

Supplemental Site Investigation Report

Former Columbia Street Manufactured
Gas Plant Property
Olympia, Washington

for

Puget Sound Energy

January 29, 2010



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Gas Plant Property
Olympia, Washington

File No. 0186-774-00

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Prepared for:

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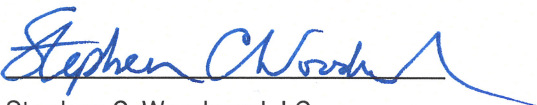
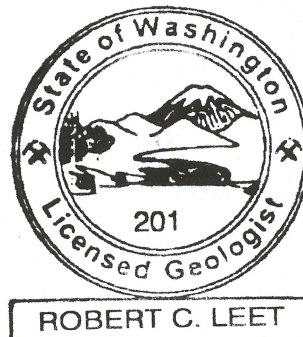
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1.0 INTRODUCTION

This report presents the results of soil and groundwater sampling completed in November 2009 as part of Puget Sound Energy's (PSE's) supplemental investigation of the Former Columbia Street Manufactured Gas Plant (MGP) Property in Olympia, Washington (the "Property"). The Property is located at 320 Columbia Street NW in Olympia (Figure 1). PSE is performing remedial actions at the Property in accordance with the Model Toxics Control Act (MTCA) Cleanup Regulation (Washington Administrative Code [WAC] Chapter 173-340), and has entered the Washington Department of Ecology's (Ecology's) Voluntary Cleanup Program (VCP). Ecology's designated site name for the Property is "Columbia Square Property." The Ecology site number is 91682829, and the VCP project number is SW0984. The goal of PSE's remedial actions is to obtain a No Further Action Determination for the Property from Ecology.

The supplemental investigation initiated in November 2009 builds on previous investigations completed in 2006 and 2008. The scope of the supplemental investigation consists of the soil and groundwater sampling completed in November 2009, as well as three future quarterly groundwater monitoring events scheduled to occur in February, May and August of 2010. The results of the 2010 groundwater monitoring will be reported in technical memoranda to be prepared following each monitoring event.

The overall objective of the supplemental site investigation is to obtain the soil and groundwater data needed to prepare and implement a cleanup action plan at the Property. The specific objectives of the supplemental investigation are to:

- Characterize soil conditions beneath the former office building that prevented access to the northern portion of the Property during the 2006 and 2008 studies. PSE demolished the office building in October 2009 in preparation for the supplemental investigation. The previously uncharacterized soil beneath the office building constituted a data gap in the Property characterization.
- Fill additional data gaps identified in Ecology's Opinion Letter dated February 23, 2009. The February 2009 Opinion Letter provides Ecology's opinion regarding the completeness of the Property characterization presented in the November 2008 *Site Investigation Report* (GeoEngineers, 2008a).
- Collect soil chemical and geotechnical data for cleanup action planning and remedial design. PSE anticipates that MTCA cleanup standards for the site-related constituents of concern can be achieved at the Property by conducting a routine cleanup action consisting of contaminated soil removal and off-site disposal.

The Property history, including environmental investigations completed prior to 2008, is summarized in the Sampling and Analysis Plan (SAP) prepared for PSE's 2008 site investigation (GeoEngineers, 2008b). The results of the 2008 site investigation are presented in the *Site Investigation Report* (GeoEngineers, 2008a).

2.0 FIELD INVESTIGATION

GeoEngineers conducted the soil and groundwater sampling described in this report between November 2 and November 4, 2009. The field work was performed in general accordance with a supplemental investigation SAP prepared in October 2009 (GeoEngineers, 2009). Figure 2 shows the locations of subsurface explorations completed at the Property, including locations previously sampled by PSE in 2008 and by Environmental Partners, Inc. in 2006 (EPI, 2006). The locations of the former MGP facilities and the former office building also are shown in Figure 2.

The November 2009 soil and groundwater sampling activities are summarized below. Additional details regarding field procedures, including field quality assurance/quality control (QA/QC) sampling, are provided in the supplemental investigation SAP (GeoEngineers, 2009).

2.1 Soil Sampling

Twelve soil borings (SB-9 through SB-17, MW-5, MW-7 and MW-8) were drilled to depths of 21.5 to 31.5 feet below ground surface (bgs) using hollow-stem auger drilling methods. The drilling contractor was Cascade Drilling of Woodinville, Washington. The boring locations were selected to assess the potential presence of contamination in soil and/or groundwater in the vicinity of the former office building, the former gasoline underground storage tank (UST) excavation, and near the Property boundaries. Several of the borings, including MW-8 near the western Property boundary, SB-11 and MW-5 in the southeastern corner of the Property, and SB-16, SB-17 and MW-7 in the vicinity of the former UST excavation, were positioned to address data gaps identified in Ecology's February 2009 Opinion Letter.

Soil samples were obtained at 2.5- or 5-foot intervals during drilling for lithologic description, field screening (sheen testing and headspace organic vapor screening with a photoionization detector [PID]) and potential chemical analytical or geotechnical testing. Soil types encountered and field screening results were recorded on boring logs by the field geologist. The boring logs are contained in Appendix A.

A total of 43 primary soil samples and two field duplicate samples were submitted for chemical testing. Selection of soil samples for chemical testing was based on the soil sampling and analytical testing plan presented in the supplemental investigation SAP (GeoEngineers, 2009), as well as review of lithologic and field screening data collected in the field. In addition to chemical testing, nine soil samples obtained from three borings (SB-10, MW-5 and MW-7) along the southern and eastern Property boundaries, which are adjacent to existing structures on adjoining properties, were submitted for geotechnical testing (moisture/density testing and/or sieve analysis). The geotechnical data were collected to facilitate design of an excavation shoring system, if required to protect adjacent structures during the future cleanup action. The decision to obtain soil samples for geotechnical testing was made only a few days prior to mobilizing to the field, thus geotechnical testing was not included in the supplemental investigation SAP.

Three of the soil borings (MW-5, MW-7 and MW-8) were completed as groundwater monitoring wells (see below). The borings that were not completed as monitoring wells (SB-9 through SB-17) were abandoned by filling the boreholes with cement-bentonite grout.

2.2 Groundwater Sampling

Three of the soil borings (MW-5, MW-7 and MW-8) were completed as 2-inch diameter, Schedule 40 polyvinyl chloride (PVC) groundwater monitoring wells. The wells were installed to a depth of approximately 20 feet bgs and were screened across the groundwater table. Well construction diagrams are included in Appendix A. The monitoring wells were developed by the drilling contractor.

Unfiltered groundwater samples were collected from the three new monitoring wells and six pre-existing wells (MW-1 through MW-4, MW-6 and MW-10) on November 3, 2009, using low-flow purging and sampling techniques. In addition, GeoEngineers surveyed the elevations of the three new monitoring wells and measured water levels in all the wells with an electronic water level indicator prior to sampling.

3.0 CHEMICAL ANALYTICAL AND GEOTECHNICAL TESTING

Soil and groundwater samples collected during the field investigation were analyzed for one or more of the following chemical parameters based on previous investigation results (EPI, 2006 and GeoEngineers 2008a) and Property history:

- Gasoline-, diesel- and/or lube oil-range total petroleum hydrocarbons (TPH) by Ecology Methods NWTPH-Gx and NWTPH-Dx;
- Benzene, toluene, ethylbenzene and xylenes (BTEX) by U.S. Environmental Protection Agency (EPA) Method 8021B;
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by EPA Method 8270D-SIM;
- Metals (arsenic, chromium, lead and/or mercury) by EPA Methods 6010B/6020/7470A/7471A;
- 1,2-Dibromoethane (EDB) by EPA Method 8011; and
- 1,2-Dichloroethane (EDC) and methyl tertiary butyl ether (MTBE) by EPA Method 8260B.

The specific chemical analyses performed on each sample are summarized on Tables 1 and 2. The chemical analytical testing was performed by OnSite Environmental, Inc. in Redmond, Washington.

In addition to the chemical analyses listed above, selected soil samples obtained from borings SB-10, MW-5 and MW-7 near the southern and eastern Property boundaries were analyzed for the following geotechnical parameters:

- Moisture content by ASTM Standard Method D2216 and dry density; and
- Soil gradation (sieve analysis) by ASTM Standard Method D6913.

The geotechnical testing was performed by GeoEngineers in Redmond, Washington.

4.0 RESULTS

This section presents the results of the November 2009 field investigation. The results consist of: (1) observed soil conditions, (2) observed groundwater conditions, and (3) chemical analytical and geotechnical testing results.

4.1 Observed Soil Conditions

Consistent with previous investigations, subsurface soils encountered in the borings generally consisted of gray to brown, fine to medium sand with varying amounts of silt, gravel and shell fragments. Gravel with varying amounts of silt and sand also was encountered in some borings. The soils encountered are interpreted as hydraulic fill material from the dredging of Budd Inlet in the late 1800s and early 1900s. The soils were generally homogenous in nature; no significant, laterally continuous lithologic changes that might indicate a transition from hydraulic fill to underlying native deposits were observed. In addition, no laterally continuous soil horizons with apparent low permeability (such as silt or clay) were observed.

Field screening results are documented on the boring logs contained in Appendix A. One soil sample (obtained from 5.5 feet bgs in boring MW-7) had a headspace organic vapor concentration (PID reading) of 230 parts per million. This sample was submitted for chemical analysis and is identified as sample MW-7-5.5 in the summary table of soil analytical results (Table 4). No other visual or field-screening evidence of potential significant soil contamination was encountered in the soil borings.

4.2 Observed Groundwater Conditions

Groundwater (saturated soil) was encountered at a depth of approximately 7 feet bgs in all the borings during drilling. The depth to static groundwater in monitoring wells on November 3, 2009, prior to purging and sampling the wells, ranged from 4.55 to 5.64 feet below the top of the well casings (roughly 4.7 to 5.7 feet bgs). Groundwater level measurements are summarized in Table 3. Potentiometric maps produced from the 2008 and 2009 groundwater elevation data are presented in Figures 3 through 5. In August and October 2008, the inferred groundwater migration direction was generally toward the west-northwest (Figures 3 and 4), with an apparent average horizontal hydraulic gradient of approximately 0.001 to 0.002.

In November 2009, the groundwater table appeared to be flatter, with a slight easterly gradient in the eastern portion of the Property (Figure 5). This apparent shift in the hydraulic gradient is likely the result of local groundwater mounding in the area of the former office building. The groundwater mounding may be caused by higher infiltration and groundwater recharge rates within the unpaved footprint of the former office building relative to the surrounding paved areas.

4.3 Chemical Analytical and Geotechnical Testing Results

The chemical analytical results for the November 2009 soil samples are summarized in Table 4. Chemical analytical results for all groundwater samples collected to date (August 2008, October 2008 and November 2009) from monitoring wells are summarized in Table 5. MTCA Method A cleanup levels for soil (unrestricted land use) and potable groundwater (WAC 173-340-740[2] and -720[3]) also are shown in Tables 4 and 5. Chemical analytical results for field QC blank samples (equipment rinsate blanks and trip blanks) are summarized in Table 6. Laboratory data reports for

chemical parameters are contained in Appendix B. Laboratory data reports for geotechnical parameters are contained in Appendix C.

4.3.1 Soil Chemical Analytical Results

Constituents detected in soil at concentrations exceeding MTCA Method A cleanup levels include cPAHs, mercury, lube oil-range TPH, and benzene. The soil exceedances are shown in Table 4 and Figure 6. For completeness, soil data from the previous environmental investigations (EPI, 2006; GeoEngineers, 2008a) also are included in Figure 6.

Consistent with previous sampling results, the constituent with the greatest number of exceedances in November 2009 was cPAHs. Also consistent with previous results, the cPAH exceedances occurred in soil samples obtained from depths of 10.5 feet bgs or shallower, with one exception. The exception was a sample obtained from 20.5 feet bgs in boring MW-5. The total cPAH toxic equivalent concentration (TEC) in this sample (0.13 milligrams per kilogram [mg/kg]) slightly exceeded the MTCA Method A cleanup level of 0.1 mg/kg. The highest total cPAH TEC detected in November 2009 (38 mg/kg) was in the soil sample obtained from 3 feet bgs in boring MW-5, located in the southeast corner of the Property (Figure 6). This is the same location on the Property where the highest concentrations of cPAHs (120 mg/kg) were previously detected (Figure 6).

There were relatively few MTCA exceedances of mercury, lube oil-range TPH and benzene. As shown in Table 4 and Figure 6, each exceedance of mercury, lube oil-range TPH, and benzene was collocated with a corresponding exceedance of cPAHs. Accordingly, cPAHs will be the focus of any future cleanup action.

4.3.2 Groundwater Chemical Analytical Results

Total arsenic was detected at concentrations exceeding the MTCA Method A cleanup level of 5 micrograms per liter (ug/l) in seven of the nine monitoring wells sampled on November 3, 2009, including new wells MW-5 and MW-7, which are along the apparent upgradient Property boundary (based on groundwater elevation measurements in 2008; Figures 3 and 4). The detected arsenic concentrations ranged from 6.2 ug/l (MW-1) to 88 ug/l (MW-4). In addition to the arsenic exceedances, cPAHs were detected in well MW-7 at a concentration (0.18 ug/l) slightly exceeding the MTCA Method A cleanup level of 0.1 ug/l. cPAHs were not detected in any other monitoring wells. Groundwater exceedances of MTCA Method A cleanup levels are shown in Table 5 and Figure 7. For completeness, groundwater data from the previous investigations (EPI, 2006; GeoEngineers, 2008a) also are included in Figure 7.

A source of the elevated arsenic concentrations in groundwater has not been identified in Property soils. Of the 58 soil samples analyzed for arsenic in 2008 and 2009, only four primary samples and one duplicate sample had detectable concentrations, and none of the detected concentrations exceeded the MTCA Method A cleanup level of 20 mg/kg. Additionally, the 32 soil samples with non-detectable arsenic in November 2009 had method reporting limits ranging from 5.2 to 7.1 mg/kg, indicating that arsenic concentrations in Property soils are generally below the statewide 90th percentile natural background value of 7 mg/kg (Ecology, 1994).

4.3.3 Geotechnical Testing Results

The geotechnical testing results are contained in Appendix C. The sieve analysis results indicate that shallow subsurface soils along the eastern Property boundary (at 5.5 feet bgs in MW-7 and 8 feet bgs in MW-5) consist of poorly graded sand with silt or gravel (Unified Soil Classification System [USCS] Types SP-SM and SP, respectively). The sample obtained from 20.5 feet bgs in boring MW-7 consists of poorly graded sand (USCS Type SP). Sieve analysis of the soil sample obtained from 15.5 feet bgs along the southern Property boundary (SB-10) identified silty sand with gravel (USCS Type SM). The sample obtained from 20.5 feet bgs in boring SB-10 consisted of poorly graded gravel with silt and sand (USCS Type GP-GM).

The moisture content of the nine soil samples submitted for moisture/density testing ranged from 11.2 percent (SB-10 at 20.5 feet bgs) to 29.7 percent (MW-5 at 8 feet bgs). The dry density of the samples ranged from 91.5 pounds per cubic foot (MW-5 at 8 feet bgs) to 139.4 pcf (SB-10 at 20.5 feet bgs).

4.3.4 Data Quality Assessment

GeoEngineers performed a QC review of the data contained in the chemical analytical data reports for the November 2009 samples, including laboratory QA/QC data, to assess the quality of the project analytical data. No significant data quality exceptions requiring further action were noted in the laboratory reports or during our review, and none of the data was rejected.

Field duplicate sample results are reported in Tables 4 and 5. The field duplicate results were similar to the results for the associated primary samples, indicating minimal heterogeneity of the project soil and groundwater samples.

Four equipment rinsate blanks and four trip blanks were submitted for analysis in November 2009. Analytical results for these field QC blanks are presented in Table 6. Benzo(a)anthracene and benzo(b)fluoranthene were detected marginally above method reporting limits in rinsate blank sample MW-5-20.5-R collected on November 3. There were no other detections in the rinsate blanks or trip blanks, indicating that equipment decontamination and sample handling/transport activities likely did not result in false positive detections in the project samples.

Based on GeoEngineers' QC data review, the project chemical analytical data are of acceptable quality for their intended use.

5.0 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation-derived waste (IDW) consisting of drill cuttings, monitoring well development and purge water, and equipment decontamination water was stored on the Property in 55-gallon drums pending receipt of chemical analytical data. The drums were staged near the eastern Property boundary.

Drill cuttings were characterized based on the analytical results for soil boring samples. Well development and purge water was characterized based on the analytical results for groundwater

samples. The IDW drums will be transported for disposal to CEMEX in Everett, Washington or to PSE's South King Facility in Kent, Washington.

6.0 CONCLUSIONS

The findings of the November 2009 supplemental investigation build upon the results of the 2006 baseline environmental assessment (EPI, 2006) and the 2008 site investigation (GeoEngineers, 2008a). The soil data from these three investigations indicate that in many areas of the Property, near-surface soil from the ground surface to a depth of approximately 8 to 12 feet bgs contains cPAH concentrations exceeding the MTCA Method A soil cleanup level of 0.1 mg/kg. At some locations, the cPAH exceedances are collocated with concentrations of mercury, lead, lube oil-range TPH, gasoline-range TPH and/or benzene that also exceed MTCA Method A cleanup levels. No evidence of non-aqueous phase liquid such as coal tar or tar oil was encountered in subsurface soils or groundwater.

Analytical results for groundwater samples collected from monitoring wells in 2008 and November 2009 indicate limited impacts to groundwater from historical Property activities. cPAHs were detected above the MTCA Method A groundwater cleanup level in only one well (MW-7), and the detected concentration only slightly exceeded the cleanup level. Although arsenic was detected at concentrations above the MTCA Method A groundwater cleanup level in most of the monitoring wells, the arsenic does not appear to be related to historical Property activities. This conclusion is supported by the fact that two of the wells with elevated arsenic (wells MW-5 and MW-7) are located along the apparent upgradient Property boundary. Additionally, the arsenic concentrations reported in Property soils are consistent with natural background soil arsenic concentrations in Washington state (Ecology, 1994). The lack of an identified arsenic source in soil suggests that the elevated arsenic concentrations detected in groundwater likely reflect area background concentrations in the downtown Olympia area.

In its February 2009 Opinion Letter, Ecology requested that PSE submit a Terrestrial Ecological Evaluation (TEE) Form (Ecology Form 090-300) to document the basis for the Property's exclusion from further ecological evaluation using the criteria in WAC 173-340-7491. The completed TEE form is included in Appendix D.

7.0 LIMITATIONS

GeoEngineers has prepared this report for the exclusive use of Puget Sound Energy, its authorized agents, and regulatory agencies. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Our interpretation of subsurface conditions for this study is based on field observations, field screening, and chemical analytical results obtained from widely spaced samples. It is always possible that contamination exists at locations or depths not identified by this study.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with our General Services Agreement with PSE (Contract No. 4600005167) and with generally accepted environmental and earth science practices in this area at the time this report was prepared. The conclusions and opinions presented in this report are based on our professional knowledge, judgment, and experience. No warranty or other conditions, express or implied, should be understood.

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

8.0 REFERENCES

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TABLE 1
Soil Sampling and Analytical Testing
November 2009
Former Columbia Street MGP
Olympia, Washington

Location	Planned Total Depth (feet bgs)	Sample Depth (feet bgs)	Analytical Parameters					Sampling Objective
			cPAHs (EPA 8270D-SIM)	TPH-G/BTEX (NWTPH-Gx/ EPA 8021B)	BTEX (EPA 8021B)	TPH-D/LO (NWTPH-Dx)	Metals (a) (EPA 6010/7000)	
SB-9	20	3.0	x		x	x	x	Assess soil conditions near southwest corner/western property boundary.
		8.0	x		x	x	x	
		10.5	x		x	x	x	
		15.5						
		20.5						
SB-10	30	5.5	x		x	x	x	Assess soil conditions along southern property boundary adjacent to alley and off-property building.
		10.5	x		x	x	x	
		15.5						
		20.5						
		25.5						
SB-11	20	3.0	x		x	x	x	Assess soil conditions along southern property boundary adjacent to alley and off-property buildings.
		8.0	x		x	x	x	
		10.5	x		x	x	x	
		15.5						
		20.5	x					
SB-12	20	3.0	x		x	x	x	Assess soil conditions along northern property boundary adjacent to sidewalk/street and near former gasoline UST location.
		8.0	x		x	x	x	
		10.5	x		x	x	x	
		15.5						
		20.5						
SB-13	30	3.0	x		x	x	x	Assess soil conditions along northern property boundary adjacent to sidewalk/street and within former office building footprint.
		8.0	x		x	x	x	
		10.5	x		x	x	x	
		15.5						
		20.5						
SB-14	30	3.0	x		x	x	x	Assess soil conditions along western property boundary adjacent to sidewalk/street and within former outbuilding footprint.
		8.0	x		x	x	x	
		8.0-D	x		x	x	x	
		10.5	x		x	x	x	
		15.5						
SB-15	20	3.0	x		x	x	x	Assess soil conditions within former office building footprint, between former small gas holder and 1908 shoreline.
		8.0	x		x	x	x	
		10.5	x		x	x	x	
		15.5						
		20.5	x		x	x		

TABLE 1
Soil Sampling and Analytical Testing
November 2009
Former Columbia Street MGP
Olympia, Washington

Location	Planned Total Depth (feet bgs)	Sample Depth (feet bgs)	Analytical Parameters					Sampling Objective
			cPAHs (EPA 8270D-SIM)	TPH-G/BTEX (NWTPH-Gx/ EPA 8021B)	BTEX (EPA 8021B)	TPH-D/LO (NWTPH-Dx)	Metals (a) (EPA 6010/7000)	
SB-16	20	3.0	x	x		x	x	Assess soil conditions within former office building footprint, at former scrubber location and near/downgradient of former gasoline UST location.
		8.0	x	x		x	x	
		10.5	x			x	x	
		15.5						
		20.5	x		x	x		
SB-17	20	3.0		x				Assess soil conditions at former gasoline UST location.
		8.0		x				
		10.5	x	x			x	
		10.5-D	x	x			x	
		15.5		x				
20.5								
MW-5	20	3.0	x	x		x	x	Assess soil and groundwater conditions in southeastern corner of property, upgradient of former MGP facilities and adjacent to off-property building and highest previous cPAH detections in soil.
		8.0	x	x		x	x	
		10.5						
		15.5					x	
		20.5	x					
MW-7	30 (b)	3.0	x	x		x	x	Assess soil and groundwater conditions along eastern property boundary, adjacent to off-property building and near/upgradient of former Production Building and gasoline UST location.
		5.5	x	x		x	x	
		8.0	x	x		x	x	
		10.5	x	x		x		
		15.5					x	
		20.5						
		25.5						
30.5								
MW-8	20	3.0	x	x		x	x	Assess soil and groundwater conditions near western property boundary, downgradient of former large gas holder and near purifiers.
		8.0	x	x		x	x	
		10.5	x					
		15.5					x	
		20.5						

Notes:

(a) Arsenic, lead and mercury

(b) The bottom 10 feet of the borehole for well MW-7 was backfilled with grout prior to installing the well.

BTEX = Benzene, toluene, ethylbenzene and xylenes

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

TPH-G = Gasoline-range total petroleum hydrocarbons

TPH-D/LO = Diesel- and lube oil-range total petroleum hydrocarbons

UST = Underground storage tank

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TABLE 2
Groundwater Sampling and Analytical Testing
November 2009
Former Columbia Street MGP
Olympia, Washington

Monitoring Well	Screened Interval (feet bgs)	Analytical Parameters				
		cPAHs (EPA 8270D-SIM)	TPH-G/BTEX (NWTPH-Gx/ EPA 8021B)	TPH-D/LO (NWTPH-Dx)	EDB/EDC/MTBE (EPA 8011/8260B)	Metals (a) (EPA 6010/7000)
MW-1	5.0-20.0	x				x
MW-2	5.0-20.0	x	x	x	x	x
MW-3	39.5-44.5	x				x
MW-4	23.5-28.5	x				x
MW-5*	4.5-19.5	x	x	x		x
MW-6	15 (b)	x	x	x	x	x
MW-7*	4.5-19.5	x	x	x	x	x
MW-8*	5.0-20.0	x	x	x		x
MW-10	15 (b)	x	x	x		x

Notes:

All groundwater samples were unfiltered.

*Well installed during supplemental investigation (November 2, 2009).

(a) Total arsenic, mercury, lead and chromium

(b) Wells MW-6 and MW-10 were installed by others; screened interval unknown. The measured depth to bottom of well casing is approximately 15 feet bgs (measured October 6, 2008).

BTEX = Benzene, toluene, ethylbenzene and xylenes

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

EDB = 1,2-Dibromoethane

EDC = 1,2-Dichloroethane

MTBE = Methyl tertiary butyl ether

TPH-G = Gasoline-range total petroleum hydrocarbons

TPH-D/LO = Diesel- and lube oil-range total petroleum hydrocarbons

P:\0186774\001\Task 0200 - Supplemental SI & CAP\Finals\Final Report\Supp Invest Rept Table 1 and 2.xlsx

TABLE 3
Measured Groundwater Levels in Monitoring Wells
Former Columbia Street MGP
Olympia, Washington

Monitoring Well	Screened Interval (feet bgs)	Top-of-Casing Elevation¹ (feet)	Date	Measured Depth to Groundwater² (feet below TOC)	Calculated Groundwater Elevation (feet)
MW-1	5.0-20.0	8.42	8/26/08	4.74	3.68
			10/6/08	4.64	3.78
			11/3/09	4.55	3.87
MW-2	5.0-20.0	8.96	8/26/08	5.33	3.63
			10/6/08	5.23	3.73
			11/3/09	5.05	3.91
MW-3	39.5-44.5	8.92	8/26/08	5.27	3.65
			10/6/08	5.08	3.84
			11/3/09	5.02	3.90
MW-4	23.5-28.5	9.00	8/26/08	5.30	3.70
			10/6/08	5.18	3.82
			11/3/09	5.06	3.94
MW-5	4.5-19.5	9.53	11/3/09	5.64	3.89
MW-6	15 ³	8.97	8/26/08	5.37	3.60
			10/6/08	5.37	3.60
			11/3/09	5.08	3.89
MW-7	4.5-19.5	8.93	11/3/09	5.09	3.84
MW-8	5-20	9.02	11/3/09	5.11	3.91
MW-10	15 ³	9.02	8/26/08	5.31	3.71
			10/6/08	5.25	3.77
			11/3/09	5.14	3.88

Notes:

bgs = Below ground surface

TOC = Top of well casing

¹Elevations are referenced to an arbitrary benchmark (concrete curb) near the site with an assigned elevation of 10 feet.

²Water levels measured with an electronic water level indicator.

³Approximate depth to bottom of well casing measured with an electronic water level indicator on October 6, 2008.

This well was installed by others.

P:\010186774\001\Task 0200 - Supplemental SI & CAP\Finals\Final Report\Supp Invest Rept Table 3.xlsx

TABLE 4
Soil Chemical Analytical Results
November 2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Depth (ft bgs): Sample Date:	MW-5-3.0 3.0 11/2/2009 14:25	MW-5-8.0 8.0 11/2/2009 14:32	MW-5-15.5 15.5 11/2/2009 14:45	MW-5-20.5 20.5 11/2/2009 14:50	MW-7-3.0 3.0 11/2/2009 11:55	MW-7-5.5 5.5 11/2/2009 11:57	MW-7-8.0 8.0 11/2/2009 12:05	MW-7-10.5 10.5 11/2/2009 12:10	MW-7-15.5 15.5 11/2/2009 12:20
BTEX (EPA 8021B)												
Benzene	ug/kg	30		< 20	< 20	--	--	< 20	45	< 20	< 20	--
Toluene	ug/kg	7000		< 56	< 71	--	--	< 52	< 59	< 56	< 61	--
Ethylbenzene	ug/kg	6000		< 56	< 71	--	--	< 52	160	< 56	< 61	--
Xylene, m-,p-	ug/kg	9000 (a)		< 56	< 71	--	--	< 52	170	< 56	< 61	--
Xylene, o-	ug/kg	9000 (a)		< 56	< 71	--	--	< 52	< 59	< 56	< 61	--
TPH (NWTPH-Gx/Dx)												
Gasoline-Range	mg/kg	30		< 5.6	< 7.1	--	--	< 5.2	22	< 5.6	< 6.1	--
Diesel-Range	mg/kg	2000		270	< 33	--	--	92	87	36	< 29	--
Lube Oil-Range	mg/kg	2000		2700	< 65	--	--	850	640	330	< 58	--
cPAHs (EPA 8270D-SIM)												
Benzo(a)anthracene	ug/kg	--		11000	92	--	42	3700	3000	1300	330	--
Chrysene	ug/kg	--		16000	120	--	56	5400	4200	1800	480	--
Benzo(b)fluoranthene	ug/kg	--		30000	220	--	100	11000	8800	4000	1100	--
Benzo(k)fluoranthene	ug/kg	--		7000	69	--	27	3000	2200	1100	240	--
Benzo(a)pyrene	ug/kg	--		30000	250	--	100	12000	9000	4100	1100	--
Indeno(1,2,3-cd)pyrene	ug/kg	--		28000	210	--	88	11000	8400	3600	1000	--
Dibenzo(a,h)anthracene	ug/kg	--		3200	25	--	11	1200	960	< 800	110	--
Total cPAHs TEC	ug/kg	100		38000	310	--	130	15000	11000	5200	1400	--
Metals (EPA 6010B/7471A)												
Arsenic	mg/kg	20		< 5.7	< 6.5	< 6.5	--	< 5.6	< 5.8	< 6.0	--	< 5.7
Lead	mg/kg	250		240	9.1	< 6.5	--	95	51	21	--	7.6
Mercury	mg/kg	2		0.50	< 0.33	< 0.32	--	3.1	3.1	0.49	--	< 0.29

TABLE 4
Soil Chemical Analytical Results
November 2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Depth (ft bgs): Sample Date:	MW-8-3.0 3.0 11/2/2009 10:15	MW-8-8.0 8.0 11/2/2009 10:20	MW-8-10.5 10.5 11/2/2009 10:25	MW-8-15.5 15.5 11/2/2009 10:30	SB-9-3.0 3.0 11/3/2009 12:30	SB-9-8.0 8.0 11/3/2009 12:35	SB-9-10.5 10.5 11/3/2009 12:40	SB-10-5.5 5.5 11/3/2009 10:17	SB-10-10.5 10.5 11/3/2009 10:27
BTEX (EPA 8021B)												
Benzene	ug/kg	30		< 20	< 20	--	--	< 20	< 20	< 20	< 20	< 20
Toluene	ug/kg	7000		< 54	< 65	--	--	< 54	< 63	< 58	< 58	< 63
Ethylbenzene	ug/kg	6000		< 54	< 65	--	--	< 54	< 63	< 58	< 58	< 63
Xylene, m-,p-	ug/kg	9000 (a)		< 54	< 65	--	--	< 54	< 63	< 58	< 58	< 63
Xylene, o-	ug/kg	9000 (a)		< 54	< 65	--	--	< 54	< 63	< 58	< 58	< 63
TPH (NWTPH-Gx/Dx)												
Gasoline-Range	mg/kg	30		< 5.4	< 6.5	--	--	--	--	--	--	--
Diesel-Range	mg/kg	2000		48	< 31	--	--	29	< 30	< 30	270	< 30
Lube Oil-Range	mg/kg	2000		790	< 62	--	--	280	< 60	< 60	1500	< 59
cPAHs (EPA 8270D/SIM)												
Benzo(a)anthracene	ug/kg	--		22	< 8.2	< 8.0	--	1400	67	< 7.9	290	< 7.9
Chrysene	ug/kg	--		36	< 8.2	< 8.0	--	1900	92	8.8	450	< 7.9
Benzo(b)fluoranthene	ug/kg	--		44	< 8.2	< 8.0	--	2700	140	14	890	8.8
Benzo(k)fluoranthene	ug/kg	--		11	< 8.2	< 8.0	--	710	44	< 7.9	250	< 7.9
Benzo(a)pyrene	ug/kg	--		38	< 8.2	< 8.0	--	2600	140	13	900	8.8
Indeno(1,2,3-cd)pyrene	ug/kg	--		32	< 8.2	< 8.0	--	2400	120	13	1400	10
Dibenzo(a,h)anthracene	ug/kg	--		< 7.1	< 8.2	< 8.0	--	260	14	< 7.9	150	< 7.9
Total cPAHs TEC	ug/kg	100		50	< 6.2	< 6.0	--	3400	180	17	1200	12
Metals (EPA 6010B/7471A)												
Arsenic	mg/kg	20		< 5.3	< 6.2	--	6.4	< 5.2	< 6.0	< 6.0	6.0	< 5.9
Lead	mg/kg	250		11	< 6.2	--	< 6.1	14	< 6.0	< 6.0	180	< 5.9
Mercury	mg/kg	2		< 0.26	< 0.31	--	0.42	< 0.26	< 0.30	< 0.30	0.31	< 0.30

TABLE 4
Soil Chemical Analytical Results
November 2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Depth (ft bgs): Sample Date:	SB-11-3.0 3.0 11/3/2009 9:20	SB-11-8.0 8.0 11/3/2009 9:26	SB-11-10.5 10.5 11/3/2009 9:30	SB-11-20.5 20.5 11/3/2009 9:40	SB-12-3.0 3.0 11/4/2009 10:05	SB-12-8.0 8.0 11/4/2009 10:10	SB-12-10.5 10.5 11/4/2009 10:12	SB-13-3.0 3.0 11/4/2009 8:45	SB-13-8.0 8.0 11/4/2009 8:50
BTEX (EPA 8021B)												
Benzene	ug/kg	30		< 20	< 20	< 20	--	< 20	< 20	< 20	< 20	< 20
Toluene	ug/kg	7000		< 67	< 68	< 84	--	< 56	< 52	< 59	< 57	< 59
Ethylbenzene	ug/kg	6000		< 67	< 68	< 84	--	< 56	< 52	< 59	< 57	< 59
Xylene, m-,p-	ug/kg	9000 (a)		< 67	< 68	< 84	--	< 56	< 52	< 59	< 57	< 59
Xylene, o-	ug/kg	9000 (a)		< 67	< 68	< 84	--	< 56	< 52	< 59	< 57	< 59
TPH (NWTPH-Gx/Dx)												
Gasoline-Range	mg/kg	30		--	--	--	--	--	--	--	--	--
Diesel-Range	mg/kg	2000		< 30	< 32	< 35	--	< 140	< 30	< 28	100	< 31
Lube Oil-Range	mg/kg	2000		110	< 64	< 69	--	2300	< 59	< 57	450	74
cPAHs (EPA 8270D/SIM)												
Benzo(a)anthracene	ug/kg	--		330	< 8.5	< 9.3	< 8.0	750	< 7.8	< 7.6	6200	440
Chrysene	ug/kg	--		450	< 8.5	< 9.3	< 8.0	1100	< 7.8	< 7.6	8500	570
Benzo(b)fluoranthene	ug/kg	--		760	< 8.5	< 9.3	< 8.0	1200	< 7.8	< 7.6	8600	550
Benzo(k)fluoranthene	ug/kg	--		170	< 8.5	< 9.3	< 8.0	1100	< 7.8	< 7.6	6800	450
Benzo(a)pyrene	ug/kg	--		720	< 8.5	< 9.3	< 8.0	2000	< 7.8	11	14000	890
Indeno(1,2,3-cd)pyrene	ug/kg	--		570	< 8.5	< 9.3	< 8.0	2000	< 7.8	10	12000	790
Dibenzo(a,h)anthracene	ug/kg	--		91	< 8.5	< 9.3	< 8.0	< 730	< 7.8	< 7.6	1700	110
Total cPAHs TEC	ug/kg	100		920	< 6.4	< 7.0	< 6.0	2600	< 5.9	14	18000	1100
Metals (EPA 6010B/7471A)												
Arsenic	mg/kg	20		< 6.0	< 6.4	7.9	--	< 5.5	< 5.9	< 5.7	< 5.6	< 6.1
Lead	mg/kg	250		210	< 6.4	< 6.9	--	38	< 5.9	< 5.7	150	74
Mercury	mg/kg	2		0.32	< 0.32	< 0.35	--	60	< 0.30	< 0.28	< 0.28	< 0.31

TABLE 4
Soil Chemical Analytical Results
November 2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Depth (ft bgs): Sample Date:	SB-13-10.5 10.5 11/4/2009 8:52	SB-14-3.0 3.0 11/3/2009 13:45	SB-14-8.0 8.0 11/3/2009 13:55	SB-14-8.0-D* 8.0 11/3/2009 13:55	SB-14-10.5 10.5 11/3/2009 13:58	SB-15-3.0 3.0 11/4/2009 8:00	SB-15-8.0 8.0 11/4/2009 8:05	SB-15-10.5 10.5 11/4/2009 8:07	SB-15-20.5 20.5 11/4/2009 8:20
BTEX (EPA 8021B)												
Benzene	ug/kg	30		< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
Toluene	ug/kg	7000		< 59	< 64	< 70	< 68	< 57	< 60	< 59	< 59	< 66
Ethylbenzene	ug/kg	6000		< 59	< 64	< 70	< 68	< 57	< 60	< 59	< 59	< 66
Xylene, m-,p-	ug/kg	9000 (a)		< 59	< 64	< 70	< 68	< 57	< 60	< 59	< 59	< 66
Xylene, o-	ug/kg	9000 (a)		< 59	< 64	< 70	< 68	< 57	< 60	< 59	< 59	< 66
TPH (NWTPH-Gx/Dx)												
Gasoline-Range	mg/kg	30		--	--	--	--	--	--	--	--	--
Diesel-Range	mg/kg	2000		< 31	35	< 31	< 31	< 29	< 28	< 30	< 31	< 32
Lube Oil-Range	mg/kg	2000		< 63	< 57	< 63	< 62	< 59	190	< 60	< 62	< 64
cPAHs (EPA 8270D/SIM)												
Benzo(a)anthracene	ug/kg	--		95	< 7.6	< 8.3	10	65	150	31	120	< 8.5
Chrysene	ug/kg	--		110	< 7.6	9.1	11	68	210	37	130	< 8.5
Benzo(b)fluoranthene	ug/kg	--		81	< 7.6	14	17	60	190	26	55	< 8.5
Benzo(k)fluoranthene	ug/kg	--		77	< 7.6	< 8.3	< 8.3	23	150	26	69	< 8.5
Benzo(a)pyrene	ug/kg	--		140	< 7.6	14	17	60	250	44	88	8.8
Indeno(1,2,3-cd)pyrene	ug/kg	--		93	< 7.6	10	12	25	240	29	35	< 8.5
Dibenzo(a,h)anthracene	ug/kg	--		17	< 7.6	< 8.3	< 8.3	10	34	< 8.0	16	< 8.5
Total cPAHs TEC	ug/kg	100		180	< 5.7	18	22	79	330	56	120	11
Metals (EPA 6010B/7471A)												
Arsenic	mg/kg	20		< 6.3	< 5.7	< 6.3	7.8	< 5.9	< 5.5	< 6.0	< 6.2	--
Lead	mg/kg	250		10	< 5.7	9.5	< 6.2	52	38	48	15	--
Mercury	mg/kg	2		< 0.31	0.62	< 0.31	< 0.31	< 0.29	3.4	< 0.30	< 0.31	--

TABLE 4
Soil Chemical Analytical Results
November 2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Depth (ft bgs): Sample Date:	SB-16-3.0 3.0 11/4/2009 10:55	SB-16-8.0 8.0 11/4/2009 11:00	SB-16-10.5 10.5 11/4/2009 11:03	SB-16-20.5 20.5 11/4/2009 11:10	SB-17-3.0 3.0 11/4/2009 11:50	SB-17-8.0 8.0 11/4/2009 11:55	SB-17-10.5 10.5 11/4/2009 12:00	SB-17-10.5-D* 10.5 11/4/2009 12:00	SB-17-15.5 15.5 11/4/2009 12:05
BTEX (EPA 8021B)												
Benzene	ug/kg	30		< 20	26	--	< 20	< 20	26	< 20	< 20	< 20
Toluene	ug/kg	7000		< 58	< 78	--	< 53	< 41	< 61	< 56	< 52	< 53
Ethylbenzene	ug/kg	6000		< 58	< 78	--	< 53	< 41	< 61	< 56	< 52	< 53
Xylene, m-,p-	ug/kg	9000 (a)		< 58	< 78	--	< 53	< 41	< 61	< 56	< 52	< 53
Xylene, o-	ug/kg	9000 (a)		< 58	< 78	--	< 53	< 41	< 61	< 56	< 52	< 53
TPH (NWTPH-Gx/Dx)												
Gasoline-Range	mg/kg	30		< 5.8	< 7.8	--	--	< 4.1	6.8	< 5.6	< 5.2	< 5.3
Diesel-Range	mg/kg	2000		< 27	< 36	< 30	< 28	--	--	--	--	--
Lube Oil-Range	mg/kg	2000		< 54	< 71	< 60	< 56	--	--	--	--	--
cPAHs (EPA 8270D/SIM)												
Benzo(a)anthracene	ug/kg	--		13	1100	< 8.0	< 7.5	--	--	< 7.8	< 7.8	--
Chrysene	ug/kg	--		15	1000	< 8.0	< 7.5	--	--	< 7.8	< 7.8	--
Benzo(b)fluoranthene	ug/kg	--		26	960	< 8.0	< 7.5	--	--	< 7.8	< 7.8	--
Benzo(k)fluoranthene	ug/kg	--		8.4	290	< 8.0	< 7.5	--	--	< 7.8	< 7.8	--
Benzo(a)pyrene	ug/kg	--		19	890	< 8.0	< 7.5	--	--	< 7.8	< 7.8	--
Indeno(1,2,3-cd)pyrene	ug/kg	--		16	420	< 8.0	< 7.5	--	--	< 7.8	< 7.8	--
Dibenzo(a,h)anthracene	ug/kg	--		< 7.2	190	< 8.0	< 7.5	--	--	< 7.8	< 7.8	--
Total cPAHs TEC	ug/kg	100		26	1200	< 6.0	< 5.7	--	--	< 5.9	< 5.9	--
Metals (EPA 6010B/7471A)												
Arsenic	mg/kg	20		< 5.4	< 7.1	< 6.0	--	--	--	< 5.8	< 5.8	--
Lead	mg/kg	250		6.1	140	< 6.0	--	--	--	< 5.8	< 5.8	--
Mercury	mg/kg	2		0.34	2.2	< 0.30	--	--	--	< 0.29	< 0.29	--

Notes:

¹MTCA Method A cleanup levels for soil - unrestricted land use (WAC 173-340-740[2]).

(a) Total value for all xylenes.

MTCA = Washington State Model Toxics Control Act

mg/kg = Milligrams per kilogram

ug/kg = Micrograms per kilogram

ft bgs = Feet below ground surface

*Field duplicate sample

BTEX = Benzene, toluene, ethylbenzene and xylenes

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

TEC = Toxic equivalent concentration calculated per WAC 173-340-708[8][e]. For non-detected cPAHs, one-half the practical quantitation limit was used in the calculation.

TPH = Total petroleum hydrocarbons

-- = Constituent not analyzed or cleanup level not established

Detections are shown in **bold** typeface.

Red box around the result indicates the value exceeds the associated MTCA cleanup level.

Chemical analyses performed by OnSite Environmental Inc. in Redmond, WA.

P:\010186774\001\Task 0200 - Supplemental SI & CAP\Finals\Final Report\Supp Invest Rept Table 4 and 5.xlsx

TABLE 5
Groundwater Chemical Analytical Results
2008-2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Screen Interval (ft bgs): Sample Date:	MW-1 5.0-20.0 8/26/2008 14:45	MW-1 5.0-20.0 10/6/2008	MW-1-110309 5.0-20.0 11/3/2009 12:42	MW-2 5.0-20.0 8/26/2008 13:30	MW-2 5.0-20.0 10/6/2008	MW-2-110309 5.0-20.0 11/3/2009 11:02	MW-2/DUP-110309* 5.0-20.0 11/3/2009 12:00	MW-3 39.5-44.5 8/26/2008 12:16
Volatile Organic Compounds (EPA 8011/8021B/8260B)											
Benzene	ug/l	5		< 0.50	--	--	< 0.50	--	< 1.0	< 1.0	< 0.50
Toluene	ug/l	1000		< 0.50	--	--	< 0.50	--	< 1.0	< 1.0	< 0.50
Ethylbenzene	ug/l	700		< 0.50	--	--	< 0.50	--	< 1.0	< 1.0	< 0.50
Xylene, m-,p-	ug/l	1000 (a)		< 1.0	--	--	< 1.0	--	< 1.0	< 1.0	< 1.0
Xylene, o-	ug/l	1000 (a)		< 1.0	--	--	< 1.0	--	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	< 0.0094	< 0.0095	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	< 0.20	< 0.20	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	< 0.20	< 0.20	--
TPH (NWTPH-Gx/Dx)											
Gasoline-Range	mg/l	0.8		< 0.10	--	--	< 0.10	--	< 0.10	< 0.10	< 0.10
Diesel-Range	mg/l	0.5		< 0.25	--	--	< 0.25	--	< 0.25	< 0.25	< 0.26
Lube Oil-Range	mg/l	0.5		< 0.40	--	--	< 0.40	--	< 0.40	< 0.40	< 0.41
SVOCs (EPA 8270D-SIM)											
ncPAHs											
Benzo(g,h,i)perylene	ug/l	--		< 0.0095	--	--	0.061	--	--	--	< 0.0095
cPAHs											
Benzo(a)anthracene	ug/l	--		< 0.0095	--	< 0.0094	0.012	--	< 0.0095	< 0.010	< 0.0095
Chrysene	ug/l	--		< 0.0095	--	< 0.0094	0.0099	--	< 0.0095	< 0.010	< 0.0095
Benzo(b)fluoranthene	ug/l	--		< 0.0095	--	< 0.0094	0.020	--	< 0.0095	< 0.010	< 0.0095
Benzo(k)fluoranthene	ug/l	--		< 0.0095	--	< 0.0094	< 0.0095	--	< 0.0095	< 0.010	< 0.0095
Benzo(a)pyrene	ug/l	--		< 0.0095	--	< 0.0094	0.021	--	< 0.0095	< 0.010	< 0.0095
Indeno(1,2,3-cd)pyrene	ug/l	--		< 0.0095	--	< 0.0094	0.026	--	< 0.0095	< 0.010	< 0.0095
Dibenzo(a,h)anthracene	ug/l	--		< 0.0095	--	< 0.0094	< 0.0095	--	< 0.0095	< 0.010	< 0.0095
Total cPAHs TEC	ug/l	0.1		< 0.0072	--	< 0.0071	0.028	--	< 0.0072	< 0.0076	< 0.0072
Metals (EPA 200.8/335.4/6020/7470A)											
Total Arsenic	mg/l	0.005		0.024	0.016	0.0062	0.01	0.012	0.0066	0.0069	0.083
Dissolved Arsenic ³	mg/l	0.005		--	0.017	--	--	0.011	--	--	--
Total Chromium	mg/l	0.050		0.022	--	< 0.011	0.013	--	< 0.011	< 0.011	0.043
Total Copper	mg/l	0.59 (b)		0.012	--	--	0.0071	--	--	--	0.040
Total Lead	mg/l	0.015		0.0032	0.0023	< 0.0011	0.0051	0.0036	< 0.0011	< 0.0011	0.018
Dissolved Lead ³	mg/l	0.015		--	< 0.0010	--	--	< 0.0010	--	--	--
Total Mercury	mg/l	0.002		< 0.00050	--	< 0.00050	< 0.00050	--	< 0.00050	< 0.00050	< 0.00050
Total Cyanide	mg/l	0.2 (c)		< 0.005	--	--	< 0.005	--	--	--	< 0.005

TABLE 5
Groundwater Chemical Analytical Results
2008-2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Screen Interval (ft bgs): Sample Date:	MW-3/D-08-26-08* 39.5-44.5 8/26/2008 12:45	MW-3 39.5-44.5 10/6/2008	MW-3-110309 39.5-44.5 11/3/2009 10:40	MW-4 23.5-28.5 8/26/2008 16:00	MW-4 23.5-28.5 10/6/2008	MW-4-110309 23.5-28.5 11/3/2009 15:18	MW-5 4.5-19.5 11/3/2009 14:44	MW-6 15 ² 8/26/2008 11:02
Volatile Organic Compounds (EPA 8011/8021B/8260B)											
Benzene	ug/l	5		< 0.50	--	--	< 0.50	--	--	< 1.0	< 0.50
Toluene	ug/l	1000		< 0.50	--	--	< 0.50	--	--	< 1.0	< 0.50
Ethylbenzene	ug/l	700		< 0.50	--	--	< 0.50	--	--	< 1.0	< 0.50
Xylene, m-,p-	ug/l	1000 (a)		< 1.0	--	--	< 1.0	--	--	< 1.0	< 1.0
Xylene, o-	ug/l	1000 (a)		< 1.0	--	--	< 1.0	--	--	< 1.0	< 1.0
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--
TPH (NWTPH-Gx/Dx)											
Gasoline-Range	mg/l	0.8		< 0.10	--	--	< 0.10	--	--	< 0.10	< 0.10
Diesel-Range	mg/l	0.5		< 0.25	--	--	< 0.25	--	--	< 0.25	< 0.25
Lube Oil-Range	mg/l	0.5		< 0.40	--	--	< 0.41	--	--	< 0.40	< 0.40
SVOCs (EPA 8270D-SIM)											
ncPAHs											
Benzo(g,h,i)perylene	ug/l	--		< 0.0095	--	--	< 0.0095	--	--	--	< 0.0095
cPAHs											
Benzo(a)anthracene	ug/l	--		< 0.0095	--	< 0.0093	< 0.0095	--	< 0.0095	0.012	< 0.0095
Chrysene	ug/l	--		< 0.0095	--	< 0.0093	< 0.0095	--	< 0.0095	0.012	< 0.0095
Benzo(b)fluoranthene	ug/l	--		< 0.0095	--	< 0.0093	< 0.0095	--	< 0.0095	0.017	< 0.0095
Benzo(k)fluoranthene	ug/l	--		< 0.0095	--	< 0.0093	< 0.0095	--	< 0.0095	< 0.010	< 0.0095
Benzo(a)pyrene	ug/l	--		< 0.0095	--	< 0.0093	< 0.0095	--	< 0.0095	< 0.010	< 0.0095
Indeno(1,2,3-cd)pyrene	ug/l	--		< 0.0095	--	< 0.0093	< 0.0095	--	< 0.0095	0.011	< 0.0095
Dibenzo(a,h)anthracene	ug/l	--		< 0.0095	--	< 0.0093	< 0.0095	--	< 0.0095	< 0.010	< 0.0095
Total cPAHs TEC	ug/l	0.1		< 0.0072	--	< 0.0070	< 0.0072	--	< 0.0072	0.010	< 0.0072
Metals (EPA 200.8/335.4/6020/7470A)											
Total Arsenic	mg/l	0.005		0.084	0.052	0.031	0.12	0.057	0.088	0.023	0.0056
Dissolved Arsenic ³	mg/l	0.005		--	0.034	--	--	0.042	--	--	--
Total Chromium	mg/l	0.050		0.045	--	< 0.011	0.052	--	< 0.011	< 0.011	0.013
Total Copper	mg/l	0.59 (b)		0.040	--	--	0.026	--	--	--	< 0.011
Total Lead	mg/l	0.015		0.018	0.0072	0.0039	0.0062	0.0039	0.0013	0.0054	0.0022
Dissolved Lead ³	mg/l	0.015		--	< 0.0010	--	--	< 0.0010	--	--	--
Total Mercury	mg/l	0.002		< 0.00050	--	< 0.00050	< 0.00050	--	< 0.00050	< 0.00050	< 0.00050
Total Cyanide	mg/l	0.2 (c)		< 0.005	--	--	< 0.005	--	--	--	< 0.005

TABLE 5
Groundwater Chemical Analytical Results
2008-2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Screen Interval (ft bgs): Sample Date:	MW-6 15 ² 10/6/2008	MW-6-110309 15 ² 11/3/2009 10:12	MW-7 4.5-19.5 11/3/2009 12:07	MW-8 5.0-20.0 11/3/2009 13:07	MW-10 15 ² 8/26/2008 10:00	MW-10 15 ² 10/6/2008	MW-10-110309 15 ² 11/3/2009 9:36
Volatile Organic Compounds (EPA 8011/8021B/8260B)										
Benzene	ug/l	5		--	< 1.0	1.1	< 1.0	< 0.50	--	< 1.0
Toluene	ug/l	1000		--	< 1.0	< 1.0	< 1.0	< 0.50	--	< 1.0
Ethylbenzene	ug/l	700		--	< 1.0	< 1.0	< 1.0	< 0.50	--	< 1.0
Xylene, m-,p-	ug/l	1000 (a)		--	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
Xylene, o-	ug/l	1000 (a)		--	< 1.0	< 1.0	< 1.0	< 1.0	--	< 1.0
1,2-Dibromoethane (EDB)	ug/l	0.01		--	< 0.0095	< 0.0095	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5.0		--	< 0.20	< 0.20	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	< 0.20	< 0.20	--	--	--	--
TPH (NWTPH-Gx/Dx)										
Gasoline-Range	mg/l	0.8		--	< 0.10	0.26	< 0.10	< 0.10	--	< 0.10
Diesel-Range	mg/l	0.5		--	< 0.25	< 0.25	< 0.25	< 0.25	--	< 0.25
Lube Oil-Range	mg/l	0.5		--	< 0.40	< 0.40	< 0.40	< 0.40	--	< 0.40
SVOCs (EPA 8270D-SIM)										
ncPAHs										
Benzo(g,h,i)perylene	ug/l	--		--	--	--	--	< 0.0095	--	--
cPAHs										
Benzo(a)anthracene	ug/l	--		--	< 0.0097	0.051	< 0.0097	< 0.0095	--	< 0.0098
Chrysene	ug/l	--		--	< 0.0097	0.067	< 0.0097	< 0.0095	--	< 0.0098
Benzo(b)fluoranthene	ug/l	--		--	< 0.0097	0.13	< 0.0097	< 0.0095	--	< 0.0098
Benzo(k)fluoranthene	ug/l	--		--	< 0.0097	0.030	< 0.0097	< 0.0095	--	< 0.0098
Benzo(a)pyrene	ug/l	--		--	< 0.0097	0.14	< 0.0097	< 0.0095	--	< 0.0098
Indeno(1,2,3-cd)pyrene	ug/l	--		--	< 0.0097	0.15	< 0.0097	< 0.0095	--	< 0.0098
Dibenzo(a,h)anthracene	ug/l	--		--	< 0.0097	0.016	< 0.0097	< 0.0095	--	< 0.0098
Total cPAHs TEC	ug/l	0.1		--	< 0.0073	0.18	< 0.0073	< 0.0072	--	< 0.0074
Metals (EPA 200.8/335.4/6020/7470A)										
Total Arsenic	mg/l	0.005		< 0.0033	< 0.0033	0.011	< 0.0033	0.012	0.011	0.0064
Dissolved Arsenic ³	mg/l	0.005		< 0.0030	--	--	--	--	0.01	--
Total Chromium	mg/l	0.050		--	< 0.011	< 0.011	< 0.011	< 0.011	--	< 0.011
Total Copper	mg/l	0.59 (b)		--	--	--	--	< 0.011	--	--
Total Lead	mg/l	0.015		0.0086	< 0.0011	0.0063	0.0012	< 0.0011	0.0047	0.0024
Dissolved Lead ³	mg/l	0.015		< 0.0010	--	--	--	--	< 0.0010	--
Total Mercury	mg/l	0.002		--	< 0.00050	< 0.00050	< 0.00050	< 0.00050	--	< 0.00050
Total Cyanide	mg/l	0.2 (c)		--	--	--	--	< 0.005	--	--

TABLE 5
Groundwater Chemical Analytical Results
2008-2009
Former Columbia Street MGP
Olympia, Washington

Notes:

¹MTCA Method A cleanup levels for potable groundwater (WAC 173-340-720[3]).

²Approximate depth to bottom of well casing measured with an electronic water level indicator on October 6, 2008. This well was installed by others.

³Groundwater samples analyzed for dissolved arsenic and dissolved lead were field-filtered with a 45 micron filter.

(a) Total value for all xylenes.

(b) MTCA Method B cleanup level (standard formula value) for potable groundwater (WAC 173-340-720[4][b]).

(c) Federal Primary Maximum Contaminant Level (MCL) (40 C.F.R. 141).

MTCA = Washington State Model Toxics Control Act

ug/l = Micrograms per liter

mg/l = Milligrams per liter

*Field duplicate sample

ft bgs = Feet below ground surface

SVOCs = Semivolatile organic compounds

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

ncPAHs = Non-carcinogenic polycyclic aromatic hydrocarbons

TEC = Toxic equivalent concentration calculated per WAC 173-340-708[8][e]. For non-detected cPAHs, one-half the practical quantitation limit was used in the calculation.

TPH = Total petroleum hydrocarbons

-- = Constituent not analyzed or cleanup level not established

Detections are shown in **bold** typeface.

Red box around the result indicates the value exceeds the associated MTCA cleanup level.

Chemical analyses (except cyanide) performed by OnSite Environmental, Inc. in Redmond, WA; cyanide analysis performed by Analytical Resources, Inc. in Seattle, WA.

P:\010186774\001Task 0200 - Supplemental SI & CAP\Finals\Final Report\Supp Invest Rept Table 4 and 5.xlsx

TABLE 6
Field Quality Control Blank Analytical Results
November 2009
Former Columbia Street MGP
Olympia, Washington

Analyte	Units	Sample ID: Laboratory ID: Sample Date:	MW-5-20.5-R 11-012-020 11/2/2009 15:45	SB-14-30.5-R 11-016-25 11/3/2009 15:00	Trip Blank 11-016-26 11/3/2009	RINSE-110309 11-019-11 11/3/2009	TRIP BLANK 11-019-12 11/3/2009	TRIP BLANK-1 11-035-28 11/4/2009	TRIP BLANK-2 11-035-29 11/4/2009	SB-17-20.5-R 11-016-025 11/4/2009 13:00
Volatile Organic Compounds (EPA 8011/8021B/8260B)										
Benzene	ug/l		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	ug/l		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	ug/l		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene, m-,p-	ug/l		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene, o-	ug/l		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane (EDB)	ug/l		--	--	--	< 0.0095	< 0.0094	--	--	--
1,2-Dichloroethane (EDC)	ug/l		--	--	--	< 0.20	< 0.20	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l		--	--	ug/l	< 0.20	< 0.20	--	--	--
TPH (NWTPH-Gx/Dx)										
Gasoline-Range	mg/l		< 0.10	--	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Diesel-Range	mg/l		< 0.25	< 0.25	--	< 0.25	--	--	--	< 0.25
Lube Oil-Range	mg/l		< 0.40	< 0.40	--	< 0.40	--	--	--	< 0.40
cPAHs (EPA 8270D-SIM)										
Benzo(a)anthracene	ug/l		0.011	< 0.0095	--	< 0.0095	--	--	--	< 0.0095
Chrysene	ug/l		< 0.0094	< 0.0095	--	< 0.0095	--	--	--	< 0.0095
Benzo(b)fluoranthene	ug/l		0.0097	< 0.0095	--	< 0.0095	--	--	--	< 0.0095
Benzo(k)fluoranthene	ug/l		< 0.0094	< 0.0095	--	< 0.0095	--	--	--	< 0.0095
Benzo(a)pyrene	ug/l		< 0.0094	< 0.0095	--	< 0.0095	--	--	--	< 0.0095
Indeno(1,2,3-cd)pyrene	ug/l		< 0.0094	< 0.0095	--	< 0.0095	--	--	--	< 0.0095
Dibenzo(a,h)anthracene	ug/l		< 0.0094	< 0.0095	--	< 0.0095	--	--	--	< 0.0095
Total cPAHs TEC	ug/l		0.0082	0.0072	--	< 0.0072	--	--	--	0.0072
Metals (EPA 6020/7470A)										
Arsenic	mg/l		< 0.0033	< 0.0033	--	< 0.0033	--	--	--	< 0.0033
Chromium	mg/l		--	--	--	< 0.011	--	--	--	--
Lead	mg/l		< 0.0011	< 0.0011	--	< 0.0011	--	--	--	< 0.0014
Mercury	mg/l		< 0.00050	< 0.00050	--	< 0.00050	--	--	--	< 0.00050

Notes:

ug/l = Micrograms per liter

mg/l = Milligrams per liter

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

R = Sample IDs ending in "R" are equipment rinsate blanks.

TEC = Toxic equivalent concentration calculated per WAC 173-340-708[8][e]. For non-detected cPAHs, one-half the practical quantitation limit was used in the calculation.

TPH = Total petroleum hydrocarbons

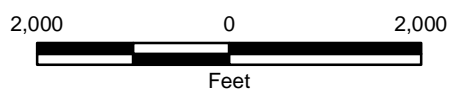
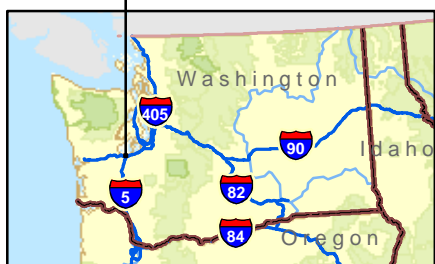
Detections are shown in **bold** typeface.

Chemical analyses performed by OnSite Environmental, Inc. in Redmond, WA.

P:\010186774\001\Task 0200 - Supplemental SI & CAP\Finals\Final Report\Supp Invest Rept Table 6.xlsx

Map Revised: January 19, 2010 mm2.EL

Office: SEA Path: P:\00186774\GIS\FI-018677400_F1_.mxd

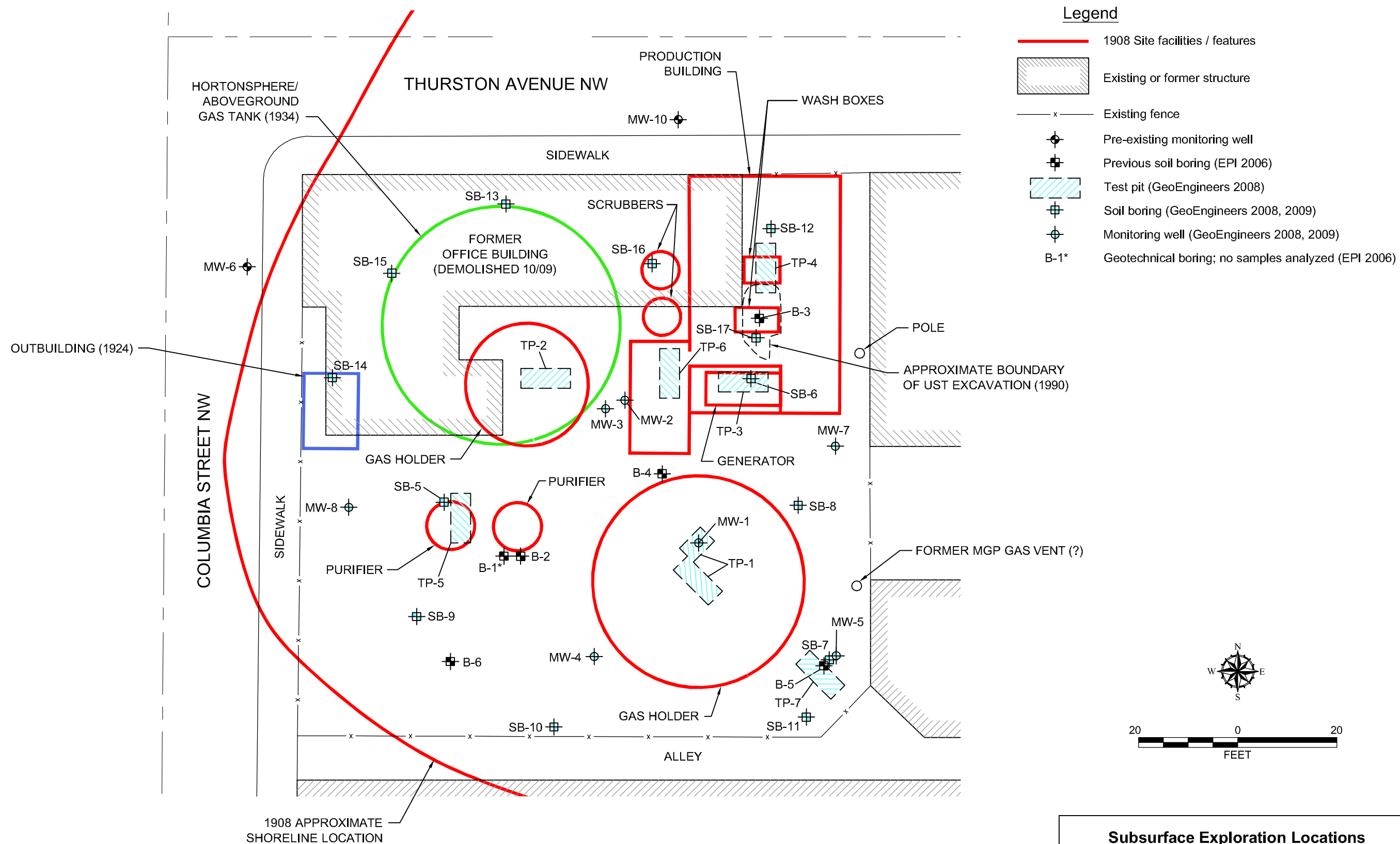


- Notes:
1. The locations of all features shown are approximate.
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps, Street Maps 2005
 Transverse Mercator, Zone 10 N North, North American Datum 1983
 North arrow oriented to grid north

Vicinity Map	
Former Columbia Street MGP Property Olympia, Washington	
	Figure 1

P:\010186774\00\TASK 0200 - SUPPLEMENTAL SI & CAP\CAD\0186774\00_TASK 0200 Fig 2 DATA REPORT.DWG\TAB:FIG 2 MODIFIED BY THICHAUD ON JAN 19, 2010 - 9:58

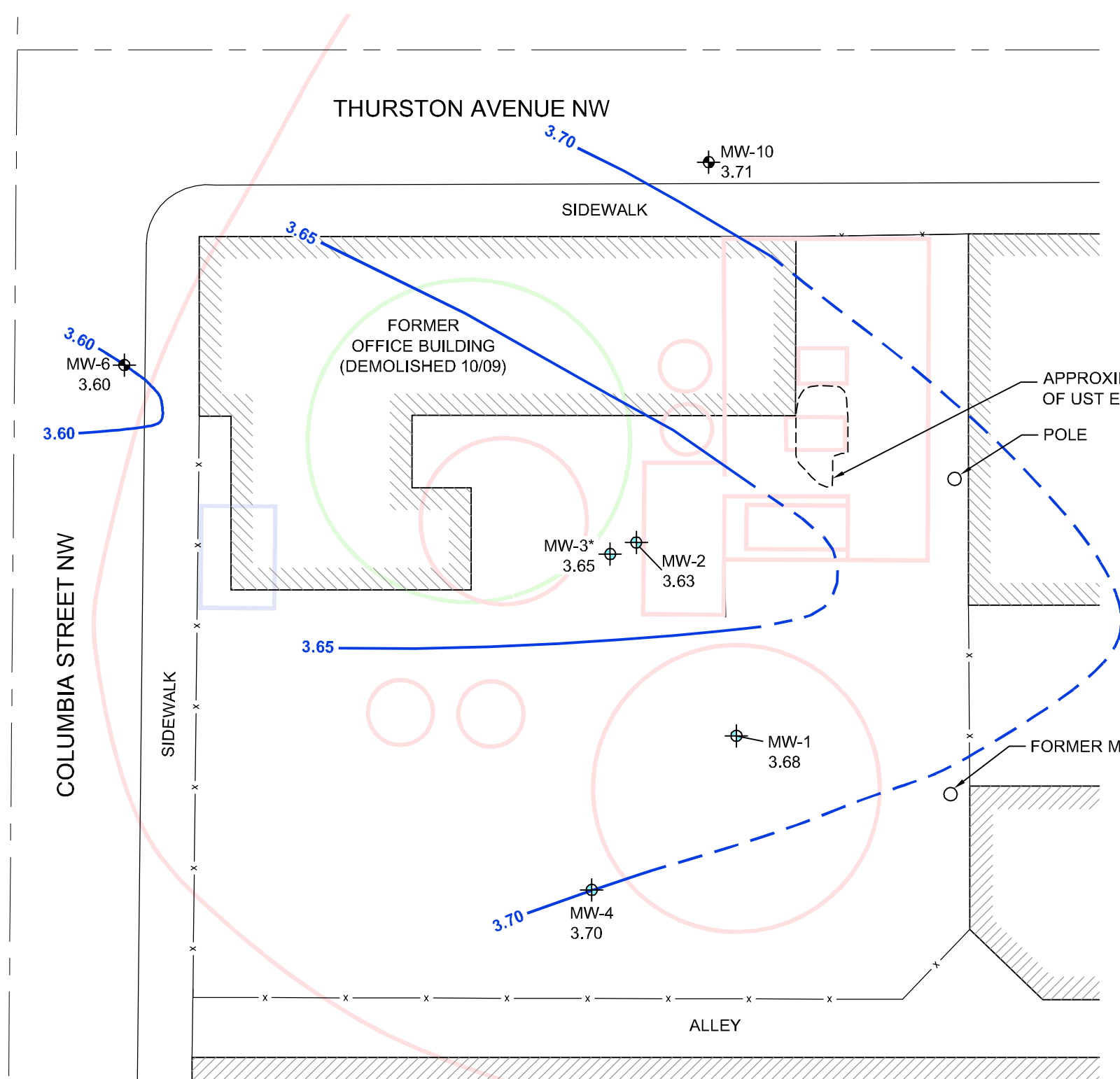


Notes

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Subsurface Exploration Locations	
Former Columbia Street MGP Property Olympia, Washington	
GEOENGINEERS	Figure 2

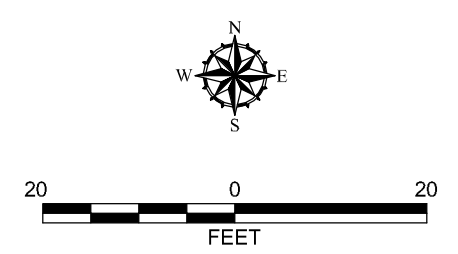
P:\01086774\00\TASK 0200 - SUPPLEMENTAL SI & CAP\CAD\018677400_TASK 0200 FIG 3 DATA REPORT.DWG\TAB:FIG 3 MODIFIED BY THICHAUD ON JAN 19, 2010 - 9:59



Legend

- Existing or former structure
- Existing fence
- 3.66 Interpolated groundwater elevation contour (feet); dashed where inferred
- Pre-existing monitoring well
- Monitoring well (GeoEngineers 2008)

* Well MW-3 screened from 39.5-44.5 feet bgs; water level not used for contouring.



Notes

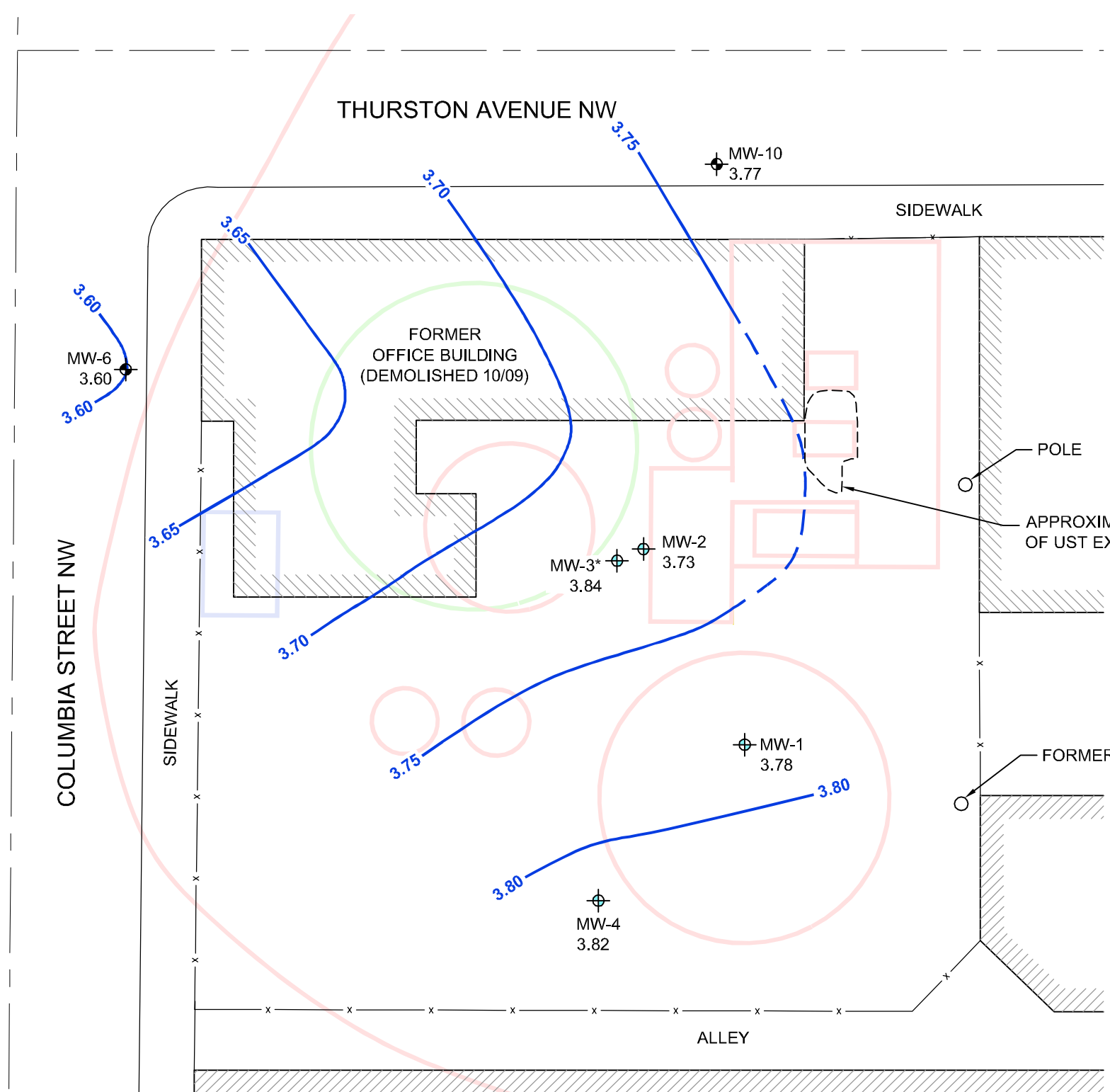
1. The locations of all features shown are approximate.
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Groundwater Potentiometric Surface Map
August 26, 2008

Former Columbia Street MGP Property
Olympia, Washington

GEOENGINEERS **Figure 3**

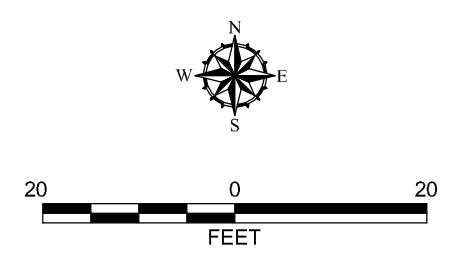
P:\010186774\00\TASK 0200 - SUPPLEMENTAL SI & CAP\CAD\018677400_TASK 0200 Fig 4 DATA REPORT.DWG\TAB:FIG 4, MODIFIED BY TMICHAUD ON JAN 19, 2010 - 10:00



Legend

- Existing or former structure
- Existing fence
- 3.66 Interpolated groundwater elevation contour (feet); dashed where inferred
- Pre-existing monitoring well
- Monitoring well (GeoEngineers 2008)

* Well MW-3 screened from 39.5-44.5 feet bgs; water level not used for contouring.

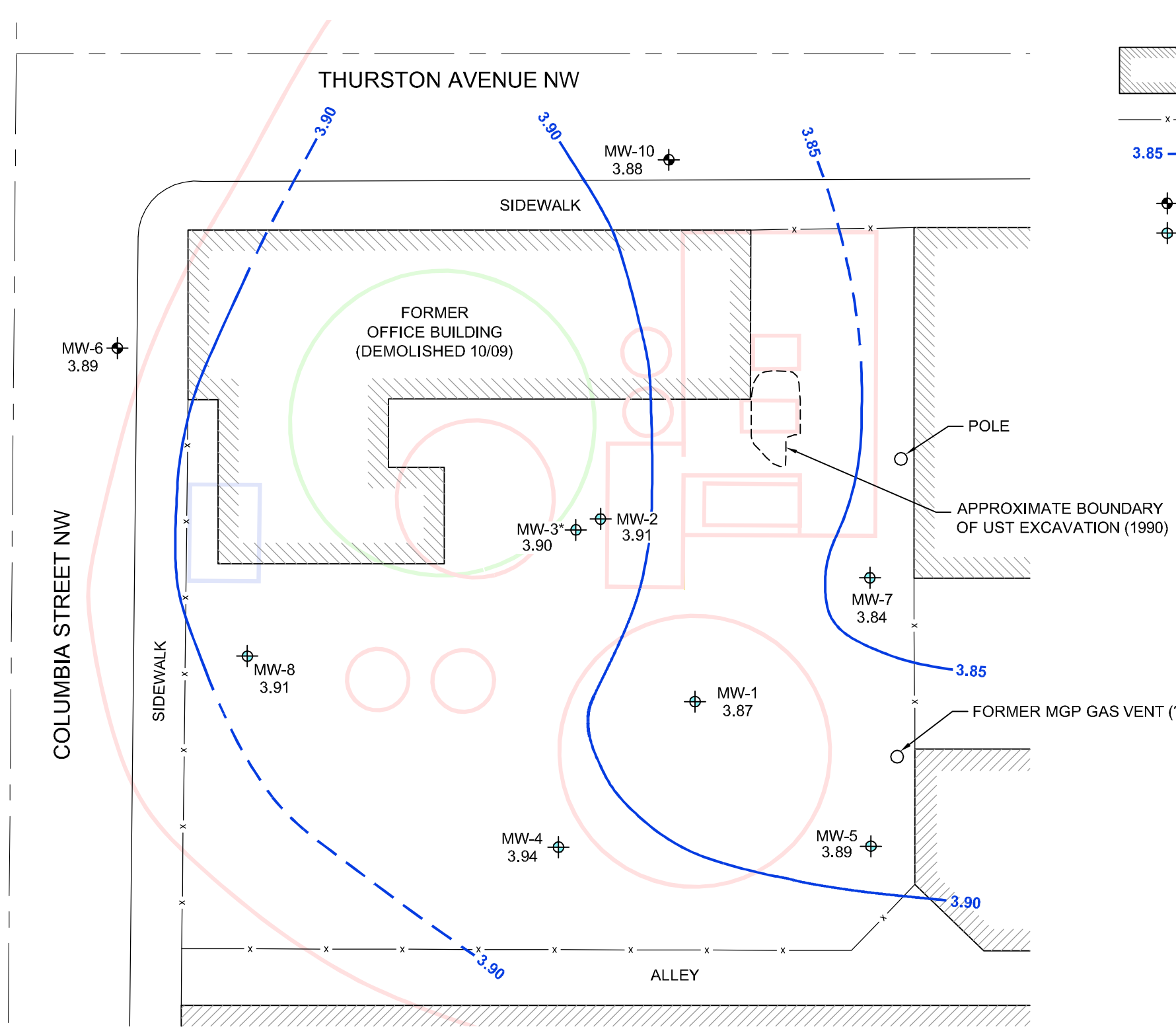


Notes

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

Groundwater Potentiometric Surface Map October 6, 2008	
Former Columbia Street MGP Property Olympia, Washington	
GEOENGINEERS	Figure 4

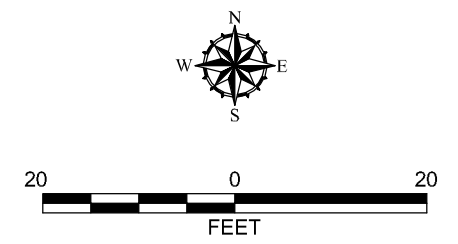
P:\010186774\00\TASK 0200 - SUPPLEMENTAL SI & CAP\CAD\018677400_TASK 0200 Fig 5 DATA REPORT.DWG\TAB:FIG 5 MODIFIED BY THICHAUD ON JAN 19, 2010 - 10:02



Legend

- Existing or former structure
- Existing fence
- 3.85 Interpolated groundwater elevation contour (feet); dashed where inferred
- Pre-existing monitoring well
- Monitoring well (GeoEngineers 2008, 2009)

* Well MW-3 screened from 39.5-44.5 feet bgs; water level not used for contouring.



Notes

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

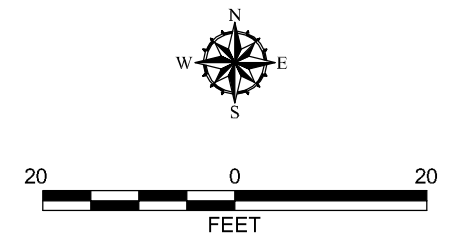
Groundwater Potentiometric Surface Map November 3, 2009	
Former Columbia Street MGP Property Olympia, Washington	
	Figure 5

P:\010186774\001\TASK 0200 - SUPPLEMENTAL SI & CAP\CAD\018677400_TASK 0200 FIG 6 DATA REPORT.DWG\TAB:FIG 6 MODIFIED BY TMCHAUD ON JAN 19, 2010 - 10:05

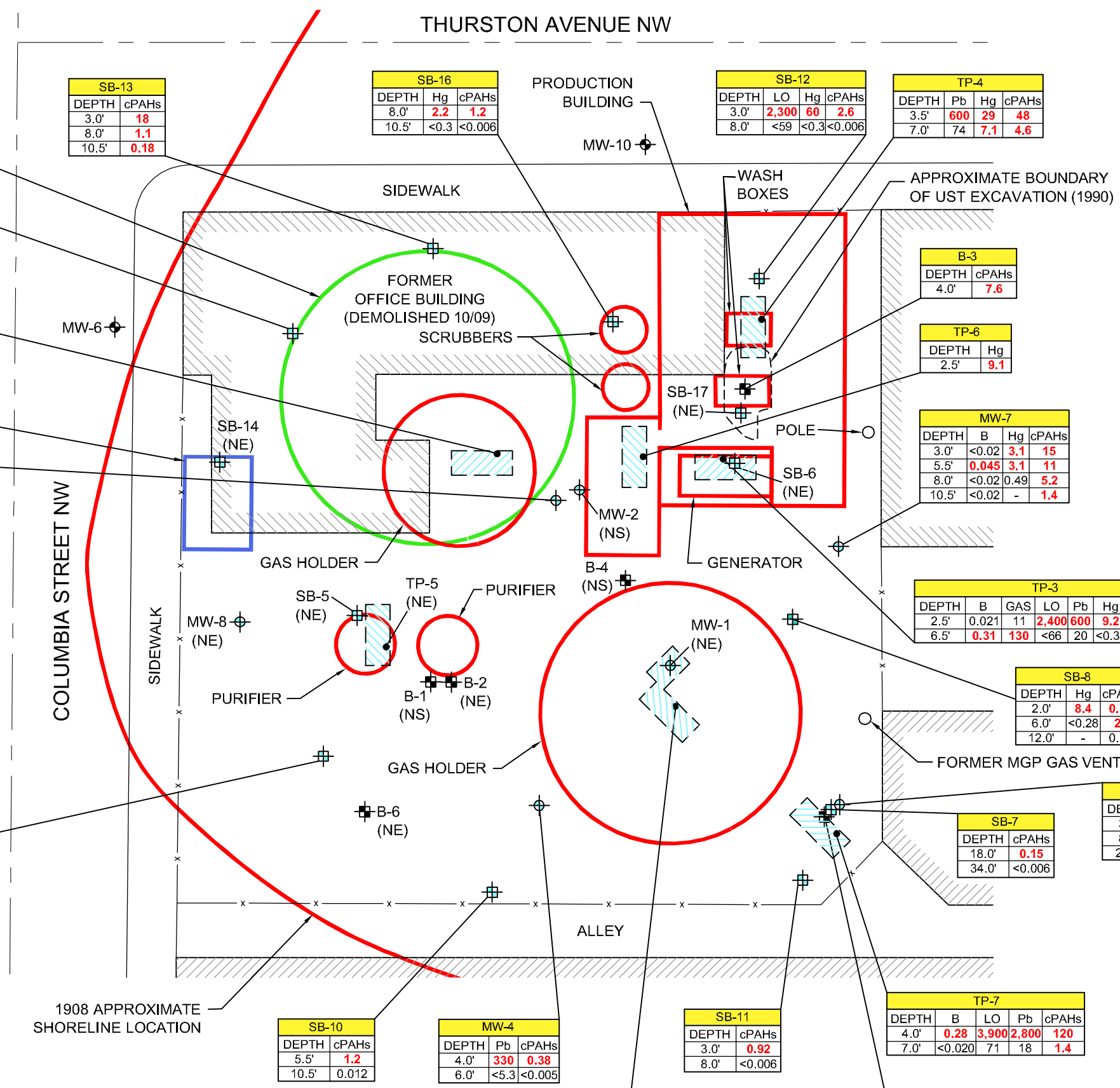
Legend

- 1908 Site facilities / features
- Existing or former structure
- x — Existing fence
- Pre-existing monitoring well
- Previous soil boring (EPI 2006); all soil samples collected at 4 ft bgs
- Test pit (GeoEngineers 2008)
- Test pit sidewall soil sampling location
- Soil boring (GeoEngineers 2008, 2009)
- Monitoring well (GeoEngineers 2008, 2009)

Soil results in mg/kg
 cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons – toxic equivalent concentration
 B = Benzene
 GAS = Gasoline-range hydrocarbons
 LO = Lube oil-range hydrocarbons
 Pb = Lead
 Hg = Mercury
 (NS) = No soil samples analyzed
 (NE) = No MTCA exceedances
Red/bold values exceed MTCA Method A cleanup levels



Constituents Detected Above MTCA Method A Cleanup Levels in Soil	
Former Columbia Street MGP Property Olympia, Washington	
	Figure 6



SB-13	
DEPTH	cPAHs
3.0'	18
8.0'	1.1
10.5'	0.18

SB-16		
DEPTH	Hg	cPAHs
8.0'	2.2	1.2
10.5'	<0.3	<0.006

SB-12			
DEPTH	LO	Hg	cPAHs
3.0'	2,300	60	2.6
8.0'	<59	<0.3	<0.006

TP-4			
DEPTH	Pb	Hg	cPAHs
3.5'	600	29	48
7.0'	74	7.1	4.6

SB-15		
DEPTH	Hg	cPAHs
3.0'	3.4	0.33
10.5'	<0.31	0.12
20.5'	-	0.011

TP-2	
DEPTH	cPAHs
4.5'	6.5
7.5'	0.007

MW-3	
DEPTH	cPAHs
8.0'	0.14
27.5'	<0.006

SB-9	
DEPTH	cPAHs
3.0'	3.4
8.0'	0.18
10.5'	0.017

SB-14 (NE)	
DEPTH	cPAHs
3.0'	3.4
8.0'	0.18
10.5'	0.017

SB-5 (NE)	
DEPTH	cPAHs
3.0'	3.4
8.0'	0.18
10.5'	0.017

SB-10	
DEPTH	cPAHs
5.5'	1.2
10.5'	0.012

MW-4		
DEPTH	Pb	cPAHs
4.0'	330	0.38
6.0'	<5.3	<0.005

TP-1		
DEPTH	Pb	cPAHs
3.0'	310	2.3
4.0'	-	0.007

SB-11	
DEPTH	cPAHs
3.0'	0.92
8.0'	<0.006

TP-7				
DEPTH	B	LO	Pb	cPAHs
4.0'	0.28	3,900	2,800	120
7.0'	<0.020	71	18	1.4

B-5	
DEPTH	cPAHs
4.0'	120

MW-7			
DEPTH	B	Hg	cPAHs
3.0'	<0.02	3.1	15
5.5'	0.045	3.1	11
8.0'	<0.02	0.49	5.2
10.5'	<0.02	-	1.4

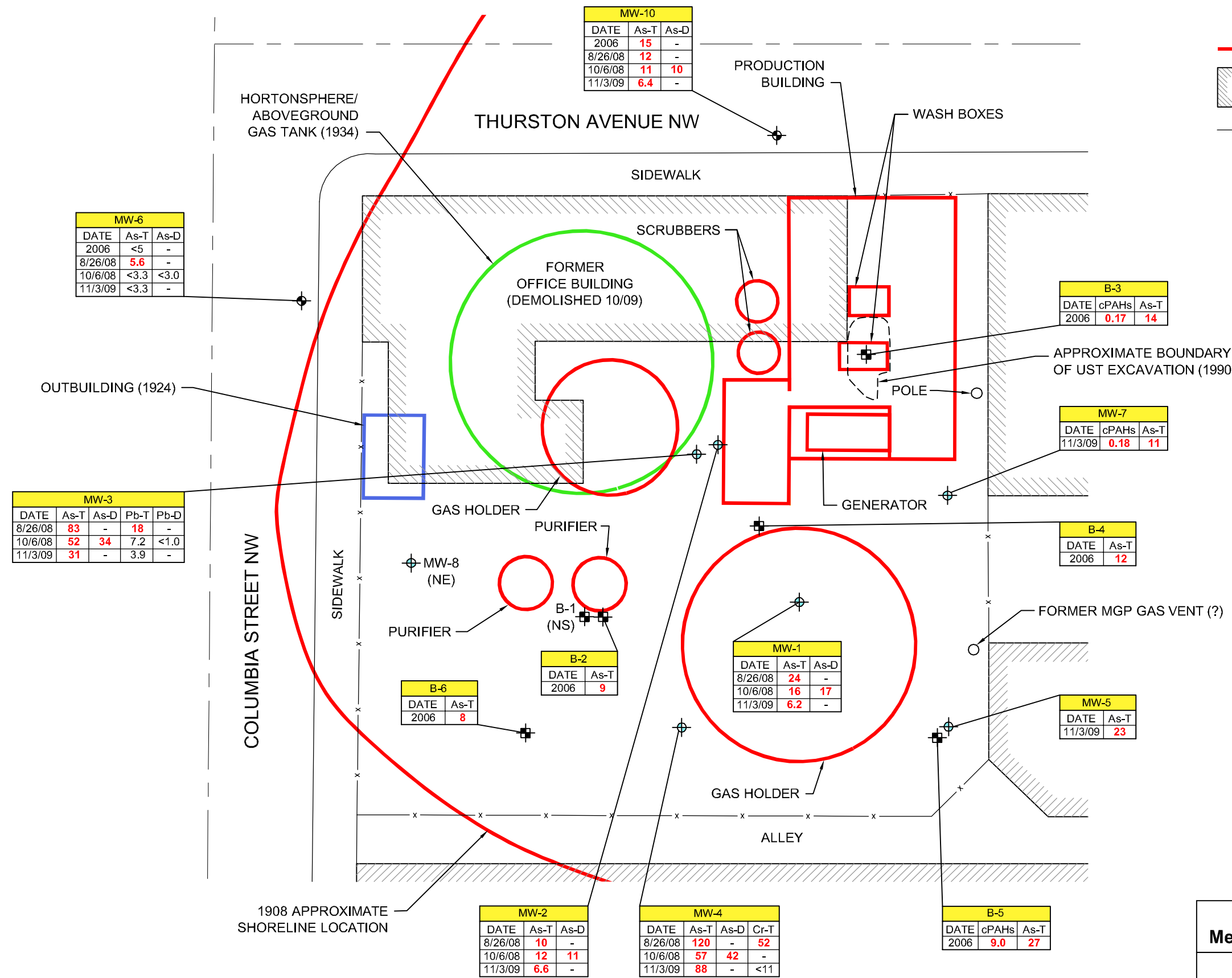
TP-3						
DEPTH	B	GAS	LO	Pb	Hg	cPAHs
2.5'	0.021	11	2,400	600	9.2	31
6.5'	0.31	130	<66	20	<0.33	<0.007

SB-8		
DEPTH	Hg	cPAHs
2.0'	8.4	0.57
6.0'	<0.28	29
12.0'	-	0.10

MW-5		
DEPTH	LO	cPAHs
3.0'	2,700	38
8.0'	<65	0.31
20.5'	-	0.13

SB-7	
DEPTH	cPAHs
18.0'	0.15
34.0'	<0.006

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



Legend

- 1908 Site facilities / features
- Existing or former structure
- x — Existing fence
- Pre-existing monitoring well
- Previous soil boring (EPI 2006); all groundwater samples collected from upper 4-6 ft of saturated zone
- Monitoring well (GeoEngineers 2008, 2009)

Groundwater results in ug/l

- As-T = Total arsenic
- As-D = Dissolved arsenic
- Pb-T = Total lead
- Pb-D = Dissolved lead
- Cr-T = Total chromium
- cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons - toxic equivalent concentration
- (NS) = No groundwater samples analyzed
- (NE) = No MTCA exceedances
- Red/bold** values exceed MTCA Method A cleanup levels



Notes

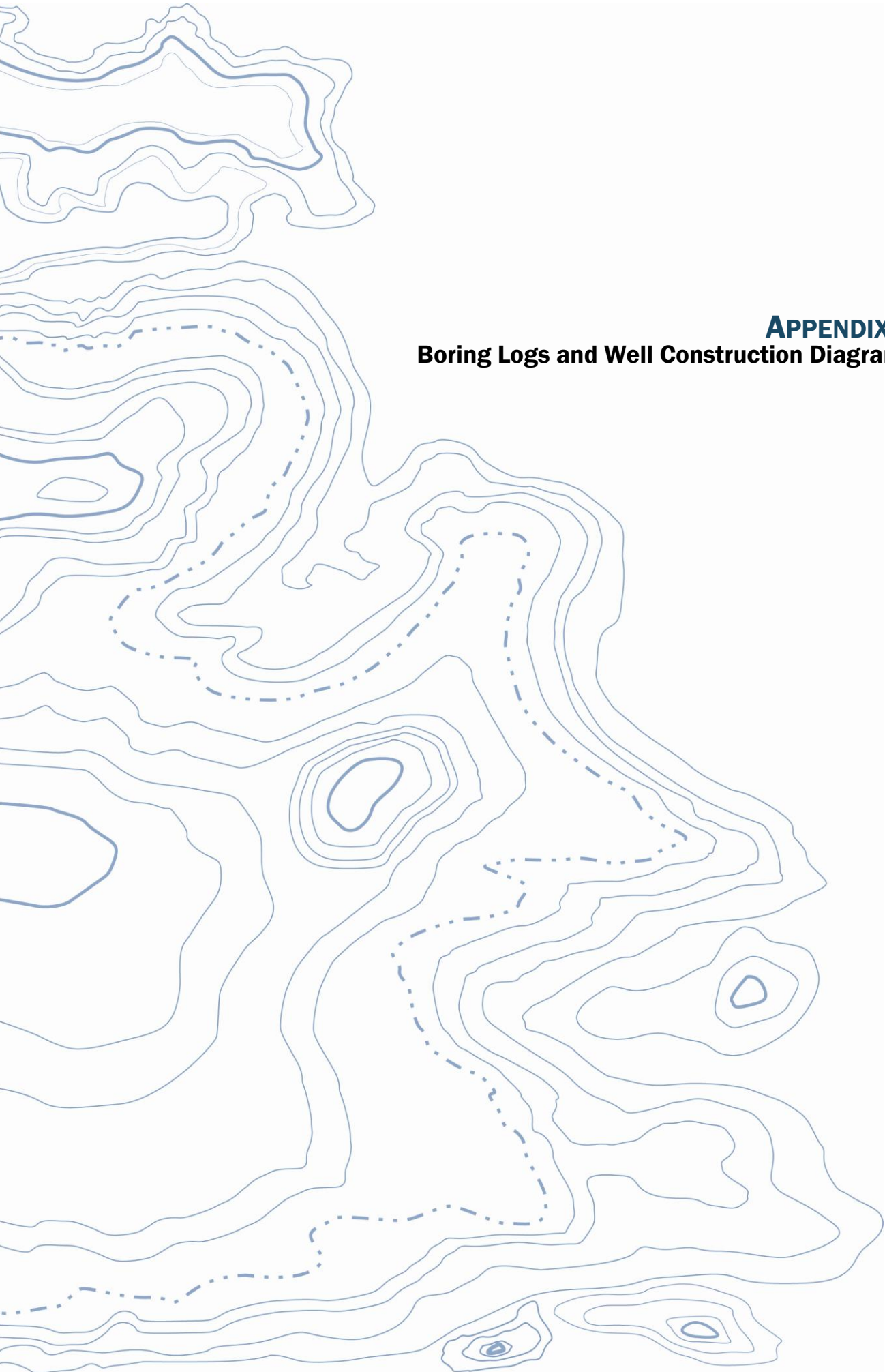
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Constituents Detected Above MTCA Method A Cleanup Levels in Groundwater

Former Columbia Street MGP Property
Olympia, Washington



Figure 7



APPENDIX A
Boring Logs and Well Construction Diagrams

SOIL CLASSIFICATION CHART

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

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

Sampler Symbol Descriptions

	2.4-inch I.D. split barrel
	Standard Penetration Test (SPT)
	Shelby tube
	Piston
	Direct-Push
	Bulk or grab

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

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

ADDITIONAL MATERIAL SYMBOLS

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



Measured groundwater level in exploration, well, or piezometer



Groundwater observed at time of exploration



Perched water observed at time of exploration



Measured free product in well or piezometer

Graphic Log Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Material Description Contact



Distinct contact between soil strata or geologic units



Approximate location of soil strata change within a geologic soil unit

Laboratory / Field Tests

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

Sheen Classification

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

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

KEY TO EXPLORATION LOGS

Drilled	Start 11/3/2009	End 11/3/2009	Total Depth (ft)	21.5	Logged By Checked By	RNM RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger	
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		D&M Sampler 300 lb 30-inch Drop		Drilling Equipment		CME 75 Truck-mounted
Easting (X) Northing (Y)			System Datum		Groundwater		Date Measured		Depth to Water (ft)		Elevation (ft)
Notes: Auger: 4¼ inch ID							11/3/2009		7.0		

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
0								AC	2 inches asphaltic concrete			
		12	17		1			SP-SM	Tan fine to medium sand with silt and occasional gravel and shell fragments (medium dense, moist)	NS	0	
5												
		18	19		2				Grades to gray, becomes wet	NS	0	
10												
		18	16		3					NS	0	
15												
		8	8		4				Grades to loose	NS	0	
20								SM	Gray silty fine to medium sand with occasional shell fragments (loose, wet)	NS	0	

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-9



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-2
 Sheet 1 of 1

Drilled	Start 11/3/2009	End 11/3/2009	Total Depth (ft)	31.5	Logged By Checked By	RNM RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger	
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		D&M Sampler 300 lb 30-inch Drop		Drilling Equipment		CME 75 Truck-mounted
Easting (X) Northing (Y)			System Datum		Groundwater		Date Measured		Depth to Water (ft)		Elevation (ft)
Notes: Auger: 4¼ inch ID							11/3/2009		7.0		

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0							AC	2 inches asphaltic concrete			
							SP-SM	Gray (with occasional orange mottling) fine to medium sand with silt and gravel (medium dense, moist)			No recovery
5	0	11							NS	0	
	6	13	1						NS	0	
	8	21	2					Occasional shell fragments	NS	0	
10	14	13	3						NS	0	
15	12	14	4				SM	Gray silty fine to medium sand with occasional gravel and shell fragments (medium dense, wet)	NS	0	
20	14	39	5				SP-SM	Gray fine to medium sand with silt and gravel (dense, wet)	NS	0	
25	12	50/6"	6				SP	Gray fine to medium sand with occasional gravel and trace silt (very dense, wet)	NS	0	
30	12	57	7						NS	0	

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-10



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-3
 Sheet 1 of 1

Start Drilled 11/3/2009	End 11/3/2009	Total Depth (ft) 21.5	Logged By Checked By RNM RCL	Driller Cascade Drilling	Drilling Method Hollow Stem Auger
Surface Elevation (ft) Vertical Datum Undetermined		Hammer Data	D&M Sampler 300 lb 30-inch Drop		Drilling Equipment CME 75 Truck-mounted
Easting (X) Northing (Y)		System Datum	<u>Groundwater</u>		Depth to Water (ft) Elevation (ft)
Notes: Auger: 4¼ inch ID			11/3/2009		7.0

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS	
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log
0							AC	2 inches asphaltic concrete			
		12	5		1		SM	Dark brown silty fine to medium sand with occasional gravel and shell fragments (loose, moist)	NS	0	
5		6	8		2		SP-SM	Gray to brown fine to medium sand with silt and occasional gravel, shell and brick fragments (loose, moist)	NS	2	
		12	10		3			Grades to gray fine to medium sand with silt and occasional shell fragments (loose, wet)	NS	0	
10		10	13		4			Becomes medium dense	NS	0	
15		14	16		5			Grades to fine to medium sand with silt and gravel and occasional shell and wood fragments (medium dense, wet)	NS	0	
20		16	33		6				NS	0	

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-11



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-4
 Sheet 1 of 1

Drilled	Start 11/4/2009	End 11/4/2009	Total Depth (ft)	21.5	Logged By Checked By	RNM RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		D&M Sampler 300 lb 30-inch Drop		Drilling Equipment CME 75 Truck-mounted	
Easting (X) Northing (Y)			System Datum		Groundwater Date Measured		Depth to Water (ft)		Elevation (ft)	
Notes: Auger: 4¼ inch ID							11/4/2009		7.0	

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0							AC	3 inches asphaltic concrete		
							GP	Dark brown fine gravel with sand and trace silt (loose, moist) (fill)	SS	0
	13		9		1		SP-SM	Gray fine to medium sand with silt and occasional gravel and shell fragments (loose, moist)	NS	0
5	16		6		2				NS	0
	14		32		3				NS	0
10	16		43		4		SP	Gray fine to medium sand with occasional gravel and trace silt (dense, wet)	NS	0
15	18		17		5			Becomes medium dense	NS	0
20	16		29		6				NS	0

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-12



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-5
 Sheet 1 of 1

Start Drilled	11/4/2009	End	11/4/2009	Total Depth (ft)	31	Logged By	RNM	Checked By	RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum	Undetermined			Hammer Data	D&M Sampler 300 lb 30-inch Drop			Drilling Equipment	CME 75 Truck-mounted				
Easting (X) Northing (Y)				System Datum				Groundwater Date Measured	11/4/2009	Depth to Water (ft)	7.0	Elevation (ft)	
Notes: Auger: 4¼ inch ID													

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
0							GP	Gray coarse gravel with sand and trace silt (loose, moist) (fill)				
							SP-SM	Gray fine to medium sand with silt and occasional gravel and shell fragments (very loose, moist)	SS	0		
5	10	4	1					Grades to gray to black fine to medium sand with silt, gravel and occasional shell fragments (loose, moist)	SS	0	Rock in sampler shoe	
							GP-GM	Gray fine to coarse gravel with silt and sand and occasional shell fragments (medium dense, wet)	NS	0		
							SP-SM	Gray fine to medium sand with silt and gravel (loose, wet)	NS	0		
							SM	Gray silty fine to medium sand with gravel and occasional shell fragments (very loose, wet)				
15	18	4	5						NS	0		
							GP-GM	Gray to brown fine to coarse gravel with silt and sand (medium dense, wet)	NS	0		
							SP-SM	Brown medium to coarse sand with silt and gravel (very dense, wet)				
25	12	50/6"	7						NS	0		
30	12	50/6"						Grades to brown fine to medium sand with silt and occasional gravel (very dense, wet)	NS	0		

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-13



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-6
 Sheet 1 of 1

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ_DBTemplate\GEOENGINEERS_GDT\GEB_ENVIRONMENTAL_STANDARD

Start Drilled	11/3/2009	End	11/3/2009	Total Depth (ft)	31.5	Logged By	RNM	Checked By	RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum	Undetermined			Hammer Data	D&M Sampler 300 lb 30-inch Drop			Drilling Equipment	CME 75 Truck-mounted				
Easting (X) Northing (Y)				System Datum				Groundwater Date Measured	11/3/2009	Depth to Water (ft)	7.0	Elevation (ft)	
Notes: Auger: 4¼ inch ID													

Elevation (feet)	FIELD DATA						MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level				
0						GP	Gray coarse gravel with sand and trace silt (loose, moist) (fill)			
						SP-SM	Gray fine to medium sand with silt, occasional gravel and shell fragments (medium dense, moist)	NS	0	
5	16	16	16	1			Grades to loose	NS	1	
	18	9	9	2			Becomes wet	NS	1	
	14	8	8	3			Grades to gray fine to medium sand with silt, gravel and occasional shell fragments (medium dense, wet)	NS	0	
10	12	13	13	4			Gray silty sand with gravel and occasional shell fragments (loose, wet)	NS	0	
	14	8	8	5		SM		NS	0	
15	12	5	5	6			Shell content increases, grades to very loose	NS	0	
	12	4	4	7			Grades to gray silty fine to medium sand with gravel and occasional shell fragments (loose, wet)	NS	0	
20	10	10	10	8				NS	0	
25										
30										

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-14



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-7
 Sheet 1 of 1

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ_DBTemplate\libTemplate\GEOENGINEERS.GDT\GEB_ENVIRONMENTAL_STANDARD

Drilled	Start 11/4/2009	End 11/4/2009	Total Depth (ft)	21.5	Logged By Checked By	RNM RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger	
Surface Elevation (ft) Vertical Datum	Undetermined			Hammer Data	D&M Sampler 300 lb 30-inch Drop		Drilling Equipment	CME 75 Truck-mounted			
Easting (X) Northing (Y)	System Datum			Groundwater Date Measured		11/4/2009	Depth to Water (ft)	7.0	Elevation (ft)		
Notes: Auger: 4¼ inch ID											

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
0								GP	Gray coarse gravel with sand and trace silt (loose, moist) (fill)			
								SP-SM	Gray fine to medium sand with silt and occasional gravel (medium dense, moist)	NS	0	
5												
									Grades to fine to medium sand with silt and gravel and occasional shell fragments (loose, wet)	NS	0	
10								SM	Gray silty fine to medium sand with gravel and occasional shell fragments (loose, wet)	NS	0	
15									Becomes very loose	NS	0	
20									Becomes loose	NS	0	

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-15



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-8
 Sheet 1 of 1

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ_DBTemplate\GEOENGINEERS_GDT\GEB_ENVIRONMENTAL_STANDARD

Drilled	Start 11/4/2009	End 11/4/2009	Total Depth (ft)	21.5	Logged By Checked By	RNM RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum			Undetermined		Hammer Data		D&M Sampler 300 lb 30-inch Drop		Drilling Equipment CME 75 Truck-mounted	
Easting (X) Northing (Y)			System Datum		Groundwater Date Measured		Depth to Water (ft)		Elevation (ft)	
Notes: Auger: 4¼ inch ID						11/4/2009		7.0		

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
0							GP	Gray coarse gravel with sand and trace silt (loose, moist) (fill)				
		9	19		1		SP-SM	Gray fine to medium sand with silt and occasional gravel (medium dense, moist)	NS	0		
5												
		14	11		2		SM	Gray silty fine to medium sand with occasional gravel and shell fragments (medium dense, wet)	NS	0		
10												
		18	2		3			Grades to gray silty fine to medium sand with gravel and occasional shell fragments (very loose, wet)	NS	0		
15												
		12	12		4		SP-SM	Gray fine to medium sand with silt and gravel (medium dense, wet)	NS	0		
20												
		14	40		5			Grades to brown-gray, becomes dense	NS	0		

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-16



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-9
 Sheet 1 of 1

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ_DBTemplate\GeoENGINEERS_GDT\GEI8_ENVIRONMENTAL_STANDARD

Start Drilled	11/4/2009	End	11/4/2009	Total Depth (ft)	21.5	Logged By	RNM	Checked By	RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum	Undetermined			Hammer Data	D&M Sampler 300 lb 30-inch Drop			Drilling Equipment	CME 75 Truck-mounted				
Easting (X) Northing (Y)				System Datum				Groundwater	Date Measured		Depth to Water (ft)	Elevation (ft)	
Notes: Auger: 4¼ inch ID								11/4/2009	7.0				

Elevation (feet)	FIELD DATA					Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing							
0								GP	Gray fine to coarse gravel with sand and trace silt (loose, moist) (fill)			
								GP-GM	Brown fine gravel with silt and sand (very dense, moist)	NS	0	Rock in sampler shoe
5								SM	Gray silty fine to medium sand with gravel and occasional shell fragments (medium dense, wet)	NS	7	
10								SP-SM	Gray fine to medium sand with silt and gravel (medium dense, wet)	NS	2	
15									Grades to dense	NS	0	
20										NS	0	

Note: See Figure A-1 for explanation of symbols

Log of Boring SB-17

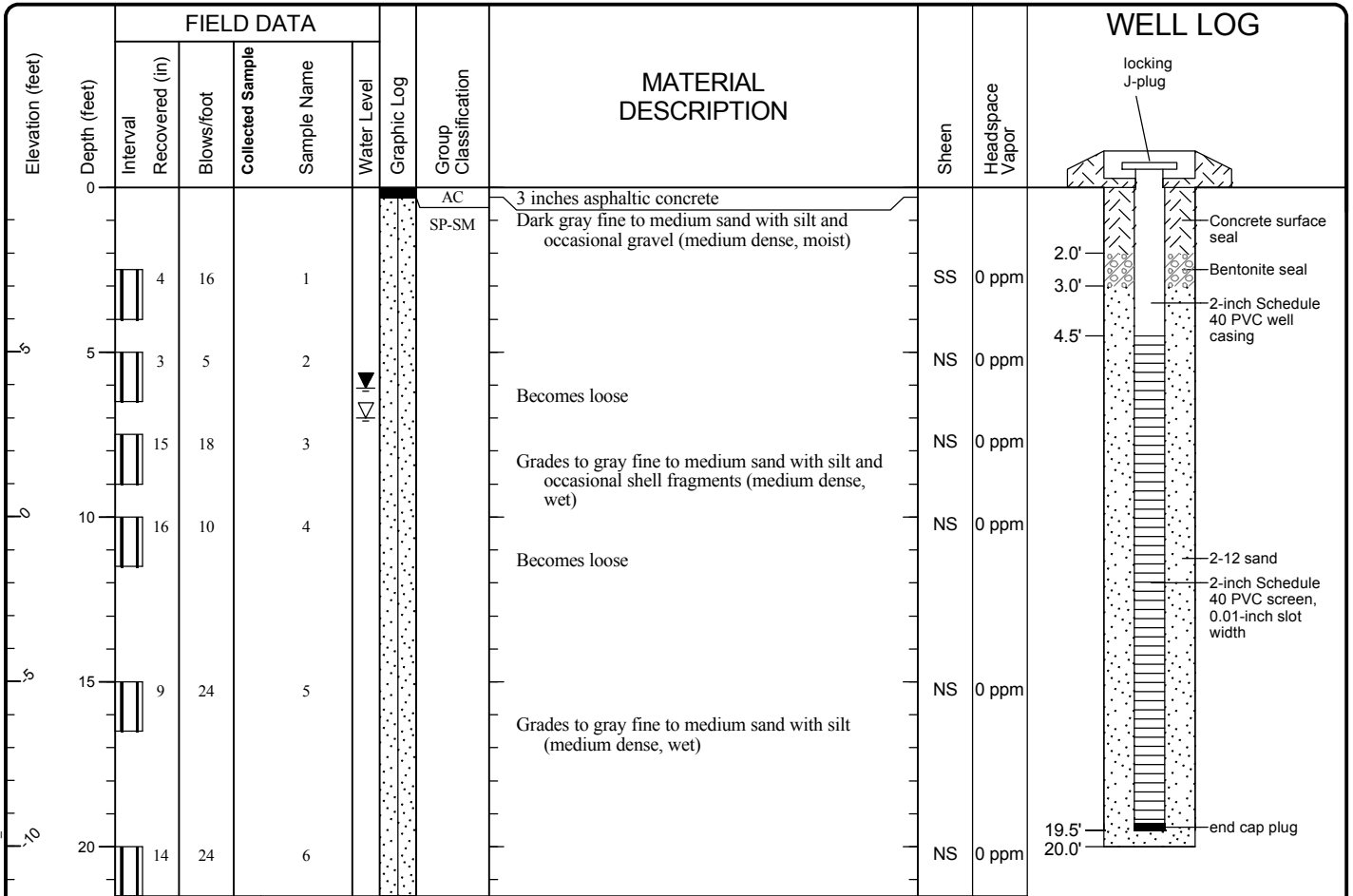


Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-10
 Sheet 1 of 1

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ DBTemplate\GEOENGINEERS.GDT\GEB_ENVIRONMENTAL_STANDARD

Start Drilled	11/2/2009	End	11/2/2009	Total Depth (ft)	21.5	Logged By	RNM	Checked By	RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger
Hammer Data	D&M Sampler 300 lb 30-inch Drop 9.99			Drilling Equipment		CME 75 Truck-mounted		A 2 (in) well was installed on 11/2/2009 to a depth of 19.5 (ft). Well was developed on 11/2/2009.					
Surface Elevation (ft)	Arbitrary BM; assigned elevation = 10 feet			Top of Casing Elevation (ft)		9.53		<u>Groundwater</u>		<u>Date Measured</u>		<u>Depth to Water (ft)</u>	<u>Elevation (ft)</u>
Easting (X)				Horizontal Datum				11/3/2009		5.64		3.89	
Notes:	Auger: 4¼ inch ID												



Note: See Figure A-1 for explanation of symbols

Log of Monitoring Well MW-5

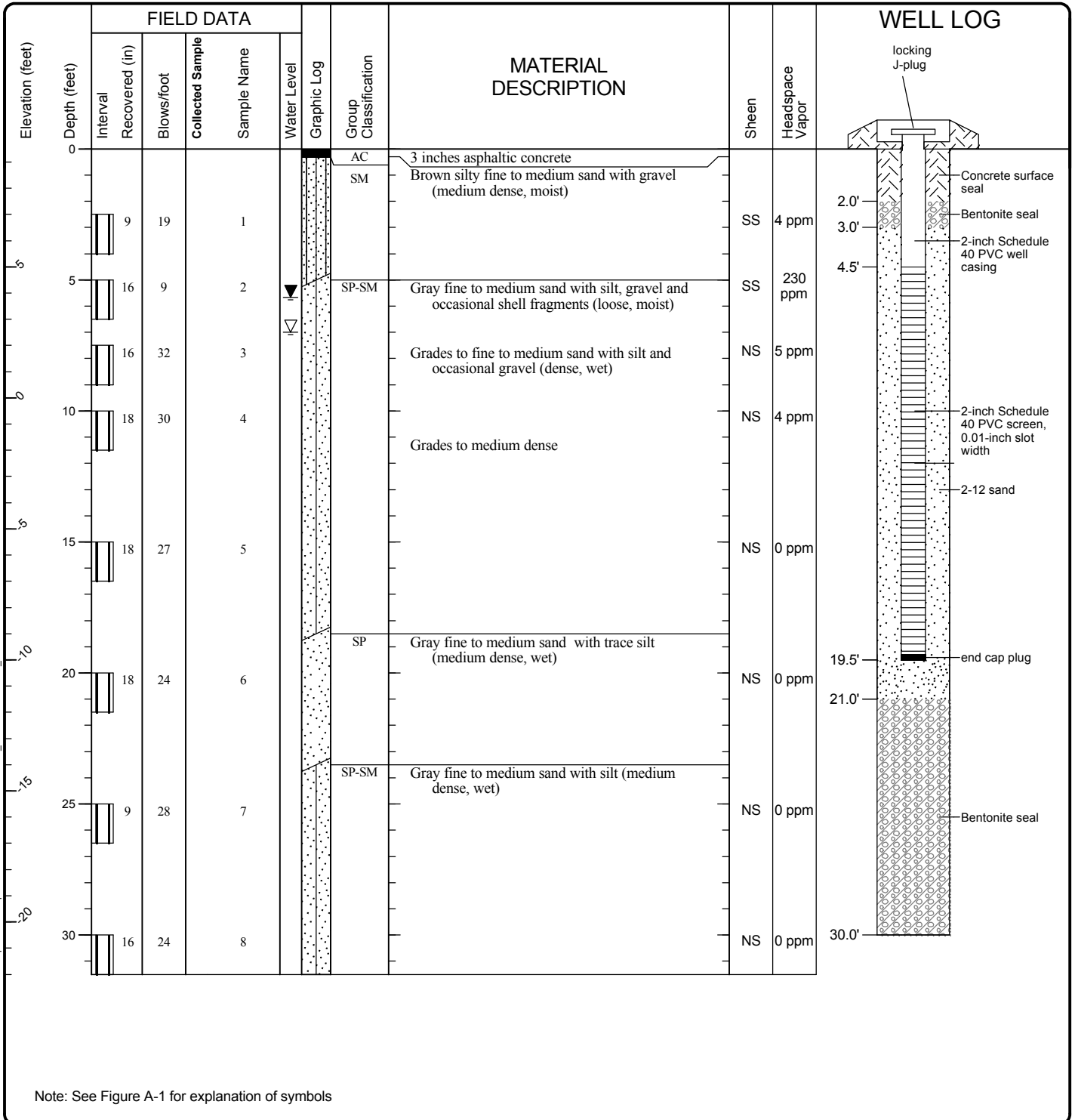


Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-11
 Sheet 1 of 1

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ_DBTemplate\libTemplate\GEOENGINEERS.GDT\GEB_ENVIRONMENTAL_WELL

Start Drilled	11/2/2009	End	11/2/2009	Total Depth (ft)	31.5	Logged By	RNM	Checked By	RCL	Driller	Cascade Drilling	Drilling Method	Hollow Stem Auger
Hammer Data	D&M Sampler 300 lb 30-inch Drop 9.50			Drilling Equipment	CME 75 Truck-mounted			A 2 (in) well was installed on 11/2/2009 to a depth of 19.5 (ft). Well was developed on 11/2/2009.					
Surface Elevation (ft)	Arbitrary BM; assigned elevation = 10 feet			Top of Casing Elevation (ft)	8.93			<u>Groundwater</u>		<u>Depth to Water (ft)</u>		<u>Elevation (ft)</u>	
Easting (X)				Horizontal Datum				11/3/2009		5.09		3.84	
Notes:	Auger: 4¼ inch ID												



Note: See Figure A-1 for explanation of symbols

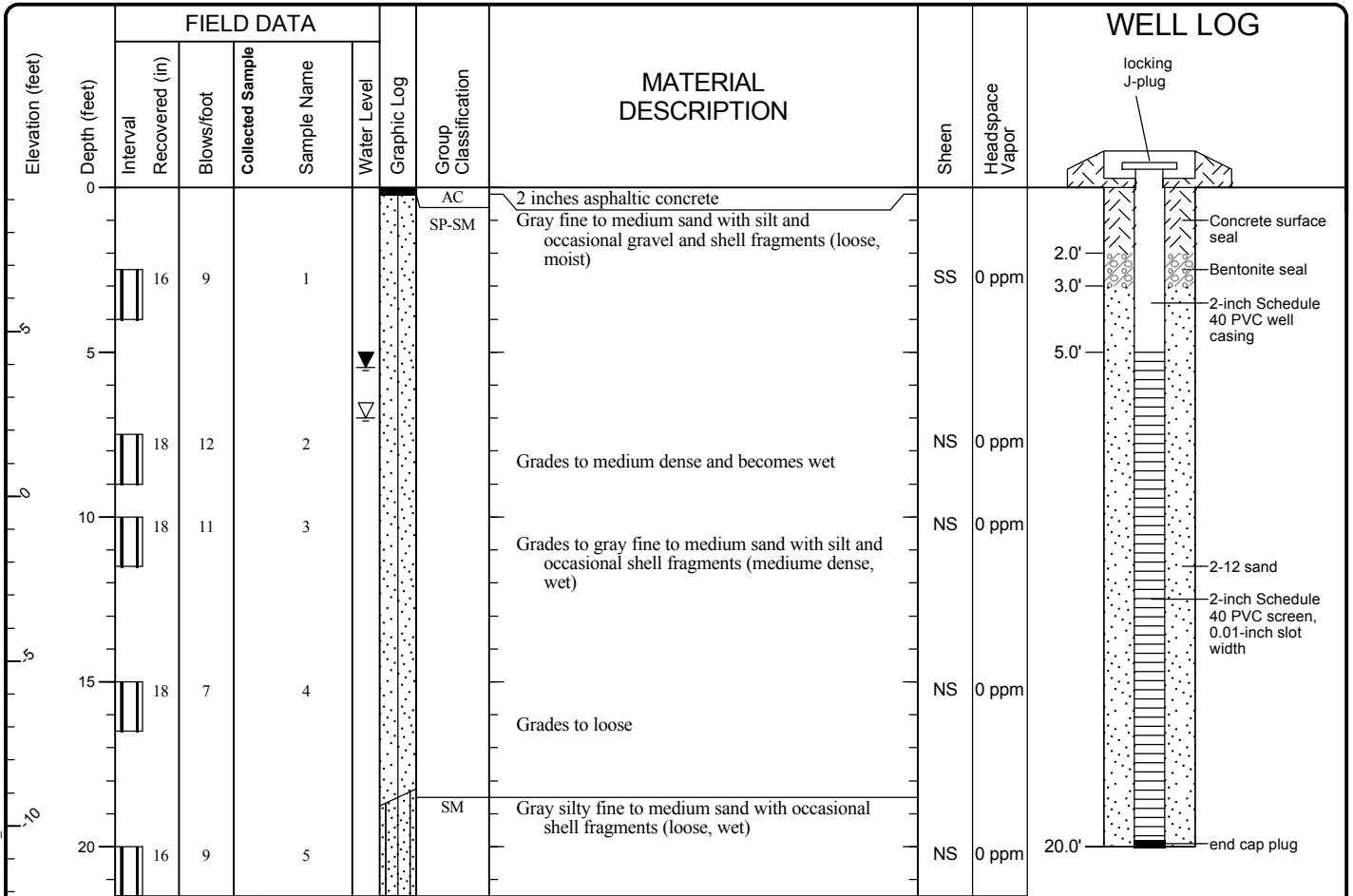
Log of Monitoring Well MW-7



Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ_DBTemplate\libTemplate\GEOENGINEERS.GDT\GEB_ENVIRONMENTAL_WELL

Start Drilled 11/2/2009	End 11/2/2009	Total Depth (ft) 21.5	Logged By Checked By RNM RCL	Driller Cascade Drilling	Drilling Method Hollow Stem Auger
Hammer Data	D&M Sampler 300 lb 30-inch Drop 9.37	Drilling Equipment CME 75 Truck-mounted		A 2 (in) well was installed on 11/2/2009 to a depth of 20 (ft). Well was developed on 11/2/2009.	
Surface Elevation (ft) Vertical Datum	Arbitrary BM; assigned elevation = 10 feet	Top of Casing Elevation (ft) 9.02		<u>Groundwater</u> Date Measured 11/3/2009	
Easting (X) Northing (Y)	Horizontal Datum		Depth to Water (ft) 5.11		Elevation (ft) 3.91
Notes: Auger: 4¼ inch ID					



Note: See Figure A-1 for explanation of symbols

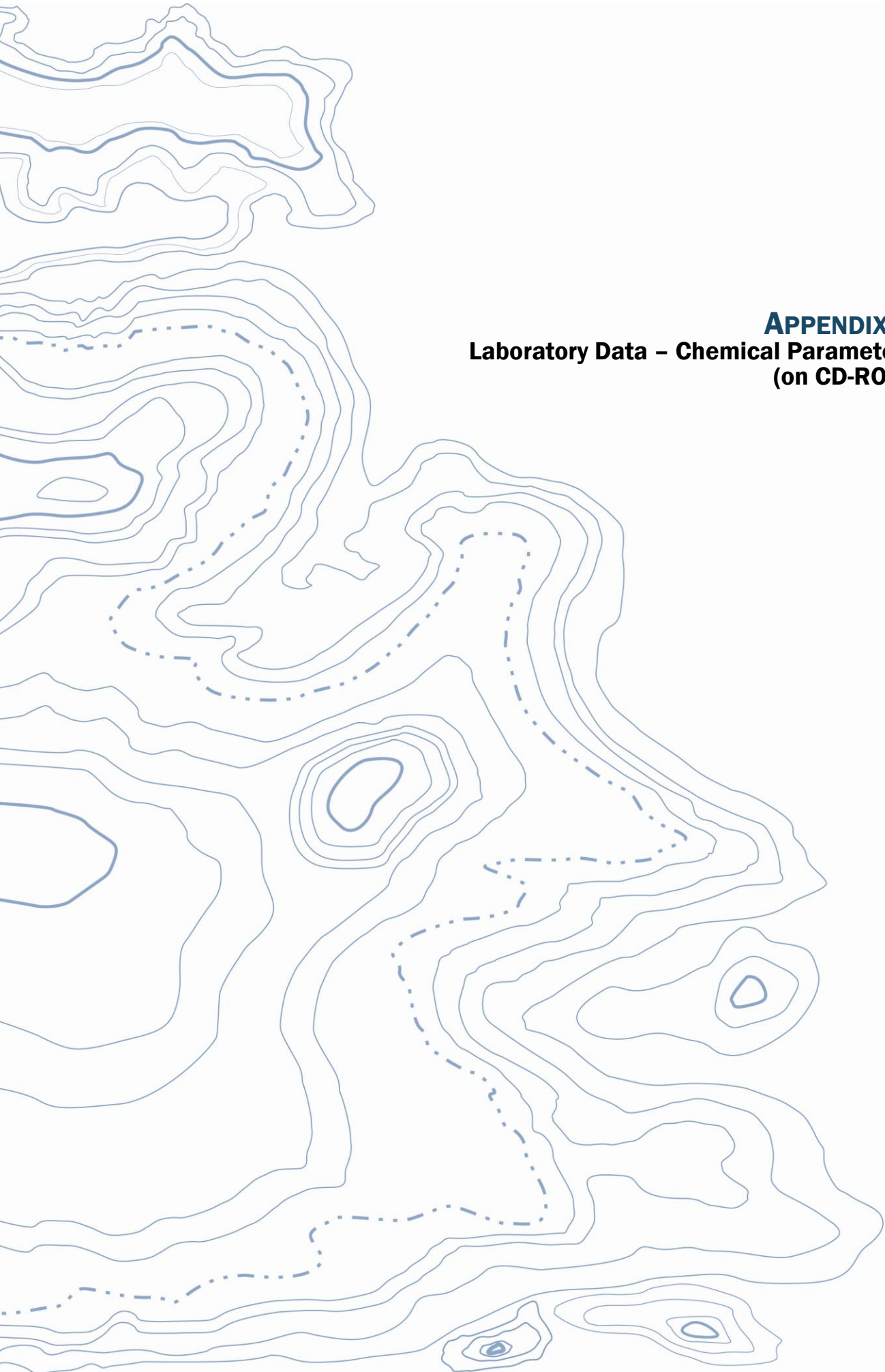
Log of Monitoring Well MW-8



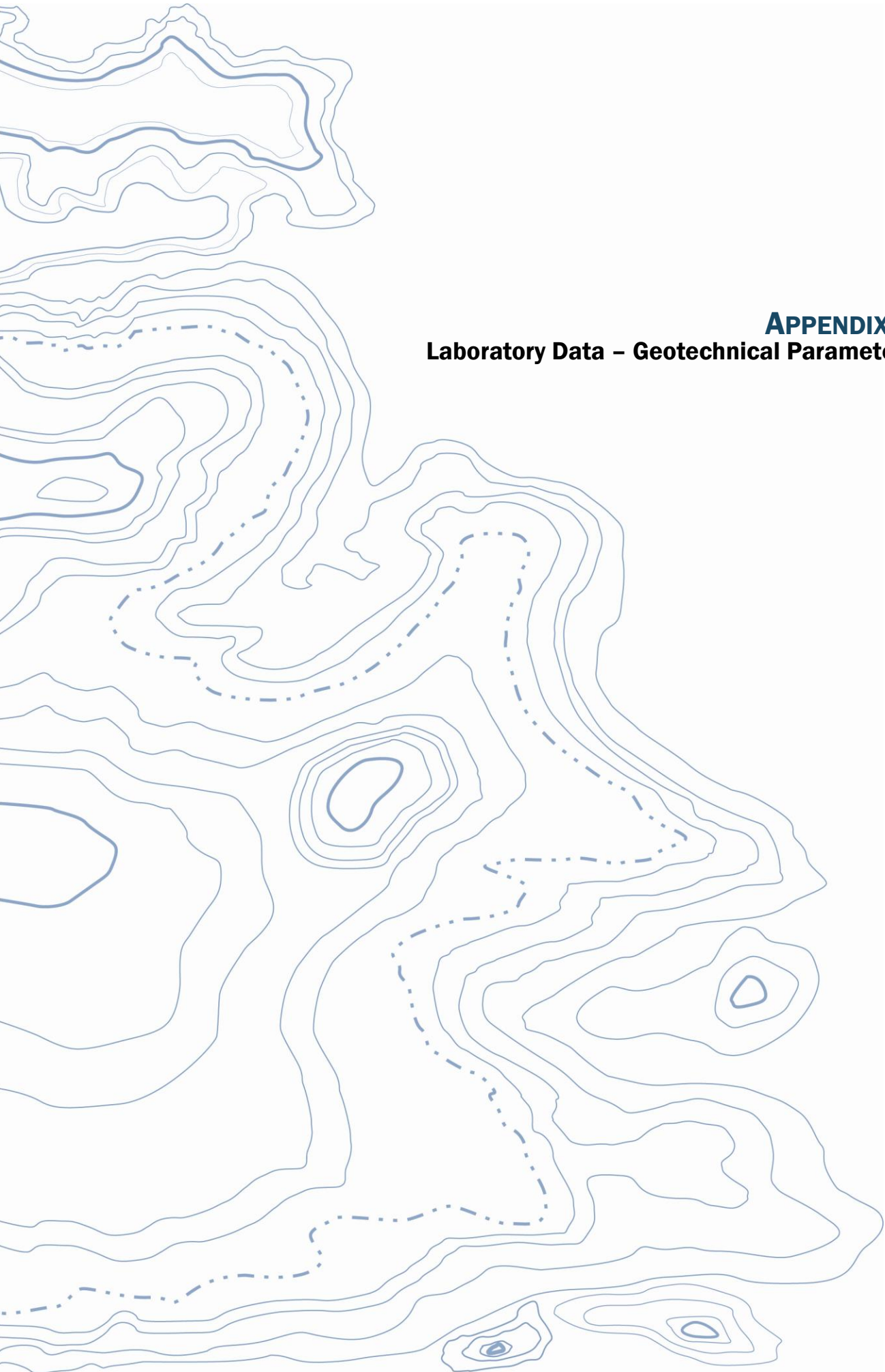
Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-13
 Sheet 1 of 1

Seattle: Date: 1/25/10 Path: P:\00186774\GINT\018677400.GPJ_DBTemplate\libTemplate\GEOENGINEERS.GDT\GEB_ENVIRONMENTAL_WELL



APPENDIX B
Laboratory Data – Chemical Parameters
(on CD-ROM)



APPENDIX C
Laboratory Data – Geotechnical Parameters

Moisture Density Determinations for Dames Moore
Ring samples with I.D. of 2.416"

Job Name: Columbia St MGP

Job Number: 0186-774-00

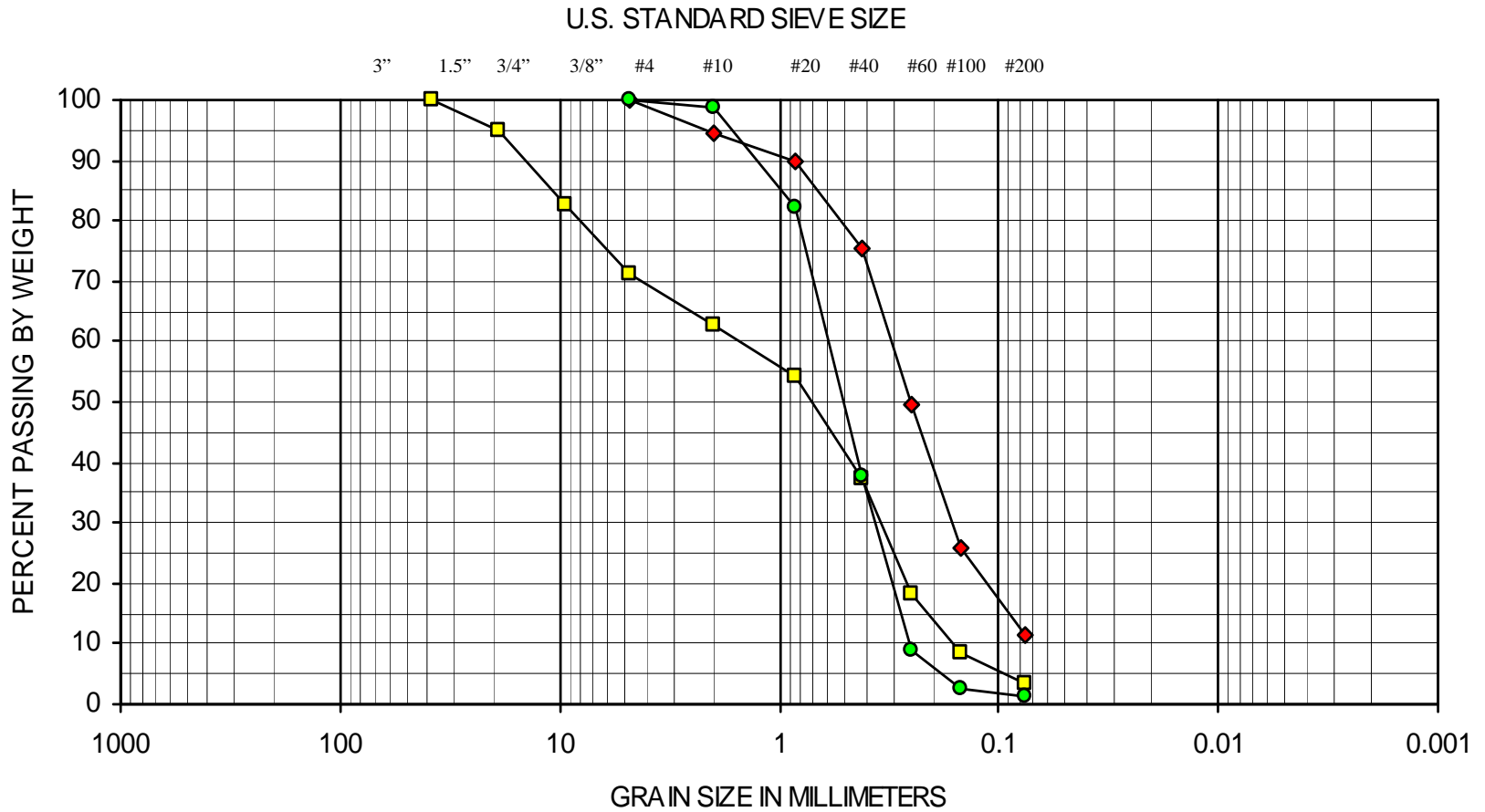
Tested by: MJP/AMD

Date: 11/24/2009

Boring number	MW-5	MW-5	MW-5	MW-7	MW-7	MW-7	SB-10	SB-10	SB-10
Sample number	3	4	6	2	4	6	3	4	5
Depth (ft)	8	10.5	20.5	5.5	10.5	20.5	10.5	15.5	20.5
Rings + Wet soil (g)	564.38	853.00	811.06	836.41	848.61	821.68	828.88	845.86	695.40
No. of Rings	3	4	4	4	4	4	4	4	3
Ring weight (g)	135.90	181.20	181.20	181.20	181.20	181.20	181.20	181.20	135.90
Wet Soil Weight (g)	428.48	671.80	629.86	655.21	667.41	640.48	647.68	664.66	559.50
Factor	0.2770	0.2078	0.2078	0.2078	0.2078	0.2078	0.2078	0.2078	0.2770
Wet Density (pcf)	118.7	139.6	130.9	136.1	138.7	133.1	134.6	138.1	155.0
Pan + Wet Soil (g)	428.48	671.80	629.86	655.21	667.41	640.48	647.68	664.66	559.50
Pan + Dry Soil (g)	332.29	571.69	533.36	552.41	592.17	529.63	538.90	560.92	504.00
Moisture Loss (g)	96.19	100.11	96.50	102.80	75.24	110.85	108.78	103.74	55.50
Pan Wt.(g)	8.43	8.40	8.23	8.26	8.42	8.48	8.29	8.39	8.33
Dry Soil Wt.(g)	323.86	563.29	525.13	544.15	583.75	521.15	530.61	552.53	495.67
Moisture Content (%)	29.7	17.8	18.4	18.9	12.9	21.3	20.5	18.8	11.2
Dry Density (pcf)	91.5	118.5	110.5	114.5	122.8	109.7	111.7	116.3	139.4



SIEVE ANALYSIS RESULTS
FIGURE C-1

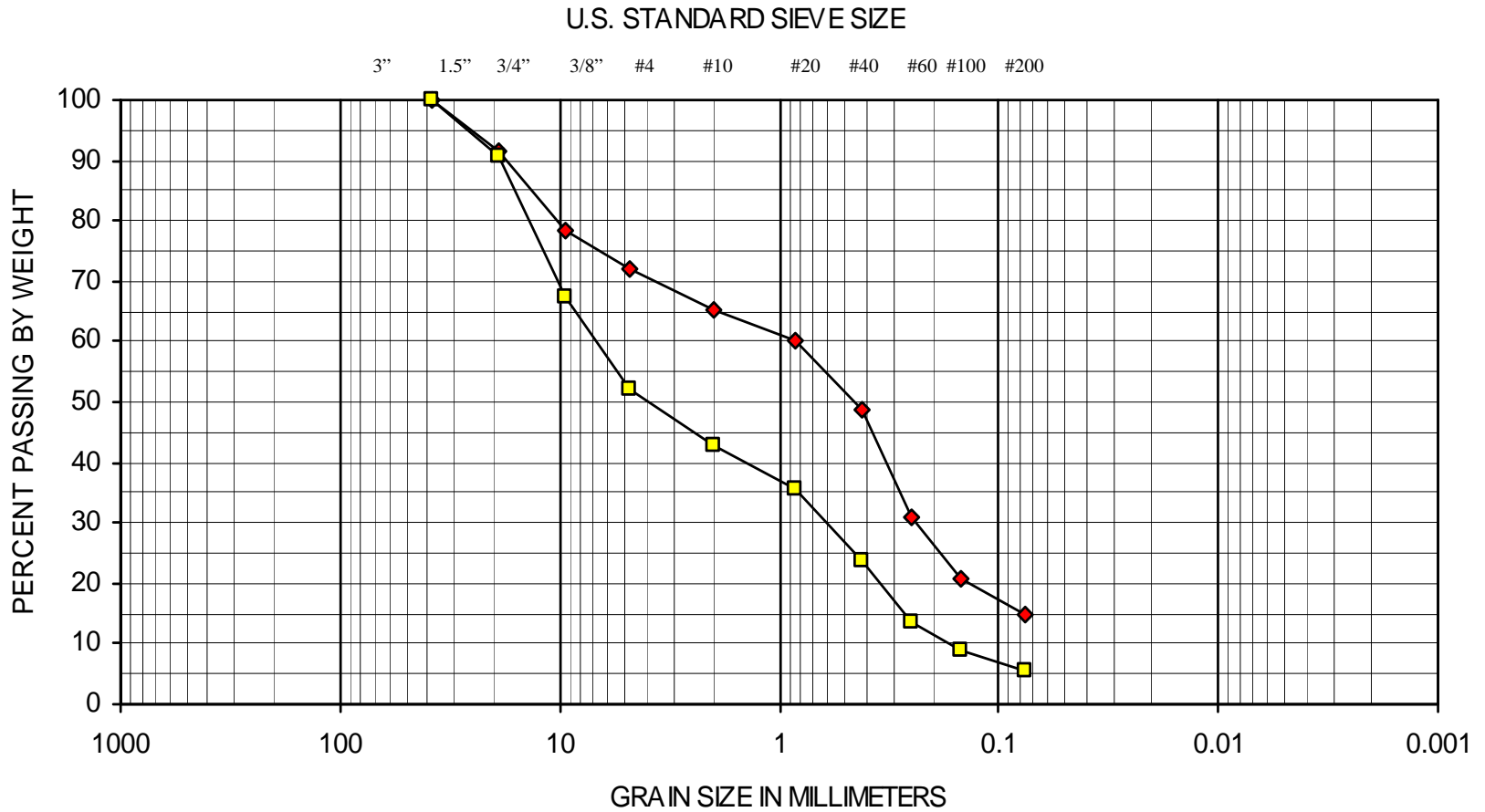


COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
◆	MW-5	8.0	Gray poorly graded sand with silt (SP-SM)
■	MW-7	5.5	Brown poorly graded sand with gravel (SP)
●	MW-7	20.5	Brown poorly graded sand (SP)



SIEVE ANALYSIS RESULTS
FIGURE C-2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
◆	SB-10	15.5	Brown silty sand with gravel (SM)
■	SB-10	20.5	Brown poorly graded gravel with silt and sand (GP-GM)

The background of the page is a topographic map. It features several sets of contour lines, some solid and some dashed, representing different elevations and terrain features. The lines are light blue and vary in thickness and style. A prominent dashed line winds through the map, possibly indicating a specific route or boundary. The map is positioned on the left side of the page, with the right side being mostly blank white space.

APPENDIX D
Terrestrial Ecological Evaluation Form



Voluntary Cleanup Program

Washington State Department of Ecology Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation. You still need to submit your evaluation as part of your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm.

Step 1: IDENTIFY HAZARDOUS WASTE SITE

Please identify below the hazardous waste site for which you are documenting an evaluation.

Facility/Site Name: Columbia Square Properties

Facility/Site Address: 320 Columbia Street NW, Olympia, WA

Facility/Site No: 91682829

VCP Project No.: SW0984

Step 2: IDENTIFY EVALUATOR

Please identify below the person who conducted the evaluation and their contact information.

Name: Rob Leet

Title: Sr. Environmental Geologist

Organization: GeoEngineers, Inc.

Mailing address: 600 Stewart Street, Suite 1700

City: Seattle

State: WA

Zip code: 98101

Phone: (206) 728-2674

Fax: (206) 728-2732

E-mail: rleet@geoengineers.com

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

- Yes *If you answered "YES," then answer **Question 2**.*
- No or Unknown *If you answered "NO" or "UNKNOWN," then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? Check all that apply. Then skip to **Step 4** of this form.

Point of Compliance: WAC 173-340-7491(1)(a)

- All soil contamination is, or will be,* at least 15 feet below the surface.
- All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

- All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

- There is less than 0.25 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.
- For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

- Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

[±] "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

[#] "Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 2** below.*
- No or Unknown *If you answered "NO" or "UNKNOWN," then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

- Yes *If you answered "YES," then answer **Question 3** below.*
- No *If you answered "NO," then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

- Yes *If you answered "YES," then answer **Question 4** below.*
- No *If you answered "NO," then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

- Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*
- Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? Check all that apply. Then skip to **Step 4** of this form.

Exposure Analysis: WAC 173-340-7492(2)(a)

- Area of soil contamination at the Site is not more than 350 square feet.
- Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

- No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.
- No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. See WAC 173-340-7493(1)(c).

1. Was there a problem? See WAC 173-340-7493(2).

- Yes *If you answered "YES," then answer **Question 2** below.*
- No *If you answered "NO," then identify the reason here and then skip to **Question 5** below:*
- No issues were identified during the problem formulation step.
 - While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? See WAC 173-340-7493(3).

- Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*
- Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use?

Check all that apply. See WAC 173-340-7493(3).

- Literature surveys.
- Soil bioassays.
- Wildlife exposure model.
- Biomarkers.
- Site-specific field studies.
- Weight of evidence.
- Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

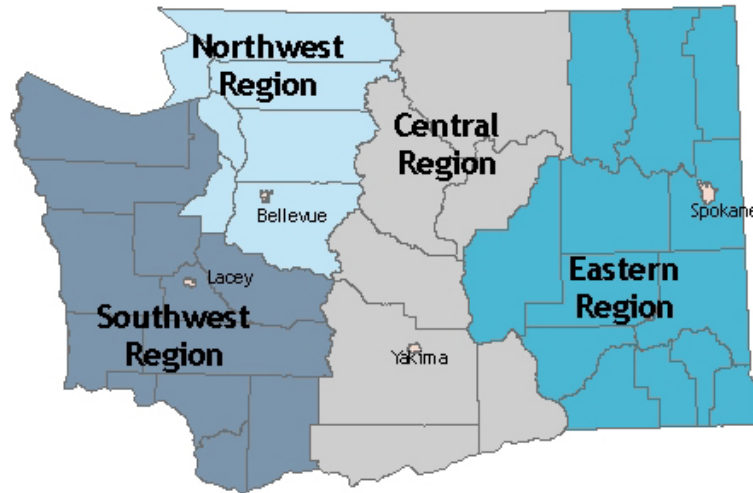
- Confirmed there was no problem.
- Confirmed there was a problem and established site-specific cleanup levels.

5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

- Yes If so, please identify the Ecology staff who approved those steps:
- No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



Northwest Region: Attn: Sara Nied 3190 160 th Ave. SE Bellevue, WA 98008-5452	Central Region: Attn: Mark Dunbar 15 W. Yakima Ave., Suite 200 Yakima, WA 98902
Southwest Region: Attn: Scott Rose P.O. Box 47775 Olympia, WA 98504-7775	Eastern Region: Attn: Patti Carter N. 4601 Monroe Spokane WA 99205-1295

If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

Map Revised: January 19, 2010




RCL:TCK

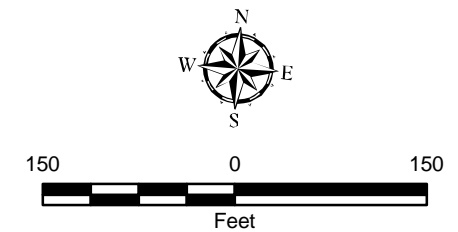
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Office:SEA



Explanation

-  1.26 Undeveloped Parcel within 500 feet of Subject Property and Total Acreage
-  Subject Property
-  500 foot Buffer from Subject Property



Undeveloped Parcels within 500 feet of Subject Property

Columbia Street MGP Property
Olympia, Washington



Figure D-1

Reference: Parcels obtained from Thurston County. Aerial photo (2009) obtained from Thurston County GeoData Center (<http://geomap1.geodata.org>).

Notes:

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



APPENDIX E
Report Limitations and Guidelines for Use

APPENDIX E REPORT LIMITATIONS AND GUIDELINES FOR USE¹

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

Read These Provisions Closely

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

Environmental Services Are Performed for Specific Purposes, Persons and Projects

This report has been prepared for use by Puget Sound Energy, their authorized agents, and regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment or remedial action study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except Puget Sound Energy should rely on this environmental report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

This Environmental Report Is Based on a Unique Set of Project-Specific Factors

This report applies to the Former Columbia Street MGP Property in Olympia, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

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

¹ Developed based on material provided by ASFE, Professional Firms Practicing in the GeoSciences, www.asfe.org.

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

Reliance Conditions for Third Parties

We have prepared this report for the exclusive use of Puget Sound Energy, their authorized agents, and regulatory agencies. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

Environmental Regulations Are Always Evolving

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Subsurface Conditions Can Change

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

Most Environmental Findings Are Professional Opinions

Our interpretations of subsurface conditions and remedial alternatives are based on field observations and chemical analytical data from the sampling locations at the site documented in this report. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. There is always a potential that areas of contamination exist in portions of the site that were not sampled or tested during this or previous studies. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions or related remedial costs.

Do Not Redraw the Exploration Logs

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

www.geoengineers.com

