December 29, 2017

Mr. Steve Kinsley
KPFF
2407 N 31st Street
Suite 100
Tacoma, WA 98407

Re: Supplemental Geotechnical Site Investigation Summary and Recommendations
Proposed Auto Import Terminal for Port of Tacoma
19303-00

Dear Steve:

We have completed our geotechnical site investigations for the former Kaiser Aluminum site for the proposed auto import terminal for the Port of Tacoma (Port). This letter presents the results of Hart Crowser's geotechnical site investigations and provides recommendations for flexible pavement design. This letter is an update of our August 11, 2017 Geotechnical Site Investigations Summary letter, which focused on infiltration feasibility for pervious pavement design. We understand that pervious pavement and site-wide infiltration are no longer being considered for this project. Refer to our August 11, 2017 letter for our preliminary infiltration-related soils assessment.

Project Understanding

We understand the project will consist of development of an auto processing and storage facility similar to other sites in the Port. The project will include new paving, utilities, buildings, and rail construction, and some regrading activities. Based on preliminary grading plans provided by KPFF, we understand that portions of the site will be filled and others cut from existing grades. Some areas will require stripping of vegetation.

The Kaiser Site has been extensively developed in the past and has been the subject of numerous phases of environmental cleanup. The site was an active aluminum smelting plant from the 1940s through the early 2000s. Since the plant closure, the Port has demolished the smelting operation and performed extensive remediation. Material dredged from the widening of the Blair Waterway has been placed in various areas of the site and the extent and nature of the dredge material and historic filling and regrading activities has resulted in a heterogeneous mixture of near surface soils.

Site Investigation and Subsurface Conditions

The approximately 96-acre site is located at 3400 Taylor Way, Tacoma, Washington on the Blair Hylebos peninsula and is owned by the Port of Tacoma (Vicinity Map, Figure 1).

We completed a site investigation on the project site consisting of 26 test pits (18 planned locations plus 8 adjusted locations) from June 28 to June 30, 2017 and 33 dynamic cone penetrometer (DCP) tests from November 15 to November 17, 2017. The DCP test provides a measurement of subgrade density and can be correlated to in-place modulus for use in pavement design. We completed our test pits in accordance with our Geotechnical Investigations Plan memorandum dated June 27, 2017 and our DCP tests in accordance with our Geotechnical Investigations Plan memorandum dated November 13, 2017. Logs of the test pit explorations are provided in Appendix A. Geotechnical laboratory testing results from select samples are provided in Appendix B.

In some test pit and DCP locations, concrete obstructions believed to be old building foundations were encountered and planned test pit locations were adjusted. Where obstructions were not encountered, test pits were extended to approximately 6 to 8 feet below ground surface (bgs). The locations of the test pits are shown on Figure 2.

Large portions of the site have approximately 6 inches of crushed concrete and rock covering fill soils. This crushed aggregate surface appeared to be generally well-compacted where present.

DCP test results indicate in-place subgrade modulus values ranging from 6,300 pounds per square inch (psi) to 18,000 psi with an average of 9,900 psi. A summary of DCP explorations is provided in Table 1.

Table 1 – Dynamic Cone Penetration Summary

DCP ID	Soil Area	Soil subgrade modulus (psi)	Notes
DCP-1	D	8,500	Asphalt at grade to 6" below grade
DCP-2	D	8,500	Concrete slab at grade to 6" below grade
DCP-3	D	8,500	Crushed concrete and rock at grade to 6" below grade
DCP-4	D	7,900	Crushed concrete and rock at grade to 6" below grade
DCP-5	D	8,400	
DCP-6	D	8,400	
DCP-7	C	18,000	High modulus likely skewed by gravel content
DCP-8	C	7,100	
DCP-9	C	6,300	
DCP-10	C	14,900	
DCP-11	B	9,100	Concrete slab at 1.25' below grade
DCP-12	B	11,900	Concrete slab at 3' below grade
DCP-13	B	11,300	Concrete slab at 3' below grade
DCP-14	B	10,700	Crushed concrete and rock at grade to 6" below grade
DCP-15	B	10,600	
DCP-16	A	7,800	
DCP-17	A	7,800	
DCP-18	A	8,200	
DCP-19	A	8,200	Crushed concrete and rock at grade to 1' below grade
DCP-20	A	11,100	
DCP-21	A	7,000	
DCP-22	A	8,900	
DCP-23	A	12,000	
DCP-24	A	7,700	
DCP-25	A	10,000	
DCP-26	A	10,000	Crushed concrete and rock at grade to 6" below grade
DCP-27	A	11,000	Crushed concrete and rock at grade to 6" below grade
DCP-28	A	11,400	
DCP-29	A	12,100	
DCP-30	B	14,400	Cobbles observed in this area
DCP-31	C	9,600	Concrete slab at 3' below grade
DCP-32	B	11,300	
DCP-33	B	9,200	Concrete slab at 2' below grade

Based on our review of the logs and soil types, modulus estimates at or near 18,000 psi are not reliable and are likely related to artificially high resistance from pieces of gravel. Surficial soils at the site consist of sand and gravel with varying amounts of silt and clay content. There appeared to be four distinct soil areas across the site – possibly due to different historical fill activity. These areas (Area A, B, C, and D) are shown on Figure 2. The boundaries and extents of the soil Areas are approximate. The general characteristics of the soils in each area are as follows:

- Area A – Poorly graded sand and gravel with silt and clay. In several Area A test pits, silt and clay conglomerates were observed that appeared to be gravel but could be crushed by hand. In-place subgrade modulus estimates from DCP tests in Area A range from 7,000 psi to 12,100 psi with an average of 9,500 psi.
- Area B – Silty sand and gravel. In several Area B test pits, silt and clay conglomerates were observed that appeared to be gravel but could be crushed by hand. In-place subgrade modulus estimates from DCP tests in Area B range from 9,100 psi to 14,400 psi with an average of 11,100 psi.
- Area C – Poorly graded sand and gravel with silt and clay. In-place subgrade modulus estimates from DCP tests in Area C range from 6,300 psi to 18,000 psi with an average of 11,200 psi. As noted previously, we do not consider modulus estimates at or near 18,000 psi to be reliable. Therefore, an average modulus of 9,500 psi is likely more appropriate.
- Area D – 2 to 4 feet of poorly graded sand with silt over silty sand. Very few gravels were observed in Area D. In-place subgrade modulus estimates from DCP tests in Area D range from 7,900 psi to 8,500 psi with an average of 8,400 psi.

Some test pit locations were vegetated and had roots to depths of 6 to 12 inches. Groundwater was encountered in 7 test pit locations at depths of 6 to 8 feet bgs. Concrete obstructions were encountered in 10 test pit locations at depths of 1.5 to 5 feet bgs. Concrete obstructions were also encountered at several DCP locations as noted in Table 1. A summary of test pit explorations is provided in Table 2.

Table 2 – Test Pit Explorations Summary

Test Pit ID	Soil Area	Approximate Depths (feet)			
		Total Test Pit Depth	Root Zone	To Groundwater	To Concrete Obstructions
TP-1	A	6	0.5	6	N/A
TP-2	A	8	0	N/A	N/A
TP-3	A	8	0.5	8	N/A
TP-4	A	7	0	N/A	N/A
TP-5	A	8	1	8	N/A
TP-6	C	3.5	0.5	N/A	3.5
TP-6-2	C	8	0	N/A	N/A
TP-7	A	8	0	N/A	N/A
TP-8	B	8	0	N/A	N/A
TP-9	B	2	0	N/A	2
TP-9-2	B	7.5	0	N/A	N/A
TP-10	B	2.5	0	N/A	2.5
TP-10-2	C	8	0	N/A	N/A
TP-11	A	8	0	7	N/A
TP-12	B	4	0	N/A	5
TP-12-2	B	8	0	N/A	N/A
TP-13	B	4.5	0	N/A	4.5
TP-13-2	C	8	0	N/A	N/A
TP-14	C	3	0.5	N/A	3
TP-14-2	C	5	0.5	N/A	5
TP-14-3	C	1.5	0.5	N/A	1.5
TP-15	C	8	0	6	N/A
TP-16	B	5	0	N/A	5
TP-16-2	B	3.5	0	N/A	3.5
TP-17	D	7	0.5	6	N/A
TP-18	D	6	0.5	6	N/A

Multiple known contaminants have been previously associated with this site. We understand that identified contamination at the site has been cleaned up or capped, but that it was possible for test pit activities at the site to result in discovery of unanticipated contamination. Except for TP-10-2, where potential black carbon waste was observed, we did not encounter any suspected contamination at the site.

Pavement Design Recommendations

This section provides recommended hot mix asphalt (HMA) pavement sections based on the anticipated subgrade conditions, traffic, and design parameters.

Subgrade Conditions

We assume that well-compacted fill soils (to a minimum depth of two feet below final subgrade elevation) will provide a subgrade modulus of about 9,000 to 10,000 psi. Cut areas should receive in-place vibratory compaction with a vibratory roller. Depending on the conditions encountered at the time of grading, it may be necessary to overexcavate the upper foot of material, compact the exposed subgrade, and then replace and recompact the removed layer of material. Based on the soil types present on the site, we estimate that a modulus value on the order of 9,000 psi will be achievable in cut areas with in-place compaction. However, areas with an existing modulus of 9,000 psi or greater may not experience much improvement from vibratory compaction. A modulus of 9,000 psi is assumed for design across the site.

Traffic

We understand there will be two categories of anticipated traffic for paved areas - "storage" (primarily used to park auto imports) and "trucking" (where occasional truck traffic and heavier vehicles may pass through). The ESALs over the 20-year design life for the storage and trucking areas used in our analysis are 18,000 and 90,000, respectively.

Design Parameters

The following pavement design parameters were based on guidelines found in WSDOT (2015c) and AASHTO (1993), as well as on the site-specific subgrade conditions encountered at and proposed for the roadway alignment.

- Average resilient modulus of 9,000 psi for cut areas subjected to in-place vibratory compaction and fill areas with well-compacted fill;
- A resilient modulus of 30,000 psi for new base rock (e.g., crushed surfacing);
- Initial and terminal serviceability index of 4.2 and 2.5, respectively;
- Reliability and standard deviation of 85 percent and 0.45, respectively, for new pavement;
- Structural coefficients of 0.50 and 0.13 for new HMAC and crushed surfacing layers, respectively.

Pavement Sections

Based on the results and assumptions above, we make the recommendations listed in Table 4 for pavement sections across the site with the proper subgrade preparation. Subgrade preparation should include compaction of in-situ soil in cut areas and areas of less than 2 feet of fill. Areas of greater than 2 feet of fill may not require in-place compaction, but should be proof rolled prior to placing well-compacted fill over them. Soft areas observed during construction may require overexcavation and replacement or additional in-place compaction.

Table 4 – Recommendations for Pavement Sections

Area Usage	HMA Thickness (inches)	Base Rock Thickness (inches)
Storage	2.5	3.5
Trucking	3.0	5.5

Note that by-the-book pavement design would allow for 2.0 inches of asphalt over 4.5 inches of base rock, however, in our experience, less than 2.5 inches of asphalt results in a product that is very susceptible to damage. It may only take a single pass of a heavily loaded vehicle to crack 2.0 inches of asphalt. Once cracked, sections of asphalt this thin are essentially beyond repair and will deteriorate rapidly. Therefore, we do not recommend asphalt sections less than 2.5 inches. The base rock thickness has been adjusted to take advantage of the extra 0.5 inch of asphalt recommended for storage areas in Table 4.

Site Preparation

Clearing Vegetation

Portions of the site will require clearing and grubbing of vegetation in advance of placing new fill. Based on the test pit observations, the root zones for minor vegetation (grass and weeds) is typically 6 inches or less. Some shrubs and small trees will have deeper roots. In general, when a topsoil zone is thin, it is often better to fill directly on top of it after mowing vegetation down rather than removing the topsoil and root zone. The vegetation can act as a sort of stabilizing layer. However, vegetation can also interfere with aggregate base compaction. Therefore, we recommend that grass and weed vegetation be mowed and fill placed directly on top where fill thicknesses (below aggregate base) is 12 inches or more. Where fill thicknesses are less than 12 inches, we recommend that the contract documents allow for at least 3 inches of surface to be stripped. Specifications should be prepared in such a manner as to allow the decision about stripping depth to be determined in the field during construction whereby we can observe the conditions and make the appropriate decisions.

Subgrade Preparation

Cut areas and areas of less than 12 inches of fill should receive in-place vibratory compaction with a vibratory roller. The effectiveness of in-place vibratory compaction is highly dependent on moisture content. If construction occurs during wet weather conditions, the assumed improvements from compaction and the ability to place well-compacted fill may be compromised. Other subgrade treatment/fill placement options (such as cement stabilization) may be needed for wet weather construction.

Following site stripping and compaction, the suitability of the subgrade should be evaluated by proof rolling with a fully loaded dump truck or similar heavy rubber-tired construction equipment to identify any remaining soft, loose, or unsuitable areas. The proof roll should be conducted prior to placing fill. The proof rolling should be observed by a representative of Hart Crowser who should evaluate the suitability of the subgrade and identify areas of yielding that are indicative of soft or loose soil.

It should be noted that much of the expected subgrade is moisture sensitive and may be wet of the optimum moisture for compaction. In these cases, it will be necessary to moisture condition the subgrade during dry weather periods using an agricultural disc or other methods to lower the moisture content to within two percent of optimum moisture.

Construction Observations

Satisfactory structure, pavement, and earthwork performance depends to a large degree on quality of construction. Sufficient monitoring of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during subsurface explorations. Recognition of differing conditions often requires experience; therefore, Hart Crowser or their representative should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated

We recommend that Hart Crowser be retained to monitor construction at the site to confirm that subsurface conditions are consistent with the site explorations and to confirm that the intent of project plans and specifications relating to earthwork and foundation construction are being met. In particular, we recommend that Hart Crowser review contractor submittals and provide a representative to observe and/or test the following:

- Placement and testing of compacted material;
- Preparation of roadway subgrade and aggregate base; and
- Other geotechnically relevant items that may arise during construction.

Closing

This letter is for the exclusive use of the Port of Tacoma, KPFF, and their consultants for the specific application to the subject project and site. We completed this preliminary investigation and assessment in accordance with generally accepted geotechnical practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. We make no other warranty, express or implied.

We trust that this letter report meets your current project needs.

Sincerely,

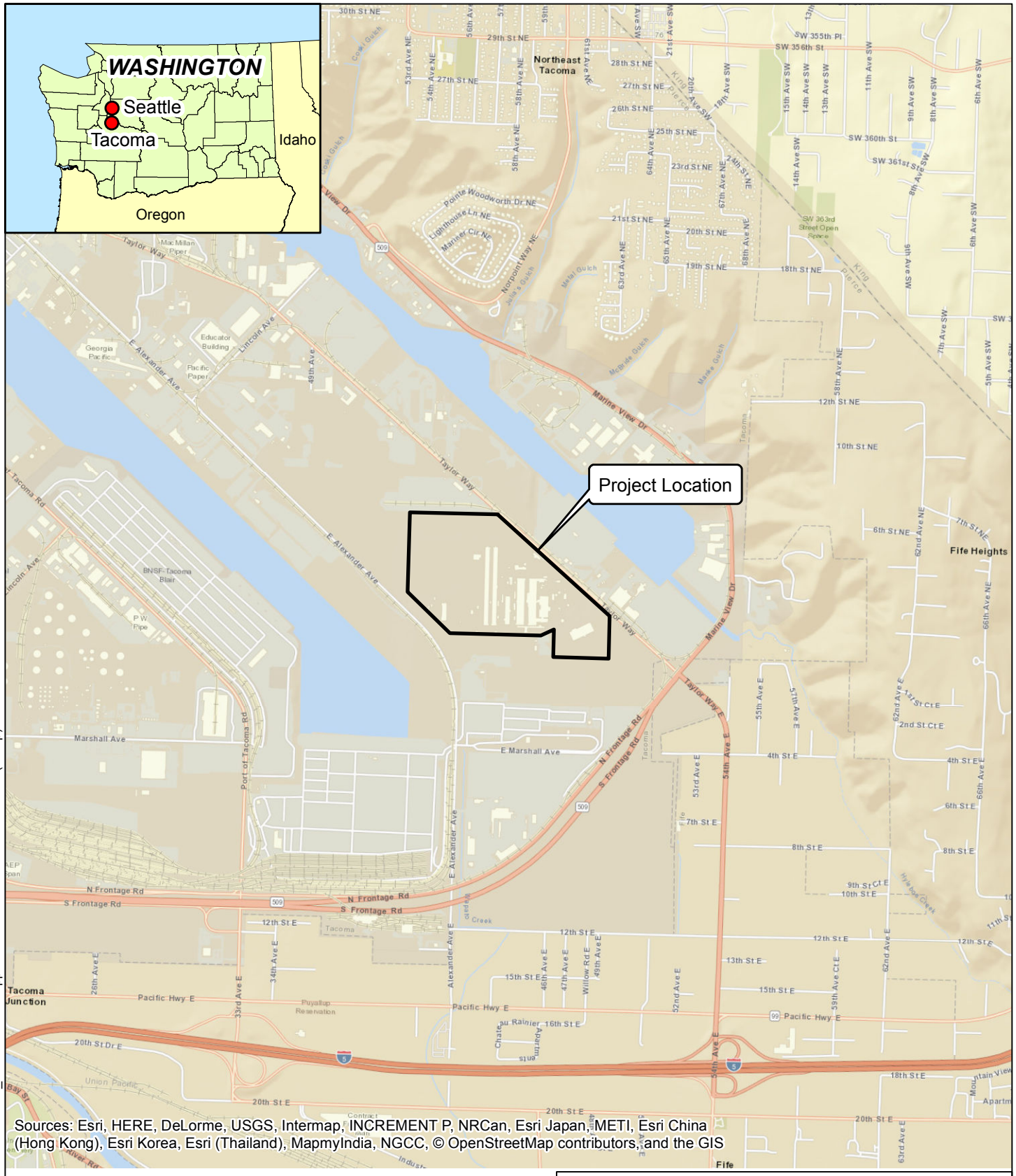
HART CROWSER, INC.

LORNE ARNOLD, PHD, PE
Project Geotechnical Engineer

GARRY E. HORVITZ, PE, LEG
Senior Principal Geotechnical Engineer

Attachments:
Figure 1 – Vicinity Map
Figure 2 – Site, Exploration and Soil Areas Plan
Appendix A – Test Pit Logs
Appendix B – Geotechnical Laboratory Testing

\\seafs\Projects\Notebooks\1930301_Geotechnical Support for Parcel 77\Deliverables\Letters\Geotech investigations and recommendations\Port of Tacoma Auto Terminal Geotechnical Investigations and Recommendations.docx



0 1,000 2,000 4,000 Feet

N

Port of Tacoma Auto Terminal
Tacoma, Washington

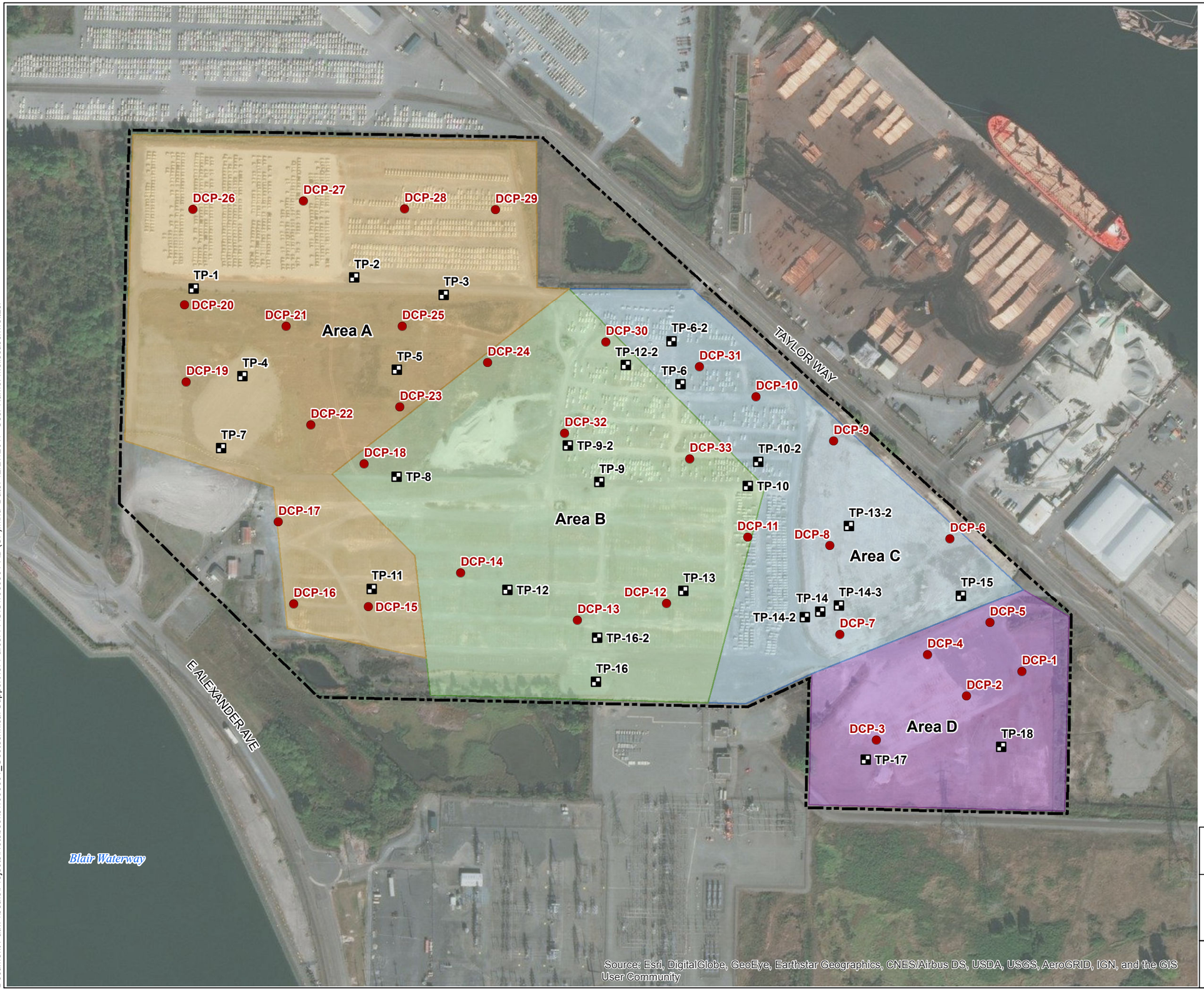
Vicinity Map

19303-01 12/17

HARTCROWSER

Figure 1

Document Path: \\seafs\Projects\Notebooks\19303301_Geotechnical Support for Parcel 77\GIS\1930301-AC (Vmap).mxd Date: 12/27/2017 User Name: melissaschweitzer



Legend

- DCP
- Test Pit
- Site Boundary

Soil Areas

- Area A
- Area B
- Area C
- Area D

Note: Feature locations are approximate.

0 150 300 600 Feet

N

Port of Tacoma Auto Terminal
Tacoma, Washington

Site and Exploration Plan

19303-01 12/17

HARTCROWSER

Figure 2

Document Path: \\seafs\Projects\Notebooks\19303301_Geotechnical Support for Parcel 77\GIS\19303301-AB (SP).mxd Date: 12/27/2017 User Name: melissaschweitzer

APPENDIX A
Test Pit Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. ASTM D 2488 visual-manual identification methods were used as a guide. Major divisions are not necessarily an indicator of soil behavior, which is a function of fines content activity and loading rate.

Relative Density/Consistency

Soil density/consistency in borings is related primarily to the standard penetration resistance (N). Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Relative Density	N (Blows/Foot)	SILT or CLAY Consistency	N (Blows/Foot)
Very loose	0 to 4	Very soft	0 to 2
Loose	4 to 10	Soft	2 to 4
Medium dense	10 to 30	Medium stiff	4 to 8
Dense	30 to 50	Stiff	8 to 15
Very dense	>50	Very stiff	15 to 30
		Hard	>30

Moisture

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

Soil Classification Chart

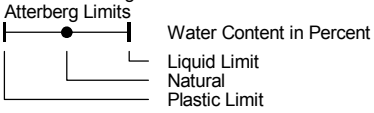
Major Divisions			Symbols: Graph	Symbols: USCS	Typical Descriptions
Coarse Grained Soils — More than 50% of Material Retained on No. 200 Sieve	Gravel and Gravelly Soils — More than 50% of Coarse Fraction Retained on No. 4 Sieve	Clean Gravels (<5% fines)		GW	Well-Graded Gravel; Well-Graded Gravel with Sand
				GP	Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Gravels (10% fines)		GW-GM	Well-Graded Gravel with Silt; Well-Graded Gravel with Silt and Sand
				GW-GC	Well-Graded Gravel with Clay; Well-Graded Gravel with Clay and Sand
				GP-GM	Poorly Graded Gravel with Silt; Poorly Graded Gravel with Silt and Sand
				GP-GC	Poorly Graded Gravel with Clay; Poorly Graded Gravel with Clay and Sand
		Gravels with Fines (>12% fines)		GM	Silty Gravel; Silty Gravel with Sand
				GC	Clayey Gravel; Clayey Gravel with Sand
	Sand and Sandy Soils — More than 50% of Coarse Fraction Passing No. 4 Sieve	Sands with few Fines (<5% fines)		SW	Well-Graded Sand; Well-Graded Sand with Gravel
				SP	Poorly Graded Sand; Poorly Graded Sand with Gravel
		Sands (10% fines)		SW-SM	Well-Graded Sand with Silt Well-Graded Sand with Silt and Gravel
				SW-SC	Well-Graded Sand with Clay; Well-Graded Sand with Clay and Gravel
				SP-SM	Poorly Graded Sand with Silt; Poorly Graded Sand with Silt and Gravel
				SP-SC	Poorly Graded Sand with Clay; Poorly Graded Sand with Clay and Gravel
		Sands with Fines (>12% fines)		SM	Silty Sand; Silty Sand with Gravel
				SC	Clayey Sand; Clayey Sand with Gravel
Fine Grained Soils — More than 50% of Material Passing No. 200 Sieve	Silts			ML	Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
				MH	Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
	Clays			CL	Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
				CH	Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
	Organics			OL/OH	Organic Soil; Organic Soil with Sand or Gravel; Sandy or Gravelly Organic Soil
Highly Organic				PT	Peat - Decomposing Vegetation - Fibrous to Amorphous Texture

Minor Constituents

	Estimated Percentage
Trace	<5
Few	5 - 10
Little	15 - 25
Some	30 - 45

Soil Test Symbols

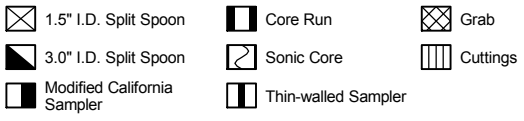
%F	Percent Passing No. 200 Sieve
AL	Atterberg Limits



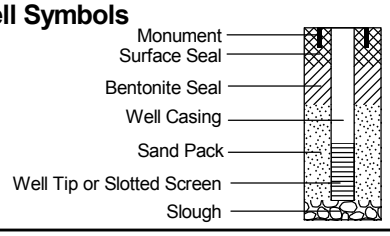
CA	Chemical Analysis
CAUC	Consolidated Anisotropic Undrained Compression
CAUE	Consolidated Anisotropic Undrained Extension
CBR	California Bearing Ratio
CIDC	Consolidated Drained Isotropic Triaxial Compression
CIUC	Consolidated Isotropic Undrained Compression
CK0DC	Consolidated Drained k0 Triaxial Compression
CK0DSS	Consolidated k0 Undrained Direct Simple Shear
CK0UC	Consolidated k0 Undrained Compression
CK0UE	Consolidated k0 Undrained Extension
CRSCN	Constant Rate of Strain Consolidation
DSS	Direct Simple Shear
DT	In Situ Density
GS	Grain Size Classification
HYD	Hydrometer
ILCN	Incremental Load Consolidation
K0CN	k0 Consolidation
kc	Constant Head Permeability
kf	Falling Head Permeability
MD	Moisture Density Relationship
OC	Organic Content
OT	Tests by Others
P	Pressuremeter
PID	Photoionization Detector Reading
PP	Pocket Penetrometer
SG	Specific Gravity
TRS	Torsional Ring Shear
TV	Torvane
UC	Unconfined Compression
UUC	Unconsolidated Undrained Triaxial Compression
VS	Vane Shear
WC	Water Content

Groundwater Indicators

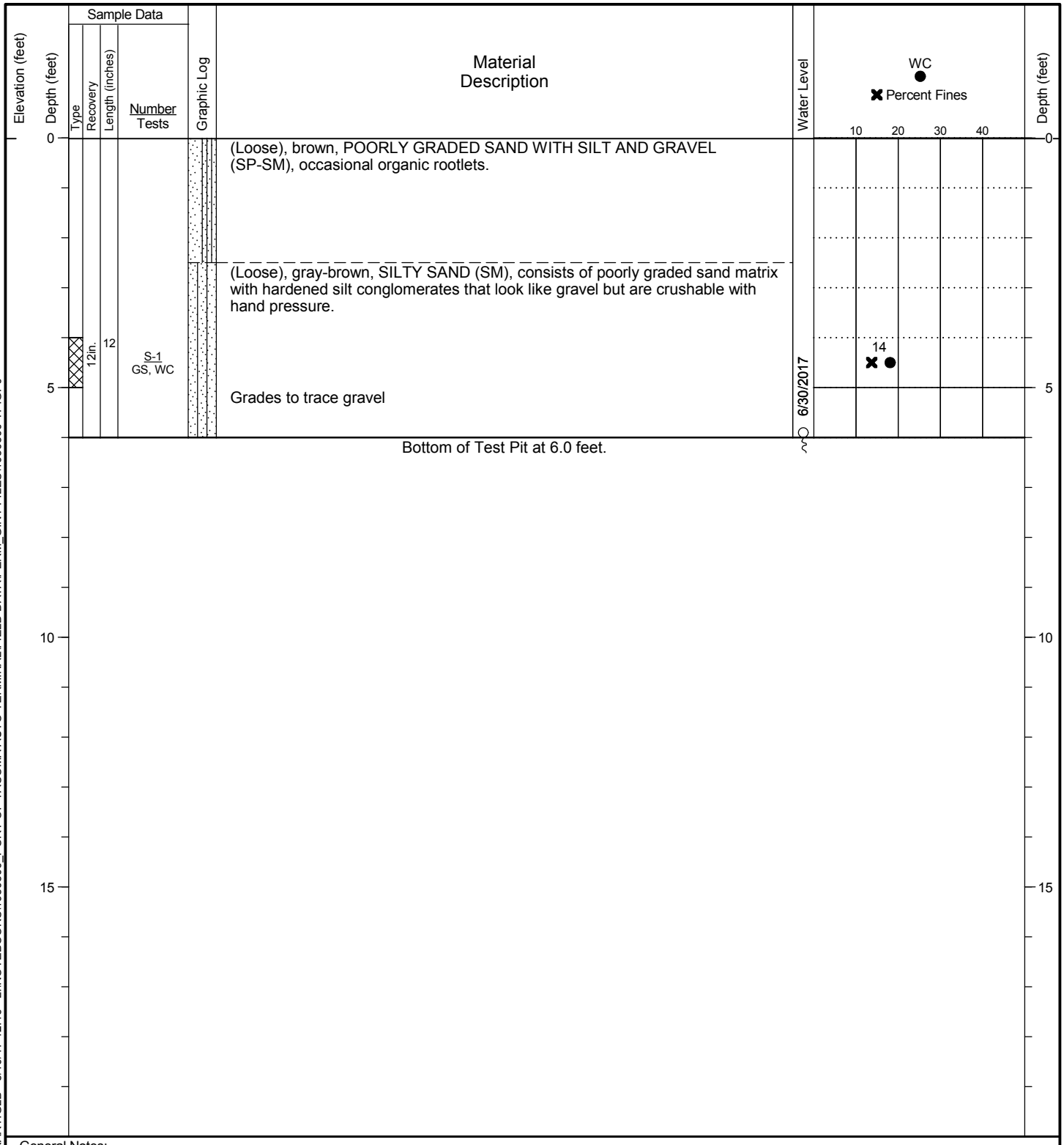
Sample Symbols



Well Symbols



Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.261893 Long: -122.375169		Total Depth: 6 feet	Depth to Seepage: 6 feet
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			



General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER	Project: Port of Tacoma Auto Terminal Location: Tacoma, WA Project No.: 19303-00	Test Pit Log **TP-1**	Figure **A-2** Sheet **1 of 1**

Date Started: 6/30/17 Date Completed: 6/30/17 Excavation Contractor/Crew:

Logged by: M. Goodman Checked by: J. Harmon Rig Model/Type:

Location: Lat: 47.262018 Long: -122.373124 Total Depth: 8 feet Depth to Seepage: Not Encountered

Ground Surface Elevation: Comments: No odors or visual indicators of potential contamination

Horizontal Datum: WGS 84

Vertical Datum:

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP).	0
		6in.		6	S-1		(Medium dense), dry, POORLY GRADED SAND WITH CLAY (SP-SC), trace gravel, high plasticity fines, brown-gray clay conglomerates.	
	5	6in.		6	S-2		(Medium dense), moist, POORLY GRADED SAND WITH SILT (SP-SM), trace gravel.	5
							Bottom of Test Pit at 8.0 feet.	
	10							10
	15							15

General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-2

Figure **A-3**
Sheet **1 of 1**

HC TEST PIT - F:\GINT\HC_LIBRARY.GLB - 8/10/17 12:16 - L:\NOTEBOOKS\1930300_PORT OF TACOMA AUTO TERMINAL\FIELD DATA\PERM_GINT FILES\1930300-TP.GPJ

Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.261881 Long: -122.371978		Total Depth: 8 feet	Depth to Seepage: 8 feet
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Water Level	Depth (feet)
	0						Topsoil, grass and weeds (6-inch thick)		0
		6in.		6	S-1		(Medium dense), dry, light brown, POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), numerous organic roots and rootlets.		
							Increased gravel content, trace cobbles		
	5	6in.		6	S-2		Moist, dark brown, POORLY GRADED SAND WITH SILT (SP-SM), trace gravel, trace clay.	6/30/2017	5
							Increased moisture content		
							Bottom of Test Pit at 8.0 feet.		
	10								10
	15								15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-3

Figure **A-4**
Sheet **1 of 1**

Date Started: 6/30/17 Date Completed: 6/30/17 Excavation Contractor/Crew:

Logged by: M. Goodman Checked by: J. Harmon Rig Model/Type:

Location: Lat: 47.261140 Long: -122.374525 Total Depth: 7 feet Depth to Seepage: Not Encountered

Ground Surface Elevation: Comments: No odors or visual indicators of potential contamination

Horizontal Datum: WGS 84

Vertical Datum:

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	WC / Percent Fines	Depth (feet)
	0							10 20 30 40	0
		6in.	6		S-1 GS, WC		(Loose to medium dense), dry, brown, POORLY GRADED GRAVEL (GP), angular gravel.	2	
							(Medium dense), dry, brown, POORLY GRADED GRAVEL WITH SAND (GP).		
	5	6in.	6		S-2		(Dense), moist, brown, POORLY GRADED SAND WITH CLAY (SP-SC), trace gravel, high plasticity fines, brown-gray clay in conglomerate pieces of to 1 inch. Becomes very dense		5
							Bottom of Test Pit at 7.0 feet.		
	10								10
	15								15

General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

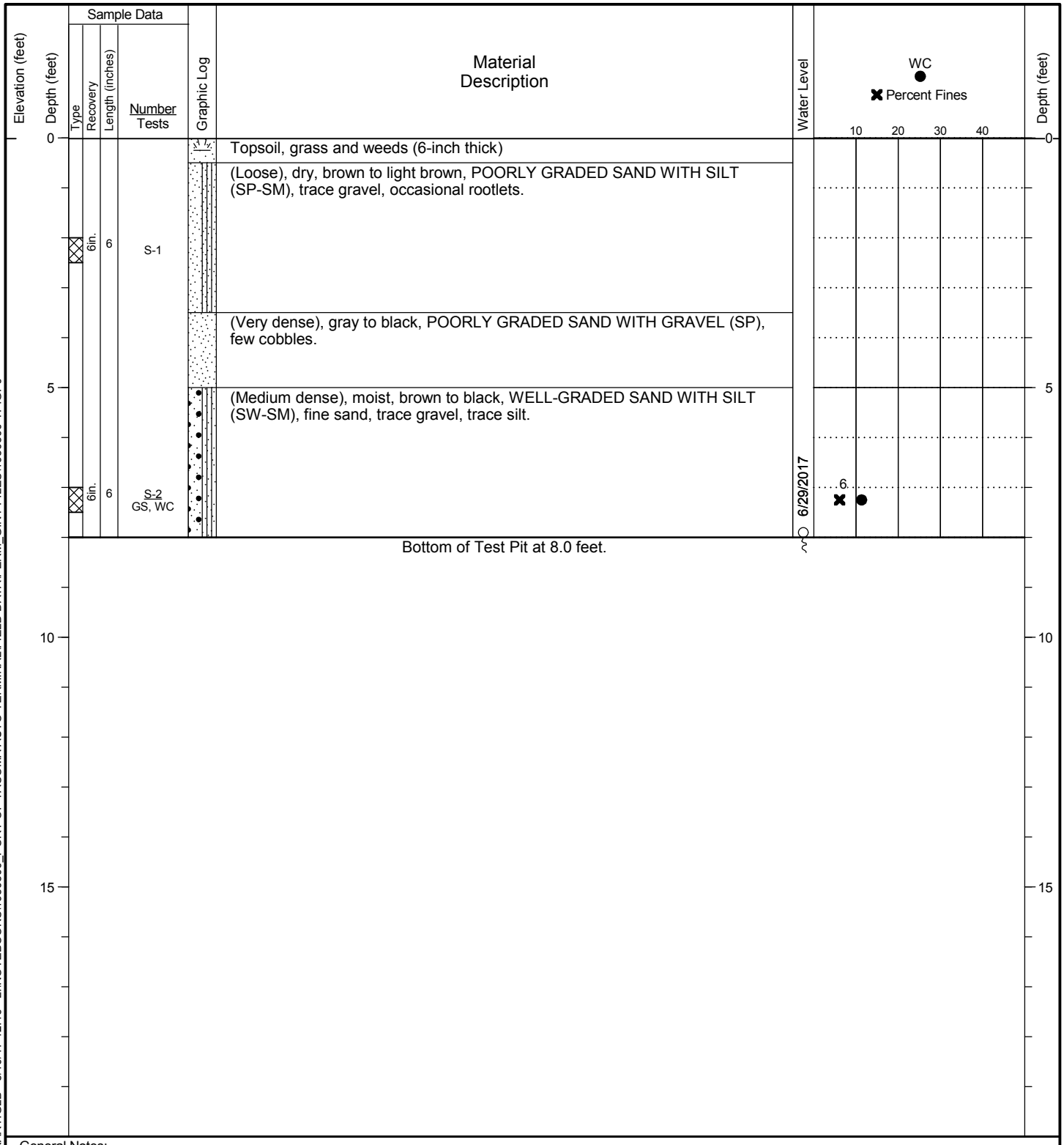
Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-4

Figure **A-5**
Sheet **1 of 1**

HC TEST PIT - F:\GINT\HC_LIBRARY.GLB - 8/10/17 12:16 - L:\NOTEBOOKS\1930300_PORT OF TACOMA AUTO TERMINAL\FIELD DATA\PERM_GINT FILES\1930300-TP.GPJ

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.261223 Long: -122.372559		Total Depth: 8 feet	Depth to Seepage: 8 feet
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			



General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER	Project: Port of Tacoma Auto Terminal Location: Tacoma, WA Project No.: 19303-00	Test Pit Log **TP-5**	Figure **A-6** Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.261147 Long: -122.368937		Total Depth: 3.5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	WC / Percent Fines	Depth (feet)
	0						(Medium dense), POORLY GRADED GRAVEL WITH SAND (GP), numerous roots and weeds near surface.	10 20 30 40	0
							(Dense), dry, black, POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), subrounded gravel.		
			6in.	6	S-1 GS, WC		Concrete slab obstruction at 3.5 feet below grade	10	
							Bottom of Test Pit at 3.5 feet.		
	5								5
	10								10
	15								15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-6

Figure **A-7**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.261517 Long: -122.369063		Total Depth: 8 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).	0
							(Medium dense), dry, brown, POORLY GRADED SAND WITH GRAVEL (SP).	
			6in.	6	S-1		(Medium dense to dense), dry, gray to brown, CLAYEY SAND (SC), trace gravel, trace cobbles. Wood chips and debris up to 3-inches large at 3' depth	
	5							5
			6in.	6	S-2		(Stiff), moist, gray, SILT WITH SAND (ML), trace gravel, low plasticity.	
							Bottom of Test Pit at 8.0 feet.	
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-6-2

Figure **A-8**
Sheet **1 of 1**

Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.260513 Long: -122.374777		Total Depth: 8 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).	0
							(Loose), dry, brown, POORLY GRADED SAND WITH GRAVEL (SP).	
			6in.	6	S-1		(Dense to very dense), moist, POORLY GRADED GRAVEL WITH CLAY (GP-GC), angular to subangular gravel, trace cobbles.	
							(Dense to very dense), POORLY GRADED SAND WITH GRAVEL (SP), trace cobbles.	
	5							5
			12in.	12	S-2		(Dense to medium dense), gray-brown, POORLY GRADED SAND WITH CLAY (SP-SC), low plasticity fines.	
							Bottom of Test Pit at 8.0 feet.	
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-7

Figure **A-9**
Sheet **1 of 1**

Date Started: 6/28/17 Date Completed: 6/28/17 Excavation Contractor/Crew:

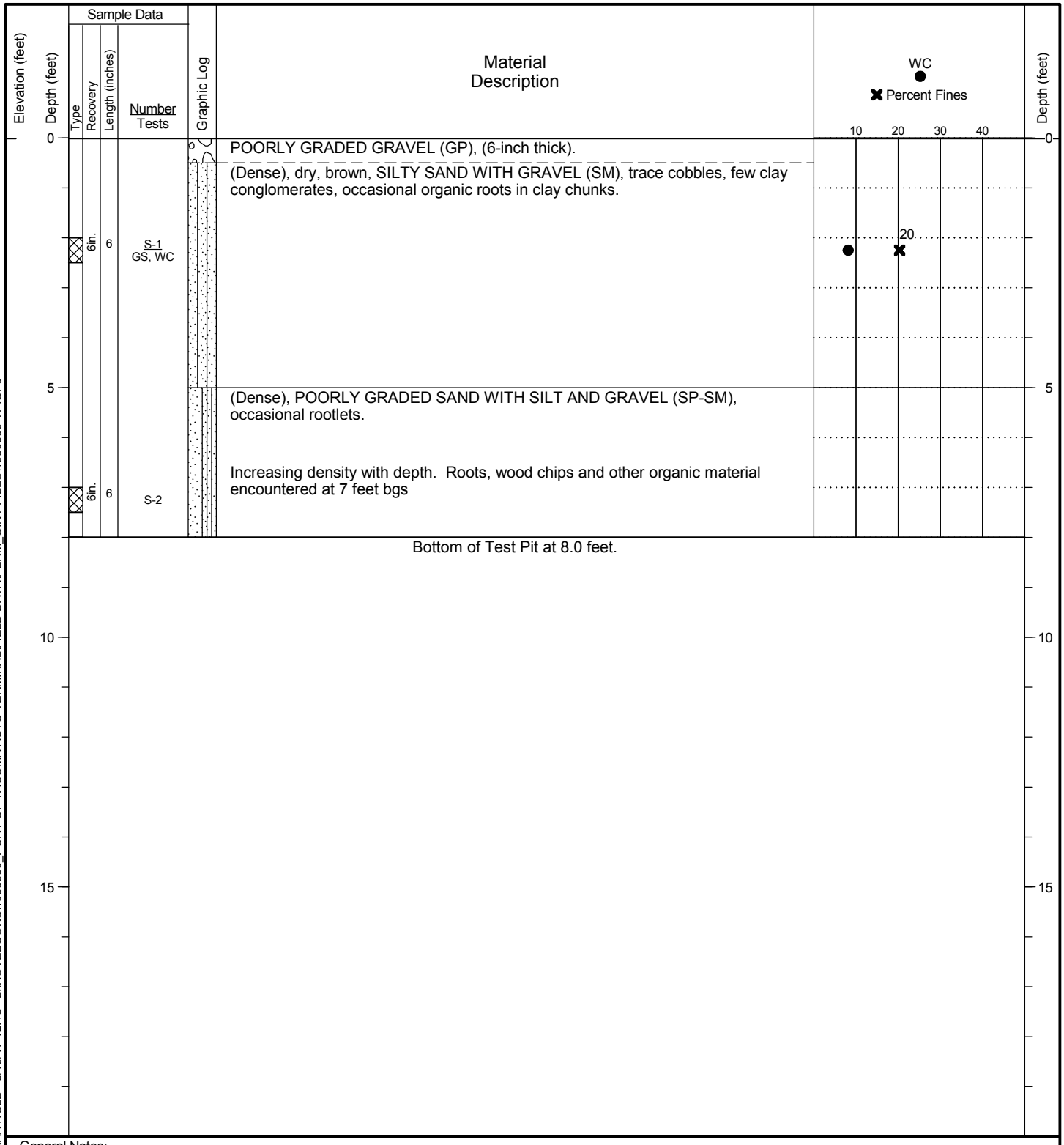
Logged by: M. Goodman Checked by: J. Harmon Rig Model/Type:

Location: Lat: 47.260294 Long: -122.372534 Total Depth: 8 feet Depth to Seepage: Not Encountered

Ground Surface Elevation: Comments: No odors or visual indicators of potential contamination

Horizontal Datum: WGS 84

Vertical Datum:



General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-8

Figure **A-10**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.260283 Long: -122.369948		Total Depth: 2 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).	0
			6in.	6	S-1		(Medium dense), brown, SILTY SAND (SM), trace gravel.	
							Concrete slab obstruction at 2 feet bgs	
							Bottom of Test Pit at 2.0 feet.	
	5							5
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-9

Figure **A-11**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.260594 Long: -122.370359		Total Depth: 7.5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	WC / Percent Fines (10, 20, 30, 40)	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).		0
							(Medium dense), dry, brown, POORLY GRADED GRAVEL WITH SAND (GP), few cobbles.		
							(Medium dense), dry, gray, SILTY SAND (SM), trace gravel, trace cobbles, few high plasticity clay conglomerates.		
		6in.	6		S-1 GS, WC			WC ● at 27; Percent Fines ✖ at 27	
	5								5
		6in.	6		S-2		(Very dense), dry, gray, POORLY GRADED GRAVEL WITH SAND (GP), subangular gravel, trace clay.		
							Bottom of Test Pit at 7.5 feet.		
	10								10
	15								15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-9-2

Figure **A-12**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.260274 Long: -122.368052		Total Depth: 2.5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	WC / Percent Fines (10, 20, 30, 40)	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).		0
							(Medium dense to dense), dry, brown, SILTY GRAVEL WITH SAND (GM), occasional small roots.		
		12in.	12		S-1 GS, WC			14	
							Bottom of Test Pit at 2.5 feet.		
	5								5
	10								10
	15								15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-10

Figure **A-13**
Sheet **1 of 1**

Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.260486 Long: -122.367927		Total Depth: 8 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).	0
			6in.	6	S-1		(Medium dense), dry, POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), trace cobbles, occasional rootlets.	
							(Medium dense), moist, POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM). Scattered brick and concrete fragments	
	5		6in.	6	S-2		Potentially black carbon waste, no sheen, Field Scan PID = 280 ppm	5
							(Medium dense), moist, brown, POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM).	
			6in.	6	S-3			
							Bottom of Test Pit at 8.0 feet.	
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-10-2

Figure **A-14**
Sheet **1 of 1**

Date Started: 6/28/17	Date Completed: 6/28/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259315 Long: -122.372821		Total Depth: 8 feet	Depth to Seepage: 7 feet
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Water Level	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).		0
							(Dense), light brown, POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), occasional rootlets.		
			6in.	6	S-1				
	5						(Dense), POORLY GRADED SAND (SP), fine sand, trace gravel.	6/28/2017	5
			6in.	6	S-2				
							Bottom of Test Pit at 8.0 feet.		
	10								10
	15								15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-11

Figure **A-15**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259330 Long: -122.371090		Total Depth: 5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).	0
							Dry to moist, brown, CLAYEY SAND (SC), trace gravel, some clay chunks up to 1-inch.	
							Increasing moisture content	
		12in.		12	S-1			
	5						Refusal at 5.0 feet. (concrete slab obstruction)	5
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-12

Figure **A-16**
Sheet **1 of 1**

Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.261303 Long: -122.369638		Total Depth: 8 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).	0
							(Medium dense to dense), dry, brown, CLAYEY SAND (SC), trace gravel.	
			6in.	6	S-1			
	5						(Medium dense), moist, gray, POORLY GRADED SAND WITH GRAVEL (SP), trace cobbles.	5
			6in.	6	S-2			
							Bottom of Test Pit at 8.0 feet.	
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-12-2

Figure **A-17**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259352 Long: -122.368848		Total Depth: 4.5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), (less than 6-inch thick).	0
			6in.	6	S-1		(Medium dense), dry, light brown to brown, CLAYEY SAND (SC), trace gravel, low plasticity fines, trace cobbles.	
			6in.	6	S-2		(Medium dense to dense), dry, gray to brown, SILTY SAND (SM), trace gravel.	
	5						Refusal at 4.5 feet. (concrete slab obstruction)	5
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-13

Figure **A-18**
Sheet **1 of 1**

Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259945 Long: -122.366753		Total Depth: 8 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Graphic Log	Material Description	Depth (feet)
	0		(Medium dense), dry to moist, brown, POORLY GRADED SAND WITH GRAVEL (SP), trace cobbles.	0
			Increasing gravel content Increasing moisture content	
	5		Asphalt, brick and wood debris up to 7 inches	5
			Bottom of Test Pit at 8.0 feet.	
	10			10
	15			15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-13-2

Figure **A-19**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259195 Long: -122.367098		Total Depth: 3 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	Depth (feet)
	0							0
			6in.	6	S-1		(Medium dense), dry, light brown to brown, POORLY GRADED SAND WITH SILT (SP-SM), trace gravel, occasional rootlets.	
							(Dense to very dense), dry, gray, POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM).	
							Refusal at 3.0 feet. (concrete slab obstruction)	
	5							5
	10							10
	15							15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

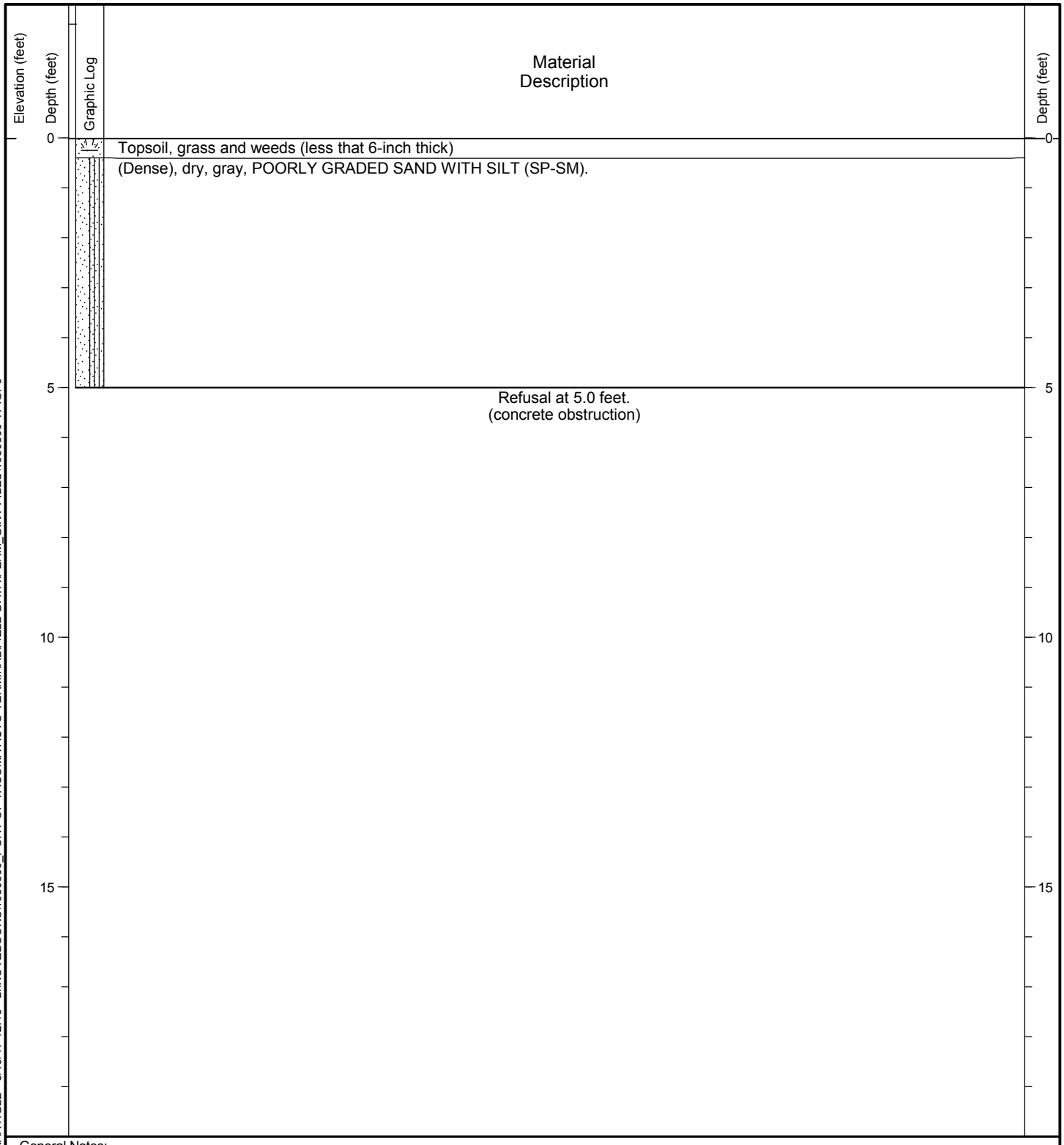
HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-14

Figure **A-20**
Sheet **1 of 1**

Date Started: 6/29/17	Date Completed: 6/29/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259145 Long: -122.367293		Total Depth: 5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			



General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HC TEST PIT - F:\GINT\HC_LIBRARY.GLB - 8/10/17 12:16 - L:\NOTEBOOKS\1930300_PORT OF TACOMA AUTO TERMINAL\FIELD DATA\PERM_GINT FILES\1930300-TP.GPJ

HARTCROWSER	Project: Port of Tacoma Auto Terminal Location: Tacoma, WA Project No.: 19303-00	Test Pit Log **TP-14-2**	Figure **A-21** Sheet **1 of 1**

Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259252 Long: -122.366860		Total Depth: 1.5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	WC / Percent Fines	Depth (feet)
	0						Topsoil, grass and weeds (less that 6-inch thick)		0
			6in.	6	S-1 GS, WC		(Medium dense), dry, brown, SILTY SAND WITH GRAVEL (SM).	18	
							Refusal at 1.5 feet. (concrete obstruction)		
	5								5
	10								10
	15								15

WC: ● Percent Fines: ✖ (10, 20, 30, 40)

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-14-3

Figure **A-22**
Sheet **1 of 1**

Date Started: 6/28/17	Date Completed: 6/28/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.259358 Long: -122.365308		Total Depth: 8 feet	Depth to Seepage: 6 feet
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number Tests	Graphic Log	Material Description	Water Level	Depth (feet)
	0	18in.	18		S-1		(Medium dense), dry, brown, POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), rounded gravel.		0
	5	12in.	12		S-2		(Medium dense), moist to wet, POORLY GRADED GRAVEL WITH SILT AND SAND (GP-GM), subrounded gravel, gray fines.	6/28/2017	5
							Bottom of Test Pit at 8.0 feet.		
	10								10
	15								15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

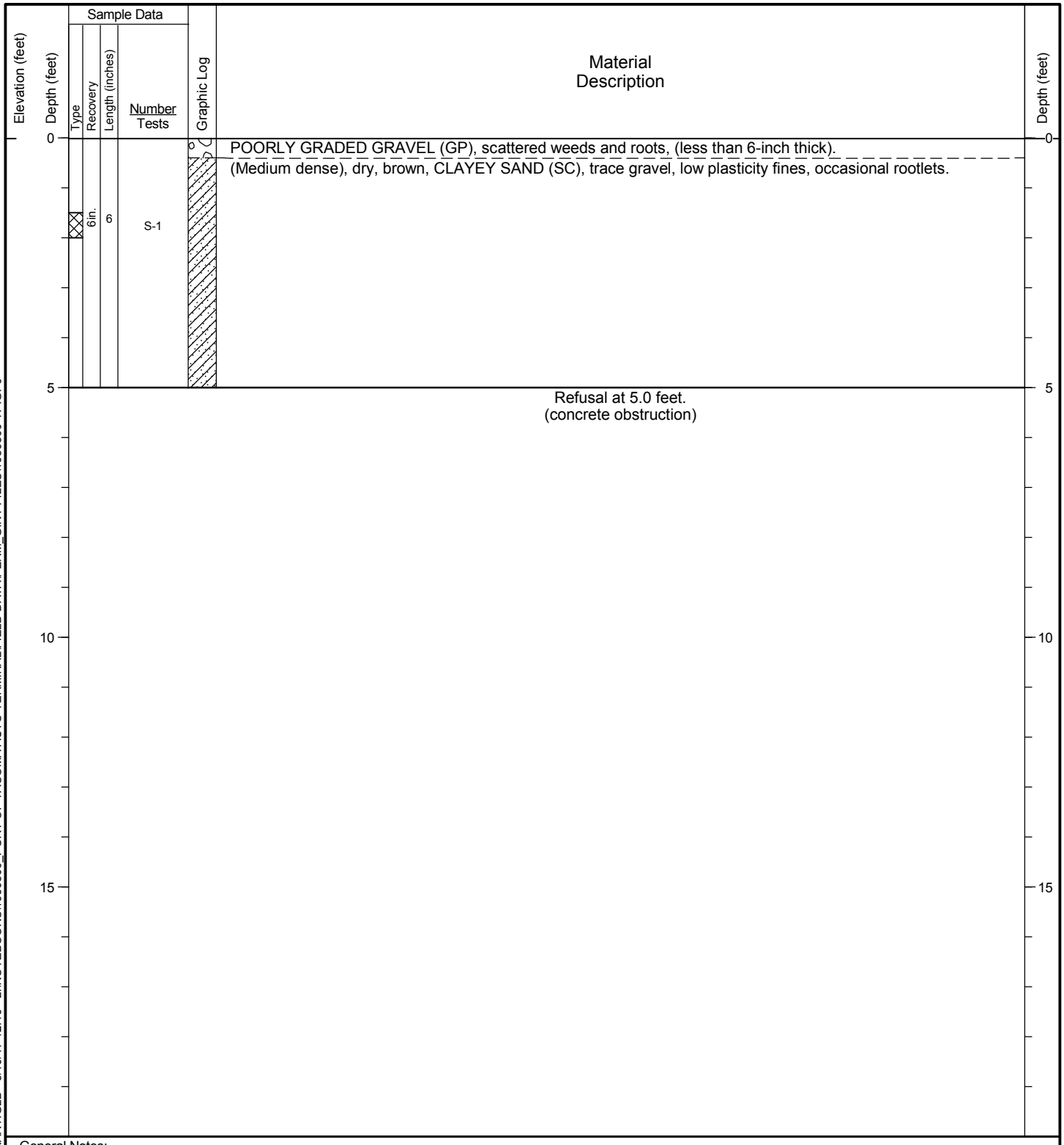
HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-15

Figure **A-23**
Sheet **1 of 1**

Date Started: 6/28/17	Date Completed: 6/28/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.258549 Long: -122.369940		Total Depth: 5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			



General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER	Project: Port of Tacoma Auto Terminal Location: Tacoma, WA Project No.: 19303-00	Test Pit Log **TP-16**	Figure **A-24** Sheet **1 of 1**

Date Started: 6/30/17	Date Completed: 6/30/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.258930 Long: -122.369935		Total Depth: 3.5 feet	Depth to Seepage: Not Encountered
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			

Elevation (feet)	Depth (feet)	Sample Data: Type	Recovery	Length (inches)	Number / Tests	Graphic Log	Material Description	WC / Percent Fines (10, 20, 30, 40)	Depth (feet)
	0						POORLY GRADED GRAVEL (GP), scattered weeds and roots, (less than 6-inch thick).		0
							(Dense), dry, brown, SILTY SAND WITH GRAVEL (SM).		
		6in.	6		S-1 GS, WC			WC ● at 22; Percent Fines ✖ at 22	
							Refusal at 3.5 feet. (concrete obstruction)		
	5								5
	10								10
	15								15

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

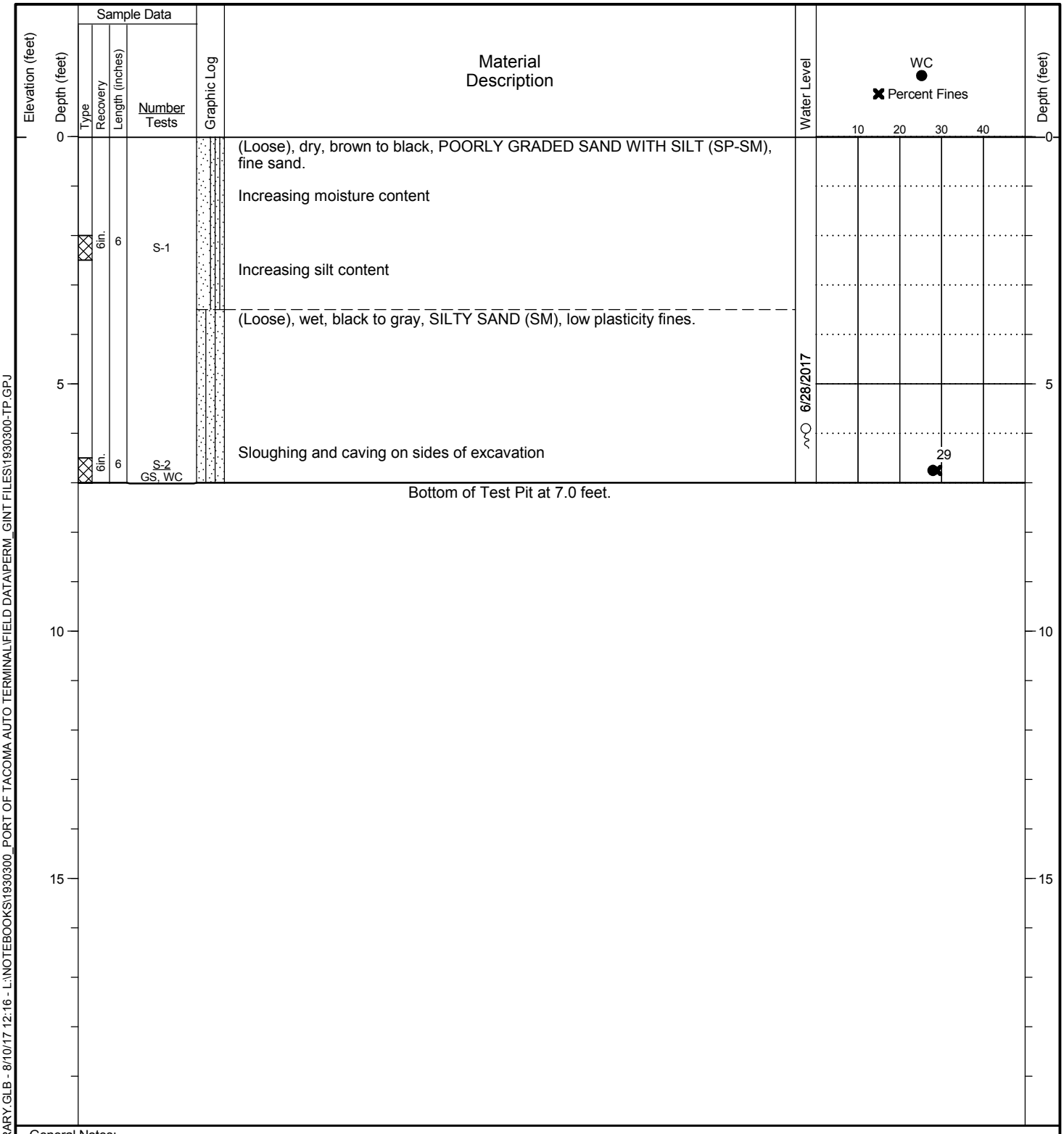
HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-16-2

Figure **A-25**
Sheet **1 of 1**

Date Started: 6/28/17	Date Completed: 6/28/17	Excavation Contractor/Crew:	
Logged by: M. Goodman	Checked by: J. Harmon	Rig Model/Type:	
Location: Lat: 47.257918 Long: -122.366481		Total Depth: 7 feet	Depth to Seepage: 6 feet
Ground Surface Elevation:		Comments: No odors or visual indicators of potential contamination	
Horizontal Datum: WGS 84			
Vertical Datum:			



General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER	Project: Port of Tacoma Auto Terminal Location: Tacoma, WA Project No.: 19303-00	Test Pit Log **TP-17**	Figure **A-26** Sheet **1 of 1**

Date Started: 6/28/17 Date Completed: 6/28/17 Excavation Contractor/Crew:

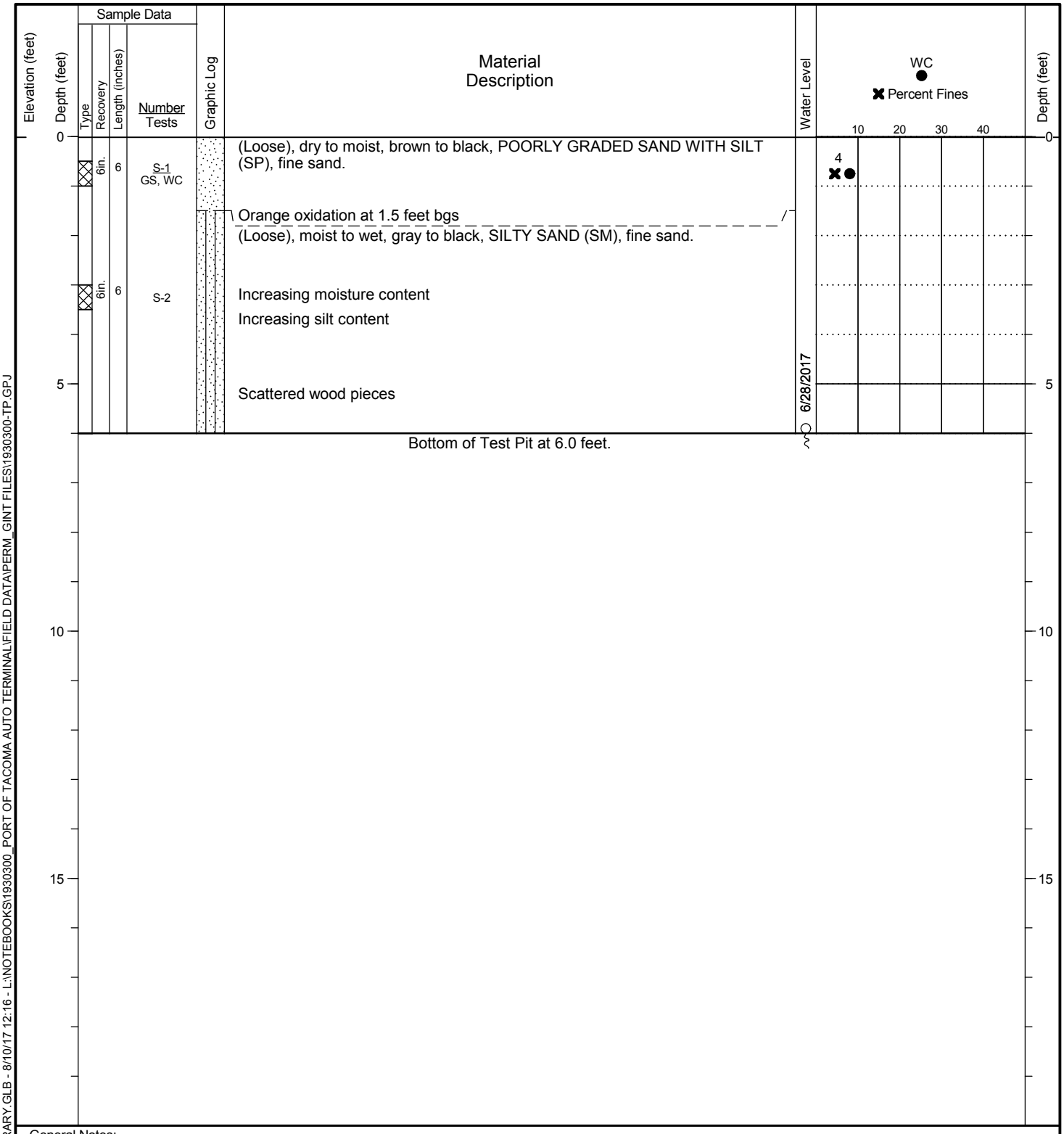
Logged by: M. Goodman Checked by: J. Harmon Rig Model/Type:

Location: Lat: 47.258053 Long: -122.364757 Total Depth: 6 feet Depth to Seepage: 6 feet

Ground Surface Elevation: Comments: No odors or visual indicators of potential contamination

Horizontal Datum: WGS 84

Vertical Datum:



General Notes:

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material descriptions and stratum lines are interpretive and actual changes may be gradual. Solid stratum lines indicate distinct contact between material strata or geologic units. Dashed stratum lines indicate gradual or approximate change between material strata or geologic units.
3. USCS designations are based on visual-manual identification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Test Pit Log
TP-18

Figure **A-27**
Sheet **1 of 1**

HC TEST PIT - F:\GINT\HC_LIBRARY.GLB - 8/10/17 12:16 - L:\NOTEBOOKS\1930300_PORT OF TACOMA AUTO TERMINAL\FIELD DATA\PERM_GINT FILES\1930300-TP.GPJ

APPENDIX B
Geotechnical Laboratory Testing

APPENDIX B
GEOTECHNICAL LABORATORY TESTING

Laboratory tests were performed for this study to evaluate the basic index and geotechnical engineering properties of the site soils. The tests and procedures are outlined below.

Soil Classification

Soil samples from the explorations were visually classified in the field and then taken to our laboratory, where the classifications were verified in a relatively controlled laboratory environment. Field and laboratory observations and tests included density/consistency, moisture condition, and grain size and plasticity estimates.

The classifications of selected samples were checked by laboratory tests such as Atterberg limits determinations and grain size analyses. Classifications were made in general accordance with the Unified Soil Classification (USC) System, ASTM D2487, as presented on Figure B-1.

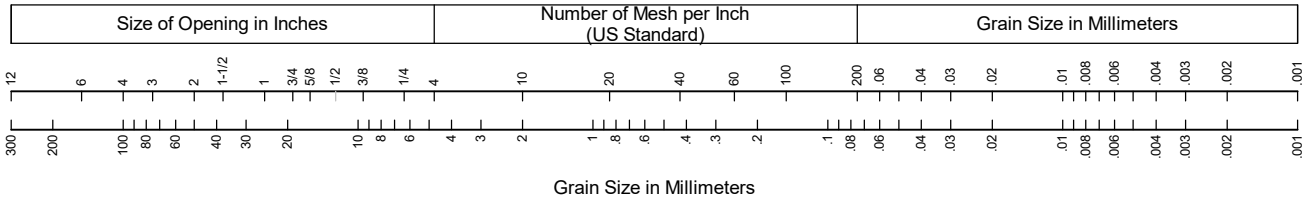
Water Content Determination

Water content was determined for most samples, in general accordance with ASTM D2216 and as soon as possible after their arrival in our laboratory. Water content was not determined for very small samples, nor for samples with large gravel content, which could give unrepresentative results. Test results are shown at the respective sample depths on the exploration logs. In addition, water content is routinely determined for samples subjected to other testing. These results are also presented on the exploration logs.

Grain Size Analysis

Grain size distribution was analyzed on representative samples in general accordance with ASTM D422. Wet sieve analysis was used to determine the size distribution greater than the U.S. No. 200 mesh sieve. Grain size results from samples taken during test pit explorations are presented on Figure B-2. Results from samples taken during DCP tests are presented on Figure B-3.

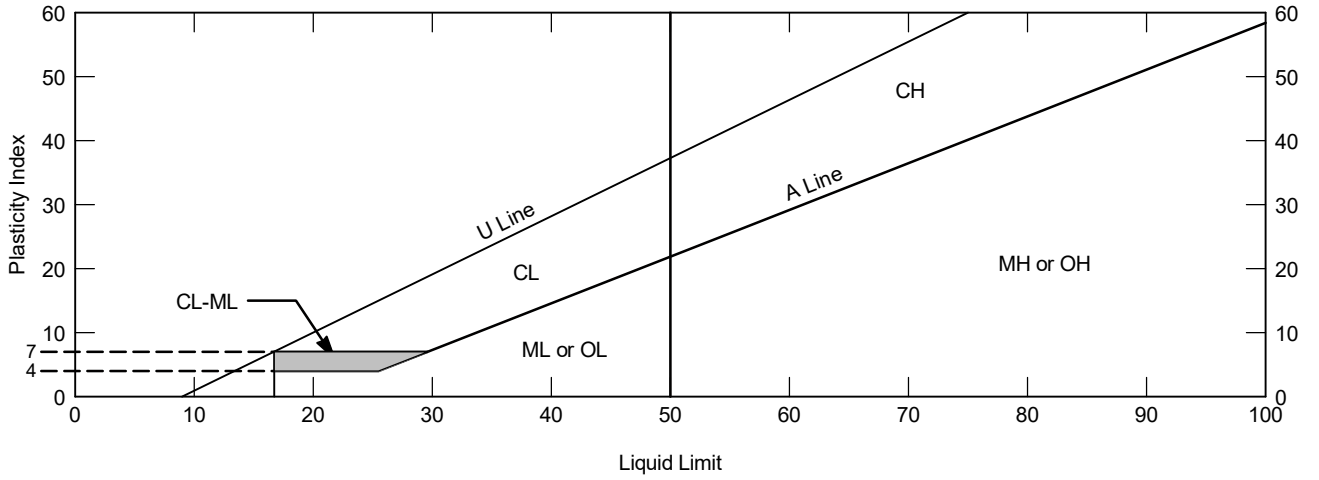
Soil Grain Size



COBBLES	GRAVEL	SAND	SILT and CLAY
Coarse-Grained Soils			Fine-Grained Soils

Fine-Grained Soils

Fine-Grained Soils > 50% smaller than No. 200 Sieve						
Soils with Liquid Limit < 50%			Soils with Liquid Limit > 50%			
SILT	CLAY	ORGANIC	SILT	CLAY	ORGANIC	PEAT
ML	**CL**	**OL**	**MH**	**CH**	**OH**	**PT**



Coarse-Grained Soils

Coarse-Grained Soils > 50% Larger than No. 200 Sieve									
GRAVEL > 50% Coarse Fraction Larger than No. 4 Sieve					SAND > 50% Coarse Fraction Smaller than No. 4 Sieve				
GRAVEL with 5% Fines	GW		GP		SAND with 5% Fines	SW		SP	
GRAVEL with >12% Fines	GM		GC		SAND with > 12% Fines	SM		SC	
GRAVEL with 5% < Fines <12%	GW-GM	GW-GC	GP-GM	GP-GC	SAND with 5% < Fines <12%	SW-SM	SW-SC	SP-SM	SP-SC

For clean sands and gravels:

$$1 \le \frac{(D_{30})^2}{D_{10} \times D_{60}} \le 3 \quad \& \quad \frac{D_{60}}{D_{10}} \text{ where } \begin{matrix} > 4 \text{ for GW} \\ > 6 \text{ for SW} \end{matrix} \text{ otherwise GP or SP} \qquad C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}} \qquad C_u = \frac{D_{60}}{D_{10}}$$

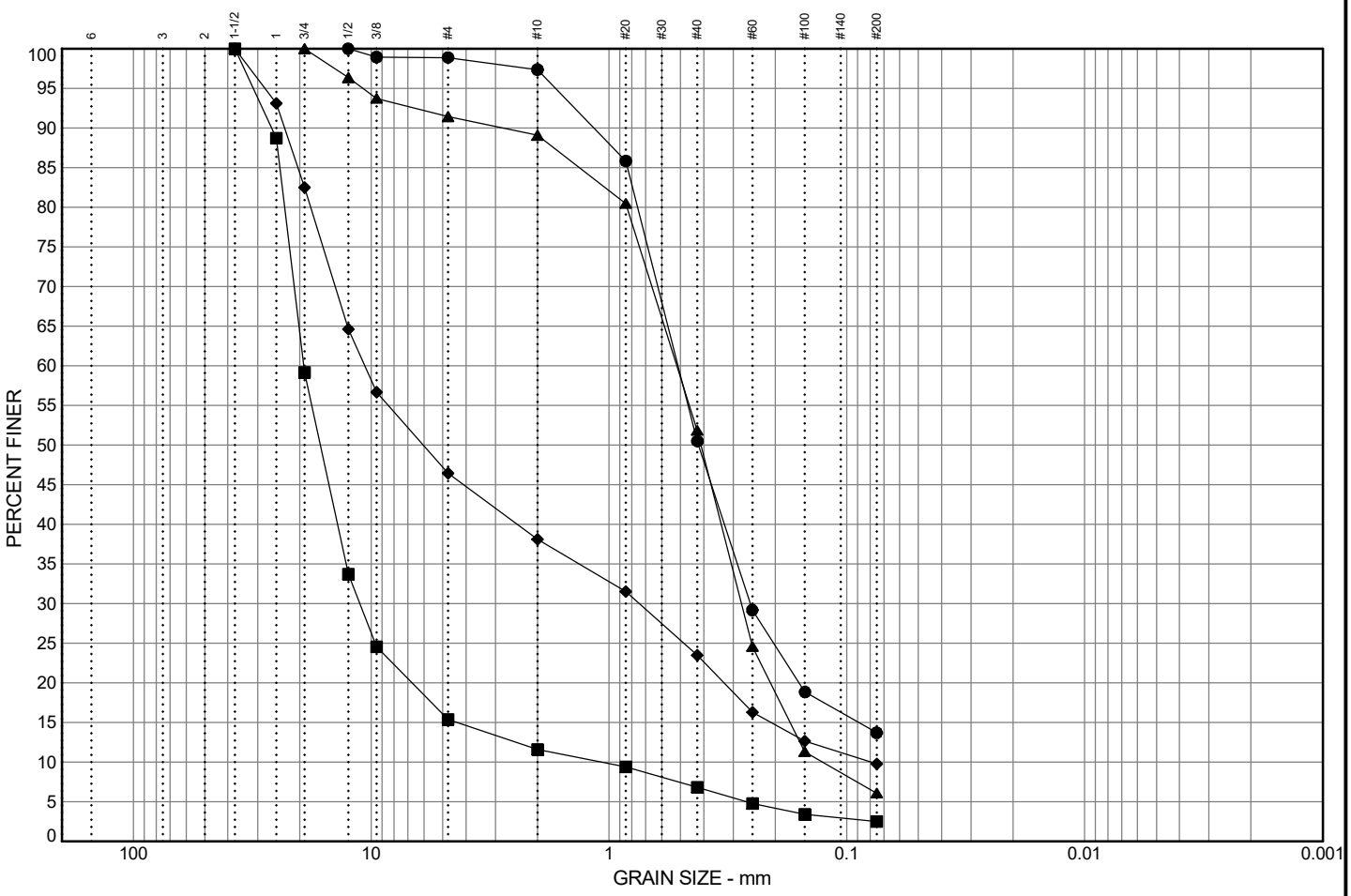
D_{10}, D_{30}, D_{60} are particle diameters for which 10, 30, and 60 percent, respectively, of the soil mass are finer.

For sands and gravels with fines:

GM and SM Atterberg limits below A line with PI < 4

GC and SC Atterberg limits above A line with PI > 7

HARTCROWSER	Project: Port of Tacoma Auto Terminal Location: Tacoma, WA Project No.: 19303-00	**Unified Soil Classification (USC) System**	Figure **B-1** Sheet **1 of 1**



Location and Description	% Cobbles	% Gravel	% Sand	% Silt	% Clay	MC%	USCS
● **Source:** TP-1 **Sample No.:** S-1 **Depth:** 4.0 to 5.0 SILTY SAND	0.0	1.1	85.2	13.7		18	SM
■ **Source:** TP-4 **Sample No.:** S-1 **Depth:** 0.5 to 1.0 POORLY GRADED GRAVEL	0.0	84.6	12.9	2.5		2	GP
▲ **Source:** TP-5 **Sample No.:** S-2 **Depth:** 7.0 to 7.5 POORLY GRADED SAND WITH SILT	0.0	8.6	85.3	6.1		11	SP-SM
◆ **Source:** TP-6 **Sample No.:** S-1 **Depth:** 2.5 to 3.0 POORLY GRADED GRAVEL WITH SILT AND SAND	0.0	53.5	36.7	9.8		4	GP-GM

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			0.836	0.512	0.420	0.255	0.089			
■			24.154	19.145	16.342	11.190	4.349	1.065	6.14	17.98
▲			1.333	0.518	0.410	0.278	0.173	0.126	1.18	4.11
◆			20.260	10.649	6.038	0.747	0.209	0.080	0.66	133.86

Remarks:

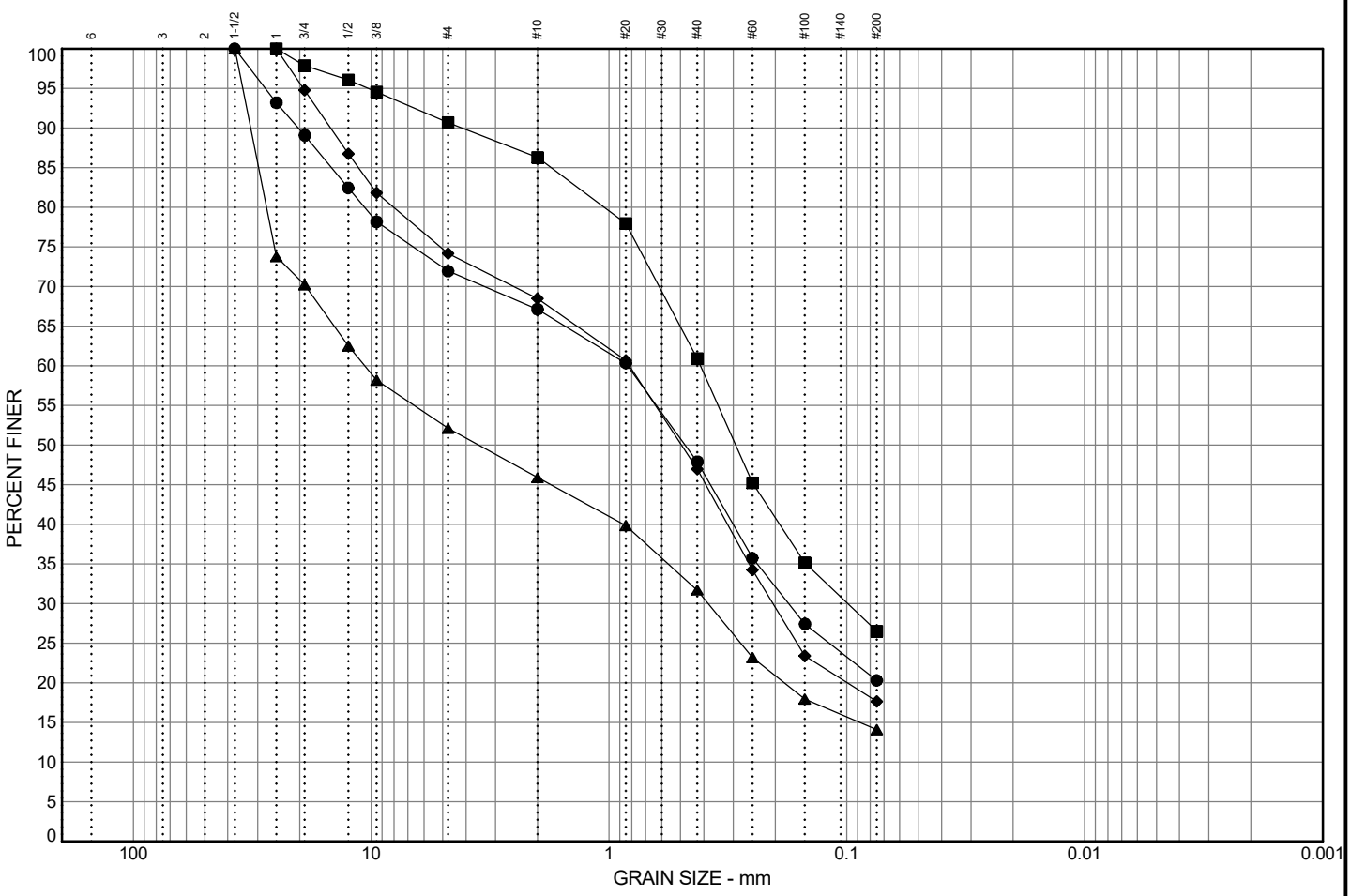
● ■ ▲ ◆

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Particle-Size Analysis

Figure **B-2**
Sheet **1 of 3**



Location and Description	% Cobbles	% Gravel	% Sand	% Silt	% Clay	MC%	USCS
● **Source:** TP-8 **Sample No.:** S-1 **Depth:** 2.0 to 2.5 SILTY SAND WITH GRAVEL	0.0	28.1	51.6	20.3		8	SM
■ **Source:** TP-9-2 **Sample No.:** S-1 **Depth:** 2.0 to 2.5 SILTY SAND	0.0	9.3	64.2	26.5		11	SM
▲ **Source:** TP-10 **Sample No.:** S-1 **Depth:** 1.5 to 2.5 SILTY GRAVEL WITH SAND	0.0	47.9	38.0	14.1		7	GM
◆ **Source:** TP-14-3 **Sample No.:** S-1 **Depth:** 1.0 to 1.5 SITLY SAND WITH GRAVEL	0.0	25.8	56.5	17.6		8	SM

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			14.688	0.834	0.478	0.176				
■			1.755	0.412	0.294	0.099				
▲			29.744	10.659	3.548	0.382	0.088			
◆			11.341	0.821	0.495	0.205				

Remarks:

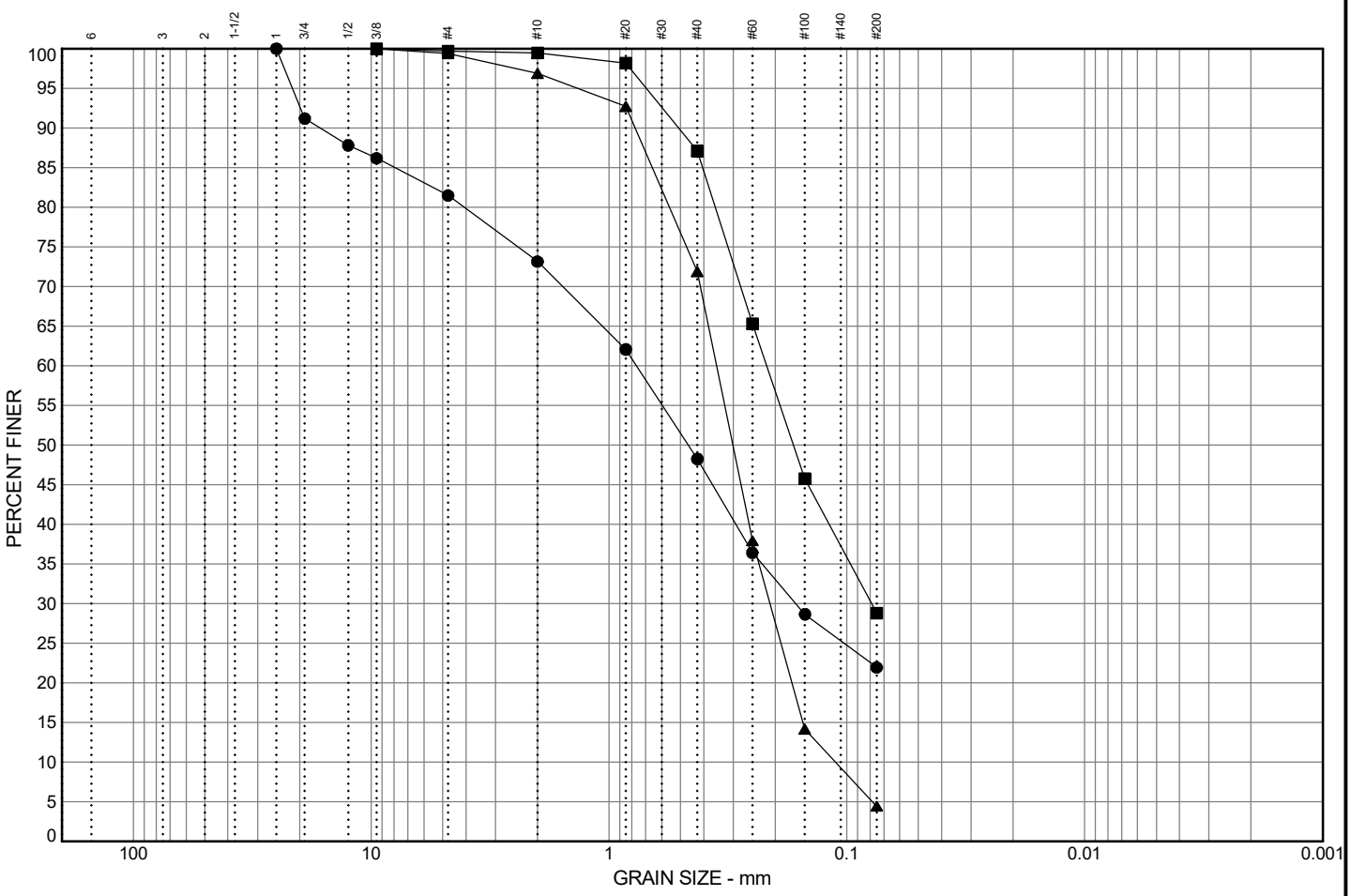
● ■ ▲ ◆

HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Particle-Size Analysis

Figure **B-2**
Sheet **2 of 3**



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Location and Description	% Cobbles	% Gravel	% Sand	% Silt	% Clay	MC%	USCS
● **Source:** TP-16-2 **Sample No.:** S-1 **Depth:** 2.0 to 2.5 SILTY SAND WITH GRAVEL	0.0	18.5	59.5	21.9		11	SM
■ **Source:** TP-17 **Sample No.:** S-2 **Depth:** 6.5 to 7.0 SILTY SAND	0.0	0.3	70.9	28.8		28	SM
▲ **Source:** TP-18 **Sample No.:** S-1 **Depth:** 0.5 to 1.0 POORLY GRADED SAND	0.0	0.6	95.0	4.4		8	SP

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			7.982	0.767	0.464	0.164				
■			0.404	0.218	0.168	0.079				
▲			0.657	0.353	0.302	0.211	0.153	0.111	1.13	3.17

Remarks:

●
■
▲

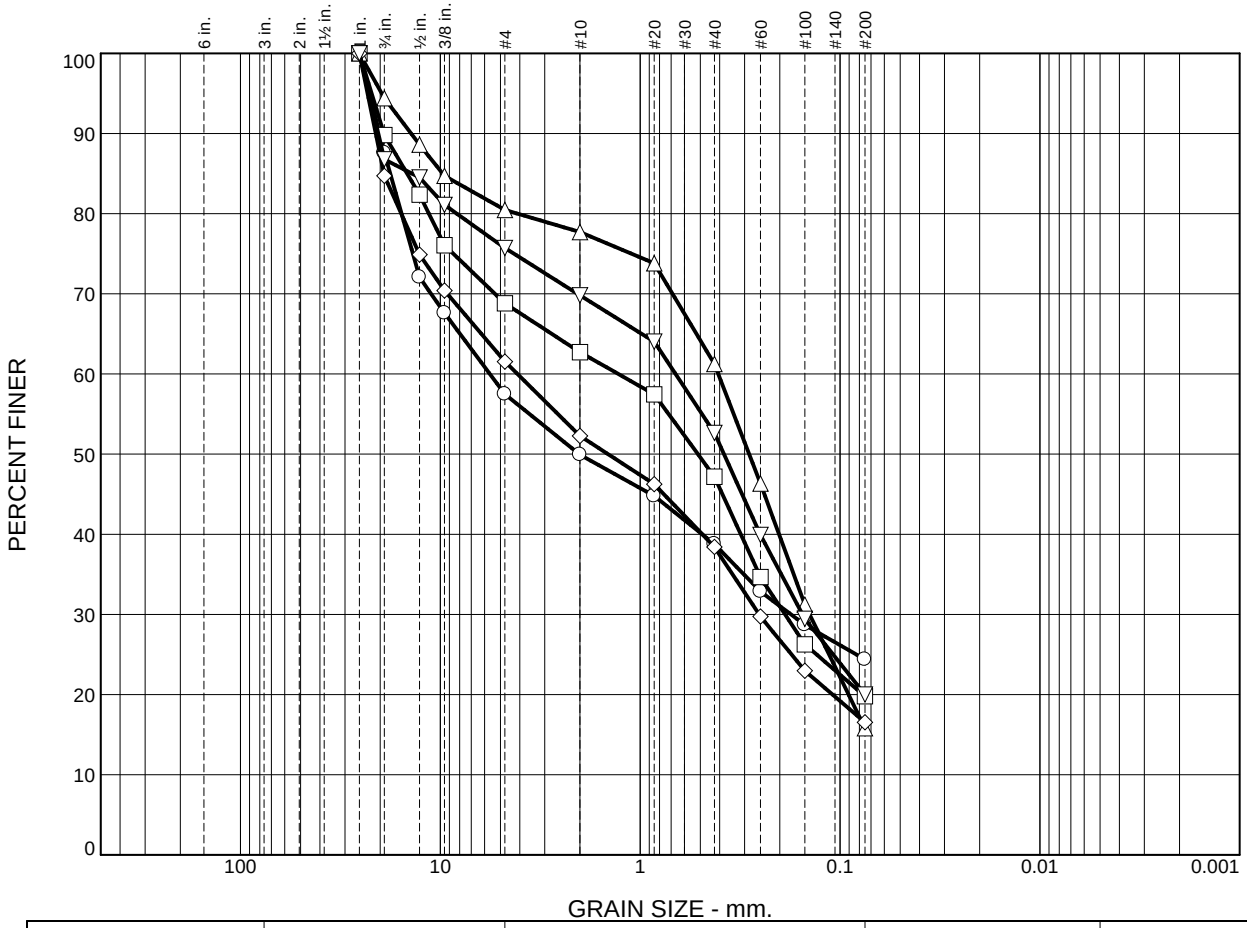
HARTCROWSER

Project: Port of Tacoma Auto Terminal
Location: Tacoma, WA
Project No.: 19303-00

Particle-Size Analysis

Figure **B-2**
Sheet **3 of 3**

Particle Size Distribution Report



	% +3"	% Gravel	% Sand	% Silt	% Clay
○	0.0	42.5	33.1	24.4	
□	0.0	31.2	49.0	19.8	
△	0.0	19.5	64.7	15.8	
◇	0.0	38.5	45.0	16.5	
▽	0.0	24.3	55.7	20.0	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	DCP-11	S-1	0	SILTY GRAVEL WITH SAND	GM
□	DCP-15	S-1	0	SILTY SAND WITH GRAVEL	SM
△	DCP-21	S-1	0	SILTY SAND WITH GRAVEL	SM
◇	DCP-28	S-1	0	SILTY SAND WITH GRAVEL	SM
▽	DCP-30	S-1	0	SILTY SAND WITH GRAVEL	SM

HARTCROWSER

Project: Port of Tacoma - Auto Terminal

Project No.: 19303-01

Figure **B-3**