Municipality of Anchorage

Port of Alaska

PORT OF ALASKA MODERNIZATION PROGRAM
DESIGN/BUILD SERVICES FOR
HELIPAD AND ACCESS ROAD

REQUEST FOR PROPOSAL NO. 2026P002

SECTION V

Sample Contract

Exhibit I
Front End Engineering Design (FEED) Documents

Part II
35% Basis of Design

For coordination with other Port projects, Design Loading shall be HS-25 as stated in the RFP

moffatt & nichol

Basis of Design

Port of Alaska – Helipad and Access Road Design-Build
240575-09

Location:	1871 Anchorage Port Road Anchorage AK, 99501
Client Name:	Port of Alaska
Contract No.:	4400001936
Submittal Stage:	35% Submittal
Issue Date:	11/7/2025

Rev #	Description	Originator	Reviewer	Approver
1	Draft Comment Addressal	Jan Deliz	Steven Lewis	Steven Lewis
		11/07/2025	11/7/2025	11/7/2025

Table of Contents

Table of Tables

Table of Figures

1. Introduction

The purpose of this document is to define the guiding principles for the development of a helipad facility and associated access roadway at the Port of Alaska in Anchorage. The design is limited to 35-percent design development level. Final design shall be determined by the awarded design-build contractor. This project provides a compliant and durable landing surface to support Army and Airforce rotary-wing operations, while accounting for local site constraints, regulatory requirements, and long-term operational needs.

1.1. Background

The Port of Alaska in Anchorage provides a strategic location for rotary-wing operations due to its proximity to Joint Base Elmendorf-Richardson (JBER). The development of a dedicated helipad and associated access roadway will enhance the Port's capacity to conduct joint training, logistical coordination, and mission support. The project area lies within an approved National Environmental Policy Act (NEPA) boundary and existing port infrastructure, requiring a compact design consistent with the Unified Facilities Criteria (UFC) and Municipality of Anchorage Standard Specifications (MASS).

1.2. Existing Conditions

Per the Geotech report obtained the site consists primarily of medium-dense silty sand with gravel extending roughly 17-feet below grade. The area currently lacks permanent hardscape but is actively used by Port personnel for container and equipment storage. Access is provided via Terminal Road, a route developed under the Port Expansion project that connects the North End Terminal to North Backland.

East of Terminal Road, a system of drainage ditches and structures manages runoff from nearby areas, followed by a dense tree line and steep bluff. To the west, open ground and gravel stockpiles extend toward the sheet pile bulkhead along Knik Arm, providing adequate space for the helipad within the approved NEPA boundary.

Several high-mast light poles are located north and south, presenting potential lateral and vertical obstructions that will be considered in the helipad approach path design and access roadway alignment. These existing conditions, along with adjacent Port operations and drainage features, will guide final grading, layout, and operational safety considerations.

1.3. Proposed Development

The project consists of a single ground-level helipad, associated safety area apron, and an access roadway designed to integrate with existing Port of Alaska infrastructure.

Initial planning evaluated the construction of two parallel helipads; however, due to limitations imposed by the approved NEPA boundary, this configuration was deemed infeasible. Per UFC 3-260-1, a minimum 200-foot centerline spacing is required between parallel helipads for non-simultaneous operations. The available environmental boundary, approximately 350 feet × 350 feet, does not provide adequate clearance to safely accommodate two helipads. To maintain compliance with UFC requirements and remain within the approved project limits, the design has been refined to include a single helipad.

The proposed helipad is designed to accommodate both the CH-47 Chinook and UH-60 Black Hawk, with the Chinook serving as the controlling aircraft. The layout incorporates a shared ingress/egress path aligned in the same direction to streamline aircraft movement and maintain

compliance with standard visual flight rules (VFR) design considerations, ensuring clear approach and departure surfaces free of obstructions.

Surface grading has been designed to promote positive drainage away from the helipad and safety area, directing runoff toward the existing stormwater infrastructure. Several existing catch basins and manhole structures have been strategically utilized to efficiently capture and convey runoff, minimizing the potential for ponding or icing within the operational area.

The project scope does not include fueling facilities, parking positions, lighting, or an air traffic control tower.

1.4. Design Life & Service Life

In accordance with UFC pavement requirements the minimum design life for the pavement is 20-years.

1.5. References, Codes & Standards

- *UFC 3-260-01 – Airfield and Heliport Planning and Design (5 May 2020)*
- *UFC 3-260-02 – Pavement Design for Airfields (30 June 2001)*
- *UFC 3-535-01 – Visual Air Navigation Facilities (25 April 2023)*
- *FC 1-300-09N – Navy and Marine Corps Design Procedures (17 May 2024)*
- *AC 150/5390-2D – Heliport Design (5 January 2023)*
- *AC 150/5345-27 – Specifications for Wind Cone Assemblies (15 December 2021)*
- *Municipality of Anchorage Design Criteria Manual, Chapter 1 – Streets (January 2007)*
- *AASHTO – Design Standards for Pavement and Roadways (2018)*
- *IBC (International Building Code), Chapter 17 Inspections (2021)*
- *Applicable ASTM and ACI Standards (Latest Version)*
- *Geotechnical Data Report - Anchorage Port Modernization Project – Shannon & Wilson, Inc. (June 2017)*

1.6. Method of Procurement

This project is being delivered under a Design-Build procurement method in accordance with FC 1-300-09N, Chapter 15. The Basis of Design and supporting documents are based on the 35-percent design submittal, which defines the design intent and performance criteria to guide the Design-Build contractor in completing the final design and construction documents.

1.7. Specifications

No project specifications are included with this project. Contractor to furnish and install paving and striping materials per MASS. Wind cone and associated foundation (without lighting) shall be per AC 150/5345-27 standards.

2. Design Disciplines/ Sections

2.1. Civil

2.1.1. General Description and Discussion of Design Components

The civil scope includes the design and construction of a single rotary-wing helipad and an associated access roadway connecting the facility to existing Port infrastructure. The helipad is designed to support safe helicopter operations under day Visual Flight Rules (VFR) conditions, with consideration for cold-climate performance and coastal environmental factors typical of the Port of Alaska.

The roadway design provides reliable year-round access for maintenance and operational vehicles, integrating with existing site grades and drainage systems to ensure proper runoff control and durability under Port traffic demands. Both the helipad and roadway are designed to function cohesively within the constrained project area, maintaining compliance with applicable UFC and Municipality of Anchorage standards while minimizing disturbance to adjacent operations.

HELIPAD PRIMARY SURFACE

In accordance with UFC 3-260-01, the primary surface defines the required landing and departure geometry for the helipad, establishing lateral and vertical clearance limits. For this project, the paved landing zone is located within the boundaries of the primary surface, which will also be fully paved to provide a continuous, stable, and durable operational area. The pavement will be constructed to deliver adequate load-bearing capacity, skid resistance, and resilience to rotor downwash, and freeze-thaw cycles typical of the coastal environment, while grading will ensure compliance with UFC slope criteria and promote positive surface drainage.

CLEAR ZONE AND APPROACH/DEPARTURE PATHS

Clear zone begins at the ends of the primary surface and extends outward and upward from a horizontal distance in accordance with UFC standards. This area will remain free of obstructions to improve operational safety during takeoff and landing operations. Approach and departure path are aligned to minimize conflicts with nearby terrain and structures. Aircraft can depart and approach from multiple azimuths around the helipad, the lateral limits of the clear zone and associated safety areas are best represented as arcs centered on the pad rather than as linear projections.

TRANSITIONAL SURFACES

An imaginary plane that extends outward and upward from the lateral boundaries of the primary surface and the approach–departure clearance surface, connecting to the horizontal surface or extending a prescribed horizontal distance beyond its limits. Each transitional surface rises at a specified slope, measured perpendicular to the helipad longitudinal centerline extended.

ACCIDENT POTENTIAL ZONES (APZS)

APZs are established in accordance with UFC standards. Extending beyond the clear zone along flight paths, the APZs reduce the risk to personnel and equipment in the event of a mishap.

PAVEMENT STRUCTURE

The pavement section for the helipad and associated roadway must be designed to accommodate the CH-47 Chinook as the controlling aircraft for the landing surface and the HS-20 loading as the governing design vehicle for the roadway. The design must address both the high dynamic rotorcraft loads and the local frost-depth conditions typical of Anchorage.

The structural section is based on previously implemented Port of Alaska projects, ensuring durability, constructability, and performance under repetitive loading and cold-region environmental stresses. Prior to pavement placement, the contractor shall strip the existing surface material to remove unsuitable soils and establish a stable, uniform subgrade. The final pavement composition will incorporate locally proven materials and thicknesses consistent with past Port projects to ensure long-term reliability and ease of maintenance across the facility. Final pavement design must be verified against the minimum thickness requirements for Army and Airforce flexible pavements design in accordance with UFC 3-260-02.

Access Roadway

An all-weather access roadway will connect the helipad to the existing Port of Alaska paved infrastructure, providing reliable, year-round access for maintenance crews, emergency response units, aircraft towing operations, and operational support vehicles. The roadway alignment follows the existing site grades and ties into Terminal Road, minimizing disturbance to active port operations and existing drainage systems.

The roadway will be designed in accordance with the Municipality of Anchorage Design Criteria Manual (DCM) and AASHTO standards, with load-bearing capacity adequate to support HS-20 design loads as well as light to medium-duty port traffic. The pavement section will utilize the same material composition and structural configuration as the helipad to ensure consistent performance, constructability, and ease of maintenance across the facility.

Roadway stripping

Pavement marking and roadway striping will be designed and installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Pavement marking will be provided to clearly define travel lanes, vehicular circulation, and helipad symbol. Marking layouts, line widths, color, and materials will comply with MUTCD.

Surface Drainage

The roadway and helipad grading will be designed to promote positive surface drainage, preventing ponding, icing, and frost heave in compliance with Municipality of Anchorage stormwater requirements. No new stormwater structures are proposed for this project; instead, the design utilizes the existing drainage infrastructure already in place at the site.

Utilities

No new utilities are included with this project.

Wind Cone

The wind cone provides a critical visual reference to pilots by indicating wind direction and relative wind speed during takeoff and landing. To avoid obstruction hazards, the wind cone will be located outside the primary surface area and positioned so it does not penetrate the approach, departure, or transitional surfaces.

The assembly will be designed and installed in accordance with FAA AC 150/5345-27, Specification for Wind Cone Assemblies, without lighting.

Safety Areas and Shoulders

Paved shoulders and graded safety areas are provided around the helipads to enhance operational safety and ensure proper surface drainage.

CONSTRUCTION CONSIDERATIONS

Construction activities will incorporate temporary erosion and sediment control measures consistent with Port of Alaska and Alaska Department of Environmental Conservation (DEC) Construction General Permit requirements. Cold-region construction practices will be applied to address freeze-thaw cycles frost depth.

2.1.2. Codes, Standard & References

The project site at the Port of Alaska in Anchorage is located near Joint Base Elmendorf-Richardson (JBER) and will be designed primarily to support Army and Airforce rotary-wing operations. The design will follow *UFC 3-260-01, Airfield and Heliport Planning and Design*, which governs Department of Defense heliport layout and design criteria, including guidance for clear zones, safety areas, and Accident Potential Zones (APZs). Where other statutory or regulatory requirements apply, the more stringent standard will govern. *FAA AC 150/5390-2D*, *Advisory Circular - Heliport Design*, will not be applied, as its requirements are less stringent than those of UFC criteria; However, the wind cone will need to conform with the standards set upon the *AC/535-27, Specification for Wind Cone Assemblies.*

The access roadway will be designed in accordance with the *Municipality of Anchorage Design Criteria Manual, Chapter 1: Streets*, and will also comply with AASHTO standards for pavement design and materials for HS-20-wheel loading.

2.1.3. Design Criteria and Dimensional Requirements

ROTARY WING HELIPAD

The design criteria are established in accordance with *UFC 3-260-01, Airfield and Heliport Planning and Design,* and applicable service-specific requirements. The helipad is sized and configured to accommodate both the CH-47 Chinook and the UH-60 Black Hawk; however, the CH-47, serves as the controlling aircraft due to its greater gross weight, rotor diameter, and overall footprint.

Table 1 summarizes the key characteristic of the rotary-wing aircraft anticipated to operate on the helipad.

Table 1: Design Helicopter Characteristics

Parameter	Boeing CH-47 Chinook	Sikorsky UH-60 Black Hawk
Maximum Gross Weight	54,000 lb (24,500 kg)	22,000 lb (9,979 kg)
Overall Length (including rotors)	99 ft (30.1 m)	65 ft (19.8m)
Main Rotor Diameter	60 ft (18.3 m)	54 ft (16.4 m)
Body Width (blades folded)	12.5 ft (3.78 m)	7.75 ft (2.36 m)
Maximum Towing Grade	3.0%	3.0%

The helipad is designed with independent safety areas, and the approach/departure paths are oriented to avoid known obstructions. Multiple high-mast light poles located to the north and south create lateral and vertical constraints; therefore, the clear zone and Accident Potential Zone (APZ) are oriented along an east–west corridor, with departures and approaches primarily over the Knik Arm waterway to the west and away from the eastern tree line, bluff, and drainage ditch. The helipad employs same-direction ingress/egress consistent with standard VFR design considerations, maintaining obstacle-free approach and departure surfaces in accordance with UFC requirements.

The primary surface and helipad will be paved and sloped within UFC tolerances to provide positive drainage and finished for adequate skid resistance and rotor-downwash durability. Grading directs runoff to the existing storm system, utilizing the existing catch basins/manholes near the pad. Night VFR capability could be achieved by future installation of perimeter lighting, an illuminated wind cone, and a heliport beacon (lighting is not in this project's scope). Table 2 summarizes the applicable UFC design criteria for the single rotary-wing helipad at this site.

Table 2: Rotary-Wing Helipads Design Criteria

Parameter	Requirement	Remarks
Helipad Size	100 ft x 100 ft (30 m x 30 m) min.	Standard VFR
Grade	Min 1.0% Max 1.5%	Grade helipad in one direction.
Paved Shoulder Width	25 ft (7.5 m)	Air Force Army, Navy and Marine Corps
Paved Shoulder longitudinal grade	Variable	Conform to the longitudinal grade of the abutting primary pavement.
Paved Shoulder transverse grade	2.0% min 4.0% max	Slope downward from edge of pavement.
Grade (adjacent to paved shoulder)	(a) 1.5-in (40 mm) drop-off at edge of paved shoulder +/- 0.5-in (13 mm). (b) minimum 2%, maximum 5% within the primary surface	Primary surface and clear zone criteria apply beyond this point.
Size of primary surface (center primary surface on helipad)	300 ft x 300 ft (91.44 m x 91.44 m) min.	Air Force and Army standard VFR helipad
Grades within the primary surface area in any direction	Min. 2.0% prior to channelization* Max 3.0%	Exclusive of pavement and shoulders. *For VFR helipads, the grade requirements apply to the entire primary surface.
Length of clear zone/protection zone**	400 ft (121.92 m)	Hoverpoints, VFR, and standard helipads. Begins at the end of the primary surface.
Width of clear zone/protection zone**	300 ft (91.44 m)	Air Force and Army standard VFR helipad and VFR helipad same direction ingress/egress.
Grade of clear zone any direction**	3.0% max	Area to be free of obstructions. Rough grade and turf when required.
APZ I length***	800 ft (243.84 m)	Elevated helipads, hoverpoints, VFR
APZ I width***	300 ft (91.44 m)	Army and Air Force standard VFR
Distance between centerline of helipad and fixed- or rotary-wing runways	700 ft (213.36 m)	For US Army, distance may be reduced to 200 ft (60.96 m) between parallel helipads for non-simultaneous operations.

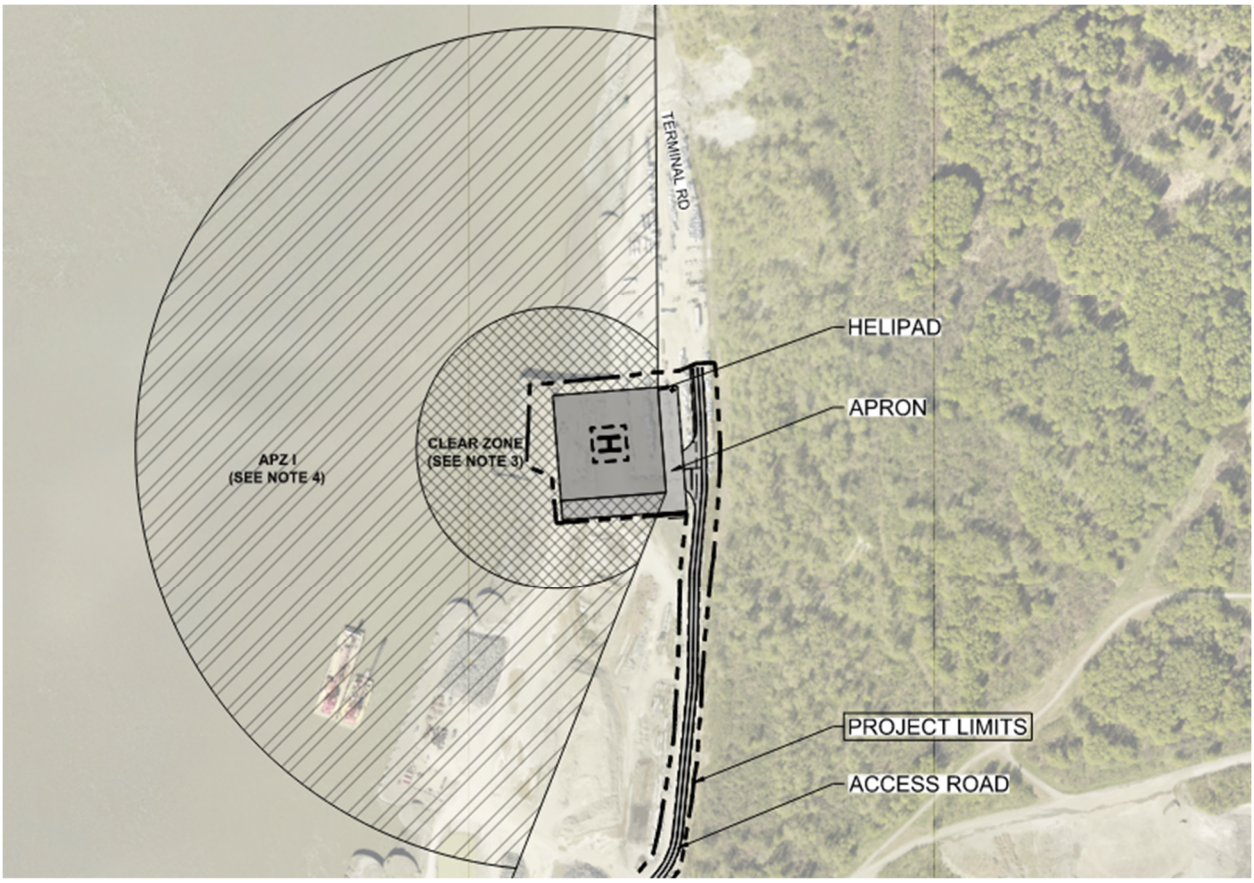

Figure 1: Rotary-Wing Helipad Preliminary Design (per UFC Standards)

Access Road

The roadway design has been developed to accommodate both standard vehicular and specialized aircraft towing operations. The HS-20 truck governs the structural design, while the CH-47 towing configuration dictates geometric controls due to its extended length and unique turning characteristics. Although the Anchorage DCM generally limits curb return radii to 40 feet, a larger turning radius is recommended to allow safe manoeuvring of the towed aircraft under controlled one-way traffic conditions. A vehicle tracking analysis will need to be performed to determine the swept path of the CH-47 under towing conditions and to verify adequate clearance and pavement geometry throughout the access roadway and helipad approach areas.

The roadway is classified as an Industrial Local Street and is designed to serve low-volume heavy traffic typical of port operations. The pavement structure is based on a previously implemented Port of Alaska section, selected for its proven performance and compatibility with the site's subgrade and frost conditions. The design provides adequate capacity to support HS-20 loading, towing operations, and other heavy transport vehicles, including containerized cargo and support equipment commonly operating within the Port.

Prior to construction, the top 5 to 6 inches of existing surface material shall be scalped and removed to eliminate organic or unsuitable silts. Subgrade areas shall be compacted and proof-rolled prior to base course placement to achieve uniform support and prevent differential settlement. Final pavement structure composition will be determined in accordance with

Anchorage DCM and project specifications, ensuring long-term durability under repetitive heavy loading.

Construction activities will be phased to ensure that Port of Alaska North Backland operations remain active throughout the project duration. The Contractor shall coordinate closely with the Port of Alaska Representative and any adjacent contractors to minimize operational disruptions and maintain safe access for port personnel and equipment. All coordination meetings and scheduling efforts required to achieve this shall be considered incidental to the Work.

The Contractor is responsible for performing all materials testing and quality control associated with this project. Testing shall be conducted by qualified personnel or an approved testing agency in accordance with the project specifications. Test results shall be submitted promptly to the Engineer for review and verification of compliance with the design requirements.

Table 3: Access Roadway Design Criteria

Parameter	Requirement	Remarks
Street Classification	Industrial Local Street	Per Municipality of Anchorage DCM
Street Width (back of curb to back of curb)	40 ft	Include two lanes and shoulders
Number of Lanes	2	One in each direction
Lane Width	11 ft	Standard for Industrial Uses
Shoulder Width	2 ft	Each side
Design Speed	25 mph	Consistent with low-volume local industrial street use.
Min. Outside Turning Radius	105 ft (assumed)	CH-47 towing operations. Accounts for fuselage and tow length.
Minimum Grade	1.0%	Minimum street grade is 0.5% for streets with curbs and gutters. For all other streets and roads, the minimum road grade is 1.0%
Maximum Grade	3.0%	The maximum grade is 3.0% for towed aircraft.
Pavement Structure	AASHTO & Anchorage DCM	Designed for heavy emergency vehicle loading and/or HS-20.
Design Vehicle	HS-20	Governing design vehicle

Table 4: Governing Transport Vehicle – HS-20 Design Loading (AASHTO)

Parameter	Value
Total Gross Vehicle Load (GVL)	72 kips (72,000 lb)
Front Axle Load	8 kips (8,000 lb)
Rear Axle Load (each)	32 kips (32,000 lb)
Number of Axles	3 total

2.1.4. Materials

The helipad pavement section will mirror that of the access roadway, utilizing the same flexible pavement structure previously implemented on other Port of Alaska projects. This approach provides consistency in materials, constructability, and proven long-term performance under heavy loading conditions. The assumption to apply for the same pavement section is based on its successful use in similar Port environments and the fact that the roadway is designed for the heavier HS-20 loading, providing additional assurance that the pavement will adequately support CH-47 Chinook operational loads.

Implementation of the roadway and helipad design will result in an estimated 391,476.24 square feet (approximately 8.99 acres) of total ground disturbance.

The selected section is composed of three layers: two layers of 2 inches of asphalt surface course (4 inches total thickness), a 2 inches of leveling course, and a 24 inches of Type IIA aggregate base, resulting in a total pavement thickness of 30 inches. This configuration ensures sufficient structural strength, frost protection, and durability for cold-region conditions.

Prior to pavement placement, the existing surface material shall be scalped to a depth of approximately six inches to remove unsuitable organic and silty soils and establish a stable, uniform subgrade. Subgrade material below the scalped surface meeting the requirements of Type IIA aggregate can be used to reduce the structural pavement section aggregate base thickness. The subgrade will then be proof-rolled and compacted to achieve the required bearing capacity prior to base placement.

Using a consistent pavement structure for both the helipad and access roadway simplifies construction, enhances maintainability, and ensures reliable performance under both rotorcraft and vehicular loading while maintaining compliance with Port of Alaska and UFC design standards.

2.1.5. Assumptions

A geotechnical investigation conducted following the construction of the Port of Alaska North Backlands Project was reviewed as part of this design effort. A bore log from that study was located in close proximity to the proposed helipad footprint and has been used to inform the assumed soil conditions for this project. The findings of that report have been evaluated and considered sufficient for preliminary design purposes. However, the report does not include pavement design recommendations. It is therefore recommended that the Engineer of Record review and verify all

pavement sections to ensure that the load-bearing capacities meet the structural demands of both HS-20 vehicular loading and CH-47 Chinook operations.

An additional design assumption was made regarding stormwater management. The proposed helipad and access roadway are intended to outfall into an existing storm drain catch basin located near the southwestern portion of the site. The existing drainage conveyance system is assumed to be adequate to accommodate the increased runoff generated by the new impervious surfaces. It is recommended that the Engineer of Record perform a hydrologic and hydraulic analysis of the existing storm drainage system to confirm its capacity and evaluate the effects of the proposed improvements, accounting for the change from a gravel surface to a fully impervious area.

The project scope does not include fueling facilities, parking positions, lighting, or an air traffic control tower.

2.1.6. Sustainable Features

Sustainability for this project will focus on operational efficiency, resilience, and reduced maintenance demands, consistent with best practices for airfield and heliport design:

- Long Term Durability – Pavement and drainage systems will be designed to withstand heavy rotary-wing aircraft operations, frost conditions, and roto downwash, minimizing the need for frequent repair.

- Climate and Site Resilience – Grading and drainage improvements will reduce potential for ponding, icing, or frost heave, extending facility service life and ensuring year-round operability.

- Regulatory Compliance – Stormwater management and erosion control measures will comply with the Port of Alaska and Alaska DEC requirements.

2.1.7. Demolition Requirements

No major demolition activities are anticipated for this project. However, several existing items and equipment within the project limits will require salvage and relocation to accommodate the proposed helipad and roadway improvements. These include jersey barriers, trailers, containers, and miscellaneous machinery currently used by POA personnel.

All salvageable items identified on the plans shall be relocated to an approved location as directed by the POA Representative or Contractor. Coordination with the POA will be required to minimize disruption to ongoing operations during relocation activities.

2.1.8. Statement of Special Inspections as required by IBC Chapter 17

Special inspections will be performed in accordance with IBC Chapter 17 and will include verification of soil compaction, concrete placement and reinforcement, and pavement thickness.

3. Related Documents

Title

Appendix A: Geotech Report

Geotechnical Data Report
Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

June 2017

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TABLE OF CONTENTS

Page

TABLES

FIGURES

APPENDICES

GEOTECHNICAL DATA REPORT
ANCHORAGE PORT MODERNIZATION PROJECT
STEP 1 NORTHERN EXTENSION STABILIZATION
PORT OF ANCHORAGE, ALASKA

1.0 INTRODUCTION

This report presents the results of subsurface explorations and laboratory testing conducted by Shannon & Wilson, Inc. to support design of the Anchorage Port Modernization Project (APMP) Step 1 Northern Extension Stabilization (NES) at the Port of Anchorage (POA), Alaska. The purpose of this geotechnical study was to observe and document subsurface conditions in the vicinity of the proposed improvements. To accomplish this, we advanced nine geotechnical borings within the project area. Selected soil samples recovered from the boring were tested in our Anchorage and Seattle laboratories. Samples were also submitted to SGS North America (SGS) as part of the limited environmental site assessment included in our scope of work. Presented in this report are descriptions of the site and project, subsurface exploration and laboratory test results, and an interpretation of subsurface conditions.

Authorization to proceed with this work was received in the form of a signed subcontract from Ms. Laura Young of the AECOM Technical Services, Inc. (AECOM) on April 21, 2017. Our work was conducted in general accordance with our April 21, 2017 proposal with the exception that Boring B-07-17 was shallower than planned to enable additional laboratory tests. The additional testing was deemed to provide greater benefit to the project than advancing the boring to its originally planned depth. These modifications were approved by AECOM and the POA project management consultant (PMC), CH2M.

2.0 SITE, LOCAL GEOLOGY, AND PROJECT DESCRIPTION

The following subsections include brief descriptions of the project site, local geology, and general project goals.

2.1 Site Description

The project is located in the North Extension and North Backlands areas at the POA. Construction of the North Backlands began in 2006, as part of the Port of Anchorage Intermodal Expansion project (PIEP), and continued into construction of the North Extension that was advanced to its current state by 2009. The North Extension and North Backlands projects largely included placing fill to create a new upland area and constructing a new sheet pile bulkhead along the face of the fill. At the time of this report the area remains largely undeveloped with

gravel surfacing and is currently used for snow storage and temporary staging for equipment and supplies. The topography of the site is relatively flat with a gentle slope downward from east to west and less than about 2 foot of relief across the site. A vicinity map indicating the general project location is presented as Figure 1. A site plan, included as Figure 2, shows prominent site features and the approximate boring locations.

2.2 Local Geology

The POA is situated at the southern end of the Knik Arm in the Upper Cook Inlet Basin, a low-lying structural trough overlying Tertiary rock formations and surrounded by Quaternary deposits of varying composition. Knik Arm has experienced at least five glacial events in the last 2 to 3 million years. The most recent events include the Knik and Naptowne Glaciations, both of which occurred within the past 75,000 years. These glaciations and subsequent erosional processes have shaped the topography and deposited thick sequences of sediment beneath the project area. Glacial deposits in the project area generally consist of, in ascending order, poorly sorted glacial till (Knik Till) and glaciolacustrine clays and silts (Bootlegger Cove Formation). In the near-shore areas, these deposits are generally overlain by more recent tidal and estuarine deposits that have been placed by tidal and alluvial processes. In the few undisturbed areas within the POA, these tidal and estuarine deposits can be found on the ground surface. Artificial fills of varying composition and gradation have been placed on top of the tidal and estuarine deposits over most of the POA area. Moraine deposits are found in the upland areas north of the POA and outwash sands and gravels (Naptowne Outwash) overlie the Bootlegger Cove deposits in the upland areas above the project area to the east, but neither is expected to be present within the immediate area of our drilling locations.

The Upper Cook Inlet region is also one of the most seismically active areas in the United States and historically subjected to large (greater than 6.0 Moment Magnitude) earthquakes. The tectonics and seismicity of southern Alaska are the result of ongoing relative motion between two lithospheric plates; the Pacific Plate moves about 2 to 2.5 inches per year (in/yr) northwestward relative to the North American Plate. The margin of convergence between the plates forms a subduction zone and is marked on the surface by the Aleutian trench, southeast of Anchorage. Active seismicity in southcentral Alaska occurs as both deep earthquakes associated with the subduction zone, as well as shallow earthquakes associated with long linear transform faults and smaller fault-cored fold structures.

2.3 Project Description

We understand the project generally consists of removing the sheet pile bulkhead structure and reshaping and stabilizing the North Extension shoreline. The project is being performed as a

progressive design/build effort, as such the details of the shore stabilization design were not available at the time of this report. Based on AECOM's alternatives analysis, which was performed concurrently with our efforts, we understand that options for the shore stabilization could include a new bulkhead/wall structure or a graded and armored slope.

3.0 SUBSURFACE EXPLORATIONS

Subsurface explorations for this study consisted of drilling and sampling nine borings, designated Borings B-01-17 through B-09-17, in the project area between May 3 and May 18, 2017. Shannon & Wilson also performed shear wave velocity testing at the Boring B-01-17 location after drilling was completed. The general boring locations were selected by representatives from AECOM and Shannon & Wilson, and authorized by the PMC, prior to mobilizing the drill rig and crew to the field. The borings were located using a handheld gps unit with an accuracy of ± 10 feet. Surface elevations shown on the boring logs were estimated from topographic contours provided by the Port of Anchorage, based on a 2015 LiDAR and mapping project conducted by Merrick & Company for the POA. The boring locations shown on the site plan in Figure 2 and the elevations reported on the boring logs should be considered approximate.

3.1 Geotechnical Drilling and Sampling

Drilling services for this project were provided by Denali Drilling, using truck-mounted CME 85 and track-mounted CME 75 and 850-X drill rigs. Borings B-01-17, B-02-17, B-04-17, and B-06-17 through B-08-17 were advanced using mud rotary techniques to depths ranging between 100 and 200 feet below the ground surface (bgs). With this method, the boring is advanced using a 3⅞-inch tricone bit and circulating a bentonite based drilling fluid. As the fluid circulates, it carries the cuttings out of the advancing hole, controls the heaving of cohesionless soil, and helps stabilize the borehole walls when the hole is advanced without casing. When caving was encountered, typically in the upper 40 to 50 feet, 4-inch inner dimeter (ID), threaded, flush-coupled casing was advanced along with the drilling. The remaining borings (Borings B-03-17, B-05-17, and B-09-17) were advanced with 3¼-inch inner diameter (ID), continuous flight, hollow-stem augers to a depth of approximately 75 feet bgs. An experienced representative from our firm was present during drilling to locate the boring, observe drill action, collect samples, log subsurface conditions, and observe groundwater conditions.

As the borings were advanced, samples were typically recovered using Standard and Modified Penetration Test (SPT/MPT) methods at 5-foot intervals to 150 feet bgs and at 10-foot intervals thereafter. The MPT procedures were used to recover larger samples needed to collect analytical samples in borings selected for the limited environmental site assessment activities. With the

SPT and MPT method, samples are recovered by driving a 2 or 3-inch outer diameter (OD) split-spoon sampler into the bottom of the advancing hole with blows of a 140 or 340-pound hammer, respectively, free falling 30 inches onto the drill rods. The number of blows required to advance the sampler the final 12 inches of an 18-inch penetration, or the middle 12 inches of a 24-inch penetration, is termed the penetration resistance. Blow counts are shown graphically on the boring log figures as "penetration resistance" and are displayed adjacent to sample depth. Where sampler refusal occurred (ie. penetration resistance exceeded 50 blows for a 6 inch penetration or after 10 blows with zero penetration), the total number of blows and the total penetration of the sampler are indicated on the boring log. The penetration resistance values give a measure of the relative density (compactness) or consistency (stiffness) of cohesionless or cohesive soils, respectively.

Samples of predominantly fine-grained soils were occasionally collected using 3-inch OD by 30-inch long, thin wall (Shelby) tubes to obtain relatively undisturbed samples for laboratory testing. These samples were recovered by attaching the Shelby tube to the end of the drill rods and pushing the rods (and sampler) using hydraulic ram pressure from the rig into the soil at the bottom of the advancing boring. The sampling device was allowed to stay in the hole for approximately 5 to 10 minutes to allow the sample to adhere to the tube at which point it was removed from the bottom of the boring. The exposed soils at the bottom of the tube samples were tested in the field using a pocket penetrometer and a torvane apparatus (see Section 4.0 for a description of these tests). The ends of the tubes were sealed with plastic caps, labeled, and fixed in an upright position for transporting to our Anchorage and Seattle laboratories. The ends of the samples that were shipped to our Seattle laboratory were sealed with wax prior to shipping.

The soils encountered were observed and described in the field in general accordance with the classification system described by ASTM International (ASTM) D2488. Selected samples recovered during drilling were tested in our laboratory to refine our soil descriptions in general accordance with the Unified Soil Classification System (USCS) described in Figure 3. Frost classifications were also estimated for samples based on laboratory testing (sieve analyses, P-200, and hydrometer) and are shown on the boring logs. The frost classification system is presented in Figure 4. Summary logs of the borings are presented in Figures 5 through 13 and subsurface profiles summarizing the soil conditions encountered during these explorations are included in Figures 14 through 16.

Borings B-02-17, B-04-17, B-06-17, and B-08-17 were completed by installing 1.5-inch, polyvinyl chloride (PVC) observation wells with hand-slotted tips to depths of 38 to 40 feet bgs to facilitate observation of groundwater levels. The annular space around the casings was

backfilled with pea gravel or on-site gravel materials to several feet above the casing. The installation details for the observation wells are shown on the boring logs. Above the gravel pack, the annular space was sealed with at least 5 feet of bentonite and then by natural caving of formation materials or on-site gravel materials to the ground surface. The well casings were cutoff slightly below the ground surface and covered with a flush-mount protective cover. Boring B-01-17 was completed by installing a 2-inch ID, flush-threaded, PVC casing to the bottom of the boring to facilitate downhole shear wave testing. The annular space around the casing was sealed with a bentonite-cement grout to approximately 5 feet bgs. The casing was cutoff about six inches below the ground surface and covered with a flush-mount protective cover. The remaining borings were completed by backfilling the hole with auger cuttings produced during drilling or with on-site gravel materials. Drill fluid and cuttings produced during mud rotary drilling were transported and disposed of in a pit excavated by the POA in the North Extension area.

3.2 Limited Environmental Site Assessment Field Activities

Field activities associated with our limited environmental site assessment consisted of field screening and collection of analytical soil samples. Soil samples recovered during drilling were "screened" for volatile organic vapors using a photoionization detector (PID) and an Alaska Department of Environmental Conservation (ADEC)-approved headspace screening technique. The PID was calibrated before screening activities with 100 parts per million (ppm) isobutylene standard gas. The field screening samples were collected in re-sealable plastic bags, warmed to a common temperature, and tested within 60 minutes of collection. Field screening results are presented on the boring logs and discussed briefly in Section 5.0. Note that field screening was only conducted on samples from above and near the top of the clay layer (see Section 5.0) encountered beneath the site. In addition to headspace screening, field screening was also conducted using a direct screening technique on samples from below the groundwater table but above the clay layer to aid in determining whether to collect additional samples for analytical sampling. In the direct screening method, field screening was conducted by creating an indentation with a clean spoon in the soil of a fresh sample and taking a reading within the indentation.

The screening results were also used to segregate potentially contaminated soil cuttings and drill fluid that may have been cross contaminated during drilling. Headspace screening results greater than 10 ppm (Boring B-02-17) were considered potentially contaminated and drill cuttings and fluid generated while advancing the borings through the contaminated zone were placed in 55-gallon drums until analytical results were available to characterize the drummed materials for

future disposal. The drummed materials were disposed in the POA provided disposal area on June 15, 2017, after approval by the PMC.

Analytical sampling was performed during drilling to support the limited environmental site assessment described in our scope of work. Analytical samples were generally collected from samples recovered from above and near the top of the groundwater table during drilling. Additional samples were collected when the groundwater table was difficult to detect (due to drilling techniques) or when direct screening results or visual/olfactory indications suggested potential contamination was present below the water table. Shannon & Wilson's field representative used decontaminated stainless steel spoons to transfer portions of the soil samples recovered from the borings into laboratory-supplied containers for analytical testing. The analytical soil samples tested for volatile constituents were collected using methanol preservation. At least 25 grams of soil were placed into a laboratory supplied 4-ounce jar that had been pre-weighed. Immediately afterward, 25 milliliters of reagent grade methanol was added to submerge the soil. The samples were transported to the laboratory in coolers with ice packs using chain-of-custody procedures. Soil analytical test results are discussed briefly in Section 5.3 and summarized in Table 3. The SGS laboratory reports are provided in Appendix B.

3.3 Shear Wave Velocity Testing

Shear wave velocity testing was completed in Boring B-01-17 on May 24, 2017. The testing was performed in general accordance with the procedures of ASTM International (ASTM) D7400. A shear wave beam, struck by a 12-pound sledge hammer, was used as the shear wave source. Data was collected using a Geostuff BHG-3 borehole geophone connected to a Geometrics Geode 24-channel seismograph. Data were generally collected at one meter intervals to approximately 195 feet bgs. Interpreted shear wave velocity results along with the calculated interval velocities are presented on Figure 17.

4.0 LABORATORY TESTING

Laboratory tests were performed on selected samples recovered from the borings to confirm field descriptions and to estimate the index properties of the typical materials encountered. The index testing was formulated with emphasis on estimating the material gradation, in-situ water content, and plasticity characteristics. Testing was also performed on Shelby tube samples of recovered fine-grained soils to estimate the materials' consolidation properties. Prior to testing, the lab test program was reviewed and approved by representatives from AECOM. Selected analytical samples were also tested to assess the presence of certain regulated substances in the soil samples recovered during drilling.

4.1 Moisture Content and Classification Tests

Water content tests were performed on the samples returned to our laboratory. The tests were performed in general accordance with ASTM D2216. The results of the water content measurements are presented graphically on the boring logs in Figures 5 through 13.

Grain size classification (gradation) testing was performed to estimate the particle size distribution of selected samples from the borings. The gradation testing generally followed the procedures described in ASTM C117/C136 and D422. The test results are presented in Appendix A, Figure A-1 and summarized on the boring logs as percent gravel, percent sand, and percent fines. Percent fines on the boring log are equal to the sum of the silt and clay fractions indicated by the percent passing the No. 200 sieve. Note that hydrometer testing indicates particle size only and visual classification under USCS designates the entire fraction of soil finer than the No. 200 sieve as silt. Plasticity characteristics (Atterberg Limits results) are required to differentiate between silt and clay soils under USCS.

Atterberg Limits were evaluated for 29 samples of cohesive/fine-grained soil recovered during drilling to estimate plasticity characteristics. These tests generally followed procedures described in ASTM D4318. The results are presented in Appendix A, Figure A-2 and on the boring logs.

4.2 Strength Testing

Limited strength testing was performed on selected samples of the fine-grained soils recovered during drilling. The procedures used to estimate the strength of the silt and/or clay soils included pocket penetrometer (PP) tests and torvane (TV) tests.

PP and TV tests were performed on most of the fine-grained soil specimens in the field. These tests provide an estimate of the unconfined compressive strength and undrained shear strength of the sample, respectively. Remolded TV tests were also performed in the laboratory to estimate the sensitivity of the samples to disturbance by remolding the samples by hand and performing a TV test on a new flat surface. Tests were performed at horizontal and vertical orientations where possible. PP and TV measurements on Shelby tube samples were taken on the ends of the samples in the field and recorded on the boring logs. After extrusion of the soil from the tube in the laboratory, PP and TV measurements were again taken on the Shelby tube samples and may not match the values shown on the boring logs because they were logged at different times. The results of the PP and TV measurements performed in the field are presented on the boring logs. Results of measurements performed on samples in the laboratory are discussed in Section 5.1.

4.3 Consolidation Tests

One dimensional consolidation tests were performed on 22 undisturbed samples (Shelby tube samples) of fine-grained soils to estimate preconsolidation pressures and consolidation properties on these soils. The tests were performed in accordance with Method B of ASTM D2435. In this test, performed in a consolidometer, samples extruded from Shelby tubes were first trimmed and fitted into a rigid ring. Porous stones were then placed on the top and bottom of the specimen to allow drainage. The specimen was then loaded in increments and the axial deflection monitored over time. The deflection at the end of each load increment was used to plot the void ratio and percent settlement versus log of the actual pressure. The results of this testing are presented in Appendix A, Figures A-3 through A-24 and discussed in Section 5.3.

4.4 Analytical Testing

Six soil samples from the explorations were submitted to SGS for analytical testing, using chain-of-custody procedures. The soil samples selected for testing were based on PID readings or to provide a representative areal distribution. All samples tested were analyzed for gasoline range organics (GRO) by Alaska Method (AK) 101, diesel range organics (DRO) by AK 102, and residual range organics (RRO) by AK 103. Samples were selectively analyzed for volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260C; benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8021B; polynuclear aromatic hydrocarbons (PAHs) and pesticides by EPA Method 8270D SIM; polychlorinated biphenyls (PCBs) by EPA Method 8082A; and Resource Conservation and Recovery Act (RCRA) Metals by EPA Method 6020A. Three methanol soil trip blanks were analyzed for GRO by AK 101 and VOCs/BTEX by EPA Method 8021B/8260C (as applicable). The results of the analytical testing are discussed in Section 5.3 and summarized in Table 3. The SGS laboratory reports are provided in Appendix B.

5.0 SUBSURFACE CONDITIONS

The subsurface soil, groundwater, and environmental conditions encountered in our explorations are described in the following subsections and presented graphically on the boring logs included in Figures 5 through 13. Subsurface profiles summarizing the soil conditions are included in Figures 14 through 16. The results of the analytical testing are summarized in Table 3 and SGS laboratory reports are provided in Appendix B. Results from previous explorations in the project area by Terracon, PND Engineers, Inc., and CH2M were also considered during development of the subsurface profiles and in the discussions below. For brevity, the details of the prior explorations, boring logs, and laboratory test results were omitted from this report but can be referenced in the following reports:

- Terracon (2004) – *Marine Geotechnical Exploration, Port of Anchorage Intermodal Expansion, Volume 1*;
- Golder Associates, Inc (2004) – *Dynamic Cone Penetrometer Testing Results, Soft Sediment Characterization Services, Port of Anchorage Expansion Contract No. 4310-1-C10*;
- PND Engineers, Inc. (2008) – *Port of Anchorage Marine Terminal Redevelopment, Geotechnical Analysis Report*; and
- CH2M (2013) – *Final Summary Report, Port of Anchorage Intermodal Expansion Project Suitability Study*

5.1 Soil Conditions

In general, borings advanced in the project area encountered four distinct soil units, in descending order:

- Artificial Fill,
- Estuarine, Tidal, and other Holocene Deposits,
- Bootlegger Cove Formation (BCF), and
- Glaciofluvial Deposits

Note that the fill layer is not present in prior explorations conducted before construction of the North Extension.

5.1.1 Artificial Fills

Artificial fills encountered in borings in the North Extension area typically ranged between 13 and 75 feet thick, with the thickness generally increasing progressively toward the seaward edge of the filled area. The fills generally consisted of very loose to dense, predominantly granular materials of varying gradation. In their Suitability Study, CH2M documented (based on PND's 2008 report) that the fills in the North Extension area include Compacted Granular Fill and un-compacted Common Fill. Compacted Granular Fills were generally used within the footprint of the open cell sheet pile (OCSP©) system and in the upper 8 feet of the embankment behind the bulkhead. Common Fill was used outside the OCSP© footprint. Based on laboratory test results from borings in the project area, the fines contents in the Compacted Granular Fill ranged between 8 and 26 percent and fines contents in the zone interpreted as Common Fill ranged between 6 and 35 percent. Moisture contents in unsaturated samples of fill materials typically ranged between approximately 3 and 10 percent.

5.1.2 Estuarine and Tidal Deposits

The fill material was underlain by soils interpreted as estuarine and tidal deposits. In the project area, these deposits predominantly consisted of non-plastic silt and silt with varying amounts of sand and gravel. Based on the explorations, the thickness of these deposits ranged from less than 5 feet to about 35 feet and were generally thicker toward the southern end of the Northern Extension area. Layers of sand and silty sand with varying gravel contents ranging from several inches to several feet thick were present in some of the explorations. Penetration resistance values suggested these materials are typically loose to very dense with the loose zones usually encountered in the upper 5 to 10 feet of the stratum. Atterberg limits results on the fine-grained materials in this stratum classified the materials as non-plastic silt. Based on our laboratory tests, fines contents in the soils encountered in this stratum ranged between 22 and 96 percent. Moisture contents typically ranged between 20 and 35 percent.

5.1.3 Bootlegger Cove Formation

The clay layer underlying the fill and estuarine/tidal deposits comprises materials of the BCF. In general, borings in the project area suggest that the BCF is relatively uniform in nature and consistency, although zones which may be interbedded with silts and sands, were encountered in the upper 5 to 10 feet of the layer in some borings. Trace amounts of sand and gravel were also encountered throughout the BCF. The top of the BCF was typically encountered at depths ranging between 43 and about 90 feet bgs [approximate elevations -9 to -55 Mean Lower Low Water (MLLW)] and extended to the bottom of the borings advanced for the current study. Borings TB-52 and TB-25, advanced by Terracon in 2004, penetrated the bottom of the BCF at elevations ranging between -152 to -160 feet MLLW. Based on penetration resistance values, the BCF in the project area would be considered medium stiff to very stiff. Pocket penetrometer tests performed on samples in the field typically estimate the unconfined compressive strength of the fine-grained BCF materials at 1.75 to 2.75 tons per square foot (tsf); while laboratory values ranged from 0.75 to 4.25. Field TV tests suggested the undrained shear strength of the fine-grained materials is estimated to range between 0.4 and 1.4 tsf; laboratory TV tests results ranged from 0.7 to about 1.8 tsf. These values suggest that the consistency of the fine-grained BCF soils encountered is generally stiff to very stiff. The following Table 1 includes a summary results from PP and TV tests performed on Shelby tube samples extracted in the laboratory. Atterberg limits testing classified the BCF materials as a lean clay with plasticity indices ranging between 9 and 26 percent. Based on our laboratory tests, fines contents in the BCF unit were typically greater than 96 percent, including random gravel particles that were noted in occasional samples. Moisture contents ranged between 23 and 35 percent.

Table 1 – Summary of Tube Sample Laboratory Test Results

Boring	Sample Number	Depth (feet bgs)	Pocket Penetrometer (tsf)	Torvane (tsf)		
				Horizontal	Vertical	Remolded
B-01-17	S12	55-56.7	2.5	0.9	0.85	0.6
	S14	65-66.7	3.5	1.0	1.25	0.63
	S16	75-77	2.75	1.38	0.85	0.43
	S18	85-87	3.0	1.38	1.63	0.65
	S20	95-97	2.75-3.25	1.25	1.25	0.65
	S22	105-107	3.5	1.13	1.63	0.65
	S26	125-127	3.25	1.38	1.13	0.53
	S30	145-147	3.75	1.5	0.88	0.6
B-02-17	S12	54.5-56.5	2.5	1.13	1.13	0.7
	S15	69.5-71.5	2.0	1.05	1.0	0.55
	S18	84.5-86.5	2.0-2.5	0.85	0.9	0.55
B-03-17	S13	60-62	2.75-4.25	1.33	1.35	0.63
	S15	70-72	2.25-3.5	1.0	1.2	0.65
B-04-17	S13	55-57	2.25	1.5	1.25	0.55
	S15	65-67	2.0	0.7	0.73	0.5
	S17	75-77	2.5	1.83	1.5	0.45
	S20	90-92	2.25	1.25	1.38	0.75
B-05-17	S13	60-62	1.25-1.75	0.9	1.0	0.45
	S15	70-72	2.0	1.0	1.25	0.6
B-06-17	S12	54-56	1.75	1.13	1.25	0.55
	S15	69-71	2.0	1.0	1.0	0.5
B-07-17	S12	55-57	2.5	1.25	1.0	0.68
	S14	65-67	1.75	1.0	0.88	0.5
	S18	85-87	2.5	1.5	1.0	0.65
	S20	95-97	2.0	0.83	0.8	0.4
	S22	105-107	2.5	1.38	1.13	0.5
	S25	120-122	1.5-2.75	0.9	0.9	0.55
	S26	125-127	2.5	1.5	1.25	0.5
	S28	135-137	3.75	1.6	1.65	NT
	S31	150-152	3.0	1.38	1.13	0.55
B-08-17	S12	54-57	1.75	1.25	1.25	0.63
	S15	69-71	1.25-2.0	0.8	0.65	0.38
	S17	79-81	2.5	1.5	1.25	0.65
B-09-17	S12	55-57	0.75-1.75	0.8	0.85	0.45
	S15	70-72	2.0	1.0	1.13	0.48

Note:
NT – Not tested

Consolidation test results were analyzed graphically using the Casagrande construction. The test results and analyses suggest that the BCF clays beneath the site are overconsolidated with overconsolidation ratios (OCR) ranging between 2.9 and 5.7. A summary of the OCR analyses is included in Table 2.

Table 2 – Summary of Consolidation Test Results

Boring	Sample	Depth	Effective Overburden Stress (σ') (tsf)*	Estimated Preconsolidation Pressure (σ'_p) (tsf)	Calculated OCR
B-01-17	S12	55-56.7	2.09	11.7	5.6
	S14	65-66.7	2.38	11.7	4.9
	S18	85-87	2.96	13.0	4.4
	S22	105-107	3.53	13.7	3.9
	S30	145-147	4.69	13.7	2.9
B-02-17	S12	54.5-56.5	2.00	11.0	5.5
B-03-17	S15	70-72	2.44	13.1	5.4
B-04-17	S13	55-57	2.17	12.3	5.7
	S17	75-77	2.74	12.4	4.5
	S20	90-92	3.17	10.3	3.2
B-05-17	S15	70-72	2.38	10.1	4.2
B-06-17	S12	54-56	1.92	9.4	4.9
	S15	69-71	2.35	11.3	4.8
B-07-17	S12	55-57	1.95	6.5	3.3
	S14	65-67	2.24	8.8	3.9
	S18	85-87	2.82	10.2	3.6
	S22	105-107	3.39	11.0	3.2
	S26	125-127	3.97	12.0	3.0
	S31	150-152	4.69	14.2	3.0
B-08-17	S12	54-56	1.90	10.3	5.4
	S17	79-81	2.62	11.1	4.2
B-09-17	S15	70-72	2.38	10.1	4.2

Note:
Effective overburden stress estimated based on assumed soil unit weights and groundwater depths estimated at the time of drilling or measured in observation wells.

5.1.4 Glaciofluvial Deposits

Based on prior explorations in the project area, dense to very deposits of sand and gravel, interbedded with hard, clay underlie the BCF. These deposits are typically encountered at elevations ranging between -150 and -175 MLLW and are thought to extend to a depth of about 600 feet.

5.2 Groundwater Conditions

Groundwater was encountered at approximately 13 to 20 feet bgs during drilling. Water levels measured on May 24, 2017 in the observation wells installed in Borings B-02-17, B-04-17, B-06-17, and B-08-17 ranged between 10.3 and 17.4 feet bgs. A second aquifer is generally present in the glaciofluvial deposits below the BCF. Often, static water levels in this deeper aquifer rise to several tens of feet above the ground surface when a conduit through the relatively impermeable BCF is provided.

Note that water levels in the near-shore area at the POA are likely influenced by tidal fluctuations and may also fluctuate by several feet seasonally or during periods of high precipitation or rapid snow melt.

5.3 Environmental Field Screening and Sample Results

Soil samples recovered during drilling were field screened for volatile organics using a PID. Screening results registered between 0.2 and 3.4 ppm. Readings of 7.2 and 14.7 ppm were registered in Boring B-05-17 in a sample recovered from 10 to 12 feet bgs, and in Boring B-02-17 in a sample recovered from 25 to 27 feet bgs, respectively. Additionally, potential hydrocarbon odors were noted in the 25 to 27 feet bgs sample from Boring B-02-17.

Analytical soil sample results were compared to the ADEC cleanup levels presented in the November 2016, 18 Alaska Administrative Code (AAC) 75 regulations. The applicable soil criteria listed in Table 3 consist of the most stringent ADEC Method Two cleanup levels listed in Tables B1 and B2 of 18 AAC 75.341, for the “under 40-inch (precipitation) zone”.

5.3.1 Discussion of Results

DRO, RRO, 13 PAH compounds, and four pesticides were detected at concentrations less than the most stringent ADEC Method Two cleanup levels in at least one soil sample submitted for testing. Except for arsenic, RCRA metals were detected in Samples B3S2 and B5S3 at concentrations less than the ADEC Method Two migration to groundwater cleanup levels. Arsenic was detected in both samples at concentrations that exceed the ADEC Migration to

Groundwater cleanup levels. Although the arsenic concentrations exceed the ADEC cleanup levels, it is our opinion that the reported arsenic concentrations are consistent with background levels present within the Anchorage area. A summary of the soil analytical results is included in Table 3; the laboratory report is included in Appendix B.

5.3.2 Quality Control

The project laboratory follows on-going quality assurance/quality control procedures to evaluate conformance to applicable ADEC data quality objectives (DQOs). Internal laboratory controls to assess data quality for this project include surrogates, method blanks, matrix spike/matrix spike duplicates (MS/MSD), and laboratory control sample/laboratory control sample duplicates (LCS/LCSD) to assess precision, accuracy, and matrix bias. If a DQO was not met, the project laboratory provides a brief narrative concerning the problem in the case narrative of their laboratory report (see Appendix B).

External quality controls for this project included laboratory-prepared soil trip blanks. The trip blanks accompanied the sample jars from the laboratory to the site during sampling activities and back again to SGS. One soil trip blank (STB2) contained an estimated concentration (J-flagged) of GRO. GRO was not detected in the corresponding samples (B4S4 and B7S2). In our opinion, this estimated detection of GRO does not impact data usability for the project.

Shannon & Wilson conducted a limited data assessment to review the laboratory's compliance with precision, accuracy, sensitivity, and completeness to the DQOs. Shannon & Wilson reviewed the SGS data deliverables. There were no non-conformances that would adversely affect the quality or usability of the data.

6.0 CLOSURE AND LIMITATIONS

This report was prepared for the exclusive use of our client and their representatives for evaluating the site as it relates to the geotechnical aspects discussed herein. The conclusions contained in this report are based on site conditions as they presently exist. It is assumed that the exploratory borings are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the explorations.

If there is a substantial lapse of time between the submittal of this report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at or adjacent to the site, it is recommended that this report be reviewed to determine the applicability of the conclusions considering the changed conditions and time lapse. Unanticipated soil

conditions are commonly encountered and cannot fully be determined by merely taking soil samples or advancing borings. Shannon & Wilson has prepared the attachments in Appendix D *Important Information About Your Geotechnical/Environmental Report* to assist you and others in understanding the use and limitations of the reports.

Copies of documents that may be relied upon by our client are limited to the printed copies (also known as hard copies) that are signed or sealed by Shannon & Wilson with a wet, blue ink signature. Files provided in electronic media format are furnished solely for the convenience of the client. Any conclusion or information obtained or derived from such electronic files shall be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, or you question the authenticity of the report please contact the undersigned.

We appreciate this opportunity to be of service. Please contact the undersigned at (907) 561-2120 with questions or comments concerning the contents of this report.

SHANNON & WILSON, INC.

Ryan Collins, C.P.G.
Senior Geologist

Kyle Brennan, P.E.
Vice President

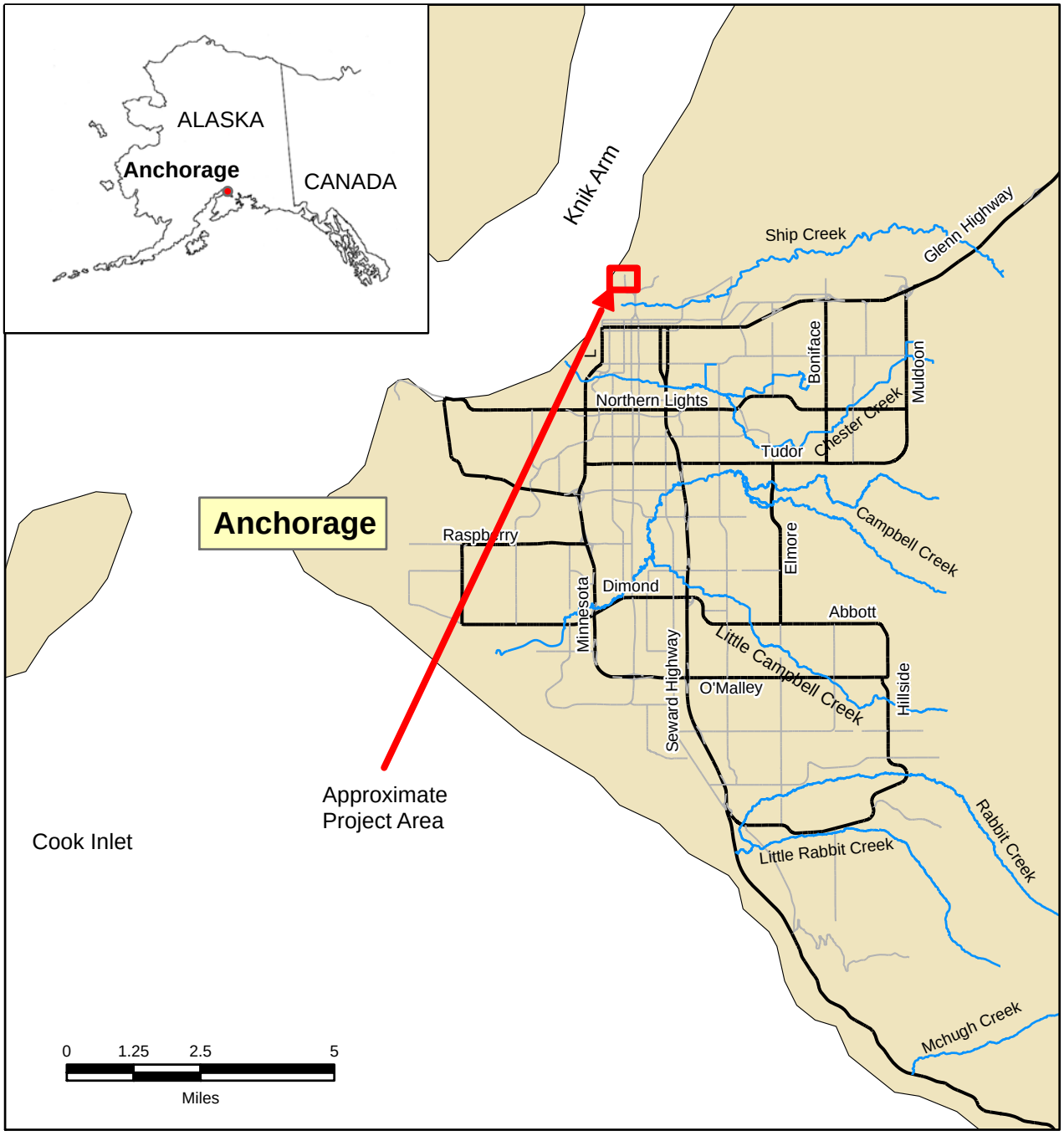
RDC/BAL:KLB

TABLE 3 - SUMMARY OF SOIL ANALYTICAL RESULTS

Parameter Tested	Method*	Cleanup Level (mg/kg)**	BoringID, Sample ID Number^ and Soil Sample Depth in Feet bgs (See Figure 2, and Figures 5 through 13)								
			Boring B-02-17	Boring B-03-17	Boring B-04-17	Boring B-05-17	Boring B-06-17	Boring B-07-17	Trip Blanks		
			B2S6 25-27	B3S2 5-7	B4S4 15-17	B5S3 10-12	B6S3 10-12	B7S2 5-7	STB1 5/3/2017	STB2 5/9/2017	STB3 5/18/2017
PID Headspace Reading - ppm	OVM 580B	-	14.7	1.4	0.9	7.2	1.9	1.8	-	-	-
Gasoline Range Organics (GRO) - mg/kg	AK 101	300	<1.38	<1.16	<1.22	<1.05	<0.930	<1.20	<0.950	**0.935 J**	<0.955
Diesel Range Organics (DRO) - mg/kg	AK 102	250	**59.8**	<10.7	**7.80 J**	**52.9**	<10.8	**10.7 J**	-	-	-
Residual Range Organics (RRO) - mg/kg	AK 103	10,000	**92.0**	**15.5 J**	**15.8 J**	**35.1**	**26.3**	**23.0**	-	-	-
Volatile Organic Compounds (VOCs)											
Benzene - mg/kg	EPA 8021B/8260C	0.022	<0.00690	<0.00520	<0.00610	<0.00690	<0.00465	<0.00595	<0.00475	<0.00475	<0.00477
Toluene - mg/kg	EPA 8021B/8260C	6.7	<0.0138	<0.0104	<0.0122	<0.0138	<0.00930	<0.0119	<0.00950	<0.00950	<0.00955
Ethylbenzene - mg/kg	EPA 8021B/8260C	0.13	<0.0138	<0.0104	<0.0122	<0.0138	<0.00930	<0.0119	<0.00950	<0.00950	<0.00955
Xylenes (total) - mg/kg	EPA 8021B/8260C	1.5	<0.0276	<0.0311	<0.0244	<0.0276	<0.0186	<0.0239	<0.0190	<0.0190	<0.0191
Other VOC Analytes - mg/kg	EPA 8260C	Various	-	ND	-	ND	-	-	-	-	ND
Polychlorinated Biphenyls (PCBs) -mg/kg	EPA 8082A	1.0	-	ND	-	ND	-	-	-	-	-
Polynuclear Aromatic Hydrocarbons (PAHs)											
2-Methylnaphthalene - mg/kg	EPA 8270D SIM	1.3	-	<0.0133	-	**0.00990 J**	-	-	-	-	-
Anthracene - mg/kg	EPA 8270D SIM	390	-	<0.0133	-	**0.0114 J**	-	-	-	-	-
Benzo(a)Anthracene - mg/kg	EPA 8270D SIM	0.28	-	<0.0133	-	**0.0320**	-	-	-	-	-
Benzo[a]pyrene - mg/kg	EPA 8270D SIM	0.20	-	<0.0133	-	**0.0271 J**	-	-	-	-	-
Benzo[b]Fluoranthene - mg/kg	EPA 8270D SIM	2.0	-	<0.0133	-	**0.0408**	-	-	-	-	-
Benzo[g,h,i]perylene - mg/kg	EPA 8270D SIM	2,300	-	<0.0133	-	**0.0169 J**	-	-	-	-	-
Benzo[k]fluoranthene - mg/kg	EPA 8270D SIM	20	-	<0.0133	-	**0.0141 J**	-	-	-	-	-
Chrysene - mg/kg	EPA 8270D SIM	82	-	<0.0133	-	**0.0357**	-	-	-	-	-
Fluoranthene - mg/kg	EPA 8270D SIM	590	-	<0.0133	-	**0.0832**	-	-	-	-	-
Indeno[1,2,3-c,d]pyrene - mg/kg	EPA 8270D SIM	2.0	-	<0.0133	-	**0.0135 J**	-	-	-	-	-
Naphthalene - mg/kg	EPA 8270D SIM	0.038	-	<0.0107	-	**0.00706 J**	-	-	-	-	-
Phenanthrene - mg/kg	EPA 8270D SIM	39	-	<0.0133	-	**0.0440**	-	-	-	-	-
Pyrene - mg/kg	EPA 8270D SIM	87	-	<0.0133	-	**0.0659**	-	-	-	-	-
Other PAH Analytes - mg/kg	EPA 8270D SIM	Various	-	<0.0133	-	<0.0138	-	-	-	-	-
Pesticides											
4,4'-DDD - mg/kg	EPA 8270D SIM	0.49	-	<0.00106	-	**0.00593**	-	-	-	-	-
4,4'-DDE - mg/kg	EPA 8270D SIM	0.72	-	<0.00106	-	**0.000940 J**	-	-	-	-	-
4,4'-DDT - mg/kg	EPA 8270D SIM	5.1	-	<0.00106	-	**0.00648**	-	-	-	-	-
gamma-BHC (Lindane) - mg/kg	EPA 8270D SIM	0.016	-	**0.000650 J**	-	<0.000815	-	-	-	-	-
Other Pesticides - mg/kg	EPA 8270D SIM	Various	-	ND	-	ND	-	-	-	-	-
RCRA Metals											
Arsenic - mg/kg	EPA 6020A	0.20	-	**7.13**	-	**5.90**	-	-	-	-	-
Barium - mg/kg	EPA 6020A	2,100	-	**61.2**	-	**62.5**	-	-	-	-	-
Cadmium - mg/kg	EPA 6020A	9.1	-	**0.0770 J**	-	**0.111 J**	-	-	-	-	-
Chromium - mg/kg	EPA 6020A	100,000	-	**29.4**	-	**31.9**	-	-	-	-	-
Lead - mg/kg	EPA 6020A	400	-	**5.39**	-	**6.40**	-	-	-	-	-
Mercury - mg/kg	EPA 6020A	0.36	-	**0.0896**	-	**0.0937**	-	-	-	-	-
Selenium - mg/kg	EPA 6020A	6.9	-	<0.510	-	<0.545	-	-	-	-	-
Silver - mg/kg	EPA 6020A	11	-	<0.102	-	<0.109	-	-	-	-	-

Notes:

*	= See Appendix B for compounds tested, methods, and laboratory reporting limits
**	= Soil cleanup level is the most stringent ADEC Method 2 standard listed in Table B1 or B2, 18 AAC 75 (November 2016), for the "under 40 inches (precipitation) zone"
^	= Sample ID number preceded by "02579-" on the chain of custody form
mg/kg	= Milligram per kilogram
<1.38	= Analyte not detected; laboratory limit of detection of 1.38 mg/kg
59.8	= Analyte detected
7.13	= Reported concentration exceeds the ADEC cleanup level
-	= Not applicable or sample not tested for this analyte
J	= Estimated concentration less than the limit of quantitation. See the SGS laboratory report for more details.
ND	= Not detected
PID	= Photoionization detector
ppm	= parts per million



Map adapted from files provided by the Municipality of Anchorage, Geographical Information Systems website

LEGEND

Streams

Streets and Roads

Major

Secondary

N

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

VICINITY MAP

June 2017

32-1-02579

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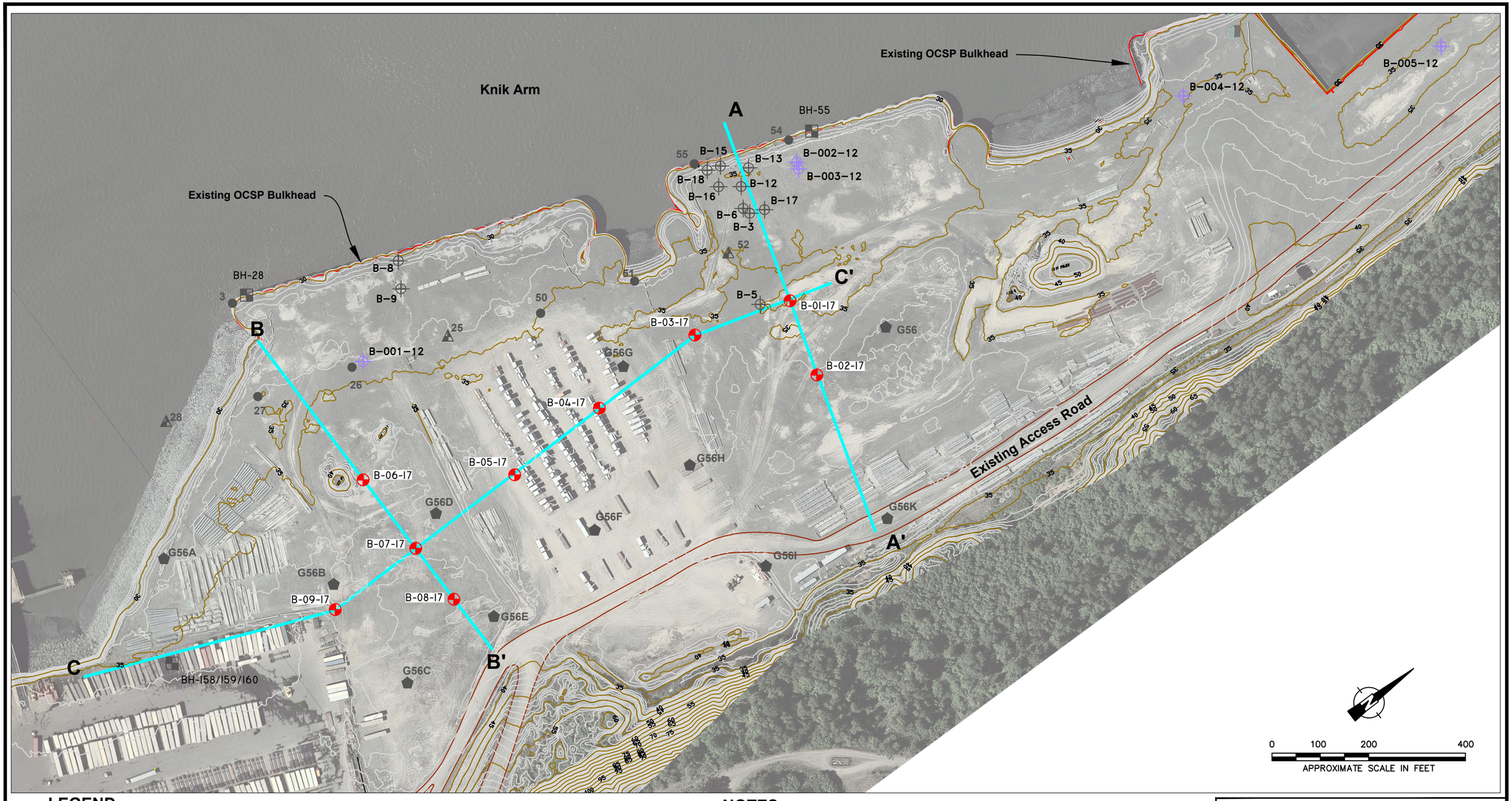
FIG. 1



LEGEND

B-01-17 — Approximate Location of Boring B-01-17, Advanced by Shannon & Wilson, May 2017.

A — A' — Subsurface Profile A - A' (see Figures 14 through 16)

Topographic Contours, 1 foot interval

Approximate Location of Prior Explorations by Others

- Boring - Terracon, 2004
- CPT - Terracon, 2004
- CPT - Golder & Associates, 2004
- Boring - PND, 2008
- Boring - CH2M Hill, 2012
- BCF Boring - CH2M Hill, 2012

NOTES

1. Aerial imagery provided by the Municipality of Anchorage. Image date May 2015.
2. Topographic contours provided by the Municipality of Anchorage based on 2015 Lidar and mapping by Merrick & Company.
3. Existing explorations outside of the immediate project area may have been omitted for clarity.
4. Logs for borings advanced by Shannon & Wilson are included with this report as Figures 5 through 13. Logs of borings by others that are shown on Subsurface Profiles A-A', B-B', and C-C' (Figures 14 through 16) are included in Appendix C. Logs of other borings and CPT explorations shown above and not used to construct the profiles can be found in their respective reports.

Anchorage Port Modernization Program
Step 1 Northern Extension Stabilization
Port of Anchorage, Alaska

SITE PLAN

June 2017 — 32-1-02579

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FIG. 2

Shannon & Wilson, Inc. (S&W), uses a soil identification system modified from the Unified Soil Classification System (USCS). Elements of the USCS and other definitions are provided on this and the following pages. Soil descriptions are based on visual-manual procedures (ASTM D2488) and laboratory testing procedures (ASTM D2487), if performed.

S&W INORGANIC SOIL CONSTITUENT DEFINITIONS

CONSTITUENT[2]	FINE-GRAINED SOILS (50% or more fines)[1]	COARSE-GRAINED SOILS (less than 50% fines)[1]
Major	***Silt, Lean Clay, Elastic Silt,*** or ***Fat Clay***[3]	***Sand*** or ***Gravel***[4]
Modifying (Secondary) Precedes major constituent	30% or more coarse-grained: ***Sandy*** or ***Gravelly***[4]	More than 12% fine-grained: ***Silty*** or ***Clayey***[3]
Minor Follows major constituent	15% to 30% coarse-grained: ***with Sand*** or ***with Gravel***[4]	5% to 12% fine-grained: ***with Silt*** or ***with Clay***[3]
	30% or more total coarse-grained *and* lesser coarse-grained constituent is 15% or more: ***with Sand*** or ***with Gravel***[5]	15% or more of a second coarse-grained constituent: ***with Sand*** or ***with Gravel***[5]

[1]All percentages are by weight of total specimen passing a 3-inch sieve.
[2]The order of terms is: *Modifying Major with Minor*.
[3]Determined based on behavior.
[4]Determined based on which constituent comprises a larger percentage.
[5]Whichever is the lesser constituent.

MOISTURE CONTENT TERMS

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

STANDARD PENETRATION TEST (SPT) SPECIFICATIONS

Hammer:	140 pounds with a 30-inch free fall. Rope on 6- to 10-inch-diam. cathead 2-1/4 rope turns, > 100 rpm NOTE: If automatic hammers are used, blow counts shown on boring logs should be adjusted to account for efficiency of hammer.
Sampler:	10 to 30 inches long Shoe I.D. = 1.375 inches Barrel I.D. = 1.5 inches Barrel O.D. = 2 inches
N-Value:	Sum blow counts for second and third 6-inch increments. Refusal: 50 blows for 6 inches or less; 10 blows for 0 inches.

NOTE: Penetration resistances (N-values) shown on boring logs are as recorded in the field and have not been corrected for hammer efficiency, overburden, or other factors.

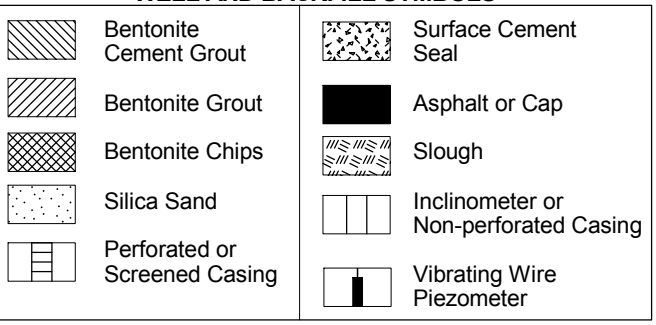
PARTICLE SIZE DEFINITIONS

DESCRIPTION	SIEVE NUMBER AND/OR APPROXIMATE SIZE
FINES	< #200 (0.075 mm = 0.003 in.)
SAND	
Fine	#200 to #40 (0.075 to 0.4 mm; 0.003 to 0.02 in.)
Medium	#40 to #10 (0.4 to 2 mm; 0.02 to 0.08 in.)
Coarse	#10 to #4 (2 to 4.75 mm; 0.08 to 0.187 in.)
GRAVEL	
Fine	#4 to 3/4 in. (4.75 to 19 mm; 0.187 to 0.75 in.)
Coarse	3/4 to 3 in. (19 to 76 mm)
COBBLES	3 to 12 in. (76 to 305 mm)
BOULDERS	> 12 in. (305 mm)

RELATIVE DENSITY / CONSISTENCY

COHESIONLESS SOILS		COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
< 4	Very loose	< 2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
> 50	Very dense	15 - 30	Very stiff
		> 30	Hard

WELL AND BACKFILL SYMBOLS



PERCENTAGES TERMS [1, 2]

Trace	< 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

[1]Gravel, sand, and fines estimated by mass. Other constituents, such as organics, cobbles, and boulders, estimated by volume.

[2]Reprinted, with permission, from ASTM D2488 - 09a Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM International, www.astm.org.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SOIL DESCRIPTION AND LOG KEY

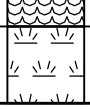
June 2017 32-1-02579

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 1 of 3

2013_BORING_CLASS1_02579 LOGS.GPJ SWNEW.GDT 6/9/17

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)
(Modified From USACE Tech Memo 3-357, ASTM D2487, and ASTM D2488)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL		TYPICAL IDENTIFICATIONS
COARSE-GRAINED SOILS *(more than 50% retained on No. 200 sieve)*	Gravels *(more than 50% of coarse fraction retained on No. 4 sieve)*	Gravel *(less than 5% fines)*	GW		Well-Graded Gravel; Well-Graded Gravel with Sand
			GP		Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Silty or Clayey Gravel *(more than 12% fines)*	GM		Silty Gravel; Silty Gravel with Sand
			GC		Clayey Gravel; Clayey Gravel with Sand
	Sands *(50% or more of coarse fraction passes the No. 4 sieve)*	Sand *(less than 5% fines)*	SW		Well-Graded Sand; Well-Graded Sand with Gravel
			SP		Poorly Graded Sand; Poorly Graded Sand with Gravel
		Silty or Clayey Sand *(more than 12% fines)*	SM		Silty Sand; Silty Sand with Gravel
			SC		Clayey Sand; Clayey Sand with Gravel
FINE-GRAINED SOILS *(50% or more passes the No. 200 sieve)*	Silts and Clays *(liquid limit less than 50)*	Inorganic	ML		Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
			CL		Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
		Organic	OL		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
	Silts and Clays *(liquid limit 50 or more)*	Inorganic	MH		Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
			CH		Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
		Organic	OH		Organic Silt or Clay; Organic Silt or Clay with Sand or Gravel; Sandy or Gravelly Organic Silt or Clay
HIGHLY-ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT		Peat or other highly organic soils (see ASTM D4427)

NOTE: No. 4 size = 4.75 mm = 0.187 in.; No. 200 size = 0.075 mm = 0.003 in.

NOTES

1. Dual symbols *(symbols separated by a hyphen, i.e., SP-SM, Sand with Silt)* are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart. Graphics shown on the logs for these soil types are a combination of the two graphic symbols (e.g., SP and SM).

2. Borderline symbols *(symbols separated by a slash, i.e., CL/ML, Lean Clay to Silt; SP-SM/SM, Sand with Silt to Silty Sand)* indicate that the soil properties are close to the defining boundary between two groups.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SOIL DESCRIPTION AND LOG KEY

June 2017 32-1-02579

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3
Sheet 2 of 3

GRADATION TERMS

Poorly Graded	Narrow range of grain sizes present or, within the range of grain sizes present, one or more sizes are missing (Gap Graded). Meets criteria in ASTM D2487, if tested.
Well-Graded	Full range and even distribution of grain sizes present. Meets criteria in ASTM D2487, if tested.

CEMENTATION TERMS[1]

Weak	Crumbles or breaks with handling or slight finger pressure
Moderate	Crumbles or breaks with considerable finger pressure
Strong	Will not crumble or break with finger pressure

PLASTICITY[2]

DESCRIPTION	VISUAL-MANUAL CRITERIA	APPROX. PLASITICTY INDEX RANGE
Nonplastic	A 1/8-in. thread cannot be rolled at any water content.	< 4
Low	A thread can barely be rolled and a lump cannot be formed when drier than the plastic limit.	4 to 10
Medium	A thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. A lump crumbles when drier than the plastic limit.	10 to 20
High	It take considerable time rolling and kneading to reach the plastic limit. A thread can be rerolled several times after reaching the plastic limit. A lump can be formed without crumbling when drier than the plastic limit.	> 20

ADDITIONAL TERMS

Mottled	Irregular patches of different colors.
Bioturbated	Soil disturbance or mixing by plants or animals.
Diamict	Nonsorted sediment; sand and gravel in silt and/or clay matrix.
Cuttings	Material brought to surface by drilling.
Slough	Material that caved from sides of borehole.
Sheared	Disturbed texture, mix of strengths.

PARTICLE ANGULARITY AND SHAPE TERMS[1]

Angular	Sharp edges and unpolished planar surfaces.
Subangular	Similar to angular, but with rounded edges.
Subrounded	Nearly planar sides with well-rounded edges.
Rounded	Smoothly curved sides with no edges.
Flat	Width/thickness ratio > 3.
Elongated	Length/width ratio > 3.

ACRONYMS AND ABBREVIATIONS

ATD	At Time of Drilling
Diam.	Diameter
Elev.	Elevation
ft.	Feet
FeO	Iron Oxide
gal.	Gallons
Horiz.	Horizontal
HSA	Hollow Stem Auger
I.D.	Inside Diameter
in.	Inches
lbs.	Pounds
MgO	Magnesium Oxide
mm	Millimeter
MnO	Manganese Oxide
NA	Not Applicable or Not Available
NP	Nonplastic
O.D.	Outside Diameter
OW	Observation Well
pcf	Pounds per Cubic Foot
PID	Photo-Ionization Detector
PMT	Pressuremeter Test
ppm	Parts per Million
psi	Pounds per Square Inch
PVC	Polyvinyl Chloride
rpm	Rotations per Minute
SPT	Standard Penetration Test
USCS	Unified Soil Classification System
q_u	Unconfined Compressive Strength
VWP	Vibrating Wire Piezometer
Vert.	Vertical
WOH	Weight of Hammer
WOR	Weight of Rods
Wt.	Weight

STRUCTURE TERMS[1]

Interbedded	Alternating layers of varying material or color with layers at least 1/4-inch thick; singular: bed.
Laminated	Alternating layers of varying material or color with layers less than 1/4-inch thick; singular: lamination.
Fissured	Breaks along definite planes or fractures with little resistance.
Slickensided	Fracture planes appear polished or glossy; sometimes striated.
Blocky	Cohesive soil that can be broken down into small angular lumps that resist further breakdown.
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay.
Homogeneous	Same color and appearance throughout.

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SOIL DESCRIPTION AND LOG KEY

June 2017 32-1-02579

SHANNON & WILSON, INC.
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FIG. 3
Sheet 3 of 3

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FROST CLASSIFICATION

(after Municipality of Anchorage, 2007)

GROUP		0.02 Mil.	P-200*	USC SYSTEM (based on P-200 results)
NFS	Sandy Soils	0 to 3	0 to 6	SW, SP, SW-SM, SP-SM
	Gravelly Soils	0 to 3	0 to 6	GW, GP, GW-GM, GP-GM
F1	Gravelly Soils	3 to 10	6 to 13	GM, GW-GM, GP-GM
F2	Sandy Soils	3 to 15	6 to 19	SP-SM, SW-SM, SM
	Gravelly Soils	10 to 20	13 to 25	GM
F3	Sands, except very fine silty sands**	Over 15	Over 19	SM, SC
	Gravelly Soils	Over 20	Over 25	GM, GC
	Clays, PI>12			CL, CH
F4	All Silts	Over 15	Over 19	ML, MH
	Very fine silty sands**			SM, SC
	Clays, PI<12			CL, CL-ML
	Varved clays and other fined grained, banded sediments			CL and ML CL, ML, and SM; SL, SH, and ML; CL, CH, ML, and SM

PI = Plasticity index
P-200 = Percent passing the number 200 sieve
0.02 Mil. = Percent material below 0.02 millimeter grain size

*Approximate P-200 value equivalent for frost classification. Value range based on typical, well-graded soil curves.

** Very fine sand : greater than 50% of sand fraction passing the number 100 sieve

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

FROST CLASSIFICATION LEGEND

June 2017 32-1-02579

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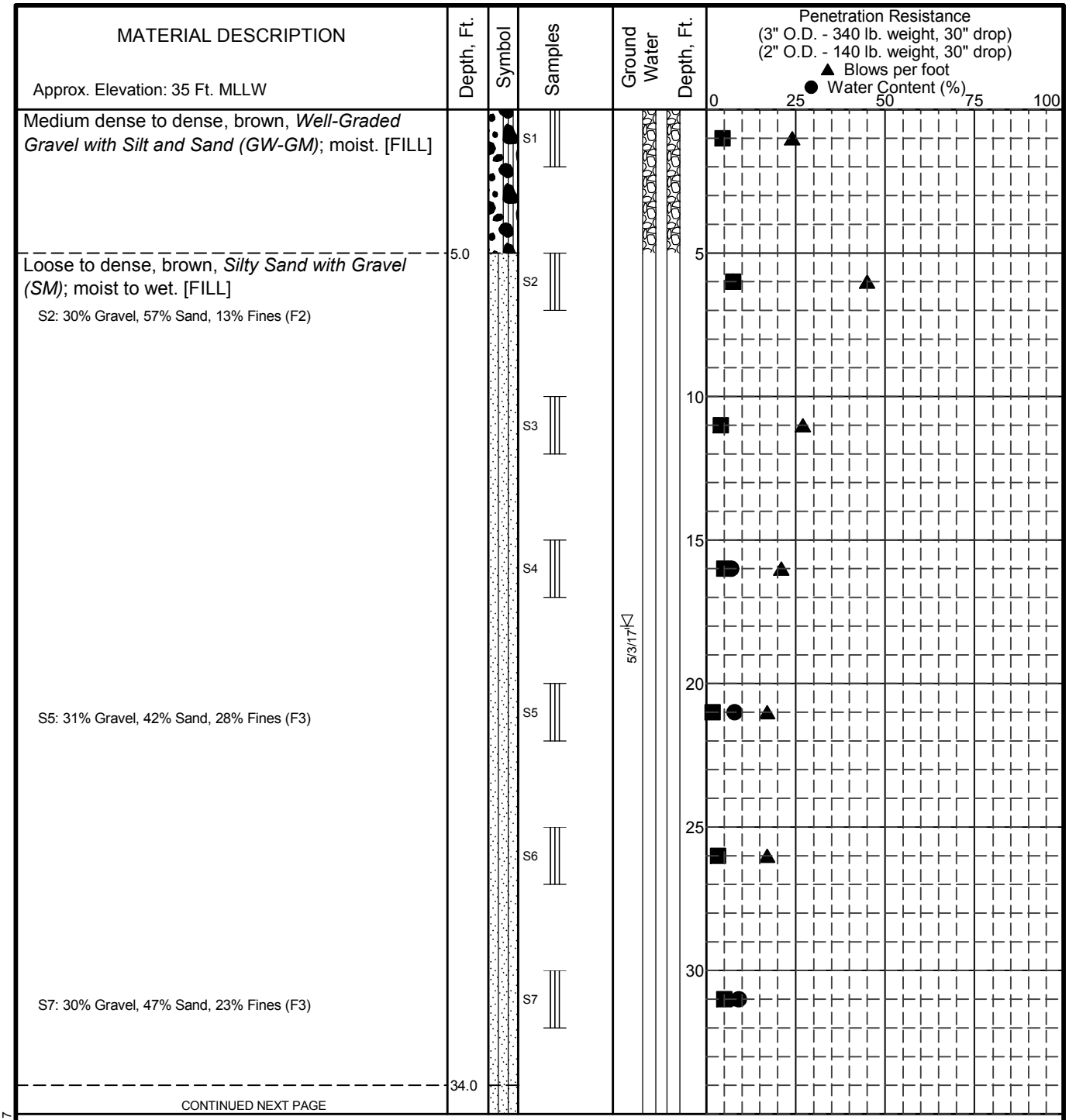
FIG. 4



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Ground Water Level At Time Of Drilling
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-01-17

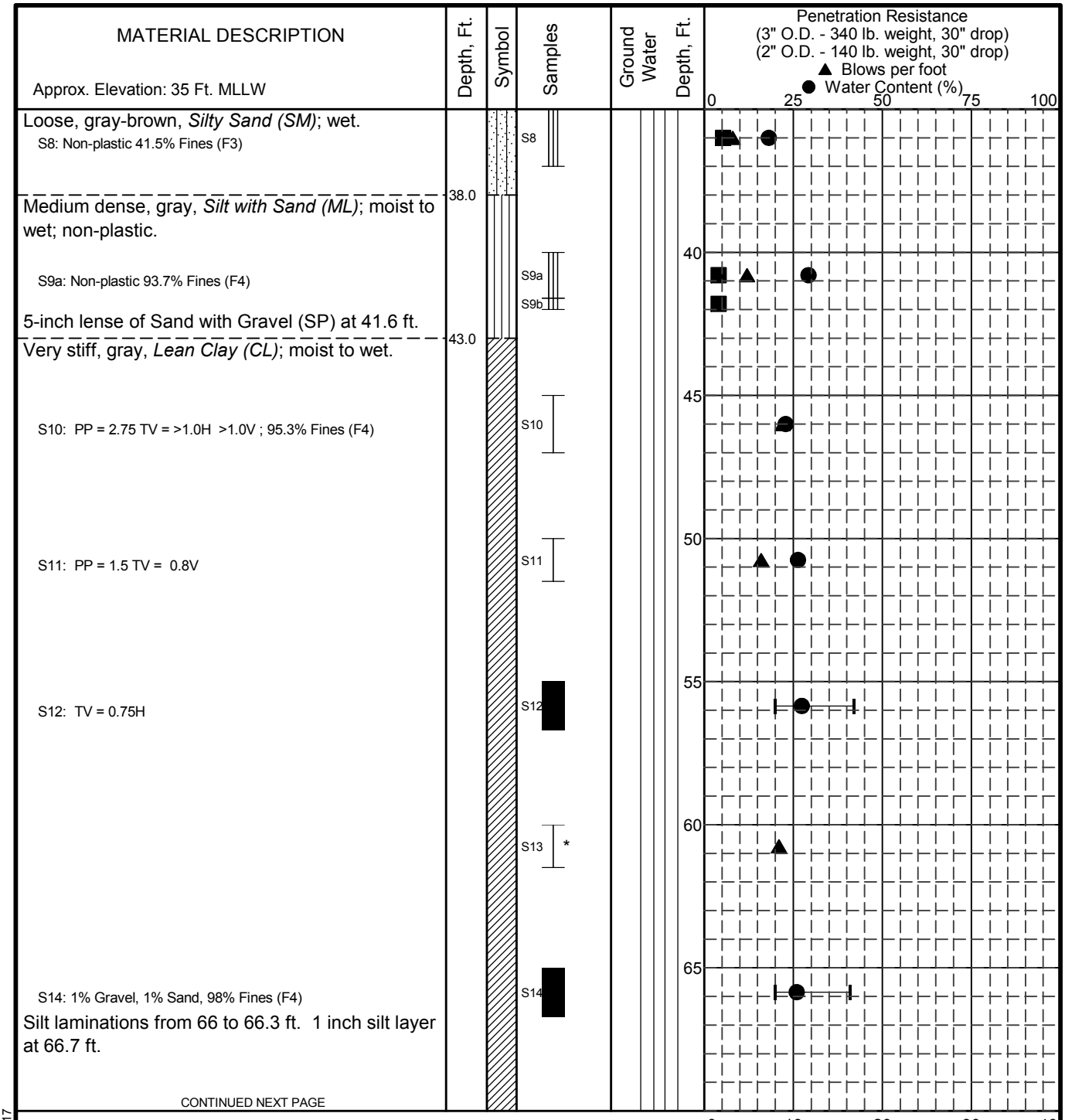
June 2017 32-1-02579

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 5
Sheet 1 of 6

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Ground Water Level At Time Of Drilling
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-01-17

June 2017 32-1-02579

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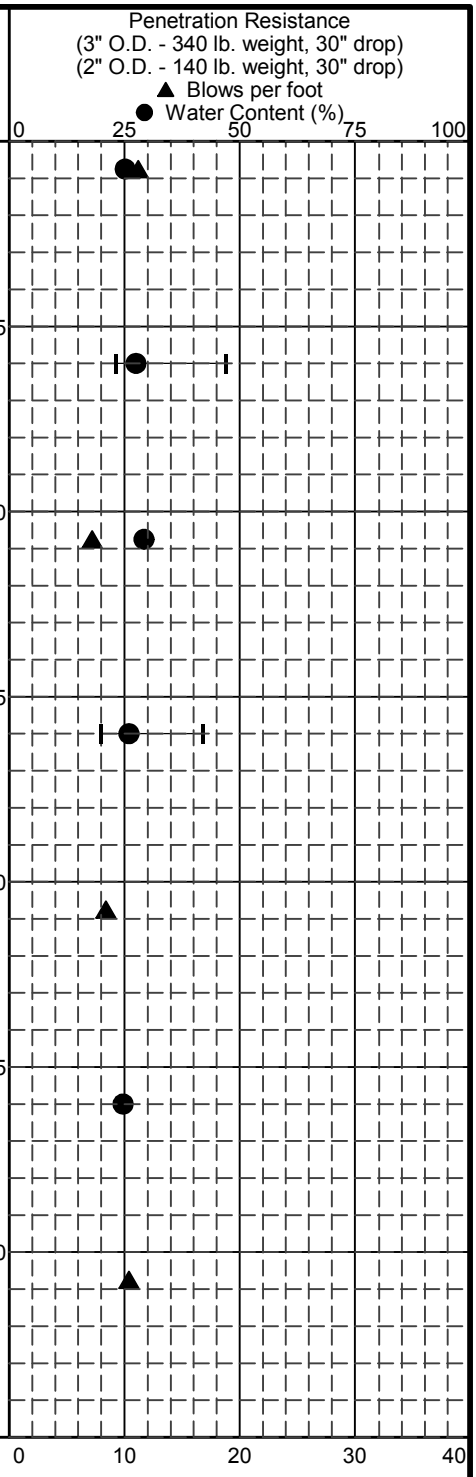
FIG. 5
Sheet 2 of 6

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Very stiff, gray, *Lean Clay (CL)*; moist to wet. S15: PP = 1.75 TV = 1.4H 1.2V			S15	
S16: TV = 1.2H			S16	
S17: PP = 2.0 TV = 1.1H 1.1V			S17	
S18: TV = 0.8H			S18	
			S19 *	
S20: PP = 1.5 TV = 0.65H 0.7V			S20	
			S21 *	
CONTINUED NEXT PAGE				



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Ground Water Level At Time Of Drilling
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-01-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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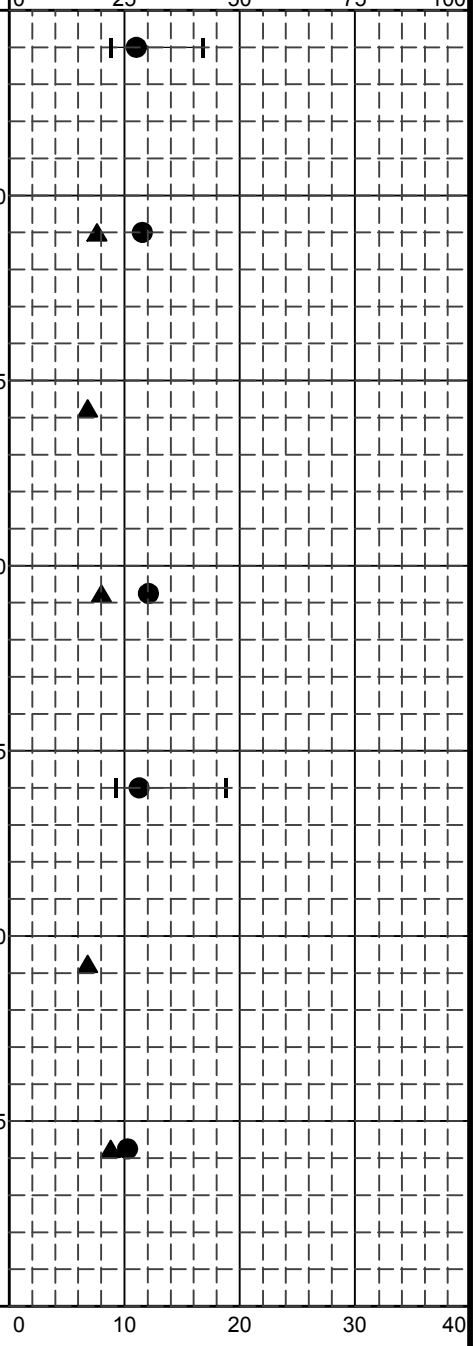
FIG. 5
Sheet 3 of 6

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.	Penetration Resistance (3" O.D. - 340 lb. weight, 30" drop) (2" O.D. - 140 lb. weight, 30" drop) ▲ Blows per foot ● Water Content (%)
Very stiff, gray, *Lean Clay (CL)*; moist to wet.					
S22: TV = 1.1H 100% Fines (F4)			S22		
S23: PP = 1.75 TV = 0.85H 0.75V			S23		
			S24 *		
S25: PP = 1.75 TV = 1.1H 0.9V			S25		
S26: TV = 1.1H			S26		
Trace gravel at 126 ft.					
S27: PP = 1.75 TV = 0.9H 0.9V			S27		
Trace gravel at 131 ft.					
Trace sand at 135 ft.					
S28: PP = 2.5 TV = 1.2H 1.3V			S28		
CONTINUED NEXT PAGE					



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Ground Water Level At Time Of Drilling
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-01-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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FIG. 5
Sheet 4 of 6

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water	Depth, Ft.
Very stiff, gray, *Clay (CL)*; moist to wet. S29: PP = 1.75-2.75 TV = 1.3H 1.4V			S29		
S30: TV = 1.4H			S30		145
Trace gravel at 150 ft. S31: PP = 2.0 TV = 0.95H 0.8V			S31		150
					155
Trace sand below 160 ft. S32: PP = 2.0 TV = 0.75H 0.9V			S32		160
					165
			S33		170

CONTINUED NEXT PAGE

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)

0 25 50 75 100

0 10 20 30 40

■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube

Ground Water Level At Time Of Drilling

Blank Section, Gravel Backfill
Blank Casing, Annular Seal
Slotted Casing, Filter Sand
Grouted Bottom Seal

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-01-17

June 2017 32-1-02579

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FIG. 5
Sheet 5 of 6

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.	Penetration Resistance (3" O.D. - 340 lb. weight, 30" drop) (2" O.D. - 140 lb. weight, 30" drop) ▲ Blows per foot ● Water Content (%)
Very stiff, gray, *Clay (CL)*; moist to wet.					
S34: PP = 1.75 TV = 0.8H 0.725V			S34		
S35: PP = 2.0 TV = 0.95H 1.05V			S35		
S36: PP = 2.5 TV = 0.7H 0.55V			S36		
Bottom of Boring Boring Completed May 9, 2017	201.5				

0 25 50 75 100

180 185 190 195 200 205

0 10 20 30 40

LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Ground Water Level At Time Of Drilling
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

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2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-01-17

June 2017 32-1-02579

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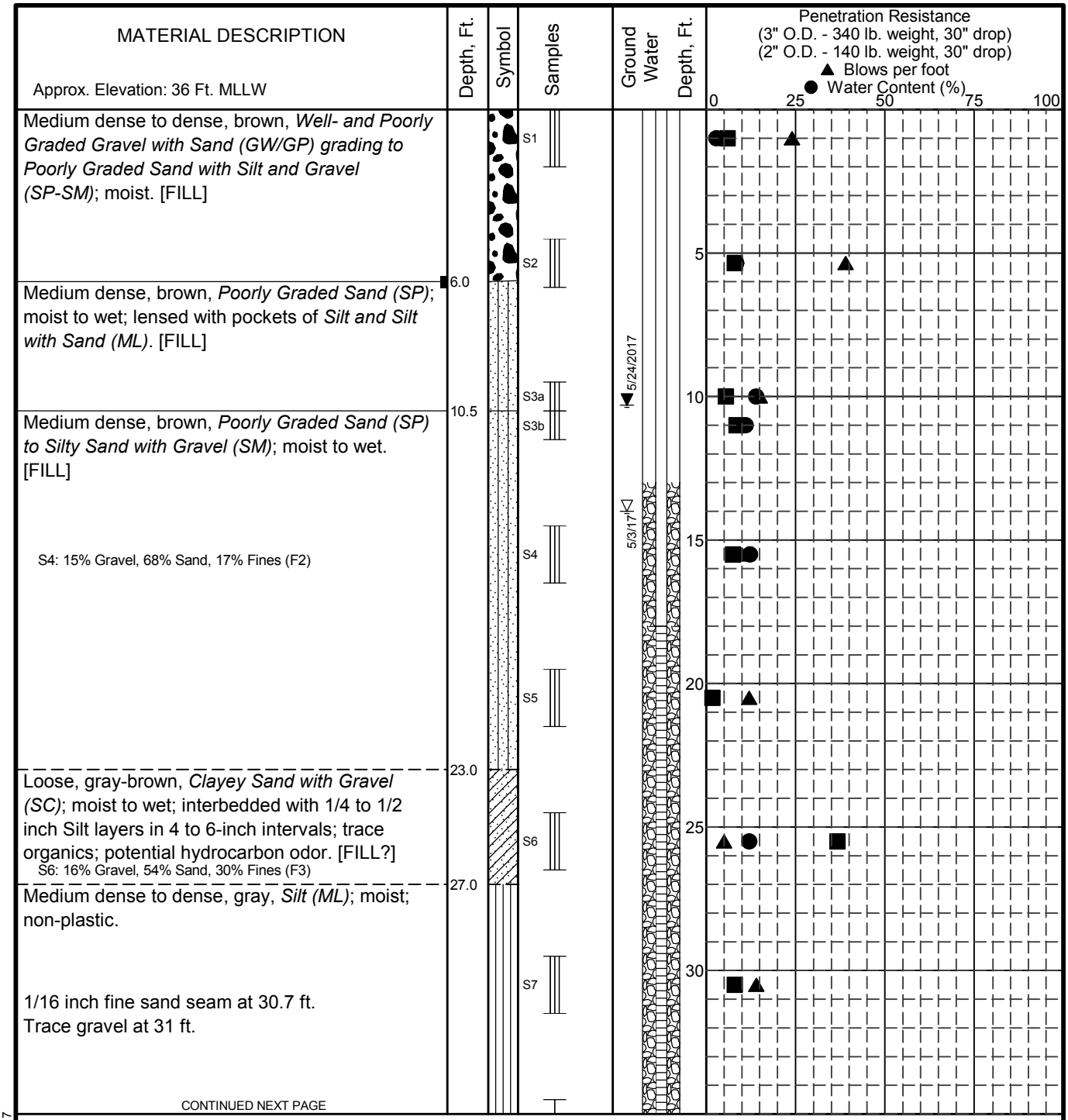
FIG. 5
Sheet 6 of 6

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Frozen
- Ground Water Level At Time Of Drilling
- Static Water Level
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal

■ PID Reading (ppm)

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-02-17

June 2017 32-1-02579

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FIG. 6
Sheet 1 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.	Penetration Resistance (3" O.D. - 340 lb. weight, 30" drop) (2" O.D. - 140 lb. weight, 30" drop) ▲ Blows per foot ● Water Content (%)
Medium dense to dense, gray, *Silt (ML)*; moist; non-plastic.			S8		0 25 50 75 100 53 blows for 16 inches
8 to 10 inch cobble encountered at 36 ft.	36.8				
Stiff to very stiff, gray, *Lean Clay (CL)*; moist.					
Trace sand at 40 ft. S9: PP = 3.25 TV = >1.0H >1.0V ; 98.7% Fines (F4)			S9		40
			S10 *		45
S11: PP = 1.5 TV = >1.0H >1.0V 1 inch silt layer at 50.9 ft.			S11		50
S12: PP = 2.0 TV = 0.95H ; 100% Fines (F4) Silt laminations from 55.5 to 55.8 ft. Trace gravel at 56.5 ft.			S12		55
Trace gravel at 60 ft. S13: PP = 1.25 TV = 0.75H 0.55V			S13		60
			S14 *		65
CONTINUED NEXT PAGE					0 10 20 30 40

LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Frozen
- Ground Water Level At Time Of Drilling
- Static Water Level
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

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2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-02-17

June 2017 32-1-02579

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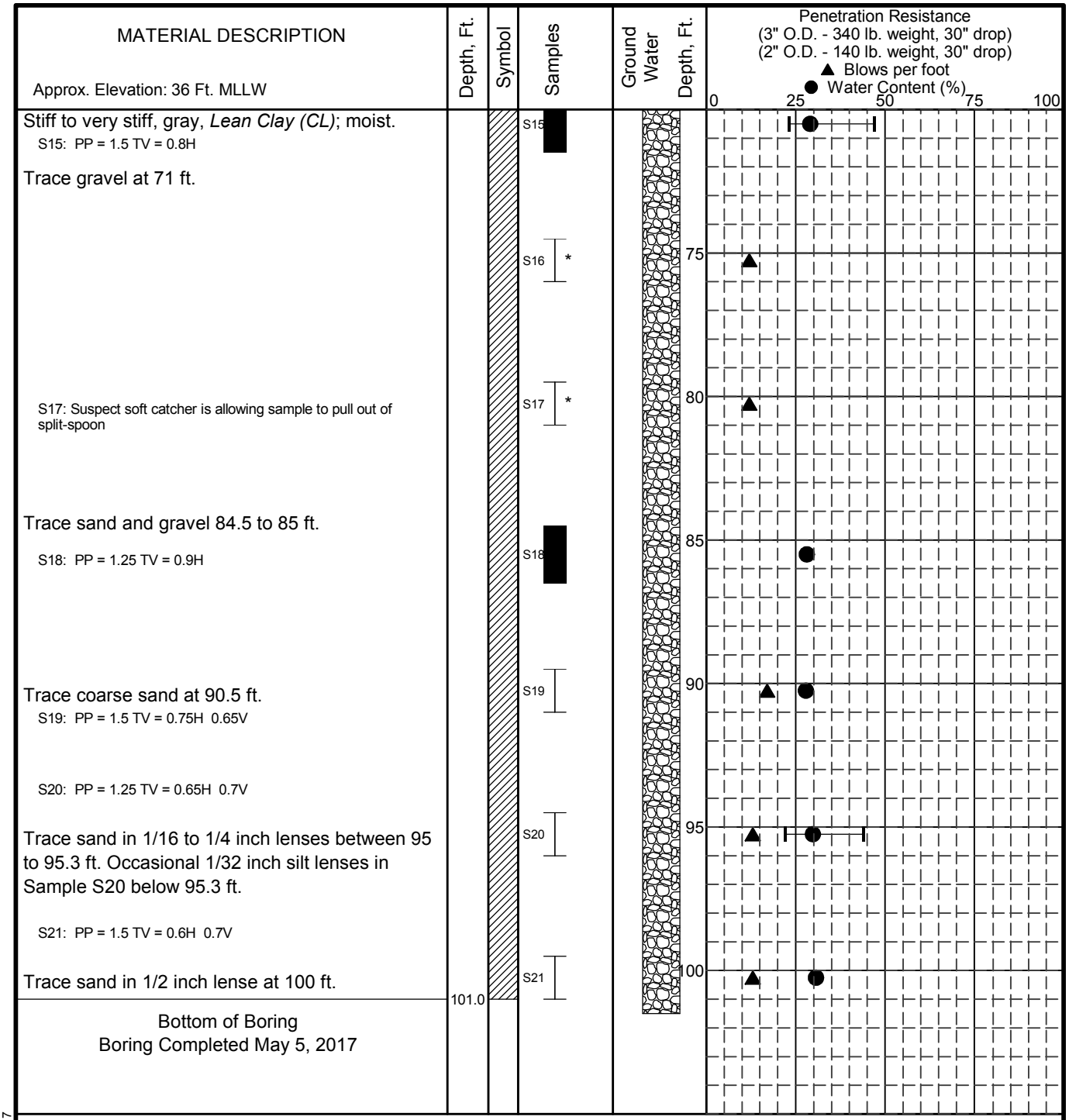
FIG. 6
Sheet 2 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

* Sample Not Recovered	Ground Water Level At Time Of Drilling
Grab Sample	Static Water Level
2" O.D. Split Spoon Sample	Blank Section, Gravel Backfill
3" O.D. Split Spoon Sample	Blank Casing, Annular Seal
Shelby Tube	Slotted Casing, Filter Sand
Frozen	Grouted Bottom Seal

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-02-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 6
Sheet 3 of 3

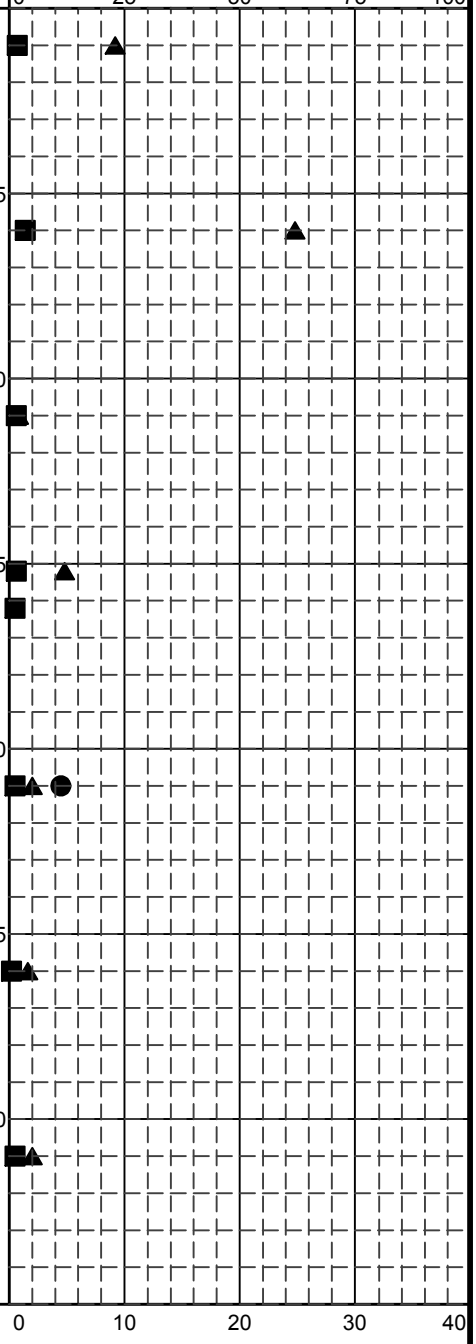
REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Medium dense, brown, *Poorly Graded Sand with Silt and Gravel (SP-SM)*; moist; trace roots. [FILL]			S1	
Very dense to very loose, brown, *Silty Sand with Gravel (SM)*; moist. [FILL]	4.0		S2 S3	
Medium dense, brown, *Poorly Graded Sand with Gravel (SP)*; wet. [FILL]	12.0			
Loose to medium dense, brown, *Silty Sand with Gravel (SM)*; wet. [FILL] S5: 20% Gravel, 48% Sand, 32% Fines (F3)	15.4		S4A S4B S5 S6 S7	5/17/17

CONTINUED NEXT PAGE

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)



LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
Ground Water Level At Time Of Drilling
■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
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3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-03-17

June 2017 32-1-02579

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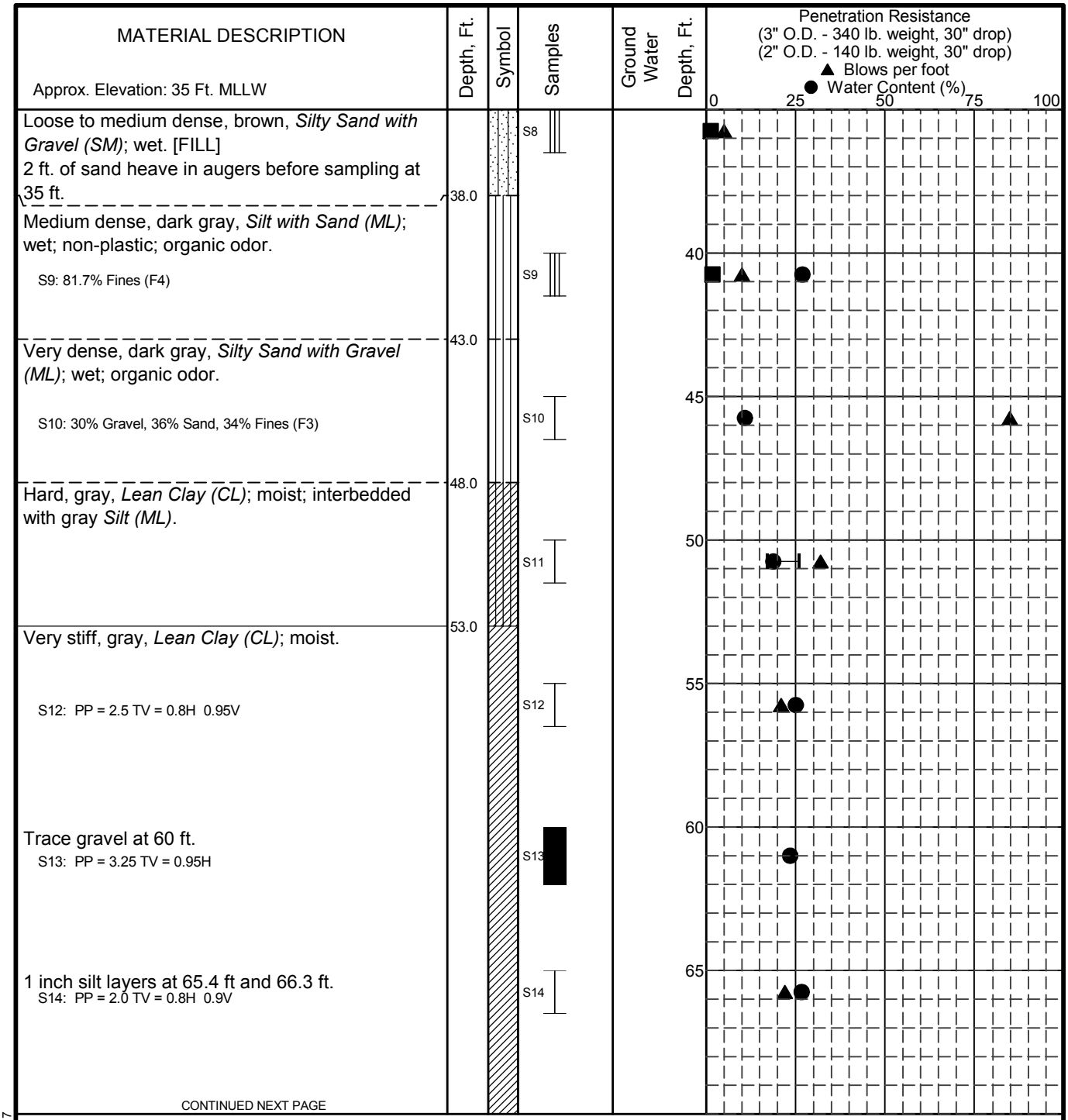
FIG. 7
Sheet 1 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- ▽ Ground Water Level At Time Of Drilling

NOTES

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-03-17

June 2017 32-1-02579

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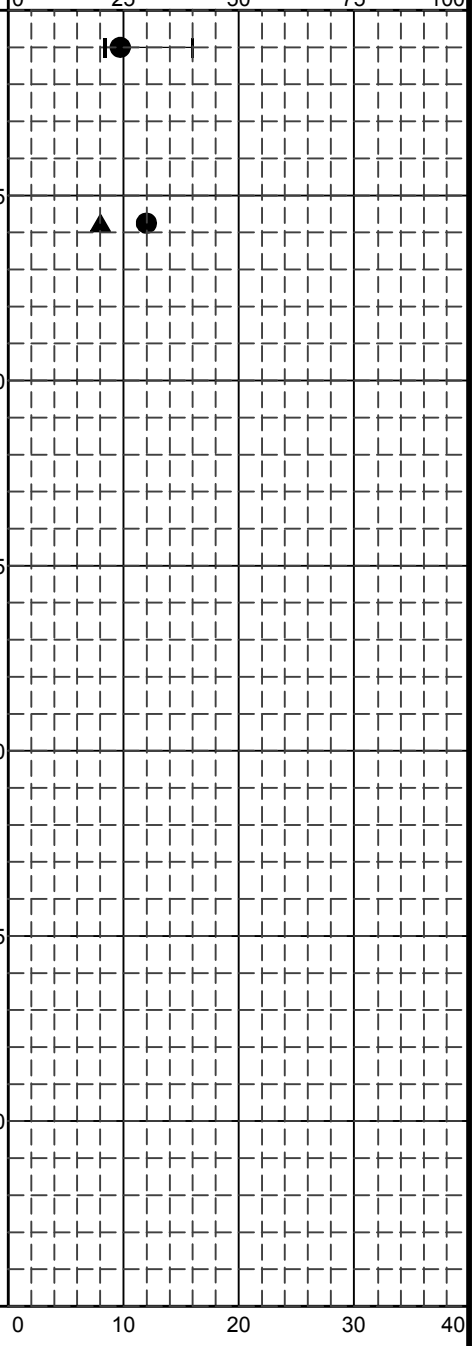
FIG. 7
Sheet 2 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Very stiff, gray, *Lean Clay (CL)*; moist. S15: PP = 3.25 TV = 0.85H Trace medium to coarse sand observed in samples below 70 feet. S16: PP = 1.5 TV = 0.65H 0.75V			S15 S16	
Bottom of Boring Boring Completed May 18, 2017	76.5			

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)



■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
▽ Ground Water Level At Time Of Drilling

NOTES

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-03-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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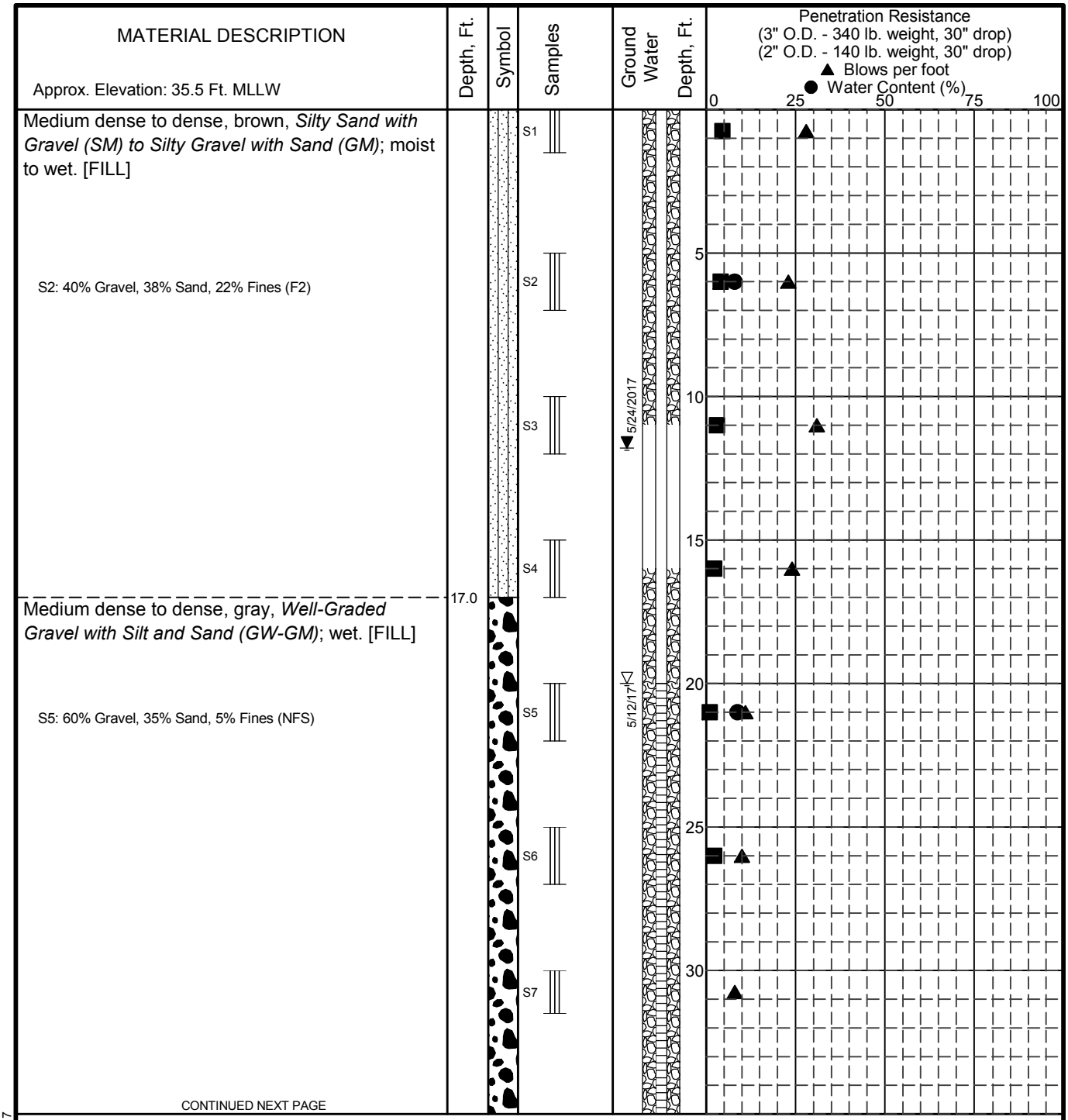
FIG. 7
Sheet 3 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

* Sample Not Recovered	Ground Water Level At Time Of Drilling
Grab Sample	Static Water Level
2" O.D. Split Spoon Sample	Blank Section, Gravel Backfill
3" O.D. Split Spoon Sample	Blank Casing, Annular Seal
Shelby Tube	Slotted Casing, Filter Sand
	Grouted Bottom Seal

■ PID Reading (ppm)

Plastic Limit ⊢●⊣ Liquid Limit

Natural Water Content

NOTES

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-04-17

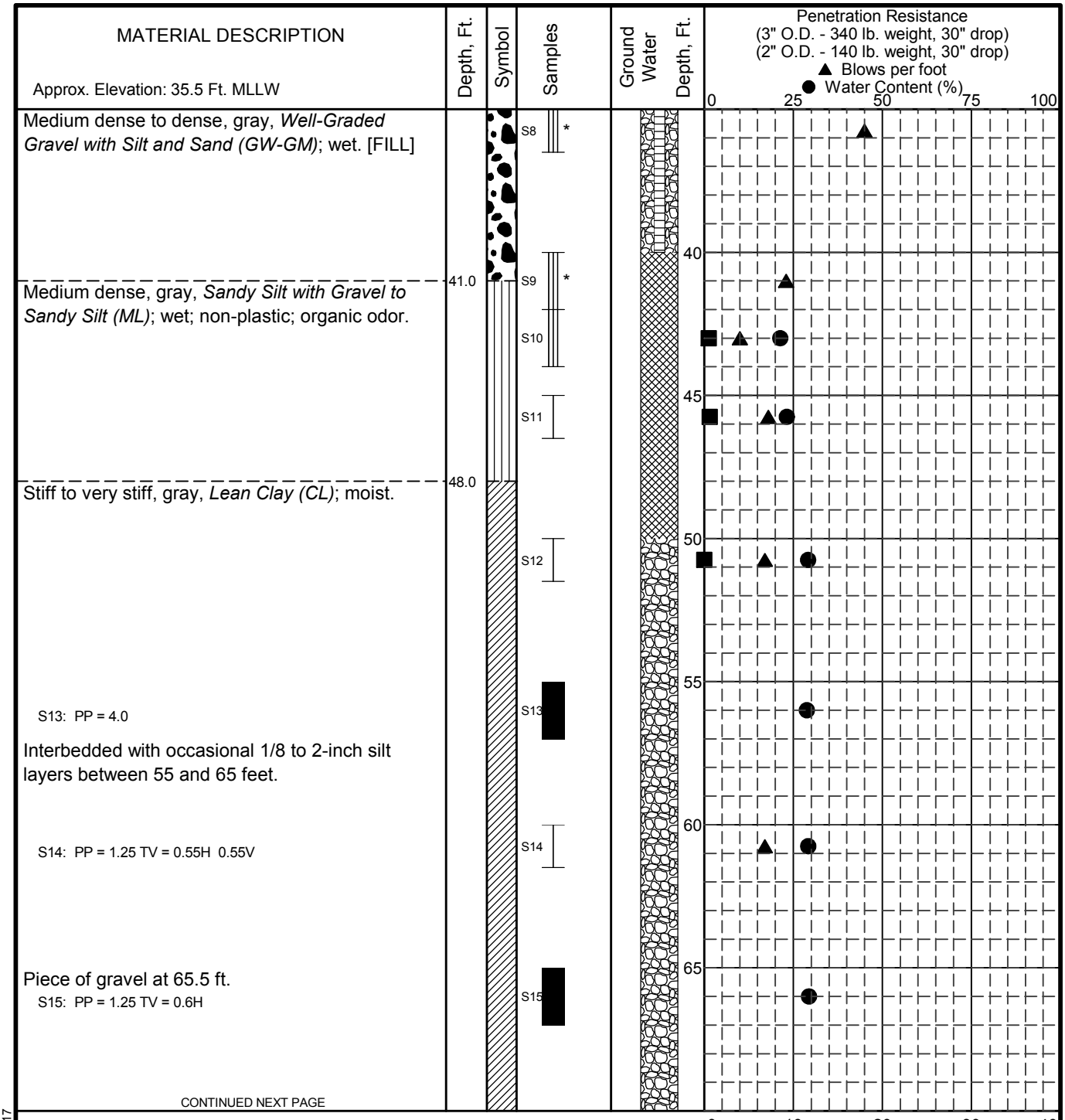
June 2017 32-1-02579

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 8
Sheet 1 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

* Sample Not Recovered	Ground Water Level At Time Of Drilling
Grab Sample	Static Water Level
2" O.D. Split Spoon Sample	Blank Section, Gravel Backfill
3" O.D. Split Spoon Sample	Blank Casing, Annular Seal
Shelby Tube	Slotted Casing, Filter Sand
	Grouted Bottom Seal

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-04-17

June 2017 32-1-02579

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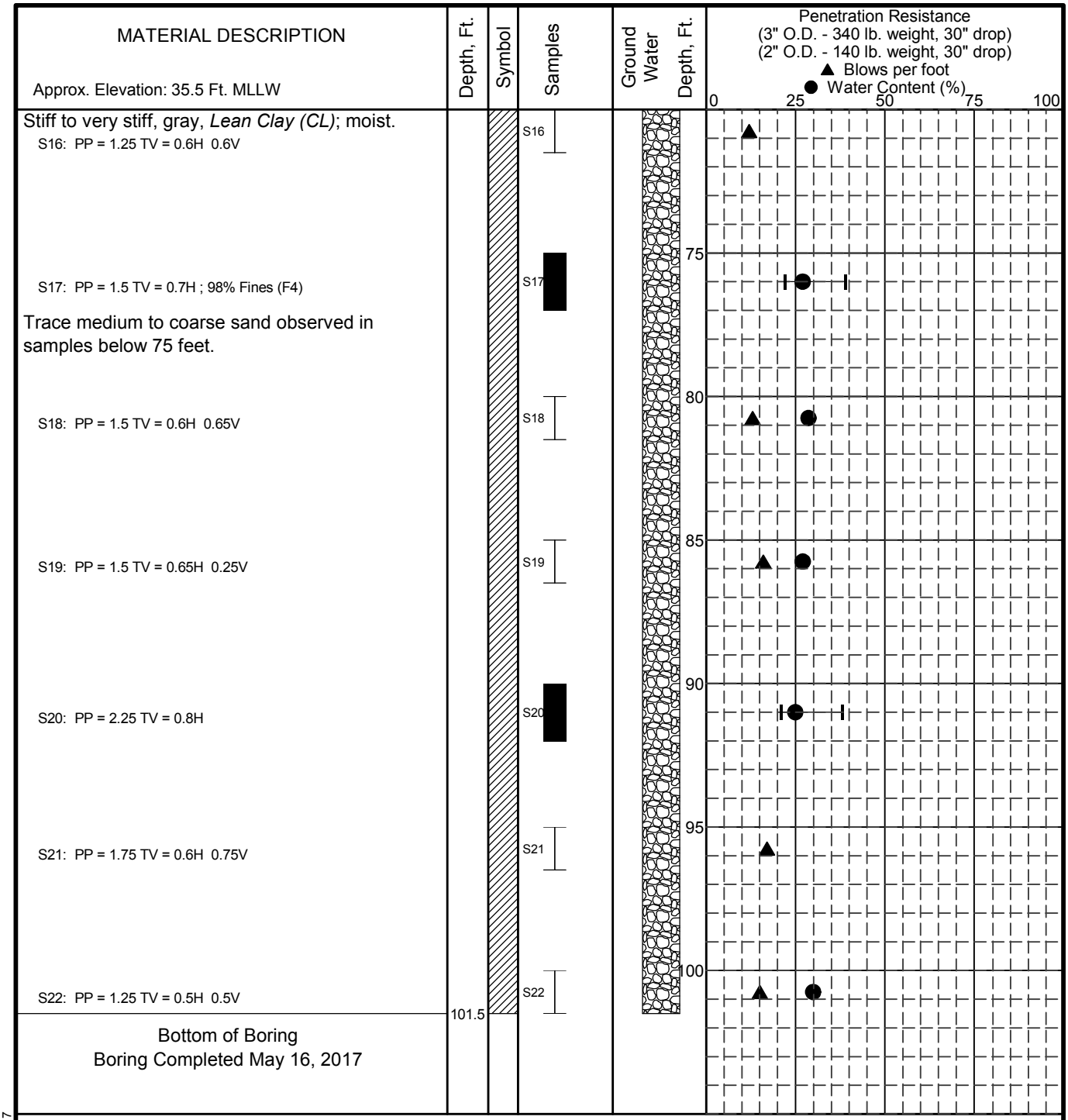
FIG. 8
Sheet 2 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

* Sample Not Recovered	Ground Water Level At Time Of Drilling
Grab Sample	Static Water Level
2" O.D. Split Spoon Sample	Blank Section, Gravel Backfill
3" O.D. Split Spoon Sample	Blank Casing, Annular Seal
Shelby Tube	Slotted Casing, Filter Sand
	Grouted Bottom Seal

NOTES

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2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-04-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 8
Sheet 3 of 3

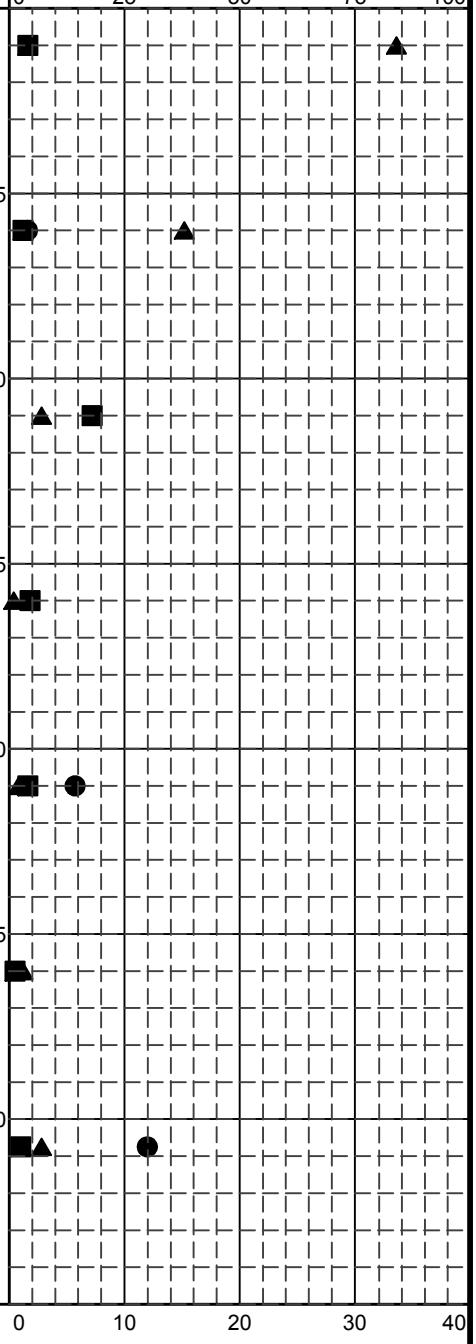
REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Dense to very dense, brown, *Silty Gravel with Sand (GM)*; moist. [FILL]			S1	
S2: 41% Gravel, 41% Sand, 18% Fines (F2)			S2	
Very loose to loose, brown, *Silty Sand with Gravel (SM)*; moist to wet. [FILL]	8.0		S3	
			S4	5/16/17
S5: 35.2% Fines (F3)			S5	
			S6	
Loose to very dense, gray, *Silt to Silt with Sand (ML)*; wet; non-plastic.	28.0		S7	

CONTINUED NEXT PAGE

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)



■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
▽ Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-05-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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FIG. 9
Sheet 1 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Loose to very dense, gray, *Silt to Silt with Sand (ML)*; wet; non-plastic. S8: 6% Gravel, 2% Sand, 92% Fines (F4) Trace gravel below 38 ft. S9: 9% Gravel, 14% Sand, 76% Fines (F4)			S8 S9	
Stiff to very stiff, gray, *Lean Clay (CL)*; moist. S11: PP = 1.0 TV = 0.5H 0.55V S12: PP = 1.25 TV = 0.7H 0.4V S14: PP = 1.25 TV = 0.675H 0.675V Trace medium to coarse sand observed in samples below 65 feet.	48.0		S10 S11 S12 S13 S14	

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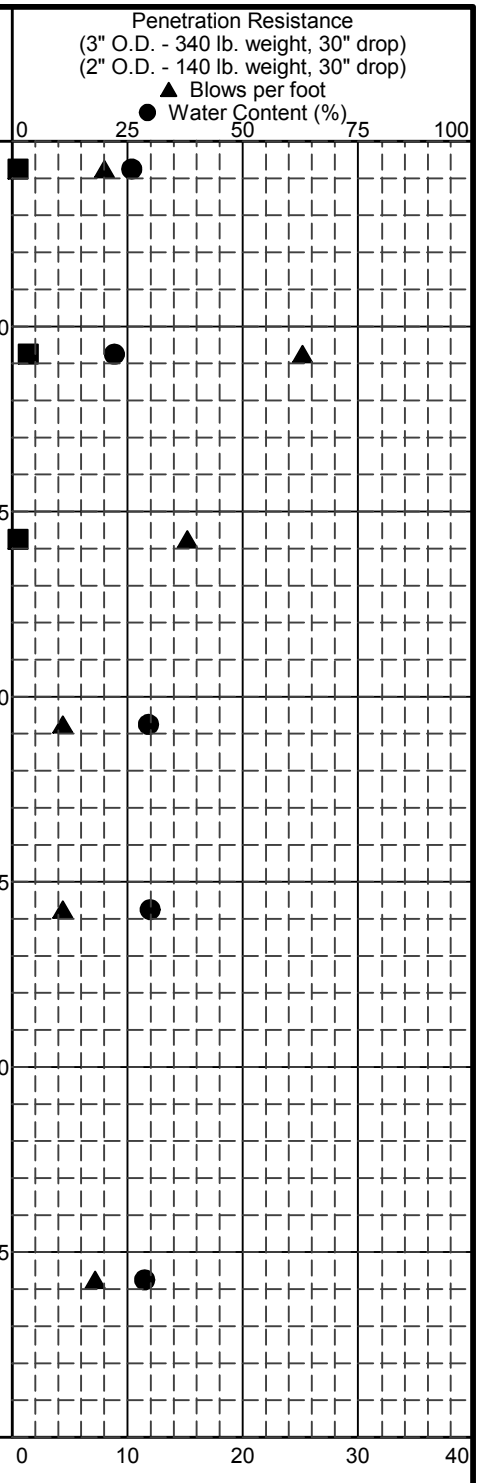

LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- ▽ Ground Water Level At Time Of Drilling
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-05-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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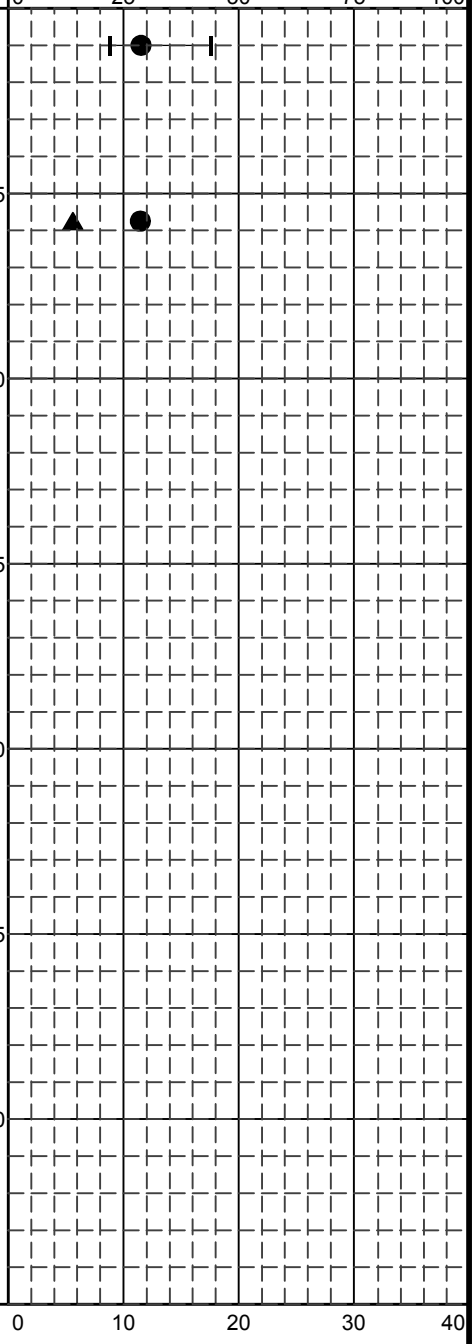
FIG. 9
Sheet 2 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Stiff to very stiff, gray, *Lean Clay (CL)*; moist. S15: PP = 1.5 TV = 0.5H S16: PP = 1.25 TV = 0.55H 0.65V			S15 S16	
	76.5			
Bottom of Boring Boring Completed May 17, 2017				

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)



■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-05-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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FIG. 9
Sheet 3 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples
Medium dense, brown, *Well-Graded Gravel with Silt and Sand (GW-GM)*; moist. [FILL]			S1
S1: 53% Gravel, 37% Sand, 9% Fines (F1)			
Loose to dense, brown, *Silty Sand with Gravel (SM)*; moist to wet. [FILL]	3.0		S2
			S3
S4: 37% Gravel, 41% Sand, 22% Fines (F3)			S4
			S5
			S6
			S7
Medium dense, gray, *Silt (ML)*; wet; non-plastic.	33.0		

CONTINUED NEXT PAGE

Ground Water Depth, Ft.
5/8/17
5/24/2017

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)

0 25 50 75 100

0 5 10 15 20 25 30

0 10 20 30 40

■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Ground Water Level At Time Of Drilling
- Static Water Level
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-06-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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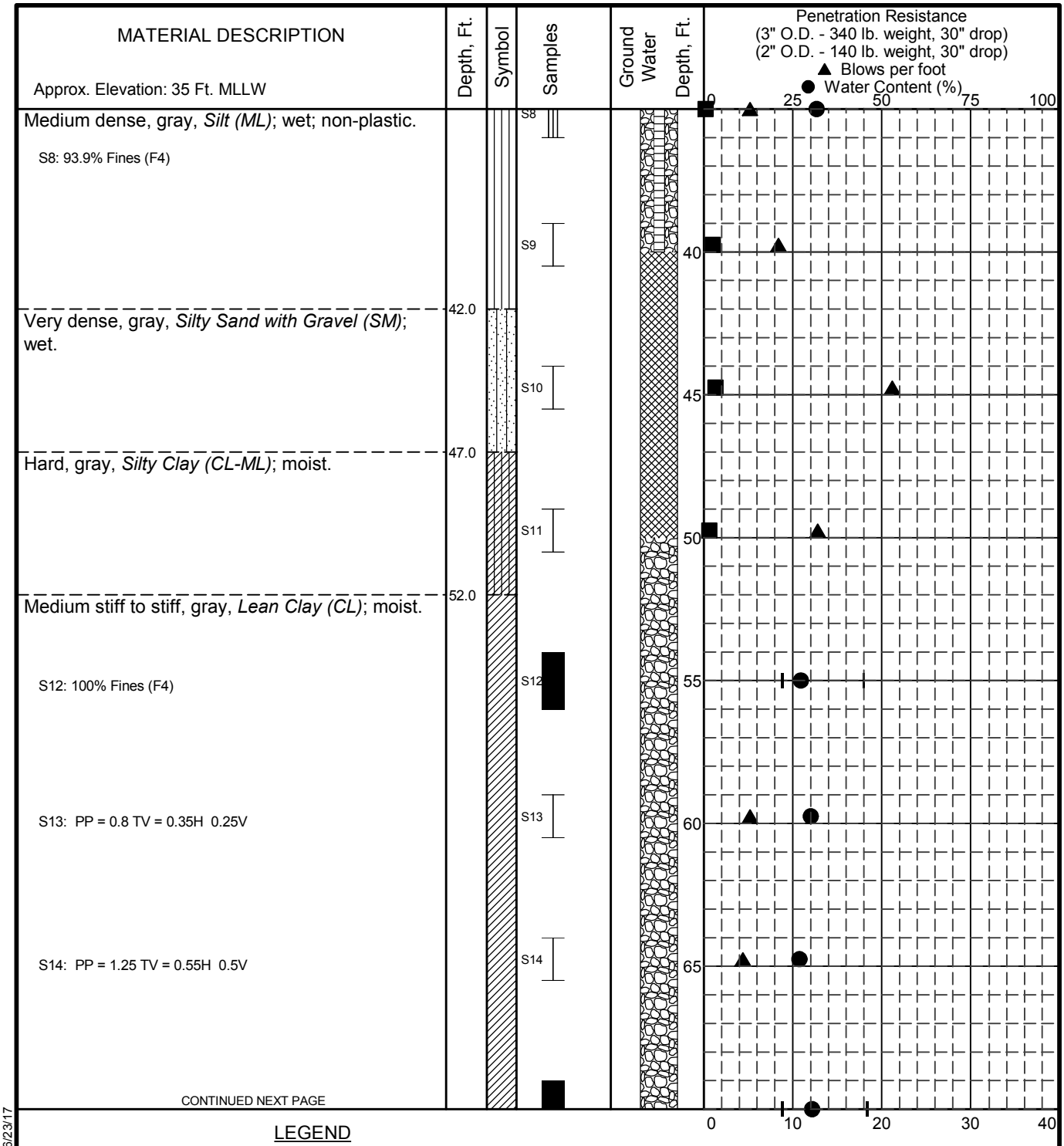
FIG. 10
Sheet 1 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

* Sample Not Recovered	Ground Water Level At Time Of Drilling
Grab Sample	Static Water Level
2" O.D. Split Spoon Sample	Blank Section, Gravel Backfill
3" O.D. Split Spoon Sample	Blank Casing, Annular Seal
Shelby Tube	Slotted Casing, Filter Sand
	Grouted Bottom Seal

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-06-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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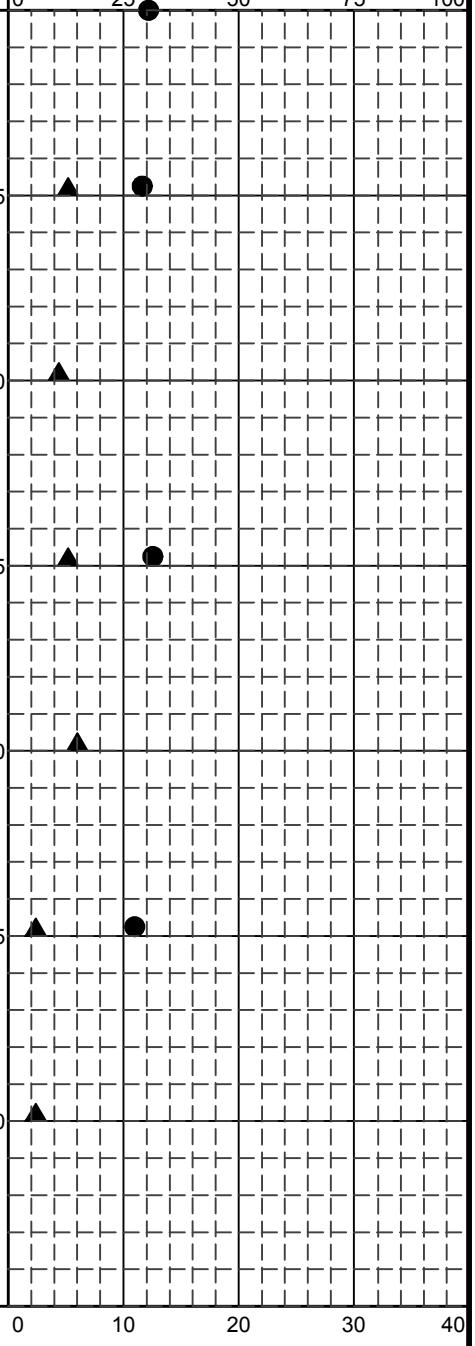
FIG. 10
Sheet 2 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 35 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Medium stiff to stiff, gray, *Lean Clay (CL)*; moist. Silt laminations between 70.7 and 70.8 ft.			S15	
S16: PP = 0.75 TV = 0.35H 0.3V			S16	
Drill action suggests occasional fine gravel between 75 and 79 feet.				
S17: PP = 0.8 TV = 0.5H 0.35V			S17	
S18: PP = 0.9 TV = 0.4H 0.4V			S18	
S19: PP = 1.25 TV = 0.5H 0.5V			S19	
S20: PP = 1.25 TV = 0.6H 0.45V			S20	
S21: PP = 1.25 TV = 0.7H 0.6V			S21	
Bottom of Boring Boring Completed May 10, 2017	100.5			

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)



■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

* Sample Not Recovered	Ground Water Level At Time Of Drilling
Grab Sample	Static Water Level
2" O.D. Split Spoon Sample	Blank Section, Gravel Backfill
3" O.D. Split Spoon Sample	Blank Casing, Annular Seal
Shelby Tube	Slotted Casing, Filter Sand
	Grouted Bottom Seal

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-06-17

June 2017 32-1-02579

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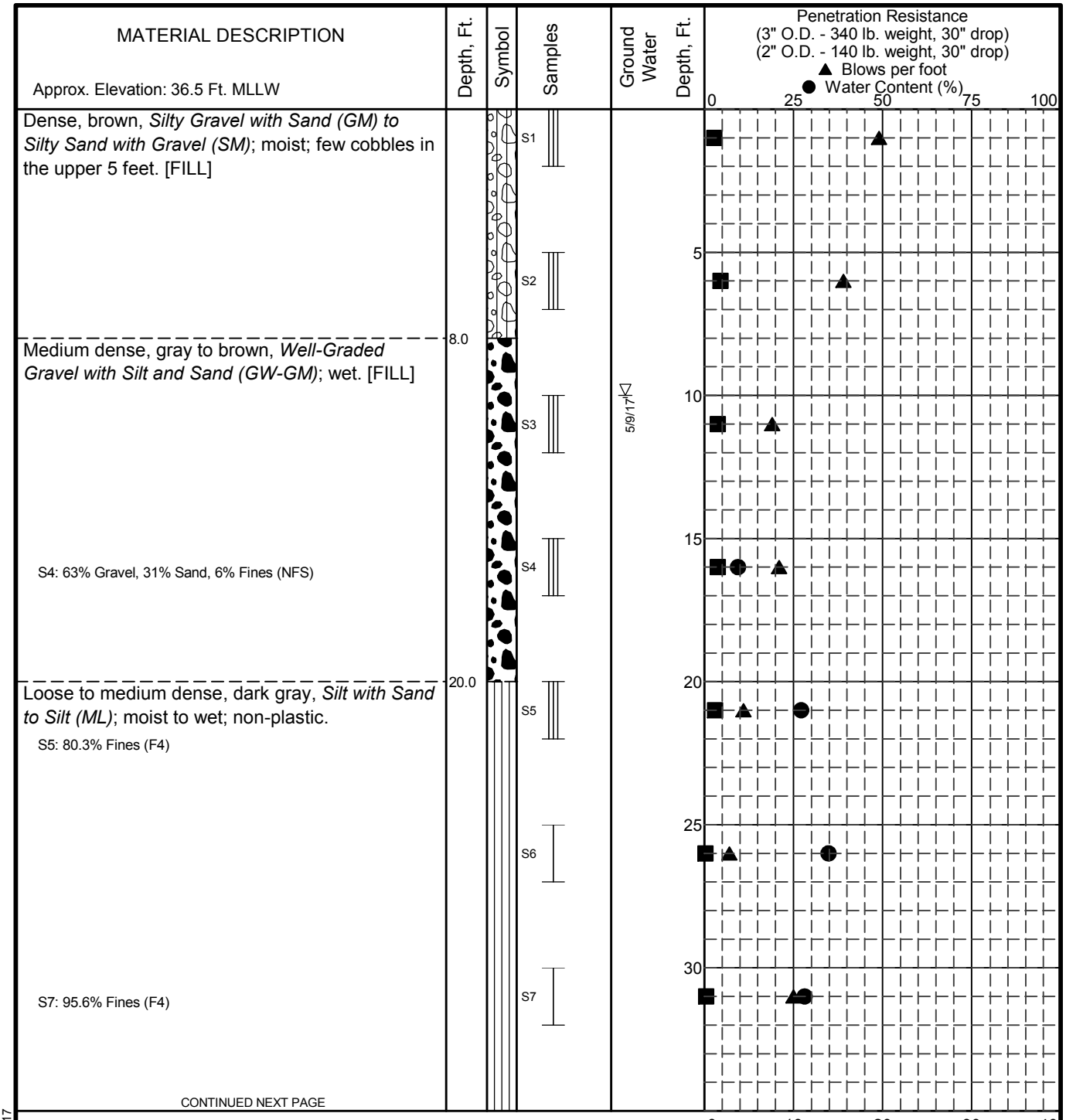
FIG. 10
Sheet 3 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
Ground Water Level At Time Of Drilling
PID Reading (ppm)
Plastic Limit — Liquid Limit
Natural Water Content

NOTES

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-07-17

June 2017 32-1-02579

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FIG. 11
Sheet 1 of 5

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36.5 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Loose to medium dense, dark gray, *Silt with Sand to Silt (ML)*; moist to wet; non-plastic.			S8	
S9: 92.0% Fines (F4)			S9	
Very stiff, gray, *Silt with Sand (ML)*; moist; interbedded with *Silty Clay with Sand (CL-ML)*.	43.0		S10a S10b	
S10b: PP = 2.5 TV = 0.95H				
Stiff to very stiff, gray, *Lean Clay (CL)*; moist.	48.0		S11	
S11: PP = 1.0 TV = 0.65H 0.7V				
S12: PP = 0.75 TV = 0.75H			S12	
S13: PP = 1.25 TV = 0.6H 0.55V			S13	
S14: PP = 1.25 TV = 0.55H			S14	
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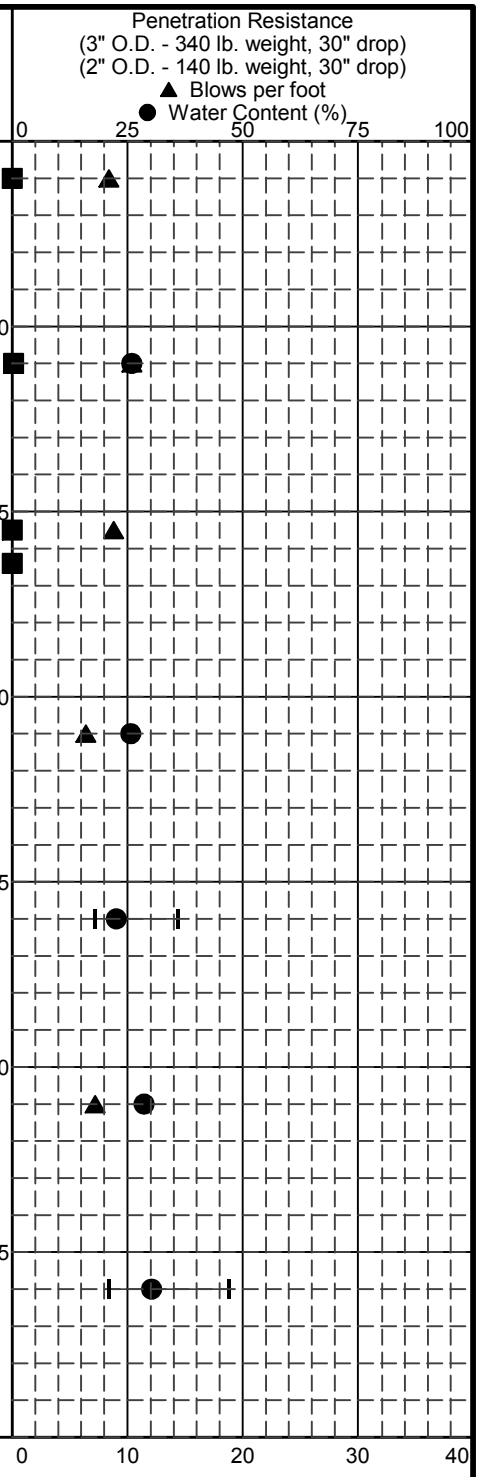

LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-07-17

June 2017 32-1-02579

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FIG. 11
Sheet 2 of 5

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36.5 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Stiff to very stiff, gray, *Lean Clay (CL)*; moist. S15: PP = 1.0 TV = 0.6H 0.7V			S15	
			S16*	
Trace sand and gravel in Sample S17. S17: PP = 0.5 TV = 0.45H 0.5V			S17	
S18: 96.0% Fines (F4)			S18	
S19: PP = 2.0 TV = 0.9H 0.6V			S19	
S20: PP = 1.75 TV = 0.7H			S20	
S21: PP = 1.25 TV = 0.6H 0.5V			S21	

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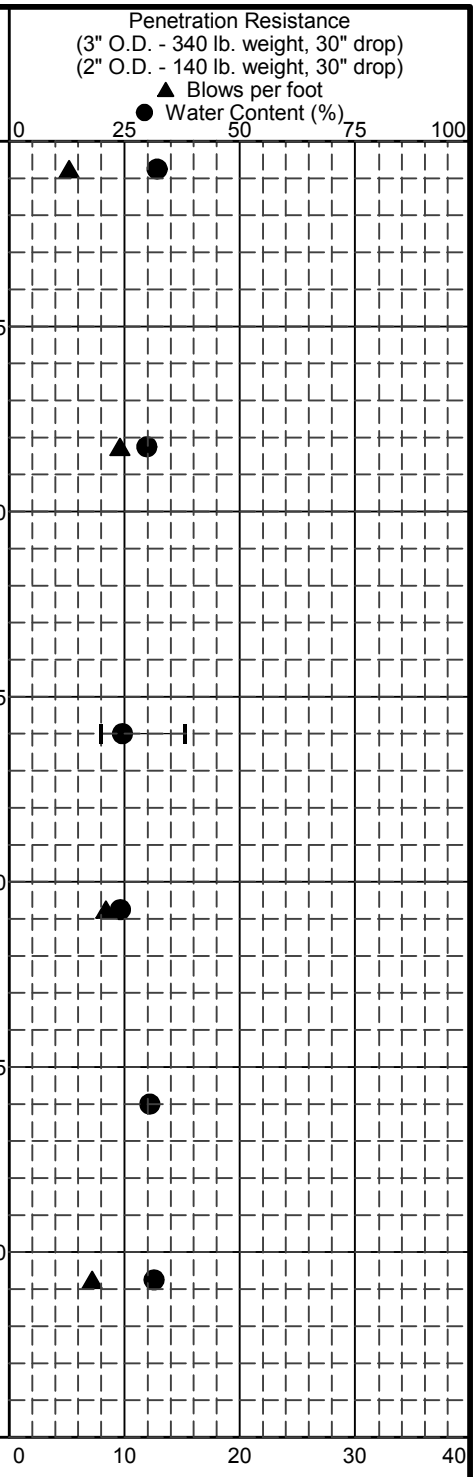

LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-07-17

June 2017 32-1-02579

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FIG. 11
Sheet 3 of 5

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36.5 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.	Penetration Resistance (3" O.D. - 340 lb. weight, 30" drop) (2" O.D. - 140 lb. weight, 30" drop) ▲ Blows per foot ● Water Content (%)
Stiff to very stiff, gray, *Lean Clay (CL)*; moist. S22: PP = 1.75 TV = 0.7H Trace course sand in samples below 105 feet. S23: PP = 1.0 TV = 0.6H 0.5V S24: PP = 1.5 TV = 0.7H 0.65V S25: PP = 2.0 TV = 0.6H S26: PP = 1.25 TV = 0.5H S27: PP = 2.75 TV = 1.05H 0.75V S28: PP = 2.25 TV = 0.95H ; 100% Fines (F4) CONTINUED NEXT PAGE			S22 S23 S24 S25 S26 S27 S28		0 25 50 75 100 110 115 120 125 130 135 0 10 20 30 40

LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- ▽ Ground Water Level At Time Of Drilling
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
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3. Water level, if indicated above, is for the date specified and may vary.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-07-17

June 2017 32-1-02579

SHANNON & WILSON, INC.
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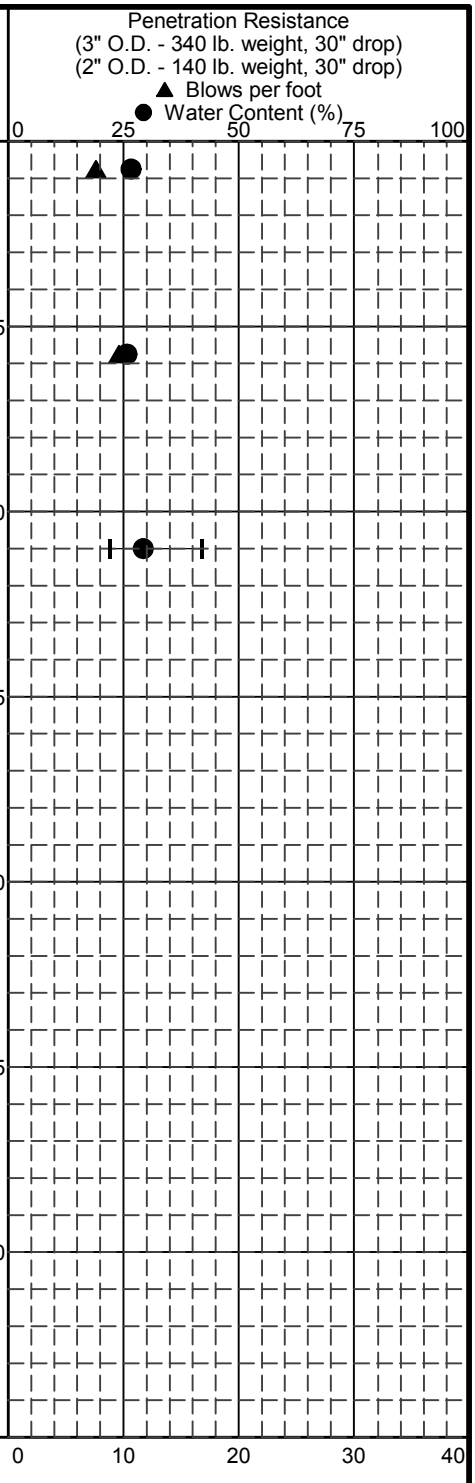
FIG. 11
Sheet 4 of 5

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36.5 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Stiff to very stiff, gray, *Lean Clay (CL)*; moist. S29: PP = 1.5 TV = 0.7H 0.7V S30: PP = 1.5 TV = 0.7H 0.6V S31: PP = 2.0 TV = 0.7H			S29 S30 S31	
Bottom of Boring Boring Completed May 12, 2017	152.0			



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- ▽ Ground Water Level At Time Of Drilling
- ■ PID Reading (ppm)
- Plastic Limit ⊢●⊣ Liquid Limit
- Natural Water Content

NOTES

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-07-17

June 2017 32-1-02579

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FIG. 11
Sheet 5 of 5

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 37 Ft. MLLW	Depth, Ft.	Symbol	Samples
Medium dense, brown, *Silty Gravel with Sand (GM)*; moist; trace organics in upper 2 feet. [FILL]			S1, S2
Medium dense, gray, *Silty Sand with Gravel (SM)*; moist. [FILL]	7.0		S3
Loose to medium dense, dark gray, *Silt (ML)*; moist; non-plastic. S4: 96.1% Fines (F4) S5: 99.3% Fines (F4)	13.0		S4, S5, S6
Medium dense to very dense, gray, *Gravelly Silt (ML)* grading to *Silt (ML)*; moist; interbedded with lenses of fine *Sand* and *Lean Clay* below 35 feet bgs. S7: 25% Gravel, 11% Sand, 63% Fines (F4)	28.0		S7, S8

CONTINUED NEXT PAGE

Ground Water Depth, Ft.

Groundwater not encountered during drilling on May 12, 2017

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)

0 25 50 75 100

0 5 10 15 20 25 30

0 10 20 30 40

■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube

Static Water Level
Blank Section, Gravel Backfill
Blank Casing, Annular Seal
Slotted Casing, Filter Sand
Grouted Bottom Seal

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-08-17

June 2017 32-1-02579

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FIG. 12
Sheet 1 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 37 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Medium dense to very dense, gray, *Gravelly Silt (ML)* grading to *Silt (ML)*; moist; interbedded with lenses of fine *Sand* and *Lean Clay* below 35 feet bgs.			S9	
Medium stiff to very stiff, gray, *Lean Clay (CL)*; moist.	43.0			
S10: PP = 1.0 TV = 0.4H 0.6V			S10	
S11: PP = 0.5 TV = 0.35H 0.25V			S11	
S12: 99% Fines (F4)			S12	
S13: PP = 1.0 TV = 0.55H 0.35V			S13	
S14: PP = 1.0 TV = 0.45H 0.45V			S14	
CONTINUED NEXT PAGE				

Groundwater not encountered during drilling on May 12, 2017

Penetration Resistance
(3" O.D. - 340 lb. weight, 30" drop)
(2" O.D. - 140 lb. weight, 30" drop)
▲ Blows per foot
● Water Content (%)

0 25 50 75 100

40 45 50 55 60 65

0 10 20 30 40

■ PID Reading (ppm)
Plastic Limit ⊢●⊣ Liquid Limit
Natural Water Content

LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Static Water Level
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal

NOTES

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Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-08-17

June 2017 32-1-02579

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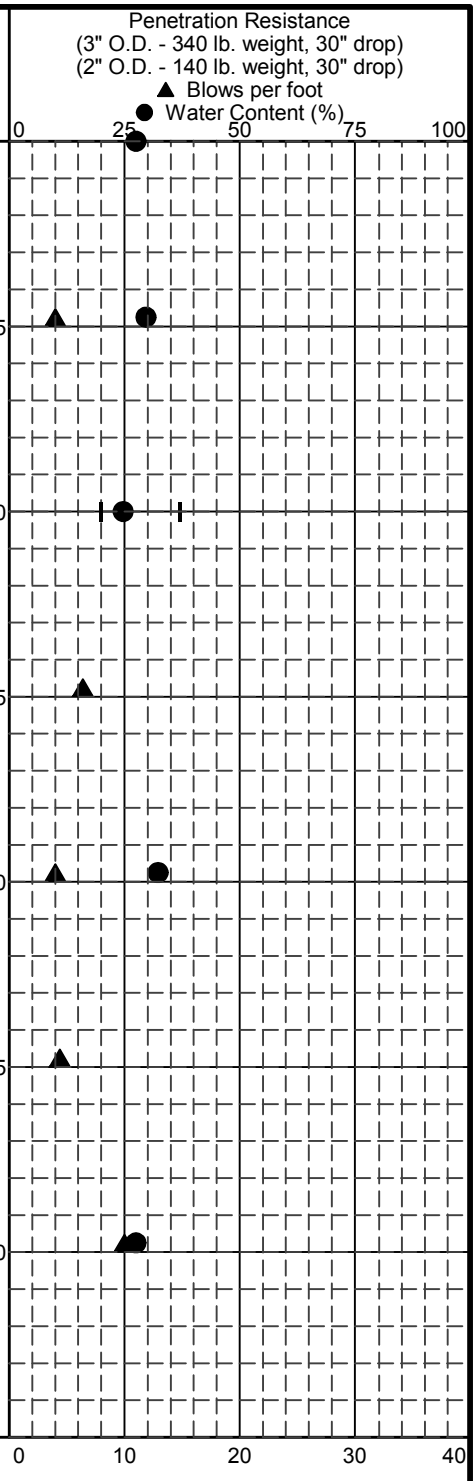
FIG. 12
Sheet 2 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 37 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Medium stiff to very stiff, gray, *Lean Clay (CL)*; moist.			S15	
S16: PP = 1.25 TV = 0.6H 0.55V			S16	
			S17	
S18: PP = 1.0 TV = 0.5H 0.4V			S18	
S19: PP = 1.0 TV = 0.45H 0.45V ; 99.7% Fines (F4)			S19	
S20: PP = 1.1 TV = 0.6H 0.55V			S20	
S21: PP = 1.75 TV = 0.8H 0.8V			S21	
	100.5			
Bottom of Boring Boring Completed May 12, 2017				

Groundwater not encountered during drilling on May 12, 2017



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- Static Water Level
- Blank Section, Gravel Backfill
- Blank Casing, Annular Seal
- Slotted Casing, Filter Sand
- Grouted Bottom Seal

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-08-17

June 2017 32-1-02579

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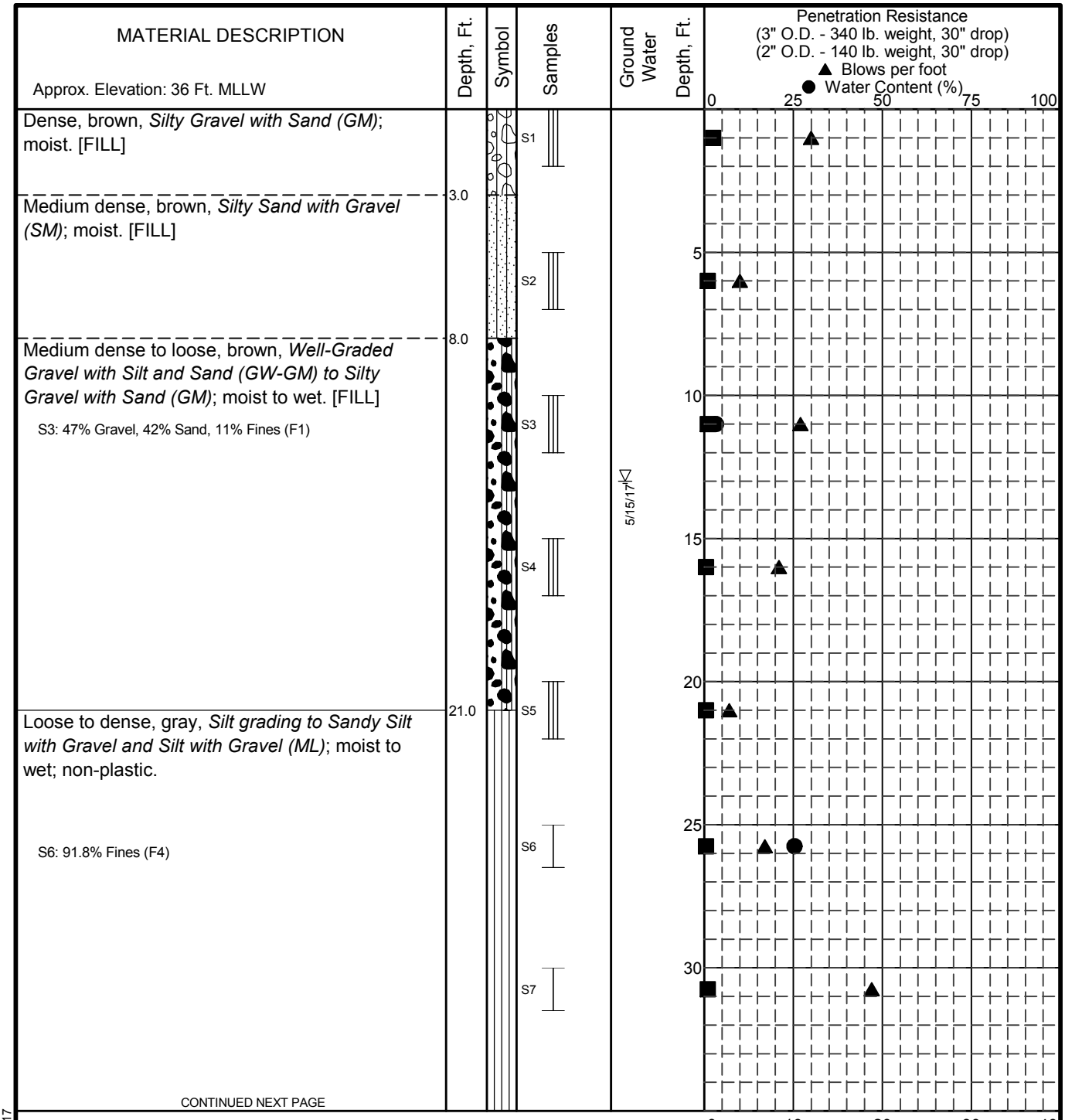
FIG. 12
Sheet 3 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

- * Sample Not Recovered
- Grab Sample
- 2" O.D. Split Spoon Sample
- 3" O.D. Split Spoon Sample
- Shelby Tube
- ▽ Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-09-17

June 2017 | 32-1-02579

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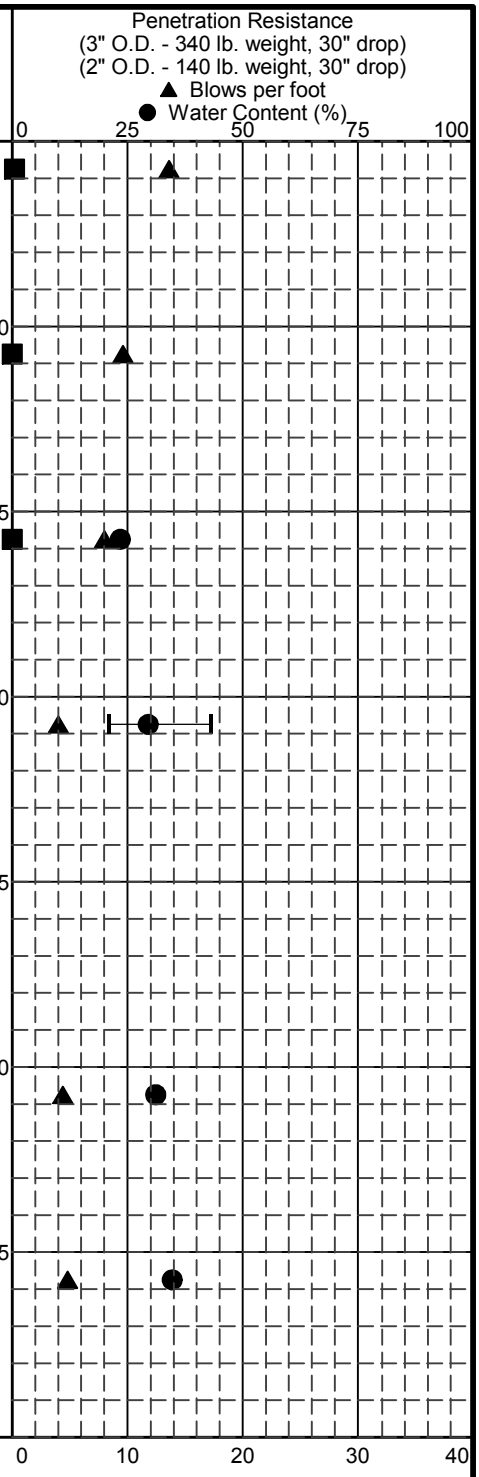
FIG. 13
Sheet 1 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Loose to dense, gray, *Silt grading to Sandy Silt with Gravel and Silt with Gravel (ML)*; moist to wet; non-plastic.			S8	
			S9	
S10: 80.7% Fines (F4)			S10	
Stiff, gray, *Lean Clay (CL)*; moist.	47.0			
S11: PP = 1.0 TV = 0.6H 0.55V			S11	
			S12	
S13: PP = 1.0 TV = 0.4H 0.45V			S13	
S14: PP = 0.9 TV = 0.4H 0.45V			S14	
CONTINUED NEXT PAGE				



LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-09-17

June 2017 32-1-02579

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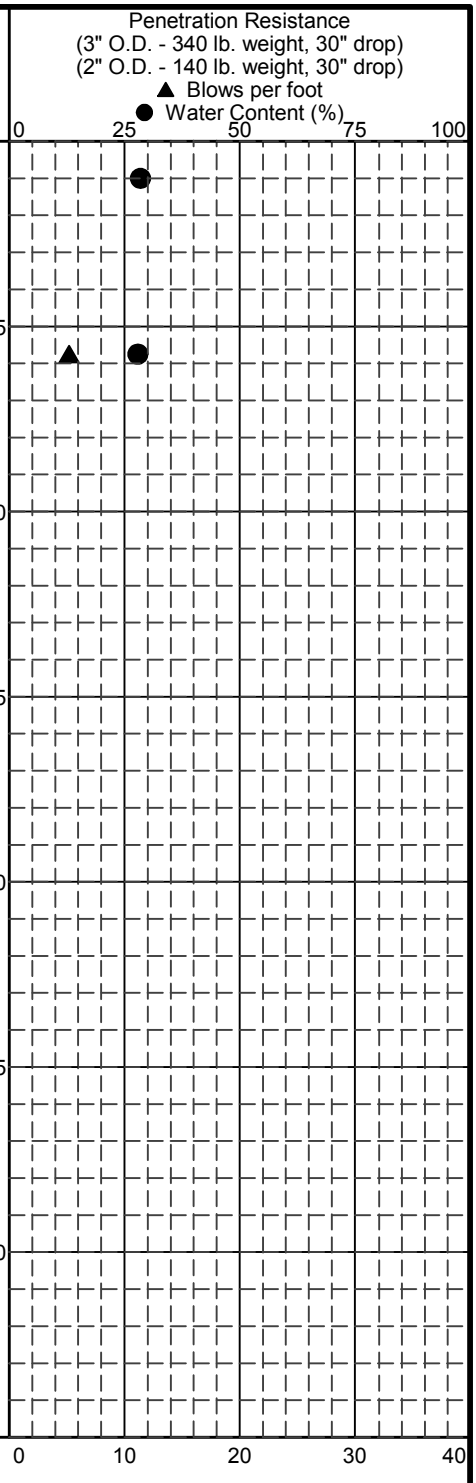
FIG. 13
Sheet 2 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17

MATERIAL DESCRIPTION Approx. Elevation: 36 Ft. MLLW	Depth, Ft.	Symbol	Samples	Ground Water Depth, Ft.
Stiff, gray, *Lean Clay (CL)*; moist.			S15	
S16: PP = 1.25 TV = 0.5H 0.5V			S16	
	76.5			
Bottom of Boring Boring Completed May 15, 2017				



LEGEND

* Sample Not Recovered
Grab Sample
2" O.D. Split Spoon Sample
3" O.D. Split Spoon Sample
Shelby Tube
Ground Water Level At Time Of Drilling

NOTES

1. The stratification lines represent the approximate boundaries between soil types, and the transition may be gradual.
2. The discussion in the text of this report is necessary for a proper understanding of the nature of subsurface materials.
3. Water level, if indicated above, is for the date specified and may vary.
4. PP (Pocket Penetrometer) tests estimate Unconfined Compressive Strength of Cohesive Soils. TV (Torvane) tests estimate the Undrained Shear Strength of Cohesive Soils. All measurements in tons per square foot.

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

LOG OF BORING B-09-17

June 2017 32-1-02579

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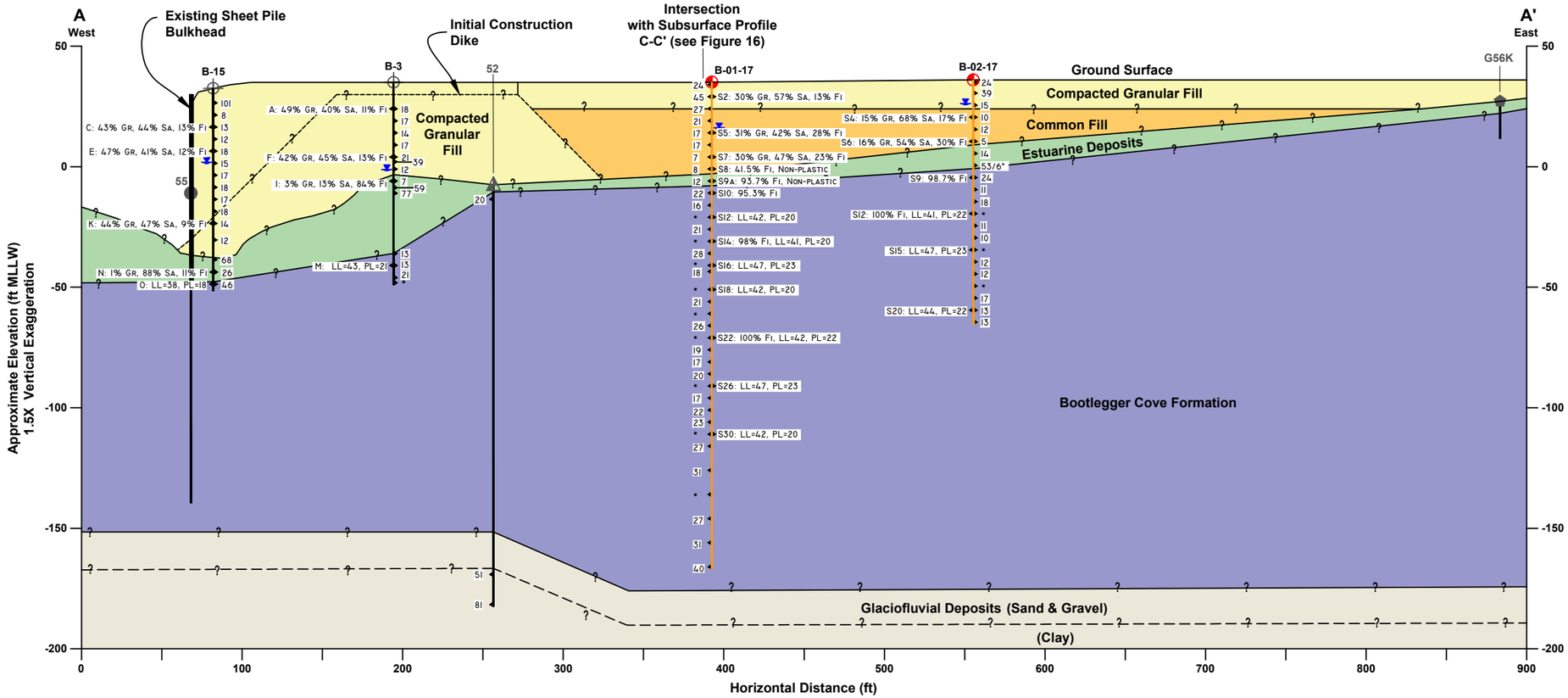
FIG. 13
Sheet 3 of 3

REV 3 - Approved for Submittal

GEOTECHNICAL LOG 02579 LOGS.GPJ S&W GEO1.GDT 6/23/17



LEGEND

B-01-17	Approximate Location of Boring B-01-17, Advanced by Shannon & Wilson, May 2017
S4: 15% GR, 68% SA, 17% FI	Sample S4 laboratory testing results indicating 15 percent gravel, 68 percent sand, and 17 percent fines (silt and clay) by weight
SI2: LL=41, PL=20	Sample S12 atterberg limits testing results indicating liquid limit of 41, plastic limit of 20
▶24	MPT/SPT Values (blows per foot at approximate sample depth. * indicates Shelby tube sample
	Approximate water level as estimated during drilling

Approximate Location of Existing Borings

- Boring - Terracon, 2004
- CPT - Terracon, 2004
- CPT - Golder & Associates, 2004
- Boring - PND, 2008
- Boring - CH2M Hill, 2012
- BCF Boring - CH2M Hill, 2012

NOTES

1. Profile taken along the A - A' line as shown on the Site Plan, Figure 2.
2. Stratigraphy interpreted from observations made during drilling (see Figures 5 through 13 and Appendix C for graphical logs).
3. Soil contacts on profile between boring locations are interpreted from our understanding of local conditions and should be considered approximate.
4. Borings shown above may not lie exactly on profile line shown on Figure 2. Subsurface conditions in some areas may be projected from borings near the profile line.
5. Ground surface profile based topographic contours provided by POA, based on 2015 LiDAR and mapping project by Merrick & Company.

0 80 160
APPROXIMATE HORIZONTAL SCALE IN FEET

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SUBSURFACE PROFILE A-A'

June 2017 32-1-02579

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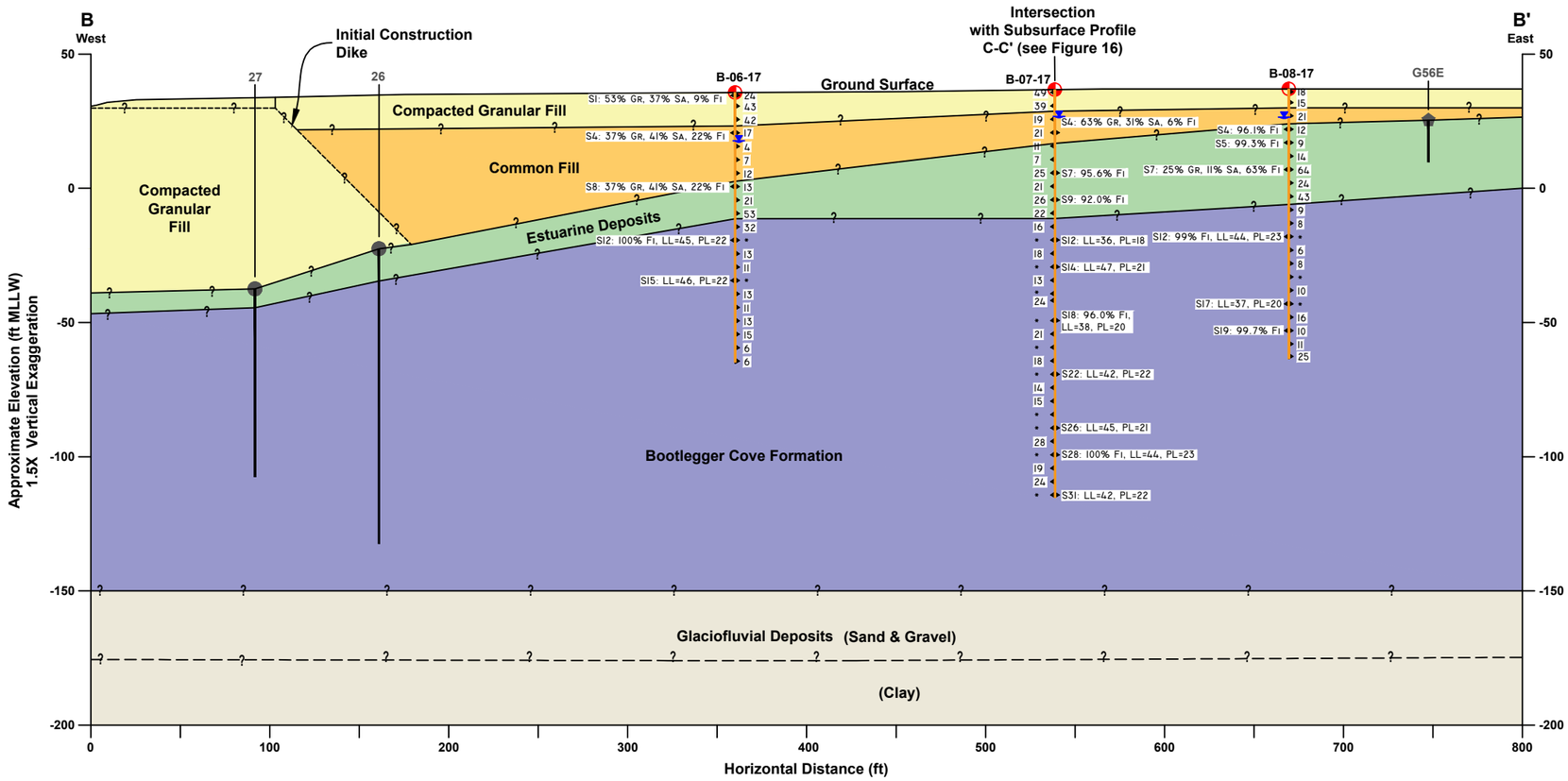
FIG. 14



LEGEND

B-07-17 — Approximate Location of Boring B-07-17, Advanced by Shannon & Wilson, May 2017

S4: 63% GR, 31% SA, 6% FI — Sample S4 laboratory testing results indicating 63 percent gravel, 31 percent sand, and 6 percent fines (silt and clay) by weight

S12: LL=36, PL=18 — Sample S12 atterberg limits testing results indicating liquid limit of 36, plastic limit of 18

▶24 — MPT/SPT Values (blows per foot at approximate sample depth. * indicates Shelby tube sample

Approximate water level as estimated during drilling

Approximate Location of Existing Borings

- Boring - Terracon, 2004
- CPT - Terracon, 2004
- CPT - Golder & Associates, 2004
- Boring - PND, 2008
- Boring - CH2M Hill, 2012
- BCF Boring - CH2M Hill, 2012

NOTES

1. Profile taken along the B - B' line as shown on the Site Plan, Figure 2.
2. Stratigraphy interpreted from observations made during drilling (see Figures 5 through 13 and Appendix C for graphical logs).
3. Soil contacts on profile between boring locations are interpreted from our understanding of local conditions and should be considered approximate.
4. Borings shown above may not lie exactly on profile line shown on Figure 2. Subsurface conditions in some areas may be projected from borings near the profile line.
5. Ground surface profile based topographic contours provided by POA, based on 2015 LiDAR and mapping project by Merrick & Company.

0 80 160
APPROXIMATE HORIZONTAL SCALE IN FEET

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SUBSURFACE PROFILE B-B'

June 2017 32-1-02579

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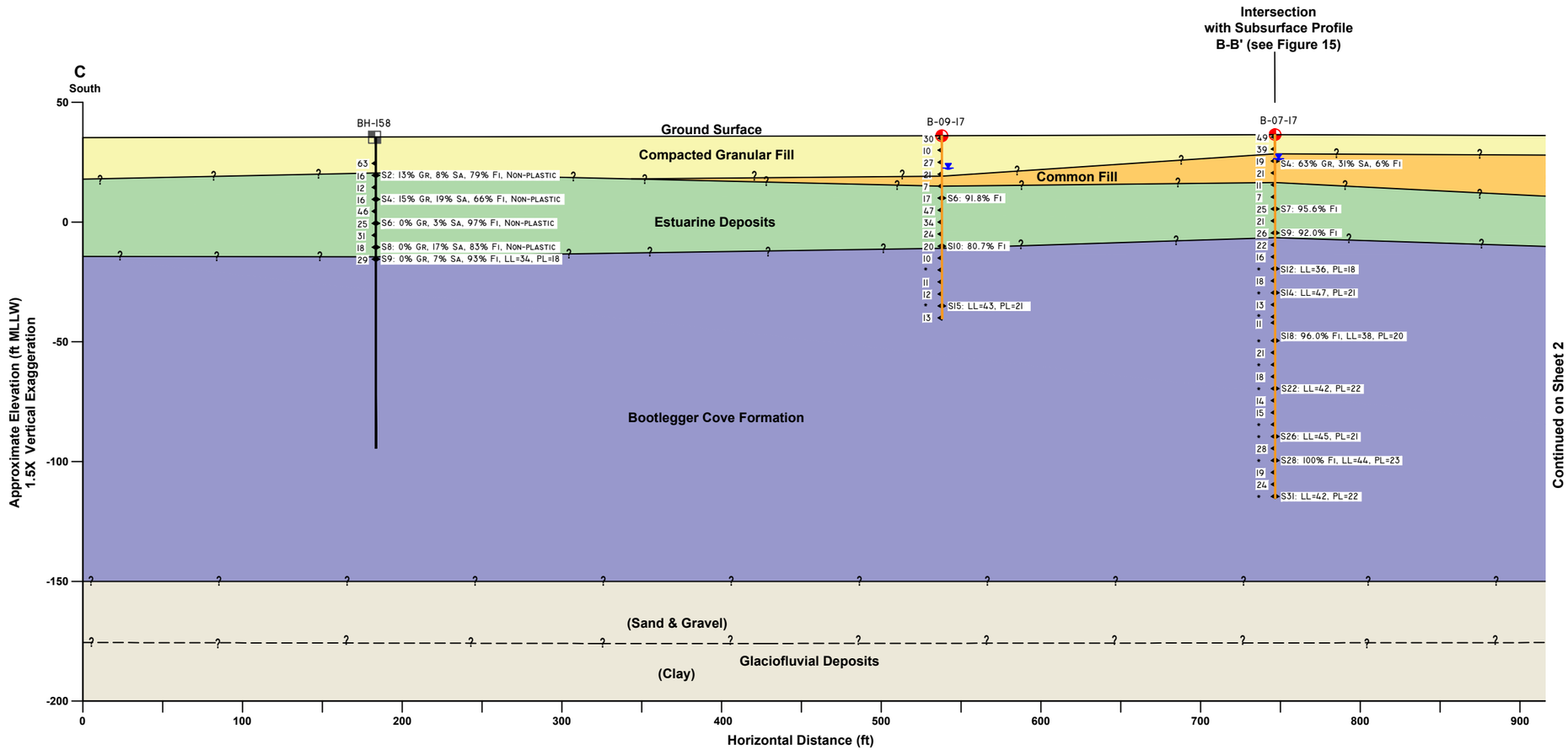
FIG. 15



LEGEND

B-07-17	Approximate Location of Boring B-07-17, Advanced by Shannon & Wilson, May 2017
S4: 63% GR, 31% SA, 6% FI	Sample S4 laboratory testing results indicating 63 percent gravel, 31 percent sand, and 6 percent fines (silt and clay) by weight
SI2: LL=36, PL=18	Sample S12 atterberg limits testing results indicating liquid limit of 36, plastic limit of 18
24	MPT/SPT Values (blows per foot at approximate sample depth. * indicates Shelby tube sample
	Approximate water level as estimated during drilling

Approximate Location of Existing Borings

- Boring - Terracon, 2004
- CPT - Terracon, 2004
- CPT - Golder & Associates, 2004
- Boring - PND, 2008
- Boring - CH2M Hill, 2012
- BCF Boring - CH2M Hill, 2012

NOTES

1. Profile taken along the C - C' line as shown on the Site Plan, Figure 2.
2. Stratigraphy interpreted from observations made during drilling (see Figures 5 through 13 and Appendix C for graphical logs).
3. Soil contacts on profile between boring locations are interpreted from our understanding of local conditions and should be considered approximate.
4. Borings shown above may not lie exactly on profile line shown on Figure 2. Subsurface conditions in some areas may be projected from borings near the profile line.
5. Ground surface profile based topographic contours provided by POA, based on 2015 LiDAR and mapping project by Merrick & Company.

0 80 160
APPROXIMATE HORIZONTAL SCALE IN FEET

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SUBSURFACE PROFILE C-C'

June 2017 32-1-02579

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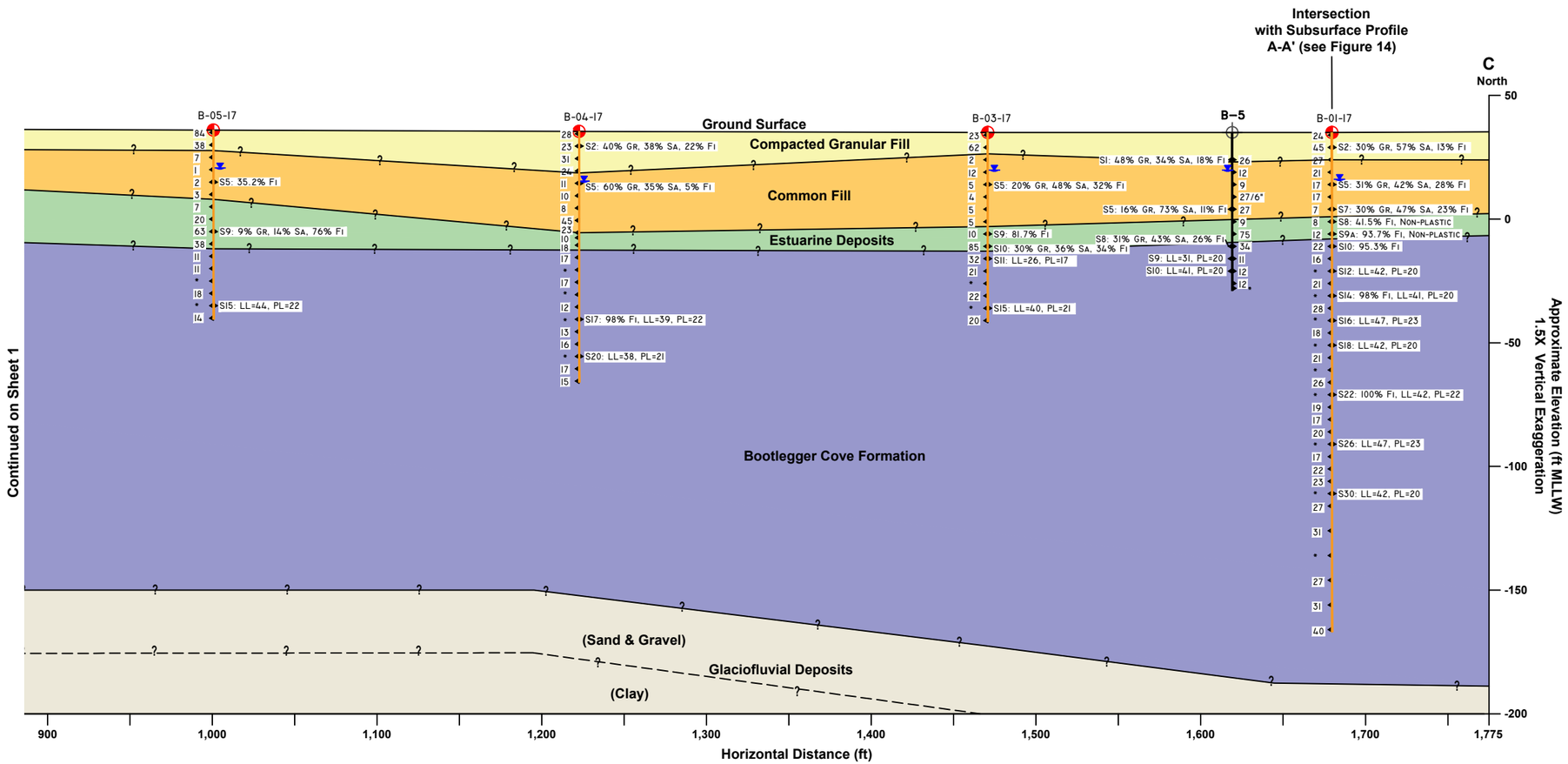
FIG. 16
Sheet 1 of 2



LEGEND

B-01-17	Approximate Location of Boring B-01-17, Advanced by Shannon & Wilson, May 2017
S4: 15% GR, 68% SA, 17% FI ◀	Sample S4 laboratory testing results indicating 15 percent gravel, 68 percent sand, and 17 percent fines (silt and clay) by weight
SI2: LL=41, PL=20 ◀	Sample S12 atterberg limits testing results indicating liquid limit of 41, plastic limit of 20
▶24	MPT/SPT Values (blows per foot at approximate sample depth. * indicates Shelby tube sample
	Approximate water level as estimated during drilling

Approximate Location of Existing Borings

- Boring - Terracon, 2004
- CPT - Terracon, 2004
- CPT - Golder & Associates, 2004
- Boring - PND, 2008
- Boring - CH2M Hill, 2012
- BCF Boring - CH2M Hill, 2012

NOTES

1. Profile taken along the C - C' line as shown on the Site Plan, Figure 2.
2. Stratigraphy interpreted from observations made during drilling (see Figures 5 through 13 and Appendix C for graphical logs).
3. Soil contacts on profile between boring locations are interpreted from our understanding of local conditions and should be considered approximate.
4. Borings shown above may not lie exactly on profile line shown on Figure 2. Subsurface conditions in some areas may be projected from borings near the profile line.
5. Ground surface profile based topographic contours provided by POA, based on 2015 LiDAR and mapping project by Merrick & Company.

0 80 160
APPROXIMATE HORIZONTAL SCALE IN FEET

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SUBSURFACE PROFILE C-C'

June 2017 32-1-02579

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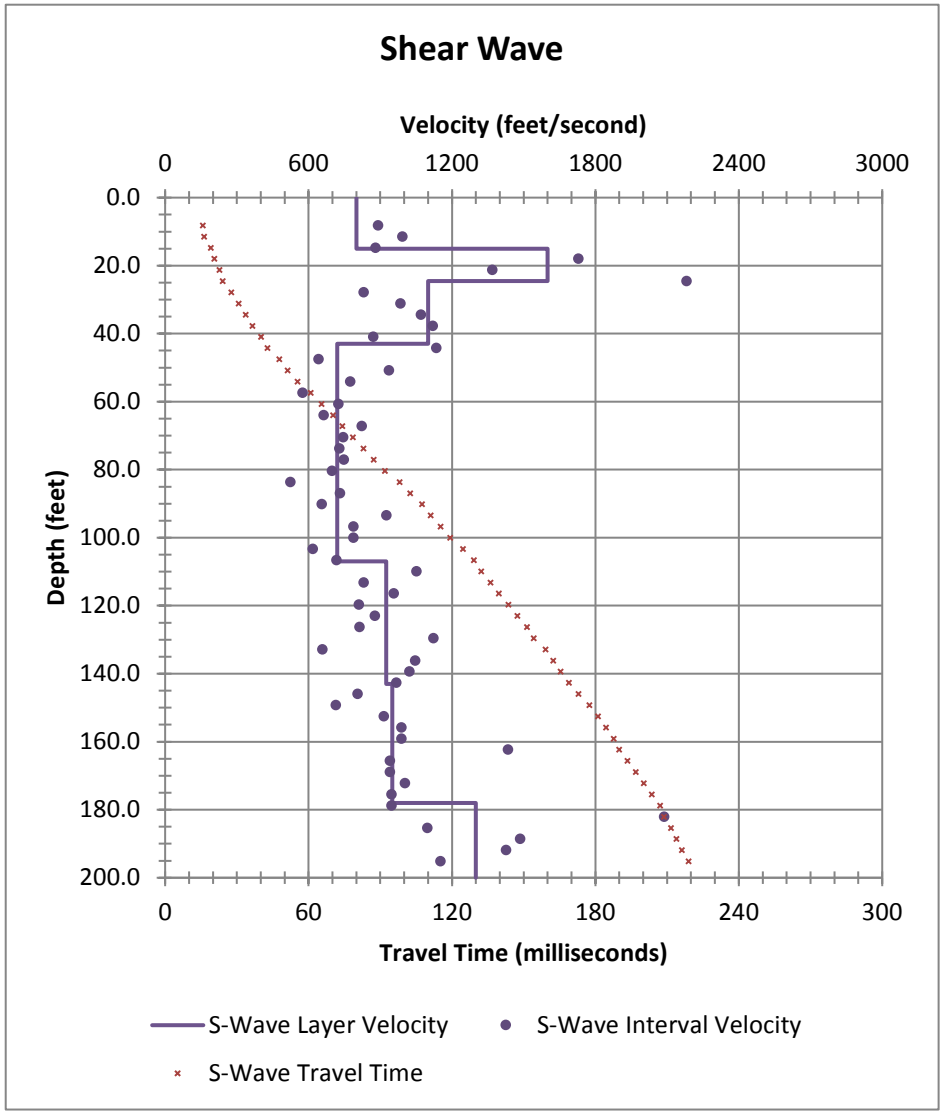
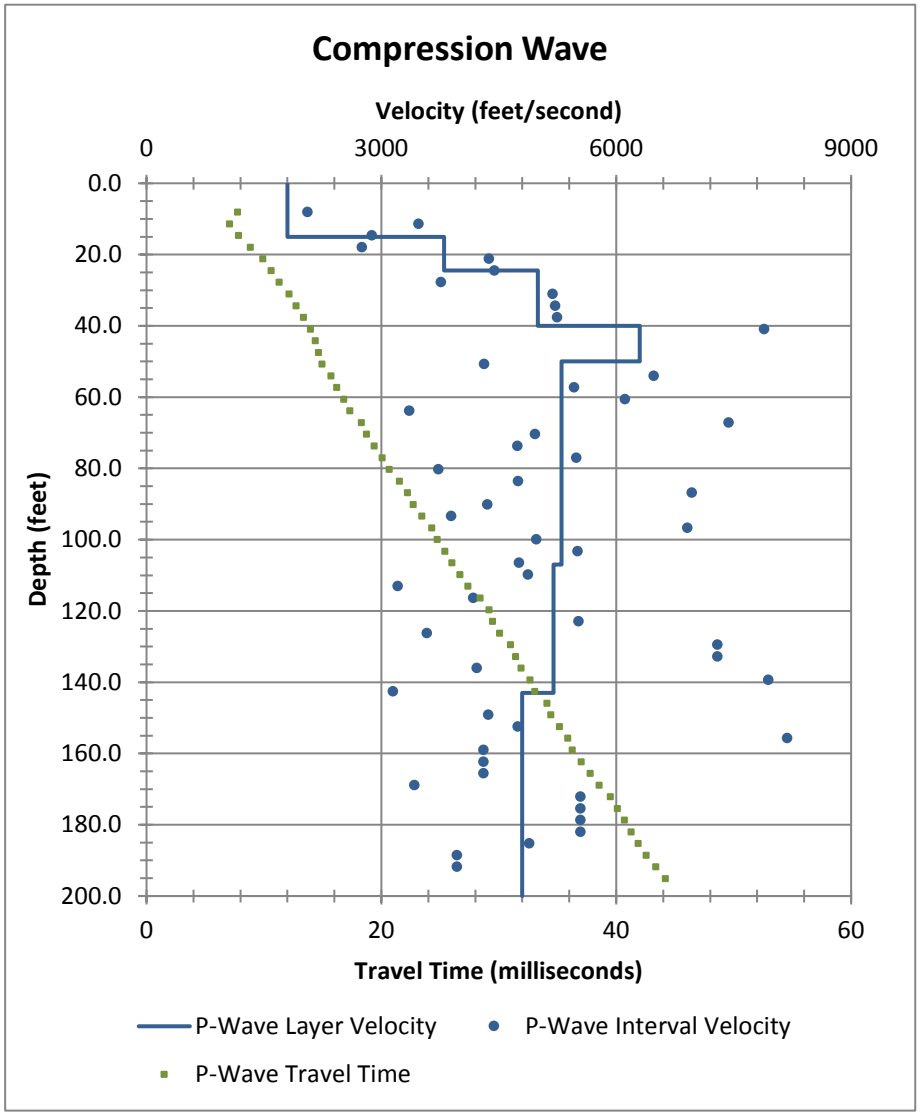
FIG. 16
Sheet 2 of 2





$\overline{v}_{s30}$ = 836 feet/second

1 $\overline{v}_s$ determined by Method A, Table C3.10.3.1-1 AASHTO LRFD Bridge Design Specifications 2012

2 P and S Wave Layer Velocity determined by best fit of slope breaks from P and S Wave Travel Times.

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

SHEAR AND COMPRESSION WAVE DATA
B-01-17

June 2017 32-1-02579

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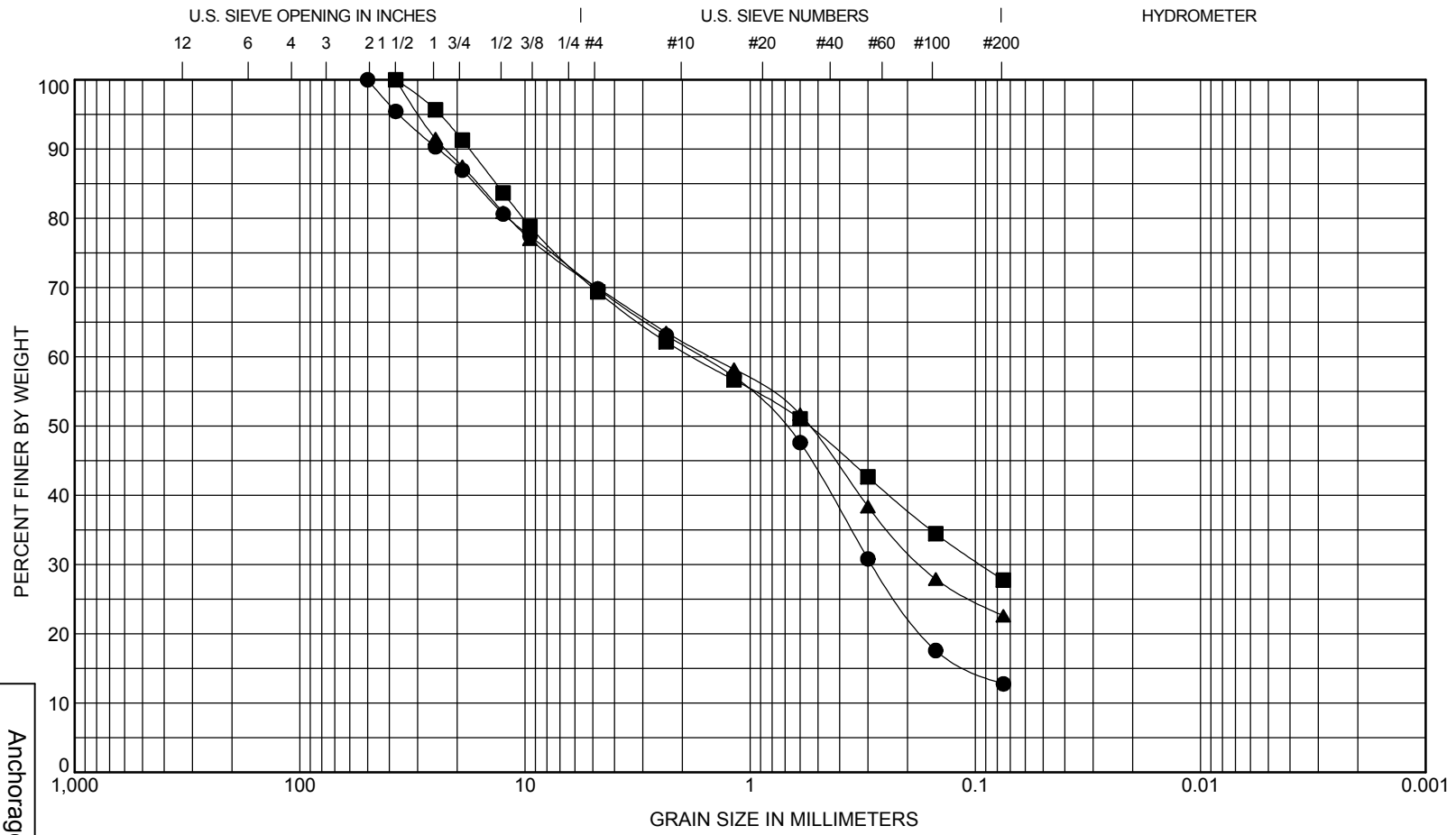
FIG. 17

APPENDIX A

LABORATORY TEST RESULTS

List of Figures



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	B-01-17 S2	5.0 - 7.0	**Silty Sand with Gravel (SM)**					
■	B-01-17 S5	20.0 - 22.0	**Silty Sand with Gravel (SM)**					
▲	B-01-17 S7	30.0 - 32.0	**Silty Sand with Gravel (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01-17 S2	5.0 - 7.0	**50**	**1.65**	**0.29**		**30**	**57**	**13**	
■	B-01-17 S5	20.0 - 22.0	**37.5**	**1.8**	**0.09**		**31**	**42**	**28**	
▲	B-01-17 S7	30.0 - 32.0	**37.5**	**1.49**	**0.17**		**30**	**47**	**23**	

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June 2017

32-1-02579

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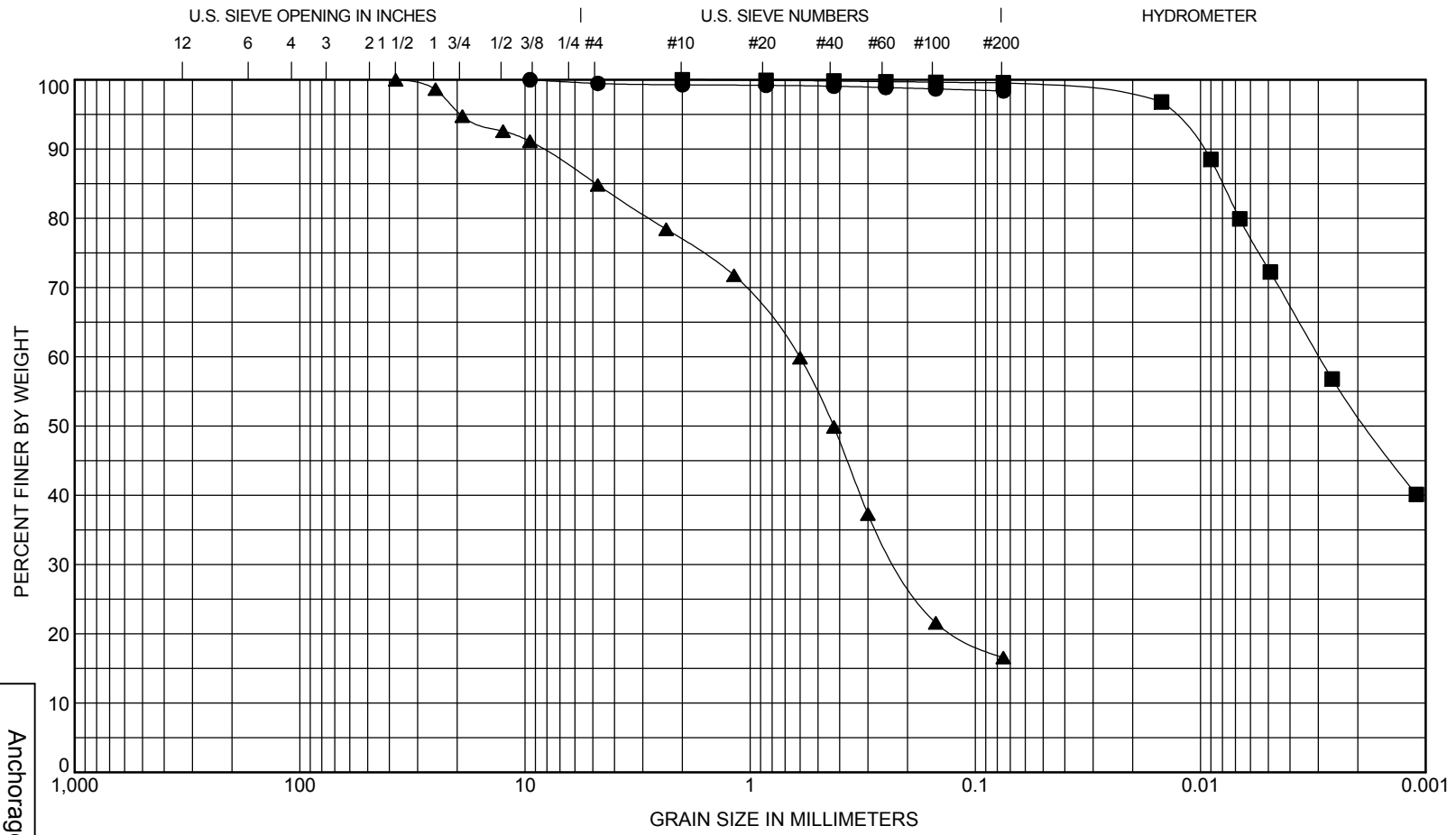
FIG. A-1
Sheet 1 of 7



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	B-01-17 S14	65.0 - 67.0	**Lean Clay (CL)**	**41**	**20**	**21**		
■	B-01-17 S22	105.0 - 107.0	**Lean Clay (CL)**	**42**	**22**	**20**		
▲	B-02-17 S4	14.5 - 16.5	**Silty Sand with Gravel (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01-17 S14	65.0 - 67.0	**9.5**				**1**	**1**	**98**	
■	B-01-17 S22	105.0 - 107.0	**2**	**0**			**0**	**0**	**100**	
▲	B-02-17 S4	14.5 - 16.5	**37.5**	**0.6**	**0.22**		**15**	**68**	**17**	

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June 2017

32-1-02579

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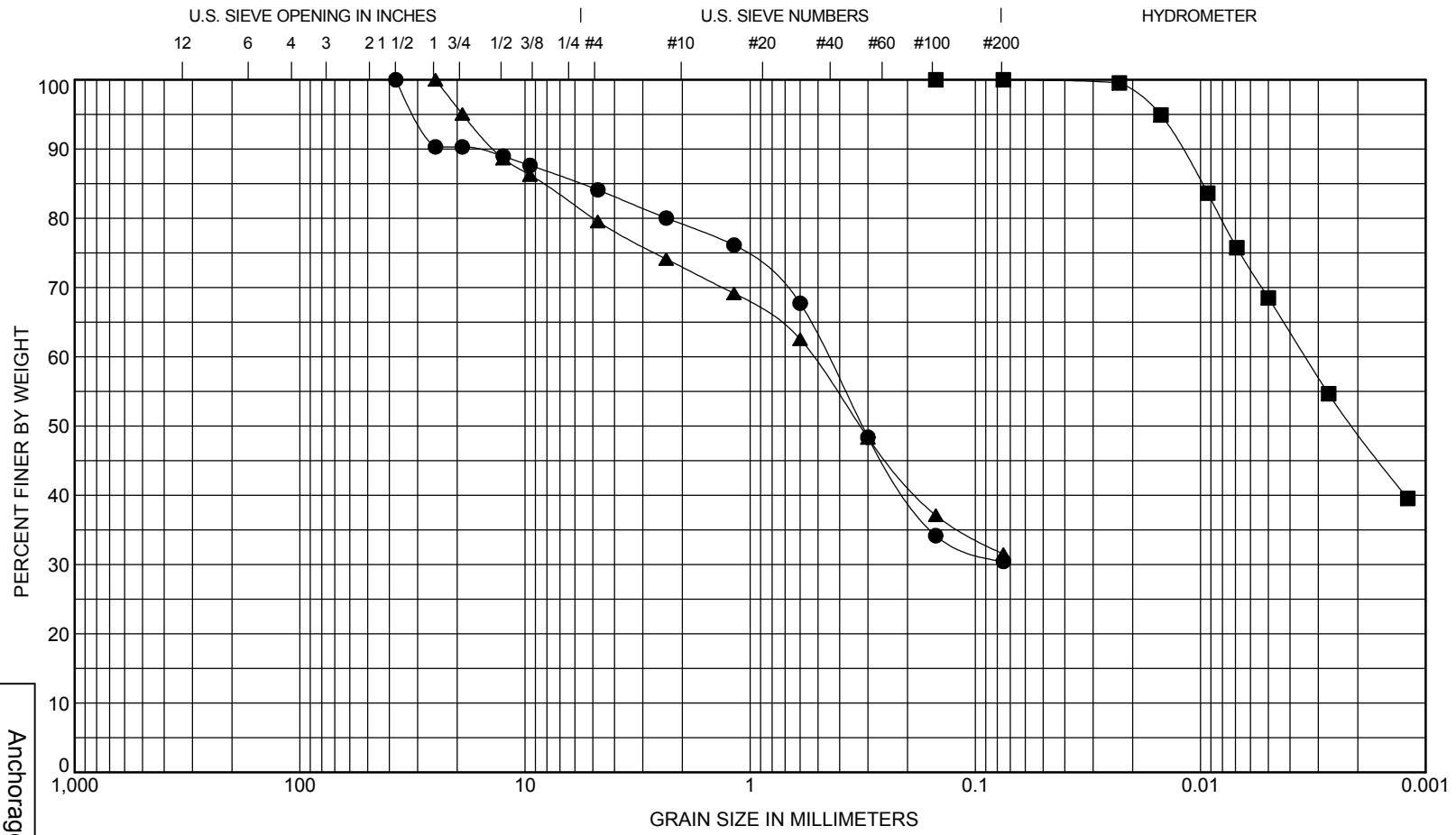
FIG. A-1
Sheet 2 of 7



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	B-02-17 S6	24.5 - 26.5	**Clayey Sand with Gravel (SC)**					
■	B-02-17 S12	54.5 - 56.5	**Lean Clay (CL)**	**41**	**22**	**19**		
▲	B-03-17 S5	20.0 - 22.0	**Silty Sand with Gravel (SM)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-02-17 S6	24.5 - 26.5	**37.5**	**0.45**			**16**	**54**	**30**	
■	B-02-17 S12	54.5 - 56.5	**0.15**	**0**			**0**	**0**	**100**	
▲	B-03-17 S5	20.0 - 22.0	**25**	**0.53**			**20**	**48**	**32**	

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June 2017

32-1-02579

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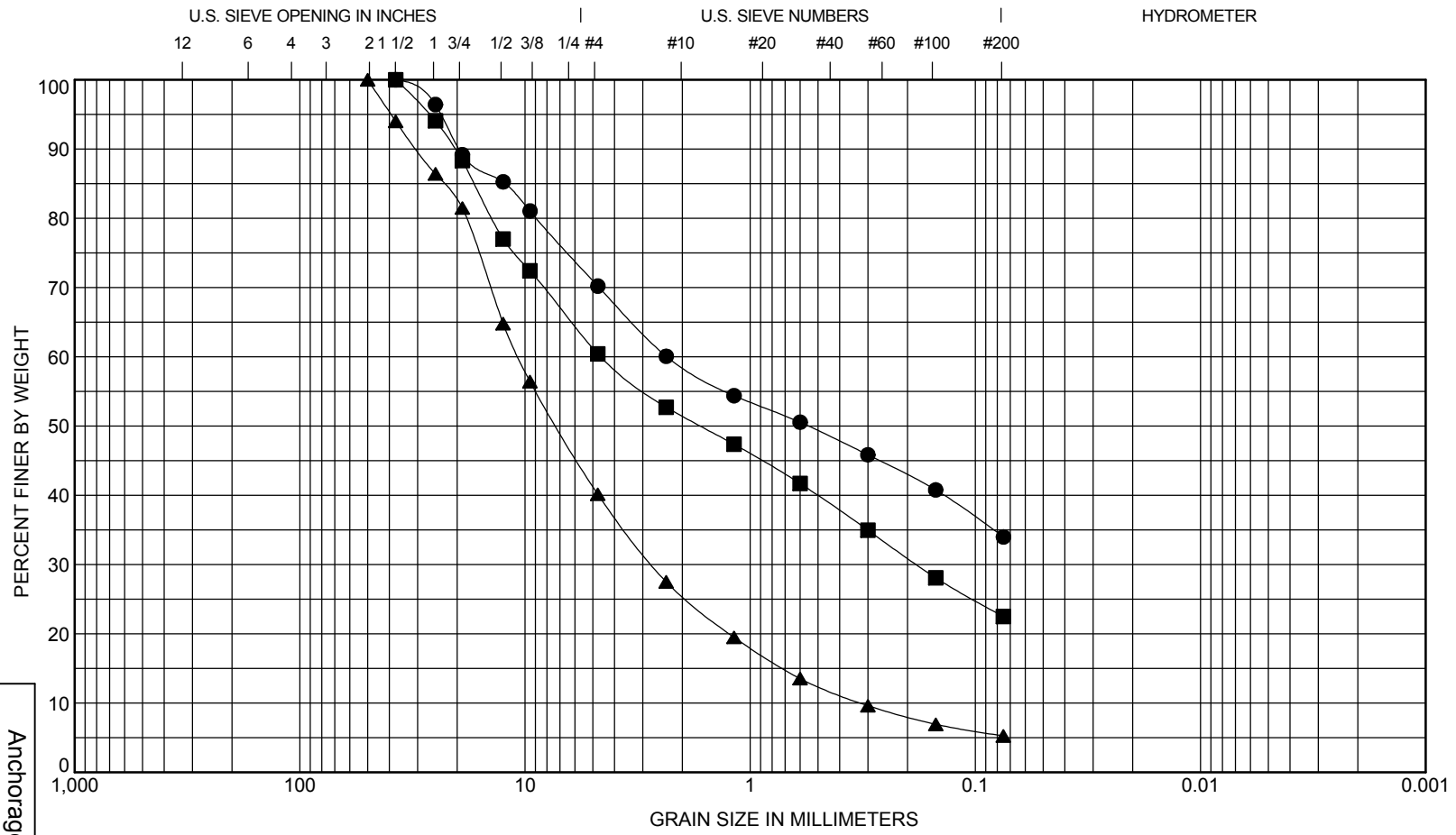
FIG. A-1
Sheet 3 of 7



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	B-03-17 S10	45.0 - 46.5	**Silty Sand with Gravel (SM)**					
■	B-04-17 S2	5.0 - 7.0	**Silty Gravel with Sand (GM)**					
▲	B-04-17 S5	20.0 - 22.0	**Well-Graded Gravel with Silt and Sand (GW-GM)**				**2.1**	**33.2**

	Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-03-17 S10	45.0 - 46.5	**37.5**	**2.34**			**30**	**36**	**34**	
■	B-04-17 S2	5.0 - 7.0	**37.5**	**4.57**	**0.18**		**40**	**38**	**22**	
▲	B-04-17 S5	20.0 - 22.0	**50**	**10.69**	**2.71**	**0.32**	**60**	**35**	**5**	

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June 2017

32-1-02579

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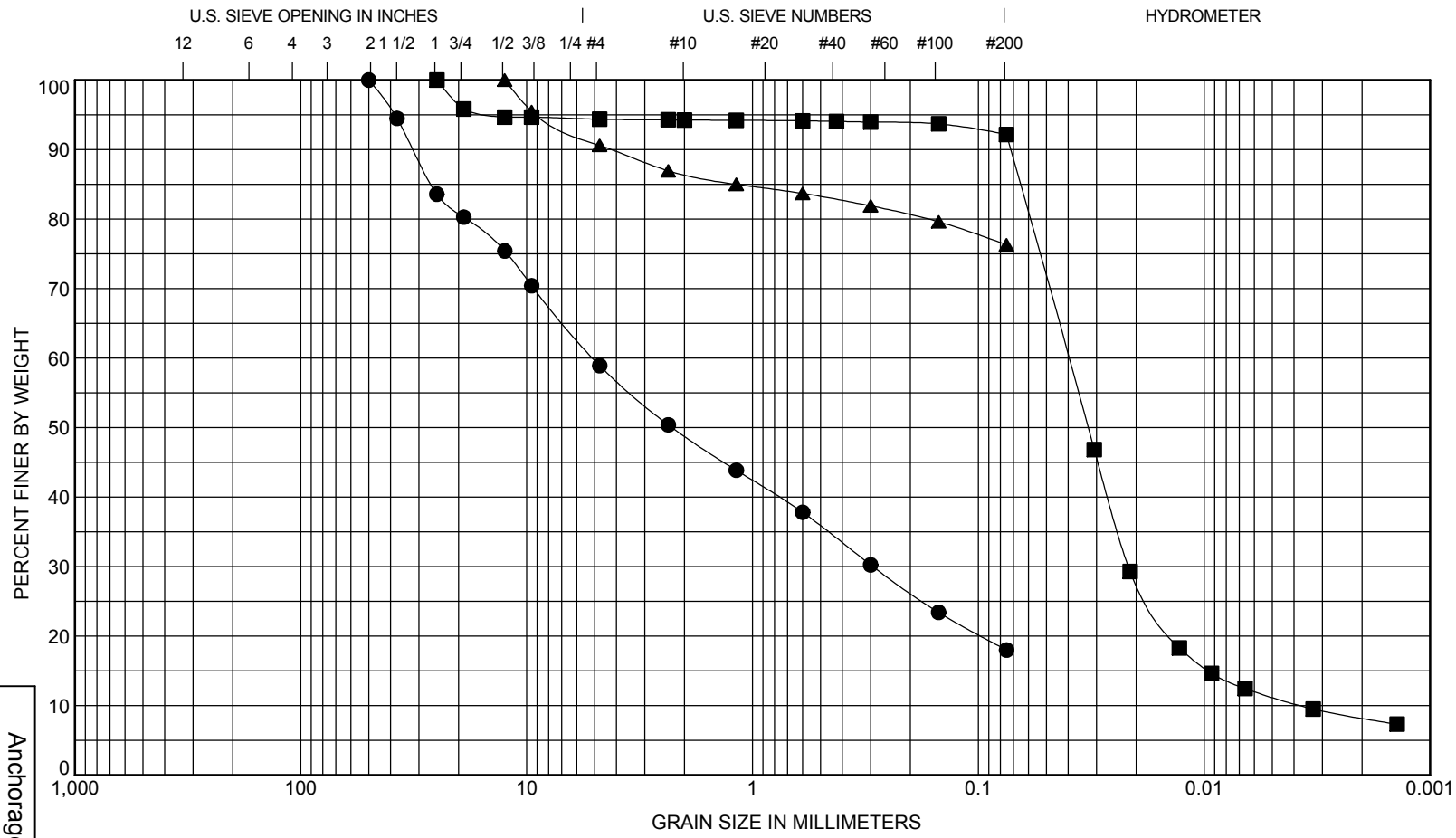
FIG. A-1
Sheet 4 of 7



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	B-05-17 S2	5.0 - 7.0	**Silty Gravel with Sand (GM)**					
■	B-05-17 S8	35.0 - 36.5	**Silt (ML)**				**3.2**	**10.7**
▲	B-05-17 S9	40.0 - 41.5	**Silt with Sand (ML)**					

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-05-17 S2	5.0 - 7.0	**50**	**5.07**	**0.29**		**41**	**41**	**18**	
■	B-05-17 S8	35.0 - 36.5	**25**	**0.04**	**0.02**	**0**	**6**	**2**	**92**	
▲	B-05-17 S9	40.0 - 41.5	**12.5**				**9**	**14**	**76**	

GRAIN SIZE CLASSIFICATION

June 2017

32-1-02579

FIG. A-1
Sheet 5 of 7

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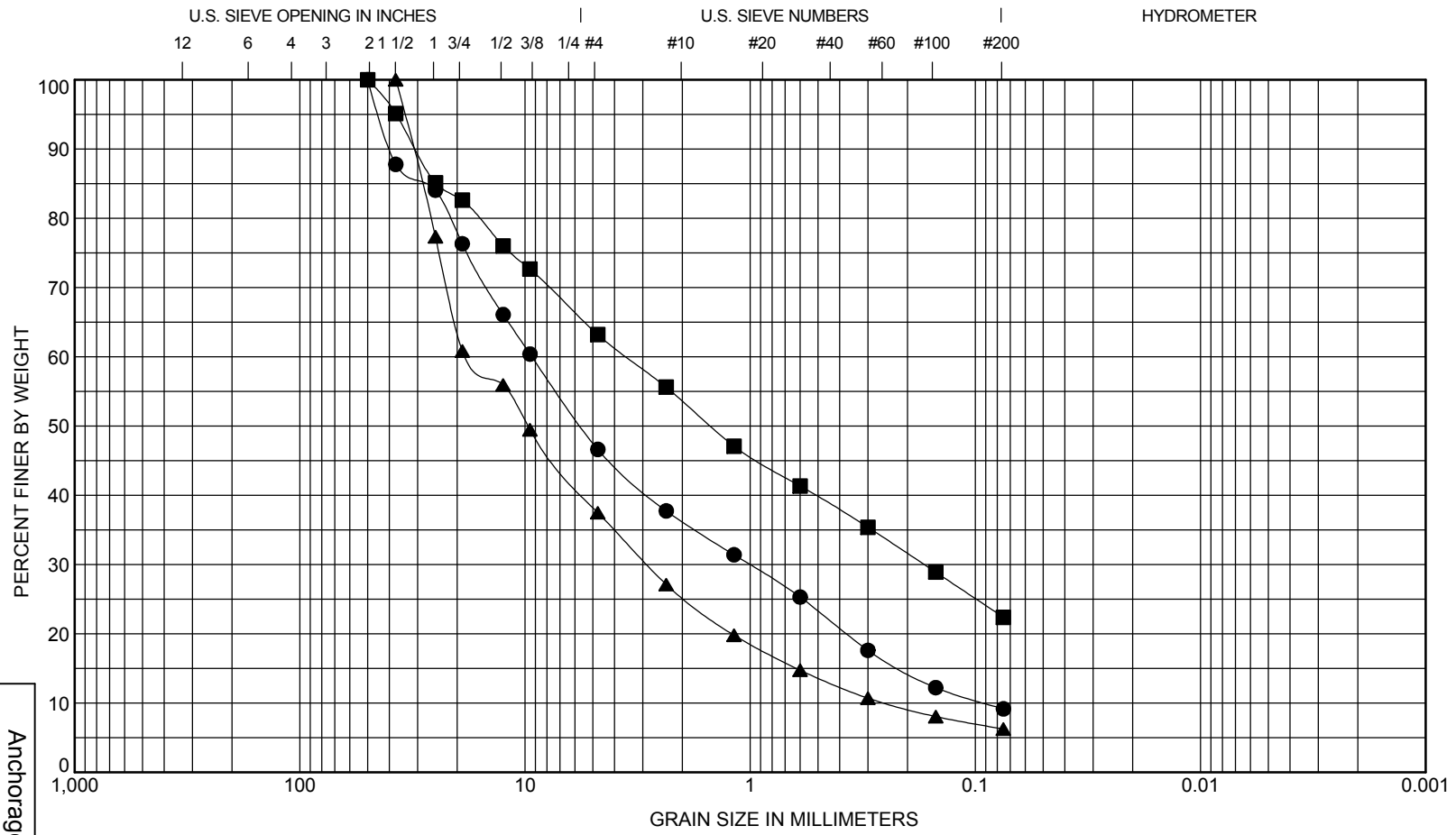
Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample		Depth, Ft	Classification	LL	PL	PI	Cc	Cu
●	B-06-17 S1	0.0 - 2.0	**Well-Graded Gravel with Silt and Sand (GW-GM)**				**1.2**	**102.7**
■	B-06-17 S4	14.0 - 16.0	**Silty Sand with Gravel (SM)**					
▲	B-07-17 S4	15.0 - 16.5	**Well-Graded Gravel with Silt and Sand (GW-GM)**				**1.9**	**70.9**

Sample		Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-06-17 S1	0.0 - 2.0	**50**	**9.32**	**1.01**	**0.09**	**53**	**37**	**9**	
■	B-06-17 S4	14.0 - 16.0	**50**	**3.54**	**0.17**		**37**	**41**	**22**	
▲	B-07-17 S4	15.0 - 16.5	**37.5**	**17.71**	**2.87**	**0.25**	**63**	**31**	**6**	

GRAIN SIZE CLASSIFICATION

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

June 2017

32-1-02579

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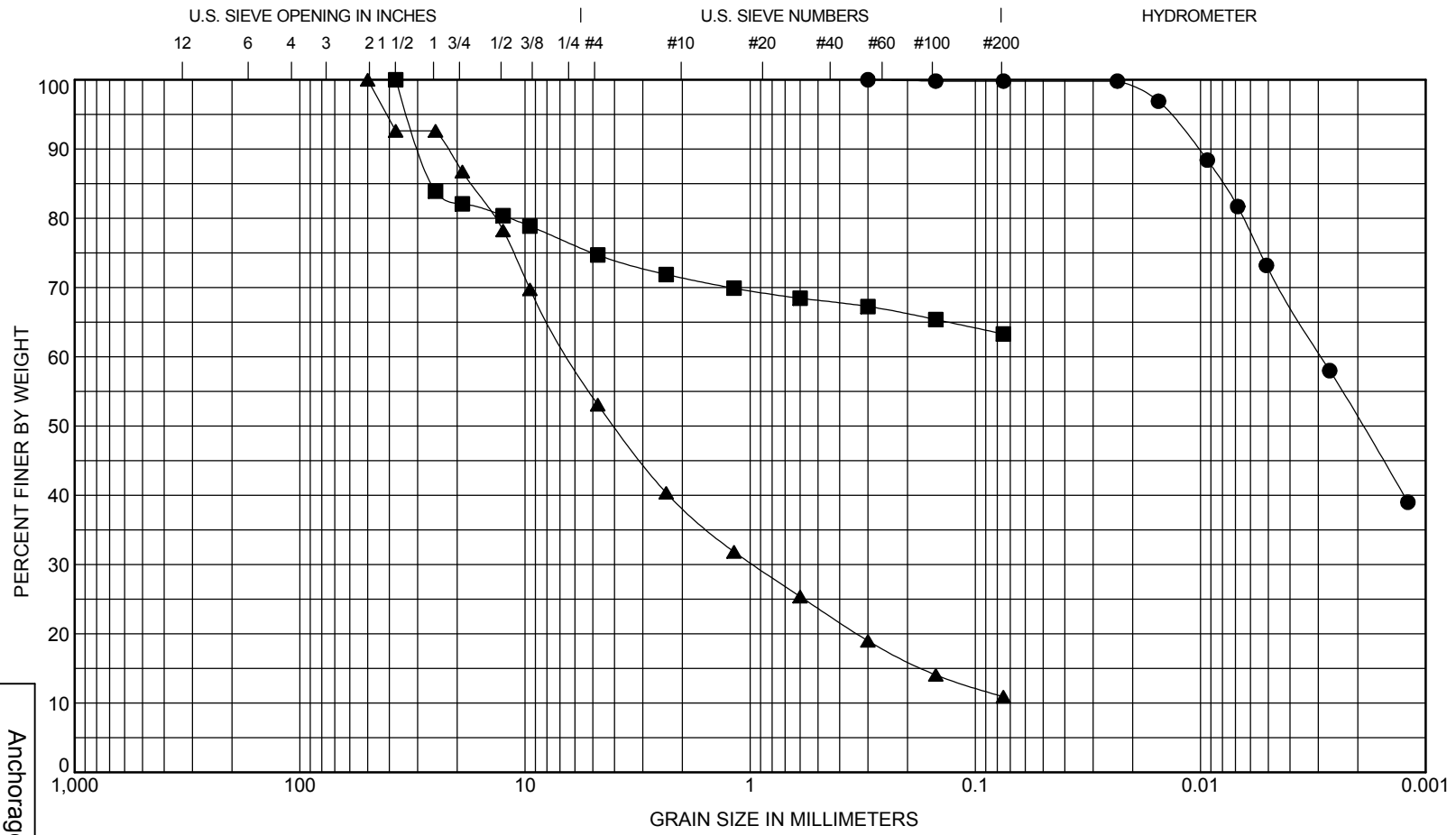
Geotechnical and Environmental Consultants

FIG. A-1
Sheet 6 of 7



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample	Depth, Ft	Classification	LL	PL	PI	Cc	Cu
● B-07-17 S28	135.0 - 137.0	**Lean Clay (CL)**	**44**	**23**	**21**		
■ B-08-17 S7	29.0 - 30.5	**Gravelly Silt (ML)**					
▲ B-09-17 S3	10.0 - 12.0	**Well-Graded Gravel with Silt and Sand (GW-GM)**				**2.4**	**103.1**

Sample	Depth, Ft	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-07-17 S28	135.0 - 137.0	**0.3**	**0**			**0**	**0**	**100**	
■ B-08-17 S7	29.0 - 30.5	**37.5**				**25**	**11**	**63**	
▲ B-09-17 S3	10.0 - 12.0	**50**	**6.33**	**0.97**		**47**	**42**	**11**	

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

GRAIN SIZE CLASSIFICATION

June 2017

32-1-02579

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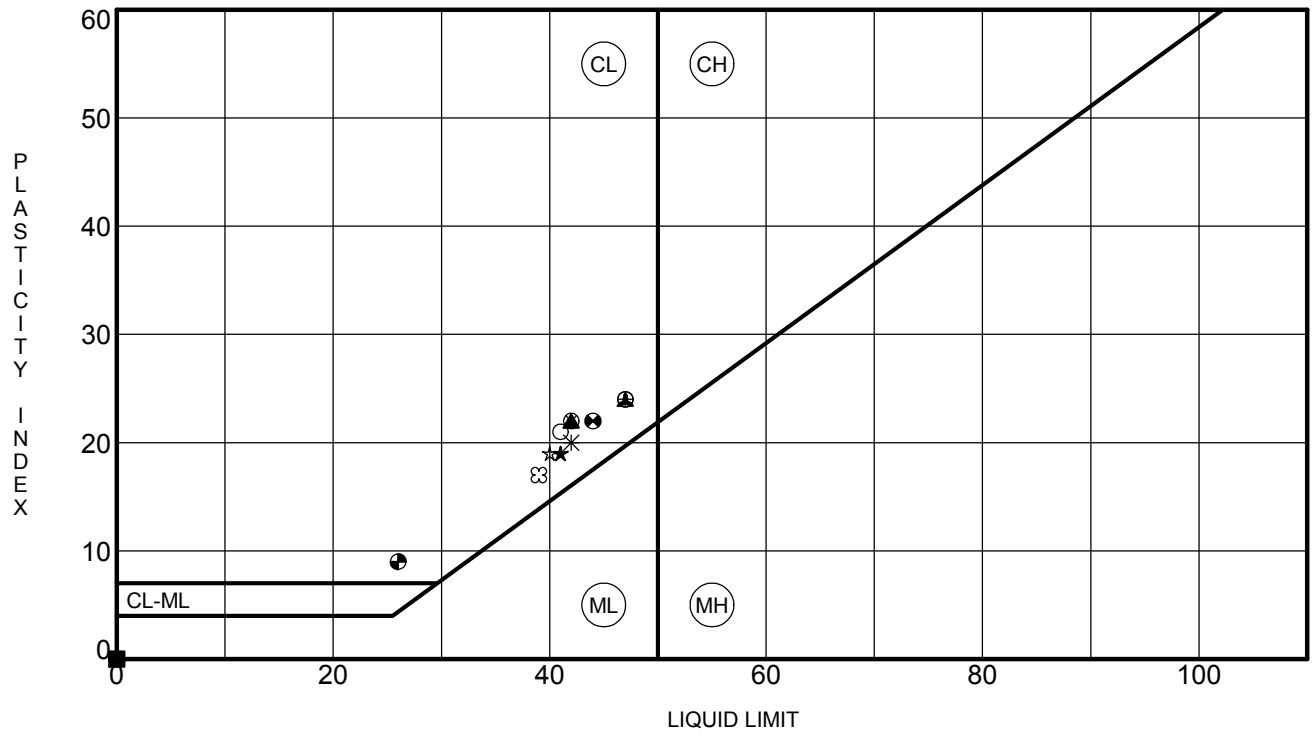
FIG. A-1
Sheet 7 of 7



Boring		Depth, Ft	LL	PL	PI	Fines	Classification
●	**B-01-17**	**35.0 - 36.5**	**NP**	**NP**	**NP**	**41.5**	**SM**
■	**B-01-17**	**40.0 - 41.5**	**NP**	**NP**	**NP**	**93.7**	**ML**
▲	**B-01-17**	**55.0 - 56.5**	**42**	**20**	**22**		**CL**
○	**B-01-17**	**65.0 - 66.5**	**41**	**20**	**21**	**98**	**CL**
⊙	**B-01-17**	**75.0 - 76.5**	**47**	**23**	**24**		**CL**
△	**B-01-17**	**85.0 - 86.5**	**42**	**20**	**22**		**CL**
✳	**B-01-17**	**105.0 - 106.5**	**42**	**22**	**20**	**100**	**CL**
⅄	**B-01-17**	**125.0 - 126.5**	**47**	**23**	**24**		**CL**
⊗	**B-01-17**	**145.0 - 146.5**	**42**	**20**	**22**		**CL**
★	**B-02-17**	**54.5 - 56.0**	**41**	**22**	**19**	**100**	**CL**
⊕	**B-02-17**	**69.5 - 71.0**	**47**	**23**	**24**		**CL**
◓	**B-02-17**	**94.5 - 96.0**	**44**	**22**	**22**		**CL**
◔	**B-03-17**	**50.0 - 51.5**	**26**	**17**	**9**		**CL**
☆	**B-03-17**	**70.0 - 71.5**	**40**	**21**	**19**		**CL**
⊠	**B-04-17**	**75.0 - 76.5**	**39**	**22**	**17**	**98**	**CL**

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

ATTERBERG LIMITS RESULTS

June 2017 32-1-02579

SHANNON & WILSON, INC.
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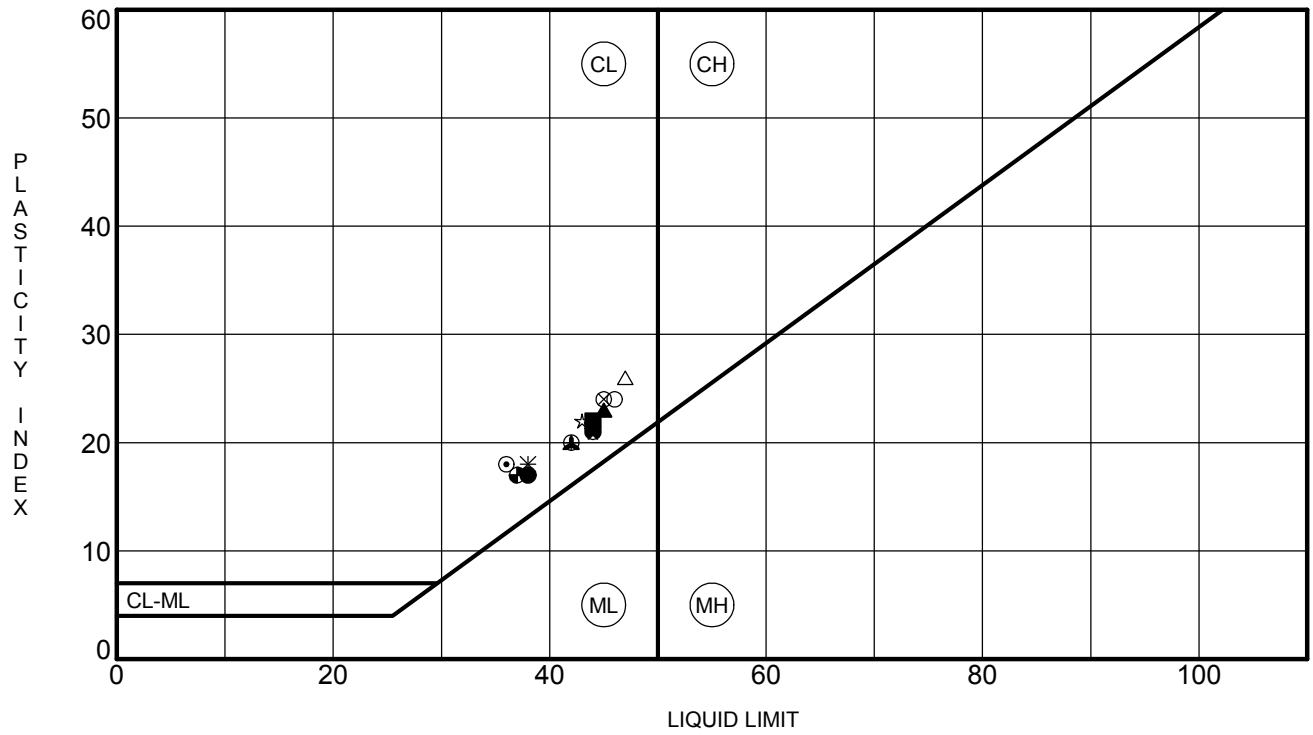
FIG. A-2
Sheet 1 of 2



Boring		Depth, Ft	LL	PL	PI	Fines	Classification
●	**B-04-17**	**90.0 - 91.5**	**38**	**21**	**17**		**CL**
■	**B-05-17**	**70.0 - 71.5**	**44**	**22**	**22**		**CL**
▲	**B-06-17**	**54.0 - 55.5**	**45**	**22**	**23**	**100**	**CL**
○	**B-06-17**	**69.0 - 70.5**	**46**	**22**	**24**		**CL**
⊙	**B-07-17**	**55.0 - 56.5**	**36**	**18**	**18**		**CL**
△	**B-07-17**	**65.0 - 66.5**	**47**	**21**	**26**		**CL**
✳	**B-07-17**	**85.0 - 86.5**	**38**	**20**	**18**	**96.0**	**CL**
⅄	**B-07-17**	**105.0 - 106.5**	**42**	**22**	**20**		**CL**
⊗	**B-07-17**	**125.0 - 126.5**	**45**	**21**	**24**		**CL**
★	**B-07-17**	**135.0 - 136.5**	**44**	**23**	**21**	**100**	**CL**
⊕	**B-07-17**	**150.0 - 151.5**	**42**	**22**	**20**		**CL**
◓	**B-08-17**	**54.0 - 55.5**	**44**	**23**	**21**	**99**	**CL**
◔	**B-08-17**	**79.0 - 80.5**	**37**	**20**	**17**		**CL**
☆	**B-09-17**	**50.0 - 51.5**	**43**	**21**	**22**		**CL**

Anchorage Port Modernization Program
Step 1 North Extension Stabilization
Port of Anchorage, Alaska

ATTERBERG LIMITS RESULTS

June 2017 32-1-02579

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. A-2
Sheet 2 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-01-17, Sample S-12, 55.6 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	42
Plastic Limit, PL	20
Plasticity Index, PI (LL - PL)	22
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	500
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.787	0.723
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.871	3.558
Wet Unit Weight, pcf	123.6	130.5
Dry Unit Weight, pcf	96.7	105.2
Water Content	28%	24%
Void Ratio	0.74	0.60
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.16									
1	0.32	33	1.8	0.002	-0.001	-0.1%	0.746	3.97E-02	1.82E-03	4.05E-09
2	0.64	38	3.0	0.009	0.005	0.6%	0.734	4.02E-01	1.08E-03	2.45E-08
3	1.29	1050	3.5	0.019	0.013	1.7%	0.715	3.09E-01	9.15E-04	1.60E-08
4	2.57	285	2.6	0.032	0.023	2.9%	0.693	1.81E-01	1.21E-03	1.25E-08
5	5.15	1185	2.7	0.050	0.038	4.8%	0.660	1.34E-01	1.14E-03	8.84E-09
6	10.30	205	1.7	0.070	0.055	7%	0.622	7.74E-02	1.69E-03	7.75E-09
7	20.60	160	1.3	0.097	0.079	10%	0.570	5.26E-02	2.11E-03	6.71E-09
8	41.20	1020	1.1	0.131	0.108	13.7%	0.504	3.31E-02	2.21E-03	4.57E-09
9	51.50	1560	10.7	0.142	0.121	15.4%	0.476	2.86E-02	2.22E-04	4.14E-10
10	12.87	2730	0.4	0.128	0.114	14.4%	0.492	4.34E-03	5.40E-03	1.56E-09
11	3.22	270	2.5	0.110	0.100	12.7%	0.523	3.35E-02	9.61E-04	2.12E-09
12	0.80	240	9.8	0.088	0.079	10%	0.570	2.01E-01	2.64E-04	3.41E-09
13	0.20	945	31.0	0.064	0.058	7.3%	0.616	8.10E-01	8.82E-05	4.46E-09

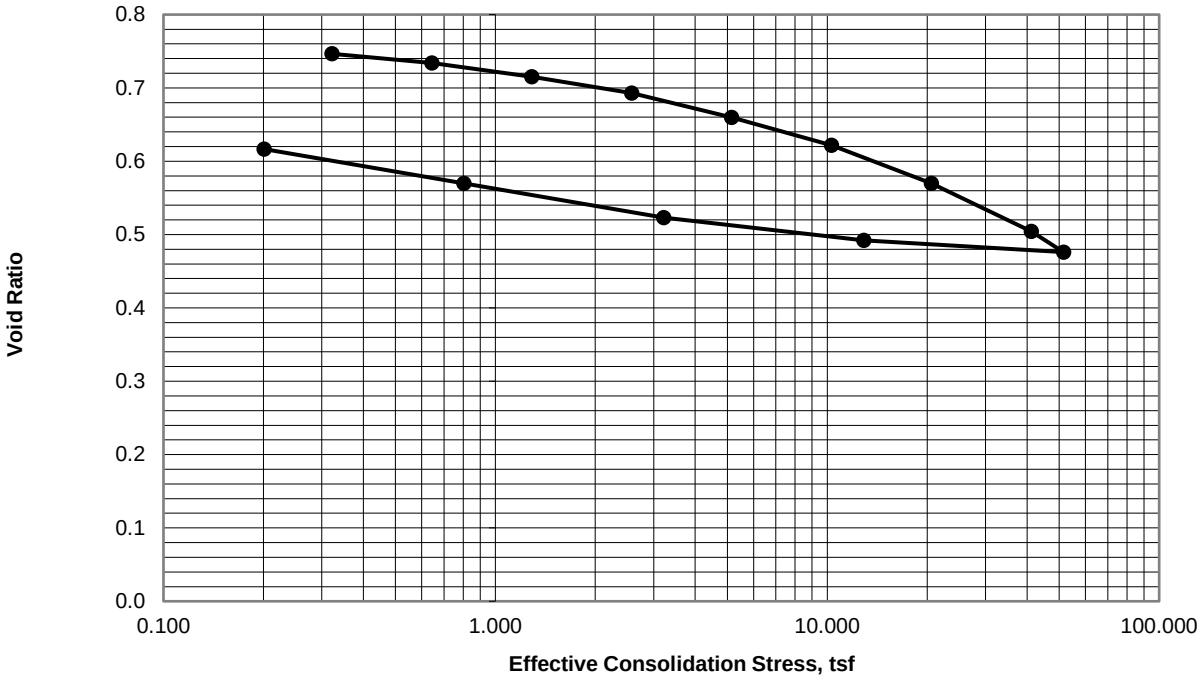
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/15/2017. Finalized by JFL.

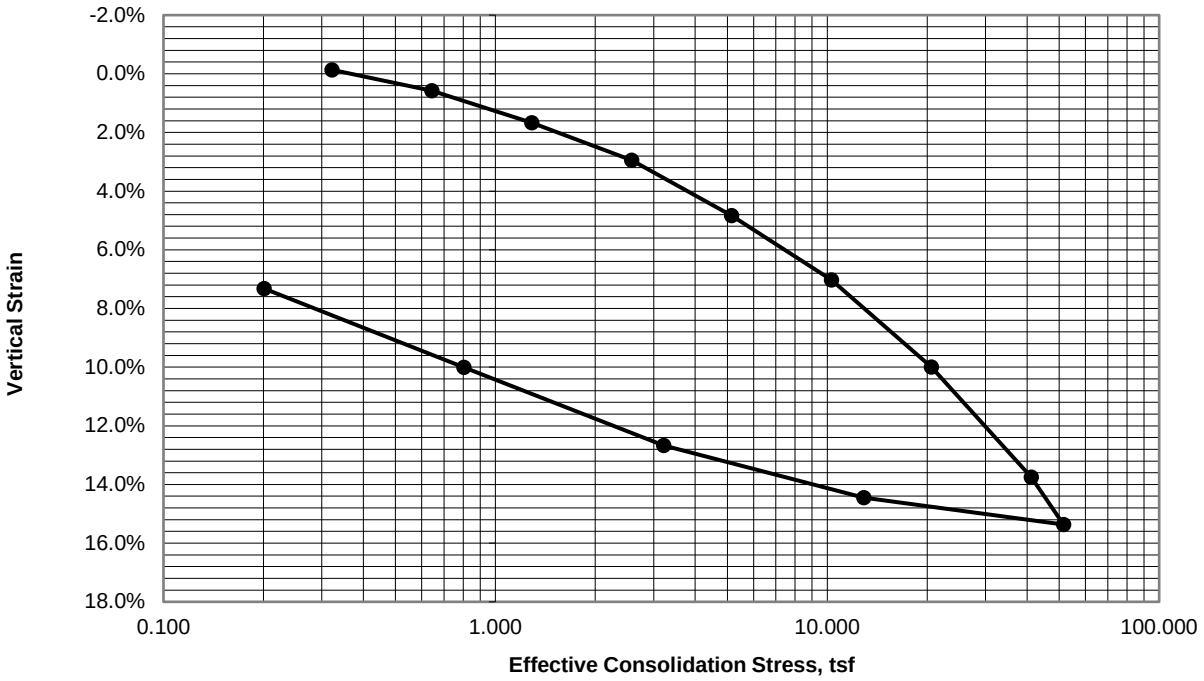
FIG. A-3
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-01-17, Sample S-12, 55.6 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.5

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/15/2017. Finalized by JFL.

FIG. A-3
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-01-17_S-12_55.6_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-01-17, Sample S-14, 66.4 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	41
Plastic Limit, PL	20
Plasticity Index, PI (LL - PL)	21
Fines Content	98%
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	400
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.778	0.713
Diameter, in	2.509	2.509
Specimen Volume, in^3	3.844	3.526
Wet Unit Weight, pcf	123.6	132.4
Dry Unit Weight, pcf	97.9	106.7
Water Content	26%	24%
Void Ratio	0.72	0.58
Degree of Saturation	98%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.13									
1	0.26	1215	2.2	0.004	-0.001	-0.2%	0.725	3.48E-01	1.44E-03	2.84E-08
2	0.51	465	2.1	0.010	0.004	0.5%	0.713	4.76E-01	1.52E-03	4.11E-08
3	1.03	915	1.6	0.019	0.011	1.5%	0.697	3.39E-01	1.96E-03	3.80E-08
4	2.05	210	1.0	0.029	0.019	2.5%	0.679	1.75E-01	2.96E-03	3.00E-08
5	4.10	92	0.7	0.041	0.028	3.6%	0.660	9.99E-02	4.22E-03	2.46E-08
6	8.20	155	0.8	0.057	0.041	5.3%	0.631	7.35E-02	3.84E-03	1.67E-08
7	16.41	1095	0.9	0.083	0.062	8%	0.584	5.96E-02	3.07E-03	1.10E-08
8	32.81	2730	0.9	0.117	0.092	11.8%	0.519	4.16E-02	2.76E-03	7.11E-09
9	49.22	270	0.8	0.135	0.109	14%	0.480	2.47E-02	2.83E-03	4.52E-09
10	12.30	20	0.3	0.124	0.107	13.8%	0.485	1.28E-03	7.91E-03	6.72E-10
11	3.08	70	1.4	0.107	0.094	12.1%	0.514	3.33E-02	1.71E-03	3.76E-09
12	0.77	150	6.0	0.086	0.075	9.7%	0.555	1.85E-01	4.22E-04	5.06E-09
13	0.19	930	20.3	0.065	0.055	7.1%	0.600	8.08E-01	1.32E-04	6.75E-09

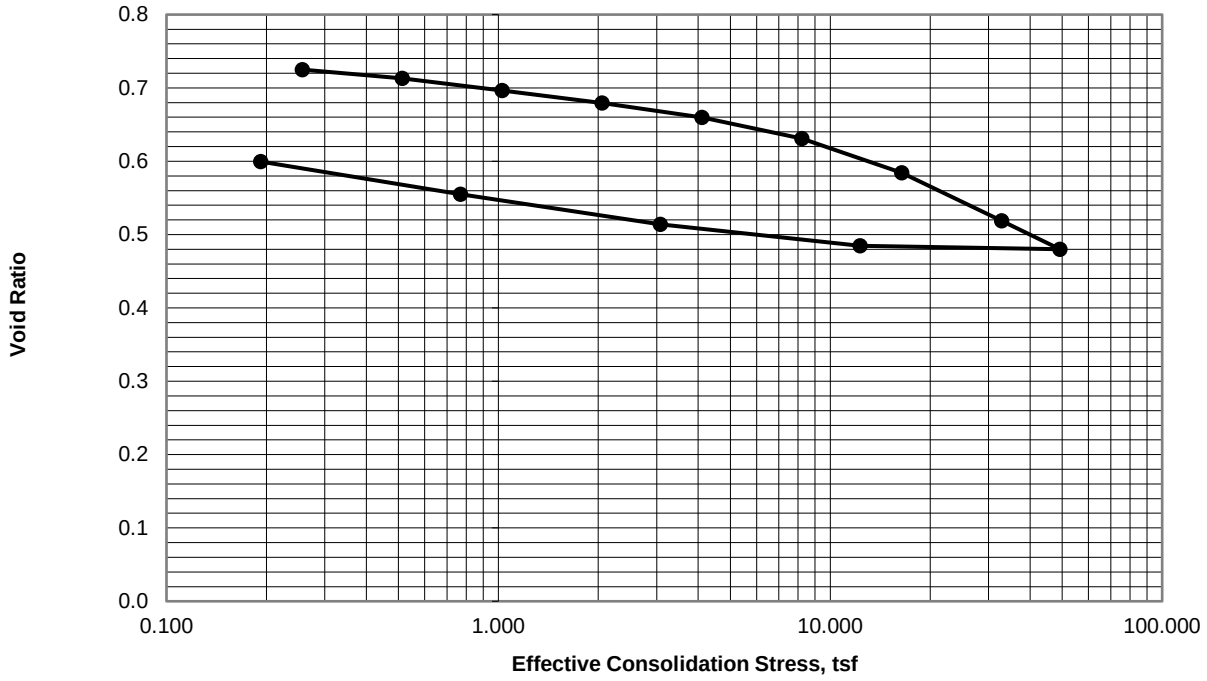
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/15/2017. Finalized by JFL.

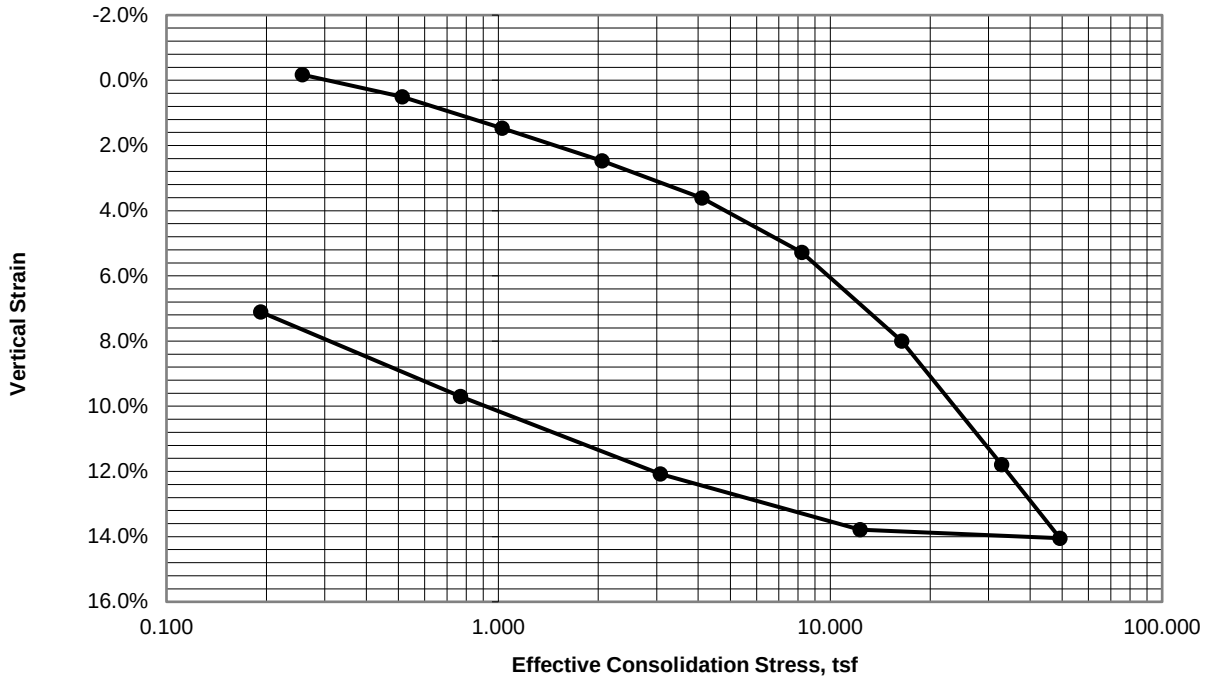
FIG. A-4
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-01-17, Sample S-14, 66.4 ft





Maximum Applied Effective Consolidation Stress, tsf = 49.22

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/15/2017. Finalized by JFL.

FIG. A-4
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-01-17_S-14_66.4_JFL.xlsm 06/23/17

32-1-02579

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-01-17, Sample S-18, 86 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	42
Plastic Limit, PL	20
Plasticity Index, PI (LL - PL)	22
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	530
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.730
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.868	3.591
Wet Unit Weight, pcf	124.3	131.6
Dry Unit Weight, pcf	97.9	105.4
Water Content	27%	25%
Void Ratio	0.72	0.60
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.17									
1	0.32	465	2.8	0.002	-0.004	-0.5%	0.730	-1.13E-01	1.17E-03	7.49E-09
2	0.64	915	2.1	0.008	0.000	0%	0.722	2.69E-01	1.56E-03	2.38E-08
3	1.29	210	1.3	0.015	0.005	0.7%	0.710	1.85E-01	2.52E-03	2.66E-08
4	2.57	92	0.7	0.024	0.012	1.6%	0.695	1.23E-01	4.50E-03	3.18E-08
5	5.15	155	0.5	0.035	0.020	2.6%	0.678	7.00E-02	6.38E-03	2.58E-08
6	10.30	1095	0.5	0.052	0.032	4.1%	0.651	5.39E-02	6.42E-03	2.02E-08
7	20.60	2730	0.7	0.082	0.055	7%	0.602	5.01E-02	4.07E-03	1.21E-08
8	41.20	270	0.7	0.117	0.088	11.2%	0.530	3.64E-02	3.83E-03	8.54E-09
9	51.50	165	1.0	0.129	0.099	12.6%	0.505	2.55E-02	2.60E-03	4.25E-09
10	12.87	16	0.3	0.116	0.097	12.4%	0.510	1.21E-03	8.58E-03	6.79E-10
11	3.22	62	1.1	0.099	0.084	10.6%	0.539	3.22E-02	2.29E-03	4.80E-09
12	0.80	945	4.9	0.077	0.065	8.3%	0.580	1.77E-01	5.47E-04	6.18E-09
13	0.20	1455	17.1	0.056	0.047	6%	0.619	6.67E-01	1.65E-04	6.85E-09

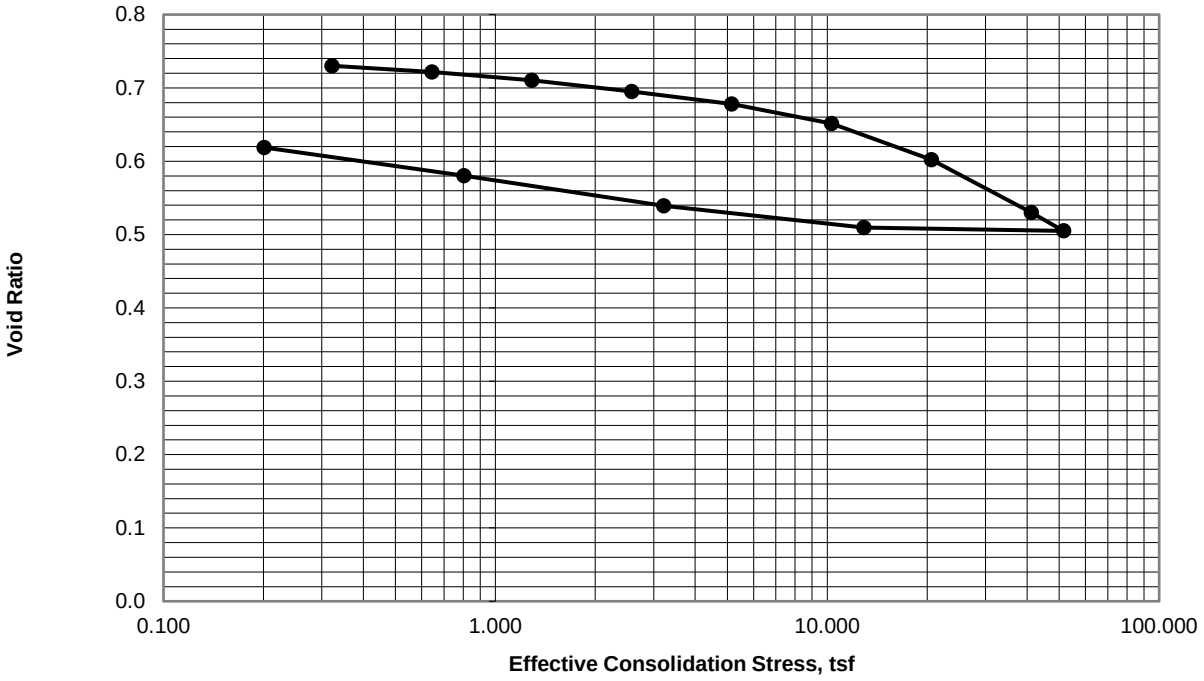
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/17/2017. Finalized by JFL.

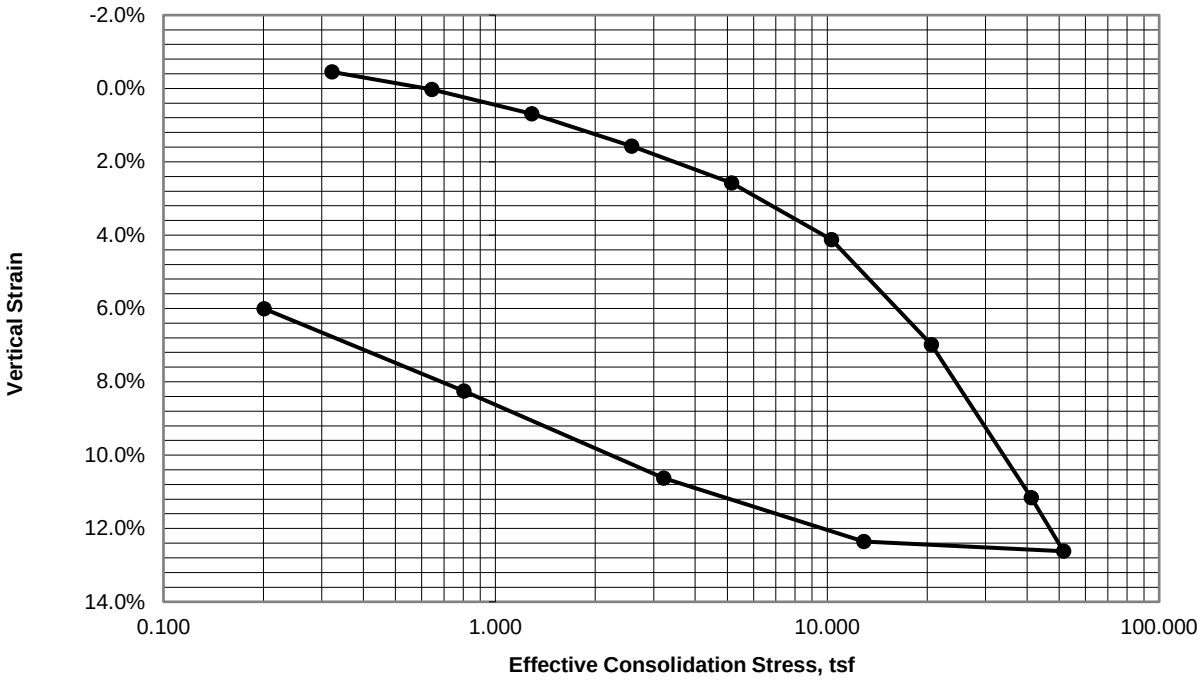
FIG. A-5
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-01-17, Sample S-18, 86 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.5

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/17/2017. Finalized by JFL.

FIG. A-5
Sheet 2 of 2

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-01-17, Sample S-22, 106 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	42
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	20
Fines Content	100%
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	800
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.733
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.868	3.608
Wet Unit Weight, pcf	123.3	129.6
Dry Unit Weight, pcf	95.8	102.7
Water Content	29%	26%
Void Ratio	0.76	0.64
Degree of Saturation	100%	100%

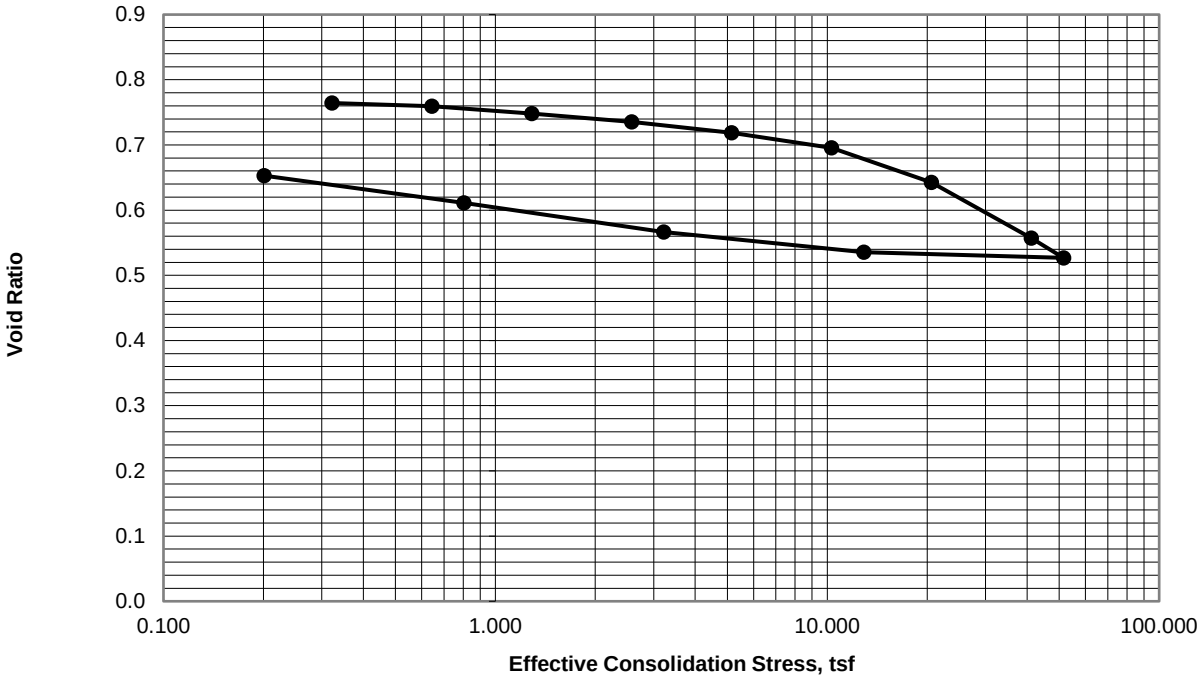
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.26									
1	0.32	1350	0.5	0.001	-0.002	-0.2%	0.764	8.58E-02	7.07E-03	3.37E-08
2	0.64	465	1.1	0.004	0.000	0.1%	0.759	1.57E-01	2.93E-03	2.56E-08
3	1.29	1095	1.1	0.011	0.005	0.7%	0.748	1.83E-01	2.89E-03	2.95E-08
4	2.57	2730	0.6	0.019	0.011	1.4%	0.735	1.06E-01	5.19E-03	3.09E-08
5	5.15	255	0.4	0.027	0.019	2.4%	0.719	6.65E-02	8.40E-03	3.16E-08
6	10.30	16	0.3	0.040	0.029	3.7%	0.695	4.72E-02	1.10E-02	2.95E-08
7	20.60	17	0.5	0.068	0.053	6.7%	0.643	5.36E-02	5.81E-03	1.80E-08
8	41.20	62	0.5	0.111	0.091	11.6%	0.557	4.34E-02	5.38E-03	1.40E-08
9	51.50	86	0.9	0.125	0.104	13.3%	0.527	3.05E-02	2.66E-03	5.10E-09
10	12.87	12	0.2	0.113	0.100	12.8%	0.535	2.34E-03	1.25E-02	1.87E-09
11	3.22	55	0.9	0.096	0.087	11%	0.566	3.34E-02	2.87E-03	6.12E-09
12	0.80	945	3.9	0.074	0.067	8.5%	0.611	1.95E-01	6.80E-04	8.28E-09
13	0.20	1470	14.1	0.053	0.048	6.1%	0.653	7.16E-01	2.00E-04	8.72E-09

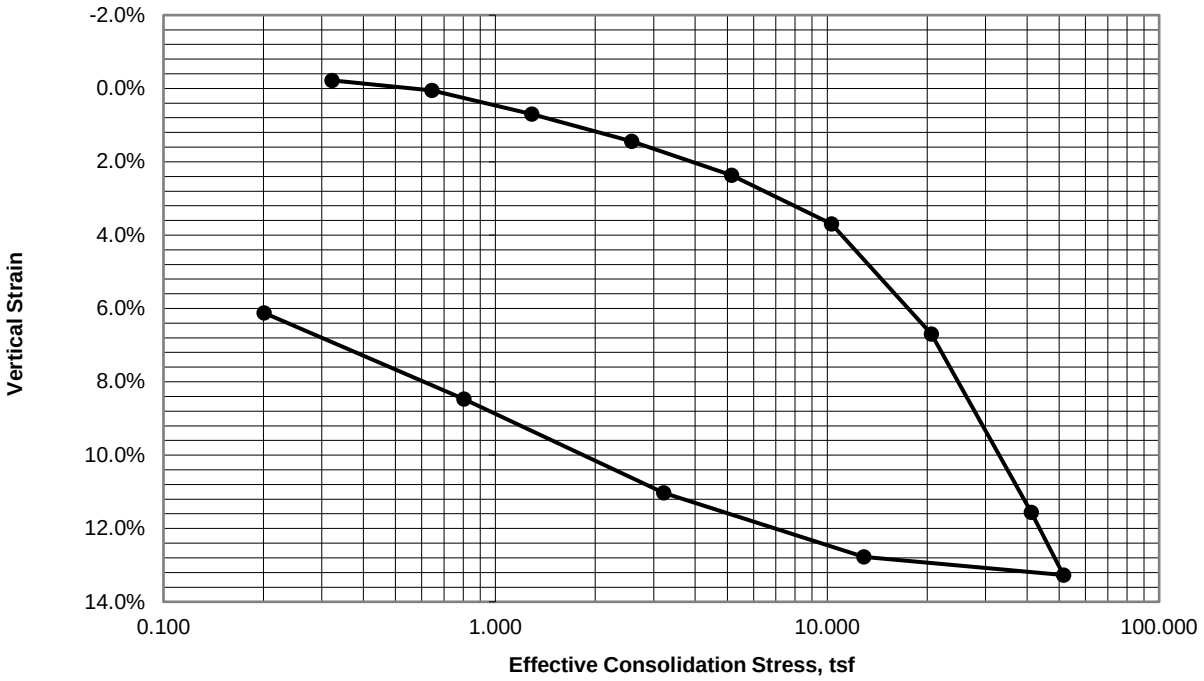
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/17/2017. Finalized by JFL.

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-01-17, Sample S-22, 106 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.5

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/17/2017. Finalized by JFL.

FIG. A-6
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-01-17_S-22_106_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-01-17, Sample S-30, 146.5 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	42
Plastic Limit, PL	20
Plasticity Index, PI (LL - PL)	22
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	950
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.736
Diameter, in	2.814	2.814
Specimen Volume, in^3	4.890	4.576
Wet Unit Weight, pcf	125.5	133.0
Dry Unit Weight, pcf	99.8	106.7
Water Content	26%	25%
Void Ratio	0.69	0.58
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.24									
1	0.31	50	2.8	0.000	-0.002	-0.3%	0.693	-6.94E-02	1.16E-03	4.65E-09
2	0.61	45	1.0	0.005	0.001	0.1%	0.687	2.31E-01	3.44E-03	4.61E-08
3	1.22	76	1.1	0.014	0.007	0.9%	0.673	2.33E-01	2.86E-03	3.87E-08
4	2.44	35	0.7	0.024	0.015	2%	0.656	1.48E-01	4.81E-03	4.18E-08
5	4.89	41	0.4	0.037	0.025	3.1%	0.636	8.42E-02	7.70E-03	3.84E-08
6	9.78	46	0.4	0.050	0.035	4.5%	0.613	4.88E-02	7.80E-03	2.28E-08
7	19.56	60	0.5	0.075	0.055	7%	0.571	4.53E-02	5.71E-03	1.57E-08
8	39.11	70	0.5	0.111	0.086	10.9%	0.505	3.52E-02	4.95E-03	1.09E-08
9	46.85	94	1.9	0.121	0.097	12.4%	0.480	3.39E-02	1.33E-03	2.93E-09
10	11.71	795	0.2	0.108	0.091	11.6%	0.492	3.72E-03	1.06E-02	2.61E-09
11	2.93	43	1.0	0.091	0.079	10%	0.520	3.26E-02	2.65E-03	5.67E-09
12	0.76	84	4.0	0.071	0.064	8.1%	0.552	1.58E-01	6.71E-04	6.82E-09
13	0.19	240	11.9	0.050	0.045	5.7%	0.593	7.35E-01	2.38E-04	1.11E-08

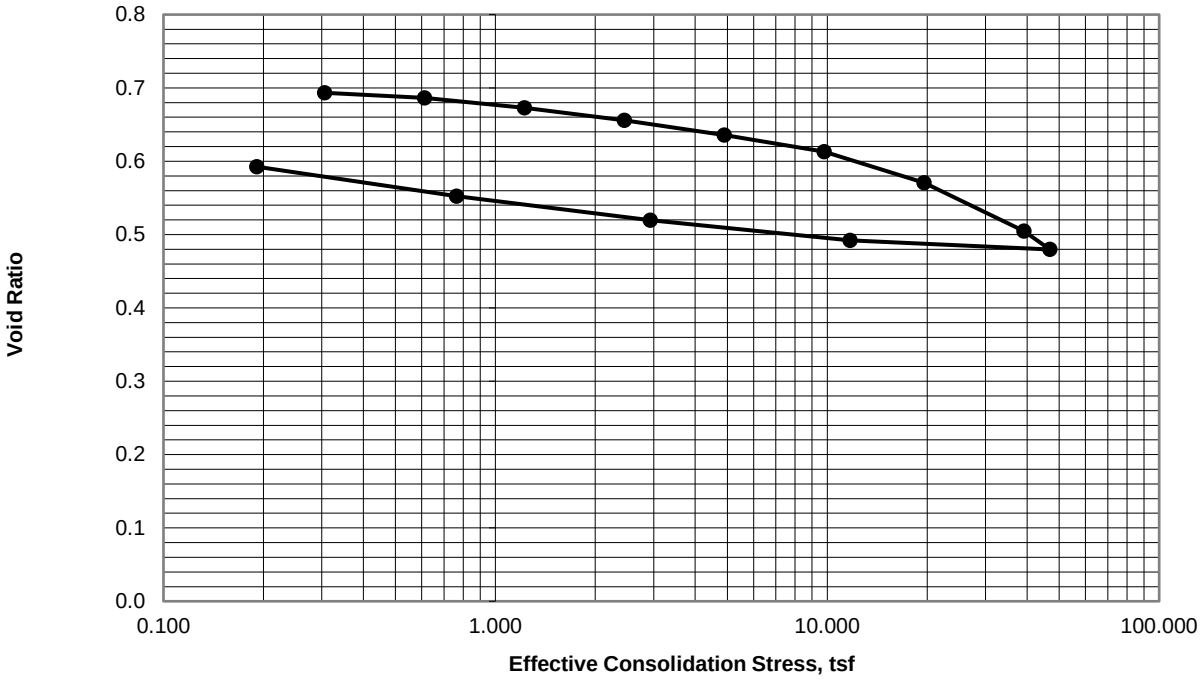
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/23/2017. Finalized by JFL.

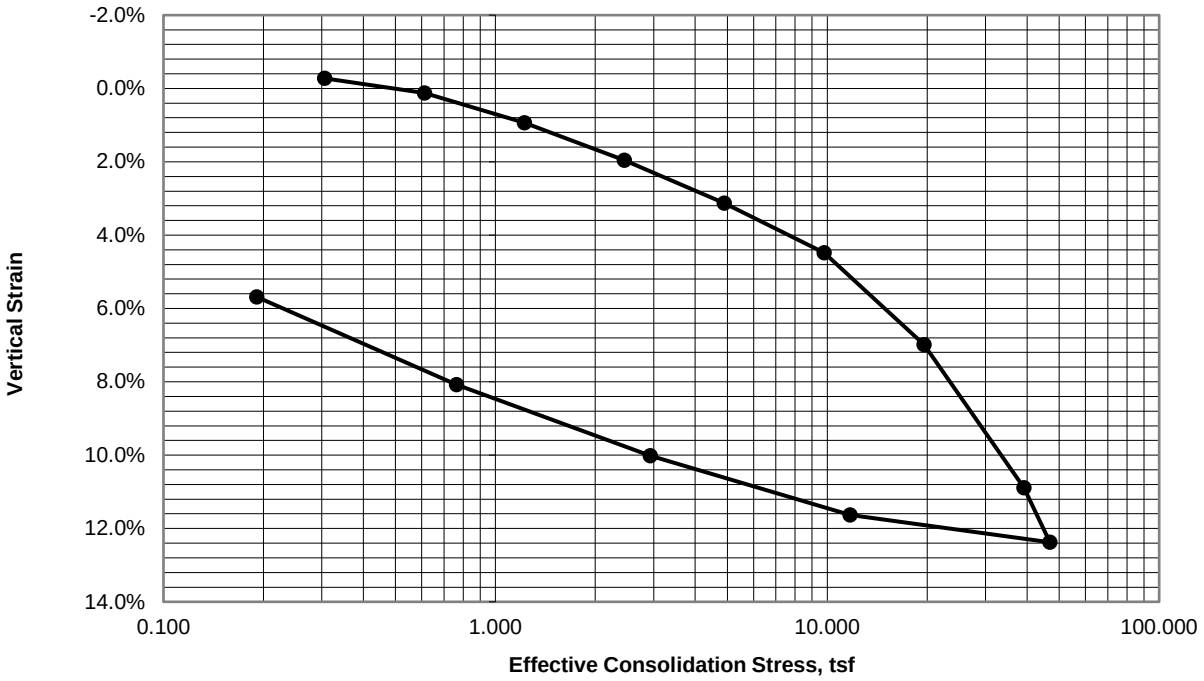
FIG. A-7
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-01-17, Sample S-30, 146.5 ft





Maximum Applied Effective Consolidation Stress, tsf = 46.85

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/23/2017. Finalized by JFL.

FIG. A-7
Sheet 2 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-02-17, Sample S-12, 54.9 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	41
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	19
Fines Content	100%
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	700
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.784	0.725
Diameter, in	2.816	2.816
Specimen Volume, in^3	4.887	4.518
Wet Unit Weight, pcf	124.5	131.7
Dry Unit Weight, pcf	97.2	105.2
Water Content	28%	25%
Void Ratio	0.73	0.60
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.18									
1	0.25	47	1.9	0.002	-0.003	-0.4%	0.741	-2.74E-01	1.73E-03	2.67E-08
2	0.51	48	1.3	0.007	0.002	0.2%	0.730	4.50E-01	2.57E-03	6.52E-08
3	1.02	76	1.0	0.016	0.008	1%	0.716	2.86E-01	3.11E-03	5.04E-08
4	2.03	35	0.7	0.025	0.015	1.9%	0.700	1.65E-01	4.41E-03	4.17E-08
5	4.07	42	0.7	0.037	0.025	3.2%	0.679	1.09E-01	4.75E-03	2.99E-08
6	8.14	42	0.6	0.053	0.037	4.7%	0.652	6.81E-02	5.26E-03	2.09E-08
7	16.27	66	0.5	0.077	0.057	7.3%	0.607	5.84E-02	5.24E-03	1.82E-08
8	32.55	170	0.5	0.112	0.088	11.2%	0.540	4.28E-02	5.21E-03	1.36E-08
9	46.78	795	0.7	0.132	0.106	13.5%	0.500	2.92E-02	3.38E-03	6.29E-09
10	11.70	41	0.2	0.120	0.104	13.2%	0.504	1.24E-03	1.31E-02	1.06E-09
11	2.92	82	1.2	0.103	0.090	11.5%	0.535	3.65E-02	2.10E-03	4.99E-09
12	0.76	76	3.9	0.083	0.072	9.2%	0.574	1.88E-01	6.68E-04	8.03E-09
13	0.19	255	14.2	0.059	0.051	6.5%	0.620	8.45E-01	1.95E-04	1.03E-08

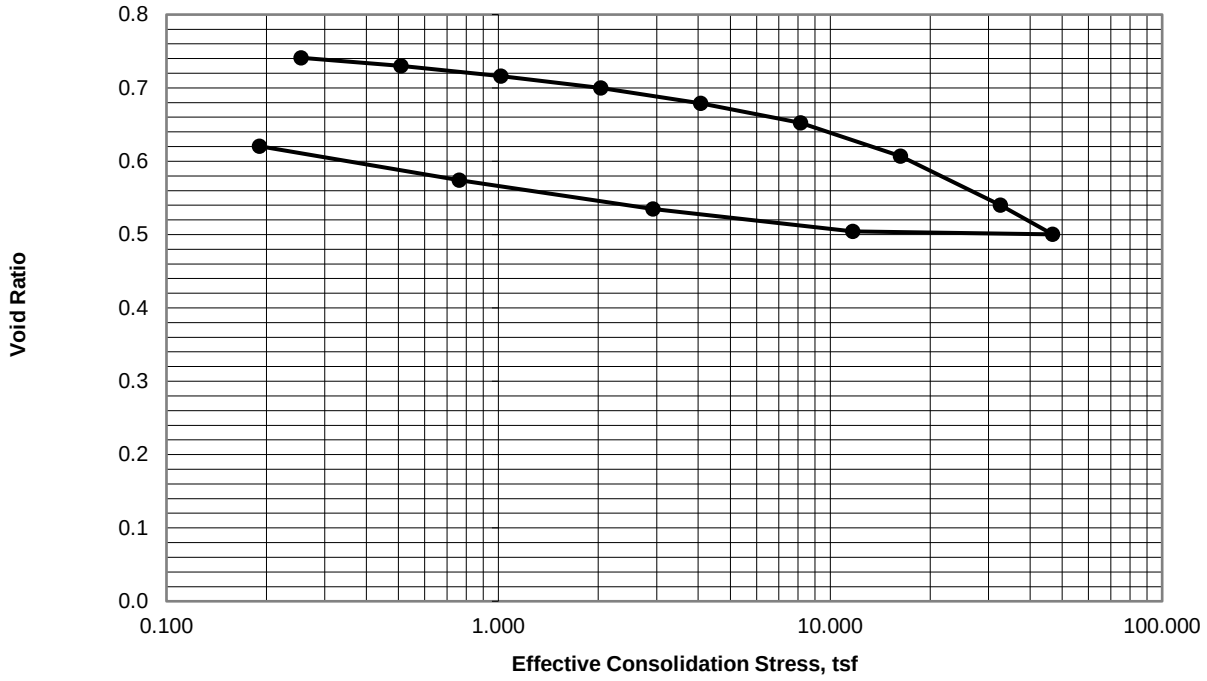
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/23/2017. Finalized by JFL.

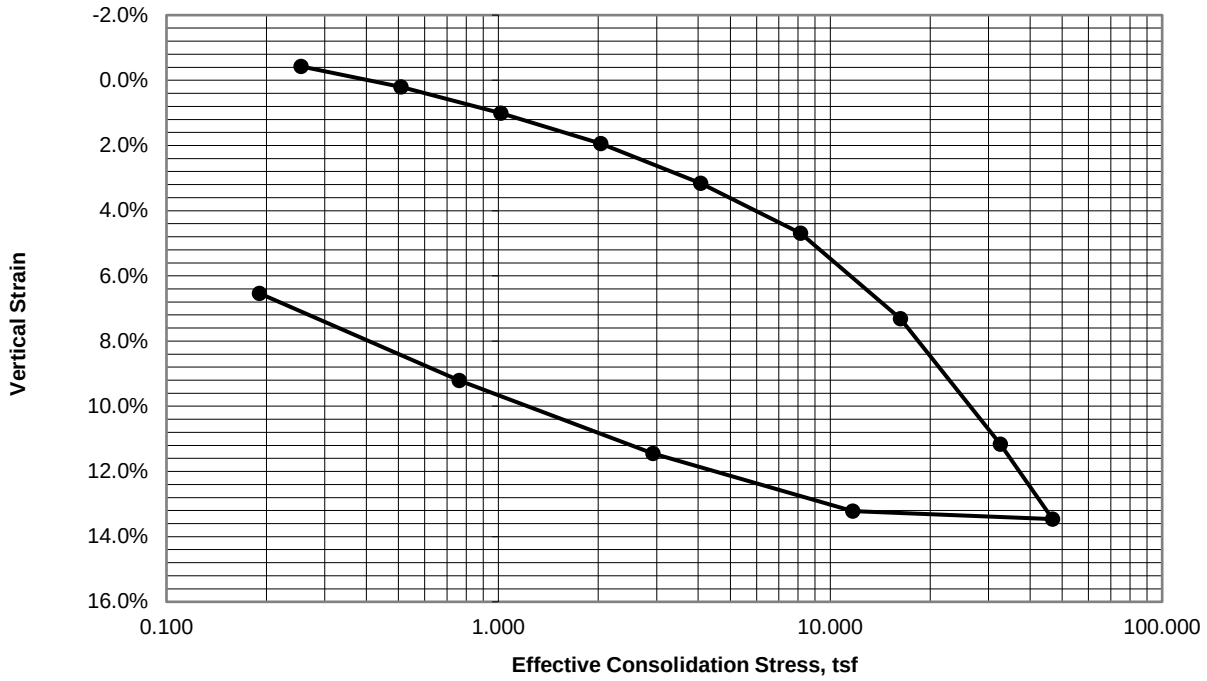
FIG. A-8
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-02-17, Sample S-12, 54.9 ft





Maximum Applied Effective Consolidation Stress, tsf = 46.78

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/23/2017. Finalized by JFL.

FIG. A-8
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-02-17_S-12_54.9_JFL.xlsm 06/23/17

32-1-02579

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-03-17, Sample S-15, 71.6 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	40
Plastic Limit, PL	21
Plasticity Index, PI (LL - PL)	19
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	650
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.741
Diameter, in	2.492	2.492
Specimen Volume, in^3	3.833	3.614
Wet Unit Weight, pcf	127.8	133.4
Dry Unit Weight, pcf	102.1	108.2
Water Content	25%	23%
Void Ratio	0.65	0.56
Degree of Saturation	100%	100%

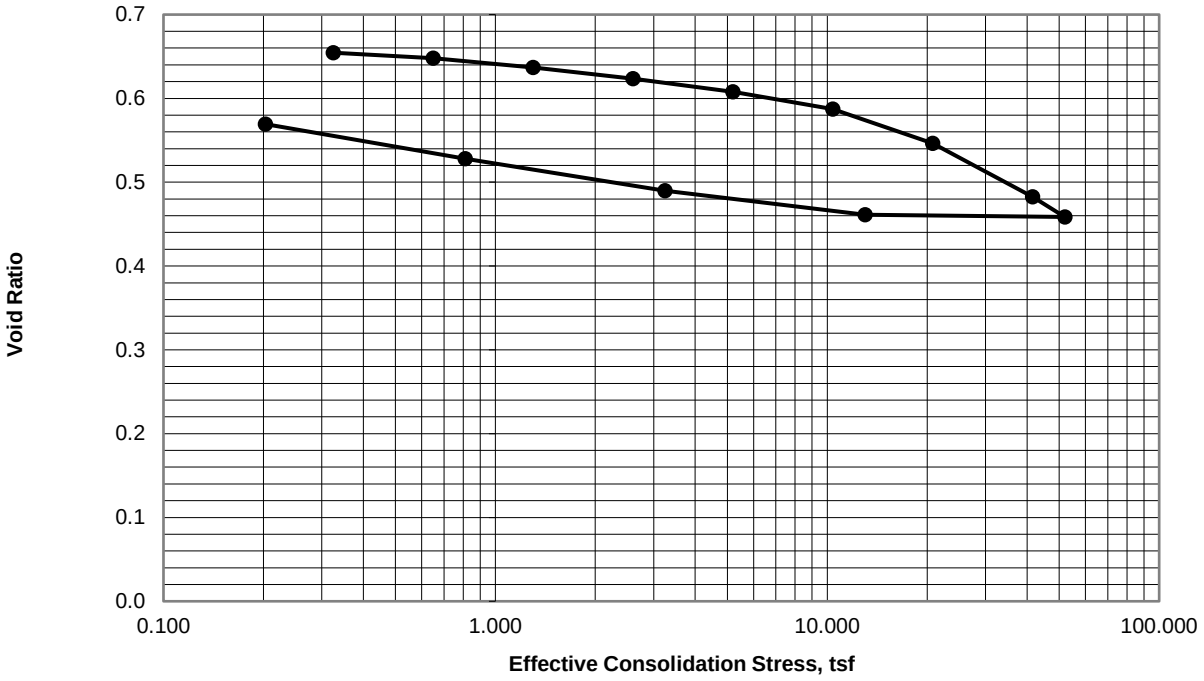
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.21									
1	0.32	100	1.1	0.001	-0.001	-0.2%	0.655	8.36E-02	3.08E-03	1.53E-08
2	0.65	74	2.7	0.006	0.002	0.2%	0.648	2.16E-01	1.22E-03	1.57E-08
3	1.30	74	1.7	0.012	0.007	0.9%	0.637	1.74E-01	1.90E-03	1.97E-08
4	2.60	30	1.1	0.020	0.013	1.7%	0.624	1.07E-01	2.98E-03	1.91E-08
5	5.20	88	0.7	0.030	0.021	2.6%	0.608	6.29E-02	4.52E-03	1.72E-08
6	10.39	55	0.6	0.043	0.031	3.9%	0.587	4.17E-02	5.12E-03	1.30E-08
7	20.78	48	0.7	0.067	0.050	6.4%	0.547	4.09E-02	4.00E-03	1.01E-08
8	41.57	54	0.7	0.101	0.080	10.2%	0.483	3.21E-02	3.75E-03	7.64E-09
9	51.96	900	1.9	0.116	0.092	11.7%	0.459	2.42E-02	1.37E-03	2.20E-09
10	12.99	138	0.4	0.104	0.091	11.5%	0.461	6.65E-04	6.51E-03	2.91E-10
11	3.25	66	1.6	0.087	0.077	9.8%	0.490	3.10E-02	1.65E-03	3.44E-09
12	0.81	225	5.7	0.066	0.059	7.5%	0.528	1.63E-01	4.76E-04	5.10E-09
13	0.20	945	19.9	0.045	0.039	5%	0.569	7.05E-01	1.44E-04	6.54E-09

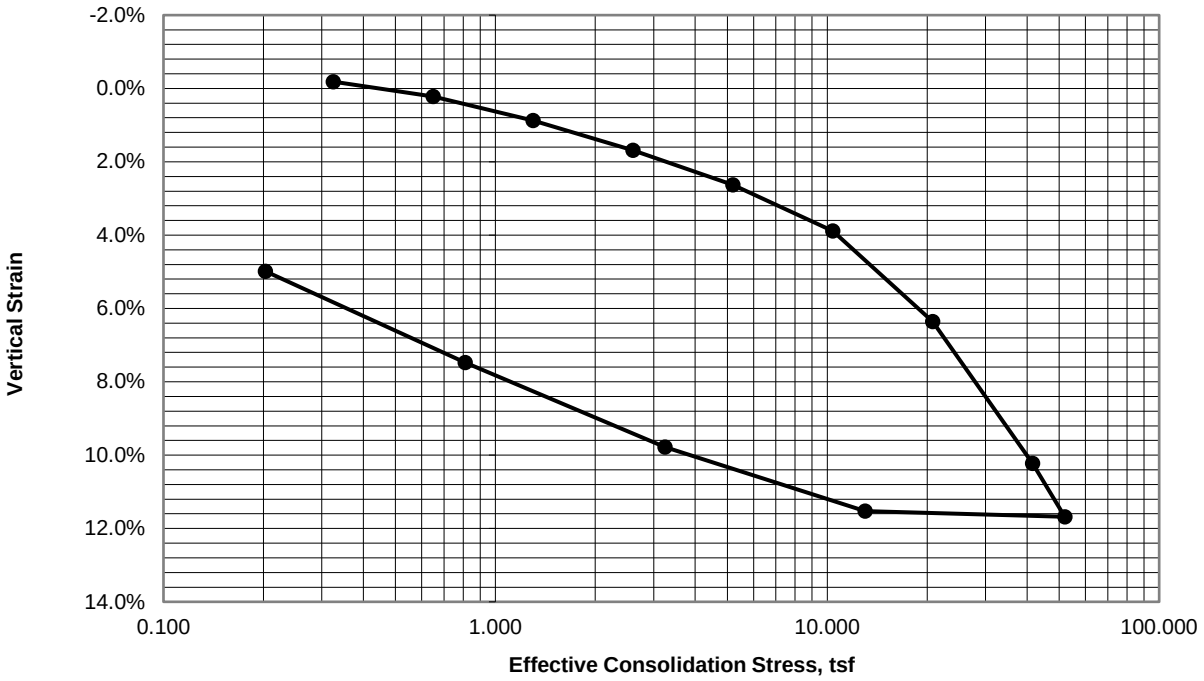
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/06/2017. Finalized by JFL.

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-03-17, Sample S-15, 71.6 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.96

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/06/2017. Finalized by JFL.

FIG. A-9
Sheet 2 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-04-17, Sample S-13, 56.3 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	---
Plastic Limit, PL	---
Plasticity Index, PI (LL - PL)	---
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	550
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.723
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.866	3.560
Wet Unit Weight, pcf	118.1	125.2
Dry Unit Weight, pcf	88.4	96.0
Water Content	34%	30%
Void Ratio	0.91	0.76
Degree of Saturation	100%	100%

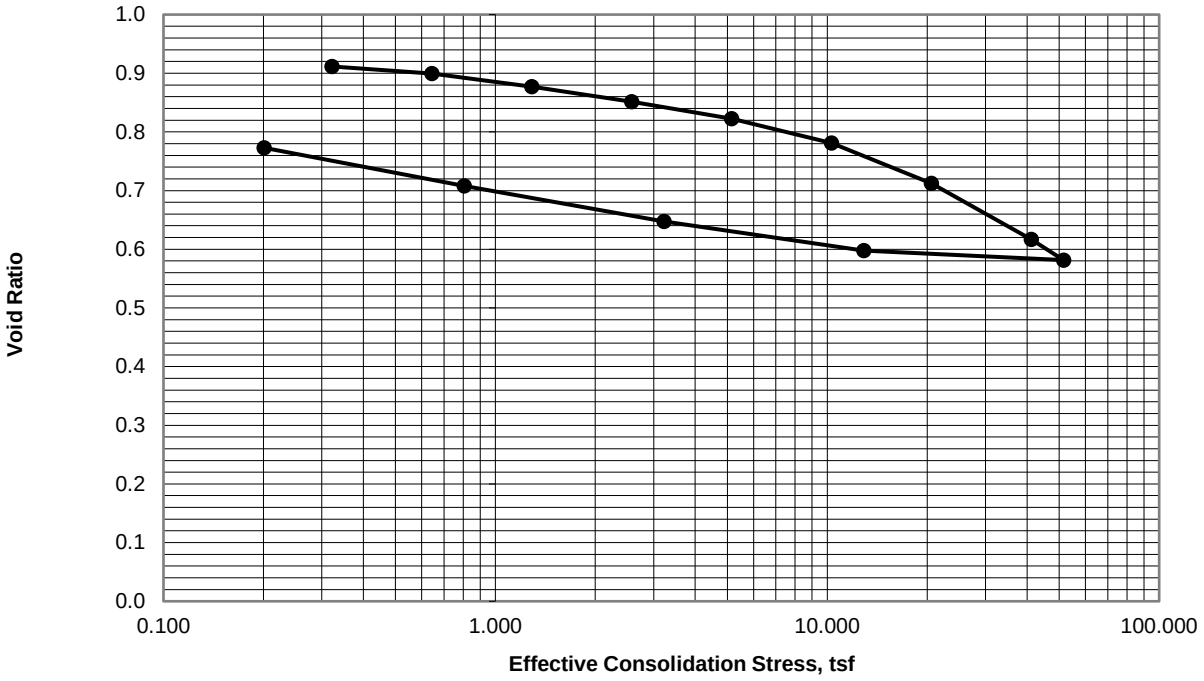
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.18									
1	0.32	138	1.1	0.002	-0.002	-0.2%	0.912	4.82E-02	2.93E-03	7.24E-09
2	0.64	68	3.0	0.008	0.003	0.4%	0.900	3.88E-01	1.08E-03	2.16E-08
3	1.29	225	3.0	0.019	0.012	1.6%	0.877	3.61E-01	1.05E-03	1.96E-08
4	2.58	930	1.9	0.033	0.023	2.9%	0.852	2.08E-01	1.62E-03	1.76E-08
5	5.15	62	1.2	0.047	0.035	4.5%	0.822	1.19E-01	2.47E-03	1.56E-08
6	10.30	74	1.1	0.067	0.052	6.6%	0.781	8.33E-02	2.65E-03	1.19E-08
7	20.60	100	1.4	0.100	0.080	10.2%	0.712	6.98E-02	2.01E-03	7.73E-09
8	41.20	66	1.2	0.142	0.120	15.2%	0.617	4.85E-02	1.99E-03	5.53E-09
9	51.51	175	1.9	0.157	0.134	17.1%	0.582	3.57E-02	1.22E-03	2.64E-09
10	12.88	17	0.5	0.143	0.128	16.2%	0.598	4.37E-03	4.13E-03	1.12E-09
11	3.22	1050	2.8	0.119	0.107	13.6%	0.647	5.36E-02	8.36E-04	2.75E-09
12	0.80	1320	11.1	0.091	0.082	10.5%	0.708	2.62E-01	2.28E-04	3.55E-09
13	0.20	1440	33.4	0.062	0.056	7.1%	0.773	1.12E+00	8.14E-05	5.24E-09

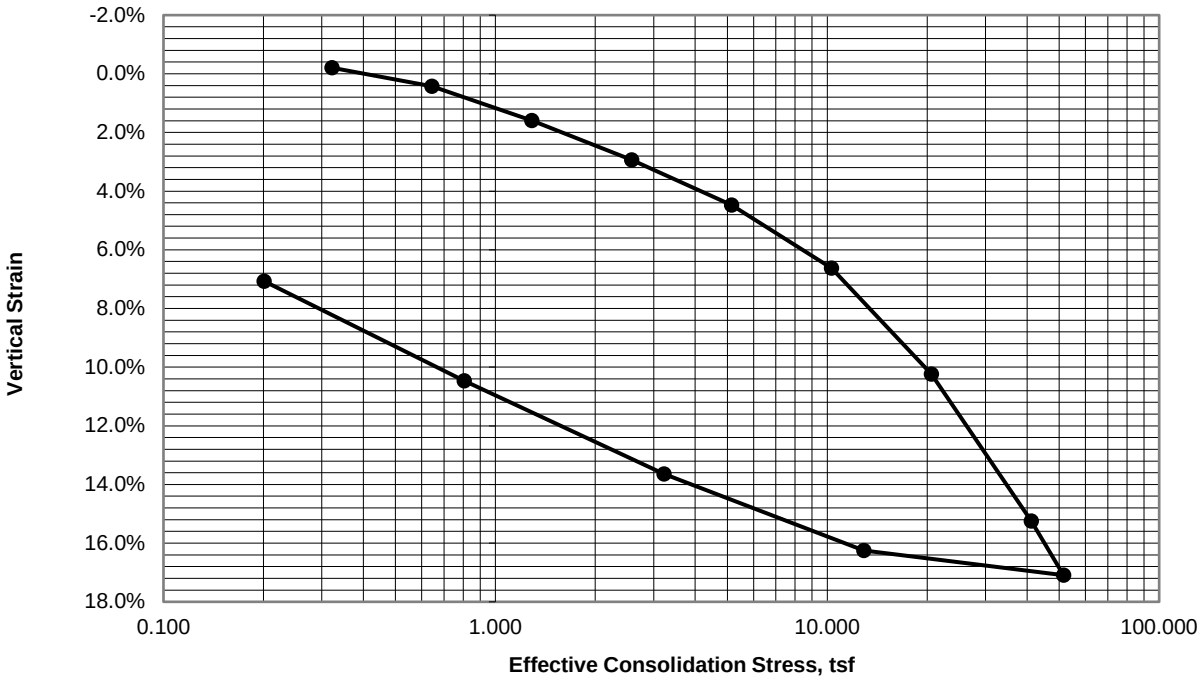
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/07/2017. Finalized by JFL.

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-04-17, Sample S-13, 56.3 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.51

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/07/2017. Finalized by JFL.

FIG. A-10
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-04-17_S-13_56.3_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-04-17, Sample S-17, 76.2 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	39
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	17
Fines Content	98%
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	400
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.717
Diameter, in	2.502	2.502
Specimen Volume, in^3	3.864	3.525
Wet Unit Weight, pcf	124.4	133.0
Dry Unit Weight, pcf	97.6	107.0
Water Content	27%	24%
Void Ratio	0.73	0.58
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.13									
1	0.32	140	1.4	0.005	-0.002	-0.2%	0.731	-7.02E-02	2.35E-03	9.34E-09
2	0.64	68	1.8	0.012	0.003	0.4%	0.720	3.59E-01	1.85E-03	3.76E-08
3	1.29	220	1.6	0.020	0.009	1.2%	0.707	2.22E-01	1.96E-03	2.48E-08
4	2.58	930	1.2	0.029	0.016	2.1%	0.692	1.19E-01	2.69E-03	1.83E-08
5	5.15	62	0.6	0.039	0.024	3.1%	0.674	7.33E-02	5.09E-03	2.17E-08
6	10.31	118	0.6	0.056	0.037	4.7%	0.645	5.75E-02	5.16E-03	1.74E-08
7	20.61	300	0.8	0.087	0.062	7.9%	0.591	5.53E-02	3.71E-03	1.22E-08
8	41.22	1065	0.8	0.127	0.097	12.4%	0.513	3.93E-02	3.26E-03	7.88E-09
9	51.53	1320	0.6	0.140	0.109	13.9%	0.487	2.68E-02	4.15E-03	7.19E-09
10	12.88	1425	0.3	0.127	0.108	13.8%	0.490	7.25E-04	7.75E-03	3.71E-10
11	3.22	116	1.4	0.111	0.095	12.1%	0.518	3.09E-02	1.82E-03	3.69E-09
12	0.81	88	5.0	0.091	0.077	9.8%	0.557	1.70E-01	5.23E-04	5.73E-09
13	0.20	315	16.9	0.069	0.046	5.8%	0.627	1.20E+00	1.67E-04	1.26E-08

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/07/2017. Finalized by JFL.

FIG. A-11
Sheet 1 of 2

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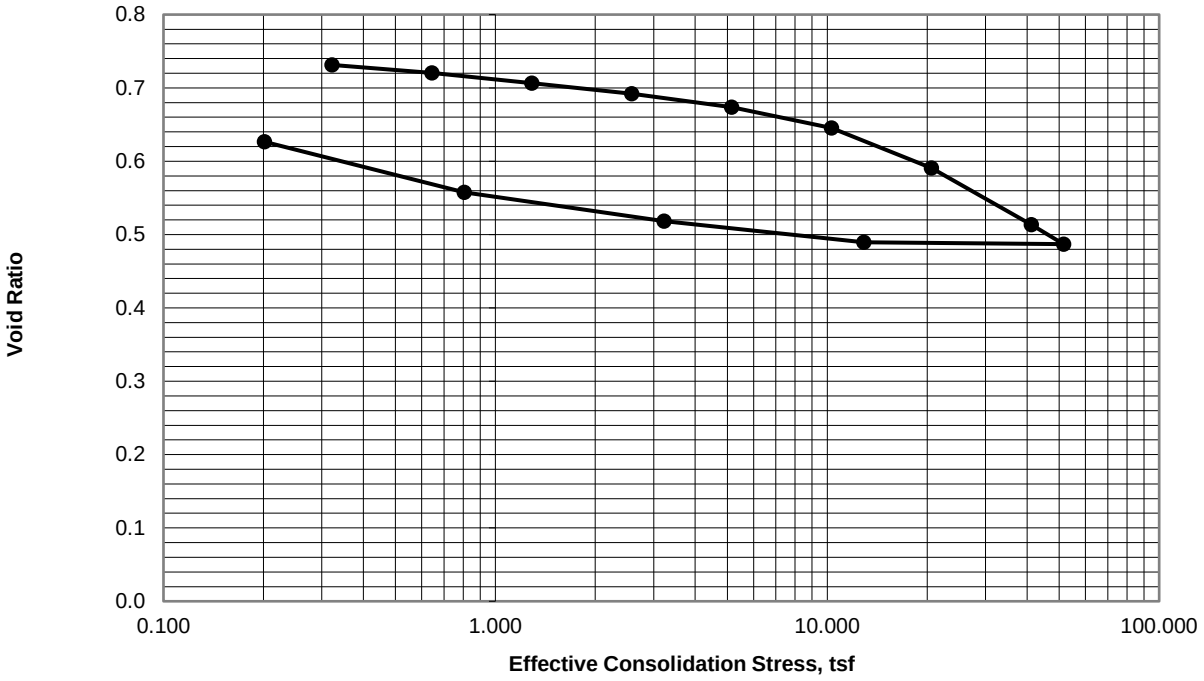
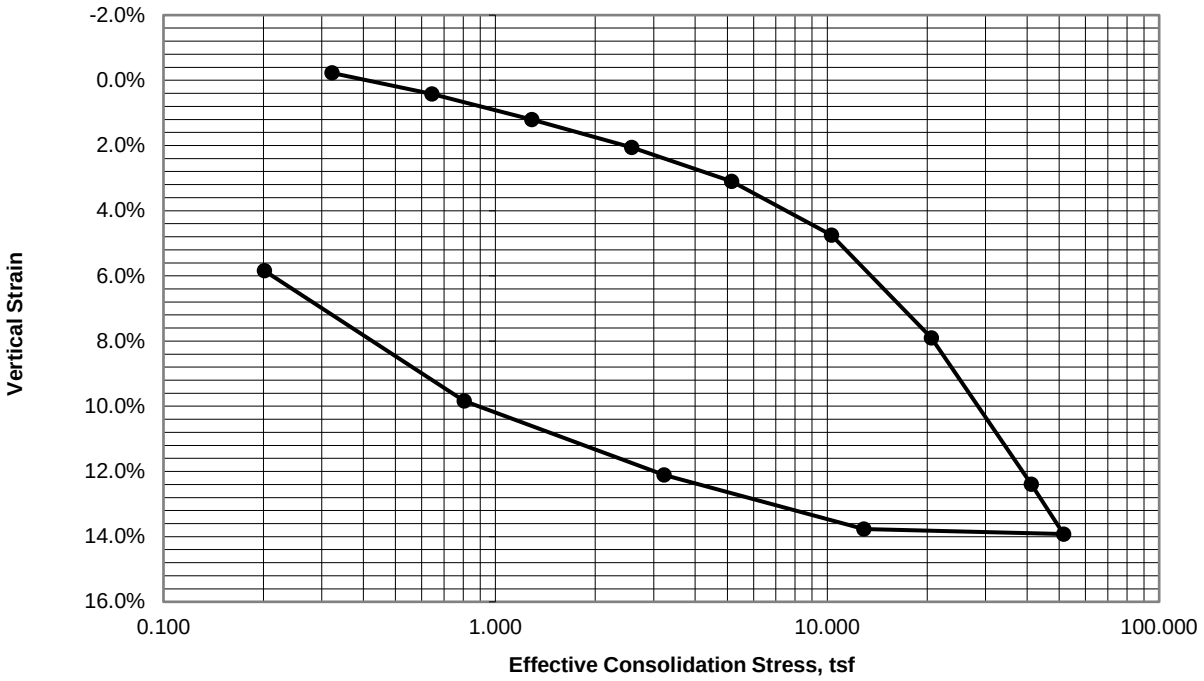
ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-04-17, Sample S-17, 76.2 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.53

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/07/2017. Finalized by JFL.

FIG. A-11
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-04-17_S-17_76.2_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-04-17, Sample S-20, 91 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	38
Plastic Limit, PL	21
Plasticity Index, PI (LL - PL)	17
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	600
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.721
Diameter, in	2.502	2.502
Specimen Volume, in^3	3.866	3.544
Wet Unit Weight, pcf	125.5	133.0
Dry Unit Weight, pcf	99.7	108.7
Water Content	26%	22%
Void Ratio	0.69	0.55
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.19									
1	0.32	140	4.3	0.002	0.000	-0.1%	0.692	1.51E-01	7.68E-04	6.72E-09
2	0.64	70	2.5	0.009	0.005	0.6%	0.681	3.54E-01	1.32E-03	2.71E-08
3	1.29	225	2.1	0.018	0.012	1.5%	0.665	2.62E-01	1.54E-03	2.35E-08
4	2.58	930	1.6	0.029	0.021	2.6%	0.647	1.49E-01	1.99E-03	1.75E-08
5	5.15	86	0.8	0.041	0.031	3.9%	0.626	8.62E-02	3.70E-03	1.90E-08
6	10.31	94	0.8	0.060	0.046	5.9%	0.592	6.83E-02	3.62E-03	1.49E-08
7	20.61	300	1.0	0.087	0.070	8.9%	0.540	5.23E-02	2.78E-03	8.95E-09
8	41.23	1065	0.9	0.121	0.099	12.6%	0.479	3.10E-02	3.01E-03	5.94E-09
9	51.53	1320	0.4	0.132	0.108	13.7%	0.459	2.02E-02	5.59E-03	7.47E-09
10	12.88	1425	0.3	0.121	0.107	13.6%	0.461	5.49E-04	8.41E-03	3.11E-10
11	3.22	116	1.5	0.106	0.094	12%	0.489	2.99E-02	1.70E-03	3.41E-09
12	0.81	88	5.6	0.086	0.077	9.9%	0.525	1.55E-01	4.60E-04	4.68E-09
13	0.20	330	16.8	0.066	0.058	7.4%	0.566	7.12E-01	1.63E-04	7.47E-09

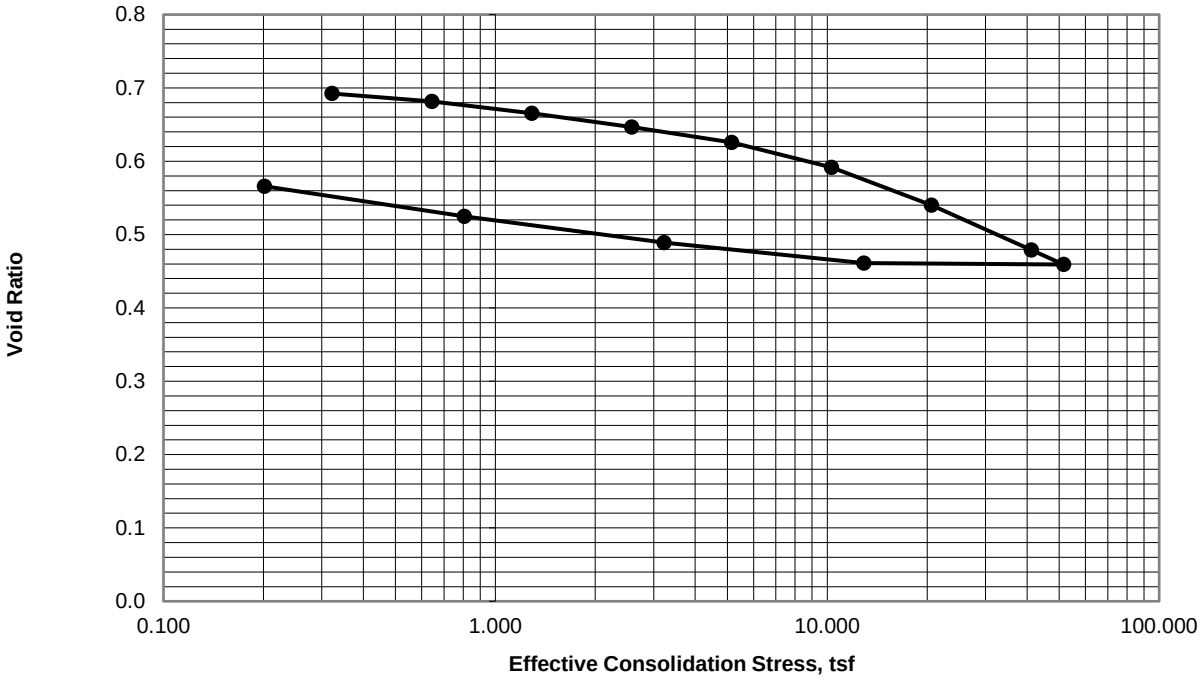
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/07/2017. Finalized by JFL.

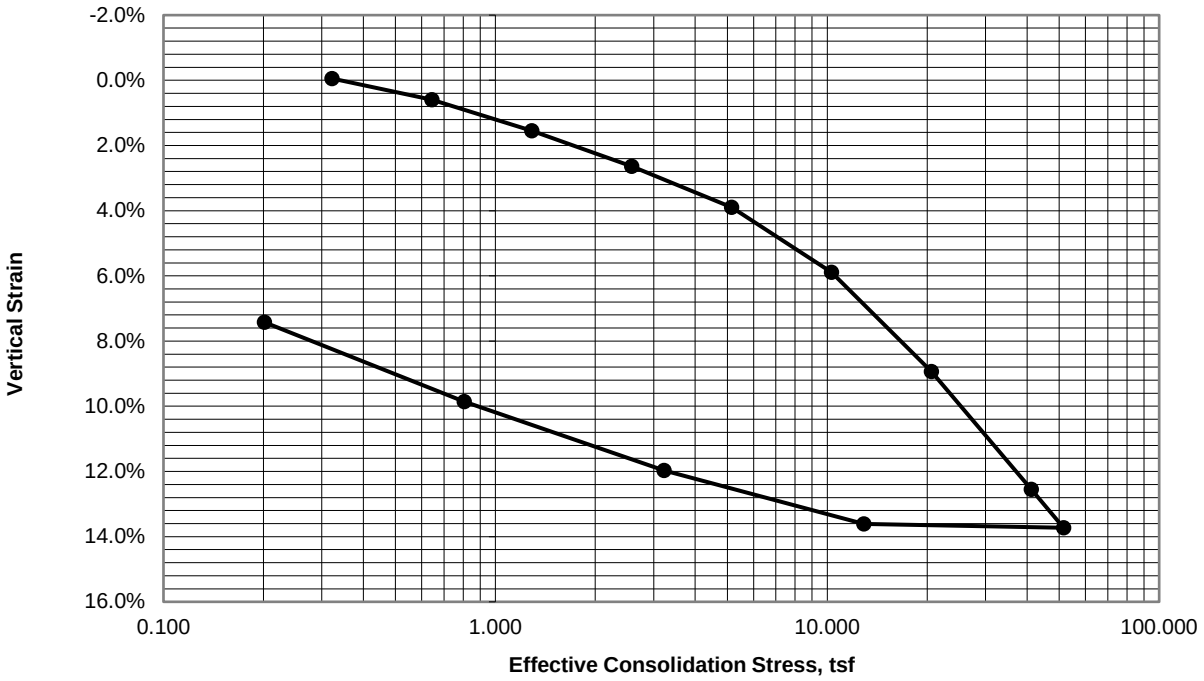
FIG. A-12
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-04-17, Sample S-20, 91 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.53

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/07/2017. Finalized by JFL.

FIG. A-12
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-04-17_S-20_91.0_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-05-17, Sample S-15, 71.4 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	44
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	22
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	550
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.718
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.871	3.536
Wet Unit Weight, pcf	122.4	129.4
Dry Unit Weight, pcf	94.9	103.9
Water Content	29%	25%
Void Ratio	0.78	0.62
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.18									
1	0.32	41	2.1	0.002	0.000	0%	0.777	1.86E-01	1.53E-03	1.57E-08
2	0.64	34	2.1	0.009	0.005	0.6%	0.765	3.81E-01	1.53E-03	3.22E-08
3	1.29	53	1.9	0.018	0.013	1.6%	0.748	2.86E-01	1.66E-03	2.63E-08
4	2.57	54	1.3	0.029	0.022	2.8%	0.727	1.69E-01	2.34E-03	2.22E-08
5	5.15	36	1.1	0.044	0.034	4.4%	0.699	1.14E-01	2.72E-03	1.76E-08
6	10.30	88	1.1	0.067	0.054	6.9%	0.655	8.96E-02	2.61E-03	1.35E-08
7	20.60	43	0.9	0.096	0.079	10.1%	0.597	5.83E-02	3.09E-03	1.07E-08
8	41.20	46	0.7	0.131	0.111	14.1%	0.526	3.58E-02	3.52E-03	7.73E-09
9	51.50	96	1.2	0.143	0.121	15.4%	0.502	2.45E-02	1.91E-03	3.00E-09
10	12.87	11	0.3	0.130	0.117	14.9%	0.512	2.72E-03	8.33E-03	1.48E-09
11	3.22	885	1.6	0.110	0.101	12.8%	0.548	3.91E-02	1.56E-03	3.96E-09
12	0.80	140	5.8	0.090	0.083	10.6%	0.588	1.72E-01	4.38E-04	4.79E-09
13	0.20	360	17.6	0.068	0.063	8%	0.635	8.02E-01	1.54E-04	7.60E-09

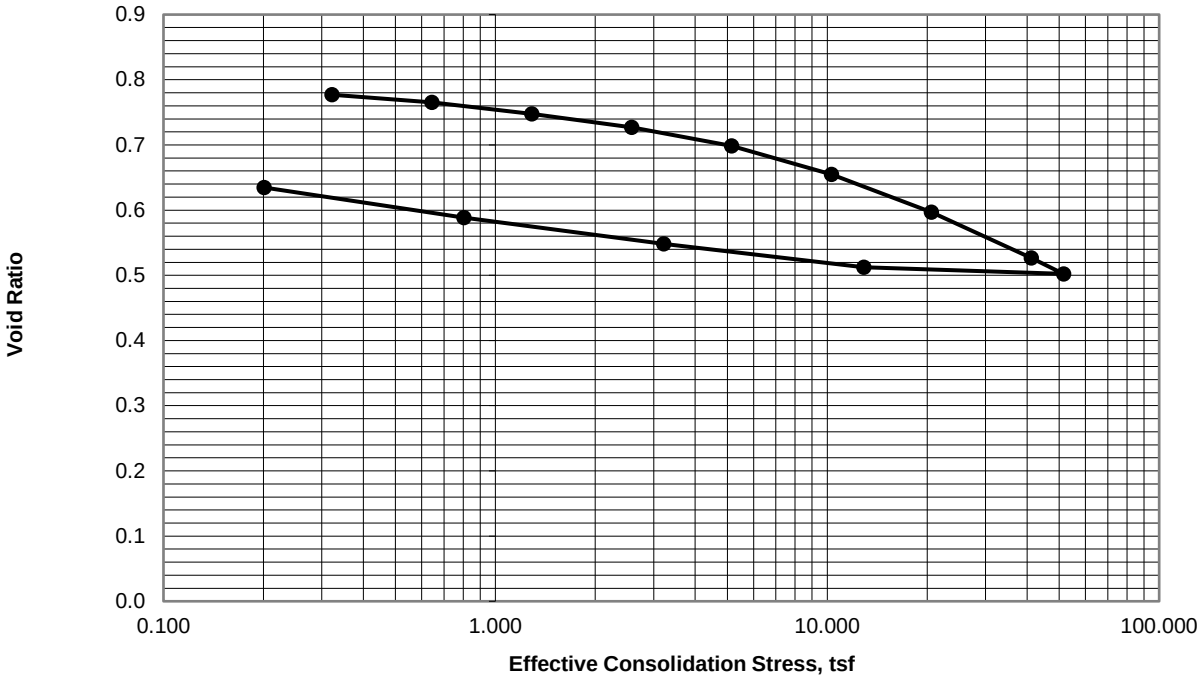
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/12/2017. Finalized by JFL.

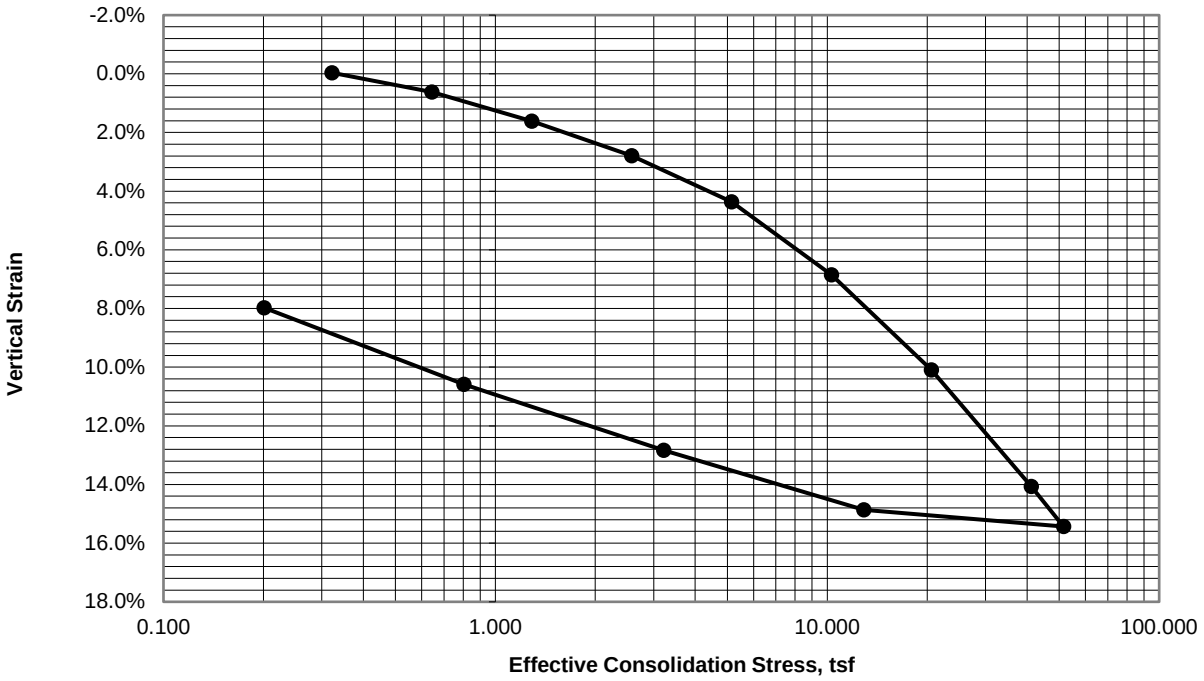
FIG. A-13
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-05-17, Sample S-15, 71.4 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.5

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/12/2017. Finalized by JFL.

FIG. A-13
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-05-17_S-15_71.4_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-06-17, Sample S-12, 54.9 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	45
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	23
Fines Content	100%
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	450
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.785	0.710
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.861	3.492
Wet Unit Weight, pcf	125.7	135.1
Dry Unit Weight, pcf	100.1	110.6
Water Content	26%	22%
Void Ratio	0.68	0.52
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.14									
1	0.32	140	4.1	0.005	0.001	0.2%	0.682	3.69E-01	7.96E-04	1.71E-08
2	0.64	74	5.7	0.014	0.009	1.1%	0.665	5.29E-01	5.60E-04	1.73E-08
3	1.29	82	4.0	0.024	0.018	2.3%	0.647	3.03E-01	7.87E-04	1.40E-08
4	2.58	52	2.7	0.036	0.027	3.5%	0.626	1.67E-01	1.15E-03	1.15E-08
5	5.15	160	2.4	0.052	0.041	5.2%	0.598	1.16E-01	1.23E-03	8.58E-09
6	10.30	870	2.6	0.075	0.060	7.7%	0.556	8.50E-02	1.09E-03	5.68E-09
7	20.60	112	1.9	0.100	0.083	10.5%	0.507	4.89E-02	1.39E-03	4.28E-09
8	41.21	146	1.5	0.131	0.111	14.1%	0.447	3.04E-02	1.69E-03	3.34E-09
9	57.95	40	1.4	0.145	0.124	15.8%	0.419	1.76E-02	1.67E-03	1.99E-09
10	14.49	78	0.7	0.133	0.118	15%	0.431	2.88E-03	3.55E-03	7.08E-10
11	3.86	120	2.5	0.117	0.105	13.4%	0.459	2.68E-02	9.72E-04	1.79E-09
12	0.97	915	9.9	0.096	0.087	11.1%	0.498	1.44E-01	2.53E-04	2.44E-09
13	0.24	510	29.8	0.075	0.068	8.6%	0.540	5.97E-01	8.91E-05	3.48E-09

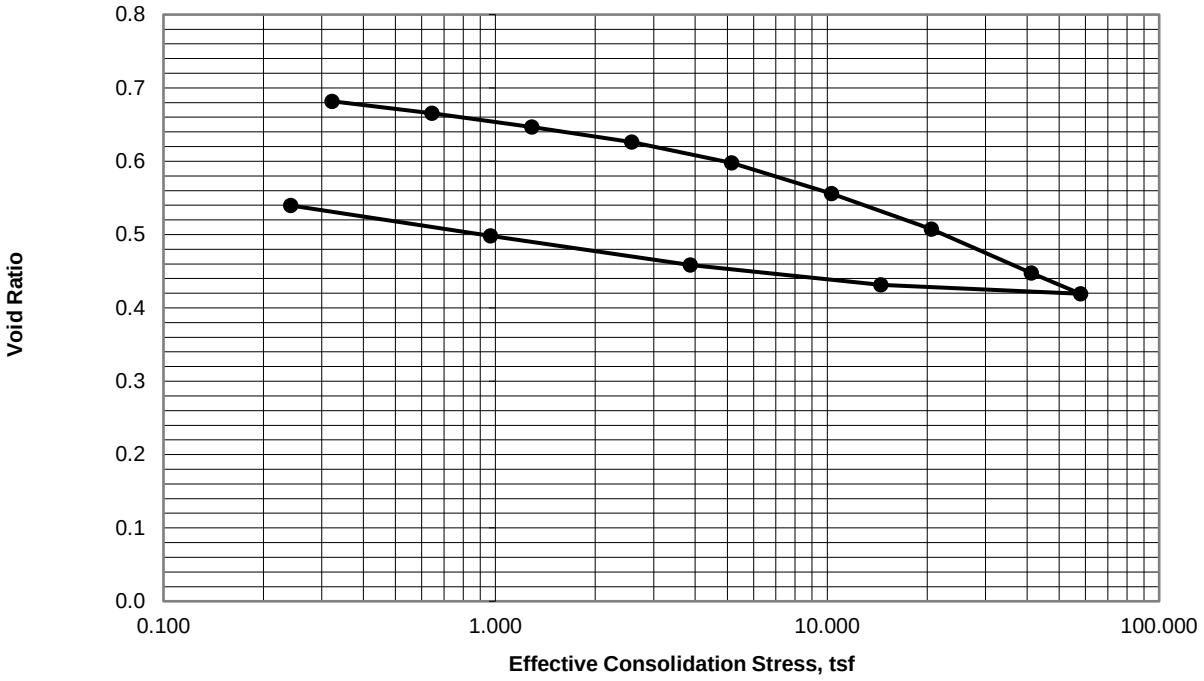
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/13/2017. Finalized by JFL.

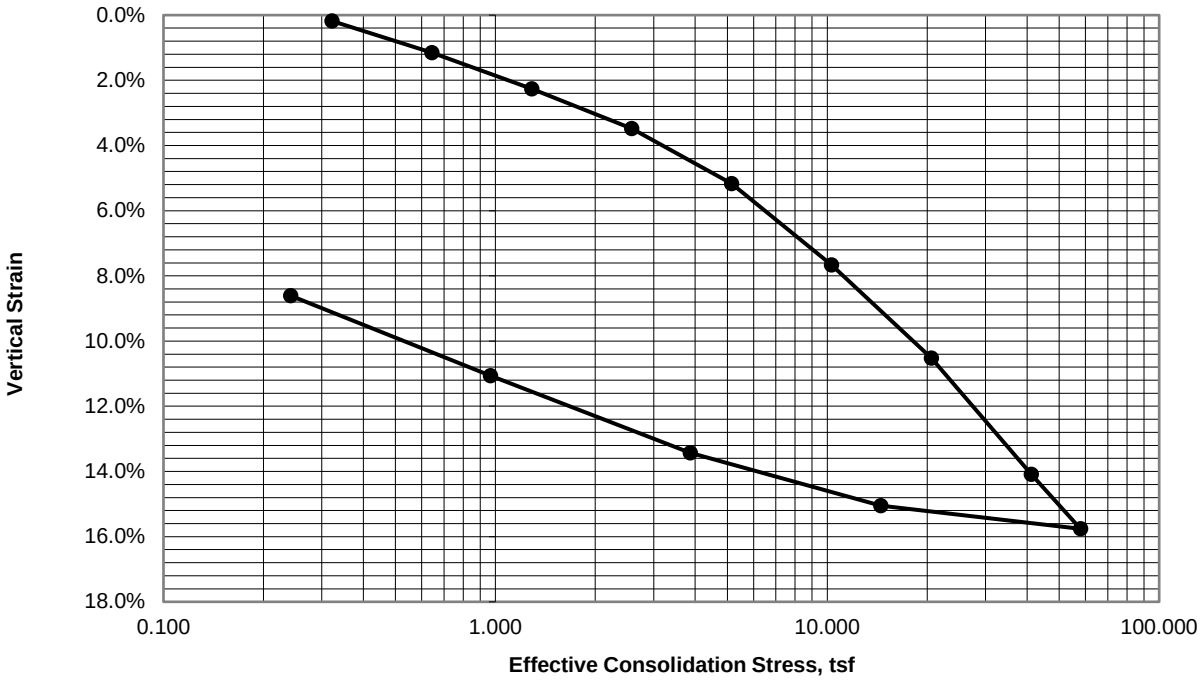
FIG. A-14
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-06-17, Sample S-12, 54.9 ft





Maximum Applied Effective Consolidation Stress, tsf = 57.95

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/13/2017. Finalized by JFL.

FIG. A-14
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-06-17_S-12_54.9_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-06-17, Sample S-15, 70.4 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	46
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	24
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	350
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.787	0.714
Diameter, in	2.502	2.502
Specimen Volume, in^3	3.867	3.508
Wet Unit Weight, pcf	119.6	127.6
Dry Unit Weight, pcf	90.0	99.2
Water Content	33%	29%
Void Ratio	0.87	0.70
Degree of Saturation	100%	100%

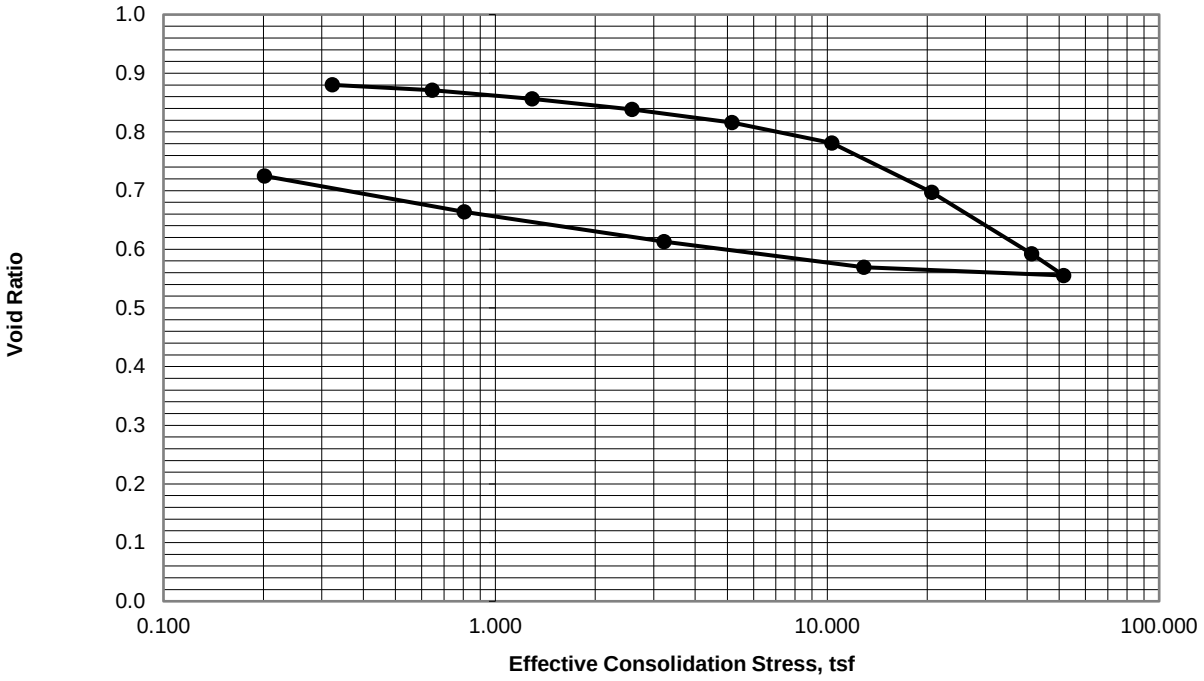
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.11									
1	0.32	30	0.9	0.003	-0.003	-0.4%	0.880	-1.17E-01	3.49E-03	2.13E-08
2	0.64	66	1.5	0.010	0.001	0.1%	0.871	3.01E-01	2.23E-03	3.50E-08
3	1.29	34	1.2	0.017	0.007	0.9%	0.857	2.32E-01	2.74E-03	3.34E-08
4	2.58	17	0.8	0.027	0.014	1.8%	0.838	1.47E-01	4.05E-03	3.15E-08
5	5.16	28	0.6	0.039	0.024	3%	0.816	9.15E-02	5.34E-03	2.61E-08
6	10.31	57	0.6	0.058	0.039	4.9%	0.781	7.04E-02	5.18E-03	1.97E-08
7	20.63	68	1.0	0.098	0.074	9.4%	0.697	8.52E-02	2.71E-03	1.27E-08
8	41.25	59	1.0	0.145	0.118	15%	0.592	5.31E-02	2.57E-03	7.90E-09
9	51.57	132	1.7	0.160	0.133	17%	0.555	3.72E-02	1.32E-03	3.02E-09
10	12.89	12	0.3	0.146	0.127	16.2%	0.570	3.85E-03	7.77E-03	1.89E-09
11	3.22	855	1.8	0.124	0.109	13.9%	0.613	4.68E-02	1.32E-03	3.86E-09
12	0.81	112	6.4	0.101	0.088	11.2%	0.664	2.20E-01	3.93E-04	5.26E-09
13	0.20	1337	21.1	0.073	0.062	7.9%	0.725	1.06E+00	1.27E-04	7.93E-09

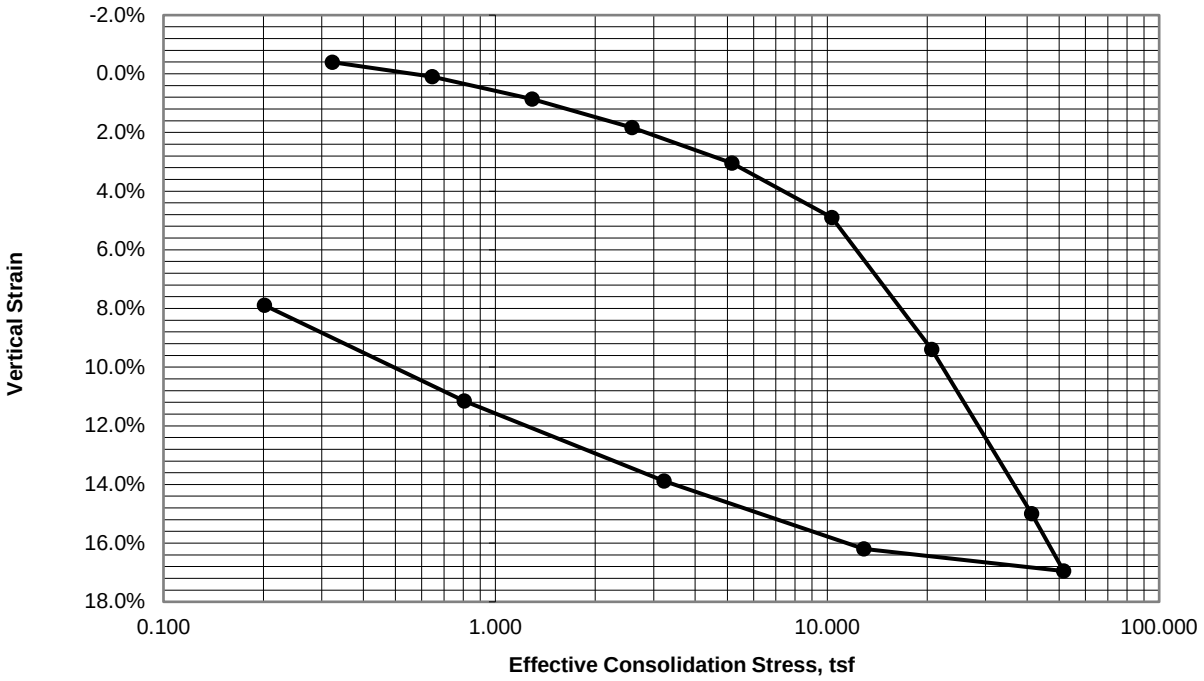
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/13/2017. Finalized by JFL.

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-06-17, Sample S-15, 70.4 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.57

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/13/2017. Finalized by JFL.

FIG. A-15
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-06-17_S-15_70.4_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-07-17, Sample S-12, 56.2 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	36
Plastic Limit, PL	18
Plasticity Index, PI (LL - PL)	18
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	350
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.713
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.869	3.508
Wet Unit Weight, pcf	126.9	135.8
Dry Unit Weight, pcf	102.7	113.2
Water Content	24%	20%
Void Ratio	0.64	0.49
Degree of Saturation	99%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.11									
1	0.32	55	1.2	0.005	0.002	0.2%	0.638	2.79E-01	2.68E-03	4.46E-08
2	0.64	43	1.4	0.011	0.007	0.9%	0.628	3.52E-01	2.26E-03	4.77E-08
3	1.29	44	1.2	0.019	0.013	1.7%	0.614	2.12E-01	2.73E-03	3.48E-08
4	2.58	25	1.0	0.030	0.022	2.8%	0.595	1.54E-01	3.27E-03	3.06E-08
5	5.15	34	1.0	0.046	0.035	4.5%	0.569	1.08E-01	3.17E-03	2.11E-08
6	10.30	68	0.9	0.066	0.051	6.5%	0.535	6.94E-02	3.28E-03	1.42E-08
7	20.60	60	0.6	0.089	0.071	9.1%	0.493	4.20E-02	4.53E-03	1.22E-08
8	41.20	70	0.5	0.117	0.094	12%	0.445	2.45E-02	5.19E-03	8.37E-09
9	51.50	150	0.8	0.128	0.105	13.3%	0.423	2.18E-02	3.19E-03	4.73E-09
10	12.88	840	0.3	0.118	0.103	13%	0.428	1.22E-03	8.10E-03	6.82E-10
11	3.22	47	0.8	0.106	0.095	12%	0.444	1.78E-02	2.95E-03	3.60E-09
12	0.80	108	3.7	0.090	0.082	10.4%	0.472	1.18E-01	6.97E-04	5.61E-09
13	0.20	360	14.0	0.073	0.066	8.4%	0.503	5.49E-01	1.92E-04	7.02E-09

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/24/2017. Finalized by JFL.

FIG. A-16
Sheet 1 of 2

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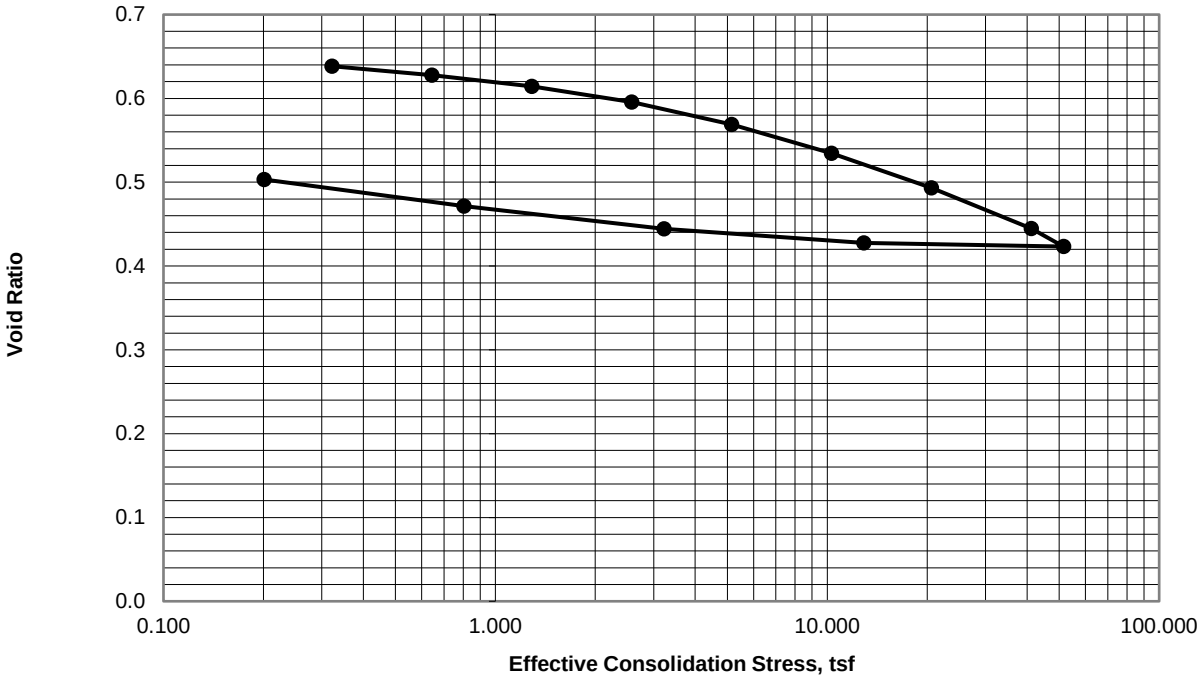
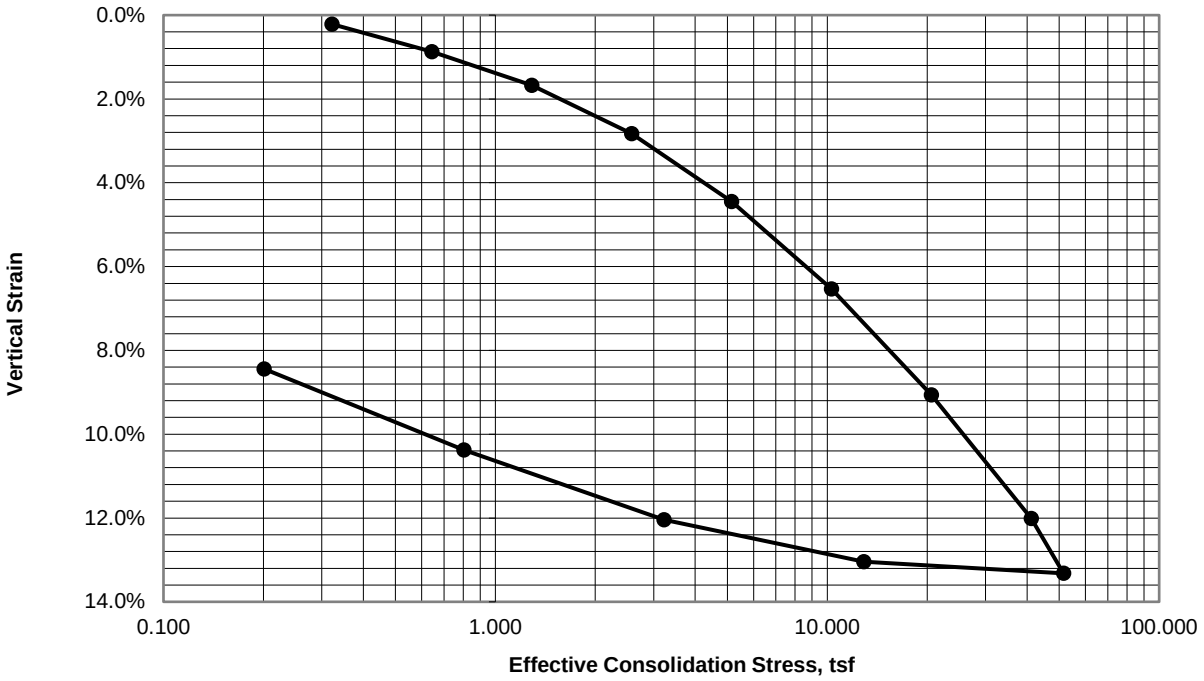
ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-07-17, Sample S-12, 56.2 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.5

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/24/2017. Finalized by JFL.

FIG. A-16
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-07-17_S-12_56.2_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-07-17, Sample S-14, 66 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	47
Plastic Limit, PL	21
Plasticity Index, PI (LL - PL)	26
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	450
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.787	0.708
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.873	3.483
Wet Unit Weight, pcf	120.2	128.7
Dry Unit Weight, pcf	91.3	101.5
Water Content	32%	27%
Void Ratio	0.85	0.66
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.14									
1	0.32	41	1.3	0.003	0.000	0.1%	0.845	1.96E-01	2.55E-03	2.65E-08
2	0.64	57	1.8	0.010	0.006	0.8%	0.832	4.31E-01	1.84E-03	4.23E-08
3	1.29	44	1.3	0.019	0.013	1.7%	0.816	2.68E-01	2.46E-03	3.53E-08
4	2.58	25	1.3	0.031	0.023	2.9%	0.793	1.86E-01	2.50E-03	2.51E-08
5	5.15	33	1.0	0.048	0.037	4.7%	0.759	1.37E-01	2.91E-03	2.18E-08
6	10.30	68	1.0	0.073	0.059	7.5%	0.708	1.03E-01	2.77E-03	1.59E-08
7	20.60	60	0.9	0.105	0.087	11.1%	0.642	6.70E-02	2.88E-03	1.11E-08
8	41.21	70	0.8	0.142	0.122	15.5%	0.561	4.13E-02	3.16E-03	7.80E-09
9	51.51	150	1.4	0.156	0.135	17.2%	0.530	3.15E-02	1.67E-03	3.31E-09
10	12.88	840	0.4	0.143	0.130	16.5%	0.542	3.30E-03	5.11E-03	1.08E-09
11	3.22	47	1.5	0.125	0.115	14.6%	0.578	3.87E-02	1.52E-03	3.75E-09
12	0.80	106	5.0	0.102	0.094	11.9%	0.626	2.12E-01	4.89E-04	6.44E-09
13	0.20	360	17.5	0.079	0.072	9.2%	0.677	8.79E-01	1.50E-04	7.94E-09

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/29/2017. Finalized by JFL.

FIG. A-17
Sheet 1 of 2

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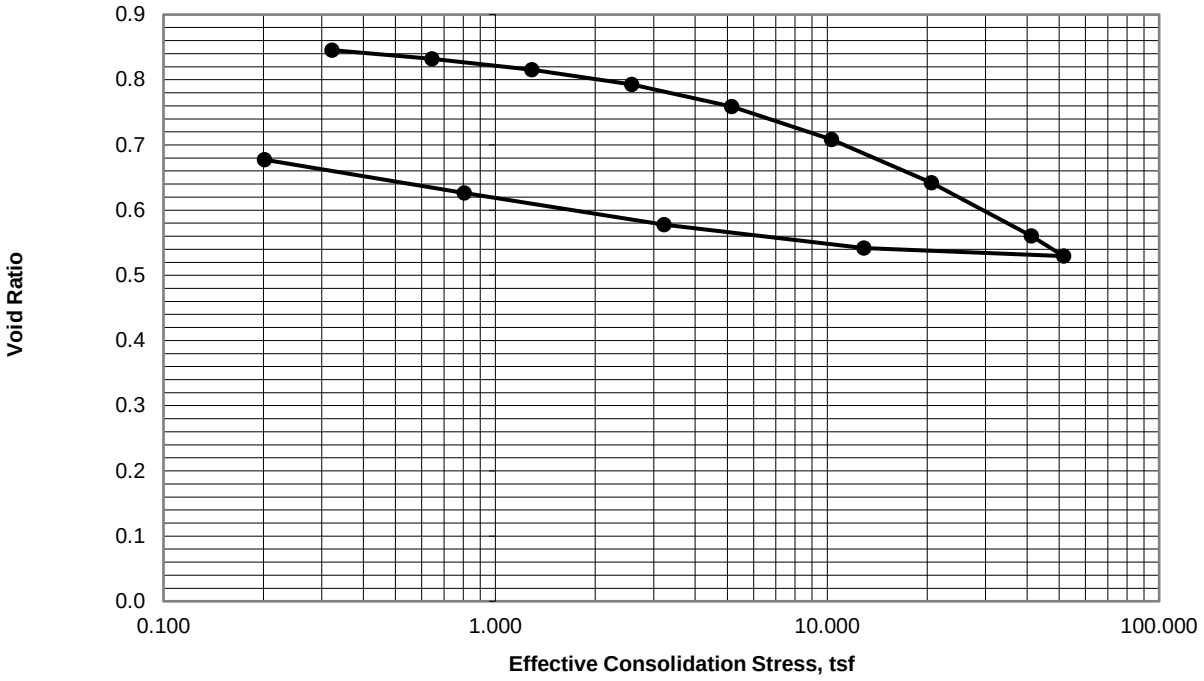
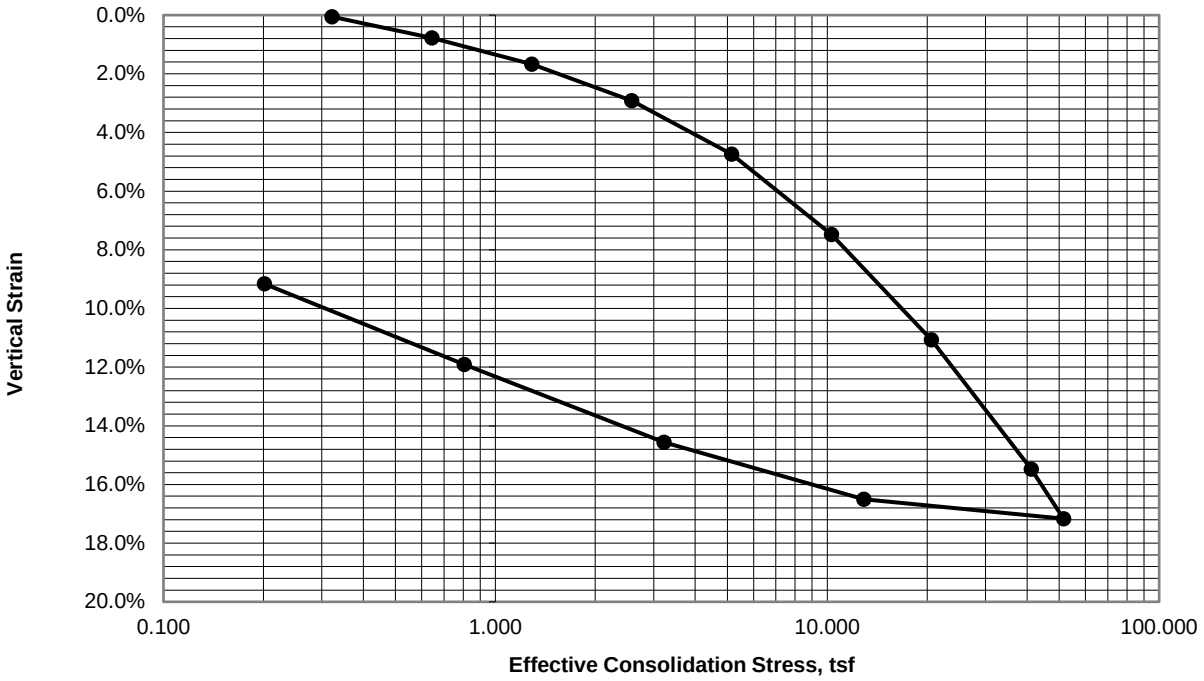
ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-07-17, Sample S-14, 66 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.51

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/29/2017. Finalized by JFL.

FIG. A-17
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-07-17_S-14_66.0_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-07-17, Sample S-18, 86.1 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	38
Plastic Limit, PL	20
Plasticity Index, PI (LL - PL)	18
Fines Content	96%
Organic Content	0%
Initial Seating Load, g	50
Final Seating Load, g	350
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.785	0.718
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.860	3.531
Wet Unit Weight, pcf	125.4	133.5
Dry Unit Weight, pcf	100.0	109.4
Water Content	25%	22%
Void Ratio	0.69	0.54
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.11									
1	0.32	35	0.9	0.004	0.000	0%	0.685	1.18E-01	3.52E-03	2.42E-08
2	0.64	21	1.1	0.010	0.005	0.6%	0.675	3.21E-01	3.02E-03	5.64E-08
3	1.29	29	1.0	0.017	0.011	1.4%	0.662	2.17E-01	3.21E-03	4.08E-08
4	2.58	21	0.6	0.027	0.018	2.3%	0.646	1.25E-01	5.32E-03	3.92E-08
5	5.15	35	0.5	0.040	0.028	3.5%	0.625	8.50E-02	6.04E-03	3.06E-08
6	10.30	64	0.5	0.058	0.042	5.4%	0.594	6.34E-02	5.60E-03	2.14E-08
7	20.60	45	0.6	0.083	0.064	8.1%	0.548	4.68E-02	5.12E-03	1.47E-08
8	41.21	84	0.5	0.117	0.092	11.7%	0.487	3.06E-02	4.88E-03	9.47E-09
9	51.51	88	0.9	0.128	0.104	13.2%	0.462	2.55E-02	2.80E-03	4.72E-09
10	12.88	84	0.2	0.119	0.103	13.1%	0.464	5.03E-04	1.36E-02	4.58E-10
11	3.22	74	0.9	0.104	0.092	11.7%	0.488	2.53E-02	2.73E-03	4.64E-09
12	0.80	1185	4.1	0.084	0.076	9.6%	0.523	1.53E-01	6.31E-04	6.37E-09
13	0.20	480	15.9	0.067	0.061	7.8%	0.553	5.25E-01	1.70E-04	5.76E-09

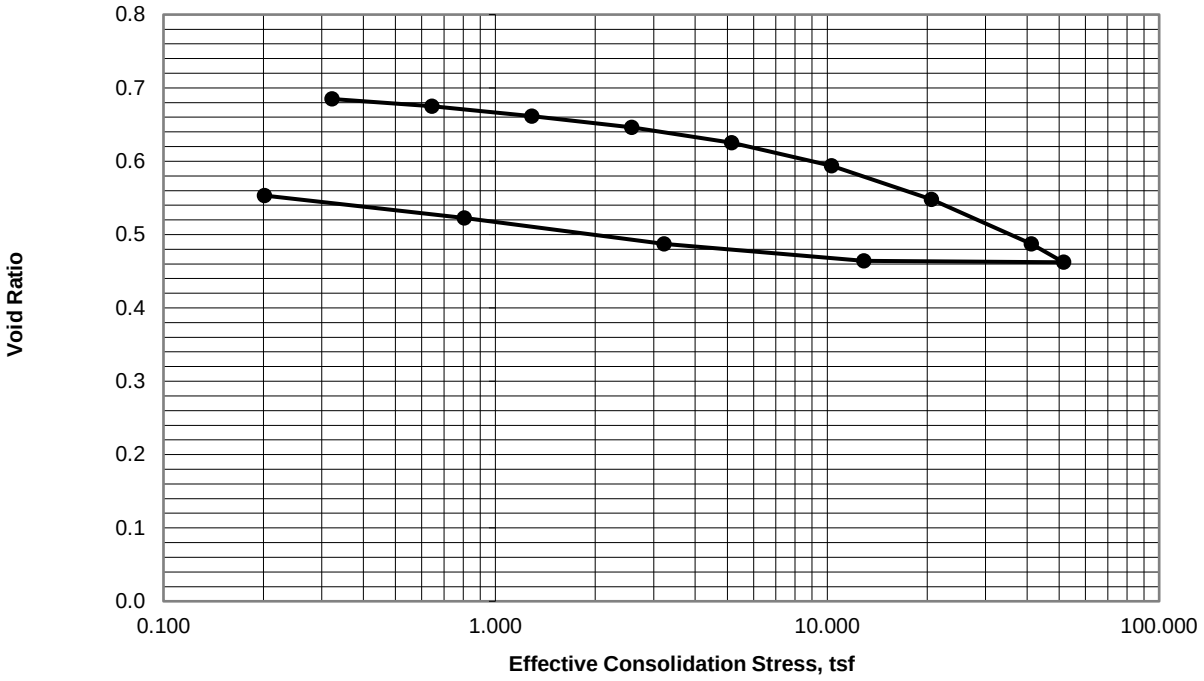
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/26/2017. Finalized by JFL.

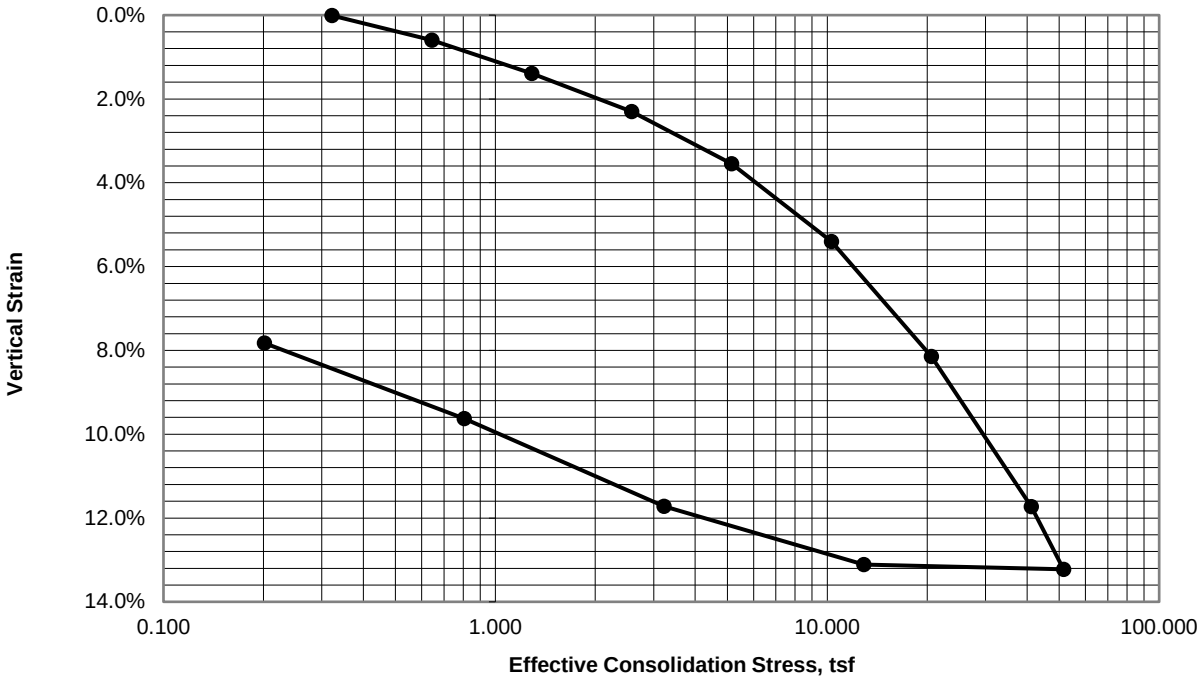
FIG. A-18
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-07-17, Sample S-18, 86.1 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.51

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/26/2017. Finalized by JFL.

FIG. A-18
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-07-17_S-18_86.1_JFL.xlsm 06/23/17

32-1-02579

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-07-17, Sample S-22, 105.6 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	42
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	20
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	800
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.785	0.719
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.864	3.541
Wet Unit Weight, pcf	122.2	129.4
Dry Unit Weight, pcf	93.9	102.4
Water Content	30%	26%
Void Ratio	0.80	0.65
Degree of Saturation	100%	100%

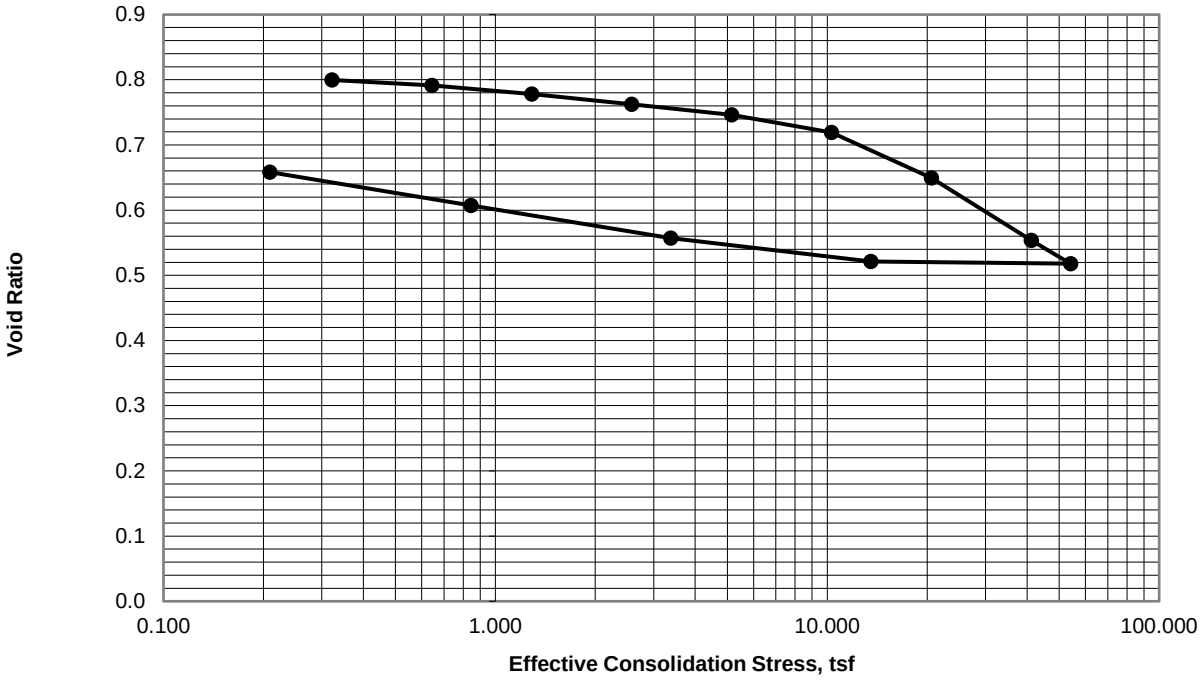
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.26									
1	0.32	33	1.4	0.001	-0.002	-0.2%	0.800	2.92E-02	2.40E-03	3.82E-09
2	0.64	32	1.3	0.006	0.002	0.3%	0.791	2.75E-01	2.55E-03	3.82E-08
3	1.29	19	1.0	0.013	0.008	1%	0.778	2.16E-01	3.31E-03	3.92E-08
4	2.58	22	0.6	0.021	0.015	1.9%	0.763	1.24E-01	5.00E-03	3.43E-08
5	5.15	35	0.5	0.031	0.022	2.8%	0.746	6.68E-02	6.89E-03	2.56E-08
6	10.30	64	0.5	0.046	0.034	4.3%	0.719	5.46E-02	6.59E-03	2.02E-08
7	20.60	68	0.9	0.081	0.064	8.1%	0.650	7.06E-02	3.16E-03	1.27E-08
8	41.20	62	0.8	0.125	0.106	13.5%	0.554	4.85E-02	3.29E-03	9.49E-09
9	54.08	84	1.0	0.142	0.121	15.5%	0.518	2.91E-02	2.38E-03	4.37E-09
10	13.52	82	0.3	0.132	0.120	15.3%	0.521	9.04E-04	8.16E-03	4.77E-10
11	3.38	74	1.5	0.114	0.104	13.3%	0.557	3.68E-02	1.63E-03	3.88E-09
12	0.84	1185	5.9	0.089	0.082	10.5%	0.607	2.07E-01	4.28E-04	5.57E-09
13	0.21	495	21.8	0.066	0.060	7.6%	0.658	8.40E-01	1.24E-04	6.37E-09

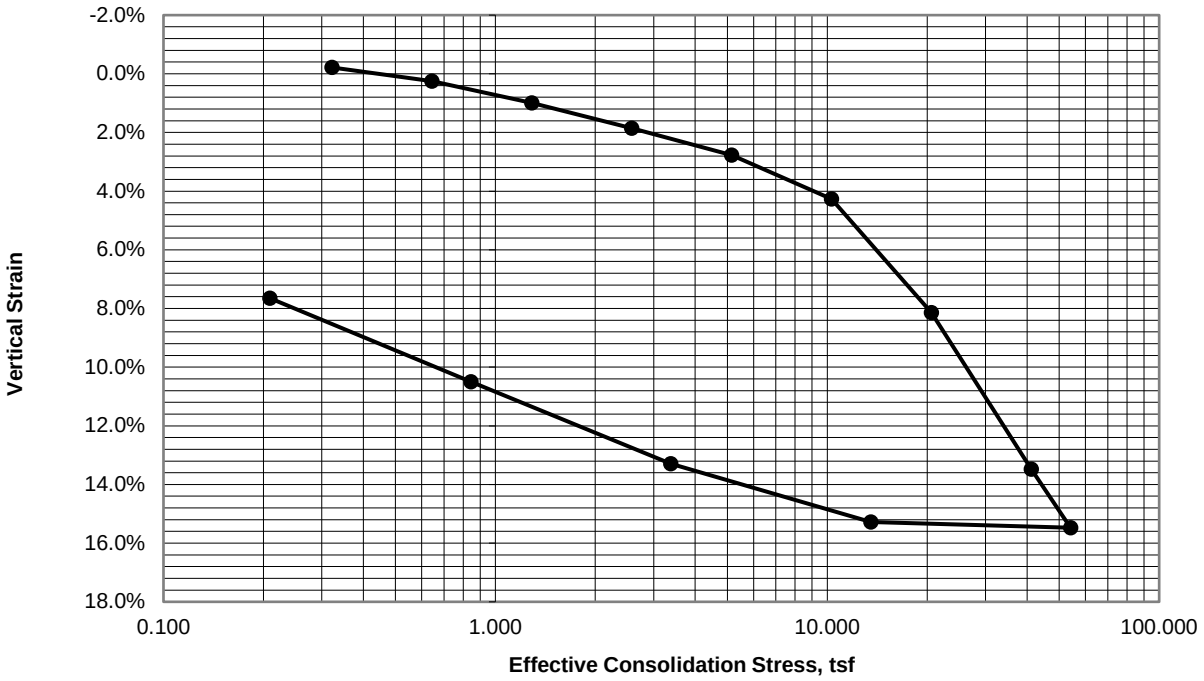
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/26/2017. Finalized by JFL.

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-07-17, Sample S-22, 105.6 ft





Maximum Applied Effective Consolidation Stress, tsf = 54.08

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/26/2017. Finalized by JFL.

FIG. A-19
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-07-17_S-22_105.6_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-07-17, Sample S-26, 126 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	45
Plastic Limit, PL	21
Plasticity Index, PI (LL - PL)	24
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	900
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.729
Diameter, in	2.816	2.816
Specimen Volume, in^3	4.894	4.543
Wet Unit Weight, pcf	122.8	129.6
Dry Unit Weight, pcf	94.5	101.8
Water Content	30%	27%
Void Ratio	0.78	0.66
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.23									
1	0.31	72	0.5	0.001	-0.002	-0.3%	0.789	-6.12E-02	6.02E-03	2.02E-08
2	0.61	25	1.0	0.006	0.001	0.1%	0.782	2.57E-01	3.23E-03	4.54E-08
3	1.22	19	1.0	0.014	0.007	0.9%	0.768	2.31E-01	3.20E-03	4.06E-08
4	2.44	20	0.7	0.023	0.014	1.8%	0.752	1.35E-01	4.82E-03	3.62E-08
5	4.88	18	0.5	0.034	0.021	2.7%	0.735	7.26E-02	6.62E-03	2.69E-08
6	9.77	35	0.5	0.049	0.033	4.2%	0.709	5.58E-02	6.05E-03	1.91E-08
7	19.53	64	0.9	0.083	0.060	7.7%	0.647	6.64E-02	3.07E-03	1.17E-08
8	39.07	26	0.8	0.126	0.101	12.8%	0.555	4.93E-02	3.30E-03	9.68E-09
9	46.80	100	1.6	0.140	0.113	14.4%	0.527	3.80E-02	1.50E-03	3.59E-09
10	11.70	19	0.3	0.126	0.108	13.7%	0.539	3.64E-03	8.43E-03	1.97E-09
11	2.92	900	1.6	0.105	0.091	11.6%	0.577	4.46E-02	1.56E-03	4.44E-09
12	0.73	132	6.2	0.082	0.072	9.2%	0.620	2.07E-01	4.24E-04	5.47E-09
13	0.18	375	18.6	0.056	0.050	6.3%	0.671	9.67E-01	1.49E-04	8.74E-09

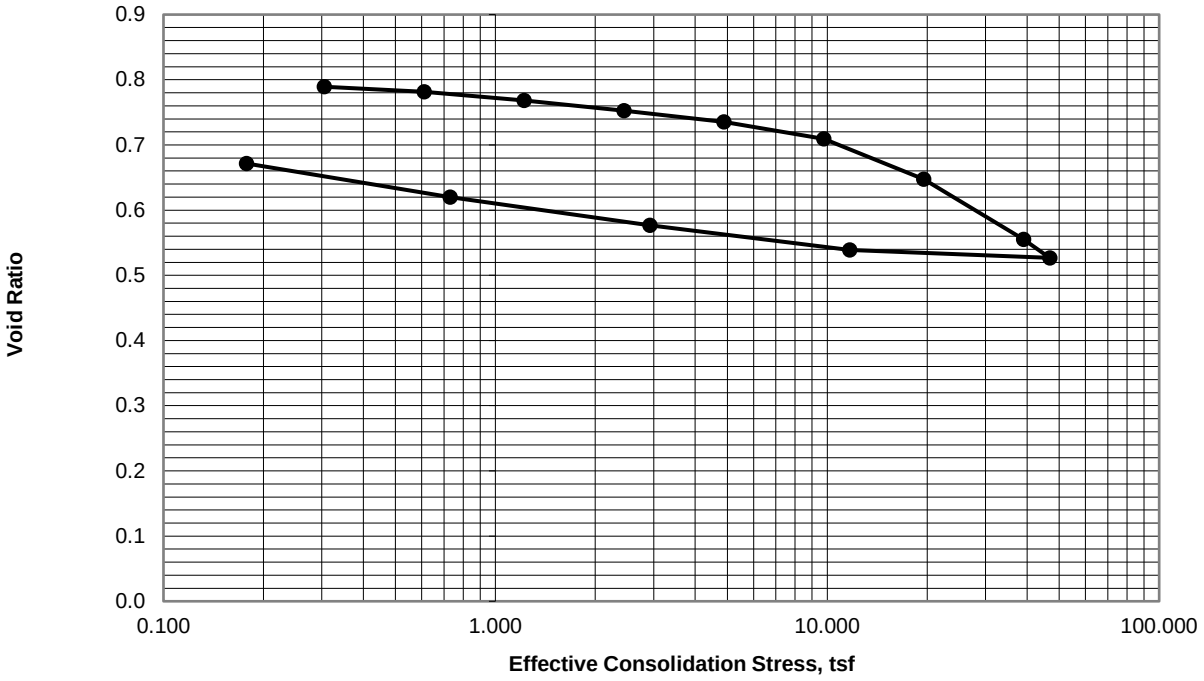
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/29/2017. Finalized by JFL.

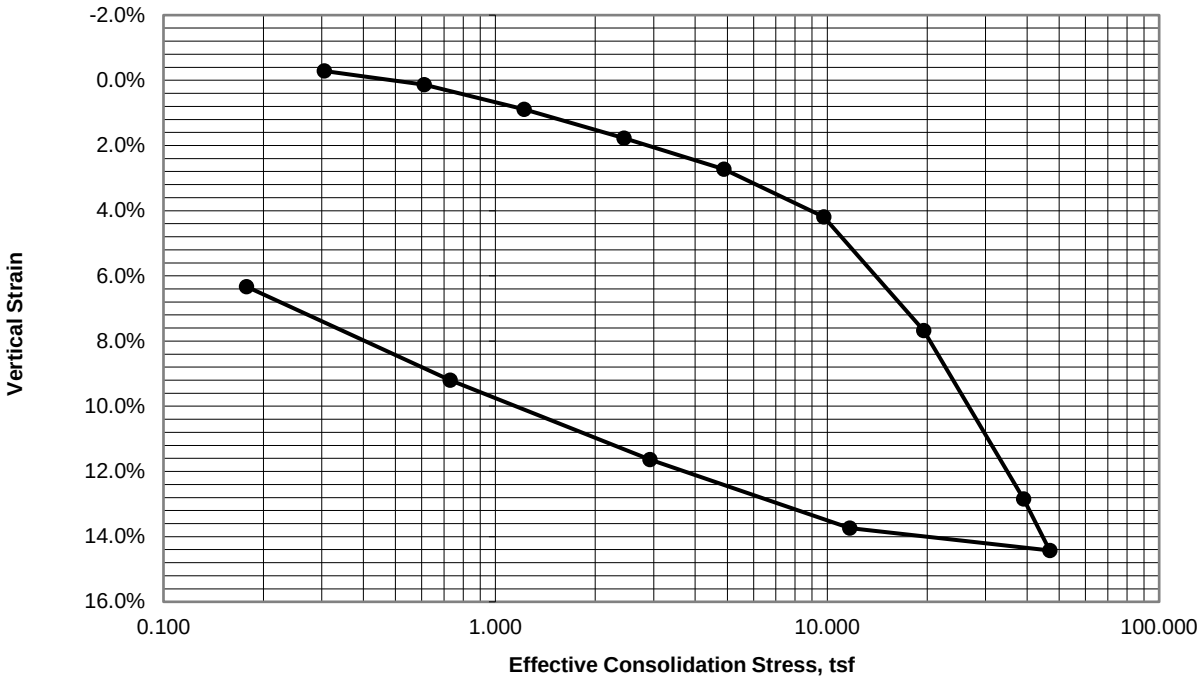
FIG. A-20
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-07-17, Sample S-26, 126 ft





Maximum Applied Effective Consolidation Stress, tsf = 46.8

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/29/2017. Finalized by JFL.

FIG. A-20
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-07-17_S-26_126_JFL.xlsm 06/23/17

32-1-02579

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-07-17, Sample S-31, 151 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	42
Plastic Limit, PL	22
Plasticity Index, PI (LL - PL)	20
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	1200
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.785	0.737
Diameter, in	2.817	2.817
Specimen Volume, in^3	4.893	4.591
Wet Unit Weight, pcf	123.5	128.6
Dry Unit Weight, pcf	94.8	101.0
Water Content	30%	27%
Void Ratio	0.78	0.67
Degree of Saturation	100%	100%

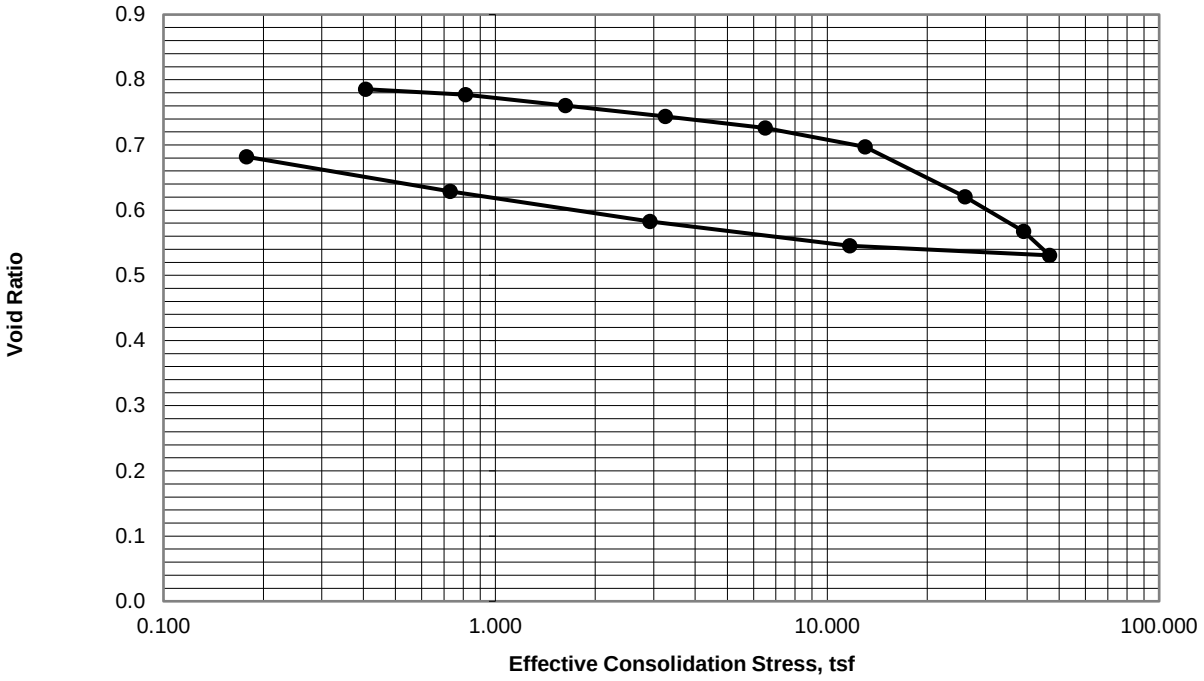
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.31									
1	0.41	70	1.8	0.001	-0.003	-0.4%	0.786	9.16E-02	1.83E-03	9.18E-09
2	0.81	27	1.4	0.008	0.001	0.1%	0.777	2.20E-01	2.35E-03	2.83E-08
3	1.63	19	0.9	0.016	0.008	1%	0.760	2.12E-01	3.62E-03	4.23E-08
4	3.25	20	0.6	0.025	0.015	2%	0.744	1.06E-01	5.45E-03	3.23E-08
5	6.51	18	0.4	0.035	0.023	3%	0.726	5.78E-02	8.77E-03	2.85E-08
6	13.02	36	0.4	0.053	0.036	4.6%	0.697	4.65E-02	7.40E-03	1.96E-08
7	26.03	68	0.8	0.090	0.070	8.9%	0.621	6.12E-02	3.76E-03	1.33E-08
8	39.05	128	0.8	0.117	0.093	11.9%	0.567	4.28E-02	3.12E-03	8.08E-09
9	46.77	930	1.6	0.130	0.109	13.9%	0.531	4.95E-02	1.52E-03	4.70E-09
10	11.69	12	0.3	0.118	0.103	13.1%	0.545	4.30E-03	9.70E-03	2.67E-09
11	2.92	40	1.3	0.099	0.087	11%	0.583	4.46E-02	2.02E-03	5.72E-09
12	0.73	76	4.5	0.075	0.066	8.4%	0.629	2.20E-01	5.92E-04	8.07E-09
13	0.18	390	16.3	0.049	0.043	5.4%	0.682	1.00E+00	1.74E-04	1.05E-08

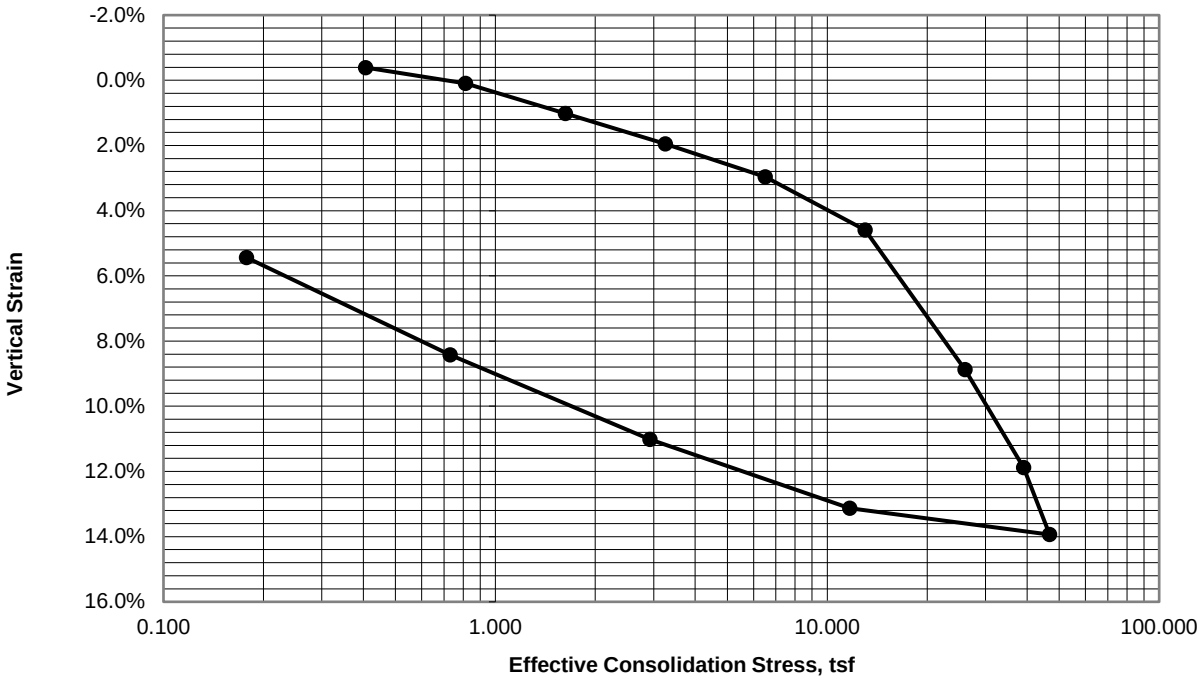
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/29/2017. Finalized by JFL.

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-07-17, Sample S-31, 151 ft





Maximum Applied Effective Consolidation Stress, tsf = 46.77

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 05/29/2017. Finalized by JFL.

FIG. A-21
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-07-17_S-31_151_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-08-17, Sample S-12, 55.2 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	44
Plastic Limit, PL	23
Plasticity Index, PI (LL - PL)	21
Fines Content	99%
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	580
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.786	0.719
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.865	3.538
Wet Unit Weight, pcf	120.9	127.6
Dry Unit Weight, pcf	92.0	100.5
Water Content	32%	27%
Void Ratio	0.83	0.68
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.19									
1	0.32	25	1.4	0.002	-0.001	-0.1%	0.835	1.35E-01	2.30E-03	1.66E-08
2	0.64	36	1.8	0.008	0.004	0.5%	0.824	3.67E-01	1.77E-03	3.46E-08
3	1.29	35	1.7	0.016	0.011	1.4%	0.808	2.55E-01	1.92E-03	2.63E-08
4	2.58	25	1.2	0.026	0.019	2.5%	0.788	1.60E-01	2.64E-03	2.30E-08
5	5.15	39	1.0	0.040	0.031	3.9%	0.762	1.06E-01	3.06E-03	1.78E-08
6	10.30	41	0.9	0.061	0.048	6.1%	0.721	8.36E-02	3.17E-03	1.48E-08
7	20.60	57	1.0	0.096	0.079	10.1%	0.649	7.28E-02	2.70E-03	1.12E-08
8	41.21	56	0.8	0.138	0.117	14.9%	0.560	4.52E-02	3.03E-03	8.14E-09
9	51.51	60	1.5	0.151	0.130	16.5%	0.531	2.92E-02	1.54E-03	2.83E-09
10	12.88	8	0.3	0.136	0.123	15.7%	0.546	4.00E-03	7.05E-03	1.81E-09
11	3.22	1185	1.8	0.115	0.105	13.4%	0.587	4.49E-02	1.34E-03	3.81E-09
12	0.80	525	7.4	0.091	0.085	10.8%	0.636	2.11E-01	3.42E-04	4.46E-09
13	0.20	765	24.2	0.067	0.061	7.8%	0.690	9.33E-01	1.11E-04	6.23E-09

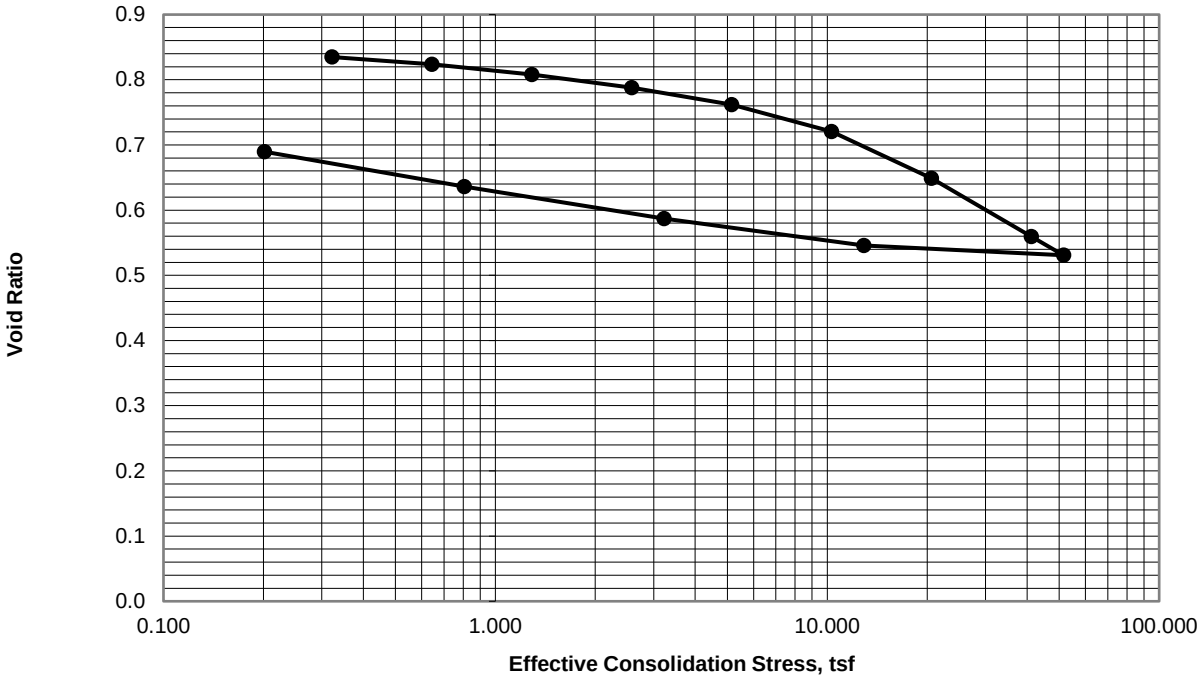
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/16/2017. Finalized by JFL.

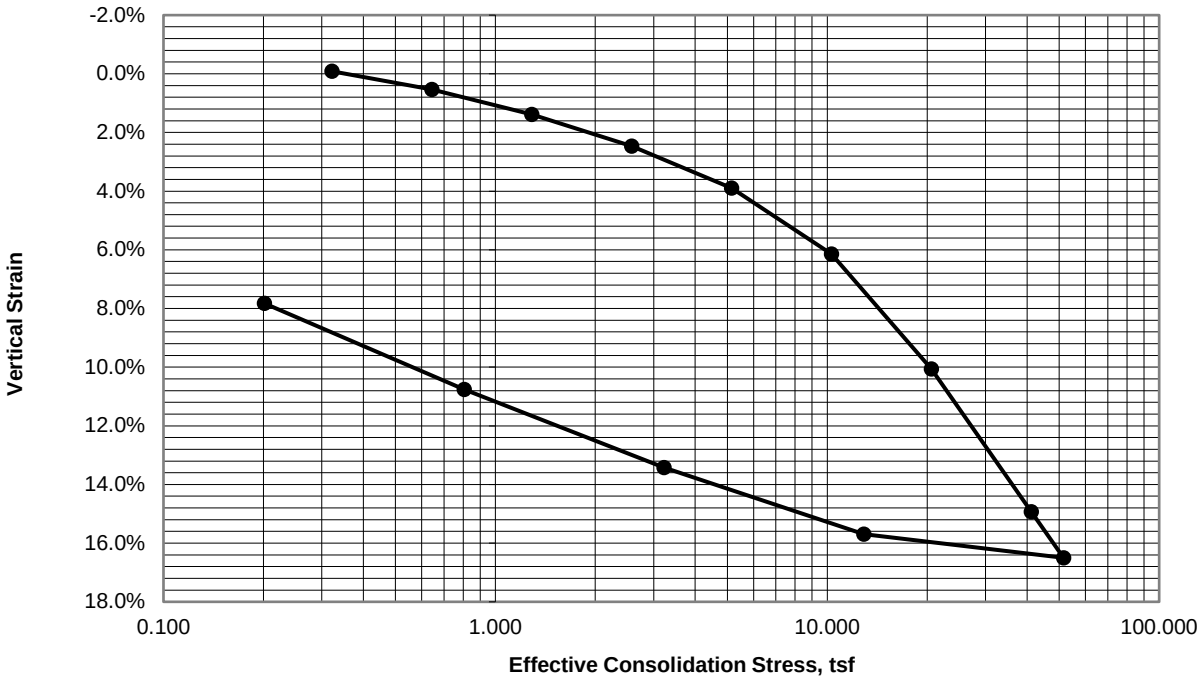
FIG. A-22
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-08-17, Sample S-12, 55.2 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.51

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/16/2017. Finalized by JFL.

FIG. A-22
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-08-17_S-12_55.2_JFL.xlsm 06/23/17

32-1-02579

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-08-17, Sample S-17, 80 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	37
Plastic Limit, PL	20
Plasticity Index, PI (LL - PL)	17
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	450
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.785	0.725
Diameter, in	2.503	2.503
Specimen Volume, in^3	3.863	3.568
Wet Unit Weight, pcf	128.7	134.4
Dry Unit Weight, pcf	102.2	110.6
Water Content	26%	22%
Void Ratio	0.65	0.52
Degree of Saturation	100%	100%

Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.14									
1	0.32	54	1.0	0.002	-0.001	-0.1%	0.653	7.33E-02	3.45E-03	1.50E-08
2	0.64	86	1.4	0.008	0.003	0.4%	0.644	2.63E-01	2.30E-03	3.60E-08
3	1.29	28	0.8	0.014	0.008	1%	0.634	1.67E-01	3.88E-03	3.86E-08
4	2.57	37	0.6	0.022	0.014	1.7%	0.622	1.01E-01	5.04E-03	3.07E-08
5	5.15	38	0.3	0.031	0.020	2.6%	0.608	5.61E-02	9.26E-03	3.14E-08
6	10.30	66	0.5	0.047	0.032	4.1%	0.582	5.26E-02	5.79E-03	1.86E-08
7	20.60	29	0.7	0.075	0.056	7.2%	0.532	5.07E-02	4.43E-03	1.39E-08
8	41.19	42	0.6	0.111	0.089	11.3%	0.463	3.47E-02	4.70E-03	1.04E-08
9	51.49	124	0.9	0.124	0.100	12.7%	0.441	2.31E-02	2.92E-03	4.52E-09
10	12.87	9	0.2	0.113	0.098	12.4%	0.445	1.12E-03	1.05E-02	8.03E-10
11	3.22	855	1.1	0.098	0.085	10.8%	0.472	2.97E-02	2.41E-03	4.87E-09
12	0.80	112	4.4	0.080	0.069	8.8%	0.505	1.40E-01	6.06E-04	5.64E-09
13	0.20	1350	15.6	0.060	0.052	6.6%	0.542	6.43E-01	1.78E-04	7.48E-09

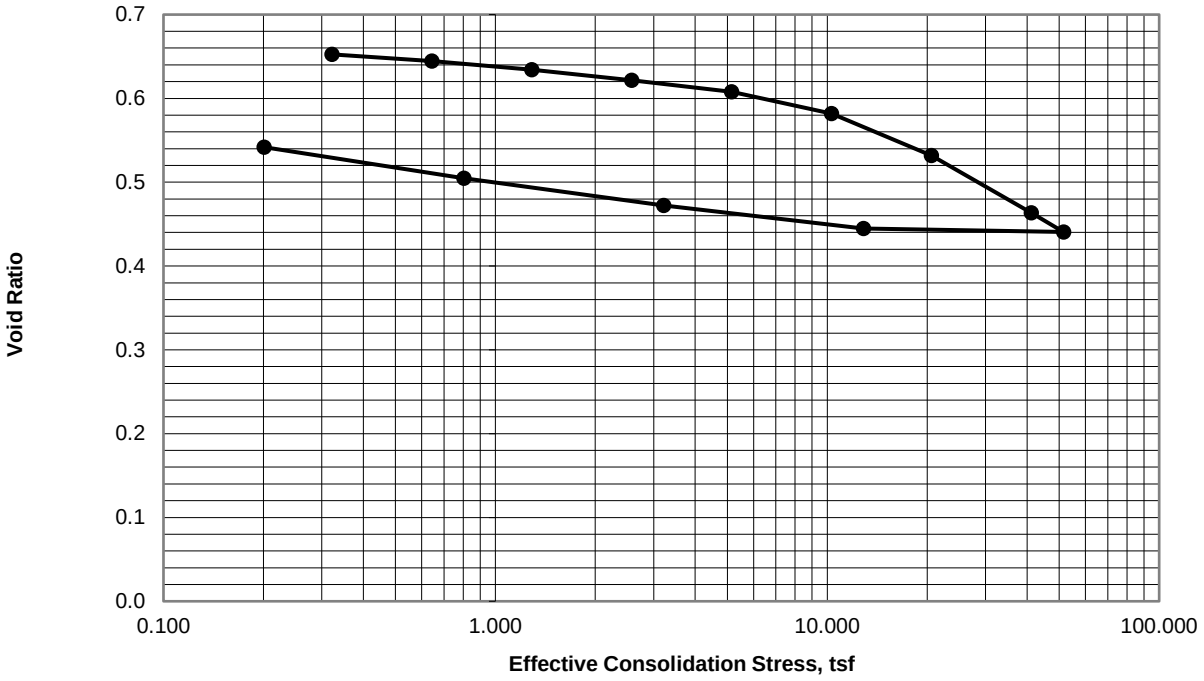
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/13/2017. Finalized by JFL.

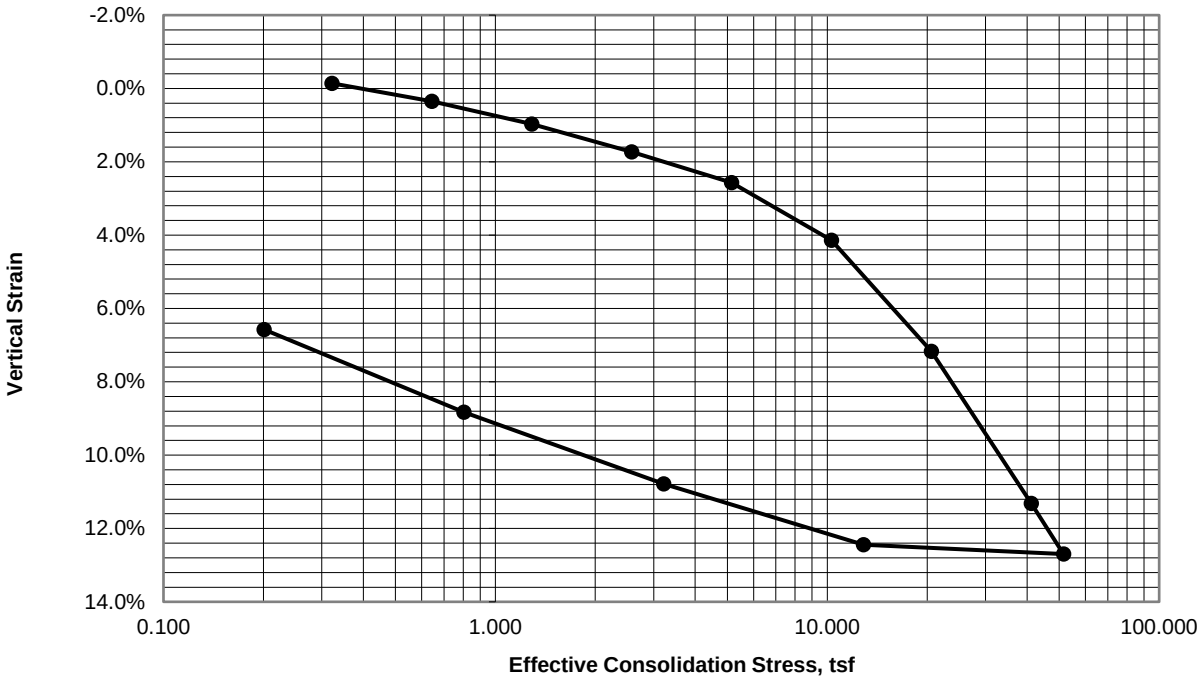
FIG. A-23
Sheet 1 of 2

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-08-17, Sample S-17, 80 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.49

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/13/2017. Finalized by JFL.

FIG. A-23
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-08-17_S-17_80.0_JFL.xlsm 06/23/17

32-1-02579

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

TEST SUMMARY
Boring B-09-17, Sample S-15, 71.3 ft

SPECIMEN DATA AND TEST RESULTS

Sample Classification:
Lean Clay (CL)

Specific Gravity, G_s (Assumed)	2.7
Liquid Limit, LL	---
Plastic Limit, PL	---
Plasticity Index, PI (LL - PL)	---
Fines Content	---
Organic Content	---
Initial Seating Load, g	50
Final Seating Load, g	450
ASTM Test Method	Method B
Coefficient of Consolidation Interpretation	Procedure 1

	Pre-Inundation	Final Load
Height, in	0.776	0.711
Diameter, in	2.509	2.509
Specimen Volume, in^3	3.837	3.513
Wet Unit Weight, pcf	123.0	130.0
Dry Unit Weight, pcf	95.0	103.8
Water Content	30%	25%
Void Ratio	0.77	0.62
Degree of Saturation	100%	100%

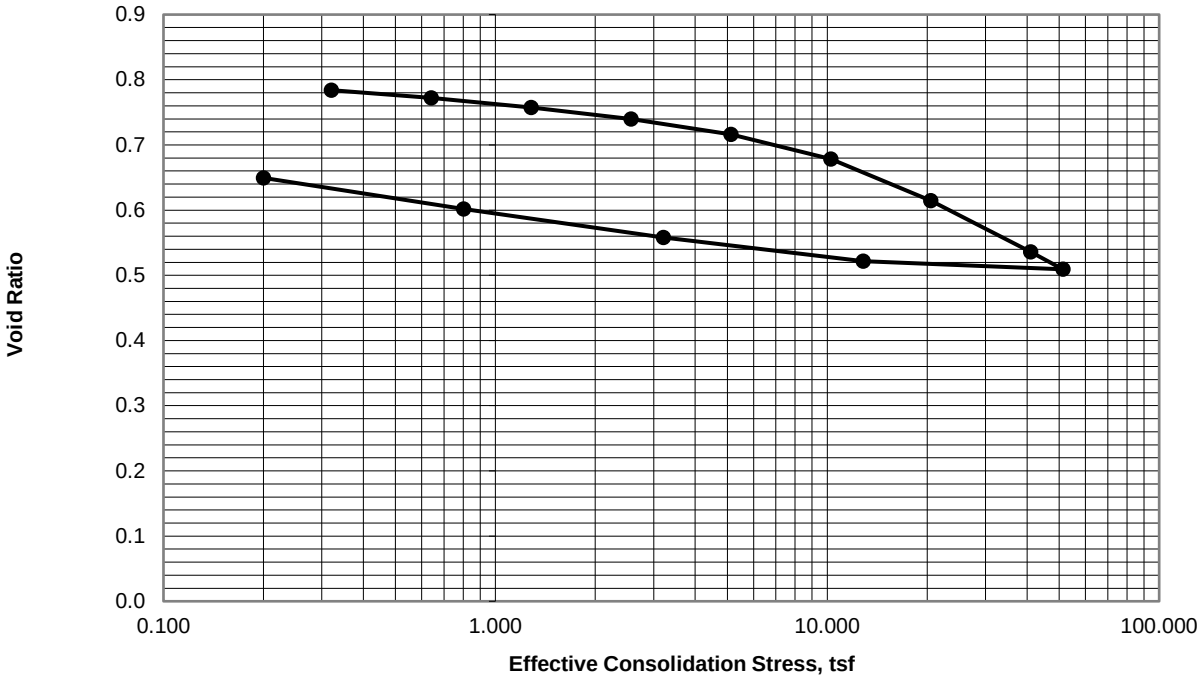
Load Increment Number	Applied Stress, tsf	t_{load}, min	t_{50}, min	ΔH_{load}, in	ΔH at t_{100}, in	$\Delta H/H_o$	Void Ratio	a_v, Mpa^{-1}	c_v, cm^2/s	k, cm/s
Seating	0.14									
1	0.32	25	1.2	0.002	-0.004	-0.5%	0.784	-7.46E-02	2.61E-03	1.07E-08
2	0.64	36	1.3	0.008	0.001	0.2%	0.772	3.90E-01	2.39E-03	5.13E-08
3	1.28	35	1.2	0.016	0.008	1%	0.758	2.36E-01	2.53E-03	3.30E-08
4	2.56	26	0.8	0.026	0.015	2%	0.740	1.43E-01	3.75E-03	2.99E-08
5	5.13	39	0.6	0.039	0.026	3.3%	0.716	9.60E-02	4.67E-03	2.53E-08
6	10.26	41	0.6	0.059	0.042	5.4%	0.679	7.72E-02	4.48E-03	1.98E-08
7	20.51	57	0.8	0.091	0.070	9%	0.614	6.53E-02	3.62E-03	1.38E-08
8	41.02	55	0.6	0.129	0.104	13.5%	0.536	3.99E-02	4.02E-03	9.74E-09
9	51.28	62	1.0	0.141	0.116	15%	0.509	2.74E-02	2.33E-03	4.08E-09
10	12.82	10	0.3	0.128	0.111	14.3%	0.522	3.40E-03	8.18E-03	1.81E-09
11	3.20	1185	1.3	0.108	0.095	12.2%	0.558	3.94E-02	1.79E-03	4.54E-09
12	0.80	525	5.9	0.087	0.076	9.7%	0.602	1.91E-01	4.31E-04	5.18E-09
13	0.20	780	18.7	0.066	0.055	7.1%	0.649	8.21E-01	1.44E-04	7.22E-09

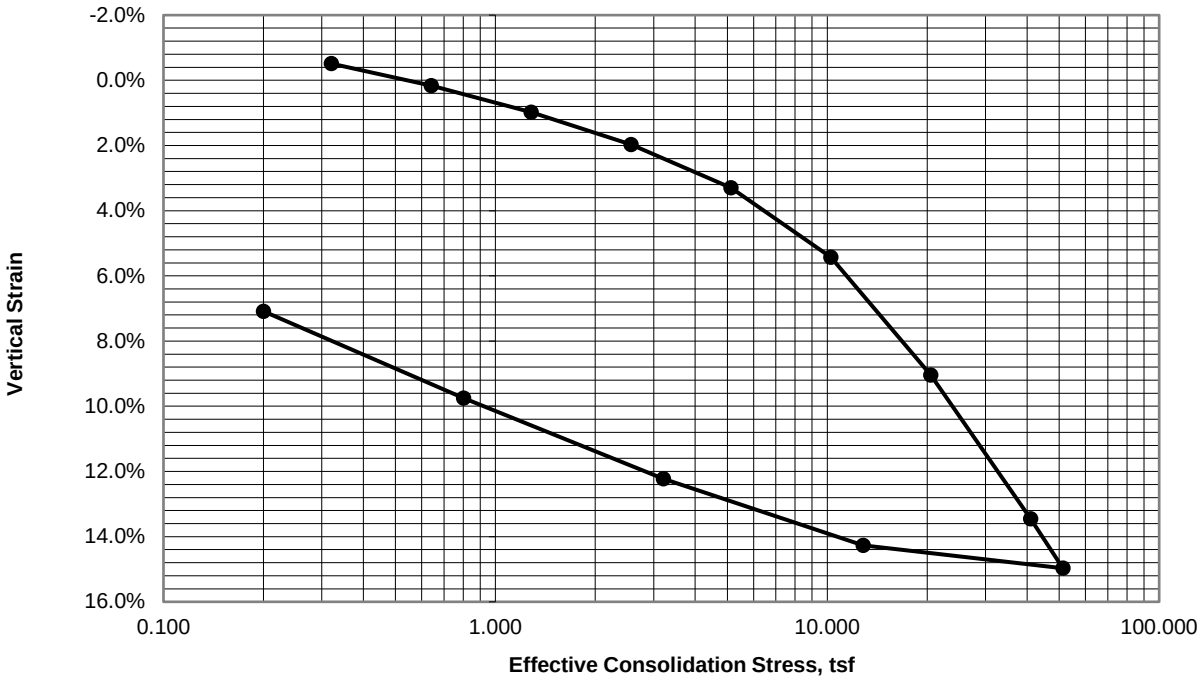
Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/16/2017. Finalized by JFL.

ONE-DIMENSIONAL CONSOLIDATION

Anchorage Port Modernization Project
Step 1 North Extension Stabilization
Anchorage, Alaska

CONSOLIDATION CURVES
Boring B-09-17, Sample S-15, 71.3 ft





Maximum Applied Effective Consolidation Stress, tsf = 51.28

Specimen trimmed using a trimming turntable and indundated with distilled water.
Tested by AKV in accordance with ASTM D2435-11. Test initiated on 06/16/2017. Finalized by JFL.

FIG. A-24
Sheet 2 of 2

CONSOL_v3.0_NOTB_B-09-17_S-15_71.3_JFL.xlsm 06/23/17

32-1-02579

APPENDIX B

RESULTS OF ANALYTICAL TESTING BY SGS NORTH AMERICA, INC OF ANCHORAGE, ALASKA

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street
Anchorage, AK 99518
907-433-3220

Report Number: **1172177**

Client Project: **32-1-02579 APMP NES1-SBS**

Dear Ryan Collins,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Victoria at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Victoria Pennick
2017.05.19
16:36:05 -08'00'

Victoria Pennick Date
Project Manager
Victoria.Pennick@sgs.com

Print Date: 05/19/2017 3:12:39PM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1172177**
Project Name/Site: **32-1-02579 APMP NES1-SBS**
Project Contact: **Ryan Collins**

Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) for which SGS North America Inc. is Provisionally Certified as of 2/8/2017 & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
02579-B2S6	1172177001	05/03/2017	05/09/2017	Soil/Solid (dry weight)
02579-B6S3	1172177002	05/08/2017	05/09/2017	Soil/Solid (dry weight)
02579-STB1	1172177003	05/03/2017	05/09/2017	Soil/Solid (dry weight)

Method	Method Description
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
SM21 2540G	Percent Solids SM2540G

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Detectable Results Summary

Client Sample ID: **02579-B2S6**
Lab Sample ID: 1172177001
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	59.8	mg/Kg
Residual Range Organics	92.0	mg/Kg

Client Sample ID: **02579-B6S3**
Lab Sample ID: 1172177002
Semivolatile Organic Fuels

Parameter	Result	Units
Residual Range Organics	26.3	mg/Kg

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **02579-B2S6**

Client Sample ID: **02579-B2S6**
Client Project ID: **32-1-02579 APMP NES1-SBS**
Lab Sample ID: 1172177001
Lab Project ID: 1172177

Collection Date: 05/03/17 15:05
Received Date: 05/09/17 16:44
Matrix: Soil/Solid (dry weight)
Solids (%):87.6
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	59.8		22.8	7.07	mg/Kg	1		05/16/17 21:25
Surrogates								
5a Androstane (surr)	98.4		50-150		%	1		05/16/17 21:25

Batch Information

Analytical Batch: XFC13335
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 05/16/17 21:25
Container ID: 1172177001-A

Prep Batch: XXX37338
Prep Method: SW3550C
Prep Date/Time: 05/16/17 10:30
Prep Initial Wt./Vol.: 30.057 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	92.0		22.8	7.07	mg/Kg	1		05/16/17 21:25
Surrogates								
n-Triacontane-d62 (surr)	98.2		50-150		%	1		05/16/17 21:25

Batch Information

Analytical Batch: XFC13335
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 05/16/17 21:25
Container ID: 1172177001-A

Prep Batch: XXX37338
Prep Method: SW3550C
Prep Date/Time: 05/16/17 10:30
Prep Initial Wt./Vol.: 30.057 g
Prep Extract Vol: 1 mL

Print Date: 05/19/2017 3:12:46PM

J flagging is activated

Results of **02579-B2S6**

Client Sample ID: **02579-B2S6**
Client Project ID: **32-1-02579 APMP NES1-SBS**
Lab Sample ID: 1172177001
Lab Project ID: 1172177

Collection Date: 05/03/17 15:05
Received Date: 05/09/17 16:44
Matrix: Soil/Solid (dry weight)
Solids (%):87.6
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.38	U	2.76	0.828	mg/Kg	1		05/10/17 22:29
Surrogates								
4-Bromofluorobenzene (surr)	92.8		50-150		%	1		05/10/17 22:29

Batch Information

Analytical Batch: VFC13627
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/10/17 22:29
Container ID: 1172177001-B

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 05/03/17 15:05
Prep Initial Wt./Vol.: 69.573 g
Prep Extract Vol: 33.6359 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.90	U	13.8	4.42	ug/Kg	1		05/10/17 22:29
Ethylbenzene	13.8	U	27.6	8.61	ug/Kg	1		05/10/17 22:29
o-Xylene	13.8	U	27.6	8.61	ug/Kg	1		05/10/17 22:29
P & M -Xylene	27.6	U	55.2	16.6	ug/Kg	1		05/10/17 22:29
Toluene	13.8	U	27.6	8.61	ug/Kg	1		05/10/17 22:29
Surrogates								
1,4-Difluorobenzene (surr)	87.6		72-119		%	1		05/10/17 22:29

Batch Information

Analytical Batch: VFC13627
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 05/10/17 22:29
Container ID: 1172177001-B

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 05/03/17 15:05
Prep Initial Wt./Vol.: 69.573 g
Prep Extract Vol: 33.6359 mL

Results of **02579-B6S3**

Client Sample ID: **02579-B6S3**
Client Project ID: **32-1-02579 APMP NES1-SBS**
Lab Sample ID: 1172177002
Lab Project ID: 1172177

Collection Date: 05/08/17 12:42
Received Date: 05/09/17 16:44
Matrix: Soil/Solid (dry weight)
Solids (%):92.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.8 U		21.5	6.67	mg/Kg	1		05/16/17 21:45
Surrogates								
5a Androstane (surr)	93.3		50-150		%	1		05/16/17 21:45

Batch Information

Analytical Batch: XFC13335
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 05/16/17 21:45
Container ID: 1172177002-A

Prep Batch: XXX37338
Prep Method: SW3550C
Prep Date/Time: 05/16/17 10:30
Prep Initial Wt./Vol.: 30.048 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	26.3		21.5	6.67	mg/Kg	1		05/16/17 21:45
Surrogates								
n-Triacontane-d62 (surr)	98.9		50-150		%	1		05/16/17 21:45

Batch Information

Analytical Batch: XFC13335
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 05/16/17 21:45
Container ID: 1172177002-A

Prep Batch: XXX37338
Prep Method: SW3550C
Prep Date/Time: 05/16/17 10:30
Prep Initial Wt./Vol.: 30.048 g
Prep Extract Vol: 1 mL

Print Date: 05/19/2017 3:12:46PM

J flagging is activated

Results of **02579-B6S3**

Client Sample ID: **02579-B6S3**
Client Project ID: **32-1-02579 APMP NES1-SBS**
Lab Sample ID: 1172177002
Lab Project ID: 1172177

Collection Date: 05/08/17 12:42
Received Date: 05/09/17 16:44
Matrix: Soil/Solid (dry weight)
Solids (%):92.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.930	U	1.86	0.558	mg/Kg	1		05/10/17 22:48
Surrogates								
4-Bromofluorobenzene (surr)	107		50-150		%	1		05/10/17 22:48

Batch Information

Analytical Batch: VFC13627
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/10/17 22:48
Container ID: 1172177002-B

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 05/08/17 12:42
Prep Initial Wt./Vol.: 91.534 g
Prep Extract Vol: 31.6072 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	4.65	U	9.30	2.98	ug/Kg	1		05/10/17 22:48
Ethylbenzene	9.30	U	18.6	5.81	ug/Kg	1		05/10/17 22:48
o-Xylene	9.30	U	18.6	5.81	ug/Kg	1		05/10/17 22:48
P & M -Xylene	18.6	U	37.2	11.2	ug/Kg	1		05/10/17 22:48
Toluene	9.30	U	18.6	5.81	ug/Kg	1		05/10/17 22:48
Surrogates								
1,4-Difluorobenzene (surr)	90		72-119		%	1		05/10/17 22:48

Batch Information

Analytical Batch: VFC13627
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 05/10/17 22:48
Container ID: 1172177002-B

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 05/08/17 12:42
Prep Initial Wt./Vol.: 91.534 g
Prep Extract Vol: 31.6072 mL

Print Date: 05/19/2017 3:12:46PM

J flagging is activated

Results of **02579-STB1**

Client Sample ID: **02579-STB1**
Client Project ID: **32-1-02579 APMP NES1-SBS**
Lab Sample ID: 1172177003
Lab Project ID: 1172177

Collection Date: 05/03/17 10:00
Received Date: 05/09/17 16:44
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.950	U	1.90	0.570	mg/Kg	1		05/10/17 16:50
Surrogates								
4-Bromofluorobenzene (surr)	89.4		50-150		%	1		05/10/17 16:50

Batch Information

Analytical Batch: VFC13627
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/10/17 16:50
Container ID: 1172177003-A

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 05/03/17 10:00
Prep Initial Wt./Vol.: 65.81 g
Prep Extract Vol: 25 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	4.75	U	9.50	3.04	ug/Kg	1		05/10/17 16:50
Ethylbenzene	9.50	U	19.0	5.93	ug/Kg	1		05/10/17 16:50
o-Xylene	9.50	U	19.0	5.93	ug/Kg	1		05/10/17 16:50
P & M -Xylene	19.0	U	38.0	11.4	ug/Kg	1		05/10/17 16:50
Toluene	9.50	U	19.0	5.93	ug/Kg	1		05/10/17 16:50
Surrogates								
1,4-Difluorobenzene (surr)	88.8		72-119		%	1		05/10/17 16:50

Batch Information

Analytical Batch: VFC13627
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 05/10/17 16:50
Container ID: 1172177003-A

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 05/03/17 10:00
Prep Initial Wt./Vol.: 65.81 g
Prep Extract Vol: 25 mL

Print Date: 05/19/2017 3:12:46PM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1758559 [SPT/10154]
Blank Lab ID: 1384046

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172177001, 1172177002

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10154
Analytical Method: SM21 2540G
Instrument:
Analyst: JMG
Analytical Date/Time: 5/10/2017 3:38:00PM

Duplicate Sample Summary

Original Sample ID: 1172114001
Duplicate Sample ID: 1384047
QC for Samples:

Analysis Date: 05/10/2017 15:38
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	94.9	94.9	%	0.01	(< 15)

Batch Information

Analytical Batch: SPT10154
Analytical Method: SM21 2540G
Instrument:
Analyst: JMG

Print Date: 05/19/2017 3:12:49PM

Duplicate Sample Summary

Original Sample ID: 1172176006
Duplicate Sample ID: 1384048
QC for Samples:
1172177001, 1172177002

Analysis Date: 05/10/2017 15:38
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	93.8	93.8	%	0.02	(< 15)

Batch Information

Analytical Batch: SPT10154
Analytical Method: SM21 2540G
Instrument:
Analyst: JMG

Print Date: 05/19/2017 3:12:49PM

Method Blank

Blank ID: MB for HBN 1758565 [VXX/30480]
Blank Lab ID: 1384078

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172177001, 1172177002, 1172177003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	102	50-150		%

Batch Information

Analytical Batch: VFC13627
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/10/2017 2:18:00PM

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 5/10/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172177 [VXX30480]
Blank Spike Lab ID: 1384081
Date Analyzed: 05/10/2017 15:15

Spike Duplicate ID: LCSD for HBN 1172177 [VXX30480]
Spike Duplicate Lab ID: 1384082
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172177001, 1172177002, 1172177003

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	12.1	97	12.5	12.5	100	(60-120)	3.60	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	103	103	1.25	104	104	(50-150)	1.10	

Batch Information

Analytical Batch: **VFC13627**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX30480**
Prep Method: **SW5035A**
Prep Date/Time: **05/10/2017 08:00**
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1758565 [VXX/30480]
Blank Lab ID: 1384078

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172177001, 1172177002, 1172177003

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	89.2	72-119		%

Batch Information

Analytical Batch: VFC13627
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/10/2017 2:18:00PM

Prep Batch: VXX30480
Prep Method: SW5035A
Prep Date/Time: 5/10/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172177 [VXX30480]
Blank Spike Lab ID: 1384079
Date Analyzed: 05/10/2017 14:37

Spike Duplicate ID: LCSD for HBN 1172177 [VXX30480]
Spike Duplicate Lab ID: 1384080
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172177001, 1172177002, 1172177003

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1150	92	1250	1180	95	(75-125)	2.40	(< 20)
Ethylbenzene	1250	1250	100	1250	1270	102	(75-125)	1.90	(< 20)
o-Xylene	1250	1230	99	1250	1250	100	(75-125)	1.40	(< 20)
P & M -Xylene	2500	2450	98	2500	2490	100	(80-125)	1.50	(< 20)
Toluene	1250	1260	101	1250	1290	103	(70-125)	2.30	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	92.2	92	1250	93.3	93	(72-119)	1.20	

Batch Information

Analytical Batch: **VFC13627**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX30480**
Prep Method: **SW5035A**
Prep Date/Time: **05/10/2017 08:00**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

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Matrix Spike Summary

Original Sample ID: 1172128004
MS Sample ID: 1384083 MS
MSD Sample ID: 1384084 MSD

Analysis Date: 05/10/2017 17:27
Analysis Date: 05/10/2017 17:46
Analysis Date: 05/10/2017 18:05
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172177001, 1172177002, 1172177003

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	7.60U	909	828	91	909	843	93	75-125	1.70	(< 20)
Ethylbenzene	15.2U	909	877	97	909	893	98	75-125	1.80	(< 20)
o-Xylene	15.2U	909	872	96	909	886	98	75-125	1.60	(< 20)
P & M -Xylene	30.4U	1816	1716	94	1816	1741	96	80-125	1.70	(< 20)
Toluene	17.3J	909	900	97	909	915	99	70-125	1.70	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		909	836	92	909	816	90	72-119	2.40	

Batch Information

Analytical Batch: VFC13627
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/10/2017 5:46:00PM

Prep Batch: VXX30480
Prep Method: AK101 Extraction (S)
Prep Date/Time: 5/10/2017 8:00:00AM
Prep Initial Wt./Vol.: 85.53g
Prep Extract Vol: 25.00mL

Print Date: 05/19/2017 3:12:57PM

Method Blank

Blank ID: MB for HBN 1758667 [XXX/37338]
Blank Lab ID: 1384515

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172177001, 1172177002

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	85.8	60-120		%

Batch Information

Analytical Batch: XFC13335
Analytical Method: AK102
Instrument: HP 7890A FID SV E F
Analyst: KMD
Analytical Date/Time: 5/16/2017 5:57:00PM

Prep Batch: XXX37338
Prep Method: SW3550C
Prep Date/Time: 5/16/2017 10:30:12AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172177 [VVVX7XX30
Blank Spike La4 ID: 1X38] 1b
Date Analyzed: 5] /1b/2517 13:13

Spike Duplicate ID: LCSD for HBN 1172177 [VVVX7XX30
Spike Duplicate La4 ID: 1X38] 17
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172177551, 1172177552

Results 4y **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Grganics	1b7	1b7	155	1b7	1bX	C8	(7] .12])	2685	(9 25)
Surrogates									
] a Androstane (surr)	X6XX	C86X	C8	X6XX	C] 68	C]	(b5.125)	26C5	

Batch Information

Analytical Batch: **XFC13335**
Analytical Method: **AK102**
Instrument: **HP 7890A FID SV E F**
Analyst: **KMD**

Prep Batch: **XXX37338**
Prep Method: **SW3550C**
Prep Date/- ime: **05/16/2017 10:30**
Spike Init < t6Tol6 1b7 mg/Kg Wktract Tol: 1 mL
Dupe Init < t6Tol6 1b7 mg/Kg Wktract Tol: 1 mL

Print Date: 5] /1O2517 X:1X:51PM

Method Blank

Blank ID: MB for HBN 1758667 [XXX/37338]
Blank Lab ID: 1384515

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172177001, 1172177002

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
nA riacontaneAd62 (surr)	F6.8	60A120		%

Batch Information

9nalytical Batch: XVC13335
9nalytical Method: 9K103
Instrument: HP 78F09 VID SE T V
9nalyst: KMD
9nalytical Date/- ime: 5/16/2017 5:57:00PM

Prep Batch: XXX37338
Prep Method: SW3550C
Prep Date/- ime: 5/16/2017 10:30:129M
Prep Initial Wt./Eol.: 30 g
Prep Txtract Eol: 1 mL

Print Date: 05/1F/2017 3:13:03PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172177 [VVVX7XX30
Blank Spike La4 ID: 1X38] 1b
Date Analyzed: 5] /1b/2517 13:13

Spike Duplicate ID: LCSD for HBN 1172177 [VVVX7XX30
Spike Duplicate La4 ID: 1X38] 17
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172177551, 1172177552

Results 4y **AK102**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Grganics	1b7	137	112	1b7	13b	112	(b5C125)	59b5	(. 25)
Surrogates									
n6triacontane2db2 (surr)	X9XX	- 79b	- 3	X9XX	- b92	- b	(b5C125)	1985	

Batch Information

Analytical Batch: **XFC12223**
Analytical Method: **AK102**
Instrument: **5H P780A FI9 SD V F**
Analyst: **KE 9**

Prep Batch: **XXX2P227**
Prep Method: **SM2330C**
Prep Date/6ime: **03W/ W01P 10:20**
Spike Init < t9Tol9 1b7 mg/Kg Wxtract Tol: 1 mL
Dupe Init < t9Tol9 1b7 mg/Kg Wxtract Tol: 1 mL

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255 < est Potter Drive Anchorage, AK -]] 13
t - 579] b292X8X f - 579] b19] X51 www9us9sgs9com

1172177

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2043 Westport Center Drive
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Lake Oswego, OR 97035
(503) 223-6147

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

Laboratory SGS
Attn: TORI

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO/BTEX AK101/8021B	DRO/RRO AK 102/103	VOC 8260B	PAH-8270D	PESTICIDES-8270D SIM	RCRA METALS EPA 6020	PCBs EPA 8082A	Total Number of Containers	Remarks/Matrix
02579-B256	(1) A-B	15:05	5/3/17		X	X	X	HOLD →			→		2	SOIL
02579-B653	(2) A-B	12:42	5/8/17		X	X	X	HOLD →			→		2	SOIL
02579-STB1	(3) A	10:00	5/3/17			X							1	SOIL TRIP BLANK

Project Information	Sample Receipt
Project Number: 32-1-02579	Total Number of Containers:
Project Name: APMP NES1-SBS	COC Seals/Intact? Y/N/(NA)
Contact: Ryan Collins	Received Good Cond./Cold: 4.9
Ongoing Project? Yes ☒ No ☐	Delivery Method: Hand Delivered #D25
Sampler: Ryan Collins	(attach shipping bill, if any)

Instructions

Requested Turnaround Time: STANDARD 10-day

Special Instructions: LEVEL II DELIVERABLES

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 16:44	Signature: Time:	Signature: Time:
Printed Name: Ryan Collins Date: 5/9/17	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time:	Signature: Time:	Signature: Time: 16:44
Printed Name: Date:	Printed Name: Date:	Printed Name: Nicholas Wells Date: 5/9/17
Company:	Company:	Company: SGS

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

23-0020

No. 30939

e-Sample Receipt Form

SGS Workorder #: **1172177**

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		yes Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	n/a	ABSENT
COC accompanied samples?	yes	
n/a **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	yes	Cooler ID: 1 @ 4.9 °C Therm. ID: D25
	n/a	Cooler ID: @ °C Therm. ID:
	n/a	Cooler ID: @ °C Therm. ID:
	n/a	Cooler ID: @ °C Therm. ID:
	n/a	Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	n/a	
If <0°C, were sample containers ice free?	n/a	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	yes	
	n/a	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	n/a	
Were all soil VOAs field extracted with MeOH+BFB?	yes	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1172177001-A	No Preservative Required	OK			
1172177001-B	Methanol field pres. 4 C	OK			
1172177002-A	No Preservative Required	OK			
1172177002-B	Methanol field pres. 4 C	OK			
1172177003-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street
Anchorage, AK 99518
907-433-3220

Report Number: **1172348**

Client Project: **32-1-02579 APMP NESI-SBS**

Dear Ryan Collins,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Victoria at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Victoria Pennick
2017.05.19
08:41:08 -08'00'

Victoria Pennick — Date
Project Manager
Victoria.Pennick@sgs.com

Print Date: 05/19/2017 8:39:57AM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1172348**
Project Name/Site: **32-1-02579 APMP NESI-SBS**
Project Contact: **Ryan Collins**

Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

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Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) for which SGS North America Inc. is Provisionally Certified as of 2/8/2017 & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
02579-B7S2	1172348001	05/09/2017	05/15/2017	Soil/Solid (dry weight)
02579-B4S4	1172348002	05/12/2017	05/15/2017	Soil/Solid (dry weight)
02579-STB2	1172348003	05/09/2017	05/15/2017	Soil/Solid (dry weight)

Method	Method Description
AK101	AK101/8021 Combo. (S)
SW8021B	AK101/8021 Combo. (S)
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
SM21 2540G	Percent Solids SM2540G

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Detectable Results Summary

Client Sample ID: **02579-B7S2**
Lab Sample ID: 1172348001
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	10.7J	mg/Kg
Residual Range Organics	23.0	mg/Kg

Client Sample ID: **02579-B4S4**
Lab Sample ID: 1172348002
Semivolatile Organic Fuels

Parameter	Result	Units
Diesel Range Organics	7.80J	mg/Kg
Residual Range Organics	15.8J	mg/Kg

Client Sample ID: **02579-STB2**
Lab Sample ID: 1172348003
Volatile Fuels

Parameter	Result	Units
Gasoline Range Organics	0.935J	mg/Kg

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Results of **02579-B7S2**

Client Sample ID: **02579-B7S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172348001
Lab Project ID: 1172348

Collection Date: 05/09/17 14:50
Received Date: 05/15/17 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.7	J	21.8	6.77	mg/Kg	1		05/17/17 13:30
Surrogates								
5a Androstane (surr)	84		50-150		%	1		05/17/17 13:30

Batch Information

Analytical Batch: XFC13339
Analytical Method: AK102
Analyst: FDR
Analytical Date/Time: 05/17/17 13:30
Container ID: 1172348001-A

Prep Batch: XXX37354
Prep Method: SW3550C
Prep Date/Time: 05/16/17 14:02
Prep Initial Wt./Vol.: 30.244 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	23.0		21.8	6.77	mg/Kg	1		05/17/17 13:30
Surrogates								
n-Triacontane-d62 (surr)	89.6		50-150		%	1		05/17/17 13:30

Batch Information

Analytical Batch: XFC13339
Analytical Method: AK103
Analyst: FDR
Analytical Date/Time: 05/17/17 13:30
Container ID: 1172348001-A

Prep Batch: XXX37354
Prep Method: SW3550C
Prep Date/Time: 05/16/17 14:02
Prep Initial Wt./Vol.: 30.244 g
Prep Extract Vol: 1 mL

Print Date: 05/19/2017 8:40:05AM

J flagging is activated

Results of **02579-B7S2**

Client Sample ID: **02579-B7S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172348001
Lab Project ID: 1172348

Collection Date: 05/09/17 14:50
Received Date: 05/15/17 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.20 U		2.39	0.716	mg/Kg	1		05/17/17 01:23
Surrogates								
4-Bromofluorobenzene (surr)	84.5		50-150		%	1		05/17/17 01:23

Batch Information

Analytical Batch: VFC13636
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/17/17 01:23
Container ID: 1172348001-B

Prep Batch: VXX30505
Prep Method: SW5035A
Prep Date/Time: 05/09/17 14:50
Prep Initial Wt./Vol.: 73.053 g
Prep Extract Vol: 31.6945 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	5.95 U		11.9	3.82	ug/Kg	1		05/17/17 01:23
Ethylbenzene	11.9 U		23.9	7.45	ug/Kg	1		05/17/17 01:23
o-Xylene	11.9 U		23.9	7.45	ug/Kg	1		05/17/17 01:23
P & M -Xylene	23.9 U		47.8	14.3	ug/Kg	1		05/17/17 01:23
Toluene	11.9 U		23.9	7.45	ug/Kg	1		05/17/17 01:23
Surrogates								
1,4-Difluorobenzene (surr)	91.9		72-119		%	1		05/17/17 01:23

Batch Information

Analytical Batch: VFC13636
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 05/17/17 01:23
Container ID: 1172348001-B

Prep Batch: VXX30505
Prep Method: SW5035A
Prep Date/Time: 05/09/17 14:50
Prep Initial Wt./Vol.: 73.053 g
Prep Extract Vol: 31.6945 mL

Results of **02579-B4S4**

Client Sample ID: **02579-B4S4**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172348002
Lab Project ID: 1172348

Collection Date: 05/12/17 15:32
Received Date: 05/15/17 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.9
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	7.80	J	22.0	6.81	mg/Kg	1		05/17/17 14:00
Surrogates								
5a Androstane (surr)	88.3		50-150		%	1		05/17/17 14:00

Batch Information

Analytical Batch: XFC13339
Analytical Method: AK102
Analyst: FDR
Analytical Date/Time: 05/17/17 14:00
Container ID: 1172348002-A

Prep Batch: XXX37354
Prep Method: SW3550C
Prep Date/Time: 05/16/17 14:02
Prep Initial Wt./Vol.: 30.051 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	15.8	J	22.0	6.81	mg/Kg	1		05/17/17 14:00
Surrogates								
n-Triacontane-d62 (surr)	93.3		50-150		%	1		05/17/17 14:00

Batch Information

Analytical Batch: XFC13339
Analytical Method: AK103
Analyst: FDR
Analytical Date/Time: 05/17/17 14:00
Container ID: 1172348002-A

Prep Batch: XXX37354
Prep Method: SW3550C
Prep Date/Time: 05/16/17 14:02
Prep Initial Wt./Vol.: 30.051 g
Prep Extract Vol: 1 mL

Print Date: 05/19/2017 8:40:05AM

J flagging is activated

Results of **02579-B4S4**

Client Sample ID: **02579-B4S4**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172348002
Lab Project ID: 1172348

Collection Date: 05/12/17 15:32
Received Date: 05/15/17 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):90.9
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.22	U	2.43	0.730	mg/Kg	1		05/17/17 02:58
Surrogates								
4-Bromofluorobenzene (surr)	87.2		50-150		%	1		05/17/17 02:58

Batch Information

Analytical Batch: VFC13636
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/17/17 02:58
Container ID: 1172348002-B

Prep Batch: VXX30505
Prep Method: SW5035A
Prep Date/Time: 05/12/17 15:32
Prep Initial Wt./Vol.: 71.036 g
Prep Extract Vol: 31.431 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	6.10	U	12.2	3.89	ug/Kg	1		05/17/17 02:58
Ethylbenzene	12.2	U	24.3	7.59	ug/Kg	1		05/17/17 02:58
o-Xylene	12.2	U	24.3	7.59	ug/Kg	1		05/17/17 02:58
P & M -Xylene	24.4	U	48.7	14.6	ug/Kg	1		05/17/17 02:58
Toluene	12.2	U	24.3	7.59	ug/Kg	1		05/17/17 02:58
Surrogates								
1,4-Difluorobenzene (surr)	89.7		72-119		%	1		05/17/17 02:58

Batch Information

Analytical Batch: VFC13636
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 05/17/17 02:58
Container ID: 1172348002-B

Prep Batch: VXX30505
Prep Method: SW5035A
Prep Date/Time: 05/12/17 15:32
Prep Initial Wt./Vol.: 71.036 g
Prep Extract Vol: 31.431 mL

Print Date: 05/19/2017 8:40:05AM

J flagging is activated

Results of **02579-STB2**

Client Sample ID: **02579-STB2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172348003
Lab Project ID: 1172348

Collection Date: 05/09/17 12:00
Received Date: 05/15/17 12:28
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.935	J	1.90	0.570	mg/Kg	1		05/16/17 15:36
Surrogates								
4-Bromofluorobenzene (surr)	86.5		50-150		%	1		05/16/17 15:36

Batch Information

Analytical Batch: VFC13636
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/16/17 15:36
Container ID: 1172348003-A

Prep Batch: VXX30504
Prep Method: SW5035A
Prep Date/Time: 05/09/17 12:00
Prep Initial Wt./Vol.: 65.818 g
Prep Extract Vol: 25 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Benzene	4.75	U	9.50	3.04	ug/Kg	1		05/16/17 15:36
Ethylbenzene	9.50	U	19.0	5.93	ug/Kg	1		05/16/17 15:36
o-Xylene	9.50	U	19.0	5.93	ug/Kg	1		05/16/17 15:36
P & M -Xylene	19.0	U	38.0	11.4	ug/Kg	1		05/16/17 15:36
Toluene	9.50	U	19.0	5.93	ug/Kg	1		05/16/17 15:36
Surrogates								
1,4-Difluorobenzene (surr)	88.8		72-119		%	1		05/16/17 15:36

Batch Information

Analytical Batch: VFC13636
Analytical Method: SW8021B
Analyst: ST
Analytical Date/Time: 05/16/17 15:36
Container ID: 1172348003-A

Prep Batch: VXX30504
Prep Method: SW5035A
Prep Date/Time: 05/09/17 12:00
Prep Initial Wt./Vol.: 65.818 g
Prep Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1759024 [SPT/10159]
Blank Lab ID: 1384976

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172348001, 1172348002

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10159
Analytical Method: SM21 2540G
Instrument:
Analyst: MWJ
Analytical Date/Time: 5/16/2017 6:09:00PM

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Duplicate Sample Summary

Original Sample ID: 1172339011
Duplicate Sample ID: 1384977
QC for Samples:

Analysis Date: 05/16/2017 18:09
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	92.5	92.2	%	0.35	(< 15)

Batch Information

Analytical Batch: SPT10159
Analytical Method: SM21 2540G
Instrument:
Analyst: MWJ

Print Date: 05/19/2017 8:40:08AM

Duplicate Sample Summary

Original Sample ID: 1172347005
Duplicate Sample ID: 1384978
QC for Samples:
1172348001, 1172348002

Analysis Date: 05/16/2017 18:09
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	72.2	74.1	%	2.50	(< 15)

Batch Information

Analytical Batch: SPT10159
Analytical Method: SM21 2540G
Instrument:
Analyst: MWJ

Print Date: 05/19/2017 8:40:08AM

Duplicate Sample Summary

Original Sample ID: 1177779010
Duplicate Sample ID: 1384979
QC for Samples:
1172348001, 1172348002

Analysis Date: 05/16/2017 18:09
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	76.6	76.9	%	0.40	(< 15)

Batch Information

Analytical Batch: SPT10159
Analytical Method: SM21 2540G
Instrument:
Analyst: MWJ

Print Date: 05/19/2017 8:40:08AM

Method Blank

Blank ID: MB for HBN 1759037 [VXX/30504]
Blank Lab ID: 1385038

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172348003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	100	50-150		%

Batch Information

Analytical Batch: VFC13636
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/16/2017 3:17:00PM

Prep Batch: VXX30504
Prep Method: SW5035A
Prep Date/Time: 5/16/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172348 [VXX30504]
Blank Spike Lab ID: 1385041
Date Analyzed: 05/16/2017 14:20

Spike Duplicate ID: LCSD for HBN 1172348 [VXX30504]
Spike Duplicate Lab ID: 1385042
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172348003

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	13.0	104	12.5	12.9	103	(60-120)	0.88	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	106	106	1.25	106	106	(50-150)	0.55	

Batch Information

Analytical Batch: **VFC13636**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX30504**
Prep Method: **SW5035A**
Prep Date/Time: **05/16/2017 08:00**
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1759037 [VXX/30504]
Blank Lab ID: 1385038

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172348003

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
Benzene	6.25U	12.5	4.00	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
Surrogates				
1,4-Difluorobenzene (surr)	89.7	72-119		%

Batch Information

Analytical Batch: VFC13636
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/16/2017 3:17:00PM

Prep Batch: VXX30504
Prep Method: SW5035A
Prep Date/Time: 5/16/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172348 [VXX30504]
Blank Spike Lab ID: 1385039
Date Analyzed: 05/16/2017 13:42

Spike Duplicate ID: LCSD for HBN 1172348 [VXX30504]
Spike Duplicate Lab ID: 1385040
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172348003

Results by **SW8021B**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	1250	1100	88	1250	1110	89	(75-125)	0.61	(< 20)
Ethylbenzene	1250	1280	103	1250	1290	103	(75-125)	0.37	(< 20)
o-Xylene	1250	1270	101	1250	1260	101	(75-125)	0.30	(< 20)
P & M -Xylene	2500	2530	101	2500	2520	101	(80-125)	0.41	(< 20)
Toluene	1250	1280	103	1250	1300	104	(70-125)	0.91	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1250	92.7	93	1250	92.3	92	(72-119)	0.45	

Batch Information

Analytical Batch: **VFC13636**
Analytical Method: **SW8021B**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX30504**
Prep Method: **SW5035A**
Prep Date/Time: **05/16/2017 08:00**
Spike Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 1250 ug/Kg Extract Vol: 25 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1172400007
MS Sample ID: 1385043 MS
MSD Sample ID: 1385044 MSD

QC for Samples: 1172348003

Analysis Date: 05/16/2017 16:52
Analysis Date: 05/16/2017 17:11
Analysis Date: 05/16/2017 17:31
Matrix: Soil/Solid (dry weight)

Results by **SW8021B**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	6.02U	522	452	87	522	456	87	75-125	0.90	(< 20)
Ethylbenzene	12.0U	522	543	103	522	547	103	75-125	0.77	(< 20)
o-Xylene	16.1	522	528	98	522	535	99	75-125	1.20	(< 20)
P & M -Xylene	28.3	1042	1063	99	1042	1073	100	80-125	1.00	(< 20)
Toluene	12.0U	522	529	101	522	534	102	70-125	0.65	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		522	483	92	522	474	91	72-119	1.90	

Batch Information

Analytical Batch: VFC13636
Analytical Method: SW8021B
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/16/2017 5:11:00PM

Prep Batch: VXX30504
Prep Method: AK101 Extraction (S)
Prep Date/Time: 5/16/2017 8:00:00AM
Prep Initial Wt./Vol.: 123.42g
Prep Extract Vol: 25.00mL

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Method Blank

Blank ID: MB for HBN 1759038 [VXX/30505]
Blank Lab ID: 1385046

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172348001, 1172348002

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.884J	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	95.1	50-150		%

Batch Information

Analytical Batch: VFC13636
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/17/2017 12:46:00AM

Prep Batch: VXX30505
Prep Method: SW5035A
Prep Date/Time: 5/16/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172348 [VXX30505]
Blank Spike Lab ID: 138504t
DaAe y nalzde/ : 056lu62017 23:4t

Spike DcpliRaAe ID: LCSD for HBN 1172348 [VXX30505]
Spike DcpliRaAe Lab ID: 1385050
x aAi(: Soil6Soli/ wrz g eih) AP

GC for Sa%pleM 1172348001O1172348002

s eMclAMbz **AK101**

	Blank Spike w%h6Qh P			Spike DcpliRaAe w%h6Qh P					
mara%eAer	Spike	s eMclA	s eRvK P	Spike	s eMclA	s eRvK P	CL	s mD vK P	s mD CL
. aMoline s anhe - rhaniRM	12<5	12<8	103	12<5	12<7	102	wu09120 P	0<84	wT 20 P
Surrogates									
49Bro%ofIcorobendene vMcrrP	1<25	105	105	1<25	105	105	w509150 P	0<04	

Batch Information

y nalzARal BaARy : **VFC13636**
y nalzARal x eA,o/ : **AK101**
InMkc%enA **Agilent 7890A PID/FID**
y nalzMA **ST**

mrep BaARy : **VXX30505**
mrep x eA,o/ : **SW5035A**
mrep DaAe6W%e: **05/16/2017 08:00**
Spike IniAE A6Vol< 12<5 %h6Qh v(AkaRAVol: 25 %L
Dcpe IniAE A6Vol< 12<5 %h6Qh v(AkaRAVol: 25 %L

Method Blank

Blank ID: MB for HBN 175903[VX/ / 430505]
Blank Lab ID: 13[508Q

Maxrd(: mod4molqy wyrg h sd) Rxu

CS for map els2:
117t 38[001i 117t 38[00t

Us2Ox2 bg **SW8021B**

. arap sxsr	Us2Ox2	Lz C4SL	DL	Pnd2
BsnKsns	Q8t 5P	1t 65	8600	O)4E)
- xRglbsnKsns	1t 65P	t 560	76[0	O)4E)
o& glsns	1t 65P	t 560	76[0	O)4E)
. T M & glsns	t 560P	5060	1560	O)4E)
, olOsns	1t 65P	t 560	76[0	O)4E)
Surrogates				
1i8&DdlOorobsnKsns w2Orru	[763	7t &l 19		%

Batch Information

Analgxdcal BaxcR: XFS13Q3Q
Analgxdcal MsxRoy: mW[0t 1B
In2xrOp snx A) dlsnx7[90A . ID4FID
Analg2x m,
Analgxdcal Daxs4 ϕ s: 54l74t 017 1t :8Q00AM

. rse BaxcR: X/ / 30505
. rse MsxRoy: mW5035A
. rse Daxs4 ϕ s: 54lQ4t 017 [:00:00AM
. rse Indcdal Wx6YXol6 50)
. rse - (xracxXol: t 5 p L

. rdhxDaxs: 054l94t 017 [:80:t t AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172348 [VXX30505]
Blank Spike Lab ID: 1385047
Da9e t nalAyez: 05dl/ d2017 23:11

Spike D6pliua9e ID: LCSD for HBN 1172348 [VXX30505]
Spike D6pliua9e Lab ID: 1385048
s a9riM SoildSoliz xzrA(eiwg9h

KC for SaP pleR 1172348001Q1172348002

c eR6l9RbA **SW8021B**

	Blank Spike x6wd%wh			Spike D6pliua9e x6wd%wh					
) araP e9er	Spike	c eR6l9	c eu xmh	Spike	c eR6l9	c eu xmh	CL	c) D xmh	c) D CL
Benyene	1250	1040	84	1250	1030	83	x75-125 h	0.EE	x< 20 h
&9gAlbenyene	1250	12/ 0	101	1250	1250	100	x75-125 h	0.80	x< 20 h
o-XAlene	1250	1240	EE	1250	1230	EE	x75-125 h	0.8E	x< 20 h
) T s -XAlene	2500	2470	EE	2500	2440	E8	x80-125 h	0.E4	x< 20 h
, ol6ene	1250	1230	E8	1250	1220	E8	x70-125 h	0.80	x< 20 h
Surrogates									
1Q4-Difl6orobenyene xR6rrh	1250	E2.2	E2	1250	E1.3	E1	x72-11E h	1.00	

Batch Information

t nalA9ual Ba9ug: **VFC13636**
t nalA9ual s e9goz: **SW8021B**
InR96P en9 **Agilent 7890A PID/FID**
t nalAR9 **ST**

) rep Ba9ug: **VXX30505**
) rep s e9goz: **SW5035A**
) rep Da9ed iP e: **05/16/2017 08:00**
Spike Ini9W9d Vol.: 1250 6wd%w &M9rau9Vol: 25 P L
D6pe Ini9W9d Vol.: 1250 6wd%w &M9rau9Vol: 25 P L

) rin9Da9e: 05dlEd2017 8:40:24t s

Matrix Spike Summary

Original Sample ID: 117240M831
8 S Sample ID: 14M5351 8 S
8 SD Sample ID: 14M5352 8 SD

Analysis Date: 35/17/2317 1:24
Analysis Date: 35/17/2317 13:41
Analysis Date: 35/17/2317 13:53
8 atri6: Sxil/Sxlio dbry (eigwth

c Q Qxr Samples: 117240M831L117240M832

) esRlts uy **SW8021B**

		8 atri6 Spibe dRg/k gh			Spibe DRpliKate dRg/k gh					
f arameter	Sample	Spibe	) esRlt	) eKdP h	Spibe	) esRlt	) eKdP h	Q%	) f D dP h	) f D Q%
Benzene	5U5-	. 04	. 20	. M	. 04	. 42	. .	759125	3UM5	d< 23 h
Etwyluenzene	11U-	. 04	. 0M	131	. 04	. 52	131	759125	3U00	d< 23 h
x9Xylene	11U-	. 04	. 20	. M	. 04	. 27	. M	759125	3U4.	d< 23 h
f & 8 9Xylene	24U-	1MM4	1M53	. M	1MM4	1MT1	. .	M39125	3U03	d< 23 h
, xlRene	11U-	. 04	. T0	132	. 04	. T.	134	739125	3UTT	d< 23 h
Surrogates										
1L09Di0Rxrxuenzene dsRrrh		. 04	. 30	. T	. 04	M T	. 5	7291 1.	3U 3	

Batch Information

AnalytiKal BatKw: VFQ14T4T
AnalytiKal 8 etwxo: SWM821B
InstrRment: Agilent 7M 3A f ID/FID
Analyst: S,
AnalytiKal Date/, ime: 5/17/2317 13:41:33A8

f rep BatKw: VXX43535
f rep 8 etwxo: Ak 131 E6traKtixn dSh
f rep Date/, ime: 5/1T/2317 M33:33A8
f rep Initial WtUVxlU 74U35g
f rep E6traKt Vxl: 25U33m%

f rint Date: 35/1. /2317 M03:25A8

Method Blank

Blank ID: MB for HBN 1758995 [XXX/37354]
Blank Lab ID: 1384873

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172348001, 1172348002

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	89.8	60-120		%

Batch Information

Analytical Batch: XFC13339
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: FDR
Analytical Date/Time: 5/17/2017 11:14:00AM

Prep Batch: XXX37354
Prep Method: SW3550C
Prep Date/Time: 5/16/2017 2:02:42PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172348 [VVV373X40
Blank Spike La5 ID: 1384874
Da]e bnalt Aey: zXdl7c2z17 11:24

Spike D/ pli6a]e ID: LCSD for HBN 1172348 [VVV373X40
Spike D/ pli6a]e La5 ID: 138487X
Ra]ris: SoilcSoliy Mjrt x ei(wjg

%C for Sa) plec: 1172348zz1K1172348zz2

u ec/ l]c 5t **AK102**

	Blank Spike Ml (dm(g			Spike D/ pli6a]e Mj (dm(g					
hara) e]er	Spike	u ec/ l]	u e6 MP g	Spike	u ec/ l]	u e6 MP g	CL	uhD MP g	uhD CL
Diecel u an(e Qr(ani6c	1G7	17G	1zX	1G7	1XG	O4	M7X.12X g	11<Xz	M 2z g
Surrogates									
Xa bnyroc]ane Md/ rrg	3<33	O7<1	O7	3<33	O4	O4	MGz.12z g	3<2z	

Batch Information

bnalt]i6al Ba]6w: **XFC13339**
bnalt]i6al Re]woy: **AK102**
Inc]r/) en]: **Agilent 7890B F**
bnalt c]: **FDR**

hrep Ba]6w: **XXX37354**
hrep Re]woy: **SW3550C**
hrep Da]ed9i) e: **05/16/2017 14:02**
Spike Ini] T]<dWol< 1G7) (dm(Es]ra6] Wol: 1) L
D/ pe Ini] T]<dWol< 1G7) (dm(Es]ra6] Wol: 1) L

Method Blank

Blank ID: MB for HBN 1758995 [XXX/37354]
Blank Lab ID: 1384873

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172348001, 1172348002

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
nA riacontaneAd62 (surr)	88.1	60A120		%

Batch Information

Fnalytical Batch: XTC13339
Fnalytical Method: FK103
Instrument: Fgilent 7890B T
Fnalyst: TDR
Fnalytical Date/- ime: 5/17/2017 11:14:00FM

Prep Batch: XXX37354
Prep Method: SW3550C
Prep Date/- ime: 5/16/2017 2:02:42PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 05/19/2017 8:40:30FM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172348 [VVV373X40
Blank Spike La5 ID: 1384874
Da]e bnalt Aey: zXdl7c2z17 11:24

Spike D/ pli6a]e ID: LCSD for HBN 1172348 [VVV373X40
Spike D/ pli6a]e La5 ID: 138487X
Ra]ris: SoilcSoliy Myrt x ei(wjg

%C for Sa) plec: 1172348zz1K1172348zz2

u ec/ l]c 5t **AK102**

	Blank Spike Ml (dm(g			Spike D/ pli6a]e Ml (dm(g					
hara) e]er	Spike	u ec/ l]	u e6 MP g	Spike	u ec/ l]	u e6 MP g	CL	uhD MP g	uhD CL
u eciy/ al u an(e Qr(ani6c	1G7	1Gz	OG	1G7	14O	Oz	MGz.12z g	G<8z	M 2z g
Surrogates									
n.9ria6on]ane.yG2 M/ rrg	3<33	1z2	1z2	3<33	O2<3	O2	MGz.12z g	1z<2z	

Batch Information

bnalt]i6al Ba]6w: **XFC12223**
bnalt]i6al Re]woy: **AK102**
Inc]r/) en]: **Agilent 9730B F**
bnalt c]: **F8 D**

hrep Ba]6w: **XXX292R5**
hrep Re]woy: **S4 2RR0C**
hrep Da]ec9i) e: **0RW/ W019 15:06**
Spike Ini] T]<dWol< 1G7) (dm(Es]ra6] Wol: 1) L
D/ pe Ini] T]<dWol< 1G7) (dm(Es]ra6] Wol: 1) L

1172348

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

3990 Collins Way, Suite 100
Lake Oswego, OR 97035
(503) 223-6147

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

Laboratory SGS
Attn: TORI

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO/BTEX	AK101/8021B	DRO/RRO AK102/103	VOC 8260B	PAHs 8270D SIM	PESTICIDES 8260D SIM	RCRA METALS EPA 6020	PCBs EPA 8082A	Total Number of Containers	Remarks/Matrix
02579-B752	(1) A-B	14:50	5/9		X	X	X	HOLD →						2	SOIL
02579-STB2	(3) A	12:00 AM	5/9			X								1	SOIL TRIP BLANK
02579-B454	(2) A-B	15:32	5/12		X	X	X	HOLD →						2	SOIL

Project Information		Sample Receipt	
Project Number: 32-1-02579		Total Number of Containers	
Project Name: ADMP NESI-SBS		COC Seals/Intact? Y/N/(NA)	
Contact: RYAN COLLINS		Received Good Cond./Cold	6.4
Ongoing Project? Yes ☒ No ☐		Delivery Method: Hand Delivered (attach shipping bill, if any)	#D11
Sampler: RYAN COLLINS			

Instructions	
Requested Turnaround Time:	STANDARD 10-DAY
Special Instructions:	LEVEL II DELIVERABLES

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 12:28	Signature: Time:	Signature: Time:
Printed Name: RYAN COLLINS Date: 5/15	Printed Name: Date:	Printed Name: Date:
Company: SHANNON & WILSON	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time: 12:28
Printed Name: Date:	Printed Name: Date:	Printed Name: Nicholas Wells Date: 5/15/17
Company:	Company:	Company: SGS

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 30942

e-Sample Receipt Form

SGS Workorder #: **1172348**

1 1 7 2 3 4 8

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	N/A	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	Absent
COC accompanied samples?	Yes	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	No	Cooler ID: 1 @ 6.4 °C Therm. ID: D11
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	No	Out of temp procceeded per Tori's request
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)? **Note: If times differ <1hr, record details & login per COC.	No	Sample 2 time did not match COC. Logged in according to COC time.
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	Yes	
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	Yes	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1172348001-A	No Preservative Required	OK			
1172348001-B	Methanol field pres. 4 C	OK			
1172348002-A	No Preservative Required	OK			
1172348002-B	Methanol field pres. 4 C	OK			
1172348003-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

Laboratory Report of Analysis

To: Shannon & Wilson, Inc.
5430 Fairbanks Street
Anchorage, AK 99518
907-433-3220

Report Number: **1172484**

Client Project: **32-1-02579 APMP NESI-SBS**

Dear Ryan Collins,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Victoria at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

SGS North America Inc.
Environmental Services – Alaska Division
Project Manager

Victoria Pennick
2017.06.02
09:32:47 -08'00'

Victoria Pennick — Date
Project Manager
Victoria.Pennick@sgs.com

Print Date: 05/31/2017 4:25:39PM

Case Narrative

SGS Client: **Shannon & Wilson, Inc.**
SGS Project: **1172484**
Project Name/Site: **32-1-02579 APMP NESI-SBS**
Project Contact: **Ryan Collins**

Refer to sample receipt form for information on sample condition.

LCS for HBN 1759934 [VXX/30564 (1387349) LCS

8260C - LCS Recovery for carbon disulfide (138%) does not meet QC criteria. This analyte was not detected above the LOQ in the associated samples.

MB for HBN 1759298 [XXX/37384] (1385437) MB

8082A - Surrogate recovery in the MB for decachlorobiphenyl (138%) does not meet QC criteria. The MB and associated samples were not detected above the LOQ. No further action was taken.

1172456006MS (1385489) MS

8270D SIM - PAH MS recoveries for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

1172484002MS (1385559) MS

8270D SIM - Pesticide MS recoveries for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

1172484001(1386089MS) (1386090) MS

6020A - Metals MS recovery for chromium (135%) does not meet QC criteria. The post digestion spike was successful.

1177819045MS (1387350) MS

8260C - MS recoveries for 2,2-dichloropropane (144%), carbon disulfide (137%) and vinyl acetate (161%) do not meet QC criteria.

Refer to LCS for accuracy requirements.

1172456006MSD (1385490) MSD

8270D SIM - PAH MSD recoveries for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.

1172484002MSD (1385560) MSD

8270D SIM - Pesticide MSD recoveries for several analytes do not meet QC criteria. Refer to the LCS for accuracy requirements.
8270D SIM - Pesticide MS/MSD RPDs for heptachlor (23.3), endrin (22) and methoxychlor (30.2) do not meet QC criteria. These analytes were not detected above the LOQ in the parent sample.
8270D SIM - Pesticide MS/MSD RPD for 4,4-DDT (34.1) does not meet QC criteria. Results for this analyte are considered estimated in the parent sample.

1177819045MSD (1387351) MSD

8260C - MSD RPD for trichlorofluoromethane (21.8) does not meet QC criteria. This analyte was not detected above the LOQ in the parent sample.
8260C - MSD recoveries for carbon disulfide (136%) and vinyl acetate (155%) do not meet QC criteria. Refer to LCS for accuracy requirements.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
8270D SIM (PAH)				
1172456006	LABREFQC	XMS10043	Benzo[k]fluoranthene	RP
1172484002	02579-B5S3	XMS10043	Benzo[k]fluoranthene	RP
1385489	1172456006MS	XMS10043	Benzo[k]fluoranthene	RP
1385490	1172456006MSD	XMS10043	Benzo[k]fluoranthene	RP
8270D SIM (PEST)				
1385559	1172484002MS	XMS10041	gamma-BHC (Lindane)	BLC
1385560	1172484002MSD	XMS10041	gamma-BHC (Lindane)	BLC
SW8260C				
1387349	LCS for HBN 1759934 [VXX/30564	VMS16765	Freon-113	PNF
1387366	CCV for HBN 1759940 (VMS/16765	VMS16765	Freon-113	PNF

Manual Integration Reason Code Descriptions

Code	Description
O	Original Chromatogram
M	Modified Chromatogram
SS	Skimmed surrogate
BLG	Closed baseline gap
RP	Reassign peak name
PIR	Pattern integration required
IT	Included tail
SP	Split peak
RSP	Removed split peak
FPS	Forced peak start/stop
BLC	Baseline correction
PNF	Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 05/31/2017 4:25:41PM

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

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SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & UST-005 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
02579-B3S2	1172484001	05/17/2017	05/18/2017	Soil/Solid (dry weight)
02579-B5S3	1172484002	05/16/2017	05/18/2017	Soil/Solid (dry weight)
02579-STB3	1172484003	05/18/2017	05/18/2017	Soil/Solid (dry weight)

Method	Method Description
8270D SIM (PAH)	8270 PAH SIM Semi-Volatiles GC/MS
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
AK101	Gasoline Range Organics (S)
SW6020A	Metals by ICP-MS (S)
SM21 2540G	Percent Solids SM2540G
8270D SIM (PEST)	Pesticides 8270D SIM GC/MS
SW8082A	SW8082 PCB's
SW8260C	VOC 8260 (S) Field Extracted

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Detectable Results Summary

Client Sample ID: **02579-B3S2**
Lab Sample ID: 1172484001

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	7.13	mg/Kg
	Barium	61.2	mg/Kg
	Cadmium	0.0770J	mg/Kg
	Chromium	29.4	mg/Kg
	Lead	5.39	mg/Kg
	Mercury	0.0896	mg/Kg
Organochlorinated Pesticides by GC/MS	gamma-BHC (Lindane)	0.650J	ug/Kg
Semivolatile Organic Fuels	Residual Range Organics	15.5J	mg/Kg

Client Sample ID: **02579-B5S3**
Lab Sample ID: 1172484002

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	5.90	mg/Kg
	Barium	62.5	mg/Kg
	Cadmium	0.111J	mg/Kg
	Chromium	31.9	mg/Kg
	Lead	6.40	mg/Kg
	Mercury	0.0937	mg/Kg
Organochlorinated Pesticides by GC/MS	4,4'-DDD	5.93	ug/Kg
	4,4'-DDE	0.940J	ug/Kg
	4,4'-DDT	6.48	ug/Kg
Polynuclear Aromatics GC/MS	2-Methylnaphthalene	9.90J	ug/Kg
	Anthracene	11.4J	ug/Kg
	Benzo(a)Anthracene	32.0	ug/Kg
	Benzo[a]pyrene	27.1J	ug/Kg
	Benzo[b]Fluoranthene	40.8	ug/Kg
	Benzo[g,h,i]perylene	16.9J	ug/Kg
	Benzo[k]fluoranthene	14.1J	ug/Kg
	Chrysene	35.7	ug/Kg
	Fluoranthene	83.2	ug/Kg
	Indeno[1,2,3-c,d] pyrene	13.5J	ug/Kg
	Naphthalene	7.06J	ug/Kg
	Phenanthrene	44.0	ug/Kg
	Pyrene	65.9	ug/Kg
Semivolatile Organic Fuels	Diesel Range Organics	52.9	mg/Kg
	Residual Range Organics	35.1	mg/Kg

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Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	7.13		1.02	0.316	mg/Kg	10		05/24/17 12:28
Barium	61.2		0.306	0.0959	mg/Kg	10		05/24/17 12:28
Cadmium	0.0770	J	0.204	0.0633	mg/Kg	10		05/24/17 12:28
Chromium	29.4		0.408	0.133	mg/Kg	10		05/24/17 12:28
Lead	5.39		0.204	0.0633	mg/Kg	10		05/24/17 12:28
Mercury	0.0896		0.0408	0.0122	mg/Kg	10		05/24/17 12:28
Selenium	0.510	U	1.02	0.316	mg/Kg	10		05/24/17 12:28
Silver	0.102	U	0.204	0.0633	mg/Kg	10		05/24/17 12:28

Batch Information

Analytical Batch: MMS9793
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 05/24/17 12:28
Container ID: 1172484001-A

Prep Batch: MXX30675
Prep Method: SW3050B
Prep Date/Time: 05/23/17 13:30
Prep Initial Wt./Vol.: 1.049 g
Prep Extract Vol: 50 mL

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Organochlorinated Pesticides by GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
4,4'-DDD	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
4,4'-DDE	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
4,4'-DDT	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Aldrin	0.795 U		1.59	0.498	ug/Kg	1		05/22/17 15:36
alpha-BHC	0.795 U		1.59	0.498	ug/Kg	1		05/22/17 15:36
alpha-Chlordane	0.795 U		1.59	0.498	ug/Kg	1		05/22/17 15:36
beta-BHC	0.795 U		1.59	0.498	ug/Kg	1		05/22/17 15:36
delta-BHC	0.795 U		1.59	0.498	ug/Kg	1		05/22/17 15:36
Dieldrin	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Endosulfan I	0.795 U		1.59	0.498	ug/Kg	1		05/22/17 15:36
Endosulfan II	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Endosulfan sulfate	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Endrin	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Endrin aldehyde	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Endrin ketone	2.65 U		5.30	1.59	ug/Kg	1		05/22/17 15:36
gamma-BHC (Lindane)	0.650 J		1.59	0.498	ug/Kg	1		05/22/17 15:36
gamma-Chlordane	0.795 U		1.59	0.498	ug/Kg	1		05/22/17 15:36
Heptachlor	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Heptachlor epoxide	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Methoxychlor	1.06 U		2.12	0.657	ug/Kg	1		05/22/17 15:36
Toxaphene	53.0 U		106	32.8	ug/Kg	1		05/22/17 15:36
Surrogates								
2-Fluorobiphenyl (surr)	84.7		46-115		%	1		05/22/17 15:36
Terphenyl-d14 (surr)	95.8		58-113		%	1		05/22/17 15:36

Batch Information

Analytical Batch: XMS10041
Analytical Method: 8270D SIM (PEST)
Analyst: DSH
Analytical Date/Time: 05/22/17 15:36
Container ID: 1172484001-A

Prep Batch: XXX37386
Prep Method: SW3550C
Prep Date/Time: 05/19/17 13:53
Prep Initial Wt./Vol.: 22.737 g
Prep Extract Vol: 1 mL

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Polychlorinated Biphenyls**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aroclor-1016	26.6	U	53.2	16.0	ug/Kg	1		05/24/17 19:27
Aroclor-1221	107	U	213	65.9	ug/Kg	1		05/24/17 19:27
Aroclor-1232	26.6	U	53.2	16.0	ug/Kg	1		05/24/17 19:27
Aroclor-1242	26.6	U	53.2	16.0	ug/Kg	1		05/24/17 19:27
Aroclor-1248	26.6	U	53.2	16.0	ug/Kg	1		05/24/17 19:27
Aroclor-1254	26.6	U	53.2	16.0	ug/Kg	1		05/24/17 19:27
Aroclor-1260	26.6	U	53.2	16.0	ug/Kg	1		05/24/17 19:27
Surrogates								
Decachlorobiphenyl (surr)	93		60-125		%	1		05/24/17 19:27

Batch Information

Analytical Batch: XGC9729
Analytical Method: SW8082A
Analyst: FDR
Analytical Date/Time: 05/24/17 19:27
Container ID: 1172484001-A

Prep Batch: XXX37384
Prep Method: SW3550C
Prep Date/Time: 05/19/17 08:06
Prep Initial Wt./Vol.: 22.64 g
Prep Extract Vol: 5 mL

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
2-Methylnaphthalene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Acenaphthene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Acenaphthylene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Anthracene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Benzo(a)Anthracene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Benzo[a]pyrene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Benzo[b]Fluoranthene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Benzo[g,h,i]perylene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Benzo[k]fluoranthene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Chrysene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Dibenzo[a,h]anthracene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Fluoranthene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Fluorene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Indeno[1,2,3-c,d] pyrene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Naphthalene	10.7	U	21.3	6.38	ug/Kg	1		05/25/17 04:54
Phenanthrene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Pyrene	13.3	U	26.6	7.98	ug/Kg	1		05/25/17 04:54
Surrogates								
2-Fluorobiphenyl (surr)	91.2		46-115		%	1		05/25/17 04:54
Terphenyl-d14 (surr)	121		58-133		%	1		05/25/17 04:54

Batch Information

Analytical Batch: XMS10043
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 05/25/17 04:54
Container ID: 1172484001-A

Prep Batch: XXX37385
Prep Method: SW3550C
Prep Date/Time: 05/19/17 11:41
Prep Initial Wt./Vol.: 22.642 g
Prep Extract Vol: 5 mL

Print Date: 05/31/2017 4:25:46PM

J flagging is activated

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	10.7	U	21.4	6.62	mg/Kg	1		05/20/17 14:53
Surrogates								
5a Androstane (surr)	98.8		50-150		%	1		05/20/17 14:53

Batch Information

Analytical Batch: XFC13350
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 05/20/17 14:53
Container ID: 1172484001-A

Prep Batch: XXX37378
Prep Method: SW3550C
Prep Date/Time: 05/19/17 09:29
Prep Initial Wt./Vol.: 30.063 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	15.5	J	21.4	6.62	mg/Kg	1		05/20/17 14:53
Surrogates								
n-Triacontane-d62 (surr)	99		50-150		%	1		05/20/17 14:53

Batch Information

Analytical Batch: XFC13350
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 05/20/17 14:53
Container ID: 1172484001-A

Prep Batch: XXX37378
Prep Method: SW3550C
Prep Date/Time: 05/19/17 09:29
Prep Initial Wt./Vol.: 30.063 g
Prep Extract Vol: 1 mL

Print Date: 05/31/2017 4:25:46PM

J flagging is activated

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.16	U	2.32	0.695	mg/Kg	1		05/19/17 21:52
Surrogates								
4-Bromofluorobenzene (surr)	88.8		50-150		%	1		05/19/17 21:52

Batch Information

Analytical Batch: VFC13642
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/19/17 21:52
Container ID: 1172484001-C

Prep Batch: VXX30526
Prep Method: SW5035A
Prep Date/Time: 05/17/17 12:13
Prep Initial Wt./Vol.: 68.069 g
Prep Extract Vol: 29.468 mL

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	9.25	U	18.5	5.75	ug/Kg	1		05/26/17 21:23
1,1,1-Trichloroethane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,1,2,2-Tetrachloroethane	5.80	U	11.6	3.61	ug/Kg	1		05/26/17 21:23
1,1,2-Trichloroethane	4.63	U	9.27	2.87	ug/Kg	1		05/26/17 21:23
1,1-Dichloroethane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,1-Dichloroethene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,1-Dichloropropene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,2,3-Trichlorobenzene	23.1	U	46.3	13.9	ug/Kg	1		05/26/17 21:23
1,2,3-Trichloropropane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,2,4-Trichlorobenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,2,4-Trimethylbenzene	23.1	U	46.3	13.9	ug/Kg	1		05/26/17 21:23
1,2-Dibromo-3-chloropropane	46.4	U	92.7	28.7	ug/Kg	1		05/26/17 21:23
1,2-Dibromoethane	4.63	U	9.27	2.87	ug/Kg	1		05/26/17 21:23
1,2-Dichlorobenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,2-Dichloroethane	4.63	U	9.27	2.87	ug/Kg	1		05/26/17 21:23
1,2-Dichloropropane	4.63	U	9.27	2.87	ug/Kg	1		05/26/17 21:23
1,3,5-Trimethylbenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,3-Dichlorobenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
1,3-Dichloropropane	4.63	U	9.27	2.87	ug/Kg	1		05/26/17 21:23
1,4-Dichlorobenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
2,2-Dichloropropane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
2-Butanone (MEK)	116	U	232	72.3	ug/Kg	1		05/26/17 21:23
2-Chlorotoluene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
2-Hexanone	46.4	U	92.7	28.7	ug/Kg	1		05/26/17 21:23
4-Chlorotoluene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
4-Isopropyltoluene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
4-Methyl-2-pentanone (MIBK)	116	U	232	72.3	ug/Kg	1		05/26/17 21:23
Benzene	5.80	U	11.6	3.61	ug/Kg	1		05/26/17 21:23
Bromobenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Bromochloromethane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Bromodichloromethane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Bromoform	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Bromomethane	92.5	U	185	57.5	ug/Kg	1		05/26/17 21:23
Carbon disulfide	46.4	U	92.7	28.7	ug/Kg	1		05/26/17 21:23
Carbon tetrachloride	5.80	U	11.6	3.61	ug/Kg	1		05/26/17 21:23
Chlorobenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Chloroethane	92.5	U	185	57.5	ug/Kg	1		05/26/17 21:23

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Chloromethane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
cis-1,2-Dichloroethene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
cis-1,3-Dichloropropene	5.80	U	11.6	3.61	ug/Kg	1		05/26/17 21:23
Dibromochloromethane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Dibromomethane	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Dichlorodifluoromethane	23.1	U	46.3	13.9	ug/Kg	1		05/26/17 21:23
Ethylbenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Freon-113	46.4	U	92.7	28.7	ug/Kg	1		05/26/17 21:23
Hexachlorobutadiene	9.25	U	18.5	5.75	ug/Kg	1		05/26/17 21:23
Isopropylbenzene (Cumene)	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Methylene chloride	46.4	U	92.7	28.7	ug/Kg	1		05/26/17 21:23
Methyl-t-butyl ether	46.4	U	92.7	28.7	ug/Kg	1		05/26/17 21:23
Naphthalene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
n-Butylbenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
n-Propylbenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
o-Xylene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
P & M -Xylene	23.1	U	46.3	13.9	ug/Kg	1		05/26/17 21:23
sec-Butylbenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Styrene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
tert-Butylbenzene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
Tetrachloroethene	5.80	U	11.6	3.61	ug/Kg	1		05/26/17 21:23
Toluene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
trans-1,2-Dichloroethene	11.6	U	23.2	7.23	ug/Kg	1		05/26/17 21:23
trans-1,3-Dichloropropene	5.80	U	11.6	3.61	ug/Kg	1		05/26/17 21:23
Trichloroethene	4.63	U	9.27	2.87	ug/Kg	1		05/26/17 21:23
Trichlorofluoromethane	23.1	U	46.3	13.9	ug/Kg	1		05/26/17 21:23
Vinyl acetate	46.4	U	92.7	28.7	ug/Kg	1		05/26/17 21:23
Vinyl chloride	4.63	U	9.27	2.87	ug/Kg	1		05/26/17 21:23
Xylenes (total)	34.8	U	69.5	21.1	ug/Kg	1		05/26/17 21:23
Surrogates								
1,2-Dichloroethane-D4 (surr)	101		71-136		%	1		05/26/17 21:23
4-Bromofluorobenzene (surr)	127		55-151		%	1		05/26/17 21:23
Toluene-d8 (surr)	99.1		85-116		%	1		05/26/17 21:23

Print Date: 05/31/2017 4:25:46PM

J flagging is activated

Results of **02579-B3S2**

Client Sample ID: **02579-B3S2**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484001
Lab Project ID: 1172484

Collection Date: 05/17/17 12:13
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):93.4
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16765
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 05/26/17 21:23
Container ID: 1172484001-C

Prep Batch: VXX30564
Prep Method: SW5035A
Prep Date/Time: 05/17/17 12:13
Prep Initial Wt./Vol.: 68.069 g
Prep Extract Vol: 29.468 mL

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200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Arsenic	5.90		1.09	0.337	mg/Kg	10		05/24/17 13:12
Barium	62.5		0.326	0.102	mg/Kg	10		05/24/17 13:12
Cadmium	0.111	J	0.217	0.0674	mg/Kg	10		05/24/17 13:12
Chromium	31.9		0.435	0.141	mg/Kg	10		05/24/17 13:12
Lead	6.40		0.217	0.0674	mg/Kg	10		05/24/17 13:12
Mercury	0.0937		0.0435	0.0130	mg/Kg	10		05/24/17 13:12
Selenium	0.545	U	1.09	0.337	mg/Kg	10		05/24/17 13:12
Silver	0.109	U	0.217	0.0674	mg/Kg	10		05/24/17 13:12

Batch Information

Analytical Batch: MMS9793
Analytical Method: SW6020A
Analyst: VDL
Analytical Date/Time: 05/24/17 13:12
Container ID: 1172484002-A

Prep Batch: MXX30675
Prep Method: SW3050B
Prep Date/Time: 05/23/17 13:30
Prep Initial Wt./Vol.: 1.013 g
Prep Extract Vol: 50 mL

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Organochlorinated Pesticides by GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
4,4'-DDD	5.93		2.17	0.673	ug/Kg	1		05/22/17 15:52
4,4'-DDE	0.940	J	2.17	0.673	ug/Kg	1		05/22/17 15:52
4,4'-DDT	6.48		2.17	0.673	ug/Kg	1		05/22/17 15:52
Aldrin	0.815	U	1.63	0.510	ug/Kg	1		05/22/17 15:52
alpha-BHC	0.815	U	1.63	0.510	ug/Kg	1		05/22/17 15:52
alpha-Chlordane	0.815	U	1.63	0.510	ug/Kg	1		05/22/17 15:52
beta-BHC	4.07	U	8.14	2.55	ug/Kg	5		05/23/17 22:36
delta-BHC	0.815	U	1.63	0.510	ug/Kg	1		05/22/17 15:52
Dieldrin	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Endosulfan I	0.815	U	1.63	0.510	ug/Kg	1		05/22/17 15:52
Endosulfan II	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Endosulfan sulfate	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Endrin	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Endrin aldehyde	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Endrin ketone	2.71	U	5.43	1.63	ug/Kg	1		05/22/17 15:52
gamma-BHC (Lindane)	0.815	U	1.63	0.510	ug/Kg	1		05/22/17 15:52
gamma-Chlordane	0.815	U	1.63	0.510	ug/Kg	1		05/22/17 15:52
Heptachlor	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Heptachlor epoxide	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Methoxychlor	1.09	U	2.17	0.673	ug/Kg	1		05/22/17 15:52
Toxaphene	54.5	U	109	33.7	ug/Kg	1		05/22/17 15:52
Surrogates								
2-Fluorobiphenyl (surr)	61.8		46-115		%	1		05/22/17 15:52
Terphenyl-d14 (surr)	101		58-113		%	1		05/22/17 15:52

Batch Information

Analytical Batch: XMS10041
Analytical Method: 8270D SIM (PEST)
Analyst: DSH
Analytical Date/Time: 05/22/17 15:52
Container ID: 1172484002-A

Prep Batch: XXX37386
Prep Method: SW3550C
Prep Date/Time: 05/19/17 13:53
Prep Initial Wt./Vol.: 22.828 g
Prep Extract Vol: 1 mL

Analytical Batch: XMS10056
Analytical Method: 8270D SIM (PEST)
Analyst: DSH
Analytical Date/Time: 05/23/17 22:36
Container ID: 1172484002-A

Prep Batch: XXX37386
Prep Method: SW3550C
Prep Date/Time: 05/19/17 13:53
Prep Initial Wt./Vol.: 22.828 g
Prep Extract Vol: 1 mL

Print Date: 05/31/2017 4:25:46PM

J flagging is activated

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Polychlorinated Biphenyls**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aroclor-1016	27.4	U	54.9	16.5	ug/Kg	1		05/24/17 19:37
Aroclor-1221	110	U	220	68.1	ug/Kg	1		05/24/17 19:37
Aroclor-1232	27.4	U	54.9	16.5	ug/Kg	1		05/24/17 19:37
Aroclor-1242	27.4	U	54.9	16.5	ug/Kg	1		05/24/17 19:37
Aroclor-1248	27.4	U	54.9	16.5	ug/Kg	1		05/24/17 19:37
Aroclor-1254	27.4	U	54.9	16.5	ug/Kg	1		05/24/17 19:37
Aroclor-1260	27.4	U	54.9	16.5	ug/Kg	1		05/24/17 19:37
Surrogates								
Decachlorobiphenyl (surr)	91		60-125		%	1		05/24/17 19:37

Batch Information

Analytical Batch: XGC9729
Analytical Method: SW8082A
Analyst: FDR
Analytical Date/Time: 05/24/17 19:37
Container ID: 1172484002-A

Prep Batch: XXX37384
Prep Method: SW3550C
Prep Date/Time: 05/19/17 08:06
Prep Initial Wt./Vol.: 22.553 g
Prep Extract Vol: 5 mL

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Polynuclear Aromatics GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1-Methylnaphthalene	13.8	U	27.5	8.24	ug/Kg	1		05/25/17 05:14
2-Methylnaphthalene	9.90	J	27.5	8.24	ug/Kg	1		05/25/17 05:14
Acenaphthene	13.8	U	27.5	8.24	ug/Kg	1		05/25/17 05:14
Acenaphthylene	13.8	U	27.5	8.24	ug/Kg	1		05/25/17 05:14
Anthracene	11.4	J	27.5	8.24	ug/Kg	1		05/25/17 05:14
Benzo(a)Anthracene	32.0		27.5	8.24	ug/Kg	1		05/25/17 05:14
Benzo[a]pyrene	27.1	J	27.5	8.24	ug/Kg	1		05/25/17 05:14
Benzo[b]Fluoranthene	40.8		27.5	8.24	ug/Kg	1		05/25/17 05:14
Benzo[g,h,i]perylene	16.9	J	27.5	8.24	ug/Kg	1		05/25/17 05:14
Benzo[k]fluoranthene	14.1	J	27.5	8.24	ug/Kg	1		05/25/17 05:14
Chrysene	35.7		27.5	8.24	ug/Kg	1		05/25/17 05:14
Dibenzo[a,h]anthracene	13.8	U	27.5	8.24	ug/Kg	1		05/25/17 05:14
Fluoranthene	83.2		27.5	8.24	ug/Kg	1		05/25/17 05:14
Fluorene	13.8	U	27.5	8.24	ug/Kg	1		05/25/17 05:14
Indeno[1,2,3-c,d] pyrene	13.5	J	27.5	8.24	ug/Kg	1		05/25/17 05:14
Naphthalene	7.06	J	22.0	6.59	ug/Kg	1		05/25/17 05:14
Phenanthrene	44.0		27.5	8.24	ug/Kg	1		05/25/17 05:14
Pyrene	65.9		27.5	8.24	ug/Kg	1		05/25/17 05:14
Surrogates								
2-Fluorobiphenyl (surr)	92.6		46-115		%	1		05/25/17 05:14
Terphenyl-d14 (surr)	107		58-133		%	1		05/25/17 05:14

Batch Information

Analytical Batch: XMS10043
Analytical Method: 8270D SIM (PAH)
Analyst: S.G
Analytical Date/Time: 05/25/17 05:14
Container ID: 1172484002-A

Prep Batch: XXX37385
Prep Method: SW3550C
Prep Date/Time: 05/19/17 11:41
Prep Initial Wt./Vol.: 22.559 g
Prep Extract Vol: 5 mL

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	52.9		21.8	6.77	mg/Kg	1		05/20/17 15:03
Surrogates								
5a Androstane (surr)	98.2		50-150		%	1		05/20/17 15:03

Batch Information

Analytical Batch: XFC13350
Analytical Method: AK102
Analyst: KMD
Analytical Date/Time: 05/20/17 15:03
Container ID: 1172484002-A

Prep Batch: XXX37378
Prep Method: SW3550C
Prep Date/Time: 05/19/17 09:29
Prep Initial Wt./Vol.: 30.264 g
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	35.1		21.8	6.77	mg/Kg	1		05/20/17 15:03
Surrogates								
n-Triacontane-d62 (surr)	98.3		50-150		%	1		05/20/17 15:03

Batch Information

Analytical Batch: XFC13350
Analytical Method: AK103
Analyst: KMD
Analytical Date/Time: 05/20/17 15:03
Container ID: 1172484002-A

Prep Batch: XXX37378
Prep Method: SW3550C
Prep Date/Time: 05/19/17 09:29
Prep Initial Wt./Vol.: 30.264 g
Prep Extract Vol: 1 mL

Print Date: 05/31/2017 4:25:46PM

J flagging is activated

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	1.05	U	2.11	0.633	mg/Kg	1		05/19/17 22:11
Surrogates								
4-Bromofluorobenzene (surr)	88.5		50-150		%	1		05/19/17 22:11

Batch Information

Analytical Batch: VFC13642
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/19/17 22:11
Container ID: 1172484002-C

Prep Batch: VXX30526
Prep Method: SW5035A
Prep Date/Time: 05/16/17 12:16
Prep Initial Wt./Vol.: 85.976 g
Prep Extract Vol: 32.9174 mL

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	8.45	U	16.9	5.23	ug/Kg	1		05/26/17 21:40
1,1,1-Trichloroethane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,1,2,2-Tetrachloroethane	5.25	U	10.5	3.29	ug/Kg	1		05/26/17 21:40
1,1,2-Trichloroethane	4.21	U	8.43	2.61	ug/Kg	1		05/26/17 21:40
1,1-Dichloroethane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,1-Dichloroethene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,1-Dichloropropene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,2,3-Trichlorobenzene	21.1	U	42.2	12.7	ug/Kg	1		05/26/17 21:40
1,2,3-Trichloropropane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,2,4-Trichlorobenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,2,4-Trimethylbenzene	21.1	U	42.2	12.7	ug/Kg	1		05/26/17 21:40
1,2-Dibromo-3-chloropropane	42.1	U	84.3	26.1	ug/Kg	1		05/26/17 21:40
1,2-Dibromoethane	4.21	U	8.43	2.61	ug/Kg	1		05/26/17 21:40
1,2-Dichlorobenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,2-Dichloroethane	4.21	U	8.43	2.61	ug/Kg	1		05/26/17 21:40
1,2-Dichloropropane	4.21	U	8.43	2.61	ug/Kg	1		05/26/17 21:40
1,3,5-Trimethylbenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,3-Dichlorobenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
1,3-Dichloropropane	4.21	U	8.43	2.61	ug/Kg	1		05/26/17 21:40
1,4-Dichlorobenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
2,2-Dichloropropane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
2-Butanone (MEK)	106	U	211	65.8	ug/Kg	1		05/26/17 21:40
2-Chlorotoluene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
2-Hexanone	42.1	U	84.3	26.1	ug/Kg	1		05/26/17 21:40
4-Chlorotoluene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
4-Isopropyltoluene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
4-Methyl-2-pentanone (MIBK)	106	U	211	65.8	ug/Kg	1		05/26/17 21:40
Benzene	5.25	U	10.5	3.29	ug/Kg	1		05/26/17 21:40
Bromobenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Bromochloromethane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Bromodichloromethane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Bromoform	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Bromomethane	84.5	U	169	52.3	ug/Kg	1		05/26/17 21:40
Carbon disulfide	42.1	U	84.3	26.1	ug/Kg	1		05/26/17 21:40
Carbon tetrachloride	5.25	U	10.5	3.29	ug/Kg	1		05/26/17 21:40
Chlorobenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Chloroethane	84.5	U	169	52.3	ug/Kg	1		05/26/17 21:40

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Chloromethane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
cis-1,2-Dichloroethene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
cis-1,3-Dichloropropene	5.25	U	10.5	3.29	ug/Kg	1		05/26/17 21:40
Dibromochloromethane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Dibromomethane	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Dichlorodifluoromethane	21.1	U	42.2	12.7	ug/Kg	1		05/26/17 21:40
Ethylbenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Freon-113	42.1	U	84.3	26.1	ug/Kg	1		05/26/17 21:40
Hexachlorobutadiene	8.45	U	16.9	5.23	ug/Kg	1		05/26/17 21:40
Isopropylbenzene (Cumene)	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Methylene chloride	42.1	U	84.3	26.1	ug/Kg	1		05/26/17 21:40
Methyl-t-butyl ether	42.1	U	84.3	26.1	ug/Kg	1		05/26/17 21:40
Naphthalene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
n-Butylbenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
n-Propylbenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
o-Xylene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
P & M -Xylene	21.1	U	42.2	12.7	ug/Kg	1		05/26/17 21:40
sec-Butylbenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Styrene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
tert-Butylbenzene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
Tetrachloroethene	5.25	U	10.5	3.29	ug/Kg	1		05/26/17 21:40
Toluene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
trans-1,2-Dichloroethene	10.6	U	21.1	6.58	ug/Kg	1		05/26/17 21:40
trans-1,3-Dichloropropene	5.25	U	10.5	3.29	ug/Kg	1		05/26/17 21:40
Trichloroethene	4.21	U	8.43	2.61	ug/Kg	1		05/26/17 21:40
Trichlorofluoromethane	21.1	U	42.2	12.7	ug/Kg	1		05/26/17 21:40
Vinyl acetate	42.1	U	84.3	26.1	ug/Kg	1		05/26/17 21:40
Vinyl chloride	4.21	U	8.43	2.61	ug/Kg	1		05/26/17 21:40
Xylenes (total)	31.6	U	63.3	19.2	ug/Kg	1		05/26/17 21:40
Surrogates								
1,2-Dichloroethane-D4 (surr)	102		71-136		%	1		05/26/17 21:40
4-Bromofluorobenzene (surr)	123		55-151		%	1		05/26/17 21:40
Toluene-d8 (surr)	99.8		85-116		%	1		05/26/17 21:40

Print Date: 05/31/2017 4:25:46PM

J flagging is activated

Results of **02579-B5S3**

Client Sample ID: **02579-B5S3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484002
Lab Project ID: 1172484

Collection Date: 05/16/17 12:16
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):90.8
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16765
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 05/26/17 21:40
Container ID: 1172484002-C

Prep Batch: VXX30564
Prep Method: SW5035A
Prep Date/Time: 05/16/17 12:16
Prep Initial Wt./Vol.: 85.976 g
Prep Extract Vol: 32.9174 mL

Results of **02579-STB3**

Client Sample ID: **02579-STB3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484003
Lab Project ID: 1172484

Collection Date: 05/18/17 14:22
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.955	U	1.91	0.572	mg/Kg	1		05/19/17 16:51
Surrogates								
4-Bromofluorobenzene (surr)	82.5		50-150		%	1		05/19/17 16:51

Batch Information

Analytical Batch: VFC13642
Analytical Method: AK101
Analyst: ST
Analytical Date/Time: 05/19/17 16:51
Container ID: 1172484003-A

Prep Batch: VXX30526
Prep Method: SW5035A
Prep Date/Time: 05/18/17 14:22
Prep Initial Wt./Vol.: 65.539 g
Prep Extract Vol: 25 mL

Results of **02579-STB3**

Client Sample ID: **02579-STB3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484003
Lab Project ID: 1172484

Collection Date: 05/18/17 14:22
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	7.65	U	15.3	4.73	ug/Kg	1		05/26/17 19:40
1,1,1-Trichloroethane	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,1,2,2-Tetrachloroethane	4.77	U	9.54	2.98	ug/Kg	1		05/26/17 19:40
1,1,2-Trichloroethane	3.81	U	7.63	2.37	ug/Kg	1		05/26/17 19:40
1,1-Dichloroethane	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,1-Dichloroethene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,1-Dichloropropene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,2,3-Trichlorobenzene	19.1	U	38.1	11.4	ug/Kg	1		05/26/17 19:40
1,2,3-Trichloropropane	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,2,4-Trichlorobenzene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,2,4-Trimethylbenzene	19.1	U	38.1	11.4	ug/Kg	1		05/26/17 19:40
1,2-Dibromo-3-chloropropane	38.1	U	76.3	23.7	ug/Kg	1		05/26/17 19:40
1,2-Dibromoethane	3.81	U	7.63	2.37	ug/Kg	1		05/26/17 19:40
1,2-Dichlorobenzene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,2-Dichloroethane	3.81	U	7.63	2.37	ug/Kg	1		05/26/17 19:40
1,2-Dichloropropane	3.81	U	7.63	2.37	ug/Kg	1		05/26/17 19:40
1,3,5-Trimethylbenzene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,3-Dichlorobenzene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
1,3-Dichloropropane	3.81	U	7.63	2.37	ug/Kg	1		05/26/17 19:40
1,4-Dichlorobenzene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
2,2-Dichloropropane	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
2-Butanone (MEK)	95.5	U	191	59.5	ug/Kg	1		05/26/17 19:40
2-Chlorotoluene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
2-Hexanone	38.1	U	76.3	23.7	ug/Kg	1		05/26/17 19:40
4-Chlorotoluene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
4-Isopropyltoluene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
4-Methyl-2-pentanone (MIBK)	95.5	U	191	59.5	ug/Kg	1		05/26/17 19:40
Benzene	4.77	U	9.54	2.98	ug/Kg	1		05/26/17 19:40
Bromobenzene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
Bromochloromethane	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
Bromodichloromethane	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
Bromoform	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
Bromomethane	76.5	U	153	47.3	ug/Kg	1		05/26/17 19:40
Carbon disulfide	38.1	U	76.3	23.7	ug/Kg	1		05/26/17 19:40
Carbon tetrachloride	4.77	U	9.54	2.98	ug/Kg	1		05/26/17 19:40
Chlorobenzene	9.55	U	19.1	5.95	ug/Kg	1		05/26/17 19:40
Chloroethane	76.5	U	153	47.3	ug/Kg	1		05/26/17 19:40

Results of **02579-STB3**

Client Sample ID: **02579-STB3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484003
Lab Project ID: 1172484

Collection Date: 05/18/17 14:22
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
Chloromethane	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
cis-1,2-Dichloroethene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
cis-1,3-Dichloropropene	4.77 U		9.54	2.98	ug/Kg	1		05/26/17 19:40
Dibromochloromethane	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
Dibromomethane	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
Dichlorodifluoromethane	19.1 U		38.1	11.4	ug/Kg	1		05/26/17 19:40
Ethylbenzene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
Freon-113	38.1 U		76.3	23.7	ug/Kg	1		05/26/17 19:40
Hexachlorobutadiene	7.65 U		15.3	4.73	ug/Kg	1		05/26/17 19:40
Isopropylbenzene (Cumene)	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
Methylene chloride	38.1 U		76.3	23.7	ug/Kg	1		05/26/17 19:40
Methyl-t-butyl ether	38.1 U		76.3	23.7	ug/Kg	1		05/26/17 19:40
Naphthalene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
n-Butylbenzene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
n-Propylbenzene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
o-Xylene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
P & M -Xylene	19.1 U		38.1	11.4	ug/Kg	1		05/26/17 19:40
sec-Butylbenzene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
Styrene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
tert-Butylbenzene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
Tetrachloroethene	4.77 U		9.54	2.98	ug/Kg	1		05/26/17 19:40
Toluene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
trans-1,2-Dichloroethene	9.55 U		19.1	5.95	ug/Kg	1		05/26/17 19:40
trans-1,3-Dichloropropene	4.77 U		9.54	2.98	ug/Kg	1		05/26/17 19:40
Trichloroethene	3.81 U		7.63	2.37	ug/Kg	1		05/26/17 19:40
Trichlorofluoromethane	19.1 U		38.1	11.4	ug/Kg	1		05/26/17 19:40
Vinyl acetate	38.1 U		76.3	23.7	ug/Kg	1		05/26/17 19:40
Vinyl chloride	3.81 U		7.63	2.37	ug/Kg	1		05/26/17 19:40
Xylenes (total)	28.6 U		57.2	17.4	ug/Kg	1		05/26/17 19:40
Surrogates								
1,2-Dichloroethane-D4 (surr)	104		71-136		%	1		05/26/17 19:40
4-Bromofluorobenzene (surr)	123		55-151		%	1		05/26/17 19:40
Toluene-d8 (surr)	98.7		85-116		%	1		05/26/17 19:40

Print Date: 05/31/2017 4:25:46PM

J flagging is activated

Results of **02579-STB3**

Client Sample ID: **02579-STB3**
Client Project ID: **32-1-02579 APMP NESI-SBS**
Lab Sample ID: 1172484003
Lab Project ID: 1172484

Collection Date: 05/18/17 14:22
Received Date: 05/18/17 14:57
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS16765
Analytical Method: SW8260C
Analyst: NRO
Analytical Date/Time: 05/26/17 19:40
Container ID: 1172484003-A

Prep Batch: VXX30564
Prep Method: SW5035A
Prep Date/Time: 05/18/17 14:22
Prep Initial Wt./Vol.: 65.539 g
Prep Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1759506 [MXX/30675]
Blank Lab ID: 1386087

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002

Results by **SW6020A**

Parameter	Results	LOQ/CL	DL	Units
Arsenic	0.500U	1.00	0.310	mg/Kg
Barium	0.150U	0.300	0.0940	mg/Kg
Cadmium	0.100U	0.200	0.0620	mg/Kg
Chromium	0.165J	0.400	0.130	mg/Kg
Lead	0.100U	0.200	0.0620	mg/Kg
Mercury	0.0200U	0.0400	0.0120	mg/Kg
Selenium	0.500U	1.00	0.310	mg/Kg
Silver	0.100U	0.200	0.0620	mg/Kg

Batch Information

Analytical Batch: MMS9793
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 5/24/2017 12:19:52PM

Prep Batch: MXX30675
Prep Method: SW3050B
Prep Date/Time: 5/23/2017 1:30:18PM
Prep Initial Wt./Vol.: 1 g
Prep Extract Vol: 50 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [MXX30675]
Blank Spike Lab ID: 1386088
Date Analyzed: 05/24/2017 12:24

Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002

Results by **SW6020A**

Blank Spike (mg/Kg)

Parameter	Spike	Result	Rec (%)	CL
Arsenic	50	49.5	99	(82-118)
Barium	50	49.2	99	(86-116)
Cadmium	5	4.93	99	(84-116)
Chromium	20	20.5	103	(83-119)
Lead	50	56.5	113	(84-118)
Mercury	0.5	0.553	111	(74-126)
Selenium	50	50.6	101	(80-119)
Silver	5	5.08	102	(83-118)

Batch Information

Analytical Batch: **MMS9793**
Analytical Method: **SW6020A**
Instrument: **Perkin Elmer Nexion P5**
Analyst: **VDL**

Prep Batch: **MXX30675**
Prep Method: **SW3050B**
Prep Date/Time: **05/23/2017 13:30**
Spike Init Wt./Vol.: 50 mg/Kg Extract Vol: 50 mL
Dupe Init Wt./Vol.: Extract Vol:

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200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1386089
MS Sample ID: 1386090 MS
MSD Sample ID: 1386091 MSD

Analysis Date: 05/24/2017 12:28
Analysis Date: 05/24/2017 12:33
Analysis Date: 05/24/2017 12:37
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1172484001, 1172484002

Results by **SW6020A**

		Matrix Spike (mg/Kg)				Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Arsenic	6.66	48.7	55.8	101		49.7	54.8	97	82-118	1.84	(< 20)
Barium	57.1	48.7	112	113		49.7	114	114	86-116	1.23	(< 20)
Cadmium	0.0720J	4.87	4.93	100		4.97	5.02	100	84-116	1.83	(< 20)
Chromium	27.5	19.5	53.7	135	*	19.9	47.7	102	83-119	11.90	(< 20)
Lead	5.04	48.7	54.2	101		49.7	54.9	100	84-118	1.26	(< 20)
Mercury	0.0838	0.487	.607	107		0.497	0.578	100	74-126	4.79	(< 20)
Selenium	0.476U	48.7	49.3	101		49.7	49.4	100	80-119	0.11	(< 20)
Silver	0.0955U	4.87	4.79	98		4.97	4.89	98	83-118	1.91	(< 20)

Batch Information

Analytical Batch: MMS9793
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 5/24/2017 12:33:20PM

Prep Batch: MXX30675
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 5/23/2017 1:30:18PM
Prep Initial Wt./Vol.: 1.03g
Prep Extract Vol: 50.00mL

Print Date: 05/31/2017 4:25:52PM

Bench Spike Summary

Original Sample ID: 1386089
MS Sample ID: 1386092 BND
MSD Sample ID:

Analysis Date: 05/24/2017 12:28
Analysis Date: 05/24/2017 12:42
Analysis Date:
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1172484001, 1172484002

Results by **SW6020A**

		Matrix Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Chromium	27.5	119	139	93				80-120		

Batch Information

Analytical Batch: MMS9793
Analytical Method: SW6020A
Instrument: Perkin Elmer Nexlon P5
Analyst: VDL
Analytical Date/Time: 5/24/2017 12:42:19PM

Prep Batch: MXX30675
Prep Method: Soils/Solids Digest for Metals by ICP-MS
Prep Date/Time: 5/23/2017 1:30:18PM
Prep Initial Wt./Vol.: 1.05g
Prep Extract Vol: 50.00mL

Print Date: 05/31/2017 4:25:52PM

Method Blank

Blank ID: MB for HBN 1759292 [SPT/10161]
Blank Lab ID: 1385422

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT10161
Analytical Method: SM21 2540G
Instrument:
Analyst: MWJ
Analytical Date/Time: 5/18/2017 5:00:00PM

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Duplicate Sample Summary

Original Sample ID: 1172462001
Duplicate Sample ID: 1385423
QC for Samples:
1172484001

Analysis Date: 05/18/2017 17:00
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	74.6	70.5	%	5.70	(< 15)

Batch Information

Analytical Batch: SPT10161
Analytical Method: SM21 2540G
Instrument:
Analyst: MWJ

Print Date: 05/31/2017 4:25:55PM

Duplicate Sample Summary

Original Sample ID: 1172484001
Duplicate Sample ID: 1385424
QC for Samples:
1172484001, 1172484002

Analysis Date: 05/18/2017 17:00
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	93.4	93.2	%	0.20	(< 15)

Batch Information

Analytical Batch: SPT10161
Analytical Method: SM21 2540G
Instrument:
Analyst: MWJ

Print Date: 05/31/2017 4:25:55PM

Method Blank

Blank ID: MB for HBN 1759355 [VXX/30526]
Blank Lab ID: 1385689

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002, 1172484003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.25U	2.50	0.750	mg/Kg
Surrogates				
4-Bromofluorobenzene (surr)	98.6	50-150		%

Batch Information

Analytical Batch: VFC13642
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: ST
Analytical Date/Time: 5/19/2017 3:54:00PM

Prep Batch: VXX30526
Prep Method: SW5035A
Prep Date/Time: 5/19/2017 8:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [VXX30526]
Blank Spike Lab ID: 1385692
Date Analyzed: 05/19/2017 14:57

Spike Duplicate ID: LCSD for HBN 1172484 [VXX30526]
Spike Duplicate Lab ID: 1385693
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002, 1172484003

Results by **AK101**

	Blank Spike (mg/Kg)			Spike Duplicate (mg/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	12.0	96	12.5	12.4	99	(60-120)	3.20	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25	102	102	1.25	101	101	(50-150)	1.70	

Batch Information

Analytical Batch: **VFC13642**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **ST**

Prep Batch: **VXX30526**
Prep Method: **SW5035A**
Prep Date/Time: **05/19/2017 08:00**
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

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Method Blank

Blank ID: MB for HBN 1759934 [VXX/30564]
Blank Lab ID: 1387348

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002, 1172484003

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	10.0U	20.0	6.20	ug/Kg
1,1,1-Trichloroethane	12.5U	25.0	7.80	ug/Kg
1,1,2,2-Tetrachloroethane	6.25U	12.5	3.90	ug/Kg
1,1,2-Trichloroethane	5.00U	10.0	3.10	ug/Kg
1,1-Dichloroethane	12.5U	25.0	7.80	ug/Kg
1,1-Dichloroethene	12.5U	25.0	7.80	ug/Kg
1,1-Dichloropropene	12.5U	25.0	7.80	ug/Kg
1,2,3-Trichlorobenzene	25.0U	50.0	15.0	ug/Kg
1,2,3-Trichloropropane	12.5U	25.0	7.80	ug/Kg
1,2,4-Trichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2,4-Trimethylbenzene	25.0U	50.0	15.0	ug/Kg
1,2-Dibromo-3-chloropropane	50.0U	100	31.0	ug/Kg
1,2-Dibromoethane	5.00U	10.0	3.10	ug/Kg
1,2-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,2-Dichloroethane	5.00U	10.0	3.10	ug/Kg
1,2-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,3,5-Trimethylbenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
1,3-Dichloropropane	5.00U	10.0	3.10	ug/Kg
1,4-Dichlorobenzene	12.5U	25.0	7.80	ug/Kg
2,2-Dichloropropane	12.5U	25.0	7.80	ug/Kg
2-Butanone (MEK)	125U	250	78.0	ug/Kg
2-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
2-Hexanone	50.0U	100	31.0	ug/Kg
4-Chlorotoluene	12.5U	25.0	7.80	ug/Kg
4-Isopropyltoluene	12.5U	25.0	7.80	ug/Kg
4-Methyl-2-pentanone (MIBK)	125U	250	78.0	ug/Kg
Benzene	6.25U	12.5	3.90	ug/Kg
Bromobenzene	12.5U	25.0	7.80	ug/Kg
Bromochloromethane	12.5U	25.0	7.80	ug/Kg
Bromodichloromethane	12.5U	25.0	7.80	ug/Kg
Bromoform	12.5U	25.0	7.80	ug/Kg
Bromomethane	100U	200	62.0	ug/Kg
Carbon disulfide	50.0U	100	31.0	ug/Kg
Carbon tetrachloride	6.25U	12.5	3.90	ug/Kg
Chlorobenzene	12.5U	25.0	7.80	ug/Kg
Chloroethane	100U	200	62.0	ug/Kg
Chloroform	12.5U	25.0	7.80	ug/Kg

Method Blank

Blank ID: MB for HBN 1759934 [VXX/30564]
Blank Lab ID: 1387348

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002, 1172484003

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units
Chloromethane	12.5U	25.0	7.80	ug/Kg
cis-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
cis-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Dibromochloromethane	12.5U	25.0	7.80	ug/Kg
Dibromomethane	12.5U	25.0	7.80	ug/Kg
Dichlorodifluoromethane	25.0U	50.0	15.0	ug/Kg
Ethylbenzene	12.5U	25.0	7.80	ug/Kg
Freon-113	50.0U	100	31.0	ug/Kg
Hexachlorobutadiene	10.0U	20.0	6.20	ug/Kg
Isopropylbenzene (Cumene)	12.5U	25.0	7.80	ug/Kg
Methylene chloride	50.0U	100	31.0	ug/Kg
Methyl-t-butyl ether	50.0U	100	31.0	ug/Kg
Naphthalene	12.5U	25.0	7.80	ug/Kg
n-Butylbenzene	12.5U	25.0	7.80	ug/Kg
n-Propylbenzene	12.5U	25.0	7.80	ug/Kg
o-Xylene	12.5U	25.0	7.80	ug/Kg
P & M -Xylene	25.0U	50.0	15.0	ug/Kg
sec-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Styrene	12.5U	25.0	7.80	ug/Kg
tert-Butylbenzene	12.5U	25.0	7.80	ug/Kg
Tetrachloroethene	6.25U	12.5	3.90	ug/Kg
Toluene	12.5U	25.0	7.80	ug/Kg
trans-1,2-Dichloroethene	12.5U	25.0	7.80	ug/Kg
trans-1,3-Dichloropropene	6.25U	12.5	3.90	ug/Kg
Trichloroethene	4.25J	10.0	3.10	ug/Kg
Trichlorofluoromethane	25.0U	50.0	15.0	ug/Kg
Vinyl acetate	50.0U	100	31.0	ug/Kg
Vinyl chloride	5.00U	10.0	3.10	ug/Kg
Xylenes (total)	37.5U	75.0	22.8	ug/Kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	104	71-136		%
4-Bromofluorobenzene (surr)	98.5	55-151		%
Toluene-d8 (surr)	98.9	85-116		%

Method Blank

Blank ID: MB for HBN 1759934 [VXX/30564]
Blank Lab ID: 1387348

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002, 1172484003

Results by **SW8260C**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS16765
Analytical Method: SW8260C
Instrument: VQA 7890/5975 GC/MS
Analyst: NRO
Analytical Date/Time: 5/26/2017 5:03:00PM

Prep Batch: VXX30564
Prep Method: SW5035A
Prep Date/Time: 5/26/2017 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 05/31/2017 4:26:01PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [VXX30564]
Blank Spike Lab ID: 1387349
Date Analyzed: 05/26/2017 17:20

Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002, 1172484003

Results by **SW8260C**

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)		CL
1,1,1,2-Tetrachloroethane	750	863	115		(78-125)
1,1,1-Trichloroethane	750	796	106		(73-130)
1,1,2,2-Tetrachloroethane	750	845	113		(70-124)
1,1,2-Trichloroethane	750	821	109		(78-121)
1,1-Dichloroethane	750	744	99		(76-125)
1,1-Dichloroethene	750	847	113		(70-131)
1,1-Dichloropropene	750	787	105		(76-125)
1,2,3-Trichlorobenzene	750	847	113		(66-130)
1,2,3-Trichloropropane	750	839	112		(73-125)
1,2,4-Trichlorobenzene	750	855	114		(67-129)
1,2,4-Trimethylbenzene	750	806	107		(75-123)
1,2-Dibromo-3-chloropropane	750	903	120		(61-132)
1,2-Dibromoethane	750	815	109		(78-122)
1,2-Dichlorobenzene	750	797	106		(78-121)
1,2-Dichloroethane	750	705	94		(73-128)
1,2-Dichloropropane	750	785	105		(76-123)
1,3,5-Trimethylbenzene	750	806	107		(73-124)
1,3-Dichlorobenzene	750	797	106		(77-121)
1,3-Dichloropropane	750	792	106		(77-121)
1,4-Dichlorobenzene	750	819	109		(75-120)
2,2-Dichloropropane	750	861	115		(67-133)
2-Butanone (MEK)	2250	2280	101		(51-148)
2-Chlorotoluene	750	804	107		(75-122)
2-Hexanone	2250	2570	114		(53-145)
4-Chlorotoluene	750	821	109		(72-124)
4-Isopropyltoluene	750	847	113		(73-127)
4-Methyl-2-pentanone (MIBK)	2250	2450	109		(65-135)
Benzene	750	773	103		(77-121)
Bromobenzene	750	803	107		(78-121)
Bromochloromethane	750	750	100		(78-125)
Bromodichloromethane	750	834	111		(75-127)
Bromoform	750	841	112		(67-132)
Bromomethane	750	838	112		(53-143)
Carbon disulfide	1130	1560	138	*	(63-132)

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [VXX30564]
Blank Spike Lab ID: 1387349
Date Analyzed: 05/26/2017 17:20

Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002, 1172484003

Results by **SW8260C**

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
Carbon tetrachloride	750	853	114	(70-135)
Chlorobenzene	750	789	105	(79-120)
Chloroethane	750	801	107	(59-139)
Chloroform	750	754	100	(78-123)
Chloromethane	750	627	84	(50-136)
cis-1,2-Dichloroethene	750	756	101	(77-123)
cis-1,3-Dichloropropene	750	874	116	(74-126)
Dibromochloromethane	750	830	111	(74-126)
Dibromomethane	750	740	99	(78-125)
Dichlorodifluoromethane	750	868	116	(29-149)
Ethylbenzene	750	784	104	(76-122)
Freon-113	1130	1320	118	(66-136)
Hexachlorobutadiene	750	855	114	(61-135)
Isopropylbenzene (Cumene)	750	783	104	(68-134)
Methylene chloride	750	842	112	(70-128)
Methyl-t-butyl ether	1130	1170	104	(73-125)
Naphthalene	750	860	115	(62-129)
n-Butylbenzene	750	890	119	(70-128)
n-Propylbenzene	750	822	110	(73-125)
o-Xylene	750	779	104	(77-123)
P & M -Xylene	1500	1540	103	(77-124)
sec-Butylbenzene	750	832	111	(73-126)
Styrene	750	791	105	(76-124)
tert-Butylbenzene	750	806	107	(73-125)
Tetrachloroethene	750	802	107	(73-128)
Toluene	750	777	104	(77-121)
trans-1,2-Dichloroethene	750	772	103	(74-125)
trans-1,3-Dichloropropene	750	900	120	(71-130)
Trichloroethene	750	788	105	(77-123)
Trichlorofluoromethane	750	821	109	(62-140)
Vinyl acetate	750	1110	148	(50-151)
Vinyl chloride	750	793	106	(56-135)
Xylenes (total)	2250	2320	103	(78-124)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [VXX30564]
Blank Spike Lab ID: 1387349
Date Analyzed: 05/26/2017 17:20

Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002, 1172484003

Results by **SW8260C**

	Blank Spike (%)			
Parameter	Spike	Result	Rec (%)	CL
Surrogates				
1,2-Dichloroethane-D4 (surr)	750	96.3	96	(71-136)
4-Bromofluorobenzene (surr)	750	99	99	(55-151)
Toluene-d8 (surr)	750	102	102	(85-116)

Batch Information

Analytical Batch: **VMS16765**
Analytical Method: **SW8260C**
Instrument: **VQA 7890/5975 GC/MS**
Analyst: **NRO**

Prep Batch: **VXX30564**
Prep Method: **SW5035A**
Prep Date/Time: **05/26/2017 06:00**
Spike Init Wt./Vol.: 750 ug/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1177819045
MS Sample ID: 1387350 MS
MSD Sample ID: 1387351 MSD

Analysis Date: 05/26/2017 21:06
Analysis Date: 05/26/2017 18:32
Analysis Date: 05/26/2017 18:49
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002, 1172484003

Results by **SW8260C**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	17.1U	911	1035	114	911	1062	117	78-125	2.50	(< 20)
1,1,1-Trichloroethane	21.4U	911	939	103	911	965	106	73-130	2.70	(< 20)
1,1,2,2-Tetrachloroethane	10.7U	911	1017	112	911	1059	116	70-124	4.00	(< 20)
1,1,2-Trichloroethane	8.55U	911	989	109	911	1011	111	78-121	2.20	(< 20)
1,1-Dichloroethane	21.4U	911	867	95	911	897	98	76-125	3.50	(< 20)
1,1-Dichloroethene	21.4U	911	1009	111	911	1011	111	70-131	0.24	(< 20)
1,1-Dichloropropene	21.4U	911	930	102	911	953	105	76-125	2.40	(< 20)
1,2,3-Trichlorobenzene	42.7U	911	888	97	911	1007	111	66-130	12.70	(< 20)
1,2,3-Trichloropropane	21.4U	911	1009	111	911	1031	113	73-125	2.10	(< 20)
1,2,4-Trichlorobenzene	21.4U	911	943	103	911	1012	111	67-129	7.20	(< 20)
1,2,4-Trimethylbenzene	42.7U	911	923	101	911	944	104	75-123	2.30	(< 20)
1,2-Dibromo-3-chloropropane	85.5U	911	1050	115	911	1132	124	61-132	7.60	(< 20)
1,2-Dibromoethane	8.55U	911	1000	110	911	1017	112	78-122	1.70	(< 20)
1,2-Dichlorobenzene	21.4U	911	941	103	911	958	105	78-121	1.80	(< 20)
1,2-Dichloroethane	8.55U	911	837	92	911	859	94	73-128	2.70	(< 20)
1,2-Dichloropropane	8.55U	911	934	103	911	959	105	76-123	2.60	(< 20)
1,3,5-Trimethylbenzene	21.4U	911	940	103	911	960	105	73-124	2.10	(< 20)
1,3-Dichlorobenzene	21.4U	911	936	103	911	956	105	77-121	2.00	(< 20)
1,3-Dichloropropane	8.55U	911	956	105	911	981	108	77-121	2.60	(< 20)
1,4-Dichlorobenzene	21.4U	911	956	105	911	976	107	75-120	2.00	(< 20)
2,2-Dichloropropane	21.4U	911	1309	144 *	911	1161	127	67-133	12.00	(< 20)
2-Butanone (MEK)	214U	2731	2569	94	2731	2880	106	51-148	11.70	(< 20)
2-Chlorotoluene	21.4U	911	961	105	911	950	104	75-122	1.10	(< 20)
2-Hexanone	85.5U	2731	2980	109	2731	3254	119	53-145	8.80	(< 20)
4-Chlorotoluene	21.4U	911	979	107	911	985	108	72-124	0.65	(< 20)
4-Isopropyltoluene	21.4U	911	989	109	911	999	110	73-127	1.00	(< 20)
4-Methyl-2-pentanone (MIBK)	214U	2731	2843	104	2731	3080	113	65-135	7.80	(< 20)
Benzene	10.7U	911	918	101	911	935	103	77-121	1.80	(< 20)
Bromobenzene	21.4U	911	960	105	911	956	105	78-121	0.35	(< 20)
Bromochloromethane	21.4U	911	940	103	911	899	99	78-125	4.40	(< 20)
Bromodichloromethane	21.4U	911	996	109	911	1012	111	75-127	1.60	(< 20)
Bromoform	21.4U	911	1027	113	911	1047	115	67-132	1.90	(< 20)
Bromomethane	171U	911	949	104	911	921	101	53-143	3.00	(< 20)
Carbon disulfide	85.5U	1372	1870	137 *	1372	1858	136 *	63-132	0.91	(< 20)
Carbon tetrachloride	10.7U	911	1019	112	911	1035	114	70-135	1.60	(< 20)
Chlorobenzene	21.4U	911	938	103	911	964	106	79-120	2.80	(< 20)
Chloroethane	171U	911	911	100	911	1011	111	59-139	10.40	(< 20)

Print Date: 05/31/2017 4:26:05PM

Matrix Spike Summary

Original Sample ID: 1177819045
MS Sample ID: 1387350 MS
MSD Sample ID: 1387351 MSD

Analysis Date: 05/26/2017 21:06
Analysis Date: 05/26/2017 18:32
Analysis Date: 05/26/2017 18:49
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002, 1172484003

Results by **SW8260C**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Chloroform	21.4U	911	889	98	911	906	100	78-123	2.00	(< 20)
Chloromethane	21.4U	911	771	85	911	714	78	50-136	7.60	(< 20)
cis-1,2-Dichloroethene	21.4U	911	887	97	911	928	102	77-123	4.50	(< 20)
cis-1,3-Dichloropropene	10.7U	911	1059	116	911	1064	117	74-126	0.46	(< 20)
Dibromochloromethane	21.4U	911	1015	111	911	1019	112	74-126	0.30	(< 20)
Dibromomethane	21.4U	911	882	97	911	895	98	78-125	1.50	(< 20)
Dichlorodifluoromethane	42.7U	911	995	109	911	1016	112	29-149	2.10	(< 20)
Ethylbenzene	21.4U	911	933	102	911	941	103	76-122	1.00	(< 20)
Freon-113	85.5U	1372	1596	117	1372	1584	116	66-136	0.70	(< 20)
Hexachlorobutadiene	17.1U	911	986	108	911	1030	113	61-135	4.30	(< 20)
Isopropylbenzene (Cumene)	21.4U	911	940	103	911	943	104	68-134	0.32	(< 20)
Methylene chloride	85.5U	911	1047	115	911	1074	118	70-128	2.50	(< 20)
Methyl-t-butyl ether	85.5U	1372	1421	104	1372	1446	106	73-125	1.40	(< 20)
Naphthalene	21.4U	911	930	102	911	1044	115	62-129	11.50	(< 20)
n-Butylbenzene	21.4U	911	1047	115	911	1044	115	70-128	0.35	(< 20)
n-Propylbenzene	21.4U	911	973	107	911	975	107	73-125	0.28	(< 20)
o-Xylene	21.4U	911	918	101	911	938	103	77-123	2.20	(< 20)
P & M -Xylene	42.7U	1820	1845	101	1820	1870	103	77-124	1.60	(< 20)
sec-Butylbenzene	21.4U	911	971	107	911	984	108	73-126	1.20	(< 20)
Styrene	21.4U	911	931	102	911	938	103	76-124	0.68	(< 20)
tert-Butylbenzene	21.4U	911	953	105	911	958	105	73-125	0.48	(< 20)
Tetrachloroethene	10.7U	911	964	106	911	989	109	73-128	2.60	(< 20)
Toluene	21.4U	911	915	100	911	948	104	77-121	3.50	(< 20)
trans-1,2-Dichloroethene	21.4U	911	909	100	911	933	102	74-125	2.60	(< 20)
trans-1,3-Dichloropropene	10.7U	911	1113	122	911	1118	123	71-130	0.46	(< 20)
Trichloroethene	8.55U	911	923	101	911	953	105	77-123	3.30	(< 20)
Trichlorofluoromethane	42.7U	911	1238	136	911	995	109	62-140	21.80 *	(< 20)
Vinyl acetate	85.5U	911	1471	161 *	911	1409	155 *	50-151	3.80	(< 20)
Vinyl chloride	8.55U	911	868	95	911	909	100	56-135	4.70	(< 20)
Xylenes (total)	64.0U	2731	2768	101	2731	2818	103	78-124	1.80	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		911	870	96	911	869	95	71-136	0.17	
4-Bromofluorobenzene (surr)		1521	1259	83	1521	1259	83	55-151	0.19	
Toluene-d8 (surr)		911	934	102	911	938	103	85-116	0.45	

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Matrix Spike Summary

Original Sample ID: 1177819045
MS Sample ID: 1387350 MS
MSD Sample ID: 1387351 MSD

Analysis Date:
Analysis Date: 05/26/2017 18:32
Analysis Date: 05/26/2017 18:49
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002, 1172484003

Results by **SW8260C**

		Matrix Spike (%)			Spike Duplicate (%)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL

Batch Information

Analytical Batch: VMS16765
Analytical Method: SW8260C
Instrument: VQA 7890/5975 GC/MS
Analyst: NRO
Analytical Date/Time: 5/26/2017 6:32:01PM

Prep Batch: VXX30564
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 5/26/2017 6:00:00AM
Prep Initial Wt./Vol.: 51.33g
Prep Extract Vol: 25.00mL

Print Date: 05/31/2017 4:26:05PM

Method Blank

Blank ID: MB for HBN 1759209 [XXX/37378]
Blank Lab ID: 1385390

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
5a Androstane (surr)	97.3	60-120		%

Batch Information

Analytical Batch: XFC13350
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: KMD
Analytical Date/Time: 5/20/2017 1:26:00PM

Prep Batch: XXX37378
Prep Method: SW3550C
Prep Date/Time: 5/19/2017 9:29:03AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [VVVX7X783
Blank Spike La0 ID: 1X85X61
Da]e bnal9t eA: y5z2yz2y17 1X:Xd

Spike D/ pliua]e ID: LCSD for HBN 1172484 [VVVX7X783
Spike D/ pliua]e La0 ID: 1X85X62
s a]riM SoilzSoliA xAr9 (eiwg]h

KC for SaP pleR 1172484yy1Q1172484yy2

c eR/ l]R09 **AK102**

	Blank Spike xP wz%wh			Spike D/ pliua]e xP wz%wh					
) araP e]er	Spike	c eR/ l]	c eu xmh	Spike	c eR/ l]	c eu xmh	CL	c) D xmh	c) D CL
DieRel c anwe , rwaniuR	1d7	18X	11y	1d7	181	1y6	x75G125 h	1.2y	xO2y h
Surrogates									
5a bnAroR]ane xR/ rrh	X.XX	1y4	1y4	X.XX	1yX	1yX	xdyG12y h	y.5y	

Batch Information

bnal9]iual Ba]ug: **XFC13350**
bnal9]iual s e]goA: **AK102**
InR]r/ P en]: **Agilent 7890B F**
bnal9R]: **KMD**

) rep Ba]ug: **XXX37378**
) rep s e]goA: **SW3550C**
) rep Da]ez- iP e: **05/19/2017 09:29**
Spike Ini] <].zTol.: 1d7 P wz%w WM]rau] Tol: 1 P L
D/ pe Ini] <].zTol.: 1d7 P wz%w WM]rau] Tol: 1 P L

) rin] Da]e: y5zX1z2y17 4:2d:y7) s

Method Blank

Blank ID: MB for HBN 1759209 [XXX/37378]
Blank Lab ID: 1385390

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	10.0U	20.0	6.20	mg/Kg
Surrogates				
nA riacontaneAd62 (surr)	97.6	60A120		%

Batch Information

Fnalytical Batch: XTC13350
Fnalytical Method: FK103
Instrument: Fgilent 7890B T
Fnalyst: KMD
Fnalytical Date/- ime: 5/20/2017 1:26:00PM

Prep Batch: XXX37378
Prep Method: SW3550C
Prep Date/- ime: 5/19/2017 9:29:03FM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 1 mL

Print Date: 05/31/2017 4:26:10PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [VVVX7X783
Blank Spike La0 ID: 1X85X61
Da]e bnal9t eA: y5z2yz2y17 1X:Xd

Spike D/ pliua]e ID: LCSD for HBN 1172484 [VVVX7X783
Spike D/ pliua]e La0 ID: 1X85X62
s a]riM SoilzSoliA xAr9 (eiwg]h

KC for SaP pleR 1172484yy1Q1172484yy2

c eR/ l]R09 **AK102**

	Blank Spike xP wz%wh			Spike D/ pliua]e xP wz%wh					
) araP e]er	Spike	c eR/ l]	c eu xmh	Spike	c eR/ l]	c eu xmh	CL	c) D xmh	c) D CL
c eRA/ al c anwe , rwaniuR	1d7	17y	1y2	1d7	17y	1y2	xdyG12y h	y.y1	xO2y h
Surrogates									
nG riauon]aneGAd2 xR/ rrh	X.XX	1y2	1y2	X.XX	1y4	1y4	xdyG12y h	1.7y	

Batch Information

bnal9]iual Ba]ug: **XFC12230**
bnal9]iual s e]goA: **AK102**
InR]r/ P en]: **Agilent 5780B F**
bnal9R]: **K9 M**

) rep Ba]ug: **XXX25257**
) rep s e]goA: **SD 2330C**
) rep Da]ez- iP e: **03W8W015 08:/ 8**
Spike Ini] <].zTol.: 1d7 P wz%w WM]rau] Tol: 1 P L
D/ pe Ini] <].zTol.: 1d7 P wz%w WM]rau] Tol: 1 P L

) rin] Da]e: y5zX1z2y17 4:2d:12) s

Method Blank

Blank ID: MB for HBN 1759298 [XXX/37384]
Blank Lab ID: 1385437

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002

Results by **SW8082A**

Parameter	Results	LOQ/CL	DL	Units
Aroclor-1016	25.0U	50.0	15.0	ug/Kg
Aroclor-1221	100U	200	62.0	ug/Kg
Aroclor-1232	25.0U	50.0	15.0	ug/Kg
Aroclor-1242	25.0U	50.0	15.0	ug/Kg
Aroclor-1248	25.0U	50.0	15.0	ug/Kg
Aroclor-1254	25.0U	50.0	15.0	ug/Kg
Aroclor-1260	25.0U	50.0	15.0	ug/Kg
Surrogates				
Decachlorobiphenyl (surr)	138*	60-125		%

Batch Information

Analytical Batch: XGC9729
Analytical Method: SW8082A
Instrument: Agilent 7890B GC ECD SW R
Analyst: FDR
Analytical Date/Time: 5/24/2017 5:03:00PM

Prep Batch: XXX37384
Prep Method: SW3550C
Prep Date/Time: 5/19/2017 8:06:52AM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [MMMX7X843
Blank Spike La0 ID: 1X864X8
Da5e] nalbt eA: y6z24z2y17 17:1X

s a5iu: SoilzSoliA xArb (eiwg5h

KC for SaP ple/ : 1172484yy1Q1172484yy2

d e/ R15 0b **SW8082A**

Blank Spike xRwz%wh

) araP e5er	Spike	d e/ R15	d emxc h	CL
] rom1or,1y19	222	261	11X	x47,1X4 h
] rom1or,129y	222	244	11y	x6X,14y h
Surrogates				
Dem1ang1oro0ipgenbl x/ Rrrh	222	11X	11X	x9y,126 h

Batch Information

] nalb5ma1 Ba5mg: **XGC9729**
] nalb5ma1 s e5goA: **SW8082A**
In/ 5RP en5 **Agilent 7890B GC ECD SW R**
] nalb/ 5 **FDR**

) rep Ba5mg: **XXX37384**
) rep s e5goA: **SW3550C**
) rep Da5ez- iP e: **05/19/2017 08:06**
Spike Ini5. 5zTolv. 222 Rwz%w Wu5am5Tol: 6 P L
DRpe Ini5. 5zTolv. Wu5am5Tol:

Matrix Spike Summary

Original Sample ID: 1177790025
MS Sample ID: 1385439 MS
MSD Sample ID: 1385440 MSD

Analysis Date: 05/24/2017 18:36
Analysis Date: 05/24/2017 18:46
Analysis Date: 05/24/2017 18:56
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002

Results by **SW8082A**

		Matrix Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Aroclor-1016	29.2U	263	292	111	259	250	96	47-134	15.70	(< 30)
Aroclor-1260	29.2U	263	237	90	259	202	78	53-140	15.50	(< 30)
Surrogates										
Decachlorobiphenyl (surr)		263	271	103	259	239	92	60-125	12.50	

Batch Information

Analytical Batch: XGC9729
Analytical Method: SW8082A
Instrument: Agilent 7890B GC ECD SW R
Analyst: FDR
Analytical Date/Time: 5/24/2017 6:46:00PM

Prep Batch: XXX37384
Prep Method: Sonication Extraction Soil SW8080 PCB
Prep Date/Time: 5/19/2017 8:06:52AM
Prep Initial Wt./Vol.: 22.51g
Prep Extract Vol: 5.00mL

Print Date: 05/31/2017 4:26:16PM

Method Blank

Blank ID: MB for HBN 17593[V X / / 0373256
Blank] aL ID: 1325b27

Ma,rti : Cotl0Coltx dkr(y ptwg,h

8 Q for CaS mlpe:
117sb2b[[14117sb2b[[s

) peRl,e L(8270D SIM (PAH)

OaraS p,pr	) peRl,e	] U8 0Q]	D]	u nt,e
1PMp,g(lnamg,galpnp	1sG5u	s5Gp	7G5[	RwOc w
sPMp,g(lnamg,galpnp	1sG5u	s5Gp	7G5[	RwOc w
. Kpnamg,gpnp	1sG5u	s5Gp	7G5[	RwOc w
. Kpnamg,g(lpnp	1sG5u	s5Gp	7G5[	RwOc w
. n,graKpnp	1sG5u	s5Gp	7G5[	RwOc w
Bpn- odah n,graKpnp	1sG5u	s5Gp	7G5[	RwOc w
Bpn- oXa6m(rpnp	1sG5u	s5Gp	7G5[	RwOc w
Bpn- oXL6zlRoran,gpnp	1sG5u	s5Gp	7G5[	RwOc w
Bpn- oXv4g46mpr(lpnp	1sG5u	s5Gp	7G5[	RwOc w
Bpn- oXk6lRoran,gpnp	1sG5u	s5Gp	7G5[	RwOc w
Qgr(epnp	1sG5u	s5Gp	7G5[	RwOc w
DtLpn- oXa4g6an,graKpnp	1sG5u	s5Gp	7G5[	RwOc w
zlRoran,gpnp	1sG5u	s5Gp	7G5[	RwOc w
zlRorpnp	1sG5u	s5Gp	7G5[	RwOc w
InxpnoX14s43PK4x6m(rpnp	1sG5u	s5Gp	7G5[	RwOc w
Namg,galpnp	1[Gu	s[Gp	VGp[	RwOc w
Ogpnan,grpnp	1sG5u	s5Gp	7G5[	RwOc w
O(rpnp	1sG5u	s5Gp	7G5[	RwOc w
Surrogates				
sPzlRoroLtmgpn(l deRrrh	293	bVP115		%
Aprmgpn(lPx1b deRrrh	1[b	52P133		%

Batch Information

. nal(,tKal Ba,Kg: / MC1[[b3
. nal(,tKal Mp,gox: 2s7[D ClM dO. Hh
Ine,rRS pn,: CF . wtlpn, 72[05975 T Q0MC
. nal(e,: CGT
. nal(,tKal Da,p0AtS p: 50s50s[17 s:[9:[[. M

OrpmBa,Kg: / / / 37325
OrpmMp,gox: CW355[Q
OrpmDa,p0AtS p: 5019Os[17 11:b1:b2. M
OrpmInt,tal W,GFolG ssG5 w
OrpmEi ,raK, Fol: 5 S]

Ortn, Da,p: [5031Os[17 b:sV:17OM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [XXX37385]
Blank Spike Lab ID: 1385488
Date Analyzed: 05/25/2017 13:33

Spike Duplicate ID: LCSD for HBN 1172484 [XXX37385]
Spike Duplicate Lab ID: 1385501
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002

Results by **8270D SIM (PAH)**

	Blank Spike (ug/Kg)			Spike Duplicate (ug/Kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	111	93.7	84	111	94.0	85	(43-111)	0.32	(< 20)
2-Methylnaphthalene	111	88.1	79	111	89.4	80	(39-114)	1.40	(< 20)
Acenaphthene	111	117	106	111	119	107	(44-111)	1.10	(< 20)
Acenaphthylene	111	97.2	88	111	98.2	88	(39-116)	1.10	(< 20)
Anthracene	111	100	90	111	102	92	(50-114)	1.70	(< 20)
Benzo(a)Anthracene	111	97.2	87	111	97.5	88	(54-122)	0.37	(< 20)
Benzo[a]pyrene	111	99.4	90	111	99.0	89	(50-125)	0.44	(< 20)
Benzo[b]Fluoranthene	111	98.6	89	111	98.1	88	(53-128)	0.45	(< 20)
Benzo[g,h,i]perylene	111	97.9	88	111	96.3	87	(49-127)	1.70	(< 20)
Benzo[k]fluoranthene	111	96.1	86	111	94.7	85	(56-123)	1.40	(< 20)
Chrysene	111	98.4	89	111	99.1	89	(57-118)	0.75	(< 20)
Dibenzo[a,h]anthracene	111	101	91	111	100	90	(50-129)	0.72	(< 20)
Fluoranthene	111	95.5	86	111	97.4	88	(55-119)	1.90	(< 20)
Fluorene	111	96.3	87	111	98.0	88	(47-114)	1.70	(< 20)
Indeno[1,2,3-c,d] pyrene	111	98.9	89	111	98.1	88	(49-130)	0.78	(< 20)
Naphthalene	111	88.2	79	111	89.6	81	(38-111)	1.50	(< 20)
Phenanthrene	111	94.2	85	111	95.2	86	(49-113)	1.00	(< 20)
Pyrene	111	98.8	89	111	101	91	(55-117)	1.80	(< 20)
Surrogates									
2-Fluorobiphenyl (surr)	111	92.9	93	111	93.3	93	(46-115)	0.44	
Terphenyl-d14 (surr)	111	94.8	95	111	95.7	96	(58-133)	0.99	

Batch Information

Analytical Batch: **XMS10050**
Analytical Method: **8270D SIM (PAH)**
Instrument: **SVA Agilent 780/5975 GC/MS**
Analyst: **S.G**

Prep Batch: **XXX37385**
Prep Method: **SW3550C**
Prep Date/Time: **05/19/2017 11:41**
Spike Init Wt./Vol.: 111 ug/Kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 111 ug/Kg Extract Vol: 5 mL

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Matrix Spike Summary

Original Sample ID: 1172456006
MS Sample ID: 1385489 MS
MSD Sample ID: 1385490 MSD

QC for Samples: 1172484001, 1172484002

Analysis Date: 05/25/2017 3:52
Analysis Date: 05/25/2017 4:13
Analysis Date: 05/25/2017 4:33
Matrix: Soil/Solid (dry weight)

Results by **8270D SIM (PAH)**

		Matrix Spike (ug/Kg)				Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
Acenaphthene	630	114	753	107		116	762	114	*	44-111	1.30	(< 20)
Acenaphthylene	260U	114	276J	242	*	116	283J	243	*	39-116	2.00	(< 20)
Anthracene	197J	114	307J	96		116	306J	94		50-114	0.09	(< 20)
Benzo(a)Anthracene	349J	114	475J	110		116	473J	107		54-122	0.33	(< 20)
Benzo[a]pyrene	260U	114	214J	187	*	116	223J	192	*	50-125	4.30	(< 20)
Benzo[b]Fluoranthene	296J	114	405J	96		116	395J	85		53-128	2.80	(< 20)
Benzo[g,h,i]perylene	260U	114	260U	0	*	116	260U	0	*	49-127	0.00	(< 20)
Benzo[k]fluoranthene	260U	114	181J	159	*	116	210J	181	*	56-123	14.60	(< 20)
Chrysene	499J	114	625	111		116	618	102		57-118	1.30	(< 20)
Dibenzo[a,h]anthracene	260U	114	260U	0	*	116	260U	0	*	50-129	0.00	(< 20)
Fluoranthene	888	114	1120	199	*	116	1110	190	*	55-119	0.60	(< 20)
Fluorene	1410	114	1466	49		116	1487	64		47-114	1.30	(< 20)
Indeno[1,2,3-c,d] pyrene	260U	114	260U	0	*	116	260U	0	*	49-130	0.00	(< 20)
Phenanthrene	2160	114	2304	130	*	116	2262	91		49-113	1.90	(< 20)
Pyrene	867	114	1099	203	*	116	1089	194	*	55-117	0.67	(< 20)
1-Methylnaphthalene	13800	114	13927	175	*	116	13508	-222	*	43-111	3.30	(< 20)
2-Methylnaphthalene	17400	114	17382	-18	*	116	17068	-312	*	39-114	2.00	(< 20)
Naphthalene	12700	114	12356	-378	*	116	12042	-595	*	38-111	2.10	(< 20)
Surrogates												
2-Fluorobiphenyl (surr)		114	107	93		116	115	99		46-115	7.50	
Terphenyl-d14 (surr)		114	120	105		116	128	110		58-133	6.30	

Batch Information

Analytical Batch: XMS10043
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: S.G
Analytical Date/Time: 5/25/2017 4:13:00AM

Prep Batch: XXX37385
Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
Prep Date/Time: 5/19/2017 11:41:48AM
Prep Initial Wt./Vol.: 22.86g
Prep Extract Vol: 5.00mL

Analytical Batch: XMS10050
Analytical Method: 8270D SIM (PAH)
Instrument: SVA Agilent 780/5975 GC/MS
Analyst: S.G
Analytical Date/Time: 5/25/2017 2:34:00PM

Prep Batch: XXX37385
Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml
Prep Date/Time: 5/19/2017 11:41:48AM
Prep Initial Wt./Vol.: 22.86g
Prep Extract Vol: 5.00mL

Print Date: 05/31/2017 4:26:20PM

Method Blank

Blank ID: MB for HBN 1759321 [XXX/37386]
Blank Lab ID: 1385557

Matrix: Soil/Solid (dry weight)

QC for Samples:
1172484001, 1172484002

Results by **8270D SIM (PEST)**

Parameter	Results	LOQ/CL	DL	Units
4,4'-DDD	1.00U	2.00	0.620	ug/Kg
4,4'-DDE	1.00U	2.00	0.620	ug/Kg
4,4'-DDT	1.00U	2.00	0.620	ug/Kg
Aldrin	0.750U	1.50	0.470	ug/Kg
alpha-BHC	0.750U	1.50	0.470	ug/Kg
alpha-Chlordane	0.750U	1.50	0.470	ug/Kg
beta-BHC	0.750U	1.50	0.470	ug/Kg
delta-BHC	0.750U	1.50	0.470	ug/Kg
Dieldrin	1.00U	2.00	0.620	ug/Kg
Endosulfan I	0.750U	1.50	0.470	ug/Kg
Endosulfan II	1.00U	2.00	0.620	ug/Kg
Endosulfan sulfate	1.00U	2.00	0.620	ug/Kg
Endrin	1.00U	2.00	0.620	ug/Kg
Endrin aldehyde	1.00U	2.00	0.620	ug/Kg
Endrin ketone	2.50U	5.00	1.50	ug/Kg
gamma-BHC (Lindane)	0.750U	1.50	0.470	ug/Kg
Heptachlor	1.00U	2.00	0.620	ug/Kg
Heptachlor epoxide	1.00U	2.00	0.620	ug/Kg
gamma-Chlordane	0.750U	1.50	0.470	ug/Kg
Methoxychlor	1.00U	2.00	0.620	ug/Kg
Toxaphene	50.0U	100	31.0	ug/Kg
Surrogates				
2-Fluorobiphenyl (surr)	77	46-115		%
Terphenyl-d14 (surr)	98.5	58-113		%

Batch Information

Analytical Batch: XMS10041
Analytical Method: 8270D SIM (PEST)
Instrument: HP 6890 Series II MS2 SVOA
Analyst: DSH
Analytical Date/Time: 5/22/2017 2:30:00PM

Prep Batch: XXX37386
Prep Method: SW3550C
Prep Date/Time: 5/19/2017 1:53:53PM
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1172484 [XXX37386]
Blank Spike Lab ID: 1385558
Date Analyzed: 05/22/2017 15:03

Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002

Results by **8270D SIM (PEST)**

Blank Spike (ug/Kg)

Parameter	Spike	Result	Rec (%)	CL
4,4'-DDD	11.1	9.10	82	(56-139)
4,4'-DDE	11.1	10.1	91	(56-134)
4,4'-DDT	11.1	10.5	94	(50-141)
Aldrin	11.1	8.91	80	(45-136)
alpha-BHC	11.1	8.75	79	(45-137)
alpha-Chlordane	11.1	10.2	92	(54-133)
beta-BHC	11.1	9.52	86	(50-136)
delta-BHC	11.1	9.05	82	(47-139)
Dieldrin	11.1	9.00	81	(56-136)
Endosulfan I	11.1	8.54	77	(53-132)
Endosulfan II	11.1	8.44	76	(53-134)
Endosulfan sulfate	11.1	9.27	83	(55-136)
Endrin	11.1	9.64	87	(57-140)
Endrin aldehyde	11.1	6.10	55	(35-137)
Endrin ketone	11.1	10.4	94	(55-136)
gamma-BHC (Lindane)	11.1	8.99	81	(49-135)
Heptachlor	11.1	9.04	81	(47-136)
Heptachlor epoxide	11.1	10.4	93	(52-136)
gamma-Chlordane	11.1	10.4	94	(53-135)
Methoxychlor	11.1	10.6	96	(52-143)
Surrogates				
2-Fluorobiphenyl (surr)	22.2	72	72	(46-115)
Terphenyl-d14 (surr)	22.2	86.6	87	(58-113)

Batch Information

Analytical Batch: **XMS10041**
Analytical Method: **8270D SIM (PEST)**
Instrument: **HP 6890 Series II MS2 SVOA**
Analyst: **DSH**

Prep Batch: **XXX37386**
Prep Method: **SW3550C**
Prep Date/Time: **05/19/2017 13:53**
Spike Init Wt./Vol.: 11.1 ug/Kg Extract Vol: 1 mL
Dupe Init Wt./Vol.: Extract Vol:

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Matrix Spike Summary

Original Sample ID: 1172484002
MS Sample ID: 1385559 MS
MSD Sample ID: 1385560 MSD

Analysis Date: 05/22/2017 15:52
Analysis Date: 05/22/2017 16:08
Analysis Date: 05/22/2017 16:25
Matrix: Soil/Solid (dry weight)

QC for Samples: 1172484001, 1172484002

Results by **8270D SIM (PEST)**

		Matrix Spike (ug/Kg)				Spike Duplicate (ug/Kg)					
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
4,4'-DDD	5.93	12.1	18.2	101		12.1	17.3	94		56-139	4.60	(< 20)
4,4'-DDE	0.940J	12.1	12.4	95		12.1	12.4	95		56-134	0.23	(< 20)
4,4'-DDT	6.48	12.1	6.05	-4	*	12.1	4.28	-18	*	50-141	34.10	* (< 20)
Aldrin	0.815U	12.1	0.815U	0	*	12.1	0.815U	0	*	45-136	0.00	(< 20)
alpha-BHC	0.815U	12.1	21.0	174	*	12.1	22.4	185	*	45-137	6.20	(< 20)
alpha-Chlordane	0.815U	12.1	12.9	107		12.1	12.0	99		54-133	7.30	(< 20)
delta-BHC	0.815U	12.1	16.1	133		12.1	16.6	137		47-139	3.50	(< 20)
Dieldrin	1.09U	12.1	11.5	94		12.1	11.2	93		56-136	1.20	(< 20)
Endosulfan I	0.815U	12.1	16.9	139	*	12.1	14.8	122		53-132	13.70	(< 20)
Endosulfan II	1.09U	12.1	11.5	95		12.1	11.9	99		53-134	4.00	(< 20)
Endosulfan sulfate	1.09U	12.1	12.3	102		12.1	11.8	98		55-136	4.80	(< 20)
Endrin	1.09U	12.1	11.3	94		12.1	9.11	75		57-140	22.00	* (< 20)
Endrin aldehyde	1.09U	12.1	8.95	74		12.1	8.98	74		35-137	0.14	(< 20)
Endrin ketone	2.71U	12.1	11.2	93		12.1	10.1	83		55-136	11.00	(< 20)
gamma-BHC (Lindane)	0.815U	12.1	16.6	137	*	12.1	17.3	143	*	49-135	4.10	(< 20)
gamma-Chlordane	0.815U	12.1	12.8	106		12.1	12.4	103		53-135	3.30	(< 20)
Heptachlor	1.09U	12.1	9.06	75		12.1	7.17	59		47-136	23.30	* (< 20)
Heptachlor epoxide	1.09U	12.1	12.7	104		12.1	11.9	98		52-136	6.10	(< 20)
Methoxychlor	1.09U	12.1	3.92	32	*	12.1	2.90	24	*	52-143	30.20	* (< 20)
beta-BHC	4.07U	12.1	34.8	288	*	12.1	37.2	307	*	50-136	6.60	(< 20)
Surrogates												
2-Fluorobiphenyl (surr)		24.2	20.4	84		24.2	15.7	65		46-115	25.10	
Terphenyl-d14 (surr)		24.2	24.8	103		24.2	23.8	98		58-113	4.20	

Batch Information

Analytical Batch: XMS10041
Analytical Method: 8270D SIM (PEST)
Instrument: HP 6890 Series II MS2 SVOA
Analyst: DSH
Analytical Date/Time: 5/22/2017 4:08:00PM

Prep Batch: XXX37386
Prep Method: Sonication Extraction Soil Pesticides 82
Prep Date/Time: 5/19/2017 1:53:53PM
Prep Initial Wt./Vol.: 22.75g
Prep Extract Vol: 1.00mL

Analytical Batch: XMS10056
Analytical Method: 8270D SIM (PEST)
Instrument: HP 6890 Series II MS2 SVOA
Analyst: DSH
Analytical Date/Time: 5/23/2017 10:53:00PM

Prep Batch: XXX37386
Prep Method: Sonication Extraction Soil Pesticides 82
Prep Date/Time: 5/19/2017 1:53:53PM
Prep Initial Wt./Vol.: 22.75g
Prep Extract Vol: 1.00mL

Print Date: 05/31/2017 4:26:25PM

1172484

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600

3990 Collins Way, Suite 100
Lake Oswego, OR 97035
(503) 223-6147

2043 Westport Center Drive
St. Louis, MO 63146-3564
(314) 699-9660

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

1321 Bannock Street, Suite 200
Denver, CO 80204
(303) 825-3800

2705 Saint Andrews Loop, Suite A
Pasco, WA 99301-3378
(509) 946-6309

Laboratory ~~Brooks~~ SGS
Attn: TORI

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	GRO	AK 101	DRO/RRO	AK 102/103	VOC	8260B	PAH - 8270D	Pesticides - 8270D SIM	RCRA Metals EPA 6020	PCBs EPA 8082A	Total Number of Containers	Remarks/Matrix
02579-B3S2	①A-C	12:13	5/17/17		X	X	X		X	X	X	X		X		3	Soil
02579-B5S3	②A-C	12:16	5/16/17		X	X	X		X	X	X	X		X		3	Soil
02579-STB3	③A	14:22	5/18/17			X			X							1	Trip Blank (soil)

Project Information	Sample Receipt	
Project Number: 32-102579	Total Number of Containers	1
Project Name: APMP NESI-SBS	COC Seals/Intact? Y/N/NA	N.D.
Contact: Ryan Collins	Received Good Cond./Cold	6.8
Ongoing Project? Yes ☒ No ☐	Delivery Method:	#D11
Sampler: Brentton Leeper	(attach shipping bill, if any)	

Instructions

Requested Turnaround Time: STANDARD 10-DAY

Special Instructions:
LEVEL II DELIVERABLES

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1457	Signature: Time:	Signature: Time:
Printed Name: Brentton Leeper Date: 5/18/17	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time:	Signature: Time:	Signature: Time: 1459
Printed Name: Date:	Printed Name: Date:	Printed Name: Hannah Deeney Date: 5/18/17
Company:	Company:	Company: SGS

F-19-91/UR

No. 30941

e-Sample Receipt Form

SGS Workorder #: 1172484

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		Yes — Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	Absent
COC accompanied samples?	Yes	
Yes **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	No	Cooler ID: 1 @ 6.8 °C Therm. ID: D11
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
	N/A	Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	No	Proceed per client.
If <0°C, were sample containers ice free?	N/A	
If samples received without a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "**COOLER TEMP**" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)	Yes	
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	Yes	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1172484001-A	No Preservative Required	OK			
1172484001-B	No Preservative Required	OK			
1172484001-C	Methanol field pres. 4 C	OK			
1172484002-A	No Preservative Required	OK			
1172484002-B	No Preservative Required	OK			
1172484002-C	Methanol field pres. 4 C	OK			
1172484003-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM- The container was received damaged.
FR- The container was received frozen and not usable for Bacteria or BOD analyses.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

APPENDIX C

EXCERPTED BORING LOGS FROM PRIOR EXPLORATIONS

PROJECT NUMBER:	BORING NUMBER:	
429235	B-3	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~132 feet east of Cell 29 Wall Control Line (2648304.2 N, 1660899.7 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 37 ft bgs at time of drilling.

START : 2/10/2012

END : 2/10/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					0 to 8': Frozen brown poorly graded gravel with sand. (GP)	Note: Asterisk (*) next to blowcounts means that sample was taken using 2.4" ID sampler with 340 lb hammer. Blowcounts listed without asterisk (*) means sample was taken using standard size SPT sampler with 140 lb hammer. Frozen down to 8' bgs.
5						
10	10.0					
	12.0	2.0	A	9-9-9-10* (18)	**WELL GRADED GRAVEL WITH SILT AND SAND, GW-GM,** brown, dry, gravels 1/4" to 2.5" in diameter.	A Index Test Results Gravel = 49.0% P200 = 11.4% Sand = 39.6% M.C. = 7.0%
15	15.0					
	17.0	2.0	B	13-8-9-9* (17)	**WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM),** brown, gravels 1/4" to 2" in diameter.	Broken rock fragments in sampler. B Index Test Results M.C. = 4.0%
20	20.0					
	22.0	2.0	C	4-7-7-7* (14)	**POORLY GRADED SAND WITH GRAVEL (SP),** brown, dry.	
	24.0	1.0	D	7-10-13-15 (23)	**POORLY GRADED GRAVEL WITH SAND (GP),** brown.	D Index Test Results M.C. = 5.0%
25	25.0					
	27.0	2.0	E	4-8-9-10* (17)	**POORLY GRADED GRAVEL WITH SAND (GP),** brown, dry.	
30						

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
429235	B-3	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~132 feet east of Cell 29 Wall Control Line (2648304.2 N, 1660899.7 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 37 ft bgs at time of drilling.

START : 2/10/2012

END : 2/10/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0					
		2.0	F	3-10-11-11* (21)	**SILTY SAND WITH GRAVEL, SM,** brown, dry, gravels 1/4" to 1" diameter.	F Index Test Results Gravel = 42.0% P200 = 13.1% Sand = 44.9% M.C. = 5.0%
	32.0					
		2.0	G	14-18-21-17 (39)	**SILTY SAND WITH GRAVEL (SM),** same as above.	
	34.0					
35	35.0					
		1.0	H	3-4-8-7* (12)	**35-36': POORLY GRADED SAND WITH GRAVEL (SP).** **36-37': SILT (ML)** gray, moist.	H (36-37') Index Test Results M.C. = 27.0%
	37.0					Groundwater at 37'.
40	40.0					
		2.0	I	2-3-4-7* (7)	**SILT WITH SAND, ML,** gray, wet, non-plastic.	I Index Test Results Gravel = 3.0% P200 = 84.2% Sand = 12.8% M.C. = 27.0%
	42.0					
		2.0	J	10-17-42-37 (59)	**SILT (ML),** gray, wet, non-plastic, brown sand at 44'.	
	44.0					Hard drilling at 44'.
45	45.0					
		2.0	K	24-33-44-24* (77)	**SILTY SAND WITH GRAVEL (SM),** gray, wet.	
	47.0					
50						Heavy heave encountered from 50 to 70'. Up to 6' of heave inside augers.
55						
60						

PROJECT NUMBER:	BORING NUMBER:
429235	B-3 SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~132 feet east of Cell 29 Wall Control Line (2648304.2 N, 1660899.7 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 37 ft bgs at time of drilling.

START : 2/10/2012

END : 2/10/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
65						
70	70.0					
	72.0	2.0	L	5-10-11-9* (21)	**70-71': SILTY SAND (SM),** gray, wet, fine sand. **71-72': LEAN CLAY (CL),** gray, moist. (BCF)	Drilling rate moderate with heave and silt. L Index Test Results M.C. = 20.0% BCF contact at 71'.
75	75.0					
	77.0	2.0	M	3-5-8-9* (13)	**LEAN CLAY, CL,** gray, moist. (BCF)	M Index Test Results M.C. = 27.0% LL = 43% PL = 21% PI = 22%
80	80.0					
	82.0	2.0	N	5-7-6-7* (13)	**LEAN CLAY (CL),** gray, moist. (BCF)	
	84.0		O	PUSH		Pushed shelby tube 24" using greater than 1,500 psi.
85					Bottom of hole at 84.0 ft below ground surface.	1" diameter PVC piezometer installed in boring. PVC manually slotted using a hacksaw from 18 to 84'.
90						

PROJECT NUMBER:	BORING NUMBER:
429235	B-5 SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~300 feet east of Cell 30 Wall Control Line (2648220.3 N, 1661050.1 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 15 ft bgs at time of drilling.

START : 2/9/2012

END : 2/9/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
5					0 to 8': Frozen poorly graded gravel with sand. (GP)	Note: Asterisk (*) next to blowcounts means that sample was taken using 2.4" ID sampler with 340 lb hammer. Blowcounts listed without asterisk (*) means sample was taken using standard size SPT sampler with 140 lb hammer. Frozen down to 8' bgs. Cuttings appear to have more sand than gravel.
10	10.0 12.0	2.0	A	8-15-11-11* (26)	**SILTY GRAVEL WITH SAND, GM,** brown, gravels 1/4" to 2" in diameter.	A Index Test Results Gravel = 48.0% P200 = 18.1% Sand = 33.9% M.C. = 5.0%
15	15.0 17.0		B	3-5-7-5* (12)	**POORLY GRADED SAND WITH GRAVEL (SP),** brown, wet.	Groundwater at approximately 15'. B Index Test Results M.C. = 9.0%
20	20.0 22.0	1.0	C	3-5-4-1* (9)	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM),** brown, wet, 1/4" to 1/2" diameter gravels.	B Index Test Results M.C. = 8.0%
25	25.0 27.0	2.0	D	3-27* (27)	**POORLY GRADED GRAVEL (GP),** wet, 1/4" to 3" diameter gravels.	Blows probably indicate pushing rock, blows are questionable. Heave in upper portion of sample.
30						

PROJECT NUMBER:	BORING NUMBER:	
429235	B-5	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~300 feet east of Cell 30 Wall Control Line (2648220.3 N, 1661050.1 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 15 ft bgs at time of drilling.

START : 2/9/2012

END : 2/9/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
30.0						
	1.0	E	5-20-7-6* (27)		**WELL GRADED SAND WITH SILT AND GRAVEL, SW-SM,** brown, wet, well-graded fine to coarse sand.	Upper part of sample probably heave. E Index Test Results Gravel = 16.0% P200 = 11.0% Sand = 73.0% M.C. = 12.0%
32.0						
						Very soft drilling.
35 35.0						
	2.0	F	2-4-5-3* (9)		**WELL GRADED SAND WITH SILT AND GRAVEL (SW-SM),** brown, wet, well-graded fine to coarse sand.	
37.0						
40 40.0						
	1.5	G	5-67-8-6* (75)		**WELL-GRADED SAND (SW),** gray, wet, fine to medium sand.	Blows probably associated with fractured rock. Fractured rock in sampler.
42.0						
45 45.0						
	1.5	H	4-18-16-18* (34)		**SILTY SAND WITH GRAVEL, SM,** wet, fine to medium sand.	H Index Test Results Gravel = 31.0% P200 = 26.0% Sand = 43.0% M.C. = 10.0%
47.0						
50 50.0						
	2.0	I	4-5-6-7* (11)		**SANDY CLAY, CL,** gray, moist, fine sand.	I Index Test Results M.C. = 26.0% LL = 31% PL = 20% PI = 11%
52.0						
55 55.0						
	2.0	J	3-6-6-6* (12)		**LEAN CLAY, CL,** gray, moist. (BCF)	J Index Test Results M.C. = 25.0% LL = 41% PL = 20% PI = 21%
57.0						
60						

CH2MHILL

PROJECT NUMBER:	BORING NUMBER:	
429235	B-5	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~300 feet east of Cell 30 Wall Control Line (2648220.3 N, 1661050.1 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 15 ft bgs at time of drilling.

START : 2/9/2012

END : 2/9/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
60.0	2.0	2.0	K	4-5-7-7* (12)	**LEAN CLAY (CL),** gray, moist. (BCF)	
62.0				PUSH	**LEAN CLAY (CL),** gray, moist. (BCF)	Shelby Tube pushed at 1,000 psi.
64.0					Bottom of hole at 64.0 ft below ground surface.	1" diameter PVC piezometer installed in boring. PVC manually slotted using a hacksaw from 14 to 64'.
65						
70						
75						
80						
85						
90						

PROJECT NUMBER:	BORING NUMBER:	
429235	B-15	SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~30 feet east of Cell 28 Wall Control Line (2648317.7 N, 1660787.7 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, Mud Rotary, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 30 ft bgs at time of drilling.

START : 2/14/2012

END : 2/15/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
					0 to 6': Frozen soil.	Note: Asterisk (*) next to blowcounts means that sample was taken using 2.4" ID sampler with 340 lb hammer. Blowcounts listed without asterisk (*) means sample was taken using standard size SPT sampler with 140 lb hammer. Frozen down to 6' bgs.
5 — 5.0						
5.0 – 7.0	2.0	A	12-39-62-42* (101)		**SILTY SAND WITH GRAVEL (GM),** brown, frozen to 6'.	
7.0						
10 — 10.0						
10.0 – 12.0	2.0	B	8-4-4-4* (8)		**SILTY GRAVEL WITH SAND (GM),** brown, moist.	
12.0						
15 — 15.0						
15.0 – 17.0	2.0	C	8-6-7-5* (13)		**SILTY GRAVEL WITH SAND, GM,** brown, moist.	C Index Test Results Gravel = 43.0% P200 = 13.2% Sand = 43.8% M.C. = 6.0%
17.0						
20 — 20.0						
20.0 – 22.0	2.0	D	9-6-6-9* (12)		**SILTY SAND WITH GRAVEL (SM),** brown, moist.	Rock fragments. D Index Test Results M.C. = 6.0%
22.0						
25 — 25.0						
25.0 – 27.0	2.0	E	9-9-9-5* (18)		**WELL GRADED GRAVEL WITH SILT AND SAND, GW-GM,** moist.	E Index Test Results Gravel = 47.0% P200 = 11.9% Sand = 41.1% M.C. = 6.0%
27.0						
30						

PROJECT NUMBER: 429235	BORING NUMBER: B-15	SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project

LOCATION : ~30 feet east of Cell 28 Wall Control Line (2648317.7 N, 1660787.7 E)

ELEVATION : 35 ft MLLW

DRILLING CONTRACTOR : Discovery Drilling

DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, Mud Rotary, CME 75 Truck-Mounted Drill Rig

WATER LEVELS : 30 ft bgs at time of drilling.

START : 2/14/2012

END : 2/15/2012

LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	30.0	2.0	F	5-7-8-8* (15)	**WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM),** brown, wet.	
	32.0					
35	35.0	2.0	G	13-7-10-11* (17)	**POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM),** brown, wet.	
	37.0					
40	40.0	2.0	H	3-8-10-11* (18)	**POORLY GRADED GRAVEL WITH SAND (GP),** brown, wet, 2" diameter gravels.	
	42.0					
45	45.0	2.0	I	20-9-8-13* (17)	**SILTY GRAVEL WITH SAND (GM),** brown, wet, poorly graded, 2" diameter gravel in bottom.	
	47.0					
50	50.0	1.0	J	4-8-10-10* (18)	**POORLY GRADED GRAVEL WITH SAND (GP),** brown, wet.	Rock fragments in shoe.
	52.0					
55	55.0	1.5	K	14-7-7-7* (14)	**POORLY GRADED SAND WITH SILT AND GRAVEL, SP-SM,** brown, wet.	K Index Test Results Gravel = 44.0% P200 = 8.6% Sand = 47.4% M.C. = 7.0%
	57.0					
60						

PROJECT NUMBER:	BORING NUMBER:	
429235	B-15	SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Port of Anchorage Expansion Project
LOCATION : ~30 feet east of Cell 28 Wall Control Line (2648317.7 N, 1660787.7 E)
ELEVATION : 35 ft MLLW
DRILLING CONTRACTOR : Discovery Drilling
DRILLING METHOD AND EQUIPMENT : 7-1/4" OD Diameter Hollow Stem Auger, Mud Rotary, CME 75 Truck-Mounted Drill Rig
WATER LEVELS : 30 ft bgs at time of drilling.
START : 2/14/2012
END : 2/15/2012
LOGGER : S. Erdmann

DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (ft)	#TYPE	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION **SOIL NAME (USCS GROUP SYMBOL),** COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
	62.0					Encountered fine grained silty sand / sandy silt heave at 60'. Begin mud rotary.
	64.0	1.0	L	6-6-6-4 (12)	Gray silt with drilling mud.	
65						8' of heave in casing at 65'.
70	70.0					
	72.0	2.0	M	36-40-28-25 (68)	**70-71.8': POORLY GRADED SAND WITH GRAVEL (SP),** wet, fine to coarse sand. **71.8-72': SILT (ML),** gray, wet.	
75	75.0					
	77.0	2.0	N	6-10-16-12 (26)	**POORLY GRADED SAND WITH SILT, SP-SM,** gray, wet, fine sand.	N Index Test Results Gravel = 1.0% P200 = 10.8% Sand = 88.2%
80						Drilling change at 78'. BCF at 78'.
	82.0					
	84.0	2.0	O	12-12-34-32 (46)	**LEAN CLAY, CL,** gray, wet. (BCF)	O Index Test Results M.C. = 24.0% LL = 38% PL = 18% PI = 20%
85					Bottom of hole at 84.0 ft below ground surface.	1" diameter PVC piezometer installed in boring. PVC manually slotted using a hacksaw from 10 to 84'.
90						

LOG OF BORING NO. **TB-52**

Terracon

PROJECT: PORT OF ANCHORAGE
LOCATION: ANCHORAGE, ALASKA
COORDINATES: N 2648365 E 1660993
LATITUDE: 149° 53' 59" LONGITUDE: 61° 14' 55"
PROJECT NO.: 70035032 DATE: 8-5-03

ELEVATION ft MLLW	LAYER BOUNDARY	SCALE	SYMBOL	DESCRIPTION	SAMPLES	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	PERCENT PASSING NO. 200 SIEVE	SPT N-VALUE blows per foot	UNDRAINED SHEAR STRENGTH, TSF (△ TORVANE)
0.0		0		**Water**									
		-5											
-7.5				**MUDLINE**									
-10.5		-10		-bottom of casing **CLAY**, very stiff, wet, medium plasticity, gray								20	
		-15											
		-20											
		-25											
		-30											
		-35											
		-40											
		-45		-silt and fine sand lenses									
		-50		-occasional coarse sand and gravel									
		-55											
-60.0		-60											

Continued Next Page

LOG OF BORING NO. **TB-52 Cont'd**

Terracon

PROJECT: PORT OF ANCHORAGE
LOCATION: ANCHORAGE, ALASKA
COORDINATES: N 2648365 E 1660993
LATITUDE: 149° 53' 59" LONGITUDE: 61° 14' 55"
PROJECT NO.: 70035032 DATE: 8-5-03

ELEVATION ft MLLW		SYMBOL	DESCRIPTION	SAMPLES	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	PERCENT PASSING NO. 200 SIEVE	SPT N-VALUE blows per foot	UNDRAINED SHEAR STRENGTH, TSF △ TORVANE 0.5 1.0 1.5 2.0 2.5
LAYER BOUNDARY	SCALE											
-60.0	-60		**CLAY**, very stiff, wet, medium plasticity, gray									
	-65											
	-70											
	-75											
	-80		-occasional coarse sand and gravel up to 1/2 inch									
	-85											
	-90											
	-95											
	-100											
	-105											
	-110											
	-115											
-120.0	-120		-very stiff, moist, occasional small gravel									

Continued Next Page

LOG OF BORING NO. **TB-52 Cont'd**

Terracon

PROJECT: PORT OF ANCHORAGE
LOCATION: ANCHORAGE, ALASKA
COORDINATES: N 2648365 E 1660993
LATITUDE: 149° 53' 59" LONGITUDE: 61° 14' 55"
PROJECT NO.: 70035032 DATE: 8-5-03

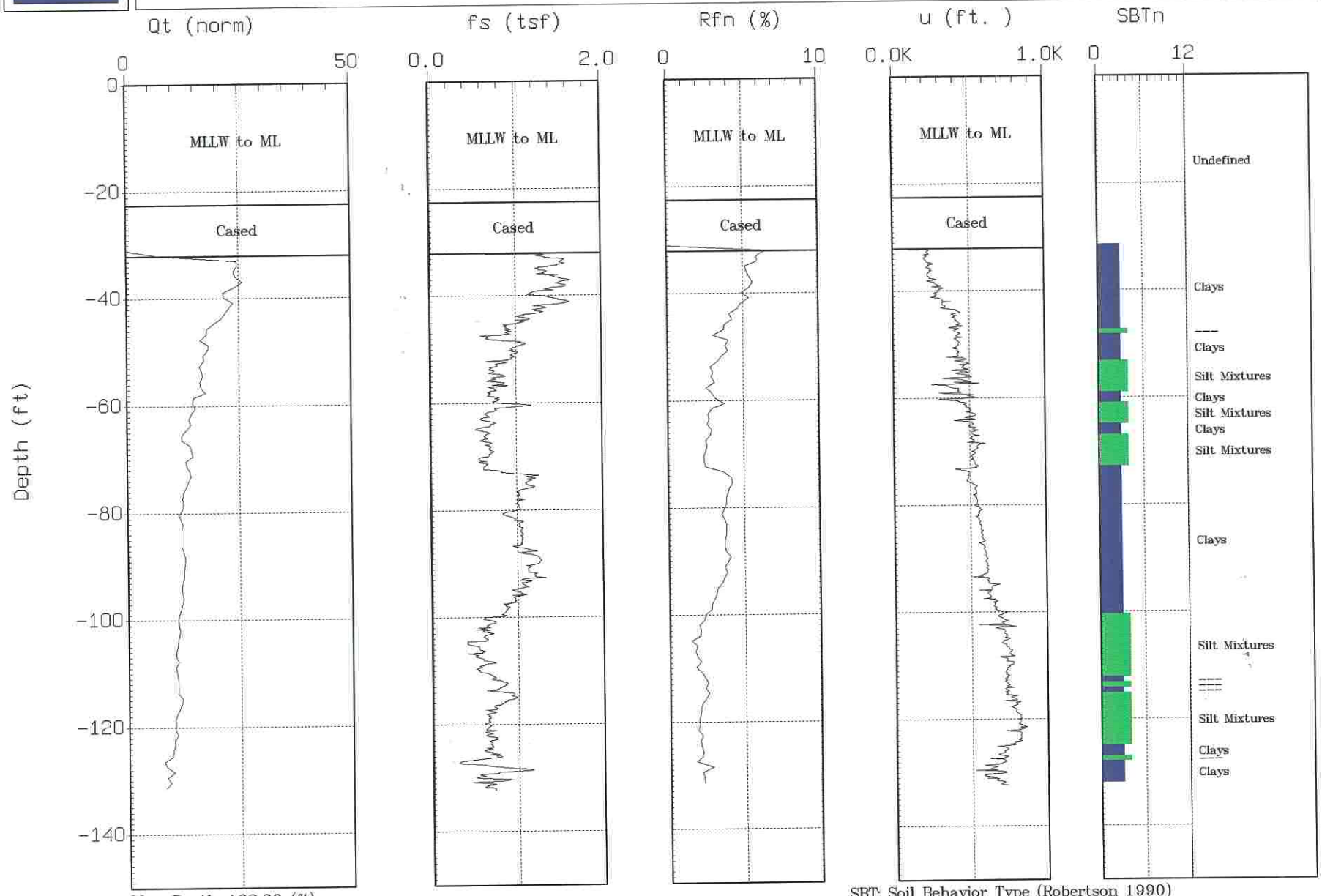
ELEVATION ft MLLW				SAMPLES	DRY UNIT WEIGHT, PCF	NATURAL MOISTURE CONTENT, %	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX, %	PERCENT PASSING NO. 200 SIEVE	SPT N-VALUE blows per foot	UNDRAINED SHEAR STRENGTH, TSF △ TORVANE 0.5 1.0 1.5 2.0 2.5
LAYER BOUNDARY	SCALE	SYMBOL	DESCRIPTION									
-120.0	-120		particles, gray **CLAY**, very stiff, wet, medium plasticity, gray									
	-125											
	-130											
	-135											
	-140											
	-145											
	-150											
-151.5			**SAND**, dense, wet, some small gravel, some silt/clay lenses likely, gray -no recovery -153.5' to -157', driller feels it is sand, gravel indicated below -157'									
	-155											
-157.0			**GRAVEL WITH SAND AND COBBLES**, dense, wet, some silt, clay lenses likely, gray									
-159.5	-160		**CLAY**, very stiff, moist, some gravel and cobbles possible, gray -no recovery -162' to -163.5', Cobble -no recovery -163.5' to -168.5'								50	
	-165											
	-170		-roller bit -168.5' to -171.5' -no recovery -171.5' to -173.5'									
-175.0	-175		-cannot get around cobble at -175' **BORING TERMINATED AT -175'**								81	
	-180											

GREGG

Koniag Services

Site: P.O.A.
Location: TB-26 CPT-01

Cone: 20 Ton St 145
Date: 07:07:03 10:28



Max. Depth: 132.38 (ft)

Depth Inc.: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

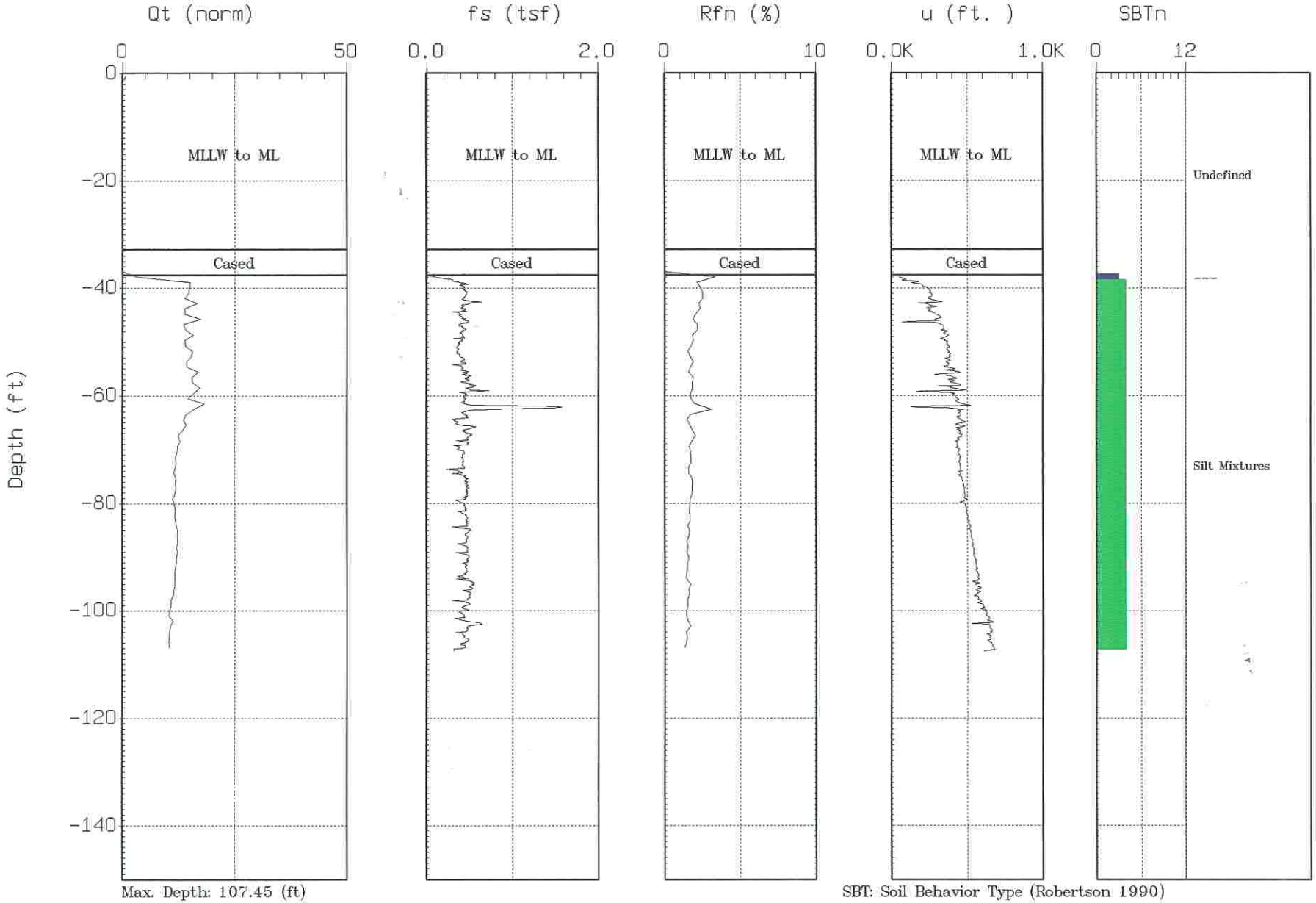
LAT: 61 14.781, LONG: 149 53.097, Datum = MLLW

GREGG

Koniag Services

Site: P.O.A.
Location: TB-27 CPT-30

Cone: 20 Ton St 113
Date: 08:09:03 13:08



Max. Depth: 107.45 (ft)

Depth Inc.: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

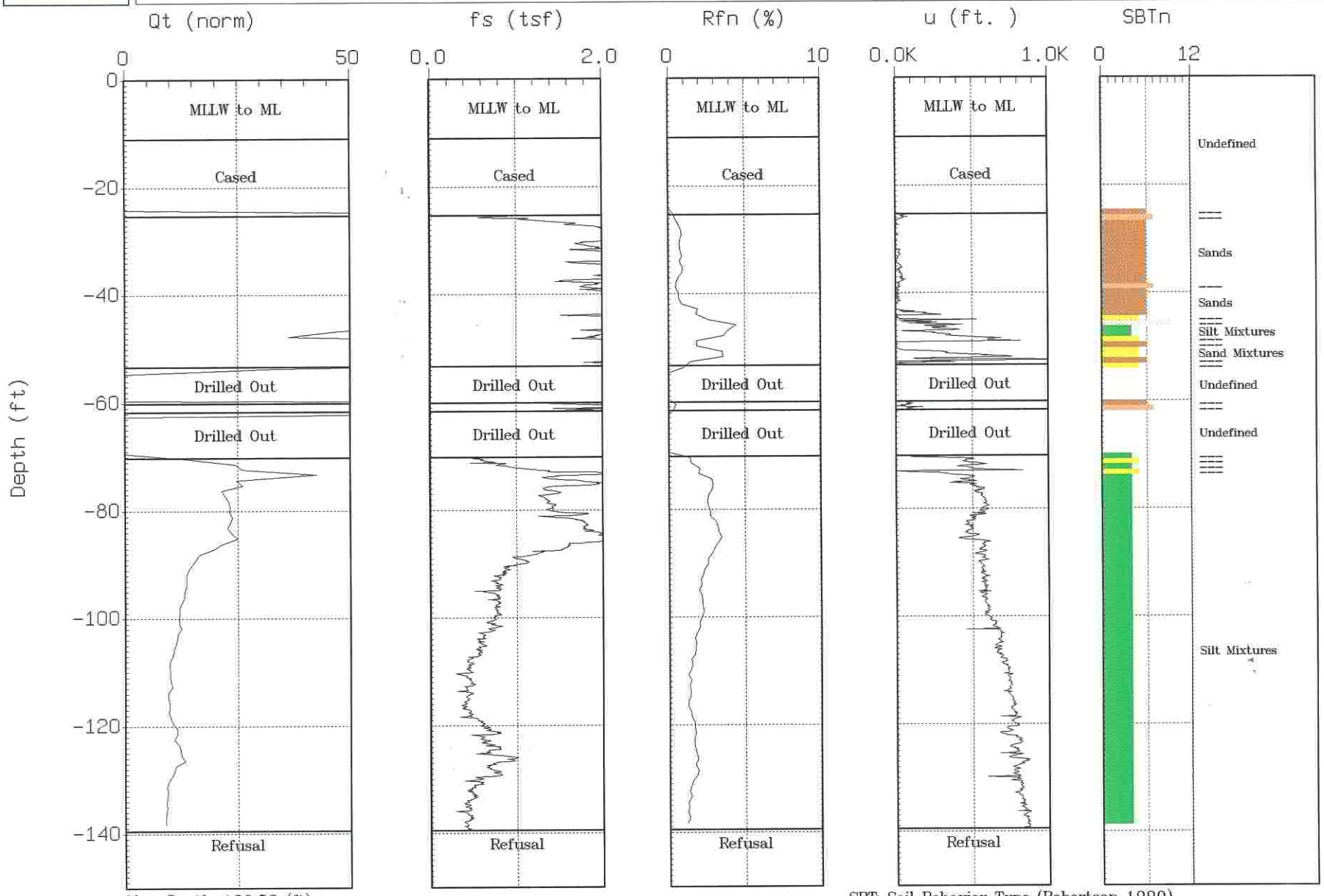
LAT: 61 14.749, LONG: 149 53.123, Datum = MLLW

GREGG

Koniag Services

Site: P.O.A.
Location: TB-55 CPT-27

Cone: 20 Ton St 095
Date: 08:03:03 14:43

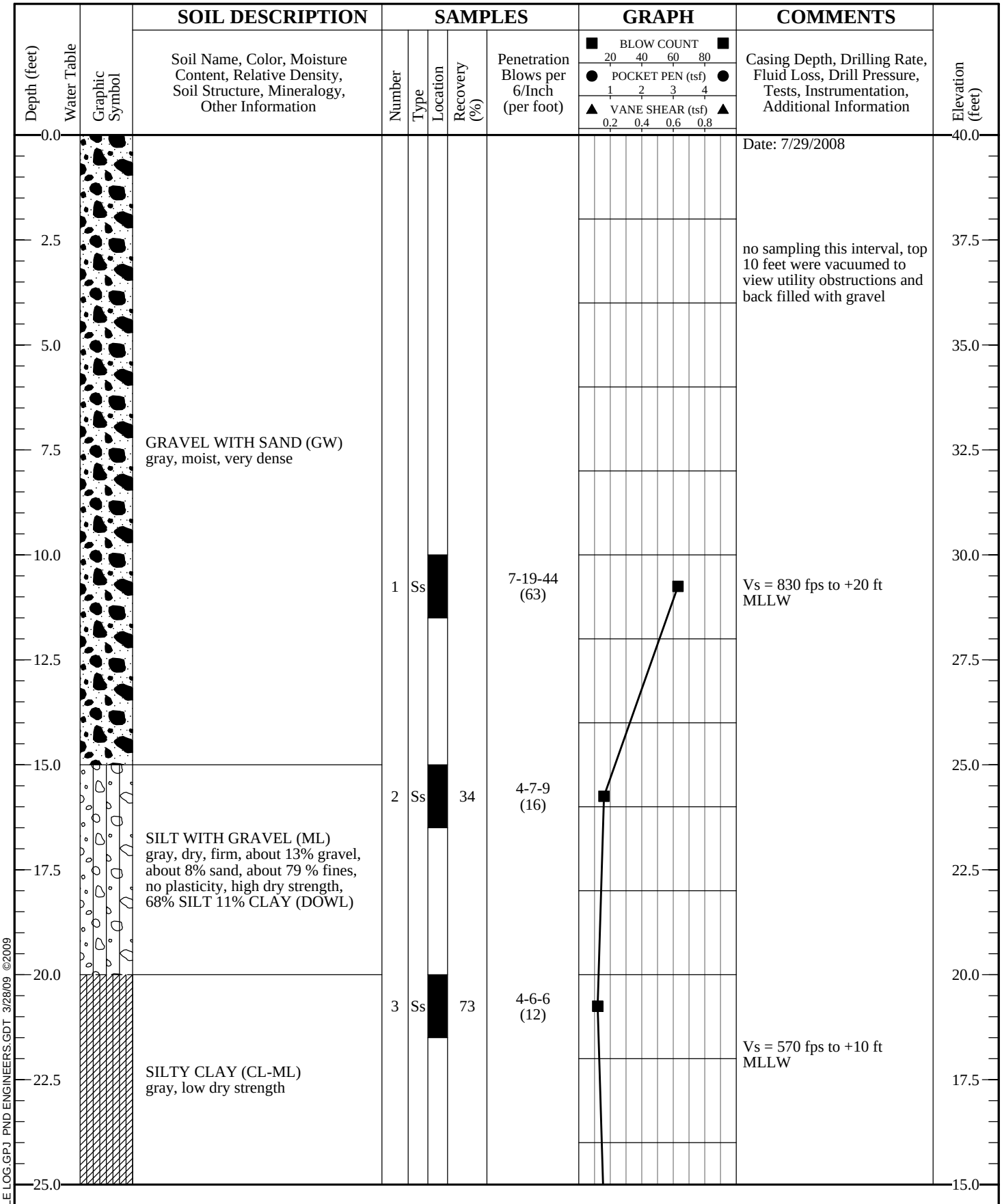


Max. Depth: 139.52 (ft)

Depth Inc.: 0.082 (ft)

SBT: Soil Behavior Type (Robertson 1990)

LAT: 61 14.939, LONG: 149 53.051, Datum = MLLW



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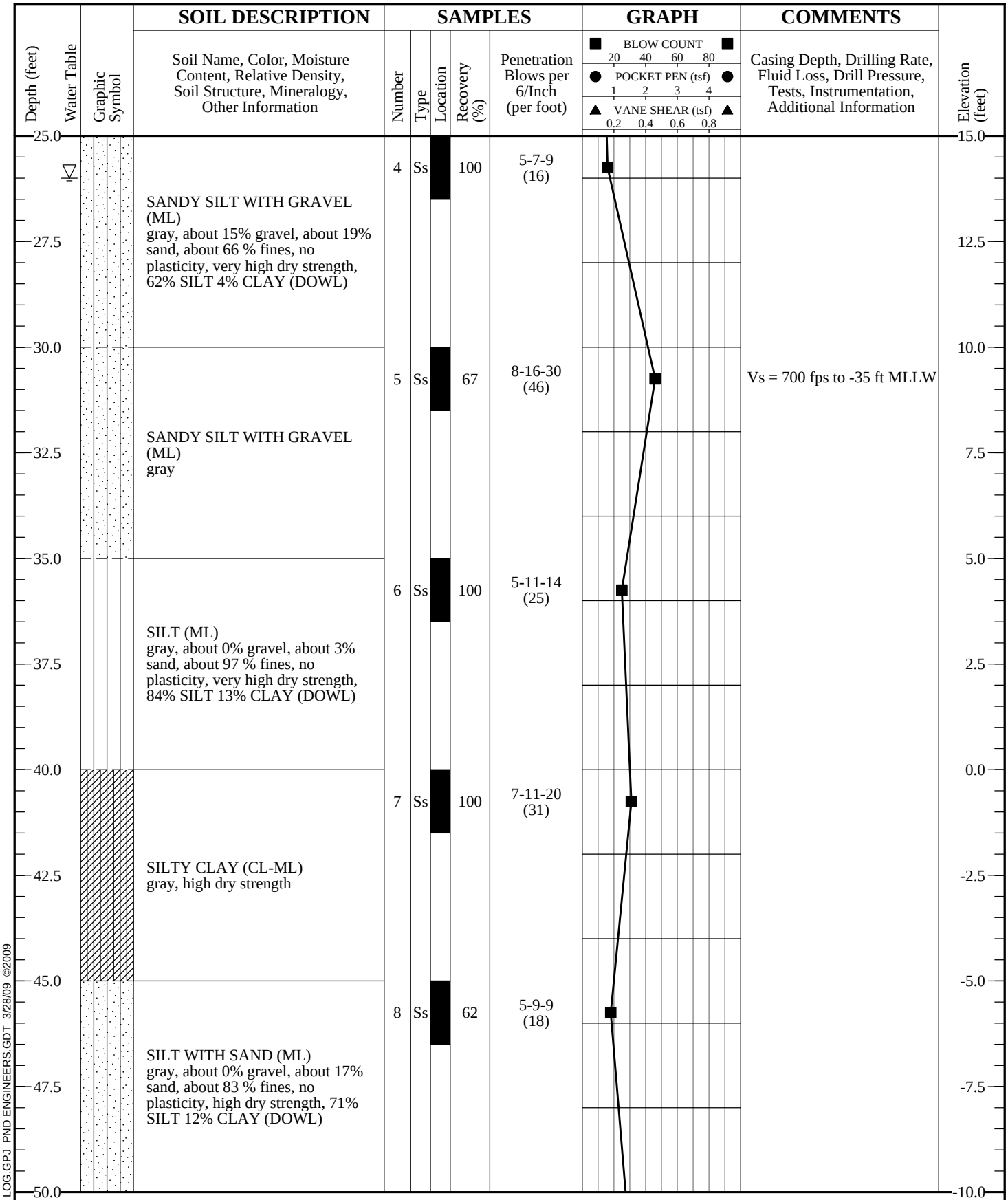
Data Entry: CAW
Checked: SM
Project No.: 061028
Date: Jun 2008

PORT OF ANCHORAGE EXPANSION
2008 Geotechnical Investigation
Anchorage, Ak

BOREHOLE BH-158

FIGURE 1

NOTE: All Sample Penetration Blows are Uncorrected Field Blow Counts by Standard Split Spoon Methods Modified by Using an Autohammer Instead of Rope and Cathead, Sampler Type Noted or as Noted on this Log



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2008 Geotechnical Investigation
Anchorage, Ak

BOREHOLE BH-158

FIGURE 1

NOTE: All Sample Penetration Blows are Uncorrected Field Blow Counts by Standard Split Spoon Methods Modified by Using an Autohammer Instead of Rope and Cathead, Sampler Type Noted or as Noted on this Log

Depth (feet)	Water Table	Graphic Symbol	SOIL DESCRIPTION: Soil Name, Color, Moisture Content, Relative Density, Soil Structure, Mineralogy, Other Information	SAMPLES: Number	Type	Location	Recovery (%)	Penetration Blows per 6/Inch (per foot)	GRAPH: BLOW COUNT 20 40 60 80 / POCKET PEN (tsf) 1 2 3 4 / VANE SHEAR (tsf) 0.2 0.4 0.6 0.8	COMMENTS: Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
50.0											-10.0
				9	Ss		100	6-12-17 (29)		Vs = 700 fps to -35 ft MLLW	
52.5			LEAN CLAY (CL) gray, about 0% gravel, about 7% sand, about 93 % fines, LL 34 PL 18 PI 16, 55% SILT 38% CLAY (DOWL)								-12.5
55.0											-15.0
				10	Ts		100				
57.5											-17.5
60.0											-20.0
				11	Ts		100				
62.5			LEAN CLAY (CL) gray								-22.5
65.0											-25.0
67.5											-27.5
70.0			GRAVELLY LEAN CLAY (CL) gray								-30.0
				12	Ts		100				
72.5			LEAN CLAY (CL) gray							no samples taken from this point foward, clay in drill wash	-32.5
75.0											-35.0

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Data Entry: CAW
Checked: SM
Project No.: 061028
Date: Jun 2008

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2008 Geotechnical Investigation
Anchorage, Ak

BOREHOLE BH-158

FIGURE 1

NOTE: All Sample Penetration Blows are Uncorrected Field Blow Counts by Standard Split Spoon Methods Modified by Using an Autohammer Instead of Rope and Cathead, Sampler Type Noted or as Noted on this Log

Depth (feet)	Water Table	Graphic Symbol	SOIL DESCRIPTION Soil Name, Color, Moisture Content, Relative Density, Soil Structure, Mineralogy, Other Information	SAMPLES Number	Type	Location	Recovery (%)	Penetration Blows per 6/Inch (per foot)	GRAPH BLOW COUNT 20 40 60 80 POCKET PEN (tsf) 1 2 3 4 VANE SHEAR (tsf) 0.2 0.4 0.6 0.8	COMMENTS Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
75.0											-35.0
				13	Ts		0			Vs = 870 fps to -90 ft MLLW	
77.5											-37.5
80.0											-40.0
82.5											-42.5
85.0											-45.0
87.5			LEAN CLAY (CL) gray								-47.5
90.0											-50.0
92.5											-52.5
95.0											-55.0
97.5											-57.5
100.0											-60.0

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Date: Jun 2008

PORT OF ANCHORAGE EXPANSION
2008 Geotechnical Investigation
Anchorage, Ak

BOREHOLE BH-158

FIGURE 1

NOTE: All Sample Penetration Blows are Uncorrected Field Blow Counts by Standard Split Spoon Methods Modified by Using an Autohammer Instead of Rope and Cathead, Sampler Type Noted or as Noted on this Log

Depth (feet) / Water Table	Graphic Symbol	SOIL DESCRIPTION: Soil Name, Color, Moisture Content, Relative Density, Soil Structure, Mineralogy, Other Information	SAMPLES: Number	Type	Location	Recovery (%)	Penetration Blows per 6/Inch (per foot)	GRAPH: BLOW COUNT 20 40 60 80 / POCKET PEN (tsf) 1 2 3 4 / VANE SHEAR (tsf) 0.2 0.4 0.6 0.8	COMMENTS: Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
100.0									Vs = 870 fps to -90 ft MLLW	-60.0
102.5										-62.5
105.0										-65.0
107.5										-67.5
110.0										-70.0
112.5		LEAN CLAY (CL) gray								-72.5
115.0										-75.0
117.5										-77.5
120.0										-80.0
122.5										-82.5
125.0										-85.0

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Checked: SM
Project No.: 061028
Date: Jun 2008

PORT OF ANCHORAGE EXPANSION
2008 Geotechnical Investigation
Anchorage, Ak

BOREHOLE BH-158

FIGURE 1

NOTE: All Sample Penetration Blows are Uncorrected Field Blow Counts by Standard Split Spoon Methods Modified by Using an Autohammer Instead of Rope and Cathead, Sampler Type Noted or as Noted on this Log

Depth (feet) / Water Table	Graphic Symbol	SOIL DESCRIPTION: Soil Name, Color, Moisture Content, Relative Density, Soil Structure, Mineralogy, Other Information	SAMPLES: Number	Type	Location	Recovery (%)	Penetration Blows per 6/Inch (per foot)	GRAPH: BLOW COUNT ■ 20 40 60 80 / POCKET PEN (tsf) ● 1 2 3 4 / VANE SHEAR (tsf) ▲ 0.2 0.4 0.6 0.8	COMMENTS: Casing Depth, Drilling Rate, Fluid Loss, Drill Pressure, Tests, Instrumentation, Additional Information	Elevation (feet)
125.0									Vs = 870 fps to -90 ft MLLW	-85.0
127.5		LEAN CLAY (CL) gray								-87.5
130.0									Terminated at: 130.0 ft, 7/30/2008	-90.0
132.5										-92.5
135.0										-95.0
137.5										-97.5
140.0										-100.0
142.5										-102.5
145.0										-105.0
147.5										-107.5
150.0										-110.0

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P N D
ENGINEERS, INC.

Logged By: SM/CP
Data Entry: CAW
Checked: SM
Project No.: 061028
Date: Jun 2008

PORT OF ANCHORAGE EXPANSION
2008 Geotechnical Investigation
Anchorage, Ak

BOREHOLE BH-158

FIGURE 1

NOTE: All Sample Penetration Blows are Uncorrected Field Blow Counts by Standard Split Spoon Methods Modified by Using an Autohammer Instead of Rope and Cathead, Sampler Type Noted or as Noted on this Log

RECORD OF DCPT 56 K

PROJECT: Port of Anchorage Expansion
PROJECT NUMBER: 043-5680
LOCATION: Table 1
CLIENT: ICRC

DRILLING METHOD: DCP
DRILLING DATE: 10/13/04
DRILL RIG: Nodwell mounted CME-55

DATUM: Local
AZIMUTH: n/a
COORDS: n/a

SHEET 1 of 1
GS ELEVATION: --
TOC ELEVATION: n/a
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	ICE BOND	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (Hammer Weight: 140 lb (Cathead/Rope Method) Drop: 30 in.)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l (10 20 30 40)	NOTES WATER LEVELS
0	AWJ ROD W/ 1.875 in. cone tip	VEGETATION: None (tidal area) 0.0 - 15.5 Vane shear 150 psf at 0 ft Vane shear 380 psf at 0.5 ft Surface soils consist of gray clayey SILT to silty CLAY						DCP	-WOR-WOR	--	11/12		0 ft 10/13/04 1353 Residual surface water
								DCP SH	-1-2	3	12/30	■	
								DCP	-4-6	10	12/12	■	
								DCP	-4-5	9	12/12	■	
5								DCP	-9-11	20	12/12	■	
								DCP	-5-10	15	12/12	■	
								DCP	-12-10	22	12/12	■	
								DCP	-11-16	27	12/12	■	
								DCP	-18-17	35	12/12	■	
								DCP	-14-15	29	12/12	■	Smooth drive to 10.5'
10								DCP	-23-22	45	12/12	■	
								DCP	-26-26	>50	12/12	>>■	Smooth drive to 15.5'
								DCP	-37-26	>50	12/12	>>■	
								DCP	-20-20	40	12/12	■	
								DCP	-22-23	45	12/12	■	
15		End of Drive @ 15.5 ft Borehole completed at 15.5 ft.						DCP	-26	--	6/6		
20		NOTES: 1) "DCP"= Dynamic Cone Penetrometer. 2) "WOR"= Weight of Rod. 3) Made 2 attempts to access boring location - moved about 250 ft South due to very poor soil conditions.											

ANC DCPT 043-5680.GPJ GLDR_ANC.GDT 11/9/04

Golder Associates

DEPTH SCALE:1 in to 2.5 ft
DRILLING CONTRACTOR: Discovery Drilling
DRILLER: Scott

LOGGED: M. Wachholz
CHECKED: MRM
DATE: 11-04

Figure A11

PROJECT: Port of Anchorage Expansion
PROJECT NUMBER: 043-5680
LOCATION: Table 1
CLIENT: ICRC

RECORD OF DCPT 56 E

SHEET 1 of 1

DRILLING METHOD: DCP
DRILLING DATE: 10/13/04
DRILL RIG: Nodwell mounted CME-55

DATUM: Local
AZIMUTH: n/a
COORDS: n/a

GS ELEVATION: --
TOC ELEVATION: n/a
INCLINATION: -90

DEPTH (ft)	BORING METHOD	SOIL PROFILE: DESCRIPTION	ICE BOND	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	SAMPLES: NUMBER	TYPE	BLOWS per 6 in (Hammer Weight: 140 lb (Cathead/Rope Method) Drop: 30 in.)	N	REC / ATT	PENETRATION RESISTANCE BLOWS / ft ■ (10 20 30 40) / WATER CONTENT (PERCENT) W_p W W_l (10 20 30 40)	NOTES WATER LEVELS
0	AWJ ROD W/ 1.875 in. cone tip	VEGETATION: None (tidal area) 0.0 - 15.5 Smooth driving from 1 ft - 15.5 ft Vane shear 130 psf at 0 ft Vane shear 190 psf at 0.5 ft Surface soils consist of gray clayey SILT to SILT						DCP	-WOR-WOR	--	11		0 ft 10/13/04 1100 Residual water on surface
								DCP SH	-1-2	3 --	12 to 30		Pulldown on Shelby tube from 0' to 2.5' 150, 200, 200, 250, 250 PSI, no recovery.
								DCP	-2-5	7	12		
								DCP	-6-7	13	12		
								DCP	-7-6	13	12		
5								DCP	-13-13	26	12		
								DCP	-12-13	25	12		
								DCP	-11-12	23	12		
								DCP	-14-16	30	12		
10								DCP	-15-16	31	12		
								DCP	-14-17	31	12		
								DCP	-16-18	34	12		
								DCP	-16-24	40	12		
								DCP	-23-19	42	12		
								DCP	-17-23	40	12		
15		End of Drive @ 15 ft Borehole completed at 15.5 ft.						DCP	-23	--	6		
20		NOTES: 1) "DCP"= Dynamic Cone Penetrometer. 2) "WOR"= Weight of Rod. 3) Moved hole about 30 ft South due to tidal drainage ravine.											

ANC DCPT 043-5680.GPJ GLDR_ANC.GDT 11/9/04

Golder Associates

DEPTH SCALE:1 in to 2.5 ft
DRILLING CONTRACTOR: Discovery Drilling
DRILLER: Scott

LOGGED: M. Wachholz
CHECKED: MPW
DATE: 11-04

Figure A5

moffatt & nichol

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