

Data Summary Report

Former Olympia Manufactured Gas Plant Site
Olympia, Washington

for
Puget Sound Energy

October 25, 2011



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Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

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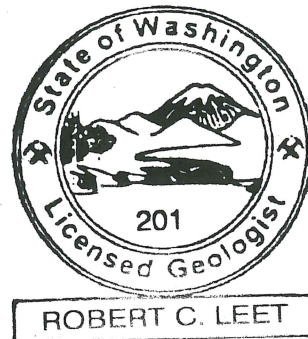
Prepared for:

Puget Sound Energy
PO Box 90868, PSE-11N
Bellevue, Washington 98009-0868

Attention: Greg Andrina

Prepared by:

GeoEngineers, Inc.
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674



Robert Leet

for

Jacob M. Letts, LG
Environmental Geologist

Robert Leet

Robert C. Leet, PhD, LG
Project Manager

Stephen C. Woodward

Stephen C. Woodward, LG
Principal

CEB:RCL:csv

cc: Eugene Radcliff/Washington State Department of Ecology (one hard copy by mail)

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1.0 INTRODUCTION

This report presents a summary of environmental investigations completed between September 2006 and April 2011 at the Former Olympia Manufactured Gas Plant (MGP) Property in Olympia, Washington (the “Property”). The Property is located at 320 Columbia Street NW in Olympia, Washington (Figure 1). Puget Sound Energy (PSE) is conducting remedial actions at the Property under the Washington State Department of Ecology (Ecology) Voluntary Cleanup Program (VCP), pursuant to the Model Toxics Control Act (MTCA) Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

The near-term goal of PSE’s remedial actions is to obtain a Property-Specific No Further Action opinion letter from Ecology to facilitate development of the Property. PSE’s longer-term goal is to obtain a No Further Action opinion letter for the broader MTCA “site,” which is defined in WAC 173-340 as “any area where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located.” According to this definition, the Olympia MGP Site (the “Site”) may include areas impacted by hazardous substances both within and outside the Property boundaries. The Site is designated “Columbia Square Properties,” with a site identification number of 91682829, in Ecology’s Facility/Site Database. The Ecology VCP project number is SW0984.

The scope and results of previous environmental investigations are presented in the following reports and technical memoranda: *Historical Review and Focused Baseline Environmental Assessment* (Environmental Partners, Inc., 2006); *Site Investigation Report* (GeoEngineers, 2008); *Supplemental Site Investigation Report* (GeoEngineers, 2010a); *Off-Property Investigation Report* (GeoEngineers, 2011a); and several groundwater monitoring technical memoranda prepared for groundwater monitoring events completed in 2010 and 2011 (GeoEngineers, 2010b, 2010c, 2011b). The objectives of this Data Summary Report are to: (1) consolidate and summarize the information presented in the separate documents referenced above in a single, comprehensive report, and (2) present the lines of evidence that suggest the elevated arsenic concentrations detected in groundwater on and off the Property are not related to the former MGP operations. The arsenic concentrations in groundwater are discussed in Section 4.2.2; the lines of evidence suggesting that the arsenic in groundwater is not related to the former MGP operations are discussed in Section 5.0.

The investigations completed to date have detected carcinogenic polycyclic aromatic hydrocarbons (cPAHs), benzene, gasoline- and lube oil-range petroleum hydrocarbons, lead, and mercury in soil at concentrations exceeding MTCA Method A cleanup levels. In addition, concentrations of cPAHs and arsenic exceeding MTCA Method A cleanup levels have been frequently detected in groundwater samples collected from one or more monitoring wells between 2008 and 2011. The nature and extent of contamination in soil and groundwater are discussed further in Section 4.0. Groundwater elevation data are provided in Table 1. Chemical analytical results for soil and groundwater samples collected between 2006 and 2011 are summarized in Tables 2 and 3.

2.0 SITE BACKGROUND

Historical research conducted by GeoEngineers and others indicates that the Olympia MGP was constructed in 1907 and 1908 by the Olympia Gas and Power Company, on a peninsula at the southern end of Budd Inlet that was created by dredging and filling operations. Figure 2 shows the approximate locations of the historical MGP structures and the Budd Inlet shoreline in 1908. The MGP was located immediately adjacent to Budd Inlet in 1908. The MGP converted oil into gas, which was distributed through underground gas mains to limited areas of Olympia for residential uses. The Olympia MGP was a primary source of Olympia's gas supply between approximately April 1908 and August 1910.

Historical newspaper articles indicate that beginning in August 1910, Olympia's primary gas supply was produced in Tacoma and delivered to Olympia via a newly constructed gas pipeline. The 1910 change in gas sources coincided with a change in status of the Olympia MGP from a primary gas supplier to a backup/standby facility. The Olympia MGP operated in this auxiliary capacity from 1910 until no later than 1923 or 1924, by which time historical records suggest that all gas production ceased at the Property.

The Property was used for the storage and distribution of Tacoma-produced gas from approximately 1924, or possibly as early as 1910, until the late 1940s. By 1934, the two original gas holders had been removed and a 50-foot diameter, aboveground Hortonsphere (spherical gas storage tank) was present in the northwestern portion of the Property. The only other surface structure present in 1934 was the original gas production building, which housed pressure regulators, gas meters, and other ancillary equipment used for monitoring and distributing the gas stored in the Hortonsphere.

Historical records suggest that the Hortonsphere and associated facilities may have been dismantled, and an office building/warehouse constructed on the Property, by the early 1950s. Washington Natural Gas owned the Property from the early 1950s until 1974, when the Property was sold to a private law firm (Bean & Gentry). The current owner is The Rants Group of Olympia.

A 1,000-gallon gasoline underground storage tank (UST) and a fuel dispenser were installed by Washington Natural Gas in 1965. Bean & Gentry removed the UST and fuel dispenser in 1990. The UST closure report submitted to Ecology in 1990 indicates that concentrations of total petroleum hydrocarbons (TPH) of 68 and 158 milligrams per kilogram (mg/kg), respectively, were detected in two soil samples obtained from the base and sidewalls of the UST excavation. A follow-up soil sample obtained from the base of the excavation, after allowing the excavation to aerate for a week, had a TPH concentration of 11 mg/kg.

3.0 ENVIRONMENTAL INVESTIGATION SUMMARY

Environmental investigations of the Property began in 2006 when Environmental Partners, Inc. (EPI) conducted an historical review and focused baseline environmental assessment in support of a potential property transfer. GeoEngineers conducted additional investigations and groundwater monitoring between 2008 and 2011 on behalf of PSE. The objective of these additional investigations was to evaluate the nature and extent of MGP-related contamination to the degree

necessary to develop a cleanup action plan (CAP) for the Property. PSE will use the results of the investigations completed to date (summarized in this report) to prepare and implement a CAP. The objective of the cleanup action will initially be to obtain a Property-Specific No Further Action opinion letter from Ecology.

Sections 3.1 through 3.5 summarize the scope of the previous investigations. The results of the investigations are summarized in Section 4.0.

3.1. HISTORICAL REVIEW AND FOCUSED BASELINE ENVIRONMENTAL ASSESSMENT (EPI, 2006)

EPI conducted an historical review and baseline environmental assessment of the Property in 2006. The purpose of this investigation was to evaluate historical information pertaining to past Property use and to assess soil and groundwater conditions in support of a potential property ownership transfer.

EPI reviewed the Property history to evaluate the potential for environmental contamination. EPI determined that an MGP began operating at the Property beginning in approximately 1908. In response to this finding, EPI conducted a focused baseline environmental assessment of the Property. The baseline assessment consisted of collecting soil and groundwater samples at several locations where MGP structures and equipment previously existed (e.g., the production building, gas holders, and purifiers).

Six soil borings (B-1 through B-6) were advanced to a depth of 12 feet below ground surface (bgs) using hollow-stem auger drilling methods. The boring locations are shown in Figures 3 and 4. Four soil samples and five groundwater samples were collected from the borings. The groundwater samples were obtained from temporary well screens placed in the boreholes; consequently, the analytical data for these groundwater samples are considered screening-level data only (as compared to analytical data for samples obtained from monitoring wells, which are considered more representative of groundwater conditions). In addition to the groundwater samples obtained from soil borings, two previously existing off-Property monitoring wells located in Columbia Street NW and Thurston Avenue NW (designated MW-NW and MW-N by EPI) were identified and sampled during the baseline assessment. (Note: these two wells were installed by others during a 1994 investigation of the property immediately north of the former MGP Property, and were originally designated MW-6 and MW-10. These original well designations were adopted during the later [2008-2011] investigations. The MW-6 and MW-10 designations are used in this report.)

The soil and groundwater samples were analyzed for polycyclic aromatic hydrocarbons (PAHs), volatile organic compounds, metals (arsenic, chromium, cadmium, lead, and mercury), and gasoline-, diesel-, and lube oil-range TPH.

Additional details of the field investigation and analytical procedures are presented in the report *Historical Review and Focused Baseline Environmental Assessment* (EPI, 2006). Results of the 2006 focused baseline environmental assessment are summarized in Section 4.0.

3.2. SITE INVESTIGATION (GEOENGINEERS, 2008)

GeoEngineers performed soil and groundwater sampling at the Property in August and October 2008. The primary objective of the investigation was to further assess the nature and extent of soil and groundwater contamination identified during the 2006 focused baseline environmental assessment.

The field investigation was conducted in two phases. During the first phase, seven test pits (TP-1 through TP-7) were excavated in the areas of the former MGP generator, wash boxes, scrubbers, purifiers, and gas holders (Figure 3). The objectives of the test pit explorations were to: (1) explore for possible relic structures or buried debris related to the former MGP facility; (2) observe and document soil and groundwater physical conditions; and (3) collect soil samples above the shallow groundwater table for chemical analysis. Test pit logs are contained in Appendix A. Thirteen soil samples were obtained from the test pits for chemical analysis. The test pits were backfilled with the original soil excavated from each test pit, supplemented as necessary by clean imported sand and gravel fill.

During the second phase of the field investigation, eight soil borings (MW-1 through MW-4 and SB-5 through SB-8; Figure 3) were advanced to various depths using hollow-stem auger drilling methods. The boring depths ranged from 20 to 50 feet bgs. Boring logs and well construction diagrams for the soil borings and monitoring wells completed by PSE are contained in Appendix A. The objective of the soil borings was to assess the potential presence of contamination in soil below the groundwater table. Saturated soil conditions were encountered at approximately 7 feet bgs during drilling.

The soil samples submitted for chemical analysis from the test pits and soil borings were obtained from locations and/or depths considered most likely to be contaminated based on field screening results. Field screening consisted of visual observation for discoloration/staining, water sheen screening, and headspace organic vapor screening using a photoionization detector (PID).

Four of the soil borings were completed as 2-inch diameter, polyvinyl chloride (PVC) groundwater monitoring wells (wells MW-1 through MW-4; Figures 3 and 4). Wells MW-1 and MW-2 were completed to a depth of 20 feet bgs and were screened across the groundwater table. Wells MW-3 and MW-4 were completed to depths of 44.5 feet bgs and 28.5 feet bgs, respectively, and were screened below the groundwater table. Monitoring well screened intervals are included in Table 1. After the four new wells were installed, the new wells and the two pre-existing off-Property wells immediately west and north of the Property (wells MW-6 and MW-10) were developed by surging and purging the well casings. Groundwater samples were collected from the six wells on August 26 and October 6, 2008 using low-flow purging and sampling techniques.

The soil and groundwater samples were analyzed for one or more of the following constituents based on the former MGP use of the Property and the results of the 2006 baseline environmental assessment: semivolatile organic compounds including PAHs; benzene, toluene, ethylbenzene, and xylenes (BTEX); metals (arsenic, chromium, copper, lead, and mercury); cyanide; and gasoline-, diesel-, and lube oil-range TPH.

Additional details of the field investigation and analytical procedures are presented in the *Site Investigation Report* (GeoEngineers, 2008). Results of the 2008 site investigation are summarized in Section 4.0.

3.3. SUPPLEMENTAL SITE INVESTIGATION (GEOENGINEERS, 2009)

GeoEngineers conducted a supplemental investigation at the Property between November 2 and November 4, 2009. The general objective of the supplemental investigation was to obtain the additional soil and groundwater data needed to develop a CAP for the Property. The specific objectives of the supplemental investigation were to:

- Characterize soil conditions in a previously inaccessible area in the northern portion of the Property that was formerly occupied by a one-story office building;
- Fill data gaps identified in Ecology's February 23, 2009 opinion letter (Ecology, 2009) summarizing Ecology's review of the 2008 Site Investigation Report (GeoEngineers, 2008); and
- Collect soil chemical and geotechnical data for preliminary cleanup action planning and remedial design.

Twelve soil borings (SB-9 through SB-17, MW-5, MW-7, and MW-8; Figure 3) were advanced to depths of 21.5 to 31.5 feet bgs using hollow-stem auger drilling methods. 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 UST excavation, and near the Property boundaries. Boring logs and well construction diagrams for the soil borings and monitoring wells completed by PSE are contained in Appendix A.

A total of 45 soil samples (including two duplicates) were submitted for chemical analysis. The soil samples were analyzed for one or more of the following constituents: cPAHs, BTEX, metals (arsenic, lead, and mercury), gasoline-range TPH, diesel-range TPH, and lube oil-range TPH. Nine additional soil samples obtained from three borings (SB-10, MW-5, and MW-7) along the southern and eastern Property boundaries were submitted for geotechnical testing (moisture, density, and/or sieve analysis) to support the design of an excavation shoring system, should shoring be required during future cleanup actions.

Three of the soil borings (MW-5, MW-7, and MW-8; Figures 3 and 4) were completed as 2-inch diameter, PVC groundwater monitoring wells. The wells were installed to a depth of approximately 20 feet bgs and screened across the groundwater table. Monitoring well screened intervals are included in Table 1. Following development of the new wells, groundwater samples were collected from the three new 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. The groundwater samples were analyzed for cPAHs, BTEX, 1,2-dibromoethane (EDB), 1,2-dichloroethane (EDC), methyl tertiary butyl ether (MTBE), metals (total arsenic, chromium, lead, and mercury), gasoline-range TPH, diesel-range TPH, and/or lube oil-range TPH.

Additional details of the field investigation and analytical procedures are presented in the *Supplemental Site Investigation Report* (GeoEngineers, 2010a). Results of the 2009 supplemental site investigation are summarized in Section 4.0.

3.4. OFF-PROPERTY INVESTIGATION (GEOENGINEERS, 2010-2011)

GeoEngineers conducted an off-Property investigation between November 2010 and January 2011. The objectives of the off-Property investigation were to:

- Assess soil and groundwater conditions outside the Property boundaries for potential MGP-related contamination; and
- Evaluate whether the elevated arsenic concentrations detected in groundwater during previous investigations may have migrated under the Property from an unknown, off-Property source.

Ten soil borings (SB-18 through SB-22, MW-00D, MW-12S, MW-12D, MW-13S, and MW-13D; Figures 3 and 4) were advanced to depths ranging from 10.5 feet to 31.5 feet bgs at off-Property locations using hollow-stem auger drilling methods. Boring logs and well construction diagrams for the soil borings and monitoring wells completed by PSE are contained in Appendix A. A total of 26 soil samples were submitted for chemical analysis. The soil samples were analyzed for one or more of the following constituents: cPAHs, BTEX, arsenic, lead, mercury, and diesel- and lube oil-range TPH.

Five borings were completed as 2-inch diameter, PVC groundwater monitoring wells, as follows:

- Well MW-00D was installed next to pre-existing well MW-00S (Figure 4), and was completed to a total depth of approximately 31 feet bgs. Monitoring well MW-00S was previously installed by an unknown party and is approximately 12 feet deep.
- Wells MW-12S and MW-12D were installed in an alley approximately 190 feet east of the Property (Figure 4). These wells were completed to total depths of approximately 20 feet and 30 feet bgs, respectively.
- Wells MW-13S and MW-13D were installed approximately 140 feet south of the Property, in the sidewalk and curb lane of Olympia Avenue NW (Figure 4). These wells were completed to total depths of approximately 20 feet and 31 feet bgs, respectively.

The monitoring wells were screened at different depth intervals because previous investigations indicated that arsenic concentrations were generally greater in deeper portions of the saturated zone; the different well depths provided further opportunity to explore these findings. The monitoring wells installed during the off-Property investigation and prior investigations are considered “shallow” or “deep” based on the depth of the well screens. The tops of the shallow well screens are generally positioned at a depth of approximately 5 feet bgs. With one exception, the tops of the deep well screens are generally positioned at a depth of approximately 25 feet bgs. The exception is well MW-3, near the middle of the Property; this is the deepest well, and is screened from approximately 40 to 45 feet bgs. Monitoring well screened intervals are included in Table 1.

GeoEngineers developed the five new off-Property monitoring wells, and then sampled all on- and off-Property monitoring wells on January 6 and 7, 2011 using low-flow purging and sampling techniques. The groundwater samples obtained from the new off-Property wells were analyzed for arsenic. The groundwater samples obtained from the other wells were analyzed for arsenic and

one or more of the following constituents: cPAHs, chromium, lead, mercury, and diesel- and lube oil-range TPH.

Additional details of the field investigation and analytical procedures are presented in the *Off-Property Investigation Report* (GeoEngineers, 2011a). Results of the 2011 off-Property investigation are summarized in Section 4.0.

3.5. GROUNDWATER MONITORING (GEOENGINEERS, 2008-2011)

Groundwater monitoring has been conducted since August 2008, utilizing the on- and off-Property wells installed during the 2008-2011 investigations and three wells previously installed by others (wells MW-00S, MW-6, and MW-10). A total of seven monitoring events were conducted between August 2008 and April 2011. Four of these events (August and October, 2008; November 2009; and January 2011) were performed in conjunction with the on- and off-Property investigations summarized in Sections 3.2 through 3.4; the other three monitoring events were conducted in February 2010, May 2010, and April 2011. Groundwater elevation data and screened intervals for the monitoring wells are presented in Table 1. Boring logs and well construction diagrams for the soil borings and monitoring wells completed by PSE are contained in Appendix A. Results of the groundwater monitoring are summarized in Section 4.0.

4.0 INVESTIGATION RESULTS

The results of the environmental investigations conducted between 2006 and 2011 are presented in this section, including the observed soil and groundwater physical conditions and a discussion of the chemical analytical results for soil and groundwater samples.

4.1. SOIL AND GROUNDWATER PHYSICAL CONDITIONS

Subsurface soils at the Property consist primarily of fill generated from the dredging of Budd Inlet in the late 1800s and early 1900s. The soils encountered in test pits and borings were generally homogenous both laterally and vertically, to the maximum exploration depth of 50 feet bgs (boring SB-7). The observed soils consist of gray to brown, fine to medium sand with varying amounts of silt, gravel, and shell fragments. Limited lithologic variation was observed beneath the Property, suggesting that the shallow saturated zone behaves as a single unconfined groundwater-bearing unit to the maximum depth explored. The thickness of the dredge fill unit is unknown – a distinct lithologic contact between the fill and underlying native deposits was not identified during any of the subsurface investigations.

Sieve analyses performed on two soil samples collected from 5.5 and 8 feet bgs along the eastern Property boundary (borings MW-5 and MW-7) during the 2009 supplemental site investigation indicate that shallow subsurface soils consist of poorly graded sand with silt or poorly graded sand with gravel (Unified Soil Classification System [USCS] Types SP-SM and SP, respectively). A soil sample obtained from 20.5 feet bgs in boring MW-7, near the center of the eastern Property boundary, was found to consist of poorly graded sand (USCS Type SP). Sieve analysis of a soil sample obtained from 15.5 feet bgs along the southern Property boundary (boring SB-10) classified this sample as silty sand with gravel (USCS Type SM). A sample obtained from 20.5 feet

bgs in boring SB-10 was found to consist of poorly graded gravel with silt and sand (USCS Type GP-GM).

Groundwater elevation data for the monitoring wells are presented in Table 1. Groundwater was generally encountered at depths of 4.5 to 7 feet bgs during the on- and off-Property investigations. The groundwater elevation data indicate that the shallow groundwater table in the vicinity of the Property is relatively flat; that is, horizontal hydraulic gradients measured between shallow wells are small (on the order of 0.0003 to 0.002). Horizontal gradients measured between deep wells are also small (on the order of 0.0003 to 0.0007). As expected for a relatively flat groundwater table, gradient directions vary both spatially and temporally, likely a reflection of the sensitivity of the gradient to temporary/localized hydraulic perturbations such as stormwater infiltration. The observed low hydraulic gradients and variable gradient directions suggest that there is no dominant groundwater migration direction beneath the Property.

Groundwater elevations measured in January and April 2011 at the four shallow/deep well pairs (MW-00S/MW-00D, MW-2/MW-3, MW-12S/MW-12D, and MW-13S/MW-13D) indicate that vertical hydraulic gradients are very low. In January 2011, there was a slight upward gradient (0.02 feet head difference) at well pair MW-00S/MW-00D and a slight downward gradient (0.05 to 0.08 feet head difference) at well pairs MW-12S/MW-12D and MW-13S/MW-13D. There was no measureable vertical gradient at well pair MW-2/MW-3 in January 2011. In April 2011, there was a slight upward gradient at well pairs MW-00S/MW-00D and MW-12S/MW-12D, and a slight downward gradient at well pairs MW-2/MW-3 and MW-13S/MW-13D.

4.2. CHEMICAL ANALYTICAL RESULTS

The chemical analytical results for the soil and groundwater samples collected from 2006 through April 2011 are summarized in Tables 2 and 3, respectively. The MTCA Method A cleanup levels for soil (WAC 173-340-740[2]) and groundwater (173-340-720[3]) are presented in these tables for comparison to the chemical analytical results. Results for constituents with at least one positive detection exceeding MTCA Method A cleanup levels for soil or groundwater are presented in Figures 3 and 4, respectively. Laboratory analytical reports are contained in the original investigation reports (see Section 8.0 for a list of references).

4.2.1. Soil Chemical Analytical Results

Two soil samples collected during the 2006 baseline environmental assessment contained cPAHs at concentrations greater than the MTCA Method A cleanup level. The samples were obtained from a depth of 4 feet bgs in borings B-3 and B-5, and had total cPAH concentrations of 7.4 mg/kg and 120 mg/kg, respectively (Table 2, Figure 3). No other constituents were detected at concentrations greater than MTCA Method A cleanup levels in soil during the 2006 baseline assessment.

During the 2008 site investigation, cPAHs were detected in several soil samples at concentrations exceeding the MTCA Method A cleanup level. With one exception, the cPAH exceedances were detected in samples obtained from depths of 7 feet bgs or less. The exception was a sample obtained from 18 feet bgs in boring SB-7 (Figure 3); the total cPAH concentration in this sample

(0.15 mg/kg) slightly exceeded the MTCA Method A cleanup level of 0.1 mg/kg. The highest cPAH concentrations detected during the 2008 investigation were reported in the soil sample obtained from 4 feet bgs in test pit TP-7, in the southeastern corner of the property (Table 2, Figure 3). This sample had a total cPAH concentration of 120 mg/kg, which was the same concentration detected in soil at approximately the same location and depth in 2006 (boring B-5; Figure 3). The sample obtained from 4 feet bgs in test pit TP-7 also had the highest concentrations of lead and lube oil-range TPH of any soil sample collected to date at the Property (Figure 3).

During the 2009 supplemental site investigation, cPAHs were the constituents detected most frequently above cleanup levels in soil. With one exception, the cPAH exceedances were detected in samples obtained from depths of 10.5 feet bgs or less. The exception was a sample obtained from 20.5 feet bgs in boring MW-5, which had a total cPAH concentration of 0.13 mg/kg (Figure 3).

Fifty-eight (58) soil samples collected at on-Property locations during the 2008 and 2009 investigations were analyzed for arsenic (in addition to other constituents). Arsenic was detected in only four primary soil samples and one duplicate sample, and none of the detected concentrations exceeded the MTCA Method A cleanup level of 20 mg/kg (Table 2). Arsenic was not detected in 32 of the soil samples collected during the 2009 investigation. The analytical method reporting limits (MRLs) for arsenic in these samples ranged from 5.2 to 7.1 mg/kg; accordingly, these results indicate that arsenic concentrations in Property soils are generally below the statewide 90th percentile natural background value of 7 mg/kg (Ecology, 1994).

During the 2010-2011 off-Property investigation, cPAHs and/or benzene were detected in soil at concentrations exceeding the MTCA Method A cleanup level at two off-Property boring locations: SB-19 and SB-20 (Figure 3). These exceedances are discussed further below. No other constituents were detected in off-Property soil at concentrations exceeding MTCA Method A cleanup levels. Furthermore, with one exception, arsenic was not detected above MRLs ranging from 5.3 to 6.6 mg/kg in any of the 26 off-Property soil samples analyzed for arsenic. The exception was a sample obtained from 25.5 feet bgs in boring SB-21 (sample SB-21-25.5), which had an arsenic concentration of 10 mg/kg. This arsenic concentration is less than the MTCA Method A cleanup level of 20 mg/kg, and falls within the range of natural background concentrations for arsenic reported throughout Washington state (Ecology, 1994).

A soil sample obtained from 2.5 feet bgs in off-Property boring SB-19 (in Thurston Avenue NW; Figure 3) had a total cPAH concentration of 3.4 mg/kg, which exceeds the MTCA Method A cleanup level of 0.1 mg/kg. The total cPAH concentration detected in this sample is similar to the concentration detected in soil at a depth of 3 feet bgs in nearby on-Property boring SB-12 (2.6 mg/kg). cPAHs were not detected in soil samples obtained from 8, 10.5, and 15.5 feet bgs in boring SB-19 (Table 2), or in samples obtained from depths greater than 3 feet bgs in boring SB-12.

At off-Property boring location SB-20 (in the alley south of the Property; Figure 3), cPAH concentrations in soil samples obtained from 2.5 feet, 8 feet, and 10.5 feet bgs exceeded the MTCA Method A cleanup level. The highest total cPAH concentration (4.8 mg/kg) was detected in the sample obtained from 2.5 feet bgs. The cPAH concentrations detected in boring SB-20 were significantly less than the highest cPAH concentrations detected in shallow soil in the southeastern corner of the Property (120 mg/kg at locations B-5 and TP-7; Figure 3). cPAHs either were not

detected or were detected at concentrations less than the MTCA Method A cleanup level in deeper samples obtained from SB-20, and in all soil samples obtained from borings SB-21 and SB-22 located farther west in the alley (Table 2, Figure 3).

The soil sample obtained from 10.5 feet bgs in off-Property boring SB-20 contained benzene at a concentration exceeding the MTCA Method A cleanup level of 0.03 mg/kg. Benzene was not detected in the two shallower samples (2.5 and 8 feet bgs) obtained from boring SB-20. Soil samples obtained from deeper than 10.5 feet bgs in boring SB-20 were not analyzed for benzene.

Several constituents besides cPAHs have been detected above MTCA Method A cleanup levels in on-Property soil, including gasoline- and lube oil-range TPH, benzene, lead, and mercury. The only non-cPAH constituent that has been detected above MTCA Method A cleanup levels in off-Property soil is benzene, which was detected at a depth of 10.5 feet bgs in boring SB-20. As shown in Table 2 and Figure 3, these non-cPAH constituents exceeded cleanup levels less frequently than cPAHs, and the exceedances were generally collocated with cPAH exceedances.

4.2.2. Groundwater Chemical Analytical Results

Cumulative groundwater chemical analytical results are presented in Table 3. Figure 4 shows the groundwater analytical results for constituents that have been detected above MTCA Method A cleanup levels in groundwater. For each well shown in Figure 4, only the results for constituents that have been detected above cleanup levels in that well are posted. An overview of groundwater analytical results is presented below; details regarding the results of individual groundwater sampling events are presented in previous reports and technical memoranda.

As shown in Figure 4, arsenic is the predominant constituent that has been detected above MTCA Method A cleanup levels in groundwater. Arsenic was detected above the Method A cleanup level of 5 micrograms per liter (ug/L) in all of the groundwater samples collected in 2006 from soil borings B-2 through B-6, and in at least one groundwater sample obtained from each monitoring well except MW-8. The highest reported arsenic concentration (340 ug/L) was detected in an unfiltered groundwater sample obtained from off-Property well MW-13D in January 2011 (Figure 4).

In addition to arsenic, cPAHs have been detected above the MTCA Method A cleanup level of 0.1 ug/L in groundwater samples obtained from well MW-7 and soil borings B-3, B-4, and B-5. As noted previously, the analytical data for the groundwater samples obtained in 2006 from soil borings B-2 through B-6 are considered screening-level data only. Although lead and chromium were detected slightly above MTCA Method A cleanup levels in groundwater samples obtained from wells MW-3 and MW-4 in August 2008 (Table 3 and Figure 4), these metals were not detected above cleanup levels in subsequent samples obtained from these wells.

The cPAH exceedances detected in groundwater at locations B-3, B-5, and MW-7 correlate with cPAH exceedances in soil at these locations (a soil sample was not obtained from boring B-4). Consequently, the cPAH detections in groundwater may be related to the former MGP operations. Because of their low aqueous solubility, cPAH compounds do not readily partition into groundwater or migrate significant distances in the dissolved phase, suggesting that the minor cPAH exceedances detected in groundwater likely derive from local soils in the immediate vicinity of the

groundwater detections. This conceptual model is supported by the observed correlation between cPAH detections in soil and groundwater.

The arsenic exceedances detected in groundwater do not correlate with arsenic exceedances in soil. In fact, arsenic was not detected in the majority of the 83 soil samples analyzed for arsenic, and the arsenic concentrations reported in the six samples with positive detections were less than the MTCA Method A cleanup level. This suggests that the elevated arsenic concentrations detected in groundwater are not related to the former MGP. Additional lines of evidence supporting this conclusion are discussed in Section 5.0.

5.0 DISCUSSION OF ARSENIC IN GROUNDWATER

As discussed in Section 4.2.2 and shown in Figure 4, arsenic is the primary constituent that has been consistently detected above MTCA Method A cleanup levels in groundwater at multiple monitoring well locations. Elevated arsenic concentrations have been detected in both on- and off-Property monitoring wells. Several lines of evidence suggest that the arsenic concentrations detected in groundwater beneath and near the Property are not related to historical MGP operations. The evidence, which includes historical information about plant operations as well as subsurface investigation data, is presented below.

1. There are no known potential sources of arsenic at the Property.

- The Olympia MGP was a primary gas supplier to Olympia for two years (1908-1910). It served as an emergency backup plant from 1910 until no later than 1923 or 1924. The gas was produced entirely from oil, not coal (see excerpts from Brown's Directory of American Gas Companies in Appendix B). Arsenic-containing wastes were not a byproduct of the oil gas process. Even at facilities that produced gas from coal (which can contain arsenic), arsenic is typically not a driver for cleanups at these MGP sites.
- Some MGPs used the Thylox process (sodium thioarsenate) to scrub hydrogen sulfide from gas. However, this process was not developed until the 1920s or later (i.e., 10 or more years after routine gas production ceased at the Olympia MGP).

2. Extensive sampling and chemical analyses indicate that arsenic concentrations in soil beneath the Property are consistent with natural background concentrations in Washington state, supporting the conclusion that the former MGP facility did not produce arsenic-containing wastes.

- Eighty-three (83) soil samples were analyzed for arsenic. Seventy-seven (77) of the samples had no detectable arsenic; the detected concentrations in the other six samples were less than the MTCA Method A cleanup level of 20 mg/kg (Table 4). The soil samples were collected throughout the vadose and saturated zones (2 to 40 feet bgs; Figure 5, Tables 4 and 5).
- Sixty-two (62) of the analyzed soil samples had MRLs less than or equal to the Washington State 90th percentile natural background value (7 mg/kg); 21 samples had MRLs ranging from 11 to 14 mg/kg (Tables 4 and 5).

3. The existing groundwater analytical data suggest that arsenic occurrence in groundwater is related to geochemical conditions in the saturated zone.
 - The highest arsenic concentrations, and the lowest reduction-oxidation potential (redox) values (negative values indicative of reducing conditions), have generally been detected in monitoring wells screened in the deeper portion of the saturated zone (approximately 24 to 45 feet bgs; Figures 6 through 11). This suggests that reducing conditions exist deeper in the saturated zone, and that these reducing conditions may be the cause of the elevated arsenic concentrations.
4. The highest arsenic concentration detected to date in groundwater (340 ug/L; January 2011) was detected in off-Property monitoring well MW-13D.
 - Well MW-13D is 140 feet south of the former MGP Property. If the arsenic source were located on the former MGP Property, the highest arsenic concentration in groundwater would be expected to occur beneath the Property, not off the Property.
5. The arsenic detections in groundwater have a much broader footprint than the MGP-related constituents that have been detected in soil and groundwater.
 - The detections of potential MGP-related constituents (e.g., cPAHs, TPH, benzene) in soil and/or groundwater are much more limited in lateral extent than the arsenic detections in groundwater.
6. Elevated arsenic concentrations have been reported in groundwater at other locations in downtown Olympia, suggesting that area background concentrations of arsenic may be elevated throughout much of the downtown Olympia area.
 - An online search of Ecology's Environmental Information Management (EIM) database (accessed April 2010) revealed that arsenic was detected at concentrations of 16 ug/L and 140 ug/L in 2007 in two monitoring wells at the LOTT Wastewater Treatment Plant site, approximately 0.3 miles east-northeast of the former MGP Property. Additionally, dissolved arsenic concentrations ranging from 5 ug/L to 62 ug/L were detected in 2008 in 15 monitoring wells at the Former WSDOT Testing Laboratory site (also known as the Former Washington State Vacant Property site and the 318 State Avenue NE site), approximately 0.2 miles east-southeast of the former MGP Property.

One possible explanation for the elevated arsenic concentrations detected in groundwater is that subsurface geochemical conditions adjacent to Budd Inlet are mobilizing naturally-occurring arsenic in buried sediments. Alternatively, the arsenic in groundwater may originate from former industrial activities in the vicinity of the Olympia MGP. Sanborn maps dating from 1896 to 1968 depict numerous industrial properties that existed historically within a few blocks of the MGP Property. These former industrial operations included machine shops, auto repair/service shops, auto body/painting shops, iron works, foundries, welding and electroplating operations, coal storage, plumbing and sheet metal works, boiler shops, boat building operations, printing and paint shops, tin smiths, petroleum operations and storage, lumber operations, etc. These industrial operations are representative of the numerous potential historical sources of metals, including arsenic, in the downtown Olympia area.

6.0 CONCLUSIONS

The soil analytical data from the investigations conducted at the former MGP Property indicate that in many areas of the Property, 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. However, these other constituents are present less frequently and occur within the broader footprint of cPAH impacts.

The results of the off-Property investigation indicate that cPAH concentrations exceed the MTCA Method A cleanup level in soil at two locations approximately 10 to 15 feet outside of the Property boundaries. These off-Property cPAH occurrences exist beneath Thurston Avenue NW, near the northeastern corner of the Property, and beneath the alley near the southeastern corner of the Property. Similar to the results of investigations conducted on the Property, the cPAH exceedances detected in off-Property soil are limited to relatively shallow depths (less than 10 feet bgs).

The cumulative groundwater monitoring results from the network of on- and off-Property monitoring wells indicate that the former MGP has had only minor impacts on groundwater beneath the Property. cPAHs are the only constituents potentially attributable to the former MGP that have been consistently detected above MTCA Method A cleanup levels, and these exceedances have been detected in only one on-Property monitoring well (MW-7). Although arsenic has been detected at concentrations exceeding the MTCA Method A cleanup level in most of the on- and off-Property monitoring wells, multiple lines of evidence suggest that the arsenic is not related to the former MGP. The arsenic may be naturally occurring in soil or dredged sediment in the Site vicinity, or could originate from former industrial activities in the area. Regardless of the arsenic source, geochemical conditions in the saturated zone may be mobilizing it.

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.

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

8.0 REFERENCES

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Table 1
Groundwater Elevation Data (2008-2011)
Former Olympia Manufactured Gas Plant Site
Olympia, Washington

Monitoring Well	Screened Interval (feet bgs)	Shallow or Deep Well	TOC Elevation ¹ (feet NAVD88)	Date	Measured Depth to Groundwater ² (feet below TOC)	Calculated Groundwater Elevation (feet NAVD88)
MW-1	5.0-20.0	Shallow	13.17	8/26/08	4.74	8.43
				10/6/08	4.64	8.53
				11/3/09	4.55	8.62
				2/15/10	4.16	9.01
				5/26/10	4.41	8.76
				1/7/11	4.27	8.90
				4/19/11	4.34	8.83
MW-2	5.0-20.0	Shallow	13.67	8/26/08	5.33	8.34
				10/6/08	5.23	8.44
				11/3/09	5.05	8.62
				2/15/10	4.44	9.23
				5/26/10	4.97	8.70
				1/7/11	4.77	8.90
				4/19/11	4.80	8.87
MW-3	39.5-44.5	Deep	13.65	8/26/08	5.27	8.38
				10/6/08	5.08	8.57
				11/3/09	5.02	8.63
				2/15/10	4.62	9.03
				5/26/10	4.94	8.71
				1/7/11	4.75	8.90
				4/19/11	4.82	8.83
MW-4	23.5-28.5	Deep	13.75	8/26/08	5.30	8.45
				10/6/08	5.18	8.57
				11/3/09	5.06	8.69
				2/15/10	4.72	9.03
				5/26/10	5.28	8.47
				1/7/11	4.85	8.90
				4/19/11	4.90	8.85
MW-5	4.5-19.5	Shallow	14.25	11/3/09	5.64	8.61
				2/15/10	5.28	8.97
				5/26/10	5.55	8.70
				1/7/11	5.40	8.85
				4/19/11	5.46	8.79
MW-6 ³	11.1 ³	Shallow	13.69	8/26/08	5.37	8.32
				10/6/08	5.37	8.32
				11/3/09	5.08	8.61
				2/15/10	4.46	9.23
				5/26/10	5.08	8.61
				1/6/11	4.88	8.81
				4/19/11	4.90	8.79
MW-7	4.5-19.5	Shallow	13.65	11/3/09	5.09	8.56
				2/15/10	4.63	9.02
				5/26/10	4.92	8.73
				1/7/11	4.77	8.88
				4/19/11	4.85	8.80
MW-8	5.0-20.0	Shallow	13.76	11/3/09	5.11	8.65
				2/15/10	4.49	9.27
				5/26/10	5.07	8.69
				1/7/11	4.83	8.93
				4/19/11	4.89	8.87
MW-10 ³	14.0 ³	Shallow	13.76	8/26/08	5.31	8.45
				10/6/08	5.25	8.51
				11/3/09	5.14	8.62
				2/15/10	4.66	9.10
				5/26/10	4.96	8.80
				1/6/11	4.91	8.85
				4/19/11	4.92	8.84

Monitoring Well	Screened Interval (feet bgs)	Shallow or Deep Well	TOC Elevation ¹ (feet NAVD88)	Date	Measured Depth to Groundwater ² (feet below TOC)	Calculated Groundwater Elevation (feet NAVD88)
MW-12S	5.0-20.2	Shallow	14.19	1/7/11	5.28	8.91
				4/19/11	5.39	8.80
MW-12D	25.0-30.0	Deep	14.20	1/7/11	5.37	8.83
				4/19/11	5.37	8.83
MW-13S	4.5-19.5	Shallow	13.43	1/7/11	4.60	8.83
				4/19/11	4.61	8.82
MW-13D	25.5-30.5	Deep	13.84	1/7/11	5.06	8.78
				4/19/11	5.04	8.80
MW-00S ³	12.4 ³	Shallow	13.59	2/15/10	4.47	9.12
				5/26/10	4.74	8.85
				1/7/11	4.75	8.84
				4/19/11	4.79	8.80
				7/18/11	-	-
MW-00D	25.5-30.5	Deep	13.32	1/7/11	4.46	8.86
				4/19/11	4.51	8.81
				7/18/11	-	-

Notes:

¹Elevations surveyed in December 2010 by Barghausen Consulting Engineers, Inc. relative to NAVD88. Previous investigations used an arbitrary site-specific datum with an assigned elevation of 10 feet.

²Water levels measured with an electronic water level indicator.

³Pre-existing monitoring well installed by others; screened interval unknown. Value shown for screened interval is the approximate depth to bottom of well casing measured with an electronic water level indicator on February 15, 2010.

bgs = Below ground surface

TOC = Top of well casing

NAVD88 = North American Vertical Datum of 1988.

Table 2
Soil Chemical Analytical Results (2006-2010)
Former Olympia Manufactured Gas Plant Site
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	B-2	B-3	B-5	B-6	TP1-3.0	TP1-4.0	MW1-2-070	MW1-5-130	MW1-9-200	TP2-4.5	TP2-7.5	MW3-03-080	MW3-13-280	MW3-22-450	TP3-2.5	TP3-6.5
				B-2	B-3	B-5	B-6	TP-1	TP-1	MW-1	MW-1	MW-1	TP-2	TP-2	MW-3	MW-3	MW-3	TP-3	TP-3
				09/13/2006	09/13/2006	09/13/2006	09/13/2006	08/06/2008	08/12/2008	08/22/2008	08/22/2008	08/22/2008	08/06/2008	08/12/2008	08/20/2008	08/20/2008	08/20/2008	08/06/2008	08/06/2008
Volatile Organic Compounds (EPA 8011/8021B/8260B)																			
Benzene	ug/kg	30		-	-	-	-	20 U	-	20 U	21	20 U	20 U	-	20 U	20 U	20 U	21	310
Toluene	ug/kg	7,000		-	-	-	-	51 U	-	59 U	61 U	79 U	47 U	-	63 U	63 U	67 U	54 U	700 U
Ethylbenzene	ug/kg	6,000		-	-	-	-	51 U	-	59 U	61 U	79 U	47 U	-	63 U	63 U	67 U	54 U	2,200
m,p-Xylene	ug/kg	9,000		-	-	-	-	51 U	-	59 U	61 U	79 U	47 U	-	63 U	63 U	67 U	54 U	900
o-Xylene	ug/kg	9,000		-	-	-	-	51 U	-	59 U	61 U	79 U	47 U	-	63 U	63 U	67 U	54 U	140 U
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																			
Gasoline-Range	mg/kg	30/100 ²		3.0 U	3.0 U	3.0 U	3.0 U	5.1 U	-	5.9 U	-	-	4.7 U	-	6.3 U	-	-	11	130
Diesel-Range	mg/kg	2,000		25 U	25 U	45 U	25 U	110	-	30 U	33 U	32 U	62	-	30 U	30 U	30 U	540	33 U
Lube Oil-Range	mg/kg	2,000		50 U	260	670	50 U	690	-	160	65 U	64 U	300	-	60 U	60 U	61 U	2,400	66 U
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)																			
Hexachlorocyclopentadiene	mg/kg	480		-	-	-	-	0.71	0.040 U	0.040 U	0.043 U	0.043 U	0.035 U	0.042 U	0.040 U	0.040 U	0.041 U	0.18 U	0.044 U
4-Nitrophenol	mg/kg	-		-	-	-	-	0.20 U	0.040 U	0.040 U	0.043 U	0.043 U	0.035 U	0.042 U	0.040 U	0.040 U	0.041 U	0.18 U	0.044 U
Dibenzofuran	mg/kg	160		-	-	-	-	0.20 U	0.040 U	0.040 U	0.043 U	0.043 U	0.035 U	0.042 U	0.040 U	0.040 U	0.041 U	0.18 U	0.044 U
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		-	-	-	-	0.20 U	0.040 U	0.040 U	0.043 U	0.043 U	0.035 U	0.042 U	0.040 U	0.040 U	0.041 U	0.18 U	0.044 U
Pentachlorophenol	mg/kg	8.3		-	-	-	-	0.98 U	0.020 U	0.020 U	0.043 U	0.043 U	0.18 U	0.21 U	0.20 U	0.20 U	0.20 U	0.91 U	0.22 U
Carbazole	mg/kg	50		-	-	-	-	0.20 U	0.040 U	0.040 U	0.043 U	0.043 U	0.035 U	0.042 U	0.040 U	0.040 U	0.041 U	0.24	0.044 U
bis(2-Ethylhexyl)phthalate	mg/kg	71		-	-	-	-	0.20 U	0.040 U	0.070	0.050	0.043 U	0.035 U	0.042 U	0.040 U	0.040 U	0.041 U	0.18 U	0.044 U
ncPAHs																			
Naphthalene	mg/kg			0.02 U	0.17	2.9	0.02 U	0.20 U	0.0079 U	0.0079 U	0.0087 U	0.0085 U	0.048	0.0084 U	0.0080 U	0.0079 U	0.0081 U	0.68	0.0088 U
1-Methylnaphthalene	mg/kg	5 ³		0.02 U	0.060	0.27	0.02 U	0.20 U	0.0079 U	0.052	0.0087 U	0.0085 U	0.035 U	0.0084 U	0.0080 U	0.0079 U	0.0081 U	0.18 U	0.14
2-Methylnaphthalene	mg/kg			0.02 U	0.070	0.28	0.02 U	0.20 U	0.0079 U	0.090	0.0087 U	0.0085 U	0.035 U	0.0084 U	0.0080 U	0.0079 U	0.0081 U	0.18 U	0.27
Total Naphthalenes	mg/kg	-		0.02 U	0.30	3.4	0.02 U	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylenes	mg/kg	-		0.02 U	0.30	5.4	0.02 U	0.22	0.0079 U	0.0079 U	0.0087 U	0.0085 U	1.5	0.0084 U	0.034	0.0079 U	0.0081 U	2.2	0.0088 U
Acenaphthene	mg/kg	4.8		0.02 U	0.08 U	0.19	0.02 U	0.20 U	0.0079 U	0.0079 U	0.0087 U	0.0085 U	1.3	0.0084 U	0.0080 U	0.0079 U	0.0081 U	0.18 U	0.0088 U
Fluorene	mg/kg	3.2		0.02 U	0.020	1.5	0.02 U	0.20 U	0.0079 U	0.0079 U	0.0087 U	0.0085 U	0.035 U	0.0084 U	0.0080 U	0.0079 U	0.0081 U	0.26	0.0088 U
Phenanthrene	mg/kg	-		0.02 U	0.78	25	0.02 U	0.20 U	0.0079 U	0.0079 U	0.0087 U	0.0085 U	1.3	0.0084 U	0.076	0.0079 U	0.0081 U	4.5	0.010
Anthracene	mg/kg	24		0.02 U	0.23	7.4	0.02 U	0.20 U	0.0079 U	0.0079 U	0.0087 U	0.0085 U	0.20	0.0084 U	0.0080 U	0.0079 U	0.0081 U	1.3	0.0088 U
Fluoranthene	mg/kg	-		0.02 U	5.6	180	0.02 U	0.63	0.0079 U	0.0079 U	0.0087 U	0.0085 U	7.8	0.0084 U	0.20	0.0079 U	0.0081 U	21	0.0088 U
Pyrene	mg/kg	-		0.02 U	7.9	240	0.02 U	0.95	0.0079 U	0.0079 U	0.0087 U	0.0085 U	10	0.013	0.28	0.0079 U	0.0081 U	31	0.0092 U
Benzo(g,h,i)perylene	mg/kg	-		0.02 U	9.1	90	0.02 U	7.7	18	0.0079 U	0.0087 U	0.0085 U	9.1	0.018	0.19	0.0079 U	0.0081 U	45	0.0088 U
cPAHs																			
Benzo(a)anthracene	mg/kg	-		0.020 U	2.2	51	0.020 U	0.41	0.0079 U	0.0079 U	0.0087 U	0.0085 U	2.1	0.0084 U	0.051	0.0079 U	0.0081 U	8.0	0.0088 U
Chrysene	mg/kg	-		0.020 U	3.0	63	0.020 U	0.55	0.0079 U	0.0079 U	0.0087 U	0.0085 U	2.8	0.0084 U	0.072	0.0079 U	0.0081 U	11	0.0088 U
Benzo(b)fluoranthene	mg/kg	-		0.020 U	3.4	54	0.020 U	0.98	0.0079 U	0.0079 U	0.0087 U	0.0085 U	3.9	0.0084 U	0.077	0.0079 U	0.0081 U	16	0.0088 U
Benzo(k)fluoranthene	mg/kg	-		0.020 U	2.8	51	0.020 U	0.87	0.0079 U	0.0079 U	0.0087 U	0.0085 U	2.6	0.0084 U	0.071	0.0079 U	0.0081 U	11	0.0088 U
Benzo(a)pyrene	mg/kg	-		0.020 U	5.9	96	0.020 U	1.7	0.0079 U	0.0079 U	0.0087 U	0.0085 U	5.4	0.0084 U	0.11	0.0079 U	0.0081 U	25	0.0088 U
Indeno(1,2,3-cd)pyrene	mg/kg	-		0.020 U	5.4	67	0.020 U	3.1	0.011	0.0079 U	0.0087 U	0.0085 U	0.83	0.011	0.12	0.0079 U	0.0081 U	26	0.0088 U
Dibenzo(a,h)anthracene	mg/kg	-		0.020 U	0.84	11	0.020 U	0.35	0.0079 U	0.0079 U	0.0087 U	0.0085 U	0.87	0.0084 U	0.012	0.0079 U	0.0081 U	1.7	0.0088 U
Total cPAHs TEC	mg/kg	0.1		0.015 U	7.4	120	0.015 U	2.3	0.0071	0.0060 U	0.0066 U	0.0064 U	6.5	0.0070	0.14	0.0060 U	0.0061 U	31	0.0066 U
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)																			
Arsenic	mg/kg	20		6 U	6 U	6 U	6 U	12 U	-	12 U	-	-	11 U	-	12 U	-	-	11 U	13 U
Chromium	mg/kg	19/2,000 ⁴		12	15	14	8.5	22	-	14	-	-	14	-	13	-	-	15	15
Copper	mg/kg	3,000		0.32 U	0.33 U	0.32 U	0.32 U	18	-	9.1	-	-	13	-	7.9	-	-	77	6.6
Lead	mg/kg	250		2.3 U	210	240	2.6 U	310	-	6.0 U	-	-	130	-	6.0 U	-	-	600	20
Mercury	mg/kg	2		0.02 U	1.3	0.070	0.02 U	0.63	-	0.30 U	-	-	0.26 U	-	0.30 U	-	-	9.2	0.33 U
Total Cyanide	mg/kg	1,600		-	-	-	-	0.534	-	0.0520 U	-	-	0.417	-	0.318	-	-	0.244	0.0650 U

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	SB6-5-130	SB6-9-200	TP4-3.5	TP4-7.0	TP4-7.0-DUP	TP5-3.5	TP5-6.0	SB5-9-220	SB5-18-400	SB5-18-400-D	TP6-2.5	TP7-4.0	TP7-7.0	SB7-6-180	SB7-14-340	SB7-19-500
				SB-6 13.0 08/22/2008	SB-6 20.0 08/22/2008	TP-4 3.5 08/06/2008	TP-4 7.0 08/06/2008	TP-4 7.0 08/06/2008	TP-5 3.5 08/06/2008	TP-5 6.0 08/06/2008	TP-5 22.0 08/21/2008	SB-5 40.0 08/21/2008	SB-5 40.0 08/21/2008	TP-6 2.5 08/12/2008	TP-7 4.0 08/06/2008	TP-7 7.0 08/06/2008	SB-7 18.0 08/21/2008	SB-7 34.0 08/21/2008	SB-7 50.0 08/21/2008
Volatile Organic Compounds (EPA 8011/8021B/8260B)																			
Benzene	ug/kg	30		20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	280	20 U	20 U	20 U	20 U
Toluene	ug/kg	7,000		55 U	55 U	48 U	55 U	72 U	52 U	60 U	65 U	59 U	67 U	45 U	290	59 U	53 U	71 U	75 U
Ethylbenzene	ug/kg	6,000		55 U	55 U	48 U	55 U	72 U	52 U	60 U	65 U	59 U	67 U	45 U	86 U	59 U	53 U	71 U	75 U
m,p-Xylene	ug/kg	9,000		55 U	55 U	48 U	55 U	72 U	52 U	60 U	65 U	59 U	67 U	45 U	230	59 U	53 U	71 U	75 U
o-Xylene	ug/kg	9,000		55 U	55 U	48 U	55 U	72 U	52 U	60 U	65 U	59 U	67 U	45 U	88	59 U	53 U	71 U	75 U
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																			
Gasoline-Range	mg/kg	30/100 ²		5.5 U	-	4.8 U	5.5 U	7.2 U	-	-	-	-	-	4.5 U	-	-	-	-	-
Diesel-Range	mg/kg	2,000		27 U	30 U	200	54	43	26 U	31 U	31 U	30 U	30 U	35 U	800	29 U	29 U	31 U	33 U
Lube Oil-Range	mg/kg	2,000		53 U	60 U	810	280	170	53 U	63 U	61 U	60 U	60 U	220	3,900	71	57 U	63 U	65 U
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)																			
Hexachlorocyclopentadiene	mg/kg	480		0.035 U	0.037 U	0.19 U	0.042 U	0.048 U	0.035 U	0.042 U	0.041 U	0.040 U	0.040 U	0.035 U	0.23 U	0.039 U	0.038 U	0.042 U	0.043 U
4-Nitrophenol	mg/kg	-		0.035 U	0.037 U	0.19 U	0.042 U	0.048 U	0.035 U	0.042 U	0.041 U	0.040 U	0.040 U	0.035 U	0.23 U	0.039 U	0.038 U	0.044	0.043 U
Dibenzofuran	mg/kg	160		0.035 U	0.037 U	0.19 U	0.042 U	0.048 U	0.035 U	0.042 U	0.041 U	0.040 U	0.040 U	0.035 U	0.23 U	0.039 U	0.038 U	0.042 U	0.043 U
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		0.035 U	0.037 U	0.19 U	0.042 U	0.048 U	0.035 U	0.042 U	0.041 U	0.040 U	0.040 U	0.035 U	0.23 U	0.039 U	0.038 U	0.043	0.043 U
Pentachlorophenol	mg/kg	8.3		0.035 U	0.037 U	0.93 U	0.21 U	0.24 U	0.18 U	0.21 U	0.21	0.20 U	0.20 U	0.18 U	1.2 U	0.20 U	0.19 U	0.28	0.23
Carbazole	mg/kg	50		0.035 U	0.037 U	0.57	0.042 U	0.048 U	0.035 U	0.042 U	0.041 U	0.040 U	0.040 U	0.035 U	0.36	0.039 U	0.038 U	0.042 U	0.043 U
bis(2-Ethylhexyl)phthalate	mg/kg	71		0.084	0.037 U	0.19 U	0.042 U	0.048 U	0.035 U	0.042 U	0.041 U	0.040 U	0.040 U	0.035 U	0.23 U	0.039 U	0.053	0.042 U	0.043 U
ncPAHs																			
Naphthalene	mg/kg	5 ³		0.0071 U	0.0075 U	0.98	0.11	0.13	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.0070 U	2,900	0.039 U	0.0077 U	0.0083 U	0.0087 U
1-Methylnaphthalene	mg/kg			0.0071 U	0.0075 U	0.19 U	0.042 U	0.048 U	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.0070 U	230 U	0.039 U	0.0077 U	0.0083 U	0.0087 U
2-Methylnaphthalene	mg/kg			0.0088	0.0075 U	0.19 U	0.042 U	0.048 U	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.0070 U	0.36	0.039 U	0.0077 U	0.0083 U	0.0087 U
Total Naphthalenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylenes	mg/kg			0.0071 U	0.0075 U	3.5	0.42	0.33	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.0070 U	0.016	7.4	0.070	0.0077 U	0.0083 U
Acenaphthene	mg/kg	4.8		0.0071 U	0.0075 U	0.19 U	0.042 U	0.048 U	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.0070 U	0.23 U	0.039 U	0.0077 U	0.0083 U	0.0087 U
Fluorene	mg/kg	3.2		0.0071 U	0.0075 U	0.54	0.042 U	0.048 U	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.0070 U	0.73	0.039 U	0.0077 U	0.0083 U	0.0087 U
Phenanthrene	mg/kg			0.016	0.0075 U	15	0.56	0.62	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.016	9.6	0.090	0.045	0.0083 U	0.0087 U
Anthracene	mg/kg	24		0.0071 U	0.0075 U	3.2	0.16	0.16	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.0070 U	3.2	0.039 U	0.0077 U	0.0083 U	0.0087 U
Fluoranthene	mg/kg			0.024	0.0075 U	58	4.1	4.4	0.0074	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.071	93	1.1	0.18	0.0083 U	0.0087 U
Pyrene	mg/kg			0.042	0.0075 U	73	5.3	5.6	0.0080	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.087	130	1.5	0.25	0.0083 U	0.0087 U
Benzo(g,h,i)perylene	mg/kg			0.046	0.0075 U	45	4.6	4.2	0.016	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.20	120	1.4	0.16	0.0083 U	0.0087 U
cPAHs																			
Benzo(a)anthracene	mg/kg			0.0076	0.0075 U	19	1.5	1.5	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.045	33	0.42	0.055	0.0083 U	0.0087 U
Chrysene	mg/kg			0.011	0.0075 U	25	2.0	2.1	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.055	47	0.60	0.063	0.0083 U	0.0087 U
Benzo(b)fluoranthene	mg/kg			0.018	0.0075 U	23	2.5	2.4	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.085	62	0.72	0.073	0.0083 U	0.0087 U
Benzo(k)fluoranthene	mg/kg			0.0071 U	0.0075 U	22	1.1	1.3	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.053	44	0.53	0.071	0.0083 U	0.0087 U
Benzo(a)pyrene	mg/kg			0.019	0.0075 U	38	3.7	3.5	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.068	96	1.1	0.12	0.0083 U	0.0087 U
Indeno(1,2,3-cd)pyrene	mg/kg			0.022	0.0075 U	31	3.1	2.9	0.0086	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.067	82	0.91	0.11	0.0083 U	0.0087 U
Dibenzo(a,h)anthracene	mg/kg			0.0071 U	0.0075 U	5.9	0.26	0.27	0.0070 U	0.0083 U	0.0081 U	0.0079 U	0.0080 U	0.014	5.3	0.039 U	0.012	0.0083 U	0.0087 U
Total cPAHs TEC	mg/kg	0.1		0.025	0.0057 U	48	4.6	4.4	0.0058	0.0063 U	0.0061 U	0.0060 U	0.0060 U	0.092	120	1.4	0.15	0.0063 U	0.0066 U
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)																			
Arsenic	mg/kg	20		-	-	11 U	13 U	14 U	11 U	13 U	15	12 U	12 U	11 U	14 U	12 U	-	-	-
Chromium	mg/kg	19/2,000 ⁴		-	-	14	12	19	14	14	14	19	19	11	23	17	-	-	-
Copper	mg/kg	3,000		-	-	22	15	20	6.5	6.2	11	12	11	11	44	7.1	-	-	-
Lead	mg/kg	250		-	-	600	74	89	5.3 U	6.3 U	6.1 U	6.0 U	6.0 U	21	2,800	18	-	-	-
Mercury	mg/kg	2		-	-	29	7.1	0.83	0.26 U	0.31 U	0.30 U	0.30 U	0.30 U	9.1	0.35 U	0.29 U	-	-	-
Total Cyanide	mg/kg	1,600		-	-	0.208	0.154	0.282	0.0480 U	0.0560 U	0.101 U	0.241	0.274	0.0600	2.12	0.0520 U	-	-	-

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	MW4-02-040	MW4-03-060	MW4-08-160	MW4-15-300	SB8-1-020	SB8-3-060	SB8-6-120	MW-5-3.0	MW-5-8.0	MW-5-15.5	MW-5-20.5	MW-7-3.0	MW-7-5.5	MW-7-8.0	MW-7-10.5
				MW-4 4.0 08/20/2008	MW-4 6.0 08/20/2008	MW-4 16.0 08/20/2008	MW-4 28.5 08/20/2008	SB-8 2.0 08/22/2008	SB-8 6.0 08/22/2008	SB-8 12.0 08/22/2008	MW-5 3.0 11/2/2009	MW-5 8.0 11/2/2009	MW-5 15.5 11/2/2009	MW-5 20.5 11/2/2009	MW-7 3.0 11/2/2009	MW-7 5.5 11/2/2009	MW-7 8.0 11/2/2009	MW-7 10.5 11/2/2009
Volatile Organic Compounds (EPA 8011/8021B/8260B)																		
Benzene	ug/kg	30		20 U	20 U	20 U	20 U	24	25 U	23 U	20 U	20 U	-	-	20 U	45	20 U	20 U
Toluene	ug/kg	7,000		62 U	57 U	63 U	63 U	55 U	120 U	120 U	56 U	71 U	-	-	52 U	59 U	56 U	61 U
Ethylbenzene	ug/kg	6,000		62 U	57 U	63 U	63 U	55 U	120 U	120 U	56 U	71 U	-	-	52 U	160	56 U	61 U
m,p-Xylene	ug/kg	9,000		62 U	57 U	63 U	63 U	55 U	120 U	120 U	56 U	71 U	-	-	52 U	170	56 U	61 U
o-Xylene	ug/kg	9,000		62 U	57 U	63 U	63 U	55 U	120 U	120 U	56 U	71 U	-	-	52 U	59 U	56 U	61 U
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																		
Gasoline-Range	mg/kg	30/100 ²		6.2 U	5.7 U	-	-	5.5 U	12 U	-	5.6 U	7.1 U	-	-	5.2 U	22	5.6 U	6.1 U
Diesel-Range	mg/kg	2,000		31 U	26 U	31 U	30 U	270	180	52	270	33 U	-	-	92	87	36	29 U
Lube Oil-Range	mg/kg	2,000		130	57	63 U	60 U	840	1,300	88	2,700	65 U	-	-	850	640	330	58 U
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)																		
Hexachlorocyclopentadiene	mg/kg	480		0.041 U	0.035 U	0.042 U	0.040 U	0.72 U	1.9 U	0.037 U	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	-		0.041 U	0.035 U	0.042 U	0.040 U	0.72 U	1.9 U	0.037 U	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	160		0.041 U	0.035 U	0.042 U	0.040 U	0.72 U	1.9 U	0.13	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		0.041 U	0.035 U	0.042 U	0.040 U	0.72 U	1.9 U	0.037 U	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	8.3		0.20 U	0.18 U	0.21 U	0.20 U	7.2 U	19 U	0.037 U	-	-	-	-	-	-	-	-
Carbazole	mg/kg	50		0.041 U	0.035 U	0.042 U	0.040 U	0.72 U	1.9 U	0.047	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	mg/kg	71		0.041 U	0.035 U	0.042 U	0.040 U	0.72 U	1.9 U	0.053	-	-	-	-	-	-	-	-
ncPAHs																		
Naphthalene	mg/kg			0.012	0.0070 U	0.0083 U	0.0080 U	0.057	0.0019 U	0.0075 U	-	-	-	-	-	-	-	-
1-Methylnaphthalene	mg/kg	5 ³		0.0081 U	0.0070 U	0.0083 U	0.0080 U	0.015	0.0019 U	0.012	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/kg			0.0081 U	0.0070 U	0.0083 U	0.0080 U	0.032	0.0019 U	0.010	-	-	-	-	-	-	-	-
Total Naphthalenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylenes	mg/kg			0.054	0.0070 U	0.0083 U	0.0080 U	0.051	0.0019 U	0.0075 U	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	4.8		0.0081 U	0.0070 U	0.0083 U	0.0080 U	0.021	0.0019 U	0.023	-	-	-	-	-	-	-	-
Fluorene	mg/kg	3.2		0.011	0.0070 U	0.0083 U	0.0080 U	0.025	0.0019 U	0.027	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg			0.25	0.0070 U	0.0083 U	0.0080 U	0.19	0.0019 U	1.1	-	-	-	-	-	-	-	-
Anthracene	mg/kg	24		0.23	0.0070 U	0.0083 U	0.0080 U	0.044	0.0019 U	0.26	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg			0.38	0.0070 U	0.0083 U	0.011	0.79	0.023	0.77	-	-	-	-	-	-	-	-
Pyrene	mg/kg			0.45	0.0070 U	0.0083 U	0.0080 U	0.91	0.027	0.51	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg			0.58	0.0070 U	0.0083 U	0.0080 U	1.2	0.030	0.077	-	-	-	-	-	-	-	-
cPAHs																		
Benzo(a)anthracene	mg/kg			0.14	0.0070 U	0.0083 U	0.0080 U	0.20	0.012	0.098	11	0.092	-	0.042	3.7	3.0	1.3	0.33
Chrysene	mg/kg			0.22	0.0070 U	0.0083 U	0.0080 U	0.30	0.012	0.11	16	0.12	-	0.056	5.4	4.2	1.8	0.48
Benzo(b)fluoranthene	mg/kg			0.19	0.0070 U	0.0083 U	0.0080 U	0.46	0.013	0.058	30	0.22	-	0.10	11	8.8	4.0	1.1
Benzo(k)fluoranthene	mg/kg			0.17	0.0070 U	0.0083 U	0.0080 U	0.11	0.013	0.057	7.0	0.069	-	0.027	3.0	2.2	1.1	0.24
Benzo(a)pyrene	mg/kg			0.29	0.0070 U	0.0083 U	0.0080 U	0.41	0.023	0.075	30	0.25	-	0.10	12	9.0	4.1	1.1
Indeno(1,2,3-cd)pyrene	mg/kg			0.33	0.0070 U	0.0083 U	0.0080 U	0.72	0.020	0.051	28	0.21	-	0.088	11	8.4	3.6	1.0
Dibenzo(a,h)anthracene	mg/kg			0.044	0.0070 U	0.0083 U	0.0080 U	0.066	0.0019 U	0.0082	3.2	0.025	-	0.011	1.2	0.96	0.80 U	0.11
Total cPAHs TEC	mg/kg	0.1		0.38	0.0053 U	0.0063 U	0.0060 U	0.57	0.029	0.10	38	0.31	-	0.13	15	11	5.2	1.4
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)																		
Arsenic	mg/kg	20		12 U	11 U	-	-	11 U	11 U	-	5.7 U	6.5 U	6.5 U	-	5.6 U	5.8 U	6.0 U	-
Chromium	mg/kg	19/2,000 ⁴		21	14	-	-	21	11	-	-	-	-	-	-	-	-	-
Copper	mg/kg	3,000		21	8.2	-	-	74	7.8	-	-	-	-	-	-	-	-	-
Lead	mg/kg	250		330	5.3 U	-	-	140	19	-	240	9.1	6.5 U	-	95	51	21	-
Mercury	mg/kg	2		0.30 U	0.26 U	-	-	8.4	0.28 U	-	0.50	0.33 U	0.32 U	-	3.1	3.1	0.49	-
Total Cyanide	mg/kg	1,600		0.247	0.110 U	-	-	0.0520 U	0.0590	-	-	-	-	-	-	-	-	-

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	MW-7-15.5 MW-7 15.5 11/2/2009	MW-8-3.0 MW-8 3.0 11/2/2009	MW-8-8.0 MW-8 8.0 11/2/2009	MW-8-10.5 MW-8 10.5 11/2/2009	MW-8-15.5 MW-8 15.5 11/2/2009	SB-9-3.0 SB-9 3.0 11/3/2009	SB-9-8.0 SB-9 8.0 11/3/2009	SB-9-10.5 SB-9 5.5 11/3/2009	SB-10-5.5 SB-10 5.5 11/3/2009	SB-10-10.5 SB-10 10.5 11/3/2009	SB-11-3.0 SB-11 3.0 11/3/2009	SB-11-8.0 SB-11 8.0 11/3/2009	SB-11-10.5 SB-11 10.5 11/3/2009	SB-11-20.5 SB-11 20.5 11/3/2009	SB-12-3.0 SB-12 3.0 11/4/2009	SB-12-8.0 SB-12 8.0 11/4/2009
Volatile Organic Compounds (EPA 8011/8021B/8260B)																			
Benzene	ug/kg	30		-	20 U	20 U	-	-	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	-	20 U	20 U
Toluene	ug/kg	7,000		-	54 U	65 U	-	-	54 U	63 U	58 U	58 U	63 U	67 U	68 U	84 U	-	56 U	52 U
Ethylbenzene	ug/kg	6,000		-	54 U	65 U	-	-	54 U	63 U	58 U	58 U	63 U	67 U	68 U	84 U	-	56 U	52 U
m,p-Xylene	ug/kg	9,000		-	54 U	65 U	-	-	54 U	63 U	58 U	58 U	63 U	67 U	68 U	84 U	-	56 U	52 U
o-Xylene	ug/kg	9,000		-	54 U	65 U	-	-	54 U	63 U	58 U	58 U	63 U	67 U	68 U	84 U	-	56 U	52 U
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																			
Gasoline-Range	mg/kg	30/100 ²		-	54 U	6.5 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Diesel-Range	mg/kg	2,000		-	48	31 U	-	-	29	30 U	30 U	270	30 U	30 U	32 U	35 U	-	140 U	30 U
Lube Oil-Range	mg/kg	2,000		-	790	62 U	-	-	280	60 U	60 U	1500	59 U	110	64 U	69 U	-	2,300	59 U
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)																			
Hexachlorocyclopentadiene	mg/kg	480		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	160		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	8.3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	mg/kg	50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	mg/kg	71		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ncPAHs																			
Naphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Methylnaphthalene	mg/kg	5 ³		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Naphthalenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	4.8		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	mg/kg	3.2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cPAHs																			
Benzo(a)anthracene	mg/kg			-	0.022	0.0082 U	0.0080 U	-	1.4	0.067	0.0079 U	0.29	0.0079 U	0.33	0.0085 U	0.0093 U	0.0080 U	0.75	0.0078 U
Chrysene	mg/kg			-	0.036	0.0082 U	0.0080 U	-	1.9	0.092	0.0088	0.45	0.0079 U	0.45	0.0085 U	0.0093 U	0.0080 U	1.1	0.0078 U
Benzo(b)fluoranthene	mg/kg			-	0.044	0.0082 U	0.0080 U	-	2.7	0.14	0.014	0.89	0.0080	0.76	0.0085 U	0.0093 U	0.0080 U	1.2	0.0078 U
Benzo(k)fluoranthene	mg/kg			-	0.011	0.0082 U	0.0080 U	-	0.71	0.044	0.0079 U	0.25	0.0079 U	0.17	0.0085 U	0.0093 U	0.0080 U	1.1	0.0078 U
Benzo(a)pyrene	mg/kg			-	0.038	0.0082 U	0.0080 U	-	2.6	0.14	0.013	0.90	0.0080	0.72	0.0085 U	0.0093 U	0.0080 U	2.0	0.0078 U
Indeno(1,2,3-cd)pyrene	mg/kg			-	0.032	0.0082 U	0.0080 U	-	2.4	0.12	0.013	1.4	0.010	0.57	0.0085 U	0.0093 U	0.0080 U	2.0	0.0078 U
Dibenzo(a,h)anthracene	mg/kg			-	0.0071 U	0.0082 U	0.0080 U	-	0.26	0.014	0.0079 U	0.15	0.0079 U	0.091	0.0085 U	0.0093 U	0.0080 U	0.70 U	0.0078 U
Total cPAHs TEC	mg/kg	0.1		-	0.050	0.0062 U	0.0060 U	-	3.4	0.18	0.017	1.2	0.012	0.92	0.0064 U	0.0070 U	0.0060 U	2.6	0.0060 U
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)																			
Arsenic	mg/kg	20		5.7 U	5.3 U	6.2 U	-	6.4	5.2 U	6.0 U	6.0	6.0	5.9 U	6.0 U	6.4 U	7.9	-	5.5 U	5.9 U
Chromium	mg/kg	19/2,000 ⁴		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	3,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	250		7.6	11	6.2 U	-	6.1 U	14	6.0 U	180	180	5.9 U	210	6.4 U	6.9 U	-	38	5.9 U
Mercury	mg/kg	2		0.29 U	0.26 U	0.31 U	-	0.42	0.26 U	0.30 U	0.31	0.31	0.30 U	0.32	0.32 U	0.35 U	-	60	0.30 U
Total Cyanide	mg/kg	1,600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	SB-12-10.5	SB-13-3.0	SB-13-8.0	SB-13-10.5	SB-14-3.0	SB-14-8.0	SB-14-8.0-D	SB-14-10.5	SB-15-3.0	SB-15-8.0	SB-15-10.5	SB-15-20.5	SB-16-3.0	SB-16-8.0	SB-16-10.5	SB-16-20.5	SB-17-3.0
				SB-12 10.5 11/4/2009	SB-13 3.0 11/4/2009	SB-13 8.0 11/4/2009	SB-13 10.5 11/4/2009	SB-14 3.0 11/3/2009	SB-14 8.0 11/3/2009	SB-14 8.0 11/3/2009	SB-14 10.5 11/3/2009	SB-15 3.0 11/4/2009	SB-15 8.0 11/4/2009	SB-15 10.5 11/4/2009	SB-15 20.5 11/4/2009	SB-16 3.0 11/4/2009	SB-16 8.0 11/4/2009	SB-16 10.5 11/4/2009	SB-16 20.5 11/4/2009	SB-17 3.0 11/4/2009
Volatile Organic Compounds (EPA 8011/8021B/8260B)																				
Benzene	ug/kg	30		20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	26	-	20 U	20 U
Toluene	ug/kg	7,000		59 U	57 U	59 U	59 U	64 U	70 U	68 U	57 U	60 U	59 U	59 U	66 U	58 U	78 U	-	53 U	41 U
Ethylbenzene	ug/kg	6,000		59 U	57 U	59 U	59 U	64 U	70 U	68 U	57 U	60 U	59 U	59 U	66 U	58 U	78 U	-	53 U	41 U
m,p-Xylene	ug/kg	9,000		59 U	57 U	59 U	59 U	64 U	70 U	68 U	57 U	60 U	59 U	59 U	66 U	58 U	78 U	-	53 U	41 U
o-Xylene	ug/kg	9,000		59 U	57 U	59 U	59 U	64 U	70 U	68 U	57 U	60 U	59 U	59 U	66 U	58 U	78 U	-	53 U	41 U
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																				
Gasoline-Range	mg/kg	30/100 ²		-	-	-	-	-	-	-	-	-	-	-	-	5.8 U	7.8 U	-	-	4.1 U
Diesel-Range	mg/kg	2,000		28 U	100	31 U	31 U	35	31 U	31 U	29 U	28 U	30 U	31 U	32 U	27 U	36 U	30 U	28 U	-
Lube Oil-Range	mg/kg	2,000		57 U	450	74	63 U	57 U	63 U	62 U	59 U	190	60 U	62 U	64 U	54 U	71 U	60 U	56 U	-
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)																				
Hexachlorocyclopentadiene	mg/kg	480		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	160		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	8.3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	mg/kg	50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	mg/kg	71		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ncPAHs																				
Naphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Methylnaphthalene	mg/kg	5 ³		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Naphthalenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	4.8		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	mg/kg	3.2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cPAHs																				
Benzo(a)anthracene	mg/kg			0.0076 U	6.2	0.44	0.095	0.0076 U	0.0083 U	0.010	0.065	0.15	0.031	0.12	0.0085 U	0.013	1.1	0.0080 U	0.0075 U	-
Chrysene	mg/kg			0.0076 U	8.5	0.57	0.11	0.0076 U	0.0091	0.011	0.068	0.21	0.037	0.13	0.0085 U	0.015	1.0	0.0080 U	0.0075 U	-
Benzo(b)fluoranthene	mg/kg			0.0076 U	8.6	0.55	0.081	0.0076 U	0.014	0.017	0.060	0.19	0.026	0.055	0.0085 U	0.026	0.96	0.0080 U	0.0075 U	-
Benzo(k)fluoranthene	mg/kg			0.0076 U	6.8	0.45	0.077	0.0076 U	0.0083 U	0.0083 U	0.023	0.15	0.026	0.069	0.0085 U	0.0084	0.29	0.0080 U	0.0075 U	-
Benzo(a)pyrene	mg/kg			0.011	14	0.89	0.14	0.0076 U	0.014	0.017	0.060	0.25	0.044	0.088	0.0088	0.019	0.89	0.0080 U	0.0075 U	-
Indeno(1,2,3-cd)pyrene	mg/kg			0.010	12	0.79	0.093	0.0076 U	0.010	0.012	0.025	0.24	0.029	0.035	0.0085 U	0.016	0.42	0.0080 U	0.0075 U	-
Dibenzo(a,h)anthracene	mg/kg			0.0076 U	1.7	0.11	0.017	0.0076 U	0.0083 U	0.0083 U	0.010	0.034	0.0080 U	0.016	0.0085 U	0.0072 U	0.19	0.0080 U	0.0075 U	-
Total cPAHs TEC	mg/kg	0.1		0.014	18	1.1	0.18	0.0057 U	0.018	0.022	0.079	0.33	0.056	0.12	0.011	0.026	1.2	0.0060 U	0.0057 U	-
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)																				
Arsenic	mg/kg	20		5.7 U	5.6 U	6.1 U	6.3 U	5.7 U	6.3 U	7.8	5.9 U	5.5 U	6.0 U	6.2 U	-	5.4 U	7.1 U	6.0 U	-	-
Chromium	mg/kg	19/2,000 ⁴		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	3,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	250		5.7 U	150	74	10	5.7 U	9.5	6.2 U	52	38	48	15	-	6.1	140	6.0 U	-	-
Mercury	mg/kg	2		0.28 U	0.28 U	0.31 U	0.31 U	0.62	0.31 U	0.31 U	0.29 U	3.4	0.30 U	0.31 U	-	0.34	2.2	0.30 U	-	-
Total Cyanide	mg/kg	1,600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	SB-17-8.0 SB-17 8.0 11/4/2009	SB-17-10.5 SB-17 10.5 11/4/2009	SB-17-10.5-D SB-17 10.5 11/4/2009	SB-17-15.5 SB-17 15.5 11/4/2009	MW-12D-10.5 MW-12D 10.5 11/30/2010	MW-12D-15.5 MW-12D 15.5 11/30/2010	MW-12D-20.5 MW-12D 20.5 11/30/2010	MW-12D-25.5 MW-12D 25.5 11/30/2010	MW-12D-30.5 MW-12D 30.5 11/30/2010	MW-13D-10.5 MW-13D 10.5 11/29/2010	MW-13D-15.5 MW-13D 15.5 11/29/2010	MW-13D-20.5 MW-13D 20.5 11/29/2010	MW-13D-25.5 MW-13D 25.5 11/29/2010	MW-13D-30.5 MW-13D 30.5 11/29/2010	MW-00D-10.5 MW-00D 10.5 12/2/2010	MW-00D-15.5 MW-00D 15.5 12/2/2010
Volatile Organic Compounds (EPA 8011/8021B/8260B)																			
Benzene	ug/kg	30		26	20 U	20 U	20 U	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	ug/kg	7,000		61 U	56 U	52 U	53 U	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	ug/kg	6,000		61 U	56 U	52 U	53 U	-	-	-	-	-	-	-	-	-	-	-	-
m,p-Xylene	ug/kg	9,000		61 U	56 U	52 U	53 U	-	-	-	-	-	-	-	-	-	-	-	-
o-Xylene	ug/kg	9,000		61 U	56 U	52 U	53 U	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																			
Gasoline-Range	mg/kg	30/100 ²		6.8	5.6 U	5.2 U	5.3 U	-	-	-	-	-	-	-	-	-	-	-	-
Diesel-Range	mg/kg	2,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lube Oil-Range	mg/kg	2,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)																			
Hexachlorocyclopentadiene	mg/kg	480		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	160		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	8.3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbazole	mg/kg	50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	mg/kg	71		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ncPAHs																			
Naphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Methylnaphthalene	mg/kg	5 ³		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Naphthalenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthylenes	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	4.8		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluorene	mg/kg	3.2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	24		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
cPAHs																			
Benzo(a)anthracene	mg/kg			-	0.0078 U	0.0078 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg			-	0.0078 U	0.0078 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg			-	0.0078 U	0.0078 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg			-	0.0078 U	0.0078 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg			-	0.0078 U	0.0078 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg			-	0.0078 U	0.0078 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzo(a,h)anthracene	mg/kg			-	0.0078 U	0.0078 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Total cPAHs TEC	mg/kg	0.1		-	0.0059 U	0.0059 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)																			
Arsenic	mg/kg	20		-	5.8 U	5.8 U	-	5.5 U	5.8 U	5.7 U	5.7 U	6.6 U	5.9 U	6.0 U	5.8 U	5.7 U	5.8 U	5.9 U	5.9 U
Chromium	mg/kg	19/2,000 ⁴		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	3,000		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	250		-	5.8 U	5.8 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	mg/kg	2		-	0.29 U	0.29 U	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cyanide	mg/kg	1,600		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	MW-00D-20.5	MW-00D-25.5	MW-00D-30.5	SB-18-2.5	SB-18-8.0	SB-18-10.5	SB-18-15.5	SB-19-2.5	SB-19-8.0	SB-19-10.5	SB-19-15.5	SB-20-2.5	SB-20-8.0	SB-20-10.5	SB-20-15.5	SB-20-20.5
				MW-00D 20.5	MW-00D 25.5	MW-00D 30.5	SB-18 2.5	SB-18 8.0	SB-18 10.5	SB-18 15.5	SB-19 2.5	SB-19 8.0	SB-19 10.5	SB-19 15.5	SB-20 2.5	SB-20 8.0	SB-20 10.5	SB-20 15.5	SB-20 20.5
Volatile Organic Compounds (EPA 8011/8021B/8260B)																			
Benzene	ug/kg	30		--	--	--	--	--	--	--	--	--	--	--	25 U	25 U	1,000	--	--
Toluene	ug/kg	7,000		--	--	--	--	--	--	--	--	--	--	--	120 U	130 U	130 U	--	--
Ethylbenzene	ug/kg	6,000		--	--	--	--	--	--	--	--	--	--	--	58 U	65 U	66 U	--	--
m,p-Xylene	ug/kg	9,000		--	--	--	--	--	--	--	--	--	--	--	120 U	130 U	130 U	--	--
o-Xylene	ug/kg	9,000		--	--	--	--	--	--	--	--	--	--	--	58 U	65 U	66 U	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																			
Gasoline-Range	mg/kg	30/100 ²		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range	mg/kg	2,000		--	--	--	29 U	31 U	30 U	--	57	30 U	28 U	--	70 U	31 U	31 U	--	--
Lube Oil-Range	mg/kg	2,000		--	--	--	57 U	62 U	60 U	--	220	59 U	56 U	--	530	170	61 U	--	--
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)																			
Hexachlorocyclopentadiene	mg/kg	480		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4-Nitrophenol	mg/kg	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzofuran	mg/kg	160		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	mg/kg	8.3		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbazole	mg/kg	50		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
bis(2-Ethylhexyl)phthalate	mg/kg	71		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ncPAHs																			
Naphthalene	mg/kg	5 ³		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnaphthalene	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	mg/kg			--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Naphthalenes	mg/kg	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylenes	mg/kg	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	mg/kg	4.8		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	3.2		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	24		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	mg/kg	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cPAHs																			
Benzo(a)anthracene	mg/kg	--		--	--	--	0.0076 U	0.0083 U	0.011	0.0091 U	1.2	0.0079 U	0.0074 U	0.0076 U	1.7	0.13	0.084	0.022	0.0075 U
Chrysene	mg/kg	--		--	--	--	0.0076 U	0.0083 U	0.010	0.0091 U	1.5	0.0079 U	0.0074 U	0.0076 U	2.0	0.14	0.089	0.021	0.0075 U
Benzo(b)fluoranthene	mg/kg	--		--	--	--	0.0076 U	0.0083 U	0.0080 U	0.0091 U	1.7	0.0079 U	0.0074 U	0.0076 U	2.5	0.19	0.075	0.016	0.0075 U
Benzo(k)fluoranthene	mg/kg	--		--	--	--	0.0076 U	0.0083 U	0.0080 U	0.0091 U	1.6	0.0079 U	0.0074 U	0.0076 U	2.0	0.15	0.075	0.016	0.0075 U
Benzo(a)pyrene	mg/kg	--		--	--	--	0.0076 U	0.0083 U	0.010	0.0091 U	2.7	0.0079 U	0.0074 U	0.0076 U	3.8	0.28	0.12	0.024	0.0075 U
Indeno(1,2,3-cd)pyrene	mg/kg	--		--	--	--	0.0076 U	0.0083 U	0.0080 U	0.0091 U	2.2	0.0079 U	0.0074 U	0.0076 U	3.0	0.23	0.081	0.014	0.0075 U
Dibenzo(a,h)anthracene	mg/kg	--		--	--	--	0.0076 U	0.0083 U	0.0080 U	0.0091 U	0.34	0.0079 U	0.0074 U	0.0076 U	0.44	0.36	0.017	0.077 U	0.0075 U
Total cPAHs TEC	mg/kg	0.1		--	--	--	0.0057 U	0.0063 U	0.013	0.0069 U	3.4	0.0060 U	0.0056 U	0.0057 U	4.8	0.36	0.15	0.031	0.0057 U
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)																			
Arsenic	mg/kg	20		5.7 U	5.5 U	5.7 U	--	--	--	--	--	--	--	--	--	6.2 U	--	5.8 U	5.6 U
Chromium	mg/kg	19/2,000 ⁴		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	mg/kg	3,000		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	mg/kg	250		--	--	--	--	--	--	--	--	--	--	--	140	93	67	--	--
Mercury	mg/kg	2		--	--	--	0.29 U	0.31 U	0.30 U	--	0.29 U	0.30 U	0.28 U	--	--	--	--	--	--
Total Cyanide	mg/kg	1,600		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Analyte	Units	MTCA Method A Cleanup Level ¹	Sample ID: Location ID: Depth (ft bgs): Sample Date:	SB-20-25.5	SB-21-2.5	SB-21-8.0	SB-21-10.5	SB-21-15.5	SB-21-20.5	SB-21-25.5	SB-21-30.5	SB-22-2.5	SB-22-8.0	SB-22-10.5
				SB-20 25.5 12/1/2010	SB-21 2.5 12/1/2010	SB-21 8.0 12/1/2010	SB-21 10.5 12/1/2010	SB-21 15.5 12/1/2010	SB-21 20.5 12/1/2010	SB-21 25.5 12/1/2010	SB-21 30.5 12/1/2010	SB-22 2.5 12/1/2010	SB-22 8.0 12/1/2010	SB-22 10.5 12/1/2010
Volatile Organic Compounds (EPA 8011/8021B/8260B)														
Benzene	ug/kg	30		-	-	-	-	-	-	-	-	-	-	-
Toluene	ug/kg	7,000		-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	ug/kg	6,000		-	-	-	-	-	-	-	-	-	-	-
m,p-Xylene	ug/kg	9,000		-	-	-	-	-	-	-	-	-	-	-
o-Xylene	ug/kg	9,000		-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)														
Gasoline-Range	mg/kg	30/100 ²		-	-	-	-	-	-	-	-	-	-	-
Diesel-Range	mg/kg	2,000		-	-	-	-	-	-	-	-	-	-	-
Lube Oil-Range	mg/kg	2,000		-	-	-	-	-	-	-	-	-	-	-
Semivolatile Organic Compounds (EPA 8270D/8270D-SIM)														
Hexachlorocyclopentadiene	mg/kg	480		-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran	mg/kg	160		-	-	-	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachlorophenol	mg/kg	2,400		-	-	-	-	-	-	-	-	-	-	-
Pentachlorophenol	mg/kg	8.3		-	-	-	-	-	-	-	-	-	-	-
Carbazole	mg/kg	50		-	-	-	-	-	-	-	-	-	-	-
bis(2-Ethylhexyl)phthalate	mg/kg	71		-	-	-	-	-	-	-	-	-	-	-
ncPAHs														
Naphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-
1-Methylnaphthalene	mg/kg	5 ³		-	-	-	-	-	-	-	-	-	-	-
2-Methylnaphthalene	mg/kg			-	-	-	-	-	-	-	-	-	-	-
Total Naphthalenes	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-
Acenaphthylenes	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-
Acenaphthene	mg/kg	4.8		-	-	-	-	-	-	-	-	-	-	-
Fluorene	mg/kg	3.2		-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	24		-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-
Benzo(g,h,i)perylene	mg/kg	-		-	-	-	-	-	-	-	-	-	-	-
cPAHs														
Benzo(a)anthracene	mg/kg	-		0.0081 U	0.0071 U	0.020	0.0078 U	-	-	-	-	0.0070 U	0.0083 U	0.0087 U
Chrysene	mg/kg	-		0.0081 U	0.0071 U	0.047	0.0078 U	-	-	-	-	0.0070 U	0.014	0.0087 U
Benzo(b)fluoranthene	mg/kg	-		0.0081 U	0.0071 U	0.013	0.0078 U	-	-	-	-	0.0070 U	0.0083 U	0.0087 U
Benzo(k)fluoranthene	mg/kg	-		0.0081 U	0.0071 U	0.010	0.0078 U	-	-	-	-	0.0070 U	0.0083 U	0.0087 U
Benzo(a)pyrene	mg/kg	-		0.0081 U	0.0071 U	0.015	0.0078 U	-	-	-	-	0.0070 U	0.0083 U	0.0087 U
Indeno(1,2,3-cd)pyrene	mg/kg	-		0.0081 U	0.0071 U	0.012	0.0078 U	-	-	-	-	0.0070 U	0.0083 U	0.0087 U
Dibenzo(a,h)anthracene	mg/kg	-		0.0081 U	0.0071 U	0.0078 U	0.0078 U	-	-	-	-	0.0070 U	0.0083 U	0.0087 U
Total cPAHs TEC	mg/kg	0.1		0.0061 U	0.0054 U	0.021	0.0059 U	-	-	-	-	0.0053 U	0.0064	0.0066 U
Metals (EPA 200.8/335.4/6010B/6020/7470A/7471A)														
Arsenic	mg/kg	20		6.0 U	-	5.8 U	-	6.2 U	5.6 U	10	6.1 U	5.3 U	-	6.5 U
Chromium	mg/kg	19/2,000 ⁴		-	-	-	-	-	-	-	-	-	-	-
Copper	mg/kg	3,000		-	-	-	-	-	-	-	-	-	-	-
Lead	mg/kg	250		-	5.3 U	26	-	-	-	-	-	5.3 U	14	-
Mercury	mg/kg	2		-	-	-	-	-	-	-	-	-	-	-
Total Cyanide	mg/kg	1,600		-	-	-	-	-	-	-	-	-	-	-

Notes:

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

²Cleanup level for gasoline-range total petroleum hydrocarbons is 30 mg/kg when benzene is present and 100 mg/kg when benzene is not present.

³Cleanup level for total Naphthalenes.

⁴Cleanup level for Cr (III) is 19 mg/kg; cleanup level for Cr (VI) is 2,000 mg/kg.

MTCA = Washington State Model Toxics Control Act

mg/kg = Milligrams per kilogram

ug/kg = Micrograms per kilogram

ft bgs = Feet below ground surface

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

TEC = Total toxic equivalent concentration calculated per WAC 173-340-708[8][e][iii][A]. For non-detected constituents, one-half the method reporting limit was used in the calculation. All values calculated using toxicity equivalency factors from WAC 173-340 Table 708-2 (Nov. 2007).

– = Constituent not analyzed or cleanup level not established

U = The analyte was analyzed for, but was not detected above the listed method reporting limit.

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

Detections are shown in **bold** typeface.

Yellow highlighted cells indicate values that exceed the associated MTCA cleanup level.

Table 3
Groundwater Chemical Analytical Results (2006-2010)
Former Olympia Manufactured Gas Plant Site
Olympia, Washington

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: Sample Date:	B-2	B-3	B-4	B-5	B-6	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2	MW-2/DUP- 110309*	MW-2	MW-2	MW-2	MW-2
				9/13/2006	9/13/2006	9/13/2006	9/13/2006	9/13/2006	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	8/26/2008	10/6/2008	11/3/2009	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011
Volatile Organic Compounds (EPA 8011/8021B/8260B)																							
Benzene	ug/l	5		2 U	2 U	2 U	2	2 U	0.50 U	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--	--
Isopropylbenzene	ug/l	--		2 U	2	2 U	2 U	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Propyl Benzene	ug/l	--		2 U	7	2 U	2 U	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	ug/l	--		2 U	5	2 U	2 U	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	ug/l	--		2 U	10	2 U	2 U	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	ug/l	1,000		--	--	--	--	--	0.50 U	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--	--
Ethylbenzene	ug/l	700		--	--	--	--	--	0.50 U	--	--	--	--	--	--	0.50 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--	--
Xylene, m-,p-	ug/l	1,000 (a)		--	--	--	--	--	1.0 U	--	--	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--	--
Xylene, o-	ug/l	1,000 (a)		--	--	--	--	--	1.0 U	--	--	--	--	--	--	1.0 U	--	1.0 U	1.0 U	1.0 U	1.0 U	--	--
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0094 U	0.0095 U	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5		--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20 U	0.20 U	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.20 U	0.20 U	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																							
Gasoline-Range	mg/l	0.8/1 (b)		0.050 U	0.37	0.050 U	0.050 U	0.050 U	0.10 U	--	--	--	--	--	--	0.10 U	--	0.10 U	0.10 U	0.10 U	0.10 U	--	--
Diesel-Range	mg/l	0.5		0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.25 U	--	--	--	--	--	--	0.25 U	--	0.25 U	0.25 U	0.26 U	0.26 U	--	--
Lube Oil-Range	mg/l	0.5		0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.40 U	--	--	--	--	--	--	0.40 U	--	0.40 U	0.40 U	0.41 U	0.41 U	--	--
Semivolatile Organic Compounds (EPA 8270D-SIM)																							
ncPAHs																							
Naphthalene	ug/l	--		0.08	1.9	0.15	0.44	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnaphthalene	ug/l	--		0.02	4.1	0.05	0.06	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/l	--		0.02	7.9	0.06	0.09	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Naphthalenes	ug/l	160		0.12	13.9	0.26	0.69	0.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/l	--		0.06	0.04	0.06	0.35	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/l	--		0.73	0.05	0.45	0.59	0.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	ug/l	--		0.02 U	0.04	0.04	0.07	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/l	--		0.06	0.17	0.16	0.48	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/l	--		0.02 U	0.03	0.03	0.14	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/l	--		0.02 U	0.15	0.09	6	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/l	--		0.02 U	0.29	0.15	11	0.09	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	ug/l	--		0.02 U	0.28	0.33	12	0.15	0.0095 U	--	--	--	--	--	--	0.061	--	--	--	--	--	--	--
cPAHs																							
Benzo(a)anthracene	ug/l	--		0.02 U	0.04	0.04	2	0.02	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.012	--	0.0095 U	0.010 U	0.013	0.0095 U	--	--
Chrysene	ug/l	--		0.02 U	0.07	0.05	3.1	0.03	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0099	--	0.0095 U	0.010 U	0.013	0.0095 U	--	--
Benzo(b)fluoranthene	ug/l	--		0.02 U	0.07	0.07	3.8	0.04	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.020	--	0.0095 U	0.010 U	0.019	0.0095 U	--	--
Benzo(k)fluoranthene	ug/l	--		0.02 U	0.07	0.05	3.9	0.05	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.010 U	0.013	0.0095 U	--	--
Benzo(a)pyrene	ug/l	--		0.02 U	0.1	0.11	7	0.03	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.021	--	0.0095 U	0.010 U	0.029	0.0095 U	--	--
Indeno(1,2,3-cd)pyrene	ug/l	--		0.02 U	0.13	0.15	6.9	0.07	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.026	--	0.0095 U	0.010 U	0.030	0.0095 U	--	--
Dibenzo(a,h)anthracene	ug/l	--		0.02 U	0.04	0.02 U	0.82	0.02 U	0.0095 U	--	0.0094 U	0.0094 U	0.0095 U	--	--	0.0095 U	--	0.0095 U	0.010 U	0.0095 U	0.0095 U	--	--
Total cPAHs TEC	ug/l	0.1		0.015 U	0.14	0.14	8.7	0.050	0.0072 U	--	0.0071 U	0.0071 U	0.0072 U	--	--	0.028	--	0.0072 U	0.0076 U	0.037	0.0072 U	--	--
Metals (EPA 200.8/335.4/6020/7470A)																							
Total Arsenic	mg/l	0.005		--	--	--	--	--	0.024	0.016	0.0062	0.013	0.0061	0.0072	0.050	0.010	0.012	0.0066	0.0069	0.0072	0.0033 U	0.0033 U	0.0039
Dissolved Arsenic ²	mg/l	0.005		0.009	0.014	0.012	0.027	0.008	--	0.017	--	--	--	--	0.0030 U	--	0.011	--	--	--	--	--	0.0030 U
Total Chromium	mg/l	0.050		--	--	--	--	--	0.022	--	0.011 U	0.011 U	0.011 U	--	--	0.013	--	0.011 U	0.011 U	0.011 U	0.011 U	--	--
Dissolved Chromium ²	mg/l	0.050		0.007 U	0.007 U	0.007 U	0.007 U	0.007 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Copper	mg/l	0.59 (c)		--	--	--	--	--	0.012	--	--	--	--	--	--	0.0071	--	--	--	--	--	--	--
Total Lead	mg/l	0.015		--	--	--	--	--	0.0032	0.0023	0.0011 U	0.0019	0.0011 U	--	--	0.0051	0.0036	0.0011 U	0.0011 U	0.0046	0.0011 U	--	--
Dissolved Lead ²	mg/l	0.015		0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	--	0.0010 U	--	--	--	--	--	--	0.0010 U	--	--	--	--	--	--
Total Mercury	mg/l	0.002		--	--	--	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--	--
Dissolved Mercury ²	mg/l	0.002		0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Cadmium	mg/l	0.005		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Cadmium ²	mg/l	0.005		0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Cyanide	mg/l	0.2 (d)		--	--	--	--	--	0.005 U	--	--	--	--	--	--	0.005 U	--	--	--	--	--	--	--

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: Sample Date:	MW-3	MW-3/D-08-26-08*	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-3	MW-4	MW-4	MW-4	MW-4	MW-4	MW-4	MW-5	MW-5	MW-5	MW-5	MW-5	
				8/26/2008	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	8/26/2008	10/6/2008	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	11/3/2009	2/15/2010	5/26/2010	1/7/2011	4/19/2011	
Volatile Organic Compounds (EPA 8011/8021B/8260B)																								
Benzene	ug/l	5		0.50 U	0.50 U	--	--	--	--	--	--	--	0.50 U	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--	
Isopropylbenzene	ug/l	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
N-Propyl Benzene	ug/l	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
1,3,5-Trimethylbenzene	ug/l	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
1,2,4-Trimethylbenzene	ug/l	--		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Toluene	ug/l	1,000		0.50 U	0.50 U	--	--	--	--	--	--	--	0.50 U	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--	
Ethylbenzene	ug/l	700		0.50 U	0.50 U	--	--	--	--	--	--	--	0.50 U	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--	
Xylene, m-,p-	ug/l	1,000 (a)		1.0 U	1.0 U	--	--	--	--	--	--	--	1.0 U	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--	
Xylene, o-	ug/l	1,000 (a)		1.0 U	1.0 U	--	--	--	--	--	--	--	1.0 U	--	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--	
1,2-Dibromoethane (EDB)	ug/l	0.01		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
1,2-Dichloroethane (EDC)	ug/l	5		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																								
Gasoline-Range	mg/l	0.8/1 (b)		0.10 U	0.10 U	--	--	--	--	--	--	--	0.10 U	--	--	--	--	--	0.10 U	0.10 U	0.10 U	--	--	
Diesel-Range	mg/l	0.5		0.26 U	0.25 U	--	--	--	--	--	--	--	0.25 U	--	--	--	--	--	0.25 U	0.26 U	0.26 U	0.26 U	--	--
Lube Oil-Range	mg/l	0.5		0.41 U	0.40 U	--	--	--	--	--	--	--	0.41 U	--	--	--	--	--	0.40 U	0.41 U	0.41 U	0.41 U	--	--
Semivolatile Organic Compounds (EPA 8270D-SIM)																								
ncPAHs																								
Naphthalene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
1-Methylnaphthalene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
2-Methylnaphthalene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Total Naphthalenes	ug/l	160		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Acenaphthylene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Acenaphthene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Fluorene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Phenanthrene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Anthracene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Fluoranthene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Pyrene	ug/l	--		--	--	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
Benzo(g,h,i)perylene	ug/l	--		0.0095 U	0.0095 U	--	--	--	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	
cPAHs																								
Benzo(a)anthracene	ug/l	--		0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.013	--	--	0.012	0.0095 U	0.021	0.023	--
Chrysene	ug/l	--		0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.012	0.0095 U	0.017	0.023	--
Benzo(b)fluoranthene	ug/l	--		0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.017	0.0095 U	0.014	0.028	--
Benzo(k)fluoranthene	ug/l	--		0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U	0.012	0.024	--
Benzo(a)pyrene	ug/l	--		0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U	0.017	0.046	--
Indeno(1,2,3-cd)pyrene	ug/l	--		0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.011	0.0095 U	0.015	0.035	--
Dibenzo(a,h)anthracene	ug/l	--		0.0095 U	0.0095 U	--	0.0093 U	0.0094 U	0.0095 U	--	--	--	0.0095 U	--	0.0095 U	0.0095 U	0.0094 U	--	--	0.010 U	0.0095 U	0.0098	0.0097 U	--
Total cPAHs TEC	ug/l	0.1		0.0072 U	0.0072 U	--	0.0070 U	0.0071 U	0.0072 U	--	--	--	0.0072 U	--	0.0072 U	0.0072 U	0.0079	--	--	0.010	0.0072 U	0.024	0.058	--
Metals (EPA 200.8/335.4/6020/7470A)																								
Total Arsenic	mg/l	0.005		0.083	0.084	0.052	0.031	0.047	0.041	0.047	0.061	0.12	0.057	0.088	0.092	0.085	0.093	0.084	0.023	0.025	0.018	0.0088	0.024	
Dissolved Arsenic ²	mg/l	0.005		--	--	0.034	--	--	--	--	0.033	--	0.042	--	--	--	--	0.082	--	--	--	--	0.0044	
Total Chromium	mg/l	0.050		0.043	0.045	--	0.011 U	0.017	0.011 U	--	--	0.052	--	0.011 U	0.011 U	0.011 U	0.011 U	--	0.011 U	0.011 U	0.011 U	0.011 U	--	
Dissolved Chromium ²	mg/l	0.050		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Copper	mg/l	0.59 (c)		0.040	0.040	--	--	--	--	--	--	--	0.026	--	--	--	--	--	--	--	--	--	--	
Total Lead	mg/l	0.015		0.018	0.018	0.0072	0.0039	0.0080	0.0038	--	--	--	0.0062	0.0039	0.0013	0.0011 U	0.0011 U	--	--	0.0054	0.0011 U	0.0011 U	0.0011 U	--
Dissolved Lead ²	mg/l	0.015		--	--	0.0010 U	--	--	--	--	--	--	0.0010 U	--	--	--	--	--	--	--	--	--	--	
Total Mercury	mg/l	0.002		0.00050 U	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--
Dissolved Mercury ²	mg/l	0.002		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Cadmium	mg/l	0.005		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Dissolved Cadmium ²	mg/l	0.005		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Total Cyanide	mg/l	0.2 (d)		0.005 U	0.005 U	--	--	--	--	--	--	--	0.005 U	--	--	--	--	--	--	--	--	--	--	

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: MW-6 ³ Sample Date: 9/13/2006																							
			MW-6 8/26/2008	MW-6 10/6/2008	MW-6 11/3/2009	MW-6 2/15/2010	MW-6 5/26/2010	MW-6 1/6/2011	MW-6 4/19/2011	MW-7 11/3/2009	MW-7 2/15/2010	MW-7/DUP-021510* 2/15/2010	MW-7 5/26/2010	MW-7/DUP-100526* 5/26/2010	MW-7 1/7/2011	MW-7/DUP-010711* 1/7/2011	MW-7 4/19/2011	MW-7/DUP-041911* 4/19/2011	MW-8 11/3/2009	MW-8 2/15/2010	MW-8 5/26/2010	MW-8 1/7/2011	MW-8 4/19/2011			
Volatile Organic Compounds (EPA 8011/8021B/8260B)																										
Benzene	ug/l	5	2 U	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.1	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--		
Isopropylbenzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
N-Propyl Benzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
1,3,5-Trimethylbenzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
1,2,4-Trimethylbenzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Toluene	ug/l	1,000	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--		
Ethylbenzene	ug/l	700	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--		
Xylene, m-,p-	ug/l	1,000 (a)	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--		
Xylene, o-	ug/l	1,000 (a)	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	--	--	--	--	1.0 U	1.0 U	1.0 U	--	--		
1,2-Dibromoethane (EDB)	ug/l	0.01	--	--	--	0.0095 U	--	--	--	--	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--		
1,2-Dichloroethane (EDC)	ug/l	5	--	--	--	0.20 U	--	--	--	--	0.20 U	--	--	--	--	--	--	--	--	--	--	--	--	--		
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20	--	--	--	0.20 U	--	--	--	--	0.20 U	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																										
Gasoline-Range	mg/l	0.8/1 (b)	0.050 U	0.10 U	--	0.10 U	0.10 U	0.10 U	--	--	0.26	0.10 U	0.10 U	0.10 U	0.10 U	--	--	--	--	0.10 U	0.10 U	0.10 U	--	--		
Diesel-Range	mg/l	0.5	0.13 U	0.25 U	--	0.25 U	0.26 U	0.26 U	--	--	0.25 U	0.25 U	0.25 U	0.26 U	0.26 U	--	--	--	--	0.25 U	0.25 U	0.26 U	--	--		
Lube Oil-Range	mg/l	0.5	0.25 U	0.40 U	--	0.40 U	0.41 U	0.41 U	--	--	0.40 U	0.40 U	0.40 U	0.41 U	0.41 U	--	--	--	--	0.40 U	0.40 U	0.42 U	--	--		
Semivolatile Organic Compounds (EPA 8270D-SIM)																										
ncPAHs																										
Naphthalene	ug/l	--	0.02	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
1-Methylnaphthalene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
2-Methylnaphthalene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Naphthalenes	ug/l	160	0.02	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Acenaphthylene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Acenaphthene	ug/l	--	0.03	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Fluorene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Phenanthrene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Anthracene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Fluoranthene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Pyrene	ug/l	--	0.03	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Benzo(g,h,i)perylene	ug/l	--	0.02 U	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
cPAHs																										
Benzo(a)anthracene	ug/l	--	0.02 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.051	0.064	0.090	0.084 J	0.12 J	0.079 J	0.049 J	0.015 J	0.028 J	0.0097 U	0.011	0.0095 U	0.0097 U	--		
Chrysene	ug/l	--	0.02 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.067	0.087 J	0.13 J	0.12 J	0.17 J	0.12 J	0.072 J	0.013 J	0.036 J	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--		
Benzo(b)fluoranthene	ug/l	--	0.02 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.13	0.14 J	0.22 J	0.16 J	0.24 J	0.19 J	0.12 J	0.023 J	0.063 J	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--		
Benzo(k)fluoranthene	ug/l	--	0.02 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.030	0.12 J	0.18 J	0.10 J	0.17 J	0.16 J	0.087 J	0.014 J	0.045 J	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--		
Benzo(a)pyrene	ug/l	--	0.02 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.14	0.21 J	0.31 J	0.23 J	0.37 J	0.28 J	0.17 J	0.019 J	0.062 J	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--		
Indeno(1,2,3-cd)pyrene	ug/l	--	0.02 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.15	0.22 J	0.32 J	0.28 J	0.42 J	0.30 J	0.17 J	0.033 J	0.095 J	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--		
Dibenzo(a,h)anthracene	ug/l	--	0.02 U	0.0095 U	--	0.0097 U	0.0095 U	0.0097 U	--	--	0.016	0.023	0.032	0.032 J	0.048 J	0.033 J	0.018 J	0.0095 U	0.011	0.0097 U	0.0095 U	0.0095 U	0.0097 U	--		
Total cPAHs TEC	ug/l	0.1	0.015 U	0.0072 U	--	0.0073 U	0.0072 U	0.0073 U	--	--	0.18	0.27 J	0.40 J	0.30 J	0.47 J	0.36 J	0.22 J	0.028 J	0.087 J	0.0073 U	0.0078	0.0072 U	0.0073 U	--		
Metals (EPA 200.8/335.4/6020/7470A)																										
Total Arsenic	mg/l	0.005	--	0.0056	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.011	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0035	0.0033 U	--	0.0033 U	0.0033 U	0.0033 U	0.0033 U	0.0033 U		
Dissolved Arsenic ²	mg/l	0.005	0.005 U	--	0.0030 U	--	--	--	--	0.0030 U	--	--	--	--	--	--	--	0.0030 U	0.0030 U	--	--	--	--	0.0030 U		
Total Chromium	mg/l	0.050	--	0.013	--	0.011 U	0.011 U	0.011 U	--	--	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	--	--	0.011 U	0.011 U	0.011 U	0.011 U	--		
Dissolved Chromium ²	mg/l	0.050	0.007 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Copper	mg/l	0.59 (c)	--	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Lead	mg/l	0.015	--	0.0022	0.0086	0.0011 U	0.0011 U	0.0025	--	--	0.0063	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0029	0.0029	--	--	0.0012	0.0011 U	0.0011 U	0.0011 U	--		
Dissolved Lead ²	mg/l	0.015	0.003 U	--	0.0010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Mercury	mg/l	0.002	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--	--	0.00050 U	0.00050 U	0.00050 U	0.00050 U	--		
Dissolved Mercury ²	mg/l	0.002	0.0002 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Cadmium	mg/l	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Dissolved Cadmium ²	mg/l	0.005	0.003 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Cyanide	mg/l	0.2 (d)	--	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		

Analyte	Units	MTCA Method A Cleanup Level ¹	Well/Sample ID: MW-10 ³ MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-10 MW-12S MW-12S MW-12D MW-12D MW-13S MW-13S MW-13D MW-13D MW-00S MW-00S MW-00S MW-00S MW-00D MW-00D																							
			Sample Date: 9/13/2006 8/26/2008 10/6/2008 11/3/2009 2/15/2010 5/26/2010 1/6/2011 4/19/2011 1/7/2011 4/19/2011 1/7/2011 4/19/2011 1/7/2011 4/19/2011 2/15/2010 5/26/2010 1/7/2011 4/19/2011 1/7/2011 4/19/2011																							
Volatile Organic Compounds (EPA 8011/8021B/8260B)																										
Benzene	ug/l	5	2 U	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Isopropylbenzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
N-Propyl Benzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3,5-Trimethylbenzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trimethylbenzene	ug/l	--	2 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	ug/l	1,000	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	ug/l	700	--	0.50 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylene, m-,p-	ug/l	1,000 (a)	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylene, o-	ug/l	1,000 (a)	--	1.0 U	--	1.0 U	1.0 U	1.0 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dibromoethane (EDB)	ug/l	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethane (EDC)	ug/l	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methyl Tertiary Butyl Ether (MTBE)	ug/l	20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Petroleum Hydrocarbons (NWTPH-Gx/Dx)																										
Gasoline-Range	mg/l	0.8/1 (b)	0.050 U	0.10 U	--	0.10 U	0.10 U	0.10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Diesel-Range	mg/l	0.5	0.13 U	0.25 U	--	0.25 U	0.25 U	0.26 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lube Oil-Range	mg/l	0.5	0.25 U	0.40 U	--	0.40 U	0.40 U	0.41 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Semivolatile Organic Compounds (EPA 8270D-SIM)																										
ncPAHs																										
Naphthalene	ug/l	--	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1-Methylnaphthalene	ug/l	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	ug/l	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Naphthalenes	ug/l	160	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthylene	ug/l	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acenaphthene	ug/l	--	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene	ug/l	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene	ug/l	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Anthracene	ug/l	--	0.02 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluoranthene	ug/l	--	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pyrene	ug/l	--	0.07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	ug/l	--	0.03	0.0095 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
cPAHs																										
Benzo(a)anthracene	ug/l	--	0.02 U	0.0095 U	--	0.0098 U	0.0095 U	0.010	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene	ug/l	--	0.02 U	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	ug/l	--	0.02 U	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	ug/l	--	0.02 U	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	ug/l	--	0.02 U	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	ug/l	--	0.02 U	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	ug/l	--	0.02 U	0.0095 U	--	0.0098 U	0.0095 U	0.0096 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total cPAHs TEC	ug/l	0.1	0.015 U	0.0072 U	--	0.0074 U	0.0072 U	0.0078	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals (EPA 200.8/335.4/6020/7470A)																										
Total Arsenic	mg/l	0.005	--	0.012	0.011	0.0064	0.0033 U	0.017	0.019	0.061	0.0052	0.029	0.028	0.014	0.0041	0.0033 U	0.34	0.079	0.010	0.0047	0.0052	0.017	0.0051	0.0047	--	
Dissolved Arsenic ²	mg/l	0.005	0.015	--	0.010	--	--	--	--	0.0030 U	--	0.0030 U	--	0.014	--	0.0030 U	--	0.080	--	--	--	0.0030 U	--	0.0030 U	--	
Total Chromium	mg/l	0.050	--	0.011 U	--	0.011 U	0.011 U	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Chromium ²	mg/l	0.050	0.007 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Copper	mg/l	0.59 (c)	--	0.011 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Lead	mg/l	0.015	--	0.0011 U	0.0047	0.0024	0.0011 U	0.0097	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Lead ²	mg/l	0.015	0.003 U	--	0.0010 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Mercury	mg/l	0.002	--	0.00050 U	--	0.00050 U	0.00050 U	0.00050 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Mercury ²	mg/l	0.002	0.0002 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Cadmium	mg/l	0.005	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Cadmium ²	mg/l	0.005	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Cyanide	mg/l	0.2 (d)	--	0.005 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

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

²Groundwater samples analyzed for dissolved metals were field-filtered with a 45 micron filter.

³Well MW-6 and MW-10 were designated MW-NW and MW-N, respectively, in EPI (2006).

(a) Total value for all xylenes.

(b) Cleanup level for gasoline-range total petroleum hydrocarbons is 0.8 mg/l when benzene is present and 1 mg/l when benzene is not present.

(c) MTCA Method A value not established; listed value is the MTCA Method B cleanup level (standard formula value) for potable groundwater (WAC 173-340-720[4][b]).

(d) 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

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

ncPAHs = Non-carcinogenic polycyclic aromatic hydrocarbons (results are shown only for ncPAHs that have been historically detected)

TEC = Total toxic equivalent concentration calculated per WAC 173-340-708[8][e][iii][A]. For non-detected constituents, one-half the method reporting limit was used in the calculation. All values calculated using toxicity equivalency factors from WAC 173-340 Table 708-2 (Nov. 2007).

-- = Constituent not analyzed or cleanup level not established

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

U = The analyte was analyzed for, but was not detected above the listed method reporting limit.

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

Detections are shown in **bold** typeface.

Yellow highlighted cells indicate values that exceed the associated MTCA cleanup level.

Table 4
Arsenic Concentrations in Soil (2008-2010)
Former Olympia Manufactured Gas Plant Site
Olympia, Washington

Sample Location	Sample ID	Sample Date	Sample Depth (ft bgs)	Arsenic Concentration ¹ (mg/kg)
TP-1/MW-1	TP1-3.0	8/6/2008	3.0	12 U
	MW1-2-070	8/22/2008	7.0	12 U
TP-2/MW-3	TP2-4.5	8/6/2008	4.5	11 U
	MW3-03-080	8/20/2008	8.0	12 U
TP-3	TP3-2.5	8/6/2008	2.5	11 U
	TP3-6.5	8/6/2008	6.5	13 U
TP-4	TP4-3.5	8/6/2008	3.5	11 U
	TP4-7.0	8/6/2008	7.0	13 U
	TP4-7.0-Dup*	8/6/2008	7.0	14 U
TP-5/SB-5	TP5-3.5	8/6/2008	3.5	11 U
	TP5-6.0	8/6/2008	6.0	13 U
	SB5-9-220	8/21/2008	22.0	15
	SB5-18-400	8/21/2008	40.0	12 U
	SB5-18-400-D*	8/21/2008	40.0	12 U
TP-6	TP6-2.5	8/12/2008	2.5	11 U
TP-7	TP7-4.0	8/6/2008	4.0	14 U
	TP7-7.0	8/6/2008	7.0	12 U
MW-4	MW4-02-040	8/20/2008	4.0	12 U
	MW4-03-060	8/20/2008	6.0	11 U
SB-8	SB8-1-020	8/22/2008	2.0	11 U
Stockpile	STK-Comp-1	8/22/2008	NA	12 U
MW-5	MW-5-3.0	11/2/2009	3.0	5.7 U
	MW-5-8.0	11/2/2009	8.0	6.5 U
	MW-5-15.5	11/2/2009	15.5	6.5 U
MW-7	MW-7-3.0	11/2/2009	3.0	5.6 U
	MW-7-5.5	11/2/2009	5.5	5.8 U
	MW-7-8.0	11/2/2009	8.0	6.0 U
	MW-7-15.5	11/2/2009	15.5	5.7 U
MW-8	MW-8-3.0	11/2/2009	3.0	5.3 U
	MW-8-8.0	11/2/2009	8.0	6.2 U
	MW-8-15.5	11/2/2009	15.5	6.4
SB-9	SB-9-3.0	11/3/2009	3.0	5.2 U
	SB-9-8.0	11/3/2009	8.0	6.0 U
	SB-9-10.5	11/3/2009	10.5	6.0 U
SB-10	SB-10-5.5	11/3/2009	5.5	6.0
	SB-10-10.5	11/3/2009	10.5	5.9 U
SB-11	SB-11-3.0	11/3/2009	3.0	6.0 U
	SB-11-8.0	11/3/2009	8.0	6.4 U
	SB-11-10.5	11/3/2009	10.5	7.9
SB-12	SB-12-3.0	11/4/2009	3.0	5.5 U
	SB-12-8.0	11/4/2009	8.0	5.9 U
	SB-12-10.5	11/4/2009	10.5	5.7 U
SB-13	SB-13-3.0	11/4/2009	3.0	5.6 U
	SB-13-8.0	11/4/2009	8.0	6.1 U
	SB-13-10.5	11/4/2009	10.5	6.3 U
Washington State natural background concentration ²				7
MTCA Method A soil cleanup level ³				20

Sample Location	Sample ID	Sample Date	Sample Depth (ft bgs)	Arsenic Concentration ¹ (mg/kg)
SB-14	SB-14-3.0	11/3/2009	3.0	5.7 U
	SB-14-8.0	11/3/2009	8.0	6.3 U
	SB-14-8.0-D*	11/3/2009	8.0	7.8
	SB-14-10.5	11/3/2009	10.5	5.9 U
SB-15	SB-15-3.0	11/4/2009	3.0	5.5 U
	SB-15-8.0	11/4/2009	8.0	6.0 U
	SB-15-10.5	11/4/2009	10.5	6.2 U
SB-16	SB-16-3.0	11/4/2009	3.0	5.4 U
	SB-16-8.0	11/4/2009	8.0	7.1 U
	SB-16-10.5	11/4/2009	10.5	6.0 U
SB-17	SB-17-10.5	11/4/2009	10.5	5.8 U
	SB-17-10.5-D*	11/4/2009	10.5	5.8 U
MW-00D	MW-00D-10.5	12/2/2010	10.5	5.9 U
	MW-00D-15.5	12/2/2010	15.5	5.9 U
	MW-00D-20.5	12/2/2010	20.5	5.7 U
	MW-00D-25.5	12/2/2010	25.5	5.5 U
	MW-00D-30.5	12/2/2010	30.5	5.7 U
MW-12D	MW-12D-10.5	11/30/2010	10.5	5.5 U
	MW-12D-15.5	11/30/2010	15.5	5.8 U
	MW-12D-20.5	11/30/2010	20.5	5.7 U
	MW-12D-25.5	11/30/2010	25.5	5.7 U
	MW-12D-30.5	11/30/2010	30.5	6.6 U
MW-13D	MW-13D-10.5	11/29/2010	10.5	5.9 U
	MW-13D-15.5	11/29/2010	15.5	6.0 U
	MW-13D-20.5	11/29/2010	20.5	5.8 U
	MW-13D-25.5	11/29/2010	25.5	5.7 U
	MW-13D-30.5	11/29/2010	30.5	5.8 U
SB-20	SB-20-8.0	12/1/2010	8.0	6.2 U
	SB-20-15.5	12/1/2010	15.5	5.8 U
	SB-20-20.5	12/1/2010	20.5	5.6 U
	SB-20-25.5	12/1/2010	25.5	6.0 U
SB-21	SB-21-8.0	12/1/2010	8.0	5.8 U
	SB-21-15.5	12/1/2010	15.5	6.2 U
	SB-21-20.5	12/1/2010	20.5	5.6 U
	SB-21-25.5	12/1/2010	25.5	10
	SB-21-30.5	12/1/2010	30.5	6.1 U
SB-22	SB-22-2.5	12/1/2010	2.5	5.3 U
	SB-22-10.5	12/1/2010	10.5	6.5 U
Washington State natural background concentration ²				7
MTCA Method A soil cleanup level ³				20

Notes:

¹Analyzed by EPA Method 6010B/7471A/7196A.

²Natural background concentration of arsenic in Washington state soil (90th percentile value) from Ecology Publication #94-115.

³MTCA Method A soil cleanup level for unrestricted land use (WAC 173-340-740[2]).

mg/kg = Milligrams per kilogram

ft bgs = Feet below ground surface

NA = Not applicable

U = Analyte was not detected at or above the method reporting limit shown.

Detections are shown in **bold** typeface.

Table 5
Summary Statistics for Arsenic in Soil (2008-2010)
Former Olympia Manufactured Gas Plant Site
Olympia, Washington

Statistic	Units	Values		
		Samples with the Following Method Reporting Limits		
		All Reporting Limits	5.0 to 7.1 mg/kg	11 to 14 mg/kg
Total number of soil analyses	--	83	62	21
Total number of samples with detections	--	6	5	1
Detection frequency	%	7.2%	8.1%	4.8%
Min. depth of soil samples analyzed	ft bgs	0.0	0	2.0
Max. depth of soil samples analyzed	ft bgs	40.0	30.5	40.0
Min. concentration of detected arsenic	mg/kg	6.0	6.0	15
Max. concentration of detected arsenic	mg/kg	15	10	15
Average concentration of detected arsenic	mg/kg	8.9	7.6	15

Samples with Arsenic Detections				
Location	Sample ID	Sample Date	Sample Depth (ft bgs)	Arsenic Concentration (mg/kg)
SB-5	SB5-9-220	8/21/2008	22.0	15
MW-8	MW-8-15.5	11/2/2009	15.5	6.4
SB-10	SB-10-5.5	11/3/2009	5.5	6.0
SB-11	SB-11-10.5	11/3/2009	10.5	7.9
SB-14	SB-14-8.0-D*	11/3/2009	8.0	7.8
SB-21	SB-21-25.5	12/1/2010	25.5	10

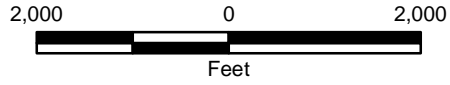
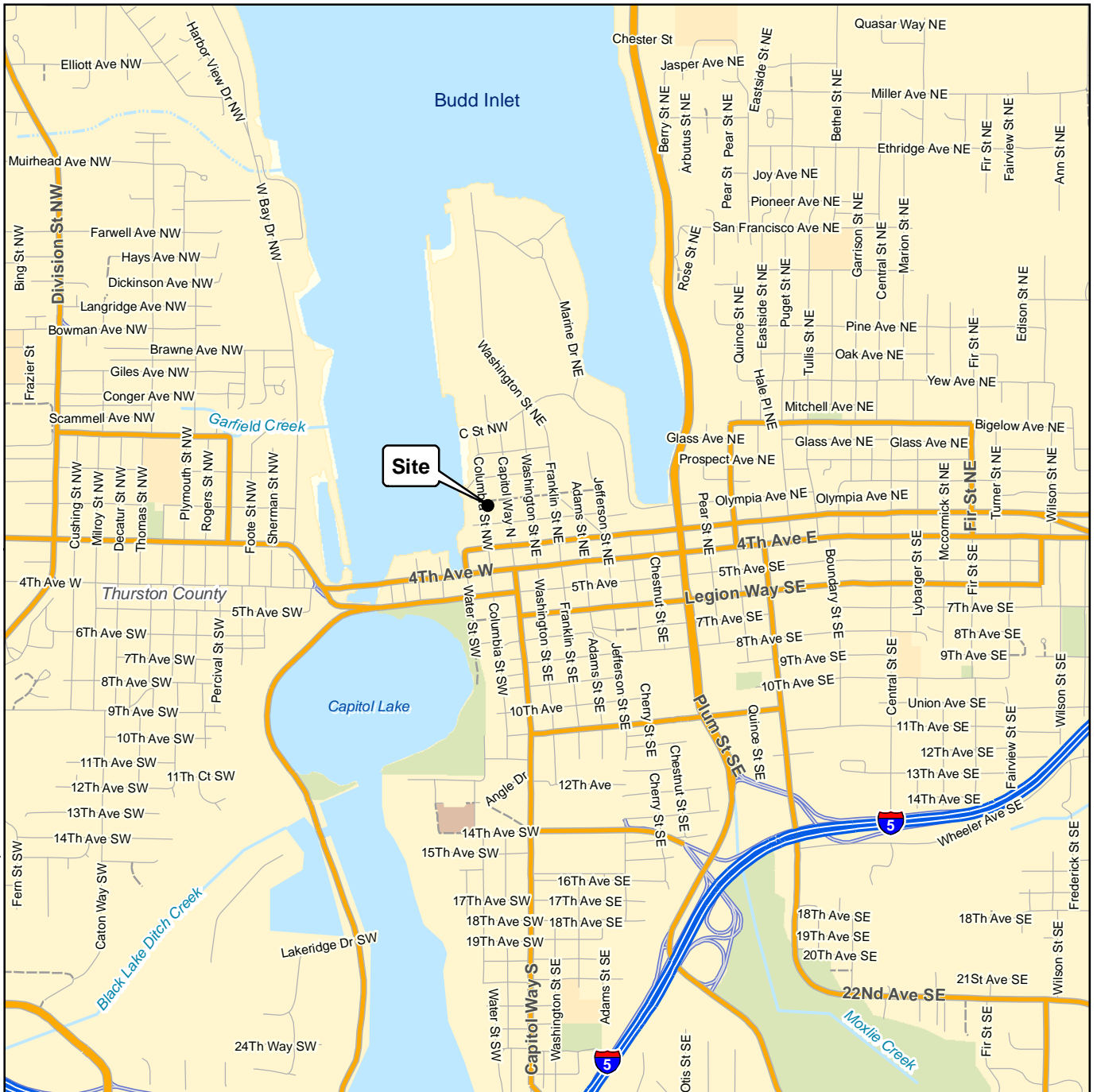
Notes:

*Field duplicate sample

ft bgs = Feet below ground surface

mg/kg = Milligrams per kilogram

Office: SEA Path: \\seal\projects\010186774\GIS\018677400_F1_VM.mxd Map Revised: 14 October 2011 amanza

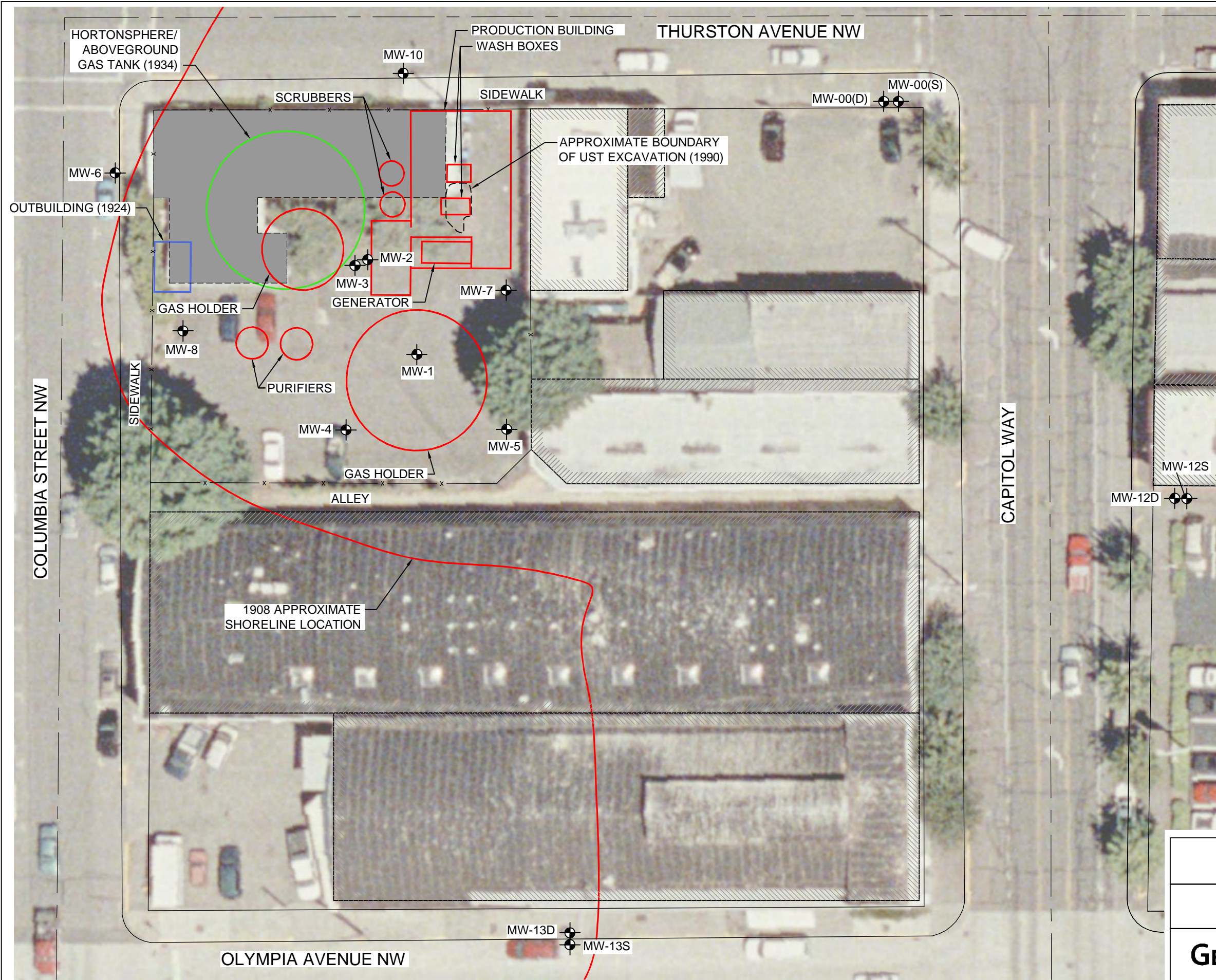


- Notes:
1. The locations of all features shown are approximate.
 2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
 3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005
 Transverse Mercator, Zone 10 N North, North American Datum 1983
 North arrow oriented to grid north

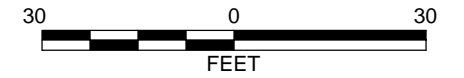
Vicinity Map	
Former Olympia MGP Site Olympia, Washington	
	Figure 1

\\SEA\PROJECTS\10186774\1001\TASK 04.00 - DATA SUMMARY REPORT\CAD\DATA SUMMARY Figs\018677400_TASK 04.00 DATA SUMMARY FIG 2.DWG\TAB.F2 MODIFIED BY TMICHAUD ON OCT 16, 2011 - 17:23



Legend

- 1908 Site facilities / features
- Existing building
- Former office building (demolished 10/2009)
- x Existing fence
- Monitoring well



Notes

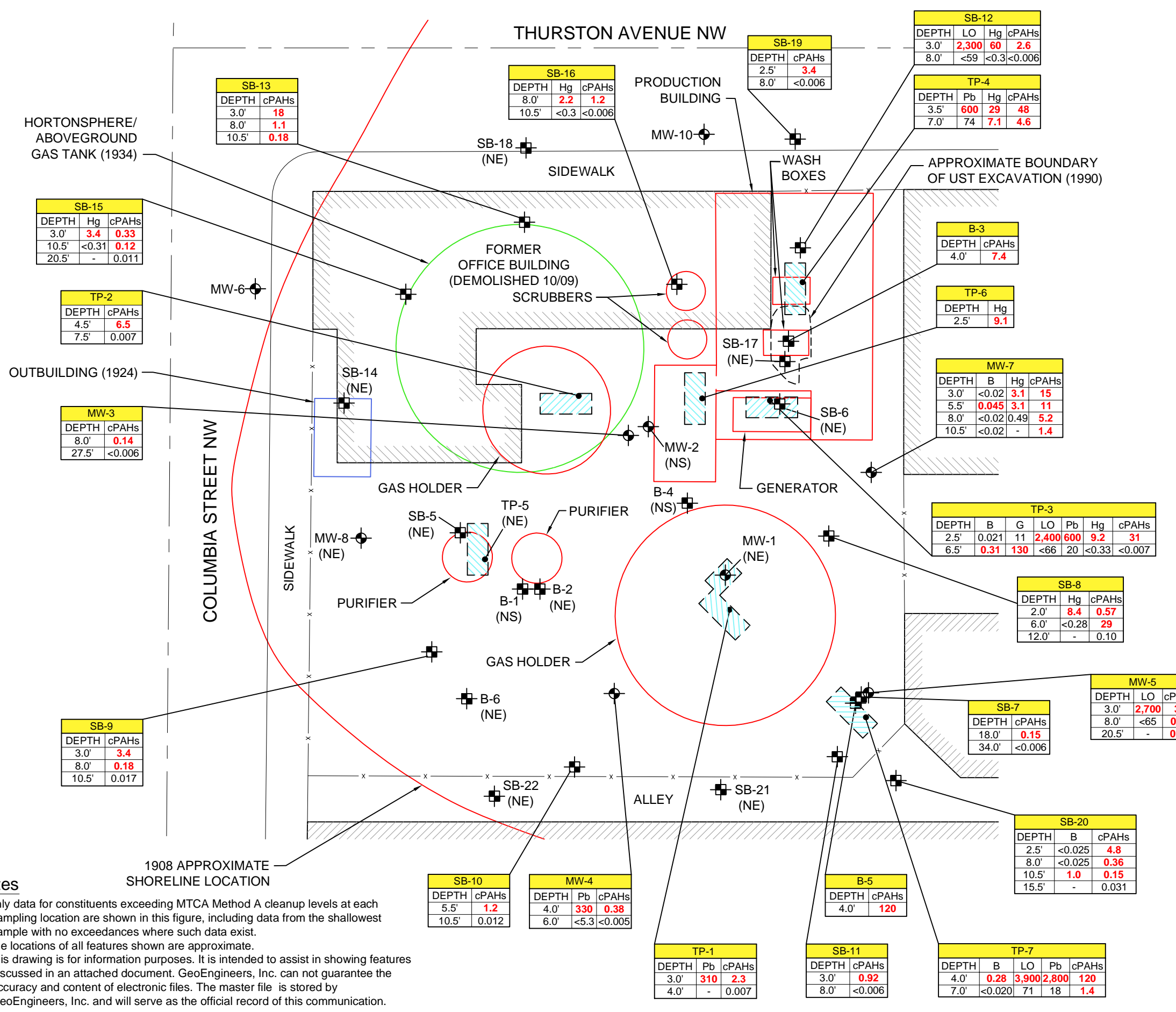
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Existing and Historical Features

Former Olympia MGP Site
Olympia, Washington



Figure 2



Legend

- 1908 Site facilities / features
- Existing or former structure
- Existing fence
- Monitoring well
- Soil boring
- Test pit
- Test pit sidewall soil sampling location

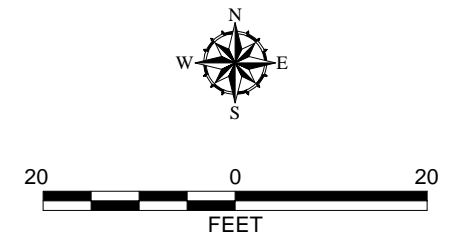
Soil results in mg/kg

cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons – toxic equivalent concentration

B = Benzene
G = 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



Notes

- Only data for constituents exceeding MTCA Method A cleanup levels at each sampling location are shown in this figure, including data from the shallowest sample with no exceedances where such data exist.
- The locations of all features shown are approximate.
- 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.

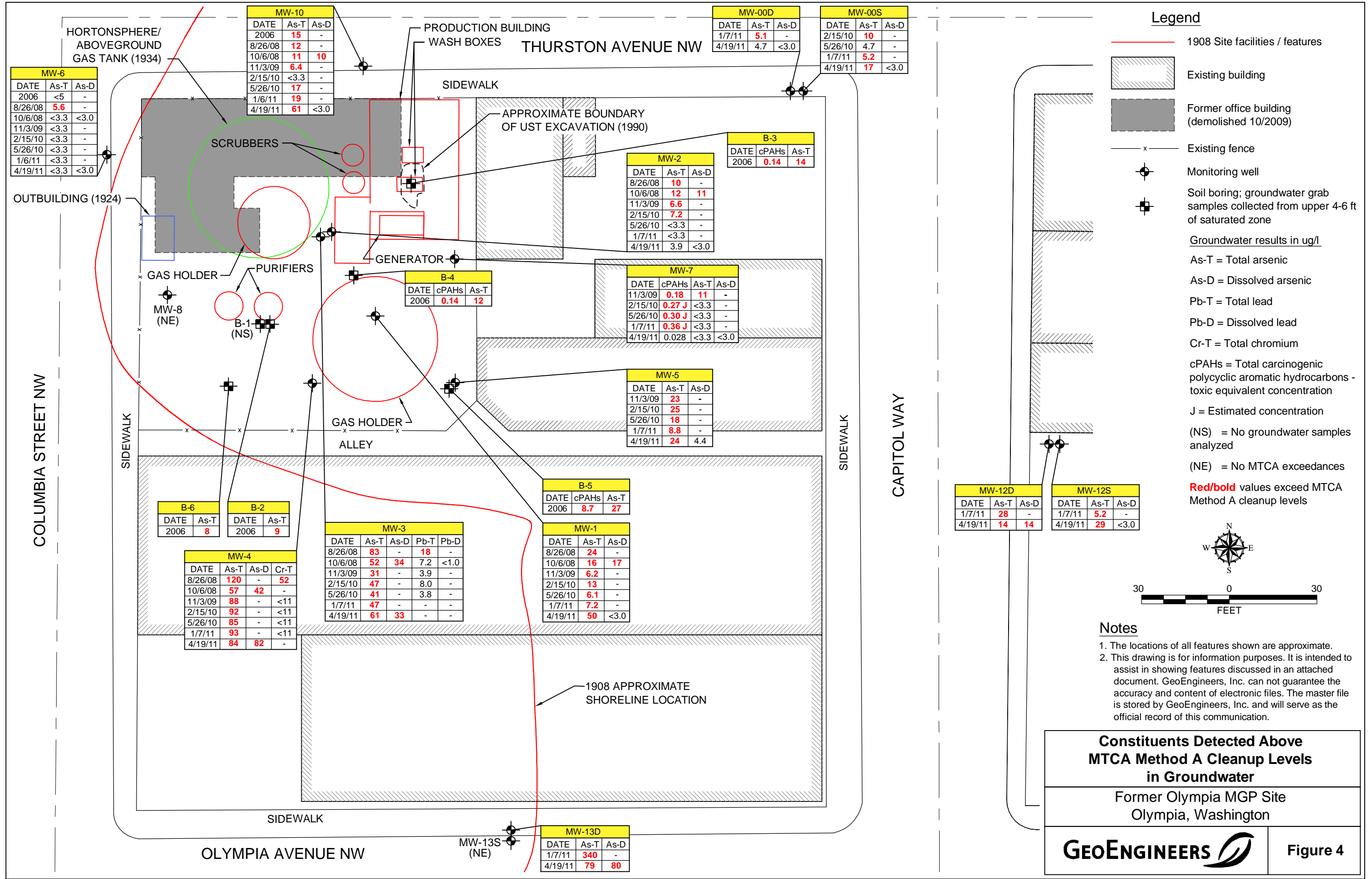
**Constituents Detected Above
MTCA Method A Cleanup Levels in Soil**

Former Olympia MGP Site
Olympia, Washington

GEOENGINEERS

Figure 3

\\SEA\PROJECTS\10186774\001\TASK 04.00 - DATA SUMMARY REPORT\CAD\DATA SUMMARY FIGS\018677400_TASK 04.00 DATA SUMMARY FIG 4.DWG\TAB.F4 MODIFIED BY TMCHAUD ON OCT 16, 2011 - 17:28



DATE	As-T	As-D
2006	<5	-
8/26/08	5.6	-
10/6/08	<3.3	<3.0
11/3/09	<3.3	-
2/15/10	<3.3	-
5/26/10	<3.3	-
1/6/11	<3.3	-
4/19/11	<3.3	<3.0

DATE	As-T	As-D
2006	15	-
8/26/08	12	-
10/6/08	11	10
11/3/09	6.4	-
2/15/10	<3.3	-
5/26/10	17	-
1/6/11	19	-
4/19/11	61	<3.0

DATE	As-T	As-D
1/7/11	5.1	-
4/19/11	4.7	<3.0

DATE	As-T	As-D
2/15/10	10	-
5/26/10	4.7	-
1/7/11	5.2	-
4/19/11	17	<3.0

DATE	As-T	As-D
8/26/08	10	-
10/6/08	12	11
11/3/09	6.6	-
2/15/10	7.2	-
5/26/10	<3.3	-
1/7/11	<3.3	-
4/19/11	3.9	<3.0

DATE	cPAHs	As-T
2006	0.14	14

DATE	cPAHs	As-T	As-D
11/3/09	0.18	11	-
2/15/10	0.27 J	<3.3	-
5/26/10	0.30 J	<3.3	-
1/7/11	0.36 J	<3.3	-
4/19/11	0.028	<3.3	<3.0

DATE	As-T	As-D
11/3/09	23	-
2/15/10	25	-
5/26/10	18	-
1/7/11	8.8	-
4/19/11	24	4.4

DATE	cPAHs	As-T
2006	8.7	27

DATE	As-T	As-D
8/26/08	24	-
10/6/08	16	17
11/3/09	6.2	-
2/15/10	13	-
5/26/10	6.1	-
1/7/11	7.2	-
4/19/11	50	<3.0

DATE	As-T	As-D	Pb-T	Pb-D
8/26/08	83	-	18	-
10/6/08	52	34	7.2	<1.0
11/3/09	31	-	3.9	-
2/15/10	47	-	8.0	-
5/26/10	41	-	3.8	-
1/7/11	47	-	-	-
4/19/11	61	33	-	-

DATE	As-T
2006	8

DATE	As-T
2006	9

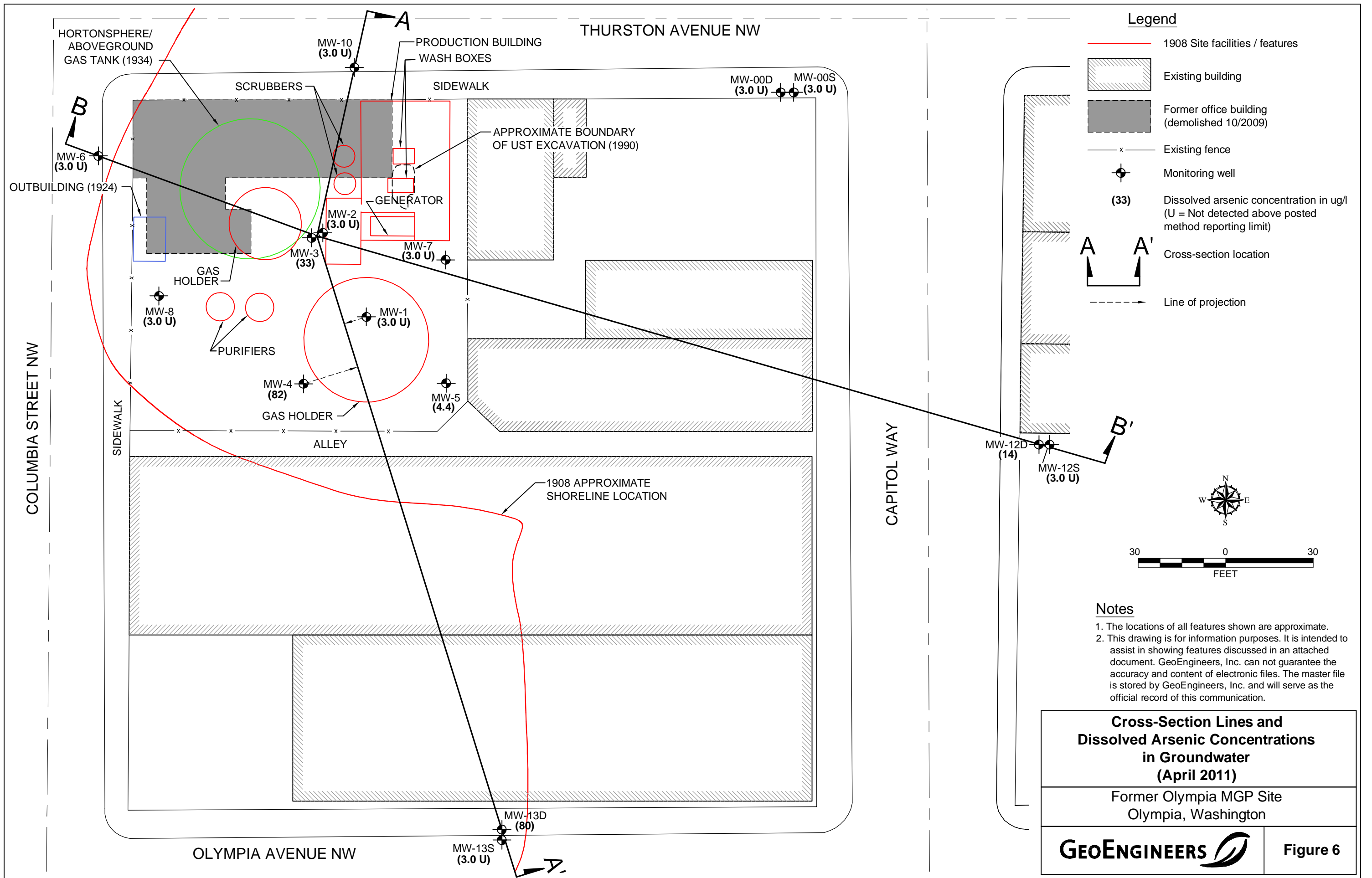
DATE	As-T	As-D	Cr-T
8/26/08	120	-	52
10/6/08	57	42	-
11/3/09	88	-	<11
2/15/10	92	-	<11
5/26/10	85	-	<11
1/7/11	93	-	<11
4/19/11	84	82	-

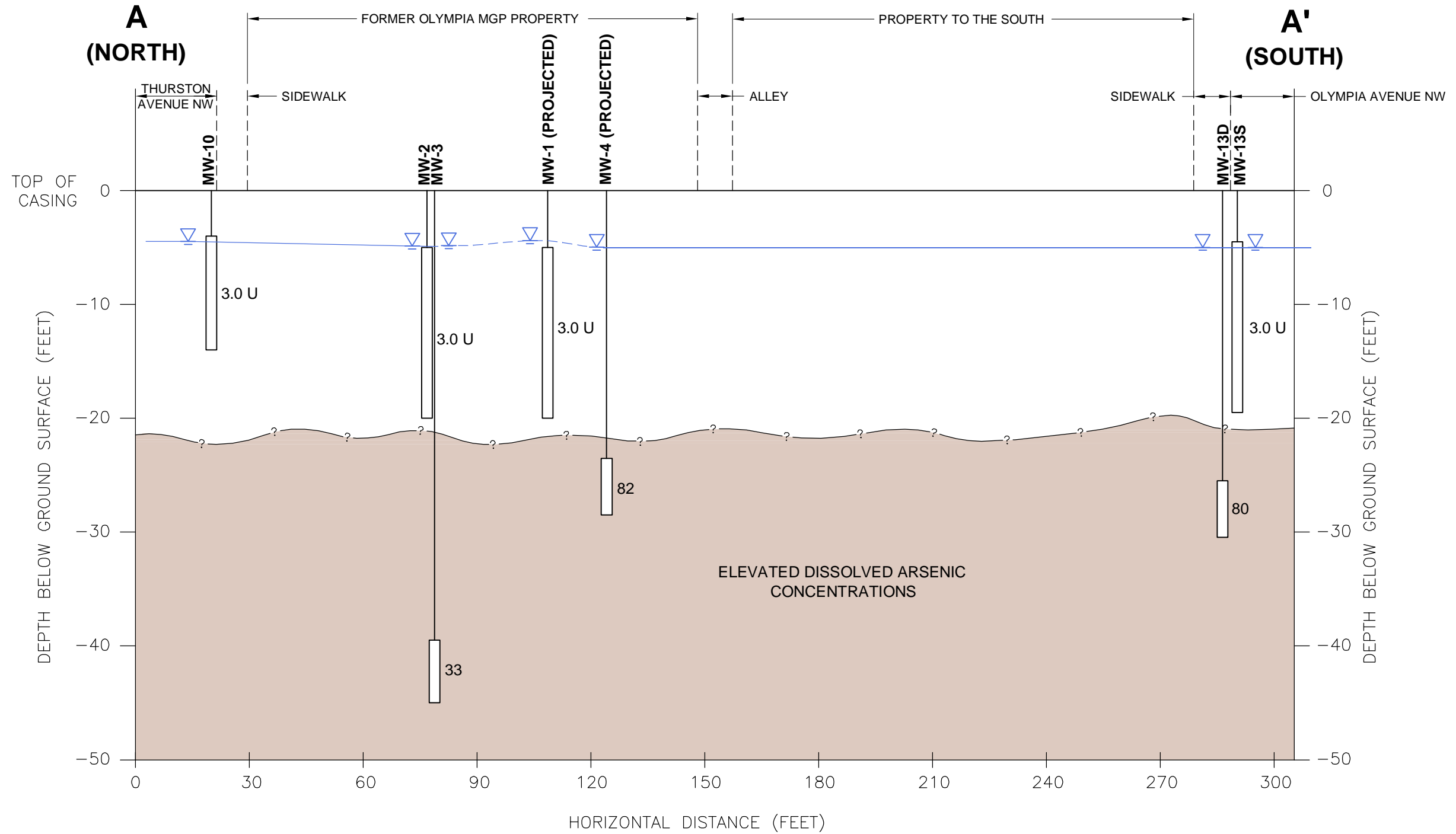
DATE	As-T	As-D
1/7/11	28	-
4/19/11	14	14

DATE	As-T	As-D
1/7/11	5.2	-
4/19/11	29	<3.0

DATE	As-T	As-D
1/7/11	340	-
4/19/11	79	80

\\SEA\PROJECTS\01086774\001\TASK 04.00 - DATA SUMMARY REPORT\CAD\DATA SUMMARY Figs\01086774\001_TASK 04.00 DATA SUMMARY FIG 6.DWG\TAB.F6 MODIFIED BY TMICHAUD ON OCT 16, 2011 - 17:31





Legend

- MW-1 Monitoring Well Number
- Measured Depth to Groundwater
- Screen Interval
- 33 Concentration of Dissolved Arsenic in Groundwater Sample Collected on 4/19/11 (ug/l) (U = Not detected above posted method reporting limit)

Notes

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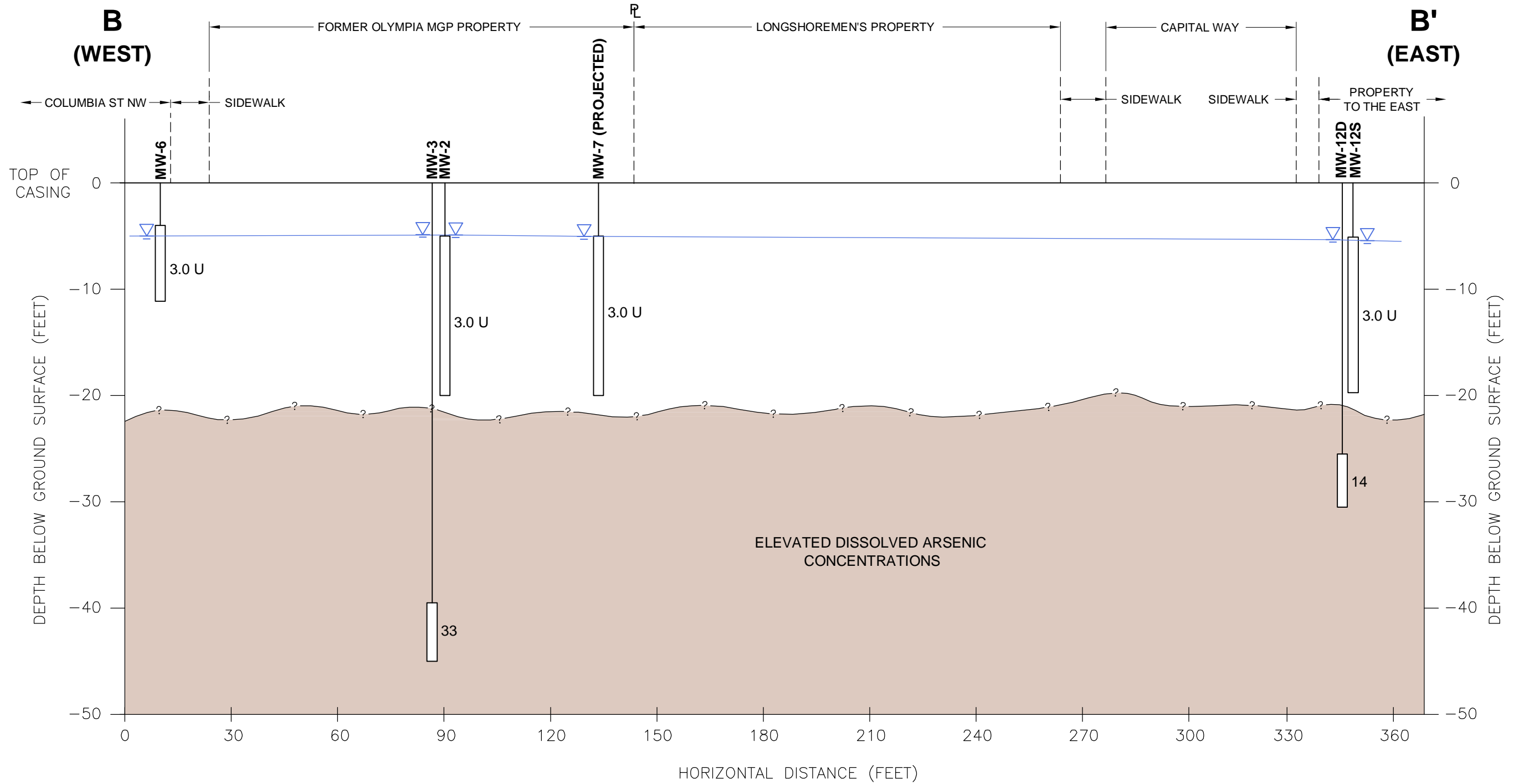
Reference: Sketch by GeoEngineers staff June, 2011.

HORIZONTAL SCALE: 1" = 30'
 VERTICAL SCALE: 1" = 10'
 VERTICAL EXAGGERATION: 3X

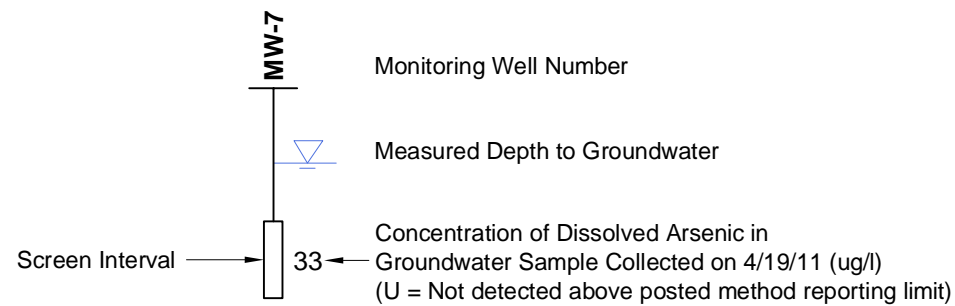


Cross-Section A-A'	
Former Olympia MGP Site Olympia, Washington	
GEOENGINEERS	Figure 7

I:\SEA\PROJECTS\010186774\001\TASK 04.00 - DATA SUMMARY REPORT\CAD\DATA SUMMARY Figs\018677400_TASK 04.00 DATA SUMMARY FIG CROSSSECTIONS.DWG\TAB:FIG 8 MODIFIED BY TRICHAUD ON OCT 16, 2011 - 17:33



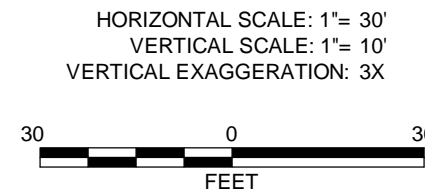
Legend



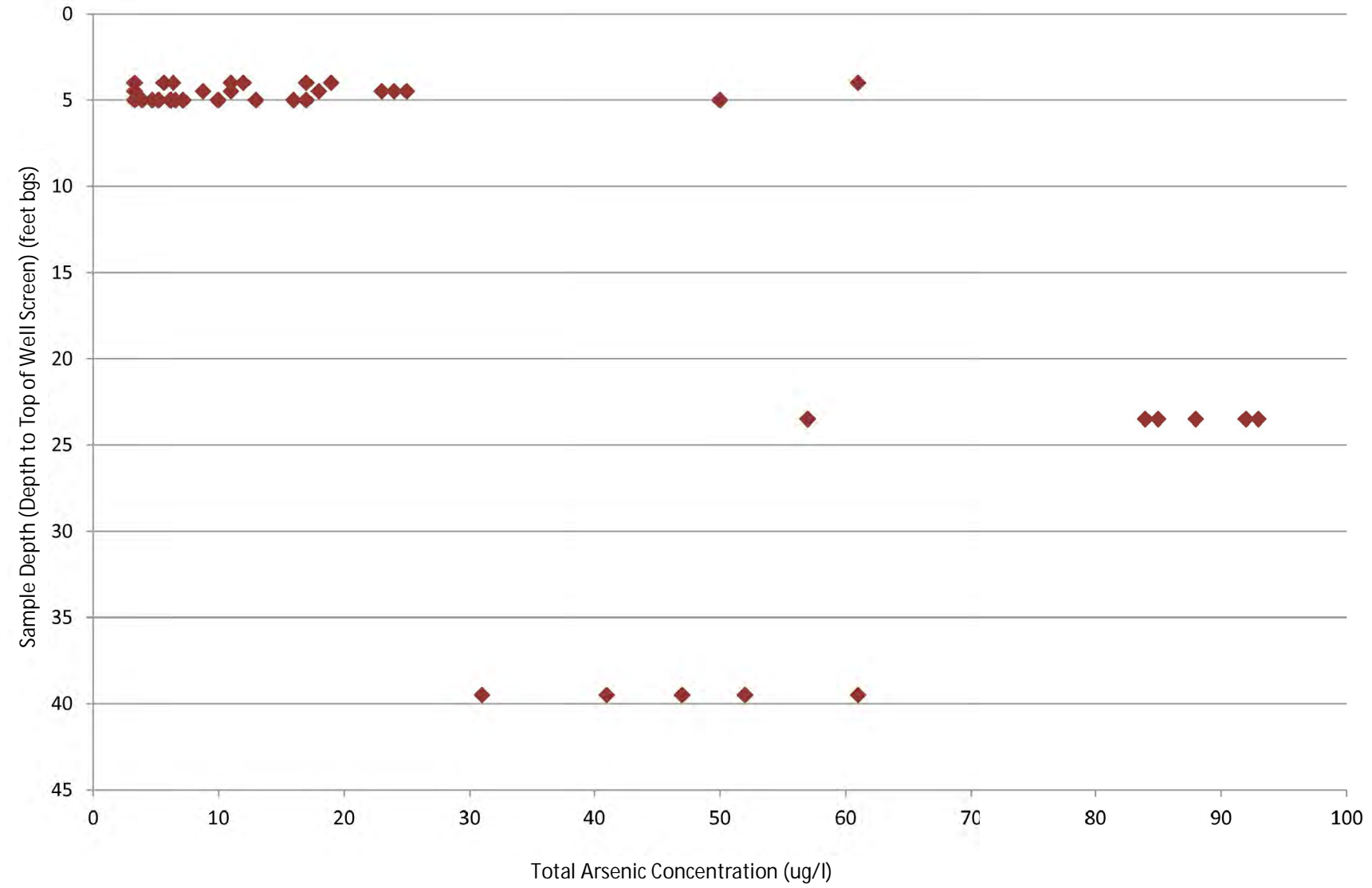
Notes


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.

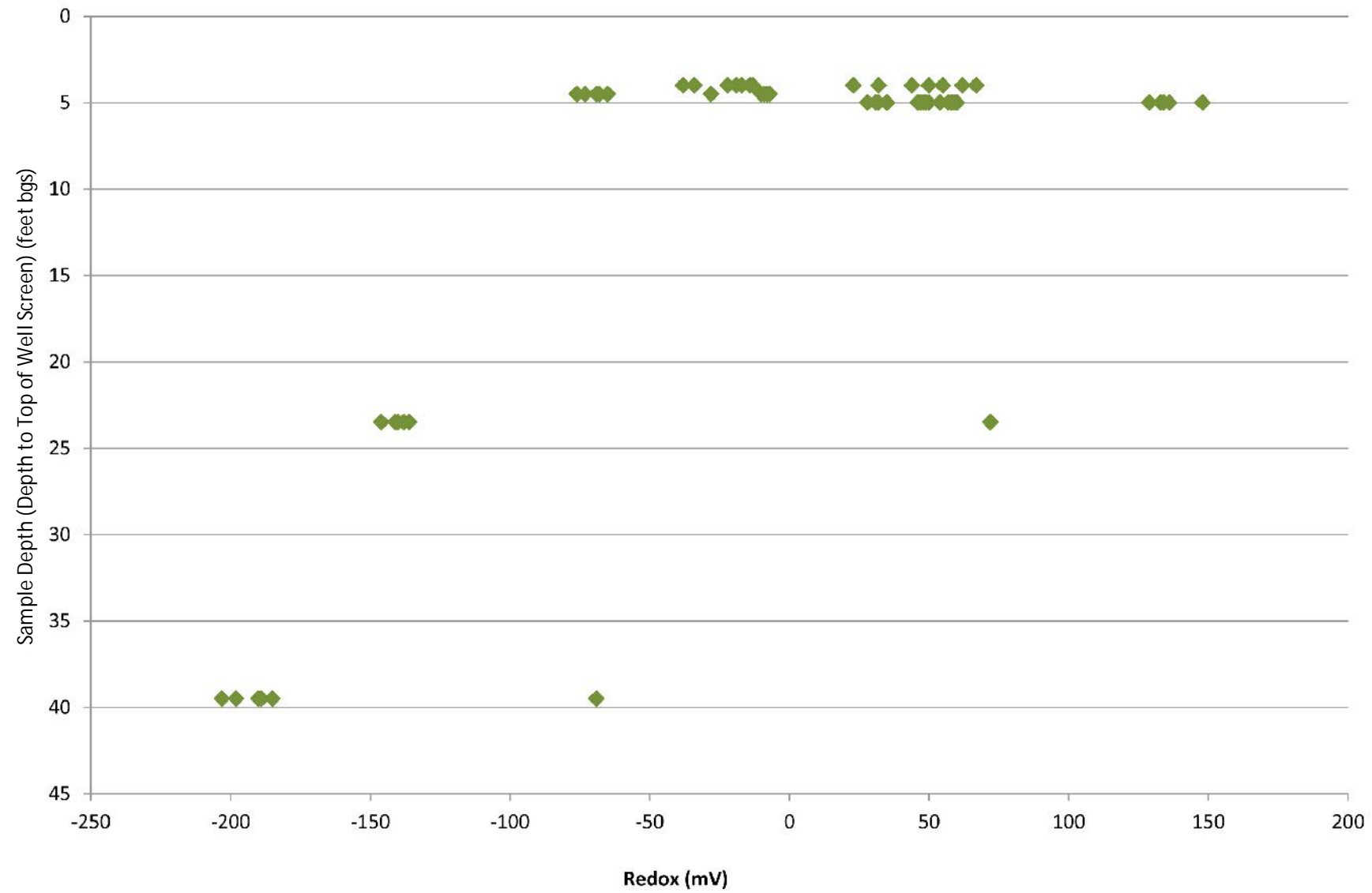
Reference: Sketch by GeoEngineers staff June, 2011.




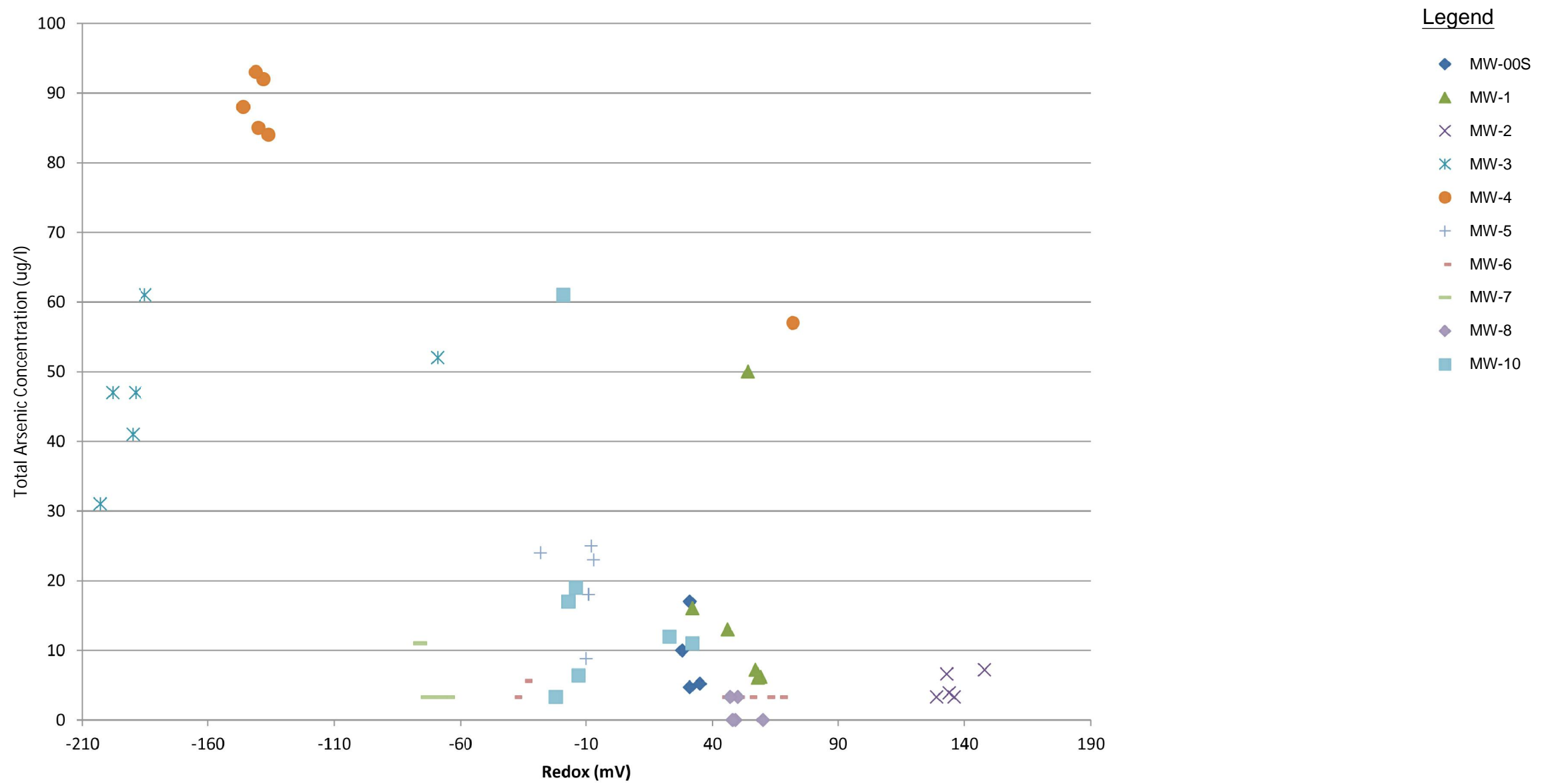
Cross-Section B-B'	
Former Olympia MGP Site Olympia, Washington	
GEOENGINEERS	Figure 8



Total Arsenic Concentration vs. Groundwater Sample Depth (Samples <15 NTU Turbidity)
Former Olympia MGP Site
Olympia, Washington
GEOENGINEERS  **Figure 9**



Redox vs. Groundwater Sample Depth (Samples <15 NTU Turbidity)	
Former Olympia MGP Site Olympia, Washington	
GEOENGINEERS 	Figure 10



**Total Arsenic Concentrations
in Groundwater vs. Redox
(Samples <15 NTU Turbidity)**

Former Olympia MGP Site
Olympia, Washington


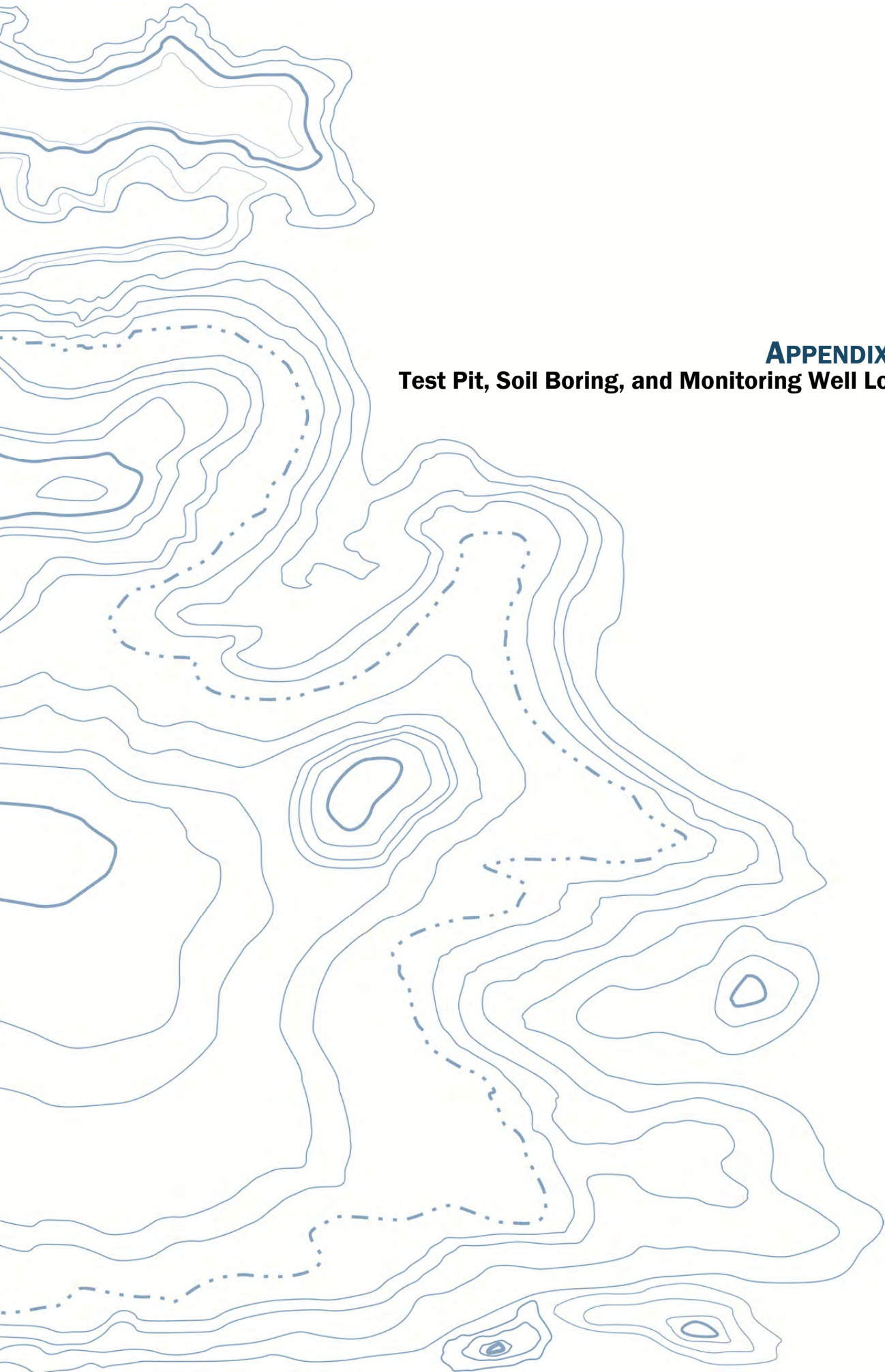
GEOENGINEERS 

Figure 11



APPENDIX A
Test Pit, Soil Boring, and Monitoring Well Logs

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
		SAND AND SANDY SOILS		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SW	WELL-GRADED SANDS, GRAVELLY SANDS
		SAND AND SANDY SOILS		SP	POORLY-GRADED SANDS, GRAVELLY SAND
FINE GRAINED SOILS	SILTS AND CLAYS	SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		SM	SILTY SANDS, SAND - SILT MIXTURES
		CLEAN SANDS <small>(LITTLE OR NO FINES)</small>		SC	CLAYEY SANDS, SAND - CLAY MIXTURES
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
		SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
HIGHLY ORGANIC SOILS	SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		CH	INORGANIC CLAYS OF HIGH PLASTICITY	
	SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY	
	SANDS WITH FINES <small>(APPRECIABLE AMOUNT OF FINES)</small>		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

Stratigraphic Contact



Distinct contact between soil strata or geologic units



Gradual change 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

Date Excavated: 8/6/08, 8/12/08

Logged by: SHL

Equipment: Backhoe (8/6/08), excavator (8/12/08)

Surface Elevation (ft):

Depth feet	Sample	Sample Number	Analytical Testing	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	OTHER TESTS AND NOTES
0					AC	2 inches asphalt			
	☒	1			SP	Brown fine to medium sand with occasional gravel (moist)	NS	0	Brick and wood debris Concrete debris (pipes)
					SM	Gray to black silty sand (moist)			
	☒	2	CA			Black silty sand (moist)	SS	0	
					CC	Concrete slab			
	☒	3	CA		SP	Brown fine to medium sand with occasional gravel (moist)	NS	0	
5	Moderate caving observed at 1 feet bgs. Concrete slab encountered at 3 feet bgs. Broke through slab on 8/12/08 to facilitate installation of monitoring well MW-1. No groundwater seepage observed.								
10									
15									
20									
25									

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

LOG OF TEST PIT TP-1



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

FIGURE A-2
 Sheet 1 of 1

V6 ENV/TPIT P:\018677400\TASK 0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 - 1.GDT 11/13/08

Date Excavated: 8/6/08, 8/12/08

Logged by: SHL

Equipment: Backhoe (8/6/08), excavator (8/12/08)

Surface Elevation (ft):

Depth feet	Sample	Sample Number	Analytical Testing	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	OTHER TESTS AND NOTES
0	☒	1			AC	3 inches asphalt			
					SP	Brown fine to medium sand with gravel (moist)	NS	0	Roots
					SP	Gray medium sand with shell fragments (moist)			Brick and shell fragments
	☒	2	CA		CC	Concrete slab	NS	0	Concrete debris
5					SP	Brown fine to medium sand with occasional gravel (moist)			
	☒	3	CA			(wet)	NS	0	
						Minor caving observed at 2 feet bgs. Concrete slab encountered at 4.5 feet bgs. Broke through slab on 8/12/08 to facilitate installation of monitoring wells MW-2 and MW-3. Groundwater seepage observed at 7 feet bgs.			
10									
15									
20									
25									

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

LOG OF TEST PIT TP-2



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

FIGURE A-3
 Sheet 1 of 1







V6 ENV/TPIT P:\0186774\001\TASK\0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 - 1.GDT 11/13/08

Date Excavated: 8/6/08

Logged by: SHL

Equipment: Backhoe

Surface Elevation (ft):

Depth feet	Sample	Sample Number	Analytical Testing	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	OTHER TESTS AND NOTES
0	☒	1			AC SP	3 inches asphalt	NS	0	Pipe
					SM	Brown fine to medium sand with gravel (moist)	SS	0	
	☒	2	CA		SM	Black silty sand (moist)	SS	0	
					CC SP	Concrete slab	NS	0	
	☒	3			SP	Brown/gray medium sand with shell fragments (moist)	NS	0	
5	☒	4	CA		SP	(wet)	MS	407	
<p>Minor caving observed at 2 feet bgs. Moderate groundwater seepage observed at 6.5 feet bgs.</p>									
10									
15									
20									
25									

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

V6 ENV/TPIT P:\01\86774\001\TASK\0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 - 1.GDT 11/13/08

LOG OF TEST PIT TP-3



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

FIGURE A-4
Sheet 1 of 1

Date Excavated: 8/6/08

Logged by: SHL

Equipment: Backhoe

Surface Elevation (ft):

Depth feet	Sample	Sample Number	Analytical Testing	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	OTHER TESTS AND NOTES
0	☒	1			AC	3 inches asphalt			
					SP	Brown fine to medium sand with gravel (moist)	NS	0	
					CC	Concrete slab			
					SP	Brown to black, fine to medium sand (moist)			
	☒	2	CA				NS	0	
					SP	Brown medium sand with shell fragments (moist)			
5									
	☒	3	CA			(wet)	NS	0	
						Heavy caving observed at 1 feet bgs. Moderate groundwater seepage observed at 7 feet bgs.			
10									
15									
20									
25									

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

V6 ENV/TPIT P:\010186774\001\TASK\0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 - 1.GDT 11/13/08

LOG OF TEST PIT TP-4



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

FIGURE A-5
 Sheet 1 of 1

Date Excavated: 8/6/08

Logged by: SHL

Equipment: Backhoe

Surface Elevation (ft):

Depth feet	Sample	Sample Number	Analytical Testing	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	OTHER TESTS AND NOTES
0	☒	1			AC SP	3 inches asphalt Brown fine to medium sand with occasional gravel (moist)	NS	0	Concrete debris Roots
					SP	Brown medium sand with shell fragments (moist)			
	☒	2	CA			(Grades to gray)	NS	0	
5	☒	3	CA			(Abundant shells)	NS	0	
<p>Minor caving observed at 3 feet bgs. Moderate groundwater seepage observed at 6 feet bgs.</p>									
10									
15									
20									
25									

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

LOG OF TEST PIT TP-5



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

FIGURE A-6
 Sheet 1 of 1

V6 ENV/TPIT P:\0186774\001\TASK\0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 - 1.GDT 11/12/08

Date Excavated: 8/12/08

Logged by: SHL

Equipment: Excavator

Surface Elevation (ft):

Depth feet	Sample	Sample Number	Analytical Testing	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	OTHER TESTS AND NOTES
0					AC	3 inches asphalt			
	☒	1			SP	Brown fine to medium sand with gravel (moist)	NS	0	Concrete block
	☒	2	CA		SP	Brown to gray medium sand with shells (moist)	NS	0	Metal debris
									4-inch steel pipe
5									
	☒	3					NS	0	
						Heavy caving observed at 2 feet bgs. Heavy groundwater seepage observed at 7 feet bgs.			
10									
15									
20									
25									

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

V6 ENV/TPIT P:\01018677400\TASK\0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 - 1.GDT 11/13/08

LOG OF TEST PIT TP-6



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

FIGURE A-7
 Sheet 1 of 1

Date Excavated: 8/6/08

Logged by: SHL

Equipment: Backhoe

Surface Elevation (ft): _____

Depth feet	Sample	Sample Number	Analytical Testing	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	OTHER TESTS AND NOTES
0					AC	3 inches asphalt			
	⊗	1			SP	Brown to gray, fine to medium sand with gravel (moist)	NS	0	Brick, concrete, bottles Edge of 14-inch concrete slab observed at NW end of test pit
	⊗	2	CA		SP	Gray fine to medium sand with shell fragments			
	⊗				SM	Black silty sand (moist)	NS	0	
	⊗				SP	Black to gray medium sand with shell fragments			
5									
	⊗	3	CA				NS	0	
						Minor caving observed at 3 feet bgs. Moderate groundwater seepage observed at 7 feet bgs.			
10									
15									
20									
25									

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

LOG OF TEST PIT TP-7

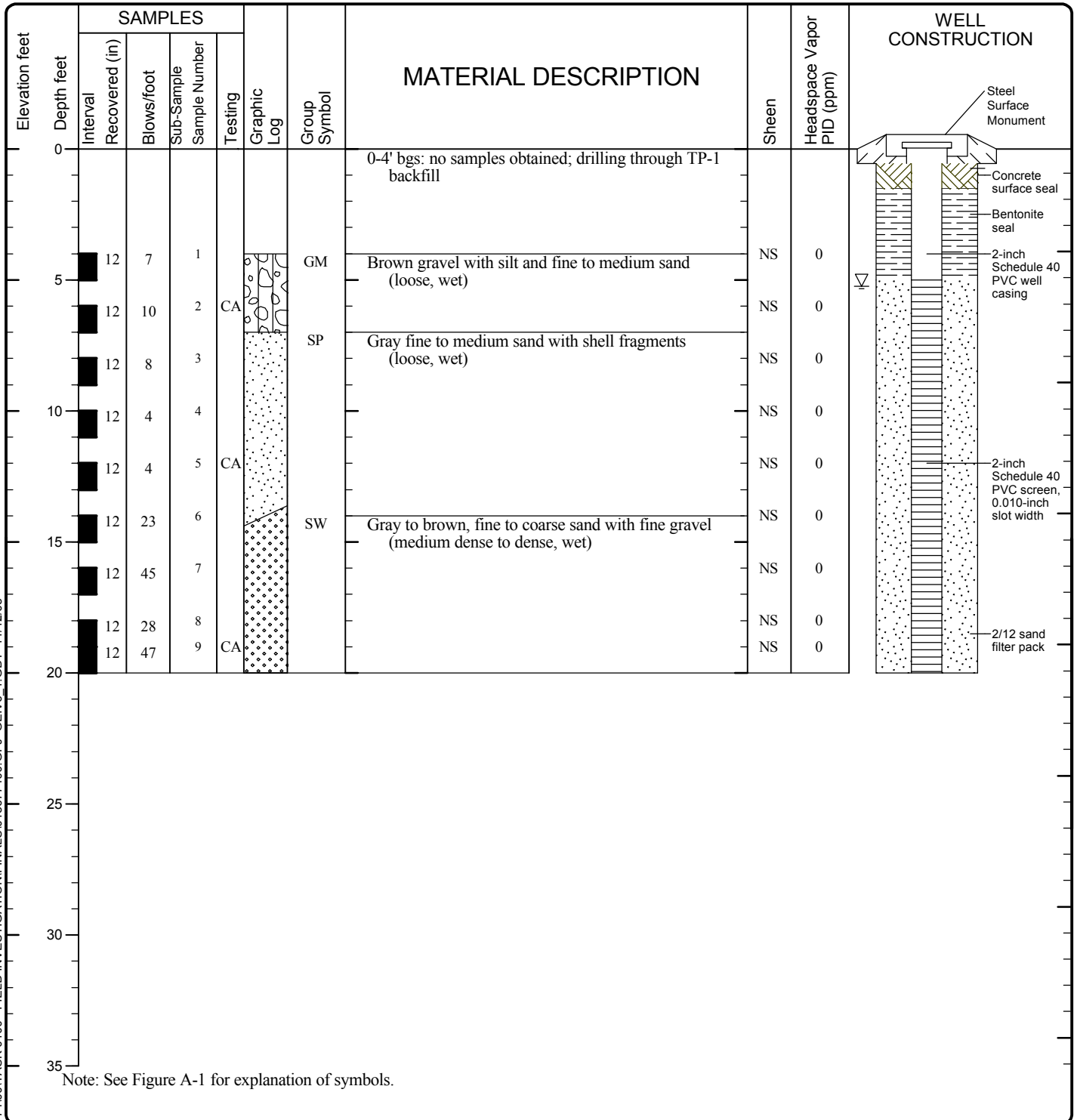


Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

FIGURE A-8
 Sheet 1 of 1

V6 ENV/TPIT P:\0186774\001\TASK\0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 - 1.GDT 11/13/08

Date(s) Drilled	8/22/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Well Depth (ft)	20	Ground Surface Elevation (ft)	8.92	Groundwater Elevation (ft)	3.68
Vertical Datum	Arbitrary Benchmark (assigned elev. = 10 ft)	Datum/System		Easting(x):	Northing(y):



V6 ENVWELL P:00186774001TASK 0100 - FIELD INVESTIGATION\FINAL\S018677400.GPJ - GEIV6 - 1.GDT - 11/12/08

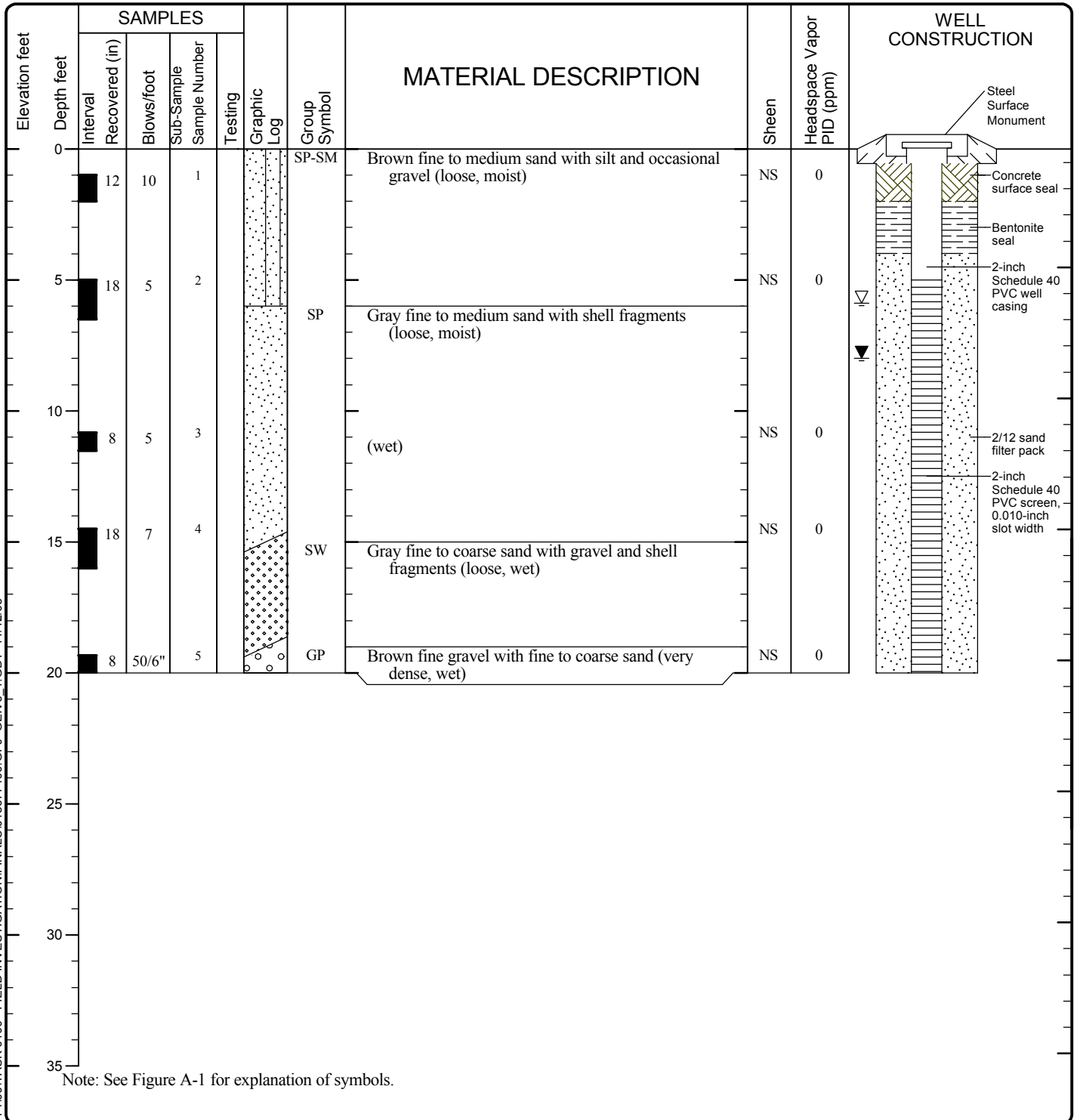
LOG OF MONITORING WELL MW-1



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-9
 Sheet 1 of 1

Date(s) Drilled	8/21/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Well Depth (ft)	20	Ground Surface Elevation (ft)	9.52	Groundwater Elevation (ft)	3.63
Vertical Datum	Arbitrary Benchmark (assigned elev. = 10 ft)	Datum/System		Easting(x):	Northing(y):



V6 ENVWELL P:\00186774\001TASK 0100 - FIELD INVESTIGATION\FINAL\S018677400.GPJ - GEIV6_1.GDT_11/12/08

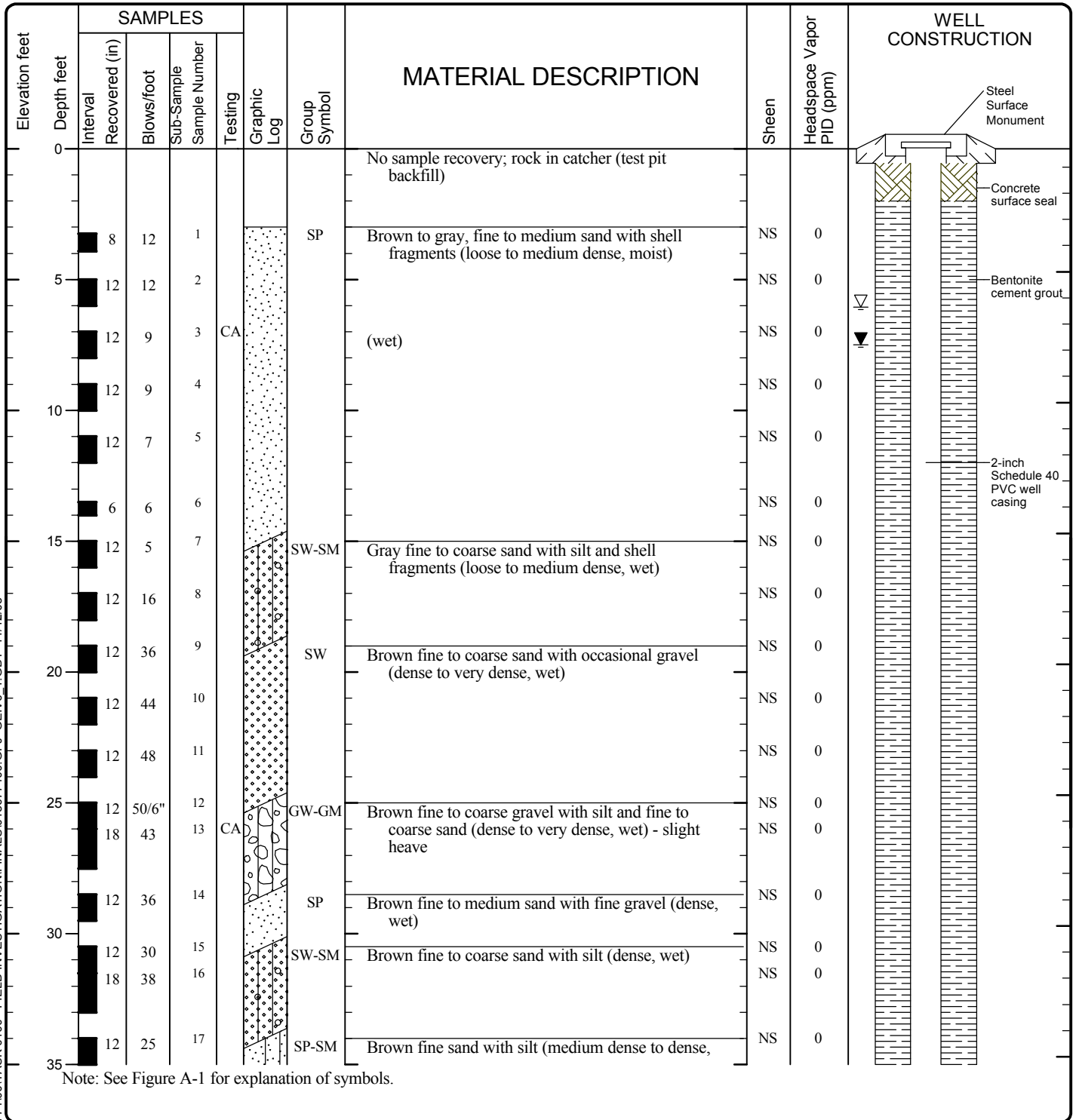
LOG OF MONITORING WELL MW-2



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-10
 Sheet 1 of 1

Date(s) Drilled	8/20/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Well Depth (ft)	44.5	Ground Surface Elevation (ft)	9.70	Groundwater Elevation (ft)	3.65
Vertical Datum	Arbitrary Benchmark (assigned elev. = 10 ft)	Datum/System		Easting(x):	Northing(y):



LOG OF MONITORING WELL MW-3

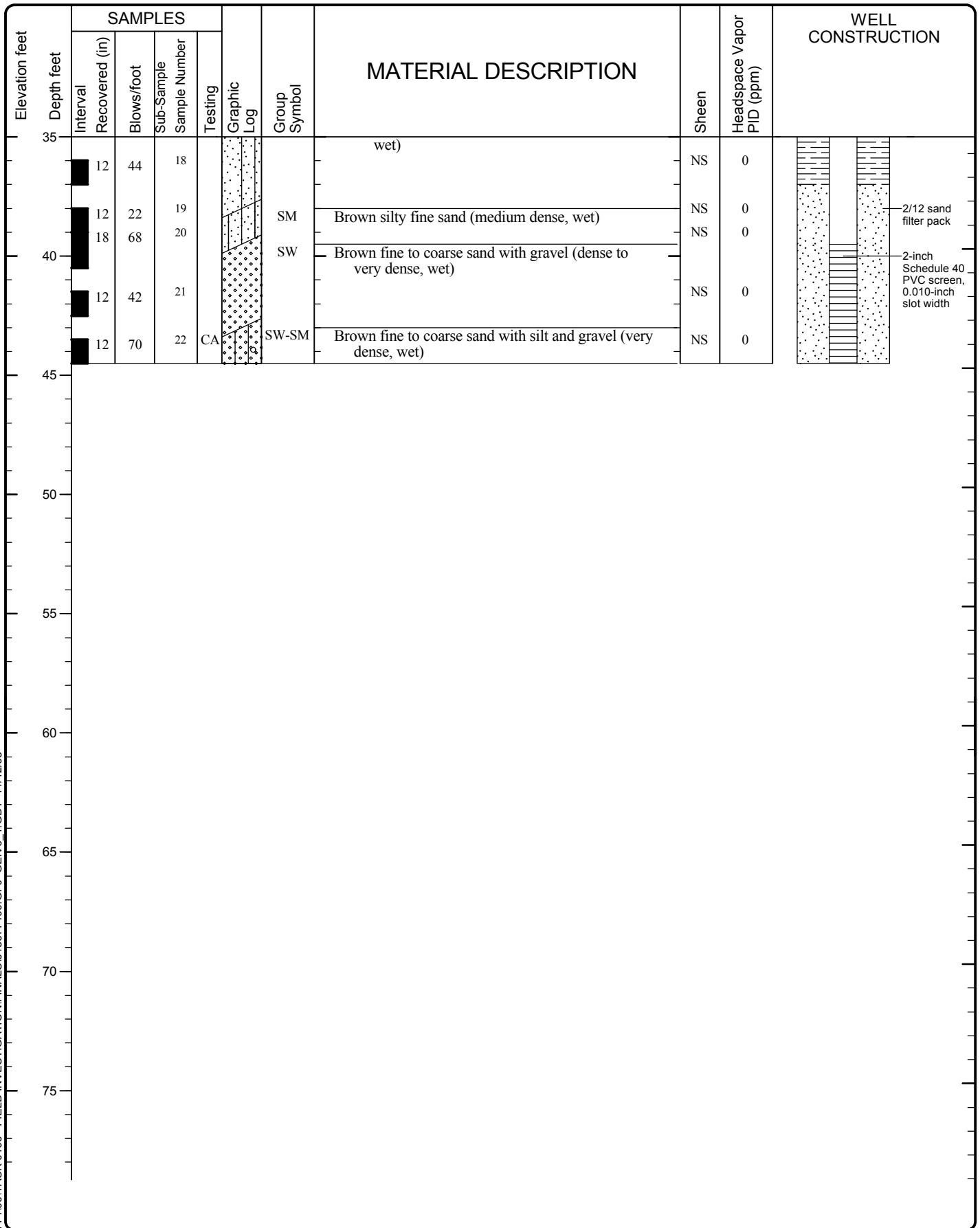


Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-11
 Sheet 1 of 2

V6 ENVWELL P:\00186774\001TASK 0100 - FIELD INVESTIGATION\FINAL\S018677400.GPJ GEIV6 1.GDT 11/12/08

V6 ENVWELL P:\00186774\001TASK 0100 - FIELD INVESTIGATION\FINAL\S018677400.GPJ GEIV6_1.GDT 11/12/08



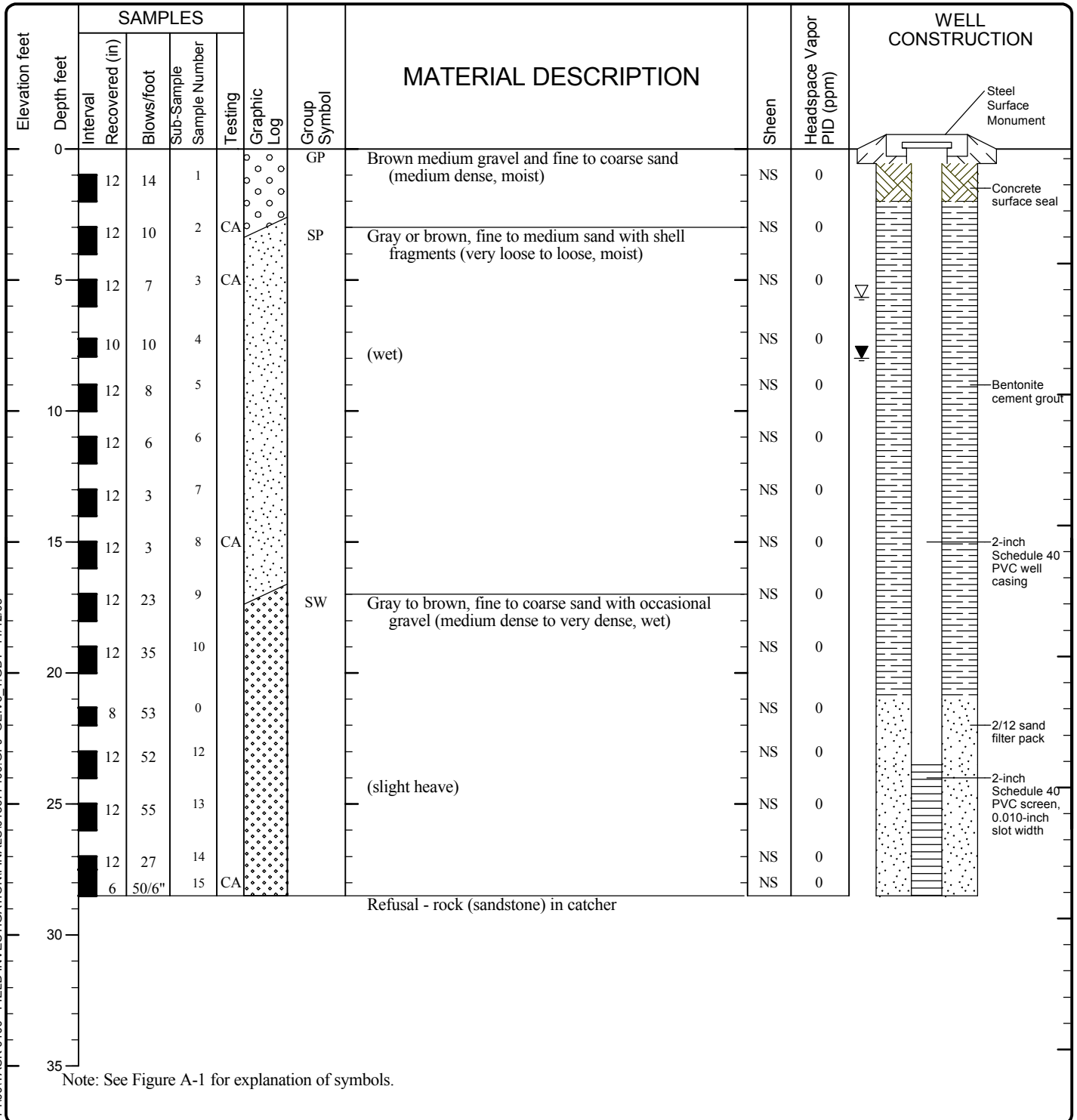
LOG OF MONITORING WELL MW-3 (continued)



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-11
 Sheet 2 of 2

Date(s) Drilled	8/20/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Well Depth (ft)	28.5	Ground Surface Elevation (ft)	9.37	Groundwater Elevation (ft)	3.7
Vertical Datum	Arbitrary Benchmark (assigned elev. = 10 ft)	Datum/System		Easting(x):	Northing(y):



LOG OF MONITORING WELL MW-4



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-12
 Sheet 1 of 1

V6 ENVWELL P:\00186774\001TASK 0100 - FIELD INVESTIGATION\FINAL\S018677400.GPJ GEIV6_1.GDT 11/12/08

Date(s) Drilled	8/21/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Depth (ft)	40	Surface Elevation (ft)		Groundwater Level (ft. bgs)	6
Vertical Datum		Datum/System		Easting(x): Northing(y):	

Depth feet	SAMPLES					Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	NOTES
	Interval Recovered (in)	Blows/foot	Sub-Sample Number	Testing								
0								SP	Brown to gray, fine to medium sand with shell fragments (very loose to medium dense, moist)	NS	0	
12	14	8								NS	0	
12	12	9								NS	0	
5	12	8	1							NS	0	
12	12	8	2						(wet)	NS	0	
10	12	10	3							NS	0	
12	12	15	4							NS	0	
12	12	7	5							NS	0	
15	12	2	6							NS	0	
12	12	5	7							NS	0	
20	12	3	8							NS	0	
12	12		9	CA						NS	0	
12	12	3	10					SP-SM	Gray coarse sand with silt (very loose, wet)	NS	0	
25	12	12	11					SW	Gray fine to coarse sand with gravel (medium dense to dense, wet)	NS	0	
12	12	28	12							NS	0	
30	12	35	13							NS	0	
12	12	87	14					SW-SM	Gray fine to coarse sand with silt and gravel (medium dense to very dense, wet)	NS	0	
12	12	48	15							NS	0	
35												

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

V6 ENVBORING P:\0186774\00\TASK 0100 - FIELD INVESTIGATION\FINAL\018677400.GPJ_GEIV6_1.GDT_11/13/08

LOG OF BORING SB-5



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-13
 Sheet 1 of 2

Depth feet	SAMPLES				Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	NOTES
	Interval Recovered (in)	Blows/foot	Sub-Sample Number	Testing							
35	12	28	16			SP-SM	Brown/orange fine to medium sand with silt (dense to very dense, wet)	NS	0		
		36	17					NS	0		
40		61	18	CA				NS	0		
45											
50											
55											
60											
65											
70											
75											

LOG OF BORING SB-5 (continued)



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Date(s) Drilled	8/22/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Depth (ft)	20	Surface Elevation (ft)		Groundwater Level (ft. bgs)	7
Vertical Datum		Datum/System		Easting(x): Northing(y):	

Depth feet	SAMPLES					Water Level Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	NOTES
	Interval Recovered (in)	Blows/foot	Sub-Sample Number	Testing							
0								0-4' bgs: no samples obtained; drilling through TP-3 backfill			
5	12	7	1			SP	Brown medium to coarse sand with gravel (loose, moist)	NS	0		
	12	7	2						HS	144	
	12	6	3			SP	Gray medium to coarse sand with shells and occasional fine gravel (loose to medium dense, wet)	NS	0		
10	12	13	4						NS	0	
	12	23	5	CA		SP	Gray medium to coarse sand (medium dense, wet)	NS	0		
	12	22	6						NS	0	
15	18	22	7			SP	Brown medium to coarse sand with gravel (medium dense to very dense, wet)	NS	0		
	12	65	8						NS	0	
20	18	66	9	CA					NS	0	

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

LOG OF BORING SB-6



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-14
 Sheet 1 of 1

V6_ENVBORING P:\0186774\00\TASK 0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ_GEIV6 11/13/08

Date(s) Drilled	8/21/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Depth (ft)	50	Surface Elevation (ft)		Groundwater Level (ft. bgs)	8
Vertical Datum		Datum/System		Easting(x):	Northing(y):

Depth feet	SAMPLES				Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	NOTES
	Interval Recovered (in)	Blows/foot	Sub-Sample Number	Testing							
0						SW	Brown fine to coarse sand with gravel (loose to medium dense, moist)	NS	0		
2	2	20						NS	0		
6	6	6						NS	0		
5	12	4				SP	Gray fine to medium sand with shell fragments (loose, moist)	NS	0		
6	12	6	1			SM	Black silty fine to medium sand (loose, moist)	NS	0		
10	12	12	2			SW	Gray fine to coarse sand with shell fragments and occasional gravel (loose to medium dense, wet)	NS	0		
12	12	4	3					NS	0		
15	12	24	4			SW	Gray to brown, fine to coarse sand with occasional gravel (medium dense to very dense, wet)	NS	0		
15	12	22	5					NS	0		
18	12	25	6	CA				NS	0		
20	12	51	7					NS	0		
20	12	44	8			SW-SM	Brown fine to coarse sand with silt and fine gravel (medium dense to very dense, wet)	NS	0		
24	12	44	9					NS	0		
25	8	60	10					NS	0		
28	12	46	11					NS	0		
30	12	42	12					NS	0		
32	12	15	13					NS	0		
35	12	51	14	CA		SP-SM	Gray fine sand with silt (medium dense to very dense, wet)	NS	0		

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

V6 ENVBORING P:\0186774\001\TASK 0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ_GEIV6_1.GDT 11/13/08

LOG OF BORING SB-7



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-15
 Sheet 1 of 2

V6 ENVBORING P:\0186774\001\TASK 0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ GEIV6 1.GDT 11/13/08

Depth feet	SAMPLES				Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	NOTES
	Interval Recovered (in)	Blows/foot	Sub-Sample Number	Testing							
35	12	37	15				Gray fine sand with silt (medium dense to very dense, wet)	NS	0		
	12	45	16								
	12	46	17								
40	12	35	18								
	12	22	19	CA							
45											
50											
55											
60											
65											
70											
75											

LOG OF BORING SB-7 (continued)



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-15
 Sheet 2 of 2

Date(s) Drilled	8/22/08	Logged By	SHL	Checked By	RCL
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow-Stem Auger	Sampling Methods	D&M Sampler
Auger Data	4.25" ID	Hammer Data	300 lb hammer/30 in drop	Drilling Equipment	
Total Depth (ft)	20	Surface Elevation (ft)		Groundwater Level (ft. bgs)	7
Vertical Datum		Datum/System		Easting(x): Northing(y):	

Depth feet	SAMPLES					Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor PID (ppm)	NOTES
	Interval Recovered (in)	Blows/foot	Sub-Sample Number	Testing								
0								SP-SM	Brown fine to medium sand with silt and gravel, wood debris (dense, moist)	SS	0	
	12	33	1	CA				SP	Brown fine to medium sand with fine gravel and wood (dense, moist)	NS	0	
	6	39	2					SW	Gray fine to coarse sand with gravel and shell fragments (loose to medium dense, wet)	NS	0	
5	12	5	3	CA				NS		0		
	12	5	4					NS	0			
	12	15	5					NS	0			
10								NS	0			
	6	28	6	CA				NS	0			
	12	54	7					SP	Gray fine to medium sand (very dense, wet)	NS	0	
15								SW-SM	Brown fine to coarse sand with silt and occasional fine gravel (dense, wet)	NS	0	
	8	30	8					SP	Gray fine to medium sand (very dense, wet)	NS	0	
	8	71	9					NS	0			
	12	86	10	CA				NS	0			
20												
25												
30												
35												

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

V6 ENVBORING P:\0186774\001\TASK 0100 - FIELD INVESTIGATION\FINALS\018677400.GPJ_GEIV6_1.GDT 11/13/08

LOG OF BORING SB-8



Project: Former Columbia Street MGP Site
 Project Location: 320 Columbia Street NW, Olympia, WA
 Project Number: 0186-774-00

Figure A-16
 Sheet 1 of 1

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	
		18	19		2				Grades to gray, becomes wet	NS	0	
		18	16		3					NS	0	
		8	8		4				Grades to loose	NS	0	
		18	5		5			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-17
 Sheet 1 of 1

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

Drilled	Start 11/3/2009	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			No recovery
							SP-SM	Gray (with occasional orange mottling) fine to medium sand with silt and gravel (medium dense, moist)			
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-18
 Sheet 1 of 1

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

Drilled	Start 11/3/2009	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						MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS			
	Depth (feet)	Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level					Graphic Log	Group Classification	
0							AC			2 inches asphaltic concrete			
		12	5		1		SM		NS	Dark brown silty fine to medium sand with occasional gravel and shell fragments (loose, moist)	0		
5		6	8		2		SP-SM		NS	Gray to brown fine to medium sand with silt and occasional gravel, shell and brick fragments (loose, moist)	2		
		12	10		3				NS	Grades to gray fine to medium sand with silt and occasional shell fragments (loose, wet)	0		
10		10	13		4				NS	Becomes medium dense	0		
15		14	16		5				NS	Grades to fine to medium sand with silt and gravel and occasional shell and wood fragments (medium dense, wet)	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-19
 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					Graphic Log
0							AC	3 inches asphaltic concrete			
							GP	Dark brown fine gravel with sand and trace silt (loose, moist) (fill)	SS	0	
	13		9		1				NS	0	
	16		6		2		SP-SM	Gray fine to medium sand with silt and occasional gravel and shell fragments (loose, moist)	NS	0	
	14		32		3				NS	0	
	16		43		4		SP	Gray fine to medium sand with occasional gravel and trace silt (dense, wet)	NS	0	
	18		17		5			Becomes medium dense	NS	0	
	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-20
 Sheet 1 of 1

Start Drilled 11/4/2009	End 11/4/2009	Total Depth (ft)	31	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 (ft)		

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		
								Grades to brown fine to medium sand with silt and occasional gravel (very dense, wet)	NS	0		
30	12	50/6"										

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-21
 Sheet 1 of 1

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					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, 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		
20	12	4	4	7				Grades to gray silty fine to medium sand with gravel and occasional shell fragments (loose, wet)	NS	0		
25	10	10	10	8					NS	0		

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-22
 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		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)				
		12	19		1		SP-SM	Gray fine to medium sand with silt and occasional gravel (medium dense, moist)	NS	0		
5												
		8	7		2			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		
		8	3		4							
20								Becomes loose	NS	0		
		8	7		5							

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-23
 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-24
 Sheet 1 of 1

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

Start Drilled 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 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

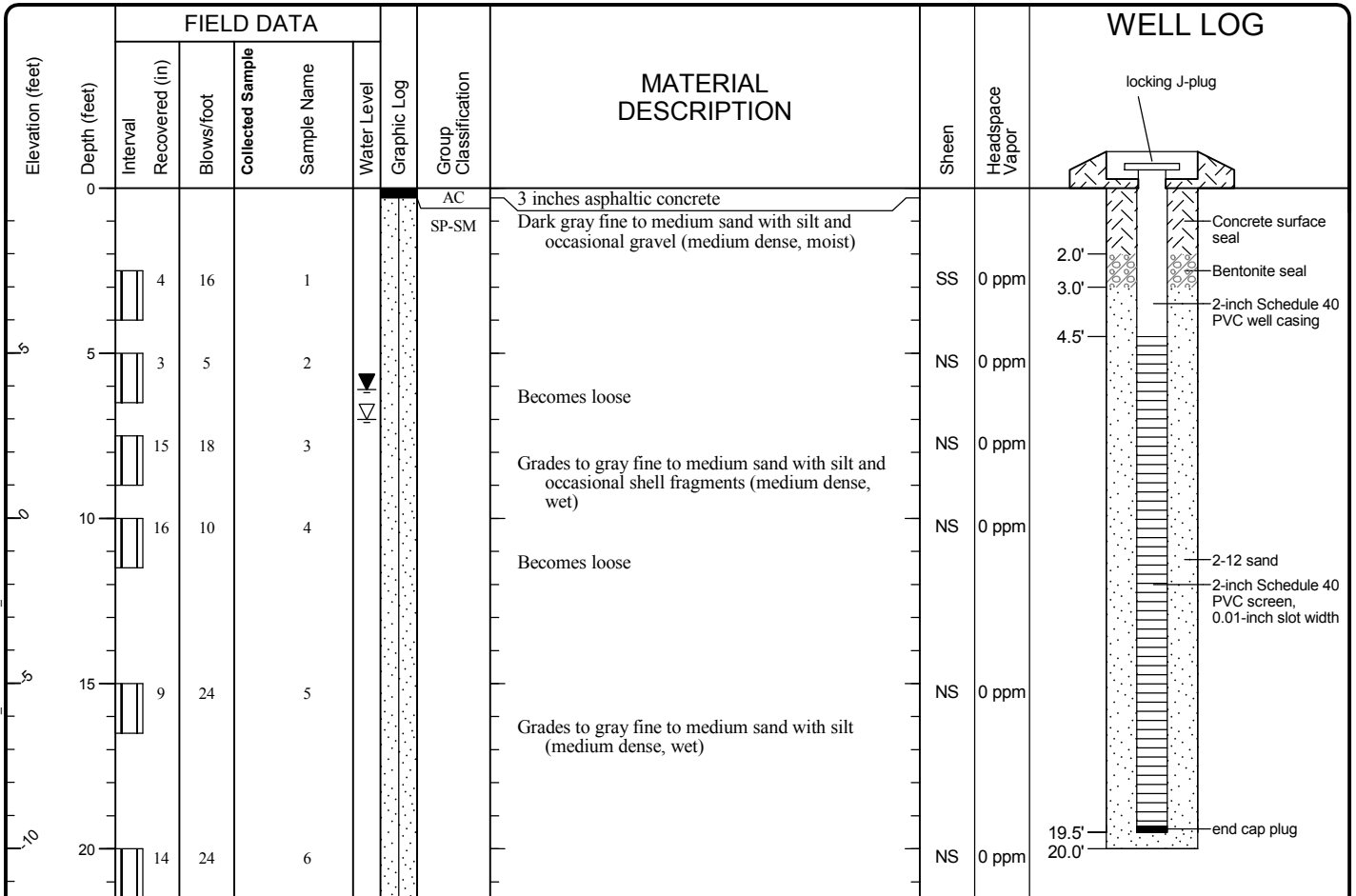


Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-25
 Sheet 1 of 1

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

Drilled	Start 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		10.0		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) Vertical Datum	Arbitrary BM; assigned elevation = 10 feet		Top of Casing Elevation (ft)		9.5		Groundwater		Date Measured	Depth to Water (ft)	Elevation (ft)
Easting (X) Northing (Y)			Horizontal Datum				11/3/2009		5.6	3.89	
Notes: Auger: 4¼ inch ID											



Note: See Figure A-1 for explanation of symbols

Log of Monitoring Well MW-5

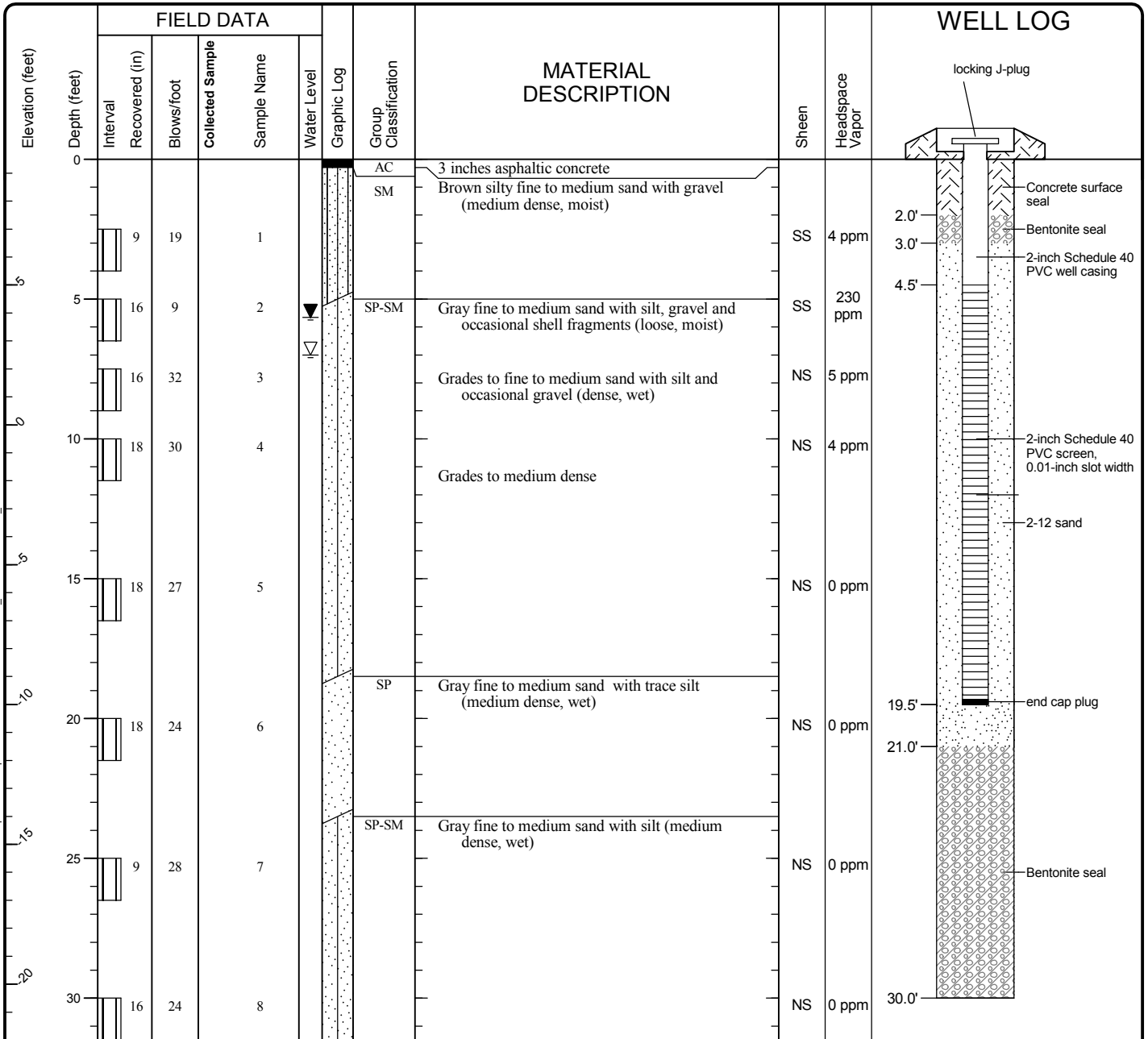


Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-26
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400.GPJ_DB\Template\Lib\Template\GEOENGINEERS\GDT\GEI\ENVIRONMENTAL_WELL

Start Drilled 11/2/2009	End 11/2/2009	Total Depth (ft) 31.5	Logged By Checked By RNM RCL	Driller Cascade Drilling	Drilling Method Hollow Stem Auger
Hammer Data	D&M Sampler 300 lb 30-inch Drop		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) Vertical Datum	Arbitrary BM; assigned elevation = 10 feet		Top of Casing Elevation (ft) 8.9		
Easting (X) Northing (Y)	Horizontal Datum		Date Measured 11/3/2009		Depth to Water (ft) 5.1 Elevation (ft) 3.84
Notes: Auger: 4¼ inch ID					



Note: See Figure A-1 for explanation of symbols

Log of Monitoring Well MW-7

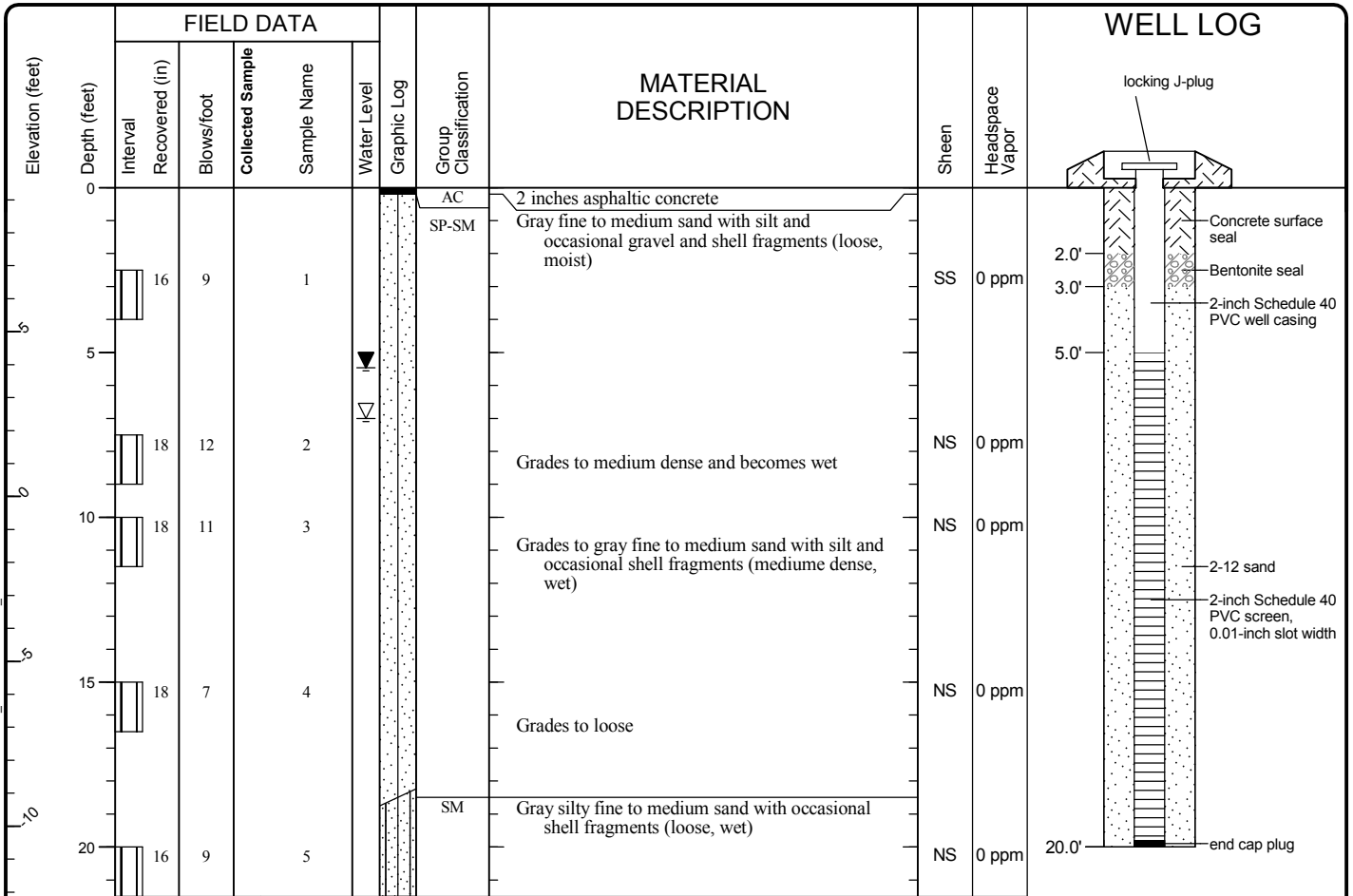


Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-27
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400.GPJ_DB\Template\Lib\Template\GEOENGINEERS\GDT\GEI\ENVIRONMENTAL_WELL

Drilled	Start 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 9.4			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)			9.0					
Easting (X) Northing (Y)				Horizontal Datum						Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
									11/3/2009	5.1	3.91	
Notes: Auger: 4¼ inch ID												



Note: See Figure A-1 for explanation of symbols

Log of Monitoring Well MW-8

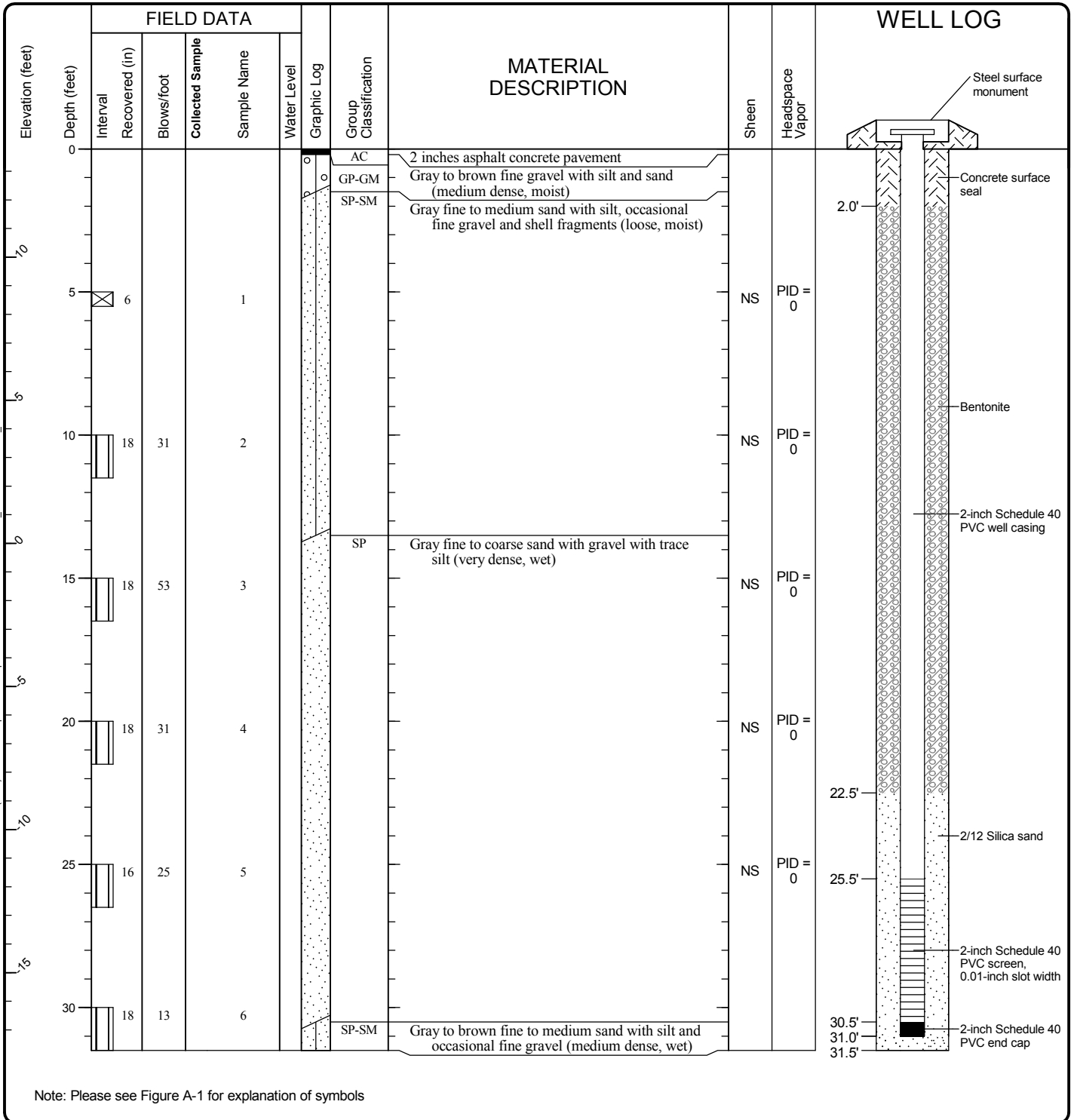


Project: PSE - Former Columbia Street MGP Site
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-28
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400.GPJ_DB\Template\lib\template\GEOENGINEERS\GDT\GEIB_ENVIRONMENTAL_WELL

Drilled	Start 12/2/2010	End 12/2/2010	Total Depth (ft)	31.5	Logged By Checked By	RNM CEB	Driller	Boart Longyear	Drilling Method	Hollow Stem Auger	
Hammer Data	Dames & Moore 300 (lbs) / 30 (in) Drop				Drilling Equipment	Truck-mounted Mobile B-59			A 2 (in) well was installed on 12/2/2010 to a depth of 31 (ft).		
Surface Elevation (ft) Vertical Datum	13.78 NAVD88				Top of Casing Elevation (ft)	13.32			Groundwater Date Measured	1/7/2011	
Easting (X) Northing (Y)	1124627.67 24204.23				Horizontal Datum	NAD83/CORS			Depth to Water (ft)	4.46	
										Elevation (ft)	8.86
Notes: 1/4-inch I.D.; Air-knifed from 3 inches to 5 feet bgs.											



Note: Please see Figure A-1 for explanation of symbols

Log of Monitoring Well MW-OOD

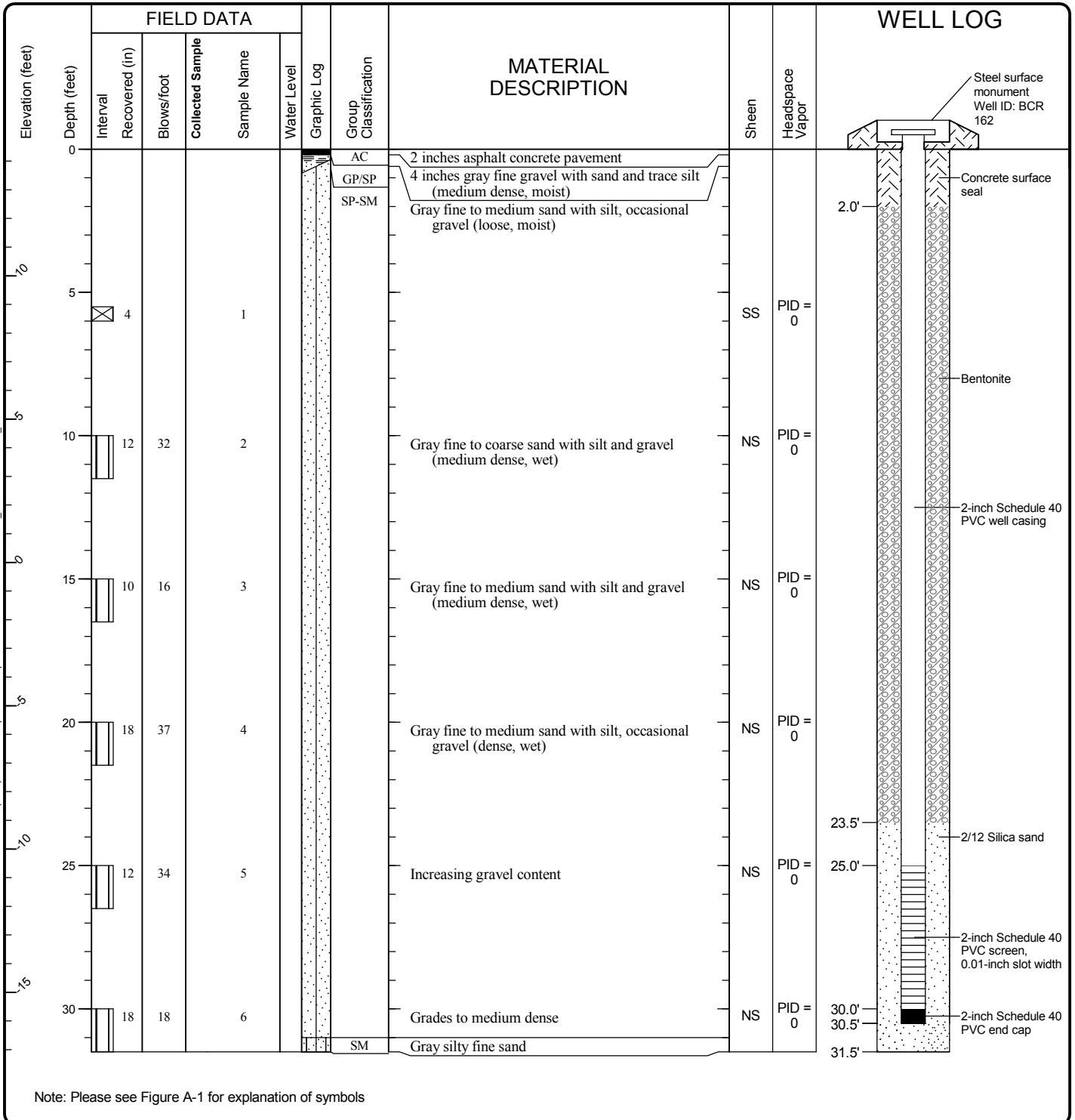


Project: Former Columbia Street MGP Property
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-29
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GP_1\DB\Template\lib\Template\GEOENGINEERS\GDT\GEB\ENVIRONMENTAL_WELL

Start Drilled 11/30/2010	End 11/30/2010	Total Depth (ft) 31.5	Logged By Checked By RNM CEB	Driller Boart Longyear	Drilling Method Hollow Stem Auger
Hammer Data Dames & Moore 300 (lbs) / 30 (in) Drop	Drilling Equipment Truck-mounted Mobile B-59		A 2 (in) well was installed on 11/30/2010 to a depth of 30.5 (ft).		
Surface Elevation (ft) Vertical Datum 14.42 NAVD88	Top of Casing Elevation (ft) 14.20		Groundwater Date Measured 1/7/2011		
Easting (X) Northing (Y) 1124735.01 24083.86	Horizontal Datum NAD83/CORS		Depth to Water (ft) 5.37		Elevation (ft) 8.83
Notes: ¼-inch I.D.; Air-knifed from 3 inches to 5 feet bgs.					



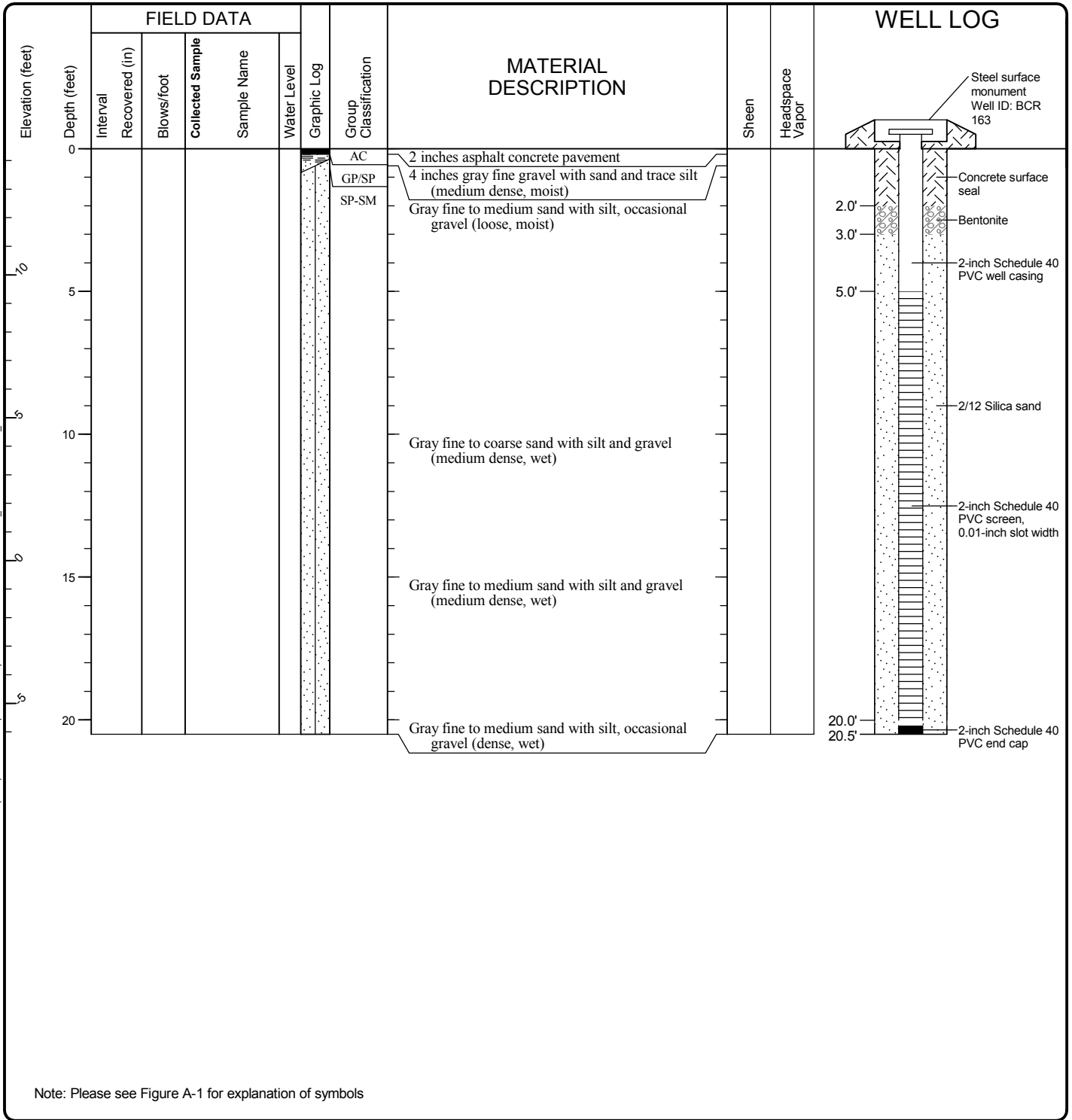
Log of Monitoring Well MW-12D



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

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GPI_DB\Template\GeoENGINEERS\GDT\GEB_ENVIRONMENTAL_WELL

Start Drilled 11/30/2010	End 11/30/2010	Total Depth (ft) 20.5	Logged By Checked By RNM CEB	Driller Boart Longyear	Drilling Method Hollow Stem Auger
Hammer Data Dames & Moore 300 (lbs) / 30 (in) Drop		Drilling Equipment Truck-mounted Mobile B-59		A 2 (in) well was installed on 11/30/2010 to a depth of 20.5 (ft).	
Surface Elevation (ft) Vertical Datum 14.42 NAVD88		Top of Casing Elevation (ft) 14.19		Groundwater Date Measured 1/7/2011	
Easting (X) Northing (Y) 1124730.26 24085.28		Horizontal Datum NAD83/CORS		Depth to Water (ft) Elevation (ft) 5.28 8.91	
Notes: 4 1/4-inch I.D.; Samples not taken due to exploration being driven directly next to MW-12D; Air knifed from 3 inches to 5 feet bgs.					



Log of Monitoring Well MW-12S



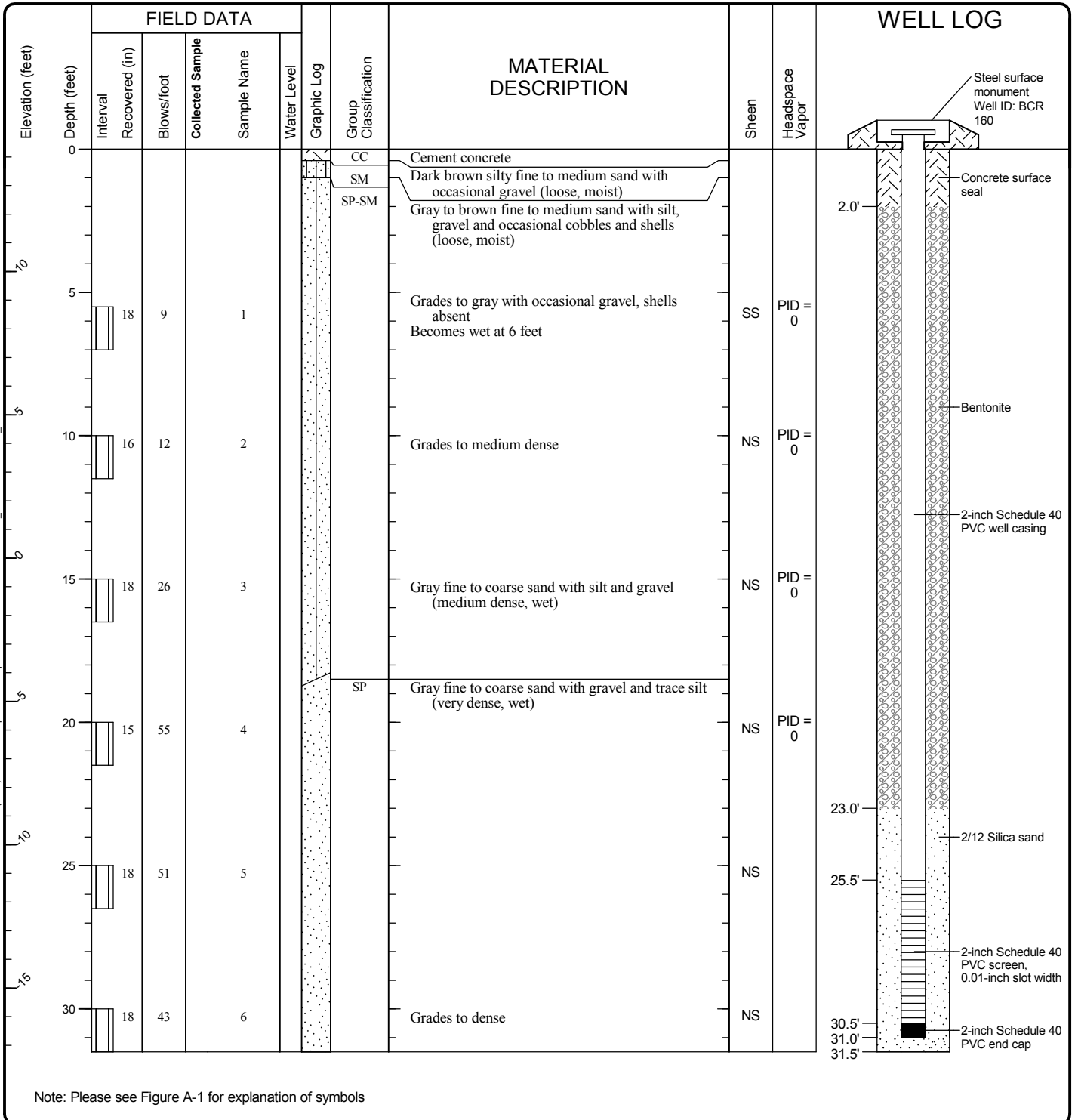
Project: Former Columbia Street MGP Property
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-31
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\G.P.L. DB Template\lib\template\GEOENGINEERS\GDT\GEB\ENVIRONMENTAL_WELL

Start Drilled 11/24/2010	End 11/24/2010	Total Depth (ft)	31.5	Logged By Checked By	RNM CEB	Driller	Boart Longyear	Drilling Method	Hollow Stem Auger
Hammer Data		Dames & Moore 300 (lbs) / 30 (in) Drop		Drilling Equipment		Truck-mounted Mobile B-59		A 2 (in) well was installed on 11/24/2010 to a depth of 31 (ft).	
Surface Elevation (ft)		14.27		Top of Casing Elevation (ft)		13.84		Groundwater Date Measured	
Vertical Datum		NAVD88		Horizontal Datum		NAD83/CORS		1/7/2011	
Easting (X)		1124558		Horizontal Datum		NAD83/CORS		Depth to Water (ft)	
Northing (Y)		23938.26		Horizontal Datum		NAD83/CORS		5.06	
								Elevation (ft)	
								8.78	

Notes: 1/4-inch I.D.; Air-knifed from 3 inches to 5 feet bgs.



Log of Monitoring Well MW-13D

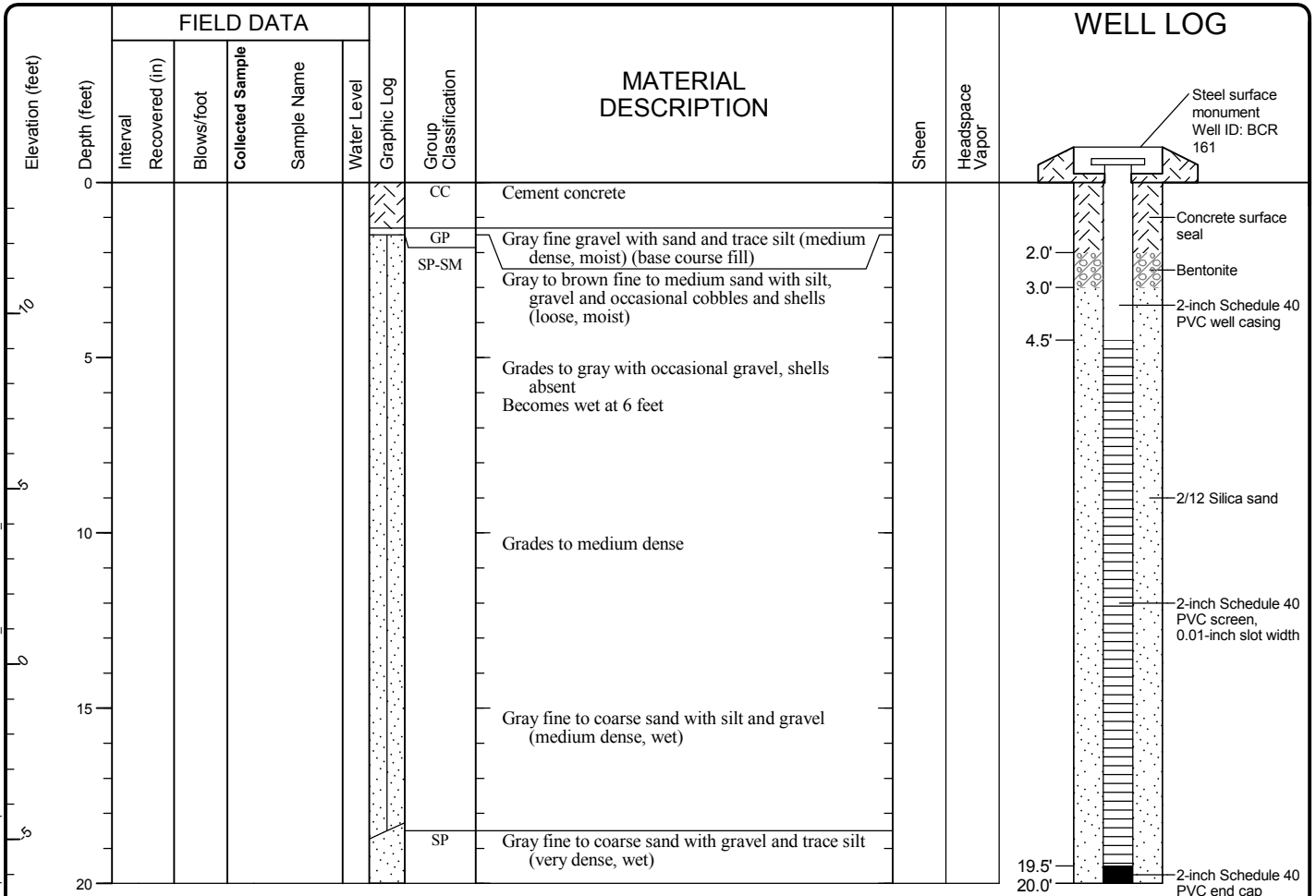


Project: Former Columbia Street MGP Property
 Project Location: Olympia, Washington
 Project Number: 0186-774-00

Figure A-32
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GPI_DB\Template\lib\template\GEOENGINEERS\GDT\GEB\ENVIRONMENTAL_WELL

Start Drilled 11/30/2010	End 11/30/2010	Total Depth (ft) 20	Logged By Checked By RNM CEB	Driller Boart Longyear	Drilling Method Hollow Stem Auger
Hammer Data Dames & Moore 300 (lbs) / 30 (in) Drop		Drilling Equipment Truck-mounted Mobile B-59		A 2 (in) well was installed on 11/30/2010 to a depth of 20 (ft).	
Surface Elevation (ft) Vertical Datum 13.74 NAVD88		Top of Casing Elevation (ft) 13.43		Groundwater Date Measured 1/7/2011	
Easting (X) Northing (Y) 1124558.27 23934.22		Horizontal Datum NAD83/CORS		Depth to Water (ft) 4.60 Elevation (ft) 8.83	
Notes: 4 1/4-inch I.D.; Samples not taken due to exploration being driven directly next to MW-13D; Air knifed from 3 inches to 5 feet bgs.					



Note: Please see Figure A-1 for explanation of symbols

Log of Monitoring Well MW-13S



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

Figure A-33
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GP_1\DB\Template\lib\template\GEOENGINEERS\GDT\GEI&_ENVIRONMENTAL_WELL

Drilled	Start 12/2/2010	End 12/2/2010	Total Depth (ft)	16.5	Logged By Checked By	RNM CEB	Driller	Boart Longyear	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum	13.89 NAVD88			Hammer Data	Dames & Moore 300 (lbs) / 30 (in) Drop			Drilling Equipment	Truck-mounted Mobile B-59	
Easting (X) Northing (Y)	1124499.59 24206.6			System Datum	NAD83/CORS			Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
Notes: 4¼-inch I.D.; Air-knifed from 3 inches to 6 feet bgs.								12/2/2010	6.0	7.9

Elevation (feet)	FIELD DATA					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 asphalt concrete				
						CC	9 inches cement concrete				
						GP	Gray fine gravel with sand and trace silt (medium dense, moist)				
	6			1		SP-SM	Gray to black fine to medium sand with silt and fine gravel and occasional shell fragments (loose, moist)	NS	PID = 0		
5											
	18		15	2			Grades to medium dense, becomes wet	NS	PID = 0		
10											
	18		31	3			Grades to dense	NS	PID = 0		
15											
	16		19	4		GP	Gray fine to coarse gravel with sand and trace silt (medium dense, wet)	NS	PID = 0		

Note: Please see Figure A-1 for explanation of symbols

Log of Boring SB-19



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

Figure A-35
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GPI_DB\Template\Lib\Template\GEOENGINEERS\GDT\GEB_ENVIRONMENTAL_STANDARD

Drilled	Start 12/1/2010	End 12/1/2010	Total Depth (ft)	26.5	Logged By Checked By	RNM CEB	Driller	Boart Longyear	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum	14.61 NAVD88			Hammer Data	Dames & Moore 300 (lbs) / 30 (in) Drop			Drilling Equipment	Truck-mounted Mobile B-59	
Easting (X) Northing (Y)	1124526.6 24073.29			System Datum	NAD83/CORS			Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
Notes: 4 1/4-inch I.D.; Air-knifed from 3 inches to 6 feet bgs.								12/2/2010	6.0	8.6

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-GM			
0							SP-SM			
1	6			1				SS	PID = 0	
5										
6	18		2	2			SP-SM	NS	PID = 0	
10	18		7	3				NS	PID = 0	
15	18		24	4			SP-SM	NS	PID = 0	
20	18		24	5				NS	PID = 0	
25	16		25	6				NS	PID = 0	

Note: Please see Figure A-1 for explanation of symbols

Log of Boring SB-20



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

Figure A-36
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GPI_DB\Template\lib\template\GEOENGINEERS\GDT\GEB_ENVIRONMENTAL_STANDARD

Drilled	Start 12/1/2010	End 12/1/2010	Total Depth (ft)	31.5	Logged By Checked By	RNM CEB	Driller	Boart Longyear	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum	14.39 NAVD88			Hammer Data	Dames & Moore 300 (lbs) / 30 (in) Drop			Drilling Equipment	Truck-mounted Mobile B-59	
Easting (X) Northing (Y)	1124407.71 24066.3			System Datum	NAD83/CORS			Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
Notes: 4¼-inch I.D.; Air-knifed from 3 inches to 6 feet bgs.								12/2/2010	6.0	8.4

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 gravel (loose, moist)				
							GP-GM	Gray to brown fine to coarse gravel with silt and sand (medium dense, moist)				
							SP	Gray fine to medium sand with occasional shell fragments and trace silt (loose, moist)	SS	PID = 0		
5							SP-SM	Gray fine to medium sand with silt, occasional gravel and shell fragments (medium dense, wet)	MS	PID = 2		
10								Becomes loose	NS	PID = 0		
15							SM	Gray silty fine to medium sand with occasional gravel and shell fragments (loose, wet)	NS	PID = 0		
20							SP-SM	Gray with orange mottling fine to medium sand with silt, occasional gravel and shell fragments (dense, wet)	NS	PID = 0		
25								Gray to brown with orange mottling fine to coarse sand with gravel and occasional shell fragments (dense, wet)	NS	PID = 0		
30								Gray to brown fine sand with silt (medium dense, wet)	NS	PID = 0		

Note: Please see Figure A-1 for explanation of symbols

Log of Boring SB-21



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

Figure A-37
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GP_LB_Template\Lib\Template\GEOENGINEERS\GDT\GEB&_ENVIRONMENTAL_STANDARD

Drilled	Start 12/1/2010	End 12/1/2010	Total Depth (ft)	11.5	Logged By Checked By	RNM CEB	Driller	Boart Longyear	Drilling Method	Hollow Stem Auger
Surface Elevation (ft) Vertical Datum	14.55 NAVD88			Hammer Data	Dames & Moore 300 (lbs) / 30 (in) Drop			Drilling Equipment	Truck-mounted Mobile B-59	
Easting (X) Northing (Y)	1124439.57 24064			System Datum	NAD83/CORS			Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
Notes: 4¼-inch I.D.; Air-knifed from 3 inches to 6 feet bgs.								12/2/2010	6.0	8.6

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	3 inches asphalt concrete			Air-knifed from 3 inches to 6 feet bgs
						GP	Gray to brown fine to coarse gravel with sand, trace silt and organic matter (roots) (medium dense, moist) (fill)			
						SP-SM	Gray fine to medium sand with silt, occasional fine gravel and shell fragments (loose, moist) Glass and metal debris at 2 feet	NS	PID = 0	
5		6			1		Gray fine to medium sand with silt, occasional fine gravel and shell fragments (loose, moist) Glass and metal debris at 2 feet	NS	PID = 0	Becomes wet at 6 feet
		15	11		2			NS	PID = 0	
		12	6		3			NS	PID = 0	

Note: Please see Figure A-1 for explanation of symbols

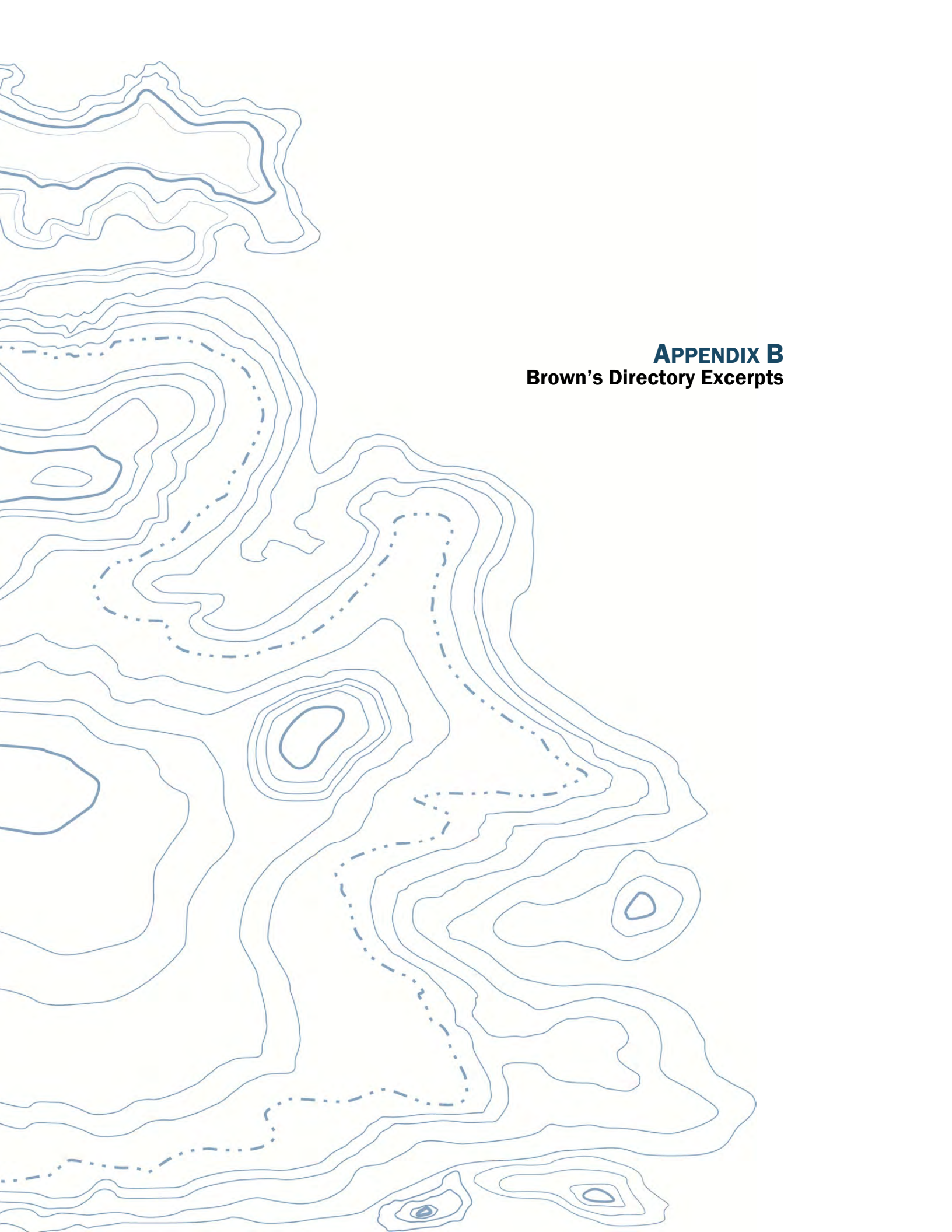
Log of Boring SB-22



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

Figure A-38
 Sheet 1 of 1

Seattle: Date: 10/11/11 Path: C:\DOCUMENTS AND SETTINGS\KROBINETT\DESKTOP\018677400\MW (2011)\GPI_DB\Template\lib\template\GEOENGINEERS\GDT\GEB_ENVIRONMENTAL_STANDARD



APPENDIX B
Brown's Directory Excerpts

NEW COMPANIES AND REPORTS OF OLD COMPANIES.

(Received too late for correction and insertion in regular order.)

CALIFORNIA.

Santa Maria Gas and Power Co., Santa Maria.
 Capital stock, \$250,000.
 Bonds, \$15,000; due, 1937; interest, 6 p. c.
 President, M. Thoenburg.
 Secretary, R. E. Easton.
 Superintendent, L. F. Chandler
 Purchasing agent, L. F. Chandler.
 No. wells drawn from 5.
 Miles of pipe line, 25.
 Price of gas, domestic, \$1.35 per 1,000.
 No. domestic consumers, 500
 Supplies Santa Maria.

IOWA.

Key City Gas Co., Dubuque.
 Capital stock, pref., \$230,000; com., \$310,500;
 ann. div., pref., 6 p. c.
 Bonds, \$170,000; due 1920; interest, 5 p. c.
 President, Geo. McLean.
 Secretary, Wm. L. Bradley.
 Treasurer, James M. Burch.
 Purchasing agent, Geo. McLean.
 Superintendent, Geo. McLean.
 Process manufacture, Coal and Lowe.
 Price coal per ton, delivered, \$4.20.
 Pop. city supplied, 40,000.
 No. meters, 4,882.
 Miles of mains, approximate, 53.
 Price gas: Light and Fuel, gross, \$1.25; net, \$1.
 Candle-power, 16.32. Cal. val., 649 B. t. u.
 Annual output, approx., 128,000,000 c. f.
 Total gas holders capacity, 660,000 c. f.
 Street main pres., max., 3.2 in., min., 2 in.
 Ranges in use, 4,000.
 No commercial arc lamps, 700.
 Supplies Dubuque.

NEW JERSEY.

Woodbury Heights Gas Co., Woodbury Heights.
 (Controlled by New Jersey Suburban Gas Co.)
 Capital stock, \$5,000.
 President, John S. R. Cassady.
 Secretary and treas., John Mayhew.
 Purchasing agent, John Mayhew.
 Superintendent, John Mayhew.
 Obtains gas from Pitman, Glassboro and
 Clayton Gas Co.
 Pop. dist. supplied, 2,234. No. meters, 20.
 Miles of mains, approximate, 1; 2.5 in.
 Price gas: \$1.50 per 1,000 c. f., less 10 p. c. for
 cash.
 No. public lamps, 20. Price per year, \$30.
 Price includes repairs, care, lighting and
 extinguishing.
 No. hours lamp is lighted per year, moon
 scale.
 Annual output, approx., 288,000 c. f.
 Supplies Woodbury Heights.

NEW YORK.

Williamsville Natural Gas Co., Williamsville.
 General office, Prudential Building, Buffalo.
 Capital stock, common \$50,000.

President, J. W. Stearn.
 Manager, J. W. Stearns.
 Treasurer, Edward C. Koester.
 No. wells drawn from, 2.
 Price of gas, gross, domestic, 32.5c. per 1,000
 c. f.
 No. domestic consumers, 262.
 Value gas supplied, \$6,069.
 Supplies Williamsville.

PENNSYLVANIA.

Emaus Gas and Fuel Co., Emaus.
 (Plant under construction.)
 Capital stock, \$75,000.
 Bonds, \$75,000; due, 1939; int. rate, 5 p. c.
 President, Simon Friedberger.
 Manager Jos. L. Sweigard.
 Purchasing agent, Jos. L. Sweigard.
 Miles of pipe line, 5.5.
 Price gas, gross; domestic, \$1.50 per 1,000 c. f.
 No. domestic consumers, 400.
 Supplies Emaus.

TEXAS.

Weatherford Gas Light, Heat and Power Co., Weather-
 ford.
 Capital stock, pref., \$12,000; com., \$23,500.
 President, C. C. Barthold.
 Secretary and treasurer, John H. Prince.
 Purchasing agent, John H. Prince.
 Process manufacture, Lowe.
 Pop. dist. supplied, 8,000. No. meters, 200.
 Miles of mains, approximate 7; 2 to 8 in.
 Price gas, per 1,000 c. f., \$1.50.
 No. public lamps, 8; price, \$99 per year.
 Consumption per burner, per hour, 20 c. f.
 No. hours lighted per year, 4,327.
 Price includes care, repairs, lighting and
 extinguishing.
 Annual sales, approximate, 1909, 4,000,000.
 Candle power, 20.
 Supplies Weatherford.

WASHINGTON.

Olympia Gas Co., Olympia.
 (Operated by H. M. Byllesby and Company.)
 Manager, A. B. Groesbeck.
 Process manufacture, Crude oil.
 Price oil per gallon, delivered, 2.5c.
 Calorific value, 600 B. t. u.
 Gas holder capacity, 30,000 c. f.
 Miles of mains, approximate, 5.8.
 Street main pressures, max., 3; min., 1.5.
 Gas unaccounted for, 10 p. c.
 Annual sales, approximate, 4,500,000 c. f.
 Pop. of city, 13 000.
 Pop. dist. supplied, 5,000.
 No. consumers, 250.
 Price gas: Light and Fuel, gross, \$1.75 to
 \$1.50; net, \$1.50 to \$1.25.
 Supplies Olympia.

PEDESTRIANS, horse and motor car drivers appreciate the uniform illumination produced by **Welsbach STREET LIGHTS**; there are no sharp lights and shadows. See advertisement, page xxvi.

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Annual sales, approx., 65,000,000 c. f.
 Gas unaccounted for, 15 p. c.
 Max. day's send out, 307,000 c. f.
 Total gas holders capacity, 290,000 c. f.
 Miles of mains, approx., 78.18.
 Street main pressures, max., 3.5 in.; min., 3 in.
 High pressure mains, miles, 32.5; pressure, 17 lbs.
 Pop. dist. supplied, 27,000; of city, 24,814.
 No. consumers, 3,722.
 No. meters, reg., 1,385; prepay., 2,337.
 Price gas: Light and Fuel, gross, \$1.50; net, \$1.35.
 No. Humphrey public arcs, 16 posts, 3 lamps each; lighted 1,825 hours per year.
 Contract includes repairs, care, lighting and extinguishing.
 Ranges in use, 3,176; heaters, 721; water heaters, 1,224.
 No. commercial gas arc lamps, 1,242.
 Supplies Everett, Snohomish, Monroe and Lowell.

ELECTRICAL DEPARTMENT.

System, 3-phase, 60 cycle.
 Sub-station capacity: Lighting and power, 1,000 kw.
 Voltage: Incand., 110; power, 220.
 City lighting contract: Hours lighted per year: Arc and incand., all night, every night.
 No. public arcs, 78; 370 watt. Price per year, \$72.
 No. public incand., 90; 75 and 100 watt. Price per year, \$18 and \$30.
 Commercial lighting: No. arcs, 22; No. incand., 10,856.
 Price per kw. hr., gross, 5.5c.
 Other lamps, 2 flaming arcs.
 Power circuits: No. motors, 58; price per kw. hr., 6c. to 2.2c.
 Power used also for 563 flatirons; 17 electric signs; 75 appliances.
 No. meters, 1,054.
 Output of station, kw. for year, approx., 848,500.
 Current purchased from Seattle-Puget Sound Traction, Light & Power Co.
 Supplies Snohomish and Monroe.

Olympia Gas Co., Olympia.

RRs.: No. Pac.; Port. T. So. S. Bs.: From San Francisco and S., T. & O. Route; Shelton Trans. Ex.: No.; Gt. No.

Operated by H. M. Byllesby & Co., Inc.
 Capital stock, pref., \$50,000; com., \$50,000.
 Bonds, \$120,000; due 1945; interest, 5 p. c.
 President, Elmer Dover.
 General manager, Elmer Dover.
 Secretary and treas., M. A. Morrison.
 Asst. mgr., Geo. Dielmann.
Gas purchased from Tacoma Gas Co. Emergency oil gas plant.
 Price oil per gal. delivered, 2.58c.
 Candle-power, 16.
 Calorific value, 600 B. t. u.
 Miles of mains, approx., 13.6.

Street main pressures, max., 4 in.; min., 2.5 in.
 High pressure mains, 4.6 miles; pressure, 5 lbs.
 Max. day's send out, 60,000 c. f.
 Gas holder capacity, 30,000 c. f.
 Annual sales, approx., 19,000,000 c. f.
 Gas unaccounted for, 9 p. c.
 Pop. of city, 7,000.
 Pop. dist. supplied, 5,000; of city, 6,996.
 No. consumers, 893.
 No. meters, reg., 817; prepay., 76.
 Price gas: Light and Fuel, gross, \$1.35 to 80c.; net, \$1.25 to 70c.
 Gas appliances in use: Ranges, 700; heaters, 300; water heaters, 290.
 No. commercial gas arc lamps in use, 200.
 Supplies Olympia, Sherlock, Tumwater and Lacey.

Key City Light and Power Co., Port Townsend.

RRs.: Port. T. So. S. Bs.: B. C. & P. S. Route; Straits Co. Int. SS.; Hastings Co. Ex.; G. N.; No.; W. T.

(Successors to Port Townsend Gas Works.)
 Capital stock, \$80,000.
 President, Peter Mitty.
 Secretary, J. M. Kinkaid.
 Treasurer, John Siebenbaum.
 Gen. mgr. and pur. agent, J. M. Kinkaid.
 Process manufacture, Coal.
 Price coal per ton, delivered, \$4.80.
 Miles of mains, approximate, 6.
 Candle-power, 18; calorific value, 650 B. t. u.
 Annual sales, approx., 4,300,000 c. f.
 Max. day's send out, 14,000 c. f.
 Total gas holders capacity, 43,000 c. f.
 Street main pres., max., 4 in.; min., 3 in.
 Pop. dist. supplied, 3,500; of city, 4,181.
 No. meters, reg., 140; prepay., 60.
 No. consumers, 200.
 Price gas: Light, gross, \$2; net, \$1.50.
 Ranges, 74; heaters, 20; water heaters, 9.
 Supplies Port Townsend.

ELECTRICAL DEPARTMENT.

Generating capacity: Lighting, 150 kw.
 Commercial lighting: 4.5c. to 15c., according to hours used. Dom. rates 16c. for 1st 30 kw.; 8c. for all above.
 Lamps used, 75 watt tungsten street series.
 Power circuits: No. motors, 12; price per kw. hr., 3c. to 15c. Disc., 10 p. c.
 Output of station, kw. per year, 350,000.
 Generating power used, Steam; rated h. p. 250.
 Cost of station fuel oil, per bbl., 95c.

Seattle Lighting Co., Seattle.

RRs.: G. N.; No. Pac.; Col. & P. S.; C., M. & St. P. S. Bs.: Am. H. SS. S. Bs. from San Francisco and Seattle to Alaska, stopping en route at Vancouver and Victoria, B. C.; Bell Bay Trans.; S. & E. Nav.; B. C. & P. S.; Inland Nav. S. Bs. from Tacoma, Straits Co.; Int. SS.; Western St. Nav.; Thompson Co.; S. T. & O.

For the VERY LATEST in high candle power street lamps inquire about THE **Welsbach** STREET LIGHTING COMPANY OF AMERICA's high pressure gas lamp. See advertisement, page xxxii.

from 1919 Brown's Directory of American Gas Companies

40

WASHINGTON

No. public incand., 94—155 watts, 363—72 watts, 41—60 cp., 14—150 watts.
 Commercial lighting: Incand. 4,220 kw. equiv.
 Price per kw. hr.: Residential lighting, 8c., first 60 kw. hr. per month; 6c. all over net. Suburban lighting, 10c. to 60 kw. hr. per month per active kw.; 7.5c. over 60 kw. hrs. per month per active kw.
 Power circuits: Motors, 691.
 Price current per kw. hr., less than 1 h. p., 5c. and 6c.; 1 to 20 h. p., 5c. to 1.5c.; 21 to 100 h. p., 5c. to 1¼c.; 101 h. p. and over 5c. to 1c. Disc., 25 p. c. if power is used "off peak" for customers with 21 h. p. or more.
 Output of station, gen. and purch., kw. for year, 22,083,700.
 Generating power: Water, rated h. p., 3,200; Steam, rated h. p., 3,728.
 Capacity of purchased power, 5,000 kw.

North Pacific Public Service Co., Centralia.

RR.: No. Pac. Ex.: No.

(Formerly Centralia & Chehalis Gas Co.)
 Controlled by Seymour & Brewer, Tacoma, Wash.)

(For capitalization bonds, officers and companies consolidated, see "Parent Companies.")

Gen'l manager and pur. agent, F. C. Brewer.
 Local manager, M. C. Hancock.

Process manufacture, Coal.
 Candle-power, 16.

Calorific value, 600 B. t. u.

Price coal per ton, delivered, \$7.

Annual production, 19,000,000 c. f.

By-products made: Coke, 1,144 tons; tar, 16,674 gals.

Gas holder capacity, 117,000 c. f.

Holder pressure, max., 3 in.

High pressure mains, 22 miles; pressure, 5 lbs.

Max. day's send out, 75,000 c. f.

Annual sales, approx., 16,000,000 c. f.

Gas unaccounted for, 15 p. c.

By-products sold: Coke, 300 tons; tar, 16,674 gals.

Pop. of city, 7,311, Centralia; 4,507, Chehalis.

No. consumers, 1,015.

No. meters, reg., 576; prepar., 439.

Price of gas: Light and Fuel, \$1.85 gross.

1st 1,000 c. f.; next 4,000 c. f., \$1.70-\$1.65;

next 5,000 c. f., \$1.60-\$1.55; next 5,000

c. f., \$1.50-\$1.45; over 15,000 c. f., 85c.-80c.

Gas appliances in use: Ranges, 490; heaters,

480; water heaters, 140.

No. commercial gas arc lamps in use, 440.

Supplies Centralia and Chehalis.

Puget Sound Gas Co., Everett.

RRs.: G. N.; No. Pac. S. Bs.: B. C. & P. S.

Route; S. & E. Nav.; Inland Nav. Ex.:

No.; G. N.

(Successor to Everett Gas Co.)

(Controlled by H. M. Byllesby & Co.)

Capital stock, pref., \$225,000; common., \$950,000.

Annual dividend, pref., 5 p. c.

Vice-pres. and general manager, D. J. Young.

Asst. treas., J. P. Simpson.

Manager and pur. agent, J. G. Bourus.

Process manufacture, Lowe (water gas).

Calorific value, 600 B. t. u.

Annual production, 57,358,000 c. f.

By-products made: Tar, 90,493 gals.

Total gas holders capacity, 300,000 c. f.

Holder pressure, max., 4.5 in.

Max. day's send out, 263,000 c. f.

Miles of mains, approx., 58.

Street main pressures, max., 4.5 in.; min., 3 in.

High pressure mains, miles, 20.69; pressure, 22 lbs.

Annual sales, approx., 50,019,000 c. f.

Gas unaccounted for, 12.6 p. c.

Pop. dist. supplied, 36,200; of cities, 36,000.

No. consumers, 2,869.

No. meters, reg., 1,887; prepar., 982.

Price gas: Light and Fuel, basic rate, net, \$2.25 to 75c.

Ranges in use, 2,683; heaters, 868; water heaters, 1,273.

No. commercial gas arc lamps, 683.

Supplies Everett, Snohomish and Monroe.

ELECTRICAL DEPARTMENT.

System, 3-phase, 60 cycle; arcs, magnetic D. C.; incand. 4 amp. D. C. and A. C.

Sub-station capacity: Lighting and power, 1,000 kw.

Voltage: Incand., 110; power, 220.

City lighting contract: Hours lighted per year, 3,830.

No. public arcs, 58; 310 watt. Price per year, \$72.

No. public incand., 85; 60 c. p. Price per year, \$18.

Commercial lighting: No. incand., 11,572.

Price per kw. hr., gross, 9c. to 2.7c. Dis., 10 p. c.

Power circuits: No. meters, 49; price per kw. hr., 5.4c. to 1.98c. Discount, 10 p. c.

Power used also for flatirons, electric signs and appliances.

No. consumers, 1,084.

Output of station, kw. for year, 1,143,040.

Current purchased from Puget Sound Trac-tion, Light & Power Co.

Supplies Snohomish and Monroe.

Olympia Gas Co., Olympia.

RRs.: No. Pac.; Port. T. So.; O. W. S. Bs.:

From San Francisco and S., T. & O.

Route: Shelton Trans. Ex.: No.; Gt.

No.; Am.

Gen. mgr., D. J. Young.

Controlled by Tacoma Gas and Fuel Co.

Gas purchased from Tacoma Gas and Fuel Co.

Annual purchase, 22,542,730 c. f.

Emergency oil gas plant.

Calorific value, 600 B. t. u.

Gas holder capacity, 25,000 c. f.

Holder pressure, max., 4 in.

Miles of mains, approx., 18.86.

Street main pressures, max., 4 in.; min., 3.5 in.

High pressure lbs.

Annual sales.

Gas unaccounted for.

Pop. dist. supplied.

No. consumers.

No. meters, reg.

Price gas: Light and Fuel.

\$1.50 to 75c.

Gas appliances in use.

353; water heaters.

No. commercial gas arc lamps.

Supplies Olympia.

Key City Light & Power Co., Portland.

RRs.: Port.

Route; S.

Ex.: G. N.

Capital stock.

President, Pe.

Secretary, J.

Treasurer, J.

Gen. mgr. an.

Process manu.

Price coal per ton.

Candle-power.

Total gas holders capacity.

Max. day's send out.

Miles of mains.

Street main pressures.

Annual sales.

Pop. dist. supplied.

No. meters, reg.

No. consumers.

Price gas: Light and Fuel.

Ranges, 100;

Supplies Portland.

ELECTRICAL DEPARTMENT.

System, 3-phase.

Sub-station capacity.

Commercial lighting.

to hours.

kw.; 6.5.

Lamps used.

Power circuits.

hr., 2c. per kw. hr.

Output of station.

Generating plant; 1.

Cost of station.

Power furnished.

Seattle Lighting & Power Co., Seattle.

RRs.: G. N.

St. P.

San Francisco

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Nav.; E.

from Tacoma

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Route;

SS. Co.

G. N.;

Capital stock

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Ann. div. p.

Bonds, \$35-

ref. 5s

1920.

EASY WORKING
DIE STOCKS
 1/8 TO 12 INCH
 THE BORDEN COMPANY

BEAVER

 THE BEAVER

SQUARE END
PIPE CUTTERS
 1/8 TO 6 INCH
 WARREN, OHIO, U. S. A.

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 W. S. Bs.:
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 Fuel Co.
 as and Fuel
 4 in.; min.,

High pressure mains, 4.62 miles; pressure, 10 lbs.
 Annual sales, approx., 20,466,044 c. f.
 Gas unaccounted for, 9.1 p. c.
 Pop. dist. supplied, 1,030; of city 10,000.
 No. consumers, 989.
 No. meters, reg., 903; prepay., 86.
 Price gas: Light and Fuel, basic rate, net, \$1.50 to 85c.
 Gas appliances in use: Ranges, 795; heaters, 353; water heaters, 325.
 No. commercial gas arc lamps in use, 150.
 Supplies Olympia, Sherlock and Lacey.

Key City Light and Power Co., Port Townsend.
 RRs.: Port. T. So. S. Bs.: B. C. & P. S. Route; Straits Co. Int. SS.; Hastings Co. Ex.: G. N.; No.; W. F.
 Capital stock, \$80,000.
 President, Peter Mitty.
 Secretary, J. M. Kinkaid.
 Treasurer, John Siebenbaum.
 Gen. mgr. and pur. agent, J. M. Kinkaid.
 Process manufacture, Coal.
 Price coal per ton, delivered, \$4.10.
 Candle-power, 18; calorific value, 650 B t. u.
 Total gas holders capacity, 40,000 c. f.
 Max. day's send out, 10,000 c. f.
 Miles of mains, approximate, 6.5.
 Street main pres., max., 8 in.; min., 2 in.
 Annual sales, approx., 3,500,000 c. f.
 Pop. dist. supplied, 3,000; of city, 4,181.
 No. meters, reg., 160; prepay., 65.
 No. consumers, 250.
 Price gas: Light, gross, \$2; net, \$1.80.
 Ranges, 100; heaters, 21; water heaters, 60.
 Supplies Port Townsend.

ELECTRICAL DEPARTMENT.

System: 3-phase, A. C.
 Sub-station capacity, 500 kw.
 Commercial lighting: 4.5c. to 11c., according to hours used. Dom. rates 11c. for 1st 60 kw.; 6.5c. for all above.
 Lamps used, 80 c. p., Type C. street series.
 Power circuits: No. motors, 17; price per kw. hr., 2c. to 7c. Disc., 10 p. c.
 Output of station, kw. hrs. for year, 400,000.
 Generating power used, Gas Engine auxiliary plant; rated h. p. 100.
 Cost of station fuel oil, 11c. per gal.
 Power furnished from Olympic Power Co.

Seattle Lighting Co., Seattle.
 RRs.: G. N.; No. Pac.; Col. & P. S.; C., M. & St. P. S. Bs.: Am. H. SS. S. Bs. from San Francisco and Seattle to Alaska, stopping en route at Vancouver and Victoria, B. C.; Bell Bay Trans.; S. & E. Nav.; B. C. & P. S.; Inland Nav. S. Bs. from Tacoma, Straits Co.; Int. SS.; Western St. Nav.; Thompson Co.; S. T. & O. Route; Lower F. Riv. Route; Alaska SS. Co.; No. Nav. Co. Ex.: No.; W. F.; G. N.; Con.
 Capital stock, pref., \$1,000,000; com., \$3,000,000.
 Ann. div. pref., 6 p. c.; com., 2 p. c.
 Bonds, \$358,000 1st 5s, due 1944; \$5,505,500 ref. 5s due 1949; \$2,000,000 deb. 6s due 1920.

President, J. D. Farrell.
 Vice-president, Rufus C. Dawes.
 Secretary, H. R. Clise.
 Treasurer, F. K. Lane.
 Engineer, Jos. C. Markley.
 Manager and pur. agent, F. K. Lane.
 Superintendent, S. E. Hutchinson.
 New bus. mgr., S. R. Hutchinson.
 Process manufacture, Coal and Lowe.
 Also manufacture coke oven gas (See By-Product Coke-Oven Dept.)
 Annual prod.: Coal gas, 877,000,000 c. f.; water gas, 609,000,000 c. f.
 Candle-power, 19.
 Total gas holders capacity, 3,700,000 c. f.
 Max. day's send out, 3,500,000 c. f.
 Miles of mains, approx., 588.
 Street main pressures, max., 7 in.; min., 5 in.
 Annual sales, approx., 1,405,000,000 c. f.
 Gas unaccounted for, 7 p. c.
 Pop. dist. supplied, 250,000; of city, 237,194.
 No. meters, reg., 41,856; prepay., 6,677.
 Price gas: Light and Fuel, \$1.25 to 60c. net.
 Min. charge, 65c.
 Ranges, 33,222; heaters, 8,095; water heaters, 13,402.
 No. commercial gas and arc lamps, 956.
 Supplies Seattle and suburbs.

Spokane Gas and Fuel Co., Spokane.
 RRs.: G. N.; Spok. & In. Emp.; O. R. R. & Nav.; No. Pac.; Spok. Int. Ex.: No.; West.; G. N.; Pac.

(Operated by Doherty Organization.)
 (For capitalization and bonds, see Appendix.)
 President, H. L. Doherty.
 1st Vice-pres., F. W. Frueauff.
 Treasurer, Harry Warner.
 Secretary, R. Aubrey Smith.
 Pur. agent, G. W. Rupert.
 General manager, Harry Warner.
 Superintendent, Ralph B. Stitzer.
 New bus. mgr., Luther Gaston.
 Process manufacture, Coal and Lowe.
 Annual production: Coal gas, 241,500,600 c. f.; water gas, 22,187,100 c. f.
 By-products made: Coke, 17,100 tons; tar, 263,006 gals.; ammonia, 103,297 lbs.
 Price coal per ton, delivered, \$6.
 Price oil, per gal., 7.6c.
 Calorific value, 600 B. t. u.
 Gas holder capacity, 455,000 c. f.
 Street mains, approx., 139.04 miles.
 Max. day's send out, 881,000 c. f.
 Annual sales, approx., 234,054,300 c. f.
 Gas unaccounted for, 10.35 p. c.
 By-products sold: Coke, 5,656 tons; tar, 408,766 gals.; ammonia, 106,942 lbs.
 Pop. of city supplied (est.), 135,000.
 No. consumers, 9,981.
 No. meters, 10,585.
 Price gas: First 1,000 c. f., \$1.80; next 1,000 c. f., \$1.65; next 3,000 c. f., \$1.55; next 5,000 c. f., \$1.45; next 5,000 c. f., \$1.40; next 20,000 c. f., \$1.30; next 15,000 c. f., \$1.10; over 50,000 c. f., 90c.
 Ranges in use, 10,270; heaters and grates, 2,286; water heaters, 3,010.
 No. commercial gas arc lamps, 250.
 Supplies Spokane.

Are you tired of paying repair bills on gas mains?

ULCO LEAD WOOL is the answer

UNITED LEAD COMPANY III BROADWAY, NEW YORK.



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Have we delivered World Class Client Service?

Please let us know by visiting [www. geoengineers.com/feedback](http://www.geoengineers.com/feedback).

