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**SUPPLEMENTAL MONITORING  
WELL INSTALLATION**

Mac's One Hour Cleaners  
10825 SE 176<sup>th</sup> Street  
Renton, Washington

**TRI WESTERN SYNDICATED  
INVESTMENTS, INC.**

# ENVIRONMENTAL ASSOCIATES, INC.

1380 - 112<sup>th</sup> Avenue Northeast, Suite 300  
Bellevue, Washington 98004  
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January 26, 2011

JN-20209-3

Mr. Colin Radford  
Tri Western Syndicated Investments, Inc.  
10423 Main Street, Suite #4  
Bellevue, Washington 98004

**RE: SUPPLEMENTAL MONITORING WELL INSTALLATION  
Mac's One Hour Cleaners  
10825 SE 176<sup>th</sup> Street  
Renton, Washington**

Dear Mr. Radford:

Environmental Associates, Inc. (EAI) has completed the installation of five (5) additional groundwater monitoring wells associated with the subject site and has sampled and laboratory tested groundwater samples from all nine (9) project monitoring wells. The work was performed in accordance with our proposal, dated April 7, 2010.

## **Project Background**

A dry-cleaners has operated as a tenant on the subject property since the 1960s. In 2009 the Client / property owner (Tri-Western Syndicated Investments) received notice from the west/southwest adjacent property owner (Bayview) that dry-cleaning solvents (tetrachloroethene or "perc" / PCE) had been discovered on their parcel and that they (Bayview) suspected that the source was the dry-cleaner on the subject property. In January / February 2010, four (4) initial groundwater monitoring wells (MW-1 through MW-4) were installed on the subject parcel to make a preliminary assessment of subsurface environmental conditions. That exploration confirmed the presence of PCE in both soil and groundwater at the subject property at concentrations above Washington State Department of Ecology (WDOE) target compliance levels for unrestricted land use. That preliminary assessment also identified the on-site dry-cleaner as a potential source for the encountered contaminants.



Through the Spring / Summer of 2010, several additional phases of environmental study were performed on the Tri-Western parcel. These activities included performing geophysical surveys, sewer-line closed-circuit TV surveys, and additional phases of soil and groundwater assessment both within the dry-cleaners and in exterior areas of the property. These efforts identified two (2) suspected "source" areas of impacts by dry-cleaning solvent, including an area along a side sewer line along the western side of the building, and a less well defined area along a section of sewer pipe north-northeast of the subject building.

Prior to selection of a potential remediation approach, the next step in the remediation feasibility study process was to further assess the extent of the environmental impact. To facilitate this next phase of work, an access agreement was worked out between the two parcel owners over the Summer / Fall of 2010.

### **Scope of Work**

To evaluate the off site extent of the PCE impact, the following scope of the work was performed:

- Drill / install five (5) additional permanent groundwater monitoring wells (MW-5 through MW-9) at the approximate locations depicted on the attached Plate 2 Study Area. One of these additional monitoring wells (MW-5) was placed in the northwest corner of the subject site to monitor the environmental quality of groundwater entering or leaving the site along the northern margin. The remaining four (4) new monitoring wells were all completed on the west/southwest adjacent Bayview property.
- Survey the relative elevations of the well casing tops and corresponding depths to groundwater in all nine (9) project monitoring wells in an effort to deduce localized groundwater flow directions.
- Collect representative groundwater samples from each monitoring well.
- Submit all recovered groundwater samples to the project laboratory with analysis for chlorinated volatile organic compounds (CVOCs) by EPA test method 8260.
- Prepare a written summary report documenting field methods, observations, findings, and conclusions.

### **Utility Location and Limited Geophysical Survey**

On November 15, 2010, EAI contacted the “one-call” public utility location service to mark public utilities approaching and/or crossing the subject parcel. Additionally, on November 18, 2010, prior to the commencement of drilling activities, EAI had a private utility location contractor further survey the proposed boring locations in an effort to locate and avoid utilities and/or underground appurtenances in the work areas.

Only one underground utility line was found to transit the site close to a proposed boring location. A private electrical line servicing a parking lot light pole was found running north-south from the Bayview building (Auto parts store) to a series of parking lot light poles that exist along the property line between Bayview and a west-adjacent bank parcel (Plate 2, Study Area). The presence of that utility required the moving of proposed monitoring well (MW-7) a couple of feet further east. No other conflicts between initially proposed boring / monitoring well locations and located underground utilities were encountered.

### **Monitoring Well Installation**

On November 22, 2010, three (3) of the five (5) additional monitoring wells (designated MW-5, MW-6, and MW-7) were completed at the approximate locations depicted on the attached graphic plates (2 through 4). Due to inclement weather (snow storm), plans to complete the installation of the remaining monitoring wells, the following day were rescheduled for November 30, 2010 at which time monitoring wells MW-8 and MW-9 were installed.

Location MW-5 was selected to help measure the environmental quality of groundwater leaving and/or entering the property along the northern boundary. Well locations MW-6 and MW-7 were selected to assist in deducing the down-gradient extent of the suspected groundwater plume along with it's geometry. Monitoring wells MW-6 and MW-7 were also selected to evaluate the potential for environmental impairments to the bank parcel to the west. Locations MW-8 and MW-9 were selected to provide further definition of the southern and southwestern extent of the groundwater plume. Monitoring well MW-8 was also selected to evaluate the environmental quality of groundwater approaching the Bayview parcel retail building from the core of the groundwater plume area.

All five (5) monitoring wells were completed with the use of an AMS hollow-stem auger drill rig operated by ESN of Lacey, Washington.

### **Soil Sampling During Drilling**

During drilling of each well, a continuous soil sample was collected in 3 to 4 foot sections beginning at the ground surface and extending to the maximum depths explored, which varied between 13 to 15 feet below the ground surface. Due to the distance from the core "source area," recovered soil samples were logged for lithology and texture, but not submitted to the project laboratory for chemical analysis.

### **Subsurface Conditions**

#### Prior Monitoring Well Installations (MW-1 through MW-4)

As summarized on the attached borings logs (Appendix-A), subsurface soils encountered across the subject site consisted of an upper 2 to 3 feet of fill soil made up of fine to medium grain sized sand with minor amounts of gravel. As a departure from this generalization, approximately 4-feet of rounded cobbles, potentially representing drain rock was encountered in the upper near surface soil at MW-1. Below the surface fill, soils consisting of silt, sand, and gravel, sometimes exhibiting a glacial till texture were encountered to depths of approximately 11 feet below the ground surface. This material generally had a low resistance to drilling and is interpreted to represent weathered and/or reworked glacial till. At MW-3, a gravelly-sand generally lacking finer grained silts was encountered to a depth of approximately 8 feet at which depth an additional 3-feet of weathered till was encountered. Below the weathered till, a much denser, compacted glacial till was present to the 15 foot maximum depth explored.

#### New Monitoring Wells (MW-5 through MW-9)

Soils consisted of an upper and variable thickness layer of organic-rich, dark-brown sand, likely representing the pre-development soil horizon. Below the old soil horizon, weathered glacial till as has been consistently encountered during the previous site explorations was encountered. The weathered till extended to depths between 9 and 11 feet, where the denser compacted glacial till was encountered to the maximum depths explored.

#### Groundwater / Hydrogeologic Model

Groundwater was encountered "perched" on top of the denser glacial till in all borings. Apparent moisture content generally decreased with increasing penetration into the denser till, although some water-saturated sandy-stringers within the upper couple feet of the denser till were noted.

As a preliminary working hydrogeological model for the subject site, it appears that the denser glacial till at approximately 9 to 11 feet below the ground surface may be serving as an aquitard resulting in the formation of a zone of “perched” groundwater that appears to underlie the majority of the study area explored to date. Static water levels within the perched zone appear to be between 5 to 2 feet below the ground surface, with the shallowest depth to groundwater at MW-9, the furthest west monitoring well and the lowest ground surface elevation in the study are monitoring well network to date.

### **Monitoring Well Construction**

All five (5) monitoring well borings were drilled to depths of approximately 13 to 15 feet below the ground surface, effectively screening across the encountered zone of perched groundwater and keying into the underlying denser glacial till, suspected to be acting as an aquitard and possible basal contact for lateral migration of detected solvents.

Each monitoring well was constructed with 2-inch diameter, schedule-40 PVC, 0.01 inch slot screen spanning the zone 4-5 to 13-15 feet below the ground surface. Consistent with WDOE guidelines, blank casing was used for the upper few feet of construction. The annular space around the well screen was backfilled with Colorado silica sand. The sand pack was carried approximately 1 foot above the top of the screen section. Hydrated bentonite was used to seal the upper section of the well casing to a depth of approximately 1.5 feet below the ground surface. Concrete and traffic-grade protective monuments were used to finish the construction and protect the well head casing. The construction details for each monitoring well, including the four previously installed wells, are presented in the boring logs in Appendix-A.

### **Water Table Survey**

After allowing the newly installed wells to equilibrate for a few days, on December 28, 2010, EAI returned to the site to survey the relative elevations of tops of each monitoring well casing and measured the depth to groundwater in each monitoring well. Table 1, presents the surveyed relative elevations for the tops of each well casing, the measured depths to groundwater, and the corresponding elevations of the shallow water table at all nine (9) monitoring well locations. Plate, 3, Water Table Survey, presents a graphical representation of the shallow water table and deduced groundwater flow directions based upon the current geometry of monitoring wells.

Examining Plate 3, groundwater flow appears to be westward with a southwesterly radial influence further south in the study area. A minor degree of northwesterly flow may also be occurring in the general vicinity of MW-5. The groundwater flow regime appears generally consistent with that deduced with the original four (4) on-site monitoring wells and further, appears to validate the selected positions for the additional monitoring wells MW-5 through MW-9.

## **Groundwater Sampling**

The nine monitoring wells were sampled on December 15 and 16, 2010. Monitoring wells MW-1 through MW-4 were last sampled in January 2010.

Prior to sampling, each monitoring well was first “micro-purged” utilizing a peristaltic pump equipped with a flow-through cell instrumented to monitor a variety of parameters including pH, water temperature, conductivity, dissolved oxygen, and redox-potential. Micro-purging continued until consecutive readings of the above parameters stabilized (i.e. varied less than 10 percent). Representative groundwater samples were then transferred directly to laboratory-prepared glassware.

## **Laboratory Results & Discussion**

The nine (9) groundwater samples were analyzed by the project laboratory for chlorinated volatile organic compounds by EPA test method 8260B. The laboratory results are presented in Table 2. Additionally, concentrations of PCE in groundwater are graphically presented on Plate 4.

PCE was detected in all nine (9) samples. Only two (2) samples contained PCE at concentrations below the WDOE target compliance level of 5 parts per billion (ppb). These samples were collected from monitoring well’s MW-1 and MW-8, both located along the southern margin of the study area. As such monitoring well’s MW-1 and MW-8 currently appear to establish a partial southern limit of the PCE groundwater plume, as presented on Plate 4, PCE In Groundwater as a red “dashed” line.

The remaining seven (7) samples all contained PCE at concentrations above the WDOE’s target compliance level. The highest concentrations of PCE were observed at monitoring well’s MW-2 and MW-3, interpreted to be closest to the suspected source of the solvent release. Further from the suspected source the concentration of PCE in the groundwater declines to values between 200 to 300 ppb. At MW-9 interpreted to be the most down-gradient monitoring well to date, the concentration of PCE has declined to 50 ppb, which none the less remains above the 5 ppb WDOE target compliance level.

A visual examination of the distribution of PCE in the groundwater as presented on Plate 4, suggests that the groundwater plume may be in “steady-state” flow from the source areas, previously identified on the subject parcel. This also suggests that the dissolution of dry-cleaning solvents into the shallow groundwater is an ongoing process and will likely continue as long as the high-concentration PCE-impacted “source” soils remain in place / untreated.

Contaminant concentrations within a groundwater plume moving through natural media that is in “steady state” will typically exhibit a logarithmic relationship with distance from the source area. A log-normal plot of concentration (log-scale) versus distance (normal scale) at steady-state distribution should produce a near-straight (linear) trend line. Chart 1, attached to this report evaluates this phenomenon utilizing the study area concentration distribution and distance data along the long-axis of the inferred groundwater plume.

Examining Chart-1, a log-normal linear relationship does appear to exist, bolstering the inference that the groundwater plume appears to be in a “steady state” condition. As a valuable key understanding for the report user, if this is the case, then it may be reasonable to consider that the length and width of the groundwater plume may be at or close to their maximum extent for the current hydrological and source strength conditions. The slope of the trend line in Chart 1 can also be used to make a preliminary estimate on a probable down-gradient extent of the plume, by extending the trend line until it crosses the 5 ppb concentration line (corresponding to the WDOE target compliance level). Doing this yields an estimate of approximately 465 feet west-southwest of the suspected source area. That distance would place the down-gradient extent of the ground water plume somewhere near the west side of 108<sup>th</sup> Avenue SE.

Modifying that projection, it is also conceivable that migration of contaminant mass westward beyond the west margin of the Bayview and/or Bank parcels may be intercepted by one or more subsurface utilities that underlie 108<sup>th</sup> Avenue SE. The presence of such utilities may substantially reduce the chance that commercial parcels west of 108<sup>th</sup> have been significantly impacted by the subject groundwater plume.

In regard to the northern margins of the study area, based upon the PCE concentrations observed at MW-5 and upon groundwater flow interpretations presented on Plate 3, Water Table, some degree of contaminant migration beyond the northern boundary of the site parcels may be occurring. Given a predominantly west-southwest groundwater flow direction and the presence of numerous subsurface utilities underlying SE 176<sup>th</sup> Street, it tentatively appears unlikely that parcels north of the roadway from the subject site have been impacted.

Chloroform was present in five (5) of the groundwater samples (Table 2) during this sampling event. Chloroform is commonly present in municipal water systems and is produced when chloride utilized as a disinfectant interacts with organic matter. The presence of chloroform in the groundwater samples may be an indication that municipal water is entering the subsurface and may conceivably point to leaking along the sanitary sewer alignment as at least one potential candidate mechanism which could account for the encountered groundwater contaminant plume. The trace detection of PCE in the groundwater at MW-4, which is relatively close to the sanitary sewer alignment and the suspected sewer vault, also points to the sanitary sewer as a possible source.



## **Conclusions**

Relying upon the on-site findings to date, which includes the installation, sampling, and integration of five (5) additional groundwater monitoring wells to the study area, the following conclusions are offered:

- Subsurface releases of dry-cleaning solvent at the subject property have resulted in environmental impairment to the subject parcels along with the west adjacent Bayview parcel. As a tentatively positive finding, the extent of impairment to the Bayview parcel appears to currently be constrained to exterior areas of the property north and west of the auto parts store.
- The contaminant distribution and groundwater flow data strongly suggest that the bank parcel to the west may also be impacted by the release of chlorinated solvents.
- Consistent with the findings from the subject property explorations completed earlier in 2010, the subject dry-cleaning facility remains the most logical source to date for the encountered release.

## **Limitations**

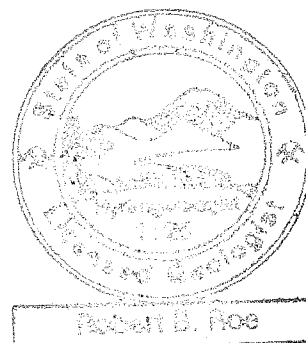
This letter report has been prepared at your request for specific application to this project in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. This document is for the exclusive of Tri Western Syndicated Investments, Inc., and its members, and appointed representatives. Information with respect to subsurface environmental conditions relies solely upon sampling and testing conducted at separated sampling localities and environmental conditions may vary between those localities or at other locations, depths, and/or media. No other warranty, expressed or implied, is made here. If new information is acquired or developed in future site work Environmental Associates, Inc., must be retained to reevaluate the conclusions of this letter report and to provide amendments as required.

We appreciate the opportunity to be of service on this project and trust that the information provided here is fully responsive to your needs. If you have any questions or we may be of additional service, please do not hesitate to contact us.

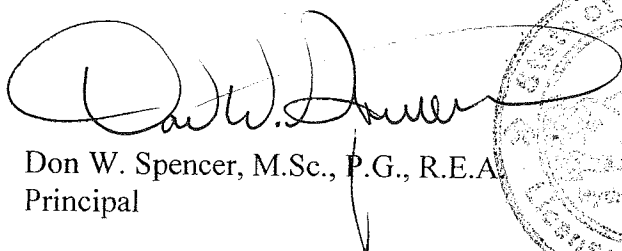
Respectfully submitted,  
ENVIRONMENTAL ASSOCIATES, INC.



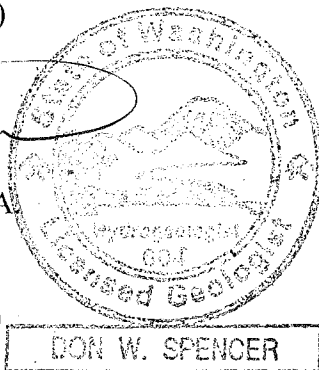
Robert B. Roe, M.Sc., P.G.  
Project Manager/Hydrogeologist



License: 1125 (Washington)



Don W. Spencer, M.Sc., P.G., R.E.A.  
Principal



License: 604 (Washington)  
License: 11464 (Oregon)  
License: 876 (California)  
License: 5195 (Illinois)  
License: 0327 (Mississippi)

**Attachments:**

Table 1 - Water Table Survey  
Table 2 - Chlorinated VOCs - Soil Sampling Results  
Table 3 - Chlorinated VOCs - Groundwater Sampling Results

Plate 1 - Vicinity / Topographic Map  
Plate 2 - Water Table Survey  
Plate 3 - PCE In Groundwater

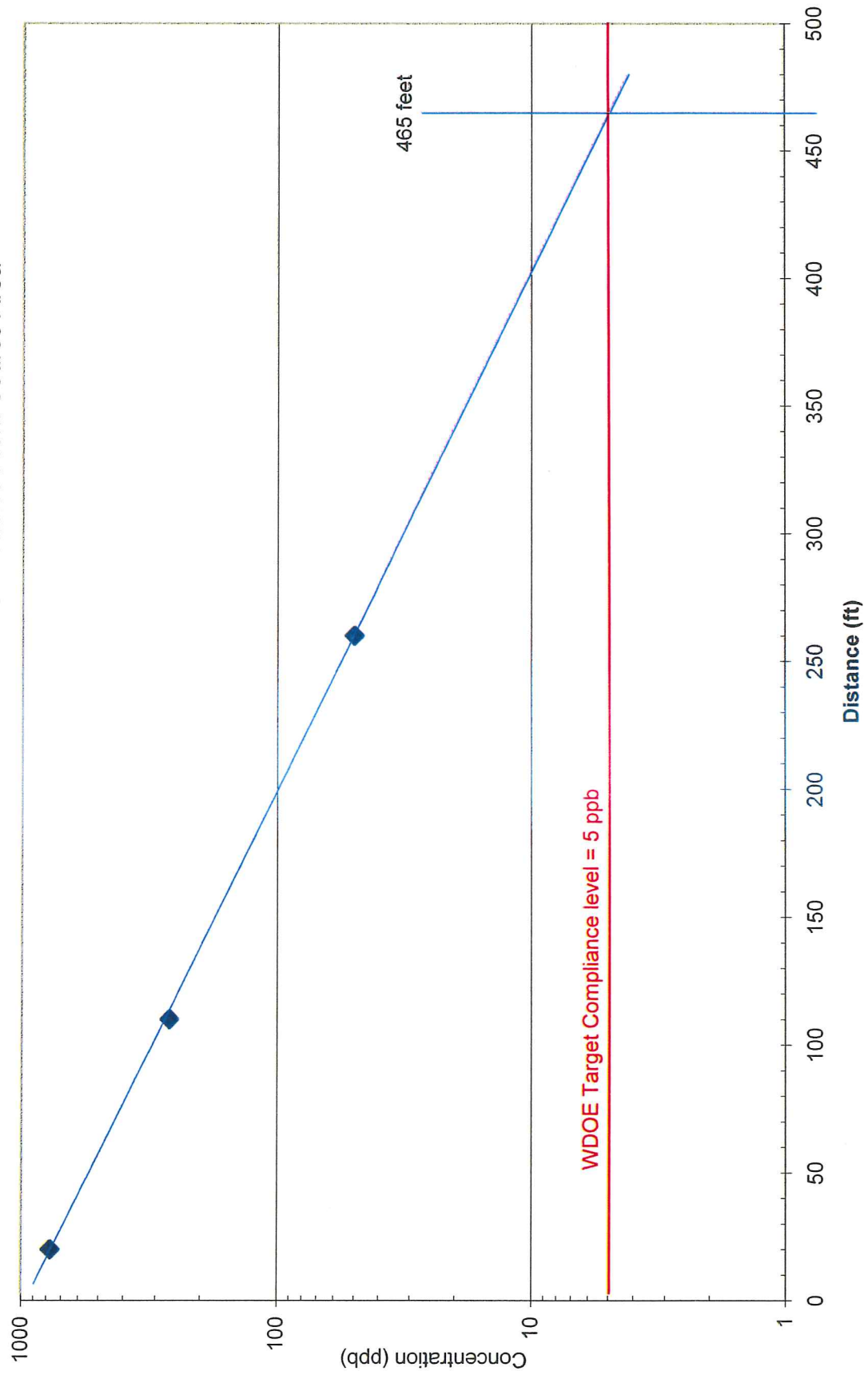
Appendix-A: Boring Logs  
Appendix-B: Laboratory Reports

**TABLE 1**  
**Water Table Survey**  
**(feet)**

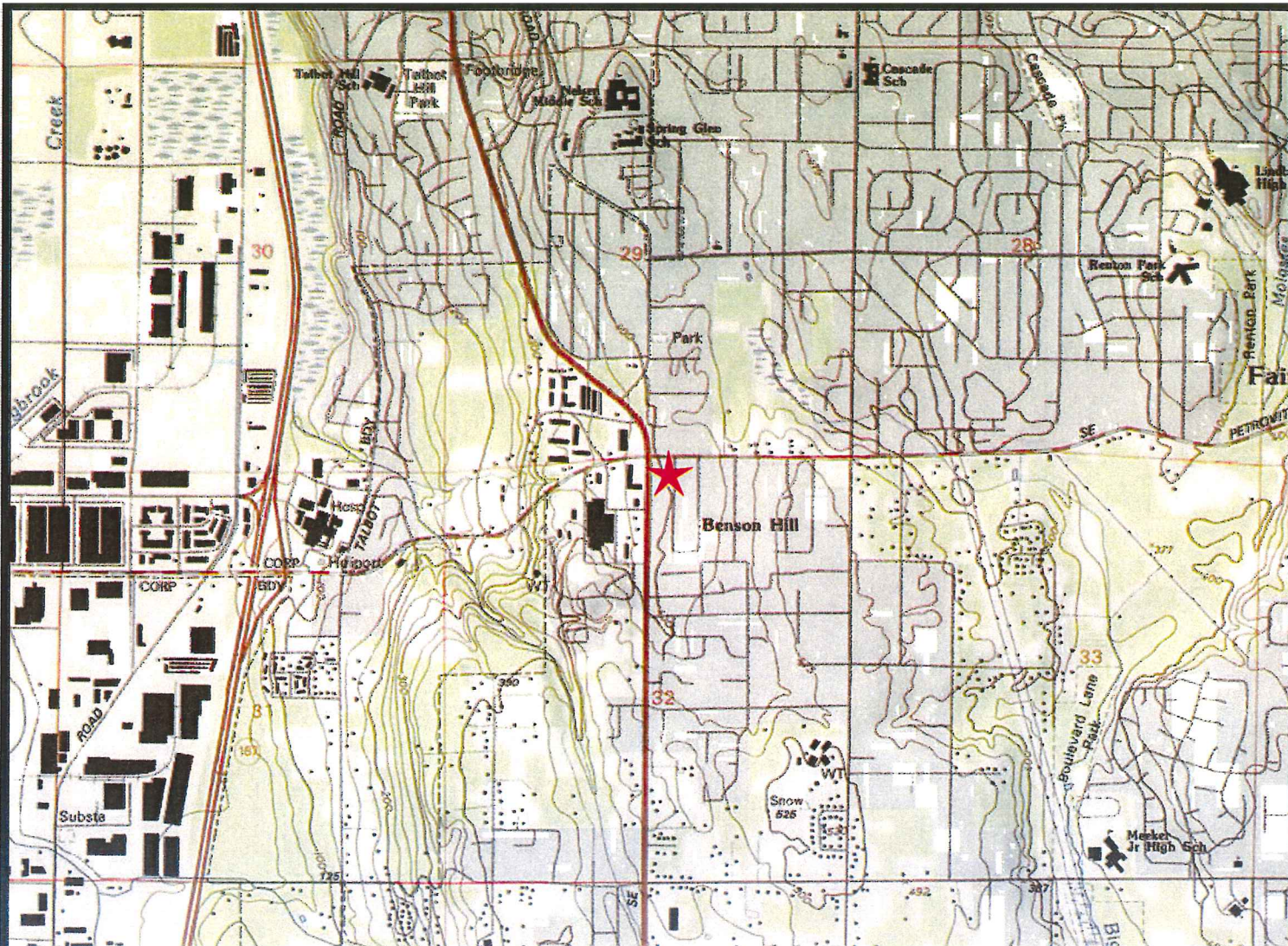
Monitoring Well Number	Ground Surface Elevation	TOC Elevation	Depth to Water Below TOC	Net Change	Elevation of Water Table
MW-1 1/20/2010 12/28/2010	408.09	407.69 407.69	5.11 5.38	-0.27	402.58 402.31
MW-2 1/20/2010 12/28/2010	408.68	408.44 408.44	5.36 5.24	0.12	403.08 403.20
MW-3 1/20/2010 12/28/2010	409.16	408.84 408.86	5.55 5.39	0.16	403.29 403.47
MW-4 1/20/2010 12/28/2010	413.11	412.74 412.77	5.65 5.53	0.12	407.09 407.24
MW-5 12/28/2010		410.09	7.06		403.03
MW-6 12/28/2010		407.83	6.48		401.35
MW-7 12/28/2010		407.41	5.25		402.16
MW-8 12/28/2010		406.22	4.39		401.83
MW-9 12/28/2010		403.23	1.94		401.29
<b>Notes:</b> (1) TOC. Top of well casing elevation. (2) Elevations based upon assigning the concrete walkway surface at the northeast corner of the subject property building an approximate elevation of 412.00 feet above sea-level.					

TABLE 2 - Chlorinated VOCs - Groundwater Sampling Results All results and limits in parts per billion (ppb)						
Monitoring Well	Tetrachloroethene (PCE)	Trichloroethene (TCE)	(cis) 1,2 Dichloroethene	(trans) 1,2 Dichloroethene	Vinyl Chloride	Chloroform
MW-1						
1/20/2010	1.5	<1	<1	<1	<0.2	<1
12/15/2010	1.5	<1	<1	<1	<0.2	<1
MW-2						
1/20/2010	<b>860</b>	1.7	<1	<1	<0.2	<b>8.5</b>
12/16/2010	<b>480</b>	1.7	<1	<1	<0.2	<b>9.7</b>
MW-3						
1/20/2010	<b>1,500</b>	1.4	<1	<1	<0.2	1.4
12/16/2010	<b>770</b>	1.7	<1	<1	<0.2	1.3
MW-4						
1/20/2010	2.6	<1	<1	<1	<1	5.0
12/16/2010	<b>6.8</b>	<1	<1	<1	<1	6.4
MW-5						
12/16/2010	<b>230</b>	1.9	<1	<1	<0.2	<1
MW-6						
12/16/2010	<b>250</b>	1.1	<1	<1	<0.2	<b>8.1</b>
MW-7						
12/15/2010	<b>280</b>	1.8	<1	<1	<0.2	3.6
MW-8						
12/15/2010	1.8	<1	<1	<1	<0.2	<1
MW-9						
12/15/2010	<b>50</b>	<1	<1	<1	<0.2	<1
Reporting Limit <sup>3</sup>	1	1	1	1	0.2	1
Existing Cleanup Level <sup>4</sup>	5 (A)	5 (A)	80 (B)	160 (B)	0.2 (A)	7.2 (B)
Notes: 1 - "ND" denotes analyte not detected at or above listed Reporting Limit. 2 - "NA" denotes sample not analyzed for specific analyte. 3 - "Reporting Limit" represents the laboratory lower quantitation limit. 4 - Method A or B groundwater cleanup levels as published in the Model Toxics Control Act (MTCA) 173-340-WAC, amended 2/12/01.  Bold and Italics denotes concentrations above existing MTCA Method A groundwater cleanup levels.						

Chart 1: PCE Concentration In Groundwater Vrs. Distance From Source Area







USGS: 7.5 Minute Quadrangle: Renton, Washington  
Contour Interval: 25 feet

Scale

1/2 Mile



Subject Property Location



Inferred groundwater flow direction based upon the local topographical gradient in the vicinity of the subject property.



**ENVIRONMENTAL  
ASSOCIATES, INC.**

1380 - 112th Avenue NE, Suite 300  
Bellevue, Washington 98004

## VICINITY / TOPOGRAPHIC MAP

Mac's One Hour Cleaners  
10825 SE 176th Street  
Renton, Washington

Job Number:

JN-20209-3

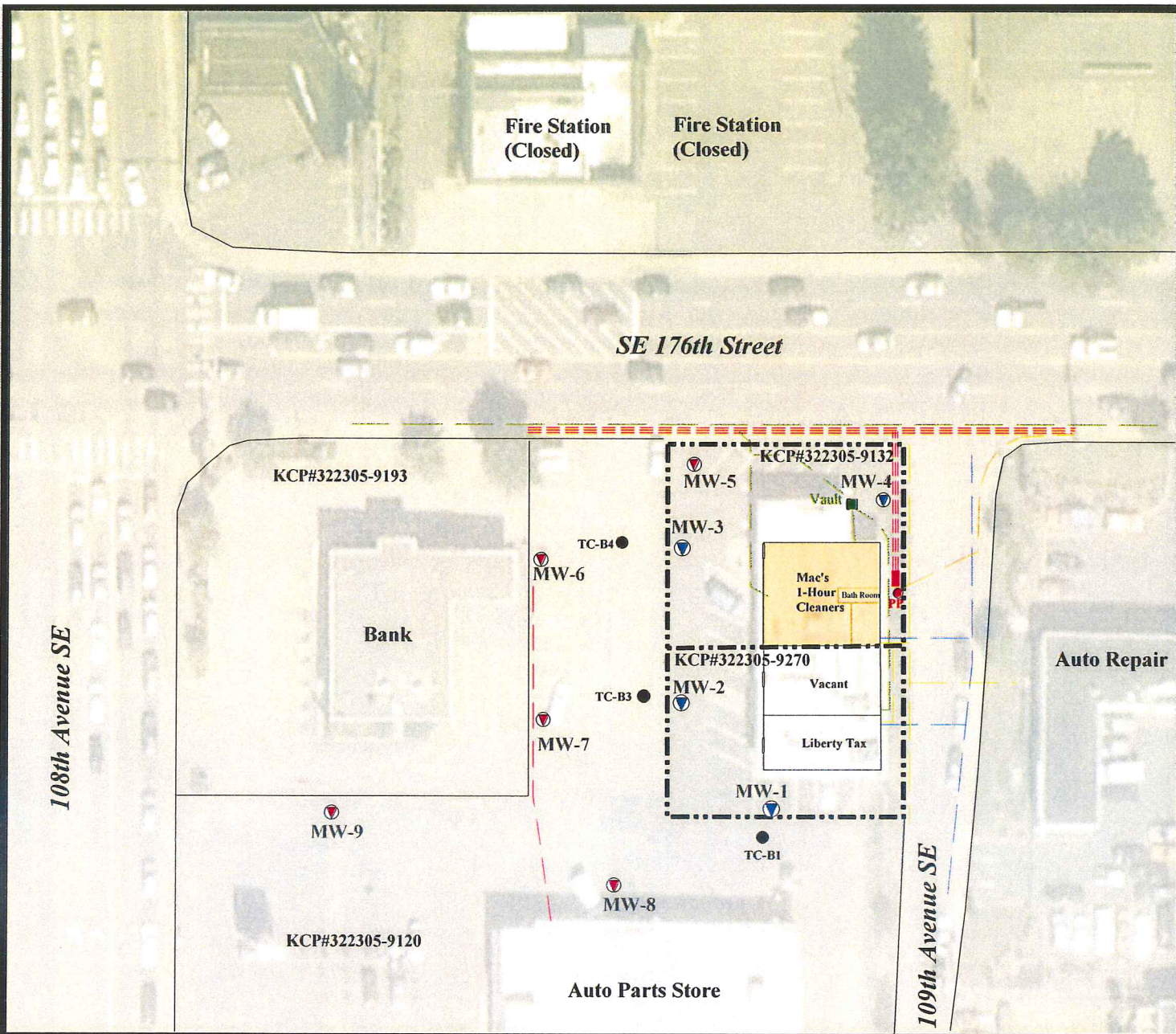
Date:

December 2010

Plate:

1





Approximate border of Subject Parcel.

KCP#: King County tax parcel numbers.



Existing Monitoring wells installed in January 2010.



Additional Monitoring wells installed as part of the current study in November 2010.



Approximate locations of borings made by Terracon (TC) on the adjacent property.



Approximate locations of underground utilities: Power (red), water (blue), natural gas (yellow), phone (orange), and sanitary sewer / storm drain (green).



## ENVIRONMENTAL ASSOCIATES, INC.

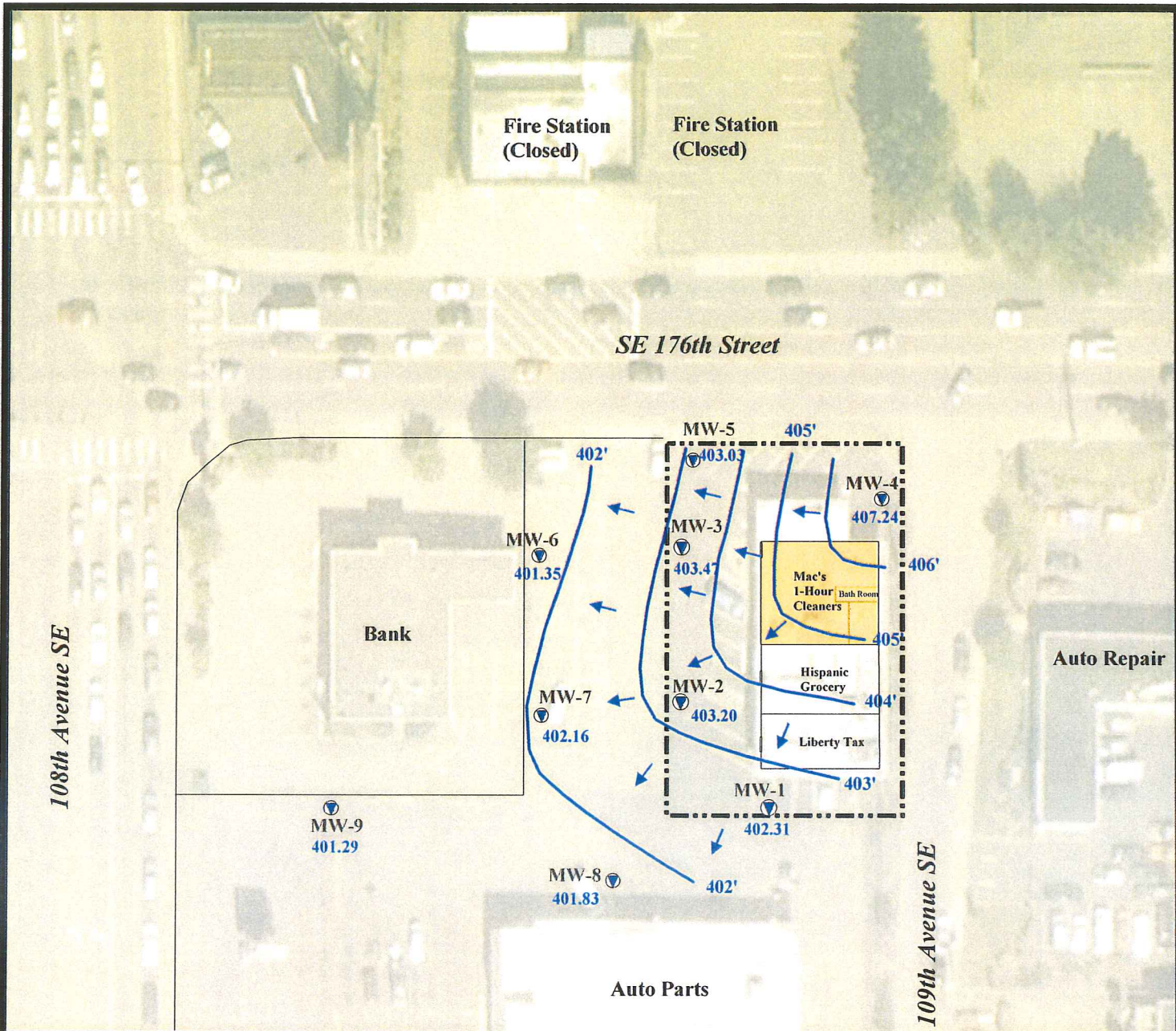
1380 112th Avenue N.E., Ste. 300  
Bellevue, Washington 98004

## STUDY AREA

Mac's One Hour Cleaners  
10825 SE 176th Street  
Renton, Washington

Job Number:	Date:	Scale:	Plate:
JN-20209-3	December 2010	1"=80'	2





Approximate border of Subject Property



Existing monitoring well locations.



## ENVIRONMENTAL ASSOCIATES, INC.

1380 112th Avenue N.E., Ste. 300  
Bellevue, Washington 98004

## WATER TABLE SURVEY

Mac's One Hour Cleaners  
10825 SE 176th Street  
Renton, Washington

Job Number:

JN-20209-3

Date:

December 2010

Scale:

1"=80'

Plate:

3



Fire Station  
(Closed)

Fire Station  
(Closed)

SE 176th Street

108th Avenue SE

Bank

Auto Repair

109th Avenue SE

Auto Parts

MW-6  
250

MW-7  
280

MW-9  
50

MW-8  
1.8

MW-5  
230

MW-3  
770

MW-2  
480

MW-1  
1.5

MW-4  
6.8

Suspected  
"Source Areas"

Mac's  
1-Hour  
Cleaners

Hispanic  
Grocery

Liberty Tax



Approximate border of Subject Property

Preliminary conceptualization of chlorinated solvent (PCE) groundwater plume. The WDOE target compliance level for PCE in groundwater is 5 parts per billion (ppb).



Existing monitoring well locations.



Approximate locations of borings made by Terracon (TC) on the adjacent property.



**ENVIRONMENTAL  
ASSOCIATES, INC.**

1380 112th Avenue N.E., Ste. 300  
Bellevue, Washington 98004

## PCE IN GROUNDWATER

Mac's One Hour Cleaners  
10825 SE 176th Street  
Renton, Washington

Job Number:

JN-20209-3

Date:

December 2010

Scale:

1"=80'

Plate:

4

## **APPENDIX-A**

### **Boring Logs**

WDOE Well Tag: BCC420  
 Lat: 47.444735 N  
 Long: -122.195747 W

TOC Elevation: 407.69 ft  
 GS Elevation: 408.09 ft

# BORING MW-1

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Field Screening (PID) Observations
0	bentonite	Damp		(F)	Asphalt pavement, gravel-base. <u>Cobbles (Fill)</u> , rounded cobbles and gravel, little to no fines, possible drain rock. No recovery.	MW1-3-4	---
5	silica sand	Wet		SM	<u>Silty-Gravelly-Sand</u> , fine to medium sand, with silt, and gravel, glacial till matrix, soft, lenses of fine sand. Suspected weathered / reworked glacial till.	MW1-7-8	80
10		Moist/ Wet		SM	<u>Glacial Till</u> , silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling. Wet sand lenses between 12 to 13 feet.	MW1-11-12	51
15		Damp			Boring terminated at 15 feet.  Depth to groundwater measured 5.11 feet below the top of the casing on 01/20/2010.	MW1-14-15	53
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.

Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.  
 2"-PVC monitoring well installed, screened (0.01 slot) 5 feet to 15 feet, completed with flush-grade monument



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ASSOCIATES, INC.**

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 Bellevue, Washington 98004

## MONITORING WELL MW-1

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:

JN-20209-X

Date:

1/14/2010

Logged by:

RBR

Plate:

A-1

WDOE Well Tag: BCC418  
 Lat: 47.444853 N  
 Long: -122.195912 W

TOC Elevation: 408.44 ft  
 GS Elevation: 408.68 ft

# BORING MW-2

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Field Screening (PID) Observations
0	bentonite	Moist		(F)	Asphalt pavement, gravel-base. <u>Sand</u> , fine to medium sand, with minor gravel, medium brown. Probable fill.	MW2-3-4	750
5	silica sand	Wet		SM	<u>Silty-Gravelly-Sand</u> , fine to medium sand, with silt, and gravel, glacial till matrix, soft, lenses of fine sand. Suspected weathered / reworked glacial till.	MW2-7-8	207
10		Moist		SM	<u>Glacial Till</u> , silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling. Poor recovery, mostly sluff.	MW2-11-12	166
15		Moist			Boring terminated at 15 feet.  Depth to groundwater measured 5.36 feet below the top of the casing on 01/20/2010.	MW2-14-15	132
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.  
 Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.  
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1380 - 112th Avenue NE, Suite 300  
 Bellevue, Washington 98004

## MONITORING WELL MW-2

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:	Date:	Logged by:	Plate:
JN-20209-X	1/14/2010	RBR	A-2

WDOE Well Tag: BCC419  
 Lat: 47.445019 N  
 Long: -122.195905 W

TOC Elevation: 408.84 ft  
 GS Elevation: 409.16 ft

# BORING MW-3

Field Screening  
 (PID)

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Observations
0				(F)	Asphalt pavement, gravel-base. Sand, fine to medium sand, with minor gravel.		
		Damp				MW3-3-4	142
5		Moist/ Wet		SP	Gravelly-Sand, fine to medium sand, with gravel and silt lenses, soft.		
						MW3-7-8	72
10		Moist/Wet		SM	Silty-Gravelly-Sand, fine to medium sand, with gravel and silt, glacial till matrix, soft. Suspected weathered / reworked glacial till.		
		Damp/ Moist		SM	Glacial Till , silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling. Sand lense between 12 to 13 feet	MW3-11-12	50
15		Damp				MW3-14-15	32
					Boring terminated at 15 feet.  Depth to groundwater measured 5.55 feet below the top of the casing on 01/20/2010.		
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.

Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.

2"-PVC monitoring well installed, screened (0.01 slot) 5 feet to 15 feet, completed with flush-grade monument



**ENVIRONMENTAL  
 ASSOCIATES, INC.**

1380 - 112th Avenue NE, Suite 300  
 Bellevue, Washington 98004

## MONITORING WELL MW-3

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:

JN-20209-X

Date:

1/14/2010

Logged by:

RBR

Plate:

A-3



WDOE Well Tag: BCC421  
 Lat: 47.445086 N  
 Long: -122.195562 W

TOC Elevation: 412.74 ft  
 GS Elevation: 413.11 ft

# BORING MW-4

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Field Screening (PID) Observations
0	benfonite silica sand			(F)	Asphalt pavement, gravel-base. <u>Sand</u> , fine to medium sand, with minor gravel.		
		Damp				MW4-3-4	0.0
5		▼ Moist/ wet		SM	<u>Silty-Gravelly-Sand</u> , fine to medium sand, with gravel and silt, glacial till matrix, soft. Suspected weathered / reworked glacial till.		
						MW4-7-8	4.5
10		Moist/ wet		SM	<u>Glacial Till</u> , silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling.	MW4-11-12	2.3
15		Damp				MW4-14-15	0.0
					Boring terminated at 15 feet.  Depth to groundwater measured 5.55 feet below the top of the casing on 01/20/2010.		
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.

Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.

2"-PVC monitoring well installed, screened (0.01 slot) 5 feet to 15 feet, completed with flush-grade monument



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 Bellevue, Washington 98004

## MONITORING WELL MW-4

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:

JN-20209-X

Date:

1/15/2010

Logged by:

RBR

Plate:

A-4

WDOE Well Tag: BBB208  
 Lat: 47.445127 N  
 Long: -122.195869 W

# BORING MW-5

TOC Elevation: 410.09 ft  
 GS Elevation: ~410.50 ft

Field Screening  
 (PID)

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Observations
0	bentonite				Asphalt pavement, gravel-base.		
		Damp		SM	Sand, fine to medium sand, with minor gravel, dark-brown soil horizon.		
5		Moist/ wet			Silty-Gravelly-Sand, fine to medium sand, with gravel and silt, glacial till matrix, soft. Suspected weathered / reworked glacial till.		
10	silica sand	Moist		SM	Glacial Till, silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling.		
		Damp/ Moist					
15					Boring terminated at 14 feet.		
					Depth to groundwater measured 7.06 feet below the top of the casing on 12/28/2010.		
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.

Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.  
 2"-PVC monitoring well installed, screened (0.01 slot) 4 feet to 14 feet, completed with flush-grade monument



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## MONITORING WELL MW-5

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:

JN-20209-3

Date:

11/22/2010

Logged by:

RBR

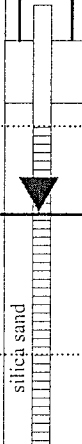
Plate:

A-5

WDOE Well Tag: BBB209  
 Lat: 47.445013 N  
 Long: -122.196135 W

# BORING MW-6

TOC Elevation: 407.83 ft  
 GS Elevation: 408.25 ft

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Field Screening (PID) Observations
0					Asphalt pavement, gravel-base.		
		Damp		SP	Sand, fine sand, dark-brown soil horizon.		
5		Moist		SM	Silty-Gravelly-Sand, fine to medium sand, with gravel and silt, glacial till matrix, soft. Suspected weathered / reworked glacial till.		
10		Wet		SM	Glacial Till, silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling.		
15		Moist			Boring terminated at 14 feet.  Depth to groundwater measured 6.48 feet below the top of the casing on 12/28/2010.		
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.

Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.  
 2"-PVC monitoring well installed, screened (0.01 slot) 4 feet to 14 feet, completed with flush-grade monument



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## MONITORING WELL MW-6

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:

JN-20209-3

Date:

11/22/2010

Logged by:

RBR

Plate:

A-6



WDOE Well Tag: BBB210  
 Lat: 47.444832 N  
 Long: -122.196133 W

TOC Elevation: 407.41 ft  
 GS Elevation: ~408.00 ft

# BORING MW-7

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Field Screening (PID) Observations
0	bentonite ▼ silty sand	Damp		SP	Asphalt pavement, gravel-base.		
5		Moist			Sand, fine sand, dark-brown soil horizon.		
10		Wet		SM	Silty-Gravelly-Sand, fine to medium sand, with gravel and silt, glacial till matrix, soft. Suspected weathered / reworked glacial till.		
15		Moist		SM	Glacial Till, silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling.		
20					Boring terminated at 14 feet.		
25					Depth to groundwater measured 5.25 feet below the top of the casing on 12/28/2010.		
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.

Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.  
 2"-PVC monitoring well installed, screened (0.01 slot) 4 feet to 14 feet, completed with flush-grade monument



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## MONITORING WELL MW-7

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:

JN-20209-3

Date:

11/22/2010

Logged by:

RBR

Plate:

A-7

WDOE Well Tag: BBB211  
 Lat: 47.444659 N  
 Long: -122.196009 W

# BORING MW-8

TOC Elevation: 406.22 ft  
 GS Elevation: ~406.75 ft

Field Screening  
 (PID)

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Observations
0		Damp		SP	Asphalt pavement, gravel-base. Sand, fine sand, dark-brown soil horizon.		
5		Moist		SM	Silty-Gravelly-Sand, fine to medium sand, with gravel and silt, glacial till matrix, soft. Suspected weathered / reworked glacial till.		
10		Wet		SM	Glacial Till, silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling.		
15		Moist			Boring terminated at 13 feet.  Depth to groundwater measured 4.39 feet below the top of the casing on 12/28/2010.		
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.

Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.  
 2"-PVC monitoring well installed, screened (0.01 slot) 4 feet to 13 feet, completed with flush-grade monument



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## MONITORING WELL MW-8

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:

JN-20209-3

Date:

11/30/2010

Logged by:

RBR

Plate:

A-8

WDOE Well Tag: BBB212  
 Lat: 47.444742 N  
 Long: -122.196476 W

TOC Elevation: 403.23 ft  
 GS Elevation: ~403.50 ft

# BORING MW-9

Field Screening  
 (PID)  
 Observations

Depth/ Sample	Well Design	Moisture/ Water Table	Blows / Foot	USCS	DESCRIPTION	Sample	Field Screening (PID) Observations
0		Moist		SP	Asphalt pavement, gravel-base. <u>Sand</u> , fine sand, with silt and gravel, dark-brown soil horizon.		
		Wet					
5		Wet		SM	<u>Silty-Gravelly-Sand</u> , fine to medium sand, with gravel and silt, glacial till matrix, soft. Suspected weathered / reworked glacial till.		
10		Damp/ Moist		SM	<u>Glacial Till</u> , silt, sand, and gravel in a glacial till matrix, medium brown, dense, significantly harder drilling.		
15					Boring terminated at 12 feet.  Depth to groundwater measured 1.94 feet below the top of the casing on 12/28/2010.		
20							
25							
30							
35							
40							

Sampler: Continuous Strataprobe Macro-Core.  
 Driller: ESN - AMS Auger Rig.

Top of casing (TOC) and ground surface (GS) elevations relative to NEC the subject buildings perimeter walkway concrete slab assigned elevation of 412.00 ft.  
 2"-PVC monitoring well installed, screened (0.01 slot) 4 feet to 12 feet, completed with flush-grade monument



**ENVIRONMENTAL  
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1380 - 112th Avenue NE, Suite 300  
 Bellevue, Washington 98004

## MONITORING WELL MW-9

Mac's One Hour Cleaners  
 10825 SE 176th Street  
 Renton, Washington

Job Number:	Date:	Logged by:	Plate:
JN-20209-3	11/30/2010	RBR	A-9

## **APPENDIX-B**

### **Laboratory Report**

December 27, 2010

Robert Roe  
Environmental Associates  
1380 112th Avenue NE, Suite 300  
Bellevue, WA 98004

Dear Mr. Roe:

Please find enclosed the analytical data report for the Mac's 1 Hour Cleaners Project in Renton, Washington. Probe services were conducted on December 20, 2010. Water samples were analyzed for Chlorinated VOC's by Method 8260 on December 20, 2010.

The results of these analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. A copy of the invoice for this work is also enclosed for your records.

ESN Northwest appreciates the opportunity to have provided analytical services to Environmental Associates for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,



Michael A. Korosec  
President

# ESN NORTHWEST CHEMISTRY LABORATORY

Tri-Western Syndicated/EAI  
MAC'S CLEANERS PROJECT  
Client Project #EAI-20209-3  
Renton, Washington

ESN Northwest  
1210 Eastside Street SE Suite 200  
Olympia, WA 98501  
(360) 459-4670 (360) 459-3432 Fax  
lab@esnnw.com

## Analysis of Chlorinated Volatile Organic Compounds in Water by Method 8260

### Analytical Results

8260B Chlorinated, µg/L	MTH BLK	LCS	LCSD	MW-1	MW-2	MW-3	MW-4
Matrix	Reporting	Water	Water	Water	Water	Water	Water
Date analyzed	Limits	12/20/10	12/20/10	12/20/10	12/20/10	12/20/10	12/20/10
Dichlorodifluoromethane	1.0	nd			nd	nd	nd
Chloromethane	1.0	nd			nd	nd	nd
Vinyl chloride	0.2	nd	99%	121%	nd	nd	nd
Chloroethane	1.0	nd			nd	nd	nd
Trichlorofluoromethane	1.0	nd			nd	nd	nd
1,1-Dichloroethene	1.0	nd	95%	110%	nd	nd	nd
Methylene chloride	1.0	nd			nd	nd	nd
trans-1,2-Dichloroethene	1.0	nd			nd	nd	nd
1,1-Dichloroethane	1.0	nd			nd	nd	nd
cis-1,2-Dichloroethene	1.0	nd	109%	133%	nd	nd	nd
2,2-Dichloropropane	1.0	nd			nd	nd	nd
Chloroform	1.0	nd	112%	128%	nd	9.7	1.3
Bromochloromethane	1.0	nd			nd	nd	nd
1,1,1-Trichloroethane	1.0	nd			nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd			nd	nd	nd
1,1-Dichloropropene	1.0	nd			nd	nd	nd
Carbon tetrachloride	1.0	nd			nd	nd	nd
Trichloroethene (TCE)	1.0	nd	108%	129%	nd	1.7	1.7
1,2-Dichloropropane	1.0	nd			nd	nd	nd
Bromodichloromethane	1.0	nd	119%	132%	nd	nd	nd
cis-1,3-Dichloropropene	1.0	nd			nd	nd	nd
trans-1,3-Dichloropropene	1.0	nd			nd	nd	nd
1,1,2-Trichloroethane	1.0	nd			nd	nd	nd
1,3-Dichloropropane	1.0	nd			nd	nd	nd
Dibromochloromethane	1.0	nd			nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	103%	132%	1.5	480	770
Chlorobenzene	1.0	nd	110%	128%	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd			nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd			nd	nd	nd
1,2,3-Trichloropropane	1.0	nd			nd	nd	nd
2-Chlorotoluene	1.0	nd			nd	nd	nd
4-Chlorotoluene	1.0	nd			nd	nd	nd
1,3-Dichlorobenzene	1.0	nd			nd	nd	nd
1,4-Dichlorobenzene	1.0	nd			nd	nd	nd
1,2-Dichlorobenzene	1.0	nd			nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd			nd	nd	nd
1,2,4-Trichlorobenzene	1.0	nd			nd	nd	nd
Hexachloro-1,3-butadiene	1.0	nd			nd	nd	nd
1,2,3-Trichlorobenzene	1.0	nd			nd	nd	nd
Surrogate recoveries							
Dibromofluoromethane		100%	100%	99%	99%	99%	95%
Toluene-d8		97%	95%	100%	92%	93%	97%
4-Bromofluorobenzene		107%	101%	104%	98%	96%	96%

### Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits  
Acceptable Recovery limits: 65% TO 135%  
Acceptable RPD limit: 35%

# ESN NORTHWEST CHEMISTRY LABORATORY

Tri-Western Syndicated/EAI  
MAC'S CLEANERS PROJECT  
Client Project #EAI-20209-3  
Renton, Washington

ESN Northwest  
1210 Eastside Street SE Suite 200  
Olympia, WA 98501  
(360) 459-4670 (360) 459-3432 Fax  
lab@esnnw.com

## Analysis of Chlorinated Volatile Organic Compounds in Water by Method 8260

### Analytical Results

8260B Chlorinated, µg/L		MW-5	MW-6	MW-7	MW-8	MW-9
Matrix	Reporting	Water	Water	Water	Water	Water
Date analyzed	Limits	12/20/10	12/20/10	12/20/10	12/21/10	12/21/10
Dichlorodifluoromethane	1.0	nd	nd	nd	nd	nd
Chloromethane	1.0	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd
Chloroethane	1.0	nd	nd	nd	nd	nd
Trichlorofluoromethane	1.0	nd	nd	nd	nd	nd
1,1-Dichloroethene	1.0	nd	nd	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd
2,2-Dichloropropane	1.0	nd	nd	nd	nd	nd
Chloroform	1.0	nd	8.1	3.6	nd	nd
Bromochloromethane	1.0	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	1.0	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	1.9	1.1	1.8	nd	nd
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	230	250	280	1.8	50
Chlorobenzene	1.0	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	1.0	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	1.0	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	1.0	nd	nd	nd	nd	nd

### Surrogate recoveries

Dibromofluoromethane	102%	100%	101%	97%	99%
Toluene-d8	96%	94%	93%	90%	88%
4-Bromofluorobenzene	98%	90%	94%	91%	87%

### Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits  
Acceptable Recovery limits: 65% TO 135%  
Acceptable RPD limit: 35%

