Geotechnical Engineering Services

Onshore Geotechnical Program Phase I
Factual Data Report
Proposed Gateway Pacific Terminal
Whatcom County, Washington

for
Pacific International Terminals, Inc.

April 19, 2011

GeoEngineers

600 Dupont Street
Bellingham, Washington 98225
360.647.1510

GeoEngineers

600 Dupont Street
Bellingham, Washington, 98225
306.647.1510

April 19, 2011

Pacific International Terminals, Inc.
1131 SW Klickitat Way
Seattle, Washington 98134

Attention: Skip Sahlin, VP Project Development
Ari Steinberg, Project Manager

Subject: Onshore Geotechnical Program Phase I
Factual Data Report
Proposed Gateway Pacific Terminal
Whatcom County, Washington
File No. 1924-008-03

We are pleased to submit two copies of our report, "Onshore Geotechnical Program Phase I, Factual Data Report, Proposed Gateway Pacific Terminal, Whatcom County, Washington." Our geotechnical services were completed in general accordance with our proposal, dated March 26, 2010. Our services were authorized by Skip Sahlin in a letter of Notice to Proceed dated April 13, 2010. Preliminary results of our services were provided to you as information became available.

We appreciate the opportunity to work with you on this project. Please call if you have any questions regarding this report.

Sincerely yours,

GeoEngineers, Inc.

J. Robert Gordon, PE
Principal

SWC:JRG:ims:sla
http://projects/sites/0192400803/Final/Factual Data Report

30 YEARS 2010

Geotechnical Engineering Services

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Factual Data Report
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Prepared for:

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1131 SW Klickitat Way
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Attention: Skip Sahlin, VP Project Development
Ari Steinberg, Project Manager

Prepared by:

GeoEngineers, Inc.
600 Dupont Street
Bellingham, Washington 98225
360.647.1510

Sean W. Cool, PE
Project Geotechnical Engineer

J. Robert Gordon, PE
Principal

SWC:JRG:ims:sla:ims
http://projects/sites/0192400803/Final/ Factual Data Report.x2

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INTRODUCTION

Project Description

GeoEngineers is pleased to present this Factual Data Report presenting our preliminary geotechnical field and laboratory results for the proposed Gateway Pacific Terminal (GPT) project to be located in the Cherry Point Industrial Area, approximately 8 miles west of Ferndale, in Whatcom County, Washington (see Vicinity Map, Figure 1). This report is based on conversations with you, information provided in the Request for Proposal (RFP) dated March 11, 2010, our knowledge of the site based on previous work completed in 1997, and our recent explorations completed at the site.

We understand that the proposed GPT site development will consist of a marine wharf and trestle for vessel berthing, and associated upland facility for storage and distribution of dry-bulk products. Phase 1 of the project is limited to the upland portion of the development which will include new railway and roadway, raised railway embankment, transfer conveyors, bulk storage shed/silos, and appurtenant structures. We understand that the Phase 1 professional services are intended to support permitting, preliminary planning, layout and preliminary design for the upland site development. Future phases of exploration and geotechnical engineering analyses for specific upland and marine structures and site locations will be required to provide final design recommendations beyond these Phase 1 services.

Scope of Services

The purpose of our services was to perform limited subsurface soil and groundwater exploration and laboratory testing for the proposed GPT project. Our scope of services included:

- Researching and reviewing available geologic and geotechnical information;
- Completing three cone penetration tests (CPT), one with measurement of seismic shear wave velocity;
- Drilling two geotechnical borings and installing groundwater piezometers at each boring location;
- Completing geotechnical laboratory testing on selected samples obtained from the borings;
- Providing this Factual Data Report as a basis for preliminary engineering analysis and design for the proposed site development.

Our specific scope of services is described in our proposal dated March 26, 2010. Our services were authorized by Skip Sahlin in a letter of Notice to Proceed dated April 13, 2010.

SITE CONDITIONS

General

The approximately 1,092 acre site is owned by Pacific International Terminals, Inc (PIT) and is located on an upland plateau along the Strait of Georgia. The current study area is bounded by Aldergrove Road to the north, Henry Johnson Road to the south and Gulf Road to the west. The

eastern boundary is approximately ½ mile to the east of Gulf Road. The entire GPT site extends to the Strait of Georgia to the south and approximately ½ mile west of Gulf Road. The adjacent properties to the east, west and south consist of undeveloped forest and pasture. The BP Cherry Point Refinery is located to the north of the project site.

Geologic Setting

We reviewed a U.S. Geologic Survey (USGS) geologic map (Easterbrook, 1976), Washington Department of Geology and Earth Resources map (Lapen, 2000), and Costal Zone Atlas of Washington (1977) for the project area. The site lies within an area mapped as a glacial drift known as Bellingham (glaciomarine) Drift (GMD). A discussion of the site specific subsurface conditions is presented in a subsequent section of this report. Based on our previous experience in the area, Vashon Stade advance outwash and Cherry Point silt underlie the glaciomarine drift.

The GMD unit consists of unsorted, unstratified silt and clay with varying amounts of sand, gravel, cobbles and occasional boulders. Glaciomarine drift is derived from sediment melted out of floating glacial ice that was deposited on the sea floor. This material locally contains shells and wood. Glaciomarine drift was deposited during the Everson Interstade approximately 11,000 to 12,000 years ago while the land surface was depressed 500 to 600 feet from previous glaciations. The upper portion of this unit, sometimes to about 15 feet of depth, can be quite stiff as a result of desiccation or partial ice contact in upland areas. This material typically grades to medium stiff or soft below the upper stiff zone. The medium stiff to soft portion of this unit is moderately to highly compressible under large foundation or fill loads.

The Vashon Stade occurred between approximately 11,000 to 18,000 years ago. Sand and gravel outwash was deposited by melt-water streams in front of and along the glacial ice, as the glacier advanced. The advance outwash was eventually overridden by the glacier. As the ice retreated, recessional outwash, similar in gradation to the advance outwash was deposited.

The relevant pre-Vashon sediments for the site include the Cherry Point silt. The Cherry Point silt consists of stratified marine clay and silt with minor sand interbeds. The Cherry Point silt is generally stiff to hard because it has been glacially consolidated.

Surface Conditions

The overall site topography slopes gently down to the southwest from approximately elevation 155 feet at the northeastern boundary to approximately 90 feet at Gulf Road and Henry Johnson Road. A steep bluff exists above the shoreline along the Strait of Georgia that varies between 5 feet in the southeast corner of the site to approximately 70 feet at the southwest corner of the site. The roads along the project site are lined with ditches to facilitate drainage from the site and a north-south oriented drainage ravine is located west of Gulf Road. Existing utilities are present in the project vicinity with primary utility corridors along the roadways. A large petroleum pipeline is located to the north and east of the site. The project site is an undeveloped area that consists of vegetated areas with pasture grass and a mixture of bushes and trees, with areas of designated wetlands located on portions of the site.

Subsurface Conditions

Subsurface Explorations and Laboratory Testing

GeoEngineers subcontracted the drilling of two borings for this project on April 26 through 28, 2010. Borings B-10-1 and B-10-2 were completed with a track-mounted drill rig at the locations shown in the Site and Exploration Plan, Figure 2. Three CPT's (CPT-10-1 through CPT-10-3) were completed with a subcontracted track mounted rig on April 26 and 27, 2010. The locations are also shown in the Site and Exploration Plan. CPT-10-3 was completed as a scope option and included seismic shear wave velocity testing.

Soil samples collected during our exploration program were taken to our laboratory for further evaluation. Selected samples were tested for moisture content, fines content, grain size distribution, and Atterberg limits (soil plasticity). Descriptions of our field exploration program along with logs for the explorations and results of geotechnical laboratory testing are provided in Appendix A. Boring logs and results of geotechnical laboratory testing for our previous explorations at the GPT site are provided in Appendix B.

Soil Conditions

Subsurface soils encountered were classified as glaciomarine drift and glacial outwash. A description of each geologic unit is presented below. We did not encounter the hard Cherry Point silt unit in our explorations during this current study; it was encountered in B-1 of our previous study.

GLACIOMARINE DRIFT. Soil interpreted to be glaciomarine drift was encountered in borings B-10-1 and B-10-2 and interpreted in the CPT explorations. The glaciomarine drift was encountered from the ground surface in both borings and was very stiff in the upper 10 to 15 feet, transitioning to medium stiff to soft or very soft with depth. The glaciomarine drift encountered generally consisted of clay and silty to sandy clay with variable gravel content. The glaciomarine drift deposits extended to depths of 46 and 120 feet below ground surface (bgs) (approximate Elevation 88 feet and 22 feet) in borings B-10-1 and B-10-2, respectively. The glaciomarine drift was interpreted to extend to a depth of about 75 feet bgs (Elevation 13 feet) in CPT-10-1 and between about 110 and 115 feet bgs (Elevation 14 feet and 27 feet) in CPT-10-2 and CPT-10-3. The lower 30 to 50 feet of the GMD in B-10-2, CPT-10-2, and CPT-10-3 were interpreted to be a transition zone with significant interbedding and increased sand and gravel content beyond that typically attributed to the glaciomarine drift unit, including lenses and layers of clayey and silty sand.

GLACIAL OUTWASH. Soil interpreted to be glacial outwash was encountered below the glaciomarine drift in both borings and was inferred in all three CPT explorations. The glacial outwash encountered generally consisted of dense to very dense silty sand with occasional gravel to gravel with sand and silt. The glacial outwash deposits extended to the full depth explored in both of our borings. The exploration at CPT-10-2 is interpreted to have met refusal on glacial outwash soils.

Groundwater Conditions

Groundwater conditions could not be directly observed or measured during our exploration program because of the drilling fluid used for the borings. Based on our experience, a seasonal perched groundwater often occurs within weathered soil horizons of the stiff clayey glaciomarine

drift soils. The glaciomarine drift unit at the site elevations is typically not a water bearing unit, although the softer gray portions of the unit are usually saturated and "pods" of more granular materials will contain free water. Groundwater piezometers were installed at both explorations to a depth of 30 feet bgs for future monitoring of shallow groundwater fluctuation or zones of seepage. Groundwater was measured at approximately 50 feet bgs in previous explorations B-1 and B-2 in 1997. Porewater pressures measured in the CPT explorations appear to be elevated as a result of the cone disturbance in the saturated clay.

CONCLUSIONS AND RECOMMENDATIONS

Conditions encountered during our exploration program were consistent: glaciomarine drift overlying advance outwash, with a transitional zone between the two units. The glaciomarine drift was typically stiff to very stiff silt/clay grading softer with depth, and the transitional zone varied between medium stiff to stiff. The glaciomarine drift and transitional zone was much thicker in the explorations at the center of the site (over 100 feet) than the southern perimeter of the site (approximately 45 to 50 feet). We provide the following conclusions for preliminary planning purposes:

- Lightly loaded structures can typically be supported using conventional shallow foundations without excessive settlement from foundation loads. Large heavily loaded foundations would transfer loads to the soft, compressible GMD.
- If deep foundations are necessary because of high loads, high capacity end-bearing piles are feasible at the southern end of the site where the advance outwash was encountered at shallower depths. In the northern portions of the site, deep foundations will likely consist of lower capacity friction piles because of the greater depth to bearing soils (greater than 120 feet at our boring locations).
- Large aerial fills and embankments will be prone to settlement resulting from consolidation of the soft clayey soil underlying the site.

More detailed conclusions and preliminary design recommendations for site development will be provided in a subsequent report, and will include the results of engineering analyses based on the proposed conceptual site development.

LIMITATIONS

We have prepared this report for use by Pacific International Terminals, and their authorized agents for the proposed Gateway Pacific Terminal Phase I, located in Whatcom County, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to the appendix titled Report Limitations and Guidelines for Use for additional information pertaining to use of this report.

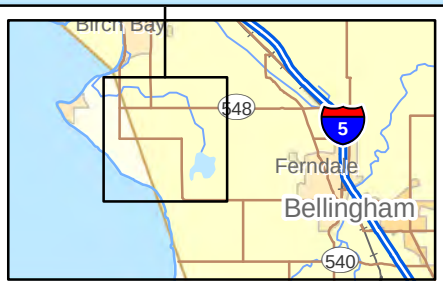
REFERENCES

Easterbrook, D.J. 1976. Geologic Map of Western Whatcom County, Washington. United States Geological Survey. Map I-854-B.

GeoEngineers. 1997. Report, Gateway Pacific Terminal Project, Whatcom County, Washington for Pacific International Terminals. June 9, 1997.

Lapen, T.J. 2000. Geologic Map of the Bellingham 1:100,000 Quadrangle, Washington. Washington Division of Geology and Earth Resources. Open File Report 2005-5.

WDOE, 1977, Coastal zone atlas of Washington: volume 1, Whatcom County: Washington Department of Ecology, Publication DOE 77-21-1



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Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

Proposed Gateway Pacific Terminal
Whatcom County, Washington

GEOENGINEERS

Figure 1

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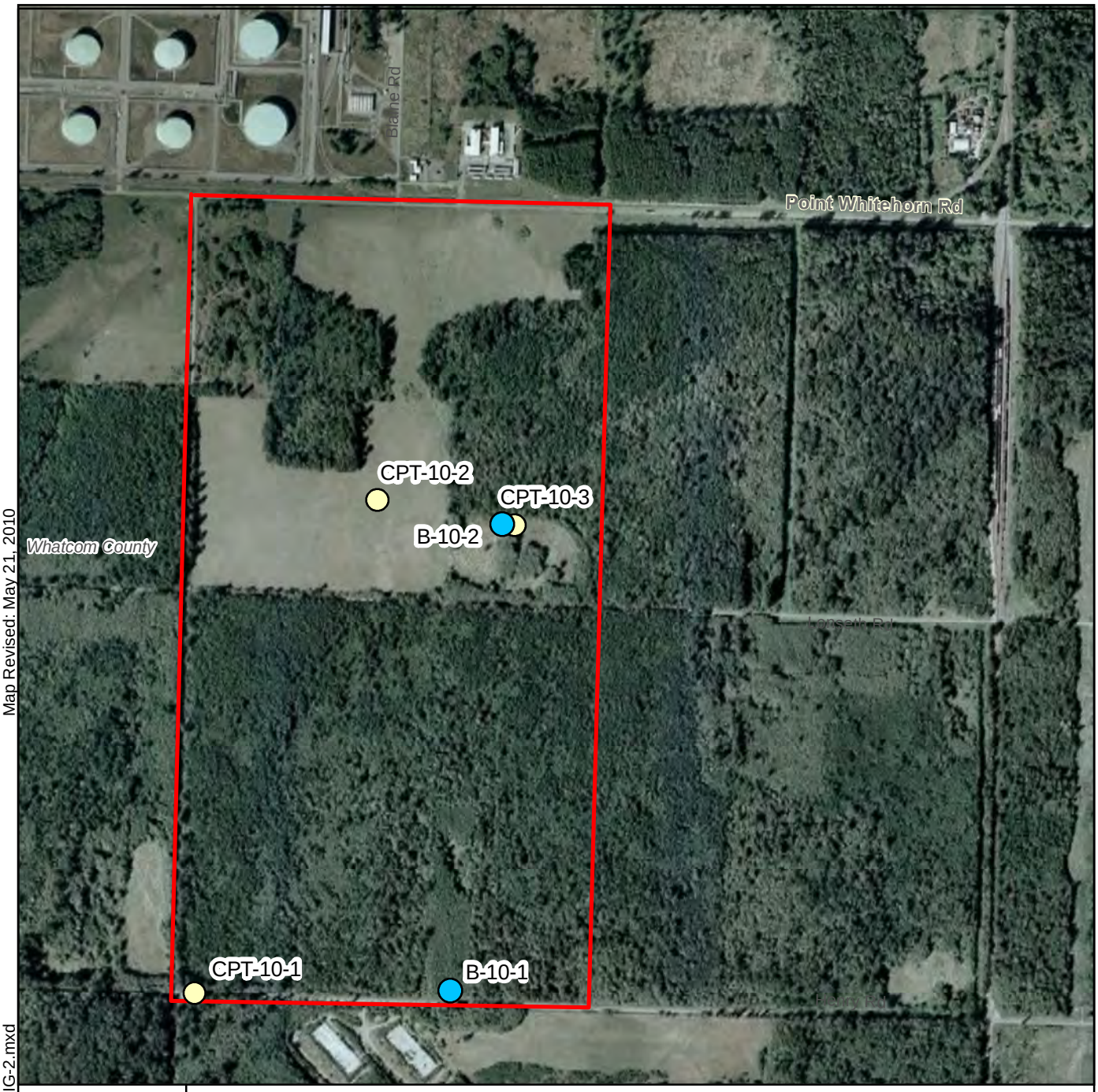

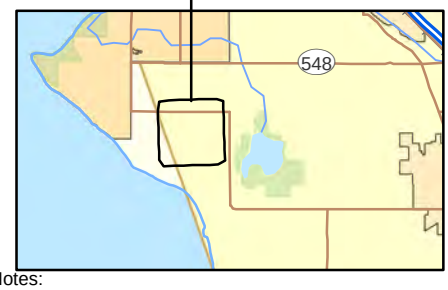

Legend

- Boring location
- Cone Penetration Test location

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Notes:
1. The locations of all features shown are approximate.
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Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Site and Exploration Plan

Gateway Pacific Terminal Phase I
Whatcom County, Washington

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Figure 2

Map Revised: May 21, 2010

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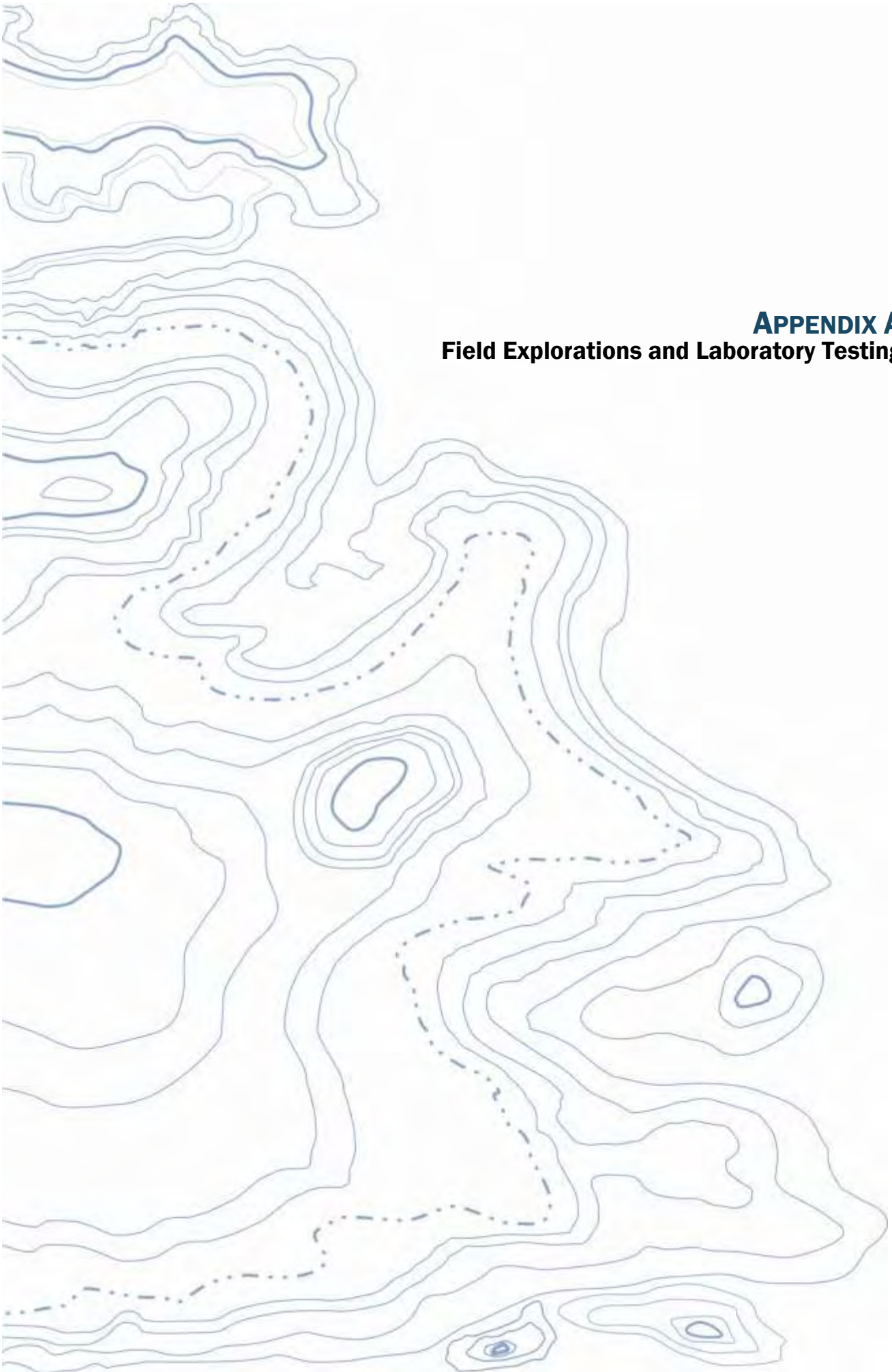


APPENDIX A
Field Explorations and Laboratory Testing

FIELD EXPLORATIONS AND LABORATORY TESTING

Field Explorations

Subsurface soil and groundwater conditions were evaluated by drilling two borings (B-10-1 and B-10-2) and advancing three cone penetration tests (CPT-10-1 through CPT-10-3) at the site. The explorations were completed to depths from 74 to 131.5 feet below the existing ground surface (bgs). The borings were completed on April 26 through April 28, 2010, using a track-mounted drill rig subcontracted to GeoEngineers, Inc. The CPT's were completed on April 26 and 27, 2010 with a track-mounted rig subcontracted to GeoEngineers, Inc. The locations of the explorations were determined by a licensed surveyor and should be considered accurate when plotted on a final site survey. The approximate (unsurveyed) exploration locations are shown in the Site and Exploration Plan, Figure 2.

The soils encountered in the borings were generally sampled at 5 or 10-foot vertical intervals with a 2-inch outside diameter split-barrel standard penetration test (SPT) sampler. The samples were obtained by driving the sampler 18 inches into the soil with a 140-pound automatic hammer free-falling 30 inches. The number of blows required for each 6 inches of penetration was recorded. The blow count ("N-value") of the soil was calculated as the number of blows required for the final 12 inches of penetration. This resistance, or N-value, provides a measure of the relative density of granular soils and the relative consistency of cohesive soils. Where very dense soil conditions preclude driving the full 18-inches, the penetration resistance for the partial penetration was entered on the logs. The blow counts are shown on the boring logs at the respective sample depths. Selected samples were attempted with a thin-walled tube "Shelby" sampler pushed into the soil.

The explorations were continuously monitored by a geotechnical engineer from our firm who examined and classified the soils encountered, obtained representative soil samples, observed groundwater conditions and prepared a detailed log of each exploration. Soils encountered were classified visually in general accordance with ASTM D-2488-90, which is described in Figure A-1. An explanation of our boring log symbols is also shown in Figure A-1.

The logs of the borings are presented in Figures A-2 through A-3. The exploration logs are based on our interpretation of the field and laboratory data and indicate the various types of soils encountered. They also indicate the depths at which these soils or their characteristics change, although the change might actually be gradual. If the change occurred between samples in the boring, it was interpreted.

The logs of the CPT soundings are presented in Figures A-4 through A-6. A seismic shear wave velocity profile is presented in Figure A-7.

Laboratory Test Results

Soil samples obtained from the explorations were transported to our laboratory and examined to confirm or modify field classifications, as well as to evaluate index properties of the soil samples. Representative samples were selected for laboratory testing consisting of the determination of the

moisture content, sieve analysis, and Atterberg Limit determinations. The tests were performed in general accordance with test methods of the American Society for Testing and Materials (ASTM) or other applicable procedures.

Moisture Content Testing

The natural moisture contents of selected soil samples obtained from the exploratory borings were determined in general accordance with ASTM D 2216 test procedures. The results from the moisture content determinations are presented in the boring logs.

Sieve Analyses

Sieve analyses were performed on selected samples in general accordance with ASTM D 422 to determine the sample grain size distribution. The wet sieve analysis method was used to determine the percentage of soil greater than the U.S. No. 200 mesh sieve. The results of the sieve analyses were plotted, classified in general accordance with the Unified Soil Classification System (USCS), and are presented in Figures A-8 and A-9.

Atterberg Limits

Atterberg limit tests were completed for three soil samples. The tests were used to classify the soil as well as to aid in evaluating index properties and consolidation characteristics of the fine-grained soil deposits. The liquid limit and the plastic limit were obtained in general accordance with ASTM D 4318. The results of the Atterberg limits are summarized in Figure A-10.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Measured groundwater level in exploration, well, or piezometer

Groundwater observed at time of exploration

Perched water observed at time of exploration

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

GEOENGINEERS

FIGURE A-1

Drilled	Start 4/27/2010	End 4/27/2010	Total Depth (ft) 74	Logged By AJH / Checked By SWC	Driller Gregory Drilling	Drilling Method Hollow-stem Auger

Hammer Data	Autohammer	Drilling Equipment	CME 850X Track-mounted Drill Rig
Surface Elevation (ft) Vertical Datum	134.6	Top of Casing Elevation (ft)	
Easting (X) Northing (Y)	1185286.38 685296.2	System Datum	

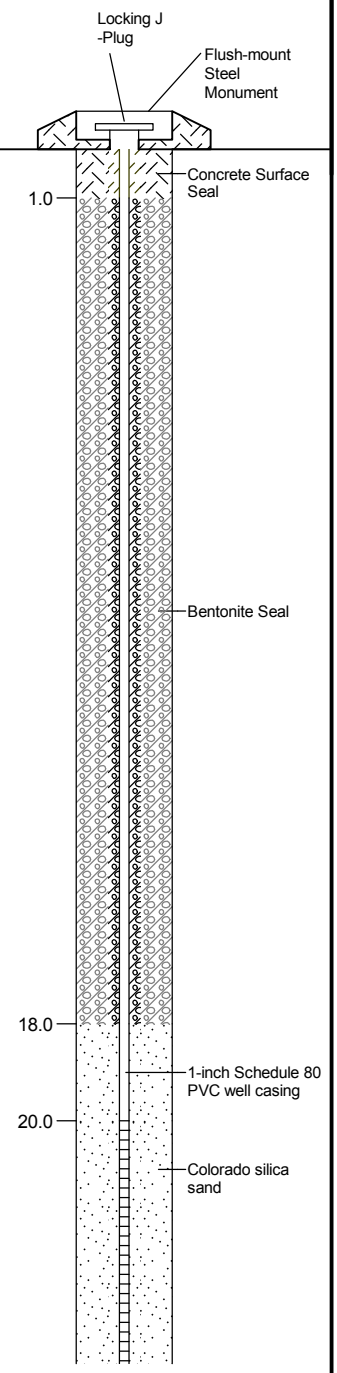
Licencing agency well number: **BTT 135**
A 1 (in) well was installed on 4/27/2010 to a depth of 30 (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
	Not encountered	Undetermined

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)
	0								CL	Brown silty clay with sand and occasional gravel (very stiff, moist) (glaciomarine drift)		
			18	28		1					18	
130	5											
			18	23		2				AL; %F=58	20	
125	10											
			18	22		3						
120	15											
									CL	Gray clay with occasional sand (stiff, moist to wet)		
			18	14		4					19	
115	20		24	P		5						
			18	16		6				- with sand and gravel		
110	25											

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-1

GeoEngineers

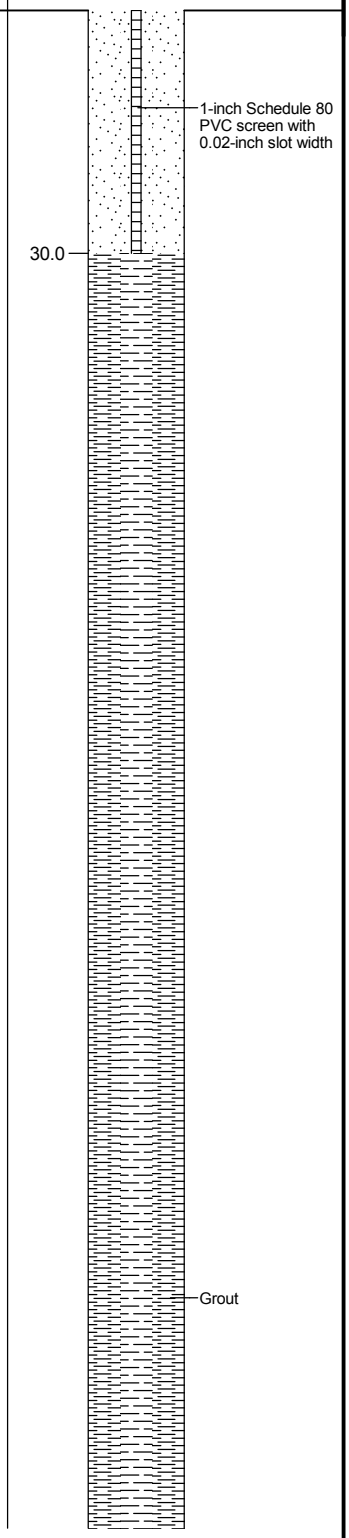
Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-2
Sheet 1 of 3

Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803 BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)
	25										
		18	11		7					14	
105	30										
		18	14		8				- becomes clayey sand with gravel %F=31	14	
100	35							SM/CL	Gray silty fine to medium sand with gravel interbedded with sandy clay (medium dense to dense/very stiff, moist to wet)		
		0	P		9						
		18	35		10						
95	40										
		6	17		11						
90	45										
								SM	Brown-gray silty fine to medium sand (dense, moist to wet) (glacial outwash)		
		12	58		12				SA; %F=22	19	
85	50										
		6	50/6"		13				- becomes fine to coarse sand with silt and gravel; rough drilling		
80	55										

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-1 (continued)

GeoEngineers

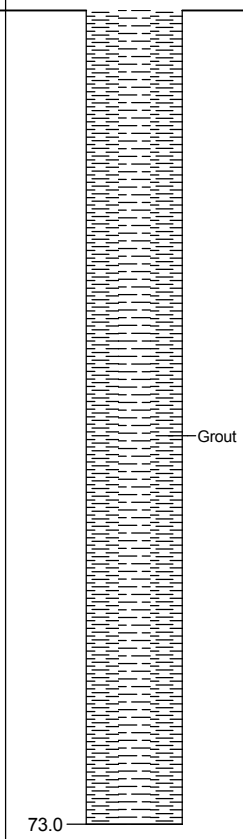
Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-2
Sheet 2 of 3

Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803 BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)
								GW-GM	Gray fine to coarse gravel with sand and silt (very dense, moist to wet)		
		8	74/10"		14					10	
75									SA; %F=6		
	60										
70											
	65										
65											
	70										
		12	50/4"		15						

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-1 (continued)

GEOENGINEERS

Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-2
Sheet 3 of 3

Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803 BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Drilled	Start 4/26/2010	End 4/28/2010	Total Depth (ft) 131.5	Logged By AJH / Checked By SWC	Driller Gregory Drilling	Drilling Method Hollow-stem Auger

Hammer Data	Autohammer	Drilling Equipment	CME 850X Track-mounted Drill Rig
Surface Elevation (ft) Vertical Datum	141.6	Top of Casing Elevation (ft)	
Easting (X) Northing (Y)	1185626.63 688382.35	System Datum	

Licencing agency well number: **BTT 134**
A 1 (in) well was installed on 4/28/2010 to a depth of 30 (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
		Undetermined

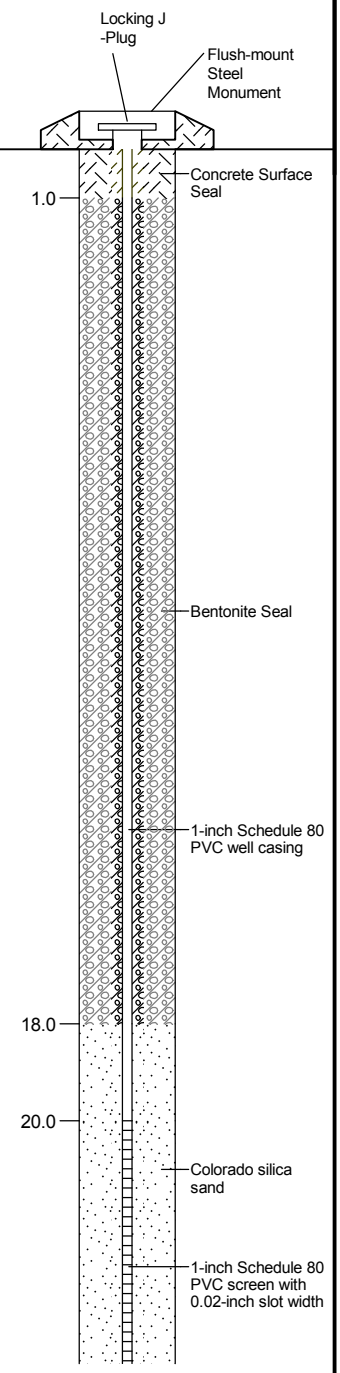
Notes:

FIELD DATA

Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)
0								ML/CL	Brown clayey silt to silty clay with sand and gravel (very stiff, moist) (glaciomarine drift)		
5		18	27		1				AL; %F=55	20	
10		18	19		2						
15		18	14		3				- becomes stiff	19	
20		18	15		4			CL	Gray clay with sand and gravel (stiff, moist to wet)		
25											

Elevation (feet): 140, 135, 130, 125, 120

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-2

GeoEngineers

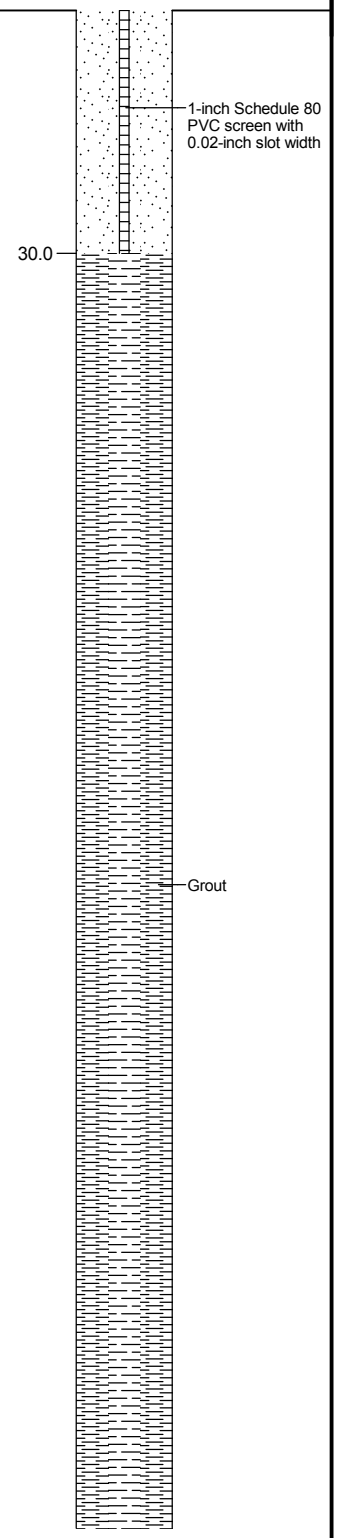
Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-3
Sheet 1 of 5

Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803.BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)
	25		16	P		5						
115			12	19		6					15	
	30		18	11		7						
110												
	35		18	6		8				- becomes medium stiff %F=66	22	
105												
	40		0	P		9						
100			18	16		10				- becomes clayey sand with occasional gravel %F=44	16	
									CL	Gray clay with sand and occasional gravel (very soft, moist to wet)		
	45		18	0		11						
95			24	P		12						
	50		18	0		13					16	
90												
	55		18	0		14					11	

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-2 (continued)

GeoEngineers

Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-3
Sheet 2 of 5

Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803 BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)	WELL LOG
85												
80	60	0	P		15							
75	65	18	15		16a				- becomes sandy clay; stiff	11		
					16b			SM	Gray silty fine to medium sand with occasional gravel (medium dense, moist) SA; %F=19	17		
70	70											
65	75	1			17				- interbedded with clay; very loose/very soft			
60	80	18	3		18			SC	Gray silty clayey sand with occasional gravel (loose, moist to wet) %F=41; AL	13		Grout
55	85											

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-2 (continued)

GeoEngineers

Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-3
Sheet 3 of 5

Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803 BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)	WELL LOG
	90	12	10		19				- blowcount overstated	15		
50												
	95								- stiffer gravelly drilling beginning at 98 feet			
45												
	100	6	8		20			SC	Gray silty clayey fine medium sand with occasional gravel (loose, wet)	13		Grout
40												
	105								- interbedded with silty sand			
35												
	110	18	7		21				SA; %F=29	11		
30												
	115											
25												

Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-2 (continued)

GeoEngineers

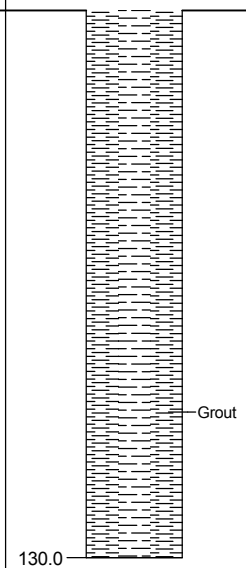
Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-3
Sheet 4 of 5

Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803 BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Water Content, %	Dry Density, (pcf)
	120		6	36		22			SM	Gray silty fine to medium sand with occeasional gravel (dense, wet) (glacial outwash) SA; %F=27	14	
20												
	125											
15												
	130		6	51		23				- blowcount overstated on rock		

WELL LOG



Note: See Figure A-1 for explanation of symbols.

Log of Boring B-10-2 (continued)

GeoEngineers

Project: Gateway Pacific Terminal Phase I
Project Location: Ferndale, Washington
Project Number: 1924-008-03

Figure A-3
Sheet 5 of 5

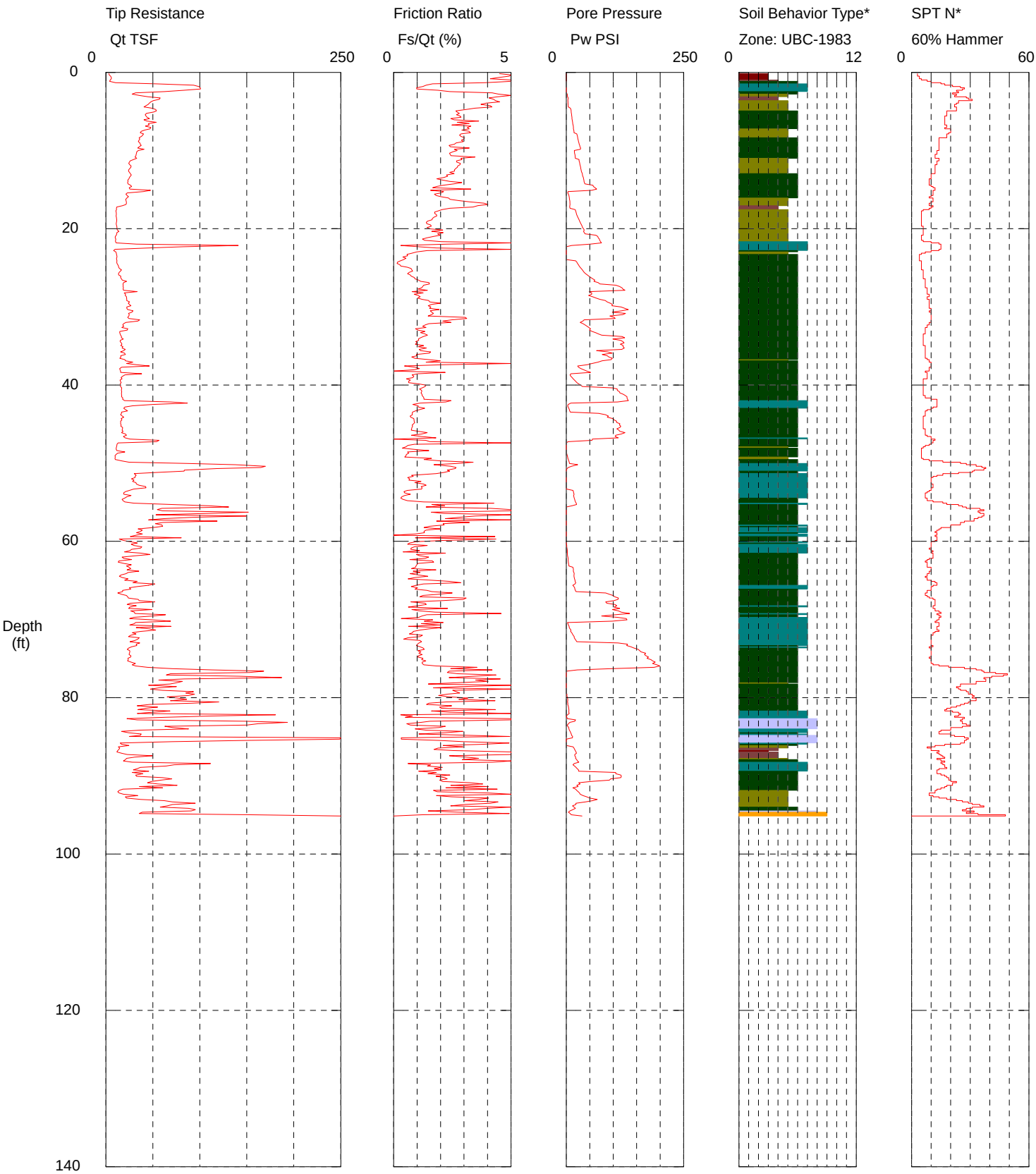
Bellingham: Date:6/7/10 Path:P:\1\1924008\GINT\192400803 BORING.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_GEOTECH_WELL

GeoEngineers

CPT-10-1

Operator: Witthus
Sounding: CPT-01
Cone Used: DSG1015
Elevation: 88.0 feet

CPT Date/Time: 4/26/2010 2:27:34 PM
Location: Gateway Pacific Terminal-Phase 1 Onshore
Job Number: 1924-008-03



Maximum Depth = 95.14 feet

Depth Increment = 0.164 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

In Situ Engineering

Figure A-4

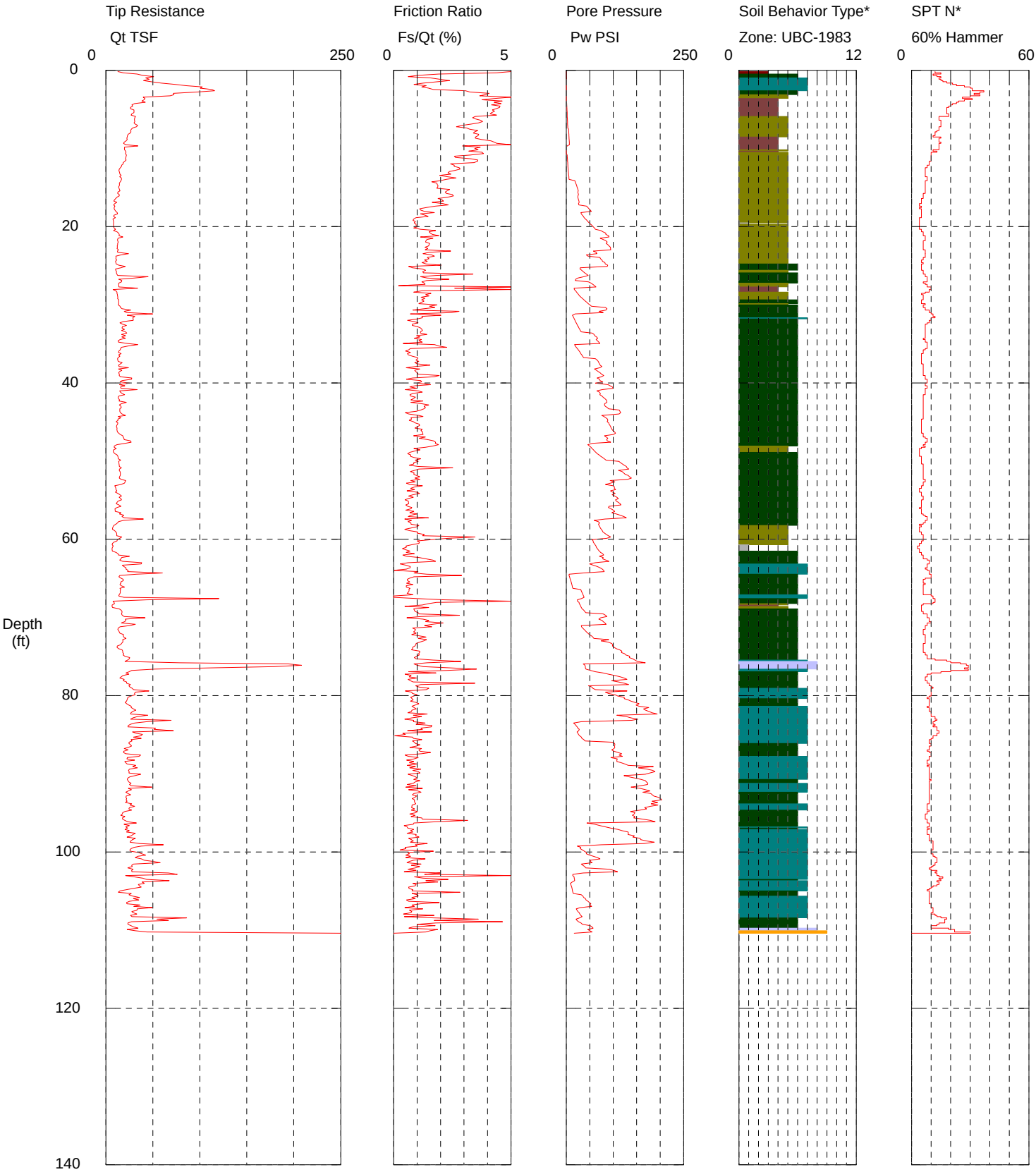
*Soil behavior type and SPT based on data from UBC-1983

GeoEngineers

CPT-10-2

Operator: Witthus
Sounding: CPT-02
Cone Used: DSG1015
Elevation: 124.4

CPT Date/Time: 4/27/2010 9:55:07 AM
Location: Gateway Pacific Terminal-Phase 1 Onshore
Job Number: 1924-008-03



Maximum Depth = 110.40 feet

Depth Increment = 0.164 feet

1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

In Situ Engineering

FIGURE A-5

*Soil behavior type and SPT based on data from UBC-1983

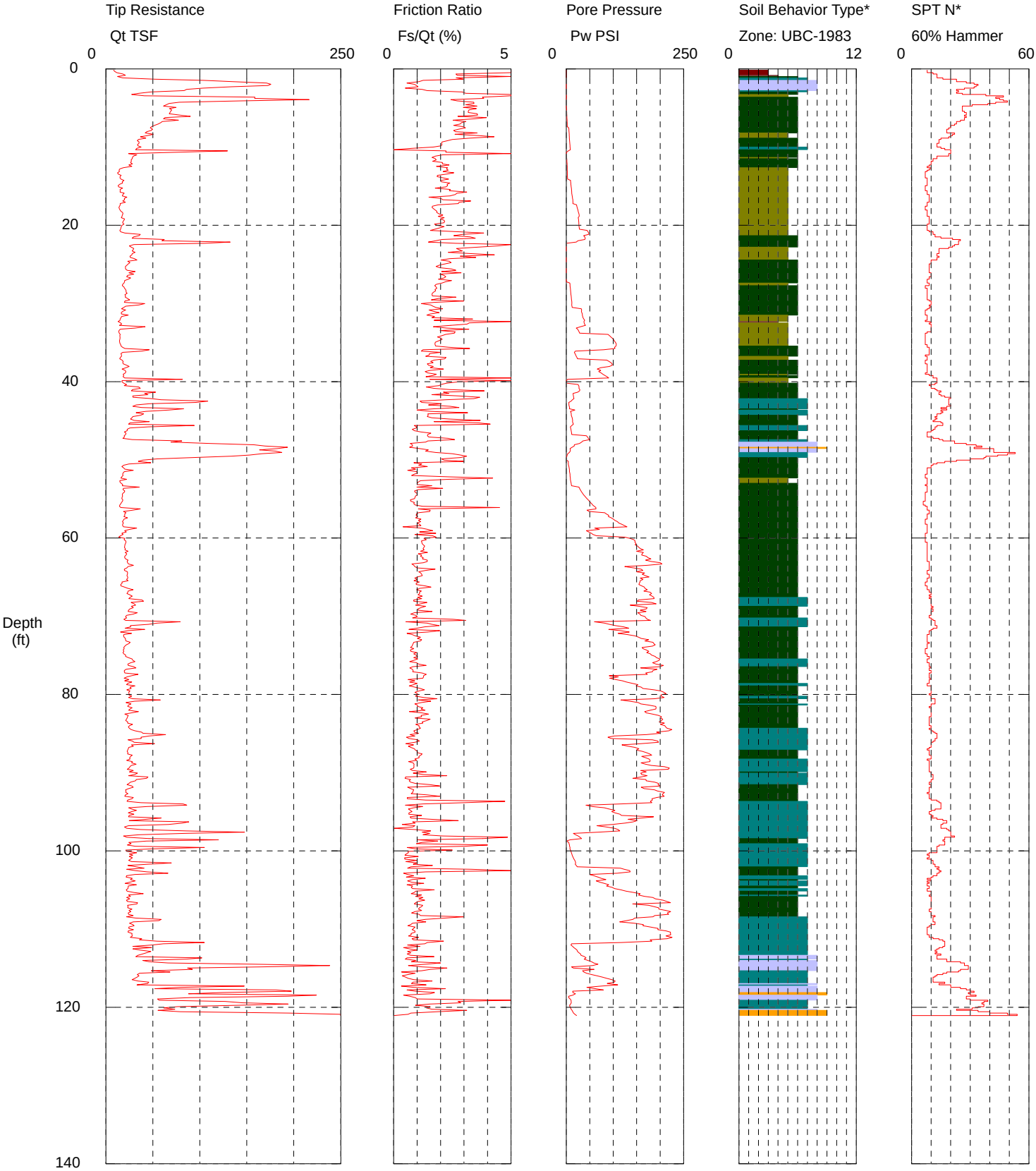
GeoEngineers

CPT-10-3

Operator: Witthus
Sounding: CPT-03
Cone Used: DSG1015

CPT Date/Time: 4/27/2010 12:04:05 PM
Location: Gateway Pacific Terminal-Phase 1 Onshore
Job Number: 1924-008-03

Elevation: 141.6



Maximum Depth = 121.06 feet

Depth Increment = 0.164 feet

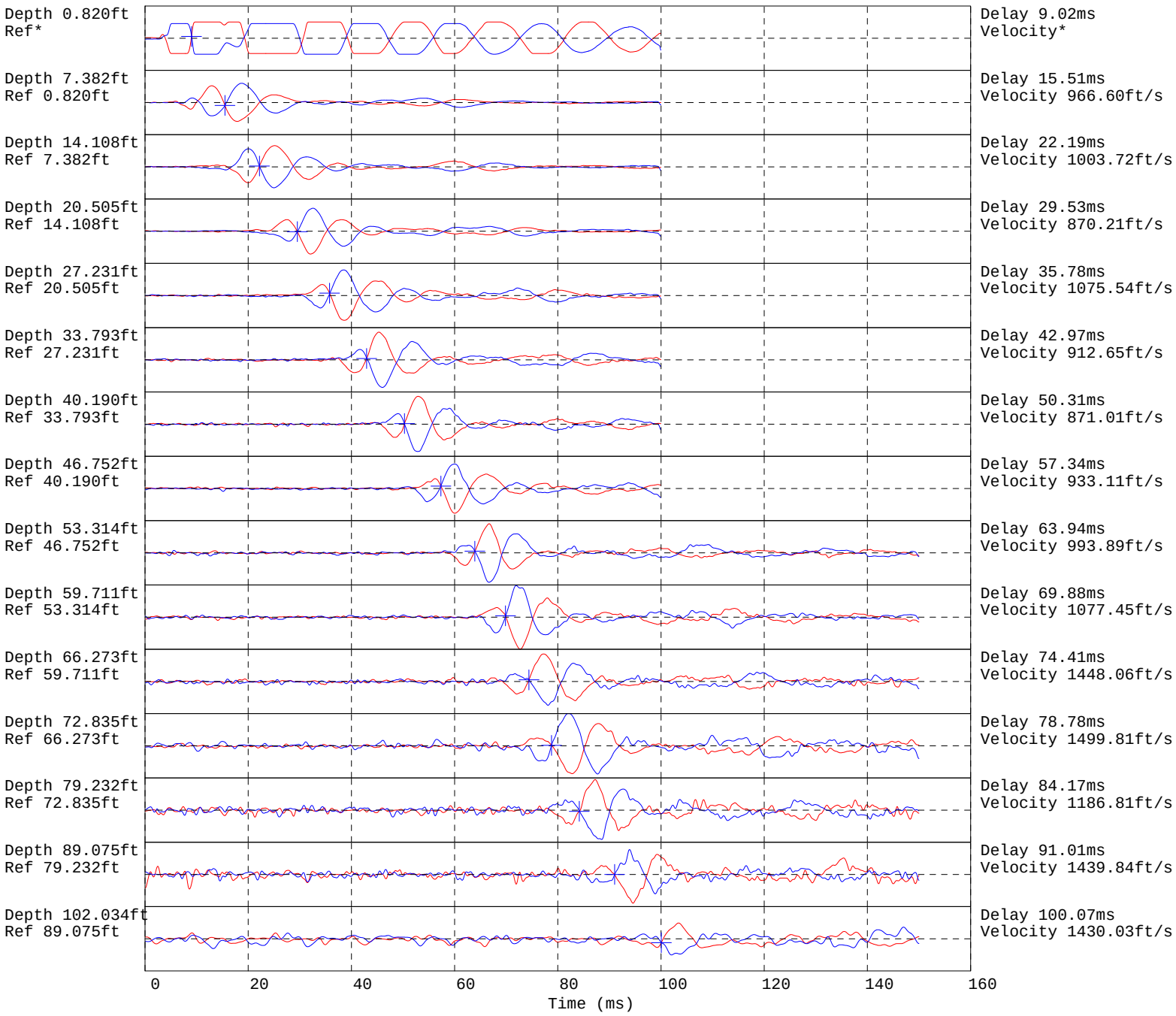
1 sensitive fine grained
2 organic material
3 clay
4 silty clay to clay
5 clayey silt to silty clay
6 sandy silt to clayey silt
7 silty sand to sandy silt
8 sand to silty sand
9 sand
10 gravelly sand to sand
11 very stiff fine grained (*)
12 sand to clayey sand (*)

In Situ Engineering

FIGURE A-6

*Soil behavior type and SPT based on data from UBC-1983

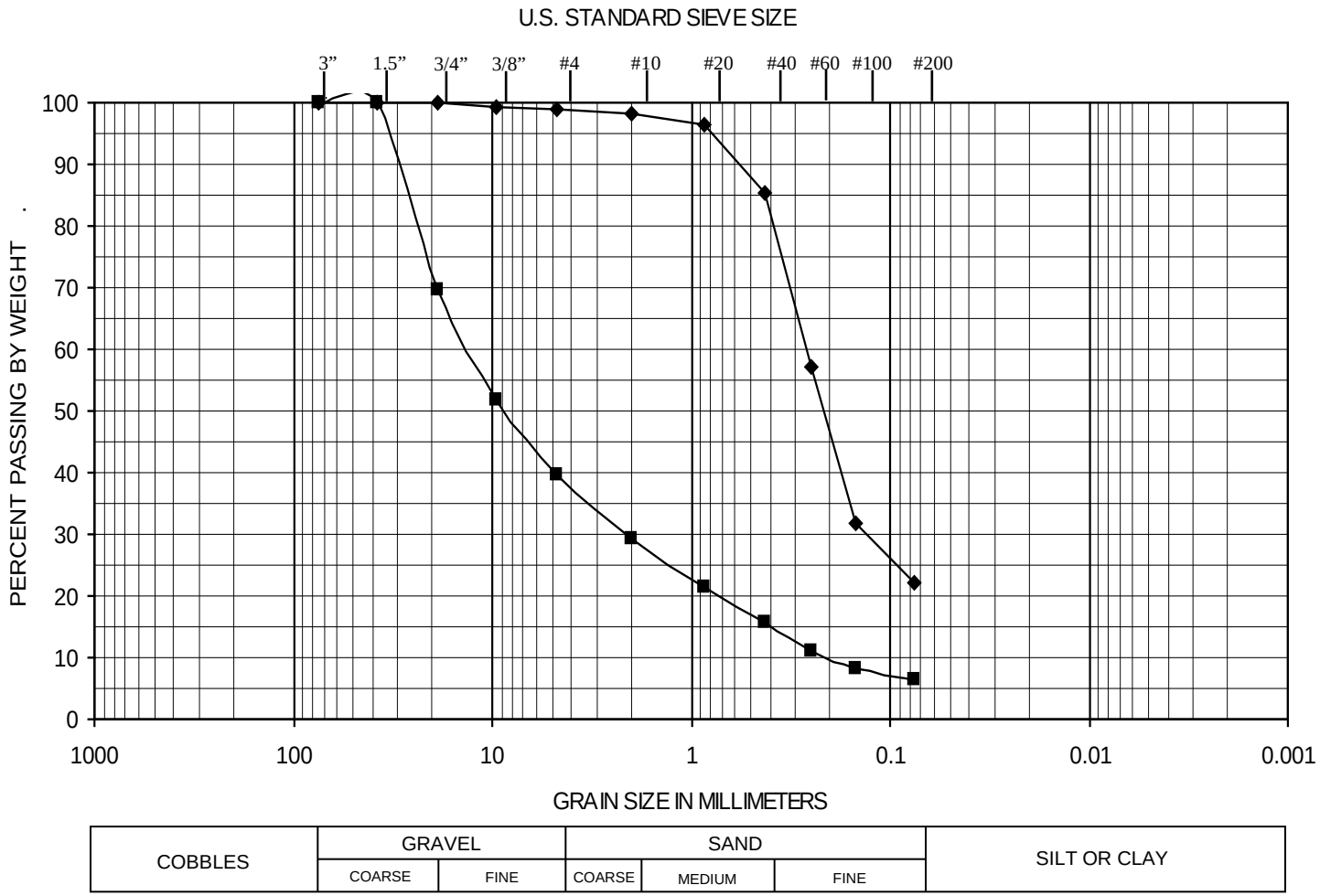
Shear Wave Velocity Plots
CPT-03



Hammer to Rod String Distance 0.25 (m)
* = Not Determined

FIGURE A-7

BELL: P:\sharepoint\[Sieve].pptx AF2:ims :sla 06/04/10



Symbol	Exploration Number	Sample Depth (feet)	Soil Classification
♦	B-1	48	Brown-gray silty fine to medium sand (SM)
■	B-1	58	Gray-brown fine to coarse gravel with sand and silt (GW-GM)

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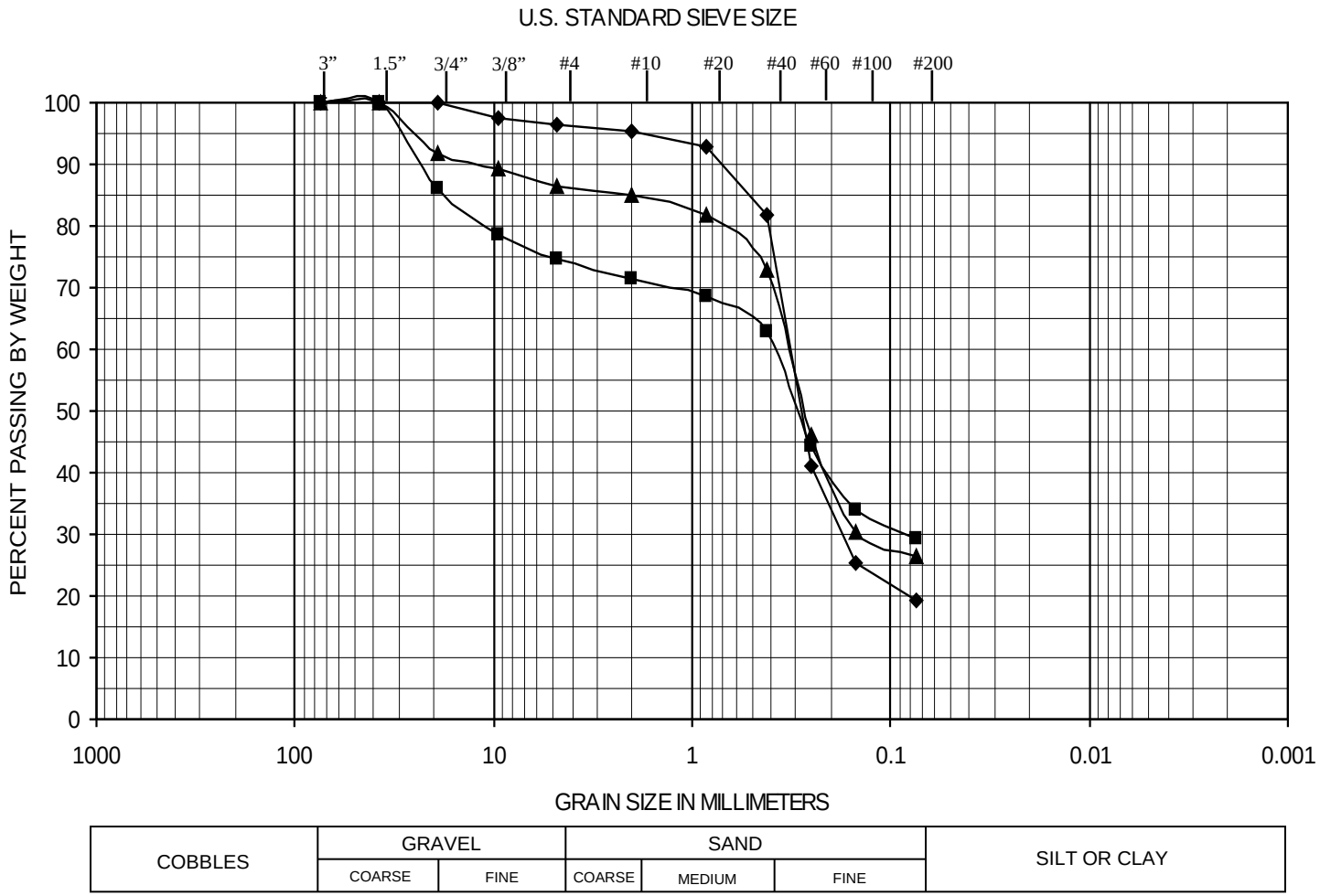
Sieve Analysis Results

Gateway Pacific Terminal
Ferndale, Washington

GeoEngineers

Figure A-8

BELL: P:\sharepoint\[Sieve].pptx AF2:ims : sla 06/04/10



Symbol	Exploration Number	Sample Depth (feet)	Soil Classification
♦	B-2	66	Gray silty fine to medium sand with occasional gravel (SM)
■	B-2	110	Gray silty clayey fine to medium sand with gravel (SC)
▲	B-2	120	Gray silty fine to medium sand with occasional gravel (SM)

performed, and should not be interpreted as representative of any other samples obtained at other times, depths or locations, or generated by separate operations or processes.

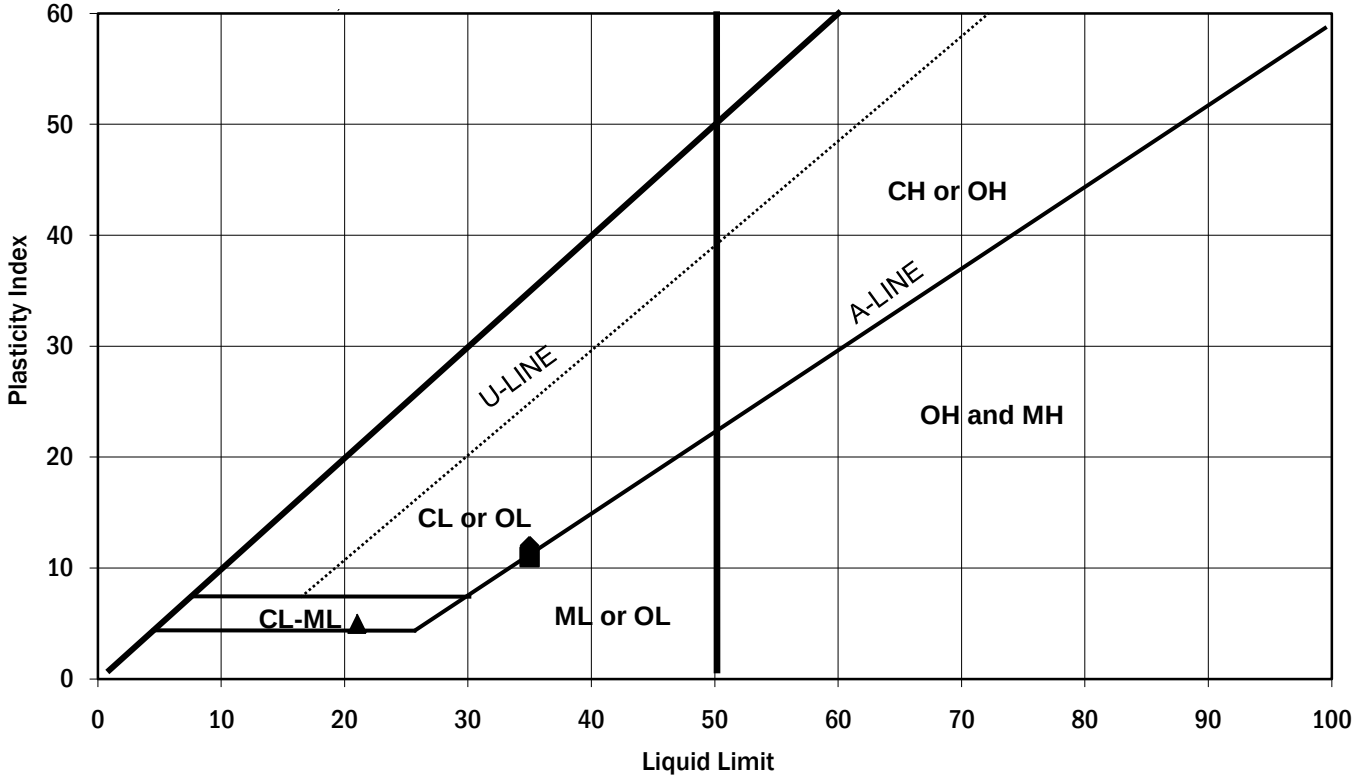
Sieve Analysis Results

Gateway Pacific Terminal
Ferndale, Washington

GeoEngineers

Figure A-9

PLASTICITY CHART



Symbol	Exploration Number	Sample Depth (feet)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Soil Description
♦	B-1	8	20	35	12	Brown silty clay (CL)
■	B-2	5	20	35	11	Brown clayey silt (ML)
▲	B-2	80	13	21	5	Gray silty clay (CL-ML)

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Atterberg Limits Test Results

Gateway Pacific
Ferndale, Washington

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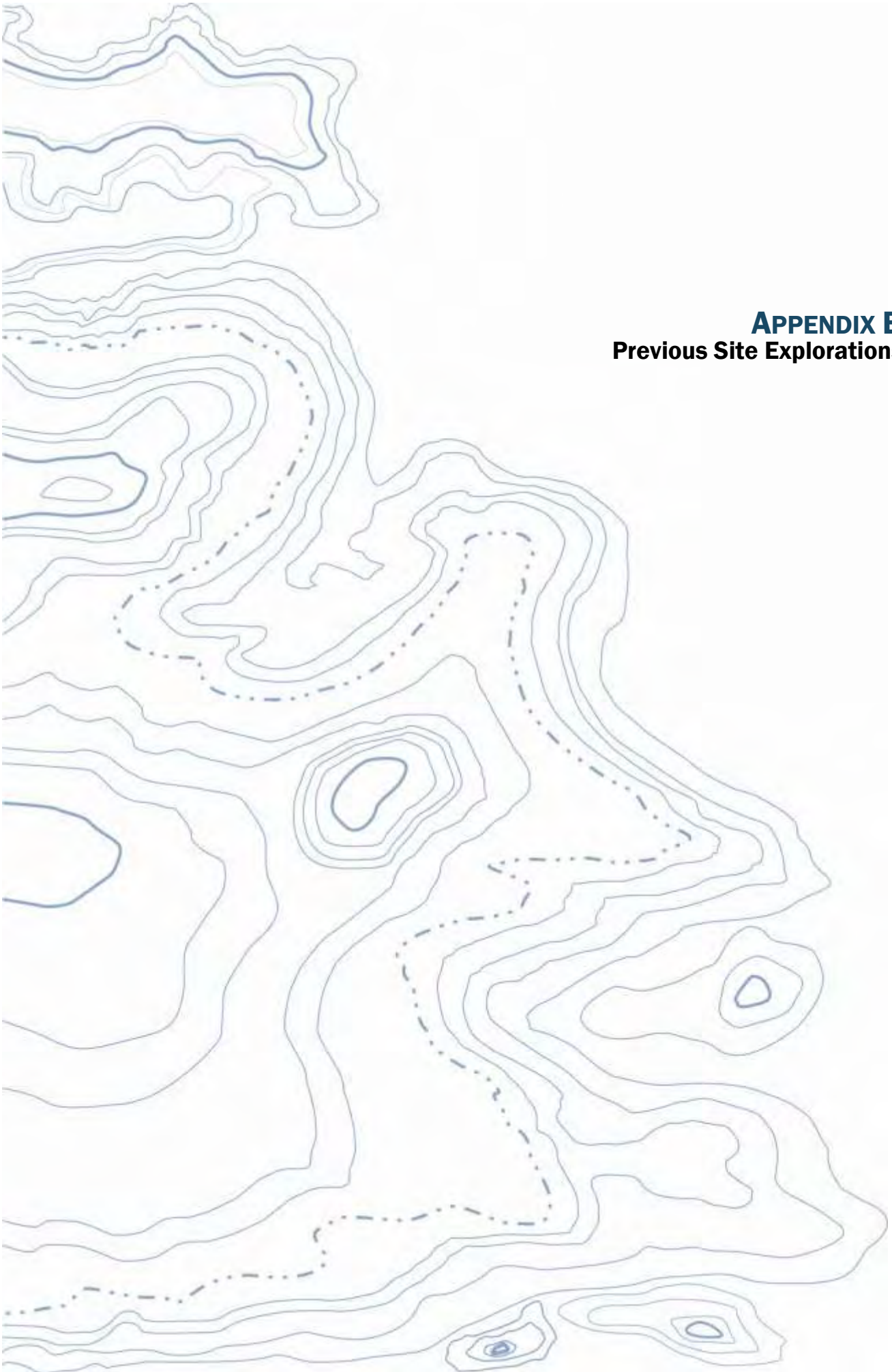
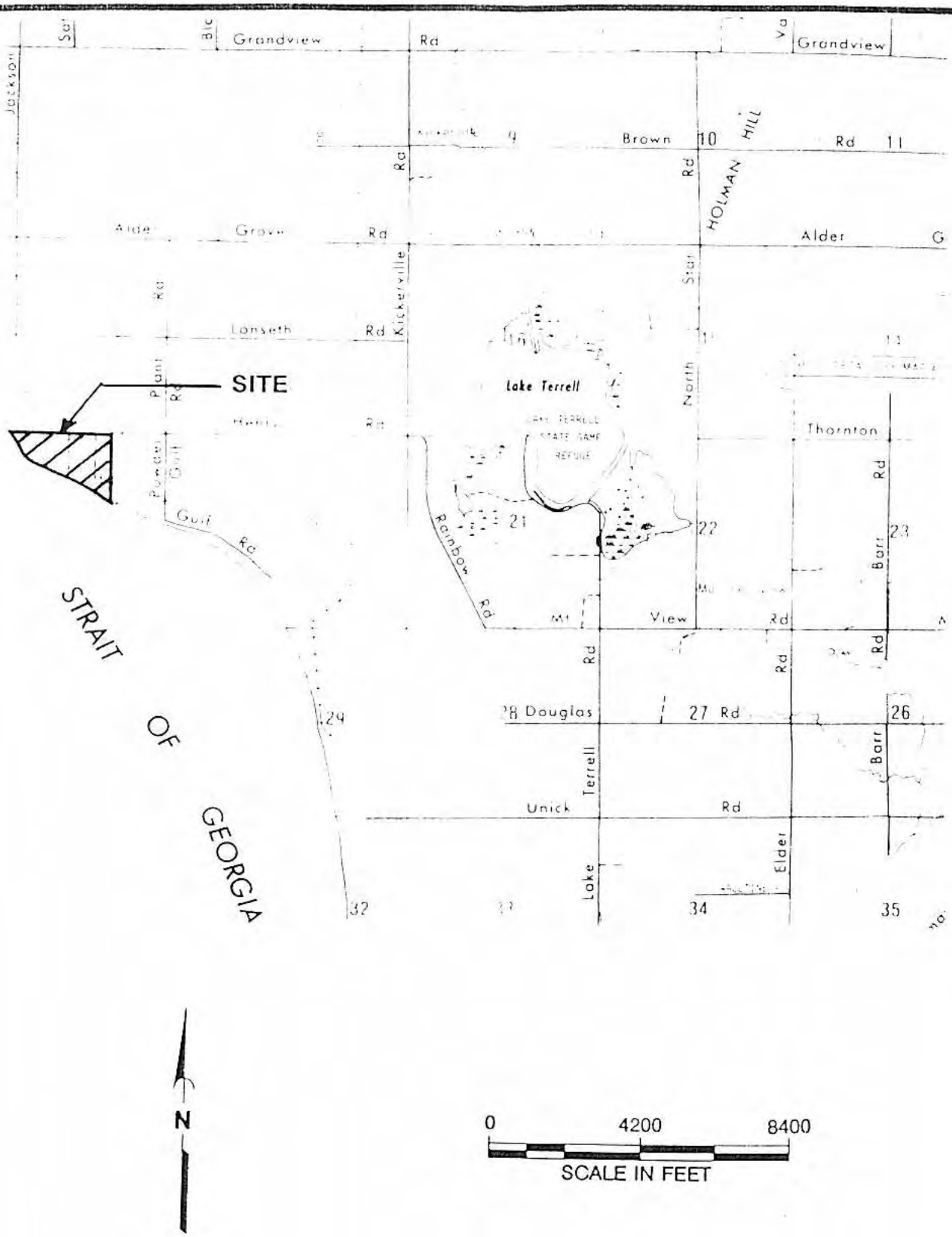
Figure A-10



APPENDIX B
Previous Site Explorations



Reference: Totem Atlas of Northwestern Washington, this is an authorized copy of a page from the Totem Atlas of Island, Skagit, Whatcom and San Juan Counties, a copyrighted publication. - A.W. Tanner

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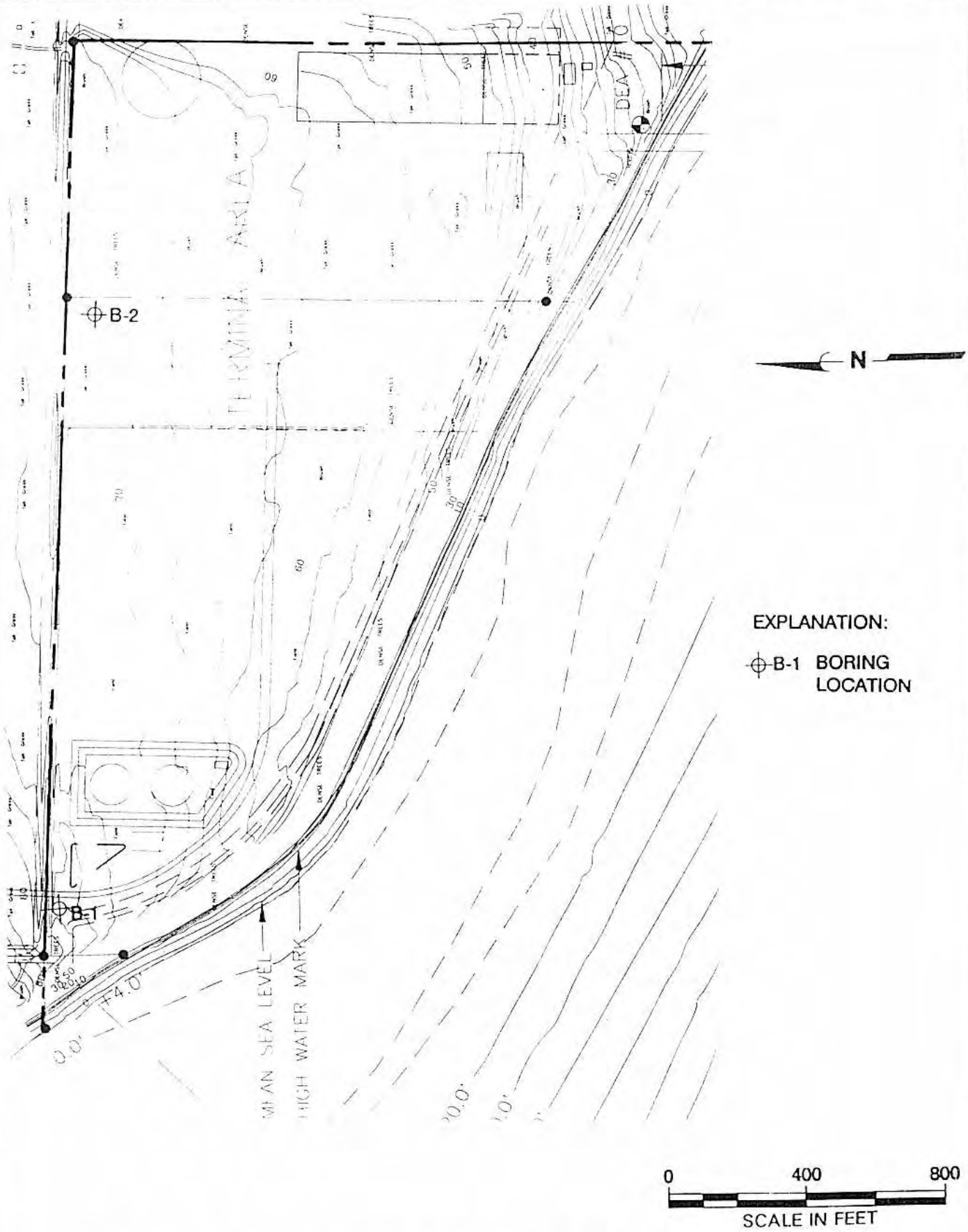
VICINITY MAP

FIGURE 1

#1924-006-13 RDW:dam 03/30/97



Reference: Undated topographic plan provided by David Evans and Associates.

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SITE PLAN

FIGURE 2

#1924-000-73 MDW.dgn 05/30/

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More Than 50% Retained on No. 200 Sieve	GRAVEL More Than 50% of Coarse Fraction Retained on No. 4 Sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More Than 50% of Coarse Fraction Passes No. 4 Sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More Than 50% Passes No. 200 Sieve	SILT AND CLAY Liquid Limit Less Than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY Liquid Limit 50 or More	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
2. Soil classification using laboratory tests is based on ASTM D2487-90.
3. Descriptions of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

Dry - Absence of moisture, dusty, dry to the touch

Moist - Damp, but no visible water

Wet - Visible free water or saturated, usually soil is obtained from below water table

GEI 85-85 Rev. 05/93

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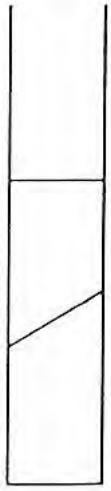
SOIL CLASSIFICATION SYSTEM

FIGURE 3

LABORATORY TESTS:

AL	Atterberg limits
CP	Compaction
CS	Consolidation
DS	Direct shear
GS	Grain-size
%F	Percent fines
HA	Hydrometer analysis
SK	Permeability
SM	Moisture content
MD	Moisture and density
SP	Swelling pressure
TX	Triaxial compression
UC	Unconfined compression
CA	Chemical analysis

SOIL GRAPH:



SM Soil Group Symbol (See Note 2)

Distinct Contact Between Soil Strata

Gradual or Approximate Location of Change Between Soil Strata

Water Level

Bottom of Boring

BLOW COUNT/SAMPLE DATA:

Blows required to drive a 2.4-inch I.D. split-barrel sampler 12 inches or other indicated distances using a 300-pound hammer falling 30 inches.

- 22 ■ Location of relatively undisturbed sample
- 12 ⊠ Location of disturbed sample
- 17 □ Location of sampling attempt with no recovery

Blows required to drive a 1.5-inch I.D. (SPT) split-barrel sampler 12 inches or other indicated distances using a 140-pound hammer falling 30 inches.

- 10 ◨ Location of sample obtained in general accordance with Standard Penetration Test (ASTM D 1586) procedures
- 26 ▥ Location of SPT sampling attempt with no recovery

▤ Location of grab sample

"P" indicates sampler pushed with weight of hammer or against weight of drill rig.

NOTES:

1. The reader must refer to the discussion in the report text, the Key to Boring Log Symbols and the exploration logs for a proper understanding of subsurface conditions.
2. Soil classification system is summarized in Figure 3 .

GEI 86-88 Rev. 2/94

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KEY TO BORING LOG SYMBOLS

FIGURE 4

TEST DATA

BORING B-1

Surface Elevation (ft.): 78

Depth (ft)	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
0						TOPSOIL	6 inches sod and topsoil
						SM	Brown silty fine to medium sand with occasional gravel (loose to medium dense, moist) Grades to wet at 2.0 feet
5	MD	19	113	22	■	ML	Grayish brown clayey silt with a trace of sand and gravel (very stiff, moist)
10	MD	24	104	20	■		Sand and gravel content increases, occasional shell fragments observed
15	MD	21	109	10	■		Grades to gray, stiff, with no shell fragments
20	MD	17	116	13	■		
						CL	Gray clay (medium stiff, moist)
25	MD	29	98	8	■		
30	MD	32	90	8	■		
35	MD	38	83	3	■		Grades to soft with a trace of sand
40	MD	38	85	7	■		

DEPTH IN FEET

Note: See Figure 4 for explanation of symbols

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LOG OF BORING

FIGURE 5

TEST DATA

BORING B-1
(Continued)

Depth in Feet	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
40							Grades to medium stiff with occasional gravel
						CL	Gray clayey silt with sand and occasional gravel (soft, moist)
				3	■		
45							
						SM	Gray silty sand with gravel (medium dense, wet)
	MD	16	115	13	■		
50							
						ML	Gray silt with fine to coarse sand and fine to coarse gravel (very stiff, moist)
55	MD	11	121	26	■		
	MD	10	133	34	■		
60							
						ML/SP	Gray silt with sand and occasional gravel interbedded with fine to coarse sand (dense, wet)
	MD	11	125	38	■		
65							
						SM/ML	Grayish brown silty fine sand interbedded with silt (very dense/hard, wet)
	MD	8	106	50/5"	■		
70							
75	MD	19	112	81	■		
	MD	15	122	59	■		
80							

Note: See Figure 4 for explanation of symbols

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LOG OF BORING

FIGURE 5

TEST DATA

BORING B-1
(Continued)

Depth (feet)	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
80						SP-SM	Gray fine to medium sand with silt (dense, wet)
85	SM	23		39	■		
90	MD	23	102	50/5.5"	■		Grades to very dense
						SP	Gray fine to medium sand (very dense, wet)
95	MD	20	110	50/5"	■	ML	Gray clayey silt (hard, moist)

Boring completed at 95.0 feet on 03/28/97
Ground water seepage observed between 2.5 and 4.0 feet, and between 49.5 and 95.0 feet

DEPTH IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

Note: See Figure 4 for explanation of symbols

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LOG OF BORING

FIGURE 5

TEST DATA

BORING B-2

Surface Elevation (ft.): 70

Depth (ft)	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
0						TOPSOIL	6 inches sod and topsoil
						SM	Brown silty fine to medium sand (medium dense, moist)
							Grades to wet at 2.5 feet
5	MD	22	105	17	■	ML	Brown clayey silt with a trace of sand and gravel (stiff, moist)
10	MD	12	122	13	■		
							Grades to wet at 12.0 feet
						CL	Gray clay with a trace of sand (soft, wet)
15	MD	28	98	4	■		
							Grades to very soft and moist
20	MD	26	104	2	■		
25	MD	34	88	4	■		Grades to soft
							Grades to medium stiff
30	MD	26	99	5	■		
35	MD	33	89	6	■		
40	MD	35	89	4	■		Gravel content increases

DEPTH IN FEET

Note: See Figure 4 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE 6

TEST DATA

BORING B-2
(Continued)

DEPTH IN FEET	Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
40							
45	MD	34	90	6	■		
						ML	Gray silt with fine to medium sand (stiff, wet)
50	SM	32		11	▨		
							Gravel content increases
55	MD	19	112	9	■		
						ML	Gray silt with sand and occasional cobbles (stiff to very stiff, wet) (blowcount overstated)
60	SM	24		39	⊟		
						ML/SM	Interbedded clayey silt, silty fine to medium sand and occasional gravel (hard/very dense, wet)
65	MD	21	108	94	■		
70	MD	15	120	50/6"	■		
							Density increased from 71.0 to 73.0 feet
						SP	Gray fine to medium sand (very dense, wet)
75	MD	22	106	50/4"	■		
80	MD	18	110	50/6"	■		

Note: See Figure 4 for explanation of symbols

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LOG OF BORING

FIGURE 6

TEST DATA

BORING B-2
(Continued)

Lab Tests	Moisture Content (%)	Dry Density (pcf)	Blow Count	Samples	Group Symbol	DESCRIPTION
					SP/SM	Gray fine to medium sand interbedded with silty fine to medium sand (very dense, wet)
			50/4"	■		
						Boring completed at 85.0 feet on 03/27/97 Ground water seepage observed between 2.5 and 4.0 feet, and between 50.0 and 85.0 feet

DEPTH IN FEET: 80, 85, 90, 95, 100, 105, 110, 115, 120

Note: See Figure 4 for explanation of symbols

Geo Engineers

LOG OF BORING

FIGURE 6

APPENDIX C
Report Limitations and Guidelines for Use

REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

Geotechnical Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for the exclusive use of Pacific International Terminals, and their authorized agents. This report may be made available to other members of the design team. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A Geotechnical Engineering or Geologic Report is Based on a Unique Set of Project-specific Factors

This report has been prepared for the proposed Gateway Pacific Terminal Phase I, to be located in Whatcom County, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

- project ownership.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

Subsurface Conditions Can Change

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

Most Geotechnical and Geologic Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Geotechnical Engineering Report Recommendations are Not Final

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A Geotechnical Engineering or Geologic Report Could be Subject to Misinterpretation

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Exploration Logs

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Give Contractors a Complete Report and Guidance

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

Contractors are Responsible for Site Safety on Their Own Construction Projects

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical, Geologic and Environmental Reports Should Not be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of biological pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of biological pollutants and no conclusions or inferences should be drawn regarding biological pollutants, as they may relate to this project. The term "biological pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.