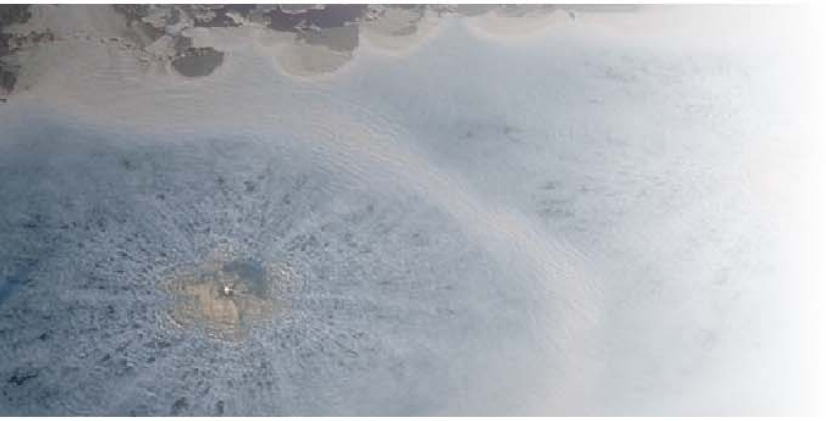

USTs N-1, 2, 3, 4, 25, and 26
Site-Specific Summary Report
Port of Tacoma UST
Remediation Program
Tacoma, Washington

Prepared for
Port of Tacoma

February 3, 2011
17581-00

HARTCROWSER

USTs N-1, 2, 3, 4, 25, and 26
Site-Specific Summary Report
Port of Tacoma UST Remediation Program
Tacoma, Washington

Prepared for
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Prepared by
Hart Crowser, Inc.

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CONTENTS

CONTENTS (Continued)

Page

USTs N-1, 2, 3, 4, 25, AND 26 SITE-SPECIFIC SUMMARY REPORT
PORT OF TACOMA UST REMEDIATION PROGRAM
TACOMA, WASHINGTON

1.0 INTRODUCTION

Hart Crowser has prepared this Site-Specific Summary Report as part of the Port of Tacoma's (Port) Underground Storage Tank (UST) Remediation Program. The Port's UST Remediation Program is focused on the northern end of the Blair-Hylebos Peninsula, north of East 11th Street in Tacoma, Washington (Figure 1).

The overall goal of this investigation is to test for the presence of contamination in soil and groundwater related to USTs N-1, 2, 3, 4, 25, and 26 (Figure 2). A Site-Specific Sampling and Analysis Plan (SSAP) (Hart Crowser 2010b), which supplemented the Area-Wide Sampling and Analysis Plan (AWSAP) (Hart Crowser 2010a), was created for this investigation. The SSAP identified the contaminants of concern related to USTs N-1, 2, 3, 4, 25, and 26 and provided a detailed sample collection protocol and rationale for this investigation.

2.0 PROJECT BACKGROUND

Currently, it is unknown whether USTs N-1, 2, 3, 4, 25, and 26 have been removed or remain in place. As of 2008/2009 the USTs were not included in the Port of Tacoma's UST records, but were identified on 1940s–1950s drawings of the former US Naval Station next to Building 529 which was labeled "Central Heating Plant." The tanks were labeled as six 25,000-gallon fuel tanks. It is likely that these USTs would have contained fuel oil for the boilers. The drawings indicate that USTs N-1, 2, 3, and 4 were in place before 1949 and USTs N-25 and 26 were installed before 1953. No information confirming the UST construction materials was available but the USTs were likely made of steel, given their ages.

The Navy drawing depicting the UST locations is provided in Appendix C. Hart Crowser performed field investigations in April 2010 with a magnetometer and ground penetrating radar (GPR) to better determine the UST locations (Global Geophysics 2010). Results from the geophysical surveys are provided in Appendix A.

The magnetometer survey detected numerous anomalies. In general, the majority of magnetometer anomalies appear to coincide with the location, number, and orientation of USTs N-1, 2, 3, 4, 25, and 26 based on 1940s–1950s

drawings of the former US Naval Station (Appendix A figure). Several of the anomalies may also be caused by interference from surface metal objects such as propane tanks, storm drain catch basins and metal vaults.

The GPR survey detected one anomaly within the survey area. Interpretation of the magnetometer and GPR results indicate that this anomaly was likely a metal pipe (Global Geophysics 2010). Based on the results of the magnetometer and GPR survey, it is likely that the USTs remain in place.

3.0 PREVIOUS INVESTIGATIONS

This section summarizes prior environmental data available in the vicinity of USTs N-1, 2, 3, 4, 25, and 26. These data are from environmental investigations completed by Hart Crowser in 1980 and 2009 and by Conestoga-Rovers & Associates (CRA) in 1995 and 2006. Boring logs from these investigations are provided in Appendix B. The 1980 Hart Crowser and 1995 and 2006 CRA borings were completed to evaluate soil and groundwater at depths greater than that typically impacted by petroleum hydrocarbons from USTs. Soil and groundwater samples were not collected for analysis during those investigations in the area of concern for this project, therefore, the boring logs are provided for stratigraphic information only.

In 2008, Hart Crowser completed one direct-push probe, HC08-EP107, approximately 50 feet project northeast of the USTs (Figure 2). This exploration was completed for the Port of Tacoma in association with its planned Blair-Hylebos Peninsula terminal redevelopment project (Hart Crowser 2009a).

Only one soil sample (HC08-EP107) was collected from that boring from the unsaturated zone at 2.5 to 4 feet below ground surface (bgs). The sample was analyzed for diesel- and oil-range petroleum hydrocarbons by NWTPH-Dx, gasoline-range petroleum hydrocarbons by NWTPH-Gx, PCBs, and selected metals. All analytical results were below Model Toxics Controls Act (MTCA) Method A (Chapter 173-340 WAC) soil cleanup levels for industrial properties. Analytical results for sample HC08-EP107 are provided in Table 1.

Groundwater was encountered at approximately 10 feet bgs. A grab groundwater sample from boring HC08-EP107 was collected from the screened interval at 10.75 to 11.75 feet bgs from the direct-push probe and was analyzed for NWTPH-Gx, NWTPH-Dx, VOCs, metals, and pH. The resulting groundwater analytical results are provided in Table 2.

All 2008 groundwater analytes were reported to be below MTCA Method A (173-340 WAC) groundwater cleanup levels, with the exception of vinyl chloride. Vinyl chloride was reported to be present at 190 ug/L. The MTCA Method A groundwater cleanup level for vinyl chloride is 0.2 ug/L.

Based on Port-provided resources, we can infer that the contents of USTs N-1, 2, 3, 4, 25, and 26 likely always were fuel oil. In addition, the location of the 2008 boring was documented to be within a vinyl chloride plume that has migrated to this location from an adjacent property (CRA 2008). Because all evidence indicates that elevated vinyl chloride in groundwater at this location is likely from a separate neighboring source and is not related to USTs N-1, 2, 3, 4, 25, and 26, vinyl chloride was not carried forward as a contaminant of concern related to these USTs.

4.0 GEOLOGY AND HYDROGEOLOGY

These USTs are located on the uplands of the Blair-Hylebos Peninsula (Figure 1). Subsurface conditions on the peninsula generally consist of an industrial fill layer extending from 0 to about 6 feet bgs over nonindustrial fill material, hydraulically dredged and placed over local tideflats and intertidal areas in the early 1900s to create the upland peninsula (Hart Crowser 2009b).

Local subsurface conditions observed in direct-push probe explorations in the vicinity of USTs N-1, 2, 3, 4, 25, and 26 generally consisted of varying thicknesses of silty sand, sand, and gravelly sand to sandy gravel. In explorations HC-N12342526-2 and HC-N12342526-3 sand was observed below the asphalt and base course extending to 12 and 16 feet bgs, respectively. Gravelly sand with brick debris was observed below the asphalt and base course in HC-N12342526-4 to 14 feet bgs where an obstruction was encountered. Exploration HC-N12342526-1 encountered gravelly sand to eight feet bgs, overlying sand from 8 to 13.5 feet bgs, and sandy gravel from 13.5 to 16 feet bgs. Shallow groundwater was encountered between 9 and 12 feet bgs in previous and current investigation explorations.

Since 1996, groundwater flow in this area has been controlled by the Occidental groundwater extraction system that surrounds these USTs. Historically, shallow groundwater in this area most likely flowed north toward Commencement Bay. Currently, groundwater flow at this location most likely is toward the closest extraction well (just south of these USTs) with strong downward components.

5.0 SUMMARY OF 2010 INVESTIGATION ACTIVITIES

5.1 Direct-Push Probe Investigation

ESN Northwest, Inc. of Olympia, Washington, completed four direct-push probe explorations, HC-N12342526-1 through HC-N12342526-4 on September 27, 2010. These probes were completed near all four sides of the inferred USTs N-1, 2, 3, 4, 25, and 26 locations to depths of approximately 12 to 16 feet bgs. The exploration locations are shown on Figure 3 and boring logs are provided in Appendix B.

Prior to this subsurface investigation, we contacted One-Call to locate utilities in the public right-of-way (ROW) and contracted with a private utility locating company to locate potential utilities on private property.

After the samples were collected, the probe locations were backfilled and abandoned in general accordance with the State of Washington Administrative Code on Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC).

Investigation-derived waste associated with this environmental investigation was stored in labeled drums on site, pending receipt of laboratory results, waste designation, and appropriate disposal by the Port.

5.2 Soil Sampling and Analytical Results

Hart Crowser collected and field screened continuous soil samples from direct push probes HC-N12342526-1 through HC-N12342526-4 at 4-foot-depth intervals using a Photoionization Detector (PID) and sheen test.

A total of five soil samples were collected: one each from HC-N12342526-1, HC-N12342526-2, and HC-N12342526-4, and two samples from HC-N12342526-3. Three of the five samples were collected from intervals with field indications of potential contamination. Soil sample HC-N12342526-3-S1 was collected from 1 to 4 feet bgs after creosote-like odors and a moderate sheen was observed in wood debris located at 2.5 feet bgs.

Soil sample HC-N12342526-4-S3 was collected from an interval in which a red and black oily substance was observed (between 8 and 11 feet bgs). The impacted interval coincided with the depth of groundwater observed in the push probe. The substance exhibited strong petroleum-like odors and a heavy sheen.

Soil samples HC-N12342526-1-S3/4 were collected after observation of petroleum-like sheen from 12 to 13.5 feet bgs.

All soil samples were submitted to Onsite Environmental Inc. (OnSite) of Redmond, Washington, for chemical analysis of diesel- and oil-range petroleum hydrocarbons by NWTPH-Dx; gasoline-range petroleum hydrocarbons by NWTPH-Gx; and benzene, ethylbenzene, toluene, and total xylenes (BETX) by EPA Method 8021.

Soil Analytical Results

Soil sample HC-N12342526-4-S3 was reported to contain diesel- and oil- range petroleum hydrocarbons at 22,000 mg/kg and 25, 000 mg/kg, respectively, exceeding MTCA Method A cleanup levels of 2,000 mg/kg. BETX was also detected in the sample; however, the benzene concentration of 0.14 mg/kg was the only compound detected above its respective cleanup level (0.03 mg/kg).

Diesel- and oil- range petroleum hydrocarbons were detected at 46 mg/kg and 98 mg/kg, respectively, in soil sample HC-N12342526-3-S1, below the MTCA Method A cleanup level of 2000 mg/kg. Soil sample HC-N12342526-3-S3, collected from 12 to 14 feet bgs did not contain diesel-, oil-, gasoline-range petroleum hydrocarbons and BETX above analytical detection limits.

Diesel-, oil-, and gasoline-range petroleum hydrocarbons and BETX were not detected in soil samples HC-N12342526-1-S3/4, HC-N12342526-2-S3, and HC-N12342526-3-S4.

The analytical results for the direct push probe soil samples are summarized in Table 3. The results of our review of chemical data quality and laboratory reports are provided in Appendix C.

5.3 Groundwater Sampling and Analytical Results

Groundwater samples were collected from temporary 3-foot miniwells installed in each of the four shallow push probe explorations, HC-N12342526-1 through HC-N12342526-4. One sample from each location was submitted to Onsite for chemical analysis of diesel-, oil-, gasoline-range petroleum hydrocarbons and BETX. Details of the Hart Crowser grab groundwater sampling procedures can be found in the SSAP (Hart Crowser 2010b) and AWSAP (Hart Crowser 2010a).

Groundwater Analytical Results

A slight to moderate sheen was observed during field screening of purge water from exploration HC-N12342526-1. The groundwater sample from this exploration contained diesel- and oil-range petroleum hydrocarbons at 0.53 mg/L and 1.8 mg/L respectively, exceeding the MTCA Method A cleanup level of 0.5 mg/L for each hydrocarbon range.

An oily product was observed during field screening of purge water from push probe exploration HC-N12342526-4. Groundwater from this exploration contained benzene at 16 ug/L, above the MTCA Method A cleanup level of 5 ug/L. Diesel- and oil-range petroleum hydrocarbons were also detected at 1.5 ug/L and 0.67 ug/L, respectively, above applicable cleanup levels of 0.5 mg/L.

No evidence of petroleum-related contamination was observed during field screening of the purge water collected from the two shallow push probe explorations HC-N12342526-2 and HC-N12342526-3. Diesel-, oil-, gasoline-range petroleum hydrocarbons and BETX were not detected above applicable analytical detection limits in these groundwater samples.

The analytical results for the direct push probe grab groundwater samples are summarized in Table 4. The results of our review of chemical data quality and laboratory reports are provided in Appendix C.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Currently, it is unknown whether USTs N-1, 2, 3, 4, 25, and 26 remain in place. However, the geophysical survey conducted as part of this investigation did identify six anomalies that may represent the UST locations.

A red and black oily substance was observed in soil between 8 and 12 feet bgs in exploration HC-N12342526-4. Diesel- and oil- range petroleum hydrocarbon and benzene concentrations of 22,000 mg/kg, 25, 000 mg/kg, and 0.13 mg/kg respectively, were detected in sample HC-N12342526-4-S3 from that interval.

Groundwater impacts exceeding cleanup levels were detected in explorations HC-N12342526-1 and HC-N12342526-4. An oily product was observed during field screening of purge water from exploration HC-N12342526-4. The groundwater sample contained diesel- and oil-range petroleum hydrocarbons and benzene concentrations at 1.5 mg/L, 0.67 mg/L, and 16 ug/L respectively. The groundwater sample from exploration HC-N12342526-1 contained

concentrations of diesel- and oil-range petroleum hydrocarbons at 0.53 mg/L and 1.8 mg/L respectively.

No other soil impacts exceeding cleanup levels were detected during the current investigation. Previous investigations found detectable levels of petroleum related compounds in soil and groundwater in the vicinity of USTs N-1 2, 3, 4, 25 and 26, but well below cleanup levels (Tables 1 and 2).

We recommend advancing additional explorations in the vicinity of explorations HC-N12342526-1 and HC-N12342526-4 to determine the extent of the soil and groundwater petroleum hydrocarbon impacts.

There are no records that indicate that these tanks have been removed. There also are no records that indicate that the USTs have been used since the Washington State Underground Storage Tank Regulations Chapter 173-360 were developed in 1989. It is not likely that the USTs were closed to today's standards. Therefore, we recommend that surface explorations be completed to determine if these tanks still remain and if so, we recommend removal. As part of the UST removal process, a UST site assessment in accordance with Ecology and Tacoma Pierce County Health Department guidance must be conducted.

7.0 REFERENCES

Conestoga-Rovers & Associates (CRA), 2008. Preliminary Draft Site Characterization Report. Prepared for Occidental Chemical Corporation, March 2008.

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Table 1 - Prior Analytical Results for Nearby Soil Samples (Hart Crowser, 2009a)

Exploration No./Sample ID		HC08-EP107
Sampling Date		10/01/08
Depth in Feet		2.5 to 4
	MTCA Cleanup Level Method A Industrial	
Metals in mg/kg		
Arsenic	20	5 U
Cadmium	2	0.2 U
Chromium		12.1
Copper		13.1
Lead	1,000	5
Mercury	2	0.05 U
Nickel		8
Zinc		30
TCLP Metals in mg/L		
Lead		
TPH in mg/kg		
Diesel-Range Hydrocarbons	2,000	6.4
Motor Oil-Range Hydrocarbons	2,000	37
Gasoline-Range Hydrocarbons	100/30 [a]	6.8
PCBs in ug/kg		
Aroclor 1016		32 U
Aroclor 1221		32 U
Aroclor 1232		32 U
Aroclor 1242		32 U
Aroclor 1248		32 U
Aroclor 1254		32 U
Aroclor 1260		32 U
Total PCBs	10,000	32 U

Notes:
Blank entry indicates no applicable MTCA criteria established or sample not analyzed for specific analyte.
U: Not detected at reporting limit indicated.
J: Estimated value.
9 Bold, boxed entry indicates concentration exceeds MTCA screening criteria.
[a] 100 mg/kg when no benzene present, 30 mg/kg when benzene present.

Modified from
Environmental Site
Characterization Data Report
(Hart Crowser 2009 a)

Table 2 - Prior Analytical Results for Nearby Groundwater Samples (Hart Crowser, 2009a)

	MTCA Cleanup Level Method A		
Sample ID		HC08-EP107	
Sampling Date		10/01/08	
Screen Interval in Feet		10.75 to 11.75	
pH [(a)]		6.81	
TPH in mg/L			
Diesel-Range Hydrocarbons	0.5	0.34	
Motor Oil-Range Hydrocarbons	0.5	0.5	U
Gasoline-Range Hydrocarbons	0.8/1 [(b)]	0.25	U
Metals in mg/L			
Arsenic	0.005	0.05	U
Cadmium	0.005	0.002	U
Chromium	0.05	0.029	
Copper		0.03	
Lead	0.015	0.02	U
Mercury	0.002	0.0001	U
Nickel		0.02	
Zinc		0.04	
Volatiles in ug/L			
1,1,1,2-Tetrachloroethane		0.2	U
1,1,1-Trichloroethane	200	0.2	U
1,1,2,2-Tetrachloroethane		0.2	U
1,1,2-Trichloro-1,2,2-trifluoroethane		0.2	U
1,1,2-Trichloroethane		0.2	U
1,1-Dichloroethane		0.2	U
1,1-Dichloroethene		0.2	U
1,1-Dichloropropene		0.2	U
1,2,3-Trichlorobenzene		0.5	U
1,2,3-Trichloropropane		0.5	U
1,2,4-Trichlorobenzene		0.5	U
1,2,4-Trimethylbenzene		0.2	U
1,2-Dibromo-3-chloropropane		0.5	U
1,2-Dichlorobenzene		0.3	
1,2-Dichloroethane	5	0.2	U
1,2-Dichloropropane		0.2	U
1,3,5-Trimethylbenzene		0.2	U
1,3-Dichlorobenzene		0.2	U
1,3-Dichloropropane		0.2	U
1,4-Dichlorobenzene		0.2	U
2,2-Dichloropropane		0.2	U
2-Butanone		2.5	U
2-Chloroethylvinylether		1	U
2-Chlorotoluene		0.2	U
2-Hexanone		2.5	U
4-Chlorotoluene		0.2	U
4-Isopropyltoluene		3.2	
4-Methyl-2-Pentanone (MIBK)		2.5	U
Acetone		3	U
Acrolein		5	U
Acrylonitrile		1	U
Benzene	5	0.3	
Bromobenzene		0.2	U
Bromochloromethane		0.2	U
Bromodichloromethane		0.2	U

Modified from
Environmental Site
Characterization Data Report
(Hart Crowser 2009 a)

Table 2 - Prior Analytical Results for Nearby Groundwater Samples (Hart Crowser, 2009a)

Sample ID		HC08-EP107
Sampling Date		10/01/08
Screen Interval in Feet		10.75 to 11.75
	MTCA Cleanup Level	
Bromoethane		0.2 U
Bromoform		0.2 U
Bromomethane		0.5 U
Carbon Disulfide		0.2 U
Carbon Tetrachloride		0.2 U
Chlorobenzene		0.2 U
Chloroethane		0.2 U
Chloroform		0.2 U
Chloromethane		0.2 U
cis-1,2-Dichloroethene		11
cis-1,3-Dichloropropene		0.2 U
Dibromochloromethane		0.2 U
Dibromomethane		0.2 U
Ethylbenzene	700	0.2 U
Ethylene Dibromide	0.01	0.2 U
Hexachlorobutadiene		0.5 U
Isopropylbenzene		0.2 U
m,p-Xylene		0.4 U
Methyl Iodide		1 U
Methylene Chloride	5	0.5 U
Naphthalene	160	0.5 U
n-Butylbenzene		0.2 U
n-Propylbenzene		0.2 U
o-Xylene		0.2
sec-Butylbenzene		0.2 U
Styrene		0.2 U
tert-Butylbenzene		0.2 U
Tetrachloroethene	5	0.3
Toluene	1000	0.2 U
trans-1,2-Dichloroethene		6.2
trans-1,3-Dichloropropene		0.2 U
trans-1,4-Dichloro-2-butene		1 U
Trichloroethene	5	0.5
Trichlorofluoromethane		0.2 U
Vinyl Acetate		1 U
Vinyl Chloride	0.2	**190**

Notes:
U = Not detected at reporting limit indicated.
Bold, boxed entry indicates concentration exceeds MTCA screening criteria.
Blank indicates sample not analyzed for specific analyte or no criteria available.
(a) pH measured in the field at the time of sample collection.
(b) 0.8 mg/L when no benzene present, 1 mg/L when benzene present.

Table 3 - Analytical Results for Soil Samples, USTs N-1, 2, 3, 4, 25, and 16 (Hart Crowser, 2010)

Sample ID	MTCA	HC-N12342526-1-S3/4	HC-N12342526-2-S3	HC-N12342526-3-S1	HC-N12342526-3-S4	HC-N12342526-4-S3
Sampling Date	Cleanup Level	9/24/2010	9/24/2010	9/24/2010	9/24/2010	9/24/2010
Sample Depth in Feet	Method A	10 to 13	8 to 10	1 to 4	12 to 14	10 to 12
TPH in mg/kg						
Diesel Range Organics	2000	31 U	33 U	46	30 U	**22000**
Lube Oil	2000	62 U	65 U	98	60 U	**25000**
Gasoline Range Organics	100/30 [a]	6.1 U	7.4 U	5 U	6 U	6.6 U
BTEX in mg/kg						
Benzene	0.03	0.02 U	0.02 U	0.02 U	0.02 U	**0.14**
Ethylbenzene	6	0.061 U	0.074 U	0.05 U	0.06 U	1.5
m, p-Xylene	9	0.061 U	0.074 U	0.05 U	0.06 U	0.85
o-Xylene	9	0.061 U	0.074 U	0.05 U	0.06 U	6.6 U
Toluene	7	0.061 U	0.074 U	0.05 U	0.06 U	0.089

Notes:
U = Not detected at the reporting limit indicated.
[a] 100 mg/kg when no benzene present, 30 mg/kg when benzene present.
Bold boxed entry indicates concentration exceeds MTCA cleanup level.
Reporting limits that exceed the MTCA cleanup level are italicized.

Table 4 - Analytical Results for Groundwater Samples, USTs N-1, 2, 3, 4, 25, and 16 (Hart Crowser, 2010)

Sample ID	MTCA	HC-N12342526-1 GW	HC-N12342526-2 GW	HC-N12342526-3 GW	HC-N12342526-4-GW
Sampling Date	Cleanup Level	9/24/2010	9/24/2010	9/24/2010	9/24/2010
Screen Interval in Feet	Method A	11 to 14	9 to 12	12 to 15	10 to 13
TPH in mg/L					
Diesel Range Organics	0.5	**0.53**	0.26 U	0.26 U	**1.5**
Lube Oil	0.5	**1.8**	0.42 U	0.42 U	**0.67**
Gasoline Range Organics	0.8/1 [a]	0.1 U	0.1 U	0.1 U	0.95
BTEX in ug/L					
Benzene	5	1 U	1 U	1 U	**16**
Ethylbenzene	700	1 U	1 U	1 U	26
m, p-Xylene	1000	1 U	1 U	1 U	6.9
o-Xylene	1000	1 U	1 U	1 U	7.4
Toluene	1000	1 U	1 U	1 U	1.5

Notes:
U = Not detected at the reporting limit indicated.
[a] 0.8 mg/L when no benzene present, 1 mg/L when benzene present.
Bold boxed entry indicates concentration exceeds MTCA cleanup level.
Reporting limits that exceed the MTCA cleanup level are italicized.

Source: Base map prepared from Microsoft Streets and Trips, 2005.

UST Remediation Program
Tacoma, Washington

Vicinity Map

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Figure
1

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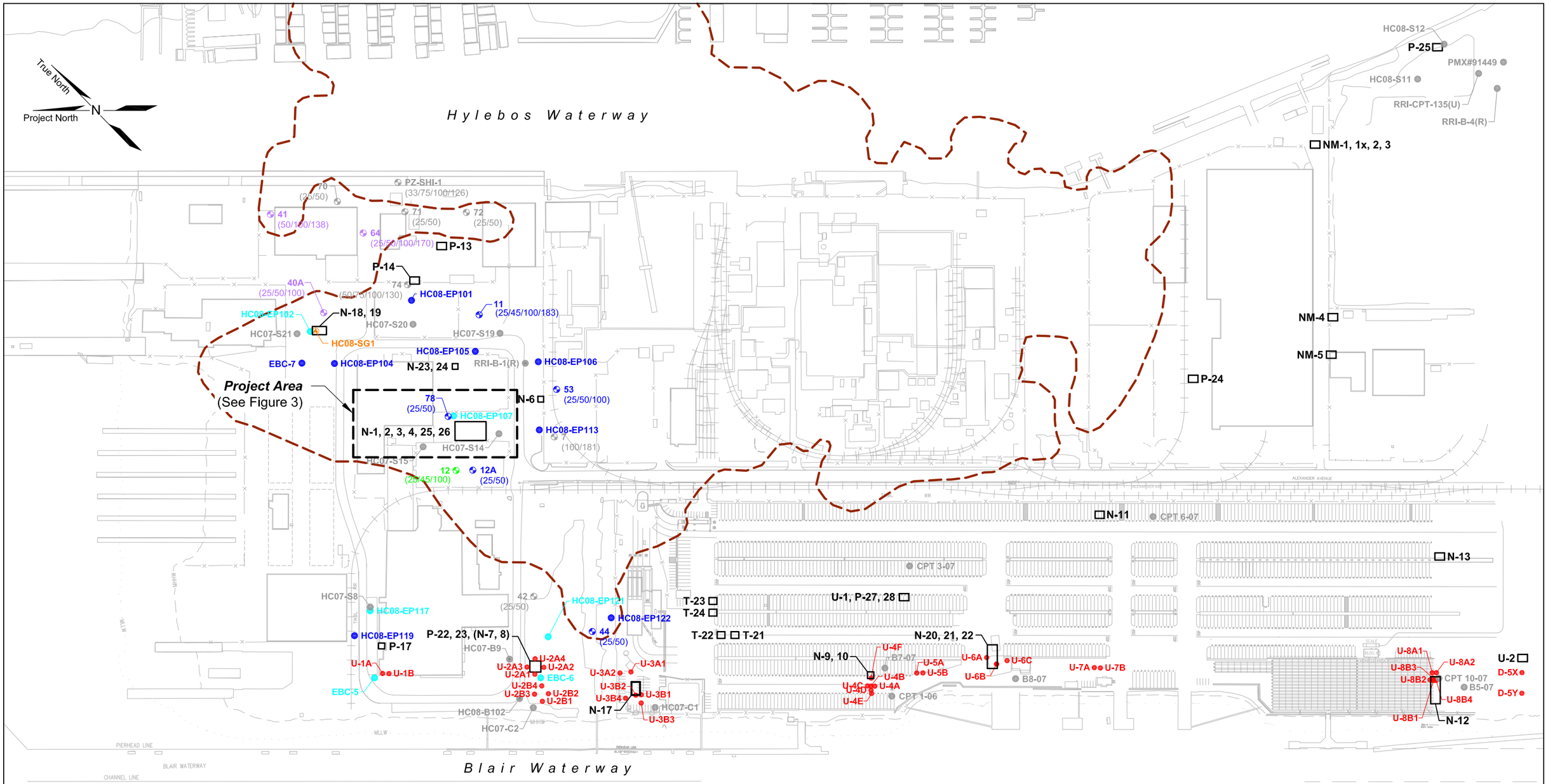

Well Location and Number

- 78 (25/50) — Hydraulic Monitoring Well, Installed Screen Depth in Feet (CRA 2008)
- 12 (25/45/100) — Hydraulic and Groundwater Monitoring Well, Installed Screen Depth in Feet (CRA 2008)
- 41 (25/50/100) — Groundwater Monitoring Well, Installed Screen Depth in Feet (CRA 2008)
- 71 (25/50) — Monitoring Well/Piezometer Cluster, Installed Screen Depth in Feet (CRA 2008)

Exploration Location and Number

- HC08-EP101 — Environmental Probe, Soil Samples Only (Hart Crowser 2009 a,b)
- HC08-EP117 — Environmental Probe with Groundwater and Soil Samples (Hart Crowser 2009 a,b)
- HC08-SG1 — Soil Gas Probe (Hart Crowser 2009 a,b)
- U-1A — Environmental Probe, Soil Samples Only (GeoEngineers 2008)
- B8-07 — Historical Exploration

N-1, 2, 3, 4, 25, 26 — Estimated Former UST Location and Designation (See SSAP for data summary)

Estimated Maximum Extent of the Occidental Chemical Corporation (OCC) Groundwater VOC Plume (Port of Tacoma Provided)

0 300 600
Scale in Feet

Port of Tacoma
UST Remediation Program

Area Map

17581-00 Phase 21 2/11

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Figure 2

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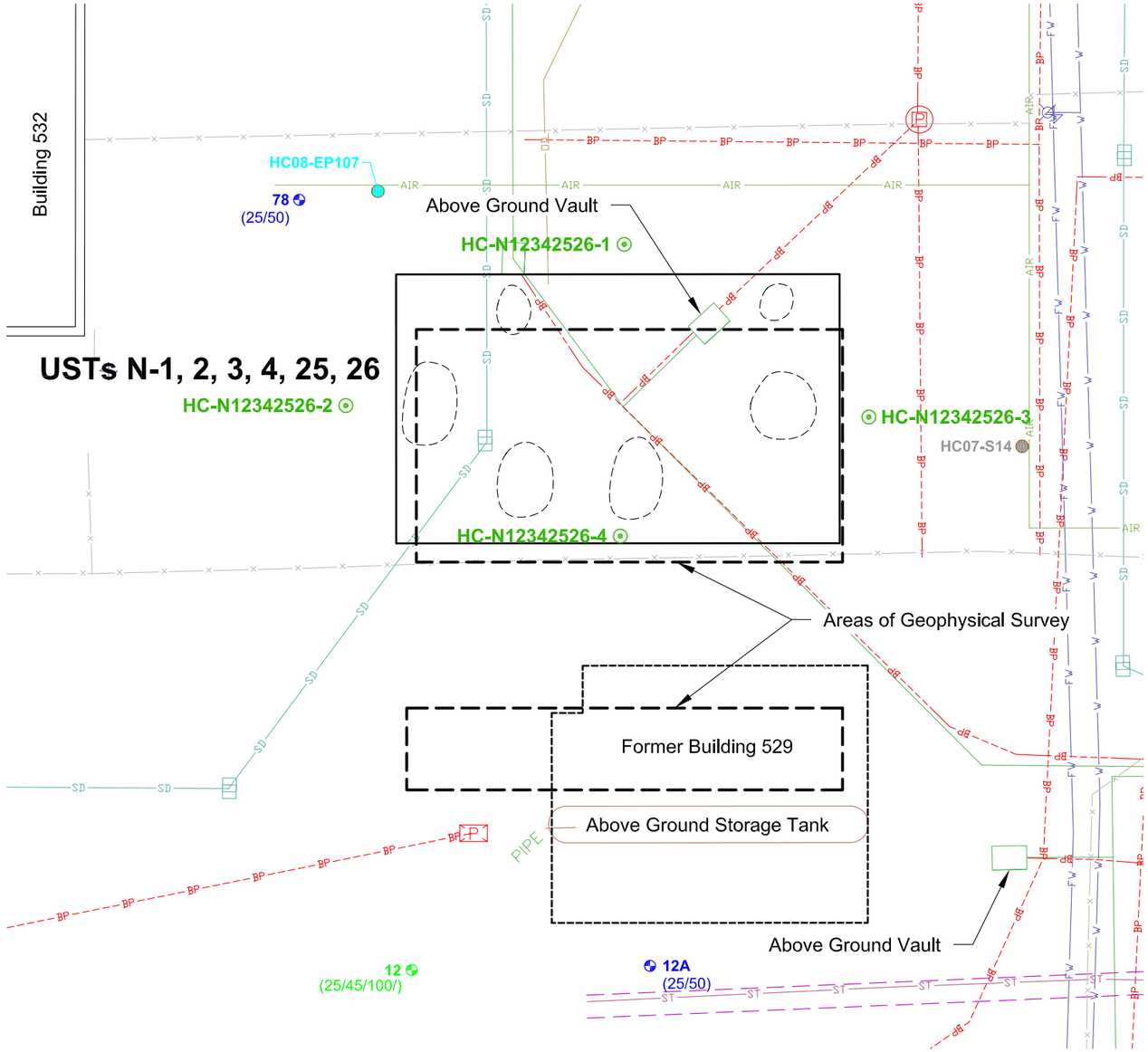


Note: EBC CAD drawings provided by the Port of Tacoma.

Exploration Location and Number

HC-N12342526-1 — Exploration

U-6A — Environmental Probe, Soil Samples Only (GeoEngineers 2008) (Approximate Location)

78 (25/50) — Hydraulic Monitoring Well, Installed Screen Depth in Feet (CRA 1995, 2008)

12 (25/45/100) — Hydraulic and Groundwater Monitoring Well, Installed Screen Depth in Feet (Hart Crowser 1980, CRA 1995, 2008)

HC08-EP107 — Environmental Probe with Groundwater and Soil Samples (Hart Crowser 2009 a,b)

B5-07 — Historical Exploration

N-1, 2, 3, 4, 25, 26 — Possible UST Location and Designation based on Port of Tacoma and GeoEngineers provided information

Possible UST Location based on Geophysical Investigation

Utility Information

- Storm Drain
- Main Water Line
- Fire Water Line
- Below Ground Power and Electrical Line
- Air Line
- Oil Line
- Steam Line
- Utilidor

True North / Project North

0 30 60

Scale in Feet

Port of Tacoma
UST Remediation Program

Site Plan USTs N-1, 2, 3, 4, 25, 26

17581-00 Phase 21 2/11

HARTCROWSER

Figure 3

JAB 02/3/11 1758100P21-002.dwg

APPENDIX A
GEOPHYSICAL SURVEY REPORT AND ASSOCIATED FIGURE

Global Geophysics

16651 White Mountain Road SE
Monroe, WA 98272

Tel: 425-890-4321
Fax: 360-805-0259

April 18, 2010 Our ref: 100-0401.000

Hart Crowser, Inc.
1700 Westlake Avenue North, Suite 200
Seattle, WA 98109-3056

ATTENTION: Ms. Colleen Rust

RE: REPORT FOR A GEOPHYSICAL SURVEY TO LOCATE BURIED UNDERGROUND STORAGE TANK

Dear Ms. Rust:

Global Geophysics conducted magnetic and ground penetrating radar (GPR) surveys at the Port of Tacoma, WA. The proposed objectives of the geophysical investigation was to locate underground storage tanks (USTs).

GEOPHYSICAL METHODS, INSTRUMENTATION AND FIELD PROCEDURES

Magnetometry and ground penetrating radar (GPR) were used to locate underground storage tanks (USTs) for this survey. The following paragraphs describe the methods and field procedures.

Magnetometry

The magnetometer measures variations in the magnetic field of the Earth, including local distortions or anomalies of the field caused by ferrous objects or minerals. In general, the magnitude of the magnetometer response is proportional to the mass of the ferrous object and the distance from the magnetometer. A single drum can be detected to a depth of approximately 15 to 20 feet. Non-ferrous metals, such as copper and aluminum, cannot be located with a magnetometer.

A Geometric Model 858 Cesium magnetometer was used for this investigation. A grid of 3 ft by 10 ft was set up in different areas. The magnetic data were collected along the lines every 3 ft apart except location N-11 where 5 ft spacing was used. The magnetic data was downloaded everyday for QA/QC on site.

Ground Penetrating Radar

The GPR method uses electromagnetic pulses, emitted at regular intervals by an antenna to map subsurface features. The electromagnetic pulses are reflected where changes in electrical properties of materials occur such as changes in lithology or where underground utilities are present. The reflected electromagnetic energy is received by an antenna, converted into an electrical signal, and

recorded on the GPR unit. The data is recorded and viewed in real time on a graphical display that depicts a continuous profile or cross-section image of the subsurface directly beneath the path of the antenna.

The depth of penetration of the GPR signal varies according to antenna frequency and the conductivity of the subsurface material. The depth of subsurface penetration with GPR decreases with an increase in the frequency of the antenna and an increase in soil conductivity. Low frequency antennas (50 to 500 MHz) provide the best compromise between obtaining good subsurface penetration and resolution.

The data at selected locations were collected using Geophysical Survey Systems, Inc. (GSSI) SIR 2000 GPR system with an antenna having a center frequency of 200 MHz. The data were digitally recorded for post processing.

RESULTS

The magnetic data was not collected at Area N-23, 24, because there were a lot of surface metal objects present at the site, and the access restrictions due to temporary buildings at the site. Only GPR data was collected at this location.

Both magnetic and GPR data were collected in the following areas: N-9, 10; N-11; N-12; N-17; N-1,2,3,4,25,26; N-23, 24; N-6; N-18, 19; P-24; N-13; and N-20, 21, 22. The magnetic data contour plans with interpretation are shown in figures in the Appendix A. Magnetic anomalies (areas in red and blue colors) are interpreted as buried metal objects or underground storgae tanks (USTs).

LIMITATIONS OF THE GEOPHYSICAL METHOD

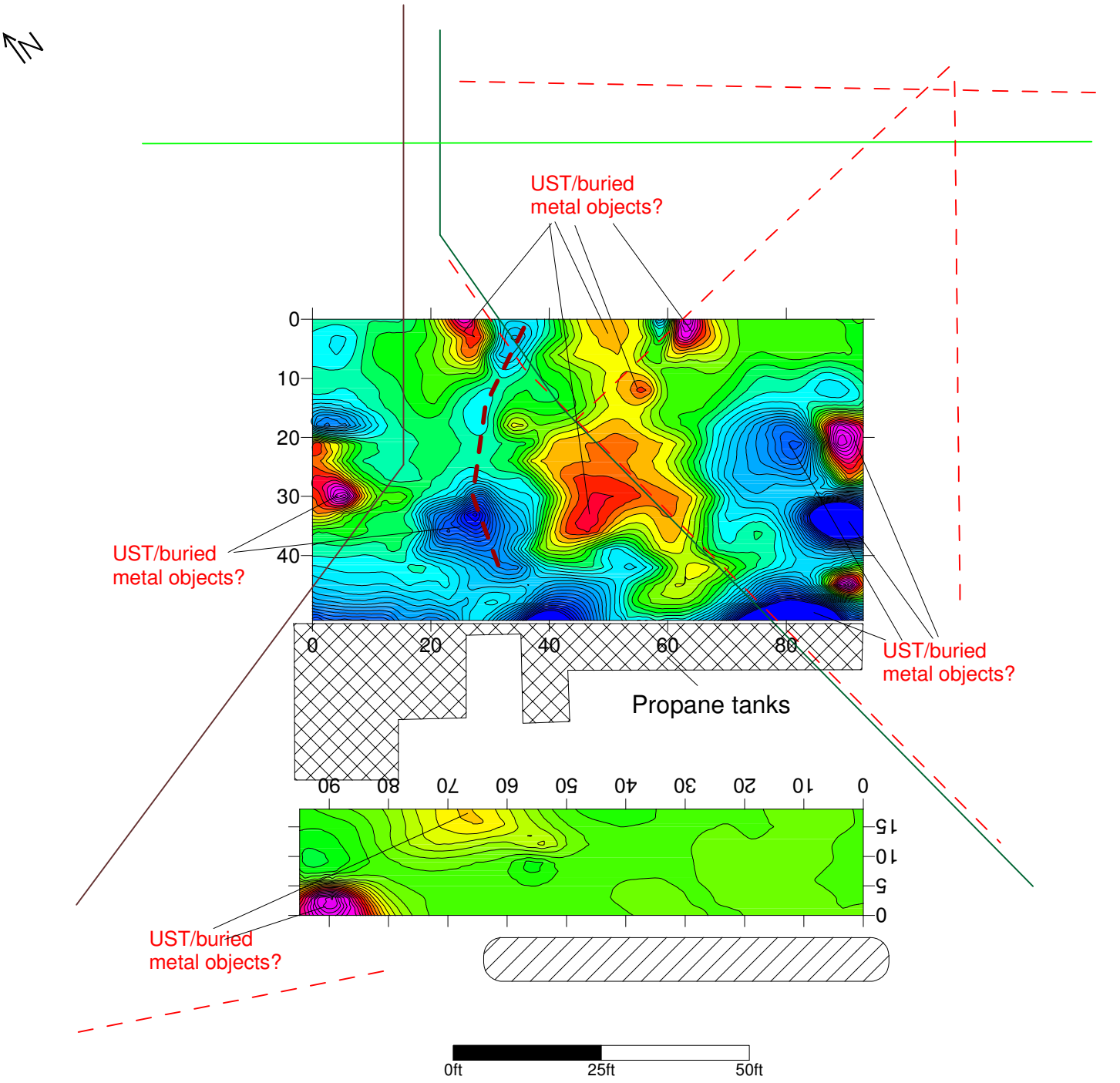
Global geophysics services are conducted in a manner consistent with the level of care and skill ordinarily exercised by other members of the geophysical community currently practicing under similar conditions subject to the time limits and financial and physical constraints applicable to the services. Magnetic and GPR are remote sensing geophysical methods that may not detect all subsurface conditions due to the limitations of the methods, soil conditions, size of the features and their depths.

Sincerely,

Global Geophysics

John Liu, Ph.D., R.G.
Principal Geophysicist

Attachment: Appendix A – Site Figures



Legend:

- Storm Drain
- Power Line
- Water
- Sewer
- Air
- Communication
- 3 feet spacing
- Interpreted metal pipe based on magnetic data
- Above ground storage tank
- Surface metal objects

PROJECT
PORT OF TACOMA
UST LOCATE

TITLE
Magnetic Data Contour Plan For Areas N-1, 2, 3, 4, 25, & 26

Global Geophysics
16651 White Mountain Road SE
Monroe, WA, 98272
Tel: 425-890-4321

PROJECT No. 100-0401			FILE No.
DESIGN	--		SCALE AS SHOWN REV.
CADD	JL		
CHECK	--		**FIGURE X**
REVIEW	--		

APPENDIX B
DIRECT-PUSH PROBE EXPLORATION LOGS AND BORING LOGS FROM PREVIOUS INVESTIGATIONS

DIRECT-PUSH PROBE EXPLORATION LOGS

Key to Exploration 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. Visual-manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 to 4	Very soft	0 to 2	<0.125
Loose	4 to 10	Soft	2 to 4	0.125 to 0.25
Medium dense	10 to 30	Medium stiff	4 to 8	0.25 to 0.5
Dense	30 to 50	Stiff	8 to 15	0.5 to 1.0
Very dense	>50	Very stiff	15 to 30	1.0 to 2.0
		Hard	>30	>2.0

Sampling Test Symbols

- 1.5" I.D. Split Spoon
- Grab (Jar)
- 3.0" I.D. Split Spoon
- Shelby Tube (Pushed)
- Bag
- Cuttings
- Core Run

SOIL CLASSIFICATION CHART

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

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

Moisture

Dry	Little perceptible moisture
Damp	Some perceptible moisture, likely below optimum
Moist	Likely near optimum moisture content
Wet	Much perceptible moisture, likely above optimum

Minor Constituents	Estimated Percentage
Trace	<5
Slightly (clayey, silty, etc.)	5 - 12
Clayey, silty, sandy, gravelly	12 - 30
Very (clayey, silty, etc.)	30 - 50

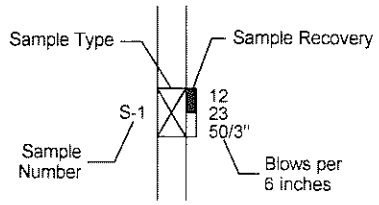
Laboratory Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits
	Water Content in Percent Liquid Limit Natural Plastic Limit
PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	In Situ Density in PCF
OT	Tests by Others

Groundwater Indicators

- Groundwater Level on Date or (ATD) At Time of Drilling
- Groundwater Seepage (Test Pits)

Sample Key



HARTCROWSER

17581-00 *9/10*

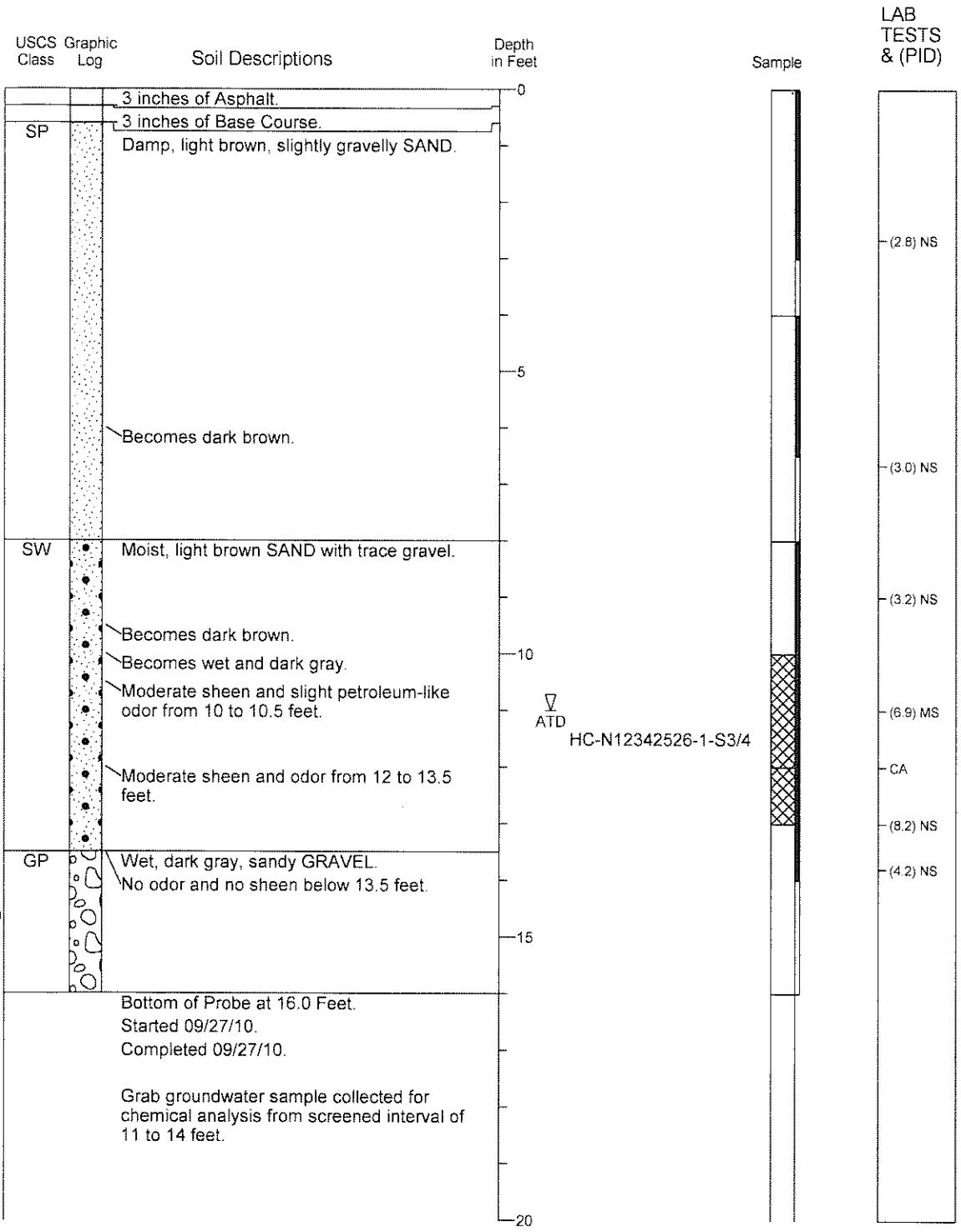
Figure B-1

KEY SHEET 17581-00-21-PP.GPJ HC_CORP.GDT 2/2/11

Push Probe Log HC-N12342526-1

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



PUSH PROBE LOG-ENV 17581-00-21-PP.GPJ HC_CORP.GDT 2/2/11

1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

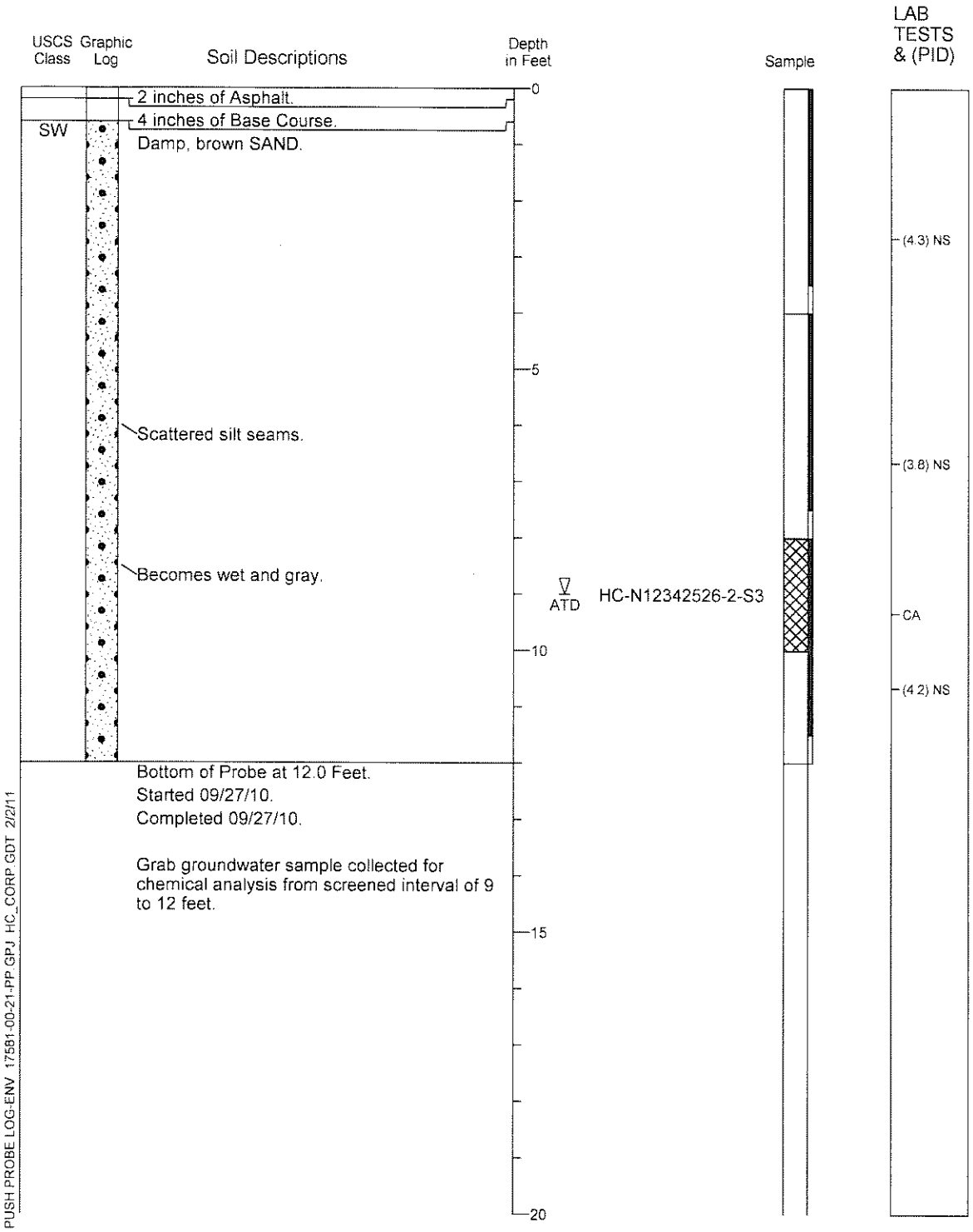
17581-00 9/10

Figure B-2

Push Probe Log HC-N12342526-2

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



PUSH PROBE LOG-ENV 17581-00-21-PP.GPJ HC_CORP.GDT 2/2/11

1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

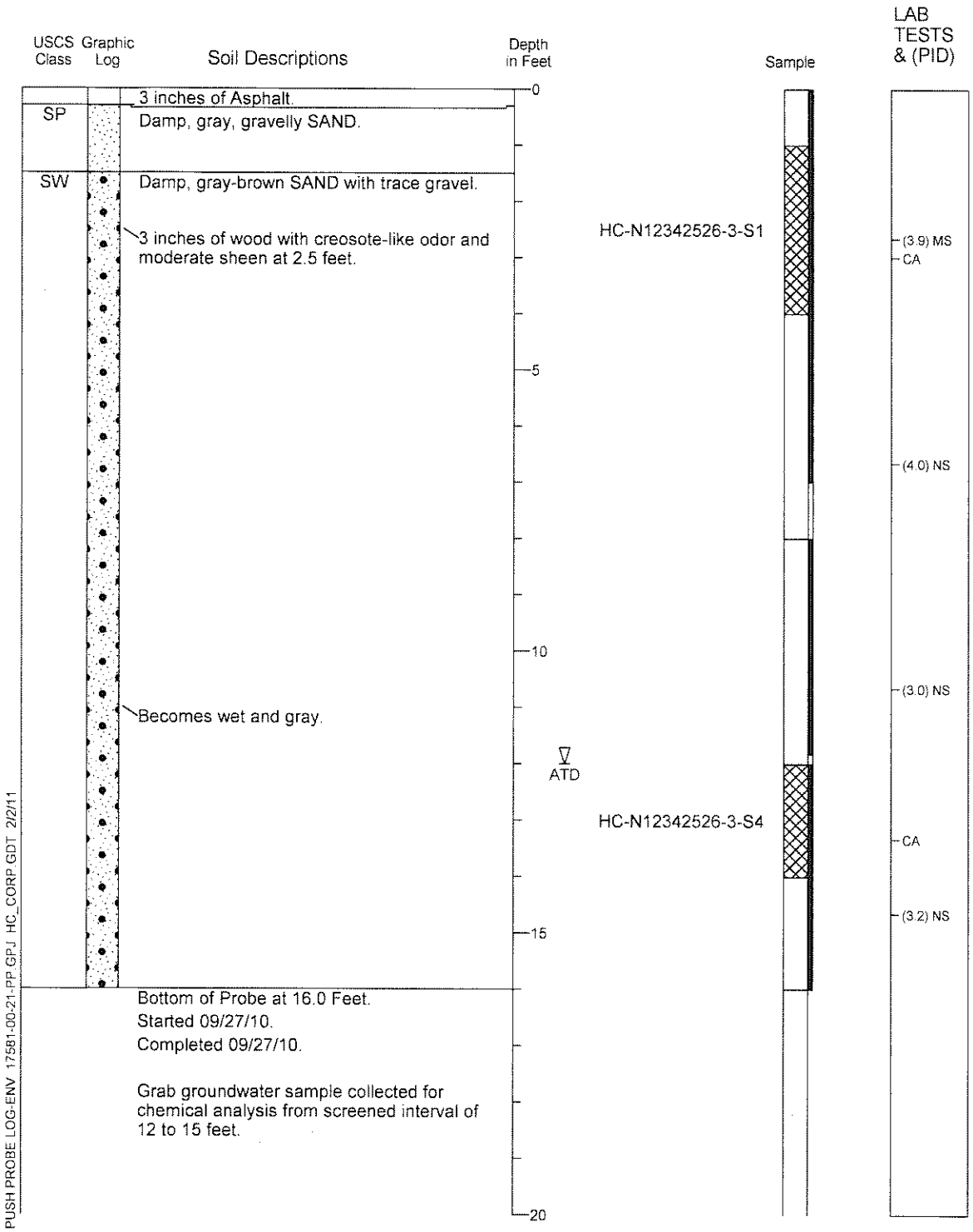
17581-00 *9/10*

Figure B-3

Push Probe Log HC-N12342526-3

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



PUSH PROBE LOG-ENV 17581-00-21-PP.GPJ HC_CORP.GDT 2/2/11

1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

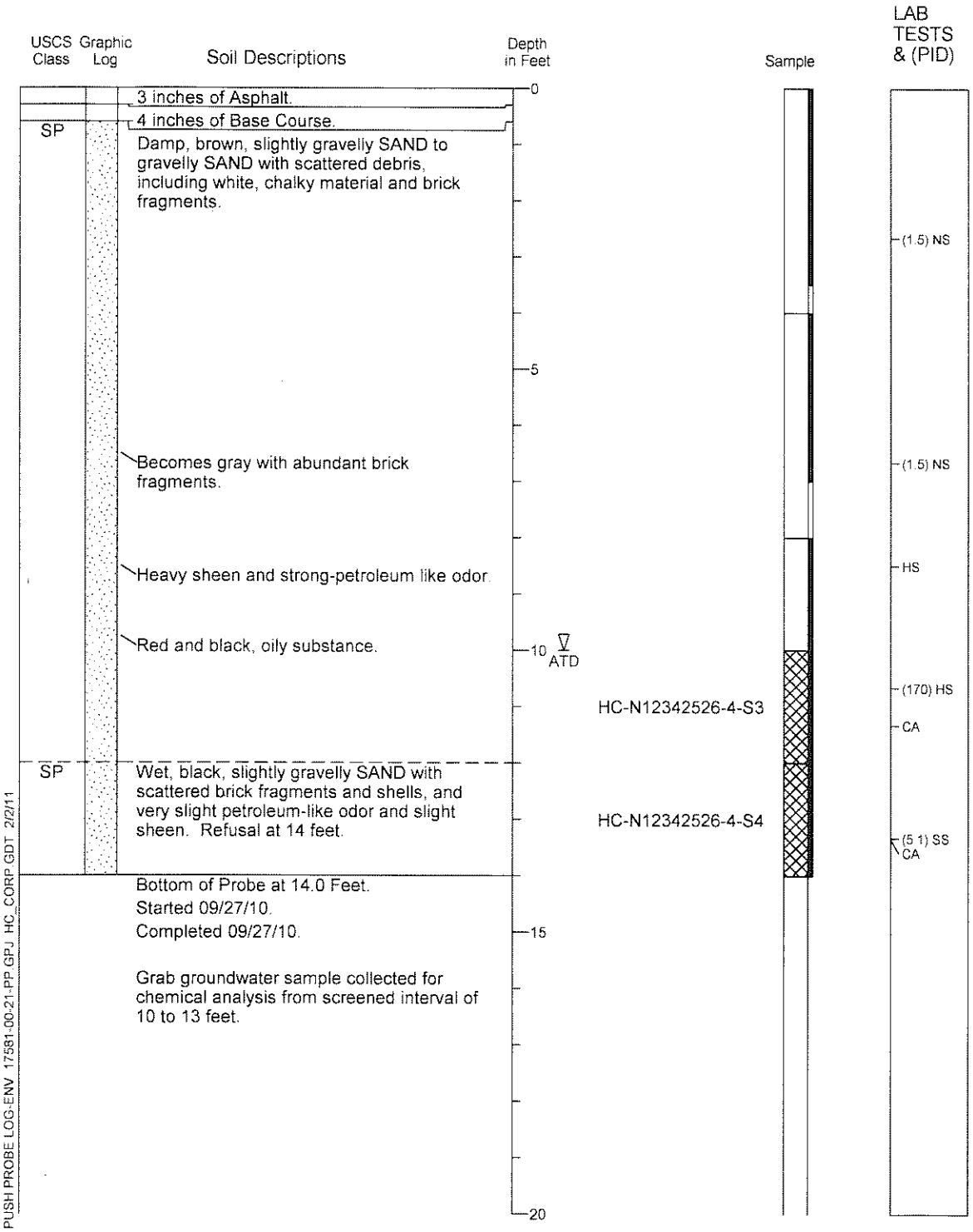
17581-00 *9/10*

Figure B-4

Push Probe Log HC-N12342526-4

Location: See Figure 3.
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: NA
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: P. Cordell Reviewed By: C. Rust



PUSH PROBE LOG-ENV 17581-00-21-PP.GPJ HC_CORP.GDT 2/2/11

1. Refer to Figure B-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. NS = No Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

HARTCROWSER

17581-00 *9/10*

Figure B-5

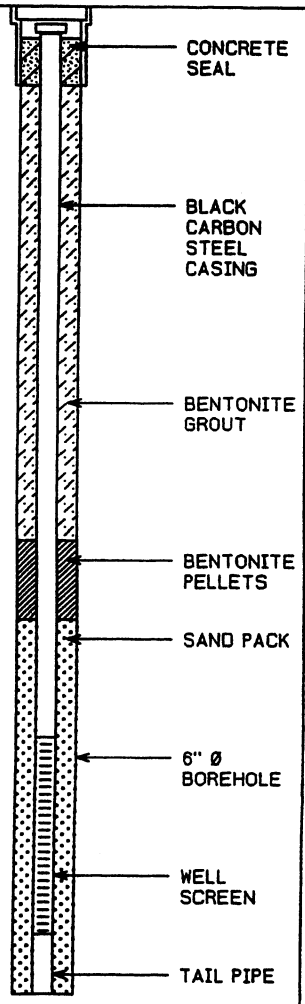
BORING LOGS FROM PREVIOUS INVESTIGATIONS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 1002-15
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: 12-25
DATE COMPLETED: OCTOBER 4, 1995
DRILLING METHOD: RESONANT SONIC
CRA SUPERVISOR: J. SCHWALLER

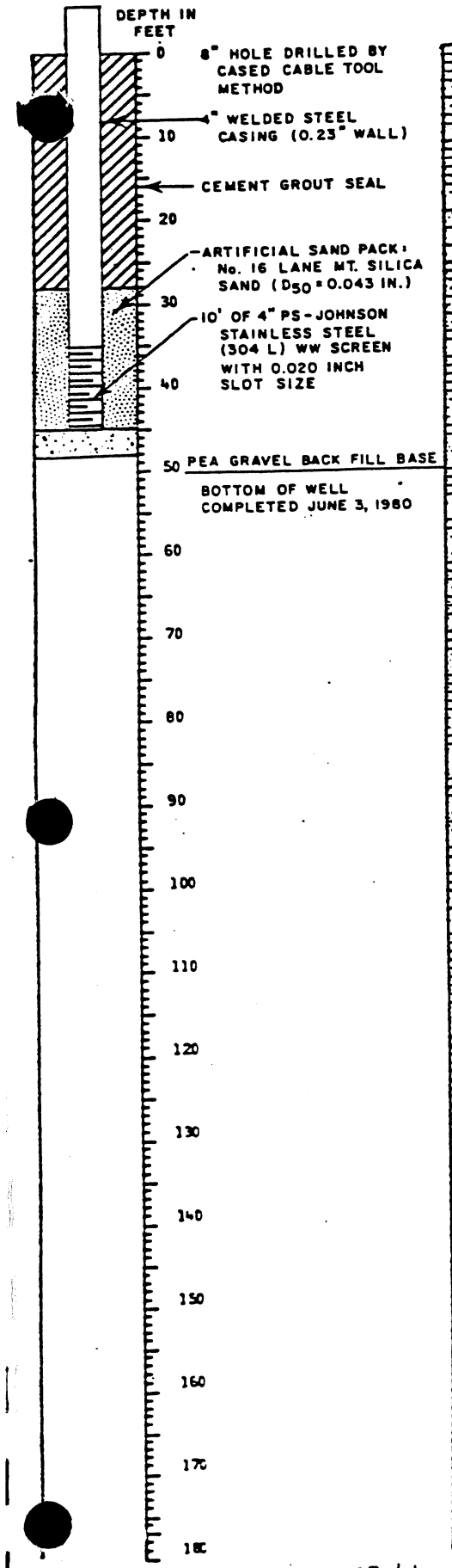
DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	*10.56* *10.4*					
	Refer to 12-45 for stratigraphic details.						
-2.5							
-5.0							
-7.5							
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0	END OF HOLE @ 25.0ft BGS	*-14.5*					
-27.5							
-30.0							
-32.5							

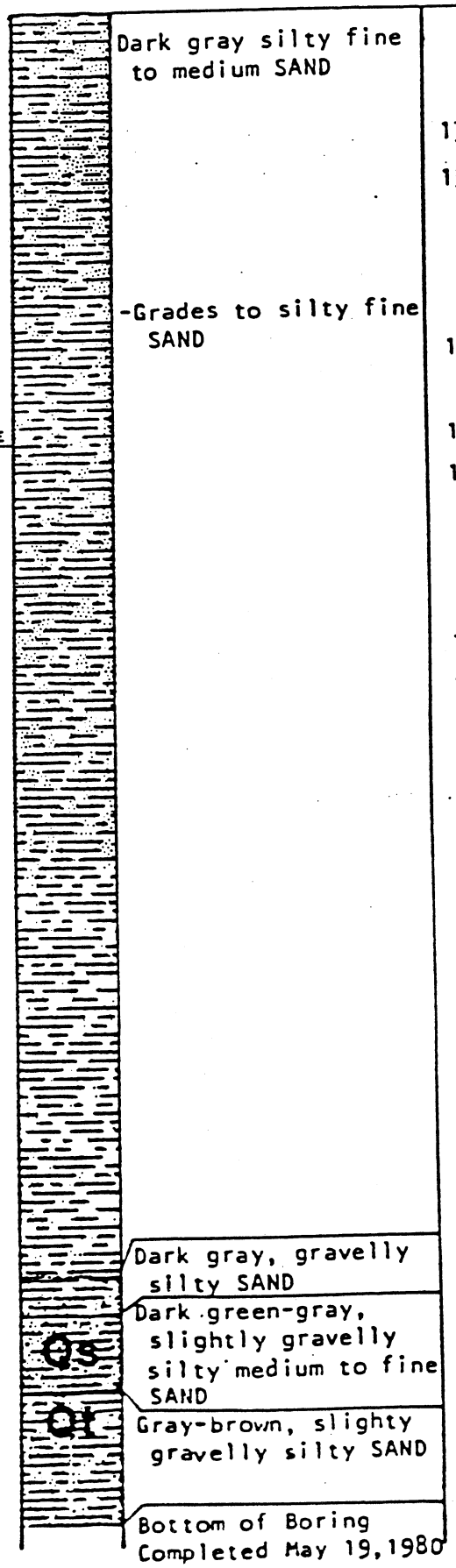


SCREEN DETAILS
Screened interval:
18.5 to 23.5ft BGS
Length: 5ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
15.5 to 25.0ft BGS
Material: 20/40 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼

12-45





QUALITATIVE CHEMICAL CONCENTRATIONS AT SAMPLED DEPTH (mg/l)

T°C	NaOH	NaCl	Cl-Organics
17.0	0	13,000	0
15.0	0	29,800	0
NA	0	18,100	0
NA	0	20,700	0
NA	0	14,500	0
14.0	0	10,700	0
NA	0	11,700	0
15.0	0	10,500	0
15.0	0	8,100	0
NA	0	7,400	NA
NA	0	7,000	NA
NA	0	7,000	NA
16.5	0	9,200	NA
15.5	0	15,900	0
NA	0	24,300	NA
15.0	0	37,400	NA
14.5	0	24,800	NA
14.5	0	23,600	NA
14.5	0	22,400	NA
15.0	0	18,500	NA
12.5	0	17,900	NA
13.0	0	17,800	0
13.0	0	17,600	NA
13.0	0	16,700	NA
13.5	0	14,300	NA
NA	0	14,000	NA
NA	0	13,600	0
13.0	0	13,500	NA
NA	0	13,200	NA
NA	0	12,600	0
NA	0	11,900	NA
NA	0	11,600	NA
NA	0	11,400	NA

SURFACE ELEVATION 17.4' MLLW

NA = Not Available TRACE = Detectable but not Measurable

J-864-02 July 1980

HART-CROWSER & associates inc.

Figure C-11

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Former OCC Tacoma Facility
PROJECT NUMBER: 07843
CLIENT: Glenn Springs Holdings
LOCATION: Tacoma, WA

HOLE DESIGNATION: 12-100 DRAFT
DATE COMPLETED: March 23, 2006
DRILLING METHOD: HSA
FIELD PERSONNEL: R. Bayne

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	monitoring well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (ft)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	(See stratigraphic logs for wells 12-25, 12-45, and 12-160 for stratigrahy).		Concrete Bentonite Chips Portland Slurry 2"Ø STEEL RISER 8"Ø BOREHOLE					

2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

OVERBURDEN LOG 07843.GPJ CRA_CORP.GDT 12/4/06

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Former OCC Tacoma Facility
PROJECT NUMBER: 07843
CLIENT: Glenn Springs Holdings
LOCATION: Tacoma, WA

HOLE DESIGNATION: 12-100 DRAFT
DATE COMPLETED: March 23, 2006
DRILLING METHOD: HSA
FIELD PERSONNEL: R. Bayne

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	monitoring well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (ft)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
36								
38								
40			Portland Slurry					
42			2"Ø STEEL RISER					
44								
46			8"Ø BOREHOLE					
48								
50								
52								
54								
56								
58								
60								
62								
64								
66								
68								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Former OCC Tacoma Facility
PROJECT NUMBER: 07843
CLIENT: Glenn Springs Holdings
LOCATION: Tacoma, WA

HOLE DESIGNATION: 12-100 DRAFT
DATE COMPLETED: March 23, 2006
DRILLING METHOD: HSA
FIELD PERSONNEL: R. Bayne

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	monitoring well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (ft)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
72								
74								
76								
78								
80			Portland Slurry					
82			2"Ø STEEL RISER					
84								
86			8"Ø BOREHOLE					
88								
90			Bentonite					
92			Sand					
94								
96	Not Sampled	95.00						
98	SM/ML - SILTY SAND, trace clay, compact, fine grain, poorly graded, dark brown, moist to wet, trace medium grain sand	97.00	2"Ø STEEL SCREEN	SS1			13	5.1
100	ML - SAND and SILT, trace clay, soft, low plasticity, homogenous, dark brown/grey, wet, fne grain sand, occasional shell fragments	99.00	SUMP	SS2			4	3.0
102	END OF BOREHOLE @ 101.0ft BGS	101.00						
104								

WELL DETAILS
Screened interval:
95.00 to 100.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 10

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

OVERBURDEN LOG 07843.GPJ CRA_CORP.GDT 12/4/06

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: Former OCC Tacoma Facility
PROJECT NUMBER: 07843
CLIENT: Glenn Springs Holdings
LOCATION: Tacoma, WA

HOLE DESIGNATION: 12-100 DRAFT
DATE COMPLETED: March 23, 2006
DRILLING METHOD: HSA
FIELD PERSONNEL: R. Bayne

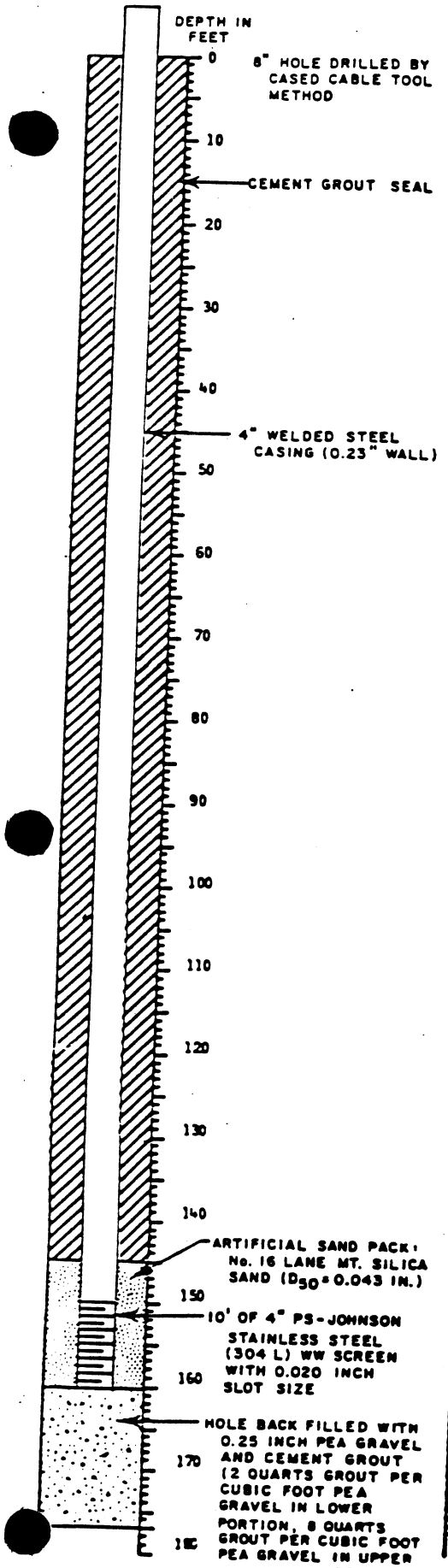
DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	monitoring well	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE REC (ft)	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
106			Material: steel Seal: 89.00 to 91.00ft BGS Material: Bentonite Sand Pack: 91.00 to 101.00ft BGS Material: Sand					
108								
110								
112								
114								
116								
118								
120								
122								
124								
126								
128								
130								
132								
134								
136								
138								

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

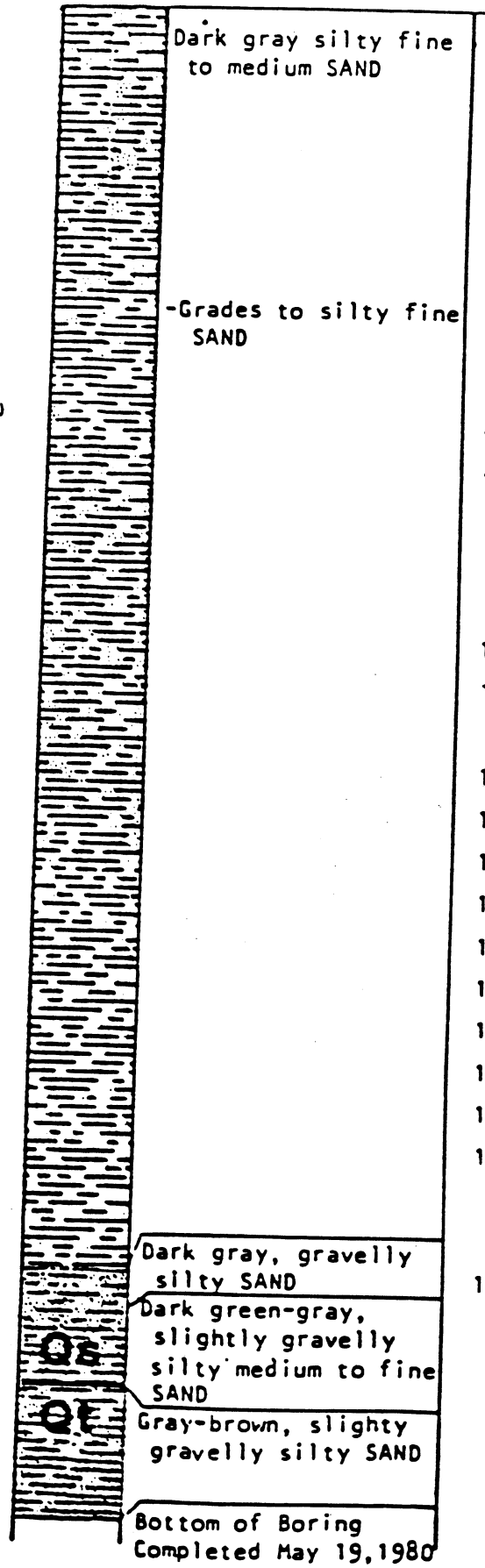
CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

OVERBURDEN LOG 07843.GPJ CRA_CORP.GDT 12/4/06

12-160



SURFACE ELEVATION 17.3' MLLW



QUALITIVE CHEMICAL CONCENTRATIONS AT SAMPLED DEPTH (mg/l)

T°C	NaOH	NaCl	Cl-Organics
17.0	0	13,000	0
15.0	0	29,800	0
NA	0	18,100	0
NA	0	20,700	0
NA	0	14,500	0
14.0	0	10,700	0
NA	0	11,700	0
15.0	0	10,500	0
15.0	0	8,100	0
NA	0	7,400	NA
NA	0	7,000	NA
NA	0	7,000	NA
16.5	0	9,200	NA
15.5	0	15,900	0
NA	0	24,300	NA
15.0	0	37,400	NA
14.5	0	24,800	NA
14.5	0	23,600	NA
14.5	0	22,400	NA
15.0	0	18,500	NA
12.5	0	17,900	NA
13.0	0	17,800	0
13.0	0	17,600	NA
13.0	0	16,700	NA
13.5	0	14,300	NA
NA	0	14,000	NA
NA	0	13,600	0
13.0	0	13,500	NA
NA	0	13,200	NA
NA	0	12,600	0
NA	0	11,900	NA
NA	0	11,600	NA
NA	0	11,400	NA

NA = Not Available

TRACE = Detectable but not Measurable

J-864-02 July 1980

HART-CROWSER & associates inc.

Figure C-12

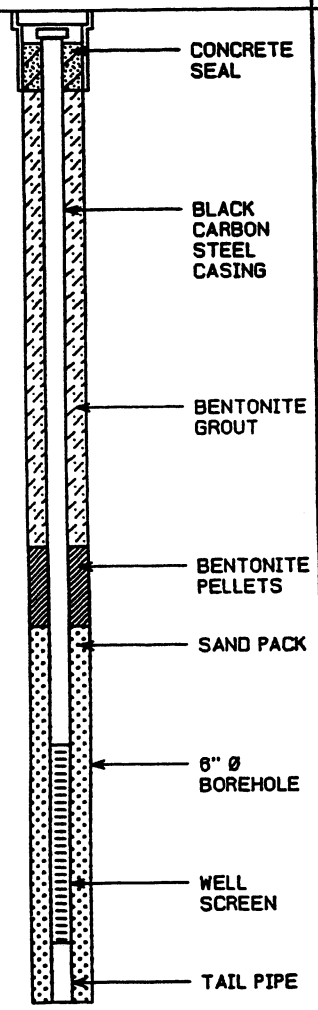
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-101)
Page 1 of 1

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 1002-15
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: 12A-25
DATE COMPLETED: OCTOBER 4, 1995
DRILLING METHOD: RESONANT SONIC
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Curb Box)	*12.7* *12.65*					
	Refer to 12A-50 for stratigraphic details.						
-2.5							
-5.0							
-7.5							
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0	END OF HOLE @ 25.0ft BGS	*-12.3*					
-27.5							
-30.0							
-32.5							



SCREEN DETAILS
Screened Interval:
18.5 to 23.5ft BGS
Length: 5ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
15.5 to 25.0ft BGS
Material: 20/40 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 1002-15
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: 12A-50
DATE COMPLETED: OCTOBER 4, 1995
DRILLING METHOD: RESONANT SONIC
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Curb Box)	*12.8* *12.69*					
2.5	SW-SAND, loose, very fine to fine grained, well graded, dark gray, red grains, moist		CONCRETE SEAL				
5.0							
7.5	- wet						
10.0	SM-SAND, some silt, dense, very fine grained	*3.8*	BENTONITE GROUT				
12.5							
15.0	SW-SAND, dense, well graded, dark brown	*-2.2*					
17.5				CC			0
20.0	- dark gray		6" Ø BOREHOLE				
22.5							
25.0	ML/CL-SILT and CLAY, soft, poorly graded	*-11.2*					
	SM-SAND, some silt, medium dense	*-13.2*					
27.5							
30.0			BLACK CARBON STEEL CASING				
32.5	SW-SAND, trace silt, loose	*-20.2*					

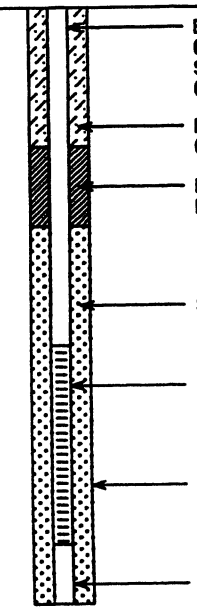
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: OXYCHEM - TACOMA
PROJECT NUMBER: 1002-15
CLIENT: OCCIDENTAL CHEMICAL CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: 12A-50
DATE COMPLETED: OCTOBER 4, 1995
DRILLING METHOD: RESONANT SONIC
CRA SUPERVISOR: J. SCHWALLER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. BGS	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-37.5	ML-SILT, trace very fine sand, dense, very fine grained	-23.2	BLACK CARBON STEEL CASING; BENTONITE GROUT; BENTONITE PELLETS; SAND PACK	CC			0
-40.0							
-42.5							
-45.0	SM/ML-SAND and SILT	-31.2	WELL SCREEN; 6" Ø BOREHOLE				
-47.5							
-50.0	END OF HOLE @ 50.0ft BGS	-37.2	TAIL PIPE				
-52.5							
-55.0							
-57.5							
-60.0							
-62.5							
-65.0							
-67.5							



SCREEN DETAILS
Screened interval:
43.5 to 48.5ft BGS
Length: 5ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
40.5 to 50.0ft BGS
Material: #20 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

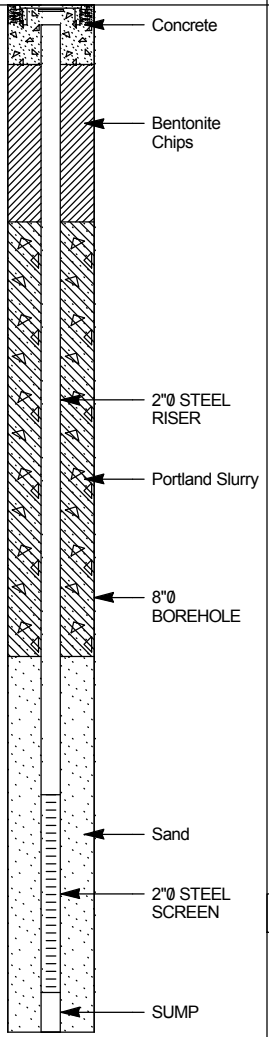
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Former OCC Tacoma Facility
PROJECT NUMBER: 07843
CLIENT: Glenn Springs Holdings
LOCATION: Tacoma, WA

HOLE DESIGNATION: 78-25 DRAFT
DATE COMPLETED: March 28, 2006
DRILLING METHOD: HSA
FIELD PERSONNEL: R. Bayne

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	(Refer to 78-50 for stratigraphy).	
22	SP - SAND, trace silt, compact, medium to fine grain, poorly graded, dark brown, moist, trace red and white fine grain sand, occasional coarse sand	22.00
24	(Refer to 78-50 for stratigraphy).	24.00
26	END OF BOREHOLE @ 26.0ft BGS	26.00

Monitoring Well



WELL DETAILS
Screened interval:
20.00 to 25.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 10
Material: Steel
Seal:
5.50 to 16.50ft BGS
Material: Bentonite
Sand Pack:
16.50 to 26.00ft BGS
Material: Sand 10-20

SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
SS1		0.0		
SS2		1.0	18	0.2
SS3		1.0		

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GRAIN SIZE ANALYSIS

OVERBURDEN LOG 07843.GPJ CRA_CORP.GDT 12/4/06

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Former OCC Tacoma Facility
PROJECT NUMBER: 07843
CLIENT: Glenn Springs Holdings
LOCATION: Tacoma, WA

HOLE DESIGNATION: 78-50 DRAFT
DATE COMPLETED: March 28, 2006
DRILLING METHOD: HSA
FIELD PERSONNEL: R. Bayne

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS	Monitoring Well	SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
0	ASPHALT	0.32	Concrete					
2	FILL - SAND and GRAVEL, trace silt, compact, medium to coarse, well graded, brown, damp, occasional stone			SS1		0.3	17	0.0
	- no gravel, loose, fine to medium grain, some coarse grain			SS2		1.5	8	0.0
6	- sandy silt, stiff, fine grain, very low plasticity, horizontal layering, (redish and brown), brown/rusty, damp			SS3		1.5	9	0.0
8	- sand with silt, loose, medium to fien grain, brown, moist, occasional red and white gine grain, sand, poorly graded			SS4		1.0	10	0.6
10	- becoming fine to medium grain, compact, and saturated	10.00	8" Ø BOREHOLE					
	SP - SAND with SILT, loose to compact, fien to medium grain, poorly graded, dark brwon, wet to saturated, occasional red and white fine grain sand		Portland Slurry	SS5		2.3	9	1.3
	- 0.16' silty sand layer	13.00						
14	SM - SILTY SAND loose, fine grain, poorly graded, dark brown, moist to wet, occasional medium grain sand, occasional red and white fine grain sand			SS6		1.0	8	0.3
	- becoming compact and saturated		2" Ø STEEL RISER					
16				SS7		2.3	9	0.1
	- 0.16' sandy silt seam							
18	- becoming loose and wet, occasional medium grain sand			SS8		0.5	5	0.1
20	SP - SAND, with SILT, loose, medium to fine grain, poorly graded, dark brown, wet to saturated, red and white medium to fine grain sand, shell fragments throughout	20.00		SS9		1.5	7	0.3
22	- trace silt, compact, occasional coarse grain sand							
24				SS10		0.5	12	0.3
	ML - SANDY SILT	25.00						
26	SP - SAND, trace silt, compact, medium to fine grain, poorly graded, dark brown, wet to saturated, red and white medium to fine grain sand, shell fragments throughout, occasional coarse grain sand	25.50		SS11		1.1	21	0.4
28				SS12		1.0	25	0.4
30								
32				SS13		0.8	20	1.0
	SM/SP - SAND with SILT, compact, fine to medium grain, poorly graded, dark brown, wet, trace red and white fine grain sand, trace coarse	33.00						
34				SS14		1.0	15	0.4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

WATER FOUND ▽

CHEMICAL ANALYSIS ⬭ GRAIN SIZE ANALYSIS ▭

OVERBURDEN LOG 07843.GPJ CRA_CORP.GDT 12/4/06

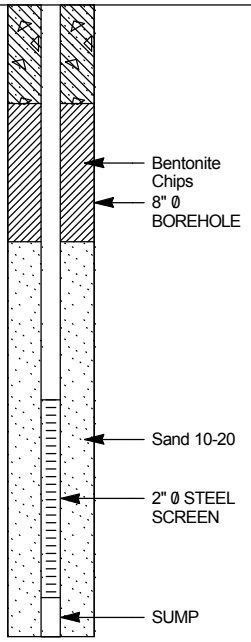
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Former OCC Tacoma Facility
PROJECT NUMBER: 07843
CLIENT: Glenn Springs Holdings
LOCATION: Tacoma, WA

HOLE DESIGNATION: 78-50 DRAFT
DATE COMPLETED: March 28, 2006
DRILLING METHOD: HSA
FIELD PERSONNEL: R. Bayne

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	DEPTH ft BGS
	grain sand, occasional shell fragments [HOW IS THIS DIFFERENT FROM 20 TO 25 FT ABOVE?]	
40	SM/ML - SAND and SILT, compact/stiff, poorly graded, very low plasticity, very fine grain, layering throughout, brown/grey, moist sand and silt layers throughout, occasional woody layers intermixed	40.00
45	Not Sampled	45.00
	SP - SAND, trace silt, compact, fien grain, poorly graded, dark brown, wet, occasional red and white fine sand grains	47.00
50	- 0.02' wood and shell fragment layer	51.00
	END OF BOREHOLE @ 51.0ft BGS	

Monitoring Well



WELL DETAILS
Screened interval:
45.00 to 50.00ft BGS
Length: 5ft
Diameter: 2in
Slot Size: 10
Material: Steel
Seal:
37.50 to 41.00ft BGS
Material: Bentonite
Sand Pack:
41.00 to 51.00ft BGS
Material: Sand 10-20

SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
SS15		0.8	23	0.8
SS16		1.0	13	0.2
SS17		1.5	13	0.1
SS18		0.5	9	0.2
SS19		2.0		
SS20		0.5	23	0.1
SS21		0.8	21	0.1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽
CHEMICAL ANALYSIS (oval) GRAIN SIZE ANALYSIS (rectangle)

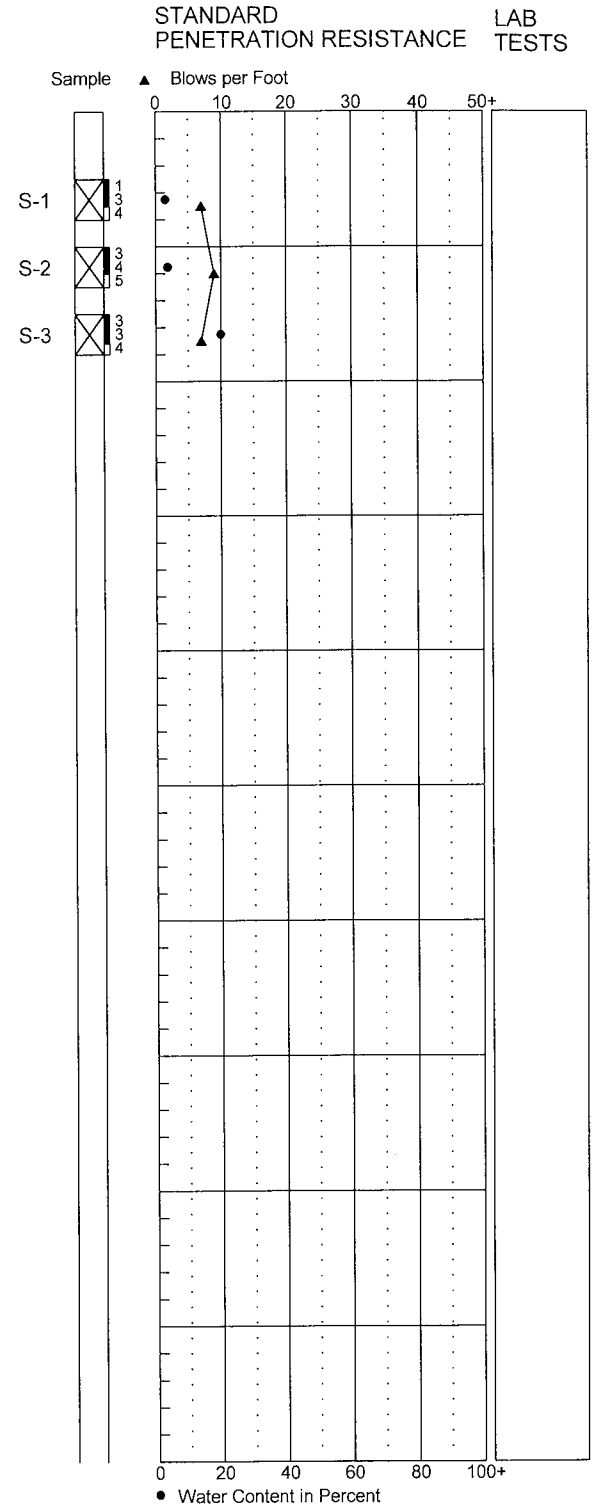
OVERBURDEN LOG 07843.GPJ CRA_CORP.GDT 12/4/06

Boring Log HC07-S14

Location: N 715662 E 1166784
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: State Plane WA South, NAD 83
Vertical Datum: MLLW

Drill Equipment: Mobile B-59
Hammer Type: SPT Automatic hammer
Hole Diameter: 6.5 inches
Logged By: P. Cordell Reviewed By: G. Knechtel

USCS Class	Graphic Log	Soil Descriptions	Depth in Feet
GW		3.5 inches of Asphalt over 15 inches of GRAVEL.	0
SW		Loose, damp, brown, slightly gravelly SAND. (FILL)	
SP		Loose, moist, brown to gray SAND with shell fragments. (FILL)	5
		Bottom of Boring at 9.0 Feet. Started 12/10/07. Completed 12/10/07.	ATD 10
			15
			20
			25
			30
			35
			40
			45
			50



NEW BORING LOG 1744100BL.GPJ HC_CORP.GDT 10/21/08

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

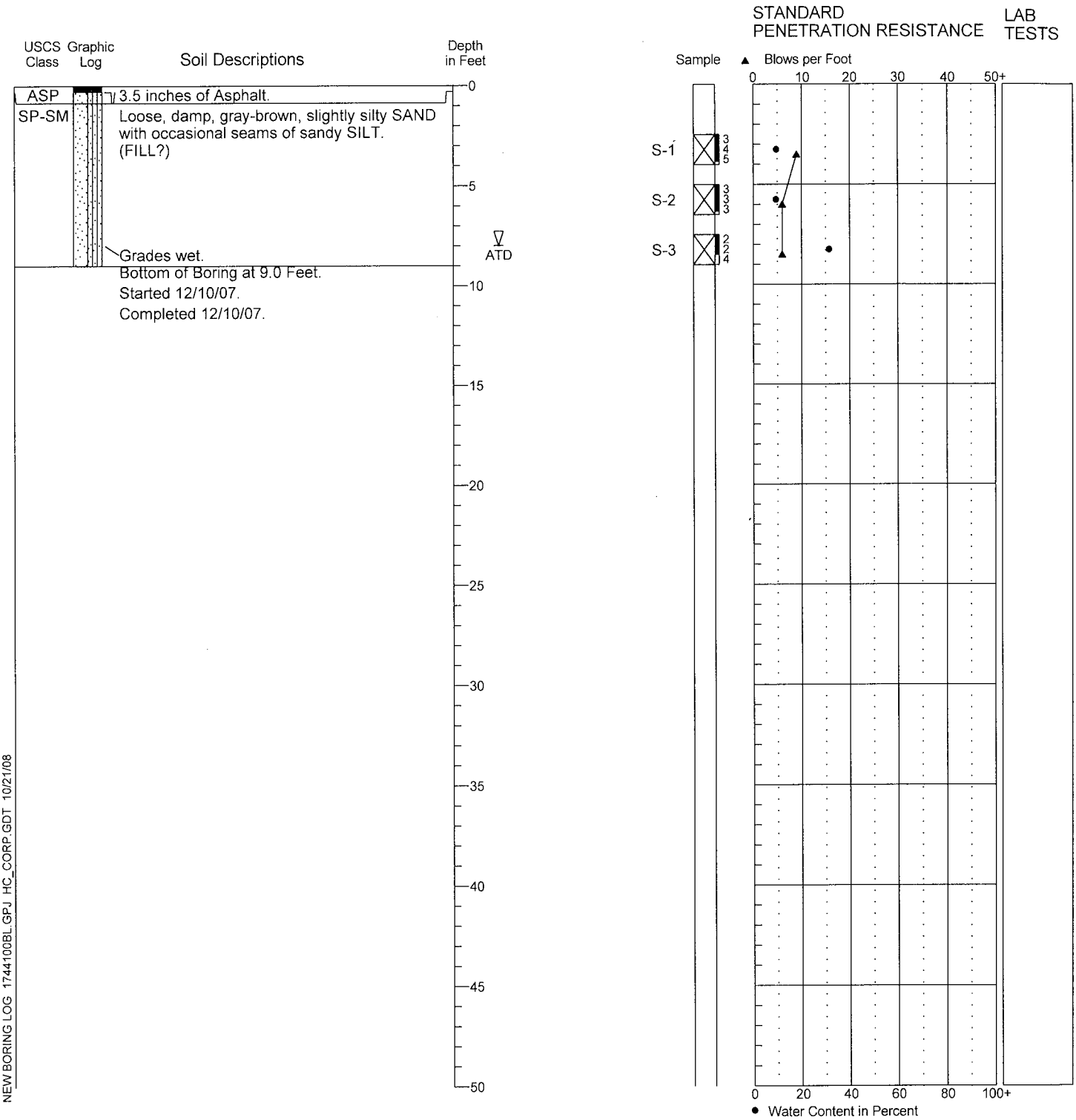
17441-00 12/07

Figure A-27

Boring Log HC07-S15

Location: N 715805 E 1166589
Approximate Ground Surface Elevation: 17 Feet
Horizontal Datum: State Plane WA South, NAD 83
Vertical Datum: MLLW

Drill Equipment: Mobile B-59
Hammer Type: SPT Automatic hammer
Hole Diameter: 6.5 inches
Logged By: P. Cordell Reviewed By: G. Knechtel



NEW BORING LOG 1744100BL.GPJ HC_CORP.GDT 10/21/08

1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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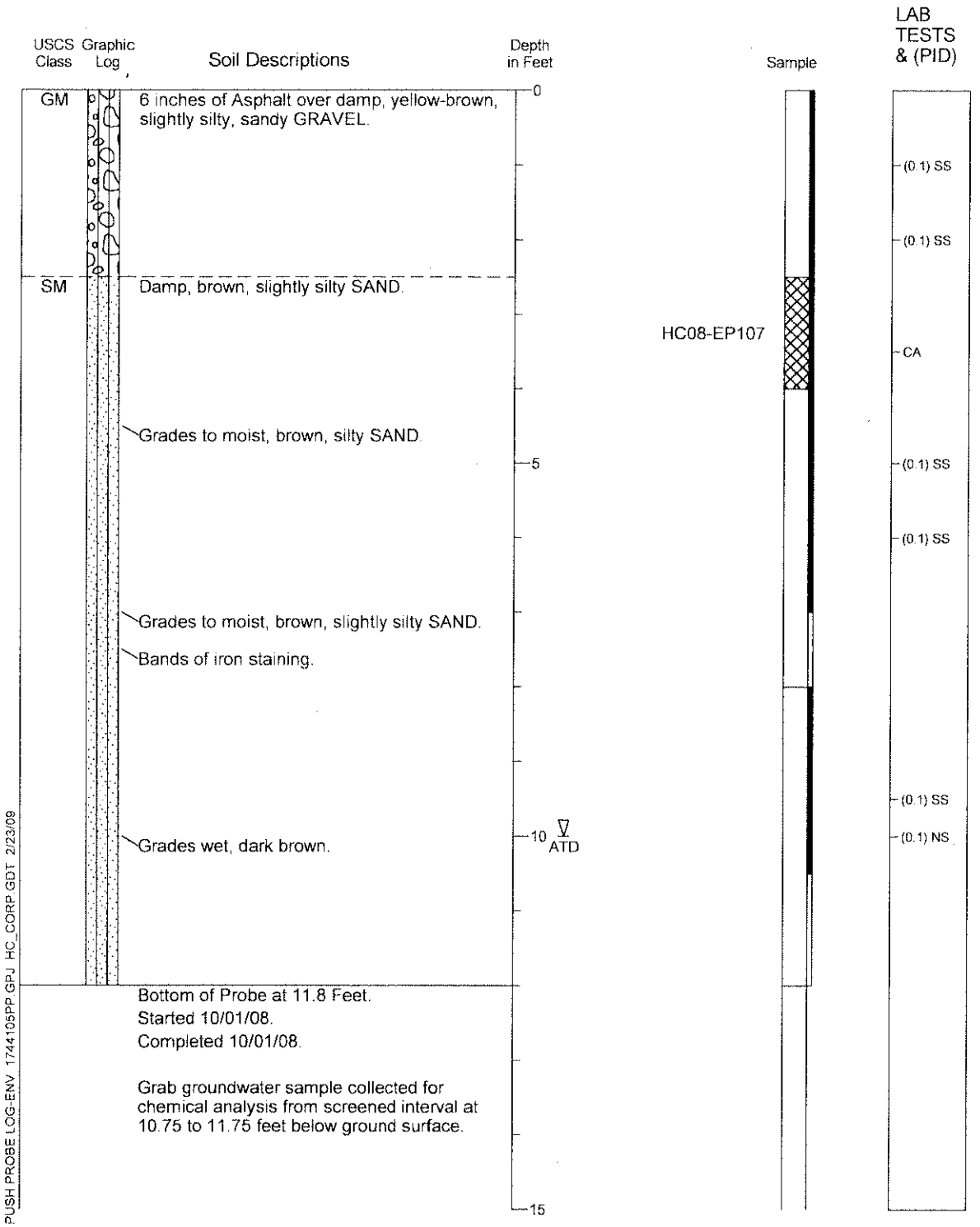
17441-00 12/07

Figure A-28

Push Probe Log HC08-EP107

Location: N 715801.48 E 1166730.28
Approximate Ground Surface Elevation: 17.89 Feet
Horizontal Datum: NAD 83/07
Vertical Datum: MLLW

Drill Equipment: Push Probe
Sample Type: Acetate Liner
Hole Diameter: 2 inches
Logged By: A. Goodwin/K. Reinauer Reviewed By: G. Both



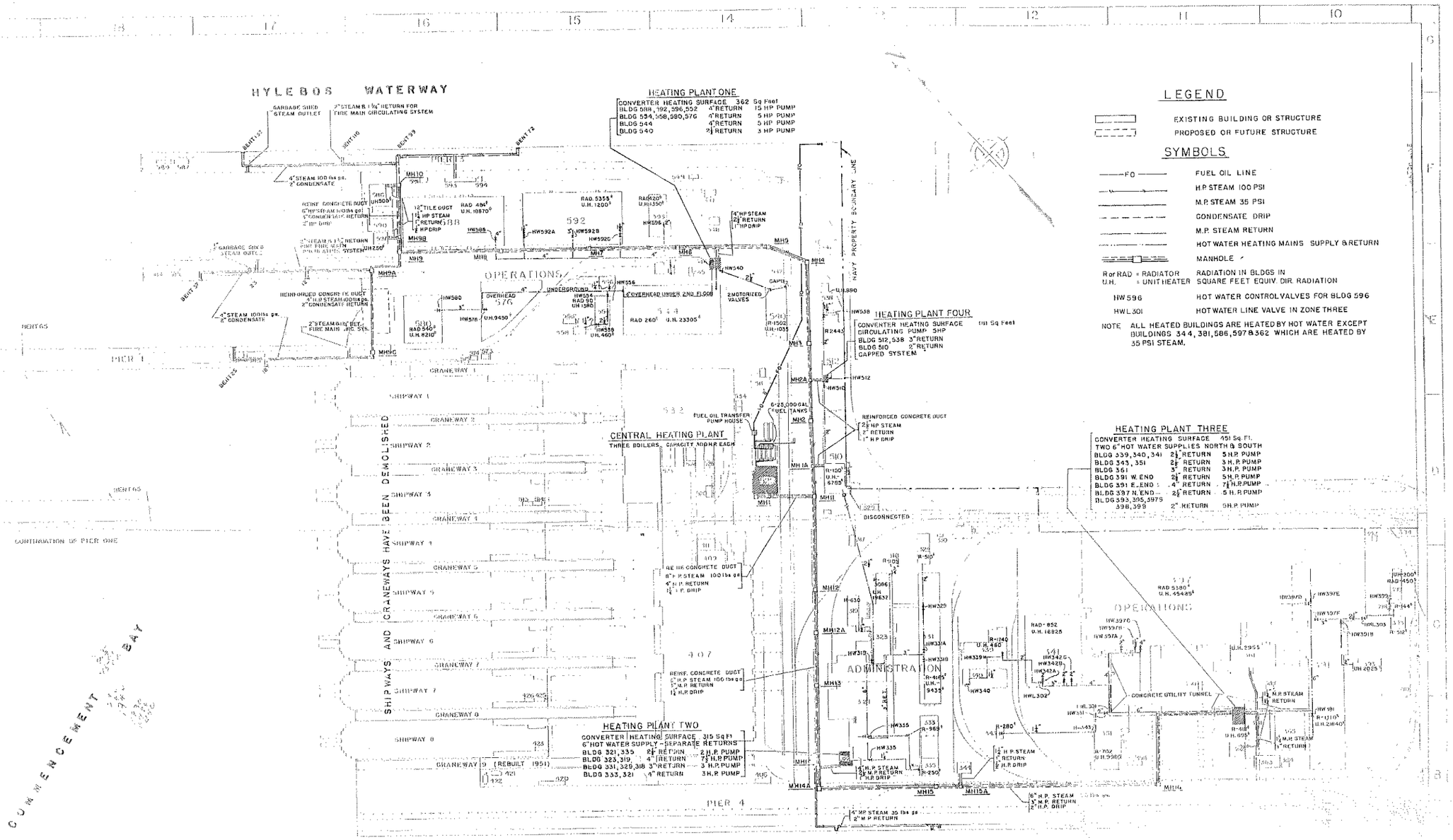
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. USCS designations are based on visual manual classification (ASTM D 2488) unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.
5. HS = High Sheen; MS = Moderate Sheen; SS = Slight Sheen; NS = No Sheen

HARTCROWSER

17441-05 10/08

Figure A-8

APPENDIX C
NAVY DRAWING


HYLEBOS WATERWAY
HEATING PLANT ONE
CONVERTER HEATING SURFACE 362 Sq Feet
BLDG 588, 592, 596, 552 4" RETURN 15 HP PUMP
BLDG 554, 556, 580, 576 4" RETURN 5 HP PUMP
BLDG 544 4" RETURN 5 HP PUMP
BLDG 540 2½" RETURN 3 HP PUMP
LEGEND
EXISTING BUILDING OR STRUCTURE
PROPOSED OR FUTURE STRUCTURE
SYMBOLS
FUEL OIL LINE
H.P. STEAM 100 PSI
M.P. STEAM 35 PSI
CONDENSATE DRIP
M.P. STEAM RETURN
HOT WATER HEATING MAINS SUPPLY & RETURN
MANHOLE
R or RAD = RADIATOR RADIATION IN BLDGS IN
U.H. = UNIT HEATER SQUARE FEET EQUIV. DIR. RADIATION
HW 596 HOT WATER CONTROL VALVES FOR BLDG 596
HWL 301 HOT WATER LINE VALVE IN ZONE THREE
NOTE ALL HEATED BUILDINGS ARE HEATED BY HOT WATER EXCEPT BUILDINGS 344, 381, 586, 597 & 362 WHICH ARE HEATED BY 35 PSI STEAM.
HEATING PLANT FOUR
CONVERTER HEATING SURFACE 191 Sq Feet
CIRCULATING PUMP 5HP
BLDG 512, 538 3" RETURN
BLDG 510 2" RETURN
CAPPED SYSTEM
HEATING PLANT THREE
CONVERTER HEATING SURFACE 351 Sq. Ft.
TWO 6" HOT WATER SUPPLIES NORTH & SOUTH
BLDG 339, 340, 341 2½" RETURN 5 H.P. PUMP
BLDG 345, 351 2½" RETURN 5 H.P. PUMP
BLDG 361 3" RETURN 5 H.P. PUMP
BLDG 391 W. END 2½" RETURN 5 H.P. PUMP
BLDG 391 E. END 4" RETURN 7½ H.P. PUMP
BLDG 387 N. END 2½" RETURN 5 H.P. PUMP
BLDG 393, 395, 397, 398, 399 2" RETURN 5 H.P. PUMP
CENTRAL HEATING PLANT
THREE BOILERS, CAPACITY 400 H.P. EACH
HEATING PLANT TWO
CONVERTER HEATING SURFACE 315 Sq Ft
6" HOT WATER SUPPLY - SEPARATE RETURNS
BLDG 321, 335 2½" RETURN 2 H.P. PUMP
BLDG 323, 319 4" RETURN 7½ H.P. PUMP
BLDG 331, 329, 318 3" RETURN 3 H.P. PUMP
BLDG 333, 321 4" RETURN 3 H.P. PUMP
PIER 1
PIER 4
CONTINUATION OF PIER ONE
COMMENCEMENT BAY
SHIPWAYS AND CRANEWAYS HAVE BEEN DEMOLISHED
OPERATIONS
ADMINISTRATION
CONCRETE UTILITY TUNNEL
NAVY PROPERTY BOUNDARY LINE
PORT INDUSTRIAL WATERWAY
GRAPHIC SCALE 1"=100'
EP-6041-12_00016
AREA DEVELOPMENT PLAN
AREAS 12 & 7 UTILITIES
STEAM, HOT WATER & FUEL OIL SYSTEM
631,668

APPENDIX D
CHEMICAL DATA QUALITY REVIEW AND LABORATORY REPORTS

APPENDIX D
CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

Chemical Data Quality Review for USTs N-1, 2, 3, 4, 25, and 26

Five soil samples and four water samples were collected on September 24 and 27, 2010. The samples were submitted to OnSite Environmental Inc., of Redmond, Washington, for chemical analysis. The sample results were reported as Laboratory Reference Nos. 1009-267 and 1009-285.

The water and soil samples were analyzed for the following:

- Gasoline range organics by Washington State Department of Ecology (Ecology) method NWTPH-Gx;
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021; and
- Diesel and lube oil range organics by Ecology method NWTPH-Dx with Acid/Silica Gel Cleanup.

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratories. Hart Crowser performed the data review, using laboratory quality control results summary sheets, to ensure they met data quality objectives for the project. The following criteria were evaluated in the standard data quality review process:

- Holding times;
- Method blanks;
- Surrogate recoveries;
- Laboratory control sample (LCS) recoveries;
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries;
- Laboratory duplicate relative percent differences (RPDs); and
- Reporting limits (RL).

The data were determined to be acceptable for use without qualification. Full laboratory results are presented at the end of this memo. Results of the data reviews follow.

Soil Samples

Gasoline by NWTPH-Gx

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

BTEX by EPA 8021

The required holding times were met. No method blank contamination was detected. Surrogate and LCS recoveries were within laboratory control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

The reporting limit for o-Xylene in sample HC-N12342526-4-S3 was elevated due to matrix interferences.

Diesel and Lube Oil by NWTPH-Dx

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Laboratory duplicate RPDs were within control limits or not applicable as the sample and duplicate were non-detect.

Surrogate recoveries were within method control limits with the following exception: No surrogate recovery was reported for sample HC-N12342526-4-S3 due to the high sample dilution required by high levels of target analytes. No results were qualified.

Water Samples

Gasoline by NWTPH-Gx

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

Hydrocarbons indicative of heavier fuels were impacting the gasoline results in sample HC-N12342526-4. Results were not qualified.

BTEX by EPA 8021

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate and MS recoveries were within laboratory control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

Diesel and Lube Oil by NWTPH-Dx

The required holding times were met. Reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within method control limits. Laboratory duplicate RPDs were not applicable as the sample and duplicate were non-detect.

Hydrocarbons in the gasoline range were impacting the diesel results in sample HC-N12342526-4. Results were not qualified.

J:\Jobs\1758100\Phase 21 1,2,3,4,25,26\Summary Report\UST N-1,2,3,4,25,26 Summary Report.doc

ONSITE ENVIRONMENTAL INC.
LABORATORY REPORTS

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 6, 2010

Colleen Rust
Hart Crowser, Inc.
1700 Westlake Avenue North, Suite 200
Seattle, WA 98109-3056

Re: Analytical Data for Project 17581-00 21
Laboratory Reference No. 1009-267

Dear Colleen:

Enclosed are the analytical results and associated quality control data for samples submitted on September 24, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

Case Narrative

Samples were collected on September 24, 2010 and received by the laboratory on September 24, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

NWTPH Gx/BTEX (soil) Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Dx
(with acid/silica gel clean-up)

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-4-S3**					
Laboratory ID:	09-267-01					
Diesel Range Organics	**22000**	590	NWTPH-Dx	9-29-10	9-30-10	
Lube Oil	**25000**	1200	NWTPH-Dx	9-29-10	9-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	---	*50-150*				S

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Dx
QUALITY CONTROL
(with acid/silica gel clean-up)

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0929S2					
Diesel Range Organics	**ND**	25	NWTPH-Dx	9-29-10	9-29-10	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*109*	*50-150*				

Analyte	Result		Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE							
Laboratory ID:	09-273-09						
	ORIG	DUP					
Mineral Oil	**46.6**	**38.3**			20	NA	
Surrogate:							
o-Terphenyl			*106* *98*	*50-150*			

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Dx
(with acid/silica gel clean-up)

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-4-GW**					
Laboratory ID:	09-267-03					
Diesel Range Organics	**1.5**	0.28	NWTPH-Dx	9-27-10	9-28-10	M
Lube Oil	**0.67**	0.45	NWTPH-Dx	9-27-10	9-28-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*96*	*50-150*				

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Dx
QUALITY CONTROL
(with acid/silica gel clean-up)

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0927W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	9-27-10	9-28-10	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	9-27-10	9-28-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*103*	*50-150*				

Analyte	Result		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-222-01							
	ORIG	DUP						
Diesel Range Organics	**ND**	**ND**				NA	NA	
Lube Oil Range Organics	**ND**	**ND**				NA	NA	
Surrogate:								
o-Terphenyl			*115*	*122*	*50-150*			

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-4-S3**					
Laboratory ID:	09-267-01					
Benzene	**0.14**	0.020	EPA 8021	9-28-10	9-29-10	
Toluene	**0.089**	0.066	EPA 8021	9-28-10	9-29-10	
Ethyl Benzene	**1.5**	0.066	EPA 8021	9-28-10	9-29-10	
m,p-Xylene	**0.85**	0.066	EPA 8021	9-28-10	9-29-10	
o-Xylene	**ND**	6.6	EPA 8021	9-28-10	9-29-10	U1
Gasoline	**ND**	6.6	NWTPH-Gx	9-28-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*55-127*				

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0928S2					
Benzene	**ND**	0.020	EPA 8021	9-28-10	9-28-10	
Toluene	**ND**	0.050	EPA 8021	9-28-10	9-28-10	
Ethyl Benzene	**ND**	0.050	EPA 8021	9-28-10	9-28-10	
m,p-Xylene	**ND**	0.050	EPA 8021	9-28-10	9-28-10	
o-Xylene	**ND**	0.050	EPA 8021	9-28-10	9-28-10	
Gasoline	**ND**	5.0	NWTPH-Gx	9-28-10	9-28-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*92*	*55-127*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	09-251-08										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*89*	*90*	*55-127*			
SPIKE BLANKS											
Laboratory ID:	SB0928S1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.925**	**0.978**	1.00	1.00		**93**	**98**	75-113	6	9	
Toluene	**0.900**	**0.943**	1.00	1.00		**90**	**94**	75-116	5	10	
Ethyl Benzene	**0.907**	**0.952**	1.00	1.00		**91**	**95**	82-117	5	10	
m,p-Xylene	**0.915**	**0.958**	1.00	1.00		**92**	**96**	81-122	5	10	
o-Xylene	**0.913**	**0.958**	1.00	1.00		**91**	**96**	83-118	5	10	
Surrogate:											
Fluorobenzene						*91*	*92*	*55-127*			

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-4-GW**					
Laboratory ID:	09-267-03					
Benzene	**16**	1.0	EPA 8021	10-4-10	10-4-10	
Toluene	**1.5**	1.0	EPA 8021	10-4-10	10-4-10	
Ethyl Benzene	**26**	1.0	EPA 8021	10-4-10	10-4-10	
m,p-Xylene	**6.9**	1.0	EPA 8021	10-4-10	10-4-10	
o-Xylene	**7.4**	1.0	EPA 8021	10-4-10	10-4-10	
Gasoline	**950**	100	NWTPH-Gx	10-4-10	10-4-10	O
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*100*	*74-121*				

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1004W1					
Benzene	**ND**	1.0	EPA 8021	10-4-10	10-4-10	
Toluene	**ND**	1.0	EPA 8021	10-4-10	10-4-10	
Ethyl Benzene	**ND**	1.0	EPA 8021	10-4-10	10-4-10	
m,p-Xylene	**ND**	1.0	EPA 8021	10-4-10	10-4-10	
o-Xylene	**ND**	1.0	EPA 8021	10-4-10	10-4-10	
Gasoline	**ND**	100	NWTPH-Gx	10-4-10	10-4-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*96*	*74-121*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	10-016-02										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*78*	*79*	*74-121*			
MATRIX SPIKES											
Laboratory ID:	10-016-02										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**52.0**	**52.4**	50.0	50.0	ND	**104**	**105**	78-118	1	8	
Toluene	**48.9**	**49.1**	50.0	50.0	ND	**98**	**98**	81-119	0	8	
Ethyl Benzene	**49.2**	**49.3**	50.0	50.0	ND	**98**	**99**	81-121	0	8	
m,p-Xylene	**49.4**	**49.1**	50.0	50.0	ND	**99**	**98**	79-123	1	8	
o-Xylene	**49.1**	**49.1**	50.0	50.0	ND	**98**	**98**	79-121	0	8	
Surrogate:											
Fluorobenzene						*99*	*99*	*74-121*			

Date of Report: October 6, 2010
Samples Submitted: September 24, 2010
Laboratory Reference: 1009-267
Project: 17581-00 21

% MOISTURE

Date Analyzed: 9-29-10

Client ID	Lab ID	% Moisture
HC-N12342526-4-S3	09-267-01	15

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Sample Custody Record

Samples Shipped to: ONSITE

N-12342526

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17581-00 21 LAB NUMBER 09-267

PROJECT NAME POT UST PROGRAM - N12342526

HART CROWSER CONTACT COLLEEN RUST, ROSS STAINSBY, PHIL CORDELL

SAMPLED BY: PRC

REQUESTED ANALYSIS

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-Dx	NWTPH-Gx	BTEX									20MOI STORE		NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
1	HC-N12342526-4-S3		9/24/10	1410	SOIL	X	X	X									X		6	
2	HC-N12342526-4-S4		↓	1435	↓														6	
3	HC-N12342526-4-GW		↓	1525	H_2O	X	X	X											15	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE [signature]	9/24/10	SIGNATURE [signature]	9-24-10
PRINT NAME Phil Cordell	TIME	PRINT NAME Jim Kavaney	TIME
COMPANY HC	1615	COMPANY Speedy Messenger	4:13

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE [signature]	9-24-10	SIGNATURE [signature]	9/24/10
PRINT NAME Jim Kavaney	TIME	PRINT NAME MVOUN	TIME
COMPANY Speedy Mess.	516	COMPANY OSE	1715

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

* Please hold additional samples and volume for future analysis.

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. ____ for Other Contract Requirements

27 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE ____
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER ____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 5, 2010

Colleen Rust
Hart Crowser, Inc.
1700 Westlake Avenue North, Suite 200
Seattle, WA 98109-3056

Re: Analytical Data for Project 17581-00 21
Laboratory Reference No. 1009-285

Dear Colleen:

Enclosed are the analytical results and associated quality control data for samples submitted on September 28, 2010.

The standard policy of OnSite Environmental Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

Case Narrative

Samples were collected on September 27, 2010 and received by the laboratory on September 28, 2010. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

NWTPH Gx/BTEX (soil) Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Gx/BTEX

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-1 GW**					
Laboratory ID:	09-285-01					
Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	100	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*74-121*				
Client ID:	**HC-N12342526-2 GW**					
Laboratory ID:	09-285-02					
Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	100	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*74-121*				
Client ID:	**HC-N12342526-3 GW**					
Laboratory ID:	09-285-03					
Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	100	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*74-121*				

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0929W1					
Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	1.0	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	100	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*74-121*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	09-285-01										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*90*	*89*	*74-121*			
MATRIX SPIKES											
Laboratory ID:	09-285-01										
	MS	MSD	MS	MSD		MS	MSD				
Benzene	**49.5**	**48.6**	50.0	50.0	ND	**99**	**97**	78-118	2	8	
Toluene	**47.3**	**46.7**	50.0	50.0	ND	**95**	**93**	81-119	1	8	
Ethyl Benzene	**47.6**	**47.1**	50.0	50.0	ND	**95**	**94**	81-121	1	8	
m,p-Xylene	**47.5**	**46.7**	50.0	50.0	ND	**95**	**93**	79-123	2	8	
o-Xylene	**47.9**	**46.9**	50.0	50.0	ND	**96**	**94**	79-121	2	8	
Surrogate:											
Fluorobenzene						*100*	*97*	*74-121*			

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-1-S3/4**					
Laboratory ID:	09-285-04					
Benzene	**ND**	0.020	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	0.061	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	0.061	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	0.061	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	0.061	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	6.1	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*94*	*55-127*				
Client ID:	**HC-N12342526-2-S3**					
Laboratory ID:	09-285-05					
Benzene	**ND**	0.020	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	0.074	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	0.074	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	0.074	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	0.074	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	7.4	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*101*	*55-127*				
Client ID:	**HC-N12342526-3-S4**					
Laboratory ID:	09-285-06					
Benzene	**ND**	0.020	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	0.060	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	0.060	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	0.060	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	0.060	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	6.0	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*95*	*55-127*				

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Gx/BTEX

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-3-S1**					
Laboratory ID:	09-285-07					
Benzene	**ND**	0.020	EPA 8021	9-29-10	9-30-10	
Toluene	**ND**	0.050	EPA 8021	9-29-10	9-30-10	
Ethyl Benzene	**ND**	0.050	EPA 8021	9-29-10	9-30-10	
m,p-Xylene	**ND**	0.050	EPA 8021	9-29-10	9-30-10	
o-Xylene	**ND**	0.050	EPA 8021	9-29-10	9-30-10	
Gasoline	**ND**	5.0	NWTPH-Gx	9-29-10	9-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*55-127*				

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Gx/BTEX
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0929S2					
Benzene	**ND**	0.020	EPA 8021	9-29-10	9-29-10	
Toluene	**ND**	0.050	EPA 8021	9-29-10	9-29-10	
Ethyl Benzene	**ND**	0.050	EPA 8021	9-29-10	9-29-10	
m,p-Xylene	**ND**	0.050	EPA 8021	9-29-10	9-29-10	
o-Xylene	**ND**	0.050	EPA 8021	9-29-10	9-29-10	
Gasoline	**ND**	5.0	NWTPH-Gx	9-29-10	9-29-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*55-127*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	09-258-05										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*97*	*98*	*55-127*			
SPIKE BLANKS											
Laboratory ID:	SB0929S1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.918**	**0.967**	1.00	1.00		**92**	**97**	75-113	5	9	
Toluene	**0.895**	**0.941**	1.00	1.00		**90**	**94**	75-116	5	10	
Ethyl Benzene	**0.899**	**0.950**	1.00	1.00		**90**	**95**	82-117	6	10	
m,p-Xylene	**0.913**	**0.961**	1.00	1.00		**91**	**96**	81-122	5	10	
o-Xylene	**0.910**	**0.955**	1.00	1.00		**91**	**96**	83-118	5	10	
Surrogate:											
Fluorobenzene						*91*	*93*	*55-127*			

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Dx
(with acid/silica gel clean-up)

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-1 GW**					
Laboratory ID:	09-285-01					
Diesel Range Organics	**0.53**	0.26	NWTPH-Dx	9-30-10	10-3-10	
Lube Oil	**1.8**	0.42	NWTPH-Dx	9-30-10	10-3-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*122*	*50-150*				
Client ID:	**HC-N12342526-2 GW**					
Laboratory ID:	09-285-02					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	9-30-10	10-3-10	
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	9-30-10	10-3-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*115*	*50-150*				
Client ID:	**HC-N12342526-3 GW**					
Laboratory ID:	09-285-03					
Diesel Range Organics	**ND**	0.26	NWTPH-Dx	9-30-10	10-3-10	
Lube Oil Range Organics	**ND**	0.42	NWTPH-Dx	9-30-10	10-3-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*130*	*50-150*				

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Dx
QUALITY CONTROL
(with acid/silica gel clean-up)

Matrix: Water
Units: mg/L (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0930W1					
Diesel Range Organics	**ND**	0.25	NWTPH-Dx	9-30-10	10-3-10	
Lube Oil Range Organics	**ND**	0.40	NWTPH-Dx	9-30-10	10-3-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*108*	*50-150*				

Analyte	Result		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-285-02							
	ORIG	DUP						
Diesel Range Organics	**ND**	**ND**				NA	NA	
Lube Oil Range Organics	**ND**	**ND**				NA	NA	
Surrogate:								
o-Terphenyl			*115*	*114*	*50-150*			

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Dx
(with acid/silica gel clean-up)

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC-N12342526-1-S3/4**					
Laboratory ID:	09-285-04					
Diesel Range Organics	**ND**	31	NWTPH-Dx	9-30-10	9-30-10	
Lube Oil Range Organics	**ND**	62	NWTPH-Dx	9-30-10	9-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*65*	*50-150*				
Client ID:	**HC-N12342526-2-S3**					
Laboratory ID:	09-285-05					
Diesel Range Organics	**ND**	33	NWTPH-Dx	9-30-10	9-30-10	
Lube Oil Range Organics	**ND**	65	NWTPH-Dx	9-30-10	9-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*82*	*50-150*				
Client ID:	**HC-N12342526-3-S4**					
Laboratory ID:	09-285-06					
Diesel Range Organics	**ND**	30	NWTPH-Dx	9-30-10	9-30-10	
Lube Oil Range Organics	**ND**	60	NWTPH-Dx	9-30-10	9-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*97*	*50-150*				
Client ID:	**HC-N12342526-3-S1**					
Laboratory ID:	09-285-07					
Diesel Range Organics	**46**	27	NWTPH-Dx	9-30-10	9-30-10	
Lube Oil	**98**	53	NWTPH-Dx	9-30-10	9-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*93*	*50-150*				

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

NWTPH-Dx
QUALITY CONTROL
(with acid/silica gel clean-up)

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0930S1					
Diesel Range Organics	**ND**	25	NWTPH-Dx	9-30-10	9-30-10	
Lube Oil Range Organics	**ND**	50	NWTPH-Dx	9-30-10	9-30-10	
Surrogate:	*Percent Recovery*	*Control Limits*				
o-Terphenyl	*100*	*50-150*				

Analyte	Result		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE								
Laboratory ID:	09-309-01							
	ORIG	DUP						
Diesel Range Organics	**ND**	**ND**				NA	NA	
Lube Oil Range Organics	**ND**	**ND**				NA	NA	
Surrogate:								
o-Terphenyl			*105*	*112*	*50-150*			

Date of Report: October 5, 2010
Samples Submitted: September 28, 2010
Laboratory Reference: 1009-285
Project: 17581-00 21

% MOISTURE

Date Analyzed: 9-29-10

Client ID	Lab ID	% Moisture
HC-N12342526-1-S3/4	09-285-04	19
HC-N12342526-2-S3	09-285-05	23
HC-N12342526-3-S4	09-285-06	17
HC-N12342526-3-S1	09-285-07	6

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Sample Custody Record

1 OF 1

Samples Shipped to: ONSITE

N-1,2,3,4,25,26

HART CROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 17581-00 21 LAB NUMBER 09-285

PROJECT NAME PoT UST Program N-1,2,3,4,25,26

HART CROWSER CONTACT C. Rust

SAMPLED BY:

	LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	NWTPH-Gx	NWTPH-Dx	BETX	Dry Wt	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
1	HC-N12342526-1	GW	CHARC.	9/27/10	1025	WATER	X	X	X		15	
2	HC-N12342526-2	GW			0945		X	X	X		5	
3	HC-N12342526-3	GW			1225		X	X	X		5	
	~~HC-N12342526-4~~	GW										NO SAMPLE
4	HC-N12342526-1	S3/4			0955	SOIL	X	X	X	X	6	
5	HC-N12342526-2	[redacted] S3			0845		X	X	X	X	6	
6	HC-N12342526-3	[redacted] S4			1200		X	X	X	X	6	
	~~HC-N12342526-4~~	S4										NO SAMPLE
	~~#6~~											
7	HC-N12342526-3	S1		9/27/10	1150	SOIL	X	X	X	X	6	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	9/27/10	SIGNATURE	9/28/10
PRINT NAME Phil Cordell	TIME	PRINT NAME Colleen Rust	TIME
COMPANY Hart Crowser	1400	COMPANY HC	1800
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	9/28/10	SIGNATURE	9.28.10
PRINT NAME Colleen Rust	TIME	PRINT NAME P MCKinson	TIME
COMPANY HC	800	COMPANY CR	9:15A

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

*Please hold extra samples and volume

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian