STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

September 15, 2015

Mr. John Rork
Puget Sound Energy
P.O. Box 90868
PSE-11N
Bellevue, Washington 98009-0868

Re: No Further Action at a Property associated with a Site

- **Property Address:** 320 Columbia Street, Olympia, Washington 98501
- **Facility/Site No.:** 91682829
- **Cleanup Site ID No.:** 6851
- **VCP Project No.:** SW0984

Dear Mr. Rork:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of a Property associated with the Columbia Square Properties facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issues Presented and Opinion

1. Is further remedial action necessary at the Property to clean up contamination associated with the Site?

   NO. Ecology has determined that no further remedial action is necessary at the Property to clean up contamination associated with the Site.

   This opinion is dependent on the continued performance and effectiveness of the post-cleanup controls and monitoring specified below.

2. Is further remedial action still necessary elsewhere at the Site?

YES. Ecology has determined that further remedial action is still necessary elsewhere at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

Description of the Property and the Site

This opinion applies only to the Property and the Site described below. This opinion does not apply to any other sites that may affect the Property. Any such sites, if known, are identified separately below.

1. Description of the Property.

The Property includes the following tax parcel in Thurston County, which were affected by the Site and addressed by your cleanup:

- 78500200100.

Enclosure A includes a legal description of the Property. **Enclosure B** includes a diagram of the Site that illustrates the location of the Property within the Site.

2. Description of the Site.

The Site is defined by the nature and extent of contamination associated with the following release:

- Total petroleum hydrocarbons (TPH) in the gasoline range (TPH-G), TPH in the diesel range (TPH-D), and TPH in the heavy oil range (TPH-O) into the soils.
- Volatile organic compounds (benzene) into the soils.
- Lead and mercury into the soils.
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs), into the soils and groundwater.

Those releases have affected more than one parcel of real property, including the parcel identified above.
Enclosure B includes a detailed description and diagram of the Site, as currently known to Ecology.

3. Identification of Other Sites that may affect the Property.

Please note a parcel of real property can be affected by multiple sites. Please note that groundwater laboratory analytical results indicated total arsenic was present in the Property groundwater at concentrations that were above the MTCA Method A Groundwater Cleanup Levels. Additional off-Property groundwater sampling indicated the total arsenic contamination originated from an unknown, off-Site source, which also affects the Property. This opinion does not apply to any contamination associated with the off-Site unknown source of total arsenic groundwater contamination.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. GeoEngineers, Inc. (GeoEngineers), **Cleanup Action Report, Former Olympia Manufactured Gas Plant Property, 320 Columbia Street NW, Olympia, Washington,** dated January 4, 2013.

2. GeoEngineers, **Revised Cleanup Action Plan, Former Olympia Manufactured Gas Plant Site, Olympia, Washington,** dated July 30, 2012.

3. GeoEngineers, **Groundwater Monitoring Technical Memorandum, October 2001 Monitoring Event, PSE Former Olympia MGP Site, 320 Columbia Street NW, Olympia, Washington,** dated December 21, 2011.

4. GeoEngineers, **Data Summary Report, Former Olympia Manufactured Gas Plant, Olympia, Washington,** dated October 25, 2011.

5. Ecology, **Further Action at a Property Opinion Letter,** dated February 23, 2009.

Those documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

1. Cleanup of the Property located within the Site.

Ecology has concluded that **no further remedial action** is necessary at the Property to clean up contamination associated with the Site. That conclusion is based on the following analysis:

a. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards for the Site and select a cleanup for the Property. The Site is described above and in **Enclosure B**.

The Site is on and around the location of the former Columbia Street Manufactured Gas Plant (MGP), located at 320 Columbia Street NW in Olympia, Thurston County, Washington (Property). The Property cleanup activities are being administered by Puget Sound Energy (PSE) as a legacy property. Starting in 1908, the Site operated as a MGP for about 16 years before it was converted into a gas storage facility; receiving coal gas that was manufactured in Tacoma. During the 1950s, the manufactured gas storage operations had ceased at the Site. After closing the gas storage operation, the Site was used as a warehouse until the 1970s and was then used as retail office space[1].

In 1990, Estern Geotechnical, Inc. (Estern) conducted the removal of a 1,000-gallon underground storage tank (UST). The soil from the UST excavation was evaluated for TPH and benzene, toluene, ethylbenzene, and xylenes. The analytical results for the excavation bottom exceeded the soil cleanup level of 100 parts per million (ppm) for TPH. Estern allowed the excavation bottom soils to aerate for one week and then collected new samples and analyzed them; the new soil results were reported at 11 ppm for TPH. The excavation was backfilled to the original grade.

From 2006 until 2011, four investigations have been conducted to delineate the extent of the soil and groundwater contamination. These investigations identified benzene, cPAHs, TPH-G, TPH-D, TPH-O, lead, and mercury[2] as the major

[1] Environmental Partners, Inc., Summary of Findings, Historical Review and Focused Baseline Environmental Assessment, Parcels 7850-02-00100, 9900-00-06800, and 9900-08-32500 in Thurston County, 320 Columbia Street NW, Olympia, Washington, September 13, 2006.

[2] Total arsenic above the MTCA Method A Groundwater Cleanup Level was identified in the Site groundwater during the remedial investigation phase of the project. GeoEngineers offered to Ecology a scenario where the source of the groundwater total arsenic contamination was from an off-Site area. Ecology requested additional groundwater investigation to include up-gradient locations that were presumably off the Site. After their

constituents of concern (COCs) for the Site soil and groundwater. The majority of the soil contamination was found to be within 6 feet of the ground surface. Groundwater depth on the Property has ranged from approximately 4 feet to 6.5 feet below ground surface (bgs) (see Table 1).

In February 2009, Ecology provided a *Further Action at a Property* Opinion Letter for the Property. Ecology recommended additional monitoring wells to further define the COCs and the extents of the groundwater contamination plume.

In October 2010, GeoEngineers submitted a Cleanup Action Plan (CAP) for Ecology review and revised their plan in July 2012 after two interim investigations and a data analysis of previous investigation. Based on their analysis, the most wide-spread contaminate was cPAHs. GeoEngineers estimated that ninety-four percent of the total cPAH contaminant mass was within 6 feet of the ground surface (see Figure 4). In their feasibility study and disproportionate cost analysis (FS/DCA), GeoEngineers proposed:

- **Alternative 1:** Excavation of soil to a maximum depth of 15 feet bgs, as necessary to remove soil with concentrations of cPAHs exceeding the MTCA Method A cleanup level. Fifteen feet is the MTCA standard point of compliance for risk to human health through the direct contact pathway. Excavation to this depth would require dewatering and the use of structural controls to protect the integrity of surrounding buildings, sidewalks, and streets.

- **Alternative 2:** Excavation of soil to a maximum depth of approximately 6 feet bgs, with vertical sidewalls around the Property perimeter. Six feet bgs corresponds to the depth at which groundwater is encountered at the Property during low-water conditions. Trench boxes or other excavation methods would be used to protect the integrity of surrounding buildings, sidewalks, and streets.

- **Alternative 3:** Excavation of soil to a maximum depth of 6 feet bgs using sloped excavation sidewalls around the Property perimeter to protect the integrity of surrounding structures.

---

investigation, GeoEngineers did identify up-gradient arsenic groundwater contamination at similar concentrations to that which occurred in the Site and Property groundwater. The groundwater data from the up-gradient wells, plus the data indicating there was no arsenic in the Site soils led Ecology to determine the arsenic was not part of the Site but was part of a larger, yet unidentified source of the arsenic groundwater contamination.

GeoEngineers recommended and PSE selected Alternative 3. Ecology reviewed the FS/DCA, concurred with the assessment, and approved the CAP.

In October 2013, GeoEngineers implemented the preferred cleanup alternative on the Property involving excavation and disposal of contaminated soil. An artesian well was uncovered and capped in the process.

In January 2013, GeoEngineers submitted the *Cleanup Action Report* for review. In their report, GeoEngineers concluded the cleanup objectives had been met and available analytical data indicated the soil-to-indoor air pathway would not be complete on the property. In addition, groundwater data indicated the groundwater-to-indoor air pathway was likely to be incomplete on the Property (see Table 2). GeoEngineers requested Ecology provide a Property-specific *No Further Action (NFA)* Opinion Letter. Ecology review of the soil analytical results indicated PAHs and the other COCs did not extend past the southern and western property boundaries. PAHs concentrations above the MTCA Method A Soil CUL on the eastern boundary and on the northern boundary next to the treated wooden telephone pole and at a location that extended under the sidewalk and possibly under Thurston Avenue. Groundwater analytical results from monitoring wells MW-6, MW-10, MW-15, and MW-16 further indicated that PAHs were not detected above the laboratory reporting limits or were not above the MTCA Method A Groundwater CUL, further indicating groundwater impacts were limited to the Property. **Ecology concluded the cleanup objectives were met and indicated the Property would qualify for a Property-specific NFA Opinion Letter with the application of institutional controls under an Environmental Covenant.**

In October 2013, GeoEngineers provided a *Groundwater Compliance Monitoring Plan.* Ecology reviewed and approved the plan and stipulated it must be filed as an addendum to the environmental covenant attached to the Property.

b. Establishment of cleanup standards for the Site.

Ecology has determined the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA.

The point of compliance (POC) for protection of groundwater was established in the soils throughout the Site. For soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, a conditional POC was established in the soils

throughout the Property from the ground surface to 6 feet bgs; a building is planned to be built on the compacted fill further isolating the residual PCS below 6 feet bgs. In addition, the conditional POC for the groundwater was established at the Property boundary; groundwater COC concentrations must be below the applicable MTCA Method A Groundwater CULs at monitoring wells MW-6, MW-10, MW-15, and MW-16 at the Property boundaries (see Figure 2). Applicable MTCA Method A Soil CULs are established must be used for soils across the Site.

c. Selection of cleanup for the Property.

Ecology has determined the cleanup you selected for the Property meets the substantive requirements of MTCA. The cleanup meets the minimum cleanup requirements and does not exacerbate conditions or preclude reasonable cleanup alternatives elsewhere at the Site.

GeoEngineers selected a preferred cleanup alternative for addressing the hazardous substances in soil at the Property. That action involved most of the soil on the Property to be excavated down to 6 feet bgs. The excavated soil would be disposed of off the Property. The preferred alternative also would use a conditional POC for groundwater that would be set at the Property boundaries; all COCs would have to meet the applicable CULs at those wells (POCs).

Ecology concurred with this proposed alternative and agreed with its implementation. The Property is currently undeveloped. Future proposed uses of the Property could include mixed use of the Property. Analytical data suggests this alternative is protective of human health and the environment with covenants and institutional controls applied at the Property.

d. Cleanup of the Property.

Ecology has determined the cleanup you performed meets the applicable Site cleanup standards within the Property. This determination is dependent on the continued performance and effectiveness of the post-cleanup controls and monitoring specified below.

In October 2012, GeoEngineers orchestrated the excavation and removal of contaminated soil from the entire 0.33-acre Property to an average depth of 6 feet bgs. Once the excavation was completed, 36 soil samples were collected from the

bottom of the excavation; the excavation bottom was divided into thirty-six 20-foot by 20-foot grid sections. One soil sample was collected from each grid and analyzed for the COCs attributed to that grid area. In addition, soil samples were also collected from the north, east, and south side walls of the excavation at selected locations. Soil analytical results indicated the bulk of the metals and cPAH contamination on the Property was removed down to 6 feet bgs with the notable exception of the floor along the east wall of the excavation and the eastern side wall itself.

In this area, residual contamination above the applicable MTCA Soil CULs was left in place due to concerns of undercutting and destabilizing the building on the adjacent property (Gardner's Restaurant) (see Figure 2 [2015]). Also, residual mercury and cPAH soil contamination slightly above the applicable MTCA CULs remained under the city sidewalk located on the north side wall (under the city sidewalks) and residual TPH-D and TPH-O soil contamination above the applicable CULs remained in the southern excavation bottom and southern side wall (under the alley gravel cap) (see Figure 2 [2015]).

Due to the cohesiveness and integrity of the Property soils, additional contaminated soil was excavated along the south, west, and north side walls. As a result, much of the soil that was thought to be inaccessible under Alternative 3 was removed without the additional costs associated with structural shoring of the excavation. Once the cleanup action was completed, the excavation was backfilled with clean structural fill and gravel to the former grade. The structural fill acts as a cap to prevent direct-contact with the residual soil contamination.

Approximately 4,400 tons of contaminated soil and other subsurface structures were excavated and removed from the Property. The excavated material was transported to and disposed of at Waste Management's Riverbend Subtitle D Landfill in McMinnville, Oregon.

2. Cleanup of the Site as a whole.

Ecology has concluded that **further remedial action** under MTCA is still necessary elsewhere at the Site. In other words, while your cleanup constitutes the final action for the Property, it constitutes only an **"interim action"** for the Site as a whole.

Post-Cleanup Controls and Monitoring

Post-cleanup controls and monitoring are remedial actions performed after the cleanup to maintain compliance with cleanup standards. This opinion is dependent on the continued performance and effectiveness of the following:

1. Compliance with institutional controls.

Institutional controls prohibit or limit activities that may interfere with the integrity of engineered controls or result in exposure to hazardous substances. The following institutional controls are necessary at the Property:

- Restriction on any intrusive activities without written approval from Ecology.
- Restriction on groundwater use, for any purpose, without written approval from Ecology.

To implement that control, an Environmental Covenant will be recorded on the following parcel of real property in Thurston County:

- 78500200100.

Ecology approved the recorded Covenant. A copy of the Covenant is included in **Enclosure B**.

2. Performance of confirmational monitoring.

Confirmational monitoring is necessary at the Property to confirm the long-term effectiveness of the cleanup. The monitoring data will be used by Ecology during periodic reviews of post-cleanup conditions. Ecology has approved the monitoring plan you submitted. A copy of the plan is included in **Enclosure C**.

Periodic Review of Post-Cleanup Conditions

Ecology will conduct periodic reviews of post-cleanup conditions at the Property to ensure that they remain protective of human health and the environment. If Ecology determines, based on a periodic review, that further remedial action is necessary at the Property, then Ecology will withdraw this opinion.

Listing of the Site

Based on this opinion, Ecology will update the status of remedial action at the Site on our database of hazardous waste sites. However, because further remedial action is still necessary elsewhere at the Site, we will not remove the Site from our lists of hazardous waste sites. Furthermore, the Property will remain listed as part of the Site because the cleanup of the Property does not change the boundaries of the Site.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Change the boundaries of the Site.
- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. State is immune from liability.

The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

Contact Information

Thank you for cleaning up your Property under the Voluntary Cleanup Program (VCP). We look forward to working with you to clean up the remainder of the Site.

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion or the termination of the Agreement, please contact me by phone at (360) 407-7404 or by e-mail at erad461@ecy.wa.gov.

Sincerely,

Eugene Radcliff, L.G.
VCP Site Manager
SWRO Toxics Cleanup Program

GER: knf

Enclosures (9): A – Legal Description of the Property, Including Site Description, Legal Description, Figures and Tables

Figure 1	Vicinity Map
Figure 2	Remedial Excavation Limits and Soil Analytical Results
Figure 2 [2015]	August 2013 and February 2015 Ground Water Compliance Monitoring
Figure 4	Calculated Relative Mass of Total cPAHs by Depth Below Ground Surface
Table 1	Measured Groundwater Levels in Monitoring Wells
Table 2	Groundwater Chemical Analytical results (August 2013 and February 2015)

B – Environmental Covenant and Groundwater Compliance Monitoring Plan

By certified mail: 91710821333939704189 62

cc: Mr. Nick Rohrbach, GeoEngineers, Inc.
Mr. Patrick Rants, The Rants Group
Olympia Longshoreman Benevolent Association
JFL Holdings LLC
Mr. Oran Johnson
Mr. Gerald Tousley, Thurston County Health Department
Ms. Richelle Perez, Ecology
Ms. Carol Johnston, Ecology
Ms. Dolores Mitchell, Ecology

Enclosure A

Legal Description of the Property Including Site Description, Legal Description, Figures and Tables

Site Description

Media of Concern: Soil and Groundwater

The former Columbia Street Manufactured Gas Plant (MGP) Site is located at 320 Columbia Street NW in Olympia, Washington (Property) (see Figure 1). The Property consists of one contiguous parcel totaling 0.33 acres located on the east side of Columbia Street. This Property is located approximately 300 feet east of West Bay (Puget Sound) in downtown Olympia. The entire Property is vacant; the lot is graded flat and is paved with gravel. The total 0.33 acres of the Property has been excavated to a depth of at least 6 feet below ground surface (bgs) and backfilled and compacted with clean fill to the former grade. Columbia Street NW, a city park, and Puget Sound bound the Property on the west. Thurston Avenue and a hotel bound the property to the north. A commercial property with a building bound the Property to the east, an alley and commercial buildings bound the Property to the south. The Thurston County Office of the Assessor[1] (TCOA) notes the tax parcel number as 78500200100.

The legal description of the property is:

> **Abbreviated Legal Description**[2] – Section 14 Township 18 Range 2W Quarter SW NW Plat SYLVESTER TOWN OF OLYMPIA 2 1 & 4 Document 001/014.
>
> and
>
> **Legal Description**[3] – Lots 1 and 4 in Block 2 of Sylvester Plat of Olympia, as recorded in Volume 1 of Plats, page 14.

Latitude and Longitude[4]**:**

47° 2' 50" and 122° 54' 3"

The Washington Department of Natural Resources – Division of Geology & Earth Sciences, Washington State Geologic Information Portal[5] describes the downtown area of Olympia as a continuous mass of Quaternary unconsolidated or semi-consolidated alluvial clay, silt, sand, gravel, and cobble deposits; which can include layers or pockets of peat, muck, diatomite, beach sands, lacustrine, estuarine, marsh, glacial, colluvium, volcaniclastic or tephra deposits, plus anthropogenic modified lands and artificial fill.

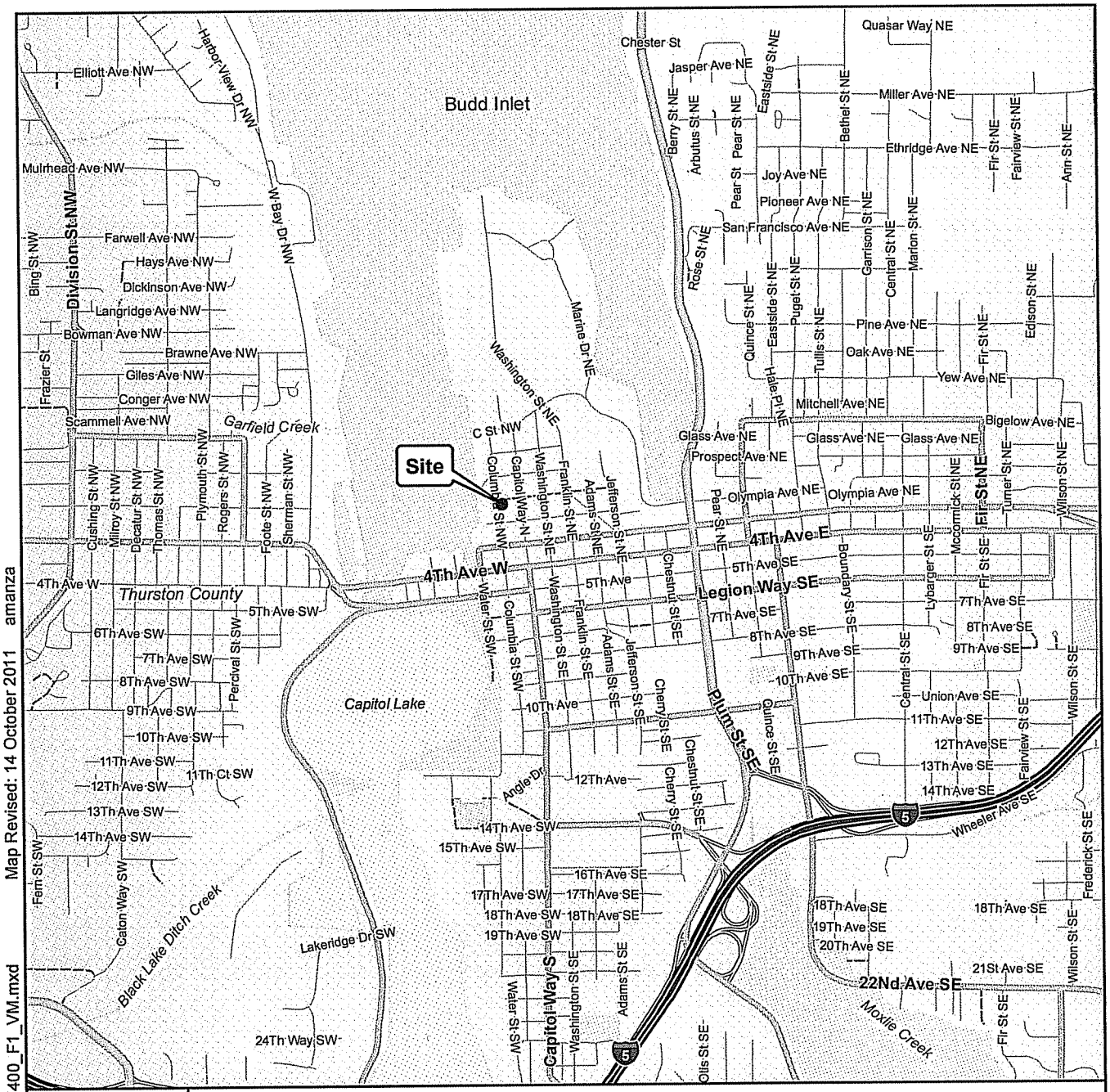
The United States Department of Agriculture, Natural Resources Conservation Service (NRCS) website[6] identifies the Property soil as Xerorthents, typically found on 0 to 5 percent slopes and most often observed as area of tidal flats. Xerorthents parent material is described a sandy and loamy cut and fill material and found in areas with typical mean annual precipitation ranging

---

[1] http://www.geodata.org/website/cadastral/viewer.htm
[2] Thurston Geodata Center:
http://www.geodata.org/website/cadastral/resultsparcel.asp?parcel=78500200100&submit=Go%21
[3] As provided in the Environmental Covenant in Enclosure B.
[4] http://www.itouchmap.com/latlong.html
[5] https://fortress.wa.gov/dnr/geology/?Theme=wigm
[6] http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

from 30 inches to 60 inches and where mean annual air temperature can range from 39 to 50 degrees Fahrenheit. Xerorthents are classified as *somewhat excessively drained* with a capacity to transmit water (Ksat) as *moderately high to high*. The typical xerorthents profile from 0 to 60 inches bgs is described as a variable mixture of the material described in the previous paragraph.

Locally at the Property, well logs of the shallow surface soil was described to consist of 1.5 to 4 feet of fine to medium sand with varying amounts of silt and gravel, interpreted as structural fill. Soils encountered below the structural fill generally consisted of gray to brown, fine to coarse sand with variable amounts of silt, gravel, and shell fragments. This material was interpreted as hydraulic fill from dredging of Budd Inlet in the 1800s and early 1900s. Groundwater was encountered approximately 4.5 to 6.5 feet below ground surface (bgs) and groundwater measurements imply a shallow groundwater gradient that migrates towards West Bay.



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

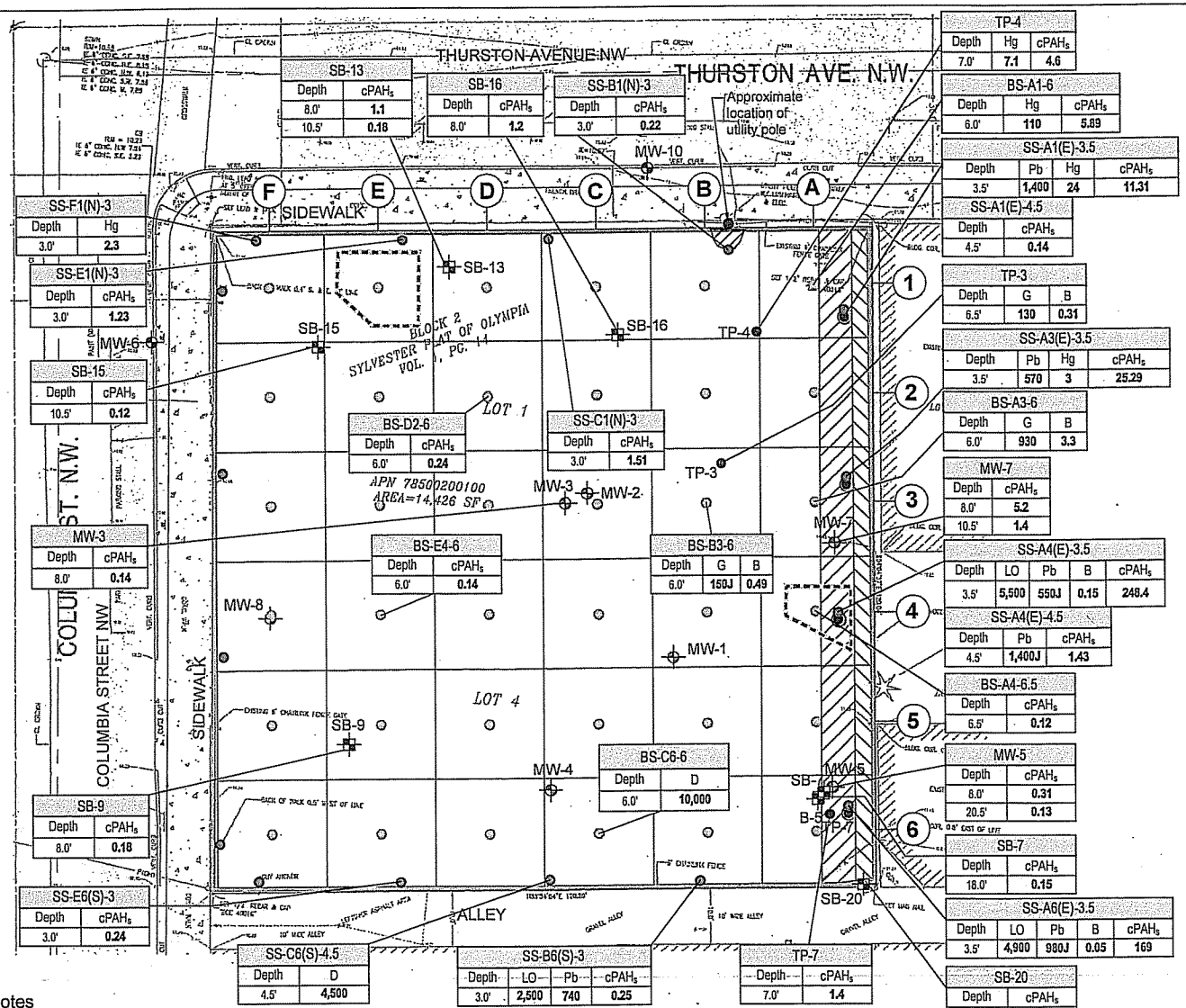
Vicinity Map

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 1

Office: SEA Path: \\sea\projects\0\0186774\GIS\0186774400_F1_VM.mxd Map Revised: 14 October 2011 amanza



SB-13	
Depth	cPAHs
8.0'	1.1
10.5'	0.18

SB-16	
Depth	cPAHs
8.0'	1.2

SS-B1(N)-3	
Depth	cPAHs
3.0'	0.22

TP-4		
Depth	Hg	cPAHs
7.0'	7.1	4.6

BS-A1-6		
Depth	Hg	cPAHs
6.0'	110	5.89

SS-A1(E)-3.5			
Depth	Pb	Hg	cPAHs
3.5'	1,400	24	11.31

SS-A1(E)-4.5	
Depth	cPAHs
4.5'	0.14

SS-F1(N)-3	
Depth	Hg
3.0'	2.3

SS-E1(N)-3	
Depth	cPAHs
3.0'	1.23

SB-15	
Depth	cPAHs
10.5'	0.12

TP-3		
Depth	G	B
6.5'	130	0.31

SS-A3(E)-3.5			
Depth	Pb	Hg	cPAHs
3.5'	570	3	25.29

BS-A3-6		
Depth	G	B
6.0'	930	3.3

BS-D2-6	
Depth	cPAHs
6.0'	0.24

SS-C1(N)-3	
Depth	cPAHs
3.0'	1.51

MW-7	
Depth	cPAHs
8.0'	5.2
10.5'	1.4

MW-3	
Depth	cPAHs
8.0'	0.14

BS-E4-6	
Depth	cPAHs
6.0'	0.14

BS-B3-6		
Depth	G	B
6.0'	150J	0.49

SS-A4(E)-3.5				
Depth	LO	Pb	B	cPAHs
3.5'	5,500	550J	0.15	248.4

SS-A4(E)-4.5		
Depth	Pb	cPAHs
4.5'	1,400J	1.43

BS-A4-6.5	
Depth	cPAHs
6.5'	0.12

BS-C6-6	
Depth	D
6.0'	10,000

MW-5	
Depth	cPAHs
8.0'	0.31
20.5'	0.13

SB-9	
Depth	cPAHs
8.0'	0.18

SB-7	
Depth	cPAHs
18.0'	0.15

SS-E6(S)-3	
Depth	cPAHs
3.0'	0.24

SS-A6(E)-3.5				
Depth	LO	Pb	B	cPAHs
3.5'	4,900	980J	0.05	169

SS-C6(S)-4.5	
Depth	D
4.5'	4,500

SS-B6(S)-3			
Depth	LO	Pb	cPAHs
3.0'	2,500	740	0.25

TP-7	
Depth	cPAHs
7.0'	1.4

SB-20	
Depth	cPAHs
8.0'	0.36
10.5'	0.15

Legend

- Property boundary/ Excavation Limit
- Area where excavation depth was greater than 6-feet (to remove stained soil)
- Existing Building
- Existing fence
- Confirmation soil sample (excavation base)
- Confirmation soil sample (excavation sidewall)
- Confirmation soil sample (excavation sidewall) where two samples were collected at two separate depths
- MW-10 — Existing groundwater monitoring well
- MW-8 — Groundwater monitoring well decommissioned prior to commencing remedial excavation activities
- Soil boring (completed during a previous investigation)
- Test pit location (completed during a previous investigation)
- B / 2 — Confirmation sampling grid
- Sidewall sloped 1-foot horizontal: 1-foot vertical
- 3-foot setback from property line
- 4-foot setback from utility pole

Soil analytical results (mg/kg) for contamination that remains in-place at concentrations greater than MTCA A cleanup levels.

B = Benzene
cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons – toxic equivalent concentration
LO = Lube oil-range hydrocarbons
D = Diesel-range hydrocarbons
G = Gasoline-range hydrocarbons
Hg = Mercury
Pb = Lead
J = The result is an estimated value.

Red/bold values exceed MTCA Method A cleanup levels

Note: Analytical results were less than MTCA Method A cleanup levels for confirmation soil samples with no posted data.

N W E S

20 0 20
FEET

Notes

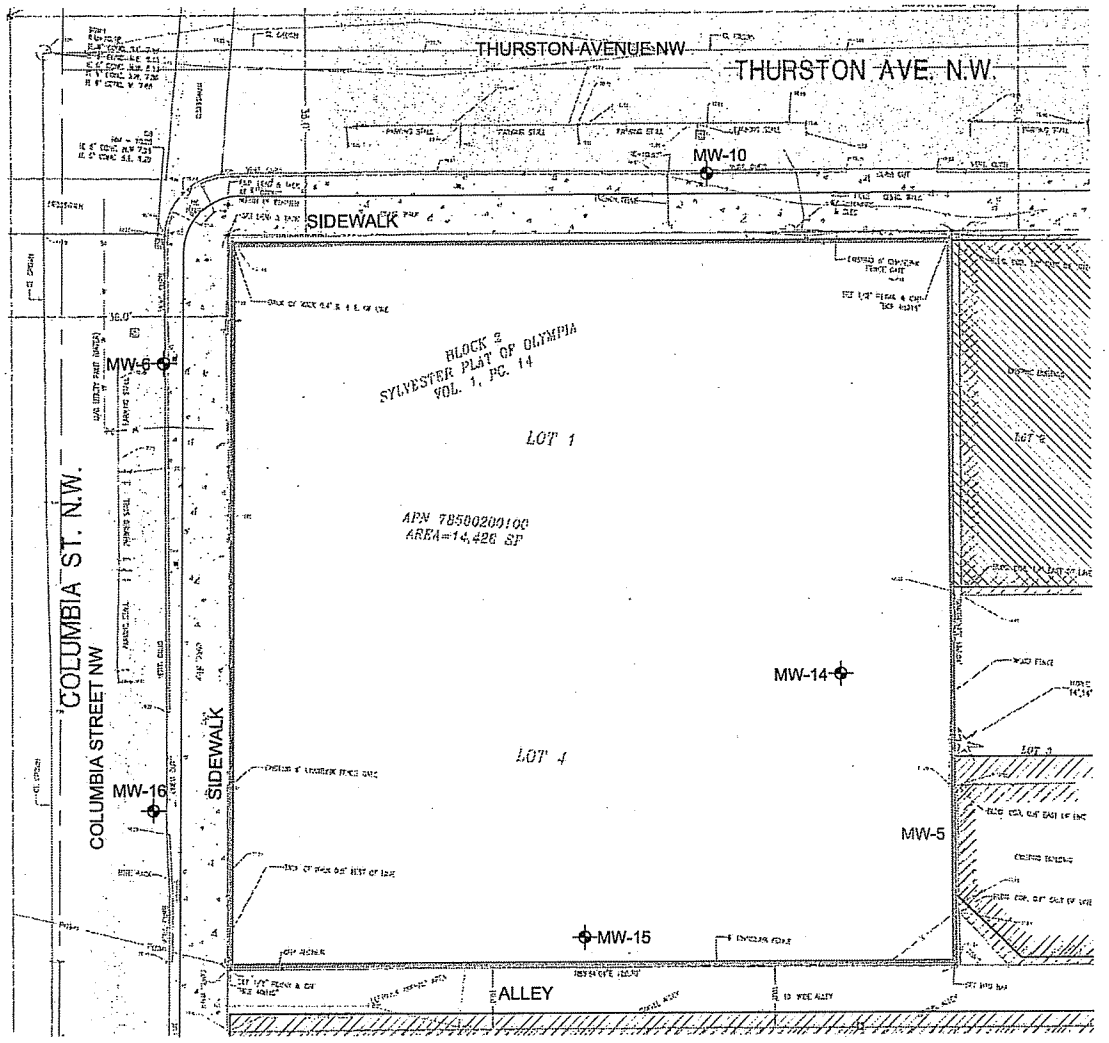
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Remedial Excavation Limits and Soil Analytical Results

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 2



Legend

- Property boundary
- Existing Building
- Existing fence
- MW-10 Compliance monitoring well

N W E S

20 0 20
FEET

Notes

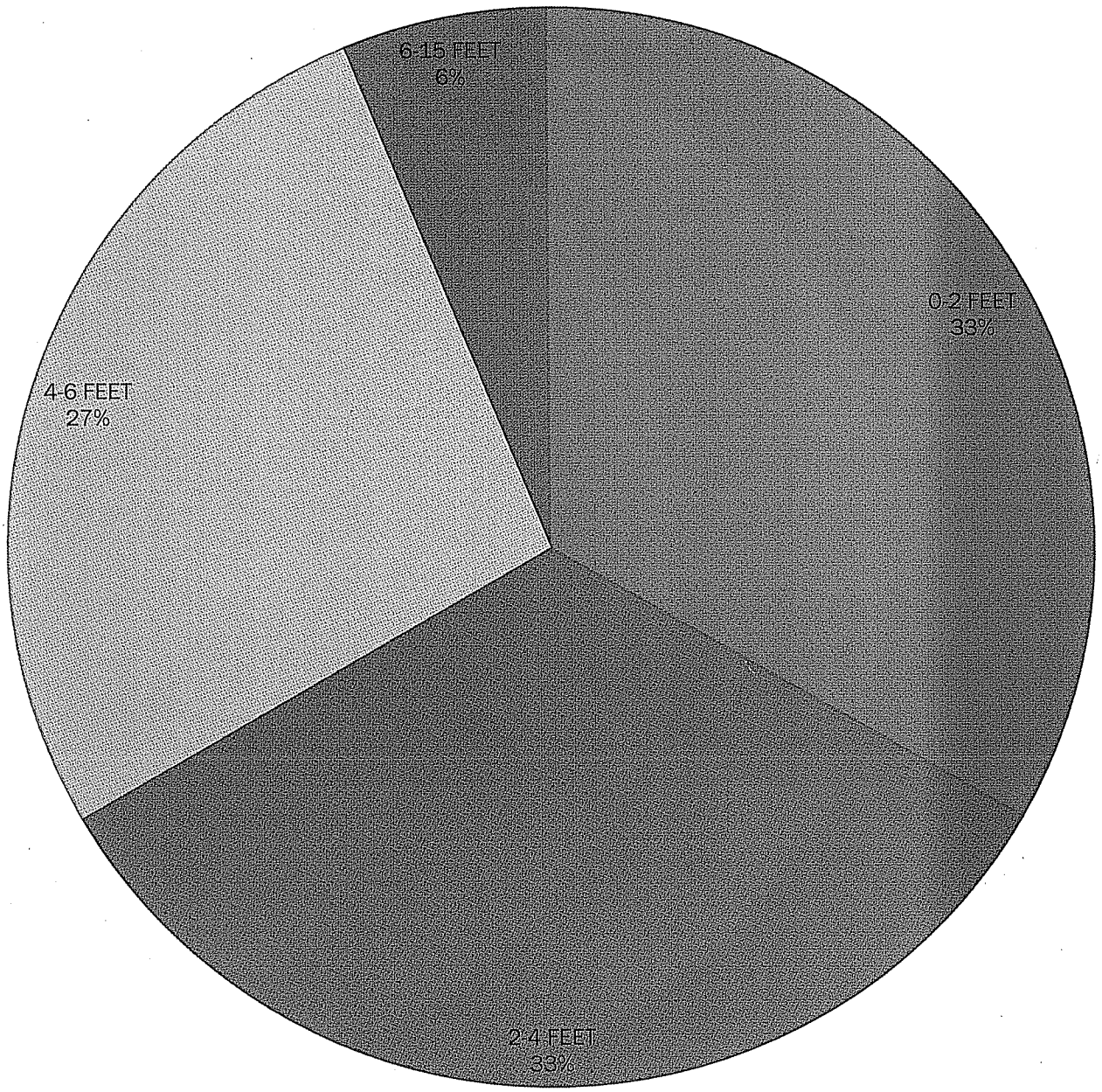
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

August 2013 and February 2015 Ground Water Compliance Monitoring Locations

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 2



Calculated Relative Mass of Total cPAHs by Depth Below Ground Surface

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 4

Table 1

Measured Groundwater Levels in Monitoring Wells

2008-2015

PSE Former Olympia MGP Site

Olympia, Washington

Monitoring Well	Screened Interval (feet bgs)	Shallow/Deep Well	Top-of-Casing Elevation[1] (feet NAVD88)	Date	Measured Depth to Groundwater[2] (feet below TOC)	Calculated Groundwater Elevation (feet NAVD88)
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
				7/18/11	NM	–
				10/18/11	NM	–
				8/26/13	5.16	8.53
				2/26/15	4.78	8.91
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	9.1
				5/26/10	4.96	8.8
				1/6/11	4.91	8.85
				4/19/11	4.92	8.84
				7/18/11	NM	–
				10/18/11	NM	–
				8/26/13	5.30	8.46
				2/26/15	4.91	8.85
MW-14[4]	4 to 20	Shallow	14.64	8/26/13	6.24	8.40
				2/26/15	5.95	8.69
MW-15[4]	4 to 20	Shallow	14.20	8/26/13	5.81	8.39
				2/26/15	5.38	8.82
MW-16[4]	4 to 20	Shallow	13.39	8/26/13	4.98	8.41
				2/26/15	4.51	8.88

Notes:

[1]MW-6 and MW-10 Elevations surveyed in December 2010 by Barghausen Consulting Engineers, Inc. relative to NAVD88. MW-14, MW-15, and MW-16 elevations are based on a laser level survey (utilizing the same datum) performed by GeoEngineers.

[2]Water levels measured with an electronic water level indicator.

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

[4]Monitoring well installed by Cascade Drilling and observed by GeoEngineers in August 2013.

bgs = Below ground surface

MW = Monitoring well

NAVD88 = North American Vertical Datum of 1988.

NM = Not measured

TOC = Top of well casing

Table 2

Groundwater Chemical Analytical Results (August 2013 and February 2015)

Former Olympia Manufactured Gas Plant Site

Olympia, Washington

		Location ID	MW-6	MW-6	MW-10	MW-10	MW-14	MW-14	Duplicate	MW-14 (Dup)*	MW-15	MW-15	MW-16	MW-16
		Sample ID	MW-6-082613-W	MW-6-022615-W	MW-10-082613-W	MW-10-022615-W	MW-14-082613-W	MW-14-022615-W	MW-DUP-052613-W*	MW-DUP-022615-W	MW-15-082613-W	MW-15-022615-W	MW-16-082613-W	MW-16-022615-W
		Sample Date	8/26/2013	2/26/2015	8/26/2013	2/26/2015	8/26/2013	2/26/2015	8/26/2013	2/26/2015	8/26/2013	2/26/2015	8/26/2013	2/26/2015
Analyte	Units	MTCA Method A Cleanup Level[1]												
Benzene by 8260C														
Benzene	µg/L	5	--	--	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	--	--
Total Petroleum Hydrocarbons (NWTPH-Dx)														
Diesel-range hydrocarbons	mg/L	0.5	--	--	--	--	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	--	--
Lube Oil-range hydrocarbons	mg/L	0.5	--	--	--	--	0.41 U	0.41 U	0.42 U	0.41 U	0.41 U	0.41 U	--	--
cPAHs by 8270D-SIM														
Benzo(a)anthracene	µg/L	NE	0.0095 U	0.0097 U	0.0094 U	0.0094	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
Chrysene	µg/L	NE	0.0095 U	0.0097 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
Benzo(b)fluoranthene	µg/L	NE	0.0095 U	0.0097 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
Benzo(k)fluoranthene	µg/L	NE	0.0095 U	0.0097 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
Benzo(a)pyrene	µg/L	NE	0.0095 U	0.0097 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
Indeno(1,2,3-cd)pyrene	µg/L	NE	0.0095 U	0.0097 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
Dibenzo(a,h)anthracene	µg/L	NE	0.0095 U	0.0097 U	0.0094 U	0.0094 U	0.0094 U	0.0095 U	0.0095 U	0.0094 U	0.0095 U	0.0095 U	0.0095 U	0.0095 U
Total cPAHs TEC	µg/L	0.1	0.0072 UT	0.0073 UT	0.0071 UT	0.0076 T	0.0071 UT	0.0072 UT	0.0072 UT	0.0071 UT	0.0072 UT	0.0072 UT	0.0072 UT	0.0072 UT
Metals by 200.8/7470														
Total Lead	mg/L	0.015	--	--	--	--	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	--	--
Dissolved Lead[2]	mg/L	0.015	--	--	--	--	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U	--	--
Total Mercury	mg/L	0.002	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	0.0005 U	0.0005 U
Dissolved Mercury[2]	mg/L	0.002	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	--	--	0.0005 U	0.0005 U

Notes:

[1]Model Toxics Control Act (MTCA) Method A cleanup levels for potable groundwater (Washington Administrative Code [WAC] 173-340-720[3]).

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

*Field duplicate sample of MW-14.

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

mg/L = milligrams per liter

NE = Cleanup level not established

T = Calculated by GeoEngineers.

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).

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

µg/L = micrograms per liter

-- = Constituent not analyzed

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

Enclosure B

Environmental Covenant and Groundwater Compliance Monitoring Plan

After Recording Return
Original Signed Covenant to:
Eugene Radcliff, L.G.
Toxics Cleanup Program
Department of Ecology
Southwest Regional Office
300 Desmond Dr SE
Lacey, WA 98503-1274

Environmental Covenant

Grantor: Evergreen Olympic Properties Inc. d/b/a The Rants Group
Grantee: State of Washington, Department of Ecology
Brief Legal Description: Lots 1 & 4 Blk 2 Sylvester's
Tax Parcel Nos.: 7850-02-00100
Cross Reference:

RECITALS

a. This document is an environmental (restrictive) covenant (hereafter "Covenant") executed pursuant to the Model Toxics Control Act ("MTCA"), chapter 70.105D RCW and Uniform Environmental Covenants Act ("UECA"), chapter 64.70 RCW.

b. The Property that is the subject of this Covenant is part or all of a site commonly known as Columbia Square Properties (Facility ID 91682829). The Property is legally described in Exhibit A, and illustrated in Exhibit B, both of which are attached (hereafter "Property"). If there are differences between these two Exhibits, the legal description in Exhibit A shall prevail.

c. The Property is the subject of remedial action under MTCA. This Covenant is required because residual contamination remains on the Property after completion of remedial actions. Specifically, the following principle contaminants remain on the Property:

Medium	Principle Contaminants Present
Soil	Gasoline-, diesel- and lube oil-range petroleum hydrocarbons, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), benzene, lead, and mercury
Groundwater	cPAHs
Surface Water/Sediment	Not applicable (N/A)

d. It is the purpose of this Covenant to restrict certain activities and uses of the Property to protect human health and the environment and the integrity of remedial actions conducted at the site. Records describing the extent of residual contamination and remedial actions conducted are available through the Washington State Department of Ecology. This includes the following documents:

"Supplemental Site Investigation Report, Former Columbia Street Manufactured Gas Plant Property, Olympia, Washington," prepared by GeoEngineers, January 29, 2010.

"Data Summary Report, Former Olympia Manufactured Gas Plant Site, Olympia, Washington," prepared by GeoEngineers, October 17, 2011.

"Revised Cleanup Action Plan, Former Columbia Street Manufactured Gas Plant Property, Olympia, Washington," prepared by GeoEngineers, July 30, 2012.

"Construction Work Plan, Former Olympia Manufactured Gas Plant Site, Olympia, Washington," prepared by GeoEngineers, September 19, 2012.

"Cleanup Action Report, Former Olympia Manufactured Gas Plant Property, Olympia, Washington," prepared by GeoEngineers, January 4, 2013.

e. This Covenant grants the Washington State Department of Ecology, as holder of this Covenant, certain rights specified in this Covenant. The right of the Washington State Department of Ecology as a holder is not an ownership interest under MTCA, Chapter 70.105D RCW or the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") 42 USC Chapter 103.

COVENANT

Evergreen Olympic Properties Inc. d/b/a The Rants Group, as Grantor and owner of the Property hereby grants to the Washington State Department of Ecology, and its successors and assignees, (hereafter "Ecology") the following covenants. Furthermore, it is the intent of the Grantor that such covenants shall run with the land and be binding on all current and future owners of any portion of, or interest in, the Property.

Section 1. General Restrictions and Requirements.

The following general restrictions and requirements shall apply to the Property:

a. Interference with Remedial Action. The Grantor shall not engage in any activity on the Property that may impact or interfere with the remedial action and any operation, maintenance, inspection or monitoring of that remedial action without prior written approval from Ecology.

b. Protection of Human Health and the Environment. The Grantor shall not engage in any activity on the Property that may threaten continued protection of human health or the environment without prior written approval from Ecology. This includes, but is not limited to, any activity that results in the release of residual contamination that was contained as a part of the remedial action or that exacerbates or creates a new exposure to residual contamination remaining on the Property.

c. Continued Compliance Required. Grantor shall not convey any interest in any portion of the Property without providing for the continued adequate and complete operation, maintenance and monitoring of remedial actions and continued compliance with this Covenant.

d. Leases. Grantor shall restrict any lease for any portion of the Property to uses and activities consistent with this Covenant and notify all lessees of the restrictions on the use of the Property.

e. Amendment to the Covenant. Grantor must notify and obtain approval from Ecology at least sixty (60) days in advance of any proposed activity or use of the Property in a manner that is inconsistent with this Covenant. Before approving any proposal, Ecology must issue a public notice and provide an opportunity for the public to comment on the proposal. If Ecology approves the proposal, the Covenant will be amended to reflect the change.

Section 2. Specific Prohibitions and Requirements.
In addition to the general restrictions in Section 1 of this Covenant, the following additional specific restrictions and requirements shall apply to the Property.

a. Land use.
There are no land use restrictions because the cleanup was conducted using MTCA cleanup levels for unrestricted land use.

b. Containment of soil/waste materials.
The remedial action for the Property includes containment of some contaminated soil that could not be practicably removed. The remaining contaminated soil is contained under a cap consisting of approximately 6 feet of clean imported fill. The 6-foot-thick cap is located as illustrated in Exhibit B. The primary purpose of this cap is to minimize the potential for contact with the contaminated soil. As such, the following restrictions shall apply within the area illustrated in Exhibit B:

Any activity on the Property that will compromise the integrity of the cap including: drilling; digging; piercing the cap with sampling device, post, stake or similar device; grading; excavation; installation of underground utilities; removal of the cap; or, application of loads in excess of the cap load bearing capacity, is prohibited without prior written approval by Ecology. The Grantor shall report to Ecology within forty-eight (48) hours of the discovery of any damage to the cap. Unless an alternative plan has been approved by Ecology in writing, the Grantor shall promptly repair the damage and submit a report documenting this work to Ecology within thirty (30) days of completing the repairs.

c. Groundwater use.

The groundwater beneath the Property remains contaminated and shall not be extracted for any purpose other than temporary construction dewatering, investigation, monitoring or remediation. Drilling of a well for any water supply purpose is strictly prohibited. Groundwater extracted from the Property for any purpose shall be considered potentially contaminated and any discharge of this water shall be done in accordance with state and federal law.

d. Monitoring

Several groundwater monitoring wells are located on or adjacent to the Property to monitor the performance of the remedial action. Groundwater conditions are being monitored in accordance with the Groundwater Compliance Monitoring Plan dated October 8, 2013 and an associated Addendum #1 dated November 5, 2014 as presented in Exhibit C. The Grantor shall maintain clear access to those devices located on the Property and maintain the functional integrity of the groundwater monitoring well network and protect that network from damage or replace damaged components to maintain the intended purpose and functionality of the network. The Grantor shall report to Ecology within forty-eight (48) hours of the discovery of any damage to any monitoring device. Unless Ecology approves of an alternative plan in writing, the Grantor shall promptly repair the damage and submit a report documenting this work to Ecology within thirty (30) days of completing the repairs.

Section 3. Access.

a. The Grantor shall maintain clear access to all remedial action components necessary to construct, operate, inspect, monitor and maintain the remedial action.

b. The Grantor freely and voluntarily grants Ecology and its authorized representatives, upon reasonable notice, the right to enter the Property at reasonable times to evaluate the effectiveness of this Covenant and associated remedial actions, and enforce compliance with this Covenant and those actions, including the right to take samples, inspect any remedial actions conducted on the Property, and to inspect related records.

c. No right of access or use by a third party to any portion of the Property is conveyed by this instrument.

Section 4. Notice Requirements.

a. Conveyance of Any Interest. Because the anticipated use may be a multi-tenant/owner use where residents will not be exposed to residual contamination, Ecology waives the requirement that Grantor provide notice to Ecology of conveyances of interests in parts of the Property illustrated in Exhibit B. However, waiver of this notice to Ecology for these transactions does not constitute waiver of this notice requirement for the entire Property nor a waiver of the requirement to provide notice in any document conveying interest in the entire Property as follows:

i. Notify Ecology at least thirty (30) days in advance of the conveyance.

ii. Include in the conveying document a notice in substantially the following form, as well as a complete copy of this Covenant:

NOTICE: THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL COVENANT GRANTED TO THE WASHINGTON STATE DEPARTMENT OF ECOLOGY AND RECORDED WITH THE THURSTON COUNTY AUDITOR . USES AND ACTIVITIES ON THIS PROPERTY MUST COMPLY WITH THAT COVENANT, A COMPLETE COPY OF WHICH IS ATTACHED TO THIS DOCUMENT.

iii. Unless otherwise agreed to in writing by Ecology, provide Ecology with a complete copy of the executed document within thirty (30) days of the date of execution of such document.

b. **Reporting Violations.** Should the Grantor become aware of any violation of this Covenant, Grantor shall promptly report such violation to Ecology.

c. **Emergencies.** For any emergency or significant change in site conditions due to Acts of Nature (for example, flood, fire) resulting in a violation of this Covenant, the Grantor is authorized to respond to such an event in accordance with state and federal law. The Grantor must notify Ecology of the event and response actions planned or taken as soon as practical but no later than within 24 hours of the discovery of the event.

d. Any required written notice, approval, or communication shall be personally delivered or sent by first class mail to the following persons. Any change in this contact information shall be submitted in writing to all parties to this Covenant.

Evergreen Olympic Properties Inc. d/b/a The Rants Group Attn: Patrick Rants 724 Columbia St. NW, Suite 200 Olympia, WA 98501 Phone contact: 360 943-8060	Environmental Covenants Coordinator Washington State Department of Ecology Toxics Cleanup Program P.O. Box 47600 Olympia, WA 98504 – 7600 (360) 407-6000

As an alternative to providing written notice and change in contact information by mail, these documents may be provided electronically in an agreed upon format at the time of submittal.

Section 5. Modification or Termination.

a. If the conditions at the site requiring a Covenant have changed or no longer exist, then the Grantor may submit a request to Ecology that this Covenant be amended or terminated. Any amendment or termination of this Covenant must follow the procedures in Chapter 64.70 RCW and Chapter 70.105D RCW and any rules promulgated under these chapters.

Section 6. Enforcement and Construction.

a. This Covenant is being freely and voluntarily granted by the Grantor.

b. Grantor shall provide Ecology with an original signed Covenant and proof of recording within ten (10) days of execution of this Covenant.

c. Ecology shall be entitled to enforce the terms of this Covenant by resort to specific performance or legal process. All remedies available in this Covenant shall be in addition to any

and all remedies at law or in equity, including Chapter 70.105D RCW and Chapter 64.70 RCW. Enforcement of the terms of this Covenant shall be at the discretion of Ecology, and any forbearance, delay or omission to exercise its rights under this Covenant in the event of a breach of any term of this Covenant is not a waiver by Ecology of that term or of any subsequent breach of that term, or any other term in this Covenant, or of any rights of Ecology under this Covenant.

d. The Grantor, upon request by Ecology, shall be obligated to pay for Ecology's costs to process a request for any modification or termination of this Covenant and any approval required by this Covenant.

e. This Covenant shall be liberally construed to meet the intent of the Model Toxics Control Act, chapter 70.105D RCW and Uniform Environmental Covenants Act, chapter 64.70 RCW.

f. The provisions of this Covenant shall be severable. If any provision in this Covenant or its application to any person or circumstance is held invalid, the remainder of this Covenant or its application to any person or circumstance is not affected and shall continue in full force and effect as though such void provision had not been contained herein.

g. A heading used at the beginning of any section or paragraph or exhibit of this Covenant may be used to aid in the interpretation of that section or paragraph or exhibit but does not override the specific requirements in that section or paragraph.

The undersigned Grantor warrants he/she holds the title to the Property and has authority to execute this Covenant.

EXECUTED this 5th day of May, 2015.

Evergreen Olympic Properties Inc.
d/b/a The Rants Group

Patrick C. Rants, President

Dated: 5-5-15

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Rebecca S. Lawson

Section Manager

Dated: 5/28/15

GRANTOR INDIVIDUAL ACKNOWLEDGMENT

STATE OF _____
COUNTY OF _____

On this _____ day of _____, 20__, I certify that _____ personally appeared before me, and acknowledged that **he/she** is the individual described herein and who executed the within and foregoing instrument and signed the same at **his/her** free and voluntary act and deed for the uses and purposes therein mentioned.

_____
Notary Public in and for the State of Washington, residing at _____.
My appointment expires _____.

GRANTOR CORPORATE ACKNOWLEDGMENT

STATE OF Washington
COUNTY OF Thurston

On this 5th day of May, 2015, I certify that Patrick C. Rants personally appeared before me, acknowledged that **he/she** is the President of the corporation that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that **he/she** was authorized to execute said instrument for said corporation.

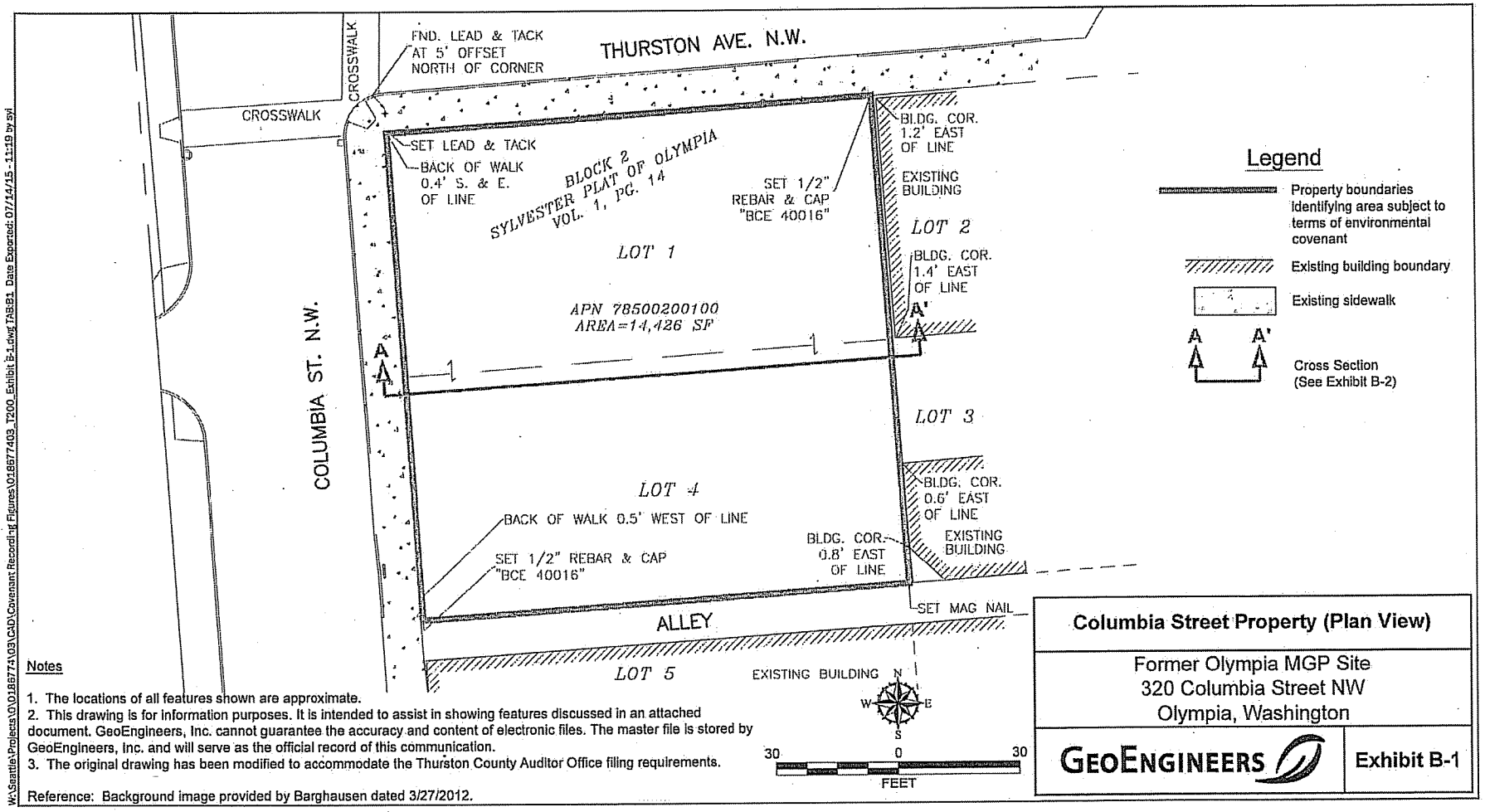
CAROLYN GRADEN
COMMISSION EXPIRES
NOTARY PUBLIC
11-08-18
STATE OF WASHINGTON

Carolyn Graden
Notary Public in and for the State of Washington, residing at Olympia, WA.
My appointment expires 11/8/18.

Exhibit A

LEGAL DESCRIPTION

Lots 1 and 4 in Block 2 of Sylvester Plat of Olympia, as recorded in Volume 1 of Plats, page 14.



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.
3. The original drawing has been modified to accommodate the Thurston County Auditor Office filing requirements.

Reference: Background image provided by Barghausen dated 3/27/2012.

Columbia Street Property (Plan View)

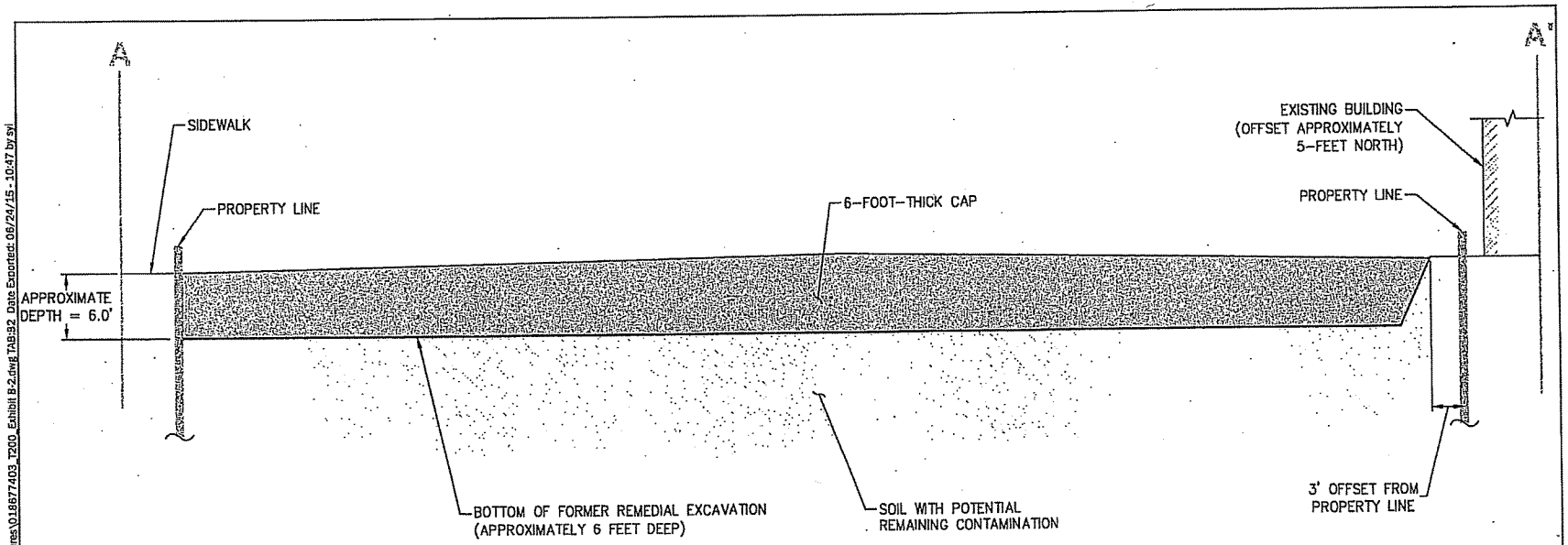
Former Olympia MGP Site
320 Columbia Street NW
Olympia, Washington

GeoEngineers

Exhibit B-1

Exhibit B

PROPERTY MAP



Note:

1. See Exhibit B-1 for Section A-A' location.

HORIZONTAL SCALE: 1"= 12'
VERTICAL SCALE: 1"= 6'
VERTICAL EXAGGERATION: 2X

12 0 12
FEET

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: Data based on sketch provided by GeoEngineers staff.

Columbia Street Property
Cross Section View of Cap

Former Olympia MGP Site
320 Columbia Street NW
Olympia, Washington

GeoEngineers

Exhibit B-2

W:\Seattle\Projects\0\0186774\03\CAD\Covenant Recording Figures\0186774003_T200_Exhibit B-2.dwg TAB:B2 Date Exported: 06/24/15 - 10:47 by syl

Exhibit C

GROUNDWATER COMPLIANCE MONITORING PLAN

Groundwater Compliance Monitoring Plan

320 Columbia Street NW
Olympia, Washington

for
Puget Sound Energy

October 8, 2013

GeoEngineers

1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Groundwater Compliance Monitoring Plan

320 Columbia Street NW
Olympia, Washington

File No. 0186-774-03

October 8, 2013

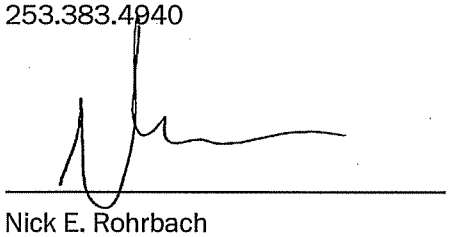
Prepared for:

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

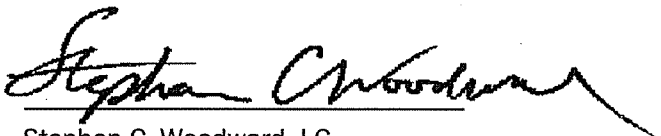
Attention: Greg Andrina

Prepared by:

GeoEngineers, Inc.
1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940



Nick E. Rohrbach
Environmental Scientist/Project Manager



Stephen C. Woodward, LG
Principal

NER:SCW:CSV:TLN:CSV

Table of Contents

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

This Groundwater Compliance Monitoring Plan (GWCMP) describes the procedures for performing groundwater monitoring to assess compliance with Model Toxic Control Act (MTCA) cleanup levels at the 320 Columbia Street NW property (Property), located in Olympia, Washington. Puget Sound Energy (PSE) entered into the Washington State Department of Ecology's (Ecology) Voluntary Cleanup Program (VCP) in September 2008 with the goal of achieving a No Further Action (NFA) determination for the Property. The remedial actions selected for the Property in cooperation with Ecology included the removal of soil with chemical concentrations greater than MTCA cleanup levels to the maximum extent practicable and post-remediation compliance groundwater monitoring. Remedial excavation activities were completed in October 2012 (GeoEngineers, 2013).

The purpose of the activities described in this GWCMP is to evaluate groundwater conditions beneath the Property after completing the 2012 cleanup action. This GWCMP describes procedures for monitoring well installation, well development, and groundwater sampling and analysis.

The following section, Section 2.0, describes the Property and Section 3.0 provides information on past investigations and remedial actions. The procedures for groundwater compliance monitoring are presented in Section 4.0. The standard operating procedures for field investigation activities are provided in Appendix A. A Quality Assurance Project Plan (QAPP) is included as Appendix B. A Health and Safety Plan (HASP) for groundwater compliance monitoring has been prepared under separate cover.

2.0 PROPERTY LOCATION AND DESCRIPTION

The Property occupies approximately 0.33 acres at the southeast corner of the intersection of Columbia Street NW and Thurston Avenue NW in Olympia, Washington and is currently vacant. It is identified as Thurston County tax parcel number 78500200100 and is located in the southwest quarter (SW 1/4) of the northwest quarter (NW 1/4) of Section 14, Township 18 North, Range 2 West of the Public Land Survey System land grid. The Property is bounded by Thurston Avenue NW to the north, Columbia Street NW to the west, and commercial properties to the east and south. Budd Inlet is located approximately 300 feet west of the Property (Figure 1).

3.0 PROPERTY BACKGROUND

3.1. Property History

The Property was developed as a manufactured gas plant (MGP) in 1908 by the Olympia Gas and Power Company. The Olympia MGP produced gas from oil and distributed the gas through underground pipes to limited areas of Olympia for residential uses such as lighting, heating, and cooking. The Olympia MGP was a primary source of Olympia's residential gas supply between April 1908 and August 1910. By August 1910, construction of a gas pipeline between Tacoma and Olympia was completed. This pipeline carried gas produced at an MGP in Tacoma and became Olympia's primary gas source. Consequently, from 1910 until approximately 1923 or 1924, the

Olympia MGP served as a backup/auxiliary plant, producing gas only as needed during temporary interruptions in the Tacoma gas supply.

Historical records indicate that all gas production at the Olympia MGP ceased by approximately 1924. 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. A 50-foot diameter aboveground spherical gas storage tank called a "Hortonsphere" was present on the Property from at least 1934 until the late 1940s. By the early 1950s, it appears that all gas production and storage facilities were dismantled, and a new office building/warehouse had been constructed on the Property. The Property was owned by Washington Natural Gas from the early 1950s until 1974, and a private law firm (Bean & Gentry) owned the Property from 1974 until 2008. 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 Property is currently owned by The Rants Group (TRG) and has been vacant since October 2009, when the office building was demolished to allow environmental sampling within the building footprint.

3.2. Previous Site Investigations and Remedial Actions

Four phases of environmental investigation were conducted at the Property between 2006 and 2011. Detailed summaries of these previous investigations are presented in the Data Summary Report (GeoEngineers, 2011). The previous investigations identified carcinogenic polycyclic aromatic hydrocarbons (cPAHs), benzene, gasoline- and lube oil-range petroleum hydrocarbons, lead, and mercury in Property soil at concentrations exceeding MTCA Method A cleanup levels. In addition, cPAHs have been detected in shallow groundwater at concentrations exceeding the MTCA Method A cleanup level near the eastern Property boundary. These contaminants were identified as chemicals of concern (COCs) in the revised CAP (GeoEngineers, 2012a).

The preferred cleanup alternative for the Property included the following: excavation of soil containing COC concentrations exceeding MTCA cleanup levels for unrestricted land use; off-site disposal of the excavated soil at a permitted facility, and; use of institutional controls. Institutional controls are needed because all contaminated soil was not removed from the Property, but rather, was removed to the maximum extent practicable. A disproportionate cost analysis was presented in the revised CAP to select the extent of excavation. In addition to mitigating risks associated with direct contact with contaminated soil, the selected remedy also reduced the risk of impacts to groundwater as a result of removing most of the contaminated soil from the Property.

The remedial action included removal and off-site disposal of approximately 4,400 tons of soil from the Property. The final limits of the completed excavation measured approximately 120 feet by 120 feet and extended to a total depth of approximately 6 feet below ground surface. The excavation depth approximately coincided with the depth of groundwater. The excavation sidewalls were generally vertical along the north, west and south sides of the Property. The eastern excavation sidewall sloped at an inclination of approximately 1H:1V (horizontal:vertical).

Discrete confirmation soil samples were collected at the limits of the remedial excavation and analyzed in accordance with the sampling and analysis plan (SAP) provided in the Construction

Work Plan (GeoEngineers, 2012b). Analytical results for all confirmation soil samples are presented in the Cleanup Action Report (GeoEngineers, 2013). Present-day soil conditions beneath the Property are characterized by a combination of confirmation soil samples collected during the remedial action and soil samples collected during pre-remedial investigations. All analytical results that document present-day (post remedy) MTCA exceedances in soil beneath the Property are shown in Figure 2.

3.3. Summary of Previous Groundwater Investigation Results

Several groundwater investigations were performed on and adjacent to the Property between 2006 and 2010. Groundwater analytical results from these investigations were compared to MTCA cleanup levels (Table 1). The results of the previous groundwater investigations were discussed in the Data Summary Report (GeoEngineers, 2011). Figure 3 presents analytical results for contaminants that were detected in groundwater at concentrations greater than MTCA cleanup levels during the previous monitoring events.

Arsenic and cPAHs were detected at concentrations exceeding MTCA groundwater cleanup levels during several previous sampling events. The arsenic has been shown to be unrelated to historic activities on the Property (GeoEngineers, 2011). The only reoccurring exceedances of cPAHs have been in MW-7. Carcinogenic PAHs have a low aqueous solubility and do not readily partition into groundwater or typically migrate significant distances in the dissolved phase. As a result, the cPAH exceedances in MW-7 are believed to have been derived from contaminated soil in that immediate area.

Lead and chromium also were detected at concentrations exceeding MTCA cleanup levels during a single previous monitoring event, but did not exceed cleanup levels in four subsequent monitoring events.

Groundwater level measurements from previous monitoring events indicate that the groundwater gradient beneath the Property is relatively flat, with no consistent groundwater flow direction.

4.0 GROUNDWATER COMPLIANCE MONITORING

4.1. Introduction

Groundwater compliance monitoring will be performed to assess concentrations of various constituents (detailed below) in groundwater beneath the Property. The monitoring program will include the following:

- Groundwater sampling in two existing monitoring wells (MW-6 and MW-10) and three new monitoring wells (MW-14 through MW-16), located as shown in Figure 4.
- The following criteria were used to select analytes to be tested during future groundwater compliance monitoring:
    - Previous groundwater data – Future groundwater analysis will be conducted for cPAHs because this analyte group exceeded MTCA cleanup levels on numerous occasions, even though the exceedances occurred in only one monitoring well (MW-7).

Groundwater samples will not be tested for arsenic because it has been shown to be unrelated to historic activities on the Property (Table 2). Chromium also has been eliminated from consideration because it exceeded the cleanup level in only one of 42 samples, and was not detected in four subsequent (consecutive) monitoring events.

- Remaining soil contamination – Groundwater compliance samples will be analyzed for total and dissolved lead, total and dissolved mercury, benzene, and diesel- and lube oil-range hydrocarbons because these contaminants remain in soil at concentrations that could potentially impact groundwater.

  Potential impacts to groundwater were evaluated using the fixed parameter three-phase model (Washington Administrative Code (WAC) 173-340-747) for mercury and benzene. The number in which the remaining mercury and benzene concentrations exceed values protective of groundwater is very limited: six of 62 soil samples for mercury and six of 74 soil samples for benzene (Figure 2). The potential threat to groundwater by lead and diesel- and lube oil-range hydrocarbons was based on constituent concentrations exceeding the MTCA Method A soil cleanup level remaining in soil within and adjacent to the Property; the Method A soil cleanup levels are considered protective of groundwater.

  Inclusion of total and dissolved lead, total and dissolved mercury, benzene, and diesel- and lube oil-range hydrocarbons in the groundwater compliance monitoring plan is considered to be very conservative because these constituents were never detected in groundwater at concentrations exceeding cleanup levels during past groundwater monitoring events, prior to removing substantial contaminant mass by remedial excavation.

  Five other constituents were detected in remaining soil at concentrations exceeding values theoretically protective of groundwater. These include gasoline-range hydrocarbons, ethylbenzene, m- and p-xylene, pentachlorophenol and copper. These constituents will not be included in groundwater compliance sampling and analysis because they were detected in soil at a frequency less than the constituents discussed above, and have never been detected in groundwater at concentrations exceeding cleanup levels.

- Constituent analysis will vary between monitoring wells based on the criteria described above, as presented in Table 2.

- Collection of geochemical parameters including pH, redox potential, dissolved oxygen, temperature, conductivity and turbidity.
- Groundwater levels will be measured in the five compliance monitoring wells.

Future modifications to the monitoring program will be considered, if appropriate, based on monitoring results and discussions with Ecology.

4.2. Groundwater Monitoring Locations

Groundwater compliance sampling locations were selected based on the results of previous groundwater sampling events and soil conditions at the Property after the cleanup (Table 2).

Two existing and three new monitoring wells in and around the former remedial excavation will be used for groundwater compliance monitoring. The proposed groundwater compliance monitoring locations are shown in Figure 4. Existing monitoring well MW-6 is located near the northwest Property boundary and existing monitoring well MW-10 is located along the northern Property boundary. These wells will be sampled to provide adequate spatial coverage along the northern and western portions of the Property, and assess potential impacts from contaminated soil remaining in the vicinity of each well.

New monitoring wells will be installed at three locations. Groundwater monitoring well MW-14 will be installed near the eastern Property boundary, in the vicinity of the greatest remaining concentrations of cPAHs in soil (Figure 4). Monitoring well MW-15 will be installed adjacent to the southern Property boundary, close to the location where residual diesel- and lube oil-range hydrocarbons were detected in the southern sidewall of the remedial excavation. Monitoring well MW-16 will be installed west of the southwest Property boundary to provide spatial coverage west of the Property.

Monitoring wells MW-14 through MW-16 will be constructed by a licensed drilling contractor in accordance with Washington Administrative Code (WAC) 173-160, Minimum Standards for Construction and Maintenance of Wells. Upon completion of each soil boring, and prior to well installation, the water level within the boring will be measured to help select an appropriate well design. The tops of well screens will be positioned above the seasonal high groundwater table elevation. It is expected that the wells will be completed to depths of approximately 20 feet below ground surface (bgs) with approximately 10 to 15 feet of screen, similar to previous groundwater monitoring wells installed on the Property.

One soil sample from the well screen interval of each soil boring (MW-14 through MW-16) will be selected for chemical analysis based on field screening results and/or sample depth relative to groundwater depth. In the absence of positive field screening results, the soil sample will be collected from the upper part of the saturated zone. These samples will be placed in laboratory-supplied containers and submitted for chemical analysis of most of the constituents that will be analyzed in groundwater, including the following: cPAHs, diesel- and lube oil-range petroleum hydrocarbons, benzene and/or total mercury. The purpose of these analyses is to characterize soil conditions in the well screen intervals to support the interpretation of future groundwater monitoring results.

Following completion of the monitoring well, the well will be sufficiently developed prior to collecting groundwater samples. The standard operating procedures for field activities are included in Appendix A.

4.3. Monitoring Well Sampling and Analysis

Low-flow/low-turbidity sampling techniques will be used to minimize the suspension of sediment in the groundwater samples. Parameters including electrical conductivity, dissolved oxygen, pH, turbidity, oxidation-reduction potential and temperature will be collected using water quality instruments. Groundwater samples for laboratory analyses will be collected once water quality parameters have stabilized in accordance with the field procedures presented in Appendix B.

Groundwater samples for laboratory analysis will be collected in laboratory-prepared containers, placed into a cooler with ice and logged on the chain-of-custody in accordance with quality assurance procedures. Additional information regarding field and laboratory quality assurance/quality control (QA/QC) procedures is provided in the QAPP (Appendix B).

The laboratory analyses that will be performed on groundwater samples and rationale supporting the selected analysis are summarized in Table 2. Groundwater samples will be submitted for analysis of one or more of the following constituents based on the rationale provide in Section 4.1:

- cPAHs by EPA Method 8270-SIM;
- Benzene by EPA Method 8260;
- Diesel- and lube oil-range hydrocarbons by Ecology Method NWTPH-Dx;
- Total and dissolved lead by EPA Method 200.8; and
- Total and dissolved mercury by EPA Method 7470.

Chemical analyses to be conducted on each groundwater sample, including certain contingency analyses that may be conducted on the groundwater sample from MW-16, are summarized in Table 2. A concise summary of the analytical program for each monitoring well is presented below.

	Compliance Monitoring Well				
Constituents to be Analyzed	**MW-6**	**MW-10**	**MW-14**	**MW-15**	**MW-16**
cPAHs	X	X	X	X	X
Benzene		X	X	X	X[1]
Diesel- and lube oil-range hydrocarbons			X	X	X[1]
Total and dissolved lead			X	X	
Total and dissolved mercury	X	X	X		X

Notes:

[1]These samples will be submitted for analyses of these constituents only if these constituents are first detected at concentrations exceeding MTCA cleanup levels in monitoring wells MW-14 or MW-15.

The analytical program summarized above and in Table 2 may be modified depending on analytical results. No changes will be made without first discussing and obtaining approval from Ecology.

4.4. Groundwater Level Measurements

Groundwater levels will be measured in each the five compliance monitoring wells during each monitoring event. The groundwater level data will be used to calculate relative groundwater elevations and estimate groundwater gradients (if any).

4.5. Groundwater Compliance Criteria

The groundwater chemical analytical sample results for each monitoring event will be compared against the MTCA Method A values presented in Table B-2 in Appendix B. The specific chemicals to be compared to MTCA Method A compliance criteria are cPAHs, benzene, diesel- and lube-oil

petroleum hydrocarbons and mercury. A discussion of the chemical analytical results compared to the compliance criteria for each monitoring event will be provided in a summary technical memorandum as presented in Section 5.0.

5.0 SCHEDULE

Groundwater monitoring will be performed on an 18-month interval. Monitoring well installation and the initial round of groundwater monitoring will be performed after review and approval of this GWCMP by Ecology. The first summary technical memorandum will be prepared after completing the second monitoring event scheduled for February 2015. Summary technical memoranda will be submitted after each monitoring event thereafter. Report submittals to Ecology shall consist of two hard copies and one electronic (pdf) version. Each technical memorandum will present the following:

- Summary of the sampling activities;
- Tabulated summary of field- and laboratory-derived water quality data;
- Discussion of the monitoring data relative to groundwater compliance cleanup levels;
- Laboratory analytical reports; and
- Data quality review of the laboratory analytical results.

Validated analytical results from each monitoring event also will be submitted to Ecology's electronic environmental information management (EIM) system. Changes to the interval between sampling events may be considered depending on analytical results and discussions with Ecology.

6.0 REFERENCES

GeoEngineers, Inc., 2011. "Data Summary Report, Former Olympia Manufactured Gas Plant Site, Olympia, Washington." GEI File No. 0186-774-00, dated October 25, 2011.

GeoEngineers, Inc., 2012a. "Revised Cleanup Action Plan, Former Columbia Street Manufactured Gas Plant Property, Olympia, Washington." GEI File No. 00186-774-01, dated July 30, 2012.

GeoEngineers, Inc., 2012b. "Construction Work Plan, Former Olympia Manufactured Gas Plant Site, Olympia, Washington." GEI File No. 0186-774-02, dated September 19, 2012.

GeoEngineers, Inc., 2013. "Cleanup Action Report, Former Olympia Manufactured Gas Plant Property, Olympia, Washington." GEI File No. 0186-774-02, dated January 4, 2013.

Table 1

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 9/13/2006	B-3 9/13/2006	B-4 9/13/2006	B-5 9/13/2006	B-6 9/13/2006	MW-1 8/26/2008	MW-1 10/6/2008	MW-1 11/3/2009	MW-1 2/15/2010	MW-1 5/26/2010	MW-1 1/7/2011	MW-1 4/19/2011	MW-2 8/26/2008	MW-2 10/6/2008	MW-2 11/3/2009	MW-2/DUP-110309* 11/3/2009	MW-2 2/15/2010	MW-2 5/26/2010	MW-2 1/7/2011	MW-2 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 8/26/2008	MW-3/D-08-26-08* 8/26/2008	MW-3 10/6/2008	MW-3 11/3/2009	MW-3 2/15/2010	MW-3 5/26/2010	MW-3 1/7/2011	MW-3 4/19/2011	MW-4 8/26/2008	MW-4 10/6/2008	MW-4 11/3/2009	MW-4 2/15/2010	MW-4 5/26/2010	MW-4 1/7/2011	MW-4 4/19/2011	MW-5 11/3/2009	MW-5 2/15/2010	MW-5 5/26/2010	MW-5 1/7/2011	MW-5 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] Sample Date: 9/13/2006	MW-10 8/26/2008	MW-10 10/6/2008	MW-10 11/3/2009	MW-10 2/15/2010	MW-10 5/26/2010	MW-10 1/6/2011	MW-10 4/19/2011	MW-12S 1/7/2011	MW-12S 4/19/2011	MW-12D 1/7/2011	MW-12D 4/19/2011	MW-13S 1/7/2011	MW-13S 4/19/2011	MW-13D 1/7/2011	MW-13D 4/19/2011	MW-00S 2/15/2010	MW-00S 5/26/2010	MW-00S 1/7/2011	MW-00S 4/19/2011	MW-00D 1/7/2011	MW-00D 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:

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

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

[3]Well 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 toxocity 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 2

Groundwater Compliance Monitoring Program Rationale

Former Olympia MGP Site

Olympia, Washington

Historical Groundwater Analytical Results			Include Analyte in Groundwater Compliance Monitoring?			Proposed Compliance Sampling Locations	
Analyte	Number of Exceedances[1]	Location of Exceedances	Yes	No	Rationale for Analyte Inclusion/Exclusion	Monitoring Well(s)	Rationale for Sampling Location
cPAHs [2]	4/45	Former monitoring well MW-7	x		cPAHs were the only site-related constituent detected in groundwater at concentrations exceeding the cleanup level on more than one occasion.	All compliance monitoring wells	cPAHs are the only analytes detected in groundwater at concentrations exceeding the cleanup level more than one monitoring event.
Total Lead, Dissolved Lead	1/47 (Total), 0/8 (Dissolved)	Former monitoring well MW-3	x		Total and dissolved lead will be analyzed during the first groundwater compliance event due to elevated lead concentrations remaining in soil in six confirmation soil samples collected in the eastern and southeastern portions of the Property. After the first groundwater compliance event, total and dissolved lead will be considered to be removed from the analyte list for future sampling events if total and dissolved lead concentrations are less than the groundwater cleanup levels. This change to sampling program would require prior Ecology approval.	MW-14 and -15	Lead concentrations greater than the MTCA Method A cleanup level in soil remain in close proximity to two of the proposed new monitoring wells, MW-14 and -15.
Total Chromium, Dissolved Chromium	1/42 (Total), 0/2 (Dissolved)	Former monitoring well MW-4		x	Total Chromium was detected at a concentration exceeding the cleanup level during only the first monitoring event, followed by four clean quarters. Dissolved chromium was not detected in previous monitoring events. Residual soil concentrations at the site do not exceed the calculated value protective of groundwater.	N/A	N/A
Total Arsenic, Dissolved Arsenic	48/71 (Total), 10/24 Dissolved)	Multiple wells		x	Total arsenic and dissolved arsenic are not a site-related constituent as discussed in the Data Summary Report[3].	N/A	N/A
Total Mercury, Dissolved Mercury	0/40 (Total), 0/2 (Dissolved)	None	x		Total mercury concentrations have not exceeded groundwater cleanup level in the past, but residual mercury concentrations exceed the calculated value protective of groundwater in six soil samples collected in the northeastern, eastern and western portions of the Property. Dissolved mercury was not detected in previous monitoring events.	MW-6, -10, -14 and -16	Total and dissolved mercury will be analyzed in monitoring wells generally located near remaining soil that contains mecury at concentrations exceeding values theoretically protective of groundwater.
Benzene	0/30	None	x		Benzene concentrations have not exceeded the groundwater cleanup level in past monitoring events, but remaining benzene concentrations in soil exceed the calculated value protective of groundwater in five confirmation soil samples collected in the northeastern, eastern and southeastern portions of the Property.	MW-10, -14, -15 and -16[4]	Benzene will be analyzed in monitoring wells generally located near remaining soil that contains benzene at concentrations exceeding values theoretically protective of groundwater.
Diesel- and Lube Oil-range Hydrocarbons[5]	0/31	None	x		Diesel- and lube oil-range hydrocarbons have not been detected in groundwater in the past, but elevated diesel- and lube oil-range hydrocarbon concentrations remain in soil. Five confirmation soil samples collected in the eastern and southern portions of the Property are greater than the MTCA Method A cleanup level for soil.	MW-14, -15 and -16[4]	Diesel- and lube oil-range hydrocarbons will be analyzed in monitoring wells generally located near remaining soil that contains these constituents at concentrations exceeding MTCA Method A cleanup levels for soil.

Notes:

[1] Number of samples exceeding the cleanup level / total number of groundwater samples analyzed for this constituent, excluding groundwater samples obtained from temporary sampling points.

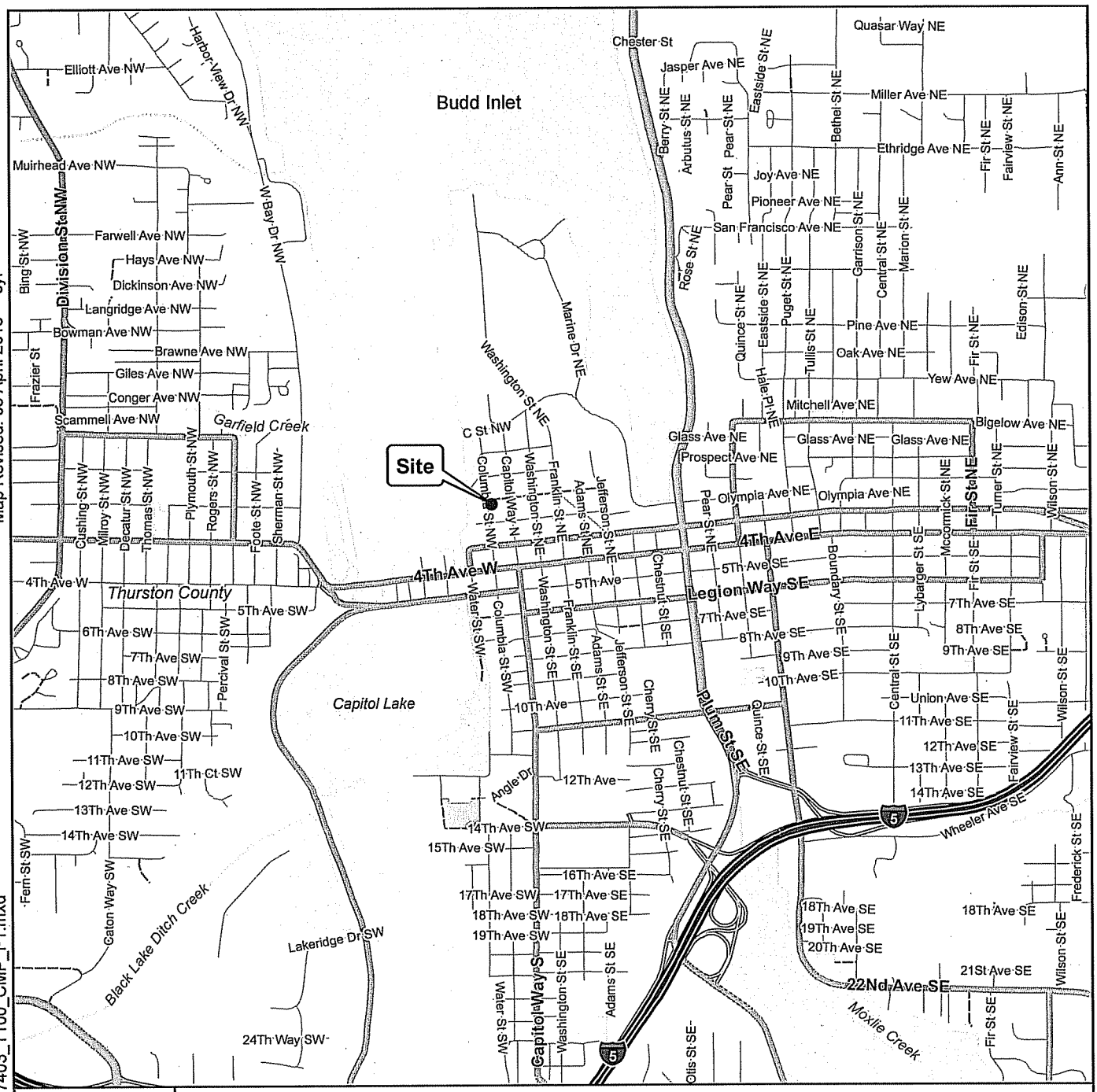
[2] cPAHs = carcinogenic polycyclic aromatic hydrocarbons

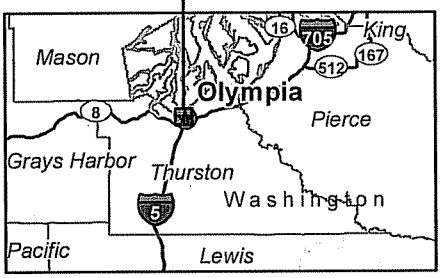
[3] GeoEngineers, Inc., 2011. "Data Summary Report, Former Olympia Manufactured Gas Plant Site, Olympia, Washington." October 17, 2011

[4] A contingency sample will be collected from MW-16 and placed on hold with the laboratory. The sample will be analyzed only if the analyte is first detected at concentrations exceeding the MTCA Method A cleanup level in MW-14 or MW-15. The groundwater samples collected from MW-14 and MW-15 will be analyzed on an appropriate turnaround time to allow the contingency sample from MW-16 to be analyzed, if necessary, within applicable holding times.

[5] Based on current Ecology guidance, the silica gel/acid cleanup step will be eliminated from the laboratory analysis. In the event that diesel- and/or lube oil-range hydrocarbons are detected in groundwater, the use of silicagel/acid cleanup may be reconsidered with Ecology's input for subsequent monitoring events.

N/A = Not applicable





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

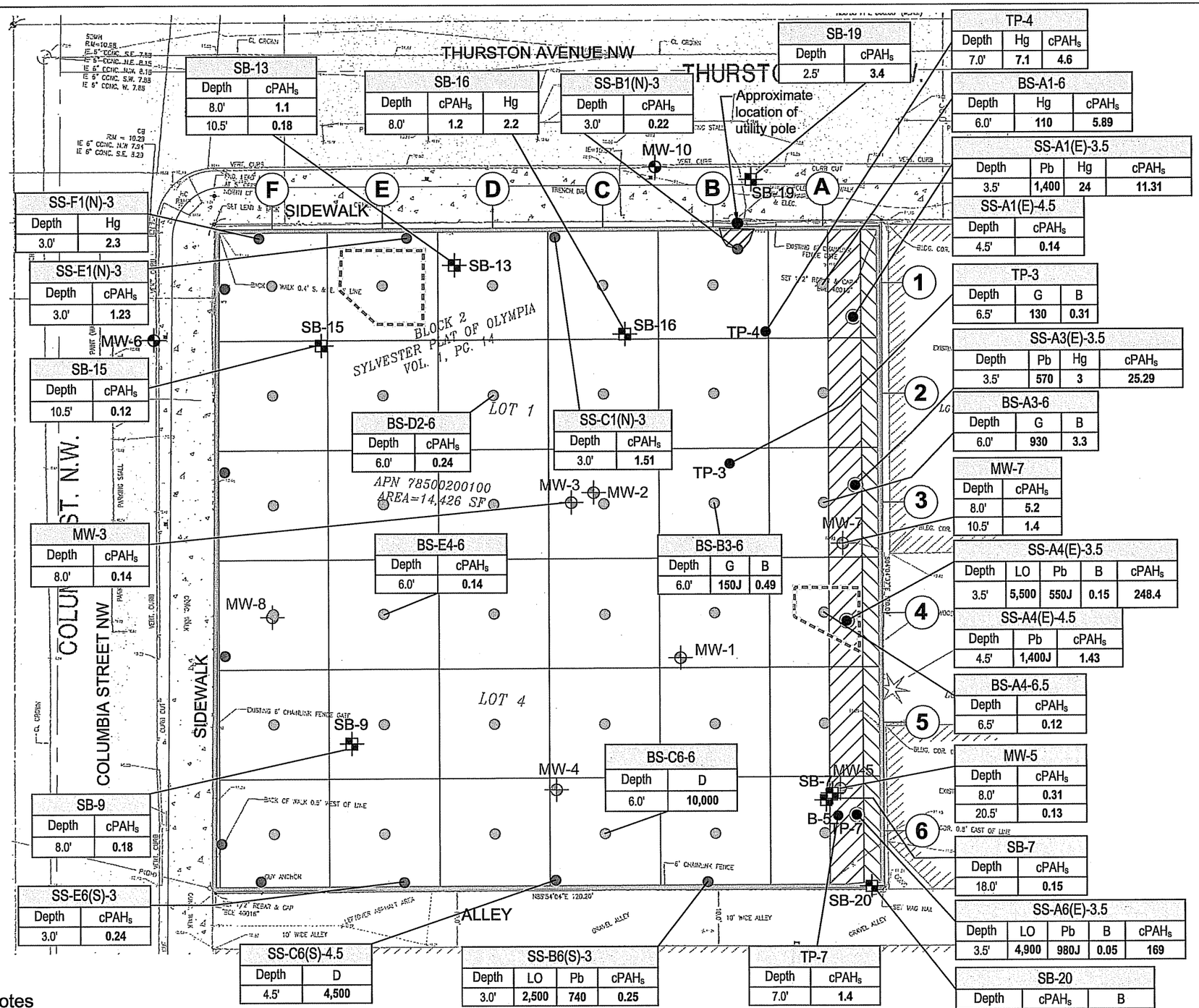
GeoEngineers

Figure 1

Map Revised: 03 April 2013 syi

Path: \\SEA\projects\0\0186774\GIS\0186774403_T100_CMP_F1.mxd

Office: SEA



SB-13	
Depth	cPAHs
8.0'	1.1
10.5'	0.18

SB-16		
Depth	cPAHs	Hg
8.0'	1.2	2.2

SS-B1(N)-3	
Depth	cPAHs
3.0'	0.22

SB-19	
Depth	cPAHs
2.5'	3.4

TP-4		
Depth	Hg	cPAHs
7.0'	7.1	4.6

BS-A1-6		
Depth	Hg	cPAHs
6.0'	110	5.89

SS-A1(E)-3.5			
Depth	Pb	Hg	cPAHs
3.5'	1,400	24	11.31

SS-A1(E)-4.5	
Depth	cPAHs
4.5'	0.14

TP-3		
Depth	G	B
6.5'	130	0.31

SS-A3(E)-3.5			
Depth	Pb	Hg	cPAHs
3.5'	570	3	25.29

BS-A3-6		
Depth	G	B
6.0'	930	3.3

MW-7	
Depth	cPAHs
8.0'	5.2
10.5'	1.4

SS-A4(E)-3.5				
Depth	LO	Pb	B	cPAHs
3.5'	5,500	550J	0.15	248.4

SS-A4(E)-4.5		
Depth	Pb	cPAHs
4.5'	1,400J	1.43

BS-A4-6.5	
Depth	cPAHs
6.5'	0.12

MW-5	
Depth	cPAHs
8.0'	0.31
20.5'	0.13

SB-7	
Depth	cPAHs
18.0'	0.15

SS-A6(E)-3.5				
Depth	LO	Pb	B	cPAHs
3.5'	4,900	980J	0.05	169

SB-20		
Depth	cPAHs	B
2.5'	4.8	<0.025
8.0'	0.36	<0.025
10.5'	0.15	1.0

MW-3	
Depth	cPAHs
8.0'	0.14

SB-15	
Depth	cPAHs
10.5'	0.12

SS-F1(N)-3	
Depth	Hg
3.0'	2.3

SS-E1(N)-3	
Depth	cPAHs
3.0'	1.23

SB-9	
Depth	cPAHs
8.0'	0.18

SS-E6(S)-3	
Depth	cPAHs
3.0'	0.24

BS-D2-6	
Depth	cPAHs
6.0'	0.24

SS-C1(N)-3	
Depth	cPAHs
3.0'	1.51

BS-E4-6	
Depth	cPAHs
6.0'	0.14

BS-B3-6		
Depth	G	B
6.0'	150J	0.49

BS-C6-6	
Depth	D
6.0'	10,000

SS-C6(S)-4.5	
Depth	D
4.5'	4,500

SS-B6(S)-3			
Depth	LO	Pb	cPAHs
3.0'	2,500	740	0.25

TP-7	
Depth	cPAHs
7.0'	1.4

Legend

- Property boundary/ Excavation Limit
- Area where excavation depth was greater than 6-feet (to remove stained soil)
- Existing Building
- Existing fence
- Confirmation soil sample (excavation base)
- Confirmation soil sample (excavation sidewall)
- Confirmation soil sample (excavation sidewall) where two samples were collected at two separate depths
- MW-10 — Existing groundwater monitoring well
- MW-3 — Groundwater monitoring well decommissioned prior to commencing remedial excavation activities
- Soil boring (completed during a previous investigation)
- Test pit location (completed during a previous investigation)
- B-2 — Confirmation sampling grid
- Sidewall sloped 1-foot horizontal: 1-foot vertical
- 3-foot setback from property line
- 4-foot setback from utility pole

Soil analytical results (mg/kg) for contamination that remains in-place at concentrations greater than MTCA A cleanup levels.

B = Benzene
cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons – toxic equivalent concentration
LO = Lube oil-range hydrocarbons
D = Diesel-range hydrocarbons
G = Gasoline-range hydrocarbons
Hg = Mercury
Pb = Lead
J = The result is an estimated value.

Red/bold values exceed MTCA Method A cleanup levels

Note: Analytical results were less than MTCA Method A cleanup levels for confirmation soil samples with no posted data.

N W E S

20 0 20
FEET

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.

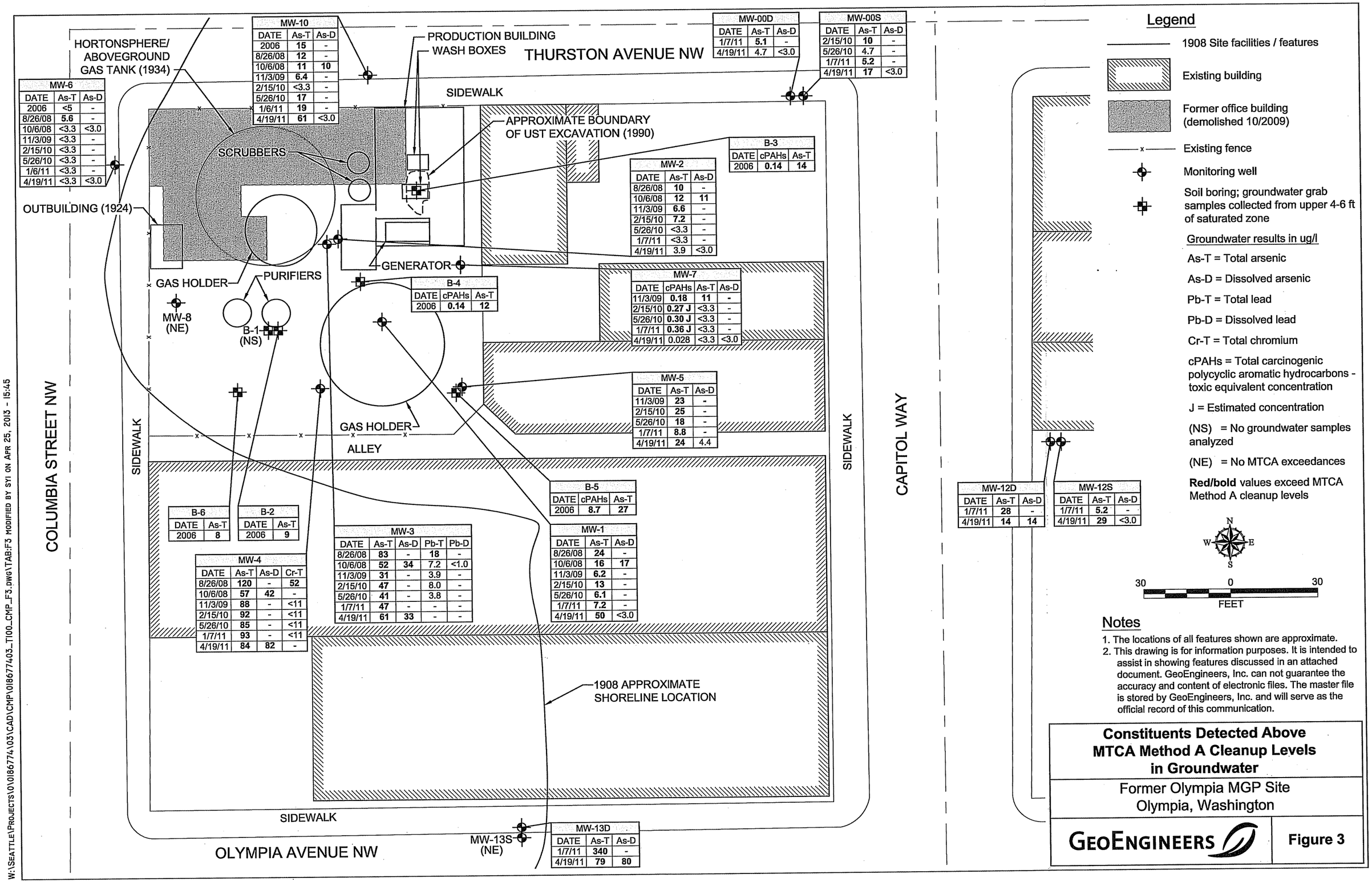
Post-Remedy Soil Impacts >MTCA

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 2

OFFICE: SEA Dwg name: D:\PROJECT\SEATTLE\0186774.03\CAD\CMP\0186774403_T100_CMP_F2.dwg User: syi Plot time: Oct-04-13 @ 2:05pm



MW-10		
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

MW-00D		
DATE	As-T	As-D
1/7/11	**5.1**	-
4/19/11	4.7	<3.0

MW-00S		
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

MW-6		
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

B-3		
DATE	cPAHs	As-T
2006	**0.14**	**14**

MW-2		
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

B-4		
DATE	cPAHs	As-T
2006	**0.14**	**12**

MW-7			
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

MW-5		
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

B-5		
DATE	cPAHs	As-T
2006	**8.7**	**27**

B-6	
DATE	As-T
2006	**8**

B-2	
DATE	As-T
2006	**9**

MW-3				
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**	-	-

MW-4			
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**	-

MW-1		
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

MW-13D		
DATE	As-T	As-D
1/7/11	**340**	-
4/19/11	**79**	**80**

Legend

- 1908 Site facilities / features
- Existing building
- Former office building (demolished 10/2009)
- Existing fence
- Monitoring well
- Soil boring; groundwater grab samples collected from upper 4-6 ft of saturated zone

Groundwater results in ug/l

As-T = Total arsenic

As-D = Dissolved arsenic

Pb-T = Total lead

Pb-D = Dissolved lead

Cr-T = Total chromium

cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons - toxic equivalent concentration

J = Estimated concentration

(NS) = No groundwater samples analyzed

(NE) = No MTCA exceedances

Red/bold values exceed MTCA Method A cleanup levels

MW-12D		
DATE	As-T	As-D
1/7/11	**28**	-
4/19/11	**14**	**14**

MW-12S		
DATE	As-T	As-D
1/7/11	**5.2**	-
4/19/11	**29**	<3.0

N W E S

30 0 30

FEET

Notes

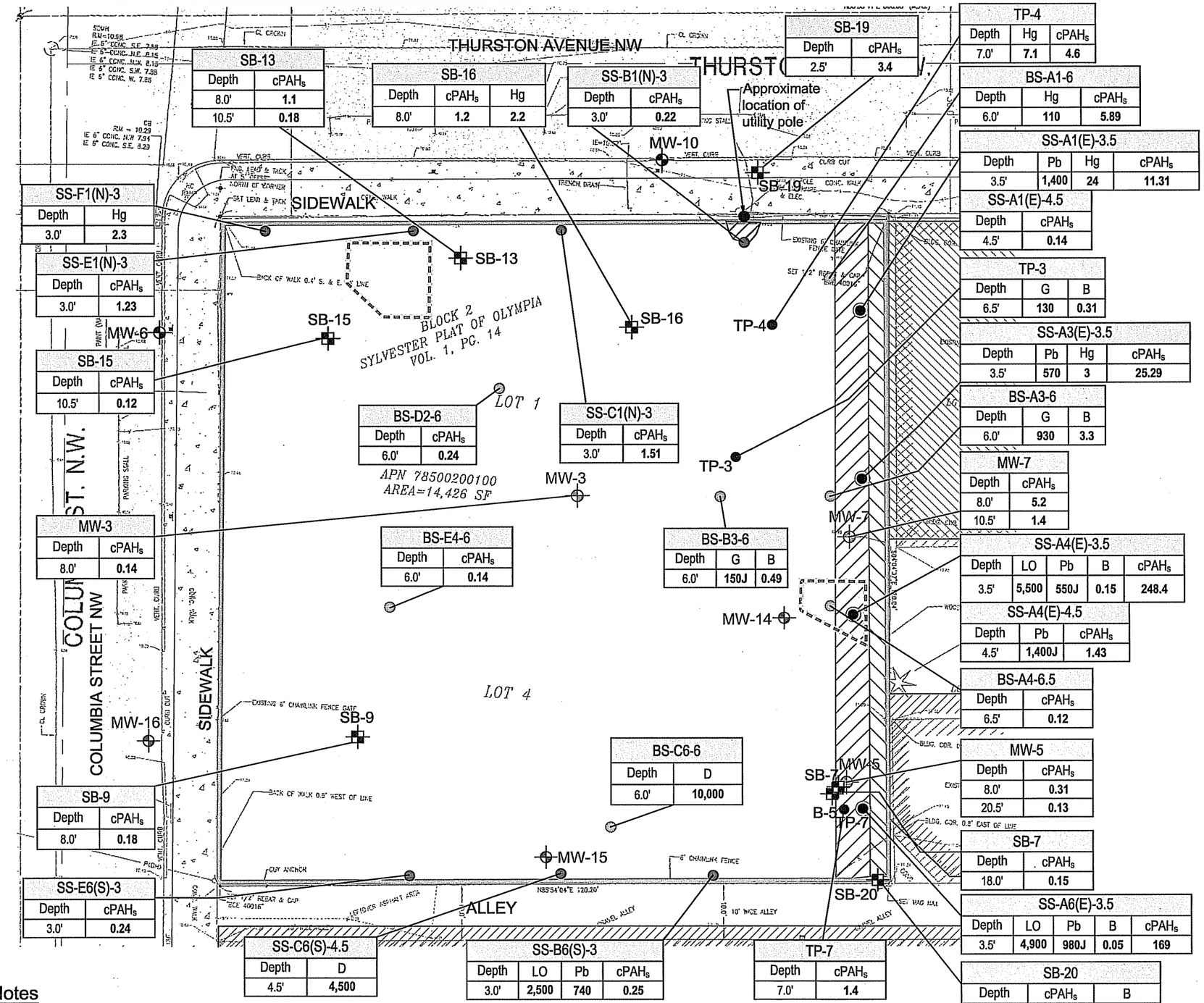
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Constituents Detected Above MTCA Method A Cleanup Levels in Groundwater

Former Olympia MGP Site
Olympia, Washington

GeoEngineers

Figure 3



SB-13	
Depth	cPAHs
8.0'	1.1
10.5'	0.18

SB-16		
Depth	cPAHs	Hg
8.0'	1.2	2.2

SS-B1(N)-3	
Depth	cPAHs
3.0'	0.22

SB-19	
Depth	cPAHs
2.5'	3.4

TP-4		
Depth	Hg	cPAHs
7.0'	7.1	4.6

BS-A1-6		
Depth	Hg	cPAHs
6.0'	110	5.89

SS-A1(E)-3.5			
Depth	Pb	Hg	cPAHs
3.5'	1,400	24	11.31

SS-A1(E)-4.5	
Depth	cPAHs
4.5'	0.14

TP-3		
Depth	G	B
6.5'	130	0.31

SS-A3(E)-3.5			
Depth	Pb	Hg	cPAHs
3.5'	570	3	25.29

BS-A3-6		
Depth	G	B
6.0'	930	3.3

MW-7	
Depth	cPAHs
8.0'	5.2
10.5'	1.4

SS-A4(E)-3.5				
Depth	LO	Pb	B	cPAHs
3.5'	5,500	550J	0.15	248.4

SS-A4(E)-4.5		
Depth	Pb	cPAHs
4.5'	1,400J	1.43

BS-A4-6.5	
Depth	cPAHs
6.5'	0.12

MW-5	
Depth	cPAHs
8.0'	0.31
20.5'	0.13

SB-7	
Depth	cPAHs
18.0'	0.15

SS-A6(E)-3.5				
Depth	LO	Pb	B	cPAHs
3.5'	4,900	980J	0.05	169

SB-20		
Depth	cPAHs	B
2.5'	4.8	<0.025
8.0'	0.36	<0.025
10.5'	0.15	1.0

SS-F1(N)-3	
Depth	Hg
3.0'	2.3

SS-E1(N)-3	
Depth	cPAHs
3.0'	1.23

SB-15	
Depth	cPAHs
10.5'	0.12

MW-3	
Depth	cPAHs
8.0'	0.14

SB-9	
Depth	cPAHs
8.0'	0.18

SS-E6(S)-3	
Depth	cPAHs
3.0'	0.24

BS-D2-6	
Depth	cPAHs
6.0'	0.24

SS-C1(N)-3	
Depth	cPAHs
3.0'	1.51

BS-E4-6	
Depth	cPAHs
6.0'	0.14

BS-B3-6		
Depth	G	B
6.0'	150J	0.49

BS-C6-6	
Depth	D
6.0'	10,000

SS-C6(S)-4.5	
Depth	D
4.5'	4,500

SS-B6(S)-3			
Depth	LO	Pb	cPAHs
3.0'	2,500	740	0.25

TP-7	
Depth	cPAHs
7.0'	1.4

Legend

- Property boundary/ Remedial Excavation Limit
- Area where excavation depth was greater than 6-feet (to remove stained soil)
- Existing Building
- x — Existing fence
- Confirmation soil sample (excavation base)
- Confirmation soil sample (excavation sidewall)
- Confirmation soil sample (excavation sidewall) where two samples were collected at two separate depths
- MW-14 — Proposed new groundwater monitoring well
- MW-10 — Existing groundwater monitoring well
- MW-3 — Groundwater monitoring well decommissioned prior to commencing remedial excavation activities
- Soil boring (completed during a previous investigation)
- Test pit location (completed during a previous investigation)
- Sidewall sloped 1-foot horizontal: 1-foot vertical
- 3-foot setback from property line
- 4-foot setback from utility pole

Soil analytical results (mg/kg) for contamination that remains in-place at concentrations greater than MTCA A cleanup levels.

B = Benzene
cPAHs = Total carcinogenic polycyclic aromatic hydrocarbons – toxic equivalent concentration
LO = Lube oil-range hydrocarbons
D = Diesel-range hydrocarbons
G = Gasoline-range hydrocarbons
Hg = Mercury
Pb = Lead
J = The result is an estimated value.

Red/bold values exceed MTCA Method A cleanup levels

Note: Analytical results were less than MTCA Method A cleanup levels for confirmation soil samples with no posted data.

N W E S

20 0 20
FEET

Notes

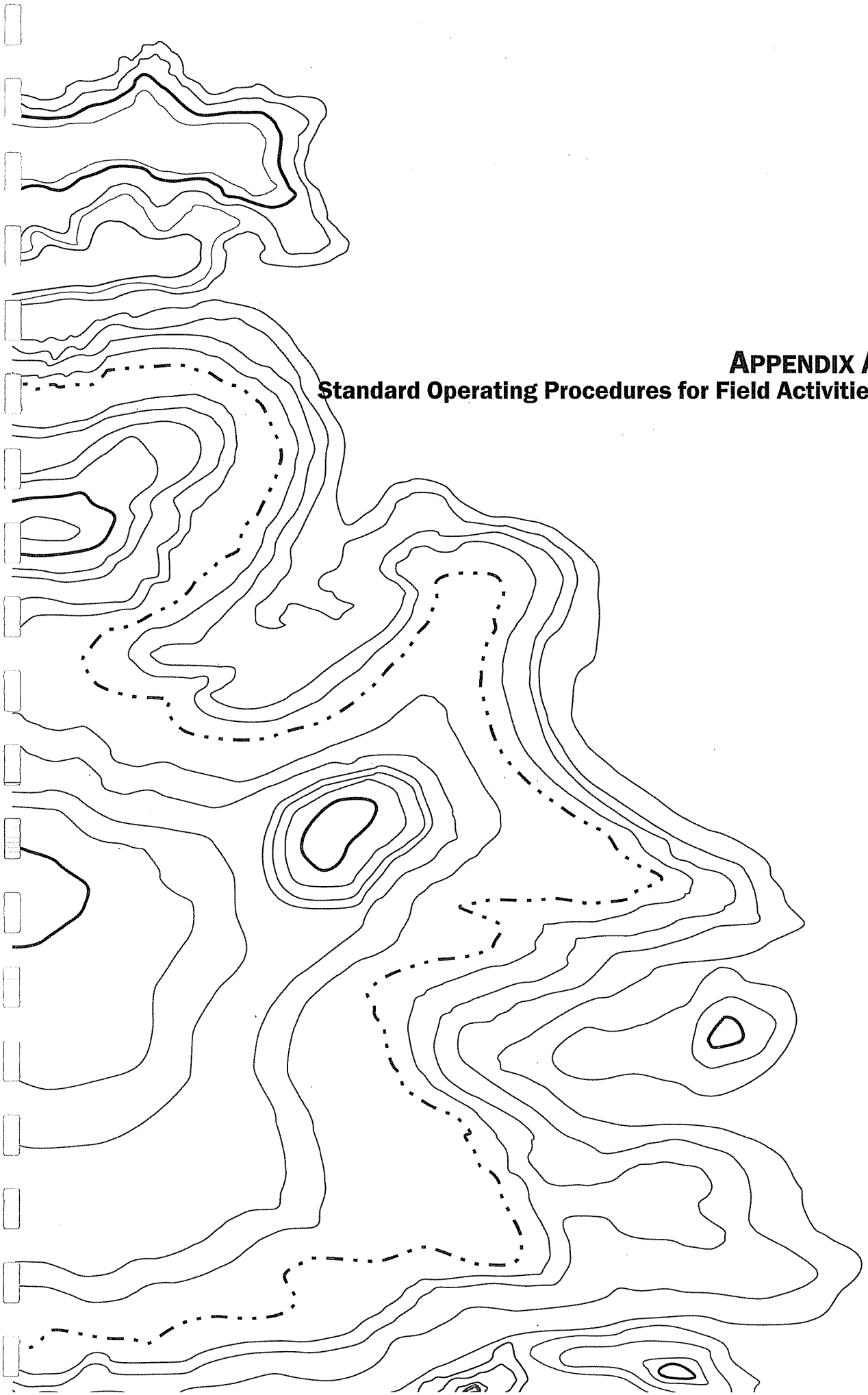
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers,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

Proposed Groundwater Monitoring Well Locations

Former Olympia MGP Site
Olympia, Washington

GeoEngineers | Figure 4

OFFICE: SEA Dwg name: D:\PROJECT\SEATTLE\0186774\03\CAD\CMP\0186774O3_T100_CMP_F4.dwg User: syi Plot time: Oct-04-13 @ 9:19am



APPENDIX A
Standard Operating Procedures for Field Activities

APPENDIX A
STANDARD OPERATING PROCEDURES FOR FIELD ACTIVITIES

This appendix identifies the field procedures to be implemented during groundwater compliance monitoring.

A.1. Underground Utility Locate

Prior to drilling, an underground utility locate (public and private) will be conducted in the area of the proposed boring locations to identify subsurface utilities and/or potential underground physical hazards. A public utility locate (one-call) will be performed, and a private utility locating company will be contracted to mark underground utilities in the vicinity of the proposed borings.

A.2. Monitoring Well Construction

Drilling and construction of the monitoring wells will be conducted by a Washington State licensed driller in accordance with the *Minimum Standards for Construction and Maintenance of Wells* (Chapter 173-160 WAC). Wells will be constructed of 2-inch-diameter, flush-threaded Schedule 40 polyvinyl chloride (PVC) casing with machine-slotted PVC screen (0.010 inch). Installation of the wells will be observed by a GeoEngineers representative, who will maintain a detailed log of the materials encountered during drilling and depths and construction details of the wells. The borings are anticipated to be advanced to a depth of approximately 20 feet bgs. The screened intervals are anticipated to extend between approximately 4 feet and 20 feet bgs.

Following placement of the well screen and casing in the borehole, a filter pack will be installed around the well screen. The filter pack will extend from the bottom of the well to a minimum of 1 foot above the top of the well screen. Filter pack material will consist of commercially prepared 10-20 silica sand.

A bentonite seal at least 1-foot thick will be placed above the sand pack. Each well will be completed with a concrete seal extending from the top of the bentonite seal to slightly above the ground surface. The concrete seal will be exposed at the surface surrounding the well monument. Locking steel flush-mount monuments will be cemented in place from the surface to a depth of about 1.5 feet bgs.

A.3. Monitoring Well Development

The monitoring wells will be developed to stabilize the filter pack and formation materials surrounding the well screens and establish the hydraulic connection between the well screens, filter pack and surrounding soil. The well screens will be gently surged with a decontaminated stainless steel bailer or electrical purge pump (such as a 'whale' brand pump) after installation. Development will continue until a minimum of five casing volumes of water have been removed and turbidity of the discharged water decreases. The goal of well development will be to reduce the turbidity of the water to less than 25 NTU. Up to 10 well volumes of water will be removed from the wells, if needed, to attain the 25 NTU goal. The removal rate and volume of groundwater removed will be recorded during well development procedures. Water that is removed from the well during well development activities will be stored on site in labeled 55-gallon drums, pending off-site disposal at a permitted facility. Depths to water in the monitoring wells will be measured prior to development.

A.4. Groundwater Monitoring and Sampling

Water levels will be measured in each compliance monitoring well during each groundwater monitoring event. Groundwater levels will be measured to the nearest 0.01 foot using an electric water level indicator. The water levels will be measured relative to the top of the north side of the casing rim.

Groundwater samples will be obtained using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the samples. Groundwater samples will be obtained from monitoring wells using dedicated down-hole tubing and a peristaltic pump. Groundwater will be pumped at an approximate rate of 0.5 liter per minute.

Water quality will be measured using a flow-through cell (e.g., a Horiba U-22 or similar equipment) during purging. The following water quality parameters will be monitored during purging: electrical conductivity, dissolved oxygen, pH, oxidation-reduction potential, turbidity and temperature. It will be assumed that ambient groundwater conditions will have been reached once the parameters measured by the water quality instrument vary by less than 10 percent on three consecutive measurements. The stabilized field measurements will be documented on field forms. If all field parameters do not stabilize after five well volumes of water have been removed, samples will be collected.

Following well purging, the flow through cell will be disconnected and groundwater samples will be collected in laboratory-prepared containers.

The samples will be placed into a cooler with ice and logged on the chain-of-custody using the procedures described in the Quality Assurance Project Plan (QAPP) provided in Appendix B.

A.5. Decontamination

Sampling equipment will be decontaminated using procedures described in the QAPP.

A.6. Sample Handling

Sample handling procedures, including labeling, container and preservation requirements, and holding times are described in the QAPP.

A.7. Disposal of Investigation-Derived Materials

A.7.1. Soil

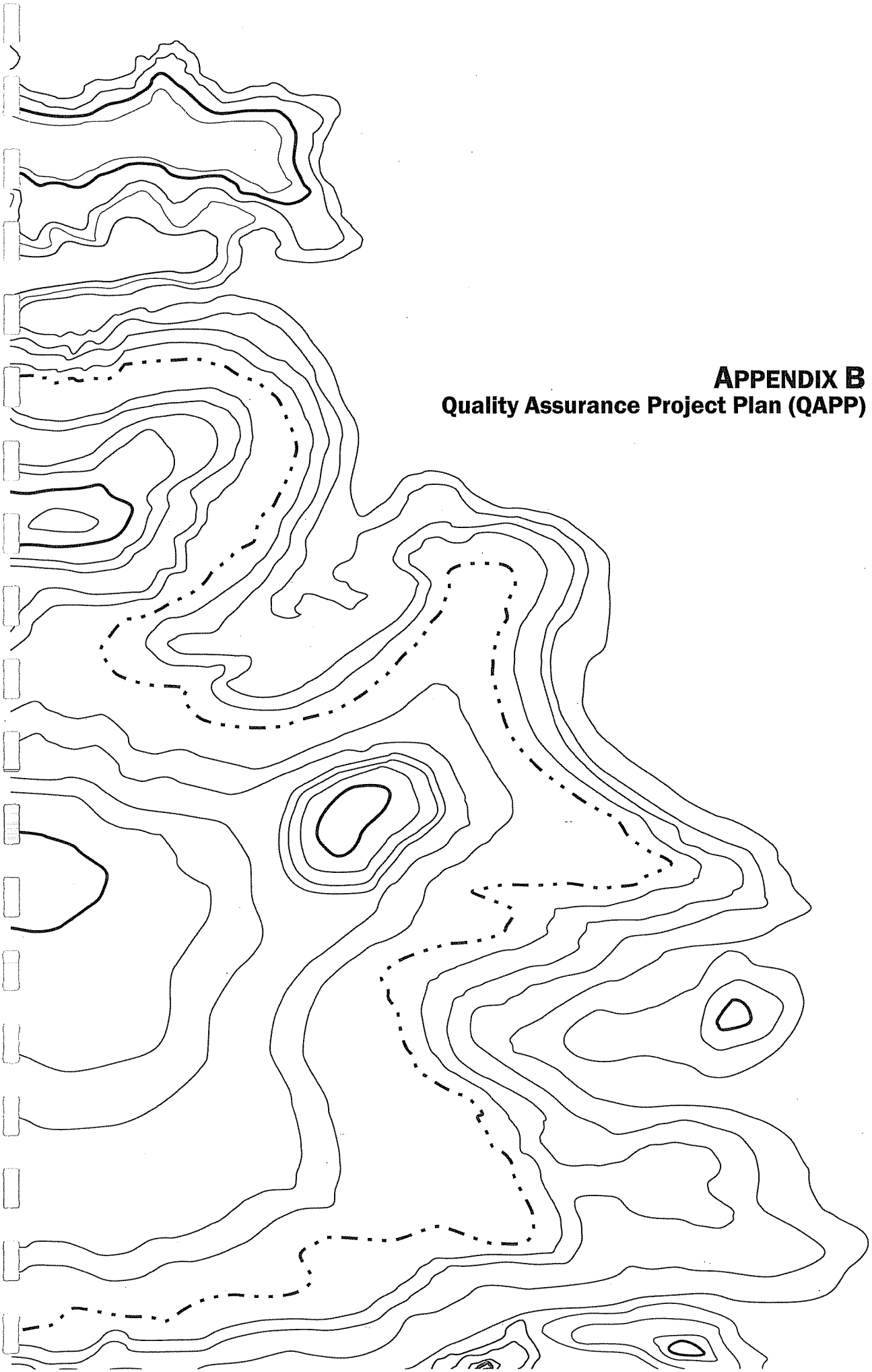
Soil cuttings from the borings for MW-14 through MW-16 will be placed in a labeled and sealed 55-gallon drums. The drums will be temporarily stored on site pending off-site disposal at a permitted disposal facility.

A.7.2. Groundwater and Decontamination Water

Development and purge water removed from the monitoring wells and decontamination water generated during all sampling activities will be stored on site in labeled and sealed in 55-gallon drums. The drums will be temporarily stored on site until they can be transported off-site for disposal at a permitted disposal facility.

A.7.3. Disposition of Incidental Waste

Incidental waste generated during sampling activities includes items such as gloves, plastic sheeting, paper towels and similar expended and discarded field supplies. These materials are considered *de minimis* and will be disposed of in a local trash receptacle or county disposal facility.



APPENDIX B
Quality Assurance Project Plan (QAPP)

APPENDIX B
QUALITY ASSURANCE PROJECT PLAN

The QAPP serves as the primary guide for the integration of quality assurance (QA) and quality control (QC) functions into monitoring activities. The QAPP presents the objectives, procedures, organization, functional activities and specific QA and QC activities designed to achieve data quality goals established for the project. This QAPP is based on guidelines specified in WAC Chapter 173-340-820 and Environmental Protection Agency (EPA) Guidelines (EPA 2004, 2008).

Throughout the project, environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality and meet established objectives. QA/QC procedures will be implemented so that precision, accuracy, representativeness, completeness and comparability (PARCC) of data generated meet the specified data quality objectives.

B.1. Project Organization and Responsibility

Descriptions of the responsibilities, lines of authority and communication for the key positions for QA and QC are provided below. The project organization facilitates the efficient performance of project work, allows for an independent quality review and permits resolution of any QA issues before submittal.

B.1.1. Project Leadership and Management

The Project Manager's duties consist of providing concise technical work statements for project tasks, selecting project team members, determining subcontractor participation, establishing budgets and schedules, adhering to budgets and schedules, providing technical oversight, and providing overall production and review of project deliverables. Nick Rohrbach is the Project Manager for activities at the Property. The Principal-in-Charge is responsible to PSE for fulfilling contractual and administrative requirements of the project. Steve Woodward is the Principal-in Charge.

B.1.2. Field Coordinator

The Field Coordinator is responsible for the daily management of activities in the field. Specific responsibilities include the following:

- Develops schedules and allocates resources for field tasks.
- Coordinates data collection activities to be consistent with information requirements.
- Collects field data and submits samples to laboratory.
- Assures that data are correctly and completely reported.
- Implements field sampling in accordance with GWCMP requirements.
- Schedules sample delivery to the analytical laboratory.
- Assures that appropriate sampling, testing and measurement procedures are followed.
- Participates in QA corrective actions as required.

The Field Coordinator for activities at the Property will be determined at the time of field activities.

B.1.3. Quality Assurance Leader

The GeoEngineers project Quality Assurance Leader is Mark Lybeer, who is responsible for the project's overall QA. The Project QA Leader is responsible for coordinating QA/QC activities as they relate to the acquisition of field data. The QA Leader has the following responsibilities:

- Serves as the official contact for laboratory data QA concerns.
- Responds to laboratory data, QA needs, resolves issues, and answers requests for guidance and assistance.
- Reviews the implementation of the QAPP and the adequacy of the data generated from a quality perspective.
- Maintains the authority to implement corrective actions as necessary.
- Reviews and approves the laboratory QA Plan.
- Evaluates the laboratory's final QA report for any condition that adversely impacts data generation.
- Ensures that appropriate sampling, testing, and analysis procedures are followed and that correct quality control checks are implemented.
- Monitors laboratory compliance with data quality requirements.

B.1.4. Laboratory Management

The Laboratory's QA Coordinator administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensures implementation of the QA Plan.
- Serves as the laboratory point of contact.
- Activates corrective action for out-of-control events.
- Issues the final QA/QC report.
- Administers QA sample analysis.
- Complies with the specifications established in the project plans as related to laboratory services.
- Participates in QA audits and compliance inspections.

The chemical analytical laboratory QA Coordinator will be determined by the laboratory (Onsite Environmental Laboratory, Redmond, Washington).

B.2. DATA QUALITY OBJECTIVES

The QA objective for technical data is to collect environmental monitoring data of known, acceptable and reportable quality. The QA objectives established for the project are:

- Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for PARCC parameters and by testing data against these criteria.

The sampling design, field procedures, laboratory procedures and QC procedures are set up to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (precision, bias, accuracy, completeness and reporting limits) and qualitative factors (representativeness and comparability). The measurement quality objectives (MQO) associated with these data quality factors are summarized in Table B-1.

B.2.1. Analytes

Groundwater samples will be submitted for analysis of a selected combination of the following:

- cPAHs by EPA Method 8270-SIM;
- Benzene by EPA Method 8260;
- Diesel- and lube oil-range hydrocarbons by Ecology Method NWTPH-Dx;
- Total and dissolved lead by EPA Method 200.8, and;
- Total and dissolved mercury by EPA Method 7470.

B.2.2. Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Individual instruments often can detect but not accurately quantify compounds at concentrations lower than the MDL, referred to as the instrument detection limit (IDL). Although results reported near the MDL or IDL provide insight to site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL) or reporting limit (RL). The contract laboratory will provide numerical results for all analytes and report them as detected above the RL or undetected at the RL.

Achieving a stated detection limit for a given analyte is helpful in providing statistically useful data. Intended data uses, such as comparison to numerical criteria or risk assessments, typically dictate specific project target reporting limits (TRLs) necessary to fulfill stated objectives. For this project, the TRLs are less than MTCA Method A cleanup levels. The project analytes, applicable cleanup levels, and laboratory TRLs are shown in Table B-2. The TRLs were obtained from Onsite Environmental, Redmond, Washington. The analytical methods and processes selected will provide RLs less than the TRLs under ideal conditions. Therefore, a particular TRL is considered a target because several factors may influence final RLs. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries. Careful interpretation is required to correctly characterize site conditions.

B.2.3. Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates) and laboratory control duplicates. The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons and field duplicate comparisons. This value is calculated by:

$$RPD = 100[(Xs - Xd)/(Xs + Xd)]/2$$

Where:

RPD = relative percent difference

Xs = sample analytical result

Xd = duplicate sample analytical result

The RPD will be calculated for appropriate sample sets and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (EPA, 2004; EPA, 2008) that address criteria exceedances and courses of action. The relative percent difference goal for this effort is 50 percent in analyses, unless the duplicate sample concentrations are less than 5 times the reporting limit.

B.2.4. Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported value versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

Accuracy will be expressed as the percent recovery of a surrogate compound (also known as "system monitoring compound"), a matrix spike result, or from a standard reference material where:

$$PR = 100(Xss - Xs)/T$$

Where:

PR = percent recovery

Xss = spike sample analytical result

Xs = sample analytical result

T = known spike concentration

Persons performing the evaluation must review one or more pertinent documents (EPA 2004, EPA 2008) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, matrix spikes and laboratory control spikes are found in Table B-1.

B.2.5. Representativeness, Completeness and Comparability

Representativeness expresses the degree to which data accurately and precisely represent the actual site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within this GWCMP and QAPP.
- Comparing analytical results of field duplicates to determine the variations in the analytical results.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative. Only representative data will be used in subsequent data reduction, validation and reporting activities.

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved an evaluation will be made to determine if the data are adequate to meet study objectives.

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

B.2.6. Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. Holding times for the analytes in this project are shown in Table B-3.

B.2.7. Blanks

According to the National Functional Guidelines for Organic Data Review (EPA, 2008), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks, and equipment blanks)." Trip blanks are placed with samples during shipment; method blanks are created during sample preparation and follow samples throughout the analysis process.

Analytical results for blanks will be interpreted in general accordance with EPA's National Functional Guidelines for Organic Data Review and professional judgment. Blanks are discussed further in Section B.6.

B.3. SAMPLE COLLECTION, HANDLING AND CUSTODY

B.3.1. Sampling Equipment Decontamination

Groundwater samples will be collected from each well using dedicated down-hole tubing in each monitoring well and a peristaltic pump. General decontamination procedures for any other equipment (e.g., the water level indicator) will consist of the following: 1) wash with non-phosphate detergent solution (Alconox and distilled water), 2) rinse with distilled water, and 3) second distilled water rinse. Field personnel will limit cross-contamination by changing gloves between sampling events or more frequently as needed. Wash water used to decontaminate the sampling equipment will be combined with well purge water in on-site drums for proper off-site disposal.

B.3.2. Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling and documentation. Samples obtained will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Table B-3.

Sample containers will be labeled with at least the following information at the time of collection:

- project number,
- sample name, and
- date and time of collection.

Samples will be named according to the following example:

- MW-06-052813-W,
  Where:
  - "MW-06" indicates monitoring well number 6,
  - "052813" indicates May 28, 2013, and
  - "W" indicates the sample is a water sample

The sample collection activities will be noted on field logs. The Field Coordinator will monitor consistency between this GWCMP, sample containers/labels, field logs and the chain of custody.

B.3.3. Sample Storage

Samples will be placed in a cooler with "wet ice" immediately after they are collected. The objective of the cold storage will be to attain a sample temperature of approximately 4 – 6 degrees Celsius. Holding times will be observed during sample storage.

B.3.4. Sample Shipment

The samples will be transported and delivered to the analytical laboratory in coolers. Field personnel will transport and hand-deliver samples to the laboratory or to a laboratory courier. All analyses for this project are anticipated to be performed using the Onsite Environmental laboratory and sample shipping is not anticipated.

B.3.5. Chain-Of-Custody Records

Field personnel are responsible for the security of samples from the time the samples are collected until the samples have been received by the laboratory or courier. A chain-of-custody form will be completed at the end of the field day for samples being shipped to the laboratory. Information to be included on the chain-of-custody form includes:

- Project name and number.
- Sample identification numbers.
- Date and time of sampling.
- Sample matrix and number of containers from each sampling point, including preservatives used.
- Analyses to be performed or samples to be archived.
- Names of sampling personnel and transfer of custody acknowledgment spaces.

The original chain-of-custody record will be signed by the field collector and bear a unique tracking number. Field personnel shall retain carbon copies and place the original and remaining copies in a plastic bag, placed within the cooler or taped to the inside lid of the cooler before sealing the container for transport. This record will accompany the samples during transit by the field team member or courier to the laboratory.

B.3.6. Laboratory Custody Procedures

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include at a minimum, the analysts name or initial, and the time and date of analysis.

B.3.7. Field Documentation

Field documentation provides important information about potential problems or special circumstances surrounding sample collection. Field personnel will maintain daily field logs while on site. The field logs will be prepared on field report forms. Entries in the field logs and associated sample documentation forms will be made in pencil on Rite-in-the-Rain logs, or

waterproof ink on standard paper, and corrections will consist of line-out deletions that are initialed and dated. Individual logs will become part of the project files.

At a minimum, the following information will be recorded during the collection of each sample:

- Sample location and description
- Sampler's name(s)
- Date and time of sample collection
- Type of sample
- Type of sampling equipment used
- Field instrument readings as appropriate
- Field observations and details that are pertinent to the integrity/condition of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, etc.)
- Sample preservation

In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling:

- Names of field personnel
- Time of Property arrival/departure
- Other personnel present at the Property, as appropriate
- Summary of pertinent meetings or discussions with regulatory agency personnel
- Deviations from the GWCMP, HASP and QAPP procedures
- Changes in personnel and responsibilities with reasons for the changes
- Levels of safety protection
- Calibration readings for any equipment used and equipment model and serial number

The handling, use and maintenance of field logs are the field coordinator's responsibilities.

B.4. CALIBRATION PROCEDURES

B.4.1. Field Instrumentation

Equipment and instrumentation calibration facilitates accurate and reliable field measurements. Field and laboratory equipment used on the project will be calibrated and adjusted in general accordance with the manufacturer's recommendations. Methods and intervals of calibration and maintenance will be based on the type of equipment, stability characteristics, required accuracy, intended use and environmental conditions.

B.4.2. Laboratory Instrumentation

For analytical chemistry, calibration procedures will be performed in general accordance with the methods cited and laboratory standard operating procedures. Calibration documentation will be retained at the laboratory and readily available for a period of six months.

B.5. DATA REPORTING AND LABORATORY DELIVERABLES

The laboratory will report data in formatted hardcopy and digital form. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and detection limit (RL only). Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverables (EDD) will be established by GeoEngineers, Inc., with the contract laboratory. Final results will be sent to the Project Manager.

B.6. INTERNAL QUALITY CONTROL

Table B-4 summarizes the types and frequency of QC samples to be collected, including both field QC and Laboratory QC samples. The following sections describe field and laboratory QC samples.

B.6.1. Field Quality Control

Field QC samples serve as a control and check mechanism to monitor the consistency of sampling methods. The following sections provide a description of field QC samples.

FIELD DUPLICATES

In addition to replicate analyses performed in the laboratory, field duplicates also serve as measures for precision. Field duplicates are used to evaluate the consistency of the sampling techniques used by field personnel. Additionally, field duplicates are used to evaluate the precision and consistency of laboratory analytical procedures and methods.

One field duplicate groundwater sample will be collected during each round of monitoring and analyzed for the same analytes as the parent sample. The field duplicate will be collected by "splitting" the water approximately equally between parent and duplicate containers for each analyte.

TRIP BLANKS

One trip blank will be placed in each cooler that contains samples to be analyzed for benzene. The blank samples will be analyzed for benzene (same as the parent sample).

B.6.2. Laboratory Quality Control

Laboratory quality control procedures will be evaluated through a formal data validation process. The analytical laboratory will follow standard method procedures that include specified QC monitoring requirements. These requirements will vary by method but generally include:

- method blanks
- internal standards

- calibrations
- matrix spike/matrix spike duplicates (MS/MSD)
- laboratory control spikes/spike duplicates (LCS/LCSD)
- laboratory replicates or duplicates
- surrogate spikes

LABORATORY BLANKS

Laboratory procedures employ the use of several types of blanks but the most commonly used blank for QA/QC assessments are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process or high performance liquid chromatography (HPLC) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. Method blanks are particularly useful during volatiles analysis since VOCs can be transported in the laboratory through the vapor phase. If a substance is found in the method blank then one (or more) of the following occurred:

- Measurement apparatus or containers were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.
- Contaminated analytical equipment was not properly cleaned.
- Volatile substances in the air with high solubility or affinities toward the sample matrix contaminated the samples during preparation or analysis.

It is difficult to determine which of the above scenarios occurred if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. Given method blank results, validation rules assist in determining which substances in samples are considered "real," and which ones are attributable to the analytical process. Furthermore, EPA guidelines state, ". . . there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example."

CALIBRATIONS

Several types of calibrations are used, depending on the method, to determine whether the methodology is "in control" by verifying the linearity of the calibration curve and to assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations and continuing calibration verification.

MATRIX SPIKE/MATRIX SPIKE DUPLICATES (MS/MSD)

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix affects cannot be determined due to dilution and/or high levels of related substances in the sample. A matrix spike is evaluated by spiking a known amount of one or more of the target analytes ideally at a concentration of 5 to 10 times higher than the sample result. A percent recovery is calculated by subtracting the sample result from the spike result, dividing by the spiked amount, and multiplying by 100.

The samples for the MS and MSD analyses should be collected from a sampling location that is believed to exhibit low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for these analyses. This MS/MSD sample will be a composite to achieve a level of representativeness and reproducibility in the data. For the first round of groundwater monitoring, the MS/MSD sample will be collected from one of the downgradient/crossgradient wells at the Property (i.e., not MW-14 or MW-15). Subsequent choosing of the location for MS/MSD samples will be based on results of the first round of sampling.

LABORATORY CONTROL SPIKES/LABORATORY CONTROL SPIKE DUPLICATES (LCS/LCSD)

Also known as blanks spikes, LCS samples are similar to MS samples in that a known amount of one or more of the target analytes are spiked into a prepared media and a percent recovery of the spiked substances are calculated. The primary difference between a MS and LCS is that the LCS spike media is considered "clean" or contaminant free. For example, HPLC water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance, and analyst performance. LCS data must be reviewed in context with other controls to determine if out-of-control events occur.

LABORATORY REPLICATES/DUPLICATES

Laboratories often utilize MS/MSDs, LCS/LCSDs and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process, but most commonly occur as a second analysis on the extracted media.

SURROGATE SPIKES

The purposes of using a surrogate are to verify the accuracy of the instrument being used and extraction procedures. Surrogates are substances similar to, but not one of, the target analytes. A known concentration of surrogate is added to the sample and passed through the instrument, noting the surrogate recovery. Each surrogate used has an acceptable range of percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified range of acceptance a possibility of false positives exist, although non-detected results are considered accurate.

B.7. DATA REDUCTION AND ASSESSMENT PROCEDURES

B.7.1. Data Reduction

Data reduction involves the conversion or transcription of field and analytical data to a useable format. The laboratory personnel will reduce the analytical data for review by the QA Leader and Project Manager.

B.7.2. Field Measurement Evaluation

Field data will be reviewed at the end of each day by following the QC checks outlined below. Field data documentation will be checked against the applicable criteria as follows:

- Sample collection information
- Field instrumentation and calibration
- Sample collection protocol
- Sample containers, preservation and volume
- Field QC samples collected at the frequency specified
- Sample documentation and chain of custody protocols
- Sample delivery

Cooler receipt forms and sample condition forms provided by the laboratory will be reviewed for out-of-control incidents. If anything is found to be out-of-control the Project Manager will implement corrective actions to ensure that additional out-of-control incidents do not occur. The final report will contain what effects, if any, the out-of-control incident may have on data quality. Sample collection information will be reviewed for correctness before inclusion in a final report.

B.7.3. Field Quality Control Evaluation

A field QC evaluation will be conducted by reviewing field logs and daily reports, discussing field activities with staff, and reviewing field QC samples (trip blanks and field duplicates). Trip blanks will be evaluated using the same criteria as method blanks.

B.7.4. Laboratory Data Quality Control Evaluation

The laboratory data assessment will consist of a formal review of the following QC parameters:

- Holding times
- Method blanks
- Matrix spike/spike duplicates
- Laboratory control spikes/spike duplicates
- Surrogate spikes
- Replicates

In addition to these QC mechanisms, other documentation such as cooler receipt forms and case narratives will be reviewed to fully evaluate laboratory QA/QC.

B.7.5. Corrective Action

Any deviation from the established criteria will be documented, and the data will be qualified, as appropriate. If significant quality assurance problems are encountered, appropriate corrective action as determined by GeoEngineers' Project Manager, GeoEngineers' Associate/Principal and/or the analytical laboratory will be implemented as appropriate.

B.8. REFERENCES

Environmental Protection Agency. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, OSWER 9240.1-45, EPA 540-R-04-004. October 2004.

Environmental Protection Agency. Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, EPA-540-R-08-01. June 2008.

Washington State Department of Ecology. Model Toxics Control Act (MTCA) Cleanup Regulations, Washington Administrative Code, Chapter 173-340-820. October 2007.

Table B-1

Groundwater Monitoring Measurement Quality Objectives

Former Olympia MGP Site

Olympia, Washington

Laboratory Analysis	Reference Method	Check Standard (LCS) %R Limits[1]	Matrix Spike (MS) %R Limits[1]	Surrogate Standards (SS) %R Limits [2]	MS Duplicate Samples or Lab Duplicate RPD Limits[3]	Field Duplicate Samples RPD Limits[3]
Total Metals (Hg)	EPA 7470	80%-120%	75%-125%	NA	≤20%	≤50%
Benzene	EPA 8260	78%-125%	78%-117%	62%-122%	≤15%	≤30%
Petroleum Hydrocarbons	NWTPH-Dx	63%-125%	NA	50%-150%	NA	≤30%
cPAHs	EPA 8270 - SIM	40%-130%	40%-130%	37%-137%	≤33%	≤30%

Notes:

[1] Percent recovery limits are based on laboratory control limits. Limits will vary for individual analytes, but will be inside of the limits shown.

[2] Surrogate standard limits are based on laboratory control limits, or are dictated by the method.

[3] RPD control limits are only applicable if the concentrations are greater than 5 times the method reporting limit (MRL). For results less than 5 times the MRL, the difference between the sample and duplicate must be less than the MRL.

NA = Not apllicable

LCS = Laboratory control sample

%R = Percent recovery

RPD = Relative percent difference

cPAHs = Carcinogenic polycyclic aromatic hydrocarbons

Table B-2

Groundwater Monitoring Cleanup Levels and Target Reporting Limits

Former Olympia MGP Site

Olympia, Washington

Chemical of Concern (µg/l)	MTCA[1] Cleanup Level	Target Laboratory Reporting Limit
Benzene [2]	5	0.20
Diesel-Range Total Petroleum Hydrocarbons [2]	500	250
Lube Oil-Range Total Petroleum Hydrocarbons [2]	500	400
cPAHs (TEC)	0.1	0.070
Mercury [2]	2	0.50

Notes:

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

[2] Analyte to be included in first event of groundwater monitoring. Subsequent analysis during future groundwater monitoring events will be determined after consultation with the Department of Ecology.

TEC = Total toxic equivalent concentration calculated per WAC 173-340-708.

cPAHs = carcinogenic polycyclic aromatic hydrocarbons

µg/l = micrograms per liter

Table B-3

Groundwater Monitoring Test Methods, Sample Containers, Preservation and Holding Time[1]

Former Olympia MGP Site

Olympia, Washington

Analysis	Method	Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times
Total Metals (Hg)	EPA 7470	100ml	500ml poly	HNO3 pH<2, Cool to 4 C	28 days
Benzene	EPA 8260	40ml	Three 40mL VOA Vials	HCl pH<2, Cool to 4 C	14 days
Petroleum Hydrocarbons	NWTPH-Dx	500ml	Two 500ml amber glass	HCl pH<2, Cool to 4 C	14 days
cPAHs	EPA 8270 SIM	1 Liter	2-1 L amber glass container	0 to 6 degrees C	7 days until extraction

Notes:

[1] Holding Times are based on elapsed time from date of collection

mL = Milliliter

C = Celcius

L = Liter

cPAHs = carcinogenic polycyclic aromatic hydrocarbons

Table B-4

Groundwater Monitoring Quality Control Samples Type and Frequency

Former Olympia MGP Site

Olympia, Washington

Parameter	Field Quality Control		Laboratory Quality Control			
	Field Duplicates	Trip Blanks	Method Blanks	LCS	MS / MSD	Lab Duplicates
Total Metals (Hg)	1 per round of monitoring	NA	1/batch	1/batch	1 /batch	1/batch
Benzene	1 per round of monitoring	Minimum 1 within each cooler	1/batch	1/batch	1 /batch	NA
TPH - Dx	1 per round of monitoring	NA	1/batch	1/batch	NA	1/batch
cPAHs	1 per round of monitoring	NA	1/batch	1/batch	1 /batch	NA

Notes:

An analytical batch is defined as a group of samples taken through a preparation procedure and sharing a method blank, LCS, and MS/ MSD (or MS and lab duplicate).

cPAHs = carcinogenic polycyclic aromatic hydrocarbons

NA = Not applicable

LCS = Laboratory control sample

MS = Matrix spike sample

MSD = Matrix spike duplicate sample