ENVIRONMENTAL PARTNERS INC
1990 - 2015

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May 21, 2015

Mr. Art Skotdal
Skotdal Enterprises, Inc.
2707 Colby Avenue, Suite 1200
Everett, Washington 98201

Re: Additional Subsurface Investigation and Preliminary Groundwater Interim Action Plan
Snohomish Cleaners Site
VCP ID No. NW2740
1419 Avenue D
Snohomish, Washington

EPI Project Number: 69402.0

Dear Mr. Skotdal:

Environmental Partners, Inc. (EPI) is pleased to present this Additional Subsurface Investigation and Preliminary Groundwater Interim Action Plan letter report for addressing impacts associated with the Snohomish Square Cleaners situated within the Snohomish Square Shopping Center located at 1419 Avenue D in Snohomish, Washington (subject property). The location of the subject property is indicated on Figure 1.

The work documented in this letter report was conducted on behalf of Skotdal Enterprises, Inc. in an ongoing effort to comply with the Model Toxics Control Act (MTCA; Revised Code of Washington [RCW] Chap. 70.105D) and its implementing regulations (Washington Administrative Code [WAC] 173-340; collectively referred to as MTCA).

Based on a review of available data, tetrachloroethene (PCE) was released at the subject property, which has resultantly impacted soil and groundwater. The groundwater impacts have migrated off-property to the south, onto a property owned by Snohomish County. The "Site", as defined by MTCA, includes portions of the subject property as well as part of the 'upper terrace' of the down-gradient impacted property owned by Snohomish County.

The Site is enrolled in the Department of Ecology's Voluntary Cleanup Program (VCP). The VCP ID No. is NW2740 and the Ecology-assigned project manager is John Guenther.

The initial focus of this letter report is to facilitate obtaining a property-specific 'No Further Action' (NFA) determination for the adjacent Snohomish County property, with a longer-term objective of obtaining an NFA determination for the remainder of the Site. The proposed treatment and data gap assessment described herein is based on input received from Ecology's VCP project manager and is intended to be

responsive to Ecology comments and expectations to facilitate issuance of a property-specific NFA determination for the upper terrace.

Prior Work

In preparation of this letter report, EPI has reviewed the following environmental investigation documents that were prepared for the Site:

- *Source Area Removal and Remedial Action Pilot Study* prepared by ERM-West, Inc. (ERM) and dated November 2007 (ERM Report)

- *Phase II Environmental Site Assessment Data* letter report prepared by CDM Smith Inc. (CDM Smith, previously Camp Dresser & McKee Inc.) and dated August 30, 2010 (CDM Smith Phase II Report)

- *Remedial Investigation and Focused Feasibility Study* prepared by CDM Smith and dated April 30, 2013 (CDM Smith RI Report)

- *Preliminary Remedial Investigation and Cleanup Action Plan* prepared by Associated Earth Sciences, Inc. (AES) dated August 12, 2014 (AES Report)

This body of work in combination with the additional investigation documented herein serves to provide sufficient information for selecting and implementing an appropriate interim action for impacts to shallow groundwater that are migrating from the Snohomish Cleaners property onto the downgradient Snohomish County property.

Setting and Brief History

The Snohomish Square Shopping Center is located in a commercially developed area within the City of Snohomish city limits. The property is currently zoned as COM for commercial development and is approximately 12 acres in size with multiple commercial buildings. The Snohomish Square Cleaners was located in the northwest corner of the main building at the subject property. The location of Snohomish Square Cleaners relative to the property boundary and the Snohomish County property is depicted on Figure 2. It should be noted that the dry cleaner has been closed and there is no current PCE use at the subject property.

According to the ERM Report, the release of PCE to soil and groundwater was identified at the subject property in 2003. The source of impact was identified as likely disposal of cleaning solvent in a planter box located to the north of the cleaners.

Based on a review of the ERM Report, impacts to soil appear to have been limited to the area surrounding the planter box. In August 2006, ERM conducted soil remediation in the source area by excavation with off-site disposal. Excavation activities occurred during four phases over an area of approximately 945 square feet to a depth of about 8.5 to 9 feet, which resulted in the removal and off-site disposal of approximately 415 tons of PCE-impacted soil. Based on EPI's review of the analytical

data for soil in the excavation bottom and sidewalls, the vast majority of impacted soil source material has been removed from the subject property and only marginal soil impacts remain.

Additional investigations performed by ERM and CDM Smith identified PCE impacts to groundwater that extend from Snohomish Square Cleaners to approximately 950 feet in a south to southwesterly direction. Impacts to groundwater have migrated off-property and have impacted the upper terrace portion of the property owned by Snohomish County ("Snohomish property") to the south of the subject property.

CDM Smith performed investigations at the Snohomish property in 2009 and 2010 in support of a planned redevelopment of that property. According to the CDM Smith RI Report, the Snohomish property is divided into two distinct geographic areas; upper (eastern) and lower (western) terraces. A discontinuous perched layer of groundwater was encountered on the upper terrace, which is where the PCE impacts to groundwater were encountered. This perched layer was demonstrated to be laterally confined to the upper terrace. Therefore, the groundwater impacts migrating onto the Snohomish property are limited to the perched layer in the upper terrace and do not extend onto the lower terrace.

Contaminants of Concern

Based on a review of the available data, the only contaminants of concern (COCs) for the Site are Tetrachloroethene (PCE) and its associated breakdown products. The list of COCs for the Site are as follows:

- PCE;
- Trichloroethene (TCE);
- cis-1,2-Dichloroethene (cis 1,2 DCE);
- trans-1,2-Dichlroroethene (trans 1,2 DCE); and,
- Vinyl chloride.

No other COCs have been identified for the Site.

DATA GAPS

In review of the above documents, EPI identified two data gaps that were necessary to investigate in order to select and design appropriate treatment of shallow groundwater impacts that extend to the upper terrace. The two identified data gaps are:

- **PCE concentrations in soil within the source area** – The remedial actions for soil previously conducted by ERM at the subject property were implemented to a cleanup level of 1.9 milligrams/kilogram (mg/kg). This cleanup level was based on protection of direct contact, which was in effect at the time that the remediation was performed. However, the

direct contact cleanup level is not currently considered protective of the soil leaching to groundwater exposure pathway. The extent of soil impacts at a concentration exceeding an applicable cleanup level that is protective of the soil leaching-to-groundwater exposure pathway represents a data gap. If there is an on-going soil source of PCE dissolution to groundwater, then additional actions in soil may be necessary in order to treat the resultant groundwater impacts and addressing this data gap is a critical step in understanding the extent of the source area that may require additional treatment.

- **Width of groundwater impacts migrating off-site** – The width of groundwater impacts migrating off-site, particularly at the property boundary, is not sufficiently defined to design an appropriate groundwater treatment system. Additional wells along the property line and to the east of the impacted area are warranted to more accurately define the width of the groundwater impacts.

It should be noted that the data gaps identified above represent only the immediate data gaps that required investigation to design and implement an appropriate interim action treatment system for groundwater impacts migrating off-site to the upper terrace property. These data gaps are not a comprehensive list of "Site-wide" data gaps that must be investigated to consider the Remedial Investigation complete at the Site. Ecology may require investigation of other data gaps for the Site as a whole before it can be considered "fully characterized".

OBJECTIVES

The general objective of the work documented herein was to sufficiently characterize the Site such that interim actions could be implemented to treat the off-property portion of impacted groundwater. The specific objectives of the investigation work were:

- Perform additional subsurface investigation and collect additional soil and groundwater samples to address the two data gaps listed above and provide a basis for an interim action design;
- Document the characterization of groundwater impacts migrating off-property;
- Select a remedial technology appropriate for addressing the off-property groundwater impacts; and,
- Propose a schedule for implementing interim actions.

ADDITIONAL SUBSURFACE INVESTIGATION

Additional subsurface activities were performed to delineate the impacts to soil in the source area at the Site, as well as confirm the width of PCE-impacts to groundwater at the downgradient property boundary for the subject property.

Soil Borings

EPI advanced three additional soil borings (SB1 through SB3) in the original PCE release area to delineate soil impacts to the cleanup level that is considered to be protective of groundwater. The three borings were advanced by ESN Northwest using direct push technology (DPT) drilling techniques. Soil boring locations are indicated on Figure 2.

EPI collected soil samples at two depth intervals at each of the three soil borings for a total of six soil samples. Each sample was collected using EPA Method 5035 to minimize volatilization and was analyzed for volatile organic compounds (VOCs) using EPA Method 8260.

Well Installation

EPI installed three new groundwater monitoring wells (MW-12 through MW-14) at the subject property in order to delineate the width of PCE-impacts to groundwater. The locations of the newly installed wells are indicated on Figure 2.

The wells were installed by Cascade Drilling, Inc. using standard hollow-stem auger (HSA) drilling techniques. The total depths of the new wells ranged from 20 to 25 feet below grade. Soils encountered during the boring advancement were described using the United Soil Classification System using ASTM Standard D2488-00, Visual-Manual Procedure. Soil descriptions are included in the borehole logs, which are included in Attachment A.

Each monitoring well was installed with 10 feet of 0.010-inch factory-slotted screen and appropriate sand filter pack, bentonite well seal, and traffic-rated flush mount monuments. The screened intervals ranged from 9 to 19 feet to 15 to 25 feet. The specific construction details of each well are included in the borehole logs in Attachment A. Following installation, each monitoring well was developed to the satisfaction of the on-site geologist.

Prior to collecting samples, the depth to groundwater was measured in all of the existing groundwater monitoring wells at the Site (including the monitoring wells located on the Snohomish County property) in order to collect sufficient data to generate a current piezometric surface map. The static depth to water of each well was measured using a Solinst electronic water level meter accurate to within 0.01 feet. To ensure reproducibility of the data, all measurements were taken at marked and surveyed measuring points on the north side of the top surface of the PVC well casing.

EPI purged each of the new monitoring wells using a peristaltic pump and standard low-flow sampling techniques until field parameters stabilized to within pre-established limits. Upon stabilization, EPI collected groundwater samples from each of the new monitoring wells. Each groundwater sample was analyzed for volatile organic compounds (VOCs) using EPA Method 8260. Single-use peristaltic pump tubing was used between each sampling location to prevent cross contamination.

Findings

Subsurface Conditions

Subsurface soils encountered during the investigation and documented herein consisted of silt and sand mixture within the upper 10 to 15 feet. Below these silt and sand mixtures was a prevalent gravel unit with varying quantities of sand and silt. These soil descriptions are consistent with conditions documented in the previously prepared reports listed above in "Prior Work". Soil boring logs are included in Attachment A.

Groundwater was encountered in MW-11 through MW-13 at depths ranging from 12 to 19 feet below ground surface (bgs) at the time of drilling.

Piezometric Conditions

On January 20, 2015, static water levels ranged from 1.68 to 21.70 feet below top of casing in all of the wells at the Site. A summary of the depth to water, and monitoring well and groundwater elevations are provided in Table 1. Figure 3 depicts groundwater elevation contours and inferred groundwater flow direction at the subject property. These data indicate that groundwater flow direction at the subject property is generally in a south-southwest direction with a gradient of 0.017 foot/foot.

Soil

A total of six soil samples were submitted for VOC analysis. Table 2 presents a summary of the resulting analytical data. Analytical results from this sampling event along with previous soil sampling results collected during the remedial excavation are presented graphically on Figure 4. Attachment B contains copies of the hardcopy analytical reports.

PCE was detected in two soil samples (SB1 [at 2 feet bgs] and SB2 [at 10 feet bgs]) at concentrations of 0.028 milligrams/kilogram (mg/kg) and 0.065 mg/kg, respectively. PCE was not detected at a concentration exceeding the method detection limit (MDL) in any other sample analyzed.

Naphthalene was detected in one soil sample (SB [at 2 feet bgs]) at a concentration of 0.096 mg/kg, which is below the MTCA Method A Soil CUL of 5 mg/kg. Naphthalene was not detected at a concentration exceeding the MDL in any other sample analyzed and is not considered a contaminant of concern for the Site.

Groundwater

A total of three groundwater samples were collected from the newly installed wells MW-11 through MW-13 and were submitted for VOC analysis. Table 3 presents a summary of the resulting analytical data. Analytical results are presented graphically on Figure 5. Attachment B contains copies of the hardcopy analytical reports.

PCE was detected in two of the three samples (MW-12 and MW-13) at concentrations of 1.5 micrograms/Liter (µg/L) and 3.6 µg/L, respectively. PCE was not detected in the sample from MW-14 at a reporting limit of 1 µg/L and no other COCs were detected in any of the groundwater samples.

CONCEPTUAL SITE MODEL

The conceptual site model (CSM) is based on the data collected during the investigative actions performed at the Site and identifies potential human and ecologic exposure pathways. This CSM was developed based on the investigation documented herein and a review of the reports listed in the "Prior Work" section on page 2. The elements of the CSM that are supported by these data are:

- The COCs for the Site are PCE, TCE, cis 1,2-DCE, trans 1,2-DCE, and vinyl chloride.

- The subject property and the off-site impacted property are currently zoned as COM for commercial development. Commercial development is currently planned for the Snohomish County parcel located to the south of the subject property.

- The environmental media where COCs have been detected at concentrations greater than applicable regulatory levels at the subject property are soil and groundwater.

- Uppermost groundwater at the Site is a discontinuous perched groundwater table located at depths ranging from 1.6 feet to 21.7 feet below grade. The perched groundwater is not a source of drinking water and is unlikely to be hydraulically connected to a current or potential drinking water source. The source of drinking water at the subject property and surrounding properties is a public water supply and water wells are not a component of any planned development.

- The likely source of impacts to soil are historical releases of PCE to the planter box south of the Snohomish Square Cleaners. The data indicate that impacts to soil are directly associated with this release. Substantial soil remediation has been performed in the source area and only a small quantity of residual soil impact remains at the edges of the remedial excavation. The remaining residual soil impacts are generally limited to less than 10 feet in depth.

- Since the COCs detected in soil and groundwater at the subject property are volatile, indoor air is a medium of concern for current and future buildings constructed at the subject property. For both on- and off-property areas of groundwater impacts, indoor air will be addressed through engineering controls, if necessary, to prevent vapor intrusion into buildings.

- Potential human exposure pathways to COCs are ingestion and direct contact with soil, and, conservatively, ingestion of groundwater (as drinking water).

- There are no complete potential exposure pathways for ecological receptors at the subject property. Therefore, based on WAC 173-340-7490, the subject property qualifies for a Terrestrial Ecological Evaluation (TEE) exclusion.

- Under MTCA, (WAC 173-340-740(6)(d)) the standard point of compliance for soil is 15 feet, which corresponds to direct contact for human health.

- Under MTCA, (WAC 173-340-720(8)(a)), the standard point of compliance for groundwater is the point where groundwater cleanup levels have been attained.

- For purposes of obtaining a site-specific NFA for the Snohomish County parcel to the south of the subject property, under MTCA, (WAC 173-340-720(8)(c)) a conditional point of compliance is established for groundwater at the southern property boundary of the Snohomish Square Shopping Center property.

CLEANUP LEVEL DEVELOPMENT

EPI developed appropriate cleanup levels (CULs) for the COCs to ensure protectiveness of current and potential exposure pathways as identified in the CSM in order to design an appropriate and protective interim action. The CULs to be used must be protective of human health and the environment based upon the exposure pathways that remain after completion of a selected remedial action and implementation of institutional and/or engineering controls. In some cases, protectiveness of certain exposure pathways may be addressed exclusively by implementation of engineering controls.

To evaluate soil CULs, the following potential exposure pathways were considered:

- Direct contact with soil for residential exposures; and

- Soil leaching-to-groundwater as a drinking water source.

The soil CULs used for direct contact are the MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses (MTCA Method A Soil CUL) and/or Method B Soil Cleanup Level for Direct Contact (MTCA Method B Soil CUL), which are provided in the Cleanup Levels and Risk Calculations II (CLARC; *i.e.,* book values)

In order to evaluate CULs for soil leaching-to-groundwater exposure pathways, CULs were calculated using MTCA equation 747-1. These CUL calculations are presented in Attachment C. The resultant CULs for the soil leaching to groundwater exposure pathway are presented in Table 4.

The MTCA Method A and Method B groundwater CULs are presented in Table 4 for comparative purposes.

EPI has selected the MTCA Method A CULs for groundwater and the associated soil to groundwater leaching values for CULs for the Site. If a Method A value is not available, then the MTCA Method B value is used. These cleanup levels are summarized in Table 4.

The selected soil CULs are fully protective of both the soil leaching to groundwater and direct contact exposure pathways.

DISTRIBUTION OF IMPACTS

The following sections describe the current state of the characterization of the soil source area and associated shallow groundwater impacts at the Site. The data discussed are a summary of the body of data collected during various environmental investigations at the Site, including the data gathered during this phase of work. The bibliography of the reports reviewed for this summary is included above (see page 2, "Prior Work").

Soil

The vast majority of the soil source at the Snohomish Square Cleaners was remediated through soil excavation with off-site disposal, which is documented in ERM Report. At the time of the remedial excavation, the CUL selected for PCE in soil was 1.9 mg/kg based on the MTCA Method B soil CUL for 'direct contact', which was in effect at that time. This CUL is not considered protective of the currently applicable soil leaching-to-groundwater pathway (i.e., 0.05 mg/kg). Therefore, additional soil sampling was performed during this investigation that was intended to characterize the residual soil impacts to a concentration that is considered protective of the soil leaching-to-groundwater pathway.

The only COC remaining in soil at concentrations exceeding the selected CULs presented in Table 4 is PCE. The remaining area of PCE-impacted soil and pertinent soil data is summarized on Figure 4. Based on the available data, the residual impacts to soil appear to be very limited in extent and low concentration (i.e., 0.66 mg/kg or less).

The aerial extent of PCE-impacted soil is approximately 3,090 square feet with a 4-foot thick zone of impacted soil at approximately 5 to 9 feet bgs (i.e., 4-foot thick zone of PCE-impacted soil). This equates to approximately 458 cubic yards of low concentration PCE-impacted soil, which will be left in place. The remaining impacts to soil are not expected to measurably affect the remediation of groundwater at the Site.

Groundwater

COCs for groundwater at the Site are PCE, TCE, cis 1,2-DCE, trans 1,2 DCE, and vinyl chloride. The only COC to migrate off-property to the upper terrace at a concentration exceeding the selected CUL is PCE. The extent of PCE impacts to groundwater is displayed on Figure 5. This interpretation is based on a compilation of the data collected during the various rounds of environmental sampling at the Site, which are documented in the reports noted above (see page 2, "Prior Reports").

The PCE-impacted groundwater plume is characterized and does not migrate off of the Snohomish County upper terrace property. The PCE-impacted plume is approximately 950 feet in length with the widest portion, (approximately 210 feet wide), immediately downgradient of the source area and decreasing in width downgradient, toward the Snohomish County upper terrace property. The width of the plume entering the Snohomish County upper terrace property is approximately 105 feet.

SELECTED INTERIM ACTION TECHNOLOGY

Based on the body of work performed at the Site, specifically the bench scale and pilot testing documented in the ERM report, enhanced reductive dechlorination (ERD) appears to be a viable and appropriate remediation technology to address groundwater impacts at the Site, including the upper terrace property.

ERD is an *in situ* nutrient substrate application intended to stimulate subsurface microbiological activity. Using ERD, the subsurface geochemical conditions are manipulated to preferentially promote the growth of certain anaerobic bacteria populations that are effective in the reductive dechlorination of chlorinated VOCs such as PCE and its breakdown products, which comprise the COCs for the Site. Under the proper geochemical conditions anaerobic bacteria can metabolize chlorinated VOCs by successively removing chlorine atoms from the PCE molecule and replacing them with hydrogen atoms until only non-toxic ethene remains.

Anaerobic bacteria operate in reducing (low to no dissolved oxygen and negative oxidation reduction potential) conditions in which they obtain energy by transferring electrons to the chlorinated compound (the electron acceptor) and in the course of this reaction, remove a chloride ion. ERD stimulates this anaerobic process through which certain capable bacteria (halorespirers) degrade chlorinated VOCs by successively removing chlorine atoms from the chlorinated ethene molecule. In this redox reaction, the introduction of a readily available carbon food source will stimulate the bacteria to thrive and metabolize the chlorinated compounds. Chlorinated VOCs such as PCE undergo a series of reductions through dechlorination reactions (PCE➔TCE➔cis-1,2-DCE➔VC➔ethene). Each biologically-mediated dechlorination step in the process requires stronger reducing conditions to complete than its predecessor.

Direct injection is a commonly used application method for the nutrient substrate, and site conditions and project goals drive the choice of application method. In Washington State, an Underground Injection Control (UIC) permit from the Department of Ecology is required and will be initiated following final plan approval. This is a relatively simple process and no problem is anticipated in obtaining the UIC permit. No other regulatory permits will be required and no waste products will be generated.

EPI anticipates ERD treatment within the two areas. The first area of treatment would be within, or immediately up-gradient of the soil source area to treat the highest PCE concentrations at the Site. This would serve to eliminate the source of impacts migrating down-gradient. This area of treatment is indicated on Figure 6.

There is an existing infiltration gallery that may be used for treatment in Area 1. The infiltration gallery was installed by ERM in 2006 during the soil remediation conducted at the subject property. Potential use of the infiltration gallery will be explored further prior to preparation of the Remedial Action Work Plan (RAWP), which will be prepared prior to implementation. Additional investigation will likely be performed in order to finalize the design criteria for Area 1.

The second treatment area would be within a linear alignment along Avenue D to serve as a treatment zone to impacts migrating off-property onto the Snohomish County property. This will serve as an active treatment zone that remediates contaminated groundwater immediately prior to exiting the subject property. This is an active approach that constitutes a permanent treatment to the "maximum extent practicable" of groundwater that is affecting the upper terrace property. The linear area of treatment along Avenue D is also indicated on Figure 6.

Based on the local soil conditions and the initial work performed by ERM, EPI anticipates that the injections along Avenue D will occur using pre-installed wells. By having pre-installed wells, additional nutrient substrate injections to maintain sufficiently reducing geochemical conditions would be easily implementable and cost-effective. Direct push technology is not a viable option for the subject property based upon local site conditions. EPI anticipates that the well spacing for the injection wells will be based on an approximate radius of influence ranging from 20 to 25 feet. This equates to 10 to 12 wells across this alignment.

The wells are anticipated to be either 4 or 6-inch in diameter to depths ranging from 25 to 30 feet deep to fully intersect the shallow groundwater aquifer. Additional investigation will likely be performed in order to finalize the design criteria for treatment along Avenue D.

Based on EPI's experience, it is anticipated that the injections will continue to treat groundwater for 6 months to a year after the initial application. However, groundwater monitoring will ultimately dictate the frequency of future nutrient substrate applications. Baseline parameters such as total organic carbon (TOC), dissolved oxygen (DO), and oxidation reduction potential (ORP) will be established prior to treatment. When TOC becomes depleted, further injection events will be evaluated to maintain reducing conditions. These performance criteria will be established in the RAWP, which will be completed prior to implementation.

The next logical process is to prepare the detailed RAWP that will identify specific injection products, well and gallery installation designs, estimated treatment frequencies, and groundwater performance monitoring with associated action items. The RAWP would be submitted to Ecology for approval prior to implementation.

SCHEDULE

Based on the current level of understanding, EPI anticipates the following schedule to implement remedial actions at the Site.

- June/July 2015 – Prepare the RAWP and submit to the Department of Ecology for review
- September 2015 – Install treatment network and begin active groundwater treatment
- January 2016 through January 2019 – Perform groundwater monitoring and additional treatments as necessary.

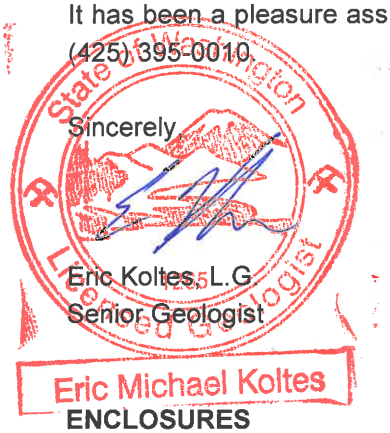
LIMITATIONS

To the extent that preparation of this Additional Subsurface Investigation and Preliminary Remedial Plan letter report has required the application of best professional judgment and the application of scientific principles, certain results of this work have been based on subjective interpretation. EPI makes no warranties express or implied, including and without limitation, warranties as to merchantability or fitness for a particular purpose. The information provided in this Additional Subsurface Investigation and Data Summary letter report is not to be construed as legal advice.

This Additional Subsurface Investigation and Preliminary Remedial Plan was prepared solely for Skotdal Enterprises, Inc. and the contents herein may not be used or relied upon by any other person without the express written consent and authorization of EPI.

It has been a pleasure assisting you with this project. If you have any questions, please contact me at (425) 395-0010.

Sincerely,



Eric Koltes, L.G.
Senior Geologist

ENCLOSURES

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Attachment C	Cleanup Level Calculations

Tables

Table 1
Survey and Depth to Groundwater Data
Additional Subsurface Investigation and Preliminary Remedial Plan
Snohomish Square Cleaners
1419 Avenue D, Snohomish, Washington

Monitoring Well I.D.	Top of Casing Elevation[a] (feet)	Depth to Groundwater[b] (ft below TOC)	Groundwater Elevation (feet)
GW-1	144.8	1.68	143.12
GW-2	144.99	NM	NM
GW-3	144.34	3.08	141.26
GW-4	144.24	2.04	142.2
GW-5	144.78	4.44	140.34
GW-6	144.78	3.79	140.99
GW-7	147.53	2.71	144.82
GW-8	146.3	2.48	143.82
GW-9	146.37	2.46	143.91
GW-10	168.38	21.7	146.68
GW-11	164.24	18.69	145.55
MW-1	162.2	6.83	155.37
MW-2	164.41	8.45	155.96
MW-3	161.57	5.45	156.12
MW-4	161.09	5.29	155.8
MW-5	169.51	NM	NM
MW-6	165.61	13.8	151.81
MW-7	163.64	10.15	153.49
MW-8	163.75	9.94	153.81
MW-9	163	6.98	156.02
MW-10	NM	5.08	NM
MW-11	NM	5.81	NM
MW-12	NM	9.93	NM
MW-13	NM	18.49	NM
MW-14	NM	11.41	NM

Notes:
All results presented in feet using North American Vertical Datum 1988 (NAVD88).
Survey data provided from *Remedial Investigation and Focused Feasibility Study, Snohomish County Shop Upper Terrace, 1200 Block of Avenue D, Snohomish, Washington.*

a Surveyed by Snohomish County surveyors using State Plane Coordinate System. Benchmark for survey: brass plug in concrete on west side of Bickford Rd at SE corner of building. Snohomish County Point ID#248 Designation #5501. NAVD88, Elevation = 136.31'.
b Depth to water measured by EPI on January 20,2015.
TOC Top of casing.
NM Not measured.

Table 2
Summary of Soil Analytical Results (in mg/kg)
Additional Subsurface Investigation and Preliminary Remedial Plan
Snohomish Square Cleaners
1419 Avenue D, Snohomish, Washington

Sample ID	Sample Depth (feet)	Sample Date	Tetrachloroethene (PCE)[a]	Naphthalene[a]
SB1	2	12/19/14	**0.028**	**0.096**
	10	12/19/14	<0.025	<0.05
SB2	4	12/19/14	<0.025	<0.05
	10	12/19/14	**0.065**	<0.05
SB3	5	12/19/14	<0.025	<0.05
	9	12/19/14	<0.025	<0.05
Soil Cleanup Level			0.05[b]	5[b]

Notes:
All results presented in milligrams/kilogram (mg/kg).
Bold Bold results indicate that the compound was detected.
Shaded cells indicate that the compound was detected at a concentration greater than the cleanup level.
a Analyzed by EPA 8260.
b MTCA Method A Soil Cleanup Level for Unrestricted Land Uses.

Table 3
Summary of Groundwater Analytical Results (in µg/L)
Additional Subsurface Investigation and Preliminary Remedial Plan
Snohomish Square Cleaners
1419 Avenue D, Snohomish, Washington

Sample ID	Sample Date	Tetrachloroethene (PCE)[a]
MW-12	1/20/15	**1.5**
MW-13	1/20/15	**3.6**
MW-14	1/20/15	<1
MTCA Method B Groundwater Cleanup Level		5

Notes:
All results presented in microigrams/liter (µg/L).
Bold Bold results indicate that the compound was detected above the MDL.
a Analyzed by EPA Method 8260.

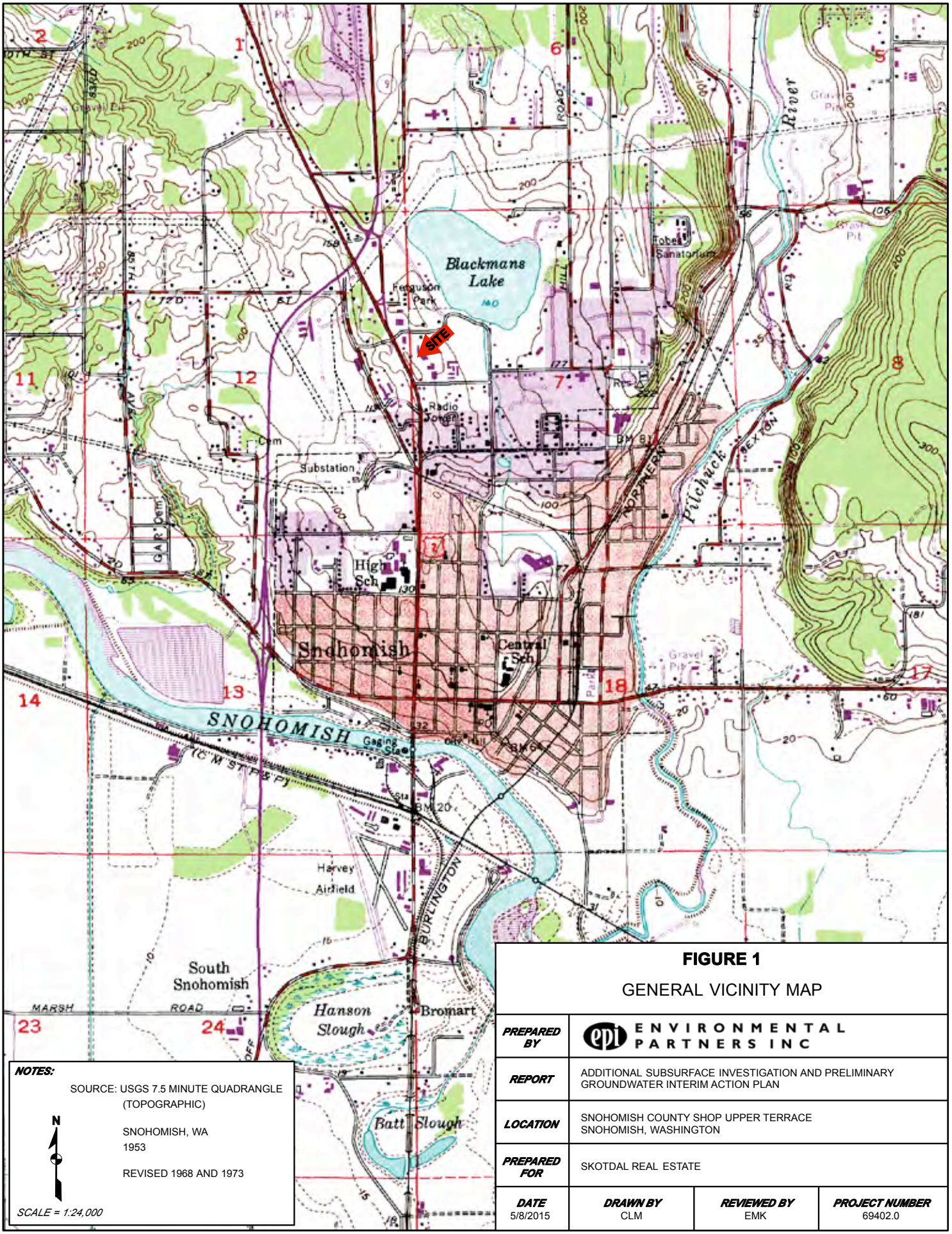
Table 4
Summary of Cleanup Levels
Additional Subsurface Investigation and Preliminary Remedial Plan
Snohomish Square Cleaners
1419 Avenue D, Snohomish, Washington

Compound of Concern	Soil (mg/kg)				Groundwater (µg/L)	
	MTCA Method A Soil Cleanup Levels for Unrestricted Land Uses[a]	MTCA Method B Cleanup Levels (Unrestricted Land Uses)[b]	Soil-to-Groundwater Leaching		MTCA Method A Cleanup Levels for Ground Water[d]	MTCA Method B Groundwater Cleanup Level[e]
			Based on MTCA Method A GW CUL[c]	Based on MTCA Method B GW CUL[c]		
Tetrachloroethene (PCE)	0.05	476	0.05	0.22	5	20.8
Trichloroethene (TCE)	0.03	12	0.03	0.003	5	0.54
Cis 1,2 dichloroethene (cis 1,2 DCE)	NVE	160	NVE	0.08	NVE	16
Trans 1,2 dichloroethene (trans 1,2 DCE)	NVE	1600	NVE	0.87	NVE	160
Vinyl chloride	NVE	240	0.001	0.142	0.2	0.029

Notes:
- a Based on MTCA Table 740-1
- b Based on MTCA CLARC Table dated May 2014, based on direct contact
- c Calculated using MTCA Equation 747-1
- d Based on MTCA Table 720-1
- e Based on MTCA CLARC Table dated May 2014
- NVE No value established

Selected soil cleanup level
Selected groundwater cleanup level

Figures



NOTES:

SOURCE: USGS 7.5 MINUTE QUADRANGLE (TOPOGRAPHIC)

SNOHOMISH, WA
1953

REVISED 1968 AND 1973

N

SCALE = 1:24,000

FIGURE 1

GENERAL VICINITY MAP

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	ADDITIONAL SUBSURFACE INVESTIGATION AND PRELIMINARY GROUNDWATER INTERIM ACTION PLAN		
LOCATION	SNOHOMISH COUNTY SHOP UPPER TERRACE SNOHOMISH, WASHINGTON		
PREPARED FOR	SKOTDAL REAL ESTATE		
DATE 5/8/2015	**DRAWN BY** CLM	**REVIEWED BY** EMK	**PROJECT NUMBER** 69402.0

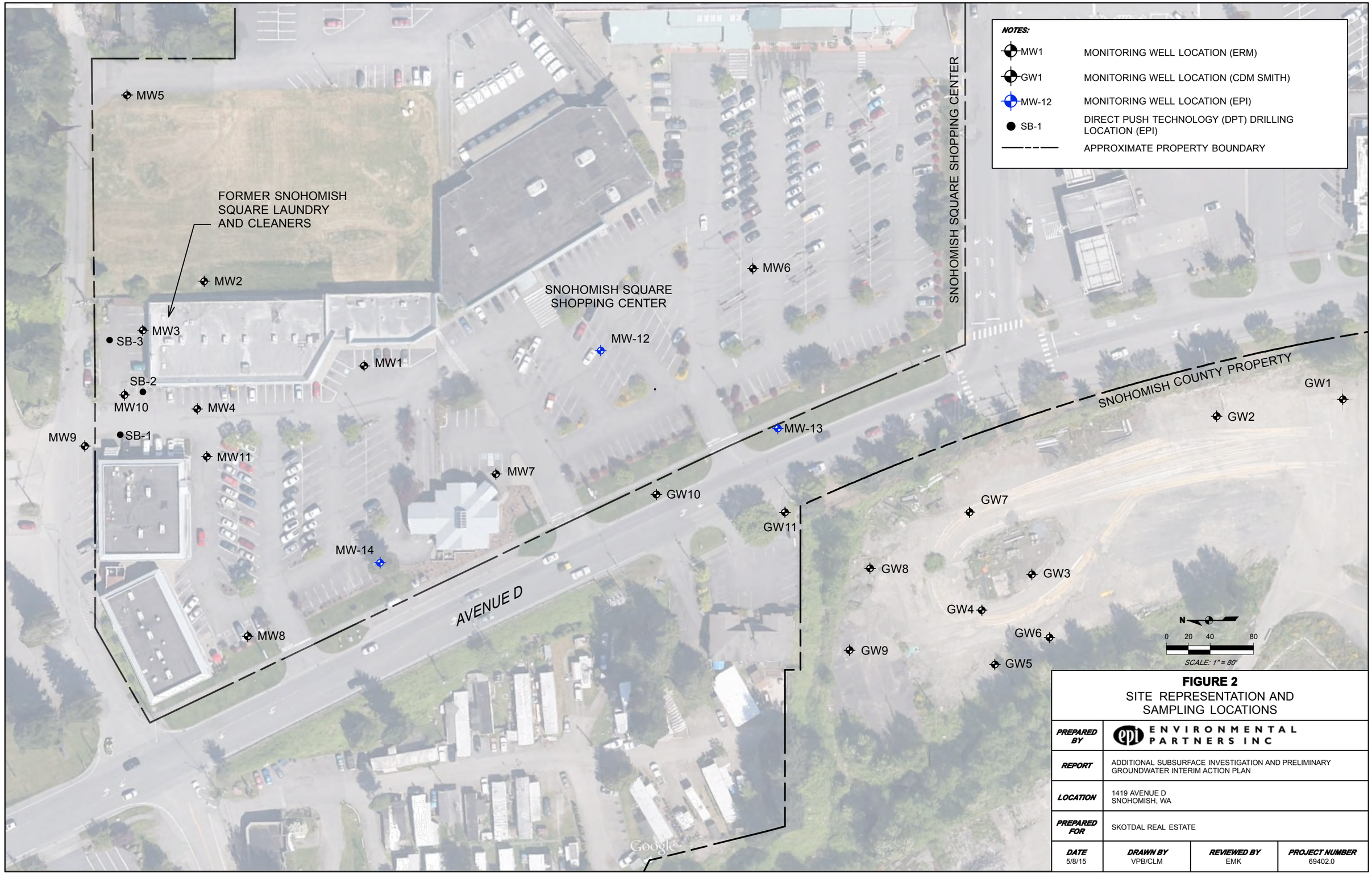


FIGURE 2
SITE REPRESENTATION AND SAMPLING LOCATIONS

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	ADDITIONAL SUBSURFACE INVESTIGATION AND PRELIMINARY GROUNDWATER INTERIM ACTION PLAN		
LOCATION	1419 AVENUE D SNOHOMISH, WA		
PREPARED FOR	SKOTDAL REAL ESTATE		
DATE 5/8/15	***DRAWN BY*** VPB/CLM	***REVIEWED BY*** EMK	***PROJECT NUMBER*** 69402.0

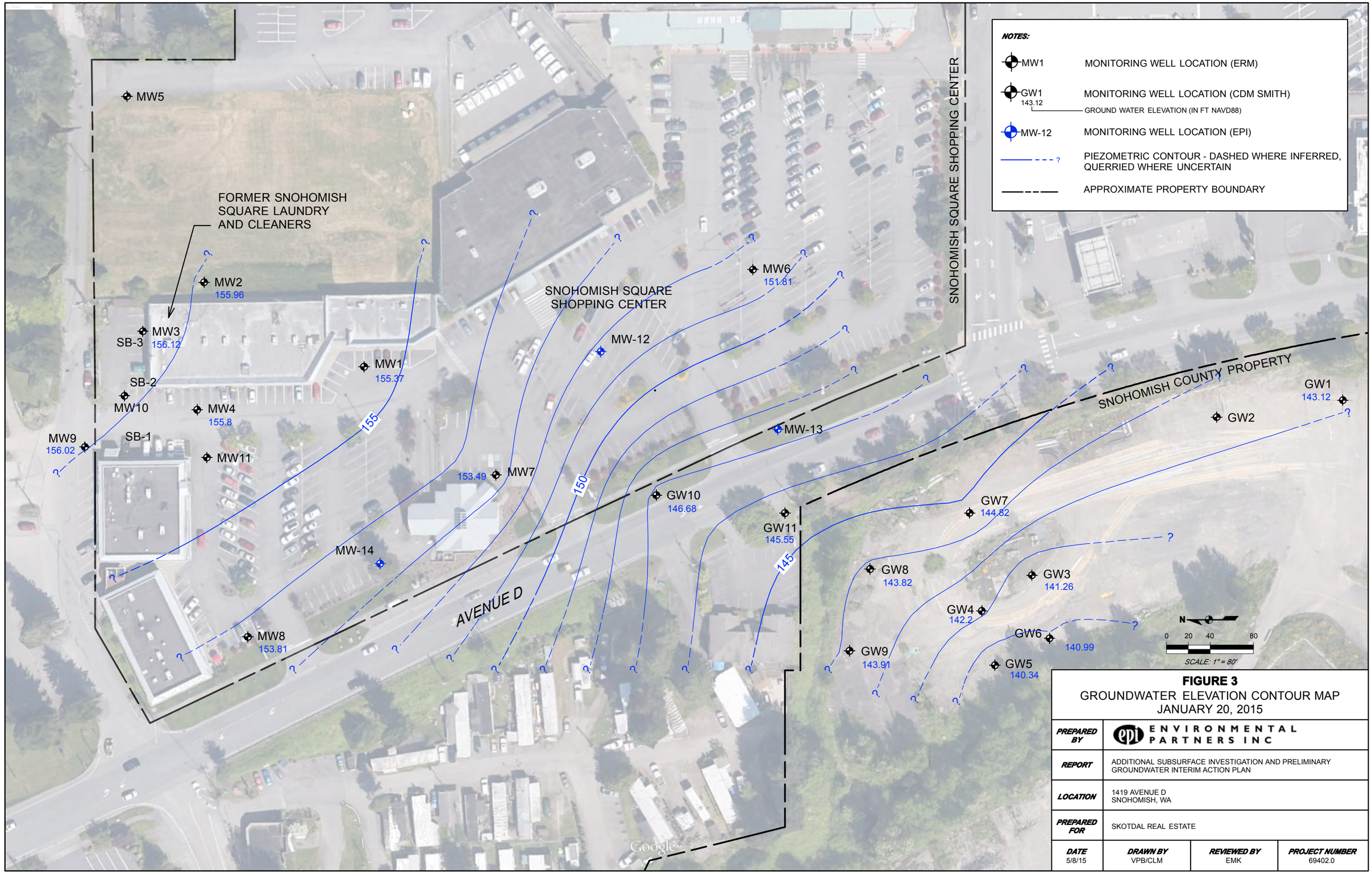


FIGURE 3
GROUNDWATER ELEVATION CONTOUR MAP
JANUARY 20, 2015

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	ADDITIONAL SUBSURFACE INVESTIGATION AND PRELIMINARY GROUNDWATER INTERIM ACTION PLAN		
LOCATION	1419 AVENUE D SNOHOMISH, WA		
PREPARED FOR	SKOTDAL REAL ESTATE		
DATE 5/8/15	DRAWN BY VPB/CLM	REVIEWED BY EMK	PROJECT NUMBER 69402.0

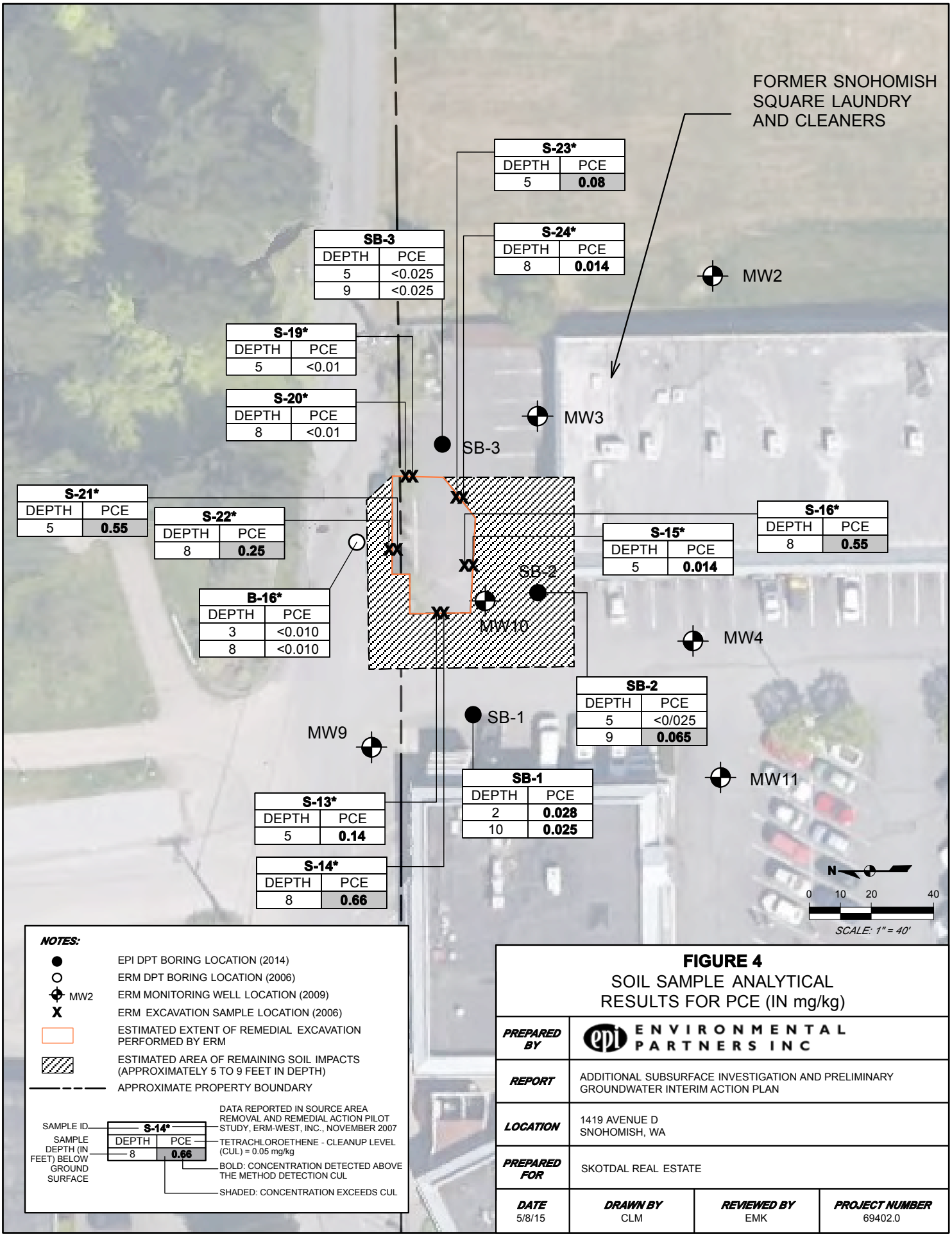
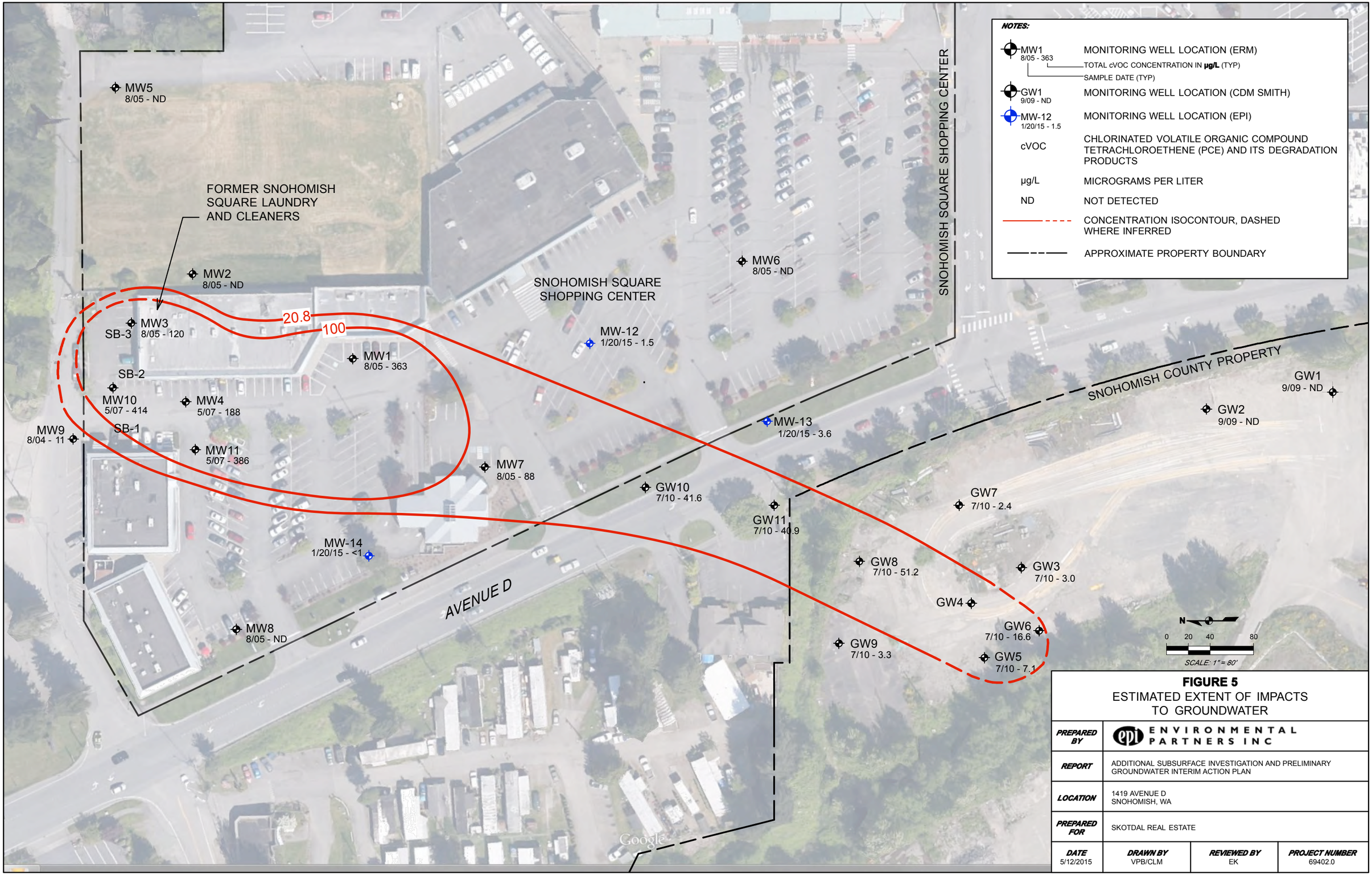


FIGURE 4
SOIL SAMPLE ANALYTICAL RESULTS FOR PCE (IN mg/kg)

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	ADDITIONAL SUBSURFACE INVESTIGATION AND PRELIMINARY GROUNDWATER INTERIM ACTION PLAN		
LOCATION	1419 AVENUE D SNOHOMISH, WA		
PREPARED FOR	SKOTDAL REAL ESTATE		
DATE 5/8/15	DRAWN BY CLM	REVIEWED BY EMK	PROJECT NUMBER 69402.0



NOTES:

- MW1 8/05 - 363 — MONITORING WELL LOCATION (ERM)
  - TOTAL cVOC CONCENTRATION IN **µg/L** (TYP)
  - SAMPLE DATE (TYP)
- GW1 9/09 - ND — MONITORING WELL LOCATION (CDM SMITH)
- MW-12 1/20/15 - 1.5 — MONITORING WELL LOCATION (EPI)
- cVOC — CHLORINATED VOLATILE ORGANIC COMPOUND TETRACHLOROETHENE (PCE) AND ITS DEGRADATION PRODUCTS
- µg/L — MICROGRAMS PER LITER
- ND — NOT DETECTED
- CONCENTRATION ISOCONTOUR, DASHED WHERE INFERRED
- APPROXIMATE PROPERTY BOUNDARY

FIGURE 5
ESTIMATED EXTENT OF IMPACTS
TO GROUNDWATER

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	ADDITIONAL SUBSURFACE INVESTIGATION AND PRELIMINARY GROUNDWATER INTERIM ACTION PLAN		
LOCATION	1419 AVENUE D SNOHOMISH, WA		
PREPARED FOR	SKOTDAL REAL ESTATE		
DATE 5/12/2015	***DRAWN BY*** VPB/CLM	***REVIEWED BY*** EK	***PROJECT NUMBER*** 69402.0

MW5
8/05 - ND

FORMER SNOHOMISH
SQUARE LAUNDRY
AND CLEANERS

MW2
8/05 - ND

MW3
8/05 - 120
SB-3

20.8

100

TREATMENT
AREA (AREA 1)

SB-2

MW1
8/05 - 363

MW10
5/07 - 414

MW4
5/07 - 188

MW9
8/04 - 11

SB-1

MW11
5/07 - 386

MW7
8/05 - 88

GW10
7/10 - 41.6

MW-14
1/20/15 - <1

AVENUE D

MW8
8/05 - ND

SNOHOMISH SQUARE
SHOPPING CENTER

MW6
8/05 - ND

MW-12
1/20/15 - 1.5

LINEAR TREATMENT
ALIGNMENT (AREA 2)

MW-13
1/20/15 - 3.6

GW11
7/10 - 40.9

GW9
7/10 - 3.3

GW8
7/10 - 51.2

GW7
7/10 - 2.4

GW4

GW3
7/10 - 3.0

GW6
7/10 - 16.6

GW5
7/10 - 7.1

SNOHOMISH SQUARE SHOPPING CENTER

SNOHOMISH COUNTY PROPERTY

GW1
9/09 - ND

GW2
9/09 - ND

Google

NOTES:

MW1 8/05 - 363 (TOTAL cVOC CONCENTRATION IN µg/L (TYP); SAMPLE DATE (TYP))	MONITORING WELL LOCATION (ERM)
GW1 9/09 - ND	MONITORING WELL LOCATION (CDM SMITH)
MW-12 1/20/15 - 1.5	MONITORING WELL LOCATION (EPI)
cVOC	CHLORINATED VOLATILE ORGANIC COMPOUND TETRACHLOROETHENE (PCE) AND ITS DEGRADATION PRODUCTS
µg/L	MICROGRAMS PER LITER
ND	NOT DETECTED
———	CONCENTRATION ISOCONTOUR, DASHED WHERE INFERRED
— — —	APPROXIMATE PROPERTY BOUNDARY

N

0 20 40 80

SCALE: 1" = 80'

FIGURE 6

APPROXIMATE TREATMENT AREAS

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	ADDITIONAL SUBSURFACE INVESTIGATION AND PRELIMINARY GROUNDWATER INTERIM ACTION PLAN		
LOCATION	1419 AVENUE D SNOHOMISH, WA		
PREPARED FOR	SKOTDAL REAL ESTATE		
DATE 5/12/2015	DRAWN BY VPB/CLM	REVIEWED BY EK	PROJECT NUMBER 69402.0

Attachment A
Borehole Logs

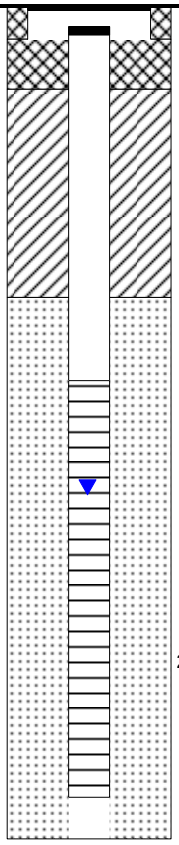
ENVIRONMENTAL PARTNERS INC

BORING ID: MW-12

SITE ADDRESS: **1419 Avenue D, Snohomish, WA**	CLIENT: **Skotdal Real Estate**	CASING MATERIAL AND SIZE: **2" PVC**
DRILLING CONTRACTOR: **Cascade Drilling Inc.**	PROJECT #: **69402**	SCREEN SIZE: **2" PVC 0.010"- Slot**
DRILLING EQUIPMENT: **Truck Mounted Rig**	DATE: **12/18/14**	SCREEN INTERVAL: **9'-19'**
DRILLING METHOD: **Hollow-Stem Auger**	GROUND SURFACE ELEV. FT AMSL:	FILTER PACK: **#2/12 Sand**
LOGGED BY: **M. McElheron Holder** / BOREHOLE SIZE: **8"**	TOTAL DEPTH: **21.5'**	FILTER PACK INTERVAL: **7'-20'**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Blows per 6"	Sample	PID (ppm)
0		Asphalt				
	SM	SILTY SAND; reddish brown; moist; mostly sand with some silt an few gravel				
		SILT WITH SAND; grayish brown; damp				
5	ML	Decreased sand content; color change to gray	30	6-3-3		0.8
		Increased sand content				
10			50	50/6"		0.8
	SM	SILTY SAND WITH GRAVEL; reddish brown; wet; very dense; mostly coarse sand with minor silt and few gravel				
15		Color change to a mixed dark gray and light olive brown	70	50/6"		0.4
	SM	SILTY SAND; light olive brown; wet; very dense; mostly sand with some silt				
20			40	50/6"		0.4
		End of Borehole				
25						
30						

Well Construction



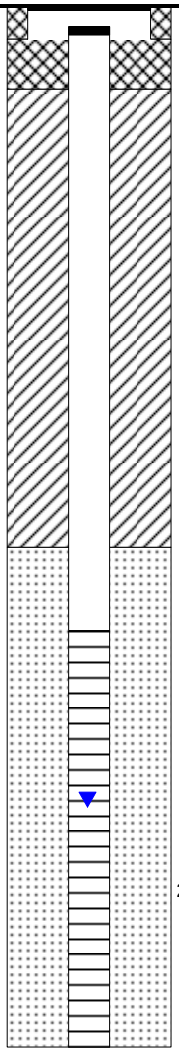
NOTES:

ENVIRONMENTAL PARTNERS INC

BORING ID: MW-13

SITE ADDRESS **1419 Avenue D, Snohomish, WA**	CLIENT: **Skotdal Real Estate**	CASING MATERIAL AND SIZE: **2" PVC**
DRILLING CONTRACTOR: **Cascade Drilling Inc.**	PROJECT #: **69402**	SCREEN SIZE: **2" PVC 0.010"- Slot**
DRILLING EQUIPMENT: **Truck Mounted Rig**	DATE: **12/18/14**	SCREEN INTERVAL: **15'-25'**
DRILLING METHOD: **Hollow-Stem Auger**	GROUND SURFACE ELEV. FT AMSL:	FILTER PACK: **#2/12 Sand**
LOGGED BY: **M. McElheron Holder** / BOREHOLE SIZE: **8"**	TOTAL DEPTH: **26.5'**	FILTER PACK INTERVAL: **13'-25'**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Blows per 6"	Sample	PID (ppm)
0		Grass and soil				
	ML	SANDY SILT; dark brown; damp; medium dense; mostly silt with some sand and gravel				
5		Color change to reddish brown; increased moisture	75	22-50/6"		0
	ML	SILT WITH SAND; brown; moist; mostly silt with sand and some gravel				
10			50	50/5"		0
	SP-SM	POORLY-GRADED SAND WITH SILT AND GRAVEL; grayish brown; wet; mostly coarse sand with some silt and minor gravel				
15			50	50/6"		0.1
20			60	50/6"		0.1
25		No Recovery	0	50/6"		
		End of Borehole				
30						



NOTES:

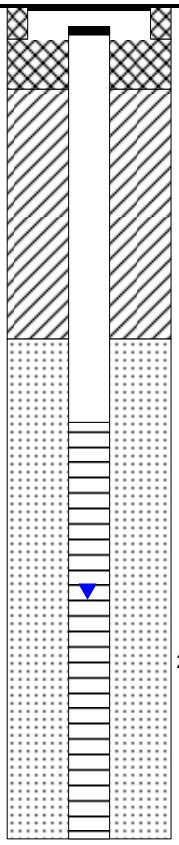
ENVIRONMENTAL PARTNERS INC

BORING ID: MW-14

SITE ADDRESS: **1419 Avenue D, Snohomish, WA**	CLIENT: **Skotdal Real Estate**	CASING MATERIAL AND SIZE: **2" PVC**
DRILLING CONTRACTOR: **Cascade Drilling Inc.**	PROJECT #: **69402**	SCREEN SIZE: **2" PVC 0.010"- Slot**
DRILLING EQUIPMENT: **Truck Mounted Rig**	DATE: **12/23/14**	SCREEN INTERVAL: **10'-20'**
DRILLING METHOD: **Hollow-Stem Auger**	GROUND SURFACE ELEV. FT AMSL:	FILTER PACK: **#2/12 Sand**
LOGGED BY: **M. McElheron Holder** / BOREHOLE SIZE: **8"**	TOTAL DEPTH: **21.5'**	FILTER PACK INTERVAL: **8'-20'**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Blows per 6"	Sample	PID (ppm)
0		Soil and Landscaping				
	ML	SANDY SILT WITH GRAVEL; dark brown; moist; dense; mostly silt with some sand and minor gravel; organic				
5		Color change to light brown	50	4-3-4		
10	SM	SILTY SAND WITH GRAVEL; light olive brown; moist; mostly sand with silt and few gravel	80	Soft		
15	GP	POORLY-GRADED GRAVEL; light olive brown; wet; mostly gravel with few sand and silt	80	22-27-30		
		Color change to light gray; very wet				
20			80	53-35-50/6"		
		End of Borehole				
25						
30						

Well Construction



NOTES:

ENVIRONMENTAL PARTNERS INC

BORING ID: SB-1

SITE ADDRESS: **1419 Avenue D, Snohomish, WA**	CLIENT: **Skotdal Real Estate**
DRILLING CONTRACTOR: **ESNNW**	PROJECT #: **69402**
DRILLING EQUIPMENT: **Truck Mounted Rig**	DATE: **12/19/14**
DRILLING METHOD: **Direct-Push Technology**	GROUND SURFACE ELEV. FT AMSL:
LOGGED BY: **Mary McElheron Holder**	TOTAL DEPTH: **10'**
DECOMMISSIONING MATERIAL: **Bentonite + Asphalt**	BOREHOLE SIZE: **2"**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	PID (ppm)	Sample	Sheen	Notes
0		4" Asphalt					
	ML	SILT WITH SAND; dark brown; damp; mostly silt with some sand		0			
1							
		Color change to light olive brown; trace gravel		0.2	SB1:2'		
2			67				
		Decreased sand and gravel content		0			
3							
4							
5							
	SM	SILTY SAND; light olive brown; mostly sand with some silt					
6				0			
	GP-GM	POORLY-GRADED GRAVEL WITH SILT AND SAND; damp; mostly gravel (rocks) with sand and silt; broken gravel or cobble pieces	75				
7							
8				0			
9	SM	SILTY SAND WITH GRAVEL; salt and pepper (dark gray and light olive brown); wet; mostly coarse sand with minor silt and few gravel					
10		End of Borehole		0.1	SB1:10'		
11							
12							

NOTES:

ENVIRONMENTAL PARTNERS INC

BORING ID: SB-2

SITE ADDRESS **1419 Avenue D, Snohomish, WA**	CLIENT: **Skotdal Real Estate**
DRILLING CONTRACTOR: **ESNNW**	PROJECT #: **69402**
DRILLING EQUIPMENT: **Truck Mounted Rig**	DATE: **12/19/14**
DRILLING METHOD: **Direct-Push Technology**	GROUND SURFACE ELEV. FT AMSL:
LOGGED BY: **Mary McElheron Holder**	TOTAL DEPTH: **10'**

DECOMMISSIONING MATERIAL:
Bentonite + Asphalt

BOREHOLE SIZE:
2"

Depth (feet)	USCS	Description USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other	Interval & % Recovery	PID (ppm)	Sample	Sheen	Notes
0		Asphalt					
	ML	SILT WITH SAND; dark brown; damp; mostly silt with minor sand and few gravel					
1							
		Increased silt content; light brown					
2			80				
3							
4		Increased sand content mixed with hard silt layer		0.1	SB-2:4'		
5							
6							
	SM	SILTY SAND WITH GRAVEL; salt and pepper (dark gray and light olive brown) coloring; mostly sand with minor silt and minor coarse gravel					
7			80				
8							
9							
10		End of Borehole		0.9	SB2:10'		
11							
12							

NOTES:

ENVIRONMENTAL PARTNERS INC

BORING ID: SB-3

SITE ADDRESS **1419 Avenue D, Snohomish, WA**	CLIENT: **Skotdal Real Estate**
DRILLING CONTRACTOR: **ESNNW**	PROJECT #: **69402**
DRILLING EQUIPMENT: **Truck Mounted Rig**	DATE: **12/19/14**
DRILLING METHOD: **Direct-Push Technology**	GROUND SURFACE ELEV. FT AMSL: DECOMMISSIONING MATERIAL: **Bentonite + Asphalt**
LOGGED BY: **Mary McElheron Holder**	TOTAL DEPTH: **10'** BOREHOLE SIZE: **2"**

Depth (feet)	USCS	Description USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other	Interval & % Recovery	PID (ppm)	Sample	Sheen	Notes
0		Asphalt					
1	ML	SILT WITH SAND; dark brown; damp; mostly silt with minor some sand and few gravel Silt with Sand; reddish brown; damp		0			
2	GP	POORLY-GRADED GRAVEL; white and gray; dry; very coarse gravel		0.2			
3	SM	SILTY SAND; gray; moist; mostly coarse sand with few silt and few gravel	75				
	ML	SILT WITH SAND; light olive brown; moist; mostly silt with sand					
4	GM	SILTY GRAVEL; light olive brown; moist; mostly gravel with sand and silt; mixed color gravel					
5				0	SB3:5'		
6	SM	SILTY SAND WITH GRAVEL; salt and pepper (dark gray and light olive brown); wet; mostly sand with silt and gravel		0			
7				0			
8			75				
9				0	SB3:9'		
10		End of Borehole					
11							
12							

NOTES:

Attachment B
Analytical Reports

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

December 26, 2014

Eric Koltes, Project Manager
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

RE: 69402, F&BI 412352

Dear Mr. Koltes:

Included are the results from the testing of material submitted on December 19, 2014 from the 69402, F&BI 412352 project. There are 11 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Cynthia Moon
EPI1226R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 19, 2014 by Friedman & Bruya, Inc. from the Environmental Partners 69402, F&BI 412352 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Environmental Partners
412352-01	SB1:2'
412352-02	SB1:10'
412352-03	SB2:4'
412352-04	SB2:10'
412352-05	SB3:5'
412352-06	SB3:9'

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB1:2'	Client:	Environmental Partners
Date Received:	12/19/14	Project:	69402, F&BI 412352
Date Extracted:	12/19/14	Lab ID:	412352-01
Date Analyzed:	12/23/14	Data File:	122315.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	90	111
Toluene-d8	102	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	0.028
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Methylene chloride	<0.5	o-Xylene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Styrene	<0.05
trans-1,2-Dichloroethene	<0.05	Isopropylbenzene	<0.05
1,1-Dichloroethane	<0.05	Bromoform	<0.05
2,2-Dichloropropane	<0.05	n-Propylbenzene	<0.05
cis-1,2-Dichloroethene	<0.05	Bromobenzene	<0.05
Chloroform	<0.05	1,3,5-Trimethylbenzene	<0.05
2-Butanone (MEK)	<0.5	1,1,2,2-Tetrachloroethane	<0.05
1,2-Dichloroethane (EDC)	<0.05	1,2,3-Trichloropropane	<0.05
1,1,1-Trichloroethane	<0.05	2-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	4-Chlorotoluene	<0.05
Carbon tetrachloride	<0.05	tert-Butylbenzene	<0.05
Benzene	<0.03	1,2,4-Trimethylbenzene	<0.05
Trichloroethene	<0.02	sec-Butylbenzene	<0.05
1,2-Dichloropropane	<0.05	p-Isopropyltoluene	<0.05
Bromodichloromethane	<0.05	1,3-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,4-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dichlorobenzene	<0.05
cis-1,3-Dichloropropene	<0.05	1,2-Dibromo-3-chloropropane	<0.5
Toluene	<0.05	1,2,4-Trichlorobenzene	<0.25
trans-1,3-Dichloropropene	<0.05	Hexachlorobutadiene	<0.25
1,1,2-Trichloroethane	<0.05	Naphthalene	0.096
2-Hexanone	<0.5	1,2,3-Trichlorobenzene	<0.25

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB1:10'	Client:	Environmental Partners
Date Received:	12/19/14	Project:	69402, F&BI 412352
Date Extracted:	12/19/14	Lab ID:	412352-02
Date Analyzed:	12/19/14	Data File:	121932.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	90	111
Toluene-d8	98	64	137
4-Bromofluorobenzene	98	81	119

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Methylene chloride	<0.5	o-Xylene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Styrene	<0.05
trans-1,2-Dichloroethene	<0.05	Isopropylbenzene	<0.05
1,1-Dichloroethane	<0.05	Bromoform	<0.05
2,2-Dichloropropane	<0.05	n-Propylbenzene	<0.05
cis-1,2-Dichloroethene	<0.05	Bromobenzene	<0.05
Chloroform	<0.05	1,3,5-Trimethylbenzene	<0.05
2-Butanone (MEK)	<0.5	1,1,2,2-Tetrachloroethane	<0.05
1,2-Dichloroethane (EDC)	<0.05	1,2,3-Trichloropropane	<0.05
1,1,1-Trichloroethane	<0.05	2-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	4-Chlorotoluene	<0.05
Carbon tetrachloride	<0.05	tert-Butylbenzene	<0.05
Benzene	<0.03	1,2,4-Trimethylbenzene	<0.05
Trichloroethene	<0.02	sec-Butylbenzene	<0.05
1,2-Dichloropropane	<0.05	p-Isopropyltoluene	<0.05
Bromodichloromethane	<0.05	1,3-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,4-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dichlorobenzene	<0.05
cis-1,3-Dichloropropene	<0.05	1,2-Dibromo-3-chloropropane	<0.5
Toluene	<0.05	1,2,4-Trichlorobenzene	<0.25
trans-1,3-Dichloropropene	<0.05	Hexachlorobutadiene	<0.25
1,1,2-Trichloroethane	<0.05	Naphthalene	<0.05
2-Hexanone	<0.5	1,2,3-Trichlorobenzene	<0.25

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB2:4'	Client:	Environmental Partners
Date Received:	12/19/14	Project:	69402, F&BI 412352
Date Extracted:	12/19/14	Lab ID:	412352-03
Date Analyzed:	12/19/14	Data File:	121933.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	90	111
Toluene-d8	99	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Methylene chloride	<0.5	o-Xylene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Styrene	<0.05
trans-1,2-Dichloroethene	<0.05	Isopropylbenzene	<0.05
1,1-Dichloroethane	<0.05	Bromoform	<0.05
2,2-Dichloropropane	<0.05	n-Propylbenzene	<0.05
cis-1,2-Dichloroethene	<0.05	Bromobenzene	<0.05
Chloroform	<0.05	1,3,5-Trimethylbenzene	<0.05
2-Butanone (MEK)	<0.5	1,1,2,2-Tetrachloroethane	<0.05
1,2-Dichloroethane (EDC)	<0.05	1,2,3-Trichloropropane	<0.05
1,1,1-Trichloroethane	<0.05	2-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	4-Chlorotoluene	<0.05
Carbon tetrachloride	<0.05	tert-Butylbenzene	<0.05
Benzene	<0.03	1,2,4-Trimethylbenzene	<0.05
Trichloroethene	<0.02	sec-Butylbenzene	<0.05
1,2-Dichloropropane	<0.05	p-Isopropyltoluene	<0.05
Bromodichloromethane	<0.05	1,3-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,4-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dichlorobenzene	<0.05
cis-1,3-Dichloropropene	<0.05	1,2-Dibromo-3-chloropropane	<0.5
Toluene	<0.05	1,2,4-Trichlorobenzene	<0.25
trans-1,3-Dichloropropene	<0.05	Hexachlorobutadiene	<0.25
1,1,2-Trichloroethane	<0.05	Naphthalene	<0.05
2-Hexanone	<0.5	1,2,3-Trichlorobenzene	<0.25

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB2:10'	Client:	Environmental Partners
Date Received:	12/19/14	Project:	69402, F&BI 412352
Date Extracted:	12/19/14	Lab ID:	412352-04
Date Analyzed:	12/19/14	Data File:	121934.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	90	111
Toluene-d8	100	64	137
4-Bromofluorobenzene	100	81	119

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	0.065
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Methylene chloride	<0.5	o-Xylene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Styrene	<0.05
trans-1,2-Dichloroethene	<0.05	Isopropylbenzene	<0.05
1,1-Dichloroethane	<0.05	Bromoform	<0.05
2,2-Dichloropropane	<0.05	n-Propylbenzene	<0.05
cis-1,2-Dichloroethene	<0.05	Bromobenzene	<0.05
Chloroform	<0.05	1,3,5-Trimethylbenzene	<0.05
2-Butanone (MEK)	<0.5	1,1,2,2-Tetrachloroethane	<0.05
1,2-Dichloroethane (EDC)	<0.05	1,2,3-Trichloropropane	<0.05
1,1,1-Trichloroethane	<0.05	2-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	4-Chlorotoluene	<0.05
Carbon tetrachloride	<0.05	tert-Butylbenzene	<0.05
Benzene	<0.03	1,2,4-Trimethylbenzene	<0.05
Trichloroethene	<0.02	sec-Butylbenzene	<0.05
1,2-Dichloropropane	<0.05	p-Isopropyltoluene	<0.05
Bromodichloromethane	<0.05	1,3-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,4-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dichlorobenzene	<0.05
cis-1,3-Dichloropropene	<0.05	1,2-Dibromo-3-chloropropane	<0.5
Toluene	<0.05	1,2,4-Trichlorobenzene	<0.25
trans-1,3-Dichloropropene	<0.05	Hexachlorobutadiene	<0.25
1,1,2-Trichloroethane	<0.05	Naphthalene	<0.05
2-Hexanone	<0.5	1,2,3-Trichlorobenzene	<0.25

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB3:5'	Client:	Environmental Partners
Date Received:	12/19/14	Project:	69402, F&BI 412352
Date Extracted:	12/19/14	Lab ID:	412352-05
Date Analyzed:	12/19/14	Data File:	121935.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	90	111
Toluene-d8	100	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Methylene chloride	<0.5	o-Xylene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Styrene	<0.05
trans-1,2-Dichloroethene	<0.05	Isopropylbenzene	<0.05
1,1-Dichloroethane	<0.05	Bromoform	<0.05
2,2-Dichloropropane	<0.05	n-Propylbenzene	<0.05
cis-1,2-Dichloroethene	<0.05	Bromobenzene	<0.05
Chloroform	<0.05	1,3,5-Trimethylbenzene	<0.05
2-Butanone (MEK)	<0.5	1,1,2,2-Tetrachloroethane	<0.05
1,2-Dichloroethane (EDC)	<0.05	1,2,3-Trichloropropane	<0.05
1,1,1-Trichloroethane	<0.05	2-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	4-Chlorotoluene	<0.05
Carbon tetrachloride	<0.05	tert-Butylbenzene	<0.05
Benzene	<0.03	1,2,4-Trimethylbenzene	<0.05
Trichloroethene	<0.02	sec-Butylbenzene	<0.05
1,2-Dichloropropane	<0.05	p-Isopropyltoluene	<0.05
Bromodichloromethane	<0.05	1,3-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,4-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dichlorobenzene	<0.05
cis-1,3-Dichloropropene	<0.05	1,2-Dibromo-3-chloropropane	<0.5
Toluene	<0.05	1,2,4-Trichlorobenzene	<0.25
trans-1,3-Dichloropropene	<0.05	Hexachlorobutadiene	<0.25
1,1,2-Trichloroethane	<0.05	Naphthalene	<0.05
2-Hexanone	<0.5	1,2,3-Trichlorobenzene	<0.25

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB3:9'	Client:	Environmental Partners
Date Received:	12/19/14	Project:	69402, F&BI 412352
Date Extracted:	12/19/14	Lab ID:	412352-06
Date Analyzed:	12/19/14	Data File:	121936.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	90	111
Toluene-d8	100	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Methylene chloride	<0.5	o-Xylene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Styrene	<0.05
trans-1,2-Dichloroethene	<0.05	Isopropylbenzene	<0.05
1,1-Dichloroethane	<0.05	Bromoform	<0.05
2,2-Dichloropropane	<0.05	n-Propylbenzene	<0.05
cis-1,2-Dichloroethene	<0.05	Bromobenzene	<0.05
Chloroform	<0.05	1,3,5-Trimethylbenzene	<0.05
2-Butanone (MEK)	<0.5	1,1,2,2-Tetrachloroethane	<0.05
1,2-Dichloroethane (EDC)	<0.05	1,2,3-Trichloropropane	<0.05
1,1,1-Trichloroethane	<0.05	2-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	4-Chlorotoluene	<0.05
Carbon tetrachloride	<0.05	tert-Butylbenzene	<0.05
Benzene	<0.03	1,2,4-Trimethylbenzene	<0.05
Trichloroethene	<0.02	sec-Butylbenzene	<0.05
1,2-Dichloropropane	<0.05	p-Isopropyltoluene	<0.05
Bromodichloromethane	<0.05	1,3-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,4-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dichlorobenzene	<0.05
cis-1,3-Dichloropropene	<0.05	1,2-Dibromo-3-chloropropane	<0.5
Toluene	<0.05	1,2,4-Trichlorobenzene	<0.25
trans-1,3-Dichloropropene	<0.05	Hexachlorobutadiene	<0.25
1,1,2-Trichloroethane	<0.05	Naphthalene	<0.05
2-Hexanone	<0.5	1,2,3-Trichlorobenzene	<0.25

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Environmental Partners
Date Received:	Not Applicable	Project:	69402, F&BI 412352
Date Extracted:	12/19/14	Lab ID:	04-2526 mb
Date Analyzed:	12/19/14	Data File:	121908.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	90	111
Toluene-d8	100	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)	Compounds:	Concentration mg/kg (ppm)
Dichlorodifluoromethane	<0.5	1,3-Dichloropropane	<0.05
Chloromethane	<0.5	Tetrachloroethene	<0.025
Vinyl chloride	<0.05	Dibromochloromethane	<0.05
Bromomethane	<0.5	1,2-Dibromoethane (EDB)	<0.05
Chloroethane	<0.5	Chlorobenzene	<0.05
Trichlorofluoromethane	<0.5	Ethylbenzene	<0.05
Acetone	<0.5	1,1,1,2-Tetrachloroethane	<0.05
1,1-Dichloroethene	<0.05	m,p-Xylene	<0.1
Methylene chloride	<0.5	o-Xylene	<0.05
Methyl t-butyl ether (MTBE)	<0.05	Styrene	<0.05
trans-1,2-Dichloroethene	<0.05	Isopropylbenzene	<0.05
1,1-Dichloroethane	<0.05	Bromoform	<0.05
2,2-Dichloropropane	<0.05	n-Propylbenzene	<0.05
cis-1,2-Dichloroethene	<0.05	Bromobenzene	<0.05
Chloroform	<0.05	1,3,5-Trimethylbenzene	<0.05
2-Butanone (MEK)	<0.5	1,1,2,2-Tetrachloroethane	<0.05
1,2-Dichloroethane (EDC)	<0.05	1,2,3-Trichloropropane	<0.05
1,1,1-Trichloroethane	<0.05	2-Chlorotoluene	<0.05
1,1-Dichloropropene	<0.05	4-Chlorotoluene	<0.05
Carbon tetrachloride	<0.05	tert-Butylbenzene	<0.05
Benzene	<0.03	1,2,4-Trimethylbenzene	<0.05
Trichloroethene	<0.02	sec-Butylbenzene	<0.05
1,2-Dichloropropane	<0.05	p-Isopropyltoluene	<0.05
Bromodichloromethane	<0.05	1,3-Dichlorobenzene	<0.05
Dibromomethane	<0.05	1,4-Dichlorobenzene	<0.05
4-Methyl-2-pentanone	<0.5	1,2-Dichlorobenzene	<0.05
cis-1,3-Dichloropropene	<0.05	1,2-Dibromo-3-chloropropane	<0.5
Toluene	<0.05	1,2,4-Trichlorobenzene	<0.25
trans-1,3-Dichloropropene	<0.05	Hexachlorobutadiene	<0.25
1,1,2-Trichloroethane	<0.05	Naphthalene	<0.05
2-Hexanone	<0.5	1,2,3-Trichlorobenzene	<0.25

Date of Report: 12/26/14
Date Received: 12/19/14
Project: 69402, F&BI 412352

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 412334-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	mg/kg (ppm)	2.5	<0.5	24	28	10-56	15
Chloromethane	mg/kg (ppm)	2.5	<0.5	53	57	10-90	7
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	54	59	10-91	9
Bromomethane	mg/kg (ppm)	2.5	<0.5	76	81	10-110	6
Chloroethane	mg/kg (ppm)	2.5	<0.5	67	71	10-101	6
Trichlorofluoromethane	mg/kg (ppm)	2.5	<0.5	62	66	10-95	6
Acetone	mg/kg (ppm)	12.5	<0.5	81	87	11-141	7
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	70	74	11-103	6
Methylene chloride	mg/kg (ppm)	2.5	<0.5	73	76	14-128	4
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	<0.05	84	86	17-134	2
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	75	80	13-112	6
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	79	83	23-115	5
2,2-Dichloropropane	mg/kg (ppm)	2.5	<0.05	81	83	18-117	2
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	84	87	25-120	4
Chloroform	mg/kg (ppm)	2.5	<0.05	84	88	29-117	5
2-Butanone (MEK)	mg/kg (ppm)	12.5	<0.5	81	83	20-133	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	83	86	22-124	4
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	81	85	27-112	5
1,1-Dichloropropene	mg/kg (ppm)	2.5	<0.05	80	84	26-107	5
Carbon tetrachloride	mg/kg (ppm)	2.5	<0.05	82	84	22-115	2
Benzene	mg/kg (ppm)	2.5	<0.03	80	83	26-114	4
Trichloroethene	mg/kg (ppm)	2.5	<0.03	84	88	30-112	5
1,2-Dichloropropane	mg/kg (ppm)	2.5	<0.05	86	89	31-119	3
Bromodichloromethane	mg/kg (ppm)	2.5	<0.05	88	91	31-131	3
Dibromomethane	mg/kg (ppm)	2.5	<0.05	89	90	27-124	1
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	<0.5	95	93	16-147	2
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	87	87	28-137	0
Toluene	mg/kg (ppm)	2.5	<0.05	82	86	34-112	5
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	<0.05	86	89	30-136	3
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	<0.05	89	91	32-126	2
2-Hexanone	mg/kg (ppm)	12.5	<0.5	86	87	17-147	1
1,3-Dichloropropane	mg/kg (ppm)	2.5	<0.05	87	91	29-125	4
Tetrachloroethene	mg/kg (ppm)	2.5	<0.03	80	85	27-110	6
Dibromochloromethane	mg/kg (ppm)	2.5	<0.05	85	87	32-143	2
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	<0.05	89	92	32-126	3
Chlorobenzene	mg/kg (ppm)	2.5	<0.05	84	87	37-113	4
Ethylbenzene	mg/kg (ppm)	2.5	<0.05	85	88	38-111	3
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	90	93	35-126	3
m,p-Xylene	mg/kg (ppm)	5	<0.1	87	90	38-112	3
o-Xylene	mg/kg (ppm)	2.5	<0.05	89	91	38-113	2
Styrene	mg/kg (ppm)	2.5	<0.05	90	93	38-118	3
Isopropylbenzene	mg/kg (ppm)	2.5	<0.05	89	92	37-114	3
Bromoform	mg/kg (ppm)	2.5	<0.05	78	77	18-155	1
n-Propylbenzene	mg/kg (ppm)	2.5	<0.05	91	93	36-114	2
Bromobenzene	mg/kg (ppm)	2.5	<0.05	88	90	40-115	2
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	<0.05	91	95	35-116	4
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	<0.05	89	93	33-128	4
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	<0.05	86	89	33-123	3
2-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	87	90	39-110	3
4-Chlorotoluene	mg/kg (ppm)	2.5	<0.05	88	91	39-111	3
tert-Butylbenzene	mg/kg (ppm)	2.5	<0.05	95	98	36-116	3
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	<0.05	89	93	35-116	4
sec-Butylbenzene	mg/kg (ppm)	2.5	<0.05	91	95	33-118	4
p-Isopropyltoluene	mg/kg (ppm)	2.5	<0.05	88	92	32-119	4
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	89	91	38-111	2
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	84	86	39-109	2
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	<0.05	89	91	40-111	2
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	<0.5	83	86	34-134	4
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	88	94	31-117	7
Hexachlorobutadiene	mg/kg (ppm)	2.5	<0.25	91	95	25-122	4
Naphthalene	mg/kg (ppm)	2.5	<0.05	92	95	39-120	3
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	<0.25	92	96	35-117	4

Date of Report: 12/26/14
Date Received: 12/19/14
Project: 69402, F&BI 412352

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Dichlorodifluoromethane	mg/kg (ppm)	2.5	63	10-76
Chloromethane	mg/kg (ppm)	2.5	81	34-98
Vinyl chloride	mg/kg (ppm)	2.5	87	42-107
Bromomethane	mg/kg (ppm)	2.5	105	46-113
Chloroethane	mg/kg (ppm)	2.5	97	47-115
Trichlorofluoromethane	mg/kg (ppm)	2.5	99	53-112
Acetone	mg/kg (ppm)	12.5	108	39-147
1,1-Dichloroethene	mg/kg (ppm)	2.5	98	65-110
Methylene chloride	mg/kg (ppm)	2.5	97	62-119
Methyl t-butyl ether (MTBE)	mg/kg (ppm)	2.5	102	72-122
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	99	76-109
2,2-Dichloropropane	mg/kg (ppm)	2.5	103	64-151
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	103	77-110
Chloroform	mg/kg (ppm)	2.5	103	78-108
2-Butanone (MEK)	mg/kg (ppm)	12.5	97	60-121
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	102	80-109
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	104	72-116
1,1-Dichloropropene	mg/kg (ppm)	2.5	101	77-108
Carbon tetrachloride	mg/kg (ppm)	2.5	106	67-123
Benzene	mg/kg (ppm)	2.5	97	75-107
Trichloroethene	mg/kg (ppm)	2.5	103	72-107
1,2-Dichloropropane	mg/kg (ppm)	2.5	103	78-111
Bromodichloromethane	mg/kg (ppm)	2.5	106	75-126
Dibromomethane	mg/kg (ppm)	2.5	106	80-111
4-Methyl-2-pentanone	mg/kg (ppm)	12.5	113	80-128
cis-1,3-Dichloropropene	mg/kg (ppm)	2.5	104	71-138
Toluene	mg/kg (ppm)	2.5	100	79-112
trans-1,3-Dichloropropene	mg/kg (ppm)	2.5	103	77-135
1,1,2-Trichloroethane	mg/kg (ppm)	2.5	104	84-115
2-Hexanone	mg/kg (ppm)	12.5	101	71-129
1,3-Dichloropropane	mg/kg (ppm)	2.5	103	82-113
Tetrachloroethene	mg/kg (ppm)	2.5	98	77-110
Dibromochloromethane	mg/kg (ppm)	2.5	102	64-152
1,2-Dibromoethane (EDB)	mg/kg (ppm)	2.5	104	83-116
Chlorobenzene	mg/kg (ppm)	2.5	100	82-113
Ethylbenzene	mg/kg (ppm)	2.5	102	81-114
1,1,1,2-Tetrachloroethane	mg/kg (ppm)	2.5	109	76-125
m,p-Xylene	mg/kg (ppm)	5	104	82-115
o-Xylene	mg/kg (ppm)	2.5	107	81-116
Styrene	mg/kg (ppm)	2.5	107	81-118
Isopropylbenzene	mg/kg (ppm)	2.5	108	81-117
Bromoform	mg/kg (ppm)	2.5	92	50-174
n-Propylbenzene	mg/kg (ppm)	2.5	106	82-116
Bromobenzene	mg/kg (ppm)	2.5	102	82-118
1,3,5-Trimethylbenzene	mg/kg (ppm)	2.5	108	83-120
1,1,2,2-Tetrachloroethane	mg/kg (ppm)	2.5	105	83-125
1,2,3-Trichloropropane	mg/kg (ppm)	2.5	100	79-116
2-Chlorotoluene	mg/kg (ppm)	2.5	101	80-114
4-Chlorotoluene	mg/kg (ppm)	2.5	102	82-114
tert-Butylbenzene	mg/kg (ppm)	2.5	111	82-116
1,2,4-Trimethylbenzene	mg/kg (ppm)	2.5	105	82-116
sec-Butylbenzene	mg/kg (ppm)	2.5	108	81-123
p-Isopropyltoluene	mg/kg (ppm)	2.5	105	82-124
1,3-Dichlorobenzene	mg/kg (ppm)	2.5	103	80-118
1,4-Dichlorobenzene	mg/kg (ppm)	2.5	97	79-117
1,2-Dichlorobenzene	mg/kg (ppm)	2.5	104	80-118
1,2-Dibromo-3-chloropropane	mg/kg (ppm)	2.5	100	71-131
1,2,4-Trichlorobenzene	mg/kg (ppm)	2.5	104	75-122
Hexachlorobutadiene	mg/kg (ppm)	2.5	109	74-130
Naphthalene	mg/kg (ppm)	2.5	107	83-128
1,2,3-Trichlorobenzene	mg/kg (ppm)	2.5	108	80-126

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

412352

SAMPLE CHAIN OF CUSTODY

ME 12/19/14

VSI

Send Report To erick@epi-wa.com

Company Environmental Partners, Inc

Address 1180 NW Maple St Suite 310

City, State, ZIP Issaquah, WA 98027

Phone # (425) 395-0010 Fax # (425) 395-0011

SAMPLERS *(signature)*

PROJECT NAME/NO. | PO# 69402.

REMARKS

Page # _____ of _____

TURNAROUND TIME
- ☐ Standard (2 Weeks)
- ☐ RUSH 5 DAYS please

Rush charges authorized by _____

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS							Notes
SB1:2'	01 A-D	12/19/14	0822	soil	4				X									
SB1:10'	02		0830						X									
SB2:4'	03		0849						X									
SB2:10'	04		0856						X									
SB3:5'	05		0933						X									
SB3:9'	06		0940						X									

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Mary McElheron Holder	EPI	12/19/14	13:00
Received by:		Nhan Phan	FEBI	12/19/14	13:00
Relinquished by:					
Received by:			Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 28, 2015

Eric Koltes, Project Manager
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

RE: 69402, F&BI 501259

Dear Mr. Koltes:

Included are the results from the testing of material submitted on January 20, 2015 from the 69402, F&BI 501259 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Cynthia Moon
EPI0128R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 20, 2015 by Friedman & Bruya, Inc. from the Environmental Partners 69402, F&BI 501259 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Environmental Partners
501259-01	MW-12
501259-02	MW-13
501259-03	MW-14

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12	Client:	Environmental Partners
Date Received:	01/20/15	Project:	69402, F&BI 501259
Date Extracted:	01/22/15	Lab ID:	501259-01
Date Analyzed:	01/22/15	Data File:	012209.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	100	93	107
4-Bromofluorobenzene	98	76	126

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	1.5
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-13	Client:	Environmental Partners
Date Received:	01/20/15	Project:	69402, F&BI 501259
Date Extracted:	01/22/15	Lab ID:	501259-02
Date Analyzed:	01/22/15	Data File:	012210.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	85	117
Toluene-d8	100	93	107
4-Bromofluorobenzene	99	76	126

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	3.6
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-14	Client:	Environmental Partners
Date Received:	01/20/15	Project:	69402, F&BI 501259
Date Extracted:	01/22/15	Lab ID:	501259-03
Date Analyzed:	01/22/15	Data File:	012211.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	85	117
Toluene-d8	100	93	107
4-Bromofluorobenzene	100	76	126

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Environmental Partners
Date Received:	Not Applicable	Project:	69402, F&BI 501259
Date Extracted:	01/22/15	Lab ID:	05-0109 mb
Date Analyzed:	01/22/15	Data File:	012208.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	101	93	107
4-Bromofluorobenzene	100	76	126

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

Date of Report: 01/28/15
Date Received: 01/20/15
Project: 69402, F&BI 501259

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	113	114	54-149	1
Chloromethane	ug/L (ppb)	50	94	98	67-133	4
Vinyl chloride	ug/L (ppb)	50	98	101	73-132	3
Bromomethane	ug/L (ppb)	50	112	117	69-123	4
Chloroethane	ug/L (ppb)	50	102	105	68-126	3
Trichlorofluoromethane	ug/L (ppb)	50	102	106	70-132	4
Acetone	ug/L (ppb)	250	104	108	44-145	4
1,1-Dichloroethene	ug/L (ppb)	50	97	99	75-119	2
Methylene chloride	ug/L (ppb)	50	98	101	63-132	3
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	96	99	70-122	3
trans-1,2-Dichloroethene	ug/L (ppb)	50	95	96	76-118	1
1,1-Dichloroethane	ug/L (ppb)	50	97	99	80-116	2
2,2-Dichloropropane	ug/L (ppb)	50	99	104	62-141	5
cis-1,2-Dichloroethene	ug/L (ppb)	50	96	99	81-111	3
Chloroform	ug/L (ppb)	50	96	100	81-109	4
2-Butanone (MEK)	ug/L (ppb)	250	97	97	53-140	0
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	98	102	79-109	4
1,1,1-Trichloroethane	ug/L (ppb)	50	101	104	80-116	3
1,1-Dichloropropene	ug/L (ppb)	50	98	100	78-112	2
Carbon tetrachloride	ug/L (ppb)	50	105	108	72-128	3
Benzene	ug/L (ppb)	50	93	95	81-108	2
Trichloroethene	ug/L (ppb)	50	95	97	77-108	2
1,2-Dichloropropane	ug/L (ppb)	50	103	105	82-109	2
Bromodichloromethane	ug/L (ppb)	50	107	110	76-120	3
Dibromomethane	ug/L (ppb)	50	98	102	80-110	4
4-Methyl-2-pentanone	ug/L (ppb)	250	107	108	59-142	1
cis-1,3-Dichloropropene	ug/L (ppb)	50	112	115	76-128	3
Toluene	ug/L (ppb)	50	96	98	83-108	2
trans-1,3-Dichloropropene	ug/L (ppb)	50	109	111	76-128	2
1,1,2-Trichloroethane	ug/L (ppb)	50	104	105	82-110	1
2-Hexanone	ug/L (ppb)	250	106	106	53-145	0
1,3-Dichloropropane	ug/L (ppb)	50	101	103	83-110	2
Tetrachloroethene	ug/L (ppb)	50	100	100	78-109	0
Dibromochloromethane	ug/L (ppb)	50	112	114	63-140	2
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	102	104	85-113	2
Chlorobenzene	ug/L (ppb)	50	96	98	84-108	2
Ethylbenzene	ug/L (ppb)	50	95	98	84-110	3
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	107	108	76-125	1
m,p-Xylene	ug/L (ppb)	100	99	100	84-112	1
o-Xylene	ug/L (ppb)	50	99	101	82-113	2
Styrene	ug/L (ppb)	50	102	103	84-116	1
Isopropylbenzene	ug/L (ppb)	50	98	100	81-122	2
Bromoform	ug/L (ppb)	50	107	110	40-161	3
n-Propylbenzene	ug/L (ppb)	50	95	95	81-115	0
Bromobenzene	ug/L (ppb)	50	95	96	80-113	1
1,3,5-Trimethylbenzene	ug/L (ppb)	50	100	100	83-117	0
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	103	104	79-118	1
1,2,3-Trichloropropane	ug/L (ppb)	50	96	97	74-116	1
2-Chlorotoluene	ug/L (ppb)	50	95	95	79-112	0
4-Chlorotoluene	ug/L (ppb)	50	97	97	81-113	0
tert-Butylbenzene	ug/L (ppb)	50	101	101	81-119	0
1,2,4-Trimethylbenzene	ug/L (ppb)	50	100	101	83-116	1
sec-Butylbenzene	ug/L (ppb)	50	97	97	83-116	0
p-Isopropyltoluene	ug/L (ppb)	50	100	101	82-119	1
1,3-Dichlorobenzene	ug/L (ppb)	50	93	95	83-111	2
1,4-Dichlorobenzene	ug/L (ppb)	50	97	96	82-109	1
1,2-Dichlorobenzene	ug/L (ppb)	50	91	92	83-111	1
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	105	107	62-133	2
1,2,4-Trichlorobenzene	ug/L (ppb)	50	91	94	77-117	3
Hexachlorobutadiene	ug/L (ppb)	50	86	89	74-118	3
Naphthalene	ug/L (ppb)	50	100	103	75-131	3
1,2,3-Trichlorobenzene	ug/L (ppb)	50	91	94	82-115	3

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

501259

SAMPLE CHAIN OF CUSTODY

ME 01-20-15 VI

Page # 1 of 1

Send Report To _____

Company Environmental Partners, Inc

Address 1180 NW Maple St Suite 310

City, State, ZIP Issaquah, WA 98027

Phone # (425) 395-0010 Fax # (425) 395-0011

SAMPLERS *(signature)* Ch Mcf

PROJECT NAME/NO. 69402

PO#

REMARKS

TURNAROUND TIME
☐ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by8260	SVOCs by 8270	HFS							Notes
MW-12	01 A-C	1/20/15	12:38	Water	3				X									
MW-13	02	1/20/15	13:20	↓	↓				X									
MW-14	03	1/20/15	14:12	↓	↓				X									

Samples received at 5 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Ch Mcf	Charles McFadden	epi	1/20/15	15:15
Received by:		FBI	1/20/15	15:15
Relinquished by:				
Received by:		Samples rec		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

Attachment C
Cleanup Level Calculations

Cleanup Level Calculations
Snohomish Square Cleaners
1419 Avenue D, snohomish, Washington
Tetrachloroethene

Soil Cleanup Level for Protection of Ground Water
Equation 747-1

$$\text{Soil CUL} = C_w(UCF)DF\left[K_d + \frac{(\theta_w + \theta_a H_{cc})}{\rho_b}\right]$$

CUL	Units
0.05	**mg/kg**

Variable	Units	Value
C_w	µg/L	5.0
UCF	1 mg/1,000 µg	0.001
DF	Unitless	20
K_d	L/Kg	0.3
θ_w	ml water/ml soil	0.3
θ_a	ml air/ml soil	0.13
H_{cc}	dimensionless	0.754
ρ_b	Kg/L	1.5

Notes:

C_w	MTCA Method A Ground water cleanup level
UCF	Unit Conversion Factor
DF	Dilution Factor
K_d	Distribution Coeffecient
θ_w	Water-filled soil porosity
θ_a	Air-filled soil porosity
H_{cc}	Henry's Law Constant
ρ_b	Dry soil bulk density

Distribution Coefficient (Kd) (for use in Equation 747-1)
Equation 747-2

$$K_d = K_{oc} \times f_{oc}$$

Coefficient	Units
0.3	**L/kg**

Variable	Unit	Value
K_{oc}	ml/g	265
f_{oc}	g/g	0.001

Notes:

K_{oc}	Soil organic carbon partitioning coefficient (from AK Dept. of Environmental Conservation, *Cleanup Levels Guidance*, June 9, 2008)
f_{oc}	Soil fraction of organic carbon

MTCA Method B Soil Cleanup Level for Unrestricted Land Uses
CLARC Database

CUL	Units
476	**mg/kg**

Cleanup Level Calculations
Snohomish Square Cleaners
1419 Avenue D, snohomish, Washington
Trichloroethene

Soil Cleanup Level for Protection of Ground Water
Equation 747-1

$$\text{Soil CUL} = C_w(UCF)DF\left[K_d + \frac{(\theta_w + \theta_a H_{cc})}{\rho_b}\right]$$

CUL	Units
0.03	**mg/kg**

Variable	Units	Value
C_w	µg/L	5
UCF	1 mg/1,000 µg	0.001
DF	Unitless	20
K_d	L/Kg	0.1
θ_w	ml water/ml soil	0.3
θ_a	ml air/ml soil	0.13
H_{cc}	dimensionless	0.422
ρ_b	Kg/L	1.5

Notes:

C_w	MTCA Method A Ground water cleanup level
UCF	Unit Conversion Factor
DF	Dilution Factor
K_d	Distribution Coeffecient
θ_w	Water-filled soil porosity
θ_a	Air-filled soil porosity
H_{cc}	Henry's Law Constant
ρ_b	Dry soil bulk density

Distribution Coefficient (Kd) (for use in Equation 747-1)
Equation 747-2

$$K_d = K_{oc} \times f_{oc}$$

Coefficient	Units
0.1	**L/kg**

Variable	Unit	Value
K_{oc}	ml/g	94
f_{oc}	g/g	0.001

Notes:

K_{oc}	Soil organic carbon partitioning coefficient (from AK Dept. of Environmental Conservation, *Cleanup Levels Guidance*, June 9, 2008)
f_{oc}	Soil fraction of organic carbon

MTCA Method B Soil Cleanup Level for Unrestricted Land Uses
CLARC Database

CUL	Units
12	**mg/kg**

Cleanup Level Calculations
Snohomish Square Cleaners
1419 Avenue D, snohomish, Washington
Cis 1,2 Dichloroethene

Soil Cleanup Level for Protection of Ground Water
Equation 747-1

$$\text{Soil CUL} = C_w(UCF)DF\left[K_d + \frac{(\theta_w + \theta_a H_{cc})}{\rho_b}\right]$$

CUL	Units
0.08	**mg/kg**

Variable	Units	Value
C_w	µg/L	16.0
UCF	1 mg/1,000 µg	0.001
DF	Unitless	20
K_d	L/Kg	0.0
θ_w	ml water/ml soil	0.3
θ_a	ml air/ml soil	0.13
H_{cc}	dimensionless	0.167
ρ_b	Kg/L	1.5

Notes:

C_w	MTCA Method B Ground water cleanup level
UCF	Unit Conversion Factor
DF	Dilution Factor
K_d	Distribution Coeffecient
θ_w	Water-filled soil porosity
θ_a	Air-filled soil porosity
H_{cc}	Henry's Law Constant
ρ_b	Dry soil bulk density

Distribution Coefficient (Kd) (for use in Equation 747-1)
Equation 747-2

$$K_d = K_{oc} \times f_{oc}$$

Coefficient	Units
0.0	**L/kg**

Variable	Unit	Value
K_{oc}	ml/g	36
f_{oc}	g/g	0.001

Notes:

K_{oc}	Soil organic carbon partitioning coefficient (from AK Dept. of Environmental Conservation, *Cleanup Levels Guidance*, June 9, 2008)
f_{oc}	Soil fraction of organic carbon

MTCA Method B Soil Cleanup Level for Unrestricted Land Uses
CLARC Database

CUL	Units
160	**mg/kg**

Cleanup Level Calculations
Snohomish Square Cleaners
1419 Avenue D, snohomish, Washington
Trans 1,2 Dichloroethene

Soil Cleanup Level for Protection of Ground Water
Equation 747-1

$$\text{Soil CUL} = C_w(UCF)DF\left[K_d + \frac{(\theta_w + \theta_a H_{cc})}{\rho_b}\right]$$

CUL	Units
0.87	**mg/kg**

Variable	Units	Value
C_w	µg/L	160.0
UCF	1 mg/1,000 µg	0.001
DF	Unitless	20
K_d	L/Kg	0.0
θ_w	ml water/ml soil	0.3
θ_a	ml air/ml soil	0.13
H_{cc}	dimensionless	0.385
ρ_b	Kg/L	1.5

Notes:

C_w	MTCA Method B Ground water cleanup level
UCF	Unit Conversion Factor
DF	Dilution Factor
K_d	Distribution Coeffecient
θ_w	Water-filled soil porosity
θ_a	Air-filled soil porosity
H_{cc}	Henry's Law Constant
ρ_b	Dry soil bulk density

Distribution Coefficient (Kd) (for use in Equation 747-1)
Equation 747-2

$$K_d = K_{oc} \times f_{oc}$$

Coefficient	Units
0.04	**L/kg**

Variable	Unit	Value
K_{oc}	ml/g	38
f_{oc}	g/g	0.001

Notes:

K_{oc}	Soil organic carbon partitioning coefficient (from AK Dept. of Environmental Conservation, *Cleanup Levels Guidance*, June 9, 2008)
f_{oc}	Soil fraction of organic carbon

MTCA Method B Soil Cleanup Level for Unrestricted Land Uses
CLARC Database

CUL	Units
1,600	**mg/kg**

Cleanup Level Calculations
Snohomish Square Cleaners
1419 Avenue D, snohomish, Washington
Vinyl Chloride

Soil Cleanup Level for Protection of Ground Water
Equation 747-1

$$\text{Soil CUL} = C_w(UCF)DF\left[K_d + \frac{(\theta_w + \theta_a H_{cc})}{\rho_b}\right]$$

CUL	Units
0.001	**mg/kg**

Variable	Units	Value
C_w	µg/L	0.2
UCF	1 mg/1,000 µg	0.001
DF	Unitless	20
K_d	L/Kg	0.0
θ_w	ml water/ml soil	0.3
θ_a	ml air/ml soil	0.13
H_{cc}	dimensionless	1.1
ρ_b	Kg/L	1.5

Notes:

C_w	MTCA Method A Ground water cleanup level
UCF	Unit Conversion Factor
DF	Dilution Factor
K_d	Distribution Coeffecient
θ_w	Water-filled soil porosity
θ_a	Air-filled soil porosity
H_{cc}	Henry's Law Constant
ρ_b	Dry soil bulk density

Distribution Coefficient (Kd) (for use in Equation 747-1)
Equation 747-2

$$K_d = K_{oc} \times f_{oc}$$

Coefficient	Units
0.02	**L/kg**

Variable	Unit	Value
K_{oc}	ml/g	19
f_{oc}	g/g	0.001

Notes:

K_{oc}	Soil organic carbon partitioning coefficient (from AK Dept. of Environmental Conservation, *Cleanup Levels Guidance*, June 9, 2008)
f_{oc}	Soil fraction of organic carbon

MTCA Method B Soil Cleanup Level for Unrestricted Land Uses
CLARC Database

CUL	Units
240	**mg/kg**