Volume 2:
Appendices C through H
Closure Report
Acrowood Corporation Facility
4425 South Third Avenue
Everett, Washington

Prepared for
Acrowood Corporation, Inc.
4425 South Third Avenue
Everett, WA 98206

Prepared by
LSI ADAPT, Inc.
800 Maynard Avenue S.
Suite 403
Seattle, WA 98134

LSI ADAPT Job No. WA99-2877-2
January 18, 2002

APPENDIX C

ADAPT PRELIMINARY PHASE II ENVIRONMENTAL SITE ASSESSMENT (November 30, 1999)

***ADaPT* Engineering, Inc.**
800 Maynard Avenue South, Suite 403
Seattle, Washington 98134

Tel (206) 654-7045
Fax (206) 654-7048

November 30, 1999

ADaPT Job No. WA99-2877

Acrowood Corporation, Inc.
4425 South Third Avenue
Everett, WA 98206

Attention: Mr. Farhang Javid

Subject: Preliminary Phase II Environmental Site Assessment
Acrowood Corporation Facility
4425 South Third Avenue
Everett, Washington

Dear Mr. Javid:

ADaPT Engineering, Inc. (ADaPT), is pleased to provide you with the following results of our Preliminary Phase II Environmental Site Assessment for the above referenced site. This report is provided for Acrowood Corporation and their agents. If this report is to be reproduced and/or transmitted to a third party, it must be reproduced and/or transmitted in its entirety. Any exceptions will be made only with the written permission of ADaPT.

ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Environmental Manager
Environmental Services

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Attachments:

0.0 EXECUTIVE SUMMARY

This section presents the findings of ADaPT's Preliminary Phase II Environmental Site Assessment Services at the property located at 4425 South Third Avenue in Everett, Washington.

The purpose of our work was to assess soil, and if encountered, groundwater, conditions beneath the site to provide data for evaluation of possible contaminants associated with environmental recognized concerns identified in ADaPT's Phase I dated August 20, 1999.

Field Activities: A geophysical survey was conducted in two areas with suspected underground storage tanks (USTs).

A total of 16 Geoprobe boreholes were advanced into subsurface fill and native soils present on site. The Geoprobe boreholes were advanced to approximately 12 to 22 feet below ground surface. Groundwater was encountered in 4 of the borings at depths of approximately 6 to 11 feet below ground surface.

Two dust wipe samples were collected from the accumulated dust on the beams/rafters in the foundry and machine areas.

Laboratory Analysis: A total of 49 soil and 4 groundwater samples were collected from the 16 Geoprobe holes. Sixteen (16) selected soil and one (1) groundwater samples were submitted to the laboratory for analysis for petroleum hydrocarbons using NWTPH-HCID; halogenated compounds using EPA8021B; lead, arsenic, cadmium and chromium using EPA 6000 series; and polynuclear aromatic hydrocarbons using EPA GC/MS SIM. In addition, 2 dust wipe samples were submitted for analysis for lead, arsenic, cadmium, and chromium using EPA 6000/7000 series; polynuclear aromatic hydrocarbons using EPA GC/MS SIM; polychlorinated biphenyls using EPA 8082.

Conclusions: The Phase I revealed the presence of recognized environmental conditions (as defined by ASTM Practice E1527-97 and Preliminary Phase II ASTM Practice E 1903-97) associated with the subject site, that in ADaPT's professional opinion, have resulted in a release of hazardous substances or petroleum products to the subject site. In general, the findings discussed below suggest that observed environmental contamination impacts are relatively limited in aerial extent. Observed concentrations of contaminants appear localized in both soils and groundwater and do not at this point suggest widespread environmental problems for the subject site.

Based on the analytical results diesel, range and heavy oil range hydrocarbon have impacted soil beneath the subject site in two areas. The two areas are the former fuel tank area adjacent to the steel shop and the former UST adjacent to the receiving building. The site is currently used for industrial use with no changes planned. The diesel range and heavy oil range hydrocarbons were detected in the subsurface soils above the current MTCA Method A Industrial cleanup level of 200 mg/kg. Since the site is currently non-residential use, the levels of petroleum hydrocarbons would likely meet current Method "B" or "C" clean up levels which are health risk based. In addition, new proposed clean up levels for diesel and heavy oil range hydrocarbons are expected to increase the Method "A" industrial concentration to 2000 mg/kg when, and if, the new MTCA regulations are approved at the end of this year. Based on the new Method "A" cleanup standards only the soil sample from beneath the fuel tanks area would be above the new standard. Polynuclear aromatic hydrocarbons (PAHs) detected in the fuel tanks area are currently below the MTCA Method A Industrial cleanup level however, when, and if, the new proposed cleanup levels are approved the existing PAH concentrations will likely exceed the new cleanup levels. It would be prudent to consider addressing this issue prior to future changes in regulations. It would be prudent to discuss this issue with an environmental attorney.

In addition, analytical results indicated that trichloroethene was detected in concentrations above laboratory detection levels but below the Method C Cleanup levels in the groundwater beneath the paint/solvent storage building.

The analytical results of the dust wipe samples indicates that the dust may be a potential worker safety issue as well as a future disposal issue, if demolition or remodeling of existing structures occurs.

The Executive Summary is intended for introductory purposes only and should be used in conjunction with the full text of this report.

1.0 INTRODUCTION

1.1 General

This report presents the findings of ADaPT's Preliminary Phase II Environmental Site Assessment at the property located at 4425 South Third Avenue in Everett, Washington. Our work was performed in general accordance with our proposal, dated October 5, 1999 (ADaPT proposal No. 1510).

A Location/Topographic Map (Figure 1), and Site Plan (Figure 2) are attached at the end of the report.

1.2 Authorization

Written authorization to perform the work was given by Mr. Farhang Javid CEO of Acrowood Corporation (Acrowood) on October 18, 1999.

1.3 Scope and Purpose

The scope of the Preliminary Phase II consisted of two parts. The first part consisted of advancing up to 16 Geoprobe boreholes to a depth of approximately 12 to 22 feet below ground surface (bgs) in areas identified as potential environmental concerns in ADaPT's August 20, 1999 Phase I ESA. Representative soil, and groundwater samples would be collected from each boring for analytical testing. The second part consisted of collecting two wipe samples from the overhead rafters and beams in the foundry and machine areas of the main facility building.

The purpose of this assessment is to screen the soil and groundwater underlying the site, and the accumulated dust in the buildings, to better estimate the chemical and physical impacts of the past activities on the subject site.

1.4 Quality Assurance/Quality Control (QA/QC)

All sampling and testing was performed in general accordance with EPA and Washington Department of Ecology (Ecology) approved methodologies and generally accepted environmental practices.

1.5 Project Background

During ADaPT's preparation of the Phase I ESA research revealed that the site has been used as a iron and metal foundry since 1913. Historical information indicated that Sumner Iron Works used the subject site for metal and iron casting and molding from 1913 to approximately the early 1970s. The site was occupied by Black-Clawson-Sumner as a metal fabrication facility until 1984. The current occupant Acrowood has operated the site for metal fabrication of forestry industry equipment since 1984. ADaPT identified several recognized environmental concerns associated with past and present site operations that warranted a Preliminary Phase II ESA.

The following environmental concerns were targeted for additional assessment work during the Preliminary Phase II ESA:

- There is a potential for impact from the former UST located between the Maintenance Shop and the Store room east of the Machine Shop was reported removed in the late 1970s. No information was available on the removal or whether soil samples were collected from the excavation the two former gasoline USTs which were located at the southeast corner of the store. According to Mr. Hutmacher, no removal report was prepared and no soil sampling was conducted during the removal. In ADaPT's opinion, the former UST may represent a potential for subsurface soil contamination. An environmental impact from this UST cannot be discounted.

- The 1960 Sanborn Map depicts fuel oil tanks located on the east edge of the site adjacent to the steel shop. No information was obtained regarding the nature of the tanks. ADaPT believes that it would be prudent to further assess the potential for impact to subsurface soils from the area identified in the Sanborn Map.

- Based on waste notification documents and discussions with Acrowood personnel chlorinated and other solvents including tetrachloroethylene, 1,1,1-Trichloroethane, Methyl Ethyl Ketone, and mineral spirits were used prior to 1995 to clean parts and as paint thinners in the paint area. Based on ADaPT's professional experience with these types of solvents there is potential for impact to the subsurface soils if a release has occurred. ADaPT believes it would be prudent to further assess the potential for impacts to the subsurface soils beneath the paint area and beneath the paint storage area where these chemicals were reportedly stored.

- Field observations made along the eastern edge of the subject site appear to indicate that waste iron and slag was apparently disposed of on site. There is a potential for environmental impacts due to metals and waste casting materials. ADaPT believes it would be prudent to further assess the potential impact to subsurface soils from the waste metals and debris located along the eastern edge of the subject site.

- There is a low potential for impact to the subsurface soils from petroleum hydrocarbon and on-site chemical usage and releases to the ground surface which may be washed into the storm drain system during periods of precipitation. Stormwater drains past through the main building and discharge at the eastern edge of the subject site and have the potential to collect spills and releases from inside the building. Metal shavings and stained soil observed at the discharge pipe appear to indicate that petroleum hydrocarbons may have impacted the soil beneath the discharge pipe. ADaPT believes that it would be prudent to further assess the potential for impact to subsurface soils from the existing storm drain.

- Historical information indicates that the site was used as a metal and iron casting foundry for over 60 years. Based on typical industry operations practices, and ADaPT professional experience with other similar industries, there is a potential for environmental impacts due to use of solvents, PCBs, metals and petroleum hydrocarbons. ADaPT believes it would be prudent to further assess the potential for subsurface impacts to soils from operational activities associated with casting and molding metal work. In addition, it would be prudent to evaluate the possibility of heavy metal laden dust within the on-site structures.

2.0 PROCEDURES

2.1 Ground Penetrating Radar

Geo-Recon International was contracted to conduct a geophysical survey using a magnetometer and electromagnetic instruments to locate suspected the USTs and fuel tanks identified in the Phase I if still present.

2.2 Geoprobe Soil and Groundwater Sampling

This phase of work involved advancing 16 Geoprobe holes to a depth of approximately 12 to 22 feet below ground surface (bgs). The borings were advanced using a truck-mounted, direct push drill rig, owned and operated by Transglobal Environmental Geosciences Northwest, Inc. (TEG), under subcontract to our firm. All borings were supervised, sampled, and logged by an ADaPT scientist. The borings were located based on findings of ADaPT's Phase I, field observations, and site access. Figure 2, 3 and 4 shows the approximate locations of the borings, site boundaries, and other pertinent site features. Subsurface exploration and soil sampling procedures are described in Appendix A.

Soil samples were generally collected from continuous probing at approximate intervals of 0 to 4 feet, 4 to 8 feet, 8 to 12 feet, 12 to 16 feet, 16 to 20 feet and 20 to 22 feet bgs using a four foot long core soil sampler with a acetate liner which is pushed as the lead section of the tool string. Discrete soil samples were collected for each interval at significant lithologic changes and/or based on visual, olfactory or field screening data as determined by the on-site geologist. Soil samples were collected using a clean stainless steel, disposable trowel, or gloved hand and transferred to a clean 4-ounce glass jar with a Teflon® lined lid. The jar was filled minimizing headspace. The soil samples were stored in a cooler at approximately 4 degrees Celsius for transport to the project analytical laboratory. All samples were collected, stored and transported under standard Chain of Custody (COC) procedures. A completed COC form is presented in Appendix B.

All soil samples were field screened using a MiniRae 10.6ev Photoionization Detector (PID). Field screen samples were collected from the remaining soil in the sampled interval. A representative soil sample was placed in a Ziplock® type plastic bag and sealed. The sample was allowed to volatilize for at least 10 minutes prior to obtaining a reading. The PID tip was inserted in small hole poked in the bag just prior to reading. The highest PID reading observed was recorded on the boring log sheet as were any subjective olfactory impressions of the sample by the on site geologist.

2.4 Dust Wipe Sampling

This phase of the work involved the collection of two randomly collected dust wipe samples from the overhead beams and rafters in the foundry and machine areas of the main facility building. The sample areas were determined by accessibility of the beam and location relative to past operations.

The beams to be sampled were approximately 8-inches wide. In order to wipe a known area a 6-inch by 12-inch (0.5 square foot) template was constructed. The template was placed on the beam and the wipe was rubbed through the accumulated dust and ash to bare wood to cover the whole area of the template. A separate wipe area was required for each analytical method requested. Each sample area was to be analyzed for arsenic, cadmium, chromium and lead; polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) necessitating three separate wipe areas for each sampled area.

Each wipe was presoaked in hexane, and placed in a 4-ounce glass jar with a Teflon lined lid, by North Creek Analytical Laboratory. The wipe was removed from the jar just prior to wiping the outlined area and then replaced in the jar after wiping the outlined area. The wipe samples were stored in a cooler at approximately 4 degrees Celsius for transport to the project analytical laboratory. All samples were collected, stored and transported under standard Chain of Custody (COC) procedures. A completed COC form is presented in Appendix B.

3.0 RESULTS

3.1 Ground Penetrating Survey

The ground penetrating radar survey did not identify a UST in either the fuel tank area or in the former UST area adjacent to the receiving building. The ground penetrating radar report is presented in Appendix C.

3.2 Subsurface Conditions –Soil

3.2.1 Fuel Tanks Area

Soils encountered in the Geoprobe holes generally consisted of fill material consisting of loose to medium dense, dark brown, moist silty sand with occasional iron slag to a depth of 10 to 13 feet. Native soils consisting of medium dense, brown, medium to slightly gravelly sand to total depth of boring underlie the fill materials.

Soil samples collected from the boring P1 exhibited moderate to heavy petroleum staining and odor from approximately 5 feet to 15 feet below ground surface (bgs). Soil samples collected from P2 and P3 did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples ranged from 0.0 to 35 parts per million (ppm) in soil sample P1S4 at 12 to 13 feet bgs.

3.2.2 Former UST

Soils encountered in the Geoprobe holes generally consisted of loose to medium dense, brown, moist, sandy silt to a depth of approximately 3 to 4 feet bgs. A medium dense, brown, moist to wet silty to medium sand underlies the silt to a depth of approximately 11 to 13 feet bgs. In borings P9 and P10 a very stiff, brown, moist silt underlies the sand to the total depth of the borings.

Soil samples collected from borings P8 and P9 exhibited faint hydrocarbon odors from approximately 7.5 feet to 13 feet bgs and 9.5 to 12 feet bgs, respectively. Soil samples collected from P10 did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples ranged from 0.0 to 5 ppm in soil sample P9S3 at 9 feet bgs.

3.2.3 Paint/Solvent Storage Area

Soils encountered in the Geoprobe holes generally consisted of loose to medium dense, brown, moist sand to total depth of the borings P5, P6 and P7. A thin approximately 1 to 1.5 feet thick layer of silty sand and sandy silt were observed in P6 and P7 at approximately 8 feet bgs.

Soil samples collected from the three borings did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples were 0.0 ppm.

3.2.4 Stormwater Outflow

Soils encountered in the Geoprobe holes generally consisted of loose to medium dense, light to dark brown, moist clayey to gravelly sand to a depth of approximately 12 feet bgs. Underlying the sand is a hard, brown with orange mottles to gray silt to the total depth of boring.

Soil samples collected from P4 did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples were 0.0 ppm.

3.2.5 Southern Fill Area

Soils encountered in the Geoprobe holes generally consisted of fill material consisting of loose to medium dense, dark brown, moist silty sand with iron slag and debris to depths of 6 to 13 feet. Native soils consisting of medium dense, brown, medium sand to total depth of borings P13 P14, and P15 underlie the fill materials. In borings P11, P12 and P16 the sand is underlain by a stiff, moist, brown to gray with orange, brown or red mottling, silt to total depth of the three borings. The deeper areas of fill were observed along the eastern edge of the fill area and the thickness lessens towards the west. Debris encountered in the fill portion include glass and metal fragments.

Soil samples collected from the borings did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples were 0.0 ppm.

3.3 Subsurface Conditions- Groundwater

3.3.1 Fuel Tank Area

Groundwater was not encountered in borings P1, P2 and P3 to a depth of 22 feet.

3.3.2 Former UST

Groundwater was encountered in P9 at a depth of approximately 12 to 13 feet bgs. The groundwater sample collected from the boring did not exhibit obvious signs of environmental impact such as odors or a sheen. Groundwater was not encountered in P8 and P10 to a depth of approximately 12 feet.

3.3.3 Paint/Solvent Storage Area

Groundwater was encountered in P6 and P7 at a depth of approximately 9 feet bgs. The groundwater sample collected from the boring did not exhibit obvious signs of environmental impact such as odors or a sheen. Groundwater was not encountered in P5 located approximately 40 feet southwest of P6 and P7.

3.3.4 Stormwater Outflow

Groundwater was encountered in P4 at a depth of approximately 8 to 9 feet bgs. The groundwater sample collected from the boring did not exhibit obvious signs of environmental impact such as odors or a sheen.

3.3.5 Southern Fill Area

Groundwater was not encountered in any of the borings placed in the southern fill area.

3.4 Dust Wipe Samples

The beam sampled in the machine area had approximately ½ to 1-inch of dust on the upper surface. The beam sampled in the foundry area had approximately 1 to 1.5-inches of accumulated dust. The dust was dry and light brown to gray in color. No odors were noted while sampling.

4.0 QUANTITATIVE ANALYSES -

4.1 Quantitative Analyses - Soil

4.1.1 Fuel Tank Area

Three soil samples were submitted to North Creek Analytical laboratory for analytical testing. The soil samples were analyzed for petroleum hydrocarbon identification using WTPH-HCID. Preliminary analytical results indicated that two soil samples P1S4 and P3S3 taken at 16-feet and 12-feet bgs, respectively, had detectable levels of diesel and heavy oil. The soil sample P8S3 was reanalyzed using a more specific analytical method to obtain a quantitative result for comparison with appropriate cleanup standards. The soil sample was analyzed for diesel and heavy oil hydrocarbons using WTPH-Dx (diesel extended). In addition all three samples were analyzed for polynuclear aromatic hydrocarbons (PAHs) using EPA Method Gas Chromatograph/Mass Spectrometer (GC/MS) with Selected Ion Monitoring, and arsenic, cadmium, chromium, and lead using EPA Method 6000/7000 series. The analytical results have been summarized below in Table 1, and included in Appendix B.

Table 1 : Analytical Results Fuel Tanks: Soil

Sample				WTPH-HCID (mg/kg) (gasoline/diesel/heavy oil)	WTPH-Dx (mg/kg) diesel/heavy oil	EPA GC/MS SIM (PAHs) (mg/kg)	Metals (mg/kg)			
Sample ID	Date	Depth (ft)	PID (ppm)				As	Cd	Cr	Pb
P1S1	11/3/99	4	NA	--	--	--	--	--	--	--
P1S2	11/3/99	8	3	--	--	--	--	--	--	--
P1S3	11/3/99	12	22	--	--	--	--	--	--	--
P1S4	11/3/99	16	35	ND/DET/DET	**10,000/4010**	Acenaphthene-6.27 Acenaphtylene-1.21 Anthracene-6.94 ***Benzo (a) anthracene-4.62** ***Benzo (a) pyrene-1.53** ***Benzo (b) fluoranthene-0.745** ***Benzo (ghi) perylene-0.705** ***Benzo (k) fluoranthene-ND** ***Chrysene-7.01** ***Dibenz (a,h) anthracene-ND** Fluoranthene-2.86 Fluorene-7.88 ***Indeno (1,2,3-cd) pyrene-ND** Napthalene-11.8 Phenanthrene-28.2 Pyrene-11.3 (*=carcinogenic)	3.24	ND	36.5	3.60
P1S5	11/3/99	19	18	--	--	--	--	--	--	--
P1S6	11/3/99	22	7	ND/ND/ND	--	--	--	--	--	--
P2S1	11/3/99	4	0	--	--	--	--	--	--	--
P2S2	11/3/99	8	0	--	--	--	--	--	--	--
P2S3	11/3/99	12	0	ND/ND/ND	--	--	--	--	--	--
P2S4	11/3/99	16	0	--	--	--	--	--	--	--
P3S1	11/3/99	4	0	--	--	--	--	--	--	--

Table 1 : Analytical Results Fuel Tanks: Soil

Sample				WTPH-HCID (mg/kg) (gasoline/diesel/heavy oil)	WTPH-Dx (mg/kg) diesel/heavy oil	EPA GC/MS SIM (PAHs) (mg/kg)	Metals (mg/kg)			
Sample ID	Date	Depth (ft)	PID (ppm)				As	Cd	Cr	Pb
P3S2	11/3/99	8	0	--	--	--	--	--	--	--
P3S3	11/3/99	12	0	ND/ND/DET	134/**210**	--	--	--	--	--
P3PS4	11/3/99	16	0	--	--	--	--	--	--	--
MTCA Method A Industrial Clean up Level					200/200	Carcinogenic-20.0	200	10	500	1000

ND= not detected at the laboratory detection level of 50 mg/kg for diesel and 100 mg/kg heavy oil.
DET= analyte noted detected above laboratory detection levels.
--= not tested
As = arsenic; Cd = cadmium; Cr = Chromium; Pb = lead
Bolded values are above respective MTCA Method A Cleanup levels

Based on the analytical results diesel and heavy oil petroleum hydrocarbons were detected above the MTCA Method A Industrial Cleanup levels in Borings P1 and P3. Petroleum hydrocarbons were not detected above the standard laboratory detection levels in the soil sample from Boring P2. PAHs were detected in soil sample P1S4 at concentrations above laboratory detection levels but below the MTCA Method A Industrial Cleanup levels. Arsenic, chromium and lead were detected above the standard laboratory detection limits but below the MTCA Method A Industrial Cleanup levels in the soil sample, P1S4, from Boring P1. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.1.2 Former UST

Three soil sample were submitted to North Creek Analytical laboratory for analytical testing. The soil samples were analyzed for petroleum hydrocarbon identification using WTPH-HCID. Preliminary analytical results indicated that one sample P8S3 taken at 8.5 feet bgs had detectable levels of diesel and heavy oil. The soil sample P8S3 was reanalyzed using a more specific analytical method to obtain a quantitative result for comparison with appropriate cleanup standards. The soil sample was analyzed for diesel and heavy oil hydrocarbons using WTPH-Dx (diesel extended). The analytical results have been summarized below in Table 2, and included in Appendix B.

Table 2 : Analytical Results Former UST: Soil

Sample				WTPH-HCID (gasoline/diesel/heavy oil)	WTPH-Dx (mg/kg) diesel/heavy oil
Sample ID	Date	Depth (ft)	PID (ppm)		
P8S1	11/3/99	4	0	--	--
P8S2	11/4/99	8	0	--	--
P8S3	11/4/99	8.5	0	ND/DET/DET	**983/1920**
P8S4	11/4/99	12	0	--	--
P9S1	11/3/99	4	NA	--	--
P9S2	11/3/99	8	0	--	--
P9S3	11/3/99	12	0	ND/ND/ND	--
P10S1	11/3/99	4	0	--	--
P10S2	11/4/99	8	0	--	--
P10S3	11/4/99	12	NA	ND/ND/ND	--
MTCA Method A Industrial Clean up Level				100/200/200	200/200

ND= not detected at the laboratory detection level of 50 mg/kg for diesel and 100 mg/kg heavy oil.
DET= analyte noted detected above laboratory detection levels.
--= not tested
Bolded values are above respective MTCA Method A Cleanup levels

Based on the analytical results diesel and heavy oil petroleum hydrocarbons were detected above the MTCA Method A Industrial Cleanup levels in Boring P8. Petroleum hydrocarbons were not detected above the standard laboratory detection levels in the two soil samples from Borings P9 or P10. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.1.3 Paint/Solvent Storage Area

Three soil sample was submitted to North Creek Analytical laboratory for analytical testing. The soil samples were analyzed for petroleum hydrocarbon identification using WTPH-HCID, and HVOCs using EPA 8021B. The analytical results have been summarized below in Table 3, and included in Appendix B.

Table 3 : Analytical Results Paint Storage Area: Soil

Sample				WTPH-HCID (gasoline/diesel/heavy oil)	EPA 8021B (mg/kg)
Sample ID	Date	Depth (ft)	PID (ppm)		
P5S1	11/3/99	4	0	--	--
P5S2	11/3/99	8	0	ND/ND/ND	ND
P5S3	11/3/99	12	0	--	--
P6S1	11/3/99	4	0	--	--
P6S2	11/3/99	8	0	ND/ND/ND	ND
P6S3	11/3/99	12	0	--	--
P7S1	11/3/99	4	0	--	--
P7S2	11/3/99	8	0	ND/ND/ND	TCE-0.055
P7S3	11/3/99	12	0	--	--
MTCA Method A Industrial Clean up Level				100/200/200	0.5

ND= not detected at the laboratory detection level of 50 mg/kg for diesel and 100 mg/kg heavy oil.
DET= analyte noted detected above laboratory detection levels.
--= not tested
TCE= trichloroethene

Based on the analytical results trichloroethene was detected above the standard laboratory detection limits but below the MTCA Method A Industrial Cleanup levels in Boring P7 at approximately 8 feet bgs. Petroleum hydrocarbons were not detected above the standard laboratory detection levels in any of the three soil samples. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.1.4 Stormwater Outflow

One soil sample was submitted to North Creek Analytical laboratory. The soil sample was analyzed for arsenic, cadmium, chromium and lead using EPA Method 6000/7000, petroleum hydrocarbon identification using WTPH-HCID, and HVOCs using EPA 8021B. The analytical results have been summarized below in Table 4, and included in Appendix B.

Table 4 : Summary of Analytical Results Stormwater Outflow: Soil

Sample			WTPH-HCID (mg/kg) Gas/diesel/heavy oil	EPA 8021B (mg/kg)	Metals (mg/kg)			
Sample ID	Date	Depth (ft)			As	Cd	Cr	Pb
P4S3	11/3/99		ND/ND/ND	ND	3.67	ND	38.1	4.05
MTCA Method A Industrial Clean up Level			100/200/200	Various	200.0	10.0	500.0	1,000

ND= not detected above the standard laboratory detection level for listed method.
--= not tested
As = arsenic; Cd = cadmium; Cr = Chromium; Pb = lead.

Based on the analytical results arsenic, chromium and lead were detected above the standard laboratory detection limits but below the MTCA Method A Industrial Cleanup levels in the soil sample from the Boring P4. Petroleum hydrocarbons and HVOCs were not detected above the standard laboratory detection limits in the soil sample from Boring P4. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.1.5 Southern Fill Area

A total of 5 soil samples were analyzed by North Creek Analytical laboratory. The soil samples were analyzed for arsenic, cadmium, chromium and lead using EPA Method 6000/7000. The analytical results have been summarized below in Table 5, and included in Appendix B.

Table 5 : Analytical Results Fill Area: Soil

Sample				Metals (mg/kg)			
Sample ID	Date	Depth (ft)	PID (ppm)	Arsenic	Cadmium	Chromium	Lead
P11S1	11/4/99	2.8	NA	--	--	--	--
P11S2	11/4/99	8	NA	--	--	--	--
P11S3	11/4/99	15	NA	3.57	ND	44.4	3.56
P12S1	11/4/99	3.5	0	--	--	--	--
P12S2	11/4/99	10	NA	5.58	ND	60.3	6.80
P13S1	11/4/99	6	NA	--	--	--	--
P14S1	11/4/99	4-8	0	--	--	--	--

Table 5 : Analytical Results Fill Area: Soil

Sample				Metals (mg/kg)			
Sample ID	Date	Depth (ft)	PID (ppm)	Arsenic	Cadmium	Chromium	Lead
P14S2	11/4/99	11.5	0	4.04	ND	42.5	3.88
P15S1	11/4/99	3.5	NA	--	--	--	--
P15S2	11/4/99	7	NA	2.45	ND	28.5	2.26
P16S1	11/4/99	7.5	NA	--	--	--	--
P16S2	11/4/99	14	NA	3.31	ND	39.7	3.27
MTCA Method A Industrial Clean up Level				200	10	500	1,000

--= not tested
NA= not analyzed
ND= not detected above laboratory detection levels

Based on the analytical results arsenic, chromium and lead were detected above the standard laboratory detection limits but below the MTCA Method A Industrial Cleanup levels in all soil samples analyzed. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 4.

4.2 Quantitative Analyses - Groundwater

One groundwater sample was submitted to North Creek Analytical laboratory for analytical testing for petroleum hydrocarbon identification using NWTPH-HCID, arsenic, cadmium, chromium and lead using EPA 6000/7000 and halogenated volatile compounds using EPA 8021B. The analytical results have been summarized below in Table 6, and included in Appendix B.

Table 6 : Summary of Groundwater Analytical Results

Sample			WTPH-HCID (mg/l) Gas/diesel/heavy oil	EPA 8021B (µg/l)	Metals (µg/l)			
Sample ID	Date	Depth (ft)			As	Cd	Cr	Pb
P6W1	11/3/99	8.4-9	ND/ND/ND	TCE-**8.38**	2.44	ND	17.9	4.50
MTCA Method A Industrial Clean up Level			1000-total petroleum hydrocarbons	39.8[1]	5.0	5.0	50.0	5.0

ND= not detected at the laboratory detection level of oil.
TCE= Trichloroethene
Bolded values are above respective MTCA Method A Cleanup levels
[1] Cleanup level is MTCA Method C Cleanup level

Based on the results summarized in Table 6, trichloroethene was detected in the groundwater beneath the paint/solvent storage building above the laboratory detection levels but below MTCA Method C Cleanup levels in the analyzed groundwater sample from approximately 9-feet bgs. Arsenic, chromium and lead were detected above laboratory detection limits but below MTCA Method A Industrial cleanup levels. No petroleum hydrocarbons were detected above the laboratory detection levels in the analyzed groundwater sample. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.3 Quantitative Analyses – Dust Wipe Samples

Two dust wipe samples were submitted to North Creek Analytical laboratory for analytical testing for polychlorinated biphenyls using EPA-8082, arsenic, cadmium, chromium and lead using EPA 6000/7000 and polynuclear aromatic hydrocarbons using EPA GC/MS-SIM. The analytical results have been summarized below in Table 7, and included in Appendix B.

Table 7: Analytical Results: Dust Wipe Samples

Sample			EPA 8082 (ug/sqft)	PAHS (ug/sqft)	Metals (mg/kg)			
Sample ID	Date	Location			As	Cd	Cr	Pb
SW-1	11/4/99	Machine area	Arocolor 1262-56.8	Acenaphthene-ND Acenaphtylene-ND Anthracene-9.60 *Benzo (a) anthracene-108 *Benzo (a) pyrene-88.0 *Benzo (b) fluoranthene-304 *Benzo (ghi) perylene-130.4 *Benzo (k) fluoranthene-84.0 *Chrysene-286 *Dibenz (a,h) anthracene-39.2 Fluoranthene-146.0 Fluorene-ND *Indeno (1,2,3-cd) pyrene-136.8 Napthalene-ND Phenanthrene-49.6 Pyrene-135.2 (*=carcinogenic)	166	40.8	3,800	10,820
SW-2	11/4/99	Foundry Area	ND	Acenaphthene-12.0 Acenaphtylene-ND Anthracene-20.4 *Benzo (a) anthracene-384 *Benzo (a) pyrene-400 *Benzo (b) fluoranthene-746 *Benzo (ghi) perylene-508 *Benzo (k) fluoranthene-244 *Chrysene-536 *Dibenz (a,h) anthracene-152 Fluoranthene-634 Fluorene-ND *Indeno (1,2,3-cd) pyrene-514 Napthalene-20.0 Phenanthrene-138.4 Pyrene-570 (*=carcinogenic)	204	26.8	1,436	3,180

ND= not detected above the standard laboratory detection level for listed method.
As = arsenic; Cd = cadmium; Cr = chromium; Pb = lead.
Values are in micrograms per square foot-each wipe area was 0.5 square feet

Based on the results summarized in Table 7, arsenic, cadmium, chromium and lead were detected in both dust samples at significant concentrations. PAHs were also detected at high concentrations in both samples. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 5.

6.0 CONCLUSIONS

The Phase I revealed the presence of recognized environmental conditions (as defined by ASTM Practice E1527-97 and Preliminary Phase II ASTM Practice E 1903-97) associated with the subject site, that in ADaPT's professional opinion, have resulted in a release of hazardous substances or petroleum products to the subject site. In general, the findings discussed below suggest that observed environmental contamination impacts are relatively limited in aerial extent. Observed concentrations of contaminants appear localized in both soils and groundwater and do not at this point suggest widespread environmental problems for the subject site.

Based on the analytical results diesel, range and heavy oil range hydrocarbon have impacted soil beneath the subject site in two areas. The two areas are the former fuel tank area adjacent to the steel shop and the former UST adjacent to the receiving building. The site is currently used for industrial use with no changes planned. The diesel range and heavy oil range hydrocarbons were detected in the subsurface soils above the current MTCA Method A Industrial cleanup level of 200 mg/kg. Since the site is currently non-residential use, the levels of petroleum hydrocarbons would likely meet current Method "B" or "C" clean up levels which are health risk based. In addition, new proposed clean up levels for diesel and heavy oil range hydrocarbons are expected to increase the Method "A" industrial concentration to 2000 mg/kg when and if the new MTCA regulations are approved at the end of this year. Based on the new Method "A" cleanup standards only the soil sample from beneath the fuel tanks area would be above the new standard. Polynuclear aromatic hydrocarbons (PAHs) detected in the fuel tanks area are currently below the MTCA Method A Industrial cleanup level however, when the new proposed cleanup levels are approved the existing PAH concentrations will likely exceed the new cleanup levels. It would be prudent to consider addressing this issue prior to future changes in regulations. It would be prudent to discuss this issue with an environmental attorney.

In addition, analytical results indicated that trichloroethene was detected in concentrations above laboratory detection levels but below the Method C Cleanup levels in the groundwater beneath the paint/solvent storage building.

6.1 Fuel Tanks Area

Analytical results from borings placed in and around the suspected fuel tanks area indicate that there has been a release of petroleum hydrocarbons. Boring P1 had heavy staining and free product in the soil. In order to characterize the extent two additional borings (P2 and P3) were placed approximately 20 and 12 feet radial from P1 in two separate directions. Diesel and heavy oil hydrocarbons were detected in P3 but not in P2. Analytical results appeared to define the lateral extent to an area within 10 to 12 feet of P1. Vertical soil sampling delineated the vertical extent to between 4.5 feet and 16 feet below ground surface.

ADaPT believes it would be prudent to conduct additional assessment work and possibly removal activities to remove contaminated soil in the vicinity of Boring P1.

6.2 Former UST

Analytical results from borings placed in and around the former UST indicates that there has been a diesel release beneath the location of the former UST. Boring P8 had faint hydrocarbon odors and 983 ppm of diesel an d 1920 ppm of heavy oil hydrocarbons in the soil. In order to characterize the extent two additional borings were placed approximately 8 and 15 feet radial from P8 in along the footprint of the former UST. Analytical results appeared to define the lateral extent to an area within 8 to 10 feet of P8. Vertical soil sampling did not delineate the vertical extent.

ADaPT believes it would be prudent to conduct additional assessment to delineate the vertical extent of the impacted soil. Groundwater was not encountered in P8.

6.3 Paint Storage Area

Analytical results from borings placed in and around the Paint/Solvent Storage Building indicates that there has been a release of chlorinated solvents beneath the building to soil and groundwater. Boring P7 had 0.055 ppm of trichloroethene in soil and 8.38 ppb of trichloroethene in groundwater. Boring P6 and P5 did not exhibit any detectable concentrations of any chlorinated solvents.

ADaPT believes it would be prudent to conduct additional environmental assessment work to evaluate the condition of the groundwater and to evaluate potential soil release points.

6.4 Stormwater Outflow

Analytical results and field observations did not indicate that petroleum hydrocarbons, chlorinated solvents, or lead, arsenic, cadmium or chromium are present in the subsurface soils sampled and tested above MTCA Method A Industrial Cleanup levels, beneath the stormwater outflow area. In ADaPT's professional opinion, further Phase II Environmental Site Assessment work for the stormwater outflow is unwarranted at this time.

6.5 Southern Fill Area

The analytical results and field observations did not indicate that the fill soils and iron slag are impacting the underlying native soils with lead, arsenic, cadmium, chromium. In ADaPT's professional opinion, further Phase II Environmental Site Assessment work for the southern fill area is unwarranted at this time. It would be prudent to sample the fill slag and test by toxicity charateristics leaching procedures (TCLP) to document this assumption.

6.6 Dust

The analytical results and field observations indicate that the dust which appears to cover the top of the exposed beams/rafters and any flat area within the main building is a potential environmental concern. Levels of metals and PAHs are considered to have potential to be a worker safety and disposal issue. ADaPT believes it would be prudent to conduct air monitoring in the main building to evaluate the potential exposure to onsite workers.

7.0 CLOSURE

The results of the Preliminary Phase II do not appear to indicate that there are widespread environmental impacts on the subject site. However, the Preliminary Phase II did not collect or analysis soil or from all areas of the site only areas that appeared to have historical usage which might have the potential to impact the environment, and does not guarantee that additional areas, items or objects are not present on the subject site. This Preliminary Phase II was designed to evaluate the presence of environmental contamination existing in suspect areas of the site. More focused subsurface characterization work will be required to delineate the vertical and lateral extent of identified contaminated areas on the property. Care should be taken during any remodeling or redevelopment of the subject site and any observed environmental impacts should be assessed at that time.

8.0 LIMITATIONS

This report has been prepared to aid in the evaluation of the site and can be relied upon by Acrowood Corporation and their agents. Our conclusions and recommendations have been prepared in accordance with generally accepted professional engineering principles and practices. We make no other warranty, neither express nor implied. Our conclusions are based on results of field explorations in a limited portion of the subject site, and on our interpretation of analytical results. If conditions are encountered that appear different from those described in this report, we must be notified so we may review and verify or modify our recommendations.

ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

ADaPT Engineering, Inc.

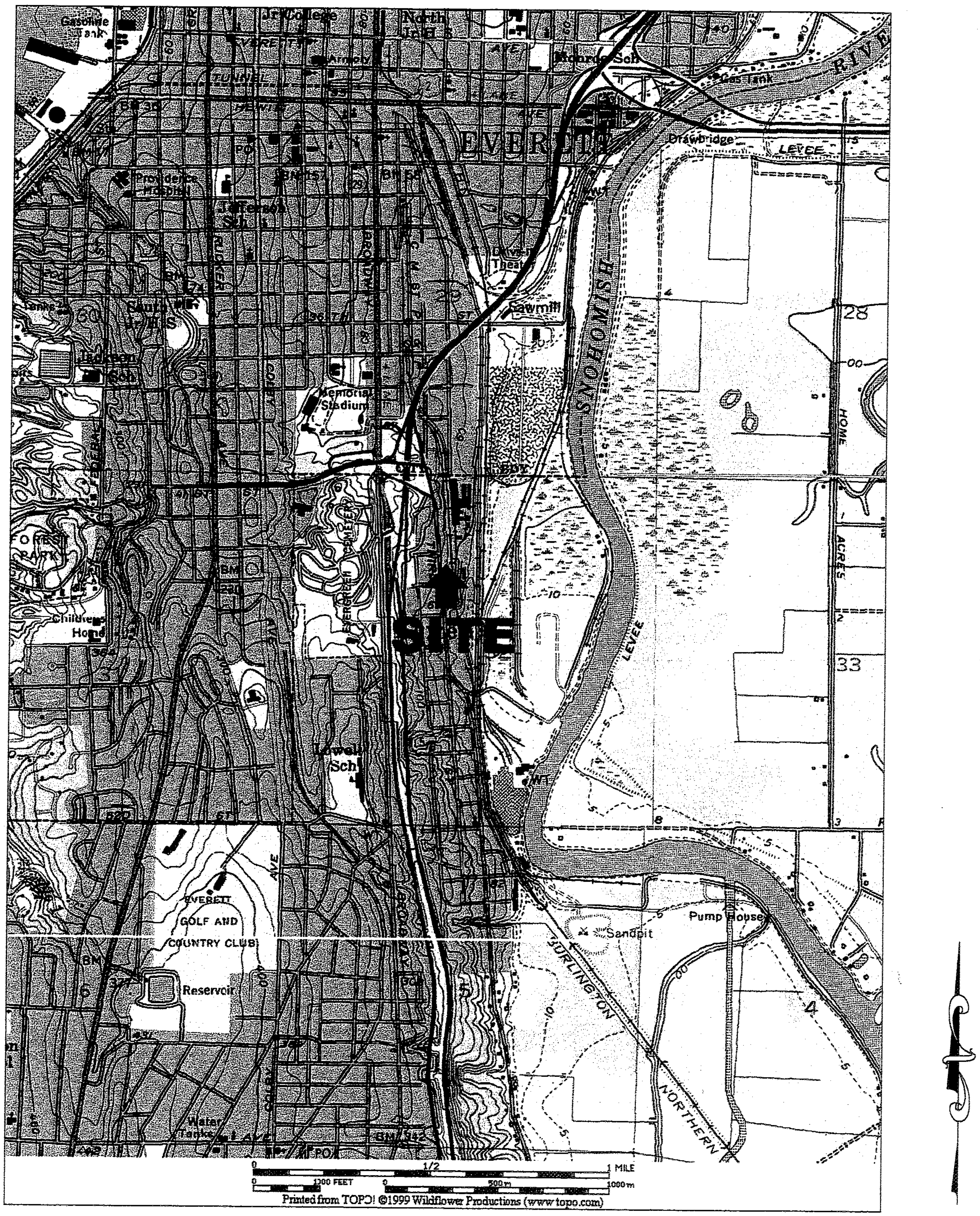
Keith A. Ross, P.G.,
Senior Environmental Manager
Environmental Services

Reviewed by:

(FOR)

Daryl S. Petrarca, R.E.A.
VP, Environmental Services Department

KAR/DSP/kar



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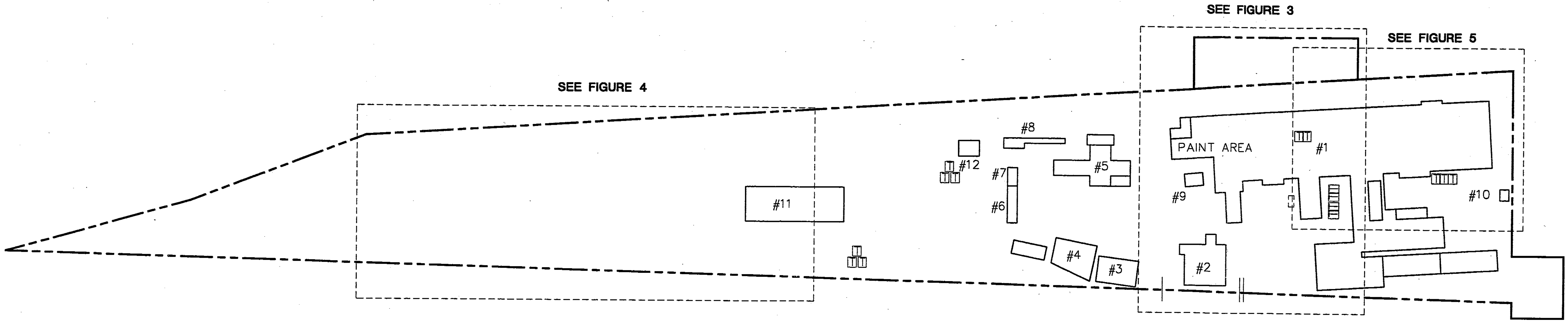
***ADaPT* Engineering, Inc.**

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

Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 1 - Location/Topographic Map

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/17/99 **Job # :** S-WA-99-2877



NOTES:

\# 1 BUILDING NUMBER REFER TO TABLE 1

⬚ REPORTED APPROXIMATE LOCATION OF FORMER UST

◫ TRANSFORMERS

| DISCHARGE PIPE ROOT DRAINS

‖ AIR COMPRESSOR DRAIN

NOT TO SCALE

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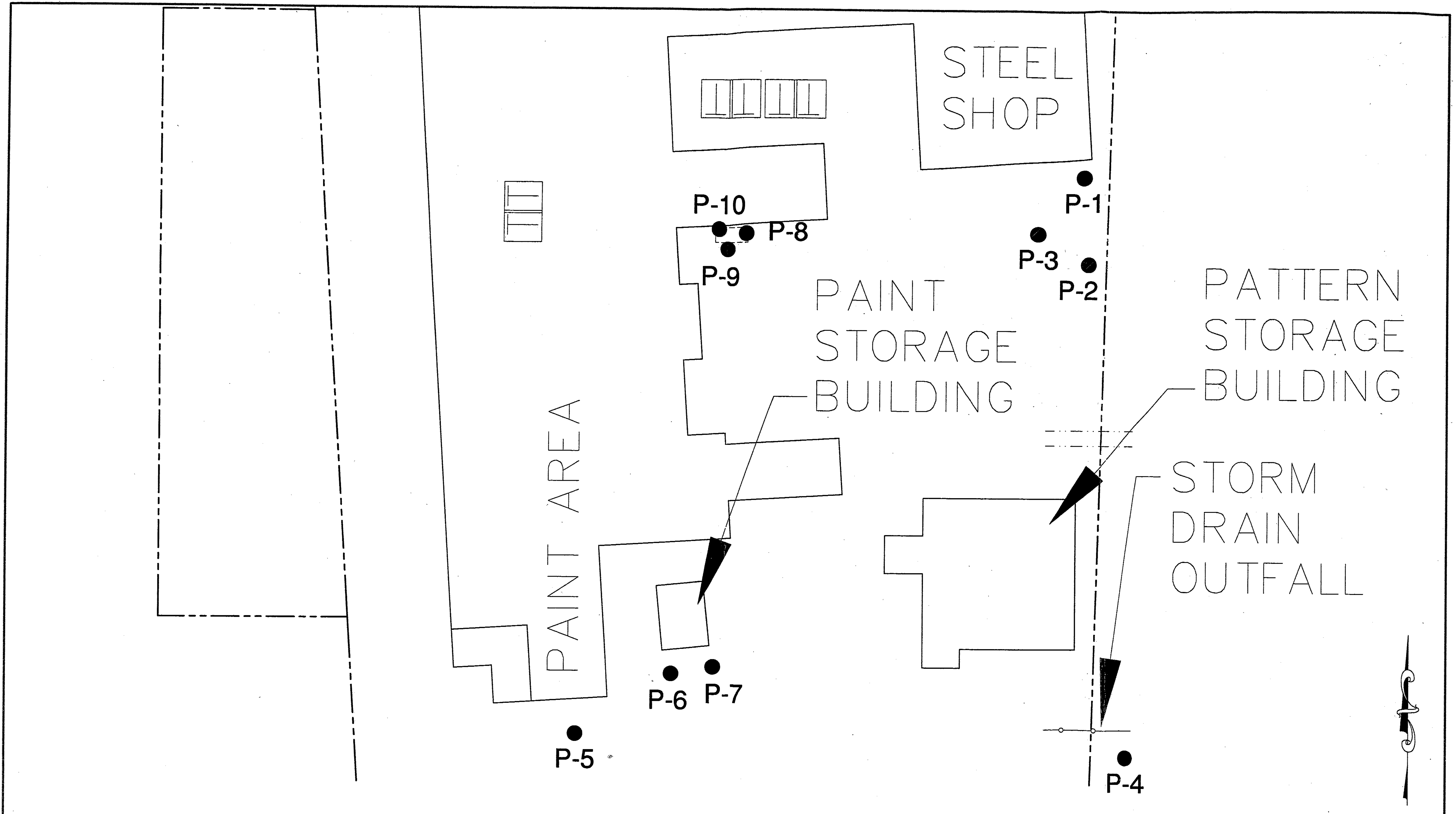
800 Maynard Avenue S., Suite 403
Seattle, Washington 98134
Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 2 - Site Plan

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/17/99
Job # :S-WA-99-2877



NOT TO SCALE

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FIGURE 3 - Center Area Detail

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 11/17/99 **Job # :**S-WA-99-2877

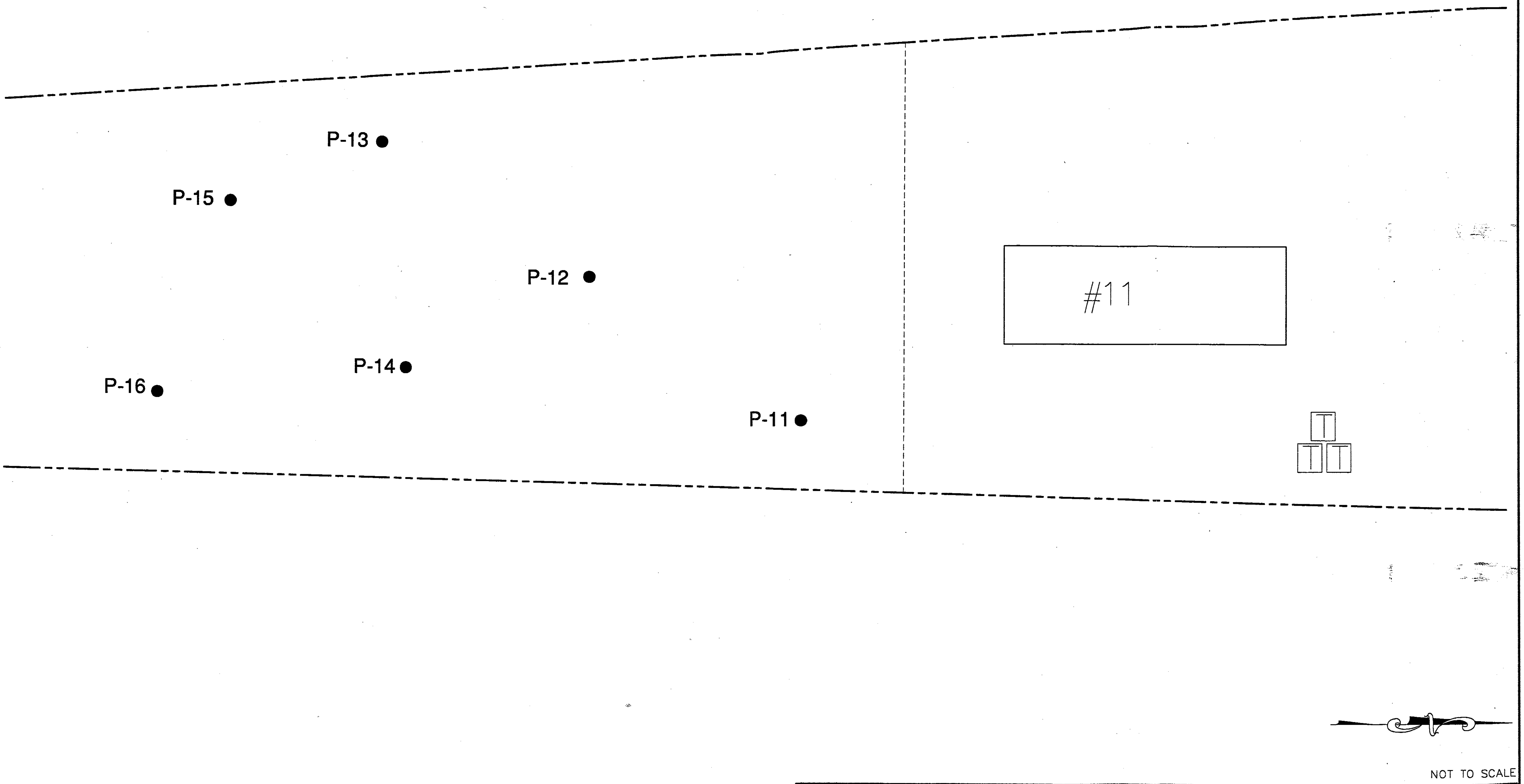

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FIGURE 4 - South Hill Area Detail

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 11/17/99 **Job #**S-WA-99-2877

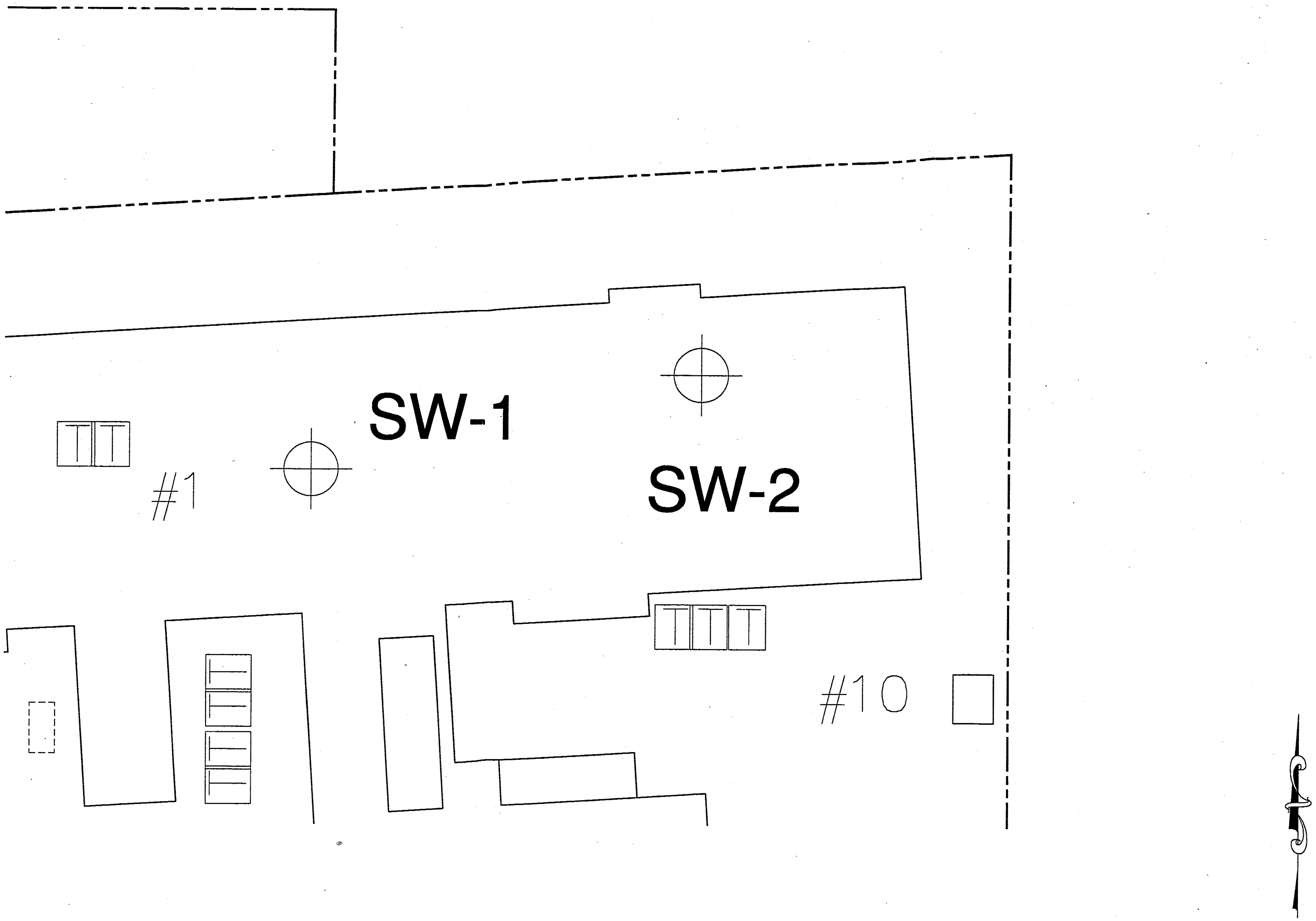

FIGURE 5 - Dust Wipe Samples

***ADaPT* Engineering, Inc.**

800 Maynard Avenue S., Suite 403
Seattle, Washington 98134
Ph : 206.654.7045 Fax : 206.654.7048

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 11/17/99 **Job #** :S-WA-99-2877

APPENDIX A

SUBSURFACE EXPLORATION PROCEDURES AND BORING LOGS

APPENDIX A

SUBSURFACE EXPLORATION PROCEDURES AND BORING LOGS

StrataProbe Borings/Hydropunch

The field exploration program conducted for this study consisted of advancing a series of 16 StrataProbe borings. The approximate locations are Illustrated on Figures 2, 3, & 4. These locations were obtained In the field by taping and pacing from existing site features.

The borings were advanced on November 3 and 4, 1999 by Transglobal Environmental Geosciences Northwest, Inc., a local exploration drilling company under subcontract to our firm. Each boring consisted of driving a 1.5-Inch outside diameter drill rod and attached sample barrel and probe tip with a truck-mounted drill rig. The drill rod was pushed to the desired sampling depth then the sample barrel was pushed three feet. Soil samples were generally obtained from 0-4 foot depth, 4-8 foot depth, 8-12 foot depth and 12-16 foot depth intervals. Borings were continuously observed and logged in the field by a geologist from our firm. Prior to each boring, the drilling equipment and sampling tools were decontaminated.

Characterization of Soil

Relatively undisturbed soil samples were collected at three foot intervals by using a three foot long 1.5-inch diameter split spoon sample barrel. The split spoon sample barrel was pushed to the desired depth and opened the sample barrel was then pushed into undisturbed soil at the bottom of the boring.

The soil samples were characterized by an experienced geologist from ADaPT. The samples were visually classified and screened using a photoionzation detector in the field.

Soil Sampling Procedures

The soil samples were removed at each interval using procedures designed to minimize the risk of cross contamination. Prior to each boring, the drilling equipment and sampling tools were scrubbed with a stiff brush and a solution of Liquinox (a phosphate free detergent) and water, and then rinsed with potable water and deionized water. The samples were classified and screened In the field, and Immediately transferred to laboratory-prepared glass jars, and tightly sealed with a Teflon-lined, threaded cap. Samples were stored and transported in a chilled-cooler throughout the field program. All retained soil samples were subsequently transferred to the chemical testing laboratory in accordance with ADaPT, chain-of-custody procedures.

Groundwater Sampling Procedures

Following completion of the boring a five foot temporary screen was installed in the boring and a1/4-inch ID polyethylene tubing inserted into the temporary well. The wells were then developed by pumping until relatively clear with a peristaltic pump.

Groundwater samples were obtained from each monitoring well for laboratory analysis using the peristaltic pump. Following sampling, recovered portions were immediately placed in laboratory-prepared glass jars and tightly sealed with Teflon-lined, threaded caps. The samples were stored and transported, as previously described under the section on soil sampling. The temporary well was removed after sampling and the boring backfilled with bentonite grout.

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-1

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose to medium dense, moist, dark brown, medium SAND; petroleum staining No odor		S-1					
5	Loose to medium dense, moist, dark brown, medium SAND; petroleum staining with occasional iron slag No odor		S-2		3			
			S-3		22			
10								
	Becomes silty, moist to wet, hydrocarbon odor		S-4		35			
15	Medium dense, moist, gray, silty SAND; petroleum staining, hydrocarbon odor							
	Dense, moist to wet, brown, SAND; faint odor		S-5		18			
20	Becomes slightly silty		S-6		7			
	Total depth 22 feet							
25								
30								

LEGEND

⊥	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⊥	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
✕	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/3/99
Drilling Completion Date : 11/3/99
Logged By : GSP

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ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-2

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose to medium dense, dense, moist, dark brown, SAND No odor		S-1		0			
			S-2		0			
5								
	Medium dense, moist, brown, medium SAND		S-3		0			
10								
	Becomes moist to wet; occasional fine gravel		S-4		0			
15								
	Total depth 16 feet							
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
✕	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Bor.log1

Page : 1 of 1

Drilling Start Date : 11/3/99

Drilling Completion Date : 11/3/99

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SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : **P-3**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose to medium dense, moist, dark brown, medium SAND; occasional iron slag and small debris		S-1					
			S-2		0			
5								
			S-3		0			
10	Medium dense, moist, brown with black mottles, silty SAND							
	Medium dense, moist, black, medium SAND		S-4					
	Medium dense, moist to wet, brown, slightly gravelly SAND							
15								
	Total depth 16 feet							
20								
25								
30								

LEGEND

- 2-inch O. D. Split-Spoon Sample
- 2" Geoprobe
- Sample not Recovered
- ▼ DATE Static Water Level at Drilling
- ▽ DATE Static Water Level
- ▼ DATE Perched Groundwater
- ▨ Grab Sample
- WTPH-D Ext. 8010 Type of Analytical Testing Used
- NR No Recovery
- ATD At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/3/99

Drilling Completion Date : 11/3/99

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ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-4

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose, moist, dark brown, gravelly silty SAND		S-1		0			
	Loose to medium dense, moist, light brown, fine gravelly SAND							
			S-2		0			
5	Become moist to wet							
	Medium dense, moist, brown, clayey SAND							
			S-3		0	▼	8-9'	
	Medium dense, wet, brown, silty SAND							
10								
	Becomes moist with occasional gravel							
	Hard, moist, brown with orange mottles, slightly sandy SILT		s-4					
	Hard, moist, gray, SILT							
15	Total depth 15 feet							
20								
25								
30								

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
I	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
X	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Bor-log1

Page : 1 of 1

Drilling Start Date : 11/3/99
Drilling Completion Date : 11/3/99
Logged By : GSP

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ADaPT Engineering, Inc.
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SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : **P-5**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	0-3" Asphalt 3" - 6" Sandy, gravelly road base Loose to medium dense, brown, medium SAND		S-1		0			
	Same with occasional orange mottles		S-2					
5					0			
			S-3		0			
10	Becomes moist to wet							
	Total depth 12 feet							
15								
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
✕	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/3/99

Drilling Completion Date : 11/3/99

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ADaPT Engineering, Inc.
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TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-6

Elevation Reference : N/A
Ground Surface Elevation : N/A

Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose, moist, dark brown, sandy, silty GRAVEL		S-1					
	Loose, moist, brown, SAND							
			S-2					
5					0			
	Stiff, brown, sandy SILT and silty SAND		S-3					
	Medium dense, wet, brown, SAND					▼ 11/3 1999	9'	
10								
	Total depth 12 feet							
15								
20								
25								
30								

LEGEND

I	2-Inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
I	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
X	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/3/99
Drilling Completion Date : 11/3/99
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ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-7

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose, moist, dark brown, sandy silty GRAVEL		S-1					
	Loose, moist, brown with occasional orange mottles, SAND							
5			S-2		0			
	Medium dense, moist, brown, sandy SILT and silty SAND		S-3			▼ 11/3 1999		
	Medium dense, wet, SAND							
10								
	Total depth 12 feet							
15								
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
☒	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/3/99

Drilling Completion Date : 11/3/99

Logged By : GSP

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ADaPT Engineering, Inc.
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TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-8

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Asphalt and gravel road base		S-1					
	Soft, moist, brown, sandy SILT							
	Loose, moist, gray, SAND							
	Medium dense, moist, brown, silty SAND		S-2					
5					0			
	Medium dense, moist, brown, medium SAND		S-3					
10	Medium dense, moist to wet, brown, silty SAND; Hydrocarbon odor							
	Total depth 12 feet							
15								
20								
25								
30								

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
I	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
╳	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/3/99

Drilling Completion Date : 11/4/99

Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-9

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Asphalt and gravel road base		S-1					
	Loose to medium dense, moist, brown sandy SILT and silty SAND							
	Medium dense, moist, brown, SAND		S-2					
5								
	Medium stiff, moist, brown, sand SILT; Faint hydrocarbon odor		S-3		5			
10								
	Medium dense, moist to wet, brown, silty SAND; Faint hydrocarbon odor		S-4			▼	12-13'	
	Very stiff, moist, brown, SILT							
15	Total depth 15 feet							
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
✕	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Bor-log1

Page : 1 of 1

Drilling Start Date : 11/3/99
Drilling Completion Date : 11/3/99
Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : **P-10**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Asphalt and gravel road base		S-1					
	Loose to medium dense, moist, brown sandy SILT and silty SAND; occasional concrete debris							
	Medium dense, moist, brown, medium SAND with silty sand lense		S-2					
5	No odor							
10	Becomes moist to wet		S-3					
	Very stiff, moist, brown, SILT							
	Total depth 12 feet							
15								
20								
25								
30								

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
I	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
╳	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/4/99

Drilling Completion Date : 11/4/99

Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-11

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	0 - 6" Soft, moist, brown, gravelly, sandy SILT; roots		S-1		0			
	Loose, moist, black - brown, sandy GRAVEL							
	Loose, moist, brown, fine SAND							
	Iron SLAG							
	Medium dense, moist, varigated reddish-brown and black, gravelly SAND; occasional small debris (Fill)		S-2					
5					0			
			S-3					
10								
	Medium dense, moist, black, SAND		S-4					
	Medium dense, moist, brownish red, gravelly, silty SAND							
	Stiff, moist, brown with red mottles, SILT							
15								
			S-5					
20	Total depth 20 feet							
25								
30								

LEGEND

2-inch O. D. Split-Spoon Sample
2" Geoprobe
Sample not Recovered

▼ DATE Static Water Level at Drilling
▽ DATE Static Water Level
▼ Perched Groundwater

▨ Grab Sample
WTPH-D Ext. 8010 Type of Analytical Testing Used
NR No Recovery
ATD At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/4/99
Drilling Completion Date : 11/4/99
Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : **P-12**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	0 - 6" Soft, moist, brown, gravelly, sandy SILT, small roots		S-1					
	Loose to medium dense, moist, black SAND (Fill); occasional wood and small debris							
			S-2		0			
5								
			S-3					
10	Stiff, moist, gray-green with brown mottles, fine sandy SILT; occasional gravel							
	Total depth 12 feet							
15								
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	DATE ▽	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
✕	Sample not Recovered	DATE ▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Bor-log

Page : 1 of 1

Drilling Start Date : 11/4/99

Drilling Completion Date : 11/4/99

Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : **P-13**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	0 - 6" Soft, moist, brown, gravelly, sandy SILT; small roots Loose to medium dense, moist, black SAND (Fill)		S-1					
			S-2		0			
5	Medium dense, moist, brown, medium SAND							
			S-3		0			
10								
	Total depth 11.5 feet							
15								
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
⊠	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/4/99

Drilling Completion Date : 11/4/99

Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : P-14

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	0 - 3" Soft, moist, brown, sandy, gravelly SILT; small roots		S-1					
	Loose to medium dense, moist, black SAND; occasional large wood (Fill)							
			S-2					
5					0			
			S-3					
	Medium dense, moist, brown, SAND							
10								
	Total depth 12 feet							
15								
20								
25								
30								

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
I	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
╳	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/4/99
Drilling Completion Date : 11/4/99
Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : **P-15**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	0 - 6" Soft, moist, brown, sandy SILT; small roots Loose to medium dense, moist, black SAND; occasional wood (Fill)		S-1					
			S-2		~~8~~			
5								
	Medium dense, moist, brown, medium SAND							
	Total depth 8 feet							
10								
15								
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
╳	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/4/99
Drilling Completion Date : 11/4/99
Logged By : GSP

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877

Boring No. : **P-16**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	0 - 6" Loose, moist, brown, sandy, gravelly SILT; fine roots		S-1					
	Loose to medium dense, moist, black, SAND (Fill)							
			S-2					
5								
			S-3					
10								
			S-4					
	Very stiff, moist, brown with orange mottles, sandy SILT; occasional cobbles							
15								
	Total depth 16 feet							
20								
25								
30								

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
I	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
X	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 11/4/99

Drilling Completion Date : 11/4/99

Logged By : GSP

APPENDIX B

LABORATORY ANALYTICAL REPORT /CHAIN OF CUSTODY FORMS

nca™
www.ncalabs.com

Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

12 November, 1999

Keith Ross
ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle, WA 98134

RE: Acrowood

Enclosed are the results of analyses for samples received by the laboratory on 11/05/99 15:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kirk Gendron
Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/12/99 14:17

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SW-1	B9K0124-01	Wipe	11/04/99 09:46	11/05/99 15:15
SW-2	B9K0124-02	Wipe	11/04/99 10:00	11/05/99 15:15

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Kirk Gendron

Kirk Gendron, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/12/99 14:17

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-1 (B9K0124-01) Wipe	**Sampled: 11/04/99 09:46**	**Received: 11/05/99 15:15**							
Arsenic	**133**	0.250	ug/Wipe	1	9K10019	11/10/99	11/11/99	EPA 6010B	
Cadmium	**20.4**	0.00250	"	"	"	"	11/11/99	"	
Chromium	**1900**	0.0200	"	4	"	"	11/11/99	"	
Lead	**5910**	0.300	"	"	"	"	"	"	
SW-2 (B9K0124-02) Wipe	**Sampled: 11/04/99 10:00**	**Received: 11/05/99 15:15**							
Arsenic	**102**	0.250	ug/Wipe	1	9K10019	11/10/99	11/11/99	EPA 6010B	
Cadmium	**13.4**	0.00250	"	"	"	"	11/11/99	"	
Chromium	**718**	0.00500	"	"	"	"	11/11/99	"	
Lead	**1590**	0.0750	"	"	"	"	11/11/99	"	

North Creek Analytical - Bothell

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Kirk Gendron, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/12/99 14:17

Polychlorinated Biphenyls by EPA Method 8082
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-1 (B9K0124-01) Wipe Sampled: 11/04/99 09:46 Received: 11/05/99 15:15									
Aroclor 1016	ND	8.00	ug/Wipe	1	9K08002	11/08/99	11/10/99	EPA 8082	
Aroclor 1221	ND	8.00	"	"	"	"	"	"	
Aroclor 1232	ND	8.00	"	"	"	"	"	"	
Aroclor 1242	ND	8.00	"	"	"	"	"	"	
Aroclor 1248	ND	8.00	"	"	"	"	"	"	
Aroclor 1254	ND	8.00	"	"	"	"	"	"	
Aroclor 1260	ND	8.00	"	"	"	"	"	"	
Aroclor 1262	**28.4**	8.00	"	"	"	"	"	"	
Aroclor 1268	ND	8.00	"	"	"	"	"	"	
Surrogate: TCX		*113 %*	*40-130*		"	"	"	"	
Surrogate: Decachlorobiphenyl		*118 %*	*40-130*		"	"	"	"	
SW-2 (B9K0124-02) Wipe Sampled: 11/04/99 10:00 Received: 11/05/99 15:15									
Aroclor 1016	ND	8.00	ug/Wipe	1	9K08002	11/08/99	11/10/99	EPA 8082	
Aroclor 1221	ND	8.00	"	"	"	"	"	"	
Aroclor 1232	ND	8.00	"	"	"	"	"	"	
Aroclor 1242	ND	8.00	"	"	"	"	"	"	
Aroclor 1248	ND	8.00	"	"	"	"	"	"	
Aroclor 1254	ND	8.00	"	"	"	"	"	"	
Aroclor 1260	ND	8.00	"	"	"	"	"	"	
Aroclor 1262	ND	8.00	"	"	"	"	"	"	
Aroclor 1268	ND	8.00	"	"	"	"	"	"	
Surrogate: TCX		*73.5 %*	*40-130*		"	"	"	"	
Surrogate: Decachlorobiphenyl		*82.0 %*	*40-130*		"	"	"	"	

ADaPT Engineering, Inc. - Seattle	Project: Acrowood	
800 Maynard Avenue South, Suite 403	Project Number: WA99-2877	**Reported:**
Seattle WA, 98134	Project Manager: Keith Ross	11/12/99 14:17

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-1 (B9K0124-01) Wipe Sampled: 11/04/99 09:46 Received: 11/05/99 15:15									
Acenaphthene	ND	4.00	ug/Wipe	2	9K08040	11/08/99	11/10/99	GCMS-SIM	
Acenaphthylene	ND	4.00	"	"	"	"	"	"	
Anthracene	**4.80**	4.00	"	"	"	"	"	"	
Benzo (a) anthracene	**54.0**	4.00	"	"	"	"	"	"	
Benzo (a) pyrene	**44.0**	4.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	**152**	4.00	"	"	"	"	"	"	
Benzo (ghi) perylene	**65.2**	4.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	**42.0**	4.00	"	"	"	"	"	"	
Chrysene	**143**	4.00	"	"	"	"	"	"	
Dibenz (a,h) anthracene	**19.6**	4.00	"	"	"	"	"	"	
Fluoranthene	**73.2**	4.00	"	"	"	"	"	"	
Fluorene	ND	4.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	**68.4**	4.00	"	"	"	"	"	"	
Naphthalene	ND	4.00	"	"	"	"	"	"	
Phenanthrene	**24.8**	4.00	"	"	"	"	"	"	
Pyrene	**67.6**	4.00	"	"	"	"	"	"	
Surrogate: 2-FBP		*87.2 %*	*30-150*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*102 %*	*30-150*		"	"	"	"	
Surrogate: p-Terphenyl-d14		*87.2 %*	*30-150*		"	"	"	"	
SW-2 (B9K0124-02) Wipe Sampled: 11/04/99 10:00 Received: 11/05/99 15:15									
Acenaphthene	**6.00**	4.00	ug/Wipe	2	9K08040	11/08/99	11/10/99	GCMS-SIM	
Acenaphthylene	ND	4.00	"	"	"	"	"	"	
Anthracene	**10.4**	4.00	"	"	"	"	"	"	
Benzo (a) anthracene	**192**	4.00	"	"	"	"	"	"	
Benzo (a) pyrene	**200**	4.00	"	"	"	"	"	"	
Benzo (b) fluoranthene	**373**	4.00	"	"	"	"	"	"	
Benzo (ghi) perylene	**254**	4.00	"	"	"	"	"	"	
Benzo (k) fluoranthene	**122**	4.00	"	"	"	"	"	"	
Chrysene	**268**	4.00	"	"	"	"	"	"	
Dibenz (a,h) anthracene	**76.0**	4.00	"	"	"	"	"	"	
Fluoranthene	**317**	4.00	"	"	"	"	"	"	
Fluorene	ND	4.00	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	**257**	4.00	"	"	"	"	"	"	
Naphthalene	**10.0**	4.00	"	"	"	"	"	"	
Phenanthrene	**69.2**	4.00	"	"	"	"	"	"	
Pyrene	**285**	4.00	"	"	"	"	"	"	
Surrogate: 2-FBP		*114 %*	*30-150*		"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Kirk Gendron, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/12/99 14:17

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SW-2 (B9K0124-02) Wipe	**Sampled: 11/04/99 10:00**	**Received: 11/05/99 15:15**							
Surrogate: Nitrobenzene-d5		*112 %*	*30-150*		*9K08040*	*11/08/99*	*11/10/99*	*GCMS-SIM*	
Surrogate: p-Terphenyl-d14		*113 %*	*30-150*		*"*	*"*	*"*	*"*	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Kirk Gendron, Project Manager

Total Metals by EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K10019: Prepared 11/10/99 Using EPA 3050B										
Blank (9K10019-BLK1)										
Arsenic	0.297	0.250	ug/Wipe							
Cadmium	ND	0.00250	"							
Chromium	0.280	0.00500	"							
Lead	ND	0.0750	"							
LCS (9K10019-BS1)										
Arsenic	557	0.250	ug/Wipe	500		111	80-120			
Cadmium	534	0.00250	"	500		107	80-120			
Chromium	526	0.00500	"	500		105	80-120			
Lead	542	0.0750	"	500		108	80-120			
LCS Dup (9K10019-BSD1)										
Arsenic	536	0.250	ug/Wipe	500		107	80-120	3.84	20	
Cadmium	522	0.00250	"	500		104	80-120	2.27	20	
Chromium	522	0.00500	"	500		104	80-120	0.763	20	
Lead	526	0.0750	"	500		105	80-120	3.00	20	

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ADaPT Engineering, Inc. - Seattle 800 Maynard Avenue South, Suite 403 Seattle WA, 98134	Project: Acrowood Project Number: WA99-2877 Project Manager: Keith Ross	**Reported:** 11/12/99 14:17

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K08002: Prepared 11/08/99 Using EPA 3580A										
Blank (9K08002-BLK1)										
Aroclor 1016	ND	8.00	ug/Wipe							
Aroclor 1221	ND	8.00	"							
Aroclor 1232	ND	8.00	"							
Aroclor 1242	ND	8.00	"							
Aroclor 1248	ND	8.00	"							
Aroclor 1254	ND	8.00	"							
Aroclor 1260	ND	8.00	"							
Aroclor 1262	ND	8.00	"							
Aroclor 1268	ND	8.00	"							
Surrogate: TCX	*1.60*		*"*	*2.00*		*80.0*	*40-130*			
Surrogate: Decachlorobiphenyl	*1.54*		*"*	*2.00*		*77.0*	*40-130*			
LCS (9K08002-BS1)										
Aroclor 1260	8.57	8.00	ug/Wipe	10.0		85.7	52-140			
Surrogate: TCX	*1.66*		*"*	*2.00*		*83.0*	*40-130*			
Surrogate: Decachlorobiphenyl	*1.47*		*"*	*2.00*		*73.5*	*40-130*			
LCS Dup (9K08002-BSD1)										
Aroclor 1260	9.46	8.00	ug/Wipe	10.0		94.6	52-140	9.87	15	
Surrogate: TCX	*1.70*		*"*	*2.00*		*85.0*	*40-130*			
Surrogate: Decachlorobiphenyl	*1.60*		*"*	*2.00*		*80.0*	*40-130*			

North Creek Analytical - Bothell

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Kirk Gendron, Project Manager

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K08040: Prepared 11/08/99 Using EPA 3580A										
Blank (9K08040-BLK1)										
Acenaphthene	ND	2.00	ug/Wipe							
Acenaphthylene	ND	2.00	"							
Anthracene	ND	2.00	"							
Benzo (a) anthracene	ND	2.00	"							
Benzo (a) pyrene	ND	2.00	"							
Benzo (b) fluoranthene	ND	2.00	"							
Benzo (ghi) perylene	ND	2.00	"							
Benzo (k) fluoranthene	ND	2.00	"							
Chrysene	ND	2.00	"							
Dibenz (a,h) anthracene	ND	2.00	"							
Fluoranthene	ND	2.00	"							
Fluorene	ND	2.00	"							
Indeno (1,2,3-cd) pyrene	ND	2.00	"							
Naphthalene	ND	2.00	"							
Phenanthrene	ND	2.00	"							
Pyrene	ND	2.00	"							
Surrogate: 2-FBP	*39.4*		*"*	*50.0*		*78.8*	*30-150*			
Surrogate: Nitrobenzene-d5	*51.4*		*"*	*50.0*		*103*	*30-150*			
Surrogate: p-Terphenyl-d14	*48.4*		*"*	*50.0*		*96.8*	*30-150*			
LCS (9K08040-BS1)										
Chrysene	10.8	2.00	ug/Wipe	10.0		108	10-125			
Fluorene	9.60	2.00	"	10.0		96.0	11-116			
Indeno (1,2,3-cd) pyrene	11.4	2.00	"	10.0		114	10-147			
Surrogate: 2-FBP	*49.2*		*"*	*50.0*		*98.4*	*30-150*			
Surrogate: Nitrobenzene-d5	*55.4*		*"*	*50.0*		*111*	*30-150*			
Surrogate: p-Terphenyl-d14	*51.0*		*"*	*50.0*		*102*	*30-150*			

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Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K08040: Prepared 11/08/99 Using EPA 3580A										
LCS Dup (9K08040-BSD1)										
Chrysene	10.8	2.00	ug/Wipe	10.0		108	10-125	0	28	
Fluorene	9.00	2.00	"	10.0		90.0	11-116	6.45	32	
Indeno (1,2,3-cd) pyrene	10.4	2.00	"	10.0		104	10-147	9.17	34	
Surrogate: 2-FBP	*48.2*		"	*50.0*		*96.4*	*30-150*			
Surrogate: Nitrobenzene-d5	*53.8*		"	*50.0*		*108*	*30-150*			
Surrogate: p-Terphenyl-d14	*50.6*		"	*50.0*		*101*	*30-150*			

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Kirk Gendron, Project Manager

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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Kirk Gendron, Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network
www.ncalabs.com

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 (425) 420-9200 FAX 420-9210
East 11115 Montgomery, Suite B, Spokane, WA 98206-4776 (509) 924-9200 FAX 924-9290
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 FAX 906-9210
20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: B9K0124

CLIENT: ADaPT
REPORT TO: KEITH ROSS
ADDRESS: 803 MAYNARD AVE S. # 403
SEATTLE, WA 98134
PHONE: 206 654-7045 FAX: 654-7048
INVOICE TO:
P.O. NUMBER:
PROJECT NAME: ACRWOOD
PROJECT NUMBER: WA99-2877
SAMPLED BY: KEITH ROSS

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses
☒ 10 (STD.) ☐ 7 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1

Petroleum Hydrocarbon Analyses
☒ 5 (STD.) ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1

☐ OTHER Please Specify

**Turnaround Requests less than standard may incur Rush Charges.*

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	As Cd, Cr, Pb	PCBs	PAHs											MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1. SW-1	11/4/99 900	X	X	X											O	3	swipe samples	-1
2. SW-2	11/4/99 1000	X	X	X											O	3	swipe samples	-2
3. BLK																		-3
4.																		
5.																		
6.																		
7.																		
8.																		
9.																		
10.																		
11.																		
12.																		
13.																		
14.																		
15.																		

RELINQUISHED BY:
PRINT NAME: KEITH A. ROSS FIRM: ADaPT DATE: 11/5/99 TIME: 1410

RECEIVED BY: Sonny Vots
PRINT NAME: FIRM: NCA DATE: 11/5/99 TIME: 1410

RELINQUISHED BY: Sonny Tontz
PRINT NAME: PRANY TONTY FIRM: NCA DATE: 11/5/99 TIME: 1515

RECEIVED BY:
PRINT NAME: M Hutchinson FIRM: NCA DATE: 11-5-99 TIME: 1515

ADDITIONAL REMARKS:

TEMP:

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Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508
425.420.9200 fax 425.420.9210
Spokane East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
509.924.9200 fax 509.924.9290
Portland 9405 SW Nimbus Avenue, Beaverton, OR 97008-7132
503.906.9200 fax 503.906.9210
Bend 20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711
541.383.9310 fax 541.382.7588

19 November, 1999

Keith Ross
ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle, WA 98134

RE: Acrowood

Enclosed are the results of analyses for samples received by the laboratory on 11/05/99 15:15. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Kirk Gendron

Kirk Gendron
Project Manager

North Creek Analytical, Inc.
Environmental Laboratory Network

nca™
www.ncalabs.com

Seattle 18939 120th Avenue NE, Suite 101, Bothell, WA 98011-9508
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541.383.9310 fax 541.382.7588

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
P1S4	B9K0123-04	Soil	11/03/99 09:03	11/05/99 15:15
P1S6	B9K0123-06	Soil	11/03/99 09:41	11/05/99 15:15
P2S3	B9K0123-08	Soil	11/03/99 10:34	11/05/99 15:15
P3S3	B9K0123-12	Soil	11/03/99 11:06	11/05/99 15:15
P4S3	B9K0123-16	Soil	11/03/99 11:48	11/05/99 15:15
P5S2	B9K0123-19	Soil	11/03/99 12:44	11/05/99 15:15
P6S2	B9K0123-21	Soil	11/03/99 13:15	11/05/99 15:15
P7S2	B9K0123-24	Soil	11/03/99 14:00	11/05/99 15:15
P8S3	B9K0123-28	Soil	11/03/99 09:00	11/05/99 15:15
P9S3	B9K0123-32	Soil	11/03/99 15:43	11/05/99 15:15
P10S3	B9K0123-35	Soil	11/04/99 09:40	11/05/99 15:15
P11S3	B9K0123-38	Soil	11/04/99 10:43	11/05/99 15:15
P12S2	B9K0123-40	Soil	11/04/99 11:10	11/05/99 15:15
P14S2	B9K0123-43	Soil	11/04/99 11:58	11/05/99 15:15
P15S2	B9K0123-45	Soil	11/04/99 13:30	11/05/99 15:15
P16S2	B9K0123-47	Soil	11/04/99 13:46	11/05/99 15:15
P6W1	B9K0123-48	Water	11/03/99 13:40	11/05/99 15:15

North Creek Analytical - Bothell

Kirk Gendron, Project Manager

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ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Hydrocarbon Identification by Washington DOE Method WTPH-HCID

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P1S4 (B9K0123-04) Soil	**Sampled: 11/03/99 09:03**	**Received: 11/05/99 15:15**							
Gasoline Range Hydrocarbons	ND	60.0	mg/kg dry	3	9K08004	11/08/99	11/12/99	WTPH-HCID	
Diesel Range Hydrocarbons	**DET**	150	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	**DET**	300	"	"	"	"	"	"	
Surrogate: 2-FBP		*119 %*	*50-150*		"	"	"	"	
P1S6 (B9K0123-06) Soil	**Sampled: 11/03/99 09:41**	**Received: 11/05/99 15:15**							
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K08004	11/08/99	11/12/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*104 %*	*50-150*		"	"	"	"	
P2S3 (B9K0123-08) Soil	**Sampled: 11/03/99 10:34**	**Received: 11/05/99 15:15**							
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K08004	11/08/99	11/12/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*99.1 %*	*50-150*		"	"	"	"	
P3S3 (B9K0123-12) Soil	**Sampled: 11/03/99 11:06**	**Received: 11/05/99 15:15**							
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K08004	11/08/99	11/12/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	**DET**	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*122 %*	*50-150*		"	"	"	"	
P4S3 (B9K0123-16) Soil	**Sampled: 11/03/99 11:48**	**Received: 11/05/99 15:15**							
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K09013	11/09/99	11/11/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*102 %*	*50-150*		"	"	"	"	

North Creek Analytical - Bothell

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Kirk Gendron, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Hydrocarbon Identification by Washington DOE Method WTPH-HCID
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P5S2 (B9K0123-19) Soil Sampled: 11/03/99 12:44 Received: 11/05/99 15:15									
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K09013	11/09/99	11/11/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*110 %*	*50-150*		"	"	"	"	
P6S2 (B9K0123-21) Soil Sampled: 11/03/99 13:15 Received: 11/05/99 15:15									
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K09013	11/09/99	11/11/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*51.7 %*	*50-150*		"	"	"	"	
P7S2 (B9K0123-24) Soil Sampled: 11/03/99 14:00 Received: 11/05/99 15:15									
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K09013	11/09/99	11/11/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*96.6 %*	*50-150*		"	"	"	"	
P8S3 (B9K0123-28) Soil Sampled: 11/03/99 09:00 Received: 11/05/99 15:15									
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K08004	11/08/99	11/12/99	WTPH-HCID	
Diesel Range Hydrocarbons	**DET**	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	**DET**	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*96.1 %*	*50-150*		"	"	"	"	
P9S3 (B9K0123-32) Soil Sampled: 11/03/99 15:43 Received: 11/05/99 15:15									
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K08004	11/08/99	11/12/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*108 %*	*50-150*		"	"	"	"	

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Hydrocarbon Identification by Washington DOE Method WTPH-HCID

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P10S3 (B9K0123-35) Soil Sampled: 11/04/99 09:40 Received: 11/05/99 15:15									
Gasoline Range Hydrocarbons	ND	20.0	mg/kg dry	1	9K08004	11/08/99	11/12/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	50.0	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	100	"	"	"	"	"	"	
Surrogate: 2-FBP		*107 %*	*50-150*		"	"	"	"	
P6W1 (B9K0123-48) Water Sampled: 11/03/99 13:40 Received: 11/05/99 15:15									
Gasoline Range Hydrocarbons	ND	0.376	mg/l	1	9K08003	11/08/99	11/10/99	WTPH-HCID	
Diesel Range Hydrocarbons	ND	0.947	"	"	"	"	"	"	
Heavy Oil Range Hydrocarbons	ND	0.947	"	"	"	"	"	"	
Surrogate: 2-FBP		*86.9 %*	*50-150*		"	"	"	"	

North Creek Analytical - Bothell

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Kirk Gendron, Project Manager

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended)

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P1S4 (B9K0123-04) Soil Sampled: 11/03/99 09:03 Received: 11/05/99 15:15									
Diesel Range Hydrocarbons	**10000**	210	mg/kg dry	21	9K16006	11/16/99	11/16/99	WTPH-D	
Heavy Oil Range Hydrocarbons	**4010**	525	"	"	"	"	"	"	
Surrogate: 2-FBP		*94.3 %*	*50-150*		"	"	"	"	
P3S3 (B9K0123-12) Soil Sampled: 11/03/99 11:06 Received: 11/05/99 15:15									
Diesel Range Hydrocarbons	**134**	10.0	mg/kg dry	1	9K16006	11/16/99	11/17/99	WTPH-D	
Heavy Oil Range Hydrocarbons	**210**	25.0	"	"	"	"	"	"	
Surrogate: 2-FBP		*83.1 %*	*50-150*		"	"	"	"	
P8S3 (B9K0123-28) Soil Sampled: 11/03/99 09:00 Received: 11/05/99 15:15									
Diesel Range Hydrocarbons	**983**	30.0	mg/kg dry	3	9K16006	11/16/99	11/17/99	WTPH-D	
Heavy Oil Range Hydrocarbons	**1920**	75.0	"	"	"	"	"	"	
Surrogate: 2-FBP		*103 %*	*50-150*		"	"	"	"	

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Total Metals by EPA 6000/7000 Series Methods

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P1S4 (B9K0123-04) Soil	**Sampled: 11/03/99 09:03**	**Received: 11/05/99 15:15**							
Arsenic	**3.24**	0.403	mg/kg dry	1	9K08031	11/08/99	11/09/99	EPA 6020	
Cadmium	ND	0.403	"	"	"	"	"	"	
Chromium	**36.5**	0.403	"	"	"	"	"	"	
Lead	**3.00**	0.403	"	"	"	"	"	"	
P4S3 (B9K0123-16) Soil	**Sampled: 11/03/99 11:48**	**Received: 11/05/99 15:15**							
Arsenic	**3.67**	0.403	mg/kg dry	1	9K16015	11/16/99	11/18/99	EPA 6020	
Cadmium	ND	0.403	"	"	"	"	"	"	
Chromium	**38.1**	0.403	"	"	"	"	"	"	
Lead	**4.05**	0.403	"	"	"	"	"	"	
P11S3 (B9K0123-38) Soil	**Sampled: 11/04/99 10:43**	**Received: 11/05/99 15:15**							
Arsenic	**3.57**	0.427	mg/kg dry	1	9K08031	11/08/99	11/09/99	EPA 6020	
Cadmium	ND	0.427	"	"	"	"	"	"	
Chromium	**44.4**	0.427	"	"	"	"	"	"	
Lead	**3.56**	0.427	"	"	"	"	"	"	
P12S2 (B9K0123-40) Soil	**Sampled: 11/04/99 11:10**	**Received: 11/05/99 15:15**							
Arsenic	**5.58**	0.400	mg/kg dry	1	9K08031	11/08/99	11/09/99	EPA 6020	
Cadmium	ND	0.400	"	"	"	"	"	"	
Chromium	**60.3**	0.400	"	"	"	"	"	"	
Lead	**6.80**	0.400	"	"	"	"	"	"	
P14S2 (B9K0123-43) Soil	**Sampled: 11/04/99 11:58**	**Received: 11/05/99 15:15**							
Arsenic	**4.04**	0.357	~~mg/kg dry~~	1	9K08031	11/08/99	11/09/99	EPA 6020	
Cadmium	ND	0.357	"	"	"	"	"	"	
Chromium	**42.5**	0.357	"	"	"	"	"	"	
Lead	**3.88**	0.357	"	"	"	"	"	"	

Total Metals by EPA 6000/7000 Series Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P15S2 (B9K0123-45) Soil	**Sampled: 11/04/99 13:30**	**Received: 11/05/99 15:15**							
Arsenic	**2.45**	0.360	mg/kg dry	1	9K08031	11/08/99	11/09/99	EPA 6020	
Cadmium	ND	0.360	"	"	"	"	"	"	
Chromium	**28.5**	0.360	"	"	"	"	"	"	
Lead	**2.26**	0.360	"	"	"	"	"	"	
P16S2 (B9K0123-47) Soil	**Sampled: 11/04/99 13:46**	**Received: 11/05/99 15:15**							
Arsenic	**3.31**	0.312	mg/kg dry	1	9K08031	11/08/99	11/09/99	EPA 6020	
Cadmium	ND	0.312	"	"	"	"	"	"	
Chromium	**39.7**	0.312	"	"	"	"	"	"	
Lead	**3.27**	0.312	"	"	"	"	"	"	
P6W1 (B9K0123-48) Water	**Sampled: 11/03/99 13:40**	**Received: 11/05/99 15:15**							
Arsenic	**0.00244**	0.00100	mg/l	1	9K09002	11/09/99	11/11/99	EPA 6020	
Cadmium	ND	0.00100	"	"	"	"	"	"	
Chromium	**0.0179**	0.00100	"	"	"	"	"	"	
Lead	**0.00450**	0.00100	"	"	"	"	"	"	

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Halogenated Volatile Organics by EPA Method 8021B (modified)
North Creek Analytical - Bothell

P4S3 (B9K0123-16) Soil Sampled: 11/03/99 11:48 Received: 11/05/99 15:15

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Bromodichloromethane	ND	0.0500	mg/kg dry	1	9K16029	11/16/99	11/16/99	EPA 8021B	
Bromoform	ND	0.0500	"	"	"	"	"	"	
Bromomethane	ND	0.0500	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.0500	"	"	"	"	"	"	
Chlorobenzene	ND	0.0500	"	"	"	"	"	"	
Chloroethane	ND	0.0500	"	"	"	"	"	"	
Chloroform	ND	0.0500	"	"	"	"	"	"	
Chloromethane	ND	0.0500	"	"	"	"	"	"	
Dibromochloromethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.0500	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
Methylene chloride	ND	0.500	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.0500	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0500	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
Trichloroethene	ND	0.0500	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.0500	"	"	"	"	"	"	
Vinyl chloride	ND	0.0500	"	"	"	"	"	"	
Surrogate: 4-BFB (ELCD)		*118 %*	*50-150*		"	"	"	"	

North Creek Analytical - Bothell

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Kirk Gendron, Project Manager

Halogenated Volatile Organics by EPA Method 8021B (modified)

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P5S2 (B9K0123-19) Soil	**Sampled: 11/03/99 12:44**	**Received: 11/05/99 15:15**							
Bromodichloromethane	ND	0.0500	mg/kg dry	1	9K16029	11/16/99	11/16/99	EPA 8021B	
Bromoform	ND	0.0500	"	"	"	"	"	"	
Bromomethane	ND	0.0500	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.0500	"	"	"	"	"	"	
Chlorobenzene	ND	0.0500	"	"	"	"	"	"	
Chloroethane	ND	0.0500	"	"	"	"	"	"	
Chloroform	ND	0.0500	"	"	"	"	"	"	
Chloromethane	ND	0.0500	"	"	"	"	"	"	
Dibromochloromethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.0500	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
Methylene chloride	ND	0.500	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.0500	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0500	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
Trichloroethene	ND	0.0500	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.0500	"	"	"	"	"	"	
Vinyl chloride	ND	0.0500	"	"	"	"	"	"	
Surrogate: 4-BFB (ELCD)		*126 %*	*50-150*		*"*	*"*	*"*	*"*	

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Kirk Gendron, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Halogenated Volatile Organics by EPA Method 8021B (modified)

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P6S2 (B9K0123-21) Soil	**Sampled: 11/03/99 13:15**		**Received: 11/05/99 15:15**						
Bromodichloromethane	ND	0.0500	mg/kg dry	1	9K16029	11/16/99	11/16/99	EPA 8021B	
Bromoform	ND	0.0500	"	"	"	"	"	"	
Bromomethane	ND	0.0500	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.0500	"	"	"	"	"	"	
Chlorobenzene	ND	0.0500	"	"	"	"	"	"	
Chloroethane	ND	0.0500	"	"	"	"	"	"	
Chloroform	ND	0.0500	"	"	"	"	"	"	
Chloromethane	ND	0.0500	"	"	"	"	"	"	
Dibromochloromethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.0500	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
Methylene chloride	ND	0.500	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.0500	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0500	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
Trichloroethene	ND	0.0500	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.0500	"	"	"	"	"	"	
Vinyl chloride	ND	0.0500	"	"	"	"	"	"	
Surrogate: 4-BFB (ELCD)		*120 %*	*50-150*		*"*	*"*	*"*	*"*	

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Kirk Gendron, Project Manager

ADaPT Engineering, Inc. - Seattle	Project: Acrowood	
800 Maynard Avenue South, Suite 403	Project Number: WA99-2877	**Reported:**
Seattle WA, 98134	Project Manager: Keith Ross	11/19/99 14:30

Halogenated Volatile Organics by EPA Method 8021B (modified)

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P7S2 (B9K0123-24) Soil	**Sampled: 11/03/99 14:00**	**Received: 11/05/99 15:15**							
Bromodichloromethane	ND	0.0500	mg/kg dry	1	9K16029	11/16/99	11/16/99	EPA 8021B	
Bromoform	ND	0.0500	"	"	"	"	"	"	
Bromomethane	ND	0.0500	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.0500	"	"	"	"	"	"	
Chlorobenzene	ND	0.0500	"	"	"	"	"	"	
Chloroethane	ND	0.0500	"	"	"	"	"	"	
Chloroform	ND	0.0500	"	"	"	"	"	"	
Chloromethane	ND	0.0500	"	"	"	"	"	"	
Dibromochloromethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.0500	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.0500	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.0500	"	"	"	"	"	"	
Methylene chloride	ND	0.500	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.0500	"	"	"	"	"	"	
Tetrachloroethene	ND	0.0500	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.0500	"	"	"	"	"	"	
Trichloroethene	**0.0550**	0.0500	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.0500	"	"	"	"	"	"	
Vinyl chloride	ND	0.0500	"	"	"	"	"	"	
Surrogate: 4-BFB (ELCD)		*116 %*	*50-150*		"	"	"	"	

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ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Halogenated Volatile Organics by EPA Method 8021B (modified)

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P6W1 (B9K0123-48) Water Sampled: 11/03/99 13:40 Received: 11/05/99 15:15									
Bromodichloromethane	ND	1.00	ug/l	1	9K15047	11/15/99	11/16/99	EPA 8021B	
Bromoform	ND	1.00	"	"	"	"	"	"	
Bromomethane	ND	1.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	1.00	"	"	"	"	"	"	
Chlorobenzene	ND	1.00	"	"	"	"	"	"	
Chloroethane	ND	1.00	"	"	"	"	"	"	
Chloroform	ND	1.00	"	"	"	"	"	"	
Chloromethane	ND	1.00	"	"	"	"	"	"	
Dibromochloromethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	1.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	1.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	1.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	1.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	1.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	1.00	"	"	"	"	"	"	
Tetrachloroethene	ND	1.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	1.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	1.00	"	"	"	"	"	"	
Trichloroethene	**8.38**	1.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	1.00	"	"	"	"	"	"	
Vinyl chloride	ND	1.00	"	"	"	"	"	"	
Surrogate: 4-BFB (ELCD)		*118 %*	*50-150*		"	"	"	"	

North Creek Analytical - Bothell

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Kirk Gendron, Project Manager

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P1S4 (B9K0123-04) Soil	**Sampled: 11/03/99 09:03**	**Received: 11/05/99 15:15**							
Acenaphthene	**6.27**	0.500	mg/kg dry	50	9K08025	11/08/99	11/09/99	GCMS-SIM	
Acenaphthylene	**1.21**	0.500	"	"	"	"	"	"	
Anthracene	**6.94**	0.500	"	"	"	"	"	"	
Benzo (a) anthracene	**4.62**	0.500	"	"	"	"	"	"	
Benzo (a) pyrene	**1.53**	0.500	"	"	"	"	"	"	
Benzo (b) fluoranthene	**0.745**	0.500	"	"	"	"	"	"	
Benzo (ghi) perylene	**0.705**	0.500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.500	"	"	"	"	"	"	
Chrysene	**7.01**	0.500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.500	"	"	"	"	"	"	
Fluoranthene	**2.86**	0.500	"	"	"	"	"	"	
Fluorene	**7.88**	0.500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.500	"	"	"	"	"	"	
Naphthalene	**11.8**	0.500	"	"	"	"	"	"	
Phenanthrene	**28.2**	0.500	"	"	"	"	"	"	
Pyrene	**11.3**	0.500	"	"	"	"	"	"	
Surrogate: 2-FBP		*84.2 %*	*30-150*		"	"	"	"	
Surrogate: Nitrobenzene-d5		*65.8 %*	*30-150*		"	"	"	"	
Surrogate: p-Terphenyl-d14		*100 %*	*30-150*		"	"	"	"	

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ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P1S4 (B9K0123-04) Soil	**Sampled: 11/03/99 09:03**	**Received: 11/05/99 15:15**							
Dry Weight	**85.1**	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P1S6 (B9K0123-06) Soil	**Sampled: 11/03/99 09:41**	**Received: 11/05/99 15:15**							
Dry Weight	**84.2**	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P2S3 (B9K0123-08) Soil	**Sampled: 11/03/99 10:34**	**Received: 11/05/99 15:15**							
Dry Weight	**74.8**	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P3S3 (B9K0123-12) Soil	**Sampled: 11/03/99 11:06**	**Received: 11/05/99 15:15**							
Dry Weight	**75.3**	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P4S3 (B9K0123-16) Soil	**Sampled: 11/03/99 11:48**	**Received: 11/05/99 15:15**							
Dry Weight	**87.4**	1.00	%	1	9K17022	11/17/99	11/18/99	BSOPSPL003R07	
P5S2 (B9K0123-19) Soil	**Sampled: 11/03/99 12:44**	**Received: 11/05/99 15:15**							
Dry Weight	**94.4**	1.00	%	1	9K17022	11/17/99	11/18/99	BSOPSPL003R07	
P6S2 (B9K0123-21) Soil	**Sampled: 11/03/99 13:15**	**Received: 11/05/99 15:15**							
Dry Weight	**90.9**	1.00	%	1	9K17022	11/17/99	11/18/99	BSOPSPL003R07	
P7S2 (B9K0123-24) Soil	**Sampled: 11/03/99 14:00**	**Received: 11/05/99 15:15**							
Dry Weight	**90.5**	1.00	%	1	9K17022	11/17/99	11/18/99	BSOPSPL003R07	
P8S3 (B9K0123-28) Soil	**Sampled: 11/03/99 09:00**	**Received: 11/05/99 15:15**							
Dry Weight	**89.2**	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
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Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Physical Parameters by APHA/ASTM/EPA Methods
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
P9S3 (B9K0123-32) Soil Sampled: 11/03/99 15:43 Received: 11/05/99 15:15									
Dry Weight	84.0	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P10S3 (B9K0123-35) Soil Sampled: 11/04/99 09:40 Received: 11/05/99 15:15									
Dry Weight	85.2	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P11S3 (B9K0123-38) Soil Sampled: 11/04/99 10:43 Received: 11/05/99 15:15									
Dry Weight	86.4	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P12S2 (B9K0123-40) Soil Sampled: 11/04/99 11:10 Received: 11/05/99 15:15									
Dry Weight	80.4	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P14S2 (B9K0123-43) Soil Sampled: 11/04/99 11:58 Received: 11/05/99 15:15									
Dry Weight	91.3	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P15S2 (B9K0123-45) Soil Sampled: 11/04/99 13:30 Received: 11/05/99 15:15									
Dry Weight	92.6	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	
P16S2 (B9K0123-47) Soil Sampled: 11/04/99 13:46 Received: 11/05/99 15:15									
Dry Weight	87.2	1.00	%	1	9K10018	11/10/99	11/11/99	BSOPSPL003R07	

Hydrocarbon Identification by Washington DOE Method WTPH-HCID - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K08003: Prepared 11/08/99 Using EPA 3520C/600 Series										
Blank (9K08003-BLK1)										
Gasoline Range Hydrocarbons	ND	0.250	mg/l							
Diesel Range Hydrocarbons	ND	0.630	"							
Heavy Oil Range Hydrocarbons	ND	0.630	"							
Surrogate: 2-FBP	*DET*		*"*	*0.320*		*71.9*	*50-150*			
Batch 9K08004: Prepared 11/08/99 Using HCID (WA)										
Blank (9K08004-BLK1)										
Gasoline Range Hydrocarbons	ND	20.0	mg/kg wet							
Diesel Range Hydrocarbons	ND	50.0	"							
Heavy Oil Range Hydrocarbons	ND	100	"							
Surrogate: 2-FBP	*DET*		*"*	*154*		*103*	*50-150*			
Batch 9K09013: Prepared 11/09/99 Using HCID (WA)										
Blank (9K09013-BLK1)										
Gasoline Range Hydrocarbons	ND	20.0	mg/kg wet							
Diesel Range Hydrocarbons	ND	50.0	"							
Heavy Oil Range Hydrocarbons	ND	100	"							
Surrogate: 2-FBP	*DET*		*"*	*169*		*111*	*50-150*			

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Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Diesel Hydrocarbons (C12-C24) and Heavy Oil (C24-C40) by WTPH-D (extended) - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K16006: Prepared 11/16/99 Using EPA 3550B										
Blank (9K16006-BLK1)										
Diesel Range Hydrocarbons	ND	10.0	mg/kg wet							
Heavy Oil Range Hydrocarbons	ND	25.0	"							
Surrogate: 2-FBP	*8.91*		"	*10.8*		*82.5*	*50-150*			
LCS (9K16006-BS1)										
Diesel Range Hydrocarbons	54.5	10.0	mg/kg wet	65.8		82.8	60-140			
Surrogate: 2-FBP	*8.63*		"	*10.5*		*82.2*	*50-150*			
Duplicate (9K16006-DUP1)					**Source: B9K0123-12**					
Diesel Range Hydrocarbons	144	10.0	mg/kg dry		134			7.19	50	
Heavy Oil Range Hydrocarbons	207	25.0	"		210			1.44	50	
Surrogate: 2-FBP	*12.2*		"	*14.0*		*87.1*	*50-150*			

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Kirk Gendron, Project Manager

Total Metals by EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K08031: Prepared 11/08/99 Using EPA 3050B										
Blank (9K08031-BLK1)										
Arsenic	ND	0.500	mg/kg wet							
Cadmium	ND	0.500	"							
Chromium	ND	0.500	"							
Lead	ND	0.500	"							
LCS (9K08031-BS1)										
Arsenic	26.0	0.500	mg/kg wet	25.0		104	70-130			
Cadmium	25.5	0.500	"	25.0		102	70-130			
Chromium	26.2	0.500	"	25.0		105	80-120			
Lead	26.5	0.500	"	25.0		106	80-120			
Matrix Spike (9K08031-MS1)					**Source: B9K0122-02**					
Arsenic	22.4	0.403	mg/kg dry	21.4	2.86	91.3	70-130			
Cadmium	22.0	0.403	"	21.4	0.121	102	70-130			
Chromium	56.2	0.403	"	21.4	32.3	112	70-130			
Lead	26.1	0.403	"	21.4	2.95	108	70-130			
Matrix Spike Dup (9K08031-MSD1)					**Source: B9K0122-02**					
Arsenic	21.6	0.391	mg/kg dry	20.7	2.86	90.5	70-130	3.64	20	
Cadmium	21.0	0.391	"	20.7	0.121	101	70-130	4.65	20	
Chromium	53.3	0.391	"	20.7	32.3	101	70-130	5.30	20	
Lead	25.2	0.391	"	20.7	2.95	107	70-130	3.51	20	
Batch 9K09002: Prepared 11/09/99 Using EPA 3020A										
Blank (9K09002-BLK1)										
Arsenic	ND	0.00100	mg/l							
Cadmium	ND	0.00100	"							
Chromium	ND	0.00100	"							
Lead	ND	0.00100	"							

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Total Metals by EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K09002: Prepared 11/09/99 Using EPA 3020A										
LCS (9K09002-BS1)										
Arsenic	0.201	0.00100	mg/l	0.200		101	80-120			
Cadmium	0.195	0.00100	"	0.200		97.5	80-120			
Chromium	0.209	0.00100	"	0.200		105	80-120			
Lead	0.206	0.00100	"	0.200		103	80-120			
Matrix Spike (9K09002-MS1)					**Source: B9K0123-48**					
Arsenic	0.199	0.00100	mg/l	0.200	0.00244	98.3	75-125			
Cadmium	0.193	0.00100	"	0.200	0.000237	96.4	75-125			
Chromium	0.221	0.00100	"	0.200	0.0179	102	75-125			
Lead	0.211	0.00100	"	0.200	0.00450	103	75-125			
Matrix Spike Dup (9K09002-MSD1)					**Source: B9K0123-48**					
Arsenic	0.199	0.00100	mg/l	0.200	0.00244	98.3	75-125	0	20	
Cadmium	0.193	0.00100	"	0.200	0.000237	96.4	75-125	0	20	
Chromium	0.222	0.00100	"	0.200	0.0179	102	75-125	0.451	20	
Lead	0.209	0.00100	"	0.200	0.00450	102	75-125	0.952	20	
Batch 9K16015: Prepared 11/16/99 Using EPA 3050B										
Blank (9K16015-BLK1)										
Arsenic	ND	0.500	mg/kg wet							
Cadmium	ND	0.500	"							
Chromium	ND	0.500	"							
Lead	ND	0.500	"							B
LCS (9K16015-BS1)										
Arsenic	25.1	0.500	mg/kg wet	25.0		100	70-130			
Cadmium	24.9	0.500	"	25.0		99.6	70-130			
Chromium	24.9	0.500	"	25.0		99.6	80-120			
Lead	26.6	0.500	"	25.0		106	80-120			

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Reported:
11/19/99 14:30

Total Metals by EPA 6000/7000 Series Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K16015: Prepared 11/16/99 Using EPA 3050B										
Matrix Spike (9K16015-MS1)					**Source: B9K0292-01**					
Arsenic	25.4	0.403	mg/kg dry	24.4	17.3	33.2	70-130			Q-15
Cadmium	31.8	0.403	"	24.4	3.91	114	70-130			
Chromium	90.3	0.403	"	24.4	45.3	184	70-130			Q-15
Lead	3540	20.2	"	24.4	464	12600	70-130			Q-15
Matrix Spike Dup (9K16015-MSD1)					**Source: B9K0292-01**					
Arsenic	41.0	0.382	mg/kg dry	23.1	17.3	103	70-130	47.0	20	Q-15
Cadmium	27.6	0.382	"	23.1	3.91	103	70-130	14.1	20	
Chromium	84.2	0.382	"	23.1	45.3	168	70-130	6.99	20	Q-15
Lead	684	3.82	"	23.1	464	952	70-130	135	20	Q-15
Post Spike (9K16015-PS1)					**Source: B9K0292-01**					
Arsenic	471	1.76	mg/kg dry	426	17.3	107	0-200			
Chromium	487	1.76	"	426	45.3	104	0-200			

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Kirk Gendron, Project Manager

Halogenated Volatile Organics by EPA Method 8021B (modified) - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K15047: Prepared 11/15/99 Using EPA 5030B [P/T]										
Blank (9K15047-BLK1)										
Bromodichloromethane	ND	1.00	ug/l							
Bromoform	ND	1.00	"							
Bromomethane	ND	1.00	"							
Carbon tetrachloride	ND	1.00	"							
Chlorobenzene	ND	1.00	"							
Chloroethane	ND	1.00	"							
Chloroform	ND	1.00	"							
Chloromethane	ND	1.00	"							
Dibromochloromethane	ND	1.00	"							
1,2-Dichlorobenzene	ND	1.00	"							
1,3-Dichlorobenzene	ND	1.00	"							
1,4-Dichlorobenzene	ND	1.00	"							
1,1-Dichloroethane	ND	1.00	"							
1,2-Dichloroethane	ND	1.00	"							
1,1-Dichloroethene	ND	1.00	"							
cis-1,2-Dichloroethene	ND	1.00	"							
trans-1,2-Dichloroethene	ND	1.00	"							
1,2-Dichloropropane	ND	1.00	"							
cis-1,3-Dichloropropene	ND	1.00	"							
trans-1,3-Dichloropropene	ND	1.00	"							
Methylene chloride	ND	5.00	"							
1,1,2,2-Tetrachloroethane	ND	1.00	"							
Tetrachloroethene	ND	1.00	"							
1,1,1-Trichloroethane	ND	1.00	"							
1,1,2-Trichloroethane	ND	1.00	"							
Trichloroethene	ND	1.00	"							
Trichlorofluoromethane	ND	1.00	"							
Vinyl chloride	ND	1.00	"							
Surrogate: 4-BFB (ELCD)	*11.9*		*"*	*10.0*		*119*	*50-150*			

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Kirk Gendron, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Halogenated Volatile Organics by EPA Method 8021B (modified) - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K15047: Prepared 11/15/99 Using EPA 5030B [P/T]										
LCS (9K15047-BS1)										
Chlorobenzene	9.09	1.00	ug/l	10.0		90.9	70-130			
1,1-Dichloroethene	8.62	1.00	"	10.0		86.2	70-130			
Trichloroethene	10.4	1.00	"	10.0		104	70-130			
Surrogate: 4-BFB (ELCD)	*11.0*		"	*10.0*		*110*	*50-150*			
Matrix Spike (9K15047-MS1)					**Source: B9K0112-01**					
Chlorobenzene	9.27	1.00	ug/l	10.0	ND	92.7	70-130			
1,1-Dichloroethene	7.74	1.00	"	10.0	ND	77.4	70-130			
Trichloroethene	10.5	1.00	"	10.0	ND	105	70-130			
Surrogate: 4-BFB (ELCD)	*11.2*		"	*10.0*		*112*	*50-150*			
Matrix Spike Dup (9K15047-MSD1)					**Source: B9K0112-01**					
Chlorobenzene	8.90	1.00	ug/l	10.0	ND	89.0	70-130	4.07	20	
1,1-Dichloroethene	7.84	1.00	"	10.0	ND	78.4	70-130	1.28	20	
Trichloroethene	9.95	1.00	"	10.0	ND	99.5	70-130	5.38	20	
Surrogate: 4-BFB (ELCD)	*10.9*		"	*10.0*		*109*	*50-150*			
Batch 9K16029: Prepared 11/16/99 Using EPA 5030B [P/T]										
Blank (9K16029-BLK1)										
Bromodichloromethane	ND	0.0500	mg/kg wet							
Bromoform	ND	0.0500	"							
Bromomethane	ND	0.0500	"							
Carbon tetrachloride	ND	0.0500	"							
Chlorobenzene	ND	0.0500	"							
Chloroethane	ND	0.0500	"							
Chloroform	ND	0.0500	"							
Chloromethane	ND	0.0500	"							
Dibromochloromethane	ND	0.0500	"							
1,2-Dichlorobenzene	ND	0.0500	"							
1,3-Dichlorobenzene	ND	0.0500	"							
1,4-Dichlorobenzene	ND	0.0500	"							
1,1-Dichloroethane	ND	0.0500	"							
1,2-Dichloroethane	ND	0.0500	"							
1,1-Dichloroethene	ND	0.0500	"							
cis-1,2-Dichloroethene	ND	0.0500	"							

Halogenated Volatile Organics by EPA Method 8021B (modified) - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K16029: Prepared 11/16/99 Using EPA 5030B [P/T]										
Blank (9K16029-BLK1)										
trans-1,2-Dichloroethene	ND	0.0500	mg/kg wet							
1,2-Dichloropropane	ND	0.0500	"							
cis-1,3-Dichloropropene	ND	0.0500	"							
trans-1,3-Dichloropropene	ND	0.0500	"							
Methylene chloride	ND	0.500	"							
1,1,2,2-Tetrachloroethane	ND	0.0500	"							
Tetrachloroethene	ND	0.0500	"							
1,1,1-Trichloroethane	ND	0.0500	"							
1,1,2-Trichloroethane	ND	0.0500	"							
Trichloroethene	ND	0.0500	"							
Trichlorofluoromethane	ND	0.0500	"							
Vinyl chloride	ND	0.0500	"							
Surrogate: 4-BFB (ELCD)	*1.99*		*"*	*2.00*		*99.5*	*50-150*			
LCS (9K16029-BS1)										
Chlorobenzene	0.849	0.0500	mg/kg wet	1.00		84.9	60-140			
1,1-Dichloroethene	0.652	0.0500	"	1.00		65.2	60-140			
Trichloroethene	0.967	0.0500	"	1.00		96.7	60-140			
Surrogate: 4-BFB (ELCD)	*2.25*		*"*	*2.00*		*113*	*50-150*			
Matrix Spike (9K16029-MS1)					**Source: B9K0123-24**					
Chlorobenzene	0.926	0.0500	mg/kg dry	1.10	ND	84.2	60-140			
1,1-Dichloroethene	0.771	0.0500	"	1.10	ND	70.1	60-140			
Trichloroethene	1.09	0.0500	"	1.10	0.0550	94.1	60-140			
Surrogate: 4-BFB (ELCD)	*2.41*		*"*	*2.21*		*109*	*50-150*			
Matrix Spike Dup (9K16029-MSD1)					**Source: B9K0123-24**					
Chlorobenzene	0.975	0.0500	mg/kg dry	1.10	ND	88.6	60-140	5.16	30	
1,1-Dichloroethene	0.785	0.0500	"	1.10	ND	71.4	60-140	1.80	30	
Trichloroethene	1.15	0.0500	"	1.10	0.0550	99.5	60-140	5.36	30	
Surrogate: 4-BFB (ELCD)	*2.42*		*"*	*2.21*		*110*	*50-150*			

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Project: Acrowood
Project Number: WA99-2877
Project Manager: Keith Ross

Reported:
11/19/99 14:30

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K08025: Prepared 11/08/99 Using EPA 3550B										
Blank (9K08025-BLK1)										
Acenaphthene	ND	0.0100	mg/kg wet							
Acenaphthylene	ND	0.0100	"							
Anthracene	ND	0.0100	"							
Benzo (a) anthracene	ND	0.0100	"							
Benzo (a) pyrene	ND	0.0100	"							
Benzo (b) fluoranthene	ND	0.0100	"							
Benzo (ghi) perylene	ND	0.0100	"							
Benzo (k) fluoranthene	ND	0.0100	"							
Chrysene	ND	0.0100	"							
Dibenz (a,h) anthracene	ND	0.0100	"							
Fluoranthene	ND	0.0100	"							
Fluorene	ND	0.0100	"							
Indeno (1,2,3-cd) pyrene	ND	0.0100	"							
Naphthalene	ND	0.0100	"							
Phenanthrene	ND	0.0100	"							
Pyrene	ND	0.0100	"							
Surrogate: 2-FBP	*1.33*		"	*1.64*		*81.1*	*30-150*			
Surrogate: Nitrobenzene-d5	*1.41*		"	*1.64*		*86.0*	*30-150*			
Surrogate: p-Terphenyl-d14	*1.38*		"	*1.64*		*84.1*	*30-150*			
LCS (9K08025-BS1)										
Chrysene	0.349	0.0100	mg/kg wet	0.329		106	10-125			
Fluorene	0.304	0.0100	"	0.329		92.4	11-116			
Indeno (1,2,3-cd) pyrene	0.389	0.0100	"	0.329		118	10-147			
Surrogate: 2-FBP	*1.33*		"	*1.64*		*81.1*	*30-150*			
Surrogate: Nitrobenzene-d5	*1.42*		"	*1.64*		*86.6*	*30-150*			
Surrogate: p-Terphenyl-d14	*1.48*		"	*1.64*		*90.2*	*30-150*			

Polynuclear Aromatic Compounds by GC/MS with Selected Ion Monitoring - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K08025: Prepared 11/08/99 Using EPA 3550B										
Matrix Spike (9K08025-MS1)					**Source: B9K0122-03**					
Chrysene	0.340	0.0100	mg/kg dry	0.358	ND	95.0	10-125			
Fluorene	0.299	0.0100	"	0.358	ND	83.5	10-154			
Indeno (1,2,3-cd) pyrene	0.394	0.0100	"	0.358	ND	110	10-144			
Surrogate: 2-FBP	*1.31*		"	*1.79*		*73.2*	*30-150*			
Surrogate: Nitrobenzene-d5	*1.45*		"	*1.79*		*81.0*	*30-150*			
Surrogate: p-Terphenyl-d14	*1.44*		"	*1.79*		*80.4*	*30-150*			
Matrix Spike Dup (9K08025-MSD1)					**Source: B9K0122-03**					
Chrysene	0.391	0.0100	mg/kg dry	0.365	ND	107	10-125	14.0	28	
Fluorene	0.338	0.0100	"	0.365	ND	92.6	10-154	12.2	32	
Indeno (1,2,3-cd) pyrene	0.439	0.0100	"	0.365	ND	120	10-144	10.8	47	
Surrogate: 2-FBP	*1.45*		"	*1.83*		*79.2*	*30-150*			
Surrogate: Nitrobenzene-d5	*1.55*		"	*1.83*		*84.7*	*30-150*			
Surrogate: p-Terphenyl-d14	*1.61*		"	*1.83*		*88.0*	*30-150*			

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9K10018: Prepared 11/10/99 Using Dry Weight										
Blank (9K10018-BLK1)										
Dry Weight	100	1.00	%							
Blank (9K10018-BLK2)										
Dry Weight	100	1.00	%							
Blank (9K10018-BLK3)										
Dry Weight	100	1.00	%							
Batch 9K17022: Prepared 11/17/99 Using Dry Weight										
Blank (9K17022-BLK1)										
Dry Weight	100	1.00	%							
Blank (9K17022-BLK2)										
Dry Weight	100	1.00	%							
Blank (9K17022-BLK3)										
Dry Weight	100	1.00	%							
Blank (9K17022-BLK4)										
Dry Weight	100	1.00	%							

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Notes and Definitions

B	Analyte detected in the method blank.
Q-15	Analyses are not controlled on matrix spike RPD and/or percent recoveries when the sample concentration is significantly higher than the spike level.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

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Environmental Laboratory Network
www.ncalabs.com

East 11115 Montgomery, Suite B, Spokane, WA 98206-4776 (509) 924-9200 FAX 924-9290
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 FAX 906-9210
20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: B9K0123

CLIENT: ADAPT
REPORT TO: KEITH / GREG
ADDRESS:
PHONE: 4/499-2827 FAX:
PROJECT NAME: ACROWOOD
PROJECT NUMBER:
SAMPLED BY:

INVOICE TO:
P.O. NUMBER:

TURNAROUND REQUEST in Business Days*
Organic & Inorganic Analyses
[✓ 10] STD 7 5 4 3 2 1 <1
Petroleum Hydrocarbon Analyses
[✓ 5] STD. 4 3 2 1 <1
OTHER Please Specify
*Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	HCID	HALOGENATED 8021B	RCRA METALS Cd, Cr, Pb, As	PAH'S	HOLD									MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
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2. P1S2	853					+												-02
3. P1S3	858					+												-03
4. P1S4	903	+		X	X													-04
5. P1S5	917					X												-05
6. P1S6	941	+																-06
7. P2S2	1028					X												-07
8. P2S3	1034	+																-08
9. P2S4	1040					+												-09
10. P3S1	1056					+												-10
11. P3S2	1103					X												-11
12. P3S3	1106	+																-12
13. P3S4	1113					+												-13
14. P4S1	1138					+												-14
15. P4S2	1145					+												-15

RELINQUISHED BY: PRINT NAME: FIRM: DATE: 11-5-99 TIME: 1410
RECEIVED BY: Frany Tonty PRINT NAME: PRANY TONTY FIRM: NCA DATE: 11/5/99 TIME: 1410
RELINQUISHED BY: Frany Tonty PRINT NAME: PRANY TONTY FIRM: NCA DATE: 11/5/99 TIME: 1515
RECEIVED BY: M. Hutchinson PRINT NAME: FIRM: NCA DATE: 11-5-99 TIME: 1515
ADDITIONAL REMARKS: wo/ 0.1°C
TEMP:

COC REV 3/99 PAGE 1 OF 4

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Environmental Laboratory Network
www.ncalabs.com

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9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 FAX 906-9210
20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: B9K0123

CLIENT: ADAPT
REPORT TO: KEITH ROSS
ADDRESS:
PHONE: FAX:
INVOICE TO:
P.O. NUMBER:
PROJECT NAME: Aclowood
PROJECT NUMBER: WA99-2877
SAMPLED BY: GSP

TURNAROUND REQUEST in Business Days*
Organic & Inorganic Analyses
☒ 10 STD. ☐ 7 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1
Petroleum Hydrocarbon Analyses
☒ 5 STD. ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1
☐ OTHER Please Specify
*Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME		HCID	(HALOGENATED BY 8021B)	~~(8260~~ METALS Cd, Cr, Pb, As	PAH'S	HOLD	MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
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6.	P6S2		1315	X	X							-21
7.	P6S3		1330					X				-22
8.	P7S1		1356					X				-23
9.	P7S2		1400	X	X							-24
10.	P7S3		1405					X				-25
11.	P8S1		1510					X				-26
12.	P8S2	11-4	840					X				-27
13.	P8S3	11-4	906	X								-28
14.	P8S4	11-4	902					✓				-29
15.	P9S1	11-3	1558					X				-30

RELINQUISHED BY:
PRINT NAME: FIRM: DATE: TIME: 1410
RECEIVED BY:
PRINT NAME: FIRM: NCA DATE: 11/5/99 TIME: 1410
RELINQUISHED BY:
PRINT NAME: FIRM: DATE: TIME:
RECEIVED BY:
PRINT NAME: M. Hutchinson FIRM: NCA DATE: 11-5-9 TIME: 153
ADDITIONAL REMARKS: wo/ 10.5 r
TEMP: 2 4
COC REV 3/99

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: B9K0123

CLIENT: ADAPT
REPORT TO: KEITH Ross
ADDRESS:
PHONE: FAX:
INVOICE TO:
P.O. NUMBER:
PROJECT NAME: ACROWOOD
PROJECT NUMBER: WA99-2877
SAMPLED BY: GJP

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses
☒ 10 STD. ☐ 7 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1

Petroleum Hydrocarbon Analyses
☒ 5 STD. ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ <1

☐ OTHER Please Specify ______

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME		HCID	HALOGENATED BY 8021B	RCRA ~~METALS~~ Cd, Cr, Pb, As	PAH's	HOLD									MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
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4.	P10S2	11·4	9:32					+												-34
5.	P10S3	11·4	940	X																-35
6.	P11S1	11·4	1014					+												-36
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8.	P11S3		1043			X														-38
9.	P12S1		1050					+												-39
10.	P12S2		1110			X														-40
11.	P13S1		1120					+												-41
12.	P14S1		1152					+												-42
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14.	P15S1		1320					+												-44
15.	P15S2		1330			X														-45

RELINQUISHED BY: Gary Peter
PRINT NAME: FIRM:
DATE: 11-5-99 TIME: 1410

RECEIVED BY: Sanny Tonty
PRINT NAME: PRANY TONTY FIRM: NCA
DATE: 11/5/99 TIME: 1410

RELINQUISHED BY: Sanny Tonty
PRINT NAME: PRANY TONTY FIRM: NCA
DATE: 11/5/99 TIME: 1515

RECEIVED BY:
PRINT NAME: M. Hutchinson FIRM: NCA
DATE: 11.5.99 TIME: 1515

ADDITIONAL REMARKS: w/ 10.1°C

TEMP:

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20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: B9K0123

CLIENT: ADAPT
REPORT TO:
ADDRESS:
PHONE:
FAX:
INVOICE TO:
P.O. NUMBER:
PROJECT NAME: ACROWOOD
PROJECT NUMBER: WA99-2827
SAMPLED BY:

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses
☐ 10 ☐ 7 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ < 1 [✓ STD.]

Petroleum Hydrocarbon Analyses
☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☐ < 1 [✓ STD.]

☐ OTHER Please Specify ____________

Turnaround Requests less than standard may incur Rush Charges.

		REQUESTED ANALYSES																
CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	HCID	HALOGENATED 8021B	RCRA Cd, Cr, Pb, As METALS	PAH's	HOLD									MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA W ID
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3. P6W1	11.3 1340	X	X	X											SW	4		-48
4. P7W1	11.3 1415					X									W	4		-49
5. P8W1	11.4 9:10					X									W	4		-50
6. P10W1	11.4 930					X									W	4		-51
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8. P2S1	11/3 1023					X									S			-53
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11.																		
12.																		
13.																		
14.																		
15.																		

RELINQUISHED BY:
PRINT NAME:
FIRM:
DATE: 11-5-99
TIME: 1410

RECEIVED BY: Sony Toits
PRINT NAME:
FIRM: NCA
DATE: 11/5/9
TIME: 1410

RELINQUISHED BY: Sony Toth
PRINT NAME: PRAM TONTY
FIRM: NCA
DATE: 11/5/99
TIME: 1515

RECEIVED BY: M. Hutchinson
PRINT NAME:
FIRM: NCA
DATE: 11.5.9
TIME: 1615

ADDITIONAL REMARKS: wo1 '0.1°'

TEMP:

PAGE 11 4

OC RE

APPENDIX C

GEOPHYSICAL SURVEY RESULTS

GEO RECON INTERNATIONAL
applied geophysics

November 4, 1999
J99-683/D-31

Adapt Engineering
Suite 403
800 Maynard Ave South
Seattle, Wa 981134

RE: UST Search at the Acrowood Corporation Facility
4425 S 3rd Avenue
Everett, Washington

This letter reports the results of a geophysical exploration for underground storage tanks (UST) at the Acrowood Corporation Facility, Everett, Washington. The exploration was over two areas of reported UST locations. The work was completed on November 1, 1999.

Results of the Survey

Ground Penetrating Radar was used to scan the two areas for the USTs.

The first location was a heating oil UST that had been reported as removed.

The second location was that of fuel USTs reported on the Sanborn maps.

No evidence of Underground Storage Tanks was located at the two sites.

Methods

The Ground Penetrating Radar (a GSSI, SIR System 3) utilized a 500 Mega-Hertz antenna. The GPR antenna used for this investigation transmits a 2 nano-second (ns) pulse at a frequency of 500 Mega-Hertz for the selected scan rate of 8 times per second. When the signal encounters a change in electrical properties (a change in electrical permittivity), a portion of the signal energy is reflected back to the surface. The reflected signal received by the antenna, is digitally processed and recorded on a chart recorder in an amplitude-threshold format. The character of the reflection is used to interpret the source of the reflection.

The GPR records were recorded at a full-scale sweep of 80 nano-seconds, and have 8

APPENDIX D

ADAPT SUPPLEMENTAL PHASE II ENVIRONMENTAL SITE ASSESSMENT

(May 23, 2000)

ADaPT

May 23, 2000

ADaPT Job No. WA99-2877-1

Acrowood Corporation, Inc.
4425 South Third Avenue
Everett, WA 98206

Attention: Mr. Farhang Javid

Subject: Supplemental Phase II Environmental Site Assessment
Acrowood Corporation Facility
4425 South Third Avenue
Everett, Washington

Dear Mr. Javid:

ADaPT Engineering, Inc. (ADaPT), is pleased to provide you with the following results of our Preliminary Phase II Environmental Site Assessment for the above referenced site. This report is provided for Acrowood Corporation and their agents. If this report is to be reproduced and/or transmitted to a third party, it must be reproduced and/or transmitted in its entirety. Any exceptions will be made only with the written permission of ADaPT.

ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Hydrogeologist
Environmental Services

800 Maynard Avenue South
Suite 403
Seattle, Washington 98134

ADaPT Engineering, Inc.

Tel (206) 654-7045
Fax (206) 654-7048
www.adaptengr.com

TABLE OF CONTENTS

Attachments:

0.0 EXECUTIVE SUMMARY

This section presents the findings of ADaPT's Supplemental Phase II Environmental Site Assessment Services at the property located at 4425 South Third Avenue in Everett, Washington.

The purpose of our work was to delineate soil, and groundwater, impact beneath the areas identified in ADaPT's Preliminary Phase II ESA dated November 30, 1999 with environmental impact to soil and /or groundwater.

Field Activities: A preliminary soil vapor and soil sampling survey was conducted beneath the paint/solvent storage building. Four soil vapor and soil samples were collected from approximately 2.5 feet below the top of the concrete floor slab of the building.

A total of 4 Geoprobe boreholes and two hand auger boreholes were advanced into subsurface fill and native soils present on site. The Geoprobe boreholes were advanced to approximately 12 to 15 feet below ground surface. Groundwater was encountered in all of the borings at depths of approximately 3 to 9 feet below ground surface.

Laboratory Analysis: A total of 4 vapor, 27 soil and 6 groundwater samples were collected from the field activities. Three (3) selected soil and three (3) groundwater samples were submitted to the laboratory for analysis for diesel and heavy oil range hydrocarbons using NWTPH-Dx. Two groundwater samples were submitted for analysis for halogenated compounds using EPA8021B. In order to conduct a preliminary risk based closure evaluation one soil and one groundwater sample from the Suspected Fuel Tank area were submitted for analysis for volatile petroleum hydrocarbons (VPH), extractable petroleum hydrocarbons (EPH), and polynuclear aromatic hydrocarbons (PAHs)

Conclusions: The Phase I revealed the presence of recognized environmental conditions (as defined by ASTM Practice E1527-97 and Preliminary Phase II ASTM Practice E 1903-97) associated with the subject site, that in ADaPT's professional opinion, have resulted in a release of hazardous substances or petroleum products to the subject site. In general, the findings discussed below suggest that observed environmental contamination impacts are relatively limited in aerial extent. Observed concentrations of contaminants appear localized in both soils and groundwater and do not at this point suggest widespread environmental problems for the subject site.

Based on the analytical results from both the Supplemental and the Preliminary Phase II the vertical and horizontal extent of impact from diesel and heavy oil range hydrocarbons in the vicinity of the former UST, and the impact from solvent in the vicinity of the paint/solvent storage building have been delineated.

Analytical results from borings, placed in and around the suspected fuel tank area, indicate that there has been a release of petroleum hydrocarbons. Boring P1 and P20 had heavy staining and free product in the soil. Four additional borings (P2, P3, HA1 and HA2) were placed south, west, east and northeast of P1 approximately 20, 12, 10 and 15 feet radial from P1, respectively. Analytical results from soil and groundwater samples, appear to indicate that the area of impact is localized to the area approximately 10 to 15 feet radial from P1 and P20 and from approximately 5 to 15 feet bgs. The northern boundary appears to be located beneath the existing fabrication building.

Due to the location and type of contamination, remedial alternatives are limited. Petroleum hydrocarbons are in the diesel and heavy oil range, with minor amounts of lighter volatile hydrocarbons. These heavy end petroleum hydrocarbons are generally not amenable to soil vapor extraction or bioremediation. Generally soil excavation is a viable alternative however due to the proximity of the existing building and retaining wall, soil excavation activities may affect the structural integrity of the building. Based on these preliminary remediation constraints, ADaPT conducted a preliminary risk based closure calculation to evaluate the potential alternative for leaving the existing contamination in place. Based on the results of the preliminary calculations the concentrations of PAHs appears to exceed MCTA Method B and C Clean up levels in the impacted area. Although the absence of detected concentrations of petroleum hydrocarbons in the hand auger borings to the east of the retaining wall appears to indicate that the petroleum hydrocarbon has not migrated offsite.

Depending on Acrowood's planned objectives for the subject site and the necessity of a Ecology review, a "No Further Action" letter from Ecology, may be required. ADaPT believes it would be possible to obtain a NFA for the Former UST and Paint/Solvent Storage building based on current data. However, Ecology may require groundwater monitoring data from approved groundwater monitoring wells prior to issuance of a NFA for the suspected fuel tank area. As such ADaPT believes it would be prudent to install three groundwater monitoring wells in the vicinity of the suspected fuel tank area to obtain representative data on the groundwater conditions downgradient of the fuel tank area. ADaPT also believes it would be prudent to discuss these findings with an environmental attorney.

The Executive Summary is intended for introductory purposes only and should be used in conjunction with the full text of this report.

1.0 INTRODUCTION

1.1 General

This report presents the findings of ADaPT's Supplemental Phase II Environmental Site Assessment at the property located at 4425 South Third Avenue in Everett, Washington. ADaPT's work was performed in general accordance with our proposal, dated February 16, 2000 (ADaPT proposal No. 1592).

A Location/Topographic Map (Figure 1), and Site Plan (Figure 2) are attached at the end of the report.

1.2 Authorization

Written authorization to perform the work was given by Mr. Farhang Javid CEO of Acrowood Corporation (Acrowood) on March 7, 2000.

1.3 Scope and Purpose

The scope of the Supplemental Phase II consisted of three parts. The first part consisted of a preliminary soil vapor/soil sampling survey beneath the Paint/Solvent Storage Building. The second part consisted of advancing up to 6 Geoprobe boreholes to a depth of approximately 12 to 22 feet below ground surface (bgs) in areas identified with environmental impacts during ADaPT's Preliminary Phase II ESA dated November 30, 1999. At least one boring would be placed in the suspected fuel tank area and one in the former UST location. The location and number of borings in the Paint/Solvent Storage Building would be dependent on the results of the first part of this scope of work. The third part would consists of advancing up to two hand auger borings adjacent to the suspected fuel tank area east of the existing retaining wall. Representative soil, and groundwater samples would be collected from each boring for analytical testing.

The purpose of this assessment is to screen the soil and groundwater underlying the site, to better estimate the extent of the chemical and physical impacts of the past activities on the subject site.

1.4 Quality Assurance/Quality Control (QA/QC)

All sampling and testing was performed in general accordance with EPA and Washington Department of Ecology (Ecology) approved methodologies and generally accepted environmental practices.

1.5 Project Background

During ADaPT's preparation of the Phase I ESA research revealed that the site has been used as a iron and metal foundry since 1913. Historical information indicated that Sumner Iron Works used the subject site for metal and iron casting and molding from 1913 to approximately the early 1970s. The site was occupied by Black-Clawson-Sumner as a metal fabrication facility until 1984. The current occupant Acrowood has operated the site for metal fabrication of forestry industry equipment since 1984. ADaPT identified several recognized environmental concerns associated with past and present site operations that warranted a Preliminary Phase II ESA.

ADaPT conducted a Preliminary Phase II in November 1999. The Preliminary Phase II included Geoprobe borings at the recognized environmental concerns to assess the potential environmental impacts. Based on the results of the Preliminary Phase II, three of the six areas were identified with documented impacts to the soil and/or groundwater. These three areas the suspected fuel tank area, the former underground storage tank (UST) and the Paint/Solvent Storage building, were targeted for additional assessment work during the Supplemental Phase II ESA:

- **Former UST**: Analytical results from soil samples collected from the former UST pit, located between the Maintenance Shop and the Store room east of the Machine shop, indicated that diesel and heavy oil range hydrocarbons were present in the soil above current MTCA Method A non-Residential Cleanup levels. Additional sampling west and south of the pit indicated that the impact was defined to the south and west. Additional assessment work was proposed to delineate the eastern extent and evaluate the potential groundwater impact.

- **Suspected Fuel Tank Area:** The 1960 Sanborn Map depicts fuel oil tanks located on the east edge of the site adjacent to the steel shop (fabrication shop). Analytical results from borings placed in and around the suspected fuel tank area indicate that there has been a release of petroleum hydrocarbons. Boring P1 located in the center of the suspected fuel tank area had heavy petroleum staining and free product in the soil. Two additional borings that were placed around the suspected fuel tank area to the south and west appeared to delineate the lateral extent in those directions. Vertical sampling appeared to indicate that the vertical extent extends from approximately 4.5 to 16 feet below ground surface. The northern and eastern extent have not been delineated.

- **Paint/Solvent Storage Building:** Analytical results from the Geoprobe borings placed around the Paint/Solvent Storage Building indicates that there has been a release of chlorinated solvents to the groundwater and soil. One boring placed in the southeast corner of the building had detectable concentrations of trichloroethene in both soil and groundwater. Two additional borings placed in the southwest corner and adjacent to the south of the painting area did not have detectable concentrations of any chlorinated solvents. A potential source or the lateral extent to the east has not been delineated.

2.0 PROCEDURES

2.1 Preliminary Soil Vapor Soil Sampling Survey

This phase of work involved advancing a total of 3 borings through the concrete slab to obtain soil vapor and soil samples. One hole was placed in the southwest corner in the vicinity of moderate staining (solvent was and is stored and dispensed in the southwest corner. A second hole was located east of the first, adjacent to the doorway, and the third hole was placed in the northern portion adjacent to paint stains. A fourth hole was hand augered in the southwest corner of the outside of the building adjacent to the building foundation. The hand auger hole was angled to collect a sample from beneath the interior of the building. All borings were drilled, and sampled by an ADaPT scientist. Figure 2 shows the approximate locations of the borings, building boundaries, and other pertinent site features.

A roto-hammer was used to drill through the concrete and approximately six to eight inches into the soil beneath the concrete slab. All borings were field screened using a portable photoionzation detector (PID) with a 10.6ev lamp designed to detect the compounds of interest. PID readings were obtained prior to soil gas sampling by inserting the PID probe tip into the hole to just below the bottom of the concrete. An AMS hand soil gas probe with a soil gas tip was placed in the hole and driven to approximately 2.5 foot into undisturbed soil at the bottom of the hole. The soil gas tip was opened by retracting the probe approximately 2 inches to expose the screen to the soil. A ¼-inch polyethylene tubing was attached to the soil gas tip and to the MiniRAe PID's tip a second ¼-poly tube was attached to the out port of the PID and was connected to a Tedlar bag. The Tedlar bag was opened and allowed to fill to approximately 80% of full and placed in a cooler at approximately 4 degrees Celsius for transport to the laboratory under ADaPT's Chain of Custody.

An AMS soil sampler with an ½-inch diameter by 12 inch acetate liner was then pushed into the undisturbed soil from 2.5 to 3.5 feet to collect a soil sample. The acetate liner was removed and capped with Teflon tape and a plastic cap and stored in a cooler at approximately 4 degrees Celsius for transport to the laboratory under ADaPT's Chain of Custody.

All sampling and drilling equipment was decontaminated between borings.

2.2 Geoprobe Soil and Groundwater Sampling

This phase of work involved advancing 4 Geoprobe borings to a depth of approximately 12 to 15 feet below ground surface (bgs). The borings were advanced using a truck-mounted, direct push drill rig, owned and operated by Cascade, Inc., under subcontract to our firm. All borings were supervised, sampled, and logged by an ADaPT Professional Geologist. The borings were located based on findings of ADaPT's Phase I and Preliminary Phase II, field observations, and site access. Figure 2, 3 and 4 shows the approximate locations of the borings, site boundaries, and other pertinent site features. Subsurface exploration and soil sampling procedures are described in Appendix A.

Soil samples were generally collected from continuous probing at approximate intervals of 0 to 3 feet, 3 to 6 feet, 6 to 9 feet, 9 to 12 feet, and 12-15 feet bgs using a three foot long core soil sampler with a acetate liner which is pushed as the lead section of the tool string. Discrete soil samples were collected for each interval at significant lithologic changes and/or based on visual, olfactory or field screening data as determined by the on-site geologist. Soil samples were collected using a clean stainless steel, disposable trowel, or gloved hand and transferred to a clean 4-ounce glass jar with a Teflon® lined lid. The jar was filled minimizing headspace. The soil samples were stored in a cooler at approximately 4 degrees Celsius for transport to the project analytical laboratory. All samples were collected, stored and transported under standard Chain of Custody (COC) procedures. A completed COC form is presented in Appendix B.

All soil samples were field screened using a MiniRae 10.6ev Photoionization Detector (PID). Field screen samples were collected from the remaining soil in the sampled interval. A representative soil sample was placed in a Ziplock® type plastic bag and sealed. The sample was allowed to volatilize for at least 10 minutes prior to obtaining a reading. The PID tip was inserted in small hole poked in the bag just prior to reading. The highest PID reading observed was recorded on the boring log sheet as were any subjective olfactory impressions of the sample by the on site geologist.

2.3 Hand Auger Borings

This phase of work involved advancing 2 hand auger borings to a depth of approximately 5.5 feet below ground surface (bgs). The borings were advanced using a 3 ½ inch outside diameter

AMS hand auger by an ADaPT professional geologist. Based on the findings of ADaPT's Phase I, and Preliminary Phase II, field observations, and site access, the hand auger borings were located at the base of the 9-feet high retaining wall adjacent to the east of the suspected fuel tank area. Figure 2, 3 shows the approximate locations of the borings, site boundaries, and other pertinent site features. Subsurface exploration and soil sampling procedures are described in Appendix A.

Soil samples were generally collected at significant lithologic changes and/or based on visual, olfactory or field screening data as determined by the on-site geologist. Soil samples were collected using a clean hand auger bucket, or gloved hand and transferred to a clean 4-ounce glass jar with a Teflon® lined lid. The jar was filled minimizing headspace. The soil samples were stored in a cooler at approximately 4 degrees Celsius for transport to the project analytical laboratory. All samples were collected, stored and transported under standard Chain of Custody (COC) procedures. A completed COC form is presented in Appendix B.

All soil samples were field screened using a MiniRae 10.6ev Photoionization Detector (PID). Field screen samples were collected from the remaining soil in the sampled interval. A representative soil sample was placed in a Ziplock® type plastic bag and sealed. The sample was allowed to volatilize for at least 10 minutes prior to obtaining a reading. The PID tip was inserted in small hole poked in the bag just prior to reading. The highest PID reading observed was recorded on the boring log sheet as were any subjective olfactory impressions of the sample by the on site geologist.

3.0 RESULTS

3.1 Subsurface Conditions-Vapor

3.1.1 Paint/Solvent Storage Building

Initial PID field screen readings obtained from the soil vapor borings, were 179 to 200 parts per million (ppm) in SV-1, 8.6 ppm in SV-2 and 10.5 ppm in SV-3. PID readings during vapor sample collection ranged from approximately 7.5 ppm to 8.1 ppm in SV-1 to 4.6 ppm in SV-2. Generally the reading peaked and were observed to be decreasing near the end of sample collection.

3.2 Subsurface Conditions –Soil

3.2.1 Paint/Solvent Storage Building

Soils encountered in soil vapor borings SV-1, SV-2, SV-3, and SV-4 generally consisted of approximately 4-inches concrete pavement underlain by a 1- to 3- inch layer of gravel base course over loose to medium dense, brown silty sand, that extended to the full depth explored of 3.5 foot.

No staining, odors were noted in any of the borings.

3.2.2 Paint/solvent Storage Area

Soils encountered in the Geoprobe borings generally consisted of approximately 6-inches of gravel underlain by loose to medium dense, brown, moist fine to medium sand to total depth of the borings P17, and P18.

Soil samples collected from the two borings did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for soil samples ranged from 0.4 parts per million (ppm) to 0.9 ppm in P17 and 1.2 ppm to 1.6 ppm in P18.

3.2.3 Former UST

Soils encountered in the Geoprobe boring (P19) generally consisted of loose to medium dense, red brown, moist, fine to coarse sand with gravel and iron slag to a depth of approximately 1-foot bgs. A medium dense, brown, moist to wet silty to medium sand underlies the fine to coarse sand to the total depth of the boring.

Soil samples collected from P19 did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples ranged from 1.4 ppm to 2.1 ppm.

3.2.4 Suspected Fuel Tank Area

Soils encountered in the Geoprobe borings generally consisted of fill material consisting of loose to medium dense, dark brown to black, moist silty sand with iron slag to a depth of approximately 10 feet. Apparent native soils consisting of medium dense, gray to brown, sand, underlie the fill materials to a depth of 12 feet bgs. A black to brown clayey sand to sandy clay underlies the gray/brown sand to the total depth of the hole.

Soil samples collected from the Geoporbe boring P20 and Hand auger boring HA1 exhibited moderate to heavy petroleum staining and odor from approximately 5 feet to 13 feet below ground surface (bgs) and from approximately 1-foot to 4 feet, respectively. Free product was observed in some of the void spaces above the saturated soil. Soil samples collected from the Hand auger borings HA2 did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples ranged from 1.3 ppm to 41.3 ppm in soil sample P20-12 at 9 to 12 feet bgs. The PID reading for the sample at 15 feet bgs was 15.3 ppm.

3.3 Subsurface Conditions- Groundwater

3.3.1 Paint/Solvent Storage Area

Groundwater was encountered in P17 and P18 at a depth of approximately 8.5 to 9 feet bgs. The groundwater samples collected from the borings did not exhibit obvious signs of environmental impact such as odors or sheen.

3.3.2 Former UST

Groundwater was encountered in P19 at a depth of approximately 7 feet bgs. The groundwater sample collected from the boring did not exhibit obvious signs of environmental impact such as odors or sheen.

3.3.3 Suspected Fuel Tank Area

3.3.3 Suspected Fuel Tank Area

Groundwater was encountered in P20 at a depth of approximately 13 feet bgs. Approximately ¼-inch of free product along with a moderate to strong petroleum hydrocarbon odor was noted on the groundwater sample collected from the boring.

4.0 QUANTITATIVE ANALYSES -

4.1 Quantitative Analyses- Soil Vapor

Four soil vapor were submitted to certified laboratories for analysis for halogenated volatile organic compounds using EPA Method 8260B (modified). The analytical results for the vapor samples have been summarized below in Table 1. The analytical results for the soil samples have been summarized below in Table 2.

Table 1 : Summary of Analytical Results: Soil Vapor

Sample				PID (ppm)		EPA Method 8260B (modified) (μg/l Air)	
ID	Depth (ft)	Media[1]	Date	Initial	Sampling	Tetrachloroethene	Trichloroethene
SV-1-A	25	SV	3/27/00	179-200	7.8-8.1	ND	ND
SV2-A	2.5	SV	3/27/00	8.6	4.6	ND	ND
SV-3-A	2.5	SV	3/27/00	10.5	4.0-5.1	ND	ND
SV-4-A	2.5	SV	3/27/00	NA	3.8-4.1	ND	ND

ND= not detected at the standard laboratory detection level

Based on the analytical results summarized in Table 1, no solvents were detected above the standard laboratory reporting limits in any of the four vapor samples. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 2.

4.2 Quantitative Analyses - Soil

4.2.1 Paint/Solvent Storage Area

Four soil sample were submitted to Onsite Environmental laboratory for analytical testing. The soil samples were analyzed for HVOCs using EPA 8260B. The analytical results have been summarized below in Table 2, and included in Appendix B.

Table 2 : Analytical Results beneath Paint Storage Building: Soil

Sample				EPA Method 8260B (modified) (ppm)
ID	Depth (ft)	Media	Date	
SV-1-4	2.5-4	Soil	3/27/00	ND
SV-2-3.5	2.5.3.5	Soil	3/27/00	ND
SV-3-3.5	2.5-3.5	Soil	3/27/00	ND
SV-4-3.5	2.5-3.5	Soil	3/27/00	ND
MTCA Method A Cleanup Level in soil				Various

ND= not detected at the standard laboratory detection level

Based on the analytical results summarized in Table 2, no solvents were detected above the standard laboratory reporting limits in any of the four soil samples from beneath the building. Previous analytical results from soil samples had exhibited trichloroethene concentrations of 0.055 ppm at approximately 8-feet bgs just outside the southeast corner of the building. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 2.

4.2.2 Former UST

One soil sample was submitted to OnSite Environmental laboratory for analytical testing. The soil sample was analyzed for diesel and heavy oil range petroleum hydrocarbons using NWTPH-Dx. Gasoline range hydrocarbons were not identified in the Preliminary Phase II assessment and threrfore analysis for gasoline range hydrocarbons was not conducted. The analytical results have been summarized below in Table 3, and included in Appendix B.

Table 3 : Analytical Results Former UST: Soil

Sample				WTPH-HCID (gasoline/diesel/heavy oil)	WTPH-Dx (mg/kg) diesel/heavy oil
Sample ID	Date	Depth (ft)	PID (ppm)		
P8S3	*11/4/99*	*8.5*	*0*	*ND/DET/DET*	***983/1920***
P9S3	*11/3/99*	*12*	*0*	*ND/ND/ND*	--
P10S3	*11/4/99*	*12*	*NA*	*ND/ND/ND*	--
P19-3	4/17/00	0-3	1.4	--	--
P19-6	4/17/00	3-6	2.4	--	--
P19-9	4/17/00	6-9	2.1	--	ND/ND
MTCA Method A Industrial Clean up Level				100/200/200	200/200

ND= not detected at the laboratory detection level of 50 mg/kg for diesel and 100 mg/kg heavy oil.
DET= analyte noted detected above laboratory detection levels.
--= not tested
Bolded values are above respective MTCA Method A Non-Residential Cleanup levels.
Italicized results from the Preliminary Phase II ESA. Shown here for comparison purposes.

Based on the analytical result summarized in Table 3, diesel and heavy oil petroleum hydrocarbons were not detected above the MTCA Method A Industrial Cleanup levels in Boring P19. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.2.3 Suspected Fuel Tank Area

Four soil samples were submitted to OnSite Environmental laboratory for analytical testing.). Soil samples P20-15, HA1-4 and HA2-5 were analyzed for diesel and heavy oil range hydrocarbons using NWTPH-Dx. The soil sample P20-12 was analyzed for volatile and extractable petroleum hydrocarbons (VPH & EPH) using Interim TPH Methods VPH & EPH, and for polynuclear aromatic hydrocarbons (PAHs) using EPA Method Gas Chromatograph/Mass Spectrometer (GC/MS) with Selected Ion Monitoring (SIM). The analytical results have been summarized below in Table 4, and included in Appendix B.

Table 4 : Analytical Results Suspected Fuel Tank Area: Soil

Sample				WTPH-HCID (mg/kg) (gasoline/diesel/heavy oil)	WTPH-Dx (mg/kg) diesel/heavy oil	EPA GC/MS SIM (PAHs) (mg/kg)	Interim TPH Methods	
Sample ID	Date	Depth (ft)	PID (ppm)				VPH	EPH
P1S4	*11/3/99*	*16*	*35*	*ND/DET/DET*	***10,000/4010***	*Acenaphthene-6.27* *Acenaphtylene-1.21* *Anthracene-6.94* **Benzo (a) anthracene-4.62* **Benzo (a) pyrene-1.53* **Benzo (b) fluoranthene-0.745* **Benzo (ghi) perylene-0.705* **Benzo (k) fluoranthene-ND* **Chrysene-7.01* **Dibenz (a,h) anthracene-ND* *Fluoranthene-2.86* *Fluorene-7.88* **Indeno (1,2,3-cd) pyrene-ND* *Napthalene-11.8* *Phenanthrene-28.2* *Pyrene-11.3* *(*=carcinogenic)*	--	--
P1S6	*11/3/99*	*22*	*7*	*ND/ND/ND*	--	--	--	--
P2S3	*11/3/99*	*12*	*0*	*ND/ND/ND*	--	--	--	--
P3S3	*11/3/99*	*12*	*0*	*ND/ND/DET*	***134/210***	--	--	--
P20-3	4/17/00	0-3	1.3	--	--	--	--	--
P20-6	4/17/00	3-6	No sample					
P20-9	4/17/00	6-9	3.7	--	--	--		

Table 4 : Analytical Results Suspected Fuel Tank Area: Soil

Sample				WTPH-HCID (mg/kg) (gasoline/diesel/heavy oil)	WTPH-Dx (mg/kg) diesel/heavy oil	EPA GC/MS SIM (PAHs) (mg/kg)	Interim TPH Methods	
Sample ID	Date	Depth (ft)	PID (ppm)				VPH	EPH
P20-12	4/17/00	9-12	41.3	--	--	Acenaphthene-7.9 Acenaphtylene-ND Anthracene-7.1 *Benzo (a) anthracene-5.1 *Benzo (a) pyrene-1.4 *Benzo (b) fluoranthene-<2.0 *Benzo (ghi) perylene-<2.0 *Benzo (k) fluoranthene-<2.0 *Chrysene-8.0 *Dibenz (a,h) anthracene-ND Fluoranthene-2.1 Fluorene-12 *Indeno (1,2,3-cd) pyrene-ND Naphthalene-15 2-Methylnaphthalene-100 Phenanthrene-33 Pyrene-11 (*=carcinogenic)	Aliphatic C5-C6: ND Aliphatic C6-C8: 5.9 Aliphatic C8-C10: ND Aliphatic C10-C12: 110 Total Aliphatic: 120 Aromatic C8-C10: 40 Aromatic C10-C12: 250 Aromatic C12-C13: 600 Total Aromatic: 890 MTBE: ND Benzene: ND Toluene: ND Ethylbenzene: ND m, p-Xylene: ND o-Xylene: 0.68	Aliphatic C10-C12: 69 Aliphatic C12-C16: 870 Aliphatic C16-C18: 400 Aliphatic C18-C21: 370 Aliphatic C21-C28: 690 Aliphatic C28-C36: 760 Total Aliphatic: 3200 Aromatic C10-C12: 85 Aromatic C12-C-16: 880 Aromatic C16-C18: 440 Aromatic C18-C21: 1600 Aromatic C21-C28: 790 Aromatic C28-C36: 740 Total Aromatic: 4500
P20-15	4/17/00	12-15	15.3	--	ND/ND	--	--	--
HA1-1	4/17/00	0-1	21.3	--	--	--	--	--
HA1-4	4/17/00	3-4	5.0	--	75/**500**	--	--	--
HA2-5	4/17/00	4-5	5.4	--	ND/ND	--	--	--
MTCA Method A Industrial Clean up Level					200/200	Carcinogenic-20.0		

ND= not detected at the standard laboratory detection level
DET= analyte noted detected above laboratory detection levels.
--= not tested
Bolded values are above respective MTCA Method A Industrial Cleanup levels
Italicized results from the Preliminary Phase II ESA. Shown here for comparison purposes.

Based on the analytical results summarized in Table 4, diesel and heavy oil petroleum hydrocarbons were detected above the MTCA Method A Industrial Cleanup levels in soil samples P20-12 and HA1-4. Petroleum hydrocarbons were not detected above the standard laboratory detection levels in the soil sample from the bottom of Boring P20 (P20-15) and HA2-5. PAHs were detected in soil sample P20-12 at concentrations above laboratory detection levels but below the MTCA Method A Industrial Cleanup levels for carcinogenic PAHs. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.3 Quantitative Analyses - Groundwater

4.3.1 Paint/Solvent Storage Area

Two groundwater samples were submitted to OnSite Environmental laboratory for analytical testing for halogenated volatile compounds using EPA 8260B. The analytical results have been summarized below in Table 5, and included in Appendix B.

Table 5 : Summary of Groundwater Analytical Results-Paint Storage area

Sample			WTPH-HCID (mg/l) Gas/diesel/heavy oil	EPA 8021B (µg/l)	Metals (µg/l)			
Sample ID	Date	Depth (ft)			As	Cd	Cr	Pb
P6W1	*11/3/99*	*8.4-9*	*ND/ND/ND*	*TCE-**8.38***	*2.44*	*ND*	*17.9*	*4.50*
P17-W	4/17/00	8-12	--	TCE-4.9	--	--	--	--
P18-W	4/17/00	7-11	--	TCE-0.27 Chloroform-1.8	--	--	--	--
MTCA Method A Industrial Clean up Level			1000-total petroleum hydrocarbons	39.8[1]	5.0	5.0	50.0	5.0

ND= not detected at the laboratory detection level.
-- = not tested
TCE= Trichloroethene
Bolded values are above respective MTCA Method A Cleanup levels
[1] Cleanup level is MTCA Method C Cleanup level
Italicized results from the Preliminary Phase II ESA. Shown here for comparison purposes.

Based on the results summarized in Table 5, trichloroethene was detected in the groundwater to the east and south of the paint/solvent storage building above the laboratory detection levels but below MTCA Method C Cleanup levels in the analyzed groundwater samples. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.3.2 Former UST

One groundwater sample was submitted to OnSite Environmental laboratory for analytical testing for diesel and heavy oil range hydrocarbons using NWTPH-Dx. The analytical results have been summarized below in Table 6, and included in Appendix B.

Table 6 : Summary of Analytical Results- Former UST Area-Groundwater

Sample			NWTPH-Dx (mg/l) diesel/heavy oil
Sample ID	Date	Depth (ft)	
P19-W	4/17/00	7-11	ND/ND
MTCA Method A Industrial Clean up Level			1000-total petroleum hydrocarbons

ND= not detected at the standard laboratory detection level

Based on the analytical results summarized in Table 6, diesel or heavy oil range hydrocarbons were not detected in the groundwater above the laboratory detection levels. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

4.3.3 Suspected Fuel Tank Area

Three groundwater samples were submitted to OnSite Environmental laboratory for analytical testing.). Groundwater samples HA1-W and HA2-W were analyzed for diesel and heavy oil range hydrocarbons using NWTPH-Dx. The groundwater sample P20-W was analyzed for volatile and extractable petroleum hydrocarbons (VPH & EPH) using Interim TPH Methods VPH & EPH, and for polynuclear aromatic hydrocarbons (PAHs) using EPA Method Gas Chromatograph/Mass Spectrometer (GC/MS) with Selected Ion Monitoring (SIM). The analytical results have been summarized below in Table 7, and included in Appendix B.

Table 7 : Analytical Results Suspected Fuel Tank Area: Groundwater

Sample			WTPH-Dx (ug/L) diesel/heavy oil	EPA GC/MS SIM (PAHs) (ug/L)	Interim TPH Methods (mg/L)	
Sample ID	Date	Depth (ft)			VPH	EPH
P20-W	4/17/00	11-15	--	Acenaphthene-16 Acenaphtylene-2.1 Anthracene-8.7 ***Benzo (a) anthracene-5.6** ***Benzo (a) pyrene-1.6** ***Benzo (b) fluoranthene-0.77** ***Benzo (ghi) perylene-0.94** ***Benzo (k) fluoranthene-<0.5** ***Chrysene-8.8** ***Dibenz (a,h) anthracene-<0.5** Fluoranthene-2.7 Fluorene-17 ***Indeno (1,2,3-cd) pyrene-<0.5** Naphthalene-60 2-Methylnaphthalene-200 Phenanthrene-36 Pyrene-12 (*=carcinogenic)	Aliphatic C5-C6-ND Aliphatic C6-C8-ND Aliphatic C8-C10-ND Aliphatic C10-C12-0.11 Total Aliphatic-0.11 Aromatic C8-C10-0.098 Aromatic C10-C12-0.3 Aromatic C12-C13-0.58 Total Aromatic-0.980 MTBE-ND Benzene-ND Toluene-ND Ethylbenzene-ND m, p-Xylene-ND o-Xylene-0.0076	Aliphatic C10-C12: ND Aliphatic C12-C16: 0.40 Aliphatic C16-C18: 0.20 Aliphatic C18-C21: 0.20 Aliphatic C21-C28: 0.39 Aliphatic C28-C36: 0.39 Total Aliphatic: 1.6 Aromatic C10-C12: 0.22 Aromatic C12-C-16: 0.94 Aromatic C16-C18: 0.29 Aromatic C18-C21: 0.88 Aromatic C21-C28: 0.40 Aromatic C28-C36: 0.36 Total Aromatic: 3.1
HA1-W	4/17/00	5	ND/ND	--	--	--
HA2-W	4/17/00	4.5	ND/ND	--	--	--
MTCA Method A Industrial Clean up Level			200/200	Carcinogenic-0.1	1.0	

ND= not detected at the standard laboratory detection level
--= not tested
Bolded values are above respective MTCA Method A Industrial Cleanup levels
Italicized results from the Preliminary Phase II ESA. Shown here for comparison purposes.

Based on the results summarized in Table 7, diesel and heavy oil range hydrocarbons and PAHs were detected in the groundwater beneath the suspected fuel tank area (Sample P20-W). Analytical results of groundwater to the east, HA1-W and HA2-W, did not exhibit diesel or heavy oil range hydrocarbons above the laboratory detection levels. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

5.0 PRELIMINARY RISK-BASED CLOSURE ASSESSMENT

In order to evaluate whether the VPH and EPH concentrations observed in P20-12 would constitute an environmental risk and impact groundwater at concentrations above MTCA Method A cleanup levels for groundwater, Ecology's Interim TPH guidance was used. The results of the VPH and EPH analytical testing was used to project the concentration of petroleum in a monitoring well. The concentration of diesel and heavy oil range petroleum hydrocarbons and PAHs were calculated using the Interim TPH soil to groundwater pathway calculations. The results of the assessment appear to indicate that the concentrations of diesel and heavy oil in the soil and groundwater do not appear to exceed the MTCA Method B or C cleanup levels. The PAHs concentration in soil and groundwater appear to exceed the Cleanup levels. However, based on the groundwater analytical results from the two hand auger borings in the estimated downgradient direction petroleum hydrocarbons do not appear to have migrated offsite. The calculations are attached to this report in Appendix C.

6.0 CONCLUSIONS

The Preliminary and Supplemental Phase II revealed the presence of recognized environmental conditions (as defined by ASTM Practice E1527-97 and Preliminary Phase II ASTM Practice E 1903-97) associated with the subject site, that in ADaPT's professional opinion, have resulted in a release of hazardous substances or petroleum products to the subject site. In general, the findings discussed below suggest that observed environmental contamination impacts are relatively limited in aerial extent. Observed concentrations of contaminants appear localized in both soils and groundwater and do not at this point suggest widespread environmental problems for the subject site.

Based on the analytical results, diesel, range and heavy oil range hydrocarbon have impacted soil beneath the subject site in two areas. The two areas are the suspected fuel tank area adjacent to the fabrication shop and the former UST adjacent to the receiving building. The site is currently used for industrial use with no changes planned. The diesel range and heavy oil range hydrocarbons were detected in the subsurface soils above the current MTCA Method A Industrial cleanup level of 200 mg/kg. Since the site is currently non-residential use, the levels of petroleum hydrocarbons would likely meet current Method "B" or "C" clean up levels which are health risk based. In addition, new proposed clean up levels for diesel and heavy oil range hydrocarbons are expected to increase the Method "A" industrial concentration to 2000 mg/kg when and if the new MTCA regulations are approved at the end of this year. Based on the new Method "A" cleanup standards only the soil sample from beneath the suspected fuel tank area would be above the new standard. In addition, PAHs detected in groundwater beneath the suspected fuel tank area exceeds the MTCA Method A Industrial cleanup level. Polynuclear aromatic hydrocarbons (PAHs) detected in soil beneath the suspected fuel tank area are currently below the MTCA Method A Industrial cleanup level however, when the new proposed cleanup levels are approved the existing PAH concentrations will likely exceed the new cleanup levels. It would be prudent to consider addressing this issue prior to future changes in regulations. It would be prudent to discuss this issue with an environmental attorney.

6.1 Paint Storage Area

Analytical results from the soil vapor survey and Geoprobe borings, placed in and around the Paint/Solvent Storage Building, indicate that there has been a minor release of chlorinated solvents (trichloroethene) to soil and groundwater. The assessment work to date appears to indicate that the vertical and horizontal extent of the impact is limited to the vicinity of the building.

Based on the these results and the proposed new MTCA Non-Residential Cleanup levels ADaPT believes that no further assessment work is warranted at this time for the Paint/Solvent Storage Building and Area.

6.2 Former UST

Analytical results from borings placed in and around the former UST indicate that there has been a petroleum release beneath the location of the former UST. Boring P8 had faint hydrocarbon odors and exhibited concentrations of 983 ppm of diesel and 1920 ppm of heavy oil hydrocarbons in the soil when tested. Three borings have been located around P8 in order to characterize the lateral extent of the impacted area. Analytical results appeared to limit the lateral extent to an area within 8 to 10 feet of P8. Groundwater analytical results appear to indicate that groundwater has not been impacted by the petroleum release.

Based on the these results and the proposed new MTCA Non-Residential Cleanup levels ADaPT believes that no further assessment work is warranted at this time fro the Former UST area.

6.3 Suspected Fuel Tank Area

Analytical results from borings, placed in and around the suspected fuel tank area, indicate that there has been a release of petroleum hydrocarbons. Boring P1 and P20 had heavy staining and free product in the soil. Four additional borings (P2, P3, HA1 and HA2) were placed south, west, east and northeast of P1 approximately 20, 12, 10 and 15 feet radial from P1, respectively. Analytical results from soil and groundwater samples, appear to indicate that the area of impact is localized to the area approximately 10 to 15 feet radial from P1 and P20 and from approximately 5 to 15 feet bgs. The northern boundary appears to be located beneath the existing fabrication building.

Due to the location and type of contamination remedial alternatives are limited. The petroleum hydrocarbons is in the diesel and heavy oil range, with minor amounts of lighter volatile hydrocarbons, and is generally not amenable to soil vapor extraction or bioremediation. Generally soil excavation is a viable alternative however due to the proximity of the existing building and retaining wall, soil excavation activities may affect the structural integrity of the building. Based on these preliminary remediation constraints, ADaPT conducted a preliminary risk based closure calculation to evaluate the potential alternative for leaving the existing contamination in place. Based on the results of the preliminary calculations, the concentrations of PAHs in soil and groundwater appear to exceed MCTA Method B and C Clean up levels in the impacted area. Although the absence of detected concentrations of petroleum hydrocarbons in the groundwater in the hand auger borings to the east of the retaining wall appears to indicate that the petroleum hydrocarbons have apparently not migrated offsite.

7.0 CLOSURE

Depending on Acrowood's planned objectives for the subject site and the necessity of a Ecology review, a "No Further Action" letter from Ecology, may be prudent or required. ADaPT believes it would be possible to obtain a NFA for the Former UST and Paint/Solvent Storage building based on current data. However, Ecology would likely require groundwater monitoring data from approved groundwater monitoring wells prior to issuance of a NFA for the suspected fuel tank area. As such ADaPT believes it would be prudent to install three groundwater monitoring wells in the vicinity of the suspected fuel tank area to obtain representative data on the groundwater conditions downgradient of the suspected fuel tank area. ADaPT also believes it would be prudent to discuss these findings with an environmental attorney.

8.0 LIMITATIONS

This report has been prepared to aid in the evaluation of the site and can be relied upon by Acrowood Corporation and their agents. Our conclusions and recommendations have been prepared in accordance with generally accepted professional engineering principles and practices. We make no other warranty, neither express nor implied. Our conclusions are based on results of field explorations in a limited portion of the subject site, and on our interpretation of analytical results. However, the Supplemental Phase II did not collect, or analyze, soil or groundwater from all areas of the site only areas that appeared to have historical usage which might have the potential to impact the environment, and does not guarantee that additional areas, items or objects are not present on the subject site. Care should be taken during any remodeling or redevelopment of the subject site and any observed environmental impacts should be assessed at that time. If conditions are encountered that appear different from those described in this report, we must be notified so we may review and verify or modify our recommendations.

ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

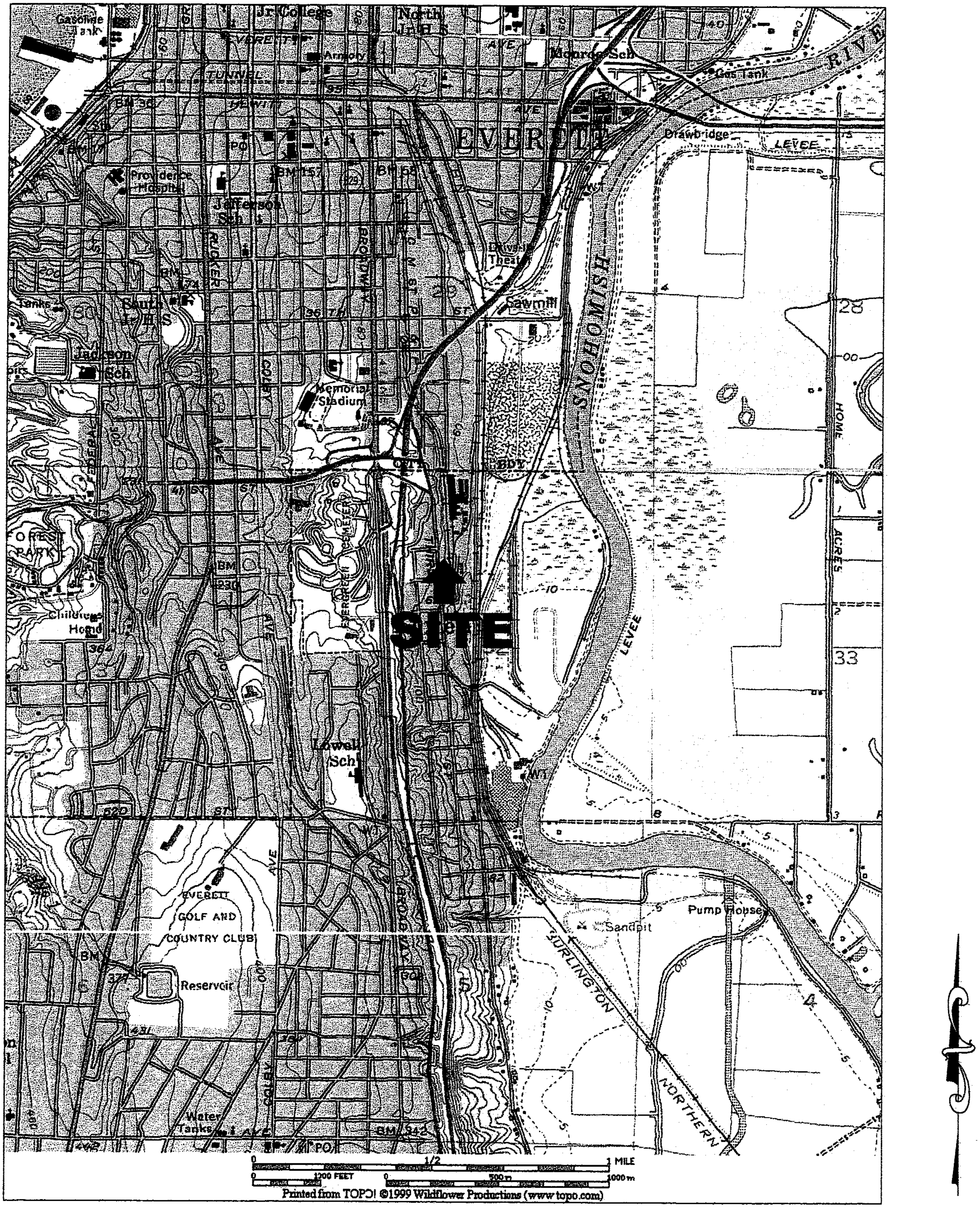
ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Environmental Manager
Environmental Services

Reviewed by:

Daryl S. Petrarca, R.E.A.
VP, Environmental Services Department

KAR/DSP/kar



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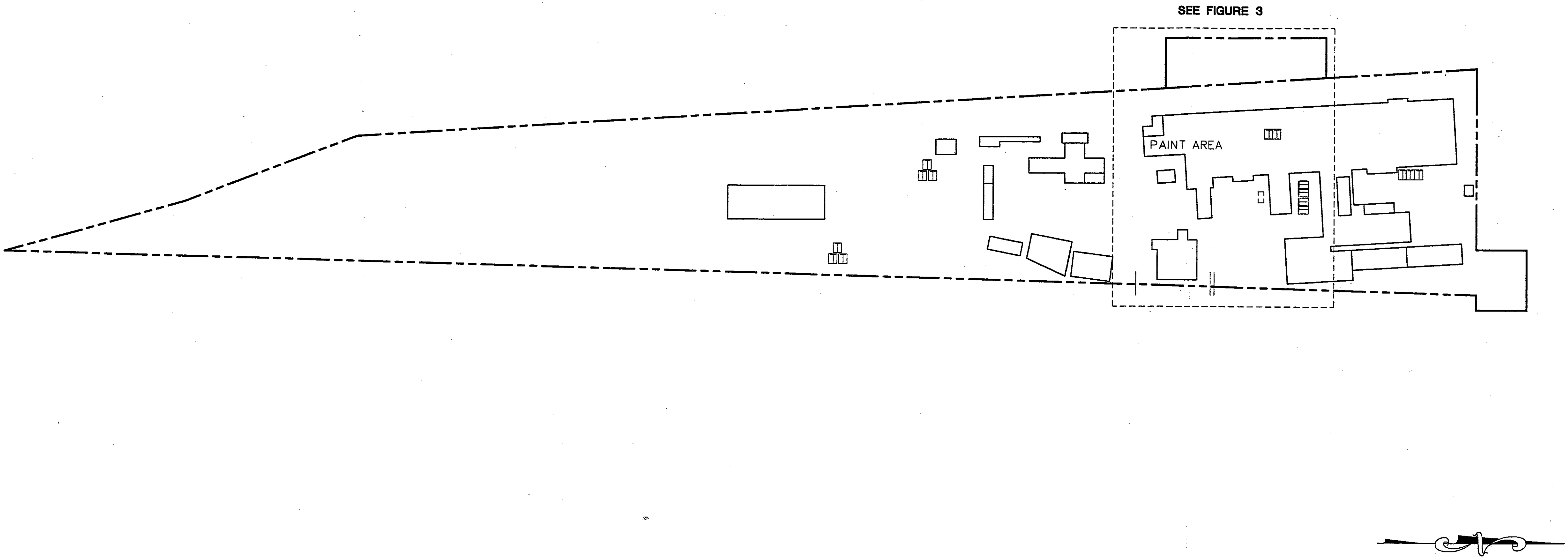
ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 1 - Location/Topographic Map

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 5/3/00 **Job # :** S-WA-99-2877-1

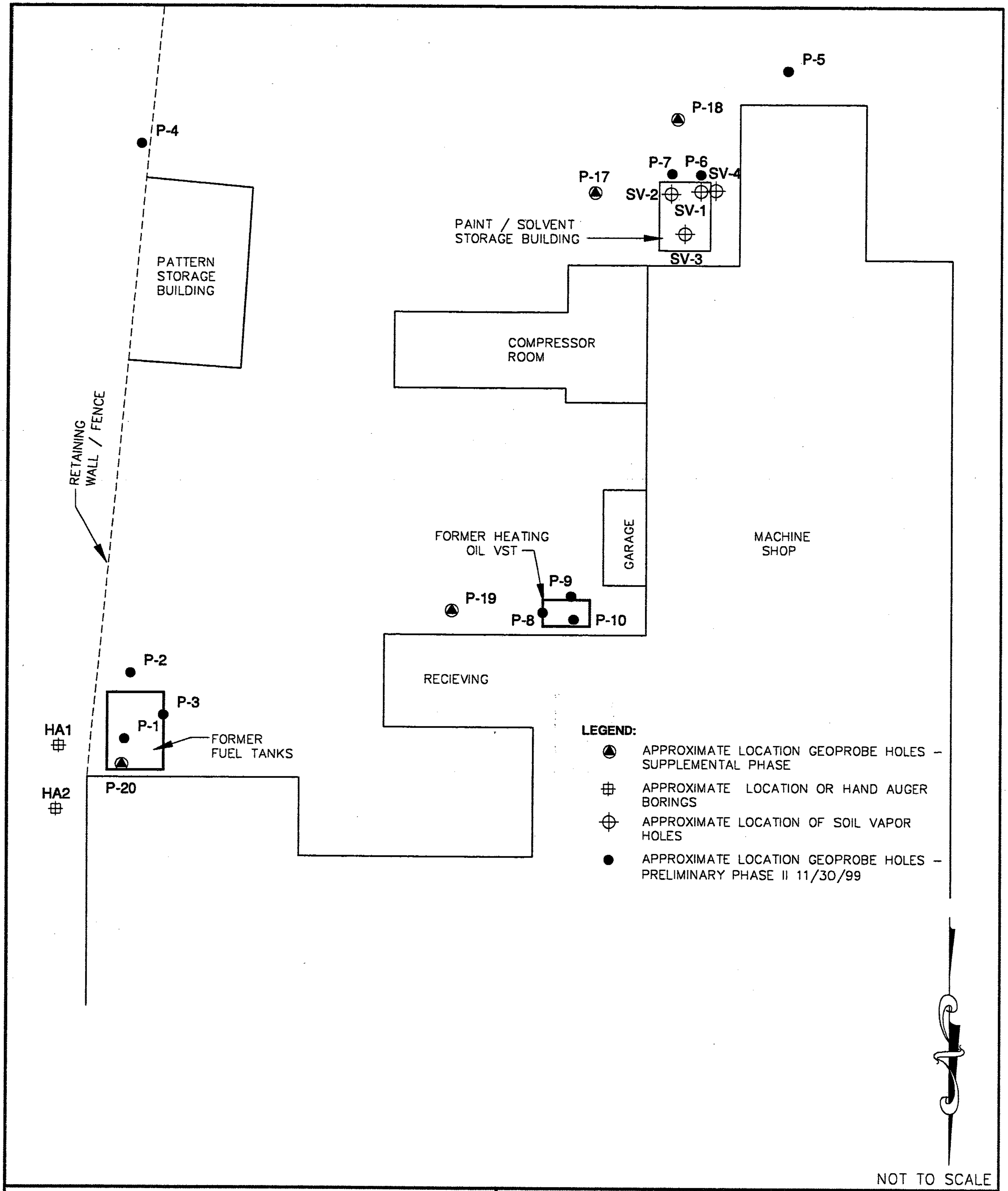


ADaPT **Engineering, Inc.**

800 Maynard Avenue S., Suite 403
Seattle, Washington 98134
Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 2 - Site Plan

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 5/3/00
Job # : S-WA-99-2877-1



ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 3 - Exploration Detail

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 5/3/00 **Job # :** S-WA-99-2877-1

APPENDIX A

SUBSURFACE EXPLORATION PROCEDURES AND BORING LOGS

APPENDIX A

SUBSURFACE EXPLORATION PROCEDURES AND BORING LOGS

Geoprobe Borings

The field exploration program conducted for this study consisted of advancing a series of 4 Geoprobe borings. The approximate locations are Illustrated on Figures 3. These locations were obtained In the field by taping and pacing from existing site features.

The borings were advanced on April 17, 2000 by Cascade Drilling, Inc., a local exploration drilling company under subcontract to our firm. Each boring consisted of driving a 1.5-Inch outside diameter drill rod and attached sample barrel and probe tip with a truck-mounted drill rig. The drill rod was pushed to the desired sampling depth then the sample barrel was pushed three feet. Soil samples were continuously obtained using a three foot long sampler. Borings were continuously observed and logged in the field by a geologist from our firm. Prior to each boring, the drilling equipment and sampling tools were decontaminated.

Characterization of Soil

Relatively undisturbed soil samples were collected at three foot intervals by using a three foot long 1.5-inch diameter split spoon sample barrel. The split spoon sample barrel was pushed to the desired depth and opened the sample barrel was then pushed into undisturbed soil at the bottom of the boring.

The soil samples were characterized by an experienced geologist from ADaPT. The samples were visually classified and screened using a photoionzation detector in the field.

Soil Sampling Procedures

The soil samples were removed at each interval using procedures designed to minimize the risk of cross contamination. Prior to each boring, the drilling equipment and sampling tools were scrubbed with a stiff brush and a solution of Liquinox (a phosphate free detergent) and water, and then rinsed with potable water and deionized water. The samples were classified and screened In the field, and Immediately transferred to laboratory-prepared glass jars, and tightly sealed with a Teflon-lined, threaded cap. Samples were stored and transported in a chilled-cooler throughout the field program. All retained soil samples were subsequently transferred to the chemical testing laboratory in accordance with ADaPT, chain-of-custody procedures.

Groundwater Sampling Procedures

Following completion of the boring a five foot temporary screen was installed in the boring and a1/4-inch ID polyethylene tubing inserted into the temporary well. The wells were then developed by pumping until relatively clear with a peristaltic pump.

Groundwater samples were obtained from each monitoring well for laboratory analysis using the peristaltic pump. Following sampling, recovered portions were immediately placed in laboratory-prepared glass jars and tightly sealed with Teflon-lined, threaded caps. The samples were stored and transported, as previously described under the section on soil sampling. The temporary well was removed after sampling and the boring backfilled with bentonite grout.

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877-1

Boring No. : **P-17**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Medium dense, moist, dark brown, coarse SAND with gravel		P17-3		0.4			
	Medium dense, moist, medium brown, fine medium SAND							
			P17-6		0.4			
5								
	As above		P17-9		0.9			
						▼		
	As above		P17-11		0.4			
10								
	End hole at 11 feet Water was at ~ 8.5 feet							
15								
20								
25								
30								

LEGEND

	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
✕	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 4/17/00

Drilling Completion Date : 4/17/00

Logged By : KAR

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877-1

Boring No. : **P-18**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Medium dense, moist, brown, fine medium SAND	‖	P18-3		1.2			
	As above	‖	P18-6		1.6			
5								
	As above	‖	P18-9		1.6	▼		
10	End hole at 9 feet Water at ~ 7 feet							
15								
20								
25								
30								

LEGEND

⊥	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
‖	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
╳	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 4/17/00
Drilling Completion Date : 4/17/00
Logged By : KAR

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877-1

Boring No. : P-19

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose, moist, red brown, fine coarse SAND with gravel and iron slag		P19-3		1.4			
	Medium dense, moist, light brown, fine medium SAND							
	As above		P19-6		2.4			
5								
	As above		P19-9		2.1	▼		
10	End hole at 9 feet Water at ~ 7 feet							
15								
20								
25								
30								

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
I	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
X	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Geo-log1

Page : 1 of 1

Drilling Start Date : 4/17/00
Drilling Completion Date : 4/17/00
Logged By : KAR

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877-1

Boring No. : **P-20**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

AS-BUILT DESIGN

TESTING

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER
0	Loose, damp, black, fine medium SAND with brick, concrete, iron fragments		P20-3		1.3	
3	Iron slag fragments				-	
5						
6					3.7	
7	Iron SLAG and brown CLAY		P20-9			
9					41.3	
10	Loose to medium dense, moist to very moist, gray to black, clayey SAND with visible petroleum staining		P20-12			
12	Medium dense, wet, black to brown, sandy CLAY faint petroleum odor		P20-15		15.3	
13						▼
15	End hole at 15 feet Water at ~ 13 feet Trace to 1/4 inches free product on water table					
20						
25						
30						

LEGEND

⌶	2-Inch O. D. Split-Spoon Sample	▼	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	DATE ▽	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
✕	Sample not Recovered	DATE ▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Bo-log1

Page : 1 of 1

Drilling Start Date : 4/17/00

Drilling Completion Date : 4/17/00

Logged By : KAR

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877-1

Boring No. : **HA1**

Elevation Reference : N/A
Ground Surface Elevation : N/A

Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Soft, very moist, CLAY with gravel, faint to moderate petroleum odor trace staining	▨	HA1-1		21.3			
	Loose, wet, brown, clayey SAND No petroleum odor							
		▨	HA1-4		21.3	▼		
5	Becomes dense at 5.5 feet							
	End boring at 5.5 feet Water at 4 feet							
10								
15								
20								
25								
30								

LEGEND

⌶	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
⌶	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
╳	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Bor-log1

Page : 1 of 1

Drilling Start Date : 4/17/00

Drilling Completion Date : 4/17/00

Logged By : KAR

GEOPROBE LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Job Number : WA99-2877-1

Boring No. : **HA2**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	PID (PPM)	GROUND WATER	AS-BUILT DESIGN	TESTING
0	Loose, moist to very moist, black to brown, clayey SAND							
	Loose, very moist to wet, brown, clayey SAND							
						▼		
		▨	HA2-1		5.4			
5	End boring at 5 feet Water at ~ 3.5 feet							
10								
15								
20								
25								
30								

LEGEND

Ⲓ	2-Inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
Ⲓ	2" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
╳	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 4/17/00
Drilling Completion Date : 4/17/00
Logged By : KAR

APPENDIX B

LABORATORY ANALYTICAL REPORT /CHAIN OF CUSTODY FORMS

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877-1
Project Manager: Keith Ross

Reported:
03/30/00 14:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SV-1-A	B0C0568-01	Air	03/27/00 09:40	03/27/00 16:00
SV-2-A	B0C0568-02	Air	03/27/00 10:45	03/27/00 16:00
SV-3-A	B0C0568-03	Air	03/27/00 12:15	03/27/00 16:00
SV-4-A	B0C0568-04	Air	03/27/00 13:25	03/27/00 16:00

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877-1
Project Manager: Keith Ross

Reported:
03/30/00 14:56

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SV-1-A (B0C0568-01) Air	**Sampled: 03/27/00 09:40**	**Received: 03/27/00 16:00**							
Bromodichloromethane	ND	2.00	ug/l Air	1	0C29008	03/29/00	03/29/00	EPA 8260B	
Bromoform	ND	2.00	"	"	"	"	"	"	
Bromomethane	ND	2.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.00	"	"	"	"	"	"	
Chlorobenzene	ND	2.00	"	"	"	"	"	"	
Chloroethane	ND	2.00	"	"	"	"	"	"	
Chloroform	ND	2.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
Methylene chloride	ND	10.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.00	"	"	"	"	"	"	
Tetrachloroethene	ND	2.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.00	"	"	"	"	"	"	
Trichloroethene	ND	2.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.00	"	"	"	"	"	"	
Vinyl chloride	ND	2.00	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	*89.2 %*	*70-130*			"	"	"	"	
Surrogate: 4-BFB	*98.9 %*	*70-130*			"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SV-2-A (B0C0568-02) Air Sampled: 03/27/00 10:45 Received: 03/27/00 16:00									
Bromodichloromethane	ND	2.00	ug/l Air	1	0C29008	03/29/00	03/29/00	EPA 8260B	
Bromoform	ND	2.00	"	"	"	"	"	"	
Bromomethane	ND	2.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.00	"	"	"	"	"	"	
Chlorobenzene	ND	2.00	"	"	"	"	"	"	
Chloroethane	ND	2.00	"	"	"	"	"	"	
Chloroform	ND	2.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
Methylene chloride	ND	10.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.00	"	"	"	"	"	"	
Tetrachloroethene	ND	2.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.00	"	"	"	"	"	"	
Trichloroethene	ND	2.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.00	"	"	"	"	"	"	
Vinyl chloride	ND	2.00	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	*93.2 %*	*70-130*			"	"	"	"	
Surrogate: 4-BFB	*106 %*	*70-130*			"	"	"	"	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877-1
Project Manager: Keith Ross

Reported:
03/30/00 14:56

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SV-3-A (B0C0568-03) Air Sampled: 03/27/00 12:15 Received: 03/27/00 16:00									
Bromodichloromethane	ND	2.00	ug/l Air	1	0C29008	03/29/00	03/29/00	EPA 8260B	
Bromoform	ND	2.00	"	"	"	"	"	"	
Bromomethane	ND	2.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.00	"	"	"	"	"	"	
Chlorobenzene	ND	2.00	"	"	"	"	"	"	
Chloroethane	ND	2.00	"	"	"	"	"	"	
Chloroform	ND	2.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
Methylene chloride	ND	10.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.00	"	"	"	"	"	"	
Tetrachloroethene	ND	2.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.00	"	"	"	"	"	"	
Trichloroethene	ND	2.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.00	"	"	"	"	"	"	
Vinyl chloride	ND	2.00	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	*98.0 %*	*70-130*			"	"	"	"	
Surrogate: 4-BFB	*104 %*	*70-130*			"	"	"	"	

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Amar Gill, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877-1
Project Manager: Keith Ross

Reported:
03/30/00 14:56

Volatile Organic Compounds by EPA Method 8260B
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SV-4-A (B0C0568-04) Air Sampled: 03/27/00 13:25 Received: 03/27/00 16:00									
Bromodichloromethane	ND	2.00	ug/l Air	1	0C29008	03/29/00	03/29/00	EPA 8260B	
Bromoform	ND	2.00	"	"	"	"	"	"	
Bromomethane	ND	2.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	2.00	"	"	"	"	"	"	
Chlorobenzene	ND	2.00	"	"	"	"	"	"	
Chloroethane	ND	2.00	"	"	"	"	"	"	
Chloroform	ND	2.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	2.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	2.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	2.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	2.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	2.00	"	"	"	"	"	"	
Methylene chloride	ND	10.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	2.00	"	"	"	"	"	"	
Tetrachloroethene	ND	2.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	2.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	2.00	"	"	"	"	"	"	
Trichloroethene	ND	2.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	2.00	"	"	"	"	"	"	
Vinyl chloride	ND	2.00	"	"	"	"	"	"	
Surrogate: 1,2-DCA-d4	*104 %*	*70-130*			"	"	"	"	
Surrogate: 4-BFB	*100 %*	*70-130*			"	"	"	"	

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877-1
Project Manager: Keith Ross

Reported:
03/30/00 14:56

Volatile Organic Compounds by EPA Method 8260B - Quality Control
North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0C29008: Prepared 03/29/00 Using EPA 5030B [P/T]										
Blank (0C29008-BLK1)										
Bromodichloromethane	ND	2.00	ug/l Air							
Bromoform	ND	2.00	"							
Bromomethane	ND	2.00	"							
Carbon tetrachloride	ND	2.00	"							
Chlorobenzene	ND	2.00	"							
Chloroethane	ND	2.00	"							
Chloroform	ND	2.00	"							
Chloromethane	ND	5.00	"							
Dibromochloromethane	ND	2.00	"							
1,2-Dichlorobenzene	ND	2.00	"							
1,3-Dichlorobenzene	ND	2.00	"							
1,4-Dichlorobenzene	ND	2.00	"							
1,1-Dichloroethane	ND	2.00	"							
1,2-Dichloroethane	ND	2.00	"							
1,1-Dichloroethene	ND	2.00	"							
cis-1,2-Dichloroethene	ND	2.00	"							
trans-1,2-Dichloroethene	ND	2.00	"							
1,2-Dichloropropane	ND	2.00	"							
cis-1,3-Dichloropropene	ND	2.00	"							
trans-1,3-Dichloropropene	ND	2.00	"							
Methylene chloride	ND	10.0	"							
1,1,2,2-Tetrachloroethane	ND	2.00	"							
Tetrachloroethene	ND	2.00	"							
1,1,1-Trichloroethane	ND	2.00	"							
1,1,2-Trichloroethane	ND	2.00	"							
Trichloroethene	ND	2.00	"							
Trichlorofluoromethane	ND	2.00	"							
Vinyl chloride	ND	2.00	"							
Surrogate: 1,2-DCA-d4	*9.79*		*"*	*10.0*		*97.9*	*70-130*			
Surrogate: 4-BFB	*10.7*		*"*	*10.0*		*107*	*70-130*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

Volatile Organic Compounds by EPA Method 8260B - Quality Control

North Creek Analytical - Bothell

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0C29008: Prepared 03/29/00 Using EPA 5030B [P/T]										
LCS (0C29008-BS1)										
Chlorobenzene	4.04	2.00	ug/l Air	5.00		80.8	60-140			
1,1-Dichloroethene	4.04	2.00	"	5.00		80.8	60-140			
Trichloroethene	3.73	2.00	"	5.00		74.6	60-140			
Surrogate: 1,2-DCA-d4	*9.33*		"	*10.0*		*93.3*	*70-130*			
Surrogate: 4-BFB	*10.3*		"	*10.0*		*103*	*70-130*			
LCS Dup (0C29008-BSD1)										
Chlorobenzene	4.75	2.00	ug/l Air	5.00		95.0	60-140	16.2	20	
1,1-Dichloroethene	4.39	2.00	"	5.00		87.8	60-140	8.30	20	
Trichloroethene	4.63	2.00	"	5.00		92.6	60-140	21.5	20	Q-07
Surrogate: 1,2-DCA-d4	*8.66*		"	*10.0*		*86.6*	*70-130*			
Surrogate: 4-BFB	*10.4*		"	*10.0*		*104*	*70-130*			

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

ADaPT Engineering, Inc. - Seattle
800 Maynard Avenue South, Suite 403
Seattle WA, 98134

Project: Acrowood
Project Number: WA99-2877-1
Project Manager: Keith Ross

Reported:
03/30/00 14:56

Notes and Definitions

Q-07	The RPD value for this QC sample is above the established control limit. Review of associated QC indicates the high RPD does not represent an out-of-control condition for the batch.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Amar Gill, Project Manager

nca™
North Creek Analytical, Inc.
Environmental Laboratory Network
www.ncalabs.com

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 (425) 420-9200 FAX 420-9210
East 11115 Montgomery, Suite B, Spokane, WA 98206-4776 (509) 924-9200 FAX 924-9290
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 FAX 906-9210
20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #: B0C0568

CLIENT: ADAPT
REPORT TO: KEITH ROSS
ADDRESS: 800 MAYNARD AVE S. #403
SEATTLE, WA 98134
PHONE: 206 654 7045 FAX: 654-7049

INVOICE TO: SAME.

P.O. NUMBER:

PROJECT NAME: ACROWOOD
PROJECT NUMBER: WA952877-1
SAMPLED BY: KEITH ROSS

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 (STD.) 7 5 4 3 2 1 <1

Petroleum Hydrocarbon Analyses: 5 (STD.) 4 [✓ 3] 2 1 <1

OTHER Please Specify

*Turnaround Requests less than standard may incur Rush Charges.

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES													MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
			HVOCs 8021B																
1.	SV-1-A	3/27/00 940	X													O	1		-01
2.	SV-2-A	3/27/00 1045	X													O	1		-02
3.	SV-3-A	| 1215	X													O	1		-03
4.	SV-4-A	| 1325	X													O	1		-04
5.																			
6.																			
7.																			
8.																			
9.																			
10.																			
11.																			
12.																			
13.																			
14.																			
15.																			

SAMPLES WERE NOT @ 2-6C UPON RECEIPT

RELINQUISHED BY: KAR
PRINT NAME: KEITH A. ROSS FIRM: ADAPT DATE: 3/27/00 TIME: 1608

RECEIVED BY:
PRINT NAME: FIRM: NCAB. DATE: 27Mar00 TIME: 1600

RELINQUISHED BY:
PRINT NAME: FIRM: DATE: TIME:

RECEIVED BY:
PRINT NAME: FIRM: DATE: TIME:

ADDITIONAL REMARKS:

N/A

TEMP:

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

April 5, 2000

Keith Ross
Adapt Engineering
800 Maynard Avenue S, Suite 403
Seattle, WA 98134

Re: Analytical Data for Project WA99-2877-1
Laboratory Reference No. 0003-197

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on March 27, 2000.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	3-28-00
Date Analyzed:	3-28-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	03-197-01
Client ID:	**SV-1-4**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.052
Chloromethane	ND		0.052
Vinyl Chloride	ND		0.052
Bromomethane	ND		0.052
Chloroethane	ND		0.052
Trichlorofluoromethane	ND		0.052
1,1-Dichloroethene	ND		0.052
Methylene Chloride	ND		0.26
(trans) 1,2-Dichloroethene	ND		0.052
1,1-Dichloroethane	ND		0.052
2,2-Dichloropropane	ND		0.052
(cis) 1,2-Dichloroethene	ND		0.052
Chloroform	ND		0.052
1,1,1-Trichloroethane	ND		0.052
Carbon Tetrachloride	ND		0.052
1,1-Dichloropropene	ND		0.052
1,2-Dichloroethane	ND		0.052
Trichloroethene	ND		0.052
1,2-Dichloropropane	ND		0.052
Dibromomethane	ND		0.052
Bromodichloromethane	ND		0.052
2-Chloroethyl Vinyl Ether	ND		0.26
(cis) 1,3-Dichloropropene	ND		0.052
(trans) 1,3-Dichloropropene	ND		0.052
1,1,2-Trichloroethane	ND		0.052
Tetrachloroethene	ND		0.052
1,3-Dichloropropane	ND		0.052

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 03-197-01
Client ID: **SV-1-4**

Compound	**Results**	**Flags**	**PQL**
Dibromochloromethane	ND		0.052
1,2-Dibromoethane	ND		0.052
Chlorobenzene	ND		0.052
1,1,1,2-Tetrachloroethane	ND		0.052
Bromoform	ND		0.052
Bromobenzene	ND		0.052
1,1,2,2-Tetrachloroethane	ND		0.052
1,2,3-Trichloropropane	ND		0.052
2-Chlorotoluene	ND		0.052
4-Chlorotoluene	ND		0.052
1,3-Dichlorobenzene	ND		0.052
1,4-Dichlorobenzene	ND		0.052
1,2-Dichlorobenzene	ND		0.052
1,2-Dibromo-3-chloropropane	ND		0.26
1,2,4-Trichlorobenzene	ND		0.052
Hexachlorobutadiene	ND		0.052
1,2,3-Trichlorobenzene	ND		0.052

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	81	65-125
Toluene-d8	105	77-116
4-Bromofluorobenzene	90	67-133

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	3-28-00
Date Analyzed:	3-28-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	03-197-02
Client ID:	**SV-2-3.5**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.058
Chloromethane	ND		0.058
Vinyl Chloride	ND		0.058
Bromomethane	ND		0.058
Chloroethane	ND		0.058
Trichlorofluoromethane	ND		0.058
1,1-Dichloroethene	ND		0.058
Methylene Chloride	ND		0.29
(trans) 1,2-Dichloroethene	ND		0.058
1,1-Dichloroethane	ND		0.058
2,2-Dichloropropane	ND		0.058
(cis) 1,2-Dichloroethene	ND		0.058
Chloroform	ND		0.058
1,1,1-Trichloroethane	ND		0.058
Carbon Tetrachloride	ND		0.058
1,1-Dichloropropene	ND		0.058
1,2-Dichloroethane	ND		0.058
Trichloroethene	ND		0.058
1,2-Dichloropropane	ND		0.058
Dibromomethane	ND		0.058
Bromodichloromethane	ND		0.058
2-Chloroethyl Vinyl Ether	ND		0.29
(cis) 1,3-Dichloropropene	ND		0.058
(trans) 1,3-Dichloropropene	ND		0.058
1,1,2-Trichloroethane	ND		0.058
Tetrachloroethene	ND		0.058
1,3-Dichloropropane	ND		0.058

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 03-197-02
Client ID: **SV-2-3.5**

Compound	**Results**	**Flags**	**PQL**
Dibromochloromethane	ND		0.058
1,2-Dibromoethane	ND		0.058
Chlorobenzene	ND		0.058
1,1,1,2-Tetrachloroethane	ND		0.058
Bromoform	ND		0.058
Bromobenzene	ND		0.058
1,1,2,2-Tetrachloroethane	ND		0.058
1,2,3-Trichloropropane	ND		0.058
2-Chlorotoluene	ND		0.058
4-Chlorotoluene	ND		0.058
1,3-Dichlorobenzene	ND		0.058
1,4-Dichlorobenzene	ND		0.058
1,2-Dichlorobenzene	ND		0.058
1,2-Dibromo-3-chloropropane	ND		0.29
1,2,4-Trichlorobenzene	ND		0.058
Hexachlorobutadiene	ND		0.058
1,2,3-Trichlorobenzene	ND		0.058

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	78	65-125
Toluene-d8	105	77-116
4-Bromofluorobenzene	91	67-133

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted:	3-28-00
Date Analyzed:	3-28-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	03-197-03
Client ID:	**SV-3-3.5**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.059
Chloromethane	ND		0.059
Vinyl Chloride	ND		0.059
Bromomethane	ND		0.059
Chloroethane	ND		0.059
Trichlorofluoromethane	ND		0.059
1,1-Dichloroethene	ND		0.059
Methylene Chloride	ND		0.29
(trans) 1,2-Dichloroethene	ND		0.059
1,1-Dichloroethane	ND		0.059
2,2-Dichloropropane	ND		0.059
(cis) 1,2-Dichloroethene	ND		0.059
Chloroform	ND		0.059
1,1,1-Trichloroethane	ND		0.059
Carbon Tetrachloride	ND		0.059
1,1-Dichloropropene	ND		0.059
1,2-Dichloroethane	ND		0.059
Trichloroethene	ND		0.059
1,2-Dichloropropane	ND		0.059
Dibromomethane	ND		0.059
Bromodichloromethane	ND		0.059
2-Chloroethyl Vinyl Ether	ND		0.29
(cis) 1,3-Dichloropropene	ND		0.059
(trans) 1,3-Dichloropropene	ND		0.059
1,1,2-Trichloroethane	ND		0.059
Tetrachloroethene	ND		0.059
1,3-Dichloropropane	ND		0.059

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B

page 2 of 2

Lab ID: 03-197-03
Client ID: **SV-3-3.5**

Compound	**Results**	**Flags**	**PQL**
Dibromochloromethane	ND		0.059
1,2-Dibromoethane	ND		0.059
Chlorobenzene	ND		0.059
1,1,1,2-Tetrachloroethane	ND		0.059
Bromoform	ND		0.059
Bromobenzene	ND		0.059
1,1,2,2-Tetrachloroethane	ND		0.059
1,2,3-Trichloropropane	ND		0.059
2-Chlorotoluene	ND		0.059
4-Chlorotoluene	ND		0.059
1,3-Dichlorobenzene	ND		0.059
1,4-Dichlorobenzene	ND		0.059
1,2-Dichlorobenzene	ND		0.059
1,2-Dibromo-3-chloropropane	ND		0.29
1,2,4-Trichlorobenzene	ND		0.059
Hexachlorobutadiene	ND		0.059
1,2,3-Trichlorobenzene	ND		0.059

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	74	65-125
Toluene-d8	104	77-116
4-Bromofluorobenzene	86	67-133

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
page 1 of 2

Date Extracted: 3-28-00
Date Analyzed: 3-28-00

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID: 03-197-04
Client ID: SV-4-3.5

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.053
Chloromethane	ND		0.053
Vinyl Chloride	ND		0.053
Bromomethane	ND		0.053
Chloroethane	ND		0.053
Trichlorofluoromethane	ND		0.053
1,1-Dichloroethene	ND		0.053
Methylene Chloride	ND		0.26
(trans) 1,2-Dichloroethene	ND		0.053
1,1-Dichloroethane	ND		0.053
2,2-Dichloropropane	ND		0.053
(cis) 1,2-Dichloroethene	ND		0.053
Chloroform	ND		0.053
1,1,1-Trichloroethane	ND		0.053
Carbon Tetrachloride	ND		0.053
1,1-Dichloropropene	ND		0.053
1,2-Dichloroethane	ND		0.053
Trichloroethene	ND		0.053
1,2-Dichloropropane	ND		0.053
Dibromomethane	ND		0.053
Bromodichloromethane	ND		0.053
2-Chloroethyl Vinyl Ether	ND		0.26
(cis) 1,3-Dichloropropene	ND		0.053
(trans) 1,3-Dichloropropene	ND		0.053
1,1,2-Trichloroethane	ND		0.053
Tetrachloroethene	ND		0.053
1,3-Dichloropropane	ND		0.053

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
page 2 of 2

Lab ID: 03-197-04
Client ID: **SV-4-3.5**

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.053
1,2-Dibromoethane	ND		0.053
Chlorobenzene	ND		0.053
1,1,1,2-Tetrachloroethane	ND		0.053
Bromoform	ND		0.053
Bromobenzene	ND		0.053
1,1,2,2-Tetrachloroethane	ND		0.053
1,2,3-Trichloropropane	ND		0.053
2-Chlorotoluene	ND		0.053
4-Chlorotoluene	ND		0.053
1,3-Dichlorobenzene	ND		0.053
1,4-Dichlorobenzene	ND		0.053
1,2-Dichlorobenzene	ND		0.053
1,2-Dibromo-3-chloropropane	ND		0.26
1,2,4-Trichlorobenzene	ND		0.053
Hexachlorobutadiene	ND		0.053
1,2,3-Trichlorobenzene	ND		0.053

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	82	65-125
Toluene-d8	109	77-116
4-Bromofluorobenzene	92	67-133

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 1 of 2

Date Extracted:	3-28-00
Date Analyzed:	3-29-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	MB0328S1

Compound	Results	Flags	PQL
Dichlorodifluoromethane	ND		0.050
Chloromethane	ND		0.050
Vinyl Chloride	ND		0.050
Bromomethane	ND		0.050
Chloroethane	ND		0.050
Trichlorofluoromethane	ND		0.050
1,1-Dichloroethene	ND		0.050
Methylene Chloride	ND		0.25
(trans) 1,2-Dichloroethene	ND		0.050
1,1-Dichloroethane	ND		0.050
2,2-Dichloropropane	ND		0.050
(cis) 1,2-Dichloroethene	ND		0.050
Chloroform	ND		0.050
1,1,1-Trichloroethane	ND		0.050
Carbon Tetrachloride	ND		0.050
1,1-Dichloropropene	ND		0.050
1,2-Dichloroethane	ND		0.050
Trichloroethene	ND		0.050
1,2-Dichloropropane	ND		0.050
Dibromomethane	ND		0.050
Bromodichloromethane	ND		0.050
2-Chloroethyl Vinyl Ether	ND		0.25
(cis) 1,3-Dichloropropene	ND		0.050
(trans) 1,3-Dichloropropene	ND		0.050
1,1,2-Trichloroethane	ND		0.050
Tetrachloroethene	ND		0.050
1,3-Dichloropropane	ND		0.050

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
page 2 of 2

Lab ID: MB0328S1

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.050
1,2-Dibromoethane	ND		0.050
Chlorobenzene	ND		0.050
1,1,1,2-Tetrachloroethane	ND		0.050
Bromoform	ND		0.050
Bromobenzene	ND		0.050
1,1,2,2-Tetrachloroethane	ND		0.050
1,2,3-Trichloropropane	ND		0.050
2-Chlorotoluene	ND		0.050
4-Chlorotoluene	ND		0.050
1,3-Dichlorobenzene	ND		0.050
1,4-Dichlorobenzene	ND		0.050
1,2-Dichlorobenzene	ND		0.050
1,2-Dibromo-3-chloropropane	ND		0.25
1,2,4-Trichlorobenzene	ND		0.050
Hexachlorobutadiene	ND		0.050
1,2,3-Trichlorobenzene	ND		0.050

Surrogate	Percent Recovery	Control Limits
Dibromofluoromethane	81	65-125
Toluene-d8	103	77-116
4-Bromofluorobenzene	87	67-133

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

HALOGENATED VOLATILES by EPA 8260B
MS/MSD QUALITY CONTROL

Date Extracted:	3-28-00
Date Analyzed:	3-28-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	03-170-01

Compound	Spike Amount	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
1,1-Dichloroethene	2.50	2.60	104	2.45	98	5.9	
Benzene	2.50	1.84	74	1.75	70	5.0	
Trichloroethene	2.50	2.37	95	2.15	86	9.7	
Toluene	2.50	2.30	92	2.23	89	3.1	
Chlorobenzene	2.50	2.31	92	2.13	85	8.1	

Date of Report: April 5, 2000
Samples Submitted: March 27, 2000
Lab Traveler: 03-197
Project: WA99-2877-1

Date Analyzed: 3-28-00

% MOISTURE

Client ID	Lab ID	% Moisture
SV-1-4	03-197-01	4.0
SV-2-3.5	03-197-02	14
SV-3-3.5	03-197-03	15
SV-4-3.5	03-197-04	5.0

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected
MRL - Method Reporting Limit
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

Page 1 of 1

Company: ADaPT
Project No.: WA99-2877-1
Project Name: Acrowood
Project Manager: Keith Rosi

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☒ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)
☐ 4/4 (other)

Project Chemist: DB

Laboratory No. 03-197

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
1	SV-1-4	3/27/00	1040	S	1					X															X
2	SV-2-3.5	|	1100	S	1					X															X
3	SV-3-3.5	|	1225	S	1					X															X
4	SV-4-3.5	|	1350	S	1					X															X

RELINQUISHED BY	DATE 3/27/00	RECEIVED BY	DATE 3/27/00
FIRM ADaPT	TIME 1547	FIRM OSE	TIME 3:47
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS:

Chromatographs with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

April 21, 2000

Keith Ross
Adapt Engineering
800 Maynard Avenue S, Suite 403
Seattle, WA 98134

Re: Analytical Data for Project WA00-2877.1
Laboratory Reference No. 0004-098

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on April 17, 2000. **Please note that the EPH data will follow.**

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx

Date Extracted: 4-19-00
Date Analyzed: 4-19-00

Matrix: Soil
Units: mg/Kg (ppm)

Client ID:	P19-9	P20-15	HA1-4
Lab ID:	04-098-12	04-098-17	04-098-20
Diesel Fuel:	ND	ND	75
PQL:	30	29	31
Heavy Oil:	ND	ND	500
PQL:	60	58	61
Surrogate Recovery:			
o-Terphenyl	83%	68%	79%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Client ID:	HA2-5
Lab ID:	04-098-22
Diesel Fuel:	ND
PQL:	38
Heavy Oil:	ND
PQL:	76
Surrogate Recovery:	
o-Terphenyl	66%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	MB0419S1
Diesel Fuel:	ND
PQL:	25
Heavy Oil:	ND
PQL:	50
Surrogate Recovery:	
o-Terphenyl	116%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 4-19-00
Date Analyzed: 4-19-00

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID:	04-098-12	04-098-12 DUP
Diesel Fuel:	ND	ND
PQL:	25	25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	83%	95%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx

Date Extracted: 4-19-00
Date Analyzed: 4-19&21-00

Matrix: Water
Units: mg/L (ppm)

Client ID:	P19-W	HA1-W	HA2-W
Lab ID:	04-098-13	04-098-21	04-098-23
Diesel Fuel:	ND	ND	ND
PQL:	0.25	0.25	0.25
Heavy Oil:	ND	ND	ND
PQL:	0.50	0.50	0.50
Surrogate Recovery:			
o-Terphenyl	80%	102%	73%
Flags:		Y	

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB0419W1
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	80%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-21-00
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB0419W1
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	104%
Flags:	Y

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	04-098-13	04-098-13 DUP
Diesel Fuel:	ND	ND
PQL:	0.25	0.25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	80%	85%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	4-24-00
Date Analyzed:	4-24-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	04-098-05
Client ID:	**P17-W**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Chloroform	ND		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	4.9		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID:	04-098-05
Client ID:	**P17-W**

Compound	Results	Flags	PQL
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		0.20
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		1.0
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	Percent Recovery		Control Limits
Dibromofluoromethane	148	Q	71-133
Toluene-d8	108		80-151
4-Bromofluorobenzene	121		75-139

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

HALOGENATED VOLATILES by EPA 8260B
Page 1 of 2

Date Extracted:	4-24-00
Date Analyzed:	4-24-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	04-098-09
Client ID:	**P18-W**

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		0.20
Chloromethane	ND		0.20
Vinyl Chloride	ND		0.20
Bromomethane	ND		0.20
Chloroethane	ND		0.20
Trichlorofluoromethane	ND		0.20
1,1-Dichloroethene	ND		0.20
Methylene Chloride	ND		1.0
(trans) 1,2-Dichloroethene	ND		0.20
1,1-Dichloroethane	ND		0.20
2,2-Dichloropropane	ND		0.20
(cis) 1,2-Dichloroethene	ND		0.20
Chloroform	1.8		0.20
1,1,1-Trichloroethane	ND		0.20
Carbon Tetrachloride	ND		0.20
1,1-Dichloropropene	ND		0.20
1,2-Dichloroethane	ND		0.20
Trichloroethene	0.27		0.20
1,2-Dichloropropane	ND		0.20
Dibromomethane	ND		0.20
Bromodichloromethane	ND		0.20
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		0.20
(trans) 1,3-Dichloropropene	ND		0.20
1,1,2-Trichloroethane	ND		0.20
Tetrachloroethene	ND		0.20
1,3-Dichloropropane	ND		0.20

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

HALOGENATED VOLATILES by EPA 8260B

Page 2 of 2

Lab ID: 04-098-09
Client ID: **P18-W**

Compound	**Results**	**Flags**	**PQL**
Dibromochloromethane	ND		0.20
1,2-Dibromoethane	ND		0.20
Chlorobenzene	ND		0.20
1,1,1,2-Tetrachloroethane	ND		0.20
Bromoform	ND		0.20
Bromobenzene	ND		0.20
1,1,2,2-Tetrachloroethane	ND		0.20
1,2,3-Trichloropropane	ND		1.0
2-Chlorotoluene	ND		0.20
4-Chlorotoluene	ND		0.20
1,3-Dichlorobenzene	ND		0.20
1,4-Dichlorobenzene	ND		0.20
1,2-Dichlorobenzene	ND		0.20
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		0.20
Hexachlorobutadiene	ND		0.20
1,2,3-Trichlorobenzene	ND		0.20

Surrogate	**Percent Recovery**		**Control Limits**
Dibromofluoromethane	152	Q	71-133
Toluene-d8	109		80-151
4-Bromofluorobenzene	126		75-139

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 1 of 2

Date Extracted:	4-24-00
Date Analyzed:	4-24-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0424W1

Compound	**Results**	**Flags**	**PQL**
Dichlorodifluoromethane	ND		1.0
Chloromethane	ND		1.0
Vinyl Chloride	ND		1.0
Bromomethane	ND		1.0
Chloroethane	ND		1.0
Trichlorofluoromethane	ND		1.0
1,1-Dichloroethene	ND		1.0
Methylene Chloride	ND		5.0
(trans) 1,2-Dichloroethene	ND		1.0
1,1-Dichloroethane	ND		1.0
2,2-Dichloropropane	ND		1.0
(cis) 1,2-Dichloroethene	ND		1.0
Chloroform	ND		1.0
1,1,1-Trichloroethane	ND		1.0
Carbon Tetrachloride	ND		1.0
1,1-Dichloropropene	ND		1.0
1,2-Dichloroethane	ND		1.0
Trichloroethene	ND		1.0
1,2-Dichloropropane	ND		1.0
Dibromomethane	ND		1.0
Bromodichloromethane	ND		1.0
2-Chloroethyl Vinyl Ether	ND		1.0
(cis) 1,3-Dichloropropene	ND		1.0
(trans) 1,3-Dichloropropene	ND		1.0
1,1,2-Trichloroethane	ND		1.0
Tetrachloroethene	ND		1.0
1,3-Dichloropropane	ND		1.0

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

HALOGENATED VOLATILES by EPA 8260B
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Lab ID: MB0424W1

Compound	**Results**	**Flags**	**PQL**
Dibromochloromethane	ND		1.0
1,2-Dibromoethane	ND		1.0
Chlorobenzene	ND		1.0
1,1,1,2-Tetrachloroethane	ND		1.0
Bromoform	ND		1.0
Bromobenzene	ND		1.0
1,1,2,2-Tetrachloroethane	ND		1.0
1,2,3-Trichloropropane	ND		1.0
2-Chlorotoluene	ND		1.0
4-Chlorotoluene	ND		1.0
1,3-Dichlorobenzene	ND		1.0
1,4-Dichlorobenzene	ND		1.0
1,2-Dichlorobenzene	ND		1.0
1,2-Dibromo-3-chloropropane	ND		1.0
1,2,4-Trichlorobenzene	ND		1.0
Hexachlorobutadiene	ND		1.0
1,2,3-Trichlorobenzene	ND		1.0

Surrogate	**Percent Recovery**	**Control Limits**
Dibromofluoromethane	106	71-133
Toluene-d8	105	80-151
4-Bromofluorobenzene	113	75-139

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

HALOGENATED VOLATILES by EPA 8260B
SB/SBD QUALITY CONTROL

Date Extracted:	4-24-00
Date Analyzed:	4-24-00
Matrix:	Water
Units:	ug/L (ppb)

Lab ID: SB0424W1

Compound	**Spike Amount**	**SB**	**Percent Recovery**	**SBD**	**Percent Recovery**	**RPD**	**Flags**
1,1-Dichloroethene	50.0	44.3	89	42.1	84	5.0	
Benzene	50.0	45.3	91	44.0	88	3.0	
Trichloroethene	50.0	47.0	94	46.8	94	0.6	
Toluene	50.0	45.9	92	44.6	89	2.8	
Chlorobenzene	50.0	47.5	95	47.9	96	0.8	

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

PAH's by EPA 8270C

Date Extracted:	4-19-00
Date Analyzed:	4-20-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	04-098-16
Client ID:	**P20-12**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	15		2.0
2-Methylnaphthalene	100		2.0
Acenaphthylene	ND		2.0
Acenaphthene	7.9		2.0
Fluorene	12		2.0
Phenanthrene	33		2.0
Anthracene	7.1		2.0
Fluoranthene	2.1		2.0
Pyrene	11		2.0
Benzo[a]anthracene	5.1		2.0
Chrysene	8.0		2.0
Benzo[b]fluoranthene	ND		2.0
Benzo[k]fluoranthene	ND		2.0
Benzo[a]pyrene	1.4	J	2.0
Indeno[1,2,3-cd]pyrene	ND		2.0
Dibenz[a,h]anthracene	ND		2.0
Benzo[g,h,i]perylene	ND		2.0

Surrogate :	**Percent Recovery**		**Control Limits**
2-Fluorophenol	30		25 - 121
Phenol-d6	33		24 - 113
Nitrobenzene-d5	46		23 - 120
2-Fluorobiphenyl	71		30 - 115
2,4,6-Tribromophenol	---	S	19 - 122
Terphenyl-d14	62		18 - 137

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

PAH's by EPA 8270C
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	MB0419S1

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.033
2-Methylnaphthalene	ND		0.033
Acenaphthylene	ND		0.033
Acenaphthene	ND		0.033
Fluorene	ND		0.033
Phenanthrene	ND		0.033
Anthracene	ND		0.033
Fluoranthene	ND		0.033
Pyrene	ND		0.033
Benzo[a]anthracene	ND		0.033
Chrysene	ND		0.033
Benzo[b]fluoranthene	ND		0.033
Benzo[k]fluoranthene	ND		0.033
Benzo[a]pyrene	ND		0.033
Indeno[1,2,3-cd]pyrene	ND		0.033
Dibenz[a,h]anthracene	ND		0.033
Benzo[g,h,i]perylene	ND		0.033

Surrogate :	**Percent Recovery**	**Control Limits**
2-Fluorophenol	57	25 - 121
Phenol-d6	63	24 - 113
Nitrobenzene-d5	60	23 - 120
2-Fluorobiphenyl	69	30 - 115
2,4,6-Tribromophenol	70	19 - 122
Terphenyl-d14	81	18 - 137

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

PAH's by EPA 8270C
MS/MSD QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	04-091-10

Compound:	**Spike Amount**	**MS**	**Percent Recovery**	**MSD**	**Percent Recovery**	**RPD**	**Flags**
Acenaphthene	1.67	1.32	77	1.25	73	5.1	
Pyrene	1.67	1.25	74	1.23	73	1.3	

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

PAH's by EPA 8270C

Date Extracted:	4-20-00
Date Analyzed:	4-21-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	04-098-18
Client ID:	**P20-W**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	60		0.50
2-Methylnaphthalene	200		5.0
Acenaphthylene	2.1		0.50
Acenaphthene	16		0.50
Fluorene	17		0.50
Phenanthrene	36		0.50
Anthracene	8.7		0.50
Fluoranthene	2.7		0.50
Pyrene	12		0.50
Benzo[a]anthracene	5.6		0.50
Chrysene	8.8		0.50
Benzo[b]fluoranthene	0.77		0.50
Benzo[k]fluoranthene	ND		0.50
Benzo[a]pyrene	1.6		0.50
Indeno[1,2,3-cd]pyrene	ND		0.50
Dibenz[a,h]anthracene	ND		0.50
Benzo[g,h,i]perylene	0.94		0.50

Surrogate :	**Percent Recovery**		**Control Limits**
2-Fluorophenol	52		21 - 100
Phenol-d6	56		10 - 94
Nitrobenzene-d5	71		35 - 114
2-Fluorobiphenyl	99		43 - 116
2,4,6-Tribromophenol	147	Q	10 - 123
Terphenyl-d14	76		33 - 144

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

PAH's by EPA 8270C
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-20-00
Date Analyzed:	4-21-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0420W1

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.50
2-Methylnaphthalene	ND		0.50
Acenaphthylene	ND		0.50
Acenaphthene	ND		0.50
Fluorene	ND		0.50
Phenanthrene	ND		0.50
Anthracene	ND		0.50
Fluoranthene	ND		0.50
Pyrene	ND		0.50
Benzo[a]anthracene	ND		0.50
Chrysene	ND		0.50
Benzo[b]fluoranthene	ND		0.50
Benzo[k]fluoranthene	ND		0.50
Benzo[a]pyrene	ND		0.50
Indeno[1,2,3-cd]pyrene	ND		0.50
Dibenz[a,h]anthracene	ND		0.50
Benzo[g,h,i]perylene	ND		0.50

Surrogate :	**Percent Recovery**	**Control Limits**
2-Fluorophenol	49	21 - 100
Phenol-d6	41	10 - 94
Nitrobenzene-d5	56	35 - 114
2-Fluorobiphenyl	68	43 - 116
2,4,6-Tribromophenol	69	10 - 123
Terphenyl-d14	70	33 - 144

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

PAH's by EPA 8270C
SB/SBD QUALITY CONTROL

Date Extracted:	4-20-00
Date Analyzed:	4-21-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	SB0420W1

Compound:	**Spike Amount**	**SB**	**Percent Recovery**	**SBD**	**Percent Recovery**	**RPD**	**Flags**
Acenaphthene	50.0	17.0	34	18.1	36	6.3	I
Pyrene	50.0	17.8	36	18.9	38	5.8	

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS

Date Extracted: 4-19-00
Date Analyzed: 4-20-00

Matrix: Soil
Units: mg/Kg (ppm)

Lab ID: 04-098-16
Client ID: **P20-12**

VPH:	**Results**	**PQL**
Aliphatic C5-C6	ND	5.0
Aliphatic C6-C8	5.9	5.0
Aliphatic C8-C10	ND	5.0
Aliphatic C10-C12	110	5.0
Total Aliphatic:	120	
Aromatic C8-C10	40	5.0
Aromatic C10-C12	250	5.0
Aromatic C12-C13	600	5.0
Total Aromatic:	890	
Target Analytes:		
Methyl t-butylether	ND	0.50
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylene	ND	0.50
o-Xylene	0.68	0.50

Surrogate:	**Percent Recovery**	**Control Limits**
Fluorobenzene	93	60%-140%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS
METHOD BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-20-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	MB0419S2

VPH:	**Results**	**PQL**
Aliphatic C5-C6	ND	5.0
Aliphatic C6-C8	ND	5.0
Aliphatic C8-C10	ND	5.0
Aliphatic C10-C12	ND	5.0
Total Aliphatic:	NA	
Aromatic C8-C10	ND	5.0
Aromatic C10-C12	ND	5.0
Aromatic C12-C13	ND	5.0
Total Aromatic:	NA	
Target Analytes:		
Methyl t-butylether	ND	0.50
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylene	ND	0.50
o-Xylene	ND	0.50

Surrogate:	**Percent Recovery**	**Control Limits**
Fluorobenzene	130	60%-140%

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS
DUPLICATE QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-20-00
Matrix:	Soil
Units:	mg/Kg (ppm)

Lab ID:	04-091-08	04-091-08 DUP			
VPH:	**Results**	**Results**	**PQL**	**RPD**	**Flags**
Aliphatic C5-C6	ND	ND	5.0	NA	
Aliphatic C6-C8	40.8	30.4	5.0	29	
Aliphatic C8-C10	ND	30.4	5.0	NA	
Aliphatic C10-C12	97.0	85.1	5.0	13	
Aromatic C8-C10	72.3	56.1	5.0	25	
Aromatic C10-C12	106	88.9	5.0	18	
Aromatic C12-C13	98.6	88.2	5.0	11	
Target Analytes:					
Methyl t-butylether	ND	ND	0.50	NA	
Benzene	ND	ND	0.50	NA	
Toluene	ND	ND	0.50	NA	
Ethylbenzene	0.507	ND	0.50	NA	
m,p-Xylene	1.14	1.02	0.50	11	
o-Xylene	ND	ND	0.50	NA	

Surrogate:	**Percent Recovery**	**Percent Recovery**	**Control Limits**
Fluorobenzene	84	75	60%-140%

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS
SB/SBD QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-20-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Spike Level:	1.00 ppm

Lab ID:	SB0419S1		SB0419S1 DUP		
	Result	Percent Recovery	Result	Percent Recovery	PQL
Methyl t-butylether	1.10	110	1.19	119	0.50
Benzene	1.11	111	1.01	101	0.50
Toluene	1.19	119	1.17	117	0.50
Ethylbenzene	1.20	120	1.19	119	0.50
m,p-Xylene	1.23	123	1.16	116	0.50
o-Xylene	1.20	120	1.18	118	0.50

Surrogate:	Percent Recovery	Percent Recovery	Control Limits
Fluorobenzene	130	120	60%-140%

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS

Date Extracted:	4-21-00
Date Analyzed:	4-21-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	04-098-18
Client ID:	**P20-W**

VPH:	**Results**	**PQL**
Aliphatic C5-C6	ND	50
Aliphatic C6-C8	ND	50
Aliphatic C8-C10	ND	50
Aliphatic C10-C12	110	50
Total Aliphatic:	110	
Aromatic C8-C10	98	50
Aromatic C10-C12	300	50
Aromatic C12-C13	580	50
Total Aromatic:	980	
Target Analytes:		
Methyl t-butylether	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylene	ND	5.0
o-Xylene	7.6	5.0

Surrogate:	**Percent Recovery**	**Control Limits**
Fluorobenzene	110	60%-140%

Flags:

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS METHOD BLANK QUALITY CONTROL

Date Extracted:	4-20-00
Date Analyzed:	4-20-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0420W1

VPH:	**Results**	**PQL**
Aliphatic C5-C6	ND	50
Aliphatic C6-C8	ND	50
Aliphatic C8-C10	ND	50
Aliphatic C10-C12	ND	50
Total Aliphatic:	NA	
Aromatic C8-C10	ND	50
Aromatic C10-C12	ND	50
Aromatic C12-C13	ND	50
Total Aromatic:	NA	
Target Analytes:		
Methyl t-butylether	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylene	ND	5.0
o-Xylene	ND	5.0

Surrogate:	**Percent Recovery**	**Control Limits**
Fluorobenzene	120	60%-140%

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS METHOD BLANK QUALITY CONTROL

Date Extracted:	4-21-00
Date Analyzed:	4-21-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0421W1

VPH:	**Results**	**PQL**
Aliphatic C5-C6	ND	50
Aliphatic C6-C8	ND	50
Aliphatic C8-C10	ND	50
Aliphatic C10-C12	ND	50
Total Aliphatic:	NA	
Aromatic C8-C10	ND	50
Aromatic C10-C12	ND	50
Aromatic C12-C13	ND	50
Total Aromatic:	NA	
Target Analytes:		
Methyl t-butylether	ND	5.0
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylene	ND	5.0
o-Xylene	ND	5.0

Surrogate:	**Percent Recovery**	**Control Limits**
Fluorobenzene	110	60%-140%

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS DUPLICATE QUALITY CONTROL

Date Extracted:	4-21-00
Date Analyzed:	4-21-00
Matrix:	Water
Units:	ug/L (ppb)

Lab ID:	04-098-18	04-098-18 DUP			
VPH:	**Results**	**Results**	**PQL**	**RPD**	**Flags**
Aliphatic C5-C6	ND	ND	50	NA	
Aliphatic C6-C8	ND	ND	50	NA	
Aliphatic C8-C10	ND	ND	50	NA	
Aliphatic C10-C12	108	107	50	0.93	
Aromatic C8-C10	98.1	108	50	9.6	
Aromatic C10-C12	301	343	50	13	
Aromatic C12-C13	584	631	50	7.7	
Target Analytes:					
Methyl t-butylether	ND	ND	5.0	NA	
Benzene	ND	ND	5.0	NA	
Toluene	ND	ND	5.0	NA	
Ethylbenzene	ND	ND	5.0	NA	
m,p-Xylene	ND	ND	5.0	NA	
o-Xylene	7.55	7.96	5.0	5.3	

Surrogate:	**Percent Recovery**	**Percent Recovery**	**Control Limits**
Fluorobenzene	110	110	60%-140%

Date of Report: April 21, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877.1

VOLATILE PETROLEUM HYDROCARBONS
SB/SBD QUALITY CONTROL

Date Extracted: 4-20-00
Date Analyzed: 4-20-00

Matrix: Water
Units: ug/L (ppb)

Spike Level: 50.0 (ppb)

Lab ID:	SB0420W1		SB0420W1 DUP			
	Result	**Percent Recovery**	**Result**	**Percent Recovery**	**PQL**	**RPD**
Methyl t-butylether	57.3	115	51.2	102	5.0	11
Benzene	46.2	92	46.3	93	5.0	0.22
Toluene	46.8	94	46.2	92	5.0	1.3
Ethylbenzene	42.8	86	48.0	96	5.0	11
m,p-Xylene	46.2	92	52.1	104	5.0	12
o-Xylene	47.7	95	50.4	101	5.0	5.5

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected
MRL - Method Reporting Limit
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 2

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Company: ADaPT

Project No.: WA00-2877-1

Project Name: Arrowood

Project Manager: KEITH A ROSS

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☑ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)

☐ 4/24 4/25 (other)

Project Chemist: DB

Laboratory No.

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
1	P17-3	4/17/00	930	S	1																				
2	P17-6		940	S	1																				
3	P17-9		950	S	1																				
4	P17-11		900	S	1																				
5	P17-W		915	W	3					X															
6	P18-3		940	S	1																				
7	P18-6		945	S	1																				
8	P18-9		955	S	1																				
9	P18-W		1000	W	2					X															
10	P19-3		1025	S	1																				
11	P19-6		1030	S	1																				
12	P19-9		1040	S	1			X																	

RELINQUISHED BY KEITH Ross	DATE 4/17/00	RECEIVED BY	DATE 4/17/00
FIRM ADaPT	TIME 1655	FIRM	TIME 1155
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS: [illegible] DB

Chromatographs with final report ☐

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OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

Page 2 of 2

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☐ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)
☐ 4/24 - 4/25 (other)

Project Chemist: DB

Laboratory No.

Company: ADoPT
Project No.: WA00-2877-1
Project Name: Arrowood
Project Manager: Keith Ross

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
13	P19-W	4/17/00	1105	W	3			X																	
14	P20-3		1135	S	1																				
15	P20-9		1145	S	1																				
16	P20-12*		1155	S	1			~~X~~				⊗					⊗	⊗							⊗
17	P20-15		1205	S	1			X																	X
19	P20-W * (ANALYZE [illegible] VIAL FIRST)		1250	W	3			~~X~~				X					⊗	⊗							
19	HA1-1		1400	S	1																				
20	HA1-4		1410	S	1			X																	X
21	HA1-W		1500	W	1			X																	X
22	HA2-5		1440	S	1			X																	X
23	HA2-W		1525	W	1			X																	X

RELINQUISHED BY Keith Ross	DATE 4/17/00	RECEIVED BY	DATE 4/17/00
FIRM ADoPT	TIME 1655	FIRM	TIME 1655
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS:
* To have for additional Analysis
⊗ Added 4/19/00 DB

Chromatographs with final report ☐

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OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

April 27, 2000

Keith Ross
Adapt Engineering
800 Maynard Avenue S, Suite 403
Seattle, WA 98134

Re: Analytical Data for Project WA00-2877-1
Laboratory Reference No. 0004-098

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on April 17, 2000.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881 • Fax (425) 885-4603

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS

Date Extracted:	4-19-00
Date Analyzed:	4-21-00
Matrix:	Soil
Units:	mg/Kg (ppm)

Lab ID:	04-098-16	
Client ID:	**P20-12**	
	Results	**PQL**
Aliphatic C10-C12	69	5.3
Aliphatic C12-C16	870	5.3
Aliphatic C16-C18	400	5.3
Aliphatic C18-C21	370	5.3
Aliphatic C21-C28	690	5.3
Aliphatic C28-C36	760	5.3
Total Aliphatic	3200	
Aromatic C10-C12	85	5.3
Aromatic C12-C16	880	5.3
Aromatic C16-C18	440	5.3
Aromatic C18-C21	1600	5.3
Aromatic C21-C28	790	5.3
Aromatic C28-C36	740	5.3
Total Aromatic	4500	

Surrogate	**Percent Recovery**	**Control Limits**
o-Terphenyl	--	50 - 150
1-Chlorooctadecane	--	50 - 150

Flags: F

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS METHOD BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-21-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	MB0419S1

	Results	PQL
Aliphatic C10-C12	ND	5.0
Aliphatic C12-C16	ND	5.0
Aliphatic C16-C18	ND	5.0
Aliphatic C18-C21	ND	5.0
Aliphatic C21-C28	ND	5.0
Aliphatic C28-C36	ND	5.0
Total Aliphatic	NA	
Aromatic C10-C12	ND	5.0
Aromatic C12-C16	ND	5.0
Aromatic C16-C18	ND	5.0
Aromatic C18-C21	ND	5.0
Aromatic C21-C28	ND	5.0
Aromatic C28-C36	ND	5.0
Total Aromatic	NA	

Surrogate	**Percent Recovery**	**Control Limits**
o-Terphenyl	88	50 - 150
1-Chlorooctadecane	67	50 - 150

Flags:

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS DUPLICATE QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-21-00
Matrix:	Soil
Units:	mg/Kg (ppm)

Lab ID:	04-091-08	04-091-08 DUP		
	Results	**Results**	**PQL**	**RPD**
Aliphatic C10-C12	18.0	18.5	5.0	2.9
Aliphatic C12-C16	119	126	5.0	6.0
Aliphatic C16-C18	36.3	38.7	5.0	6.4
Aliphatic C18-C21	20.3	23.5	5.0	15
Aliphatic C21-C28	11.4	11.8	5.0	3.5
Aliphatic C28-C36	6.18	5.1	5.0	19
Aromatic C10-C12	7.49	6.11	5.0	20
Aromatic C12-C16	32.9	29.6	5.0	11
Aromatic C16-C18	13.0	11.7	5.0	10
Aromatic C18-C21	31.9	28.7	5.0	10
Aromatic C21-C28	ND	ND	5.0	NA
Aromatic C28-C36	ND	ND	5.0	NA

Surrogate	**Percent Recovery**	**Percent Recovery**	**Control Limits**
o-Terphenyl	62	89	50 - 150
1-Chlorooctadecane	62	77	50 - 150

Flags:

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS
SPIKE BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-21-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	SB0419S1
Spike Level:	100 ppm

	Results	PQL
Aliphatic C10-C12	ND	5.0
Aliphatic C12-C16	25.1	5.0
Aliphatic C16-C18	13.1	5.0
Aliphatic C18-C21	13.9	5.0
Aliphatic C21-C28	9.15	5.0
Aliphatic C28-C36	ND	5.0
Total Aliphatic	61.2	
Aromatic C10-C12	ND	5.0
Aromatic C12-C16	8.82	5.0
Aromatic C16-C18	ND	5.0
Aromatic C18-C21	12.8	5.0
Aromatic C21-C28	ND	5.0
Aromatic C28-C36	ND	5.0
Total Aromatic	21.6	
Percent Recovery	83	

Surrogate	Percent Recovery	Control Limits
o-Terphenyl	78	50 - 150
1-Chlorooctadecane	78	50 - 150

Flags:

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	04-098-18	
Client ID:	**P20-W**	
	Results	**PQL**
Aliphatic C10-C12	ND	0.050
Aliphatic C12-C16	0.40	0.050
Aliphatic C16-C18	0.20	0.050
Aliphatic C18-C21	0.20	0.050
Aliphatic C21-C28	0.39	0.050
Aliphatic C28-C36	0.39	0.050
Total Aliphatic	1.6	
Aromatic C10-C12	0.22	0.050
Aromatic C12-C16	0.94	0.050
Aromatic C16-C18	0.29	0.050
Aromatic C18-C21	0.88	0.050
Aromatic C21-C28	0.40	0.050
Aromatic C28-C36	0.36	0.050
Total Aromatic	3.1	

Surrogate	**Percent Recovery**	**Control Limits**
o-Terphenyl	101	50 - 150
1-Chlorooctadecane	96	50 - 150

Flags:

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS METHOD BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-26-00
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB0419S1

	Results	PQL
Aliphatic C10-C12	ND	0.050
Aliphatic C12-C16	ND	0.050
Aliphatic C16-C18	ND	0.050
Aliphatic C18-C21	ND	0.050
Aliphatic C21-C28	ND	0.050
Aliphatic C28-C36	ND	0.050
Total Aliphatic	NA	
Aromatic C10-C12	ND	0.050
Aromatic C12-C16	ND	0.050
Aromatic C16-C18	ND	0.050
Aromatic C18-C21	ND	0.050
Aromatic C21-C28	ND	0.050
Aromatic C28-C36	ND	0.050
Total Aromatic	NA	

Surrogate	Percent Recovery	Control Limits
o-Terphenyl	68	50 - 150
1-Chlorooctadecane	68	50 - 150

Flags:

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS
DUPLICATE QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	04-098-13	04-098-13 DUP		
	Results	**Results**	**PQL**	**RPD**
Aliphatic C10-C12	ND	ND	0.050	NA
Aliphatic C12-C16	ND	ND	0.050	NA
Aliphatic C16-C18	ND	ND	0.050	NA
Aliphatic C18-C21	ND	ND	0.050	NA
Aliphatic C21-C28	0.129	0.0661	0.050	64
Aliphatic C28-C36	0.166	0.0645	0.050	88
Aromatic C10-C12	ND	ND	0.050	NA
Aromatic C12-C16	ND	ND	0.050	NA
Aromatic C16-C18	ND	ND	0.050	NA
Aromatic C18-C21	ND	ND	0.050	NA
Aromatic C21-C28	ND	ND	0.050	NA
Aromatic C28-C36	ND	ND	0.050	NA

Surrogate	**Percent Recovery**		**Control Limits**
o-Terphenyl	72	71	50 - 150
1-Chlorooctadecane	68	61	50 - 150

Flags:

Date of Report: April 27, 2000
Samples Submitted: April 17, 2000
Lab Traveler: 04-098
Project: WA00-2877-1

EXTRACTABLE PETROLEUM HYDROCARBONS
SPIKE BLANK QUALITY CONTROL

Date Extracted:	4-19-00
Date Analyzed:	4-19-00
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	SB0419S1
Spike Amount	1.0 mg/L (ppm)

	Results	PQL
Aliphatic C10-C12	ND	0.050
Aliphatic C12-C16	0.23	0.050
Aliphatic C16-C18	0.13	0.050
Aliphatic C18-C21	0.13	0.050
Aliphatic C21-C28	0.085	0.050
Aliphatic C28-C36	ND	0.050
Total Aliphatic	0.58	
Aromatic C10-C12	ND	0.050
Aromatic C12-C16	0.072	0.050
Aromatic C16-C18	ND	0.050
Aromatic C18-C21	0.11	0.050
Aromatic C21-C28	ND	0.050
Aromatic C28-C36	ND	0.050
Total Aromatic	0.18	
Percent Recovery	76	

Surrogate	**Percent Recovery**	**Control Limits**
o-Terphenyl	78	50 - 150
1-Chlorooctadecane	80	50 - 150

Flags:

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

ND - Not Detected
MRL - Method Reporting Limit
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page ______ of ______

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Company: ADaPT
Project No.: WA00-2877-1
Project Name: Arrowood
Project Manager: KEITH ROSS

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Day ☐ 3 Day
☐ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)
☐ 4/24 - 4/25 (other)

Project Chemist: DB

Laboratory No. 04 - 098

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
13	P19-W	4/17/00	1105	W	3			X																	
14	P20-3		1135	S	1																				
15	P20-9		1145	S	1																				
16	P20-12*		1155	S	1			~~X~~				⊗					⊗	⊗							⊗
17	P20-15		1205	S	1			X																	X
18	P20-W *, (ANALYZE "USE FIRST" VIAL FIRST.)		1250	W	3			~~⊗~~				X					⊗	⊗							
19	HA1-1		1400	S	1																				
20	HA1-4		1410	S	1			X																	X
21	HA1-W		1500	W	1			X																	X
22	HA2-5		1440	S	1			X																	X
23	HA2-W		1525	W	1			X																	X

RELINQUISHED BY Keith Ross	DATE 4/17/00	RECEIVED BY	DATE 4/17/00
FIRM ADaPT	TIME 1655	FIRM OSE	TIME 1655
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS:
* To have for additional Analysis
⊗ Added 4/18/00 DB

Chromatographs with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

APPENDIX C

INTERIM TPH WORKSHEET

Worksheet:

Calculations for Using the TPH Interim Policy (Two Pathways: Human Health and Soil-to-Groundwater)*

1. As in "Calculations for Using the TPH Interim Policy" example put the soil concentrations in the "Soil Conc" column.
2. Examine the hazard index and risk for each land use you wish to use, for each chemical or fraction, and the "Conc. at the well."
3. Hazard quotients for individual substances or fractions cannot exceed 1.0
4. The hazard index (sum of the hazard quotients) cannot exceed 1.0
5. The risk for individual substance or fractions cannot exceed 1x10E-06 for residential land use or 1x10E-05 for commercial or industrial.
6. The risk for the total cannot exceed 1x10E-05 for any land use.
7. The "concentration at the well" cannot exceed 1.0 mg/L total TPH.
8. If any exceedence occurs in 3-7 above, then the cleanup level for TPH has not been met.

1	2	3	4	5	6	7	8	9	10	11	12	13
	Soil Conc.	RfD	OCPF	Residential		Commercial		Industrial		Mol. Frac.	Effect. Sol.	Conc.@ well
Compound	(mg/kg)	(mg/kg*day)	(kg*day/mg)	HQ	Risk	HQ	Risk	HQ	Risk	(percent)	(mg/l)	(mg/l)
Aliphatics												
EC 5 - 6	0									0.00	0.0	0.000
EC >6 - 8	6									0.00	0.01	0.000
EC >8 -10	0									0.00	0.000	0.0000
EC >10 -12	179									0.03	0.0008	0.00004
EC >12 -16	870									0.11	0.00007	0.00000
EC >16 - 21	770									0.07	0.0000001	0.000000
Total aliphatic	1825	0.06		0.38		0.10		0.01				
Aromatics												
EC >8 - 10	40									0.01	0.6	0.028
EC >10 - 12	335									0.07	1.7	0.084
EC >12 - 16	1480									0.26	1.50	0.075
EC >16 - 21	2040									0.28	0.143	0.0072
EC >21 - 35	1530									0.17	0.00110	0.0001
Total aromatic	5425	0.03										
Benzene	0		0.029		0.00E+00		0.00E+00		0.00E+00	0.00	0.0	0.00
c-PAHs	14.61		7.3		1.07E-04		2.67E-05		8.13E-06			
Ethylbenzene	0	0.10		0.00		0.00		0.00				
Toluene	0	0.20		0.00		0.00		0.00		0.00	0.0	0.000
Xylenes	0.68	2.00		0.00		0.00		0.00				
Total aromatic+B-E-X	5424	0.03		2.26		0.57		0.05				
Total				2.64	1.07E-04	0.66	2.67E-05	0.06	8.13E-06	1.00000		0.2

*Note: This worksheet calculates Methods B and C soil cleanup levels for TPH for two pathways: "direct contact human health" and "soil-to-groundwater." Other possible pathways, such as vapor and surface water must be considered (see "Interim Policy"). In Addition to not exceeding a TPH level in the groundwater of 1.0 mg/L, there cannot be exceedance in the groundwater for individual substances such as the "BETX" compounds.

APPENDIX E

ADAPT MONITORING WELL INSTALLATION AND 1ST QUARTER GROUNDWATER MONITORING REPORT

(August 29, 2000)

ADaPT

August 29, 2000

ADaPT Job No. WA99-2329-1

Acrowood Corporation, Inc.
4425 South Third Avenue
Everett, WA 98206

Attention: Mr. Farhang Javid

Subject: Groundwater Monitoring Well Installation and
1st Quarter Groundwater Quality Monitoring Report
Acrowood Corporation Facility
4425 South Third Avenue
Everett, Washington

Dear Mr. Javid:

ADaPT Engineering, Inc. (ADaPT), is pleased to provide you with the following results of our Groundwater Monitoring Well Installation and 1st Quarter Groundwater Quality Monitoring Report for the above referenced site. This report is provided for Acrowood Corporation and their agents. If this report is to be reproduced and/or transmitted to a third party, it must be reproduced and/or transmitted in its entirety. Any exceptions will be made only with the written permission of ADaPT.

ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Hydrogeologist
Environmental Services

800 Maynard Avenue South
Suite 403
Seattle, Washington 98134

ADaPT Engineering, Inc.

Tel (206)-654-7045
Fax (206) 654-7048
www.adaptengr.com

TABLE OF CONTENTS

Attachments:

0.0 EXECUTIVE SUMMARY

This report presents the findings of ADaPT's Monitoring Well Installation and 1st Quarterly Monitoring Results at the property located at 4425 South Third Avenue in Everett, Washington.

The purpose of our work was to assess site soil, and groundwater conditions beneath the site to provide data to evaluate the migration of documented impacts to soil and groundwater beneath the suspected fuel tank area.

A total of three hollow stem auger borings were advanced into the subsurface fill and native soils on the property to a depth of approximately 13 to 20 feet below ground surface. The borings were converted in to 2-inch groundwater monitoring wells.

A total of 3 soil and 3 groundwater samples were collected and submitted to the laboratory for analytical testing for diesel and heavy oil range petroleum hydrocarbons using NWTPH-Dx and polynuclear aromatic hydrocarbons using EPA Method 8270C. The groundwater samples were collected using micro-purging and sampling methods.

Results of the Monitoring well installation and first quarterly monitoring indicate concentrations of petroleum hydrocarbons were not detected above standard laboratory reporting limits.

This summary is intended for introductory purposes. The full body of the report should be read for relevant information and conclusions.

1.0 INTRODUCTION

1.1 General

This report presents the findings of ADaPT's Monitoring Well Installation and Soil and Groundwater Sampling and Testing Results at the property located at 4425 South Third Avenue in Everett, Washington. Our work was performed in general accordance with our proposal, dated June 29, 2000 (ADaPT proposal No. 1636).

1.2 Authorization

Written authorization to perform the work was given in the form of a signed proposal dated July 5, 2000.

1.3 Scope and Purpose

Our scope of services for this subsurface characterization included advancing three hollow stem auger borings into groundwater, installing groundwater monitoring wells in the borings, well development, submitting soil and water samples for analysis, advancing one hand auger boring along the southern property line, and report preparation.

The purpose of our work was to assess soil, and groundwater conditions in the subsurface. The monitoring well locations would be placed with the intent to maximize the effectiveness of the data.

1.4 Quality Assurance/Quality Control (QA/QC)

All sampling and testing was performed in general accordance with EPA and Washington Department of Ecology (Ecology) approved methodologies and generally accepted environmental practices.

1.5 Project Background

During ADaPT's preparation of the Phase I ESA, research revealed that the site has been used as a iron and metal foundry since 1913. Historical information indicated that Sumner Iron Works used the subject site for metal and iron casting and molding from 1913 to approximately the early 1970s. The site was occupied by Black-Clawson-Sumner as a metal fabrication facility until 1984. The current occupant Acrowood has operated the site for metal fabrication of forestry industry equipment since 1984. ADaPT identified several recognized environmental concerns associated with past and present site operations that warranted a Preliminary Phase II ESA.

ADaPT conducted a Preliminary Phase II in November 1999 and a Supplemental Phase II in April of 2000. The Phase II activities included Geoprobe borings at the recognized environmental concerns to assess the potential environmental impacts. Based on the results of the Preliminary Phase II, three of the six areas were identified with documented impacts to the soil and/or groundwater. The extent of impacts were delineated in two of the areas, the former UST and the Paint Storage Area. Based on analytical results, impacts to soil and or groundwater were below Washington State Model Toxics Control Act (MTCA) Method A Cleanup levels for both of the these areas. Only the suspected fuel tank area adjacent to the steel shop had exhibited concentrations of chemicals of concern above MTCA Cleanup levels in both soil and groundwater.

- **Suspected Fuel Tank Area:** The 1960 Sanborn Map depicts fuel oil tanks located on the east edge of the site adjacent to the steel shop (fabrication shop). Analytical results from borings placed in and around the suspected former fuel tank area, during the Phase II and Supplemental Phase II, indicate that there has been a release of petroleum hydrocarbons. Based on field observations the petroleum hydrocarbons appeared viscous and has been interpreted as Bunker C fuel oil mixed with some diesel. Two borings located in the center of the suspected fuel tank area, during the Phase II and Supplemental, had heavy petroleum staining and free product in the soil and groundwater. Four additional borings that were placed around the suspected fuel tank area, during the Phase II and Supplemental, appeared to delineate the lateral and vertical extent of the impacted soil and groundwater. Vertical sampling appeared to indicate that the vertical extent extends from approximately 4.5 to 16 feet below ground surface. The analytical results from the Phase IIs indicated that the impacted soil and groundwater was localized behind the retaining wall and under the building adjacent to the retaining wall. Groundwater samples from downgradient of the suspected fuel tank area within ten feet of the retaining wall did not exhibit diesel or heavy oil range hydrocarbons. In order to obtain closure on the subject site for the suspected fuel tank area groundwater monitoring data would be needed to document that the impacted groundwater has not migrated offsite or poses a health or environmental concern. In that regard Acrowood chose to install monitoring wells to further assess site conditions as described below.

2.0 PROCEDURES

2.1 Monitoring Well Installation

This phase of work involved advancing three hollow stem auger borings to depths of approximately 13 to 20 feet below ground surface (bgs). After completion of the borings, monitoring wells were installed in each boring. The borings were advanced using a hollow stem auger drill rig, owned and operated by Holt Drilling, Inc. (Holt), under subcontract to our firm. All borings were supervised, sampled, and logged by an ADaPT scientist. The borings were located based on field observations of site topography, and previous reported groundwater flow direction. Monitoring well MW1 was located west of the suspected fuel tank area in the upgradient direction. Monitoring wells MW2 and MW3 were located east of the retaining wall downgradient of the suspected fuel tank area. Figure 3 shows the approximate locations of the borings/monitoring wells, existing building, site boundaries, and other pertinent site features. Subsurface exploration and soil sampling procedures are described in Appendix A.

Monitoring well MW-1 was completed with 10 feet of 2-inch I.D., Schedule-40, PVC, blank casing thread fit to 10 feet of 2-inch I.D., Schedule-40, PVC, machine slotted well screen (0.02 inch slots). Monitoring well MW-2 was completed with 3.5 feet of 2-inch I.D., Schedule-40, PVC, blank casing thread fit to 10 feet of 2-inch I.D., Schedule-40, PVC, machine slotted well screen (0.02 inch slots). Monitoring well MW-3 was completed with 3 feet of 2-inch I.D., Schedule-40, PVC, blank casing thread fit to 10 feet of 2-inch I.D., Schedule-40, PVC, machine slotted well screen (0.02 inch slots). Each well was installed with graded #8-#10 Colorado silica sand filter pack, with a bentonite and concrete surface seal and a flush mounted traffic rated vault.

The monitoring wells were developed approximately 24 hours after installation. Each well was developed using a 1.5-inch O.D. submersible pump. The monitoring wells were alternately surged and pumped to clear the casing and filter sand of silt and clay particles and then pumped until the discharge was clear. All three wells ran dry after approximately 6.5 to 7 gallons and were allowed to recover prior to completion of development. Approximately 7.5 to 12 gallons of water were pumped from the wells during the development.

All soil cuttings, decontamination water, purge water, and development water were placed in labeled 55-gallon drums for temporary storage prior to evaluation for appropriate disposal.

A more through discussion of well installation, development, and sampling protocols appears in Appendix B, attached.

A total of 10 soil and three groundwater samples were collected from the three borings. Three soil and three groundwater samples were submitted to OnSite Environmental for analysis for diesel and heavy oil range petroleum hydrocarbons using NWTPH-Dx and polynuclear aromatic hydrocarbons using EPA Method 8270C.

2.2 Monitoring Well Sampling

The monitoring wells were sampled 24 hours after development to allow any residual particulate material to settle to the bottom of the well. The monitoring wells were sampled according to ADaPT's standard procedures for micro-purging and sampling. The wells were sampled using a GeoTech Peristaltic pump. Micro-purging and sampling was conducted at a flow rate designed to avoid mobilizing particulate matter from the formation. ADaPT purged the monitoring wells at a flow rate of approximately 0.125 liters per minute (L/m) in MW-1 and approximately 0.175 to 0.2 L/m in MW-2 and MW-3.

3.0 RESULTS

3.1 Subsurface Conditions - Soil

Soils encountered in Boring MW1 generally consisted of fill material consisting of loose to medium dense, light brown to black, damp to moist, silty sand to a depth of approximately 12 feet. Apparent native soils consisting of loose to medium dense, wet, light brown, silty fine to coarse sand with gravel, underlie the fill materials to the total depth of the hole. The soils encountered in borings MW2 and MW3 generally consisted of loose, moist to wet light brown, silty sand to approximately 12. An interbedded silty sand, fine sandy silt and silt was encountered underlying the silty sands to the total depth of the borings.

Soil samples collected from the borings did not exhibit obvious signs of environmental impact. All soil samples were field screened using a MiniRae Photoionzation Detector (PID). PID readings for all soil samples ranged from 0.8 ppm to 4.7 ppm. Samples from MW2 and MW3 were moist and generally exhibited higher readings.

3.2 Subsurface Conditions – Groundwater

Apparent "perched" groundwater was encountered during our explorations at depths ranging from approximately 4.5 feet bgs in MW2 and MW3 to 12 feet bgs in MW1 at the time of drilling. Top of casing and ground surface elevations of the new monitoring wells were established using optical differential leveling techniques relative to elevation from Monitoring Well MW1. An assumed elevation of 100 feet was established for MW1. Groundwater depth in MW 1 was 12.61 feet bgs, 5.39 feet bgs in MW2 and 5.52 feet bgs in MW3 as measured from the top of casing at the time of monitoring/sampling (August 10, 2000). Based on the observed elevations groundwater migration direction appears to be towards the east with a slight southward trend beneath the subject site. Fluid levels are summarized on Table 1, and estimated groundwater migration direction is graphically depicted on Figure 3.

Table 1: Summary of Fluid Measurements

Well Number	Top of Casing Elevation (ft)	Date Measured	Depth to Water (ft)	Groundwater Elevation (ft)
MW-1	100	8/09/00	12.59	87.41
		8/10/00	12.61	87.39
MW-2	89.92	8/09/00	5.32	84.60
		8/10/00	5.39	84.53
MW-3	90.48	8/09/00	5.35	85.13
		8/10/00	5.52	84.96

Notes: Wells were surveyed using an assumed elevation of Monitoring Well MW-1 as 100 feet.

4.0 QUANTITATIVE ANALYSES - RELATION TO MTCA METHOD A GUIDELINES

4.1 Quantitative Analyses – Soil

Three soil samples were submitted to OnSite for analytical testing for diesel and heavy oil range petroleum hydrocarbons using NWTPH-Dx and polynuclear aromatic hydrocarbons using EPA Method 8270C. Analytical results of soil samples are summarized below in Table 3.

Table 2: Summary of Soil Analytical Results

Sample				NWTPH-Dx (mg/kg)		EPA 287C PAHs (mg/kg)
ID	Depth (ft)	Date	PID (ppm)	Diesel	Heavy Oil	
MW1-10	8.5 –10	8/8/00	0.8	ND	ND	ND
MW-2-5	3.5-5	8/8/00	3.9	ND	ND	ND
MW3-5	3.5-5	8/8/00	4.8	ND	ND	ND
Washington State Model Toxics Control Act (MTCA) Method "A" Residential Clean up Level				200	200	Various

Based on the results summarized in Table 2, no chemicals of concern were detected above standard laboratory reporting limits. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 2.

4.2 Quantitative Analyses - Groundwater

Three groundwater samples were submitted to North Creek for analytical testing for HVOCs using EPA Method 8021B. The samples were collected using micro-sampling procedures designed to minimize agitation of the water. Monitoring Wells MW1 was purged at approximately 0.125 L/min. Monitoring well MW2 and MW3 were purged at approximately 0.175 to 0.200 L/min. The groundwater sample was collected with a pump rate of approximately 0.125 L/min. Field parameters were monitored during purging and samples were collected after stable reading for pH, temperature and conductivity were obtained. Groundwater sampling field parameter notes are presented in Appendix C. Analytical results have been summarized below in Table 4, depicted on Figure 3.

Table 3 : Summary of Groundwater Analytical Results

Sample		NWTPH-Dx (µg/L)		EPA 8270C PAHs (µg/L)
Sample ID	Date	Diesel	Heavy Oil	
MW1	8/10/00	ND	ND	ND
MW2	8/10/00	ND	ND	ND
MW3	8/10/00	ND	ND	ND
MTCA Method "A" Residential Clean up Level		1000.0		Various

Based on the results summarized in Table 3, no chemicals of concern were detected above standard laboratory reporting limits. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Petroleum hydrocarbons were not exhibited in any of the groundwater samples collected from the groundwater monitoring wells. In ADaPT's professional opinion, based on the analytical results, observed groundwater flow direction, and field observations, the petroleum hydrocarbons observed in the soil and groundwater beneath the steel shop and suspected former fuel tank area do not appear to have migrated off-site. ADaPT believes it would be prudent to continue the quarterly groundwater monitoring as outlined in the approved proposal. ADaPT anticipates that the next quarter groundwater sampling will be conducted in November, 2000.

6.0 LIMITATIONS

Information contained in this report is based upon site characterization, field observations, and the laboratory analyses completed for this study. Conclusions presented are professional opinions based upon our interpretation of the analytical laboratory test results, as well as our experience and observations during the field activities. The number, locations, and depth of the explorations, as well as the analytical scope were completed within the site and proposal constraints. ADaPT's observations and the analytical data are limited to the vicinity of each test probe and do not necessarily reflect conditions across the site. No other warranty, express or implied is made. In the event that additional information regarding either the site or surrounding properties becomes known, or changes to existing conditions occurs, the conclusions in this report should be reviewed, and if necessary, revised to reflect the updated information. Project specific limitations are presented in the appropriate sections of this report.

This report has been prepared for the exclusive use of Acrowood Corporation and their agents for specific application to the project site. Use or reliance upon this report by a third is at their own risk. ADaPT does not make any representation or warranty, express or implied, to such other parties as to the accuracy or completeness of this report or the suitability of its use by such other parties for any purpose whatever, known or unknown, to ADaPT.

ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

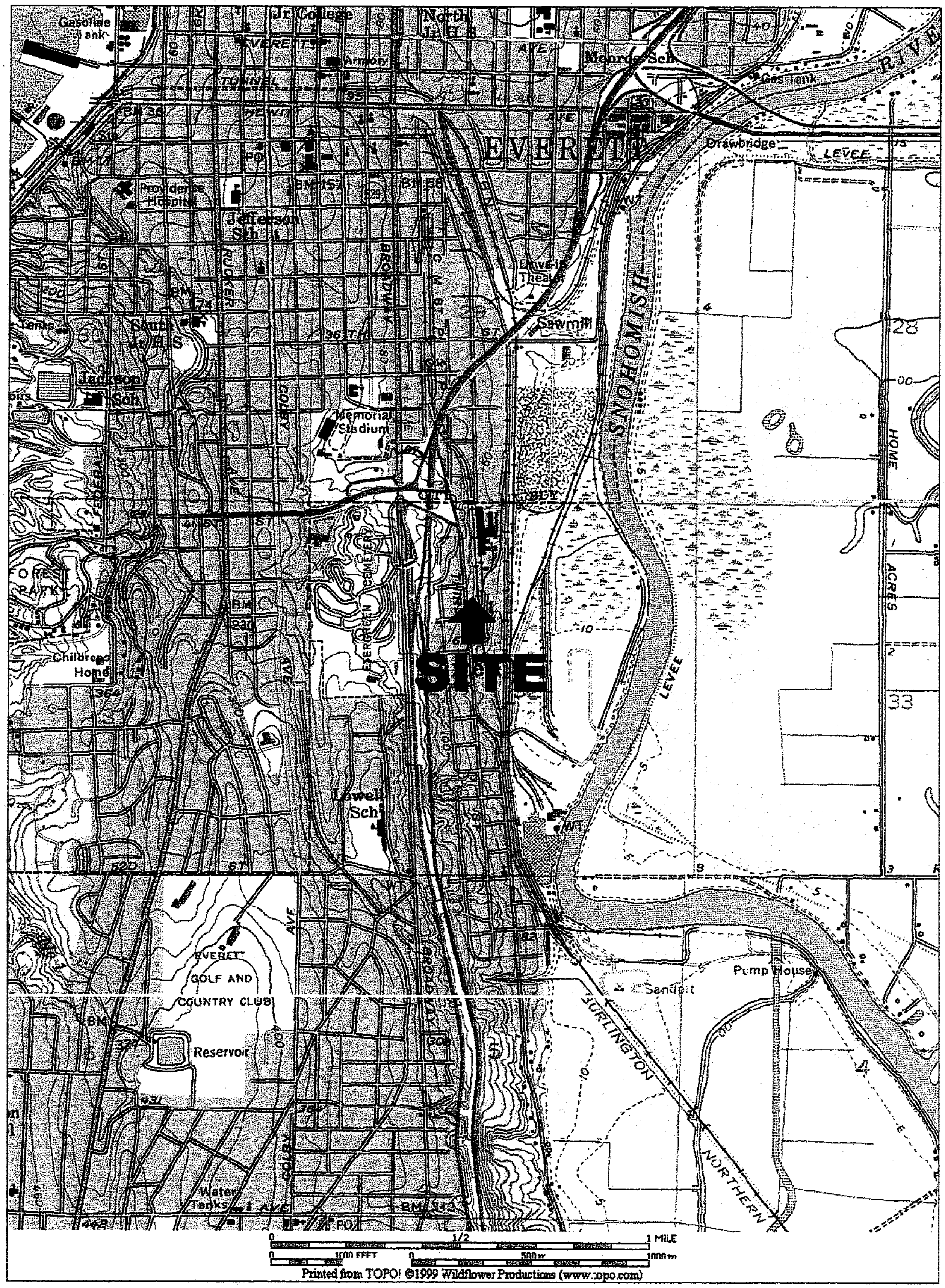
Respectfully Submitted,

ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Hydrogeologist
Environmental Services

Daryl S. Petrarca, R.E.A.
VP, Environmental Services Group
Senior Reviewer

KAR/DSP/kar



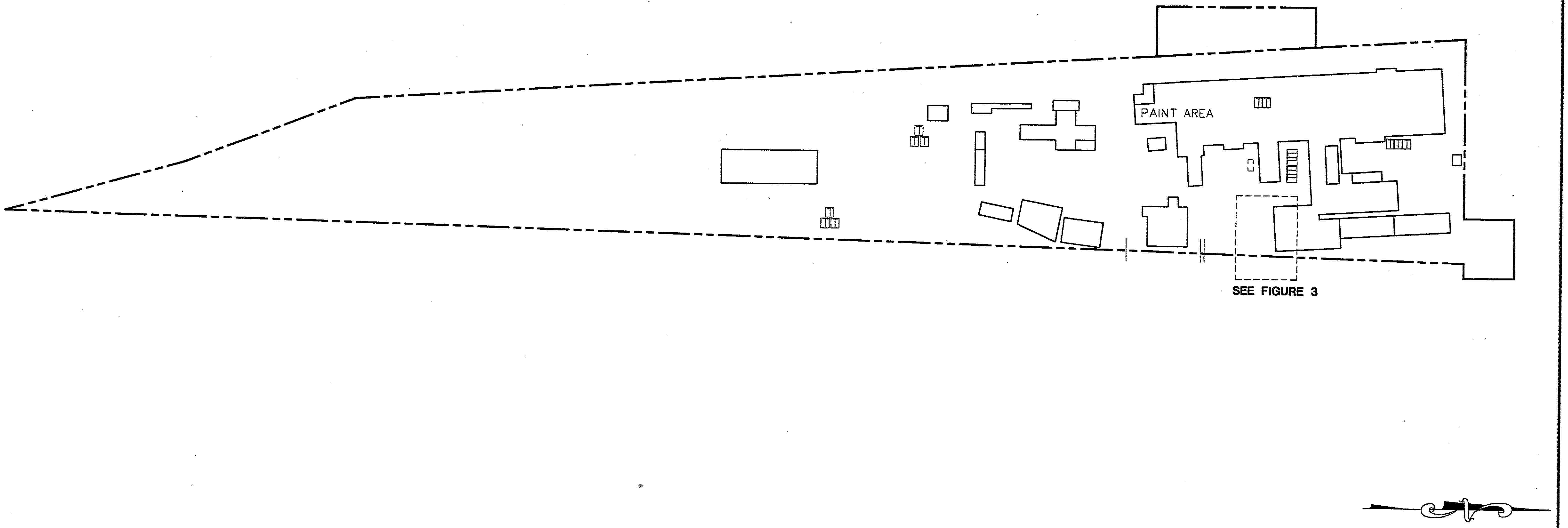
ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 1 - Location/Topographic Map

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00 **Job # :**S-WA-99-2877-2

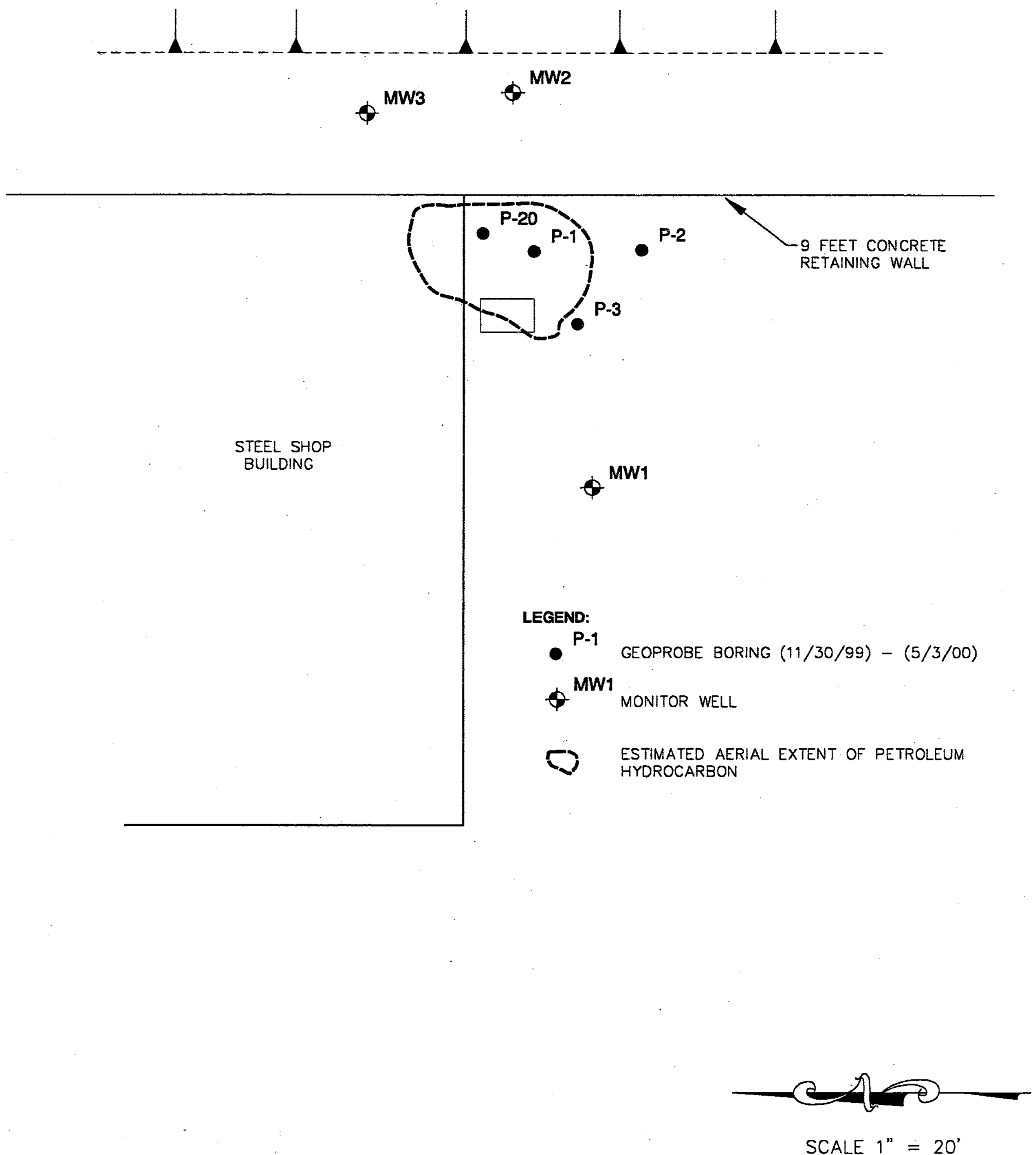


ADaPT **Engineering, Inc.**

800 Maynard Avenue S., Suite 403
Seattle, Washington 98134
Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 2 - Site Plan

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00
Job # : S-WA-99-2877-2

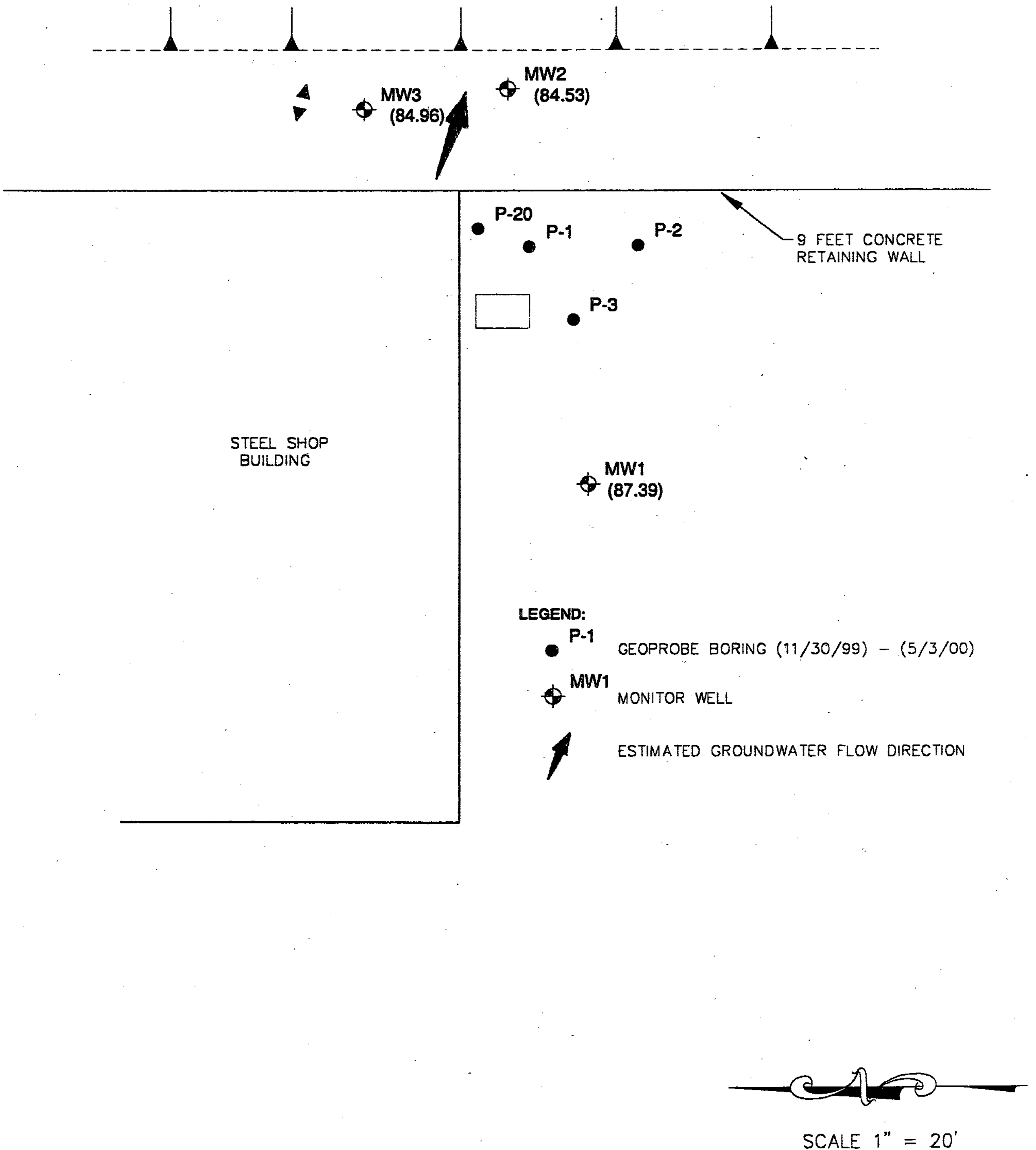


ADaPT Engineering, Inc.
800 Maynard Avenue S., Suite 403
Seattle, Washington 98134

Ph : 206.654.7045 Fax : 206.654.7048

FIG 3-Detail Suspect Fuel Tank Area

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00 **Job # :** S-WA-99-2877-2



ADaPT Engineering, Inc.
800 Maynard Avenue S., Suite 403
Seattle, Washington 98134

Ph : 206.654.7045 Fax : 206.654.7048

FIG 4-Groundwater Elevation (8/10/00)

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00 **Job # :** S-WA-99-2877-2

APPENDIX A

SUBSURFACE EXPLORATION PROCEDURES AND BORING LOGS

SUBSURFACE EXPLORATION PROCEDURES AND BORING LOGS

Soil Borings/Monitoring Wells

The field exploration program conducted for this study consisted of advancing a series of three hollow-stem auger borings which were completed as 2-inch ground monitoring wells. The approximate locations are illustrated on the Site Plan, Figure 1. These locations were obtained in the field by taping and pacing from existing site features.

The borings were advanced on August 8, 2000 by Holt Drilling, Inc., a local exploration drilling company under subcontract to our firm. Each boring consisted of advancing a 4-Inch inside diameter hollow-stem auger with a truck-mounted drill rig. During the drilling process, soil samples were generally obtained at 5-foot depth intervals. Borings were continuously observed and logged in the field by a geologist from our firm. Prior to each boring, the drilling equipment and sampling tools were steam cleaned.

Characterization of Soil

Disturbed soil samples were collected at 5-foot intervals by using the Standard Penetration Test Procedure, as described in ASTM: D-1 586. This test and sampling method consists of driving a standard 2-inch outside diameter split-barrel sampler a distance of 18 inches into the soil with a 140-pound hammer free falling a distance of 30 Inches. The number of blows for each 6-inch interval is recorded. The number of blows required to drive the sampler the final 12 inches is considered the Standard Penetration Resistance "N" or blow count. The blow counts are presented in the boring logs in this appendix. If a total of 50 blows are recorded within one 6-inch interval, the blow count is recorded as 50 blows for the actual number of inches of penetration. The blow count or N" value, provides a measure of the relative density of granular soils or the relative consistency of cohesive soils.

Field splits of the soil samples were characterized by an experienced geologist from ADaPT. Following collection, analytical samples were placed in laboratory-prepared glass jars equipped with Teflon-lined screw-on lids to minimize the loss of volatiles. All sample jars were immediately placed in a chilled cooler for storage, until they could be transported to an analytical laboratory under ADaPT's chain-of-custody procedures.

Soil Sampling Procedures

The soil samples were removed at each interval using procedures designed to minimize the risk of cross contamination. Prior to each boring, the drilling equipment and sampling tools were scrubbed with a stiff brush and a solution of Liquinox (a phosphate free detergent) and warm water, and then rinsed with potable water and deionized water. The samples were classified and screened in the field, and immediately transferred to laboratory-prepared glass jars, and tightly sealed with a Teflon-lined, threaded cap. Samples were stored and transported in a chilled chest throughout the field program. All retained soil samples were subsequently transferred to the chemical testing laboratory in accordance with ADaPT, chain-of-custody procedures.

Fluid Level Measurements

Fluid levels (water and/or immiscible free-phase liquids) are obtained prior to purging and sampling of any well at a project site. The periodicity of recording fluid levels at a site is project specific and may not necessarily coincide with the periodicity of groundwater sampling. This is necessary sometimes to obtain data in respect to factors which may affect groundwater levels on a more periodic basis such as tides, irrigation or water supply well interference, surface water bodies, or seasonal fluctuations. Fluid levels are necessary to:

- Detect the presence of LNAPLs and DNAPLs;
- Detect changes in horizontal and vertical hydraulic gradients and flow directions;
- Detect influences due to factors such as those stated above (tides.. .)and;
- Collect feasibility/performance data during aquifer testing.

ADAPT shall utilize direct reading instruments calibrated to a precision of 0.01 foot. These instruments include:

- The interface probe - capable of detecting and measuring both immiscible contaminants (LNAPLs and DNAPLs) and water levels and
- Solinst Water Level Probe - capable of detecting water levels only.

The calibrated markings on all ADAPT instruments are to be checked on a quarterly basis for indications of stretching.

All measurements shall be made in respect to a specific marked section of the well casing. ADAPT personnel shall mark the north side of all well casings with a small notch at the time of well installation to indicate the exact position which all measurements are to be taken.

- The cap from the well casing is unlocked and removed, allowing the pressure to equalize in well.

- Measurements are taken from cleanest to most heavily contaminated wells if this information is available.

- The sensor head is lowered into the well opening until a signal is obtained. The sensor is slightly raised and lowered to determine the loudest signal

- The measurement is read off the tape at the point which corresponds to the survey mark on top of well casing, or the highest point on the casing if there is no survey mark.

- If the instrument has a direct reading measuring tape, the depth measurement is recorded at the survey mark. If the tape is marked at five-foot intervals, use a tape measure or ruler is used to measure from the point on the tape held at the survey mark to the nearest increment marker.

- The exposed tape is not reeled back into the instrument until it has been decontaminated.

Well Development Procedures

Monitoring wells must be developed after installation in order to ensure collection of a sample representative of true groundwater quality around a well. Well development:

- establishes an effective, graded filter pack around the well;
- may repair the damage/disturbance created by drilling to the formation(s);
- removes fine-grained materials around the well, allowing for low turbidity samples to be obtained and;
- restores the natural water quality by removing foreign materials such as water/drilling muds introduced during installation.

Development may be performed immediately following installation of the well, however, both EPA guidelines state that it is preferential to allow sufficient time for the well materials to settle and cure. The method of development should include a two directional flow in and out of the filter pack/well screen so that fines are drawn into the well and removed and that clogging/bridging of the filter pack is avoided. This generally involves pumping or bailing of the well to remove the fines and surging of the well to stabilize the filter pack.

The basic method of development that will be employed by ADAPT will involve either the use of a pump or stainless steel/PVC bailers coupled with use of a surge block. The general procedure will be as follows:

1. Record static water level, total depth of well, and any observations (odors, positive pressure release...) and calculate purge volume(s).

2. Pump or bail well until several well volumes of groundwater have been removed;

3. Use surge block to surge the screened interval of the well;

4. Continue pumping or bailing until the turbidity/fines in the well are minimized. Generally this occurs between 6 to 10 well casing volumes but additional volumes should be removed if well is still very turbid, or if fluids were introduced during drilling (the volume of added fluids should be removed during development);

5. Repeat surging and removal until the turbidity of the well is adequate. If the turbidity of the well is not observed to decrease as development continues this may be due to either a poor well installation or the general characteristics of the formation.

6. Water quality parameters such as pH, Conductivity, and Temperature should be recorded in order to establish data supporting the restoration of groundwater quality to natural conditions;

7. All observations and measurements should be recorded on the standard ADaPT Groundwater Monitoring Form and in the Daily Field Report.

Wells which continuously yield turbid samples may be indicative of poor installation, poor development, or formations characterized by the presence of large quantities of fine-grained materials. The project manager will utilize all information available to determine which factor(s) are applicable from the boring logs and field reports. If poor well installation is the contributing factor, it may be necessary to re-install another well, however, Ecology may be consulted to determine whether this would be a requirement. All development water which has not been properly characterized will be containerized on site and properly labeled.

Well Micro-Purging Procedures

Prior to sample collection, all wells must be purged. Purging of the stagnant water from a well is necessary prior to sampling to obtain a groundwater sample representative of the surrounding formation. Water which has been standing in the well casing is not necessarily representative of formation water since it has been exposed to conditions/materials not normally encountered in the formation (such as the atmosphere and the well casing).

ADAPT personnel shall purge at a minimum 3 well casing volumes of groundwater or until temperature, pH, conductivity, and dissolved oxygen readings do not vary by more than 10 percent for three consecutive readings whichever is less. Purging of the well(s) will be considered complete when these readings have stabilized within at least 10% of the two preceding measurement over a time period at least three minutes apart (USEPA,1992). If these readings are not being taken, ADAPT personnel will remove at least 3 well casing volumes of water to ensure that the amount of water removed was adequate. All readings and observations (turbidity, color, odors...) should be recorded in the field notebook/file and transposed in accordance with the documentation standards.

Wells which are purged dry shall be allowed to recover for at least two hours or until the water level is at least 80% of the original level. If water level measurements indicate that the well has not recovered to within 80% in the two hour time frame then groundwater samples should be collected as soon as there is enough water in the well(s) to obtain the necessary samples.

Purging of the wells should be accomplished using either a low flow pump , or a stainless steel/PVC/teflon bailer. Purge rates should be performed at substantially lower rates than development to avoid overdevelopment, volatilization of organics and, mobilization of otherwise stable areas of contaminants in the surrounding formation. Low flow pumping is therefore preferential to bailing; however if using a bailer, surging of the well should be minimized by gently lowering the bailer just below the air/water interface. When using either method, wells should not be purged dry if water is observed to be cascading down the sides of the screen. This action would result in the loss of volatile components and thus a nonrepresentative groundwater sample. All materials which can be reused (bailers, pumps, discharge hoses ...) must be decontaminated between locations if more than one well is being purged. If known, or suspected, wells should be purged in order of increasing contamination to prevent risk of cross contamination.

Ideally, when using a pump for purging, the intake should be placed immediately above the well screen; however, if sampling is performed using a bailer (other than a double check valve), the intake should be positioned near the air/water interface and lowered as the water level drops. This will ensure that the stagnant water above the screened interval and in the filter pack is removed.

All purge water shall be placed in containers as indicated in until it is properly characterized for disposal purposes. All equipment used for purging will be decontaminated accordingly to standard procedures. Purging of the wells should be in order of increasing contamination to minimize the risk of cross contamination.

POST SAMPLING ACTIVITIES

Once the sample is collected into the appropriate container, the outside of the bottle should be wiped with a clean paper towel to remove excess sampling material. If necessary, a clean paper towel moistened with alconox solution is used.

The sample bottle is then properly labeled, covering both the lid and the container so the seal has to be broken to open it. The sample is placed in a plastic bag and preserved at approximately 4°C in a cooler with ice. Information such as sample number, location, collection time and sample description is be recorded in the field logbook. Associated paperwork (e.g. Chain of Custody forms, Sample Analysis Request forms) is completed and stays with the sample. The samples are packaged in a manner that will allow the appropriate storage temperature to be maintained during shipment to the lab. Samples should be delivered to the lab within 24 hours so that proper temperature maintenance is assured and analytical holding times are not exceeded.

SURVEYING

In order to establish a groundwater gradient, or direction of groundwater migration, it is necessary to obtain the relative elevation differences among all the monitoring wells on a site. For Initial site Investigations and determination of potentiometric gradient, ADaPT may perform its own surveying. In the case of remediation system designs, professional surveying services should be contracted.

When using the surveying equipment, one should follow the procedures outlined below:

- Set up tripod and level. Adjust level until air bubble is in the center of the black circle. Rotate the level 90° -bubble should still be in the center of the circle. Rotate another 90° assure bubble is still in the center of the circle. If using a self leveling transit step one will not be required.
- Second person holding stadia rod should set the rod on the highest point of the well casing and mark this spot with a waterproof marker.
- Look through level viewfinder toward the stadia rod. Focus until numbers on rod are readable. Read the number on the engineering rod that coincides with the middle crosshair.
- When using the extendable engineering rod, the measurements can be read directly from the stadia rod and recorded in the field notebook for each well location. The markings on the rod are in Increments of 0.01 feet.
- Measurements are collected from the center of the well vault lid and from a marked location at the top of the casing.
- The first measurement is the obtained from the assigned datum location. All future measurements will be compared to the assigned datum.
- Proceed to obtain measurements from all wells with visual site of the assigned datum. If necessary the transit may need to be moved to obtain measurement from wells not visible from the first location.
- To move the transit identify a second (temporary) datum point. Obtain measurement of this point.
- Move transit to new location where additional wells can be measured. Obtain reading of second datum and primary datum and if possible one of the previous wells.
- Complete measurements of all wells and calculate the relative elevation using the following formula.

  Assign datum elevation + rod reading at assigned datum – rod reading at well = elevation

- Repeat calculation for vault elevation and top of casing elevation.

BORING/MONITORING WELL LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everret
4425 3rd Aavenue
Everret, Washington 98206

Job Number : WA99-2877-2

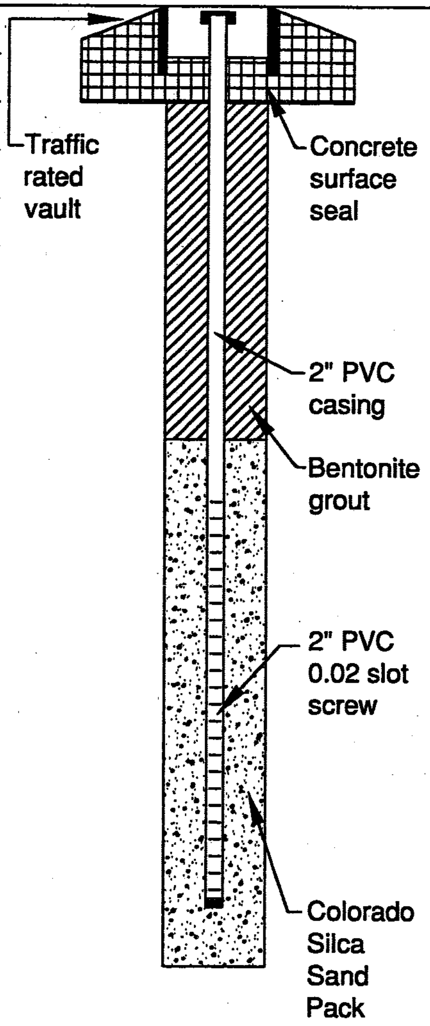
Boring No. :

Monitoring Well No.: **MW1**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	OVM READING	GROUND WATER
0	3 Inches asphallt					
	Loose, dry, black, SAND					
	Loose, damp, light brown, silty fine medium SAND					
	Loose, damp, light brown, silty fine medium SAND					
		I	S-1	2 3 5	NA	
5						
	Loose, damp, light brown, silty fine SAND / fine sandy SILT	I	S-2	1 5 7	0.8	
10	Loose, damp, dark brown to black SAND					
						▼
	Loose, moist to wet, light brown, silty fine coarse SAND trace gravel	I	S-3	5 7 9	1.0	
15						
	Medium dense, wet, ligth brown, silty / clayey fine coarse SAND with gravel	I	S-4	15 22 32	0.9	
20	End boring at 20 feet					
25						
30						

AS-BUILT DESIGN



TESTING

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
II	1" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
X	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 8/8/00
Drilling Completion Date : 8/8/00
Logged By : KAR

BORING/MONITORING WELL LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everret
4425 3rd Aavenue
Everret, Washington 98206

Job Number : WA99-2877-2

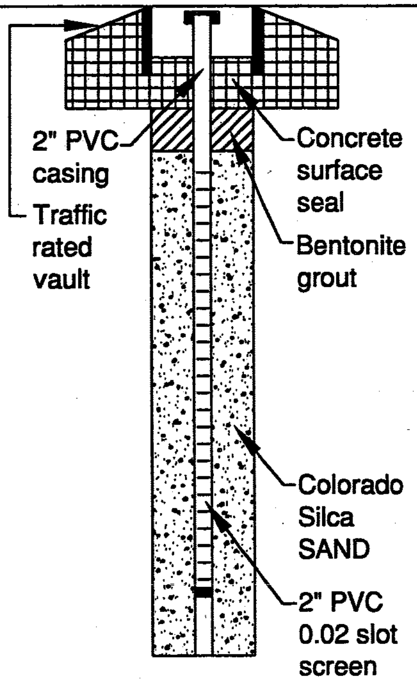
Boring No. :

Monitoring Well No.: **MW2**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	OVM READING	GROUND WATER
0	Loose, moist, brown, silty SAND					
	Loose, moist to wet, light brown, silty fine coarse SAND	Ⅱ	S-1	2 4 5	3.9	▼ ≡ ▽
5						
	As above	Ⅱ	S-2	4 6 10	4.2	
10						
	As above with interbedded SILT layer below 12 feet	Ⅱ	S-3	5 16 19	4.1	
	End hole at 13.5 feet					
15						
20						
25						
30						

AS-BUILT DESIGN



TESTING

LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
Ⅱ	1" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
X	Sample not Recovered	▼ ≡	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

Page : 1 of 1

Drilling Start Date : 8/8/00 Drilling Completion Date : 8/8/00 Logged By : KAR

BORING/MONITORING WELL LOG

ADaPT Engineering, Inc.
800 Maynard Avenue South, Suite 403
SEATTLE, WASHINGTON 98134
TEL: 206.654.7045 FAX: 206.654.7048

PROJECT : Acrowood Everret
4425 3rd Aavenue
Everret, Washington 98206

Job Number : WA99-2877-2

Boring No. :

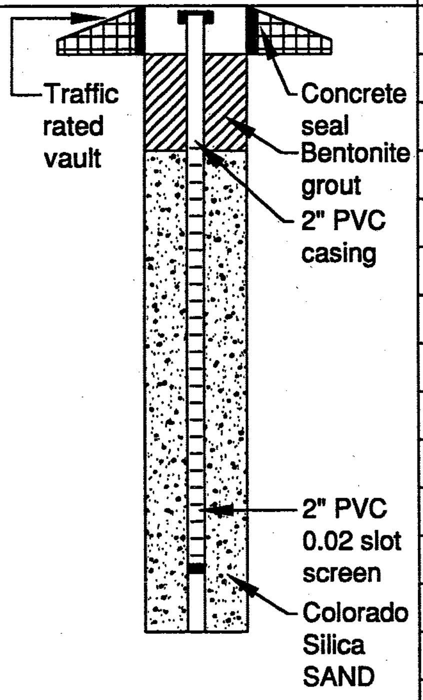
Monitoring Well No.: **MW3**

Elevation Reference : N/A
Ground Surface Elevation : N/A
Well Completed : N/A
Casing Elevation : N/A

DEPTH (feet)		SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNT	OVM READING	GROUND WATER
0	Loose, moist, brown, silty SAND					
		I	S-1	5 14 16	4.0	▼
	Medium dense, moist to wet, olive brown, fine coarse SAND trace SILT					
5						▽
	Loose, wet, light brown, gravelly coarse SAND trace silt					
		I	S-2	2 3 8	4.1	
10						
		I	S-3	4 16 22	4.7	
	Medium firm to firm, moist, mottled gray / orange silt with interbedded fine sandy silt					
	End boring at 13 feet					
15						
20						
25						
30						

AS-BUILT DESIGN

TESTING



LEGEND

I	2-inch O. D. Split-Spoon Sample	▼ DATE	Static Water Level at Drilling	▨	Grab Sample
II	1" Geoprobe	▽ DATE	Static Water Level	WTPH-D Ext. 8010	Type of Analytical Testing Used
X	Sample not Recovered	▼	Perched Groundwater	NR	No Recovery
				ATD	At Time of Drilling

File Name : Borlog1

Page : 1 of 1

Drilling Start Date : 8/8/00 Drilling Completion Date : 8/8/00 Logged By : KAR

APPENDIX B
LABORATORY ANALYTICAL REPORT /CHAIN OF CUSTODY FORMS

OnSite
Environmental Inc.
Analytical Testing and Mobile Laboratory Services

August 17, 2000

Keith Ross
Adapt Engineering
800 Maynard Avenue S, Suite 403
Seattle, WA 98134

Re: Analytical Data for Project WA99-2877-2
Laboratory Reference No. 0008-090

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on August 9, 2000.

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

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

Sincerely,

for David Baumeister
Project Manager

Enclosures

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881 • Fax (425) 885-4603

Date of Report: August 17, 2000
Samples Submitted: August 9, 2000
Lab Traveler: 08-090
Project: WA99-2877-2

NWTPH-Dx

Date Extracted: 8-14-00
Date Analyzed: 8-14-00

Matrix: Soil
Units: mg/Kg (ppm)

Client ID:	MW 3-5	MW 2-5	MW 1-10
Lab ID:	08-090-01	08-090-04	08-090-08
Diesel Fuel:	ND	ND	ND
PQL:	31	29	31
Heavy Oil:	ND	ND	ND
PQL:	62	59	61
Surrogate Recovery:			
o-Terphenyl	65%	69%	69%

Flags:

Date of Report: August 17, 2000
Samples Submitted: August 9, 2000
Lab Traveler: 08-090
Project: WA99-2877-2

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	8-14-00
Date Analyzed:	8-14-00
Matrix:	Soil
Units:	mg/Kg (ppm)

Lab ID:	MB0814S1
Diesel Fuel:	ND
PQL:	25
Heavy Oil:	ND
PQL:	50
Surrogate Recovery:	
o-Terphenyl	81%

Flags:

Date of Report: August 17, 2000
Samples Submitted: August 9, 2000
Lab Traveler: 08-090
Project: WA99-2877-2

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	8-14-00
Date Analyzed:	8-14-00
Matrix:	Soil
Units:	mg/Kg (ppm)

Lab ID:	08-085-13	08-085-13 DUP
Diesel Fuel:	ND	ND
PQL:	25	25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	76%	81%

Flags:

Date of Report: August 17, 2000
Samples Submitted: August 9, 2000
Lab Traveler: 08-090
Project: WA99-2877-2

PAH's by EPA 8270C

Date Extracted:	8-10-00
Date Analyzed:	8-10-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	08-090-08
Client ID:	**MW1-10**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.041
2-Methylnaphthalene	ND		0.041
Acenaphthylene	ND		0.041
Acenaphthene	ND		0.041
Fluorene	ND		0.041
Phenanthrene	ND		0.041
Anthracene	ND		0.041
Fluoranthene	ND		0.041
Pyrene	ND		0.041
Benzo[a]anthracene	ND		0.041
Chrysene	ND		0.041
Benzo[b]fluoranthene	ND		0.041
Benzo[k]fluoranthene	ND		0.041
Benzo[a]pyrene	ND		0.041
Indeno[1,2,3-cd]pyrene	ND		0.041
Dibenz[a,h]anthracene	ND		0.041
Benzo[g,h,i]perylene	ND		0.041

Surrogate :	**Percent Recovery**	**Control Limits**
2-Fluorophenol	65	25 - 121
Phenol-d6	79	24 - 113
Nitrobenzene-d5	81	23 - 120
2-Fluorobiphenyl	91	30 - 115
2,4,6-Tribromophenol	99	19 - 122
Terphenyl-d14	101	18 - 137

Date of Report: August 17, 2000
Samples Submitted: August 9, 2000
Lab Traveler: 08-090
Project: WA99-2877-2

PAH's by EPA 8270C
METHOD BLANK QUALITY CONTROL

Date Extracted:	8-10-00
Date Analyzed:	8-10-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	MB0810S1

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.033
2-Methylnaphthalene	ND		0.033
Acenaphthylene	ND		0.033
Acenaphthene	ND		0.033
Fluorene	ND		0.033
Phenanthrene	ND		0.033
Anthracene	ND		0.033
Fluoranthene	ND		0.033
Pyrene	ND		0.033
Benzo[a]anthracene	ND		0.033
Chrysene	ND		0.033
Benzo[b]fluoranthene	ND		0.033
Benzo[k]fluoranthene	ND		0.033
Benzo[a]pyrene	ND		0.033
Indeno[1,2,3-cd]pyrene	ND		0.033
Dibenz[a,h]anthracene	ND		0.033
Benzo[g,h,i]perylene	ND		0.033

Surrogate :	**Percent Recovery**	**Control Limits**
2-Fluorophenol	69	25 - 121
Phenol-d6	86	24 - 113
Nitrobenzene-d5	86	23 - 120
2-Fluorobiphenyl	95	30 - 115
2,4,6-Tribromophenol	101	19 - 122
Terphenyl-d14	100	18 - 137

Date of Report: August 17, 2000
Samples Submitted: August 9, 2000
Lab Traveler: 08-090
Project: WA99-2877-2

PAH's by EPA 8270C
MS/MSD QUALITY CONTROL

Date Extracted:	8-10-00
Date Analyzed:	8-10-00
Matrix:	Soil
Units:	mg/Kg (ppm)
Lab ID:	08-096-01

Compound:	**Spike Amount**	**MS**	**Percent Recovery**	**MSD**	**Percent Recovery**	**RPD**	**Flags**
Phenol	3.33	2.08	62	2.34	70	12	
2-Chlorophenol	3.33	2.37	71	2.83	85	18	
1,4-Dichlorobenzene	1.67	0.930	56	1.13	68	19	
N-Nitroso-di-n-propylamine	1.67	1.05	63	1.26	76	19	
1,2,4-Trichlorobenzene	1.67	1.16	70	1.46	88	23	
4-Chloro-3-methylphenol	3.33	2.69	81	3.20	96	17	
Acenaphthene	1.67	1.43	86	1.66	99	14	
2,4-Dinitrotoluene	1.67	1.32	79	1.47	88	10	
4-Nitrophenol	3.33	2.31	69	3.00	90	26	
Pentachlorophenol	3.33	1.88	56	2.31	69	21	
Pyrene	1.67	1.60	93	1.62	94	1.0	

Date of Report: August 17, 2000
Samples Submitted: August 9, 2000
Lab Traveler: 08-090
Project: WA99-2877-2

Date Analyzed: 8-10-00

% MOISTURE

Client ID	Lab ID	% Moisture
MW3-5	08-090-01	19
MW2-5	08-090-04	15
MW1-10	08-090-08	18

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

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

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

Page 1 of 1

Company: ADaPT

Project No.: WA99-2877-2

Project Name: ACRowood

Project Manager: KEITH Ross

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☒ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)

☐ 8/16 8/17 (other)

Project Chemist: DB

Laboratory No. 08-090

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
1	MW3-5	8/8/00	915	S	1			X				~~X~~ NO													X
2	MW3-10		925	S	1																				
3	MW3-15		935	S	1																				
4	MW2-5		1035	S	1			X				~~X~~ 8/16													X
5	MW2-10		1040	S	1																				
6	MW2-15		1050	S	1																				
7	MW1-5		1215	S	1																				
8	MW1-10		1225	S	1			X				X													X
9	MW1-15		1230	S	1																				
10	MW1-20		1245	S	1																				

RELINQUISHED BY	DATE 9/9/00	RECEIVED BY	DATE 8/9/00
FIRM ADaPT	TIME 1330	FIRM OSE	TIME 1520
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS:

Chromatographs with final report ☐

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**OnSite
Environmental Inc.**
Analytical Testing and Mobile Laboratory Services

August 22, 2000

Keith Ross
Adapt Engineering
800 Maynard Avenue S, Suite 403
Seattle, WA 98134

Re: Analytical Data for Project WA99-2877-2
Laboratory Reference No. 0008-110

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on August 10, 2000.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project; WA99-2877-2

NWTPH-Dx

Date Extracted:	8-11-00
Date Analyzed:	8-11-00
Matrix:	Water
Units:	mg/L (ppm)

Client ID:	MW1-W	MW2-W	MW3-W
Lab ID:	08-110-01	08-110-02	08-110-03
Diesel Fuel:	ND	ND	ND
PQL:	0.25	0.25	0.25
Heavy Oil:	ND	ND	ND
PQL:	0.50	0.50	0.50
Surrogate Recovery:			
o-Terphenyl	70%	79%	82%

Flags:

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

NWTPH-Dx

Date Extracted:	8-11-00
Date Analyzed:	8-11-00
Matrix:	Water
Units:	mg/L (ppm)
Client ID:	MW4-W
Lab ID:	08-110-04
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	84%

Flags:

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	8-11-00
Date Analyzed:	8-11-00
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB0811W1
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	86%

Flags:

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	8-11-00
Date Analyzed:	8-11-00
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	08-113-01	08-113-01 DUP
Diesel Fuel:	ND	ND
PQL:	0.25	0.25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	73%	81%

Flags:

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

PAH's by EPA 8270C & SIM

Date Extracted:	8-14-00
Date Analyzed:	8-15&18-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	08-110-01
Client ID:	**MW1-W**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.50
2-Methylnaphthalene	ND		0.50
Acenaphthylene	ND		0.50
Acenaphthene	ND		0.50
Fluorene	ND		0.50
Phenanthrene	ND		0.50
Anthracene	ND		0.50
Fluoranthene	ND		0.50
Pyrene	ND		0.50
Benzo[a]anthracene	ND		0.012
Chrysene	ND		0.012
Benzo[b]fluoranthene	ND		0.012
Benzo[k]fluoranthene	ND		0.012
Benzo[a]pyrene	ND		0.012
Indeno[1,2,3-cd]pyrene	ND		0.012
Dibenz[a,h]anthracene	ND		0.012
Benzo[g,h,i]perylene	ND		0.012

Surrogate :	**Percent Recovery**	**Control Limits**
2-Fluorophenol	23	21 - 100
Phenol-d6	16	10 - 94
Nitrobenzene-d5	54	35 - 114
2-Fluorobiphenyl	58	43 - 116
2,4,6-Tribromophenol	66	10 - 123
Terphenyl-d14	78	33 - 144

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

PAH's by EPA 8270C & SIM

Date Extracted:	8-14-00
Date Analyzed:	8-15&18-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	08-110-02
Client ID:	**MW2-W**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.50
2-Methylnaphthalene	ND		0.50
Acenaphthylene	ND		0.50
Acenaphthene	ND		0.50
Fluorene	ND		0.50
Phenanthrene	ND		0.50
Anthracene	ND		0.50
Fluoranthene	ND		0.50
Pyrene	ND		0.50
Benzo[a]anthracene	ND		0.012
Chrysene	ND		0.012
Benzo[b]fluoranthene	ND		0.012
Benzo[k]fluoranthene	ND		0.012
Benzo[a]pyrene	ND		0.012
Indeno[1,2,3-cd]pyrene	ND		0.012
Dibenz[a,h]anthracene	ND		0.012
Benzo[g,h,i]perylene	ND		0.012

Surrogate :	**Percent Recovery**		**Control Limits**
2-Fluorophenol	19	Q	21 - 100
Phenol-d6	13		10 - 94
Nitrobenzene-d5	43		35 - 114
2-Fluorobiphenyl	48		43 - 116
2,4,6-Tribromophenol	71		10 - 123
Terphenyl-d14	81		33 - 144

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

PAH's by EPA 8270C & SIM

Date Extracted:	8-14-00
Date Analyzed:	8-15&18-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	08-110-03
Client ID:	**MW3-W**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.50
2-Methylnaphthalene	ND		0.50
Acenaphthylene	ND		0.50
Acenaphthene	ND		0.50
Fluorene	ND		0.50
Phenanthrene	ND		0.50
Anthracene	ND		0.50
Fluoranthene	ND		0.50
Pyrene	ND		0.50
Benzo[a]anthracene	ND		0.012
Chrysene	ND		0.012
Benzo[b]fluoranthene	ND		0.012
Benzo[k]fluoranthene	ND		0.012
Benzo[a]pyrene	ND		0.012
Indeno[1,2,3-cd]pyrene	ND		0.012
Dibenz[a,h]anthracene	ND		0.012
Benzo[g,h,i]perylene	ND		0.012

Surrogate :	**Percent Recovery**	**Control Limits**
2-Fluorophenol	22	21 - 100
Phenol-d6	15	10 - 94
Nitrobenzene-d5	48	35 - 114
2-Fluorobiphenyl	52	43 - 116
2,4,6-Tribromophenol	65	10 - 123
Terphenyl-d14	75	33 - 144

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

PAH's by EPA 8270C & SIM

Date Extracted: 8-14-00
Date Analyzed: 8-15&18-00

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-110-04
Client ID: **MW4-W**

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.50
2-Methylnaphthalene	ND		0.50
Acenaphthylene	ND		0.50
Acenaphthene	ND		0.50
Fluorene	ND		0.50
Phenanthrene	ND		0.50
Anthracene	ND		0.50
Fluoranthene	ND		0.50
Pyrene	ND		0.50
Benzo[a]anthracene	ND		0.012
Chrysene	ND		0.012
Benzo[b]fluoranthene	ND		0.012
Benzo[k]fluoranthene	ND		0.012
Benzo[a]pyrene	ND		0.012
Indeno[1,2,3-cd]pyrene	ND		0.012
Dibenz[a,h]anthracene	ND		0.012
Benzo[g,h,i]perylene	ND		0.012

Surrogate :	**Percent Recovery**	**Control Limits**
2-Fluorophenol	23	21 - 100
Phenol-d6	16	10 - 94
Nitrobenzene-d5	43	35 - 114
2-Fluorobiphenyl	49	43 - 116
2,4,6-Tribromophenol	63	10 - 123
Terphenyl-d14	67	33 - 144

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

PAH's by EPA 8270C & SIM
METHOD BLANK QUALITY CONTROL

Date Extracted:	8-14-00
Date Analyzed:	8-15&18-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0814W1

Compound:	**Results**	**Flags**	**PQL**
Naphthalene	ND		0.50
2-Methylnaphthalene	ND		0.50
Acenaphthylene	ND		0.50
Acenaphthene	ND		0.50
Fluorene	ND		0.50
Phenanthrene	ND		0.50
Anthracene	ND		0.50
Fluoranthene	ND		0.50
Pyrene	ND		0.50
Benzo[a]anthracene	ND		0.012
Chrysene	ND		0.012
Benzo[b]fluoranthene	ND		0.012
Benzo[k]fluoranthene	ND		0.012
Benzo[a]pyrene	ND		0.012
Indeno[1,2,3-cd]pyrene	ND		0.012
Dibenz[a,h]anthracene	ND		0.012
Benzo[g,h,i]perylene	ND		0.012

Surrogate :	**Percent Recovery**		**Control Limits**
2-Fluorophenol	22		21 - 100
Phenol-d6	15		10 - 94
Nitrobenzene-d5	38		35 - 114
2-Fluorobiphenyl	41	**Q1**	43 - 116
2,4,6-Tribromophenol	55		10 - 123
Terphenyl-d14	71		33 - 144

Date of Report: August 22, 2000
Samples Submitted: August 10, 2000
Lab Traveler: 08-110
Project: WA99-2877-2

PAH's by EPA 8270C
MS/MSD QUALITY CONTROL

Date Extracted:	8-14-00
Date Analyzed:	8-15-00
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	08-121-07

Compound:	**Spike Amount**	**MS**	**Percent Recovery**	**MSD**	**Percent Recovery**	**RPD**	**Flags**
Phenol	100	37.4	37	35.5	35	5.1	
2-Chlorophenol	100	55.4	55	53.3	53	3.9	
1,4-Dichlorobenzene	50.0	25.3	49	23.8	46	6.0	
N-Nitroso-di-n-propylamine	50.0	24.5	49	25.4	51	3.7	
1,2,4-Trichlorobenzene	50.0	27.2	54	26.7	53	2.0	
4-Chloro-3-methylphenol	100	65.4	65	63.7	64	2.5	
Acenaphthene	50.0	33.2	66	33.0	66	0.48	
2,4-Dinitrotoluene	50.0	36.6	73	35.7	71	2.5	
4-Nitrophenol	100	42.8	43	47.4	47	10	
Pentachlorophenol	100	67.7	58	66.0	56	2.5	
Pyrene	50.0	36.4	73	37.4	75	2.7	

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

Q1 – The percent recovery of the surrogate 2-Fluorobiphenyl for the Method Blank was outside established QC limits. A re-analysis yielded similar results. However, all of the percent recoveries of the other five surogates were within limits. In addition, the percent recovery of 2-Fluorobiphenyl for all of the associated samples was within limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

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

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

Page 1 of 1

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☒ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)

☐ 8/17 - 8/18 (other)

Project Chemist: DB

Laboratory No. 08-110

Company: ADaPT

Project No.: WA99-2877-2

Project Name: ACRoWooD

Project Manager: KEITH Ross

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
1	mw1-w	8/10/00	1125	w	4			X				X													
2	mw2-w	8/10/00	1220	w	4			X				X													
3	mw3-w	8/10/00	1340	w	4			X				X													
4	mw4-w	8/10/00	1250	w	4			X				X													

RELINQUISHED BY	DATE 8/10/00	RECEIVED BY	DATE 8/10/00
FIRM ADaPT	TIME 1448	FIRM	TIME 2:48
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS:

Chromatographs with final report ☐

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APPENDIX C

GROUNDWATER SAMPLING FIELD FORMS

Groundwater Sample Collection Log

Project Name: ACROWOOD Number: WA99-2877-2
Sampler: KEITH Ross & MARCI Lewis
Monitor Well Number: MW1 Date: 8/10/00
Weather: Cloudy cool → Became Sunny

Water Level Measurement:

(a) Depth to Water: 12.61 ft (c) Height of water (b-a = c): 7.29 ft
(b) Total Depth of Well: 19.9 ft Equipment: Solinst
Casing Size: 2 inches (d) Casing volume: 0.163 gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): 1.19 gals (f) Purge volume (3 x e = f): ______ gals
Depth to Product: N/A ft

Purge data:

Purge Equipment: Geotech peristaltic
Purge Procedure: micro purge at

Flow Rate: 125 ml/min 1/2 cup/min How determined: Bucket & watch

Comments: Flow rate → with approx 1" drop in water level / 5 min

Start Time: 1045 End Time: 1115
Volume Purged: 3.75 ~~gals~~/Liters Time Purged: 30 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1048	7.83	64.7	1,240 x 100	~~0375 1/4 [illegible]~~
1051	7.43	63.1	957 x10	~~375~~ 3 cups 0.75
1054	6.94	62.8	11.46	1,125
1057	6.66	62.8	11.57	1.5
1100	6.83	62.7	11.13	1.875
1104	6.38	62.7	11.10	2.375
1108	6.33	62.5	10.23	2.875
1112	6.17	62.3	10.47	3.375
1115	6.17	62.3	10.22	3.75

Sampling:

Sample Number: MW1-W Sampling Equipment: Peristaltic
Sampling Procedure: micro sample at ~

Time of sample: 1125 1115 - 1140
Duplicate Sample taken: yes [✓ no:] If yes Sample ID: ______
DTW at time of sampling: 13.16

***ADaPT* Engineering, Inc.**

Groundwater Sample Collection Log

Project Name: ACROWOOD Number: WA99-2877-2
Sampler: KEITH Ross & MARGI Lewis
Monitor Well Number: MW 2 Date: 8/10/00
Weather: same as MW 1

Water Level Measurement:

(a) Depth to Water: 5.39 ft
(c) Height of water (b-a = c): 8.22 ft
(b) Total Depth of Well: 13.61 ft
Equipment:
Casing Size: 2 inches
(d) Casing volume: .163 gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): 1.34 gals
(f) Purge volume (3 x e = f): gals
Depth to Product: NA ft

Purge data:

Purge Equipment: same as MW 1
Purge Procedure:

Flow Rate: ~200 ml/min How determined: Bucket & watch

Comments: water level drop ~ 3 min/inch to ~ 5 min/inch

Start Time: 1152 End Time: 1220
Volume Purged: 5.6 ~~gals~~ Liters Time Purged: 28 min

Time	pH	Temperature F C	Conductivity x10	Total Volume Pumped
1154	7.35	62.4	10.48 x10	400 ml
1158	7.17	62.1	9.60	1.2
1203	6.55	62.3	10.01	2.2
1206	6.17	62.1	10.47	2.8
1209	6.24	62.1	9.37	3.4
1213	6.05	61.9	9.63	4.2
1216	6.13	61.8	9.18	4.8
1219	5.95	61.9	9.44	5.6

Sampling:

Sample Number: MW2-W Sampling Equipment:
Sampling Procedure: micro sample

Time of sample:
Duplicate Sample taken: [✓ yes] no: If yes Sample ID: MW4-W 1250
DTW at time of sampling: ~~706~~ 6.06

Groundwater Sample Collection Log

Project Name: ACROWOOD Number: WA99-2877-2
Sampler: Keith Ross + Margi Lewis
Monitor Well Number: MW3 Date: 8/10/00
Weather: same as MW1

Water Level Measurement:

(a) Depth to Water: 5.52 ft (c) Height of water (b-a = c): 7.28 ft
(b) Total Depth of Well: 12.80 ft Equipment:
Casing Size: 2 inches (d) Casing volume: 0.163 gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): 1.19 gals (f) Purge volume (3 x e = f): gals
Depth to Product: NA ft

Purge data:

Purge Equipment: Per same as MW1
Purge Procedure: Micro

Flow Rate: ~200 ml/min How determined: Bucket & watch

Comments: water level down ~ 3 to 5 mm / each

Start Time: 1310 End Time: ~~1323~~ 1333
Volume Purged: 4.6 gals Time Purged: 23 min

Time	pH	Temperature F C	Conductivity x10	Total Volume Pumped
1311	6.67	64.0	15.13	0.200 ℓ
1315	6.52	62.8	12.51	1.00
1319	6.54	68.0	12.81	1.8
1322	6.40	64.3	13.77	2.6
1326	6.35	64.3	14.21	3.4
1329	6.28	64.3	14.02	4.0
1332	6.31	64.4	13.91	4.6

Sampling:

Sample Number: MW3-W Sampling Equipment: peristaltic
Sampling Procedure: micro ~200ml/min

Time of sample:
Duplicate Sample taken: yes [✓ no:] If yes Sample ID:
DTW at time of sampling: 6.13

APPENDIX F

ADAPT 2nd, 3rd & 4th QUARTER GROUNDWATER QUALITY MONITORING REPORTS

ADaPT

December 6, 2000

ADaPT Job No. WA99-2877-2

Acrowood Corporation, Inc.
4425 South Third Avenue
Everett, WA 98206

Attention: Mr. Farhang Javid

Subject: 2nd Quarter Groundwater Quality Monitoring Report
Acrowood Corporation Facility
4425 South Third Avenue
Everett, Washington

Dear Mr. Javid:

ADaPT Engineering, Inc. (ADaPT), is pleased to provide you with the following results of our 2nd Quarter Groundwater Quality Monitoring Report for the above referenced site. This report is provided for Acrowood Corporation and their agents. If this report is to be reproduced and/or transmitted to a third party, it must be reproduced and/or transmitted in its entirety. Any exceptions will be made only with the written permission of ADaPT.

The purpose of the ongoing assessment is to continue to evaluate the groundwater quality in the vicinity of the suspected former fuel tank area. ADaPT installed three groundwater monitoring wells in August 2000. These wells are being sampled for four quarters to evaluate the groundwater quality. This report represents the second of the four quarters.

Monitoring Well Sampling

On November 15, 2000 the three monitoring wells were purged using low flow methods, with a GeoPump 2 Peristaltic pump, with disposable ¼-inch polyethylene tubing, until temperature, conductivity, and pH were stabilized and then sampled using a peristaltic pump. Prior to purging the depth to water in all three wells was recorded to evaluate the flow direction at time of sampling. During purging flow rate of the pump was approximately 50 to 75 milliliters per minute and approximately 1 liter was purged from each well prior to sampling. Groundwater field sampling sheets are attached in Appendix A.

Samples were collected with the peristaltic pump and placed into laboratory prepared containers. The filled containers were placed in a chilled cooler at approximately 4 degrees Celsius for transport to OnSite Environmental Inc. for analytical testing for diesel and heavy oil range hydrocarbons using NWTPH-DX. Laboratory analytical results are summarized in Table 2. Laboratory reports and completed chain of custody are attached in Appendix B.

Groundwater Elevation and Flow Direction

Depth to water was measured in all three wells to evaluate the groundwater elevations beneath the suspected former fuel tank area. Groundwater depth in MW 1 was 12.32 feet bgs, in MW2 4.34 feet bgs, and in MW3, 4.35 feet bgs as measured from the top of casing at the time of monitoring/sampling (November 15, 2000). Based on the observed elevations groundwater migration direction appears to be towards the east with a slight southward trend beneath the subject site. Fluid levels are summarized on Table 1, and estimated groundwater migration direction is graphically depicted on Figure 3.

Table 1: Groundwater Elevation

Well Number	Top of Casing Elevation (ft)	Date Measured	Depth to Water (ft)	Groundwater Elevation (ft)
MW-1	100	8/09/00	12.59	87.41
		8/10/00	12.61	87.39
		11/15/00	12.32	87.68
MW-2	89.92	8/09/00	5.32	84.60
		8/10/00	5.39	84.53
		11/15/00	4.34	85.58
MW-3	90.48	8/09/00	5.35	85.13
		8/10/00	5.52	84.96
		11/15/00	4.35	86.13

Notes: Wells were surveyed using an assumed elevation of Monitoring Well MW-1 as 100 feet.

Groundwater Analytical Results

Three groundwater samples were submitted to North Creek for analytical testing for diesel and heavy oil range hydrocarbons using NWTPH-Dx. Due to the previous analytical results the groundwater samples were not analyzed for polynuclear aromatic hydrocarbons (PAHs). The samples were collected using micro-sampling procedures designed to minimize agitation of the water. Monitoring Wells MW1 was purged and sampled at approximately 0.50 L/min. Monitoring well MW2 was purged and sampled at approximately 0.75 L/min. Monitoring well MW3 was purged and sampled at a pump rate of approximately 0.50 L/min. Field parameters were monitored during purging and samples were collected after stable reading for pH, temperature and conductivity were obtained. Groundwater sampling field parameter notes are presented in Appendix A. Analytical results have been summarized below in Table 2, depicted on Figure 3.

Table 2 : Summary of Groundwater Analytical Results

Sample		NWTPH-Dx (mg/L)		EPA 8270C PAHs (ug/L)
Sample ID	Date	Diesel	Heavy Oil	
MW1	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
MW2	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
MW3	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.25	--
MW4 (Duplicate of MW2)	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
MTCA Method "A" Residential Clean up Level		1.0		Various

ND= not detected above standard laboratory reporting levels
-- = not tested due to previous results

Based on the results summarized in Table 2, diesel and heavy oil range hydrocarbons were not detected above standard laboratory reporting limits. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

CONCLUSIONS AND RECOMMENDATIONS

Petroleum hydrocarbons were not exhibited in any of the groundwater samples collected from the groundwater monitoring wells. In ADaPT's professional opinion, based on the analytical results, observed groundwater flow direction, and field observations, the petroleum hydrocarbons observed in the soil and groundwater beneath the steel shop and suspected former fuel tank area do not appear to have migrated off-site. ADaPT believes it would be prudent to continue the quarterly groundwater monitoring as outlined in the approved proposal. ADaPT anticipates that the next quarter groundwater sampling will be conducted in February 2001.

LIMITATIONS

Information contained in this report is based upon site characterization, field observations, and the laboratory analyses completed for this study. Conclusions presented are professional opinions based upon our interpretation of the analytical laboratory test results, as well as our experience and observations during the field activities. The number, locations, and depth of the explorations, as well as the analytical scope were completed within the site and proposal constraints. ADaPT's observations and the analytical data are limited to the vicinity of each test probe and do not necessarily reflect conditions across the site. No other warranty, express or implied is made. In the event that additional information regarding either the site or surrounding properties becomes known, or changes to existing conditions occurs, the conclusions in this report should be reviewed, and if necessary, revised to reflect the updated information. Project specific limitations are presented in the appropriate sections of this report.

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ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Hydrogeologist
Environmental Services

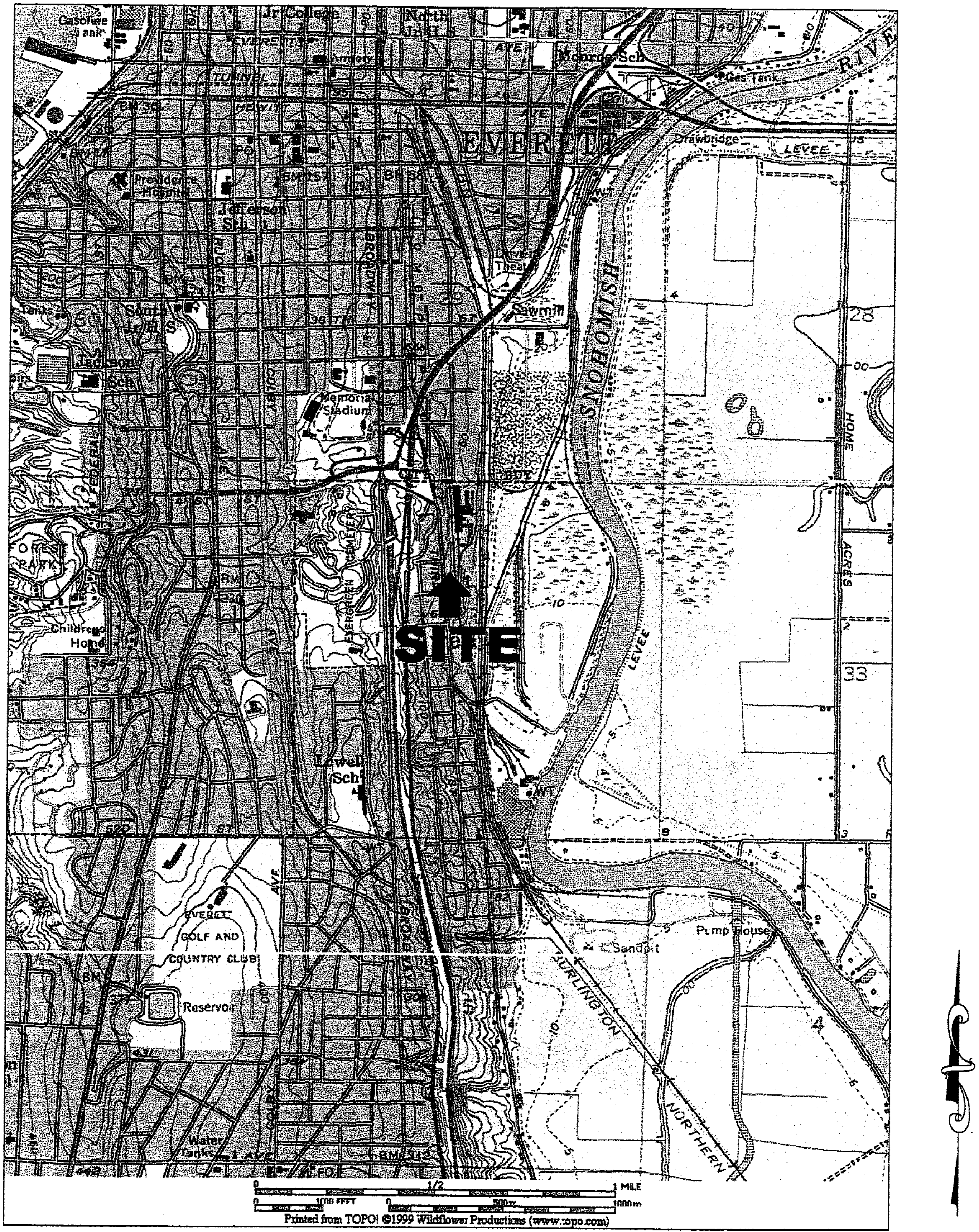
Daryl S. Petrarca, R.E.A.
VP, Environmental Services Group
Senior Reviewer

KAR/DSP/kar

Attachments:

- Figure 1 - Location Map
- Figure 2 – Site & Vicinity Plan
- Figure 3 – Groundwater Elevation and Flow Direction

- Appendix A - Groundwater Sampling Field Forms
- Appendix B - Laboratory Analytical Report /Chain of Custody Forms



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ADaPT Engineering, Inc.

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

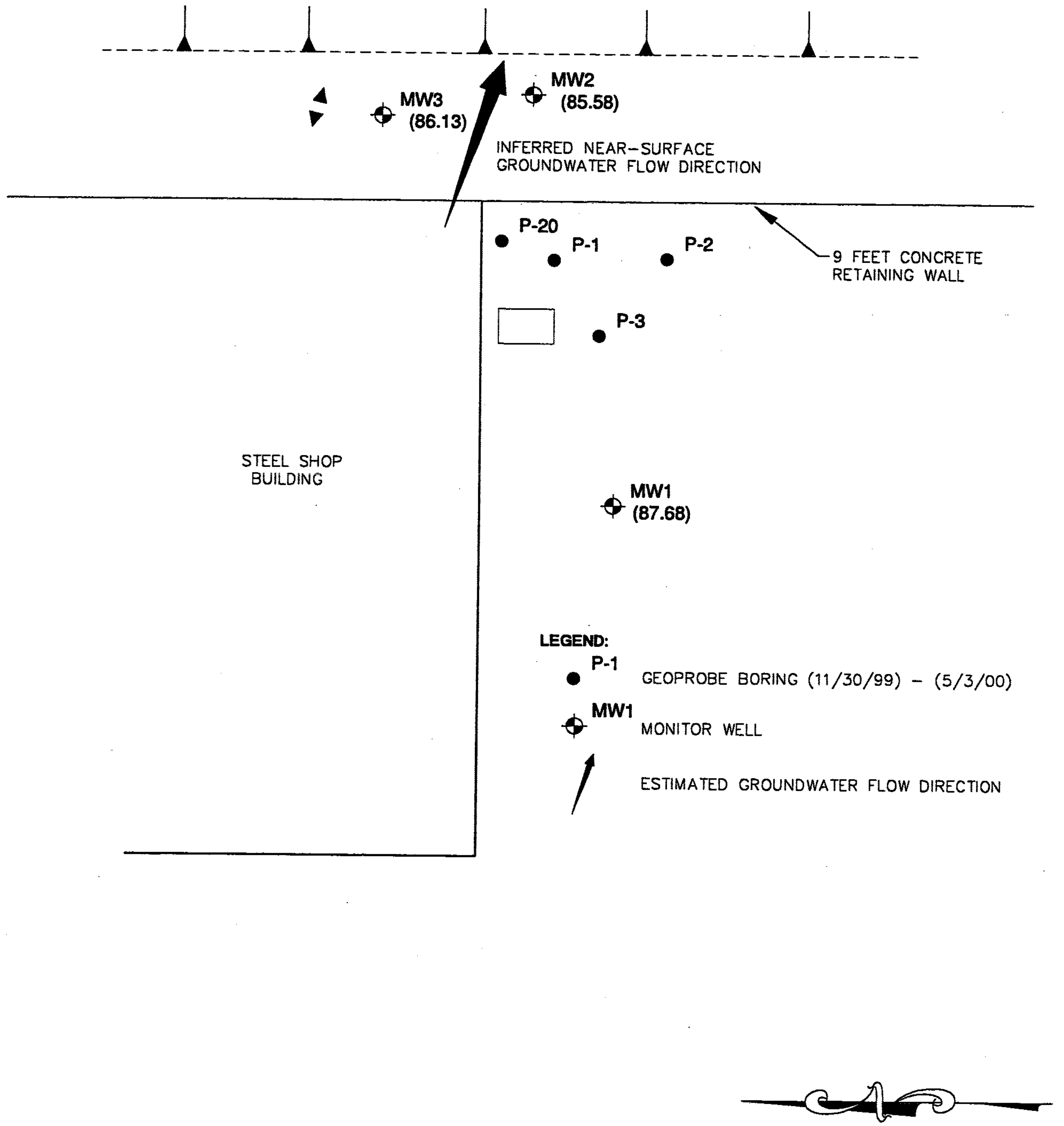
Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 1 - Location/Topographic Map

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206

Client : Acrowood Corporation

Date : 8/15/00 **Job # :**S-WA-99-2877-2



SCALE 1" = 20'

ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIG 3-2ND Quarter Groundwater Elevation (11/15/00)

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 12/05/00 **Job # :** S-WA-99-2877-2

APPENDIX A

GROUNDWATER SAMPLING FIELD FORMS

***ADaPT* Engineering, Inc.**

Groundwater Sample Collection Log

Project Name: Acrowood Number: WA99-2877-2
Sampler: Keith Ross
Monitor Well Number: MW-1 Date: 11/15/00
Weather: Sunny cold ~40°F

Water Level Measurement:

(a) Depth to Water: 12.32 ft
(c) Height of water (b-a = c): ____ ft
(b) Total Depth of Well: 19.5 ft
Equipment: ____
Casing Size: ____ inches
(d) Casing volume: ____ gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): ____ gals
(f) Purge volume (3 x e = f): ____ gals
Depth to Product: ____ ft
Meas pt 100 ft

Purge data:

Purge Equipment: Peristaltic
Purge Procedure: Low Flow
End of Tubing at 15 ft

Flow Rate: 50 ml/min How determined: Watch & Bucket

Comments: Aprox 1 inch draw down / 8 min

Start Time: 1045 End Time: 1105
Volume Purged: 1 ~~gals~~ Liters Time Purged: 20 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1046	7.05	51.9	1660	
1050	6.84	53.7	1740	
1054	6.70	56.6	1740	
1057	6.69	57.3	1720	
1100	6.75	57.3	1720	
1104	6.53	56.9	1760	

Sampling:

Sample Number: MW-1 Sampling Equipment: Peristaltic pump
Sampling Procedure: Low Flow ~50ml/min

Time of sample: ~~1105~~ 1105
Duplicate Sample taken: yes [✓ no] If yes Sample ID: —
DTW at time of sampling: 12.53

***ADaPT* Engineering, Inc.**

Groundwater Sample Collection Log

Project Name: Acrowood Number: WA99-2877-2
Sampler: Keith Ross
Monitor Well Number: MW-2 ~ Date: 11/15/00
Weather: Sunny

Water Level Measurement:

(a) Depth to Water: 4.34 ft
(c) Height of water (b-a = c): ______ ft
(b) Total Depth of Well: ______ ft
Equipment: ______
Casing Size: ______ inches
(d) Casing volume: ______ gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): ______ gals
(f) Purge volume (3 x e = f): ______ gals
Depth to Product: ______ ft Max. 89.92

Purge data:

Purge Equipment: Peristaltic pump
Purge Procedure: Low Flow Minimum Drawdown

Flow Rate: 75 mL/min How determined: Watch & Beaker

Comments: Drawdown < 0.1 ft/1-min

Start Time: 1142 End Time: 1202
Volume Purged: ______ gals Time Purged: 20 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1142	6.52	49.2	1500	
1148	6.51	50.2	1520	
1152	6.50	50.7	1460	
1155	6.47	50.3	1520	
1158	6.47	51.0	1460	
1201	6.47	50.7	1450	

Sampling:

Sample Number: MW-2 Sampling Equipment: Peristaltic
Sampling Procedure: ______

Time of sample: 1205
Duplicate Sample taken: [✓ yes] no: If yes Sample ID: MW-4 1220
DTW at time of sampling: 4.08

***ADaPT* Engineering, Inc.**

Groundwater Sample Collection Log

Project Name: Acrowood Number: WA99-2877-2
Sampler: Keith Ross
Monitor Well Number: MW-3 Date: 11/15/00
Weather:

Water Level Measurement:

(a) Depth to Water: 4.35 ft (c) Height of water (b-a = c): ft
(b) Total Depth of Well: ft Equipment:
Casing Size: inches (d) Casing volume: gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): gals (f) Purge volume (3 x e = f): gals
Depth to Product: ft

Meas 90.45

Purge data:

Purge Equipment: Peristaltic
Purge Procedure: Low Flow

Flow Rate: ~50 ml/min How determined: Watch & Beaker

Comments: ~~Drawdown 0.10 ft~~ No Drawdown at ~ 50 ml/min
~ 0.1 ft per 15 min

Start Time: 1248 End Time: 1306
Volume Purged: gals Time Purged: 18 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1250	6.93	57.2	1690	
1253	6.91	56.5	1510	
1256	6.67	55.9	1450	
1259	6.61	55.1	1490	
1302	6.53	54.4	1470	
1305	6.55	54.4	1470	

Sampling:

Sample Number: MW-3 Sampling Equipment: Peristaltic
Sampling Procedure:

Time of sample: 1306
Duplicate Sample taken: yes [✓ no:] If yes Sample ID: —
DTW at time of sampling: 4.[illegible]

APPENDIX B
LABORATORY ANALYTICAL REPORT /CHAIN OF CUSTODY FORMS

OnSite Environmental Inc.
Analytical Testing and Mobile Laboratory Services

November 22, 2000

Keith Ross
Adapt Engineering
800 Maynard Avenue S, Suite 403
Seattle, WA 98134

Re: Analytical Data for Project WA99-2877-2
Laboratory Reference No. 0011-126

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on November 15, 2000.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: November 22, 2000
Samples Submitted: November 15, 2000
Lab Traveler: 11-126
Project: WA99-2877-2

NWTPH-Dx

Date Extracted: 11-16-00
Date Analyzed: 11-16-00

Matrix: Water
Units: mg/L (ppm)

Client ID:	MW-1	MW-2	MW-3
Lab ID:	11-126-01	11-126-02	11-126-03
Diesel Fuel:	ND	ND	ND
PQL:	0.25	0.25	0.25
Heavy Oil:	ND	ND	ND
PQL:	0.50	0.50	0.50
Surrogate Recovery:			
o-Terphenyl	64%	74%	68%

Flags:

Date of Report: November 22, 2000
Samples Submitted: November 15, 2000
Lab Traveler: 11-126
Project: WA99-2877-2

NWTPH-Dx

Date Extracted:	11-16-00
Date Analyzed:	11-17-00
Matrix:	Water
Units:	mg/L (ppm)
Client ID:	MW-4
Lab ID:	11-126-04
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	81%

Flags:

Date of Report: November 22, 2000
Samples Submitted: November 15, 2000
Lab Traveler: 11-126
Project: WA99-2877-2

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	11-16-00
Date Analyzed:	11-16-00
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB1116W1
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	78%

Flags:

Date of Report: November 22, 2000
Samples Submitted: November 15, 2000
Lab Traveler: 11-126
Project: WA99-2877-2

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	11-16-00
Date Analyzed:	11-17&18-00
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	11-123-01	11-123-01 DUP
Diesel Fuel:	ND	ND
PQL:	0.25	0.25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	143%	94%
Flags:	Y	Y

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

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

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

Page 1 of 1

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☒ Standard
(Hydrocarbon analyses: 5 days, All other analyses: 7 days)

☐ 11/22 (other)

Project Chemist: DB

Laboratory No.

Company: ADaPT

Project No.: WA99-2977-2

Project Name: ACROWOOD

Project Manager: KEITH ROSS

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
1	MW-1	11/15/00	1105	W	2			X																	
2	MW-2	|	1205	W	34			X																	
3	MW-3	|	1310	W	2			X																	
4	MW-4	|	1220	W	2			X																	

RELINQUISHED BY	DATE 11/15/00	RECEIVED BY	DATE 11/15/00
FIRM ADaPT	TIME 1530	FIRM OnSite Env.	TIME 1530
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME

COMMENTS:

REVIEWED BY

DATE REVIEWED

Chromatographs with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

LSI-
ADaPT

March 14, 2001

ADaPT Job No. WA99-2877-2

Acrowood Corporation, Inc.
4425 South Third Avenue
Everett, WA 98206

Attention: Mr. Farhang Javid

Subject: 3rd Quarter Groundwater Quality Monitoring Report
Acrowood Corporation Facility
4425 South Third Avenue
Everett, Washington

Dear Mr. Javid:

ADaPT Engineering, Inc. (ADaPT), is pleased to provide you with the following results of our 3rd Quarter Groundwater Quality Monitoring Report for the above referenced site. This report is provided for Acrowood Corporation and their agents. If this report is to be reproduced and/or transmitted to a third party, it must be reproduced and/or transmitted in its entirety. Any exceptions will be made only with the written permission of ADaPT.

The purpose of the ongoing assessment is to continue to evaluate the groundwater quality in the vicinity of the suspected former fuel tank area. ADaPT installed three groundwater monitoring wells in August 2000. These wells are being sampled for four quarters to evaluate the groundwater quality. This report represents the third of the four quarters.

Monitoring Well Sampling

On February 23, 2001 the three monitoring wells were purged using low flow methods, with a GeoPump 2 Peristaltic pump, with disposable ¼-inch polyethylene tubing, until temperature, conductivity, and pH were stabilized and then sampled using a peristaltic pump. Prior to purging the depth to water in all three wells was recorded to evaluate the flow direction at time of sampling. During purging flow rate of the pump was approximately 100 milliliters per minute and approximately 3 to 4-liters were purged from each well prior to sampling. Groundwater field sampling sheets are attached in Appendix A.

Samples were collected with the peristaltic pump and placed into laboratory prepared containers. The filled containers were placed in a chilled cooler at approximately 4 degrees Celsius for transport to OnSite Environmental Inc. for analytical testing for diesel and heavy oil range hydrocarbons using NWTPH-DX. Laboratory analytical results are summarized in Table 2. Laboratory reports and completed chain of custody are attached in Appendix B.

Groundwater Elevation and Flow Direction

Depth to water was measured in all three wells to evaluate the groundwater elevations beneath the suspected former fuel tank area. Groundwater depth in MW 1 was 12.21 feet bgs, in MW2 4.29 feet bgs, and in MW3, 4.53 feet bgs as measured from the top of casing at the time of monitoring/sampling (November 15, 2000). Based on the observed elevations groundwater migration direction appears to be towards the east with a slight southward trend beneath the subject site. Fluid levels are summarized on Table 1, and estimated groundwater migration direction is graphically depicted on Figure 3.

Table 1: Groundwater Elevation

Well Number	Top of Casing Elevation (ft)	Date Measured	Depth to Water (ft)	Groundwater Elevation (ft)
MW-1	100	8/09/00	12.59	87.41
		8/10/00	12.61	87.39
		11/15/00	12.32	87.68
		2/23/01	12.21	87.79
MW-2	89.92	8/09/00	5.32	84.60
		8/10/00	5.39	84.53
		11/15/00	4.34	85.58
		2/23/01	4.29	85.63
MW-3	90.48	8/09/00	5.35	85.13
		8/10/00	5.52	84.96
		11/15/00	4.35	86.13
		2/23/01	4.53	85.95

Notes: Wells were surveyed using an assumed elevation of Monitoring Well MW-1 as 100 feet.

Groundwater Analytical Results

Three groundwater samples were submitted to OnSite Environmental Services for analytical testing for diesel and heavy oil range hydrocarbons using NWTPH-Dx. Due to the previous analytical results the groundwater samples were not analyzed for polynuclear aromatic hydrocarbons (PAHs). The samples were collected using micro-sampling procedures designed to minimize agitation of the water. Monitoring Wells MW1 was purged and sampled at approximately 0.1 L/min. Monitoring well MW2 was purged and sampled at approximately 0.1 L/min. Monitoring well MW3 was purged and sampled at a pump rate of approximately 0.1 L/min. Field parameters were monitored during purging and samples were collected after stable reading for pH, temperature and conductivity were obtained. Groundwater sampling field parameter notes are presented in Appendix A. Analytical results have been summarized below in Table 2, depicted on Figure 3.

Table 2 : Summary of Groundwater Analytical Results

Sample		NWTPH-Dx (mg/L)		EPA 8270C PAHs (ug/L)
Sample ID	Date	Diesel	Heavy Oil	
MW1	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
MW2	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
MW3	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
MW4 (Duplicate of MW2)	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
MTCA Method "A" Residential Clean up Level		1.0		Various

ND= not detected above standard laboratory reporting levels
-- = not tested due to previous results

Based on the results summarized in Table 2, diesel and heavy oil range hydrocarbons were not detected above standard laboratory reporting limits. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

CONCLUSIONS AND RECOMMENDATIONS

Petroleum hydrocarbons were not exhibited in any of the groundwater samples collected from the groundwater monitoring wells. In ADaPT's professional opinion, based on the analytical results, observed groundwater flow direction, and field observations, the petroleum hydrocarbons observed in the soil and groundwater beneath the steel shop and suspected former fuel tank area do not appear to have migrated off-site. ADaPT believes it would be prudent to continue the quarterly groundwater monitoring as outlined in the approved proposal. ADaPT anticipates that the last quarter groundwater sampling will be conducted in May 2001.

LIMITATIONS

Information contained in this report is based upon site characterization, field observations, and the laboratory analyses completed for this study. Conclusions presented are professional opinions based upon our interpretation of the analytical laboratory test results, as well as our experience and observations during the field activities. The number, locations, and depth of the explorations, as well as the analytical scope were completed within the site and proposal constraints. ADaPT's observations and the analytical data are limited to the vicinity of each test probe and do not necessarily reflect conditions across the site. No other warranty, express or implied is made. In the event that additional information regarding either the site or surrounding properties becomes known, or changes to existing conditions occurs, the conclusions in this report should be reviewed, and if necessary, revised to reflect the updated information. Project specific limitations are presented in the appropriate sections of this report.

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ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Hydrogeologist
Environmental Services

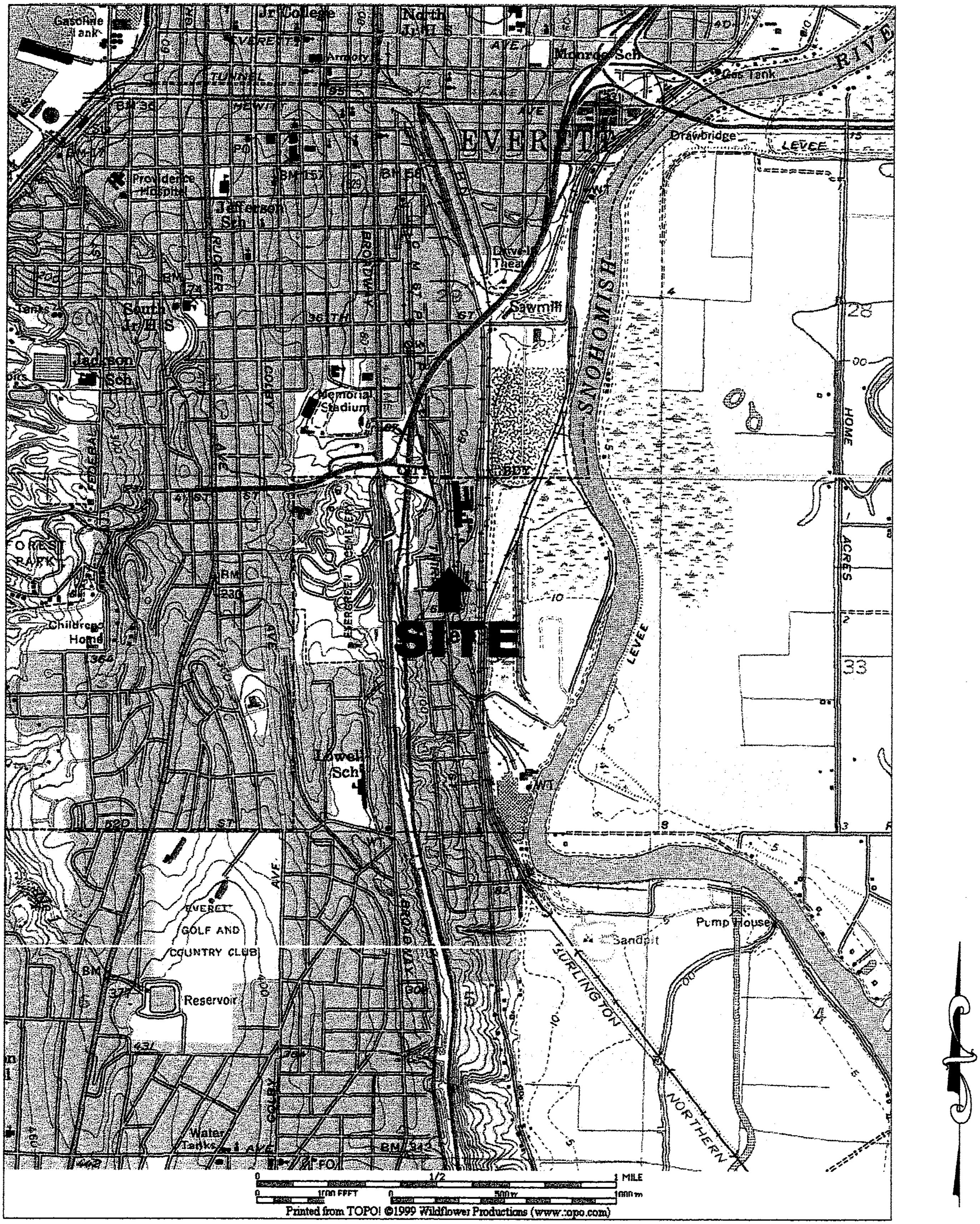
Daryl S. Petrarca, R.E.A.
VP, Environmental Services Group
Senior Reviewer

KAR/DSP/kar

Attachments:

Figure 1 - Location Map
Figure 2 – Site & Vicinity Plan
Figure 3 – Groundwater Elevation and Flow Direction

Appendix A - Groundwater Sampling Field Forms
Appendix B - Laboratory Analytical Report /Chain of Custody Forms



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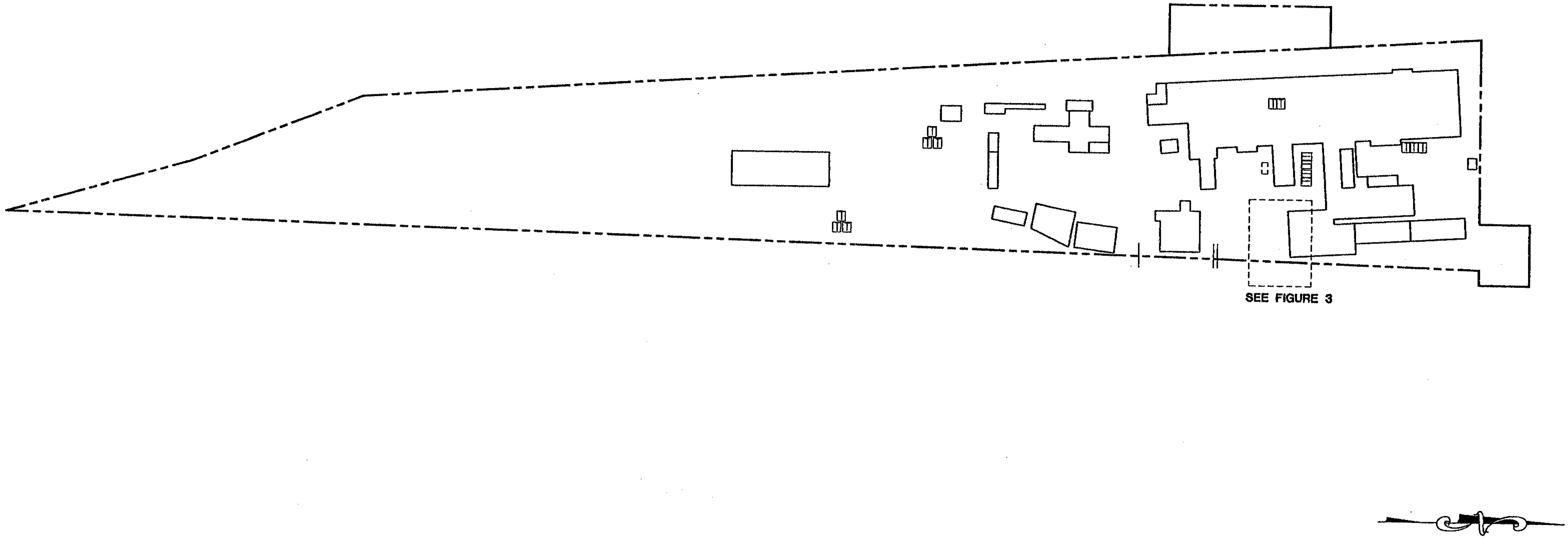
ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 1 - Location/Topographic Map

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00 **Job # :** S-WA-99-2877-2



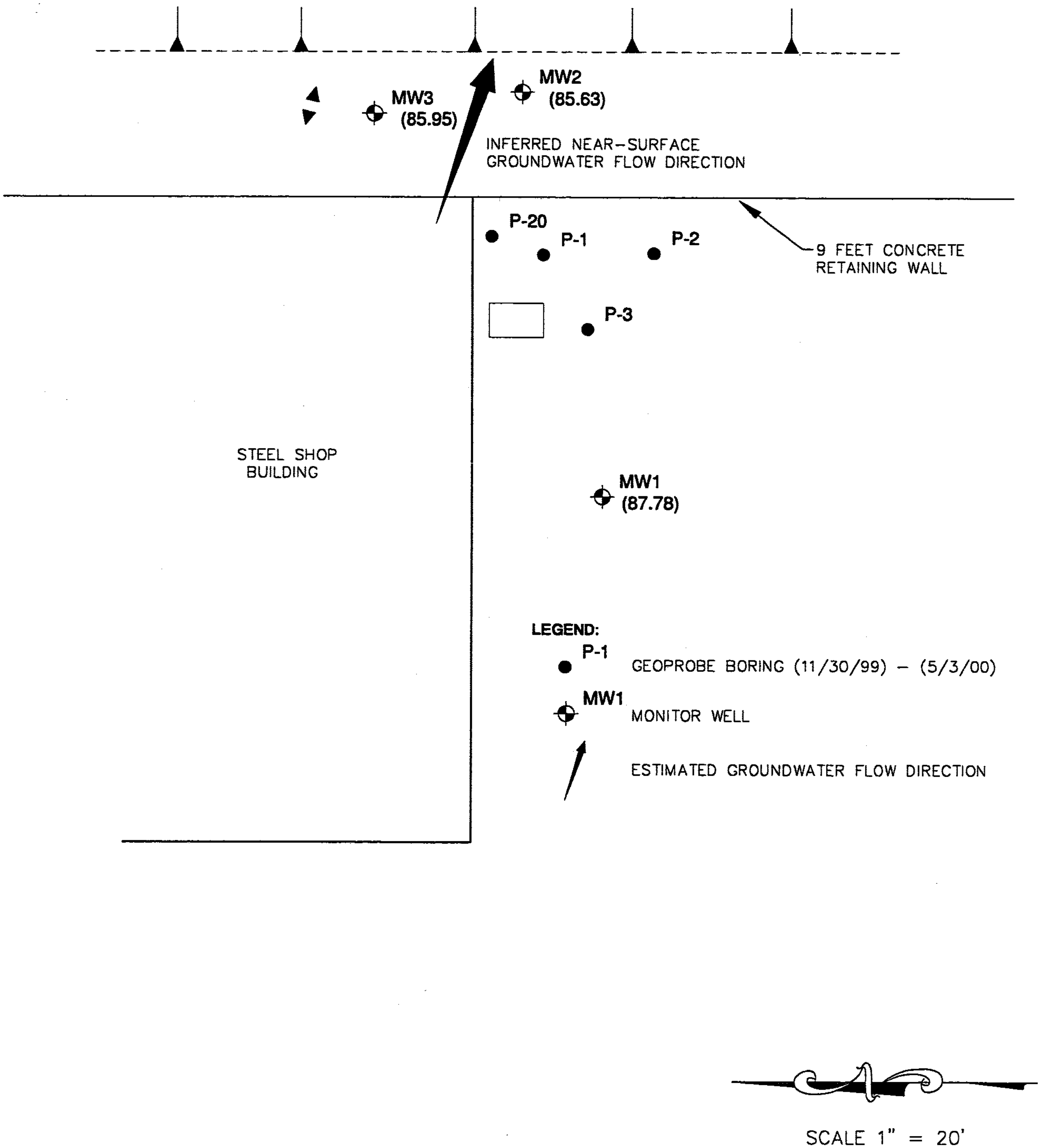
NOT TO SCALE

ADaPT Engineering, Inc.

800 Maynard Avenue S., Suite 403
Seattle, Washington 98134
Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 2 - Site Plan

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00 **Job # :**S-WA-99-2877-2



ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIG 3 - 3rd Quarter Groundwater Elevation (02/23/01)

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 03/08/01 **Job # :** S-WA-99-2877-2

APPENDIX A

GROUNDWATER SAMPLING FIELD FORMS

Groundwater Sample Collection Log

Project Name: ACRowood Number: 0495-2677.2
Sampler: KEITH RUI
Monitor Well Number: MW-1 Date: 2/23/01
Weather: cloudy Foggy

Water Level Measurement:

(a) Depth to Water: 12.21 ft (c) Height of water (b-a = c): ____ ft
(b) Total Depth of Well: ____ ft Equipment: ____
Casing Size: ____ inches (d) Casing volume: ____ gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): ____ gals (f) Purge volume (3 x e = f): ____ gals
Depth to Product: ____ ft

Purge data:

Purge Equipment: Geotech GeoPump2 Peristaltic
Purge Procedure: Low Flow

Flow Rate: 0.1 Lpm How determined: watch + Bucket

Comments: water clear Drawdown < 0.1 ft /7min

Start Time: 1153 End Time: 1224
Volume Purged: 3.1 ~~gals~~ Liters Time Purged: 31 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1154	6.22	50.4	169	0.1
1159	5.92	52.5	173	
1204	5.75	53.4	176	
1209	5.90	53.4	169	
1214	5.67	53.7	173	
1219	5.60	54.3	171	
1224	5.72	54.2	168	3.1

Sampling:

Sample Number: MW-1 Sampling Equipment: Peristaltic
Sampling Procedure: Low Flow

Time of sample: 1230
Duplicate Sample taken: yes [✓ no:] If yes Sample ID: ____
DTW at time of sampling: 12.61

***ADaPT* Engineering, Inc.**

Groundwater Sample Collection Log

Project Name: ACRewood Number: WA95-2877-2
Sampler: KEITH Ross
Monitor Well Number: MW-2 Date: 2/23/01
Weather: Cloudy Foggy

Water Level Measurement:

(a) Depth to Water: 4.29 ft
(c) Height of water (b-a = c): ft
(b) Total Depth of Well: ft
Equipment:
Casing Size: inches
(d) Casing volume: gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): gals
(f) Purge volume (3 x e = f): gals
Depth to Product: ft

Purge data:

Purge Equipment: AS Per MW-1
Purge Procedure:

Flow Rate: 0.1 Lpm How determined: WATCH Bucket

Comments: clear Drawdown < 0.1 ft / 5 min

Start Time: 930 End Time: 1015
Volume Purged: 4.5 ~~gals~~ Liters Time Purged: 45 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
931	8.10	43.3	150	0.1
936	7.26	45.5	130	
941	7.06	45.9	119	
946	6.79	45.9	134	
951	6.97	45.9	125	2.1
956	6.67	45.9	126	
1001	6.52	46.1	124	
1006	6.39	46.0	124	
1012	6.26	45.9	122	4.2

Sampling:

Sample Number: South well Sampling Equipment: Peristaltic
Sampling Procedure: AS Per MW-1

Time of sample: 1025
Duplicate Sample taken: [✓ yes] no: If yes Sample ID: MW-4 @ 1100
DTW at time of sampling: 5.06

Groundwater Sample Collection Log

Project Name: Acrowood Number: WA99-2877.2
Sampler: KEITH Ross
Monitor Well Number: Mw-3 Date: 2/23/01
Weather: Cloudy Foggy

Water Level Measurement:

(a) Depth to Water: 4.53 ft (c) Height of water (b-a = c): ______ ft
(b) Total Depth of Well: ______ ft Equipment: ______
Casing Size: ______ inches (d) Casing volume: ______ gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): ______ gals (f) Purge volume (3 x e = f): ______ gals
Depth to Product: ______ ft

Purge data:

Purge Equipment: As Per Mw 1
Purge Procedure: ______

Flow Rate: 0.1 Lpm How determined: WATCH & Bucket

Comments: clear Drawdown Time 0.25 ft

Start Time: 1049 End Time: 1120
Volume Purged: 3.1 ~~gals~~ Liters Time Purged: 31 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1050	6.63	47.3	129	0.1
1055	6.47	48.1	125	
1106	6.29	47.8	118	
1113	6.27	48.3	123	
1118	6.26	48.9	122	3.1

Sampling:

Sample Number: North well Sampling Equipment: Peristaltic
Sampling Procedure: As Per Mw-1

Time of sample: 1125
Duplicate Sample taken: yes [✓ no] If yes Sample ID: —
DTW at time of sampling: 4.75

APPENDIX B
LABORATORY ANALYTICAL REPORT /CHAIN OF CUSTODY FORMS

OnSite
Environmental Inc.
Analytical Testing and Mobile Laboratory Services

March 2, 2001

Keith Ross
LSI-Adapt Engineering
800 Maynard Avenue S, Suite 403
Seattle, WA 98134

Re: Analytical Data for Project WA99-2877-2
Laboratory Reference No. 0102-142

Dear Keith:

Enclosed are the analytical results and associated quality control data for samples submitted on February 23, 2001.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: March 2, 2001
Samples Submitted: February 23, 2001
Lab Traveler: 02-142
Project: WA99-2877-2

NWTPH-Dx

Date Extracted: 2-26-01
Date Analyzed: 2-26-01

Matrix: Water
Units: mg/L (ppm)

Client ID:	South Well	MW-4	North Well
Lab ID:	02-142-01	02-142-02	02-142-03
Diesel Fuel:	ND	ND	ND
PQL:	0.25	0.25	0.25
Heavy Oil:	ND	ND	ND
PQL:	0.50	0.50	0.50
Surrogate Recovery:			
o-Terphenyl	69%	79%	72%

Flags:

Date of Report: March 2, 2001
Samples Submitted: February 23, 2001
Lab Traveler: 02-142
Project: WA99-2877-2

NWTPH-Dx

Date Extracted:	2-26-01
Date Analyzed:	2-26-01
Matrix:	Water
Units:	mg/L (ppm)
Client ID:	MW-1
Lab ID:	02-142-04
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	78%

Flags:

Date of Report: March 2, 2001
Samples Submitted: February 23, 2001
Lab Traveler: 02-142
Project: WA99-2877-2

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	2-26-01
Date Analyzed:	2-26-01
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	MB0226W1
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	87%

Flags:

Date of Report: March 2, 2001
Samples Submitted: February 23, 2001
Lab Traveler: 02-142
Project: WA99-2877-2

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	2-26-01
Date Analyzed:	2-26-01

Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	02-142-01	02-142-01 DUP
Diesel Fuel:	ND	ND
PQL:	0.25	0.25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	69%	74%

Flags:

**OnSite
Environmental Inc.**

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

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

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

Page 1 of 1

Project Chemist: B

Laboratory No. 02-142

Company: LSI ADaPT

Project No.: WA99-2877-2

Project Name: ACROWOOD

Project Manager: KEITH RUSS

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☑ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)

☐ 3/2 (other)

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
1	South Well	2/23/01	1025	W	3			X																	
2	MW-4		1100	W	2			X																	
3	North Well		1125	W	2			X																	
4	MW-1		1230	W	2			X																	

RELINQUISHED BY	DATE 2/23/01	RECEIVED BY	DATE 2.23.01
FIRM LSI ADaPT	TIME 1332	FIRM OSE	TIME 1:45 PM
RELINQUISHED BY	DATE	RECEIVED BY	DATE
FIRM	TIME	FIRM	TIME
REVIEWED BY		DATE REVIEWED	

COMMENTS:

Chromatographs with final report ☐

DISTRIBUTION LEGEND: White - OnSite Copy Yellow - Report Copy Pink - Client Copy

LSI
ADaPT

July 2, 2001

ADaPT Job No. WA99-2877-2

Acrowood Corporation, Inc.
4425 South Third Avenue
Everett, WA 98206

Attention: Mr. Farhang Javid

Subject: 4th Quarter Groundwater Quality Monitoring Report
Acrowood Corporation Facility
4425 South Third Avenue
Everett, Washington

Dear Mr. Javid:

LSI ADaPT, Inc. (ADaPT), is pleased to provide you with the following results of our 3rd Quarter Groundwater Quality Monitoring Report for the above referenced site. This report is provided for Acrowood Corporation and their agents. If this report is to be reproduced and/or transmitted to a third party, it must be reproduced and/or transmitted in its entirety. Any exceptions will be made only with the written permission of ADaPT.

The purpose of the ongoing assessment is to continue to evaluate the groundwater quality in the vicinity of the suspected former fuel tank area. ADaPT installed three groundwater monitoring wells in August 2000. These wells are being sampled for a total of four quarters to evaluate groundwater quality. This report presents the results of the last of the four quarters of monitoring.

Monitoring Well Sampling

On June 5, 2001 the three monitoring wells were purged using low flow methods, with a GeoPump 2 Peristaltic pump, with disposable ¼-inch polyethylene tubing, until temperature, conductivity, and pH were stabilized and then sampled using a peristaltic pump. Prior to purging the depth to water in all three wells was recorded to evaluate the flow direction at time of sampling. During purging flow rate of the pump was approximately 0.1 Liters per minute (Lpm) to 0.15 Lpm and approximately 3 to 4-liters were purged from each well prior to sampling. Groundwater field sampling sheets are attached in Appendix A.

Samples were collected with the peristaltic pump and placed into laboratory prepared containers. The filled containers were placed in a chilled cooler at approximately 4 degrees Celsius for transport to OnSite Environmental Inc. for analytical testing for diesel and heavy oil range hydrocarbons using NWTPH-DX. Laboratory analytical results are summarized in Table 2. Laboratory reports and completed chain of custody are attached in Appendix B.

800 Maynard Avenue South
Suite 403
Seattle, Washington 98134

LSI ADaPT

Tel (206)-654-7045
Fax (206) 654-7048
www.adaptengr.com

Groundwater Elevation and Flow Direction

Depth to water was measured in all three wells to evaluate the groundwater elevations beneath the suspected former fuel tank area. Groundwater depth in MW 1 was 12.39 feet bgs, in MW2 4.24 feet bgs, and in MW3, 3.90 feet bgs as measured from the top of casing at the time of monitoring/sampling (June 5, 2001). Based on the observed elevations groundwater migration direction appears to be towards the east with a slight southward trend beneath the subject site. Fluid levels are summarized on Table 1, and estimated groundwater migration direction is graphically depicted on Figure 3.

Table 1: Groundwater Elevation

Well Number	Top of Casing Elevation (ft)	Date Measured	Depth to Water (ft)	Groundwater Elevation (ft)
MW-1	100	8/09/00	12.59	87.41
		8/10/00	12.61	87.39
		11/15/00	12.32	87.68
		2/23/01	12.21	87.79
		6/5/01	12.39	87.61
MW-2	89.92	8/09/00	5.32	84.60
		8/10/00	5.39	84.53
		11/15/00	4.34	85.58
		2/23/01	4.29	85.63
		6/5/01	4.24	85.68
MW-3	90.48	8/09/00	5.35	85.13
		8/10/00	5.52	84.96
		11/15/00	4.35	86.13
		2/23/01	4.53	85.95
		6/5/01	3.90	86.58

Notes: Wells were surveyed using an assumed elevation of Monitoring Well MW-1 as 100 feet.

Groundwater Analytical Results

Three groundwater samples were submitted to OnSite Environmental Services for analytical testing for diesel and heavy oil range hydrocarbons using NWTPH-Dx. Due to the previous analytical results the groundwater samples were not analyzed for polynuclear aromatic hydrocarbons (PAHs). The samples were collected using micro-sampling procedures designed to minimize agitation of the water. Monitoring Wells MW1 was purged and sampled at approximately 0.15 Lpm. Monitoring well MW2 was purged and sampled at approximately 0.1 Lpm. Monitoring well MW3 was purged and sampled at a pump rate of approximately 0.15 L/min. Field parameters were monitored during purging and samples were collected after stable reading for pH, temperature and conductivity were obtained. Groundwater sampling field parameter notes are presented in Appendix A. Analytical results have been summarized below in Table 2, depicted on Figure 3.

Table 2 : Summary of Groundwater Analytical Results				
Sample		NWTPH-Dx (mg/L)		EPA 8270C PAHs (ug/L)
Sample ID	Date	Diesel	Heavy Oil	
MW1	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
	6/5/01	<0.25	<0.50	--
MW2	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
	6/5/01	<0.25	<0.50	--
MW3	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
	6/5/01	<0.25	<0.50	--
MW4 (Duplicate of MW2)	8/10/00	<0.25	<0.50	ND
	11/15/00	<0.25	<0.50	--
	2/23/01	<0.25	<0.50	--
	6/5/01	<0.25	<0.50	--
MTCA Method "A" Residential Clean up Level		1.0		Various

ND= not detected above standard laboratory reporting levels
-- = not tested due to previous results

Based on the results summarized in Table 2, diesel and heavy oil range hydrocarbons were not detected above standard laboratory reporting limits. Copies of laboratory results and chain-of-custody documents have been included in Appendix B. Specific sampling locations are depicted on Figure 3.

CONCLUSIONS AND RECOMMENDATIONS

Petroleum hydrocarbons were not exhibited in any of the groundwater samples collected from the on-site groundwater monitoring wells. In ADaPT's professional opinion, based on the analytical results, observed groundwater flow direction, and field observations, the petroleum hydrocarbons observed in the soil and groundwater beneath the steel shop and suspected former fuel tank area do not appear to have migrated off-site. Based on the observed analytical results from the past four quarters of sampling it appears that the petroleum impacted soil and groundwater is not migrating off-site.

LIMITATIONS

Information contained in this report is based upon site characterization, field observations, and the laboratory analyses completed for this study. Conclusions presented are professional opinions based upon our interpretation of the analytical laboratory test results, as well as our experience and observations during the field activities. The number, locations, and depth of the explorations, as well as the analytical scope were completed within the site and proposal constraints. ADaPT's observations and the analytical data are limited to the vicinity of each test probe and do not necessarily reflect conditions across the site. No other warranty, express or implied is made. In the event that additional information regarding either the site or surrounding properties becomes known, or changes to existing conditions occurs, the conclusions in this report should be reviewed, and if necessary, revised to reflect the updated information. Project specific limitations are presented in the appropriate sections of this report.

This report has been prepared for the exclusive use of Acrowood Corporation and their agents for specific application to the project site. Use or reliance upon this report by a third is at their own risk. ADaPT does not make any representation or warranty, express or implied, to such other parties as to the accuracy or completeness of this report or the suitability of its use by such other parties for any purpose whatever, known or unknown, to ADaPT.

ADaPT appreciates the opportunity to work with you on this project. If you have any questions, or if we can be of further assistance to you, please contact us at (206) 654-7045.

Respectfully Submitted,

ADaPT Engineering, Inc.

Keith A. Ross, P.G.,
Senior Hydrogeologist
Environmental Services

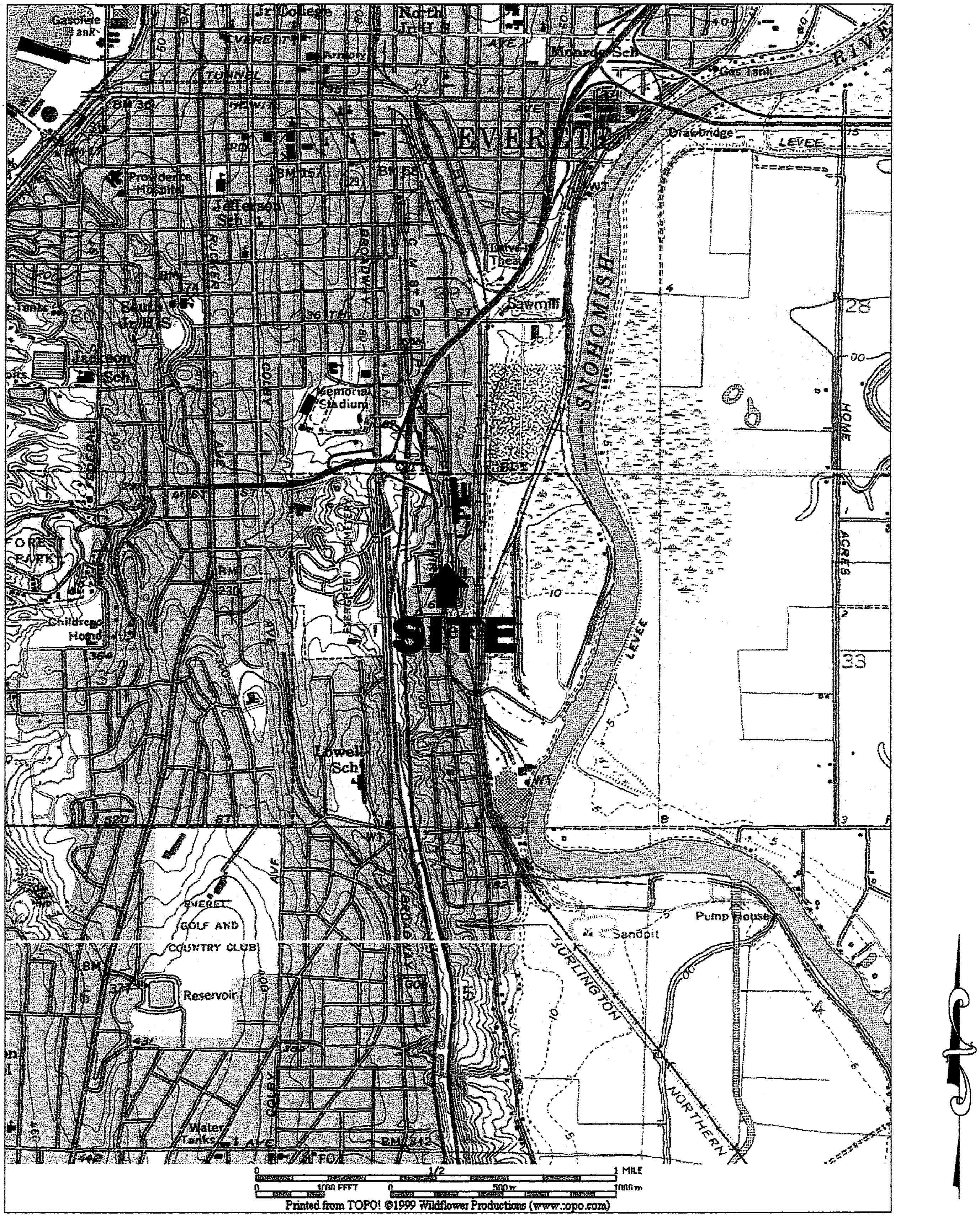
Daryl S. Petrarca, R.E.A.
VP, Environmental Services Group
Senior Reviewer

KAR/DSP/kar

Attachments:

Figure 1 - Location Map
Figure 2 – Site & Vicinity Plan
Figure 3 – Groundwater Elevation and Flow Direction

Appendix A - Groundwater Sampling Field Forms
Appendix B - Laboratory Analytical Report /Chain of Custody Forms



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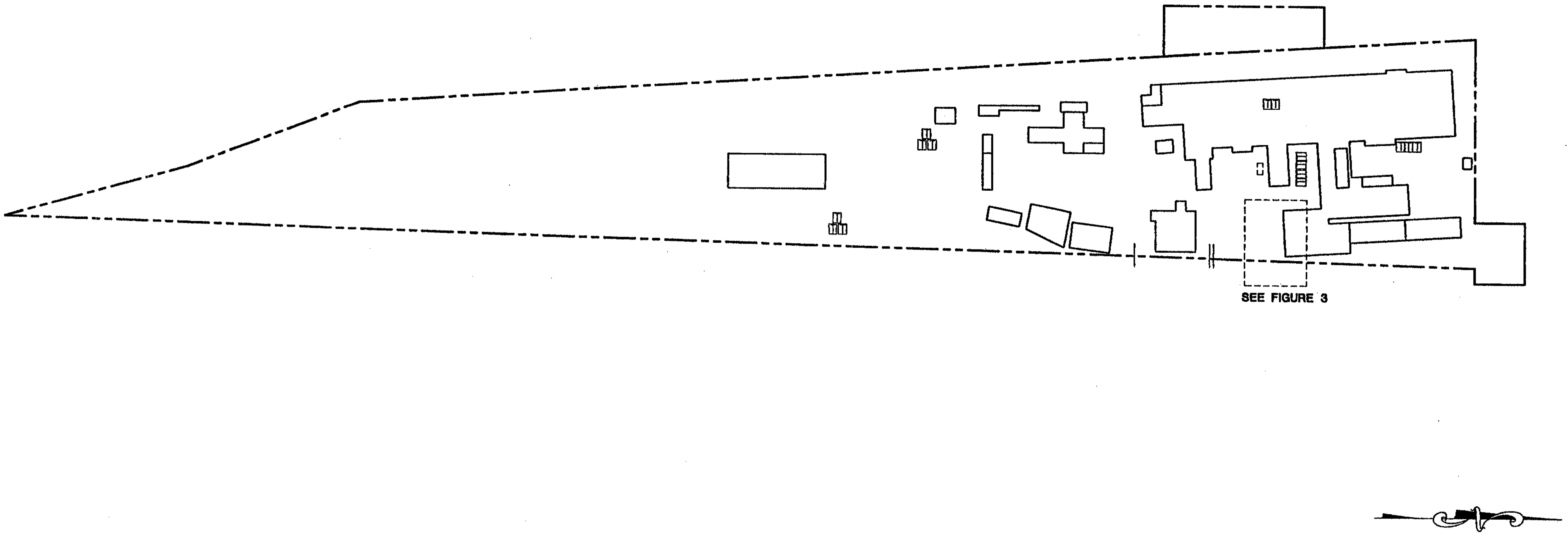
ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 1 - Location/Topographic Map

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00 **Job # :** S-WA-99-2877-2



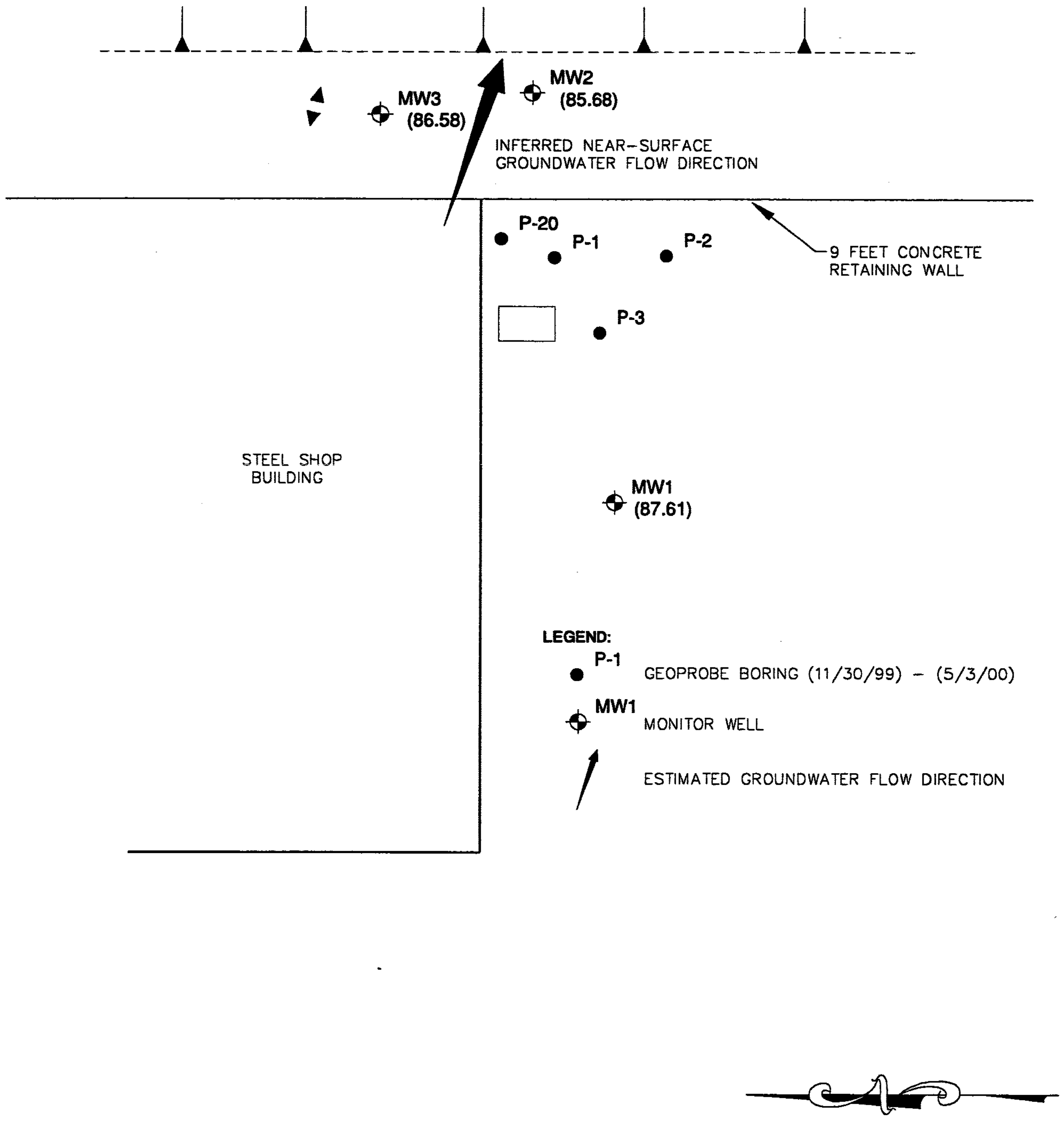
NOT TO SCALE

***ADaPT* Engineering, Inc.**

800 Maynard Avenue S., Suite 403
Seattle, Washington 98134
Ph : 206.654.7045 Fax : 206.654.7048

FIGURE 2 - Site Plan

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 8/15/00 **Job # :**S-WA-99-2877-2



SCALE 1" = 20'

ADaPT Engineering, Inc.

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

Ph : 206.654.7045 Fax : 206.654.7048

FIG 3 - 4th Quarter Groundwater Elevation (02/23/01)

Location : Acrowood Everett
4425 3rd Avenue
Everett, Washington 98206
Client : Acrowood Corporation
Date : 07/03/01 **Job # :** S-WA-99-2877-2

APPENDIX A

GROUNDWATER SAMPLING FIELD FORMS

Groundwater Sample Collection Log

Project Name: ACROWOOD Number: WA99-2577-2
Sampler: KEITH ROSS
Monitor Well Number: MW-1 Date: 6/5/01
Weather:

Water Level Measurement:

(a) Depth to Water: 12.39 ft (c) Height of water (b-a = c): ft
(b) Total Depth of Well: ft Equipment:
Casing Size: inches (d) Casing volume: gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): gals (f) Purge volume (3 x e = f): gals
Depth to Product: ft PID Reading: units Measurement Point

Purge data:

Purge Equipment: SEE MW-2
Purge Procedure:

Flow Rate: 0.150 [✓ LPM]/GPM How determined:

Comments:

Start Time: 1558 End Time: 1625
Volume Purged: Liters/Gallons Time Purged: min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
~~55~~ 1600	6.42	60.5	165.3	0.300
1605	6.06	60.1	160.0	1.05
1610	5.88	60.1	164.1	1.80
1615	5.94	60.3	161.3	2.55
1620	5.79	60.2	160.7	3.30
1625	5.82	60.3	162.9	

Sampling:

Sample Number: MW-1 Sampling Equipment:
Sampling Procedure:

Time of sample: 1625
Duplicate Sample taken: yes [✓ no] If yes Sample ID: Sample Time:
DTW at time of sampling:

Groundwater Sample Collection Log

Project Name: ACROWOOD Number: WA99-2577-2
Sampler: KEITH ROSS
Monitor Well Number: MW-2 Date: 6/5/01
Weather:

Water Level Measurement:

(a) Depth to Water: ~~[illegible]~~ 4.24 ft (c) Height of water (b-a = c): ft
(b) Total Depth of Well: ft Equipment:
Casing Size: inches (d) Casing volume: gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): gals (f) Purge volume (3 x e = f): gals
Depth to Product: NA ft PID Reading: units Measurement Point

Purge data:

Purge Equipment: Geotech Geopump 2 Peristaltic
Purge Procedure: Low Flow minimal Draw Down

Flow Rate: 0.100 [✓ LPM]/GPM How determined: WATCH & Bucket

Comments: Draw Down ~ 0.1 ft per 8 min

Start Time: 1403 End Time: 1440
Volume Purged: 3.7 [✓ Liters]/Gallons Time Purged: 37 min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1405	6.52	60.1	115.6	0.2
1410	6.19	59.6	137.5	0.7
1415	6.02	59.3	133.8	1.2
1420	6.02	60.0	139.7	1.7
1425	5.99	59.5	137.5	2.2
1430	5.96	59.4	124.7	2.7
1435	5.91	58.4	125.4	3.2
1440	5.91	58.4	130.7	3.7

Sampling:

Sample Number: MW-2 Sampling Equipment:
Sampling Procedure:

LABeled 1425
Time of sample: 1440
Duplicate Sample taken: [✓ yes] no: If yes Sample ID: MW-4 Sample Time: 1440
DTW at time of sampling:

LABeled 1455

Groundwater Sample Collection Log

Project Name: ACROWOOD Number: W433-2877.2
Sampler: KEITH ROSS
Monitor Well Number: MW-3 Date: 6/5/01
Weather:

Water Level Measurement:

(a) Depth to Water: ~~4.24~~ 3.90 ft (c) Height of water (b-a = c): ____ ft
(b) Total Depth of Well: ____ ft Equipment:
Casing Size: ____ inches (d) Casing volume: ____ gal/ft (2in-0.163: 4in-0.653: 6in-1.469)
(e) 1 Casing Volume (c x d = e): ____ gals (f) Purge volume (3 x e = f): ____ gals
Depth to Product: ____ ft PID Reading: ____ units Measurement Point

Purge data:

Purge Equipment:
Purge Procedure:

Flow Rate: ~~600~~ 0.150 [✓ LPM]/GPM How determined:

Comments:

Start Time: 1500 End Time:
Volume Purged: ____ Liters/Gallons Time Purged: ____ min

Time	pH	Temperature F C	Conductivity	Total Volume Pumped
1501	6.56	58.2	117.4	0.150
1506	6.42	57.8	119.2	~~0.6~~ 0.75
1512	6.77	58.3	119.2	~~1.2~~ 1.50
1517	6.27	58.7	117.1	2.25
1522	6.26	58.9	120.7	3.00
	6.22	58.4	116.9	3.75

Sampling:

Sample Number: MW-3 Sampling Equipment:
Sampling Procedure:

Time of sample: 1530
Duplicate Sample taken: yes [✓ no:] If yes Sample ID: Sample Time:
DTW at time of sampling: 4.71

APPENDIX B
LABORATORY ANALYTICAL REPORT /CHAIN OF CUSTODY FORMS

Date of Report: June 15, 2001
Samples Submitted: June 6, 2001
Lab Traveler: 06-038
Project: WA99-2877-2

NWTPH-Dx

Date Extracted:	6-6-01
Date Analyzed:	6-6-01
Matrix:	Water
Units:	mg/L (ppm)
Client ID:	MW - 4
Lab ID:	06-038-04
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	42%

Flags:

Date of Report: June 15, 2001
Samples Submitted: June 6, 2001
Lab Traveler: 06-038
Project: WA99-2877-2

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	6-6-01
Date Analyzed:	6-6-01
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB0606W1
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	76%

Flags:

Date of Report: June 15, 2001
Samples Submitted: June 6, 2001
Lab Traveler: 06-038
Project: WA99-2877-2

NWTPH-Dx
METHOD BLANK QUALITY CONTROL

Date Extracted:	6-11-01
Date Analyzed:	6-12-01
Matrix:	Water
Units:	mg/L (ppm)
Lab ID:	MB0611W1
Diesel Fuel:	ND
PQL:	0.25
Heavy Oil:	ND
PQL:	0.50
Surrogate Recovery:	
o-Terphenyl	102%
Flags:	Y

Date of Report: June 15, 2001
Samples Submitted: June 6, 2001
Lab Traveler: 06-038
Project: WA99-2877-2

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted: 6-6-01
Date Analyzed: 6-6-01

Matrix: Water
Units: mg/L (ppm)

Lab ID:	06-038-04	06-038-04 DUP
Diesel Fuel:	ND	ND
PQL:	0.25	0.25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	42%	32%

Flags:

Date of Report: June 15, 2001
Samples Submitted: June 6, 2001
Lab Traveler: 06-038
Project: WA99-2877-2

NWTPH-Dx
DUPLICATE QUALITY CONTROL

Date Extracted:	6-11-01
Date Analyzed:	6-12-01
Matrix:	Water
Units:	mg/L (ppm)

Lab ID:	06-060-01	06-060-01 DUP
Diesel Fuel:	ND	ND
PQL:	0.25	0.25
RPD:	N/A	
Surrogate Recovery:		
o-Terphenyl	89%	166%
Flags:	Y	Y

OnSite Environmental Inc.

DATA QUALIFIERS AND ABBREVIATIONS

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

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

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

D - Data from 1:____ dilution.

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

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

G - Insufficient sample quantity for duplicate analysis.

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

O - Hydrocarbons outside the defined gasoline range are present in the sample; NWTPH-Dx recommended.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

X - Sample extract treated with a silica gel cleanup procedure.

Y - Sample extract treated with an acid cleanup procedure.

Z -

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

OnSite Environmental Inc.
14648 NE 95th Street • Redmond, WA 98052
Fax: (425) 885-4603 • Phone: (425) 883-3881

Chain of Custody

Page 1 of 1

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day

☐ 2 Day ☐ 3 Day

☒ Standard (Hydrocarbon analyses: 5 days, All other analyses: 7 days)

☐ 6/14 (other)

Project Chemist: DB

Laboratory No. 06-038

Company: LSI ADAPT

Project No.: WA99-2977-2

Project Name: Acrowood

Project Manager: KEITH ROSS

Requested Analysis

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Dx	Volatiles by 8260B	Halogenated Volatiles by 8260B	Semivolatiles by 8270C	PAHs by 8270C	PCB's by 8082	Pesticides by 8081	Total RCRA Metals (8)	TCLP Metals	VPH	EPH							% Moisture
1	MW-1	6/5/01	1625	W	2			X																	
2	MW-2		1425	W	2			X																	
3	MW-3		1530	W	2			X																	
4	MW-4		1455	W	2			X																	

RELINQUISHED BY	DATE 6/6/01	RECEIVED BY A Herald	DATE 6-6-01
FIRM LSI ADAPT	TIME 1108	FIRM [illegible]	TIME
RELINQUISHED BY	DATE	RECEIVED BY Diane Quinn	DATE 6-6-01
FIRM	TIME	FIRM OSE	TIME 1:15 pm
REVIEWED BY		DATE REVIEWED	

COMMENTS:

Chromatographs with final report ☐

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APPENDIX G

MTCA PARTITIONING MODEL SPREADSHEET CALCULATIONS

Soil Cleanup Levels: Worksheet for Data Entry

Refer to WAC 173-340-720, 740,745, 747, 750

Date: 09/25/01
Site Name: ACROWOOD
Sample Name: P20-12

1. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	2.5	0.03%
AL_EC >6-8	5.9	0.07%
AL_EC >8-10	2.5	0.03%
AL_EC >10-12	110	1.38%
AL_EC >12-16	870	10.94%
AL_EC >16-21	770	9.68%
AL_EC >21-34	1450	18.23%
AR_EC >8-10	40	0.50%
AR_EC >10-12	235	2.96%
AR_EC >12-16	880	11.07%
AR_EC >16-21	2025	25.46%
AR_EC >21-34	1528	19.21%
Benzene	0	0.00%
Toluene	0	0.00%
Ethylbenzene	0	0.00%
Total Xylenes	0	0.00%
Total Naphthalenes	15	0.19%
n-Hexane	0	0.00%
MTBE	0	0.00%
Ethylene Dibromide (EDB)	0	0.00%
1,2 Dichloroethane (EDC)	0	0.00%
Benzo(a)anthracene	5.1	0.06%
Benzo(b)fluoranthene	1	0.01%
Benzo(k)fluoranthene	1	0.01%
Benzo(a)pyrene	1.4	0.02%
Chrysene	8	0.10%
Dibenzo(a,h)anthracene	1	0.01%
Indeno(1,2,3-cd)pyrene	1	0.01%
Sum	7952.4	100.00%

2. Enter Site-Specific Hydrogeological Data

Total soil porosity: default is 0.43	0.43	Unitless
Volumetric water content: default is 0.3	0.3	Unitless
Volumetric air content: default is 0.13	0.13	Unitless
Soil bulk density measured: default is 1.5	1.5	kg/l
Fraction Organic Carbon: default is 0.001	0.001	Unitless
Dilution Factor: default is 20	20	Unitless

Exposure Pathway		Pass or Fail?	HI	RISK
Soil Direct Contact	Unrestricted Land use	Fail	3.13E+00	2.59E-05
	Industrial Land use	Pass	2.56E-01	6.44E-06
Method B Potable Ground Water Protection		Pass	3.27E-01	3.98E-09

Warning!!!

*Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required based on site-specific conditions and type of fuel (see WAC 173-340-7490~7494).

*Check Soil Residual Saturation Evaluation specified in WAC 173-340-747(10).

Note:

1. All data must be numeric values. Use of alphabetical characters (i.e., "ND", "NA", "<", ">", or "=") will cause an error.
2. Try to avoid double counting: The Petroleum Equivalent Carbon (EC) fractions include many individual substances that must be analyzed separately. When entering the concentration of petroleum EC fraction into the data entry cell, make sure you subtract the concentration of individual substances from the appropriate EC fraction. (See User's Guide)
3. For the values of soil measurement below the method detection limit, substitute one-half the method detection limit as required by WAC173-340-740-(7). For the values for soil measurement above the method detection limit but below the practical quantitation limit, substitute the method detection limit. However, for a hazardous substance or petroleum fraction which has never been detected in any sample at a site and these substances are not suspected of being present at the site based on site history and other knowledge, enter "0" for that hazardous substances or petroleum fraction for further calculation. Refer to WAC173-340-740(7) for detail.
4. For detail analytical testing requirements for petroleum contaminated sites, refer to WAC 173-340-820, 830 and 840, and Table 830-1.
5. For detail information on site-specific hydrogeological conditions, refer to WAC 173-340-747.

REMARK:
Enter site-specific information here........

Worksheet for Calculating Method B Potable Ground Water Cleanup Levels

Refer to MTCA WAC 173-340-720

Date: 8/15/01
Site Name: ACROWOOD Corp.
Sample info: P20-W

1. All data must be numeric values. Use of alphabetical

error.
2. Try to avoid double counting: When entering the

make sure you subtract the concentration of individual substances from the appropriate EC fraction. (See User's Guide)

Enter Ground Water Concentration Measured			Current Condition			Adjusted Condition			
Chemical of Concern or EC Group	Measured Ground Water Conc	Ground Water Cleanup Level	HQ	RISK	Pass or Fail?	Ground Water Conc being tested	HQ	RISK	Pass or Fail?
	ug/l	ug/l	unitless	unitless		ug/l	unitless	unitless	
Petroleum EC Fraction									
AL_EC >5-6	15		3.29E-04			1.92E+00	4.21E-05		
AL_EC >6-8	25		5.48E-04			3.20E+00	7.02E-05		
AL_EC >8-10	25		1.04E-01			3.20E+00	1.33E-02		
AL_EC >10-12	110		4.58E-01			1.41E+01	5.87E-02		
AL_EC >12-16	400		8.33E-01			5.12E+01	1.07E-01		
AL_EC >16-21	400		1.25E-02			5.12E+01	1.60E-03		
AL_EC >21-34	780		2.44E-02			9.98E+01	3.12E-03		
AR_EC >8-10	98		2.45E-01			1.25E+01	3.14E-02		
AR_EC >10-12	240		6.00E-01			3.07E+01	7.68E-02		
AR_EC >12-16	940		1.18E+00			1.20E+02	1.50E-01		
AR_EC >16-21	1153		2.40E+00			1.48E+02	3.07E-01		
AR_EC >21-34	760		1.58E+00			9.73E+01	2.03E-01		
Benzene	0	5		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Toluene	0	1000				0.00E+00	0.00E+00		
Ethylbenzene	0	700				0.00E+00	0.00E+00		
Total Xylenes	0	1000				0.00E+00	0.00E+00		
Total Naphthalenes	60	160	3.75E-01			7.68E+00	4.80E-02		
n-Hexane	0					0.00E+00	0.00E+00		
MTBE	0	20				0.00E+00			
Ethylene Dibromide (EDB)	0	0.01		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
1,2 Dichloroethane (EDC)	0	5		0.00E+00		0.00E+00	0.00E+00	0.00E+00	
Benzo(a)anthracene	5.6			4.67E-05	*for*	7.17E-01		5.98E-06	*for*
Benzo(b)fluoranthene	0.77			6.42E-06	*all*	9.85E-02		8.22E-07	*all*
Benzo(k)fluoranthene	0.01			8.34E-08	*cPAHs*	1.28E-03		1.07E-08	*cPAHs*
Benzo(a)pyrene	0.01			8.34E-07		1.28E-03		1.07E-07	
Chrysene	8.8			7.34E-06	***Fail***	1.13E+00		9.40E-07	
Dibenzo(a,h)anthracene	0.01			3.34E-07		1.28E-03		4.27E-08	
Indeno(1,2,3-cd)pyrene	0.01			8.34E-08		1.28E-03		1.07E-08	
Sum	**5021.21**		7.81E+00	6.18E-05	***Fail***	6.43E+02	1.00E+00	7.91E-06	

Current Condition	
TPH, ug/l=	5021.21
HI=	7.81E+00
Cancer RISK=	6.18E-05
Pass or Fail?	Fail

Adjusted Condition	
TPH, ug/l=	642.591
HI=	1.00E+00
Cancer RISK=	7.91E-06
Pass or Fail?	Pass

Please check WAC 246-290-310!

Exposure Parameters		
for Non-carcinogens		Units
Average Body Weight, ABW	16	kg
Unit Conversion Factor, UCF	1000	ug/mg
Drinking Water Ingestion Rate, DWIR	1	l/day
Drinking Water Fraction, DWF	1	unitless
for Carcinogens		Units
Average Body Weight, ABW	70	kg
Unit Conversion Factor, UCF	1000	ug/mg
Averaging time, AT	75	yr
Drinking Water Ingestion Rate, DWIR	2	l/day
Exposure Duration, ED	30	yr
Drinking Water Fraction, DWF	1	unitless

Worksheet for Calculating Soil Cleanup Levels for Unrestricted & Industrial Land Use

Date: 12/4/01
Site Name: Acrowood Soil sample P7-S2
Evaluator: Keith A. Ross

Refer to WAC 173-340-720, 740, 745, 747 and 750 for details.

A. INPUT PARAMETERS FOR SOIL CLEANUP LEVEL CALCULATIONS

Note: If no data is available for any of the following inputs, then leave the input box blank

Item	Symbol	Value	Units
1. General information			
Name of Chemical:		TCE	
Measured Soil Concentration, if any:	C_s	0.055	mg/kg
Natural Background Concentration for Soil:	NB_s		mg/kg
Practical Quantitation Limit for Soil:	PQL_s		mg/kg
To evaluate the ingestion and dermal pathways concurrently, check here and input values for AF, ABS_d, GI:	☑		
2. Toxicological Properties of the Chemical: Chemical-Specific			
Oral Reference Dose:	RfD_o	0.006	mg/kg-day
Oral Carcinogenic Potency Factor:	CPF_o	0.011	kg-day/mg
Inhalation Reference Dose:	RfD_i		mg/kg-day
Inhalation Carcinogenic Potency Factor:	CPF_i	0.017	kg-day/mg
3. Exposure Parameters			
Inhalation Correction Factor (default = "2" for volatiles; "1" for all others): for target ground water cleanup level	INH	2	unitless
Inhalation Absorption Fraction (default = "1"): for target air cleanup level	ABS_i	1	unitless
Gastrointestinal Absorption Fraction (default = "1"): for ingestion & dermal exposure pathways	$AB1$	1	unitless
Adherence Factor (default = "0.2"): for dermal exposure pathway	AF	0.2	mg/cm^2-day
Dermal Absorption Fraction (chemical-specific or defaults): for dermal exposure pathway	ABS_d	0.1	unitless
Gastrointestinal Absorption Conversion Factor (chemical-specific or defaults): for dermal exposure pathway	GI	1	unitless
4. Physical and Chemical Properties of the Chemical: Chemical-Specific			
Soil Organic Carbon-Water Partitioning Coefficient: for metals, enter K_d value here and enter "1" for f_{oc} value	K_{oc}	9.400E+01	l/kg
Henry's Law Constant: for the evaluation of ground water and vapor exposure pathway	H_{cc}	*4.684E+00*	unitless
**If the value for Henry's Law Constant is given in the unit of "atm.m^3/mol", enter value here:*	H	*1.100E-01*	atm.m^3/mol
**Converted unitless form of H_{cc} @13° C: (Enter this converted value into "H_{cc} input Box" above for a calculation)*	H_{cc}	*4.684E+00*	unitless

Solubility of the Chemical in Water: for the calculation of soil saturation limit	***S***	1.100E-03	mg/l

5. Target Ground Water Cleanup Level

Target Ground Water Cleanup Level applicable for a soil cleanup level calculation: **Results from the Ground Water Cleanup Level Worksheet are not automatically transferred into this worksheet.*	C_w	**5.00E+00**	ug/l

6. Site-Specific Hydrogeological Characteristics

Total Soil Porosity (default = "0.43"):	n	0.43	unitless
Volumetric Water Content (default = "0.30"):	Θ_w	0.3	unitless
Volumetric Air Content (default = "0.13"):	Θ_a	0.13	unitless
Dry Soil Bulk Density (default = "1.50"):	ρ_b	1.5	kg/l
Fraction Soil Organic Carbon (default = "0.001"): for metals, enter "1" for f_{oc} value here	f_{oc}	0.001	unitless
Dilution Factor (default = "20" for unsaturated zone soil; "1" for saturated zone soil; or site-specific)	***DF***	20	unitless

7. Vapor Attenuation Factor due to Advection (building structure) & Diffusion (soil layer) Mechanisms

** Vapor Attenuation Factor is the ratio of vapor-phase contaminant concentration within the soil at the source to the air concentration at the exposure point (e.g., within the building)*

Enter Vapor Attenuation Factor: for the evaluation of vapor exposure pathway	***VAF***	10000	unitless

B. SUMMARY OF SOIL CLEANUP LEVEL CALCULATIONS

Chemical of Concern: TCE

1. Summary of Results

To calculate a soil cleanup level based on Industrial Land Use (Method C) for Direct Soil Contact, check here: ☑

To calculate a soil concentration based on Method C vapor pathway, check here: ☑

Basis for Soil Concentration	Conc	Units
Most stringent soil concentration based on Soil Direct Contact & Ground Water Protection:	6.999E-02	mg/kg
Natural Background concentration for Soil:	N/A	mg/kg
Practical Quantitation Limit for Soil:	N/A	mg/kg
Soil Cleanup Level (not considering vapor pathway):	6.999E-02	mg/kg
Warning! Soil Cleanup Level above may not be protective of vapor exposure pathway - evaluate vapor pathway further.		
Soil concentration based on Vapor Pathway (informational purposes only):	7.691E-03	mg/kg

Warning: Soil Cleanup Level is higher than Soil Saturation Limit!

C_{sat} corresponds to the total soil chemical concentration saturated in soil.

R is the ratio of the ground water flow velocity to the

Soil Saturation Limit, C_{sat}:	7.699E-04	mg/kg
Retardation Factor, R:	1.3	unitless

R is the ratio of the ground water flow velocity to the contaminant migration velocity in saturated zone.

2. Summary of Calculation for each Exposure Pathway

Summary by Exposure Pathway						
Soil Direct Contact			*Method B* *Unrestricted Land Use* @ HQ=1.0; RISK =1.0E-6		*Method C* *Industrial Land Use* @ HQ=1.0; RISK =1.0E-5	
			Ingestion only	Ingestion & Dermal	Ingestion only	Ingestion & Dermal
	Under the Current Condition	HQ? @ Exposure Point	1.146E-04	1.398E-04	2.619E-06	9.167E-06
		RISK? @ Exposure Point	6.050E-10	7.381E-10	4.610E-11	1.613E-10
	Target Soil CUL? mg/kg	@HQ=1.0	4.800E+02	3.934E+02	2.100E+04	6.000E+03
		@RISK =1.0E-6 or 1.0E-5	9.091E+01	7.452E+01	1.193E+04	3.409E+03
Protection of Potable Ground Water			*Method B* @ HQ=1.0; RISK =1.0E-6		*Method C* @ HQ=1.0; RISK =1.0E-5	
	Under the Current Condition	Predicted Ground Water Conc? ug/l	3.929E+00			
		HQ? @ Exposure Point	8.185E-02		3.742E-02	
		RISK? @ Exposure Point	9.878E-07		9.878E-07	
	Target Ground Water CUL? ug/l		5.000E+00			
	Target Soil CUL? mg/kg		6.999E-02			
Protection of Air Quality ***(for informational purpose only)***			*Method B* @ HQ=1.0; RISK =1.0E-6		*Method C* @ HQ=1.0; RISK =1.0E-5	
	Under the Current Condition	Predicted Air Conc? ug/m^3 @Exposure Point	3.681E+01			
		HQ? @ Exposure Point	N/A		N/A	
		RISK? @ Exposure Point	7.151E-05		7.151E-05	
	Target Air CUL? ug/m^3	@ HQ=1.0	N/A		N/A	
		@ RISK=1.0E-6 or 1.0E-5	5.147E-01		5.147E+00	
	Target Soil CUL? mg/kg	@ HQ=1.0	N/A		N/A	
		@ RISK=1.0E-6 or 1.0E-5	7.691E-04		7.691E-03	

NOTES: "CUL" = Cleanup Level; "Conc" = concentration; "HQ" = hazard quotient; "RISK" = carcinogenic risk.

CAUTION: The requirements and procedures for establishing soil cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-740, 173-340-745, 173-340-747 and 173-340-7490 through 173-340-7494). The use of this Workbook is not sufficient to establish soil cleanup levels under the regulation. Specifically, the soil cleanup levels derived using this Workbook do not account for the following:

- Concentrations based on applicable state and federal laws (see WAC 173-340-740(3)(b)(i) and 173-340-745(5)(b)(i));
- Soil residual saturation (see WAC 173-340-747(10));
- Ecological impacts (see WAC 173-340-7490 through 7494); and
- Total site risk (see WAC 173-340-740(5)(a) and 173-340-745(6)(a)).

Other exposure pathways may also need to be evaluated on a site-specific basis to establish soil cleanup levels.

CAUTION: The requirements and procedures for establishing air cleanup levels that are protective of human health and the environment are specified in the MTCA Cleanup Regulation (see WAC 173-340-750). The use of this Workbook may not be sufficient to establish air cleanup levels under the regulation. Specifically, the air cleanup levels derived using this Workbook do not account for the following:

- Concentrations based on applicable state and federal laws (see WAC 173-340-750(3)(b)(i) and (4)(b)(i));
- Concentrations based on natural background and the practical quantitation limit (see WAC 173-340-750(5)(c));
- Total site risk (see WAC 173-340-750(5)(a)).

Model Toxics Control Act
Chemical-Specific Parameters Values
Toxicological Properties
Bioconcentration Factors and Inhalation Correction Factors
Data updated: November 2001

		Non-Carcinogens (Toxicity)					Carcinogens				SURFACE WATER			GROUND WATER
		Oral Reference Dose (RfDo)			Inhalation Reference Dose (RfDi)		Oral Cancer Potency Factor (CPFo)		Inhalation Cancer Potency Factor (CPFi)		Bioconcentration Factor (BCF)			Inhalation Correction Factor (INH)
CAS Number	Chemical Name	mg/kg-day	Reference	Toxic Effects	mg/kg-day	Reference	kg-day/mg	Reference	kg-day/mg	Reference	L/kg	Reference	Gastrointestinal Absorption Fraction (AB1)	unitless
79-01-6	trichloroethylene		H97;NI12/97			H97;NI12/97	0.011	H91a;WI10/95	0.017	H91a;NI12/00	10.6	AWQC07/92;12/00	1	2

Model Toxics Control Act
Chemical-Specific Parameters Values
Toxicological Properties
Bioconcentration Factors and Inhalation Correction Factors
Data updated: November 2001

									Method A		GROUND WATER		GROUND WATER		SURFACE WATER		SURFACE WATER	
		Maximum Contaminant Level (MCL)						Method A			Method B		Method C		Method B		Method C	
			MCL Treatment Technique			WA State Board of Health MCLs					Standard Formula Values		Standard Formula Values		Standard Formula Values		Standard Formula Values Standard Formula Values	
CAS Number	Chemical Name	MCL mg/L	Action Level mg/L	MCL Goal mg/L	MCL Secondary mg/L	Primary mg/L	Secondary mg/L	Ground Water	Soil Unrestricted Land Use	Soil Industrial	Carcinogen ug/L	Non-carcinogen ug/L	Carcinogen ug/L	Non-carcinogen ug/L	Carcinogen ug/L	Non-carcinogen ug/L	Carcinogen ug/L	Non-carcinogen ug/L
79-01-6	trichloroethylene	0.005		0				5 ug/L	0.03 mg/kg	0.03 mg/kg	3.98E+00		3.98E+01		5.56E+01		1.39E+03	

Model Toxics Control Act
Chemical-Specific Parameters Values
Toxicological Properties
Bioconcentration Factors and Inhalation Correction Factors
Data updated: November 2001

		SOIL - Direct Contact Pathway (Ingestion Only)		SOIL - Direct Contact Pathway (Ingestion Only)		SOIL - Protection of Ground Water								SOIL - Protectio
		Method B: Unrestricted Land Use		Method C: Industrial Land Use Standard Formula Values		Contact the Toxics Cleanup Program at (360) 407-7170 for information regarding								Meth
CAS Number	Chemical Name	Carcinogen mg/kg	Non-carcinogen mg/kg	Carcinogen mg/kg	Non-carcinogen mg/kg	Koc unitless @ pH=6.8		Kd (for metals) L/kg @pH=6.8		Henry's Law Constant (Hcc) unitless		Aqueous Solubility (S) mg/l		Target Ground Water Cleanup Level ug/L
						Value	Reference	Value	Reference	Value	Reference	Value	Reference	
79-01-6	trichloroethylene	9.09E+01		1.19E+04		9.400E+01	SSG96, T.38			4.22E-01	SSG01, T.C-1	1.10E+03	SSG01, T.C-1	

Model Toxics Control Act
Chemical-Specific Parameters Values
Toxicological Properties
Bioconcentration Factors and Inhalation Correction Factors
Data updated: November 2001

		of Ground Water	SOIL - Protection of Ground Water		AIR		AIR	
		od B	Method C		Method B		Method C	
					Standard Formula Values		Standard Formula Values Standard Formula Values	
CAS Number	Chemical Name	Soil Concentration Protective of Ground Water mg/kg	Target Ground Water Cleanup Level ug/L	Soil Concentration Protective of Ground Water mg/kg	Carcinogen ug/m3	Non-carcinogen ug/m3	Carcinogen ug/m3	Non-carcinogen ug/m3
79-01-6	trichloroethylene				5.15E-01		5.15E+00	

Sources: I = IRIS H = HEAST A = HEAST Alternate W = Withdrawn from IRIS or HEAST
E = EPA-NCEA provisional value O = other

Basis: C = Carcinogenic effects N = Noncarcinogenic effects ! = RBC at HI of 0.1 < RBC-c

							Risk-based concentrations					Region III SSLs	
												Soil, for groundwater migration	
Chemical	CAS	RfDo mg/kg/d	CSFo 1/mg/kg/d	RfDi mg/kg/d	CSFi 1/mg/kg/d	VOC	Tap water ug/l	Ambient air ug/m3	Fish mg/kg	Soil Industrial mg/kg	Residential mg/kg	DAF 1 mg/kg	DAF 20 mg/kg
TITANIUM	7440326	4.00E+000 E		8.60E-003 E			1.5E+005 N	3.1E+001 N	5.4E+003 N	8.2E+006 N	3.1E+005 N		
TITANIUM DIOXIDE	13463677	4.00E+000 E		8.60E-003 E			1.5E+005 N	3.1E+001 N	5.4E+003 N	8.2E+006 N	3.1E+005 N		
TOLUENE	108883	2.00E-001 I		1.14E-001 I		y	7.5E+002 N	4.2E+002 N	2.7E+002 N	4.1E+005 N	1.6E+004 N	4.4E-001	8.8E+000 N
TOLUENE-2,4-DIAMINE	95807		3.20E+000 H				2.1E-002 C	2.0E-003 C	9.9E-004 C	1.8E+000 C	2.0E-001 C		
TOLUENE-2,5-DIAMINE	95705	6.00E-001 H					2.2E+004 N	2.2E+003 N	8.1E+002 N	1.2E+006 N	4.7E+004 N		
TOLUENE-2,6-DIAMINE	823405	2.00E-001 H					7.3E+003 N	7.3E+002 N	2.7E+002 N	4.1E+005 N	1.6E+004 N		
P-TOLUIDINE	106490		1.90E-001 H				3.5E-001 C	3.3E-002 C	1.7E-002 C	3.0E+001 C	3.4E+000 C	3.0E-004	5.9E-003 C
TOXAPHENE	8001352		1.10E+000 I		1.10E+000 I		6.1E-002 C	5.7E-003 C	2.9E-003 C	5.2E+000 C	5.8E-001 C	3.1E-002	6.3E-001 C
1,2,4-TRIBROMOBENZENE	615543	5.00E-003 I					1.8E+002 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N		
TRIBUTYLTIN OXIDE	56359	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N		
2,4,6-TRICHLOROANILINE	634935		3.40E-002 H				2.0E+000 C	1.8E-001 C	9.3E-002 C	1.7E+002 C	1.9E+001 C		
1,2,4-TRICHLOROBENZENE	120821	1.00E-002 I		5.70E-002 H		y	1.9E+002 N	2.1E+002 N	1.4E+001 N	2.0E+004 N	7.8E+002 N	3.8E-001	7.5E+000 N
**1,1,1-TRICHLOROETHANE	71556	2.80E-001 E		6.30E-001 E		y	3.2E+003 N	2.3E+003 N	3.8E+002 N	5.7E+005 N	2.2E+004 N	3.0E+000	6.0E+001 N
1,1,2-TRICHLOROETHANE	79005	4.00E-003 I	5.70E-002 I		5.60E-002 I	y	1.9E-001 C	1.1E-001 C	5.5E-002 C	1.0E+002 C	1.1E+001 C	3.9E-005	7.8E-004 C
TRICHLOROETHENE	79016	6.00E-003 E	1.10E-002 E		6.00E-003 E	y	1.6E+000 C	1.0E+000 C	2.9E-001 C	5.2E+002 C	5.8E+001 C !	7.7E-004	1.5E-002 C
TRICHLOROFLUOROMETHANE	75694	3.00E-001 I		2.00E-001 A		y	1.3E+003 N	7.3E+002 N	4.1E+002 N	6.1E+005 N	2.3E+004 N	1.1E+000	2.3E+001 N
2,4,5-TRICHLOROPHENOL	95954	1.00E-001 I					3.7E+003 N	3.7E+002 N	1.4E+002 N	2.0E+005 N	7.8E+003 N		
2,4,6-TRICHLOROPHENOL	88062		1.10E-002 I		1.00E-002 I		6.1E+000 C	6.3E-001 C	2.9E-001 C	5.2E+002 C	5.8E+001 C		
2,4,5-T	93765	1.00E-002 I					3.7E+002 N	3.7E+001 N	1.4E+001 N	2.0E+004 N	7.8E+002 N	9.8E-002	2.0E+000 N
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC ACID	93721	8.00E-003 I					2.9E+002 N	2.9E+001 N	1.1E+001 N	1.6E+004 N	6.3E+002 N	1.1E+000	2.1E+001 N
1,1,2-TRICHLOROPROPANE	598776	5.00E-003 I				y	3.0E+001 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N	1.2E-002	2.5E-001 N
**1,2,3-TRICHLOROPROPANE	96184	6.00E-003 I	2.00E+000 E	1.4E-003 E		y	5.3E-003 C	3.1E-003 C	1.6E-003 C	2.9E+000 C	3.2E-001 C	1.8E-006	3.6E-005 C
1,2,3-TRICHLOROPROPENE	96195	5.00E-003 H				y	3.0E+001 N	1.8E+001 N	6.8E+000 N	1.0E+004 N	3.9E+002 N	1.2E-002	2.5E-001 N
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76131	3.00E+001 I		8.60E+000 H		y	5.9E+004 N	3.1E+004 N	4.1E+004 N	6.1E+007 N	2.3E+006 N	1.2E+002	2.3E+003 N
1,2,4-TRIMETHYLBENZENE	95636	5.00E-002 E		1.70E-003 E		y	1.2E+001 N	6.2E+000 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
1,3,5-TRIMETHYLBENZENE	108678	5.00E-002 E		1.70E-003 E		y	1.2E+001 N	6.2E+000 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		
TRIMETHYL PHOSPHATE	512561		3.70E-002 H				1.8E+000 C	1.7E-001 C	8.5E-002 C	1.5E+002 C	1.7E+001 C		
1,3,5-TRINITROBENZENE	99354	3.00E-002 I					1.1E+003 N	1.1E+002 N	4.1E+001 N	6.1E+004 N	2.3E+003 N		
2,4,6-TRINITROTOLUENE	118967	5.00E-004 I	3.00E-002 I				2.2E+000 C !	2.1E-001 C !	1.1E-001 C !	1.9E+002 C !	2.1E+001 C !		
URANIUM (SOLUBLE SALTS)		3.00E-003 I					1.1E+002 N	1.1E+001 N	4.1E+000 N	6.1E+003 N	2.3E+002 N		
VANADIUM	7440622	7.00E-003 H					2.6E+002 N	2.6E+001 N	9.5E+000 N	1.4E+004 N	5.5E+002 N	2.6E+002	5.1E+003 N
VANADIUM PENTOXIDE	1314621	9.00E-003 I					3.3E+002 N	3.3E+001 N	1.2E+001 N	1.8E+004 N	7.0E+002 N		
VANADIUM SULFATE	16785812	2.00E-002 H					7.3E+002 N	7.3E+001 N	2.7E+001 N	4.1E+004 N	1.6E+003 N		
VINCLOZOLIN	50471448	2.50E-002 I					9.1E+002 N	9.1E+001 N	3.4E+001 N	5.1E+004 N	2.0E+003 N		
VINYL ACETATE	108054	1.00E+000 H		5.71E-002 I		y	4.1E+002 N	2.1E+002 N	1.4E+003 N	2.0E+006 N	7.8E+004 N	8.7E-002	1.7E+000 N
VINYL CHLORIDE	75014		1.90E+000 H		3.00E-001 H	y	1.9E-002 C	2.1E-002 C	1.7E-003 C	3.0E+000 C	3.4E-001 C	7.9E-006	1.6E-004 C
WARFARIN	81812	3.00E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N	2.2E-002	4.4E-001 N
M-XYLENE	108383	2.00E+000 H				y	1.2E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N	1.3E+001	2.5E+002 N
O-XYLENE	95476	2.00E+000 H				y	1.2E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N	1.1E+001	2.3E+002 N
P-XYLENE	106423					y							
XYLENES	1330207	2.00E+000 I				y	1.2E+004 N	7.3E+003 N	2.7E+003 N	4.1E+006 N	1.6E+005 N	8.5E+000	1.7E+002 N
ZINC	7440666	3.00E-001 I					1.1E+004 N	1.1E+003 N	4.1E+002 N	6.1E+005 N	2.3E+004 N	6.8E+002	1.4E+004 N
ZINC PHOSPHIDE	1314847	3E-004 I					1.1E+001 N	1.1E+000 N	4.1E-001 N	6.1E+002 N	2.3E+001 N		
ZINEB	12122677	5E-002 I					1.8E+003 N	1.8E+002 N	6.8E+001 N	1.0E+005 N	3.9E+003 N		

APPENDIX H

VAPOR INTRUSION SPREADSHEET CALCULATION

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
56553	5,100	Benz(a)anthracene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
				Totals must add up to value of L_t (cell D28)					
Average soil temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to top of contamination, L_t (cm)	Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (μg/kg)	Indoor exposure soil conc., noncarcinogen (μg/kg)	Risk-based indoor exposure soil conc., (μg/kg)	Soil saturation conc., C_{sat} (μg/kg)	Final indoor exposure soil conc., (μg/kg)
1.02E+07	NA	1.02E+07	2.24E+04	2.24E+04

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES ☒ X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☐

ENTER Chemical CAS No., (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
50328	1,400	Benzo(a)pyrene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
50328	1,400	Benzo(a)pyrene

ENTER Average soil temperature, T_S (^oC)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm \cdot s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (μg/kg)	Indoor exposure soil conc., noncarcinogen (μg/kg)	Risk-based indoor exposure soil conc., (μg/kg)	Soil saturation conc., C_{sat} (μg/kg)	Final indoor exposure soil conc., (μg/kg)
1.02E+07	NA	1.02E+07	2.24E+04	2.24E+04

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)		Chemical
56553	5,100		Benz(a)anthracene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (μg/kg)	Indoor exposure soil conc., noncarcinogen (μg/kg)	Risk-based indoor exposure soil conc., (μg/kg)	Soil saturation conc., C_{sat} (μg/kg)	Final indoor exposure soil conc., (μg/kg)
NA	NA	NA	2.24E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.0E-10	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES ☒

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☐

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
50328	1,400	Benzo(a)pyrene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (μg/kg)	Indoor exposure soil conc., noncarcinogen (μg/kg)	Risk-based indoor exposure soil conc., (μg/kg)	Soil saturation conc., C_{sat} (μg/kg)	Final indoor exposure soil conc., (μg/kg)
6.85E+06	NA	6.85E+06	9.91E+03	9.91E+03

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
50328	1,400	Benzo(a)pyrene

ENTER Average soil temperature, T_S ($^{\circ}$C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (μg/kg)	Indoor exposure soil conc., noncarcinogen (μg/kg)	Risk-based indoor exposure soil conc., (μg/kg)	Soil saturation conc., C_{sat} (μg/kg)	Final indoor exposure soil conc., (μg/kg)
NA	NA	NA	9.91E+03	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-10	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☐

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
218019	8,000	Chrysene

ENTER	ENTER	ENTER	ENTER	ENTER Totals must add up to value of L_t (cell D28)	ENTER	ENTER	ENTER		ENTER
Average soil temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to top of contamination, L_t (cm)	Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP $(g/cm\text{-}s^2)$	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
9.71E+07	NA	9.71E+07	3.82E+03	3.82E+03

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
218019	8,000	Chrysene

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, $\rho_b{}^A$ (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w{}^A$ (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, $f_{oc}{}^A$ (unitless)	ENTER Stratum B soil dry bulk density, $\rho_b{}^B$ (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w{}^B$ (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, $f_{oc}{}^B$ (unitless)	ENTER Stratum C soil dry bulk density, $\rho_b{}^C$ (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w{}^C$ (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, $f_{oc}{}^C$ (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (μg/kg)	Indoor exposure soil conc., noncarcinogen (μg/kg)	Risk-based indoor exposure soil conc., (μg/kg)	Soil saturation conc., C_{sat} (μg/kg)	Final indoor exposure soil conc., (μg/kg)
NA	NA	NA	3.82E+03	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.2E-11	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)	Chemical
91203	15,000	Naphthalene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
				Totals must add up to value of L_t (cell D28)					
Average soil temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to top of contamination, L_t (cm)	Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	Stratum A soil total porosity, n^A (unitless)	Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	Stratum B soil total porosity, n^B (unitless)	Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	Stratum C soil total porosity, n^C (unitless)	Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Enclosed space floor thickness, L_{crack} (cm)	Soil-bldg. pressure differential, ΔP (g/cm-s^2)	Enclosed space floor length, L_B (cm)	Enclosed space floor width, W_B (cm)	Enclosed space height, H_B (cm)	Floor-wall seam crack width, w (cm)	Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER
Averaging time for carcinogens, AT_c (yrs)	Averaging time for noncarcinogens, AT_{nc} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1

Used to calculate risk-based soil concentration.

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (μg/kg)	Indoor exposure soil conc., noncarcinogen (μg/kg)	Risk-based indoor exposure soil conc., (μg/kg)	Soil saturation conc., C_{sat} (μg/kg)	Final indoor exposure soil conc., (μg/kg)
NA	2.67E+06	2.67E+06	3.75E+05	3.75E+05

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (μg/kg)
91203	15,000

Chemical
Naphthalene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
				Totals must add up to value of L_t (cell D28)					
Average soil temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to top of contamination, L_t (cm)	Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	303	455	303	0	0	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
1.5	0.43	0.15	0.006	1.5	0.43	0.25	0.003	1.7	0.34	0.26	0.002

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_c (yrs)	ENTER Averaging time for noncarcinogens, AT_{nc} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	350	1.0E-06	1
				Used to calculate risk-based soil concentration.	

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	3.75E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.6E-03

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☒ X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☐

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)		Chemical
56553	5.6		Benz(a)anthracene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
			Totals must add up to value of L_{WT} (cell D28)							
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
6.83E+03	NA	6.83E+03	9.40E+00	9.40E+00

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
56553	5.6	Benz(a)anthracene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, $\rho_b{}^A$ (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, $\theta_w{}^A$ (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, $\rho_b{}^B$ (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, $\theta_w{}^B$ (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, $\rho_b{}^C$ (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, $\theta_w{}^C$ (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.2E-10	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☒

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☐

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
50328	1.6	Benzo(a)pyrene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm·s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
1.81E+03	NA	1.81E+03	1.62E+00	1.62E+00

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
50328	1.6	Benzo(a)pyrene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm \cdot s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.8E-10	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

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September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
205992	0.77	Benzo(b)fluoranthene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)						OR	
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
9.15E+02	NA	9.15E+02	1.50E+00	1.50E+00

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)		Chemical
205992	0.77		Benzo(b)fluoranthene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
			Totals must add up to value of L_{WT} (cell D28)							
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.4E-10	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☒ X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☐

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
218019	8.8	Chrysene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)							
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm·s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
1.10E+05	NA	1.10E+05	1.60E+00	1.60E+00

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
218019	8.8	Chrysene

ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
			Totals must add up to value of L_{WT} (cell D28)							
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.0E-11	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☒

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☐

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)		Chemical
91203	60		Naphthalene

ENTER	ENTER	ENTER	ENTER Totals must add up to value of L_{WT} (cell D28)	ENTER	ENTER	ENTER	ENTER	ENTER		ENTER
Average soil/ groundwater temperature, T_S (°C)	Depth below grade to bottom of enclosed space floor, L_F (cm)	Depth below grade to water table, L_{WT} (cm)	Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	Soil stratum directly above water table, (Enter A, B, or C)	SCS soil type directly above water table	Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	User-defined stratum A soil vapor permeability, k_v (cm^2)
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm·s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	7.04E+05	7.04E+05	3.10E+04	3.10E+04

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

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September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)	Chemical
91203	60	Naphthalene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)		ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
			Totals must add up to value of L_{WT} (cell D28)						OR	
10	60	410	410	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.5E-05

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

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CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☒ X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☐

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)		Chemical
79016	8.38		Trichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	15	273	273	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
1.47E+02	NA	1.47E+02	1.10E+06	1.47E+02

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

DATA ENTRY SHEET

VERSION 1.2
September, 1998

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES ☐

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES ☒

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (μg/L)
79016	8.38

Chemical
Trichloroethylene

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell D28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
10	15	273	273	0	0	A	S	S		

ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
1.5	0.43	0.2	1.7	0.42	0.27	1.7	0.43	0.3

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\cdot s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
60	40	4554	2580	760	0.1	0.45

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
70	30	30	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (μg/L)	Indoor exposure groundwater conc., noncarcinogen (μg/L)	Risk-based indoor exposure groundwater conc., (μg/L)	Pure component water solubility, S (μg/L)	Final indoor exposure groundwater conc., (μg/L)
NA	NA	NA	NA	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.7E-08	NA

ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)