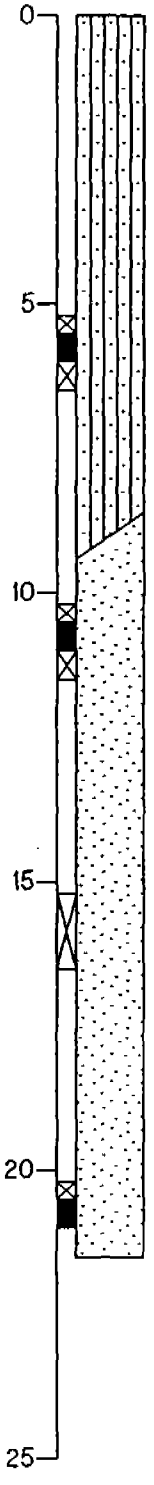
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	10776 687		12/92	

31934

Equipment Hollow-Stem Auger 8"-diameter

Elevation 132.91 (grnd) Date 02-01-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
			mild organic?	0		VERY DARK GRAYISH-BROWN SILTY SAND (SM) (10YR 3/2): moist, very fine- to fine-grained
16	17	ND	mild organic	5		@ 5': dark yellowish-brown (10YR 4/4): medium dense, very fine- to medium-grained
19	16	ND	none	10		PALE YELLOW SAND (SP) (2.5Y 7/4): medium dense, moist, fine- to medium-grained
60	16	ND	none	15		@ 15': very dense
92	11	ND	none	20		@ 20': light olive-brown (2.5Y 5/4), very fine- to fine-grained, up to 10% clay
				25		*Bottom of boring at 21.5 feet. No groundwater encountered.*



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-09
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B10**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	10776 687		12/92	

31936

Equipment Hollow-Stem Auger
8"-diameter

Elevation 133.25 (grnd) Date 02-01-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
			slight organic odor	0		BROWN SILTY SAND (SM) (10YR 4/3): moist, very fine- to medium-grained
17	15	ND	none	5		LIGHT OLIVE-BROWN SAND (SP) (2.5Y 5/6): medium dense, moist, very fine- to medium-grained
23	15	ND	none	10		@ 10': light yellowish-brown (2.5Y 6/4), very fine- to fine-grained
48	15	ND	none	15		@ 15': dense
39	17	ND	none	20		@ 20': yellow (2.5Y 7/6)
				25		*Bottom of boring at 21.5 feet. No groundwater encountered.*

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-11
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B12**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	10776 687	E B	12/92	

31937

Equipment Hollow-Stem Auger
8"-diameter

Elevation 128.58 (grnd) Date 02-01-92

Blows/foot	Recovery (inches)	OVA Reading* (ppm)	Odor	Depth (ft.)	Sample	
			mild petroleum	0		VERY DARK BROWN CLAYEY SAND (SC) (10YR 2/2): moist, no oil films.
				5		
31	15	NA	none	10		BROWNISH-YELLOW SAND (SP) (10YR 6/6): dense, moist, medium-grained
67	17	NA	none	15		@ 15': very dense, very fine- to fine-grained
47	15	NA	none	20		@ 20': dense
				25		*Bottom of boring at 21.5 feet. No groundwater encountered.*

NOTES: Boring previously hand augered to 8 ft. for UXB clearance
** OVA not operating properly*

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-12
Site Characterization
Site 16 – DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B13**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	10776 687		12/92	

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 10-20-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9342B016	0		CONCRETE PAD
						DARK BROWN SAND (SP) (7.5YR 4/3); loose to medium dense, moist, medium sand, 10% silt
		ND				
						@ 3.5 feet: dark brown (2.5YR 3/3)
		ND	063F	5		@ 4.5 feet: very dark gray (2.5YR n3/1), petroleum hydrocarbon staining
						@ 4.75 feet: dark brown (7.5YR 3/3)
		ND				
						@ 7.5 feet: dark yellowish brown (10YR 3/4)
			066F			
		ND				
				10		@ 9.5 feet: dark yellowish brown (10YR 4/6), medium dense
		ND				
						@ 11.5 feet: yellowish brown (10YR 5/6)
				15		@ 15 feet: as above
		ND				
				20		@ 18 to 20 feet: no recovery
						Bottom of boring at 20 feet. No groundwater encountered. Borehole backfilled with cement grout (10/20/93)
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-13
Site 16 - DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B14

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	1/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 10-20-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample
			9342B016	0	
21					
24					
			071F	5	
		ND			
			072F		
		ND		10	
		ND		15	
				20	
				25	

LIGHT OLIVE BROWN SILTY SAND WITH GRAVEL (SM) (2.5YR 5/3): medium dense, dry, fine to coarse sand, 25% fine to coarse subangular granitic gravel, 20% silt, fill

DARK YELLOWISH BROWN SAND (SW) (10YR 4/4): medium dense, dry, medium sand, 10% silt, fill

@ 2.0 feet: dark brown (10YR 3/3)

DARK BROWN SAND (SP) (10YR 3/3): medium dense, moist, medium sand, 10% silt

@ 6.5 feet: dark yellowish brown (10YR 4/6)

@ 11.5 feet: yellowish brown (10YR 5/6)

@ 15 feet: as above

@ 18 to 20 feet: no recovery

Bottom of boring at 20 feet. No groundwater encountered. Borehole backfilled with cement grout (10/20/93)

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-14
Site 16 - DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B15**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	1/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 10-20-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9342B016	0		LIGHT OLIVE BROWN SILTY SAND WITH GRAVEL (SM) (2.5YR 5/3): medium dense, dry, fine to coarse sand, 25% fine to coarse gravel, 20% silt, fill
		ND				OLIVE GRAY SAND (SP) (5Y 4/2): medium dense, moist, medium sand, 10% silt
						@ 3 feet: yellowish brown
		ND				
				5		@ 5 feet: dark brown (10YR 3/3)
		>1000	074F			@ 6.5 feet: very dark gray, moist to wet, petroleum hydrocarbon staining
		30				
		4	075F			@ 8.5 feet: very dark brown
		0.5		10		@ 10 feet: dark yellowish brown
		ND				@ 11.5 feet: yellowish brown (10YR 5/6)
		ND				
				15		@ 15 feet: as above
		ND	076F			
				20		@ 18 to 20 feet: no recovery
						Bottom of boring at 20 feet. No groundwater encountered. Borehole backfilled with cement grout (10/20/93)
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-15
Site 16 - DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B16**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	1/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 10-21-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number (9342B016)	Depth (ft.)	Sample	Description
				0		LIGHT OLIVE BROWN SILTY SAND WITH GRAVEL (SM) (2.5Y 5/3): medium dense, dry, fine to coarse sand, 30% fine to coarse subangular granitic gravel, 15% silt, fill
						OLIVE GRAY SAND (SP) (5Y 4/2): medium dense, moist, medium sand, 10-15% silt
21		ND	077F			@ 1.5 feet: yellowish brown
20		ND	078F			@ 2.5 feet: dark brown (10YR 3/3)
			079F			@ 4 feet: very dark grayish brown (2.5Y 3/2)
				5		@ 4.5 feet: dark brown (10YR 3/3)
		ND	080F			@ 6 feet: black (10YR 2/1)
			081F	10		DARK YELLOWISH BROWN SAND (SW) (10YR 3/6): medium dense, moist, fine to medium sand, 10% silt
		ND				YELLOWISH BROWN SAND (SP) (10YR 5/6): medium dense, moist, medium sand, 10% silt
				15		@ 15 feet: as above
		ND				
				20		@ 18 to 20 feet: no recovery
						Bottom of boring at 20 feet. No groundwater encountered. Borehole backfilled with cement grout (10/21/93)
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-16
Site 16 - DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B17**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	1/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 10-21-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			93428016	0		LIGHT OLIVE BROWN SILTY SAND WITH GRAVEL (SM) (2.5Y 5/3): medium dense, dry, fine to coarse sand, 25% fine to coarse subangular granitic gravel, 20% silt, fill
						YELLOWISH BROWN SAND (SP) (10YR 5/6): medium dense, dry, medium sand, 10% silt
						@ 2 feet: very dark grayish brown, becomes moist
		0.5				
				5		@ 5 feet: dark brown
		0.5	083F			@ 7 feet: black (10YR 2/1), possible petroleum hydrocarbon staining
						@ 8.5 feet: dark brown
		0.5	084F	10		
		ND				
						@ 12.5 feet: dark yellowish brown
						@ 13 feet: yellowish brown
				15		@ 15 feet: as above
		ND				
				20		@ 18 to 20 feet: no recovery
						Bottom of boring at 20 feet. No groundwater encountered. Borehole backfilled with cement grout (10/21/93)
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-17
Site 16 – DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B18

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	1/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 10-21-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Description
			9342B016	0	LIGHT OLIVE BROWN CLAYEY SAND WITH GRAVEL (SC) (2.5Y 5/3): medium dense, dry, fine to coarse sand, 25% clay, 20% fine to coarse gravel, fill
		ND			YELLOWISH BROWN SAND (SP) (10YR 5/6): medium dense, dry, medium sand, 10% silt
					@ 1.5 feet: dark brown
				5	@ 5 feet: dark yellowish brown (10YR 4/4), moist
		500			
			095F		@ 7 feet: dark brown (10YR 3/3)
		500			@ 8.5 feet: very dark gray (10YR 3/1), petroleum hydrocarbon staining
				10	
		30			
		ND	096F		
			097F	15	@ 15 feet: yellowish brown (10YR 5/6)
		ND			
				20	@ 18 to 20 feet: no recovery
					Bottom of boring at 20 feet. No groundwater encountered. Borehole backfilled with cement grout (10/21/93)
				25	

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-19
Site 16 – DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B20

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	1/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 10-22-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9342S016	0		
		ND				LIGTH OLIVE BROWN SILTY SAND WITH GRAVEL (SM) (2.5Y 5/3): medium dense, dry, fine to coarse sand, 20% silt, 20% fine to coarse subangular granitic gravel, fill
						DARK YELLOWISH BROWN SILTY SAND (SM) (10YR 4/6): medium dense, dry, fine sand, 20% silt
						YELLOWISH BROWN SAND (SP) (10YR 5/8): medium dense, dry to moist, fine sand
		ND	211F	5		@ 4.5 feet: dark yellowish brown (10YR 3/4)
						@ 6 feet: dark yellowish brown (10YR 5/6)
						@ 7 feet: loose
						@ 8 feet: dark yellowish brown (10YR 3/6)
						@ 9 feet: dark grayish brown (10YR 3/2), petroleum hydrocarbon staining
		ND	212F	10		@ 9.5 feet: (10YR 3/1 to 2/1), petroleum hydrocarbon staining
						@ 12.5 feet: dark yellowish brown (10YR 4/6)
		ND	213F	15		@ 14 feet: dark gray to black (10YR 3/1 to 2/1), petroleum hydrocarbon staining
		ND	214F			
						@ 16.5 feet: strong brown (7.5YR 4/6), loose
		ND				@ 18 feet: yellowish brown (10YR 5/8)
		ND		20		*Bottom of boring at 20 feet.* No groundwater encountered. Borehole backfilled with cement grout (10/22/93)
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-20
Site 16 - DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B21**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	1/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 02-28-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9409G016	Depth (ft.)	Sample
				0	VERY DARK BROWN SAND (SP) (10YR 2/2): loose, moist, fine sand, 10-15% silt
				5	@ 4 feet: dark yellowish brown (10YR 3/4): medium dense, 5% silt
17	17	ND	096F		
					@ 9 feet: brownish yellow (10YR 6/6)
				10	@ 10 feet: as above
49	16	ND	097F		
				15	@ 15 feet: dense
73	17	ND			
				20	@ 20 feet: very dense
89	17	ND	099F		
				25	*Bottom of boring at 21.5 feet.* No groundwater encountered. Borehole backfilled with cement grout (02/28/94)

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-21
Site 16 - Pete's Pond
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B22

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 02-28-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9409Y016	Depth (ft.)	Sample	
				0		DARK BROWN SAND (SP) (10YR 3/6): loose, dry, fine to medium sand, roots in top 6 inches
24	18	ND				
						@ 3 feet: brown (10Y 5/3)
	24	ND	011F	5		@ 4.5 feet: dark yellowish brown (10YR 4/6)
						@ 9 feet: yellowish brown (10YR 5/6), medium dense, moist, 0-5% silt
	24	ND	012F	10		
	20	ND		15		@ 15 feet: brownish yellow (10YR 6/8)
	12	ND	014F	20		*Bottom of boring at 20 feet.* No groundwater encountered. Borehole backfilled with cement grout (02/28/94)
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-22
Site 16 – Pete's Pond
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B23

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation 132 ft. (grnd) (approx) Date 02-25-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9408G016	Depth (ft.)	Sample
				0	DARK BROWN SAND (SP) (10YR 3/4): loose, moist, fine sand, 5-15% silt
27	10		087F		
24	4				@ 3.5 feet: increase in moisture content
				5	
12		ND	088F		
					@ 9 feet: yellowish brown (10YR 5/6), medium dense, fine to medium sand
				10	@ 10 feet: dense
61	20	6	089F		
				15	@ 15 feet: light yellowish brown (10YR 6/4)
72	16	8			
				20	@ 20 feet: very dense
94	14	ND			
				25	

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-23
Site 16 – Pete's Pond
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B24

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation 132 ft. (grnd) (approx) Date 02-25-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9408G016	25		@ 25 feet: as above
85	16	ND	092F			
				30		@ 30 feet: yellowish brown (10YR 5/6)
92	13	ND				
				35		@ 35 feet: as above
100	16	ND				
				40		@ 40 feet: as above
74	17	ND	095F			
						Bottom of boring at 41.5 feet. No groundwater encountered. Borehole backfilled with cement grout (02/25/94)
				45		
				50		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-23
Site 16 - Pete's Pond
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B24

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation ~139 ft. MSL Date 03-01-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9409G016	Depth (ft.)	Sample	
				0		VERY DARK BROWN SAND (SP) (10YR 2/2): loose, moist, fine sand, 10-15% silt, rust stains
31	21	ND				
			101F			
			101F			
				5		
35	10	ND	102F			
						@ 8.5 feet: yellowish brown (10YR 5/4): medium dense, fine to medium sand, no silt
				10		
						@ 11 feet: dry
22	17	ND				
						@ 14 feet: yellowish brown (10YR 6/4), moist
				15		
						@ 16 feet: brownish yellow (10YR 6/6), fine sand
43	23	ND	104F			
			104F			
			104F			
88		ND	104F			
				20		@ 20 feet: as above
42	16	ND				
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-24
Site 16 - Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B25**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation ~139 ft. MSL Date 03-01-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9409G016	25		@ 25 feet: as above
36	17	ND				
				30		@ 30 feet: as above
47		ND	107F			
						Bottom of boring at 31.5 feet. No groundwater encountered. Borehole backfilled with cement grout (03/02/94)
				35		
				40		
				45		
				50		

FTO

PLA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-24
Site 16 – Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

B25

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-15-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9411Y016	Depth (ft.)	Sample	
				0		DARK BROWN SAND (SP) (10YR 3/3): loose, moist, fine to medium sand Hand augered for first 5 feet
						@ 4 feet: yellowish brown (10YR 5/6), fine sand
				5		
40	20	ND				@ 6 feet: brownish yellow (10YR 6/6), medium dense
				10		
56	20	ND	085F			@ 11 feet: dense
				15		@ 15 feet: fine to medium sand
54	16	ND	086F			
				20		@ 20 feet: very dense
88	18	ND				
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-25
Site 16 - Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B26

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-15-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9411Y016	25		@ 25 feet: yellowish brown (10YR 5/4), fine sand
74	18	ND	088F			
				30		@ 30 feet: as above
84	18	ND	089F			
						Bottom of boring at 31.5 feet. No groundwater encountered. Borehole backfilled with cement grout (03/15/94)
				35		
				40		
				45		
				50		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-25
Site 16 - Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B26

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation ~146 ft. MSL Date 03-03-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9409Y016	Depth (ft.)	Sample	
				0		VERY DARK GRAYISH BROWN SAND (SP) (10YR 3/2): loose, moist, fine to medium sand, 0-5% silt
9	12	ND				
						@ 2 feet: dark yellowish brown (10YR 3/4)
			020F			
			020F			
13	18	ND	020F			
				5		
29	24	ND	021F			@ 6 feet: yellowish brown (10YR 5/4), medium dense, dry
				10		
45	24	ND				@ 11 feet: brownish yellow (10YR 6/6), moist
				15		@ 15 feet: yellowish brown (10YR 3/6), very dense
93	18	ND	023F			
			024F			
			024F			
			024F			
97/10"	18	ND	024F			
				20		
96	18	ND				
				25		@ 24.5 feet: yellowish brown (10YR 5/6), dense, moist, medium sand

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-26
Site 16 - Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B27

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation ~146 ft. MSL Date 03-03-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9409Y016	25		@ 25 feet: as above
80/10"	10	ND				
				30		@ 30 feet: as above
88	16	ND	027F			
						Bottom of boring at 31.5 feet. No groundwater encountered. Borehole backfilled with cement grout (03/03/94)
				35		
				40		
				45		
				50		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-26
Site 16 – Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B27

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFm	03/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-12-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9410Y016	Depth (ft.)	Sample	
				0		DARK YELLOWISH BROWN SAND (SP) (10YR 3/6): loose, moist, fine sand, 0-5% silt
54	22	ND				@ 2 feet: yellowish brown (10YR 5/6), dense
						@ 3.5 feet: dark yellowish brown (10YR 4/6)
				5		@ 5 feet: dense
80	22	ND	074F			
				10		@ 10 feet: as above
56	22	ND				
						@ 13 feet: black (10YR 2/1)
				15		
92	16	ND	076F			@ 15.5 feet: yellowish brown (10YR 5/8), very dense
				20		@ 19.5 feet: dark yellowish brown (10YR 4/6), medium dense
26	18	ND				
				25		@ 24 feet: yellowish brown (10YR 5/8), moist

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-27
Site 16 - Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B28

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-12-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample
			9410Y016	25	@ 25.5 feet: brownish yellow (10YR 6/8)
48	18	ND			
				30	@ 30 feet: dense
52	18	ND			
				35	@ 35 feet: very dense, fine to medium sand
94/10"	16	ND			
				40	@ 40 feet: fine sand
85	10	ND	081F		
					Bottom of boring at 43 feet. No groundwater encountered. Boring backfilled with cement grout (03/12/94)
				45	
				50	

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-27
Site 16 – Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B28

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RGM	04/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation ~136 ft. MSL Date 03-01-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9409Y016	Depth (ft.)	Sample
				0	DARK YELLOWISH BROWN SAND (SP) (10YR 3/6): loose, dry, fine to medium sand
32	24	ND	015F		@ 1 foot: very dark brown (10YR 2/2), medium dense, moist, 0-5% silt
					@ 4 feet: as above
29	24	ND	016F	5	
					@ 8.5 feet: yellowish brown (10YR 5/8)
44	24	ND		10	*Bottom of boring at 10 feet.* No groundwater encountered. Borehole backfilled with cement grout (03/01/94)
				15	
				20	
				25	

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-28
Site 16 – Pete's Pond Extension
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B29

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 041711	RFM	03/94	04/29/94

31941

Top of Casing Elev. 136.63

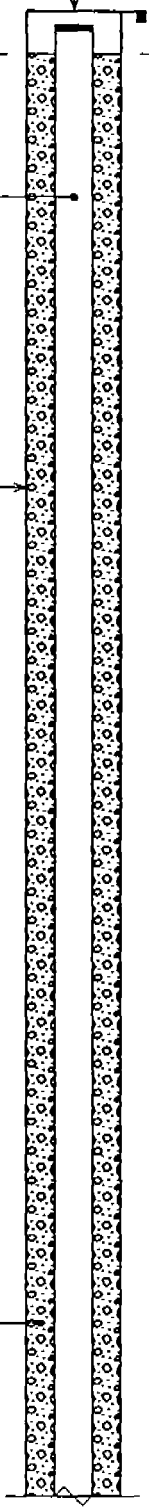
LOCKING STEEL COVER

GROUND SURFACE

4" DIAMETER SCHEDULE 40 PVC BLANK CASING: 0 to 101.4 ft.

10" DIAMETER BOREHOLE: 0 to 117.5 ft.

CEMENT/ BENTONITE SEAL: 0-91.4 ft.



Equipment Dual Tube Percussion
10"-diameter casing

Elevation 134.40 (grnd) Date 2-3-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Depth (ft.)	Sample	
			0		[Hole previously augered to 20 feet]
			10		
19	16	ND	20		YELLOW SAND (SP) (10YR 7/6): medium dense, moist, fine sand, 3-5% silt
21	18	ND			@ 26': as above
20	17	0.2	30		@ 30': as above
27	16	0.1			@ 35': pockets of coarse sand
26	18	0.1	40		@ 40': very pale brown (10YR 7/4), dense, 100% very fine to fine sand
18	16	ND			@ 46': as above
			50		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-16-01-A
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B31**

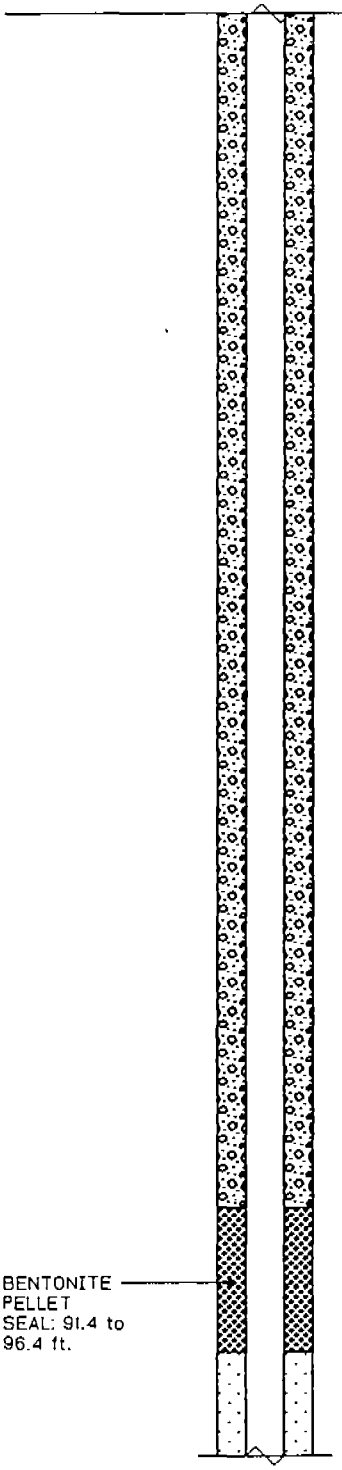
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

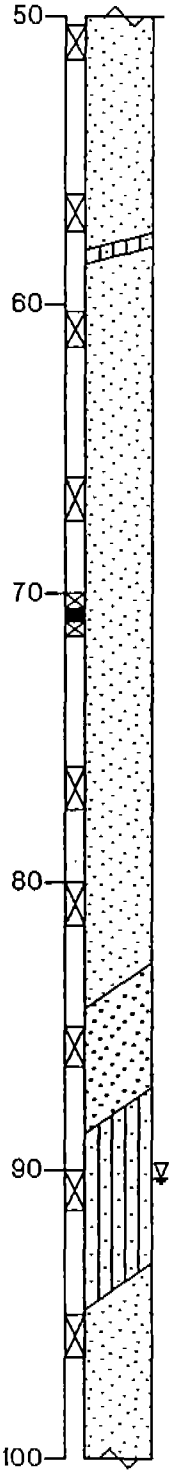
31942

Equipment Dual Tube Percussion
10"-diameter casing

Elevation 134.40 (grnd) Date 2-3-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)
23	14	ND
21	16	0.1
27	15	ND
26	18	0.1
21	18	0.1
22	18	ND
14	18	0.2
23	11	NA
20	18	ND
40	8	NA
NA	0	NA





@ 50': as above

@ 56': as above

BROWN SILTY SAND (SM) (10YR 4/3): wet, fine sand, 15-20% silt

YELLOW SAND (SP) (10YR 7/6): dense, moist, 100% fine sand

@ 66': as above

@ 70': medium dense

@ 76': very pale brown (10YR 7/4), 100% very fine to fine sand

@ 80': as above

LIGHT YELLOWISH-BROWN SAND (SW) (10YR 6/4): medium dense, wet, 100% fine to coarse sand

YELLOWISH-BROWN SILTY SAND (SM) (10YR 5/4): medium dense, wet, 85% fine to coarse sand, 15% silt

@ 90': saturated

YELLOW SAND (SP) (10YR 8/6): very dense, wet, 100% coarse sand

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-16-01-A
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

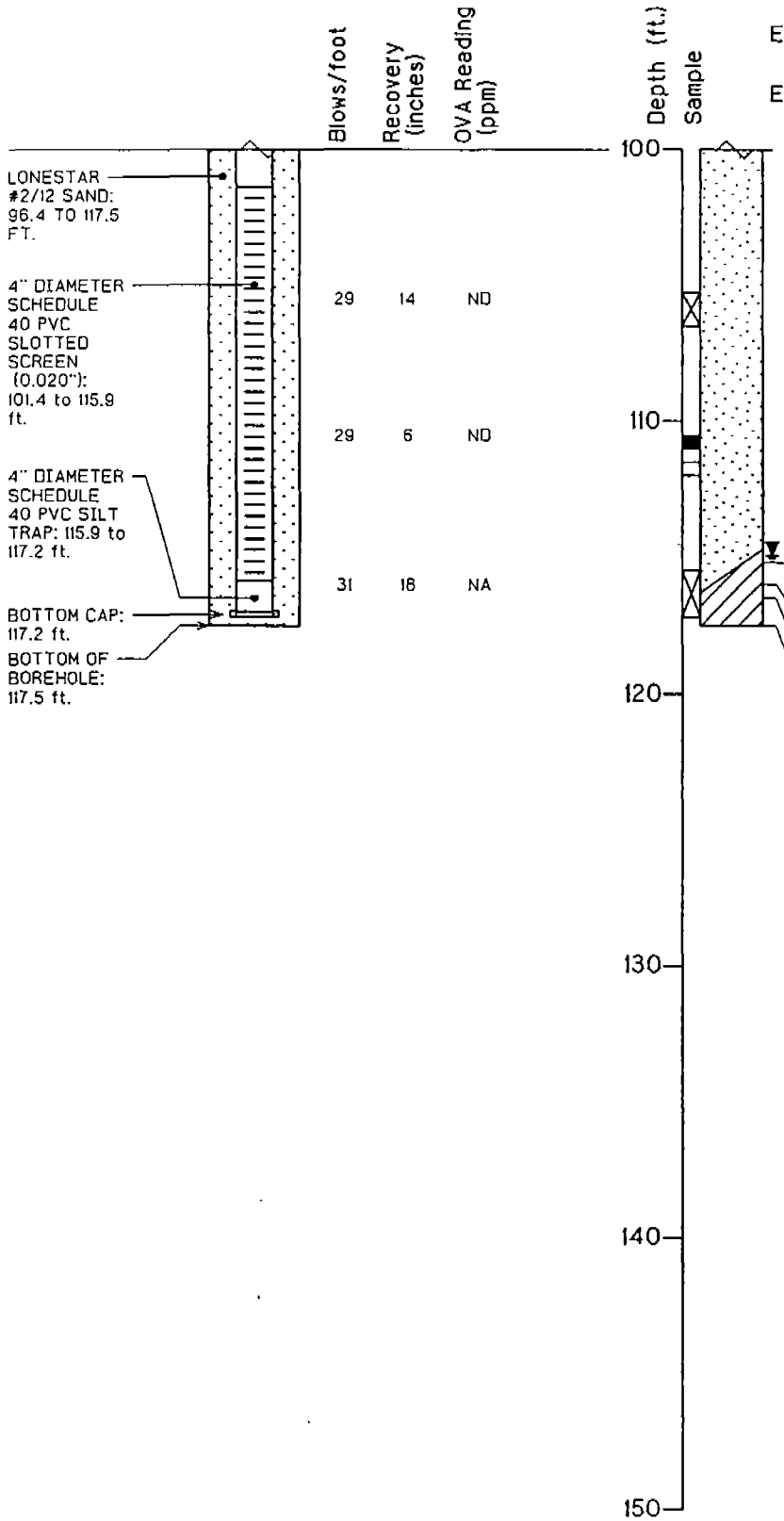
PLATE **B31**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687		12/92	

31943

Equipment Dual Tube Percussion
10"-diameter casing

Elevation 134.40 (grnd) Date 2-3-92



@ 100': no recovery

@ 105': dense

@ 110.5': yellow (10YR 7/6), coarse sand, 3-5% gravel

@ 114.7': static groundwater

@ 115': yellowish-brown gravelly sand (10YR 5/6), coarse sand, 15-20% gravel

MOTTLED GRAY CLAY (CL) (5Y 6/1): hard, moist

@ 116.5': dark greenish-gray (5Y 4/1)

Bottom of boring at 117.5 feet.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-16-01-A
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B31**

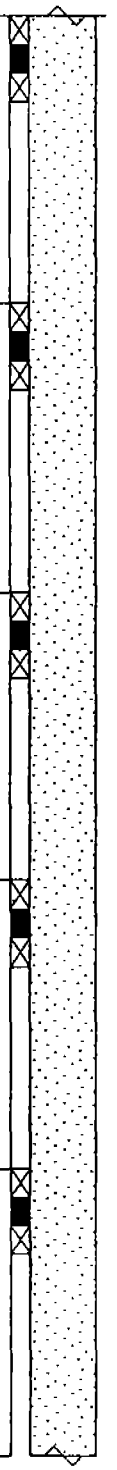
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 687	EB	12/92	

31649

Equipment Hollow Stem Auger
8"-diameter

Elevation _____ Date 01-16-92

Blows/6 in.	Recovery (inches)	OVA/OVM Reading (ppm)	Odor	Depth (ft.)	Sample	
65	17	700	none	25		@25': very dense
64	16	220	none	30		@30': as above
49	15	400	none	35		@35': dark yellowish-brown (10YR 4/6), medium-grained, dense, moist to wet
55	16	950	none	40		@40': very dense
63	15	250	none	45		@45': as above
				50		



Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-17-01
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE
B32

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31650

Equipment Hollow Stem Auger
8"-diameter

Elevation _____ Date 01-16-92

Blows/6 in.	Recovery (inches)	OVA/OVM Reading (ppm)	Odor	Depth (ft.)	Sample	
65/6"	11	ND	none	50		@50': as above
61/6"	10	ND	none	55		@55': moist
34	10	ND	none	60		@60': as above
						Bottom of boring at 61.5 ft.
				65		
				70		
				75		

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-17-01
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE
B32

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-04-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9409G017	Depth (ft.)	Sample
99	17	ND		0	ASPHALT AGGREGATE SUBBASE DARK BROWN SAND (SP) (10YR 3/3): very dense, moist, fine sand, <5% silt @ 2 feet: dark yellowish brown (10YR 3/6)
				5	@ 5 feet: loose
12	10	ND	109F		@ 6.5 feet: very dark brown (10YR 2/2), 20-30% large pieces of white clay (CH) (10YR 8/1) in shoe with rust coloration
				10	@ 10 feet: dark yellowish brown (10YR 4/4)
13	18	ND			
				15	
25	20	ND			@ 16 feet: medium dense @ 18 feet: yellowish brown (10YR 5/6), no silt
				20	
37	18	ND	112F		
					@ 23 feet: brownish yellow (10YR 6/6) very dense, fine to medium sand
				25	

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-03
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B34

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-04-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9409G017	25		@ 25 feet: as above
86	18	ND				
				30		@ 30 feet: fine sand
98	14	ND				
						Bottom of boring at 31.5 feet. No groundwater encountered. Borehole backfilled with cement grout (03/04/94)
				35		
				40		
				45		
				50		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-03
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

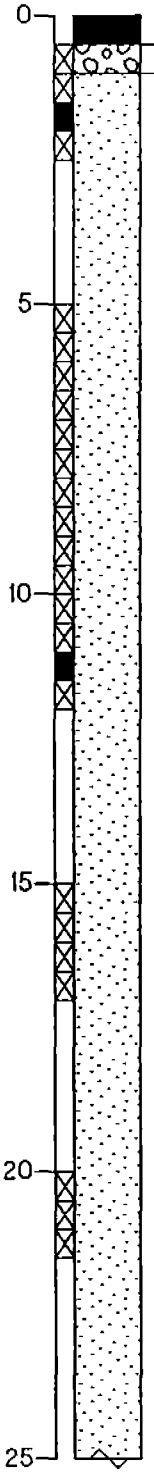
PLAT
B34

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RAM	03/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 03-04-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9409Y017	Depth (ft.)	Sample
76	18	ND	028F	0	
53	18	ND		5	
22	24	ND	030F	10	
22	16	ND		15	
44	18	ND		20	
				25	



ASPHALT

AGGREGATE SUBBASE

DARK YELLOWISH BROWN SAND (SP) (10YR 4/6): dense, dry, fine to medium sand

@ 6 feet: brownish yellow (10YR 6/6)

@ 7 to 10 feet: mottled with very pale brown (10YR 8/3) and brownish yellow (10YR 6/6)

@ 11 feet: dark yellowish brown (10YR 3/4), medium dense

@ 15 feet: yellowish brown (10YR 5/6)

@ 20 feet: brownish yellow (10YR 6/8)

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-04
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B35

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 03-04-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9409Y017	25		
88	18	ND				@ 26 feet: very dense
				30		@ 30 feet: as above
92/10"	18	ND	034F			
				35		
				40		
				45		
				50		

Bottom of boring at 31.75 feet. No groundwater encountered. Borehole backfilled with cement grout (03/04/94)

FTO

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-17-04
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B35

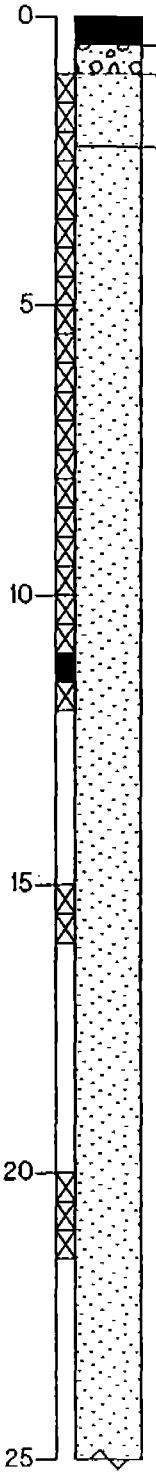
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-07-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number
			9410G017
132	22	ND	
68	22		
61	20	ND	
69	16		117F
74/6"	11	ND	
105	16	ND	

Depth (ft.) Sample



ASPHALT

OLIVE GRAVEL WITH SAND (GW) (5Y 4/4): dense, moist, 1/4-3/4" subangular gravel, 30% fine sand

DARK YELLOWISH BROWN SAND (SP) (10YR 3/4): very dense, moist, fine sand, 10-15% silt

@ 2.5 feet: brownish yellow (10YR 6/6): dense, <5% silt

@ 11 feet: no silt

@ 15 feet: as above

@ 20 feet: as above

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-05
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B36

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFGH	03/94	

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-07-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9410G017	25		@ 25 feet: as above
55/6"	10	ND				
				30		@ 30 feet: as above
60/6"	10	ND	121F			*Bottom of boring at 31 feet.* No groundwater encountered. Borehole backfilled with cement grout (03/07/94)
				35		
				40		
				45		
				50		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-05
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B36

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 03-07-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9410Y017	Depth (ft.)	Sample
				0	ASPHALT
					DARK YELLOWISH BROWN SAND (SP) (10YR 3/6): dense, dry, fine to medium sand
78	18	ND	035F		@ 1.75 feet: brownish yellow (10YR 6/6)
					@ 4 feet: yellowish brown (10YR 5/1)
61	18	ND		5	
				10	@ 10 feet: as above
78	18	ND	037F		
				15	
					@ 16 feet: as above
60/4"	8	ND			
				20	@ 20 feet: as above
60/4"	10	ND			
				25	

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-08
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B37

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/28/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 03-07-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9410Y017	25		@ 25 feet: as above
105/10"	12	ND				
				30		@ 30 feet: as above
94	12	ND	041F			
						Bottom of boring at 32 feet. No groundwater encountered. Borehole backfilled with cement grout (03/07/94)
				35		
				40		
				45		
				50		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-06
Site 17 – Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B37

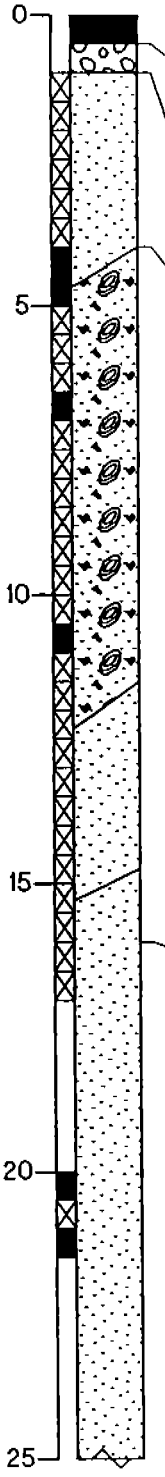
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	03/94	04/28/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-08-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number 9410G017
65	20	ND	
			122F
15	20		122F
11	17	ND	123F
			124F
13	15	ND	
51	12		
8	14		
41	15	ND	
90	10		
			126F
87	16	1	126F

Depth (ft.) / Sample



ASPHALT

OLIVE GRAVEL WITH SAND (GP) (5Y 4/3): medium dense, moist, 1/4" to 3/4" subangular fine gravel, 20-25% fine sand, fill

DARK BROWN SAND (SP) (10YR 3/3): medium dense, moist, fine sand, 5-10% silt, fill

@ 3.5 feet: brownish yellow (10YR 6/6) loose, fine to medium sand

DARK YELLOWISH BROWN SAND (SP) (10YR 3/4): loose, moist, fine sand, 20-25% debris (glass, gauze, wood, wire, banding, rusted metal), fill

@ 9 feet: 5% debris

VERY DARK BROWN SAND (SP) (10YR 2/2): medium dense, moist, fine sand, 5-10% silt, trace debris (wood, wire, glass, rusted containers, strips of metal), fill

@ 14 feet: loose

LIGHT OLIVE BROWN SAND (SP) (2.5Y 5/3): medium dense to dense, moist, fine to medium sand

@ 16 feet: very dense

@ 20 feet: as above

@ 22 feet: light yellowish brown (2.5Y 6/3)

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-07
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B38

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter
Elevation _____ Date 03-08-94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample
			9410G017		
			127F	25	@ 25 feet: as above
112	17	1			
				30	@ 30 feet: as above
93	10	1	128F		
				35	@ 35 feet: as above
87	10	1			
				40	@ 40 feet: as above
90	16	ND			
				45	
				50	

Bottom of boring at 41.5 feet. No groundwater encountered. Borehole backfilled with cement grout (03/08/94)

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-07
Site 17 – Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B38

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
3-1/4" diameter

Elevation _____ Date 03-09-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number 9410Y017	Depth (ft.)	Description
					0	ASPHALT
						ASPHALT SUBBASE AGGREGATE
						DARK YELLOWISH BROWN SAND (SP) (10YR 3/6): dense, dry, fine sand, fill
53	12	ND	ND			
						DARK YELLOWISH BROWN SAND WITH DEBRIS (SP) (10YR 3/6): loose, dry, fine sand, 15-20% debris (glass, metal, wood)
8	4	ND	ND		5	
						@ 6 feet: dark brown (10YR 3/3): medium dense, moist, 15-25% debris (broken glass, ceramic, hair or twine)
24	4	ND	ND			
						@ 9 feet: yellowish brown (10YR 5/6) layered with dark brown (10YR 3/3) and black
	10	ND	ND		10	
						DARK BROWN SILTY SAND WITH DEBRIS (SM) (10YR 3/3): medium dense, moist, fine sand, 20-35% debris (broken glass, metal, steel cans and tops, 60mm mortar cannister, safety pin cover)
34	10	ND	ND	043F		
46	3	ND	ND			
					15	
				044F		
				044F		
						LIGHT OLIVE BROWN SAND (SP) (2.5Y 5/3): medium dense, moist, fine to medium sand
47	18	ND	ND			
64	20	ND	10	047F		
					20	@ 20 feet: light yellowish brown (2.5Y 6/3), very dense
55/6"	14	ND	10			
					25	

FTO-OVA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-08
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B39

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	

Equipment Hollow-Stem Auger
3-1/4" diameter

Elevation _____ Date 03-09-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number	Depth (ft.)	Sample	
				9410Y017	25		
65/6"	10	ND	10				
54	18	ND	5				@ 29 feet: dark yellowish brown (10YR 4/6)
					30		
				051F			
48	18	ND	10	052F			
				051F			
					35		
				053F			
100/10"	12	ND	10				@ 36 feet: light yellowish brown (10YR 6/4)
					40		
92	15	ND	10				
				057F			
111	18	ND	6				*Bottom of boring at 44 feet.* No groundwater encountered. Borehole backfilled with cement grout (03/09/94)
					45		
					50		

FTO-OVA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-08
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B39

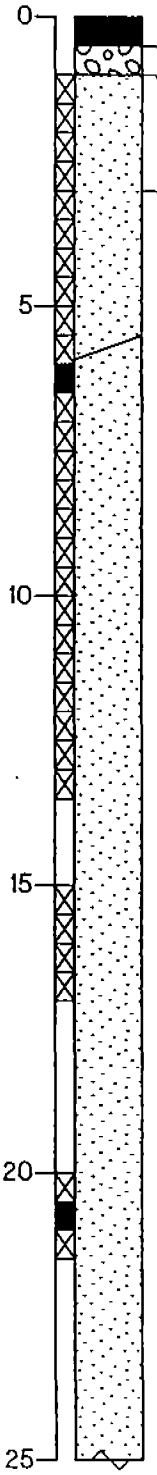
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-10-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number 9410G017
59	21	ND	ND	
27	23			
11	10	ND	ND	132F
88	16	ND	ND	
82				
90	20	ND	1	
98	15	ND	ND	135F

Depth (ft.) Sample



ASPHALT

OLIVE GRAVEL WITH SAND (GP) (5Y 4/3): loose, moist, subangular fine gravel, 20-25% fine sand, fill

DARK YELLOWISH BROWN SAND (SP) (10YR 3/4): medium dense, moist, fine sand, 5-10% silt, fill

@ 3 feet: brownish yellow (10YR 6/6) dense, trace debris (rusted metal)

DARK BROWN SAND (SP) (10YR 3/3): loose, moist, fine sand, <5% silt

@ 8 feet: brownish yellow (10YR 6/6) dense to very dense, fine to medium sand

@ 15 feet: as above

@ 20 feet: as above

FTO-OVA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-09
Site 17 ~ Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B40**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-10-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number	Depth (ft.)	Sample	
				94106017	25		@ 25 feet: as above
98	13	1	ND				
					30		@ 30 feet: as above
88	15	2	1				
							Bottom of boring at 31.5 feet. No groundwater encountered. Borehole backfilled with cement grout (03/10/94)
					35		
					40		
					45		
					50		

FTO-OVA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-09
Site 17 – Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B40

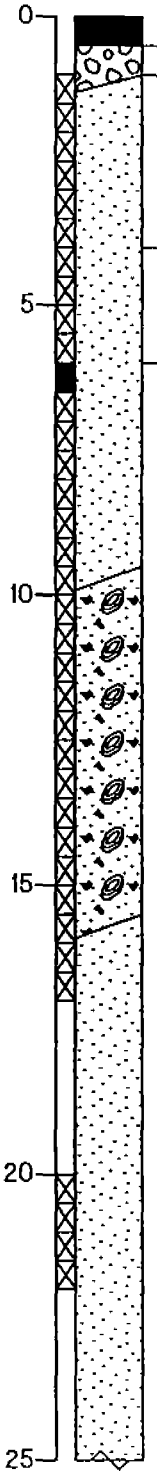
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 03-10-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number 9410Y017
27	20	ND	ND	
17	20	ND	ND	
19	22	ND	5	060F
	14			
13	20	2.5	ND	
	12	2.5	5	
60	20	ND	ND	
68	18	ND	7	

Depth (ft.) / Sample



ASPHALT

ASPHALT SUBBASE AGGREGATE

DARK YELLOWISH BROWN SAND (SP) (10YR 3/6): medium dense, moist, fine sand, 0–5% silt, fill

@ 3.5 feet: yellowish brown (10YR 5/8): loose, dry, fine to medium sand

@ 4 feet: dark yellowish brown (10YR 3/6)

@ 5.5 feet: yellowish brown (10YR 5/8)

@ 6 feet: dark yellowish brown (10YR 3/6), intermittent layers of 10–15% debris (broken glass, ceramic)

VERY DARK BROWN SAND WITH DEBRIS (SP) (10YR 2/2): loose, dry, fine sand, 0–25% debris (some non-charred wood, steel)

YELLOWISH BROWN SAND (SP) (10YR 5/8): dense, moist, fine to medium sand

@ 20 feet: brownish yellow (10YR 6/8)

FTO-OVA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-10
Site 17 – Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B41**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	

Equipment Hollow-Stem Auger
8" diameter

Elevation _____ Date 03-10-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number 9410Y017
70	18	ND	6	064F
80	18	ND	ND	

Depth (ft.) | Sample

25

@ 25 feet: as above

30

@ 30 feet: as above

Bottom of boring at 31.5 feet. No groundwater encountered. Borehole backfilled with cement grout (03/10/94)

35

40

45

50

FTO-OVA

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring SB-17-10
Site 17 – Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLAT
B41

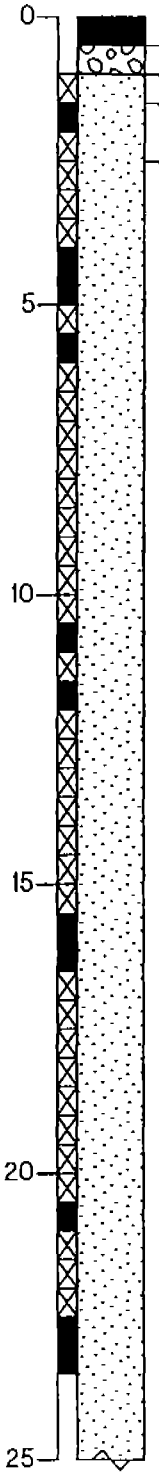
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-11-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number
				9410G017
				138F
103	19	ND	ND	
				139F
102	19			139F
				139F
105	21	ND	ND	
139				
73				
				140F
22	23	ND	ND	140F
28	16			
18	16			
				141F
18	16	ND	ND	141F
18	16			
21	16			
30	15	ND	ND	142F
56	16			
				142F
67	11			142F

Depth (ft.) Sample



ASPHALT

OLIVE GRAVEL WITH SAND (GP) (5Y 5/3): medium dense, moist, subangular fine gravel, 20-25% fine sand, fill

DARK YELLOWISH BROWN SAND (SP) (10YR 3/4): very dense, moist, fine sand, 5-10% silt

@ 1.5 feet: yellowish brown (10YR 5/6)

@ 2.5 feet: dark yellowish brown (10YR 3/4), 5% silt

@ 6 feet: yellowish brown (10YR 5/5), trace medium sand

@ 8 feet: dark brown (10YR 3/3), fine to medium sand

@ 10 feet: very dark brown (10YR 2/2), fine sand, 5% silt

@ 14.5 feet: dark yellowish brown: loose to medium dense

@ 20 feet: brownish yellow (10YR 6/6)

@ 22 feet: dense

@ 24.5 yellowish brown (10YR 5/6), very dense, fine to medium sand

FTO-OVA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-11
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B42

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFm	04/94	04/29/94

Equipment Hollow-Stem Auger
8-1/4" diameter

Elevation _____ Date 03-11-94

Blows/foot	Recovery (inches)	OVM (ppm)	OVA (ppm)	Sample Number	Depth (ft.)	Sample	
				94106017	25		@ 25 feet: as above
93	17	ND	ND	143F			
							@ 29 feet: brownish yellow (10YR 6/6)
					30		
90	15	ND	ND				*Bottom of boring at 31.5 feet.* No groundwater encountered. Borehole backfilled with cement grout (03/11/94) .
					35		
					40		
					45		
					50		

FTO-OVA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-11
Site 17 – Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLA

B42

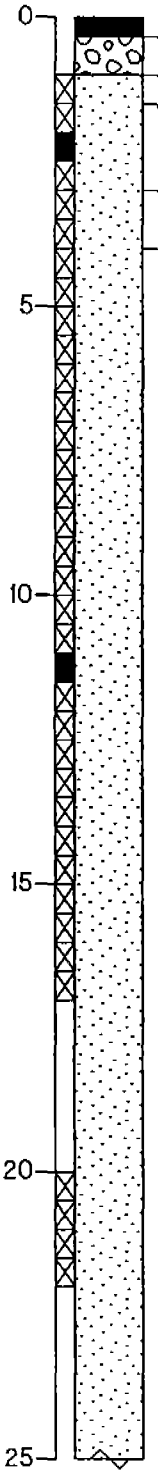
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
3-1/4" diameter

Elevation _____ Date 03-11-94

Blows/foot	Recovery (inches)	OVM Reading (ppm)	Sample Number 9410Y017
82	20	ND	066F
97	24	ND	
77	24	ND	
15		ND	
5			
9	22	ND	068F
16	18	ND	
24	18	ND	
54	22	ND	
62	16	ND	

Depth (ft.) / Sample



ASPHALT

ASPHALT SUBBASE AGGREGATE

BROWNISH YELLOW SAND (SP) (10YR 6/6): medium dense, moist, medium sand

@ 1.5 feet: dark yellowish brown (10YR 3/6), fine sand

@ 3 feet: yellowish brown (10YR 5/6), dense

@ 4 feet: dark yellowish brown (10YR 4/6), very dense, dry

@ 8 feet: very dark brown (10YR 2/2), loose

@ 10.5 feet: dark yellowish brown (10YR 3/6), very loose, moist

@ 13.5 feet: brownish yellow (10YR 6/8), medium dense, fine to medium sand

@ 16 feet: dense

@ 20 feet: yellowish brown (10YR 5/8)

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-12
Site 17 – Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B43**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFM	04/94	04/29/94

Equipment Hollow-Stem Auger
3-1/4" diameter

Elevation _____ Date 03-11-94

Blows/foot	Recovery (inches)	OVM Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9410Y017	25		@ 25 feet: as above
83	16	ND	071F			
				30		@ 30 feet: as above
87	18	ND				*Bottom of boring at 31.5 feet.* No groundwater encountered. Borehole backfilled with cement grout (03/11/94)
				35		
				40		
				45		
				50		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-17-12
Site 17 - Disposal Area
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B43

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LRH	23366 041711	RFA	04/94	04/29/94

31652

Top of Casing Elev. 165.48 ft

LOCKING STEEL COVER

GROUND SURFACE

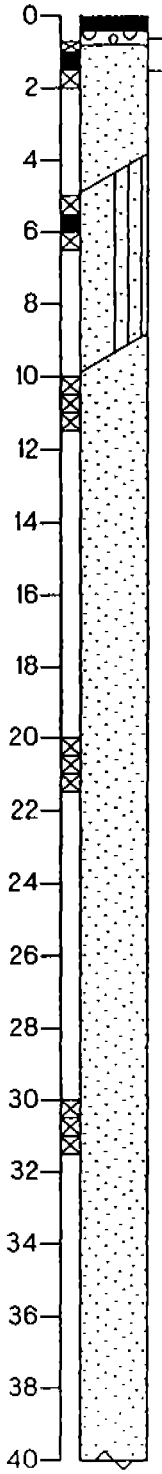
4" DIAMETER SCHEDULE 40 PVC BLANK CASING: .3 to 147.1 ft.

10" DIAMETER BOREHOLE: 0 to 163.5 ft.

Equipment Dual Tube Percussion
10"-diameter casing

Elevation GS 165.9 ft Date 2-1-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
22	16	1.5	none
10	18	ND	none
25	18	NA	none
20	18	ND	none
18	18	ND	none



4" ASPHALT

4" GRAY SANDY GRAVEL (GP) (10YR 3/1): medium dense, moist, (baserock)

YELLOWISH-BROWN SAND (SP) (10YR 5/4): loose to medium dense, moist, fine- to medium-grained sand, 3-5% silt

DARK YELLOWISH-BROWN SAND TO SILTY SAND (SP-SM) (10YR 3/4): loose, moist, fine- to medium-grained sand, 5-10% silt

YELLOW SAND (SP) (10YR 7/6): medium dense, moist, fine- to medium-grained sand, 5-10% silt

@ 20': trace bark and wood fragments

@ 30': as above, no bark, wood

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-01-A
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE **B44**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694	83	03/93	

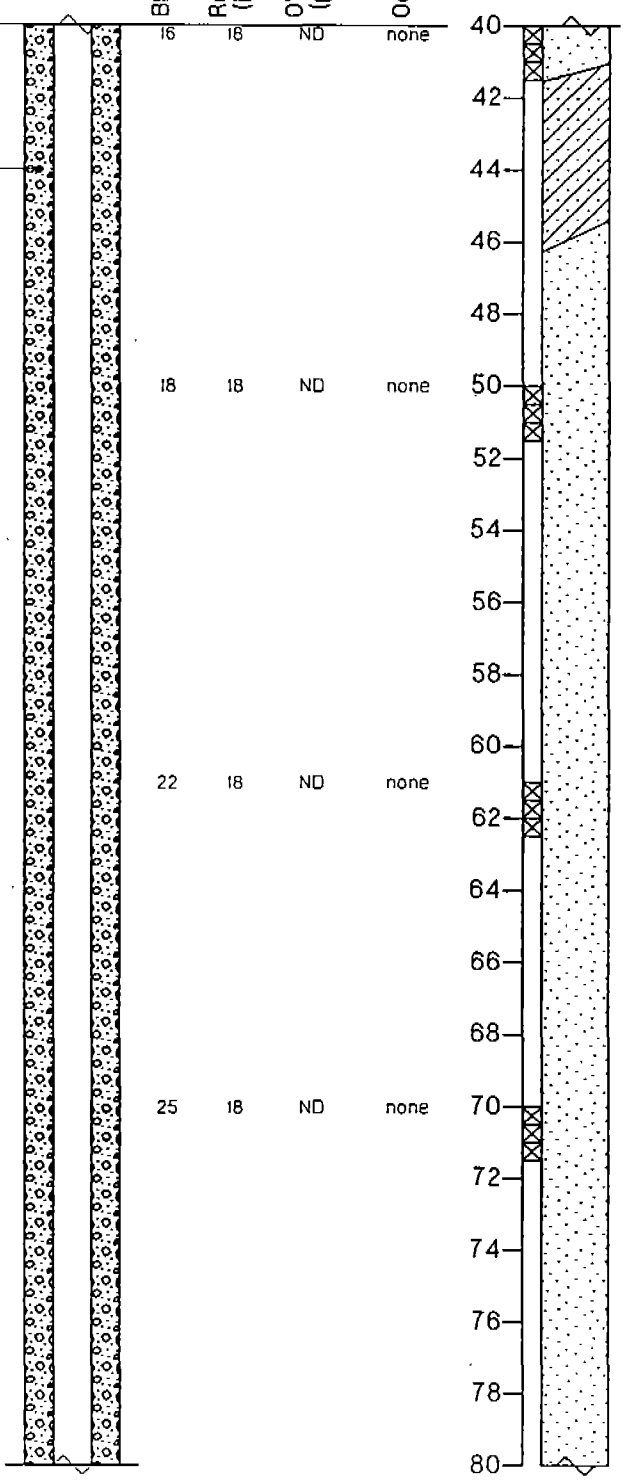
31653

Equipment Dual Tube Percussion
10"-diameter casing

Elevation GS 165.9 ft Date 2-1-92

Depth (ft.)	Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Description
40	16	18	ND	none	@ 40': as above
42					DARK YELLOWISH-BROWN CLAYEY SAND (SC) (10YR 3/4): medium dense, moist, fine- to coarse-grained sand, 15-20% clay
44					
46					YELLOWISH-BROWN SAND (SP) (10YR 5/6): medium dense, moist, medium- to coarse-grained sand, 3-5% silt
48					
50	18	18	ND	none	@ 50': as above
52					
54					
56					
58					
60					
62	22	18	ND	none	@ 61': yellowish-brown (10YR 5/4), fine- to medium-grained sand, 3-5% silt
64					
66					
68					
70	25	18	ND	none	@ 70': as above
72					
74					
76					
78					
80					

CEMENT/ BENTONITE SEAL: 0-137 ft.



Sample

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-01-A
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE **B44**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31654

Equipment: Dual Tube Percussion
10"-diameter casing

Elevation: GS 165.9 ft Date: 2-1-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
17	18	ND	none	80		@ 80': brownish-yellow (10YR 6/6)
				82		
				84		
				86		
				88		
14	18	NA	none	90		BROWNISH-YELLOW SAND TO SILTY SAND (SP-SM) (10YR 6/6): loose, moist, very fine- to fine-grained sand, 5-10% silt
				92		
				94		
				96		
				98		
12	18	ND	none	100		@ 100': fine- to medium-grained
				102		
				104		
				106		
				108		
10	18	ND	none	110		YELLOWISH-BROWN SAND TO SILTY SAND (SW-SM) (10YR 5/4): loose, moist, fine- to coarse-grained sand, 5-10% fines
				112		
				114		
				116		
				118		
				120		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-01-A
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE **B44**

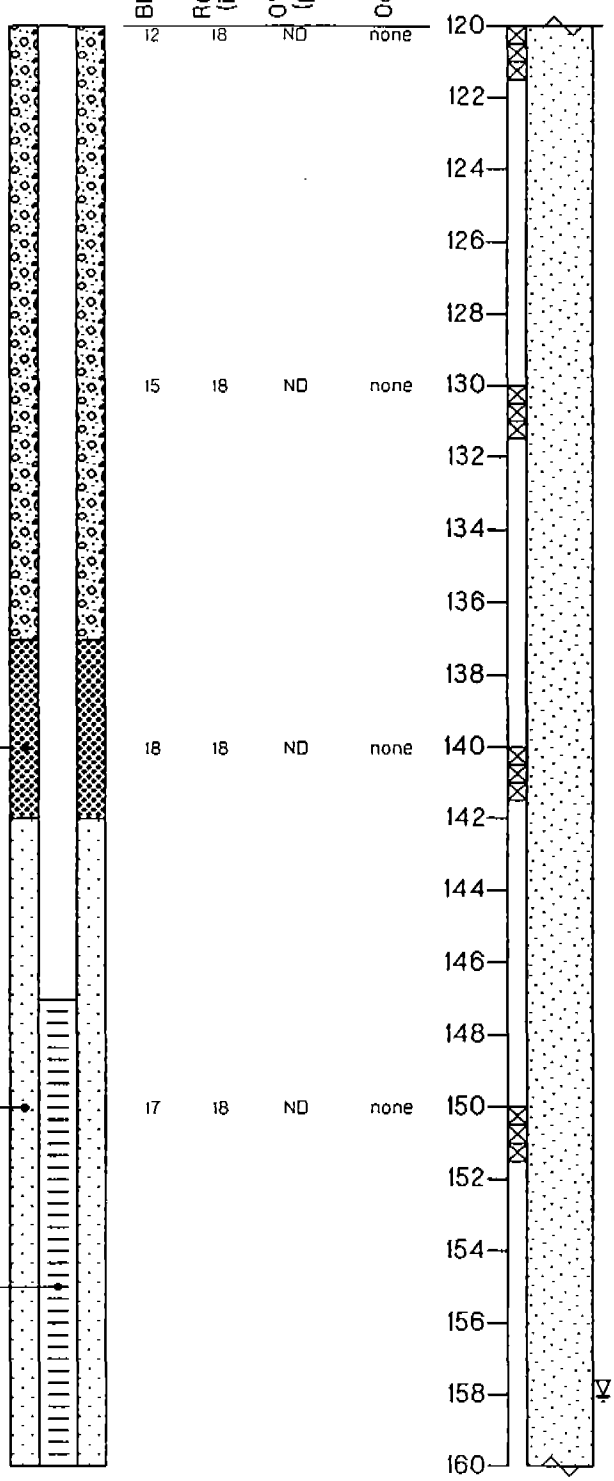
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31655

Equipment: Dual Tube Percussion
10"-diameter casing

Elevation: GS 165.9 ft Date: 2-1-92

Depth (ft.)	Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Description
120	12	18	ND	none	BROWNISH-YELLOW SAND (SP) (10YR 6/6): loose, moist, fine- to medium-grained sand, trace silt
122					
124					
126					
128					
130	15	18	ND	none	@ 130': as above
132					
134					from 134' to 138': very dark grayish-brown sandy silt balls coming up in cuttings, probably occuring in thin horizons
136					
138					
140	18	18	ND	none	@ 140': moist to wet, medium- to coarse-grained sand, trace fine-grained sand and silt
142					
144					@ 144': trace fine gravel appearing to 1/4" dia. subrounded
146					
148					
150	17	18	ND	none	@ 150': gravelly sand, medium dense, wet, 70% medium- to very coarse-grained sand, 30% gravel to 1/2" dia. subrounded
152					
154					
156					
158					@ 157.8': first encountered groundwater
160					



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-01-A
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE **B44**

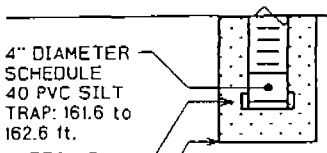
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31656

Equipment Dual Tube Percussion
10"-diameter casing

Elevation GS 165.9 ft Date 2-1-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
40	10	ND	none	160		
				162		GRAY CLAY (CL) (5Y 5/1): very stiff, moist, trace fine-grained sand, some mottling and rust staining
				164		*Bottom of boring at 163.5 feet.*
				166		
				168		
				170		
				172		
				174		
				176		
				178		
				180		
				182		
				184		
				186		
				188		
				190		
				192		
				194		
				196		
				198		
				200		



Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-01-A
Site Characterization
Site 17 – 1400 Block Motor Pool
Fort Ord, California

PLATE **B44**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31657

Top of Casing Elev. 171.52 ft

LOCKING STEEL COVER

GROUND SURFACE

4" DIAMETER SCHEDULE 40 PVC BLANK CASING: .3 to 165.3 ft.

10" DIAMETER BOREHOLE: 0 to 190 ft.

Equipment: Dual Tube Percussion, 10"-diameter casing

Elevation: GS 171.8 ft Date: 2-11-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
17	18	ND	none
11	18	ND	none
8	18	ND	none
20	18	ND	none
20	18	ND	none

Depth (ft.): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40

Sample

ASPHALT AND CONCRETE

BASEROCK

BROWNISH-YELLOW SAND TO SILTY SAND (SP-SM) (10YR 6/8): loose, moist, very fine- to medium-grained sand, 10% silt, 5% coarse- to very coarse-grained

@ 4': brown (10YR 4/3), very fine- to medium-grained, 5-10% silt

@ 5.5': very dark grayish-brown (10YR 4/2), very fine- to medium-grained sand, 5-10% silt

@ 9': dark brown (10YR 3/3), roots, fine- to medium-grained, 5-10% silt, 5%> medium, 5% very fine

@ 12': dark yellowish-brown (10YR 4/4), very fine- to medium sand, 5-10% silt

BROWNISH-YELLOW SAND (SW) (10YR 6/6): moist, medium dense (?), very fine- to coarse-grained, 3-5% silt

@ 20': as above

@ 24': as above

@ 30': brownish-yellow (10YR 6/6), medium dense, fine- to coarse-grained, 10% very fine, 10% very coarse, no silt

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-02-180
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

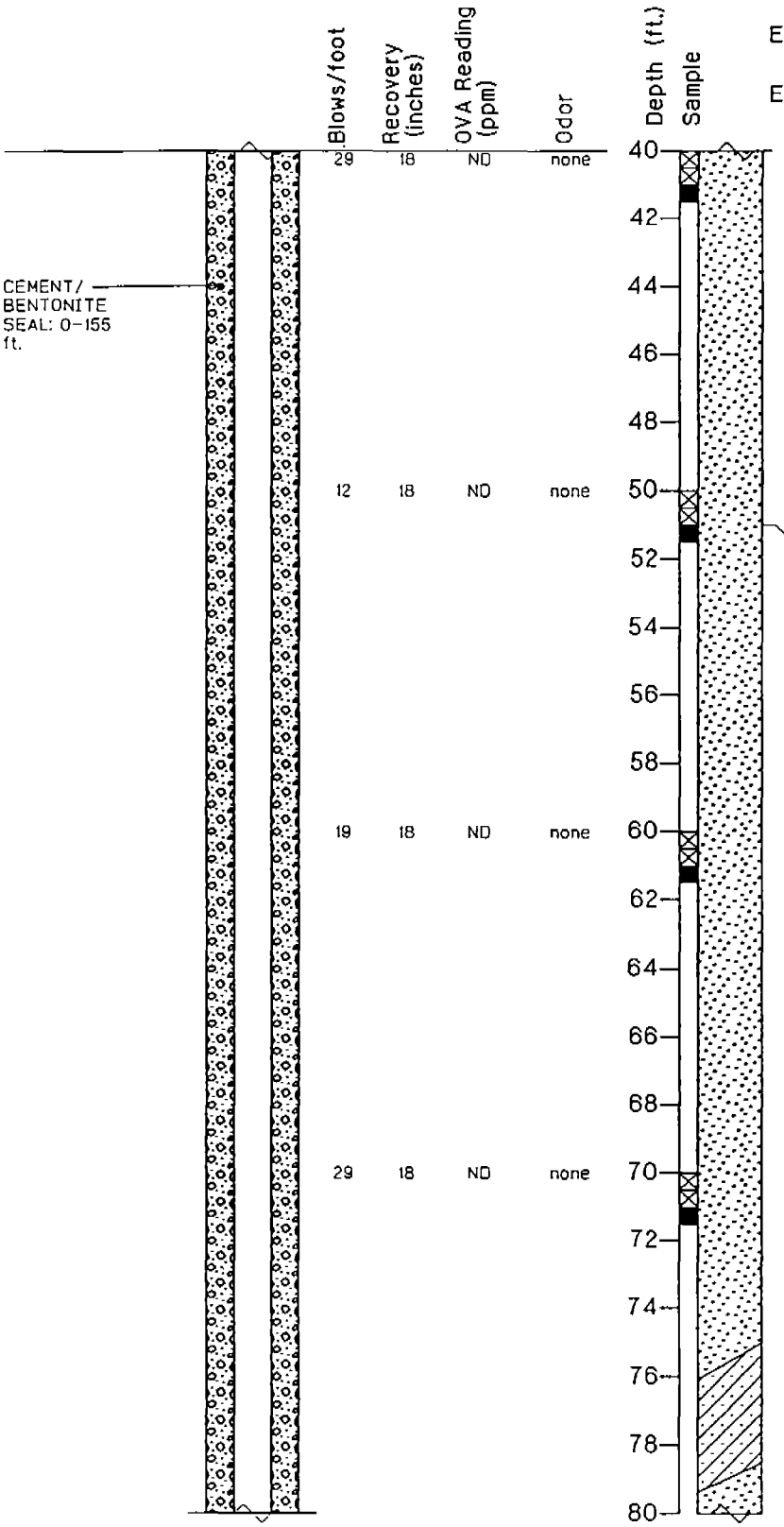
PLATE **B45**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31658

Equipment: Dual Tube Percussion
10"-diameter casing

Elevation: GS 171.8 ft Date: 2-11-92



@ 40': 60% medium- to coarse-grained, 15% very coarse, 20% fine, 5% very fine

@ 48': up to 15% very coarse sand, 2% granules

@ 50': medium- to very coarse-grained, 20% very fine to fine sand

@ 51': lenses of very coarse-grained sand in sampler

@ 60': medium to very coarse sand, 15% fine sand, 5% very fine sand, lenses of very coarse sand

@ 64': very coarse-grained lenses

@ 70': as above

STRONG BROWN CLAYEY SAND (SC) (7.5YR 5/6): 50% fine- to coarse-grained sand, 20% very fine, 10% very coarse, 20% clay

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-02-180
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE **B45**

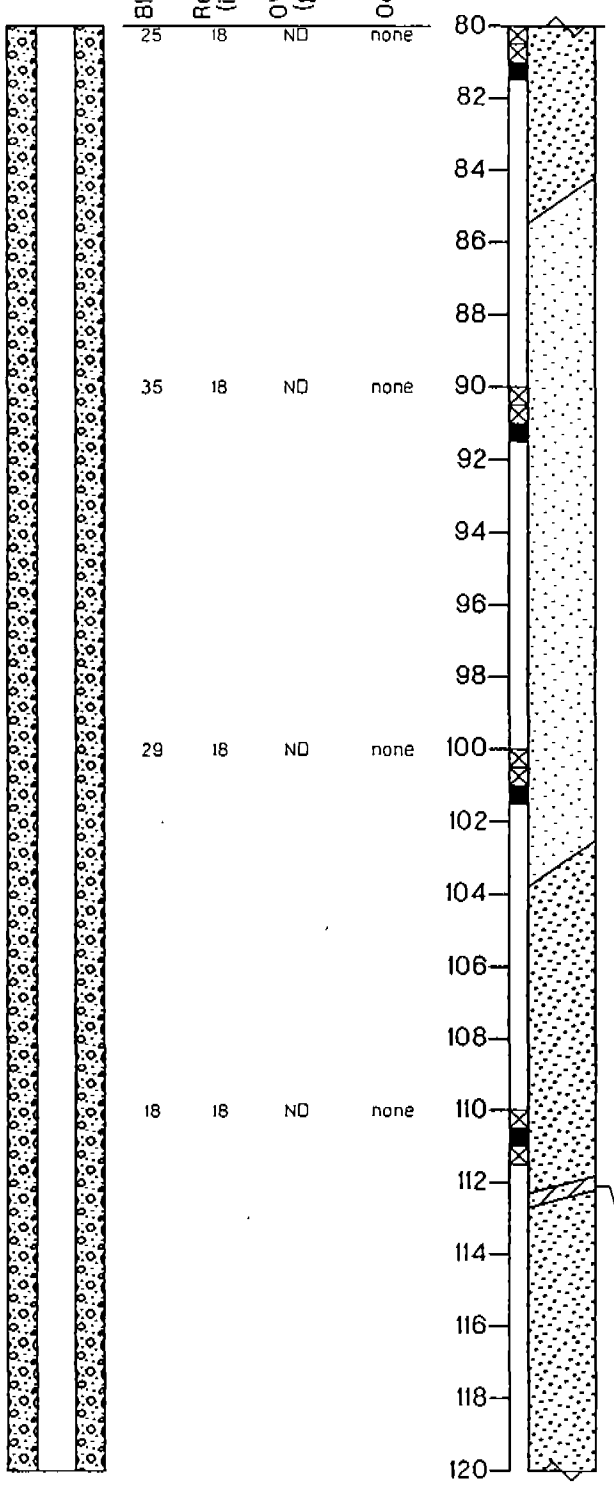
DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31659

Equipment: Dual Tube Percussion
10"-diameter casing

Elevation: GS 171.8 ft Date: 2-11-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
25	18	ND	none
35	18	ND	none
29	18	ND	none
18	18	ND	none



BROWNISH-YELLOW SAND (SW) (10YR 6/6): medium dense, moist, very fine- to very coarse-grained sand, 3-5% silt

BROWNISH-YELLOW SAND (SP) (10YR 6/6): medium dense, moist, very fine- to medium-grained, 3-5% coarse- to very coarse-grained sand

@ 90': as above

@ 92': lenses of brown silt within cuttings

@ 94.5': yellowish-brown (10YR 5/8)

@ 100': very coarse-grained lenses to 2" thick, 80% very fine- to medium-grained sand

BROWNISH-YELLOW SAND (SW) (10YR 6/6): medium dense, moist, very fine- to medium-grained, 15-20% coarse to very coarse sand

@ 112': fine- to medium-grained, 15% very fine-grained, 5% coarse- to very coarse-grained

STRONG BROWN CLAYEY SAND (SC) STRINGER (7.5YR 4/6): moist

BROWNISH-YELLOW SAND (SW) (10YR 6/6): medium dense, moist, 85% fine- to medium-grained, 5% very fine, 5% coarse, 5% very coarse

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-02-180
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE **B45**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31660

Equipment: Dual Tube Percussion
10"-diameter casing

Elevation: GS 171.8 ft Date: 2-11-92

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor	Depth (ft.)	Sample	
23	18	ND	none	120		@ 120': as above
				122		
				124		
				126		
				128		DARK YELLOWISH-BROWN CLAYEY SAND STRINGERS (10YR 4/6): 4" thick
21	18	ND	none	130		BROWNISH-YELLOW SAND (SW) (10YR 6/6): medium dense, moist, fine- to coarse-grained, 10% very coarse sand, 5% very fine to coarse sand, trace silt
				132		
				134		
				136		@ 137': clayey sand and silt stringers
				138		@ 139': becoming coarser-grained
18	18	ND	none	140		@ 140': medium- to coarse-grained, 10% very coarse sand, 15% fine sand, 5% very fine sand
				142		
				144		
				146		@ 147': very coarse-grained fraction increasing
				148		
23/5"	0	NA	none	150		@ 150': no recovery
23/5"	0					
				152		@ 151.5': no recovery @ 152': no recovery
				154		
				156		@ 155': 60% medium to coarse sand @ 156': yellowish-brown (10YR 5/8), medium- to very coarse-grained sand, 1% granules to 4mm, 9% very fine- to fine-grained sand
				158		
32	18	ND	none	160		@ 159': yellow gravelly sand (10YR 7/8), wet, 85% medium- to very coarse-grained, 10% granules, 5% very fine- to fine-grained, granules to 4mm

BENTONITE PELLET SEAL: 155 to 160 ft.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-02-180
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

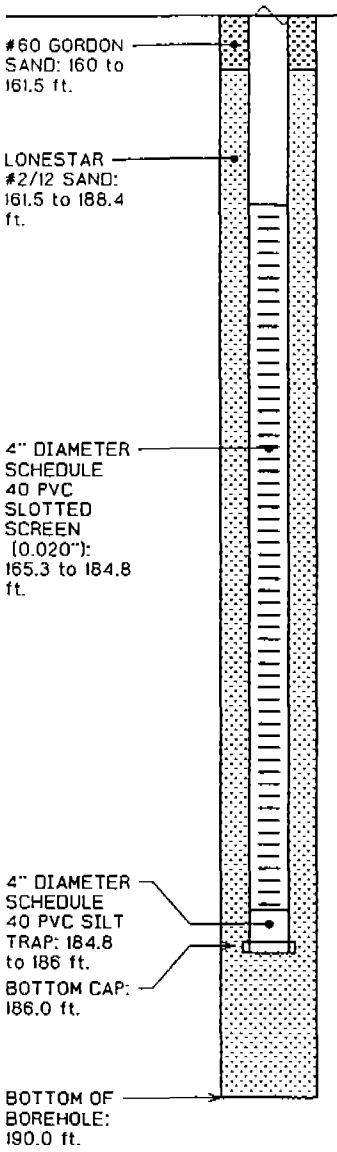
PLATE **B45**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

31661

Equipment: Dual Tube Percussion
10"-diameter casing

Elevation: GS 171.8 ft Date: 2-11-92



Blows/foot	Recovery (inches)	OVA Reading (ppm)	Odor
22	6	NA	none
37	18	ND	none

Depth (ft.) / Sample

160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200

@ 162': pebbles to 1/2" (well rounded)

@ 164': less pebbles

@ 169': no recovery

@ 170.9: static groundwater 8:30am on Feb. 12th

@ 172': first encountered groundwater 17:10pm on Feb. 10th

OLIVE-BROWN SAND (SP) (2.5Y 6/6): medium dense, wet

@ 174': light olive-brown (2.5Y 5/4), very fine- to medium-grained

@ 177.5: very fine- to medium-grained, 3-5% coarse-grained, trace pebbles

@ 183': medium- to coarse-grained sand with 1 to 2% shell fragments

LIGHT OLIVE-BROWN SILTY TO CLAYEY SAND (SM-SC) (2.5Y 5/4): medium dense, fine- to coarse-grained, silty, clayey

Bottom of boring at 190 feet.

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring and Well Completion MW-17-02-180
Site Characterization
Site 17 - 1400 Block Motor Pool
Fort Ord, California

PLATE **B45**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
GTG	10776 694		03/93	

Equipment Power Auger

Elevation _____ Date 11/03/94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9444T016	0		
			038F			GRAYISH BROWN SILTY SAND (SM) (10YR 5/2): dense, dry, very fine to fine sand, subangular gravels to 1"
			039F			DARK BROWN GRAVEL WITH SAND (GW) (10YR 4/3): dense, dry, subangular gravels to 1"
						Bottom of boring at 1.5 feet. No groundwater encountered. Borehole backfilled with drill cuttings (11/03/94)
				5		
				10		
				15		
				20		
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-29
Site 16 - DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B46

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	23366 041721	RFM	11/94	

Equipment Power Auger

Elevation _____ Date 11/03/94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9444T016	0		
			040F			DARK GRAYISH GRAVEL WITH SAND (GW) (10YR 4/1): dense, dry, subangular gravels to 1", very fine to fine sand, trace silt
			041F			@ 1 foot: dark grayish brown (2.5Y 4/2)
						Bottom of boring at 1.5 feet. No groundwater encountered. Borehole backfilled with drill cuttings (11/03/94)
				5		
				10		
				15		
				20		
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-30
Site 16 – DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B47

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	23366 041721	RFM	11/94	

Equipment Power Auger

Elevation _____ Date 11/03/94

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9444T016	0		
			042F			GRAYISH BROWN GRAVEL WITH SAND (GW) (10YR 5/2): dense, dry, subangular gravels to 1/2", very fine to fine sand, trace silt
			043F			@ 1 foot: grayish brown (2.5Y 5/2)
						Bottom of boring at 1.5 feet. No groundwater encountered. Borehole backfilled with drill cuttings (11/03/94)
				5		
				10		
				15		
				20		
				25		

FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-31
Site 16 – DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
B48

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	23366 041721	RFM	11/94	

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9444T016	0		OLIVE BROWN SILTY SAND WITH GRAVEL (SM) (2.5Y 4/3): dense, dry, very fine to fine sand, subangular gravels to 1/2"
			044F			*Bottom of boring at 2 feet.* No groundwater encountered. Borehole backfilled with drill cuttings (11/03/94)
				5		
				10		
				15		
				20		
				25		

Equipment Power Auger

Elevation _____ Date 11/03/94

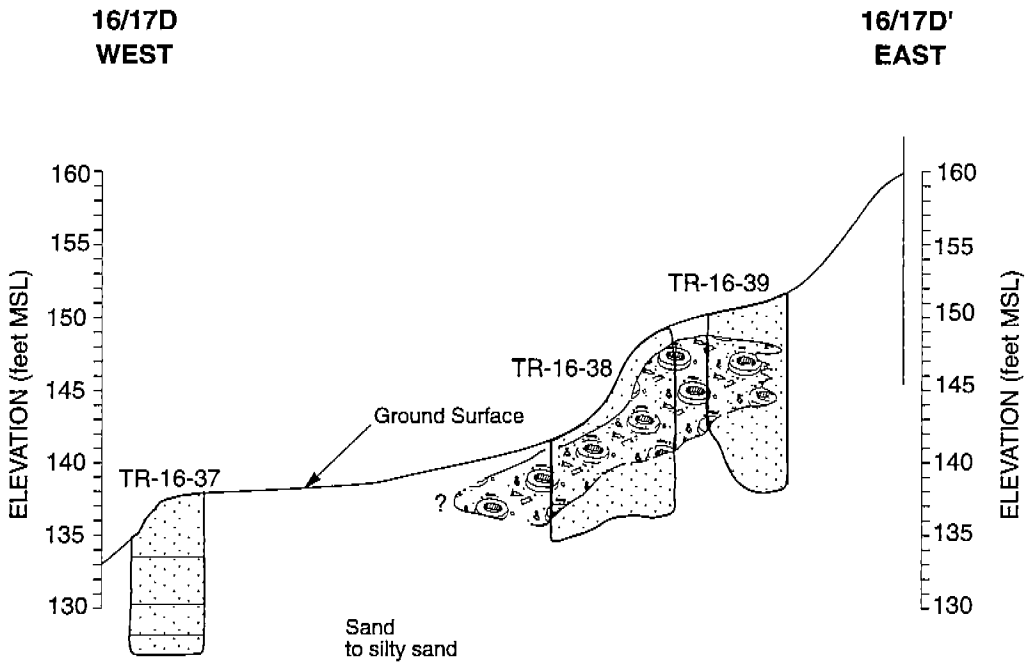
FTO

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring SB-16-32
Site 16 - DOL Maintenance Yard
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE **B49**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	23366 041721	RFM	11/94	



Vertical Scale: 1" = 8'
Horizontal Scale: 1" = 40'
Vertical Exaggeration 5:1

EXPLANATION

Extent of subsurface debris; dashed where inferred and queried where uncertain

SB-31-15

Type designation
SB - Soil Boring
TR - Test Pit

Soil Boring or Test Pit number

Site number

Notes
1. See Plate A1 in Appendix A for key to patterns
2. Location of cross section shown on Plate 3

Harding Lawson Associates
Engineering and
Environmental Services

Geologic Cross Section 16/17D - 16/17D'
Site 16 - Pete's Pond Extension
Volume II - RI, Basewide RI/FS
Fort Ord, California

PLATE
18

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
AGc	23366 041721	RFM	12/94	

31748

Equipment Hand Auger
3 1/2"-diameter
Elevation _____ Date 3-13-92

Recovery (inches)	OVA Reading (ppm)	Depth (ft.)	Sample	
6	NA	0		BROWN SAND (SP): dense, dry
6	NA			@ 3': moist
6	NA	5		@ 5': medium dense
				Bottom of boring at 5.5 ft. *No groundwater encountered*
		10		
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring OF-16-03-02
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A18

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	

31749

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-13-92

Recovery (inches)	OVA Reading (ppm)
6	NA

Depth (ft.) | Sample

0

LIGHT BROWN SILTY SAND (SM)

@ 0.9': rocks and cobbles encountered,boring terminated

Bottom of boring at 0.9 ft.
No groundwater encountered

5

10

15

20

25

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-16-04-01
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE
A19

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JOM	06/92	

31750

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-13-92

Recovery (inches)	OVA Reading (ppm)
6	NA

Depth (ft.) | Sample

0

BROWN GRAVELLY SAND (SP): loose to medium dense

@ 0.7': rock encountered,boring terminated

Bottom of boring at 0.7 ft.
No groundwater encountered

5

10

15

20

25

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring OF-16-04-02
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A20

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	

31751

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-13-92

Recovery (inches)	OVA Reading (ppm)
6	NA

Depth (ft.) | Sample

0

GRAY-BROWN SAND (SP): loose, moist

@ 0.8': rocks and cobbles encountered, boring terminated

Bottom of boring at 0.8 ft.
No groundwater encountered

5

10

15

20

25

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-16-05-01
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A21

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	

31752

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-13-92

Recovery (inches)	OVA Reading (ppm)	Depth (ft.)	Sample	
6	NA	0		DARK BROWN SAND TO SILTY SAND (SP-SM): loose to medium dense, moist, fine- to medium-grained, 5-10% fines
				@ 1.75': brown, medium dense to dense
6	NA			@ 3': as above
6	NA	5		@ 4.75': light brown, medium dense, moist
				Bottom of boring at 5.5 ft. *No groundwater encountered*
		10		
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring OF-16-08-01
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A22

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	

31753

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-13-92

Recovery (inches)	OVA Reading (ppm)	Depth (ft.)	Sample	
6	NA	0		DARK BROWN SAND TO SILTY SAND (SP-SM): medium dense, moist, fine- to medium-grained, 5-10% fines
6	NA			@ 3': as above
6	NA	5		@ 5': light brown, as above
				Bottom of boring at 5.5 ft. *No groundwater encountered*
		10		
		15		
		20		
		25		

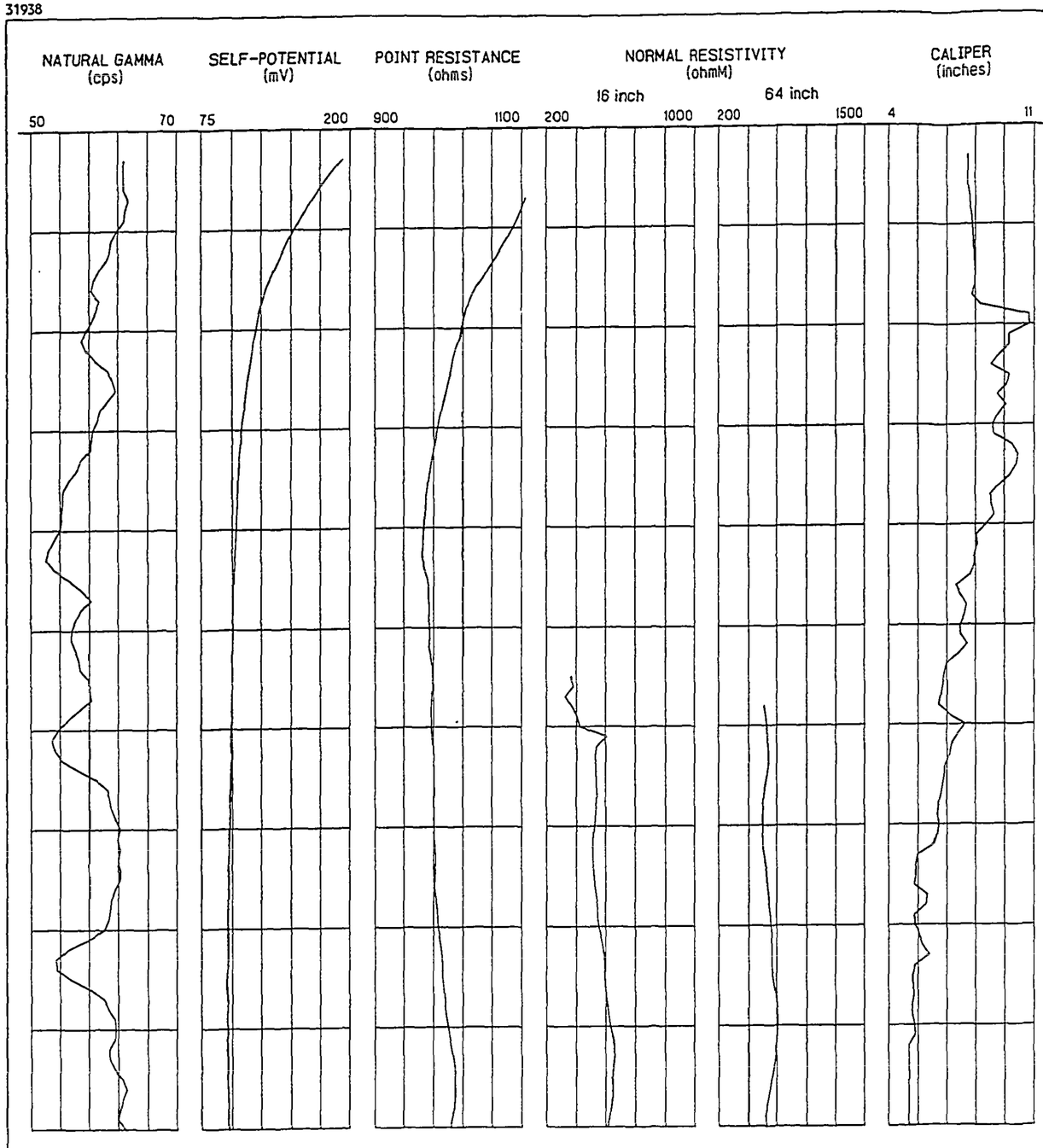
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring OF-16-06-02
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A23

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	Jom	06/92	

31938



Blows/foot	Recovery (inches)	Reading (ppm)	Odor
	18		
	18		
	8		
	6		
	9		
	12		

Depth (ft.) 0, 10, 20, 30, 40, 50

Sample

Equipment Mud-Rotary
6"-diameter bit

Elevation approx. 134.4 (grnd) Date 01-31-92

VERY PALE BROWN SAND (SP) (10YR 7/4): very fine- to medium-grained, some coarse-grained, subangular to rounded, predominantly quartz, some lithic grains

@ 28.5': very fine-grained, rare lithic grains

@ 34.5': angular to rounded, predominantly quartz, some black lithic grains

@ 39.5': very fine- to fine-grained, subangular to well rounded, predominantly quartz, some lithics, minor feldspar

@ 44.5': light yellowish-brown (2.5Y 6/3), very fine-grained, predominantly quartz, abundant lithics, rare feldspar

@ 49': very fine- to medium-grained, predominantly quartz, abundant lithics, minor feldspar

WELL DATA

Fluid Type	Bentonite
Mud Resistivity	NA
Mud Temperature	13 ° C
Mud Conductivity	NA

LOGGING SPEED

Natural Gamma	15 ft/min
SP/PR	18 ft/min
Normal Resistivity	20 ft/min
Caliper	13 ft/min

If this image is not as legible as this overlay, it's due to the poor quality of the original document

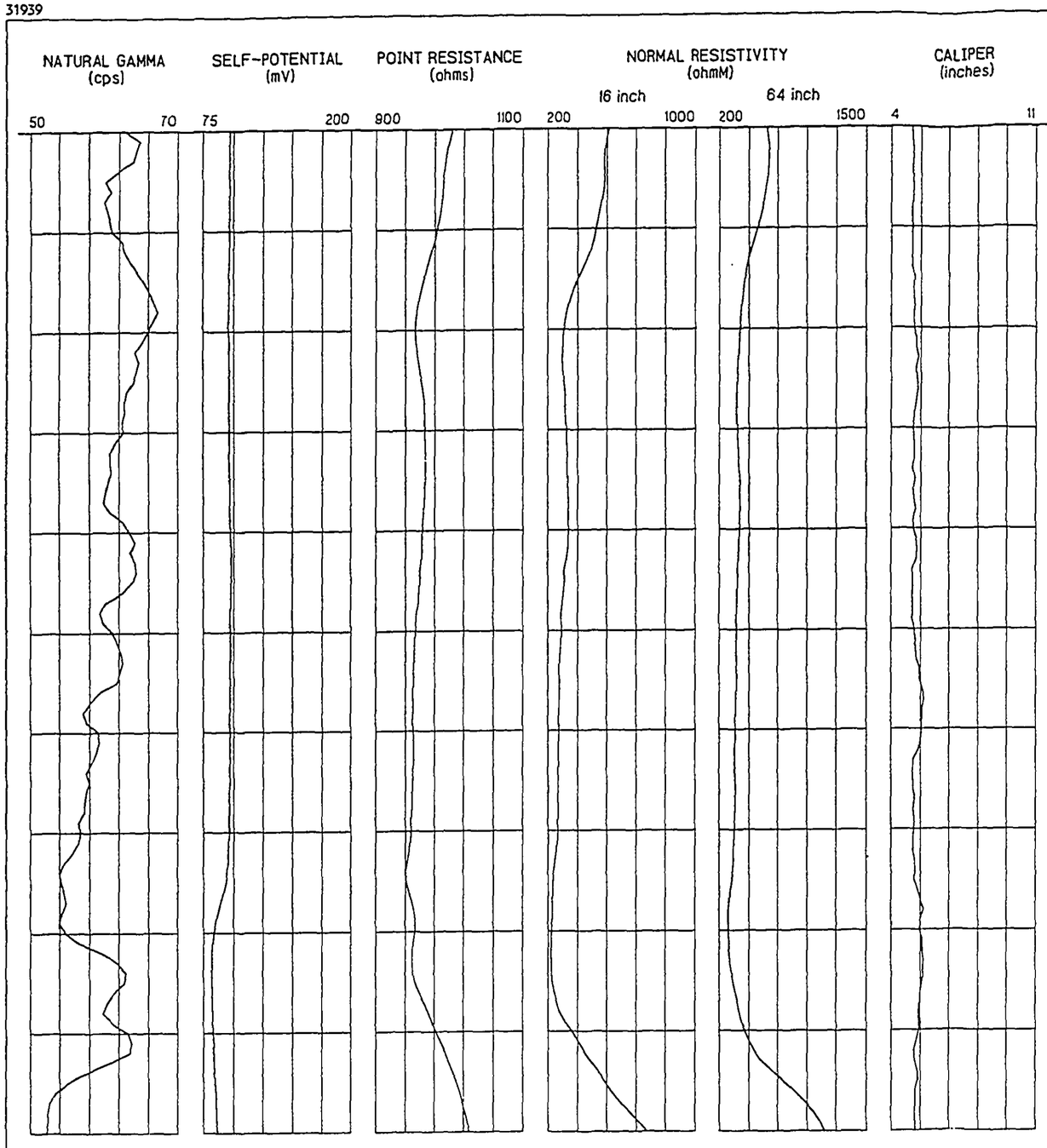
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring PB-16-01
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE B30

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LNR	10776 687		12/92	

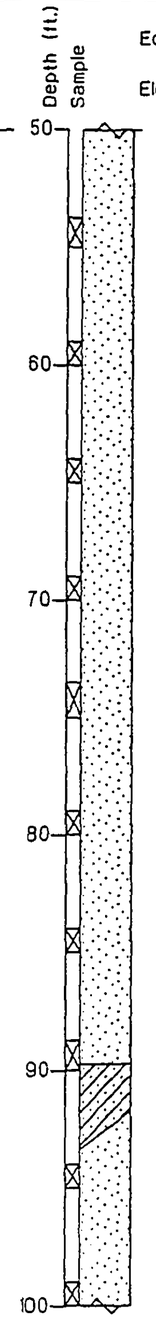
31939



Blows/foot	Recovery (inches)	Reading (ppm)	Odor
	15		
	12		
	12		
	12		
	12		
	12		
	15		
	12		
	12		

Equipment Mud-Rotary
6"-diameter bit

Elevation approx. 134.4 (grnd) Date 01-31-92



@ 54': predominantly quartz, some lithics, rare feldspar

@ 59': very fine- to medium-grained, some coarse lenses, 3-5% silt, predominantly quartz, some lithics, rare feldspar

@ 64': very fine- to fine-grained, predominantly quartz, some lithics, rare feldspar

@ 69': very fine- to medium-grained, some coarse-grained, predominantly quartz, some lithics, rare feldspar, very rare mica

@ 73.5': very fine- to medium-grained, predominantly quartz, some lithics, rare feldspar

@ 79': as above

@ 84': very fine- to fine-grained, predominantly quartz, some lithics, rare feldspar, very rare mica

@ 89': as above

REDDISH-BROWN CLAYEY SAND (SC) (5YR 5/4): fine- to medium-grained

REDDISH BROWN SAND (SP) (5YR 5/4): fine- to medium-grained, angular to rounded, predominantly quartz, minor lithics, rare feldspar, 3-5% clay

@ 99': very pale brown (10YR 7/3), fine- to medium-grained, subangular to well rounded, predominantly quartz, some lithics, minor feldspar

WELL DATA

Fluid Type	Bentonite
Mud Resistivity	NA
Mud Temperature	13 ° C
Mud Conductivity	NA

LOGGING SPEED

Natural Gamma	15 ft/min
SP/PR	18 ft/min
Normal Resistivity	20 ft/min
Caliper	13 ft/min

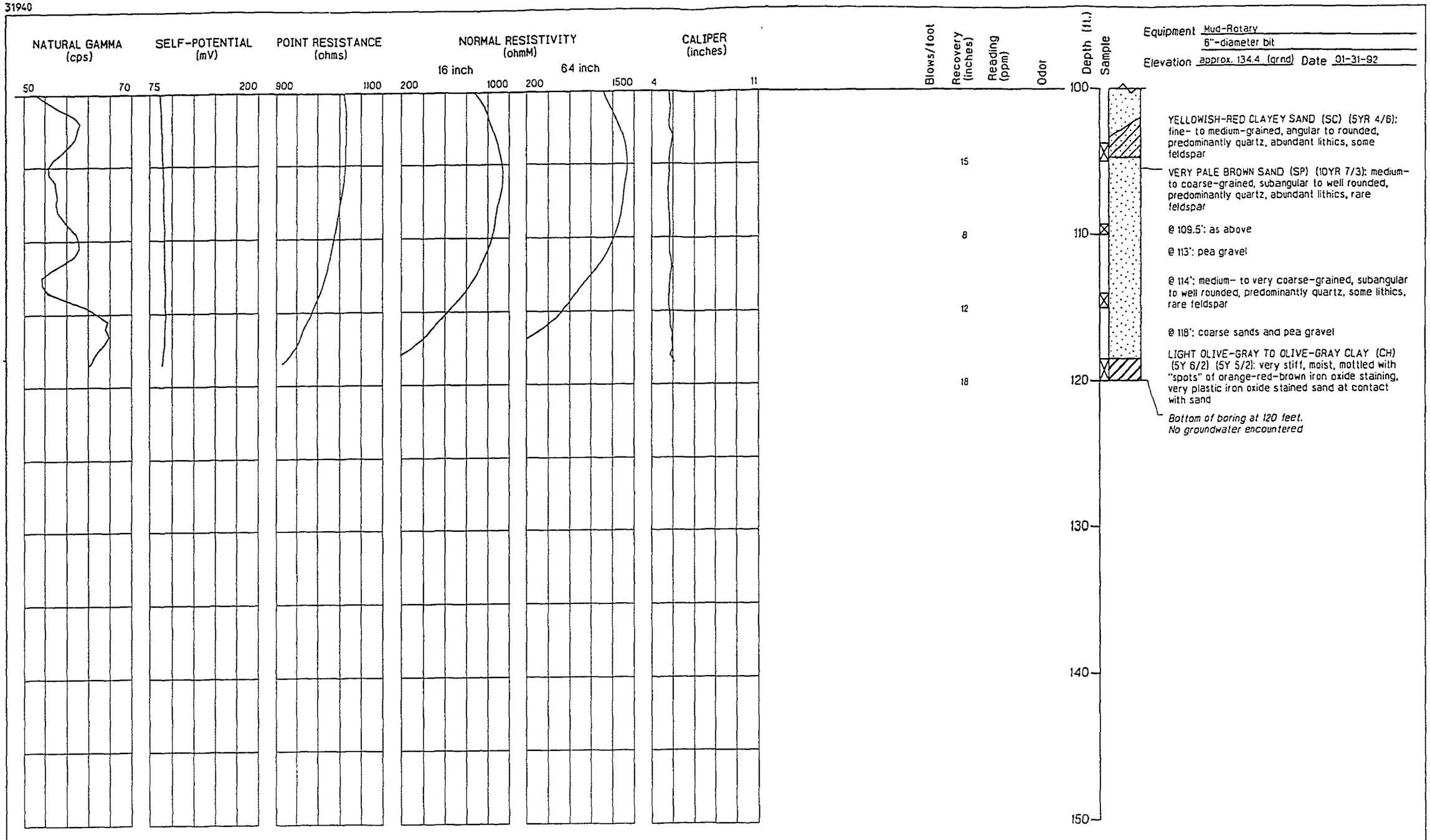
Harding Lawson Associates
Engineering and Environmental Services

Log of Boring PB-16-01
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B30**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LNR	10776 687	E M	12/92	

31940



WELL DATA

Fluid Type	Bentonite
Mud Resistivity	NA
Mud Temperature	13 ° C
Mud Conductivity	NA

LOGGING SPEED

Natural Gamma	15 ft/min
SP/PR	18 ft/min
Normal Resistivity	20 ft/min
Caliper	13 ft/min

If this image is not as legible as this overlay, it's due to the poor quality of the original document

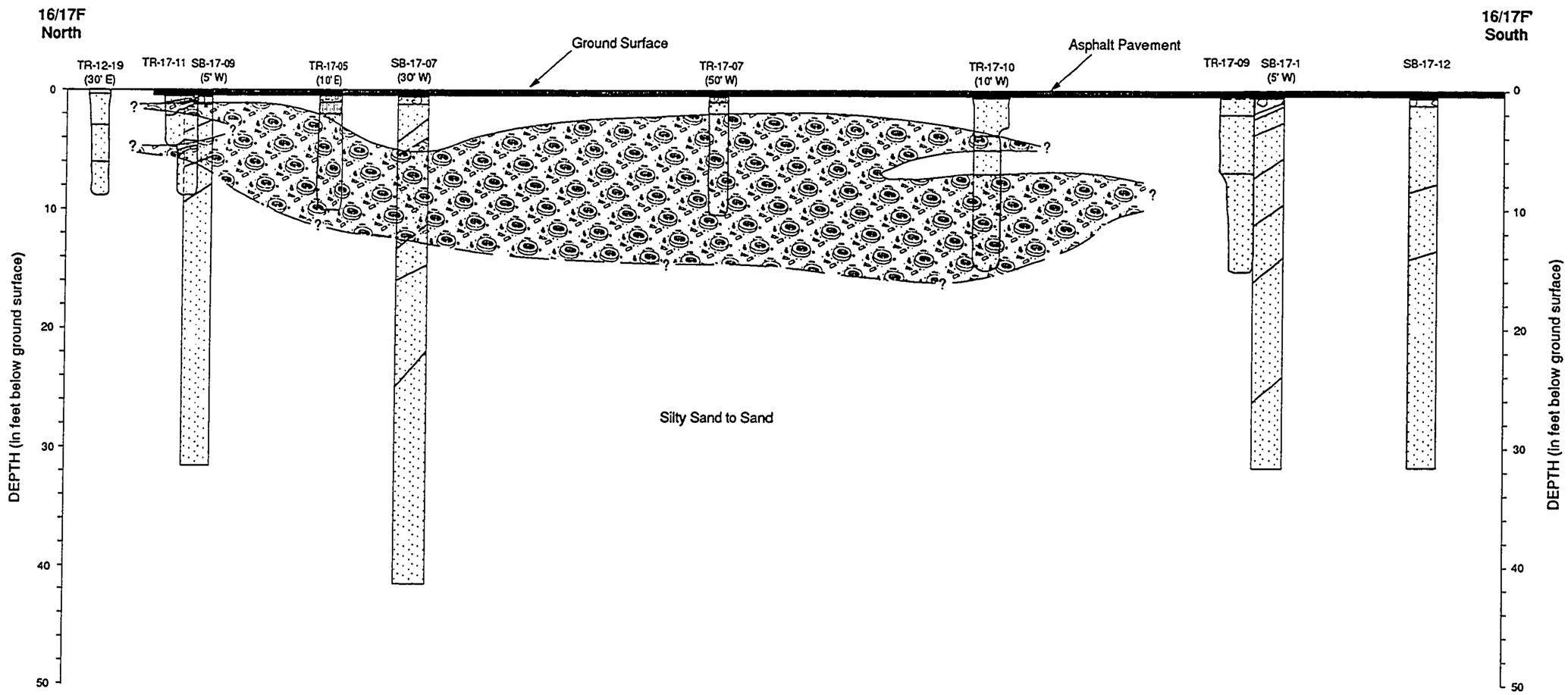
HLA

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring PB-16-01
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **B30**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
LNR	10776 687		12/92	



EXPLANATION

Extent of subsurface debris; dashed where inferred and queried where uncertain

Type designation
SB - Soil Boring
TR - Test Pit

SB-31-15

Soil Boring or Test Pit number

Site number

(10' E) Distance and direction from cross-section line

Notes:

1. See Plate A1 in Appendix A for key to patterns

2. Location of cross section shown on Plate 5

3. The topography along the cross-section line is relatively flat at an approximate elevation of 150 feet MSL and has been shown as level. Elevations of soil borings and test pits were not surveyed.

If this image is not as legible as this overlay, it's due to the poor quality of the original document

Vertical Scale: 1" = 10'
Horizontal Scale: 1" = 50'
Vertical Exaggeration 5:1

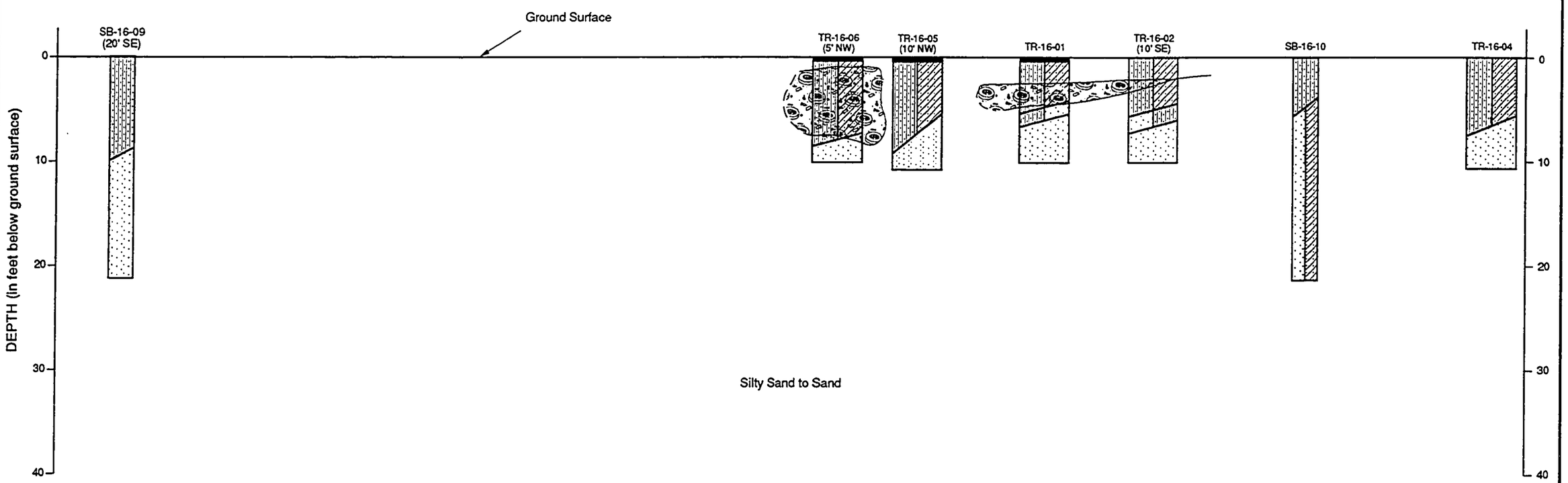
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
	7/94	DRAFT	340 071494AG	23366 041711			AG
2	12/94	DRAFT FINAL	340 112294LFD	23366 041721	KFM	11/21/94	

Harding Lawson Associates
Engineering and Environmental Services

Volume II - Remedial Investigation
Basewide RI/FS
Fort Ord, California

Geologic Cross Section 16/17F- 16/17F'
Site 17 - Disposal Area

PLATE: 21



EXPLANATION

Extent of suburface debris; dashed where inferred

Type designation
SB - Soil Boring
TR - Test Pit

SB-31-15

Soil Boring or Test Pit number

Site number

(10' E) Distance and direction from cross-section line

Notes:

1. See Plate A1 in Appendix A for key to patterns

2. Location of cross section shown on Plate 4

3. The topography along the cross-section line is relatively flat at an approximate elevation of 130 feet MSL and has been shown as level. Elevations of soil borings and test pits were not surveyed.

If this image is not as legible as this overlay, it's due to the poor quality of the original document

Vertical Scale: 1" = 5'
Horizontal Scale: 1" = 25'
Vertical Exaggeration 5:1

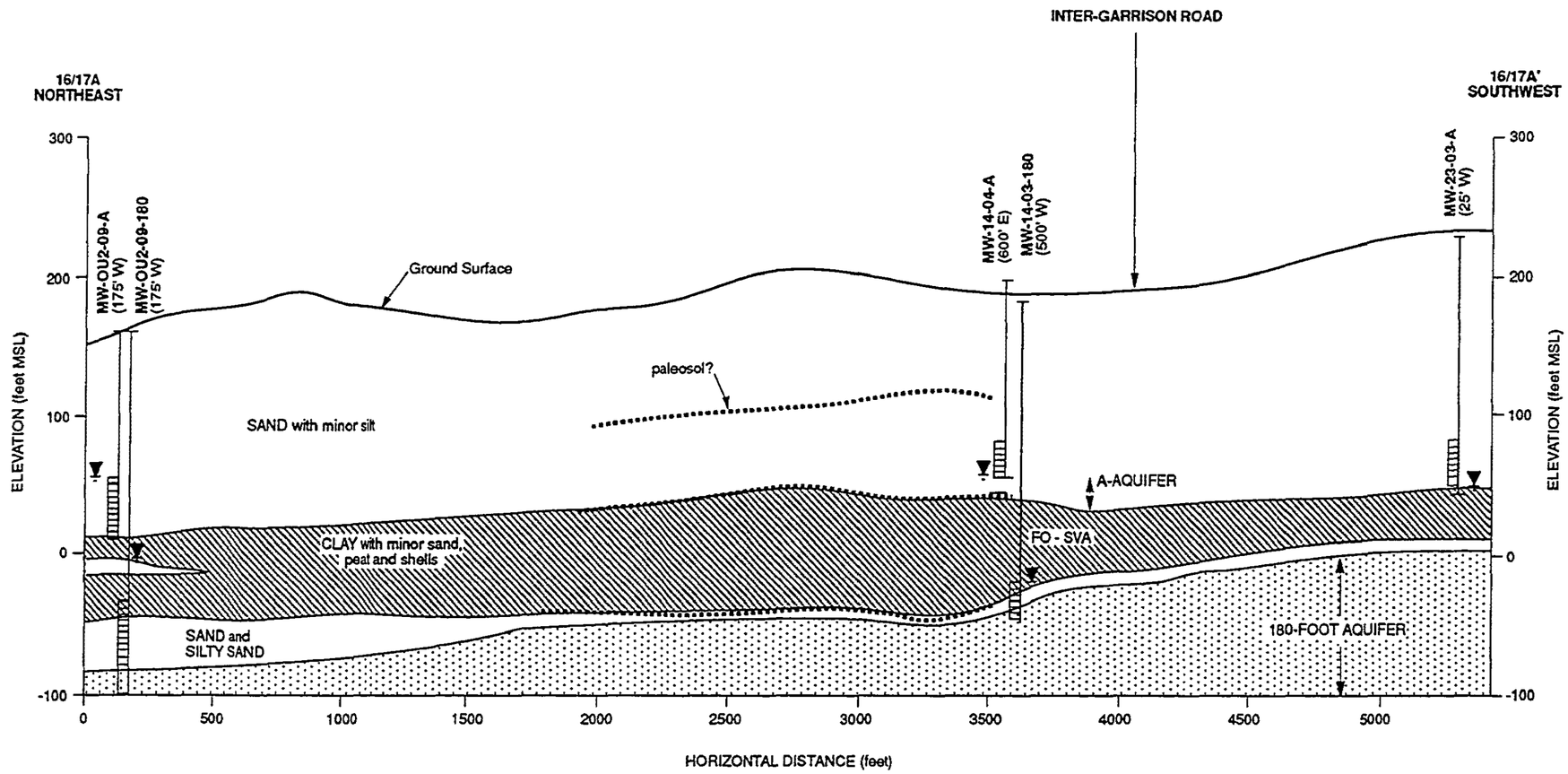
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
	7/94	DRAFT	mc0711494AG	23366.041711			DJP
2	12/94	DRAFT FINAL	mc1122094LFD	23366.041721	RFm	11/21/94	

Harding Lawson Associates
Engineering and Environmental Services

Volume II - Remedial Investigation
Basewide RI/FS
Fort Ord, California

Geologic Cross Seciton 16/17E- 16/17E'
Site 16 - Pete's Pond

PLATE: 20



EXPLANATION

Well/Boring Location Showing Screened Interval

Static Water Level from HLA February 1994 Measurements

Seismic Reflector from HLA 1991-1992 seismic reflection survey

(10' E) Distance and direction from cross-section line

Note: Well data projected and interpreted as it would occur approximately at the cross section line.

Lithologic Patterns*:

- Clay
- Sand
- Gravel

*Patterns are located in areas of borehole control; at distance from borings, the absence of a pattern indicates relatively poor subsurface control.

Vertical Scale: 1" = 100'
Horizontal Scale: 1" = 500'
Vertical Exaggeration 5:1

If this image is not as legible as this overlay, it's due to the poor quality of the original document

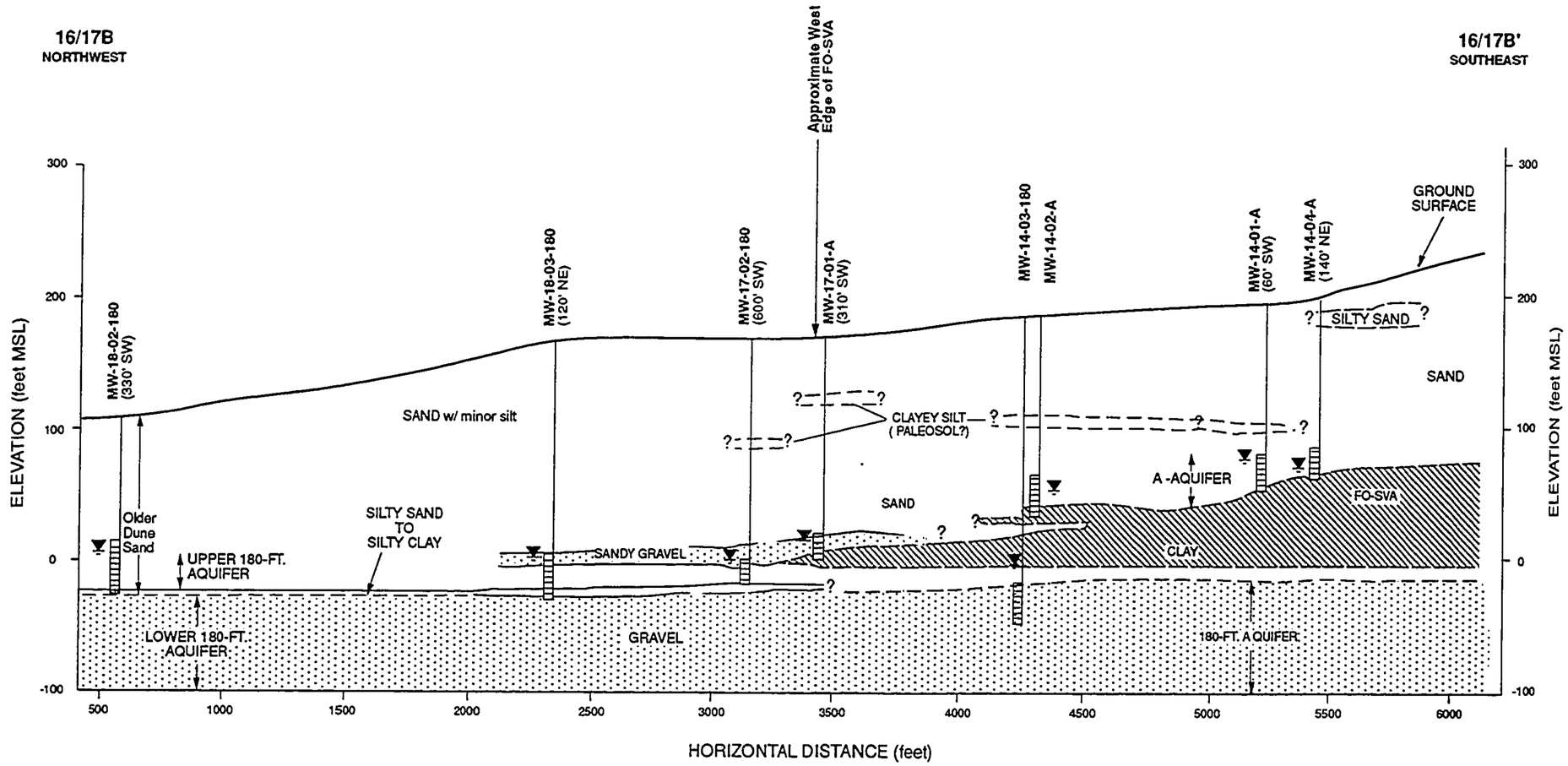
NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
	7/94	DRAFT	mc071494AG	23366941711			DJP
2	12/94	DRAFT FINAL	mc112294LFD	23366941721	RFm	8/22/94	

Harding Lawson Associates
Engineering and Environmental Services

Volume II - Remedial Investigation
Basewide RI/FS
Fort Ord, California

Regional Geologic Cross Section 16/17A-16/17A'
Sites 16 and 17

PLATE: 12



EXPLANATION

Well/Boring Location Showing Screened Interval

Static Water Level from HLA February 1994 Measurements

(10' E) Distance and direction from cross-section line

Note: Well data projected and interpreted as it would occur approximately at the cross section line.

Lithologic Patterns*:

- Clay
- Sand
- Gravel

*Patterns are located in areas of borehole control; at distance from borings, the absence of a pattern indicates relatively poor subsurface control.

Vertical Scale:	1" = 100'
Horizontal Scale:	1" = 500'
Vertical Exaggeration	5:1

If this image is not as legible as this overlay, it's due to the poor quality of the original document

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
	7/94	DRAFT	mc071494AG	23366.041711			DJP
2	12/94	DRAFT FINAL	mc112294LFD	23366.041721	RFM	11/21/94	

Harding Lawson Associates
Engineering and Environmental Services

Volume II - Remedial Investigation
Basewide RI/FS
Fort Ord, California

Regional Geologic Cross Section 16/17B-16/17B'
Sites 16 and 17

PLATE: 13

PHYSICAL TESTING STANDARDS FOR SOIL

The following physical testing was performed as part of the remedial investigation (RI) for these sites. Physical tests were performed during the RI to provide data for the evaluation of fate and transport of chemicals and of remedial action alternatives for the feasibility study. Descriptions of the physical testing conducted follow:

- Particle Size Analysis (Sieve Analysis): This test is described in detail in ASTM Standard D 422 (Method for Particle-Size Analysis of Soil) and determines the particle size distribution of the soil. Information from this test is used by the laboratory to determine the classification of soil in accordance with the Uniform Soil Classification System (USCS). Field and laboratory classifications of some soil samples sometimes differ. Soil borings were logged by HLA geologists or engineers in the field using ASTM D 2488-90 (Practice for Description and Identification of Soil [Visual-Manual Procedure]). The differences in classifications are partly the result of the natural differences between quantitative laboratory results and the subjective element in qualitative visual or manual field classification. In addition, the field method classifies sand with more than 15 percent fines as silty or clayey sand, whereas the laboratory method uses 12 percent fines for this threshold.

- Atterberg Limits: This test is described in detail in ASTM Standard D 4318 (Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soil) and determines the plastic and liquid limits of soil. Soil can be solid, liquid, or plastic depending on the moisture content. Water contents at which soil changes (1) from solid to plastic and (2) from plastic to liquid are called the Atterberg limits, known individually as the plastic limit and liquid limit, respectively. High liquid limits generally indicate a high clay content in the soil and a low load-carrying capacity. The difference between the liquid and plastic limits is known as the plasticity index. A low plasticity index generally indicates that a relatively small amount of moisture will change the soil from a semisolid to a liquid. A high plasticity index (generally greater than 20) indicates that considerable water may be added to the soil before it reaches a liquid condition. Sandy soil with low clay contents, such as those often found at Fort Ord, typically have low liquid limits and are non-plastic (have no plastic limit).

- Organic Content: This test is described in detail in ASTM Standard D 2974 (Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soil). This test measures the amount of organic matter in the soil. The organic content indicated by this test can be used to evaluate the sorptive properties of the soil and the potential for methane gas generation.

- Swell Consolidation: This test is described in detail in ASTM Standard D 4546 (Test Methods for One-Dimensional Swell or Settlement Potential of Cohesive Soil). Results of this test can be used to estimate the total amount of soil consolidation under various future loading conditions, as well as the swell or expansion of the soil once such loading is removed.

- Modified Proctor Compaction: This test is described in detail in ASTM Standard D 1557 (Test Methods for Moisture-Density Relations of Soil and Soil-Aggregate Mixtures using a 10 Pound Rammer and 18 Inch Drop). This test is used to determine the optimum moisture content and density of the soil. Optimum moisture content and density are used in developing backfill and site grading/compaction requirements. (Specified compactions are often expressed as 90 to 100 percent relative compaction relative to these optimal conditions.)

- Specific Gravity: This test is performed in accordance with ASTM D 854 (Test Method for Specific Gravity of Soil). The specific

gravity of soil can be used with the dry density to calculate soil porosity, void ratio, percent saturation, and moisture content. These values give an indication of actual field conditions. The porosity of soil can also be used to qualitatively evaluate the permeability of soil by indicating the amount of pore space present in the sample.

- Moisture Content and Dry Density: Moisture content of soil is determined in accordance with ASTM Standard D 2216 (Method for Laboratory Determination of Water [Moisture] Content of Soil, Rock, and Soil-Aggregate Mixtures). The moisture content of the soil can be used to evaluate the capillary fringe of a groundwater table and the effectiveness of soil vapor extraction or bioremediation of soil.

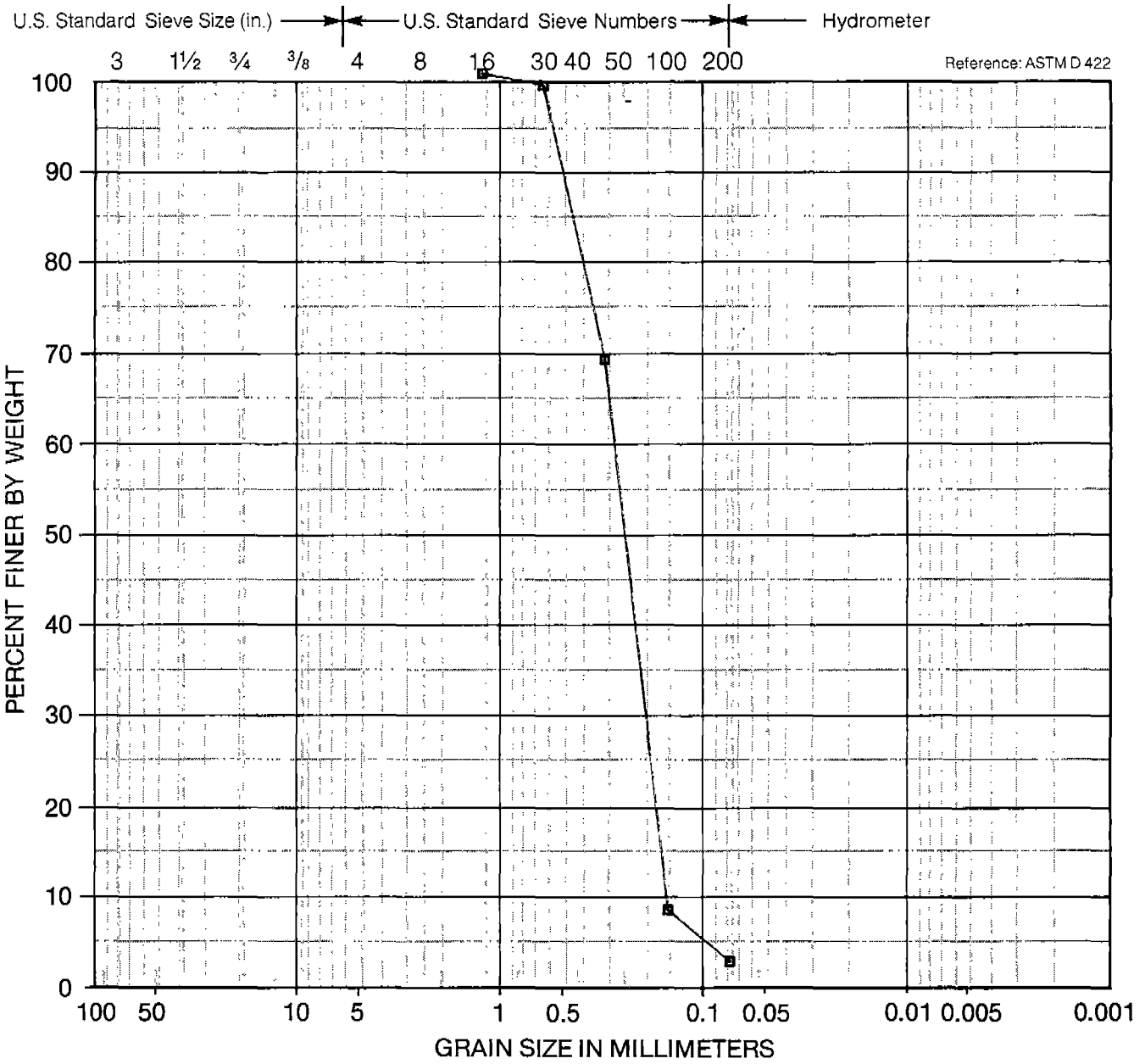
  The moisture content of the soil is also used to determine the maximum dry density of soil. A cylindrical soil sample is measured for height, diameter, and wet weight in the laboratory and the actual wet density of the soil is calculated. The dry density is then calculated by dividing the actual density by one plus the moisture content. Dry density is required in many geotechnical test methods, as well as for the general evaluation of soil properties.

- Hydraulic Conductivity: Two ASTM tests can be used to determine hydraulic conductivity. Sandy uncohesive soil, such as those typically found at Fort Ord, are usually tested for hydraulic conductivity using ASTM Standard D 2434 (Test Method for Permeability of Granular Soil, Constant Head). For silty and/or clayey soil, ASTM Standard D 5084 (Test Method for Permeability of Granular Soil, Falling Head) is used to measure hydraulic conductivity. Hydraulic conductivity values can be used to estimate the leachability potential of the soil and to design landfill liners and caps. Hydraulic conductivity can also be used for groundwater modeling or for estimating the flow of water through soil.

- Air Permeability: This test is performed using a modified ASTM Standard D 4525 test. The normal ASTM D 4525 (Test Method for Permeability of Rocks by Flowing Air) test is used to measure the conductivity of air through rock. This procedure was slightly modified by the analytical laboratory (see attached laboratory sheets). Soil permeability is a measure of continuous voids throughout the sample and of the ease with which liquids (air or water) can migrate through them. Air permeability results can be used to aid in determining the effectiveness of certain remedial technologies such as air sparging, soil vapor extraction, and bioventing.

- Hveem Stabilometer or R-Value: This test is described in detail in ASTM Standard D 2844 (Test Method for Resistance R-Value and Expansion Pressure of Compacted Soil). The R-value is measured using a Hveem stabilometer, and ranges from 0 (the resistance of water) to 100 (the resistance of steel). This test measures the resistance of a soil to lateral deformation when a vertical load is applied to it. When displacement occurs, the soil moves out and away from the applied load. R-values are used in the design of asphalt pavements or caps that must support vehicular or other loadings.

29278



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-16-01 @ 21.0 FT	LIGHT BROWN SAND (SP)

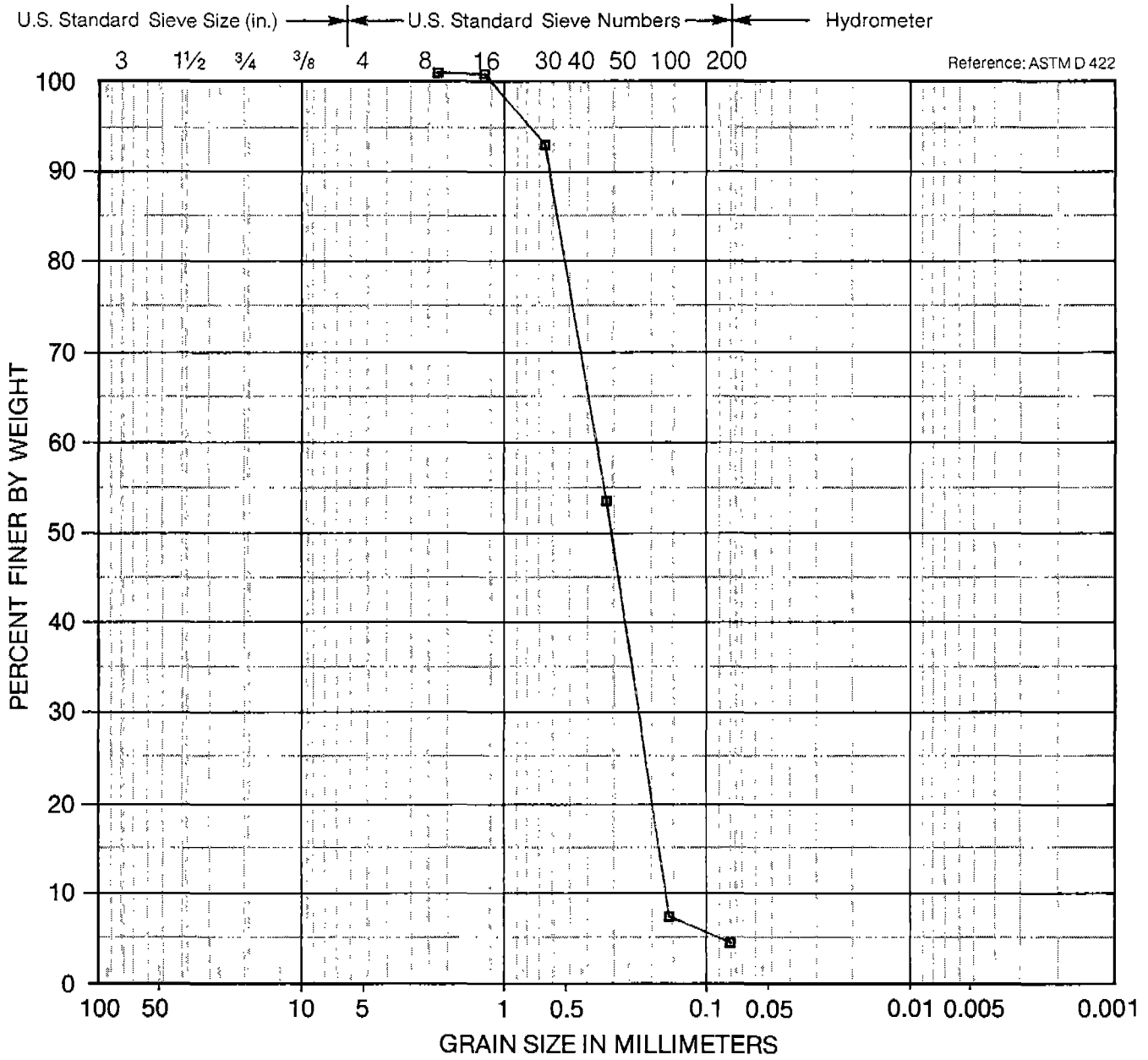
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-01
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **C1**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02		04-02-1992		

29279



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-16-02 @ 15.5 FT	YELLOW-BROWN SAND (SP)

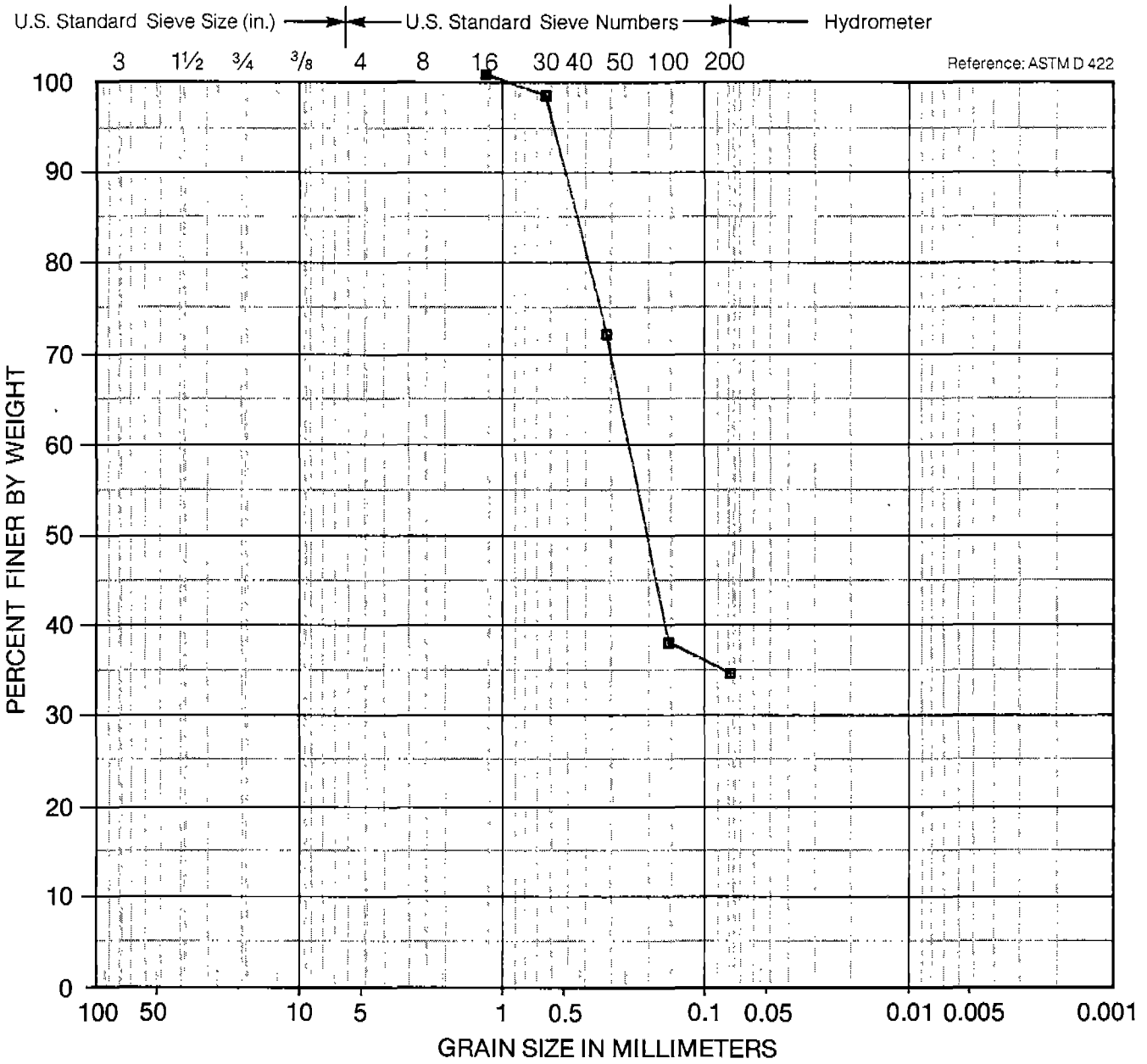
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-02
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE
C2

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02		03-28-1992		

29280



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
■	SB-16-03 @ 20.5 FT	YELLOW-BROWN CLAYEY SAND (SC)

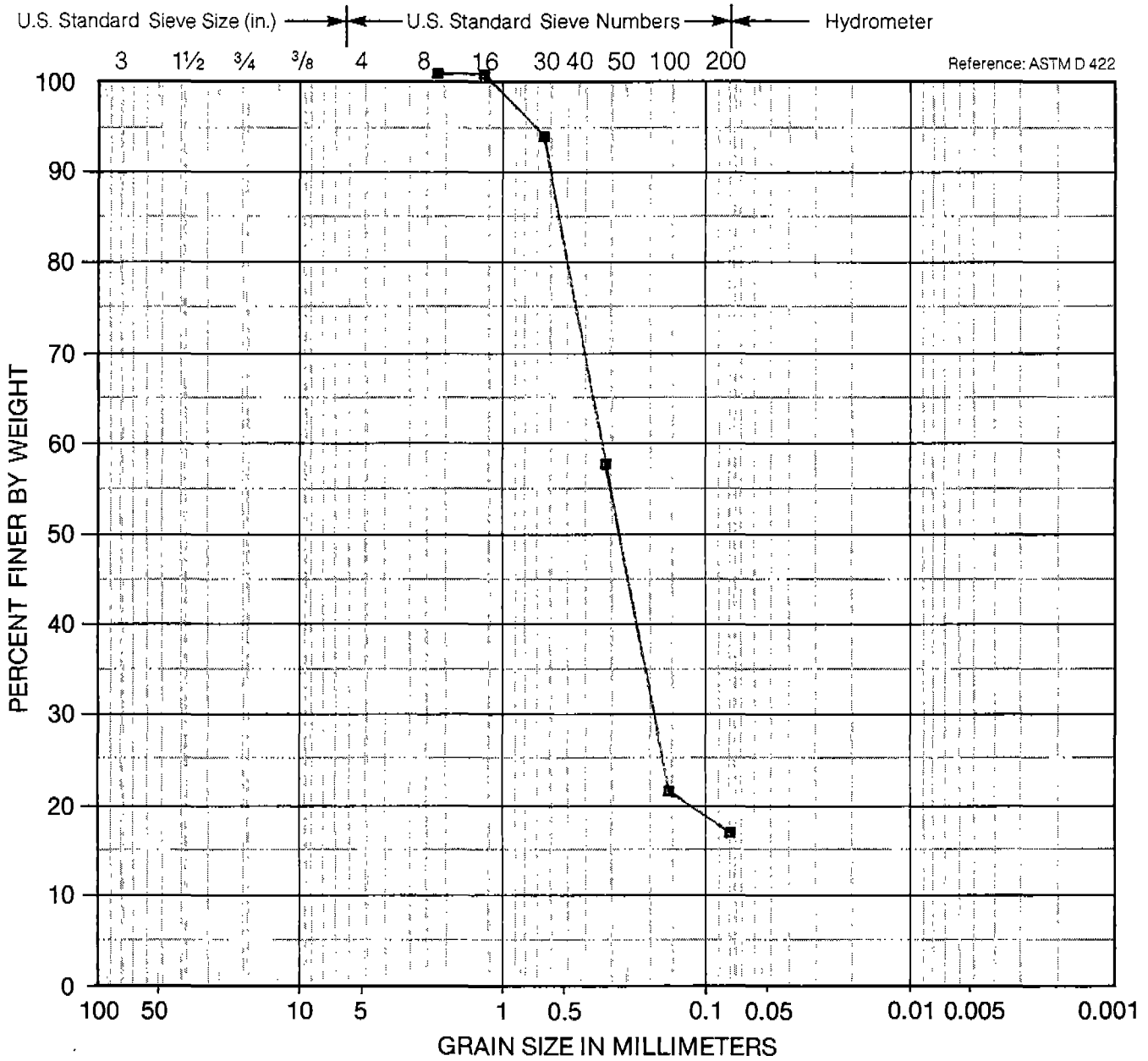
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-03
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE
C3

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02	AH	03-25-1992		

29281



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-16-04 @ 10.5 FT	DARK BROWN CLAYEY SAND (SC)

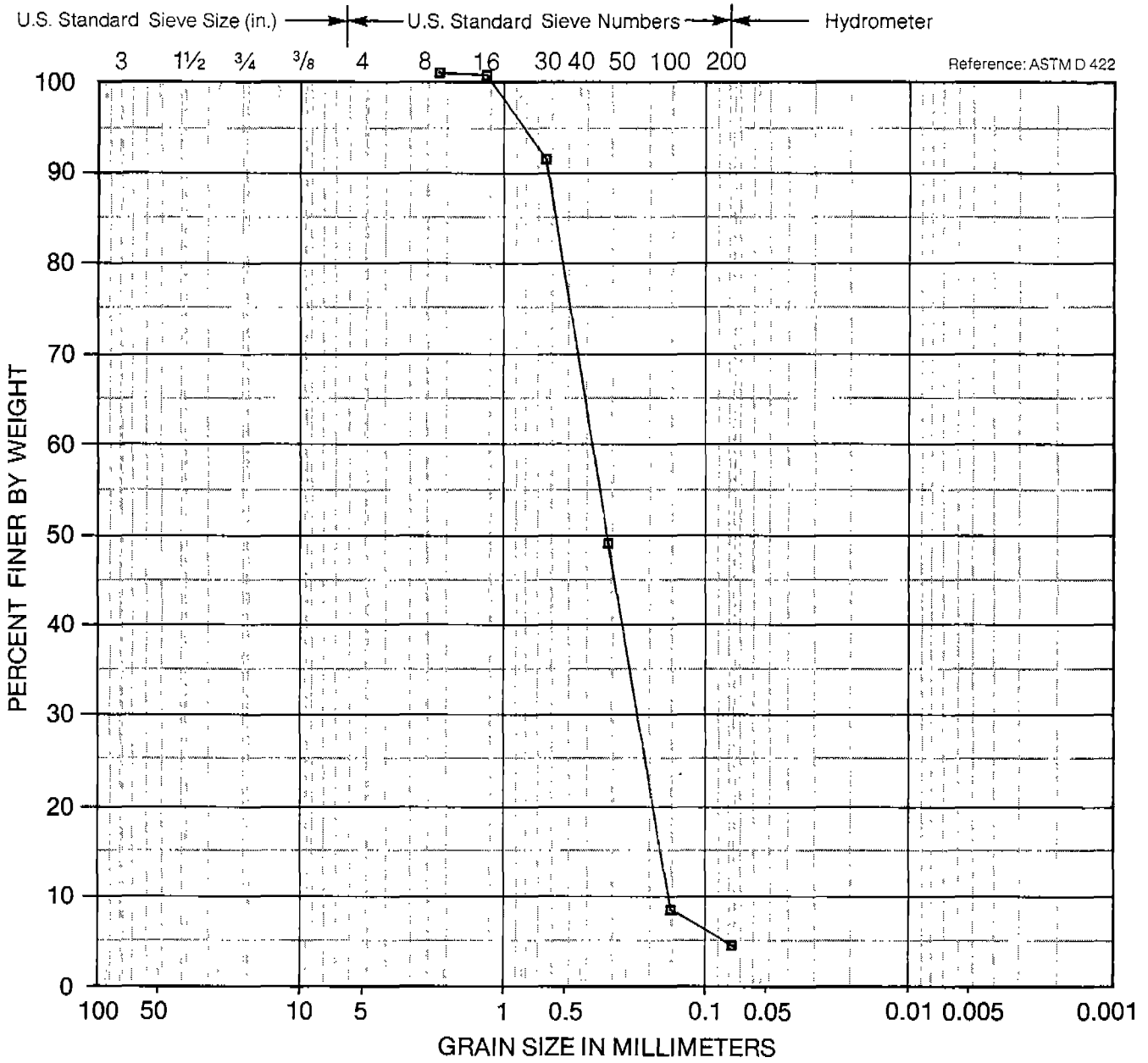
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-04
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE
C4

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02	EH	03-25-1992		

29282



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-16-05 @ 14.0 FT	YELLOW-BROWN SAND (SP)

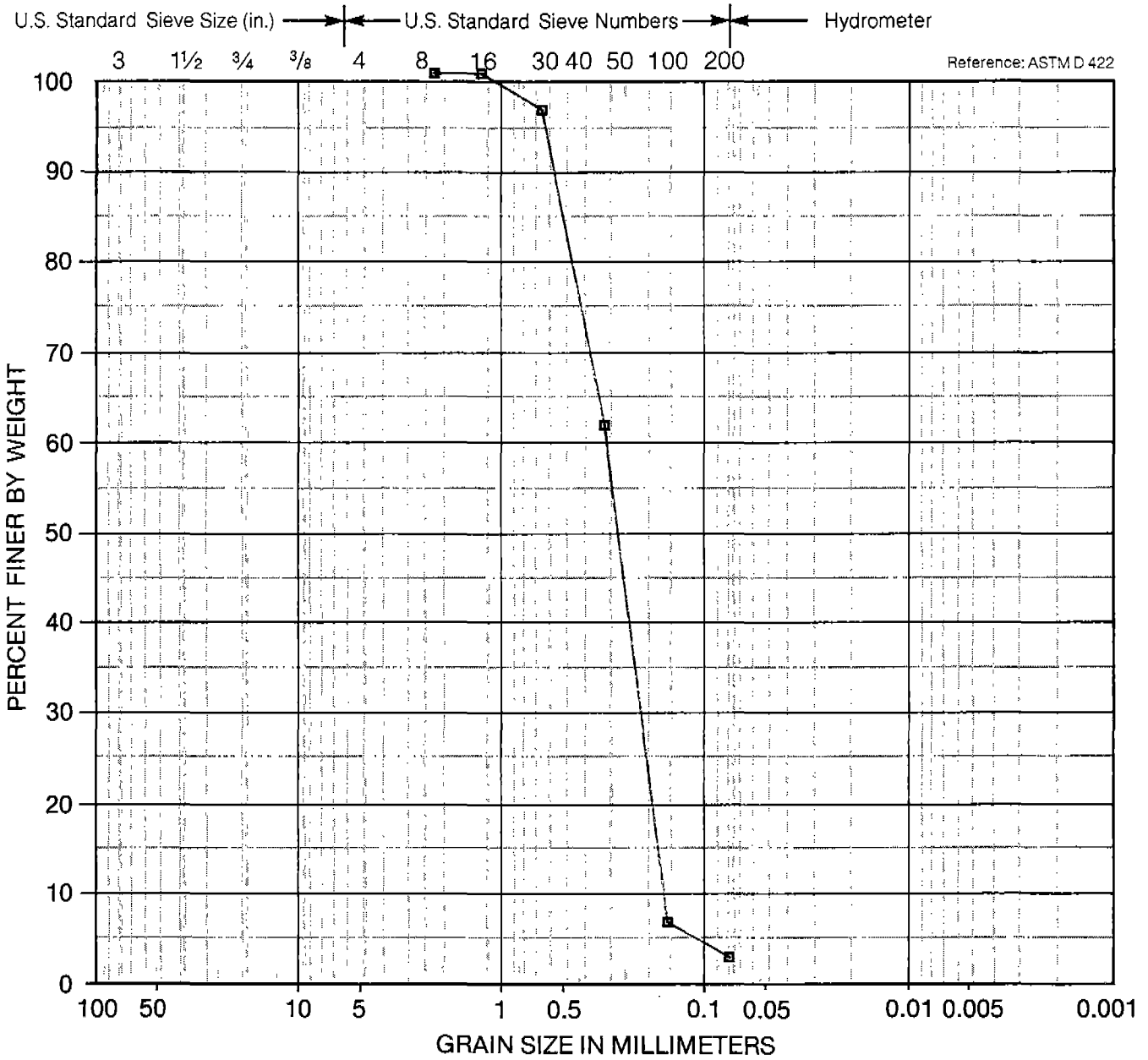
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-05
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **C5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02	EH	03-26-1992		

29283



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-16-06 @ 21.0 FT	LIGHT BROWN SAND (SP)

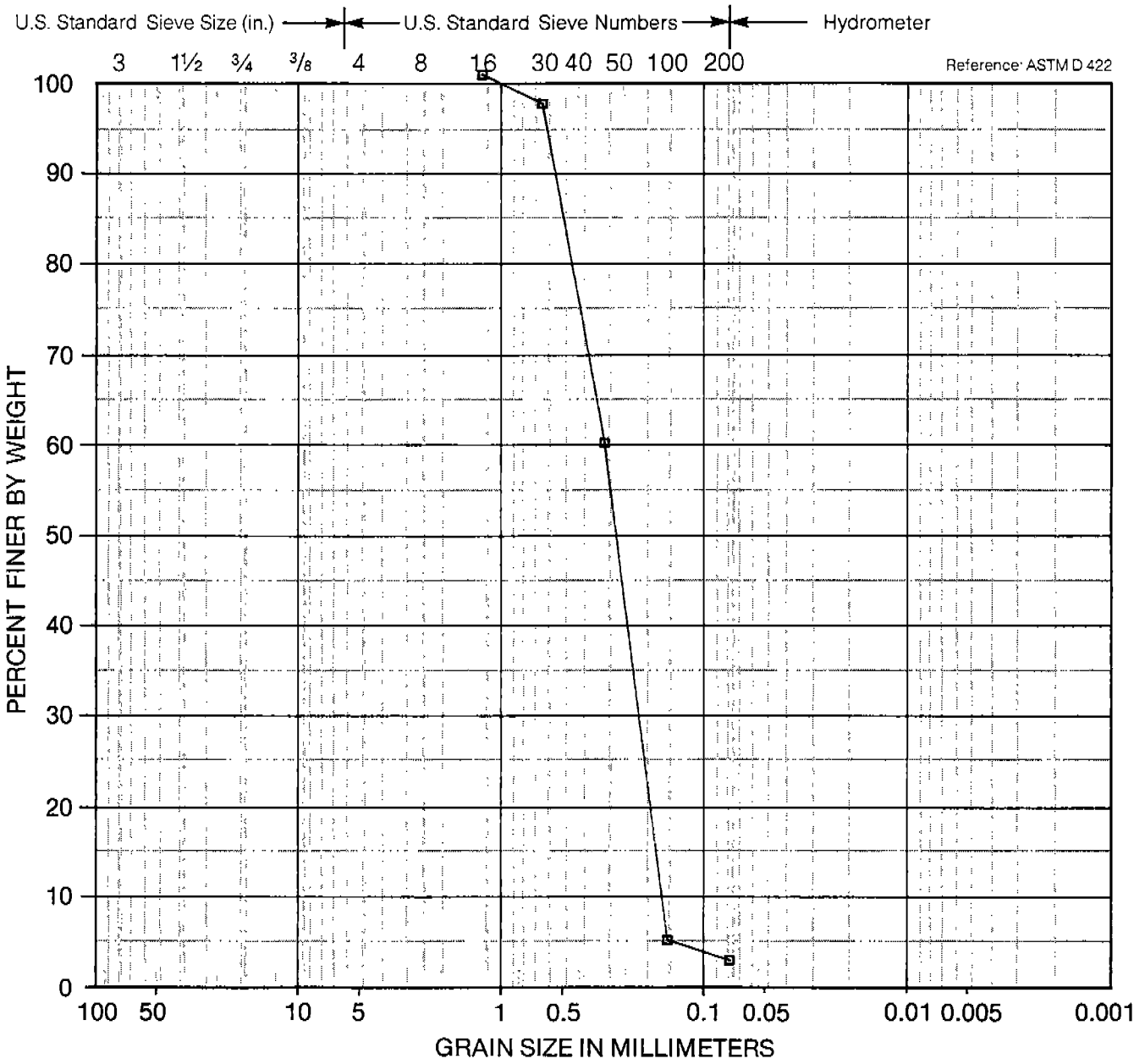
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-06
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **C6**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02	HH	03-28-1992		

29284



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-16-07 @ 20.5 FT	YELLOW-BROWN SAND (SP)

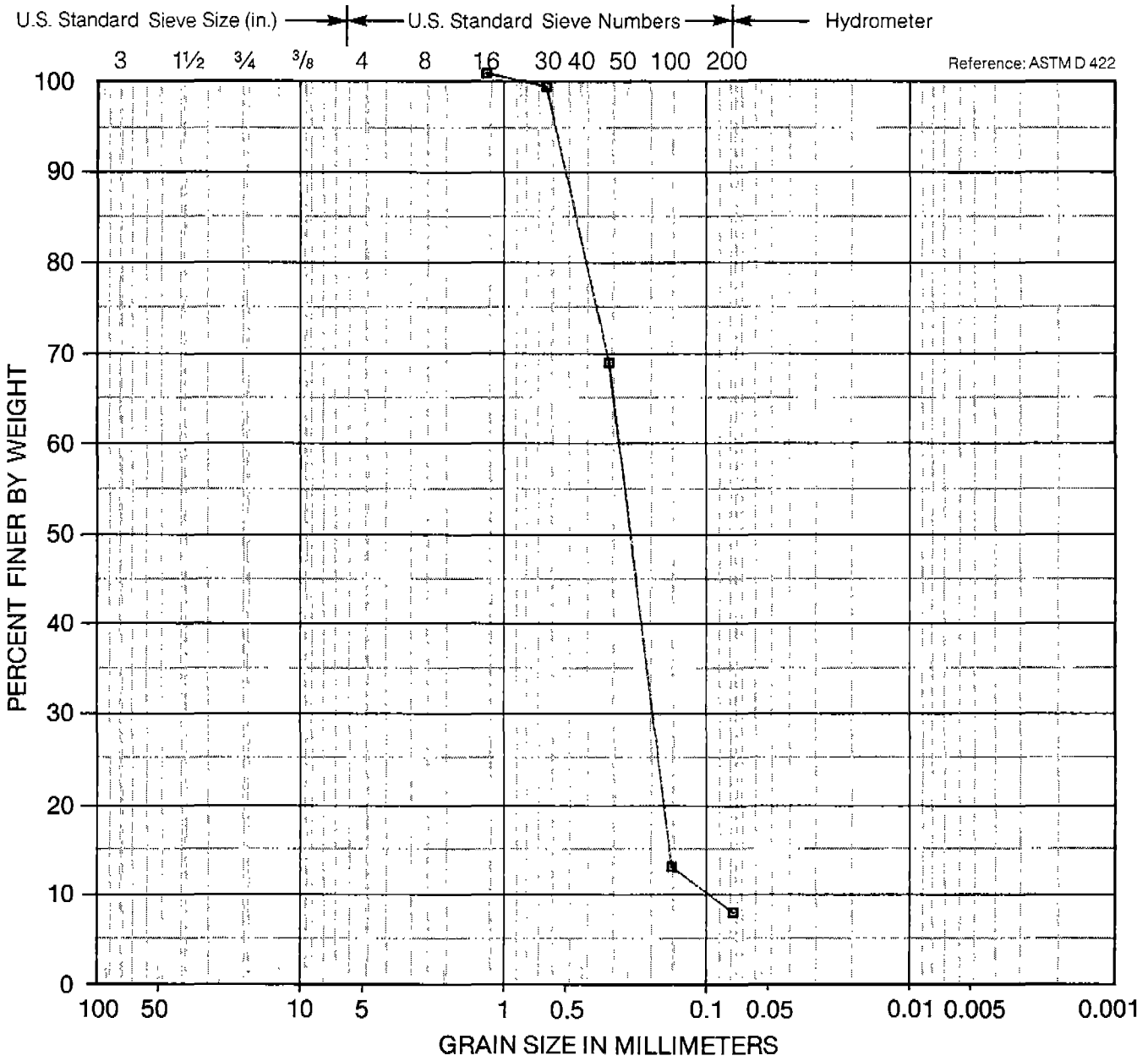
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-07
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE
C7

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02		03-25-1992		

29285



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-16-08 @ 20.0 FT	LIGHT BROWN SAND W/CLAY (SP-SC)

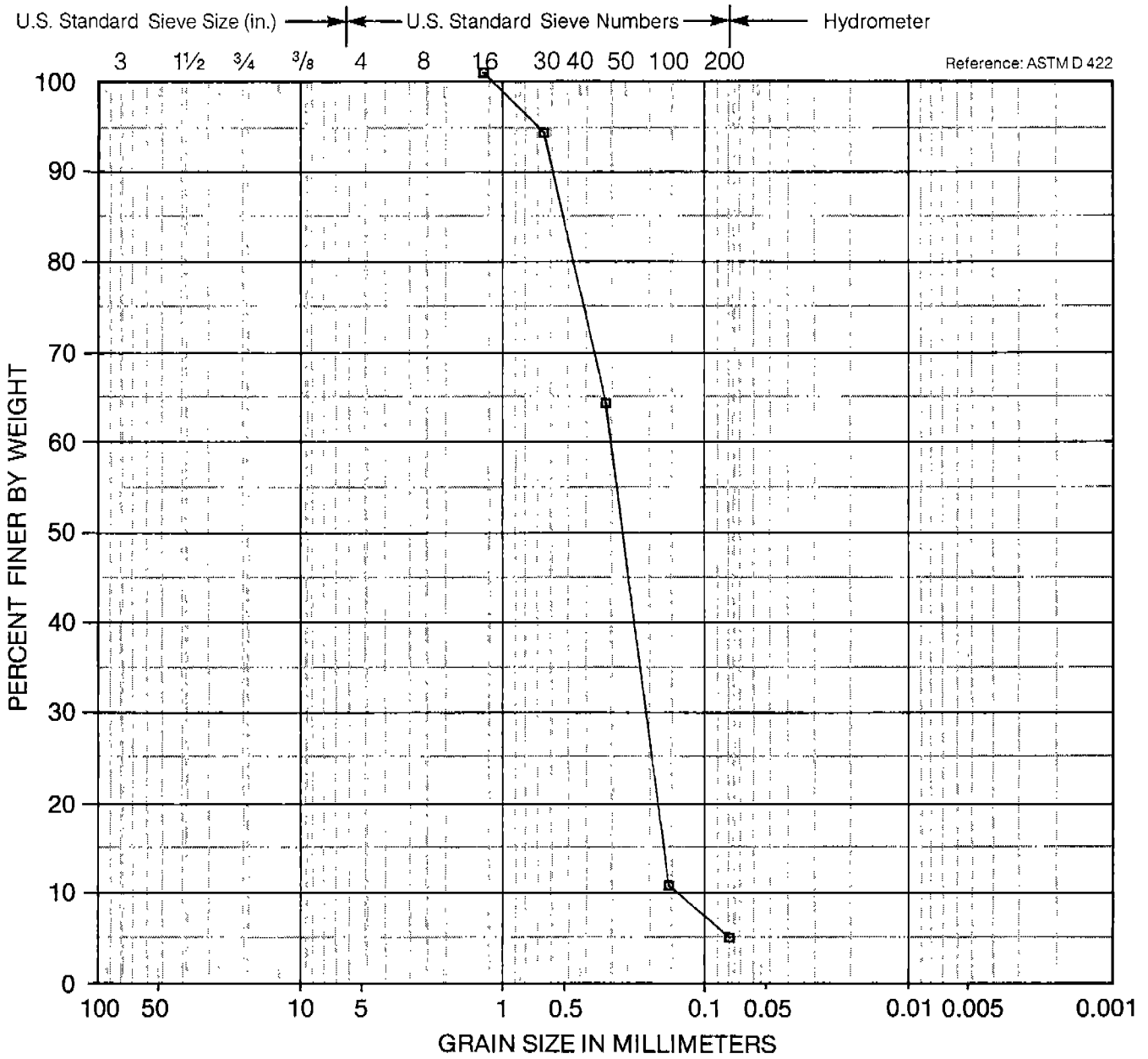
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-08
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **C8**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02	EFH	04-02-1992		

29286



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
■	SB-16-09 @ 15.5 FT	LIGHT BROWN SAND (SP)

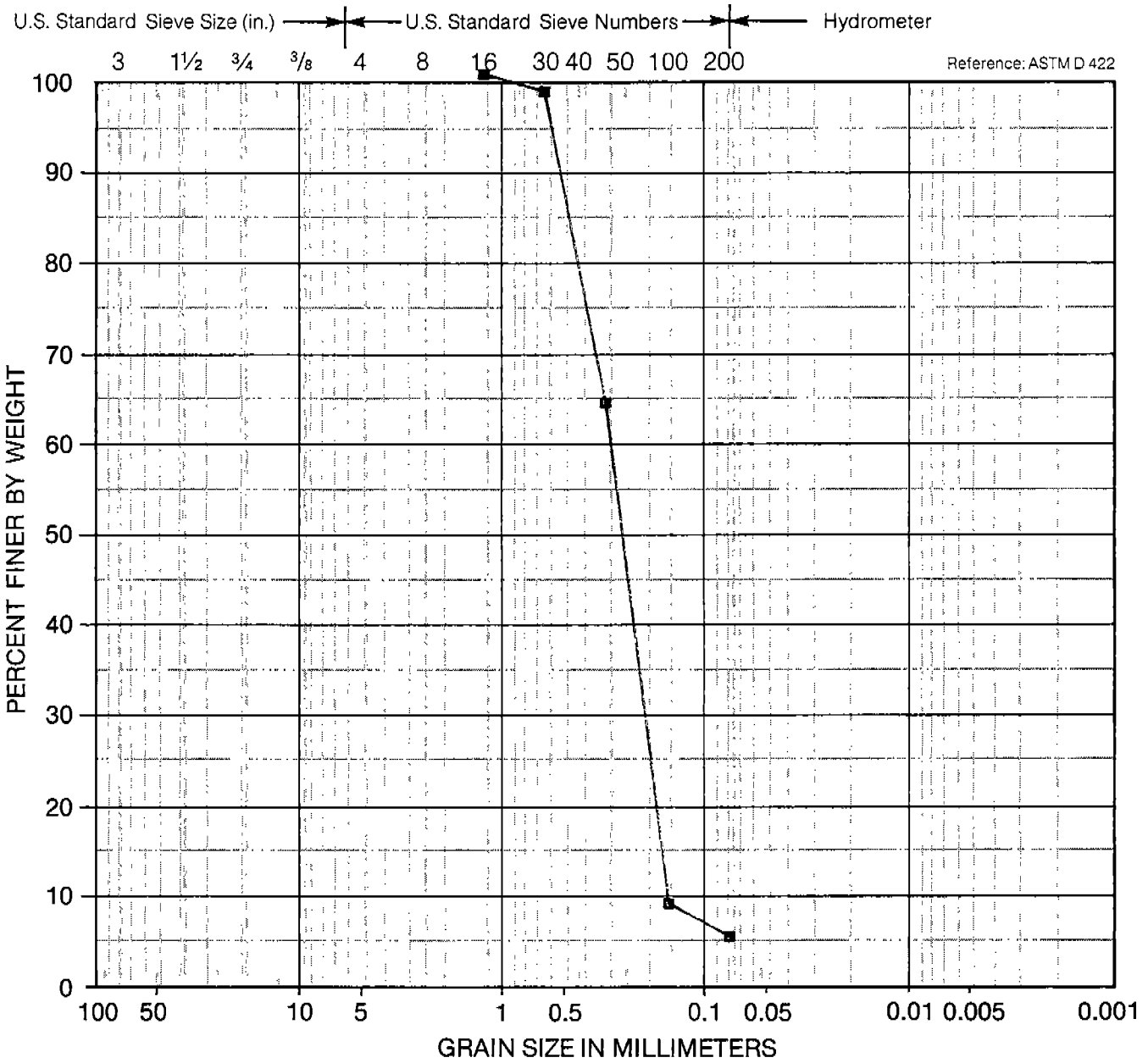
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-09
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **C9**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02	EH	03-25-1992		

29287



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-16-10 @ 15.5 FT	LIGHT BROWN SAND W/CLAY (SP-SC)

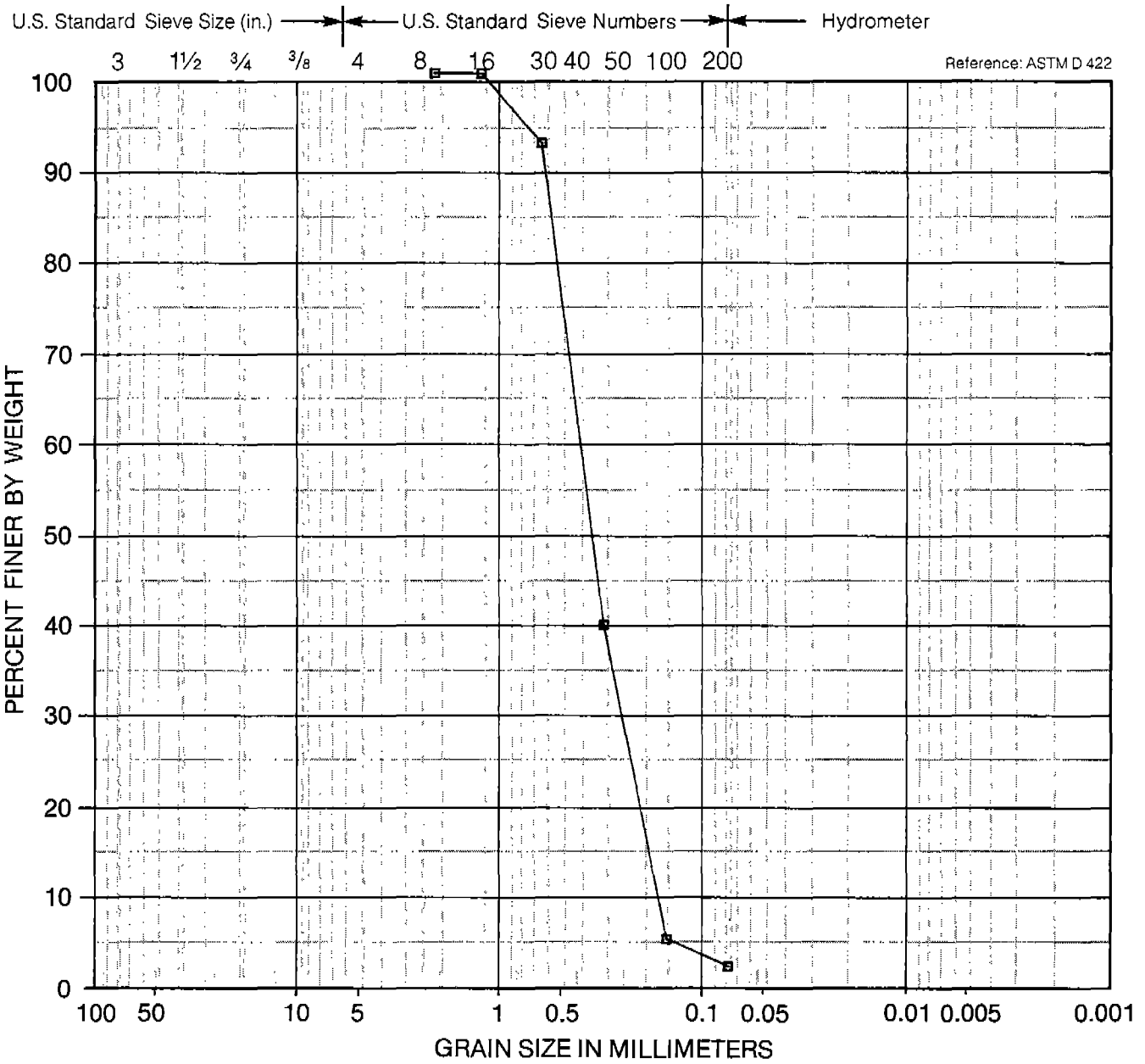
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-10
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **C10**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02		03-27-1992		

29288



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-16-11 @ 15.5 FT	YELLOW-BROWN SAND (SP)

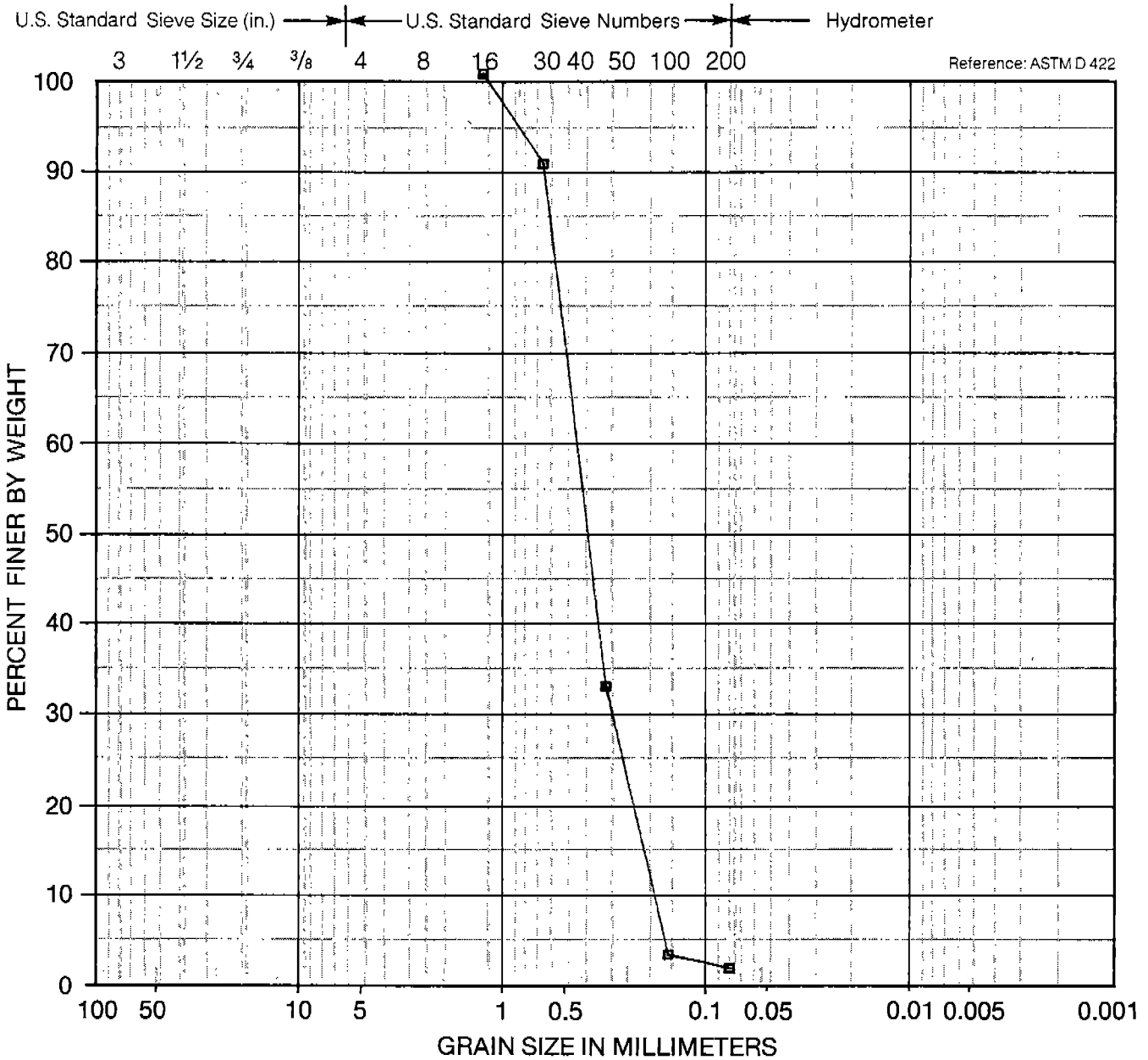
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-11
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE **C11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02		03-25-1992		

29289



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
▫	SB-16-12 @ 10.0 FT	LIGHT BROWN SAND (SP)

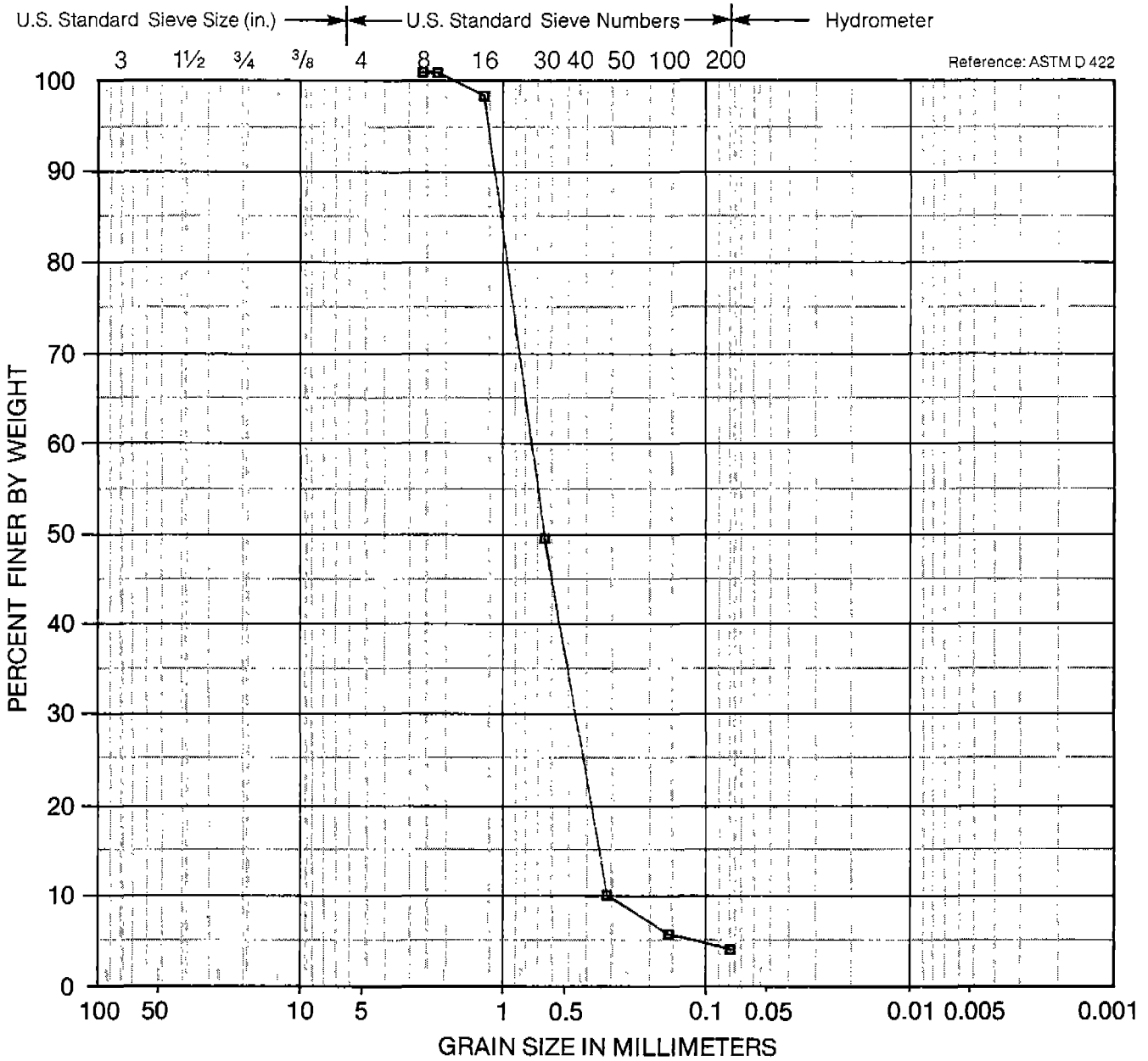
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-16-12
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE
C12

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02	EH	03-29-1992		

29290



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
▫	MW-16-01 @ 105.5 FT	YELLOW-BROWN SAND (SP)

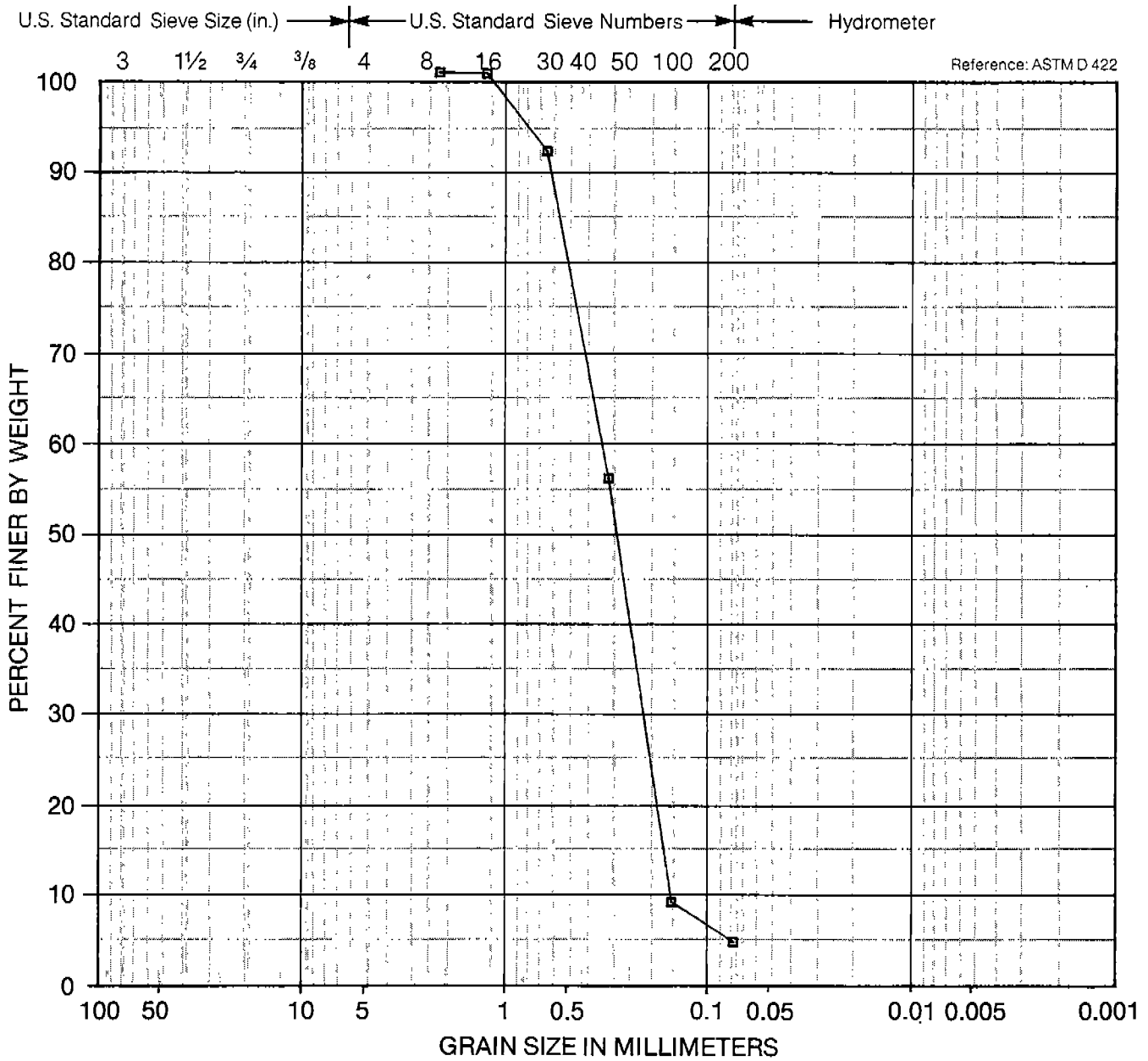
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring MW-16-01
Site Characterization
Site 16 - DOL Maintenance Yard, Pete's Pond
Fort Ord, California

PLATE
C13

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.687.02		03-29-1992		

30075



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
■	SB-17-01 @ 31.0 FT	ORANGE-BROWN SAND (SP)

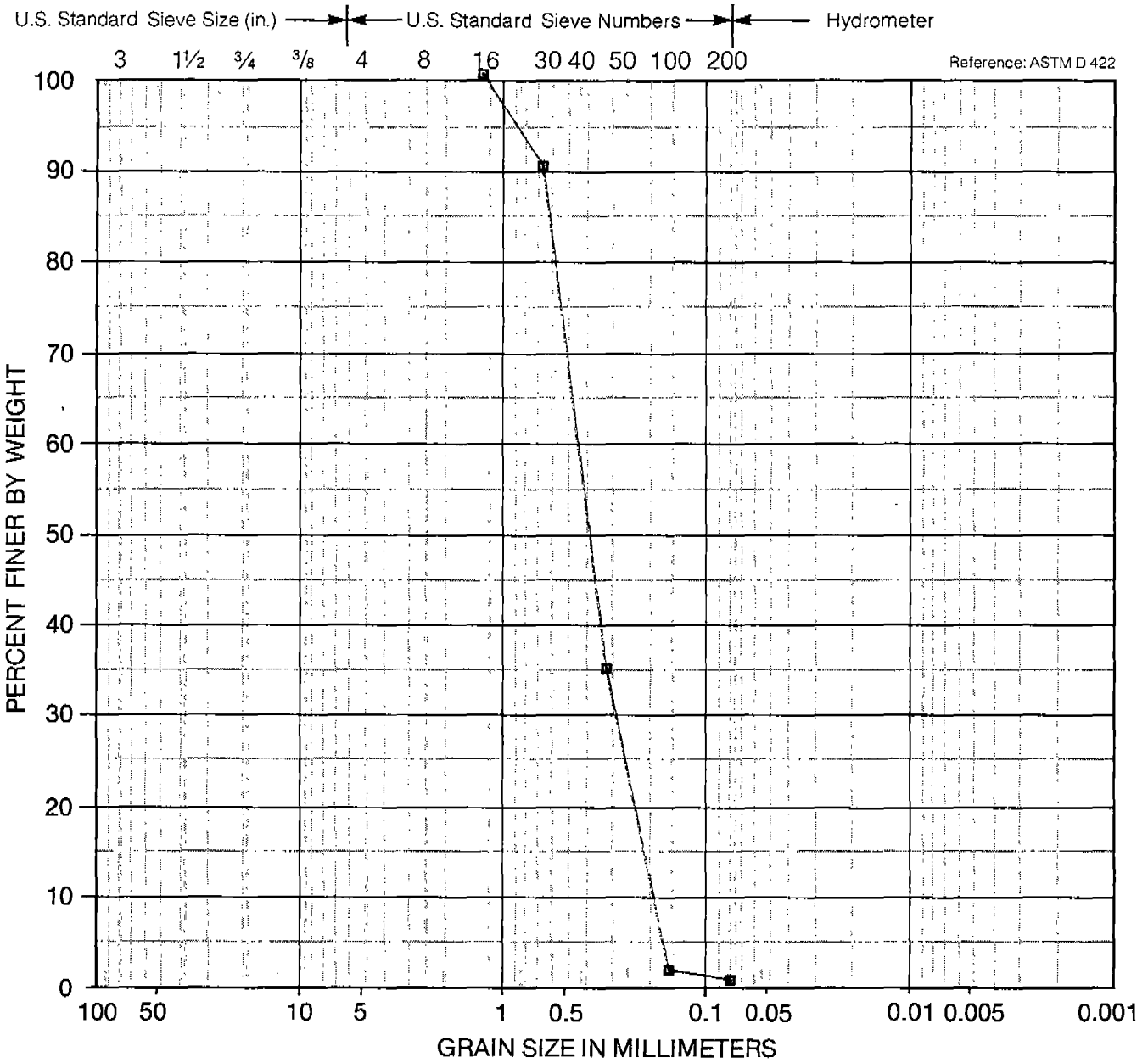
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-17-01
Site 17 - 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE
C14

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.694.02	EH	03-21-1992		

30076



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-17-02 @ 16.0 FT	YELLOW-BROWN SAND (SP)

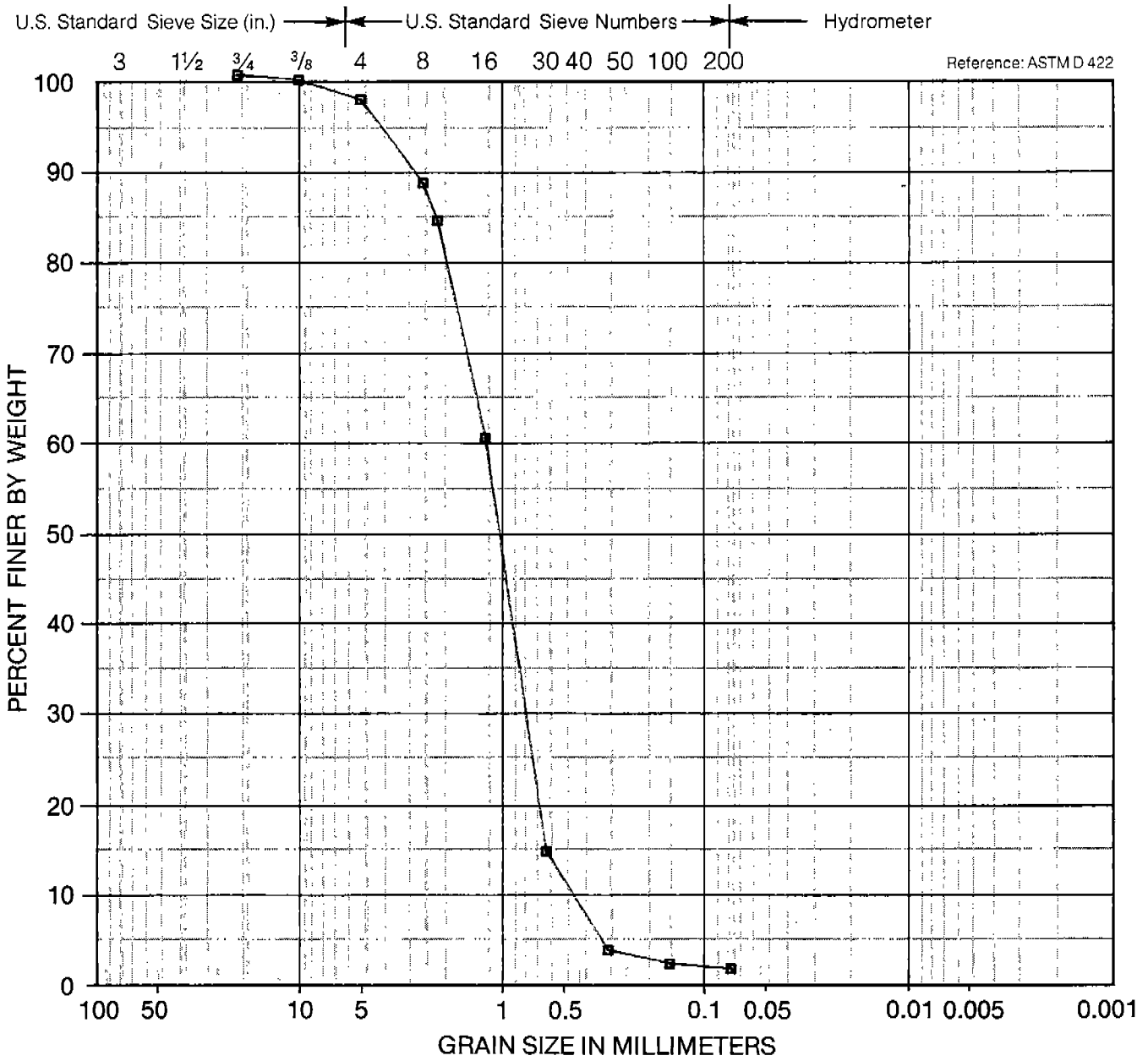
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring SB-17-02
Site 17 - 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE
C15

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.694.02	EFH	04-02-1992		

30077



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	MW-17-01 @ 150.0 FT	YELLOW-BROWN SAND (SP)

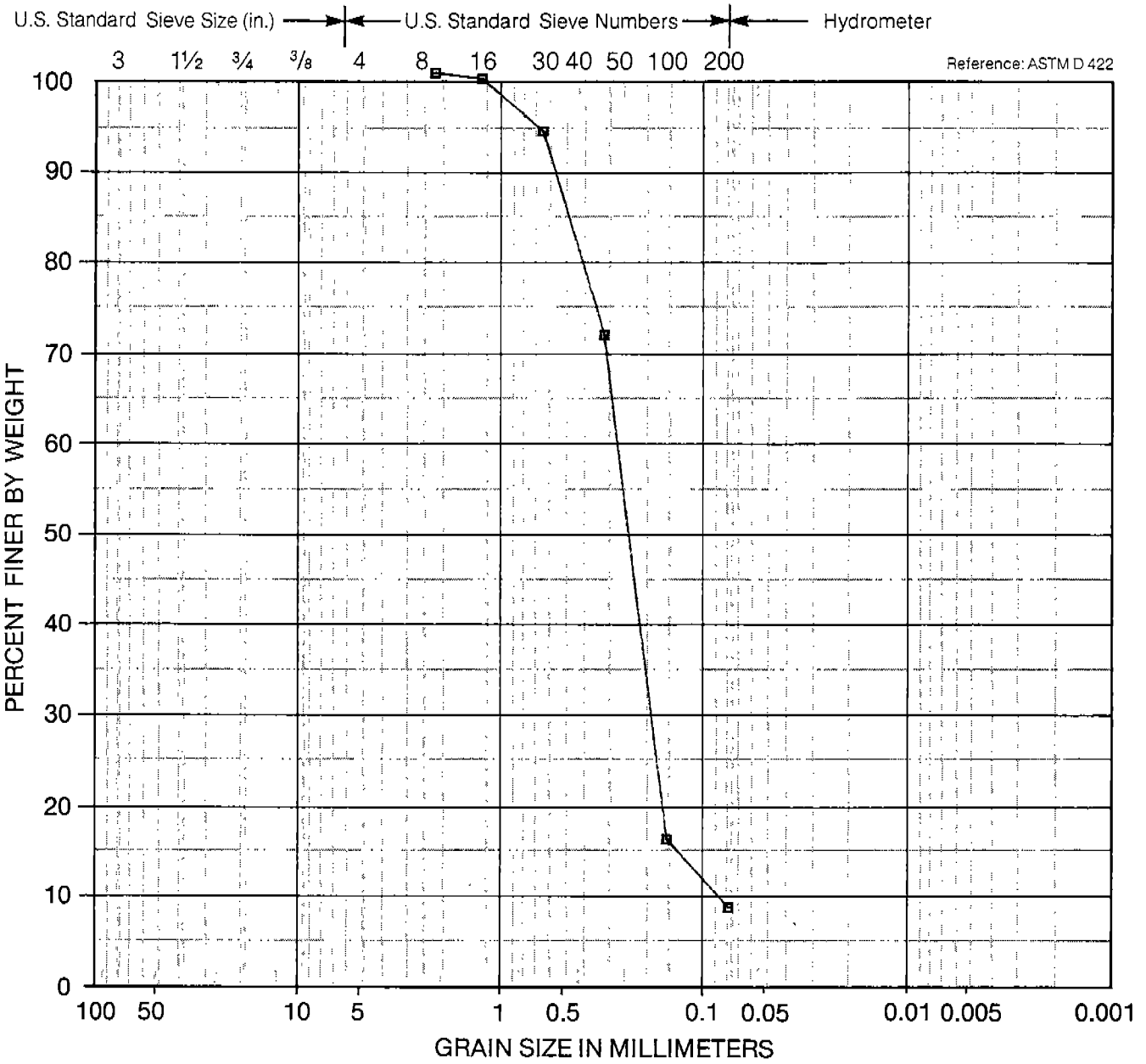
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring MW-17-01
Site 17 - 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE
C16

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.694.02	EH	04-02-1992		

30078



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	MW-17-02 @ 180.0 FT	BROWN SAND W/CLAY (SP-SC)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Boring MW-17-02
Site 17 - 1400 Block Motor Pool
and Suspected Disposal Area
Site Characterization
Fort Ord, California

PLATE
C17

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.694.02	EHH	03-26-1992		

SOLEA TESTING GROUP

Transmittal/Memorandum

To: **Harding Lawson Associates**
7655 Redwood Blvd., P.O. Box 578
Novato, CA 94948

Attn: Brent Dostert

From: Ms. Farideh Faraji, Technical Director
Date: November 18, 1993
Subject: Laboratory Test Results; Fort Ord Site 16, HLA #23366.01724
STG No.: HLA.002
LRN: 4376

Remarks: Enclosed are the final test results for the subject project. Samples were submitted to our Laboratory November 8, 1993. These tests have been performed in general accordance with accepted standards and checked with STG's Quality Assurance Plan. This transmittal includes the following test(s):

Item	Description	Quantity
1	Moisture Content & Dry Density	2
2	Sieve Analysis to #200 Seive	2
3	Organic Content	2

Untested samples, portions of tested samples, when available, and sample tubes will be held for a period of 8 weeks. Samples and tubes will be discarded at that time unless other arrangements are made. Sample storage fees will be charged for storage periods greater than 8 weeks. STG does not store contaminated samples and by-products produced from testing. These will be returned to you.

If you have any questions, please call me at (510) 682-7005. Thank you.

Farideh Faraji

Ms. Farideh Faraji, Technical Director

Thomas Davise

Thomas Davise, CEO

cc:

SOLEA TESTING GROUP

SOLEA TESTING GROUP

Statement of Additions and Omissions

Harding Lawson Associates
7655 Redwood Blvd., P.O. Box 578
Novato, CA 94948

Laboratory Test Results; Fort Ord Site 16, HLA #23366.01724

November 18, 1993

STG Client No.: HLA.002

---

1. Sample SB-16-18, 9342BO16077F, @ 4.0' the air permeability was impervious. No replacement sample was provided.

SOLEA
SOLEA TESTING GROUP

LABORATORY TESTING PROGRAM

Sample Receipt Record

LRN 4376

CLIENT NAME: Harding Lawson Ass	CONTRACT NO.	SOLEA CLIENT NUMBER
CLIENT PROJECT: FORT ORD Site 16	REPORT ADDRESS: 578 7655 Redwood Blvd. P.O. Box	DATE VERBAL RESULTS DUE
	CITY: Novato Calif 94948	DATE FINAL REPORT DUE
CLIENT PROJECT NO.: 23366.01724	INVOICE ADDRESS: Same as above	RECEIVED BY / DATE
CONTACT / REPORT TO: Rick McCartney	CITY	HAZARD I.D.
TESTS ASSIGNED BY: David Browne	PHONE NUMBER: (415) 892-0821	SEE LABORATORY HEALTH AND SAFETY PLAN
SAMPLES RELINQUISHED BY: [illegible]	FAX NUMBER	SAMPLE TYPE CODE: ST-shelby, BT-brass, SS-stainless, BK-bulk, BG-baggie, J-jar

	HOLE NO.	SAMPLE I.D.	DEPTH (FT)	SAMPLE TYPE	SAMPLE CONDITION	CONTAMINATED	SAMPLE RECEIVED	010 MOISTURE CONTENT	011 MOISTURE AND DENSITY	.025 SPECIFIC GRAVITY	030 ATTERBERG LIMIT, 3-PT	040 SIEVE ANALYSIS TO #200	042 PERCENT PASSING #200	043 HYDROMETER ANALYSIS	ORGANIC Content	100 COMPACTION (MODIFIED)	120 R-VALUE		.150 CONSOLIDATION	167 TRIAXIAL PERMEABILITY*	175 AIR PERMEABILITY		200 UNCONFINED COMPRESSION	211 DIRECT SHEAR (UU)*		220 TRIAXIAL SHEAR (UU)*	222 TRIAXIAL SHEAR (CU)*		*CONFINING PRESSURE (PSI)	REMARKS
	SPECIAL INSTRUCTIONS																													
1	~~SB-16-16~~	53423016							(2)																					
2	SB-16-16	077 F	3						X																					
3	SB-16-16	078 F	4									X																		
4	SB-16-16	079 F	4.5												X															
5	SB-16-18	086 F	2.0						(2)						X															
6	SB-16-18	087 F	2.5						X																					
7	SB-16-18	090 F	4.0																		(1) X									
8	SB-16-18	091 F	5.0									X																		
9																														
10																														
11																														
12																														
13																														
14																														
15																														
	TALLY																													

SPECIAL INSTRUCTIONS

[illegible]

PAGE

STORAGE LOCATION

LEGEND

NOTES

TEST ASSIGNED

TEST PREPARED

TEST COMPLETED

TEST COMPUTERIZED

SOLEA TESTING GROUP

Transmittal/Memorandum

To: **Harding Lawson Associates**
105 Digital Drive
Novato, CA 94949

Attn: Rick McCartney

From: Ms. Farideh Faraji, Technical Director
Date: April 7, 1994
Subject: Laboratory Test Results;Fort Ord , Site 16/17
STG No.: HLA.002
LRN: 4469

Remarks: Enclosed are the final test results for the subject project. Samples were submitted to our Laboratory March 23, 1994. These tests have been performed in general accordance with accepted standards and checked with STG's Quality Assurance Plan. This transmittal includes the following test(s):

Item	Description	Quantity
1	Moisture Content & Dry Density	9
2	Porosity	4
3	Atterberg Limit Non-Plastic	13
4	Sieve Analysis to #200 Sieve	11
5	Organic Content	13
6	Compaction (Modified) 4"	4
7	Swell Consolidation-Method A	4
8	Fixed-Wall Permeability-Falling Head	5

Untested samples, portions of tested samples, when available, and sample tubes will be held for a period of 8 weeks. Samples and tubes will be discarded at that time unless other arrangements are made. Sample storage fees will be charged for storage periods greater than 8 weeks. STG does not store contaminated samples and by-products produced from testing. These will be returned to you.

If you have any questions, please call me at (510) 682-7005. Thank you.

Farideh Faraji

Ms. Farideh Faraji, Technical Director

cc:

SOLEA TESTING GROUP

Transmittal/Memorandum

To: **Harding Lawson Associates**
105 Digital Drive
Novato, CA 94949

Attn: Rick McCartney

From: Ms. Farideh Faraji, Technical Director
Date: April 8, 1994
Subject: Laboratory Test Results; Fort Ord, Site 16/17
STG No.: HLA.002
LRN: 4469

Remarks: Enclosed are the final test results for the subject project. Samples were submitted to our Laboratory March.23, 1994. These tests have been performed in general accordance with accepted standards and checked with STG's Quality Assurance Plan. This transmittal includes the following test(s):

Item	Description	Quantity
1	R-Value and Expansion Pressure	1

Untested samples, portions of tested samples, when available, and sample tubes will be held for a period of 8 weeks. Samples and tubes will be discarded at that time unless other arrangements are made. Sample storage fees will be charged for storage periods greater than 8 weeks. STG does not store contaminated samples and by-products produced from testing. These will be returned to you.

If you have any questions, please call me at (510) 682-7005. Thank you.

Farideh Faraji

Ms. Farideh Faraji, Technical Director

cc:

SOLEA TESTING GROUP

Statement of Additions and Omissions

Harding Lawson Associates
105 Diigital Dr.
Novato, CA 94949

Laboratory Test Results: Ford Ord Site 16/17

April 8, 1994

STG Client No. HLA.002

---

1. **Boring SB-17-11 @ 4.5 - 5.0 was too disturbed - permeability test was omitted.**

2. **Borings SB-16-26 @ 18 and SB-16-26 @ 2.5 were too disburted - consolidation test was omitted.**

3. **Specific gravity test was run on SB-16-26 @ 17.5, SB-16-26 @ 2.5, SB-17-08 @ 30.5 and SB-16-24 @ 18.5 instead of air permeability.**

Harding Lawson Associates
Engineering
and
Environmental Services

SHEET 1 OF 6
JOB NO
DATE 3/29
COMPUTED BY MJG
CHECKED BY

PROJECT FORT ORD RF SAMPLE
SUBJECT

3/29/94

Farideh
Soiltea Testing Group
Concord, CA

Because air permeability tests are unavailable for recent soil samples sent to your laboratory, please run specific gravity tests for soil samples which requested the air permeability tests.

Sincerely,

Mark Groth

SOLEA
SOLEA TESTING GROUP

LABORATORY TESTING PROGRAM

Sample Receipt Record

LRN

CLIENT NAME: Harding Lawson	CONTRACT NO.	SOLEA CLIENT NUMBER
CLIENT PROJECT: Fort Ord - Site 16/17	REPORT ADDRESS	DATE VERBAL RESULTS DUE
	CITY: Novato	DATE FINAL REPORT DUE
CLIENT PROJECT NO.: 23366 01724	INVOICE ADDRESS	RECEIVED BY / DATE
CONTACT / REPORT TO: Rick McCarthy	CITY	HAZARD I.D.
TESTS ASSIGNED BY: Rick McCarthy	PHONE NUMBER	SEE LABORATORY HEALTH AND SAFETY PLAN
SAMPLES RELINQUISHED BY: Rick McCarthy	FAX NUMBER: 415-884-3300	SAMPLE TYPE CODE: S-shelby, BT-brass, SS-stainless, BK-bulk, BG-baggie, J-jar

	HOLE NO.	SAMPLE I.D.	DEPTH (FT).	SAMPLE TYPE	SAMPLE CONDITION	CONTAMINATED	SAMPLE RECEIVED	010 MOISTURE CONTENT	011 MOISTURE AND DENSITY	025 SPECIFIC GRAVITY	030 ATTERBERG LIMIT, 3-PT	040 SIEVE ANALYSIS TO #200	042 PERCENT PASSING #200	043 HYDROMETER ANALYSIS	Organic Content	100 COMPACTION (MODIFIED)	120 R-VALUE	150 CONSOLIDATION (1)	167 TRIAXIAL PERMEABILITY*	170 AIR PERMEABILITY	1	200 UNCONFINED COMPRESSION	211 DIRECT SHEAR (UU)*	220 TRIAXIAL SHEAR (UU)*	222 TRIAXIAL SHEAR (CU)*	*CONFINING PRESSURE (PSI)	REMARKS
	SPECIAL INSTRUCTIONS																										
1	SB-16-22		2-4 ft	S	P											X											5 gal
2	SB-16-24	—	2-4 ft	S	P											X											5 gal
3	SB-16-26	9409Y016020	2-4 ft	S	P											X											5 gal
4	SB-17-4	9410Y017 141F	15.5-16	S	G													X									Fill
5	SB-17-11	140F	11.5-12	S	G						X	X															Fill
6	SB-17-4	140F	10.5-11	S	G				X						X												Fill
7	SB-17-4	139F	4.5-5	S	G																						Cover
8	SB-17-11	139F	5.5-6	S	G				X						X												cover
9	SB-17-11	139F	4-4.5	S	G													X									cover
10	SB-17-11	139F	1.5-2	S	G						X	X															cover
11	SB-17-11	142F	20.5-21	S	G																X						native
12	SB-17-11	142F	22.5-23	S	G						X	X															native
13	SB-17-11	142F	23-23.5	S	G				X						X												Native
14	SB-17-11		1.5-4	S	P											X	X										5-gal
15																											
	TALLY																										

SPECIAL INSTRUCTIONS

(1) Consolidation - flood at 100 psf after initial settling

PAGE	
STORAGE LOCATION	
LEGEND	
NOTES	(1)
TEST ASSIGNED	✓
TEST PREPARED	X
TEST COMPLETED	✓
TEST COMPUTERIZED	

SOLEA
SOLEA TESTING GROUP

LABORATORY TESTING PROGRAM

Sample Receipt Record

LRN

CLIENT NAME: Harding Lawson Associates	CONTRACT NO.	SOLEA CLIENT NUMBER
CLIENT PROJECT: Fort Ord Site 16/17	REPORT ADDRESS	DATE VERBAL RESULTS DUE
	CITY: Novato	DATE FINAL REPORT DUE
CLIENT PROJECT NO.: 23366 01724	INVOICE ADDRESS	RECEIVED BY / DATE
CONTACT / REPORT TO: Rick McCarthy	CITY	HAZARD I.D.
TESTS ASSIGNED BY: Rick McCarthy	PHONE NUMBER	SEE LABORATORY HEALTH AND SAFETY PLAN
SAMPLES RELINQUISHED BY	FAX NUMBER: 415-884-3300	SAMPLE TYPE CODE: T-shelby, BT-brass, SS-stainless, BC-bulk, BG-bag, Jar

	HOLE NO.	SAMPLE I.D.	DEPTH (FT)	SAMPLE TYPE	SAMPLE CONDITION	CONTAMINATED	SAMPLE RECEIVED	010 MOISTURE CONTENT	011 MOISTURE AND DENSITY	025 SPECIFIC GRAVITY	030 ATTERBERG LIMIT, 3 PT	040 SIEVE ANALYSIS TO #200	042 PERCENT PASSING #200	043 HYDROMETER ANALYSIS	Organic Content	160 COMPACTION (MODIFIED)	120 R-VALUE	150 CONSOLIDATION (1)	147 TRIAXIAL PERMEABILITY*	175 AIR PERMEABILITY	Hydraulic Conductivity	200 UNCONFINED COMPRESSION	210 DIRECT SHEAR (UU)*	220 TRIAXIAL SHEAR (UU)*	222 TRIAXIAL SHEAR (CU)*	*CONFINING PRESSURE (PSI)	REMARKS
	SPECIAL INSTRUCTIONS																										
1	SB-17-07	9410Y017/27F	25-25.5	S	P				X							X											native
2	SB-17-07	9410Y017/22F	21-21.5	S	G																X						native
3	SB-17-07	"	20-20.5	S	P						X	X															native
4	SB-17-07	9410Y017/22F	4-4.5	S	G													X									fill
5	SB-17-07	"	10.5-11	S	ok				X							X											fill
6	SB-17-07	9410Y017/22F	4.5-5	S	G						X	X															fill
7	SB-16-26	9409Y016024F	17.5-18	S	P			X	X							X				X							native
8	SB-16-26	"	16.5-17	S	-						X	X															native
9	SB-16-26	"	16-16.5	S	G																X						native
10	SB-16-26	"	18-18.5	S	G													X									native
11	SB-16-26	9409Y016024F	2.5-4	S	ok			X	X							X				X							cover
12	SB-16-26	"	2.5-4	S	ok						X	X															cover
13	SB-16-26	"	2.5-4	S	ok													X									cover
14	SB-17-08	9410Y017044F	15-15.5	S	P				X							X											fill
15	SB-17-08	"	15.5-16	S	G						X	X															fill
	TALLY																										

SPECIAL INSTRUCTIONS

(1) Consolidation - flood at 100 psf after initial settling

PAGE	
STORAGE LOCATION	
LEGEND	
NOTES	①
TEST ASSIGNED	✓
TEST PREPARED	X
TEST COMPLETED	
TEST COMPUTERIZED	

SOLEA
SOLEA TESTING GROUP

LABORATORY TESTING PROGRAM

Sample Receipt Record

LRN

CLIENT NAME: Harding Lawson Associates	CONTRACT NO.	SOLEA CLIENT NUMBER
CLIENT PROJECT: Fort Ord Site 16/17	REPORT ADDRESS	DATE VERBAL RESULTS DUE
	CITY: Novato	DATE FINAL REPORT DUE
CLIENT PROJECT NO.: 23366 01724	INVOICE ADDRESS	RECEIVED BY / DATE
CONTACT / REPORT TO: Rick McCartney	CITY	HAZARD I.D.
TESTS ASSIGNED BY: Rick McCartney	PHONE NUMBER	SEE LABORATORY HEALTH AND SAFETY PLAN
SAMPLES RELINQUISHED BY	FAX NUMBER: 415-884-3300	SAMPLE TYPE CODE: ST-shelby, BT-brass, SS-stainless, BK-bulk, BG-baggie, Jar

	HOLE NO.	SAMPLE I.D.	DEPTH (FT)	SAMPLE TYPE	SAMPLE CONDITION	CONTAMINATED	SAMPLE RECEIVED	010 MOISTURE CONTENT	011 MOISTURE AND DENSITY	023 SPECIFIC GRAVITY	030 ATTERBERG LIMIT, 3-PT	040 SIEVE ANALYSIS TO #200	042 PERCENT PASSING #200	043 HYDROMETER ANALYSIS	Organic Content	100 COMPACTION (MODIFIED)	120 R-VALUE	150 CONSOLIDATION (1)	167 TRIAXIAL PERMEABILITY*	176 AIR PERMEABILITY	1/1	1/2	200 UNCONFINED COMPRESSION	211 DIRECT SHEAR (UU)*		220 TRIAXIAL SHEAR (UU)*	222 TRIAXIAL SHEAR (CU)*		*CONFINING PRESSURE (PSI)	REMARKS
	SPECIAL INSTRUCTIONS																													
1	SB-17-08	9410Y017053F	35.5-36	S	P						X	X																		native
2	SB-17-08	9410Y017051F	30.5-31	S	P				X	X					X					X										native
3	SB-17-08	"	31.5-32	S	G																									native
4	SB-17-08	9410Y017057F	42.5-43	S	P													X												native
5	SB-16-24	9409G016101F	3.5-4	S	-				X						X															Fill, no cover
6	SB-16-24	"	3-3.5	S	-						X	X																		5-4
7	SB-16-24	9409G016104F	18-18.5	S	G																									native
8	SB-16-24	"	17.5-18	S	P						X	X																		native
9	SB-16-24	"	18.5-19	S	G				X	X					X					X										native
10																														
11																														
12																														
13																														
14																														
15																														
	TALLY																													

SPECIAL INSTRUCTIONS

(1) Consolidation - flood at 100 psf after initial settling

PAGE	
STORAGE LOCATION	
LEGEND	
NOTES	①
TEST ASSIGNED	✓
TEST PREPARED	X
TEST COMPLETED	✓
TEST COMPUTERIZED	■

MOISTURE CONTENT AND DENSITY

Specimen Data Worksheet

Project: HLA-Fort Ord, Site 16/17 Project No.: HLA.002 LRN: 4469

Test Type	Sample No.	Boring No.	Depth (ft.)	Tare No.	Wet Soil +Tare	Dry Soil +Tare	Tare Weight	Height (in.)	Diameter (in.)	Wet Soil (gm)	Date In Oven
MD, OC		SB-17-11	10.5-11	C-8	413.0	391.0	51.9	6.00	2.400	801.1	
MD, OC		SB-17-11	5.5-6	X-31	311.4	302.2	51.6	6.00	2.400	789.1	
MD, OC		SB-17-11	23-23.5	Z-8	263.4	257.6	55.0	6.00	2.400	658.6	
MD, OC		SB-17-07	25-25.5	D-54	249.0	242.0	42.6	6.10	2.400	763.3	
MD, OC		SB-17-07	10.5-11	X-2	261.2	250.6	51.2	6.00	2.400	652.7	
MD,OC,Gs		SB-16-26	17.5-18	DD	822.3	805.9	125.8	5.70	2.400	696.8	
MD,OC,Gs		SB-16-26	2.5-4	AC-8	843.9	786.5	122.8	6.00	2.400	721.5	
MD, OC		SB-17-08	15-15.5	N-16	269.8	253.0	52.9	6.00	2.400	664.2	
MD,OC,Gs		SB-17-08	30.5-31	PB-10	934.7	867.4	121.9	6.00	2.400	813.2	
MD, OC		SB-16-24	3.5-4	Y-48	258.0	238.7	51.0	5.70	2.400	589.4	
MD,OC,Gs		SB-16-24	18.5-19	PB-3	828.4	805.5	121.8	5.90	2.400	707.1	
MD, OC, PI		SB-31-23	3.5-4	Z-3	261.8	250.3	51.0	6.00	2.400	635.0	
MD, OC, PI		SB-31-31	3.5-4	J-21	250.9	234.8	51.8	6.00	2.400	627.5	

md-sheet.xls (A) 11/3/92

DATE	SETUP	CHECKED	PAGE
4/8/94		FF	MD 1

Sample No.	Boring No.	Depth (ft.)	Sample Description	Group Symbol	Moisture Content,%	Dry Density,pc	Specific Gravity	Void Ratio	Porosity %	Saturation %
	SB-17-11	10.5-11	Dark Brown Silty Sand	SM	6.5	105.6				
	SB-17-11	5.5-6	Light Brown Sand	SP	3.7	106.8				
	SB-17-11	23-23.5	Light Brown Sand	SP	2.9	89.9				
	SB-17-07	25-25.5	Light Brown Sand	SP	3.5	101.8				
	SB-17-07	10.5-11	Brown sand W/Silt	SP-SM	5.3	87.0				
	SB-16-26	17.5-18	Yellow Brown Sand W/Silt	SP-SM	2.4	100.5	2.61	0.621	38.3	10.1
	SB-16-26	2.5-4	Dark Brown Silty Sand	SM	8.6	93.2	2.61	0.748	42.8	30.2
	SB-17-08	15-15.5	Dark Brown Silty Sand	SM	8.4	86.0				
	SB-17-08	30.5-31	Yellow Brown Silty Sand	SM	9.0	104.7	2.64	0.574	36.5	41.5
	SB-16-24	3.5-4	Dark Brown Silty Sand	SM	10.3	79.0				
	SB-16-24	18.5-19	Yellow Brown Silty Sand	SM	3.3	97.7	2.65	0.694	41.0	12.8
	SB-31-23	3.5-4	Yellow-Brown Silty Sand	SM	5.8	84.3				
	SB-31-31	3.5-4	Dark Brown Silty Sand	SM	8.8	81.0				

SOLEA

SOLEA TESTING GROUP

LABORATORY SUMMARY REPORT

HLA-Fort Ord, Site 16/17

DRAWN	DATE	PROJECT	LRN	APPROVED	PAGE
REW	4/8/94	HLA.002	4469	FF	

Sample No.	Boring No.	Depth (ft.)	Sample Description	Group Symbol	Moisture Content,%	Dry Density,pcf	Organic Content
9342B016077F	SB-16-16	3			7.1	115.2	
9342B016078F	SB-16-16	4	Brown Silty Sand	SM			
9342B016079F	SB-16-16	4.5	Dark Brown Silty Sand	SM			8.7
9342B016086F	SB-16-18	2	Dark Brown Sand w/Silt	SP-SM			4.4
9342B016087F	SB-16-18	2.5			4.8	110.6	
9342B016090F	SB-16-18	4					
9342B016091F	SB-16-18	5	Yellow-Brown Sand w/Silt	SP-SM			

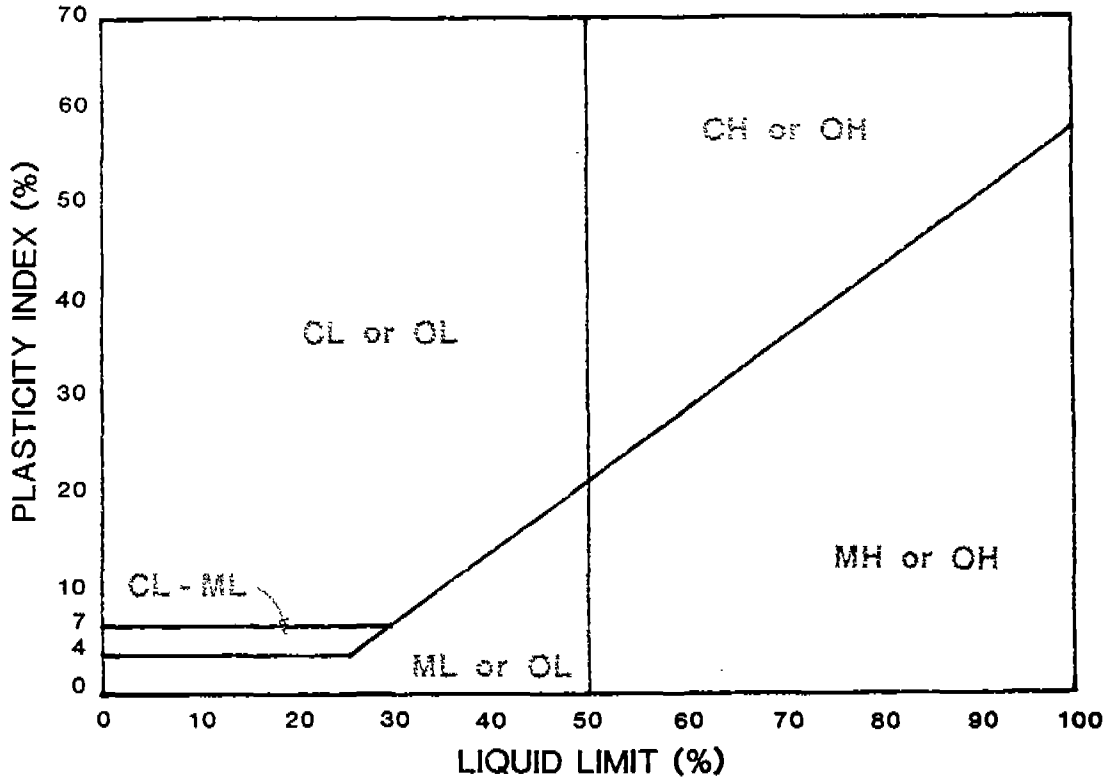
SOLEA

SOLEA TESTING GROUP

LABORATORY SUMMARY REPORT

HLA-Fort Ord Site 16, #23366.01724

DRAWN	DATE	PROJECT	LRN	APPROVED	PAGE
CLM	11/18/93	HLA.002	4376	FF	2



Reference: ASTM D-4318

SYMBOL	BORING NUMBER	DEPTH (feet)	CLASSIFICATION	LL (%)	PL (%)	PI (%)	MOISTURE CONTENT (%)
⊡	SB-16 -24	3.0	DARK BROWN SAND W/SILT (SP-SM)	NP	NP	NP	
△	SB-16 -24	17.5	BROWN SAND (SP)	NP	NP	NP	
▽	SB-16 -26	2.5	LIGHT BROWN SILTY SAND (SM)	NP	NP	NP	
◇	SB-16 -26	16.5	LIGHT BROWN SAND (SP)	NP	NP	NP	
+	SB-17 -07	4.5	LIGHT BROWN SAND (SP)	NP	NP	NP	
⊙	SB-17 -07	20.0	LIGHT BROWN SAND (SP)	NP	NP	NP	
×	SB-17 -08	15.5	BROWN SAND (SP)	NP	NP	NP	

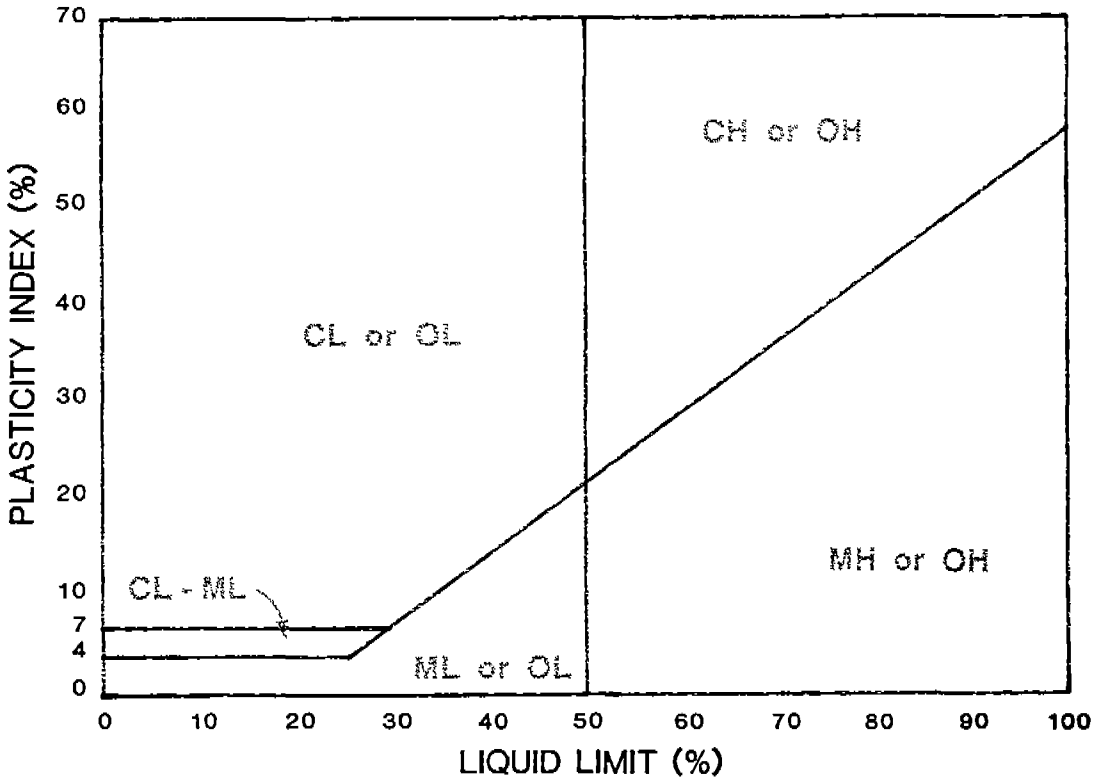
Plasticity Chart

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	04-01-1994		



Reference: ASTM D-4318

SYMBOL	BORING NUMBER	DEPTH (feet)	CLASSIFICATION	LL (%)	PL (%)	PI (%)	MOISTURE CONTENT (%)
⊡	SB-17 -08	35.5	BROWN SAND (SP)	NP	NP	NP	
△	SB-17 -11	1.5	YELLOW BROWN SAND W/SILT (SW-SM)	NP	NP	NP	
▽	SB-17 -11	11.5	BROWN SAND W/SILT (SP-SM)	NP	NP	NP	
◇	SB-17 -11	22.5	LIGHT BROWN SAND (SP)	NP	NP	NP	
+	SB-31 -23	3.5	DARK BROWN SILTY SAND (SM)	NP	NP	NP	
⊙	SB-31 -31	3.5	YELLOW-BROWN SILTY SAND (SM)	NP	NP	NP	

Plasticity Chart

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	04-07-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD
Project Number: HLA.2-4376

Test Date: 11-16-1993
Location: SB16-16 @ 4.0

Total Sample Weight (g): 744.4

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0

Sand : 84.4

Fines : 15.6

Particle Diameter (mm):

@ 60% Passing : 0.3660

@ 30% Passing : 0.1915

@ 10% Passing : 0.0338

Coefficient of Uniformity: 1.08E 1

Coefficient of Curvature: 2.96E 0

Soil Classification: BROWN SILTY SAND (SM*)

Frost Classification: --

Data Entry By: CLM

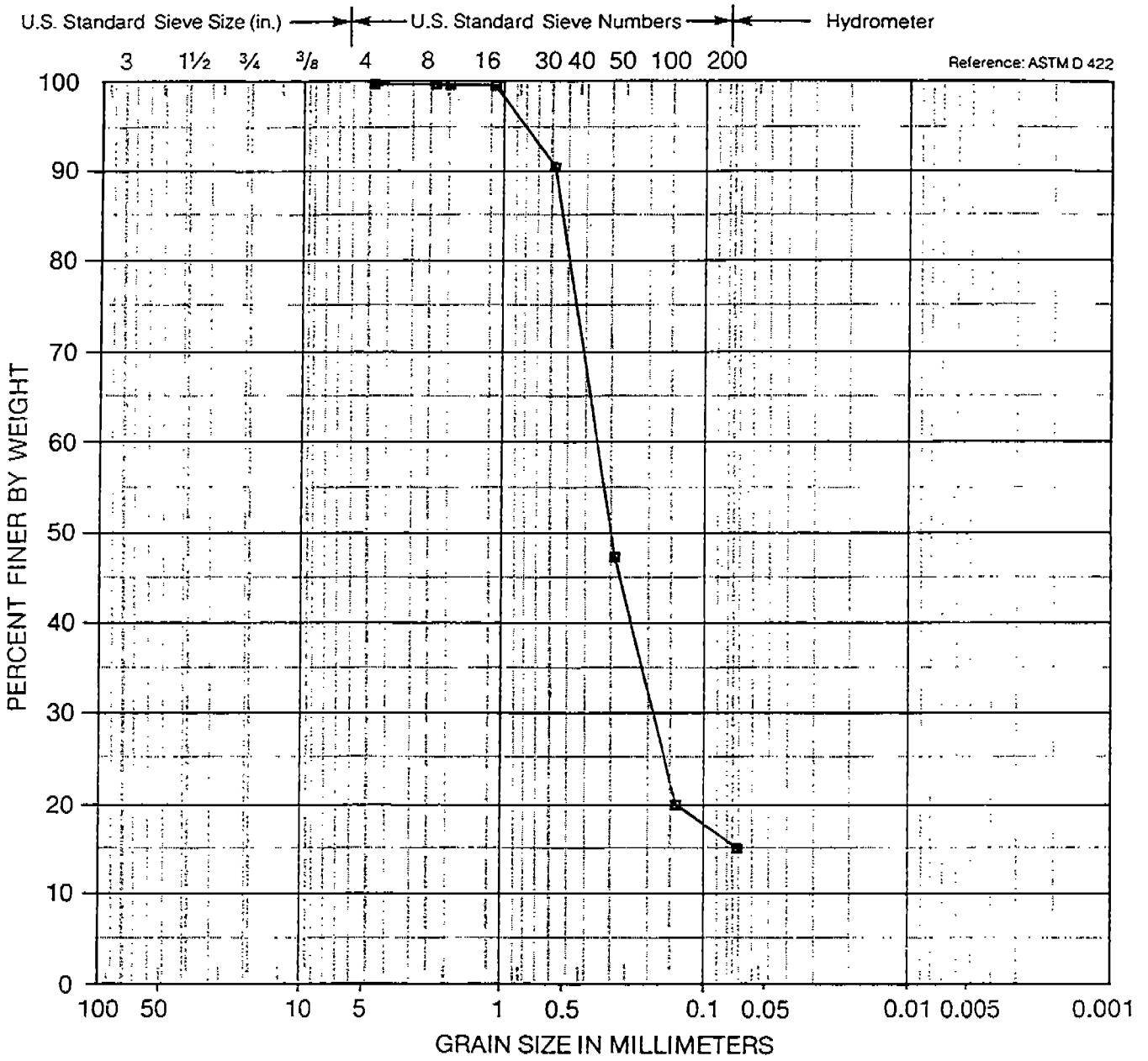
File #: 613

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD ID : HLA.2-4376 Test Date : 11-16-1993

Data Entry By : CLM Location : SB16-16 @ 4.0 Data File : TEST0613

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.3	100.0
No. 10	2.000	0.6	99.9
No. 16	1.180	1.4	99.8
No. 30	0.600	69.0	90.7
No. 50	0.300	389.7	47.6
No. 100	0.150	592.6	20.4
No. 200	0.075	628.6	15.6



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB16-16 @ 4.0 FT	BROWN SILTY SAND (SM)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	HLA.2-4376		11-16-1993		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD
Project Number: HLA.2-4376

Test Date: 11-16-1993
Location: SB-16-18 @ 5.0

Total Sample Weight (g): 731.3

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: ---

Plasticity Index: ---

Soil Composition (%):

Gravel : 0.0

Sand : 90.6

Fines : 9.4

Particle Diameter (mm):

@ 60% Passing : 0.3787

@ 30% Passing : 0.2135

@ 10% Passing : 0.0809

Coefficient of Uniformity: 4.68E 0

Coefficient of Curvature: 1.49E 0

Soil Classification: YELLOW-BROWN SAND W/SILT (SP-SM*)

Frost Classification: --

Data Entry By: CLM

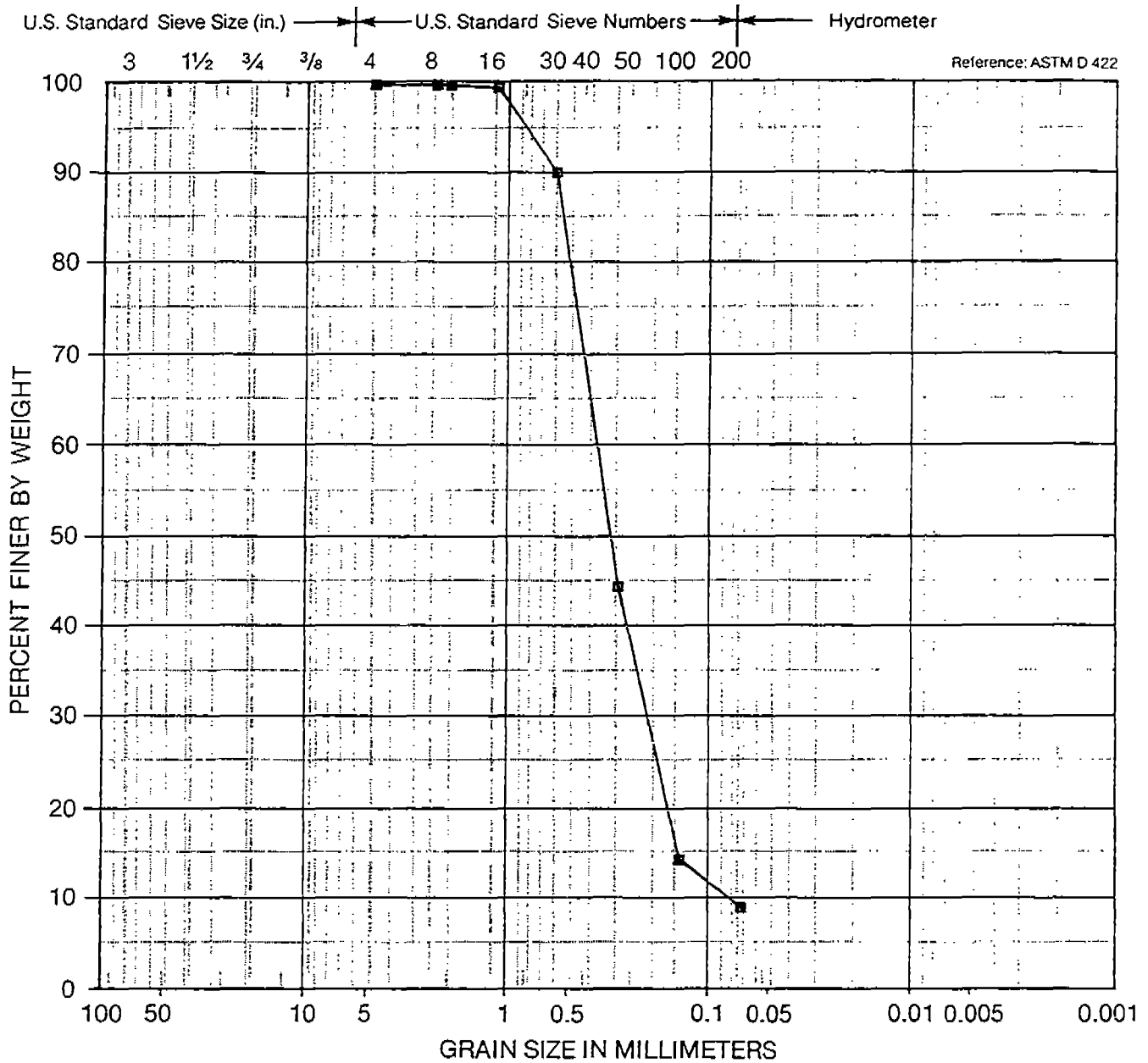
File #: 614

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD ID : HLA.2-4376 Test Date : 11-16-1993

Data Entry By : CLM Location : SB-16-18 @ 5.0 Data File : TEST0614

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.4	99.9
No. 10	2.000	0.9	99.9
No. 16	1.180	2.8	99.6
No. 30	0.600	71.5	90.2
No. 50	0.300	404.4	44.7
No. 100	0.150	623.6	14.7
No. 200	0.075	662.4	9.4



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-16-18 @ 5.0 FT	YELLOW-BROWN SAND W/SILT (SP-SM)

Particle Size Analysis

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	HLA.2-4376		11-16-1993		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-16-24 @ 3.0

Total Sample Weight (g): 410.3

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	10.6	@ 60% Passing :	0.4275
Sand :	80.7	@ 30% Passing :	0.2164
Fines :	8.7	@ 10% Passing :	0.0900

Coefficient of Uniformity: 4.75E 0

Coefficient of Curvature: 1.22E 0

Soil Classification: DARK BROWN SAND W/SILT (SP-SM*)

Frost Classification: --

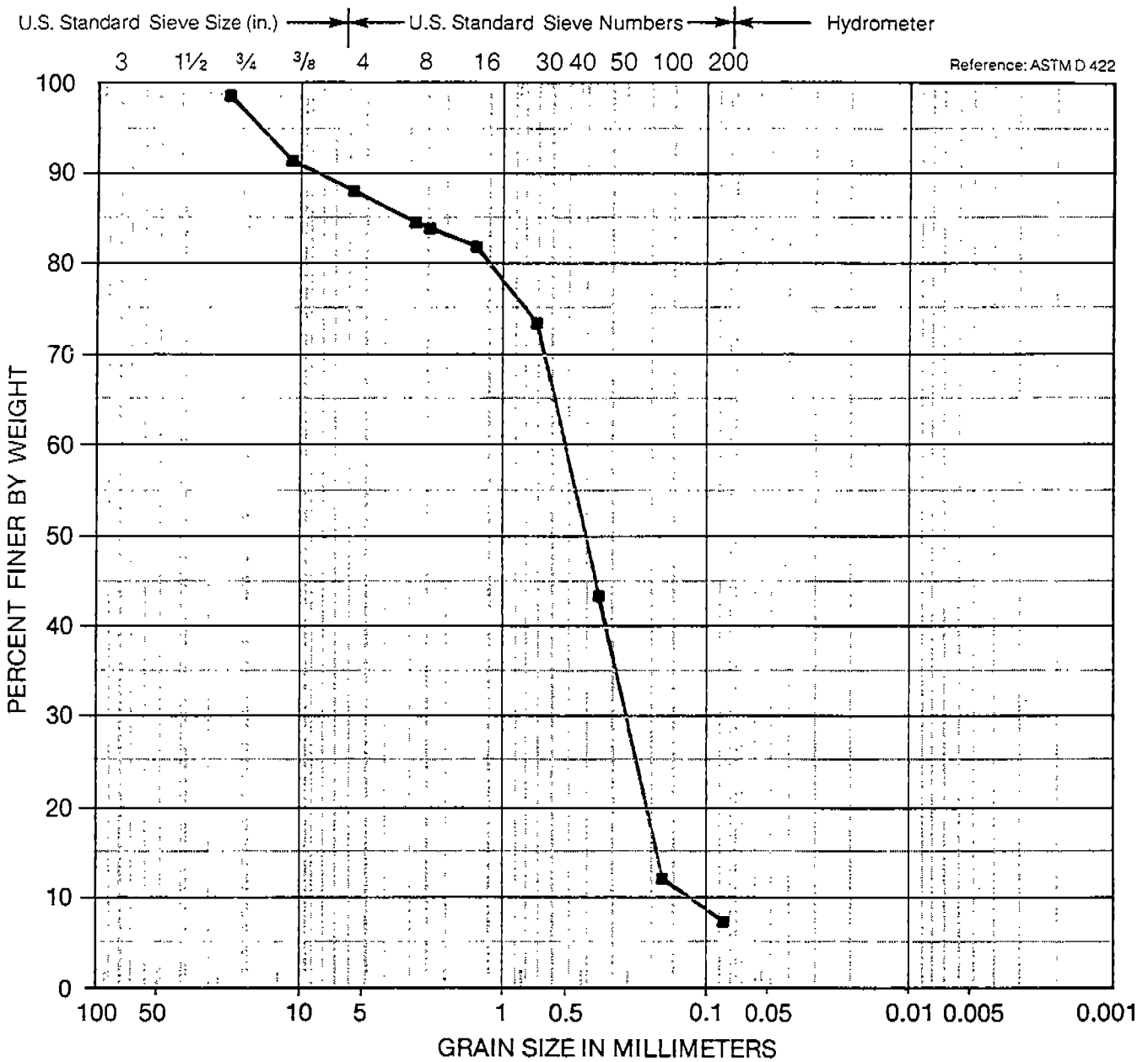
Data Entry By: FF File #: 404

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-16-24 @ 3.0 Data File : TEST0404

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	29.7	92.8
No. 4	4.750	43.4	89.4
No. 8	2.360	58.1	85.8
No. 10	2.000	60.7	85.2
No. 16	1.180	69.1	83.2
No. 30	0.600	104.0	74.7
No. 50	0.300	226.9	44.7
No. 100	0.150	354.9	13.5
No. 200	0.075	374.4	8.7



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-16-24 @ 3.0 FT	DARK BROWN SAND W/SILT (SP-SM)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-16-24 @ 17.5

Total Sample Weight (g): 428.2

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.0	@ 60% Passing :	0.3290
Sand :	98.3	@ 30% Passing :	0.2108
Fines :	1.7	@ 10% Passing :	0.1594

Coefficient of Uniformity: 2.06E 0

Coefficient of Curvature: 8.47E-1

Soil Classification: BROWN SAND (SP)

Frost Classification: --

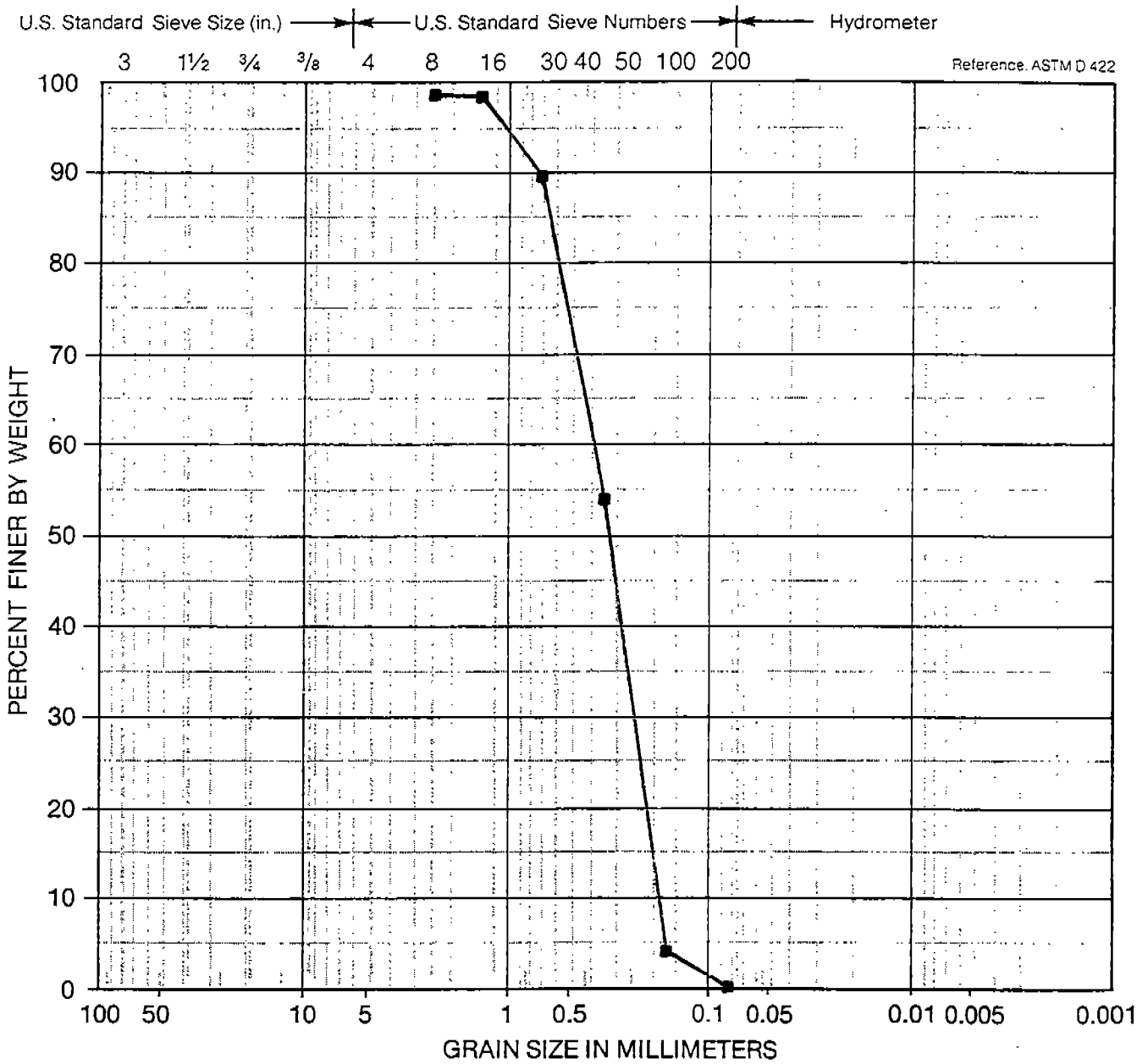
Data Entry By: FF File #: 405

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-16-24 @ 17.5 Data File : TEST0405

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	1.0	99.8
No. 30	0.600	39.0	90.9
No. 50	0.300	191.6	55.3
No. 100	0.150	404.1	5.6
No. 200	0.075	421.1	1.7



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-16-24 @ 17.5 FT	BROWN SAND (SP)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-16-26 @ 2.5

Total Sample Weight (g): 382.3

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.6	@ 60% Passing :	0.3317
Sand :	82.3	@ 30% Passing :	0.1735
Fines :	17.1	@ 10% Passing :	0.0333

Coefficient of Uniformity: 9.97E 0

Coefficient of Curvature: 2.73E 0

Soil Classification: MED. BROWN SILTY SAND (SM*)

Frost Classification: --

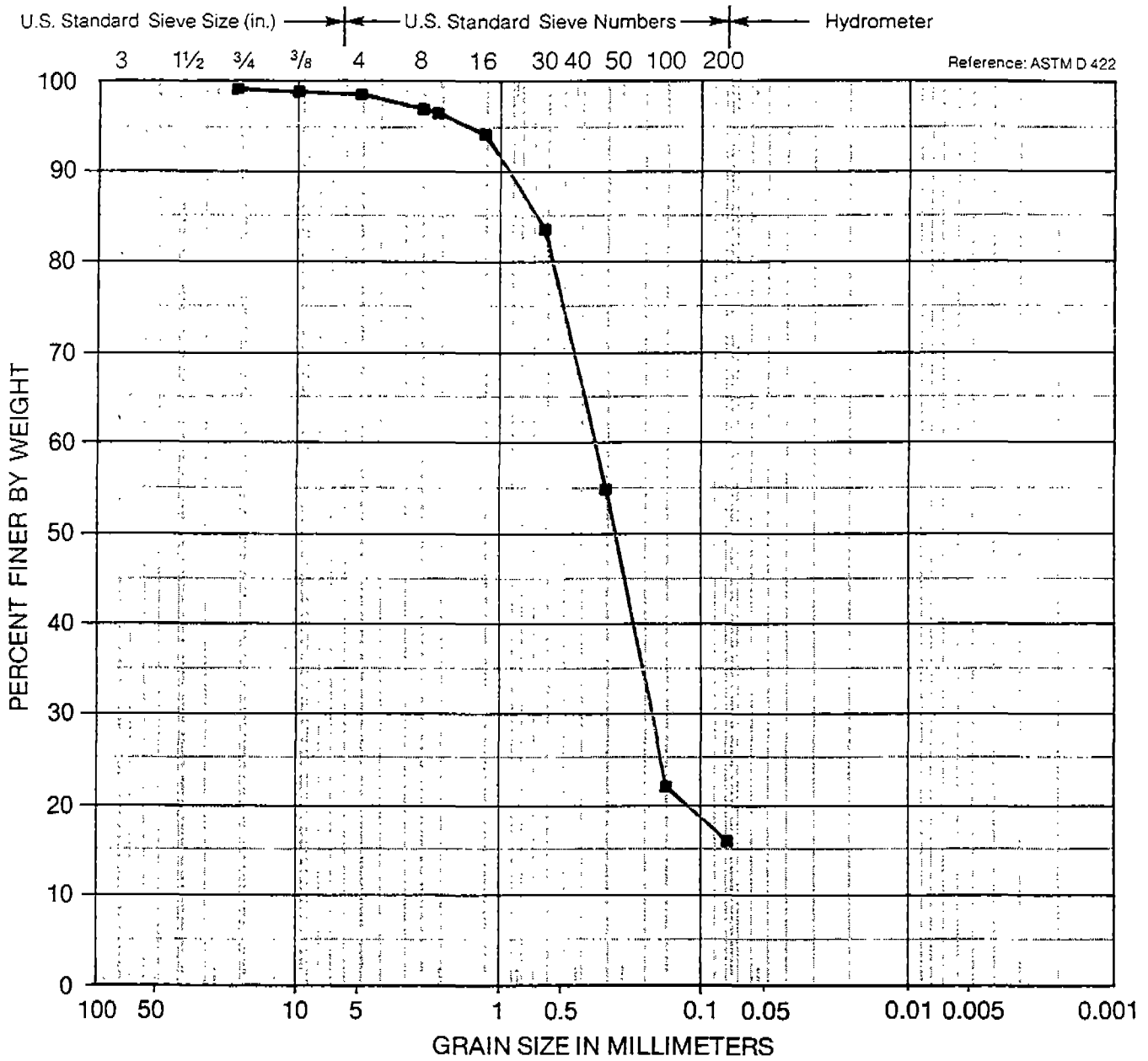
Data Entry By: FF File #: 400

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-16-26 @ 2.5 Data File : TEST0400

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	1.2	99.7
No. 4	4.750	2.3	99.4
No. 8	2.360	8.4	97.8
No. 10	2.000	10.1	97.4
No. 16	1.180	19.0	95.0
No. 30	0.600	59.3	84.5
No. 50	0.300	168.8	55.8
No. 100	0.150	293.9	23.1
No. 200	0.075	317.0	17.1



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-16-26 @ 2.5 FT	MED. BROWN SILTY SAND (SM)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-16-26 @ 16.5

Total Sample Weight (g): 415.0

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.0	@ 60% Passing :	0.3782
Sand :	97.0	@ 30% Passing :	0.2463
Fines :	3.0	@ 10% Passing :	0.1667

Coefficient of Uniformity: 2.27E 0

Coefficient of Curvature: 9.63E-1

Soil Classification: LIGHT BROWN SAND (SP*)

Frost Classification: --

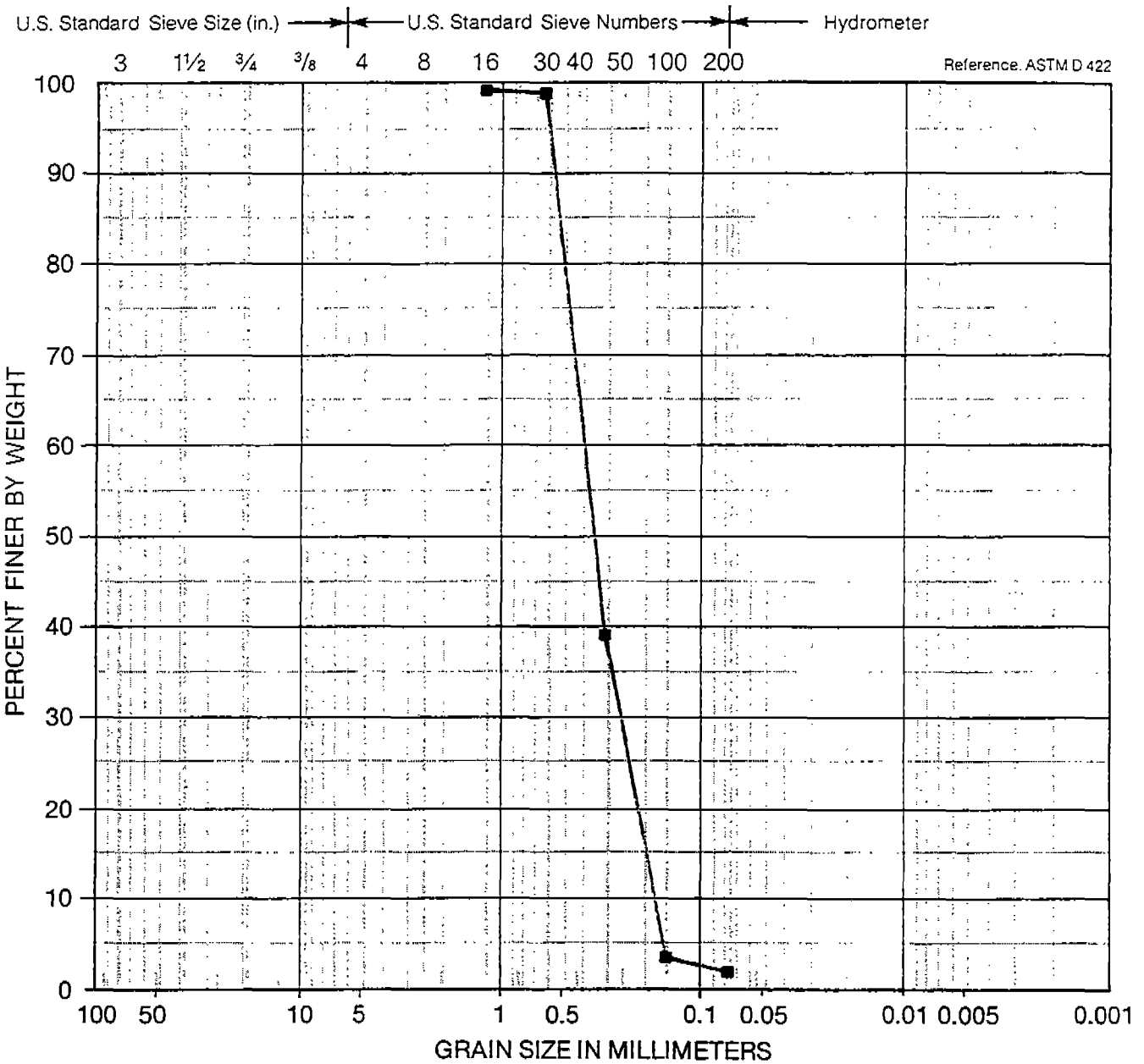
Data Entry By: FF File #: 399

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-16-26 @ 16.5 Data File : TEST0399

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.0	100.0
No. 30	0.600	1.3	99.7
No. 50	0.300	248.6	40.1
No. 100	0.150	395.9	4.6
No. 200	0.075	402.6	3.0



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
■	SB-16-26 @ 16.5 FT	LIGHT BROWN SAND (SP)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-17-07 @ 4.5

Total Sample Weight (g): 437.0

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.0	@ 60% Passing :	0.3860
Sand :	98.4	@ 30% Passing :	0.2355
Fines :	1.6	@ 10% Passing :	0.1640

Coefficient of Uniformity: 2.35E 0

Coefficient of Curvature: 8.76E-1

Soil Classification: LIGHT BROWN SAND (SP*)

Frost Classification: --

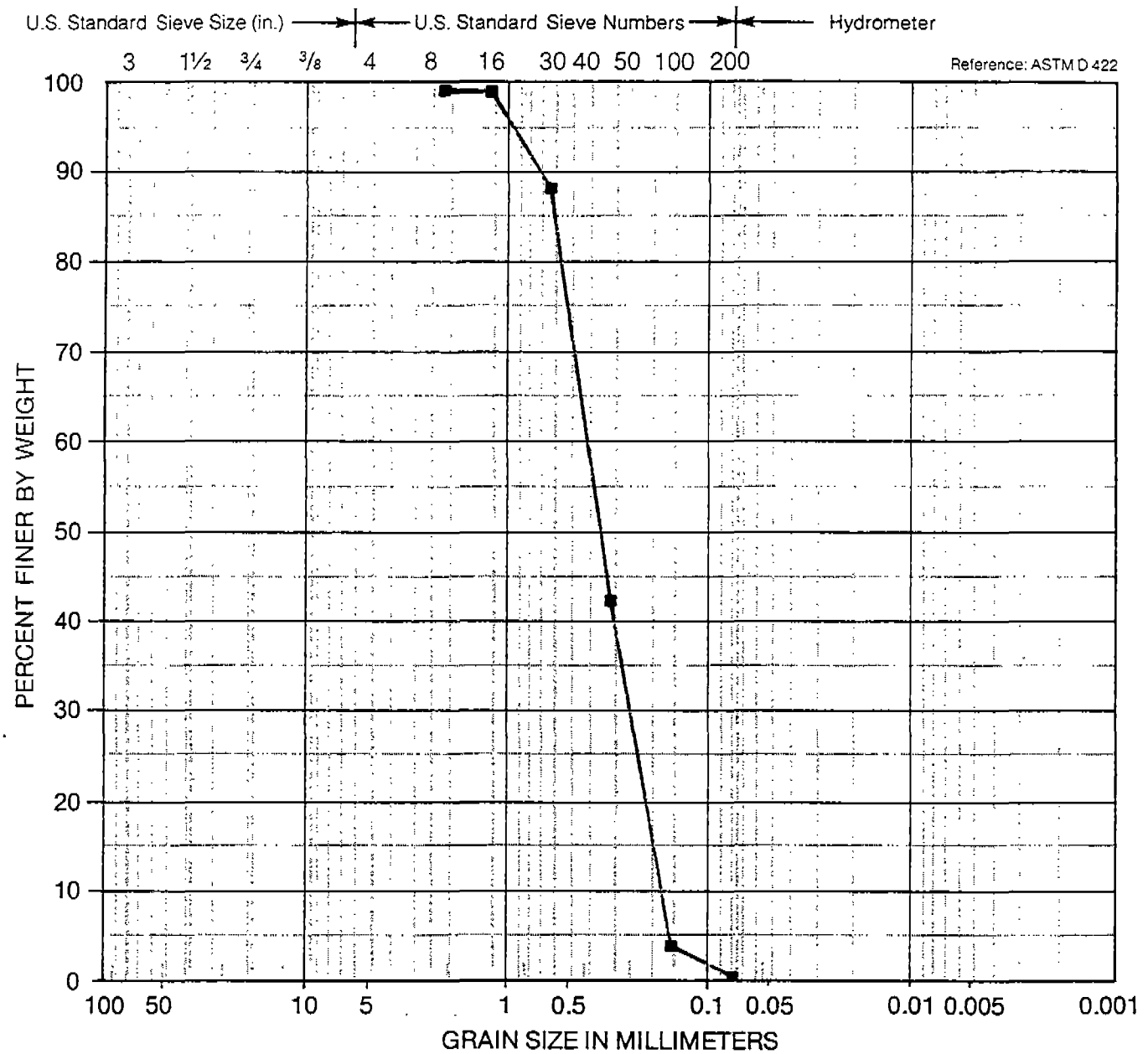
Data Entry By: FF File #: 398

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-17-07 @ 4.5 Data File : TEST0398

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.4	99.9
No. 30	0.600	47.6	89.1
No. 50	0.300	247.5	43.4
No. 100	0.150	414.8	5.1
No. 200	0.075	430.0	1.6



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-17-07 @ 4.5 FT	LIGHT BROWN SAND (SP)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-17-07 @ 20.0

Total Sample Weight (g): 419.9

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.0	@ 60% Passing :	0.5537
Sand :	98.3	@ 30% Passing :	0.3282
Fines :	1.7	@ 10% Passing :	0.1776

Coefficient of Uniformity: 3.12E 0

Coefficient of Curvature: 1.10E 0

Soil Classification: LIGHT BROWN SAND (SP*)

Frost Classification: --

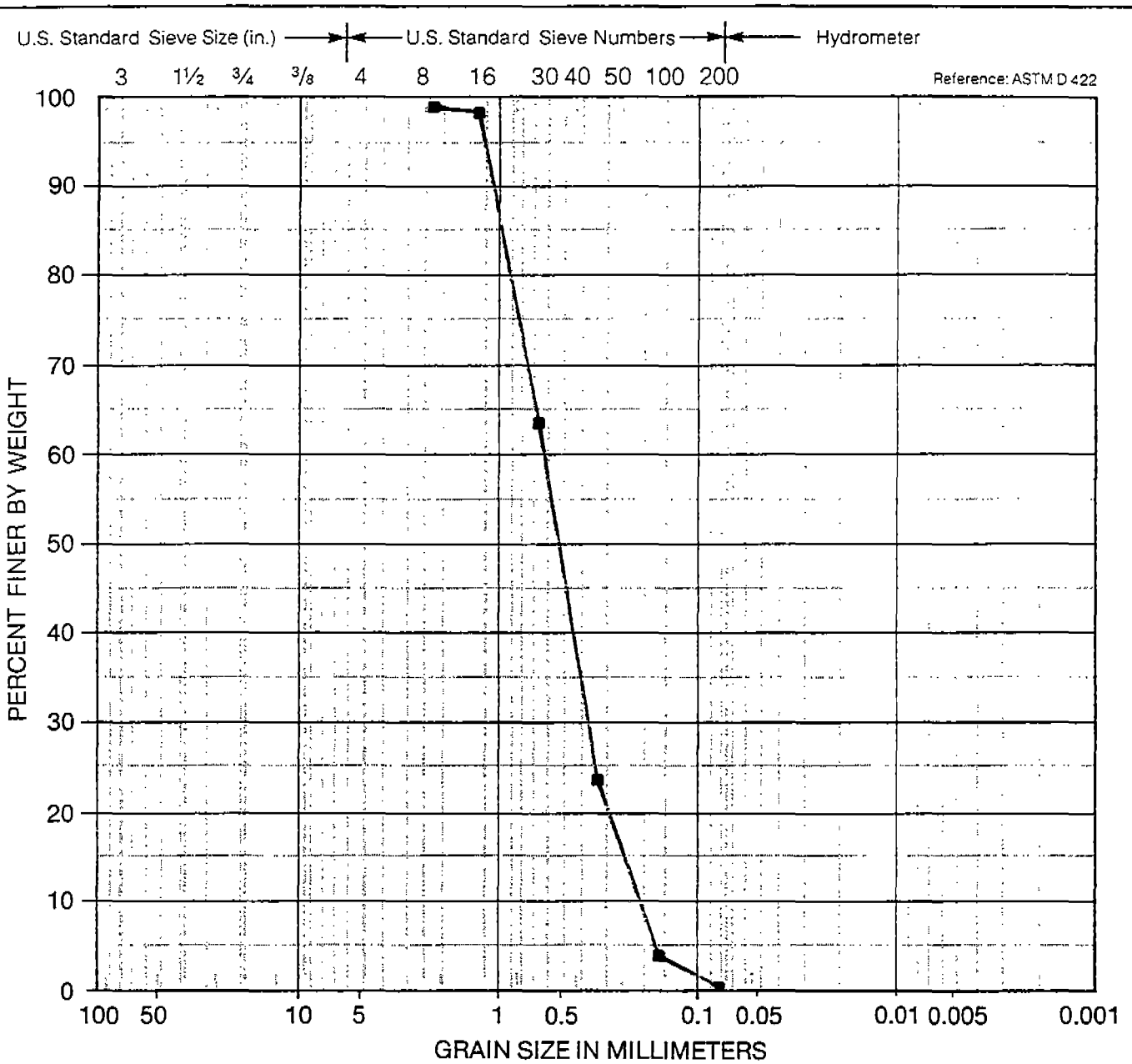
Data Entry By: FF File #: 397

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-17-07 @ 20.0 Data File : TEST0397

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	2.8	99.3
No. 30	0.600	148.6	64.6
No. 50	0.300	315.6	24.8
No. 100	0.150	398.0	5.2
No. 200	0.075	412.9	1.7



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-17-07 @ 20.0 FT	LIGHT BROWN SAND (SP)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-17-08 @ 15.5

Total Sample Weight (g): 456.8

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.0	@ 60% Passing :	0.3750
Sand :	95.4	@ 30% Passing :	0.2218
Fines :	4.6	@ 10% Passing :	0.1499

Coefficient of Uniformity: 2.50E 0

Coefficient of Curvature: 8.75E-1

Soil Classification: BROWN SAND (SP)

Frost Classification: --

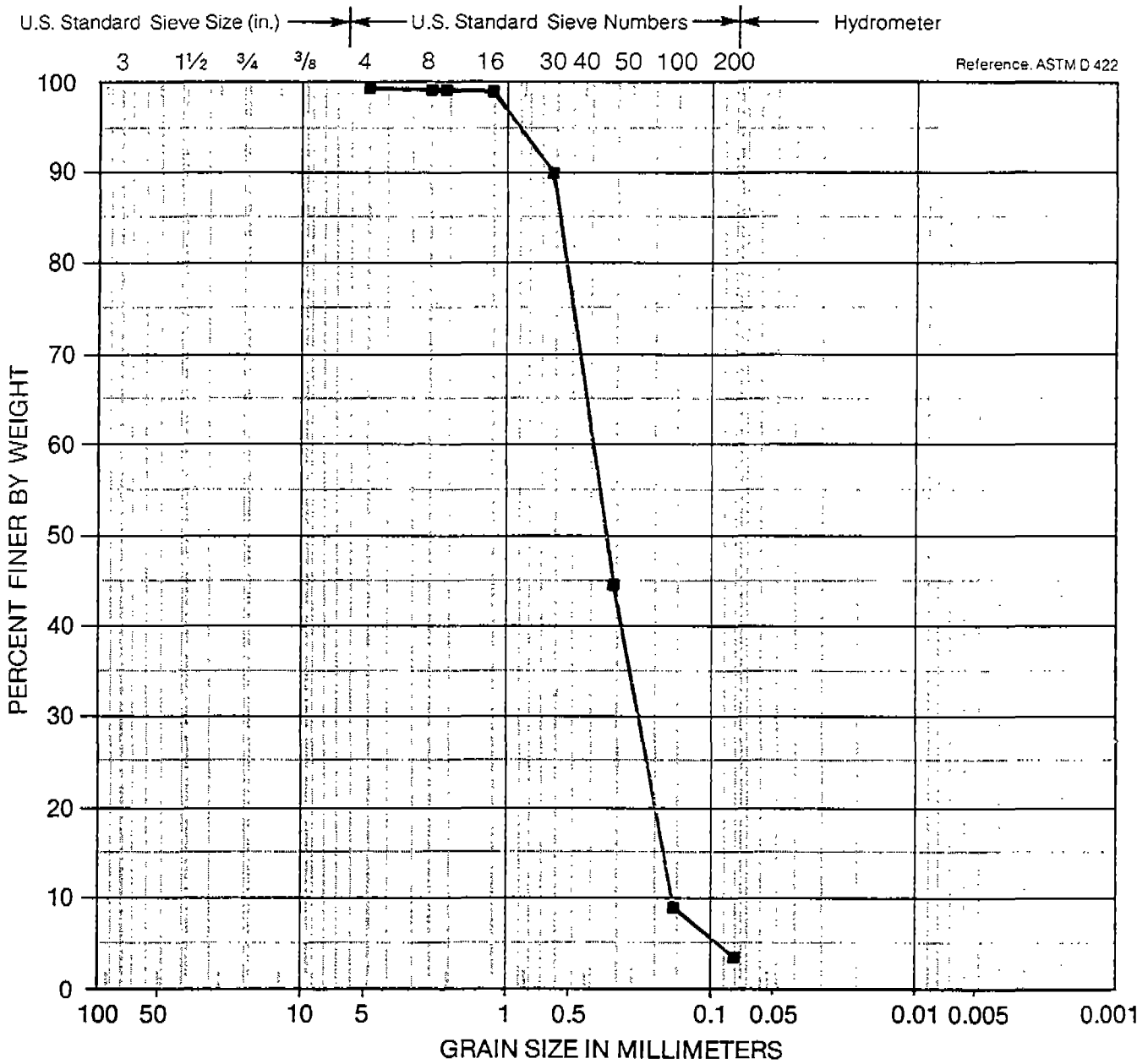
Data Entry By: FF File #: 401

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-17-08 @ 15.5 Data File : TEST0401

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.6	99.9
No. 10	2.000	0.7	99.8
No. 16	1.180	1.3	99.7
No. 30	0.600	42.5	90.7
No. 50	0.300	249.3	45.4
No. 100	0.150	411.1	10.0
No. 200	0.075	435.9	4.6



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-17-08 @ 15.5 FT	BROWN SAND (SP)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-17-08 @ 35.5

Total Sample Weight (g): 449.2

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.0	@ 60% Passing :	0.4706
Sand :	99.4	@ 30% Passing :	0.3163
Fines :	0.6	@ 10% Passing :	0.1888

Coefficient of Uniformity: 2.49E 0

Coefficient of Curvature: 1.13E 0

Soil Classification: BROWN SAND (SP)

Frost Classification: --

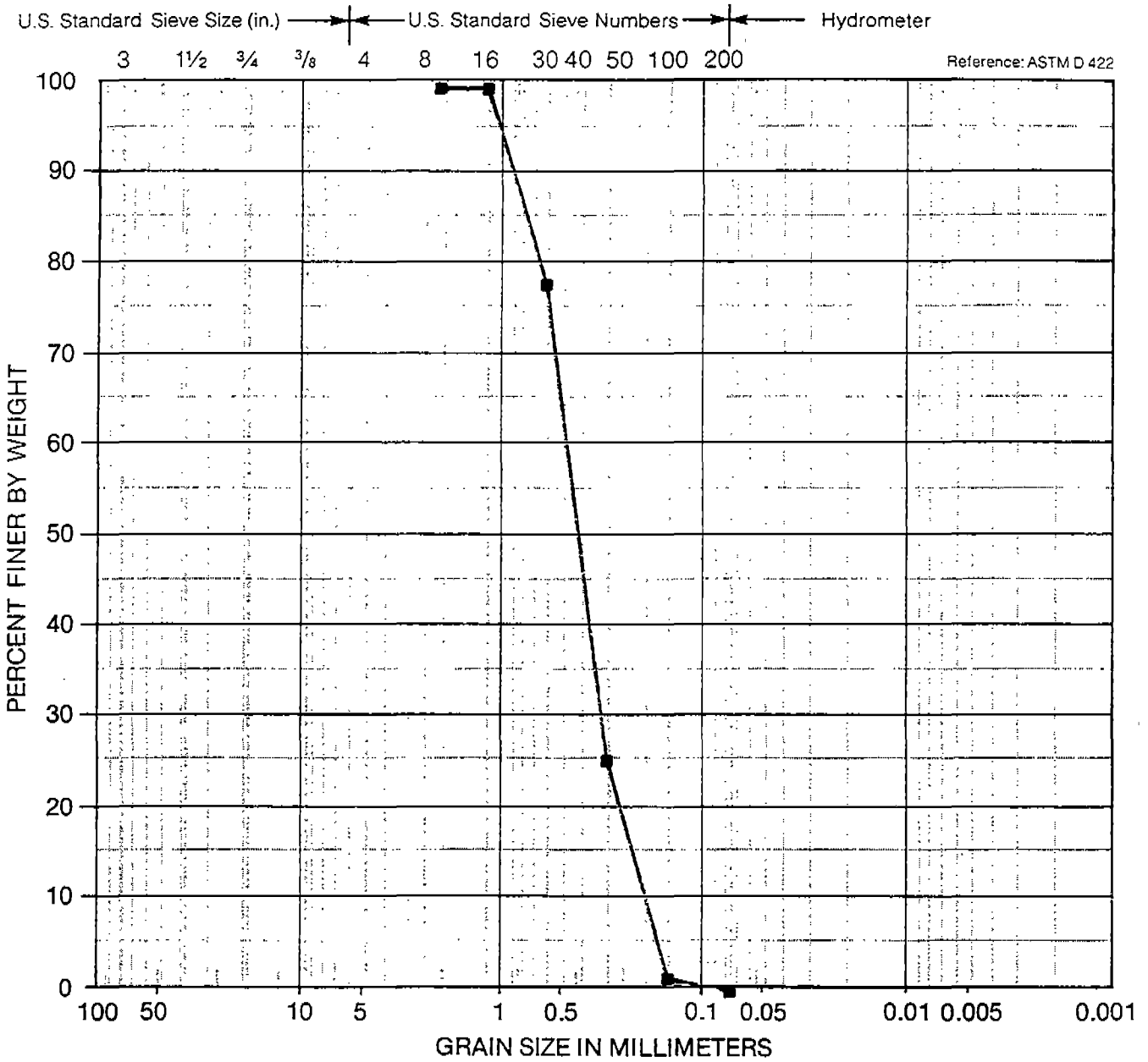
Data Entry By: FF File #: 406

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-17-08 @ 35.5 Data File : TEST0406

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.3	99.9
No. 30	0.600	97.3	78.3
No. 50	0.300	332.4	26.0
No. 100	0.150	440.0	2.0
No. 200	0.075	446.3	0.6



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

Symbol	Sample Source	Classification
■	SB-17-08 @ 35.5 FT	BROWN SAND (SP)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-17-11 @ 1.5

Total Sample Weight (g): 438.7

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	1.1	@ 60% Passing :	0.4102
Sand :	87.5	@ 30% Passing :	0.2147
Fines :	11.4	@ 10% Passing :	0.0601

Coefficient of Uniformity: 6.82E 0

Coefficient of Curvature: 1.87E 0

Soil Classification: YELLOW BROWN SAND W/SILT (SW-SM*)

Frost Classification: --

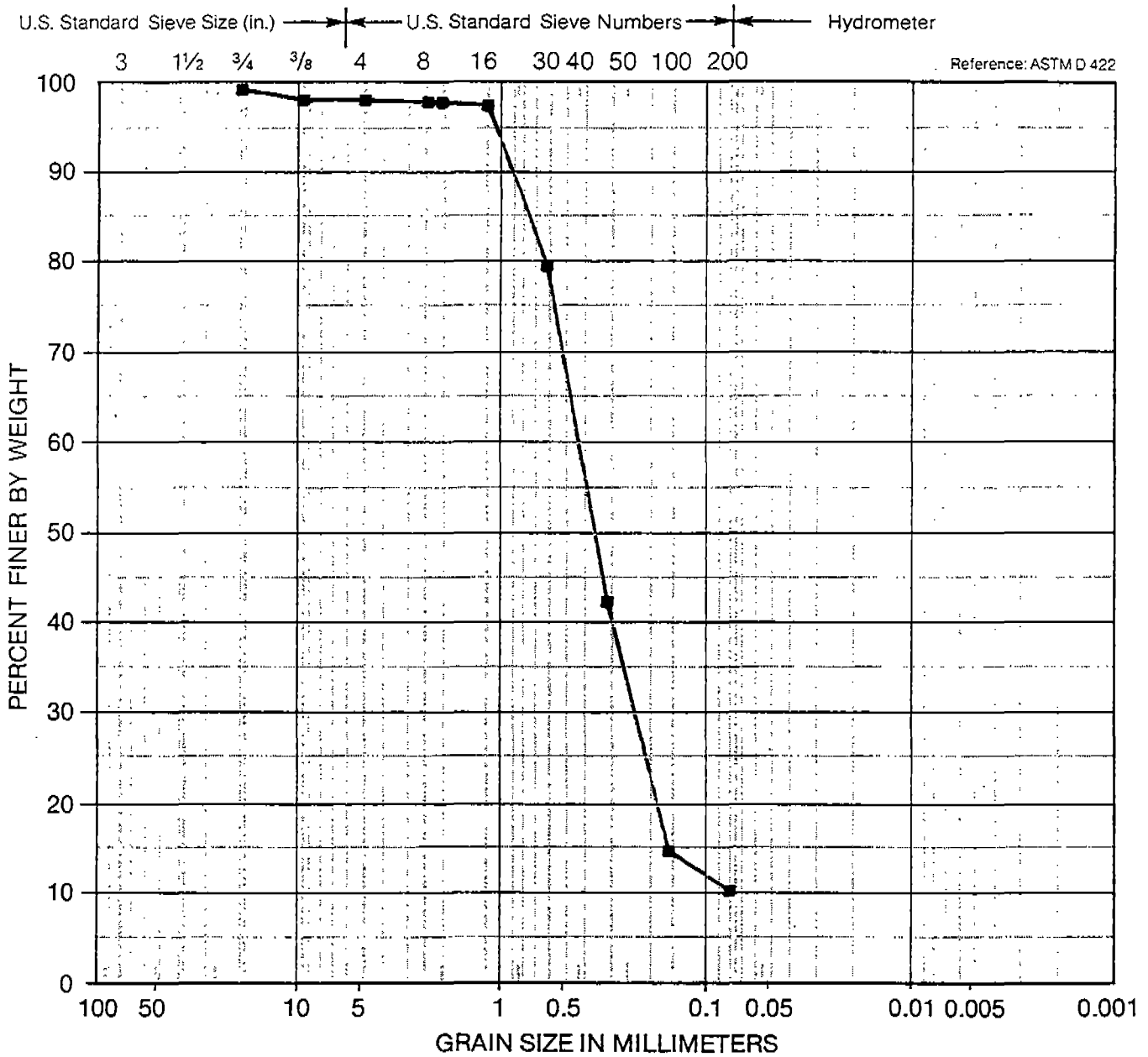
Data Entry By: FF File #: 395

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-17-11 @ 1.5 Data File : TEST0395

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	5.0	98.9
No. 4	4.750	5.0	98.9
No. 8	2.360	5.8	98.7
No. 10	2.000	6.0	98.6
No. 16	1.180	7.5	98.3
No. 30	0.600	86.3	80.3
No. 50	0.300	248.8	43.3
No. 100	0.150	369.5	15.8
No. 200	0.075	388.7	11.4



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-17-11 @ 1.5 FT	YELLOW BROWN SAND W/SILT (SW-SM)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-17-11 @ 11.5

Total Sample Weight (g): 369.4

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.5	@ 60% Passing :	0.3591
Sand :	89.9	@ 30% Passing :	0.2031
Fines :	9.6	@ 10% Passing :	0.0802

Coefficient of Uniformity: 4.48E 0

Coefficient of Curvature: 1.43E 0

Soil Classification: BROWN SAND W/SILT (SP-SM)

Frost Classification: F2**

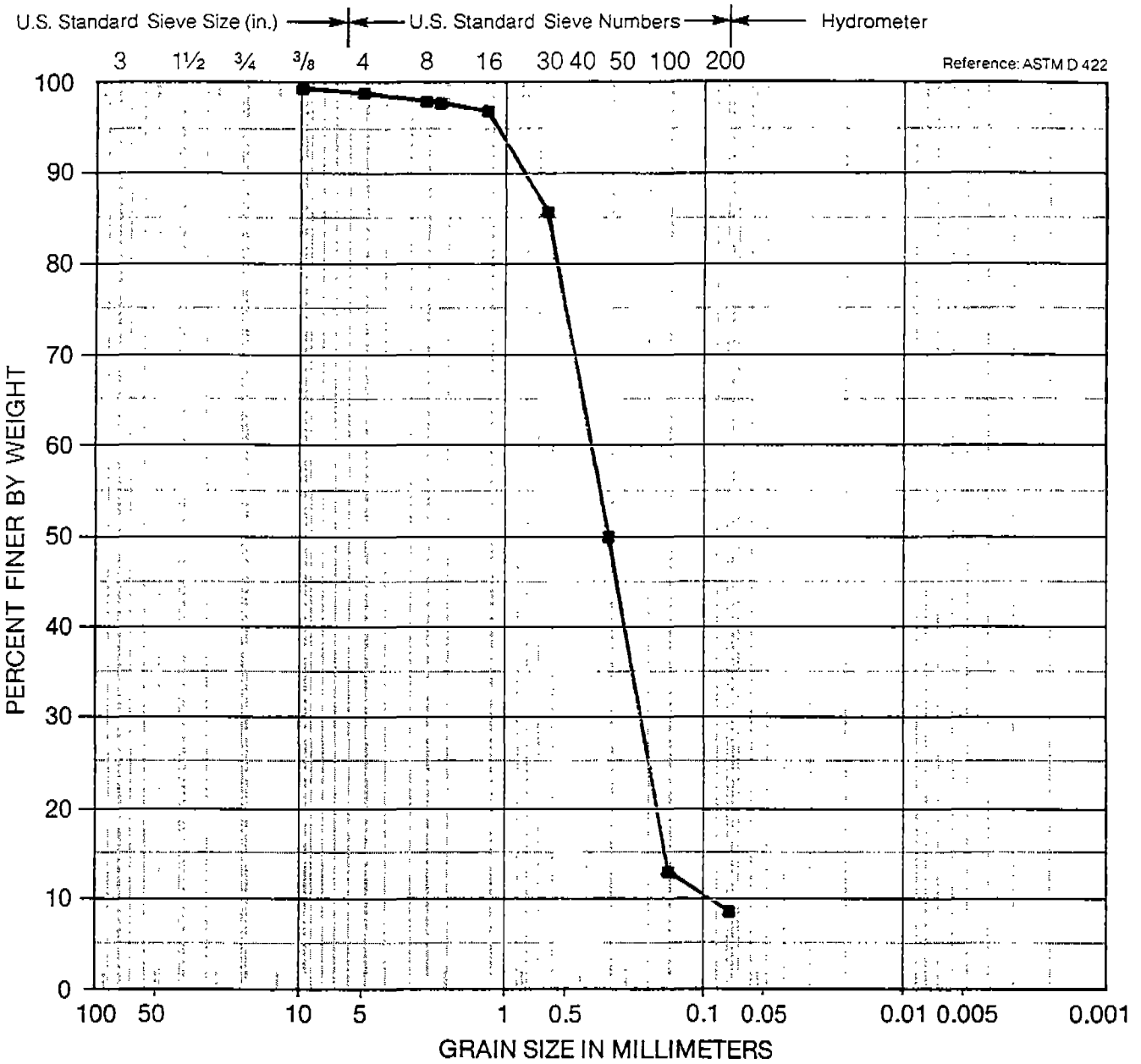
Data Entry By: FF File #: 394

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-17-11 @ 11.5 Data File : TEST0394

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	1.8	99.5
No. 8	2.360	5.1	98.6
No. 10	2.000	5.9	98.4
No. 16	1.180	9.0	97.6
No. 30	0.600	50.0	86.5
No. 50	0.300	182.0	50.7
No. 100	0.150	318.0	13.9
No. 200	0.075	334.0	9.6



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
■	SB-17-11 @ 11.5 FT	BROWN SAND W/SILT (SP-SM)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 03-29-1994
Project Number: 23366-4469 Location: SB-17-11 @ 22.5

Total Sample Weight (g): 396.3

Percent Passing No. 10 Sieve : 0.0

Representative Sample Weight (g): ----

PI Results (used in determining fines classification)

Liquid Limit: 0 Plasticity Index: 0

Soil Composition (%):		Particle Diameter (mm):	
Gravel :	0.0	@ 60% Passing :	0.4013
Sand :	98.7	@ 30% Passing :	0.2465
Fines :	1.3	@ 10% Passing :	0.1684

Coefficient of Uniformity: 2.38E 0

Coefficient of Curvature: 9.00E-1

Soil Classification: LIGHT BROWN SAND (SP*)

Frost Classification: --

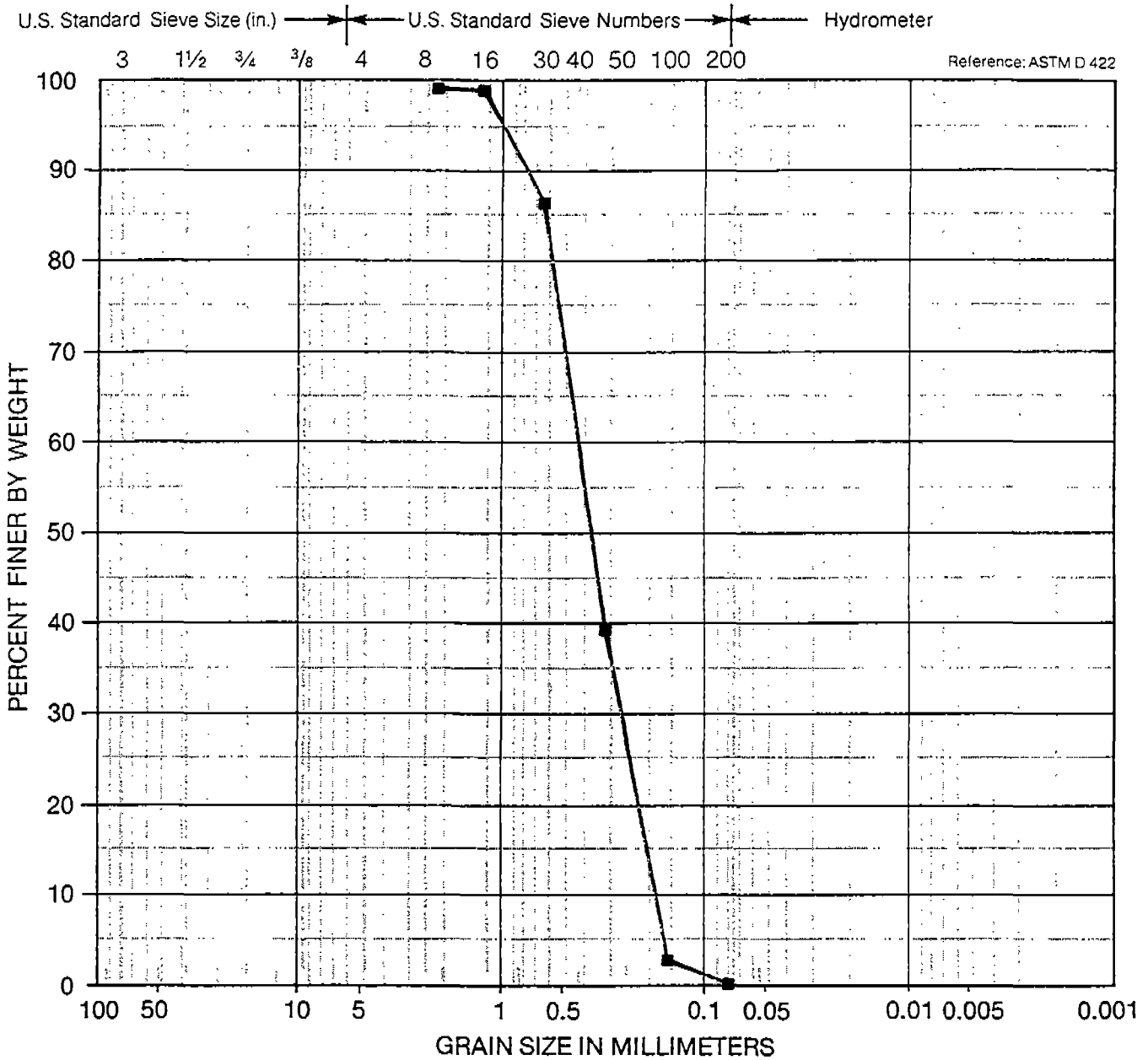
Data Entry By: FF File #: 396

Particle Size Analysis
Sieve Method
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 03-29-1994

Data Entry By : FF Location : SB-17-11 @ 22.5 Data File : TEST0396

Sieve Name	Sieve Size (mm)	Cum. Weight Retained (g)	Percent of Total Weight Passing
5.000 in	125.000	0.0	100.0
3.000 in	75.000	0.0	100.0
1.500 in	37.500	0.0	100.0
3/4 in	19.000	0.0	100.0
3/8 in	9.500	0.0	100.0
No. 4	4.750	0.0	100.0
No. 8	2.360	0.0	100.0
No. 10	2.000	0.0	100.0
No. 16	1.180	0.8	99.8
No. 30	0.600	50.5	87.3
No. 50	0.300	236.6	40.3
No. 100	0.150	380.7	3.9
No. 200	0.075	391.0	1.3



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	SB-17-11 @ 22.5 FT	LIGHT BROWN SAND (SP)

Particle Size Analysis

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	03-29-1994		

Organic Loss on Ignition Test

Project: HLA Fort Ord Site 16/17 ID: 23366-4469 Test Date: 4/8/94

Boring Desc.	Depth (ft)	Organic Matter (%)
17 - 11	10.5	7.1
17 - 11	5.5	0.6
17 - 11	23.0	2.8
17 - 07	25.0	0.5
17 - 07	10.5	6.2
16 - 26	17.5	0.4
16 - 26	2.5	9.3
17 - 08	15.0	1.6
17 - 08	30.5	0.9
16 - 24	3.5	2.5
16 - 24	18.5	0.5
31 - 23	3.5	2.4
31 - 31	3.5	4.2

LABORATORY COMPACTION TEST

BULK NO.: C-940 LRN: 4469 By: FF Page No. 1

JOB NAME: HLA- Fort Ord Site 16/17 JOB NO.: 23366-01724

SAMPLE ID: SB-16-22

SOIL CLASSIFICATION: Light Brown Sandy Silt (ML)

NOTES:

MAXIMUM DRY DENSITY: **125.0 pcf** **OPTIMUM MOISTURE CONTENT:** **10.0 %**

ASTM:	1557-91	**SAMPLE**	Retained			Sample
Method:	A	**SPLIT**	Weight	% Individual	% Cumulative	Weight
Preparation:	Wet	+ 3/4" Sieve				
Rammer:	Mechanical	+ 3/8" Sieve	0.2	0.4%	0.4%	8.8
Other:		+ #4 Sieve	1.2	2.1%	2.5%	52.6
Non-ASTM:		- #4 Sieve	55.6	97.5%	100.0%	2438.6
Specific Gravity:		TOTAL:	57.0	100.0%		2500.0
Classification from Sieve Data:			Sand or finer			

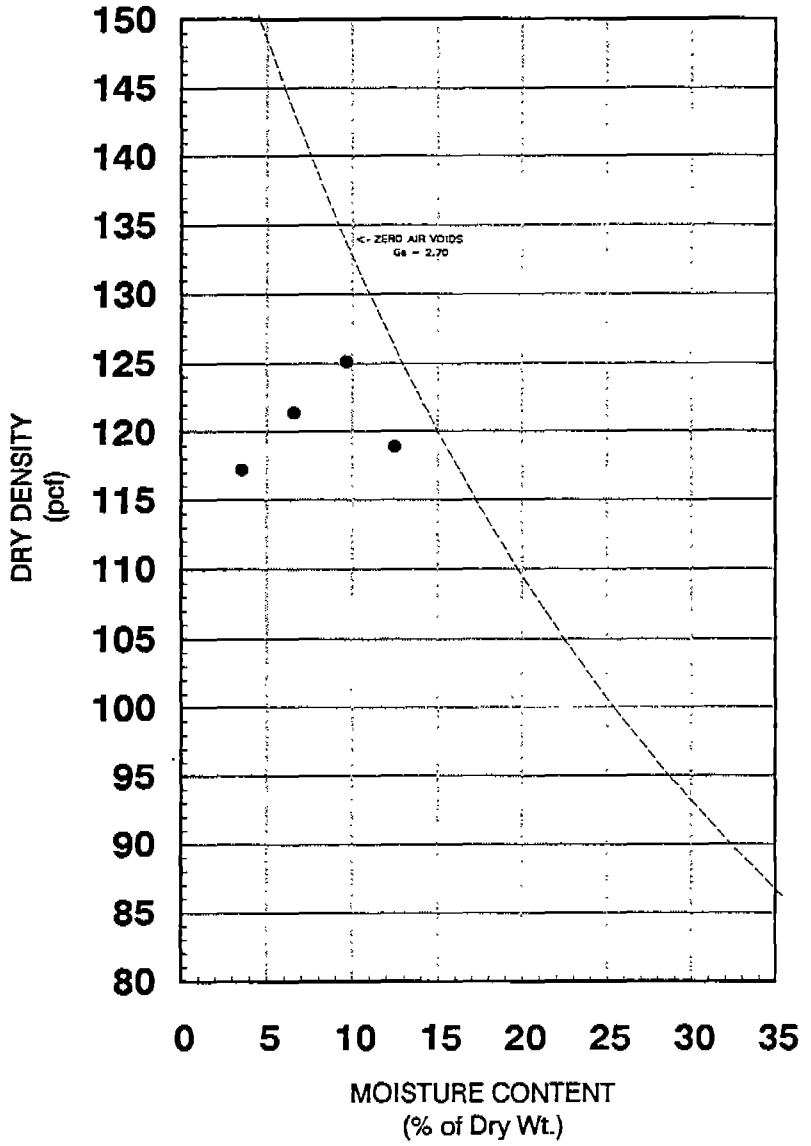
MOISTURE/DENSITY DATA

	1	2	3	4	5	6
RELATIVE MOISTURE, %	**N**	**3 %**	**6 %**	**9 %**		
MOLD & WET SOIL, gm.	6130.0	6251.0	6370.0	6317.0		
MOLD, gm.	4295.0	4295.0	4295.0	4295.0		
WET SOIL, gm.	1835.0	1956.0	2075.0	2022.0		
FACTOR 4" / 6" Dia.	.06614 / .0294	.06614 / .0294	.06614 / .0294	.06614 / .0294		
WET DENSITY, pcf	121.4	129.4	137.2	133.7		
PAN NO.	SP-1	SP-7A	SP-7	SP-4		
PAN & WET SOIL, gm.	1427.1	1481.8	1385.1	1467.0		
PAN & DRY SOIL, gm.	1390.2	1412.2	1294.0	1343.3		
MOISTURE LOSS, gm.	36.9	69.6	91.1	123.7		
PAN TARE, gm.	353.9	353.4	354.1	352.0		
DRY SOIL, gm.	1036.3	1058.8	939.9	991.3		
MOISTURE CONTENT, %	**3.6**	**6.6**	**9.7**	**12.5**		
DRY DENSITY, pcf	**117.2**	**121.4**	**125.1**	**118.9**		

LF-F100c

CM No: 0178 Checked by: FF

compactn.xls (C) rev. 5/3/93

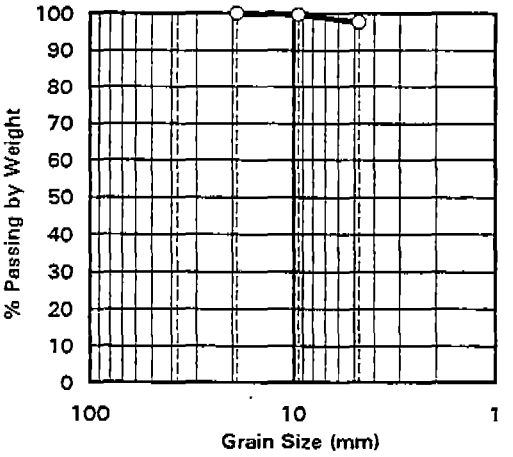


MAXIMUM DRY DENSITY:

125.0 pcf

OPTIMUM MOISTURE CONTENT:

10.0 %



SIEVE DATA		
+3/4"	+19 mm	
+3/8"	+9.5 mm	0.4 %
+#4	+4.75 mm	2.1 %
-#4	-4.75 mm	97.5 %

SAMPLE ID:	SB-16-22					
SOIL CLASSIFICATION:	Light Brown Sandy Silt (ML)					
		1	2	3	4	5	6
MOISTURE CONTENT, %		3.6%	6.6%	9.7%	12.5%		
DRY DENSITY, pcf		117.2	121.4	125.1	118.9		
ASTM Method: 1557-91	Procedure: A	Preparation: Wet	Rammer: Mechanical	Passing 3/4" 100.0%	Specific Gravity	Other:	
NOTES:							

LF-F100r

SOLEA

SOLEA TESTING GROUP

LABORATORY COMPACTION TEST REPORT

HLA- Fort Ord Site 16/17

DRAWN	DATE	PROJECT	LRN	APPROVED	PAGE
FF	4/1/94	23366-01724	4469	FF	1

LABORATORY COMPACTION TEST

BULK NO.: C-941 LRN: 4469 By: FF Page No. 2

JOB NAME: HLA-Fort Ord site 16/17 JOB NO.: 23366-01724

SAMPLE ID: SB-16-24

SOIL CLASSIFICATION: Dark Brown Sandy Silt (ML)

NOTES:

MAXIMUM DRY DENSITY: **116.0 pcf** **OPTIMUM MOISTURE CONTENT:** **14.0 %**

ASTM:	1557-91	**SAMPLE**	Retained			Sample
Method:	A	**SPLIT**	Weight	% Individual	% Cumulative	Weight
Preparation:	Wet	+ 3/4" Sieve				
Rammer:	Mechanical	+ 3/8" Sieve	1.1	2.5%	2.5%	62.1
Other:		+ #4 Sieve	2.8	6.3%	8.8%	158.0
Non-ASTM:		- #4 Sieve	40.4	91.2%	100.0%	2279.9
Specific Gravity:		TOTAL:	44.3	100.0%		2500.0
Classification from Sieve Data:			Sand or finer			

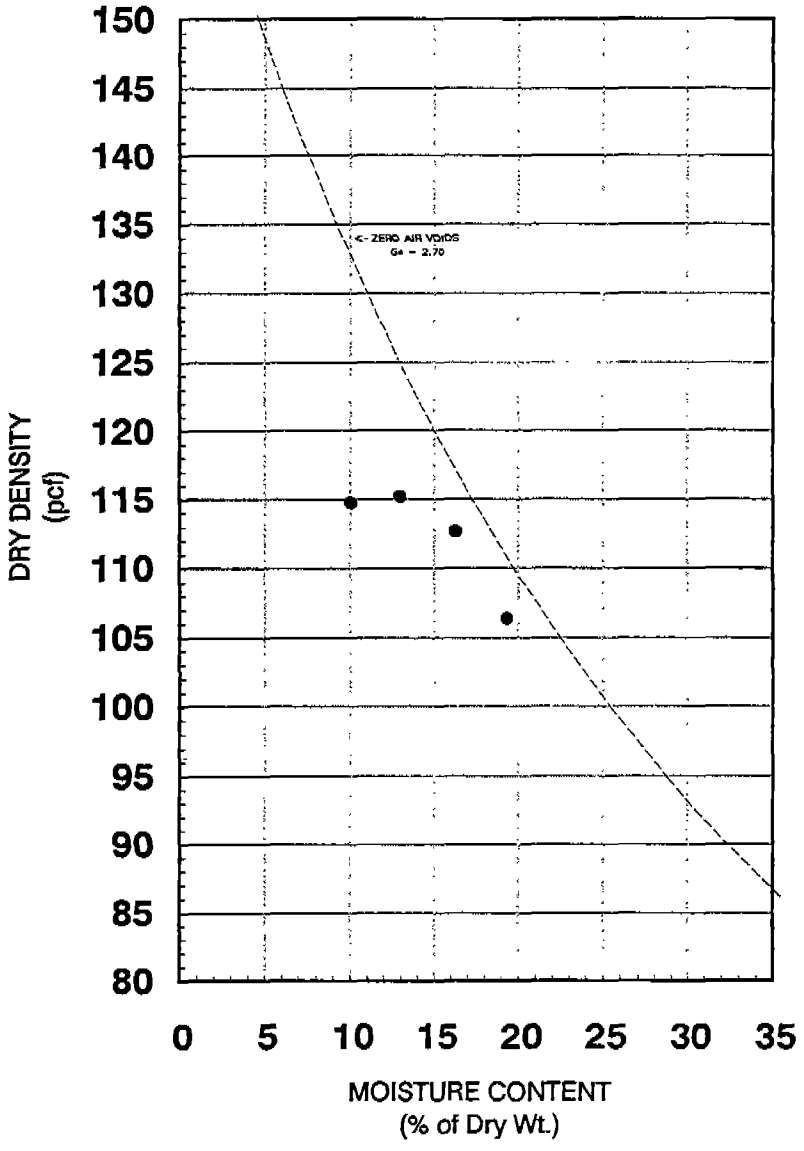
MOISTURE/DENSITY DATA

	1	2	3	4	5	6
RELATIVE MOISTURE, %	**N**	**3 %**	**6 %**	**9 %**		
MOLD & WET SOIL, gm.	6204.0	6263.0	6275.0	6214.0		
MOLD, gm.	4295.0	4295.0	4295.0	4295.0		
WET SOIL, gm.	1909.0	1968.0	1980.0	1919.0		
FACTOR 4" / 6" Dia.	.06614 / .0294	.06614 / .0294	.06614 / .0294	.06614 / .0294		
WET DENSITY, pcf	126.3	130.2	131.0	126.9		
PAN NO.	SP-7	SP-4	SP-5	SP-7A		
PAN & WET SOIL, gm.	1396.0	1559.5	1401.0	1463.4		
PAN & DRY SOIL, gm.	1301.0	1421.0	1254.6	1283.7		
MOISTURE LOSS, gm.	95.0	138.5	146.4	179.7		
PAN TARE, gm.	354.1	352.0	354.4	353.4		
DRY SOIL, gm.	946.9	1069.0	900.2	930.3		
MOISTURE CONTENT, %	**10.0**	**13.0**	**16.3**	**19.3**		
DRY DENSITY, pcf	**114.7**	**115.2**	**112.6**	**106.4**		

LF-F100c

CM No: 0177 Checked by: FF

compactn.xls (C) rev. 5/3/93

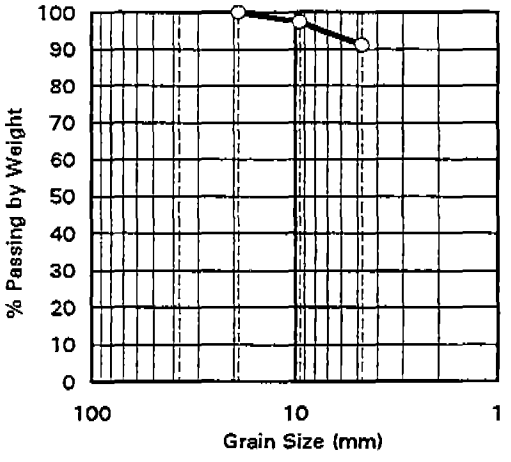


MAXIMUM DRY DENSITY:

116.0 pcf

OPTIMUM MOISTURE CONTENT:

14.0 %



SIEVE DATA		
+3/4"	+19 mm	
+3/8"	+9.5 mm	2.5 %
+#4	+4.75 mm	6.3 %
-#4	-4.75 mm	91.2 %

SAMPLE ID:		SB-16-24					
SOIL CLASSIFICATION:		Dark Brown Sandy Silt (ML)					
		1	2	3	4	5	6
MOISTURE CONTENT, %		10.0%	13.0%	16.3%	19.3%		
DRY DENSITY, pcf		114.7	115.2	112.6	106.4		
ASTM Method:	Procedure:	Preparation:	Rammer:	Passing 3/4"	Specific Gravity	Other:	
1557-91	A	Wet	Mechanical	100.0%			
NOTES:							

LF-F100r

SOLEA

SOLEA TESTING GROUP

LABORATORY COMPACTION TEST REPORT

HLA-Fort Ord site 16/17

DRAWN	DATE	PROJECT	LRN	APPROVED	PAGE
FF	4/1/94	23366-01724	4469	FF	2

LABORATORY COMPACTION TEST

BULK NO.: C-942 LRN: 4469 By: FF Page No. 3

JOB NAME: HLA- Fort Ord JOB NO.: 23366-01724

SAMPLE ID: SB-16-26

SOIL CLASSIFICATION: Dark Brown Sandy Silt (ML)

NOTES:

MAXIMUM DRY DENSITY: **117.0 pcf** **OPTIMUM MOISTURE CONTENT:** **11.0 %**

			Retained			Sample
ASTM:	1557-91	**SAMPLE**				
Method:	A	**SPLIT**	Weight	% Individual	% Cumulative	Weight
Preparation:	Wet	+ 3/4" Sieve				
Rammer:	Mechanical	+ 3/8" Sieve	0.1	0.2%	0.2%	5.9
Other:		+ #4 Sieve	0.2	0.5%	0.7%	11.8
Non-ASTM:		- #4 Sieve	42.2	99.3%	100.0%	2482.4
Specific Gravity:		TOTAL:	42.5	100.0%		2500.0

Classification from Sieve Data: Sand or finer

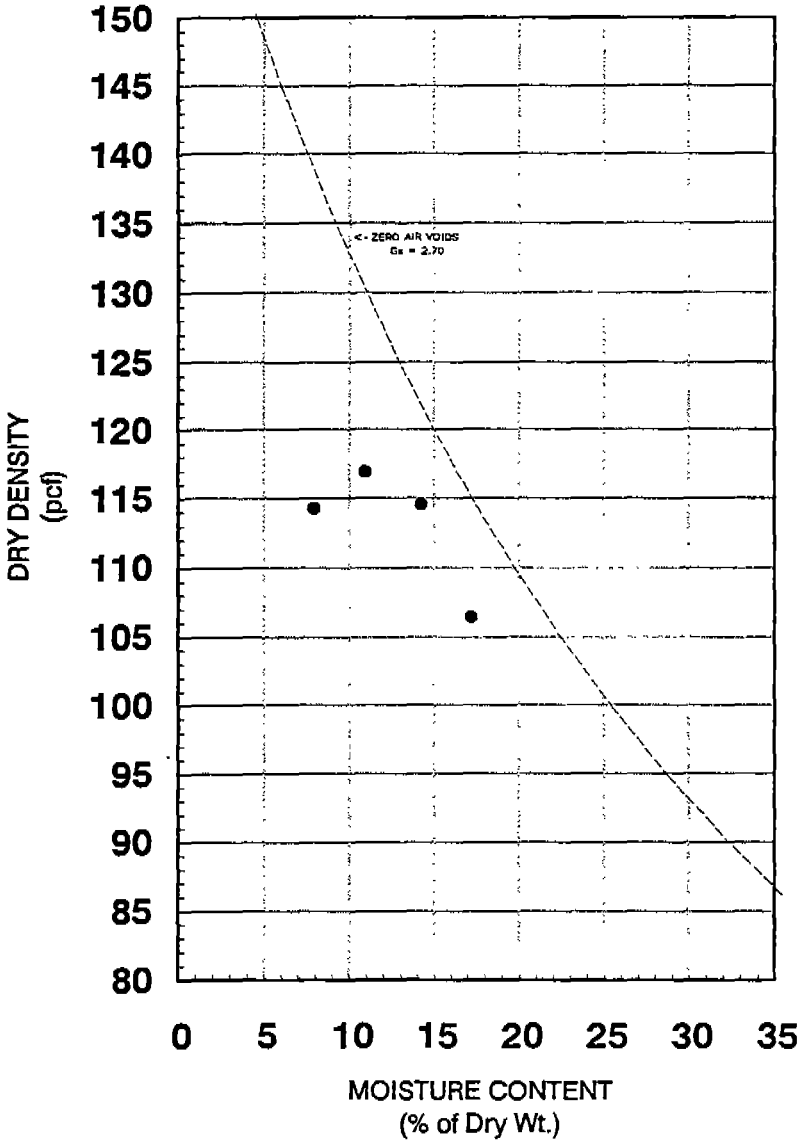
MOISTURE/DENSITY DATA

	1	2	3	4	5	6
RELATIVE MOISTURE, %	N	3 %	6 %	9 %		
MOLD & WET SOIL, gm.	6160.0	6256.0	6273.0	6181.0		
MOLD, gm.	4295.0	4295.0	4295.0	4295.0		
WET SOIL, gm.	1865.0	1961.0	1978.0	1886.0		
FACTOR 4" / 6" Dia.	.06614 / .0294	.06614 / .0294	.06614 / .0294	.06614 / .0294		
WET DENSITY, pcf	123.4	129.7	130.8	124.7		
PAN NO.	SP-5	SP-4	SP-7	SP-8		
PAN & WET SOIL, gm.	1398.3	1442.3	1390.5	1416.0		
PAN & DRY SOIL, gm.	1321.5	1334.9	1261.6	1260.3		
MOISTURE LOSS, gm.	76.8	107.4	128.9	155.7		
PAN TARE, gm.	354.4	352.0	354.1	355.6		
DRY SOIL, gm.	967.1	982.9	907.5	904.7		
MOISTURE CONTENT, %	**7.9**	**10.9**	**14.2**	**17.2**		
DRY DENSITY, pcf	**114.3**	**116.9**	**114.6**	**106.4**		

LF-F100c

CM No: 0178 Checked by: FF

compactn.xls (C) rev. 5/3/93

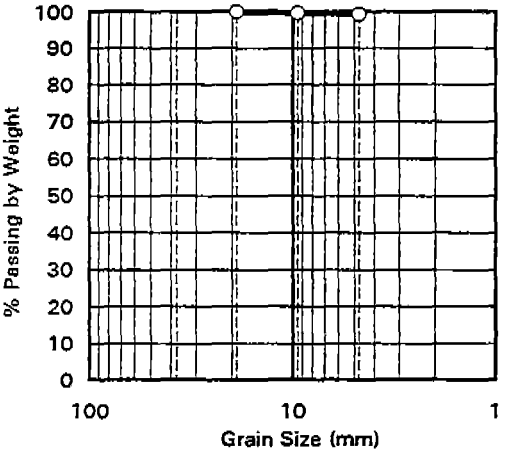


MAXIMUM DRY DENSITY:

117.0 pcf

OPTIMUM MOISTURE CONTENT:

11.0 %



SIEVE DATA		
+3/4"	+19 mm	
+3/8"	+9.5 mm	0.2 %
+#4	+4.75 mm	0.5 %
-#4	-4.75 mm	99.3 %

SAMPLE ID:		SB-16-26					
SOIL CLASSIFICATION:		Dark Brown Sandy Silt (ML)					
		1	2	3	4	5	6
MOISTURE CONTENT, %		7.9%	10.9%	14.2%	17.2%		
DRY DENSITY, pcf		114.3	116.9	114.6	106.4		
ASTM Method:	Procedure:	Preparation:	Rammer:	Passing 3/4"	Specific Gravity	Other:	
1557-91	A	Wet	Mechanical	100.0%			
NOTES:							

LF-F100r

SOLEA

SOLEA TESTING GROUP

LABORATORY COMPACTION TEST REPORT

HLA- Fort Ord

DRAWN	DATE	PROJECT	LRN	APPROVED	PAGE
FF	4/1/94	23366-01724	4469	FF	3

LABORATORY COMPACTION TEST

BULK NO.: C-943 LRN: 4469 By: FF Page No. 4

JOB NAME: HLA- Fort Ord Site 16/17 JOB NO.: 23366-01724

SAMPLE ID: SB-17-11

SOIL CLASSIFICATION: Light Brown Sandy Silt (ML)

NOTES:

MAXIMUM DRY DENSITY: 122.0 pcf **OPTIMUM MOISTURE CONTENT:** 9.0 %

			Retained			Sample
ASTM:	1557-91	**SAMPLE**				
Method:	A	**SPLIT**	Weight	% Individual	% Cumulative	Weight
Preparation:	Wet	+ 3/4" Sieve	0.2	0.4%	0.4%	9.2
Rammer:	Mechanical	+ 3/8" Sieve	0.4	0.7%	1.1%	18.3
Other:		+ #4 Sieve	0.7	1.3%	2.4%	32.1
Non-ASTM:		- #4 Sieve	53.3	97.6%	100.0%	2440.5
Specific Gravity:		TOTAL:	54.6	100.0%		2500.0

Classification from Sieve Data: Sand or finer

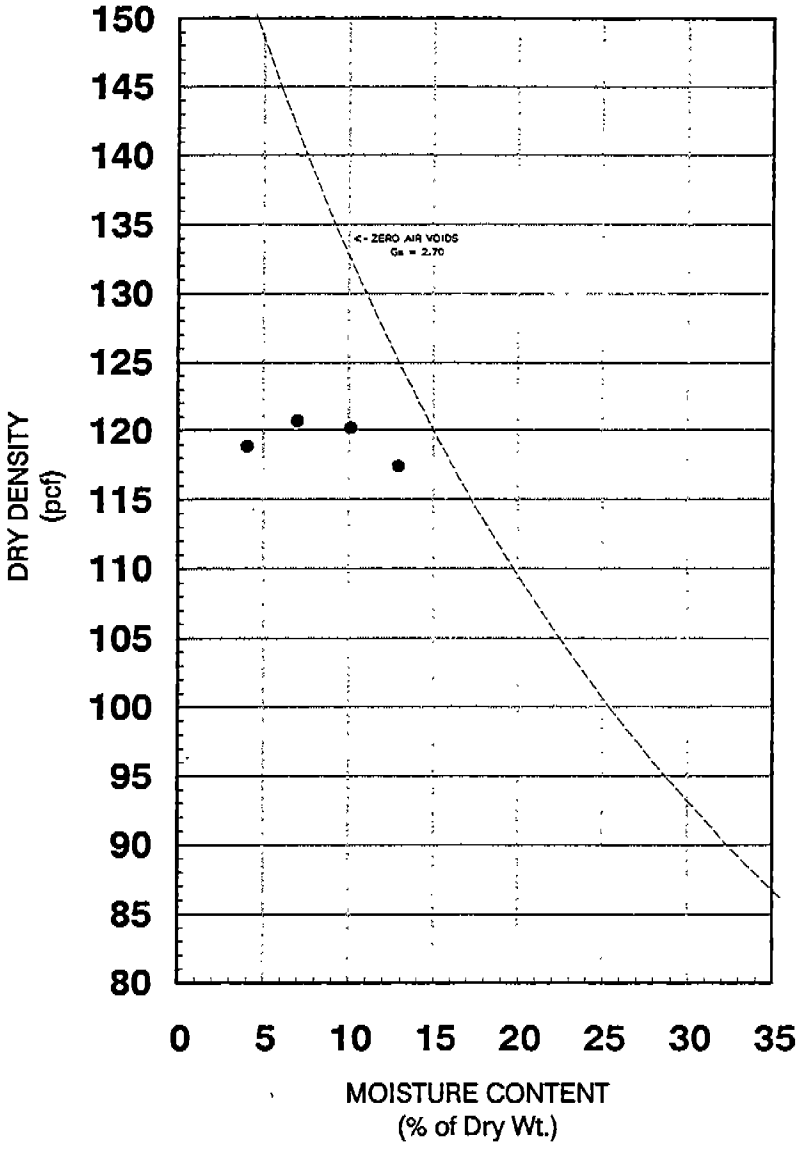
MOISTURE/DENSITY DATA

	1	2	3	4	5	6
RELATIVE MOISTURE, %	**N**	**3 %**	**6 %**	**9 %**		
MOLD & WET SOIL, gm.	6164.0	6248.0	6296.0	6299.0		
MOLD, gm.	4295.0	4295.0	4295.0	4295.0		
WET SOIL, gm.	1869.0	1953.0	2001.0	2004.0		
FACTOR 4" / 6" Dia.	.06614 / .0294	.06614 / .0294	.06614 / .0294	.06614 / .0294		
WET DENSITY, pcf	123.6	129.2	132.3	132.5		
PAN NO.	R	S	SP-13	SP-3		
PAN & WET SOIL, gm.	1186.7	1254.9	1389.3	1638.5		
PAN & DRY SOIL, gm.	1148.7	1186.1	1294.2	1492.4		
MOISTURE LOSS, gm.	38.0	68.8	95.1	146.1		
PAN TARE, gm.	206	205.5	355.2	359.1		
DRY SOIL, gm.	942.7	980.6	939.0	1133.3		
MOISTURE CONTENT, %	**4.0**	**7.0**	**10.1**	**12.9**		
DRY DENSITY, pcf	**118.8**	**120.7**	**120.2**	**117.4**		

LF-F100c

CM No: 0179 Checked by: FP

compactn.xls (C) rev. 5/3/93

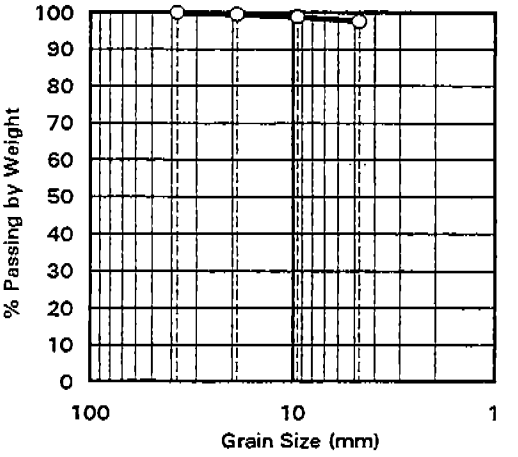


MAXIMUM DRY DENSITY:

122.0 pcf

OPTIMUM MOISTURE CONTENT:

9.0 %



SIEVE DATA		
+3/4"	+19 mm	0.4 %
+3/8"	+9.5 mm	0.7 %
+#4	+4.75 mm	1.3 %
-#4	-4.75 mm	97.6 %

SAMPLE ID:	SB-17-11					
SOIL CLASSIFICATION:	Light Brown Sandy Silt (ML)					
	1	2	3	4	5	6
MOISTURE CONTENT, %	4.0%	7.0%	10.1%	12.9%		
DRY DENSITY, pcf	118.8	120.7	120.2	117.4		
ASTM Method: 1557-91	Procedure: A	Preparation: Wet	Rammer: Mechanical	Passing 3/4" 99.6%	Specific Gravity	Other:
NOTES:						

LF-F100r

SOLEA

SOLEA TESTING GROUP

LABORATORY COMPACTION TEST REPORT

HLA- Fort Ord Site 16/17

DRAWN	DATE	PROJECT	LRN	APPROVED	PAGE
FF	4/1/94	23366-01724	4469	FF	4

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 04-05-1994
Project Number: 23366-4469 Location: SB-17-07 @ 4.0

Deformation Dial Constant (in/div): 0.0001

Sample Data:

Diameter (in): 2.43 Initial Height (in): 0.80

Dry Weight (g): 83.4 Specific Gravity (g/cc): 2.70

Overburden (psf): Preconsolidation (psf):

LL: -- PL: -- PI: --

Compression Index:

Specimen Type: UNDISTURBED

Soil Classification: BROWN SAND W/SILT (SP-SM)

Test Results:

	Initial	Final
Moisture Content (%):	4.7	24.8
Void Ratio :	0.97	0.95
Saturation (%) :	13.1	70.2
Dry Density (pcf) :	86	86

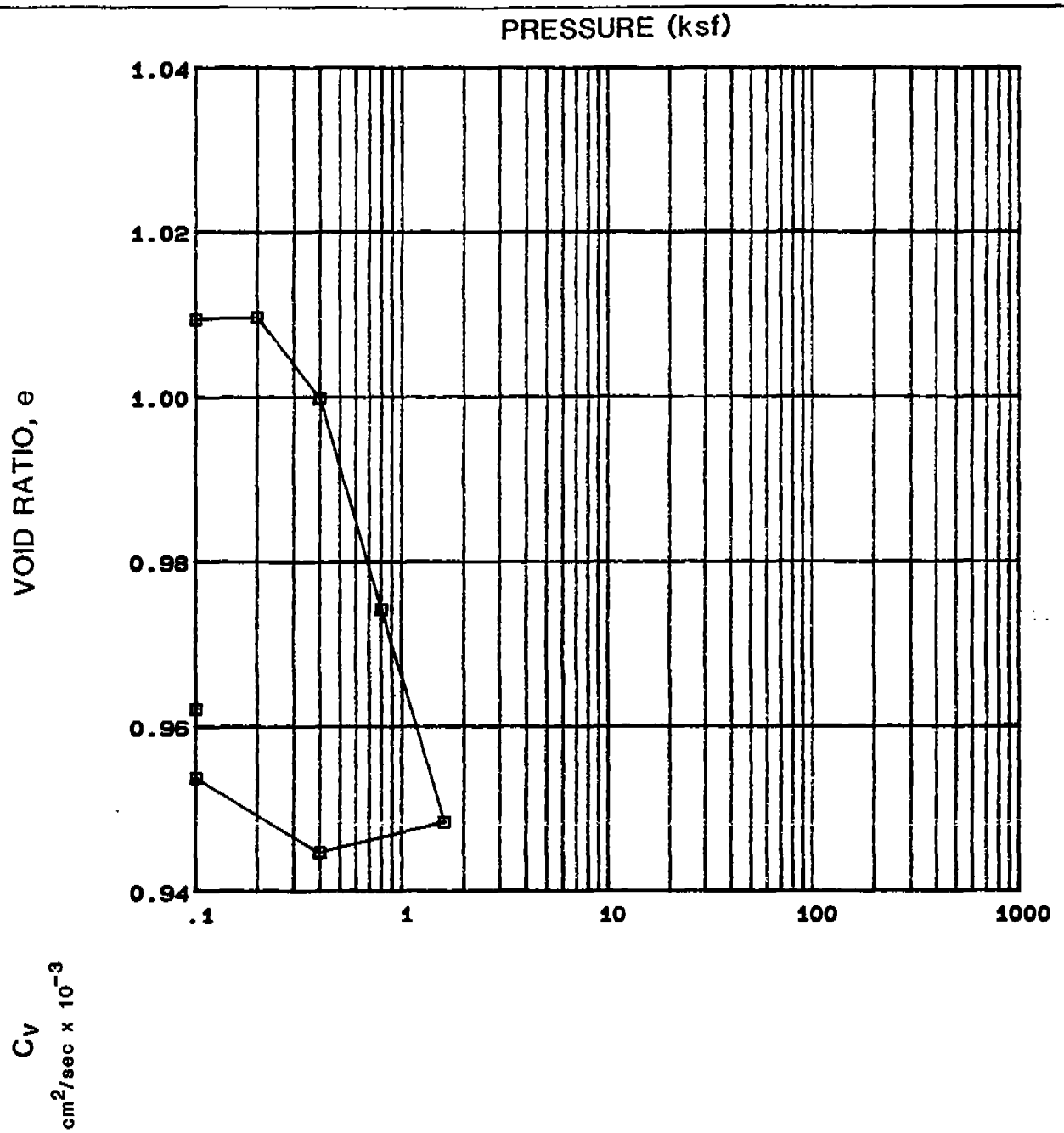
Data Entry By: FF File #: 423

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 04-05-1994

Data Entry By : FF Location : SB-17-07 @ 4.0 Data File : TEST0423

Load (psf)	Corrected Deformation (div)	Void Ratio
100	25	0.96
100	-167	1.01
200	-168	1.01
400	-128	1.00
800	-24	0.97
1600	81	0.95
400	96	0.94
100	59	0.95



Reference: ASTM D-2435

SPECIMEN TYPE UNDISTURBED			BEFORE TEST			AFTER TEST	
DIAMETER (in) 2.43	HEIGHT (in) 0.80		MOISTURE CONTENT	w_o	4.7 %	w_f	24.8 %
OVERBURDEN PRESSURE, σ_{vo}'		psf	VOID RATIO	e_o	0.97	e_f	0.95
PRECONSOL PRESSURE, $(\sigma_{vo}')_{max}$		psf	SATURATION	S_o	13 %	S_f	70 %
COMPRESSION INDEX, C_c			DRY DENSITY	γ_d	86 pcf	γ_d	86 pcf
LIQUID LIMIT —	PLASTIC LIMIT —		PLASTICITY INDEX —			SPECIFIC GRAVITY	2.70
CLASSIFICATION BROWN SAND W/SILT (SP-SM)			SOURCE SB-17-07 @ 4.0 FT				

Consolidation Test Report

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	04-05-1994		

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 04-05-1994
Project Number: 23366-4469 Location: SB-17-08 @ 42.5

Deformation Dial Constant (in/div): 0.0001

Sample Data:

Diameter (in): 2.43 Initial Height (in): 0.80

Dry Weight (g): 94.9 Specific Gravity (g/cc): 2.70

Overburden (psf): Preconsolidation (psf):

LL: -- PL: -- PI: --

Compression Index:

Specimen Type: UNDISTURBED

Soil Classification: BROWN SAND W/SILT (SP-SM)

Test Results:

	Initial	Final
Moisture Content (%):	7.8	20.9
Void Ratio :	0.73	0.69
Saturation (%) :	28.9	81.2
Dry Density (pcf) :	97	99

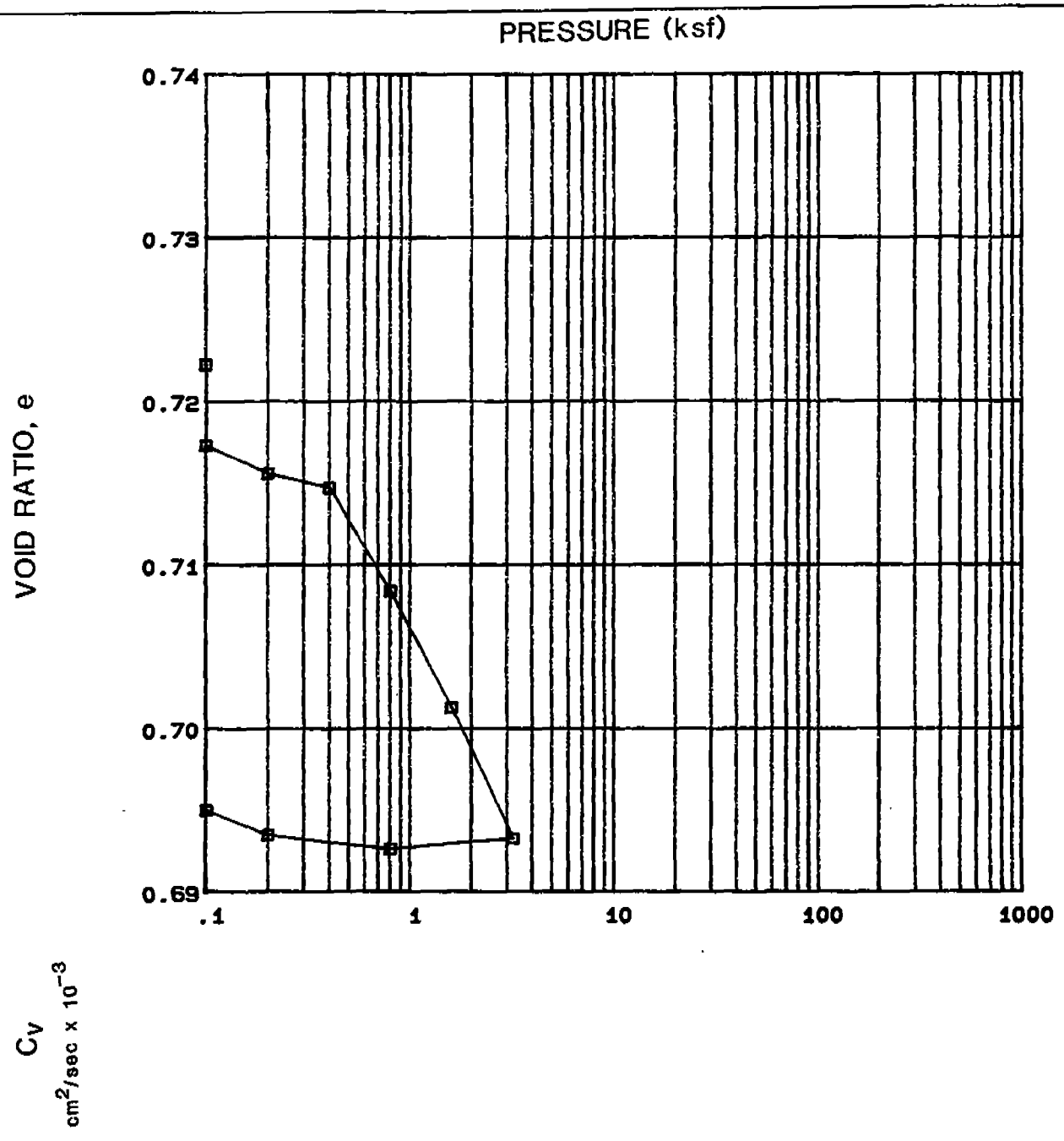
Data Entry By: FF File #: 424

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 04-05-1994

Data Entry By : FF Location : SB-17-08 @ 42.5 Data File : TEST0424

Load (psf)	Corrected Deformation (div)	Void Ratio
100	35	0.72
100	58	0.72
200	66	0.72
400	70	0.71
800	99	0.71
1600	132	0.70
3200	169	0.69
800	172	0.69
200	168	0.69
100	161	0.69



Reference: ASTM D-2435

SPECIMEN TYPE	UNDISTURBED		BEFORE TEST			AFTER TEST	
DIAMETER (in)	2.43	HEIGHT (in) 0.80	MOISTURE CONTENT	w_o	7.8 %	w_f	20.9 %
OVERBURDEN PRESSURE, σ_{vo}'	psf		VOID RATIO	e_o	0.73	e_f	0.69
PRECONSOL PRESSURE, $(\sigma_{vo}')_{max}$	psf		SATURATION	S_o	29 %	S_f	81 %
COMPRESSION INDEX, C_c			DRY DENSITY	γ_d	97 pcf	γ_d	99 pcf
LIQUID LIMIT —	PLASTIC LIMIT —		PLASTICITY INDEX —		SPECIFIC GRAVITY 2.70		
CLASSIFICATION BROWN SAND W/SILT (SP-SM)			SOURCE SB-17-08 @ 42.5 FT				

Consolidation Test Report

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	04-05-1994		

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 04-05-1994
Project Number: 23366-4469 Location: SB-17-11 @ 15.5

Deformation Dial Constant (in/div): 0.0001

Sample Data:

Diameter (in): 2.43 Initial Height (in): 0.80

Dry Weight (g): 99.2 Specific Gravity (g/cc): 2.70

Overburden (psf): Preconsolidation (psf):

LL: -- PL: -- PI: --

Compression Index:

Specimen Type: UNDISTURBED

Soil Classification: BROWN SAND W/SILT (SP-SM)

Test Results:

	Initial	Final
Moisture Content (%):	6.2	19.6
Void Ratio :	0.65	0.60
Saturation (%) :	25.4	91.0
Dry Density (pcf) :	102	107

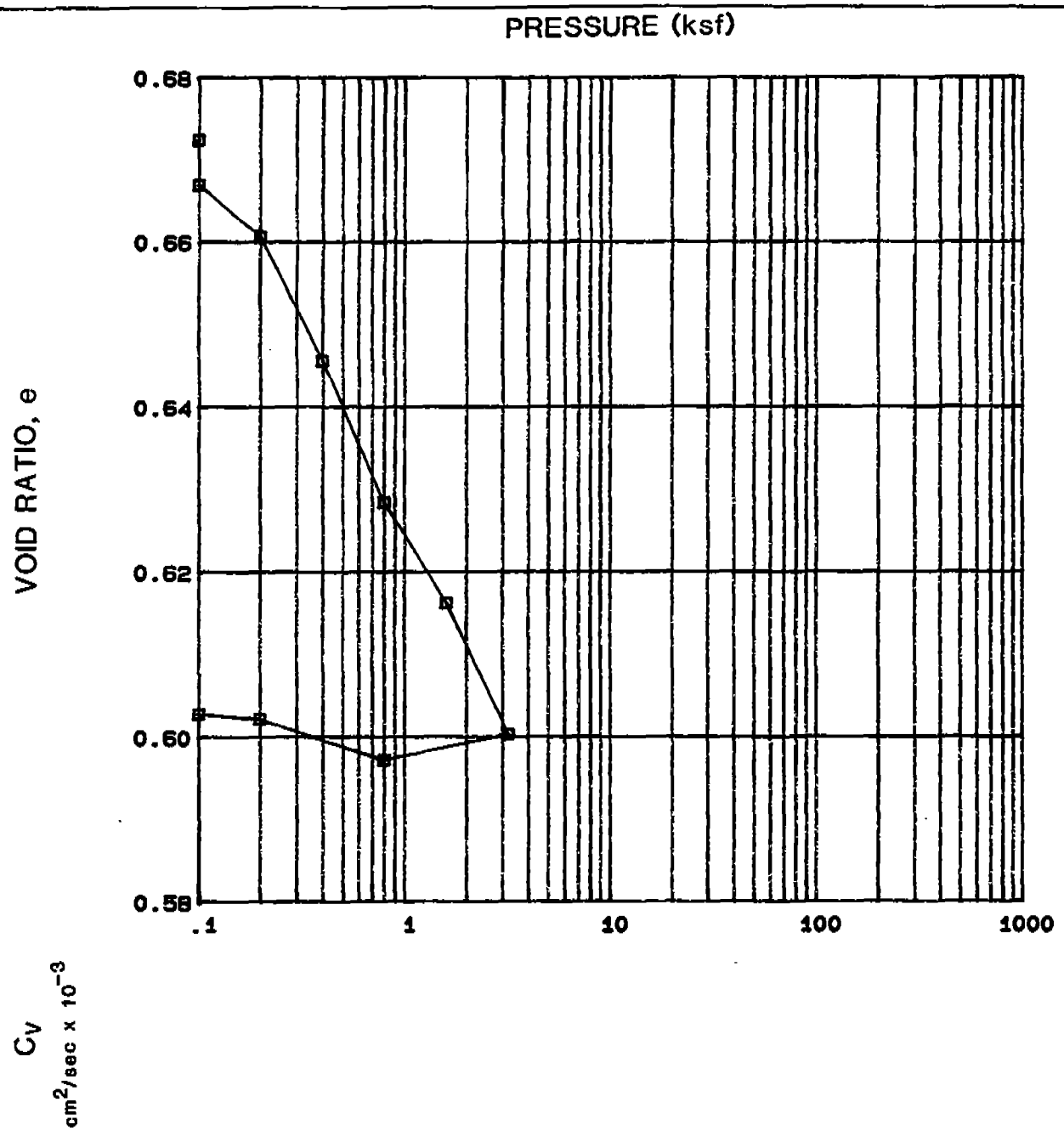
Data Entry By: FF File #: 421

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 04-05-1994

Data Entry By : FF Location : SB-17-11 @ 15.5 Data File : TEST0421

Load (psf)	Corrected Deformation (div)	Void Ratio
100	21	0.67
100	47	0.67
200	77	0.66
400	149	0.65
800	231	0.63
1600	289	0.62
3200	365	0.60
800	380	0.60
200	356	0.60
100	353	0.60



Reference: ASTM D-2435

SPECIMEN TYPE UNDISTURBED			BEFORE TEST			AFTER TEST	
DIAMETER (in) 2.43	HEIGHT (in) 0.80		MOISTURE CONTENT	w_o	6.2 %	w_f	19.6 %
OVERBURDEN PRESSURE, σ_{vo}'		psf	VOID RATIO	e_o	0.65	e_f	0.60
PRECONSOL PRESSURE, $(\sigma_{vo}')_{max}$		psf	SATURATION	S_o	25 %	S_f	91 %
COMPRESSION INDEX, C_c			DRY DENSITY	γ_d	102 pcf	γ_d	107 pcf
LIQUID LIMIT ——	PLASTIC LIMIT ——		PLASTICITY INDEX ——		SPECIFIC GRAVITY 2.70		
CLASSIFICATION BROWN SAND W/SILT (SP-SM)			SOURCE SB-17-11 @ 15.5 FT				

Consolidation Test Report

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	04-05-1994		

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project Name: HLA-FORT ORD 16/17 Test Date: 04-05-1994
Project Number: 23366-4469 Location: SB-17-11 @ 4.0

Deformation Dial Constant (in/div): 0.0001

Sample Data:

Diameter (in): 2.43 Initial Height (in): 0.80

Dry Weight (g): 98.7 Specific Gravity (g/cc): 2.70

Overburden (psf): Preconsolidation (psf):

LL: -- PL: -- PI: --

Compression Index:

Specimen Type: UNDISTURBED

Soil Classification: BROWN SAND W/SILT (SP-SM)

Test Results:

	Initial	Final
Moisture Content (%):	6.1	20.7
Void Ratio :	0.66	0.63
Saturation (%) :	24.8	88.2
Dry Density (pcf) :	101	103

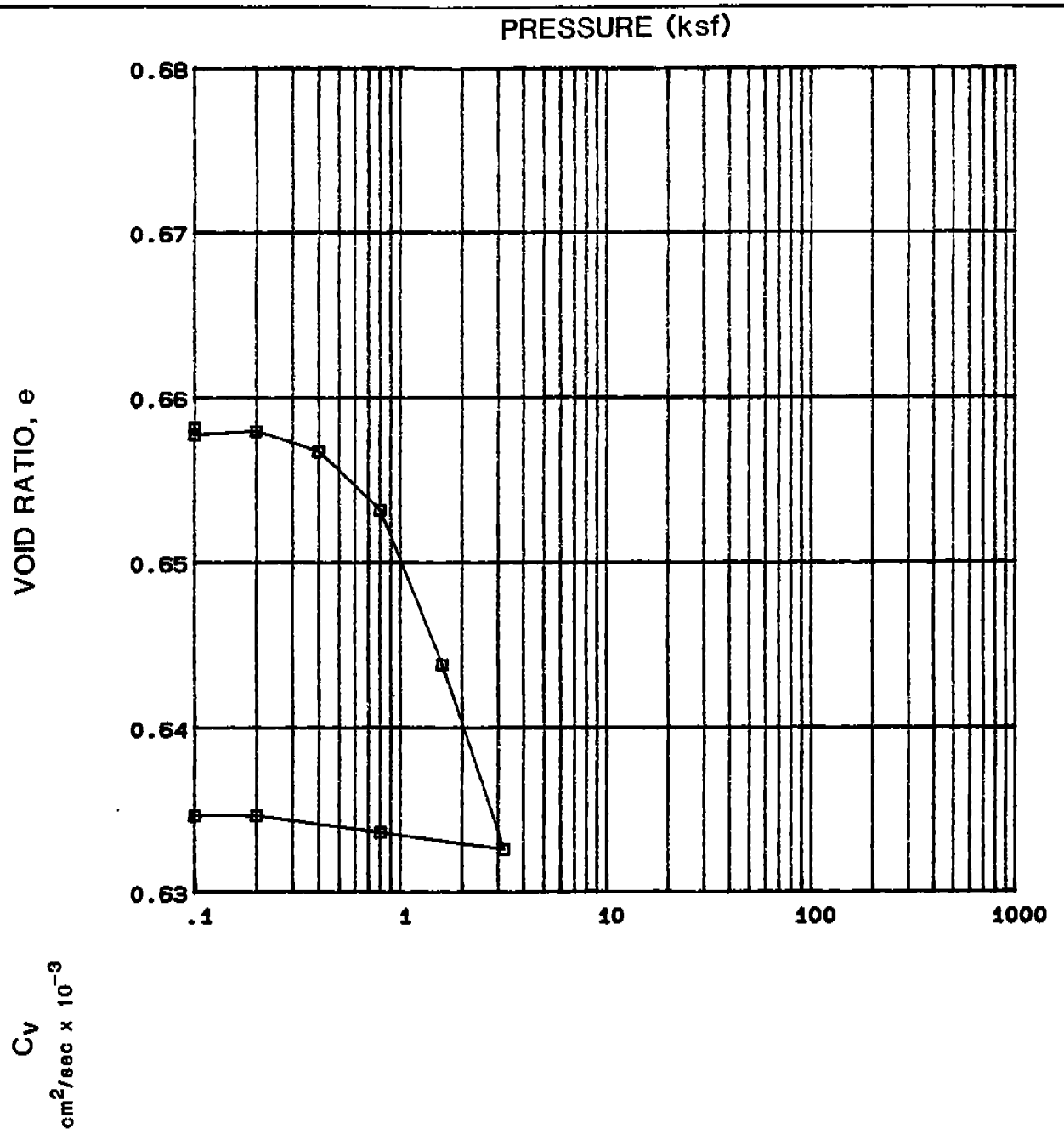
Data Entry By: FF File #: 422

Consolidation Test Report
HLA Laboratory Analysis Routines Ver 3.0

Project : HLA-FORT ORD 16/17 ID : 23366-4469 Test Date : 04-05-1994

Data Entry By : FF Location : SB-17-11 @ 4.0 Data File : TEST0422

Load (psf)	Corrected Deformation (div)	Void Ratio
100	24	0.66
100	26	0.66
200	25	0.66
400	31	0.66
800	48	0.65
1600	93	0.64
3200	147	0.63
800	142	0.63
200	137	0.63
100	137	0.63



Reference: ASTM D-2435

SPECIMEN TYPE UNDISTURBED			BEFORE TEST			AFTER TEST	
DIAMETER (in) 2.43	HEIGHT (in) 0.80		MOISTURE CONTENT	w_o	5.1 %	w_f	20.7 %
OVERBURDEN PRESSURE, σ_{vo}'		psf	VOID RATIO	e_o	0.66	e_f	0.63
PRECONSOL PRESSURE, $(\sigma_{vo}')_{max}$		psf	SATURATION	S_o	25 %	S_f	88 %
COMPRESSION INDEX, C_c			DRY DENSITY	γ_d	101 pcf	γ_d	103 pcf
LIQUID LIMIT —	PLASTIC LIMIT —		PLASTICITY INDEX —			SPECIFIC GRAVITY	2.70
CLASSIFICATION BROWN SAND W/SILT (SP-SM)			SOURCE SB-17-11 @ 4.0 FT				

Consolidation Test Report

PLATE

SOLEA

SOLEA TESTING GROUP

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366-4469	FF	04-05-1994		

SOLEA
SOLEA TESTING GROUP

FIXED-WALL PERMEABILITY REPORT

Fallinghead-Risingtail Method (ASTM D-2434)

PSN 0726

Project: HLA-Fort Ord Site 16/17 Project No.: HLA.002 LRN: 4469

Sample I.D.: Boring: SB-16-24 Depth: 18-18.5

Sample Description: Yellow Brown Sand W/Silt (SP SM)

MOISTURE DATA			Before Test			After Test		
Setup Date: 3/29/94		julian day 453	Specimen	Trimmings	Misc.	Specimen	Solids	Total
Tare No.:						S-317	J-9	
Wet Soil & Tare Weight:		grams				987.6		
Dry Soil & Tare Weight:		grams				838.7	51.3	
Tare Weight:		grams				133.6	50.9	
Wet Soil Weight:		grams	729.1			854.0		854.5
Dry Soil Weight:		grams	705.50			705.10	0.40	705.50
Water Content:		%	3.35			21.12		21.12

DIMENSIONS								
	Initial Length (inches)	6.000	Initial Diameter (inches)	2.400	Final Length (inches)	5.900	Final Diameter (inches)	2.400
	Average	6.000	Average	2.400	Average	5.900	Average	2.400

SPECIMEN DATA		Initial	Δ	Saturated	Δ	Consolidated	Δ	Final
Length, Ave.	centimeters	15.240				14.986	=5.900in.	14.986
Diameter, Ave.	centimeters	6.096				5.904		6.096
Area	cm²	29.186				27.378		29.186
Dial Reading	inches							
Burette Reading:	centimeters							
Effective Consolidation Pressure:			Back Pressure		Burette Area:	0.30 cm^2	C factor:	0.0770

Solids Weight, cc:	Ws	705.50	Gs = 2.70	705.50		705.50		705.50
Volume Total, cc:	Vt	444.80	-34.52	410.28		410.28	27.11	437.39
Volume Solids, cc:	Vs	261.30		261.30		261.30		261.30
Volume Voids, cc:	Vv	183.50		148.98		148.98		176.09
Volume Water, cc:	Vw	23.60		148.98		148.98		148.98

Void Ratio	e	0.702		0.570		0.570		0.674
% Saturation	S	12.86		100.00		100.00		84.61
% Porosity	n	41.23		36.28		36.28		40.23
% Moisture	M	3.35		21.12		21.12		21.12
Dry Density, pcf	γ	99.02		107.35		107.35		100.70

FINAL PERMEABILITY DATA

Trial	Time, sec.	Ho, cm	Hf, cm	Gradient Range (i)		Day	K20 cm/sec
1	15	59.7	25.0	2	4		4.5E-3
2	15	60.0	25.3	2	4		4.4E-3
3	15	59.7	25.1	2	4		4.4E-3
4	15	59.9	25.4	2	4		4.4E-3

AVERAGE PERMEABILITY, cm/sec: 4.4E-3

Assumptions & Notes

1.) "Initial" data based on initial measured weights and dimensions.
2.) "Saturated" data show calculated values, based on 100% saturation. Volume changes are calculated, not measured.
3.) "Consolidated" data is based on measured water content and consolidation volume change and the sample is 100% saturated.
4.) "Final" data based on measured weights and dimensions on specimen out of the cell which may allow change in water content and volume.
5.) Permeant type: 0.005N Solution of CaSO4.
6.) Notes:

k-check3.xls (C) rev. 8/27/92 LF-H170c

DRAWN DATE APPROVED PAGE

4/7/94 FF 4

SOLEA

SOLEA TESTING GROUP

FIXED-WALL PERMEABILITY REPORT

PSN 0724

Fallinghead-Risingtail Method (ASTM D-2434)

Project: HLA-Fort Ord Site 16/17 | Project No.: HLA.002 | LRN: 4469

Sample I.D.: | Boring: SB-16-26 | Depth: 16-16.5

Sample Description: Olive Brown Sand W/silt (SP-SM)

MOISTURE DATA			Before Test			After Test		
Setup Date: 3/30/94	julian day 454		Specimen	Trimmings	Misc.	Specimen	Solids	Total
Tare No.:						AC-5	C-3	
Wet Soil & Tare Weight:		grams				832.5		
Dry Soil & Tare Weight:		grams				701.3	54.4	
Tare Weight:		grams				122.5	53.1	
Wet Soil Weight:		grams	596.5			710.0		711.6
Dry Soil Weight:		grams	580.10			578.80	1.30	580.10
Water Content:		%	2.83			22.67		22.67

DIMENSIONS								
	Initial Length (inches)	5.200	Initial Diameter (inches)	2.400	Final Length (inches)	5.050	Final Diameter (inches)	2.400
	Average	5.200	Average	2.400	Average	5.050	Average	2.400

SPECIMEN DATA		Initial	Δ	Saturated	Δ	Consolidated	Δ	Final
Length, Ave.	centimeters	13.208				12.827	=5.050in.	12.827
Diameter, Ave.	centimeters	6.096				5.863		6.096
Area	cm²	29.186				27.001		29.186
Dial Reading	inches							
Burette Reading:	centimeters							
Effective Consolidation Pressure:			Back Pressure		Burette Area:	0.30 cm^2	C factor:	0.0659
Solids Weight, cc:	Ws	580.10	Gs = 2.70	580.10		580.10		580.10
Volume Total, cc:	Vt	385.49	-39.15	346.35		346.35	28.03	374.37
Volume Solids, cc:	Vs	214.85		214.85		214.85		214.85
Volume Voids, cc:	Vv	170.64		131.49		131.49		159.52
Volume Water, cc:	Vw	16.40		131.49		131.49		131.49
Void Ratio	e	0.794		0.612		0.612		0.742
% Saturation	S	9.61		100.00		100.00		82.43
% Porosity	n	44.24		37.94		37.94		42.58
% Moisture	M	2.83		22.67		22.67		22.67
Dry Density, pcf	γ	93.95		104.56		104.56		96.74

FINAL PERMEABILITY DATA

Trial	Time, sec.	Ho, cm	Hf, cm	Gradient Range (i)		Day	K20 cm/sec
1	15	59.5	23.2	2	5		4.1E-3
2	15	59.6	23.0	2	5		4.2E-3
3	15	59.8	23.3	2	5		4.1E-3
4	15	59.5	23.3	2	5		4.1E-3

AVERAGE PERMEABILITY, cm/sec: 4.1E-3

Assumptions & Notes

1.) "Initial" data based on initial measured weights and dimensions.

2.) "Saturated" data show calculated values, based on 100% saturation. Volume changes are calculated, not measured.

3.) "Consolidated" data is based on measured water content and consolidation volume change and the sample is 100% saturated.

4.) "Final" data based on measured weights and dimensions on specimen out of the cell which may allow change in water content and volume.

5.) Permeant type: 0.005N Solution of CaSO4.

6.) Notes:

SOLEA

SOLEA TESTING GROUP

FIXED-WALL PERMEABILITY REPORT

PSN 0723

Fallinghead-Risingtail Method (ASTM D-2434)

Project: HLA-Fort Ord Site16/17 | Project No.: HLA.002 | LRN: 4469

Sample I.D.: | Boring: SB-17-07 | Depth: 21-21.5

Sample Description: Olive-Brown Sand w/ Silt (SP-SM)

MOISTURE DATA			Before Test			After Test		
Setup Date: 3/31/94		julian day 455	Specimen	Trimmings	Misc.	Specimen	Solids	Total
Tare No.:						CC	D-59	
Wet Soil & Tare Weight:		grams				832.3		
Dry Soil & Tare Weight:		grams				684.2	60.8	
Tare Weight:		grams				107.6	40.8	
Wet Soil Weight:		grams	617.0			724.7		749.8
Dry Soil Weight:		grams	596.60			576.60	20.00	596.60
Water Content:		%	3.42			25.69		25.69

DIMENSIONS								
	Initial Length (inches)	5.250	Initial Diameter (inches)	2.400	Final Length (inches)	5.150	Final Diameter (inches)	2.400
	Average	5.250	Average	2.400	Average	5.150	Average	2.400

SPECIMEN DATA		Initial	Δ	Saturated	Δ	Consolidated	Δ	Final
Length, Ave.	centimeters	13.335				13.081	=5.150in.	13.081
Diameter, Ave.	centimeters	6.096				6.035		6.096
Area	cm²	29.186				28.606		29.186
Dial Reading	inches							
Burette Reading:	centimeters							
Effective Consolidation Pressure:			Back Pressure		Burette Area:	0.30 cm^2	C factor:	0.0672

Solids Weight, cc:	Ws	596.60	Gs = 2.70	596.60		596.60		596.60
Volume Total, cc:	Vt	389.20	-15.00	374.20		374.20	7.59	381.79
Volume Solids, cc:	Vs	220.96		220.96		220.96		220.96
Volume Voids, cc:	Vv	168.24		153.24		153.24		160.82
Volume Water, cc:	Vw	20.40		153.24		153.24		153.24

Void Ratio	e	0.761		0.693		0.693		0.728
% Saturation	S	12.13		100.00		100.00		95.28
% Porosity	n	43.20		40.92		40.92		42.10
% Moisture	M	3.42		25.69		25.69		25.69
Dry Density, pcf	γ	95.70		99.53		99.53		97.56

FINAL PERMEABILITY DATA

Trial	Time, sec.	Ho, cm	Hf, cm	Gradient Range (i)		Day	K20 cm/sec
1	15	60.6	18.9	1	5		5.2E-3
2	15	60.9	20.0	2	5		5.0E-3
3	15	61.6	19.5	1	5		5.2E-3
4	15	61.2	19.7	2	5		5.1E-3

AVERAGE PERMEABILITY, cm/sec: 5.1E-3

Assumptions & Notes

1.) "Initial" data based on initial measured weights and dimensions.

2.) "Saturated" data show calculated values, based on 100% saturation. Volume changes are calculated, not measured.

3.) "Consolidated" data is based on measured water content and consolidation volume change and the sample is 100% saturated.

4.) "Final" data based on measured weights and dimensions on specimen out of the cell which may allow change in water content and volume.

5.) Permeant type: 0.005N Solution of CaSO4.

6.) Notes:

k-check3.xls (C) rev. 8/27/92 LF-H170c

DRAWN | DATE 4/6/94 | APPROVED FF | PAGE 4

SOLEA

SOLEA TESTING GROUP

FIXED-WALL PERMEABILITY REPORT

PSN 0725

Fallinghead-Risingtail Method (ASTM D-2434)

Project: HLA-Fort Ord Site 16/17 | Project No.: HLA.002 | LRN: 4469

Sample I.D.: | Boring: SB-17-08 | Depth: 31.5-32

Sample Description: Brown Silty Sand (SM)

MOISTURE DATA			Before Test			After Test		
Setup Date:	3/29/94	julian day 453	Specimen	Trimmings	Misc.	Specimen	Solids	Total
Tare No.:						KK	M-12	
Wet Soil & Tare Weight:		grams				975.3		
Dry Soil & Tare Weight:		grams				859.4	51.4	
Tare Weight:		grams				125.3	51.3	
Wet Soil Weight:		grams	812.5			850.0		850.1
Dry Soil Weight:		grams	734.20			734.10	0.10	734.20
Water Content:		%	10.66			15.79		15.79

DIMENSIONS								
	Initial Length (inches)	5.700	Initial Diameter (inches)	2.400	Final Length (inches)	5.600	Final Diameter (inches)	2.400
	Average	5.700	Average	2.400	Average	5.600	Average	2.400

SPECIMEN DATA		Initial	Δ	Saturated	Δ	Consolidated	Δ	Final
Length, Ave.	centimeters	14.478				14.224	=5.600in.	14.224
Diameter, Ave.	centimeters	6.096				5.892		6.096
Area	cm²	29.186				27.267		29.186
Dial Reading	inches							
Burette Reading:	centimeters							
Effective Consolidation Pressure:			Back Pressure		Burette Area:	0.30 cm^2	C factor:	0.0731

Solids Weight, cc:	Ws	734.20	Gs = 2.70	734.20		734.20		734.20
Volume Total, cc:	Vt	422.56	-34.72	387.84		387.84	27.30	415.15
Volume Solids, cc:	Vs	271.93		271.93		271.93		271.93
Volume Voids, cc:	Vv	150.63		115.92		115.92		143.22
Volume Water, cc:	Vw	78.30		115.92		115.92		115.92

Void Ratio	e	0.554		0.426		0.426		0.527
% Saturation	S	51.98		100.00		100.00		80.94
% Porosity	n	35.62		29.85		29.85		34.47
% Moisture	M	10.66		15.79		15.79		15.79
Dry Density, pcf	γ	108.47		118.18		118.18		110.41

FINAL PERMEABILITY DATA

Trial	Time, sec.	Ho, cm	Hf, cm	Gradient Range (i)		Day	K20 cm/sec
1	180	60.0	22.3	2	4		4.0E-4
2	180	59.8	22.6	2	4		4.0E-4
3	180	59.4	22.1	2	4		4.0E-4
4	180	60.1	22.4	2	4		4.0E-4

AVERAGE PERMEABILITY, cm/sec: 4.0E-4

Assumptions & Notes

1.) "Initial" data based on initial measured weights and dimensions.

2.) "Saturated" data show calculated values, based on 100% saturation. Volume changes are calculated, not measured.

3.) "Consolidated" data is based on measured water content and consolidation volume change and the sample is 100% saturated.

4.) "Final" data based on measured weights and dimensions on specimen out of the cell which may allow change in water content and volume.

5.) Permeant type: 0.005N Solution of CaSO4.

6.) Notes:

k-check3.xls (C) rev. 8/27/92 LF-H170c

DRAWN | DATE 4/5/94 | APPROVED FF | PAGE 4

SOLEA

SOLEA TESTING GROUP

FIXED-WALL PERMEABILITY REPORT

PSN 0722

Fallinghead-Risingtail Method (ASTM D-2434)

Project: HLA-Fort Ord Site16/17 | Project No.: HLA.002 | LRN: 4469

Sample I.D.: | Boring: SB-17-11 | Depth: 20.5-21

Sample Description: Brown Sand w/ Silt (SP-SM)

MOISTURE DATA			Before Test			After Test		
Setup Date:	3/31/94	julian day 455	Specimen	Trimmings	Misc.	Specimen	Solids	Total
Tare No.:						GG	D-58	
Wet Soil & Tare Weight:		grams				947.1		
Dry Soil & Tare Weight:		grams				816.8	41.4	
Tare Weight:		grams				105.3	40.4	
Wet Soil Weight:		grams	754.1			841.8		843.0
Dry Soil Weight:		grams	712.50			711.50	1.00	712.50
Water Content:		%	5.84			18.31		18.31

DIMENSIONS								
	Initial Length (inches)	5.950	Initial Diameter (inches)	2.400	Final Length (inches)	5.850	Final Diameter (inches)	2.400
	Average	5.950	Average	2.400	Average	5.850	Average	2.400

SPECIMEN DATA		Initial	Δ	Saturated	Δ	Consolidated	Δ	Final
Length, Ave.	centimeters	15.113				14.859	-5.850in.	14.859
Diameter, Ave.	centimeters	6.096				5.813		6.096
Area	cm²	29.186				26.541		29.186
Dial Reading	inches							
Burette Reading:	centimeters							
Effective Consolidation Pressure:			Back Pressure		Burette Area:	0.30 cm^2	C factor:	0.0764

Solids Weight, cc:	Ws	712.50	Gs = 2.70	712.50		712.50		712.50
Volume Total, cc:	Vt	441.09	-46.72	394.37		394.37	39.31	433.68
Volume Solids, cc:	Vs	263.89		263.89		263.89		263.89
Volume Voids, cc:	Vv	177.20		130.48		130.48		169.79
Volume Water, cc:	Vw	41.60		130.48		130.48		130.48
Void Ratio	e	0.672		0.494		0.494		0.643
% Saturation	S	23.48		100.00		100.00		76.85
% Porosity	n	40.15		33.05		33.05		39.12
% Moisture	M	5.84		18.31		18.31		18.31
Dry Density, pcf	γ	100.84		112.79		112.79		102.57

FINAL PERMEABILITY DATA

Trial	Time, sec.	Ho, cm	Hf, cm	Gradient Range (i)		Day	K20 cm/sec
1	30	59.6	21.5	1	4		2.6E-3
2	30	59.4	21.8	1	4		2.6E-3
3	30	58.8	21.5	1	4		2.6E-3
4	30	59.3	21.8	1	4		2.5E-3

AVERAGE PERMEABILITY, cm/sec: 2.6E-3

Assumptions & Notes

1.) "Initial" data based on initial measured weights and dimensions.

2.) "Saturated" data show calculated values, based on 100% saturation. Volume changes are calculated, not measured.

3.) "Consolidated" data is based on measured water content and consolidation volume change and the sample is 100% saturated.

4.) "Final" data based on measured weights and dimensions on specimen out of the cell which may allow change in water content and volume.

5.) Permeant type: 0.005N Solution of CaSO4.

6.) Notes:

k-check3.xls (C) rev. 8/27/92 LF-H170c

DRAWN	DATE	APPROVED	PAGE
	4/6/94	FF	4

KLEINFELDER

R-VALUE TEST WORKSHEET

PROJECT NO 23366-01724 LAB NO. 3193 TECH: LS/SH DATE: 4-4-94

SALBA ELA-FORT ORD SITE 16/17

TEST SPECIMEN						
MOLD NO.						
Foot Pressure, psi						
Initial Moisture, %	4.0	4.0	4.0			
Initial "As-Is" Sample Weight	1200	1200	1200	1200		
Initial Dry Sample Weight	1154	1154	1154			
Water Added, ml	+50	+100	+70			
Water Added, %						
Moisture at Compaction, %	8.3	12.7	10.1			
Height of Briquette, in.	2.56	2.73	2.42			
Wet Weight of Briquette + Mold	3134	3272	3124			
Tare Weight Mold	2081 x	2092	2104 x			
Wet Weight Briquette	1053	1180	1020			
Dry Density, lbs/cu. ft.	115.1	116.2	116.0			
Stabilometer 1000 lbs.	14	18	12		15	
Stabilometer 2000 lbs.	25	35	22			
Displacement	4.08	4.20	4.77			
Exudation Pressure, lbs.	10,000	1260	4850			
Exudation Pressure, psi	800	100	390			
R-Value	77	68	77			
Dial Reading, End	78	72	76			
Dial Reading, Start						
Difference	Ø	Ø	Ø			
Expansion Pressure, psf	Ø	Ø	Ø			

INITIAL MOISTURE

Pan No. MUD

Wet Sample + Pan 1200

Dry Sample + Pan 1154

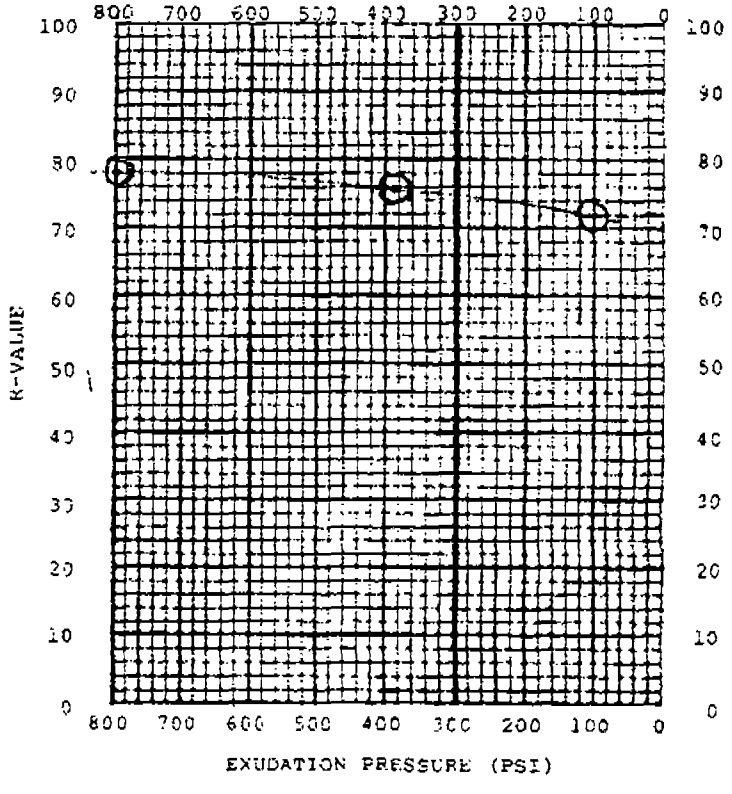
Weight of Water

Tare Weight Pan

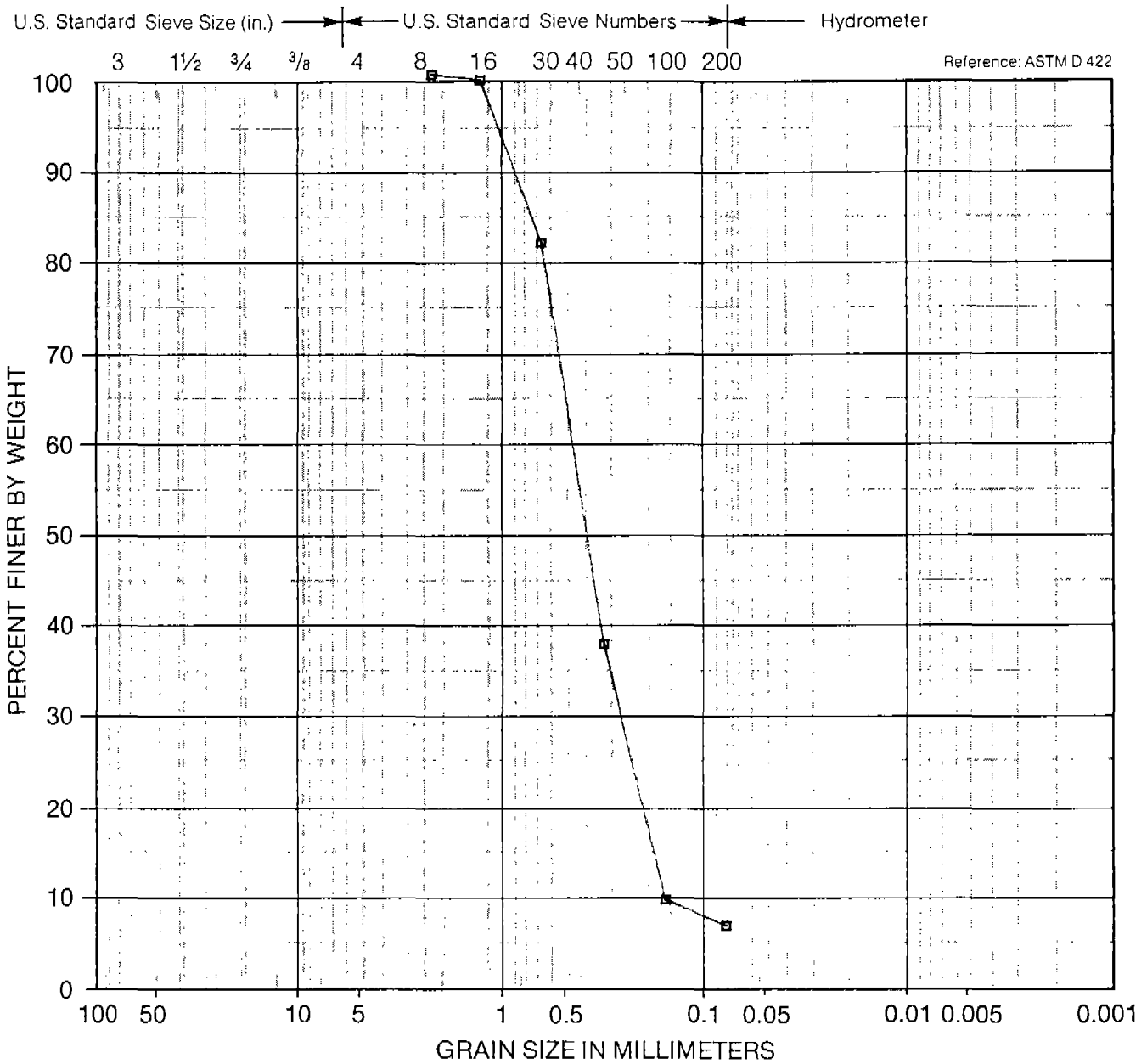
Weight Dry Sample

Moisture Content, % 4.0

REMARKS: BRN SA



29058



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
▫	BW-SG-16-5 @ 0.0 FT	DARK BROWN SAND W/CLAY (SP-SC)

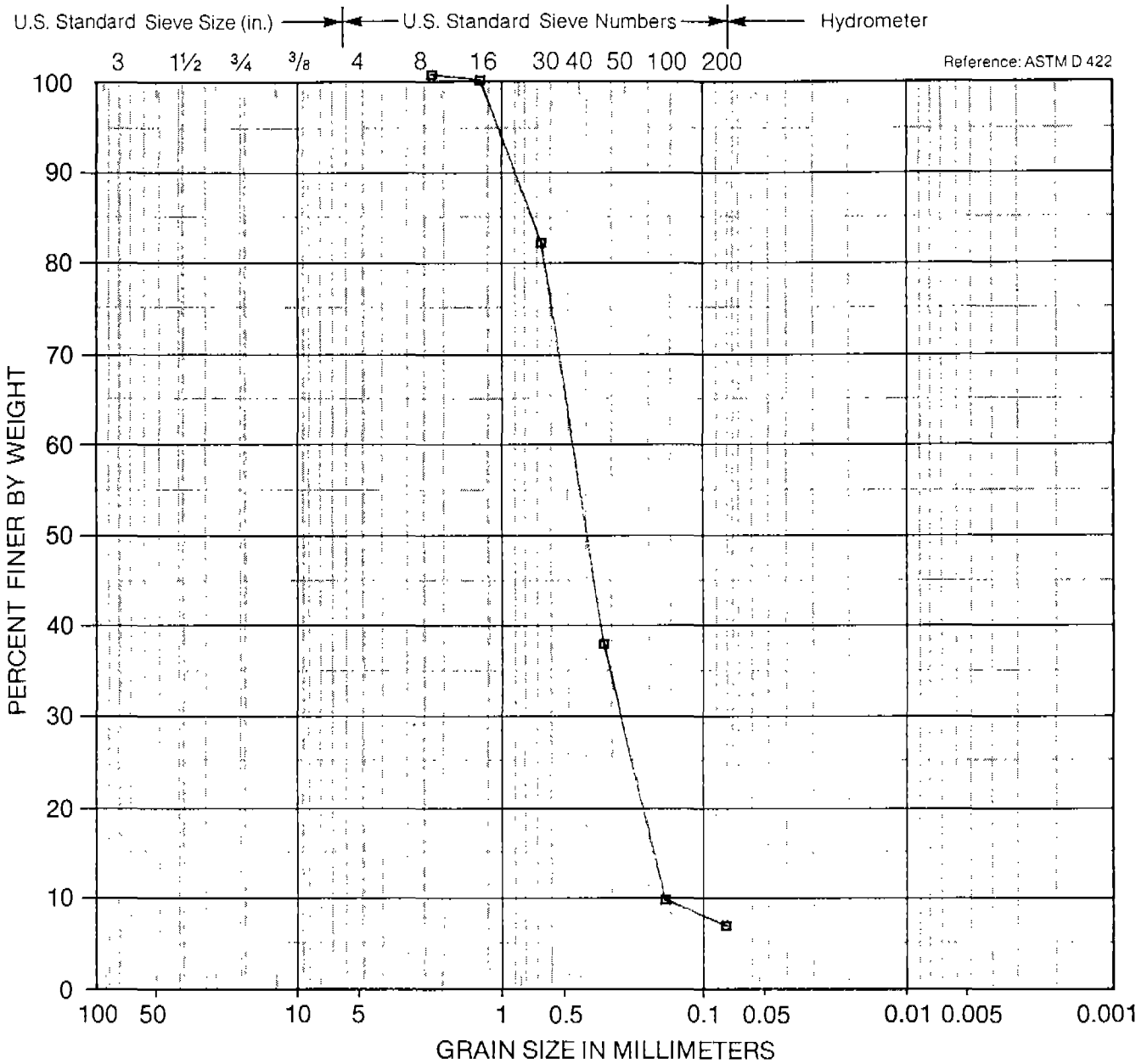
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Station OF-16-05
Basewide Surface Water Outfall Investigation
Remedial Investigation/ Feasibility Study
Fort Ord, California

PLATE
B10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.534.02		04-23-1992		

29058



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
▫	BW-SG-16-5 @ 0.0 FT	DARK BROWN SAND W/CLAY (SP-SC)

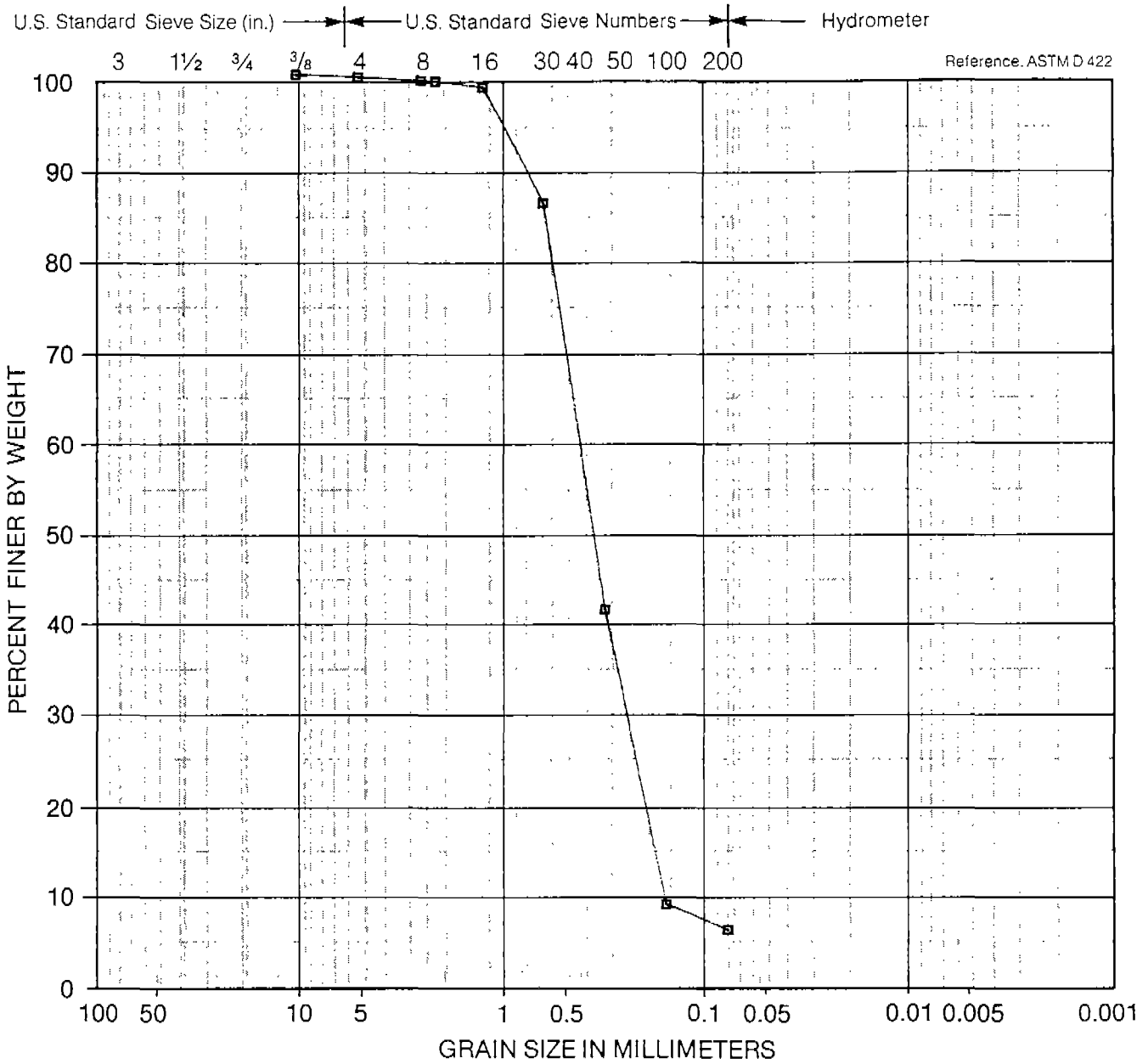
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Station OF-16-05
Basewide Surface Water Outfall Investigation
Remedial Investigation/ Feasibility Study
Fort Ord, California

PLATE
B10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.534.02		04-23-1992		

29059



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
▫	BW-SG-16-6 @ 0.0 FT	DARK BROWN SAND W/CLAY (SP-SC)

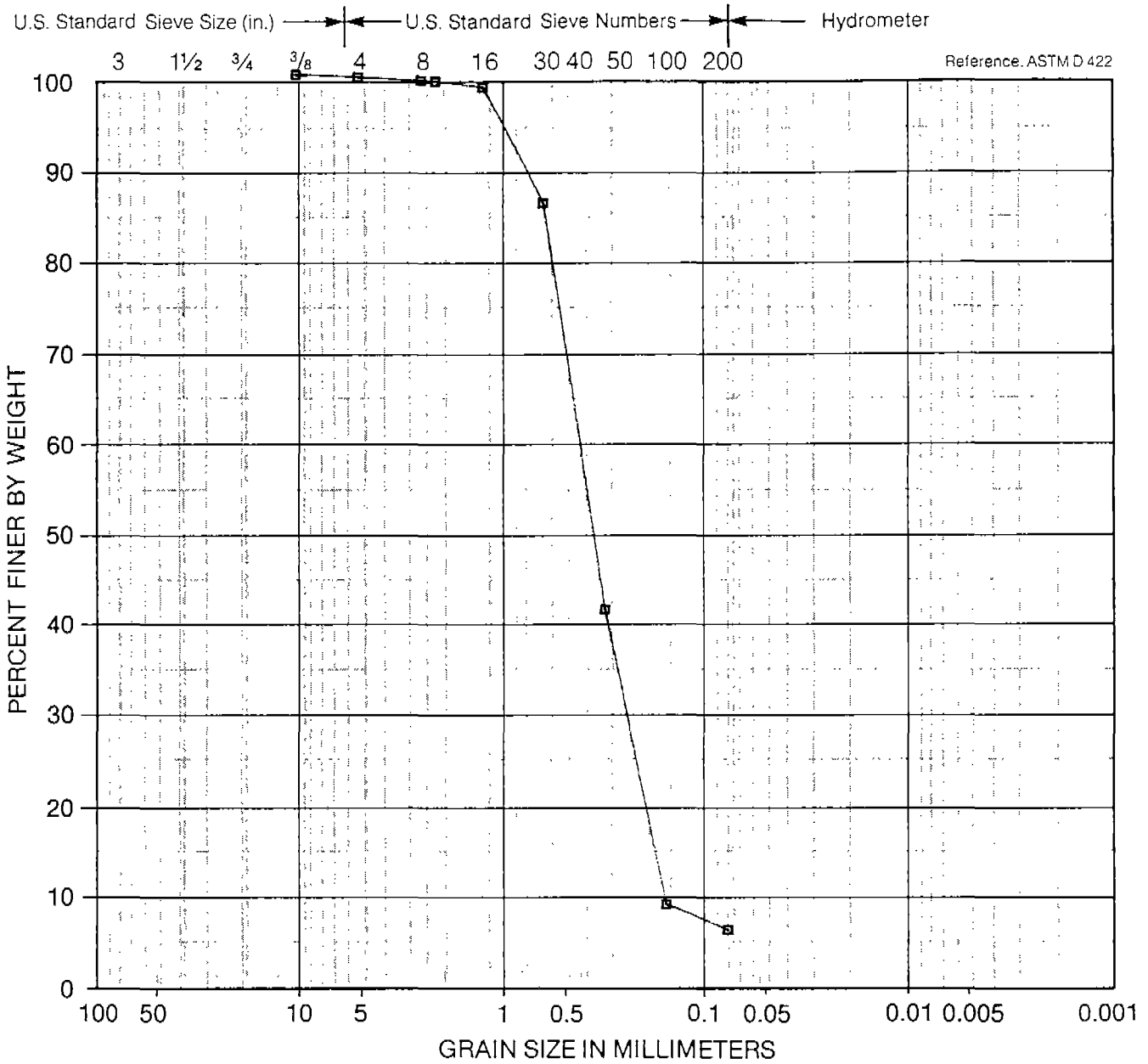
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Station OF-16-06
Basewide Surface Water Outfall Investigation,
Remedial Investigation/ Feasibility Study
Fort Ord, California

PLATE **B11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.534.02	EFL	04-23-1992		

29059



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
▫	BW-SG-16-6 @ 0.0 FT	DARK BROWN SAND W/CLAY (SP-SC)

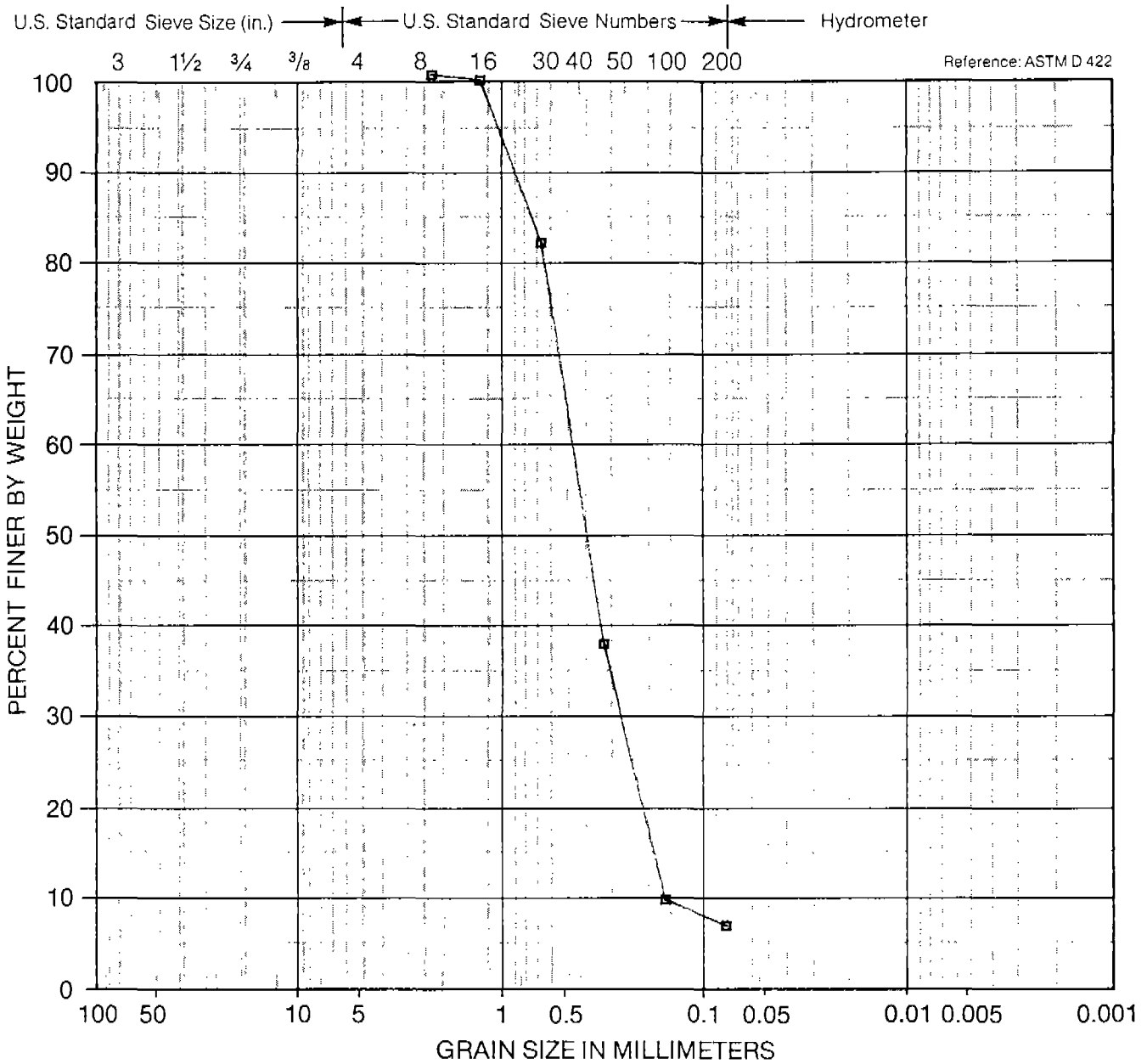
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Station OF-16-06
Basewide Surface Water Outfall Investigation,
Remedial Investigation/ Feasibility Study
Fort Ord, California

PLATE **B11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.534.02	EFL	04-23-1992		

29058



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
▫	BW-SG-16-5 @ 0.0 FT	DARK BROWN SAND W/CLAY (SP-SC)

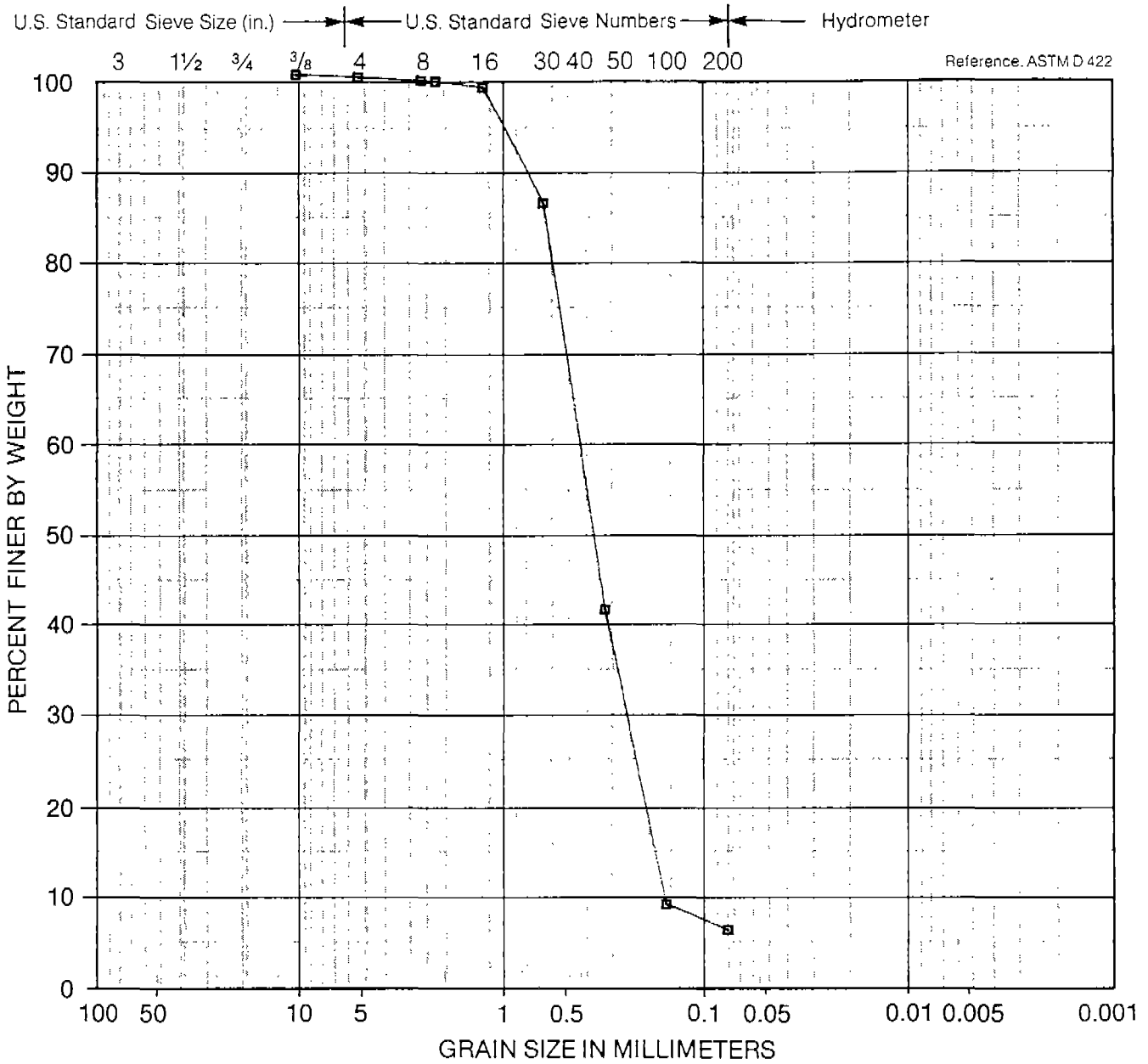
Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Station OF-16-05
Basewide Surface Water Outfall Investigation
Remedial Investigation/ Feasibility Study
Fort Ord, California

PLATE
B10

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.534.02		04-23-1992		

29059



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
▫	BW-SG-16-6 @ 0.0 FT	DARK BROWN SAND W/CLAY (SP-SC)

Harding Lawson Associates
Engineers, Geologists
& Geophysicists

Particle Size Analysis - Station OF-16-06
Basewide Surface Water Outfall Investigation,
Remedial Investigation/ Feasibility Study
Fort Ord, California

PLATE **B11**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	07579.534.02	EFL	04-23-1992		

Site 18[1,2]

[1] Please see Figure 5 for full citation.
[2] Boring logs for Site 18 could not be located. Location map included for reference.

EXPLANATION

SB-18-05 SOIL BORING LOCATION

SB-18 SOIL BORING (JMM)

MW-18-07-180 MONITORING WELL (JMM)

FULLY DEVELOPED

UPLAND RUDERAL

LANDSCAPED

COAST LIVE OAK WOODLAND

N

0 200 400

SCALE IN FEET

If this image is not as legible as this overlay, it's due to the poor quality of the original document

23366056 2004
19940301.15.50

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO	APPROVED	APPROVAL DATE	DRAWN BY
1	7/11/94	DRAFT	23366295	23366 041714			PH
2	12/94	DRAFT FINAL	23366295	23366 041724	[illegible]	11/17/94	PH

Harding Lawson Associates
Engineering and Environmental Services

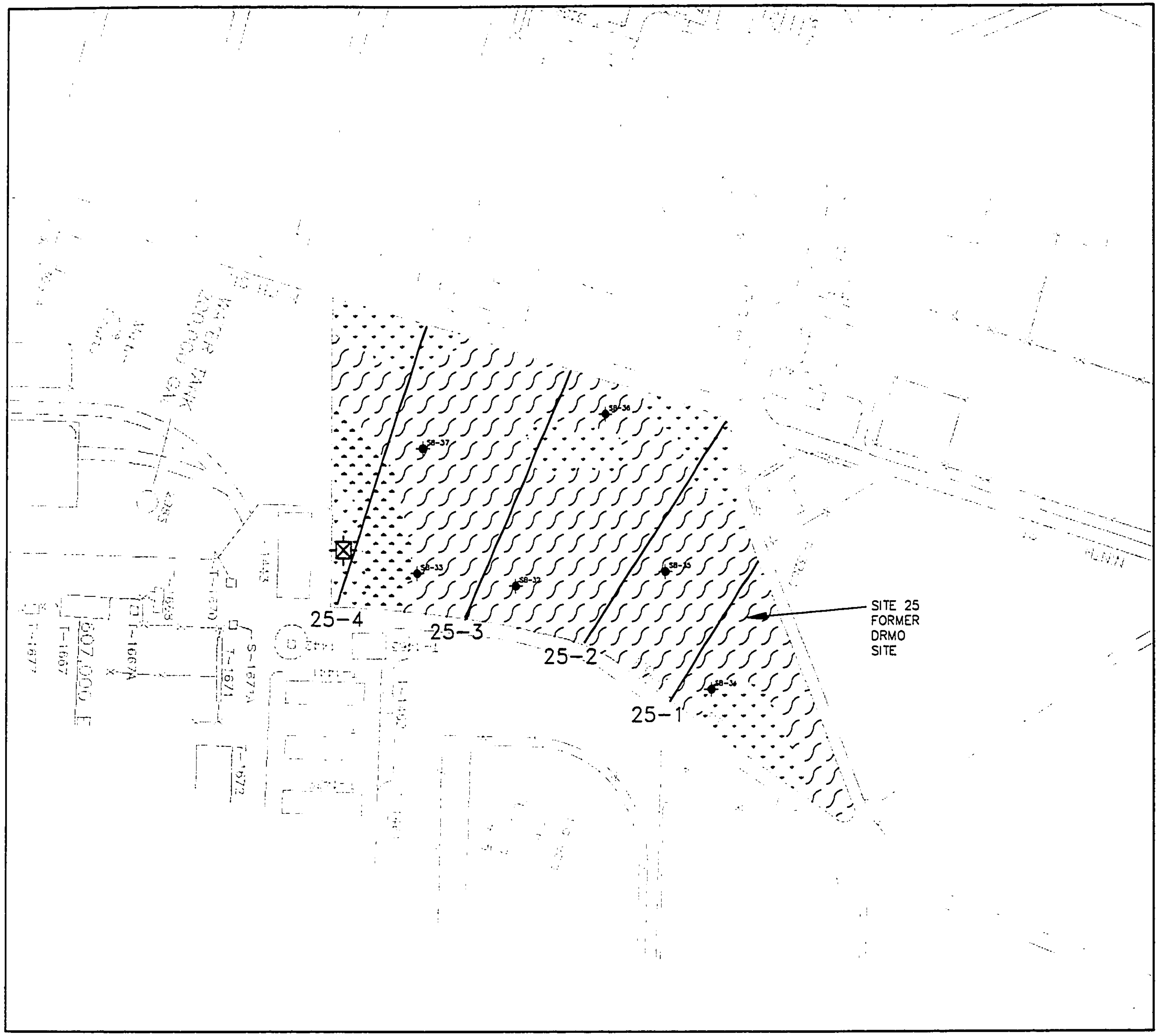
Volume IV – Ecological Risk Assessment
Basewide RI/FS
Fort Ord, California

Plant Communities and Sampling Locations
Site 18 – 1600 Block Facility

PLATE: 3.9

Site 25[1]

[1] Please see Figure 5 for full citation.



EXPLANATION

✦ SB-32 SOIL BORING LOCATION (JMM)

☒ RODENT COLLECTION

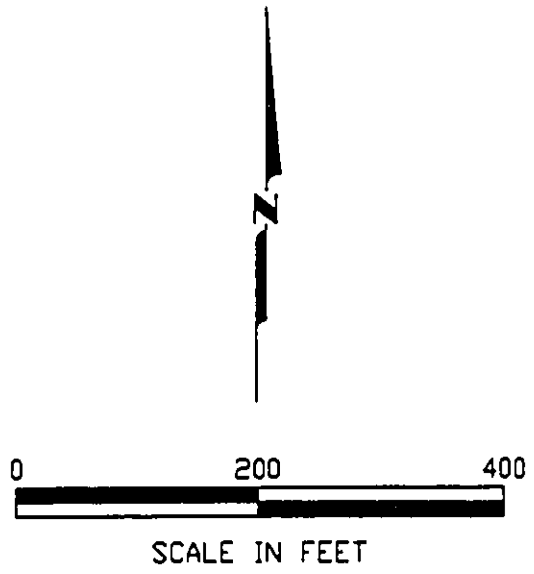
☐ FULLY DEVELOPED/NOT SURVEYED

▨ UPLAND RUDERAL

▨ LANDSCAPED

▨ CENTRAL MARITIME CHAPARRAL

25-1 ——— BIOTA SAMPLING TRANSECT (OAT/ICEPLANT, SOIL, RODENT, LITTER)



If this image is not as legible as this overlay, it's due to the poor quality of the original document

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	7/12/94	DRAFT	23366302	23366 041714			AED
2	12/94	DRAFT FINAL	23366302	23366 041724	MGS	11/17/94	PH

Harding Lawson Associates
Engineering and
Environmental Services

Volume IV - Ecological Risk Assessment
Basewide RI/FS
Fort Ord, California

Plant Communities and Sampling Locations
Site 25 - Former DRMO

PLATE:
4.13

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 12-13-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9350COF	0		
			174F			OLIVE BROWN SILT WITH SAND (ML) (2.5YR 4/4) moist, 15-20% fine sand
			175F			@ 3 feet, brown (10YR 4/3), 39% sand, 12.7% clay
						YELLOWISH BROWN SAND (SP) (10YR 5/4) moist, fine sand
			176F	5		*Bottom of boring at 5.5 feet.*
				10		
				15		
				20		
				25		

OLJ

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-25-01
Basewide Surface Water Investigation
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
A44

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 01834	JM	02/94	

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 12-13-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9350C0F	0		
			177F			GRAVEL, varicolor ,to 0 5' diameter YELLOWISH BROWN SAND (SP) (10YR 5/4) moist to wet, fine sand with trace of gravel
			178F			
			179F	5		BROWN SAND WITH SILT (SP-SM) (10YR 4/3): fine sand, 4% silt, 2% clay *Bottom of boring at 5.5 feet.*
				10		
				15		
				20		
				25		

FTO

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-25-02
Basewide Surface Water Investigation
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
A45

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 01834	JM	02/94	

Site 26[1]

[1] Please see Figure 5 for full citation.

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 12-15-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9350C0F	0		
			180F			DARK YELLOWISH BROWN SILT WITH SAND (ML) (10YR 3/4), dense, dry to moist, silt, 20-25% fine sand
						YELLOWISH BROWN SAND (SP) (10YR 5/4), moist, fine sand
			181F			BROWN SILTY SAND (SM) (10YR 4/3) 10% silt, 4-5% clay
			182F	5		*Bottom of boring at 5.5 feet.*
				10		
				15		
				20		
				25		

FTO

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-26-01
Basewide Surface Water Investigation
Volume II-RI, RI/FS
Fort Ord, California

PLATE
A46

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 01834	JDM	02/94	

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 12-15-93

Blows/foot	Recovery (inches)	OVA Reading (ppm)	Sample Number	Depth (ft.)	Sample	
			9350C0F	0		GRAY SAND (10YR 5/1), moist, fine sand
			183F			DARK YELLOWISH BROWN SILT WITH SAND (ML) (10YR 3/4): dense, dry to moist
						YELLOWISH BROWN SAND (SP) (10YR 5/4): moist, fine sand
			184F			BROWN SILTY SAND (SM) (10YR 4/3), 10% silt, 4% clay
			185F	5		*Bottom of boring at 5.5 feet.*
				10		
				15		
				20		
				25		

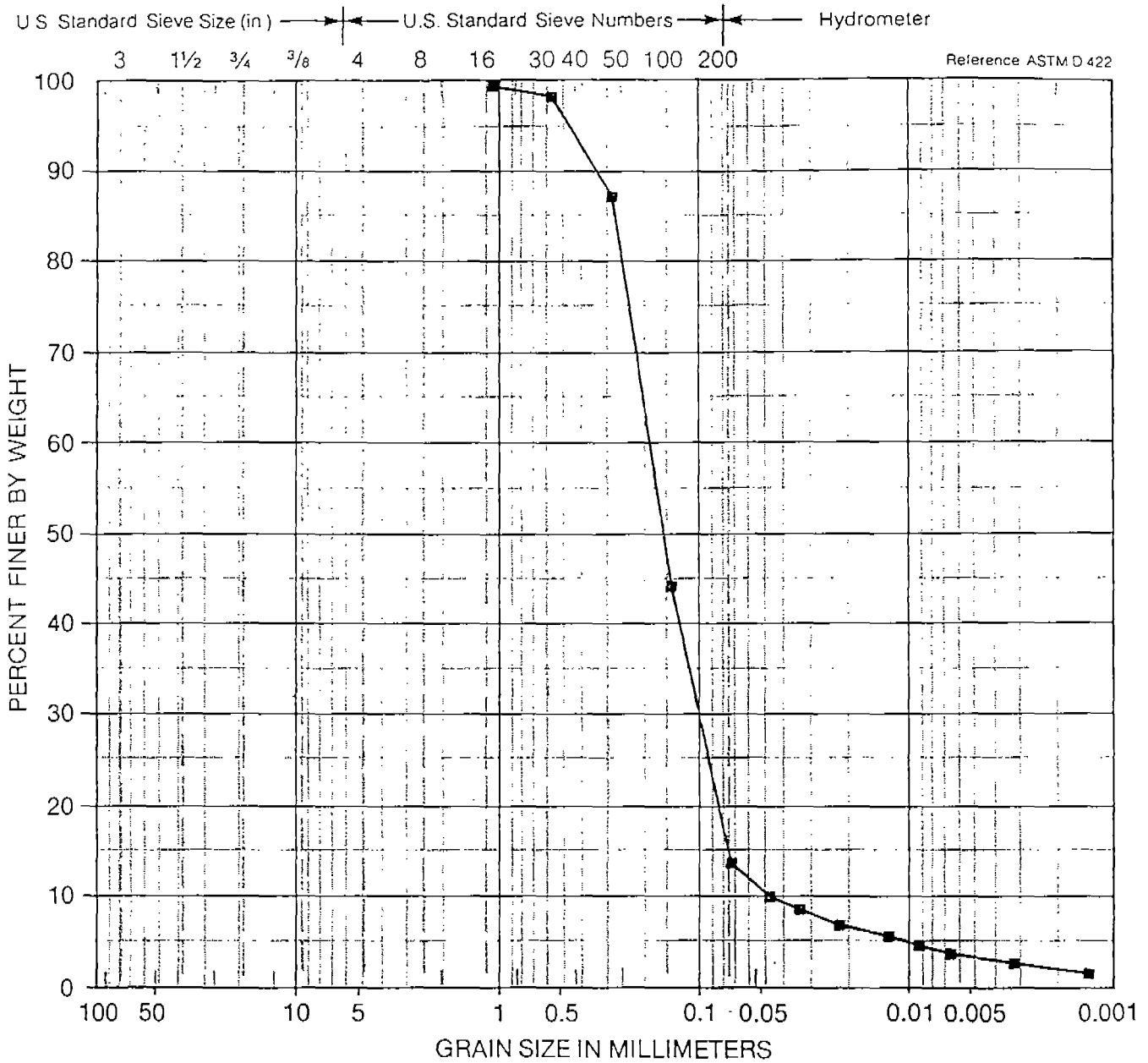
FTO

Harding Lawson Associates
Engineering and
Environmental Services

Log of Boring OF-26-02
Basewide Surface Water Investigation
Volume II-RI, Basewide RI/FS
Fort Ord, California

PLATE
A47

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
BWH	23366 01834	JOM	02/94	



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

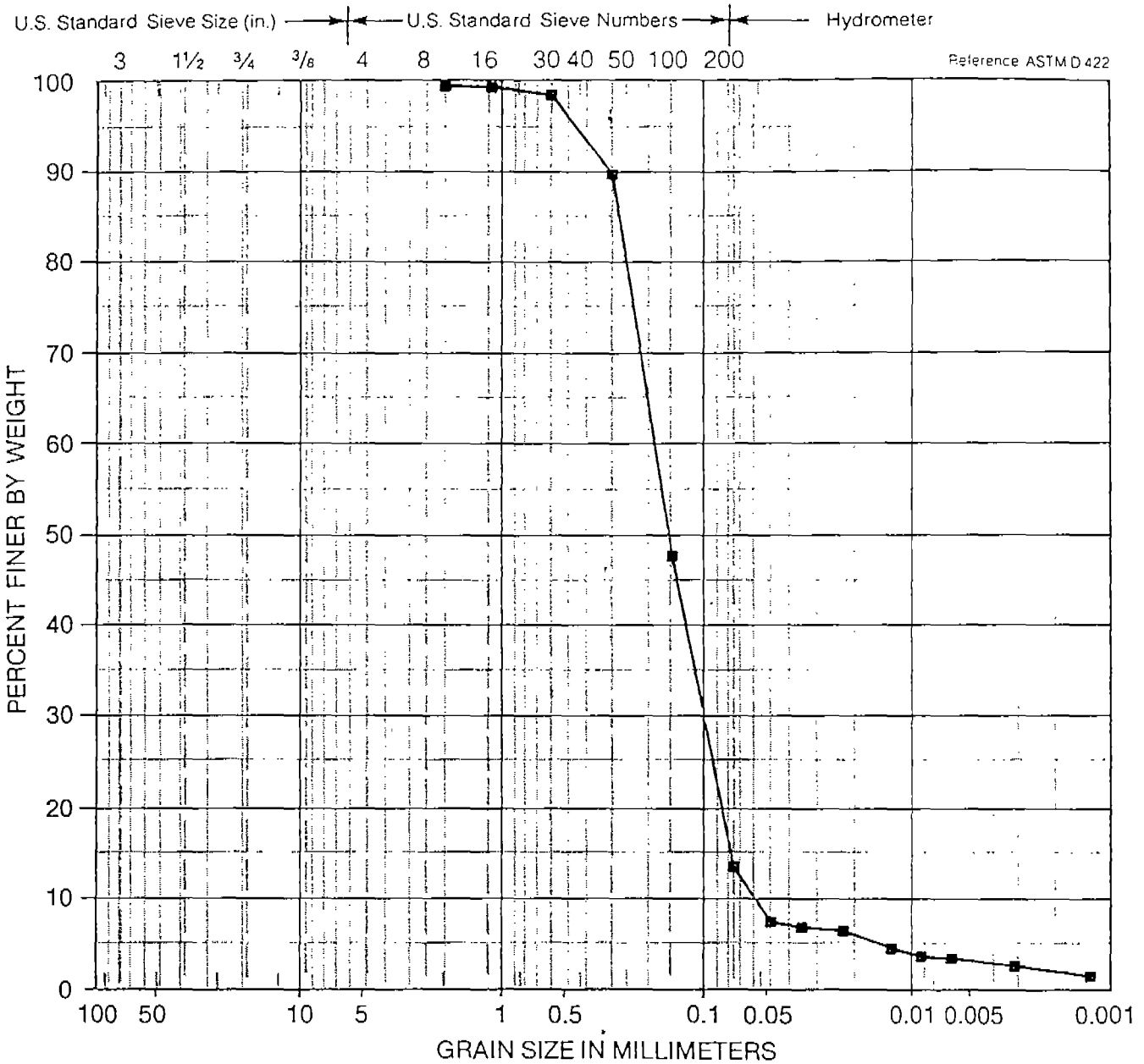
Symbol	Sample Source	Classification
■	0F-26-01 @ 4.0 FT	BROWN SILTY SAND (SM)

Harding Lawson Associates
Engineering and Environmental Services

Particle Size Analysis - Station 0F-26-01
Basewide Surface Water Outfall Investigation
Volume II - Basewide RI/FS
Fort Ord, California

PLATE **B21**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366 041712		12-28-1993		



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

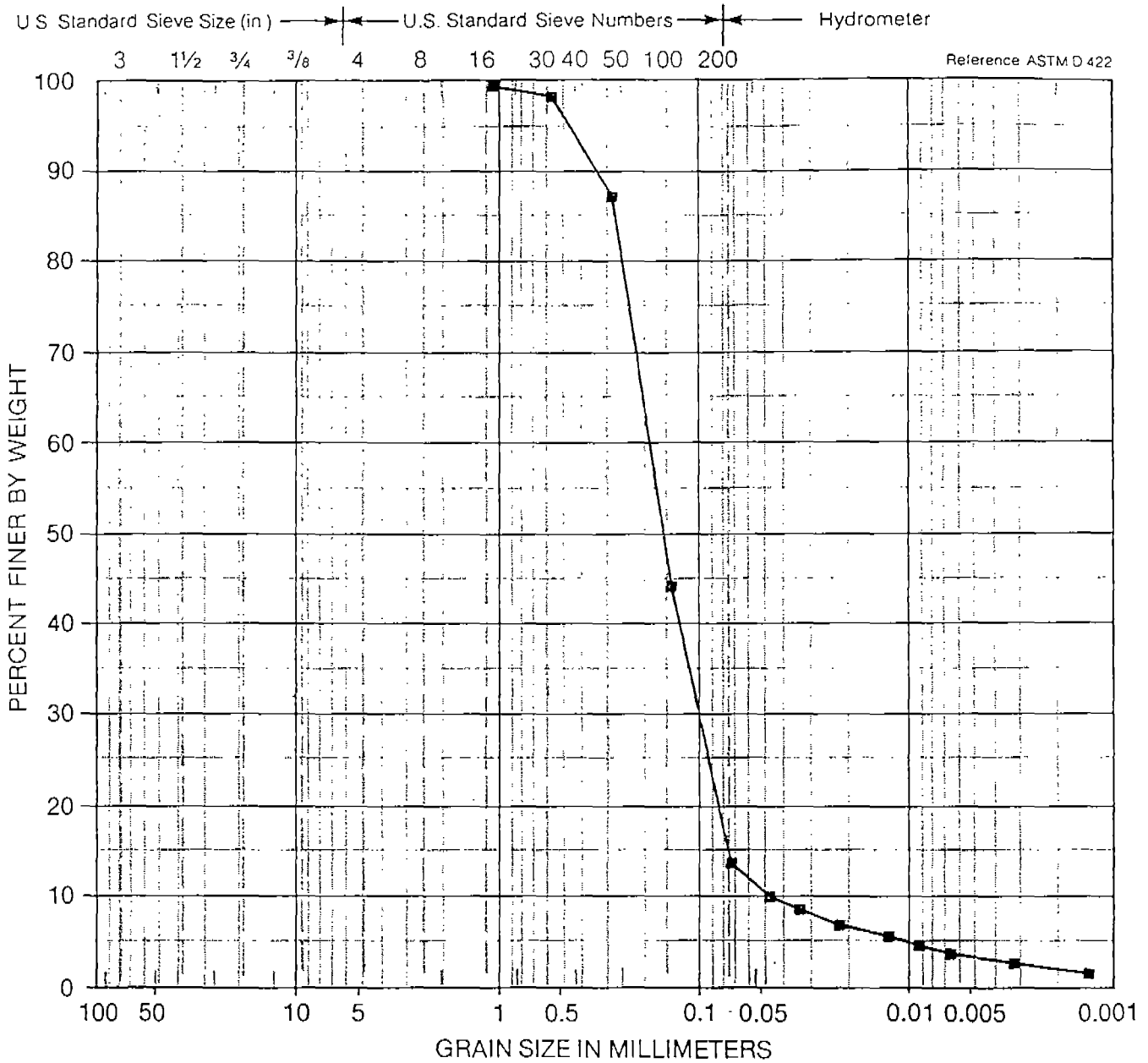
Symbol	Sample Source	Classification
■	0F-26-02 @ 4.0 FT	BROWN SILTY SAND (SM)

Harding Lawson Associates
Engineering and Environmental Services

Particle Size Analysis - Station 0F-26-02
Basewide Surface Water Outfall Investigation
Volume II - Basewide RI/FS
Fort Ord, California

PLATE **B22**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366 041712		12-28-1993		



COBBLES	GRAVEL: COARSE	GRAVEL: FINE	SAND: COARSE	SAND: MEDIUM	SAND: FINE	SILT OR CLAY

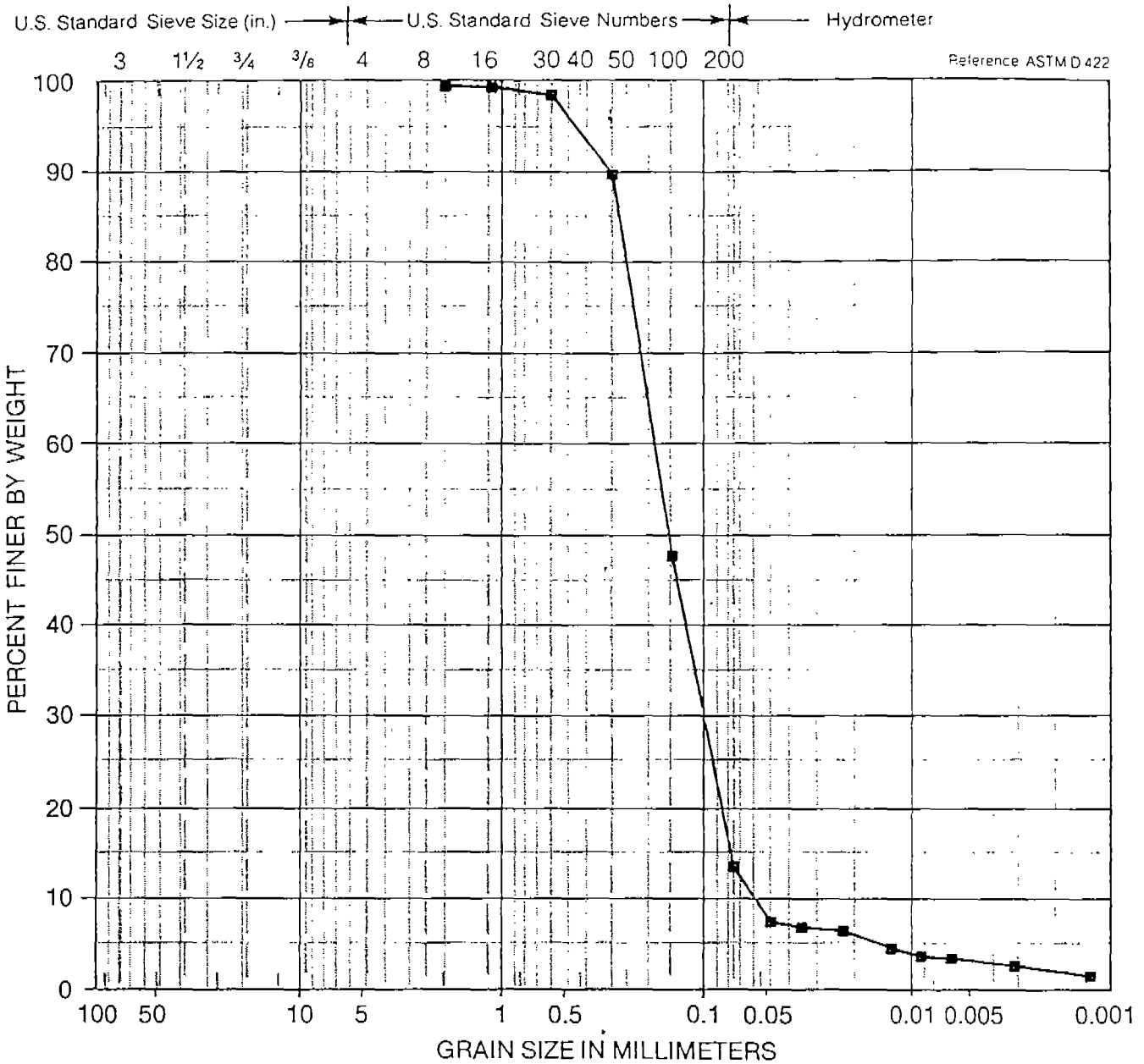
Symbol	Sample Source	Classification
■	0F-26-01 @ 4.0 FT	BROWN SILTY SAND (SM)

Harding Lawson Associates
Engineering and Environmental Services

Particle Size Analysis - Station 0F-26-01
Basewide Surface Water Outfall Investigation
Volume II - Basewide RI/FS
Fort Ord, California

PLATE **B21**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366 041712		12-28-1993		



COBBLES	COARSE	FINE	COARSE	MEDIUM	FINE	SILT OR CLAY
	GRAVEL		SAND			

Symbol	Sample Source	Classification
■	0F-26-02 @ 4.0 FT	BROWN SILTY SAND (SM)

Harding Lawson Associates
Engineering and Environmental Services

Particle Size Analysis - Station 0F-26-02
Basewide Surface Water Outfall Investigation
Volume II - Basewide RI/FS
Fort Ord, California

PLATE **B22**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED	DATE
	23366 041712		12-28-1993		

Site 27[1]

[1] Please see Figure 5 for full citation.

EXPLANATION

SB-27-01 SOIL BORING LOCATION

FULLY DEVELOPED

UPLAND RUDERAL

LANDSCAPED

COAST LIVE OAK WOODLAND

N

0 150 300

SCALE IN FEET

If this image is not as legible as this overlay, it's due to the poor quality of the original document

23366303_150.0
19941031.1552

NO.	DATE	REVISIONS	HLA FILE NO.	PROJECT NO.	APPROVED	APPROVAL DATE	DRAWN BY
1	6/94	DRAFT	23366303	23366 041714			MEK
2	12/94	DRAFT FINAL	23366303	23366 041724	MES	11/17/94	PH

Harding Lawson Associates
Engineering and Environmental Services

Volume IV – Ecological Risk Assessment
Basewide RI/FS
Fort Ord, California

Plant Communities and Sampling Locations
Site 27 – Army Reserve Motor Pool

PLATE: 3.17

31766

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-9-92

Recovery (inches)	OVA Reading (ppm)	Depth (ft.)	Sample	
6	NA	0		LIGHT BROWN SILTY SAND (SM): loose, dry
				@ 1.5': medium dense, moist
6	NA	5		@ 5': brown, as above
				Bottom of boring at 5.5 ft.
				No groundwater encountered
		10		
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring OF-27-01
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A36

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	

31/67

Equipment Hand Auger
3 1/2"-diameter

Elevation _____ Date 3-9-92

Recovery (inches)	OVA Reading (ppm)	Depth (ft.)	Sample	
6	NA	0		BROWN SILTY SAND (SM): loose to medium dense, dry, fine-grained
				@ 3': medium dense, moist
6	NA	5		@ 5': fine- to medium-grained
				Bottom of boring at 5.5 ft. *No groundwater encountered*
		10		
		15		
		20		
		25		

Harding Lawson Associates
Engineering and Environmental Services

Log of Boring OF-27-02
Basewide Surface Water Investigation
Remedial Investigation
Fort Ord, California

PLATE A37

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CEG	07579,534.02	JDM	06/92	

TerraTech 1997[1]

[1] Please see Figure 5 for full citation.

BORING LOG

No. B-1

PROJECT FORA – NORTH SOUTH ROAD | DATE 2/19/97 | LOGGED BY GH

DRILL RIG Mobile B-53 | HOLE DIA. 6" | SAMPLER X = Mod Cal

GROUND WATER DEPTH INITIAL -- -- | FINAL -- -- | HOLE ELEVATION -- --

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
SILTY SAND; medium brown, damp, loose to medium dense, fine grained sand	SM	1										
			S									
		2	X									
			X	10				6		101		
		3										
		4	S									
POORLY GRADED SAND; tan, damp, medium dense, fine grained sand	SP		X									
Passing No. 200 sieve = 4%		5	X	9				6		99		
		6										
		7										
		8										
		9	S									
			X									
		10	X	24								
		11										
		12										
		13										
		14	S									
dense			X									
		15	X	40								
BOTTOM OF BORING @ 15 FEET NO GROUND WATER ENCOUNTERED		16										
		17										
		18										
		19										
		20										

BORING LOG

No. B-2

PROJECT FORA – NORTH SOUTH ROAD | DATE 2/19/97 | LOGGED BY GH

DRILL RIG Mobile B-53 | HOLE DIA. 6" | SAMPLER X = Mod Cal

GROUND WATER DEPTH INITIAL – – | FINAL – – | HOLE ELEVATION – –

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
SILTY SAND; medium brown, damp, loose to medium dense, fine grained sand	SM	1										
			S									
Passing No. 200 sieve = 13%		2	X									
			X	2				8		103		
		3										
		4	S									
POORLY GRADED SAND; tan, damp, medium dense, fine grained sand	SP		X									
		5	X	13				8		104		
		6										
		7										
		8										
		9	S									
			X									
		10	X	27								
		11										
		12										
		13										
		14	S									
medium dense to dense			X									
		15	X	34								
		16										
		17										
		18										
		19	S									
dense			X									
		20	X	41								

BOTTOM OF BORING @ 20 FEET
NO GROUND WATER ENCOUNTERED

BORING LOG

No. B-3

PROJECT FORA – NORTH SOUTH ROAD | DATE 2/19/97 | LOGGED BY GH

DRILL RIG Mobile B-53 | HOLE DIA. 6" | SAMPLER X = Mod Cal

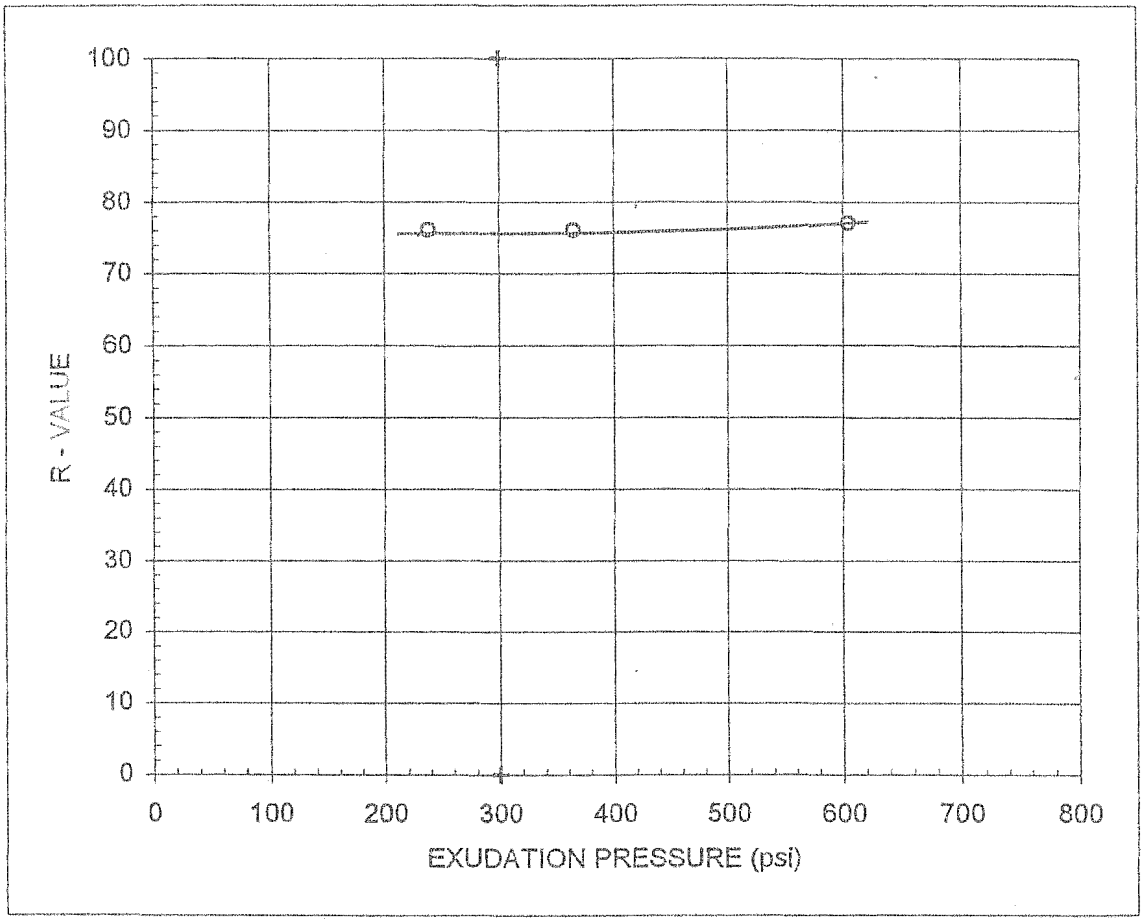
GROUND WATER DEPTH INITIAL -- | FINAL -- | HOLE ELEVATION --

DESCRIPTION	SOIL TYPE	DEPTH	SAMPLE	BLOWS PER FOOT	POCKET PEN (tsf)	TORVANE (tsf)	LIQUID LIMIT	WATER CONTENT	PLASTIC LIMIT	DRY DENSITY (pcf)	FAILURE STRAIN (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)
SILTY SAND; medium brown, damp, loose to medium dense, fine grained sand	SM	1										
			S									
		2	X									
Passing No. 200 sieve = 13%			X	11				10		102		
		3										
		4	S									
			X									
		5	X	16				15		105		
POORLY GRADED SAND; tan, damp, medium dense, fine grained sand	SP	6										
		7										
		8										
		9	S									
			X									
Passing No. 200 sieve = 2%		10	X	27								
		11										
		12										
		13										
		14	S									
			X									
		15	X	23								
BOTTOM OF BORING @ 15 FEET NO GROUND WATER ENCOUNTERED		16										
		17										
		18										
		19										
		20										

R-VALUE REPORT

Terratech, Inc. ASTM D2844 (408) 297-6969

Project:	Fora North South Road	Date:	02/24/97
Client:	Bestor Engineering	Project #:	201014.002
	Attn: Pat Ward	Lab #:	J 10624 - 1
Sample #:	Bulk 1	Sample Date:	02/21/97
Material Description:	silty SAND; gray brown	Sampled By:	C. Liang



Specimen No.	A	B	C
Exudation Pressure, psi	239	366	605
Expansion Pressure, psf	17	17	22
R-Value	76	76	77
Moisture Content at Test, %	12.1	11.7	11.2
Dry Density at Test, pcf	112.4	113	114

R-Value @ 300 psi Exudation Pressure = 76 | Expansion Pressure @300 psi Exudat'n, psf 17

Comments:

Report By: Antonio C. Fuentse, Laboratory Manager

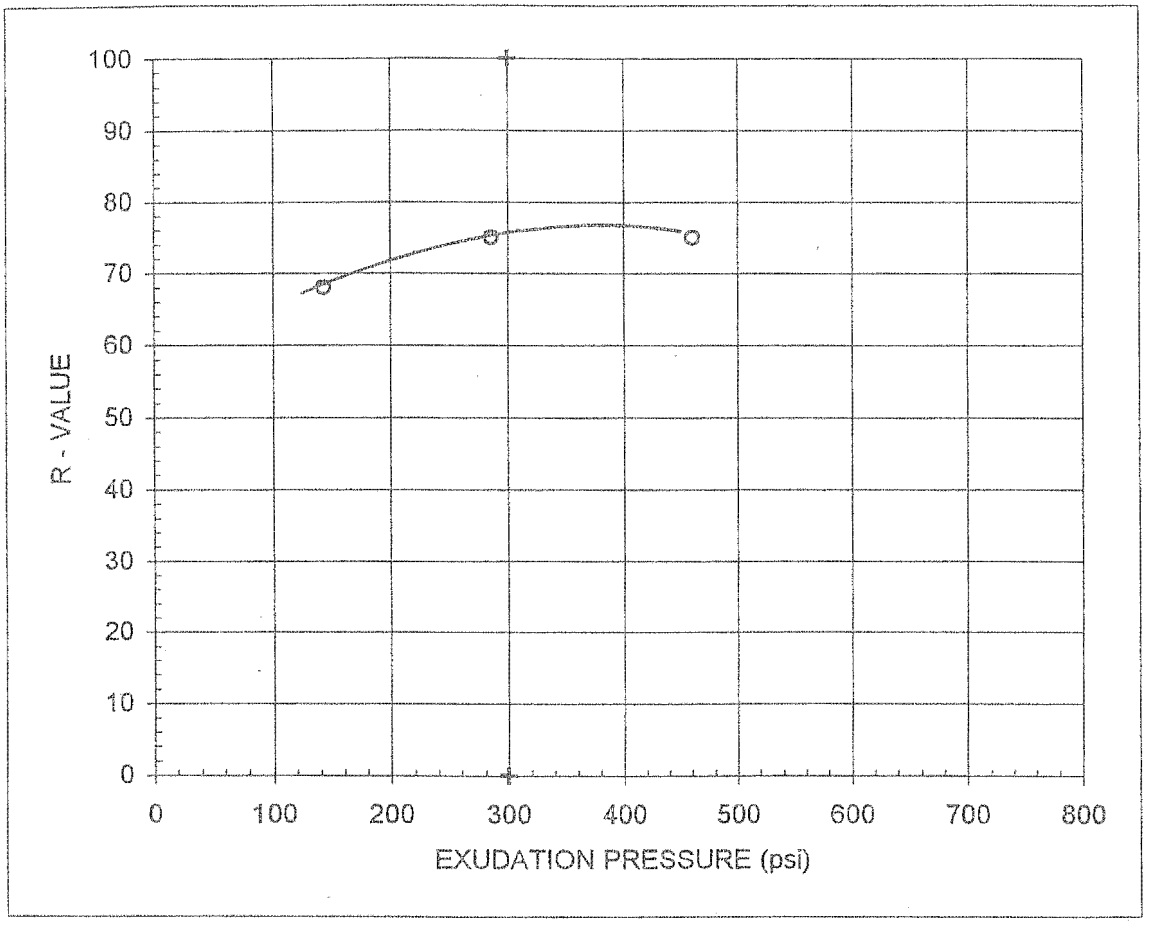
R341 rev.12/04/96

TERRATECH, INC.

R-VALUE REPORT

Terratech, Inc. — ASTM D2844 — (408) 297-6969

Project:	Fora North South Road	Date:	02/24/97
Client:	Bestor Engineering	Project #:	201014.002
	Attn: Pat Ward	Lab #:	J 10624 - 2
Sample #:	Bulk 2	Sample Date:	02/21/97
Material Description:	silty SAND; brown	Sampled By:	C. Liang



Specimen No.	A	B	C
Exudation Pressure, psi	143	286	461
Expansion Pressure, psf	0	4	4
R-Value	68	75	75
Moisture Content at Test, %	13.1	12.2	11.3
Dry Density at Test, pcf	111.5	113	114.2

R-Value @ 300 psi Exudation Pressure = 75

Expansion Pressure @300 psi Exudat'n, psf 4

Comments:

Report By: Antonio C. Fuentse, Laboratory Manager

R34) rev 12/04/96

TERRATECH, INC.

Twining Laboratories 2004[1]

[1] Please see Figure 5 for full citation.

KEY TO SYMBOLS

Symbol	Description
Strata symbols	
	SAND, Silty (SM)
	SAND, Poorly Graded with Silt (SP-SM)
	SAND, Poorly Graded (SP)
	FILL
Misc. Symbols	
	Boring continues
Soil Samplers	
	California Modified split barrel ring sampler

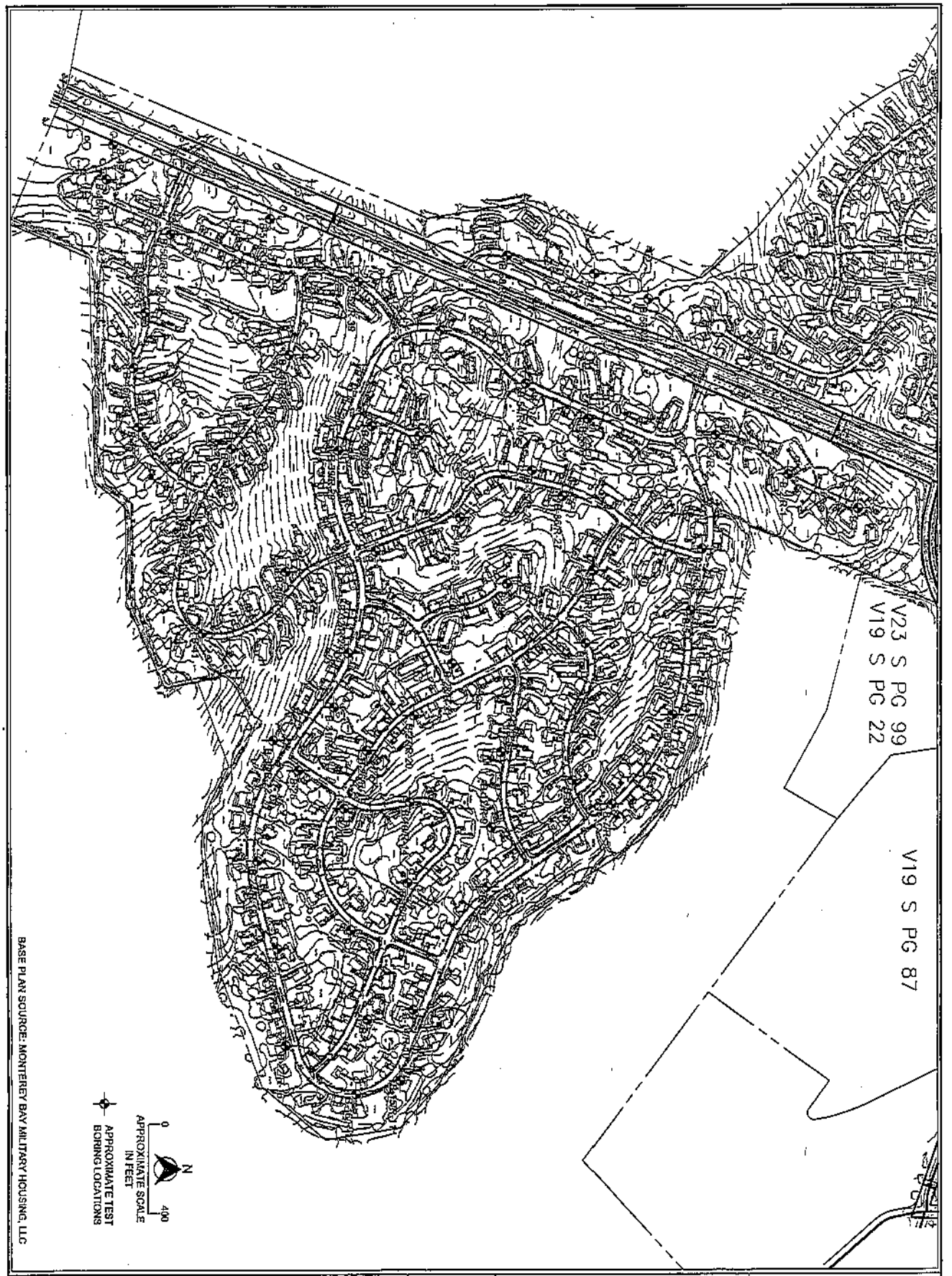
Symbol	Description
	Standard penetration test

Notes:

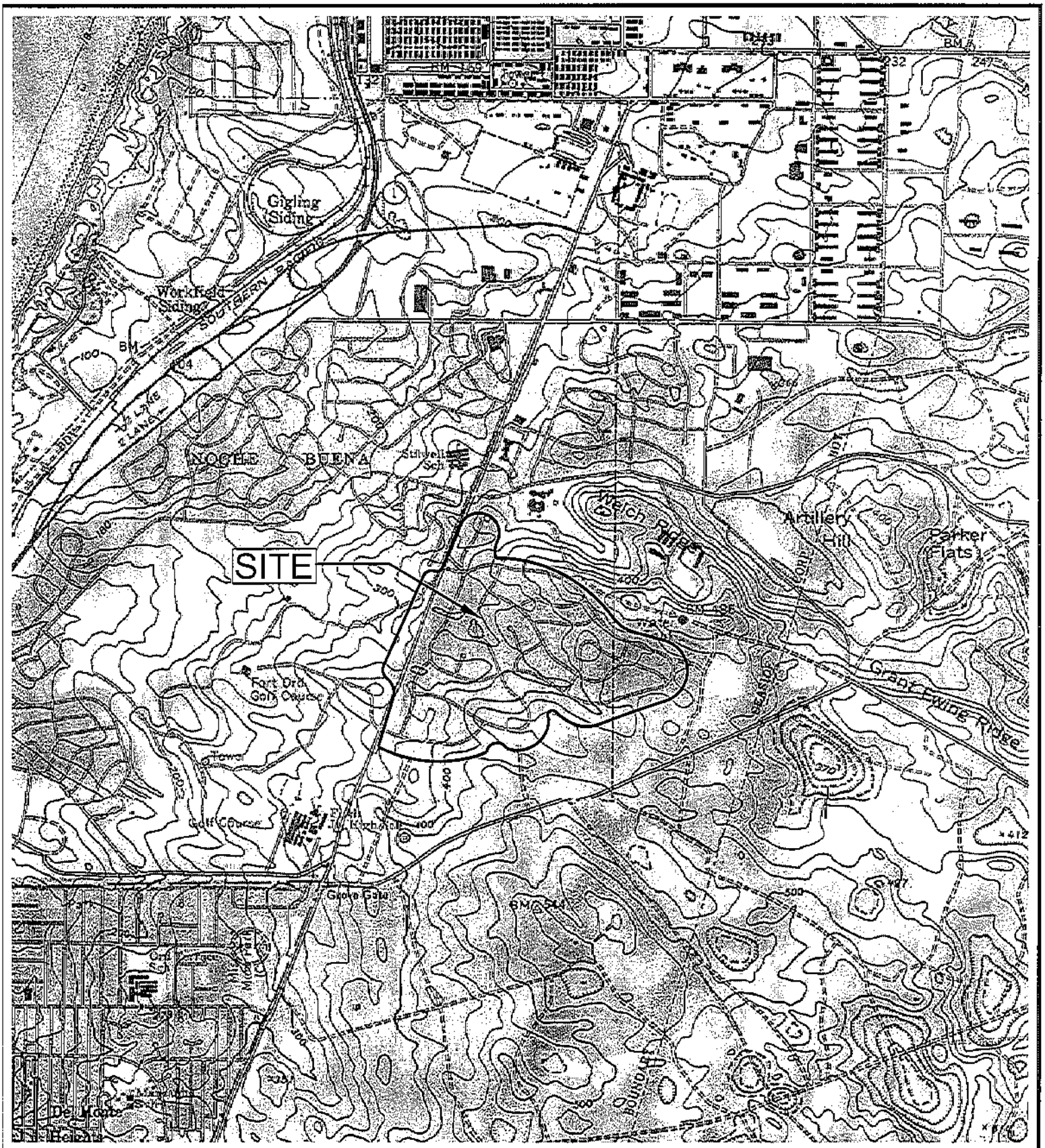
1. Test borings were drilled on 03/09/04 using a CME 75 equipped with 6 5/8 " O.D. Hollow Stem Auger.
2. Groundwater was encountered during drilling operations.
3. Boring locations were located by measuring wheel with reference to assumed southwest corner of the site.
4. These logs are subject to the limitations, conclusions, and recommendations in this report.
5. Results of tests conducted on samples recovered are reported on the logs. Abbreviations used are:

DD = Natural dry density
UC = Unconfined compression (psf)
-4 = Percent passing #4 sieve (%)
-200 = Percent passing #200 sieve (%)
SR = Soil resistivity (ohm-cm)
c = Cohesion (psf)
TS = Field Torvane Shear Strength test (tsf)
ND = None Detected

LL = Liquid limit (%)
PI = Plasticity index (%)
pH = Soil pH
SS = Soluble sulfates (%)
Cl = Soluble chlorides (%)
ϕ = Angle of internal friction (degrees)



TEST BORING AND R-VALUE LOCATION MAP FITCH PARK MILITARY HOUSING MONTEREY COUNTY, CALIFORNIA	FILE NO. 82604-01	DATE DRAWN: 03/18/04	THE TWINING LABORATORIES, INC. EST. 1895 FRESNO/MODESTO/VISALIA/BAKERSFIELD/MONTEREY
	DRAWN BY: WME	APPROVED BY:	
	PROJECT NO. B82604.01	DRAWING NO. 2	



SOURCE: U.S.G.S. TOPOGRAPHIC MAP, 7 ½ MINUTE SERIES
SEASIDE, CALIFORNIA QUADRANGLE, PHOTOREVISED 1983

0 2000
APPROXIMATE SCALE IN FEET

SITE LOCATION MAP
PROPOSED FITCH PARK MILITARY HOUSING
SEASIDE, MONTEREY COUNTY, CALIFORNIA

FILE NO.: 82604-SLM	DATE: 04/02/04
DRAWN BY: WME	APPROVED BY:
PROJECT NO. B82604.01	DRAWING NO. 1

THE TWINING LABORATORIES, INC.
EST. 1898
FRESNO/MODESTO/VISALIA/BAKERSFIELD/MONTEREY

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-1

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/03/04

Logged By: D. Ledgerwood

Elevation: 343 Feet

Drilled By: S. Riley

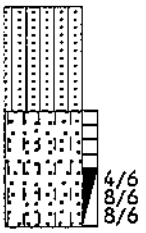
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0		SM	AC = 3.75 inches Base = 5 inches			
340			SAND, Silty; medium dense, damp, fine to medium, light brown			
5		SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine, yellowish-brown	DD = 99 pcf	--	4
					16	5
335			Bottom of Boring at 6.5 Feet			
10						
330						
15						
325						
20						
320						
25						
315						
30						

Notes:

Figure Number B-1

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-2

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/03/04

Logged By: D. Ledgerwood

Elevation: 336 Feet

Drilled By: S. Riley

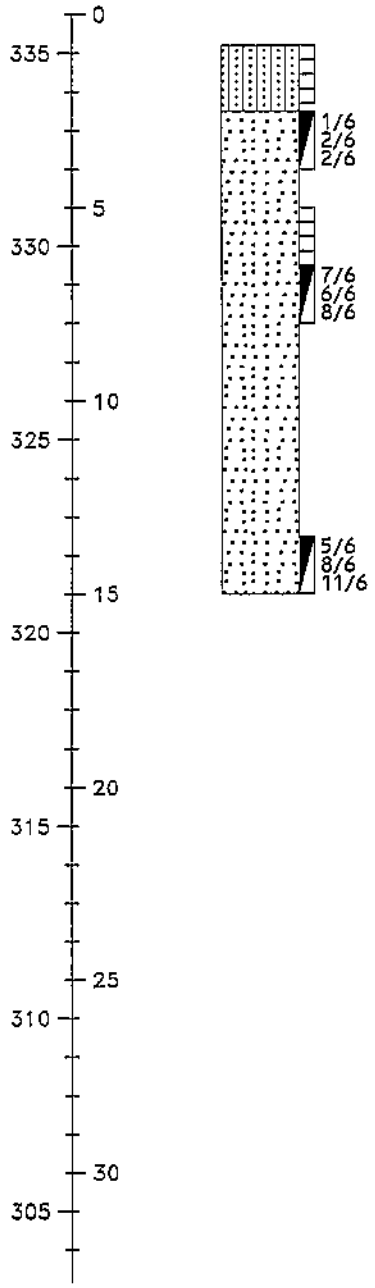
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			AC = 3.75 inches			
		SM	Base = 5 inches	DD = 109 pcf Φ = 30° C = 349 psf	--	6
		SP	SAND, Silty; loose, damp, fine, dark-brown			
	1/6 2/6 2/6		SAND, Poorly Graded; loose, damp, fine, brown		4	6
5			At 4 Feet - Medium dense, light-brown	DD = 104 pcf	--	7
330	7/6 6/6 8/6		Light reddish-brown		14	8
10						
325			Yellowish-brown			
	5/6 8/6 11/6				19	6
15			Bottom of Boring at 15 Feet			
320						
20						
315						
25						
310						
30						
305						

Notes:

Figure Number B-2

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-3

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/03/04

Logged By: D. Ledgerwood

Elevation: 351 Feet

Drilled By: S. Riley

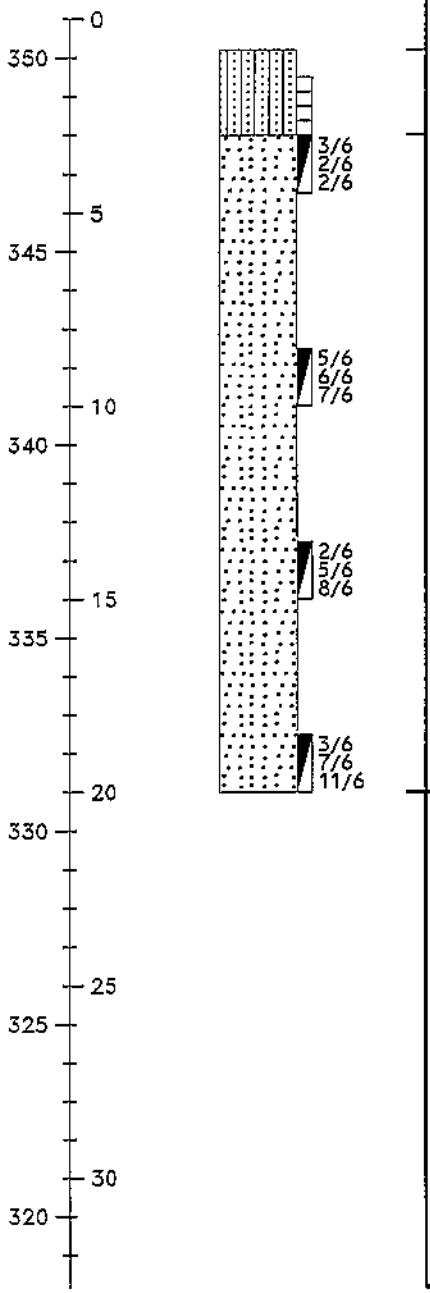
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 3.75 inches BAse = 5 inches	DD = 106 pcf	--	4
		SP	SAND, Silty; loose, damp, fine to medium, dark-brown to brown		4	3
			SAND, Poorly Graded; loose damp, fine, light-brown			
			Medium dense, yellowish-brown		13	4
					13	4
			Dry, fine to medium		18	2
			Bottom of Boring at 20 Feet			

Notes:

Figure Number B-3

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-4

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/03/04

Logged By: D. Ledgerwood

Elevation: 378 Feet

Drilled By: S. Riley

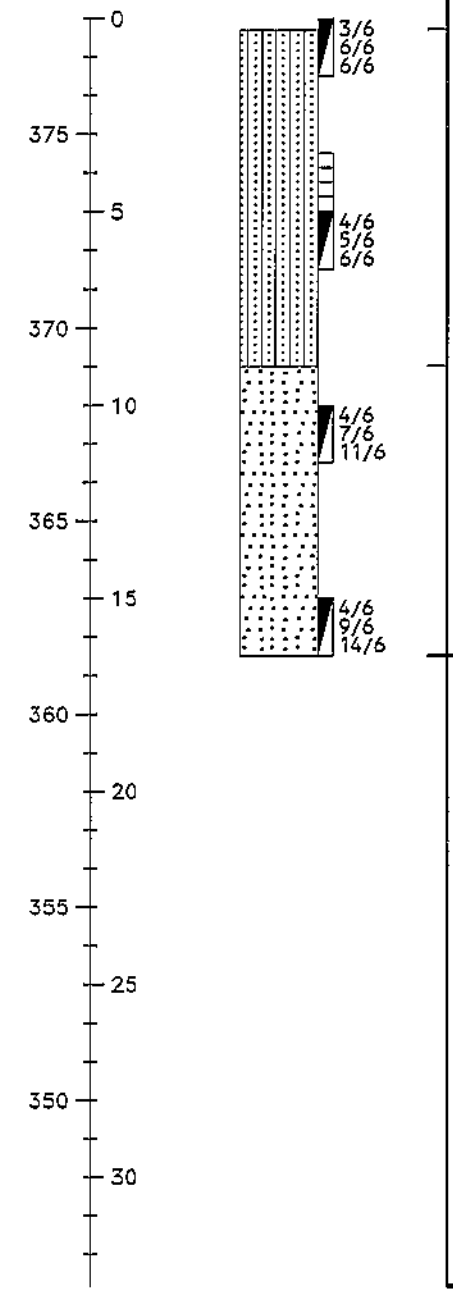
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			Grass with fine roots			
		SM	SAND, Silty; medium dense, damp to moist, fine, light-brown		12	8
			At 3 Feet – Light reddish-brown	DD = 99 pcf -200 = 12%	--	9
					11	8
		SP	SAND, Poorly Graded; medium dense, damp, fine to medium, light-brown		18	4
					23	4
			Bottom of Boring at 16.5 Feet			

Notes:

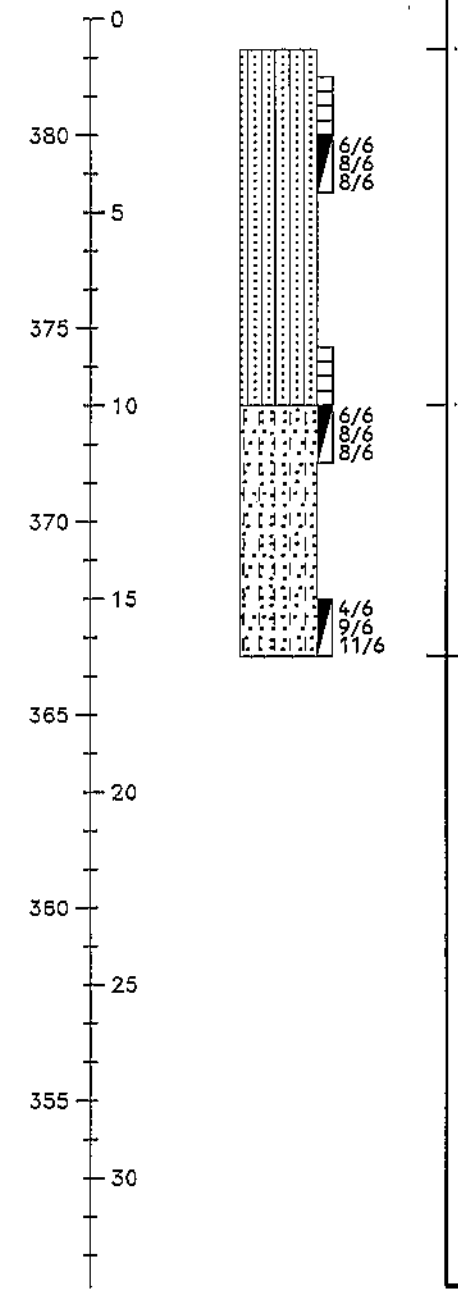
Figure Number B-4

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-5

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/03/04
Logged By: D. Ledgerwood
Elevation: 383 Feet
Drilled By: S. Riley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 4 inches Base = 5 inches	DD = 109 pcf	--	4
			SAND, Silty; medium dense, damp, fine, brown		16	5
			Moist, fine to medium, trace clay, reddish-brown	DD = 102 pcf	--	9
		SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine to medium, yellowish-brown		16	5
			Light-brown		20	5
			Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-5

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-6

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/03/04

Logged By: D. Ledgerwood

Elevation: 422 Feet

Drilled By: S. Riley

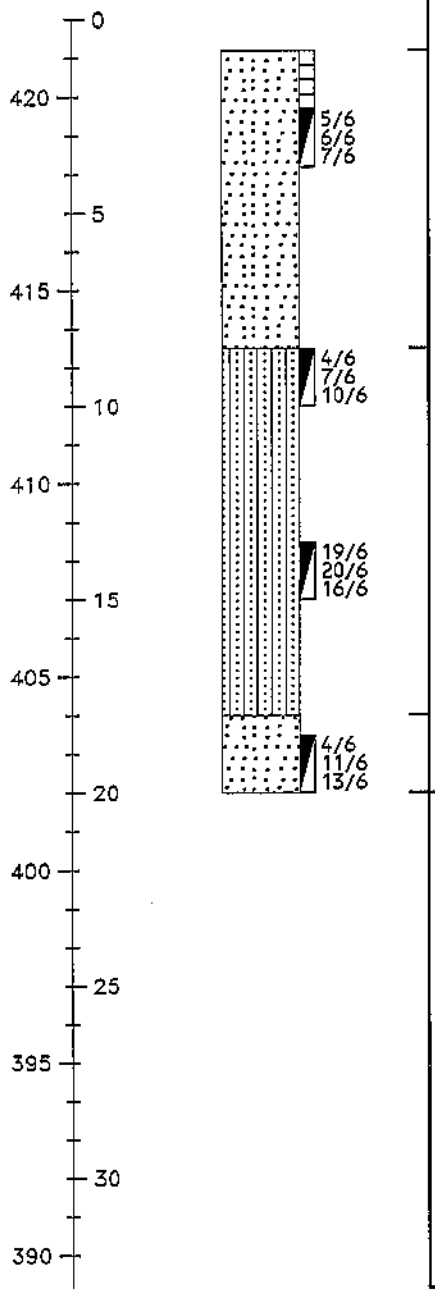
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SP	AC = 4 inches BAse – 5 inches	DD = 104 pcf	--	3
			SAND, Poorly Graded; medium dense, damp, fine to medium, yellowish-brown		13	5
		SM	SAND, Silty; medium dense, moist, fine, yellowish-brown		17	9
			Dense, increase in silt, grayish-brown		36	7
		SP	SAND, Poorly Graded; medium dense, damp, fine to medium with interbedded silty sand with trace clay, light-brown		24	5
			Bottom of Boring at 20 Feet			

Notes:

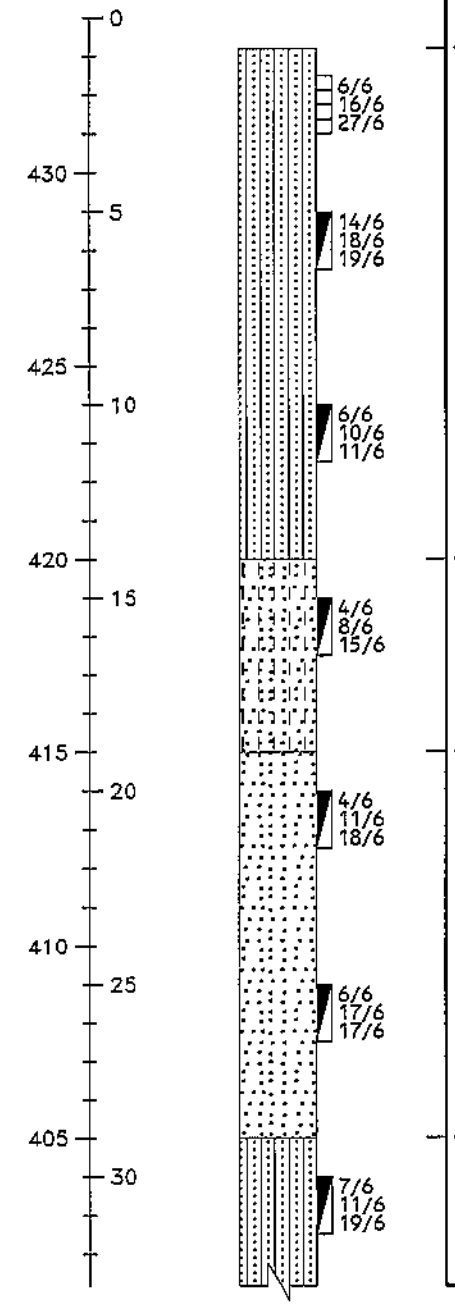
Figure Number B-6

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-7

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/04/04
Logged By: D. Ledgerwood
Elevation: 434 Feet
Drilled By: S. Riley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			AC = 3.5 inches			
		SM	Base = 6 inches	DD = 113 pcf		6
			SAND, Silty; damp, fine, brown		43	
			Dry, increase in silt, fine			
					37	2
			Medium dense, decrease in percent silt, slightly cemented		21	3
		SP-SM	SAND, Poorly Graded with Silt; medium dense, dry, fine, yellowish-brown		23	2
		SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		29	3
					34	3
		SM	SAND, Silty; medium dense, moist, fine to medium, trace fine subrounded gravel		30	10

Notes:

Figure Number B-7

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-7

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/04/04

Logged By: D. Ledgerwood

Elevation: 434 Feet

Drilled By: S. Riley

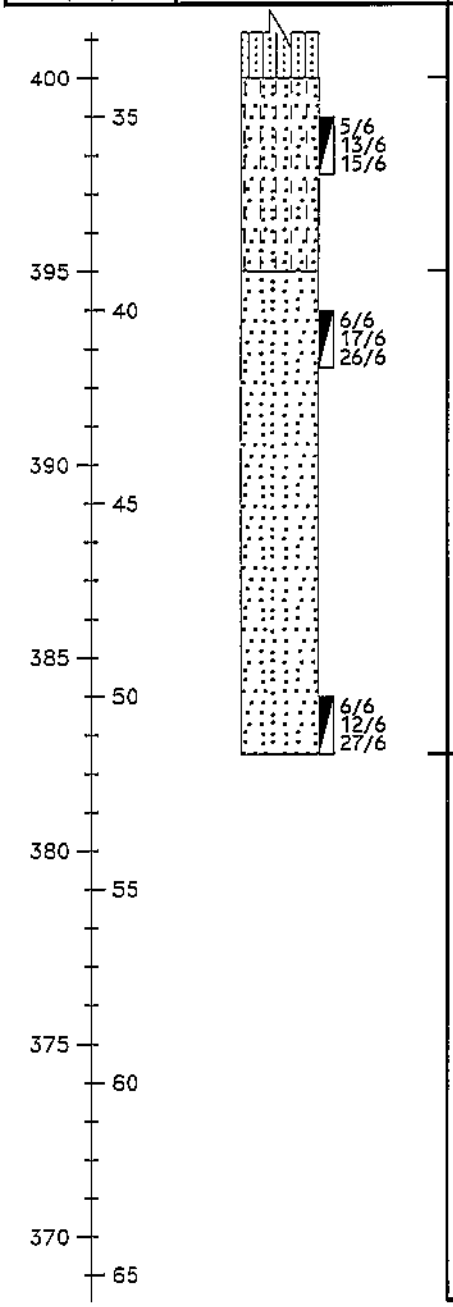
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine to medium, light-brown		28	5
SP	SAND, Poorly Graded; dense, damp, fine to medium, yellowish-brown		43	4
	Moist, fine, yellowish-brown		39	7
	Bottom of Boring at 51.5 Feet			

Notes:

Figure Number B-7

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-8

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/04/04

Logged By: D. Ledgerwood

Elevation: 410 Feet

Drilled By: S. Riley

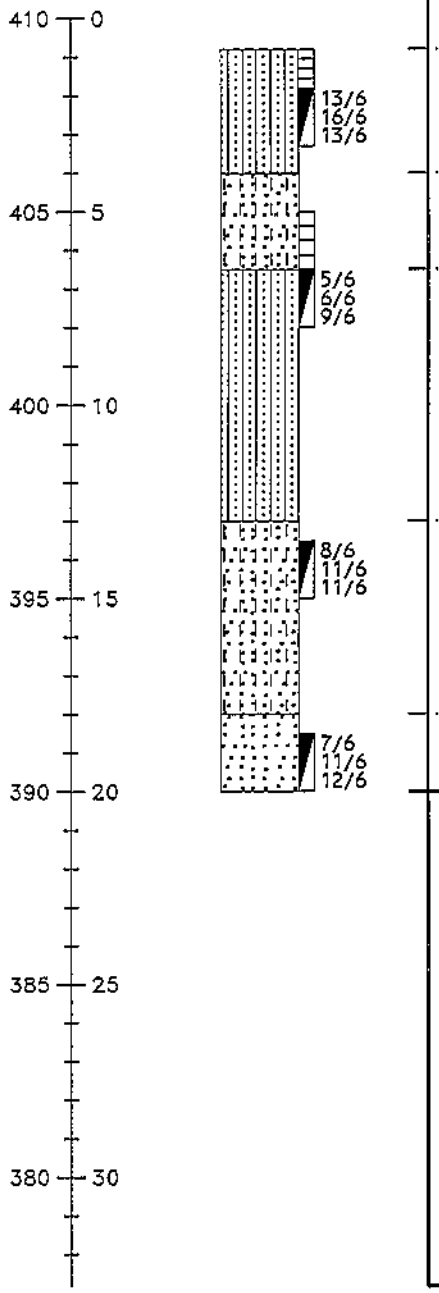
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 4 inches Base = 5 inches	DD = 113 pcf	--	6
			SAND, Silty; medium dense, damp, fine to medium, trace fine subrounded gravel, brown		29	5
		SP-SM	At 1.8 Feet - No gravel, trace silt	DD = 103 pcf	--	7
		SM	SAND, Poorly Graded with silt; medium dense, moist, fine to medium, light-brown		15	9
			SAND, Silty; medium dense, moist, fine to medium, yellowish-brown to brown			
		SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine to medium, light-brown		22	7
		SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		23	5
			Bottom of Boring at 20 Feet			

Notes:

Figure Number B-8

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-9

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/04/04

Logged By: D. Ledgerwood

Elevation: 368 Feet

Drilled By: S. Riley

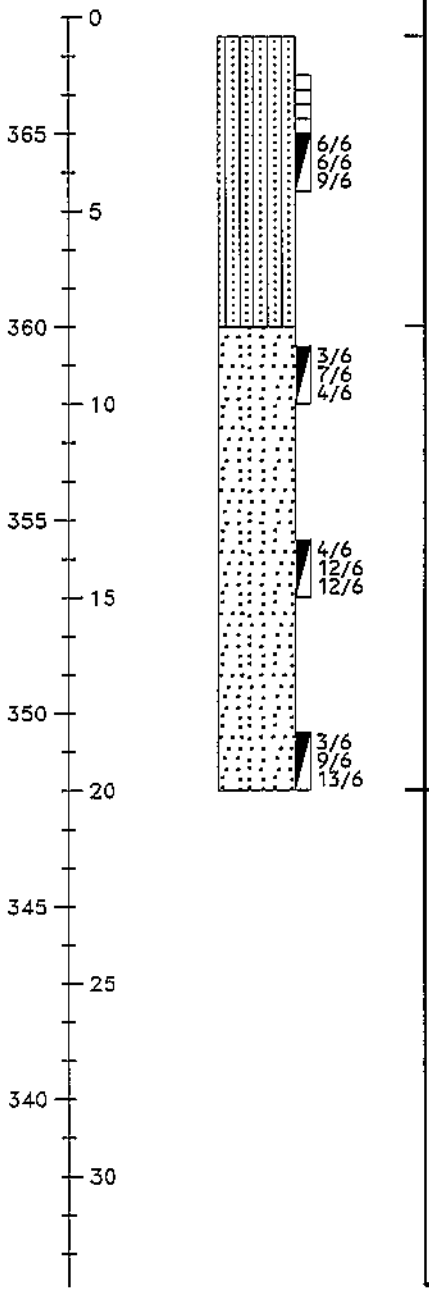
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 3.5 inches Base = 2.5 inches			
			SAND, Silty; medium dense, moist, fine to medium, yellowish-brown At 3 Feet = Dark yellowish-brown	DD = 106 pcf	--	8
					15	10
		SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		11	5
					24	3
			Fine to medium		27	4
			Bottom of boring at 20 Feet			

Notes:

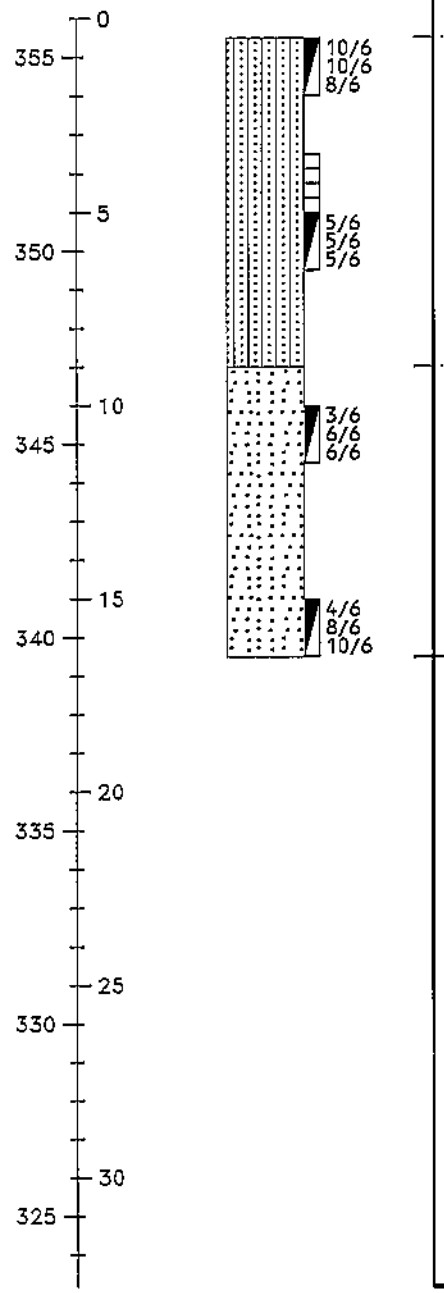
Figure Number B-9

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-10

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/04/04
Logged By: D. Ledgerwood
Elevation: 356 Feet
Drilled By: S. Riley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 3 inches Base = 3 inches			
			SAND, Silty; medium dense, damp, fine, brown At 3 Feet – Loose, moist	DD = 103 pcf	18 --	6 6
			At 5 Feet – Moist, trace clay, reddish-brown		10	11
		SP	SAND, Poorly Graded; medium dense, damp, fine to medium, light yellowish-brown		12	5
					18	5
			Bottom of Boring at 16.5 Feet			

Notes:

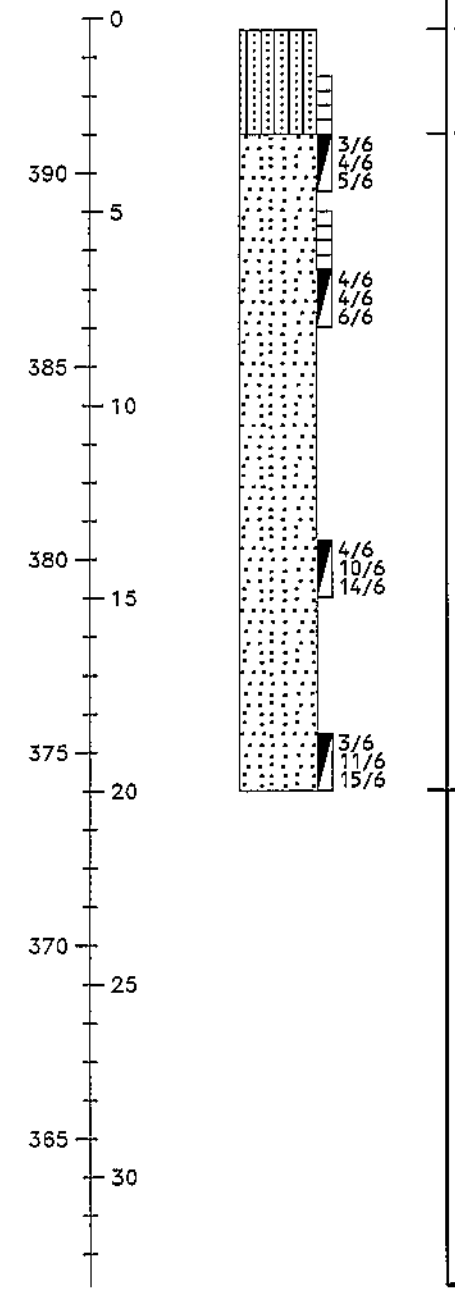
Figure Number B-10

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-11

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/04/04
Logged By: D. Ledgerwood
Elevation: 394 Feet
Drilled By: S. Riley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 8" O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	Grass with top soils, fine roots			
			SAND, Silty; loose, moist, fine to medium, brown	DD = 110 pcf	--	10
		SP	SAND, Poorly Graded; loose, moist, fine to medium, yellowish-brown		9	9
				DD = 101 pcf	--	9
					10	11
			Medium dense, damp, slight decrease in grain size		24	4
					26	4
			Bottom of Boring at 20 Feet			

Notes:

Figure Number B-11

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-12

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

Date: 03/08/04

Elevation: 415 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
415 — 0	3/6 3/6 4/6	SM	SAND, Silty; loose, moist, fine, dark-brown Brown to light brown	DD = 110 pcf	--	11
					7	10
410 — 5						
405 — 10	5/6 8/6 7/6	SP	SAND, Poorly Graded; medium dense, dry to damp, fine, yellowish-brown		15	3
400 — 15	5/6 12/6 14/6				26	2
395 — 20	5/6 11/6 15/6				26	3
			Bottom of Boring at 20 Feet			
390 — 25						
385 — 30						

Notes:

Figure Number B-12

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-13

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/04/04

Logged By: D. Ledgerwood

Elevation: 423 Feet

Drilled By: S. Riley

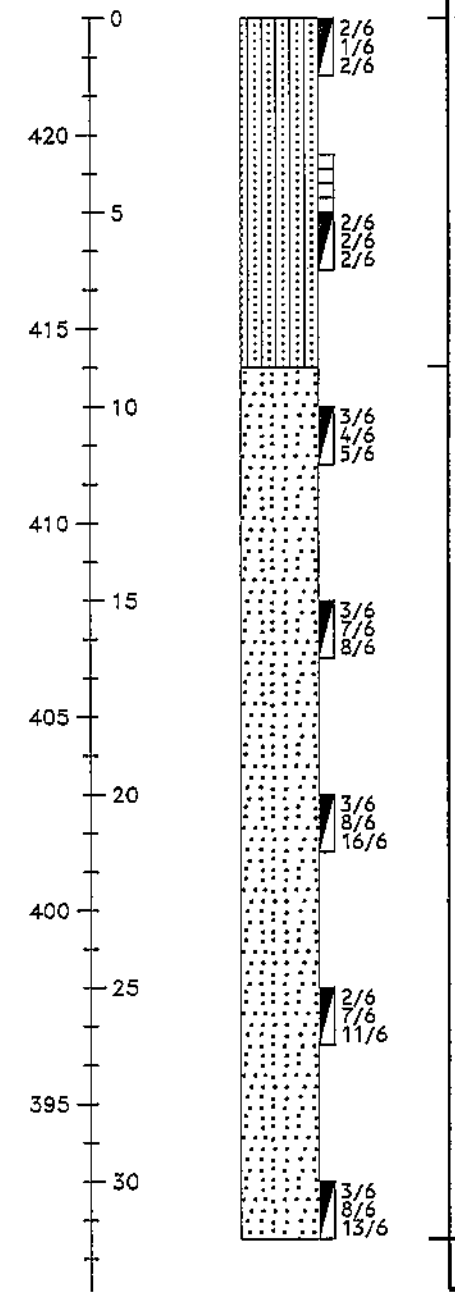
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; very loose, moist, fine, dark-brown		3	7
		DD = 94 pcf	--	9
	Brown		4	8
SP	SAND, Poorly Graded, loose, damp, fine, yellowish-brown		9	3
	Medium dense		15	4
	Increase in percent fine sand		24	4
			18	4
			21	4
	Bottom of Boring at 31.5 Feet			

Notes:

Figure Number B-13

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-14

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

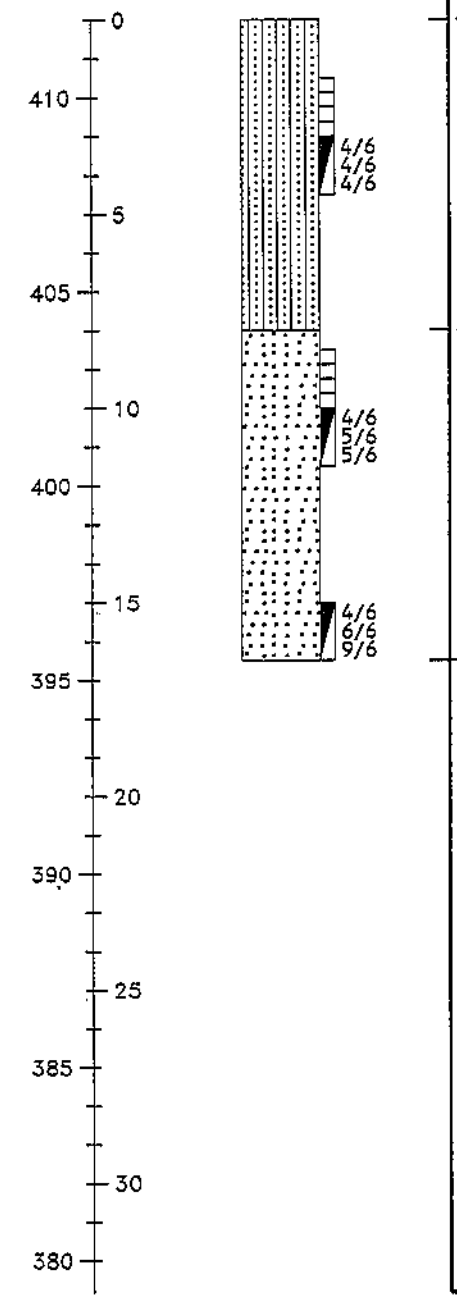
Date: 03/04/04

Elevation: 412 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; loose, moist, fine, dark-brown	DD = 106 pcf	--	10
	Brown		8	8
SP	SAND, Poorly Graded; loose, moist, fine, yellowish-brown	DD = 97 pcf	--	7
	Damp		10	5
	Medium dense		15	5
	Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-14

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-15

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

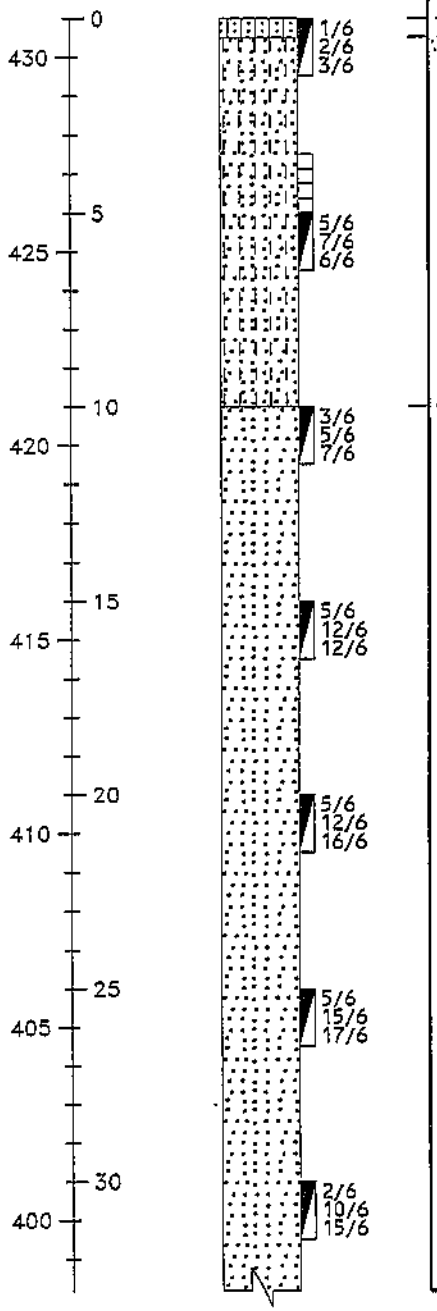
Date: 03/04/04

Elevation: 431 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; loose, moist, fine to medium dark-brown with roots		5	14
SP-SM	SAND, Poorly Graded with Silt; loose, moist, fine, yellowish-brown At 4 Feet - Medium dense, dark yellowish-brown	DD = 104 pcf	--	9
			13	7
SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		12	5
	Moist		24	7
	Damp, fine to medium		28	3
	Dense		32	4
	Medium dense, trace silt		25	4

Notes:

Figure Number B-15

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-15

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

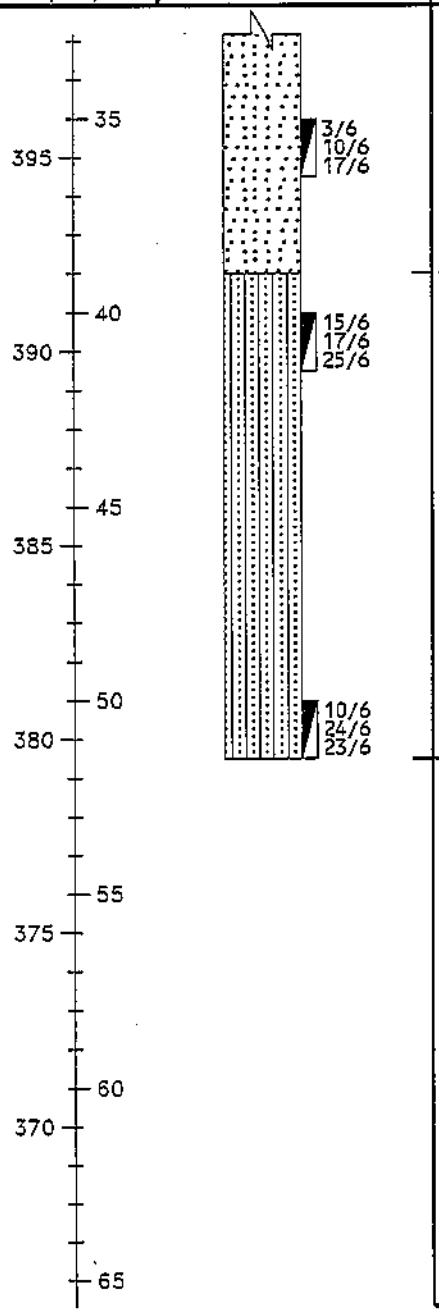
Date: 03/04/04

Elevation: 431 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
			27	3
SM	SAND, Silty; dense, moist, fine, grayish-brown with reddish-brown interbeds		42	10
	Fine to medium, reddish-brown		47	9
	Bottom of Boring at 51.5 Feet			

Notes:

Figure Number B-15

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-16

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

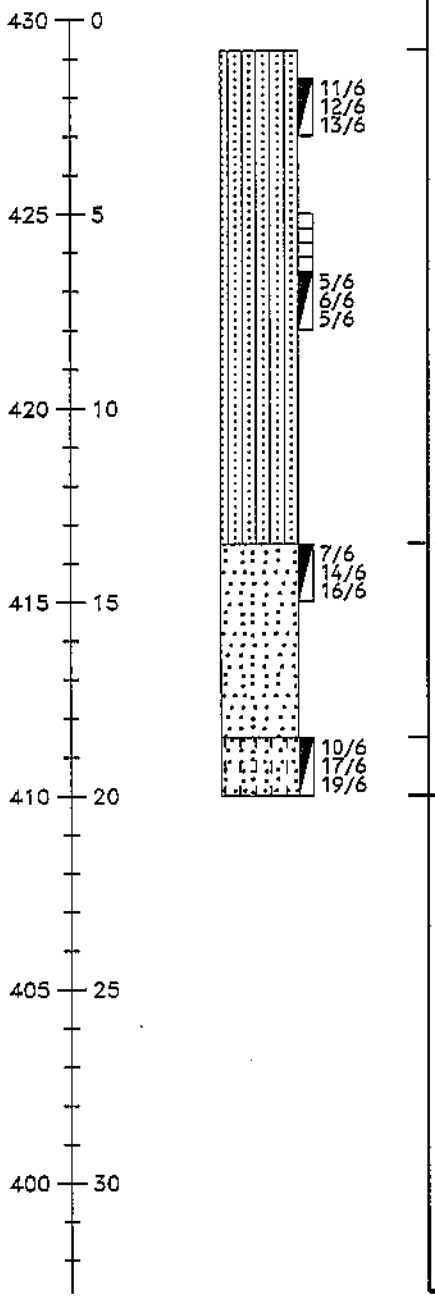
Date: 03/04/04

Elevation: 430 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 3.5 inches Base = 5 inches SAND, Silty; medium dense, moist, fine, brown		25	7
			Yellowish-brown	DD = 107 pcf	--	7
					11	9
		SP	SAND, Poorly Graded; dense, damp, fine to medium, reddish-brown		30	5
		SP-SM	SAND, Poorly Graded with Silt; dense, moist, fine to medium, reddish-brown		36	7
			Bottom of Boring at 20 Feet			

Notes:

Figure Number B-16

THE TWINING LABORATORIES, INC. EST. 1938

SOIL TEST BORING SYMBOLIC LOG

BORING B-17

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/04/04

Logged By: D. Ledgerwood

Elevation: 422 Feet

Drilled By: S. Riley

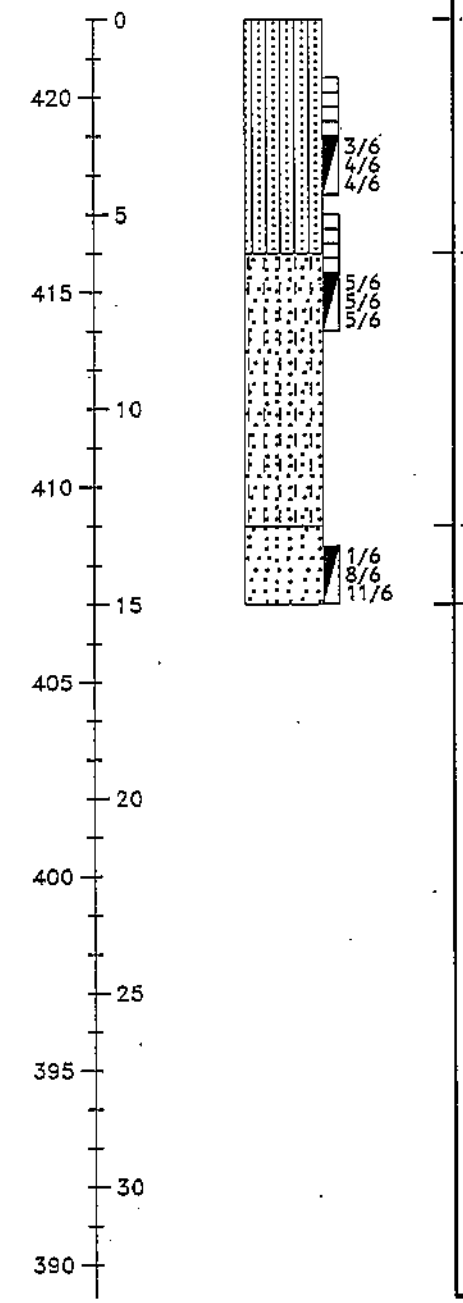
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; loose, moist, fine, dark-brown to black	DD = 99 pcf Φ = 350° C = 403 psf	-- 8	12 10
SP-SM	SAND, Poorly Graded with Silt; loose, moist, fine, yellowish-brown	DD = 108 pcf	-- 10	10 7
SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		19	5
	Bottom of Boring at 15 Feet			

Notes:

Figure Number B-17

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-18

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

Date: 03/05/04

Elevation: 418 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0		SM	SAND, Silty; loose, moist, fine, dark-brown, with roots	DD = 106 pcf	--	9
415	4/6 4/6 5/6		Brown		9	13
5	4/6 5/6 6/6		Medium dense, fine to medium, light reddish-brown		11	8
410						
10	5/6 8/6 10/6		Yellowish-brown		18	6
405						
15	3/6 7/6 8/6	SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine to medium, yellowish-brown		15	5
400			Bottom of Boring at 16.5 Feet			
20						
395						
25						
390						
30						

Notes:

Figure Number B-18

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-19

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

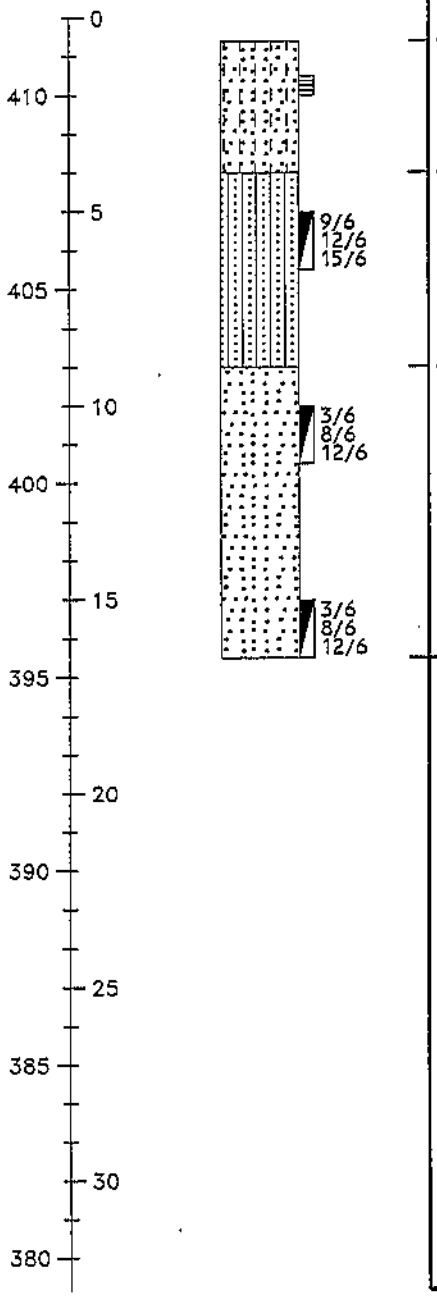
Date: 03/05/04

Elevation: 412 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SP-SM	AC = 3 inches Base = 4 inches SAND, Poorly Graded with Silt; medium dense, dry, fine, light-brown	DD = 102 pcf -200 = 12%	--	2
		SM	SAND, Silty; medium dense, damp, fine, slightly cemented, yellowish-brown		27	5
		SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		20	4
					20	4
			Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-19

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-20

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

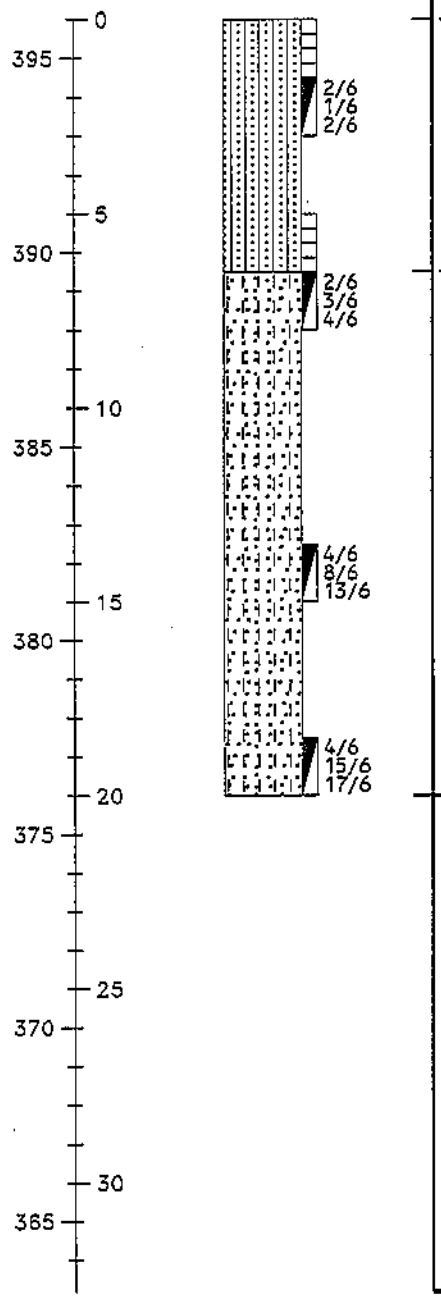
Date: 03/05/04

Elevation: 396 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; very loose, moist, fine, with roots, dark-brown with interbeds light-brown	DD = 97 pcf	--	10
			3	9
	Loose	DD = 100 pcf	--	9
SP-SM	SAND, Poorly Graded with Silt; loose, moist, fine yellowish-brown		7	7
	Medium dense, moist		21	9
	Dense, damp		32	4
	Bottom of Boring at 20 Feet			

Notes:

Figure Number B-20

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-21

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/05/04

Logged By: D. Ledgerwood

Elevation: 410 Feet

Drilled By: S. Riley

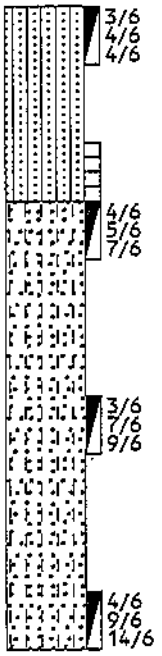
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 8" O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
410 — 0		SM	SAND, Silty; loose, moist, fine, with light-brown interbeds		8	8
			Medium dense	DD = 98 pcf	--	7
405 — 5		SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine, yellowish-brown		12	6
400 — 10					16	6
395 — 15					23	6
			Bottom of Boring at 16.5 Feet			
390 — 20						
385 — 25						
380 — 30						

Notes:

Figure Number B-21

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-22

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

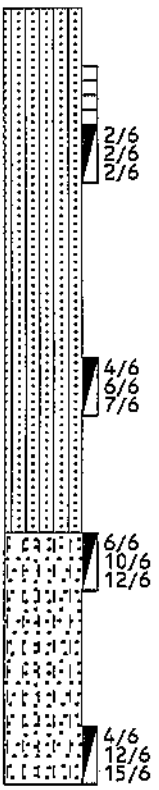
Date: 03/05/04

Elevation: 435 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
435 – 0		SM	SAND, Silty; very loose, moist, fine to medium, brown with light-brown interbeds	DD = 101 pcf	--	11
	2/6 2/6 2/6		light-brown		4	10
430 – 5						
			Medium dense, damp			
425 – 10	4/6 6/6 7/6				13	6
	6/6 10/6 12/6	SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine to medium, yellowish-brown		22	6
420 – 15						
	4/6 12/6 15/6				27	5
415 – 20			Bottom of Boring at 20 Feet			
410 – 25						
405 – 30						

Notes:

Figure Number B-22

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-23

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: S. Riley

Drill Type: CME 75

Auger Type: 8" O.D. Hollow Stem Auger

Project Number: TLB82604.01

Date: 03/05/04

Elevation: 422 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0 / 420	1/6 3/6 5/6	SM	SAND, Silty; loose, damp, fine, brown At 1 Foot - Light-brown		8	6
			Very loose, moist, brown	DD = 101 pcf	--	14
5 / 415	2/6 2/6 1/6				3	8
			Medium dense	DD = 106 pcf	--	8
10 / 410	4/6 5/6 6/6		Light-brown		11	8
15 / 405	5/6 7/6 11/6	SP	SAND, Poorly Graded; medium dense, damp, fine to medium, yellowish-brown		18	4
			Bottom of Boring at 16.5 Feet			
20 / 400						
25 / 395						
30 / 390						

Notes:

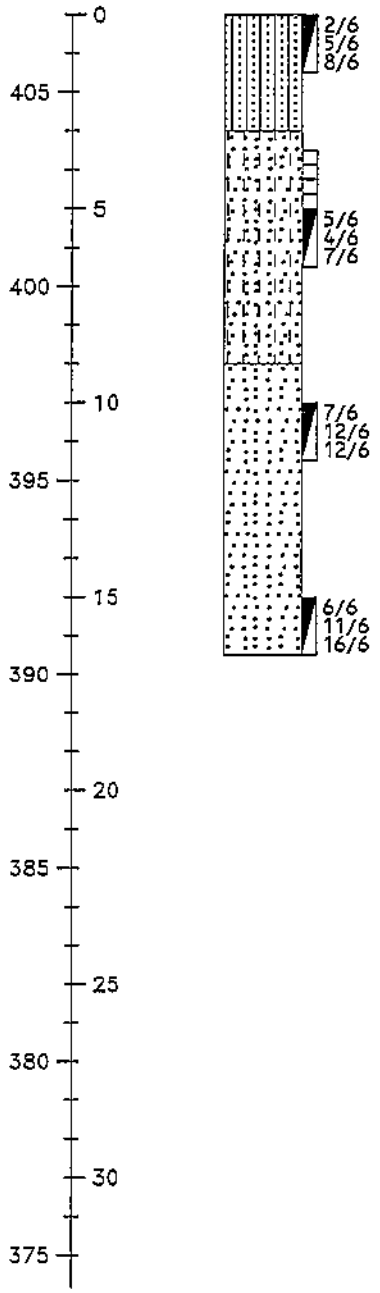
Figure Number B-23

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-24

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/08/04
Logged By: D. Ledgerwood
Elevation: 407 Feet
Drilled By: T.Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8 " O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; medium dense, moist, brown		13	8
		SP-SM	SAND, Poorly Graded with Silt; medium dense, moist, fine, yellowish-brown	DD = 96 pcf	--	7
					11	9
		SP	SAND, Poorly Graded; medium dense, moist, fine, yellowish-brown		24	7
			Damp		27	4
			Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-24

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-25

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 389.5 Feet

Drilled By: T.Conley

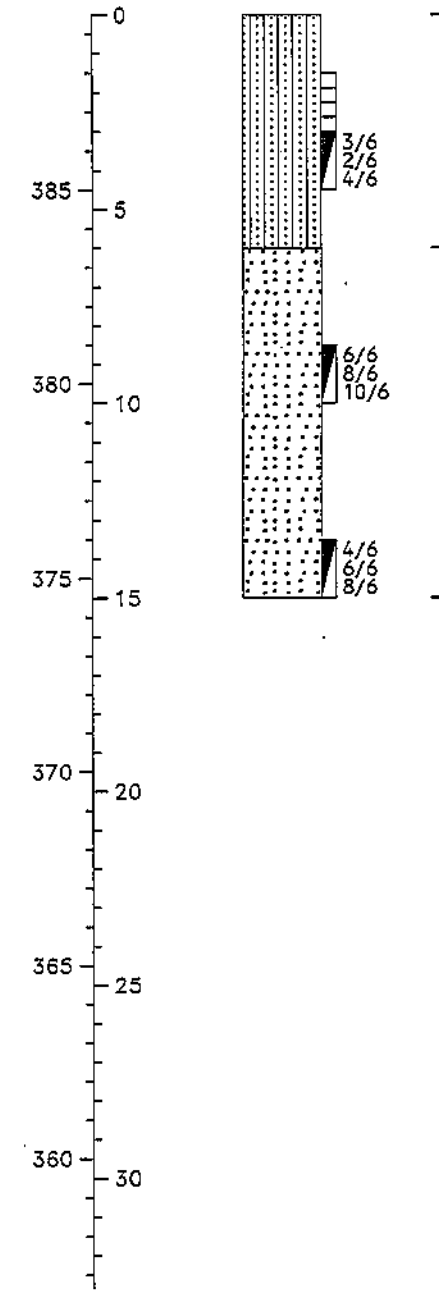
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; loose, moist, dark-brown with light-brown	DD = 96 pcf Φ = 30° C = 58 psf	--	10
	Dark-brown		6	11
SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		18	3
			14	3
	Bottom of Boring at 15 Feet			

Notes:

Figure Number B-25

THE TWINING LABORATORIES, INC. EST. 1896

SOIL TEST BORING SYMBOLIC LOG

BORING B-26

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

Date: 03/08/04

Elevation: 379 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0	3/6 3/6 3/6	SM	SAND, Silty; loose, moist, fine to medium, dark brown to brown (Fill?) Trace roots brown (Wood debris?)	DD = 102 pcf	--	12
					6	11
375 5				DD = 103 pcf	--	10
	3/6 3/6 6/6		Reddish-brown		9	11
370 10						
365 15	6/6 9/6 13/6	SP	Sand, Poorly Graded; medium dense, damp, fine, yellowish-brown		27	5
360 20	5/6 9/6 16/6				25	5
			Bottom of Boring at 20 Feet			
355 25						
350 30						

Notes:

Figure Number B-26

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-27

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 378 Feet

Drilled By: T.Conley

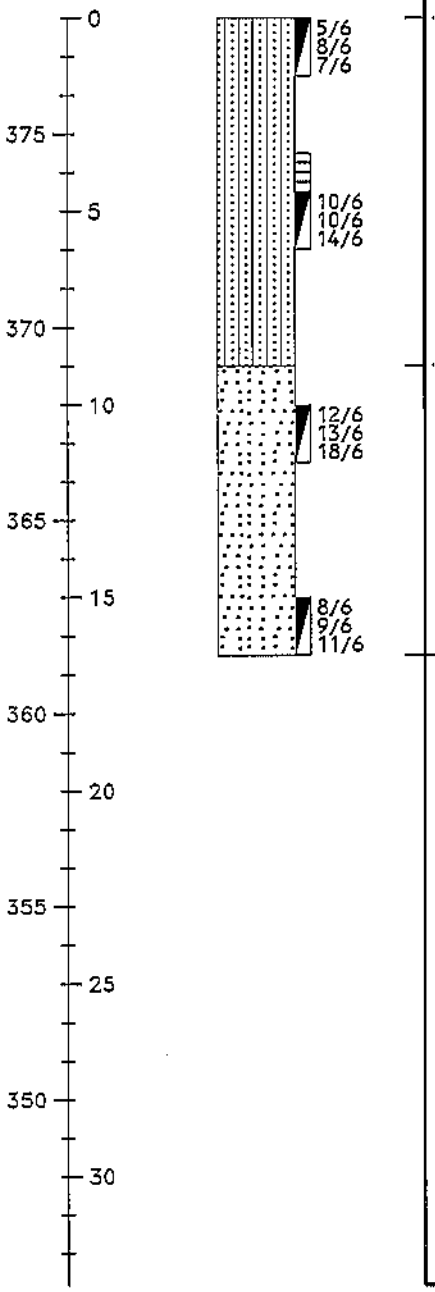
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; medium dense, moist, fine, brown		15	8
		DD = 111 pcf	--	6
	Damp, light-brown		24	3
SP	SAND, Poorly Graded; dense, moist, fine, reddish-brown		31	6
	Medium dense, damp, yellowish-brown		20	3
	Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-27

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-28

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 378 Feet

Drilled By: T.Conley

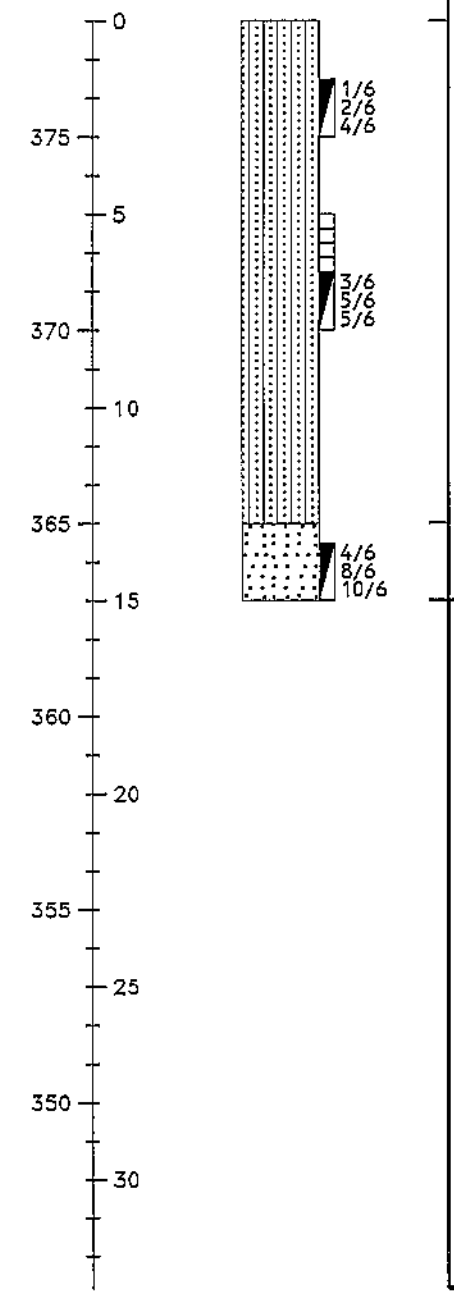
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; loose, moist, fine, brown		6	9
			Light-brown	DD = 101 pcf	--	9
					10	7
		SP	SAND, Poorly Graded, medium dense, damp, fine to medium, light-brown		18	4
			Bottom of Boring at 15 Feet			

Notes:

Figure Number B-28

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-29

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/08/04
Logged By: D. Ledgerwood
Elevation: 360 Feet
Drilled By: T.Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8 " O.D. Hollow Stem Auger
Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
360 — 0		SM	AC = 3 inches Base = 4.5 inches	DD = 108 pcf	--	5
	7/6 9/6 12/6	SP-SM	SAND, Silty; medium dense, damp, fine to medium, reddish-brown		21	4
355 — 5		SP	SAND, Poorly Graded with Silt; medium dense, damp, fine to medium, reddish-brown At 3.5 Feet - Fine, yellowish-brown			
			SAND, Poorly Graded; medium dense, dry to damp, fine, yellowish-brown Fine to medium	DD = 99 pcf	--	2
350 — 10	6/6 7/6 13/6				20	3
345 — 15	7/6 12/6 17/6				29	5
			Bottom of Boring at 16.5 Feet			
340 — 20						
335 — 25						
330 — 30						

Notes:

Figure Number B-29

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-30

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 391 Feet

Drilled By: T.Conley

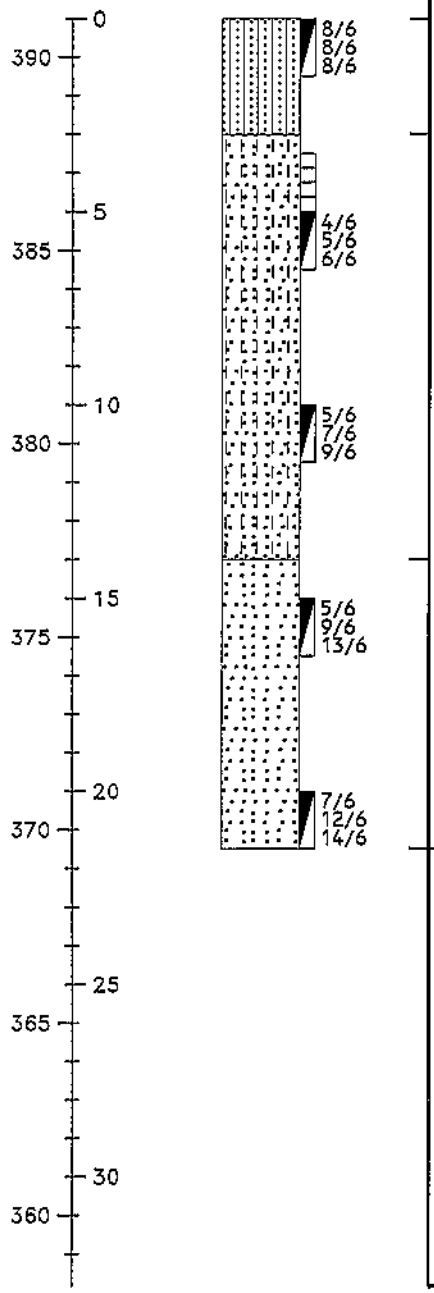
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; medium dense, moist, fine, brown, roots		16	9
		SP-SM	SAND, Poorly Graded with Silt; medium dense, moist, fine to medium, reddish-brown	DD = 99 pcf -200 = 12%	--	8
					11	8
			Fine, light reddish-brown		16	8
		SP	SAND, Poorly Graded; medium dense, damp, fine to medium, yellowish-brown		22	4
					26	4
			Bottom of Boring at 21.5 Feet			

Notes:

Figure Number B-30

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-31

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 364 Feet

Drilled By: T.Conley

Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0		SM	SAND, Silty; loose, moist, fine, brown to dark brown			
	3/6 4/6 5/6				9	9
360			Increase in moisture, fine to medium			
5				DD = 101 pcf	--	13
	2/6 3/6 6/6		Decrease in moisture, yellowish-brown		9	8
355						
10						
			Medium dense			
350	6/6 9/6 14/6				23	7
15			Bottom of Boring at 15 Feet			
345						
20						
340						
25						
335						
30						

Notes:

Figure Number B-31

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-32

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 366 Feet

Drilled By: T.Conley

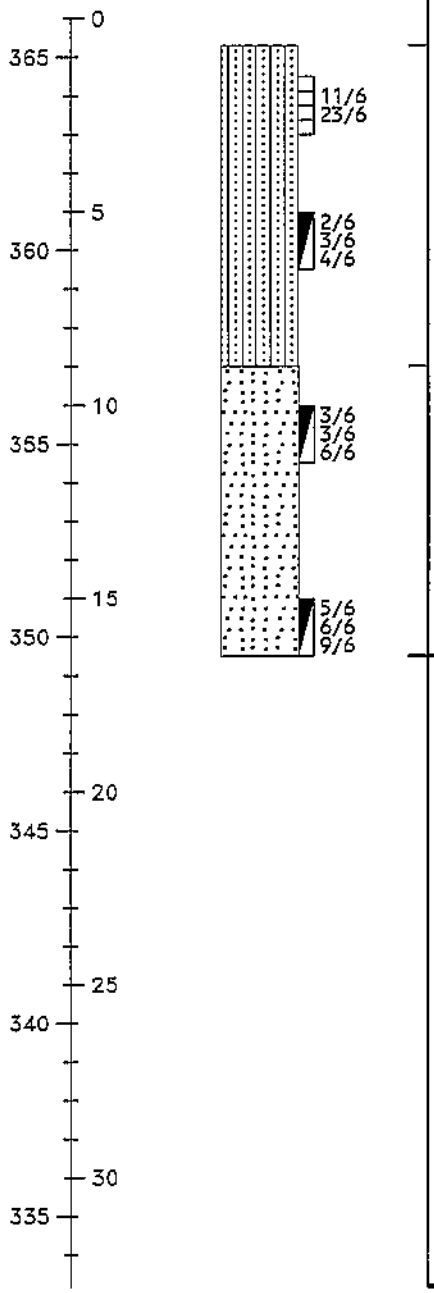
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 3 inches Base = 5.5 inches SAND, Silty; dense, damp, fine, brown	DD = 117 pcf	34	6
			Loose, moist, dark reddish-brown		7	9
		SP	SAND, Poorly Graded; loose, damp, fine, yellowish-brown		9	6
					15	6
			Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-32

SOIL TEST BORING SYMBOLIC LOG

THE TWINING LABORATORIES, INC. EST. 1898

BORING B-33

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 360 Feet

Drilled By: T.Conley

Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
360 — 0	2/6 3/6 5/6	SM	SAND, Silty; loose, moist, fine to medium, dark-brown with roots		8	8
			Medium dense, some 3/8" roots, brown	DD = 101 pcf	--	8
355 — 5	5/6 4/6 8/6		No roots		12	8
350 — 10	7/6 6/6 7/6	SP	SAND, Poorly Graded; medium dense, damp, fine, reddish-brown		13	5
345 — 15	5/6 9/6 15/6		Fine to medium, yellowish-brown		24	3
			Bottom of Boring at 16.5 Feet			
340 — 20						
335 — 25						
330 — 30						

Notes:

Figure Number B-33

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-34

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 344 Feet

Drilled By: T.Conley

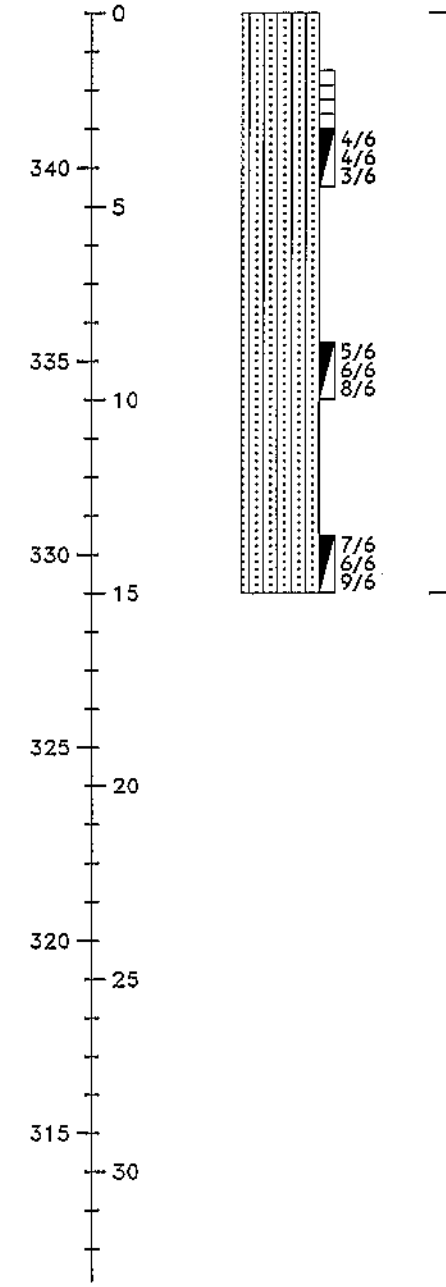
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; loose, damp, fine, brown to dark-brown	DD = 104 pcf	--	9
	Slight decrease in percent silt, brown		7	9
	Medium dense, brown to light-brown		14	6
			15	8
	Bottom of Boring at 15 Feet			

Notes:

Figure Number B-34

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-35

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 338 Feet

Drilled By: T.Conley

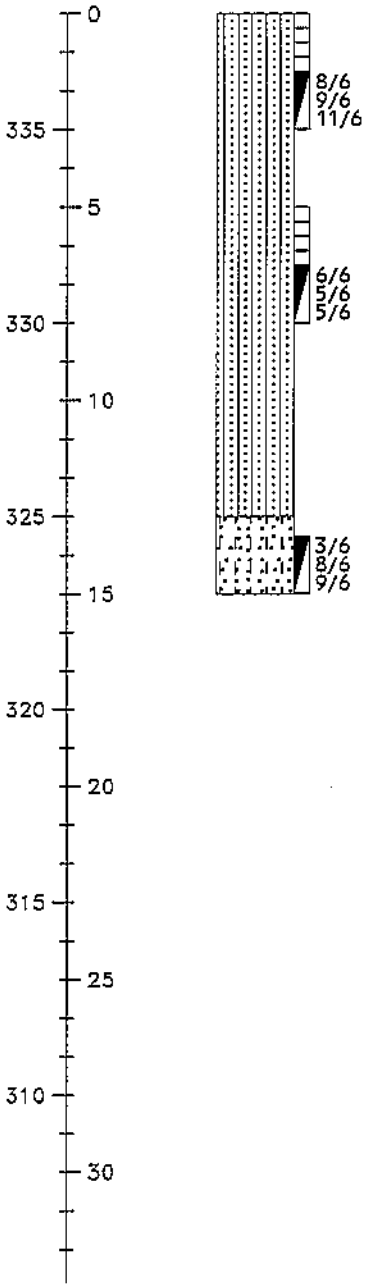
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; medium dense, moist, fine, trace fine roots, brown to dark-brown	DD = 110 pcf	--	11
			At 1.5 Feet - No roots		20	7
			Loose	DD = 107 pcf	--	6
			Damp, brown		10	5
		SP-SM	SAND, Poorly Graded with Silt; medium dense, moist, fine to medium, yellowish-brown		17	11
			Bottom of Boring at 15 Feet			

Notes:

Figure Number B-35

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-36

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/08/04

Logged By: D. Ledgerwood

Elevation: 346 Feet

Drilled By: T.Conley

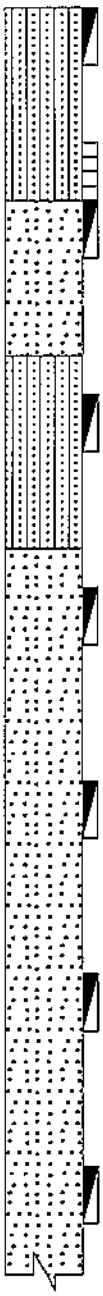
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0	3/6 6/6 6/6	SM	SAND, Silty; medium dense, moist, fine to medium, dark yellowish-brown to brown		12	8
				DD = 104 pcf	--	7
5	5/6 6/6 5/6	SP	SAND, Poorly Graded, medium dense, damp, fine, yellowish-brown		11	5
10	4/6 6/6 6/6	SM	SAND, Silty; medium dense, moist, yellowish-brown to light reddish-brown		12	7
15	4/6 7/6 10/6	SP	SAND, Poorly Graded; medium dense, damp, yellowish-brown		17	4
20	6/6 12/6 15/6				27	3
25	5/6 10/6 12/6				22	3
30	5/6 10/6 13/6				23	3

Notes:

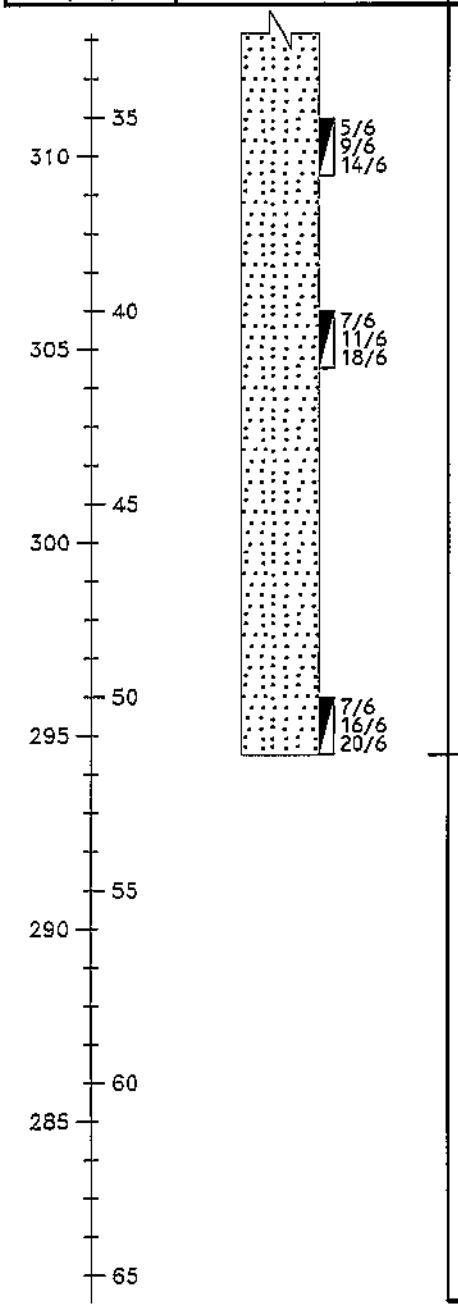
Figure Number B-36

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-36

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/08/04
Logged By: D. Ledgerwood
Elevation: 346 Feet
Drilled By: T.Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8 " O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
35	5/6 9/6 14/6				23	3
40	7/6 11/6 18/6				29	3
50	7/6 16/6 20/6		Dense		36	4
			Bottom of Boring at 51.5 Feet			

Notes:

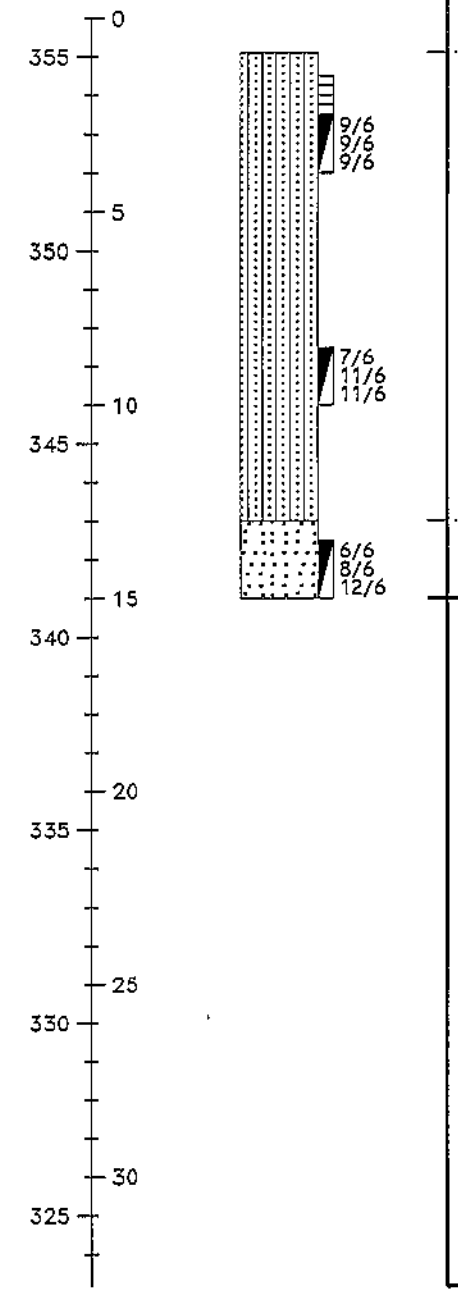
Figure Number B-36

THE TWINING LABORATORIES, INC. EST. 1896

SOIL TEST BORING SYMBOLIC LOG

BORING B-37

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/09/04
Logged By: D. Ledgerwood
Elevation: 356 Feet
Drilled By: T.Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8 " O.D. Hollow Stem Auger
Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
	AC = 3 inches			
SM	Base = 8 inches			
	SAND, Silty; medium dense, damp, fine, brown	DD = 108 pcf -200 = 19%	--	5
			18	4
	Moist, light reddish-brown		22	7
SP	SAND, Poorly Graded; medium dense, damp, yellowish-brown		20	4
	Bottom of Boring at 15 Feet			

Notes:

Figure Number B-37

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-38

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

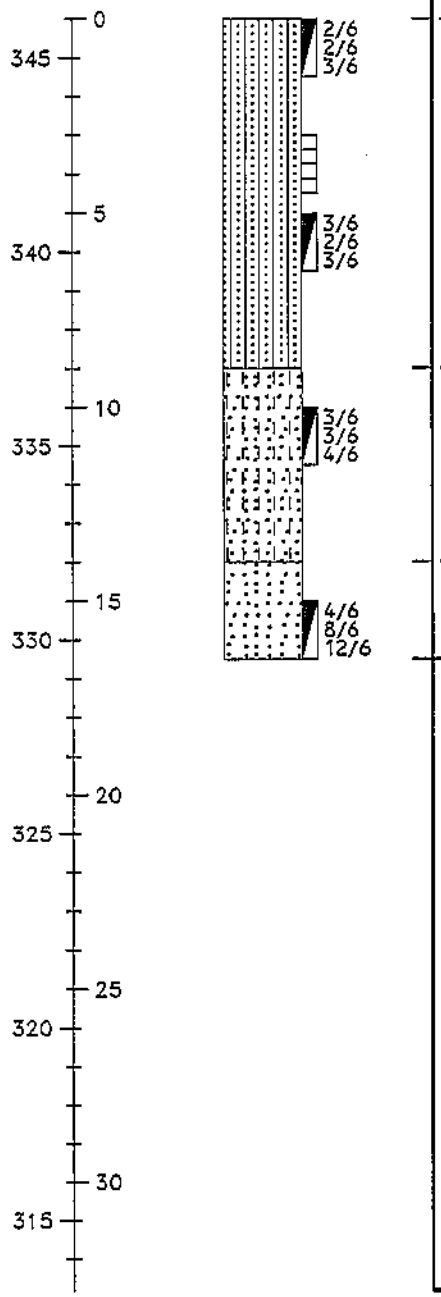
Date: 03/09/04

Elevation: 346 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; loose, moist, dark-brown	-200 = 13%	5	8
	Brown	DD = 109 pcf	--	10
			5	12
SP-SM	SAND, Poorly Graded with Silt; loose, moist, reddish-brown		7	8
SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		20	5
	Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-38

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-39

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/09/04

Logged By: D. Ledgerwood

Elevation: 352 Feet

Drilled By: T.Conley

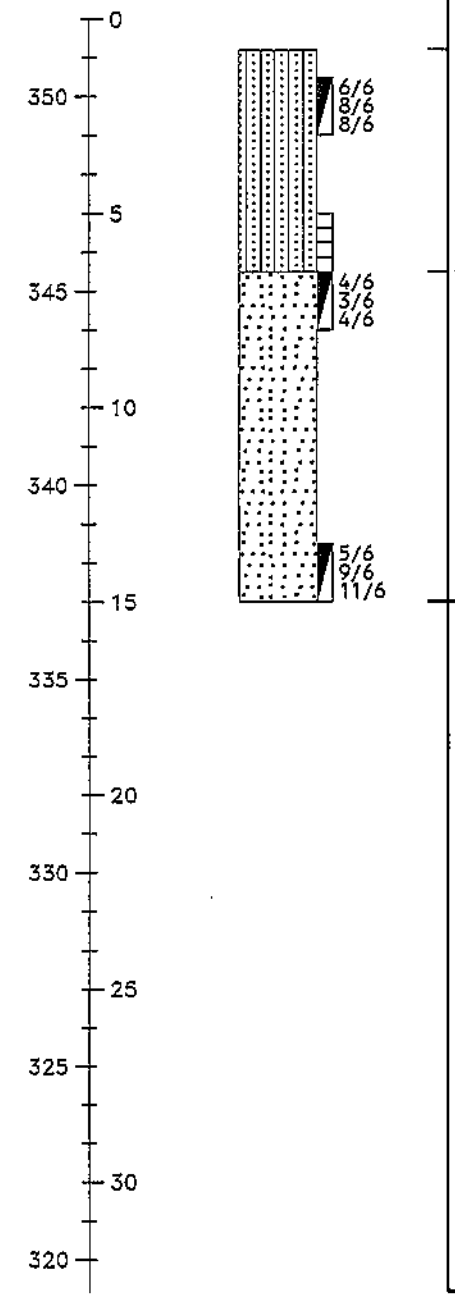
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
	AC = 3 inches			
SM	Base = 5.5 inches			
	SAND, Silty; medium dense, damp, fine, brown		16	4
		DD = 101 pcf	--	4
SP	SAND, Poorly Graded; loose, damp, fine, yellowish-brown		7	4
	Medium dense		20	3
	Bottom of Boring at 15 Feet			

Notes:

Figure Number B-39

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-40

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/09/04

Logged By: D. Ledgerwood

Elevation: 392 Feet

Drilled By: T.Conley

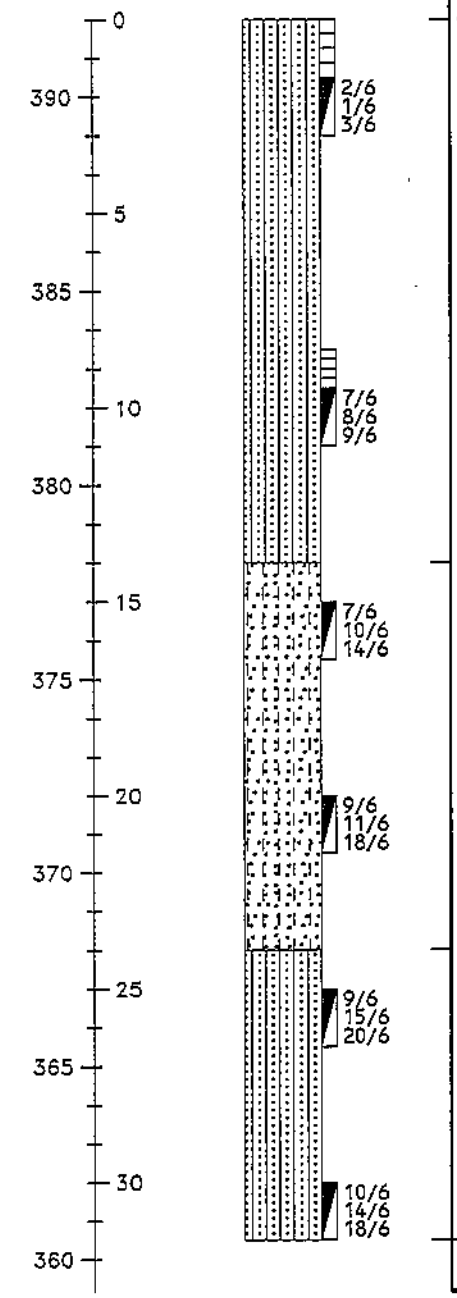
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; very loose, moist, fine, brown to dark-brown	DD = 102 pcf	--	8
			At 1.5 Feet - Moist, brown		4	8
			Medium dense, moist to damp, fine to medium, light-brown	DD = 108 pcf	--	9
					17	6
		SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine, yellowish-brown		24	6
					29	5
		SM	SAND, Silty; dense, moist, fine, yellowish-brown		35	8
			Reddish-brown		32	12
			Bottom of Boring at 31.5 Feet			

Notes:

Figure Number B-40

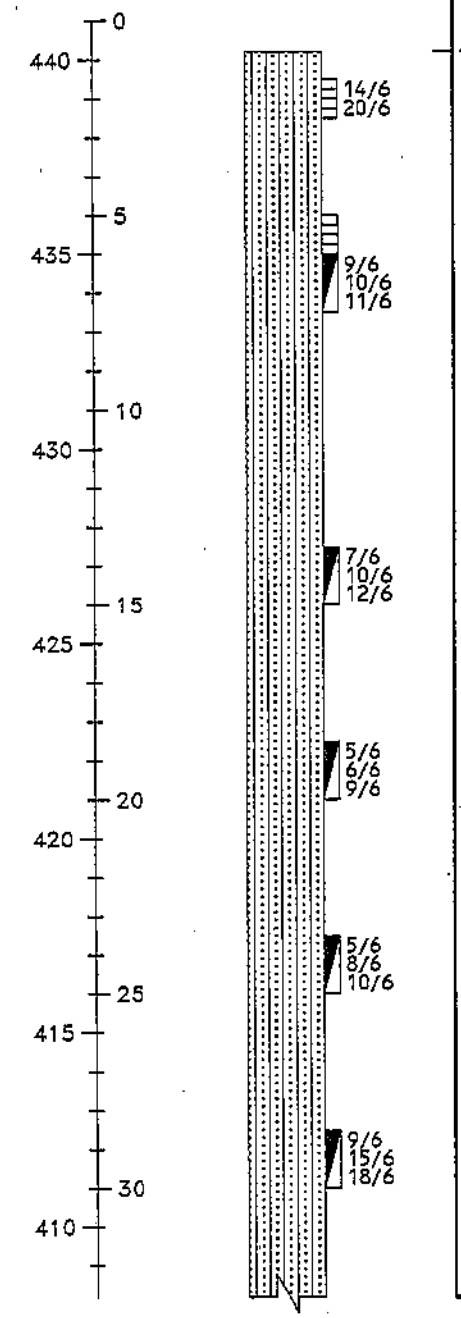
THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-41

Project: Fitch Park, Clark Realty
Location: Monterey, CA
Logged By: D. Ledgerwood
Drilled By: T.Conley
Drill Type: CME 75
Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01
Date: 03/08/04 and 03/10/04
Elevation: 441 Feet
Depth to Groundwater: N/E
Cased to Depth: N/A
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			AC = 3 inches			
		SM	Base = 6 inches			
			SAND, Silty; dense, damp, fine, brown	DD = 112 pcf	34	3
			Medium dense			
				DD = 102 pcf	--	6
			Reddish-brown	Φ = 32°		
				C = 92 psf	21	6
			Yellowish-brown, decrease in fines		22	6
					15	6
					18	6
			Moist, fine to medium		33	9

Notes:

Figure Number B-41

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-41

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

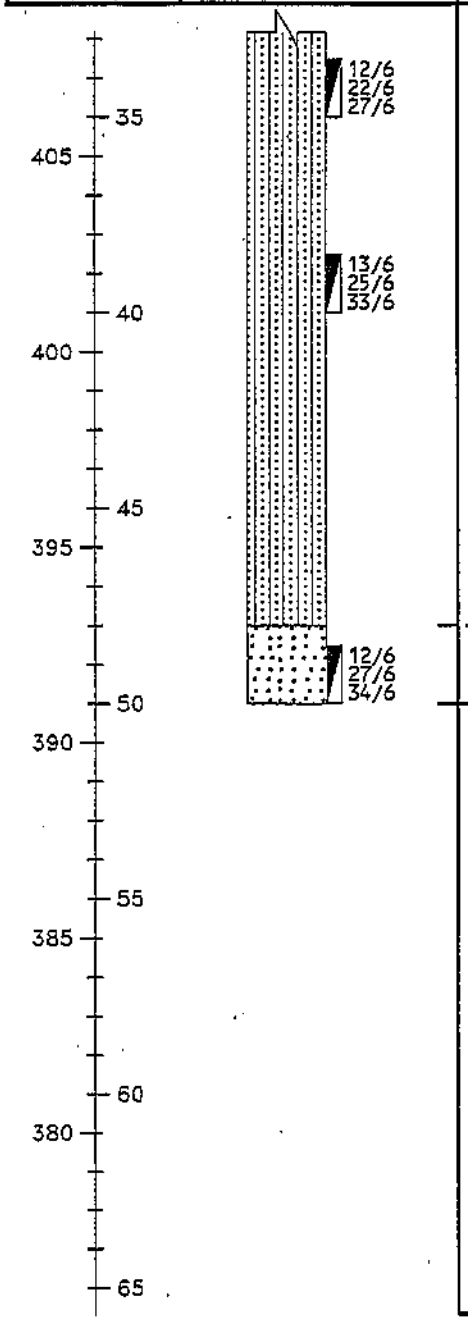
Date: 03/08/04 and 03/10/04

Elevation: 441 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			Dense, reddish-brown		49	10
			Very dense, fine to medium, dark reddish-brown		58	10
		SP	SAND, Poorly Graded; very dense, damp, fine, yellowish-brown		61	5
			Bottom of Boring at 50 Feet			

Notes:

Figure Number B-41

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-42

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/09/04

Logged By: D. Ledgerwood

Elevation: 434 Feet

Drilled By: T.Conley

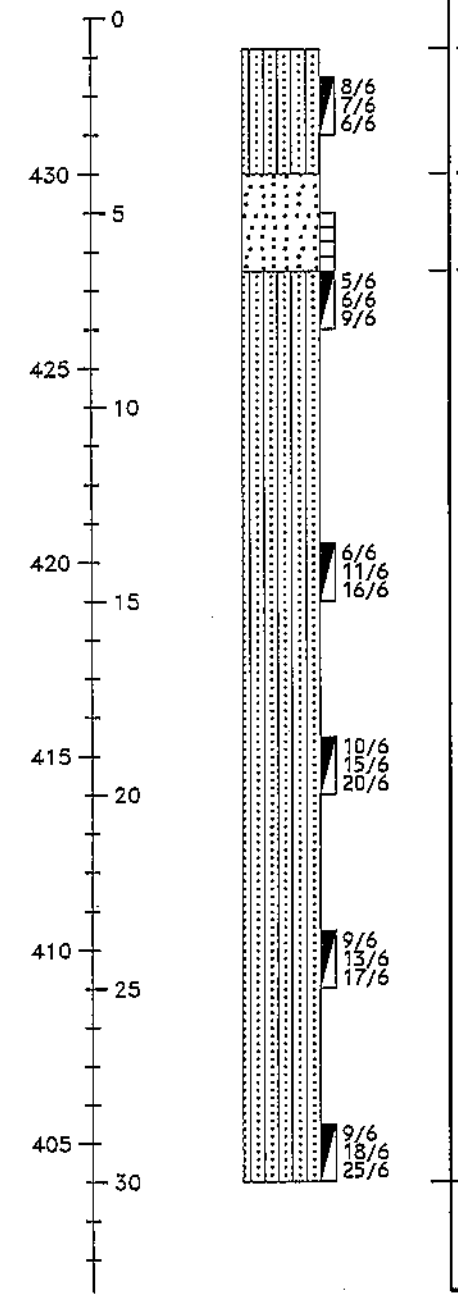
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
	AC = 3 inches Base = 5 inches			
SM	SAND, Silty; medium dense, damp, fine, light-brown		13	4
SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown	DD = 97 pcf	--	4
SM	SAND, Silty; medium dense, moist, fine, yellowish-brown to light-brown		15	6
			27	6
	Dense, fine to medium, reddish-brown		35	9
	Medium dense, fine, yellowish-brown		30	7
	Dense, fine to medium		43	6
	Bottom of Boring at 30 Feet			

Notes:

Figure Number B-42

SOIL TEST BORING SYMBOLIC LOG

THE TWINING LABORATORIES, INC. EST. 1898

BORING B-43

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/09/04

Logged By: D. Ledgerwood

Elevation: 412 Feet

Drilled By: T.Conley

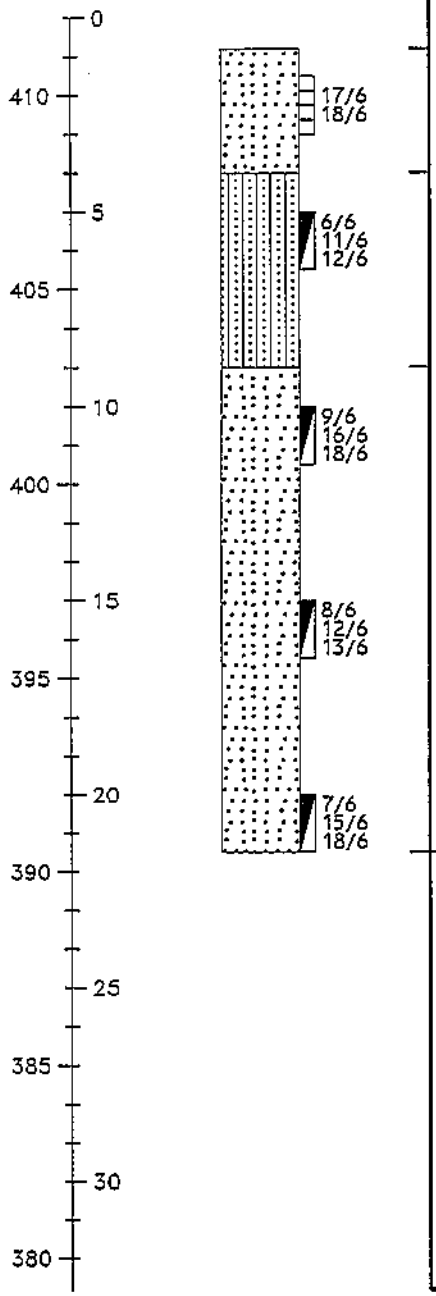
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
	AC = 3 inches Base = 5 inches			
SP	SAND, Poorly Graded; dense, damp, fine to medium, light brown	DD = 102 pcf	35	4
SM	SAND, Silty; medium dense, moist, fine to medium, reddish-brown		23	10
SP	SAND, Poorly Graded; dense, damp, fine, yellowish-brown		34	5
	Medium dense		25	5
	Dense, dry		33	2
	Bottom of Boring at 21.5 Feet			

Notes:

Figure Number B-43

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-44

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

Date: 03/09/04

Elevation: 372 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0			AC = 3.5 inches			
370	7/6 9/6 10/6	SP	Base = 5 inches		19	6
		SM	SAND, Poorly Grade; medium dense, damp, fine, yellowish-brown with some interbeds of reddish-brown silty fine sand	DD = 101 pcf	--	6
5	5/6 7/6 10/6		SAND, Silty; medium dense, damp to moist, fine, yellowish-brown		17	9
365						
10	6/6 15/6 18/6	SP	SAND, Poorly Graded; dense, moist, fine, yellowish-brown		33	7
360						
15	5/6 6/6 7/6	SP-SM	SAND, Poorly Graded with Silt; medium dense, moist, fine, yellowish-brown		13	6
355			Bottom of Boring at 16.5 Feet			
20						
350						
25						
345						
30						
340						

Notes:

Figure Number B-44

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-45

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/10/04

Logged By: D. Ledgerwood

Elevation: 388 Feet

Drilled By: T.Conley

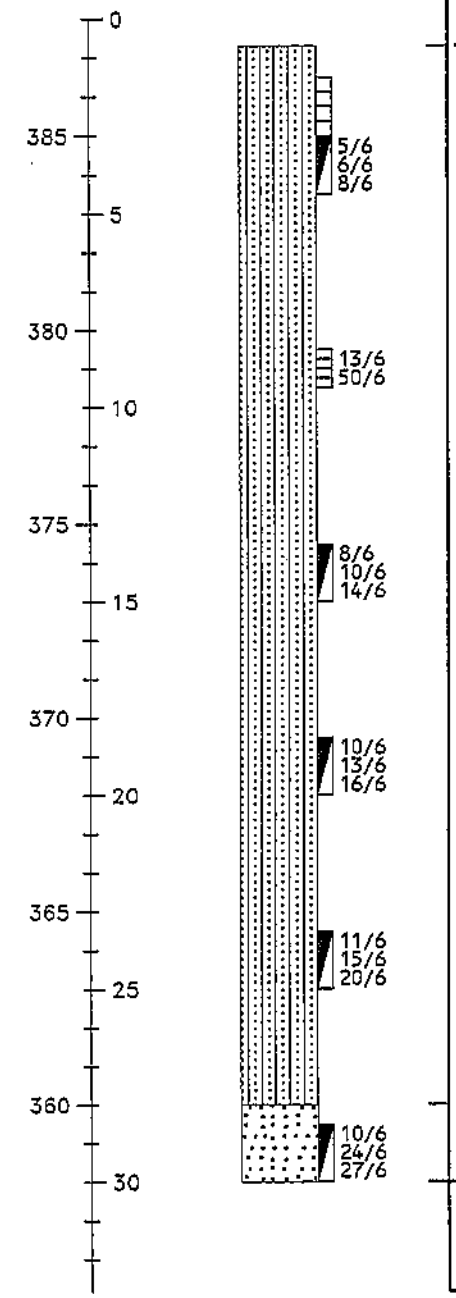
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 2.5 inches Base = 6.5 inches	DD = 99 pcf	--	10
			SAND, Silty; medium dense, moist, fine, light-brown At 3 Feet - Damp, trace silt		14	5
			Very dense, moist, increase in fines, brown to grayish-brown	DD = 122 pcf	>63	8
			Medium dense, decrease in fines, yellowish-brown		24	7
			Reddish-brown		29	7
			Dense, increase in moisture, fine to medium, trace clay, reddish-brown		35	11
		SP	SAND, Poorly Graded; very dense, damp, fine, yellowish-brown		51	4
			Bottom of Boring at 30 Feet			

Notes:

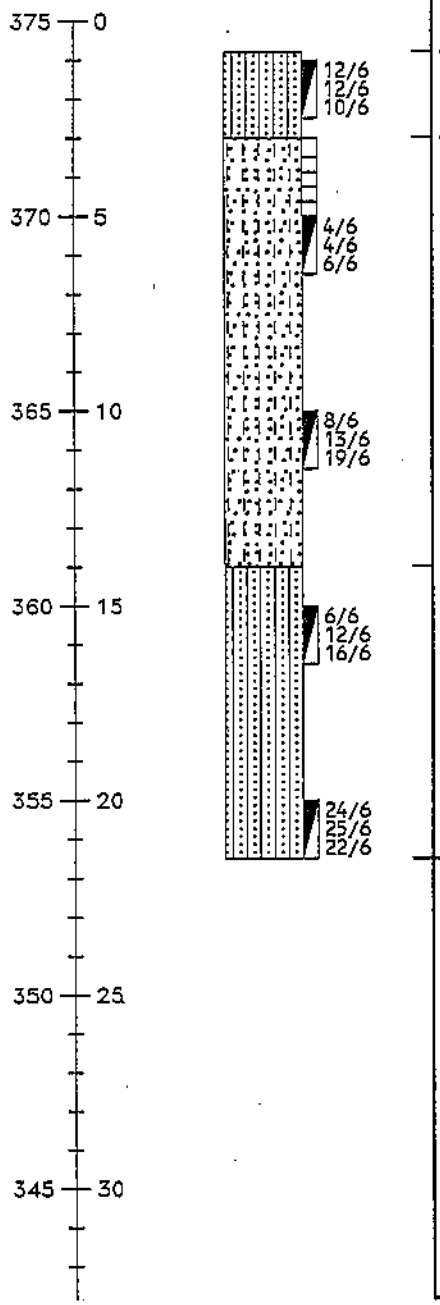
Figure Number B-45

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-46

Project: Fitch Park, Clark Realty
Project Number: TLB82604.01
Location: Monterey, CA
Date: 03/10/04
Logged By: D. Ledgerwood
Elevation: 375 Feet
Drilled By: T.Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8 " O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-value	Moisture Content %
		AC = 3 inches			
	SM	BAse = 5 inches			
		SAND, Silty; medium dense, moist, light-brown		22	8
	SP-SM	SAND, Poorly Graded with Silt; loose, damp, fine, yellowish-brown	DD = 98 pcf -200 = 10%	--	4
				10	5
		Dense		32	4
	SM	SAND, Silty; medium dense, moist, fine, yellowish-brown, micaceous		28	6
		Dense, some weak cementation, increase in fines, pale reddish-brown		47	9
		Bottom of Boring at 21.5 Feet			

Notes:

Figure Number B-46

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-47

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/10/04

Logged By: D. Ledgerwood

Elevation: 362 Feet

Drilled By: T.Conley

Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip

ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
0			AC = 3.5 inches Base = 5 inches			
360	4/6 7/6 12/6	SM	SAND, Silty; medium dense, moist, fine, yellowish-brown to reddish-brown		19	6
5		SP-SM	SAND, Poorly Graded with Silt; medium dense, moist, fine, dark yellowish-brown	DD = 100 pcf	--	6
355	5/6 7/6 10/6				17	6
10						
350						
15	9/6 15/6 19/6	SP	SAND, Poorly Graded; dense, damp, fine to medium, yellowish-brown		34	3
			Bottom of Boring at 15 Feet			
345						
20						
340						
25						
335						
30						
330						

Notes:

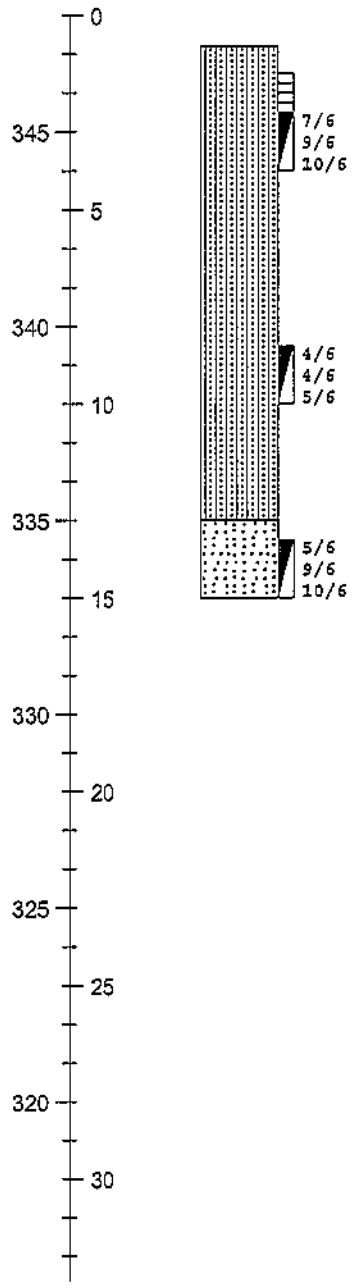
Figure Number B-47

THE TWINING LABORATORIES, INC. EST. 1938

SOIL TEST BORING SYMBOLIC LOG

BORING B-48

Project: Fitch Park, Clark Realty
Project Number: B82604.01
Location: Monterey, CA
Date: 03/10/04
Logged By: D. Ledgerwood
Elevation: 348 Feet
Drilled By: T.Conley
Depth to Groundwater: N/E
Drill Type: CME 75
Cased to Depth: N/A
Auger Type: 6 5/8 " O.D. Hollow Stem Auger
Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-values blows/ft.	Moisture Content %
		SM	AC = 3.5 inches Base = 4.5 inches	DD = 112 pcf	--	8
	7/6 9/6 10/6		SAND, Silty; medium dense, moist, fine to medium, minor amounts of wood, brown to grayish-brown (FILL) At 2 Feet - Gray At 3 Feet - Dark-gray to black Reddish-brown		19	9
	4/6 4/6 5/6				9	5
	5/6 9/6 10/6	SP	SAND, Poorly Graded; medium, dense, damp, fine, yellowish-brown		19	4
			Bottom of Boring at 15 Feet			

Notes:

Figure Number 48

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-49

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/10/04

Logged By: D. Ledgerwood

Elevation: 338 Feet

Drilled By: T.Conley

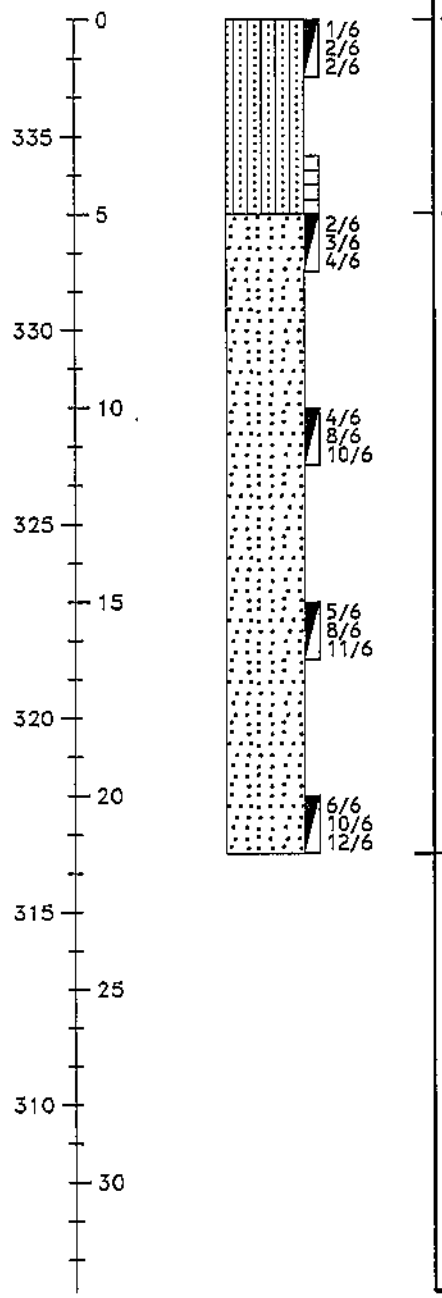
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; very loose, moist, fine, brown to dark-brown		4	7
			Loose, decrease in percent silt, reddish-brown	DD = 111 pcf Φ = 33° C = 46 psf	--	9
		SP	SAND, Poorly Graded; loose, moist, fine, reddish-brown		7	6
			Medium dense, dry, fine to medium, yellowish-brown		18	2
					19	2
			Damp		22	3
			Bottom of Boring at 21.5 Feet			

Notes:

Figure Number B-49

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-50

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/10/04

Logged By: D. Ledgerwood

Elevation: 350 Feet

Drilled By: T.Conley

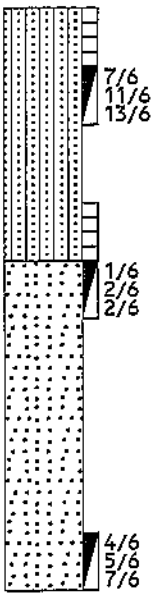
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	USCS	Soil Description	Remarks	N-value	Moisture Content %
350 — 0	SM	SAND, Silty; medium dense, moist, fine to medium, dark-brown to brown with roots Trace 1/4" roots	DD = 106 pcf	--	15
				24	7
345 — 5		Dark-brown	DD = 112 pcf	--	8
	SP	SAND, Poorly Graded; loose, damp, fine, yellowish-brown		4	5
340 — 10					
		Medium dense		12	4
335 — 15		Bottom of Boring at 15 Feet			
330 — 20					
325 — 25					
320 — 30					

Notes:

Figure Number B-50

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-51

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/10/04

Logged By: D. Ledgerwood

Elevation: 352 Feet

Drilled By: T.Conley

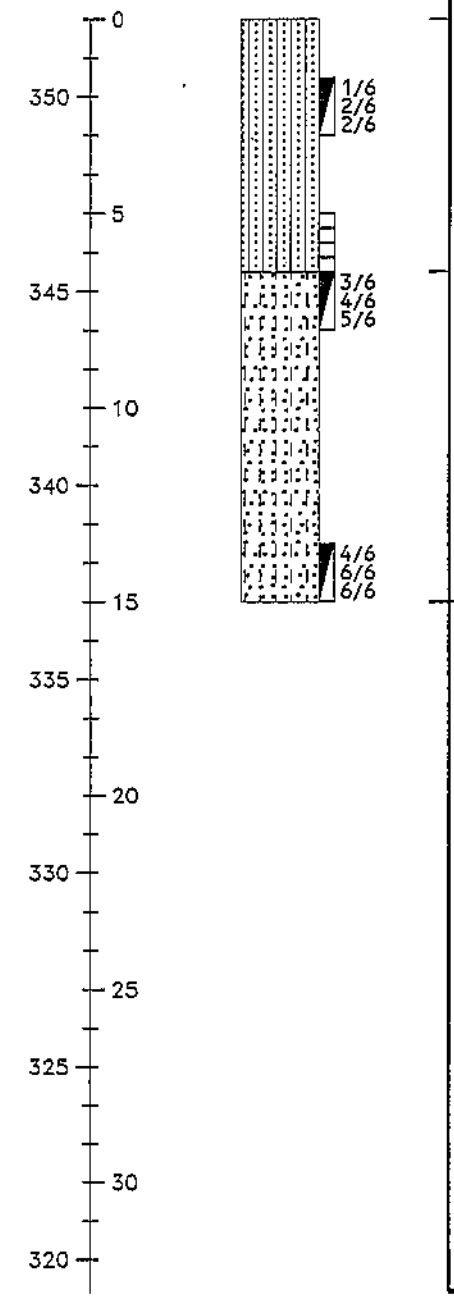
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; very loose, moist, fine, brown		4	6
			Reddish-brown	DD = 103 pcf	--	7
		SP-SM	SAND, Poorly Graded with Silt; loose, moist, fine, yellowish-brown		9	6
			Medium dense, slight increase in fines		12	7
			Bottom of Boring at 15 Feet			

Notes:

Figure Number B-51

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-52

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/10/04

Logged By: D. Ledgerwood

Elevation: 350 Feet

Drilled By: T.Conley

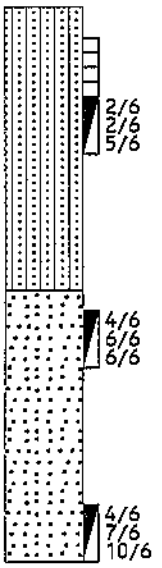
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
350 — 0		SM	AC = 3.5 inches Base = 4 inches SAND, Silty; loose, moist, fine, brown	DD = 104 pcf	--	6
					7	6
345 — 5						
		SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		12	4
340 — 10						
					17	3
335 — 15			Bottom of Boring at 15 Feet			
330 — 20						
325 — 25						
320 — 30						

Notes:

Figure Number B-52

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-53

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/10/04

Logged By: D. Ledgerwood

Elevation: 358 Feet

Drilled By: T.Conley

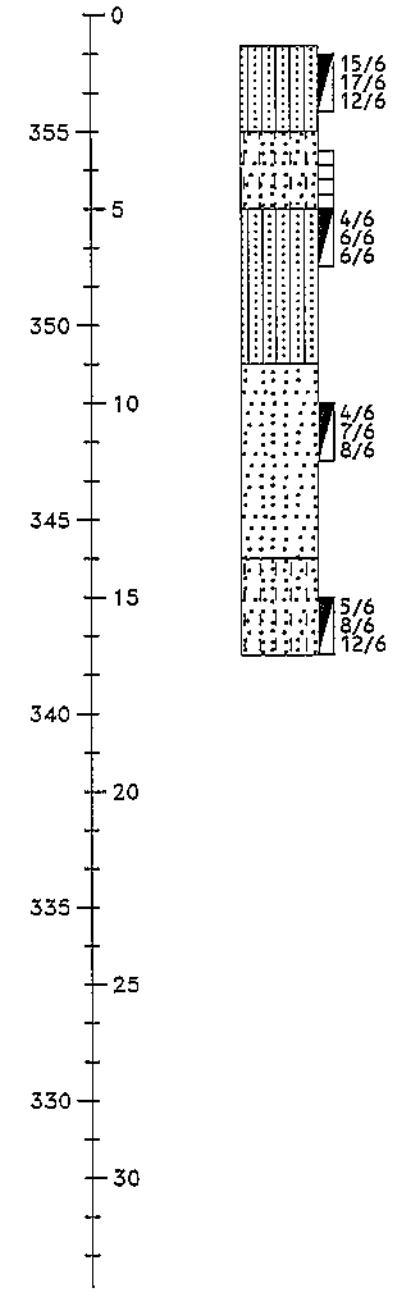
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
			AC = 2.5 inches			
		SM	Base = 6 inches			
			SAND, Silty; medium dense, damp, fine, brown		29	5
		SP-SM	SAND, Poorly Graded with Silt; medium dense, dry, fine, light brown	DD = 100 pcf	--	2
		SM	SAND, Silty; medium dense, damp, fine, yellowish-brown to reddish-brown		12	4
		SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		15	4
		SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine, yellowish-brown		20	3
			Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-53

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-54

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

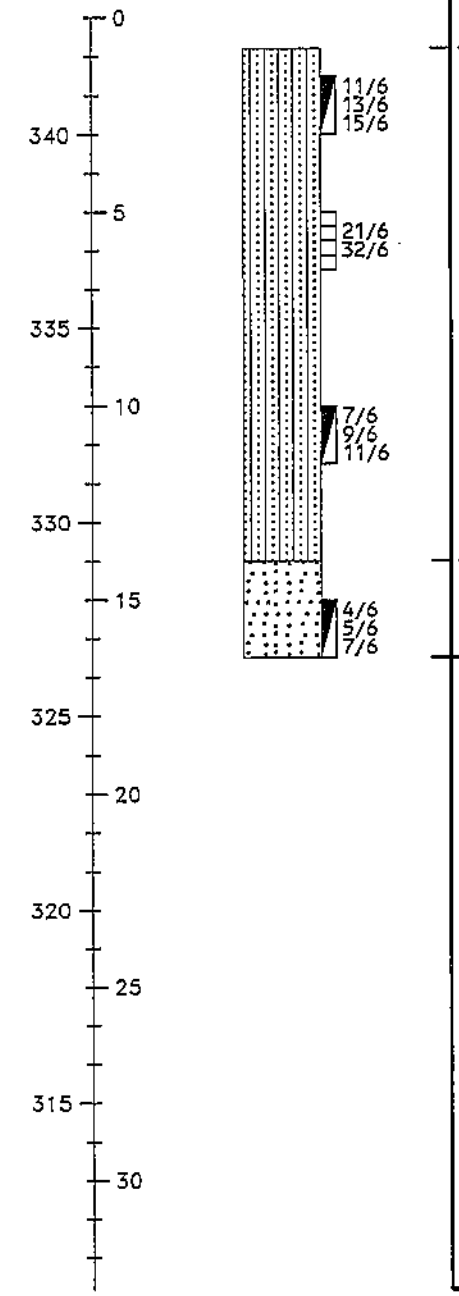
Date: 03/10/04

Elevation: 343 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
	AC = 3.5 inches Base = 5 inches			
SM	SAND, Silty; medium dense, moist, fine, brown to dark-brown		28	6
	Very dense; damp, increase in fines, dark-brown	DD = 110 pcf	53	3
	Medium dense, slight decrease in percent silt, some weak cementation, brown to reddish-brown		20	4
SP	SAND, Poorly Graded; medium dense, damp, fine, yellowish-brown		12	3
	Bottom of Boring at 16.5 Feet			

Notes:

Figure Number B-54

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-55

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

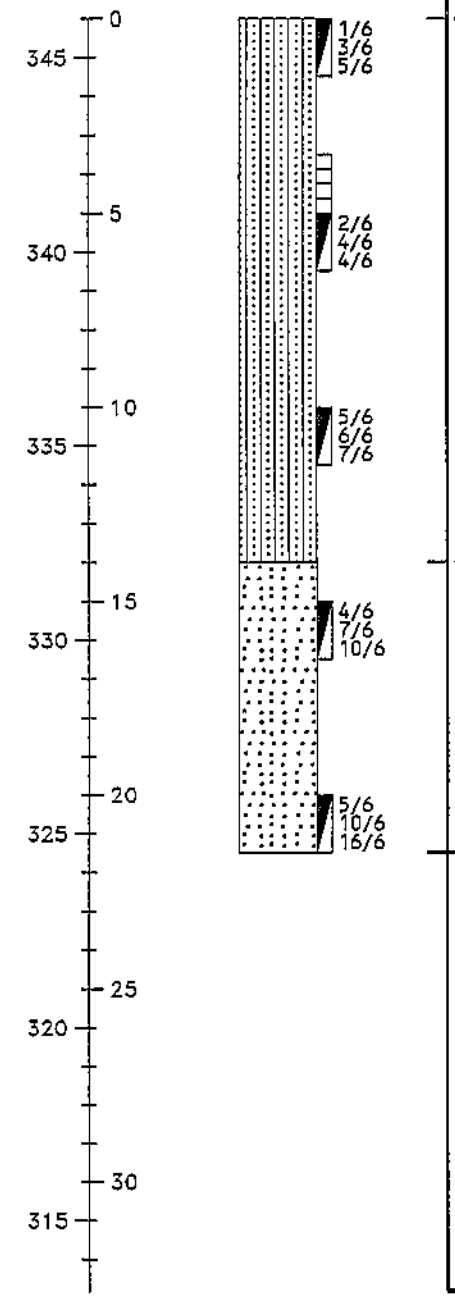
Date: 03/09/04

Elevation: 346 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



USCS	Soil Description	Remarks	N-value	Moisture Content %
SM	SAND, Silty; loose, moist, fine to medium, dark-brown to brown		8	7
	Fine, brown	DD = 102 pcf	--	7
			8	9
	Medium dense, increase in moisture, reddish-brown		13	12
SP	SAND, Poorly Graded; medium dense, moist, fine to medium, yellowish-brown	-200 = 5%	17	6
	Damp, fine, yellowish-brown		26	4
	Bottom of Boring at 21.5 Feet			

Notes:

Figure Number B-55

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-56

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/09/04

Logged By: D. Ledgerwood

Elevation: 331 Feet

Drilled By: T.Conley

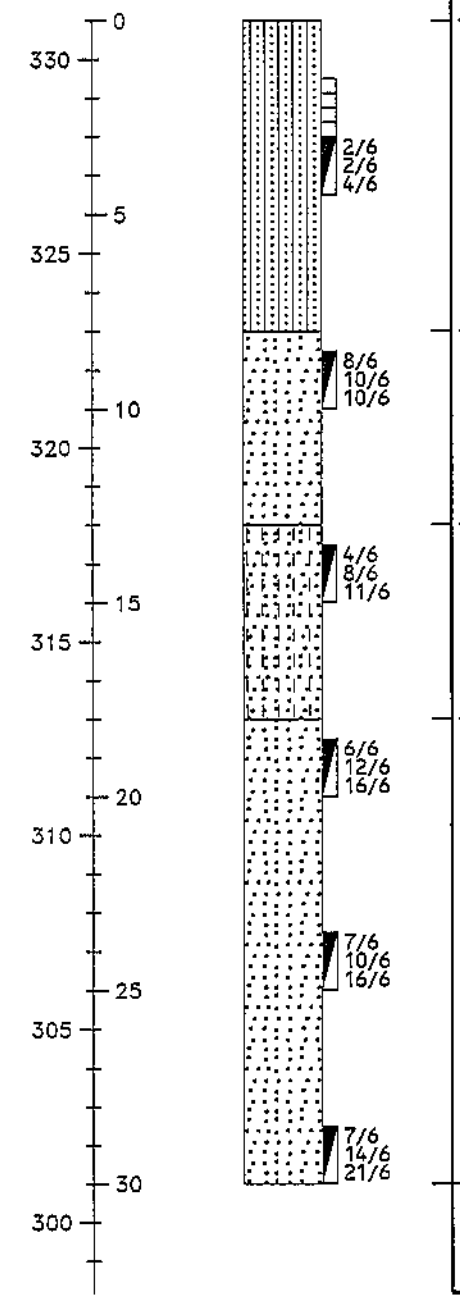
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; loose, moist, fine, brown	DD = 104 pcf	--	7
						7
	2/6 2/6 4/6				6	
	8/6 10/6 10/6	SP	SAND, Poorly Graded; medium dense, moist, fine, yellowish-brown		20	6
	4/6 8/6 11/6	SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine, yellowish-brown		19	5
	6/6 12/6 16/6	SP	SAND, Poorly Graded; medium dense, damp, fine to medium, yellowish-brown		28	3
	7/6 10/6 16/6		Fine		26	5
	7/6 14/6 21/6		Dense, fine to medium		35	4
			Bottom of Boring at 30 Feet			

Notes:

Figure Number B-56

THE TWINING LABORATORIES, INC. EST. 1893

SOIL TEST BORING SYMBOLIC LOG

BORING B-57

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/09/04

Logged By: D. Ledgerwood

Elevation: 318 Feet

Drilled By: T.Conley

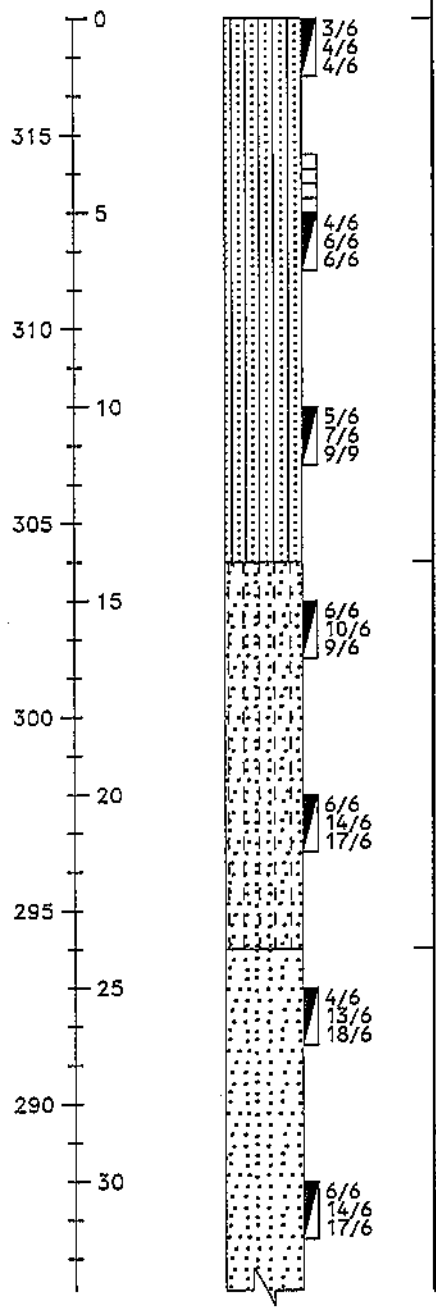
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	SAND, Silty; loose, moist, fine, brown to dark-brown		8	7
			Medium dense, brown	DD = 104 pcf Φ = 31° C = 124 psf	--	8
			Yellowish-brown to reddish-brown		12	8
					16	8
		SP-SM	SAND, Poorly Graded with Silt; medium dense, damp, fine, yellowish-brown		19	5
			Dense		31	4
		SP	SAND, Poorly Graded; dense, damp, fine, yellowish-brown		31	3
					31	4

Notes:

Figure Number B-57

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-57

Project: Fitch Park, Clark Realty

Project Number: TLB82604.01

Location: Monterey, CA

Date: 03/09/04

Logged By: D. Ledgerwood

Elevation: 318 Feet

Drilled By: T.Conley

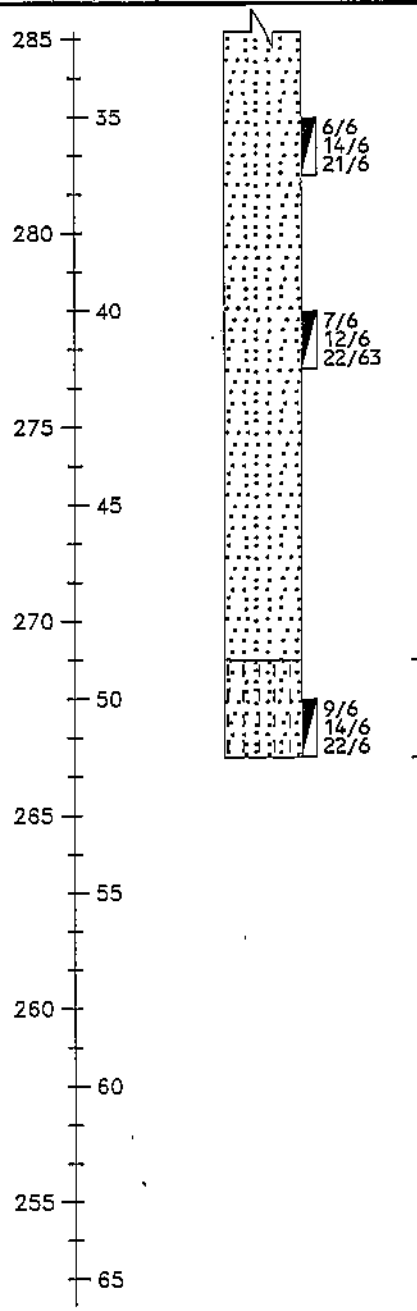
Depth to Groundwater: N/E

Drill Type: CME 75

Cased to Depth: N/A

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
					35	4
					34	4
		SP-SM	SAND, Poorly Graded with Silt; dense, damp, fine, yellowish-brown		36	5
			Bottom of Boring at 51.5 Feet			

Notes:

Figure Number B-57

THE TWINING LABORATORIES, INC. EST. 1898

SOIL TEST BORING SYMBOLIC LOG

BORING B-58

Project: Fitch Park, Clark Realty

Location: Monterey, CA

Logged By: D. Ledgerwood

Drilled By: T.Conley

Drill Type: CME 75

Auger Type: 6 5/8 " O.D. Hollow Stem Auger

Project Number: TLB82604.01

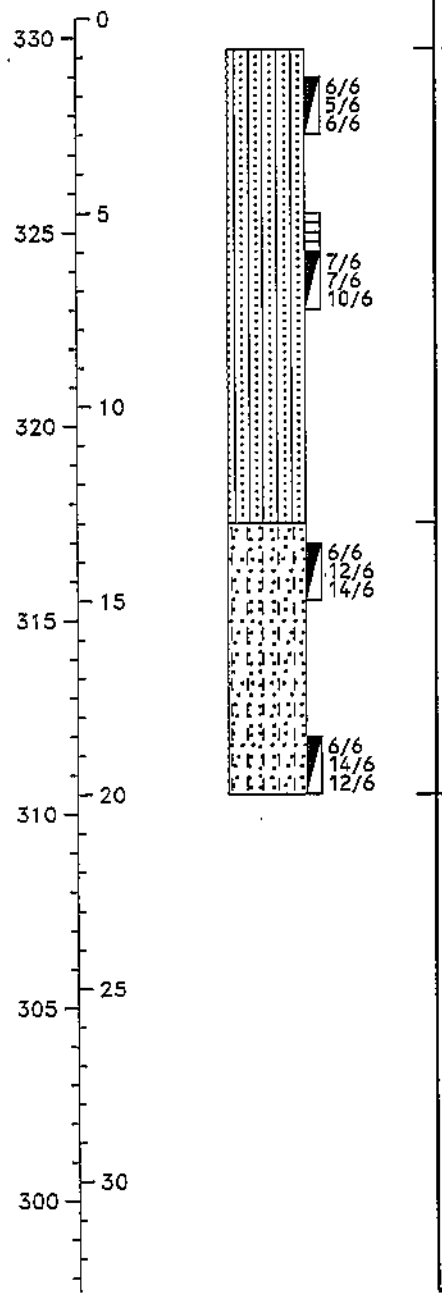
Date: 03/09/04

Elevation: 330.5 Feet

Depth to Groundwater: N/E

Cased to Depth: N/A

Hammer Type: Trip



ELEVATION/ DEPTH (feet)	SOIL SYMBOLS SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Soil Description	Remarks	N-value	Moisture Content %
		SM	AC = 3 inches Base = 6 inches			
			SAND, silty; medium dense, damp to moist, fine, yellowish-brown		11	5
				DD = 98 pcf	--	6
					17	8
		SP-SM	SAND, Poorly Graded with Silt; medium dense, moist, fine, yellowish-brown		26	6
			Damp		26	4
			Bottom of Boring at 20 Feet			

Notes:

Figure Number B-58

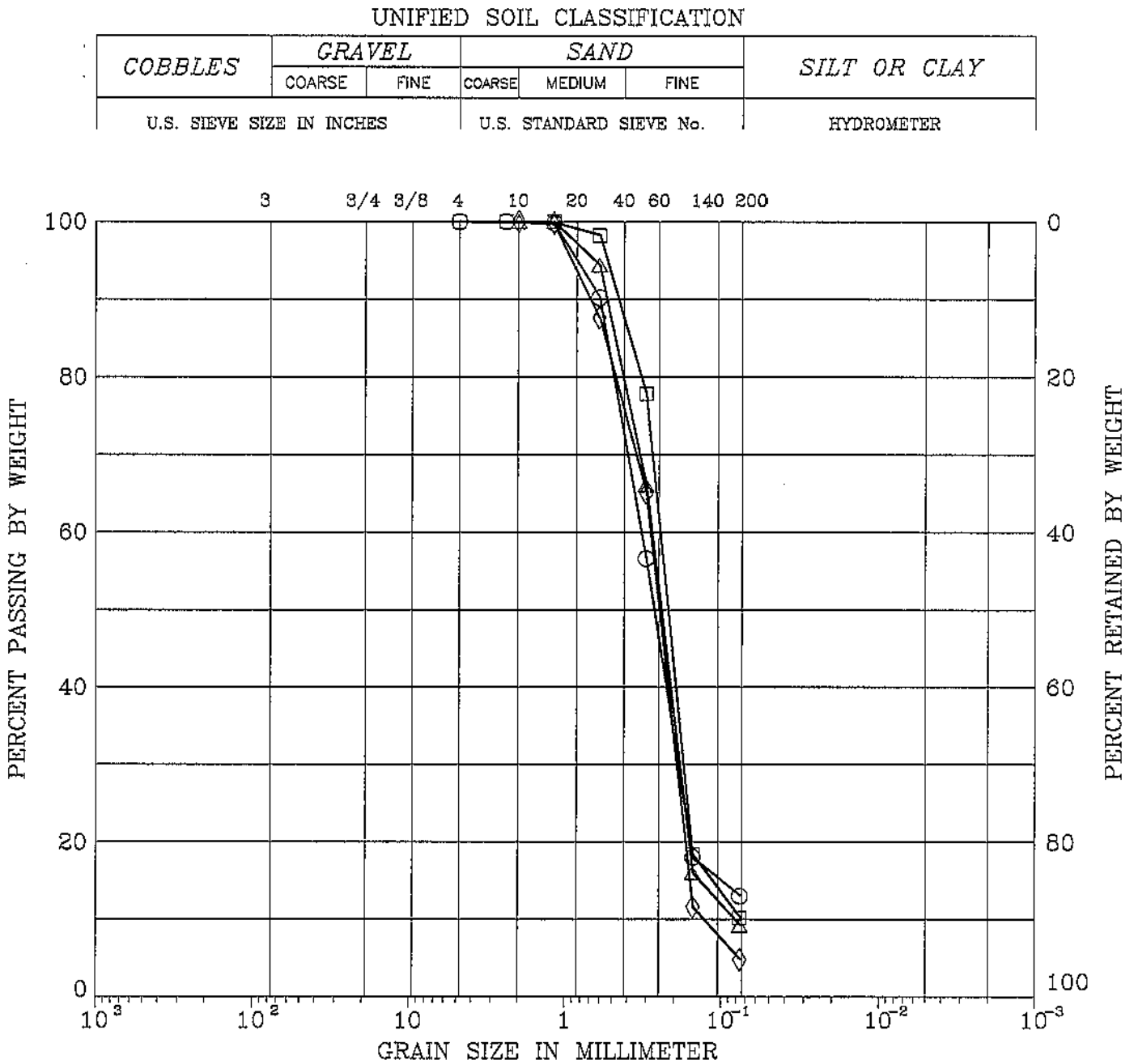
APPENDIX C

RESULTS OF LABORATORY TESTS

This appendix contains the individual results of the following tests. The results of the moisture content and dry density tests are included on the test boring logs in Appendix B. These data, along with the field observations, were used to prepare the final test boring logs in Appendix B.

These Included:	Number of Tests:	To Determine:
Natural Moisture (ASTM D2216)	323	Moisture contents representative of field conditions at the time the sample was taken.
Natural Density (ASTM D2216)	69	Dry unit weight of sample representative of in-situ or in-place undisturbed condition.
Consolidation (ASTM D2435)	12	The amount and rate at which a soil sample compresses when loaded, and the influence of saturation on its behavior.
Moisture-Density Relationship (ASTM D1557)	4	The optimum (best) moisture content for compacting soil and the maximum dry unit weight (density) for a given compactive effort.
R-Value (ASTM D2844)	30	The capacity of a subgrade or subbase to support a pavement section designed to carry a specified traffic load.

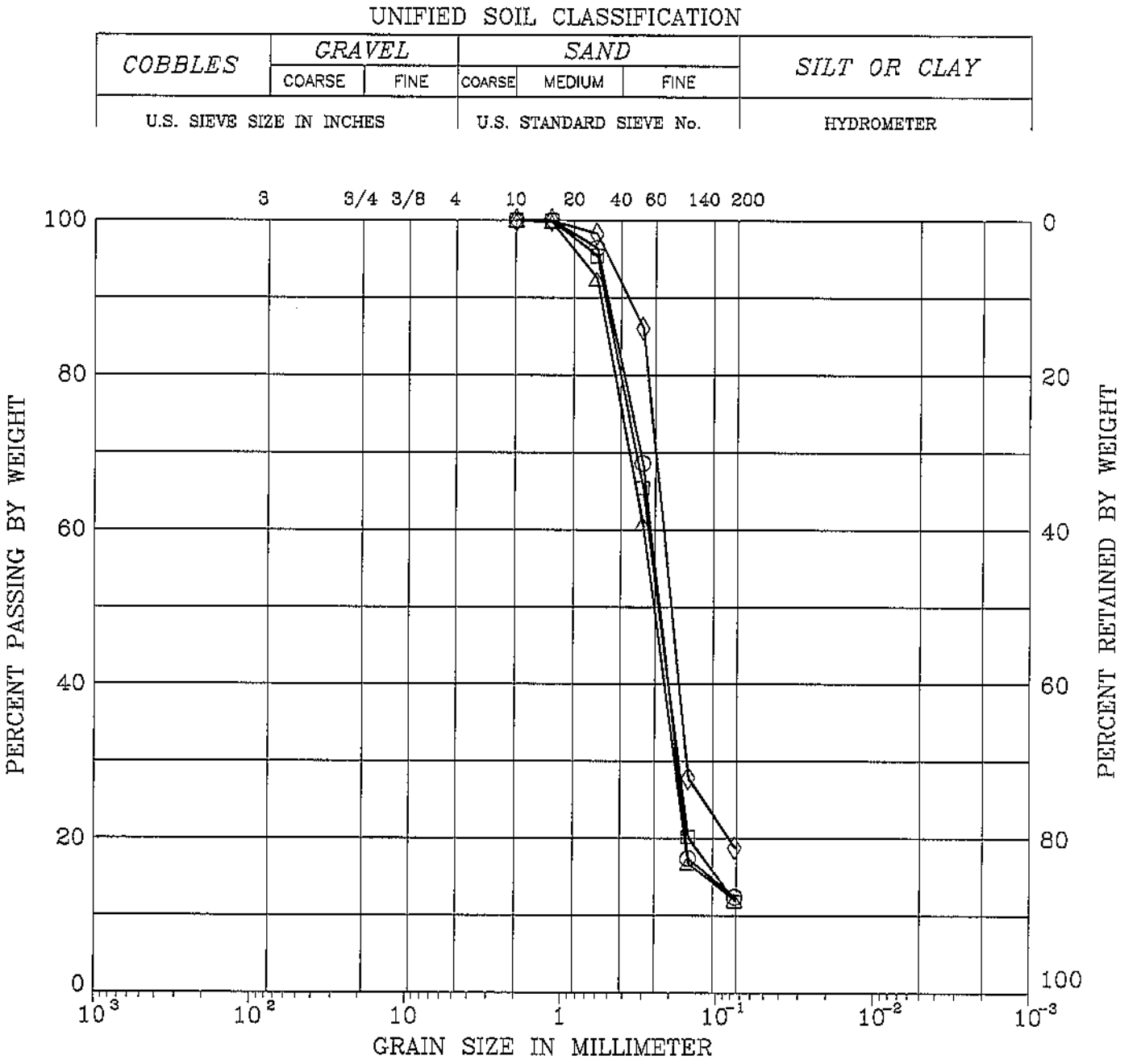
These Included:	Number of Tests:	To Determine:
Grain-Size Distribution (ASTM D422)	8	Size and distribution of soil particles, i.e., clay, silt, sand, and gravel.
Direct Shear (ASTM D3080)	6	Soil shearing strength under varying loads and/or moisture conditions.
Sulfate Content (ASTM D4327)	3	Percentage of water-soluble sulfate as (SO_4) in soil samples. Used as an indication of the relative degree of sulfate attack on concrete and for selecting the cement type.
Chloride Content (ASTM D4327)	3	Percentage of soluble chloride in soil. Used to evaluate the potential attack on encased reinforcing steel.
Resistivity (ASTM D1125)	3	The potential of the soil to corrode metal.
pH (ASTM D4972)	3	The acidity or alkalinity of subgrade material



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	B-38	0-1.5			SILTY SAND (SM)
□	B-46	3.5-5			POORLY-GRADED SAND with Silt (SP-SM)
△	B-47	5-6.5			POORLY-GRADED SAND with Silt (SP-SM)
◇	B-55	15-16.5			POORLY-GRADED SAND (SP)

Remark :

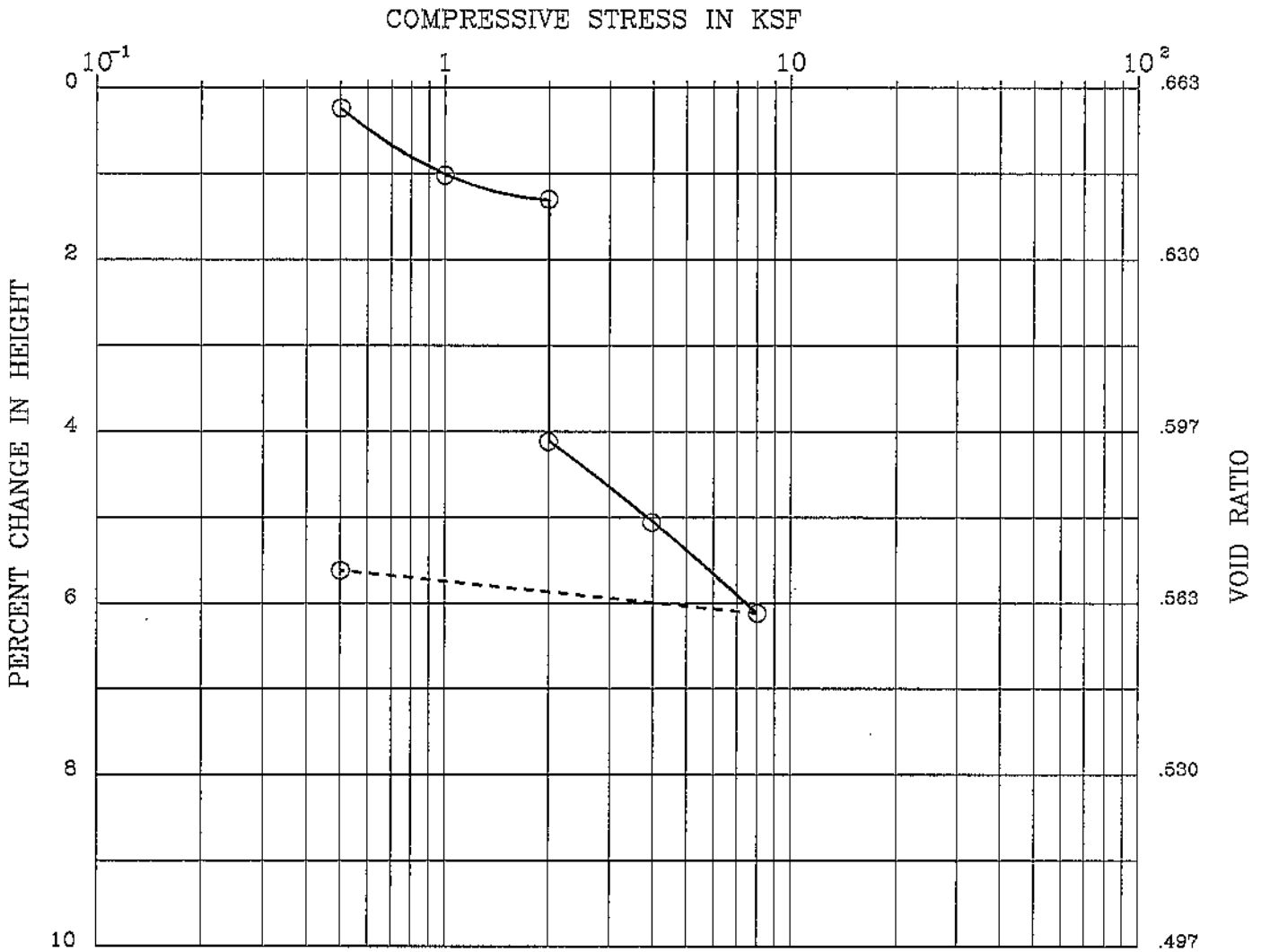
B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	GRAIN SIZE DISTRIBUTION Figure No. 1



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	B-4	3.5-5			SILTY SAND (SM)
□	B-19	1.5-3			Poorly Graded Sand with Silt (SP-SM)
△	B-30	3.5-5			SILTY SAND (SM)
◇	B-37	2.5-4			SILTY SAND (SM)

Remark :

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	GRAIN SIZE DISTRIBUTION Figure No. 2

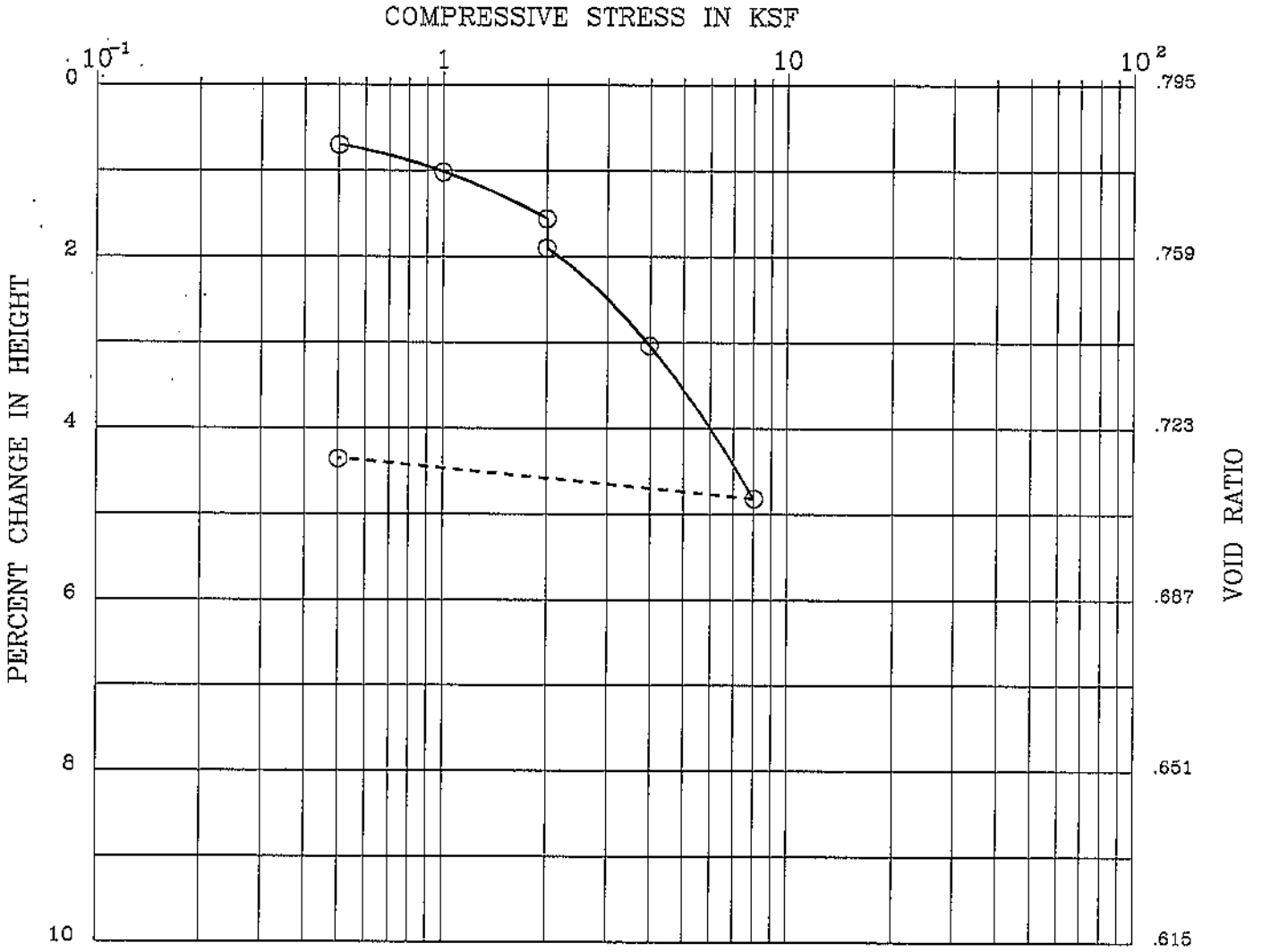


BORING	: B-2	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 0.8-2.3	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	7.1	99.6	28	.663
FINAL	15.8	105.6	74	.568

Remark : Saturated at 2ksf

B82604.01	OMC 2 3 Fitch Park Mil. Housing
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 3

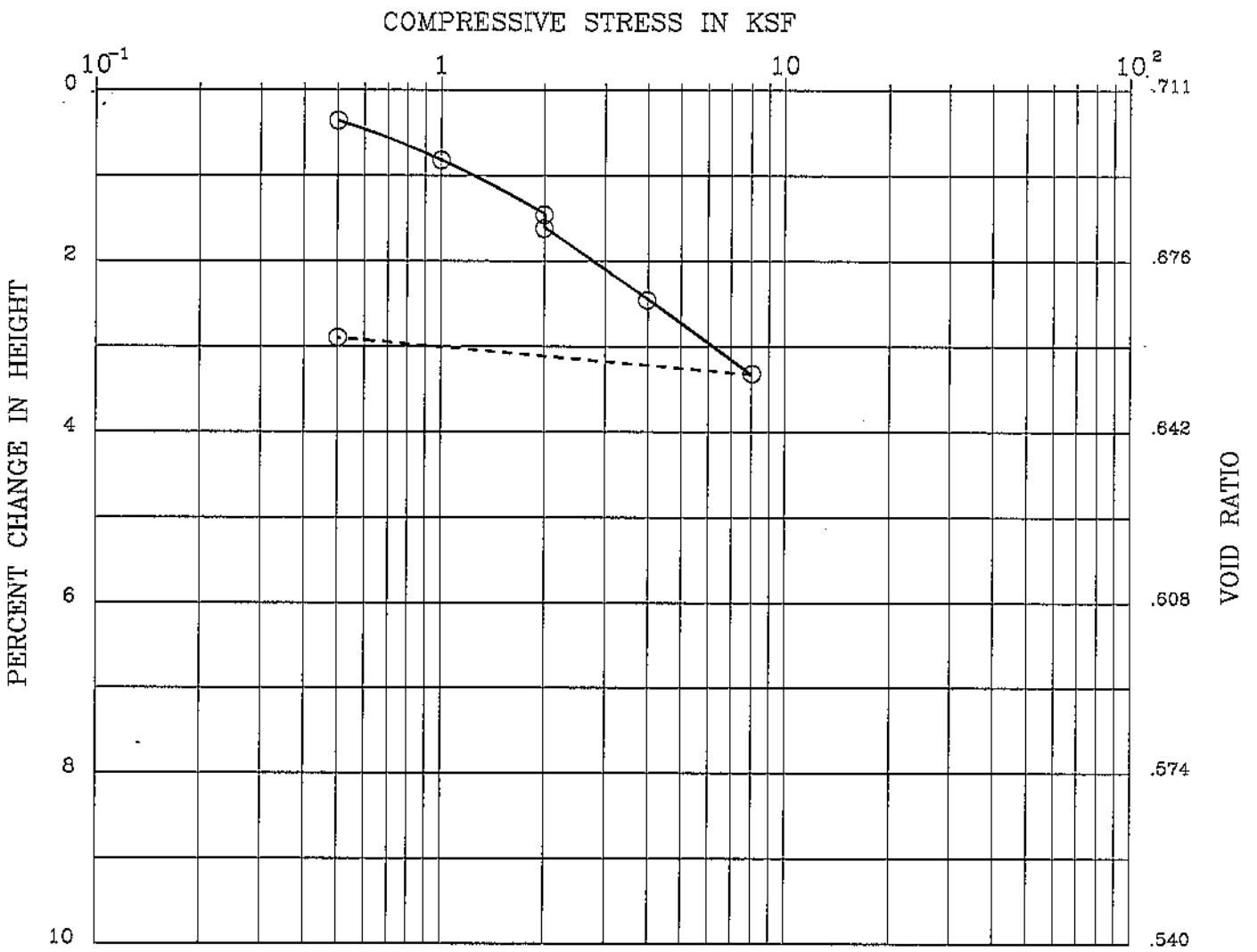


BORING	: B-13	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 3.5-5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	11.6	92.2	39	.795
FINAL	17.9	95.6	65	.732

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 4

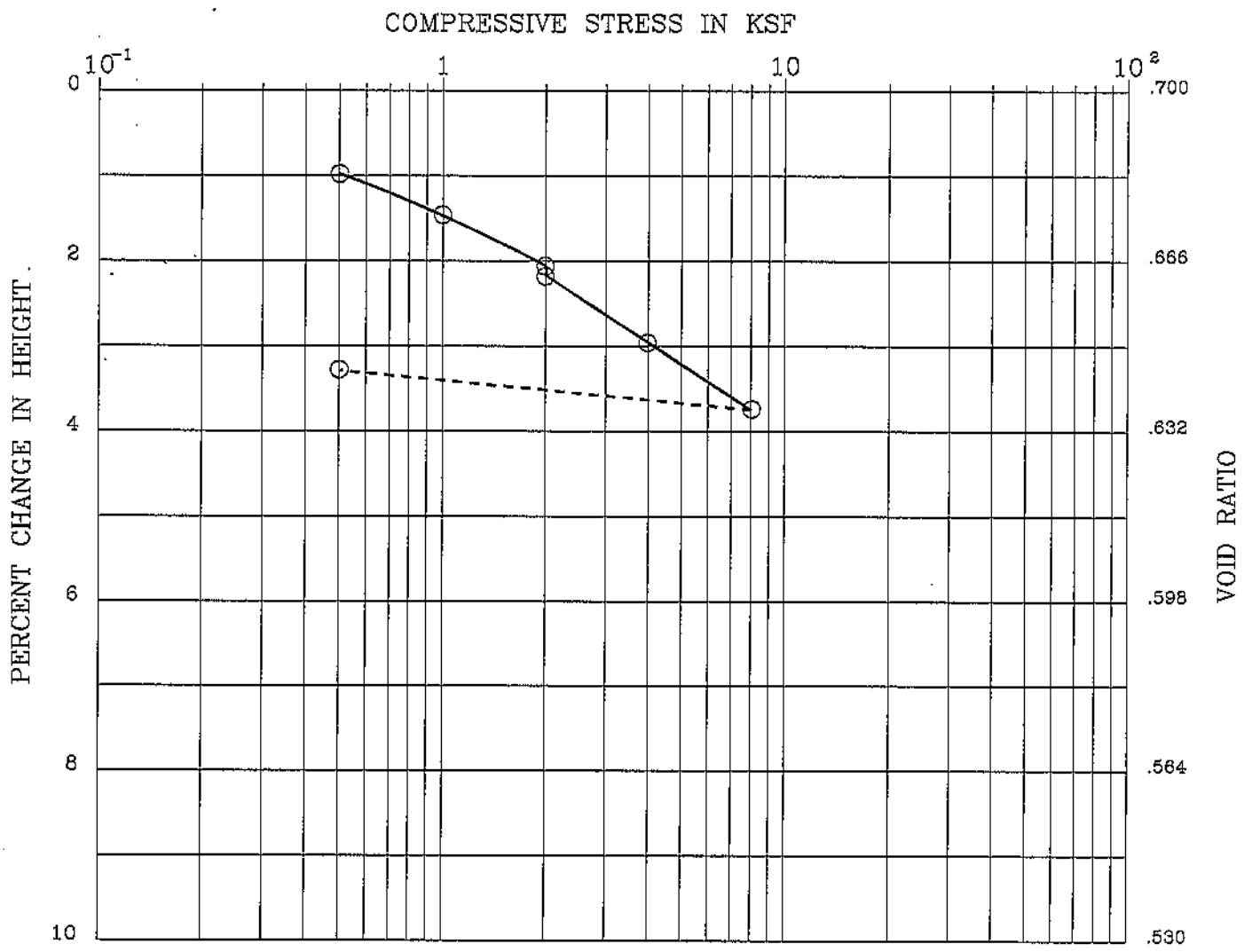


BORING	: B-17	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 1.5-3	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	12.0	96.8	45	.711
FINAL	17.6	99.7	71	.661

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 5

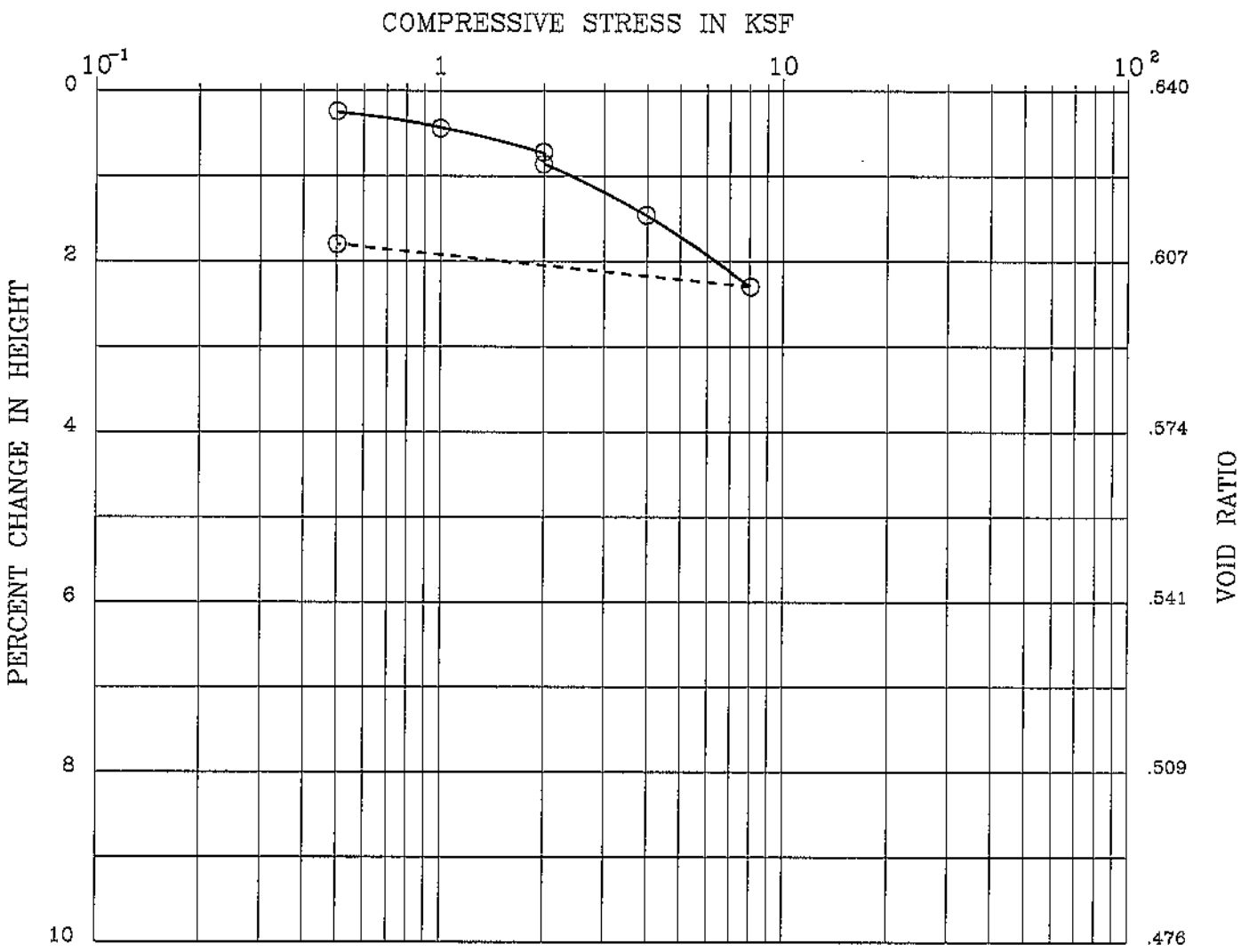


BORING	: B-20	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 0-1.5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	10.6	97.4	40	.700
FINAL	20.8	100.7	86	.644

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 6

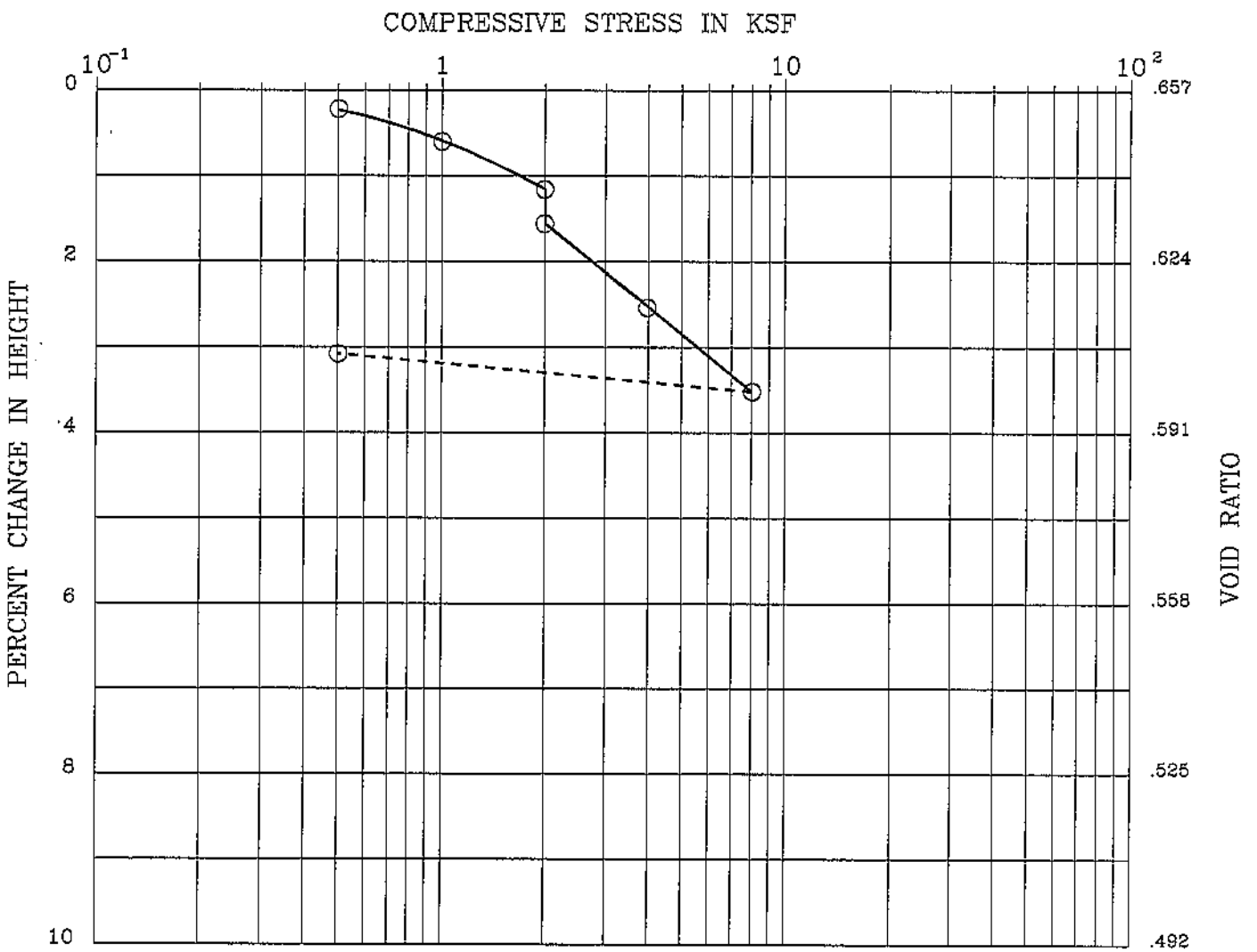


BORING	: B-28	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 5-6.5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	11.8	101.0	49	.640
FINAL	17.8	102.8	77	.610

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 7



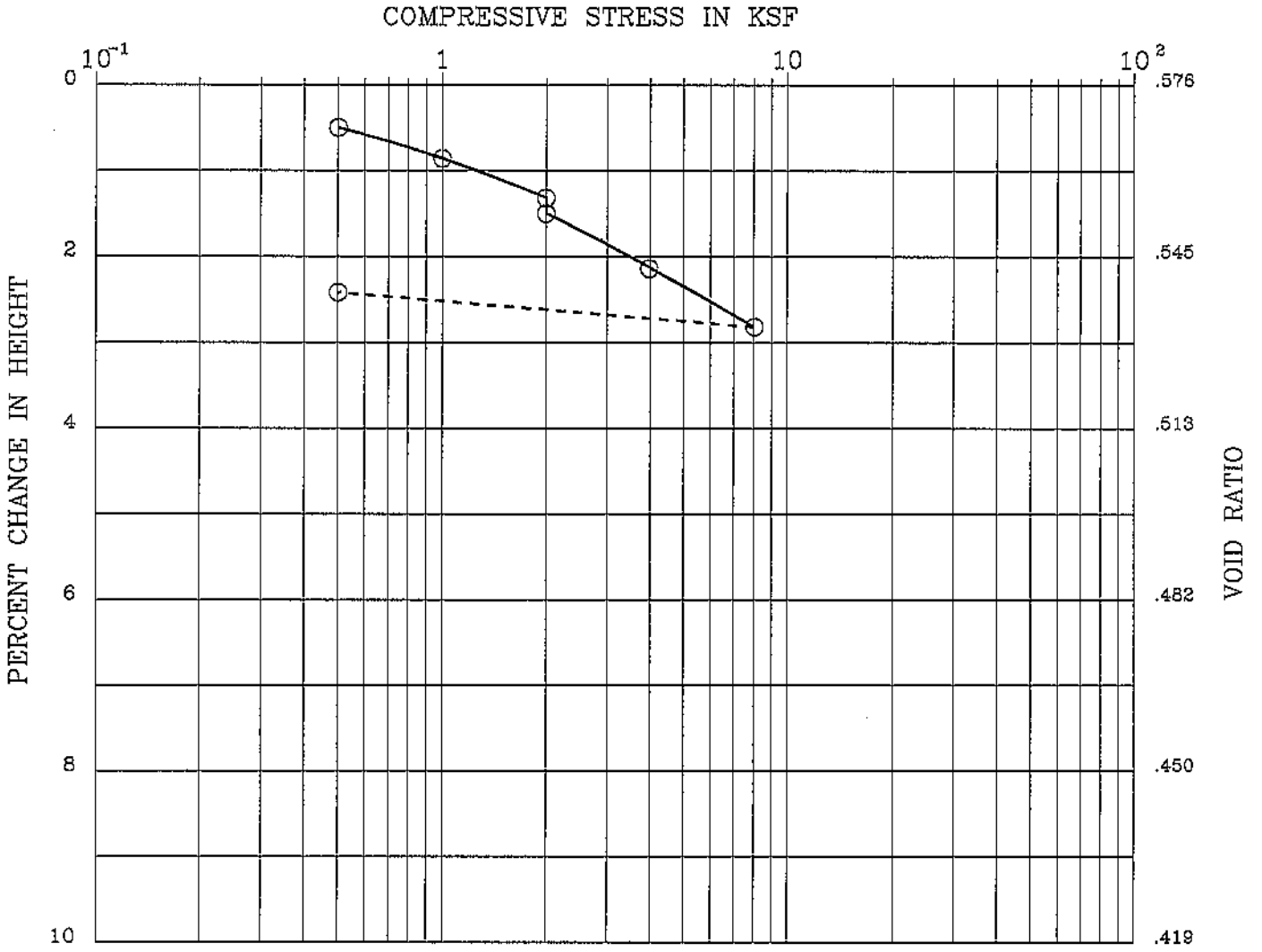
BORING : B-33
DEPTH (ft) : 3.5-5
SPEC. GRAVITY : 2.65

DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT :
PLASTIC LIMIT :

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	9.6	99.9	39	.657
FINAL	18.4	103.1	81	.606

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 8

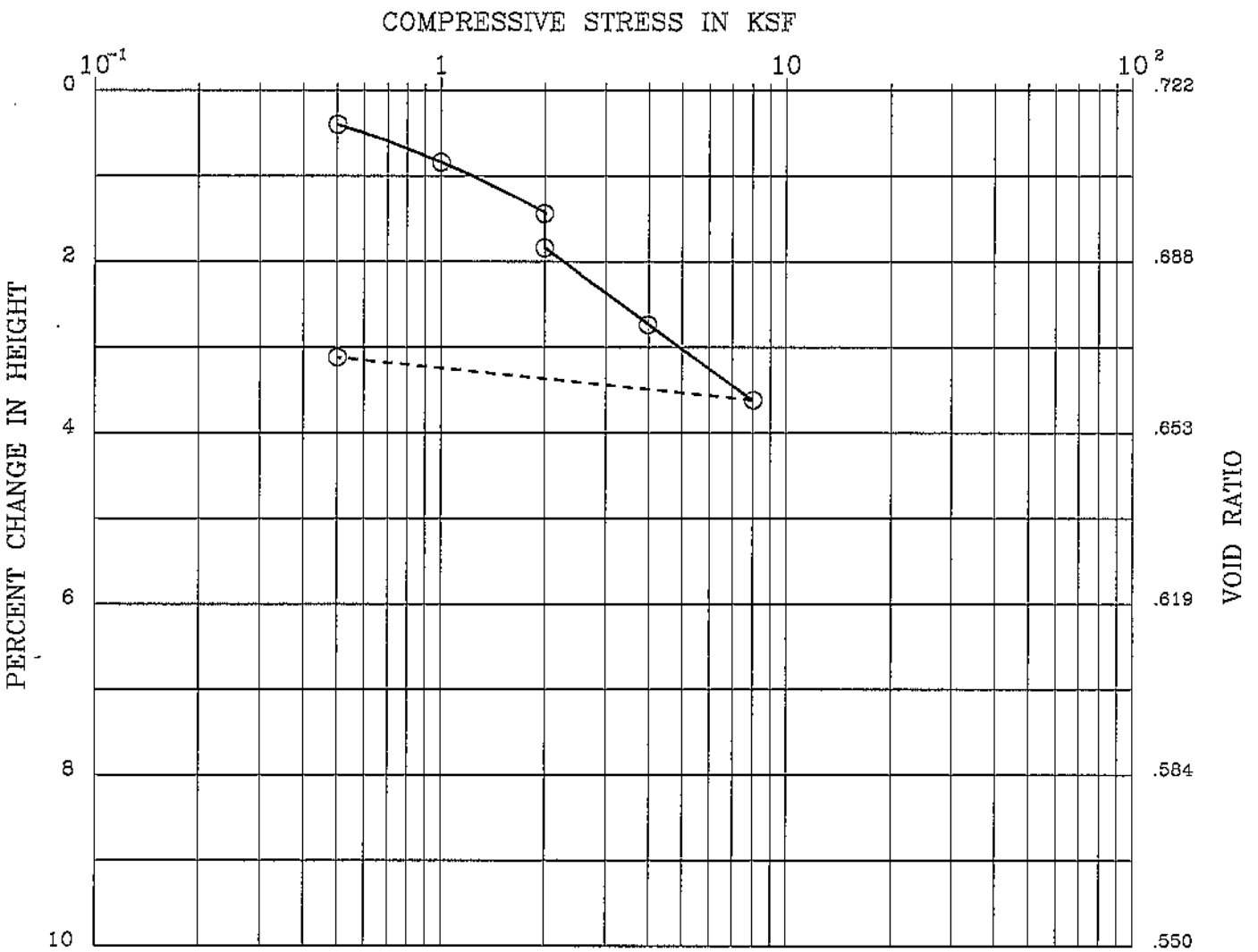


BORING	: B-40	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 0-1.5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	8.3	105.0	38	.576
FINAL	16.4	107.7	81	.537

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 9



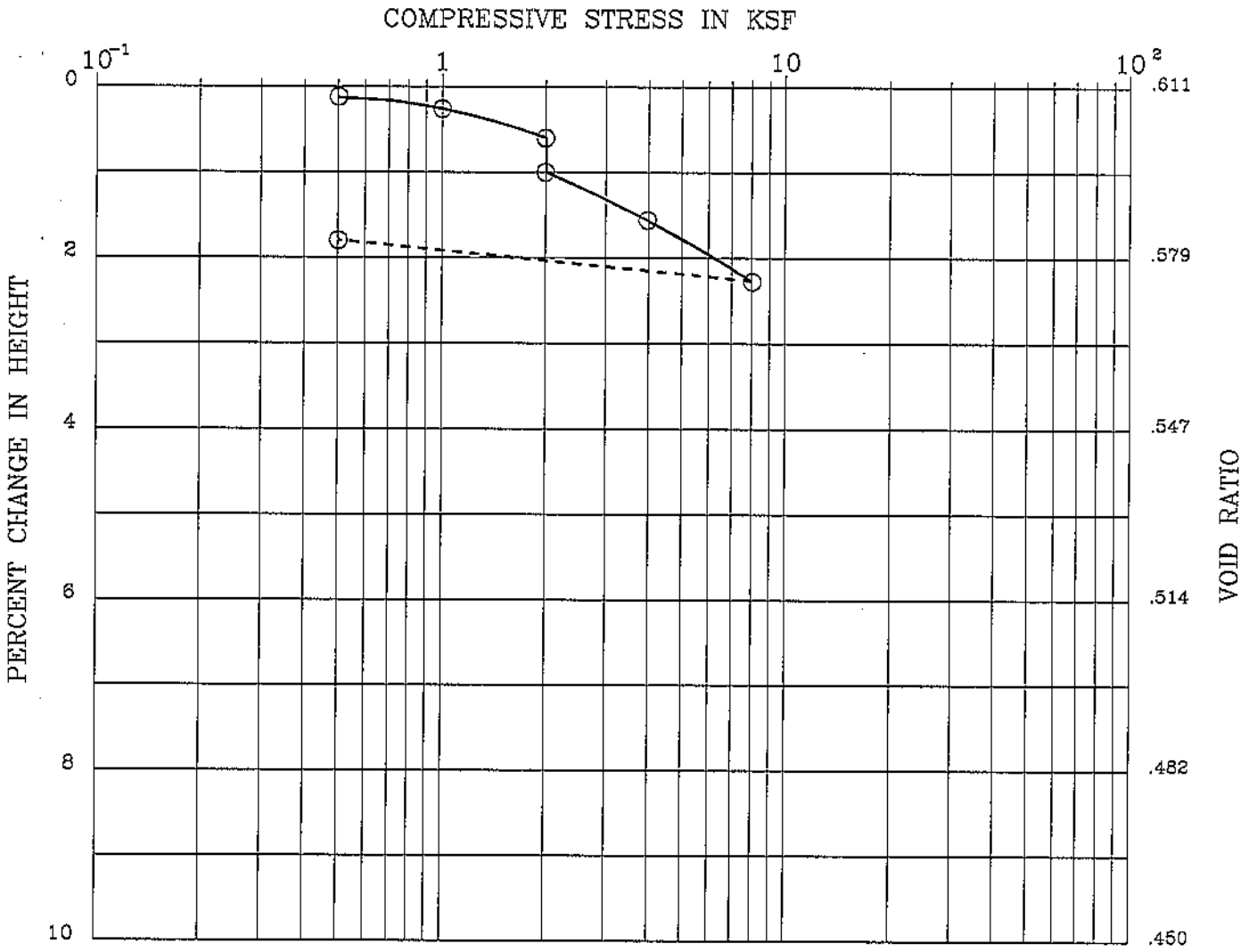
BORING : B-42
DEPTH (ft) : 5-6.5
SPEC. GRAVITY : 2.65

DESCRIPTION : Poorly Graded SAND (SP)
LIQUID LIMIT :
PLASTIC LIMIT :

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	6.9	96.1	25	.722
FINAL	21.4	99.3	85	.667

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 10

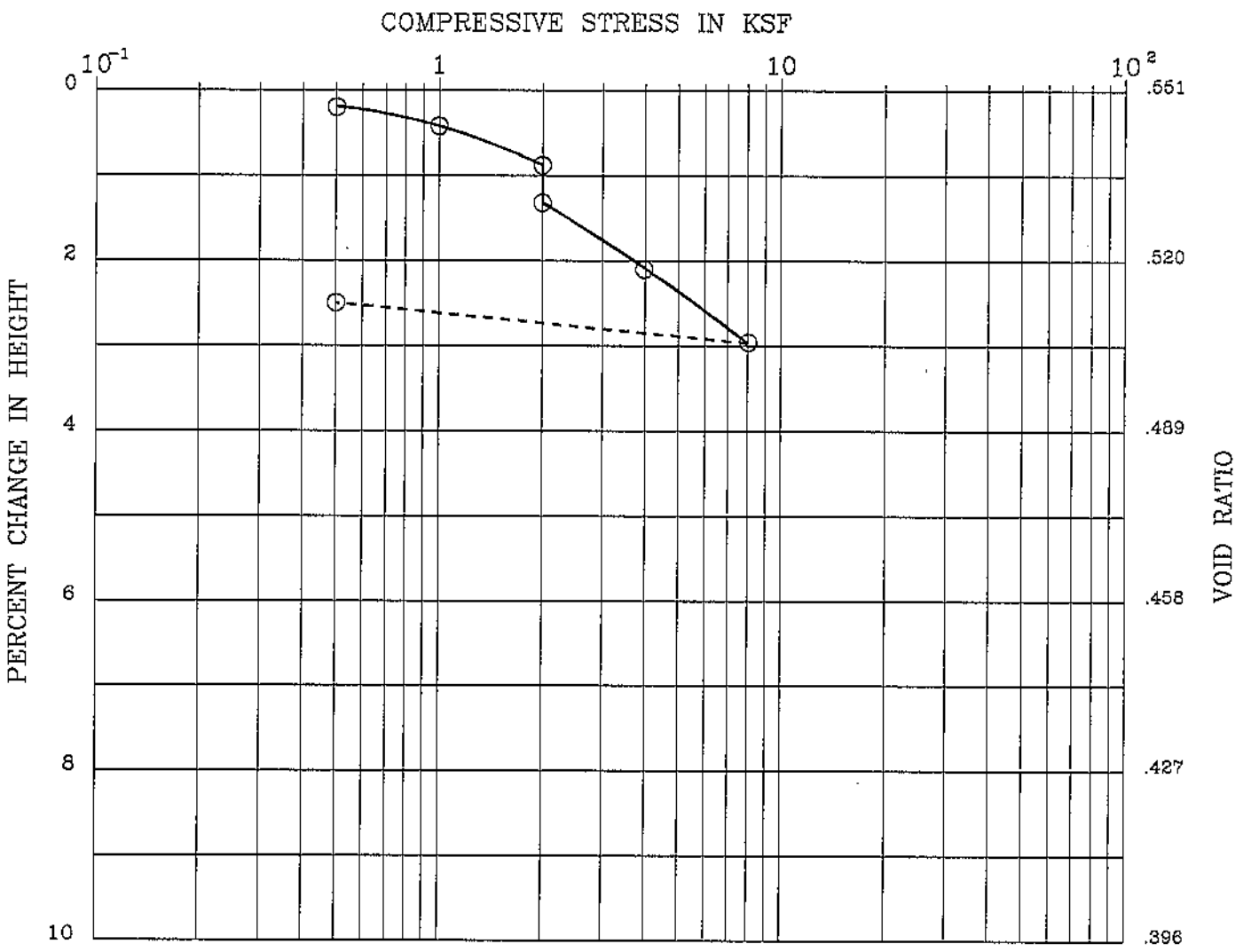


BORING	: B-44	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 3.5-4.5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	8.2	102.8	36	.611
FINAL	19.3	104.6	88	.582

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 11

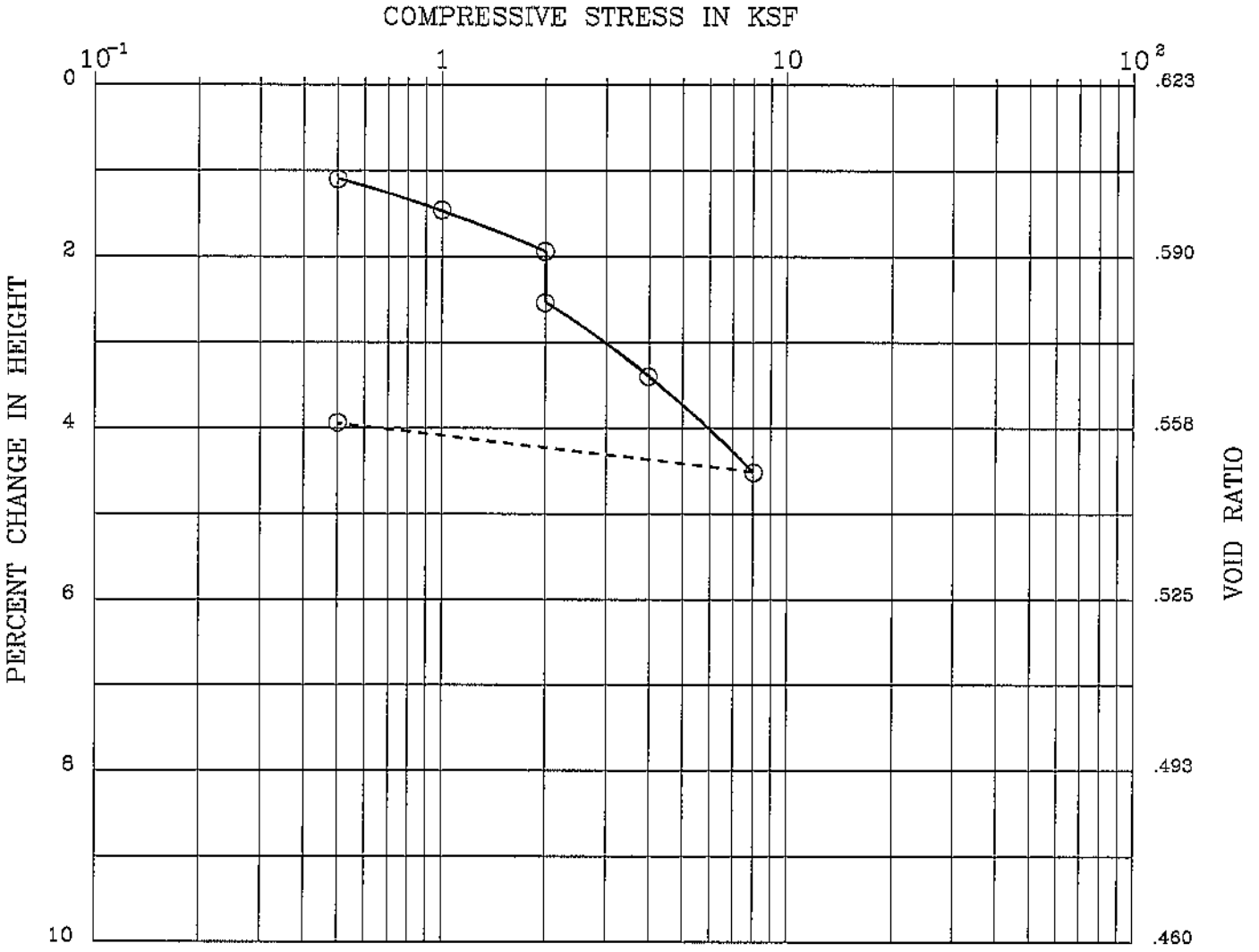


BORING	: B-49	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 3.5-5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	11.0	106.7	53	.551
FINAL	18.3	109.5	95	.512

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 12

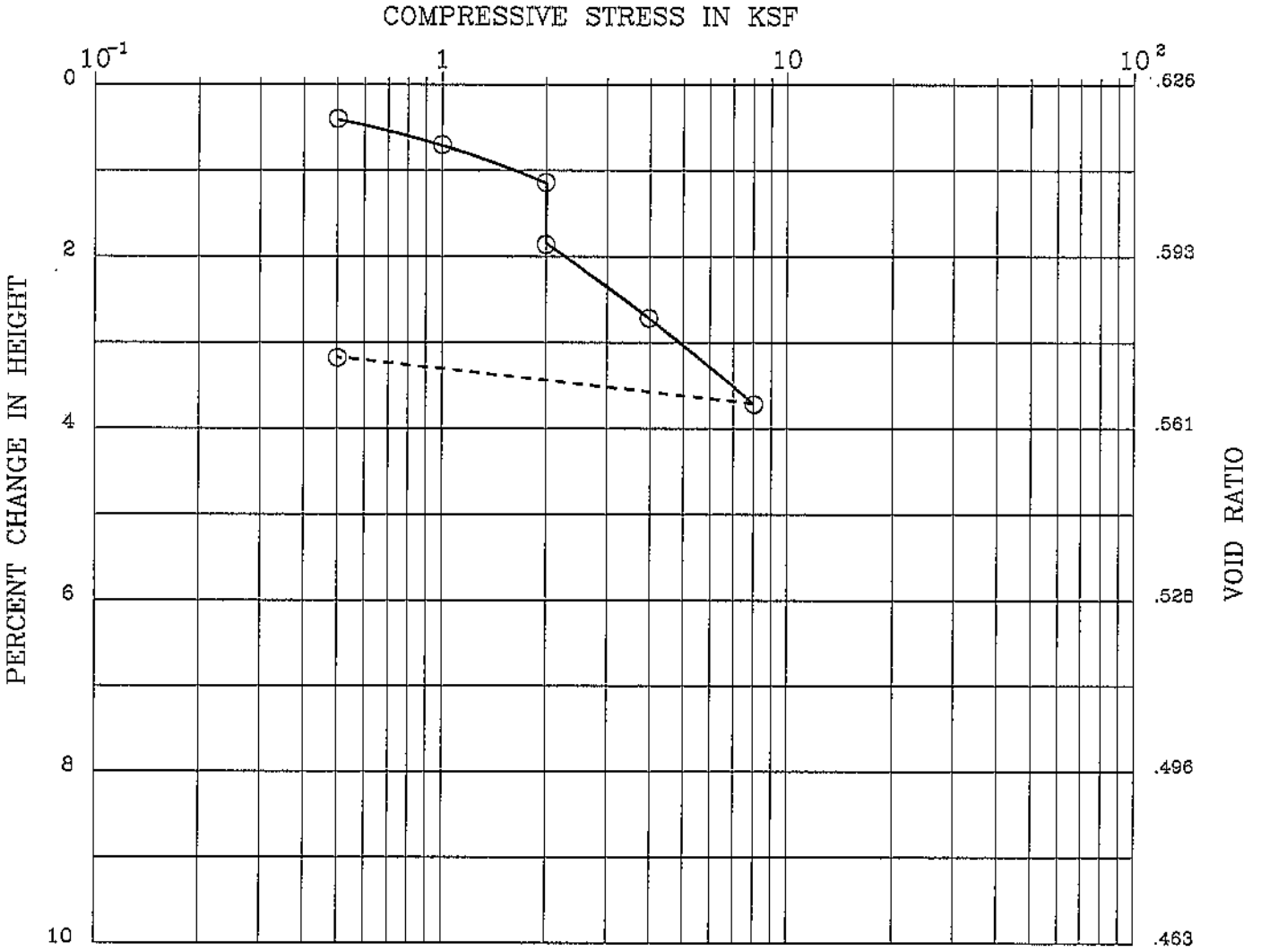


BORING	: B-55	DESCRIPTION	: Silty SAND (SM)
DEPTH (ft)	: 3.5-5	LIQUID LIMIT	:
SPEC. GRAVITY	: 2.65	PLASTIC LIMIT	:

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	9.7	102.0	41	.623
FINAL	19.2	106.3	91	.558

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 13



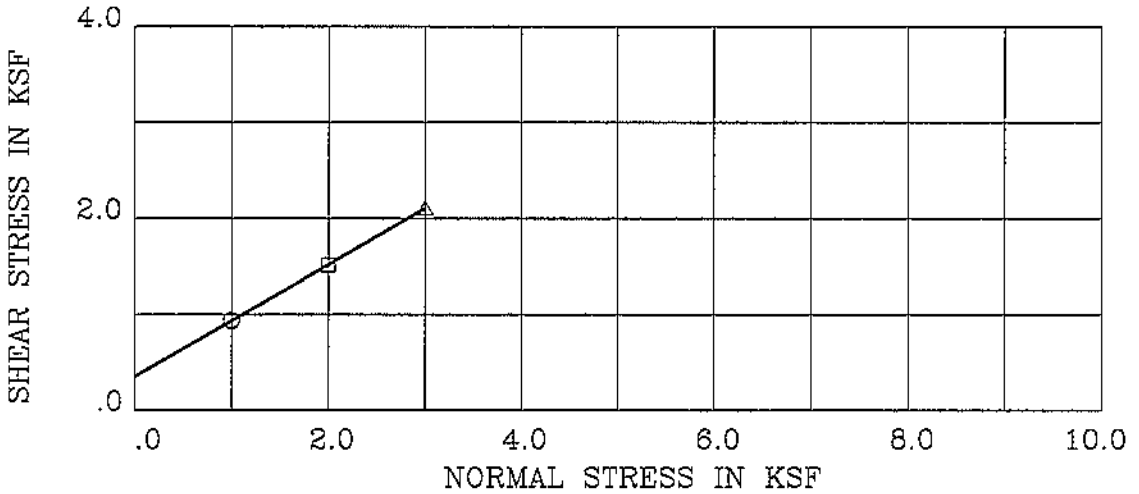
BORING : B-56
DEPTH (ft) : 1.5-3
SPEC. GRAVITY : 2.65

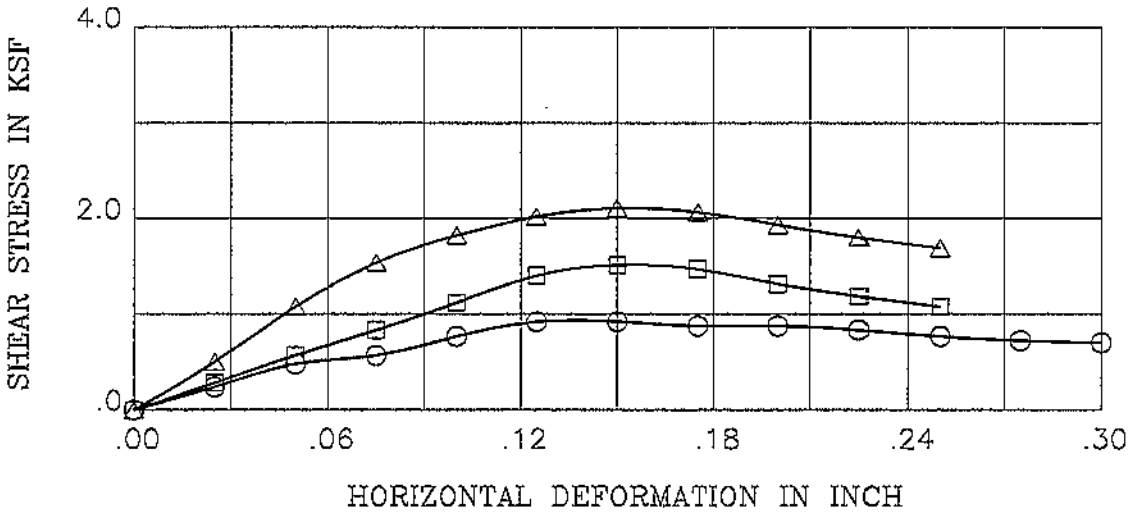
DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT :
PLASTIC LIMIT :

	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	PERCENT SATURATION	VOID RATIO
INITIAL	8.5	101.8	36	.626
FINAL	19.5	105.2	90	.574

Remark : Saturated at 2ksf

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	CONSOLIDATION TEST Figure No. 14



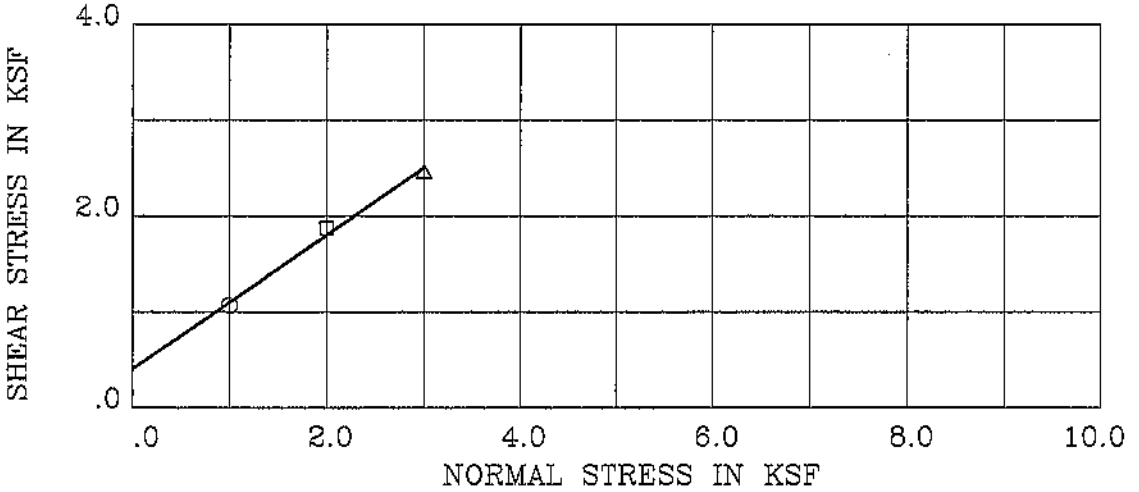


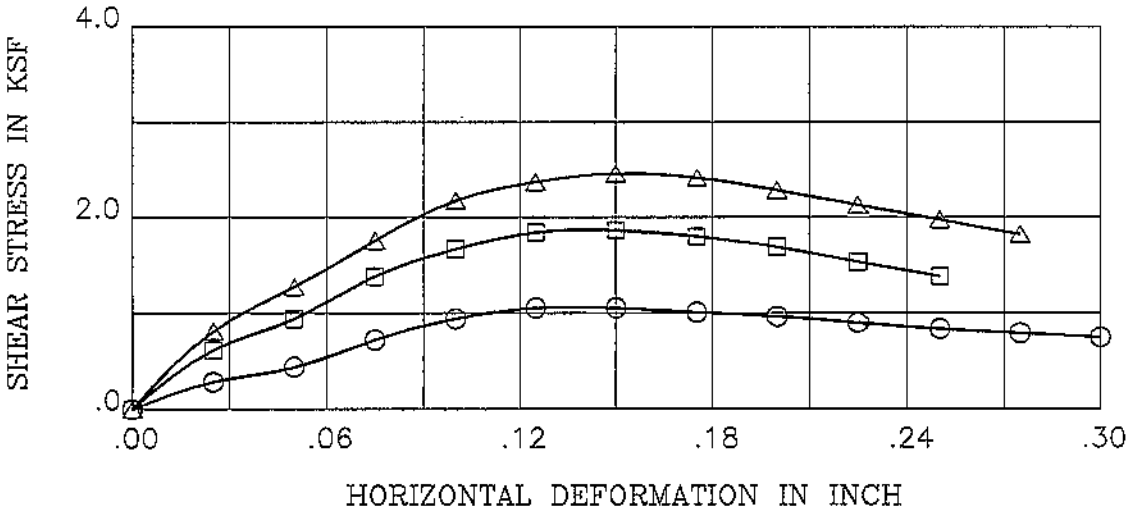
BORING/SAMPLE : B-2 DEPTH (ft) : .8-2.3
DESCRIPTION :Silty SAND (SM)
STRENGTH INTERCEPT (C) : .349 KSF
FRICTION ANGLE (PHI) : 30.4 DEG
(PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	18.1	106.8	.549	1.00	.94	.70
□	16.5	109.9	.505	2.00	1.52	1.08
△	18.0	105.8	.562	3.00	2.11	1.69

Remark :

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No. 15



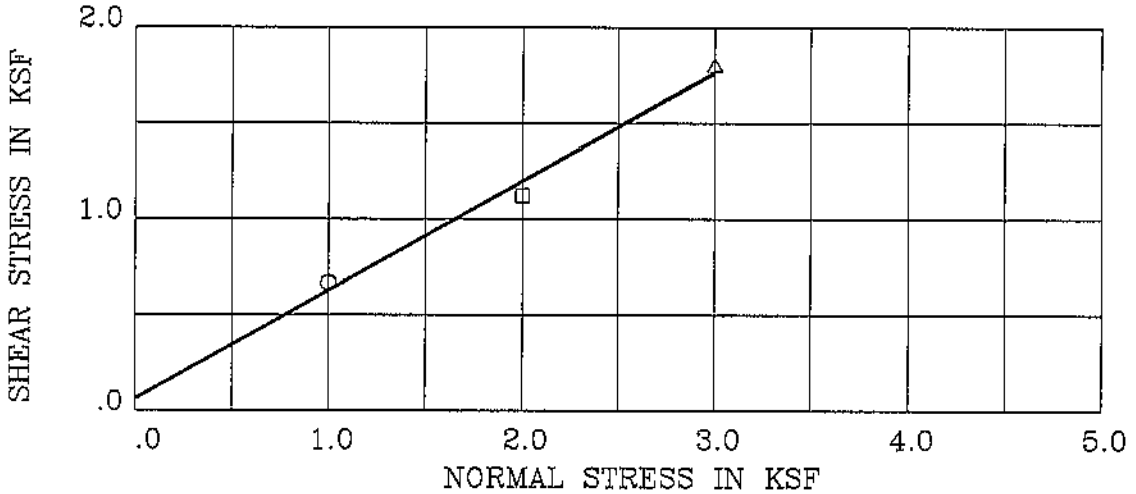


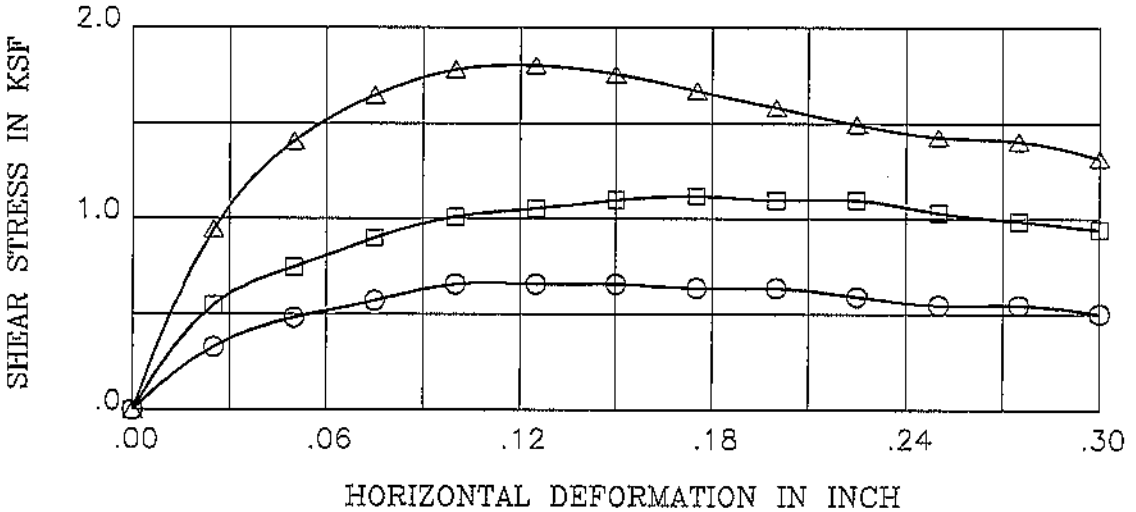
BORING/SAMPLE : B-17 DEPTH (ft) : 1.5-3
DESCRIPTION : Silty SAND (SM)
STRENGTH INTERCEPT (C) : .403 KSF
FRICTION ANGLE (PHI) : 34.9 DEG
(PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	25.8	96.2	.719	1.00	1.06	.75
□	24.7	96.6	.713	2.00	1.87	1.38
△	25.6	98.0	.687	3.00	2.46	1.82

Remark :

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No. 16



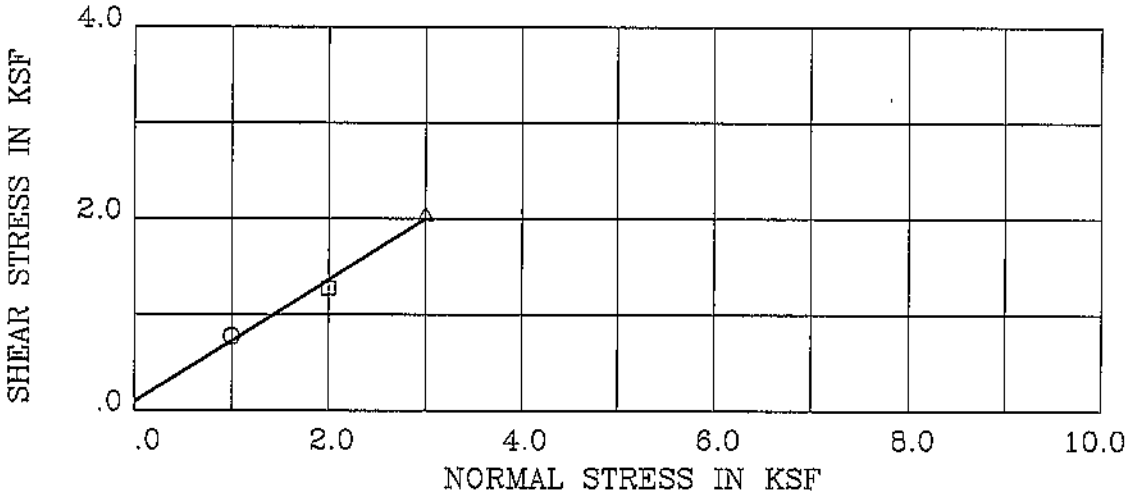


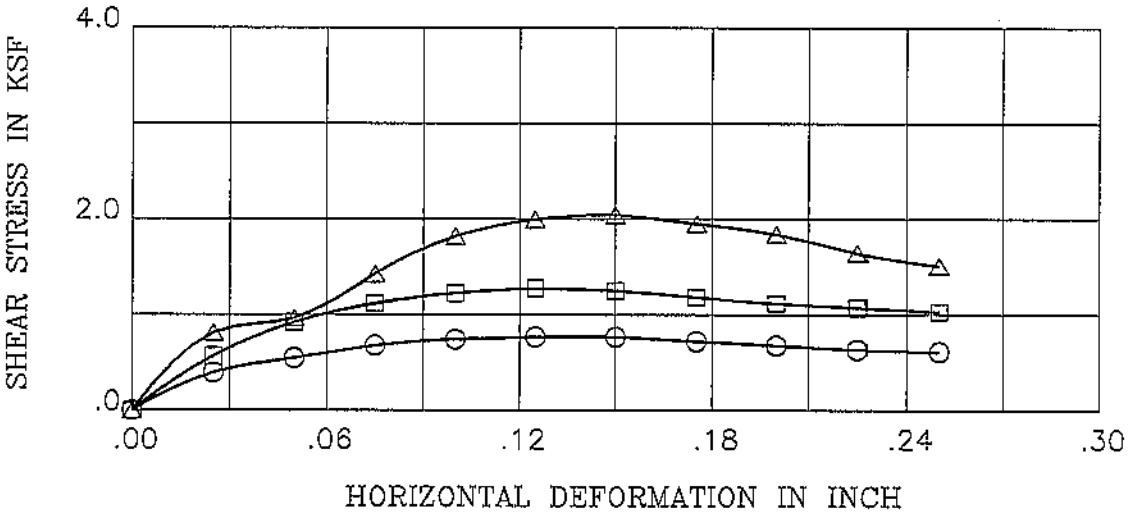
BORING/SAMPLE : B-25 DEPTH (ft) : 1.5-3
DESCRIPTION :Silty SAND (SM)
STRENGTH INTERCEPT (C) : .058 KSF
FRICTION ANGLE (PHI) : 29.6 DEG
(PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	26.4	93.8	.763	1.00	.67	.50
□	25.8	92.6	.786	2.00	1.12	.94
△	22.8	97.1	.702	3.00	1.80	1.32

Remark :

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No. 17



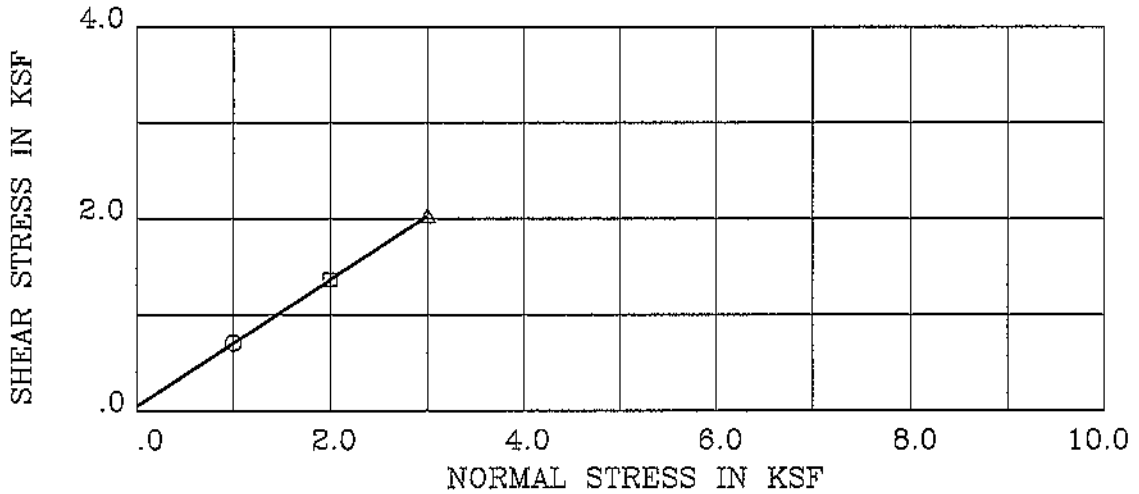


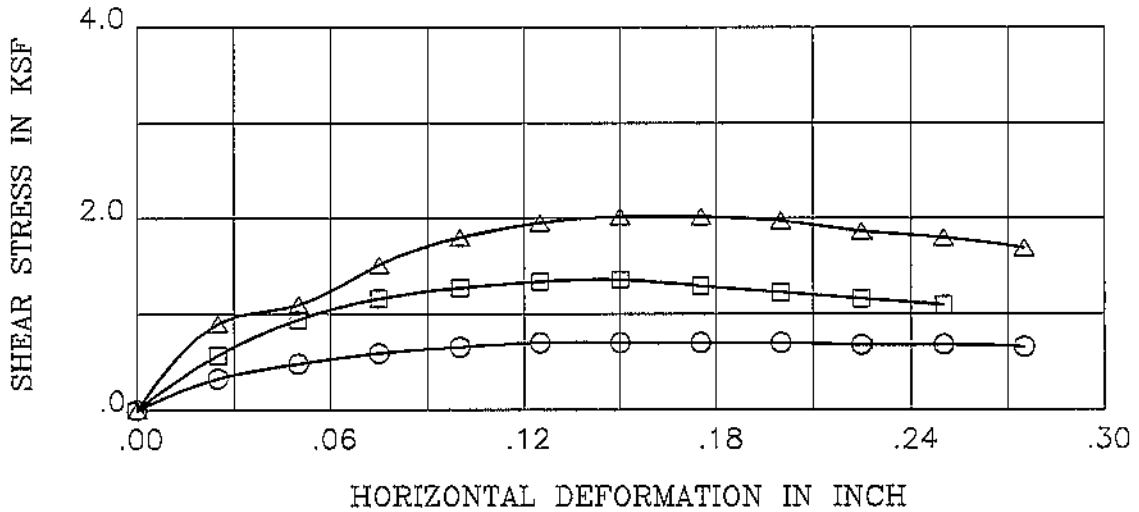
BORING/SAMPLE : B-41 DEPTH (ft) : 5.0~6.5
DESCRIPTION :Silty SAND (SM)
STRENGTH INTERCEPT (C) : .092 KSF
FRICTION ANGLE (PHI) : 32.4 DEG
(PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	18.8	102.8	.608	1.00	.77	.61
□	23.6	94.1	.758	2.00	1.27	1.03
△	19.6	106.1	.559	3.00	2.04	1.51

Remark :

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No. 18



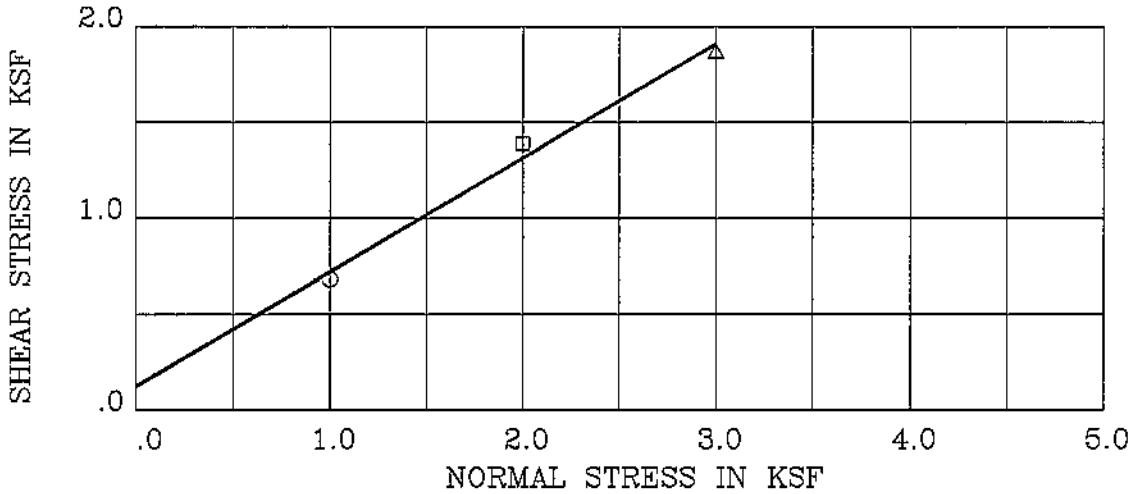


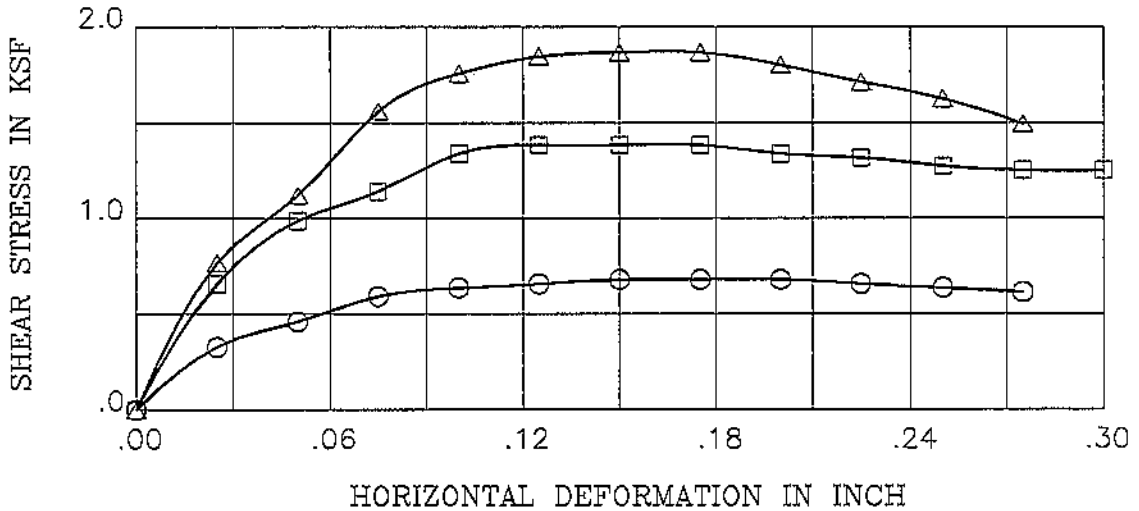
BORING/SAMPLE : B-49 DEPTH (ft) : 3.5-5
DESCRIPTION : Silty SAND (SM)
STRENGTH INTERCEPT (C) : .046 KSF
FRICTION ANGLE (PHI) : 33.4 DEG
(PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	19.9	103.7	.595	1.00	.71	.66
□	18.6	107.8	.535	2.00	1.36	1.10
△	18.8	102.4	.614	3.00	2.03	1.69

Remark :

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No. 19





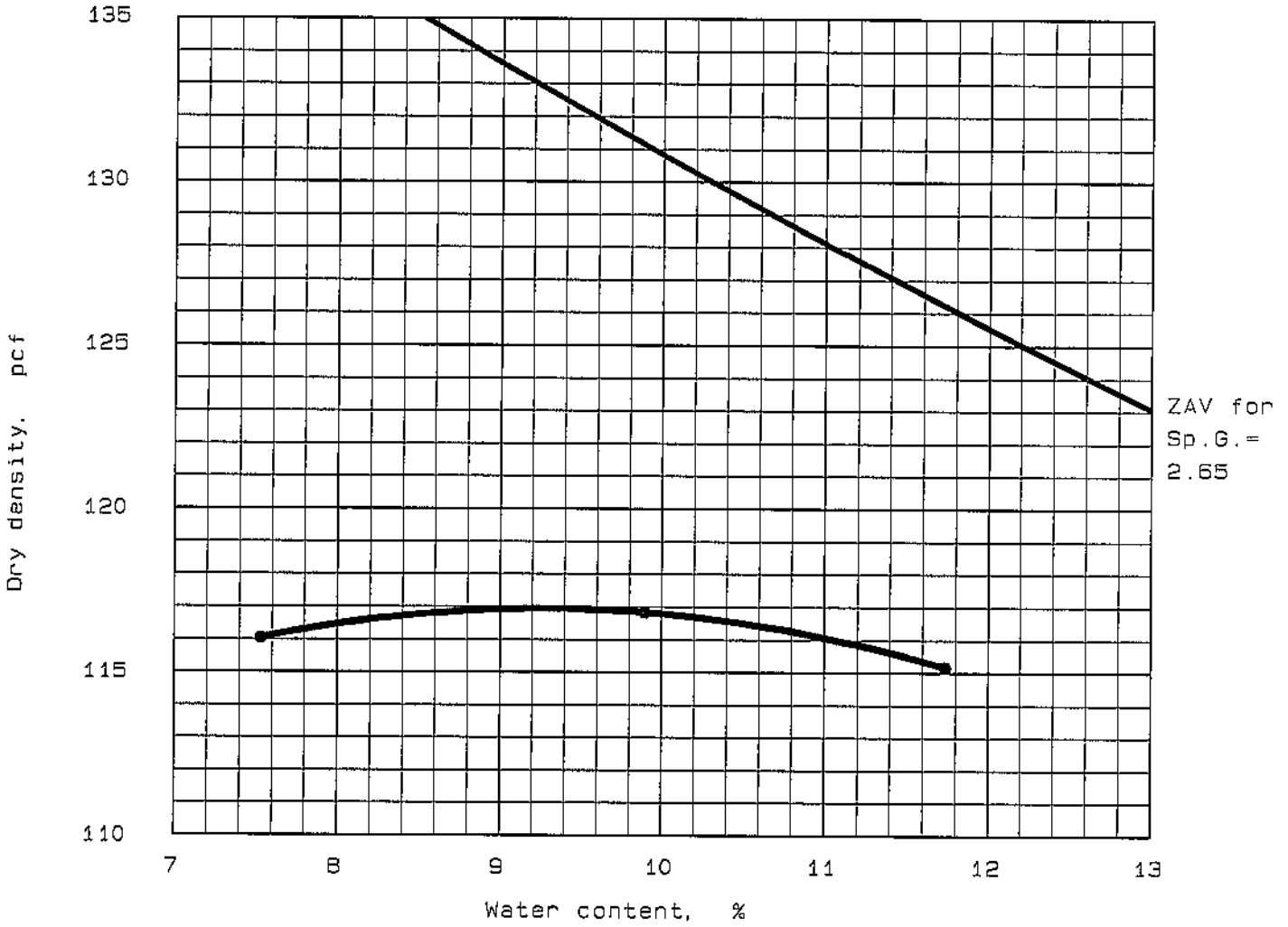
BORING/SAMPLE : B-57 DEPTH (ft) : 3.5-5
DESCRIPTION : Silty SAND (SM)
STRENGTH INTERCEPT (C) : .124 KSF
FRICTION ANGLE (PHI) : 30.7 DEG
(PEAK STRENGTH)

SYMBOL	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	VOID RATIO	NORMAL STRESS (ksf)	PEAK SHEAR (ksf)	RESIDUAL SHEAR (ksf)
○	18.6	102.8	.609	1.00	.68	.61
□	18.7	101.9	.622	2.00	1.39	1.25
△	19.8	103.6	.597	3.00	1.87	1.49

Remark :

B82604.01	Fitch Park
The Twining Labs Inc. Fresno, CA	DIRECT SHEAR TEST Figure No. 20

PROCTOR TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
1-3.5	(SM)			2.65				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 9.3 % Maximum dry density = 117.0 pcf	SILTY, SAND (SM)

Project No.: B82604.01
Project: Fitch Park
Location: A-1, B-2

Date: 03-29-04

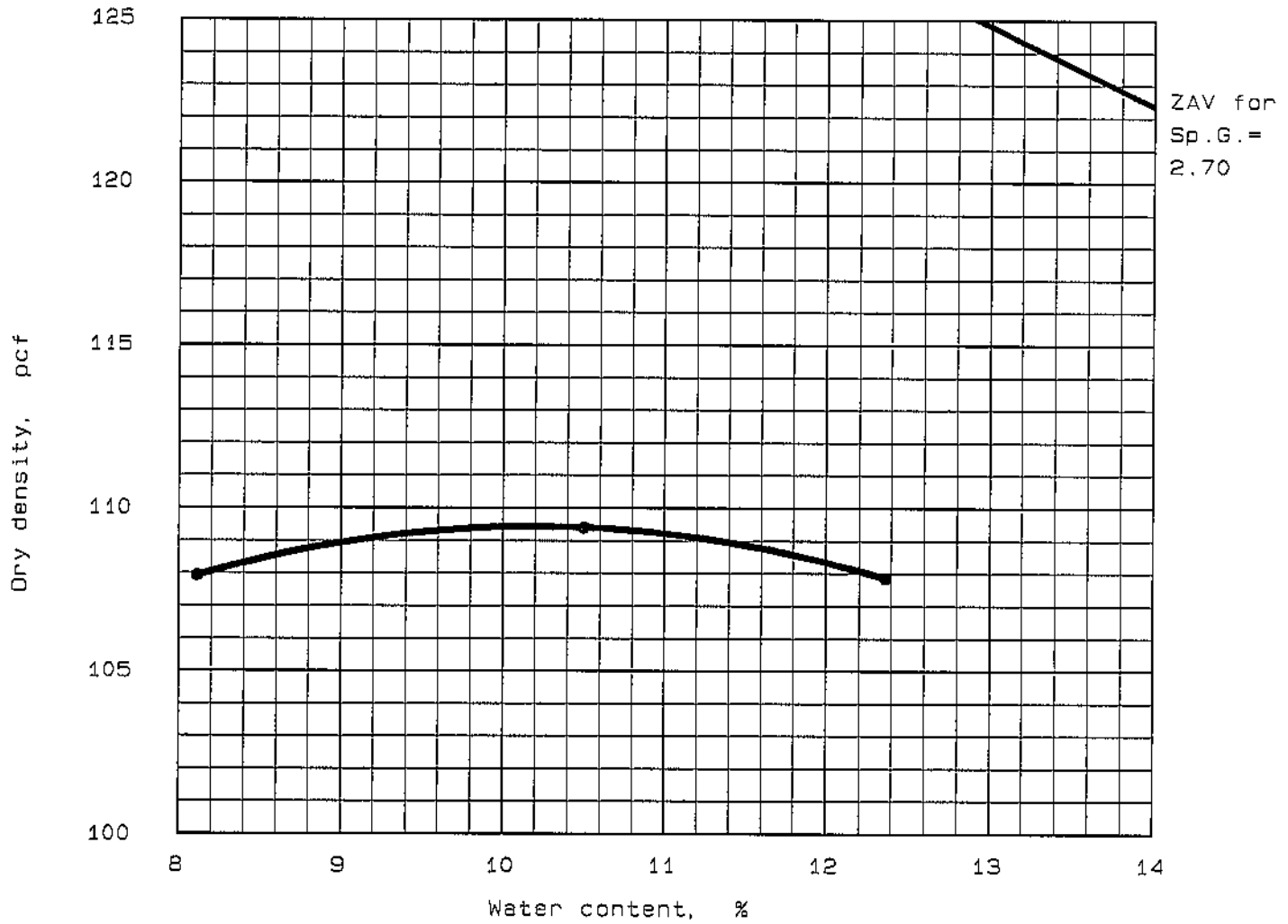
Remarks:

PROCTOR TEST REPORT

THE TWINING LABORATORIES, INC.

Figure No. 21

PROCTOR TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
.5-3.5	SP-SM			2.70				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 10.2 % Maximum dry density = 109.4 pcf	Silty SAND (SM)

Project No.: 882604.01

Project: Fitch Park

Location: R-14, B-19

Date: 3-29-04

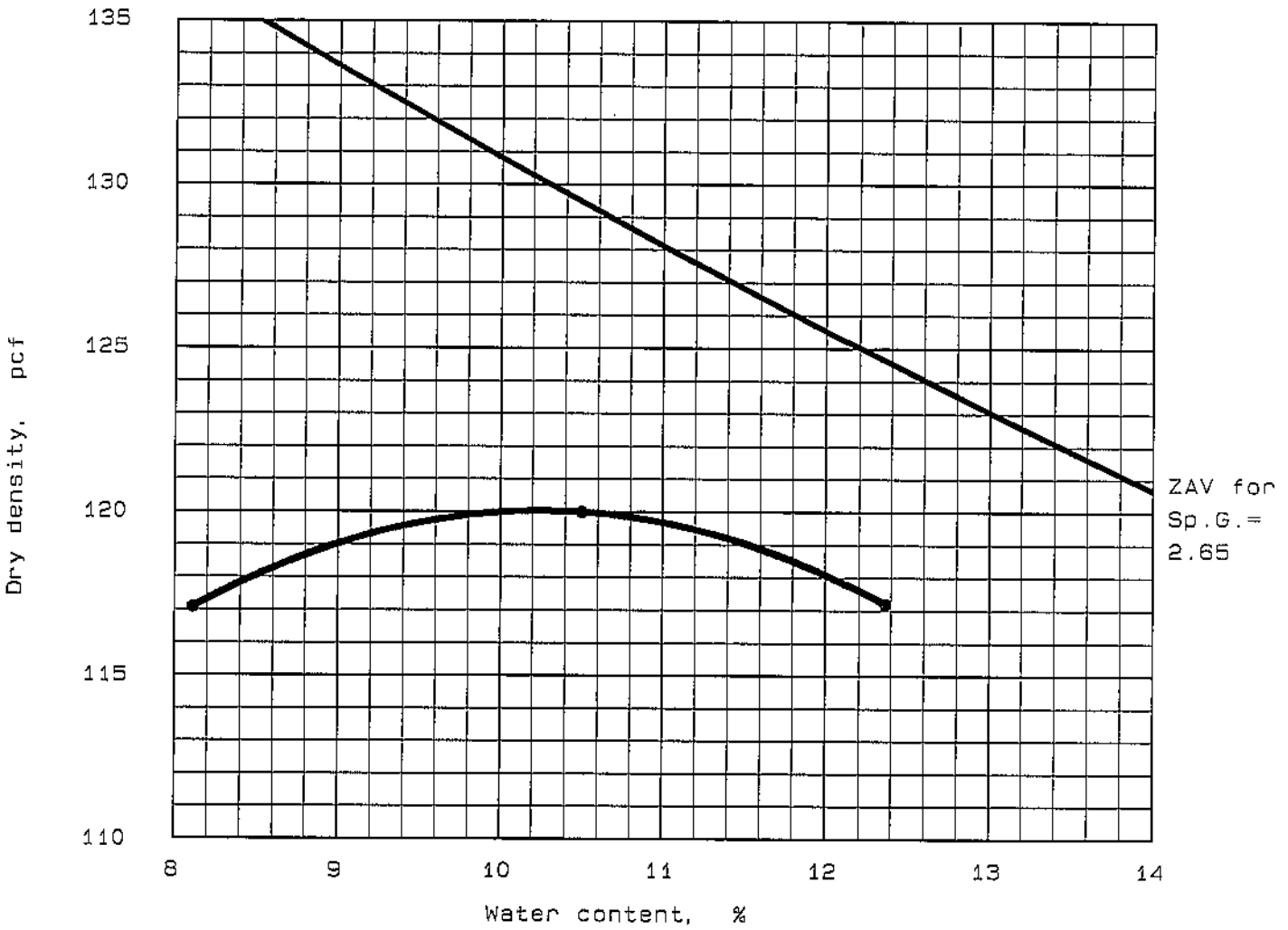
Remarks:

PROCTOR TEST REPORT

THE TWINING LABORATORIES, INC.

Figure No. 22

PROCTOR TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
.5-3.5	(SM)			2.65				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 10.3 % Maximum dry density = 120.0 pcf	SILTY SAND (SM)

Project No.: B82604.01
Project: Fitch Park
Location: R-28, B-38

Date: 03-26-04

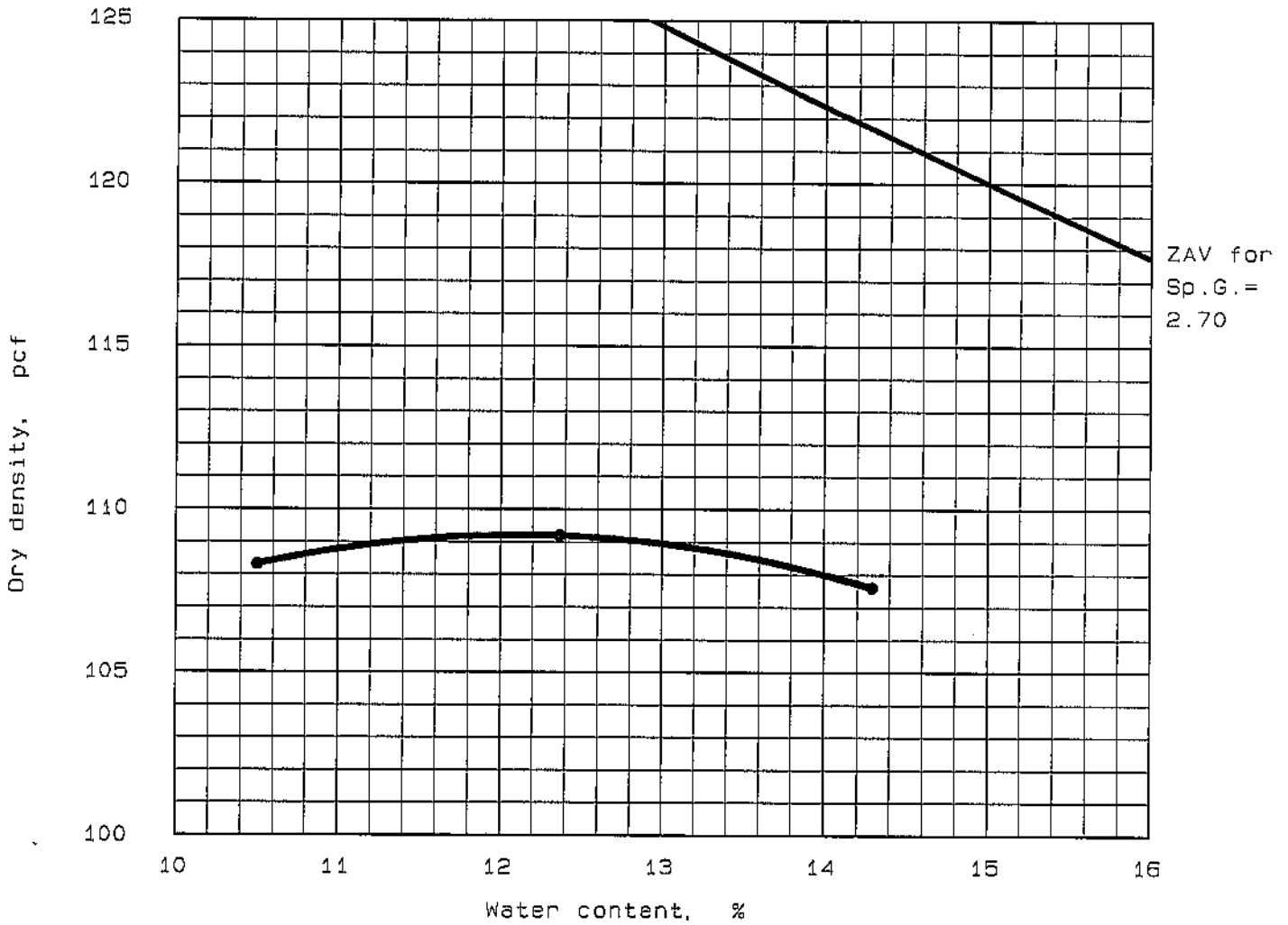
Remarks:

PROCTOR TEST REPORT

THE TWINING LABORATORIES, INC.

Figure No. 23

PROCTOR TEST REPORT



"Modified" Proctor, ASTM D 1557, Method A

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > No.4	% < No.200
	USCS	AASHTO						
1-3.5	SM			2.70				

TEST RESULTS	MATERIAL DESCRIPTION
Optimum moisture = 12.1 % Maximum dry density = 109.2 pcf	Silty SAND (SM)

Project No.: 882604.01

Project: Fitch Park

Location: A-35, B-47

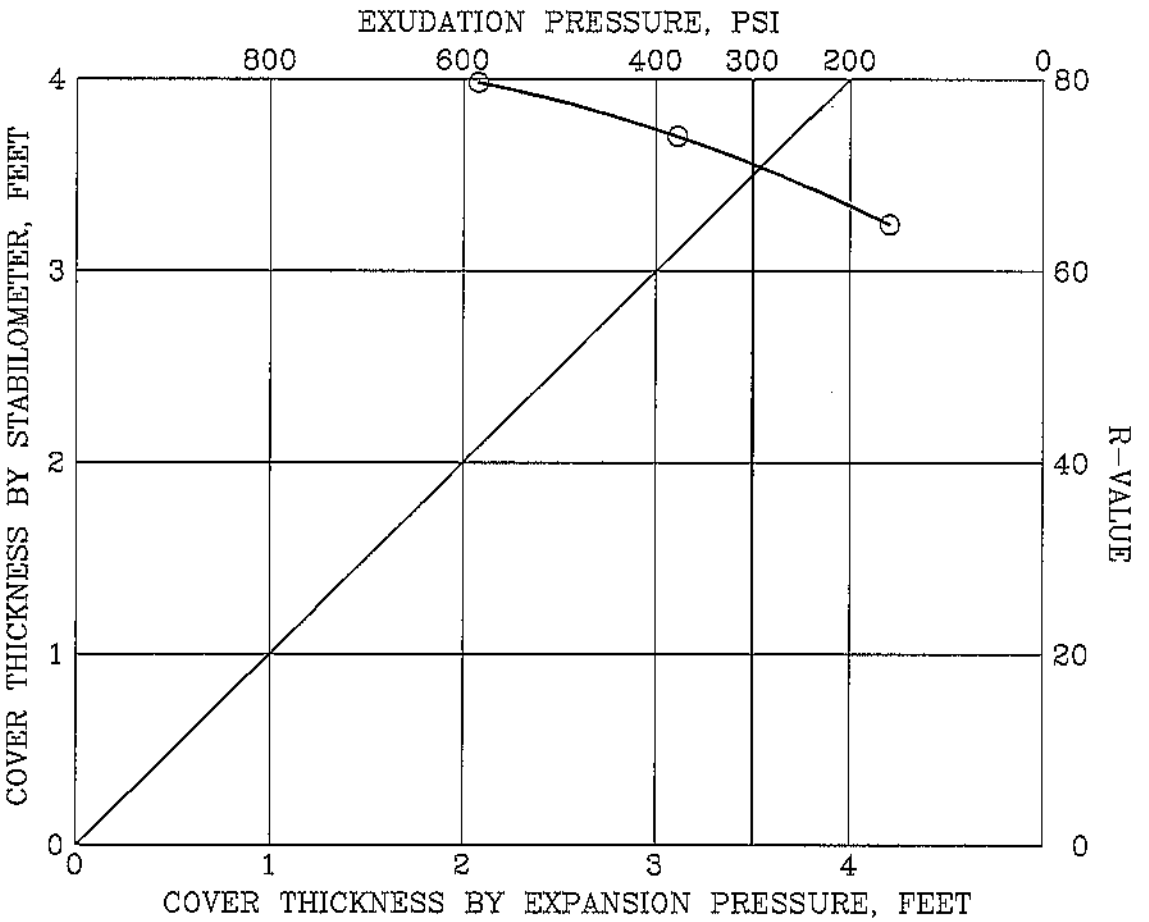
Date: 3-29-04

Remarks:

PROCTOR TEST REPORT

THE TWINING LABORATORIES, INC.

Figure No. 24



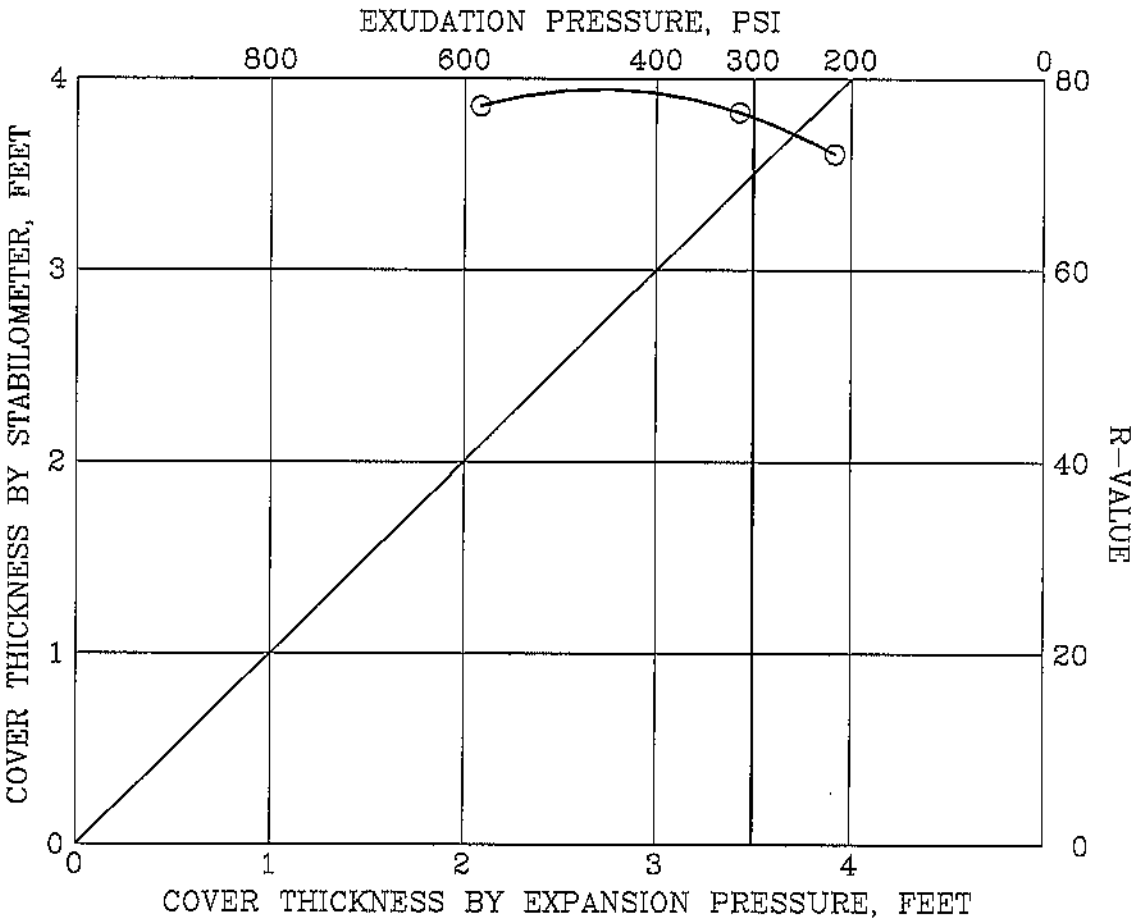
SAMPLE LOCATION : B-2,R-1
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/09/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	1.0	1.0	1.0		
MOISTURE AT COMPACTION,	9.4	10.3	9.0		
DRY DENSITY, PCF	120.2	118.7	117.8		
EXUDATION PRESSURE, PSI	378.0	159.2	584.1		
G.E. (STABILITY), FT	.25	.35	.21		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 71.1

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 24



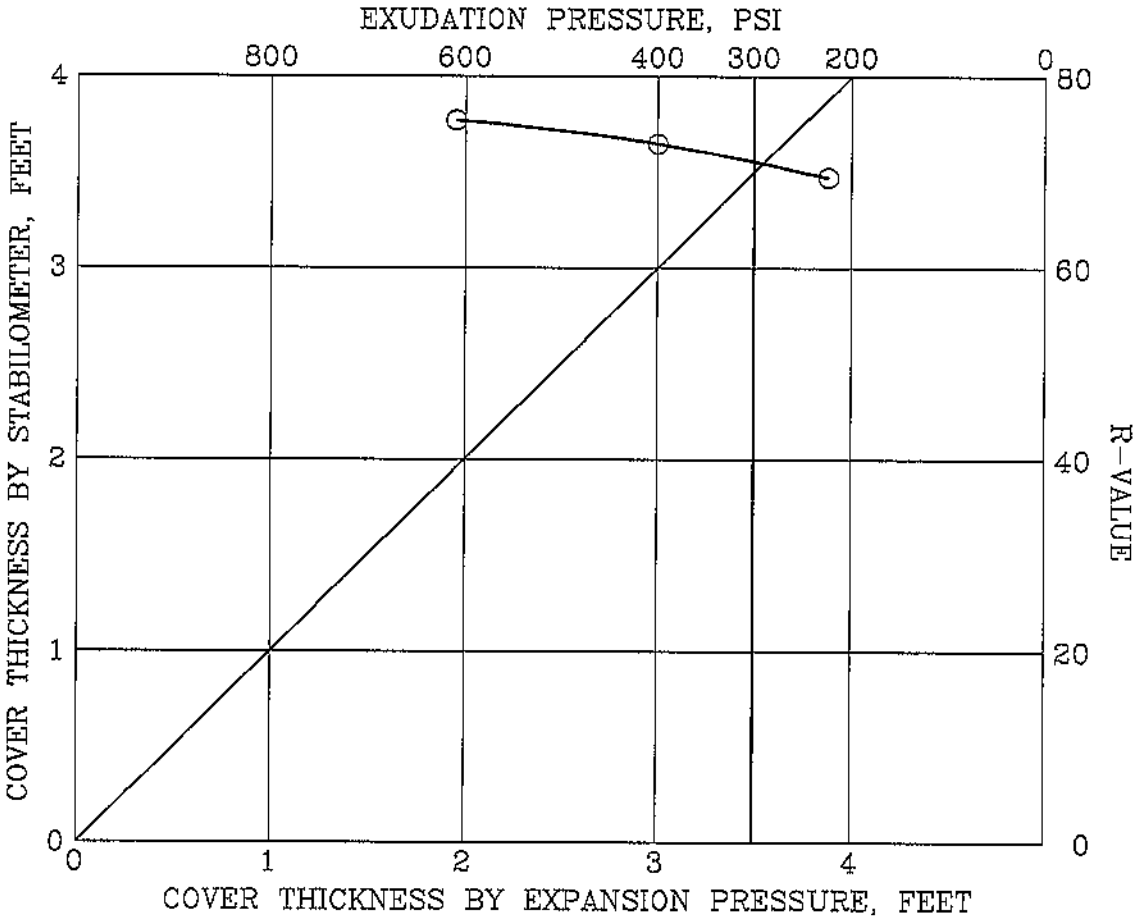
SAMPLE LOCATION : B-4,R-3
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/11/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	.5	.5	.5		
MOISTURE AT COMPACTION,	13.9	14.3	13.5		
DRY DENSITY, PCF	106.1	105.3	107.0		
EXUDATION PRESSURE, PSI	314.3	217.3	583.3		
G.E. (STABILITY), FT	.25	.30	.24		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 76.0

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 25



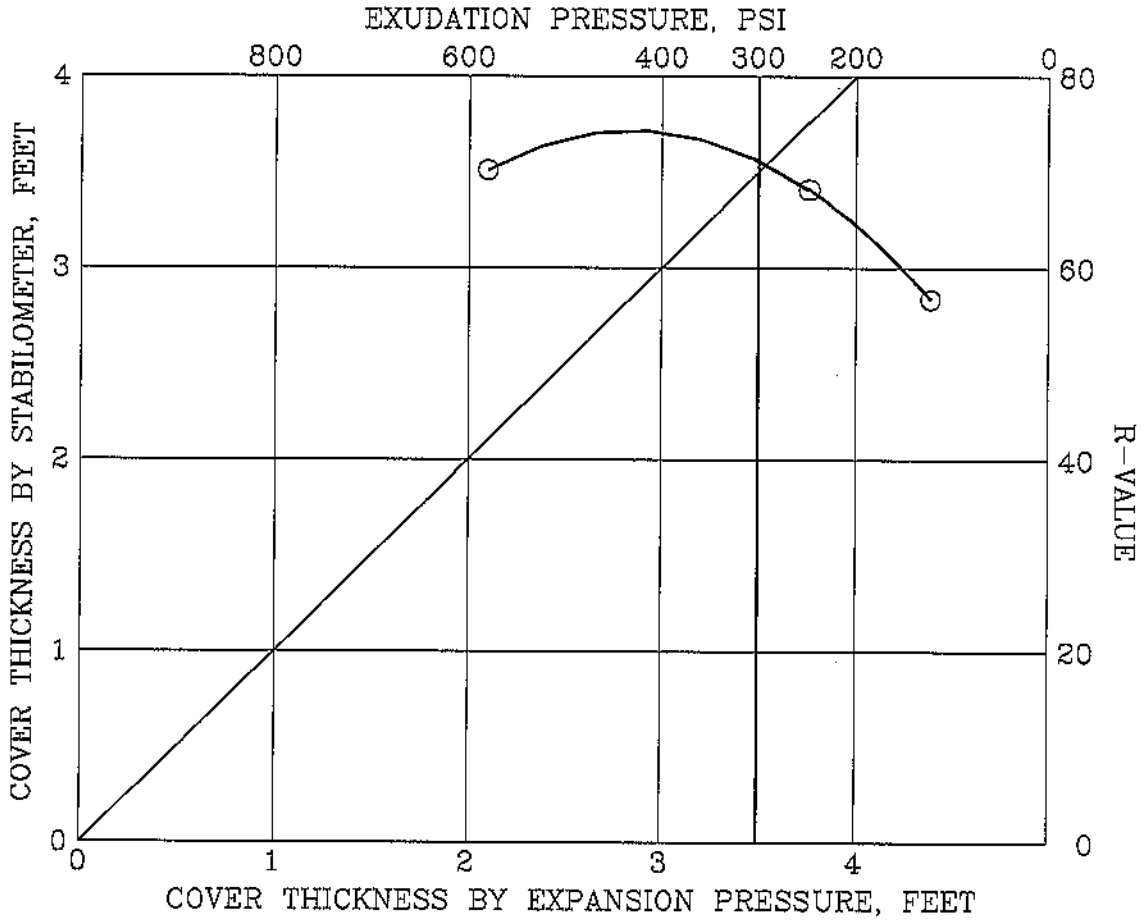
SAMPLE LOCATION : B-6,R-4
SOIL DESCRIPTION : Poorly Graded SAND (SP)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/15/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	1.5	1.5	1.4		
MOISTURE AT COMPACTION,	11.7	12.5	13.2		
DRY DENSITY, PCF	107.4	107.8	107.0		
EXUDATION PRESSURE, PSI	609.6	400.3	224.4		
G.E. (STABILITY), FT	.27	.28	.32		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 71.1

Cal Test Method

B82604.01	Fitch Park
Twining Labs, Inc.	R-VALUE TEST Figure No. 26



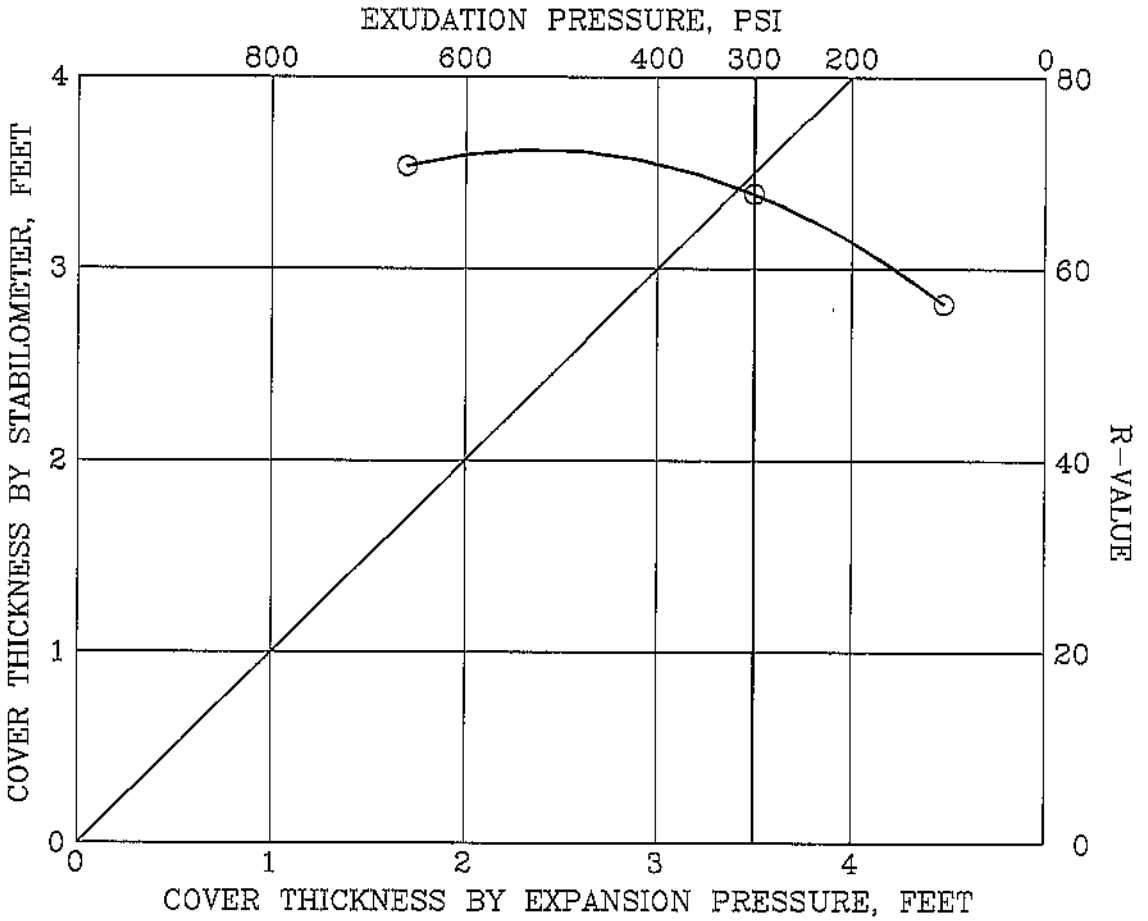
SAMPLE LOCATION : B-8, R-6
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/12/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	.5	.5	.5		
MOISTURE AT COMPACTION,	11.8	11.0	9.7		
DRY DENSITY, PCF	117.2	117.9	115.0		
EXUDATION PRESSURE, PSI	122.6	248.3	580.1		
G.E. (STABILITY), FT	.43	.32	.28		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 71.1

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 27



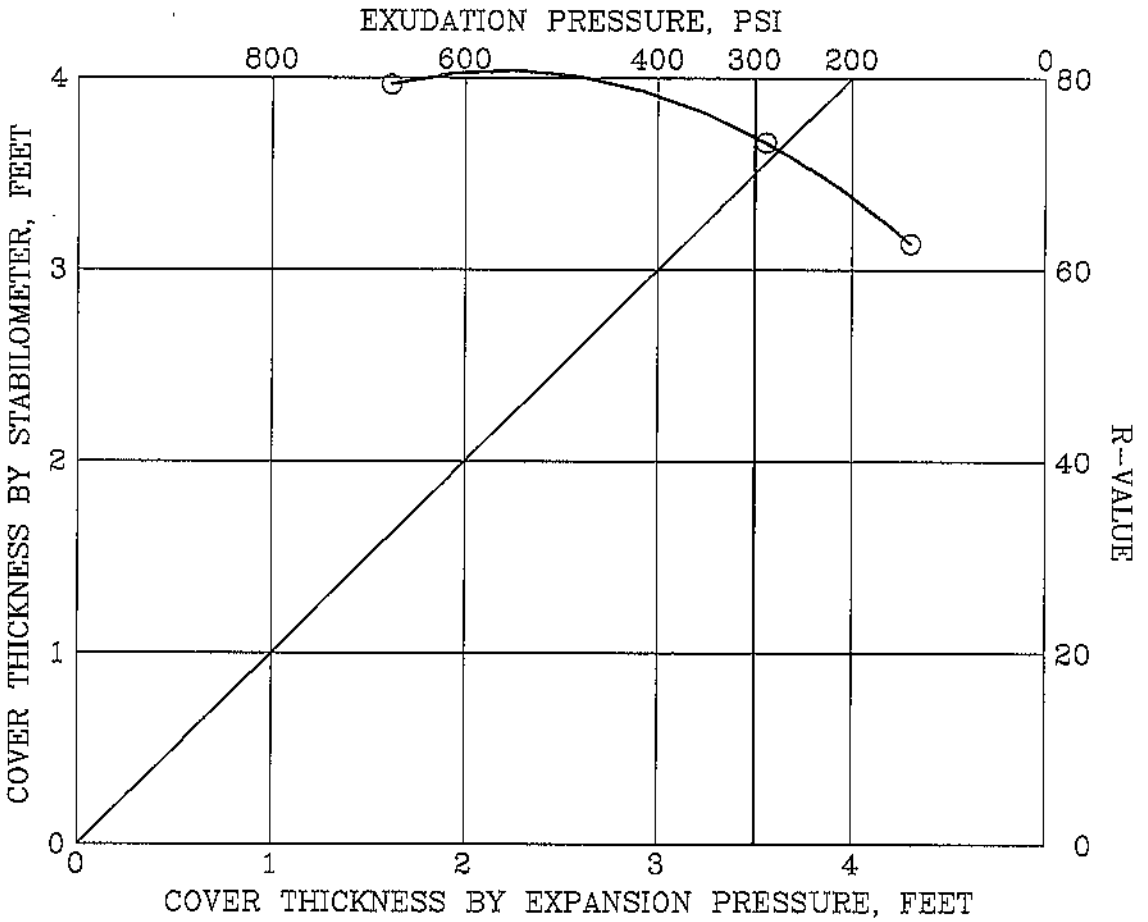
SAMPLE LOCATION : B-10,R-7
SOIL DESCRIPTION :Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/07/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	3.1	3.1	3.1		
MOISTURE AT COMPACTION,	10.8	10.0	9.1		
DRY DENSITY, PCF	119.2	116.8	118.8		
EXUDATION PRESSURE, PSI	105.0	300.0	660.5		
G.E. (STABILITY), FT	.42	.34	.30		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 67.8

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 28



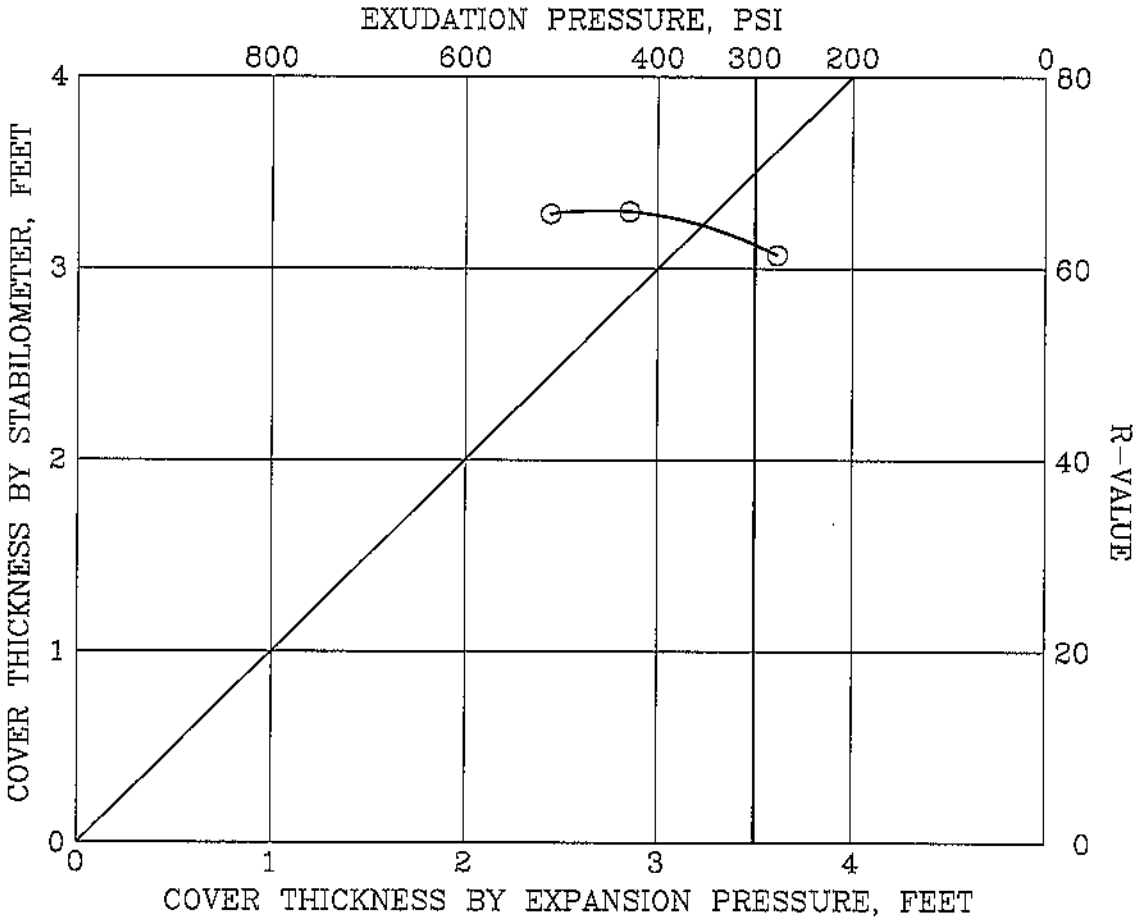
SAMPLE LOCATION : B-11,R-8
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/11/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	.5	.5	.5		
MOISTURE AT COMPACTION,	13.1	11.8	10.1		
DRY DENSITY, PCF	111.0	111.9	110.7		
EXUDATION PRESSURE, PSI	139.3	288.1	676.4		
G.E. (STABILITY), FT	.36	.27	.22		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 73.8

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 29



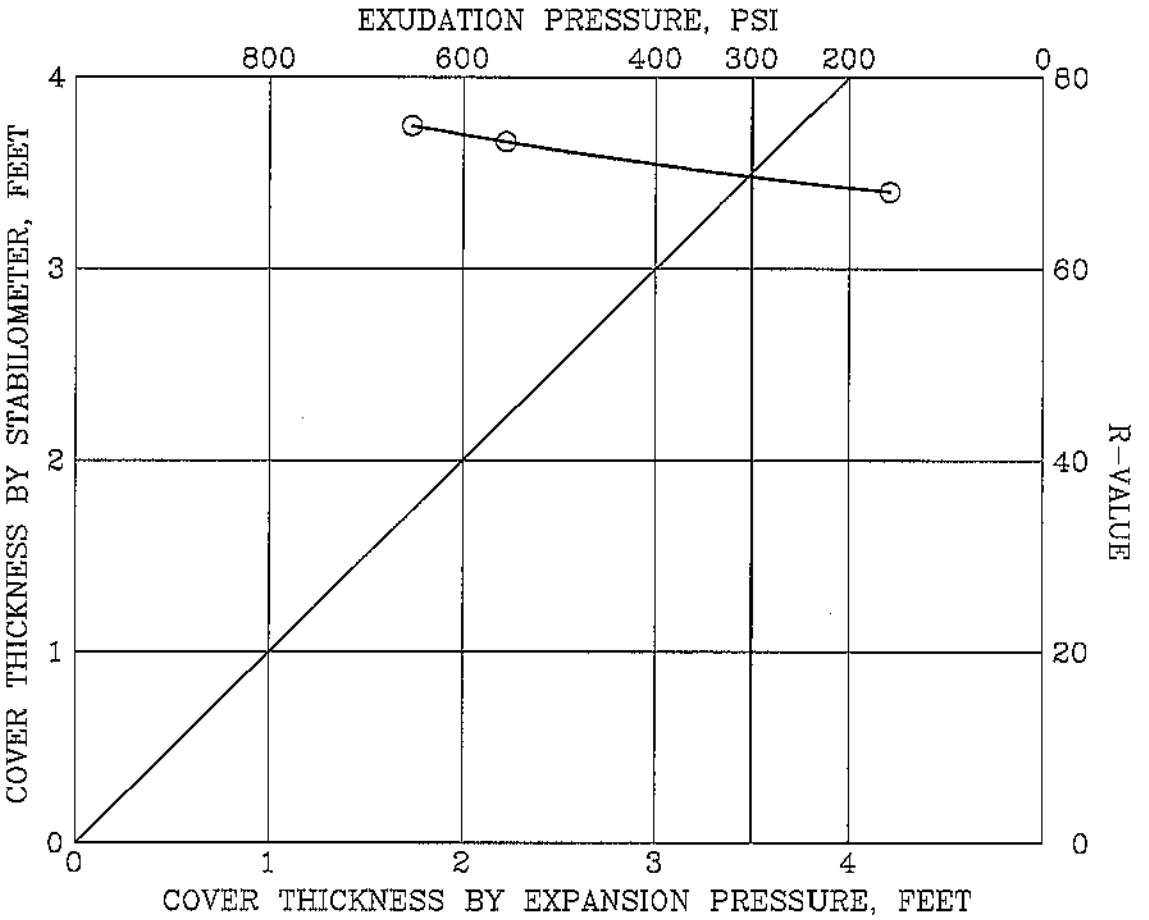
SAMPLE LOCATION : B-12,R-9
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/30/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	1.0	1.0	1.0		
MOISTURE AT COMPACTION,	10.7	9.8	10.3		
DRY DENSITY, PCF	119.8	121.0	119.6		
EXUDATION PRESSURE, PSI	276.9	511.7	429.7		
G.E. (STABILITY), FT	.37	.33	.34		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 62.5

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 30



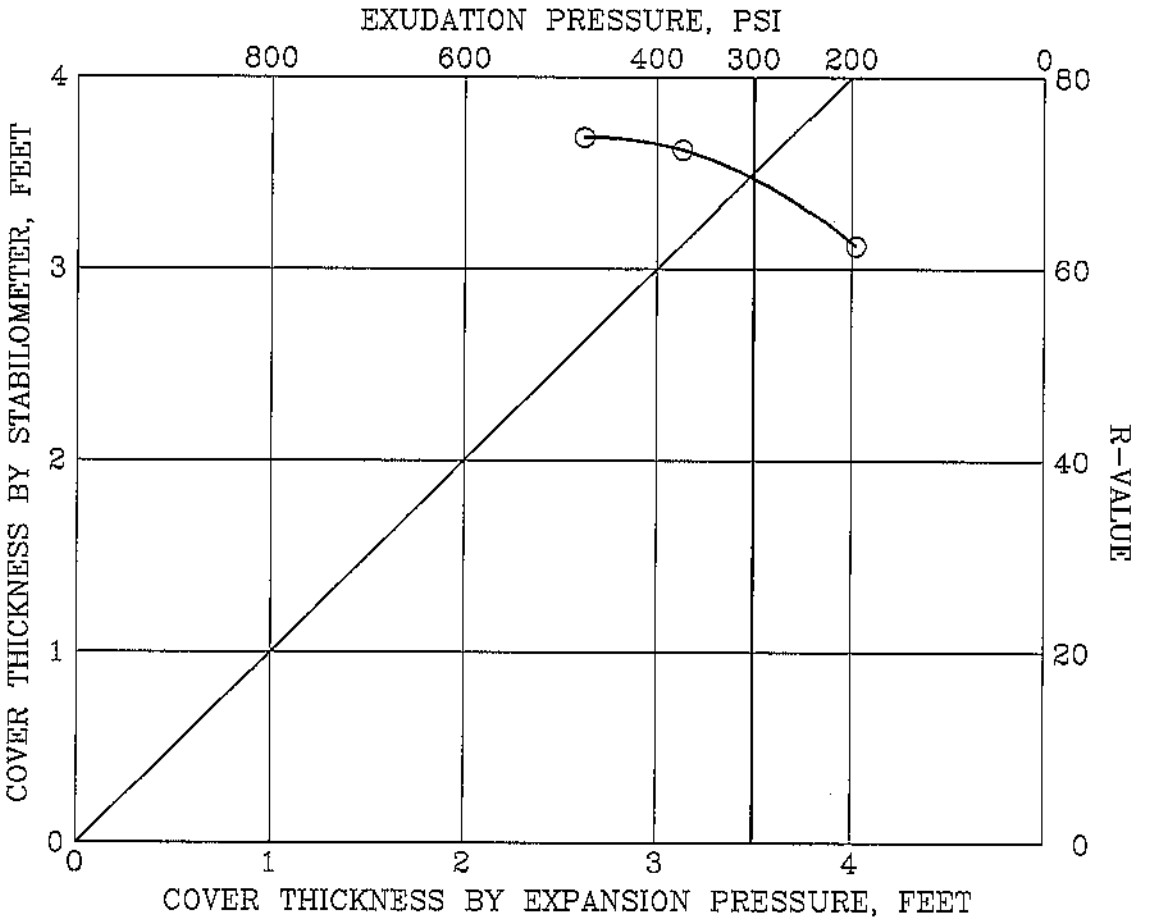
SAMPLE LOCATION : B-14,R-10
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/12/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	.5	.5	.5		
MOISTURE AT COMPACTION,	11.4	12.2	11.6		
DRY DENSITY, PCF	111.5	111.3	111.8		
EXUDATION PRESSURE, PSI	652.6	158.4	555.5		
G.E. (STABILITY), FT	.27	.33	.28		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 69.6

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 31



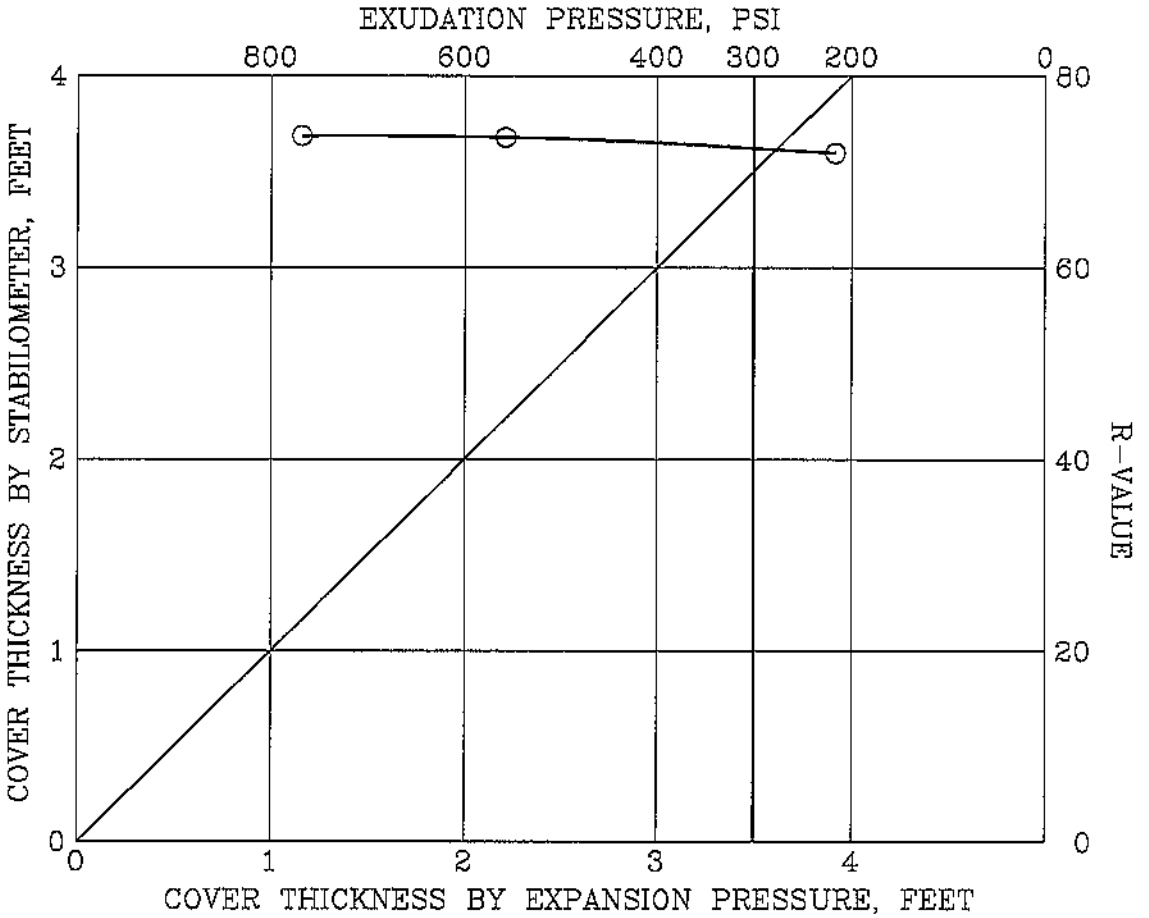
SAMPLE LOCATION : B-16,R-12
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/24/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	1.5	1.5	1.5		
MOISTURE AT COMPACTION,	10.4	9.6	10.0		
DRY DENSITY, PCF	122.9	122.4	118.7		
EXUDATION PRESSURE, PSI	195.8	475.9	374.0		
G.E. (STABILITY), FT	.34	.25	.26		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 69.4

Test Method Cal 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 32



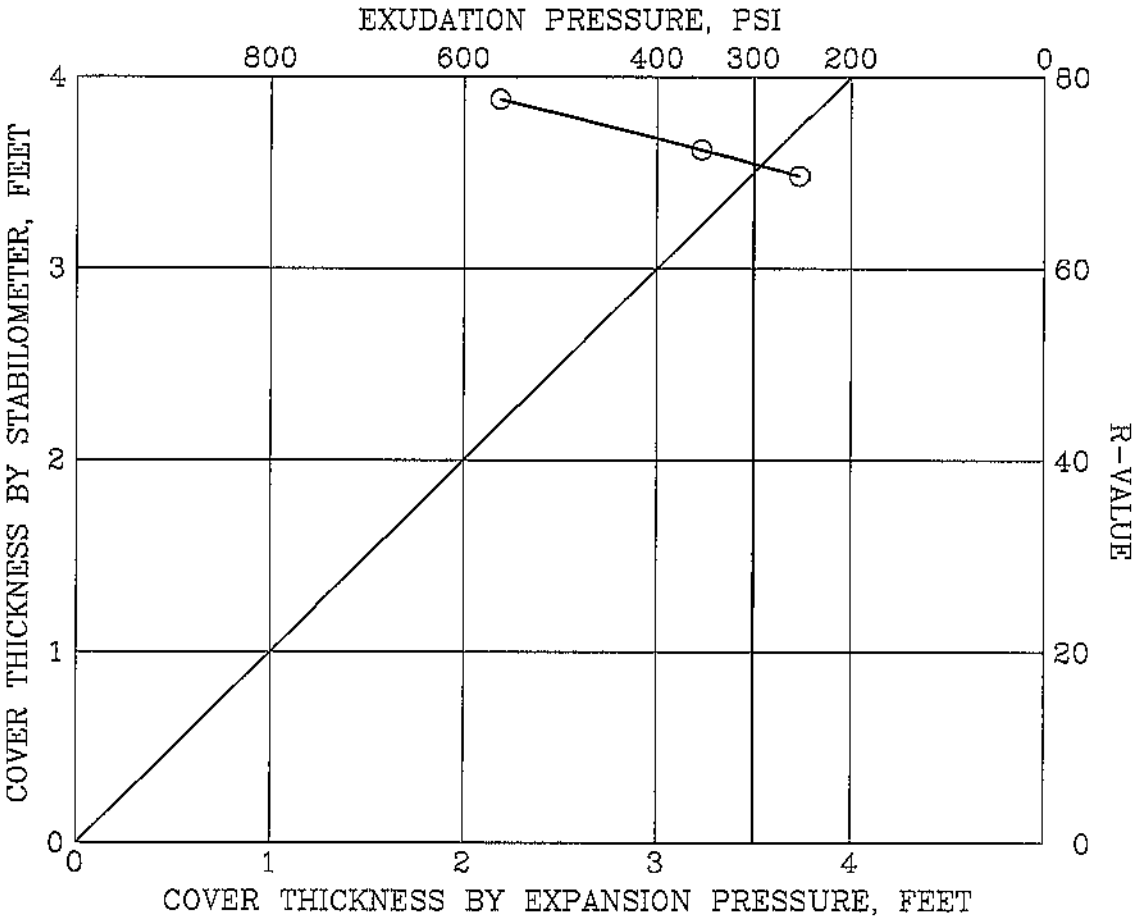
SAMPLE LOCATION : B-18,R-13
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/18/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	.5	.5	.5		
MOISTURE AT COMPACTION,	10.1	11.0	10.6		
DRY DENSITY, PCF	111.7	111.5	111.6		
EXUDATION PRESSURE, PSI	767.9	217.3	557.9		
G.E. (STABILITY), FT	.28	.29	.28		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 72.5

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 33



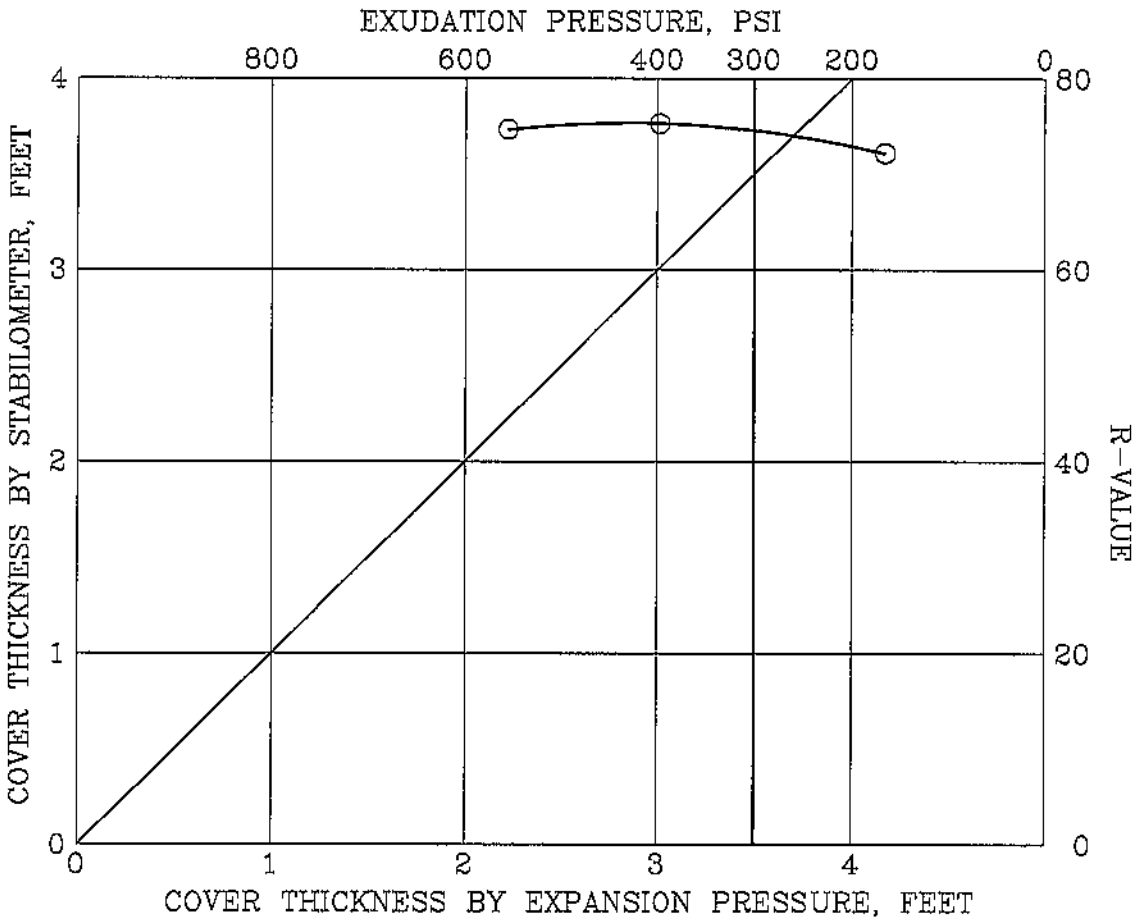
SAMPLE LOCATION : B-19,R-14
SOIL DESCRIPTION : Poorly Graded SAND with Silt (SP-SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/29/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	.1	.1	.1		
MOISTURE AT COMPACTION,	13.0	12.6	11.7		
DRY DENSITY, PCF	108.7	108.9	108.8		
EXUDATION PRESSURE, PSI	253.1	354.1	562.6		
G.E. (STABILITY), FT	.32	.29	.25		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 70.9

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 34



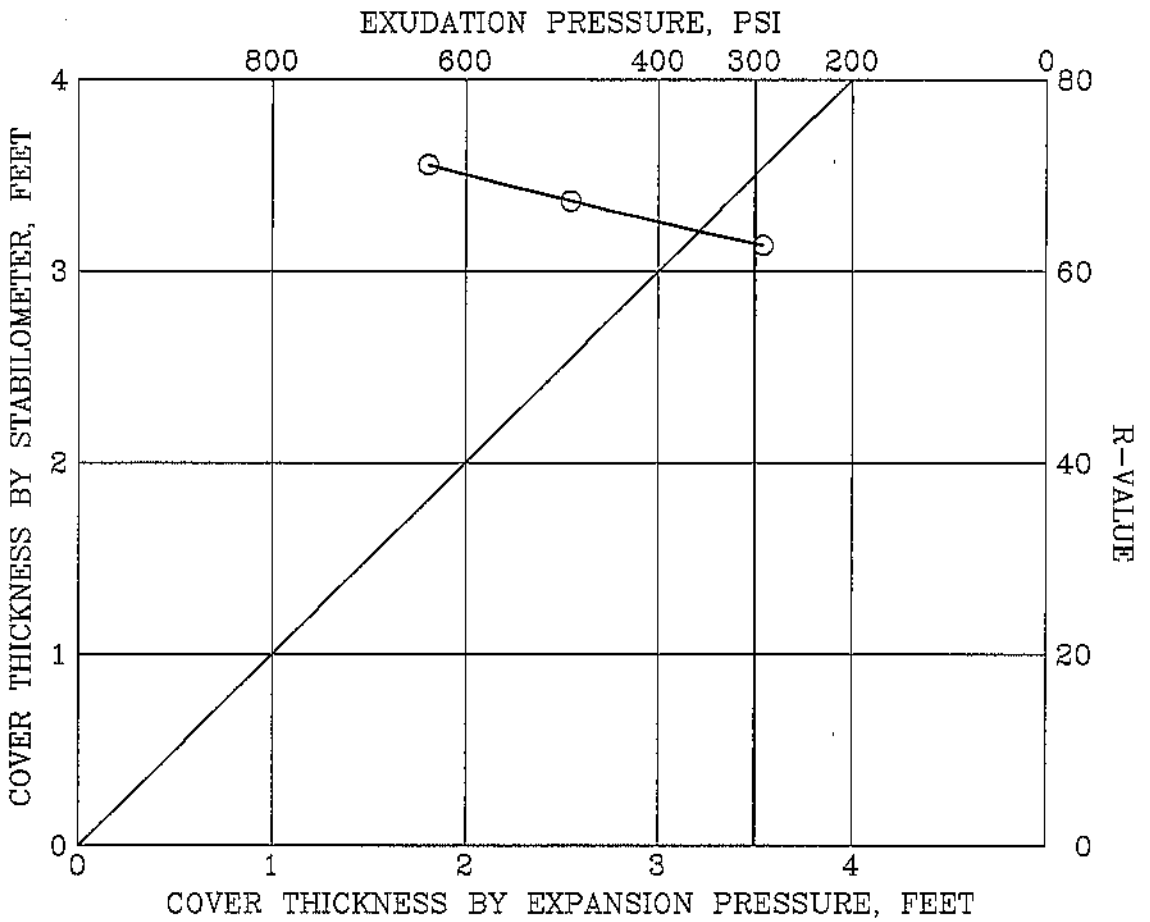
SAMPLE LOCATION : B-23,R-17
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/11/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	.5	.5	.5		
MOISTURE AT COMPACTION,	13.5	12.6	13.1		
DRY DENSITY, PCF	108.1	109.0	107.3		
EXUDATION PRESSURE, PSI	166.3	555.5	397.9		
G.E. (STABILITY), FT	.28	.27	.27		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 74.5

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 35



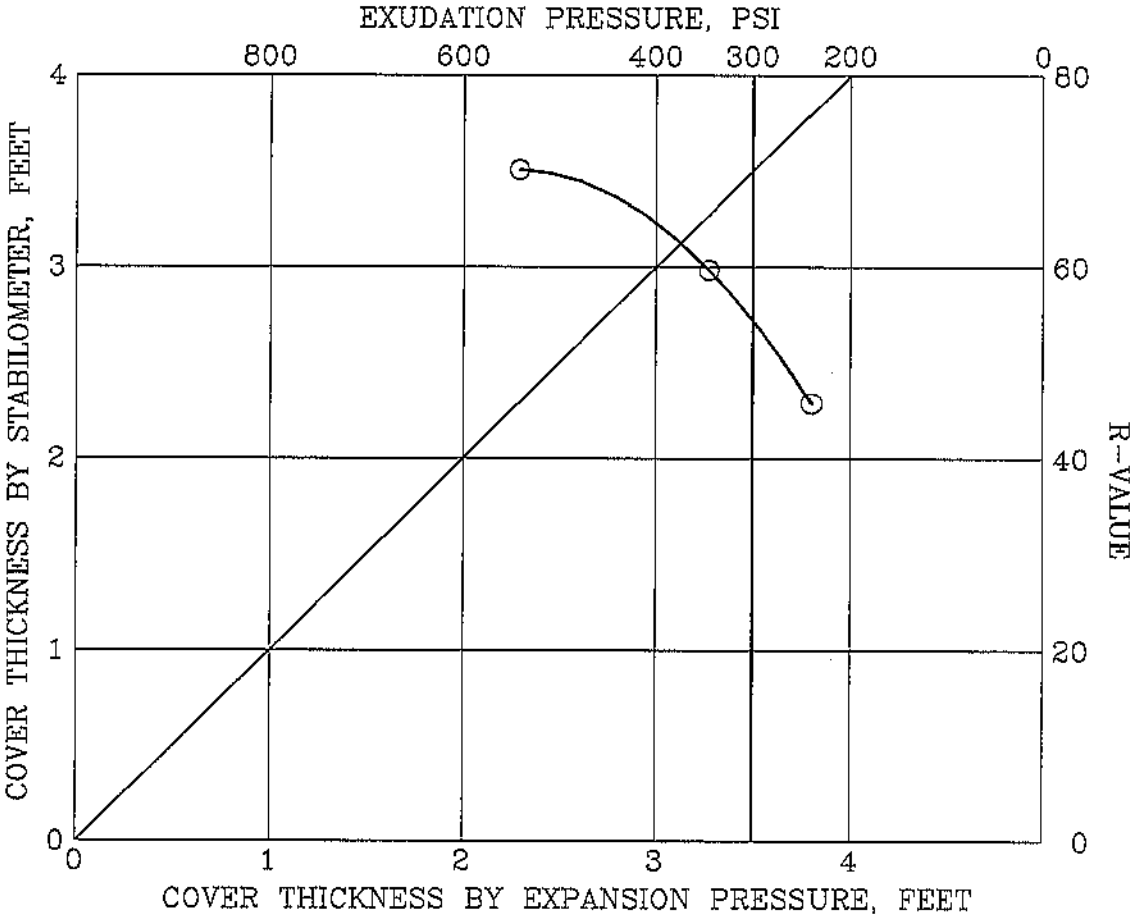
SAMPLE LOCATION : B-24,R-18
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/29/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	4.2	4.2	4.2		
MOISTURE AT COMPACTION,	11.6	12.9	12.0		
DRY DENSITY, PCF	113.3	111.1	112.3		
EXUDATION PRESSURE, PSI	638.2	291.3	491.0		
G.E. (STABILITY), FT	.31	.39	.34		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 62.9

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 36



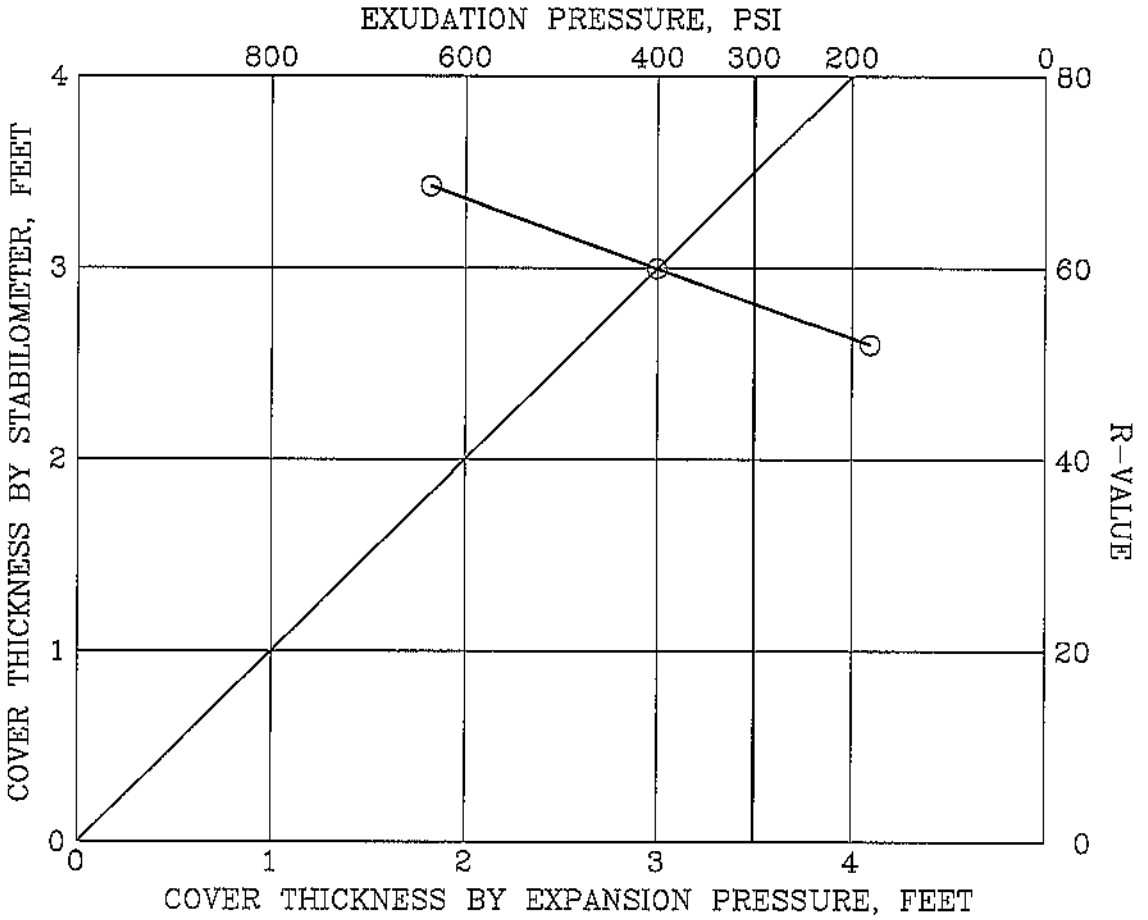
SAMPLE LOCATION : B-27,R-20
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/29/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	4.7	4.7	4.7		
MOISTURE AT COMPACTION,	11.3	10.4	11.7		
DRY DENSITY, PCF	120.1	121.1	119.4		
EXUDATION PRESSURE, PSI	345.4	541.9	239.5		
G.E. (STABILITY), FT	.41	.30	.54		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 54.4

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 37



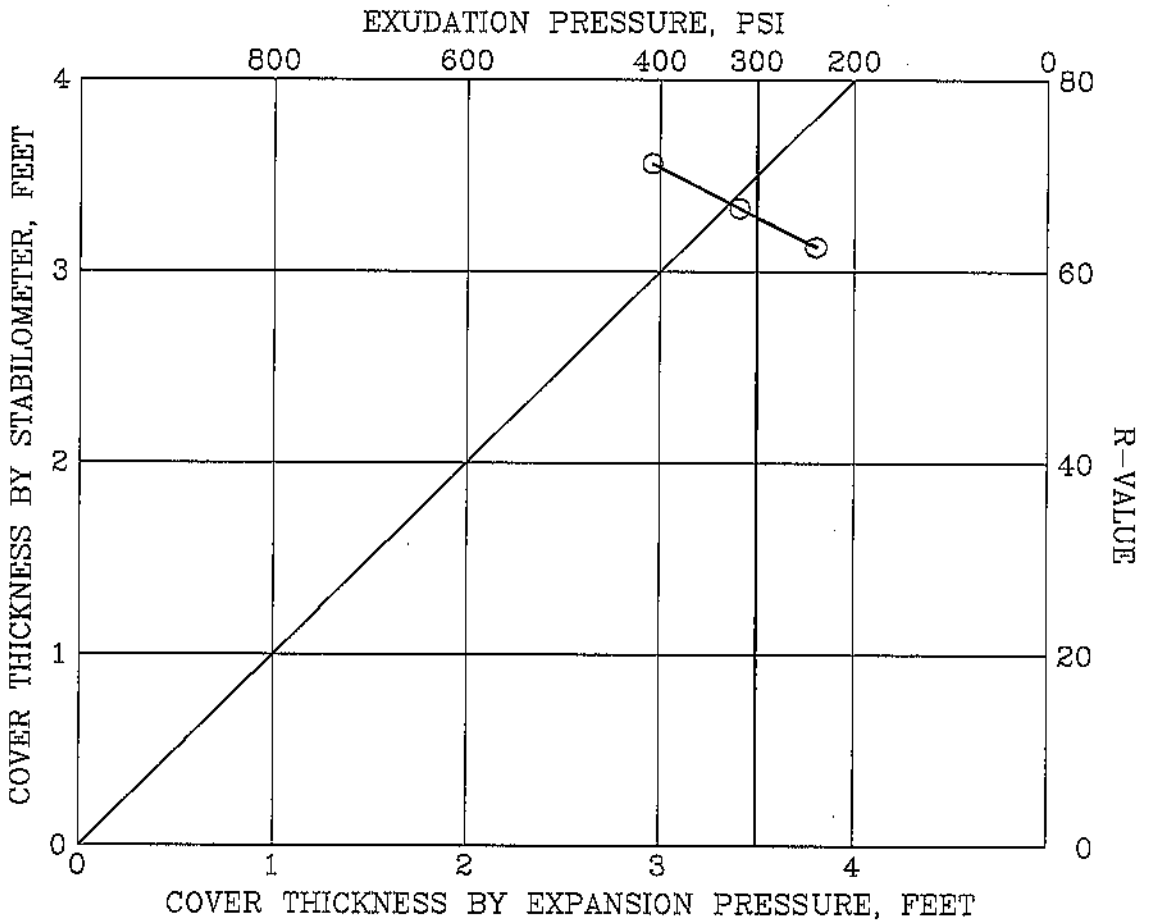
SAMPLE LOCATION : B-30,R-22
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/15/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	5.8	5.8	5.8		
MOISTURE AT COMPACTION,	12.0	11.1	11.6		
DRY DENSITY, PCF	111.8	114.6	113.8		
EXUDATION PRESSURE, PSI	181.4	635.8	401.1		
G.E. (STABILITY), FT	.48	.30	.38		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 56.2

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 38



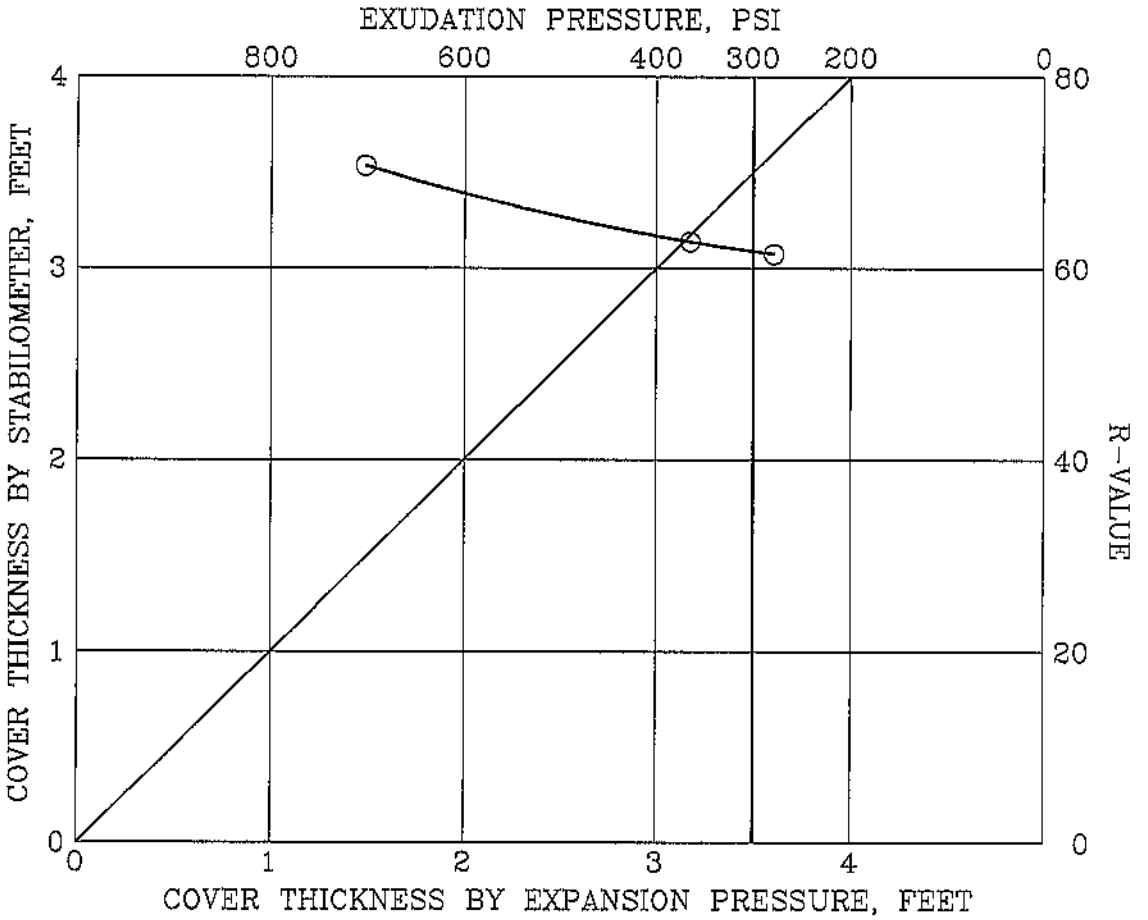
SAMPLE LOCATION : B-32,R-24,0.7-3.5'
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/23/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.0	2.0	2.0		
MOISTURE AT COMPACTION,	10.5	11.4	11.0		
DRY DENSITY, PCF	117.8	116.6	117.5		
EXUDATION PRESSURE, PSI	408.2	239.5	318.3		
G.E. (STABILITY), FT	.28	.36	.32		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 65.6

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 39



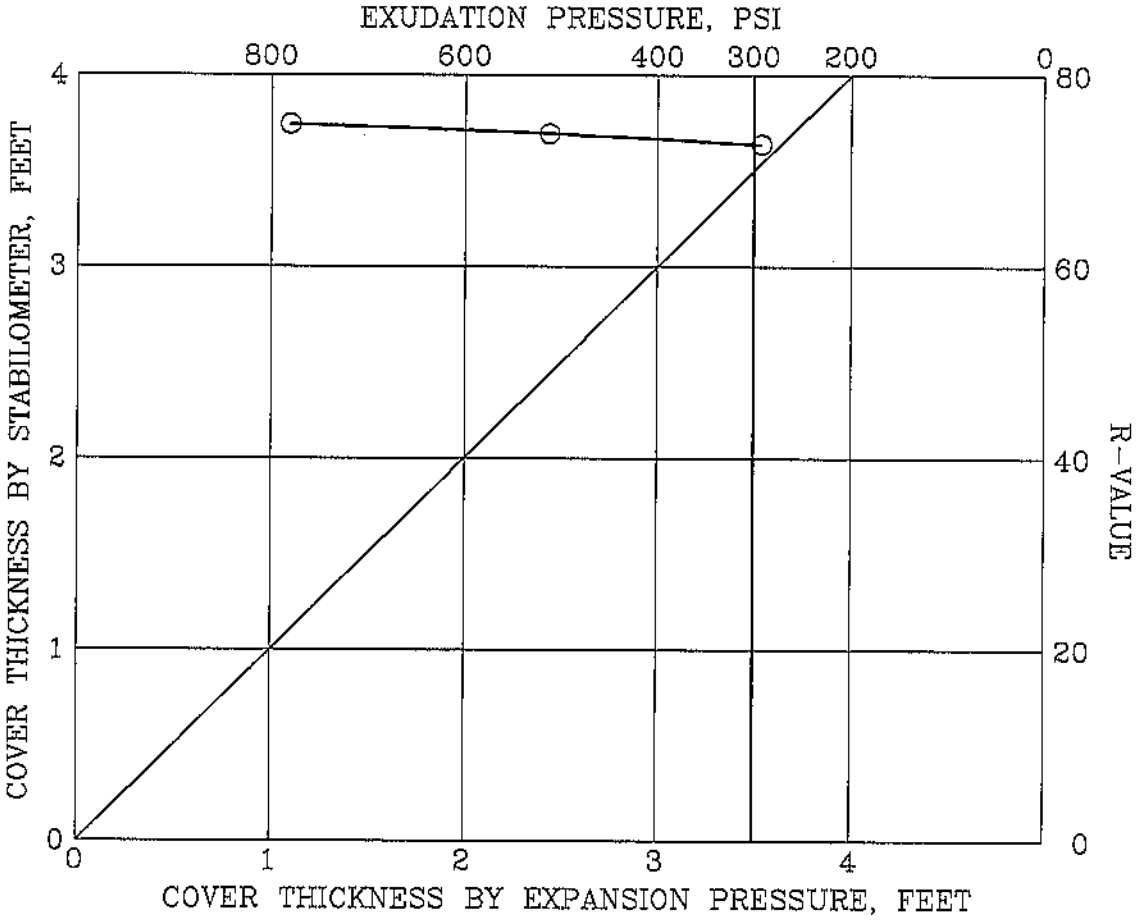
SAMPLE LOCATION : B-34,R-25 0.5-3.5
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/26/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	3.1	3.1	3.1		
MOISTURE AT COMPACTION,	11.7	10.8	11.4		
DRY DENSITY, PCF	118.3	118.4	118.6		
EXUDATION PRESSURE, PSI	278.5	702.7	365.3		
G.E. (STABILITY), FT	.37	.28	.36		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 61.8

Cal test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 40



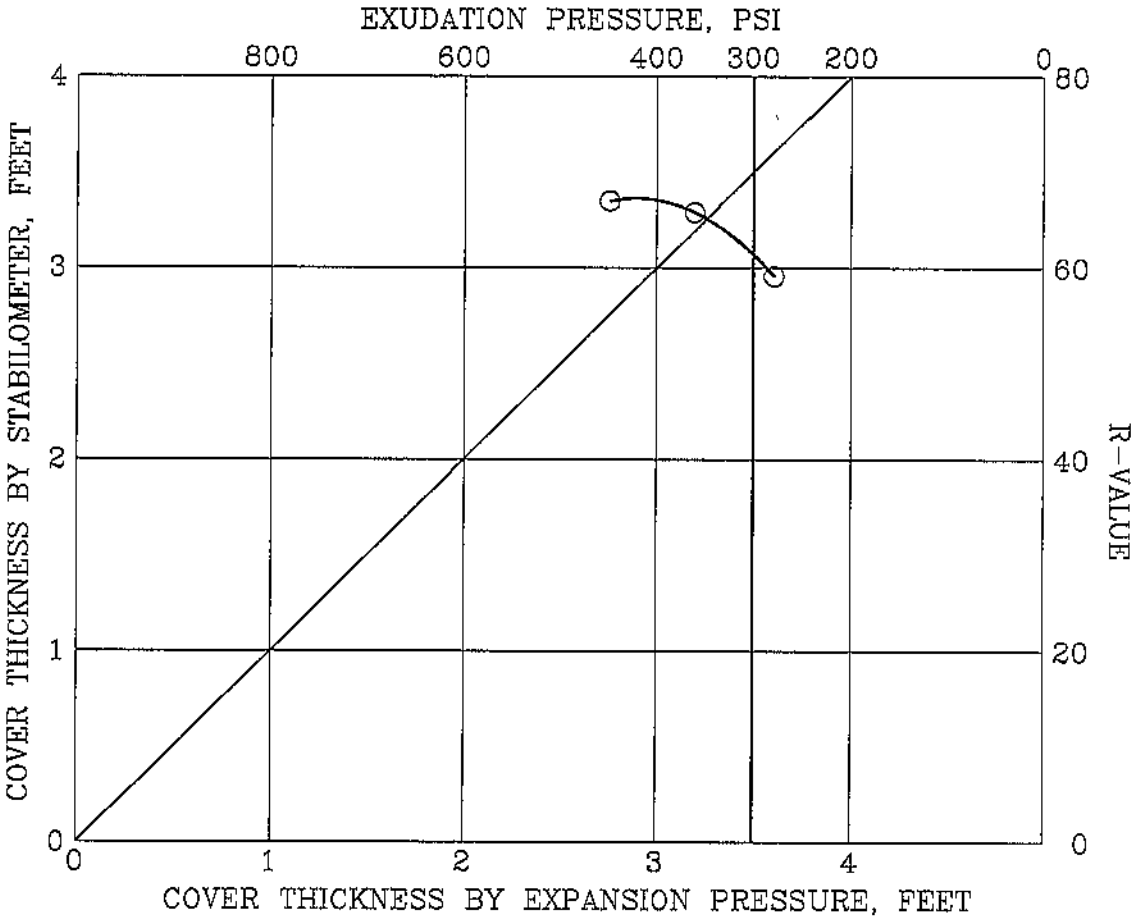
SAMPLE LOCATION : B-36,R-27 0.5-3.5
SOIL DESCRIPTION :Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/24/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	3.1	3.1	3.1		
MOISTURE AT COMPACTION,	11.7	13.4	12.6		
DRY DENSITY, PCF	114.9	114.7	115.1		
EXUDATION PRESSURE, PSI	780.7	292.1	512.5		
G.E. (STABILITY), FT	.24	.26	.25		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 72.8

Test Method Cal 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 41



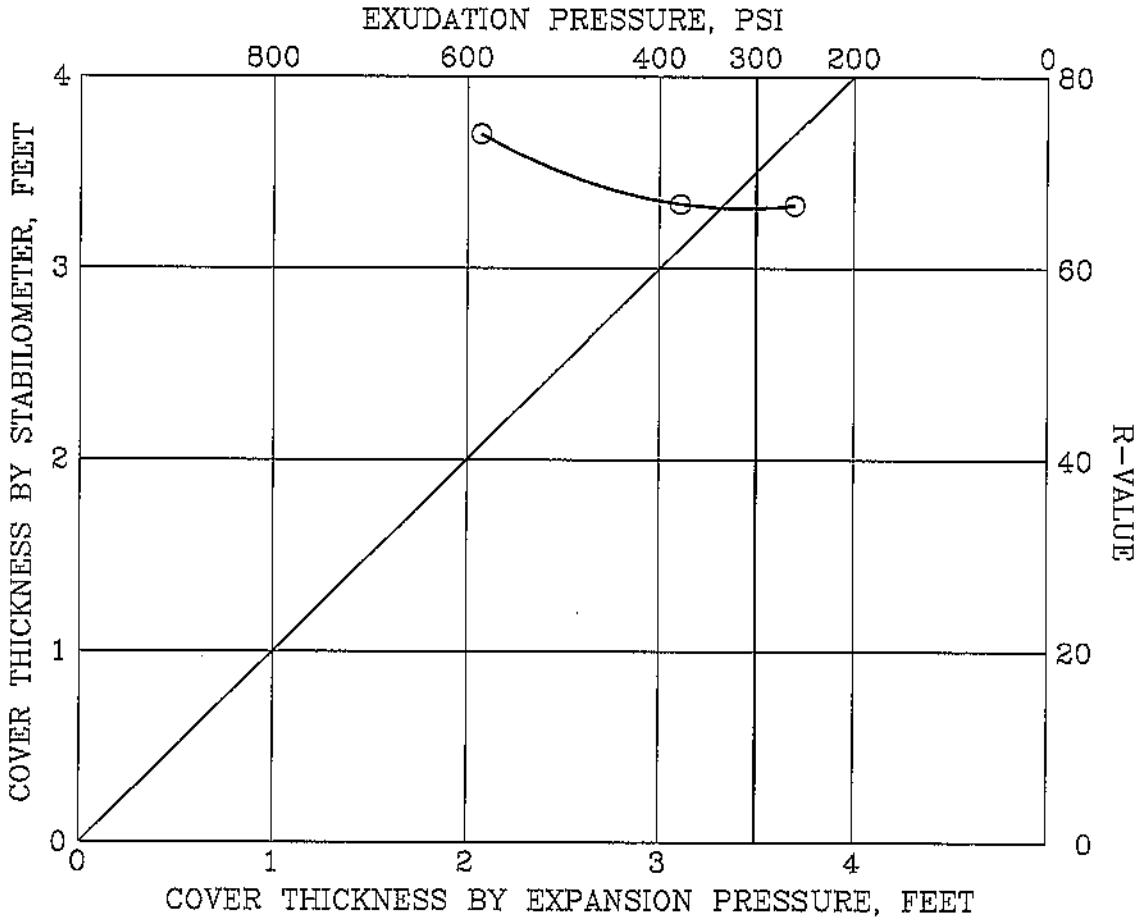
SAMPLE LOCATION : B-38,R-28 0.5-3.5'
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/26/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.0	2.0	2.0		
MOISTURE AT COMPACTION,	10.5	11.4	11.0		
DRY DENSITY, PCF	120.1	120.3	223.1		
EXUDATION PRESSURE, PSI	448.8	278.5	361.3		
G.E. (STABILITY), FT	.32	.38	.33		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 61.4

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 42



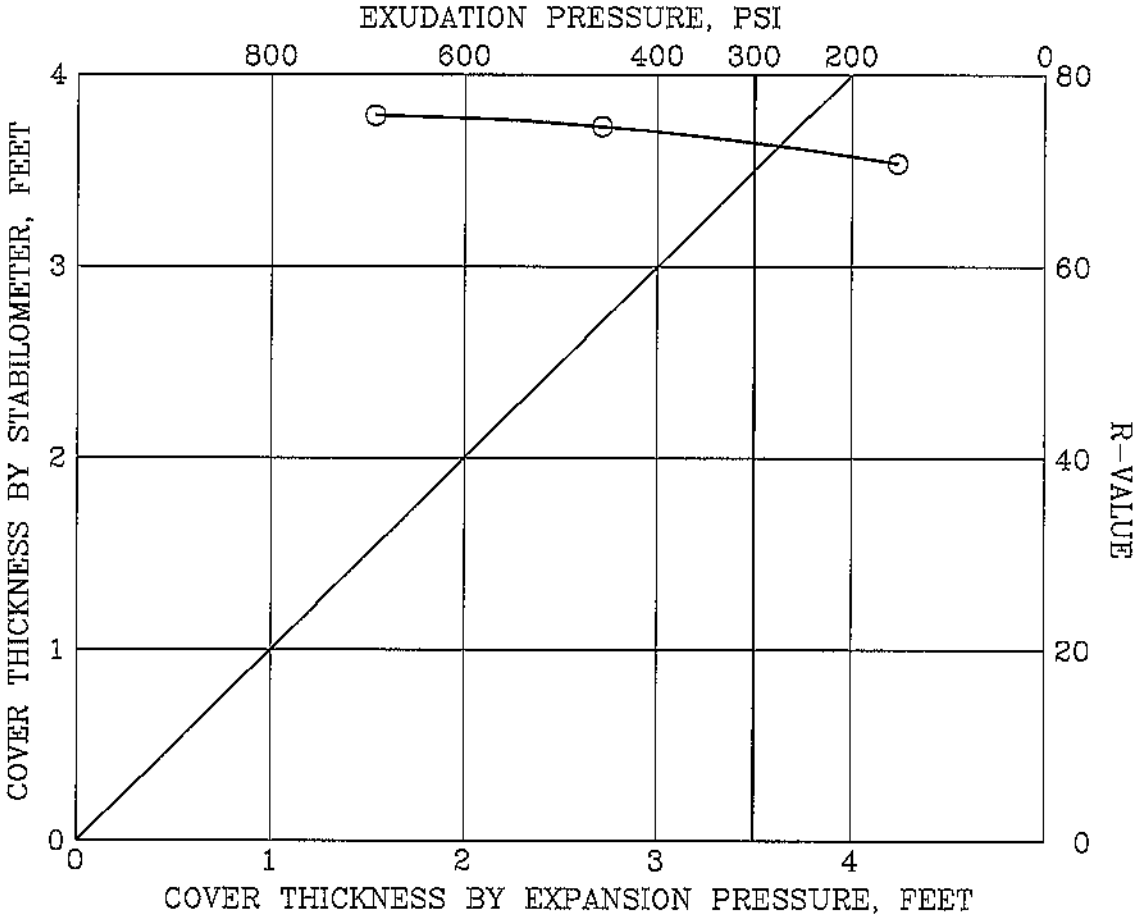
SAMPLE LOCATION : B-40, R-30
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/29/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.0	2.0	2.0		
MOISTURE AT COMPACTION,	11.4	11.8	11.0		
DRY DENSITY, PCF	114.8	114.2	114.5		
EXUDATION PRESSURE, PSI	378.8	260.2	585.7		
G.E. (STABILITY), FT	.35	.35	.27		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 66.3

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 43



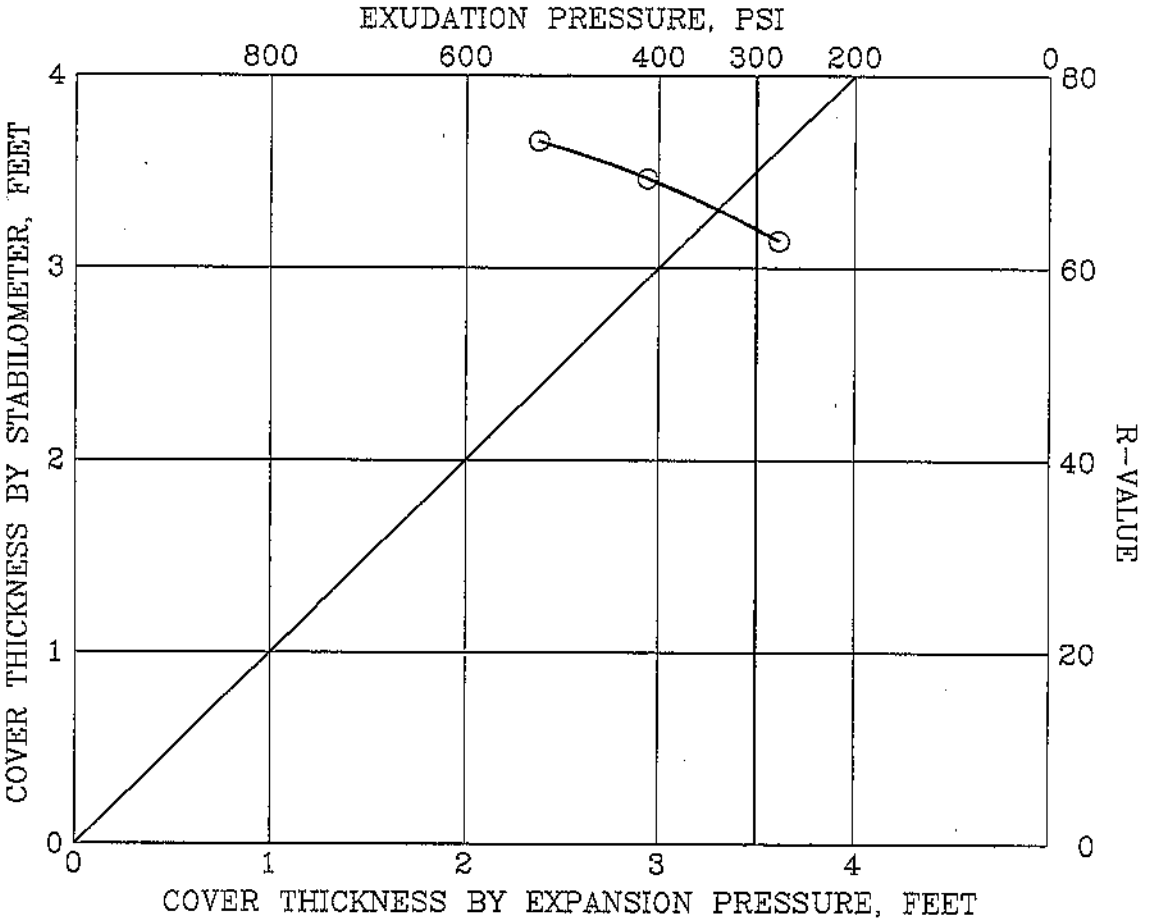
SAMPLE LOCATION : B-42,R-31
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/19/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.0	2.0	2.0		
MOISTURE AT COMPACTION,	11.4	13.1	12.2		
DRY DENSITY, PCF	110.3	109.4	111.0		
EXUDATION PRESSURE, PSI	692.3	152.8	457.6		
G.E. (STABILITY), FT	.23	.28	.26		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 72.9

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 44



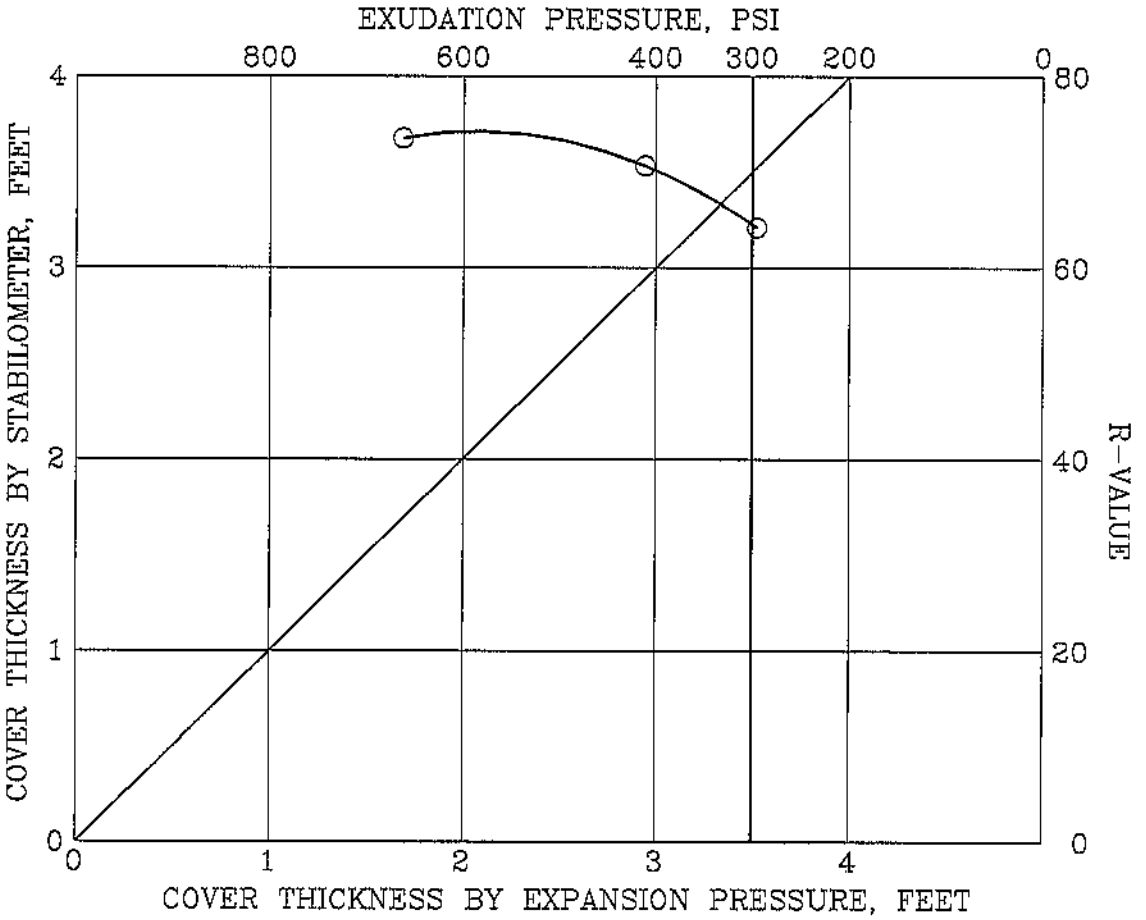
SAMPLE LOCATION : B-44,R-33
SOIL DESCRIPTION : Poorly Graded SAND (SP)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/22/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	3.0	3.0	3.0		
MOISTURE AT COMPACTION,	12.5	12.0	13.1		
DRY DENSITY, PCF	113.8	114.0	114.0		
EXUDATION PRESSURE, PSI	412.2	524.4	276.9		
G.E. (STABILITY), FT	.31	.28	.36		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 64.0

Cal Test Method

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 45



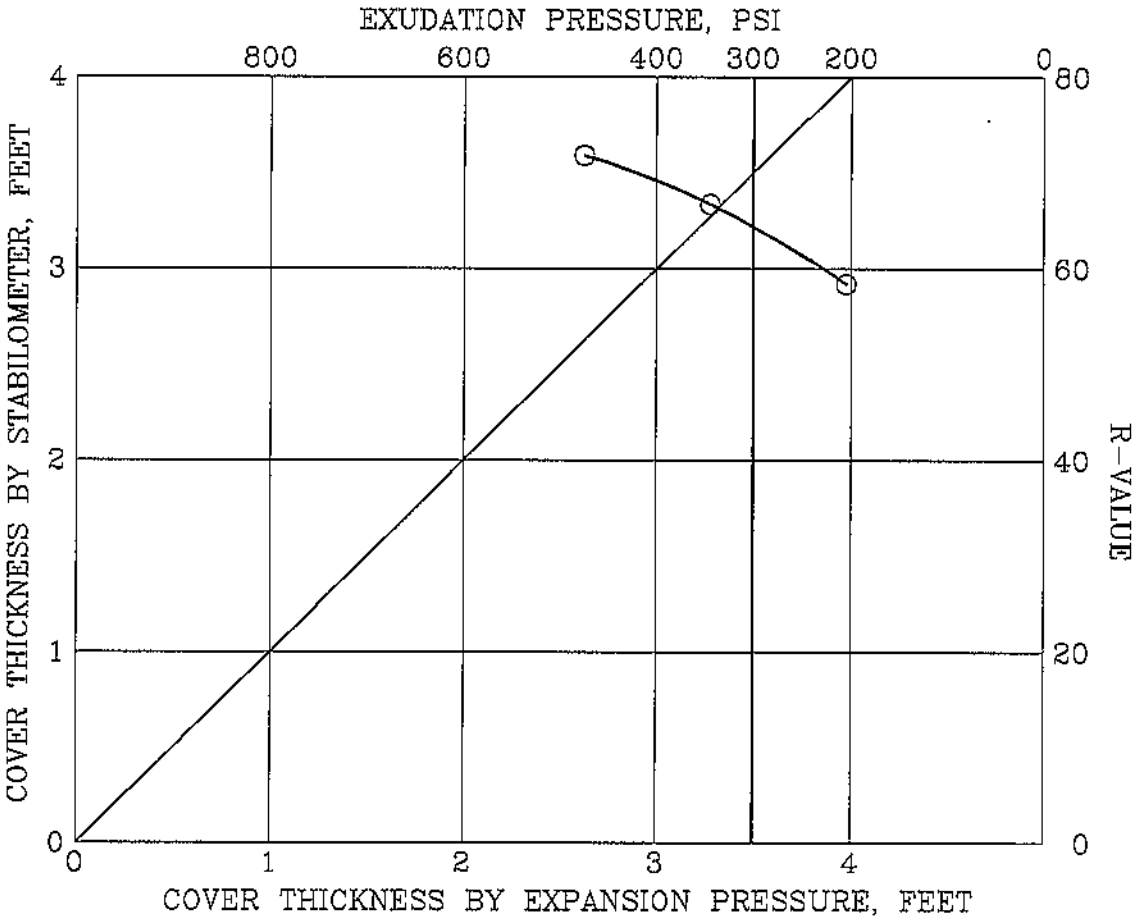
SAMPLE LOCATION : B-46,R-34
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/22/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	3.1	3.1	3.1		
MOISTURE AT COMPACTION,	12.6	12.1	13.2		
DRY DENSITY, PCF	112.1	113.0	112.5		
EXUDATION PRESSURE, PSI	411.4	662.1	295.2		
G.E. (STABILITY), FT	.30	.26	.36		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 64.5

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 46



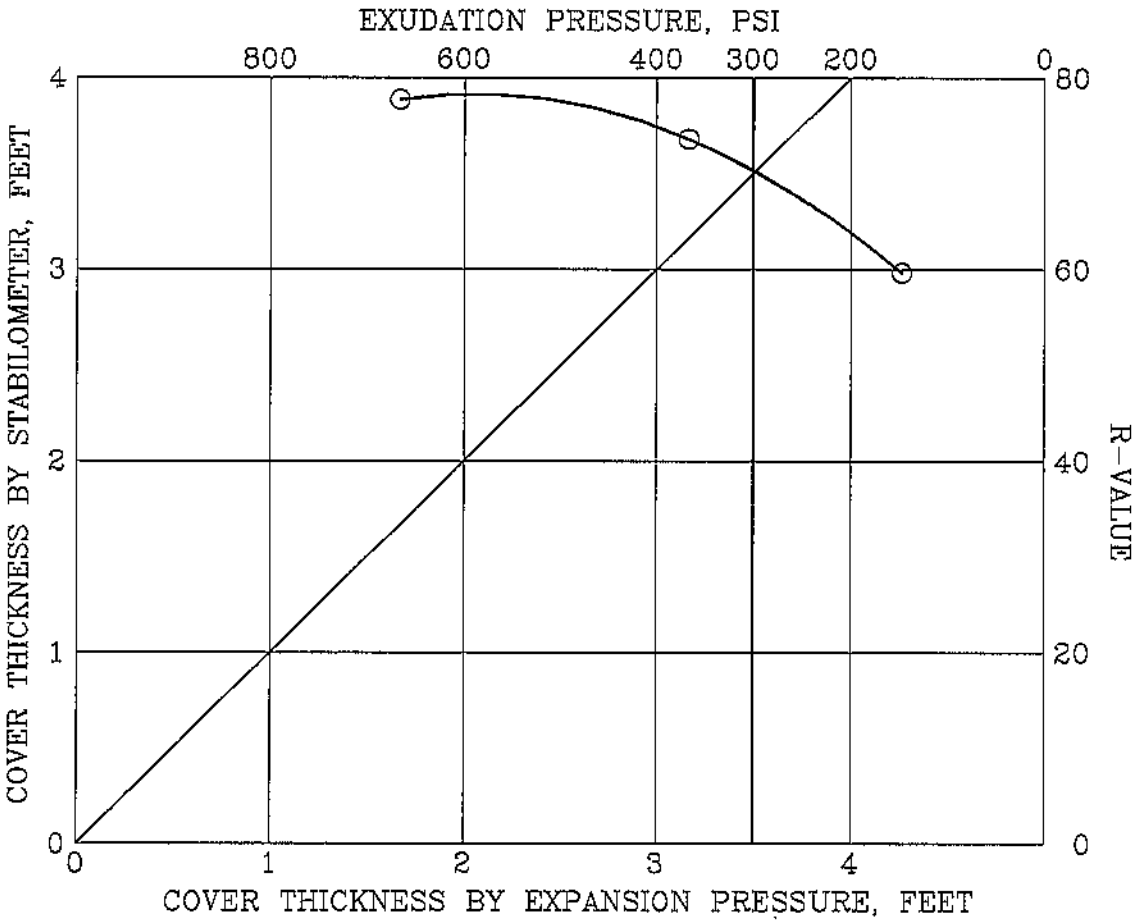
SAMPLE LOCATION : B-48,R-36
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/19/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	4.7	4.7	4.7		
MOISTURE AT COMPACTION,	11.3	10.4	9.9		
DRY DENSITY, PCF	120.0	120.8	121.3		
EXUDATION PRESSURE, PSI	205.3	344.6	475.1		
G.E. (STABILITY), FT	.41	.33	.27		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 64.4

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 47



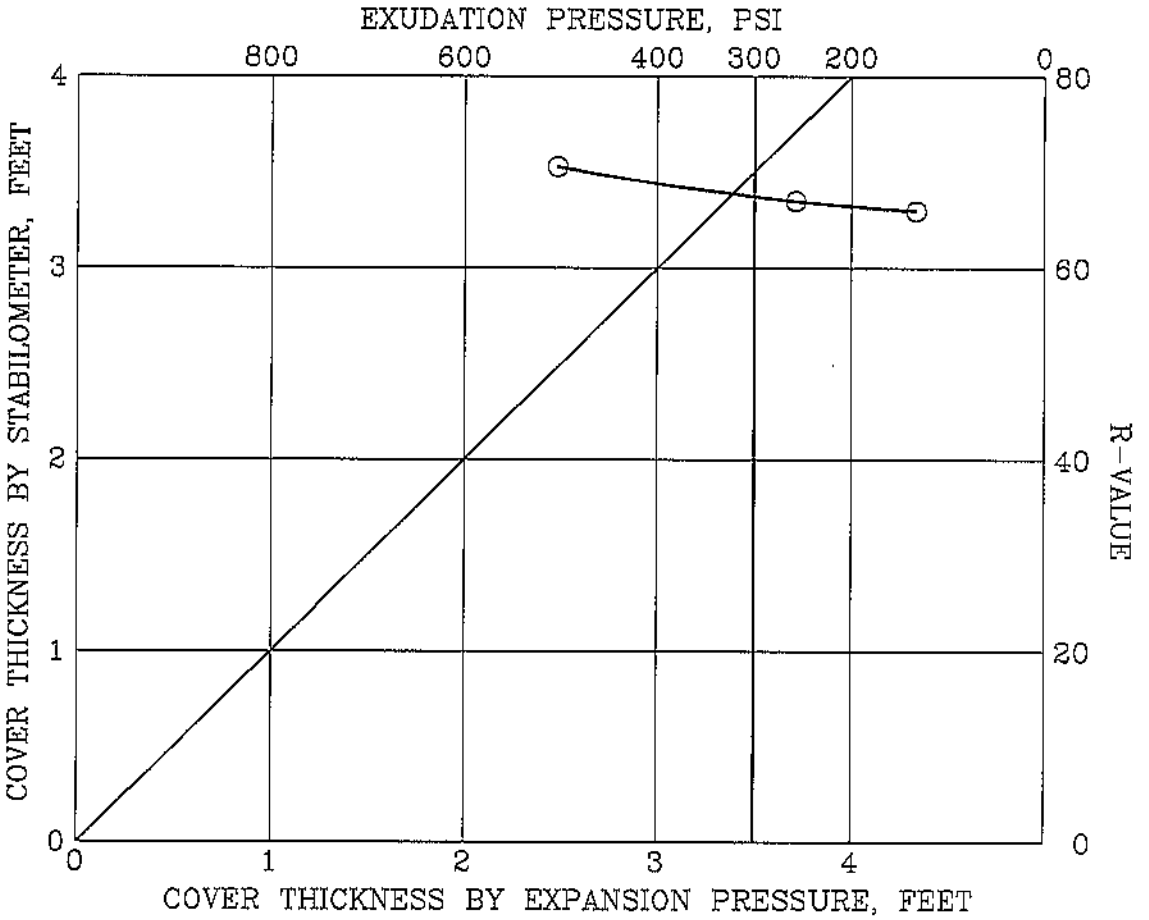
SAMPLE LOCATION : B-50,R-37
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/19/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	4.2	4.2	4.2		
MOISTURE AT COMPACTION,	10.7	9.4	8.9		
DRY DENSITY, PCF	119.4	121.2	122.5		
EXUDATION PRESSURE, PSI	147.2	366.9	666.9		
G.E. (STABILITY), FT	.40	.27	.21		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 70.3

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 48



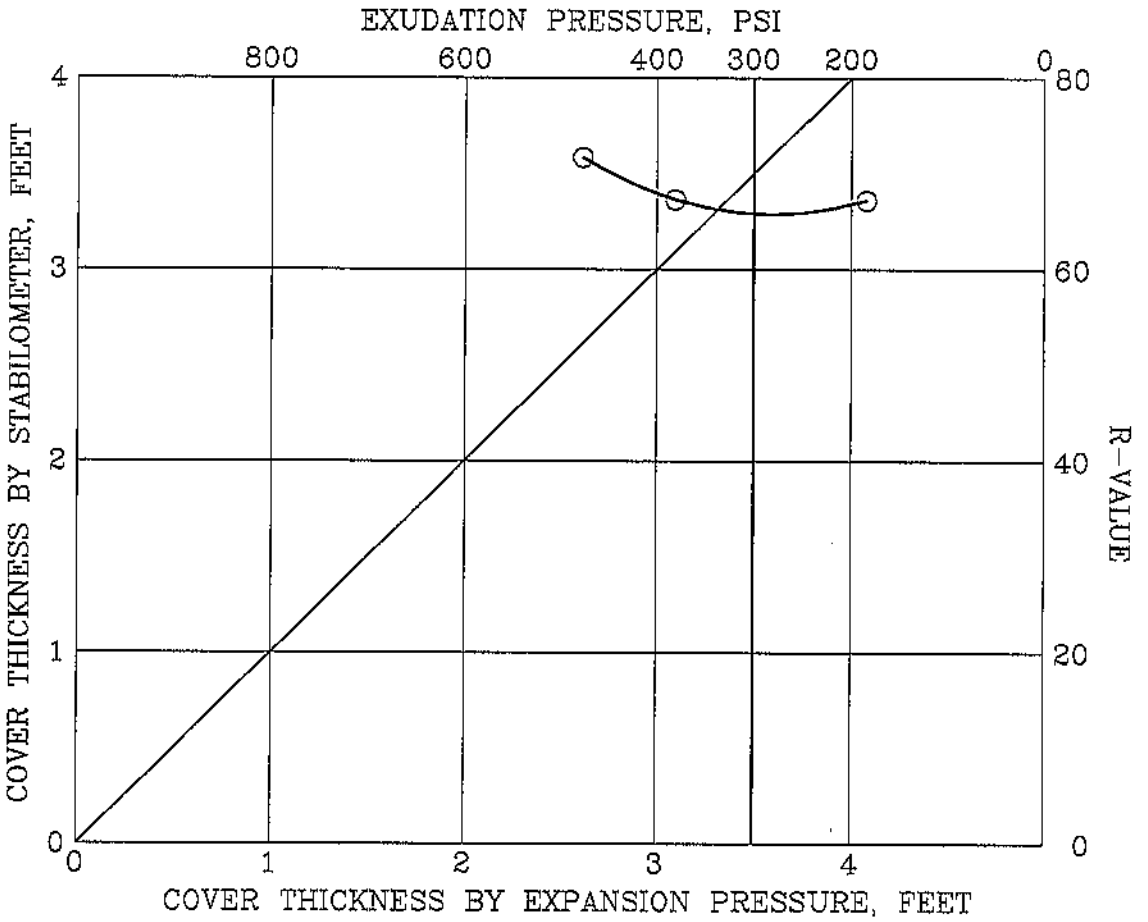
SAMPLE LOCATION : B-52, R-39
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/19/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.6	2.6	2.6		
MOISTURE AT COMPACTION,	10.7	9.4	10.0		
DRY DENSITY, PCF	117.9	118.7	119.8		
EXUDATION PRESSURE, PSI	132.9	503.7	257.0		
G.E. (STABILITY), FT	.35	.28	.33		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 67.4

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 49



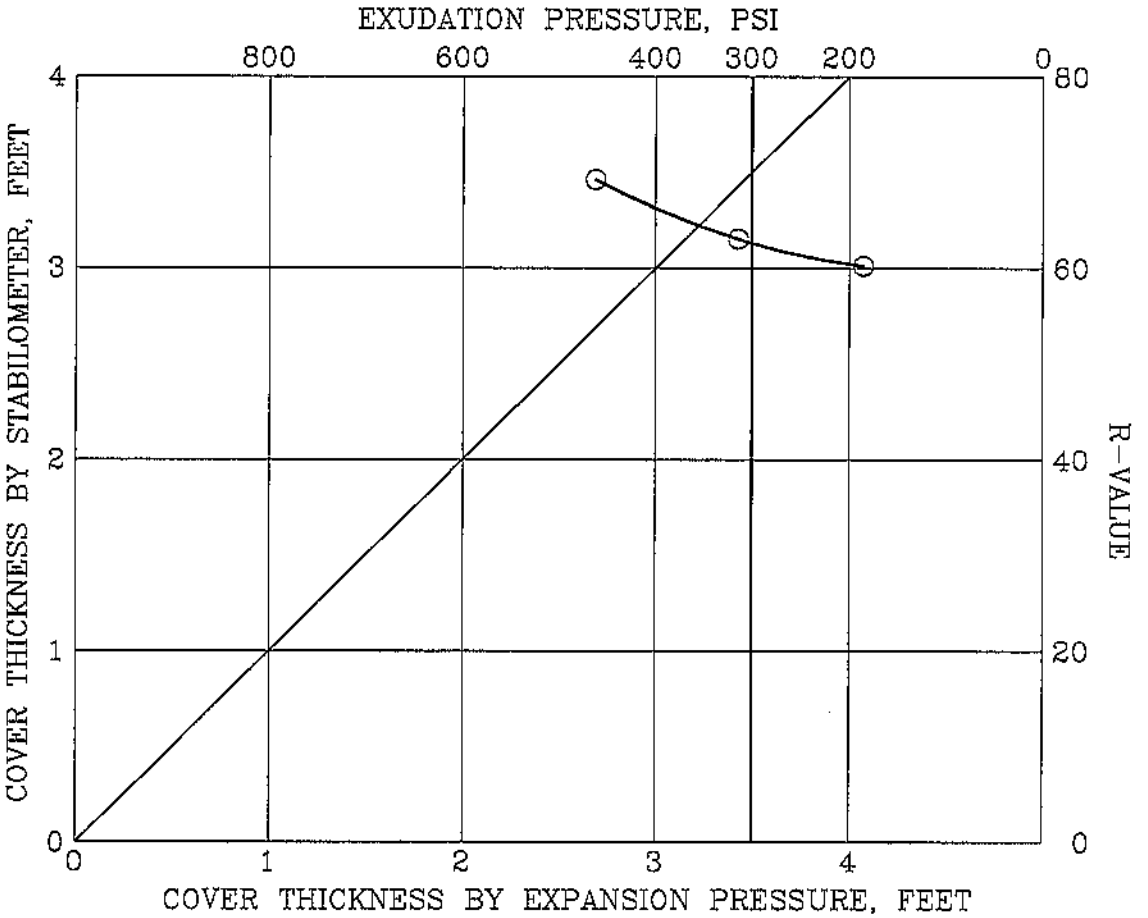
SAMPLE LOCATION : B-54,R-40
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/22/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.6	2.6	2.6		
MOISTURE AT COMPACTION,	11.1	12.0	11.6		
DRY DENSITY, PCF	113.0	113.1	113.9		
EXUDATION PRESSURE, PSI	477.5	184.6	381.2		
G.E. (STABILITY), FT	.30	.31	.31		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 65.8

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 50



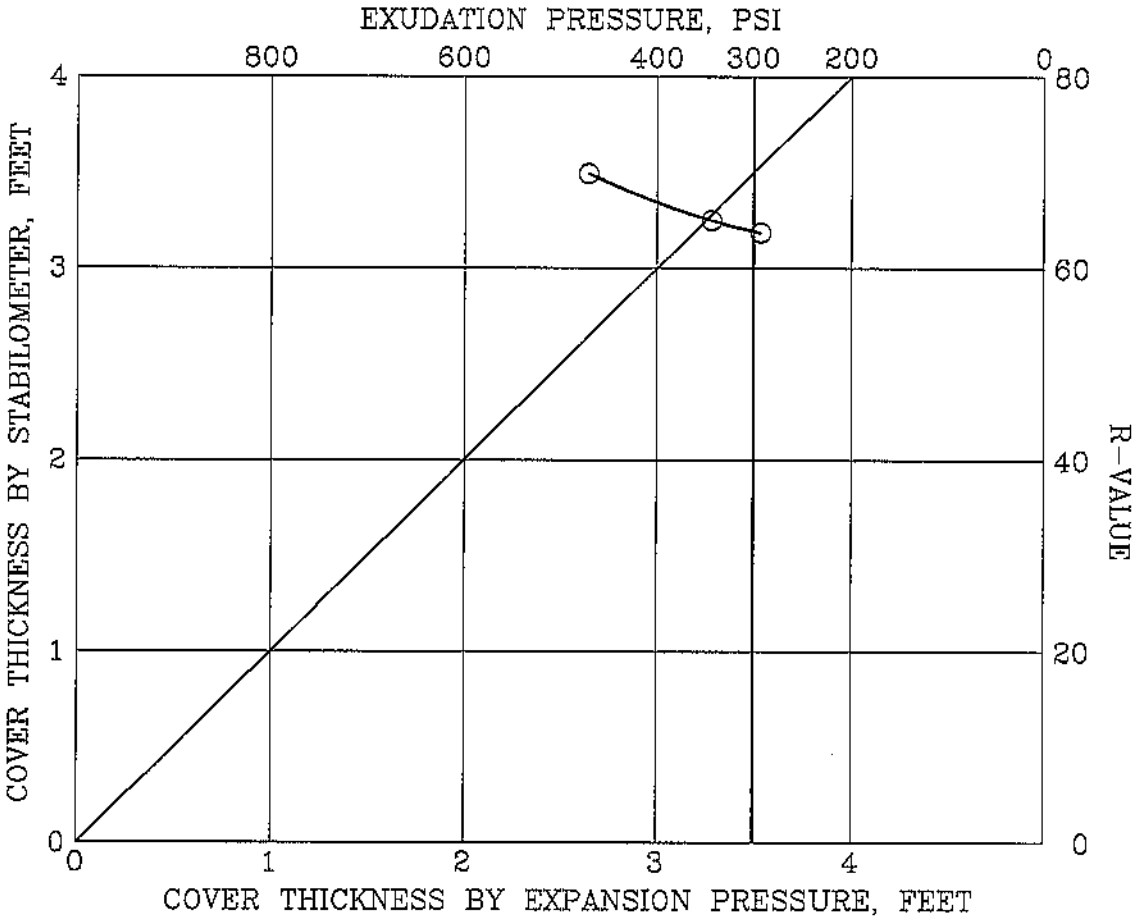
SAMPLE LOCATION : B-55,R-41,0.5-3.5
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/23/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.6	2.6	2.6		
MOISTURE AT COMPACTION,	12.4	11.6	11.1		
DRY DENSITY, PCF	114.9	115.8	115.8		
EXUDATION PRESSURE, PSI	185.4	314.3	462.4		
G.E. (STABILITY), FT	.38	.35	.30		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 62.6

Test Method Cal 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 51



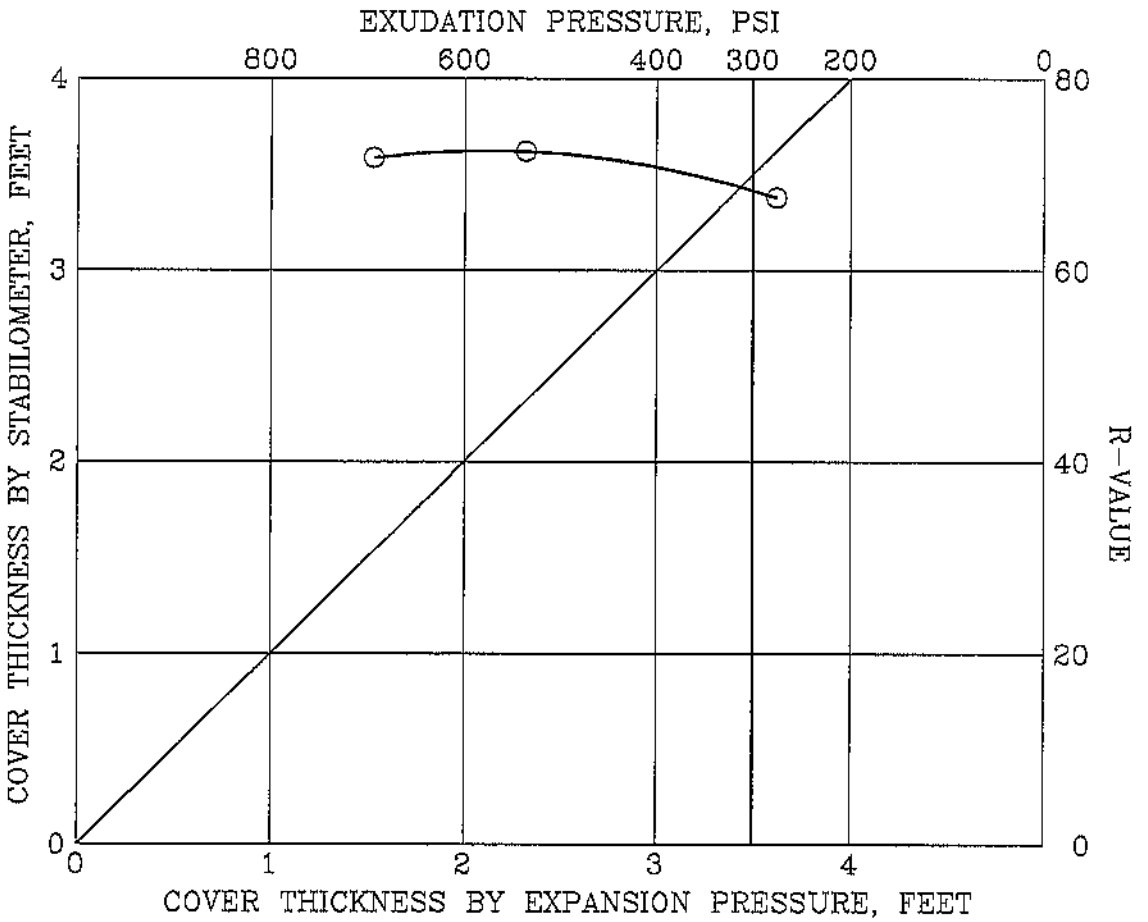
SAMPLE LOCATION : B-56,R-42,0.5-3.5
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/23/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	2.6	2.6	2.6		
MOISTURE AT COMPACTION,	12.0	12.4	12.9		
DRY DENSITY, PCF	114.8	113.9	113.3		
EXUDATION PRESSURE, PSI	471.1	343.8	292.9		
G.E. (STABILITY), FT	.29	.34	.35		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 63.8

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 52



SAMPLE LOCATION : B-58,R-43,1-3.5'
SOIL DESCRIPTION : Silty SAND (SM)
LIQUID LIMIT : SPECIFIC GRAVITY : 2.65
PLASTIC LIMIT : DATE : 03/26/04

TEST NUMBER	1	2	3	4	5
COMPACTION PRESSURE, PSI	350.0	350.0	350.0		
INITIAL MOISTURE,	1.5	1.5	1.5		
MOISTURE AT COMPACTION,	15.1	14.2	14.6		
DRY DENSITY, PCF	107.8	107.5	106.6		
EXUDATION PRESSURE, PSI	275.3	693.9	536.4		
G.E. (STABILITY), FT	.34	.29	.29		
G.E. (EXPANSION), FT	.00	.00	.00		

R-VALUE BY STABILITY : 68.3

Cal Test Method 301

B82604.01	Fitch Park	
Twining Labs, Inc.	R-VALUE TEST	Figure No. 53

THE TWINING LABORATORIES, INC.
EST. 1898
ANALYTICAL CHEMISTRY • ENVIRONMENTAL SERVICES
GEOTECHNICAL SERVICES • SAMPLING SERVICES
CONSTRUCTION INSPECTION & MATERIALS TESTING

ANALYTICAL CHEMISTRY DIVISION
PROJECT COVER SHEET

REPORT DATE : March 24, 2004
LABORATORY ID : 4C17004.1-3

INVOICE # 4C17004
PROJECT MANAGER: A. HARKER
AMENDED REPORT: April 1, 2004

ATTENTION : Andrea Clarke
CLIENT Clark Realty Capital, L.L.C.
PO Box 8540
Seaside, CA 93955

PROJECT INFO : FITCH PARK
PROJECT # : B82604.01

Please find enclosed the analytical results of your samples. In accordance with your instructions, the samples were analyzed for the components specified.

The Twining Laboratories is accredited by the State of California Department of Health Services for the analysis of Drinking Water, Wastewater and Hazardous Waste under Certificate No. 1371.

This report has been amended to reflect the correct project name and number.

Please feel free to contact us if you have any questions or comments regarding the analyses or results. Thank you for allowing us to serve your analytical needs.

ljt, ars

Figure No. 54

THE TWINING LABORATORIES, INC.

Ronald J. Boquist
Director of Analytical Chemistry

Rev. 4 08/03 jau (COVER)

REPORT DATE : March 24, 2004
LABORATORY ID : 4C17004.1

THE TWINING LABORATORIES, INC.

DATE SAMPLED : 03-12-04 by I. Bianchi
DATE RECEIVED : 03-17-04 at 1030 from I. Bianchi

CLIENT : GEOTECH / A. HARKER

PROJECT INFO : FITCH PARK
PROJECT# : B82604.01

ANALYZED BY : N. Tyler
REVIEWED BY : J. Ureno

DATE PREPARED : 03-19-04
DATE ANALYZED : 03-19-04

SAMPLE TYPE : Soil

CLIENT SAMPLE ID : R-1 / B-2 1-3.5

CORROSION	RESULT	UNITS	DLR	METHOD
pH	5.8	pH	N/A	ASTM D4972-89 Mod.[1]
Resistivity	1200	ohms/cm	N/A	CAL Test 424/ASTM D1125-82[2]
Chloride (Cl)	ND	% by weight	0.001	CAL Test 422/ASTM D4327-84[2]
Sulfate (SO_4)	ND	% by weight	0.01	CAL Test 417/ASTM D4327-84[2]
Sulfate (SO_4)*	21	mg/L	2.0	CAL Test 417/ASTM D4327-84

[1]pH Determination performed on reagent-water leachate.
[2]Leachate preparation as per CAL Test reference; quantitative analysis as per ASTM reference.
% by weight: Percent by weight
ohms/cm: ohms per centimeter @ 25°C
N/A: Not Applicable
ASTM: American Society for Testing and Materials
ND: None Detected
mg/L: Milligrams per Liter (ppm)
CAL Test: Department of Transportation
DLR: Detection Limit for Reporting purposes

*extraction ratio of Solid: Water = 1:3

REPORT DATE : March 24, 2004
LABORATORY ID : 4C17004.2

THE TWINING LABORATORIES, INC.

DATE SAMPLED : 03-12-04 by I. Bianchi
DATE RECEIVED : 03-17-04 at 1030 from I. Bianchi

CLIENT : GEOTECH / A. HARKER

PROJECT INFO : FITCH PARK
PROJECT# : B82604.01

ANALYZED BY : N. Tyler
REVIEWED BY : J. Ureno

DATE PREPARED : 03-19-04
DATE ANALYZED : 03-19-04

SAMPLE TYPE : Soil

CLIENT SAMPLE ID : R-12 / B-16 1-3.5

CORROSION	RESULT	UNITS	DLR	METHOD
pH	6.8	pH	N/A	ASTM D4972-89 Mod.[1]
Resistivity	7300	ohms/cm	N/A	CAL Test 424/ASTM D1125-82[2]
Chloride (Cl)	ND	% by weight	0.001	CAL Test 422/ASTM D4327-84[2]
Sulfate (SO_4)	0.011	% by weight	0.01	CAL Test 417/ASTM D4327-84[2]
Sulfate (SO_4)*	37	mg/L	2.0	CAL Test 417/ASTM D4327-84

[1]pH Determination performed on reagent-water leachate.
[2]Leachate preparation as per CAL Test reference; quantitative analysis as per ASTM reference.
% by weight: Percent by weight
ohms/cm: ohms per centimeter @ 25°C
N/A: Not Applicable
ASTM: American Society for Testing and Materials
ND: None Detected
mg/L: Milligrams per Liter (ppm)
CAL Test: Department of Transportation
DLR: Detection Limit for Reporting purposes

*extraction ratio of Solid: Water = 1:3

REPORT DATE : March 24, 2004
LABORATORY ID : 4C17004.3

THE TWINING LABORATORIES, INC.

DATE SAMPLED : 03-12-04 by I. Bianchi
DATE RECEIVED : 03-17-04 at 1030 from I. Bianchi

CLIENT : GEOTECH / A. HARKER

PROJECT INFO : FITCH PARK
PROJECT# : B82604.01

ANALYZED BY : N. Tyler
REVIEWED BY : J. Ureno

DATE PREPARED : 03-19-04
DATE ANALYZED : 03-19-04

SAMPLE TYPE : Soil

CLIENT SAMPLE ID : R-31 / B-42 1-3.5

CORROSION	RESULT	UNITS	DLR	METHOD
pH	6.1	pH	N/A	ASTM D4972-89 Mod.[1]
Resistivity	11000	ohms/cm	N/A	CAL Test 424/ASTM D1125-82[2]
Chloride (Cl)	ND	% by weight	0.001	CAL Test 422/ASTM D4327-84[2]
Sulfate (SO_4)	ND	% by weight	0.01	CAL Test 417/ASTM D4327-84[2]
Sulfate (SO_4)*	34	mg/L	2.0	CAL Test 417/ASTM D4327-84

[1]pH Determination performed on reagent-water leachate.
[2]Leachate preparation as per CAL Test reference; quantitative analysis as per ASTM reference.
% by weight: Percent by weight
ohms/cm: ohms per centimeter @ 25°C
N/A: Not Applicable
ASTM: American Society for Testing and Materials
ND: None Detected
mg/L: Milligrams per Liter (ppm)
CAL Test: Department of Transportation
DLR: Detection Limit for Reporting purposes

*extraction ratio of Solid: Water = 1:3

APPENDIX D

ENGEO, INCORPORATED

Preliminary Trenching Evaluation Letter

7496.1.001.01
August 7, 2007

ENGEO
INCORPORATED

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
7496.1.001.01

October 23, 2006

Ms. Yousra Tilden
RMC Water and Environment
2290 N. First Street, Suite 212
San Jose, CA 95131

Subject: Marina Coast Recycled Water Pipeline – 100% Design
Marina, California

PRELIMINARY TRENCHING EVALUATION

Reference: LandMarine Geotechnics; Preliminary Geotechnical Investigation, Marina Coast Water District, Regional Urban Water Augmentation Project, 30% Design, Marina, California, July 2006, Project No. 107.001.

Dear Ms. Tilden:

This letter records the results of our preliminary consultation regarding trenching conditions along the Marina Coast Recycled Water Pipeline. Our consultation is based on our review of the referenced report for 30% design, interviews, and a site reconnaissance recently conducted for the project. ENGEO Incorporated is currently providing geotechnical services for final design in accordance with our proposal dated October 10, 2006.

TRENCHING CONDITIONS

Review of existing data suggests that the entire proposed alignment is underlain by Stabilized Dune Deposits consisting of clean to silty sands, which are loose to medium dense, in the upper 10 feet or so. The sands have varying moisture content, depending on the surfacing, local hydrology, and the time of year. The variables of fines content, density, and moisture content all effect trench stand-up time and, as a result, excavation shoring options.

Soil conditions along the chosen project alignment appear to be relatively uniform and not particularly favorable for trenching. Review of the available data indicates that there likely is not a pattern to the occurrence of silty soils which are more favorable to trench stand-up time. A good example of this is from the geotechnical investigation we reviewed for General Jim Moore Boulevard where borings drilled at 1,000-foot spacing revealed sands with fines content varying from 3 percent to 10 percent and moisture contents generally less than 5 percent. At the north end of the alignment an investigation for the Regional Wastewater management system yielded similar results. It is interesting to note that this latter investigation

2010 Crow Canyon Place • Suite 250 • San Ramon, CA 94583-4634 • (925) 866-9000 • Fax (888) 279-2698
www.engeo.com

included test pits. The pits encountered essentially the same material type. One pit caved, and one did not.

INTERVIEWS

Our staff has conducted several interviews with contractors, professionals, and local agency employees familiar with the area and has gathered a significant amount of information.

Don Chapin Company – Our engineer spoke with an employee of Don Chapin Company, a contractor based out of Salinas, California. Company projects include the Castroville Water Project, the Quail Meadows Project, the Gilroy Sports Park, Campo Pico Blanco and others. Several contacts have recommended them as knowledgeable about construction practices for pipelines along the Monterey Bay and Central Coast.

The staff member we talked to told us that the sands in the Marina and Seaside areas can be problematic for trenching because they tend to slough into the trench and undermine the adjacent pavement if cut too close to vertical. This person told us that they would personally rather use a trench shield than speed shoring; however, they acknowledged that where existing utilities conflicted with the proposed trench, a shored system such as plywood sheeting with speed shores would be necessary. The employee generally said that sands in the Marina area were able to stand open more easily than those in the Seaside or Sand City areas. This person did confirm that the soils are variable in the area and that differentiating reaches with good trenching conditions versus difficult trenching conditions could be challenging.

Sanco Incorporated - An employee with Sanco Incorporated, based in Campbell, California, communicated with our representative regarding potential trenching conditions that might be encountered in the Marina area. Company projects include a large commercial and retail center in the Marina area for Shea Homes, including a large underground stormwater drainage system, and similar projects throughout the central coast. Other contacts have recommended them as extremely knowledgeable about pipeline construction along the Monterey Coast. They claimed that speed shores were not an option they used for similar work in the Marina area. They said that they open cut the streets and then installed trench shields and pulled them along as they excavated at two recent projects in Marina.

Their staff member indicated that the sand would run at close to ¾:1 slope (horizontal:vertical) and that the material is similar to beach sand. The employee said that they did install some jacks with plywood to cross under utilities. They mentioned that a large amount of existing utilities would make it difficult to pull a trench shield, and that they thought it may be necessary to both remove and replace the utilities as you proceed or open the street wide enough to allow for the angle of repose.

Monterey Peninsula Engineering – Our engineer talked to an employee of Monterey Peninsula Engineering regarding potential trenching conditions in the area. MPE is currently constructing improvements on General Jim Moore Boulevard which will connect into the southern end of the proposed pipeline. The staff member we talked to claimed that vertical cuts up to eight feet deep could be accomplished if they were properly shored; however, deeper than eight feet, the trench would begin to slough in. The staff member claimed that in some areas you might get "12 feet if you were lucky" and in other areas much less. This person confirmed that conditions were variable throughout the area.

Monterey Bay Engineers – Our engineer talked to an employee of Monterey Bay Engineers, an engineering consulting company. Contacts at the City of Marina recommended them as knowledgeable about construction practices for pipelines in the project vicinity.

Their employee claimed that caving is generally not a construction issue if the excavation is less than six feet; however, this was assuming an open cut trench with sloped back sides. The employee indicated that "no one in the area counts on vertical trenches staying open". Typically, this employee has seen slopes up to ½:1 stand open. Trenches deeper than six feet would need trench boxes for protection from caving.

Local Sanitary District – An inspector with the local sanitary district was able to speak with our representative regarding previous trenching experience in the area. The inspector was able to confirm that speed shoring was not feasible below approximately 5 feet in depth because of the tendency of the soils to cave. The inspector suggested that a good method to try and use would be the angled bucket recently used on Reservation Road to install pipeline to approximately 5 feet in depth. Review of pictures of this bucket show an angle of approximately 1:1 to ¾:1.

City of Marina – Members of the City of Marina staff confirmed the existence of variability in the tendency of the soils to stand open in relatively shallow vertical cut trenches throughout the area.

CSUMB – Staff members with the university spoke to our representative briefly about soil conditions along the proposed alignment. They confirmed that common methods used in the area for trenching include open cut with slopes of ¾:1 to 1:1.

Marina Coast Water District – Staff with the MCWD were able to talk with our representative regarding previous trenching experience in the area, some of which is directly applicable to the currently proposed alignment.

The water district recently installed a pipeline along Reservation Road between Imjin Avenue and Crescent Avenue. This section of pipeline was installed using open cut trenches to approximately 5 feet in depth, laid back at an angle of about ¾:1. The contractor had planned to use trench boxes but in general, did not have to use them for most of the installation. This trench

was excavated using an angled bucket, as shown in photographs received from the district. This particular method proved very successful and may be a method for consideration by contractors if the necessary trench section proves acceptable.

In addition, district employees related that past experience with contractors in the area had consisted of almost exclusive use of open cut trenches with slopes of ¾:1 to 1:1 (horizontal:vertical). These trenches were often shored with trench boxes to protect workers; however, sheet piling was very rarely used.

Field representatives of the Water District were also interviewed regarding trenching conditions. They related similar experience and gave specific information regarding Crescent Avenue and Reservation Road. The field staff interviewed said that conditions along our proposed alignment could vary considerably with some areas standing up at angles greater than 1:1, and others acting like "sugar sand". Along Reservation Road, during installation of pipeline, much of the trench stood open at about ¾:1; however, there were also areas that were like "baby powder". They also said that the hill on Crescent Avenue tended to be more dry towards the top (north of Reservation Road) and would stand open better the farther down towards Reservation Road you trenched.

The field staff interviewed also indicated that the intersection of Reservation and Crescent Avenue has a large number of underground utilities running through it. In general, for the Marina area, they said that utilities were sometimes removed and replaced if too close to an excavation.

Field staff confirmed that speed shoring would likely not be feasible for vertical cuts greater than about 5 feet deep.

Fort Ord Reuse Authority – Staff with FORA related their experience in the area regarding prior trenching work. In general, the staff said that you could expect stand up time of a few hours until the sand dries out. They also confirmed that speed shoring would be difficult to use below 5 feet deep, primarily because the sand would begin to run. The staff indicated that cribbing (similar to speed shoring) could be used if the sands were not running. FORA staff also said that they had seen trench boxes and speed shoring equipment at the nearby University Village Project (on the south side of 12th Avenue), but they had not seen them in use.

CONCLUSIONS AND DISCUSSION

At this time we can not differentiate different reaches of the project where flowing sand will or will not be encountered. Due to the nature of the sand deposition, there likely are local areas historically dominated by transient dunes where loose, dry, clean sand exists. There are also historic low areas where more silty sands may have accumulated. Also, areas likely exist where grading for the development of the streets and the military base has altered the natural

deposition. We will attempt to identify areas of varying conditions; however, realistically, conditions likely will vary over short distances and will be difficult to characterize.

It is our opinion that the project can be accomplished using sloped open cuts and an alternative trapezoidal trench backfill section. This may result in conflicts where adjacent utilities exist within the trench influence zone and will result in a larger area of street reconstruction than would vertical trenches. In some areas, particularly where shallow trenches are feasible, trenches may stand open vertically a sufficient time to allow for the use of internal shoring (plywood and speed shores/cribbing). While this configuration may save time and cost, it will likely be unacceptable where utilities are located within the influence zone of the trench.

In order to address these concerns we suggest the following:

- Identify areas where sloped open cuts will not interfere with adjacent utilities and allow sloped open cuts or internal shoring at the contractors own risk and discursion.

- In areas with close adjacent utilities, consider that the contractor may need to:

  - Use sheet piling with trench shields as cross bracing.
  - Relocate selected utilities and use sloped open cuts.

- Specify selected reaches of trenchless construction, as needed.

The Marina Coast Water District's standard specifications for recycled water pipelines prescribe minimum cover of 42 inches above the pipe (assuming a 12-inch pavement section). This implies a trench depth of 6 to 7 feet to the bottom of pipe bedding. Based on these dimensions and approximately 6 inches of clearance on either side of the pipe, we anticipate that an open cut trench with sides sloped at 1.5:1, as prescribed by OSHA for type C soils, can be constructed with a minimum saw cut of approximately 11 feet, side to side. In turn, existing utilities should have at least 1 foot of cover in the temporary cut, meaning that utilities with adequate vertical cover could be unaffected within 2 to 3 feet of the trench walls, and not have to be replaced. For planning purposes, we anticipate that an 8-foot zone clear of existing utilities centered along the pipeline will be sufficient to avoid significant removal and replacement activity due to disturbance by trenching activity. In areas where this is not feasible, sheet piling could be driven utilizing a trench shield as cross bracing. This may prove more cost effective than removal and replacement, and should be evaluated by the design team based on the anticipated areas and extent of utility conflicts.

We recommend that the project team proceed with the geotechnical investigation, including the further evaluation of trenching conditions, as planned. We will continue to consider this important issue in all the work we do on the project. We will work with you to provide appropriate design guidelines and information for the contractor to base their bids upon.

Please let us know if you have any questions or comments.

Very truly yours,

ENGEO INCORPORATED

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
ROSS WILLIAM RUDOLPH
No. 741
Exp. 12/31/2006
GEOTECHNICAL
STATE OF CALIFORNIA

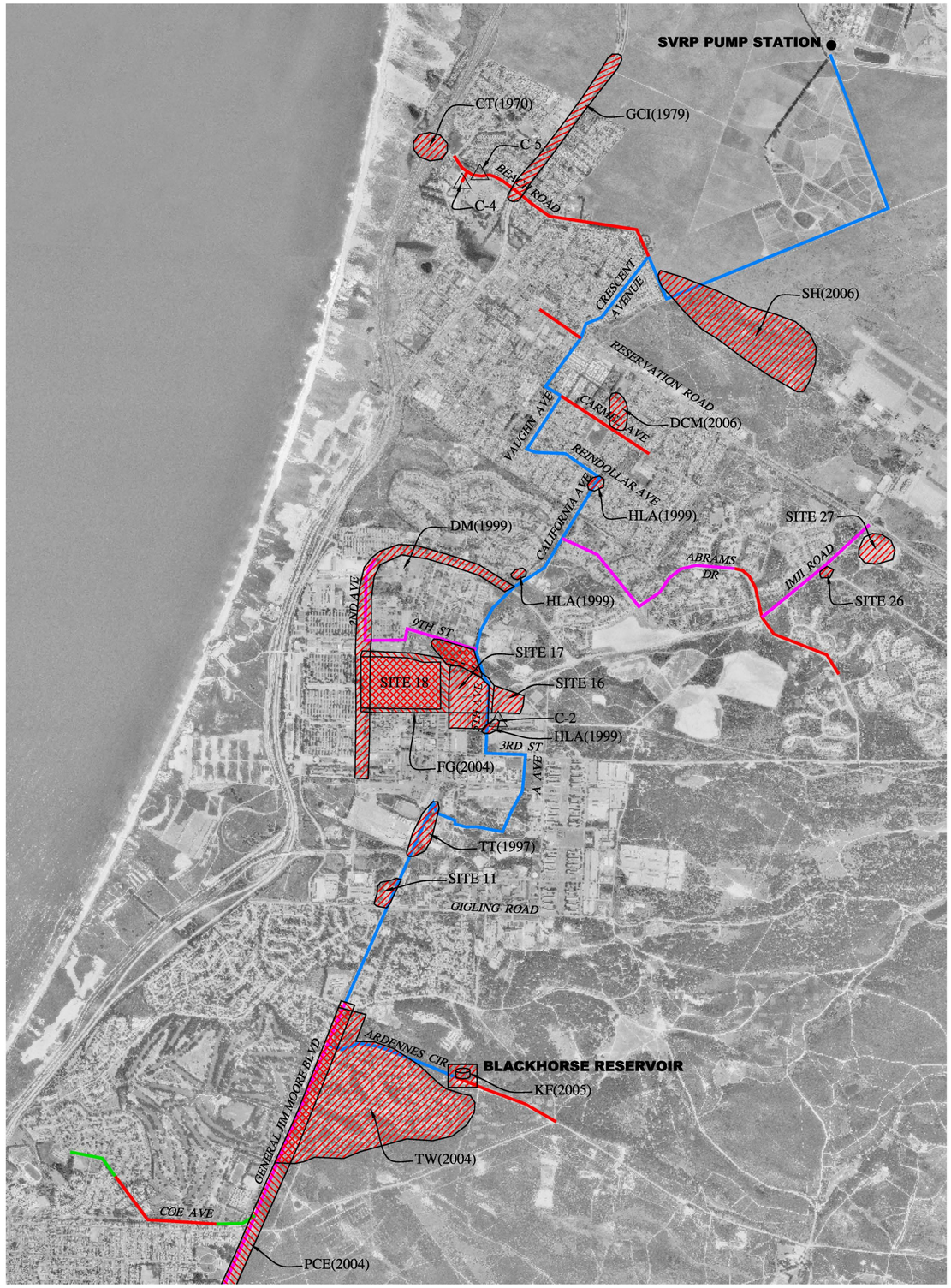
Douglas Wahl
dw/le:trnch

R. William Rudolph

Attachment: Figure 5, Existing Geotechnical Information – Draft

cc: 1 – Mr. Bob Hoffman – Carollo Engineers
1 – Mr. Brad Hamada – RMC Water and Environment (e-mail only)
1 – Mr. Lou Carella – Carollo Engineers (e-mail only)

DRAFT



EXPLANATION

- DESIGNED BY OTHERS
- EXISTING RW PIPELINE
- TRANSMISSION MAIN (20"Ø)
- LATERALS (6"-8"Ø)

C-5 △ CPT (LAND MARINE GEOTECHNICS, 2006)

N

0 FEET 2500
0 METERS 1250

GEOTECHNICAL EXPLORATION REFERENCES:

CT 1970 - Reservation Road Undercrossing, soil logs obtained from Cal Trans District 5, 1970. (See Appendix F)

GCI 1979 - Geotechnical Investigation, Phase II, Regional Wastewater Management System, Stage II, Monterey County, California, Prepared by Geotechnical Consultants Inc., April 1979. (See Appendix F)

D & M 1999 - Report of Geotechnical Investigation, 12th Street Gateway/2nd Avenue Realignment, Former Fort Ord, Marina and Seaside, California, Prepared by D & M Consulting Engineers, Inc., November 1999. (See Appendix F)

PCE 2004 - Geotechnical Investigation for General Jim Moore Boulevard and Eucalyptus Road, Seaside, California, Prepared by Pacific Crest Engineering Inc., February 2004. (See Appendix F)

TW 2004 - Geotechnical Engineering Investigation Report, Proposed Fitch Park Military Housing, Fort Ord Military Reservation, Seaside, Monterey County, California, Prepared by Twining Laboratories, Inc., November 12, 2004. (See Appendix F)

KF 2005 - Geotechnical Investigation Proposed East Garrison, "B" Zone Tanks, "D" Zone Reservoirs, "E" Zone Hydropneumatic Pump Station, and Transmission Mains, Marina Coast Water District, Marina, California, Prepared by Kleinfelder Inc., September 28, 2005. (See Appendix F)

Site 11 - HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Basewide Surface Water Outfall Investigation. Final. October 19, 1995. (See Appendix F)

Site 16 - HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Sites 16 and 17. Final. October 19, 1995. (See Appendix F)

Site 17 - HLA. 1994. Harding Lawson Associates. Volume II - Remedial Investigation. Sites 16 and 17. Final. October 19, 1995. (See Appendix F)

Site 18 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

Site 25 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

Site 26 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

Site 27 - HLA. 1994. Harding Lawson Associates. Volume IV - Baseline Ecological Risk Assessment. Final. October 19, 1995. (See Appendix F)

HLA 1999 - Test Pit Logs Obtained From Fort Ord Reuse Authority, Logged by Harding Lawson Associates, November 1999, Location Maps Included. (See Appendix F)

TT 1997 - Boring Logs Obtained From Fort Ord Reuse Authority, Logged by TerraTech Inc., February 1997, No Location Map Included. (See Appendix F)

SH 2006 - Draft Well Installation Completion Report, Armstrong Ranch, Operable Unit 1, Former Fort Ord, California, Total Environmental Restoration Contract, Contract No. DACW05-96-D-0011, Prepared by Shaw Environmental Group Inc., September 2006. (See Appendix F)

DCM 2006 -Geotechnical Engineering Investigation Report, Marina Coast Water District, 2005 Marina Sewer Improvement Projects, Marina, California, Prepared by DCM Engineering, August 2006. (See Appendix F)

FG 2004 - Geotechnical Study, California State University Monterey Bay, North Campus Housing, Monterey County, California, Prepared by Fugro West Inc., March 2004. (See Appendix F)

DRAFT

BASE MAP SOURCE: USGS, TERRASERVER, 1989

ENGEO INCORPORATED
EXCELLENT SERVICE SINCE 1971

EXISTING GEOTECHNICAL INFORMATION
MARINA COAST RECYCLING WATER PIPELINE
MARINA, CALIFORNIA

PROJECT NO.: 7496.1.001.01
DATE: OCTOBER 2006
DRAWN BY: PC
CHECKED BY:

FIGURE NO. 5

ORIGINAL FIGURE PRINTED IN COLOR

G:\Drafting\DRAFTING2_Dwg\7496\001\7496100101-2-ProjectAlign-1006.dwg 10-20-06 05:43:51 PM