U.S. Army Corps of Engineers

Alaska District

Soils and Geology Section

GEOTECHNICAL FINDINGS REPORT

Anchorage Harbor Deepening
Port of Anchorage, Alaska

June 2008

CEPOA-EN-ES-SG 13 June 2008

MEMORANDUM FOR CEPOA-CO-O (Allen Churchill)

SUBJECT: Geotechnical Findings Report for the Anchorage Harbor Deepening Project at the Port of Anchorage, Alaska.

1. Enclosed is the final Geotechnical Findings Report for the Anchorage Harbor Deepening Project at the Port of Anchorage, Alaska. Included with the report are the project location and vicinity map, the test boring location map, test boring logs, grain size distribution curves, and a discussion of the findings of the geotechnical investigation for the project.

2. Questions should be addressed to John Rajek at 753-5695 or Chuck Wilson at 753-2687.

JAMES W. PEKAR
Chief, Geotechnical Services

GEOTECHNICAL FINDINGS REPORT
Anchorage Harbor Deepening
Port of Anchorage, Alaska
June 2008

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1.0 INTRODUCTION

This report documents the results of a marine geotechnical investigation performed for the Anchorage Harbor Deepening Project at the Port of Anchorage, Alaska. The scope of this investigation was to identify subsurface conditions for future dredging associated with the expansion of the Port. This report presents a summary of the findings based on site observations and results of the field exploration and laboratory testing program.

1.1 Project Location and Description

The Port of Anchorage is located on the north edge of Anchorage, Alaska. The U.S. Army Corps of Engineers, Alaska District (USACE-AD) has the responsibility of maintaining commercial navigation to the port facility which is currently dredged to a depth of -35 feet mean lower low water (MLLW). The Port of Anchorage is currently engaged in a Port Intermodal Expansion Project which is anticipated to be completed by 2012. This work will include an expansion of the port facility that will increase the backland storage area of the port, improve road and rail service to the port, and modernize and expand the dock facility from the existing 3,000 linear feet to 8,800 linear feet. To provide commercial navigation access to the expanded port facility, USACE-AD plans to deepen the existing Port access to -45 feet MLLW and dredge new areas in the north to -25, -35, and -45 feet MLLW and in the south to -35 feet MLLW. A Project Location and Vicinity Map is enclosed as Figure 1 and the boundaries of proposed dredge areas are shown on the Test Boring Location Map enclosed as Figure 2.

1.2 Prior Geotechnical Investigations

A previous marine geotechnical investigation was conducted for the Port of Anchorage Intermodal Expansion Project by Terracon and Gregg Drilling & Testing. This investigation is presented in the following separate reports:

> Terracon, March 16, 2004. “Marine Geotechnical Exploration Port of Anchorage Intermodal Expansion, Volume I”.
>
> Gregg Drilling & Testing, Inc, September 10, 2003. “Marine Geotechnical Exploration Port of Anchorage Intermodal Expansion, Volume II, Site Investigation Project Data Presentation”.

These studies were conducted to investigate design options and develop geotechnical parameters for the expansion of the Port loading facilities.

1.3 Prior Environmental Investigation

A previous environmental investigation was conducted for the Port of Anchorage Intermodal Expansion project by USACE-AD. This investigation is presented in the following separate report:

> USACE-AD, January 2007, "Chemical Data Report, Anchorage Harbor ROST Study, Anchorage Harbor Expansion, Anchorage, Alaska".

A total of 26 soil probes were advanced using a Geoprobe Rapid Optical Screening Tool (ROST) to screen for petroleum contamination. The results of this report showed the dredged material tested was suitable for open water disposal without additional testing.

2.0 FIELD EXPLORATION

The subsurface exploration for this project was conducted from 10 September to 5 October 2007. A total of 48 test borings were drilled, ranging in depth from 34 to 42 feet below mudline. The borings have been designated AP-4585 through AP-4632.

2.1 Drilling Operations

Jack-up barge and drilling services were provided by Gregg Drilling & Testing, Inc. The Skate III jack-up barge used to access the test boring locations had a deck area of 2,560 square feet (40 feet by 64 feet). Four jacking legs located on the corners of the barge were used to lift the barge out of the water and provide a stable drilling platform. The Skate III's jacking legs were 30-inch diameter closed end pipe, approximately 110 feet in length, which allowed drilling in water depths of 80 feet. Drilling operations were conducted on a 24 hour per day basis with the jack-up barge moved between boring locations by a local tugboat service during high tides. A skid mounted Mobile B-80 drill rig fitted with 4.0-inch I.D. x 4.5-inch O.D. HWT casing was used to perform the exploration. Engineers with USACE-AD supervised the drilling and logged the test borings. A view of the drilling operations can be seen in Photograph 1.

At each boring location an outer conductor casing, 6.0-inch I.D. x 9.0-inch O.D., was installed from the deck of the jack-up barge to the mudline. The outer conductor casing was positioned several feet into the mudline to stabilize the casing against movement by the current. After the outer conductor casing was installed, an inner 4.0-inch I.D. x 4.5-inch O.D. HWT casing was installed and used to advance the boring employing rotary wash techniques. Generally, saltwater was used as the drilling fluid, however on occasion, guar gum was added to the saltwater to suspend drill cuttings and prevent accumulation around the bit and casing.

Photograph 1: View of drilling operations during the night shift.

2.2 Field Soil Sampling

Soil samples were generally collected 2.5 feet below mudline and at approximately five-foot intervals thereafter. In all but two test borings, soil samples were obtained in accordance with ASTM D 1586, "Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils" using a 2.0-inch outside diameter split spoon sampler driven with a 140-pound automatic hammer, falling 30 inches on an anvil and NWJ sample rods. Some of the soil samples collected in AP-4592 and AP-4603 used a 3.0-inch outside diameter split spoon to increase the sample recovery in coarse grained soils. These samples were also driven with the 140-pound automatic hammer. The number of blows required to drive each six-inch increment is recorded on the exploration logs. The blow count is an indication of the relative density or consistency of the soil. Some test borings encountered very soft or very loose soils during sampling. At these locations the weight of the hammer and sample rods caused the sampler to penetrate into the soil without any blows from the hammer. The value of "0" was recorded on the exploration logs at these locations. In the field, soil samples were classified in accordance with ASTM D 2488, "Description and Identification of Soils (Visual - Manual Procedure)". Pocket penetrometer tests were performed on cohesive soils at selected intervals using a Soiltest CL-700. The unconfined strength reported in tons per square foot from pocket penetrometer tests are recorded on the exploration logs.

The soil descriptions and classifications contained in this report are the project engineer's interpretation of the field logs and results of the laboratory testing program. The stratification lines shown on the exploration logs represent approximate boundaries between soil types. The actual transitions are often gradual or not discernible by drill action. The exploration logs are presented in Appendix A.

2.3 Field Environmental Sampling

A USACE-AD chemist collected soil samples for environmental contamination testing in test borings AP-4601, AP-4604, AP-4610, AP-4613, AP-4619, and AP-4629. The chemical testing results from these samples are presented separately in the "Anchorage Port Expansion Chemical Data Report" dated March 2008, prepared by the USACE-AD Materials Section.

2.4 Standard Penetration Test Energy Measurements

During the Standard Penetration Tests performed in test borings AP-4593, AP-4598, and AP-4614, dynamic energy measurements of the automatic hammer striking the anvil and sample rods were taken in accordance with ASTM D 4633, "Standard Test Method for Energy Measurement for Dynamic Penetrometers". These tests were conducted with two strain gauges mounted on a two-foot section of NWJ rod to measure force, while two accelerometers bolted on the same rod measured acceleration. Signals from the strain gauges and accelerometers were collected and stored by a model PAK Pile Driving Analyzer. A summary of standard penetration test energy results are reported for each test boring in Table 1. A complete set of energy measurements and related calculations from Gregg Drilling and Testing is attached in Appendix C.

Table 1: Standard Penetration Test Energy Results

Test Boring No.		Date	Overall Average ETR (%)*
Field No.	Permanent No.		
TB-32	AP-4614	11 Sep 2007	75 %
TB-16	AP-4598	22 Sep 2007	77 %
TB-10	AP-4593	28 Sep 2007	81 %

*ETR (%) = Ratio of the measured energy transferred to the sample rods to the theoretical potential energy.

2.5 Field Vane Shear Testing

Field vane shear testing was conducted in AP-4605, AP-4611, and AP-4612 using a Geonor H-10 Vane Shear Borer with a 55-millimeter x 110-millimeter rectangular vane, as seen in Photograph 2. Torque measurements were made during the test by means of an electric torque transducer and data was collected and stored on a lap-top computer. The field vane shear tests were performed in accordance with ASTM D 2573, "Standard Test Method for Field Vane Shear Test in Cohesive Soils". The undrained shear strengths and remolded undrained shear strengths are reported in kips per square foot and recorded on the exploration logs. A report from Gregg Drilling and Testing containing plots and tabular summaries of the field vane shear testing is attached in Appendix D.

Photograph 2: View of 55-millimeter x 110-millimeter rectangular vane used during the field vane shear testing.

2.6 Test Boring Locations

The horizontal locations of the test borings were determined by a real time kinematics global positioning system utilizing the existing beacon at the Anchorage International Airport. Test boring coordinates reported on the exploration logs are based on NAD83, Alaska State Plane Zone 4, in feet. The mudline elevations at each test boring were determined by importing the horizontal locations of the test borings into a CAD drawing titled "Port of Anchorage Expansion Survey", dated 5 October 2007, Terrasond, LTD. Mudline elevations were selected from the digital surface within the bathymetry survey drawing. Vertical control from the 5 October 2007 survey is referenced to

MLLW based on the 1983-2001 tidal epoch in feet based on NOAA/NOS tidal bench mark list "9455920 Anchorage, Knik Arm, Cook Inlet, Alaska", published 04/21/2003, holding USCGS SBC "Tidal 16 1966" as 40.53' and USCGS SBC "B 75 1965" as 36.82'. A test boring location map can be found as Figure 2 and a summary table of boring coordinates and elevations is presented in Appendix A.

3.0 LABORATORY TESTING AND SOILS CLASSIFICATION

A laboratory testing program was established to classify and determine the physical and engineering properties of the encountered soils. The program consisted of engineering classifications, sieve analyses, moisture contents, and Atterberg limits. The testing program used the latest version of the following test methods found in Table 2.

Table 2: Soils Laboratory Test Methods

Test Designation	Test Description
ASTM D 422	Standard Test Method for Particle Size Analysis of Soils (Sieve and Hydrometer)
ASTM D 2216	Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 4318	Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

The soils laboratory test results are provided in Appendix B.

3.1 Environmental Sampling Results

Soil samples collected for environmental contamination testing in test borings AP-4601, AP-4604, AP-4610, AP-4613, AP-4619, and AP-4629 were used to characterize the dredge material. The chemical testing results from these samples are presented separately in the "Anchorage Port Expansion Chemical Data Report" dated March 2008, prepared by the USACE-AD Materials Section. This report is attached as Appendix E. All sediments tested were reported suitable for open water disposal.

4.0 REGIONAL GEOLOGY

The Port of Anchorage is located within an area locally referred to as the Anchorage Bowl. The Anchorage Bowl is located within the Cook Inlet-Susitna Lowland Section of the Coastal Trough Physiographic Province of Alaska, and generally is bordered by the Chugach Mountains on the east, Turnagain Arm on the south, Knik Arm on the west and the Elmendorf Moraine on the north. Glacial features including ground moraines, drumlins, eskers and outwash plains, characterize the Cook Inlet-Susitna Lowlands. Five major glacial advances of the Quaternary Period (Pleistocene and Holocene or Recent) can be recognized in the Cook Inlet-Susitna Lowlands section (Karlstrom, 1957). These glacial advances are discussed further in the following paragraph.

The Anchorage Bowl is near the east border of a deep structural trough filled with moderately consolidated Tertiary rocks that underlie Cook Inlet and extend northeastward toward Mount McKinley (Capps, 1940). These Tertiary rocks are overlain by Pleistocene deposits as a result of repeated glacial advances during that epoch. These deposits accumulated to a thickness of 650 feet and more and appear to thicken westward from the mountain front toward Cook Inlet. They consist chiefly of three categories of material: 1) glaciofluvial consisting primarily of outwash sands and gravels, 2) proglacial silty clays of estuarine-marine or lacustrine-estuarine origin (including Bootlegger Cove Clay), and 3) glacial till deposited as ground moraine. Most of the Anchorage Bowl is overlain by relatively clean coarse-grain soils derived from outwash and glacial debris deposited in front of the youngest Pleistocene glacier (Naptowne-Wisconsin) that migrated into the area. This glacier produced a large east-west end moraine (Elmendorf moraine) across Fort Richardson and the north side of Elmendorf AFB. Outwash from this glacier spread southward across the Anchorage Bowl and buried ground moraine and the proglacial silty clays. The outwash thins toward the west and south away from its source and tends to become coarser toward the mountains, grading laterally into cobble and boulder sizes. The silty clays below the outwash are interbedded with silt and fine sand. The clay deposit extends to depths on the order of 200 to 250 feet within the Anchorage Bowl and "pinches-out" on the east near the Chugach Mountains and on the north near a line connecting Dishno Pond and Sixmile Lake. Glacial till, consisting of boulders, cobbles, gravels, sand, and fine-grain soils, underlies the silty clays (where encountered) and extends to the Tertiary rock. Ground moraine of the Naptown glaciation overlies the advance outwash of that glaciation and glacial till of the earlier Knik glaciation to the north of the Elmendorf moraine.

5.0 SITE CONDITIONS

The Anchorage Harbor Deepening project can be divided into three separate areas: the northern area which includes all proposed dredging north of the existing dredge limits, the area within the existing dredge limits, and the southern area which includes all proposed dredging south of the existing dredge limits. These boundaries are shown on the Test Boring Location Map enclosed as Figure 2.

5.1 Surface Conditions

Potential Dredging Obstructions

Two bathymetric surveys performed on 26 July 2007 by Hughes and Associates and 5 October 2007 by Terrasond, LTD located a total of 60 potential dredging obstructions protruding above the mudline. There were 57 obstructions located in the northern dredge area and three located in the southern dredge area. These potential dredging obstructions were selected from abrupt elevation anomalies in the digital surface within the bathymetric surveys. The location of obstruction number "22" is a group of nine obstructions. Obstruction number "30" has been identified as concrete pill boxes by divers. A barge bridal chain was also brought to the surface by dredgers at this location. Obstruction numbers "T20" and "T22" are steel pipe piling. The other obstructions are assumed to be boulders lying on or partially covered near the mudline surface. Potential dredging obstruction locations are presented on the Test Boring Location Map enclosed as Figure 2 and a list of coordinates and elevations is provided in Appendix A.

Northern Dredge Area

The bathymetry of the northern dredge area shows the mudline surface elevations range from zero to greater than -45 feet MLLW. The ground surface, observed within the tidal zone on the northern edge of the dredge area, is covered primarily with fine-grained soils with local areas of sand, gravel, and cobbles and a few boulders. Drilling resistance and drill cuttings viewed on the barge deck from cleaning out the conductor casing indicated similar soil conditions on the mudline in the subtidal zones.

Large boulders, greater than 10 feet in diameter, are visible on the mudflats at low tide near the edge of the northern dredge area. An example of these boulders can be seen in Photograph 3. This indicates that large boulders are present within the end-moraine deposits of glacial till and outwash-stream deposits which are located in the proposed dredge area.

Photograph 3: View of three large boulders during a -0.6 feet MLLW tide just offshore in the northern dredge area.

Existing Dredge Area

The bathymetry of the existing dredge area shows the mudline surface elevations range from -35 to greater than -45 feet MLLW. This area is dredged annually to maintain commercial navigation to the Port. The mudline surface is comprised of fine-grained soils deposited by sedimentation and tidal action.

Southern Dredge Area

The bathymetry of the southern dredge area shows the mudline surface elevations range from five to greater than -45 feet MLLW. This area gently slopes seaward, becoming steeper near the existing dredge boundary. The ground surface, visually seen within the tidal zone, is covered primarily with fine-grained soils with local areas of sand and gravel. Drilling resistance and drill cuttings viewed on the barge deck indicated similar soil conditions at the mudline in the subtidal zones. An example of these soil conditions and potential dredging obstruction numbers “T20” and “T22” can be seen in photograph 4.

Photograph 4: View looking southwest during a -0.6 feet MLLW tide in the southern dredge area.

5.2 Subsurface Conditions

Northern Dredge Area

The subsurface soils in the northern dredge area vary significantly in composition. Generally, end-moraine deposits of glacial till and outwash-stream deposits were found overlying estuarine or lacustrine deposits to the limits of exploration. The glacial till and outwash-stream deposits consisted of sands or gravels with silt or clay and cobbles (SP, SP-SM, SP-SC, SM, SC, GW, GP, GW-GM, GP-GM, GP-GC, GM, GC). This coarse-grained soil unit extended from the mudline to a depth ranging from 2.5 feet to the limits of exploration. Some test borings did not encounter this coarse-grained soil unit near the southern portion of the area. Laboratory results indicate the fines content in these coarse-grained deposits range from four to 49 percent, and a visual-manual description of the soils plasticity range from nonplastic to medium plasticity. Atterberg Limit test results reported on one sample had a liquid limit of 25 percent and a plasticity index of eight. Photograph 5 shows a sample of this coarse-grained soil unit encountered during our exploration.

Photograph 5: Sample from test boring AP-4628 taken between 3.0 and 5.0 feet below the mudline.

Within these coarse-grained deposits, zones of fine-grained soils consisting of clay or silt (CL, ML) were encountered with thicknesses ranging from 2.5 to 16 feet thick. Blow counts indicated the relative density of the glacial till and outwash-stream deposits range from medium dense to very dense and the consistency of the interbedded zones of fine-grained soils range from soft to hard. Cobbles are present in the glacial till and outwash-stream deposits as indicated by drill action, cuttings, and drive fractured particles in the samples. The boulders visible on the mudflats at low tide indicate their presents within these deposits. It was not possible to determine the amount or maximum size of cobbles or boulders encountered during the drilling program due to the type and size of sampling equipment used.

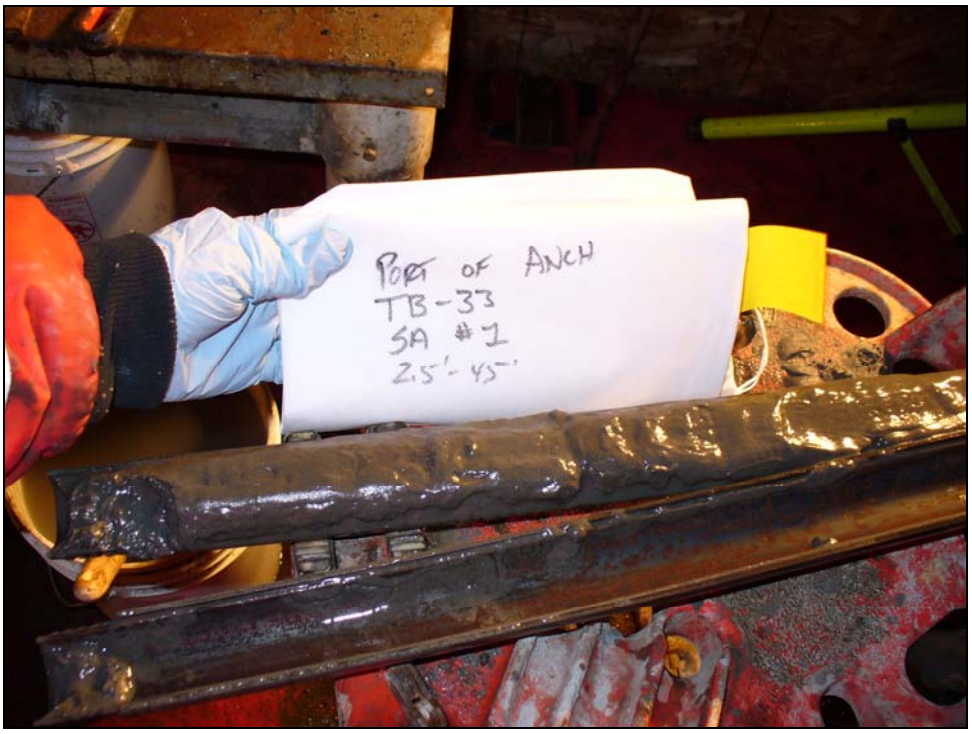
Below the glacial till and outwash-stream deposits or at the mudline, estuarine or lacustrine deposits consisting of clay and silt with sand and gravel (CL, ML) were encountered to the limits of exploration. Laboratory results indicate the fines content in these deposits range from 80 to 89 percent, moisture contents range from 20 to 36 percent, and a visual-manual description of the soils plasticity range from nonplastic to medium plasticity. Atterberg Limit test results indicate liquid limits range from 21 to 39 percent and plasticity indexes range from nonplastic to 18 percent. Blow counts indicate the consistency of these fine-grained soils range from firm to hard and the unconfined compressive strength approximated by the pocket penetrometer range from 2.0

to greater than 4.5 tons per square foot. Photograph 6 shows a typical sample of these fine-grained soils encountered during our exploration.

Photograph 6: Sample from test boring AP-4606 taken between 8.0 and 10.0 feet below the mudline.

Existing Dredge Area

The subsurface soils in the existing dredge area are composed of three major soil units. Generally, recent marine deposits from sedimentation are found overlying fluvial deposits and estuarine or lacustrine deposits to the limits of exploration. The recent marine deposits consist of silt with sand, sandy silt, or silty sand (ML, SM). This soil unit extends from the mudline to depths ranging from eight feet to the limits of exploration. Laboratory results indicate the fines content in these deposits range from 44 to 91 percent, and a visual-manual description of the soils plasticity range from nonplastic to medium plasticity. Atterberg Limit test results reported these soils as nonplastic. Blow counts indicate the consistency of these fine-grained soils range from very soft to soft. Photograph 7 shows a sample of this soil unit encountered during our exploration.



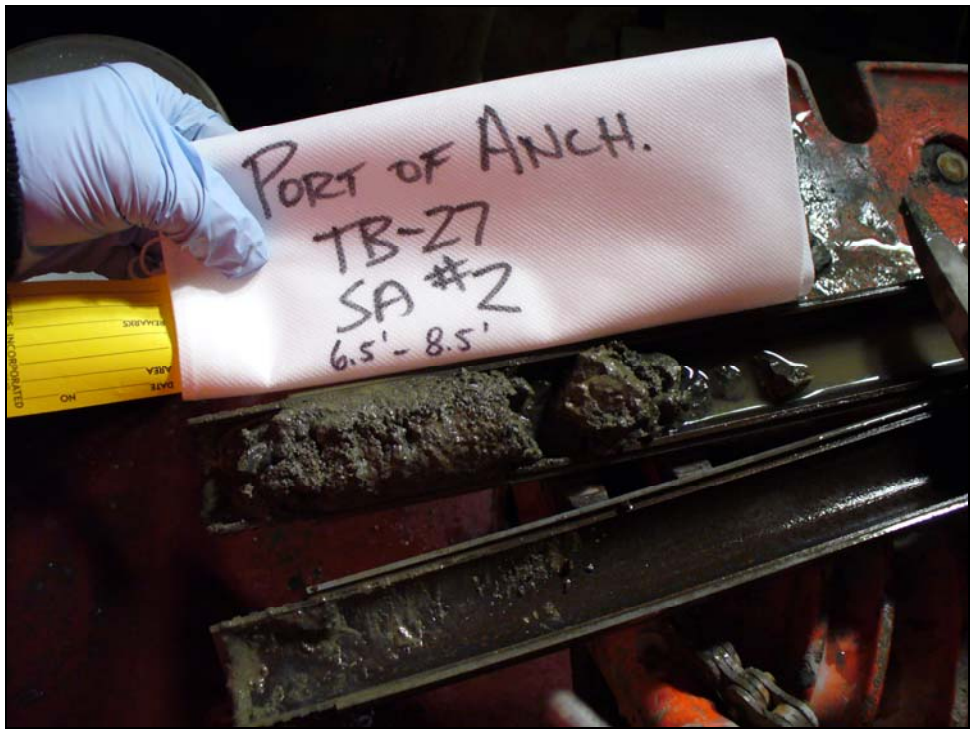
Photograph 7: Sample from test boring AP-4615 taken between 2.5 and 4.5 feet below the mudline.

Below the recent marine deposits, fluvial deposits consisting of silt, sand, and gravel (GP, GP-GM, SM, and ML) were encountered with thickness ranging from a few feet to the limits of exploration. Laboratory results indicate the fines content in these deposits range from 14 to 77 percent and a visual-manual description of the soils plasticity range from nonplastic to medium plasticity. Atterberg Limit test results reported these soils as nonplastic. Blow counts indicate the relative density of the fluvial deposits range from medium dense to very dense. Below the fluvial deposits estuarine or lacustrine deposits consisting of clay and silt with sand and gravel (CL, ML, SP-SM) were encountered to the limits of exploration. Laboratory results indicate moisture contents range from 24 to 30 percent, and a visual-manual description of the soils plasticity range from nonplastic to medium plasticity. Atterberg Limit test results indicate liquid limits range from 32 to 39 percent and plasticity indexes range from 11 to 16 percent. Blow counts indicate the consistency of these fine-grained soils range from firm to hard and the unconfined compressive strength approximated by the pocket penetrometer range from 1.0 to 3.75 tons per square foot.

Southern Dredge Area

The subsurface soils in the southern dredge area are composed of two major soil units. Generally, fluvial deposits are found overlaying estuarine or lacustrine deposits to the limits of exploration; however, recent marine deposits from sedimentation were encountered in AP-4630 to a depth of 17.5 feet below

mudline. The fluvial deposits consisted of sand and gravel with clay and silt (GP, GC, GP-GM, GW-GC, SP, SW, SP-SM, and SM). This soil unit extends from the mudline to thickness ranging from a few feet to 22.5 feet. Laboratory results indicate the fines content in these deposits range from four to 21 percent and a visual-manual description of the soils plasticity range from nonplastic to medium plasticity. Blow counts indicate the relative density of the fluvial deposits range from medium dense to very dense. Photograph 8 shows a sample of this soil unit encountered during our exploration.



Photograph 8: Sample from test boring AP-4609 taken between 6.5 and 8.5 feet below the mudline.

Below the fluvial deposits, estuarine or lacustrine deposits consisting of clay and silt (CL, ML) were encountered to the limits of exploration. Laboratory results indicate moisture contents range from 23 to 43 percent, and a visual-manual description of the soils plasticity range from nonplastic to medium plasticity. Atterberg Limit test results indicate liquid limits range from 31 to 40 percent and plasticity indexes range from 11 to 18 percent. Blow counts indicated the consistency of these fine-grained soils range from very soft to firm and the unconfined compressive strength approximated by the pocket penetrometer range from 0.5 to 1.25 tons per square foot. Field vane shear testing indicated the undrained shear strengths range from 0.597 to 1.945 kips per square foot (kip/ft^2), remolded undrained shear strengths range from 0.158 to 0.714 kip/ft^2 and a sensitivity range from 1.8 to 4.3. Photograph 9 shows a sample of this soil unit encountered during our exploration.

Photograph 9: Sample from test boring AP-4609 taken between 21.5 and 23.5 feet below the mudline.

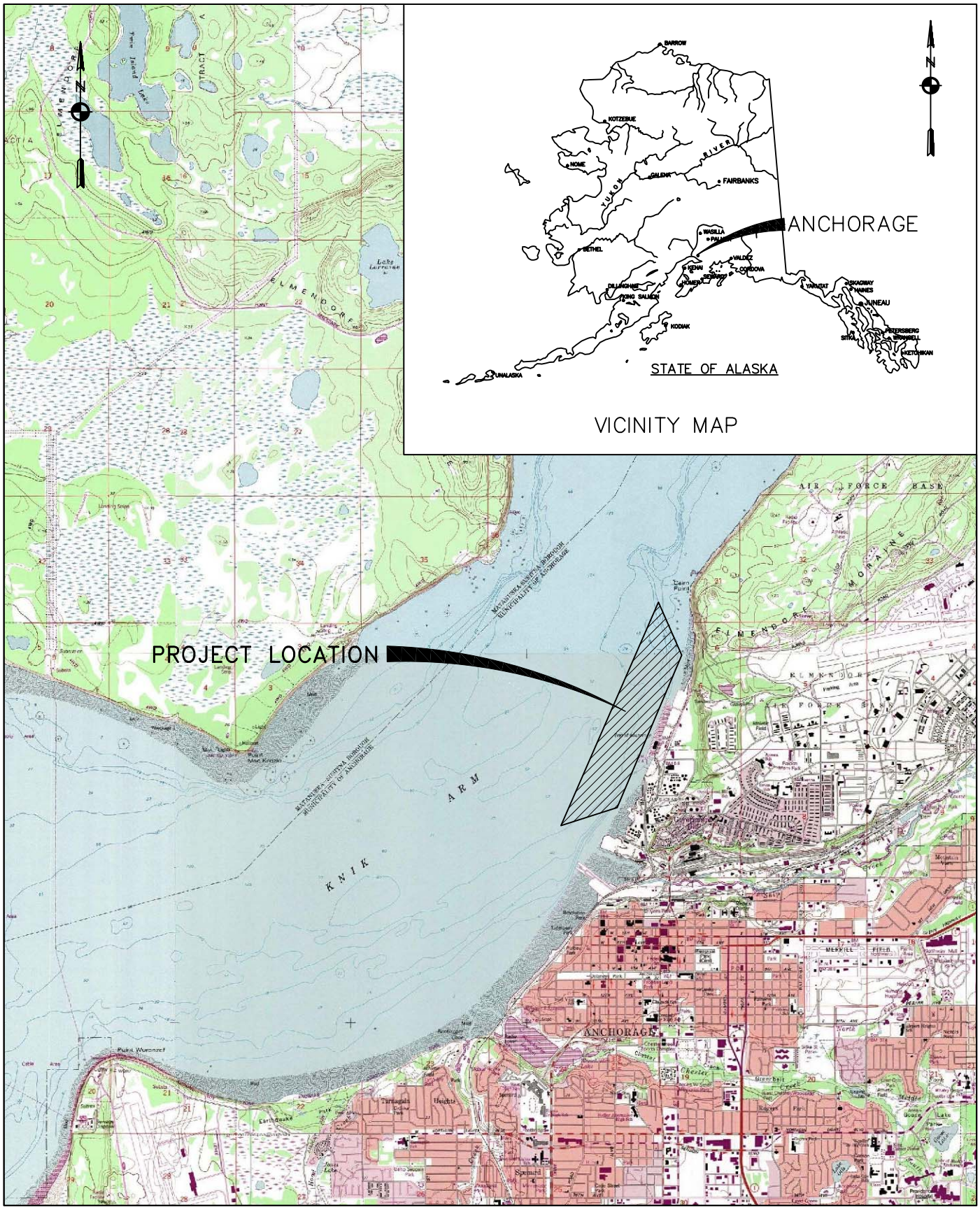
5.3 Port of Anchorage Tidal Data

Tidal data from the Port of Anchorage, referenced to MLLW in feet, is provided below in Table 3.

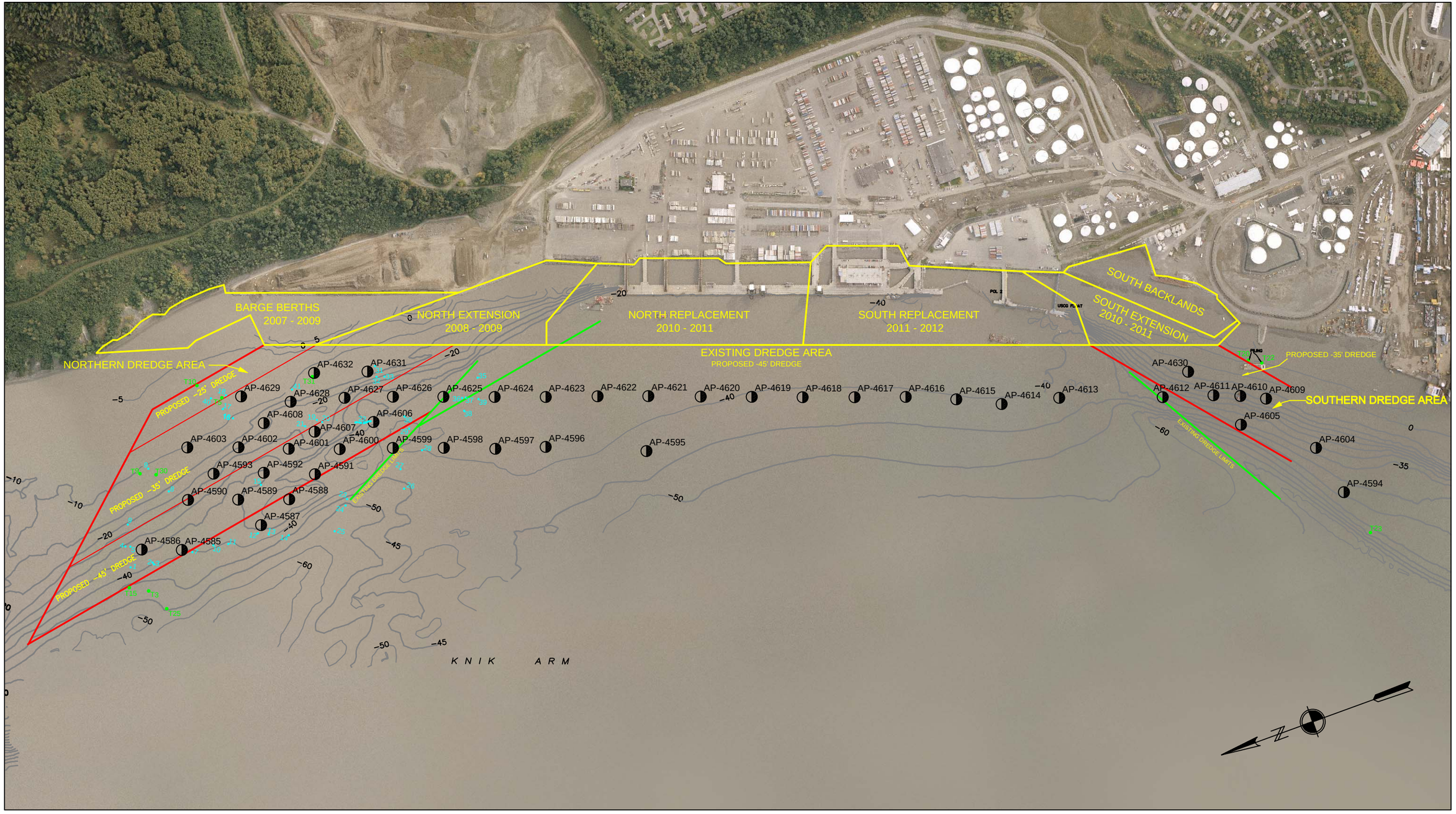
Table 3: Anchorage Tidal Datum

Tidal Level	Elevation (ft) (MLLW)
Highest Tide	+34.45
Mean Higher High Water	+29.01
Mean High Water	+28.30
Mean Tide Level	+15.30
Mean Low Water	+2.3
Mean Lower Low Water	0.00
Lowest Tide Observed	-6.30

Note: Tidal datum at the Port of Anchorage is based on five years of records, 1984-1988, reduced to mean values. NOAA / NOS Publication dated 04/02/90.



ALASKA DISTRICT CORPS OF ENGINEERS SOILS AND GEOLOGY	PROJECT LOCATION AND VICINITY MAP ANCHORAGE HARBOR DEEPENING PORT OF ANCHORAGE, ALASKA	SCALE: NTS DATE: MAY 2008 DRAWN/RVW: JR/CW FIGURE 1



ALASKA DISTRICT
CORPS OF ENGINEERS
SOILS AND GEOLOGY

AP-XXXX — Test Boring Locations
Bathymetry taken 5 Oct 2007 (feet MLLW)
21 — Potential Dredging Obstructions from Bathymetry taken 26 July 2007
T3 — Additional Potential Dredging Obstructions from Bathymetry taken 5 October 2007

0 500 1000 2000
Scale (feet)
Photo Taken 17 September 2007

TEST BORING LOCATION MAP
ANCHORAGE HARBOR DEEPENING
PORT OF ANCHORAGE, ALASKA

SCALE: GRAPHIC
DATE: MAY 2008
DRWN/RVW: JR/CW
FIGURE 2

APPENDIX A
EXPLORATION LOGS

Anchorage Harbor Deepening
Test Boring Location Coordinates and Depths

BORING NUMBER (FIELD)	BORING NUMBER (PERMANENT)	COORDINATES (FEET)		MUDLINE ELEVATION (FEET)	TOTAL DEPTH (FEET)	JACK-UP BARGE DECK ELEVATION (FEET)
		NORTHING	EASTING			
TB-2	AP-4585	2,650,544	1,659,871	-39.3	38	38.7
TB-3	AP-4586	2,650,838	1,659,981	-33.7	35.3	37.8
TB-4	AP-4587	2,649,897	1,659,842	-32.8	41	38.2
TB-5	AP-4588	2,649,622	1,659,955	-27.1	39	35.9
TB-6	AP-4589	2,649,997	1,660,090	-36.9	38.5	40.1
TB-7	AP-4590	2,650,365	1,660,221	-25.3	38.5	38.2
TB-8	AP-4591	2,649,367	1,660,070	-36.8	39.8	37.2
TB-9	AP-4592	2,649,738	1,660,217	-35.3	39	36.7
TB-10	AP-4593	2,650,108	1,660,345	-22.7	36.9	37.3
TB-11	AP-4594	2,641,877	1,657,195	-43.0	40	37.5
TB-12	AP-4595	2,646,877	1,659,356	-42.0	37	36
TB-14	AP-4596	2,647,604	1,659,655	-38.7	40	37.3
TB-15	AP-4597	2,647,978	1,659,775	-39.2	42	35.8
TB-16	AP-4598	2,648,353	1,659,920	-39.7	35	27.3
TB-17	AP-4599	2,648,726	1,660,055	-40.4	35	38.6
TB-18	AP-4600	2,649,118	1,660,188	-42.1	42	36.9
TB-19	AP-4601	2,649,491	1,660,326	-26.6	34.5	35.8
TB-20	AP-4602	2,649,855	1,660,471	-19.9	34	38.1
TB-21	AP-4603	2,650,231	1,660,607	-10.7	34.5	38.3
TB-22	AP-4604	2,641,963	1,657,594	-30.8	39.5	36.1
TB-23	AP-4605	2,642,451	1,657,964	-35.2	35.75	30.8
TB-24	AP-4606	2,648,799	1,660,297	-37.7	40	38.3
TB-25	AP-4607	2,649,256	1,660,382	-20.9	39	37.1
TB-26	AP-4608	2,649,605	1,660,581	-17.3	37.25	35.7
TB-27	AP-4609	2,642,198	1,658,088	-7.7	38.5	34.8
TB-28	AP-4610	2,642,380	1,658,176	-13.1	37	31.9
TB-29	AP-4611	2,642,574	1,658,253	-17.6	34.25	32.2
TB-30	AP-4612	2,642,951	1,658,374	-34.1	37.35	28.9
TB-31	AP-4613	2,643,711	1,658,645	-41.7	37	37.3
TB-32	AP-4614	2,644,150	1,658,753	-40.5	40	36.7
TB-33	AP-4615	2,644,469	1,658,909	-40.3	39.5	37.2
TB-34	AP-4616	2,644,833	1,659,062	-40.7	36	35.3
TB-35	AP-4617	2,645,209	1,659,196	-41.6	40	35.4
TB-36	AP-4618	2,645,589	1,659,334	-40.9	36	31.6
TB-37	AP-4619	2,645,961	1,659,473	-40.2	38.5	27.3
TB-38	AP-4620	2,646,334	1,659,610	-39.1	42	30.9
TB-39	AP-4621	2,646,717	1,659,754	-38.0	41	32
TB-40	AP-4622	2,647,089	1,659,888	-38.4	40	33.6
TB-41	AP-4623	2,647,470	1,660,021	-37.7	40	33.3
TB-42	AP-4624	2,647,845	1,660,157	-39.7	41	30.3
TB-43	AP-4625	2,648,220	1,660,295	-38.7	41	32.3
TB-44	AP-4626	2,648,589	1,660,430	-32.8	37	32.2
TB-45	AP-4627	2,648,946	1,660,551	-24.3	39	32.7
TB-46	AP-4628	2,649,351	1,660,666	-16.8	39.5	39.2
TB-47	AP-4629	2,649,701	1,660,837	-8.1	35	33.9
TB-48	AP-4630	2,642,697	1,658,493	-3.5	40	33.5
TB-49	AP-4631	2,648,709	1,660,683	-11.6	42	33.4
TB-50	AP-4632	2,649,103	1,660,814	-10.6	40	35.4

1. Horizontal control is in Alaska State Plane, Zone 4, NAD83, in U.S. survey feet
2. Vertical control is in feet, referring to Mean-Lower-Low-Water (MLLW)
3. Vertical control used to establish mudline elevations came from Terrasond, LTD survey conducted 5 Oct 07.

POTENTIAL DREDGING OBSTRUCTIONS
NORTHERN DREDGE AREA

NUMBER	NORTHING	EASTING	ELEVATION
1	2650966.30	1659880.23	-33.0
2	2650785.92	1659839.34	-35.3
3	2650792.22	1659856.41	-34.0
4	2650912.46	1660031.81	-27.6
5	2650948.43	1660046.85	-26.7
6	2650872.17	1660201.32	-16.1
7	2650472.58	1659826.23	-35.1
8	2650483.38	1660334.22	-11.7
9	2650573.56	1660555.75	-4.5
10	2650300.14	1659821.12	-36.3
11	2650187.70	1659790.57	-34.9
12	2649942.85	1659789.88	-30.4
13	2649866.59	1659752.92	-34.0
14	2649721.59	1659693.44	-38.5
15	2649790.89	1660136.22	-26.8
16	2649817.99	1660698.57	-1.7
17	2649868.28	1660792.80	-0.5
18	2649808.15	1660885.57	4.1
19	2649207.69	1660462.27	-14.3
20	2649174.49	1660433.56	-14.2
21	2649310.91	1660447.58	-16.0
22	2648873.14	1660314.76	-19.2
23	2649197.92	1659802.90	-43.4
24	2649226.23	1659759.69	-46.3
25	2649374.63	1659600.43	-32.3
26	2648753.07	1659727.01	-38.9
27	2648727.40	1659879.44	-38.2
28	2648518.42	1659960.88	-33.6
29	2648555.51	1660153.32	-33.8
30	2648558.09	1660255.17	-26.7
31	2648597.54	1660600.27	-16.4
32	2648656.58	1660619.83	-17.1
33	2648639.06	1660701.66	-4.5
34	2647869.19	1660501.66	-21.1
35	2647918.37	1660344.04	-30.5
36	2648085.74	1660236.03	-29.2
37	2648058.92	1660231.31	-31.3
38	2648104.41	1660136.77	-21.4
39	2647967.81	1660190.53	-29.7
40	2649927.20	1660903.59	-1.5
41	2649308.95	1660751.54	-3.9
T3	2650896.40	1659658.60	-45.6
T5	2649845.00	1660878.00	-5.1
T9	2650647.70	1660540.70	-5.8
T10	2649995.30	1661034.80	1.9
T15	2651030.40	1659735.10	-36.4
T25	2650811.40	1659481.10	-44.1
T30	2649308.95	1660490.20	-9.3
T31	2649125.60	1660878.00	-8.8

NOTES: Obstruction numbers 1 through 41 were identified by Hughes and Associates on 26 July 2007. Obstruction numbers with "T" were identified by Terrasond, LTD. on 5 October 2007. Horizontal control is NAD 83, Alaska State Plane Zone 4 in feet and vertical control is referring to mean lower low water (MLLW) in feet. Obstruction number 30 was identified as "Pillboxes" by divers. A barge bridal chain was brought to the surface by the dredger at this location. Obstruction number 22 is a group of nine obstructions.

POTENTIAL DREDGING OBSTRUCTIONS
SOUTHERN DREDGE AREA

NUMBER	NORTHING	EASTING	ELEVATION
T20	2642225	1658417	NA
T22	2642134	1658362	NA
T23	2641790	1656829	-50.2

NOTES: Obstruction numbers with "T" were identified by Terrasond, LTD. on 5 October 2007. Horizontal control is NAD 83, Alaska State Plane Zone 4 in feet and vertical control is referring to mean lower low water (MLLW) in feet. Obstruction numbers T20 and T22 are steel pipe piling.

ALASKA DISTRICT
CORPS OF ENGINEERS
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **29 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,650,544 ft.** Easting: **1,659,871 ft.**

Top of Hole Elevation: **-39.3 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-2	**AP-4585**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **36.0 ft.**

Total Depth: **38.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 38.7 ft.**
															Drill action indicates gravel
		1			7 5 13 16	ML	**Sandy SILT**					1		18	**Grey, wet, subangular gravel, fine to coarse sand, Atterberg Limits-Nonplastic**
5		2			16 19 15 21	GM	**Silty GRAVEL with Sand**	27	27	46		1			**Grey, wet, subangular gravel, fine to coarse sand, low plasticity fines**
10		3			28 32 29 36	SM	**Silty SAND with Gravel**	43	44	13		>1.4			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, nonplastic (NP) fines, gravel fractured while driving**
15		4			15 26 28 25	NR	**No Recovery**								**Drill action indicates the same as above**
20		5			22 14 20 25	SM	**Silty SAND with Gravel**	19	68	13		1.25			**Grey, wet, subrounded gravel, fine to coarse sand, NP fines**
25		6			50 28 27 31	SP-SM	**Poorly graded SAND with Silt, Gravel, and Cobbles**					>1.4			**Grey, wet, subrounded gravel, fine to medium sand, NP fines, gravel fractured while driving, drill action indicates cobbles**
30		7			57 27 57 58	SM	**Silty SAND**								**Grey, wet, fine to medium sand, NP to low plasticity fines**
35		8			20 40 26 20	GP	**Poorly graded GRAVEL with Sand**					>1.4			**Grey, wet, subrounded gravel, fine to coarse sand, gravel fractured while driving**
															Bottom of Hole 38.0 ft. **Elevation -77.3 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **30 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,650,838 ft.** Easting: **1,659,981 ft.**

Top of Hole Elevation: **-33.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-3	**AP-4586**	**Walter Mahousky**	**Inocencio Roman**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **33.5 ft.**

Total Depth: **35.3 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks
															Jack-Up Barge Deck Elevation: 37.8 ft.
															Drill action indicates cobbles or boulder
5		1			12 10 12 15	ML	**Sandy SILT**	11	19	70		0.25			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, medium plasticity fines**
10		2			9 14 15 16	ML	**SILT**							22	**Grey, wet, Atterberg Limits-LL=24, PI=1**
15		3			11 13 12 17	ML	**Sandy SILT**					0.5		12	**Grey, wet, fine to coarse sand, Atterberg Limits-Nonplastic**
20		4			10 11 10 17	ML	**Gravelly SILT with Sand**					0.75		13	**Grey, wet, subangular to subrounded gravel, fine to coarse sand, Atterberg Limits-Nonplastic**
25		5			21 17 23 23	ML	**Gravelly SILT with Sand**					1.25			**Grey, wet, subangular gravel, fine sand, medium plasticity fines, very low sample recovery**
30		6			6 11 18 24	CL	**Lean CLAY**					0.75			**Grey, wet, subrounded gravel, fine sand, medium plasticity fines**
35		7			38 41 51 50/4in.	NR	**No Recovery**								**Bottom of Hole 35.3 ft.** **Elevation -69.0 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **30 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,897 ft.** Easting: **1,659,842 ft.**

Top of Hole Elevation: **-32.8 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-4	**AP-4587**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **39.0 ft.**

Total Depth: **41.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 38.2 ft.**
															Drill action indicates gravel and cobbles
5		1			17 20 19 22	CL	**Gravelly lean CLAY**					>1.4			**Grey, wet, subangular to subrounded gravel, medium plasticity fines, gravel fractured while driving**
10		2			7 11 15 21	CL	**Lean CLAY with Gravel**					1			**Grey, wet, subrounded gravel, medium plasticity fines**
15		3			3 10 12 20	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, low recovery, lean clay on outside of sampler**
20		4			7 7 11 15	CL	**Lean CLAY**							24	**Grey, moist, Atterberg Limits-LL=34, PI=12, 2.0 TSF indicated by pocket penetrometer**
25		5			6 10 15 24	CL	**Lean CLAY**							24	**Grey, moist, Atterberg Limits-LL=35, PI=13, 3.0 TSF indicated by pocket penetrometer**
30		6			5 12 17 23	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 4.0 TSF indicated by pocket penetrometer**
35		7			6 16 23 28	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, greater than 4.5 TSF indicated by pocket penetrometer**
40		8			7 13 23 38	CL	**Lean CLAY**								**Grey, moist, fine to medium sand, medium plasticity fines, greater than 4.5 TSF indicated by pocket penetrometer**
															Bottom of Hole 41.0 ft. **Elevation -73.8 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **1 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,622 ft.** Easting: **1,659,955 ft.**

Top of Hole Elevation: **-27.1 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-5	**AP-4588**	**Walter Mahousky**	**Inocencio Roman**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.0 ft.**

Total Depth: **39.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 35.9 ft.**
															Drill cuttings indicate sand and gravel
		1			7 7 9 12	SP-SC	**Poorly graded SAND with Clay and Gravel**	23	70	7		1.25			**Grey, wet, subangular gravel, fine to coarse sand, medium plasticity fines, gravel fractured while driving**
5															
		2			8 8 10 12	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=29, PI=9**
10															
		3			6 14 18 34	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=35, PI=14**
15															
		4			7 13 21 30	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=34, PI=11, trace gravel**
20															
		5			9 12 19 23	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines**
25															
		6			7 14 24 32	CL	**Lean CLAY**					0.25			**Grey, wet, medium plasticity fines, trace gravel in the sampler drive shoe**
30															
		7			9 13 22 30	CL	**Lean CLAY**							21	**Grey, wet, Atterberg Limits-LL=31, PI=11**
35															
		8			9 18 27 37	CL	**Lean CLAY**					0.75			**Grey, wet, subangular gravel, fine sand, medium plasticity fines**
40															**Bottom of Hole 39.0 ft.** **Elevation -66.1 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4588**

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ALASKA DISTRICT
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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **27 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,997 ft.** Easting: **1,660,090 ft.**

Top of Hole Elevation: **-36.9 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-6	**AP-4589**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.0 ft.**

Total Depth: **38.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Sample Recovery	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 40.1 ft.**
												Drill action indicates sand, gravel and cobbles
	1	62 50/3in.	GP	**Poorly graded GRAVEL with Sand and Cobbles**					>1.4			**Grey, wet, subangular gravel, fine to coarse sand, gravel fractured while driving, drill action indicates cobbles**
5												
	2	7 11 15 20	SP ML	**Poorly graded SAND** **SILT**	0	96	4					**Grey, wet, fine to medium sand** **Grey, wet, low plasticity fines**
10												
	3	7 10 19 33	SP- SM	**Poorly graded SAND with Silt**	0	92	8					**Grey, wet, fine to medium sand, nonplastic (NP) fines**
15												
	4	7 18 31 36	SP- SM	**Poorly graded SAND with Silt**								**Grey, wet, fine to medium sand, NP fines**
20												
	5	39 43 42 35	NR	**No Recovery**					>1.4			**Gravel stuck in sampler driving shoe**
25												
	6	18 34 36 34	SP- SM	**Poorly graded SAND with Silt**	1	90	9					**Grey, wet, fine to medium sand, NP fines**
30												
	7	22 31 48 50/3in.	SP- SM	**Poorly graded SAND with Silt**								**Grey, wet, fine to medium sand, NP fines**
35												
	8	30 39 57	SP- SM	**Poorly graded SAND with Silt**								**Grey, wet, fine to medium sand, NP fines**
40												**Bottom of Hole 38.5 ft.** **Elevation -75.4 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45												

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4589**

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ALASKA DISTRICT
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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **29 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,650,365 ft.** Easting: **1,660,221 ft.**

Top of Hole Elevation: **-25.3 ft.**

Hole Number, Field: **TB-7** Permanent: **AP-4590**

Operator: **Walter Mahousky**

Inspector: **Inocencio Roman/Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **36.5 ft.**

Total Depth: **38.5 ft.**

Hammer Weight: **140 lbs**

Split Spoon I.D.: **1.375 in.**

Size and Type of Bit: **4 in. I.D. x 4.5 in. O.D. HWT Casing**

Type of Equipment: **Mobile B-80 w/ Automatic Hammer**

Type of Samples: **Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 38.2 ft.**
0		1			14 16 20 13	GP-GM	**Poorly graded GRAVEL with Silt and Sand**	60	29	11		>1.4			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, low plasticity fines, gravel fractured while driving**
5		2			9 14 14 24	ML	**SILT with Gravel**					1		19	**Grey, wet, subrounded gravel, fine sand, Atterberg Limits-Nonplastic**
10		3			40 42 40 41	SC	**Clayey SAND with gravel**	24	48	28		1.25			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, medium plasticity fines, gravel fractured while driving**
15		4			50/5in.	GC	**Clayey GRAVEL with Sand**					>1.4			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, medium plasticity fines, gravel fractured while driving**
20		5			30 52 45 44	GC	**Clayey GRAVEL with Sand**	44	39	17		1.25			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, medium plasticity fines, gravel fractured while driving**
25		6			17 17 29 29	SC	**Clayey SAND with gravel**					0.75			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, medium plasticity fines, gravel fractured while driving**
30		7			13 14 18 30	CL	**Lean CLAY**					0.5			**Grey, wet, subangular gravel, fine sand, medium plasticity fines**
35		8			15 7 12 19	CL	**Lean CLAY**					0.5			**Grey, wet, subangular gravel, fine sand, medium plasticity fines**
40															**Bottom of Hole 38.5 ft.** **Elevation -63.8 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **14 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,367 ft.** Easting: **1,660,070 ft.**

Top of Hole Elevation: **-36.8 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-8	**AP-4591**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **39.8 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 37.2 ft.**
															Drill cuttings indicate lean clay
		1			6 12 19 30	CL	**Lean CLAY**							22	**Grey, wet, Atterberg Limits-LL=34, PI=14, 4.0 TSF indicated by pocket penetrometer**
5															
		2			10 13 14 18	CL ML	**Sandy lean CLAY** **Sandy SILT with Gravel**					0.5		12	**Grey, wet, medium plasticity fines** **Grey, wet, subrounded gravel, fine to medium sand, Atterberg Limits-Nonplastic**
10															
		3			6 21 18 18	SM	**Silty SAND with Gravel**	17	36	47		0.75			**Grey, wet, subrounded gravel, fine to coarse sane, low plasticity fines**
15															
		4			8 18 20 25	CL	**Lean CLAY**							20	**Grey, wet, Atterberg Limits-LL=26, PI=9, greater than 4.5 TSF indicated by pocket penetrometer**
20															
		5			25 26 20 20	SM	**Silty SAND with Gravel**					>1.4			**Grey, wet, angular to subrounded gravel, fine to medium sand, low plasticity fines, gravel fractured while driving**
25															
		6			17 33 35 38	SM	**Silty SAND with Gravel**					>1.4			**Grey, wet, angular to subrounded gravel, fine sand, low plasticity fines, gravel fractured while driving**
30															
		7			20 50 48 45	SM	**Silty SAND with Gravel**					>1.4			**Grey, wet, angular to subrounded gravel, fine sand, low plasticity fines, gravel fractured while driving**
35															
		8			19 19 35 50/4in.	SM	**Silty SAND with Gravel**					>1.4			**Low recovery, gravel lodged in sampler shoe, material is similar to previous sample**
40															**Bottom of Hole 39.8 ft.** **Elevation -76.6 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4591**

EXPLORATION LOG ANCHORAGE.GPJ ACE_ANC.GDT 28/5/08

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **1 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,738 ft.** Easting: **1,660,217 ft.**

Top of Hole Elevation: **-35.3 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-9	**AP-4592**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.0 ft.**

Total Depth: **39.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 36.7 ft.**
															Drill action indicates gravel and cobbles
		1			71 60/3in.	NR	**No Recovery**								**Sampler bouncing on gravel or cobbles, very difficult drilling to 7 feet**
5						CL	**Gravelly lean CLAY with Sand**					1			**Grey, wet, subrounded gravel, fine to coarse sand, medium plasticity fines**
		2			6 7 9 12	CL	**Lean CLAY**							28	**Grey, moist, Atterberg Limits-LL=35,PI=17, 2.0 TSF indicated by pocket penetrometer, used 2.5 in. I.D. split spoon sampler, switched back to 1.375 in. I.D. split spoon sampler below 12 feet**
10															
		3			3 6 9 12	CL	**Lean CLAY**							36	**Grey, moist, Atterberg Limits-LL=38, PI=16**
15															**Drill action indicates gravel between 14 and 15 feet**
		4			8 8 10 15	CL	**Lean CLAY**					0.25		29	**Grey, moist, subrounded gravel, Atterberg Limits-LL=36, PI=15, 3.5 TSF indicated by pocket penetrometer**
20															
		5			16 10 11 15	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 3.5 TSF indicated by pocket penetrometer**
25															
		6			6 11 13 20	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 4.0 TSF indicated by pocket penetrometer**
30															
		7			6 8 11 14	CL	**Lean CLAY**							25	**Grey, moist, Atterberg Limits-LL=33, PI=15, 3.5 TSF indicated by pocket penetrometer**
35															
		8			6 8 13 21	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 3.5 TSF indicated by pocket penetrometer**
40															**Bottom of Hole 39.0 ft.** **Elevation -74.3 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4592**

EXPLORATION LOG ANCHORAGE.GPJ ACE_ANC.GDT 28/5/08

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **28 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,650,108 ft.** Easting: **1,660,345 ft.**

Top of Hole Elevation: **-22.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-10	**AP-4593**	**Walter Mahousky**	**Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **35.0 ft.**

Total Depth: **36.9 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 37.3 ft.**
															Drill action indicates gravel
5		1			6 6 13 18	SM	**Silty SAND**	8	43	49		1			**Grey, wet, sounded to subrounded gravel, fine to coarse sand, nonplastic (NP) to low plasticity fines**
10		2			2 7 8 13	NR	**No Recovery**								
15		3			6 17 24 32	CL	**Lean CLAY**							21	**Grey, Atterberg Limits-LL=33, PI=12, greater than 4.5 TSF indicated by pocket penetrometer**
20		4			40 60	CL	**Lean CLAY**							20	**Grey, Atterberg Limits-LL=33, PI=13, greater than 4.5 TSF indicated by pocket penetrometer** **Drill action indicates coarse grained soils**
25		5			6 12 28 46	SM	**Silty SAND with Gravel**	16	66	18		0.75			**Grey, rounded gravel, fine to medium sand, low plasticity fines**
30		6			2 2 16 44	SP	**Poorly graded SAND**	0	96	4					**Grey, fine to medium sand**
35		7			10 22 32 53/5in.	NR	**No Recovery**								**Drill action indicates no change in material**
															Bottom of Hole 36.9 ft. **Elevation -59.6 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **10 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,641,877 ft.** Easting: **1,657,195 ft.**

Top of Hole Elevation: **-43.0 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-11	**AP-4594**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 37.5 ft.**
5		1			18 17 20 23	SW	**Well-graded SAND with Gravel**	47	49	4		1.4			**Grey, wet, subrounded to rounded gravel, fine to coarse sand, gravel fractured while driving**
10		2			15 21 29 38	SP	**Poorly graded SAND with Gravel**	20	75	5		1			**Grey, wet, rounded gravel, fine to coarse sand**
15		3			11 28 32 37	SP-SM	**Poorly graded SAND with Silt and Gravel**	20	73	7		0.75			**Grey, wet, rounded gravel, fine to coarse sand, nonplastic (NP) fines**
20		4			23 50/5in.	GP-GM	**Poorly graded GRAVEL with Silt and Sand**					>1.4			**Grey, wet, angular to rounded gravel, fine to coarse sand, NP fines, gravel fractured while driving** **Drill action indicates possible cobbles between 19 and 22.5 feet**
25		5			6 0 2 5	CL	**Lean CLAY**	0	7	93					**Grey, wet, medium plasticity fines, one fractured piece of gravel at top of sample**
30		6			7 4 5 7	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines**
35		7			70/6in.	NR	**No Recovery**					>1.4			**No recovery, grey to black, fractured gravel or cobble stuck in sampler drive shoe** **Difficult and slow drilling between 32 and 36.5 feet, possible cobbles**
40		8			6 6 8 11	CL	**Lean CLAY**								**Easier drilling below 36.5 feet** **Grey, wet, medium plasticity fines, trace of gravel**
45															**Bottom of Hole 40.0 ft.** **Elevation -83.0 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **12 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,646,877 ft.** Easting: **1,659,356 ft.**

Top of Hole Elevation: **-42.0 ft.**

Hole Number, Field: **TB-12** Permanent: **AP-4595**

Operator: **Walter Mahousky**

Inspector: **Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **35.0 ft.**

Total Depth: **37.0 ft.**

Hammer Weight: **140 lbs**

Split Spoon I.D.: **1.375 in.**

Size and Type of Bit: **4 in. I.D. x 4.5 in. O.D. HWT Casing**

Type of Equipment: **Mobile B-80 w/ Automatic Hammer**

Type of Samples: **Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 36 ft.**
5		1			0 1 0 1	ML	**Sandy SILT**	2	43	55					**Greenish grey, wet, fine sand, nonplastic (NP) fines**
10		2			0 0 0 0	ML	**Sandy SILT**	15	33	52		0.3			**Greenish grey, wet, fine and some sand, NP fines**
15		3			0 0 0 1	ML	**Sandy SILT**					0.3			**Greenish grey, wet, fine and some sand, NP fines**
20		4			0 0 0 0	NR	**No Recovery**								**Drilling resistance increases below 22.5 feet**
25		5			17 12 11 13	ML	**Sandy SILT**	4	39	57		0.6			**Grey, wet, subangular gravel, fine to coarse sand, NP fines, gravel fractured while driving**
30		6			19 10 13 18	SM	**Silty SAND**					0.7			**Grey, wet, subrounded peace of gravel, fine to medium sand, NP fines**
35		7			15 25 33 32	SM	**Silty SAND**					1			**Grey, wet, subangular gravel, fine to medium sand, NP fines, gravel stuck in sampling drive shoe**
40															**Bottom of Hole 37.0 ft.** **Elevation -79.0 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **13 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,647,604 ft.** Easting: **1,659,655 ft.**

Top of Hole Elevation: **-38.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-14	**AP-4596**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 37.3 ft.**
5		1			5 9 2 3	ML	**SILT with Sand**	0	22	78					Grey, wet, fine sand, nonplastic (NP) fines
10		2			1 2 2 2	ML	**Sandy SILT**	0	31	69					Grey, wet, fine sand, NP fines
15		3			1 1 2 2	SM	**Silty SAND**	0	56	44					Grey, wet, fine sand, NP fines, 0.25 inch lens of black fibrous organics
20		4			2 2 3 3	SM	**Silty SAND**								Grey, wet, fine sand, NP fines, 0.25 inch lens of black fibrous organics
															Drill action indicates gravel
25		5A 5B			14 14 8 13	GP CL	**Poorly graded GRAVEL with Sand** **Lean CLAY**					0.75			Grey, wet, subangular to rounded gravel, fine to coarse sand Grey, wet, medium plasticity fines
30		6			8 11 12 18	CL	**Lean CLAY**								Grey, wet, medium plasticity fines, 1.00 TSF indicated by pocket penetrometer
35		7			5 11 19 27	CL	**Lean CLAY**							26	Grey, wet, Atterberg Limits-LL=36, PI=14, 2.50 TSF indicated by pocket penetrometer
40		8			19 29 39 44	SP-SM	**Poorly graded SAND with Silt**								Grey, wet, fine sand, NP fines
															Bottom of Hole 40.0 ft. **Elevation -78.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **13 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,647,978 ft.** Easting: **1,659,775 ft.**

Top of Hole Elevation: **-39.2 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-15	**AP-4597**	**Walter Mahousky**	**Robert Weakland**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **40.0 ft.**

Total Depth: **42.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 35.8 ft.**
5		1			3 1 0 1	ML	**SILT with Sand**	0	19	81					**Grey, wet, fine sand, nonplastic (NP) fines**
10		2			0 0 0 0	ML	**SILT with Sand**	0	26	74					**Grey, wet, fine sand, NP fines**
15		3			0 0 0 9	ML	**Sandy SILT**	0	31	69					**Grey, wet, fine sand, NP fines**
															Drill action indicates gravel between 17 and 20 feet
20		4			20 7 9 19	CL	**Lean CLAY**					0.7			**Grey, wet, medium plasticity fines, 1.70 TSF indicated by pocket penetrometer, fractured pieces of gravel at top of sample**
25		5			10 11 14 18	CL	**Lean CLAY**							25	**Grey, wet, Atterberg Limits-LL=38, PI=14, 2.25 TSF indicated by pocket penetrometer**
30		6			16 34 30 30	CL	**Lean CLAY with Gravel**					1.3			**Grey, wet, angular gravel, fine sand, medium plasticity fines, gravel fractured while driving, 1.10 TSF indicated by pocket penetrometer**
35		7A			15 27	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 2.80 TSF indicated by pocket penetrometer**
		7B			26 34	ML	**Sandy SILT**					1			**Grey, wet, angular gravel, fine sand, low plasticity fines, gravel fractured while driving**
40		8			10 26 26 32	CL	**Lean CLAY with Sand**								**Grey, wet, fine sand, medium plasticity fines, 3.75 TSF indicated by pocket penetrometer**
															Bottom of Hole 42.0 ft. **Elevation -81.2 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **22 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,648,353 ft.** Easting: **1,659,920 ft.**

Top of Hole Elevation: **-39.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-16	**AP-4598**	**Walter Mahousky**	**Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **33.0 ft.**

Total Depth: **35.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 27.3 ft.**
5		1			2 3 1 1	ML	**Sandy SILT**	0	45	55					**Grey, wet, fine sand, nonplastic (NP) fines**
10		2			0 1 1 1	ML	**SILT with Sand**	0	28	72					**Grey, wet, fine sand, NP fines, trace organics**
15		3			0 1 9 14	ML	**Sandy SILT**	10	38	52		0.5			**Grey, wet, subrounded gravel, fine to medium sand, NP fines**
20		4			8 16 19 24	NR	**No Recovery**								
25		5			3 14 24 29	CL SM	**Lean CLAY** **Silty SAND**								**Grey, low plasticity fines** **Grey, fine sand, NP fines**
30		6			25 34 37 41	ML	**Sandy SILT**	0	46	54					**Grey, fine sand, NP fines**
35		7			12 19 20 24	CL	**Lean CLAY**								**Grey, low plasticity fines**
40															**Bottom of Hole 35.0 ft.** **Elevation -74.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **25 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,648,726 ft.** Easting: **1,660,055 ft.**

Top of Hole Elevation: **-40.4 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-17	**AP-4599**	**Walter Mahousky**	**Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **33.0 ft.**

Total Depth: **35.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 38.6 ft.**
		1			3 5 6 9	ML	**SILT**	**0**	**1**	**99**					**Grey, wet, fine sand, nonplastic (NP) fines**
5															**Drill action indicates gravel from 6 to 8 feet**
		2			11 7 7 9	NR	**No Recovery**								**Heaving sands in sample** **Added guar gum to drilling fluid**
10															
		3			8 7 9 13	ML	**SILT**							**31**	**Grey, Atterberg Limits-Nonplastic**
15															
		4			10 9 11 17	CL	**Lean CLAY**								**Grey, low plasticity fines, 3.5 TSF indicated by pocket penetrometer**
20															
		5			11 10 15 18	CL	**Lean CLAY**							**28**	**Grey, Atterberg Limits-LL=38, PI=15, greater than 4.5 TSF indicated by pocket penetrometer**
25															**Drill action indicates very stiff soils**
		6			28 15 18 21	CL	**Lean CLAY**								**Grey, low plasticity fines**
30															
		7			7 10 13 17	CL	**Lean CLAY**								**Grey, low plasticity fines**
35															**Bottom of Hole 35.0 ft.** **Elevation -75.4 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4599**

EXPLORATION LOG ANCHORAGE.GPJ ACE_ANC.GDT 28/5/08

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **25 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,118 ft.** Easting: **1,660,188 ft.**

Top of Hole Elevation: **-42.1 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-18	**AP-4600**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **40.0 ft.**

Total Depth: **42.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 36.9 ft.**
		1			4 5 9	SP	**Poorly graded SAND**	3	94	3		0.5			**Grey, wet, subrounded gravel, fine to medium sand**
5		2			12 2 5 10 13	SP	**Poorly graded SAND**	4	91	5		0.25			**Grey, wet, subrounded gravel, fine to medium sand**
10		3			6 10 19 29	SP	**Poorly graded SAND**	3	93	4		0.5			**Grey, wet, subrounded gravel, fine to coarse sand**
15		4			10 17 22 22	SP	**Poorly graded SAND**								**Grey, wet, fine to medium sand**
20		5			22 40 50 53	SP- SM	**Poorly graded SAND with Silt**								**Grey, wet, fine sand, nonplastic (NP) fines**
25		6			23 32 50 47	SP- SM CL	**Poorly graded SAND with Silt** **Lean CLAY**	0	92	8					**Grey, wet, fine to medium sand, NP fines** **Grey, wet, medium plasticity fines in tip of sampler**
30		7			6 10 14 31	CL	**Lean CLAY**								**Grey, wet, fine sand, medium plasticity fines**
35		8			5 26 28 40	CL	**Lean CLAY**								**Grey, wet to moist, fine sand, medium plasticity fines**
40		9			6 14 25 42	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines**
45															**Bottom of Hole 42.0 ft.** **Elevation -84.1 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4600**

EXPLORATION LOG ANCHORAGE.GPJ ACE_ANC.GDT 28/5/08

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **14 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,491 ft.** Easting: **1,660,326 ft.**

Top of Hole Elevation: **-26.6 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-19	**AP-4601**	**Walter Mahousky**	**Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **32.5 ft.**

Total Depth: **34.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 35.8 ft.**
		1			10 5 6 10	GC	**Clayey GRAVEL with Sand**					1		17	**Grey, wet, angular gravel, fine to course sand, Atterberg Limits-LL=25, PI=8, gravel fractured while driving**
5		2			11 15 19 20	GC	**Clayey GRAVEL with Sand**	53	17	30		1			**Grey, wet, angular gravel, fine to course sand, medium plasticity fines**
10		3A			27 18	CL	**Lean CLAY**							15	**Grey, wet, Atterberg Limits-LL=25, PI=8, greater than 4.5 TSF indicated by pocket penetrometer**
		3B			22 37	GW	**Well-graded GRAVEL with Sand**	86	11	3		1.2			**Grey, wet, angular gravel, medium to course sand, gravel fractured while driving, fines look washed from sample, may not be representative**
15		4			7 13 8 21	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=35, PI=13, 4.3 TSF indicated by pocket penetrometer**
20		5			13 23 37 45	NR	**No Recovery**					>1.4			**Gravel stuck in sampling drive shoe**
25		6			13 17 26 42	CL	**Lean CLAY with Gravel**					1.3			**Grey, wet, angular gravel, medium plasticity fines, 1.2 TSF indicated by pocket penetrometer**
30		7			13 23 36 45	CL	**Lean CLAY**								**Grey, wet medium plasticity fines, greater than 4.5 TSF indicated by pocket penetrometer**
35															**Bottom of Hole 34.5 ft.** **Elevation -61.1 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **27 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,855 ft.** Easting: **1,660,471 ft.**

Top of Hole Elevation: **-19.9 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-20	**AP-4602**	**Walter Mahousky**	**Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **32.0 ft.**

Total Depth: **34.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 38.1 ft.**
															Drill action indicated gravel at surface of mudline
		1			12 20 12 16	GP-GM	**Poorly graded GRAVEL with Silt and Sand**	48	40	12					**Grey, wet, subrounded gravel, fine to coarse sand, nonplastic (NP) fines**
5															
		2			8 10 14 19	NR	**No Recovery**								**No recovery but clay on outside of sampler**
10															
		3			8 11 15 20	CL	**Lean CLAY**							27	**Grey, wet, Atterberg Limits-LL=40, PI=16, 4.0 TSF indicated by pocket penetrometer**
15															
		4			7 9 17 25	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=35, PI=14, greater than 4.5 TSF indicated by pocket penetrometer**
20															
		5			7 12 18 31	CL	**Lean CLAY**							22	**Grey, wet, Atterberg Limits-LL=32, PI=12, greater than 4.5 TSF indicated by pocket penetrometer**
25															
		6			12 21 32 41	CL	**Lean CLAY**							22	**Grey, wet, Atterberg Limits-LL=31, PI=12, greater than 4.5 TSF indicated by pocket penetrometer**
30															
		7			14 37 50/5in.	SP	**Poorly graded SAND**	0	98	2					**Grey, fine sand, NP fines**
35															**Bottom of Hole 34.0 ft.** **Elevation -53.9 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **28 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,650,231 ft.** Easting: **1,660,607 ft.**

Top of Hole Elevation: **-10.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-21	**AP-4603**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **33.0 ft.**

Total Depth: **34.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 38.3 ft.**
															Drill action indicates gravel and cobbles at surface of mudline, very difficult drilling to 31 feet
5		1			50 41 39 34	GM	**Silty GRAVEL with Sand and Cobbles**					>1.4			**Grey, wet, subangular gravel, fine to coarse sand, low plasticity fines, gravel fractured while driving, drill action indicates cobbles**
10		2			14 21 35 56	GM	**Silty GRAVEL with Sand and Cobbles**	41	30	29		>1.4			**Grey, wet, subangular gravel, fine to coarse sand, low plasticity fines, gravel fractured while driving, drill action indicates cobbles**
15		3			25 74 50/3in.	GC	**Clayey GRAVEL with Sand and Cobbles**					>1.4			**Low recovery, grey, wet, rounded gravel, coarse sand, medium plasticity fines, gravel fractured while driving, drill action indicates cobbles**
20		4			18 28 43 40	NR	**No Recovery**								**No recovery, lean clay on outside of sampler, drill action indicates same soils as above**
25		5			40 112 95	GP-GC	**Poorly graded GRAVEL with Clay, Sand, and Cobbles**	59	29	12		>3			**Grey, wet, subangular gravel, fine to coarse sand, medium plasticity fines, gravel and cobbles fractured while driving, used 2.5 inch ID sampler**
30		6			10 63 80	GC	**Clayey GRAVEL with Sand and Cobbles**					>3			**Grey, wet, subrounded gravel, medium plasticity fines, low recovery, cobble stuck in drive shoe, used 2.5 inch ID sampler**
		7			8 22 38	CL	**Lean CLAY**					0.75		20	**Grey, wet, subrounded gravel, Atterberg Limits-LL=27, PI=9, used 2.5 inch ID sampler**
35															**Bottom of Hole 34.5 ft.** **Elevation -45.2 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector** **During drilling the HWT casing bit was destroyed**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **16 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,641,963 ft.** Easting: **1,657,594 ft.**

Top of Hole Elevation: **-30.8 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-22	**AP-4604**	**Walter Mahousky**	**Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.5 ft.**

Total Depth: **39.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 36.1 ft.**
		1			0 0 0 3	ML	**SILT**							30	**Grey, wet, Atterberg Limits-Nonplastic, 1.0 TSF indicated by pocket penetrometer**
5															
		2			0 0 0 6	CL	**Lean CLAY**							31	**Grey, wet, Atterberg Limits-LL=38, PI=15, 1.25 TSF indicated by pocket penetrometer**
10															
		3			0 0 0 4	CL	**Lean CLAY**							32	**Grey, wet, Atterberg Limits-LL=37, PI=14, 0.75 TSF indicated by pocket penetrometer**
15															
		4			0 0 4 6	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 1.25 TSF indicated by pocket penetrometer**
20															
		5			0 0 0 3	CL	**Lean CLAY**							34	**Grey, wet, Atterberg Limits-LL=41, PI=17, 1.0 TSF indicated by pocket penetrometer**
25															
		6			0 0 5 7	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 0.75 TSF indicated by pocket penetrometer**
30															
		7			0 0 0 6	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 1.0 TSF indicated by pocket penetrometer**
35															
		8			0 0 4 7	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 1.0 TSF indicated by pocket penetrometer**
40															**Bottom of Hole 39.5 ft.** **Elevation -70.3 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **20 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,642,451 ft.** Easting: **1,657,964 ft.**

Top of Hole Elevation: **-35.2 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-23	**AP-4605**	**Walter Mahousky**	**Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **29.0 ft.**

Total Depth: **35.8 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 30.8 ft.**
5		1			2 2 3 5	CL	**Lean CLAY**							35	**Grey, wet, angular gravel, Atterberg Limits-LL=36, PI=15, 0.5 TSF indicated by pocket penetrometer**
		VST													**Undrained Shear Strength = 0.597 kip/ft^2** **Remolded Undrained Shear Strength = 0.158 kip/ft^2**
10															
		VST													**Undrained Shear Strength = 1.392 kip/ft^2** **Remolded Undrained Shear Strength = 0.600 kip/ft^2**
15		2			10 5 5 6	ML	**SILT**							26	**Grey, wet, Atterberg Limits-38, PI=12, 1.0 TSF indicated by pocket penetrometer**
		VST													**Undrained Shear Strength = 1.594 kip/ft^2** **Remolded Undrained Shear Strength = 0.561 kip/ft^2**
20															
		VST													**Vane refusal**
25		3			6 7 5 6	CL	**Lean CLAY**							30	**Grey, wet, Atterberg Limits-LL=36, PI=16, 1.25 TSF indicated by pocket penetrometer**
30		4			2 2 3 4	CL	**Lean CLAY**							43	**Grey, wet, Atterberg Limits-LL=40, PI=15, 0.5 TSF indicated by pocket penetrometer**
		VST													**Undrained Shear Strength = 1.268 kip/ft^2** **Remolded Undrained Shear Strength = 0.714 kip/ft^2**
35															**Bottom of Hole 35.8 ft.** **Elevation -71.0 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector** **Vane Shear Test (VST): ASTM D2573** **Vane Size(D x H): 55mmx110mm rectangular**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **24 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,648,799 ft.** Easting: **1,660,297 ft.**

Top of Hole Elevation: **-37.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-24	**AP-4606**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 38.3 ft.**
5		1			8 11 11 14	NR	**No Recovery**								**Drill cuttings indicate lean clay with gravel**
10		2			7 12 16 30	CL	**Lean CLAY**							24	**Grey, moist, Atterberg Limits-LL=36, PI=15, 3.25 TSF indicated by pocket penetrometer**
15		3			7 14 22 23	CL	**Lean CLAY**							24	**Grey, moist, Atterberg Limits-LL=36, PI=14, 4.0 TSF indicated by pocket penetrometer**
20		4			8 12 20 28	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 4.0 TSF indicated by pocket penetrometer**
25		5			6 14 22 34	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, greater than 4.5 TSF indicated by pocket penetrometer**
30		6			13 18 38 44	CL ML	**Lean CLAY** **SILT**								**Grey, moist, medium plasticity fines** **Grey, wet, fine sand, nonplastic (NP) fines**
35		7			4 29 38 40	ML	**SILT**	**0**	**11**	**89**					**Grey, wet, fine sand, NP fines**
40		8			15 12 16 23	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, greater than 4.5 TSF indicated by pocket penetrometer**
45															**Bottom of Hole 40.0 ft.** **Elevation -77.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4606**

EXPLORATION LOG ANCHORAGE.GPJ ACE_ANC.GDT 28/5/08

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **26 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,256 ft.** Easting: **1,660,382 ft.**

Top of Hole Elevation: **-20.9 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-25	**AP-4607**	**Walter Mahousky**	**Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.0 ft.**

Total Depth: **39.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Sample Recovery	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	%Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 37.1 ft.**
	1	18 21 24 18	GP-GM	**Poorly graded GRAVEL with Silt and Sand**	70	24	6		1			**Grey, wet, subrounded gravel, fine to coarse sand, nonplastic (NP) fines**
5	2	7 17 24 34	SP-SM	**Poorly graded SAND with Silt**	2	91	7		0.25			**Grey, wet, fine to medium sand, NP fines**
10	3	18 26 38 47	SP-SM	**Poorly graded SAND with Silt**	0	93	7					**Grey, wet, fine sand, NP fines**
15	4	12 23 26 30	SM	**Silty SAND**	0	83	17					**Grey, wet, fine to medium sand, NP fines**
20	5	18 41 57	SP-SM	**Poorly graded SAND with Silt**	1	92	7		0.25			**Grey, wet, fine to medium sand, NP fines**
25	6	23 32 47	SP-SM	**Poorly graded SAND with Silt**	1	91	8		0.25			**Grey, wet, fine to medium sand, NP fines, three inch layer of lean clay at 28 feet**
30	7	27 35 47	CL	**Lean CLAY**							27	**Grey, wet, Atterberg Limits-LL=27, PI=10**
35	8	16 27 32 38	SM	**Silty SAND**								**Grey, wet, fine sand, NP fines**
40												**Bottom of Hole 39.0 ft.** **Elevation -59.9 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45												

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **15 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,605 ft.** Easting: **1,660,581 ft.**

Top of Hole Elevation: **-17.3 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-26	**AP-4608**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.0 ft.**

Total Depth: **37.3 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 35.7 ft.**
		1			20 10 5 8	GP-GM	**Poorly graded GRAVEL with Silt and Sand**					>1.4			**Grey, wet, angular to subrounded gravel, fine sand, nonplastic (NP) fines, low recovery, sample may not be representative**
5		2			3 7 12 18	CL	**Lean CLAY**							23	**Grey, wet, Atterberg Limits-LL=36, PI=14, 3.0 TSF indicated by pocket penetrometer**
10		3			3 7 13 15	CL	**Lean CLAY**							23	**Grey, wet, Atterberg Limits-LL=34, PI=13, 3.25 TSF indicated by pocket penetrometer**
15		4			4 7 13 18	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=35, PI=17, 3.0 TSF indicated by pocket penetrometer**
20		5			10 11 22 33	SP	**Poorly graded SAND**	2	93	5		0.25			**Drill action indicates material change** **Grey, wet, fine sand**
25		6			6 21 38 47	SP	**Poorly graded SAND**	5	90	5		0.25			**Grey wet, fine to medium sand**
30		7			5 22 37 45	SP-SM	**Poorly graded SAND with Silt**	3	88	9		0.25			**Grey, wet, fine sand, NP fines, silty sand in tip of sampling drive shoe**
35		8			50/3in.	NR	**No Recovery**								**Hammer bouncing indicating possible cobble**
40															**Bottom of Hole 37.3 ft.** **Elevation -54.6 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4608**

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ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **17 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,642,198 ft.** Easting: **1,658,088 ft.**

Top of Hole Elevation: **-7.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-27	**AP-4609**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **36.5 ft.**

Total Depth: **38.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 34.8 ft.**
															Drill cutting are sand, gravel, and grey fines
		1			11 13 16 19	NR	**No Recovery**								**No recovery**
5		2			18 15 10 8	GP-GM	**Poorly graded GRAVEL with Silt and Sand**	52	42	6		>1.4			**Grey, wet, angular to subrounded gravel, fine to coarse sand, nonplastic (NP), gravel fractured while driving**
10		3			9 12 12 15	SP-SM	**Poorly graded SAND with Silt and Gravel**	27	63	10		1.4			**Grey, wet, subrounded gravel, fine to coarse sand, NP fines**
15		4			19 34 32	GP-GM	**Poorly graded GRAVEL with Silt and Sand**	48	40	12		1.4			**Grey to brown, wet, subangular to subrounded gravel, fine to coarse sand, NP fines**
20		5			1 2 0 4	CL	**Lean CLAY**							35	**Grey, wet, Atterberg Limits-LL=31, PI=11, 0.5 TSF indicated by pocket penetrometer**
25		6			4 4 6 7	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines**
30		7			3 4 5 7	CL	**Lean CLAY**							26	**Grey, wet, Atterberg Limits-LL=32, PI=12, 0.75 TSF indicated by pocket penetrometer**
35		8			4 4 6 8	CL	**Lean CLAY**							31	**Grey, wet, Atterberg Limits-LL=38, PI=18, 1.0 TSF indicated by pocket penetrometer**
40															**Bottom of Hole 38.5 ft.** **Elevation -46.2 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **17 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,642,380 ft.** Easting: **1,658,176 ft.**

Top of Hole Elevation: **-13.1 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-28	**AP-4610**	**Walter Mahousky**	**Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **35.0 ft.**

Total Depth: **37.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 31.9 ft.**
															Drill cutting are sand, gravel, and grey fines
5		1			4 5 7 7	NR	**No Recovery**								
10		2			4 8 7 8	SM	**Silty SAND with Gravel**	**28**	**53**	**19**		**0.8**			**Grey, wet, angular to subangular gravel, fine to coarse sand, nonplastic (NP) fines**
15		3			2 3 6 7	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, low recovery**
20		4			0 3 6 8	CL	**Lean CLAY**							**27**	**Grey, wet, Atterberg Limits-LL=37, PI=18, 1.5 TSF indicated by pocket penetrometer**
25		5			1 0 4 7	ML	**SILT**							**25**	**Grey, wet, Atterberg Limits-Nonplastic, 1.5 TSF indicated by pocket penetrometer**
30		6			0 0 0 6	CL	**Lean CLAY**							**30**	**Grey, wet, Atterberg Limits-LL=38, PI=17, 1.25 TSF indicated by pocket penetrometer**
35		7			1 2 4 6	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 1.75 TSF indicated by pocket penetrometer**
															Bottom of Hole 37.0 ft. **Elevation -50.1 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **18 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,642,574 ft.** Easting: **1,658,253 ft.**

Top of Hole Elevation: **-17.6 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-29	**AP-4611**	**Walter Mahousky**	**Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **30.0 ft.**

Total Depth: **34.3 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks
															Jack-Up Barge Deck Elevation: 32.2 ft.
5		1			12 17 24 50/0in.	GC	**Clayey GRAVEL with Sand**	48	36	16		1			**Grey, wet, angular to subangular gravel, fine to coarse sand, medium plasticity fines**
10		2			2 5 5 0	CL	**Lean CLAY**							23	**Grey, wet, Atterberg Limits-LL=40, PI=18, 0.75 TSF indicated on pocket penetrometer**
		VST													**Undrained Shear Strength = 1.403 kip/ft^2** **Remolded Undrained Shear Strength = 0.649 kip/ft^2**
15															
		VST													**Undrained Shear Strength = 1.558 kip/ft^2** **Remolded Undrained Shear Strength = 0.587 kip/ft^2**
20		3			0 0 3 6	CL	**Lean CLAY**							26	**Grey, wet, Atterberg Limits-LL=39, PI=15, 1.25 TSF indicated on pocket penetrometer**
		VST													**Undrained Shear Strength = 1.636 kip/ft^2** **Remolded Undrained Shear Strength = 0.685 kip/ft^2**
25															
		VST													**Undrained Shear Strength = 1.945 kip/ft^2** **Remolded Undrained Shear Strength = 0.634 kip/ft^2**
30		4			0 0 3 5	ML	**SILT**							24	**Grey, wet, Atterberg Limits-Nonplastic, 1.5 TSF indicated on pocket penetrometer**
		VST													**Undrained Shear Strength = 1.034 kip/ft^2** **Remolded Undrained Shear Strength = 0.496 kip/ft^2**
35															**Bottom of Hole 34.3 ft.** **Elevation -51.9 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector** **Vane Shear Test (VST): ASTM D2573** **Vane Size(D x H): 55mmx110mm rectangular**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **19 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,642,951 ft.** Easting: **1,658,374 ft.**

Top of Hole Elevation: **-34.1 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-30	**AP-4612**	**Walter Mahousky**	**Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **23.0 ft.**

Total Depth: **37.4 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks
															Jack-Up Barge Deck Elevation: 28.9 ft.
		1A			15	GW-	Well-graded GRAVEL with	55	39	6		1			Grey, wet, angular to subangular gravel, fine
					33	GC	Clay and Sand								to coarse sand, medium plasticity fines, gravel
5		1B			16	CL	Lean CLAY								fractured while driving
					3										Grey, wet, medium plasticity fines
		2			5	CL	Lean CLAY								Grey, wet, medium plasticity fines, 0.6 TSF
					2										indicated by pocket penetrometer
10					1										
					2										
		VST													Undrained Shear Strength = 1.125 kip/ft^2
															Remolded Undrained Shear Strength = 0.526
															kip/ft^2
15															
		VST													Undrained Shear Strength = 1.621 kip/ft^2
															Remolded Undrained Shear Strength = 0.536
															kip/ft^2
20															
		VST													Undrained Shear Strength = 1.044 kip/ft^2
															Remolded Undrained Shear Strength = 0.380
		3			0	CL	Lean CLAY							25	kip/ft^2
					0										Grey, wet, Atterberg Limits-LL=40, PI=16,
25					0										small lens of silt at 24 feet, 0.8 TSF indicated
					0										by pocket penetrometer
		VST													Undrained Shear Strength = 1.721 kip/ft^2
															Remolded Undrained Shear Strength = 0.420
															kip/ft^2
30															
		VST													Undrained Shear Strength = 1.858 kip/ft^2
															Remolded Undrained Shear Strength = 0.435
															kip/ft^2
35															
		VST													Undrained Shear Strength = 1.823 kip/ft^2
															Remolded Undrained Shear Strength = N.A.
															Computer Crashed
40															Bottom of Hole 37.4 ft.
															Elevation -71.5 ft.
															Drilled Below Water
															PID = (Cold/Hot) Photo Ionization Detector
															Vane Shear Test (VST): ASTM D2573
45															Vane Size(D x H): 55mmx110mm rectangular

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4612**

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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **19 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,643,711 ft.** Easting: **1,658,645 ft.**

Top of Hole Elevation: **-41.7 ft.**

Hole Number, Field: **TB-31**

Permanent: **AP-4613**

Operator: **Chris St. Pierre**

Inspector: **Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **35.0 ft.**

Total Depth: **37.0 ft.**

Hammer Weight: **140 lbs**

Split Spoon I.D.: **1.375 in.**

Size and Type of Bit: **4 in. I.D. x 4.5 in. O.D. HWT Casing**

Type of Equipment: **Mobile B-80 w/ Automatic Hammer**

Type of Samples: **Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 37.3 ft.**
0		1			0 0 0	ML	**SILT**	0	15	85					**Grey, wet, fine sand, nonplastic (NP) fines**
5		2			0 0 0 0 0	ML	**SILT with Sand**	0	21	79					**Grey, wet, fine sand, NP fines**
10		3			14 26 25 50/3in.	SM	**Silty SAND with Gravel**	39	44	17		>1.4			**Grey, wet, angular to subrounded gravel, fine to coarse sand, NP fines, gravel fractured while driving**
15		4			24 29 31 13	GP-GM	**Poorly graded GRAVEL with Silt and Sand**					>1.4			**Grey, wet, angular to subrounded gravel, fine to coarse sand, NP fines, gravel fractured while driving**
20		5			4 4 6 9	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 1.5 TSF indicated by pocket penetrometer**
25		6			8 7 11 12	CL	**Lean CLAY**							27	**Grey, wet, Atterberg Limits-LL=39, PI=16, 1.5 TSF indicated by pocket penetrometer**
30		7			1 3 8 20	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 1.25 TSF indicated by pocket penetrometer**
35		8			8 28 48 40	ML	**Gravelly SILT with Sand**					>1.4			**Grey, wet, rounded gravel, coarse sand, low plasticity fines**
40															**Bottom of Hole 37.0 ft.** **Elevation -78.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **11 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,644,150 ft.** Easting: **1,658,753 ft.**

Top of Hole Elevation: **-40.5 ft.**

Hole Number, Field: **TB-32** Permanent: **AP-4614**

Operator: **Walter Mahousky**

Inspector: **Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight: **140 lbs**

Split Spoon I.D.: **1.375 in.**

Size and Type of Bit: **4 in. I.D. x 4.5 in. O.D. HWT Casing**

Type of Equipment: **Mobile B-80 w/ Automatic Hammer**

Type of Samples: **Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 36.7 ft.**
5		1			0 0 2	ML	**SILT with Sand**	0	25	75					**Grey, wet, fine sand, nonplastic (NP) fines**
10		2			0 1 1 1	ML	**SILT with Sand**	0	21	79					**Grey, wet, fine sand, NP fines**
15		3			4 4 2 3	NR	**No Recovery**								
20		4			1 2 1 5	ML	**SILT with Sand**	7	16	77		0.5			**Greenish grey, wet, subrounded gravel, fine sand, NP fines**
25		5			1 1 2 5	ML	**SILT with Sand**								**Greenish grey, wet, fine sand, NP fines**
30		6			0 3 2 2	NR	**No Recovery**								
35		7			7 4 2 2	ML	**SILT with Sand**								**Greenish grey, wet, fine sand, NP fines**
40		8			6 5 6 7	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
45															**Bottom of Hole 40.0 ft.** **Elevation -80.5 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **11 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,644,469 ft.** Easting: **1,658,909 ft.**

Top of Hole Elevation: **-40.3 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-33	**AP-4615**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.5 ft.**

Total Depth: **39.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Sample Recovery	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 37.2 ft.**
												Barge legs penetrated over 25' into the soil indicating low strength material
	1	9 3 0 0	ML	**SILT with Sand**	**0**	**18**	**82**					**Grey, wet, fine sand, nonplastic (NP) fines**
5												
	2	0 0 1 0	NR	**No Recovery**								**Trace of material similar to previous sample**
10												
	3	0 0 0 1	ML	**SILT**	**0**	**13**	**87**					**Grey, wet, fine sand, NP fines**
15												
	4	1 2 3 3	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines, drill casing was being driven down by hammer, blow counts are erroneous**
20												
	5	0 0 1 1	ML	**SILT with Sand**	**0**	**25**	**75**					**Grey, wet, fine sand, NP fines**
25												
	6	4 5 3 2	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
30												
	7	3 3 6 8	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
35												
	8	2 4 4 3	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
40												**Bottom of Hole 39.5 ft.** **Elevation -79.8 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45												

* Indicates Estimated Frost Classification

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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **24 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,644,833 ft.** Easting: **1,659,062 ft.**

Top of Hole Elevation: **-40.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-34	**AP-4616**	**Walter Mahousky**	**Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **34.0 ft.**

Total Depth: **36.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 35.3 ft.**
5		1			1 0 0 1	ML	**SILT with Sand**	0	23	77					**Grey, wet, fine sand, nonplastic (NP) fines**
10		2			0 0 0 0	ML	**SILT**	0	12	88					**Grey, wet, fine sand, NP fines**
15		3			0 0 0 0	ML	**Sandy SILT**								**Grey, wet, fine sand, NP fines**
20		4			0 0 0 0	ML	**SILT**	0	14	86					**Grey, wet, fine sand, NP fines**
25		5			0 0 0 0	ML	**Sandy SILT**								**Grey, wet, fine sand, NP fines**
30		6			0 0 4 4	ML	**Sandy SILT**	0	30	70					**Grey, wet, fine sand, NP fines**
35		7			0 9 10 15	SM	**Silty SAND**								**Grey, wet, fine to coarse sand, NP fines**
40															**Bottom of Hole 36.0 ft.** **Elevation -76.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4616**

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ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **5 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,645,209 ft.** Easting: **1,659,196 ft.**

Top of Hole Elevation: **-41.6 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-35	**AP-4617**	**Walter Mahousky**	**Inocencio Roman**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 35.4 ft.**
															Drill action and cuttings indicate fine grained soils
		1			0 0 0 0	NR	**No Recovery**								
5															
		2			0 0 0 0	ML	**SILT with Sand**	**3**	**17**	**80**		**0.5**			**Grey, wet, fine to coarse sand, nonplastic (NP) fines**
10															
		3			0 0 0 0	ML	**SILT with Sand**	**0**	**25**	**75**					**Grey, wet, fine to coarse sand, NP fines**
15															
		4			0 0 0 0	ML	**Sandy SILT**								**Grey, wet, fine sand, NP fines**
20															
		5			0 1 1 1	ML	**Sandy SILT**					**0.5**			**Grey, wet, fine sand, trace gravel, NP fines**
25															
		6			0 2 3 6	ML	**Sandy SILT**	**0**	**38**	**62**					**Grey, wet, fine sand, NP fines**
30															**Drill action indicates gravel below 33 feet**
		7			6 6 6 7	SM	**Silty SAND with Gravel**					**0.75**			**Grey, wet, subrounded gravel, fine to coarse sand, NP fines**
35															
		8			7 10 10 8	SM	**Silty SAND with Gravel**					**0.25**			**Grey, wet, subrounded gravel, fine to coarse sand, NP fines**
40															**Bottom of Hole 40.0 ft.** **Elevation -81.6 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **5 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,645,589 ft.** Easting: **1,659,334 ft.**

Top of Hole Elevation: **-40.9 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-36	**AP-4618**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **34.0 ft.**

Total Depth: **36.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Sample Recovery	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	%Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks
												Jack-Up Barge Deck Elevation: 31.6 ft.
	1	0 0 0 0	ML	**SILT with Sand**	**0**	**28**	**72**					**Grey, wet, fine sand, nonplastic (NP) fines**
5	2	1 0 0 0 0	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
10	3	0 0 0 0 0	ML	**SILT with Sand**							**31**	**Grey, wet, fine sand, Atterberg Limits-Nonplastic**
15	4	0 0 0 0 0	ML	**SILT with Sand**	**0**	**21**	**79**					**Grey, wet, fine sand, NP fines**
20	5	0 1 2 1	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
25	6	3 4 7 5	ML	**Sandy SILT**	**0**	**31**	**69**					**Grey, wet, fine sand, NP fines**
30	7	13 15 18 16	NR	**No Recovery**								**Drill action indicates silt, sand, and gravel**
35	8	7 10 10 13	NR	**No Recovery**								**Drill action indicates silt, sand, and gravel**
40												**Bottom of Hole 36.0 ft.** **Elevation -76.9 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45												

* Indicates Estimated Frost Classification

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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **21 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,645,961 ft.** Easting: **1,659,473 ft.**

Top of Hole Elevation: **-40.2 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-37	**AP-4619**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **36.5 ft.**

Total Depth: **38.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 27.3 ft.**
		1			0 3 3 4	ML	**SILT with Sand**	0	17	83					**Grey, wet, fine sand, nonplastic (NP) fines**
5		2			0 0 1 2	ML	**SILT with Sand**	0	23	77					**Grey, wet, fine sand, NP fines**
10		3			0 0 0 1	ML	**Sandy SILT**	0	33	67					**Grey, wet, fine sand, NP fines, trace of fines**
15		4			2 2 1 4	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
20		5			0 1 1 1	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
25		6A			8 9	SM	**Silty SAND**	12	43	45		0.5			**Grey, wet, subrounded gravel, fine sand, NP fines**
		6B			9 10	ML	**SILT with Sand**								**Grey, wet, fine sand, NP fines**
30		7			6 5 8 8	ML	**Sandy SILT**					0.75			**Grey, wet, subrounded gravel, fine sand, NP fines**
35		8			7 10 10 12	NR	**No Recovery**								**No recovery**
40															**Bottom of Hole 38.5 ft.** **Elevation -78.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4619**

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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **4 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,646,334 ft.** Easting: **1,659,610 ft.**

Top of Hole Elevation: **-39.1 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-38	**AP-4620**	**Walter Mahouski**	**Inocencio Roman**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **40.0 ft.**

Total Depth: **42.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 30.9 ft.**
															Drill cuttings indicate fine grained soils
5		1			0 0 0 0	ML	**SILT**							30	**Grey, wet, Atterberg Limits-Nonplastic (NP)**
10		2			0 0 0 0	CL	**Lean CLAY with Sand**	6	18	76		0.25			**Grey, wet, subrounded gravel, fine to coarse sand, medium plasticity fines, 0.75 TSF indicated by pocket penetrometer**
15		3			0 0 0 0	ML	**SILT**							30	**Grey, wet, Atterberg Limits-Nonplastic**
20		4			0 0 1 1	ML	**SILT**								**Grey, wet, NP fines**
25		5			6 11 9 7	SM	**Silty SAND with Gravel**	21	34	45		1.25			**Grey, wet, subangular gravel, fine to coarse sand, NP fines**
30		6			5 7 8 7	ML	**Sandy SILT**								**Grey, wet, fine sand, NP fines**
35		7			4 7 9 13	ML	**Sandy SILT**	0	43	57					**Grey, wet, fine sand, NP fines**
40		8			6 9 15 21	ML	**Sandy SILT**								**Grey, wet, fine sand, NP fines**
45															**Bottom of Hole 42.0 ft. Elevation -81.1 ft. Drilled Below Water PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **4 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,646,717 ft.** Easting: **1,659,754 ft.**

Top of Hole Elevation: **-38.0 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-39	**AP-4621**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **39.0 ft.**

Total Depth: **41.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 32 ft.**
5		1			0 2 2 2	ML	**SILT**	0	9	91					**Grey, wet, fine sand, nonplastic (NP) fines**
10		2			1 1 1 1	ML	**Sandy SILT**							31	**Grey, wet, fine sand, Atterberg Limits-Nonplastic**
15		3			1 1 1 1	ML	**Sandy SILT**	0	34	66					**Grey, wet, fine to medium sand, NP fines**
20		4			1 0 0 0	SM	**Silty SAND**								**Grey, wet, fine to medium sand, NP fines**
25		5			4 5 11 14	SM	**Silty SAND with Gravel**					0.25			**Grey, wet, subrounded gravel, fine to coarse sand, NP fines**
30		6			7 9 11 25	ML	**SILT with Sand**	1	22	77		0.25			**Grey, wet, subrounded gravel, fine sand, NP fines**
35		7			10 11 12 15	ML	**Sandy SILT**					0.25			**Grey, wet, subrounded gravel, fine to coarse sand, NP fines**
40		8			27 29 8 3	GP	**Poorly graded GRAVEL with Sand**					>1.4			**Grey, wet, subangular gravel, fine to coarse sand, gravel fractured while driving, clay on tip of sampler**
45															**Bottom of Hole 41.0 ft.** **Elevation -79.0 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **3 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,647,089 ft. ±** Easting: **1,659,888 ft. ±**

Top of Hole Elevation: **-38.4 ft. ±**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-40	**AP-4622**	**Walter Mahousky**	**Inocencio Roman**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 33.6 ft.**
															Drill cuttings indicate fine grained soil
		1			0 0 0 0	ML	**SILT**							28	**Grey, wet, Atterberg Limits-Nonplastic (NP)**
5															
		2			0 0 0 0	ML	**SILT with Sand**	0	26	74					**Grey, wet, fine sand, NP fines**
10															
		3			0 0 0 0	ML	**SILT with Sand**	0	24	76					**Grey, wet, fine sand, NP fines**
15															**Drill action indicates gravel at 15.5 feet**
		4			4 0 3 8	CL	**Lean CLAY with Gravel**					0.75			**Grey, wet, subangular to subrounded gravel, fine to coarse sand, medium plasticity fines, 2.0 TSF indicated by pocket penetrometer**
20															
		5			6 8 10 13	CL	**Lean CLAY**							30	**Grey, wet, Atterberg Limits-LL=35, PI=12, 1.75 TSF indicated by pocket penetrometer**
25															
		6			3 5 7 10	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 2.75 TSF indicated by pocket penetrometer**
30															
		7			8 10 12 15	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 3.0 TSF indicated by pocket penetrometer**
35															
		8			7 10 13 15	CL	**Lean CLAY**							27	**Grey, wet, Atterberg Limits-LL=36, PI=14, 2.75 TSF indicated by pocket penetrometer**
40															**Bottom of Hole 40.0 ft.** **Elevation -78.4 ft. ±** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **2 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,647,470 ft.** Easting: **1,660,021 ft.**

Top of Hole Elevation: **-37.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-41	**AP-4623**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 33.3 ft.**
5		1			2 2 4 4	ML	**Sandy SILT**	0	42	58					**Grey, wet, fine sand, nonplastic (NP) fines**
		2			2 2 2 2	ML	**SILT with Sand**	0	27	73					**Grey, wet, fine sand, NP fines**
10															**Drill action indicates gravel at 11 feet**
		3			16 31 20 4	GP	**Poorly graded GRAVEL with Sand**					>1.4			**Grey, wet, subrounded gravel, fine to coarse sand, gravel fractured while driving**
15															**Drill action indicates fine grained soils at 16 feet**
		4			6 6 7 7	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=32, PI=11**
20															
		5			3 6 10 15	CL	**Lean CLAY**								**Grey, wet, fine sand, medium plasticity fines**
25															
		6			4 5 7 12	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 2.0 TSF indicated by pocket penetrometer**
30															
		7			3 3 6 9	CL	**Lean CLAY**							28	**Grey, wet, Atterberg Limits-LL=36, PI=14, 2.5 TSF indicated by pocket penetrometer**
35															
		8			4 5 11 12	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 2.5 TSF indicated by pocket penetrometer**
40															**Bottom of Hole 40.0 ft.** **Elevation -77.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **21 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,647,845 ft.** Easting: **1,660,157 ft.**

Top of Hole Elevation: **-39.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-42	**AP-4624**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **39.0 ft.**

Total Depth: **41.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 30.3 ft.**
5		1			0 0 0 3	ML	**SILT**	**0**	**5**	**95**					**Grey, wet, very fine to fine sand, nonplastic (NP) fines**
10		2			10 26 27 27	GM	**Silty GRAVEL with Sand**	**50**	**36**	**14**		**>1.4**			**Grey, wet, angular to subrounded gravel, fine to coarse sand, NP fines, gravel fractured while driving**
15		3			8 8 9 10	NR	**No Recovery**								**Outside of sampling spoon coated with grey, wet, medium plasticity fines**
20		4			3 7 9 11	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines**
25		5			4 7 6 8	CL	**Lean CLAY**								**Grey, wet, fine sand, medium plasticity fines, three-inch lens of NP fines, 1.0 TSF indicated by pocket penetrometer**
30		6			4 8 10 14	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines**
35		7			4 8 10 15	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 2.0 TSF indicated by pocket penetrometer**
40		8			6 10 13 18	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines**
45															**Bottom of Hole 41.0 ft.** **Elevation -80.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4624**

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EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **22 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,648,220 ft.** Easting: **1,660,295 ft.**

Top of Hole Elevation: **-38.7 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-43	**AP-4625**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **39.0 ft.**

Total Depth: **41.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 32.3 ft.**
5		1			4 5 14 17	CL	**Lean CLAY**							25	**Grey, wet, Atterberg Limits-LL=34, PI=13**
10		2			5 9 14 21	CL	**Lean CLAY**					0.75		24	**Grey, moist, subangular gravel, Atterberg Limits-LL=33, PI=10, 2.5 TSF indicated by pocket penetrometer**
15		3			4 7 12 11	CL	**Lean CLAY**					0.25		25	**Grey, moist, subrounded gravel, Atterberg Limits-LL=32, PI=11, 2.75 TSF indicated by pocket penetrometer**
20		4			3 6 12 17	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 2.75 TSF indicated by pocket penetrometer**
25		5			5 11 15 21	CL	**Lean CLAY**							25	**Grey, moist, Atterberg Limits-LL=27, PI=10, 3.0 TSF indicated by pocket penetrometer**
30		6			5 13 20 25	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 3.25 TSF indicated by pocket penetrometer**
35		7			6 10 16 23	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 3.5 TSF indicated by pocket penetrometer**
40		8			6 12 15 21	CL	**Lean CLAY**								**Grey, moist, medium plasticity fines, 3.5 TSF indicated by pocket penetrometer**
45															**Bottom of Hole 41.0 ft.** **Elevation -79.7 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **23 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,648,589 ft.** Easting: **1,660,430 ft.**

Top of Hole Elevation: **-32.8 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-44	**AP-4626**	**Walter Mahousky**	**Greg Carpenter**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **35.0 ft.**

Total Depth: **37.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 32.2 ft.**
		1			11 13 21 24	GM	**Silty GRAVEL with Sand**	47	36	17		>1.4			**Grey, wet, rounded gravel, fine to coarse sand, nonplastic (NP) fines, gravel fractured while driving**
5		2			2 6 7 8	CL	**Lean CLAY**							29	**Grey, wet, Atterberg Limits-LL=37, PI=15**
10		3			2 4 7 11	ML	**SILT**							27	**Grey, wet, Atterberg Limits-Nonplastic, 2.7 TSF indicated by pocket penetrometer**
15		4			6 10 15 21	NR	**No Recovery**								**No Recovery**
20		5			2 7 12 16	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=36, PI=14, 3.8 TSF indicated by pocket penetrometer**
25		6			9 15 18 24	CL	**Lean CLAY**								**Grey, low plasticity fines, 3.1 TSF indicated by pocket penetrometer**
30		7			12 29 36 40	ML	**SILT with Sand**	9	11	80		>1.4			**Grey, rounded gravel, fine sand, NP fines, gravel fractured while driving**
35		8			10 16 21 28	CL	**Lean CLAY**								**Grey, low plasticity fines, 3.0 TSF indicated by pocket penetrometer**
															Bottom of Hole 37.0 ft. **Elevation -69.8 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
40															
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **23 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,648,946 ft.** Easting: **1,660,551 ft.**

Top of Hole Elevation: **-24.3 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-45	**AP-4627**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **37.0 ft.**

Total Depth: **39.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Sample Recovery	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	%Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	% Water	Description and Remarks
											Jack-Up Barge Deck Elevation: 32.7 ft.
	1	18 28 41 30	GP-GM	**Poorly graded GRAVEL with Silt and Sand**	74	21	5		>1.4		**Grey, wet, subangular gravel, fine to coarse sand, nonplastic (NP) fines, gravel fractured while driving**
5	2	24 17 17 12	GW-GM	**Well-graded GRAVEL with Silt and Sand**	58	36	6		>1.4		**Grey, wet, subangular gravel, fine to coarse sand, NP fines, gravel fractured while driving**
10											**Drill action indicates fine grained soils at 11 feet**
	3	10 10 14 19	CL	**Lean CLAY**						20	**Grey, moist, Atterberg Limits-LL=26, PI=9**
15	4	13 8 12 20	CL	**Lean CLAY**						20	**Grey, moist, Atterberg Limits-LL=27, PI=8**
20	5	16 16 23 30	CL	**Lean CLAY**						20	**Grey, moist, Atterberg Limits-LL=26, PI=9, 4.0 TSF indicated by pocket penetrometer**
25	6	14 18 15 26	CL	**Lean CLAY**							**Grey, moist, medium plasticity fines, greater than 4.5 TSF indicated by pocket penetrometer**
30	7	32 27 25 30	CL	**Lean CLAY**							**Grey, moist, medium plasticity fines, 4.0 TSF indicated by pocket penetrometer**
35	8	9 16 30 40	CL	**Lean CLAY**							**Grey, moist, medium plasticity fines, 4.0 TSF indicated by pocket penetrometer**
40											**Bottom of Hole 39.0 ft.** **Elevation -63.3 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45											

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4627**

EXPLORATION LOG ANCHORAGE.GPJ ACE_ANC.GDT 28/5/08

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **26 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,351 ft.** Easting: **1,660,666 ft.**

Top of Hole Elevation: **-16.8 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-46	**AP-4628**	**Chris St. Pierre**	**John Rajek**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **39.5 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 39.2 ft.**
5		1			14 25 20 22	GW	**Well-graded GRAVEL with Sand and Cobbles**	56	40	4		>1.4			**Grey, wet, rounded to subrounded gravel, fine to coarse sand, gravel fractured while driving, drill action indicates cobbles**
10		2			13 9 4 25	SM	**Silty SAND with Gravel**	30	53	17		1			**Grey, wet, subrounded gravel, fine to coarse sand, low plasticity fines**
15		3			3 3 6 6	SC	**Clayey SAND with gravel**	22	33	45		1			**Grey, wet, subrounded gravel, fine to coarse sand, medium plasticity fines**
20		4			1 2 3 4	CL	**Lean CLAY with Gravel**					0.75		26	**Grey, wet, subrounded gravel, fine to coarse sand, Atterberg Limits-LL=38, PI=16**
25		5			1 1 2 33	CL	**Lean CLAY with Gravel**					0.25			**Grey, wet, subrounded gravel, fine to coarse sand, medium plasticity fines, low recovery, sampler possibly pushing gravel or cobble Drill action indicates gravel or cobble at 25 feet**
30		6A			23 33 57	NR	**No Recovery**								**Sampler full of heave, drilled to 30 feet and resampled**
		6B			32 12 26	ML	**SILT with Sand**								**Grey, wet, fine sand, low plasticity fines**
35		7			31 41 11 23 28 39	ML	**Sandy SILT**					1			**Grey, wet, subrounded gravel, fine sand, NP fines**
40		8			28 50 50	SP-SM	**Poorly graded SAND with Silt**								**Grey, wet, fine to medium sand, NP fines**
45															**Bottom of Hole 39.5 ft. Elevation -56.3 ft. Drilled Below Water PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **15 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,701 ft.** Easting: **1,660,837 ft.**

Top of Hole Elevation: **-8.1 ft.**

Hole Number, Field: **TB-47**

Permanent: **AP-4629**

Operator: **Walter Mahousky**

Inspector: **Robert Weakland**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **33.0 ft.**

Total Depth: **35.0 ft.**

Hammer Weight: **140 lbs**

Split Spoon I.D.: **1.375 in.**

Size and Type of Bit: **4 in. I.D. x 4.5 in. O.D. HWT Casing**

Type of Equipment: **Mobile B-80 w/ Automatic Hammer**

Type of Samples: **Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 33.9 ft.**
5		1			3 10 7 5	CL	**Lean CLAY with Gravel**					1		21	**Grey, wet, subangular gravel, Atterberg Limits-LL=36, PI=12, 4.25 TSF indicated by pocket penetrometer**
10		2			12 10 12 14	NR	**No Recovery**								
15		3			8 10 13 18	ML	**SILT with Gravel**					1		22	**Grey, wet, angular gravel, Atterberg Limits-LL=21, PI=1**
20		4			8 7 10 16	CL	**Lean CLAY**							26	**Grey, wet, Atterberg Limits-LL=37, PI=15, 2.25 TSF indicated by pocket penetrometer**
25		5			8 9 14 19	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 3.0 TSF indicated by pocket penetrometer**
30		6			6 16 8 20	CL	**Lean CLAY**							23	**Grey, wet, Atterberg Limits-LL=32, PI=12, 2.75 TSF indicated by pocket penetrometer**
35		7			5 13 16 20	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 3.0 TSF indicated by pocket penetrometer**
40															**Bottom of Hole 35.0 ft.** **Elevation -43.1 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **18 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,642,697 ft.** Easting: **1,658,493 ft.**

Top of Hole Elevation: **-3.5 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-48	**AP-4630**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 33.5 ft.**
5		1			2 3 3	ML	**SILT**							27	**Grey, wet, Atterberg Limits-Nonplastic, 1.75 TSF indicated by pocket penetrometer**
10		2			1 1 1 4	ML	**SILT**							28	**Grey, wet, Atterberg Limits-Nonplastic, 0.75 TSF indicated by pocket penetrometer**
15		3			1 1 2 3	ML	**SILT**							30	**Grey, wet, Atterberg Limits-Nonplastic, 0.75 TSF indicated by pocket penetrometer**
															Drill action indicates material change
20		4			8 9 22 27	SM	**Silty SAND with Gravel**	**36**	**43**	**21**		**1**			**Grey to brown, wet, subangular to subrounded gravel, fine and coarse sand, nonplastic (NP) fines**
25		5			5 25 24 6	SP-SM	**Poorly graded SAND with Silt and Gravel**	**39**	**54**	**7**		**1**			**Grey, wet, subangular to subrounded gravel, fine to coarse sand**
30		6			2 3 6 7	CL	**Lean CLAY**							31	**Grey, wet, Atterberg Limits-LL=37, PI=15, 1.0 TSF indicated by pocket penetrometer**
35		7			2 4 6 8	CL	**Lean CLAY**							35	**Grey, wet, Atterberg Limits-LL=36, PI=18**
40		8			1 3 5 6	ML	**SILT**							33	**Grey, wet, Atterberg Limits-LL=22, PI=1, 0.75 TSF indicated by pocket penetrometer**
45															**Bottom of Hole 40.0 ft.** **Elevation -43.5 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector** **Western (seaward) side legs penetrated approximately 25 feet into the ground**

* Indicates Estimated Frost Classification

ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **2 Oct 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,648,709 ft.** Easting: **1,660,683 ft.**

Top of Hole Elevation: **-11.6 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-49	**AP-4631**	**Walter Mahousky**	**Inocencio Roman**

Type of Hole: ☒ other **Mud Rotary**
☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **40.0 ft.**

Total Depth: **42.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks **Jack-Up Barge Deck Elevation: 33.4 ft.**
															Drill action indicates coarse grained soil
5		1			13 26 25 27	SC	**Clayey SAND**	0	84	16					**Grey, wet, fine sand, medium plasticity fines**
10		2			10 21 18 25	SC	**Clayey SAND**	0	52	48					**Grey, wet, fine sand, medium plasticity fines**
15		3			13 31 46 47	SC	**Clayey SAND**	0	85	15					**Grey, wet, fine sand, medium plasticity fines**
20		4			12 21 32 41	SC	**Clayey SAND**	0	82	18					**Grey, wet, fine sand, medium plasticity fines**
25		5			10 16 27 35	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=31, PI=14, 4.0 TSF indicated by pocket penetrometer**
30		6			7 9 14 23	CL	**Lean CLAY**							24	**Grey, wet, Atterberg Limits-LL=33, PI=12, 3.5 TSF indicated by pocket penetrometer**
35		7			7 11 16 24	CL	**Lean CLAY**							22	**Grey, wet, Atterberg Limits-LL=29, PI=9, 3.5 TSF indicated by pocket penetrometer**
40		8			6 8 14 21	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines, 3.0 TSF indicated by pocket penetrometer**
45															**Bottom of Hole 42.0 ft.** **Elevation -53.6 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4631**

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ALASKA DISTRICT
CORPS OF ENGINEERS
ENGINEERING SERVICES

Soils and Geology Section

EXPLORATION LOG

Project: **Anchorage Harbor Deepening**
Port of Anchorage, Alaska

Date: **16 Sep 2007**

Drilling Agency: ☐ Alaska District ☒ Other **Gregg Drilling / Fugro Jack-Up Barge**

Datum: Vertical **MLLW** Horizontal **NAD83**

Location: Northing: **2,649,103 ft.** Easting: **1,660,814 ft.**

Top of Hole Elevation: **-10.6 ft.**

Hole Number, Field:	Permanent:	Operator:	Inspector:
TB-50	**AP-4632**	**Chris St. Pierre**	**Marcus Palmer**

Type of Hole: ☒ other **Mud Rotary** ☐ Test Pit ☐ Auger Hole ☐ Monitoring Well ☐ Piezometer

Depth to Groundwater: **Drilled Below Water**

Depth Drilled: **38.0 ft.**

Total Depth: **40.0 ft.**

Hammer Weight:	Split Spoon I.D.:	Size and Type of Bit:	Type of Equipment:	Type of Samples:
140 lbs	**1.375 in.**	**4 in. I.D. x 4.5 in. O.D. HWT Casing**	**Mobile B-80 w/ Automatic Hammer**	**Drive**

Depth (ft.)	Lithology	Sample Recovery	ASTM D 4083 Frozen	Frost Class. ufc3-250-01fa	Blow Count	Symbol	Classification ASTM: D 2487 or D 2488	Grain Size %Gravel	%Sand	%Fines	% Finer 0.02mm	Max Size (in.)	PID (ppm)	% Water	Description and Remarks
															Jack-Up Barge Deck Elevation: 35.4 ft.
															Drill action indicates coarse grained soil
		1			3 2 1 5	NR	**No Recovery**								**No recovery, drill action indicates fine-grained soil**
5															
		2			5 8 10 10	ML	**SILT**							27	**Grey, wet, Atterberg Limits-LL=18, PI=1**
10															
		3			8 7 9 15	CL	**Lean CLAY**							26	**Grey, wet, Atterberg Limits-LL=39, PI=18, 2.0 TSF indicated by pocket penetrometer**
15															
		4			5 7 12 17	CL	**Lean CLAY**							25	**Grey, wet, Atterberg Limits-LL=36, PI=14, 3.75 TSF indicated by pocket penetrometer**
20															
		5			16 8 11 15	CL	**Lean CLAY**							25	**Slough in casing - blow counts may not be representative, grey, wet, Atterberg Limits-LL=37, PI=15, 3.0 TSF indicated by pocket penetrometer**
25															
		6			14 13 14 18	CL	**Lean CLAY**								**Grey, wet, medium plasticity fines**
30															**Drill action indicates coarse grained material mixed with fines**
		7			12 7 12 15	ML	**SILT**							24	**Grey, wet, Atterberg Limits-Nonplastic, 2.75 TSF indicated by pocket penetrometer**
35															
		8			10 15 22 28	NR	**No Recovery**								**No recovery, no indication of material change**
40															**Bottom of Hole 40.0 ft.** **Elevation -50.6 ft.** **Drilled Below Water** **PID = (Cold/Hot) Photo Ionization Detector**
45															

* Indicates Estimated Frost Classification

Project: **Anchorage Harbor Deepening**

Hole Number: **AP-4632**

EXPLORATION LOG ANCHORAGE.GPJ ACE_ANC.GDT 28/5/08

APPENDIX B
LABORATORY RESULTS

U.S. ARMY CORPS OF ENGINEERS
SOILS AND GEOLOGY SECTION, ALASKA DISTRICT

Port of Anchorage

Boring I.D (Field)	Sample Number	Depth Interval Top	Depth Interval Bottom	Moisture Content (%)	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	Particle Size Analysis Gravel	Particle Size Analysis Sand	Particle Size Analysis Silt	Passing -#200 (%)	Passing 0.02mm (%)	Frost Class.	Unified Soil Classification
TB-2	SA-1	2.0	4.0	**18.1**		**NP**								
TB-2	SA-2	6.0	8.0					**27.5**	**26.9**	**45.6**				**(GM) Silty gravel with sand**
TB-2	SA-3	11.0	13.0					**42.9**	**44.1**	**13.0**				**(SM) Silty sand with gravel**
TB-2	SA-5	21.0	23.0					**18.9**	**68.5**	**12.6**				**(SM) Silty sand with gravel**
TB-3	SA-1	3.5	5.5					**10.8**	**19.3**	**69.9**				**(ML) Sandy silt**
TB-3	SA-2	8.5	10.0	**21.9**	**24**	**23**	**1**							
TB-3	SA-3	13.5	15.5	**12.2**		**NP**								
TB-3	SA-4	18.5	20.5	**13.2**		**NP**								
TB-4	SA-4	19.0	21.0	**23.7**	**34**	**22**	**12**							
TB-4	SA-5	24.0	26.0	**23.7**	**35**	**22**	**13**							
TB-5	SA-1	2.0	4.0					**23.4**	**69.7**	**6.9**				**(SP-SM) Poorly grd. sand with silt and gravel**
TB-5	SA-2	7.0	9.0	**23.6**	**29**	**20**	**9**							
TB-5	SA-3	12.0	14.0	**23.7**	**35**	**21**	**14**							
TB-5	SA-4	17.0	19.0	**23.6**	**34**	**23**	**11**							
TB-5	SA-7	32.0	34.0	**21.2**	**31**	**20**	**11**							
TB-6	SA-2	7.0	9.0					**0.0**	**95.6**	**4.4**				**(SP) Poorly graded sand**
TB-6	SA-3	12.0	14.0					**0.2**	**91.8**	**8.0**				**(SP-SM) Poorly grd. sand with silt**
TB-6	SA-6	27.0	29.0					**1.3**	**89.6**	**9.1**				**(SP-SM) Poorly grd. sand with silt**
TB-7	SA-1	1.5	3.5					**60.4**	**28.9**	**10.7**				**(GP-GM) Poorly graded gravel w/ silt and sand**
TB-7	SA-2	6.5	8.5	**18.9**		**NP**								
TB-7	SA-3	11.5	13.5					**23.6**	**48.5**	**27.9**				**(SM) Silty sand with gravel**
TB-7	SA-5	21.5	23.5					**44.3**	**38.7**	**17.0**				**(GM) Silty gravel with sand**
TB-8	SA-1	3.0	5.0	**21.7**	**34**	**20**	**14**							
TB-8	SA-2	8.0	10.0	**12.2**		**NP**								
TB-8	SA-3	13.0	15.0					**16.7**	**35.7**	**47.6**				**(SM) Silty sand with gravel**
TB-8	SA-4	18.0	20.0	**19.7**	**26**	**17**	**9**							
TB-9	SA-2	7.0	9.0	**28.4**	**35**	**22**	**17**							
TB-9	SA-3	12.0	14.0	**35.7**	**38**	**22**	**16**							
TB-9	SA-4	17.0	19.0	**28.5**	**36**	**21**	**15**							
TB-9	SA-7	32.0	34.0	**25.1**	**33**	**18**	**15**							
TB-10	SA-1	5.0						**8.3**	**42.4**	**49.3**				**(SM) Silty sand**
TB-10	SA-3	15.0		**21.3**	**33**	**21**	**12**							
TB-10	SA-4	20.0		**20.2**	**33**	**20**	**13**							

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TB-10	SA-5	25.0						15.6	66.3	18.1				(SM) Silty sand with gravel
TB-10	SA-6	30.0	32.0					0.0	96.0	4.0				(SP) Poorly graded sand
TB-11	SA-1	3.0	5.0					46.8	49.3	3.9				(SW) Well graded sand with gravel
TB-11	SA-2	8.0	10.0					20.1	75.4	4.5				(SP) Poorly graded sand with gravel
TB-11	SA-3	13.0	15.0					20.1	72.9	7.0				(SP-SM) Poorly graded sand with silt and gravel
TB-11	SA-5	23.0	25.0					0.0	7.0	93				(ML) Silt
TB-12	SA-1	5.0	7.0					1.8	42.9	55.3				(ML) Sandy silt
TB-12	SA-2	10.0	12.0					14.7	33.3	52.0				(ML) Sandy silt
TB-12	SA-5	25.0	27.0					4.0	39.1	56.9				(ML) Sandy silt
TB-14	SA-1	3.0	5.0					0.0	22.0	78.0				(ML) Silt with sand
TB-14	SA-2	8.0	10.0					0.0	30.6	69.4				(ML) Sandy silt
TB-14	SA-3	13.0	15.0					0.0	55.6	44.4				(SM) Silty sand
TB-14	SA-7	33.0	35.0	25.6	36	22	14							
TB-15	SA-1	5.0	7.0					0.0	18.8	81.2				(ML) Silt with sand
TB-15	SA-2	10.0	12.0					0.0	25.8	74.2				(ML) Silt with sand
TB-15	SA-3	15.0	17.0					0.0	30.7	69.3				(ML) Sandy silt
TB-15	SA-5	25.0	27.0	25.4	38	24	14							
TB-16	SA-1	3.0	5.0					0.0	44.8	55.2				(ML) Sandy silt
TB-16	SA-2	8.0	10.0					0.0	28.2	71.8				(ML) Silt with sand
TB-16	SA-3	13.0	15.0					10.1	38.4	51.5				(ML) Sandy silt
TB-16	SA-6	28.0	30.0					0.0	46.4	53.6				(ML) Sandy silt
TB-17	SA-1	3.0	5.0					0.0	0.8	99.2				(ML) Silt
TB-17	SA-3	13.0	15.0	30.5		NP								
TB-17	SA-5	23.0	25.0	28.4	38	23	15							
TB-18	SA-1	3.0	5.0					3.1	93.8	3.1				(SP) Poorly graded sand
TB-18	SA-2	5.0	7.0					4.2	91.1	4.7				(SP) Poorly graded sand
TB-18	SA-3	10.0	12.0					2.9	92.8	4.3				(SP) Poorly graded sand
TB-18	SA-6	25.0	27.0					0.0	92.2	7.8				(SP-SM) Poorly grd. sand with silt
TB-19	SA-1	2.5	4.5	16.5	25	17	8							
TB-19	SA-2	7.5	9.5					52.9	17.4	29.7				(GM) Silty gravel with sand
TB-19	SA-3A	12.5	14.0	15.3	25	17	8							
TB-19	SA-3B	14.0	14.5					86.0	10.9	3.1				(GW) Well graded gravel
TB-19	SA-4	17.5	19.5	23.7	35	22	13							
TB-20	SA-1	2.0	4.0					48.4	39.7	11.9				(GP-GM) Poorly graded gravel w/ silt and sand
TB-20	SA-3	12.0	14.0	26.6	40	24	16							
TB-20	SA-4	17.0	19.0	23.5	35	21	14							
TB-20	SA-5	22.0	24.0	21.6	32	20	12							

TB-20	SA-6	27.0	29.0	**21.5**	**31**	**19**	**12**							
TB-20	SA-7	32.0	33.4					**0.0**	**98.5**	**1.5**				**(SP) Poorly graded sand**
TB-21	SA-2	8.0	10.0					**40.8**	**30.6**	**28.6**				**(GM) Silty gravel with sand**
TB-21	SA-5	23.0	25.0					**59.3**	**29.2**	**11.5**				**(GP-GM) Poorly graded gravel w/ silt and sand**
TB-21	SA-7	33.0	35.0	**19.7**	**27**	**18**	**9**							
TB-22	SA-1	2.5	4.5	**30.3**		**NP**								
TB-22	SA-2	7.5	9.5	**30.9**	**38**	**23**	**15**							
TB-22	SA-3	12.5	14.0	**31.6**	**37**	**23**	**14**							
TB-22	SA-5	22.5	24.5	**33.8**	**41**	**24**	**17**							
TB-23	SA-1	4.0	6.0	**34.6**	**36**	**21**	**15**							
TB-23	SA-2	14.0	16.0	**26.0**	**38**	**24**	**12**							
TB-23	SA-3	24.0	26.0	**29.9**	**36**	**23**	**16**							
TB-23	SA-4	29.0	31.0	**42.5**	**40**	**25**	**15**							
TB-24	SA-2	8.0	10.0	**24.3**	**36**	**21**	**15**							
TB-24	SA-3	13.0	15.0	**24.3**	**36**	**22**	**14**							
TB-24	SA-7	33.0	35.0					**0**	**10.7**	**89.3**				**(ML) Silt**
TB-25	SA-1	2.0	4.0					**70.1**	**24.3**	**5.6**				**(GP-GM) Poorly graded gravel w/ silt and sand**
TB-25	SA-2	7.0	9.0					**2.5**	**90.8**	**6.7**				**(SP-SM) Poorly grd. sand with silt**
TB-25	SA-3	12.0	14.0					**0.0**	**92.6**	**7.4**				**(SP-SM) Poorly grd. sand with silt**
TB-25	SA-4	17.0	19.0					**0.3**	**82.5**	**17.2**				**(SM) Silty sand**
TB-25	SA-5	22.0	23.5					**0.6**	**92.5**	**6.9**				**(SP-SM) Poorly grd. sand with silt**
TB-25	SA-6	27.0	28.5					**1.1**	**91.4**	**7.5**				**(SP-SM) Poorly grd. sand with silt**
TB-25	SA-7	32.0	33.5	**26.9**	**27**	**17**	**10**							
TB-26	SA-2	7.0	9.0	**22.7**	**36**	**22**	**14**							
TB-26	SA-3	12.0	14.0	**22.6**	**34**	**21**	**13**							
TB-26	SA-4	17.0	19.0	**23.7**	**35**	**22**	**17**							
TB-26	SA-5	22.0	24.0					**2.6**	**92.8**	**4.6**				**(SP) Poorly graded sand**
TB-26	SA-6	27.0	28.0					**5.6**	**89.7**	**4.7**				**(SP) Poorly graded sand**
TB-26	SA-7	32.0	34.0					**3.2**	**87.5**	**9.3**				**(SP-SM) Poorly grd. sand with silt**
TB-27	SA-2	6.5	8.5					**51.9**	**41.8**	**6.3**				**(GP-GM) Poorly graded gravel w/ silt and sand**
TB-27	SA-3	11.5	13.5					**27.0**	**62.7**	**10.3**				**(SP-SM) Poorly grd. sand with silt and gravel**
TB-27	SA-4	16.5	18.5					**48.0**	**40.2**	**11.8**				**(GP-GM) Poorly graded gravel w/ silt and sand**
TB-27	SA-5	21.5	23.5	**35.4**	**31**	**20**	**11**							
TB-27	SA-7	31.5	33.5	**26.4**	**32**	**20**	**12**							
TB-27	SA-8	36.5	38.5	**30.5**	**38**	**20**	**18**							
TB-28	SA-2	10.0	12.0					**27.9**	**52.7**	**19.4**				**(SM) Silty sand with gravel**
TB-28	SA-4	20.0	22.0	**27.4**	**37**	**19**	**18**							

TB-28	SA-5	25.0	27.0	**25.0**		**NP**								
TB-28	SA-6	30.0	32.0	**29.7**	**38**	**21**	**17**							
TB-29	SA-1	5.0	7.0					**47.9**	**36.4**	**15.7**				**(GM) Silty gravel with sand**
TB-29	SA-2	10.0	12.0	**23.3**	**40**	**22**	**18**							
TB-29	SA-3	20.0	22.0	**26.0**	**39**	**24**	**15**							
TB-29	SA-4	30.0	32.0	**23.7**		**NP**								
TB-30	SA-1A	3.0	4.5					**65.5**	**38.9**	**5.6**				**(GW-GM) Well graded gravel w/ silt and sand**
TB-30	SA-1B	4.5	5.0											**Sample not received**
TB-30	SA-3	23.0	25.0	**24.7**	**40**	**24**	**16**							
TB-31	SA-1	3.0	5.0					**0.0**	**14.8**	**85.2**				**(ML) Silt**
TB-31	SA-2	5.0	7.0					**0.0**	**21.2**	**78.8**				**(ML) Silt with sand**
TB-31	SA-3	10.0	11.0					**39.5**	**43.8**	**16.7**				**(SM) Silty sand with gravel**
TB-31	SA-6	25.0	27.0	**27.2**	**39**	**23**	**16**							
TB-32	SA-1	3.0	4.5					**0.0**	**25.2**	**74.8**				**(ML) Silt with sand**
TB-32	SA-2	8.0	10.0					**0.0**	**21.1**	**78.9**				**(ML) Silt with sand**
TB-32	SA-4	18.0	20.0					**6.9**	**15.9**	**77.2**				**(ML) Silt with sand**
TB-33	SA-1	2.5	4.5					**0.0**	**18.1**	**81.9**				**(ML) Silt with sand**
TB-33	SA-3	12.5	14.5					**0.0**	**12.7**	**87.3**				**(ML) Silt**
TB-33	SA-5	22.5	24.5					**0.0**	**24.8**	**75.2**				**(ML) Silt with sand**
TB-34	SA-1	4.0	6.0					**0.0**	**23.0**	**77.0**				**(ML) Silt with sand**
TB-34	SA-2	9.0	11.0					**0.0**	**12.3**	**87.7**				**(ML) Silt**
TB-34	SA-4	19.0	21.0					**0.0**	**14.0**	**86.0**				**(ML) Silt**
TB-34	SA-6	29.0	31.0					**0.0**	**30.2**	**69.8**				**(ML) Sandy silt**
TB-35	SA-2	8.0	10.0					**3.1**	**17.0**	**79.8**				**(ML) Silt with sand**
TB-35	SA-3	13.0	15.0					**0.2**	**25.0**	**74.8**				**(ML) Silt with sand**
TB-35	SA-6	28.0	30.0					**0.0**	**38.1**	**61.9**				**(ML) Sandy silt**
TB-36	SA-1	2.5	4.5					**0.0**	**27.6**	**72.4**				**(ML) Silt with sand**
TB-36	SA-3	9.0	11.0	**31.2**		**NP**								
TB-36	SA-4	14.0	16.0					**0.2**	**21.2**	**78.5**				**(ML) Silt with sand**
TB-36	SA-6	24.0	26.0					**0.4**	**30.2**	**69.3**				**(ML) Sandy silt**
TB-37	SA-1	2.5	4.5					**0.0**	**17.0**	**83.0**				**(ML) Silt with sand**
TB-37	SA-2	6.5	8.5					**0.0**	**22.9**	**77.1**				**(ML) Silt with sand**
TB-37	SA-3	11.5	13.5					**0.0**	**33.5**	**66.5**				**(ML) Sandy silt**
TB-37	SA-6	26.5	28.5					**12.3**	**43**	**44.7**				**(ML) Silty sand**
TB-38	SA-1	5.0	7.0	**30.1**		**NP**								
TB-38	SA-2	10.0	12.0					**5.6**	**18.0**	**76.4**				**(ML) Silt with sand**
TB-38	SA-3	15.0	17.0	**29.5**		**NP**								

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Port of Anchorage

TB-38	SA-5	25.0	27.0					**20.8**	**34.3**	**44.9**				**(SM) Silty sand with gravel**
TB-38	SA-7	35.0	37.0					**0.0**	**43.3**	**56.7**				**(ML) Sandy silt**
TB-39	SA-1	4.0	6.0					**0.0**	**9.2**	**90.8**				**(ML) Silt**
TB-39	SA-2	9.0	11.0	**30.6**		**NP**								
TB-39	SA-3	14.0	16.0					**0.0**	**34.2**	**65.8**				**(ML) Sandy silt**
TB-39	SA-6	29.0	31.0					**0.4**	**22.4**	**77.2**				**(ML) Silt with sand**
TB-40	SA-1	3.0	4.75	**27.9**		**NP**								
TB-40	SA-2	8.0	10.0					**0.0**	**26.5**	**73.5**				**(ML) Silt with sand**
TB-40	SA-3	13.0	15.0					**0.0**	**24.2**	**75.8**				**(ML) Silt with sand**
TB-40	SA-5	23.0	25.0	**29.8**	**35**	**23**	**12**							
TB-40	SA-8	38.0	40.0	**27.3**	**36**	**22**	**14**							
TB-41	SA-1	4.0	6.0					**0.0**	**42.1**	**57.9**				**(ML) Sandy silt**
TB-41	SA-2	8.0	10.0					**0.0**	**26.6**	**73.4**				**(ML) Silt with sand**
TB-41	SA-4	18.0	20.0	**24.1**	**32**	**21**	**11**							
TB-41	SA-7	33.0	35.0	**27.6**	**36**	**22**	**14**							
TB-42	SA-1	4.0	6.0					**0.0**	**5.2**	**94.8**				**(ML) Silt**
TB-42	SA-2	9.0	11.0					**49.7**	**36.3**	**14.0**				**(GM) Silty gravel with sand**
TB-43	SA-1	4.0	6.0	**25.4**	**34**	**21**	**13**							
TB-43	SA-2	9.0	11.0	**23.7**	**33**	**23**	**10**							
TB-43	SA-3	14.0	16.0	**25.2**	**32**	**21**	**11**							
TB-43	SA-5	24.0	26.0	**25.0**	**27**	**17**	**10**							
TB-44	SA-1	0.0	2.0					**46.5**	**36.2**	**17.3**				**(GM) Silty gravel with sand**
TB-44	SA-2	5.0	7.0	**29.1**	**67**	**22**	**15**							
TB-44	SA-3	10.0	12.0	**26.6**		**NP**								
TB-44	SA-5	20.0	22.0	**24.1**	**36**	**22**	**14**							
TB-44	SA-7	30.0	32.0					**9.2**	**10.5**	**80.4**				**(ML) Silt with sand**

Port of Anchorage

TB-45	SA-1	2.0	4.0					**73.6**	**21.3**	**5.1**				**(GP-GM) Poorly graded gravel w/ silt and sand**
TB-45	SA-2	7.0	9.0					**58.1**	**35.9**	**6.0**				**(GW-GM) Well graded gravel w/ silt and sand**
TB-45	SA-3	12.0	14.0	**19.8**	**26**	**17**	**9**							
TB-45	SA-4	17.0	19.0	**19.5**	**27**	**19**	**8**							
TB-45	SA-5	22.0	24.0	**20.1**	**26**	**17**	**9**							
TB-46	SA-1	3.0	5.0					**56.2**	**40.1**	**3.7**				**(GW) Well graded gravel with sand**
TB-46	SA-2	8.0	10.0					**29.9**	**52.9**	**17.2**				**(SM) Silty sand with gravel**
TB-46	SA-3	13.0	15.0					**22.2**	**33.2**	**44.6**				**(SM) Silty sand with gravel**
TB-46	SA-4	18.0	20.0	**26.4**	**38**	**22**	**16**							
TB-47	SA-1	3.0	5.0	**20.5**	**36**	**24**	**12**							
TB-47	SA-3	13.0	15.0	**22.4**	**21**	**20**	**1**							
TB-47	SA-4	18.0	20.0	**25.7**	**37**	**22**	**15**							
TB-47	SA-6	28.0	30.0	**23.0**	**32**	**20**	**12**							
TB-48	SA-1	4.0	5.5	**26.9**		**NP**								
TB-48	SA-2	8.0	10.0	**28.1**		**NP**								
TB-48	SA-3	13.0	15.0	**29.7**		**NP**								
TB-48	SA-4	18.0	20.0					**35.7**	**43.3**	**21**				**(SM) Silty sand with gravel**
TB-48	SA-5	23.0	25.0					**39.4**	**54.0**	**6.7**				**(SP-SM) Poorly graded sand with silt and gravel**
TB-48	SA-6	28.0	30.0	**31.3**	**37**	**22**	**15**							
TB-48	SA-7	33.0	35.0	**35.2**	**36**	**22**	**18**							
TB-48	SA-8	38.0	40.0	**33.2**	**22**	**21**	**1**							
TB-49	SA-1	5.0	7.0					**0.0**	**84.1**	**15.9**				**(SM) Silty sand**
TB-49	SA-2	10.0	12.0					**0.0**	**51.6**	**48.4**				**(SM) Silty sand**
TB-49	SA-3	15.0	17.0					**0.0**	**85.2**	**14.8**				**(SM) Silty sand**
TB-49	SA-4	20.0	22.0					**0.0**	**81.7**	**18.3**				**(SM) Silty sand**
TB-49	SA-5	25.0	27.0	**23.8**	**31**	**17**	**14**							
TB-49	SA-6	30.0	32.0	**23.5**	**33**	**21**	**12**							
TB-49	SA-7	35.0	37.0	**21.7**	**29**	**20**	**9**							
TB-50	SA-2	8.0	10.0	**27.2**	**18**	**18**	**1**							
TB-50	SA-3	13.0	15.0	**25.9**	**39**	**21**	**18**							
TB-50	SA-4	18.0	20.0	**24.8**	**36**	**22**	**14**							
TB-50	SA-5	23.0	25.0	**25.2**	**37**	**22**	**15**							
TB-50	SA-7	33.0	35.0	**24.3**		**NP**								

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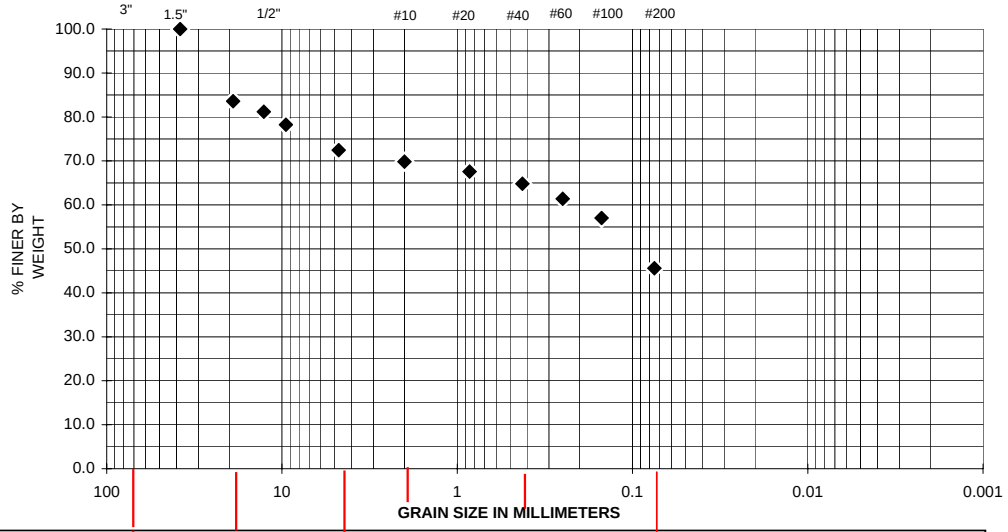
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-2**
SAMPLE NO/ DEPTH	**SA-2 (Depth 6' - 8')**
DESCRIPTION:	**Silty gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**27.5**	USC:	**GM**
% SAND:	**26.9**	FC:	
% SILT/CLAY:	**45.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**12.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

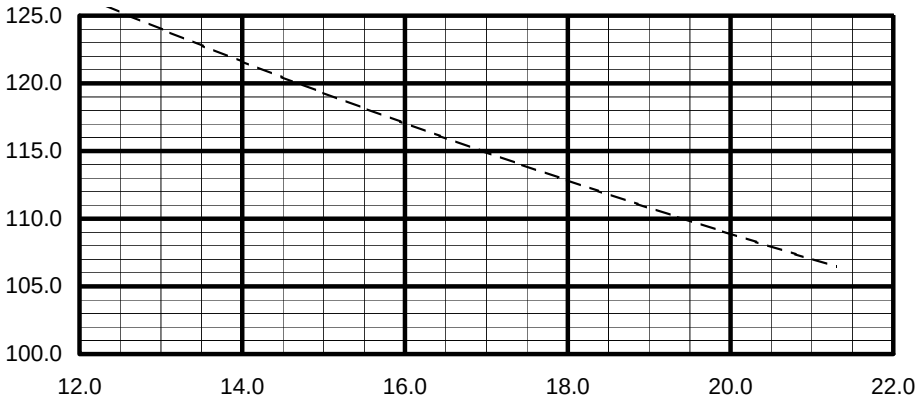
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**84**	
12.7	1/2"	**81**	
9.5	3/8"	**78**	
4.75	# 4	**72**	
2	#10	**70**	
0.85	#20	**68**	
0.425	#40	**65**	
0.25	# 60	**61**	
0.15	#100	**57**	
0.075	#200	**45.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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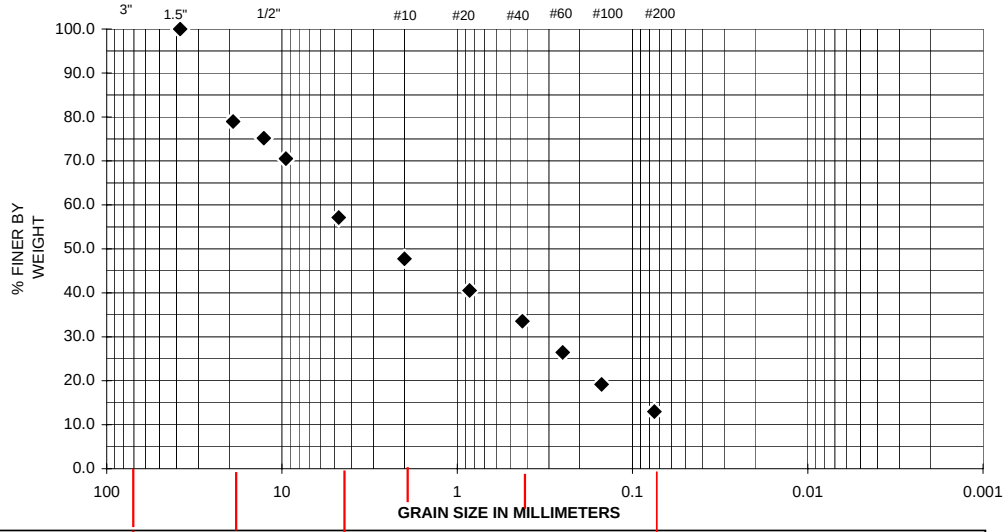
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-2**
SAMPLE NO/ DEPTH	**SA-3 (Depth 11' - 13')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**42.9**	USC:	**SM**
% SAND:	**44.1**	FC:	
% SILT/CLAY:	**13.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**7.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

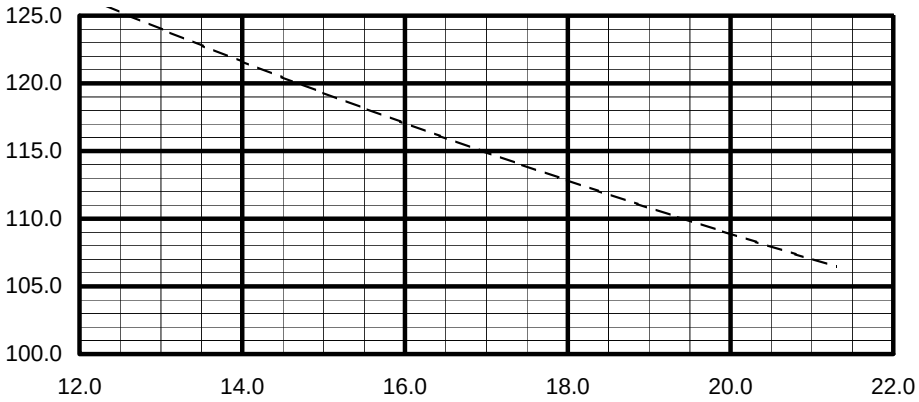
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**79**	
12.7	1/2"	**75**	
9.5	3/8"	**71**	
4.75	# 4	**57**	
2	#10	**48**	
0.85	#20	**41**	
0.425	#40	**34**	
0.25	# 60	**26**	
0.15	#100	**19**	
0.075	#200	**13.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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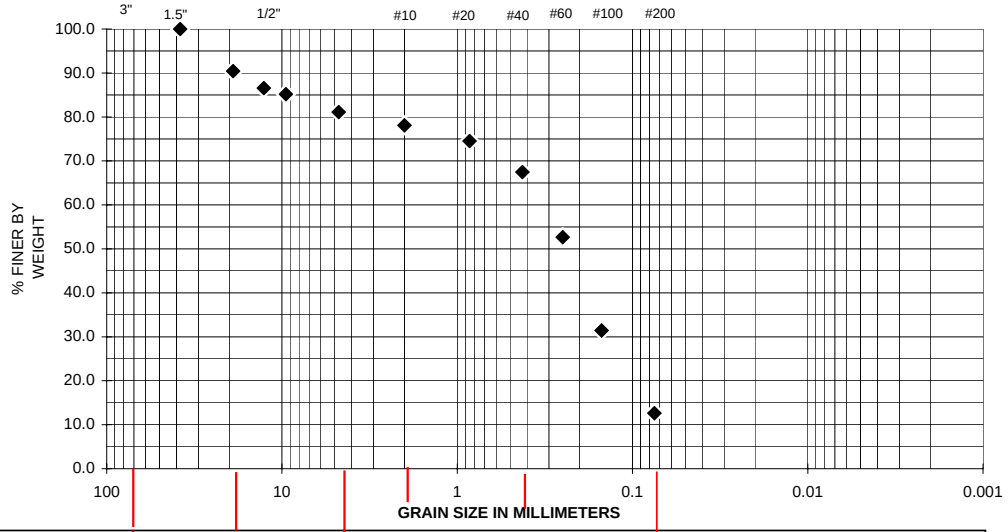
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-2**
SAMPLE NO/ DEPTH	**SA-5 (Depth 21' - 23')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**18.9**	USC:	**SM**
% SAND:	**68.5**	FC:	
% SILT/CLAY:	**12.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**14.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

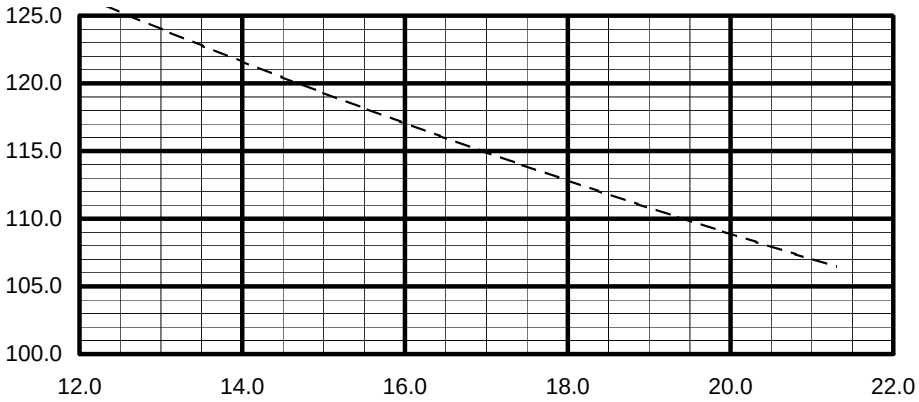
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**90**	
12.7	1/2"	**87**	
9.5	3/8"	**85**	
4.75	# 4	**81**	
2	#10	**78**	
0.85	#20	**75**	
0.425	#40	**67**	
0.25	# 60	**53**	
0.15	#100	**31**	
0.075	#200	**12.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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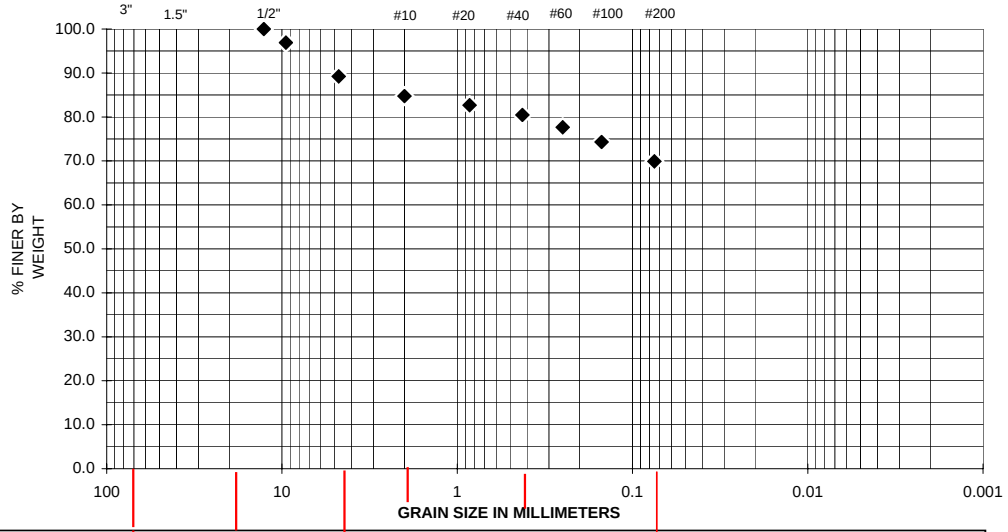
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-3**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3.5' - 5.5')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**10.8**	USC:	**ML**
% SAND:	**19.3**	FC:	
% SILT/CLAY:	**69.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**18.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

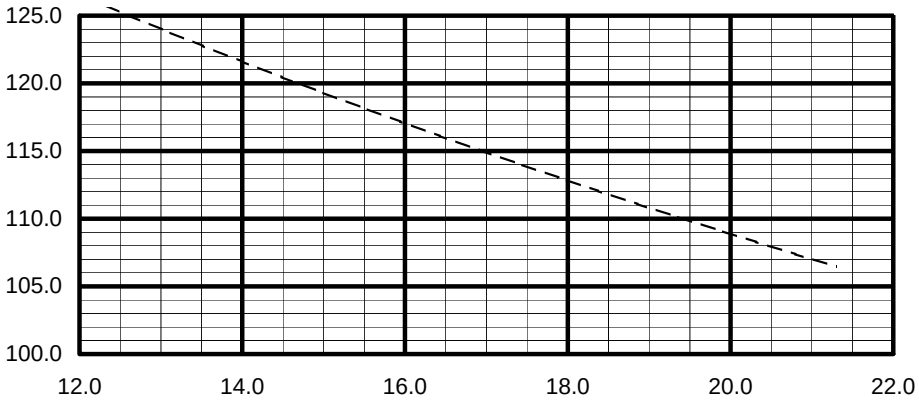
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**97**	
4.75	# 4	**89**	
2	#10	**85**	
0.85	#20	**83**	
0.425	#40	**80**	
0.25	# 60	**78**	
0.15	#100	**74**	
0.075	#200	**69.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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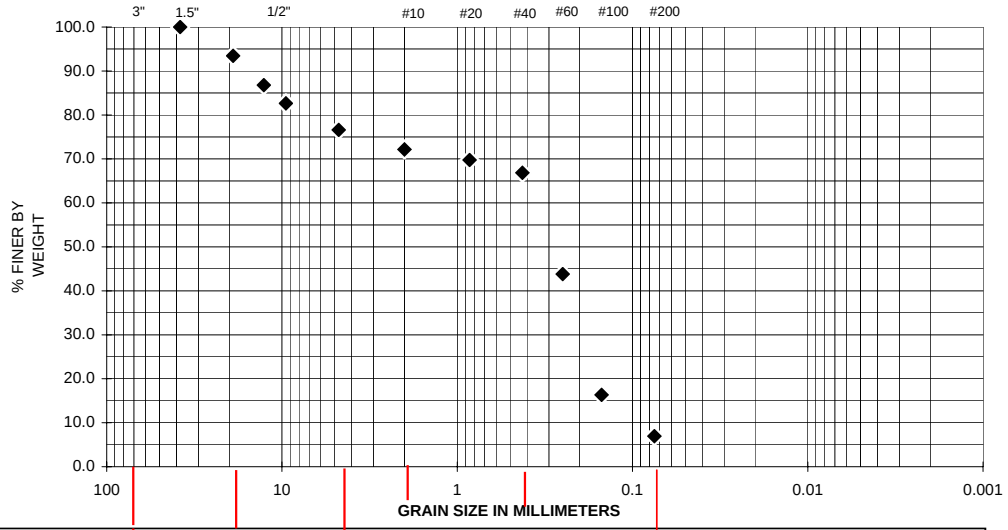
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-5**
SAMPLE NO/ DEPTH	**SA-1 (Depth 2' - 4')**
DESCRIPTION:	**Poorly grd. sand w/ silt & gravel.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**23.4**	USC:	**SP-SM**
% SAND:	**69.7**	FC:	
% SILT/CLAY:	**6.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**19.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

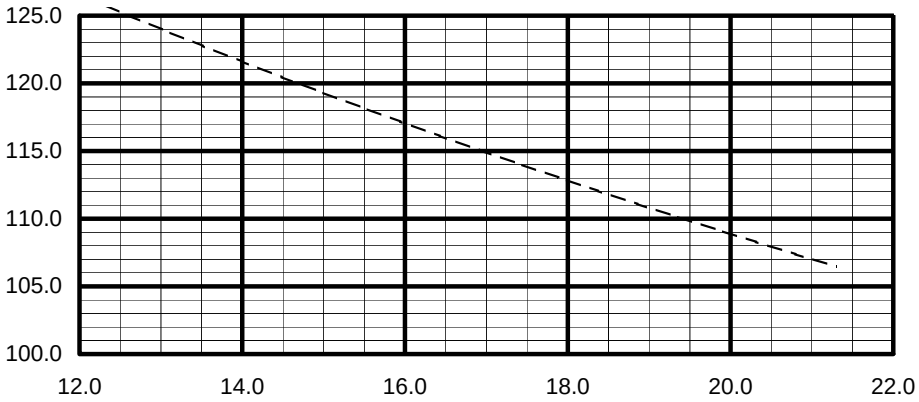
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**93**	
12.7	1/2"	**87**	
9.5	3/8"	**83**	
4.75	# 4	**77**	
2	#10	**72**	
0.85	#20	**70**	
0.425	#40	**67**	
0.25	# 60	**44**	
0.15	#100	**16**	
0.075	#200	**6.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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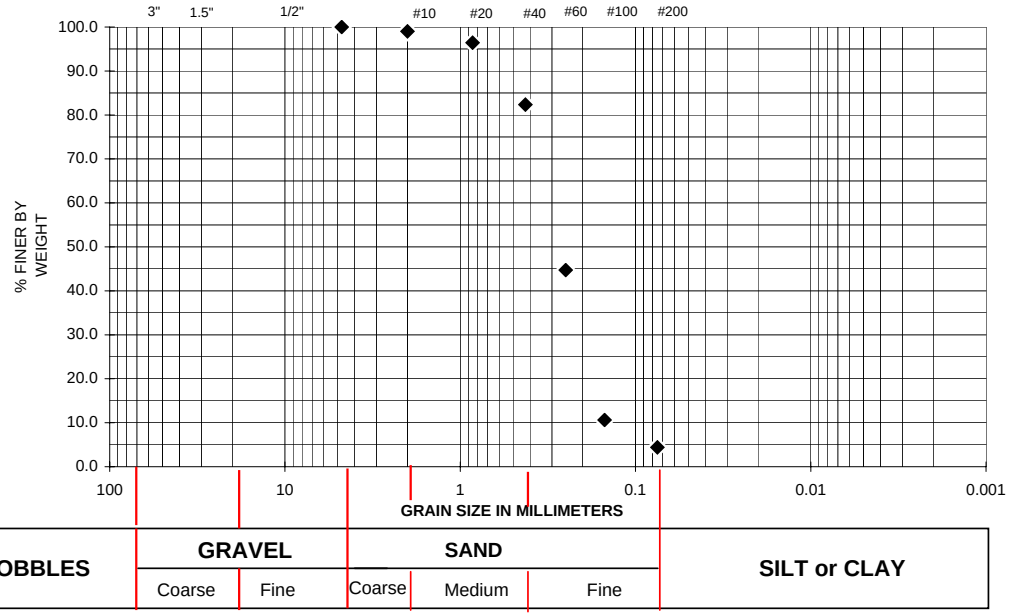
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-6**
SAMPLE NO/ DEPTH	**SA-2 (Depth 7' - 9')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SP**
% SAND:	**95.6**	FC:	
% SILT/CLAY:	**4.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**20.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

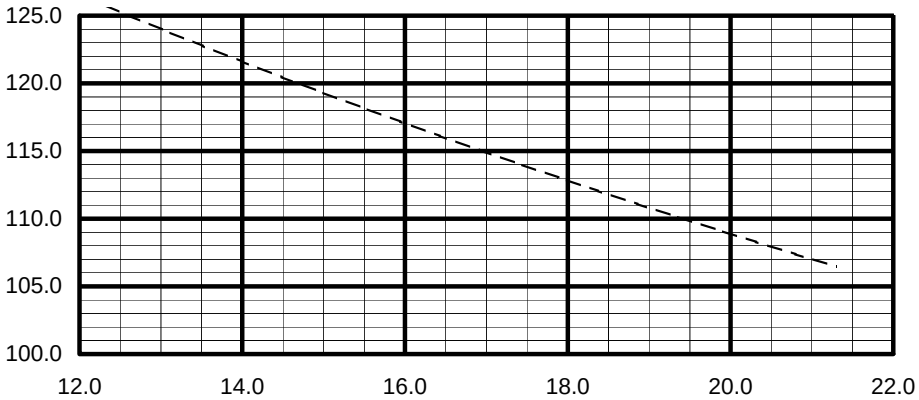
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**96**	
0.425	#40	**82**	
0.25	# 60	**45**	
0.15	#100	**11**	
0.075	#200	**4.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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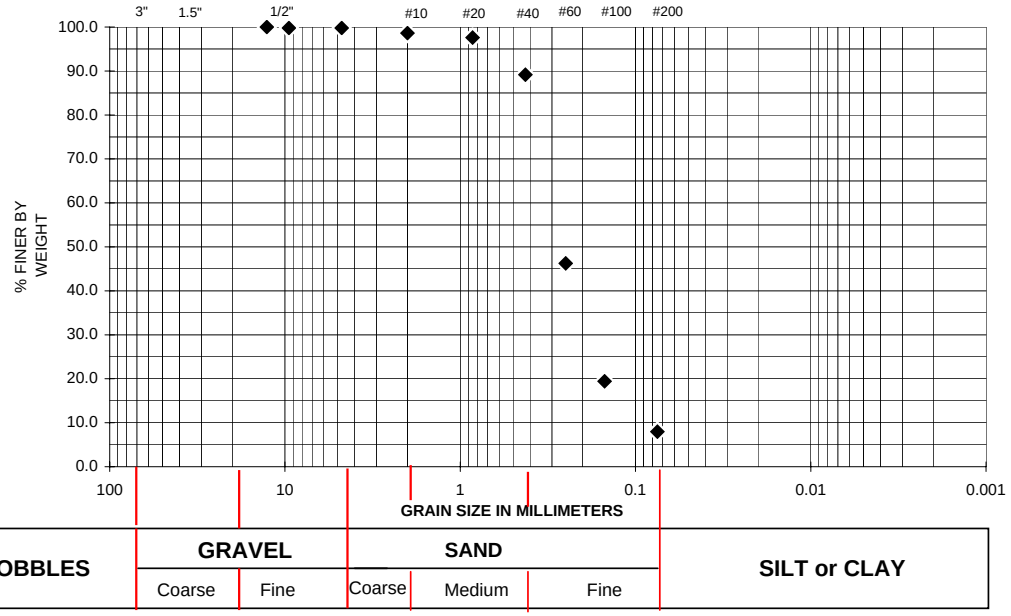
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-6**
SAMPLE NO/ DEPTH	**SA-3 (Depth 12' - 14')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.2**	USC:	**SP-SM**
% SAND:	**91.8**	FC:	
% SILT/CLAY:	**8.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**20.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

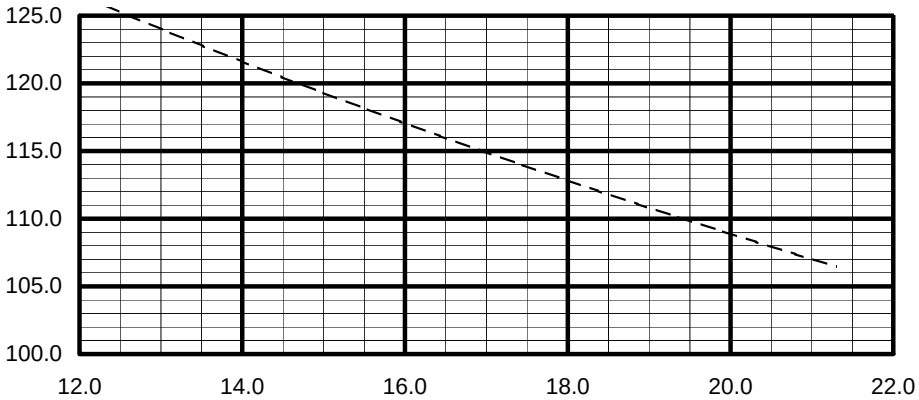
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**100**	
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**98**	
0.425	#40	**89**	
0.25	# 60	**46**	
0.15	#100	**19**	
0.075	#200	**8.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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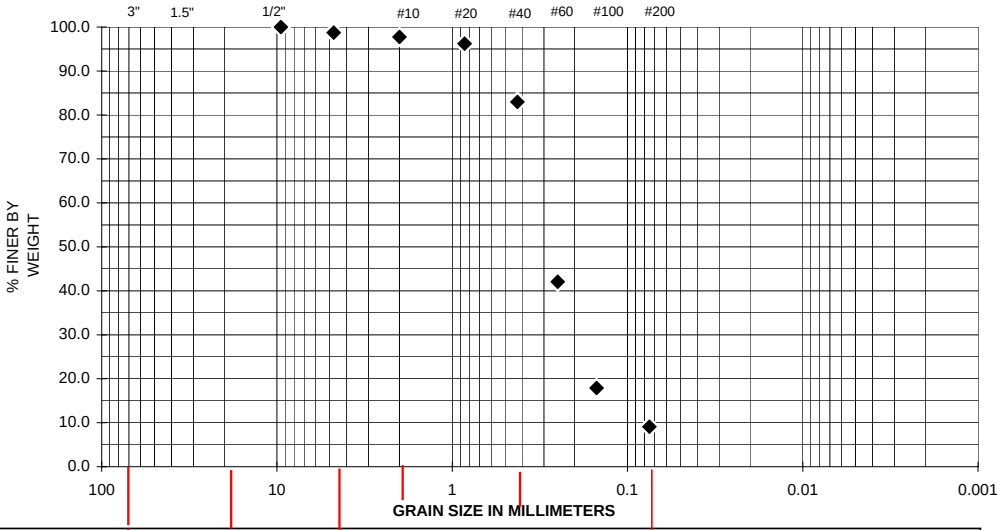
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-6**
SAMPLE NO/ DEPTH	**SA-6 (Depth 27' - 29')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**1.3**	USC:	**SP-SM**
% SAND:	**89.6**	FC:	
% SILT/CLAY:	**9.1**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**19.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

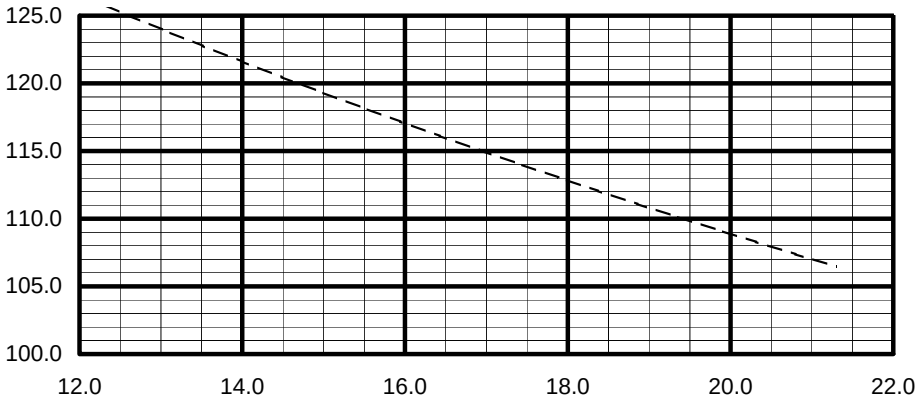
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"	**100**	
4.75	# 4	**99**	
2	#10	**98**	
0.85	#20	**96**	
0.425	#40	**83**	
0.25	# 60	**42**	
0.15	#100	**18**	
0.075	#200	**9.1**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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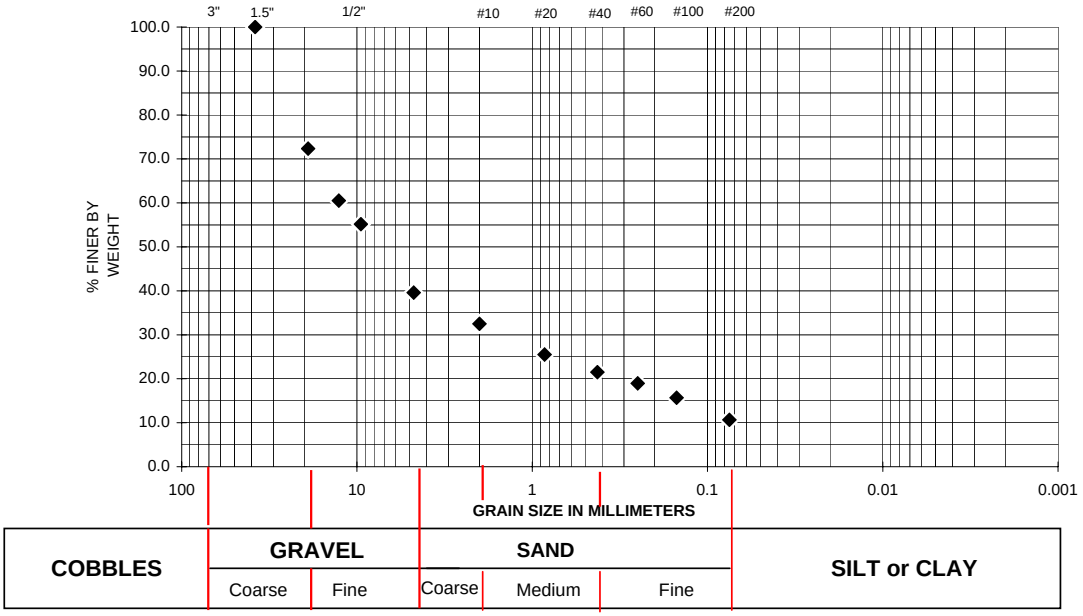
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-7**
SAMPLE NO/ DEPTH	**SA-1 (Depth 1.5' - 3.5')**
DESCRIPTION:	**Poorly grd. gravel w/ silt & sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**60.4**	USC:	**GP-GM**
% SAND:	**28.9**	FC:	
% SILT/CLAY:	**10.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**7.3**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

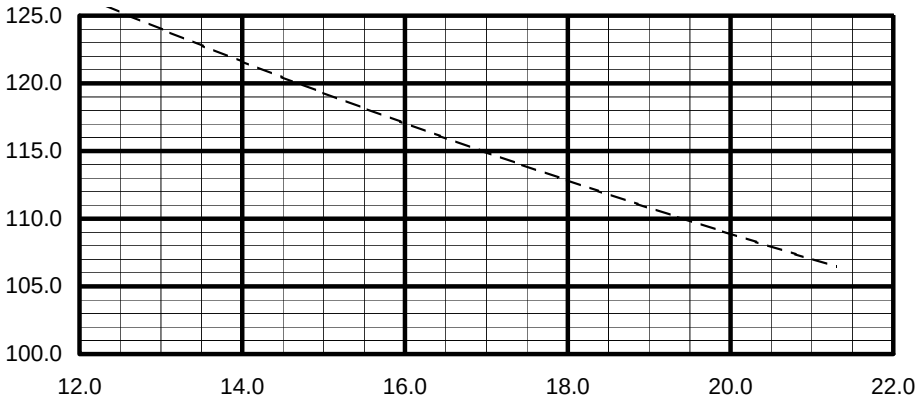
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**72**	
12.7	1/2"	**61**	
9.5	3/8"	**55**	
4.75	# 4	**40**	
2	#10	**32**	
0.85	#20	**26**	
0.425	#40	**22**	
0.25	# 60	**19**	
0.15	#100	**16**	
0.075	#200	**10.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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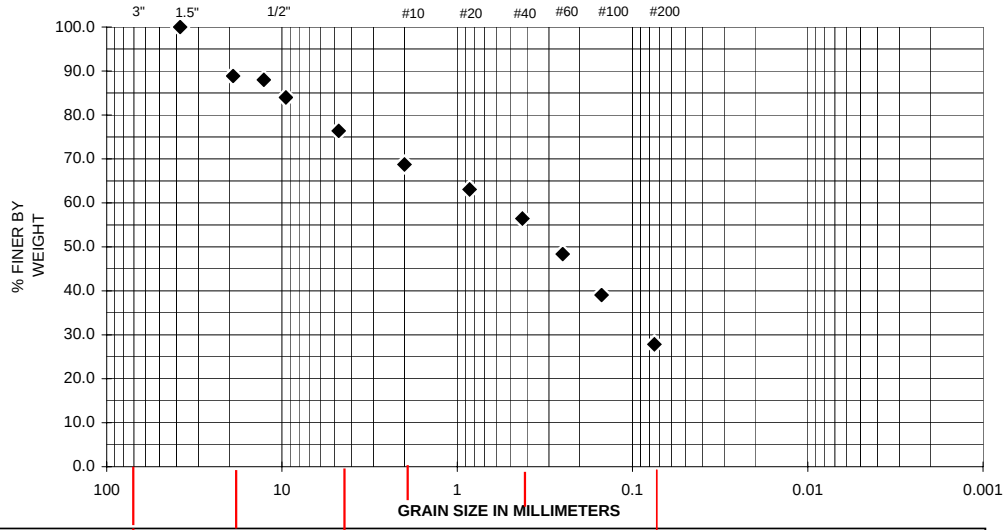
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-7**
SAMPLE NO/ DEPTH	**SA-3 (Depth 11.5' - 13.5')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**23.6**	USC:	**SM**
% SAND:	**48.5**	FC:	
% SILT/CLAY:	**27.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**9.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

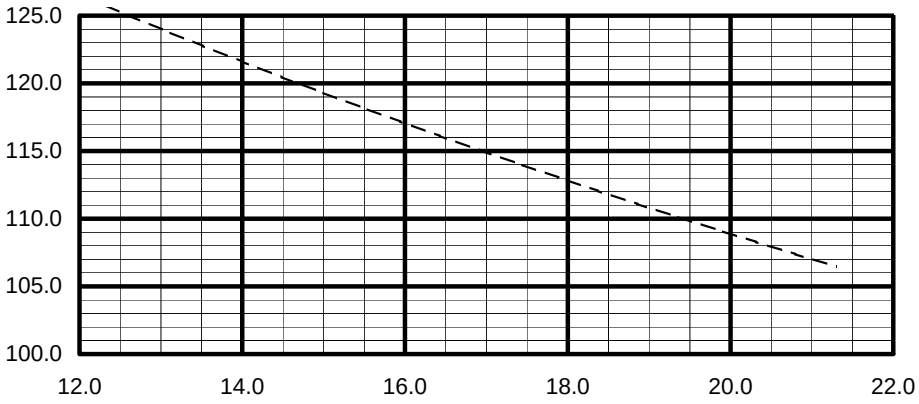
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**89**	
12.7	1/2"	**88**	
9.5	3/8"	**84**	
4.75	# 4	**76**	
2	#10	**69**	
0.85	#20	**63**	
0.425	#40	**56**	
0.25	# 60	**48**	
0.15	#100	**39**	
0.075	#200	**27.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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TERRA FIRMA TESTING

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Telephone: (907) 344-5934
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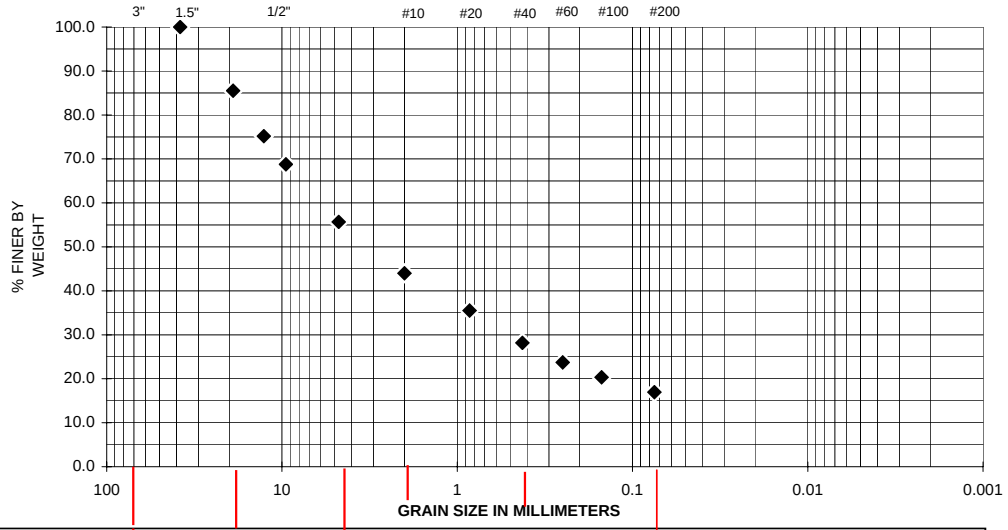
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-7**
SAMPLE NO/ DEPTH	**SA-5 (Depth 21.5' - 23.5')**
DESCRIPTION:	**Silty gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**44.3**	USC:	**GM**
% SAND:	**38.7**	FC:	
% SILT/CLAY:	**17.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**9.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

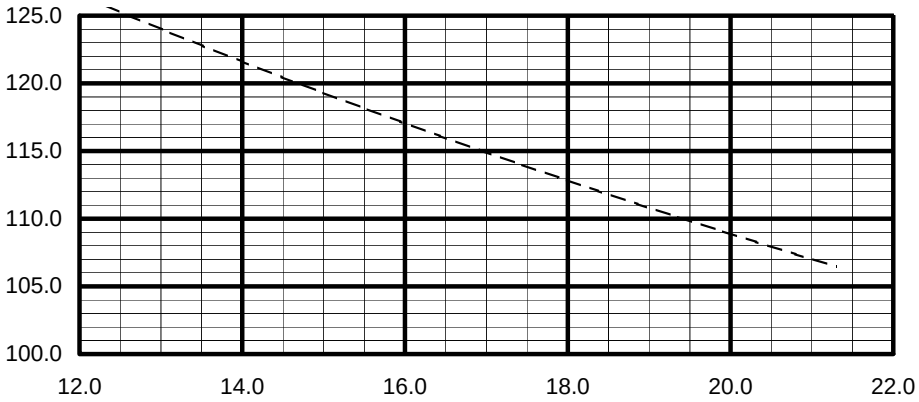
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**86**	
12.7	1/2"	**75**	
9.5	3/8"	**69**	
4.75	# 4	**56**	
2	#10	**44**	
0.85	#20	**36**	
0.425	#40	**28**	
0.25	# 60	**24**	
0.15	#100	**20**	
0.075	#200	**17.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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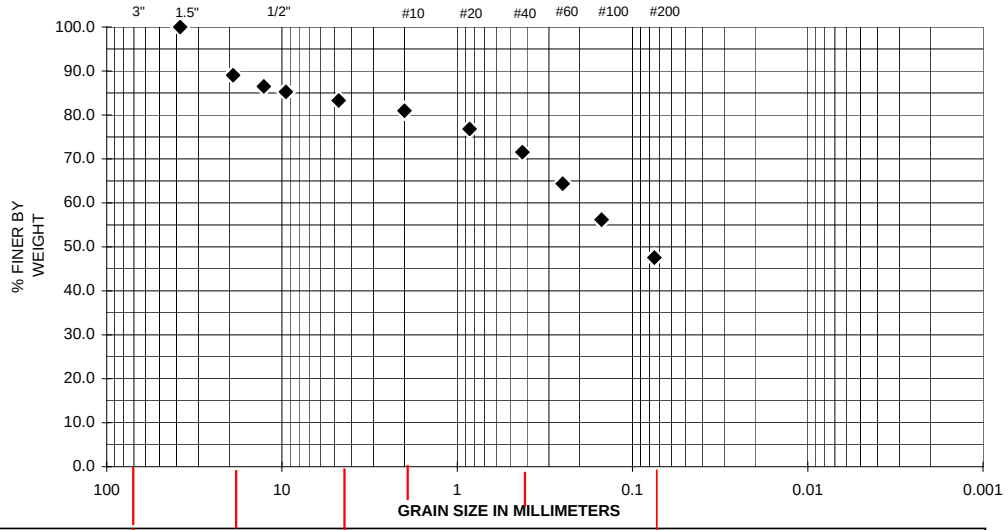
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-8**
SAMPLE NO/ DEPTH	**SA-3 (Depth 13' - 15')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**16.7**	USC:	**SM**
% SAND:	**35.7**	FC:	
% SILT/CLAY:	**47.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**15.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

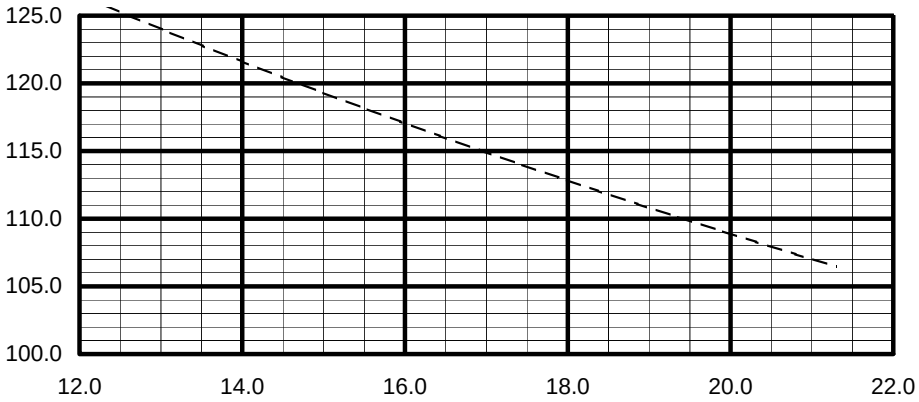
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**89**	
12.7	1/2"	**87**	
9.5	3/8"	**85**	
4.75	# 4	**83**	
2	#10	**81**	
0.85	#20	**77**	
0.425	#40	**72**	
0.25	# 60	**64**	
0.15	#100	**56**	
0.075	#200	**47.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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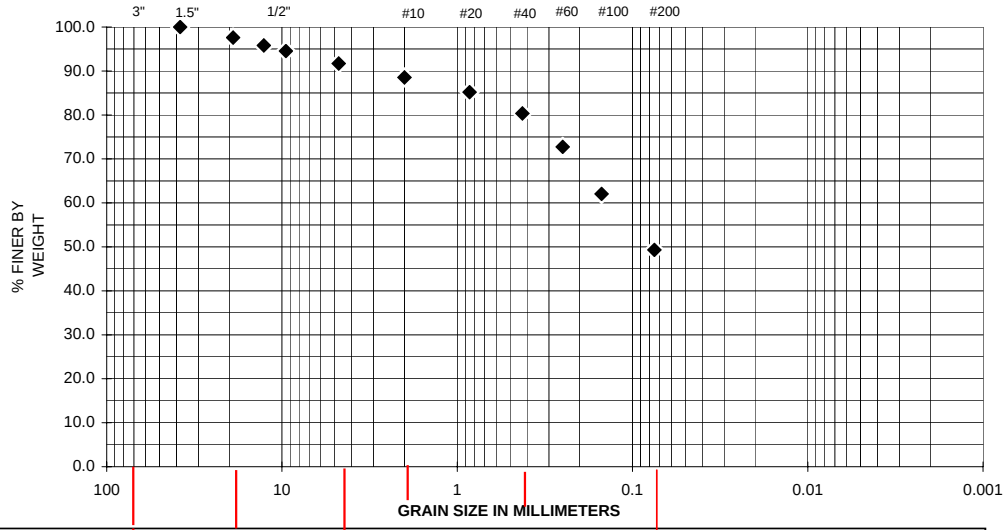
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-10**
SAMPLE NO/ DEPTH	**SA-1 (Depth 5')**
DESCRIPTION:	**Silty sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**8.3**	USC:	**SM**
% SAND:	**42.4**	FC:	
% SILT/CLAY:	**49.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**12.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

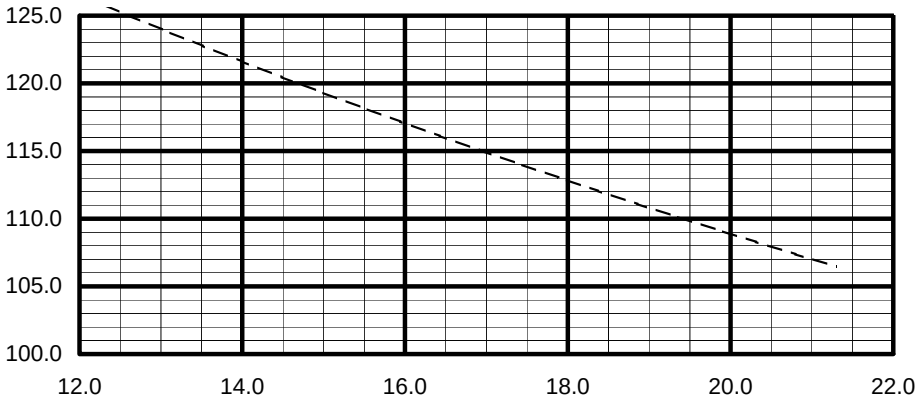
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**98**	
12.7	1/2"	**96**	
9.5	3/8"	**95**	
4.75	# 4	**92**	
2	#10	**89**	
0.85	#20	**85**	
0.425	#40	**80**	
0.25	# 60	**73**	
0.15	#100	**62**	
0.075	#200	**49.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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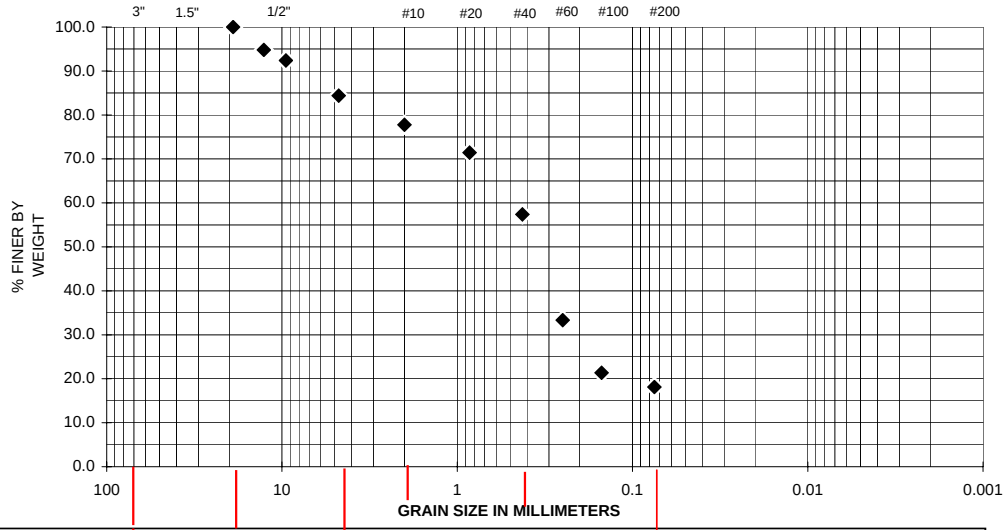
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-10**
SAMPLE NO/ DEPTH	**SA-5 (Depth 25')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**15.6**	USC:	**SM**
% SAND:	**66.3**	FC:	
% SILT/CLAY:	**18.1**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**17.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

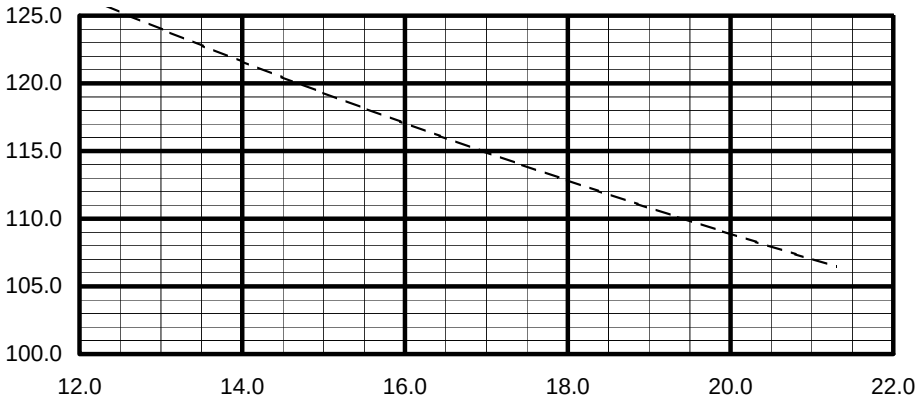
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"	**100**	
12.7	1/2"	**95**	
9.5	3/8"	**92**	
4.75	# 4	**84**	
2	#10	**78**	
0.85	#20	**71**	
0.425	#40	**57**	
0.25	# 60	**33**	
0.15	#100	**21**	
0.075	#200	**18.1**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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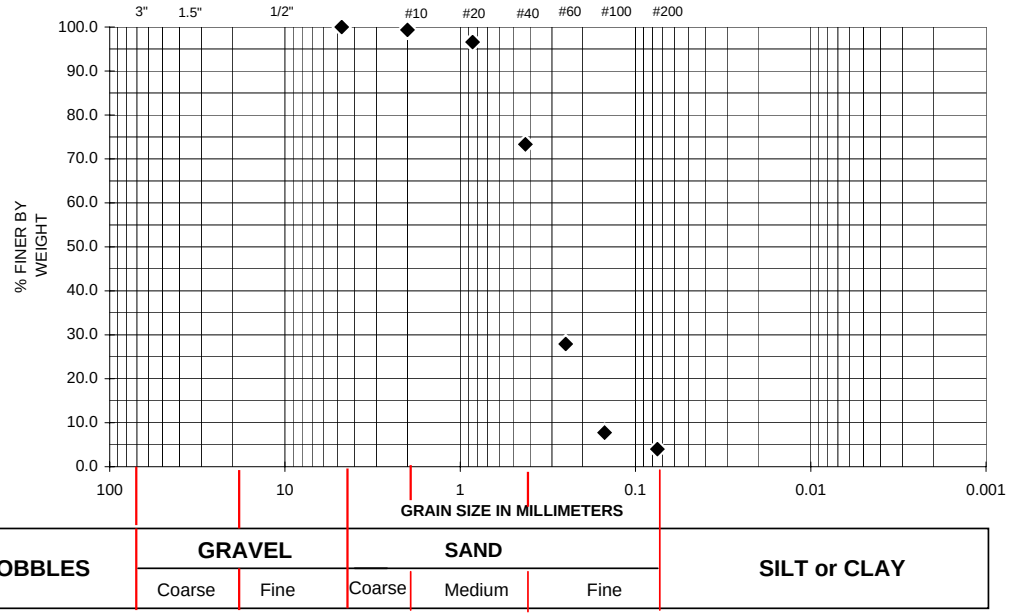
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-10**
SAMPLE NO/ DEPTH	**SA-6 (Depth 30' - 32')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SP**
% SAND:	**96.0**	FC:	
% SILT/CLAY:	**4.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**21.3**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

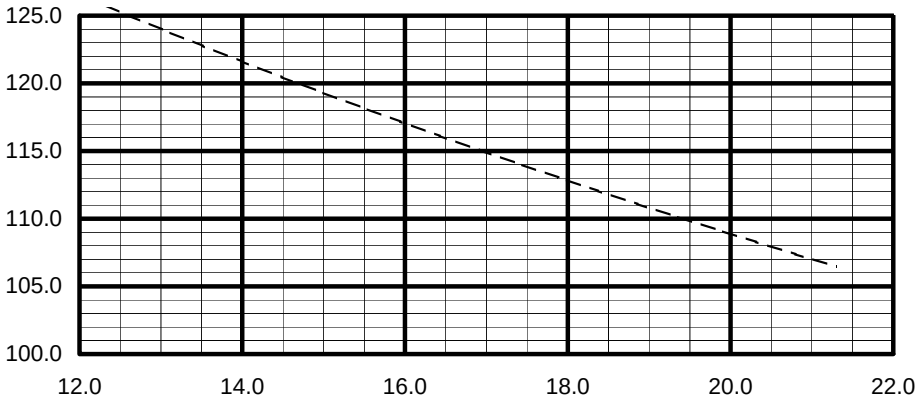
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**97**	
0.425	#40	**73**	
0.25	# 60	**28**	
0.15	#100	**8**	
0.075	#200	**4.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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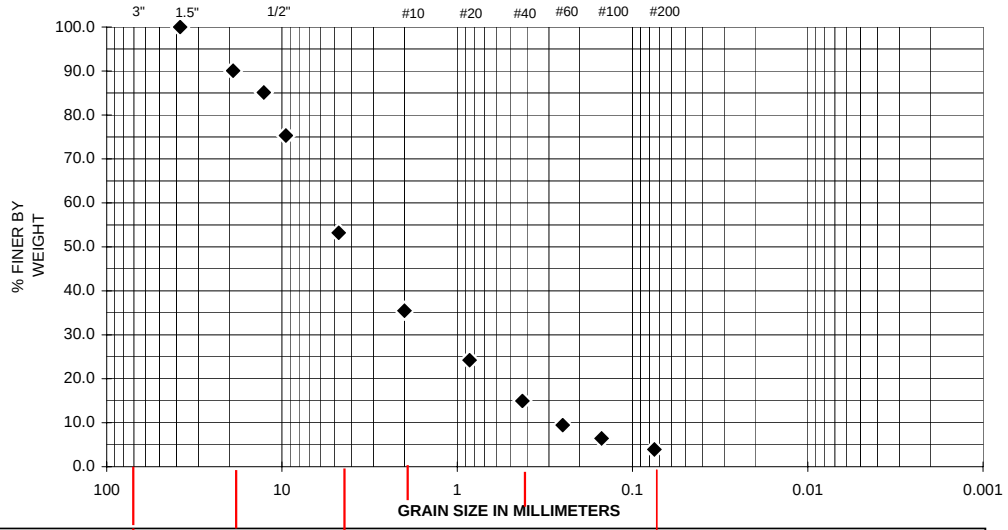
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-11**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 5')**
DESCRIPTION:	**Well grd sand w/ gravel.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**46.8**	USC:	**SW**
% SAND:	**49.3**	FC:	
% SILT/CLAY:	**3.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**9.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

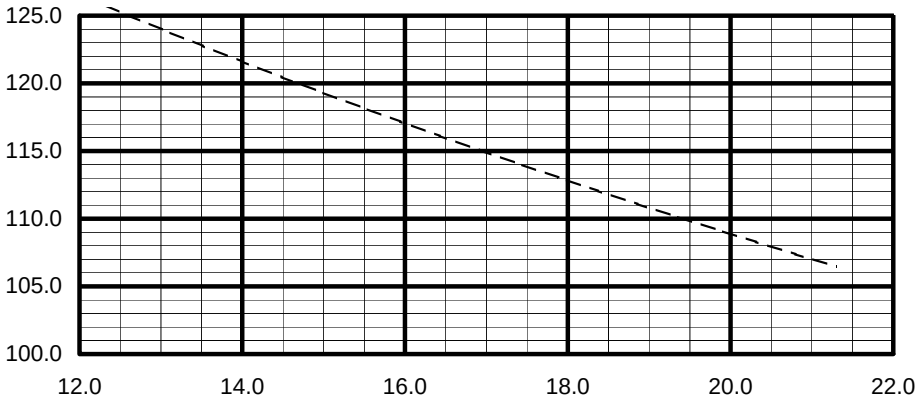
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**90**	
12.7	1/2"	**85**	
9.5	3/8"	**75**	
4.75	# 4	**53**	
2	#10	**35**	
0.85	#20	**24**	
0.425	#40	**15**	
0.25	# 60	**9**	
0.15	#100	**6**	
0.075	#200	**3.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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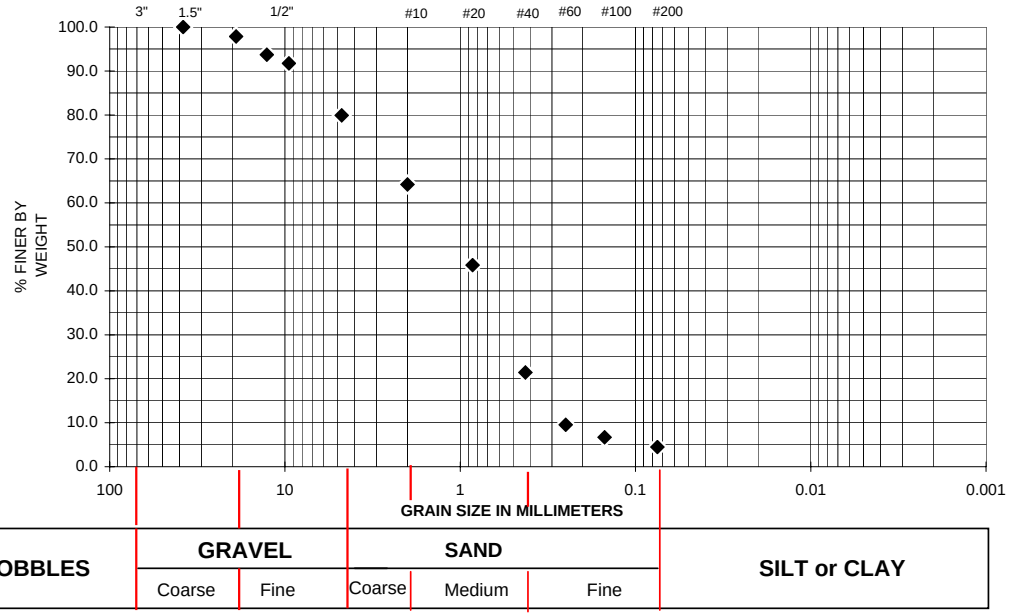
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-11**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Poorly grd. sand w/ gravel.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**20.1**	USC:	**SP**
% SAND:	**75.4**	FC:	
% SILT/CLAY:	**4.5**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**13.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

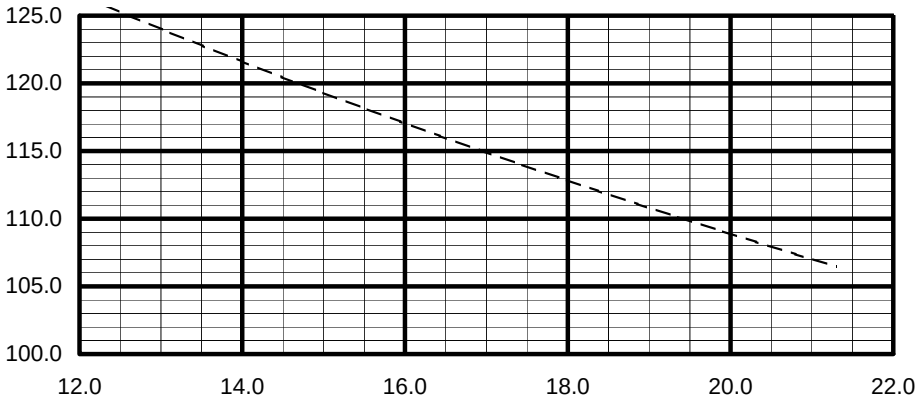
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**98**	
12.7	1/2"	**94**	
9.5	3/8"	**92**	
4.75	# 4	**80**	
2	#10	**64**	
0.85	#20	**46**	
0.425	#40	**21**	
0.25	# 60	**10**	
0.15	#100	**7**	
0.075	#200	**4.5**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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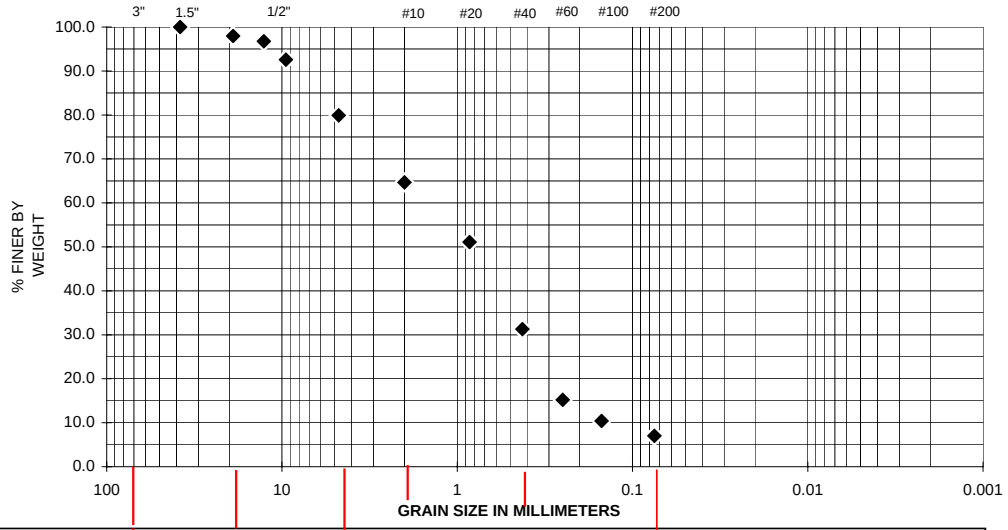
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-11**
SAMPLE NO/ DEPTH	**SA-3 (Depth 13' - 15')**
DESCRIPTION:	**Poorly grd. sand w/ silt & gravel.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**20.1**	USC:	**SP-SM**
% SAND:	**72.9**	FC:	
% SILT/CLAY:	**7.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**13.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

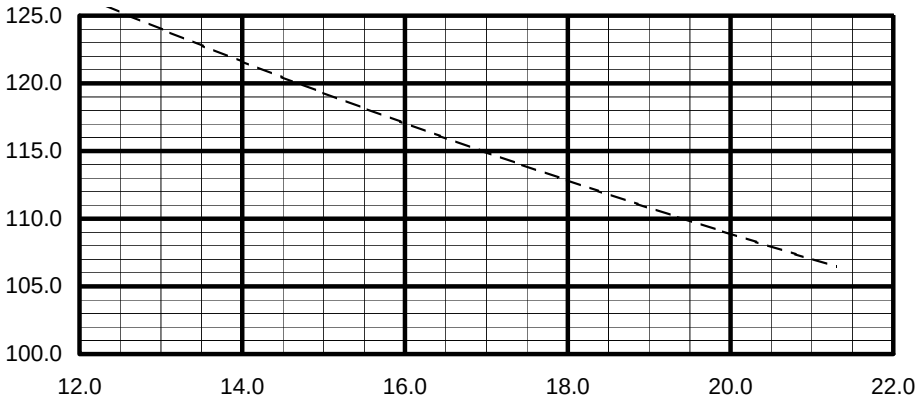
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**98**	
12.7	1/2"	**97**	
9.5	3/8"	**93**	
4.75	# 4	**80**	
2	#10	**65**	
0.85	#20	**51**	
0.425	#40	**31**	
0.25	# 60	**15**	
0.15	#100	**10**	
0.075	#200	**7.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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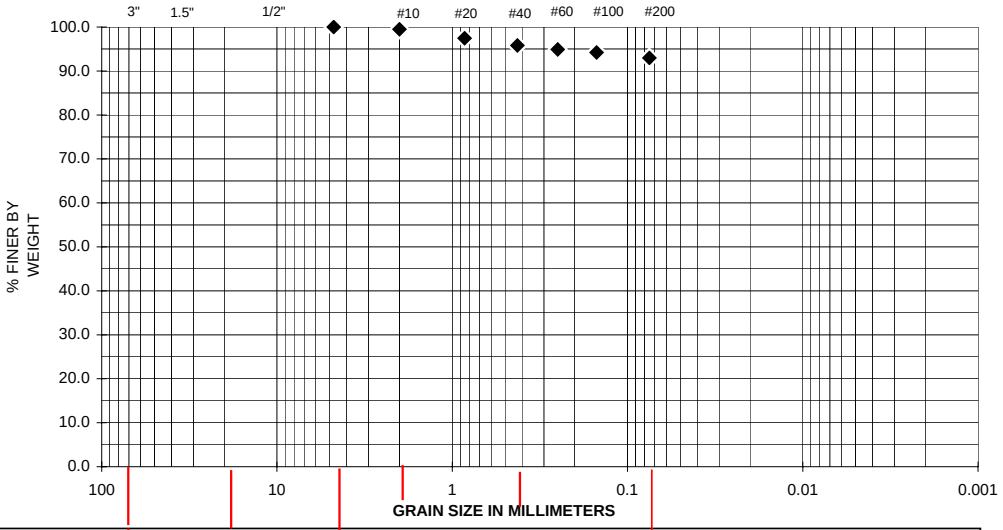
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-11**
SAMPLE NO/ DEPTH	**SA-5 (Depth 23' - 25')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**7.0**	FC:	
% SILT/CLAY:	**93.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

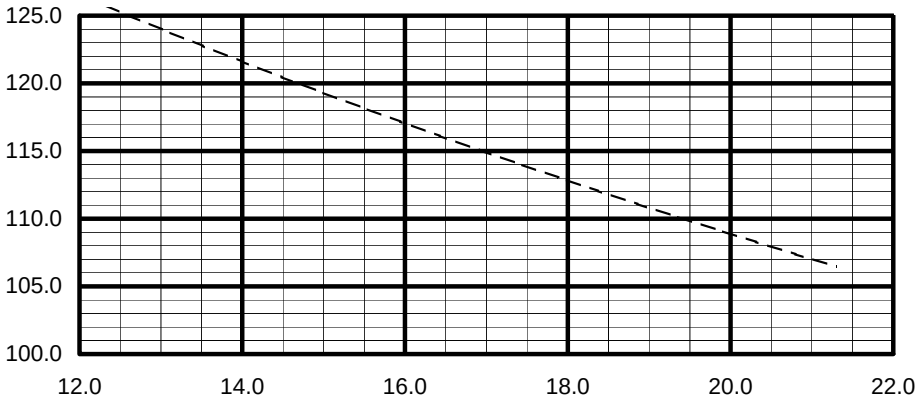
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**97**	
0.425	#40	**96**	
0.25	# 60	**95**	
0.15	#100	**94**	
0.075	#200	**93.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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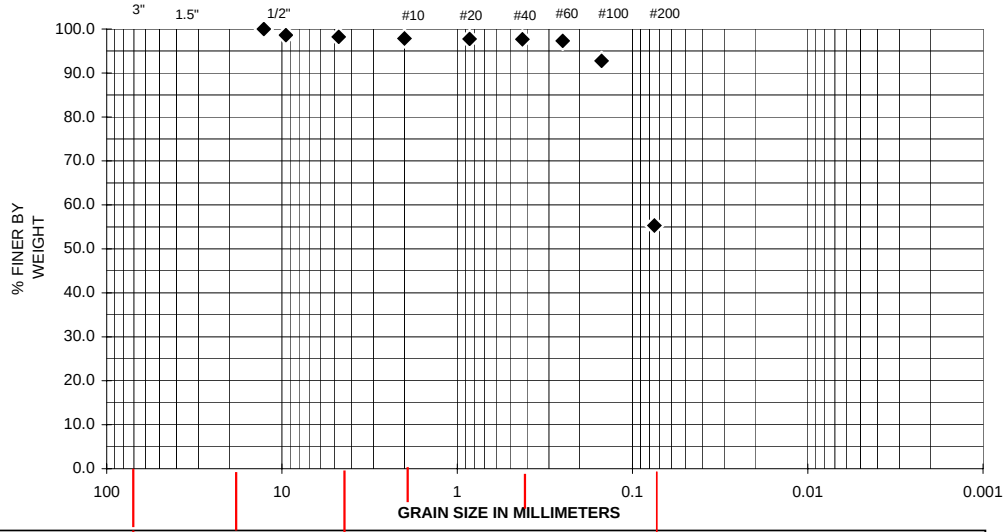
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-12**
SAMPLE NO/ DEPTH	**SA-1 (Depth 5' - 7')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**1.8**	USC:	**ML**
% SAND:	**42.9**	FC:	
% SILT/CLAY:	**55.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

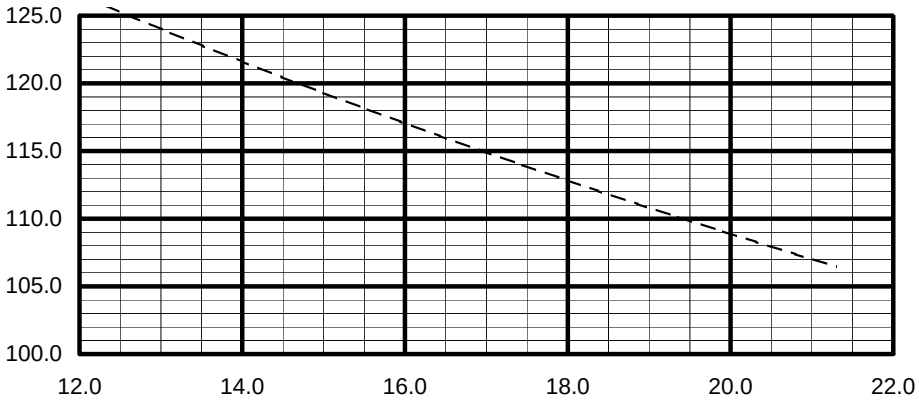
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**99**	
4.75	# 4	**98**	
2	#10	**98**	
0.85	#20	**98**	
0.425	#40	**98**	
0.25	# 60	**97**	
0.15	#100	**93**	
0.075	#200	**55.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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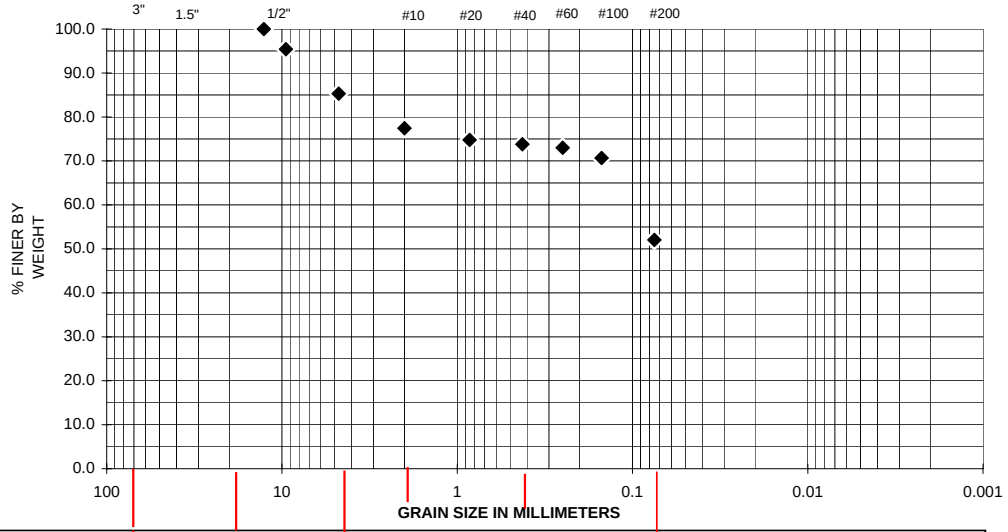
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-12**
SAMPLE NO/ DEPTH	**SA-2 (Depth 10' - 12')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**14.7**	USC:	**ML**
% SAND:	**33.3**	FC:	
% SILT/CLAY:	**52.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**28.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

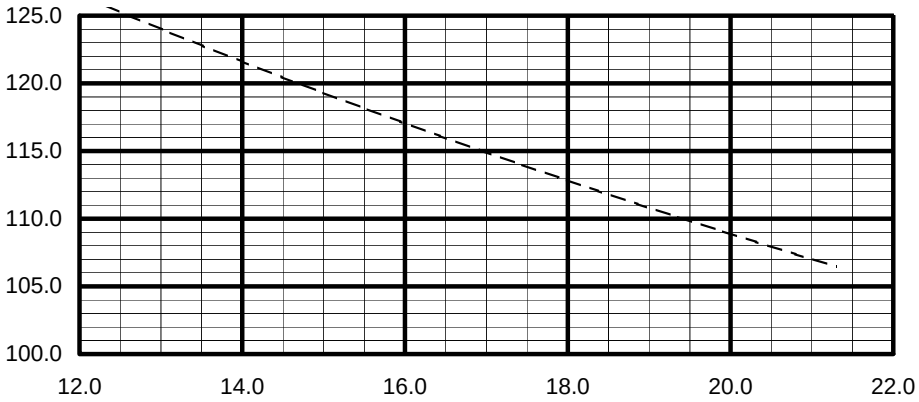
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**95**	
4.75	# 4	**85**	
2	#10	**77**	
0.85	#20	**75**	
0.425	#40	**74**	
0.25	# 60	**73**	
0.15	#100	**71**	
0.075	#200	**52.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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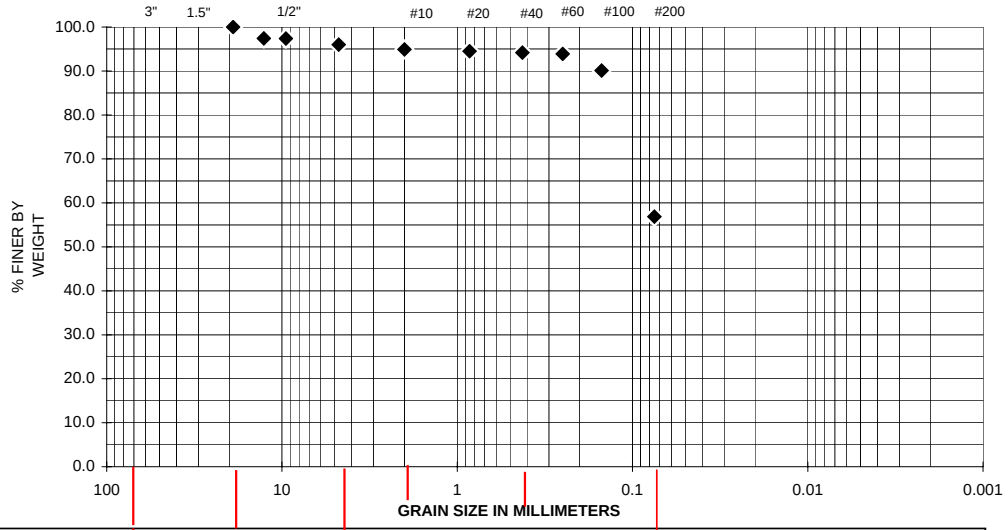
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-12**
SAMPLE NO/ DEPTH	**SA-5 (Depth 25' - 27')**
DESCRIPTION:	**Sandy Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**4.0**	USC:	**ML**
% SAND:	**39.1**	FC:	
% SILT/CLAY:	**56.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**23.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

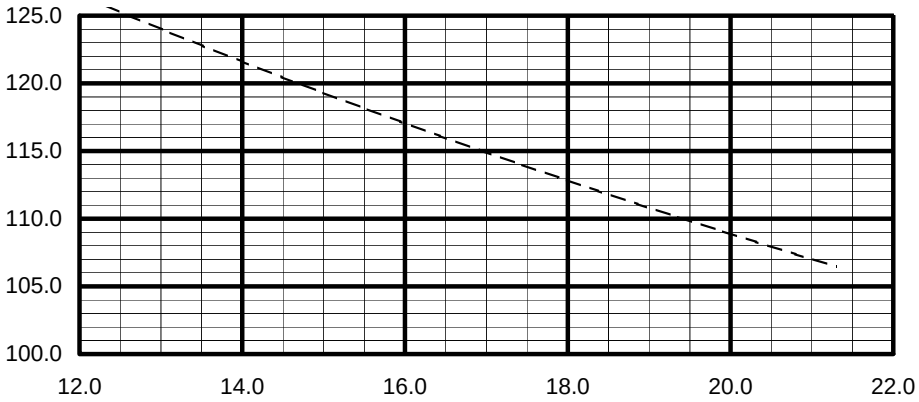
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"	**100**	
12.7	1/2"	**97**	
9.5	3/8"	**97**	
4.75	# 4	**96**	
2	#10	**95**	
0.85	#20	**94**	
0.425	#40	**94**	
0.25	# 60	**94**	
0.15	#100	**90**	
0.075	#200	**56.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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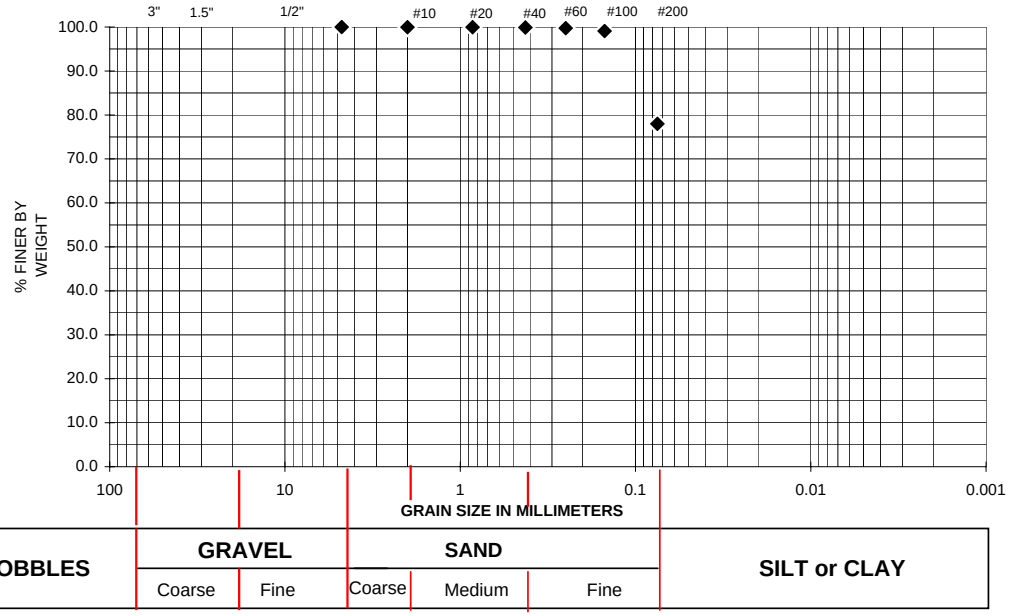
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-14**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 5')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**22.0**	FC:	
% SILT/CLAY:	**78.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**32.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

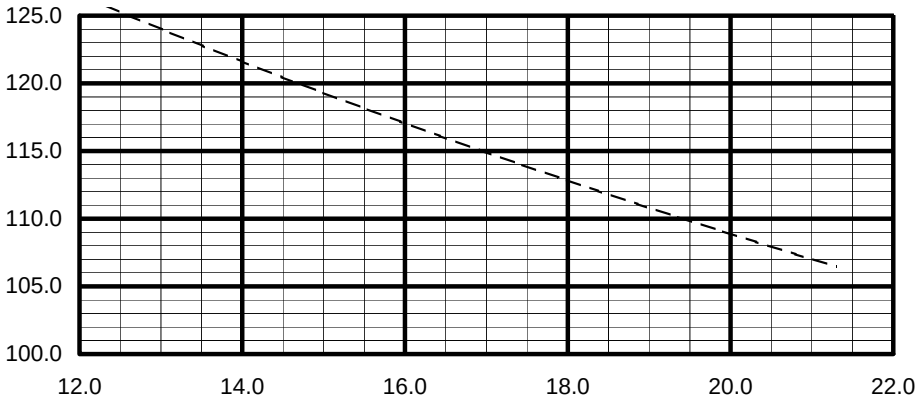
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**78.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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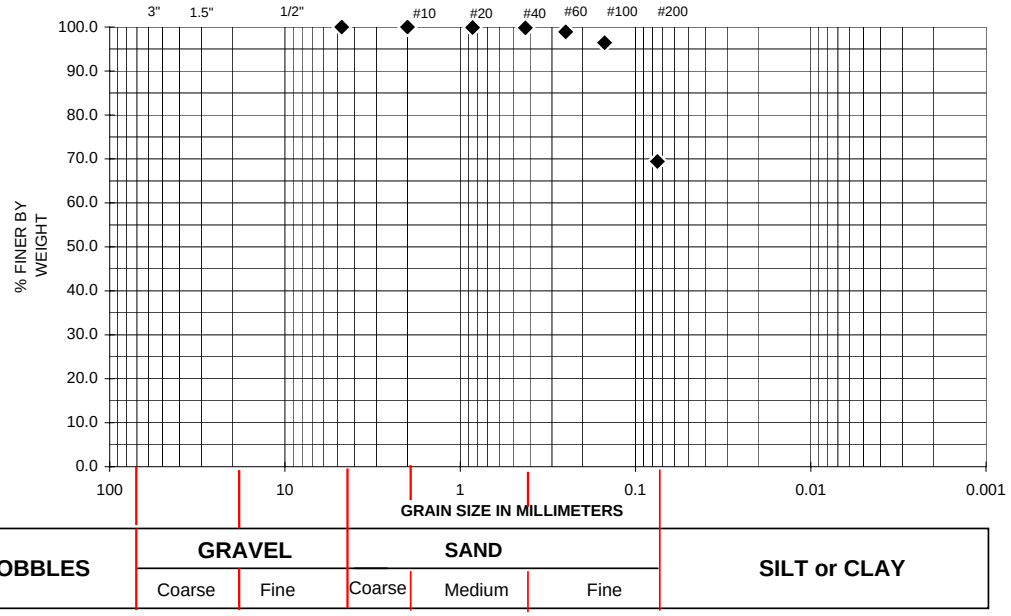
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-14**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**30.6**	FC:	
% SILT/CLAY:	**69.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**32.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

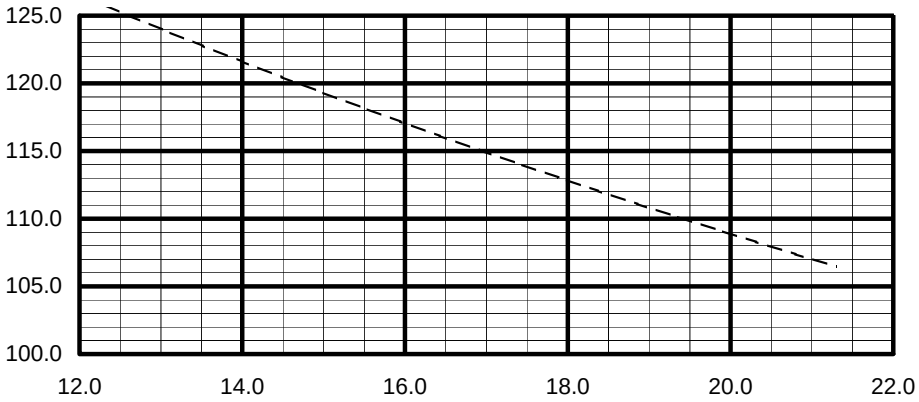
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**96**	
0.075	#200	**69.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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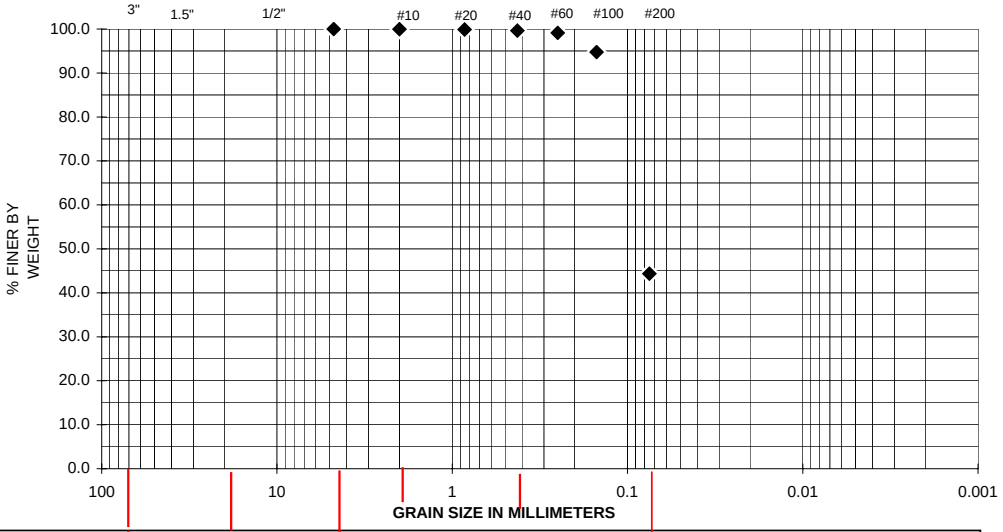
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-14**
SAMPLE NO/ DEPTH	**SA-3 (Depth 13' - 15')**
DESCRIPTION:	**Silty sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SM**
% SAND:	**55.6**	FC:	
% SILT/CLAY:	**44.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**31.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

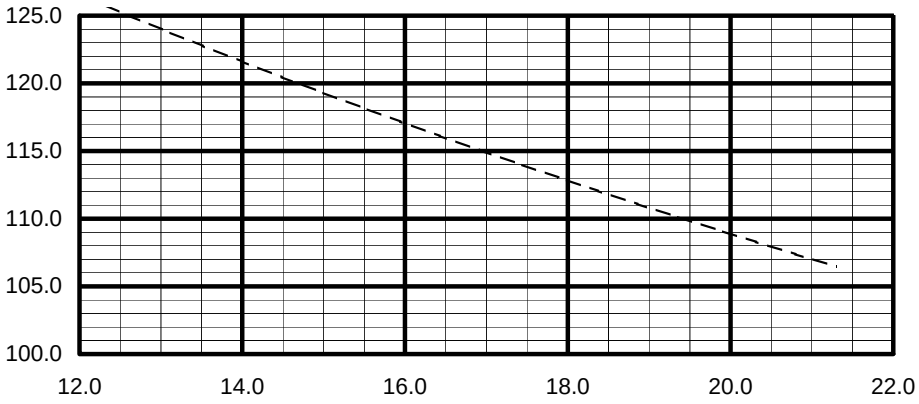
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**95**	
0.075	#200	**44.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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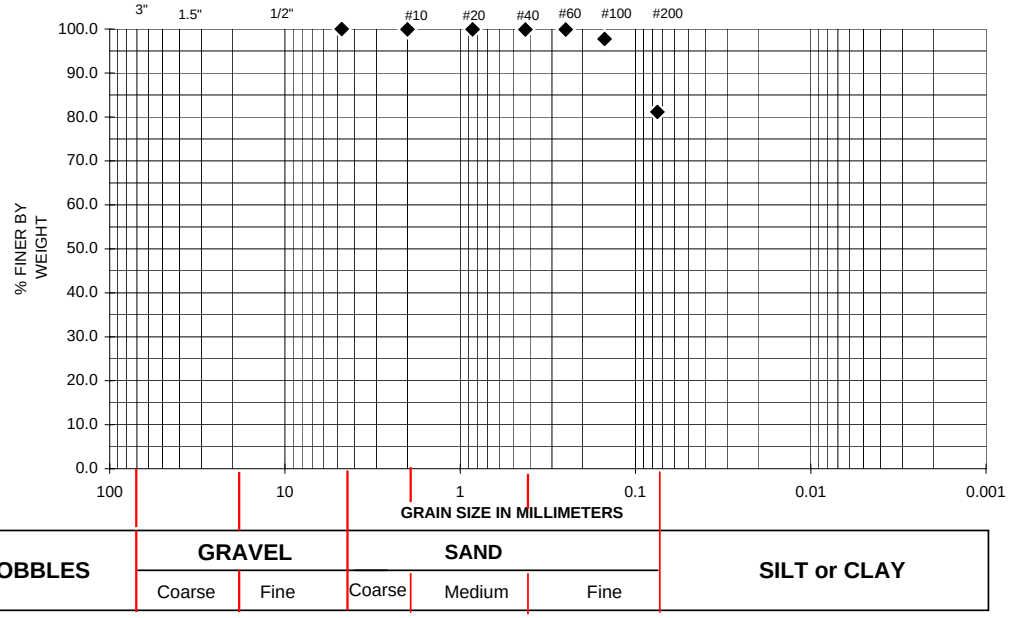
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-15**
SAMPLE NO/ DEPTH	**SA-1 (Depth 5' - 7')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**18.8**	FC:	
% SILT/CLAY:	**81.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**25.3**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

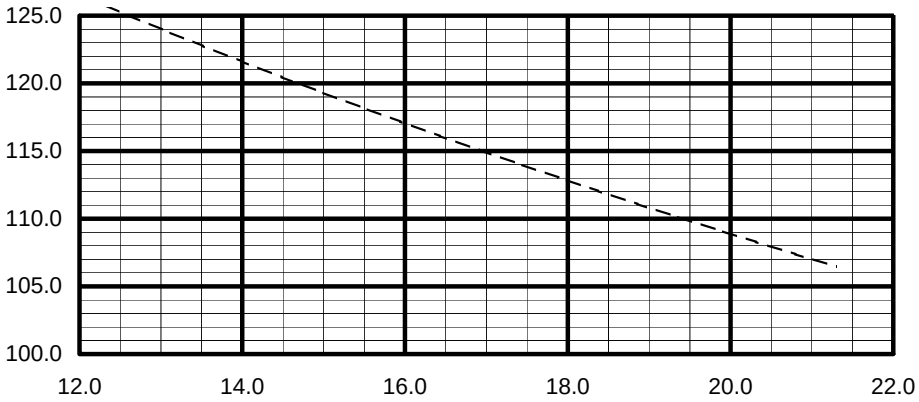
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**98**	
0.075	#200	**81.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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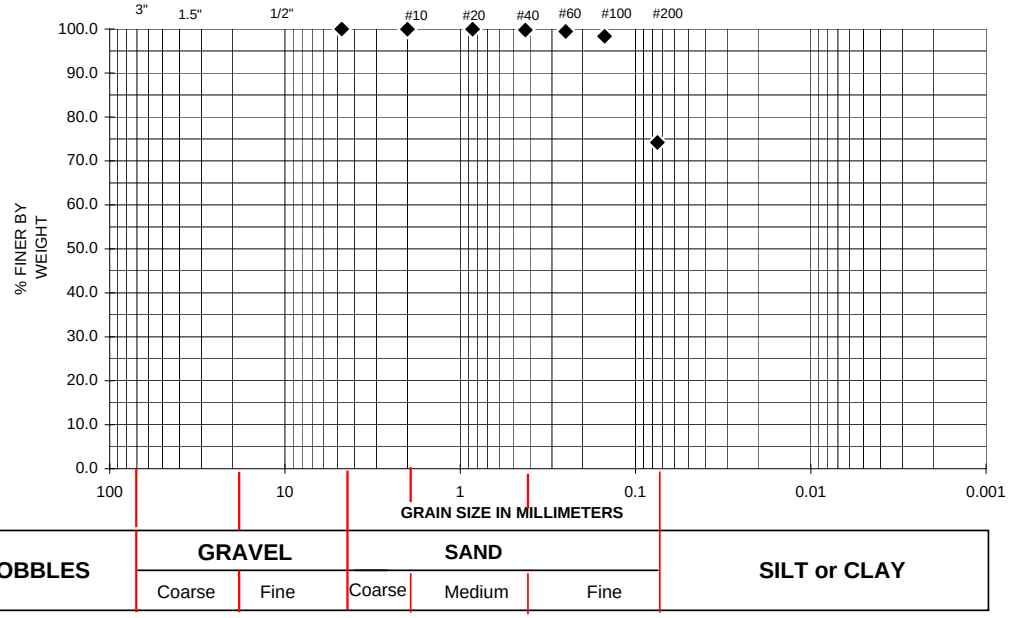
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-15**
SAMPLE NO/ DEPTH	**SA-2 (Depth 10' - 12')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**25.8**	FC:	
% SILT/CLAY:	**74.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**32.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

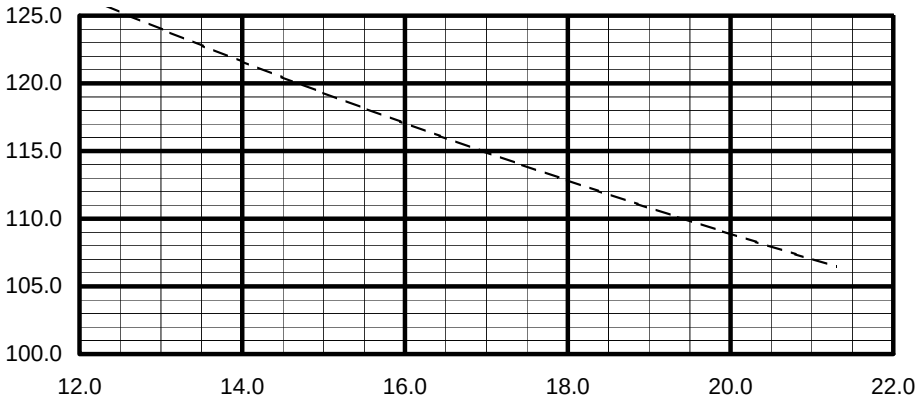
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**74.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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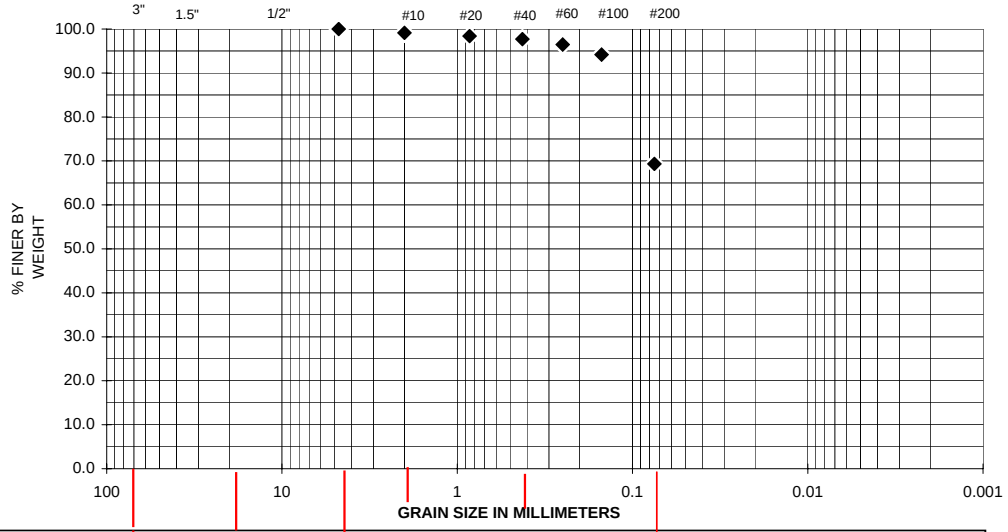
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-15**
SAMPLE NO/ DEPTH	**SA-3 (Depth 15' - 17')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**30.7**	FC:	
% SILT/CLAY:	**69.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**39.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

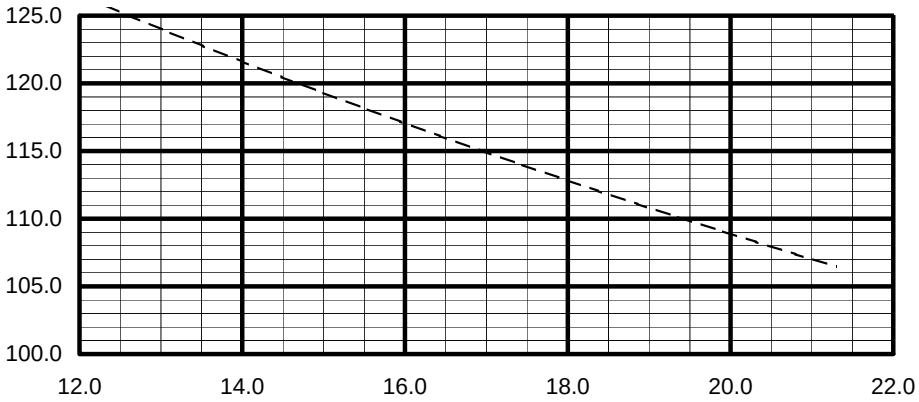
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**98**	
0.425	#40	**98**	
0.25	# 60	**96**	
0.15	#100	**94**	
0.075	#200	**69.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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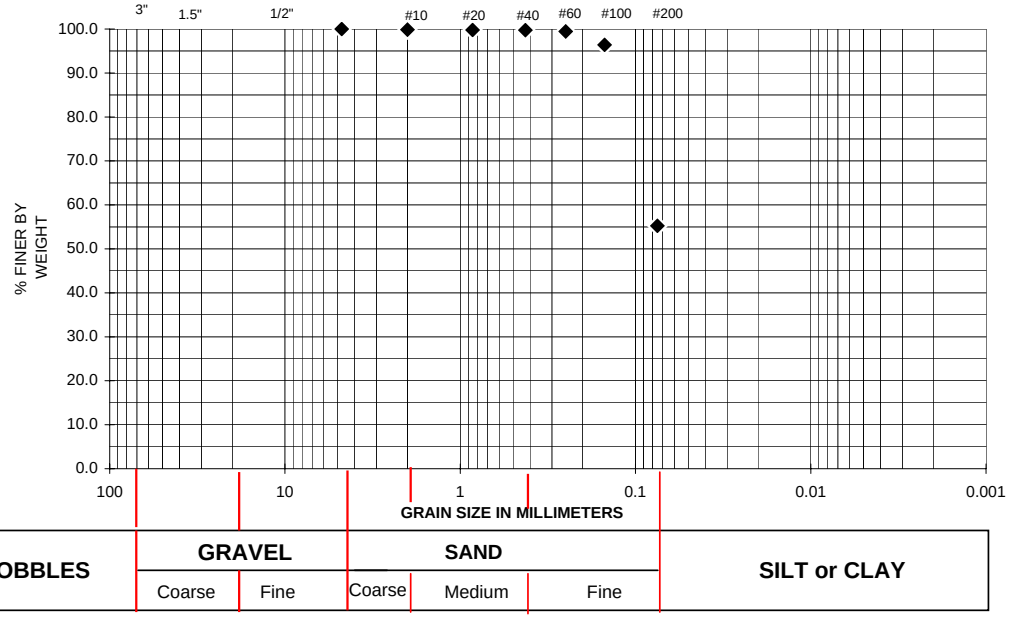
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-16**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 5')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**44.8**	FC:	
% SILT/CLAY:	**55.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**29.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

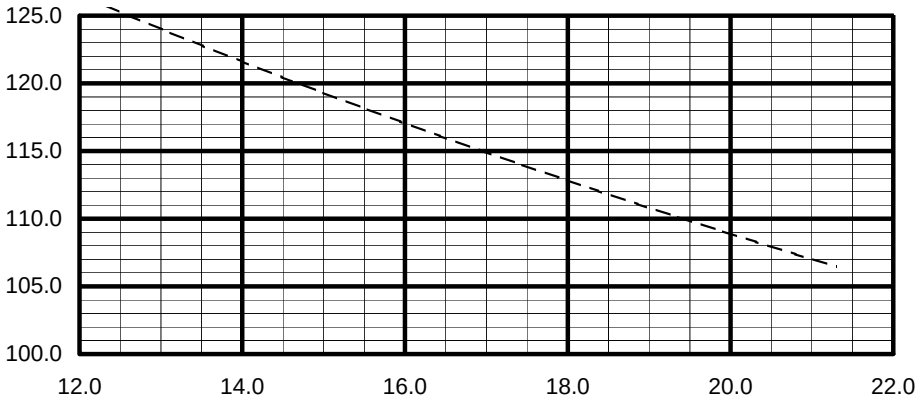
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**96**	
0.075	#200	**55.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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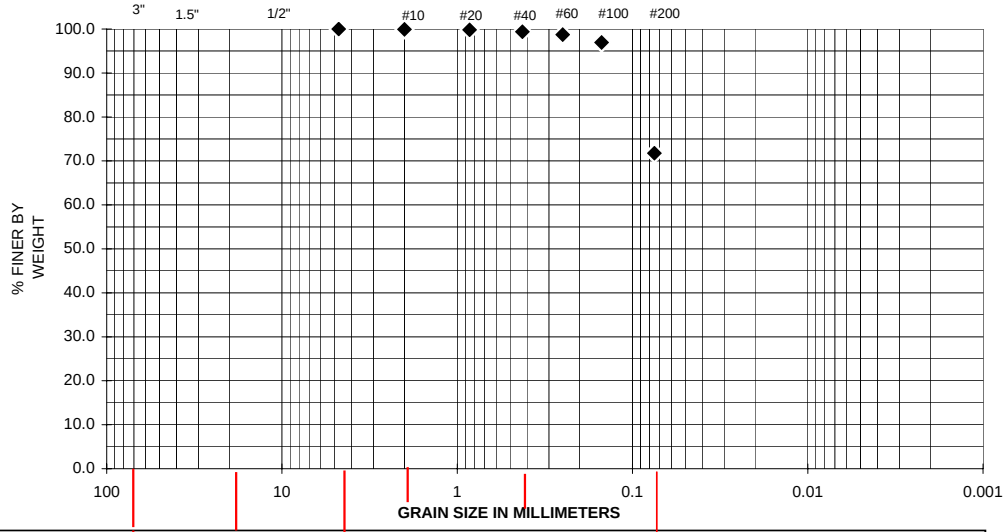
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-16**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**28.2**	FC:	
% SILT/CLAY:	**71.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**32.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

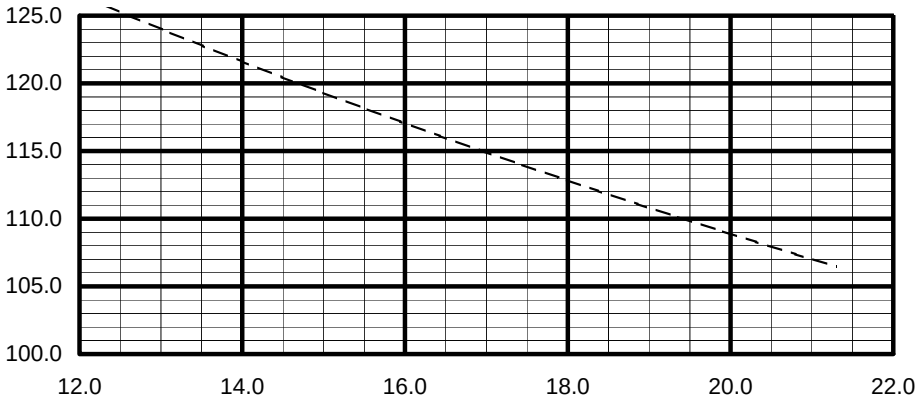
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**99**	
0.25	# 60	**99**	
0.15	#100	**97**	
0.075	#200	**71.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
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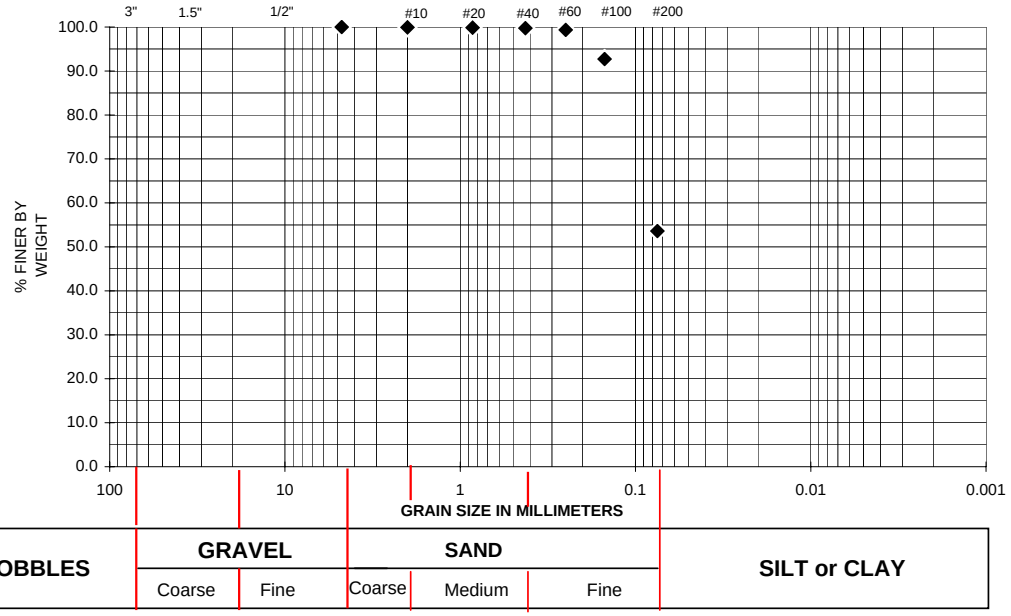
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-16**
SAMPLE NO/ DEPTH	**SA-6 (Depth 28' - 30')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**46.4**	FC:	
% SILT/CLAY:	**53.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**22.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

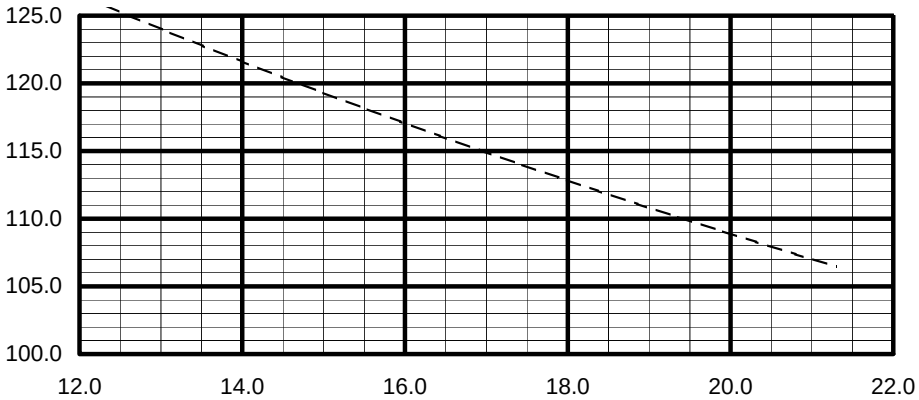
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**93**	
0.075	#200	**53.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
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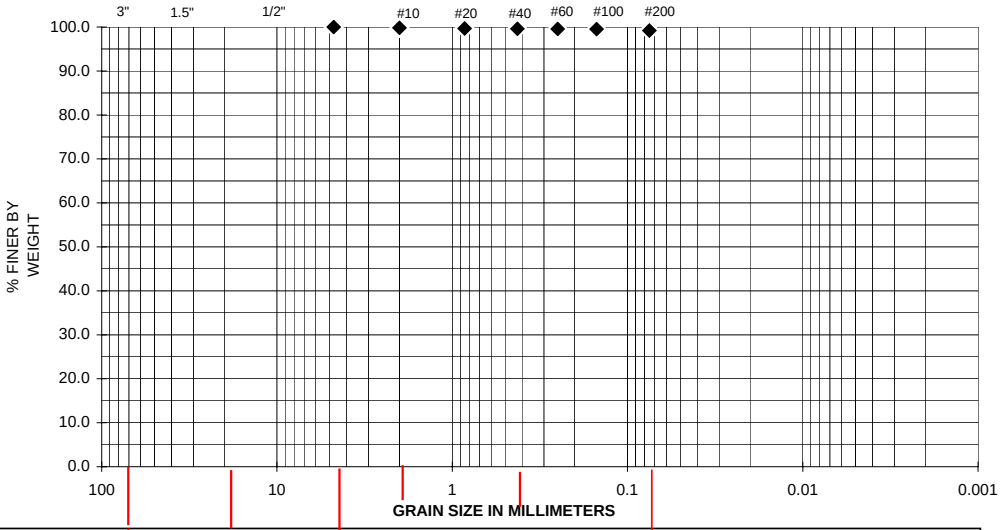
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-17**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 5')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**0.8**	FC:	
% SILT/CLAY:	**99.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

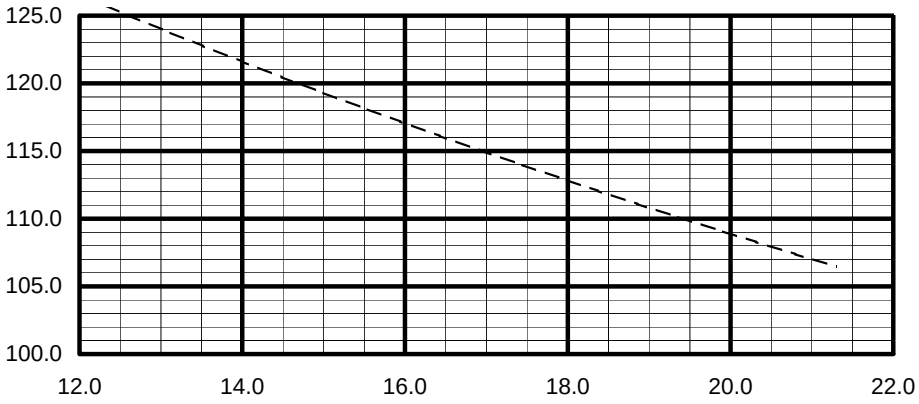
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**100**	
0.075	#200	**99.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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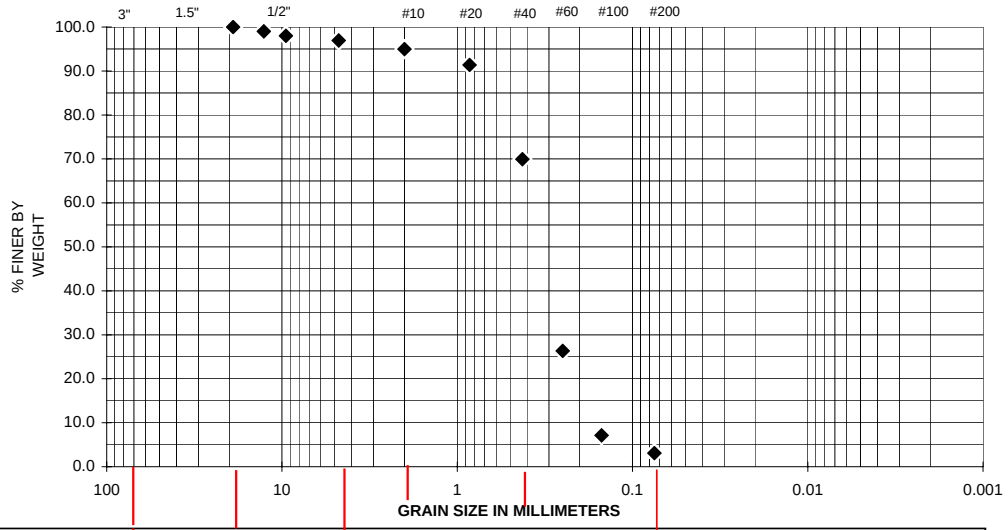
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-18**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 5')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**3.1**	USC:	**SP**
% SAND:	**93.8**	FC:	
% SILT/CLAY:	**3.1**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**21.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

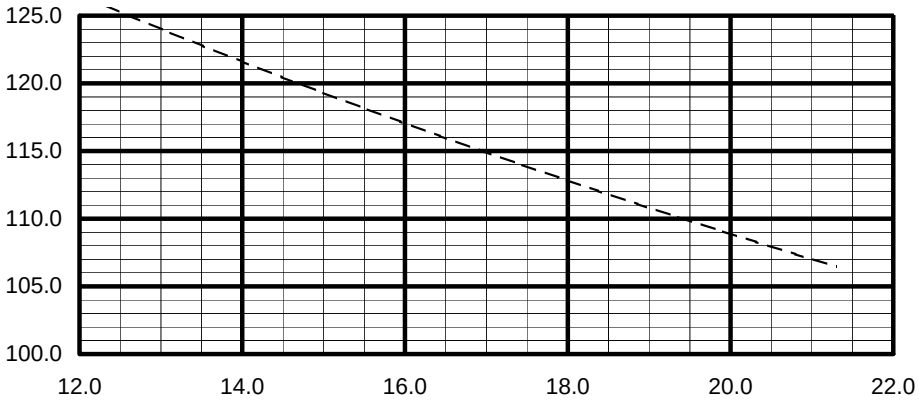
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"	**100**	
12.7	1/2"	**99**	
9.5	3/8"	**98**	
4.75	# 4	**97**	
2	#10	**95**	
0.85	#20	**91**	
0.425	#40	**70**	
0.25	# 60	**26**	
0.15	#100	**7**	
0.075	#200	**3.1**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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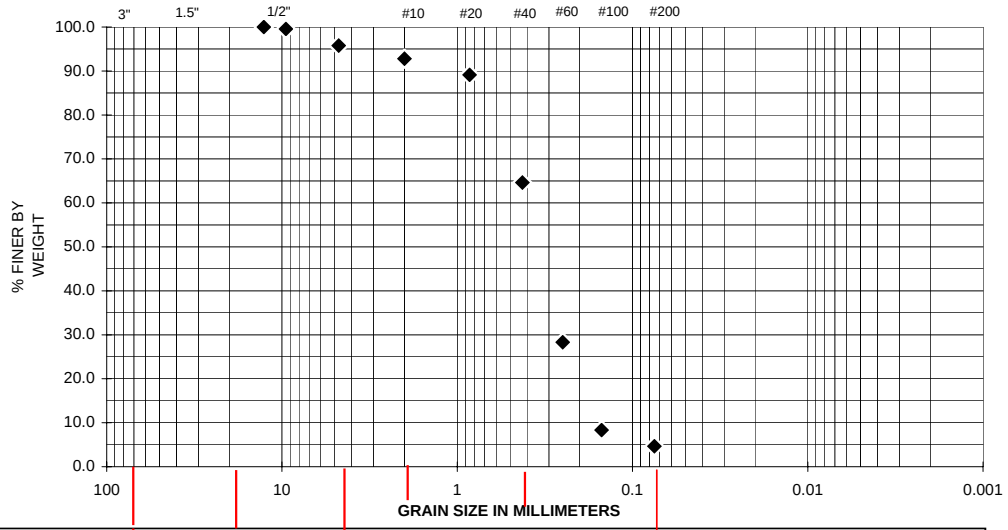
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-18**
SAMPLE NO/ DEPTH	**SA-2 (Depth 5' - 7')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**4.2**	USC:	**SP**
% SAND:	**91.1**	FC:	
% SILT/CLAY:	**4.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**24.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

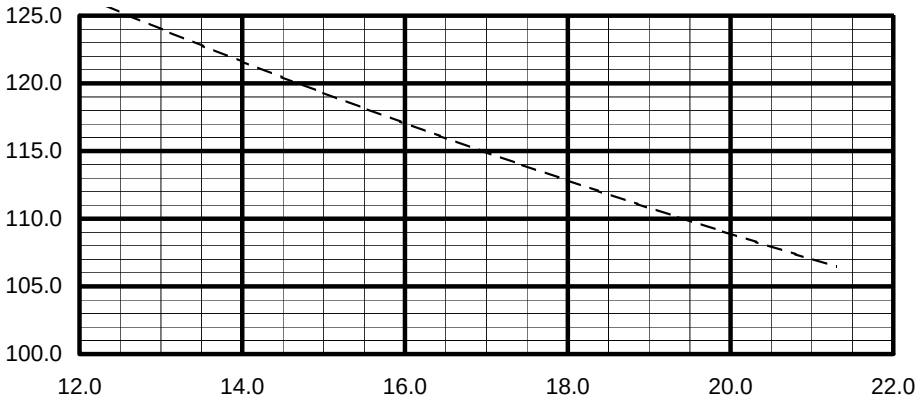
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**100**	
4.75	# 4	**96**	
2	#10	**93**	
0.85	#20	**89**	
0.425	#40	**65**	
0.25	# 60	**28**	
0.15	#100	**8**	
0.075	#200	**4.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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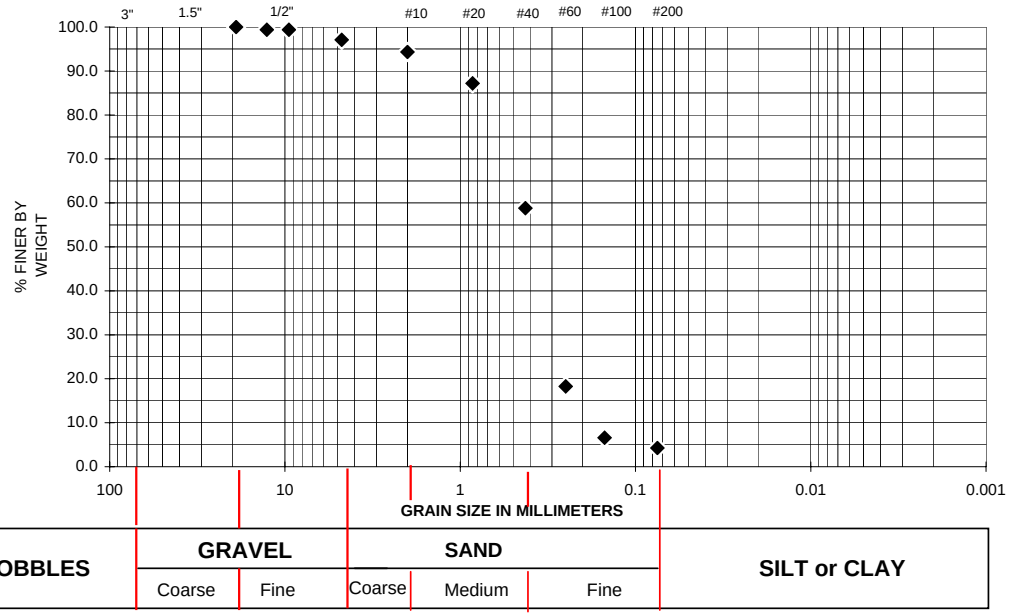
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-18**
SAMPLE NO/ DEPTH	**SA-3 (Depth 10' - 12')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**2.9**	USC:	**SP**
% SAND:	**92.8**	FC:	
% SILT/CLAY:	**4.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**20.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

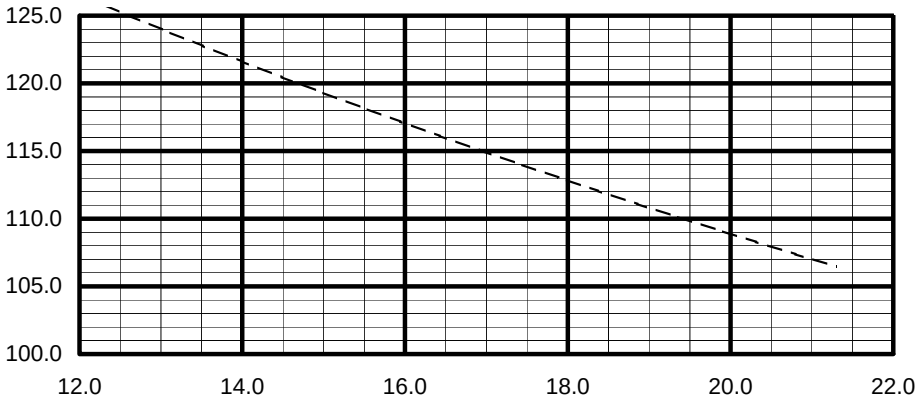
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"	**100**	
12.7	1/2"	**99**	
9.5	3/8"	**99**	
4.75	# 4	**97**	
2	#10	**94**	
0.85	#20	**87**	
0.425	#40	**59**	
0.25	# 60	**18**	
0.15	#100	**7**	
0.075	#200	**4.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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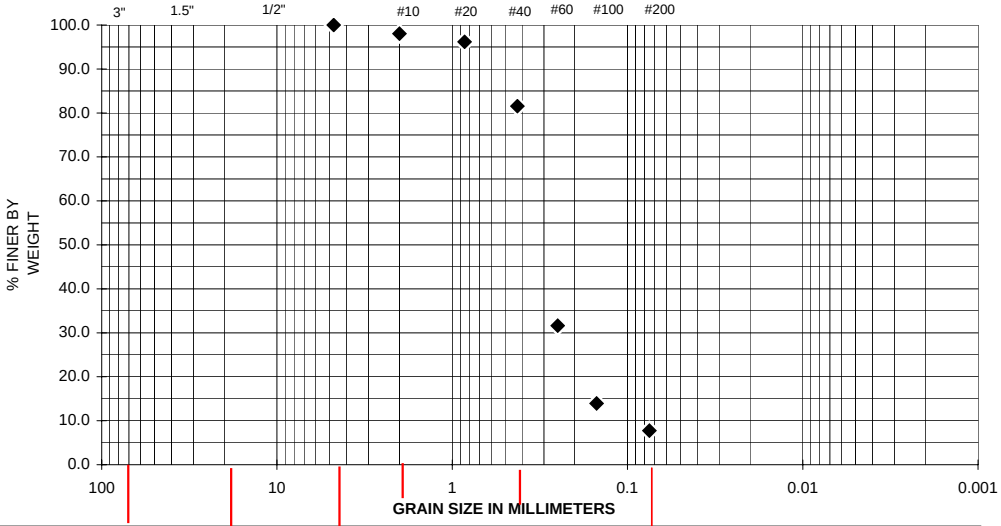
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-18**
SAMPLE NO/ DEPTH	**SA-6 (Depth 25' - 27')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SP-SM**
% SAND:	**92.2**	FC:	
% SILT/CLAY:	**7.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**18.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

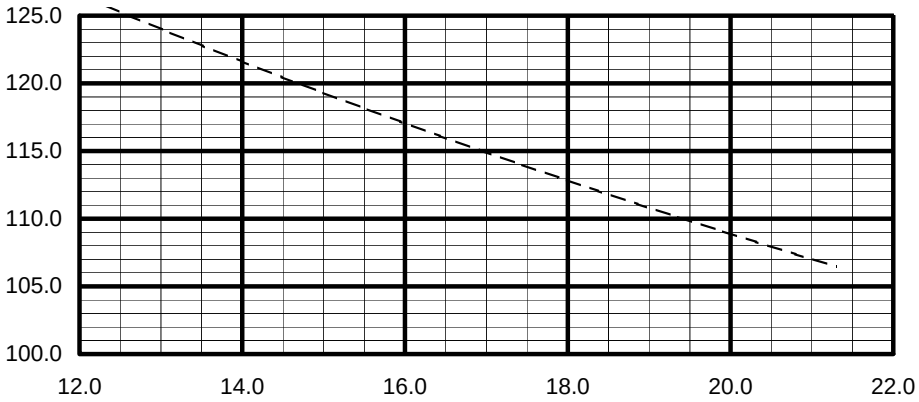
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**98**	
0.85	#20	**96**	
0.425	#40	**82**	
0.25	# 60	**32**	
0.15	#100	**14**	
0.075	#200	**7.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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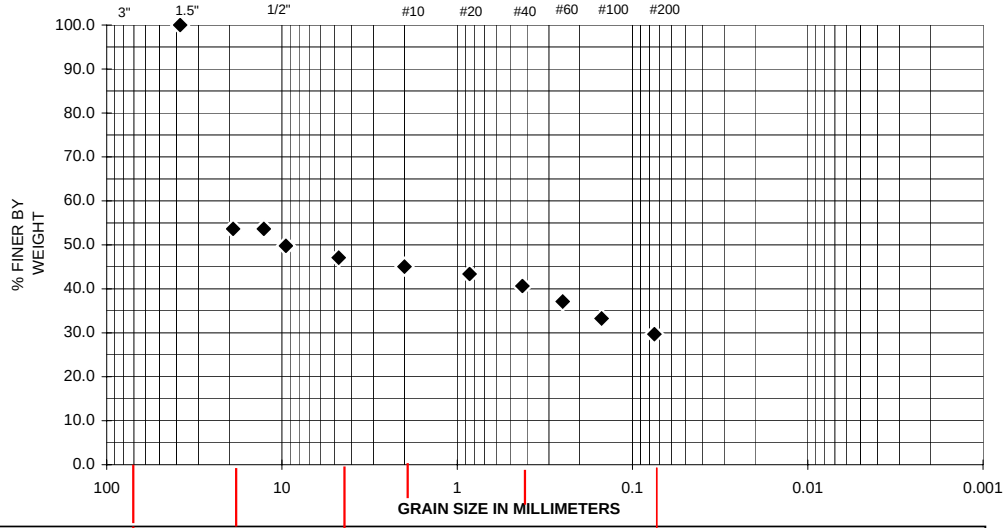
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-19**
SAMPLE NO/ DEPTH	**SA-2 (Depth 7.5' - 9.5')**
DESCRIPTION:	**Silty gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**52.9**	USC:	**GM**
% SAND:	**17.4**	FC:	
% SILT/CLAY:	**29.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**9.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

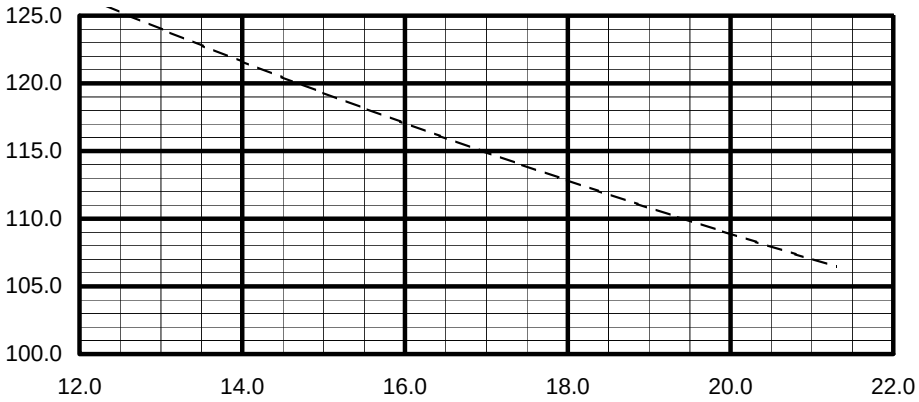
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**54**	
12.7	1/2"	**54**	
9.5	3/8"	**50**	
4.75	# 4	**47**	
2	#10	**45**	
0.85	#20	**43**	
0.425	#40	**41**	
0.25	# 60	**37**	
0.15	#100	**33**	
0.075	#200	**29.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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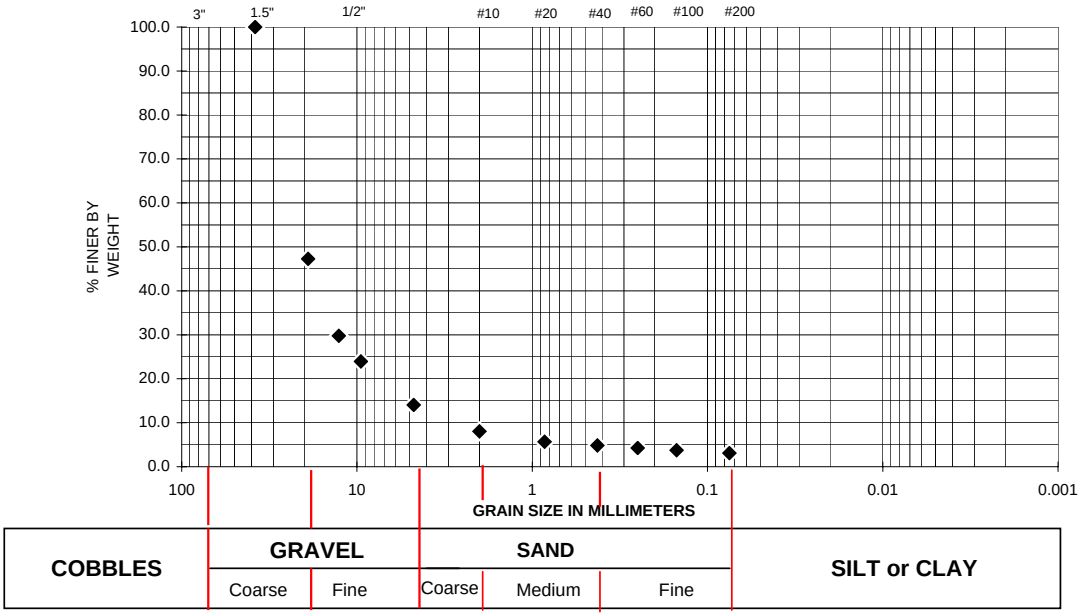
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-19**
SAMPLE NO/ DEPTH	**SA-3B (Depth 14' - 14.5')**
DESCRIPTION:	**Well grd. gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**86.0**	USC:	**GW**
% SAND:	**10.9**	FC:	
% SILT/CLAY:	**3.1**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**4.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

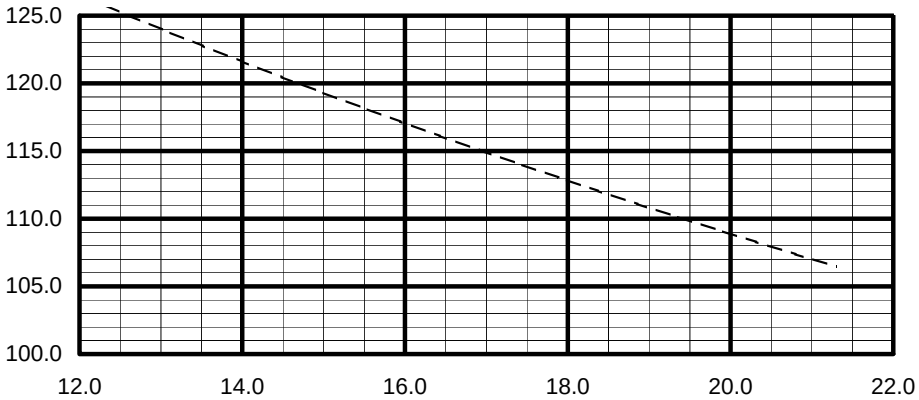
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**47**	
12.7	1/2"	**30**	
9.5	3/8"	**24**	
4.75	# 4	**14**	
2	#10	**8**	
0.85	#20	**6**	
0.425	#40	**5**	
0.25	# 60	**4**	
0.15	#100	**4**	
0.075	#200	**3.1**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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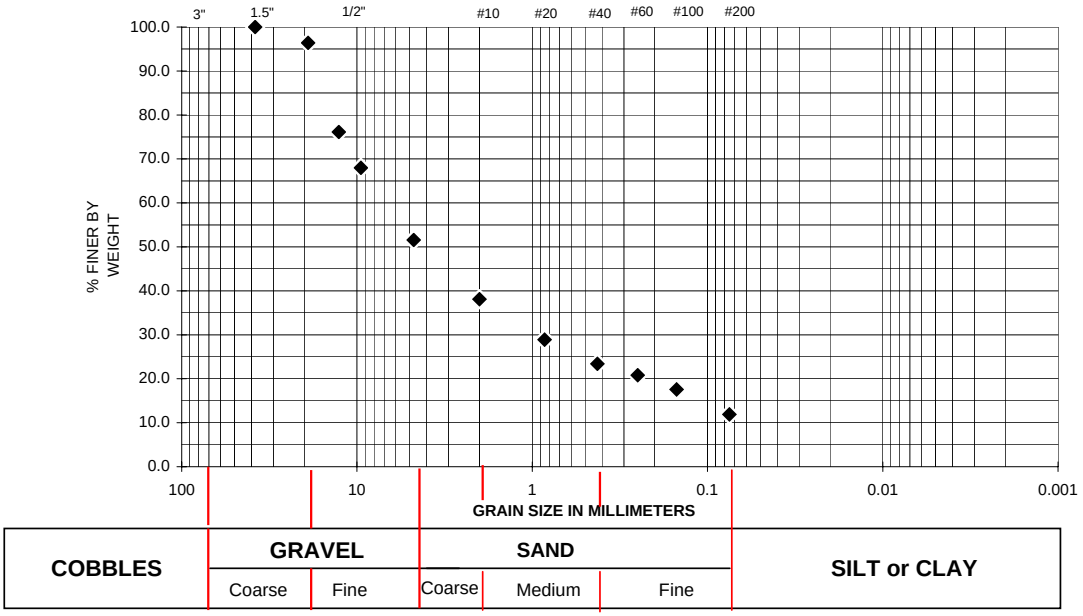
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-20**
SAMPLE NO/ DEPTH	**SA-1 (Depth 2' - 4')**
DESCRIPTION:	**Poorly grd. gravel w/ silt & sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**48.4**	USC:	**GP-GM**
% SAND:	**39.7**	FC:	
% SILT/CLAY:	**11.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**8.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

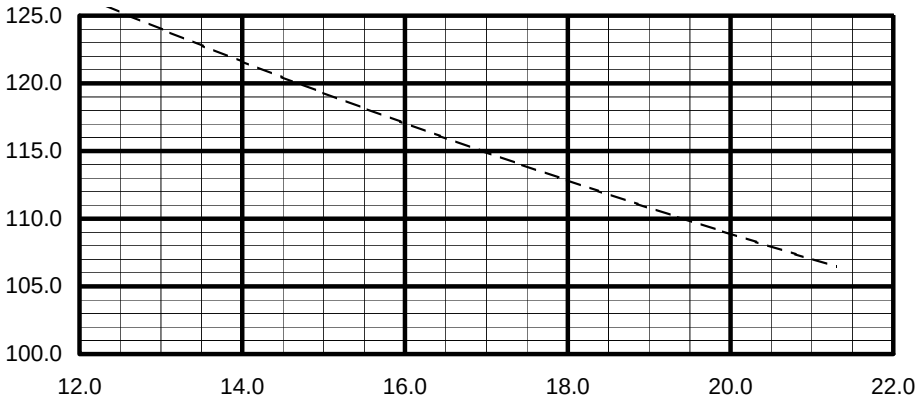
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**96**	
12.7	1/2"	**76**	
9.5	3/8"	**68**	
4.75	# 4	**52**	
2	#10	**38**	
0.85	#20	**29**	
0.425	#40	**23**	
0.25	# 60	**21**	
0.15	#100	**18**	
0.075	#200	**11.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
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Atterberg Limit ASTM 4318	

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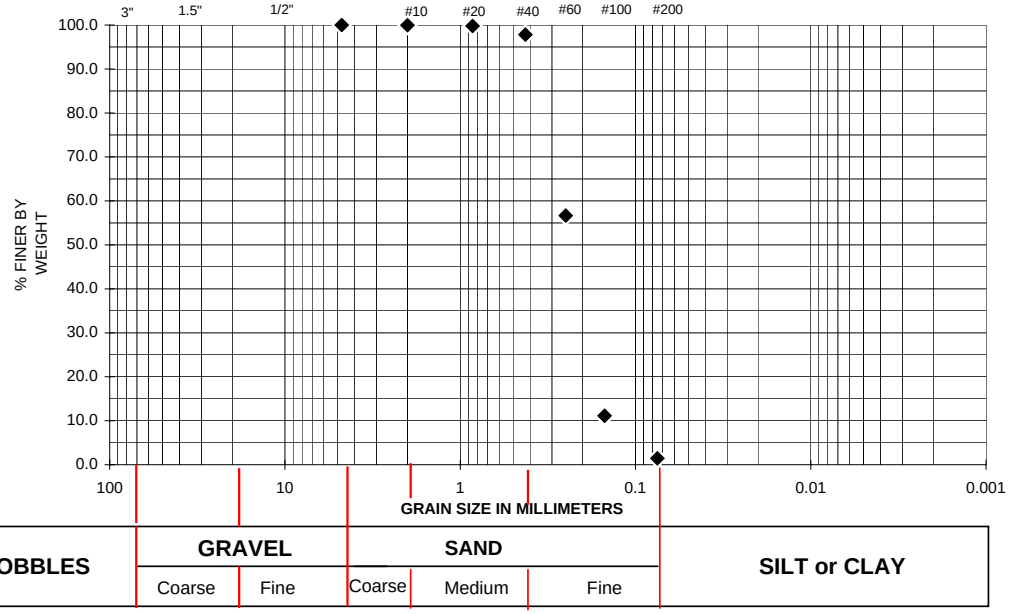
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-20**
SAMPLE NO/ DEPTH	**SA-7 (Depth 32' - 33.4')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SP**
% SAND:	**98.5**	FC:	
% SILT/CLAY:	**1.5**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**6.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

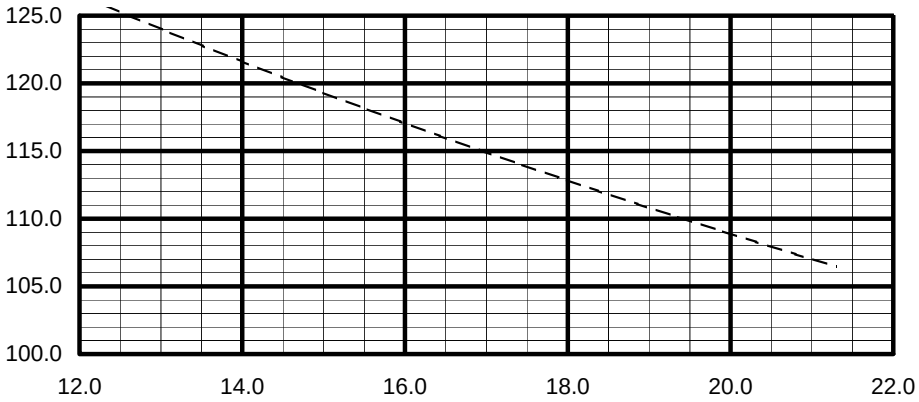
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**98**	
0.25	# 60	**57**	
0.15	#100	**11**	
0.075	#200	**1.5**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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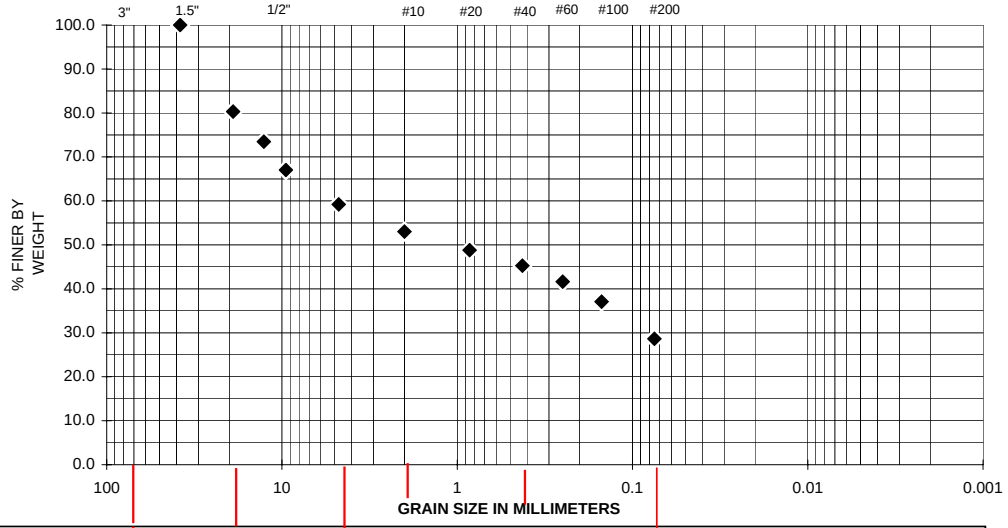
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-21**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Silty gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**40.8**	USC:	**GM**
% SAND:	**30.6**	FC:	
% SILT/CLAY:	**28.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**9.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

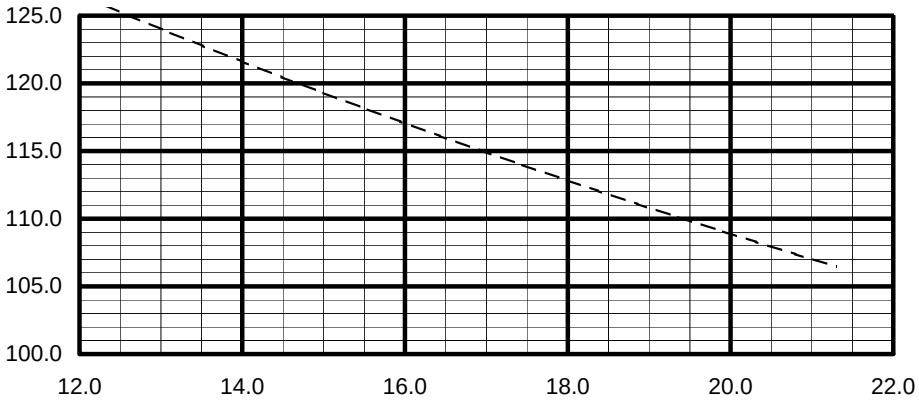
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**80**	
12.7	1/2"	**73**	
9.5	3/8"	**67**	
4.75	# 4	**59**	
2	#10	**53**	
0.85	#20	**49**	
0.425	#40	**45**	
0.25	# 60	**42**	
0.15	#100	**37**	
0.075	#200	**28.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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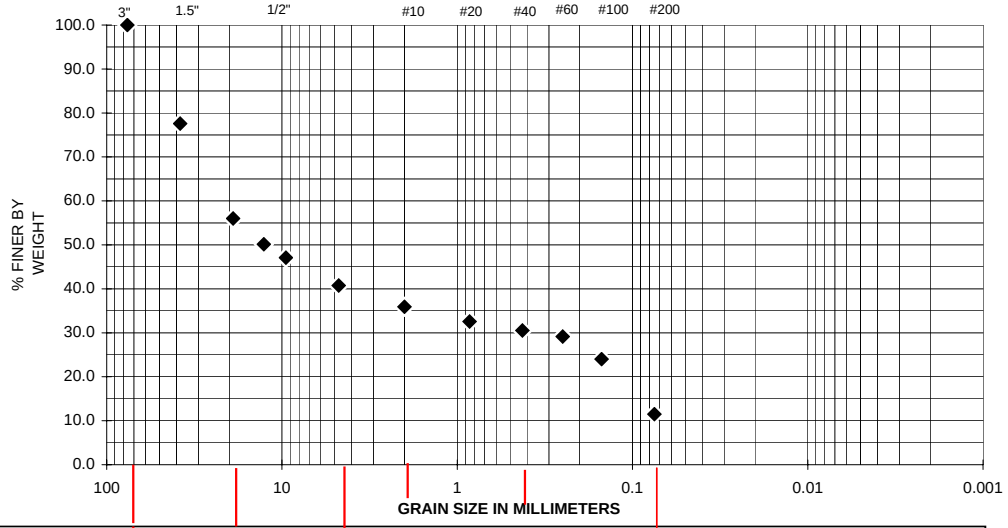
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-21**
SAMPLE NO/ DEPTH	**SA-5 (Depth 23' - 25')**
DESCRIPTION:	**Poorly grd. gravel w/ silt & sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**59.3**	USC:	**GP-GM**
% SAND:	**29.2**	FC:	
% SILT/CLAY:	**11.5**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**7.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

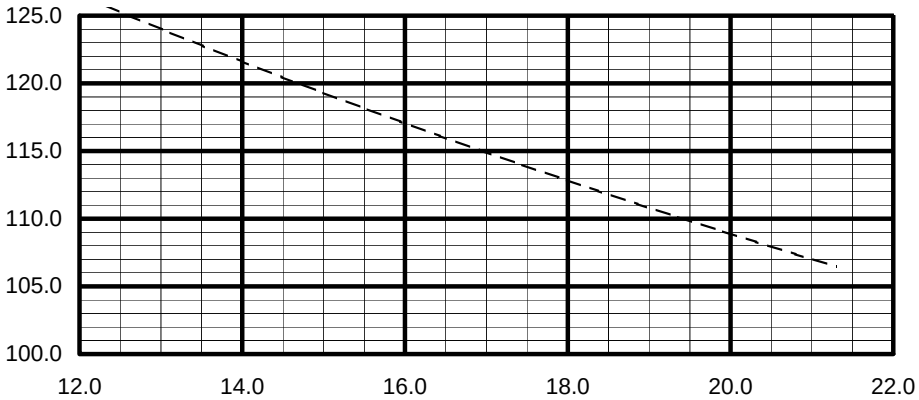
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"	**100**	
38.1	1.5"	**78**	
19.05	3/4"	**56**	
12.7	1/2"	**50**	
9.5	3/8"	**47**	
4.75	# 4	**41**	
2	#10	**36**	
0.85	#20	**33**	
0.425	#40	**31**	
0.25	# 60	**29**	
0.15	#100	**24**	
0.075	#200	**11.5**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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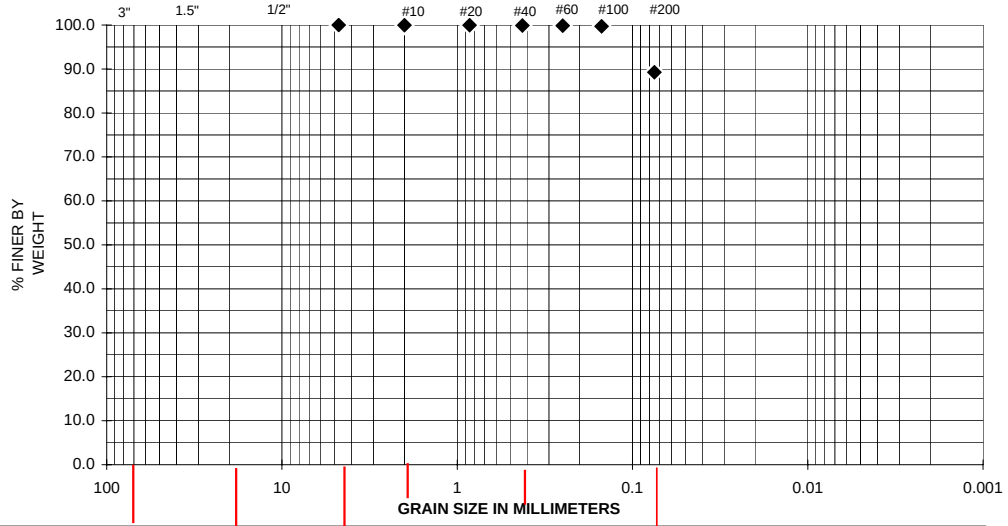
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-24**
SAMPLE NO/ DEPTH	**SA-7 (Depth 33' - 35')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**10.7**	FC:	
% SILT/CLAY:	**89.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**21.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

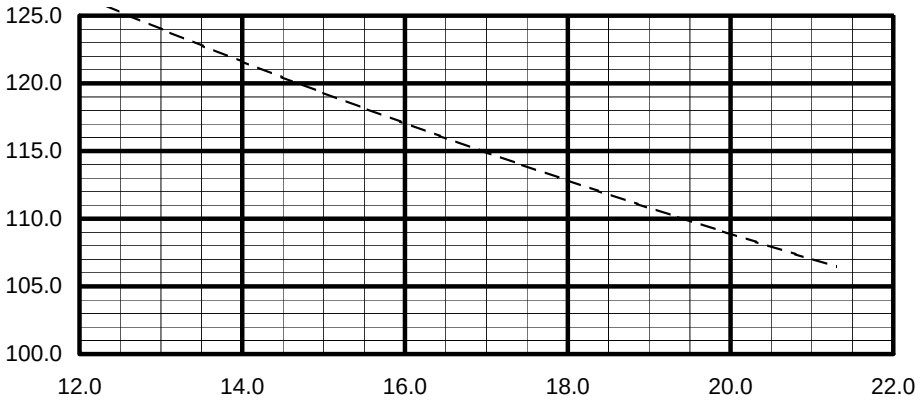
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**100**	
0.075	#200	**89.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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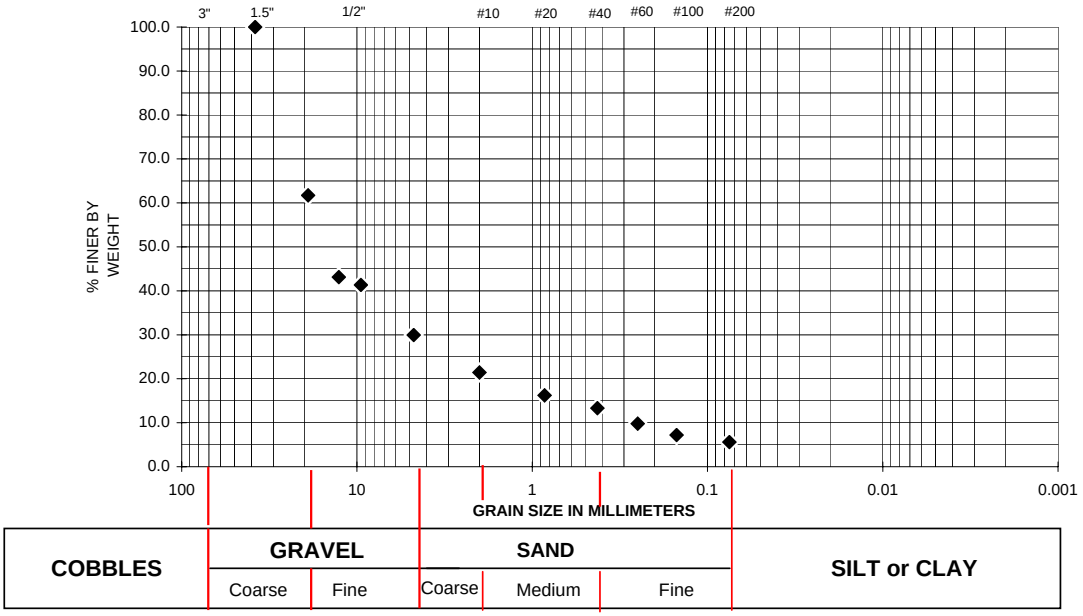
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-25**
SAMPLE NO/ DEPTH	**SA-1 (Depth 2' - 4')**
DESCRIPTION:	**Poorly grd. gravel w/ silt & sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**70.1**	USC:	**GP-GM**
% SAND:	**24.3**	FC:	
% SILT/CLAY:	**5.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**5.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

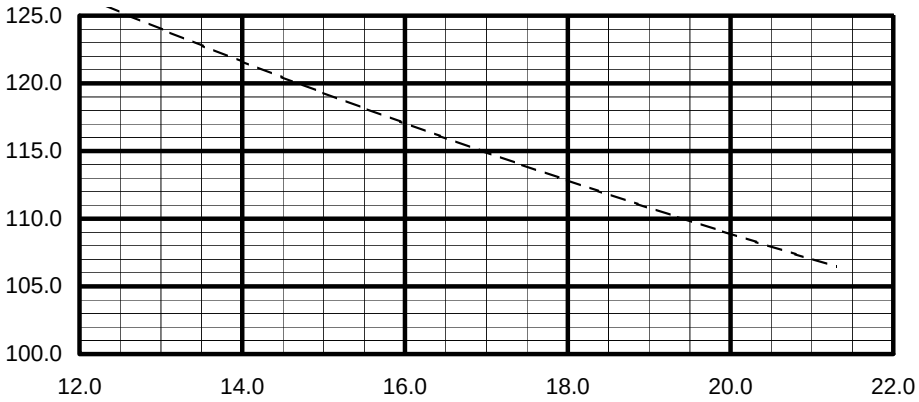
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**62**	
12.7	1/2"	**43**	
9.5	3/8"	**41**	
4.75	# 4	**30**	
2	#10	**21**	
0.85	#20	**16**	
0.425	#40	**13**	
0.25	# 60	**10**	
0.15	#100	**7**	
0.075	#200	**5.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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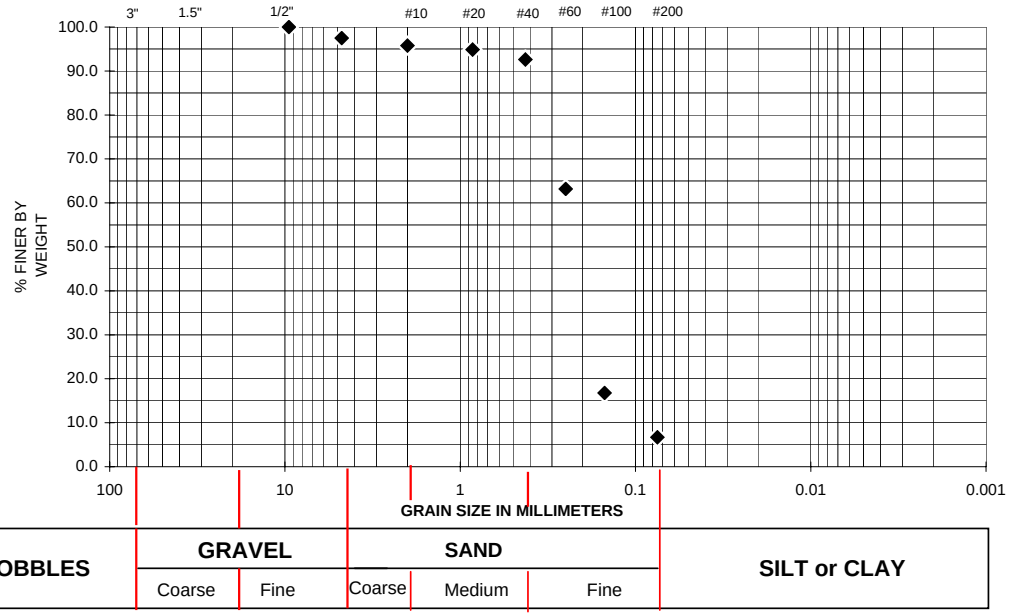
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-25**
SAMPLE NO/ DEPTH	**SA-2 (Depth 7' - 9')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**2.5**	USC:	**SP-SM**
% SAND:	**90.8**	FC:	
% SILT/CLAY:	**6.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**22.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

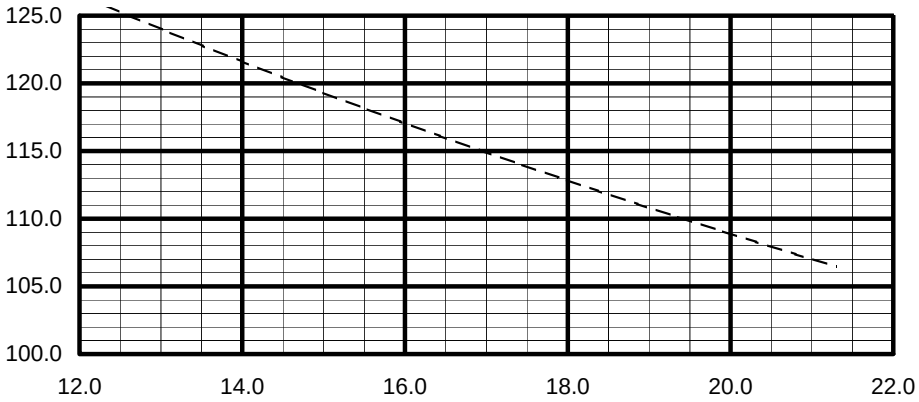
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"	**100**	
4.75	# 4	**97**	
2	#10	**96**	
0.85	#20	**95**	
0.425	#40	**93**	
0.25	# 60	**63**	
0.15	#100	**17**	
0.075	#200	**6.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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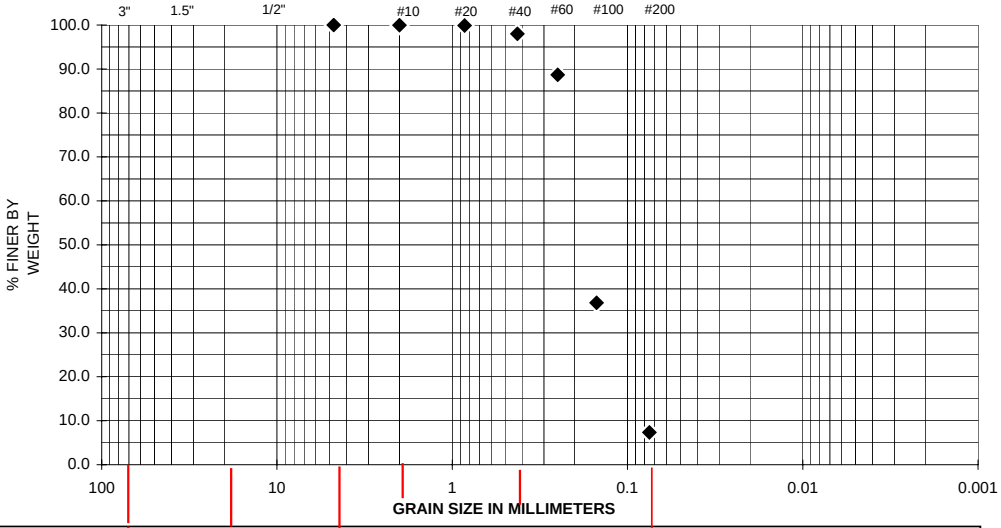
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-25**
SAMPLE NO/ DEPTH	**SA-3 (Depth 12' - 14')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SP-SM**
% SAND:	**92.6**	FC:	
% SILT/CLAY:	**7.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**23.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

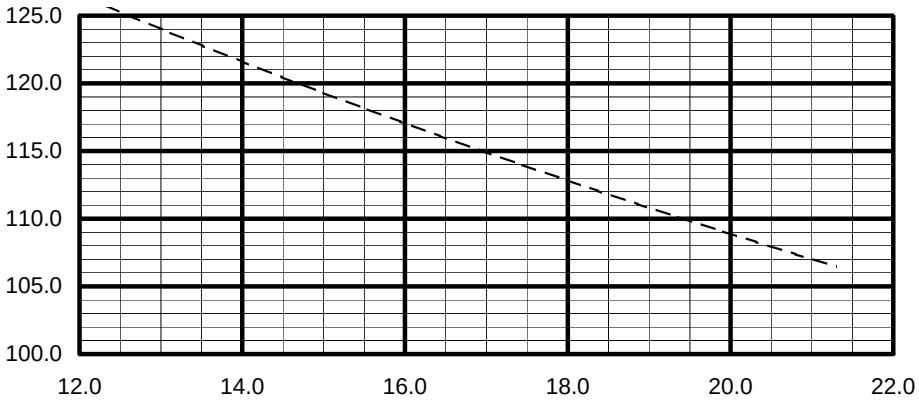
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**98**	
0.25	# 60	**89**	
0.15	#100	**37**	
0.075	#200	**7.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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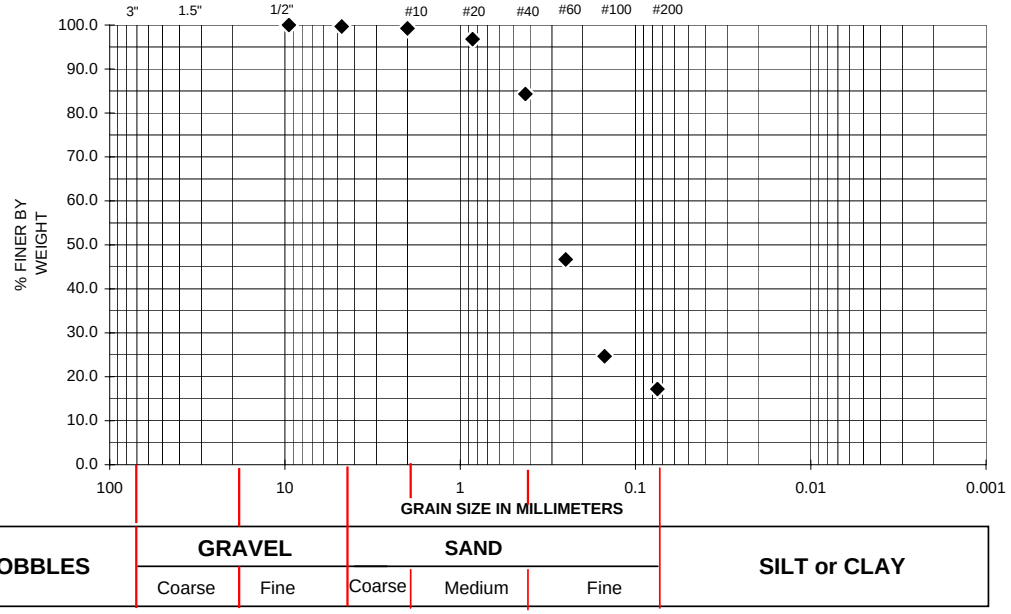
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-25**
SAMPLE NO/ DEPTH	**SA-4 (Depth 17' - 19')**
DESCRIPTION:	**Silty sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.3**	USC:	**SM**
% SAND:	**82.5**	FC:	
% SILT/CLAY:	**17.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**22.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

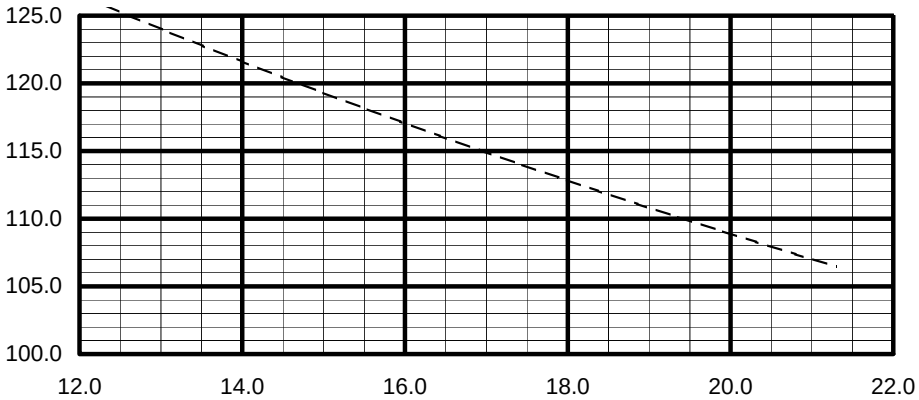
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"	**100**	
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**97**	
0.425	#40	**84**	
0.25	# 60	**47**	
0.15	#100	**25**	
0.075	#200	**17.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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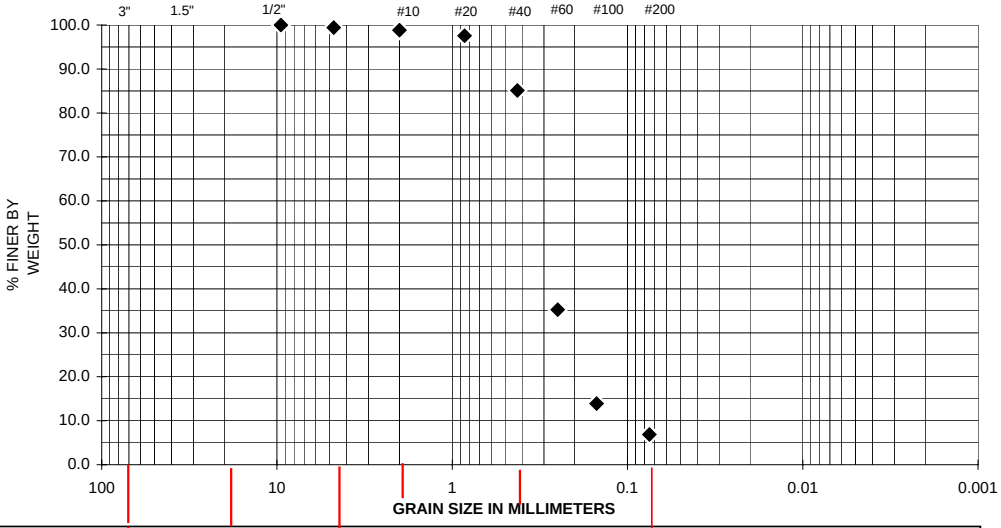
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-25**
SAMPLE NO/ DEPTH	**SA-5 (Depth 22' - 23.5')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.6**	USC:	**SP-SM**
% SAND:	**92.5**	FC:	
% SILT/CLAY:	**6.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**20.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

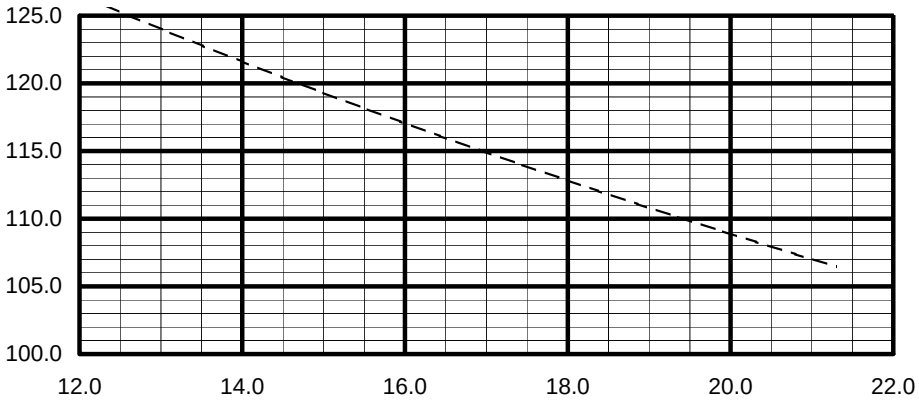
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"	**100**	
4.75	# 4	**99**	
2	#10	**99**	
0.85	#20	**98**	
0.425	#40	**85**	
0.25	# 60	**35**	
0.15	#100	**14**	
0.075	#200	**6.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
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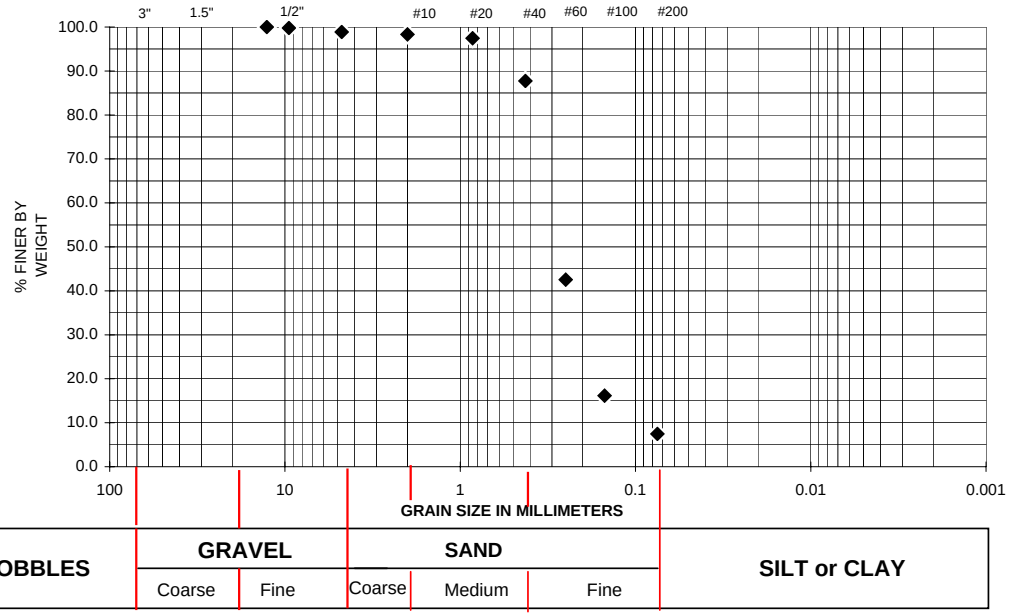
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-25**
SAMPLE NO/ DEPTH	**SA-6 (Depth 27' - 28.5')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**1.1**	USC:	**SP-SM**
% SAND:	**91.4**	FC:	
% SILT/CLAY:	**7.5**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**21.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

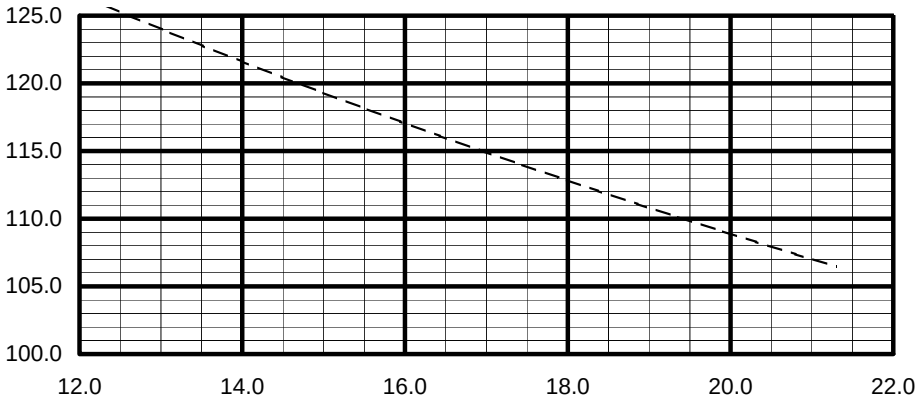
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**100**	
4.75	# 4	**99**	
2	#10	**98**	
0.85	#20	**97**	
0.425	#40	**88**	
0.25	# 60	**43**	
0.15	#100	**16**	
0.075	#200	**7.5**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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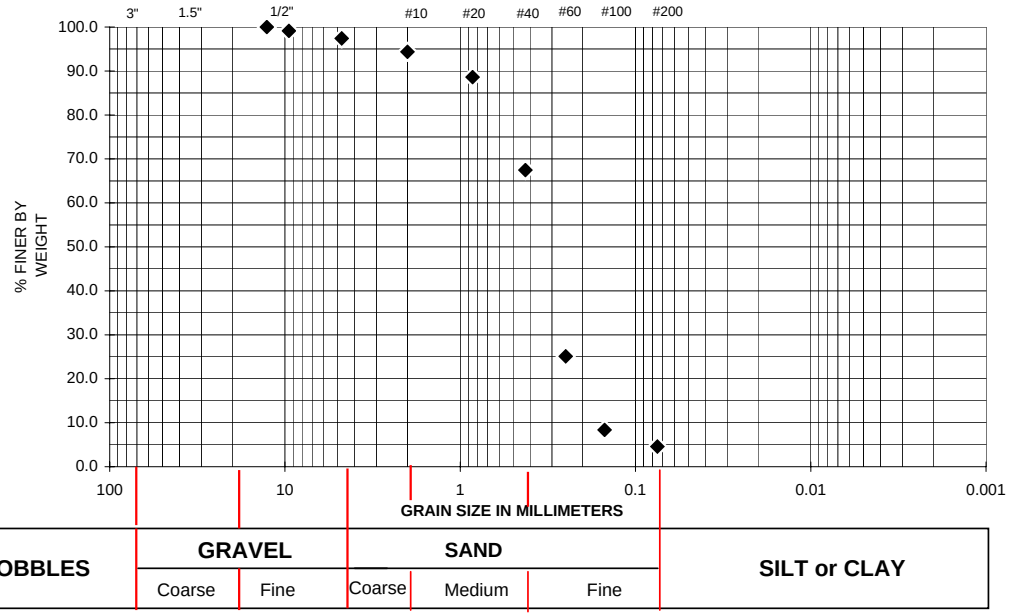
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-26**
SAMPLE NO/ DEPTH	**SA-5 (Depth 22' - 24')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**2.6**	USC:	**SP**
% SAND:	**92.8**	FC:	
% SILT/CLAY:	**4.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**19.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

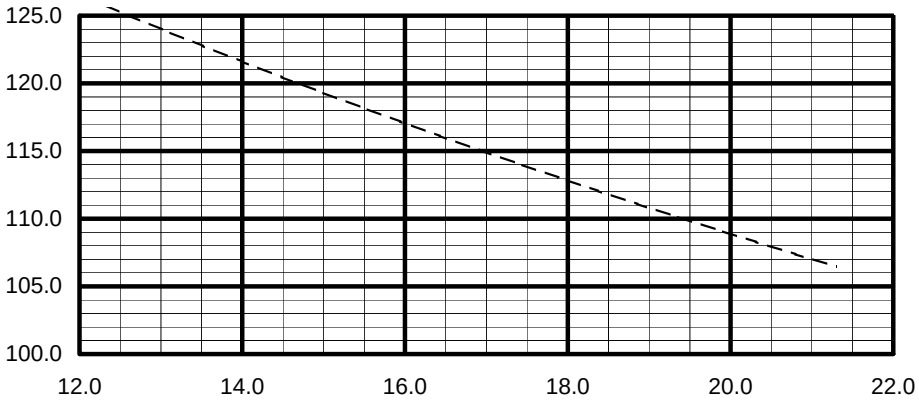
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**99**	
4.75	# 4	**97**	
2	#10	**94**	
0.85	#20	**89**	
0.425	#40	**67**	
0.25	# 60	**25**	
0.15	#100	**8**	
0.075	#200	**4.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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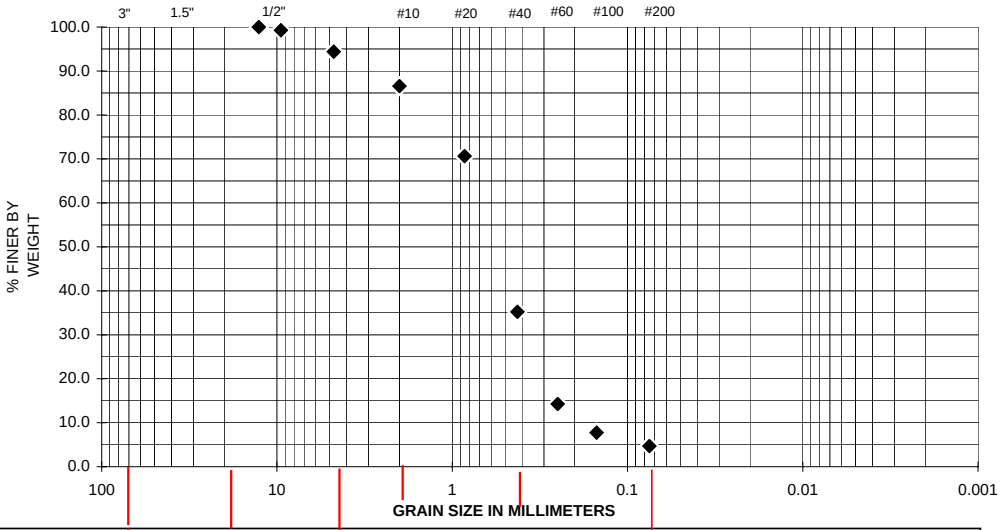
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-26**
SAMPLE NO/ DEPTH	**SA-6 (Depth 27' - 29')**
DESCRIPTION:	**Poorly grd. sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**5.6**	USC:	**SP**
% SAND:	**89.7**	FC:	
% SILT/CLAY:	**4.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**15.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

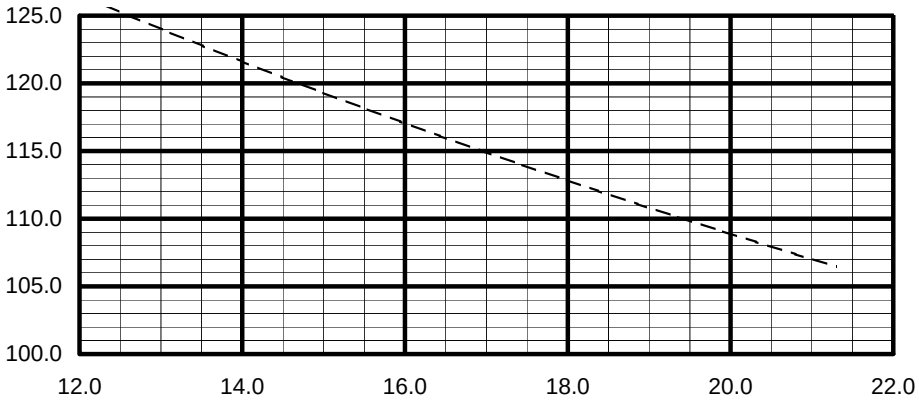
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**99**	
4.75	# 4	**94**	
2	#10	**87**	
0.85	#20	**71**	
0.425	#40	**35**	
0.25	# 60	**14**	
0.15	#100	**8**	
0.075	#200	**4.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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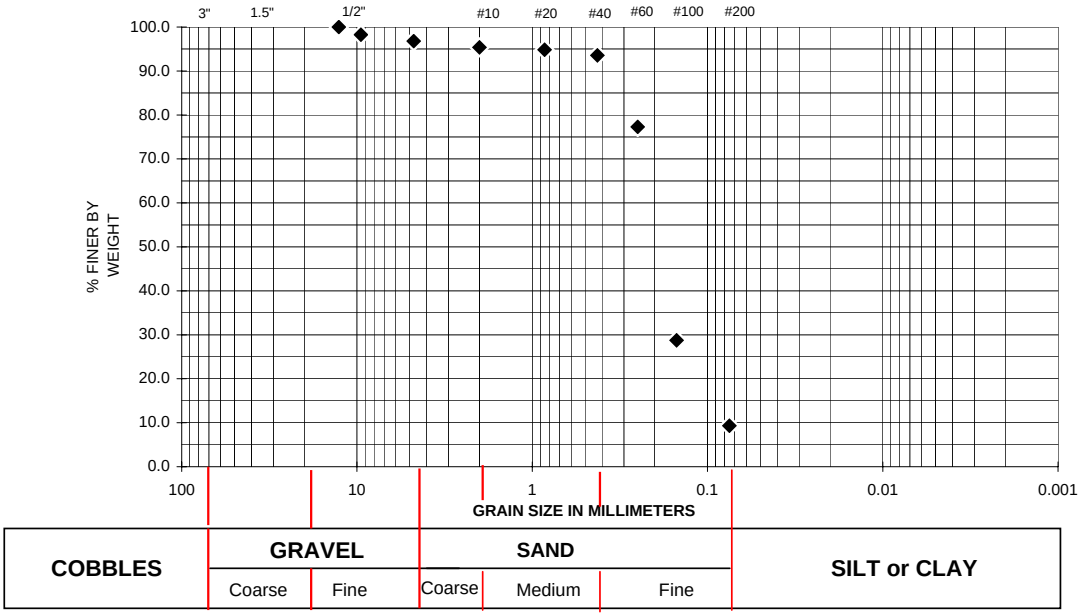
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-26**
SAMPLE NO/ DEPTH	**SA-7 (Depth 32' - 34')**
DESCRIPTION:	**Poorly grd. sand w/ silt.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**3.2**	USC:	**SP-SM**
% SAND:	**87.5**	FC:	
% SILT/CLAY:	**9.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**20.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

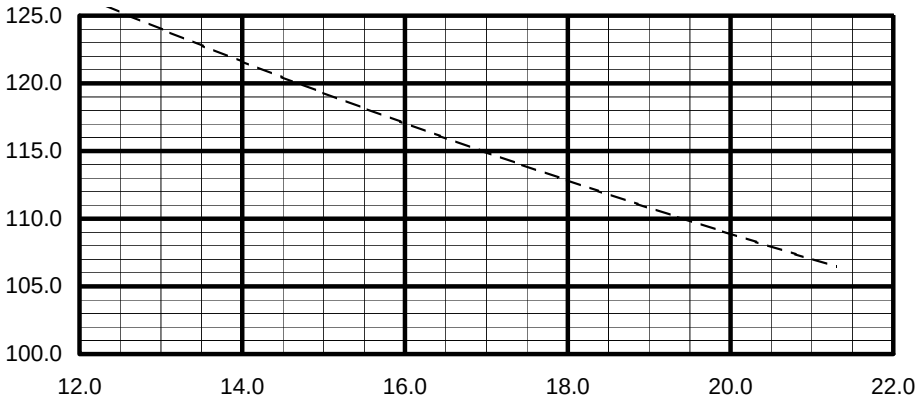
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**98**	
4.75	# 4	**97**	
2	#10	**95**	
0.85	#20	**95**	
0.425	#40	**94**	
0.25	# 60	**77**	
0.15	#100	**29**	
0.075	#200	**9.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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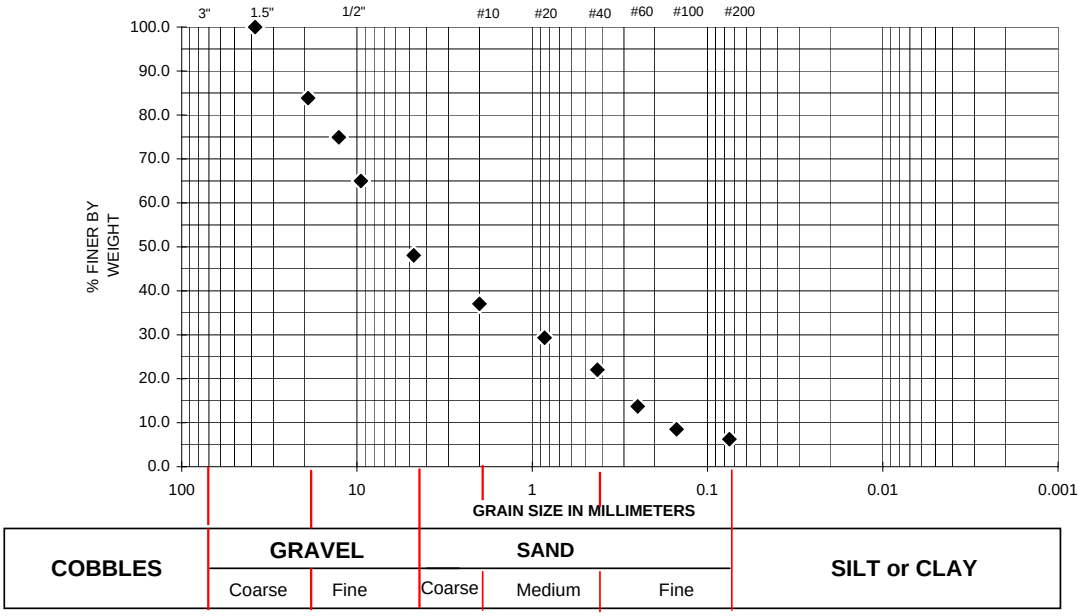
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-27**
SAMPLE NO/ DEPTH	**SA-2 (Depth 6.5' - 8.5')**
DESCRIPTION:	**Poorly grd. gravel w/ silt & sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**51.9**	USC:	**GP-GM**
% SAND:	**41.8**	FC:	
% SILT/CLAY:	**6.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**9.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

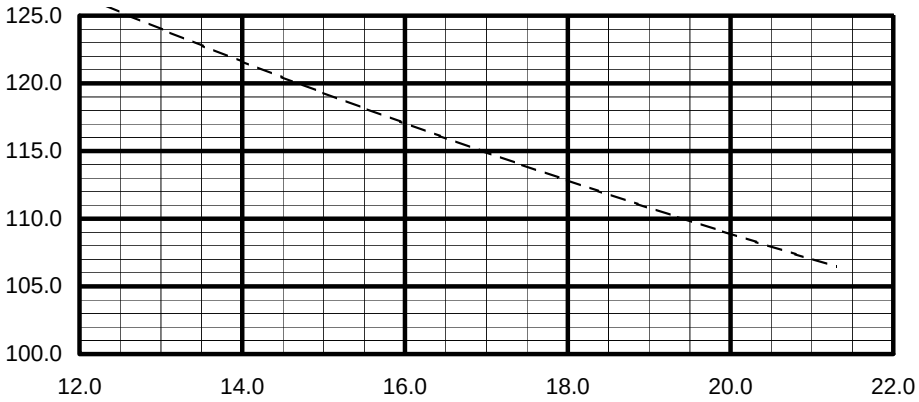
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**84**	
12.7	1/2"	**75**	
9.5	3/8"	**65**	
4.75	# 4	**48**	
2	#10	**37**	
0.85	#20	**29**	
0.425	#40	**22**	
0.25	# 60	**14**	
0.15	#100	**9**	
0.075	#200	**6.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
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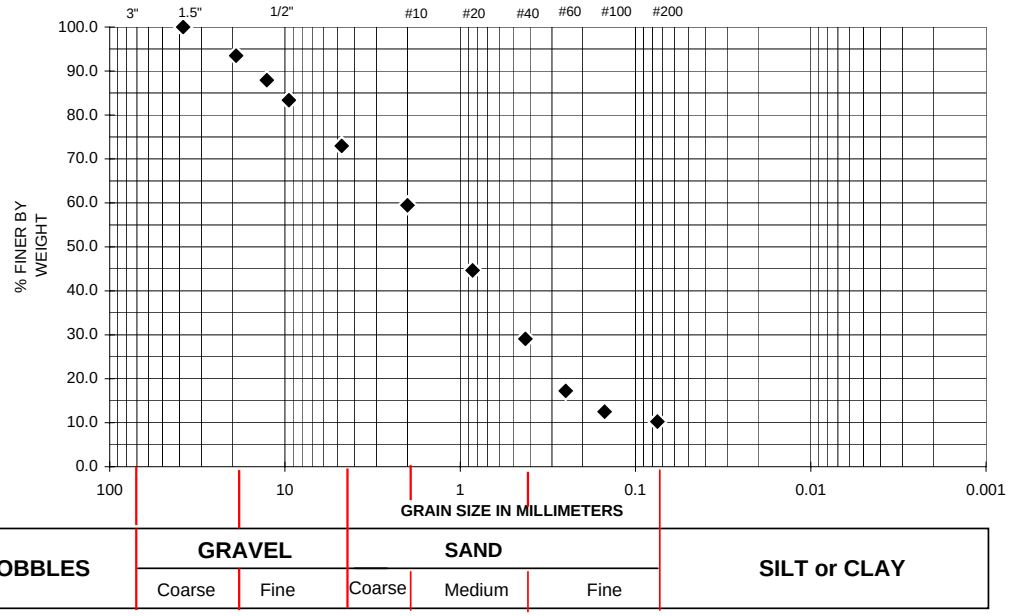
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-27**
SAMPLE NO/ DEPTH	**SA-3 (Depth 11.5' - 13.5')**
DESCRIPTION:	**Poorly grd. sand w/ silt & gravel.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**27.0**	USC:	**SP-SM**
% SAND:	**62.7**	FC:	
% SILT/CLAY:	**10.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**11.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

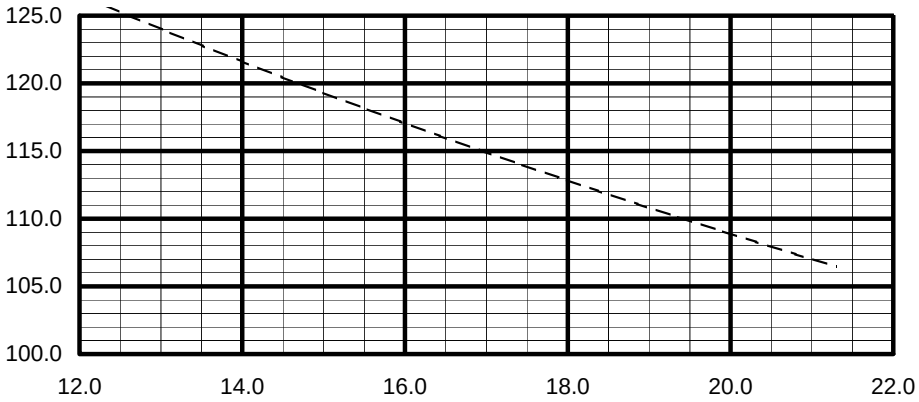
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**94**	
12.7	1/2"	**88**	
9.5	3/8"	**83**	
4.75	# 4	**73**	
2	#10	**59**	
0.85	#20	**45**	
0.425	#40	**29**	
0.25	# 60	**17**	
0.15	#100	**13**	
0.075	#200	**10.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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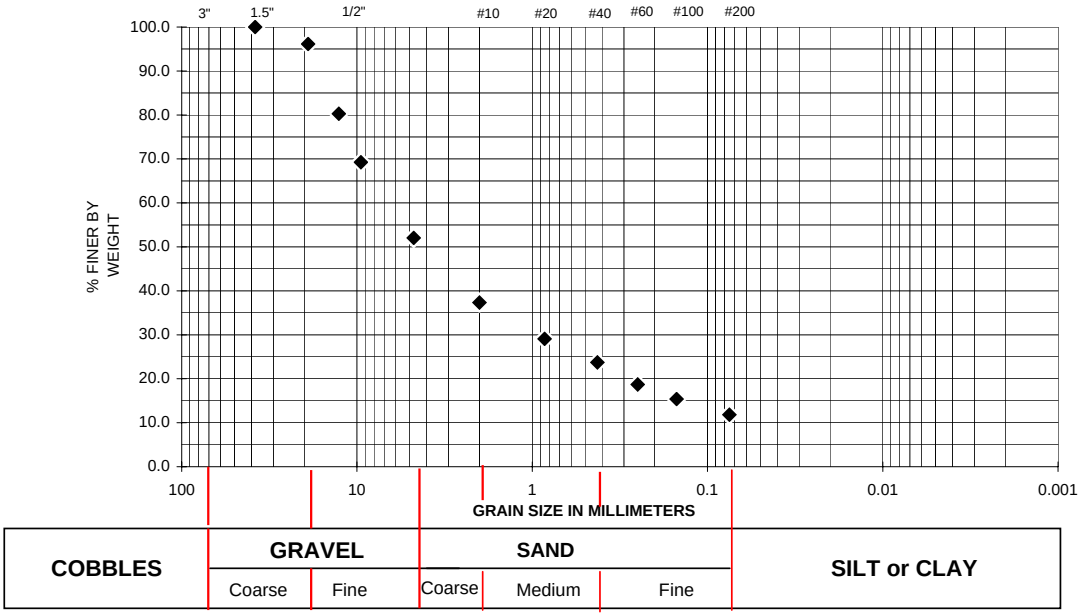
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-27**
SAMPLE NO/ DEPTH	**SA-4 (Depth 16.5' - 18.5')**
DESCRIPTION:	**Poorly grd. gravel w/ silt & sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**48.0**	USC:	**GP-GM**
% SAND:	**40.2**	FC:	
% SILT/CLAY:	**11.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**7.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

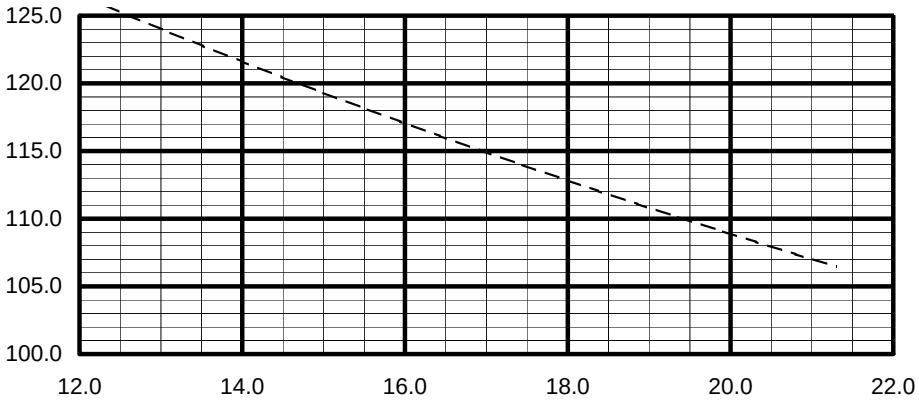
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**96**	
12.7	1/2"	**80**	
9.5	3/8"	**69**	
4.75	# 4	**52**	
2	#10	**37**	
0.85	#20	**29**	
0.425	#40	**24**	
0.25	# 60	**19**	
0.15	#100	**15**	
0.075	#200	**11.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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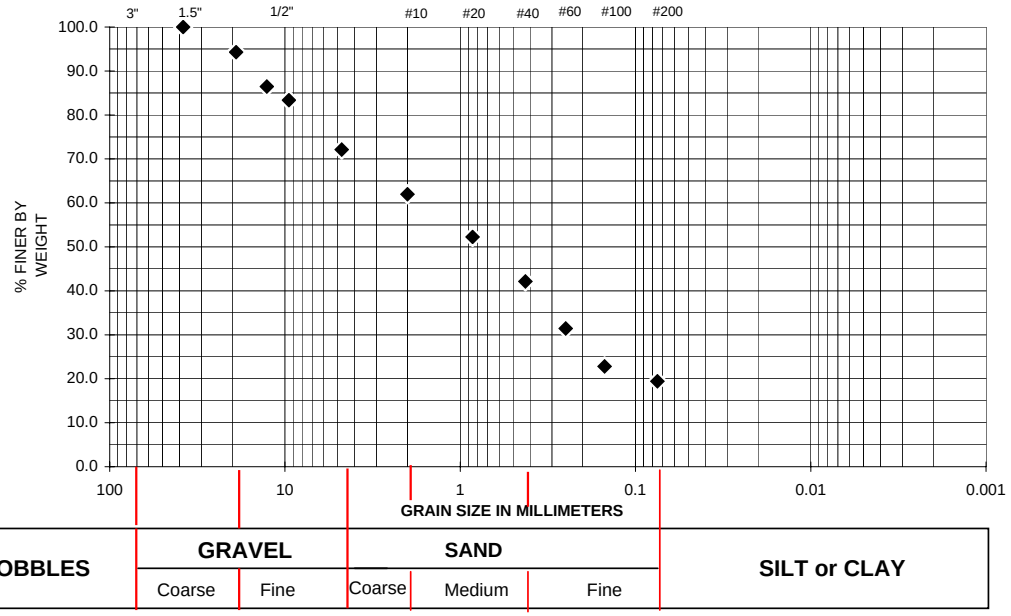
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-28**
SAMPLE NO/ DEPTH	**SA-2 (Depth 10' - 12')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**27.9**	USC:	**SM**
% SAND:	**52.7**	FC:	
% SILT/CLAY:	**19.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**11.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

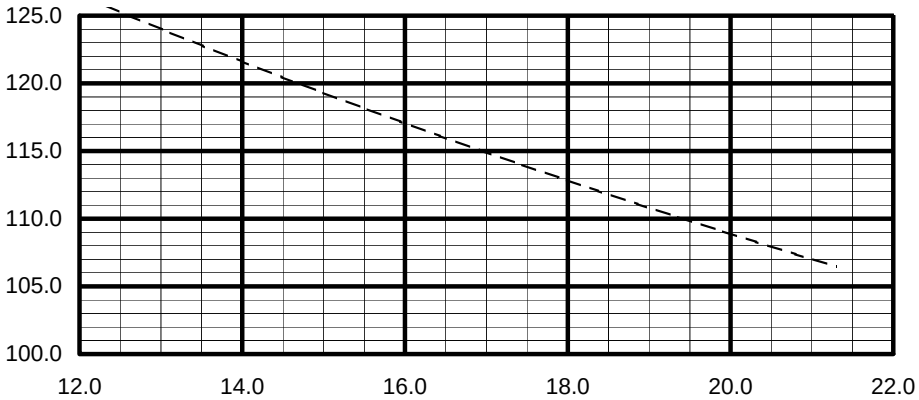
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**94**	
12.7	1/2"	**86**	
9.5	3/8"	**83**	
4.75	# 4	**72**	
2	#10	**62**	
0.85	#20	**52**	
0.425	#40	**42**	
0.25	# 60	**31**	
0.15	#100	**23**	
0.075	#200	**19.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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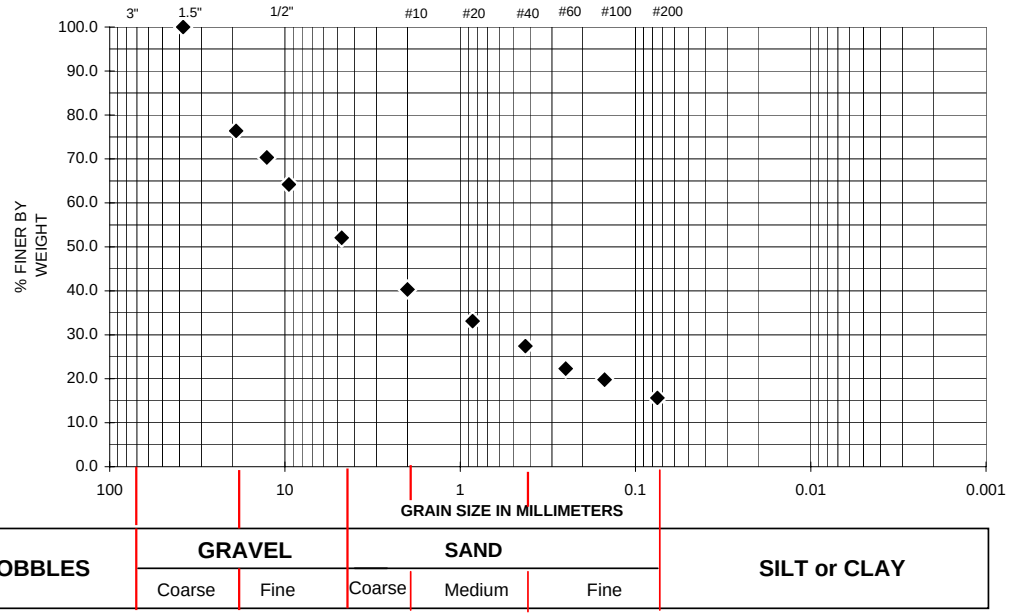
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-29**
SAMPLE NO/ DEPTH	**SA-1 (Depth 5' - 7')**
DESCRIPTION:	**Silty gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**47.9**	USC:	**GM**
% SAND:	**36.4**	FC:	
% SILT/CLAY:	**15.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**6.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

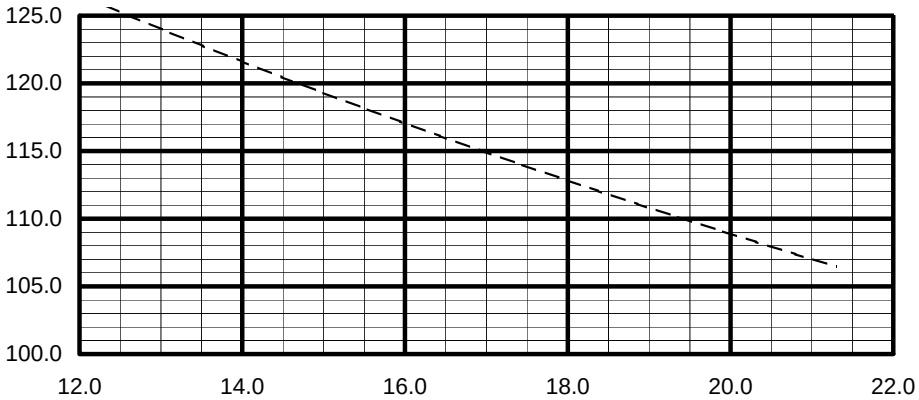
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**76**	
12.7	1/2"	**70**	
9.5	3/8"	**64**	
4.75	# 4	**52**	
2	#10	**40**	
0.85	#20	**33**	
0.425	#40	**27**	
0.25	# 60	**22**	
0.15	#100	**20**	
0.075	#200	**15.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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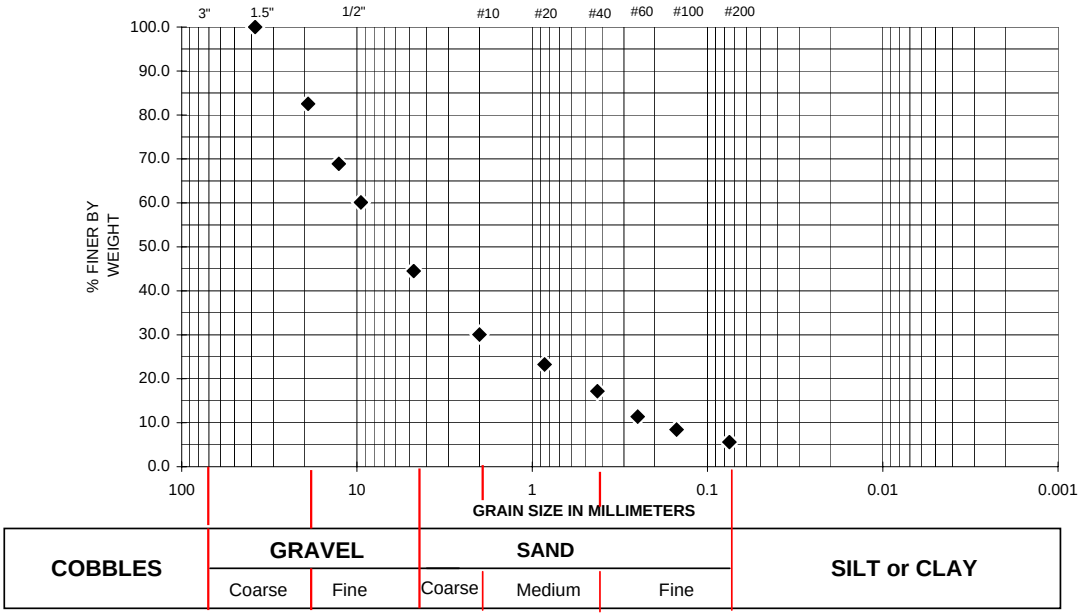
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-30**
SAMPLE NO/ DEPTH	**SA-1a (Depth 3' - 4.5')**
DESCRIPTION:	**Well grd. gravel w/ silt & sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**55.5**	USC:	**GW-GM**
% SAND:	**38.9**	FC:	
% SILT/CLAY:	**5.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**5.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

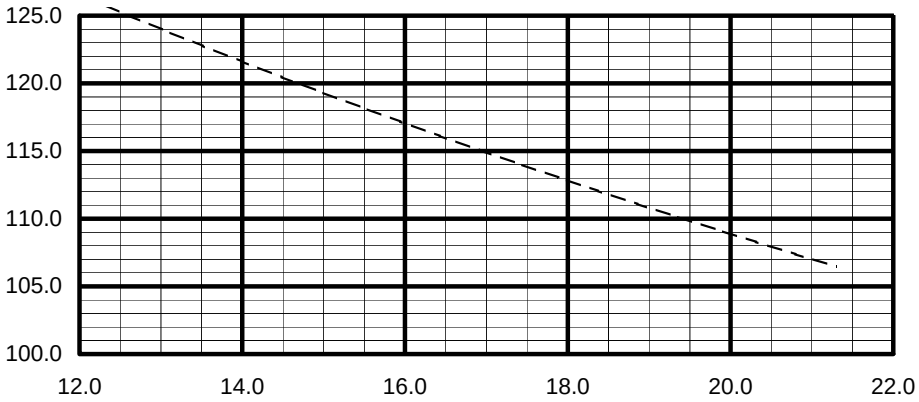
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**83**	
12.7	1/2"	**69**	
9.5	3/8"	**60**	
4.75	# 4	**45**	
2	#10	**30**	
0.85	#20	**23**	
0.425	#40	**17**	
0.25	# 60	**11**	
0.15	#100	**8**	
0.075	#200	**5.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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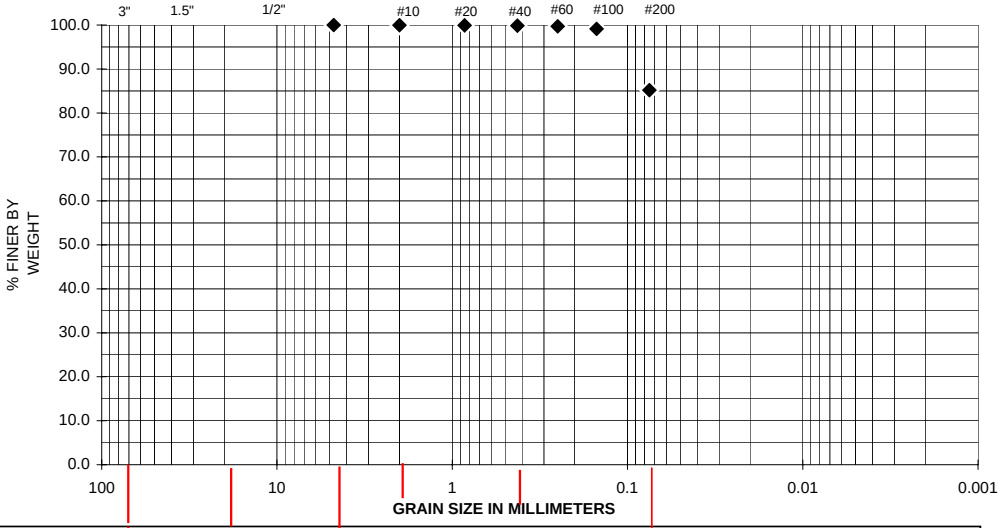
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-31**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 5')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**14.8**	FC:	
% SILT/CLAY:	**85.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**32.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

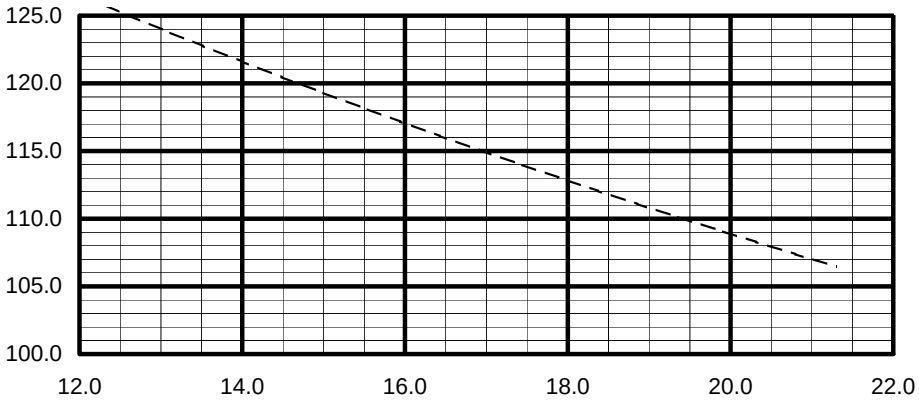
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**85.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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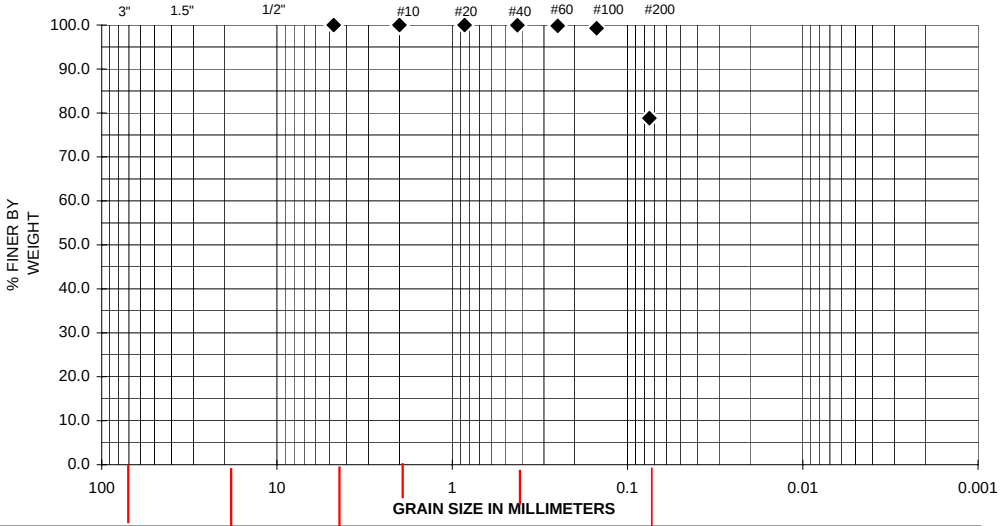
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-31**
SAMPLE NO/ DEPTH	**SA-2 (Depth 5' - 7')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**21.2**	FC:	
% SILT/CLAY:	**78.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**38.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

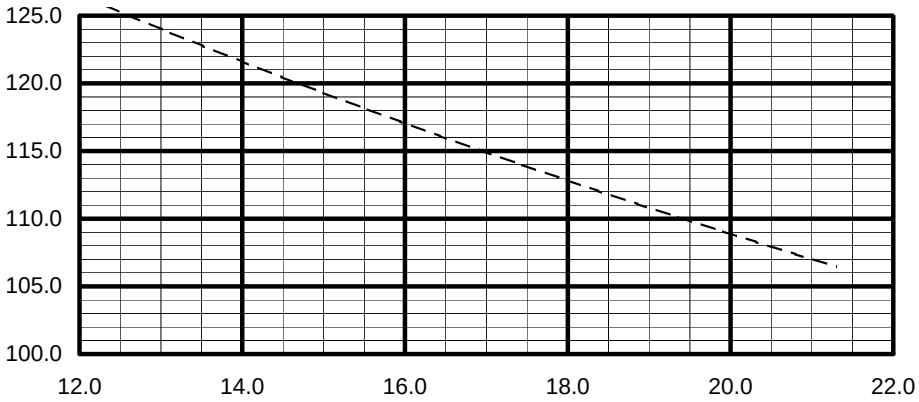
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**78.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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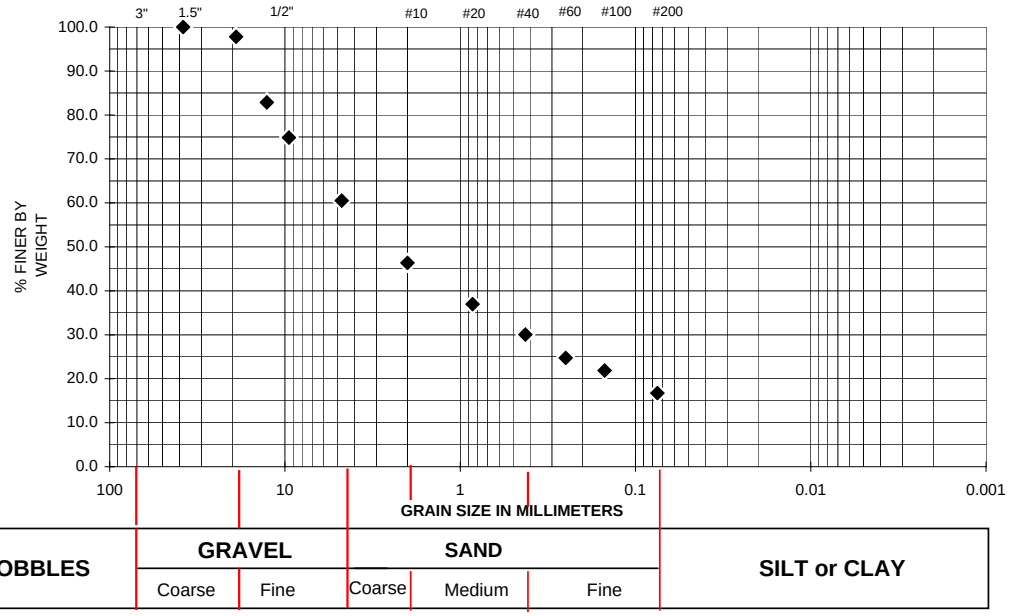
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-31**
SAMPLE NO/ DEPTH	**SA-3 (Depth 10' - 11')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**39.5**	USC:	**SM**
% SAND:	**43.8**	FC:	
% SILT/CLAY:	**16.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**8.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

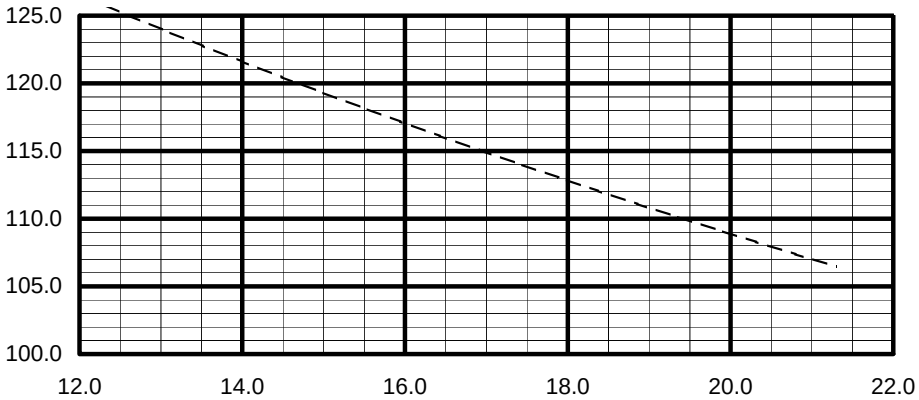
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**98**	
12.7	1/2"	**83**	
9.5	3/8"	**75**	
4.75	# 4	**60**	
2	#10	**46**	
0.85	#20	**37**	
0.425	#40	**30**	
0.25	# 60	**25**	
0.15	#100	**22**	
0.075	#200	**16.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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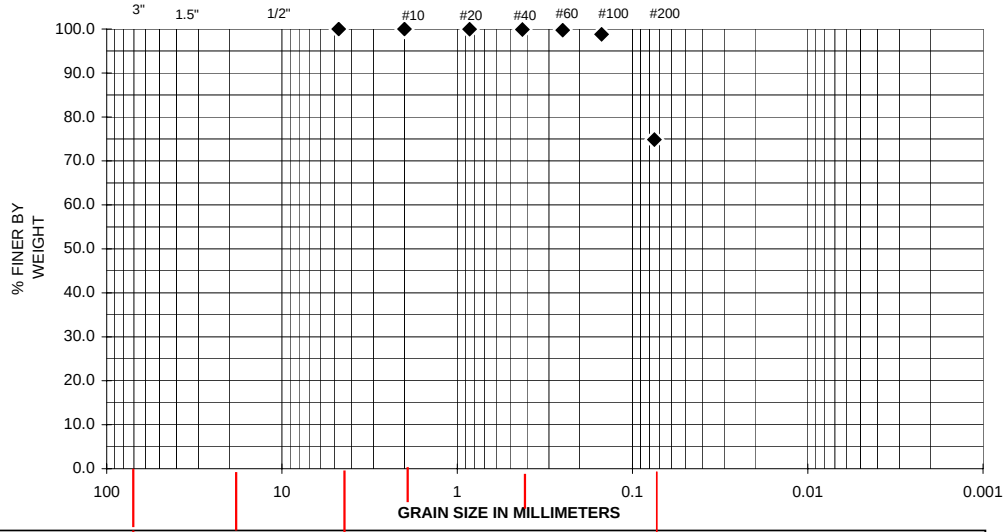
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-32**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 4.5')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**25.2**	FC:	
% SILT/CLAY:	**74.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**31.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

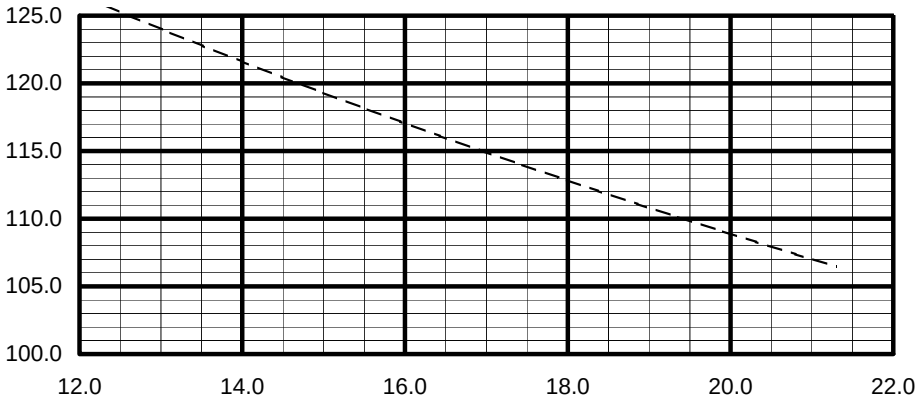
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**74.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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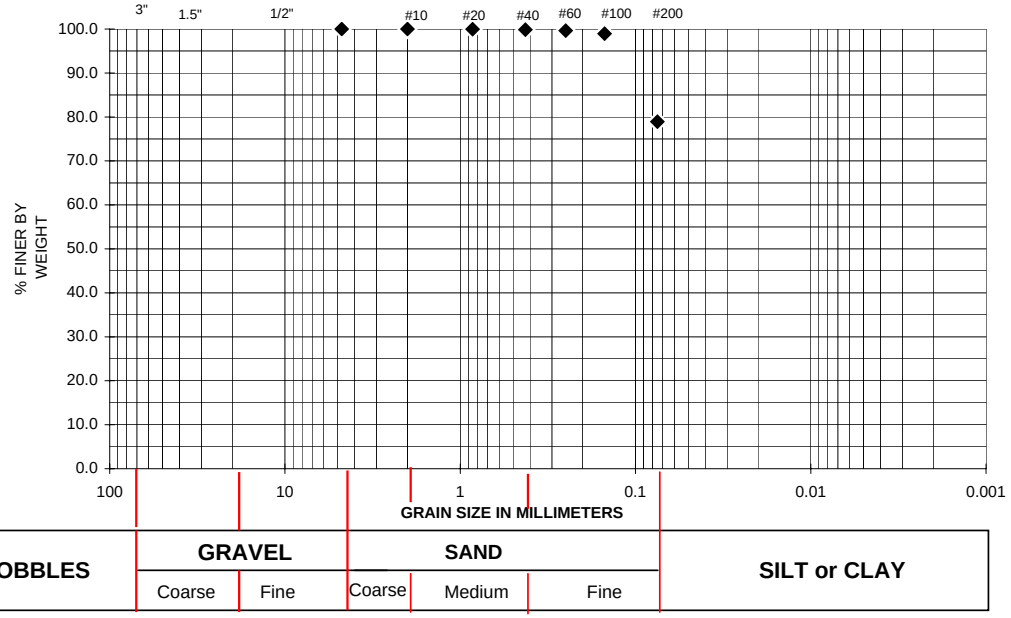
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-32**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**21.1**	FC:	
% SILT/CLAY:	**78.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**31.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

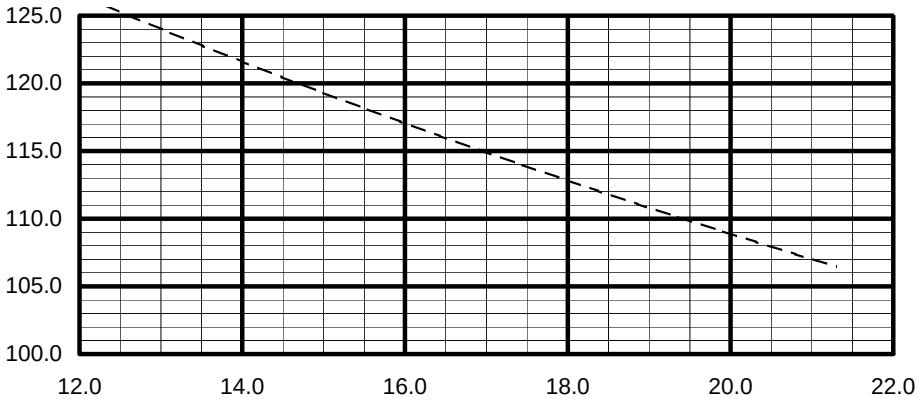
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**78.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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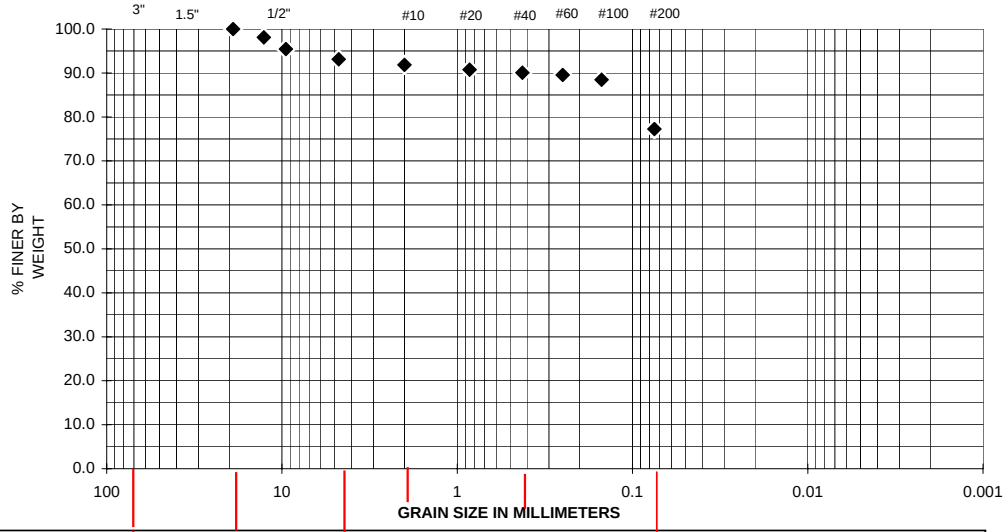
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-32**
SAMPLE NO/ DEPTH	**SA-4 (Depth 18' - 20')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**6.9**	USC:	**ML**
% SAND:	**15.9**	FC:	
% SILT/CLAY:	**77.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

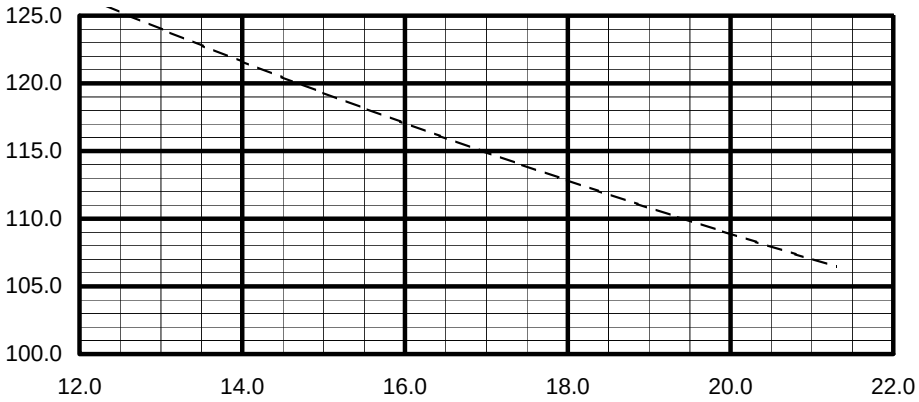
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"	**100**	
12.7	1/2"	**98**	
9.5	3/8"	**95**	
4.75	# 4	**93**	
2	#10	**92**	
0.85	#20	**91**	
0.425	#40	**90**	
0.25	# 60	**90**	
0.15	#100	**88**	
0.075	#200	**77.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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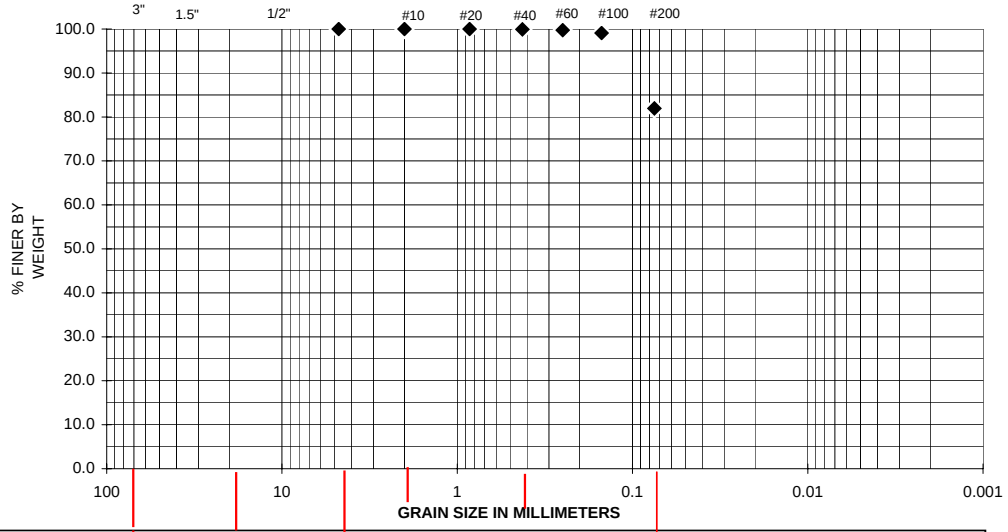
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-33**
SAMPLE NO/ DEPTH	**SA-1 (Depth 2.5' - 4.5')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**18.1**	FC:	
% SILT/CLAY:	**81.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**34.3**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

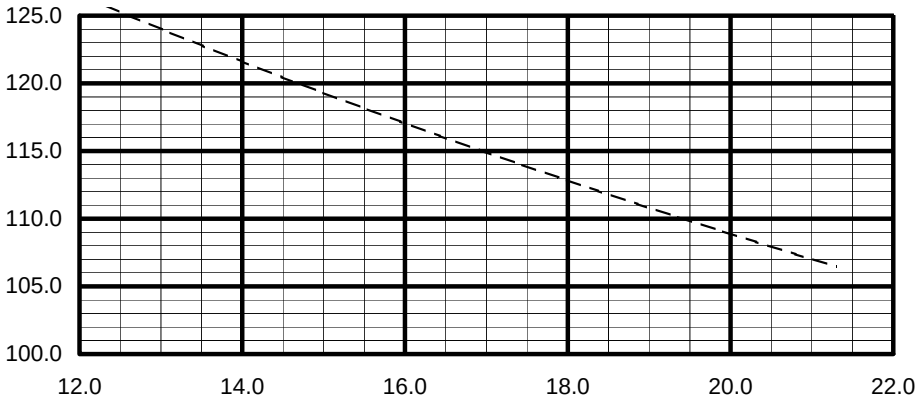
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**81.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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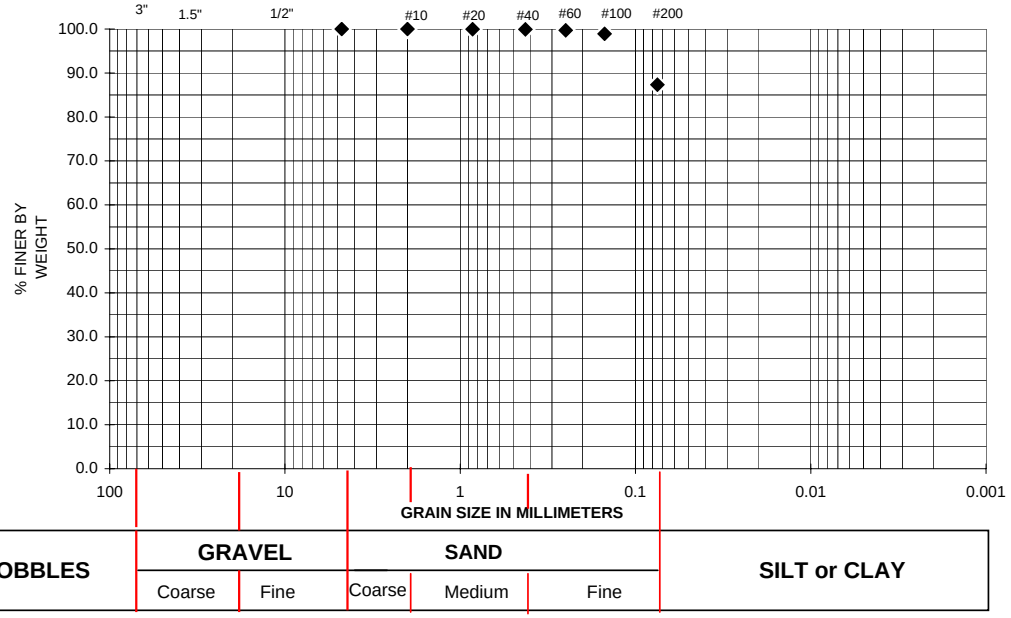
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-33**
SAMPLE NO/ DEPTH	**SA-3 (Depth 12.5' - 14.5')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**12.7**	FC:	
% SILT/CLAY:	**87.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**35.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

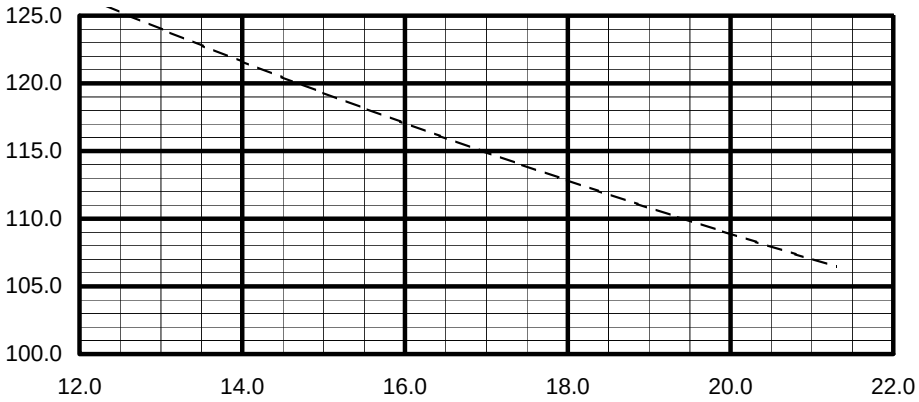
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**87.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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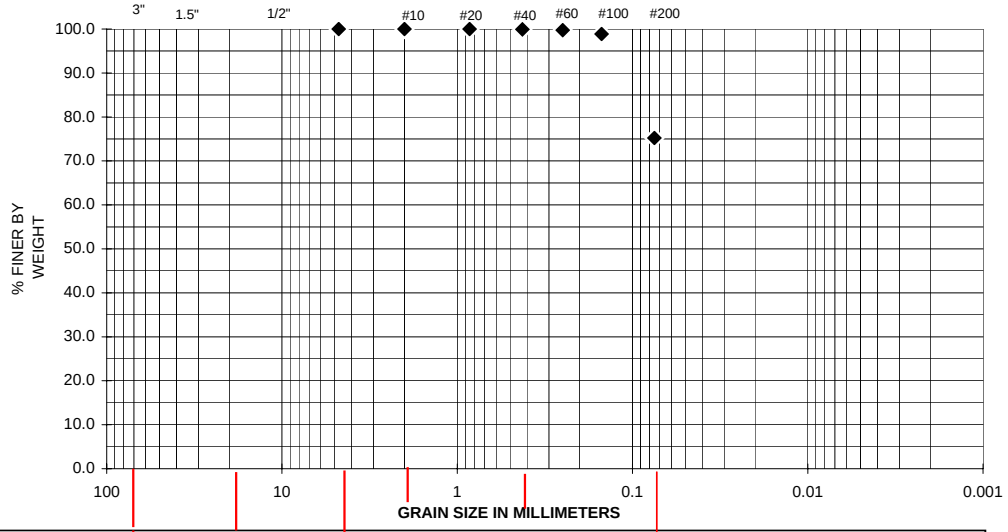
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-33**
SAMPLE NO/ DEPTH	**SA-5 (Depth 22.5' - 24.5')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**24.8**	FC:	
% SILT/CLAY:	**75.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**33.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

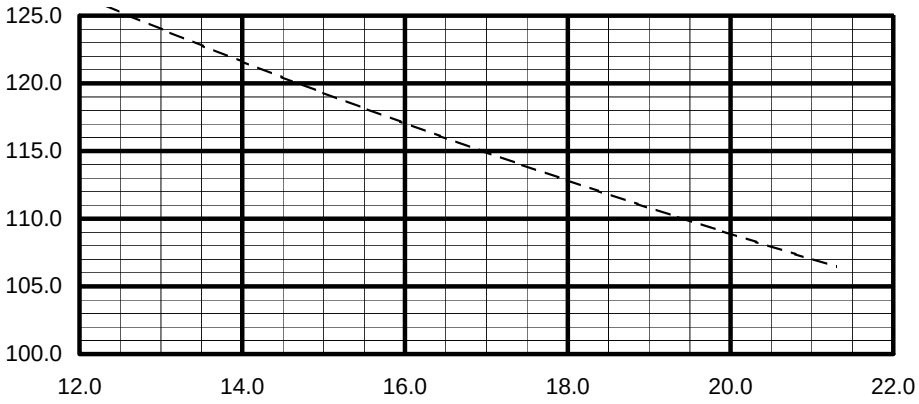
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**75.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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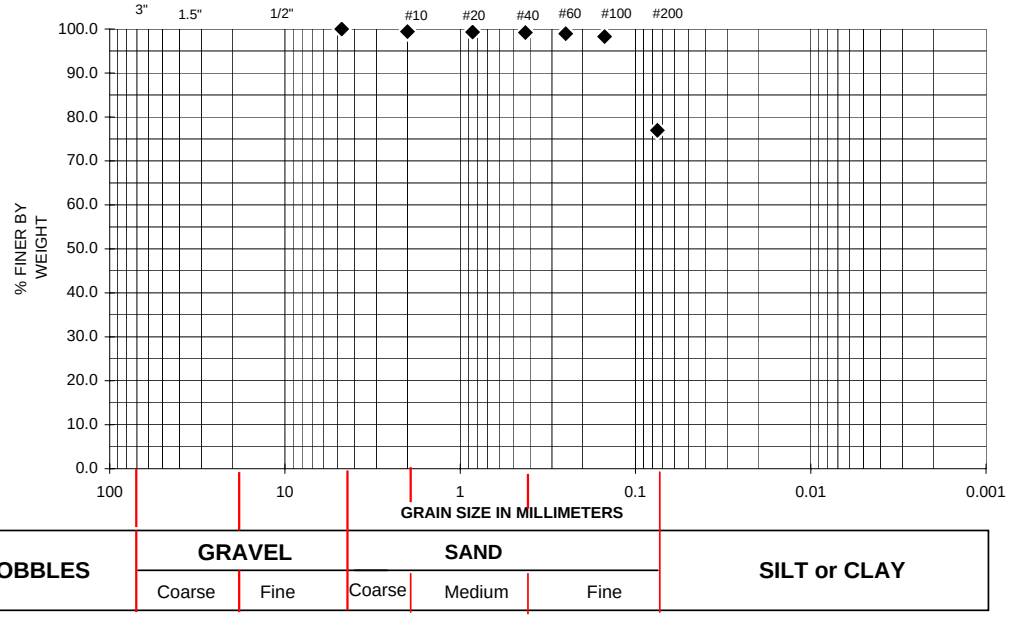
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-34**
SAMPLE NO/ DEPTH	**SA-1 (Depth 4' - 6')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**23.0**	FC:	
% SILT/CLAY:	**77.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**29.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

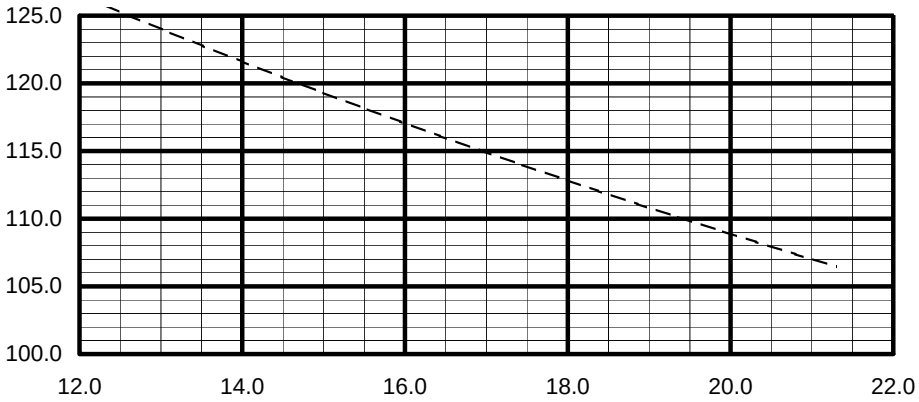
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**99**	
0.425	#40	**99**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**77.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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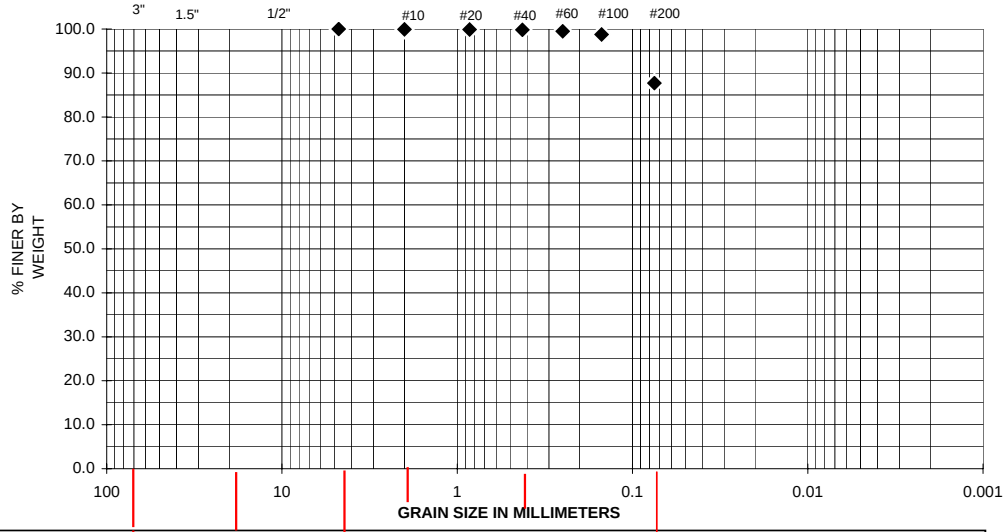
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-34**
SAMPLE NO/ DEPTH	**SA-2 (Depth 9' - 11')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**12.3**	FC:	
% SILT/CLAY:	**87.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**31.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

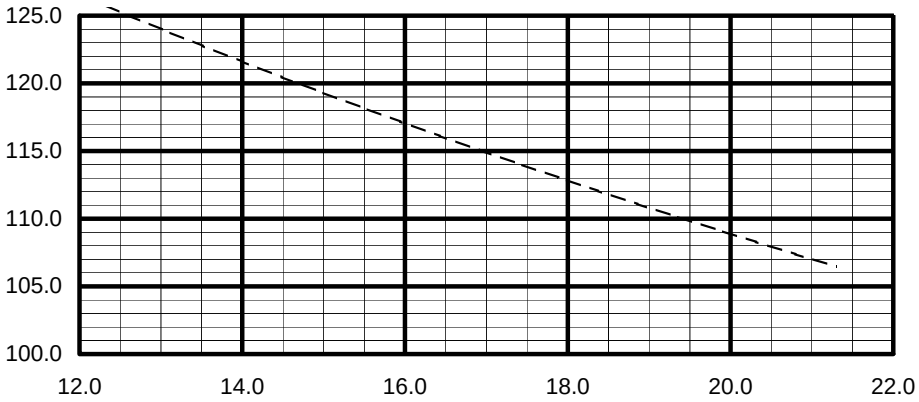
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**99**	
0.075	#200	**87.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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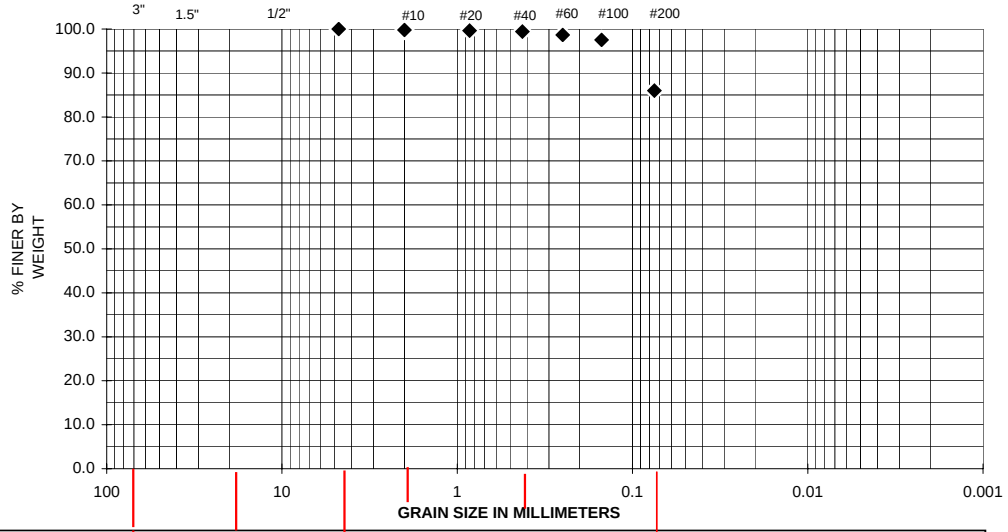
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-34**
SAMPLE NO/ DEPTH	**SA-4 (Depth 19' - 21')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**14.0**	FC:	
% SILT/CLAY:	**86.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**31.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

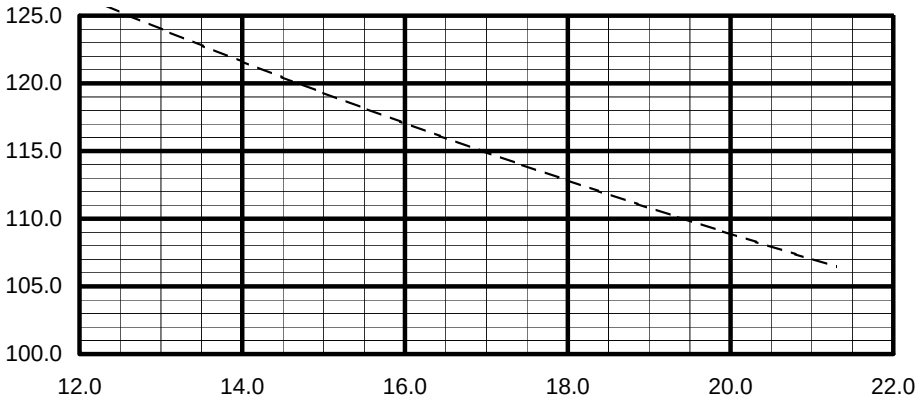
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**99**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**86.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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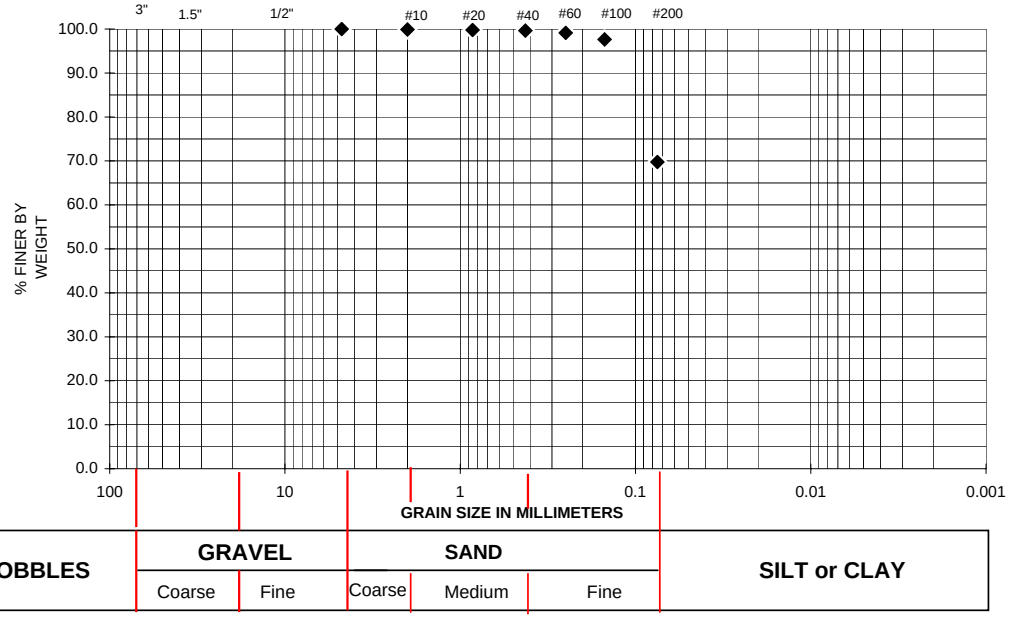
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-34**
SAMPLE NO/ DEPTH	**SA-6 (Depth 29' - 31')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**30.2**	FC:	
% SILT/CLAY:	**69.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**30.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

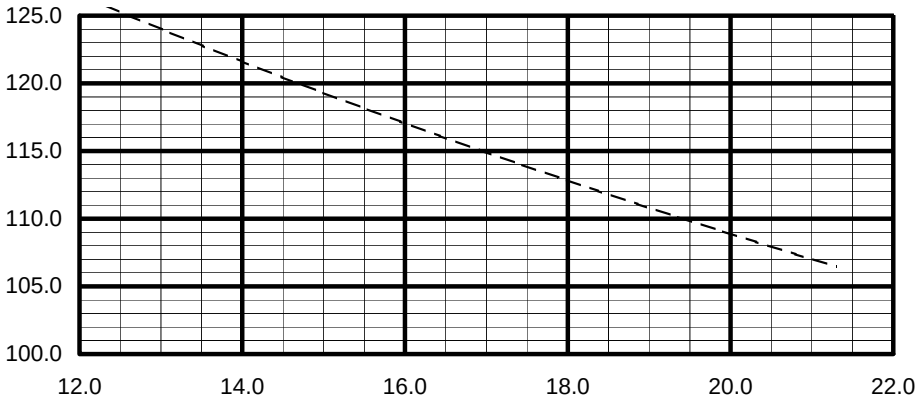
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**69.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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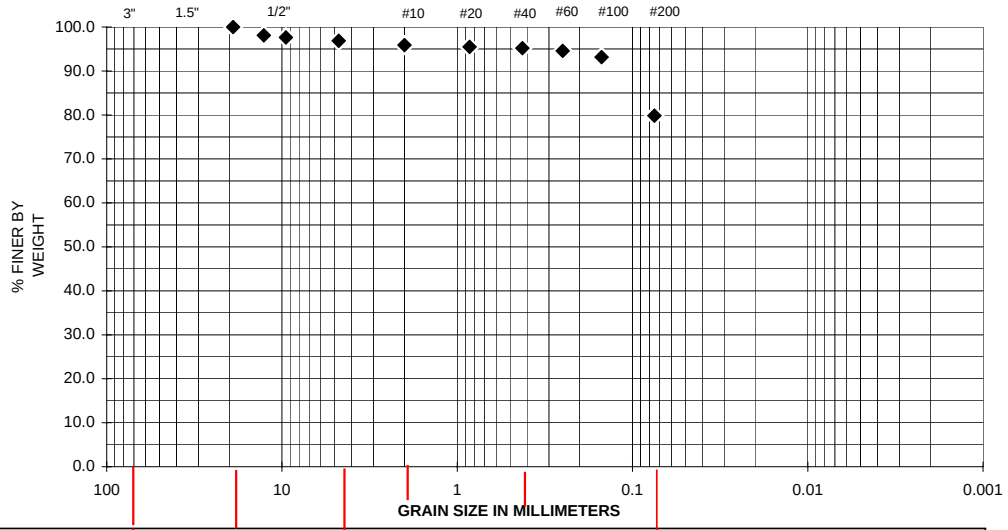
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-35**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**3.1**	USC:	**ML**
% SAND:	**17.0**	FC:	
% SILT/CLAY:	**79.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**35.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

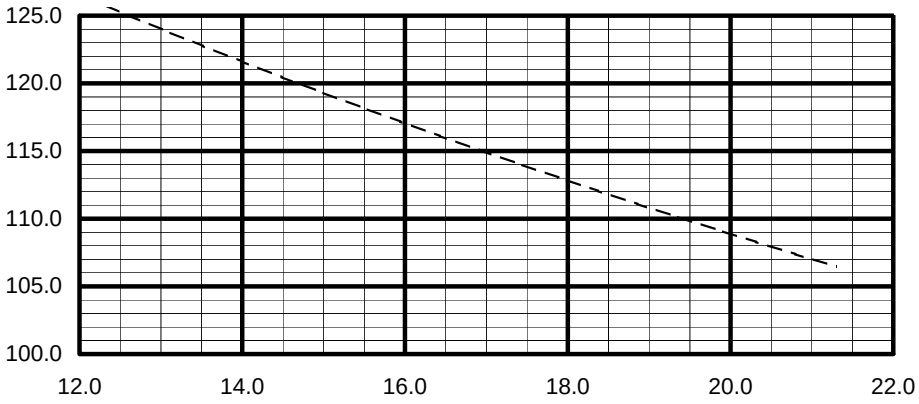
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"	**100**	
12.7	1/2"	**98**	
9.5	3/8"	**98**	
4.75	# 4	**97**	
2	#10	**96**	
0.85	#20	**95**	
0.425	#40	**95**	
0.25	# 60	**95**	
0.15	#100	**93**	
0.075	#200	**79.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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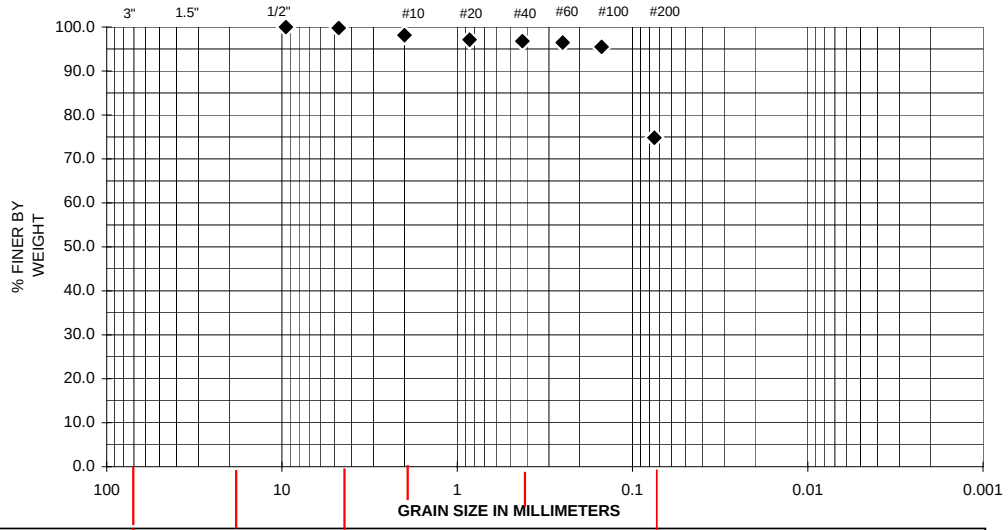
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-35**
SAMPLE NO/ DEPTH	**SA-3 (Depth 13' - 15')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.2**	USC:	**ML**
% SAND:	**25.0**	FC:	
% SILT/CLAY:	**74.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**35.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

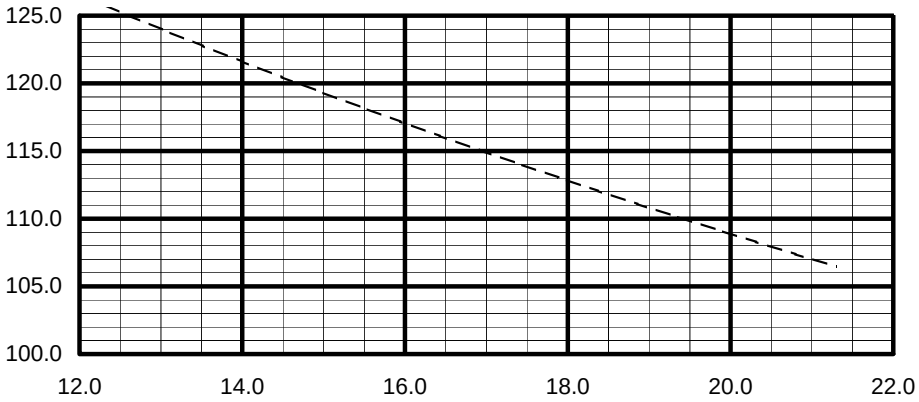
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"	**100**	
4.75	# 4	**100**	
2	#10	**98**	
0.85	#20	**97**	
0.425	#40	**97**	
0.25	# 60	**96**	
0.15	#100	**95**	
0.075	#200	**74.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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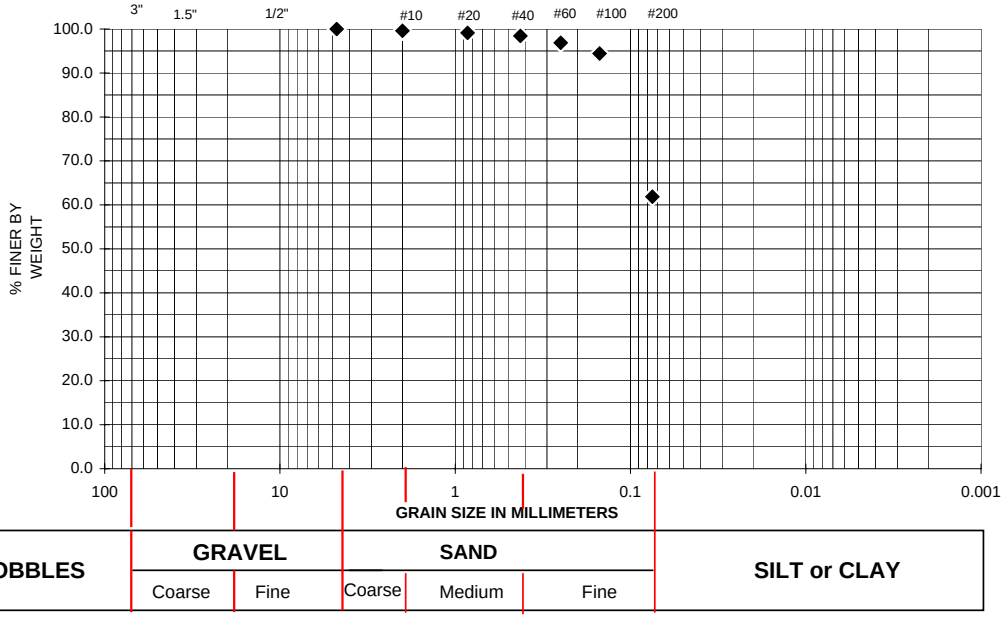
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-35**
SAMPLE NO/ DEPTH	**SA-6 (Depth 28' - 30')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**38.1**	FC:	
% SILT/CLAY:	**61.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**28.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

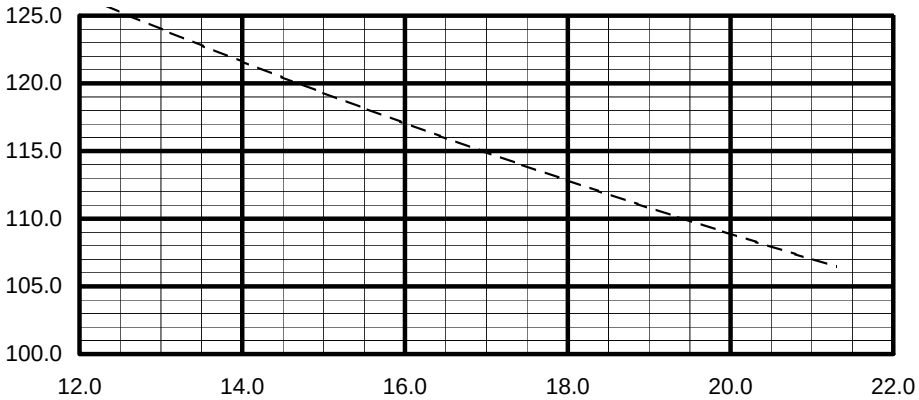
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**99**	
0.425	#40	**98**	
0.25	# 60	**97**	
0.15	#100	**94**	
0.075	#200	**61.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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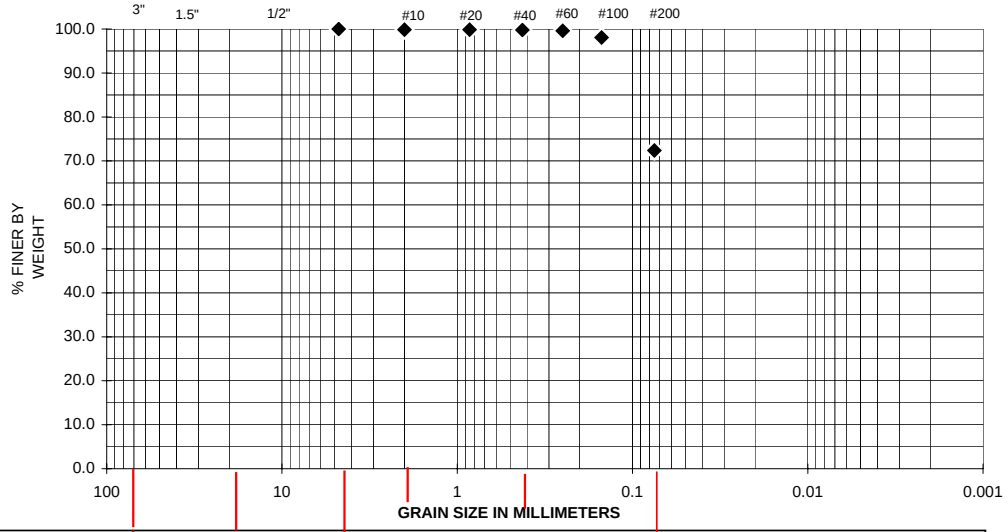
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-36**
SAMPLE NO/ DEPTH	**SA-1 (Depth 2.5' - 4.5')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**27.6**	FC:	
% SILT/CLAY:	**72.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**33.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

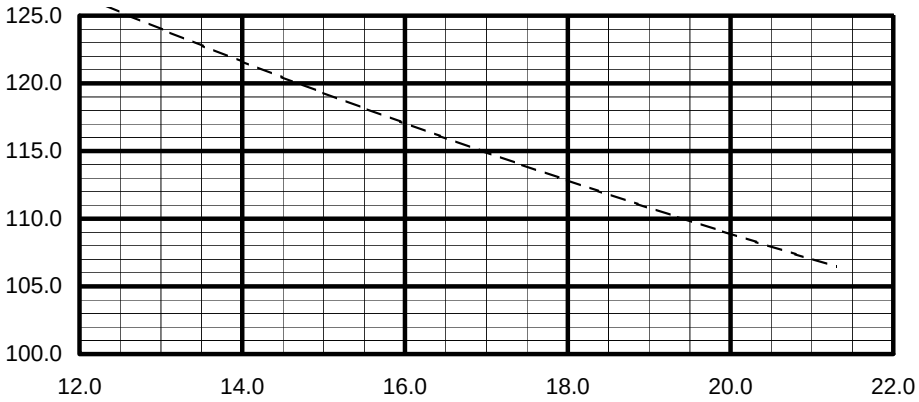
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**98**	
0.075	#200	**72.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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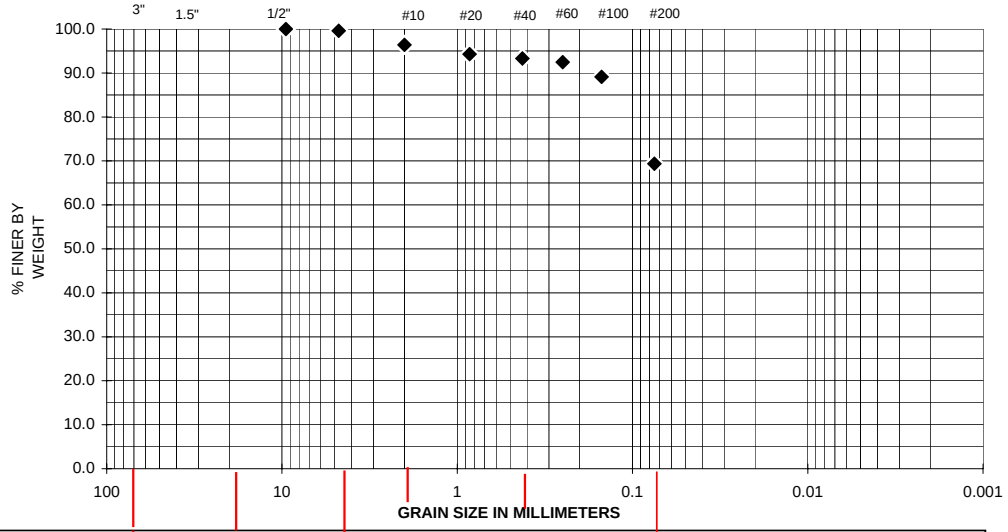
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-36**
SAMPLE NO/ DEPTH	**SA-6 (Depth 24' - 26')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.4**	USC:	**ML**
% SAND:	**30.2**	FC:	
% SILT/CLAY:	**69.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**31.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

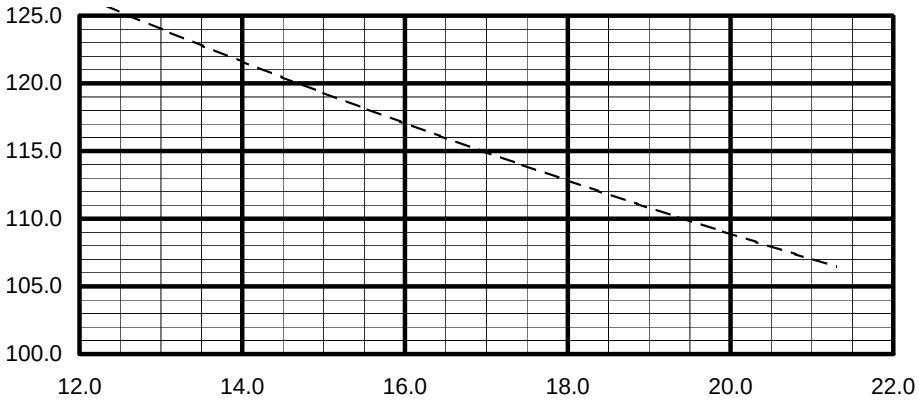
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"	**100**	
4.75	# 4	**100**	
2	#10	**96**	
0.85	#20	**94**	
0.425	#40	**93**	
0.25	# 60	**92**	
0.15	#100	**89**	
0.075	#200	**69.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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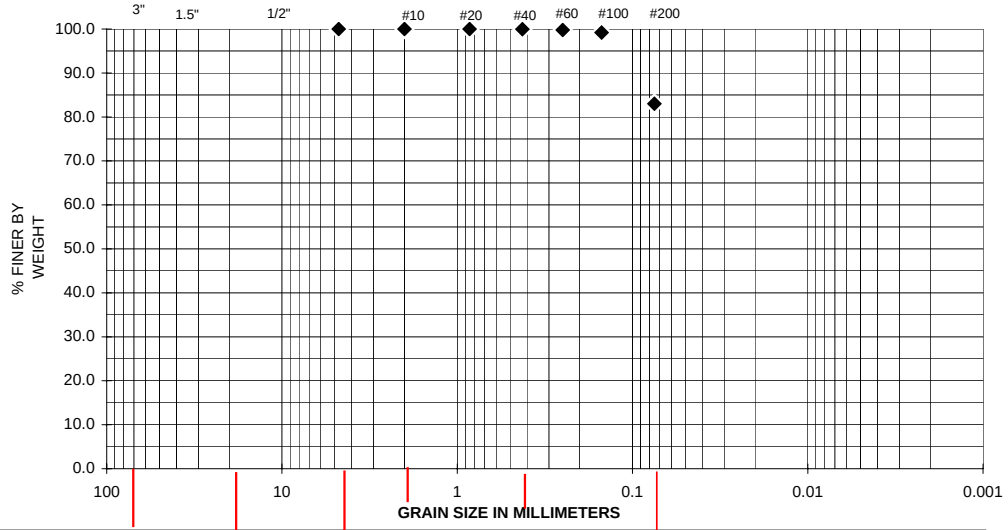
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-37**
SAMPLE NO/ DEPTH	**SA-1 (Depth 2.5' - 4.5')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**17.0**	FC:	
% SILT/CLAY:	**83.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**29.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

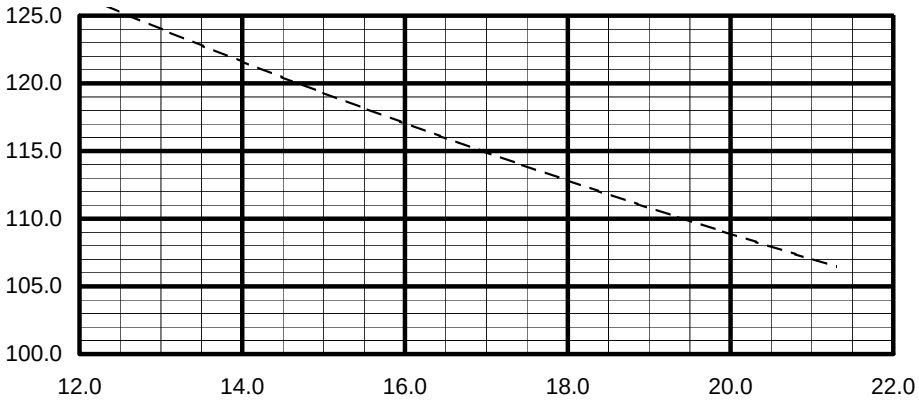
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**83.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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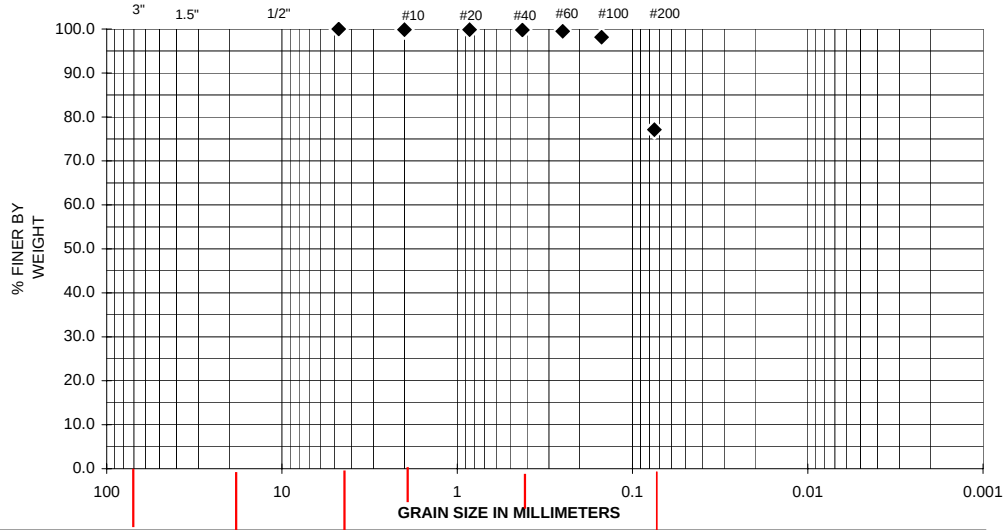
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-37**
SAMPLE NO/ DEPTH	**SA-2 (Depth 6.5' - 8.5')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**22.9**	FC:	
% SILT/CLAY:	**77.1**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**33.3**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

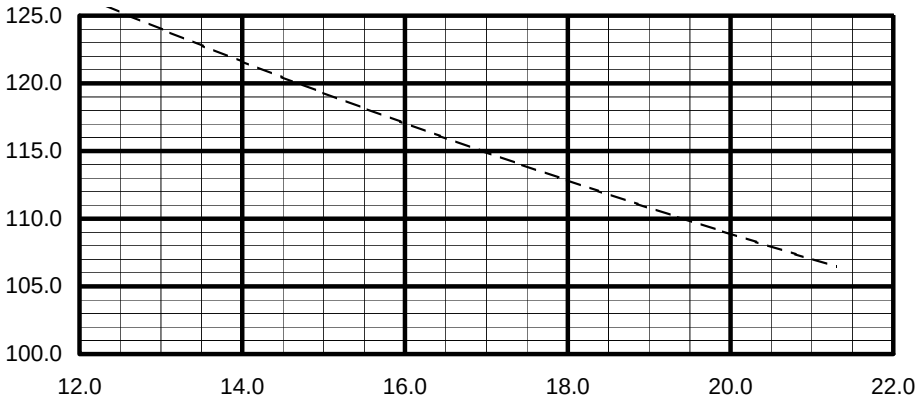
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**77.1**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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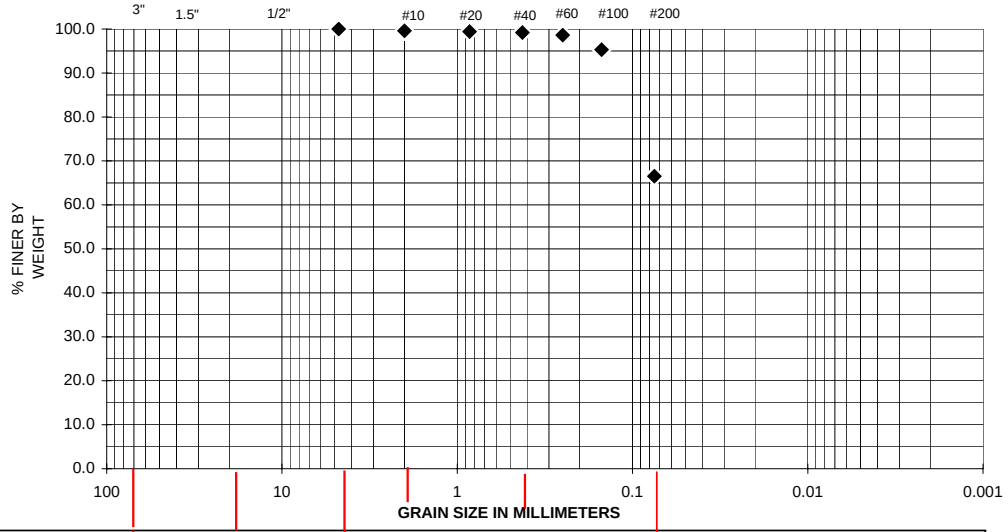
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-37**
SAMPLE NO/ DEPTH	**SA-3 (Depth 11.5' - 13.5')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**33.5**	FC:	
% SILT/CLAY:	**66.5**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**32.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

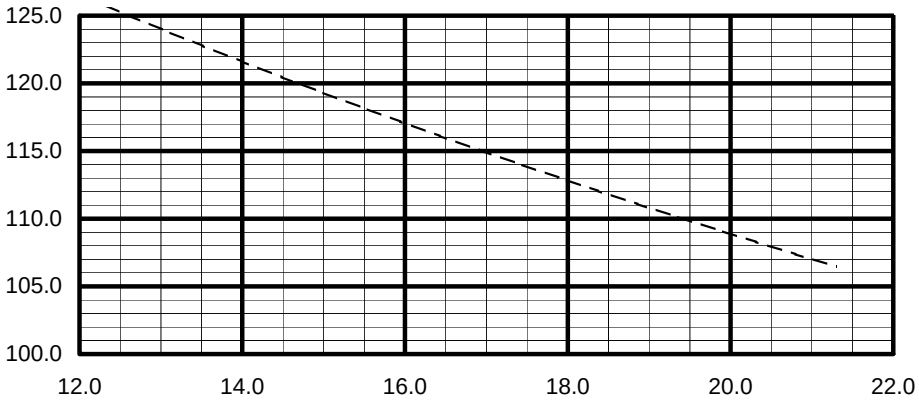
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**99**	
0.425	#40	**99**	
0.25	# 60	**99**	
0.15	#100	**95**	
0.075	#200	**66.5**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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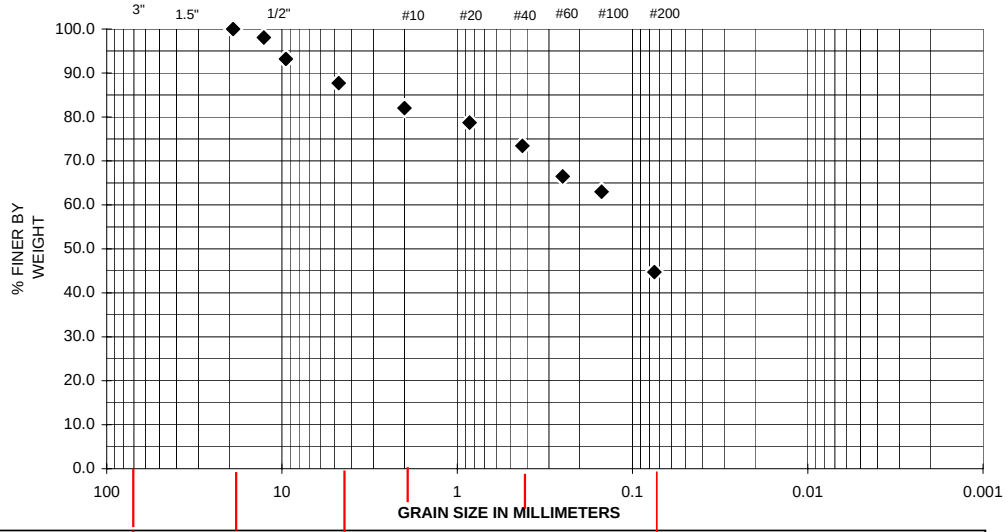
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-37**
SAMPLE NO/ DEPTH	**SA-6 (Depth 26.5' - 28.5')**
DESCRIPTION:	**Silty sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**12.3**	USC:	**SM**
% SAND:	**43.0**	FC:	
% SILT/CLAY:	**44.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**19.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

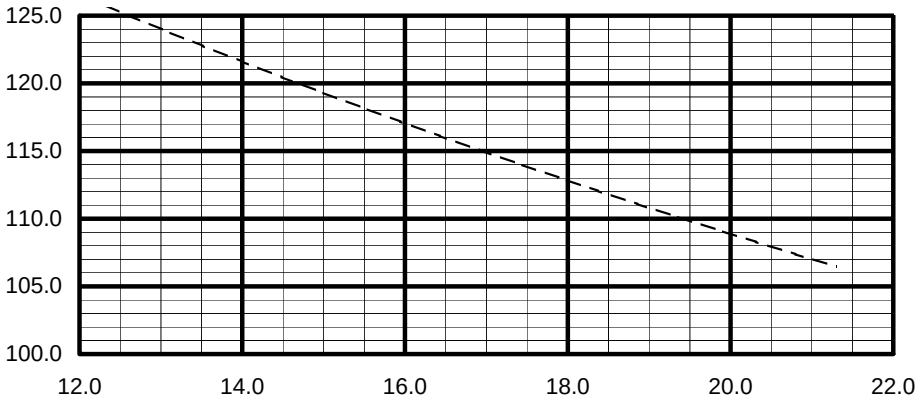
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"	**100**	
12.7	1/2"	**98**	
9.5	3/8"	**93**	
4.75	# 4	**88**	
2	#10	**82**	
0.85	#20	**79**	
0.425	#40	**73**	
0.25	# 60	**66**	
0.15	#100	**63**	
0.075	#200	**44.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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TERRA FIRMA TESTING

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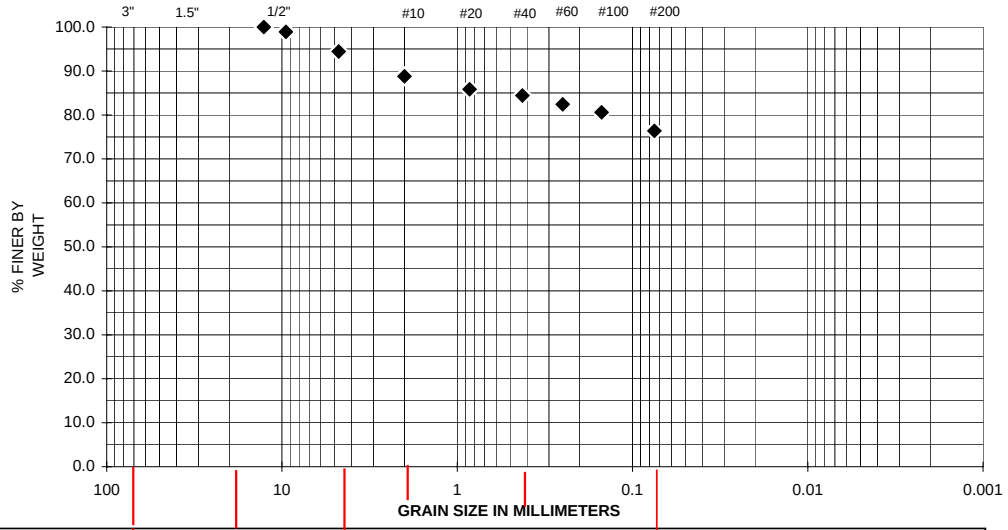
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-38**
SAMPLE NO/ DEPTH	**SA-2 (Depth 10' - 12')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**5.6**	USC:	**ML**
% SAND:	**18.0**	FC:	
% SILT/CLAY:	**76.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

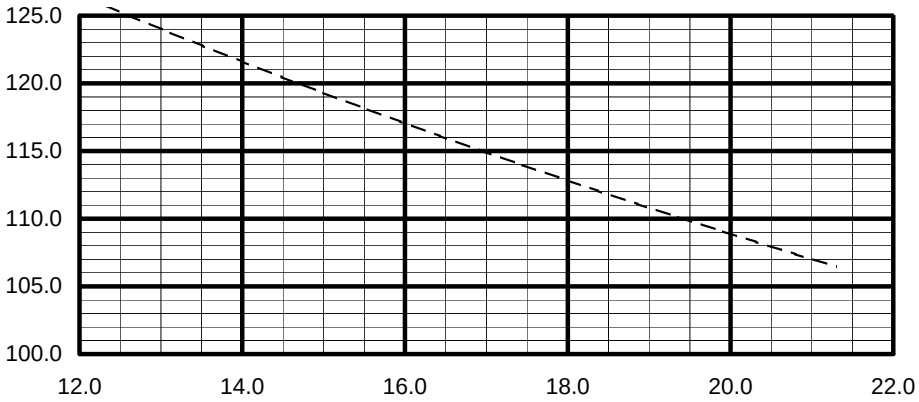
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"	**100**	
9.5	3/8"	**99**	
4.75	# 4	**94**	
2	#10	**89**	
0.85	#20	**86**	
0.425	#40	**84**	
0.25	# 60	**82**	
0.15	#100	**81**	
0.075	#200	**76.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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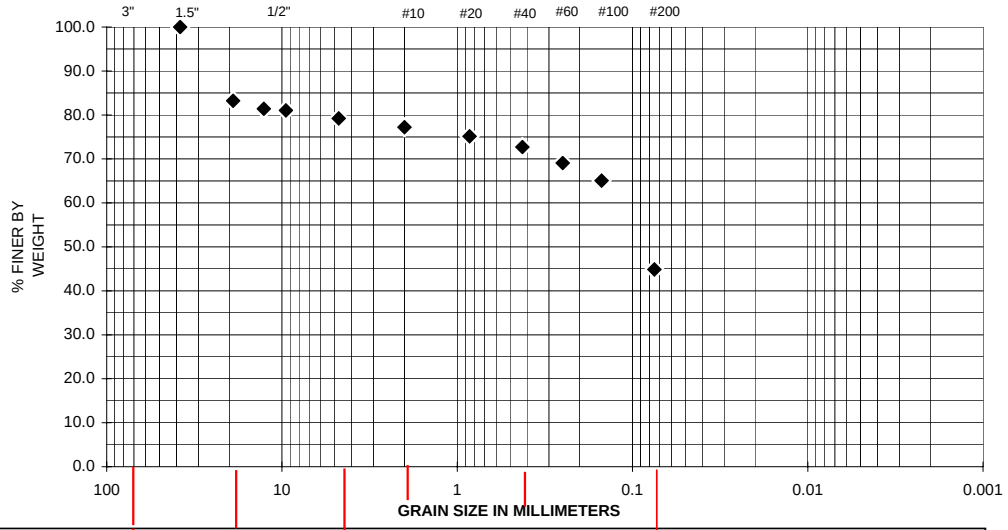
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-38**
SAMPLE NO/ DEPTH	**SA-5 (Depth 25' - 27')**
DESCRIPTION:	**Silty sand with gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**20.8**	USC:	**SM**
% SAND:	**34.3**	FC:	
% SILT/CLAY:	**44.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**20.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

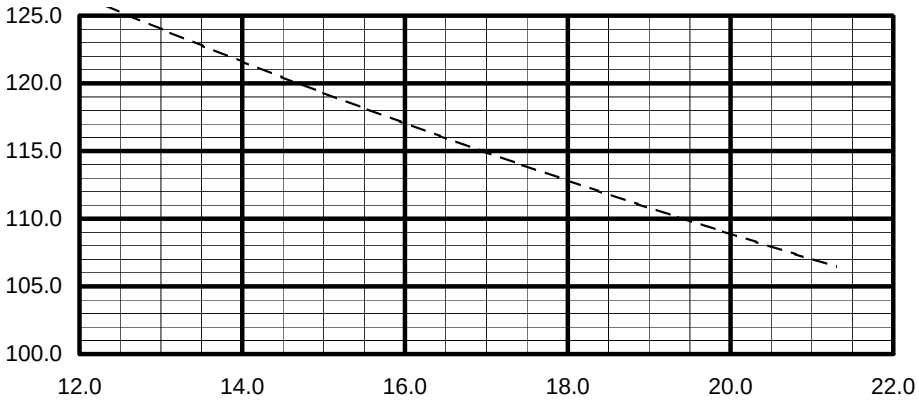
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**83**	
12.7	1/2"	**81**	
9.5	3/8"	**81**	
4.75	# 4	**79**	
2	#10	**77**	
0.85	#20	**75**	
0.425	#40	**73**	
0.25	# 60	**69**	
0.15	#100	**65**	
0.075	#200	**44.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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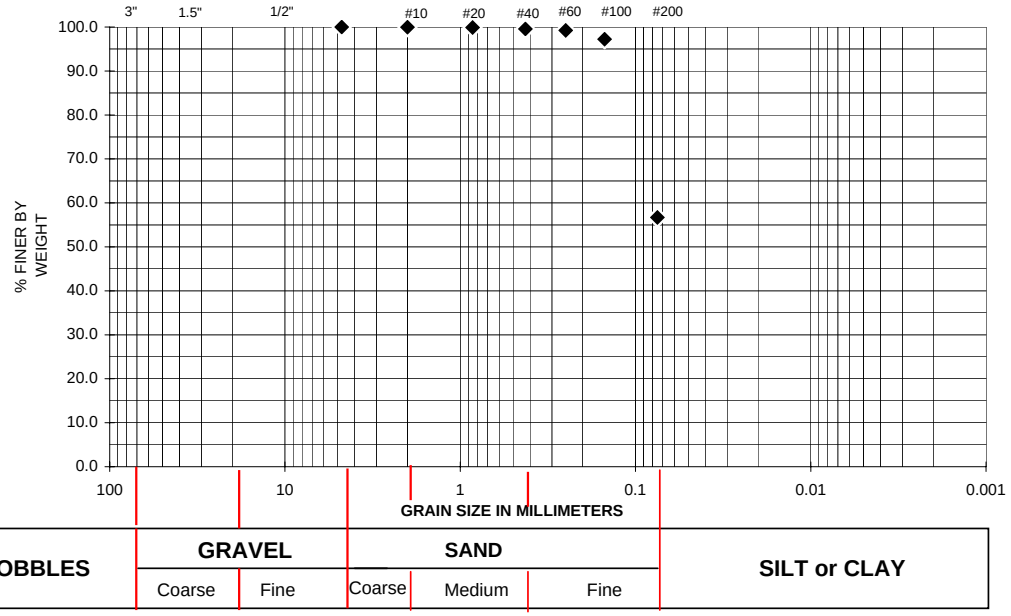
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-38**
SAMPLE NO/ DEPTH	**SA-7 (Depth 35' - 37')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**43.3**	FC:	
% SILT/CLAY:	**56.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

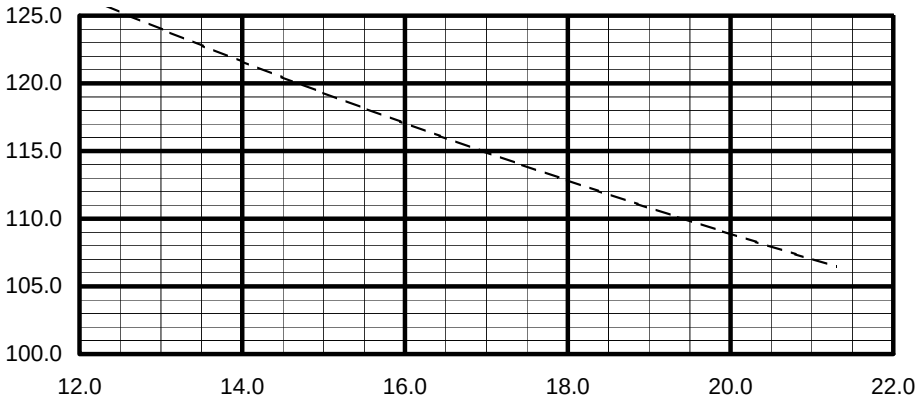
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**97**	
0.075	#200	**56.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
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Atterberg Limit ASTM 4318	

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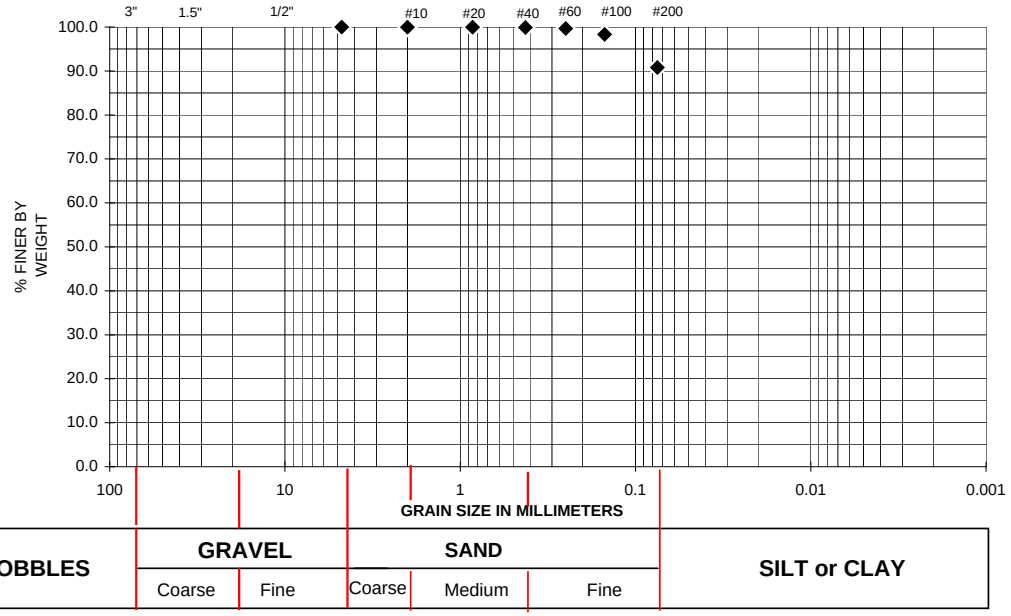
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-39**
SAMPLE NO/ DEPTH	**SA-1 (Depth 4' - 6')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**9.2**	FC:	
% SILT/CLAY:	**90.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**32.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

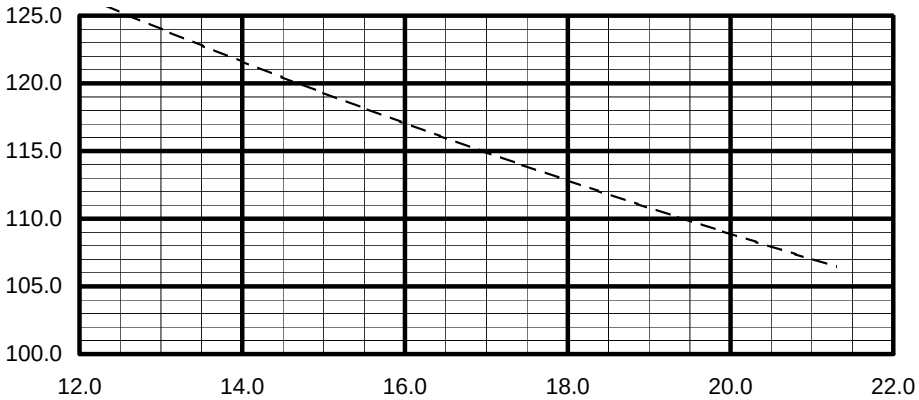
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**98**	
0.075	#200	**90.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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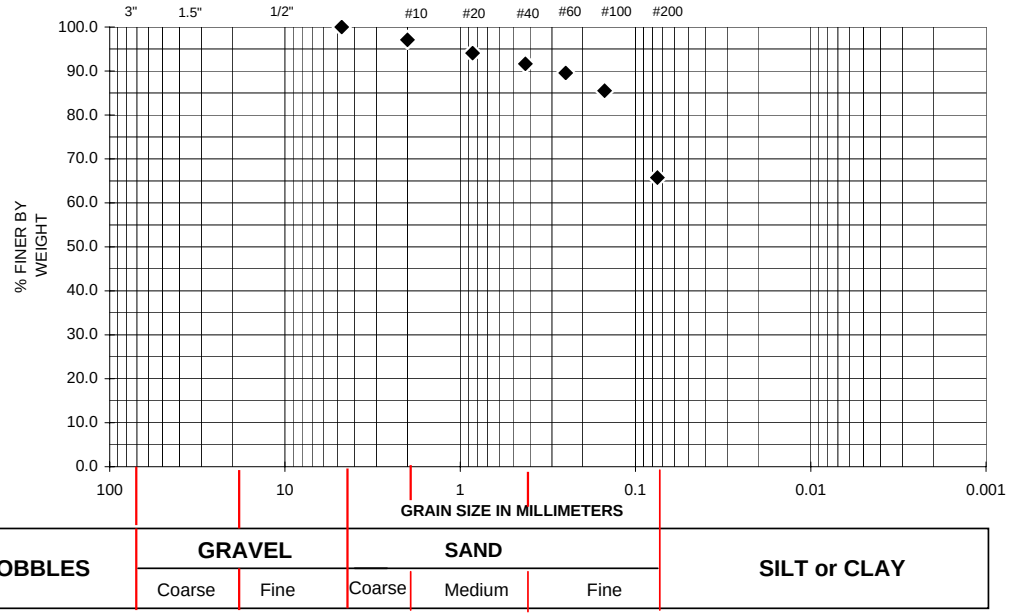
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-39**
SAMPLE NO/ DEPTH	**SA-3 (Depth 14' - 16')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**34.2**	FC:	
% SILT/CLAY:	**65.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**28.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

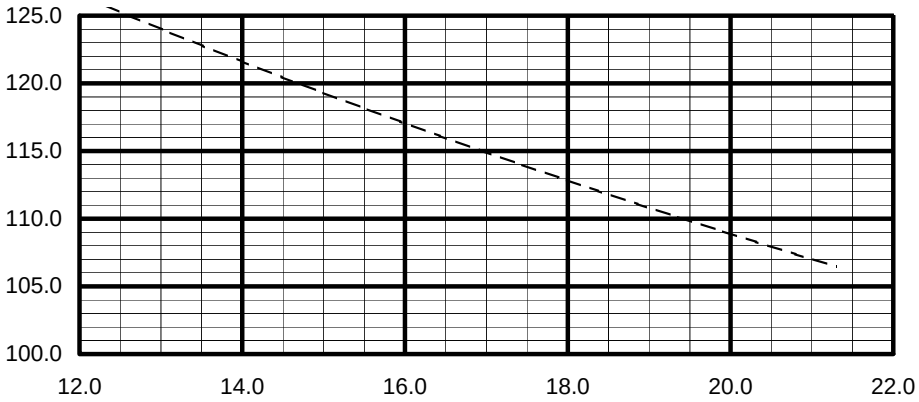
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**97**	
0.85	#20	**94**	
0.425	#40	**92**	
0.25	# 60	**90**	
0.15	#100	**86**	
0.075	#200	**65.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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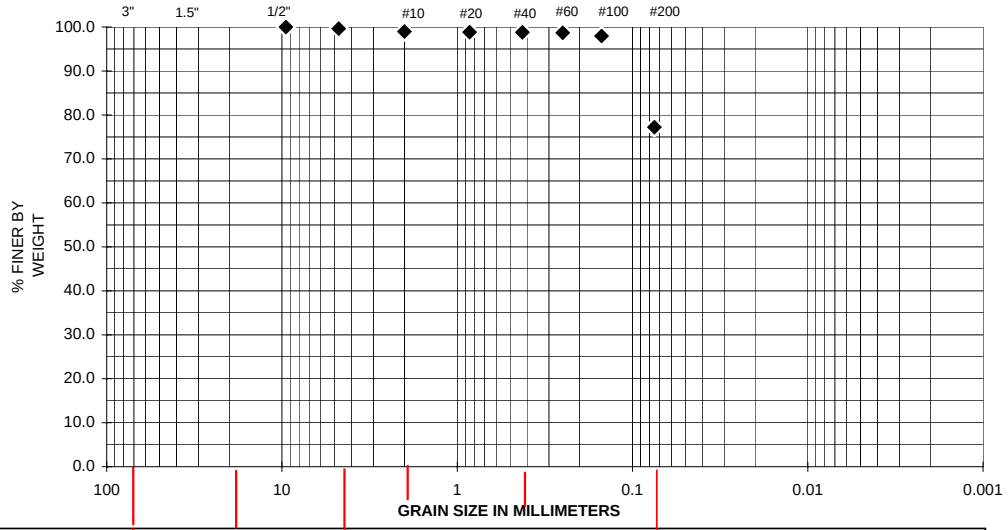
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-39**
SAMPLE NO/ DEPTH	**SA-6 (Depth 29' - 31')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.4**	USC:	**ML**
% SAND:	**22.4**	FC:	
% SILT/CLAY:	**77.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.1**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

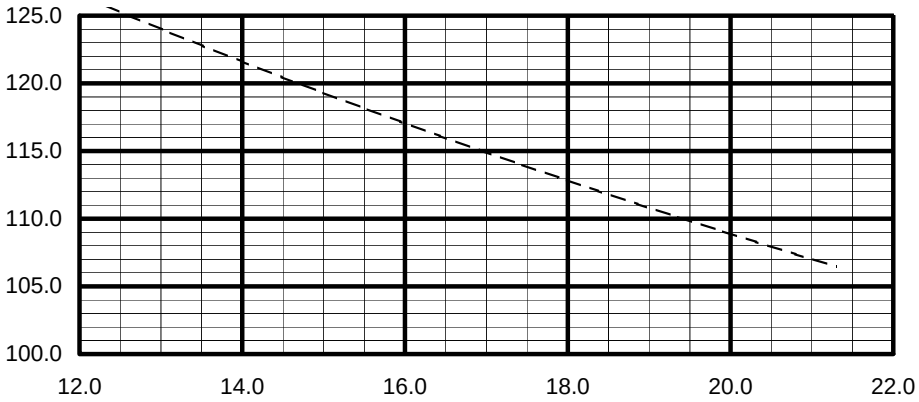
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"	**100**	
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**99**	
0.425	#40	**99**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**77.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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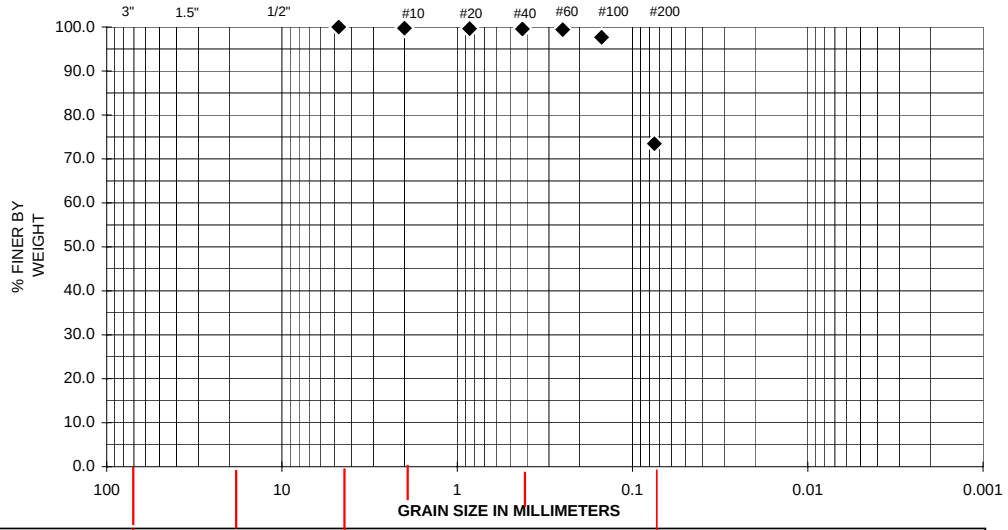
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-40**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**26.5**	FC:	
% SILT/CLAY:	**73.5**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**27.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

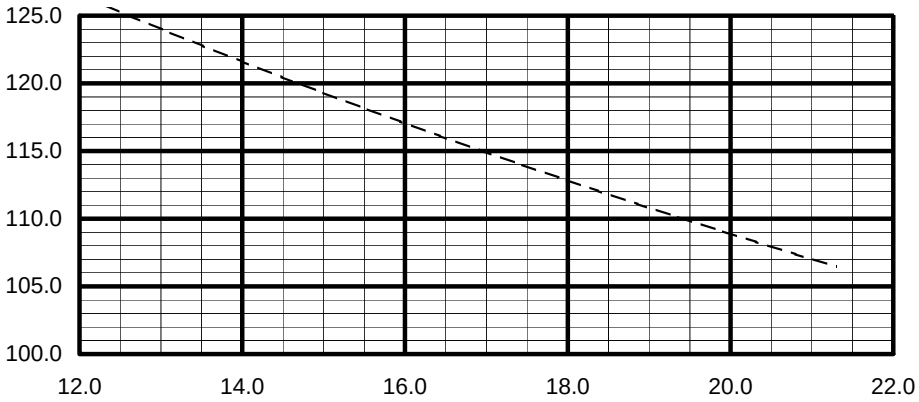
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**73.5**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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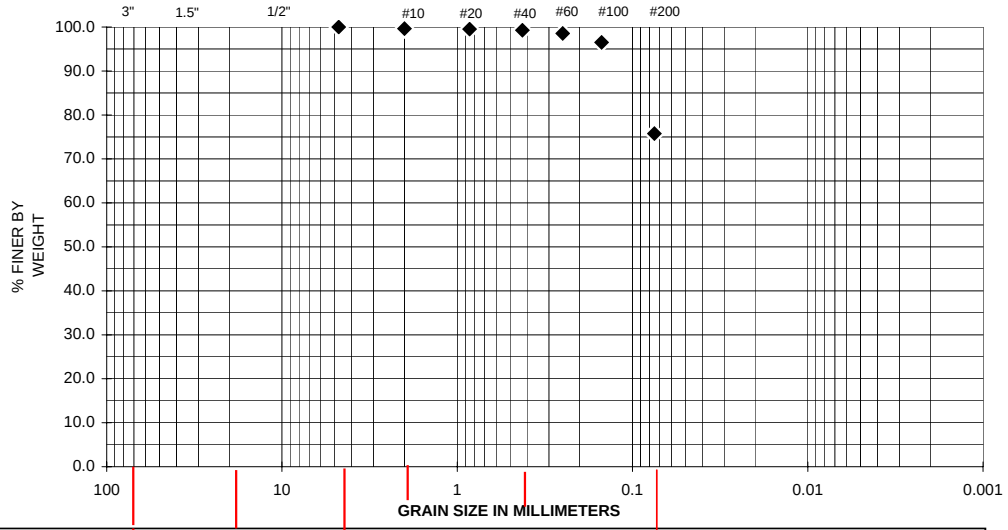
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-40**
SAMPLE NO/ DEPTH	**SA-3 (Depth 13' - 15')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**24.2**	FC:	
% SILT/CLAY:	**75.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**-8.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

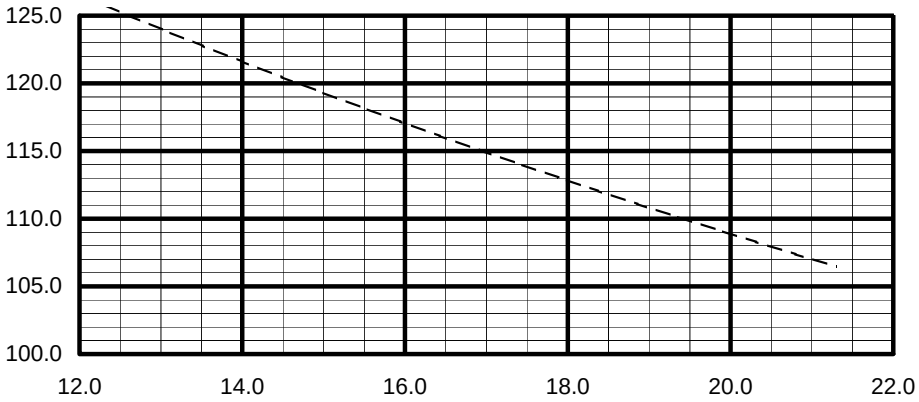
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**99**	
0.25	# 60	**99**	
0.15	#100	**97**	
0.075	#200	**75.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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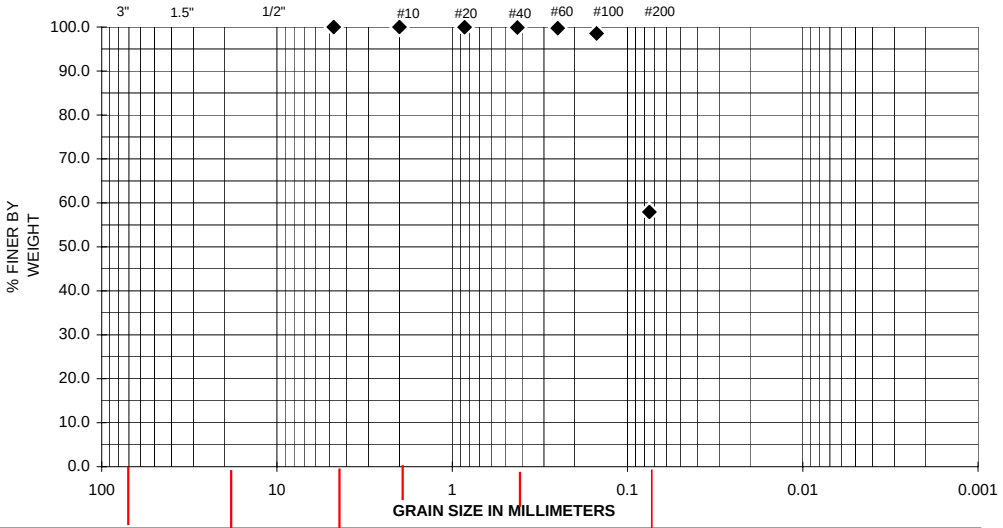
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-41**
SAMPLE NO/ DEPTH	**SA-1 (Depth 4' - 6')**
DESCRIPTION:	**Sandy silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**42.1**	FC:	
% SILT/CLAY:	**57.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**28.3**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

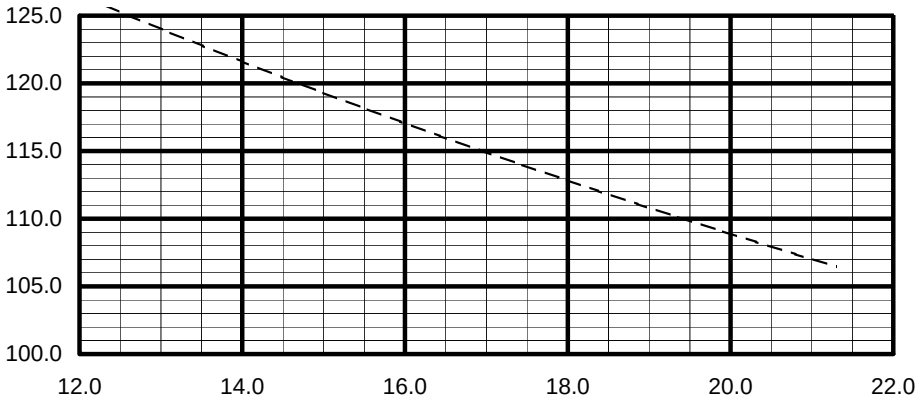
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**100**	
0.15	#100	**99**	
0.075	#200	**57.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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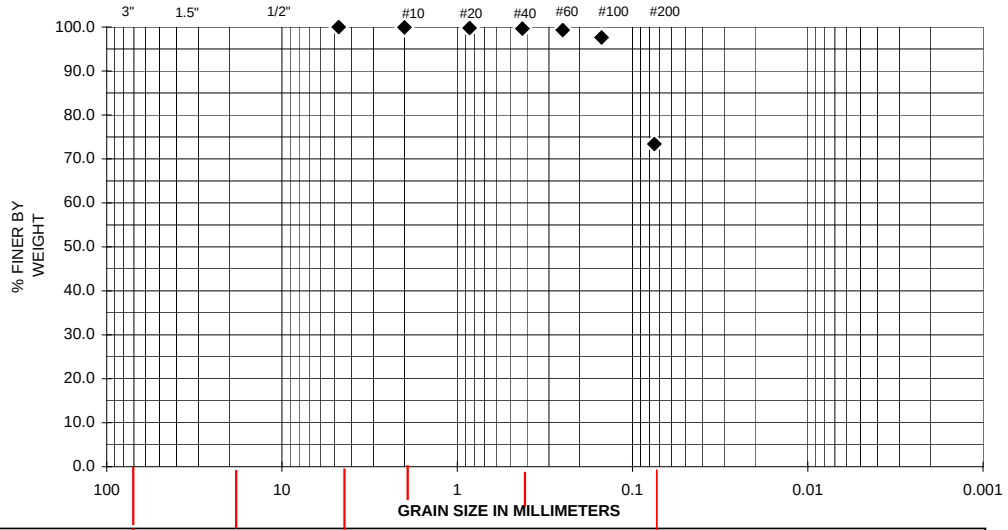
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-41**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**26.6**	FC:	
% SILT/CLAY:	**73.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**28.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

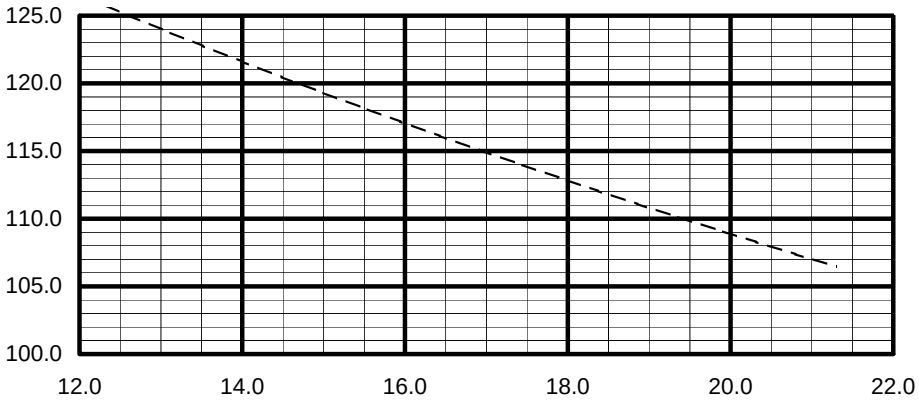
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**98**	
0.075	#200	**73.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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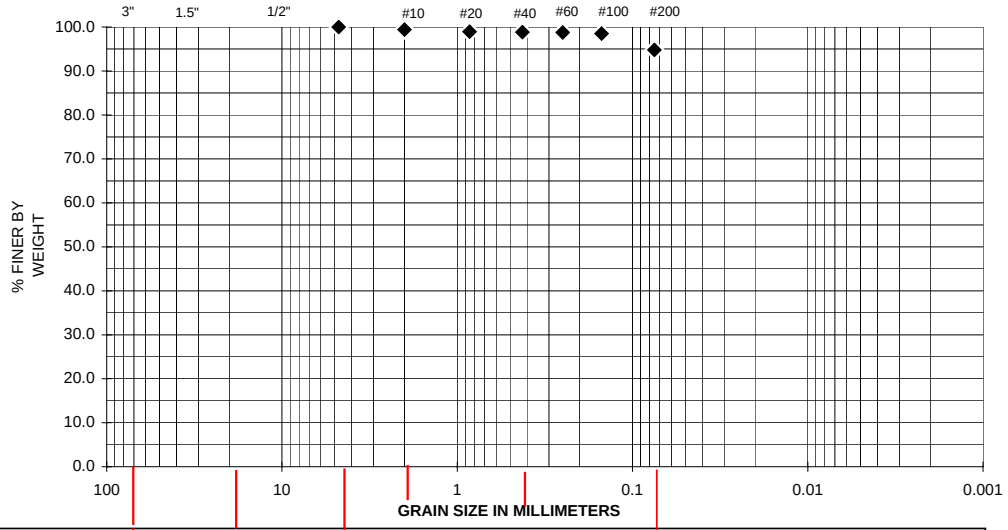
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-42**
SAMPLE NO/ DEPTH	**SA-1 (Depth 4' - 6')**
DESCRIPTION:	**Silt**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**ML**
% SAND:	**5.2**	FC:	
% SILT/CLAY:	**94.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**29.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

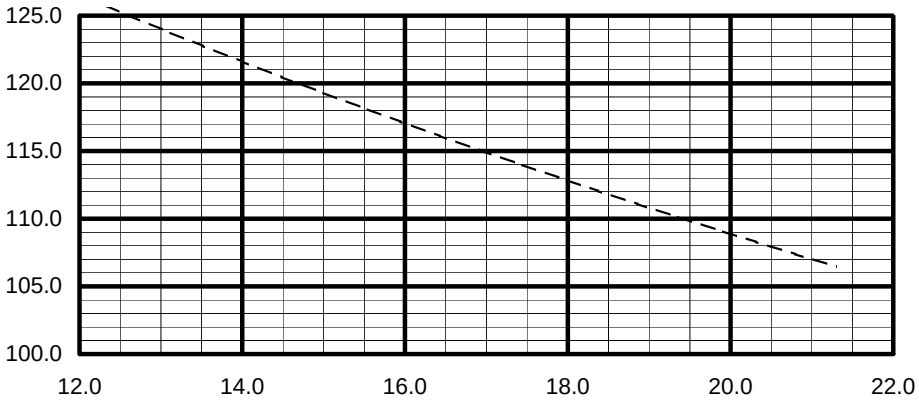
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**99**	
0.85	#20	**99**	
0.425	#40	**99**	
0.25	# 60	**99**	
0.15	#100	**99**	
0.075	#200	**94.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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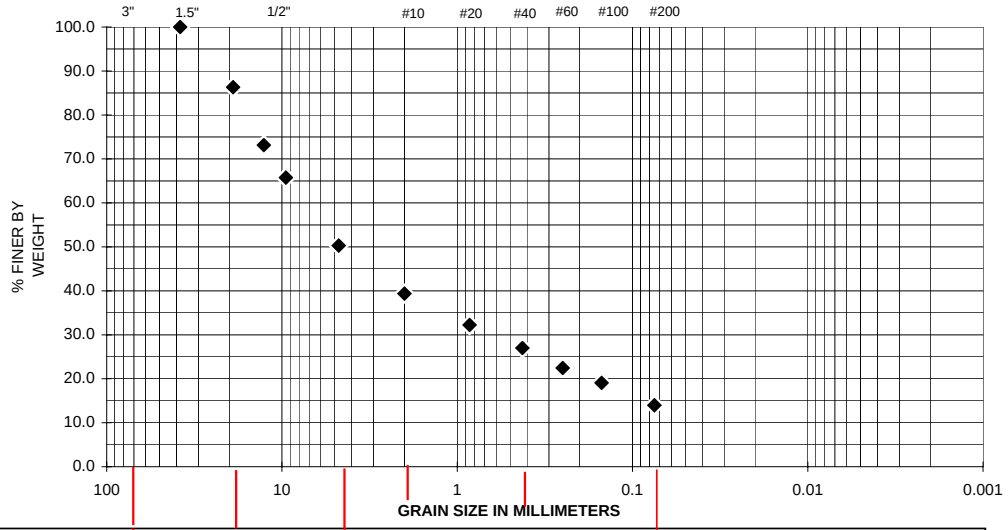
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-42**
SAMPLE NO/ DEPTH	**SA-2 (Depth 9' - 11')**
DESCRIPTION:	**Silty gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**49.7**	USC:	**GM**
% SAND:	**36.3**	FC:	
% SILT/CLAY:	**14.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**8.2**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

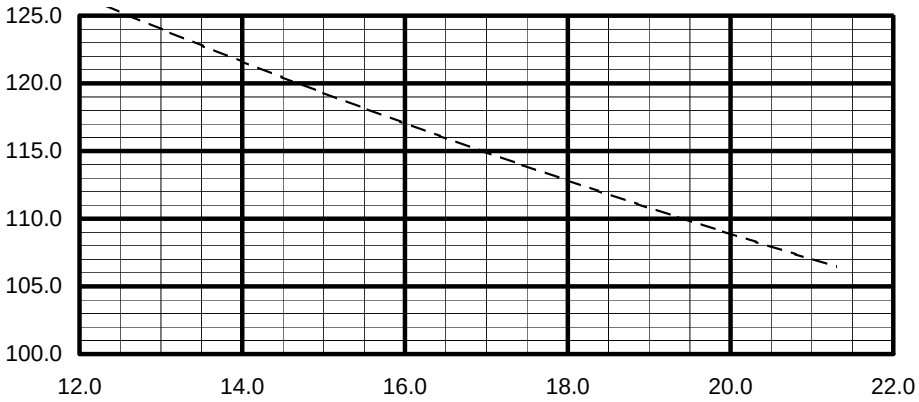
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**86**	
12.7	1/2"	**73**	
9.5	3/8"	**66**	
4.75	# 4	**50**	
2	#10	**39**	
0.85	#20	**32**	
0.425	#40	**27**	
0.25	# 60	**22**	
0.15	#100	**19**	
0.075	#200	**14.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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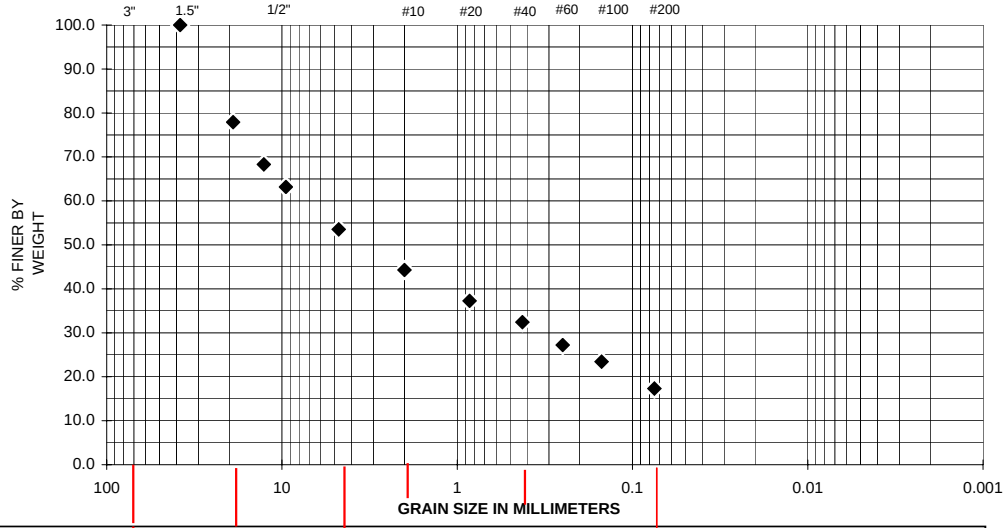
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-44**
SAMPLE NO/ DEPTH	**SA-1 (Depth 0' - 2')**
DESCRIPTION:	**Silty gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**46.5**	USC:	**GM**
% SAND:	**36.2**	FC:	
% SILT/CLAY:	**17.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**7.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

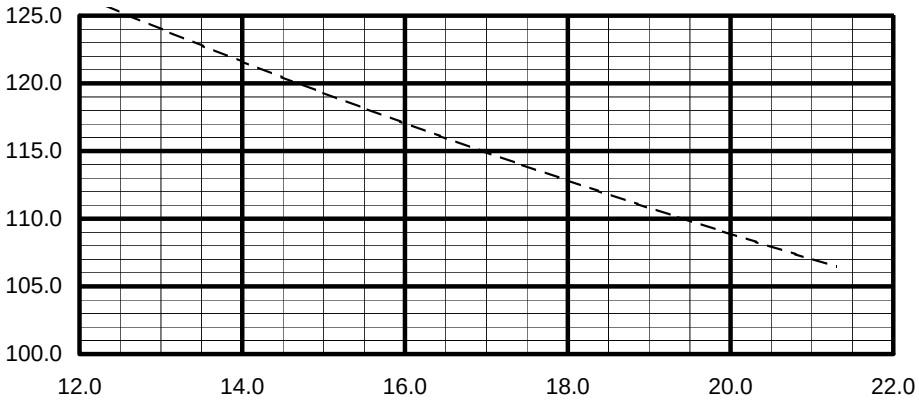
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**78**	
12.7	1/2"	**68**	
9.5	3/8"	**63**	
4.75	# 4	**54**	
2	#10	**44**	
0.85	#20	**37**	
0.425	#40	**32**	
0.25	# 60	**27**	
0.15	#100	**23**	
0.075	#200	**17.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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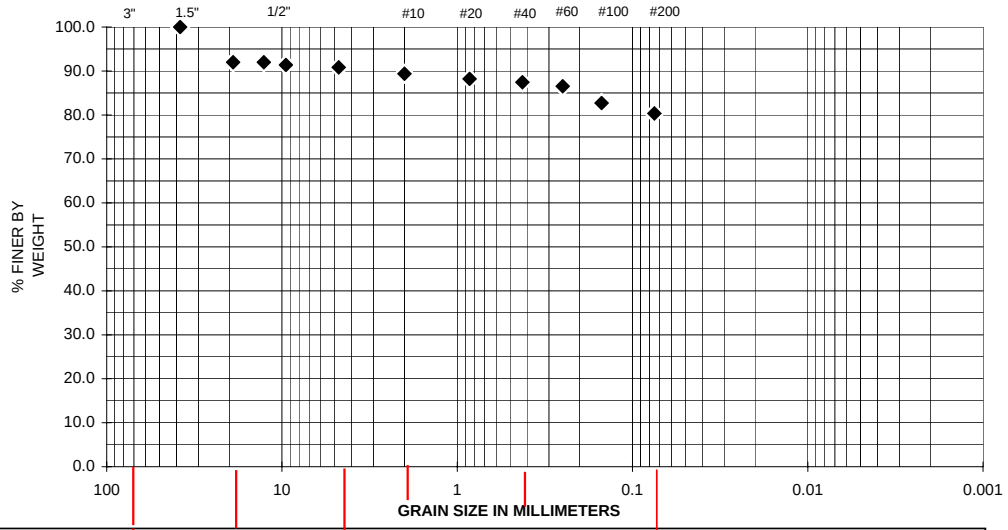
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-44**
SAMPLE NO/ DEPTH	**SA-7 (Depth 30' - 32')**
DESCRIPTION:	**Silt with sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**9.2**	USC:	**ML**
% SAND:	**10.5**	FC:	
% SILT/CLAY:	**80.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**24.3**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

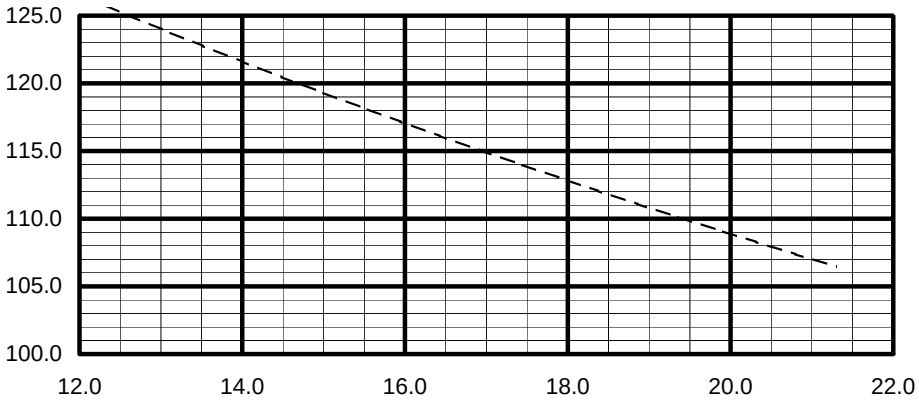
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**92**	
12.7	1/2"	**92**	
9.5	3/8"	**91**	
4.75	# 4	**91**	
2	#10	**89**	
0.85	#20	**88**	
0.425	#40	**87**	
0.25	# 60	**87**	
0.15	#100	**83**	
0.075	#200	**80.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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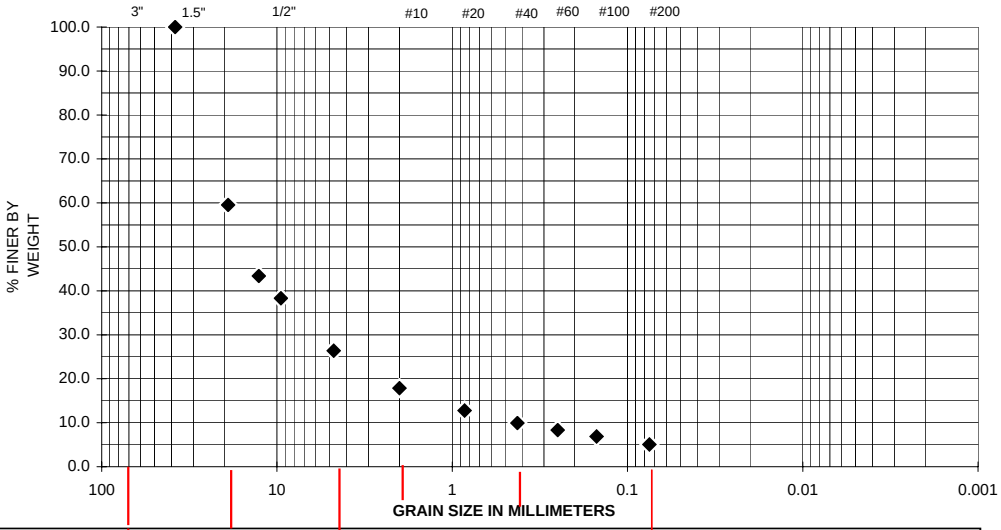
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-45**
SAMPLE NO/ DEPTH	**SA-1 (Depth 2' - 4')**
DESCRIPTION:	**Poorly grd. gravel w/ silt & sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**73.6**	USC:	**GP-GM**
% SAND:	**21.3**	FC:	
% SILT/CLAY:	**5.1**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**5.7**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

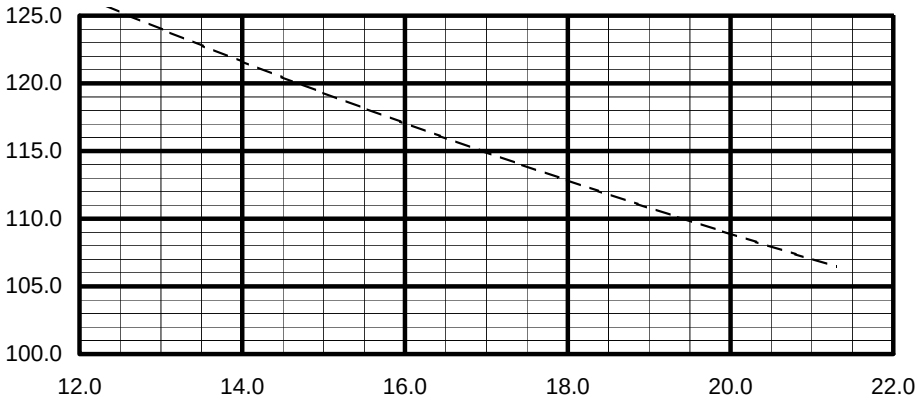
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**60**	
12.7	1/2"	**43**	
9.5	3/8"	**38**	
4.75	# 4	**26**	
2	#10	**18**	
0.85	#20	**13**	
0.425	#40	**10**	
0.25	# 60	**8**	
0.15	#100	**7**	
0.075	#200	**5.1**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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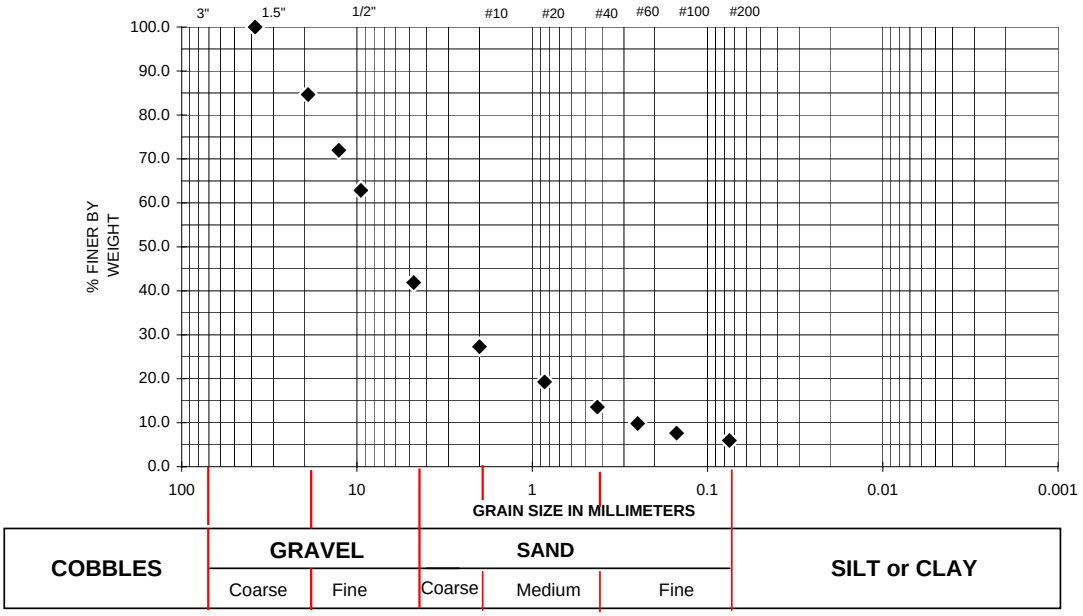
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-45**
SAMPLE NO/ DEPTH	**SA-2 (Depth 7' - 9')**
DESCRIPTION:	**Well grd. gravel w/ silt & sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**58.1**	USC:	**GW-GM**
% SAND:	**35.9**	FC:	
% SILT/CLAY:	**6.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**6.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

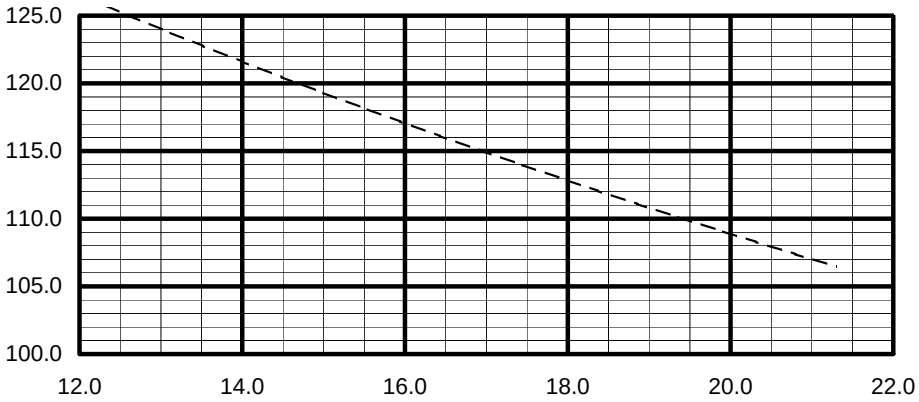
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**85**	
12.7	1/2"	**72**	
9.5	3/8"	**63**	
4.75	# 4	**42**	
2	#10	**27**	
0.85	#20	**19**	
0.425	#40	**14**	
0.25	# 60	**10**	
0.15	#100	**8**	
0.075	#200	**6.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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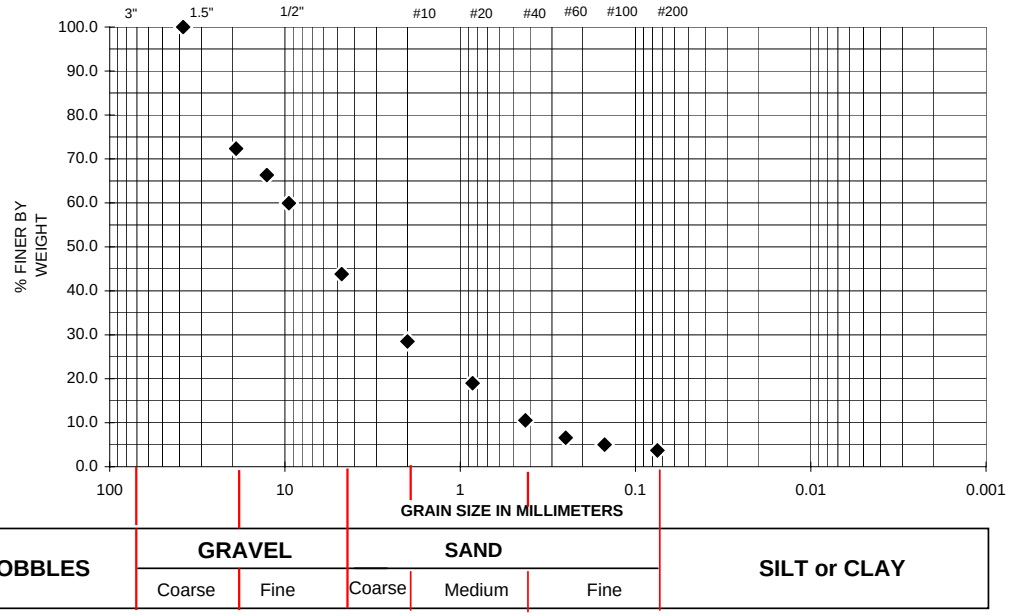
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-46**
SAMPLE NO/ DEPTH	**SA-1 (Depth 3' - 5')**
DESCRIPTION:	**Well grd. gravel w/ sand**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**56.2**	USC:	**GW**
% SAND:	**40.1**	FC:	
% SILT/CLAY:	**3.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**5.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

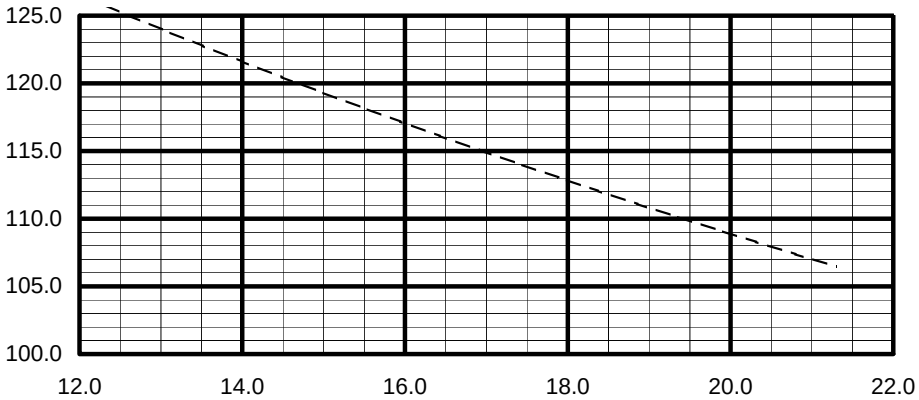
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**72**	
12.7	1/2"	**66**	
9.5	3/8"	**60**	
4.75	# 4	**44**	
2	#10	**28**	
0.85	#20	**19**	
0.425	#40	**11**	
0.25	# 60	**7**	
0.15	#100	**5**	
0.075	#200	**3.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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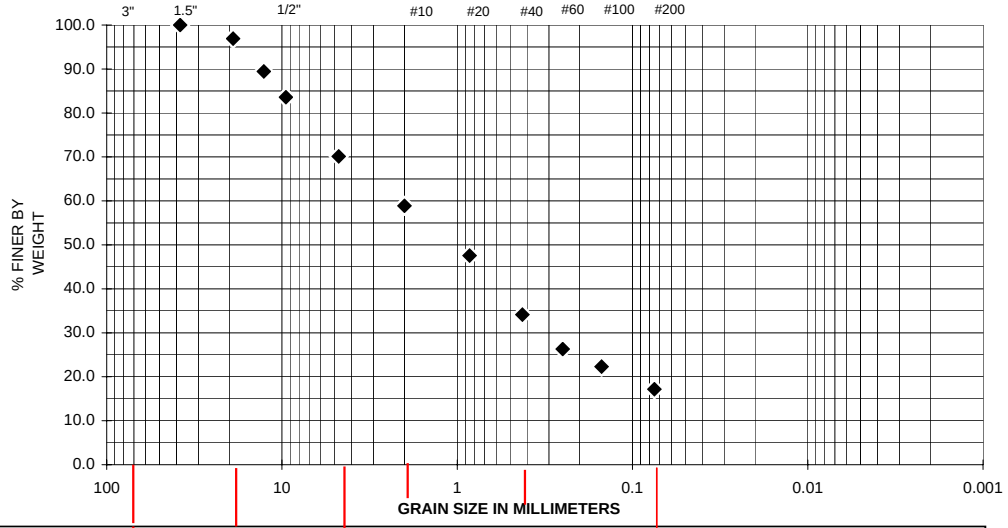
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-46**
SAMPLE NO/ DEPTH	**SA-2 (Depth 8' - 10')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**29.9**	USC:	**SM**
% SAND:	**52.9**	FC:	
% SILT/CLAY:	**17.2**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**10.9**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

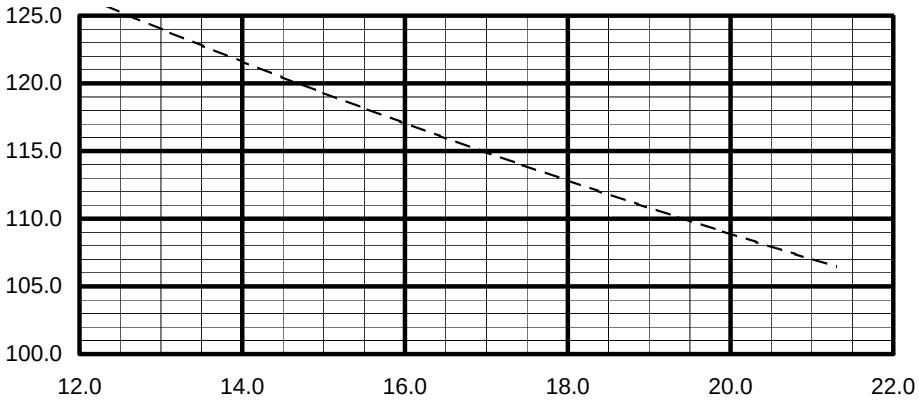
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**97**	
12.7	1/2"	**89**	
9.5	3/8"	**84**	
4.75	# 4	**70**	
2	#10	**59**	
0.85	#20	**48**	
0.425	#40	**34**	
0.25	# 60	**26**	
0.15	#100	**22**	
0.075	#200	**17.2**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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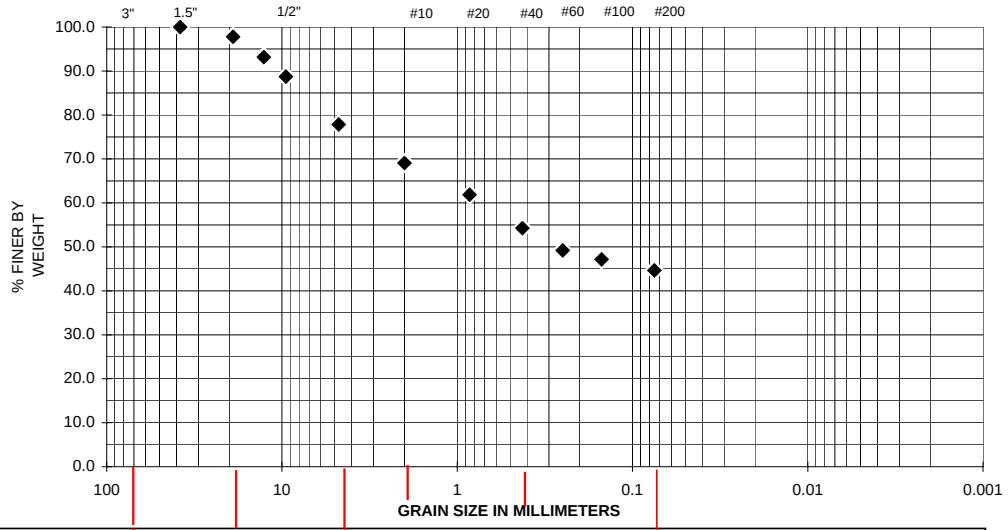
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-46**
SAMPLE NO/ DEPTH	**SA-3 (Depth 13' - 15')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**22.2**	USC:	**SM**
% SAND:	**33.2**	FC:	
% SILT/CLAY:	**44.6**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**16.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



COBBLES	GRAVEL		SAND			SILT or CLAY
	Coarse	Fine	Coarse	Medium	Fine	

SIEVE ANALYSIS RESULT

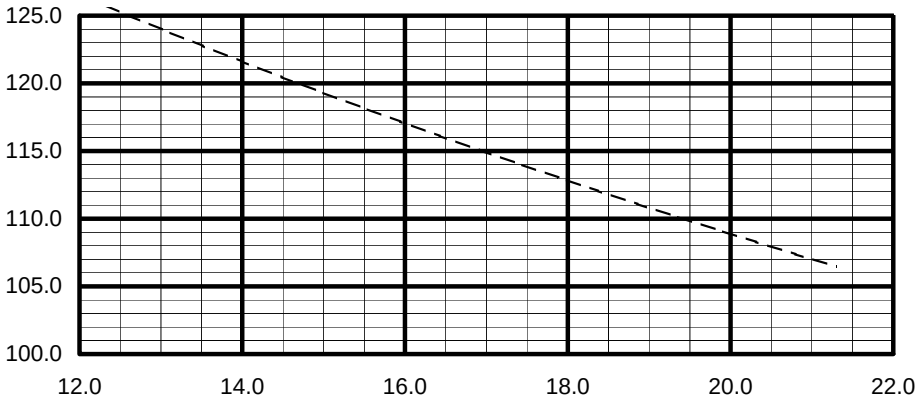
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**98**	
12.7	1/2"	**93**	
9.5	3/8"	**89**	
4.75	# 4	**78**	
2	#10	**69**	
0.85	#20	**62**	
0.425	#40	**54**	
0.25	# 60	**49**	
0.15	#100	**47**	
0.075	#200	**44.6**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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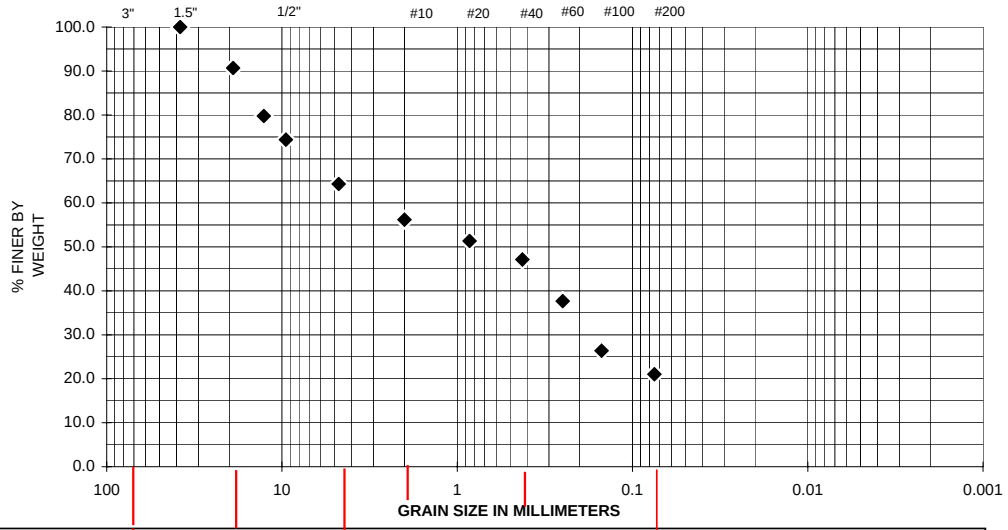
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-48**
SAMPLE NO/ DEPTH	**SA-4 (Depth 18' - 20')**
DESCRIPTION:	**Silty sand w/ gravel**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**35.7**	USC:	**SM**
% SAND:	**43.3**	FC:	
% SILT/CLAY:	**21.0**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**12.6**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

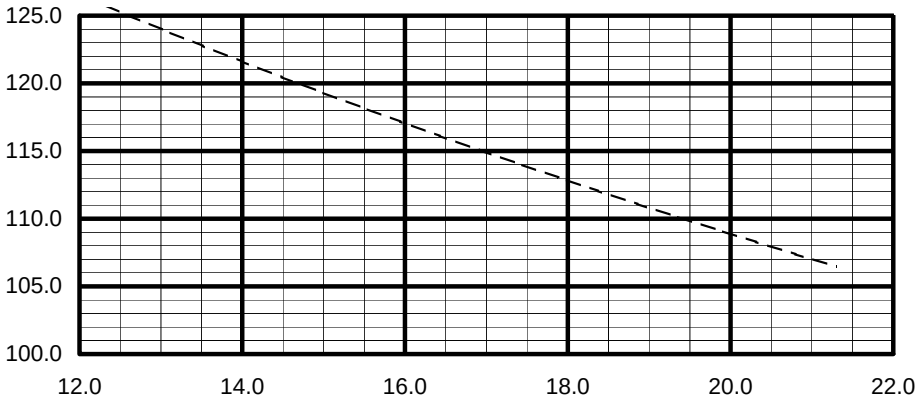
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**91**	
12.7	1/2"	**80**	
9.5	3/8"	**74**	
4.75	# 4	**64**	
2	#10	**56**	
0.85	#20	**51**	
0.425	#40	**47**	
0.25	# 60	**38**	
0.15	#100	**26**	
0.075	#200	**21.0**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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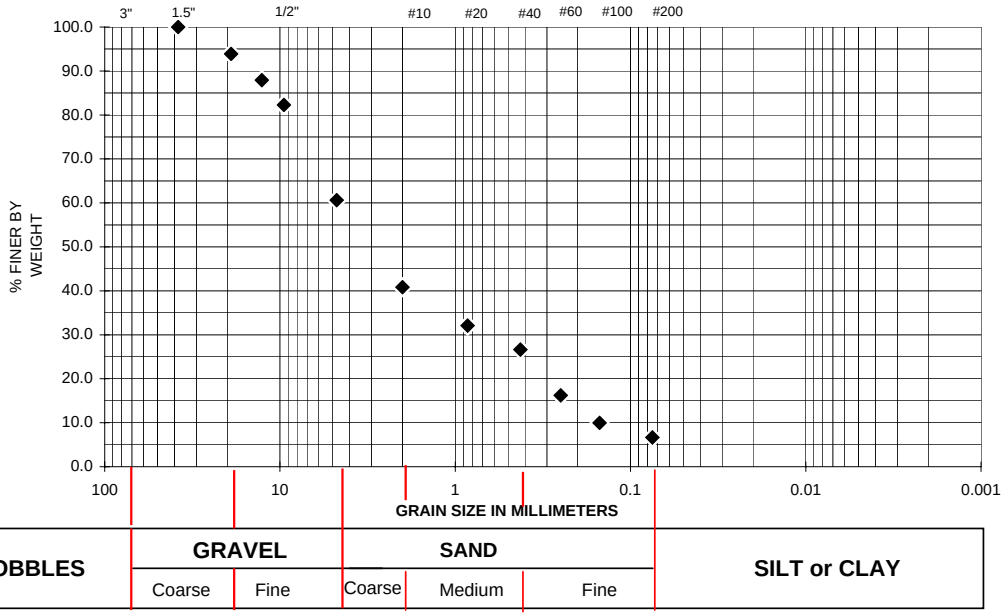
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-48**
SAMPLE NO/ DEPTH	**SA-5 (Depth 23' - 25')**
DESCRIPTION:	**Poorly grd. sand w/ silt & gravel.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**39.4**	USC:	**SP-SM**
% SAND:	**54.0**	FC:	
% SILT/CLAY:	**6.7**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**8.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

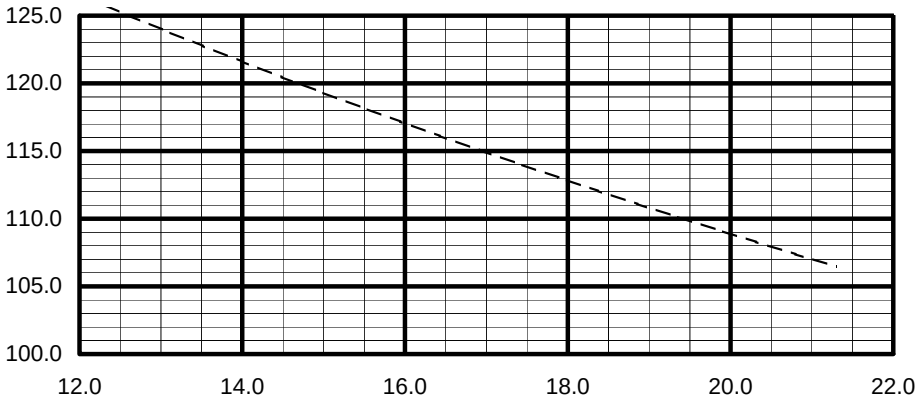
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"	**100**	
19.05	3/4"	**94**	
12.7	1/2"	**88**	
9.5	3/8"	**82**	
4.75	# 4	**61**	
2	#10	**41**	
0.85	#20	**32**	
0.425	#40	**27**	
0.25	# 60	**16**	
0.15	#100	**10**	
0.075	#200	**6.7**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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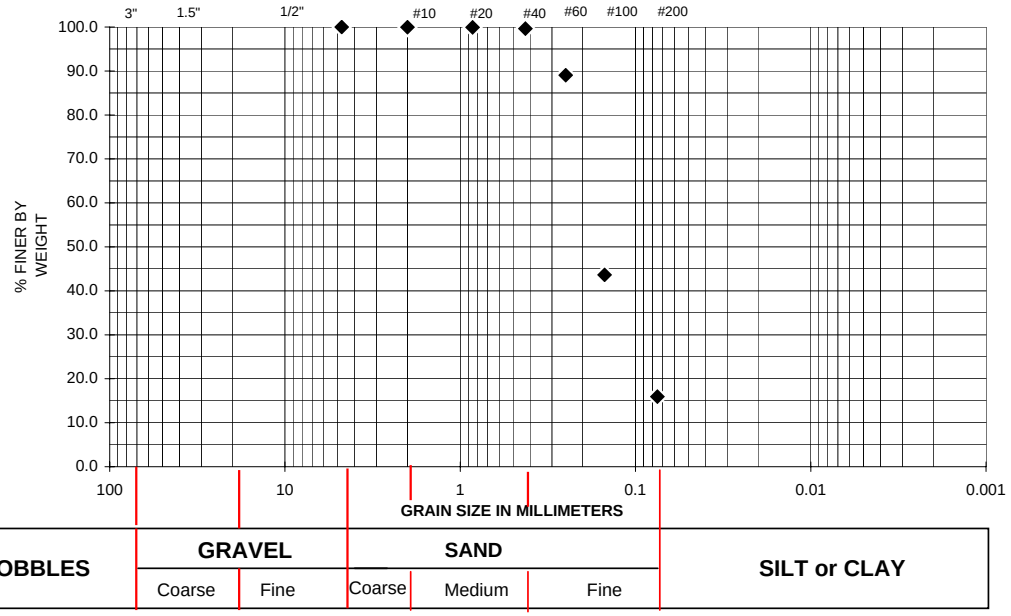
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-49**
SAMPLE NO/ DEPTH	**SA-1 (Depth 5' - 7')**
DESCRIPTION:	**Silty sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SM**
% SAND:	**84.1**	FC:	
% SILT/CLAY:	**15.9**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**21.4**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

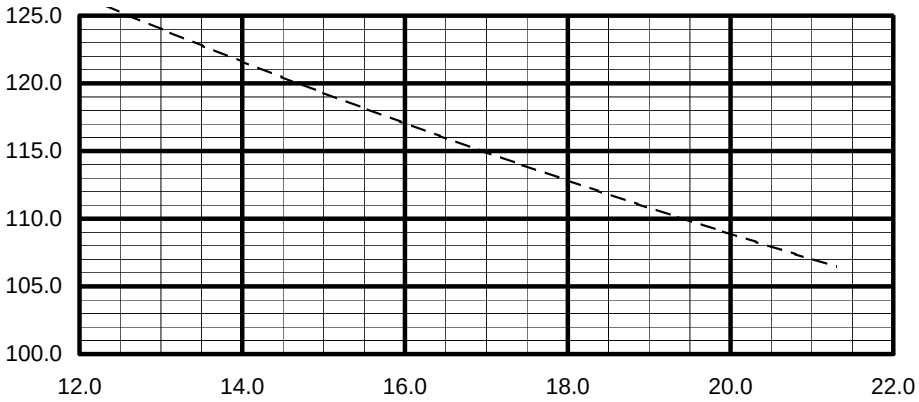
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**89**	
0.15	#100	**44**	
0.075	#200	**15.9**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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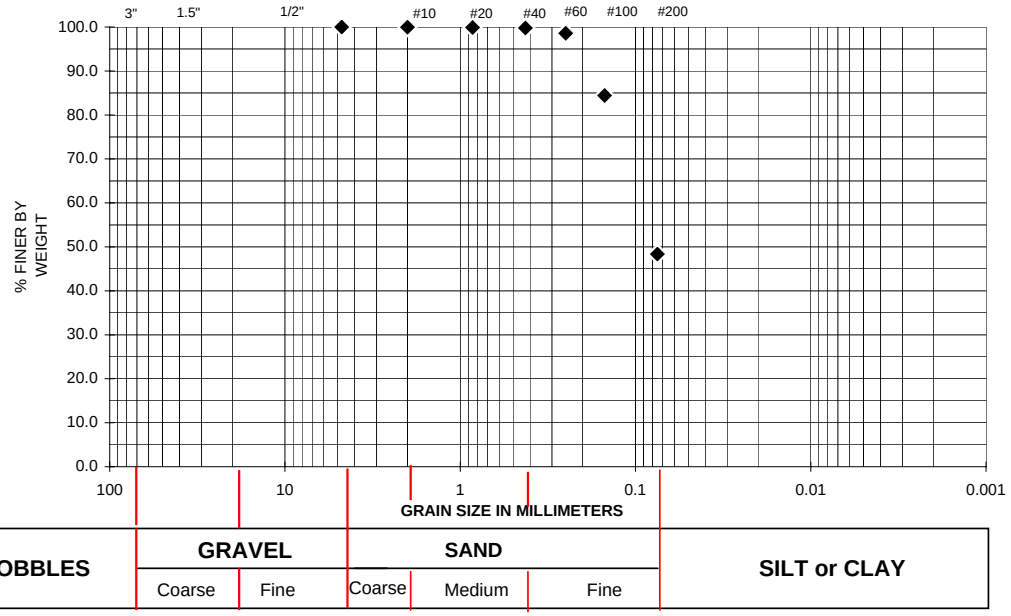
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-49**
SAMPLE NO/ DEPTH	**SA-2 (Depth 10' - 12')**
DESCRIPTION:	**Silty sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SM**
% SAND:	**51.6**	FC:	
% SILT/CLAY:	**48.4**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**23.5**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

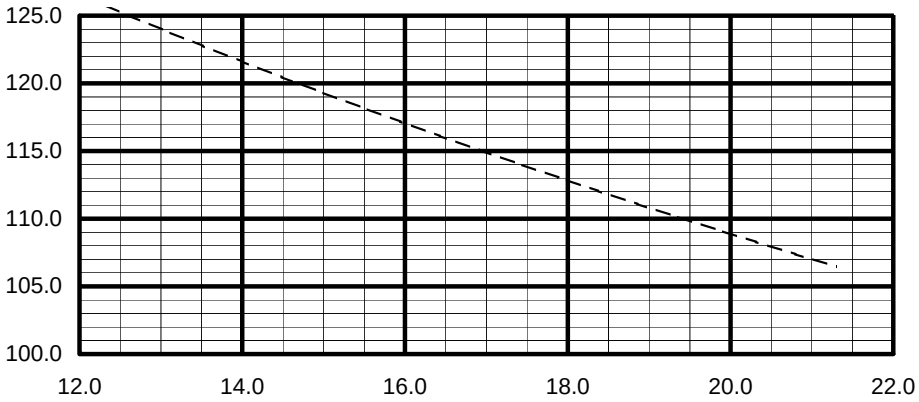
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**100**	
0.25	# 60	**99**	
0.15	#100	**84**	
0.075	#200	**48.4**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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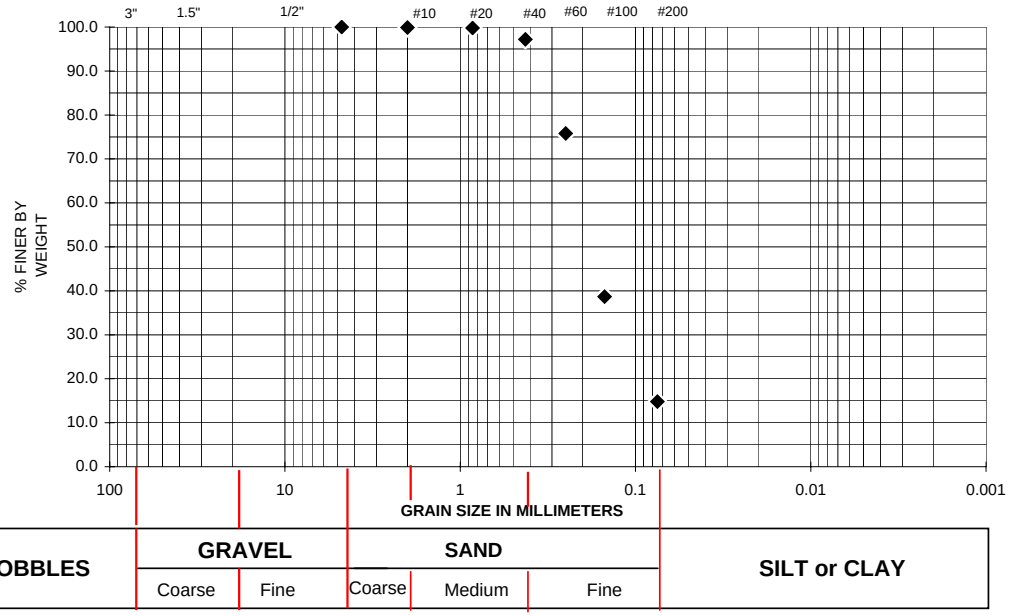
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-49**
SAMPLE NO/ DEPTH	**SA-3 (Depth 15' - 17')**
DESCRIPTION:	**Silty sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SM**
% SAND:	**85.2**	FC:	
% SILT/CLAY:	**14.8**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**19.8**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

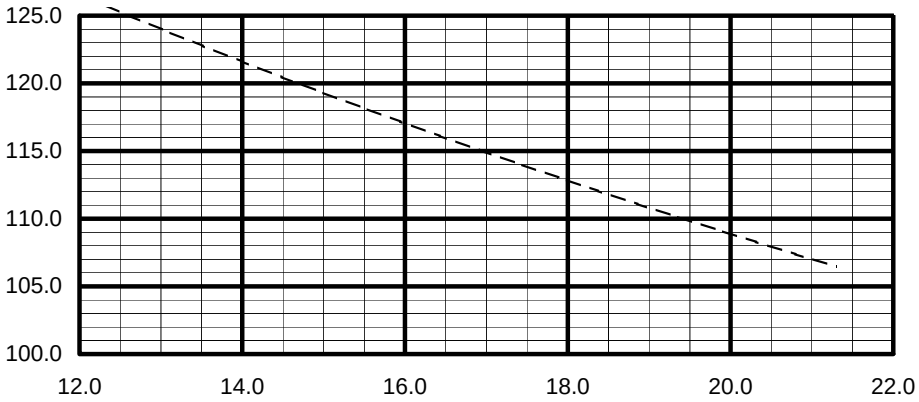
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**97**	
0.25	# 60	**76**	
0.15	#100	**39**	
0.075	#200	**14.8**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

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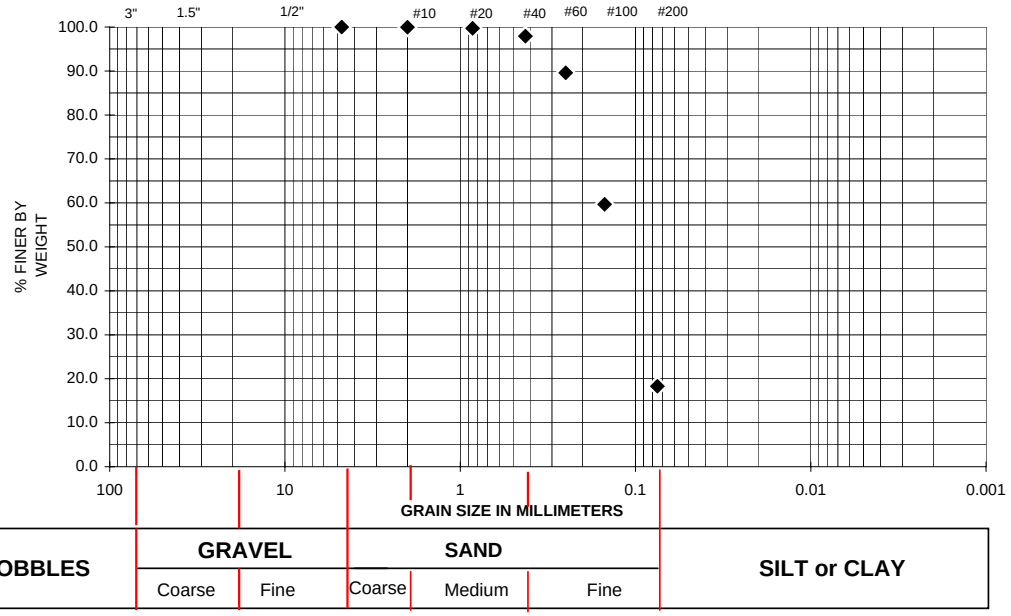
PROJECT CLIENT:	**Corps of Engrs - Alaska District**
PROJECT NAME:	**Port of Anchorage**
PROJECT NO.:	**1807-07**
SAMPLE LOCATION:	**TB-49**
SAMPLE NO/ DEPTH	**SA-4 (Depth 20' - 22')**
DESCRIPTION:	**Silty sand.**
DATE TESTED:	**10/12/2007**
TESTED BY:	**DP**
REVIEWED BY:	**Ron Caron C.E.T.**

% GRAVEL:	**0.0**	USC:	**SM**
% SAND:	**81.7**	FC:	
% SILT/CLAY:	**18.3**	.02 mm:	

ASTM D1557(uncorrected)	pcf
ASTM D4718 (corrected)	pcf
OPTIMUM M.C.% (corrected)	
NATURAL M.C. %	**22.0**

PARTICLE SIZE ANALYSIS

ASTM D422/ C136



SIEVE ANALYSIS RESULT

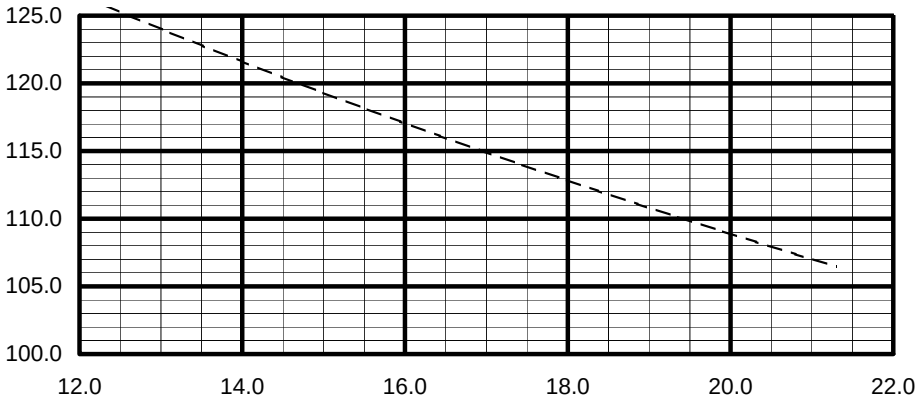
SIEVE SIZE (mm)	SIEVE SIZE (in.)	TOTAL % PASSING	SPEC
152.4	6"		
76.2	3"		
38.1	1.5"		
19.05	3/4"		
12.7	1/2"		
9.5	3/8"		
4.75	# 4	**100**	
2	#10	**100**	
0.85	#20	**100**	
0.425	#40	**98**	
0.25	# 60	**90**	
0.15	#100	**60**	
0.075	#200	**18.3**	

HYDROMETER RESULT

ELAPSED TIME	DIAMETER (mm)	TOTAL % PASSING
0		
0.5		
1		
2		
4		
8		
15		
30		
60		
250		
1440		

MOISTURE-DENSITY RELATIONSHIP

ASTM D1557



Perm. (ASTM D2438)	
Degradation (ATM T-13)	
Atterberg Limit ASTM 4318	

APPENDIX C
STANDARD PENETRATION ENERGY MEASUREMENTS

October 9, 2007

Mr. Greg Carpenter
US Army Corps of Engineers District, AK
CEPOA-CT (W911KB)
PO Box 6898
2204 3rd St.
Elmendorf AFB, AK 99506

Re: Standard Penetration Energy Measurements
Automatic Hammer on Gregg Drilling's Mobile B-80 drill rig, BORING TB-32
Port of Anchorage
Anchorage, Alaska

Dear Mr. Carpenter

This report offers results of energy measurements and related calculations made on September 11, 2007 during Standard Penetration Testing (SPT) on Gregg Drilling's mud rotary drill rig. Dynamic tests were performed on an instrumented section of NWJ drill rod attached to the sampler rod string. All dynamic measurements were obtained and recorded using a Pile Driving Analyzer®.

Equipment:

SPT energy measurements were made on SPT samplers driven by the hammer/anvil system on the Gregg Drilling drill rig on September 11, 2007. The rig was tested on the Skate III jack-up barge in the Port of Anchorage Project area. In total, 8 energy measurements were collected corresponding to 8 different samples at increasing depth.

Gregg used a Model PAK Pile Driving Analyzer (PDA) to acquire and process measurements of force and velocity with every impact of the automatic hammer on the sample rods. Two strain gauges mounted on a two foot section of NWJ rod measured force, while two piezoresistive accelerometers bolted on the same rod measured acceleration. The gauges were mounted approximately 6" from the top of the rod.
Analog signals from the gauges and accelerometers were collected, digitized, displayed in real-time, and stored by the PDA. Selected output from the PDA for each recorded impact of the hammer included:

- Maximum force in the rod (FMX)
- Maximum velocity in the rod (VMX)
- Maximum calculated transferred energy (EMX)
- Blows per minute (BPM)
- Energy transferred to the rods (ETR)

Data and Calculations:

The purpose of testing was to measure the energy transferred from the hammer to the drill rod and to calculate the energy efficiency of the hammer. The PDA measurements of force and velocity were reviewed after field testing and analyzed to calculate the transferred energy (EMX).

The maximum energy transferred past the gauge location, EMX, is computed by the PDA using force (F) and velocity (V) records as follows:

$$EMX = \int_a^b F(t)\, V(t)\, dt$$

The time "a" corresponds to the start of the record when the energy transfer begins and "b" is the time at which energy transferred to the rod reaches a maximum value. The energy transferred is defined as ETR, and is usually used to define the efficiency of the hammer/anvil system.

Results:

Table 1 summarizes the average calculated energies for each sample tested as well as the type of sample and depth. It is shown that the overall average (ETR) energy for this system is 75%. Appendix A provides plots and tables of PDA results for all hammer blows at each sampling depth. The plots and tables present selected measured and calculated results as a function of blow number. The results include:

- the blow number
- depth
- BLC (blow count in blows per foot)
- FMX (maximum rod force)
- VMX (maximum rod velocity)
- EMX (maximum transferred energy)
- BPM (blows per minute)
- ETR (energy transferred in percent of maximum)

At the end of each table is a statistical evaluation of the results for each variable including the average, standard deviation, maximum, and what blow number this maximum occurred.

If you have any questions or comments on this report, please do not hesitate to call our office at (562) 427-6899.

Sincerely,

Kelly Cabal
Engineer

Client: US ARMY CORPS OF ENGINEERS
Project: ANCHORAGE
Date: 9/11/2007
Boring: **TB-32**

Table 1 - SPT Sample Summary BORING TB-32

Sample #	Sampler	Length of Sample Rod (ft)	Sampler Length (ft)	Total Rod Length* (ft)	Depth of Sample (below Mudline) (ft)	Total Blows Analyzed by PDA	Average Energy Transferred to Rods (% of Theoretical Max.)	Maximum Efficiency Recorded (%)	Standard Deviation
1	SPT	82	4.80	86.8	80	2	71.7	76.1	NA
2	SPT	86	4.80	90.9	85	3	71.2	73.5	NA
3	SPT	91	4.80	95.8	90	12	74.5	82.0	4
4	SPT	96	4.80	100.8	95	9	72.6	75.7	3
5	SPT	101	4.80	105.8	100	8	78.9	81.8	2
6	SPT	106	4.80	110.8	105	8	78.6	81.5	2
7	SPT	111	4.80	115.8	110	15	76.2	79.3	2
8	SPT	116	4.80	120.8	115	24	78.8	81.3	2
						Average	75.3		

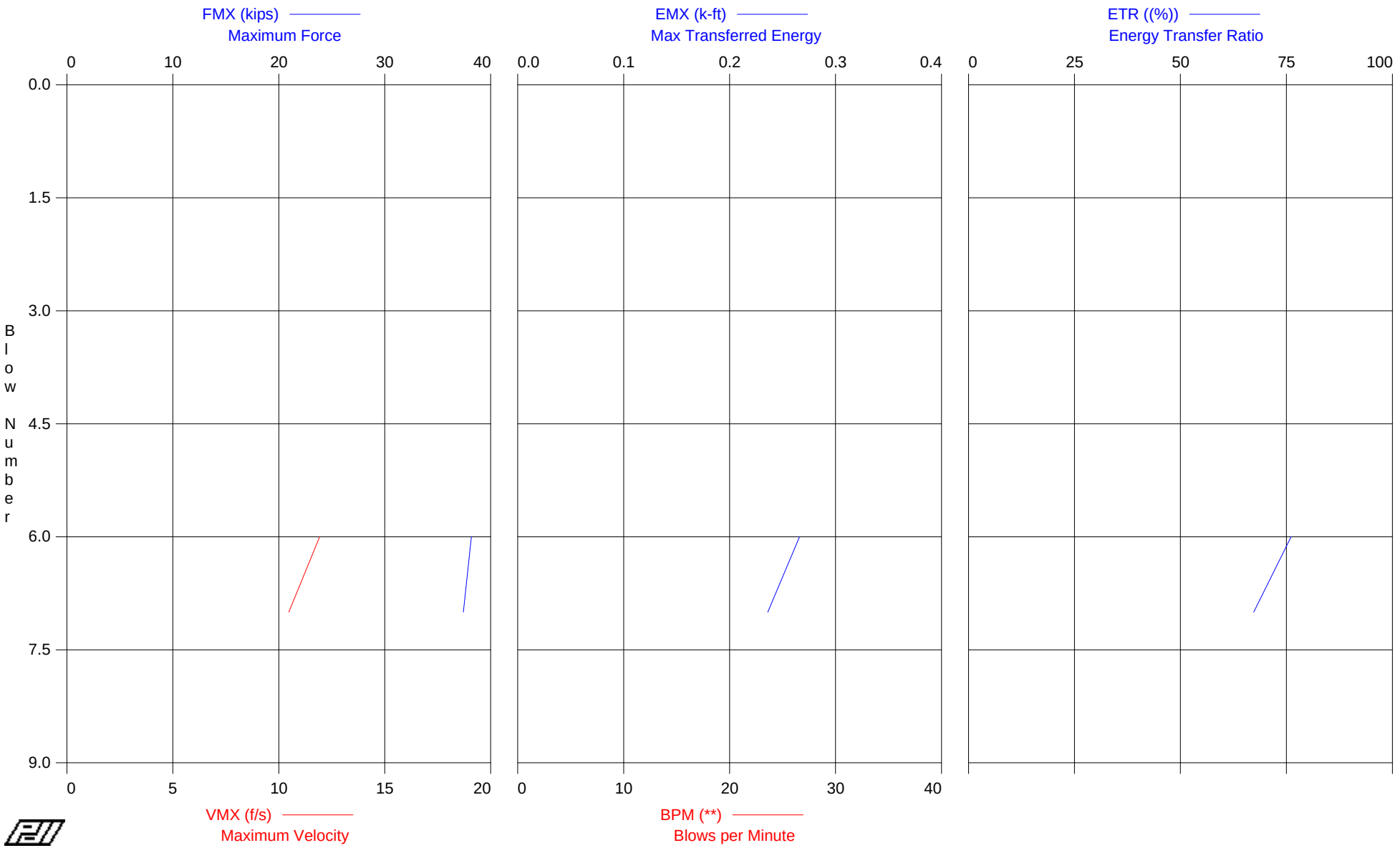
* Total rod length includes, sampler, rod, adaptors, and instrumented section below gauges

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 80'



BORING TB-32 @80'
OP: T.BOYD
AR: 1.46 in^2
LE: 86.8 ft
WS: 16,807.98 ft/s

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max. Transferred Energy

140 LB AUTO HAMMER
TEST DATE: 11-SEP-2007

SP: 0.492 k/ft3
SM: 30,000 ksi
JC: 0.75
BPM: Blows per Minute
ETR: Energy Transfer Ratio

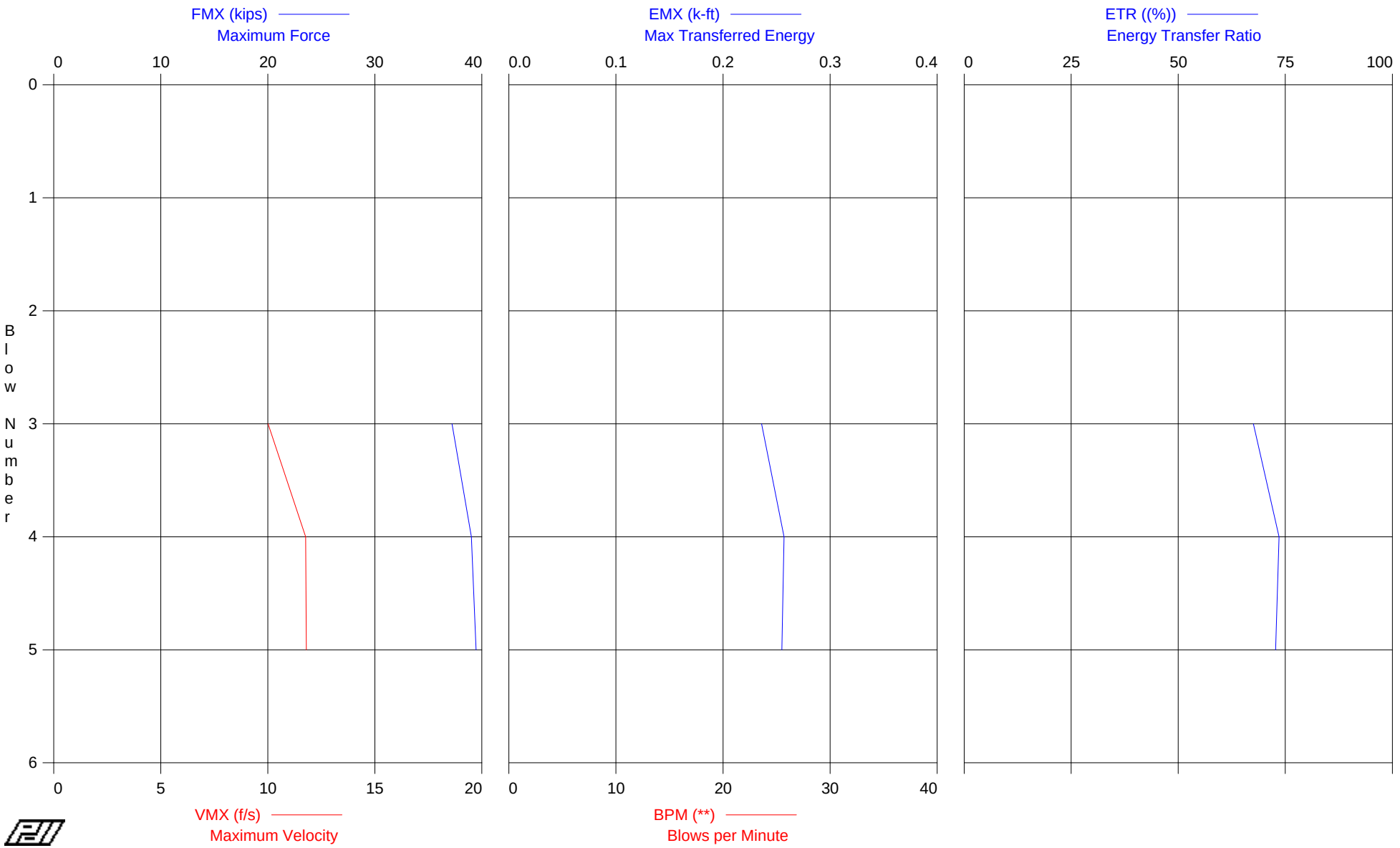
BL#	DEPTH	FMX	VMX	EMX	BPM	ETR
	ft	kips	ft/s	k-ft		(%)
1	0	38	11.9	0.3	0.0	76.1
2	0	37	10.5	0.2	0.0	67.3
	AVERAGE	37.5	11.2	0.3	0.0	71.7

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 85'



BORING TB-32 @85'
OP: T.BOYD
AR: 1.46 in^2
LE: 90.8 ft
WS: 16,807.98 ft/s

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max. Transferred Energy

140 LB AUTO HAMMER
TEST DATE: 11-SEP-2007

SP: 0.492 k/ft3
SM: 30,000 ksi
JC: 0.75
BPM: Blows per Minute
ETR: Energy Transfer Ratio

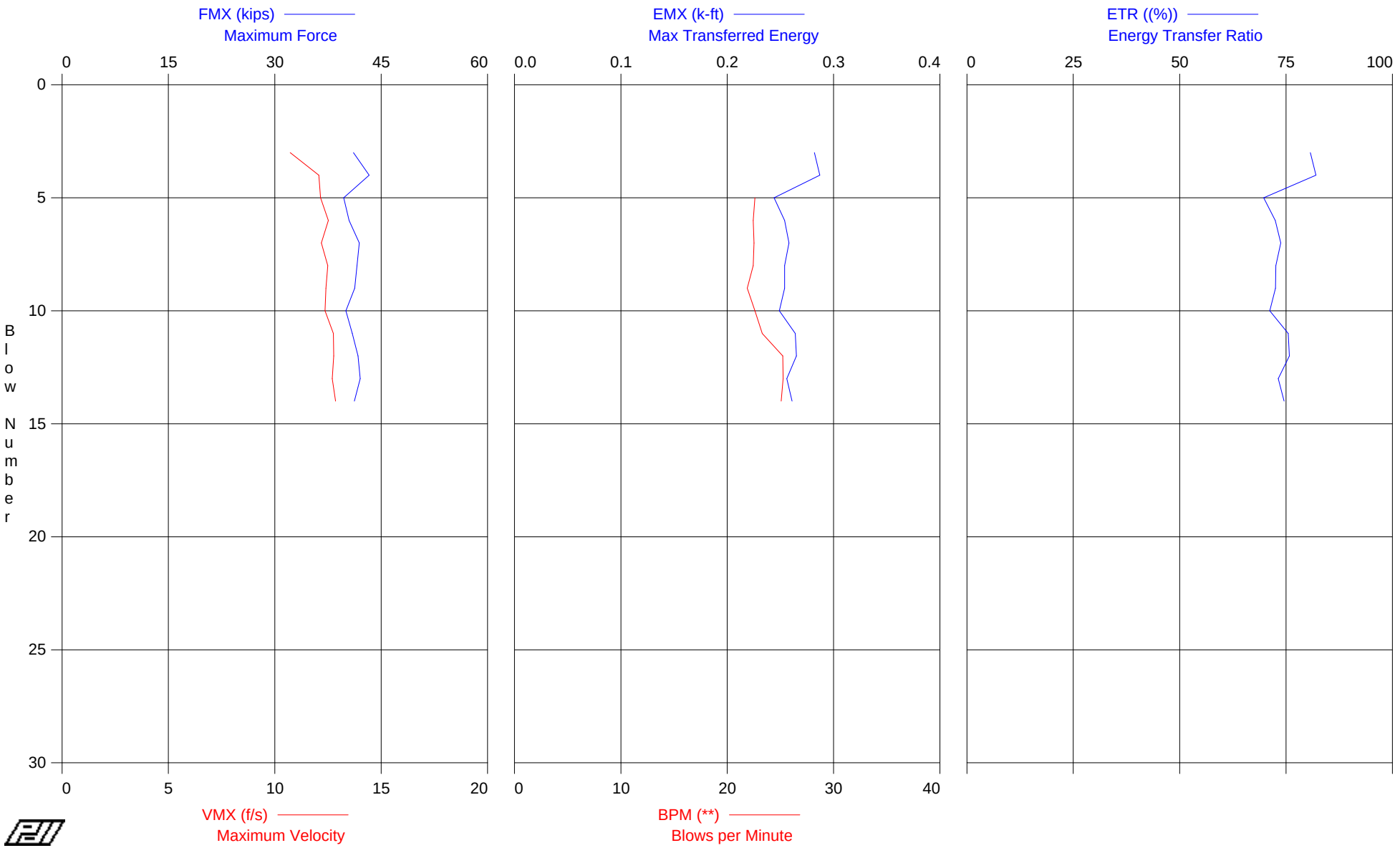
BL#	DEPTH	FMX	VMX	EMX	BPM	ETR
	ft	kips	ft/s	k-ft		(%)
1	0	37	10.0	0.2	0.0	67.5
2	0	39	11.8	0.3	0.0	73.5
3	0	39	11.8	0.3	26.5	72.7
	AVERAGE	38	11.2	0.3	8.8	71.2

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 90'



ANCHORAGE - BORING TB-32 @ 90'
OP: T.BOYD
140lb AUTO HAMMER
Test date: 11-Sep-2007

AR: 1.46 in^2
LE: 95.80 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy
BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	41	10.7	0.3	0.0	80.7
4	0.00	43	12.1	0.3	0.0	82.0
5	0.00	40	12.2	0.2	22.6	69.8
6	0.00	40	12.5	0.3	22.4	72.5
7	0.00	42	12.2	0.3	22.5	73.8
8	0.00	42	12.5	0.3	22.4	72.6
9	0.00	41	12.4	0.3	21.9	72.5
10	0.00	40	12.4	0.2	22.6	71.2
11	0.00	41	12.8	0.3	23.3	75.5
12	0.00	42	12.8	0.3	25.2	75.8
13	0.00	42	12.7	0.3	25.3	73.2
14	0.00	41	12.9	0.3	25.1	74.6
	Average	41	12.3	0.3	23.3	74.5
	Std. Dev.	1	0.5	0.0	1.3	3.5
	Maximum	43	12.9	0.3	25.3	82.0
	@ Blow#	4	14	4	13	4

Total number of blows analyzed: 12

Time Summary

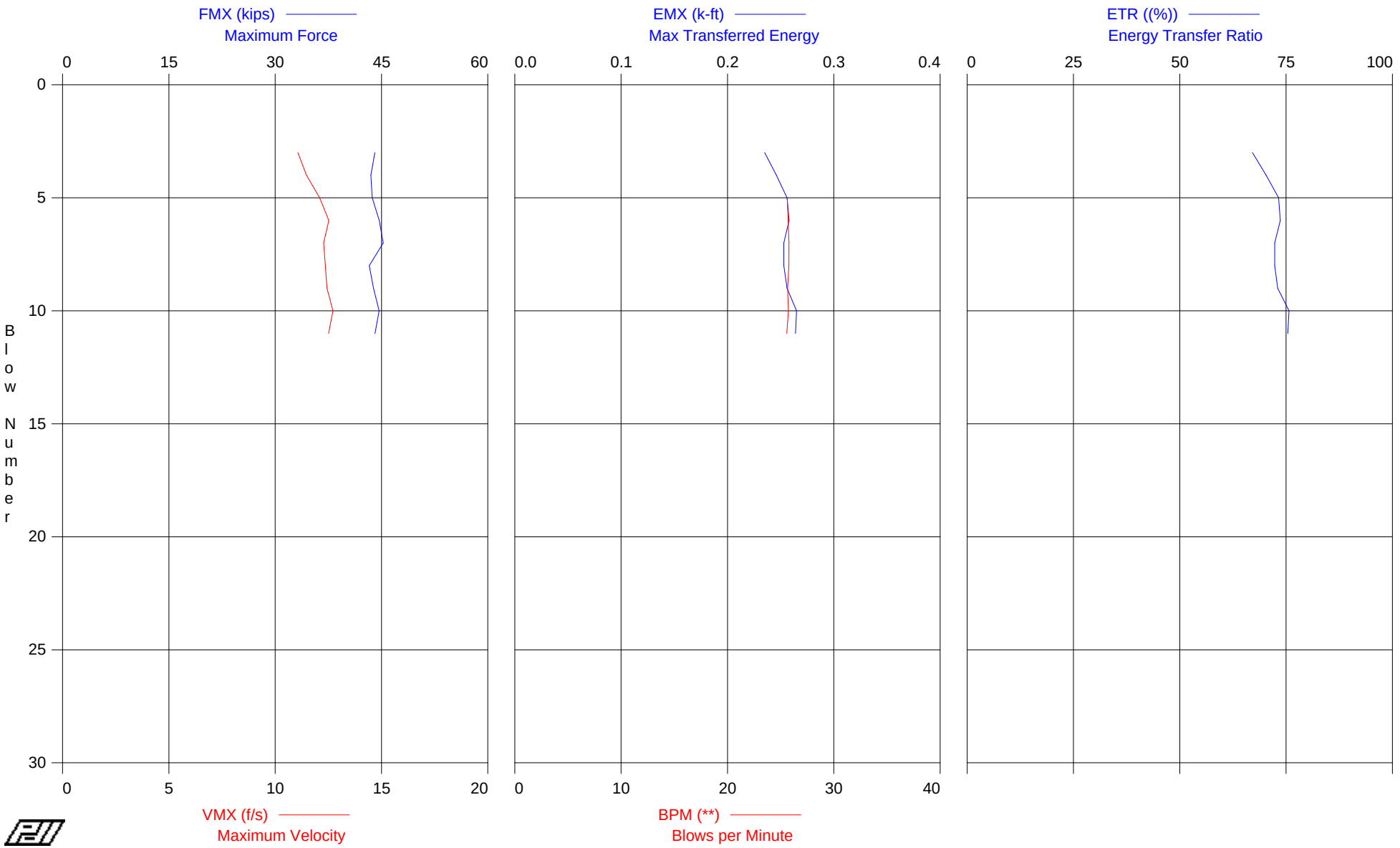
Drive 36 seconds 2:39:25 PM - 2:40:01 PM (9/11/2007) BN 3 - 14

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 95'



ANCHORAGE - BORING TB-32 @ 95'
OP: T.BOYD
140lb AUTO HAMMER
Test date: 11-Sep-2007

AR: 1.46 in^2
LE: 100.80 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy
BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	44	11.1	0.2	0.0	67.1
4	0.00	43	11.5	0.2	0.0	70.3
5	0.00	44	12.1	0.3	25.6	73.2
6	0.00	45	12.5	0.3	25.7	73.6
7	0.00	45	12.3	0.3	25.8	72.3
8	0.00	43	12.4	0.3	25.8	72.3
9	0.00	44	12.4	0.3	25.7	73.0
10	0.00	45	12.7	0.3	25.7	75.7
11	0.00	44	12.5	0.3	25.6	75.4
	Average	44	12.2	0.3	25.7	72.6
	Std. Dev.	1	0.5	0.0	0.1	2.5
	Maximum	45	12.7	0.3	25.8	75.7
	@ Blow#	7	10	10	7	10

Total number of blows analyzed: 9

Time Summary

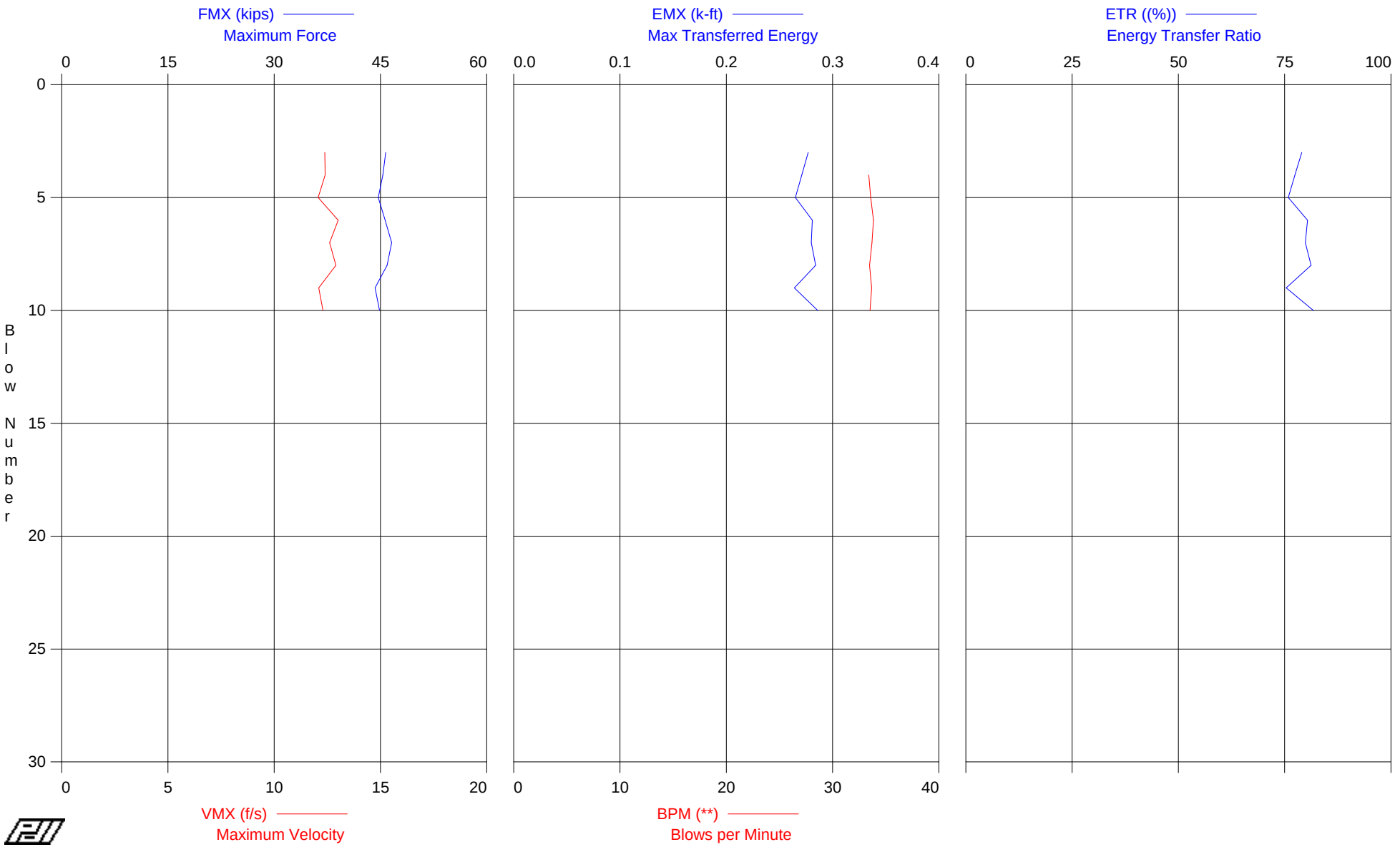
Drive 20 seconds 2:57:19 PM - 2:57:39 PM (9/11/2007) BN 3 - 11

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 100'



ANCHORAGE - BORING TB-32 @ 100'
OP: T.BOYD

140lb AUTO HAMMER
Test date: 11-Sep-2007

AR: 1.46 in^2
LE: 105.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	46	12.4	0.3	0.0	79.0
4	0.00	45	12.4	0.3	33.4	77.4
5	0.00	45	12.1	0.3	33.6	75.8
6	0.00	46	13.0	0.3	33.8	80.4
7	0.00	47	12.6	0.3	33.7	79.9
8	0.00	46	12.9	0.3	33.5	81.2
9	0.00	44	12.1	0.3	33.7	75.4
10	0.00	45	12.3	0.3	33.5	81.8
	Average	45	12.5	0.3	33.6	78.9
	Std. Dev.	1	0.3	0.0	0.1	2.3
	Maximum	47	13.0	0.3	33.8	81.8
	@ Blow#	7	6	10	6	10

Total number of blows analyzed: 8

Time Summary

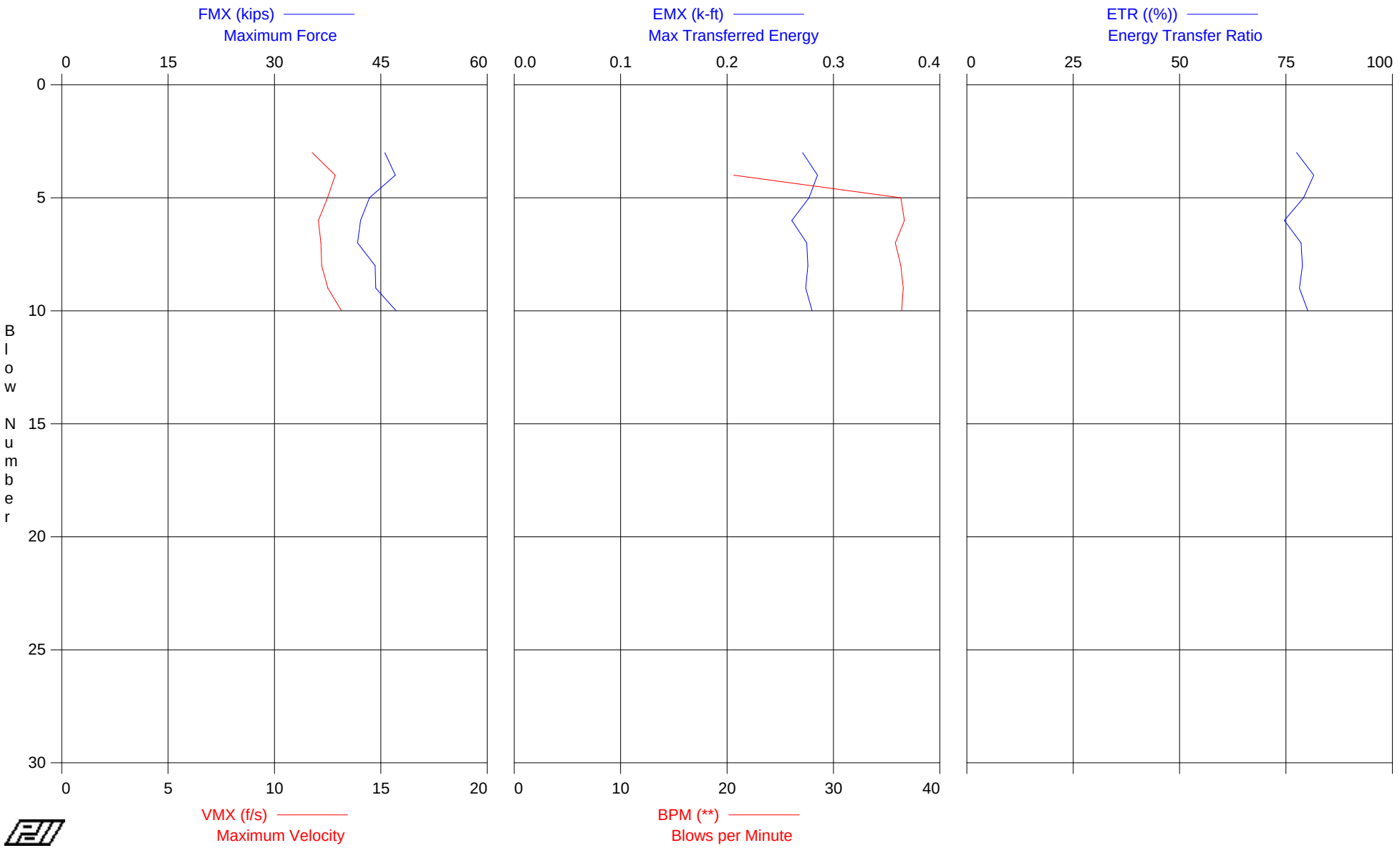
Drive 13 seconds 3:16:22 PM - 3:16:35 PM (9/11/2007) BN 3 - 10

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 105'



ANCHORAGE - BORING TB-32 @ 105'
OP: T.BOYD

140lb AUTO HAMMER
Test date: 11-Sep-2007

AR: 1.46 in^2
LE: 110.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	46	11.8	0.3	0.0	77.5
4	0.00	47	12.9	0.3	20.6	81.5
5	0.00	43	12.5	0.3	36.3	79.1
6	0.00	42	12.1	0.3	36.7	74.6
7	0.00	42	12.2	0.3	35.8	78.5
8	0.00	44	12.2	0.3	36.3	78.9
9	0.00	44	12.5	0.3	36.6	78.2
10	0.00	47	13.2	0.3	36.4	80.1
	Average	44	12.4	0.3	34.1	78.6
	Std. Dev.	2	0.4	0.0	5.5	1.9
	Maximum	47	13.2	0.3	36.7	81.5
	@ Blow#	10	10	4	6	4

Total number of blows analyzed: 8

Time Summary

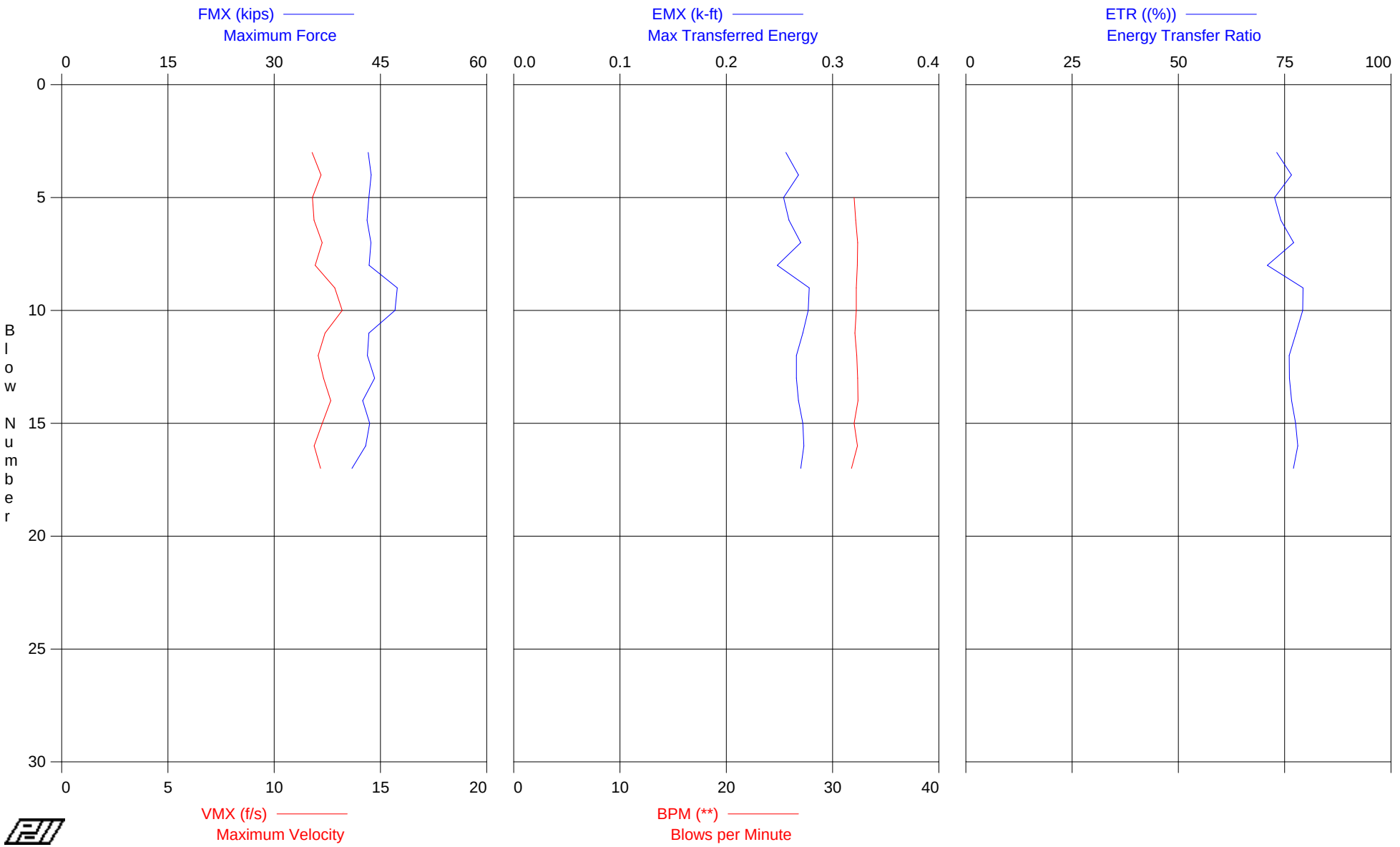
Drive 13 seconds 3:33:14 PM - 3:33:27 PM (9/11/2007) BN 3 - 10

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 110'



ANCHORAGE - BORING TB-32 @ 110'
OP: T.BOYD

140lb AUTO HAMMER
Test date: 11-Sep-2007

AR: 1.46 in^2
LE: 115.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	43	11.8	0.3	0.0	73.1
4	0.00	44	12.2	0.3	0.0	76.6
5	0.00	43	11.8	0.3	32.0	72.6
6	0.00	43	11.9	0.3	32.2	74.1
7	0.00	44	12.3	0.3	32.4	77.1
8	0.00	43	11.9	0.2	32.3	70.9
9	0.00	47	12.9	0.3	32.2	79.3
10	0.00	47	13.2	0.3	32.2	79.2
11	0.00	43	12.4	0.3	32.1	77.7
12	0.00	43	12.1	0.3	32.3	76.1
13	0.00	44	12.3	0.3	32.4	76.1
14	0.00	42	12.7	0.3	32.4	76.6
15	0.00	43	12.3	0.3	32.0	77.6
16	0.00	43	11.9	0.3	32.3	78.1
17	0.00	41	12.2	0.3	31.8	77.1
	Average	44	12.2	0.3	32.2	76.2
	Std. Dev.	2	0.4	0.0	0.2	2.4
	Maximum	47	13.2	0.3	32.4	79.3
	@ Blow#	9	10	9	14	9

Total number of blows analyzed: 15

Time Summary

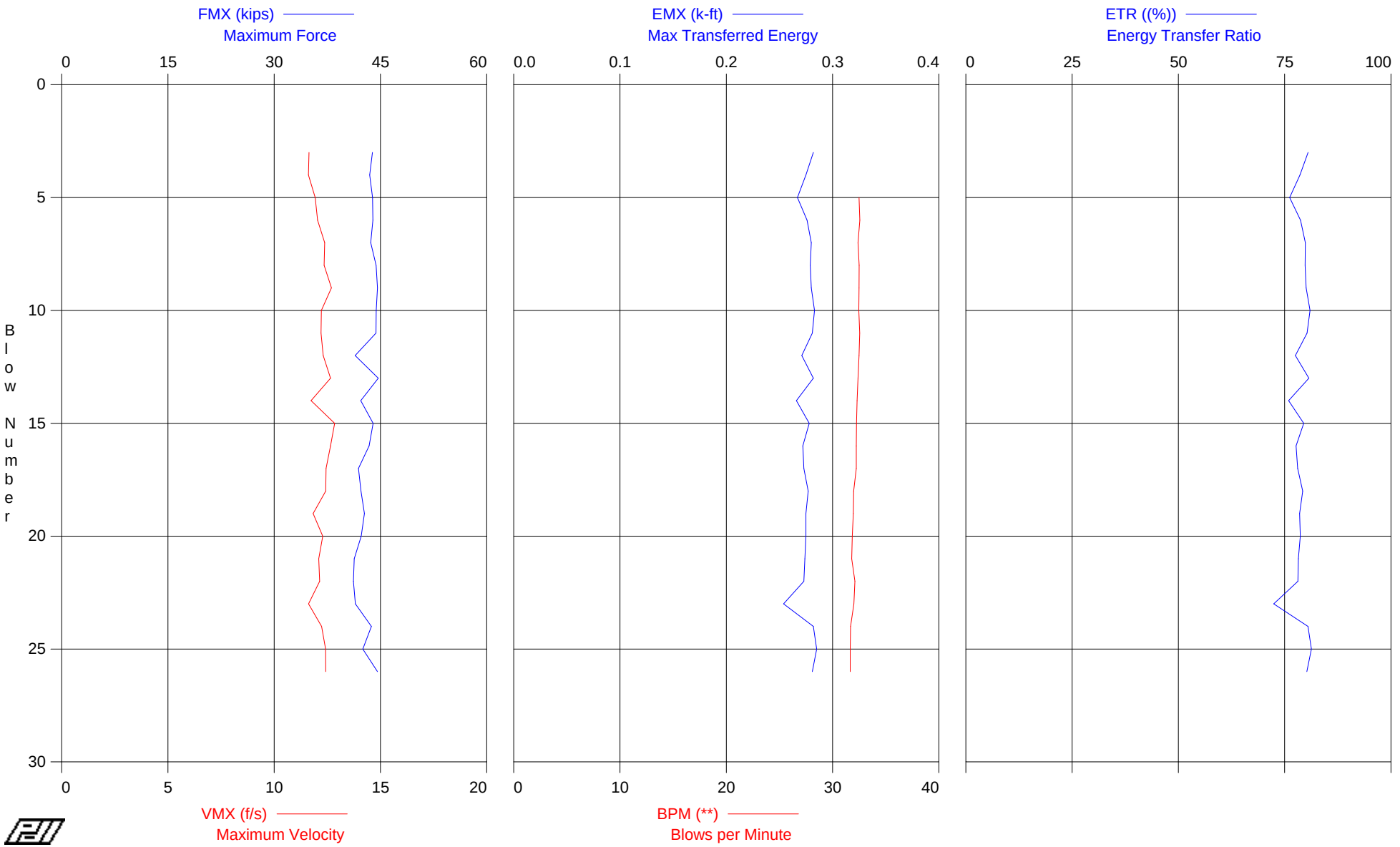
Drive 28 seconds 3:50:48 PM - 3:51:16 PM (9/11/2007) BN 3 - 17

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 11-Sep-2007

ANCHORAGE - BORING TB-32 @ 115'



ANCHORAGE - BORING TB-32 @ 115'
OP: T.BOYD

140lb AUTO HAMMER
Test date: 11-Sep-2007

AR: 1.46 in^2
LE: 120.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	44	11.6	0.3	0.0	80.5
4	0.00	43	11.6	0.3	0.0	78.6
5	0.00	44	11.9	0.3	32.5	76.2
6	0.00	44	12.0	0.3	32.6	78.8
7	0.00	44	12.4	0.3	32.4	79.9
8	0.00	44	12.4	0.3	32.5	79.8
9	0.00	45	12.7	0.3	32.5	80.0
10	0.00	44	12.2	0.3	32.5	81.0
11	0.00	44	12.2	0.3	32.6	80.3
12	0.00	41	12.3	0.3	32.5	77.5
13	0.00	45	12.6	0.3	32.4	80.7
14	0.00	42	11.7	0.3	32.3	75.9
15	0.00	44	12.8	0.3	32.3	79.5
16	0.00	43	12.7	0.3	32.2	77.7
17	0.00	42	12.4	0.3	32.2	78.0
18	0.00	42	12.4	0.3	32.0	79.2
19	0.00	43	11.8	0.3	31.9	78.5
20	0.00	42	12.3	0.3	31.9	78.7
21	0.00	41	12.1	0.3	31.8	78.2
22	0.00	41	12.1	0.3	32.1	78.1
23	0.00	41	11.6	0.3	32.0	72.4
24	0.00	44	12.2	0.3	31.7	80.5
25	0.00	43	12.4	0.3	31.7	81.3
26	0.00	45	12.4	0.3	31.7	80.2
	Average	43	12.2	0.3	32.2	78.8
	Std. Dev.	1	0.3	0.0	0.3	1.9
	Maximum	45	12.8	0.3	32.6	81.3
	@ Blow#	13	15	25	6	25

Total number of blows analyzed: 24

Time Summary

Drive 45 seconds 4:06:38 PM - 4:07:23 PM (9/11/2007) BN 3 - 26

October 9, 2007

Mr. Greg Carpenter
US Army Corps of Engineers District, AK
CEPOA-CT (W911KB)
PO Box 6898
2204 3rd St.
Elmendorf AFB, AK 99506

Re: Standard Penetration Energy Measurements
Automatic Hammer on Gregg Drilling's Mobile B-80 drill rig, BORING: TB-16
Port of Anchorage
Anchorage, Alaska

Dear Mr. Carpenter

This report offers results of energy measurements and related calculations made on September 22, 2007 during Standard Penetration Testing (SPT) on Gregg Drilling's mud rotary drill rig. Dynamic tests were performed on an instrumented section of NWJ drill rod attached to the sampler rod string. All dynamic measurements were obtained and recorded using a Pile Driving Analyzer®.

Equipment:

SPT energy measurements were made on SPT samplers driven by the hammer/anvil system on the Gregg Drilling drill rig on September 22, 2007. The rig was tested on the Skate III jack-up barge in the Port of Anchorage Project area. In total, 7 energy measurements were collected corresponding to 7 different samples at increasing depth.

Gregg used a Model PAK Pile Driving Analyzer (PDA) to acquire and process measurements of force and velocity with every impact of the automatic hammer on the sample rods. Two strain gauges mounted on a two foot section of NWJ rod measured force, while two piezoresistive accelerometers bolted on the same rod measured acceleration. The gauges were mounted approximately 6" from the top of the rod.
Analog signals from the gauges and accelerometers were collected, digitized, displayed in real-time, and stored by the PDA. Selected output from the PDA for each recorded impact of the hammer included:

- Maximum force in the rod (FMX)
- Maximum velocity in the rod (VMX)
- Maximum calculated transferred energy (EMX)
- Blows per minute (BPM)
- Energy transferred to the rods (ETR)

Data and Calculations:

The purpose of testing was to measure the energy transferred from the hammer to the drill rod and to calculate the energy efficiency of the hammer. The PDA measurements of force and velocity were reviewed after field testing and analyzed to calculate the transferred energy (EMX).

The maximum energy transferred past the gauge location, EMX, is computed by the PDA using force (F) and velocity (V) records as follows:

$$EMX = \int_a^b F(t)\, V(t)\, dt$$

The time "a" corresponds to the start of the record when the energy transfer begins and "b" is the time at which energy transferred to the rod reaches a maximum value. The energy transferred is defined as ETR, and is usually used to define the efficiency of the hammer/anvil system.

Results:

Table 1 summarizes the average calculated energies for each sample tested as well as the type of sample and depth. It is shown that the overall average (ETR) energy for this system is 77%. Appendix A provides plots and tables of PDA results for all hammer blows at each sampling depth. The plots and tables present selected measured and calculated results as a function of blow number. The results include:

- the blow number
- depth
- BLC (blow count in blows per foot)
- FMX (maximum rod force)
- VMX (maximum rod velocity)
- EMX (maximum transferred energy)
- BPM (blows per minute)
- ETR (energy transferred in percent of maximum)

At the end of each table is a statistical evaluation of the results for each variable including the average, standard deviation, maximum, and what blow number this maximum occurred.

If you have any questions or comments on this report, please do not hesitate to call our office at (562) 427-6899.

Sincerely,

Kelly Cabal
Engineer

Client:	US ARMY CORPS OF ENGINEERS
Project:	ANCHORAGE
Date:	9/22/2007
Boring:	**TB-16**

Table 1 - SPT Sample Summary BORING TB-16

Sample #	Sampler	Length of Sample Rod (ft)	Sampler Length (ft)	Total Rod Length* (ft)	Depth of Sample (below Mudline) (ft)	Total Blows Analyzed by PDA	Average Energy Transferred to Rods (% of Theoretical Max.)	Maximum Efficiency Recorded (%)	Standard Deviation
1	SPT	71	4.80	75.8	70	6	77.6	84.1	6
2	SPT	76	4.80	80.8	75	2	69.4	70.2	1
3	SPT	81	4.80	85.8	80	22	77.7	82.1	3
4	SPT	86	4.80	90.8	85	64	77.4	84.4	3
5	SPT	91	4.80	95.8	90	69	79.2	83.6	2
6	SPT	96	4.80	100.8	95	123	78.0	82.8	2
7	SPT	101	4.80	105.8	100	74	78.5	82.5	3
						Average	76.8		

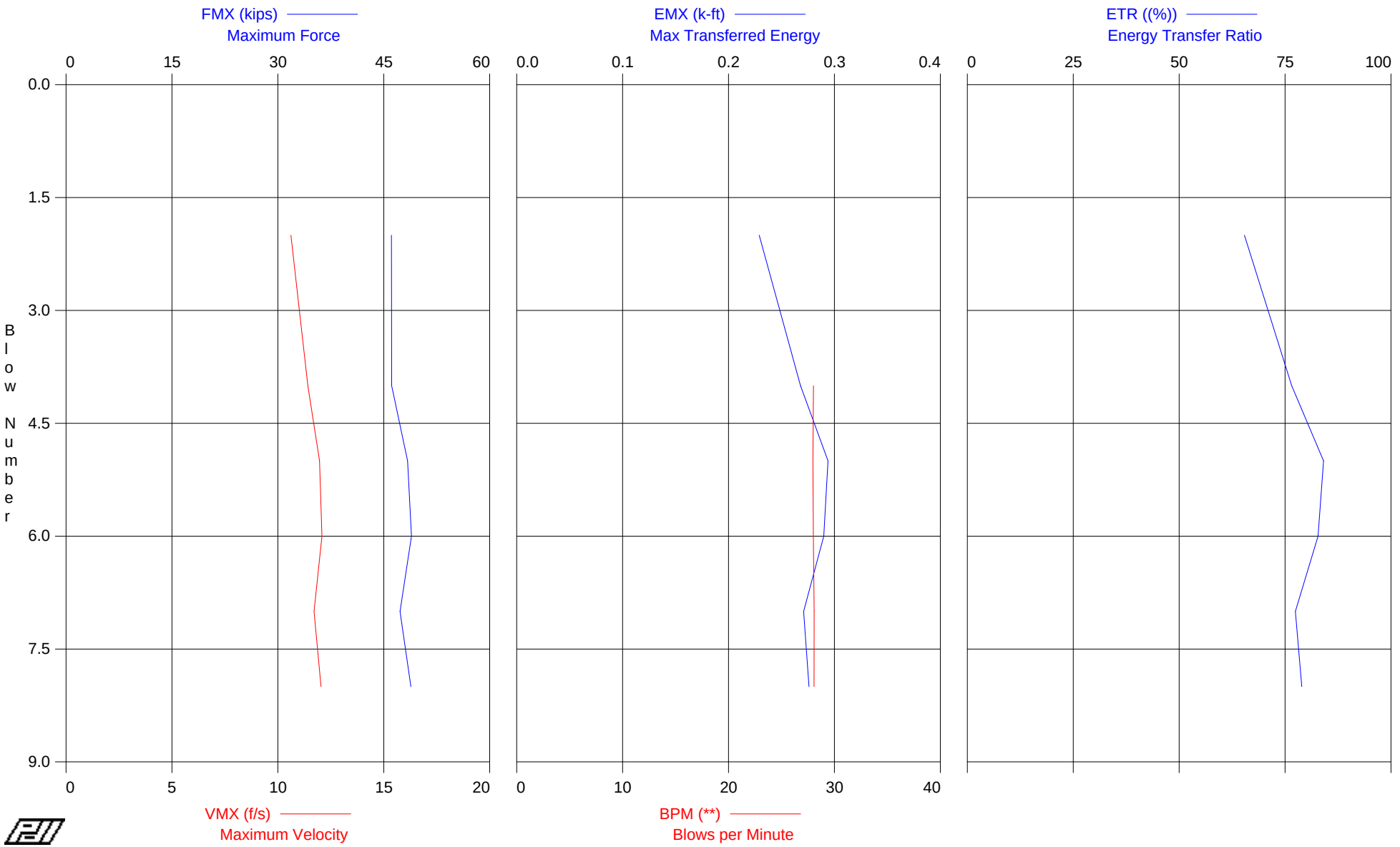
* Total rod length includes, sampler, rod, adaptors, and instrumented section below gauges

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 22-Sep-2007

ANCHORAGE - BORING TB-16 @ 70'



Gregg Drilling & Testing
Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

ANCHORAGE - BORING TB-16 @ 70'
OP: V. BAKER

140lb AUTO HAMMER
Test date: 22-Sep-2007

AR: 1.46 in^2
LE: 75.70 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
2	0.00	46	10.6	0.2	0.0	65.4
4	0.00	46	11.4	0.3	28.0	76.6
5	0.00	48	12.0	0.3	28.0	84.1
6	0.00	49	12.1	0.3	28.0	82.8
7	0.00	47	11.7	0.3	28.1	77.4
8	0.00	49	12.0	0.3	28.1	79.0
	Average	48	11.6	0.3	28.0	77.6
	Std. Dev.	1	0.5	0.0	0.0	6.1
	Maximum	49	12.1	0.3	28.1	84.1
	@ Blow#	6	6	5	7	5

Total number of blows analyzed: 6

Time Summary

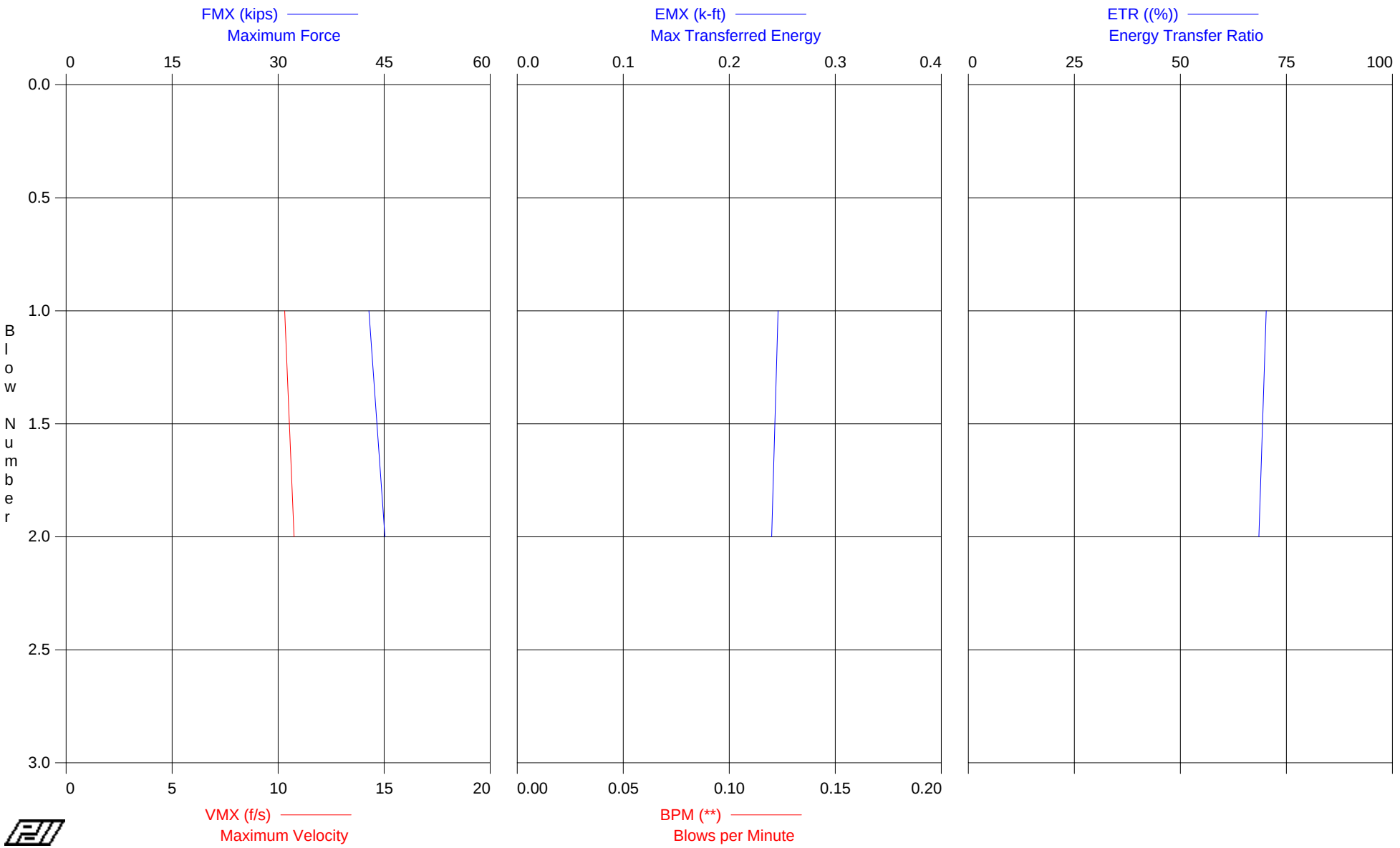
Drive 15 seconds 7:35:59 AM - 7:36:14 AM (9/22/2007) BN 2 - 8

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 22-Sep-2007

ANCHORAGE - BORING TB-16 @ 75'



ANCHORAGE - BORING TB-16 @ 75'
OP: V. BAKER
140lb AUTO HAMMER
Test date: 22-Sep-2007

AR: 1.46 in^2
LE: 80.80 ft
WS: 16,807.9 f/s
SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy
BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
1	0.00	43	10.3	0.2	0.0	70.2
2	0.00	45	10.8	0.2	0.0	68.5
	Average	44	10.5	0.2	**	69.4
	Std. Dev.	1	0.2	0.0	**	0.8
	Maximum	45	10.8	0.2	**	70.2
	@ Blow#	2	2	1	**	1

Total number of blows analyzed: 2

Time Summary

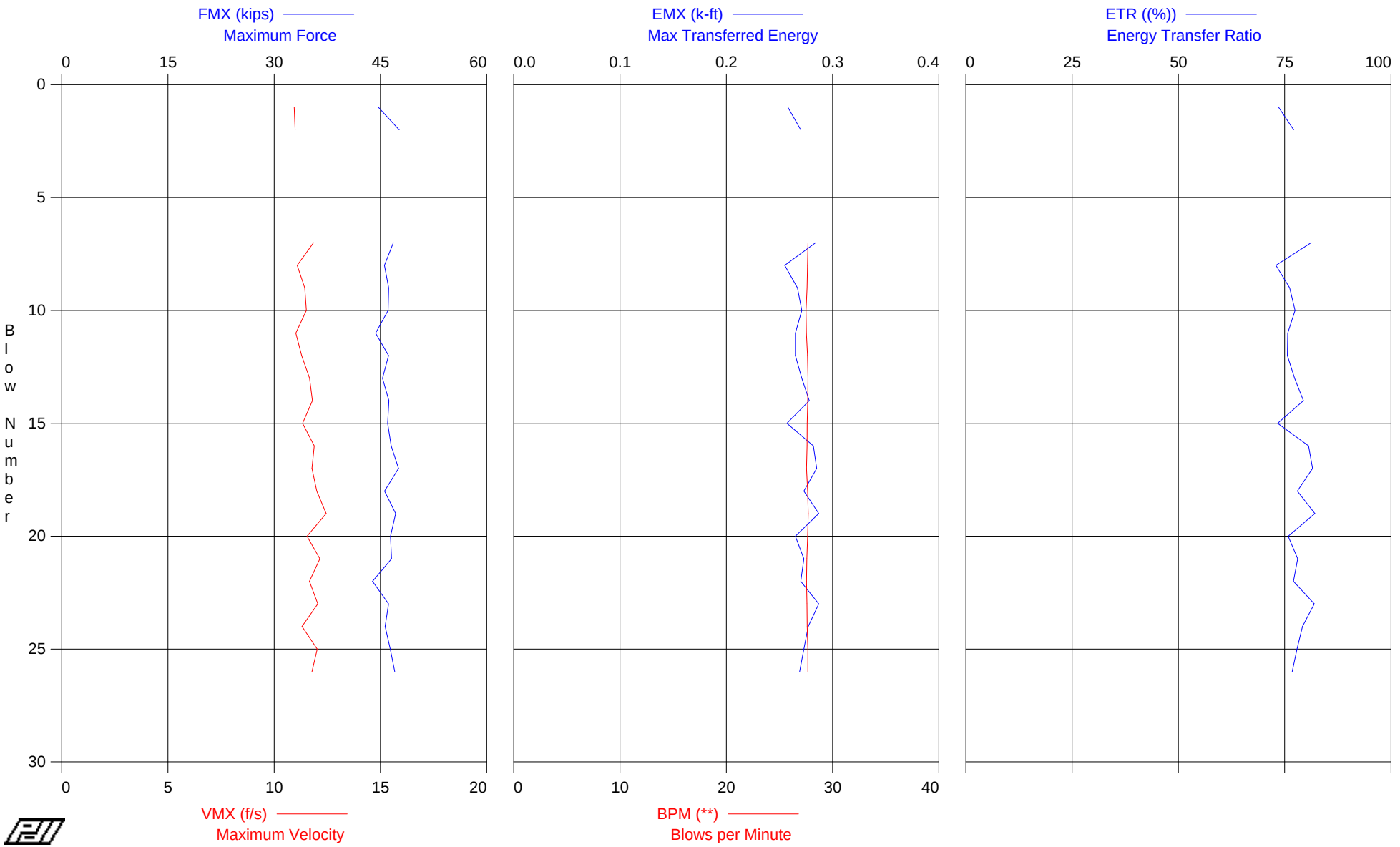
Drive 7 seconds 7:50:04 AM - 7:50:11 AM (9/22/2007) BN 1 - 2

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 22-Sep-2007

ANCHORAGE - BORING TB-16 @ 80'



ANCHORAGE - BORING TB-16 @ 80'
OP: V. BAKER

140lb AUTO HAMMER
Test date: 22-Sep-2007

AR: 1.46 in^2
LE: 85.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth ft	FMX kips	VMX f/s	EMX k-ft	BPM **	ETR (%)
1	0.00	45	10.9	0.3	0.0	73.6
2	0.00	48	11.0	0.3	0.0	77.1
7	0.00	47	11.9	0.3	27.7	81.2
8	0.00	46	11.1	0.3	27.6	72.9
9	0.00	46	11.4	0.3	27.6	76.2
10	0.00	46	11.5	0.3	27.5	77.5
11	0.00	44	11.0	0.3	27.5	75.7
12	0.00	46	11.3	0.3	27.6	75.7
13	0.00	45	11.7	0.3	27.7	77.3
14	0.00	46	11.8	0.3	27.7	79.4
15	0.00	46	11.3	0.3	27.6	73.4
16	0.00	47	11.9	0.3	27.6	80.6
17	0.00	48	11.8	0.3	27.5	81.6
18	0.00	46	12.0	0.3	27.7	78.0
19	0.00	47	12.4	0.3	27.7	82.1
20	0.00	46	11.5	0.3	27.7	75.8
21	0.00	47	12.2	0.3	27.6	78.1
22	0.00	44	11.7	0.3	27.5	77.1
23	0.00	46	12.1	0.3	27.6	82.0
24	0.00	46	11.3	0.3	27.6	79.2
25	0.00	46	12.0	0.3	27.7	77.9
26	0.00	47	11.8	0.3	27.7	76.8
	Average	46	11.6	0.3	27.6	77.7
	Std. Dev.	1	0.4	0.0	0.1	2.6
	Maximum	48	12.4	0.3	27.7	82.1
	@ Blow#	2	19	19	19	19

Total number of blows analyzed: 22

Time Summary

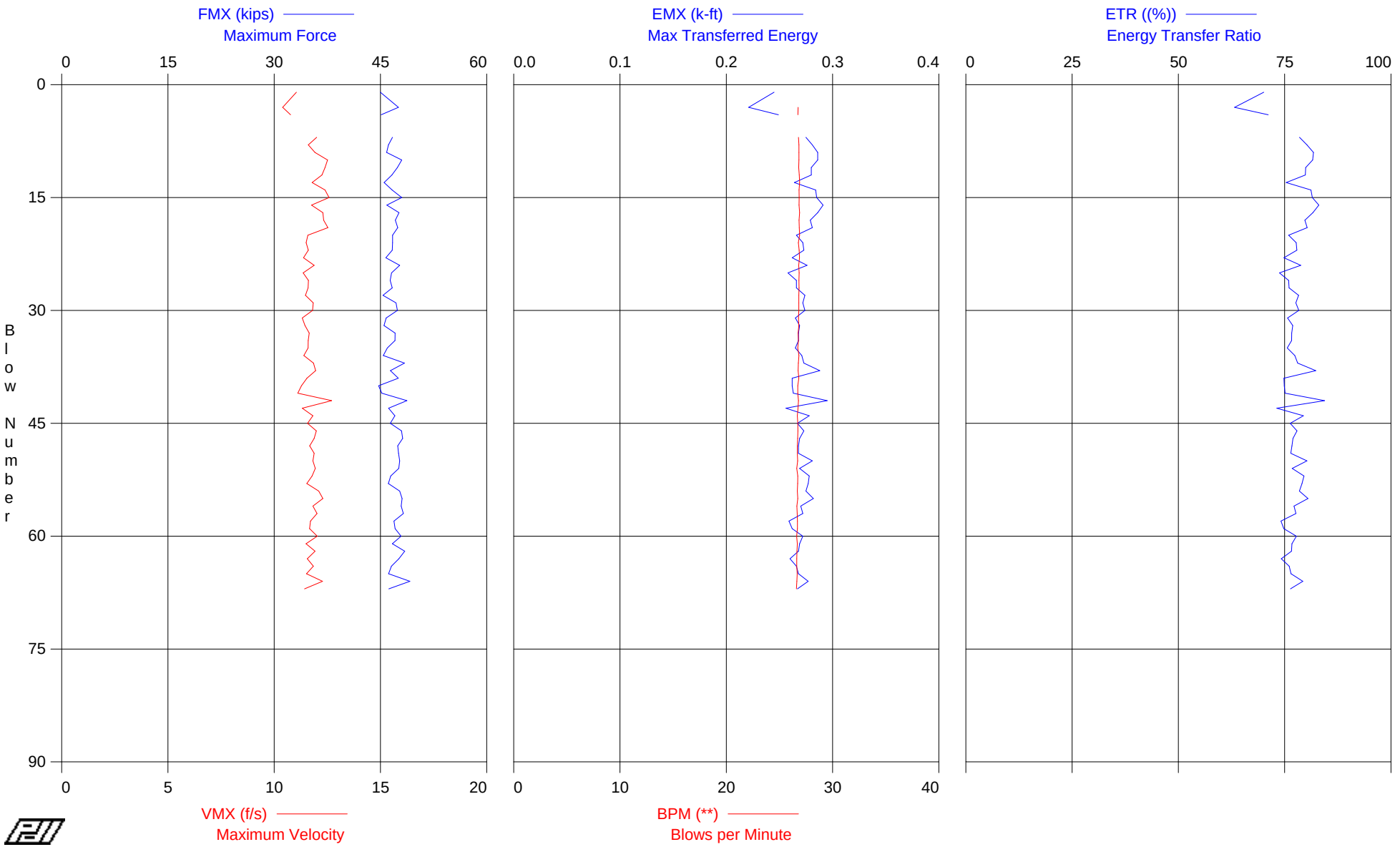
Drive 58 seconds 8:06:33 AM - 8:07:31 AM (9/22/2007) BN 1 - 26

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 22-Sep-2007

ANCHORAGE - BORING TB-16 @ 85'



ANCHORAGE - BORING TB-16 @ 85'
OP: V. BAKER

140lb AUTO HAMMER
Test date: 22-Sep-2007

AR: 1.46 in^2
LE: 90.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
1	0.00	45	11.0	0.2	0.0	70.1
3	0.00	48	10.4	0.2	26.8	63.2
4	0.00	45	10.8	0.2	26.7	71.1
7	0.00	47	12.0	0.3	26.8	78.5
8	0.00	46	11.6	0.3	26.8	80.2
9	0.00	46	11.9	0.3	26.8	81.8
10	0.00	48	12.5	0.3	26.8	81.6
11	0.00	47	12.4	0.3	26.8	79.9
12	0.00	47	12.2	0.3	26.9	79.9
13	0.00	46	11.8	0.3	26.9	75.4
14	0.00	47	12.4	0.3	26.8	81.2
15	0.00	48	12.6	0.3	26.9	81.5
16	0.00	46	11.8	0.3	26.8	83.0
17	0.00	48	12.3	0.3	26.9	81.6
18	0.00	47	12.3	0.3	26.8	79.8
19	0.00	47	12.5	0.3	26.9	80.3
20	0.00	47	11.6	0.3	26.9	75.9
21	0.00	47	11.5	0.3	26.8	77.7
22	0.00	47	11.6	0.3	26.9	77.9
23	0.00	46	11.4	0.3	26.9	74.8
24	0.00	48	11.9	0.3	26.8	78.8
25	0.00	47	11.4	0.3	26.9	73.8
26	0.00	46	11.6	0.3	26.8	75.9
27	0.00	47	11.6	0.3	26.8	76.1
28	0.00	45	11.5	0.3	26.8	78.3
29	0.00	47	11.8	0.3	26.8	77.6
30	0.00	47	11.8	0.3	26.8	78.3
31	0.00	46	11.3	0.3	26.8	75.7
32	0.00	45	11.5	0.3	26.8	76.9
33	0.00	47	11.6	0.3	26.8	76.7
34	0.00	47	11.6	0.3	26.8	76.6
35	0.00	46	11.6	0.3	26.7	75.6
36	0.00	45	11.4	0.3	26.8	77.4
37	0.00	48	11.8	0.3	26.8	78.1
38	0.00	46	12.0	0.3	26.8	82.3
39	0.00	48	11.5	0.3	26.8	74.8
40	0.00	45	11.3	0.3	26.7	74.9
41	0.00	45	11.1	0.3	26.7	75.1
42	0.00	49	12.7	0.3	26.8	84.4
43	0.00	46	11.3	0.3	26.8	73.2
44	0.00	47	11.8	0.3	26.7	79.4
45	0.00	46	11.6	0.3	26.7	76.3
46	0.00	48	12.0	0.3	26.7	77.9
47	0.00	48	11.9	0.3	26.7	77.0
48	0.00	47	11.7	0.3	26.7	76.7
49	0.00	48	11.9	0.3	26.7	76.4
50	0.00	48	11.8	0.3	26.7	80.2
51	0.00	48	11.9	0.3	26.6	76.8
52	0.00	46	11.8	0.3	26.7	79.6
53	0.00	46	11.5	0.3	26.7	79.1
54	0.00	48	12.1	0.3	26.7	78.5
55	0.00	48	12.3	0.3	26.7	80.5
56	0.00	48	11.8	0.3	26.6	77.2
57	0.00	48	12.0	0.3	26.7	77.6
58	0.00	47	11.7	0.3	26.7	74.1
59	0.00	47	11.7	0.3	26.7	74.8
60	0.00	48	12.0	0.3	26.6	77.8
61	0.00	47	11.5	0.3	26.7	76.7
62	0.00	48	11.9	0.3	26.7	76.6
63	0.00	48	11.6	0.3	26.6	74.2
64	0.00	47	11.8	0.3	26.6	76.1
65	0.00	46	11.5	0.3	26.7	76.5
66	0.00	49	12.3	0.3	26.6	79.3
67	0.00	46	11.4	0.3	26.6	76.4

ANCHORAGE - BORING TB-16 @ 85'
OP: V. BAKER
140lb AUTO HAMMER
Test date: 22-Sep-2007

	FMX	VMX	EMX	BPM	ETR
	kips	f/s	k-ft	**	(%)
Average	47	11.8	0.3	26.8	77.4
Std. Dev.	1	0.4	0.0	0.1	3.2
Maximum	49	12.7	0.3	26.9	84.4
@ Blow#	66	42	42	17	42

Total number of blows analyzed: 64

Time Summary

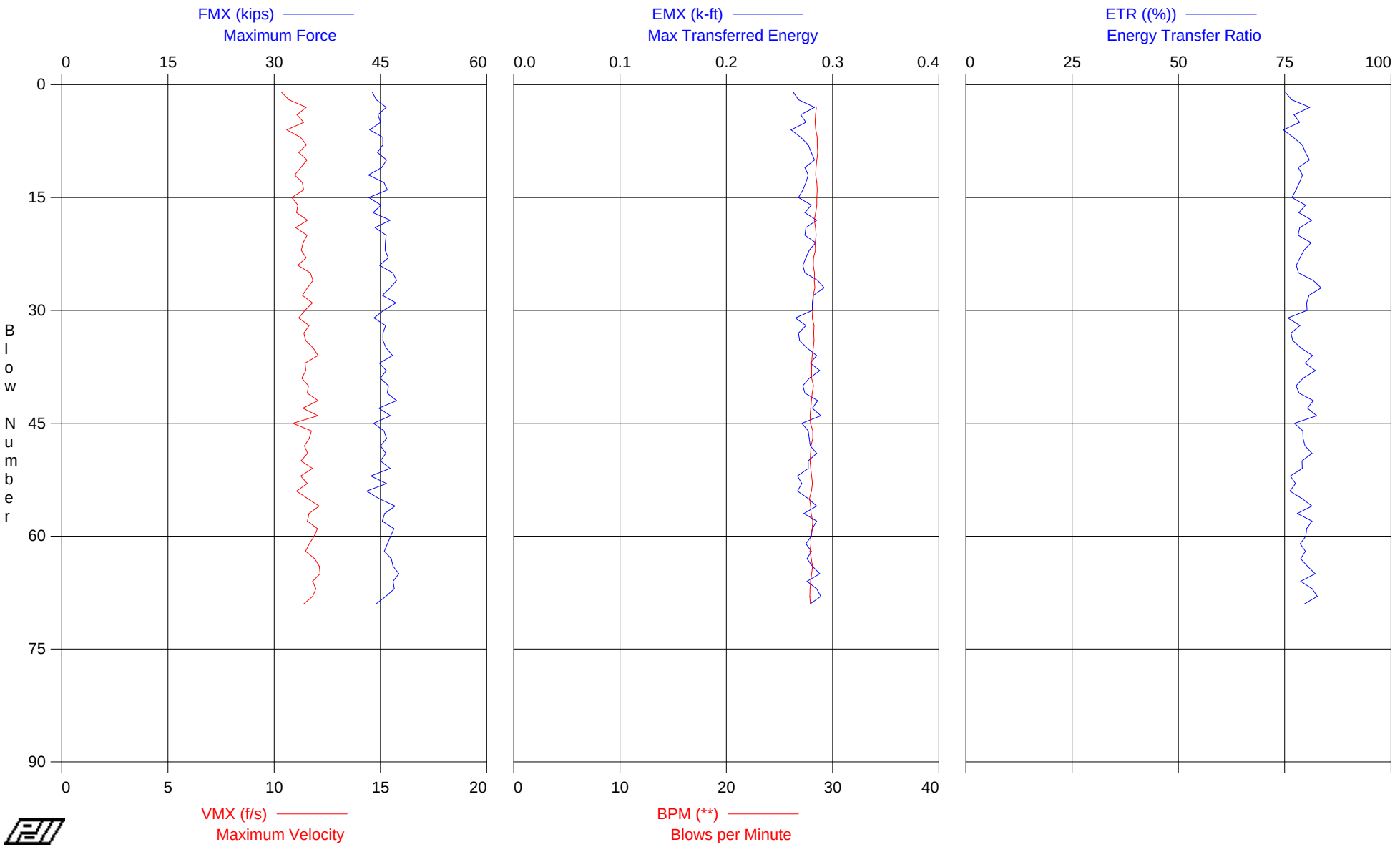
Drive	2 minutes 29 seconds	8:23:40 AM - 8:26:09 AM (9/22/2007) BN 1 - 67

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 22-Sep-2007

ANCHORAGE - BORING TB-16 @ 90'



ANCHORAGE - BORING TB-16 @ 90'
OP: V. BAKER

140lb AUTO HAMMER
Test date: 22-Sep-2007

AR: 1.46 in^2
LE: 95.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
1	0.00	44	10.3	0.3	0.0	75.2
2	0.00	44	10.7	0.3	0.0	76.7
3	0.00	46	11.5	0.3	28.5	80.9
4	0.00	45	11.1	0.3	28.4	77.2
5	0.00	45	11.4	0.3	28.4	78.5
6	0.00	43	10.6	0.3	28.4	74.7
7	0.00	45	11.2	0.3	28.6	77.0
8	0.00	45	11.5	0.3	28.6	79.2
9	0.00	45	11.2	0.3	28.6	79.9
10	0.00	46	11.5	0.3	28.5	80.8
11	0.00	45	11.2	0.3	28.4	78.2
12	0.00	43	11.0	0.3	28.4	79.2
13	0.00	45	11.3	0.3	28.5	78.5
14	0.00	46	11.4	0.3	28.6	77.7
15	0.00	43	10.8	0.3	28.5	76.7
16	0.00	45	11.1	0.3	28.5	79.9
17	0.00	44	11.1	0.3	28.4	78.4
18	0.00	46	11.6	0.3	28.3	81.4
19	0.00	44	11.0	0.3	28.4	78.5
20	0.00	46	11.5	0.3	28.5	78.1
21	0.00	46	11.4	0.3	28.4	81.2
22	0.00	46	11.3	0.3	28.4	79.6
23	0.00	46	11.5	0.3	28.2	78.6
24	0.00	45	11.1	0.3	28.2	77.7
25	0.00	47	11.7	0.3	28.3	78.3
26	0.00	47	11.8	0.3	28.3	81.7
27	0.00	46	11.6	0.3	28.3	83.6
28	0.00	45	11.3	0.3	28.2	80.7
29	0.00	47	11.8	0.3	28.2	80.2
30	0.00	45	11.4	0.3	28.1	80.3
31	0.00	44	11.2	0.3	28.1	75.7
32	0.00	46	11.6	0.3	28.3	78.6
33	0.00	45	11.4	0.3	28.2	76.5
34	0.00	45	11.5	0.3	28.3	76.9
35	0.00	46	11.8	0.3	28.2	78.8
36	0.00	47	12.1	0.3	28.1	81.6
37	0.00	45	11.5	0.3	28.0	79.8
38	0.00	46	11.5	0.3	28.0	82.2
39	0.00	45	11.3	0.3	28.0	79.3
40	0.00	46	11.6	0.3	28.2	77.7
41	0.00	46	11.6	0.3	28.1	78.4
42	0.00	47	12.1	0.3	28.0	81.8
43	0.00	45	11.3	0.3	27.9	80.3
44	0.00	46	12.1	0.3	27.9	82.5
45	0.00	44	10.9	0.3	27.9	77.3
46	0.00	46	11.8	0.3	28.1	79.3
47	0.00	46	11.6	0.3	28.1	79.3
48	0.00	45	11.4	0.3	28.0	79.8
49	0.00	46	11.6	0.3	27.9	81.4
50	0.00	45	11.3	0.3	27.9	79.1
51	0.00	46	11.8	0.3	27.9	79.2
52	0.00	44	11.3	0.3	28.0	76.4
53	0.00	46	11.6	0.3	28.1	77.5
54	0.00	43	11.1	0.3	28.0	76.2
55	0.00	45	11.6	0.3	27.8	79.1
56	0.00	47	12.1	0.3	27.9	81.4
57	0.00	46	11.6	0.3	28.0	77.9
58	0.00	45	11.6	0.3	28.1	81.4
59	0.00	47	12.0	0.3	28.1	80.2
60	0.00	46	11.9	0.3	27.9	80.0
61	0.00	46	11.7	0.3	28.0	78.7
62	0.00	46	11.5	0.3	27.9	79.9
63	0.00	47	11.9	0.3	28.0	78.8
64	0.00	47	12.1	0.3	28.1	80.4
65	0.00	48	12.2	0.3	28.0	82.2
66	0.00	47	11.8	0.3	27.9	78.8
67	0.00	47	12.0	0.3	27.9	81.5

ANCHORAGE - BORING TB-16 @ 90'
OP: V. BAKER
140lb AUTO HAMMER
Test date: 22-Sep-2007

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
68	0.00	46	11.8	0.3	27.9	82.7
69	0.00	44	11.4	0.3	27.9	79.7
	Average	45	11.5	0.3	28.2	79.2
	Std. Dev.	1	0.4	0.0	0.2	1.9
	Maximum	48	12.2	0.3	28.6	83.6
	@ Blow#	65	65	27	9	27

Total number of blows analyzed: 69

Time Summary

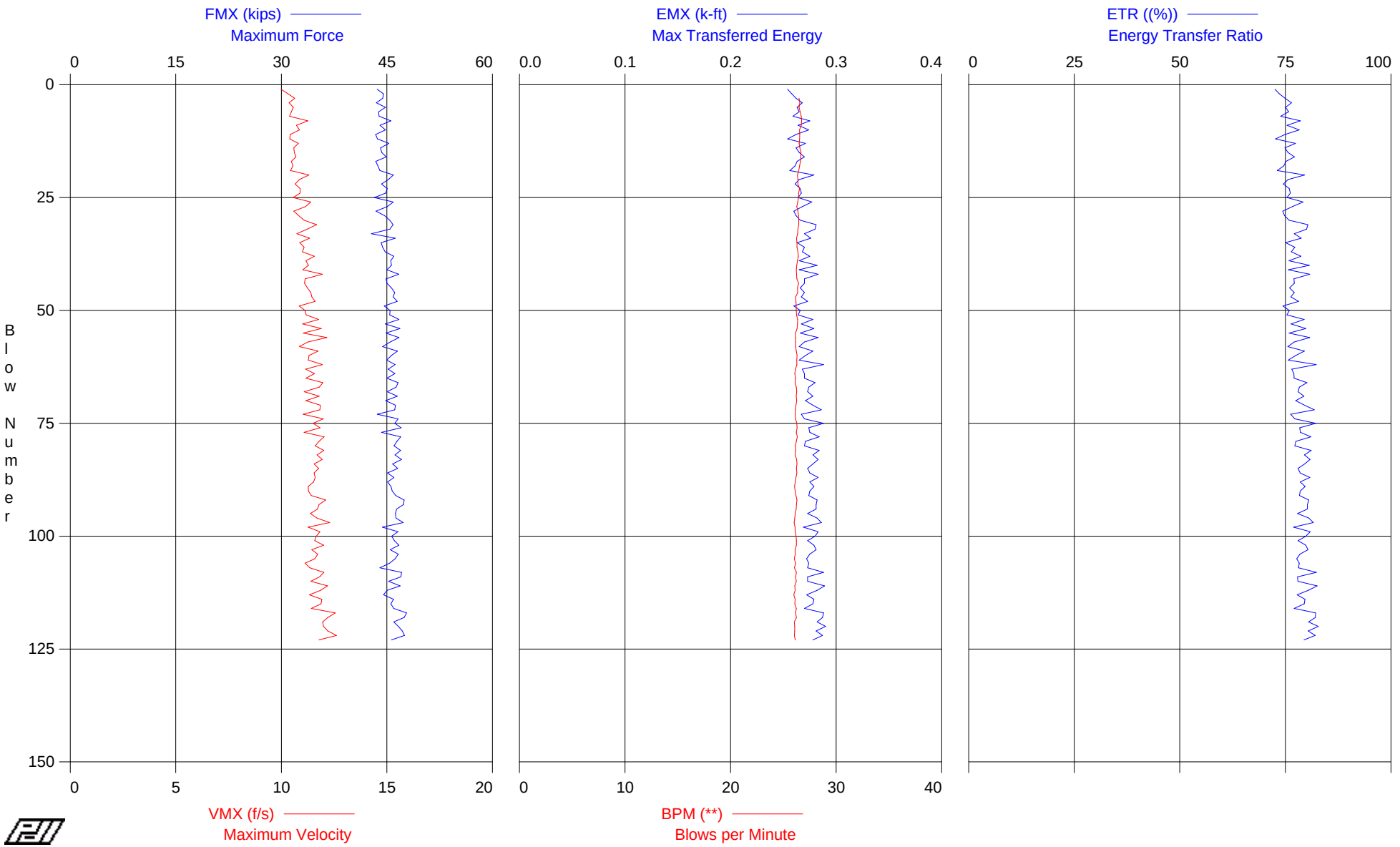
Drive	2 minutes 26 seconds	8:43:38 AM - 8:46:04 AM (9/22/2007) BN 1 - 69

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 22-Sep-2007

ANCHORAGE - BORING TB-16 @ 95'



ANCHORAGE - BORING TB-16 @ 95'
OP: V. BAKER

140lb AUTO HAMMER
Test date: 22-Sep-2007

AR: 1.46 in^2
LE: 100.70 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
1	0.00	44	10.0	0.3	0.0	72.5
2	0.00	45	10.3	0.3	0.0	73.6
3	0.00	44	10.6	0.3	26.5	74.9
4	0.00	43	10.4	0.3	26.6	76.5
5	0.00	45	10.6	0.3	26.5	75.0
6	0.00	44	10.5	0.3	26.6	75.8
7	0.00	44	10.4	0.3	26.7	73.9
8	0.00	46	11.3	0.3	26.7	78.6
9	0.00	44	10.7	0.3	26.7	75.4
10	0.00	45	10.9	0.3	26.5	78.3
11	0.00	43	10.4	0.3	26.5	74.9
12	0.00	44	10.4	0.3	26.5	72.6
13	0.00	45	10.8	0.3	26.5	77.4
14	0.00	44	10.6	0.3	26.6	74.9
15	0.00	44	10.6	0.3	26.7	75.6
16	0.00	45	10.7	0.3	26.7	77.1
17	0.00	43	10.5	0.3	26.6	75.1
18	0.00	44	10.6	0.3	26.5	74.6
19	0.00	44	10.4	0.3	26.5	73.1
20	0.00	46	11.3	0.3	26.3	79.6
21	0.00	45	10.9	0.3	26.4	75.6
22	0.00	44	10.7	0.3	26.4	74.5
23	0.00	45	10.9	0.3	26.5	75.9
24	0.00	45	10.9	0.3	26.4	76.2
25	0.00	43	10.6	0.3	26.4	75.4
26	0.00	46	11.4	0.3	26.4	79.2
27	0.00	45	11.1	0.3	26.3	76.7
28	0.00	43	10.6	0.3	26.4	74.4
29	0.00	45	10.8	0.3	26.4	74.8
30	0.00	45	11.1	0.3	26.5	75.9
31	0.00	46	11.7	0.3	26.5	80.3
32	0.00	45	11.2	0.3	26.4	80.0
33	0.00	43	10.7	0.3	26.4	77.1
34	0.00	46	11.3	0.3	26.2	78.8
35	0.00	44	10.9	0.3	26.3	75.0
36	0.00	44	11.1	0.3	26.3	77.2
37	0.00	45	11.0	0.3	26.4	76.4
38	0.00	46	11.6	0.3	26.4	78.7
39	0.00	46	11.2	0.3	26.3	75.9
40	0.00	46	11.3	0.3	26.3	80.7
41	0.00	45	11.0	0.3	26.2	75.7
42	0.00	47	11.9	0.3	26.2	80.8
43	0.00	45	11.1	0.3	26.3	77.0
44	0.00	45	11.1	0.3	26.4	77.1
45	0.00	46	11.2	0.3	26.3	76.0
46	0.00	46	11.4	0.3	26.4	77.1
47	0.00	46	11.4	0.3	26.2	76.3
48	0.00	46	11.6	0.3	26.2	78.1
49	0.00	45	10.8	0.3	26.2	74.4
50	0.00	45	11.1	0.3	26.2	75.9
51	0.00	45	11.2	0.3	26.2	75.4
52	0.00	47	11.8	0.3	26.4	79.5
53	0.00	45	11.0	0.3	26.3	76.3
54	0.00	47	11.9	0.3	26.3	79.8
55	0.00	45	11.0	0.3	26.1	75.9
56	0.00	47	12.2	0.3	26.2	80.7
57	0.00	45	11.3	0.3	26.2	77.1
58	0.00	44	10.9	0.3	26.2	75.6
59	0.00	47	11.7	0.3	26.2	79.5
60	0.00	46	11.3	0.3	26.3	77.4
61	0.00	45	11.3	0.3	26.3	75.7
62	0.00	46	11.9	0.3	26.3	82.3
63	0.00	45	11.2	0.3	26.1	76.5
64	0.00	46	11.6	0.3	26.1	77.0
65	0.00	45	11.2	0.3	26.2	77.1
66	0.00	47	12.0	0.3	26.1	80.1
67	0.00	46	11.8	0.3	26.2	78.3

ANCHORAGE - BORING TB-16 @ 95'
OP: V. BAKER
140lb AUTO HAMMER
Test date: 22-Sep-2007

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
68	0.00	45	11.1	0.3	26.3	78.0
69	0.00	46	11.8	0.3	26.2	79.4
70	0.00	45	11.2	0.3	26.3	77.4
71	0.00	46	11.8	0.3	26.2	79.5
72	0.00	46	11.8	0.3	26.1	81.8
73	0.00	44	11.0	0.3	26.1	76.3
74	0.00	47	12.0	0.3	26.2	77.2
75	0.00	46	11.5	0.3	26.3	82.2
76	0.00	47	11.8	0.3	26.3	78.4
77	0.00	44	11.1	0.3	26.2	78.5
78	0.00	47	12.0	0.3	26.3	81.1
79	0.00	46	11.8	0.3	26.2	77.5
80	0.00	46	11.6	0.3	26.1	77.3
81	0.00	47	12.0	0.3	26.2	81.1
82	0.00	46	11.7	0.3	26.1	79.5
83	0.00	47	11.9	0.3	26.3	80.8
84	0.00	46	11.6	0.3	26.3	79.6
85	0.00	47	11.8	0.3	26.2	78.0
86	0.00	45	11.5	0.3	26.3	78.5
87	0.00	46	11.6	0.3	26.2	80.8
88	0.00	45	11.5	0.3	26.1	78.5
89	0.00	46	11.3	0.3	26.1	79.7
90	0.00	46	11.3	0.3	26.1	78.5
91	0.00	46	11.4	0.3	26.2	78.3
92	0.00	47	12.1	0.3	26.3	80.5
93	0.00	47	11.8	0.3	26.2	80.2
94	0.00	46	11.7	0.3	26.2	80.2
95	0.00	46	11.4	0.3	26.1	77.9
96	0.00	46	11.7	0.3	26.1	80.6
97	0.00	47	12.3	0.3	26.0	81.6
98	0.00	44	11.3	0.3	26.1	76.9
99	0.00	47	11.8	0.3	26.1	80.9
100	0.00	46	11.7	0.3	26.2	79.9
101	0.00	46	11.6	0.3	26.2	78.0
102	0.00	47	12.0	0.3	26.2	79.8
103	0.00	45	11.4	0.3	26.1	80.3
104	0.00	47	11.7	0.3	26.1	78.4
105	0.00	46	11.6	0.3	26.0	77.7
106	0.00	45	11.1	0.3	26.2	78.3
107	0.00	44	11.3	0.3	26.1	78.1
108	0.00	47	12.0	0.3	26.2	82.3
109	0.00	47	11.8	0.3	26.2	77.9
110	0.00	45	11.4	0.3	26.2	78.0
111	0.00	47	12.2	0.3	26.1	82.5
112	0.00	45	11.9	0.3	26.1	80.4
113	0.00	45	11.3	0.3	26.0	77.8
114	0.00	46	11.9	0.3	26.1	79.6
115	0.00	46	11.9	0.3	26.1	79.5
116	0.00	46	11.4	0.3	26.2	77.1
117	0.00	48	12.6	0.3	26.2	82.2
118	0.00	47	12.2	0.3	26.2	82.1
119	0.00	46	12.0	0.3	26.0	80.5
120	0.00	47	12.0	0.3	26.1	82.8
121	0.00	47	12.2	0.3	26.1	80.4
122	0.00	47	12.6	0.3	26.0	82.1
123	0.00	46	11.8	0.3	26.1	79.4
	Average	46	11.4	0.3	26.3	78.0
	Std. Dev.	1	0.5	0.0	0.2	2.4
	Maximum	48	12.6	0.3	26.7	82.8
	@ Blow#	117	122	120	8	120

Total number of blows analyzed: 123

Time Summary

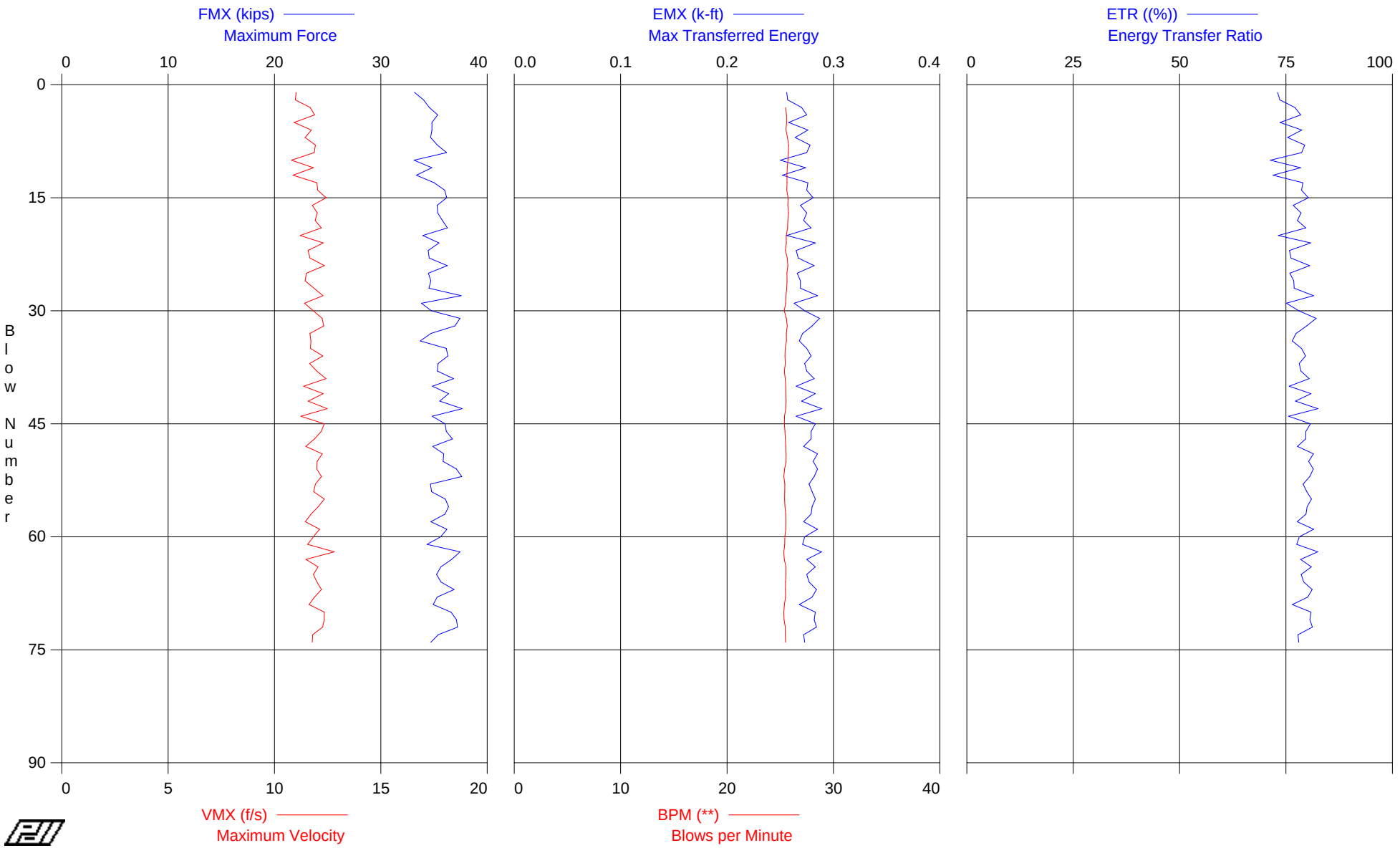
Drive 4 minutes 41 seconds 9:03:48 AM - 9:08:29 AM (9/22/2007) BN 1 - 123

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 22-Sep-2007

ANCHORAGE - BORING TB-16 @ 100'



ANCHORAGE - BORING TB-16 @ 100'
OP: V. BAKER

140lb AUTO HAMMER
Test date: 22-Sep-2007

AR: 1.46 in^2
LE: 105.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
1	0.00	33	11.0	0.3	0.0	73.0
2	0.00	34	11.0	0.3	0.0	73.6
3	0.00	35	11.7	0.3	25.5	77.1
4	0.00	35	11.9	0.3	25.6	78.5
5	0.00	35	10.9	0.3	25.6	73.6
6	0.00	35	11.7	0.3	25.5	78.7
7	0.00	35	11.4	0.3	25.7	75.4
8	0.00	35	11.9	0.3	25.8	79.4
9	0.00	36	11.9	0.3	25.8	78.7
10	0.00	33	10.8	0.3	25.7	71.3
11	0.00	35	11.8	0.3	25.7	78.4
12	0.00	33	10.9	0.3	25.6	71.9
13	0.00	35	12.0	0.3	25.6	79.0
14	0.00	36	12.0	0.3	25.6	78.7
15	0.00	36	12.4	0.3	25.7	80.3
16	0.00	35	11.8	0.3	25.7	76.7
17	0.00	35	12.0	0.3	25.8	78.6
18	0.00	36	11.9	0.3	25.7	77.7
19	0.00	36	12.2	0.3	25.7	79.7
20	0.00	34	11.2	0.3	25.6	73.2
21	0.00	35	12.3	0.3	25.6	80.8
22	0.00	34	11.6	0.3	25.5	75.8
23	0.00	35	11.7	0.3	25.7	76.2
24	0.00	36	12.4	0.3	25.7	80.6
25	0.00	34	11.5	0.3	25.6	75.9
26	0.00	35	11.4	0.3	25.6	76.8
27	0.00	35	11.9	0.3	25.6	76.9
28	0.00	38	12.3	0.3	25.5	81.5
29	0.00	34	11.4	0.3	25.5	75.1
30	0.00	35	11.8	0.3	25.4	78.0
31	0.00	37	12.2	0.3	25.6	82.1
32	0.00	37	12.3	0.3	25.7	79.9
33	0.00	35	11.7	0.3	25.6	77.3
34	0.00	34	11.7	0.3	25.6	76.5
35	0.00	36	11.7	0.3	25.5	78.7
36	0.00	36	12.3	0.3	25.4	79.6
37	0.00	35	11.7	0.3	25.5	78.1
38	0.00	35	12.0	0.3	25.4	78.5
39	0.00	37	12.4	0.3	25.5	80.4
40	0.00	35	11.4	0.3	25.5	75.7
41	0.00	36	12.3	0.3	25.5	80.9
42	0.00	36	11.6	0.3	25.6	77.2
43	0.00	38	12.5	0.3	25.5	82.5
44	0.00	35	11.2	0.3	25.4	75.6
45	0.00	36	12.3	0.3	25.4	80.7
46	0.00	36	12.2	0.3	25.4	79.7
47	0.00	37	11.9	0.3	25.5	79.6
48	0.00	35	11.5	0.3	25.5	77.7
49	0.00	36	12.2	0.3	25.6	81.5
50	0.00	36	12.0	0.3	25.6	80.3
51	0.00	37	12.0	0.3	25.4	81.4
52	0.00	38	12.2	0.3	25.3	80.6
53	0.00	35	11.9	0.3	25.4	79.0
54	0.00	35	11.8	0.3	25.4	79.9
55	0.00	36	12.3	0.3	25.4	81.0
56	0.00	36	12.1	0.3	25.4	80.0
57	0.00	36	11.7	0.3	25.5	79.7
58	0.00	35	11.4	0.3	25.5	77.6
59	0.00	36	12.1	0.3	25.5	81.5
60	0.00	36	11.8	0.3	25.4	78.1
61	0.00	34	11.6	0.3	25.4	77.5
62	0.00	37	12.8	0.3	25.3	82.5
63	0.00	37	11.5	0.3	25.4	78.4
64	0.00	36	12.1	0.3	25.5	81.0
65	0.00	35	11.8	0.3	25.5	78.6
66	0.00	36	12.0	0.3	25.5	79.2
67	0.00	37	12.2	0.3	25.5	81.2

ANCHORAGE - BORING TB-16 @ 100'
OP: V. BAKER
140lb AUTO HAMMER
Test date: 22-Sep-2007

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
68	0.00	35	11.9	0.3	25.5	80.1
69	0.00	35	11.6	0.3	25.4	76.5
70	0.00	37	12.3	0.3	25.3	80.9
71	0.00	37	12.3	0.3	25.4	80.6
72	0.00	37	12.3	0.3	25.5	81.2
73	0.00	35	11.8	0.3	25.5	77.8
74	0.00	35	11.8	0.3	25.5	78.0
	Average	36	11.9	0.3	25.5	78.5
	Std. Dev.	1	0.4	0.0	0.1	2.5
	Maximum	38	12.8	0.3	25.8	82.5
	@ Blow#	43	62	43	8	43

Total number of blows analyzed: 74

Time Summary

Drive 2 minutes 53 seconds 9:35:04 AM - 9:37:57 AM (9/22/2007) BN 1 - 74

October 9, 2007

Mr. Greg Carpenter
US Army Corps of Engineers District, AK
CEPOA-CT (W911KB)
PO Box 6898
2204 3rd St.
Elmendorf AFB, AK 99506

Re: Standard Penetration Energy Measurements
Automatic Hammer on Gregg Drilling's Mobile B-80 drill rig, BORING TB-10
Port of Anchorage
Anchorage, Alaska

Dear Mr. Carpenter

This report offers results of energy measurements and related calculations made on September 28, 2007 during Standard Penetration Testing (SPT) on Gregg Drilling's mud rotary drill rig. Dynamic tests were performed on an instrumented section of NWJ drill rod attached to the sampler rod string. All dynamic measurements were obtained and recorded using a Pile Driving Analyzer®.

Equipment:

SPT energy measurements were made on SPT samplers driven by the hammer/anvil system on the Gregg Drilling drill rig on September 28, 2007. The rig was tested on the Skate III jack-up barge in the Port of Anchorage Project area. In total, 7 energy measurements were collected corresponding to 7 different samples at increasing depth.

Gregg used a Model PAK Pile Driving Analyzer (PDA) to acquire and process measurements of force and velocity with every impact of the automatic hammer on the sample rods. Two strain gauges mounted on a two foot section of NWJ rod measured force, while two piezoresistive accelerometers bolted on the same rod measured acceleration. The gauges were mounted approximately 6" from the top of the rod.
Analog signals from the gauges and accelerometers were collected, digitized, displayed in real-time, and stored by the PDA. Selected output from the PDA for each recorded impact of the hammer included:

- Maximum force in the rod (FMX)
- Maximum velocity in the rod (VMX)
- Maximum calculated transferred energy (EMX)
- Blows per minute (BPM)
- Energy transferred to the rods (ETR)

Data and Calculations:

The purpose of testing was to measure the energy transferred from the hammer to the drill rod and to calculate the energy efficiency of the hammer. The PDA measurements of force and velocity were reviewed after field testing and analyzed to calculate the transferred energy (EMX).

The maximum energy transferred past the gauge location, EMX, is computed by the PDA using force (F) and velocity (V) records as follows:

$$EMX = \int_a^b F(t)\, V(t)\, dt$$

The time "a" corresponds to the start of the record when the energy transfer begins and "b" is the time at which energy transferred to the rod reaches a maximum value. The energy transferred is defined as ETR, and is usually used to define the efficiency of the hammer/anvil system.

Results:

Table 1 summarizes the average calculated energies for each sample tested as well as the type of sample and depth. It is shown that the overall average (ETR) energy for this system is 81%. Appendix A provides plots and tables of PDA results for all hammer blows at each sampling depth. The plots and tables present selected measured and calculated results as a function of blow number. The results include:

- the blow number
- depth
- BLC (blow count in blows per foot)
- FMX (maximum rod force)
- VMX (maximum rod velocity)
- EMX (maximum transferred energy)
- BPM (blows per minute)
- ETR (energy transferred in percent of maximum)

At the end of each table is a statistical evaluation of the results for each variable including the average, standard deviation, maximum, and what blow number this maximum occurred.

If you have any questions or comments on this report, please do not hesitate to call our office at (562) 427-6899.

Sincerely,

Kelly Cabal
Engineer

Client:	US ARMY CORPS OF ENGINEERS
Project:	ANCHORAGE
Date:	9/28/2007
Boring:	**TB-10**

Table 1 - SPT Sample Summary BORING TB-10

Sample #	Sampler	Length of Sample Rod (ft)	Sampler Length (ft)	Total Rod Length* (ft)	Depth of Sample (below Mudline) (ft)	Total Blows Analyzed by PDA	Average Energy Transferred to Rods (% of Theoretical Max.)	Maximum Efficiency Recorded (%)	Standard Deviation
1	SPT	66	4.80	70.8	65	43	85.1	88.3	2
2	SPT	70	4.80	74.8	70	28	82.8	86.0	2
3	SPT	75	4.80	79.8	75	78	74.3	85.5	5
4	SPT	80	4.80	84.8	80	121	81.7	87.0	3
5	SPT	85	4.80	89.8	85	92	81.7	84.9	2
6	SPT	90	4.80	94.8	90	64	80.8	84.0	1
7	SPT	96	4.80	100.8	95	116	82.3	85.5	1
						Average	81.2		

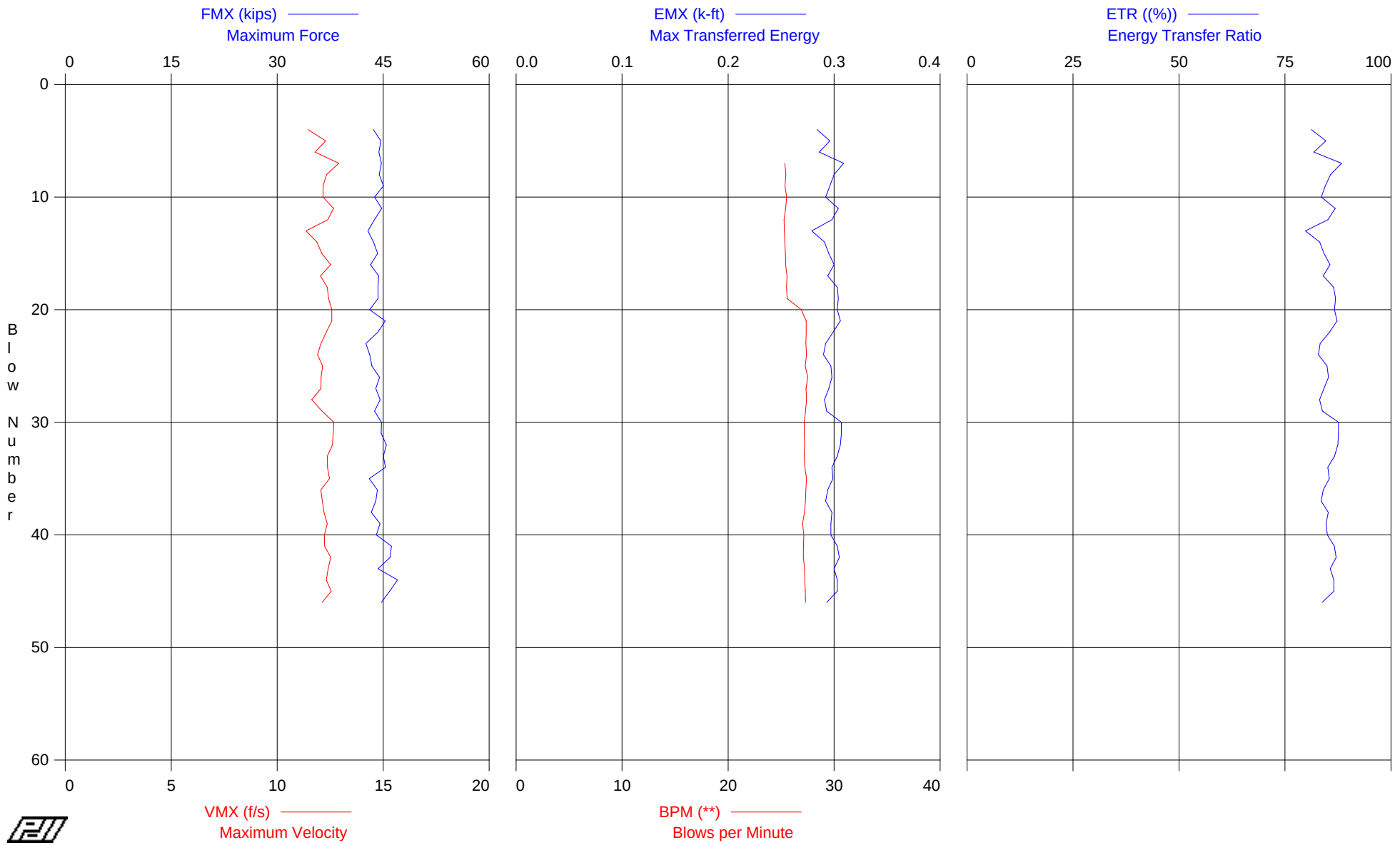
* Total rod length includes, sampler, rod, adaptors, and instrumented section below gauges

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 28-Sep-2007

ANCHORAGE - BORING TB-10 @ 65'



ANCHORAGE - BORING TB-10 @ 65'
OP: T. Boyd

140lb AUTO HAMMER
Test date: 28-Sep-2007

AR: 1.46 in^2
LE: 70.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
4	0.00	44	11.5	0.3	0.0	81.2
5	0.00	45	12.3	0.3	0.0	84.7
6	0.00	44	11.8	0.3	0.0	81.8
7	0.00	45	12.9	0.3	25.4	88.3
8	0.00	44	12.3	0.3	25.4	85.8
9	0.00	45	12.2	0.3	25.4	84.5
10	0.00	44	12.2	0.3	25.5	83.6
11	0.00	45	12.7	0.3	25.4	86.9
12	0.00	44	12.4	0.3	25.3	85.1
13	0.00	43	11.4	0.3	25.3	79.8
14	0.00	44	11.9	0.3	25.4	83.2
15	0.00	44	12.1	0.3	25.4	84.2
16	0.00	43	12.5	0.3	25.4	85.6
17	0.00	44	12.0	0.3	25.6	84.0
18	0.00	44	12.4	0.3	25.5	86.5
19	0.00	44	12.4	0.3	25.6	87.0
20	0.00	43	12.6	0.3	26.9	86.7
21	0.00	45	12.6	0.3	27.4	87.3
22	0.00	44	12.3	0.3	27.4	85.5
23	0.00	43	12.1	0.3	27.3	83.3
24	0.00	43	11.9	0.3	27.4	82.9
25	0.00	43	12.1	0.3	27.3	84.9
26	0.00	44	12.1	0.3	27.5	85.3
27	0.00	44	12.1	0.3	27.3	84.2
28	0.00	45	11.6	0.3	27.4	83.2
29	0.00	44	12.1	0.3	27.3	83.8
30	0.00	45	12.7	0.3	27.2	87.6
31	0.00	45	12.6	0.3	27.2	87.6
32	0.00	45	12.6	0.3	27.2	87.5
33	0.00	45	12.4	0.3	27.2	86.7
34	0.00	45	12.4	0.3	27.2	85.1
35	0.00	43	12.5	0.3	27.4	85.5
36	0.00	44	12.1	0.3	27.3	84.0
37	0.00	44	12.1	0.3	27.3	83.5
38	0.00	43	12.2	0.3	27.2	85.2
39	0.00	45	12.4	0.3	27.0	84.7
40	0.00	44	12.2	0.3	27.1	85.0
41	0.00	46	12.2	0.3	27.1	86.6
42	0.00	46	12.5	0.3	27.1	87.1
43	0.00	44	12.4	0.3	27.2	85.7
44	0.00	47	12.3	0.3	27.2	86.6
45	0.00	46	12.6	0.3	27.3	86.5
46	0.00	45	12.1	0.3	27.3	83.8
	Average	44	12.2	0.3	26.7	85.1
	Std. Dev.	1	0.3	0.0	0.9	1.8
	Maximum	47	12.9	0.3	27.5	88.3
	@ Blow#	44	7	7	26	7

Total number of blows analyzed: 43

Time Summary

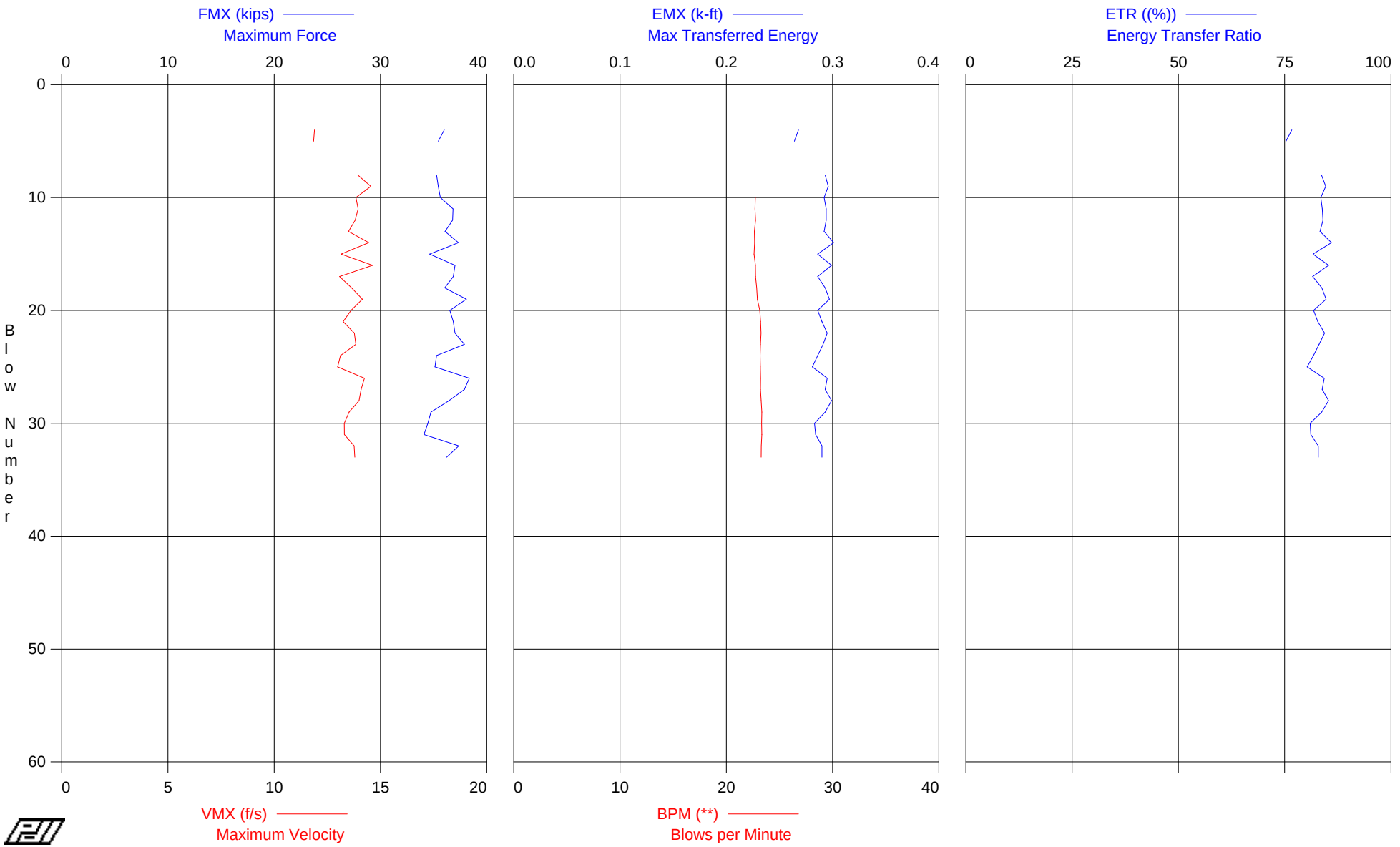
Drive 1 minute 44 seconds 11:20:14 AM - 11:21:58 AM (9/28/2007) BN 4 - 46

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 28-Sep-2007

ANCHORAGE - BORING TB-10 @ 70



ANCHORAGE - BORING TB-10 @ 70
OP: T. Boyd

140lb AUTO HAMMER
Test date: 28-Sep-2007

AR: 1.46 in^2
LE: 74.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
4	0.00	36	11.9	0.3	0.0	76.7
5	0.00	35	11.9	0.3	0.0	75.3
8	0.00	35	13.9	0.3	0.0	83.7
9	0.00	35	14.5	0.3	0.0	84.6
10	0.00	36	13.9	0.3	22.7	83.5
11	0.00	37	13.9	0.3	22.7	83.9
12	0.00	37	13.8	0.3	22.7	84.0
13	0.00	36	13.5	0.3	22.7	83.3
14	0.00	37	14.5	0.3	22.7	86.0
15	0.00	35	13.1	0.3	22.6	81.7
16	0.00	37	14.6	0.3	22.7	85.3
17	0.00	37	13.1	0.3	22.7	81.6
18	0.00	36	13.6	0.3	22.9	83.8
19	0.00	38	14.2	0.3	22.9	84.7
20	0.00	37	13.6	0.3	23.1	81.8
21	0.00	37	13.2	0.3	23.2	82.8
22	0.00	37	13.8	0.3	23.3	84.4
23	0.00	38	13.8	0.3	23.2	83.1
24	0.00	35	13.1	0.3	23.2	81.8
25	0.00	35	13.0	0.3	23.2	80.3
26	0.00	38	14.2	0.3	23.2	84.3
27	0.00	38	14.1	0.3	23.2	83.8
28	0.00	36	14.0	0.3	23.3	85.3
29	0.00	35	13.5	0.3	23.3	83.7
30	0.00	34	13.3	0.3	23.3	81.0
31	0.00	34	13.3	0.3	23.3	81.2
32	0.00	37	13.8	0.3	23.3	82.9
33	0.00	36	13.8	0.3	23.3	82.9
	Average	36	13.6	0.3	23.0	82.8
	Std. Dev.	1	0.6	0.0	0.3	2.3
	Maximum	38	14.6	0.3	23.3	86.0
	@ Blow#	26	16	14	29	14

Total number of blows analyzed: 28

Time Summary

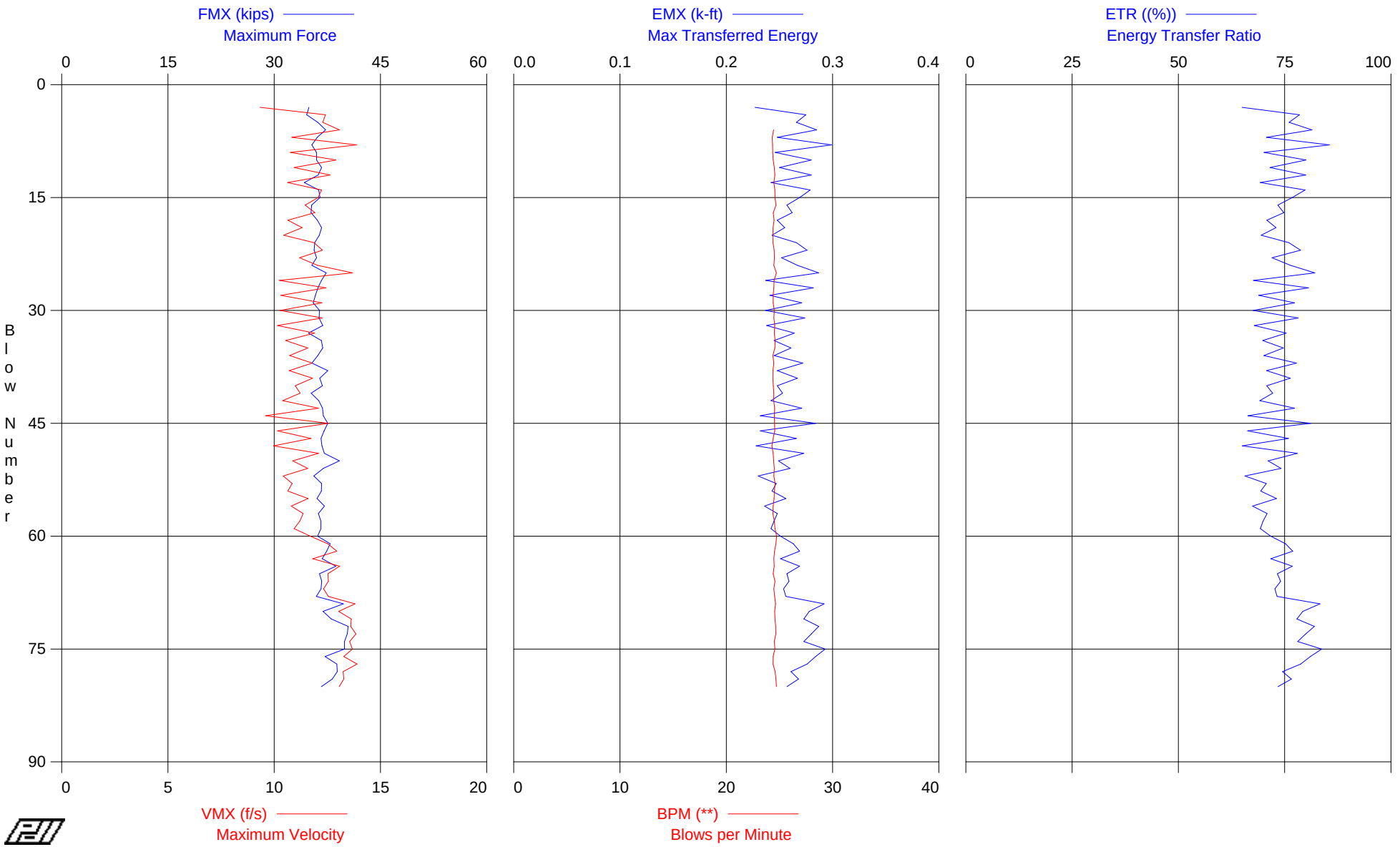
Drive 2 minutes 55 seconds 11:35:40 AM - 11:38:35 AM (9/28/2007) BN 4 - 33

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 28-Sep-2007

ANCHORAGE - BORING TB-10 @ 75



ANCHORAGE - BORING TB-10 @ 75
OP: T. Boyd

140lb AUTO HAMMER
Test date: 28-Sep-2007

AR: 1.46 in^2
LE: 79.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	35	9.3	0.2	0.0	65.0
4	0.00	35	12.4	0.3	0.0	78.5
5	0.00	36	12.3	0.3	0.0	76.0
6	0.00	37	13.1	0.3	24.5	81.4
7	0.00	36	10.8	0.2	24.3	70.7
8	0.00	35	13.9	0.3	24.4	85.5
9	0.00	36	10.8	0.2	24.4	70.2
10	0.00	36	12.9	0.3	24.4	80.0
11	0.00	37	10.9	0.3	24.5	71.5
12	0.00	36	12.6	0.3	24.6	80.0
13	0.00	34	10.6	0.2	24.5	69.3
14	0.00	36	12.2	0.3	24.6	79.8
15	0.00	36	12.1	0.3	24.6	76.8
16	0.00	35	11.5	0.3	24.7	73.4
17	0.00	35	11.9	0.3	24.4	74.8
18	0.00	36	10.6	0.2	24.5	70.8
19	0.00	37	11.3	0.3	24.4	73.0
20	0.00	36	10.4	0.2	24.4	69.5
21	0.00	36	11.9	0.3	24.4	76.0
22	0.00	36	12.3	0.3	24.5	78.7
23	0.00	36	11.2	0.3	24.5	72.0
24	0.00	35	12.0	0.3	24.5	76.4
25	0.00	37	13.7	0.3	24.7	82.1
26	0.00	37	10.2	0.2	24.5	67.6
27	0.00	36	12.4	0.3	24.5	80.6
28	0.00	36	10.3	0.2	24.4	68.9
29	0.00	36	12.2	0.3	24.4	77.3
30	0.00	36	10.3	0.2	24.5	67.6
31	0.00	36	12.3	0.3	24.5	78.2
32	0.00	37	10.2	0.2	24.6	67.9
33	0.00	35	11.9	0.3	24.5	75.4
34	0.00	37	10.5	0.2	24.6	69.9
35	0.00	37	11.6	0.3	24.6	74.7
36	0.00	36	10.7	0.2	24.4	70.1
37	0.00	35	11.8	0.3	24.5	77.8
38	0.00	38	10.7	0.2	24.4	70.7
39	0.00	36	11.8	0.3	24.4	76.3
40	0.00	37	11.0	0.2	24.4	70.8
41	0.00	35	11.2	0.3	24.5	72.2
42	0.00	36	10.4	0.2	24.5	69.1
43	0.00	37	12.1	0.3	24.6	77.3
44	0.00	37	9.6	0.2	24.5	66.4
45	0.00	38	12.6	0.3	24.5	81.1
46	0.00	37	10.2	0.2	24.6	66.3
47	0.00	37	11.7	0.3	24.4	75.9
48	0.00	37	10.0	0.2	24.3	65.0
49	0.00	37	12.1	0.3	24.4	78.0
50	0.00	39	10.9	0.2	24.5	71.1
51	0.00	37	11.6	0.3	24.5	74.2
52	0.00	36	10.4	0.2	24.5	65.6
53	0.00	37	10.8	0.2	24.6	70.7
54	0.00	37	10.6	0.2	24.5	69.4
55	0.00	36	11.6	0.3	24.5	73.1
56	0.00	37	10.8	0.2	24.4	67.5
57	0.00	36	11.4	0.2	24.4	70.9
58	0.00	37	11.2	0.2	24.5	69.9
59	0.00	37	10.9	0.2	24.6	69.3
60	0.00	36	11.7	0.3	24.7	71.7
61	0.00	38	12.5	0.3	24.7	75.2
62	0.00	37	12.9	0.3	24.5	76.9
63	0.00	37	11.8	0.3	24.5	71.7
64	0.00	39	13.1	0.3	24.5	76.8
65	0.00	36	12.5	0.3	24.4	73.3
66	0.00	37	12.5	0.3	24.6	74.1
67	0.00	37	12.3	0.3	24.5	72.7
68	0.00	36	12.5	0.3	24.6	73.2
69	0.00	40	13.8	0.3	24.6	83.3

ANCHORAGE - BORING TB-10 @ 75
OP: T. Boyd
140lb AUTO HAMMER
Test date: 28-Sep-2007

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
70	0.00	37	13.0	0.3	24.6	79.3
71	0.00	38	13.6	0.3	24.6	77.9
72	0.00	40	13.6	0.3	24.7	82.0
73	0.00	40	13.8	0.3	24.7	79.9
74	0.00	40	13.5	0.3	24.5	78.1
75	0.00	40	13.7	0.3	24.6	83.7
76	0.00	37	13.3	0.3	24.4	81.1
77	0.00	39	13.9	0.3	24.4	78.8
78	0.00	39	13.2	0.3	24.6	74.5
79	0.00	38	13.3	0.3	24.7	76.6
80	0.00	37	13.1	0.3	24.7	73.4
	Average	37	11.8	0.3	24.5	74.3
	Std. Dev.	1	1.2	0.0	0.1	4.9
	Maximum	40	13.9	0.3	24.7	85.5
	@ Blow#	72	77	8	60	8

Total number of blows analyzed: 78

Time Summary

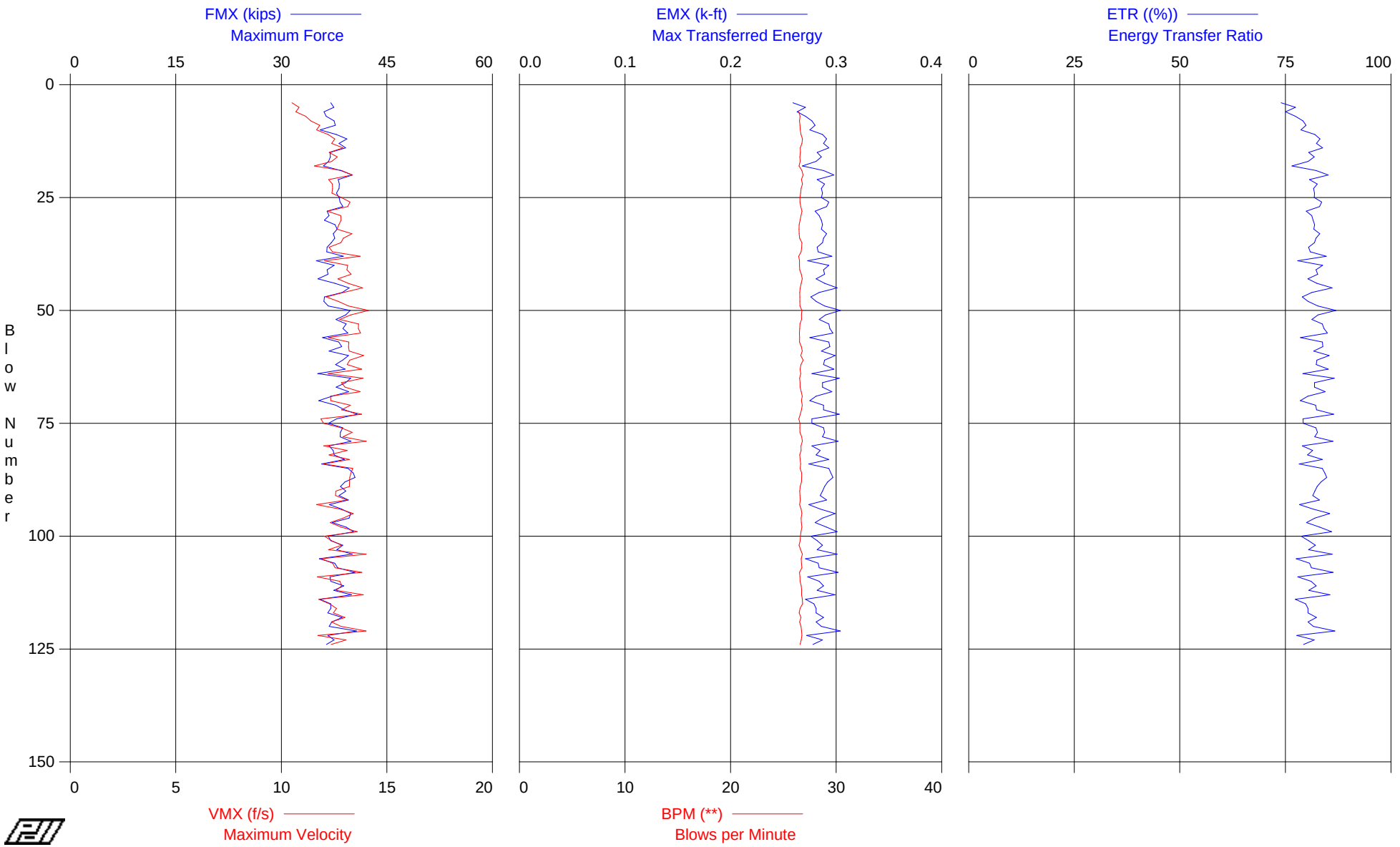
Drive 3 minutes 16 seconds 12:01:18 PM - 12:04:34 PM (9/28/2007) BN 3 - 80

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 28-Sep-2007

ANCHORAGE - BORING TB-10 @ 80



ANCHORAGE - BORING TB-10 @ 80
OP: T. Boyd

140lb AUTO HAMMER
Test date: 28-Sep-2007

AR: 1.46 in^2
LE: 84.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
4	0.00	37	10.5	0.3	0.0	74.0
5	0.00	37	10.8	0.3	0.0	77.4
6	0.00	36	10.7	0.3	26.5	75.0
7	0.00	36	11.2	0.3	26.6	77.4
8	0.00	37	11.4	0.3	26.5	79.2
9	0.00	38	11.8	0.3	26.6	79.9
10	0.00	36	11.7	0.3	26.6	78.7
11	0.00	38	12.2	0.3	26.7	82.0
12	0.00	39	12.5	0.3	26.8	83.2
13	0.00	38	12.4	0.3	26.8	82.4
14	0.00	39	12.9	0.3	26.6	83.8
15	0.00	37	12.3	0.3	26.6	80.5
16	0.00	37	12.6	0.3	26.6	81.8
17	0.00	37	12.4	0.3	26.6	80.4
18	0.00	36	11.6	0.3	26.5	76.6
19	0.00	38	12.9	0.3	26.8	82.3
20	0.00	40	13.4	0.3	26.9	85.1
21	0.00	38	12.2	0.3	26.7	80.7
22	0.00	38	12.4	0.3	26.8	82.5
23	0.00	38	12.4	0.3	26.7	81.7
24	0.00	38	12.4	0.3	26.6	81.9
25	0.00	38	12.8	0.3	26.6	81.8
26	0.00	38	13.3	0.3	26.6	83.6
27	0.00	39	13.1	0.3	26.6	83.1
28	0.00	37	12.2	0.3	26.8	79.9
29	0.00	37	12.8	0.3	26.7	81.2
30	0.00	36	12.8	0.3	26.6	81.6
31	0.00	38	12.7	0.3	26.5	81.9
32	0.00	38	12.6	0.3	26.5	81.8
33	0.00	37	13.3	0.3	26.5	83.1
34	0.00	38	12.9	0.3	26.5	82.3
35	0.00	37	12.8	0.3	26.8	81.9
36	0.00	37	12.3	0.3	26.7	80.5
37	0.00	36	12.4	0.3	26.7	80.9
38	0.00	39	13.7	0.3	26.5	84.7
39	0.00	35	12.0	0.3	26.5	77.9
40	0.00	38	13.1	0.3	26.5	83.8
41	0.00	36	13.1	0.3	26.5	82.2
42	0.00	37	13.3	0.3	26.7	82.6
43	0.00	35	12.7	0.3	26.8	80.3
44	0.00	38	13.2	0.3	26.7	82.4
45	0.00	40	13.8	0.3	26.6	86.1
46	0.00	39	12.9	0.3	26.5	81.3
47	0.00	36	12.1	0.3	26.6	79.0
48	0.00	36	12.7	0.3	26.6	80.4
49	0.00	37	13.2	0.3	26.6	82.7
50	0.00	40	14.1	0.3	26.8	87.0
51	0.00	39	13.3	0.3	26.7	82.7
52	0.00	38	12.8	0.3	26.7	81.3
53	0.00	39	13.7	0.3	26.6	83.7
54	0.00	39	13.6	0.3	26.5	84.1
55	0.00	39	13.7	0.3	26.5	85.0
56	0.00	36	12.2	0.3	26.5	78.6
57	0.00	38	13.2	0.3	26.5	83.8
58	0.00	39	13.2	0.3	26.7	83.9
59	0.00	37	13.2	0.3	26.8	81.7
60	0.00	40	13.9	0.3	26.6	85.4
61	0.00	39	13.2	0.3	26.9	82.5
62	0.00	38	13.1	0.3	26.7	82.3
63	0.00	39	13.8	0.3	26.6	85.2
64	0.00	35	12.2	0.3	26.6	79.1
65	0.00	40	13.9	0.3	26.5	86.6
66	0.00	39	12.8	0.3	26.6	81.9
67	0.00	38	13.0	0.3	26.6	81.9
68	0.00	40	13.7	0.3	26.7	84.4
69	0.00	37	12.3	0.3	26.8	80.3
70	0.00	35	12.3	0.3	26.7	78.5

ANCHORAGE - BORING TB-10 @ 80
OP: T. Boyd
140lb AUTO HAMMER
Test date: 28-Sep-2007

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
71	0.00	38	13.3	0.3	26.8	82.2
72	0.00	39	12.8	0.3	26.7	82.4
73	0.00	41	13.8	0.3	26.6	86.5
74	0.00	38	11.9	0.3	26.5	79.2
75	0.00	37	12.0	0.3	26.6	79.2
76	0.00	39	12.8	0.3	26.6	82.2
77	0.00	38	13.4	0.3	26.6	82.6
78	0.00	38	12.9	0.3	26.7	81.9
79	0.00	40	14.0	0.3	26.8	86.3
80	0.00	37	12.0	0.3	26.7	79.0
81	0.00	37	13.1	0.3	26.7	81.5
82	0.00	38	12.3	0.3	26.5	80.2
83	0.00	39	13.2	0.3	26.6	83.8
84	0.00	36	12.0	0.3	26.6	78.3
85	0.00	39	13.4	0.3	26.6	83.7
86	0.00	40	13.3	0.3	26.7	84.3
87	0.00	40	13.2	0.3	26.7	84.8
88	0.00	39	13.2	0.3	26.7	83.4
89	0.00	38	13.2	0.3	26.6	82.5
90	0.00	39	12.6	0.3	26.5	82.0
91	0.00	38	12.6	0.3	26.6	81.5
92	0.00	40	13.1	0.3	26.6	83.0
93	0.00	37	11.7	0.3	26.5	78.3
94	0.00	39	12.8	0.3	26.7	81.5
95	0.00	40	13.4	0.3	26.8	85.5
96	0.00	40	12.9	0.3	26.7	82.0
97	0.00	37	12.3	0.3	26.7	80.0
98	0.00	39	12.8	0.3	26.8	83.1
99	0.00	40	13.6	0.3	26.7	86.0
100	0.00	37	12.0	0.3	26.6	78.7
101	0.00	37	12.4	0.3	26.6	80.5
102	0.00	39	12.9	0.3	26.5	82.1
103	0.00	38	12.2	0.3	26.6	80.5
104	0.00	40	14.0	0.3	26.8	86.1
105	0.00	35	11.9	0.3	26.7	77.6
106	0.00	38	12.4	0.3	26.7	80.7
107	0.00	38	12.5	0.3	26.8	81.2
108	0.00	40	13.8	0.3	26.5	86.3
109	0.00	37	11.7	0.3	26.6	77.9
110	0.00	37	12.8	0.3	26.6	81.1
111	0.00	39	12.9	0.3	26.7	82.3
112	0.00	37	12.6	0.3	26.7	80.5
113	0.00	40	13.9	0.3	26.7	85.6
114	0.00	35	11.8	0.3	26.8	77.3
115	0.00	37	12.3	0.3	26.8	79.8
116	0.00	37	12.6	0.3	26.6	80.4
117	0.00	37	12.5	0.3	26.5	80.3
118	0.00	39	13.0	0.3	26.7	82.4
119	0.00	37	12.4	0.3	26.5	80.4
120	0.00	37	12.8	0.3	26.7	81.6
121	0.00	41	14.0	0.3	26.7	86.7
122	0.00	37	11.7	0.3	26.8	77.7
123	0.00	37	13.1	0.3	26.7	81.9
124	0.00	36	12.4	0.3	26.6	79.3
	Average	38	12.7	0.3	26.6	81.7
	Std. Dev.	1	0.7	0.0	0.1	2.5
	Maximum	41	14.1	0.3	26.9	87.0
	@ Blow#	73	50	50	61	50

Total number of blows analyzed: 121

Time Summary

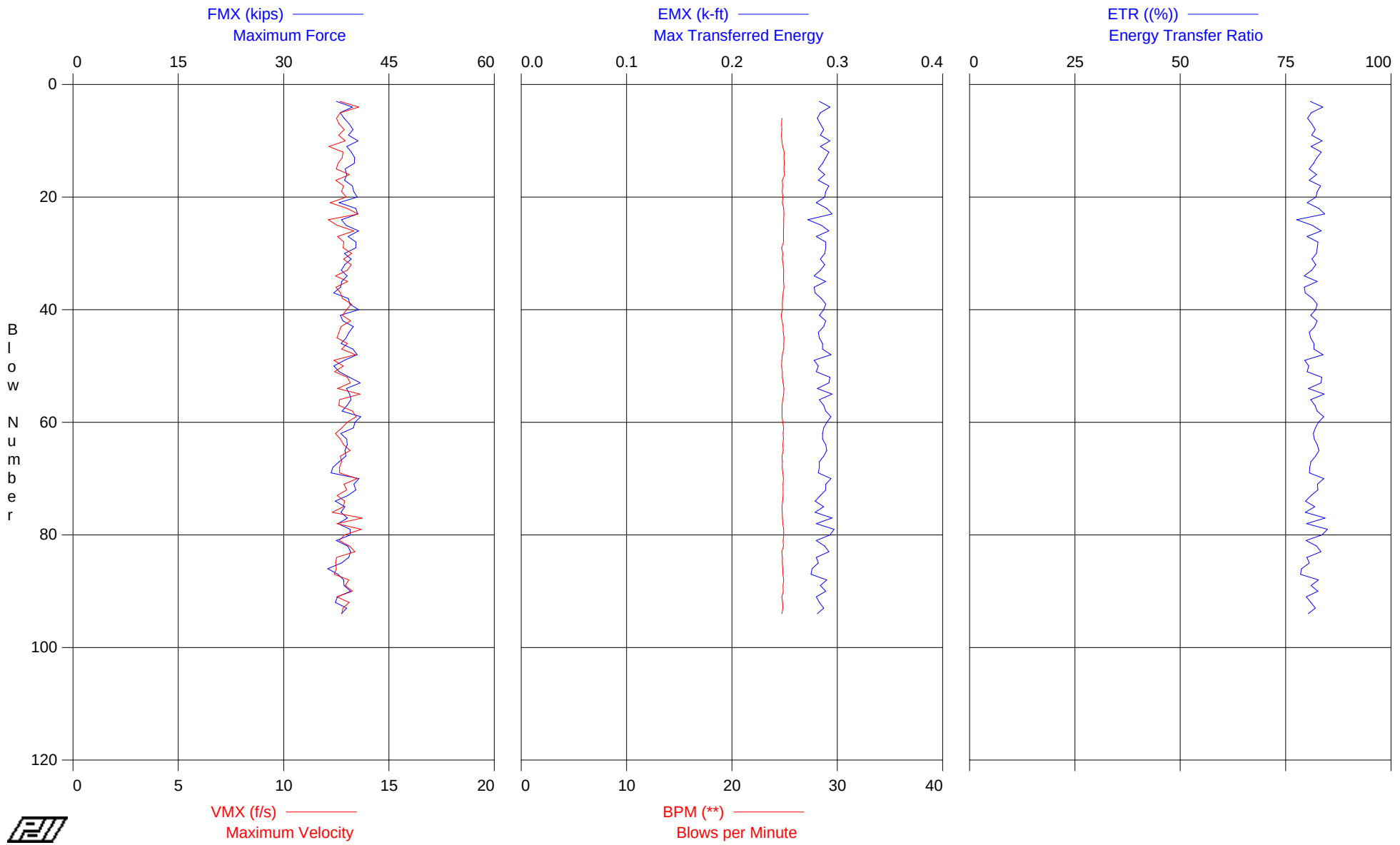
Drive 4 minutes 32 seconds 12:21:47 PM - 12:26:19 PM (9/28/2007) BN 4 - 124

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 28-Sep-2007

ANCHORAGE - BORING TB-10 @ 85



ANCHORAGE - BORING TB-10 @ 85
OP: T. Boyd

140lb AUTO HAMMER
Test date: 28-Sep-2007

AR: 1.46 in^2
LE: 89.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	38	12.7	0.3	0.0	80.8
4	0.00	40	13.6	0.3	0.0	83.8
5	0.00	38	12.7	0.3	0.0	81.1
6	0.00	39	12.5	0.3	24.8	80.2
7	0.00	39	12.6	0.3	24.7	81.2
8	0.00	40	12.9	0.3	24.7	82.0
9	0.00	39	12.6	0.3	24.7	81.2
10	0.00	41	12.9	0.3	24.7	83.7
11	0.00	39	12.1	0.3	24.8	81.0
12	0.00	40	12.8	0.3	25.0	83.5
13	0.00	40	12.8	0.3	24.9	82.4
14	0.00	40	12.6	0.3	25.0	81.7
15	0.00	39	12.5	0.3	24.9	80.6
16	0.00	39	13.1	0.3	25.0	82.4
17	0.00	39	12.5	0.3	24.8	80.6
18	0.00	40	12.8	0.3	24.8	83.3
19	0.00	40	12.8	0.3	24.8	82.5
20	0.00	40	13.0	0.3	24.8	82.2
21	0.00	38	12.2	0.3	24.8	80.1
22	0.00	40	13.0	0.3	24.9	82.9
23	0.00	41	13.5	0.3	24.9	84.3
24	0.00	38	12.1	0.3	24.9	77.6
25	0.00	39	12.5	0.3	24.9	81.3
26	0.00	41	13.3	0.3	24.9	83.5
27	0.00	39	12.6	0.3	24.9	80.1
28	0.00	40	12.9	0.3	24.9	82.7
29	0.00	40	12.8	0.3	24.7	82.5
30	0.00	39	13.2	0.3	24.8	82.3
31	0.00	40	12.8	0.3	24.8	81.3
32	0.00	39	13.2	0.3	24.9	82.2
33	0.00	38	13.0	0.3	24.9	81.2
34	0.00	39	12.5	0.3	24.9	79.4
35	0.00	38	13.0	0.3	24.9	82.5
36	0.00	38	12.5	0.3	24.9	79.4
37	0.00	37	12.7	0.3	24.9	79.7
38	0.00	39	12.8	0.3	24.8	81.4
39	0.00	39	13.2	0.3	24.8	82.5
40	0.00	41	13.0	0.3	24.8	82.1
41	0.00	38	12.8	0.3	24.7	80.9
42	0.00	38	13.2	0.3	24.8	82.5
43	0.00	40	12.7	0.3	24.9	81.9
44	0.00	39	12.6	0.3	24.9	80.6
45	0.00	39	12.5	0.3	24.9	81.0
46	0.00	38	13.0	0.3	24.9	81.7
47	0.00	40	12.8	0.3	24.9	81.7
48	0.00	40	13.4	0.3	24.8	83.9
49	0.00	39	12.4	0.3	24.7	79.5
50	0.00	37	12.8	0.3	24.7	80.5
51	0.00	38	12.4	0.3	24.8	80.1
52	0.00	39	13.0	0.3	24.8	83.6
53	0.00	41	13.2	0.3	24.9	83.4
54	0.00	39	12.6	0.3	24.9	80.4
55	0.00	39	13.6	0.3	24.9	84.2
56	0.00	40	12.6	0.3	24.8	80.9
57	0.00	39	12.6	0.3	24.8	82.0
58	0.00	38	13.3	0.3	24.8	82.5
59	0.00	41	13.4	0.3	24.7	84.0
60	0.00	40	13.0	0.3	24.8	82.8
61	0.00	40	12.8	0.3	24.9	82.1
62	0.00	38	12.5	0.3	24.9	81.6
63	0.00	39	12.7	0.3	24.9	81.8
64	0.00	39	12.8	0.3	24.8	82.5
65	0.00	39	13.2	0.3	24.9	82.9
66	0.00	39	12.7	0.3	24.7	82.1
67	0.00	38	12.8	0.3	24.8	81.0
68	0.00	37	12.7	0.3	24.8	80.7
69	0.00	37	12.7	0.3	24.8	80.7

ANCHORAGE - BORING TB-10 @ 85
OP: T. Boyd
140lb AUTO HAMMER
Test date: 28-Sep-2007

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
70	0.00	41	13.5	0.3	24.9	84.1
71	0.00	40	12.9	0.3	24.8	82.6
72	0.00	40	13.0	0.3	24.9	82.6
73	0.00	39	12.5	0.3	24.9	81.0
74	0.00	37	12.9	0.3	24.8	79.7
75	0.00	39	12.8	0.3	24.7	81.9
76	0.00	38	12.3	0.3	24.8	79.7
77	0.00	39	13.7	0.3	24.8	84.4
78	0.00	38	12.5	0.3	24.8	80.0
79	0.00	39	13.7	0.3	24.9	84.9
80	0.00	40	12.9	0.3	24.9	83.6
81	0.00	37	12.6	0.3	24.9	79.9
82	0.00	39	13.1	0.3	24.9	82.4
83	0.00	40	13.4	0.3	24.7	83.4
84	0.00	39	12.5	0.3	24.8	80.0
85	0.00	38	12.5	0.3	24.8	80.6
86	0.00	36	12.5	0.3	24.8	78.8
87	0.00	38	12.4	0.3	24.8	78.5
88	0.00	39	13.1	0.3	24.9	82.8
89	0.00	39	12.9	0.3	24.8	81.1
90	0.00	40	13.3	0.3	24.9	82.7
91	0.00	38	12.5	0.3	24.7	79.9
92	0.00	37	13.1	0.3	24.8	81.0
93	0.00	39	12.8	0.3	24.8	82.1
94	0.00	38	12.8	0.3	24.7	80.4
	Average	39	12.8	0.3	24.8	81.7
	Std. Dev.	1	0.3	0.0	0.1	1.5
	Maximum	41	13.7	0.3	25.0	84.9
	@ Blow#	59	77	79	16	79

Total number of blows analyzed: 92

Time Summary

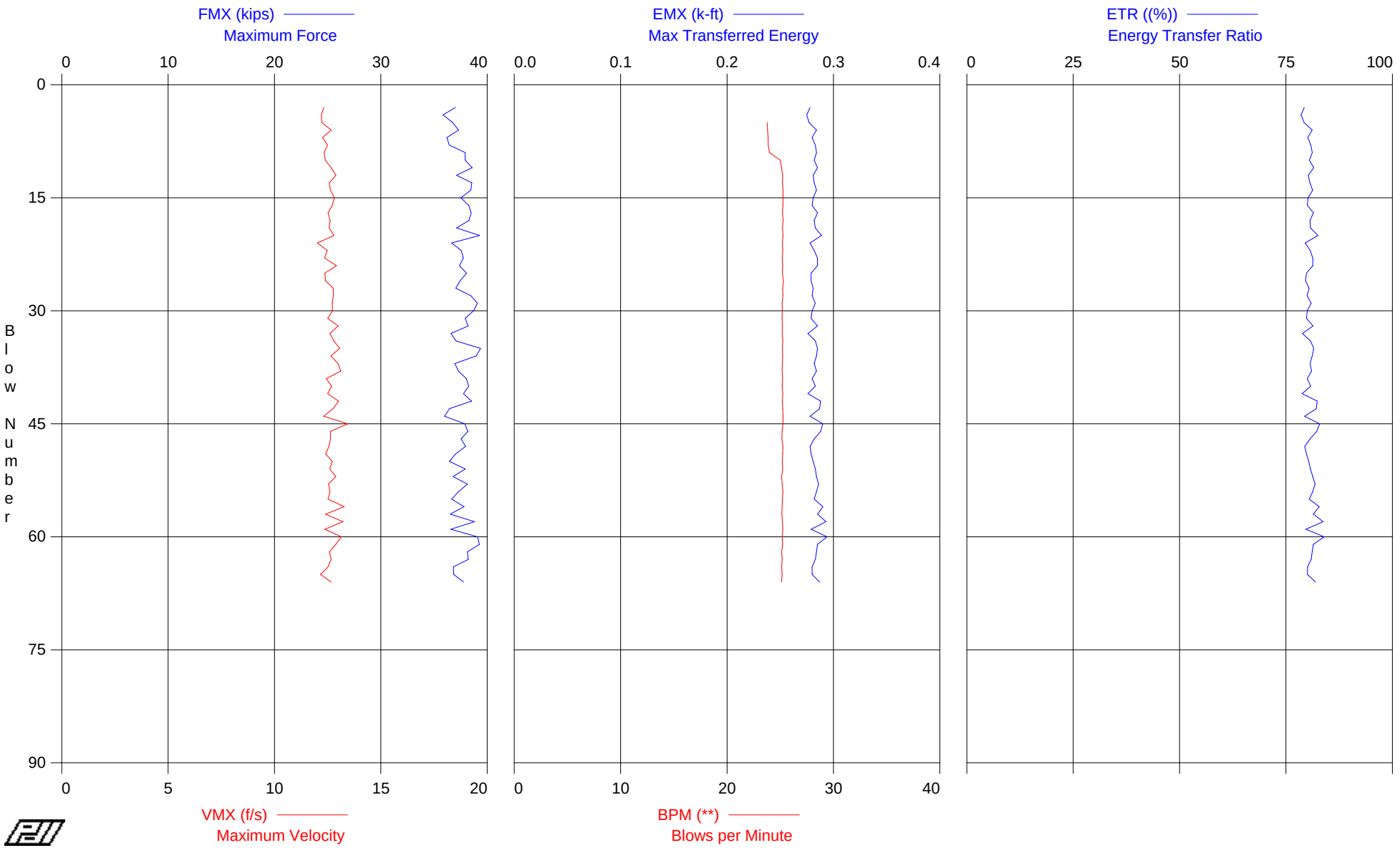
Drive 3 minutes 44 seconds 12:55:29 PM - 12:59:13 PM (9/28/2007) BN 3 - 94

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 28-Sep-2007

ANCHORAGE - BORING TB-10 @ 90



ANCHORAGE - BORING TB-10 @ 90
OP: T. Boyd

140lb AUTO HAMMER
Test date: 28-Sep-2007

AR: 1.46 in^2
LE: 94.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	37	12.3	0.3	0.0	79.3
4	0.00	36	12.2	0.3	0.0	78.6
5	0.00	37	12.2	0.3	23.8	79.2
6	0.00	37	12.7	0.3	23.8	81.2
7	0.00	36	12.3	0.3	23.9	80.1
8	0.00	36	12.5	0.3	23.9	80.8
9	0.00	38	12.3	0.3	24.0	81.2
10	0.00	38	12.4	0.3	25.0	80.5
11	0.00	39	12.7	0.3	25.1	81.5
12	0.00	37	12.9	0.3	25.2	80.2
13	0.00	39	12.6	0.3	25.2	80.6
14	0.00	38	12.6	0.3	25.3	81.3
15	0.00	38	12.8	0.3	25.3	80.2
16	0.00	38	12.7	0.3	25.3	80.0
17	0.00	38	12.5	0.3	25.2	81.5
18	0.00	38	12.6	0.3	25.3	80.7
19	0.00	37	12.6	0.3	25.2	80.8
20	0.00	39	12.8	0.3	25.3	82.5
21	0.00	37	12.0	0.3	25.2	79.5
22	0.00	38	12.5	0.3	25.2	80.7
23	0.00	38	12.4	0.3	25.2	81.3
24	0.00	37	12.9	0.3	25.2	81.3
25	0.00	38	12.4	0.3	25.2	79.8
26	0.00	37	12.4	0.3	25.3	79.6
27	0.00	37	12.8	0.3	25.2	80.4
28	0.00	38	12.8	0.3	25.3	80.0
29	0.00	39	12.7	0.3	25.2	80.9
30	0.00	39	12.7	0.3	25.2	80.0
31	0.00	38	12.5	0.3	25.2	79.8
32	0.00	38	13.0	0.3	25.2	81.3
33	0.00	37	12.6	0.3	25.2	78.9
34	0.00	37	12.8	0.3	25.2	80.8
35	0.00	39	13.1	0.3	25.2	81.5
36	0.00	39	12.7	0.3	25.2	81.1
37	0.00	37	13.0	0.3	25.2	80.7
38	0.00	37	13.1	0.3	25.2	81.0
39	0.00	38	12.4	0.3	25.2	80.0
40	0.00	38	12.7	0.3	25.2	80.8
41	0.00	38	12.5	0.3	25.2	78.8
42	0.00	39	13.0	0.3	25.2	82.3
43	0.00	36	12.8	0.3	25.2	82.1
44	0.00	36	12.3	0.3	25.3	79.4
45	0.00	38	13.4	0.3	25.3	82.9
46	0.00	38	12.6	0.3	25.2	82.2
47	0.00	38	12.6	0.3	25.2	80.7
48	0.00	38	12.6	0.3	25.3	79.4
49	0.00	37	12.4	0.3	25.2	79.8
50	0.00	36	12.7	0.3	25.2	80.4
51	0.00	38	12.6	0.3	25.2	80.8
52	0.00	37	12.9	0.3	25.1	81.3
53	0.00	38	12.5	0.3	25.2	81.8
54	0.00	37	12.6	0.3	25.3	81.3
55	0.00	37	12.5	0.3	25.2	80.5
56	0.00	38	13.3	0.3	25.2	82.8
57	0.00	37	12.4	0.3	25.2	81.4
58	0.00	39	13.2	0.3	25.2	83.8
59	0.00	37	12.4	0.3	25.2	79.7
60	0.00	39	13.2	0.3	25.2	84.0
61	0.00	39	12.9	0.3	25.2	81.4
62	0.00	38	12.6	0.3	25.1	81.2
63	0.00	38	12.7	0.3	25.2	80.9
64	0.00	37	12.5	0.3	25.1	80.1
65	0.00	37	12.2	0.3	25.2	80.0
66	0.00	38	12.7	0.3	25.1	81.9

ANCHORAGE - BORING TB-10 @ 90
OP: T. Boyd
140lb AUTO HAMMER
Test date: 28-Sep-2007

	FMX	VMX	EMX	BPM	ETR
	kips	f/s	k-ft	**	(%)
Average	38	12.6	0.3	25.1	80.8
Std. Dev.	1	0.3	0.0	0.4	1.1
Maximum	39	13.4	0.3	25.3	84.0
@ Blow#	35	45	60	26	60

Total number of blows analyzed: 64

Time Summary

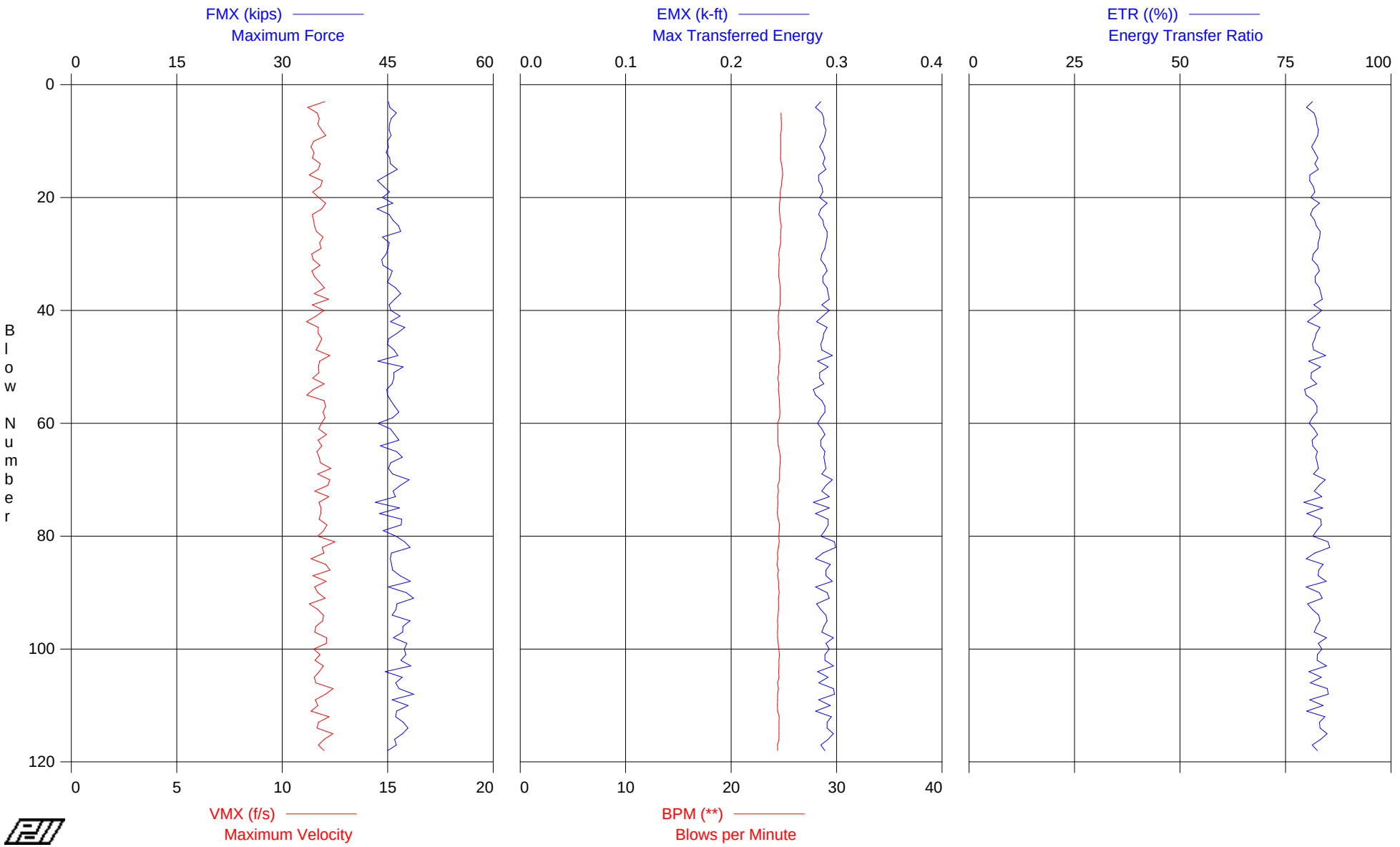
Drive	2 minutes 35 seconds	1:13:11 PM - 1:15:46 PM (9/28/2007) BN 3 - 66

Gregg Drilling & Testing - Case Method Results

PDIPLOT Ver. 2005.2 - Printed: 9-Oct-2007

Test date: 28-Sep-2007

ANCHORAGE - BORING TB-10 @ 95



ANCHORAGE - BORING TB-10 @ 95
OP: T. Boyd

140lb AUTO HAMMER
Test date: 28-Sep-2007

AR: 1.46 in^2
LE: 100.80 ft
WS: 16,807.9 f/s

SP: 0.492 k/ft3
EM: 30,000 ksi
JC: 0.75

FMX: Maximum Force
VMX: Maximum Velocity
EMX: Max Transferred Energy

BPM: Blows per Minute
ETR: Energy Transfer Ratio

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
3	0.00	45	12.0	0.3	0.0	81.4
4	0.00	45	11.2	0.3	0.0	80.0
5	0.00	46	11.7	0.3	24.7	81.8
6	0.00	45	11.8	0.3	24.7	82.3
7	0.00	45	11.7	0.3	24.8	82.4
8	0.00	45	11.9	0.3	24.8	82.8
9	0.00	45	12.1	0.3	24.7	82.6
10	0.00	45	11.5	0.3	24.7	81.9
11	0.00	45	11.4	0.3	24.7	81.2
12	0.00	45	11.5	0.3	24.7	81.9
13	0.00	45	11.4	0.3	24.7	82.7
14	0.00	45	11.8	0.3	24.8	82.0
15	0.00	46	11.7	0.3	24.9	82.8
16	0.00	45	11.3	0.3	24.9	80.8
17	0.00	44	11.9	0.3	24.8	80.8
18	0.00	44	11.8	0.3	24.8	81.6
19	0.00	45	11.4	0.3	24.6	82.0
20	0.00	44	11.7	0.3	24.7	81.0
21	0.00	46	12.1	0.3	24.6	83.0
22	0.00	43	11.9	0.3	24.6	81.5
23	0.00	45	11.4	0.3	24.6	80.9
24	0.00	46	11.5	0.3	24.7	81.9
25	0.00	47	11.5	0.3	24.8	82.3
26	0.00	47	11.6	0.3	24.7	83.2
27	0.00	44	11.9	0.3	24.7	83.1
28	0.00	45	11.8	0.3	24.7	82.7
29	0.00	45	11.8	0.3	24.6	82.7
30	0.00	45	11.4	0.3	24.5	81.6
31	0.00	44	11.5	0.3	24.6	81.4
32	0.00	44	11.8	0.3	24.5	82.6
33	0.00	46	11.4	0.3	24.5	83.1
34	0.00	45	11.5	0.3	24.5	82.0
35	0.00	45	11.8	0.3	24.6	82.1
36	0.00	46	12.0	0.3	24.6	83.1
37	0.00	47	11.5	0.3	24.7	83.4
38	0.00	46	12.2	0.3	24.7	83.7
39	0.00	45	11.4	0.3	24.7	81.7
40	0.00	45	12.0	0.3	24.5	83.6
41	0.00	47	11.6	0.3	24.5	81.9
42	0.00	45	11.1	0.3	24.5	80.2
43	0.00	47	11.7	0.3	24.5	83.2
44	0.00	46	11.7	0.3	24.5	82.3
45	0.00	45	11.9	0.3	24.5	82.0
46	0.00	45	11.7	0.3	24.6	81.4
47	0.00	46	11.6	0.3	24.6	81.7
48	0.00	46	12.3	0.3	24.6	84.5
49	0.00	44	11.8	0.3	24.6	80.5
50	0.00	47	11.7	0.3	24.5	83.3
51	0.00	46	11.7	0.3	24.5	81.1
52	0.00	46	11.4	0.3	24.4	81.0
53	0.00	46	12.0	0.3	24.5	82.4
54	0.00	45	11.5	0.3	24.5	79.5
55	0.00	45	11.2	0.3	24.6	79.9
56	0.00	45	12.0	0.3	24.6	81.7
57	0.00	46	12.1	0.3	24.6	82.5
58	0.00	47	11.9	0.3	24.6	82.5
59	0.00	46	12.0	0.3	24.6	81.4
60	0.00	44	11.9	0.3	24.4	80.6
61	0.00	45	11.7	0.3	24.4	81.8
62	0.00	46	12.1	0.3	24.4	82.6
63	0.00	47	11.7	0.3	24.4	81.3
64	0.00	44	11.9	0.3	24.5	81.5
65	0.00	46	11.6	0.3	24.6	82.6
66	0.00	47	11.7	0.3	24.7	82.2
67	0.00	45	11.8	0.3	24.6	82.5
68	0.00	45	12.3	0.3	24.6	82.8
69	0.00	46	11.7	0.3	24.6	81.6

ANCHORAGE - BORING TB-10 @ 95
OP: T. Boyd
140lb AUTO HAMMER
Test date: 28-Sep-2007

BL#	depth	FMX	VMX	EMX	BPM	ETR
	ft	kips	f/s	k-ft	**	(%)
70	0.00	48	12.3	0.3	24.6	84.4
71	0.00	47	12.2	0.3	24.4	83.0
72	0.00	46	11.5	0.3	24.5	81.8
73	0.00	46	12.2	0.3	24.4	83.6
74	0.00	43	11.7	0.3	24.5	79.4
75	0.00	47	11.8	0.3	24.4	83.8
76	0.00	44	11.8	0.3	24.4	80.1
77	0.00	47	11.7	0.3	24.5	83.4
78	0.00	47	12.1	0.3	24.6	83.5
79	0.00	44	12.0	0.3	24.6	82.4
80	0.00	46	11.7	0.3	24.5	81.5
81	0.00	47	12.5	0.3	24.6	85.1
82	0.00	48	11.9	0.3	24.5	85.5
83	0.00	46	12.0	0.3	24.4	82.0
84	0.00	45	11.4	0.3	24.4	79.9
85	0.00	46	12.1	0.3	24.4	83.9
86	0.00	46	12.3	0.3	24.5	82.9
87	0.00	47	11.5	0.3	24.4	82.8
88	0.00	48	12.1	0.3	24.5	84.7
89	0.00	45	11.5	0.3	24.5	79.9
90	0.00	48	11.7	0.3	24.6	83.0
91	0.00	49	12.0	0.3	24.5	83.7
92	0.00	46	11.3	0.3	24.5	80.2
93	0.00	46	11.7	0.3	24.5	81.4
94	0.00	46	12.0	0.3	24.5	82.9
95	0.00	48	11.9	0.3	24.4	83.2
96	0.00	47	11.6	0.3	24.4	82.3
97	0.00	47	11.5	0.3	24.4	81.8
98	0.00	46	12.1	0.3	24.4	84.7
99	0.00	48	12.1	0.3	24.5	82.8
100	0.00	47	11.5	0.3	24.5	83.6
101	0.00	48	11.8	0.3	24.6	82.6
102	0.00	47	11.6	0.3	24.5	82.5
103	0.00	48	12.0	0.3	24.6	84.7
104	0.00	45	11.8	0.3	24.5	80.6
105	0.00	47	11.5	0.3	24.6	83.5
106	0.00	46	11.6	0.3	24.4	80.9
107	0.00	47	12.4	0.3	24.5	84.9
108	0.00	49	12.0	0.3	24.4	85.2
109	0.00	46	11.6	0.3	24.4	80.8
110	0.00	48	11.7	0.3	24.4	83.9
111	0.00	46	11.4	0.3	24.4	80.0
112	0.00	46	12.2	0.3	24.6	84.4
113	0.00	47	11.7	0.3	24.6	83.0
114	0.00	48	11.6	0.3	24.6	83.2
115	0.00	47	12.4	0.3	24.6	84.9
116	0.00	46	12.0	0.3	24.6	83.4
117	0.00	46	11.7	0.3	24.4	81.3
118	0.00	45	12.0	0.3	24.4	82.6
	Average	46	11.8	0.3	24.6	82.3
	Std. Dev.	1	0.3	0.0	0.1	1.3
	Maximum	49	12.5	0.3	24.9	85.5
	@ Blow#	108	81	82	16	82

Total number of blows analyzed: 116

Time Summary

Drive 4 minutes 43 seconds 1:29:29 PM - 1:34:12 PM (9/28/2007) BN 3 - 118

APPENDIX D
FIELD VANE SHEAR TEST RESULTS

GREGG DRILLING AND TESTING, INC.
GREGG IN SITU, INC.
ENVIRONMENTAL AND GEOTECHNICAL INVESTIGATION SERVICES

October 1, 2007

Greg Carpenter
US Army Corps of Engineers District, AK
CEPOA-CT (W911KB)
2204 3rd Street
Elmendorf AFB, AK 99506-0898

Subject: Field Vane Shear Test Results
PORT OF ALASKA EXPANSION
Anchorage, Alaska

Dear Mr. Carpenter:

The following report presents the results of GREGG IN SITU's Field Vane Shear Testing Program for the above referenced site. The following testing services were performed:

1	Cone Penetration Tests	(CPTU)	☐
2	Pore Pressure Dissipation Tests	(PPD)	☐
3	Seismic Cone Penetration Tests	(SCPTU)	☐
4	Resistivity Cone Penetration Tests	(RCPTU)	☐
5	Pressuremeter Tests	(PMT)	☐
6	Groundwater Sampling	(GWS)	☐
7	Soil Sampling	(SS)	☐
8	Vapor Sampling	(VS)	☐
9	Vane Shear Testing	(VST)	X
10	SPT Energy Calibration	(SPTE)	☐

Field vane shear testing was part of a site investigation program conducted at various locations around the Port of Anchorage Expansion Project in Anchorage, Alaska. A Gregg Drilling and Testing rotary wash drill rig mounted on a Fugro jack-up barge was used for this testing program. The tests were accomplished using a Geonor H-10 Vane Borer incorporating a 55 mm x 110 mm vane. Torque measurements were made during the test by means of an electric torque transducer. A lap-top computer recorded the transducer output and stored the data for subsequent processing.

Vane Shear Testing was conducted at the southern end of the subject project where soft to medium stiff cohesive soils, suitable for vane shear testing were discovered during earlier explorations at the site. Vane shear testing was conducted at 3 borings locations, TB-23, TB-29

& TB-30. Plots and tabular summaries of the field vane shear testing results are presented in this report. The tabulated and plotted shear strengths are un-factored. The tests were conducted in general compliance with ASTM Standard Test Method D2573.

A list of reference papers providing additional background on the specific tests conducted is provided in the bibliography following the text of the report. If you would like a copy of any of these publications or should you have any questions or comments regarding the contents of this report, please do not hesitate to contact our office at (925) 313-5800.

Sincerely,
GREGG IN SITU, Inc.

Virgil A. Baker
Geotechnical Manager

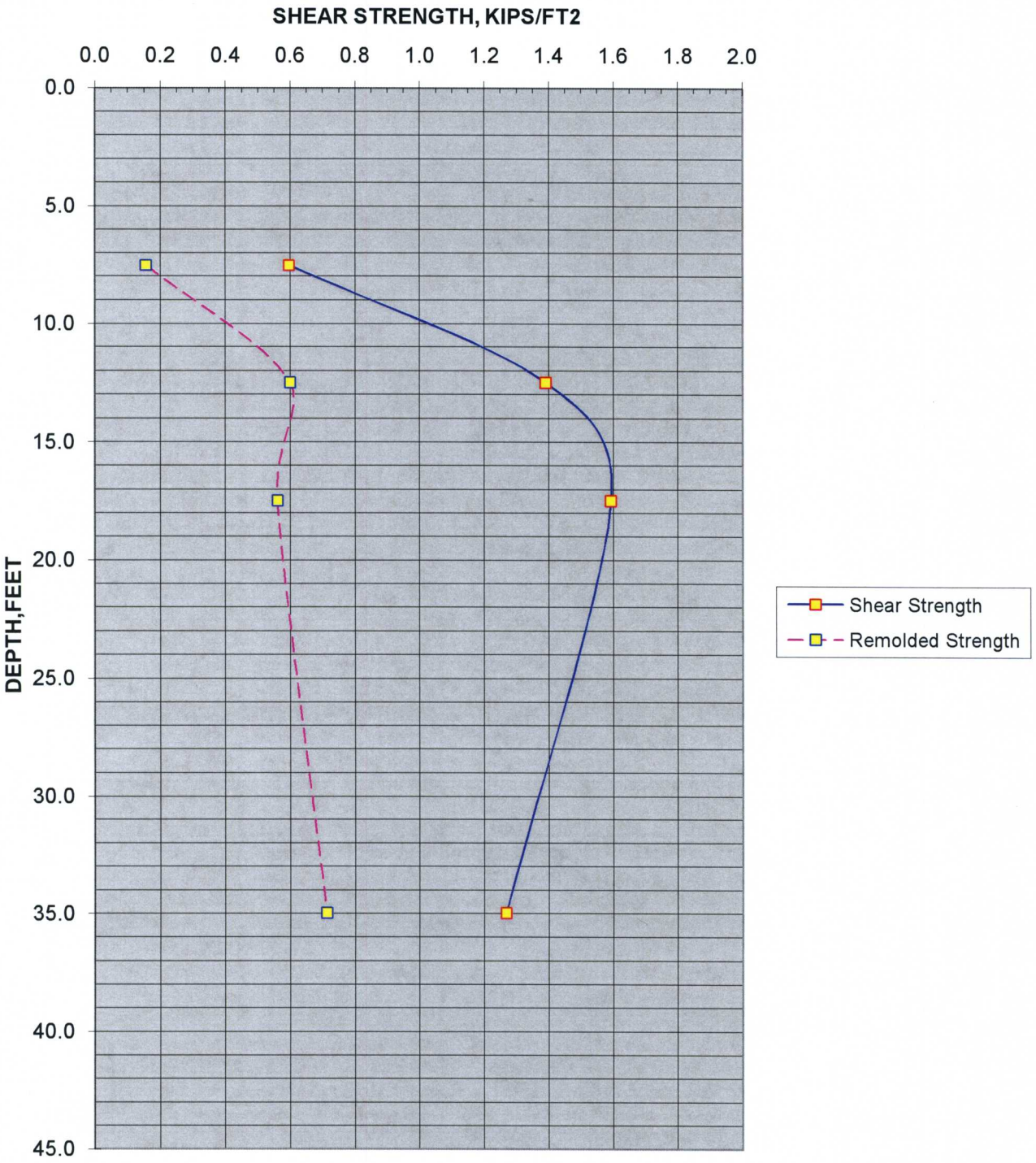
Field Vane Shear Testing Summary

-Table 1-

FVST Identification	Date	Test Depths, Below Mud line (Feet)	Comments
TB-29	09/18/07	13.6, 18.6, 23.5, 28.5, 33.5	
TB-30	09/19/07	11.6, 16.6, 21.6, 26.6, 31.6, 36.6	
Tb-23	09/20/07	7.5, 12.5, 17.5, 35.0	Attempted test at 22.5', soil was too stiff for VST

GREGG DRILLING AND TESTING

FIELD VANE SHEAR TEST RESULTS
PORT OF ANCHORAGE EXPANSION
LOCATION: TB-23



CLIENT JOB NO.: PORT OF ANCHORAGE EXPANSION

GREGG JOB NO:

LOCATION: TB-23

DATE: 12-Sep-07

VANE TYPE: Geonor H-10

VANE DIAMETER, d (mm): 55 D= 0.055 Meter

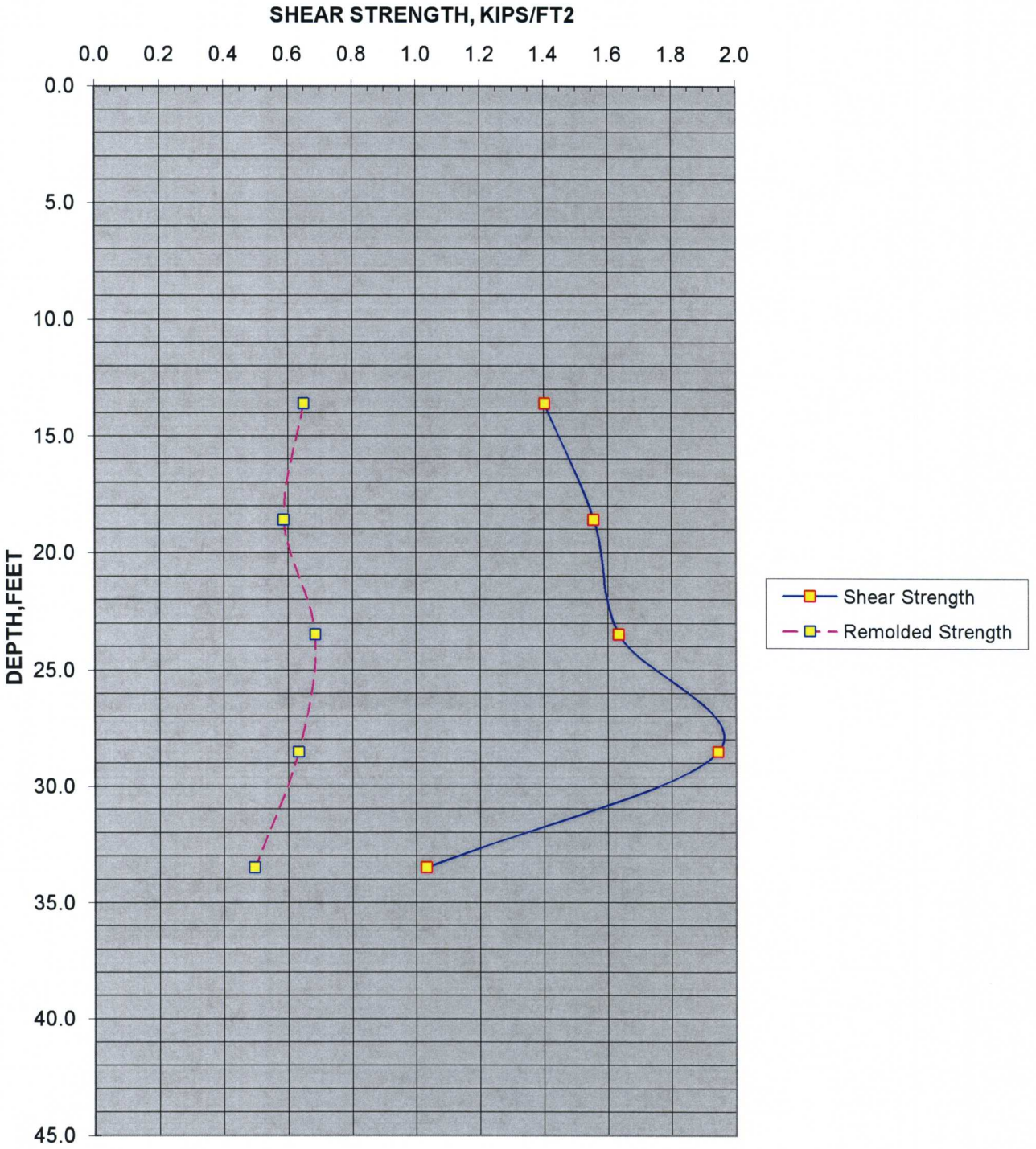
VANE Length, l (mm): 110 $1N/M^2$=1Pascal

UNDRAINED SHEAR STRENGTH, $c_u = 6M/7\pi D^3$ Where: M=Max. Recorded Torque, D= Vane Diiameter

DEPTH (M)	DEPTH (FT)	PEAK TORQUE READING (Nm)	SHEAR STRENGTH (N/m^2)	SHEAR STRENGTH (KIPS/FT^2)	REMOLDED PEAK DIAL READING (Nm)	REMOLDED SHEAR STRENGTH (kN/m^2)	REMOLDED SHEAR STRENGTH (KIPS/FT^2)	SENSITIVITY
2.29	7.5	17.41719	28562.34	0.597	4.62763	7588.82	0.158	3.8
3.81	12.5	40.65055	66662.57	1.392	17.51090	28716.01	0.600	2.3
5.33	17.5	46.54119	76322.59	1.594	16.38415	26868.26	0.561	2.8
10.67	35.0	37.02427	60715.86	1.268	20.84732	34187.38	0.714	1.8

GREGG DRILLING AND TESTING

FIELD VANE SHEAR TEST RESULTS
PORT OF ANCHORAGE EXPANSION
LOCATION: TB-29



CLIENT JOB NO.: PORT OF ANCHORAGE EXPANSION

GREGG JOB NO:

LOCATION: TB-29

DATE: 12-Sep-07

VANE TYPE: Geonor H-10

VANE DIAMETER, d (mm): 55 D= 0.055

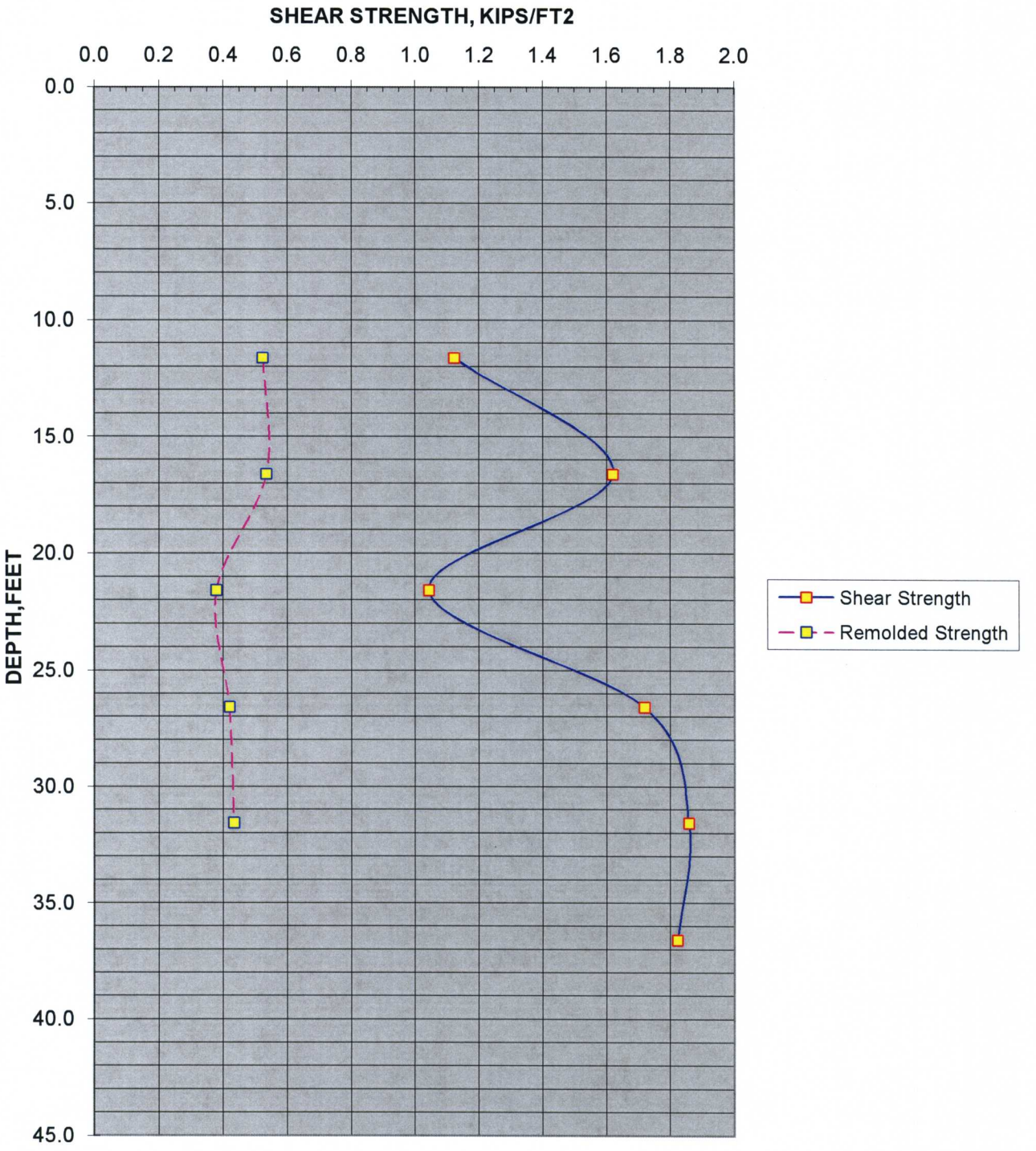
VANE Length, l (mm): 110 $1N/M^2$=1Pascal

UNDRAINED SHEAR STRENGTH, $c_u = 6M/7\pi D^3$ Where: M=Max. Recorded Torque, D= Vane Diameter

DEPTH (M)	DEPTH (FT)	PEAK TORQUE READING (Nm)	SHEAR STRENGTH (N/m^2)	SHEAR STRENGTH (KIPS/FT^2)	REMOLDED PEAK IAL READIN (Nm)	REMOLDED SHEAR STRENGTH (kN/m^2)	REMOLDED SHEAR STRENGTH (KIPS/FT^2)	SENSITIVITY
4.15	13.6	40.96162	67172.69	1.403	18.95909	31090.89	0.649	2.2
5.67	18.6	45.48343	74587.98	1.558	17.1524	28128.11	0.587	2.7
7.16	23.5	47.78061	78355.11	1.636	19.98685	32776.30	0.685	2.4
8.69	28.5	56.7818	93116.10	1.945	18.50432	30345.11	0.634	3.1
10.21	33.5	30.18456	49499.46	1.034	14.49615	23772.14	0.496	2.1

GREGG DRILLING AND TESTING

FIELD VANE SHEAR TEST RESULTS
PORT OF ANCHORAGE EXPANSION
LOCATION: TB-30



CLIENT JOB NO.: PORT OF ANCHORAGE EXPANSION

GREGG JOB NO:

LOCATION: TB-30

DATE: 11-Sep-07

VANE TYPE: Geonor H-10

VANE DIAMETER, d (mm): 55

VANE Length, l (mm): 110

D= 0.055 Meter

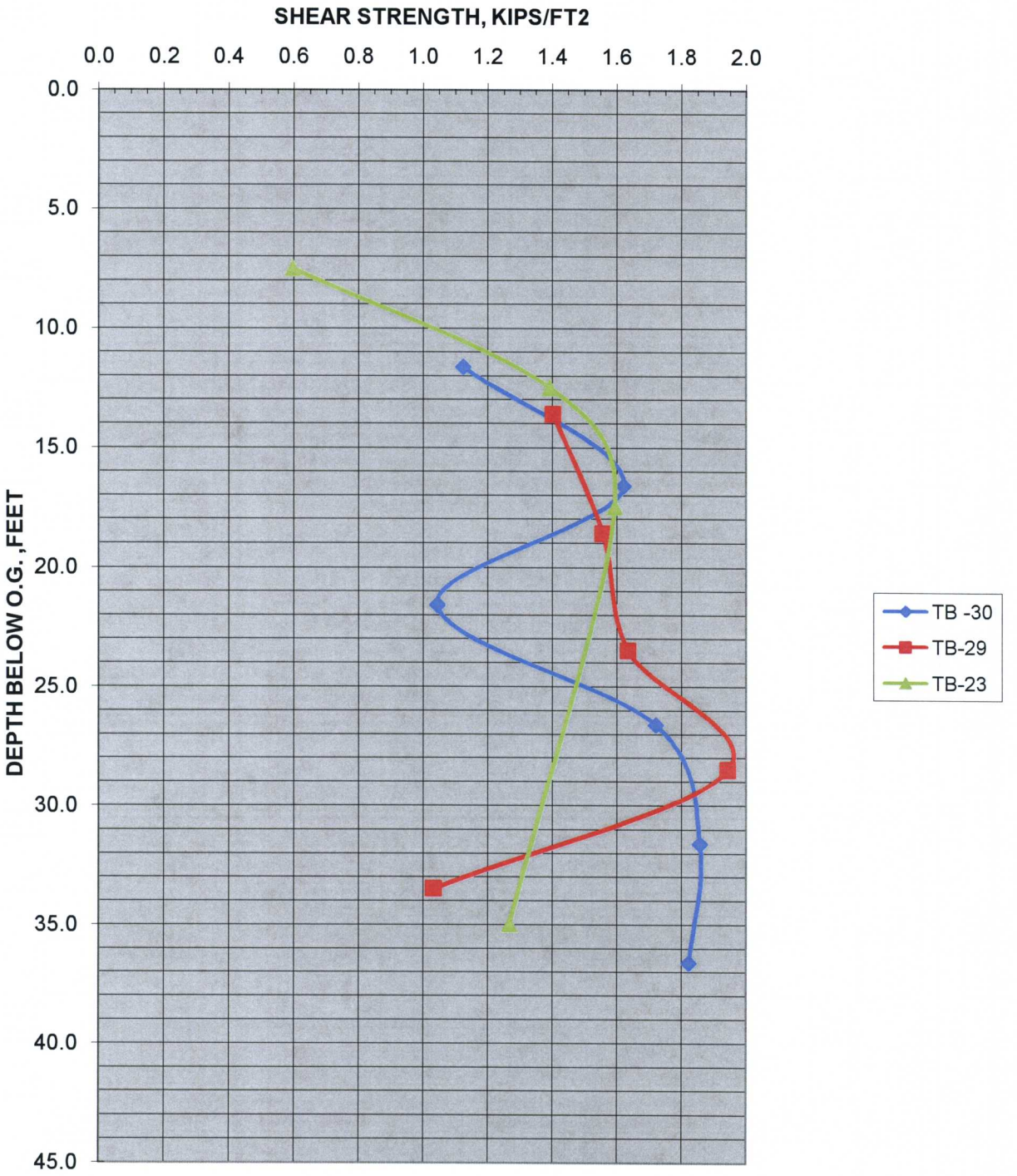
$1N/M^2$=1Pascal

UNDRAINED SHEAR STRENGTH, $c_u = 6M/7\pi D^3$

Where: M=Max. Recorded Torque, D= Vane Diiameter

DEPTH (M)	DEPTH (FT)	PEAK TORQUE READING (Nm)	SHEAR STRENGTH (N/m^2)	SHEAR STRENGTH (KIPS/FT^2)	REMOLDED PEAK DIAL READING (Nm)	REMOLDED SHEAR STRENGTH (kN/m^2)	REMOLDED SHEAR STRENGTH (KIPS/FT^2)	SENSITIVITY
3.54	11.6	32.83252	53841.84	1.125	15.34391	25162.38	0.526	2.1
5.06	16.6	47.33114	77618.03	1.621	15.64018	25648.23	0.536	3.0
6.58	21.6	30.47682	49978.74	1.044	11.09891	18201.03	0.380	2.7
8.11	26.6	50.26241	82425.00	1.721	12.26253	20109.24	0.420	4.1
9.63	31.6	54.25251	88968.34	1.858	12.69418	20817.10	0.435	4.3
11.16	36.6	53.22401	87281.71	1.823	No Remold - Computer Crash			

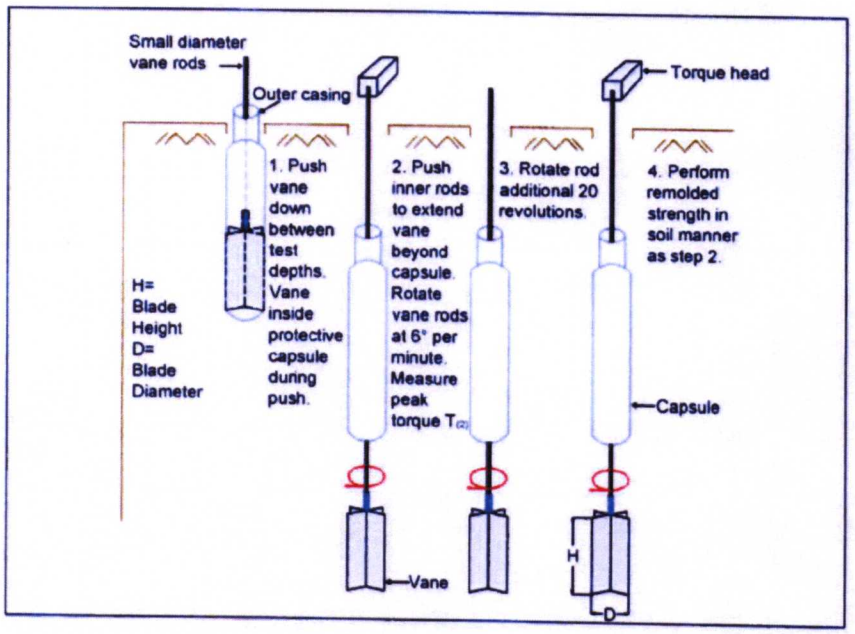
FIELD VANE SHEAR TEST RESULTS
PORT OF ANCHORAGE EXPANSION
LOCATION: TB-23, TB-29 & TB-30



Field Vane Shear Testing (FVST)

Gregg In Situ, Inc. used a H-10 Geonor vane to evaluate the in-place un-drained shear strength (s_{uv}) of soft to stiff clays & silts. A 55 by 110 mm sized vane was used for this project.

The vane is advanced to the test depth by pushing outer rods. Small diameter vane rods are then pushed to extend vane beyond the capsule. Once the vane reaches the test depth, the torque recording head is placed over and clamped onto the vane rod string. The vane rods are then loaded using the torque recording head until yielding of the surrounding soil occurs. The vane is then released from the torque recording head and is rotated clockwise twenty times with a pipe wrench to completely remold the soil. Once the soil is remolded, the torque recording head is again clamped onto the vane rods. The vane is then rotated to record the remolded strength of the soil.



A summery of the data collected is displayed in Appendix: FVST.
For further information refer to Mayne, 2002 and Greig et al. 1987.

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Copies of ASTM Standards are available through www.astm.org

APPENDIX E
USACE-AD CHEMICAL DATA REPORT

Chemical Data Report, Anchorage Port Expansion Study
NPDL WO# 07-083, March 2008 .....84 Pages

CEPOA-EN-ES-M (200-1d) 10 March 2008

MEMORANDUM FOR CEPOA-PM-CW (Elconin)

SUBJECT: Chemical Data Report, Anchorage Port Expansion Study, Anchorage Port Expansion, Anchorage, Alaska (07-083)

1. Reference Memorandum, CEPOA-PM-M (Elconin), 25 July 2007, subject: RE: Anchorage Harbor Expansion

2. Attached is the Chemical Data Report for this project.

3. Questions should be directed to Jake Sweet, x-2694.

Encl

JAMES W. PEKAR
Chief, Geotechnical Services

United States Army
Corps of Engineers

Alaska District
P.O. Box 6868
Elmendorf AFB, AK
99506-6898

Chemical Data Report

Anchorage Port Expansion Study

Anchorage Port Expansion
Anchorage, Alaska
NPDL WO# 07-083

Materials Section
Engineering Services Branch

March 2008

Executive Summary

A total of forty-eight (48) locations (AP-4585 through AP-4632) were bored for a geotechnical investigation of the sediments area surrounding the Port of Anchorage, during the period 14-21 September 2007. Of these locations, six were chosen in advance for chemical sampling. These sampling locations were chosen to characterize the dredge material and newly exposed materials. Twelve (12) sediment samples and two (2) duplicate samples were collected for chemical analysis.

All sediments tested are suitable for open water disposal according to the Puget Sound Dredging Disposal Analysis (PSDDA) screening levels.

Table of Contents

Chemical Data Report

1. Introduction

This report presents the analytical results of sediment samples collected during the Geotechnical study for the expansion of the Anchorage Harbor. These sediment samples were collected during the period of September 14-21, 2007. The Materials Section of the U.S. Army Corps of Engineers, Alaska District (CEPOA-EN-ES-M), prepared this report at the request of the Alaska District Project Management Branch (CEPOA-PM-CW).

2. Site Background Information

2.1 Location

Anchorage harbor is located on Cook Inlet on the west side of the Anchorage bowl (see Figure 1). Six boring locations were selected for sampling in order to characterize the dredge materials. Two samples were taken from each boring. One sample was taken from within the dredge prism. The second sample from each boring was taken at the depth that will form the newly exposed surface after dredging. See Figure 2 for test boring locations.

2.2 Site History and Known Contamination

The City of Anchorage constructed the first dry cargo berth and city dock in 1959. The approach to this dock was dredged to -35 Mean Lower Low Water (MLLW). In the 1964 earthquake, an Army dock was destroyed, and terminal 1 and the fuel docks were damaged. From 1968-1977, terminals two, three, and four were added extending the dock to its current 3000 foot length. Due to rapid sedimentation, dredging has been nearly constant since the dock was built. During 2004 and 2005 alone over 4 million cubic yards of material were removed (ref 7.4).

Sampling and chemical testing of the harbor sediments occurred in June, 1994. Those samples were analyzed for volatile organic compounds, semi volatile organic compounds, polychlorinated biphenyls (PCBs) and pesticides, metals, total organic carbon, and mechanical characteristics. The only findings of this sampling event were levels of arsenic levels as high as 17 parts per million (mg/kg), chromium at 47 mg/kg, barium at 167 mg/kg, and lead at 13 mg/kg. These metal levels were determined to be below the cleanup standards, and the material was determined to be suitable for open water disposal (ref 7.7).

Another sampling event occurred in October, 2006. A Corps of Engineers team performed a Rapid Optical Screening Tool (ROST) investigation of the sediments in the port. No fuel contamination was discovered during this study, and associated sediment samples showed the material was suitable for open water disposal (ref 7.5)

2.3 Limitations

This project was not intended to be a comprehensive environmental investigation of the site, and changes in the condition of the site may occur with time due to natural processes or human activities. The findings presented in this report are based on site conditions existing at the time of the investigation.

3. Field Activities and Observations

3.1 Summary of Field Activities

A total of 48 borings were drilled during the geotechnical investigation of the Anchorage Harbor Expansion site. Six of these borings were selected for chemical analysis between the dates of 14-21 September. The borings selected for chemical analysis were spread out over the entire project area in an attempt to characterize the sediments as fully as possible. Two samples were selected from each boring. The first sample was taken from within the future dredge prism. The second sample was taken from the area that will become the exposed surface after dredging. Global Positioning System (GPS) and elevation data were provided by the drilling contractor (Gregg Drilling) and were used to determine the depths below mud line that samples were taken. In total, fourteen sediment samples (12 primary and 2 duplicate) were taken.

The field crew over the course of the study consisted of Geotechnical Engineers Marcus Palmer, Inocencio Roman, John Rajek, and Robert Weakland (CEPOA-EN-ES-SG), and chemists Jake Sweet and Michael Utley (CEPOA-EN-ES-M), as well as Gregg Drilling employees.

3.2 Sampling Activities

Chemical sampling was performed in a manner consistent with the project Sampling and Analysis Plan (SAP, ref 7.8). A total of 14 sediment samples and two duplicates were taken for analysis (see Figure 2 for the location). In addition a sample of the drill casing lubricant that had been used on previous drilling jobs was taken. This lubricant was not used during the collection of any of these samples, and it does not appear to have affected any of these results. A natural non-petroleum based lubricant (vegetable shortening) was used on the casing for this project. As per the SAP, sediment samples were taken at two locations; one within the dredge prism, and one at the surface that will be exposed by dredging. Geospatial data provided by the drilling contractor was used to determine the depths below mud line that would be sampled.

3.3 Observations

This project was undertaken from a mobile drill platform in a marine environment. Tidal fluctuations were as much as 25’ per day, and current speeds and directions were constantly changing. Most of the sediments seen on this site were fine grained silts and clays, however some gravels were encountered in a few borings. There was no obvious evidence of sediment contamination.

3.4 Scope of Analytical Methods

Table 3-1 summarizes the analytical methods that were performed on soil samples submitted for chemical analysis.

Table 3-1 Scope of Sampling

Parameter	Analytical Method	Target Contaminant	Number of Samples Submitted[1]
Volatile Organic	SW846 8260B	Fuel constituents and solvent	14

Table 3-1 Scope of Sampling			
Compounds (VOCs)	Low Level	compounds	
Semivolatile Organic Compounds (SVOCs)	SW846 8270C	Fuel constituent compounds.	14
Polychlorinated Biphenyls (PCBs)	SW846 8082	PCBs from electrical equipment or waste oil	14
RCRA Metals: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver.	SW846 6020 & 7471A	Regulated metals from fuels, paints, batteries, etc.	14
Chlorinated Pesticides	SW846 8081A	Pesticides (e.g., DDT) residues from previous pest control activities	14
Total Organic Carbon (TOC)	SW846 9060	Used in interpretation of organic chemical data.	14
1. Numbers include duplicate samples.			

3.5 Investigation Derived Waste

Investigation derived waste generated during this sampling event consisted primarily of disposable sampling equipment (sampling spoons, plastic bags, paper towels, etc.). These items were brushed clean of sediment on site, bagged, and transported back to CEPOA-EN-ES-M offices for disposal as ordinary solid waste. The reusable sampling equipment was cleaned between samples by scrubbing it free of any adhering sediments with a brush, detergent and fresh water.

4. Results of Chemical Analyses

4.1 Overview

The samples collected from the project site were analyzed by Test America Tacoma, Inc., of Tacoma, Washington. The laboratory work is compliant with the Department of Defense Quality System Manual (DoD QSM) (ref. 7.2). The results of the chemical analyses are summarized in the sections below. Tables of comprehensive data are presented in Appendices B and C.

4.2 Chemicals Detected

The results of the chemical analyses were screened against Puget Sound Dredge Disposal Analysis (PSSDA) (ref. 7.6). Because the sediment consisted of mostly silts, this site could not be exempted under a PSDDA Tier IIA investigation. Therefore a tier IIB investigation was completed. Screening levels for the State of Washington Sediment Management Standards (SMS) are also included for comparison. The sediments were screened for VOCs, SVOCs, Pesticides, PCBs, and RCRA metals. The results compared to PSSDA and SMS can be found in Appendix B, and the complete results can be found in Appendix C. Appendix B has both actual and Total Organic Carbon (TOC) normalized results.

4.2.1 Volatile Organic Compounds (VOCs): Several VOCs were detected in the samples analyzed. 1,2,4-Trimethylbenzene was detected in one sample at a concentration of 0.0069 mg/kg. 1,3,5-Trimethylbenzene was detected in two samples with a maximum concentration of 0.0062 mg/kg. Acetone was detected in most samples with a maximum

concentration of 0.035 mg/kg, and was also present in the trip blank. 4-Isopropyltoluene was detected in one sample at 0.0013 mg/kg. Napthalene was detected in four samples with a maximum concentration of 0.0046 mg/kg. Methylene chloride was detected in five samples with a maximum concentration of 0.019 mg/kg. Methylene chloride was also detected at a similar concentration in the trip blank accompanying the positive samples. The detection of this chemical is ascribed to laboratory contamination. None of these chemicals are regulated by PSDDA, and the limits are far below any other screening level.

4.2.2 Semivolatile Organic Compounds (SVOCs): Numerous SVOC compounds were found in most samples. All of the SVOCs detected were at concentrations many times below PSDDA or SMS screening criteria. Very low concentrations of some SVOC compounds detected may be attributed to the lubricant that had been used on the casing during previous jobs.

4.2.2 Polychlorinated Biphenyls (PCBs): No PCB compounds were detected in any sample.

4.2.2 Chlorinated Pesticides: Beta-BHC, delta-BHC, endosulfan II, and gamma chlordane were detected at very low concentrations in several samples. None of these compounds are regulated by PSDDA or SMS, and their concentrations are far below any other screening level.

4.2.2 RCRA Metals: All metals were detected in every sample at low concentrations. No metal concentrations exceed PSSDA or SMS screening levels.

5.0 Data Quality Review and Usability Assessment

After analysis at the project laboratories, the project data was reviewed for deviations to the requirements presented in the Sampling and Analysis Plan (ref 7.8**),** the ADEC Technical Memo 06-002 (ref 7.1), and the Department of Defense (DoD) Quality Systems Manual (QSM, ref 7.2) in the following areas – precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). Elements reviewed include sample handling, holding times, method and trip blanks, laboratory control sample (LCS) recoveries and relative percent differences (RPDs), matrix spikes and matrix spike duplicates (MS/MSD) recoveries and RPDs, surrogate recovery, and field duplicate comparability. Calibration curves and continuing calibration standard recoveries were not reviewed. Quality control deviations which do not impact data quality (e.g. a high LCS recovery associated with a nondetect result) are not discussed.

The following qualifiers, listed below in order of increasing severity, are used in the data tables to indicate quality control deficiencies:

Qualifier	Definition
J	Analyte result is considered an estimated value because the level is below the laboratory PQL but above the MDL

Qualifier	Definition
MH, ML	Analyte result is considered an estimated value biased (high, low) due to matrix effects
B	Analyte result is considered a high estimated value due to contamination present in the method blank.
QH, QL, QN	Analyte result is considered an estimated value biased (high, low, uncertain) due to a quality control failure
R	Analyte result is rejected - result is not usable.

When the use of more than one qualifier is required, the more severe flag will be used.

All samples were sent to Test America-Tacoma in two Sample Delivery Groups (SDGs). This lab is validated by the State of Alaska through the Contaminated Sites Program and is approved through the National Environmental Laboratory Assessment Program. The laboratory has a Self Declaration Letter on file at the Alaska District indicating adherence to the policies and procedures outlined in the QSM. Details of the data review are presented by SDG below:

5.1 SDG 580-7449

5.1.1 Sample Handling: Nine sediment samples (including duplicates) were received in sample delivery group 580-7449 by the laboratory. All sample receiving criteria were met except for the following:

- The cooler temperature was 0.5^{o}C and the temperature blank was 1.4^{o}C at the time of receipt by the laboratory. However, the low temperature would not have had any impact on the samples or any potential contaminants. Data usability is not impacted.
- Methanol did not completely cover the soil in VOC samples 07AHSS01SD (AP-4601/TB-19 25.5'), 07AHSS02SD (AP-4601/TB-19 32.5'), 07AHSS04SD (AP-4629/TB-47 24.5'), 07AHSS06SD (AP-4604/TB-22 31.5), 07AHSS07SD (AP-4604/TB-22 34.5'), and 07AHSS09SD (AP4610/TB-28 45.2), resulting in the incomplete preservation of the samples. The VOC data for these samples are qualified biased low and flagged "QL".

5.1.2 Holding Times: All samples were analyzed within the method specified holding times.

5.1.3 Blanks: Method blanks and trip blanks were analyzed at the proper frequency. Target analytes were not detected in any method or trip blank except for the following:

- Endosulfan II was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS01SD (AP-4601/TB-19 25.5'), 07AHSS02SD (AP-4601/TB-19 32.5'), 07AHSS03SD (AP-4629/TB-47 7.5'), 07AHSS04SD (AP-4629/TB-47 24.5'), 07AHSS05SD (AP-4604/TB-22 31.5'), 07AHSS06SD (AP-4604/TB-22 31.5), 07AHSS07SD (AP-4604/TB-22

34.5'), 07AHSS08SD (AP-4610/TB-28 10.2'), and 07AHSS09SD (AP4610/TB-28 45.2). The results are flagged "B".

- Acetone was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS01SD (AP-4601/TB-19 25.5'), 07AHSS02SD (AP-4601/TB-19 32.5'), 07AHSS04SD (AP-4629/TB-47 24.5'), 07AHSS05SD (AP-4604/TB-22 31.5'), 07AHSS06SD (AP-4604/TB-22 31.5), 07AHSS07SD (AP-4604/TB-22 34.5'), 07AHSS08SD (AP-4610/TB-28 10.2'), 07AHSS09SD (AP4610/TB-28 45.2), and 07AHSS1001SD (trip blank). The results are flagged "B".
- Benzyl butyl phthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS02SD (AP-4601/TB-19 32.5'), 07AHSS03SD (AP-4629/TB-47 7.5'), 07AHSS04SD (AP-4629/TB-47 24.5'), 07AHSS05SD (AP-4604/TB-22 31.5'), 07AHSS06SD (AP-4604/TB-22 31.5), 07AHSS08SD (AP-4610/TB-28 10.2'), and 07AHSS09SD (AP4610/TB-28 45.2). The results are flagged "B"; however, all results are below the PSDDA screening levels and data usability is not impacted.
- Diethyl phthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS02SD (AP-4601/TB-19 32.5'), 07AHSS04SD (AP-4629/TB-47 24.5'), 07AHSS08SD (AP-4610/TB-28 10.2'), and 07AHSS09SD (AP4610/TB-28 45.2). The results are flagged "B"; however, all results are below the PSDDA screening levels and data usability is not impacted.
- Di-n-Butylphthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS03SD (AP-4629/TB-47 7.5'), 07AHSS04SD (AP-4629/TB-47 24.5'), 07AHSS05SD (AP-4604/TB-22 31.5'), 07AHSS06SD (AP-4604/TB-22 31.5), 07AHSS07SD (AP-4604/TB-22 34.5'), 07AHSS08SD (AP-4610/TB-28 10.2'), and 07AHSS09SD (AP4610/TB-28 45.2). The results are flagged "B"; however, all results are below the PSDDA screening levels and data usability is not impacted.

5.1.4 Laboratory Control Samples: Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) were analyzed at the required frequency. Recoveries were within the QSM acceptance limits or any deviations do not impact data quality except for the following:

- The LCS and/or LCSD recoveries for 1,1,1,2-Tetrachloroethane, Bromodichloromethane, Bromoform, Carbon disulfide, Chloroethane, Dibromochloromethane, and trans-1,3-Dichloropropene were below QSM acceptance criteria. All results for these VOCs are qualified biased low and flagged "QL".

5.1.5 Laboratory Control Sample Precision: The LCS precision as measured by relative percent difference (RPD) was within QSM or method acceptance limits or any deviations do not impact data quality.

5.1.6 Surrogates: Surrogate recoveries for all samples were within the QSM acceptance limits or deviations do not impact data quality except for the following:

- One of the VOC surrogates for samples 07AHSS01SD (AP-4601/TB-19 25.5') and 07AHSS06SD (AP-4604/TB-22 31.5) was below laboratory control limits. The impacted surrogate is the one used to ensure no loss of analyte occurred during collection, transport, and analysis at the laboratory. A second VOC surrogate for each of these samples was just above laboratory control limits. Consequently, VOC results for these two samples are qualified bias uncertain and flagged "QN". The detected concentrations of VOCs with PSDDA screening levels are well below their respective PSDDA screening levels and data usability is not impacted.
- One of the VOC surrogates for samples 07AHSS02SD (AP-4601/TB-19 32.5'), 07AHSS03SD (AP-4629/TB-47 7.5'), 07AHSS04SD (AP-4629/TB-47 24.5'), 07AHSS05SD (AP-4604/TB-22 31.5'), 07AHSS07SD (AP-4604/TB-22 34.5'), and 07AHSS09SD (AP4610/TB-28 45.2) was below laboratory control limits. The impacted surrogate is the one used to ensure no loss of analyte occurred during collection, transport, and analysis at the laboratory. Consequently, VOC results for these samples are qualified biased low and flagged "QL". The detected concentrations of VOCs with PSDDA screening levels are well below their respective PSDDA screening levels and data usability is not impacted.
- The PCB surrogate for 07AHSS06SD (AP-4604/TB-22 31.5) was below laboratory control limits. PCB data for this sample are qualified biased low and flagged "QL". All PCB results for this sample were well below PSDDA screening levels and data usability is not impacted.

5.1.7 Matrix spikes: Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples were analyzed at the required frequency and recoveries were within QSM acceptance limits or deviations do not impact data quality except as follows:

- The matrix spike recovery for Endosulfan II in the MS/MSD associated with sample 07AHSS08SD (AP-4610/TB-28 10.2') was above laboratory control limits. The result for Endosulfan II in the primary sample are flagged "MH". The recoveries for 1,2-Dichlorobenzene (SVOC), 1,3-Dichlorobenzene (SVOC), 1,4-Dichlorobenzene (SVOC), Hexachlorobutadiene (SVOC), and Hexachloroethane in this MS/MSD were below laboratory control limits. Results for these analytes in the primary sample are flagged "ML". Data usability is not impacted since all results are below PSDDA screening levels. The recoveries for 1,2-Dichlorobenzene (VOC), 1,3-Dichlorobenzene (VOC), 1,4-Dichlorobenzene (VOC), Chloroethane, Dibromochloromethane, Hexachlorobutadiene (VOC), and 2,4-Dinitrophenol were below laboratory control limits. Results for these analytes in the primary sample are flagged "ML".

5.1.8 Matrix Spike precision: The reported MS/MSD precision was within QSM acceptance limits except for the following:

- The MS/MSD RPD for 2,4-Dimethylphenol exceeded the QSM criteria in the spikes of 07AHSS08SD (AP-4610/TB-28 10.2'). All associated primary results are qualified "MN"; if results were previously qualified due to Section 5.1.7 above, the flag was changed from "ML" or "MH" to "MN" to account for the increased variability (precision) indicated by the RPD failure.

5.1.9 Field duplicates: One field duplicate was collected and submitted to the laboratory during this field effort. A total of eight samples were submitted, thus the required 10% duplicate frequency was met. All results are compliant with the criteria specified in ADEC Tech Memo 06-002 except as noted below:

- For duplicate pair 07AHSS05SD/06SD (AP-4604/TB-22 31.5'), the RPDs for beta-BHC, gamma-Chlordane, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthene, Fluoranthene, Fluorene, Naphthalene, and Pyrene are high (greater than 50%) because low concentrations were detected in one half of the duplicate pair, but not in the other. Data usability is not impacted as all results are below the PSDDA screening levels.

5.1.10 Reporting Limit Assessment: The laboratory reporting limits are defined as practical quantification limits (PQLs) and are based on the lowest level calibration standard corrected for sample preparation, dilution, and moisture (if applicable). The MDL is defined as the limit at which an analyte has a 99% chance of being greater than zero (i.e. "detected"). This limit must be less than the PQL and represents the very least that the laboratory can detect. Consequently, any nondetect result with an MDL greater than the ADEC cleanup limit cannot be used to prove the absence of that analyte. No analytes have MDLs greater than the applicable PSDDA screening levels in any sample in this SDG.

5.2 SDG 580-7502

5.2.1 Sample Handling: Six soil samples (including duplicates) were received in sample delivery group 580-7502 by the laboratory. All sample receiving criteria were met.

5.2.2 Holding Times: All samples were analyzed within the method specified holding times.

5.2.3 Blanks: Method blanks and trip blanks were analyzed at the proper frequency. Target analytes were not detected in any method or trip blank except for the following:

- Diethyl phthalate and di-n-Butylphthalate were detected in SVOC method blank 580-23744/1-A at concentrations exceeding their respective PQLs. Results for these two SVOCs in sample 07AHSS15SD (LUBE) were flagged "B" by the laboratory. Both concentrations exceed the PSDDA screening levels. However, it should be noted that this sample was taken of the grease used by the crew to lubricate the pipes, which may explain some of the phthalate hits reported. All phthalate results for the remaining samples were below PSDDA screening levels.
- Methylene chloride was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS10SD (AP-4613/TB-31 43-45'), 07AHSS11SD (AP-4613/TB-31 53-55'), 07AHSS12SD (AP-4613/TB-31 45-47'), 07AHSS13SD (AP-4619/TB-37 36-38'), 07AHSS14SD (AP-4619/TB-37 45-47') and 07AHSSTB2 (trip blank). The results are flagged "B".
- Diethylphthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth)

the concentrations detected in the following samples: 07AHSS10SD (AP-4613/TB-31 43-45'), 07AHSS11SD (AP-4613/TB-31 53-55'), 07AHSS12SD (AP-4613/TB-31 45-47'), 07AHSS13SD (AP-4619/TB-37 36-38'), and 07AHSS14SD (AP-4619/TB-37 45-47'). The results are flagged "B"; however, all results are below the PSDDA screening level for Diethylphthalate.

- Di-n-Butylphthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS10SD (AP-4613/TB-31 43-45'), 07AHSS11SD (AP-4613/TB-31 53-55'), 07AHSS12SD (AP-4613/TB-31 45-47'), 07AHSS13SD (AP-4619/TB-37 36-38'), and 07AHSS14SD (AP-4619/TB-37 45-47'). The results are flagged "B"; however, all associated results are below the PSDDA screening level for di-n-Butylphthalate.

5.2.4 Laboratory Control Samples: Laboratory Control Samples/Laboratory Control Sample Duplicates (LCS/LCSD) were analyzed at the required frequency. Recoveries were within the QSM acceptance limits or any deviations do not impact data quality except for the following:

- The LCS and/or LCSD recoveries for 1,1,1,2-Tetrachloroethane, Bromodichloromethane, Bromoform, Carbon disulfide, Chloroethane, Dibromochloromethane, and trans-1,3-Dichloropropene were below QSM acceptance criteria. All results for these VOCs are qualified biased low and flagged "QL".
- The LCS recovery for 3,3'-Dichlorobenzidine in batch 23744 was below QSM acceptance criteria. The result for 3,3'-Dichlorobenzidine in sample 07AHSS15SD (LUBE) is qualified biased low and flagged "QL". The LCS/LCSD recoveries for Diethylphthalate in batch 23744 were above QSM acceptance criteria. The result for Diethylphthalate in sample 07AHSS15SD (LUBE) is qualified biased high and flagged "QH". The result for Diethyl phthalate in this sample exceeds the PSDDA screening level. It should be noted that this sample was taken of the grease used by the crew to lubricate the pipes, which may explain the high concentration of Diethyl phthalate.
- The LCSD recovery for di-n-Butylphthalate in batch 23743 was below QSM acceptance criteria. All results for di-n-Butylphthalate for samples in batch 23743 are qualified biased low and flagged "QL". Data usability is not impacted as all results are below PSDDA screening levels.

5.2.5 Laboratory Control Sample Precision: The LCS precision as measured by relative percent difference (RPD) was within QSM or method acceptance limits or any deviations do not impact data quality except for the following:

- The LCS/LCSD RPD for 2,4-Dinitrophenol in batch 23744 exceeded QSM acceptance criteria.

5.2.6 Surrogates: Surrogate recoveries for all samples were within the QSM acceptance limits or deviations do not impact data quality except for the following:

- One of the VOC surrogates for samples 07AHSS10SD (AP-4613/TB-31 43-45'), 07AHSS11SD (AP-4613/TB-31 53-55'), 07AHSS13SD (AP-4619/TB-37 36-38'), and 07AHSS14SD (AP-4619/TB-37 45-47') was below laboratory control limits. The impacted surrogate is the one used to ensure no loss of analyte occurred during

collection, transport, and analysis at the laboratory. Consequently, VOC results for these samples are qualified biased low and flagged "QL". The detected concentrations of VOCs with PSDDA screening levels are well below their respective PSDDA screening levels and data usability is not impacted.

5.2.7 Matrix spikes: Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples were analyzed at the required frequency and recoveries were within QSM acceptance limits or deviations do not impact data quality except as follows:

- The matrix spike and/or matrix spike duplicate recoveries for 1,2-Dichlorobenzene (SVOC), 1,3-Dichlorobenzene (SVOC), 1,4-Dichlorobenzene (SVOC), Hexachlorobutadiene (SVOC), and Hexachloroethane in the MS/MSD associated with 07AHSS10SD (AP-4613/TB-31 43-45') were below laboratory control limits. Results for these analytes in the primary sample are flagged "ML". Data usability is not impacted since all results are below PSDDA screening levels. The matrix spike and/or matrix spike duplicate recoveries for 1,2-Dichlorobenzene (VOC), 1,3-Dichlorobenzene (VOC), 1,4-Dichlorobenzene (VOC), Hexachlorobutadiene (VOC), and 2,4-Dinitrophenol in the MS/MSD associated with 07AHSS10SD (AP-4613/TB-31 43-45') were below laboratory control limits. Results for these analytes in the primary sample are flagged "ML".

5.2.8 Matrix Spike precision: The reported MS/MSD precision was within QSM acceptance limits.

5.3 Field Duplicates: Two field duplicates were collected and submitted to the laboratory during this field effort. A total of fifteen samples were submitted, thus the required 10% duplicate frequency was met. All results are compliant with the criteria specified in ADEC Tech Memo 06-002 except as noted below:

- For duplicate pair 07AHSS05SD/06SD (AP-4604/TB-22 31.5'), the RPDs for beta-BHC, gamma-Chlordane, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthene, Fluoranthene, Fluorene, Naphthalene, and Pyrene are high (greater than 50%) because low concentrations were detected in one half of the duplicate pair, but not in the other. Data usability is not impacted as all results are below the PSDDA screening levels.
- For duplicate pair 07AHSS10SD/11SD (AP-4613/TB-31 43-45'), the RPDs for bis(2-Ethylhexyl)phthalate, di-n-Octylphthalate, Fluoranthene, Fluorene, and Pyrene are high (greater than 50%) because low concentrations were detected in one half of the duplicate pair, but not in the other. The RPDs for 1-Methylnaphthalene, 2-Methylnaphthalene, and Phenanthrene are high (greater than 50%), likely due to the heterogeneity of the soil. Data usability is not impacted as all results are below the PSDDA screening levels.

5.4 Reporting Limit Assessment: The laboratory reporting limits are defined as practical quantification limits (PQLs) and are based on the lowest level calibration standard corrected for sample preparation, dilution, and moisture (if applicable). The MDL is defined as the limit at which an analyte has a 99% chance of being greater than zero (i.e. "detected"). This limit must be less than the PQL and represents the very least that the laboratory can detect. Consequently, any nondetect result with an MDL greater than the PSDDA cleanup limit

cannot be used to prove the absence of that analyte. No analytes have MDLs greater than the applicable PSDDA screening levels in any sample in this SDG.

5.4 Overall Assessment: All data is usable as flagged. No data have been rejected.

6. Summary and Recommendations

6.1 Summary

Chemical analysis of these borings showed no contamination detected above or approaching the Puget Sound Dredge Disposal Analysis (PSDDA) screening levels.

6.2 Recommendations

According to the chemical data collected, the dredged sediments from this area are suitable for open water disposal following PSDDA screening guidelines.

7. References

7.1 Alaska Department of Environmental Conservation, Technical Memorandum 06-002, Environmental Laboratory Data and Quality Assurance Requirements, October 2006.

7.2 Department of Defense, Quality Systems Manual for Environmental Laboratories, Final Version 3, January 2006.

7.3 Test America Tacoma Inc., Laboratory Analytical Reports SDG # 580-7749 and 580-7502, 06-046, Anchorage Harbor Expansion, AK.

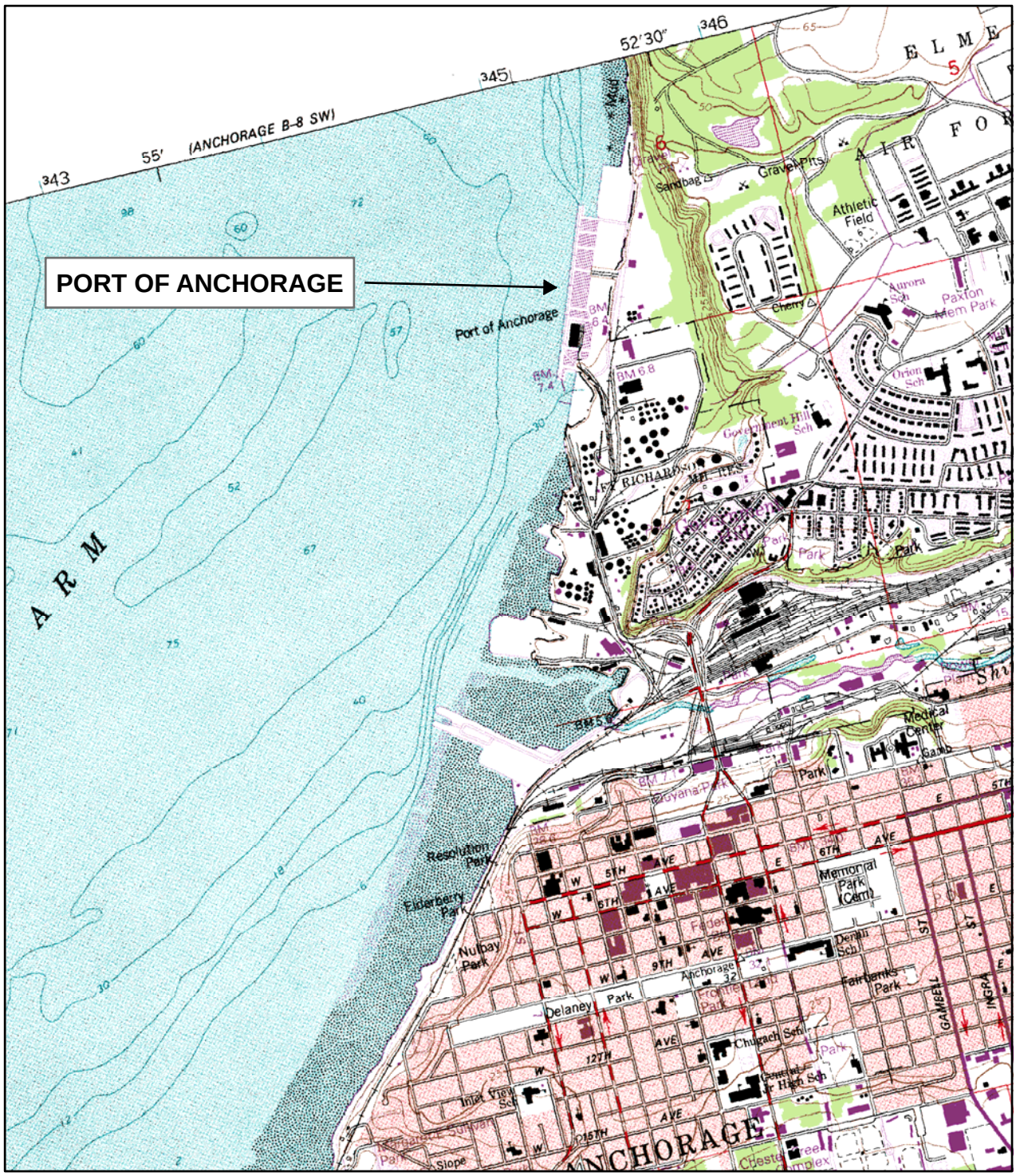
7.4 U.S. Army Corps of Engineers, Alaska District, 2005 Project Maps and Index Sheets: River and Harbors, Flood Control, 30 September 2005.

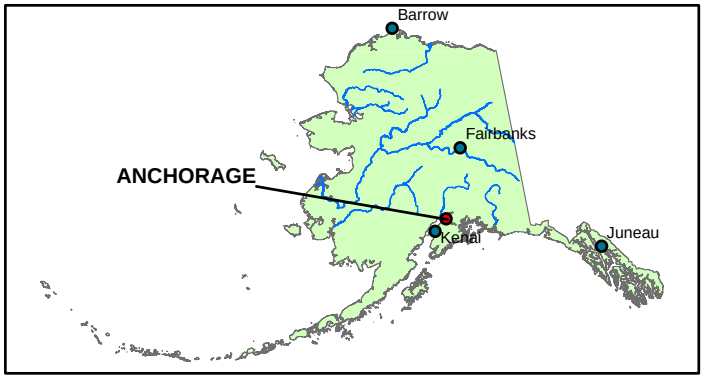
7.5 U.S. Army Corps of Engineers, Anchorage Harbor ROST Study, Anchorage Harbor Expansion, Anchorage, AK, January 2007.

7.6 U.S. Army Corps of Engineers, Seattle District *et al*, Dredged Material Evaluation and Disposal Options, A Users Manual for the Puget Sound Dredged Disposal Analysis (PSDDA) Program, February 2000.

7.7 U.S. Army Corps of Engineers, Final Chemical Report, Port of Anchorage, Anchorage, AK, September 1994.

7.8 U.S. Army Corps of Engineers, Sample and Analysis Plan, Sediment Sampling and Analysis, Port of Anchorage Expansion, Anchorage, Alaska , August 2007.





(Source: USGS 1:27,000 Anchorage A-8 NW, 1979)

Figure 1 Location & Vicinity Maps

Port of Anchorage
Anchorage, Alaska

N
W E
S

U.S. Army
Corps of Engineers
Alaska District

-45' DREDGE

EXISTING USACE PROJECT LIMITS

AP-4604

AP-4610

-35' DREDGE

AP-4613

AP-4619

EXISTING USACE PROJECT LIMITS

-45' DREDGE

AP-4601

AP-4629

-35' DREDGE

-25' DREDGE

N

Sample Location

0 500 1000 2000

SCALE (feet)

ANALYTICAL SAMPLE LOCATION MAP
ANCHORAGE HARBOR DEEPENING
PORT OF ANCHORAGE, ALASKA

ALASKA DISTRICT
CORPS OF ENGINEERS
MATERIALS

SCALE: GRAPHIC
DATE: 25 Feb 08
DRWN/RVW:
FIGURE 2

Appendix A

Site Photographs

Drilling Platform in Cook Inlet

Installing Casing for AP-4629

Cuttings from AP-4629

Typical Sediment Encountered During Borings

Drilling AP-4604

Refilling Mud Tank on AP-4629

Appendix B

Chemical Results Compared to Puget Sound Dredge Disposal Analysis Criteria

Sample Location: AP-4601 25.5' Sample Number: 07AHSS01SD TOC (ppm) 5000 TOC (%) 0.50			PSDDA/ LCRMA			State of Washington Sediment Management Standards	
	Analytical Results (ppm)	Normalized Results for TOC (b)	Screening Level	Bioaccumulation Trigger	Maxium Level	Table 1 Marine Sed. Quality Stand. Chem Criteria (a)	Table 3 Sed. Impact Zones Maximum Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	7.7	NA	57	507.1	200	57	93
Cadmium	0.42	NA	5.1	--	14	5.1	6.7
Chromium	31	NA	--	--	--	260	270
Lead	6.9	NA	450	--	1200	450	530
Mercury	0.084	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.11	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0443	8.86	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	0.00036	0.07	0.5	--	2	16	57
Fluorene	0.0041	0.82	0.54	--	3.6	23	79
Phenanthrene	0.015	3.00	1.5	--	2.1	100	480
Anthracene	0.00084	0.17	0.96	--	13	220	1200
2-Methylnaphthalene	0.024	4.80	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.0159	3.18	12	--	69	960	5300
Fluoranthene	0.0021	0.42	1.7	4.6	30	160	1200
Pyrene	0.0034	0.68	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	0.0043	0.86	1.4	--	21	110	460
Total Benzofluoranthenes[+]	0.0028	0.56	3.2	--	9.9	230	450
Benzo(a)pyrene	0.0014	0.28	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	0.0019	0.38	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	ND	NA	1.2	--	--	61	110
Di-n-butyl phthalate	ND	NA	5.1	10.22	--	220	1700
Benzyl butyl phthalate	ND	NA	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	0.0033	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4601 35.5'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS02SD						
TOC (ppm)	5300					Table 1	Table 3
TOC (%)	0.53		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	11	NA	57	507.1	200	57	93
Cadmium	ND	NA	5.1	--	14	5.1	6.7
Chromium	49	NA	--	--	--	260	270
Lead	8.4	NA	450	--	1200	450	530
Mercury	0.13	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.14	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0328	6.19	5.2	--	29	370	780
Naphthalene	0.0019	0.36	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	0.0017	0.32	0.54	--	3.6	23	79
Phenanthrene	0.0062	1.17	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.023	4.34	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.00093	0.18	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	0.00093	0.18	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.0032	0.60	1.2	--	--	61	110
Di-n-butyl phthalate	ND	NA	5.1	10.22	--	220	1700
Benzyl butyl phthalate	0.0066	1.25	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	0.01	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4629 7.5'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS03SD						
TOC (ppm)	4600					Table 1	Table 3
TOC (%)	0.46		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	7.9	NA	57	507.1	200	57	93
Cadmium	ND	NA	5.1	--	14	5.1	6.7
Chromium	43	NA	--	--	--	260	270
Lead	6.3	NA	450	--	1200	450	530
Mercury	0.097	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.14	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0292	6.35	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	0.0008	0.17	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	0.0027	0.59	0.54	--	3.6	23	79
Phenanthrene	0.0087	1.89	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.017	3.70	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.00457	0.99	12	--	69	960	5300
Fluoranthene	0.00097	0.21	1.7	4.6	30	160	1200
Pyrene	0.0014	0.30	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	0.0022	0.48	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	ND	NA	1.2	--	--	61	110
Di-n-butyl phthalate	0.0084	1.83	5.1	10.22	--	220	1700
Benzyl butyl phthalate	0.0064	1.39	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	0.0024	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4629 24.5'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS04SD						
TOC (ppm)	5000					Table 1	Table 3
TOC (%)	0.50					Marine Sed.	Sed. Impact Zones
	Analytical		Screening	Bioaccumulation	Maxium	Quality Stand.	Maximum
	Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	11	NA	57	507.1	200	57	93
Cadmium	ND	NA	5.1	--	14	5.1	6.7
Chromium	55	NA	--	--	--	260	270
Lead	9.3	NA	450	--	1200	450	530
Mercury	0.13	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.15	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0219	4.38	5.2	--	29	370	780
Naphthalene	0.0046	0.92	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	0.0011	0.22	0.54	--	3.6	23	79
Phenanthrene	0.0032	0.64	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.013	2.60	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0	0.00	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	ND	NA	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.00094	0.19	1.2	--	--	61	110
Di-n-butyl phthalate	0.0078	1.56	5.1	10.22	--	220	1700
Benzyl butyl phthalate	0.0051	1.02	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4604 31.5'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS05SD						
TOC (ppm)	6900					Table 1	Table 3
TOC (%)	0.69		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	19	NA	57	507.1	200	57	93
Cadmium	0.073	NA	5.1	--	14	5.1	6.7
Chromium	51	NA	--	--	--	260	270
Lead	11	NA	450	--	1200	450	530
Mercury	0.1	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.23	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.00535	0.78	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	0.00081	0.12	0.56	--	1.3	66	66
Acenaphthene	ND	A	0.5	--	2	16	57
Fluorene	0.00074	0.11	0.54	--	3.6	23	79
Phenanthrene	0.0013	0.19	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.0025	0.36	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0	0.00	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	ND	NA	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	ND	NA	1.2	--	--	61	110
Di-n-butyl phthalate	0.0082	1.19	5.1	10.22	--	220	1700
Benzyl butyl phthalate	0.0079	1.14	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4604 31.5'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS06SD						
TOC (ppm)	7000					Table 1	Table 3
TOC (%)	0.70		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	18	NA	57	507.1	200	57	93
Cadmium	0.079	NA	5.1	--	14	5.1	6.7
Chromium	51	NA	--	--	--	260	270
Lead	11	NA	450	--	1200	450	530
Mercury	0.085	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.21	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0024	0.34	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	ND	NA	0.54	--	3.6	23	79
Phenanthrene	0.0011	0.16	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.0013	0.19	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.00195	0.28	12	--	69	960	5300
Fluoranthene	0.0011	0.16	1.7	4.6	30	160	1200
Pyrene	0.00085	0.12	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	ND	NA	1.2	--	--	61	110
Di-n-butyl phthalate	0.0058	0.83	5.1	10.22	--	220	1700
Benzyl butyl phthalate	0.0051	0.73	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4604 34.5'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS07SD						
TOC (ppm)	6400					Table 1	Table 3
TOC (%)	0.64		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	8.8	NA	57	507.1	200	57	93
Cadmium	ND	NA	5.1	--	14	5.1	6.7
Chromium	57	NA	--	--	--	260	270
Lead	9.7	NA	450	--	1200	450	530
Mercury	0.12	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.15	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.01021	1.60	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	0.00071	0.11	0.54	--	3.6	23	79
Phenanthrene	0.0026	0.41	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.0069	1.08	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0	0.00	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	ND	NA	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	ND	NA	1.2	--	--	61	110
Di-n-butyl phthalate	0.006	0.94	5.1	10.22	--	220	1700
Benzyl butyl phthalate	ND	NA	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4610 10.2'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS08SD						
TOC (ppm)	2600					Table 1	Table 3
TOC (%)	0.26		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	7.5	NA	57	507.1	200	57	93
Cadmium	ND	NA	5.1	--	14	5.1	6.7
Chromium	30	NA	--	--	--	260	270
Lead	3.9	NA	450	--	1200	450	530
Mercury	0.056	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.058	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.00057	0.22	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	ND	NA	0.54	--	3.6	23	79
Phenanthrene	ND	NA	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.00057	0.22	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0	0.00	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	ND	NA	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.0011	0.42	1.2	--	--	61	110
Di-n-butyl phthalate	0.0068	2.62	5.1	10.22	--	220	1700
Benzyl butyl phthalate	0.0044	1.69	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4610 45.2'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS09SD						
TOC (ppm)	6800					Table 1	Table 3
TOC (%)	0.68		Screening Level	Bioaccumulation Trigger	Maxium Level	Marine Sed. Quality Stand. Chem Criteria (a)	Sed. Impact Zones Maximum Chemical Criteria (a)
	Analytical Results (ppm)	Normalized Results for TOC (b)					
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	12	NA	57	507.1	200	57	93
Cadmium	ND	NA	5.1	--	14	5.1	6.7
Chromium	65	NA	--	--	--	260	270
Lead	10	NA	450	--	1200	450	530
Mercury	0.14	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.16	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0157	2.31	5.2	--	29	370	780
Naphthalene	0.0025	0.37	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	ND	NA	0.54	--	3.6	23	79
Phenanthrene	0.0032	0.47	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.01	1.47	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.0005	0.07	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	0.0005	0.07	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.00099	0.15	1.2	--	--	61	110
Di-n-butyl phthalate	0.0073	1.07	5.1	10.22	--	220	1700
Benzyl butyl phthalate	0.0081	1.19	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4613 43-45'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS10SD						
TOC (ppm)	4100					Table 1	Table 3
TOC (%)	0.41		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	7.7	NA	57	507.1	200	57	93
Cadmium	0.015	NA	5.1	--	14	5.1	6.7
Chromium	27	NA	--	--	--	260	270
Lead	4.4	NA	450	--	1200	450	530
Mercury	0.033	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.086	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.007	1.71	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	ND	NA	0.54	--	3.6	23	79
Phenanthrene	0.0015	0.37	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.0055	1.34	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0	0.00	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	ND	NA	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.0056	1.37	1.2	--	--	61	110
Di-n-butyl phthalate	0.0036	0.88	5.1	10.22	--	220	1700
Benzyl butyl phthalate	ND	NA	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	0.0071	1.73	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4613 43-45'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS11SD						
TOC (ppm)	3280					Table 1	Table 3
TOC (%)	0.33		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	8.5	NA	57	507.1	200	57	93
Cadmium	0.017	NA	5.1	--	14	5.1	6.7
Chromium	32	NA	--	--	--	260	270
Lead	5.4	NA	450	--	1200	450	530
Mercury	ND	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.09	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.016	4.88	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	0.0011	0.34	0.54	--	3.6	23	79
Phenanthrene	0.0039	1.19	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.011	3.35	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.00118	0.36	12	--	69	960	5300
Fluoranthene	0.00054	0.16	1.7	4.6	30	160	1200
Pyrene	0.00064	0.20	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.0068	2.07	1.2	--	--	61	110
Di-n-butyl phthalate	0.0048	1.46	5.1	10.22	--	220	1700
Benzyl butyl phthalate	ND	NA	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	0.051	15.55	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location: AP-4613 45-47'			PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number: 07AHSS12SD							
TOC (ppm) 3300						Table 1	Table 3
TOC (%) 0.33			Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	8.8	NA	57	507.1	200	57	93
Cadmium	ND	NA	5.1	--	14	5.1	6.7
Chromium	37	NA	--	--	--	260	270
Lead	5.3	NA	450	--	1200	450	530
Mercury	0.032	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.092	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0122	3.70	5.2	--	29	370	780
Naphthalene	0.0023	0.70	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	ND	NA	0.54	--	3.6	23	79
Phenanthrene	0.0031	0.94	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.0068	2.06	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.00053	0.16	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	0.00053	0.16	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.0072	2.18	1.2	--	--	61	110
Di-n-butyl phthalate	0.0056	1.70	5.1	10.22	--	220	1700
Benzyl butyl phthalate	ND	NA	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	0.064	19.39	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location: AP-4619 36-38'			PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number: 07AHSS13SD							
TOC (ppm) 2000						Table 1	Table 3
TOC (%) 0.20			Screening Level	Bioaccumulation Trigger	Maxium Level	Marine Sed. Quality Stand. Chem Criteria (a)	Sed. Impact Zones Maximum Chemical Criteria (a)
	Analytical Results (ppm)	Normalized Results for TOC (b)					
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	6.4	NA	57	507.1	200	57	93
Cadmium	0.018	NA	5.1	--	14	5.1	6.7
Chromium	23	NA	--	--	--	260	270
Lead	3.2	NA	450	--	1200	450	530
Mercury	0.016	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.055	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0034	1.70	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	ND	NA	0.54	--	3.6	23	79
Phenanthrene	0.001	0.50	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.0024	1.20	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0	0.00	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	ND	NA	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	ND	NA	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.006	3.00	1.2	--	--	61	110
Di-n-butyl phthalate	0.0039	1.95	5.1	10.22	--	220	1700
Benzyl butyl phthalate	ND	NA	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	ND	NA	8.3	13.87	--	47	78
Di-n-octyl phthalate	0.01	5.00	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

Sample Location:	AP-4619 45-47'		PSDDA/ LCRMA			State of Washington Sediment Management Standards	
Sample Number:	07AHSS01SD						
TOC (ppm)	4280					Table 1	Table 3
TOC (%)	0.43		Screening	Bioaccumulation	Maxium	Marine Sed. Quality Stand.	Sed. Impact Zones Maximum
	Analytical Results (ppm)	Normalized Results for TOC (b)	Level	Trigger	Level	Chem Criteria (a)	Chemical Criteria (a)
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Arsenic	6.3	NA	57	507.1	200	57	93
Cadmium	0.0084	NA	5.1	--	14	5.1	6.7
Chromium	22	NA	--	--	--	260	270
Lead	3.4	NA	450	--	1200	450	530
Mercury	0.015	NA	0.41	1.5	2.3	0.41	0.59
Silver	0.07	NA	6.1	6.1	8.4	6.1	6.1
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
LPAH (sum of next 7 analytes)	0.0079	1.85	5.2	--	29	370	780
Naphthalene	ND	NA	2.1	--	2.4	99	170
Acenaphthylene	ND	NA	0.56	--	1.3	66	66
Acenaphthene	ND	NA	0.5	--	2	16	57
Fluorene	ND	NA	0.54	--	3.6	23	79
Phenanthrene	0.0021	0.49	1.5	--	2.1	100	480
Anthracene	ND	NA	0.96	--	13	220	1200
2-Methylnaphthalene	0.0058	1.36	0.67	--	1.9	38	64
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
HPAH (sum of next 9 analytes)	0.00328	0.77	12	--	69	960	5300
Fluoranthene	ND	NA	1.7	4.6	30	160	1200
Pyrene	0.00038	0.09	2.6	--	16	1000	1400
Benzo(a)anthracene	ND	NA	1.3	--	5.1	110	270
Chrysene	ND	NA	1.4	--	21	110	460
Total Benzofluoranthenes[+]	ND	NA	3.2	--	9.9	230	450
Benzo(a)pyrene	0.0029	0.68	1.6	3.6	3.6	99	210
Indeno(1,2,3-cd)pyrene	ND	NA	0.6	--	4.4	34	88
Dibenzo(a,h)anthracene	ND	NA	0.23	--	1.9	12	33
Benzo(g,h,i)Perylene	ND	NA	0.67	--	3.2	31	78
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
1,3-Dichlorobenzene	ND	NA	0.17	1.241	--	--	--
1,2-Dichlorobenzene	ND	NA	0.035	0.12	0.12	2.3	2.3
1,4-Dichlorobenzene	ND	NA	0.11	0.037	0.11	3.1	9
1,2,4-Trichlorobenzene	ND	NA	0.031	--	0.064	0.81	1.8
Hexachlorobutadiene	ND	NA	0.022	0.168	0.23	3.9	6.2
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Dimethyl phthalate	ND	NA	1.4	1.4	--	53	53
Diethyl phthalate	0.0074	1.73	1.2	--	--	61	110
Di-n-butyl phthalate	0.0051	1.19	5.1	10.22	--	220	1700
Benzyl butyl phthalate	ND	NA	0.97	--	--	4.9	64
bis-(2-Ethylhexyl)phthalate	0.039	9.11	8.3	13.87	--	47	78
Di-n-octyl phthalate	ND	NA	6.2	--	--	58	4500
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Phenol	ND	NA	0.42	0.876	1.2	0.042	1.2
2-Methylphenol (o-Cresol)	ND	NA	0.063	--	0.077	0.063	0.063
4-Methylphenol	ND	NA	0.67	--	3.6	0.67	0.67
2,4-Dimethylphenol	ND	NA	0.029	--	0.21	0.029	0.029
Pentachlorophenol	ND	NA	0.4	0.504	0.69	0.36	0.69
			Not TOC Normalized ppm dry			Not TOC Normalized ppm dry	
Benzyl alcohol	ND	NA	0.057	--	0.87	0.057	0.073
Benzoic acid	ND	NA	0.65	--	0.76	0.65	0.65
Dibenzofuran	ND	NA	0.54	--	1.7	--	--
Hexachloroethane	ND	NA	1.4	10.22	14	--	--
Hexachlorobutadiene	ND	NA	0.029	0.212	0.27	--	--
n-Nitrosodiphenylamine	ND	NA	0.028	0.13	0.13	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Trichloroethene	ND	NA	0.160**	1.168**	1.600**	--	--
Tetrachloroethene	ND	NA	0.057**	0.102**	0.210**	--	--
Ethylbenzene	ND	NA	0.010**	0.027**	0.050**	--	--
Total Xylenes[*]	ND	NA	0.040**	--	0.160**	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total DDT	ND	NA	0.0069	0.05	--	--	--
Aldrin	ND	NA	0.01	0.037	--	--	--
alpha-Chlordane	ND	NA	0.01	0.037	--	--	--
Dieldrin	ND	NA	0.01	0.037	--	--	--
Heptachlor	ND	NA	0.01	0.037	--	--	--
gamma-BHC (Lindane)	ND	NA	0.01	0.037	--	--	--
			Not TOC Normalized ppm dry			TOC Normalized ppm dry	
Total PCBs	ND	NA	0.13	0.038	3.1	12	65

ND: not detected at method detection limit -- no concentration listed
+ - Individual isomers were combined to obtain final result * LCRMA = 16
NA - Not Applicable ** No LCRMA Value
** Laboratory reported Total Xylenes as P&M-Xylene and o-Xylene; Total Xylene result was obtained by manual addition.

(a) Where laboratory analysis indicates a chemical is not detected in a sediment sample, the detection limit shall be reported and shall be at or below the Marine Sediment Quality Standards chemical criteria value set in this table.

(b) The listed chemical parameter criteria represent concentrations in parts per million, "normalized," or expressed, on a total organic carbon basis. To normalize to total organic carbon, the dry weight concentration for each parameter is divided by the decimal fraction representing the percent total organic carbon content of the sediment.

Appendix C

Complete Chemical Data Tables

Anchorage Harbor Expansion

	AP Number	AP-4601	AP-4601	AP-4629	AP-4629	AP-4604	AP-4604	AP-4604
	Location ID & Depth	TB-19 25.5	TB-19 35.5	TB-47 7.5'	TB-47 24.5	TB-22 31.5	TB-22 31.5	TB-22 34.5
	Sample ID	07AHSS01SD	07AHSS02SD	07AHSS03SD	07AHSS04SD	07AHSS05SD	07AHSS06SD	07AHSS07SD
	Collection Date	14-Sep-07	14-Sep-07	15-Sep-07	15-Sep-07	15-Sep-07	16-Sep-07	16-Sep-07
	SDG	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1
ANALYTE	Method	Units					Dupe of -05SD	
Arsenic	SW6020	mg/kg	7.7 [0.19]	11 [0.19]	7.9 [0.17]	11 [0.23]	19 [0.24]	18 [0.26]	8.8 [0.22]
Barium	SW6020	mg/kg	62 [0.19]	97 [0.19]	79 [0.17]	98 [0.23]	150 [0.24]	140 [0.26]	100 [0.22]
Cadmium	SW6020	mg/kg	0.42 [0.19]	ND [0.19]	ND [0.17]	ND [0.23]	0.073 [0.24]	0.079 [0.26]	ND [0.22]
Chromium	SW6020	mg/kg	31 [0.19]	49 [0.19]	43 [0.17]	55 [0.23]	51 [0.24]	51 [0.26]	57 [0.22]
Lead	SW6020	mg/kg	6.9 [0.19]	8.4 [0.19]	6.3 [0.17]	9.3 [0.23]	11 [0.24]	11 [0.26]	9.7 [0.22]
Selenium	SW6020	mg/kg	0.26 [0.48]	0.34 [0.48]	0.33 [0.42]	0.42 [0.56]	0.56 [0.6]	0.5 [0.65]	0.42 [0.55]
Silver	SW6020	mg/kg	0.11 [0.19]	0.14 [0.19]	0.14 [0.17]	0.15 [0.23]	0.23 [0.24]	0.21 [0.26]	0.15 [0.22]
Mercury	SW7471A	mg/kg	0.084 [0.021]	0.13 [0.02]	0.097 [0.018]	0.13 [0.021]	0.1 [0.017]	0.085 [0.022]	0.12 [0.021]
4,4'-DDD	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
4,4'-DDE	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
4,4'-DDT	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
Aldrin	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
alpha-BHC	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
alpha-Chlordane	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
beta-BHC	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	0.00028 [0.0012]	ND [0.0012]	ND [0.0013]	0.00066 [0.0013]	ND [0.0013]
delta-BHC	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
Dieldrin	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
Endosulfan I	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
Endosulfan II	SW8081A	mg/kg	0.0015 [0.0022] B	0.0009 [0.0022] B	0.00085 [0.0024] B	0.0008 [0.0024] B	0.00055 [0.0027] B	0.00059 [0.0025] B	0.00043 [0.0025] B
Endosulfan sulfate	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
Endrin	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
Endrin aldehyde	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
Endrin ketone	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
gamma-BHC (Lindane)	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
gamma-Chlordane	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	0.00044 [0.0013]	ND [0.0013]
Heptachlor	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
Heptachlor epoxide	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
Methoxychlor	SW8081A	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.013]
Toxaphene	SW8081A	mg/kg	ND [0.11]	ND [0.11]	ND [0.12]	ND [0.12]	ND [0.13]	ND [0.13]	ND [0.13]
PCB-1016 (Aroclor 1016)	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013] QL	ND [0.013]
PCB-1221 (Aroclor 1221)	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013] QL	ND [0.013]
PCB-1232 (Aroclor 1232)	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013] QL	ND [0.013]
PCB-1242 (Aroclor 1242)	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013] QL	ND [0.013]
PCB-1248 (Aroclor 1248)	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013] QL	ND [0.013]
PCB-1254 (Aroclor 1254)	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013] QL	ND [0.013]
PCB-1260 (Aroclor 1260)	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013] QL	ND [0.013]
1,1,1,2-Tetrachloroethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024] QL	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,1,1-Trichloroethane	SW8260B	mg/kg	ND [0.0048] QN	ND [0.0065] QL	ND [0.0095]	ND [0.0093] QL	ND [0.011] QL	ND [0.012] QN	ND [0.011] QL
1,1,2,2-Tetrachloroethane	SW8260B	mg/kg	ND [0.0024] QN	ND [0.0032] QL	ND [0.0047]	ND [0.0047] QL	ND [0.0057] QL	ND [0.006] QN	ND [0.0053] QL
1,1,2-Trichloroethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,1-Dichloroethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,1-Dichloroethene	SW8260B	mg/kg	ND [0.0048] QN	ND [0.0065] QL	ND [0.0095]	ND [0.0093] QL	ND [0.011] QL	ND [0.012] QN	ND [0.011] QL
1,1-Dichloropropene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number		AP-4601	AP-4601	AP-4629	AP-4629	AP-4604	AP-4604	AP-4604
	Location ID & Depth		TB-19 25.5	TB-19 35.5	TB-47 7.5'	TB-47 24.5	TB-22 31.5	TB-22 31.5	TB-22 34.5
	Sample ID		07AHSS01SD	07AHSS02SD	07AHSS03SD	07AHSS04SD	07AHSS05SD	07AHSS06SD	07AHSS07SD
	Collection Date		14-Sep-07	14-Sep-07	15-Sep-07	15-Sep-07	15-Sep-07	16-Sep-07	16-Sep-07
	SDG		580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1
ANALYTE	Method	Units						Dupe of -05SD	
1,2,3-Trichlorobenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2,3-Trichloropropane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2,4-Trichlorobenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2,4-Trimethylbenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	0.0069 [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2-Dibromo-3-chloropropane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2-Dibromoethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2-Dichlorobenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2-Dichloroethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2-Dichloropropane	SW8260B	mg/kg	ND [0.0024] QN	ND [0.0032] QL	ND [0.0047]	ND [0.0047] QL	ND [0.0057] QL	ND [0.006] QN	ND [0.0053] QL
1,3,5-Trimethylbenzene	SW8260B	mg/kg	ND [0.012] QN	0.0024 [0.016] QL	ND [0.024]	0.0062 [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,3-Dichlorobenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,3-Dichloropropane	SW8260B	mg/kg	ND [0.0048] QN	ND [0.0065] QL	ND [0.0095]	ND [0.0093] QL	ND [0.011] QL	ND [0.012] QN	ND [0.011] QL
1,4-Dichlorobenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
2,2-Dichloropropane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
2-Butanone	SW8260B	mg/kg	ND [0.06] QN	ND [0.081] QL	ND [0.12]	ND [0.12] QL	ND [0.14] QL	ND [0.15] QN	ND [0.13] QL
2-Chlorotoluene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
2-Hexanone	SW8260B	mg/kg	ND [0.06] QN	ND [0.081] QL	ND [0.12]	ND [0.12] QL	ND [0.14] QL	ND [0.15] QN	ND [0.13] QL
4-Chlorotoluene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
4-Isopropyltoluene	SW8260B	mg/kg	ND [0.012] QN	0.0013 [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
4-Methyl-2-pentanone	SW8260B	mg/kg	ND [0.06] QN	ND [0.081] QL	ND [0.12]	ND [0.12] QL	ND [0.14] QL	ND [0.15] QN	ND [0.13] QL
Acetone	SW8260B	mg/kg	0.0091 [0.06] QN,B	0.014 [0.081] QL,B	ND [0.12]	0.019 [0.12] QL,B	0.027 [0.14] QL B	0.031 [0.15] QN,B	0.02 [0.13] QL,B
Benzene	SW8260B	mg/kg	ND [0.0024] QN	ND [0.0032] QL	ND [0.0047]	ND [0.0047] QL	ND [0.0057] QL	ND [0.006] QN	ND [0.0053] QL
Bromobenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Bromochloromethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Bromodichloromethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024] QL	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Bromoform	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024] QL	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Bromomethane	SW8260B	mg/kg	ND [0.06] QN	ND [0.081] QL	ND [0.12]	ND [0.12] QL	ND [0.14] QL	ND [0.15] QN	ND [0.13] QL
Carbon disulfide	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024] QL	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Carbon tetrachloride	SW8260B	mg/kg	ND [0.0048] QN	ND [0.0065] QL	ND [0.0095]	ND [0.0093] QL	ND [0.011] QL	ND [0.012] QN	ND [0.011] QL
Chlorobenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Chloroethane	SW8260B	mg/kg	ND [0.06] QN	ND [0.081] QL	ND [0.12] QL	ND [0.12] QL	ND [0.14] QL	ND [0.15] QN	ND [0.13] QL
Chloroform	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Chloromethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
cis-1,2-Dichloroethene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
cis-1,3-Dichloropropene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Dibromochloromethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024] QL	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Dibromomethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Dichlorodifluoromethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Ethylbenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

			AP Number	AP-4601	AP-4601	AP-4629	AP-4629	AP-4604	AP-4604	AP-4604
			Location ID & Depth	TB-19 25.5	TB-19 35.5	TB-47 7.5'	TB-47 24.5	TB-22 31.5	TB-22 31.5	TB-22 34.5
			Sample ID	07AHSS01SD	07AHSS02SD	07AHSS03SD	07AHSS04SD	07AHSS05SD	07AHSS06SD	07AHSS07SD
			Collection Date	14-Sep-07	14-Sep-07	15-Sep-07	15-Sep-07	15-Sep-07	16-Sep-07	16-Sep-07
			SDG	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1
ANALYTE	Method	Units							Dupe of -05SD	
Hexachlorobutadiene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Isopropylbenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Methylene chloride	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Naphthalene	SW8260B	mg/kg	ND [0.012] QN	0.0019 [0.016] QL	ND [0.024]	0.0046 [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
n-Butylbenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
n-Propylbenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
o-Xylene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
sec-Butylbenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Styrene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
tert-Butylbenzene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Tetrachloroethene (PCE)	SW8260B	mg/kg	ND [0.0074] QN	ND [0.01] QL	ND [0.015]	ND [0.015] QL	ND [0.018] QL	ND [0.019] QN	ND [0.017] QL
Toluene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
trans-1,2-Dichloroethene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
trans-1,3-Dichloropropene	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024] QL	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Trichloroethene (TCE)	SW8260B	mg/kg	ND [0.0048] QN	ND [0.0065] QL	ND [0.0095]	ND [0.0093] QL	ND [0.011] QL	ND [0.012] QN	ND [0.011] QL
Trichlorofluoromethane	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
Vinyl chloride	SW8260B	mg/kg	ND [0.0048] QN	ND [0.0065] QL	ND [0.0095]	ND [0.0093] QL	ND [0.011] QL	ND [0.012] QN	ND [0.011] QL
Xylene, Isomers m & p	SW8260B	mg/kg	ND [0.012] QN	ND [0.016] QL	ND [0.024]	ND [0.023] QL	ND [0.028] QL	ND [0.03] QN	ND [0.027] QL
1,2,4-Trichlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
1,2-Dichlorobenzene	SW8270C	mg/kg	ND [0.0061]	ND [0.006]	ND [0.0067]	ND [0.0066]	ND [0.0071]	ND [0.0067]	ND [0.0071]
1,3-Dichlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
1,4-Dichlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
1-Methylnaphthalene	SW8270C	mg/kg	0.021 [0.0034]	0.026 [0.0033]	0.0098 [0.0037]	0.011 [0.0036]	0.0017 [0.0039]	ND [0.0037]	0.004 [0.0039]
2,4,5-Trichlorophenol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2,4,6-Trichlorophenol	SW8270C	mg/kg	ND [0.017]	ND [0.016]	ND [0.018]	ND [0.018]	ND [0.019]	ND [0.018]	ND [0.019]
2,4-Dichlorophenol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2,4-Dimethylphenol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2,4-Dinitrophenol	SW8270C	mg/kg	ND [0.11]	ND [0.11]	ND [0.12]	ND [0.12]	ND [0.13]	ND [0.12]	ND [0.13]
2,4-Dinitrotoluene	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2,6-Dinitrotoluene	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2-Chloronaphthalene	SW8270C	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]
2-Chlorophenol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2-Methyl-4,6-dinitrophenol	SW8270C	mg/kg	ND [0.11]	ND [0.11]	ND [0.12]	ND [0.12]	ND [0.13]	ND [0.12]	ND [0.13]
2-Methylnaphthalene	SW8270C	mg/kg	0.024 [0.0022]	0.023 [0.0022]	0.017 [0.0024]	0.013 [0.0024]	0.0025 [0.0026]	0.0013 [0.0024]	0.0069 [0.0026]
2-Methylphenol (o-Cresol)	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2-Nitroaniline	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
2-Nitrophenol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
3,3'-Dichlorobenzidine	SW8270C	mg/kg	ND [0.022]	ND [0.022]	ND [0.024]	ND [0.024]	ND [0.026]	ND [0.024]	ND [0.026]
3-Methylphenol/4-Methylphenol Coelution	SW8270C	mg/kg	ND [0.022]	ND [0.022]	ND [0.024]	ND [0.024]	ND [0.026]	ND [0.024]	ND [0.026]
3-Nitroaniline	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
4-Bromophenyl phenyl ether	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
4-Chloro-3-methylphenol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
4-Chloroaniline	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
4-Chlorophenyl phenyl ether	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

			AP Number	AP-4601	AP-4601	AP-4629	AP-4629	AP-4604	AP-4604	AP-4604
			Location ID & Depth	TB-19 25.5	TB-19 35.5	TB-47 7.5'	TB-47 24.5	TB-22 31.5	TB-22 31.5	TB-22 34.5
			Sample ID	07AHSS01SD	07AHSS02SD	07AHSS03SD	07AHSS04SD	07AHSS05SD	07AHSS06SD	07AHSS07SD
			Collection Date	14-Sep-07	14-Sep-07	15-Sep-07	15-Sep-07	15-Sep-07	16-Sep-07	16-Sep-07
			SDG	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1
ANALYTE	**Method**	**Units**							**Dupe of -05SD**	
4-Nitroaniline	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
4-Nitrophenol	SW8270C	mg/kg	ND [0.11]	ND [0.11]	ND [0.12]	ND [0.12]	ND [0.13]	ND [0.12]	ND [0.13]
Acenaphthene	SW8270C	mg/kg	ND [0.0022]	ND [0.0022]	0.0008 [0.0024]	ND [0.0024]	0.00081 [0.0026]	ND [0.0024]	ND [0.0026]
Acenaphthylene	SW8270C	mg/kg	0.00036 [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]
Anthracene	SW8270C	mg/kg	0.00084 [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]
Benzo(a)anthracene	SW8270C	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]
Benzo(a)pyrene	SW8270C	mg/kg	0.0014 [0.0034]	ND [0.0033]	ND [0.0037]	ND [0.0036]	ND [0.0039]	ND [0.0037]	ND [0.0039]
Benzo(b)fluoranthene	SW8270C	mg/kg	0.0028 [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]
Benzo(g,h,i)perylene	SW8270C	mg/kg	0.0019 [0.0028]	ND [0.0027]	ND [0.003]	ND [0.003]	ND [0.0032]	ND [0.003]	ND [0.0032]
Benzo(k)fluoranthene	SW8270C	mg/kg	ND [0.0028]	ND [0.0027]	ND [0.003]	ND [0.003]	ND [0.0032]	ND [0.003]	ND [0.0032]
Benzoic acid	SW8270C	mg/kg	ND [0.28]	ND [0.27]	ND [0.3]	ND [0.3]	ND [0.32]	ND [0.3]	ND [0.32]
Benzyl alcohol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Benzyl butyl phthalate	SW8270C	mg/kg	ND [0.022]	0.0066 [0.022] B	0.0064 [0.024] B	0.0051 [0.024] B	0.0079 [0.026] B	0.0051 [0.024] B	ND [0.026]
bis-(2-Chloroethoxy)methane	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
bis-(2-Chloroethyl)ether	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
bis(2-Chloroisopropyl)ether	SW8270C	mg/kg	ND [0.028]	ND [0.027]	ND [0.03]	ND [0.03]	ND [0.032]	ND [0.03]	ND [0.032]
bis-(2-Ethylhexyl)phthalate	SW8270C	mg/kg	ND [0.17]	ND [0.16]	ND [0.18]	ND [0.18]	ND [0.19]	ND [0.18]	ND [0.19]
Carbazole	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Chrysene	SW8270C	mg/kg	0.0043 [0.0028]	ND [0.0027]	0.0022 [0.003]	ND [0.003]	ND [0.0032]	ND [0.003]	ND [0.0032]
Dibenzo(a,h)anthracene	SW8270C	mg/kg	ND [0.0045]	ND [0.0044]	ND [0.0049]	ND [0.0048]	ND [0.0052]	ND [0.0049]	ND [0.0052]
Dibenzofuran	SW8270C	mg/kg	0.0033 [0.011]	ND [0.011]	0.0024 [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Diethyl phthalate	SW8270C	mg/kg	ND [0.022]	0.0032 [0.022] B	ND [0.024]	0.00094 [0.024] B	ND [0.026]	ND [0.024]	ND [0.026]
Dimethyl phthalate	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Di-n-butyl phthalate	SW8270C	mg/kg	ND [0.056]	ND [0.055]	0.0084 [0.061] B	0.0078 [0.06] B	0.0082 [0.064] B	0.0058 [0.061] B	0.006 [0.065] B
Di-n-octyl phthalate	SW8270C	mg/kg	ND [0.056]	ND [0.055]	ND [0.061]	ND [0.06]	ND [0.064]	ND [0.061]	ND [0.065]
Fluoranthene	SW8270C	mg/kg	0.0021 [0.0022]	ND [0.0022]	0.00097 [0.0024]	ND [0.0024]	ND [0.0026]	0.0011 [0.0024]	ND [0.0026]
Fluorene	SW8270C	mg/kg	0.0041 [0.0022]	0.0017 [0.0022]	0.0027 [0.0024]	0.0011 [0.0024]	0.00074 [0.0026]	ND [0.0024]	0.00071 [0.0026]
Hexachlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
Hexachlorobutadiene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
Hexachlorocyclopentadiene	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Hexachloroethane	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Indeno(1,2,3-cd)pyrene	SW8270C	mg/kg	ND [0.0045]	ND [0.0044]	ND [0.0049]	ND [0.0048]	ND [0.0052]	ND [0.0049]	ND [0.0052]
Isophorone	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Naphthalene	SW8270C	mg/kg	0.0061 [0.0022]	0.0055 [0.0022]	0.0057 [0.0024]	0.0058 [0.0024]	0.0021 [0.0026]	ND [0.0024]	0.0033 [0.0026]
Nitrobenzene	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
n-Nitrosodi-n-propylamine	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
n-Nitrosodiphenylamine	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
Pentachlorophenol	SW8270C	mg/kg	ND [0.022]	ND [0.022]	ND [0.024]	ND [0.024]	ND [0.026]	ND [0.024]	ND [0.026]
Phenanthrene	SW8270C	mg/kg	0.015 [0.0022]	0.0062 [0.0022]	0.0087 [0.0024]	0.0032 [0.0024]	0.0013 [0.0026]	0.0011 [0.0024]	0.0026 [0.0026]
Phenol	SW8270C	mg/kg	ND [0.011]	0.01 [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Pyrene	SW8270C	mg/kg	0.0034 [0.0022]	0.00093 [0.0022]	0.0014 [0.0024]	ND [0.0024]	ND [0.0026]	0.00085 [0.0024]	ND [0.0026]
Total Organic Carbon (TOC)	SW9060	mg/kg	5000 [1000]	5300 [1000]	4600 [1000]	5900 [1000]	6900 [1000]	7000 [1000]	6400 [1000]

Arsenic	SW6020	mg/kg	7.7 [0.19]	11 [0.19]	7.9 [0.17]	11 [0.23]	19 [0.24]	18 [0.26]	8.8 [0.22]

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

			AP Number	AP-4601	AP-4601	AP-4629	AP-4629	AP-4604	AP-4604	AP-4604
			Location ID & Depth	TB-19 25.5	TB-19 35.5	TB-47 7.5'	TB-47 24.5	TB-22 31.5	TB-22 31.5	TB-22 34.5
			Sample ID	07AHSS01SD	07AHSS02SD	07AHSS03SD	07AHSS04SD	07AHSS05SD	07AHSS06SD	07AHSS07SD
			Collection Date	14-Sep-07	14-Sep-07	15-Sep-07	15-Sep-07	15-Sep-07	16-Sep-07	16-Sep-07
			SDG	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1
ANALYTE	**Method**	**Units**							**Dupe of -05SD**	
Cadmium	SW6020	mg/kg	0.42 [0.19]	ND [0.19]	ND [0.17]	ND [0.23]	0.073 [0.24]	0.079 [0.26]	ND [0.22]	
Chromium	SW6020	mg/kg	31 [0.19]	49 [0.19]	43 [0.17]	55 [0.23]	51 [0.24]	51 [0.26]	57 [0.22]	
Lead	SW6020	mg/kg	6.9 [0.19]	8.4 [0.19]	6.3 [0.17]	9.3 [0.23]	11 [0.24]	11 [0.26]	9.7 [0.22]	
Mercury	SW7471A	mg/kg	0.084 [0.021]	0.13 [0.02]	0.097 [0.018]	0.13 [0.021]	0.1 [0.017]	0.085 [0.022]	0.12 [0.021]	
Silver	SW6020	mg/kg	0.11 [0.19]	0.14 [0.19]	0.14 [0.17]	0.15 [0.23]	0.23 [0.24]	0.21 [0.26]	0.15 [0.22]	
Total LPAH										
Naphthalene	SW8260B	mg/kg	ND [0.012]	0.0019 [0.016]	ND [0.024]	0.0046 [0.023]	ND [0.028]	ND [0.03]	ND [0.027]	
Acenaphthene	SW8270C	mg/kg	ND [0.0022]	ND [0.0022]	0.0008 [0.0024]	ND [0.0024]	0.00081 [0.0026]	ND [0.0024]	ND [0.0026]	
Acenaphthylene	SW8270C	mg/kg	0.00036 [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]	
Fluorene	SW8270C	mg/kg	0.0041 [0.0022]	0.0017 [0.0022]	0.0027 [0.0024]	0.0011 [0.0024]	0.00074 [0.0026]	ND [0.0024]	0.00071 [0.0026]	
Phenanthrene	SW8270C	mg/kg	0.015 [0.0022]	0.0062 [0.0022]	0.0087 [0.0024]	0.0032 [0.0024]	0.0013 [0.0026]	0.0011 [0.0024]	0.0026 [0.0026]	
Anthracene	SW8270C	mg/kg	0.00084 [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]	
2-Methylnaphthalene	SW8270C	mg/kg	0.024 [0.0022]	0.023 [0.0022]	0.017 [0.0024]	0.013 [0.0024]	0.0025 [0.0026]	0.0013 [0.0024]	0.0069 [0.0026]	
Total HPAH										
Fluoranthene	SW8270C	mg/kg	0.0021 [0.0022]	ND [0.0022]	0.00097 [0.0024]	ND [0.0024]	ND [0.0026]	0.0011 [0.0024]	ND [0.0026]	
Pyrene	SW8270C	mg/kg	0.0034 [0.0022]	0.00093 [0.0022]	0.0014 [0.0024]	ND [0.0024]	ND [0.0026]	0.00085 [0.0024]	ND [0.0026]	
Benzo(a)anthracene	SW8270C	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]	
Chrysene	SW8270C	mg/kg	0.0043 [0.0028]	ND [0.0027]	0.0022 [0.003]	ND [0.003]	ND [0.0032]	ND [0.003]	ND [0.0032]	
Benzofluoranthenes (total b + k)	SW8270C	mg/kg	0.0028 [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0026]	ND [0.0024]	ND [0.0026]	
Benzo(a)pyrene	SW8270C	mg/kg	0.0014 [0.0034]	ND [0.0033]	ND [0.0037]	ND [0.0036]	ND [0.0039]	ND [0.0037]	ND [0.0039]	
Indeno(1,2,3-cd)pyrene	SW8270C	mg/kg	ND [0.0045]	ND [0.0044]	ND [0.0049]	ND [0.0048]	ND [0.0052]	ND [0.0049]	ND [0.0052]	
Dibenzo(a,h)anthracene	SW8270C	mg/kg	ND [0.0045]	ND [0.0044]	ND [0.0049]	ND [0.0048]	ND [0.0052]	ND [0.0049]	ND [0.0052]	
Benzo(g,h,i)perylene	SW8270C	mg/kg	0.0019 [0.0028]	ND [0.0027]	ND [0.003]	ND [0.003]	ND [0.0032]	ND [0.003]	ND [0.0032]	
1,3-Dichlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]	
1,4-Dichlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]	
1,2-Dichlorobenzene	SW8270C	mg/kg	ND [0.0061]	ND [0.006]	ND [0.0067]	ND [0.0066]	ND [0.0071]	ND [0.0067]	ND [0.0071]	
1,2,4-Trichlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]	
Hexachlorobenzene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]	
Dimethyl phthalate	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]	
Diethyl phthalate	SW8270C	mg/kg	ND [0.022]	0.0032 [0.022]	ND [0.024]	0.00094 [0.024]	ND [0.026]	ND [0.024]	ND [0.026]	
Di-n-butyl phthalate	SW8270C	mg/kg	ND [0.056]	ND [0.055]	0.0084 [0.061]	0.0078 [0.06]	0.0082 [0.064]	0.0058 [0.061]	0.006 [0.065]	
Benzyl butyl phthalate	SW8270C	mg/kg	ND [0.022]	0.0066 [0.022]	0.0064 [0.024]	0.0051 [0.024]	0.0079 [0.026]	0.0051 [0.024]	ND [0.026]	
bis-(2-Ethylhexyl)phthalate	SW8270C	mg/kg	ND [0.17]	ND [0.16]	ND [0.18]	ND [0.18]	ND [0.19]	ND [0.18]	ND [0.19]	
Di-n-octyl phthalate	SW8270C	mg/kg	ND [0.056]	ND [0.055]	ND [0.061]	ND [0.06]	ND [0.064]	ND [0.061]	ND [0.065]	
Phenol	SW8270C	mg/kg	ND [0.011]	0.01 [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]	
2-Methylphenol (o-Cresol)	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]	
3-Methylphenol/4-Methylphenol Coelution	SW8270C	mg/kg	ND [0.022]	ND [0.022]	ND [0.024]	ND [0.024]	ND [0.026]	ND [0.024]	ND [0.026]	
2,4-Dimethylphenol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]	
Pentachlorophenol	SW8270C	mg/kg	ND [0.022]	ND [0.022]	ND [0.024]	ND [0.024]	ND [0.026]	ND [0.024]	ND [0.026]	
Benzyl alcohol	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]	
Benzoic acid	SW8270C	mg/kg	ND [0.28]	ND [0.27]	ND [0.3]	ND [0.3]	ND [0.32]	ND [0.3]	ND [0.32]	
Dibenzofuran	SW8270C	mg/kg	0.0033 [0.011]	ND [0.011]	0.0024 [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]	

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	AP-4601	AP-4601	AP-4629	AP-4629	AP-4604	AP-4604	AP-4604
	Location ID & Depth	TB-19 25.5	TB-19 35.5	TB-47 7.5'	TB-47 24.5	TB-22 31.5	TB-22 31.5	TB-22 34.5
	Sample ID	07AHSS01SD	07AHSS02SD	07AHSS03SD	07AHSS04SD	07AHSS05SD	07AHSS06SD	07AHSS07SD
	Collection Date	14-Sep-07	14-Sep-07	15-Sep-07	15-Sep-07	15-Sep-07	16-Sep-07	16-Sep-07
	SDG	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1	580-7449-1
ANALYTE	**Method**	**Units**					**Dupe of -05SD**	
Hexachloroethane	SW8270C	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.013]
Hexachlorobutadiene	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
n-Nitrosodiphenylamine	SW8270C	mg/kg	ND [0.0056]	ND [0.0055]	ND [0.0061]	ND [0.006]	ND [0.0064]	ND [0.0061]	ND [0.0065]
Trichloroethene (TCE)	SW8260B	mg/kg	ND [0.0048]	ND [0.0065]	ND [0.0095]	ND [0.0093]	ND [0.011]	ND [0.012]	ND [0.011]
Tetrachloroethene (PCE)	SW8260B	mg/kg	ND [0.0074]	ND [0.01]	ND [0.015]	ND [0.015]	ND [0.018]	ND [0.019]	ND [0.017]
Ethylbenzene	SW8260B	mg/kg	ND [0.012]	ND [0.016]	ND [0.024]	ND [0.023]	ND [0.028]	ND [0.03]	ND [0.027]
Xylenes, (total m,o & p)	SW8260B	mg/kg	ND [0.012]	ND [0.016]	ND [0.024]	ND [0.023]	ND [0.028]	ND [0.03]	ND [0.027]
Total DDT	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
Aldrin	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
alpha-Chlordane	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
Dieldrin	SW8081A	mg/kg	ND [0.0022]	ND [0.0022]	ND [0.0024]	ND [0.0024]	ND [0.0027]	ND [0.0025]	ND [0.0025]
Heptachlor	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
gamma-BHC (Lindane)	SW8081A	mg/kg	ND [0.0011]	ND [0.0011]	ND [0.0012]	ND [0.0012]	ND [0.0013]	ND [0.0013]	ND [0.0013]
Total PCBs	SW8082	mg/kg	ND [0.011]	ND [0.011]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.013]

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	AP-4610	AP-4610	AP-4613	AP-4613	AP-4613	AP-4619	AP-4619	
	Location ID & Depth	TB-28 10.2	TB-28 45.2	TB-31 43-45	TB-31 53-55	TB-31 45-47	TB-37 36-38	TB-37 45-47	TRIP BLANK
	Sample ID	07AHSS08SD	07AHSS09SD	07AHSS10SD	07AHSS11SD	07AHSS12SD	07AHSS13SD	07AHSS14SD	07AHSS1001SD
	Collection Date	17-Sep-07	17-Sep-07	19-Sep-07	19-Sep-07	19-Sep-07	21-Sep-07	21-Sep-07	20-Sep-07
	SDG	580-7449-1	580-7449-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7449-1
ANALYTE	Method	Units				Dupe of -10SD			
Arsenic	SW6020	mg/kg	7.5 [0.19]	12 [0.23]	7.7 [0.26]	8.5 [0.22]	8.8 [0.22]	6.4 [0.25]	6.3 [0.24]	
Barium	SW6020	mg/kg	17 [0.19]	99 [0.23]	75 [0.26]	77 [0.22]	81 [0.22]	58 [0.25]	61 [0.24]	
Cadmium	SW6020	mg/kg	ND [0.19]	ND [0.23]	0.015 [0.26]	0.017 [0.22]	ND [0.22]	0.018 [0.25]	0.0084 [0.24]	
Chromium	SW6020	mg/kg	30 [0.19]	65 [0.23]	27 [0.26]	32 [0.22]	37 [0.22]	23 [0.25]	22 [0.24]	
Lead	SW6020	mg/kg	3.9 [0.19]	10 [0.23]	4.4 [0.26]	5.4 [0.22]	5.3 [0.22]	3.2 [0.25]	3.4 [0.24]	
Selenium	SW6020	mg/kg	0.094 [0.47]	0.44 [0.57]	0.36 [0.64]	0.27 [0.54]	0.38 [0.55]	0.23 [0.61]	0.23 [0.6]	
Silver	SW6020	mg/kg	0.058 [0.19]	0.16 [0.23]	0.086 [0.26]	0.09 [0.22]	0.092 [0.22]	0.055 [0.25]	0.07 [0.24]	
Mercury	SW7471A	mg/kg	0.056 [0.018]	0.14 [0.021]	0.033 [0.025]	ND [0.027]	0.032 [0.024]	0.016 [0.022]	0.015 [0.02]	
4,4'-DDD	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
4,4'-DDE	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
4,4'-DDT	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Aldrin	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
alpha-BHC	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
alpha-Chlordane	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
beta-BHC	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
delta-BHC	SW8081A	mg/kg	0.0014 [0.0011]	ND [0.0013]	0.00065 [0.0013]	0.0009 [0.0013]	0.0013 [0.0014]	0.0003 [0.0014]	0.00092 [0.0013]	
Dieldrin	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Endosulfan I	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
Endosulfan II	SW8081A	mg/kg	0.00038 [0.0022] B,MH	0.00045 [0.0027] B	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Endosulfan sulfate	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Endrin	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Endrin aldehyde	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Endrin ketone	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
gamma-BHC (Lindane)	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
gamma-Chlordane	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
Heptachlor	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
Heptachlor epoxide	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
Methoxychlor	SW8081A	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
Toxaphene	SW8081A	mg/kg	ND [0.11]	ND [0.13]	ND [0.13]	ND [0.13]	ND [0.14]	ND [0.14]	ND [0.13]	
PCB-1016 (Aroclor 1016)	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
PCB-1221 (Aroclor 1221)	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
PCB-1232 (Aroclor 1232)	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
PCB-1242 (Aroclor 1242)	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
PCB-1248 (Aroclor 1248)	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
PCB-1254 (Aroclor 1254)	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
PCB-1260 (Aroclor 1260)	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	
1,1,1,2-Tetrachloroethane	SW8260B	mg/kg	ND [0.023] QL	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031] QL	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,1,1-Trichloroethane	SW8260B	mg/kg	ND [0.0091]	ND [0.011] QL	ND [0.01] QL	ND [0.011] QL	ND [0.012]	ND [0.011] QL	ND [0.01] QL	ND [0.016]
1,1,2,2-Tetrachloroethane	SW8260B	mg/kg	ND [0.0045]	ND [0.0056] QL	ND [0.0052] QL	ND [0.0057] QL	ND [0.0061]	ND [0.0056] QL	ND [0.005] QL	ND [0.008]
1,1,2-Trichloroethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,1-Dichloroethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,1-Dichloroethene	SW8260B	mg/kg	ND [0.0091]	ND [0.011] QL	ND [0.01] QL	ND [0.011] QL	ND [0.012]	ND [0.011] QL	ND [0.01] QL	ND [0.016]
1,1-Dichloropropene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	AP-4610	AP-4610	AP-4613	AP-4613	AP-4613	AP-4619	AP-4619	
	Location ID & Depth	TB-28 10.2	TB-28 45.2	TB-31 43-45	TB-31 53-55	TB-31 45-47	TB-37 36-38	TB-37 45-47	TRIP BLANK
	Sample ID	07AHSS08SD	07AHSS09SD	07AHSS10SD	07AHSS11SD	07AHSS12SD	07AHSS13SD	07AHSS14SD	07AHSS1001SD
	Collection Date	17-Sep-07	17-Sep-07	19-Sep-07	19-Sep-07	19-Sep-07	21-Sep-07	21-Sep-07	20-Sep-07
	SDG	580-7449-1	580-7449-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7449-1
ANALYTE	Method	Units				Dupe of -10SD			
1,2,3-Trichlorobenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2,3-Trichloropropane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2,4-Trichlorobenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2,4-Trimethylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2-Dibromo-3-chloropropane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2-Dibromoethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2-Dichlorobenzene	SW8260B	mg/kg	ND [0.023] ML	ND [0.028] QL	ND [0.026] QL,ML	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2-Dichloroethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2-Dichloropropane	SW8260B	mg/kg	ND [0.0045]	ND [0.0056] QL	ND [0.0052] QL	ND [0.0057] QL	ND [0.0061]	ND [0.0056] QL	ND [0.005] QL	ND [0.008]
1,3,5-Trimethylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,3-Dichlorobenzene	SW8260B	mg/kg	ND [0.023] ML	ND [0.028] QL	ND [0.026] QL,ML	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,3-Dichloropropane	SW8260B	mg/kg	ND [0.0091]	ND [0.011] QL	ND [0.01] QL	ND [0.011] QL	ND [0.012]	ND [0.011] QL	ND [0.01] QL	ND [0.016]
1,4-Dichlorobenzene	SW8260B	mg/kg	ND [0.023] ML	ND [0.028] QL	ND [0.026] QL,ML	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
2,2-Dichloropropane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
2-Butanone	SW8260B	mg/kg	ND [0.11]	ND [0.14] QL	ND [0.13] QL	ND [0.14] QL	ND [0.15]	ND [0.14] QL	ND [0.13] QL	ND [0.2]
2-Chlorotoluene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
2-Hexanone	SW8260B	mg/kg	ND [0.11]	ND [0.14] QL	ND [0.13] QL	ND [0.14] QL	ND [0.15]	ND [0.14] QL	ND [0.13] QL	ND [0.2]
4-Chlorotoluene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
4-Isopropyltoluene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
4-Methyl-2-pentanone	SW8260B	mg/kg	ND [0.11]	ND [0.14] QL	ND [0.13] QL	ND [0.14] QL	ND [0.15]	ND [0.14] QL	ND [0.13] QL	ND [0.2]
Acetone	SW8260B	mg/kg	0.018 [0.11] B	0.023 [0.14] QL,B	0.021 [0.13] QL	0.029 [0.14] QL	0.029 [0.15]	0.023 [0.14] QL	0.022 [0.13] QL	0.03 [0.2] B
Benzene	SW8260B	mg/kg	ND [0.0045]	ND [0.0056] QL	ND [0.0052] QL	ND [0.0057] QL	ND [0.0061]	ND [0.0056] QL	ND [0.005] QL	ND [0.008]
Bromobenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Bromochloromethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Bromodichloromethane	SW8260B	mg/kg	ND [0.023] QL	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031] QL	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Bromoform	SW8260B	mg/kg	ND [0.023] QL	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031] QL	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Bromomethane	SW8260B	mg/kg	ND [0.11]	ND [0.14] QL	ND [0.13] QL	ND [0.14] QL	ND [0.15]	ND [0.14] QL	ND [0.13] QL	ND [0.2]
Carbon disulfide	SW8260B	mg/kg	ND [0.023] QL	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031] QL	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Carbon tetrachloride	SW8260B	mg/kg	ND [0.0091]	ND [0.011] QL	ND [0.01] QL	ND [0.011] QL	ND [0.012]	ND [0.011] QL	ND [0.01] QL	ND [0.016]
Chlorobenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Chloroethane	SW8260B	mg/kg	ND [0.11] QL,ML	ND [0.14] QL	ND [0.13] QL	ND [0.14] QL	ND [0.15] QL	ND [0.14] QL	ND [0.13] QL	ND [0.2]
Chloroform	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Chloromethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
cis-1,2-Dichloroethene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
cis-1,3-Dichloropropene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Dibromochloromethane	SW8260B	mg/kg	ND [0.023] QL,ML	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031] QL	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Dibromomethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Dichlorodifluoromethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Ethylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	AP-4610	AP-4610	AP-4613	AP-4613	AP-4613	AP-4619	AP-4619	
	Location ID & Depth	TB-28 10.2	TB-28 45.2	TB-31 43-45	TB-31 53-55	TB-31 45-47	TB-37 36-38	TB-37 45-47	TRIP BLANK
	Sample ID	07AHSS08SD	07AHSS09SD	07AHSS10SD	07AHSS11SD	07AHSS12SD	07AHSS13SD	07AHSS14SD	07AHSS1001SD
	Collection Date	17-Sep-07	17-Sep-07	19-Sep-07	19-Sep-07	19-Sep-07	21-Sep-07	21-Sep-07	20-Sep-07
	SDG	580-7449-1	580-7449-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7449-1
ANALYTE	Method	Units				Dupe of -10SD			
Hexachlorobutadiene	SW8260B	mg/kg	ND [0.023] ML	ND [0.028] QL	ND [0.026] QL,ML	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Isopropylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Methylene chloride	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	0.014 [0.026] B,QL	0.019 [0.028] B,QL	0.013 [0.031] B	0.014 [0.028] B,QL	0.011 [0.025] B,QL	ND [0.04]
Naphthalene	SW8260B	mg/kg	ND [0.023]	0.0025 [0.028] QL	ND [0.026] QL	ND [0.028] QL	0.0023 [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
n-Butylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
n-Propylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
o-Xylene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
sec-Butylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Styrene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
tert-Butylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Tetrachloroethene (PCE)	SW8260B	mg/kg	ND [0.014]	ND [0.017] QL	ND [0.016] QL	ND [0.018] QL	ND [0.019]	ND [0.017] QL	ND [0.016] QL	ND [0.025]
Toluene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
trans-1,2-Dichloroethene	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
trans-1,3-Dichloropropene	SW8260B	mg/kg	ND [0.023] QL	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031] QL	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Trichloroethene (TCE)	SW8260B	mg/kg	ND [0.011] QL	ND [0.011] QL	ND [0.01] QL	ND [0.011] QL	ND [0.012]	ND [0.011] QL	ND [0.01] QL	ND [0.016]
Trichlorofluoromethane	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
Vinyl chloride	SW8260B	mg/kg	ND [0.0091]	ND [0.011] QL	ND [0.01] QL	ND [0.011] QL	ND [0.012]	ND [0.011] QL	ND [0.01] QL	ND [0.016]
Xylene, Isomers m & p	SW8260B	mg/kg	ND [0.023]	ND [0.028] QL	ND [0.026] QL	ND [0.028] QL	ND [0.031]	ND [0.028] QL	ND [0.025] QL	ND [0.04]
1,2,4-Trichlorobenzene	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
1,2-Dichlorobenzene	SW8270C	mg/kg	ND [0.0064] ML	ND [0.007]	ND [0.007] ML	ND [0.0075]	ND [0.0073]	ND [0.0071]	ND [0.0075]	
1,3-Dichlorobenzene	SW8270C	mg/kg	ND [0.0059] ML	ND [0.0063]	ND [0.0064] ML	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
1,4-Dichlorobenzene	SW8270C	mg/kg	ND [0.0059] ML	ND [0.0063]	ND [0.0064] ML	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
1-Methylnaphthalene	SW8270C	mg/kg	ND [0.0035]	0.0069 [0.0038]	0.0034 [0.0038]	0.0065 [0.0041]	0.0042 [0.004]	0.0011 [0.0039]	0.0032 [0.0041]	
2,4,5-Trichlorophenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2,4,6-Trichlorophenol	SW8270C	mg/kg	ND [0.018]	ND [0.019]	ND [0.019]	ND [0.021]	ND [0.02]	ND [0.019]	ND [0.02]	
2,4-Dichlorophenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2,4-Dimethylphenol	SW8270C	mg/kg	ND [0.012] MN	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2,4-Dinitrophenol	SW8270C	mg/kg	ND [0.12] ML	ND [0.13]	ND [0.13] ML	ND [0.14]	ND [0.13]	ND [0.13]	ND [0.14]	
2,4-Dinitrotoluene	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2,6-Dinitrotoluene	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2-Chloronaphthalene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
2-Chlorophenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2-Methyl-4,6-dinitrophenol	SW8270C	mg/kg	ND [0.12]	ND [0.13]	ND [0.13]	ND [0.14]	ND [0.13]	ND [0.13]	ND [0.14]	
2-Methylnaphthalene	SW8270C	mg/kg	0.00057 [0.0023]	0.01 [0.0025]	0.0055 [0.0025]	0.011 [0.0027]	0.0068 [0.0027]	0.0024 [0.0026]	0.0058 [0.0027]	
2-Methylphenol (o-Cresol)	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2-Nitroaniline	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2-Nitrophenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
3,3'-Dichlorobenzidine	SW8270C	mg/kg	ND [0.023]	ND [0.025]	ND [0.025]	ND [0.027]	ND [0.027]	ND [0.026]	ND [0.027]	
3-Methylphenol/4-Methylphenol Coelution	SW8270C	mg/kg	ND [0.023]	ND [0.025]	ND [0.025]	ND [0.027]	ND [0.027]	ND [0.026]	ND [0.027]	
3-Nitroaniline	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
4-Bromophenyl phenyl ether	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
4-Chloro-3-methylphenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
4-Chloroaniline	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
4-Chlorophenyl phenyl ether	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	AP-4610	AP-4610	AP-4613	AP-4613	AP-4613	AP-4619	AP-4619	
	Location ID & Depth	TB-28 10.2	TB-28 45.2	TB-31 43-45	TB-31 53-55	TB-31 45-47	TB-37 36-38	TB-37 45-47	TRIP BLANK
	Sample ID	07AHSS08SD	07AHSS09SD	07AHSS10SD	07AHSS11SD	07AHSS12SD	07AHSS13SD	07AHSS14SD	07AHSS1001SD
	Collection Date	17-Sep-07	17-Sep-07	19-Sep-07	19-Sep-07	19-Sep-07	21-Sep-07	21-Sep-07	20-Sep-07
	SDG	580-7449-1	580-7449-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7449-1
ANALYTE	Method	Units				Dupe of -10SD			
4-Nitroaniline	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
4-Nitrophenol	SW8270C	mg/kg	ND [0.12]	ND [0.13]	ND [0.13]	ND [0.14]	ND [0.13]	ND [0.13]	ND [0.14]	
Acenaphthene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Acenaphthylene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Anthracene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Benzo(a)anthracene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Benzo(a)pyrene	SW8270C	mg/kg	ND [0.0035]	ND [0.0038]	ND [0.0038]	ND [0.0041]	ND [0.004]	ND [0.0039]	0.0029 [0.0041]	
Benzo(b)fluoranthene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Benzo(g,h,i)perylene	SW8270C	mg/kg	ND [0.0029]	ND [0.0032]	ND [0.0032]	ND [0.0034]	ND [0.0033]	ND [0.0032]	ND [0.0034]	
Benzo(k)fluoranthene	SW8270C	mg/kg	ND [0.0029]	ND [0.0032]	ND [0.0032]	ND [0.0034]	ND [0.0033]	ND [0.0032]	ND [0.0034]	
Benzoic acid	SW8270C	mg/kg	ND [0.29]	ND [0.32]	ND [0.32]	ND [0.34]	ND [0.33]	ND [0.32]	ND [0.34]	
Benzyl alcohol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Benzyl butyl phthalate	SW8270C	mg/kg	0.0044 [0.023] B	0.0081 [0.025] B	ND [0.025]	ND [0.027]	ND [0.027]	ND [0.026]	ND [0.027]	
bis-(2-Chloroethoxy)methane	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
bis-(2-Chloroethyl)ether	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
bis(2-Chloroisopropyl)ether	SW8270C	mg/kg	ND [0.029]	ND [0.032]	ND [0.032]	ND [0.034]	ND [0.033]	ND [0.032]	ND [0.034]	
bis-(2-Ethylhexyl)phthalate	SW8270C	mg/kg	ND [0.18]	ND [0.19]	ND [0.19]	0.051 [0.21]	0.064 [0.2]	ND [0.19]	0.039 [0.2]	
Carbazole	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Chrysene	SW8270C	mg/kg	ND [0.0029]	ND [0.0032]	ND [0.0032]	ND [0.0034]	ND [0.0033]	ND [0.0032]	ND [0.0034]	
Dibenzo(a,h)anthracene	SW8270C	mg/kg	ND [0.0047]	ND [0.0051]	ND [0.0051]	ND [0.0055]	ND [0.0053]	ND [0.0052]	ND [0.0054]	
Dibenzofuran	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Diethyl phthalate	SW8270C	mg/kg	0.0011 [0.023] B	0.00099 [0.025] B	0.0056 [0.025] B	0.0068 [0.027] B	0.0072 [0.027] B	0.006 [0.026] B	0.0074 [0.027] B	
Dimethyl phthalate	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Di-n-butyl phthalate	SW8270C	mg/kg	0.0068 [0.059] B	0.0073 [0.063] B	0.0036 [0.064] B,QL	0.0048 [0.069] B,QL	0.0056 [0.067] B,QL	0.0039 [0.065] B,QL	0.0051 [0.068] B,QL	
Di-n-octyl phthalate	SW8270C	mg/kg	ND [0.059]	ND [0.063]	0.0071 [0.064]	ND [0.069]	ND [0.067]	0.01 [0.065]	ND [0.068]	
Fluoranthene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	0.00054 [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Fluorene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	0.0011 [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Hexachlorobenzene	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
Hexachlorobutadiene	SW8270C	mg/kg	ND [0.0059] ML	ND [0.0063]	ND [0.0064] ML	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
Hexachlorocyclopentadiene	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Hexachloroethane	SW8270C	mg/kg	ND [0.012] ML	ND [0.013]	ND [0.013] ML	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Indeno(1,2,3-cd)pyrene	SW8270C	mg/kg	ND [0.0047]	ND [0.0051]	ND [0.0051]	ND [0.0055]	ND [0.0053]	ND [0.0052]	ND [0.0054]	
Isophorone	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Naphthalene	SW8270C	mg/kg	ND [0.0023]	0.0063 [0.0025]	0.0032 [0.0025]	0.0049 [0.0027]	0.0034 [0.0027]	ND [0.0026]	0.0033 [0.0027]	
Nitrobenzene	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
n-Nitrosodi-n-propylamine	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
n-Nitrosodiphenylamine	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
Pentachlorophenol	SW8270C	mg/kg	ND [0.023]	ND [0.025]	ND [0.025]	ND [0.027]	ND [0.027]	ND [0.026]	ND [0.027]	
Phenanthrene	SW8270C	mg/kg	ND [0.0023]	0.0032 [0.0025]	0.0015 [0.0025]	0.0039 [0.0027]	0.0031 [0.0027]	0.001 [0.0026]	0.0021 [0.0027]	
Phenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Pyrene	SW8270C	mg/kg	ND [0.0023]	0.0005 [0.0025]	ND [0.0025]	0.00064 [0.0027]	0.00053 [0.0027]	ND [0.0026]	0.00038 [0.0027]	
Total Organic Carbon (TOC)	SW9060	mg/kg	2600 [1000]	6800 [1000]	4100 [1000]	3280 [1000]	3300 [1000]	2000 [1000]	4280 [1000]	
Arsenic	SW6020	mg/kg	7.5 [0.19]	12 [0.23]	7.7 [0.26]	8.5 [0.22]	8.8 [0.22]	6.4 [0.25]	6.3 [0.24]	

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
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Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	AP-4610	AP-4610	AP-4613	AP-4613	AP-4613	AP-4619	AP-4619	
	Location ID & Depth	TB-28 10.2	TB-28 45.2	TB-31 43-45	TB-31 53-55	TB-31 45-47	TB-37 36-38	TB-37 45-47	TRIP BLANK
	Sample ID	07AHSS08SD	07AHSS09SD	07AHSS10SD	07AHSS11SD	07AHSS12SD	07AHSS13SD	07AHSS14SD	07AHSS1001SD
	Collection Date	17-Sep-07	17-Sep-07	19-Sep-07	19-Sep-07	19-Sep-07	21-Sep-07	21-Sep-07	20-Sep-07
	SDG	580-7449-1	580-7449-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7449-1
ANALYTE	**Method**	**Units**				**Dupe of -10SD**			
Cadmium	SW6020	mg/kg	ND [0.19]	ND [0.23]	0.015 [0.26]	0.017 [0.22]	ND [0.22]	0.018 [0.25]	0.0084 [0.24]	
Chromium	SW6020	mg/kg	30 [0.19]	65 [0.23]	27 [0.26]	32 [0.22]	37 [0.22]	23 [0.25]	22 [0.24]	
Lead	SW6020	mg/kg	3.9 [0.19]	10 [0.23]	4.4 [0.26]	5.4 [0.22]	5.3 [0.22]	3.2 [0.25]	3.4 [0.24]	
Mercury	SW7471A	mg/kg	0.056 [0.018]	0.14 [0.021]	0.033 [0.025]	ND [0.027]	0.032 [0.024]	0.016 [0.022]	0.015 [0.02]	
Silver	SW6020	mg/kg	0.058 [0.19]	0.16 [0.23]	0.086 [0.26]	0.09 [0.22]	0.092 [0.22]	0.055 [0.25]	0.07 [0.24]	
Total LPAH										
Naphthalene	SW8260B	mg/kg	ND [0.023]	0.0025 [0.028]	ND [0.026]	ND [0.028]	0.0023 [0.031]	ND [0.028]	ND [0.025]	ND [0.04]
Acenaphthene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Acenaphthylene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Fluorene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	0.0011 [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Phenanthrene	SW8270C	mg/kg	ND [0.0023]	0.0032 [0.0025]	0.0015 [0.0025]	0.0039 [0.0027]	0.0031 [0.0027]	0.001 [0.0026]	0.0021 [0.0027]	
Anthracene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
2-Methylnaphthalene	SW8270C	mg/kg	0.00057 [0.0023]	0.01 [0.0025]	0.0055 [0.0025]	0.011 [0.0027]	0.0068 [0.0027]	0.0024 [0.0026]	0.0058 [0.0027]	
Total HPAH										
Fluoranthene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	0.00054 [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Pyrene	SW8270C	mg/kg	ND [0.0023]	0.0005 [0.0025]	ND [0.0025]	0.00064 [0.0027]	0.00053 [0.0027]	ND [0.0026]	0.00038 [0.0027]	
Benzo(a)anthracene	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Chrysene	SW8270C	mg/kg	ND [0.0029]	ND [0.0032]	ND [0.0032]	ND [0.0034]	ND [0.0033]	ND [0.0032]	ND [0.0034]	
Benzofluoranthenes (total b + k)	SW8270C	mg/kg	ND [0.0023]	ND [0.0025]	ND [0.0025]	ND [0.0027]	ND [0.0027]	ND [0.0026]	ND [0.0027]	
Benzo(a)pyrene	SW8270C	mg/kg	ND [0.0035]	ND [0.0038]	ND [0.0038]	ND [0.0041]	ND [0.004]	ND [0.0039]	0.0029 [0.0041]	
Indeno(1,2,3-cd)pyrene	SW8270C	mg/kg	ND [0.0047]	ND [0.0051]	ND [0.0051]	ND [0.0055]	ND [0.0053]	ND [0.0052]	ND [0.0054]	
Dibenzo(a,h)anthracene	SW8270C	mg/kg	ND [0.0047]	ND [0.0051]	ND [0.0051]	ND [0.0055]	ND [0.0053]	ND [0.0052]	ND [0.0054]	
Benzo(g,h,i)perylene	SW8270C	mg/kg	ND [0.0029]	ND [0.0032]	ND [0.0032]	ND [0.0034]	ND [0.0033]	ND [0.0032]	ND [0.0034]	
1,3-Dichlorobenzene	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
1,4-Dichlorobenzene	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
1,2-Dichlorobenzene	SW8270C	mg/kg	ND [0.0064]	ND [0.007]	ND [0.007]	ND [0.0075]	ND [0.0073]	ND [0.0071]	ND [0.0075]	
1,2,4-Trichlorobenzene	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
Hexachlorobenzene	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
Dimethyl phthalate	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Diethyl phthalate	SW8270C	mg/kg	0.0011 [0.023]	0.00099 [0.025]	0.0056 [0.025]	0.0068 [0.027]	0.0072 [0.027]	0.006 [0.026]	0.0074 [0.027]	
Di-n-butyl phthalate	SW8270C	mg/kg	0.0068 [0.059]	0.0073 [0.063]	0.0036 [0.064]	0.0048 [0.069]	0.0056 [0.067]	0.0039 [0.065]	0.0051 [0.068]	
Benzyl butyl phthalate	SW8270C	mg/kg	0.0044 [0.023]	0.0081 [0.025]	ND [0.025]	ND [0.027]	ND [0.027]	ND [0.026]	ND [0.027]	
bis-(2-Ethylhexyl)phthalate	SW8270C	mg/kg	ND [0.18]	ND [0.19]	ND [0.19]	0.051 [0.21]	0.064 [0.2]	ND [0.19]	0.039 [0.2]	
Di-n-octyl phthalate	SW8270C	mg/kg	ND [0.059]	ND [0.063]	0.0071 [0.064]	ND [0.069]	ND [0.067]	0.01 [0.065]	ND [0.068]	
Phenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
2-Methylphenol (o-Cresol)	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
3-Methylphenol/4-Methylphenol Coelution	SW8270C	mg/kg	ND [0.023]	ND [0.025]	ND [0.025]	ND [0.027]	ND [0.027]	ND [0.026]	ND [0.027]	
2,4-Dimethylphenol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Pentachlorophenol	SW8270C	mg/kg	ND [0.023]	ND [0.025]	ND [0.025]	ND [0.027]	ND [0.027]	ND [0.026]	ND [0.027]	
Benzyl alcohol	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Benzoic acid	SW8270C	mg/kg	ND [0.29]	ND [0.32]	ND [0.32]	ND [0.34]	ND [0.33]	ND [0.32]	ND [0.34]	
Dibenzofuran	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	AP-4610	AP-4610	AP-4613	AP-4613	AP-4613	AP-4619	AP-4619	
	Location ID & Depth	TB-28 10.2	TB-28 45.2	TB-31 43-45	TB-31 53-55	TB-31 45-47	TB-37 36-38	TB-37 45-47	TRIP BLANK
	Sample ID	07AHSS08SD	07AHSS09SD	07AHSS10SD	07AHSS11SD	07AHSS12SD	07AHSS13SD	07AHSS14SD	07AHSS1001SD
	Collection Date	17-Sep-07	17-Sep-07	19-Sep-07	19-Sep-07	19-Sep-07	21-Sep-07	21-Sep-07	20-Sep-07
	SDG	580-7449-1	580-7449-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7502-1	580-7449-1
ANALYTE	**Method**	**Units**				Dupe of -10SD			
Hexachloroethane	SW8270C	mg/kg	ND [0.012]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.013]	ND [0.013]	ND [0.014]	
Hexachlorobutadiene	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
n-Nitrosodiphenylamine	SW8270C	mg/kg	ND [0.0059]	ND [0.0063]	ND [0.0064]	ND [0.0069]	ND [0.0067]	ND [0.0065]	ND [0.0068]	
Trichloroethene (TCE)	SW8260B	mg/kg	ND [0.0091]	ND [0.011]	ND [0.01]	ND [0.011]	ND [0.012]	ND [0.011]	ND [0.01]	ND [0.016]
Tetrachloroethene (PCE)	SW8260B	mg/kg	ND [0.014]	ND [0.017]	ND [0.016]	ND [0.018]	ND [0.019]	ND [0.017]	ND [0.016]	ND [0.025]
Ethylbenzene	SW8260B	mg/kg	ND [0.023]	ND [0.028]	ND [0.026]	ND [0.028]	ND [0.031]	ND [0.028]	ND [0.025]	ND [0.04]
Xylenes, (total m,o & p)	SW8260B	mg/kg	ND [0.023]	ND [0.028]	ND [0.026]	ND [0.028]	ND [0.031]	ND [0.028]	ND [0.025]	ND [0.04]
Total DDT	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Aldrin	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
alpha-Chlordane	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
Dieldrin	SW8081A	mg/kg	ND [0.0022]	ND [0.0027]	ND [0.0026]	ND [0.0026]	ND [0.0028]	ND [0.0027]	ND [0.0026]	
Heptachlor	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
gamma-BHC (Lindane)	SW8081A	mg/kg	ND [0.0011]	ND [0.0013]	ND [0.0013]	ND [0.0013]	ND [0.0014]	ND [0.0014]	ND [0.0013]	
Total PCBs	SW8082	mg/kg	ND [0.011]	ND [0.013]	ND [0.013]	ND [0.013]	ND [0.014]	ND [0.014]	ND [0.013]	

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[ ] - Laboratory PQL.
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Anchorage Harbor Expansion

		AP Number	
		Location ID & Depth	TRIP BLANK
		Sample ID	07AHSSTB2
		Collection Date	19-Sep-07
		SDG	580-7502-1
ANALYTE	Method	Units	
Arsenic	SW6020	mg/kg	
Barium	SW6020	mg/kg	
Cadmium	SW6020	mg/kg	
Chromium	SW6020	mg/kg	
Lead	SW6020	mg/kg	
Selenium	SW6020	mg/kg	
Silver	SW6020	mg/kg	
Mercury	SW7471A	mg/kg	
4,4'-DDD	SW8081A	mg/kg	
4,4'-DDE	SW8081A	mg/kg	
4,4'-DDT	SW8081A	mg/kg	
Aldrin	SW8081A	mg/kg	
alpha-BHC	SW8081A	mg/kg	
alpha-Chlordane	SW8081A	mg/kg	
beta-BHC	SW8081A	mg/kg	
delta-BHC	SW8081A	mg/kg	
Dieldrin	SW8081A	mg/kg	
Endosulfan I	SW8081A	mg/kg	
Endosulfan II	SW8081A	mg/kg	
Endosulfan sulfate	SW8081A	mg/kg	
Endrin	SW8081A	mg/kg	
Endrin aldehyde	SW8081A	mg/kg	
Endrin ketone	SW8081A	mg/kg	
gamma-BHC (Lindane)	SW8081A	mg/kg	
gamma-Chlordane	SW8081A	mg/kg	
Heptachlor	SW8081A	mg/kg	
Heptachlor epoxide	SW8081A	mg/kg	
Methoxychlor	SW8081A	mg/kg	
Toxaphene	SW8081A	mg/kg	
PCB-1016 (Aroclor 1016)	SW8082	mg/kg	
PCB-1221 (Aroclor 1221)	SW8082	mg/kg	
PCB-1232 (Aroclor 1232)	SW8082	mg/kg	
PCB-1242 (Aroclor 1242)	SW8082	mg/kg	
PCB-1248 (Aroclor 1248)	SW8082	mg/kg	
PCB-1254 (Aroclor 1254)	SW8082	mg/kg	
PCB-1260 (Aroclor 1260)	SW8082	mg/kg	
1,1,1,2-Tetrachloroethane	SW8260B	mg/kg	ND [0.04]
1,1,1-Trichloroethane	SW8260B	mg/kg	ND [0.016]
1,1,2,2-Tetrachloroethane	SW8260B	mg/kg	ND [0.008]
1,1,2-Trichloroethane	SW8260B	mg/kg	ND [0.04]
1,1-Dichloroethane	SW8260B	mg/kg	ND [0.04]
1,1-Dichloroethene	SW8260B	mg/kg	ND [0.016]
1,1-Dichloropropene	SW8260B	mg/kg	ND [0.04]

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

		AP Number	
		Location ID & Depth	TRIP BLANK
		Sample ID	07AHSSTB2
		Collection Date	19-Sep-07
		SDG	580-7502-1
ANALYTE	Method	Units	
1,2,3-Trichlorobenzene	SW8260B	mg/kg	ND [0.04]
1,2,3-Trichloropropane	SW8260B	mg/kg	ND [0.04]
1,2,4-Trichlorobenzene	SW8260B	mg/kg	ND [0.04]
1,2,4-Trimethylbenzene	SW8260B	mg/kg	ND [0.04]
1,2-Dibromo-3-chloropropane	SW8260B	mg/kg	ND [0.04]
1,2-Dibromoethane	SW8260B	mg/kg	ND [0.04]
1,2-Dichlorobenzene	SW8260B	mg/kg	ND [0.04]
1,2-Dichloroethane	SW8260B	mg/kg	ND [0.04]
1,2-Dichloropropane	SW8260B	mg/kg	ND [0.008]
1,3,5-Trimethylbenzene	SW8260B	mg/kg	ND [0.04]
1,3-Dichlorobenzene	SW8260B	mg/kg	ND [0.04]
1,3-Dichloropropane	SW8260B	mg/kg	ND [0.016]
1,4-Dichlorobenzene	SW8260B	mg/kg	ND [0.04]
2,2-Dichloropropane	SW8260B	mg/kg	ND [0.04]
2-Butanone	SW8260B	mg/kg	ND [0.2]
2-Chlorotoluene	SW8260B	mg/kg	ND [0.04]
2-Hexanone	SW8260B	mg/kg	ND [0.2]
4-Chlorotoluene	SW8260B	mg/kg	ND [0.04]
4-Isopropyltoluene	SW8260B	mg/kg	ND [0.04]
4-Methyl-2-pentanone	SW8260B	mg/kg	ND [0.2]
Acetone	SW8260B	mg/kg	0.035 [0.2]
Benzene	SW8260B	mg/kg	ND [0.008]
Bromobenzene	SW8260B	mg/kg	ND [0.04]
Bromochloromethane	SW8260B	mg/kg	ND [0.04]
Bromodichloromethane	SW8260B	mg/kg	ND [0.04]
Bromoform	SW8260B	mg/kg	ND [0.04]
Bromomethane	SW8260B	mg/kg	ND [0.2]
Carbon disulfide	SW8260B	mg/kg	ND [0.04]
Carbon tetrachloride	SW8260B	mg/kg	ND [0.016]
Chlorobenzene	SW8260B	mg/kg	ND [0.04]
Chloroethane	SW8260B	mg/kg	ND [0.2]
Chloroform	SW8260B	mg/kg	ND [0.04]
Chloromethane	SW8260B	mg/kg	ND [0.04]
cis-1,2-Dichloroethene	SW8260B	mg/kg	ND [0.04]
cis-1,3-Dichloropropene	SW8260B	mg/kg	ND [0.04]
Dibromochloromethane	SW8260B	mg/kg	ND [0.04]
Dibromomethane	SW8260B	mg/kg	ND [0.04]
Dichlorodifluoromethane	SW8260B	mg/kg	ND [0.04]
Ethylbenzene	SW8260B	mg/kg	ND [0.04]

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

			AP Number	
			Location ID & Depth	TRIP BLANK
			Sample ID	07AHSSTB2
			Collection Date	19-Sep-07
			SDG	580-7502-1
ANALYTE	Method	Units		
Hexachlorobutadiene	SW8260B	mg/kg	ND [0.04]	
Isopropylbenzene	SW8260B	mg/kg	ND [0.04]	
Methylene chloride	SW8260B	mg/kg	0.021 [0.04] B	
Naphthalene	SW8260B	mg/kg	ND [0.04]	
n-Butylbenzene	SW8260B	mg/kg	ND [0.04]	
n-Propylbenzene	SW8260B	mg/kg	ND [0.04]	
o-Xylene	SW8260B	mg/kg	ND [0.04]	
sec-Butylbenzene	SW8260B	mg/kg	ND [0.04]	
Styrene	SW8260B	mg/kg	ND [0.04]	
tert-Butylbenzene	SW8260B	mg/kg	ND [0.04]	
Tetrachloroethene (PCE)	SW8260B	mg/kg	ND [0.025]	
Toluene	SW8260B	mg/kg	ND [0.04]	
trans-1,2-Dichloroethene	SW8260B	mg/kg	ND [0.04]	
trans-1,3-Dichloropropene	SW8260B	mg/kg	ND [0.04]	
Trichloroethene (TCE)	SW8260B	mg/kg	ND [0.016]	
Trichlorofluoromethane	SW8260B	mg/kg	ND [0.04]	
Vinyl chloride	SW8260B	mg/kg	ND [0.016]	
Xylene, Isomers m & p	SW8260B	mg/kg	ND [0.04]	
1,2,4-Trichlorobenzene	SW8270C	mg/kg		
1,2-Dichlorobenzene	SW8270C	mg/kg		
1,3-Dichlorobenzene	SW8270C	mg/kg		
1,4-Dichlorobenzene	SW8270C	mg/kg		
1-Methylnaphthalene	SW8270C	mg/kg		
2,4,5-Trichlorophenol	SW8270C	mg/kg		
2,4,6-Trichlorophenol	SW8270C	mg/kg		
2,4-Dichlorophenol	SW8270C	mg/kg		
2,4-Dimethylphenol	SW8270C	mg/kg		
2,4-Dinitrophenol	SW8270C	mg/kg		
2,4-Dinitrotoluene	SW8270C	mg/kg		
2,6-Dinitrotoluene	SW8270C	mg/kg		
2-Chloronaphthalene	SW8270C	mg/kg		
2-Chlorophenol	SW8270C	mg/kg		
2-Methyl-4,6-dinitrophenol	SW8270C	mg/kg		
2-Methylnaphthalene	SW8270C	mg/kg		
2-Methylphenol (o-Cresol)	SW8270C	mg/kg		
2-Nitroaniline	SW8270C	mg/kg		
2-Nitrophenol	SW8270C	mg/kg		
3,3'-Dichlorobenzidine	SW8270C	mg/kg		
3-Methylphenol/4-Methylphenol Coelution	SW8270C	mg/kg		
3-Nitroaniline	SW8270C	mg/kg		
4-Bromophenyl phenyl ether	SW8270C	mg/kg		
4-Chloro-3-methylphenol	SW8270C	mg/kg		
4-Chloroaniline	SW8270C	mg/kg		
4-Chlorophenyl phenyl ether	SW8270C	mg/kg		

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Anchorage Harbor Expansion

	AP Number		
	Location ID & Depth		TRIP BLANK
	Sample ID		07AHSSTB2
	Collection Date		19-Sep-07
	SDG		580-7502-1
ANALYTE	**Method**	**Units**	
4-Nitroaniline	SW8270C	mg/kg	
4-Nitrophenol	SW8270C	mg/kg	
Acenaphthene	SW8270C	mg/kg	
Acenaphthylene	SW8270C	mg/kg	
Anthracene	SW8270C	mg/kg	
Benzo(a)anthracene	SW8270C	mg/kg	
Benzo(a)pyrene	SW8270C	mg/kg	
Benzo(b)fluoranthene	SW8270C	mg/kg	
Benzo(g,h,i)perylene	SW8270C	mg/kg	
Benzo(k)fluoranthene	SW8270C	mg/kg	
Benzoic acid	SW8270C	mg/kg	
Benzyl alcohol	SW8270C	mg/kg	
Benzyl butyl phthalate	SW8270C	mg/kg	
bis-(2-Chloroethoxy)methane	SW8270C	mg/kg	
bis-(2-Chloroethyl)ether	SW8270C	mg/kg	
bis(2-Chloroisopropyl)ether	SW8270C	mg/kg	
bis-(2-Ethylhexyl)phthalate	SW8270C	mg/kg	
Carbazole	SW8270C	mg/kg	
Chrysene	SW8270C	mg/kg	
Dibenzo(a,h)anthracene	SW8270C	mg/kg	
Dibenzofuran	SW8270C	mg/kg	
Diethyl phthalate	SW8270C	mg/kg	
Dimethyl phthalate	SW8270C	mg/kg	
Di-n-butyl phthalate	SW8270C	mg/kg	
Di-n-octyl phthalate	SW8270C	mg/kg	
Fluoranthene	SW8270C	mg/kg	
Fluorene	SW8270C	mg/kg	
Hexachlorobenzene	SW8270C	mg/kg	
Hexachlorobutadiene	SW8270C	mg/kg	
Hexachlorocyclopentadiene	SW8270C	mg/kg	
Hexachloroethane	SW8270C	mg/kg	
Indeno(1,2,3-cd)pyrene	SW8270C	mg/kg	
Isophorone	SW8270C	mg/kg	
Naphthalene	SW8270C	mg/kg	
Nitrobenzene	SW8270C	mg/kg	
n-Nitrosodi-n-propylamine	SW8270C	mg/kg	
n-Nitrosodiphenylamine	SW8270C	mg/kg	
Pentachlorophenol	SW8270C	mg/kg	
Phenanthrene	SW8270C	mg/kg	
Phenol	SW8270C	mg/kg	
Pyrene	SW8270C	mg/kg	
Total Organic Carbon (TOC)	SW9060	mg/kg	
Arsenic	SW6020	mg/kg	

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

	AP Number	
	Location ID & Depth	TRIP BLANK
	Sample ID	07AHSSTB2
	Collection Date	19-Sep-07
	SDG	580-7502-1
ANALYTE	**Method**	**Units**	
Cadmium	SW6020	mg/kg	
Chromium	SW6020	mg/kg	
Lead	SW6020	mg/kg	
Mercury	SW7471A	mg/kg	
Silver	SW6020	mg/kg	
Total LPAH			
Naphthalene	SW8260B	mg/kg	ND [0.04]
Acenaphthene	SW8270C	mg/kg	
Acenaphthylene	SW8270C	mg/kg	
Fluorene	SW8270C	mg/kg	
Phenanthrene	SW8270C	mg/kg	
Anthracene	SW8270C	mg/kg	
2-Methylnaphthalene	SW8270C	mg/kg	
Total HPAH			
Fluoranthene	SW8270C	mg/kg	
Pyrene	SW8270C	mg/kg	
Benzo(a)anthracene	SW8270C	mg/kg	
Chrysene	SW8270C	mg/kg	
Benzofluoranthenes (total b + k)	SW8270C	mg/kg	
Benzo(a)pyrene	SW8270C	mg/kg	
Indeno(1,2,3-cd)pyrene	SW8270C	mg/kg	
Dibenzo(a,h)anthracene	SW8270C	mg/kg	
Benzo(g,h,i)perylene	SW8270C	mg/kg	
1,3-Dichlorobenzene	SW8270C	mg/kg	
1,4-Dichlorobenzene	SW8270C	mg/kg	
1,2-Dichlorobenzene	SW8270C	mg/kg	
1,2,4-Trichlorobenzene	SW8270C	mg/kg	
Hexachlorobenzene	SW8270C	mg/kg	
Dimethyl phthalate	SW8270C	mg/kg	
Diethyl phthalate	SW8270C	mg/kg	
Di-n-butyl phthalate	SW8270C	mg/kg	
Benzyl butyl phthalate	SW8270C	mg/kg	
bis-(2-Ethylhexyl)phthalate	SW8270C	mg/kg	
Di-n-octyl phthalate	SW8270C	mg/kg	
Phenol	SW8270C	mg/kg	
2-Methylphenol (o-Cresol)	SW8270C	mg/kg	
3-Methylphenol/4-Methylphenol Coelution	SW8270C	mg/kg	
2,4-Dimethylphenol	SW8270C	mg/kg	
Pentachlorophenol	SW8270C	mg/kg	
Benzyl alcohol	SW8270C	mg/kg	
Benzoic acid	SW8270C	mg/kg	
Dibenzofuran	SW8270C	mg/kg	

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Anchorage Harbor Expansion

		AP Number	
		Location ID & Depth	TRIP BLANK
		Sample ID	07AHSSTB2
		Collection Date	19-Sep-07
		SDG	580-7502-1
ANALYTE	Method	Units	
Hexachloroethane	SW8270C	mg/kg	
Hexachlorobutadiene	SW8270C	mg/kg	
n-Nitrosodiphenylamine	SW8270C	mg/kg	
Trichloroethene (TCE)	SW8260B	mg/kg	ND [0.016]
Tetrachloroethene (PCE)	SW8260B	mg/kg	ND [0.025]
Ethylbenzene	SW8260B	mg/kg	ND [0.04]
Xylenes, (total m,o & p)	SW8260B	mg/kg	ND [0.04]
Total DDT	SW8081A	mg/kg	
Aldrin	SW8081A	mg/kg	
alpha-Chlordane	SW8081A	mg/kg	
Dieldrin	SW8081A	mg/kg	
Heptachlor	SW8081A	mg/kg	
gamma-BHC (Lindane)	SW8081A	mg/kg	
Total PCBs	SW8082	mg/kg	

ADEC - most stringent of 18 AAC 75 Method 2 Table B1 and B2 Cleanup Level for Under 40 Inches
[ ] - Laboratory PQL.
Solid shade indicateds ADEC exceedance
Data Flags are defined at the end of the table

Data Flag Explanations

ND - Analyte is not detected; [ ] - Laboratory Practical Quantification Limit

Qualifier	Definition
J	Analyte result is considered an estimated value because the level is below the laboratory PQL but above the MDL
MH, ML	Analyte result is considered an estimated value biased high,low due to matrix effects
B	Analyte result is considered a high estimated value due to contamination present in the method blank.
QH, QL	Analyte result is considered an estimated value biased high, low due to a quality control failure
R	Analyte result is rejected - result is not usable.

Appendix D

ADEC Data Quality Checklists

Laboratory Data Review Checklist

Completed by:	Mark Harvison
Title:	Chemist
Date:	February 29, 2008
CS Report Name:	Anchorage Harbor Expansion
Report Date:	October 18, 2007
Consultant Firm:	U.S. Army Corps of Engineers
Laboratory Name:	TestAmerica-Tacoma
Laboratory Report Number:	580-7449
ADEC File Number:	
ADEC RecKey Number:	

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ☒ Yes ☐ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☒ Yes ☐ No Comments:

   Samples for Total Organic Carbon by EPA 9060 were subcontracted to TestAmerica-Sacramento.

2. Chain of Custody (COC)

   a. COC information completed, signed, and dated (including released/received by)?

   ☒ Yes ☐ No Comments:

b. Correct analyses requested?

☑ Yes ☐ No Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☐ Yes ☑ No Comments:

The cooler temperature was 0.5C and the temperature blank was 1.4C at the time of receipt by the laboratory.

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☐ Yes ☑ No Comments:

Methanol did not completely cover the sample in 07AHSS01SD, 02SD, 04SD, 06SD, 07SD, and 09SD.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☐ Yes ☑ No Comments:

e. Data quality or usability affected? Explain.

Comments:

The low temperature below the expected range would have had no impact on the samples or any potential contaminants. Data usability is not impacted.
Since Methanol did not completely cover the samples in 07AHSS01SD, 02SD, 04SD, 06SD, 07SD, and 09SD, the preservation was not complete which may have impacted the data quality. The VOC data for these samples are qualified biased low and flagged "QL".

4. Case Narrative

a. Present and understandable?

☑ Yes ☐ No Comments:

b. Discrepancies, errors or QC failures identified by the lab?

☒ Yes ☐ No Comments:

c. Were all corrective actions documented?

☒ Yes ☐ No Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative only describes the qualifications made to the data based on problems encountered during sample analysis.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

☒ Yes ☐ No Comments:

b. All applicable holding times met?

☒ Yes ☐ No Comments:

c. All soils reported on a dry weight basis?

☒ Yes ☐ No Comments:

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☒ No Comments:

The following analytes have PQLs above their respective ADEC cleanup limits in at least one sample: 1,2,3-Trichloroethane (8/10), 1,2,3-Trichloropropane (10/10), 1,2-Dibromoethane (10/10), 1,2-Dichloroethane (9/10), Bromomethane (1/10), cis-1,3-Dichloropropene (8/10), Methylene chloride (9/10), trans-1,3-Dichloropropene (8/10), Vinyl chloride (8/10, 2,4-Dinitrotoluene (9/9), 2,6-Dinitrotoluene (9/9), 3,3'-Dichlorobenzidine (9/9), bis(2-Chlororoethyl)ether (9/9), and Pentachlorophenol (9/9).

The following analytes have MDLs above their respective ADEC cleanup limits in all the samples in this SDG: 1,2,3-Trichloropropane, 1,2-Dibromoethane, and bis(2-Chloroethyl)ether.

e. Data quality or usability affected? Explain.

Comments:

The lab results cannot be used to determine the definitive absence of the compounds listed as having MDLs above their respective ADEC cleanup criteria.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☉ Yes ☐ No Comments:

ii. All method blank results less than PQL?

☉ Yes ☐ No Comments:

iii. If above PQL, what samples are affected?

Comments:

not applicable

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☉ Yes ☐ No Comments:

v. Data quality or usability affected? Explain.

Comments:

Endosulfan II was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS01SD, 02SD, 03SD, 04SD, 05SD, 06SD, 07SD, 08SD, and 09SD. All results are flagged "B"; however, all results are below PSDDA screening levels and data usability is not impacted.

Acetone was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concenrations detected in the following samples: 07AHSS01SD, 02SD, 04SD, 05SD, 06SD, 07SD, 08SD, 09SD, and 1001SD (trip blank). All results are flagged "B"; however, all results are below PSDDA screening levels and data usability is not impacted.

Benzyl butyl phthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS02SD, 03SD, 04SD, 05SD, 06SD, 08SD, and 09SD. All results are flagged "B"; however, all results are below PSDDA screening levels and data usability is not impacted.

Diethylphthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS02SD, 04SD, 08SD, and 09SD. All results are flagged "B"; however, all results are below PSDDA screening levels and data usability is not impacted.

di-n-Butylphthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples. 07AHSS03SD, 04SD, 05SD, 06SD, 07SD, 08SD, and 09SD. All results are flagged "B"; however, all results are below PSDDA screening levels and data usability is not impacted.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples?

☉ Yes ○ No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☉ Yes ○ No Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☒ No Comments:

The LCS and/or LCSD recoveries for 1,1,1,2-Tetrachloroethane, Bromodichloromethane, Bromoform, Carbon disulfide, Chloroethane, Dibromochloroethane, and trans-1,3-Dichloropropene were below QSM acceptance criteria. All results for these VOCs are qualified biased low and flagged "QL". All results are below PSDDA screening levels and data usability is not impacted.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☒ Yes ☐ No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

All samples are affected.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No Comments:

vii. Data quality or usability affected? Explain.

Comments:

See Section 6.b.iii above

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☒ Yes ☐ No Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☒ No Comments:

One of the VOC surrogates for samples 07AHSS01SD and 07AHSS06SD was below laboratory control limits. The impacted surrogate is the one used to ensure no loss of analyte occurred during collection, transport, and analysis at the laboratory. A second VOC surrogate for these samples was just above laboratory control limits. Consequently, VOC results for these samples are qualified bias uncertain and flagged "QN".
One of the VOC surrogates for samples 07AHSS02SD, 03SD, 04SD, 05SD, 07SD, and 09SD was below laboratory control limits. The impacted surrogate is the one used to ensure no loss of analyte occurred during collection, transport, and analysis at the laboratory. VOC results for these samples are qualified biased low and flagged "QL".
The PCB surrogate for 07AHSS06SD was below laboratory control limits. PCB data for this sample are qualified biased low and flagged "QL".

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No Comments:

iv. Data quality or usability affected? Explain.

Comments:

See Section 6.c.ii above

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☒ Yes ☐ No Comments:

ii. All results less than PQL?

☒ Yes ☐ No Comments:

iii. If above PQL, what samples are affected?

Comments:

not applicable

iv. Data quality or usability affected? Explain.

Comments:

not applicable

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No Comments:

Sample 07AHSS06SD is the duplicate to 07AHSS07SD.

ii. Submitted blind to lab?

☒ Yes ☐ No Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☐ Yes ☒ No Comments:

For duplicate pair 07AHSS05SD/06SD, the RPDs for beta-BHC, gamma-Chlordane, 1-Methylnaphthalene, 2-Methylnaphthalene, Acenaphthene, Fluoranthene, Fluorene, Naphthalene, and Pyrene are high (greater than 50%) because low concentrations were detected in one-half the duplicate pair but not the other. Data usability is not impacted as all results are below PSDDA screening levels.

iv. Data quality or usability affected? Explain.

Comments:

See comments in Section 6.e.iii above.

f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☒ Not Applicable

i. All results less than PQL?

☐ Yes ☐ No Comments:

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? Explain.

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

☉ Yes ○ No Comments:

Laboratory Data Review Checklist

Completed by: Mark Harvison

Title: Chemist

Date: March 04, 2008

CS Report Name: Anchorage Harbor Expansion

Report Date: October 23, 2007

Consultant Firm: U.S. Army Corps of Engineers

Laboratory Name: TestAmerica-Tacoma

Laboratory Report Number: 580-7502

ADEC File Number:

ADEC RecKey Number:

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

      ☒ Yes ☐ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

      ☒ Yes ☐ No Comments:

      Samples for Total Organic Carbon by EPA 9060 were subcontracted to TestAmerica-Sacramento.

2. Chain of Custody (COC)

   a. COC information completed, signed, and dated (including released/received by)?

      ☒ Yes ☐ No Comments:

b. Correct analyses requested?

☒ Yes ☐ No Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☒ Yes ☐ No Comments:

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☒ Yes ☐ No Comments:

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☒ Yes ☐ No Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☒ Yes ☐ No Comments:

e. Data quality or usability affected? Explain.

Comments:

not applicable

4. Case Narrative

a. Present and understandable?

☒ Yes ☐ No Comments:

b. Discrepancies, errors or QC failures identified by the lab?

☒ Yes ☐ No Comments:

c. Were all corrective actions documented?

☒ Yes ☐ No Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative only describes qualifications made to the data based on problems encountered during sample analysis.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

☒ Yes ☐ No Comments:

b. All applicable holding times met?

☒ Yes ☐ No Comments:

c. All soils reported on a dry weight basis?

☒ Yes ☐ No Comments:

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☒ No Comments:

The following analytes have PQLs above their respective ADEC cleanup criteria in at least one sample in this SDG: 1,1,2-Trichloroethane (6/6), 1,2,3-Trichloropropane (6/6), 1,2-Dibromoethane (6/6), 1,2-Dichloroethane (6/6), Bromoethane (1/6), cis-1,3-Dichloropropene (6/6), trans-1,3-Dichloropropene (6/6), Vinyl chloride (6/6), 1,2,4-Trichlorobenzene (1/6), 1,2-Dichlorobenzene (1/6), 1,3-Dichlorobenzene (1/6), 1,4-Dichlorobenzene (1/6), 2,4,6-Trichlorophenol (1/6), 2,4-Dichlorophenol (1/6), 2,4-Dimethylphenol (1/6), 2,4-Dinitrophenol (1/6), 2,4-Dinitrotoluene (6/6), 2,6-Dinitroltoluene (6/6), 2-Chlorophenol (1/6), 2-Methylphenol (1/6), 3,3'-Dichlorobenzidine (6/6), 4-Chloroaniline (1/6), Benzo(a)anthracene (1/6), Benzo(a)pyrene (1/6), Benzo(b)fluoranthene (1/6), bis(2-Chloroethyl)ether (6/6), bis(2-Ethylhexyl)phthalate (1/6), Carbazole (1/6), Dibenzo(a,h)anthracene (1/6), Dibenzofuran (1/6), Hexachlorobenzene (1/6), Hexachlorocyclopentadiene (1/6), Hexachloroethane (1/6), Indeno(1,2,3-cd)pyrene (1/6), Isophorone (1/6), Nitrobenzene (1/6), n-Nitrosodiphenylamine (1/6), Pentachlorophenol (6/6), and Phenol (1/6).

The following analytes have MDLs above their respective ADEC cleanup criteria in at least one sample in this SDG: 1,2,3-Trichloropropane (6/6), 1,2-Dibromoethane (6/6), 1,2,4-Trichlorobenzene (1/6), 1,2-Dichlorobenzene (1/6), 1,4-Dichlorobenzene (1/6), 2,4,6-Trichlorophenol (1/6), 2,4-Dichlorophenol (1/6), 2,4-Dimethylphenol (1/6), 2,4-Dinitrophenol (1/6), 2,4-Dinitrotoluene (1/6), 2,6-Dinitrotoluene (1/6), 2-Chlorophenol (1/6), 2-Methylphenol (1/6), 3,3'-Dichlorobenzidine (1/6), 4-Chloroaniline (1/6), Benzo(a)pyrene (1/6), bis(2-Chloroethyl)ether (6/6), Carbazole (1/6), Dibenzo(a,h)anthracene (1/6), Dibenzofuran (1/6), Hexachlorobenzene (1/6), Hexachlorocyclopentadiene (1/6), Hexachloroethane (1/6), Isophorone (1/6), Nitrobenzene (1/6), n-Nitrosodiphenylamine (1/6), and Pentachlorophenol (1/6).

e. Data quality or usability affected? Explain.

Comments:

The lab results cannot be used to determine the definitive absence of the compounds listed as having MDLs above their respective ADEC cleanup criteria.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☒ Yes ☐ No Comments:

ii. All method blank results less than PQL?

☐ Yes ☒ No Comments:

Diethylphthalate and di-n-Butylphthalate were detected in SVOC method blank 580-23744/1-A at concentrations exceeding their PQLs.

iii. If above PQL, what samples are affected?

Comments:

Sample 07AHSS15SD was the only sample impacted. The detections of Diethylphthalate and di-n-Butylphthalate detected in this sample were flagged "B" by the laboratory.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☉ Yes ○ No Comments:

v. Data quality or usability affected? Explain.

Comments:

Methylene chloride was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS10SD, 11SD, 12SD, 13SD, 14SD, and 07AHSSTB2 (trip blank). All results are flagged "B"; however, all results are below PSDDA screening levels and data usability is not impacted.

Diethylphthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS10SD, 11SD, 12SD, 13SD, and 14SD. All results are flagged "B"; however, all results are below the PSDDA screening level for Diethylphthalate.

di-n-Butylphthalate was detected in the method blank at a concentration greater than the MDL, but less than the PQL; this concentration is greater than 20% (one-fifth) the concentrations detected in the following samples: 07AHSS10SD, 11SD, 12SD, 13SD, and 14SD. All results are flagged "B"; however, all results are below the PSDDA screening level for di-n-Butylphthalate.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples?

☉ Yes ○ No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☉ Yes ○ No Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☒ No Comments:

The LCS and/or LCSD recoveries for 1,1,1,2-Tetrachloroethane, Bromodichloromethane, Bromoform, Carbon disulfide, Chloroethane, Dibromochloroethane, and trans-1,3-Dichloropropene were below QSM acceptance criteria. All results for these VOCs are qualified biased low and flagged "QL". All results are below PSDDA screening levels and data usability is not impacted.

The LCS recovery for 3,3'-Dichlorobenzidine in batch 23744 was below QSM acceptance criteria. The result for 3,3'-Dichlorobenzidine in sample 07AHSS15SD is qualified biased low and flagged "QL". The LCS/LCSD recoveries for Diethylphthalate in batch 23744 were above QSM acceptance criteria. The result for Diethylphthalate in sample 07AHSS15SD is qualified biased high and flagged "QH". The result for Diethylphthalate in this sample exceeds the PSDDA screening level.

The LCSD recoveries for di-n-Butylphthalate in batch 23743 was below QSM acceptance criteria. All results for di-n-Butylphthalate for samples in batch 23743 are qualified biased low and flagged "QL". All results are below PSDDA screening levels and data usability is not impacted.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☐ Yes ☒ No Comments:

The LCS/LCSD RPD for 2,4-Dinitrophenol in batch 23744 exceeded QSM acceptance criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

all samples are affected.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No Comments:

vii. Data quality or usability affected? Explain.

Comments:

See Section 6.b.iii above

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☒ Yes ☐ No Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☒ No Comments:

One of the VOC surrogates for samples 07AHSS10SD, 11SD, 13SD, and 14SD was below laboratory control limits. The impacted surrogate is the one used to ensure no loss of analyte occurred during collection, transport, and analysis at the laboratory. VOC results for these samples are qualified biased low and flagged "QL".

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No Comments:

iv. Data quality or usability affected? Explain.

Comments:

See Section 6.c.ii above

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and cooler?

☒ Yes ☐ No Comments:

ii. All results less than PQL?

☒ Yes ☐ No Comments:

iii. If above PQL, what samples are affected?

Comments:

not applicable

iv. Data quality or usability affected? Explain.

Comments:

not applicable

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No Comments:

07AHSS11SD is the duplicate to 07AHSS10SD.

ii. Submitted blind to lab?

☒ Yes ☐ No Comments:

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☐ Yes ☒ No Comments:

For duplicate pair 07AHSS10SD/11SD, the RPDs for bis(2-Ethylhexyl)phthalate, di-n-Octylphthalate, Fluoranthene, Fluorene, and Pyrene are high (greater than 50%) because low concentrations were detected in one-half the duplicate pair but not the other. The RPDs for 1-Methylnaphthalene, 2-Methylnaphthalene, and Phenanthrene are high (greater than 50%), likely due to the heterogeneity of the soil. Data usability is not impacted as all results are below PSDDA screening levels.

iv. Data quality or usability affected? Explain.

Comments:

See comments in Section 6.e.iii above.

f. Decontamination or Equipment Blank (if applicable)

☐ Yes ☐ No ☒ Not Applicable

i. All results less than PQL?

☐ Yes ☐ No Comments:

ii. If above PQL, what samples are affected?

Comments:

iii. Data quality or usability affected? Explain.

Comments:

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

☒ Yes ☐ No Comments:

Appendix E

Field Notebook

"Outdoor writing products for outdoor writing people."

RECYCLABLE

"DuraRite" - is a synthetic paper that is ideally suited for use in extreme weather conditions. A full line of **"DuraRite"** notebooks and loose leaf sheets are available. Custom printed **"DuraRite"** books, forms and tags can be made to meet your specific requirements.

"DuraCopy" and "Rite in the Rain" all-weather copier papers are also available which enable you to create all-weather forms, charts and maps on your copier or laser printer. See your dealer or contact the J. L. Darling Corporation for details.

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J. L. DARLING CORPORATION
Tacoma, WA 98424-1017 USA
(253) 922-5000 • FAX (253) 922-5300
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WATERPROOF

LEVEL

Waterproof Notebook
No. 611

Anchorage Harbor
Sept 2007
Jake Sweet
Mike Utley

4 5/8" x 7" - 48 Numbered Pages

07-083

9/14 Anch Harbor

Cloudy, cold

0730 meet @ dock

0815 take boat to drill rig

0830 Safety mtg w/ mike (Supervisor)

~1100 - wait for ~~possible~~ positioning
+ start on TB-19

1130 - Sample #1 5' below mudline
-25.5 ~ -27.5 MLLW
Clay

1230 Sample #2
-35.5 - -37.5 MLLW
extremely hard clay

Each Sample -
1 x 4oz VOC
1 x 4oz TOC
1 x 8oz PCB/Pest/8270/m+s

1600 back to dock
list of stuff to bring

ice
pen
log book (duh!)

Supplies on hand
gloves
bags
towels
spoons

left coolers w/ sample containers

brought 2 coolers
- supplies
- ice

Michael Kelley

9/15/07 55°F Partly Cloudy.

1044 - Setup on TB-47 (N. Area)

1050 - Safety Meeting w/ all personell.

1106 - setup complete

1114 - begin drilling TB-47

1145 - drive spoon for 1st ENV. sample

1159 Sample #3 ~~#2~~ taken.
3-5' below Mudline,
-7.5' to -9.5' below MLLW

1 x 4oz VOC (16747) 54.43 Soil
1 x 8oz PCB, Pest, ~~PAH~~, Metals, SVOC
1 x 4oz TOC

Sample ID ~~07AHSS03SE~~ 07AHSS05SE

Clay w gravel.

1245 - begin drive for ENV. Sample.

1300 Sample #~~3~~ ~~#2~~ #4 taken.

1 x 4oz VOC (16746) (54.25)
1 x 4oz TOC
1 x 8oz PCB, Pest., SVOC, metals

24.5-26.5' Below MLLW
20-22' Below Mudline.
(25' Below MLLW dredge area)
Lean clay

Sample ID: 07AHSS04SE

9/16/07

0730 - Arrive at docks.

1118 - setup on TB-22 (S. end)

TB-22 is in -35' below MLLW dredge area.

1145 - safety meeting.

1210 - begin drilling TB-22

Mudline @ ~32.7' Below MLLW

1217 - Sample #5 31.2'-33.3' below MLLW

0 - 18" below mudline (surface Sample)

#5 1x4oz VOC ~~PCB~~ (16753)
1x4oz TOC
1x8oz SVOC, metals, Pest, PCB

#6 dupe of 5 1x4oz VOC (16742)
1x4oz TOC
1x8oz SVOC, metals, PCB, PCB

1320 - Sample #7 taken

34.3 - 36.8' Below MLLW

1x4oz VOC (16744)
1x4oz TOC
1x8oz Metals, SVOC, Pest., PCB.

9/17/07 partly cloudy 50°F

1000 - arrive at port.

1153 - Setup on TB-28

TB-28 located in -45' Below MLLW dredge area.

Mudline @ ~10.2' Below MLLW

1253 - Sample #8 taken.

MS/MSD
2x4oz VOC (16755 + 16752)
2x4oz TOC
2x8oz PCB SVOC, Pest., Metals

~~21.2-23.2'~~ ~~Below~~ 20.2-22.2' Below MLLW
10-12' Below Mudline.

1404 - Sample #9 Taken

35.2 - 37.2' Below mudline
45.2 - 47.2' below MLLW

1 x 4oz VOC (16757)
1 x 4oz TOC
1 x 8oz PCB, ~~PAH~~, SVOC, Pest. metals

9/18/07 45° Rain

#2145 - Arrive at dock

2345 - Setup on TB-31

TB-31 within -45 MLLW dredge area.

Mudline @ 43' Below MLLW.

9/19/07 Rain, Wind

- 1250 took Sample #10 + #11 dupe of 10

#10 1 x 4oz VOC (16741)
1 x 4oz TOC
1 x 8oz PCB, Pest, SVOC, metals

#11 1 x 4oz VOC (16748)
1 x 4oz TOC
1 x 8oz PCB, Pest, SVOC, metals

Samples 10 + 11 are surface Samples
0-2' Below mudline
43-45' Below MLLW

1301 - collected Sample #12

1 x 4oz VOC (16745)
1 x 4oz TOC
1 x 8oz PCB, Pest, SVOC, metals

45-47' below MLLW
(2-4') below mudline.

9/20/07 Cloudy, rain, 50°F

1145 - Metal at city dock

9/21/07

0146 - hook up to TUG, begin Move to next boring.

0234 - Setup on TB-37 (located in -45' Below MLLW dredge area)

TB-37

0339 - setup & ready to drill Mudline @ ~~-43.5~~ 36.5' below MLLW

0420 - Sample #13 taken 36.5 - 38' MLLW ~~Mudline~~ (Surface sample 0"-18" below Mudline)

1 x 4oz VOC
1 x 4oz TOC
1 x 8 oz PCB, Pest, SVOC, metals

0450 - Sample #14 taken.

45 - 46.5' Below MLLW

1 x 4oz VOC
1 x 4oz TOC
1 x 8 oz PCB, Pest, SVOC, metals

0645 - took sample #15 Sample of Jetlube Kopr-KOTE Lubricant.

1 x 8oz. SVOC, metals