



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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February 13, 2017

Mr. Robert R. Graham
H&H Diesel Service Inc.
407 Porter Way
Milton, WA 98354-9686

Re: Further Action at the following Site:

- **Site Name:** H&H Diesel Service Inc.
- **Site Address:** 407 Porter Way, Milton, Washington 98354 Pierce Co.
- **Facility/Site No.:** 89863773
- **Cleanup Site No.:** 4629
- **VCP Project No.:** SW1526

Dear Mr. Graham:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup at the H&H Diesel 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.

Issue Presented and Opinion

Is further remedial action necessary to clean up contamination at the Site?

YES. Ecology has determined that further remedial action is necessary to clean up contamination 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 Site

This opinion applies only to 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.

The Site is defined by the nature and extent of contamination associated with the following Site contaminants of concern (COC[s]):

- 1) Total petroleum hydrocarbons (TPH) as gasoline (GRO) in soil and groundwater
- 2) TPH as diesel (DRO) in soil and groundwater
- 3) TPH as heavy oil (ORO) in soil and groundwater
- 4) Benzene, toluene, ethylbenzene, and total xylenes (BTEX) in soil and groundwater
- 5) Naphthalenes in soil and groundwater
- 6) 1,3,5-Trimethylbenzene in groundwater
- 7) Arsenic in soil and groundwater
- 8) Lead in soil and groundwater
- 9) Cadmium in groundwater
- 10) Chromium in soil and groundwater

The Site includes portions of two Pierce County tax parcels: 0420057009 (4.96 acres) and 0420057010 (3.41 acres). Site contamination appears to be the result to two unrelated conditions: historical Site operations and fill used to level the Site. Petroleum hydrocarbon constituents present in soil and groundwater are related to historical Site operations. Metals (arsenic, cadmium, chromium, and lead) in Site soil and/or groundwater appear to be related to fill used to level the Site, starting in the 1960s. Observations during various Site investigations identified wood waste and "slag-like material" in the fill at the Site.

Enclosure A includes a Site description and pertinent figures related to the Site, as currently known to Ecology.

Please note the parcel(s) of real property associated with this Site are also located within the projected boundaries of the Tacoma Smelter Plume facility (#FSID 62855481). At this time, Ecology has no information that those parcel(s) are actually affected. This opinion does not apply to any contamination associated with the Tacoma Smelter Plume facility.

Basis for the Opinion

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

1. *Letter to Ms. Dorothy Holmes (H&H Diesel, Inc.)* from Mr. Panjini Balaraju (Ecology), RE: H&H Diesel, Inc. Site, Milton, Washington, dated May 10, 2000.
2. *Letter to Ms. Dorothy Holmes (H&H Diesel, Inc.)* from Mr. Panjini Balaraju (Ecology), RE: H&H Diesel, Inc. Site, Milton, Washington, dated May 22, 2000.
3. *Letter to Mr. John Hildenbrand (Saltbush Environmental Services, Inc.)* from Mr. Panjini Balaraju (Ecology), RE: Your letter dated July 14, 2000 regarding H&H Diesel Site Investigation and Cleanup, dated July 31, 2000.
4. *LSI – ADAPT, 2001. Limited Phase II Environmental Site Assessment*, Truck Operator's Property, 407A Porter Way, Milton, Washington, dated July 27, 2001.
5. *Letter to Mr. Panjini Balaraju (Ecology), from Mr. John Hildenbrand (Saltbush Environmental Services, Inc.)*, RE: H&H Diesel Services, Inc., dated February 8, 2002.
6. Geo Group Northwest, Inc., *Evaluation of Site Environmental Conditions*, dated September 19, 2002.
7. *Letter to Mr. Bob Warren (Ecology), from Mr. Yen-Vy Van and Mr. Michael S. Chun*, Associated Environmental Group, LLC (AEG), RE: Voluntary Cleanup Program Request for Assistance, dated August 1, 2007.
8. Floyd Snider, *Final Cleanup Action Plan, B&L Woodwaste Site*, dated January 2008.
9. Associated Environmental Group, LLC (AEG), *Site Characterization (Flagel Property, 407A Porter Way, Milton, Washington)*, dated June 24, 2009.
10. Associated Environmental Group, LLC (AEG), *Quarterly Groundwater Event – September 2009*, dated October 23, 2009
11. Associated Environmental Group, LLC (AEG), *Quarterly Groundwater Event – December 2009 Report*, dated January 28, 2010
12. Associated Environmental Group, LLC (AEG), *Quarterly Groundwater Event – April 2010 Report*, dated June 11, 2010
13. Associated Environmental Group, LLC (AEG), *Cleanup Action Plan/Limited Disproportionate Cost Analysis (Flagel Property, 407A Porter Way, Milton, Washington)*, dated November 15, 2010
14. CDM Smith, draft *Remedial Investigation Report*, USG Interiors Highway 99 Site, Milton Washington, dated July 11, 2012.
15. Associated Environmental Group, LLC (AEG), *Remedial Investigation Report*, dated April 20, 2015.
16. Associated Environmental Group, LLC (AEG), *Remedial Action Report*, dated April 26, 2016.
17. Associated Environmental Group, LLC (AEG), *August 2016 Quarterly Groundwater Sampling Results Report*, dated August 30, 2016

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

Ecology has concluded that **further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

1. Characterization of the Site.

Ecology has determined your characterization of the Site is not sufficient to establish cleanup standards and select a cleanup action.

1) General comments:

- a. Only the boring log for boring B-1 was included in AEG's *Remedial Investigation Report* (RI). Submit two hard copies and one electronic copy of all additional boring logs from the 2015 Site investigation.
- b. Add the location of the former parts washer area to Site figures, as identified in Columbia's 1996 Figure 1 (Attached to correspondence from Ecology dated May 22, 2000).
- c. Add the remaining historical groundwater monitoring wells, soil borings, and test pits for Columbia (1996), Saltbush (1999), and LSI – ADAPT (2001), to comprehensive soil and groundwater figures.
- d. Generate tables presenting cumulative historical Site soil and groundwater analytical data.
- e. Revise Table 4 from AEG's *Remedial Action Report*. Groundwater results reported from the 2015 borings B-1 through B-10 do not match the headings presented. Based on Ecology's review of the laboratory analytical reports provided, only arsenic and lead exceed the MTCA Method A cleanup levels in grab groundwater samples collected, not mercury and chromium as presented in Table 4.

- f. For those Site COCs where MTCA Method A cleanup levels have not been established, use the MTCA Method B cleanup levels for comparison purposes on an individual substance and/or per media basis. Both Method A and Method B cleanup levels may be used at this Site, per WAC 173-340-700(8)(b)(i).
- g. Monitoring well AEG MW-3 was removed during the excavation work. Please provide the decommissioning details and well decommissioning log.
- h. Please provide the boring logs and any well decommissioning logs for wells MW-1 through MW-4 installed by in approximately 1999 by Saltbush.
- i. Specific to this Site, historical TPH as diesel analytical results for soil and groundwater using silica gel cleanup will be accepted. Ecology accepts these results because of substantial subsurface organics at the Site: a peat layer and the considerable wood waste observed in the Site subsurface. Going forward, consistent with current Ecology policy, any analysis for NWTPH-Dx should use either no silica gel cleanup or be ran twice, using both silica gel cleanup and no silica gel cleanup.
- j. Ecology recommends that Site monitoring wells be professionally surveyed to ensure accurate calculations for groundwater flow directions and gradients, as well as depth to water measurements.
- k. Historical Site operations may have contributed to potential runoff into the Site stormwater system (as evidenced by oily impacts around stormwater piping during the 2015 excavation as well as an oily sheen on the surface of liquid in the concrete vault). In order to ensure that historical Site operations did not impact the stormwater system and to determine where the stormwater system discharges, please identify:
 - i. The location of any outfall(s) for the stormwater system.
 - ii. Construction details for the stormwater catch basins.
- l. Upon completion of Site characterization, submit an updated remedial investigation (RI) report with a feasibility study (FS) for this Site. For reference, use the following checklists to guide information to be included:
 - i. RI checklist:
<https://fortress.wa.gov/ecy/publications/SummaryPages/1609006.html>
 - ii. FS checklist:
<https://fortress.wa.gov/ecy/publications/SummaryPages/1609007.html>

iii. CAP checklist:

<https://fortress.wa.gov/ecy/publications/SummaryPages/1609008.html>

2) Soil:

Both the leaching to groundwater and the direct contact pathways for soil are complete.

- 1) In ADAPT's report dated July 27, 2001, the concentration in soil of 1,4-dichlorobenzene was reportedly 230 part per million (ppm), which exceeded the current most stringent MTCA Method B cleanup level (protective of groundwater) of 1.23 ppm. However, a laboratory report table attached to Geo Group's *Evaluation of Site Environmental Conditions* report (dated September 19, 2002; Table 5) indicates that the correct analytical value for 1,4-dichlorobenzene in soil sampled at the Site was 0.23 ppm. No use or storage of chemicals containing 1,4-dichlorobenzene is known to Ecology at the Site. **Based on information available to Ecology, 1,4-dichlorobenzene in soil is not considered a Site COC and no additional sampling for this constituent is required.**
- 2) Petroleum hydrocarbon contaminant remain in soils at the following locations:
 - a. Adjacent to the concrete vault at soil sample location HS-1 3' (3 feet bgs), GRO and ORO remains in soil at concentrations in excess of the MTCA Method A cleanup levels (40,000 milligrams per kilogram (mg/kg) and 2,500 mg/kg, respectively). The concentration of naphthalenes in soil exceeds the MTCA Method A cleanup level of 5 mg/kg at this location as well. Petroleum hydrocarbon contaminated soil in excess of MTCA Method A cleanup levels for gasoline also remains in place at MW-4 at 3.5 feet bgs and MW-6 at 6 feet bgs (Figure 2; AEG 2016). **The petroleum hydrocarbon contamination at HS-1 3' and MW-6 require delineation to the west.**
 - b. At least two monitoring wells should be installed near the western Site boundary. **At least one soil sample should be collected at the approximate top of the water table (2-3 feet bgs) during installation of each monitoring well and analyze for petroleum hydrocarbon COCs.** Prior sampling of soil at boring B-4 at 7 feet bgs is below the potential smear zone and is insufficient as a delineation point or conditional point of compliance to the west.

At a minimum, the petroleum hydrocarbon constituents which should be sampled for in soil are: GRO, DRO, ORO, BTEX, naphthalenes, 1,3,5-trimethylbenzene, and total lead. Full list VOCs may be substituted for BTEX, naphthalenes, and 1,3,5-trimethylbenzene.

- c. The concentration of toluene in soil sampled at test pit location TP-3 at 8 feet bgs (Figure 3; AEG, 2009) exceeded the MTCA Method A cleanup level. **This location should be sampled for BTEX in soil and groundwater, in order to determine if any contamination remains. If contamination is identified in excess of the MTCA Method A cleanup level(s), delineation is required.**
 - d. Acetone was detected in soils at TP-3 at 8 feet bgs at a concentration slightly greater than the laboratory PQL, but approximately 20 times less than the MTCA Method B cleanup level for protection of groundwater. No history of acetone use or storage at the Site is known to Ecology. **No additional sampling for acetone at the Site is required.**
- 3) Based on the Columbia Environmental, Inc.'s 1996 Phase II ESA Figure 1, reviewed and submitted by Ecology as part of a May 22, 2000 letter, it appears the former parts washing area along the southern boundary at the Site has not been evaluated. **Soil should be evaluated in the vicinity of the former parts washing area for GRO, DRO, ORO, VOCs, and metals.**
- 4) Metals in soils have been reported as follows and require these actions:
- a. Lead in soil at 3 feet bgs collected from AEG MW-3-S6-3 exceeded the concentration of the MTCA Method A Cleanup Level (Table 1; AEG 2009). This location was over excavated in 2015, to a depth of nine feet bgs. Soils beneath the former sampling location are currently inaccessible based on the presence of the bioaugmentation membrane installed in the excavation pit in 2015. **No additional sampling is required for lead in soil at this location.**
 - b. Concentration of arsenic in soil exceeding the MTCA Method A Cleanup level (20 mg/kg) has been reported at:
 - i. ADAPT's June 28, 2001 test pit sample, TP-3 from 7-7.5 feet bgs (43 mg/kg). **Arsenic in soil at this location should be areally and vertically delineated.**

- ii. AEG MW-3-S6-3 (21 mg/kg). This location was over excavated in 2015 (to a depth of nine feet bgs). Soils beneath the former sampling location are currently inaccessible based on the presence of the bioaugmentation membrane installed in the excavation pit in 2015. **No additional sampling is required for arsenic in soil at this location.**
 - c. Chromium detected in soils at the Site initially described as potentially exceeding the MTCA Method A Cleanup levels has been speciated and was determined to be trivalent (III) and not hexavalent (VI). Thus, chromium concentrations in soil sampled at the Site should be compared to the trivalent chromium MTCA Method A Cleanup Level for soil (2,000 mg/kg). All concentrations of chromium in soil sampled at the Site are less than the MTCA Method A Cleanup Level for trivalent chromium. **No additional sampling for chromium in soils is required at these historical locations.**
- 5) Phenols were sampled for in soil during installation of AEG's monitoring wells MW-2, MW-3, and from AEG's test pits TP3, TP5, TP7, and TP8. No phenols were detected in Site soils, and the laboratory PQL was less than the MTCA Method B cleanup level. **No additional sampling for phenols in soil at these locations is required.**
 - 6) Sampling performed per WAC 173-340-900, Table 830-1, indicates that EDB, EDC, MTBE, PCBs, and cPAHs in soil have been detected at concentrations less than the laboratory PQLs or MTCA Method A Cleanup levels. **No additional sampling in soil is required for these constituents.**
 - 7) Chlorinated solvents (tetrachloroethylene [PCE], trichloroethylene [TCE], and vinyl chloride) were not detected soil sampled during installation of AEG's monitoring wells MW-2, MW-3, and from AEG's test pits TP3, TP5, TP7, and TP8 (Table 2; AEG, 2009). **No additional sampling in soil east of the main Site building is required for these constituents; however, VOCs shall be analyzed for in soils sampled in the vicinity of the former "fenced parts washer" area.**
 - 8) The concentrations of cadmium, mercury, and barium in soil sampled have been less than their respective MTCA Method A or B cleanup levels. **No additional sampling in soil for these three metals is required (excluding any disposal requirements).**

3) Groundwater:

The groundwater pathway is complete.

- PCS remain in place adjacent to the concrete vault on the east side of the larger Site building. Depth to groundwater has ranged from 1.23 to 6.54 feet below top of casing. Groundwater comes into contact with left in place PCS.
 - Concentrations of petroleum hydrocarbon constituents in groundwater has been less than the MTCA Method A cleanup levels for four consecutive monitoring events at all Site monitoring wells, except MW-4 (AEG Table 2).
 - In January 2016, monitoring well MW-4 was not sampled, though monitoring wells MW-5 and MW-6 were sampled. So far, three of four required consecutive events have been completed at MW-4 for petroleum hydrocarbon constituents. Concentrations were less than the applicable MTCA Method A or B cleanup levels.
 - In May 2009, 1,3,5-trimethylbenzene was detected in groundwater sampled at monitoring well AEG MW-3 at a concentration between the laboratory PQL and the MTCA Method B cleanup level. 1,3,5-trimethylbenzene should continue to be sampled for in groundwater at the Site. **At monitoring wells MW-4, MW-5, and MW-6, 1,3,5-trimethylbenzene should be sampled for in groundwater until two additional events are less than the MTCA Method B cleanup level.**
 - Total lead exceeded in grab groundwater from soil borings B-1, B-7, and B-10. Dissolved lead was reported at the cleanup level of 15 µg/L in grab groundwater collected from boring B-7. **Site groundwater must be sampled for dissolved lead until four total consecutive events are less than the MTCA Method A cleanup level. Ecology recommends using low flow groundwater sampling methodology.**
 - The concentrations of EDB, EDC, MTBE, in groundwater have been detected at concentrations less than the laboratory PQLs.

- Based on available information provided to Ecology, no sampling for cPAHs and PCBs has been completed in groundwater. This sampling is required for waste oil and unknown oil under WAC 173-340-900, Table 830-1. **cPAHs and PCBs should be sampled for in groundwater per the below.** Depending on the results of this groundwater monitoring, additional groundwater monitoring may be required.
- **In order to ensure at least four consecutive events of petroleum hydrocarbon contaminants in groundwater are less than the applicable cleanup levels, and in order to complete required sampling per WAC 173-340-900, Table 830-1, one additional sampling event should be completed at monitoring wells MW-4, MW-5, MW-6 for: GRO, DRO, ORO, BTEX, naphthalenes, cPAHs, and PCBs.**
- Groundwater flow direction was to the west during the August 2016 event. **No monitoring wells are present to the west or southwest of the Site, and at least two wells should be installed to delineate groundwater to the west and southwest, as well as demonstrate that surface water is not impacted by the Site. Once installed, groundwater monitoring wells along the western Site boundary should be initially sampled for all Site COCs.**
- Based on available volatile organic compound (VOC) sampling in groundwater at the Site, parts washing constituents do not appear to be impacting groundwater in the vicinity of the main Site building. **However, based on the “fenced parts washing area” identified in Columbia’s 1996 Figure 1, groundwater must be tested in this area for GRO, DRO, ORO, VOCs, and priority pollutant metals.** Additionally, Ecology recommends using low flow groundwater sampling methodology and analyze for dissolved phases of metals.
- Wood waste present in the Site subsurface is in contact with groundwater.
 - **In order to determine if the wood waste is contaminating groundwater (in addition to already identified arsenic), Ecology requires at least two sampling events for existing Site monitoring wells for phenols and pentachlorophenols across seasonal groundwater fluctuations.**

- If concentrations of these analytes are less than the laboratory PQLs for both sampling events, then no additional sampling would be required.
- If phenols and pentachlorophenols concentrations exceed the laboratory PQL but are less than the applicable MTCA cleanup level (or exceed the applicable MTCA cleanup level), then four consecutive quarterly sampling events of concentrations of these constituents less than the cleanup level are required in groundwater.
- Additionally, groundwater collected from any new monitoring wells installed at the Site should be sampled at least twice for phenols and pentachlorophenols.
- AEG, in their *Remedial Action Report*, postulated off-Site sources were responsible for arsenic contamination in groundwater at the Site.
 - Based on Ecology's review of the B&L Woodwaste Site *Final Cleanup Action Plan*, dated January 2008, B&L Woodwaste is not a contributing source to the arsenic in groundwater at the Site. The arsenic plume in groundwater at the B&L Woodwaste Site (Facility Site #1203) is delineated and does not extend to the Site.
 - Based on Ecology's review of the Draft *Remedial Investigation Report*, USG Interiors Highway 99 Site Milton, Washington, this Site is not the source of arsenic in groundwater at the Site. USG Interiors (Facility Site #84531356) is located downstream, and likely downgradient, of the Site.
 - If the arsenic source is believed to be from an off-Site source and not attributable to the on-Site fill, then a demonstration must be made that clearly shows an arsenic plume in groundwater moving onto the Site.
 - As a reminder, Ecology does not apportion liability between potentially liable parties (PLPs), and the current property owner must demonstrate another party is at fault to discharge part or all liability for cleanup of existing contamination.

Typically, the apportionment process is completed through an agreed order or consent decree. Thus, if additional PLPs are pursued for the arsenic contamination in groundwater at the Site, the Site will not remain in the Voluntary Cleanup Program (VCP).

- **Arsenic in groundwater at the Site must be delineated.**
- Grab groundwater sampled by ADAPT at their test pit TP-2 (Figure 2; ADAPT, 2001), exceeded the MTCA Method A cleanup levels for arsenic and lead. Additionally, a grab groundwater sample collected by ADAPT at their test pit TP-3 also exceeded for cadmium and chromium as well as arsenic and lead.
 - **In order to confirm current groundwater quality at both former test pit locations, a monitoring well should be installed at each location. However, these wells would not be required if it can be demonstrated that the current Site monitoring wells AEG MW-1 and AEG MW-2 coincide with these former test pit locations.**
 - **Groundwater sampling at both wells should consist of total and dissolved arsenic, lead, cadmium, and chromium. Ecology recommends low flow groundwater sampling methodology.**
 - **Sample groundwater from either the two new or two existing wells until concentrations of metals required to be sampled have at least two consecutive semi-annual events less than the laboratory PQLs or at least four consecutive quarters of less than the established cleanup levels for each COC. These sampling events should cover seasonal fluctuations of groundwater at the Site.**

4) Air/Soil Gas (Vapor):

The vapor intrusion pathway is potentially complete. At well AEG MW-3 in September 2009, 0.68 feet of separate phase hydrocarbons (SPH; free product) was reported. Most of the PCS at the Site (and likely the SPH as well) were removed by excavation in 2015. Soils contaminated with GRO, ORO, benzene, ethylbenzene, total xylenes, and naphthalenes in soil at 3 feet bgs remain in place against a concrete vault beneath the east wall of the larger Site building (Figure 2; AEG, 2016).

Decomposition of wood waste may generate combustible gases (e.g., methane and hydrogen sulfide). Combustible gases have not been evaluated in the subsurface at the Site. Ecology recommends investigating areas where wood waste comprises a significant portion of the Site fill and determine if combustible gases are present.

Vapor intrusion risk must be evaluated. To begin, Ecology recommends completing a Tier I Vapor Intrusion Assessment for the Site. For information regarding investigation and evaluating the vapor intrusion risk please refer to Ecology publication no. 09-09-047:
<https://fortress.wa.gov/ecy/publications/documents/0909047.pdf>

5) Surface Water:

Surface water is a potentially complete pathway. Hylebos Creek is located approximately 400 feet west of the Site. A wetland area is present approximately 200 feet northeast of the Site, as identified in the United States Fish and Wildlife Service, National Wetlands Inventory (<https://www.fws.gov/wetlands/data/inapper.HTML>, last accessed November 16, 2016). Groundwater flow direction of monitoring events has been predominantly to the southwest and west.

- **At least two monitoring wells should be placed along the western Site boundary in order to:**
 1. Demonstrate Site groundwater complies with final Site-specific cleanup levels for all COCs between the Site and Hylebos Creek.
 2. These monitoring wells may be the same monitoring wells as identified in section 3, Groundwater.
- Surface water cleanup levels for petroleum-related substances for freshwater may be less than the MTCA Method A cleanup levels. See Table 8.14 in Ecology's publication 10-09-057, *Guidance for Remediation of Petroleum Contaminated Sites*.
- Based on the concentration of arsenic in groundwater at boring location B-4, Ecology recommends any wells be placed at the edge of the current Site boundary or further to the west. To the extent possible, any wells installed should be used as a point of compliance for both the petroleum hydrocarbon release at the Site and for the metals in groundwater.

- If continued Site characterization indicates off-Site contamination to the northeast, surface water in the wetlands to the northeast of the Site should be sampled for GRO, DRO, ORO, VOCs, and priority pollutant metals.

6) Sediment:

Sediment is a potentially complete pathway as Hylebos Creek is located approximately 400 feet west of the Site and wetlands are mapped approximately 200 feet northeast of the Site.

The sediment pathway must be evaluated.

- If the Site characterization indicates that surface water in Hylebos Creek is impacted by the Site, then sediment must be sampled for those COCs identified in surface water.
- If the Site characterization indicates that wetlands are impacted by the Site, then any wetland sediments must be sampled for those COCs identified in surface water.

7) Ecological:

A terrestrial ecology evaluation (TEE) exclusion has been proposed for the Site, based on all contamination being left in place below 6 feet bgs and managed with institutional controls. However, some PCS has been left in place at 3 feet bgs. After Site characterization is complete, the TEE should be re-evaluated. Ecology's TEE guidance can be found at:

<http://www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm>

Based on the potential for different ecological risks and various cleanup levels depending on the two species of arsenic, Ecology recommends speciating arsenic at the Site.

- 8) In accordance with WAC 173-340-840(5) and Ecology Toxics Cleanup Program Policy 840 (Data Submittal Requirements), data generated for Remedial Actions shall be submitted simultaneously in both a written and electronic format. For additional information regarding electronic format requirements, see the website <http://www.ecy.wa.gov/eim>. Be advised that according to the policy, any reports containing sampling data that are submitted for Ecology review are considered incomplete until the electronic data has been entered.

Please ensure that data generated during on-site activities is submitted pursuant to this policy. **Data must be submitted to Ecology in this format for Ecology to issue a No Further Action determination.** Please be sure to submit all soil and groundwater data collected to date, as well as any future data, in this format. Be advised that Ecology requires up to two weeks to process the data once they are received.

2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site do not meet the substantive requirements of MTCA. Site characterization is not yet complete.

Soil and groundwater analytical results have been compared to MTCA Method A cleanup levels. Standard points of compliance have been used to discuss results at this Site.

Ecology recommends establishing MTCA Method A or B cleanup levels for each Site substance in each Site medium as appropriate. Before establishing these cleanup levels, Ecology recommends completing any revisions to the TEE and evaluating the air (vapor), surface water, and sediment pathways, as cleanup values calculated to be protective of ecological receptors may be lower than MTCA Method A or B cleanup levels in soil or groundwater protective of human health.

3. Selection of cleanup action.

Ecology has determined the cleanup action you selected (Environmental Covenant, excavation, and bioremediation) for the Site does not meet the substantive requirements of MTCA.

Interim cleanup actions implemented at the Site consist of:

- Excavation and off-Site disposal at LRI landfill in Graham, Washington, of 815 tons of petroleum hydrocarbon contaminated soil.
- Placement of oxygen reduction compound in the excavation pit before backfilling.
- Installation of a permeable membrane filter to augment biologically driven degradation of petroleum hydrocarbons and prevent contamination of clean fill.

Further characterization of Site contamination is required before selecting a final cleanup action(s).

4. Cleanup.

Ecology has determined the cleanup you performed does not meet the cleanup standards at the Site. Further characterization of the Site is required.

To date, Site cleanup activities have included the following:

- Multiple onsite and offsite investigations.
- Installation of groundwater monitoring wells.
- Excavation and offsite disposal of 815 tons of petroleum contaminated soil.
- Placement of oxygen reduction compound in the excavation pit before backfilling.
- Installation of a permeable membrane filter to augment biologically driven degradation of petroleum hydrocarbons and prevent contamination of clean fill.

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**:

- 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.

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3. State is immune from liability.

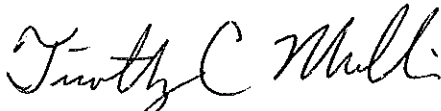
The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. See RCW 70.105D.030(1)(i).

Contact Information

Thank you for choosing to clean up the Site under VCP. After you have addressed our concerns, you may request another review of your cleanup. Please do not hesitate to request additional services as your cleanup progresses. We look forward to working with you.

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, please contact me by phone at 360-407-6265 or e-mail at Tim.Mullin@ecy.wa.gov.

Sincerely,



Tim Mullin, LG
SWRO Toxics Cleanup Program

tem: kb

Enclosures (27): A – Site Description and Applicable Figures and Tables

By Certified Mail: [91 7199 9991 7037 0278 3829]

cc: Scott Rose, AEG
Nick Acklam, Ecology
Matt Alexander, Ecology
Rob Olsen, TPCHD

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Enclosure A

Site Description and Applicable Figures and Tables

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Site Description

Site Description

Site:

The Site consists of portions of two Pierce County parcels, 0420057009 (4.96 acres) and 0420057010 (3.41 acres). The Site is identified as H&H Diesel. The Pierce County Assessor-Treasurer website lists zoning for both parcels as commercial. Hylebos Creek and then Interstate 5 define the western property boundary, to the north (from west to east) is Tacoma Hydraulics, Inc., a parking lot, and then wetlands (northeast of Site), to the south is a large undeveloped area with wetlands, and to the east is residential.

The Site is improved with a 8,640 square foot service garage built in 1969 on parcel 0420057009 along the east-central property boundary and a 720 square foot storage building in the southeast portion of parcel 0420057009, constructed in 2001. Most of the remainder of the Site is used for vehicle and large truck parking, materials staging, and storage, and is primarily covered in gravel. A stormwater system is present with at least four catch basins to the north and east of the service garage building and in the western portion of the adjacent parcel.

Soils:

Site soils to approximately 8 feet bgs are partially comprised of fill consisting of sandy gravel with silt, woody debris, "slag-like material", bricks, concrete chunks, and other garbage. Woody debris included dimensional lumber, bark, sawdust, cut timbers, and other wood waste consistent with that typically observed at sawmills. Anecdotal evidence discussed in various reports suggested that the fill for the Site was primarily wood waste which had been imported from a sawmill located at the Port of Tacoma in the 1960s, which potentially contained "slag-like material" used as road ballast. Native soils are saturated, and largely consist of peat, silty clay, and some sand and gravel.

Groundwater:

Groundwater at the Site is shallow, measured from 1.23 to 6.54 feet below top of casing. Groundwater flow direction has been varied from the south to the west. Hylebos Creek is located approximately 400 feet west of the Site, and wetlands are mapped approximately 200 feet northeast of the Site.

Previous Environmental Investigations:

In July 1996, Columbia Environmental, Inc. (Columbia) conducted a Phase II Environmental Site Assessment (ESA) on the eastern parcel at the Site. The entire report was not available to Ecology for review - only a Site plan figure (Figure 1) showing a Site map. Columbia's figure was attached to a May 22, 2000 letter from Ecology to Ms. Dorothy Holmes of H&H Diesel. The main service building is shown in its current configuration. A fenced parts washing area is depicted to the south of the building. Various storage and parking areas are also depicted.

Columbia advanced five soil borings (SP-1 through SP-5) in the vicinity of the main Site building. Columbia sampled soil at 5 and 8 feet below ground surface (bgs) in borings SP-1 and SP-2, respectively. One soil sample was collected from each SP-4 and SP-5 at a depth of 2 feet bgs. Concentrations of total petroleum hydrocarbons (TPH) as diesel and heavy oil range exceeded the MTCA Method A cleanup levels in effect at the time in at least one of each soil and groundwater samples collected. The fenced parts washer area was not investigated.

During March 1997, SECOR dug five test pits at the Site (TP-1 through TP-5). No report was available for Ecology to review, only summarized information by other consultants. One soil sample was collected at 6 feet bgs from each test pit. Cumulative concentrations of TPH as diesel and heavy oil in soil sampled at approximately 6 feet bgs at each of test pits TP-2, TP-3, and TP-4, exceeded the current MTCA Method A cleanup levels. The locations of the test pits were not presented.

In March 1999, Saltbush Environmental, Inc. (Saltbush) conducted soil and groundwater sampling at the Site. Saltbush drilled two shallow soil borings, W-1 and W-2. One soil sample at 3.5 feet bgs and groundwater was collected from each boring. TPH as heavy oil exceeded the MTCA Method A cleanup levels in soil in effect at the time. TPH as diesel and heavy oil exceeded the current MTCA Method A cleanup level in both groundwater samples collected. No report was available for Ecology to review, only summarized information by other consultants.

Saltbush returned to the Site in July 1999, drilling 14 soil borings (B-1 through B-14) on both parcels. No boring logs were reportedly submitted, though borings were reportedly drilled to 6 to 8 feet bgs. Saltbush sampled soil in each boring, and only submitted four of the thirty soil samples collected for analysis. Saltbush reportedly field screened samples using a Beacon Analytical, Inc. field test kit for indicating petroleum hydrocarbons. Saltbush noted that organics present may have influenced the field test kit results. Concentrations of TPH as diesel and heavy oil range hydrocarbons were less than the laboratory practical quantitation limits (PQLs). In one soil sample from soil boring B-1, concentrations of 1,2-dichlorobenzene, 1,4-dichlorobenzene, ethylbenzene, isopropylbenzene, p-isopropylbenzene, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, total xylenes, barium, chromium (III), and lead were detected but at concentrations less than applicable MTCA cleanup levels. In September 1999, Saltbush installed four groundwater monitoring wells (MW-1 through MW-4), in the vicinity of the building and on the eastern parcel. Depth of installation ranged from 9.5 to 11.5 feet bgs. MW-1 was screened from 3 to 8 feet bgs, and the other three wells were screened from 3 to 10 feet bgs. At least soil from monitoring well MW-4 was sampled during the well installation. No report was available for Ecology to review, only summarized information by other consultants, and Saltbush's soil and groundwater tables.

LSI-ADAPT (ADAPT) completed a limited Phase II investigation at the Site in July 2001. ADAPT reported that Saltbush had reported 1,4-dichlorobenzene in soil at a concentration of 230 parts per million (ppm) during installation of monitoring well MW-4. The 230 ppm value exceeded the MTCA Method B cleanup level. A table provided with the 1,4-dichlorobenzene result indicated the analytical value is 0.23 ppm, and the 230 ppm value appears to be in error.

ADAPT advanced five test pit locations (TP-1 through TP-5) at the Site to a maximum depth of 13 feet bgs. Soil was collected from each test pit, analyzing for gasoline, diesel, and heavy oil range TPH. Selected soil samples were analyzed for total lead, chromium, cadmium, and arsenic. Groundwater samples were collected from test pits TP-2 through TP-5, and analyzed for TPH. Selected groundwater samples were analyzed for benzene, toluene, ethylbenzene, and total xylenes (BTEX), total lead, chromium, cadmium, and arsenic.

ADAPT reported that a representative from H&H Diesel highlighted Ecology's concerns about fill soils at the Site may have contained slag material from Asarco's Tacoma Smelter Plant. However, no files at the City of Milton substantiate this claim. Ecology reportedly submitted a letter dated October 2, 2000 which listed Site observations including: violations of stormwater pollution prevention, ground stained from drums present onsite, and storage of batteries and oil equipment vehicles on unpaved portions of the Site. Ecology required stained soils to be removed within 90 days. A follow up letter by Ecology on October 19, 2000, indicated no change in Site conditions had occurred. Neither of these letters are present in Ecology's current Site file.

ADAPT sampled soil in TP-1 at 3-3.5 feet bgs, TP-2 at 1.5-2 feet bgs, TP-3 at 3-3.5 feet and 7.0-7.5 feet bgs, TP-4 at 2-2.5 feet bgs, TP-05 at 2-2.5 feet bgs. No concentrations of TPH or metals exceeded the current MTCA Method A cleanup levels in soil sampled, except for the concentration of arsenic in soil at test pit TP-3 at 7.0-7.5 feet bgs. The concentration of TPH has heavy oil exceeded the MTCA Method A cleanup level in water collected from test pit TP-5, just east of the main Site building. VOC concentrations in groundwater sampled were all less than the laboratory PQLs or MTCA cleanup levels. The concentrations of lead, chromium, cadmium, and arsenic exceeded the current MTCA Method A cleanup levels in groundwater sampled from test pit TP-3. Concentrations of arsenic and lead exceeded the MTCA Method A cleanup levels for grab groundwater from test pit TP-2.

In a report dated September 19, 2002, Geo Group Northwest, Inc. (Geo Group) summarized historical environmental Site investigations and provided an analysis for a Site path forward. Geo Group did not complete any on-Site assessment. Geo Group believed soil and groundwater conditions would need to be evaluated west of the location of the former above-ground storage tank, with at least one year of quarterly monitoring to verify groundwater was clean. Geo Group also recommended sampling existing Site wells to determine current Site conditions, and to survey Site wells.

In May 2009, Associated Environmental Group, LLC (AEG) oversaw installation of three soil borings, completed as AEG MW-1 through AEG MW-3, to a maximum depth of 19 feet bgs. ADAPT monitoring well MW-2 was also uncovered. All monitoring wells were screened from 3 to 13 feet bgs. AEG also excavated test pits TP-1 through TP-9, to depths advanced from 6.5 feet to 9 feet bgs.

Soils were sampled for one or more of TPH as gasoline, diesel, mineral oil, heavy oil, BTEX, methyl tertiary-butyl ether (MTBE), total naphthalenes, 1-2-dibromoethane (EDB), 1-2-dichloroethane (EDC), carcinogenic polycyclic aromatic hydrocarbons (cPAHs), mercury, lead,

cadmium, chromium, and arsenic. Groundwater was sampled for one or more of TPH as gasoline, diesel, mineral oil, heavy oil, volatile organic compounds (VOCs), which included BTEX, and chlorinated solvents (PCE, TCE, and degradation products). Woody debris and other waste was identified in Site fill, including additional "slag-like material" based on photos provided.

AEG sampled groundwater at the Site from monitoring wells AEG MW-1, AEG MW-2, AEG MW-3, and ADAPT MW-2, for TPH as gasoline, diesel, heavy oil and mineral oil; VOCs, total mercury, lead, cadmium, chromium, arsenic, and dissolved arsenic and lead. Total and dissolved arsenic exceeded the MTCA Method A cleanup level for all groundwater samples collected. TPH as diesel and oil periodically exceeded the MTCA Method A cleanup level in groundwater sampled at monitoring well AEG MW-3. Total lead exceeded the MTCA Method A cleanup level in groundwater sampled in May 2009, however, total lead was not detected in groundwater sampled for the remaining three consecutive groundwater monitoring events in 2009-2010. AEG noted that power washing of engine blocks ceased on the east side of the main Site building as this was thought to be a potential contributor to groundwater impacts.

AEG submitted a *Cleanup Action Plan/Limited Disproportionate Cost Analysis* in a report dated November 15, 2010. AEG cited a supposed Ecology inspection report, indicating fill at the Site was from the B&L log yard in 1971-1972, and additional fill was used from the Duwamish Drive-In to fill in the remainder of the Site in 1987. Fill was reportedly placed mostly on the eastern parcel, typically to a depth of 8 feet bgs. A 500-gallon UST containing Stoddard solvents was reportedly removed from the Site in 1991 and contaminated soils were reported in the UST basin. Original documents relating to these inspections were not available for Ecology's review. AEG identified the primary suspected source of petroleum hydrocarbon constituents into the subsurface was a leaking aboveground storage tank on the eastern side of the Site building. AEG proposed standard points of compliance and MTCA Method A cleanup levels for indicator hazardous substances (IHSs) in soil and groundwater. IHSs identified were: TPH as diesel, TPH as oil, lead, arsenic, and chromium. AEG concluded in their limited disproportionate cost analysis that a slurry wall was much more expensive than excavation. Excavation up to 10 feet bgs was proposed as the remedial option to remove petroleum hydrocarbon impacts in soil at the Site.

In March 2015, AEG advanced ten soil borings at the Site, using direct push methodology, from 8 to 12 feet bgs. Monitoring wells AEG MW-1 and AEG MW-2 were also sampled as monitoring wells AEG MW-3 and ADAPT MW-2 could not be located. The concentration of total lead in grab groundwater samples collected at locations B-1, B-7, and B-10 exceeded the MTCA Method A cleanup level. Almost all concentrations of total and dissolved arsenic in grab groundwater samples collected exceeded the MTCA Method A cleanup level. The concentration of TPH as gasoline, diesel, and heavy oil significantly exceeded the MTCA Method A cleanup levels in groundwater collected from boring B-1 and slightly exceeded the MTCA Method A cleanup level for heavy oil in groundwater collected at boring B-10. AEG's Site investigation concluded petroleum hydrocarbon impacts were present to the east of the main Site building.

In order to address petroleum hydrocarbon impacts east of the main Site building, AEG excavated to the east of the main Site building, removing a total of 815 tons of petroleum hydrocarbon constituent impacted soils. These soils were disposed of at LRI Landfill in Graham, Washington. Monitoring well AEG MW-3 was decommissioned. A concrete vault was triple rinsed to remove oily residue and water from the vault. Contaminated soils were removed associated with a stormwater line along the eastern building boundary, and the stormwater line was replaced. Soils with concentrations of gasoline, benzene, and naphthalene exceeding the MTCA Method A cleanup levels were left in place adjacent to the concrete vault at 3 feet bgs. A bioaugmentation permeable membrane system was installed in the excavation to continue treating left in place petroleum hydrocarbon contaminated soils and protect the clean fill from re-contamination. Prior to installing the membrane, 991 pounds of Regenesis Oxygen Reduction Compound-Advanced® (ORC-A®) pellets, 390 pounds of RegenOx Part A®, and 120 pounds of RegenOx Part B® were placed in the bottom of the excavation to enhance degradation of remaining petroleum hydrocarbon contamination in soil and groundwater. Chromium in soil was speciated and determined to be trivalent and not hexavalent.

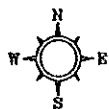
After the excavation was completed in 2015, AEG used direct push technology to install three groundwater monitoring wells, MW-4, MW-5, and MW-6 around the excavation perimeter, to a maximum depth of 15 feet bgs. Each monitoring well was screened from 3 to 13 feet bgs. In 2015 and 2016, three consecutive monitoring events at MW-4 and four consecutive events at MW-6 indicated that petroleum hydrocarbon constituent concentrations in groundwater were all less than the MTCA Method A cleanup levels. However, sampling for 1,3,5-trimethylbenzene, naphthalenes, arsenic, and lead in groundwater was not completed.

Figures and Tables

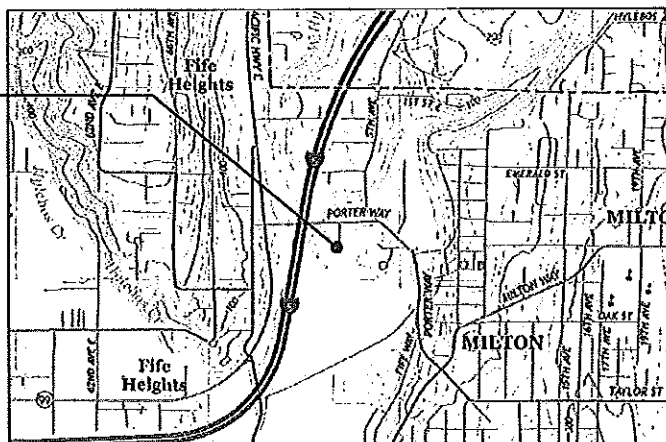
- 1) AEG 2016 – Figure 1 – Vicinity Map
- 2) Columbia Environmental, Inc. 1996 Figure 1 – Site Plan (relabeled Figure 2)
- 3) LSI ADAPT 2001 Figure 2 – Site Plan (relabeled Figure 3)
- 4) AEG 2009 Figure 2 – Previous Environmental Investigations (relabeled Figure 4)
- 5) AEG 2009 Figure 3 – Test Pits Site Plan (relabeled Figure 5)
- 6) AEG 2009 Figure 4 – Groundwater Contour Map (relabeled Figure 6)
- 7) AEG 2016 Figure 2 – Groundwater Contour Map (relabeled Figure 7)
- 8) AEG 2016 Figure 6 – Geologic Cross Section A-A' (relabeled Figure 8)
- 9) AEG 2016 Figure 7 – Geologic Cross Section B-B' (relabeled Figure 9)
- 10) LSI ADAPT Table 1 – Summary of Analytical Test Results – Soil
- 11) LSI ADAPT Table 2 – Summary of Analytical Test Results – Groundwater
- 12) Geo Group, Inc. Table 1 – Laboratory Analysis Results for Soil Samples Collected During 1996 (relabeled Table 3)
- 13) Geo Group, Inc. Table 2 – Laboratory Analysis Results for Water Samples Collected During 1996 (relabeled Table 4)
- 14) Geo Group, Inc. Table 3 – Laboratory Analysis Results for Soil Samples Collected During 1997 (relabeled Table 5)
- 15) Geo Group, Inc. Table 4 – Laboratory Analysis Results for Soil Samples Collected During 1999 (relabeled Table 6)
- 16) Geo Group, Inc. Table 5 – Volatile Organic Compounds and Metals Detected in Soil Sample Collected from Boring B-1 (1999) (relabeled Table 7)
- 17) Geo Group, Inc. Table 6 – Laboratory Analysis Results for Groundwater Samples Collected During 1999 (relabeled Table 8)
- 18) Geo Group, Inc. Table 7 – Laboratory Analysis Results for Soil Samples Collected During 2001 (relabeled Table 9)

- 19) AEG 2009 Table 1 – Summary of Soil Analytical Results – TPH, BTEX, & Metals (reabeled Table 10)
- 20) AEG 2009 Table 2 – Summary of Soil Analytical Results – Selected VOC & Semi-VOC (reabeled Table 11)
- 21) AEG 2015 Table 1 – Summary of Excavation (Soil) Analytical Results (VOC, TPH; relabeled Table 12)
- 22) AEG 2015 Table 2 – Summary of Excavation (Soil) Analytical Results (PAH, PCB, Metals); (reabeled Table 13)
- 23) AEG 2015 Table 3 – Summary of (Soil Borings) Soil Analytical Results (reabeled Table 14)
- 24) AEG 2016 Table 1 – Summary of Groundwater Elevations (reabeled Table 15)
- 25) AEG 2016 Table 2 – Summary of Groundwater Analytical Results – TPH & Metals (reabeled Table 16)
- 26) AEG 2016 Table 4 – Summary of Quarterly Groundwater Analytical Results – Selected VOC (reabeled Table 17)

FILENAME	DRAWN BY		CHECKED BY		APPROVED BY		PROJECT NUMBER
15-112_1502.DWG	KCD	4/11/2016	DB	4/11/2016	DB	4/11/2016	15-112



PROJECT
LOCATION



VICINITY MAP

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.

REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.
VICINITY IMAGE SOURCE: U.S. GEOLOGICAL SURVEY-2014, 7.5 MINUTE QUADRANGLE MAP
POVERTY BAY, WASHINGTON

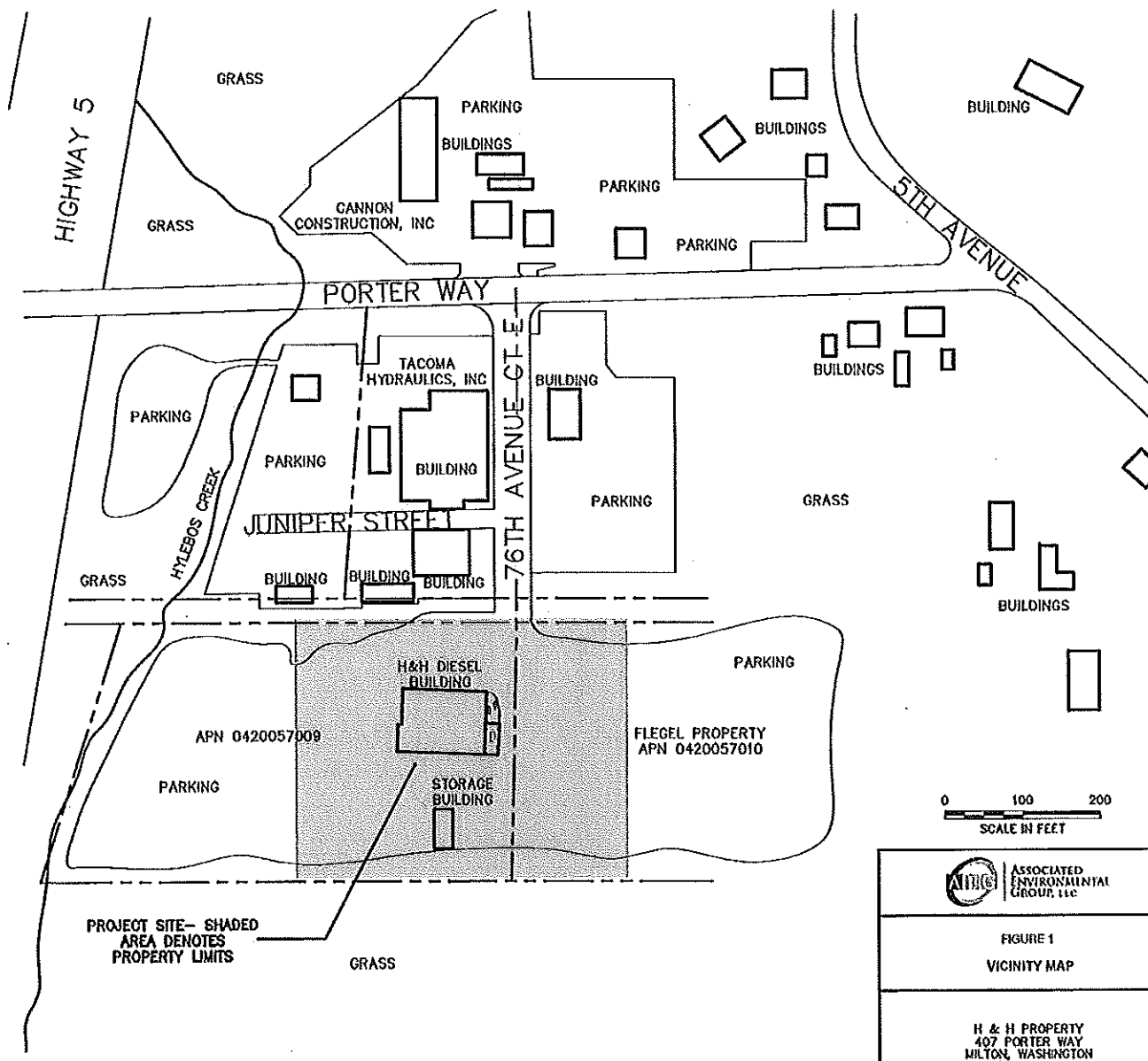
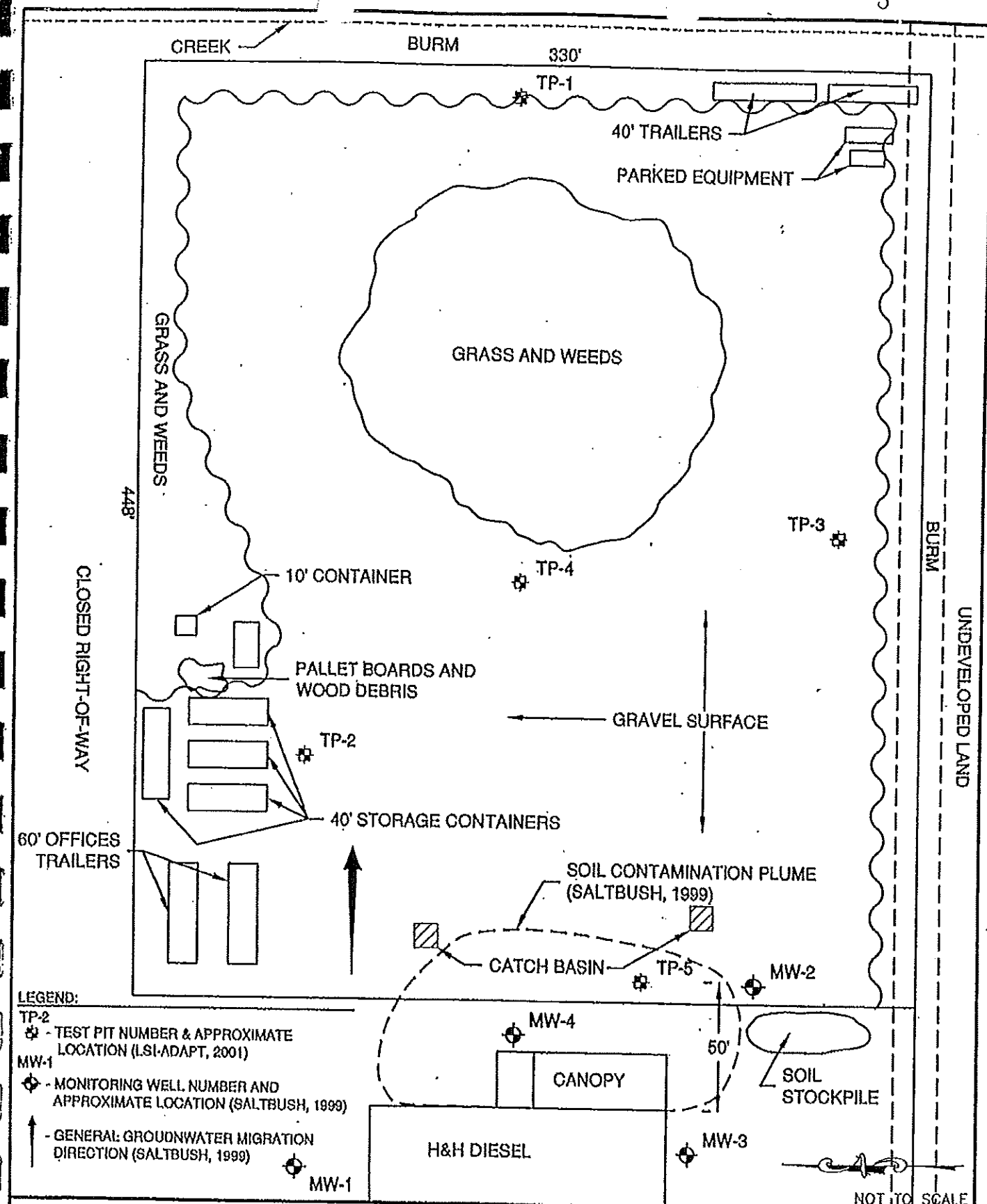


Figure 2



FIGURE - 1

Figure 3



LSI ADAPT

800 Maynard Avenue S., Suite 403
Seattle, Washington 98134

Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 2 - Site Plan

Project : Truck Operators Property

Location : 407a Porter Way

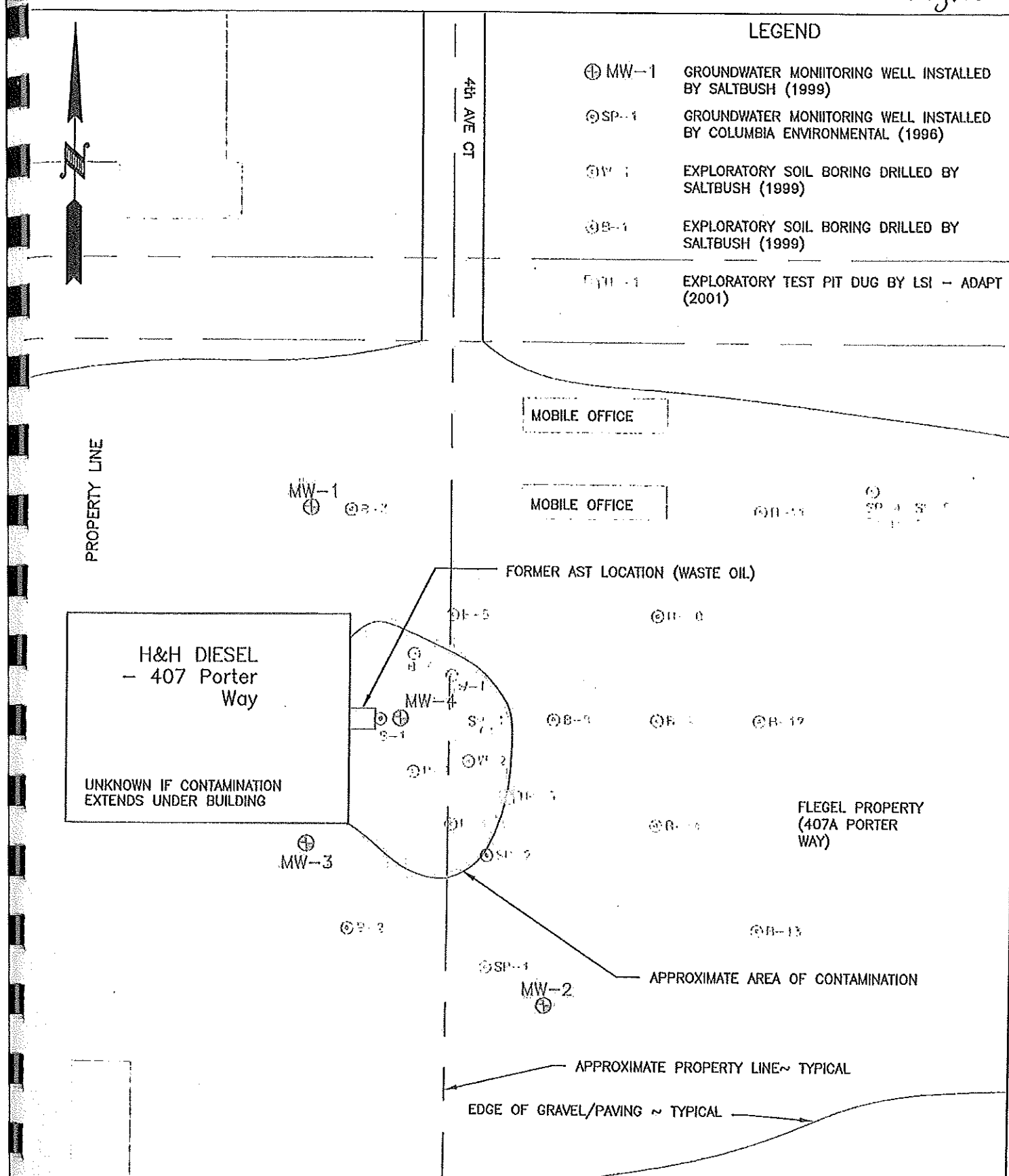
Milton, Washington

Client : Interest Construction & Development

Date : 07/11/01

Job # : S-WA-01-6486

APPENDIX B
TABLES 1 AND 2



ASSOCIATED ENVIRONMENTAL GROUP, LLC
 1728 State Avenue NE, Suite 101
 Olympia, WA 98506
 (360) 352-9835 Fax (360) 352-8104

FIGURE 2 - PREVIOUS
 ENVIRONMENTAL INVESTIGATIONS

FLEGEL/H&H PROPERTIES
 407A & 407 PORTER WAY
 MILTON, WA

Project# 07-200

Date: 4/14/2009

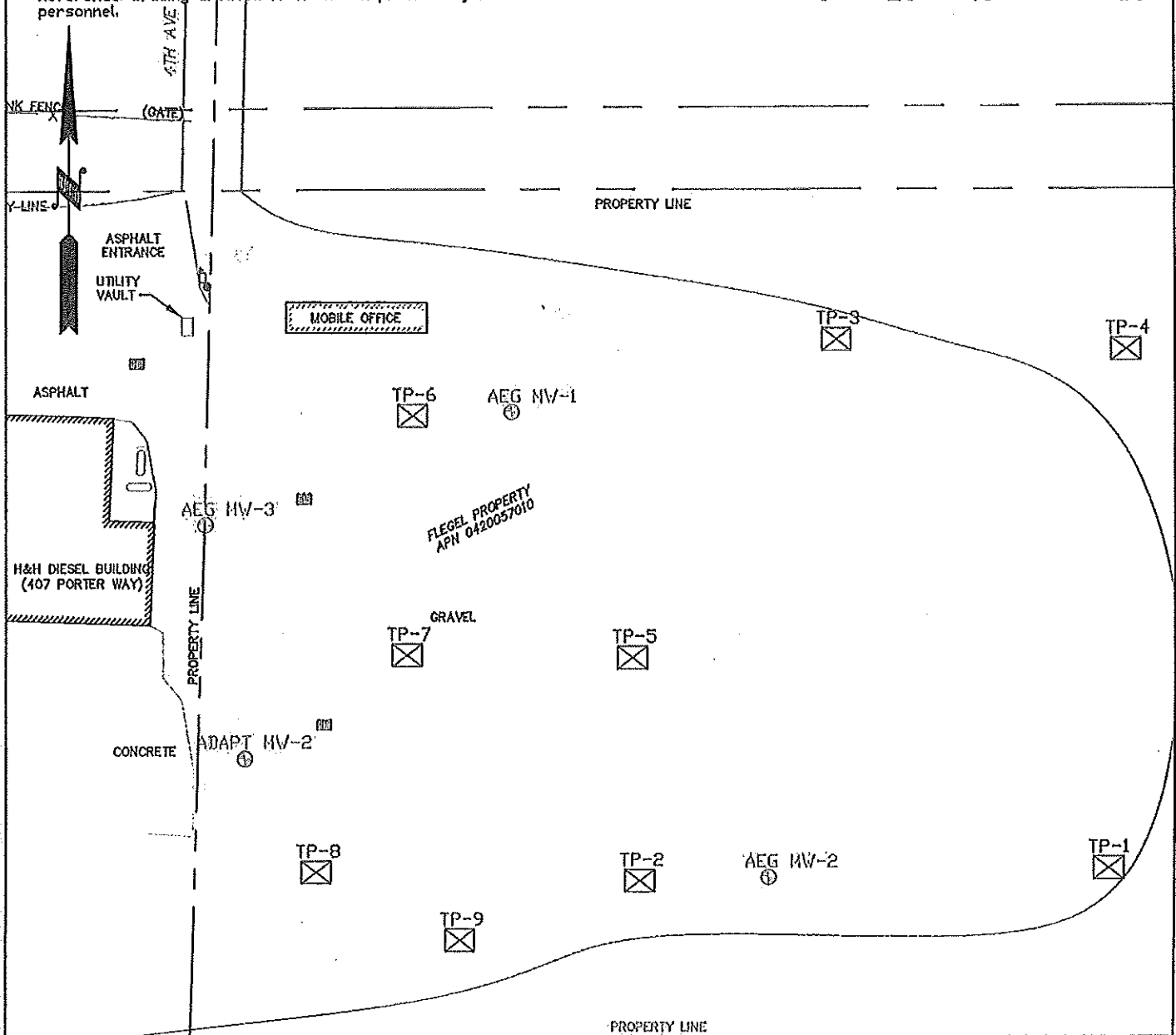
File:

Sheet 1 OF 1




Figure 5

Notes: (a) The locations of all features shown are approximate.
 (b) This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document.
 Reference: Drawing created from sketch provided by AEG's personnel.

SCALE: 1"=40 FEET



LEGEND

- MW-1  GROUNDWATER MONITORING WELL (AEG 2009)
- ADAPTMW-2  GROUNDWATER MONITORING WELL (SALTBUSH 1999)
- TP-1  TEST PIT (AEG 2009)


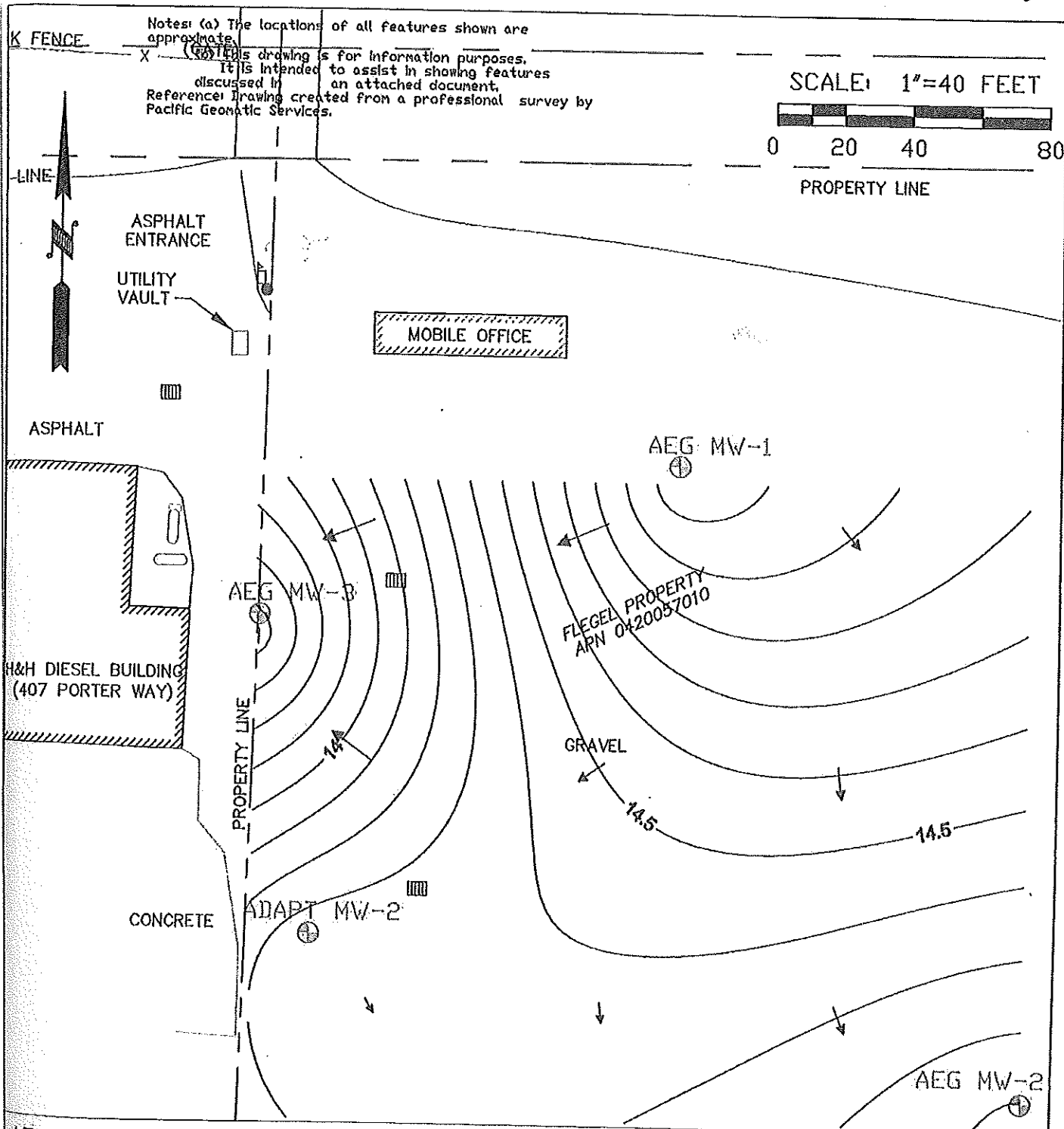
 ASSOCIATED ENVIRONMENTAL GROUP, LLC
 1728 State Avenue NE, Suite 101
 Olympia, WA 98508
 (360) 352-9835 Fax (360) 352-8164

FIGURE 3
 TEST PITS SITE PLAN

FLEGE/H&H PROPERTIES
 407A & 407 PORTER WAY
 MILTON, WA

Project# 07-200	Date: 4/14/2009
File:	Sheet 1 OF 1

Figure 6



- AEG MW-1
 Ⓢ GROUNDWATER MONITORING WELL (AEG 2009)
- ADAPT MW-2
 Ⓢ GROUNDWATER MONITORING WELL (SALTBUSH 1999)
- ← INFERRED GROUNDWATER FLOW DIRECTION

ASSOCIATED ENVIRONMENTAL GROUP, LLC
 1720 State Avenue NE, Suite 101
 Olympia, WA 98508
 (360) 352-9885 Fax (360) 352-8164

FIGURE 4
 GROUNDWATER CONTOUR MAP

FLEGEL/H&H PROPERTIES
 407A & 407 PORTER WAY
 MILTON, WA

Project# 07-200
 Flegel FLEGEL

Date: 6/09/09
 Sheet 1 OF 1

Figure 7

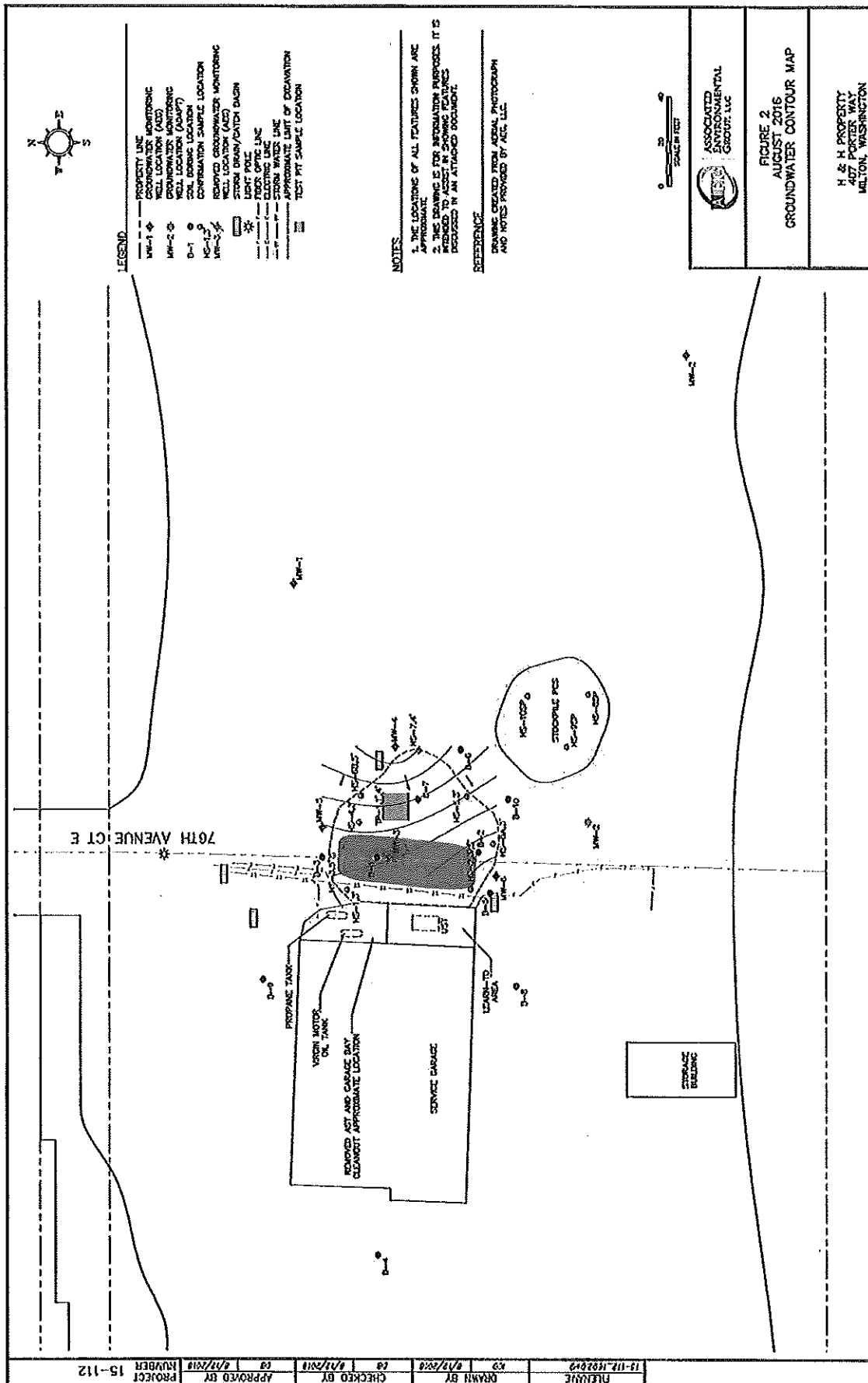
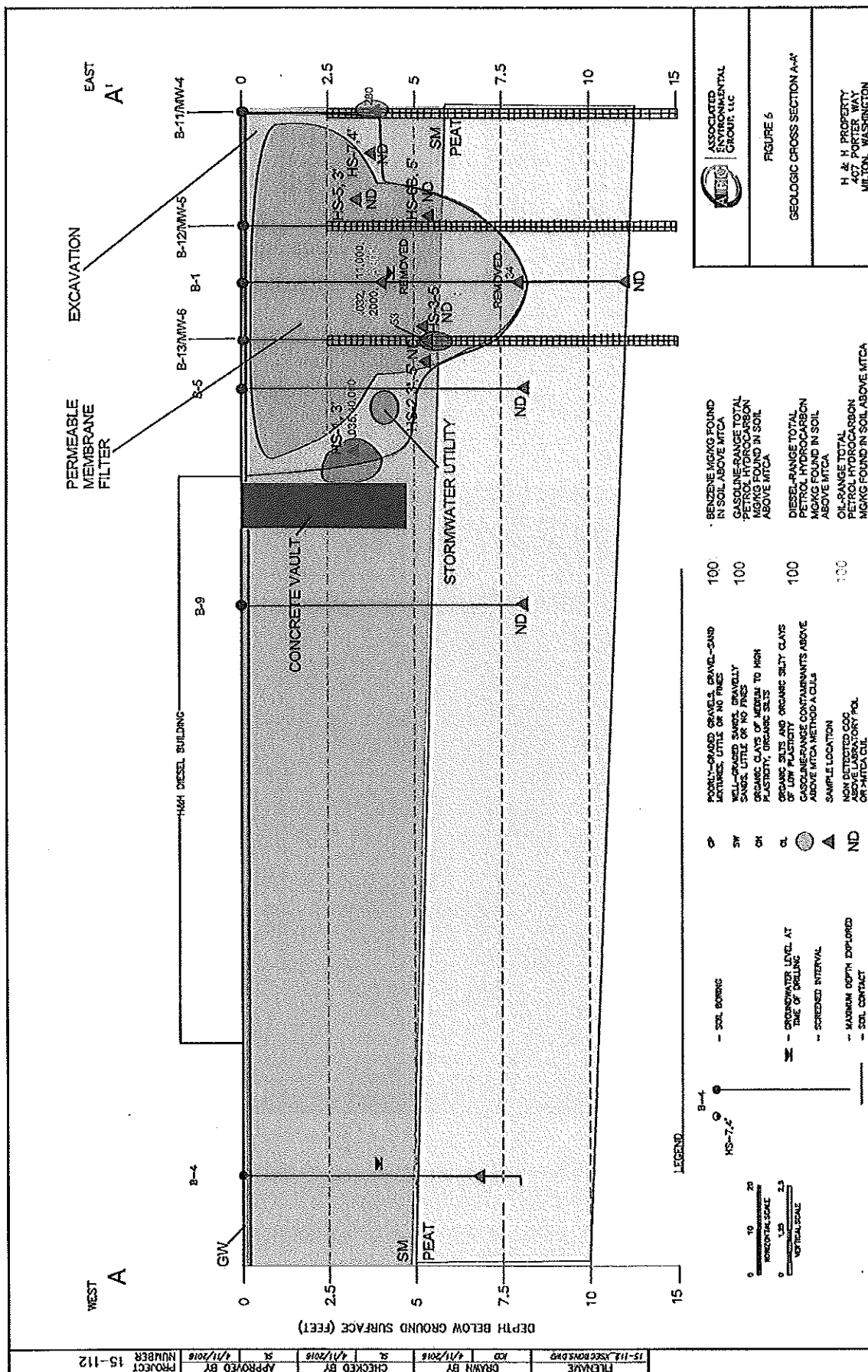


Figure 8



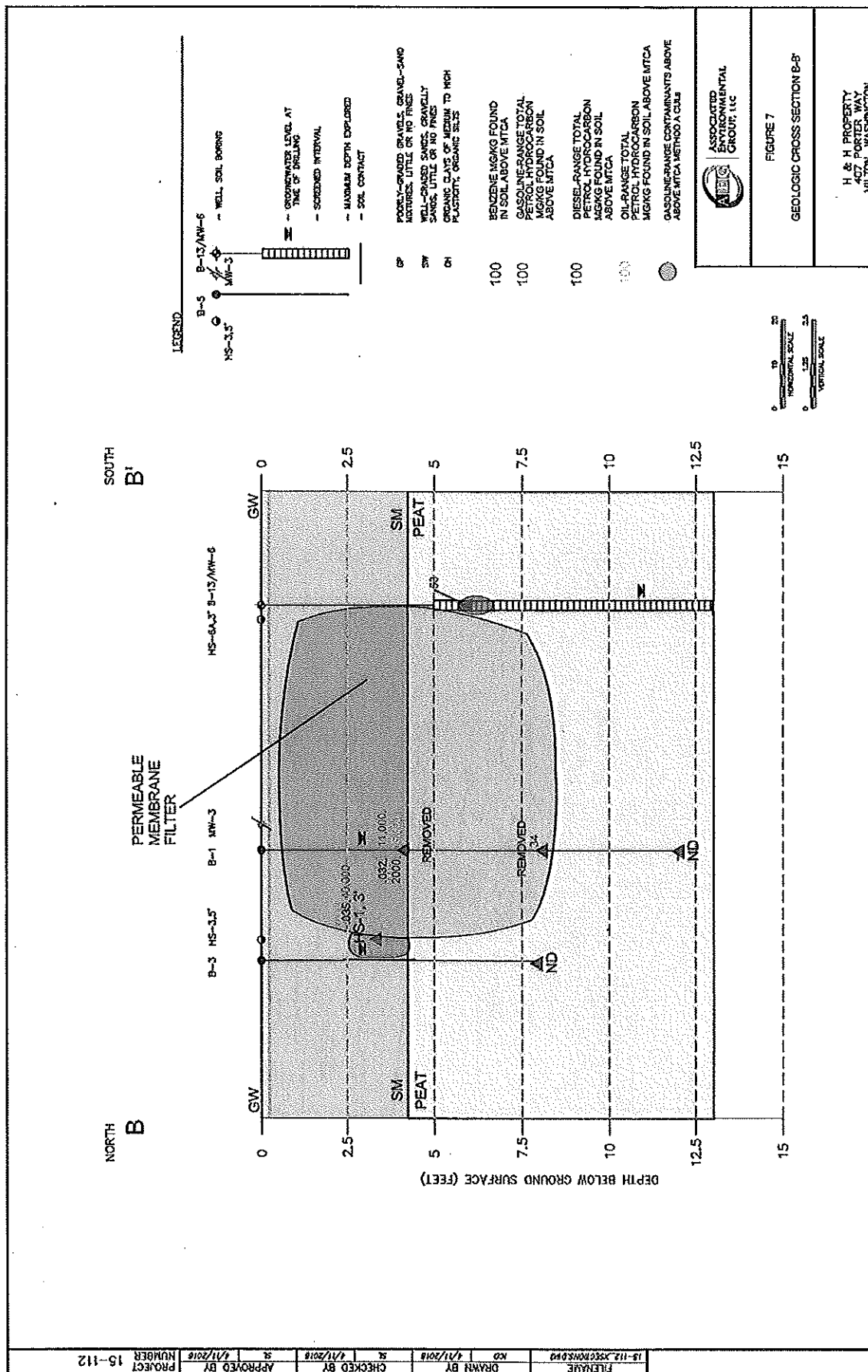


TABLE 1: SUMMARY OF ANALYTICAL TEST RESULTS - SOIL
407A PORTER WAY
MILTON, WASHINGTON
LSI - ADAPT JOB NO. S-WA01-6486

Samples collected on June 28, 2001

Sample No.	Depth (feet)	PID (ppm)	WTPH-HCID			Lead (ppm)	Chromium (ppm)	Cadmium (ppm)	Arsenic (ppm)
			Gasoline (ppm)	Diesel (ppm)	Motor Oil (ppm)				
TP-1/3.0-3.5	3.0 to 3.5	0.2	<23	<58	*100	55	42	<0.58	12
TP-2/1.5-2.0	1.5 to 2.0	5	<22	<54	<110	<5.4	<0.54	<0.54	<11
TP-3/3.0-3.5	3.0 to 3.5	0.4	<25	<63	<130	12	25	<0.63	<13
TP-3/7.0-7.5	7.0 to 7.5	0.6	NT	NT	NT	<14	50	<1.4	
TP-4/2.0-2.5	2.0 to 2.5	0.4	<22	<56	*330	28	32	<0.56	<11
TP-5/2.0-2.5	2.0 to 2.5	0.9	<22	<56	*380	56	26	<0.56	<11
MTCA			100	2,000	2,000	250	2,000	2	20

Notes:

ppm = all concentrations reported in parts per million, which is equivalent to milligrams/kilogram
PID = Photoionization detector

WTPH-HCID = Washington Total Petroleum Hydrocarbons - Hydrocarbon Identification
Lead, Chromium, Cadmium and Arsenic analyzed by EPA Method 6010

MTCA: Model Toxics Control Act (Method A cleanup levels shown)

NT = exceeds current MTCA Method A Cleanup Level

* = Samples exhibited a detectable concentration of diesel-range TPH and were subsequently analyzed for TPH by WTPH-Diesel range extended (diesel and oil-range TPH).

TABLE 2: SUMMARY OF ANALYTICAL TEST RESULTS - GROUNDWATER
407A PORTER WAY
MILTON, WASHINGTON
LSI - ADAPT JOB NO. S-WA01-6486

Samples collected on June 28, 2001

Sample No.	WTPH-HCID				B (ppb)	T (ppb)	E (ppb)	X (ppb)	Lead (ppb)	Chromium (ppb)	Cadmium (ppb)	Arsenic (ppb)
	Gasoline (ppb)	Diesel (ppb)	Motor Oil (ppb)									
TP-2/W-1	NT	NT	NT	NT	NT	NT	NT	NT	62	21	<4.4	62
TP-3/W-1	NT	NT	NT	NT	NT	NT	NT	NT	330	110	14	180
TP-4/W-1	680	<250	<500	<1	<1	<1	<1	3.5	NT	NT	NT	NT
TP-5/W-1	180	490	3100	<1	<1	<1	<1	3.1	NT	NT	NT	NT
MTCA	800/1,000	500	500	5	1,000	700	1,000	1,000	15	50	5	5

Notes:

ppb = all concentrations reported in parts per billion, which is equivalent to micrograms/kilogram
WTPH-HCID = Washington Total Petroleum Hydrocarbons - Hydrocarbon Identification
BTX = Benzene, Toluene, Ethylbenzene, and Xylenes by EPA Method 8020
Lead, Chromium, Cadmium and Arsenic analyzed by EPA Method 200.8
MTCA: Model Toxics Control Act (Method A cleanup levels shown)
= In excess of current MTCA Method A cleanup level

* = Samples exhibited a detectable concentration of diesel-range TPH and were subsequently

TABLE 1

LABORATORY ANALYSIS RESULTS FOR SOIL SAMPLES COLLECTED DURING 1996

407 Porter Way, Milton, Pierce County, Washington

E-1570

Boring No.	Drilled by	Depth (feet)	Date Collected	TRPH (ppm)	TPH-G (ppm)	TPH-D (ppm)	TPH-O (ppm)
SP-1	Columbia	5	7/10/96	650	NT	NT	NT
		8	7/10/96	1900	NT	NT	NT
SP-2	Columbia	6	7/10/96	ND	ND	NT	NT
SP-4	Columbia	2	7/10/96	NT	NT	140	NT
SP-5	Columbia	2	7/10/96	NT	NT	63	NT
Regulatory Criteria				2000 ¹	100/30 ²	2000 ³	2000 ³

Notes:

NT = Not tested.

ND = Not detected. Refer to laboratory report for detection limits.

ppm = parts per million.

Concentrations exceeding regulatory criteria are shown in bold print.

TRPH = Total Petroleum Hydrocarbons analyzed using WTPH - 418.1

TPH-G analyses performed using WTPH-G Method;

TPH-D and TPH-O analyses performed using WTPH-Dx Method.

Regulatory Criteria: Washington State Model Toxics Control Act Method A Cleanup Levels.

¹ No established cleanup level is established for this method; TPH-D and TPH-O cleanup levels are used here for general guidance.² Cleanup level is 100 ppm if no benzene is present and if total of toluene, ethylbenzene, and xylenes is less than 1% of the gasoline mixture; otherwise, the cleanup level is 30 ppm.³ Cleanup level applies to the combination of diesel and oil hydrocarbons.

TABLE 2

LABORATORY ANALYSIS RESULTS FOR WATER SAMPLES COLLECTED DURING 1996

407 Porter Way, Milton, Pierce County, Washington

E-1570

Boring No.	Collected by	Date Collected	Sample Depth (feet)	TRPH (ppb)	TPH-G (ppb)
SP-1	Columbia	7/10/96	UNK	ND	NT
SP-2	Columbia	7/10/96	UNK	700	130
SP-3	Columbia	7/10/96	3	45000	NT
W1 ¹	Columbia	7/2/96	0	ND	NT
W2 ¹	Columbia	7/2/96	0	ND	NT
Regulatory Criteria				2000 ²	800/1000 ³

Notes:

All samples are grab samples collected from either soil borings or from surface water.

Laboratory results stated in parts per billion (ppb);

divide stated results by 1000 to convert to parts per million (ppm).

UNK = Unknown.

ND = Not detected. Laboratory reporting limit unknown.

NT = Not tested.

Concentrations exceeding regulatory criteria are shown in bold print.

TPH-G analysis performed using WTPH-G Method; TRPH analyses performed using WTPH-418.1 Method.

Regulatory Criteria: Washington State Model Toxics Control Act Method A Cleanup Levels for Groundwater.

¹ Surface water sample collected from drainage ditch.

² No established cleanup level is established for this method; TPH-D and TPH-O cleanup levels are used here for general guidance.

³ Cleanup level is 1,000 ppb if no benzene is present; otherwise, the cleanup level is 800 ppb.

45000 per
2000 per
800 per

TABLE 3

Table 5

LABORATORY ANALYSIS RESULTS FOR SOIL SAMPLES COLLECTED DURING 1997

407 Porter Way, Milton, Pierce County, Washington

E-1570

SECOR TP Test POC
parent showing map

Boring No.	Drilled by	Depth (feet)	Date Collected	TPH-D (ppm)	TPH-O (ppm)
TP-1	SECOR	6*	3/1/97	117	269
TP-2	SECOR	6*	3/1/97	747	1510
TP-3	SECOR	6*	3/1/97	2880	6350
TP-4	SECOR	6*	3/1/97	665	1390
TP-5	SECOR	6*	3/1/97	715	1030
Regulatory Criteria				2000 ¹	2000 ¹

Add together
Add together
Add together

Notes:

NT = Not tested.

ND = Not detected. Refer to laboratory report for detection limits.

ppm = parts per million.

Concentrations exceeding regulatory criteria are shown in bold print.

TPH-D and TPH-O analyses performed using WTPH-Dx Method.

Regulatory Criteria: Washington State Model Toxics Control Act Method A Cleanup Levels.

* Inferred sample depth, read from photocopy of facsimile copy of laboratory analysis report.

¹ Cleanup level applies to the combination of diesel and oil hydrocarbons.

TABLE 4

Table 6

LABORATORY ANALYSIS RESULTS FOR SOIL SAMPLES COLLECTED DURING 1999

407 Porter Way, Milton, Pierce County, Washington

E-1570

Boring No.	Drilled by	Depth (feet)	Date Collected	TPH-D (ppm)	TPH-O (ppm)
W-1	Saltbush	3.5	3/15/99	150	930
W-2	Saltbush	3.5	3/15/99	49	390
B-1	Saltbush	4	7/22/99	400	410
B-7	Saltbush	6	7/22/99	<25	<100
B-12	Saltbush	2	7/22/99	<25	<100
B-14	Saltbush	6	7/22/99	<25	<100
Regulatory Criteria				2000 ¹	2000 ¹

Notes:

ppm = parts per million.

Where hydrocarbons were not detected, the result is reported as less than the detection limit (i.e., <25).

Concentrations exceeding regulatory criteria are shown in bold print.

TPH-D and TPH-O analyses performed using WTPH-Dx Method.

Regulatory Criteria: Washington State Model Toxics Control Act
Method A Cleanup Levels.¹ Cleanup level applies to the combination of diesel and oil hydrocarbons.

TABLE 5

Table 7

VOLATILE ORGANIC COMPOUNDS AND METALS
DETECTED IN SOIL SAMPLE COLLECTED FROM BORING B-1 (1999)

407 Porter Way, Milton, Pierce County, Washington

E-1570

Detected Compound	Detected Concentration (ppm)	Regulatory Criteria (ppm)
1,2-dichlorobenzene	0.275	NE
1,4-dichlorobenzene	0.23	NE
Ethylbenzene	0.91	6
Isopropylbenzene	0.82	NE
p-Isopropylbenzene	3.5	NE
Toluene	0.5	7
1,2,4-trimethylbenzene	10.95	NE
1,3,5-trimethylbenzene	5.15	NE
Xylenes	6.1	9
Barium	29	NE
Chromium (III)	28	2000
Lead	8.0	250

Notes:

ppm = parts per million.

Other target analytes for the analyses performed were not detected; for metals analyses, these included arsenic, cadmium, and mercury.

Concentrations exceeding regulatory criteria are shown in bold print.

Volatile organics analysis performed using USEPA Method 8260.

Metals analysis performed using USEPA Methods 6010 and 7470.

Regulatory Criteria: Washington State Model Toxics Control Act
Method A Cleanup Levels.

TABLE 6

LABORATORY ANALYSIS RESULTS FOR GROUNDWATER SAMPLES COLLECTED DURING 1999

407 Porter Way, Milton, Pierce County, Washington

E-1570

Boring No.	Date Collected	Top of Casing Elevation ¹ (feet)	Depth to Water (feet)	Groundwater Elevation (feet)	TPH-G (ppb)	N-propyl- benzene (ppb)	1,2,4-trimethyl- benzene (ppb)	1,3,5-trimethyl- benzene (ppb)	Ethylbenzene (ppb)	Xylenes (ppb)	TPH-D (ppb)	TPH-O (ppb)
W-1*	3/15/99	N/A	4	N/A	NT	NT	NT	NT	NT	NT	1600	12000**
W-2*	3/15/99	N/A	4	N/A	NT	NT	NT	NT	NT	NT	2000	1600
MW-1	9/7/99 10/14/99	99.59	3.25 3.37	96.34 96.22	<250 NT	ND NT	ND NT	ND NT	ND NT	ND NT	<250 NT	<1000 NT
MW-2	9/7/99 10/14/99	99.49	3.15 3.42	96.34 96.07	<250 NT	ND NT	ND NT	ND NT	ND NT	ND NT	<250 NT	<1000 NT
MW-3	9/7/99 10/14/99	99.75	3.21 3.30	96.34 96.45	<250 NT	ND NT	ND NT	ND NT	ND NT	ND NT	<250 NT	<1000 NT
MW-4	9/7/99 10/14/99	99.33	2.85 2.93	96.48 96.35	<250 NT	5 NT	39 NT	11 NT	4*** NT	28 NT	<250 NT	<1000 NT
Regulatory Criteria					800/1000 ²	NE	NE	NE	700	1000	500 ³	500 ³

Notes:

Laboratory results stated in parts per billion (ppb); divide stated results by 1000 to convert to parts per million (ppm).
 ND = Not detected. Refer to laboratory report for detection limits.

NT = Not tested.

NE = None established.

Concentrations exceeding regulatory criteria are shown in bold print.

TPH-G analysis performed using NWTPH-G Method; TPH-D and TPH-O analyses performed using NWTPH-Dx Method.
 Volatile Organic Compounds analysis performed using USEPA Method 8260.

Regulatory Criteria: Washington State Model Toxics Control Act Method A Cleanup Levels for Groundwater.

* Samples W-1 and W-2 were grab samples collected at depths of 4 feet below ground surface from soil borings; no wells were installed.

** Reported quality control data for this sample was significantly out of range.

*** Estimated value, below reporting limit.

¹ Reported surface elevation is relative to a temporary benchmark assigned an elevation of 100.00 feet.

² Cleanup level is 1,000 ppb if no benzene is present, otherwise, the cleanup level is 800 ppb.

³ Cleanup level applies to the combination of diesel and oil hydrocarbons.

TABLE 7

LABORATORY ANALYSIS RESULTS FOR SOIL SAMPLES COLLECTED DURING 2001

407 Porter Way, Milton, Pierce County, Washington

E-1570

Boring No.	Excavated by	Depth (feet)	Date Collected	TPH-G (ppm)	TPH-D (ppm)	TPH-O (ppm)	Lead (ppm)	Chromium (ppm)	Cadmium (ppm)	Arsenic (ppm)
TP-1	LSI-ADAPT	3	6/28/01	<23	<8	100	55	42	<0.58	12
TP-2	LSI-ADAPT	1.5	6/28/01	<22	<4	<110	<5.4	<0.54	<0.54	<11
TP-3	LSI-ADAPT	3 7	6/28/01 6/28/01	<25 NT	<63 NT	<130 NT	12 <14	25 50	<0.63 <1.4	<13 43
TP-4	LSI-ADAPT	2	6/28/01	<22	<56	330	28	32	<0.56	<11
TP-5	LSI-ADAPT	2	6/28/01	<22	<56	380	56	26	<0.56	<11
Regulatory Criteria				100/30 ¹	2000 ²	2000 ²	250	2000	2	20

Notes:

ppm = parts per million.

NT = Not tested.

Where hydrocarbons were not detected, the result is reported as less than the detection limit (i.e., <25).

Concentrations exceeding regulatory criteria are shown in bold print.

TPH analyses performed using NWTPH-HCID (Hydrocarbon Identification) Method, except where indicated by *.

* = TPH-D and TPH-O analyses performed using WTPH-Dx Method.

Metals analyses performed using

Regulatory Criteria: Washington State Model Toxics Control Act Method A Cleanup Levels.

¹ Cleanup level is 100 ppm if no benzene is present and if total of toluene, ethylbenzene, and xylenes is less than 1% of the gasoline mixture; otherwise, the cleanup level is 30 ppm.

² Cleanup level applies to the combination of diesel and oil hydrocarbons.

Table 9

20
Tolerance
Levels

Table 1 Summary of Soil Analytical Results - TPH, BTEX & Metals
Flegel Property
Milton, WA

Sample Number ¹	Sample Depth (feet)	Date Sampled	Gasoline TPH ² (mg/Kg)	Select Volatile Organic Compounds ³ (mg/Kg)				Diesel Extended TPH ⁴ (mg/Kg)		MTCA ⁵ Metals ⁶ (mg/Kg)				
				Benzene	Toluene	Ethylbenzene	Total Xylenes	Diesel	Heavy Oil	Mercury	Lead	Cadmium	Chromium VI/III ⁷	Arsenic
ABG MW1-S1-3	3	5/13/09	-	-	-	-	-	<50	<100	-	-	-	-	-
ABG MW1-S2-8	8	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	-	-	-	-	-	-	-
ABG MW1-S3-15	15	5/13/09	-	-	-	-	-	<50	<100	-	-	-	-	-
ABG MW2-S4-3	3	5/13/09	-	-	-	-	-	500	<100	-	-	-	-	-
ABG MW2-S5-10	10	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	-	-	-	-	-	-	-
ABG MW2-S6-3	3	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	200	13,000	<0.5	290	<1.0	140	21
ABG MW2-S7-8	8	5/13/09	-	-	-	-	-	<50	200	-	-	-	-	-
ABG MW2-S8-12	12	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	-	-	-	-	-	-	-
TP1-S	5	5/13/09	-	-	-	-	-	<50	<100	-	-	-	-	-
TP1-S	8	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	-	-	-	-	-	-	-
TP2-S	5	5/13/09	-	-	-	-	-	-	-	<0.5	72	<1.0	28	8.4
TP2-S	8	5/13/09	<10	<0.02	<0.05	0.07	<0.15	-	-	<0.5	13	<1.0	15	5.7
TP2-S	6	5/13/09	-	-	-	-	-	<50	<100	-	-	-	-	-
TP2-S	3	5/13/09	-	-	-	-	-	<50	520	<0.5	42	<1.0	18	6.5
TP2-S	8	5/13/09	-	-	-	-	-	<50	130	-	-	-	-	-
TP7-6	6	5/13/09	25	<0.02	<0.05	<0.05	<0.15	-	-	-	-	-	-	-
TP2-S	3	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	<50	<100	<0.5	67	<1.0	21	19
TP2-S	7	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	<50	460	-	-	-	-	-
TP2-S	8	5/13/09	<10	<0.02	<0.05	<0.05	<0.15	-	-	-	-	-	-	-
Ecology MTCA Method A Clean Up Levels			10	0.02	0.05	0.05	0.15	50	100	0.50	5.0	1.0	5.0	5.0
Ecology MTCA Method A Clean Up Levels			100	0.03	7	6	9	2,000	2,000	2	250	2	19/2,000	20

Notes:

¹ Approximate Sample locations are shown in figure 2

² Gasoline range total petroleum hydrocarbons (TPH). Analyzed by Northwest Method TPH-Cx.

³ Select Volatile Organic Compounds. Analyzed by EPA Method 8260B.

⁴ Diesel extended range TPH. Analyzed by Northwest Method NWTPH-D/Dx.

⁵ Analyzed by EPA Method 6020

⁶ Soil cleanup level for Chromium VI is 19 mg/Kg & Chromium III is 2,000 mg/Kg

mg/Kg - milligrams per Kilogram

-- = not analyzed for constituent

< = not detected above laboratory limits

* Ecology has not designated a cleanup level for this constituent

MDL = Method Detection Limits

Bold indicates the detected concentration exceeds Ecology

MTCA Method A cleanup levels

Table 2 Summary of Soil Analytical Results - Selected VOC & Semi-VOC
Flegel Property
Milton, WA

Sample Number ¹	Sample Depth (feet)	Date Sampled	Select Volatile Organic Compounds ² (mg/Kg)							Select Semi-Volatile Organic Compounds ³ (mg/Kg)			
			Benzene	Toluene	Ethylbenzene	Total Xylenes	PCE	TCE	Vinyl Chloride	Acetone	Benzo(a)pyrene	Phenol	Fluorene
AEG MW2-S5-10	10	5/13/09	<0.02	<0.05	<0.05	<0.15	<0.02	<0.02	<0.05	1.7	<0.1	1.00	<0.1
AEG MW3-S7-8	8	5/13/09	<0.02	<0.05	<0.05	<0.15	<0.02	<0.02	<0.05	<250	<0.1	1.00	<0.1
TP3-8	8	5/13/09	<0.02	23	<0.05	<0.15	<0.02	<0.02	<0.05	1.1	<0.1	1.00	<0.1
TP5-6	6	5/13/09	<0.02	<0.05	<0.05	<0.15	<0.02	<0.02	<0.05	<250	<0.1	1.00	<0.1
TP7-3	3	5/13/09	<0.02	<0.05	<0.05	<0.15	<0.02	<0.02	<0.05	<250	<0.1	1.00	<0.1
TP8-7	7	5/13/09	<0.02	<0.05	<0.05	<0.15	<0.02	<0.02	<0.05	1.6	<0.1	1.00	<0.1
MDL			0.02	0.05	0.05	0.15	0.02	0.02	0.05	0.25	0.1	1.00	0.1
Ecology MTCA Method A Clean Up Levels			0.03	7	6	9	0.05	0.03	*	*	*	*	*

Notes:

¹ Approximate Sample locations are shown in figure 2

² Analyzed by EPA Method 8260B

³ Analyzed by EPA Method 8270

mg/Kg - milligrams per Kilogram

PCE = tetrachloroethylene

TCE = trichloroethylene

MDL = Method Detection Limits

- = not analyzed for constituent

< = not detected above laboratory limits

* Ecology has not designated a cleanup level for this constituent

Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level.

Table 1 - Summary of Excavation (Soil) Analytical Results (VOC, TPH)
H&H Property
Milton, Washington

Sample Number	Sample Type	Depth Collected (feet)	Date Collected	Selected Volatile Organic Compounds (mg/kg)										Total Petroleum Hydrocarbons (TPH) (mg/kg)			
				Benzene	Toluene	Ethylbenzene	Xylenes	Isopropylbenzene	n-Propylbenzene	1,2,4-Trimethylbenzene	1,2,5-Trimethylbenzene	sec-Butylbenzene	Isopropyltoluene	Naphthalene	Gasoline	Diesel	Heavy Oil
TPH-1	P	1"	8/24/2015	<0.02	<0.05	<0.05	0.15	—	—	—	—	—	—	—	219	<50	160
TPH-1A	P	4"	8/24/2015	<0.02	1.1	0.47	18	—	—	—	—	—	—	—	2,800	<50	1,600
HS-1	P	3"	8/26/2015	0.052	1.7	12	57	31	35	180	89	55	<0.05	5.4	40,000	900	2,600
HS-2	P	3"	8/26/2015	<0.02	<0.05	<0.05	<0.15	—	—	—	—	—	—	—	110	<50	180
HS-3	P	5"	8/26/2015	<0.02	<0.05	<0.05	<0.15	<0.05	<0.05	0.19	0.974	<0.05	0.066	<0.02	52	<50	150
HS-4	P	5"	8/27/2015	<0.02	0.15	8.24	3	—	—	—	—	—	—	—	130	<50	1,700
HS-5	P	3"	8/27/2015	<0.02	<0.05	<0.05	<0.15	—	—	—	—	—	—	—	47	<50	1,200
HS-6	C	3"	8/27/2015	<0.02	<0.05	<0.05	<0.15	—	—	—	—	—	—	—	23	<50	100
HS-7	C	3"	9/10/2015	<0.02	<0.05	<0.05	<0.15	—	—	—	—	—	—	—	27	<50	120
HS-8	C	4"	9/10/2015	<0.02	0.057	0.052	<0.15	—	—	—	—	—	—	—	13	<50	310
HS-9	SP	1"	9/11/2015	<0.02	<0.05	<0.05	<0.15	—	—	—	—	—	—	—	20	<50	230
HS-10	SP	1"	9/11/2015	<0.02	<0.05	<0.05	<0.15	—	—	—	—	—	—	—	230	71	400
HS-10B	SP	1"	9/11/2015	<0.02	<0.05	<0.05	<0.15	—	—	—	—	—	—	—	200	120	390
MTCA Method A Cleanup Levels (mg/kg)				0.02	0.05	0.05	0.15	800**	800**	0.05	800**	800**	8.05	0.02	10	50	100
MTCA Method A Cleanup Levels (mg/kg)				0.03	7	6	9	800**	800**	0.05	800**	800**	8.05	0.02	20*	2,000	2,000

Notes:

mg/kg = milligrams per kilogram

— = Not analyzed for constituent

< = Not detected at the listed laboratory detection limits

PQL = Practical Quantification Limit (laboratory detection limit)

Red Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level

Bold indicates the detected concentration is below Ecology MTCA Method A cleanup level

* = TPH-Gasoline Cleanup Level with the presence of Benzene anywhere at the Site

** = Method B Cleanup Level

P = Performance Sample

X = Excavated/Removed

C = Confirmation Sample

SP = Stockpile Samples/Representative of removed soils

Table 2 - Summary of Excavation (Soil) Analytical Results (PAH, PCB, Metals)
H&H Property
Milton, Washington

Sample Number	Sample Type	Depth Collected (feet)	Date Collected	Polynuclear Aromatic Hydrocarbons (mg/kg)						Polychlorinated Biphenyl (mg/kg)	MTCA 5 Total Metals (mg/kg)				
				2-Methylmethylphenylene	1-Methylmethylphenylene	Naphthalene	Acenaphthylene	Fluorene	Phenanthrene		Lead	Cadmium	Chromium	Relevant Chromium	Arsenic
TP-1.1'	PX	1'	8/26/2015	—	—	—	—	—	—	—	—	—	—	—	—
TP-1.4'	PX	4'	8/26/2015	—	—	—	—	—	—	—	—	—	—	—	—
HS-1.3'	P	3'	8/26/2015	15	12	9.2	0.09	1.6	2.5	0.02	<5.0	<1.0	23	<0.01	<5.0
HS-2.3'	P	3'	8/26/2015	—	—	—	—	—	—	—	—	—	—	—	—
HS-2.5'	P	5'	8/26/2015	0.11	0.11	<0.02	<0.02	<0.02	<0.02	<0.01	7.3	<1.0	27	<0.01	7
HS-3.3'	P	3'	8/27/2015	—	—	—	—	—	—	—	—	—	—	—	—
HS-4.3'	PX	3'	8/27/2015	—	—	—	—	—	—	—	—	—	—	—	—
HS-5.3'	C	3'	8/27/2015	—	—	—	—	—	—	—	—	—	—	—	—
HS-6.3'	C	3'	8/27/2015	—	—	—	—	—	—	—	—	—	—	—	—
HS-6B.5'	C	5'	9/10/2015	—	—	—	—	—	—	—	—	—	—	—	—
HS-7.4'	C	4'	9/10/2015	—	—	—	—	—	—	—	45	<0.01	12	<0.01	7
HS-8SP	SP	1'	9/11/2015	—	—	—	—	—	—	—	76	<0.01	27	<0.01	7.4
HS-9SP	SP	1'	9/11/2015	—	—	—	—	—	—	—	44	<0.01	52	<0.01	8.1
HS-10SP	SP	1'	9/11/2015	—	—	—	—	—	—	—	25	<0.01	41	<0.01	5
PQL (mg/kg)				0.02	0.02	0.02	0.02	0.02	0.02	0.01	50	<1.0	50	<0.01	2.4
MTCA Method A Cleanup Levels (mg/kg)				220	5,600	5	4,800	3,200	N/A	1	250	2	19,200*	19	20

Notes:

mg/kg = milligrams per kilogram

— Not analyzed for constituent

< Not detected at the listed laboratory detection limits

PQL = Practical Quantification Limit (laboratory detection limit)

Not Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level

Bold indicates the detected concentration is below Ecology MTCA Method A cleanup level

* Soil cleanup level for Chromium VI is 19 mg/kg & Chromium III is 2,000 mg/kg

P = Performance Sample

X = Excavated/Removed

C = Confirmation Sample

SP = Stockpile Samples/Representative of removed soils

Table 3 - Summary of (Soil Borings) Soil Analytical Results
H&H Property
Milton, Washington

Sample Number	Depth Collected (feet)	Date Collected	BTEX (mg/kg)				Total Petroleum Hydrocarbons (TPH) (mg/kg)				MTCA 5 Total Metals (mg/kg)					Naphthalene (mg/kg)
			Benzene	Toluene	Ethylbenzene	Xylenes	Gasoline	Diesel	Heavy Oil	Lead	Cadmium	Chromium III	Arsenic	Mercury		
B1-S1-4	4.0	3/24/2015	0.032	0.98	1.5	10	11,000	2,000	5,600	21	<1.0	19	<5.0	<0.5	—	
B1-S2-8	8.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	34	<50	<100	<5.0	<1.0	23	<5.0	<0.5	—	
B1-S3-12	12.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	110	<5.0	<1.0	<5.0	<5.0	<0.5	—	
B2-S1-4	4.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	9.1	<1.0	34	<5.0	<0.5	—	
B2-S2-8	8.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	28	<5.0	<0.5	—	
B2-S3-10	10.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	23	<5.0	<0.5	—	
B3-S1-8	8.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	26	<5.0	<0.5	—	
B4-S1-7	7.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	26	<5.0	<0.5	—	
B5-S1-8	8.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	29	<5.0	<0.5	—	
B6-S1-8	8.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	26	<5.0	<0.5	—	
B8-S1-8	8.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	28	<5.0	<0.5	—	
B10-S1-2	2.0	3/24/2015	<0.02	<0.05	<0.05	<0.15	<10	<50	<100	<5.0	<1.0	24	<5.0	<0.5	—	
B11-MW4-5	4.0	9/29/2015	<0.02	<0.05	1.9	<0.15	280	370	<100	—	—	—	—	—	0.48	
B12-MW5-5	5.0	9/29/2015	<0.02	<0.05	0.14	0.82	38	<50	<100	—	—	—	—	—	0.29	
B13-MW6-5	5.0	9/29/2015	<0.02	<0.05	<0.05	<0.15	53	<50	630	—	—	—	—	—	0.21	
POL (mg/kg)			0.02	0.05	0.05	0.15	10	50	100	5.0	1.0	5.0	5.0	0.5	<0.05	
MTCA Method A Cleanup Levels (mg/kg)			0.03	7	6	9	30*	2,000	2,000	250	2	19/2000**	20	2	5	

Notes:

mg/kg = milligrams per kilogram

-- Not analyzed for constituent

< Not detected at the listed laboratory detection limits

PQL = Practical Quantification Limit (laboratory detection limit)

Red/Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level

Bold indicates the detected concentration is below Ecology MTCA Method A cleanup levels

* TPH-Gasoline Cleanup Level with the presence of Benzene anywhere at the Site

** Soil cleanup level for Chromium VI is 19 mg/kg & Chromium III is 2,000 mg/kg

Table 1 - Summary of Groundwater Elevations
H&H Property
Milton, WA

Table 15

Well Number/ TOC Elevation	Date of Measurement	Depth to Water	Depth to Free Product	Free Product Thickness	Groundwater Elevation	Change in Elevation
AEG MW-1	05/28/09	1.55	--	--	15.07	--
16.62	09/11/09	2.44	--	--	14.18	-0.89
	12/18/09	2.04	--	--	14.58	0.40
	04/05/10	1.31	--	--	15.31	0.73
	03/18/15	1.23	--	--	15.39	0.08
AEG MW-2	05/28/09	5.65	--	--	14.06	--
19.71	09/11/09	6.54	--	--	13.17	-0.89
	12/18/2009	5.68	--	--	14.03	0.86
	04/05/10	4.80	--	--	14.91	0.88
	03/18/15	4.68	--	--	15.03	0.12
AEG MW-3	05/28/09	2.49	--	--	13.54	--
16.03	09/11/09	3.44	2.76	0.68	13.13	-0.41
	12/18/09	2.20	--	--	13.83	0.70
	04/05/10	2.10	--	--	13.93	0.10
ADAPTMW-2	05/28/09	1.60	--	--	14.40	--
16.00	09/11/09	2.86	--	--	13.14	-1.26
	12/18/09	2.69	--	--	13.31	0.17
	04/05/10	1.99	--	--	14.01	0.70
MW-4	10/08/15	2.27	--	--	97.73	--
16.00 (16.00)	08/05/16	2.33	--	--	97.67	0.06
MW-5	10/08/15	2.62	--	--	97.03	--
16.00 (16.00)	08/05/16	2.77	--	--	96.88	0.15
MW-6	10/08/15	1.99	--	--	97.61	--
16.00 (16.00)	08/05/16	3.46	--	--	96.14	1.47

Notes:

16.00 (16.00) - Top of casing elevation relative to assigned benchmark

All values in feet

TOC = Top of casing elevation relative to assigned benchmark.

-- = Not measured, not available, or not applicable

Table 2 - Summary of Groundwater Analytical Results - TPH & Metals
H&H Property
Milos, WA

Monitoring Well	Date Sampled	Gasoline: TPH	Dissolved TPH			MECA 5 Metals - Total Metals					Dissolved Metals	
			Diesel	Heavy Oil	Mineral Oil	Mercury	Lead	Cadmium	Chromium	Arsenic	Lead	Arsenic
AEG MW-1	5/28/09	<100	<200	<400	<400	<0.5	6.6	<1.0	<10	50.9	..	..
	9/11/09	156	<200	<400	<400	<0.5	<5.0	<1.0	<10	70	<5.0	69
	12/18/09	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	50.3	<5.0	44.4
	4/9/10	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	44.2	<5.0	31.7
	3/18/15	..	<200	<400	..	<0.5	<5.0	<0.5	<5.0	47.8	..	13.9
AEG MW-2	5/28/09	<100	<200	<400	<400	<0.5	40.7	<1.0	12.7	101	..	..
	9/11/09	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	103	<5.0	183
	12/18/09	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	201	<5.0	169
	4/9/10	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	91.9	<5.0	32.4
	3/18/15	..	<200	<400	..	<0.5	<5.0	<0.5	<5.0	164	..	105
AEG MW-3	5/28/09	<100	700	<400	<400	<0.5	<5.0	<1.0	7.8	20.4	..	..
	9/22/09	310	<200	1,470	<400	..	..	..	..	..	..	..
	12/18/09	769	<200	<400	<400	..	..	..	..	..	..	..
	4/9/10	<100	925	<400	<400	<0.5	<5.0	<1.0	<10	39.9	<5.0	10.4
ADAPT MW-2	5/28/09	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	<5.0	..	..
	9/11/09	185	<200	<400	<400	<0.5	<5.0	<1.0	<10	13	<5.0	12.3
	12/18/09	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	<5.0	<5.0	11
	4/9/10	<100	<200	<400	<400	<0.5	<5.0	<1.0	<10	12.4	<5.0	7.4
B-1	3/24/2015	33,833	15,633	43,633	..	16	<2.0	15	31	<1.0	6.3	17
B-2	3/24/2015	<100	<250	<500	..	<2.0	<2.0	<10	31	<1.0	<2.0	39
B-3	3/24/2015	<100	<250	<500	..	<2.0	<2.0	18	41	<1.0	<2.0	37
B-4	3/24/2015	<100	<250	<500	..	8.4	<2.0	<10	31	<1.0	2.5	41
B-5	3/24/2015	<100	<250	<500	..	<2.0	<2.0	<10	36	<1.0	<2.0	31
B-6	3/24/2015	<100	<250	<500	..	7.9	<2.0	<10	49	<1.0	2.1	3.7
B-7	3/24/2015	<100	<250	550	..	39	<2.0	<10	31	<1.0	15	15
B-8	3/24/2015	<100	<250	<500	..	<2.0	<2.0	<10	33	<1.0	<2.0	31
B-9	3/24/2015	<100	<250	<500	..	<2.0	<2.0	<10	35	<1.0	<2.0	31
B-10	3/24/2015	<100	<250	1,680	..	35	<2.0	<10	37	<1.0	11	11
MW-4	10/8/15	130	<250** /	<500** /	..	..	..	..	..	..	..	..
	1/27/2016*	..	..	..	..	..	..	..	..	..	..	..
	4/1/16	<100	<250	<500	..	..	..	..	..	..	..	..
	8/5/16	<100	<250	<500	..	..	..	..	..	..	..	..
MW-5	10/8/15	<100	<250** /	<500** /	..	..	..	..	..	..	..	..
	1/27/16	210	<250	<500	..	..	..	..	..	..	..	..
	4/1/16	210	<250	<500	..	..	..	..	..	..	..	..
	8/5/16	<100	<250	<500	..	..	..	..	..	..	..	..
MW-6	10/8/15	<100	<250** /	<500** /	..	..	..	..	..	..	..	..
	1/27/16	<100	<250	<500	..	..	..	..	..	..	..	..
	4/1/16	<100	<250	<500	..	..	..	..	..	..	..	..
	8/5/16	<100	<250	<500	..	..	..	..	..	..	..	..
PQL		100	200	400	400	0.5	5.0	1.0 or 0.5	10	5.0	5.0	5.0
Ecology MECA Method A Cleanup Levels		500***	500	500	500	2	15	5	50	5	15	5

Notes

All values in micrograms per liter (ug/L)

.. = Not analyzed for constituent

< = Not detected at the listed laboratory detection limits

PQL = Practical Quantification Limit (laboratory detection limit)

Red Bold indicates the detected concentration exceeds Ecology MECA Method A cleanup level

Bold indicates the detected concentration is below Ecology MECA Method A cleanup levels

* Not sampled, well was covered with soil and could not be located. Metal detector used to locate for next event

** Analyzed with Silica Gel Cleanup

*** TPH Cleanup Level with the presence of Benzene anywhere at the Site

Table 4 - Summary of Quarterly Groundwater Analytical Results - Selected VOC
H&H Property
Milton, WA

Monitoring Well	Date Sampled	Select Volatile Organic Compounds (ug/L)											
		Benzene	Toluene	Ethylbenzene	Total Xylenes	1,3,5-Trimethylbenzene	Isopropyltoluene	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)	Naphthalenes	Tetrachloroethylene	Trichloroethylene	Vinyl Chloride
ABG MW1-W	5/28/09	<1	14.3	<1	<3	<1	<1	<1	<0.01	7.7	<1	<1	<0.20
	9/11/09	<1	136	<1	<3	-	-	-	-	-	-	-	-
	12/18/09	<1	27	<1	<3	-	-	-	-	-	-	-	-
	4/5/10	1.3	2.9	<1	3.6	-	-	-	-	-	-	-	-
ABG MW2-W	5/28/09	<1	<1	<1	<3	<1	<1	<1	<0.01	<5	<1	<1	<0.20
	9/11/09	<1	14.7	<1	<3	-	-	-	-	-	-	-	-
	12/18/09	<1	1.7	<1	<3	-	-	-	-	-	-	-	-
	4/5/10	<1	<1	<1	<3	-	-	-	-	-	-	-	-
ABG MW3-W	5/28/09	1.5	11.1	6.5	54.5	37.4	10.8	<1	<0.01	89.2	<1	<1	<0.20
	9/22/09	<1	<1	2.6	15.3	-	-	-	-	-	-	-	-
	12/18/09	1.4	1.9	3.4	26	-	-	-	-	-	-	-	-
	4/5/10	<1	4.9	2.7	32	-	-	-	-	-	-	-	-
ADAPT MW2-W	5/28/09	<1	<1	<1	<3	<1	<1	<1	<0.01	<5	<1	<1	<0.20
	9/11/09	<1	<1	<1	<3	-	-	-	-	-	-	-	-
	12/18/09	<1	<1	<1	<3	-	-	-	-	-	-	-	-
	4/5/10	<1	<1	<1	<3	-	-	-	-	-	-	-	-
POL	1	2	1	3	1	1	1	1	0.01	5	1	1	0.2
Ecology MTCA Method A Clean Up Levels		5	1,000	700	1,000	*	*	5	0.01	160	5	5	0.2

Notes:

ug/L = micrograms per liter

- Not analyzed for constituent

< Not detected at the listed laboratory detection limits

PQL = Practical Quantification Limit (laboratory detection limit)

Red Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level

Black indicates the detected concentration is below Ecology MTCA Method A cleanup levels

* Method A Cleanup Level not established