Remedial Investigation / Feasibility Study Report

Conducted on:

Manor Market

3609 – 164th Street SW

Lynnwood, Washington 98087-7017

Ecology Facility/Site ID: 77492944

Ecology VCP ID: NW2621

Prepared for:

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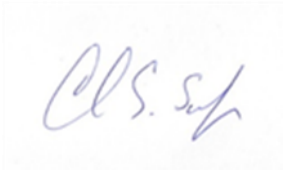

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AEG Project #: 11-124
Date of Report: April 29, 2020

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1.0 INTRODUCTION

This report presents the findings of a Remedial Investigation and Feasibility Study (RI/FS) conducted by Associated Environmental Group, LLC (AEG) at Manor Market, located at 3609 164th St. SW, Lynnwood, Washington (Site). The purpose of this report is to document the completion of the RI and provide support for remedial actions proposed in the FS. The scope of work for this investigation was developed based on our professional judgment and experience in accordance with requirements in the Washington State Department of Ecology (Ecology) Model Toxics Control Act (MTCA) Cleanup Regulations (Chapter 173-340 WAC). The investigation was performed in general accordance with the American Society for Testing and Materials (ASTM) Standard E 1903-11, Standard Guide Environmental Site Assessments: Phase II Environmental Site Assessment Process.

1.1 *General Site Information*

Site Name: Manor Market
Site Address: 3609 164th St. SW, Lynnwood, Washington 98087
Facility/Site ID No.: 77492944
Cleanup Site ID No.: 11939
Property Owner: Veniatony Corp
Snohomish County Parcel No.: 00372900300502 (0.75 acres)

1.2 *Site Use*

Site improvements include a 7,000-square-foot convenience store/retail mall constructed in 1982, and a fueling station, which includes two underground storage tanks (USTs) and three pump islands under a single canopy. Other tenants on Site include a dry cleaner, teriyaki restaurant, and salon. Figure 1, *Vicinity Map*, presents the general vicinity of the Site. The Site's current layout and features are provided in Figure 2, *Site Map*.

1.3 *Site History*

The Site has historically been a retail gasoline station since 1982. Prior to 1982, the Site use is not known. The UST system formerly included tanks "1-P, 2-N, and 3-R", which were removed in 1998.

The existing UST system was installed in 1998, and includes one 10,000-gallon regular unleaded tank, and one dual-compartment tank containing mid-grade and premium grade gasoline. Each UST is constructed of double-wall steel, clad with corrosion resistant composite materials. The fuel lines are composed of double-lined flexible piping. UST and fuel line leak detection tests are performed by the Veeder-Root TLS-300 electric monitoring system.

The dry cleaner located at the west end of the Site building (listed with Ecology as Crystal Cleaners) was once determined to have released tetrachloroethylene (PCE) into the soil beneath the building. This separate site received a No Further Action (NFA) letter from Ecology with a Restrictive Covenant (now referred to as an Environmental Covenant) applied to the property deed to protect against direct contact exposure to the soil. No groundwater monitoring was required because it was thought that the groundwater table was greater than 100 feet below ground surface (bgs).

2.0 FIELD INVESTIGATIONS

2.1 *Site Characterization History*

2.1.1 Site Assessment and UST Decommissioning/Remedial Action – QUEST/RFE, January 1998

According to QUEST, RFE performed a subsurface investigation in March 1997 to assess the subsurface soil adjacent to the former tank pad and beneath the fuel dispenser area. Seven soil borings were advanced to a maximum depth of 12 feet bgs. Soil samples were collected for analyses of gasoline-range total petroleum hydrocarbons (TPH). The results were screened against MTCA Method A cleanup levels for soil. QUEST reported that there were no gasoline-range TPH constituents found in soil samples analyzed during the 1997 assessment at the Site (QUEST 1998).

The previous UST system was decommissioned on January 13, 1998 by contractor LPI. The previous UST system was installed in 1982 and consisted of three 12,000-gallon, steel, single-walled gasoline USTs. Little information about the nature and extent of the release(s) of gasoline or characterization of soil quality were published. According to QUEST, visual and olfactory indications of petroleum-contaminated soil (PCS) were documented by contractors during the decommissioning of the former UST system. Approximately 1,000 tons of PCS was excavated, and 2,800 gallons of water were removed from the excavation pit during the remedial action. Three soil samples were collected from stockpiled soils removed from the excavation pit of the USTs. Samples were analyzed for gasoline-range TPH and associated volatile organic compounds (VOCs). Laboratory analytical results indicated concentrations of benzene (5.5 to 12 milligrams per kilogram [mg/kg]), and gasoline-range TPH (340 to 1,500 mg/kg) above their respective MTCA Method A soil cleanup levels (in place at the time) of 5 mg/kg and 30 mg/kg.

According to QUEST, closure soil samples were collected in January 1998 from within the UST and dispenser areas per Washington State regulations (WAC 173-360) governing UST closure. Five samples were collected from within the UST excavation area, one from along the fuel lines, and two from under the dispenser area. Two soil samples from within the UST excavation area exhibited concentrations of benzene above the MTCA Method A cleanup level (QUEST 1998). The approximate extent of the excavation is illustrated on Figure 2, *Site Map*.

2.1.2 Phase I Environmental Site Assessment – ENVITECH, November 2010

The Phase I ESA identified concerns that centered on past operations and included gasoline spills, UST noncompliance, and UST and dry-cleaning solvent releases. ENVITECH concluded that *"Based upon the Phase I ESA, there is risk sufficient to warrant additional investigation to address*

the Recognized Environmental Conditions and potential environmental concerns." (ENVITECH, 2010).

2.1.3 Phase II Environmental Site Assessment – ENVITECH, April 2011

The Phase II ESA was conducted at the Site by ENVITECH in April 2011 to assess the subsurface conditions in the areas of concern identified in the Phase I ESA and other previous investigations. This effort was concentrated around the UST system, specifically the UST pad and fuel dispenser islands. Five soil borings (S-1 through S-5) were advanced using a direct-push probe drill rig to depths ranging from 9 to 16 feet bgs. Drilling refusal was met at three out of the five borings at depths of 9 and 10 feet bgs. Soil samples were collected from each boring. Two of the borings, S-2 (south of the UST pad) and S-4 (north of the northeast pump island) detected benzene at 0.21 mg/kg and 0.23 mg/kg, respectively, which is above MTCA Method A cleanup level of 0.03 mg/kg (ENVITECH, 2011. Boring locations are illustrated on Figure 2, *Site Map* and analytical results are presented in the attached Table 1, *Summary of Soil Analytical Results*.

2.1.4 Supplemental Site Characterization – AEG, August 2011 & March 2012

Field work for the 2011 Supplemental Site Characterization investigation included the advancement of four soil borings (B-1 through B-4) at the Site on August 24, 2011 to assess subsurface soil and groundwater for the presence of gasoline-range TPH and VOCs due to the historical releases of gasoline at the Site. The boring locations were based on the following factors:

- The findings and laboratory analytical results from previous investigations by ENVITECH.
- QUEST's monitoring and UST decommissioning activities.
- The location of the decommissioned UST system formerly operated at the Site.

Soil samples were collected from all borings; however, only B-1 contained sufficient groundwater to collect a sample. Soil and groundwater samples were submitted for laboratory analysis for gasoline-range TPH and associated VOCs, specifically benzene, toluene, ethylbenzene, and xylene (BTEX) compounds, and halogenated VOCs associated with dry cleaning solvents (such as PCE). Based on the results, AEG concluded the following:

> *"Petroleum impacted soil and groundwater remain at the Site, most likely as a result of release(s) from the former UST system. It appears that previous remedial action (via excavation) had removed the bulk source of contamination. Based on laboratory analytical results and field observations, it appears that the subsurface impact is localized. In our professional opinion, shallow groundwater within the native soil subsurface is present at the Site. Previous excavation activities to depths ranging from 12 to 14 feet bgs and the*

> *subsequent backfilling to these depths have enabled surface water to migrate through the backfill material which was observed by AEG at boring B-1. The wet well-sorted sand, logged at B-1, at depths of approximately 22 to 23 1/2 feet bgs appears to represent shallow groundwater at the Site"* (AEG, 2011).

Further, AEG recommended:

> *"Groundwater conditions at the Site need to be evaluated to assess whether it is localized and whether the impacted groundwater at boring B-1 is representative of the residual subsurface condition. AEG recommends installation of monitoring wells at the Site to further assess the impacted groundwater subsurface condition as well as assess whether the impact is localized only to the Site".*

Analytical results are presented in the attached Table 1, *Summary of Soil Analytical Results,* and Table 2, *Summary of Groundwater Analytical Results*. Well locations are illustrated on Figure 2, *Site Map*.

2.1.5 Quarterly Groundwater Monitoring Events – AEG, March 2012 to May 2013

From March 2012 to May 2013, AEG conducted four groundwater monitoring events at the Site, which included sampling three monitoring wells (MW-1 through MW-3). Concentrations of benzene, methyl tert-butyl ether (MTBE), and total lead exceeding MTCA Method A groundwater cleanup levels were found in monitoring well MW-1. Groundwater samples from MW-2 and MW-3 did not detect any Site contaminants of concern (COCs) above appropriate cleanup levels. The analytical results are presented in Table 2, *Summary of Groundwater Analytical Results.*

2.1.6 Oxygen Release Compound (ORC) Filter Sock Installation – AEG, May 2012

On May 2, 2012, AEG installed an ORC Filter Sock in MW-1 from a depth of 19 to 34 feet bgs in an effort to treat localized groundwater impacts. The ORC Filter Sock was removed from the well about a year later as it did not seem to have much of an effect on benzene concentrations in that well.

2.1.7 Ecology Opinion Letter – 2013

In June 2013, the Site was enrolled into Ecology's Voluntary Cleanup Program (VCP), and AEG submitted a work plan for review. AEG had proposed to install three additional monitoring wells (MW-4 through MW-6) to further define the extent of contamination associated with the Site, and another three (MW-7 through MW-9) to determine whether the release to soil from the on-Site dry cleaner had impacted groundwater.

Ecology issued a formal opinion letter, dated August 28, 2013, in response to the work plan. Ecology concurred that the proposed work would help further define the nature and extent of contamination at the Site. However, Ecology also offered the following comments:

- *"Previously, in a boring drilled to install MW-1, benzene contamination in soil above the MTCA Method A cleanup level was found to occur just above and into the water column to a depth of 36 feet below the ground surface, the maximum depth explored. Thus, the vertical extent of contamination in soil has not been delineated at this location. Since the deepest soil samples to be collected (35 to 36.5 feet depth interval) will be used to verify the previous results, it may be necessary to go deeper in this area to determine the vertical extent of contamination.*
- *Figure 2 of the workplan as well as figures in previous AEG reports incorrectly labels the 'S' series of borings conducted by Envitech in 2011 as having been conducted by AEG. Future maps of the Site should correctly label the Envitech borings.*
- *There are two undeveloped greenbelts approximately 100 to 200 feet wide that are near the Property that may provide suitable habitat for terrestrial species. These areas need to be described and a determination made as to the size of contiguous undeveloped land within 500 feet of any part of the Site. A terrestrial ecological evaluation may need to be conducted in accordance with WAC 173-340-7490.*
- *Total lead was detected in ground water (MW-1 in May 2013) at a concentration of 19.9 µg/L which exceeds the MTCA Method A cleanup level of 15 µg/L. Ecology recommends ground water samples to be analyzed for metals also be filtered and analyzed for the dissolved fraction."*

2.1.8 Site Investigation – AEG, May 2015

On May 26 through 28, 2015, AEG performed additional Site investigation in response to Ecology's opinion letter to define the nature and extent of contamination at the Site, and to determine whether any other potential sources from on or off the property were impacting the Site. This investigation included the advancement of six borings to a depth of 36.5 feet bgs using a full-size auger drilling rig; the borings were completed as monitoring wells MW-4 through MW-9. Wells MW-7, MW-8, and MW-9 were advanced around the westernmost tenant space where the dry-cleaner release occurred.

As part of this work, AEG requested access from the Snohomish County Public Works Department to advance borings in the 164th Street right-of-way (ROW). Snohomish County gave AEG permission to do so; however, overhead utility lines prevented advancement of borings in the sidewalk. Instead, AEG relocated monitoring wells MW-5 and MW-6 to be on the property and not in the public ROW.

On June 4, 2015, AEG returned to the Site to sample all new and existing wells. Additional quarterly monitoring was performed in September and November 2015.

Analytical results are presented in the attached Table 1, *Summary of Soil Analytical Results*, and Table 2, *Summary of Groundwater Analytical Results*. Well locations are illustrated on Figure 2, *Site Map*.

2.1.9 Site Investigation – AEG, March 2016

On March 24, 2016, following further discussions with Ecology, AEG installed two additional monitoring wells (MW-10 and MW-11) along the eastern property boundary to use as downgradient points of compliance. The wells were installed at 35 feet bgs. Analytical results of soil samples collected from the well borings are presented in the attached Table 1, *Summary of Soil Analytical Results*. The wells were sampled, along with all other wells at the Site, in April and December 2016. Analytical results of the groundwater samples are presented in Table 2, *Summary of Groundwater Analytical Results*. Well locations are illustrated on Figure 2, *Site Map*.

2.1.10 Vapor Assessment – AEG, March 2018

On March 8, 2018, AEG completed a vapor assessment at the Site in accordance with Ecology's *Guidance for Evaluating Soil Vapor Intrusion in Washington State*. AEG collected a sub-slab soil vapor sample from beneath the floor of the building in both the dry cleaner space (SS-1) and inside the convenience store (SS-2). The sampling event included collecting ambient air samples from both inside (Indoor-1 and Indoor-2) and outside (Outdoor) the Site building to determine the potential for vapor intrusion. Sample locations are illustrated on Figure 2, *Site Map*.

The samples were analyzed for volatile organic compounds (VOCs) via Method TO-15. Benzene was present in both indoor and outdoor samples above the MTCA Method B cleanup level for ambient air. The adjusted indoor air concentration (adjusted for background) was below cleanup levels suggesting the impacts were likely associated with background conditions.

Table 3, *Summary of Indoor and Outdoor Air Analytical Results,* presents the analytical results of the samples as compared to MTCA Method B indoor air cleanup levels. Table 4, *Summary of Sub-Slab Vapor Analytical Results*, presents the analytical results of the sub-slab vapor samples as compared to MTCA Method B sub-slab screening levels.

2.1.11 Follow Up Vapor Assessment – AEG, November 2019

On November 11, 2019, AEG returned to complete a follow up sampling of the sub-slab vapor (SS-1R and SS-2R) ambient air (Indoor-1R, Indoor-2R, and Ambeint-1R) from the same locations as the previous event. The samples were analyzed for VOCs and air-phase hydrocarbons (APH)

via Method TO-15. Benzene and naphthalene were both present above the MTCA Method B cleanup level for ambient air in all samples. The adjusted indoor air concentrations (adjusted for background) still exceeded for benzene and naphthalene. However, naphthalene was non-detect in both sub-slab vapor samples, and benzene was detected below MTCA Method B sub-slab screening levels, which suggests indoor air impacts were likely associated with background conditions and not vapor intrusion.

Table 3, *Summary of Indoor and Outdoor Air Analytical Results,* presents the analytical results of the samples as compared to MTCA Method B indoor air cleanup levels. Table 4, *Summary of Sub-Slab Vapor Analytical Results*, presents the analytical results of the sub-slab vapor samples as compared to MTCA Method B sub-slab screening levels.

2.1.12 Groundwater Monitoring Events – AEG, May 2018 and December 2019

On May 8, 2018 and December 2, 2019, AEG conducted additional groundwater monitoring events at the Site, which included sampling all monitoring wells except MW-7 through MW-9. The analytical results are presented in Table 2, *Summary of Groundwater Analytical Results.*

2.2 *Field Methodology*

2.2.1 Soil Sampling Procedures

Soil sampling methods for this work followed the protocols established by Ecology and the U.S. Environmental Protection Agency (EPA). To minimize VOC losses, soil sampling and field preservation methods for VOCs followed methods set forth by EPA's Method 5035A, and Ecology's guidance, "*Collecting and Preparing Soil Samples for VOC Analysis*". Soil samples were collected from the boreholes via continuous soil cores in an acetate sleeve inside the drilling rod's core barrel. Soils were observed to document soil lithology, color, moisture content, and sensory evidence of contamination. Samples were transported via laboratory-provided pre-weighed 40-milliliter (ml) volatile organic analysis (VOA) glass vials and pre-weighted 4-ounce glass jars for analysis under chain-of-custody protocols. Boring logs are provided in Appendix B, *Supporting Documents*.

2.2.2 Well Construction

Groundwater monitoring wells at the Site were constructed pursuant to Ecology's *Minimum Standards for Construction and Maintenance of Wells*, Chapter 173-160 WAC. Groundwater monitoring wells at the Site were constructed at 35 feet bgs, with 15 feet of 2-inch diameter 0.020-inch slotted PVC screen. The annular space around the well screen was filled with 10/20 Colorado sand to approximately 1.5 feet above the top of the well screen. To seal each well, bentonite chips were placed above the sand and a traffic-rated surface monument was placed over the well casing to protect it. The monitoring wells were properly developed after installation using high-flow

pumping until turbidity decreased and stabilized. Well logs are provided in Appendix B, *Supporting Documents*.

2.2.3 Boring Groundwater, and Monitoring Well Groundwater Sampling Procedures

AEG sampled the groundwater from borings where groundwater was present. For one-time borings, a temporary well screen was installed to collect a groundwater sample. The temporary well screen was placed at the interval below the vadose zone where groundwater was encountered during drilling activities. Dedicated polyethylene tubing was inserted into the retractable screen and groundwater purged via the EPA-approved low-flow purge technique. A peristaltic pump was used to purge the well until the discharge was relatively free of sediment.

Groundwater monitoring wells were sampled via the low flow-purging technique, and purged until the field parameters, including pH, temperature, specific conductivity, dissolved oxygen, and/or total dissolved solids were stabilized, and the water was relatively free of sediment.

Groundwater samples were collected in laboratory-provided 40-ml VOA vials, 250-ml polyurethane bottles, and ½-liter amber bottles. Upon collection, the samples were placed in a chilled cooler for transport to the analytical laboratory.

2.2.1 Indoor Air and Sub-Slab Vapor Sampling Procedures

Indoor air and ambient background air samples were collected in accordance with Ecology's *Guidance for Evaluating Soil Vapor Intrusion in Washington State*. Samples were collected using 6-liter (L) Summa canisters with 8-hour inlet flow regulators and placed within the breathing zone at about 4 to 5 feet above the ground surface. After placing the canisters at each sampling location, AEG opened the inlet valves, and returned at the end of the 8-hour event to close the canisters. Ambient background samples were placed upwind of on-Site source areas.

For sub-slab vapor samples, the concrete slab was drilled out to subgrade level to allow for sampling just below the slab (typically about 1 to 2 feet bgs). A tube was placed in the hole and sealed using a bentonite seal to the concrete. A water bath was used to check for leaks in the bentonite seal. Once no leaks were found, a 1-L Summa canister with a 10-minute regulator was opened after the tube was purged for one volume of air.

The indoor air and sub-slab vapor samples were returned to ESN and sent to Friedman & Bruya, Inc. in Seattle, WA for analysis for VOCs and APH via Method TO-15, following the accepted chain of custody procedures.

2.2.2 Quality Controls

To ensure that quality information was obtained at the Site:

- All soil and groundwater samples were collected in general accordance with industry protocols for the collection, documentation, and handling of samples.
- Descriptions of soil sampling depths were carefully logged in the field; the driller and Site geologist confirmed sample depths as soil samples were collected.
- Nitrile gloves were used in handling all sampling containers and sampling devices.
- Soil samples were tightly packed into jars to eliminate sample headspace.
- Water samples were filled carefully in the sampling bottles to prevent volatilization.
- Upon sampling, all samples were placed immediately into chilled ice chests.
- The samples were transported under a chain-of-custody to the analytical laboratory for analysis.

Analytical laboratories used for this investigation provided quality assurance/quality control (QA/QC), which included:

- Surrogate recoveries for each sample.
- Method blank results.
- Laboratory Control Samples, and Laboratory Control Duplicate Samples.
- Duplicate analyses.

2.2.3 Investigation-Derived Waste

Investigation-derived waste for this project consisted of soil cuttings from the subsurface exploration activities, purge water, and decontamination water from decontamination of the drilling core barrel and associated equipment. These wastes were placed in United States Department of Transportation (DOT)-approved 55-gallon drums. The drums were appropriately labelled and stored on Site for subsequent characterization and disposal.

2.3 *Analytical Results*

Soil and groundwater samples collected to date have been analyzed for one or more of the following analyses:

- Gasoline-range TPH by Method NWTPH-Gx.
- Diesel- and oil-range TPH by Method NWTPH-Dx-Extended.

- BTEX, hexane, methyl tert-butyl ether (MTBE), ethylene dibromide (EDB), 1,2-dichloroethane (EDC), and naphthalenes by EPA Method 8260.
- Total and dissolved lead by EPA Method 6020.
- Chlorinated VOCs by EPA Method 8260.

Indoor air and sub-slab vapor samples have been analyzed for the following analyses:

- VOCs and APH via Method TO-15.

All analytical results were compared to MTCA Method A cleanup levels (soil and groundwater) and Method B cleanup levels (air). Copies of the laboratory analytical results are provided in Appendix B, *Supporting Documents, Laboratory Datasheets.*

2.3.1 Soil Results

Analytical results of the soil samples collected to date have indicated one or more detections of gasoline-range TPH, benzene, ethylbenzene, xylenes, and MTBE above their respective MTCA Method A cleanup levels. Analytical results of all soil samples collected from the Site to date are summarized in Table 1, *Summary of Soil Analytical Results.* The distribution of soil concentrations in excess of MTCA Method A cleanup levels in is illustrated in plan view on Figure 3, *Soil Plume Map*, and in cross section on Figure 5, *Geologic Cross Section A-A'*, Figure 6, *Geologic Cross Section B-B'* and, Figure 7, *Geologic Cross Section C-C'*.

2.3.2 Groundwater Results

Analytical results of the groundwater samples collected to date have indicated one or more detections of gasoline- range TPH, benzene, MTBE, and total lead above their respective MTCA Method A cleanup levels. Analytical results of all groundwater samples collected from the Site to date are summarized in Table 2, *Summary of Groundwater Analytical Results*. The distribution of groundwater concentrations in excess of MTCA Method A cleanup levels in is illustrated on Figure 8, *Groundwater Plume Map*.

2.3.3 Indoor Air and Sub-Slab Vapor Results

In March 2018, benzene was present in both indoor and outdoor samples above the MTCA Method B cleanup level for ambient air. The adjusted indoor air concentration (adjusted for background) was below cleanup levels suggesting the impacts were likely associated with background conditions.

In November 2019, benzene and naphthalene were both present above the MTCA Method B cleanup level for ambient air in all samples. The adjusted indoor air concentrations (adjusted for background) still exceeded for benzene and naphthalene. However, naphthalene was non-detect in both sub-slab vapor samples, and benzene was detected below MTCA Method B sub-slab screening levels, which suggests indoor air impacts were likely associated with background conditions and not vapor intrusion.

Table 3, *Summary of Indoor and Outdoor Air Analytical Results,* presents the analytical results of the samples as compared to MTCA Method B indoor air cleanup levels. Table 4, *Summary of Sub-Slab Vapor Analytical Results*, presents the analytical results of the sub-slab vapor samples as compared to MTCA Method B sub-slab screening levels.

3.0 CONCEPTUAL SITE MODEL (CSM)

This section provides a conceptual understanding of the Site, derived from the results of the subsurface investigations performed at the Site. The CSM is dynamic and may be refined as additional information becomes available.

3.1 *Constituents of Concern and Affected Media*

The primary conceptual release model for the Site is a release from the former UST system detected during a tank renovation in 1982. Primary source control was achieved at that time by the removal of 777 tons of soil and 2,800 gallons of water/separate phase hydrocarbons from the UST excavation, and 159 tons of soil from the dispenser area. Remaining residual areas of contamination are localized.

COCs at the Site for soil and groundwater consist of gasoline-range TPH, BTEX compounds, and MTBE. Lead is considered a contaminant of potential concern. Total lead has exceeded MTCA cleanup levels in a couple groundwater samples collected to date. However, concentrations of total lead in groundwater samples containing gasoline-range TPH and BTEX compounds have generally been either below the PQL or would meet the definition of natural background. Further, samples with corresponding dissolved lead data were non-detect. This evidence would suggest that the couple of anomalous detections were likely due to suspended solids in the sample, and not indicative of a release.

Areas of residual contamination generally occur beyond the limits of the former excavation, either at depth presumably beyond the reach of the excavator, and just beyond the lateral limits to the south and east where further excavation was likely hindered by utilities. The distribution of soil concentrations in excess of MTCA Method A cleanup levels in is illustrated in plan view on Figure 3, *Soil Plume Map*, and in cross section on Figure 5, *Geologic Cross Section A-A',* Figure 6, *Geologic Cross Section B-B'* and, Figure 7, *Geologic Cross Section C-C'*. The distribution of groundwater concentrations in excess of MTCA Method A cleanup levels in is illustrated on Figure 8, *Groundwater Plume Map*.

AEG believes the Site has been sufficiently characterized to be able to establish cleanup standards and select a cleanup action for the Site. Remedial alternatives presented in the accompanying FS contemplate contamination in both accessible and inaccessible areas of the Site.

3.2 *Site Geology and Hydrogeology*

The Site is located within the central Puget Lowlands of Western Washington State. The Puget Lowland is a north-south trough that lies from the Canadian border south to near Chehalis,

Washington, and between the Olympic Mountains to the west and the Cascade Mountains to the east. Landforms common to this region include Pacific inlets, islands, and intermountain and coastal lowlands. The topography is dominated by north-south trending valleys and low, nearly flat-topped terraces that are less than 1,000 feet in elevation. Terraces are deeply eroded by streams and rivers and are susceptible to landslides. The topographic surface of the Site and vicinity area is largely the result of deposition and erosion since the recent glacial events (Easterbrook, 1970).

According to the "*Preliminary Surficial Geologic Map of the Edmonds East and Edmonds West Quadrangles, Snohomish and King Counties, Washington*", the Site and vicinity are underlain by Recent Age glacial deposits (last 15,000 years before present), which are comprised of "…*poorly sorted, non-stratified lodgment till (Qvt) deposited as ground moraine…including mixtures of sand, silt, clay, pebbles, cobbles, and boulders….color blue to grey and extremely compact*" (Smith, 1975).

Subsurface soils encountered during AEG's investigation at the Site have consisted of dense, silty sand with fine- to medium-grained gravel to the maximum depth explored of about 36.5 feet.

Depth to groundwater at the Site has ranged from about 10 to 30 feet bgs, depending on the well location, and is likely influenced by the former excavation and fill material. Fluctuation within individual wells is typically about 1 to 3 feet.

Groundwater flow direction has been influenced by the former excavation and fill material near the current canopy island and USTs; however, the dominant flow direction is to the east. This is consistent with the local topography, which slopes steeply to the east beyond the property boundary. Groundwater gradients are illustrated on Figure 9, *Groundwater Elevation Contour Map 04/07/2016,* Figure 10, *Groundwater Elevation Contour Map 12/13/2016,* Figure 11, *Groundwater Elevation Contour Map 05/08/2018,* and Figure 12, *Groundwater Elevation Contour Map 12/02/2019*.

3.3 *Environmental Fate of TPH in the Subsurface*

Gasoline-range TPH and associated BTEX compounds are soluble and migrate in groundwater. These compounds have a specific gravity that is less than water and can be measured in monitoring wells as Light Non-Aqueous Phase Liquid (LNAPL). To date, no LNAPL has been measured in Site monitoring wells.

LNAPL can also exist as a residual non-mobile phase that is either sorbed to the soil or trapped in the pore spaces between the soil particles. Unless treated, residual LNAPL can act as a long-term source for groundwater contamination.

Gasoline-range TPH and BTEX compounds are readily biodegraded in the subsurface by naturally occurring aerobic and anaerobic bacteria. Aerobic biodegradation is the most efficient of the biological activities. At this Site, dilution and ongoing aerobic biodegradation are most likely reducing contaminant concentrations.

3.4 *Potential Exposure Pathways*

As defined in WAC 173-340-200, an exposure pathway describes the mechanism by which a hazardous substance takes or could take a pathway from a source or contaminated medium to an exposed receptor.

3.4.1 Potential Soil Exposure Pathways

Potentially complete soil exposure pathways at the Site include:

- Contact (dermal contact, incidental ingestion) with hazardous substances in soil by visitors, residents, and workers (including excavation workers). Direct ingestion of, or dermal contact with, soil containing Site COCs is considered a potential exposure pathway. Shallow soil impacts (less than 15 feet bgs, the standard point of compliance for direct contact exposure) are present in the vicinity of MW-1, MW-3, MW-6, and MW-11. These areas are currently covered by asphalt, concrete, and/or Site structures and, unless disturbed, are not available for potential direct contact or ingestion.
- Groundwater Leaching Pathway. The groundwater leaching pathway is considered complete at this Site.

3.4.2 Potential Groundwater Exposure Pathways

Potentially complete groundwater exposure pathways at the Site include:

- Contact (dermal, incidental ingestion) with hazardous substances dissolved in groundwater by visitors, residents, and workers (including excavation workers). Although groundwater in the area of the Site is not used for drinking water (drinking water is provided by the City of Lynnwood), groundwater is considered an exposure pathway for direct contact and ingestion because of the potential for using groundwater, and the shallow depth of its occurrence. Depth to groundwater at the Site has ranged from about 10 to 30 feet bgs, depending on the well location.
- Consumption of hazardous substances in groundwater. Currently, drinking water is provided by the city water supply. For the purpose of this CSM, consumption of hazardous substances in groundwater is not considered a completed pathway.

3.4.3 Potential Air Exposure Pathways

Potentially complete air exposure pathways include:

- Inhalation of hazardous substances in soil vapor by visitors, residents, and workers (including excavation workers). Benzene had been detected in indoor air, which was found to be consistent with background concentrations. However, since volatile components of gasoline-range TPH are present in soil and groundwater at the Site, air quality is a potential concern at the Site. Migration of vapors through the unsaturated soil to the surface, both indoors and outdoors, is considered a potential exposure pathway at the Site. As such, the soil-to-vapor pathway for potential vapor intrusion is considered potentially complete.

3.4.4 Terrestrial Ecological Evaluation

Exclusion from further evaluation is appropriate for this Site for the following reasons:

- Barriers to Exposure: WAC 173-340-7491(1)(b): All contaminated soil, is or will be, covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.
- Undeveloped Land: WAC 173-340-7491(1)(c): There is less than 1.5 acres of contiguous undeveloped land on or within 500 feet of any area of the Site.

A copy of the Terrestrial Ecological Evaluation form is included in Appendix B.

4.0 CLEANUP STANDARDS

The following sections identify applicable or relevant and appropriate requirements (ARARs), remedial action objectives (RAOs), and preliminary cleanup standards for the Site, which were developed to address Ecology's requirements for cleanup. These requirements address conditions relative to potential identified impacts. Together, ARARs, RAOs, and cleanup standards provide the framework for evaluating remedial alternatives.

4.1 *Potentially Applicable Laws*

All cleanup actions conducted under MTCA shall comply with applicable state and federal laws [WAC 173-340-710(1)]. MTCA defines applicable state and federal laws to include legally applicable requirements and those requirements that are relevant and appropriate. Collectively, these requirements are referred to as ARARs. The primary ARAR is the MTCA regulation (WAC 173-340), especially with regard to the development of cleanup levels and procedures for development and implementation of a cleanup under MTCA. ARARs for the Site cleanup also include the following:

- Federal Safe Drinking Water Act Maximum Contaminant Levels (MCLs; 40 CFR Part 141).
- Washington Clean Air Act (Chapter 70.94 RCW).
- Northwest Clean Air Agency (NWCAA), Regulation I.
- Washington Solid and Hazardous Waste Management (RCW 70.105); Chapter 173-303 WAC; 40 CFR 241, 257; Chapter 173-350 and 173-351 WAC) and Land Disposal Restrictions (40 CFR 268; WAC 173-303-340).
- Washington Industrial Safety and Health Act (RCW 49.17) and other Federal Occupational Safety and Health Act (29 CFR 1910, 1926).

Federal MCLs are minimum requirements for drinking water. MTCA Method A cleanup levels for groundwater are set at least as low as federal MCLs. State and federal groundwater and air quality criteria are considered in the development of cleanup levels. State dangerous waste regulations may be applicable to contaminated soil removed from the Site.

4.2 *Remedial Action Objectives*

RAOs have been established for the Site to establish remedial alternatives protective of human health and the environment under the MTCA cleanup process (WAC 173-340-350). The primary RAO for this cleanup action focuses on substantially eliminating, reducing, and controlling unacceptable risks to human health and the environment posed by the COCs, to the greatest extent practicable.

RAOs are important for the evaluation of the general response actions, technologies, process options, and cleanup action alternatives. Based on the assessment of Site-specific conditions and the potentially applicable cleanup levels presented below, the RAOs for the Site have been established as follows:

- *In a reasonable restoration time frame, reduce concentrations of COCs in Site soils, groundwater, and air to levels protective of human health and the environment and which are protective of groundwater quality.*

4.3 *Cleanup Standards*

Cleanup standards include cleanup levels and points of compliance (POCs) as described in WAC 173-340-700 through WAC 173-340-760. Cleanup standards must also incorporate other state and federal regulatory requirements applicable.

4.3.1 Proposed Cleanup Levels

MTCA Method A cleanup levels for the soil and groundwater exposure pathways are appropriate for this Site. MTCA Method B cleanup levels are appropriate for the air exposure pathway, and for constituents where MTCA Method A cleanup levels are not promulgated. These cleanup levels are based on the most stringent values for each exposure pathway and are considered appropriate for the Site COCs. Proposed MTCA cleanup levels for the Site COCs that have been measured in soil, groundwater, and air at the Site include:

Constituent	Soil	Groundwater	Air
• Gasoline-range TPH:	30 mg/kg	800 µg/L	N/A
• Benzene	0.03 mg/kg	5 µg/L	0.321 µg/m^3
• Toluene	7 mg/kg	1,000 µg/L	2,290 µg/m^3
• Ethylbenzene	6 mg/kg	700 µg/L	457 µg/m^3
• Total Xylenes	9 mg/kg	1,000 µg/L	45.7 µg/m^3
• MTBE	0.1 mg/kg	20 µg/L	9.62 µg/m^3
• Lead	250 mg/kg	15 µg/L	N/A
• APH (EC5-8 aliphatics)	N/A	N/A	2,700 µg/m^3
• APH (EC9-12 aliphatics)	N/A	N/A	140 µg/m^3
• APH (EC9-10 aromatics)	N/A	N/A	180 µg/m^3

mg/kg = milligrams per kilogram
µg/L = micrograms per liter
µg/m^3 = micrograms per cubic meter
N/A = Not Applicable; no cleanup level has been established for his constituent

4.3.2 Points of Compliance

For this Site, it is assumed that standard points of compliance will be used.

- Soil – Direct Contact: For soil cleanup levels based on human exposure via direct contact, the point of compliance is throughout the Site from the ground surface to 15 feet bgs.
- Soil – Leaching: For soil cleanup levels based on protection of groundwater, the point of compliance is throughout the Site.
- Groundwater: For groundwater, the point of compliance is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the Site.
- Indoor Air/Soil Gas: The point of compliance is ambient and indoor air throughout the Site.

5.0 IDENTIFICATION AND SCREENING OF REMEDIATION TECHNOLOGIES

This section identifies general response actions and screens remediation technologies for use in assembling remediation alternatives.

5.1 *General Response Actions*

General response actions are broad categories of remedial actions that can be combined to meet the RAOs for a site. The following are typical general response actions that are applicable to most impacted sites:

- No action
- Institutional controls
- Monitored natural attenuation
- Containment
- Removal
- Ex-situ treatment
- In-situ treatment

Potentially applicable technologies associated with these general response actions have been identified and screened based on the Site COCs and affected media and take into consideration the current and future use of the property. An overview of those technologies is provided in the following section.

5.2 *Identification and Screening of Applicable Technologies*

Applicable technologies associated with general response actions have been identified and screened for potential inclusion in the remediation alternatives for the Site. Each identified technology was screened based on applicability to Site conditions, overall effectiveness, implementability, and relative cost. Potentially applicable technologies considered for the Site are presented in Table 6, *Identification and Screening of Response Actions and Remediation Technologies*, which provides a summary of the screening results. Thirteen remedial technologies were retained for further consideration. Details of each technology are summarized below. The technologies determined to be most appropriate for the Site were then incorporated into three potentially applicable remediation alternatives.

5.2.1 Institutional Controls

Institutional controls considered for this RI/FS include legal restrictions on land and on groundwater use to limit potential exposure to contamination, often through an environmental covenant filed at the time of Site closure. Environmental covenants are often appropriate as a component of a remedial alternative for Sites where residual contamination is constrained within

the property at the completion of active remediation, and where a POC can be determined and monitored over time. Such controls prohibit or limit activities on a property that may interfere with the integrity of engineered controls or result in exposure to hazardous substances. Except under certain specified circumstances, such controls must be executed through an environmental covenant on the affected property. Environmental covenants are typically not appropriate for sites where residual contamination above cleanup standards extends off property at the time of closure unless agreed upon by adjacent property owners. Institutional controls alone do not fully mitigate the potential vapor migration pathway, and additional technologies would be required to address that exposure pathway, as necessary, as part of the overall cleanup.

5.2.2 Monitored Natural Attenuation

The term "natural attenuation" as used in this RI/FS refers to a variety of physical, chemical, or biological processes that, under favorable conditions, act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of hazardous substances in the environment (Ecology, 2005). These in-situ processes include: natural biodegradation, dispersion, dilution by recharge, sorption, volatilization, chemical or biological stabilization, transformation or destruction of hazardous substances (WAC 173-340-200).

When applied as part of a cleanup action, natural attenuation is often referred to by EPA as "monitored natural attenuation" to distinguish the action from "no action". "Monitored natural attenuation", as the term is used in EPA OSWER Directive 9200.4-17P (1999a), means the reliance on natural attenuation processes (within the context of a carefully controlled and monitored site cleanup approach) to achieve site-specific remedial objectives within a timeframe that is reasonable compared to that offered by more active cleanup methods.

The natural attenuation processes can be classified as either physical (dispersion, dilution by recharge, and volatilization), chemical (sorption and chemical degradation), or biological (biodegradation).

Natural attenuation processes that result in the reduction of concentration or mobility of a contaminant, but not the total mass, are referred to as "non-destructive" mechanisms. Those processes include the physical dispersion and dilution processes and the chemical sorption process (ASTM, 1998). Natural attenuation processes that result in the reduction of the total contaminant mass in the system are referred to as "destructive" mechanisms. Those processes include the chemical and biological degradation processes. For petroleum hydrocarbons in the subsurface, biological degradation is often the most important destructive mechanism because hydrocarbons can be destroyed (ASTM, 1998).

Although some natural attenuation typically occurs at most contaminated sites, the effectiveness of these processes varies depending on the types and concentrations of contaminants present at the site and the physical, chemical, and biological characteristics of the site. Natural attenuation should be evaluated as one potential remedial approach along with other cleanup action alternatives involving more active remedial technologies. Natural attenuation processes alone do not fully mitigate the potential vapor migration pathway, and additional technologies would be required to address that exposure pathway as part of the overall cleanup.

Although some natural attenuation typically occurs at most contaminated sites, the effectiveness of these processes varies depending on the types and concentrations of contaminants present at the site and the physical, chemical, and biological characteristics of the site. Natural attenuation should be evaluated as one potential remedial approach along with other cleanup action alternatives involving more active remedial technologies.

5.2.3 Containment (Capping)

This retained containment technology option for this Site would include retaining capped portions of the Site with an impervious surface, such as use of the existing asphalt, concrete, and building cover throughout the Site. Capping would prevent exposure to contamination in soil or groundwater if contamination remains above cleanup levels at the end of active remediation. Capping would be memorialized with institutional controls at the Site. Containment technologies do not fully mitigate the potential vapor migration pathway, and additional technologies would be required to address that exposure pathway, as necessary, as part of the overall cleanup.

5.2.4 Removal (Soil Excavation)

Excavation of contaminated soil at the Site may be an effective method of reducing remaining PCS on the property. Excavated PCS would be transported for disposal at an appropriate disposal facility, requiring access to the Site by transport trucks during the excavation. At this Site, excavation of PCS would be limited in certain areas due to the presence of utilities and other infrastructure around areas of contamination.

5.2.5 Removal (Groundwater Extraction)

Groundwater extraction would consist of submersible and/or aboveground pumping equipment used to remove and treat impacted groundwater from extraction wells. This technology would require installation of additional extraction wells within the contaminant plume. If implemented as a component of a remedial alternative, groundwater extraction would be combined with other technologies to treat the water. Treated water could either be discharged to the sanitary sewer or re-injected at the Site as part of an in-situ treatment component. Disposal of untreated groundwater to an off-Site facility may be cost-prohibitive.

5.2.6 Ex-Situ Treatment, Groundwater (Activated Carbon Adsorption)

Granulated activated carbon (GAC) treatment is a physical and chemical process that removes a wide variety of contaminants by adsorbing them from liquid streams onto an activated carbon filter. This treatment technology is most commonly used to separate organic contaminants from contaminated water. The contaminant adsorbs to the surface of GAC until the available surface area of the GAC is exhausted, after which the GAC can be either reactivated, regenerated, or discarded. If GAC is discarded, it may be considered a hazardous waste. Groundwater extracted from the subsurface of the Site could be treated through GAC after oil/water separation, to reduce contaminant concentrations to below remedial objectives, and be reinjected or discharged.

5.2.7 Ex-Situ Treatment, Groundwater (Air Stripping)

Air stripping is a full-scale technology in which volatile organics are partitioned from groundwater by greatly increasing the surface area of the contaminated water exposed to air. Types of aeration methods include packed towers, diffused aeration, tray aeration, and spray aeration.

Air stripping involves the mass transfer of volatile contaminants from water to air. For groundwater remediation, this process is typically conducted in a packed tower or an aeration tank. The typical packed tower air stripper includes a spray nozzle at the top of the tower to distribute contaminated water over the packing in the column, a fan to force air countercurrent to the water flow, and a sump at the bottom of the tower to collect decontaminated water. Auxiliary equipment that can be added to the basic air stripper includes an air heater to improve removal efficiencies; automated control systems with sump level switches and safety features, such as differential pressure monitors, high sump level switches, and explosion-proof components; and air emission control and treatment systems, such as activated carbon units, catalytic oxidizers, or thermal oxidizers. Packed tower air strippers are installed either as permanent installations on concrete pads or on a skid or a trailer.

Aeration tanks strip volatile compounds by bubbling air into a tank through which contaminated water flows. A forced air blower and a distribution manifold are designed to ensure air-water contact without the need for any packing materials. The baffles and multiple units ensure adequate residence time for stripping to occur. The discharge air from aeration tanks can be treated using the same technology as for packed tower air discharge treatment.

Modifying packing configurations greatly increase removal efficiency. The low-profile air stripper packs a number of trays in a very small chamber to maximize air-water contact while minimizing space. This unit offers significant vertical and horizontal space savings. Air strippers can be operated continuously or in a batch mode where the air stripper is intermittently fed from a collection tank. The batch mode ensures consistent air stripper performance and greater energy

efficiency than continuously operated units because mixing in the storage tanks eliminates any inconsistencies in feed water composition.

5.2.8 In-Situ Treatment (Air/Ozone Sparging)

Sparging consists of injecting air or generated ozone into groundwater below the water table. Volatile contaminants are transferred from the dissolved phase to the vapor phase for recovery. Air sparging has the additional benefit of increasing the dissolved oxygen content of groundwater and facilitating aerobic biological degradation of petroleum hydrocarbons and the co-metabolic biodegradation of co-located chlorinated VOCs.

Implementation of sparging technology at the Site would require installation of injection wells and delivering air or generated ozone to the wells using a blower or compressor. Sparging wells can be either vertical wells or horizontal wells. Vapor recovery may also need to be implemented to capture volatilized compounds generated from the air sparging process. Air sparging systems are typically installed in conjunction with a soil vapor extraction (SVE) system. SVE wells can also be installed as either vertical or horizontal wells. The selection of vertical or horizontal wells and the spacing and construction of such wells would require system design and operation based upon the current ozone sparging system.

As with aeration and air stripping treatment technologies, fouling by iron and manganese can be problematic; therefore, testing for dissolved iron and manganese at the Site would be recommended prior to implementing this technology. A remedial pilot testing event was conducted at the Site to evaluate the effective radius of influence of injected air and determine the appropriate spacing for air sparging injection wells.

5.2.9 In-Situ Treatment (Soil Vapor Extraction)

SVE technology may be implemented alone or coupled with other technologies such as groundwater extraction or air sparging. This technology would require installation of SVE wells screened within the vadose zone where impacts are present in soil. SVE technology may also utilize appropriately constructed monitoring wells for either vapor and vacuum monitoring or for active extraction. Using vacuum blower equipment, a vacuum is applied to the SVE wells to extract volatile contaminants from the subsurface. Volatile compounds are present in soil gas either through volatilization or as the result of extraction.

Extracted vapors require treatment prior to atmospheric discharge. Vapor effluent treatment technologies include GAC, thermal oxidation (therm-ox), or catalytic oxidation (cat-ox). GAC is typically applicable to lower air effluent discharges while therm-ox and cat-ox are more applicable to higher mass loadings. If vapor concentrations are expected to be significantly elevated during

the initial phase of remediation, a therm-ox or cat-ox is often more suitable and more cost-effective than using GAC adsorption equipment for vapor treatment. However, GAC could be more practical for vapor treatment once concentrations are significantly reduced. A remedial pilot test was conducted for this technology to evaluate the effective radius of influence for extraction and determine the appropriate well spacing.

5.2.10 In-Siu Soil Treatment (High-Vacuum Dual-Phase Extraction)

High-Vacuum Dual-Phase Extraction (HVDPE), also known as multi-phase extraction, vacuum-enhanced extraction, DPVE, or sometimes "bioslurping," is a technology that uses a high-vacuum system to remove various combinations of contaminated groundwater, separate-phase petroleum product, and hydrocarbon vapor from the subsurface. Extracted liquids and vapor are treated and collected for disposal, or re-injected to the subsurface (where permissible under applicable state laws).

In HVDPE systems for liquid/vapor treatment, a high-vacuum system is utilized to remove liquid and gas from low permeability or heterogeneous formations. The vacuum extraction well includes a screened section in the zone of contaminated soils and groundwater. It removes contaminants from above and below the water table. The system lowers the water table around the well, exposing more of the formation. Contaminants in the newly exposed vadose zone are then accessible to vapor extraction. Once above ground, the extracted vapors or liquid-phase organics and groundwater are separated and treated. HVDPE for liquid/vapor treatment is generally combined with bioremediation, air sparging, or bioventing when the target contaminants include long-chained hydrocarbons. Use of dual-phase extraction with these technologies can shorten the cleanup time at a site. It also can be used with pump-and-treat technologies to recover groundwater in higher-yielding aquifers.

5.2.11 In-Situ Treatment (Enhanced Bioremediation)

Enhanced bioremediation is a process in which indigenous or inoculated micro-organisms (e.g., fungi, bacteria, and other microbes) degrade (metabolize) organic contaminants found in soil and/or groundwater, converting them to innocuous end products. Nutrients, oxygen, or other amendments may be used to enhance bioremediation and contaminant desorption from subsurface materials. For this Site, in-situ treatment may consist of using the "Trap and Treat" process in which granulated carbon is injected in a grid-like pattern in areas of concern, which traps the contaminants and provides plume control. The plume is then treated with a matrix, which incorporates both aerobic and anaerobic biological processes, providing longer term remedial degradation.

5.2.12 In-Situ Treatment (Chemical Oxidation)

Application of chemical oxidation technology mineralizes contaminants within subsurface soil and groundwater through chemical reactions. A mixture of oxidant and buffering compounds are typically injected into impacted soil and groundwater and, upon contact with contaminants, the oxidizer(s) break down the dissolved contaminants into carbon dioxide, water, and salts.

Delivery of oxidants to the subsurface can be conducted using direct-push probes or injection wells installed across the Site. Typical chemical oxidants used for chemical oxidation of petroleum hydrocarbons include Fenton's reagent and ozone, both of which have been proven to effectively destroy petroleum hydrocarbons and chlorinated solvents. Fenton's reagent consists of hydrogen peroxide combined with an iron catalyst. The injection mixture also typically includes the addition of acid, as Fenton's reagent is more effective at acidic pH. Regardless of the oxidant that is used, the destruction efficiency of contaminants can be greatly affected by the organic content of the soil and other subsurface characteristics that can be readily oxidized. Therefore, testing should be conducted at the Site to analyze the overall soil and water oxygen demand and determine the appropriate oxidant dose to be applied.

When ozone is used for chemical oxidation, it is applied through sparging technology, discussed above. For ozone sparging, ozone is generated on site from air and then injected as a gas into the subsurface.

5.2.13 In-Situ Treatment (Thermal Desorption)

Electrical Resistance Heating (ERH) is an in-situ, thermal technology that uses commonly available electricity and applies it into the ground through electrodes. These electrodes can be installed either vertically to any depth or horizontally underneath buildings, operating facilities, and in the presence of buried utilities. The technology is equally effective in both soil and groundwater.

Electric current is passed through a targeted soil volume between subsurface electrode elements. The resistance to electrical flow that exists in the soil causes the formation of heat; resulting in an increase in temperature until the boiling point of water at depth is reached. After reaching this temperature, further energy input causes a phase change, forming steam and removing volatile contaminants. ERH is typically more cost effective when used for treating contaminant source areas. ERH is typically most effective on VOCs. Less volatile contaminants like xylene or diesel can also be remediated with ERH, but energy requirements increase as the volatility decreases.

6.0 DESCRIPTION AND SELECTION OF REMEDIAL ALTERNATIVES

Based on the requirements of WAC 173-340-360, *Selection of Cleanup Actions*, three potential remedial alternatives were developed from the general response actions and technologies screened in Table 6, *Identification and Screening of Response Actions and Remediation Technologies*, and described above.

All three alternatives directly address soil and groundwater contamination at the Site and are also intended to indirectly address ambient air quality at the Site. By reducing remaining contamination in the soil and groundwater to below cleanup levels, the source of contamination for ambient air is removed, and ambient air is expected to meet appropriate cleanup standards.

Based on preliminary screening of the general response actions identified in Section 5.2, *Identification and Screening of Remediation Technologies*, individual general response actions are not expected to individually meet MTCA threshold requirements, and therefore are not considered as stand-alone remedial alternatives.

6.1 *MTCA Threshold Requirements*

Potential remedial alternatives must meet the threshold requirements described in WAC 173-340-360(2)(a), which specifies that cleanup actions shall:

- Protect human health and the environment;
- Comply with cleanup standards;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring.

MTCA [WAC 173-340-360(2)(b)] also indicates other requirements that must be met by any cleanup alternative:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns.

Local Requirements

All required local permits to implement the chosen Remedial Action will be obtained according to Snohomish County requirements. These could include, but are not limited to, construction, air quality, ROW, and building permits.

6.2 *Description of Remedial Alternatives*

Based upon the screening evaluation, MTCA threshold and other requirements, AEG proposes three remedial alternatives for the Site. The alternatives were developed and are evaluated with the goal of achieving remedial objectives within a reasonable timeframe, with the most permanent cleanup and minimal disruption to the Site.

6.2.1 Alternative 1 – Natural Attenuation, Containment, and Institutional Controls

Alternative 1 includes:

- Eight additional groundwater monitoring events at 8 of the 11 existing Site monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, MW-10, and MW-11), once every 18 months over 10 years, intended to monitor natural attenuation. Each monitoring event would confirm that groundwater concentrations of COCs decrease in concentration over time, and that no additional plume migration occurs.
- Institutional controls by legal restrictions on land and on groundwater use to limit potential exposure to contamination through an environmental covenant restricting removal of the asphalt cover and overburden soils (acting as a cap) in areas that exceed safe concentrations.

Alternative 1 would result in the longest timeframe to restore the Site, limitations to Site use in the future, and would be initially the least expensive option. An environmental covenant is a deed restriction filed for the Property and ROW, which would limit access to contaminated areas of the Site without prior approval of Ecology. Restricting use of the Property may affect future Property values.

Estimated time to closure: 10 to 15 years.

6.2.2 Alternative 2 – High-Vacuum Dual-Phase Extraction, and Monitoring

Alternative 2 includes the installation and operation of an in-situ HVDPE system at the Site. Specific tasks would include:

- Development of necessary work plans and permitting.
- Performance of a short-term pilot test to provide data for well spacing and extraction wells.
- Completion of the design of the remediation option and obtain applicable air discharge permit, treated groundwater discharge permit, and apply for a notice of intent to construct permits with local/state agencies.

- Drilling, soil disposal, and installation of HVDPE wells and replacement of MW-6.
- Trenching for process conveyance piping and electrical power supply to equipment compound location.
- Purchase of equipment for air injection and vacuum process, including monitoring controller.
- Operation of the HVDPE system for approximately 24 to 36 months.
- Operation of vapor treatment, condensate water, and extracted groundwater treatment under specific discharge permits.
- Performance of monthly operations and maintenance (O&M) to provide long-term performance. For the area surrounding the Site, noise abatement must be provided for 24-hour operation. The enclosures for the equipment will require cooling to remove/reduce the effects of heat on the equipment performance. This alternative would require traffic impacts, mainly during installation and decommissioning of the system, but traffic control may be required for adjustments.
- Continued regular compliance monitoring of COCs in Site monitoring wells to demonstrate reduction of COC concentrations and confirm the HVDPE system was successful in achieving MTCA cleanup standards for groundwater.
- Confirmation sampling of previously documented areas of PCS to confirm the HVDPE system was successful in achieving MTCA cleanup standards for soil.

Performance monitoring would be used to predict the duration of the operation and effectiveness. The operation of the extraction system would require vapor treatment prior to discharge to the atmosphere and must be operated under a NWCAA permit. Provisions in the NWCAA permit would require that VOC discharges not exceed the allowable thresholds for toxic air pollutants as dictated in the NWCAA Regulations. Compliance air sampling would be required, and overall removal efficiency would need to be reported to NWCAA as mandated by the permit.

Pilot tests are recommended to determine the recoverability of the TPH, the radius of influence of extraction wells, and the resulting concentrations of hydrocarbons in the aqueous and vapor streams. In addition, respiration tests can be performed to determine the rate of biodegradation of petroleum hydrocarbons in the vadose zone.

In general, HVDPE applies a high vacuum on the subsurface soil and groundwater to remove a combination of vapor-phase and liquid-phase TPH. The liquid phases consist of free-phase TPH or LNAPL, if present, and groundwater.

The pressure gradient created in the air phase results in a driving force on the LNAPL that can be significantly greater than the driving force that can be induced by pumping the LNAPL with no air flow. Also, of importance is the fact that the vacuum extraction mechanism pulls LNAPL along more permeable horizontal zones.

HVDPE recovery systems are designed to minimize environmental discharges of the extracted oil/water mixture and soil gas. Vacuum-enhanced recovery systems can be operated to control extraction of soil gas by optimizing the placement of well screen and adjusting the system vacuum. In some instances, the volatile discharge from the vacuum-enhanced recovery system can be kept below action levels without treatment. The lifting action of a vacuum-enhanced recovery system greatly reduces the volume of groundwater that must be extracted compared to conventional LNAPL recovery systems, thus significantly reducing groundwater treatment costs.

At some sites, water and vapor treatment are necessary, which is dictated by regulatory requirements and loadings of COCs in the vapor and aqueous streams. Water treatment can include a number of unit operations such as air stripping, liquid-phase GAC, hydrophobic clay media, and chemical flocculation combined with dissolved air flotation. Vapor treatment can include gas-phase GAC, thermal oxidation, or catalytic oxidation.

Different pump arrangements can be used but the most popular technology is what is referred to as a Liquid Ring Pump (LRP). The LRP uses a cylindrical chamber filled with liquid with an offset impeller to create strong vacuums. HVDPE removes three phases of TPH (free phase, dissolved phase, and vapor phase) with the liquid phases entrained in vapors. The entrainment of fluids in vapor alleviates some physical problems associated with fluid flow, including friction and head that would preclude pulling fluids past a theoretical maximum of approximately 30 feet in depth. HVDPE has been reported to be effective to depths of up to 100 feet without a booster pump.

Vapor sampling during the pilot testing would verify if concentrations of VOCs would require the initial vapor treatment as a cat-ox and replaced after a period of time with vapor-phase GAC adsorbers once concentrations decrease to appropriate levels for GAC.

The primary advantages of HVDPE over alternate remedial technologies are relative simplicity and lower cost. The equipment is readily available and easy to install with minimal disturbance to Site operations. The components can be installed during Site investigations by completing borings as sparge wells, DPE wells, or monitoring points. Additional subsurface components can be installed cost-effectively via direct-push methods, where the soil geology and required installation

depth will permit their use. For TPH, HVDPE can remediate through both in-situ stripping and promoting biodegradation.

Disadvantages to HVDPE over alternate remedial technologies are primarily related to Site physical or chemical characteristics that either preclude contaminant removal or alter contaminant mobility to threaten potential receptors. Geological conditions, such as stratification, heterogeneity, and anisotropy, will prevent uniform air flow. O&M costs may increase based on the type of vacuum and treatment system selected. As such, careful consideration and design of HVDPE systems must be conducted where such risks may occur.

Estimated time to closure: 3 to 5 years.

6.2.3 Alternative 3 – PCS Excavation, In-Situ Treatment via BOS 200® & Hydrocarbon-Degrading Microbes, and Monitoring

Alternative 3 includes excavation of about 270 cubic yards (cy) of PCS, injection of BOS 200® in impacted areas not accessible to excavation, and performance monitoring. Specific tasks include:

- Excavation and disposal of about 270 cy of PCS from within the area between MW-1 and MW-6 to about 18 feet bgs. Apply an amendment (BOS 200®) into the excavation prior to backfill to enhance bioremediation of any residual PCS and impacted groundwater.
- Injection of BOS 200® in selected areas exceeding MTCA Method A cleanup levels to depths ranging from 3 to 20 feet bgs to target the highest concentrations of PCS on Site. According to the manufacturer, *"BOS 200® is a Trap & Treat® in situ remediation technology specifically designed to degrade petroleum hydrocarbons, related solvents, and oils. BOS 200® is a complete system effecting accelerated biodegradation of various organic compounds on an activated carbon platform that includes micro and macro nutrients, time release terminal electron acceptors, and a blend of facultative organisms designed to flourish within the aerobic to anaerobic conditions present in the pore structure of the carbon. It has been demonstrated to be effective with LNAPL, fuel oxygenates, alcohols, glycols, and cyclic ethers. No toxic byproducts such as sulfide are produced. The product is insensitive to groundwater geochemistry and is effective under aerobic and anaerobic conditions and over a broad range of pH. High salinity and TDS of 30,000 ppm are also not detrimental to performance."* BOS 200® will be injected under pressure in a top-down approach in 2-foot intervals using a direct-push injection rod. The intervals will be staggered vertically to assure targeting of all zones. From the existing data, the injections would target areas around and beneath the former excavation area. The injection points are performed on a grid, and the number of injection points per area would assume a 5-foot radius of influence (ROI) of treatment.

- Replacement of monitoring wells MW-1 and MW-6.
- Continued regular compliance monitoring of COCs in Site monitoring wells to demonstrate reduction of COC concentrations and confirm the injections were successful in achieving MTCA cleanup standards for groundwater.
- Confirmation sampling of previously documented areas of PCS to confirm the injections were successful in achieving MTCA cleanup standards for soil.

As part of compliance monitoring, the wells would be gauged for the presence of LNAPL. If LNAPL is present, passive skimmers would be installed. Groundwater at the Site would be monitored for at least four quarters after the end of treatments to verify the decrease of contaminant concentrations at the Site, and the attainment of remedial action objectives. If MTCA Method A cleanup levels are not reached within the second quarter of groundwater monitoring, a second modified injection event would be evaluated.

The advantage of this method is less Site disturbance to implement full scale. The injection area grid patterns can be pre-determined to allow for Site development and no infrastructure is left after the injections. There is no electrical equipment (i.e. pumps, blowers, etc.) to be installed or maintained during the treatment process.

From web research, the adverse reactions include carbon particles in the nearby monitoring wells, which clears up after time and "rebound" of the contaminants seen in compliance monitoring. To reduce the risk of rebound, a thorough site characterization to target contaminant area and depth in the subsurface is required. Proper injection point placement and the correct volume of product is crucial to provide coverage based on the soil types and groundwater patterns. The levels of contamination verses the quantity of injected products must be reviewed before using this option. The site characterization should include groundwater parameters that will be used as indicators of biological activities (dissolved oxygen, nitrates, sulfates, microbial counts, pH, ORP) used as a baseline and for comparison.

Estimated time to closure: 2 to 3 years.

6.3 *Evaluation of Remedial Alternatives*

This section presents an evaluation and comparison of the four proposed remedial alternatives. In accordance with MTCA, the alternatives are evaluated relative to the criteria specified in WAC 173-340-360(3)(f) and WAC 173-340-360(4), which include the following:

1. Protectiveness;
2. Permanence;

3. Effectiveness over the long term;
4. Management of short-term risks;
5. Technical and administrative implementability;
6. Consideration of public concerns;
7. Restoration time frame; and
8. Cost.

Each of these criteria is evaluated below, except for cost, which is evaluated separately. A summary of the evaluation is provided in Table 7, *Remedial Alternatives Evaluation / Disproportionate Cost Analysis*. The overall evaluation is then used to determine the relative benefit of each alternative.

Each criterion was first assigned a score ranging from 5 (best) to 1 (worst), based upon AEG's experience, best professional judgement, and the application of scientific principles. Each score is based on the perceived benefit associated with the criterion and is included in Table 7, *Remedial Alternatives Evaluation / Disproportionate Cost Analysis*. Alternatives deemed equally beneficial are given the same score. Several criteria are comprised of subcriteria. In such cases, each sub criterion is scored and the average of those scores is used as the criterion score.

6.3.1 Protectiveness

Protectiveness is defined in WAC 173-340-360(3)(f)(i) as:

> "*Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, time required to reduce risk at the facility and attain cleanup standards, on-site and off-site risks resulting from implementing and alternative, and improvement of the overall environmental quality.*"

Each of the three remedial alternatives reduce risk at the Site, and each is protective of human health and the environment. Alternative 1 requires the longest restoration timeframe to reduce risks and attain cleanup standards at the Site and received the lowest score. Alternatives 2 and 3 ranked similarly for protectiveness.

6.3.2 Permanence

Permanence is defined in WAC 173-340-360(3)(f)(ii) as:

> "*The degree to which the alternative permanently reduces the toxicity, mobility or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous*

> *substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and improvement of the overall environmental quality.*"

At the completion of remedial activities, each of the alternatives would result in a solution that is permanent. Permanence includes the subcriteria of reduction in toxicity, degree of irreversibility, and the type and character of the waste streams generated during treatment. While each of the technologies, if successfully implemented would be permanent, the degree of certainty in the success of the technology varies due to the nature of the technologies. Alternative 3 received the highest score due to its irreversibility and lack of generated waste. Alternative 2 was the next lowest score and Alternative 3 was the lowest ranked option for permanence.

6.3.3 Effectiveness over the Long Term

Effectiveness over the long term is defined in WAC 173-340-360(3)(f)(iv):

> "*Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on-site at concentrations that exceed cleanup levels, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components may be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: Reuse or recycling; destruction or detoxification; immobilization or solidification; on-site or off-site disposal in an engineered, lined and monitored facility; on-site isolation or containment with attendant engineering controls; and institutional controls and monitoring.*"

Long-term effectiveness includes the subcriteria of certainty, reliability, residual risk, and utilization of preferred remedies. Each of the alternatives have the intent of meeting cleanup standards and protecting human health and the environment after completion of the remedial action. However, there are varying levels of uncertainty and reliability associated with each technology throughout the process. Alternative 1's long-term trends are not yet fully understood, as reliable trends in soil and groundwater contamination concentrations and their ability to attenuate/degrade over a longer period of time is unknown. Alternative 1 received the lowest score. Alternative 2 received the highest score as likely to destroy the contaminants in-situ, and less likely to leave any residuals behind.

6.3.4 Management of Short-Term Risks

Management of short-term risks is defined in WAC 173-340-360(3)(f)(v):

> "*The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks.*"

All of the alternatives have manageable short-term risks and effective measures for mitigating those risks. Alternative 1 received a higher score than Alternatives 2 and 3 as it is the least intrusive of the alternatives. Alternatives 2 and 3 received the similar scores as both are intrusive operations.

6.3.5 Technical and Administrative Implementability

Technical and administrative implementability is defined in WAC 173-340-360(3)(f)(vi):

> "*Ability to be implemented including consideration of whether the alternative is technically possible, availability of necessary off-site facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions.*"

This criterion includes the concepts of technical possibility, access, necessary resources, monitoring requirements and integration into existing facility features. The primary determining subcriterion is technical possibility. Alternative 1 is technically possible but includes long-term monitoring requirements. Alternatives 2 and 3 received a similar score based on their similar advantages and disadvantages.

6.3.6 Consideration of Public Concerns

Consideration of public concerns is defined in WAC 173-340-360(3)(f)(vii):

> "*Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site.*"

Alternatives with significant construction components, or alternatives that leave contamination in place at the end of active remedial activities are assumed to have the most concern to the public. Alternative 1 received the lowest score. Alternatives 2 and 3 ranked similarly.

6.3.7 Restoration Time Frame

Restoration Time Frame (RTF) is evaluated using the following factors described in WAC 173-340-360(4)(b)(i through ix):

1. *Potential risks posed by the site to human health and the environment.*
2. *Practicability of achieving a shorter restoration timeframe.*
3. *Current use of the site.*
4. *Potential future use of the site.*
5. *Availability of alternative water supplies.*
6. *Likely effectiveness and reliability of institutional controls.*
7. *Ability to monitor and control migration of hazardous substances from the site.*
8. *Toxicity of hazardous substances at the site.*
9. *Natural processes that reduce concentrations of hazardous substances at the site.*

Estimates of restoration time frame are necessarily subjective. Each of the alternatives is assumed to provide a reasonable restoration time frame. Actual estimates of effectiveness are premature without performance monitoring data regarding actual effectiveness. Reasonable restoration time frame was ranked based upon the general aggressiveness of each of the technologies and perceived certainty associated with the technology. Alternative 1 received the lowest score given a lack of active remediation resulting in a longer restoration time frame. Alternative 2 was the next lowest score and Alternative 3 was the highest ranked option.

6.4 *Benefit Value Determination*

Average criterion scores determined in Section 6.3 are multiplied by weighting. Weighting factors adapted from those established by Ecology are used to determine the total weighted scores:

Criteria	Weighting Factor
Protectiveness	30%
Permanence	25%
Long Term Effectiveness	20%
Short-Term Risk Management	5%
Implementability	5%
Public Concerns	10%
Restoration Time Frame	5%
Total	**100%**

Each criterion is multiplied by the weighting factor and the products summed to determine each Alternative's Benefit Value. The scoring of these values is summarized in Table 7, *Remedial Alternatives Evaluation / Disproportionate Cost Analysis*.

The results show that Alternative 3 is the preferred alternative for the non-cost criteria, as it results in the highest overall benefit value. Alternative Benefit Values are compared to Estimated Alternative Costs, discussed below.

6.4.1 Estimated Alternative Costs

Cost is defined in WAC 173-340-360(f)(iii) as:

> "*The cost to implement the alternative, including the cost of construction, the net present value of any long-term costs, and agency oversight costs that are cost recoverable. Long-term costs include operation and maintenance costs, monitoring costs, equipment replacement costs, and the cost of maintaining institutional controls. Cost estimates for treatment technologies shall describe pretreatment, analytical, labor, and waste management costs. The design life of the cleanup action shall be estimated and the cost of replacement or repair of major elements shall be included in the cost estimate.*"

Estimated Alternative costs have been estimated for each of the remedial alternatives based on the descriptions and associated assumptions presented above. The expected accuracy range of the cost estimates is -30% to +50%. Costs are based on typical costs for Washington State, and the current knowledge of the Site. All costs are assumed to be for newly purchased equipment. Cost estimates are not based upon refurbished or used equipment. Estimated capital costs are based on current dollar values. Estimated recurring costs and periodic costs associated with system operation and maintenance, performance and compliance monitoring, and Site closure activities are adjusted to reflect the net present value. The following table summarizes estimated costs for each alternative. These costs are for comparison purposes only and actual implementation costs will vary from those provided. Estimated costs incorporate a variety of necessary assumptions and the validity of those assumptions cannot be fully known at this time.

Remedial Alternatives Cost Summary

Alternative Number	Remedial Alternative	Estimated Alternative Costs
1	Natural Attenuation, Containment, and Institutional Controls	$ 91,140
2	High Vacuum Dual-Phase Extraction, and Monitoring	$513,743
3	PCS Removal, In-Situ Treatment via BOS 200® & Hydrocarbon-Degrading Microbes, and Monitoring	$366,890

6.5 *Disproportionate Cost Analysis*

The disproportionate cost analysis is made by comparing Alternative Benefit Values from Section 6.3, to each remedial alternative's estimated cost from Section 6.4. Based upon WAC 173-340-360(3)(e), a cleanup action shall not be considered practicable *"if the incremental cost of the alternative over that of a lower cost alternative exceeds the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative."*

This comparison is provided below:

Disproportionate Cost Analysis			
Alternative Number	**Cost**	**Benefit Value**	**Cost per Benefit Value**
1	$ 91,140	2.01	$ 45,343
2	$513,743	3.64	$141,203
3	$366,890	3.80	$96,550

The results of the disproportionate cost analysis show that the cost per benefit value of Alternative 1 is least. The results also show that Alternatives 3 and 2 are each incrementally more costly per Benefit Value than Alternative 1. Based solely upon analysis of disproportionate cost, Alternative 1 is the preferred alternative. However, other practicable alternatives provide a significantly shorter time frame than Alternative 1 [WAC 173-340-360 (4)(b)(i)]. Alternatives 2 and 3 have similar, shorter projected timeframes for meeting cleanup levels and points of compliance. Of those alternatives, Alternative 1 has the least cost per benefit value and total benefit. Therefore, the results of the disproportionate cost analysis for practicable alternatives with similar reasonable restoration timeframes show that Alternative 3 is the preferred alternative. The analysis of disproportionate cost is included in the attachments graphically as *Chart 1, Disproportionate Cost Analysis*.

6.6 *Selection of Preferred Alternative*

Selection of the preferred alternative for the Site takes into account the following considerations:

- RAOs for the;
- Restoration Timeframe;
- Regulatory requirements;
- Disproportionate Cost Analysis; and
- The Site's continued retail operation.

Based solely on the Disproportionate Cost Analysis, Alternative 1 would be the preferred alternative, as Alternatives 3 and 2 are incrementally more costly per benefit value. While all three alternatives are assumed to meet RAOs, Alternative 1 has a restoration timeframe of between 10 and 15 years, and other practicable alternatives have significantly shorter restoration timeframes of between 2 and 5 years.

Meeting regulatory requirements is also not as certain for Alternative 1 as the other two, more active remedial alternatives. However, Alternatives 2 and 3 are likely to still leave some contamination in place either at depth and/or within the ROW thereby still requiring the need for institutional controls to achieve MTCA cleanup standards. The Cost per Benefit Value for Alternative 1 is about half of Alternative 3, and about a third of Alternative 2. Also, while Alternative 1 has a longer restoration timeframe, Alternatives 3 and 2 are incrementally more costly, with the Site likely still needing institutional controls.

The Site is currently completely capped with asphalt, concrete, buildings, and infrastructure and, unless disturbed, are not available for potential direct contact or ingestion. As such, the additional benefit gained by Alternatives 2 and 3 is disproportionate to the additional cost, particularly given the challenges associated with navigating Site utilities and infrastructure to implement each of those alternatives, likely still requiring the need for institutional controls to achieve MTCA cleanup standards.

Based on the above, it is AEG's professional opinion that Alternative 1 is the preferred alternative.

7.0 LIMITATIONS

This report summarizes the findings of the services authorized under our agreement with Mr. Nicholas Bahn. It has been prepared using generally accepted professional practices, related to the nature of the work accomplished. This report was prepared for the exclusive use of Mr. Bahn and his designated representatives for the specific application to the project purpose.

Recommendations, opinions, site history, and proposed actions contained in this report apply to conditions and information available at the time this report was completed. Since conditions and regulations beyond our control can change at any time after completion of this report, or our proposed work, we are not responsible for any impacts of any changes in conditions, standards, practices, and/or regulations subsequent to our performance of services. We cannot warrant or validate the accuracy of information supplied by others, in whole or part.

8.0 REFERENCES

American Society for Testing and Materials (ASTM) Standard E 1903-11. *Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process.*

American Society for Testing and Materials (ASTM) E 1943-98 (2015), *Standard Guide for Remediation of Ground Water by Natural Attenuation at Petroleum Release Sites*

Associated Environmental Group, LLC (AEG). 2011. *Supplemental Site Characterization*, dated September 14, 2011.

Associated Environmental Group, LLC (AEG). 2012. *Supplemental Remedial Investigation – 2nd Phase*, dated April 5, 2012.

Associated Environmental Group, LLC (AEG). 2013. *November 2012 Groundwater Event Report*, dated February 8, 2013.

Associated Environmental Group, LLC (AEG). 2013. *March 2013 Quarterly Groundwater Sampling Results*, dated May 6, 2013.

Associated Environmental Group, LLC (AEG). 2015. *September 2015 Quarterly Groundwater Sampling Results Report*, dated October 2, 2015.

Associated Environmental Group, LLC (AEG). 2016. *November 2015 Quarterly Groundwater Sampling Results Report*, dated January 25, 2016.

Associated Environmental Group, LLC (AEG). 2016. *Remedial Investigation*, dated December 29, 2016.

Associated Environmental Group, LLC (AEG). 2019. *Remedial Investigation Addendum & Opinion Letter Response*, dated April 5, 2019.

Envitech, LLC 2011. *Phase I Environmental Site Assessment Report*, dated November 8, 2010.

Envitech, LLC 2011. *Phase II Environmental Site Assessment Report*, dated April 26, 2011.

Quality Environmental Services Team, Inc (QUEST). 1998. *Results of Underground Storage Tank Removal and Site Remediation Program at "Manor market", 36096 164th Street SW, Lynnwood, WA.*

US EPA. 1991. *Engineering Bulletin, Granular Activated Carbon Treatment*, EPA/540/2-91/024, October 1991.

US EPA OSWER Directive 9200.4-17P. 1999. *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites.*

US EPA OSWER Publication 9200.2-154. June 2015. *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air.*

Washington State Department of Ecology. 2004. *Collecting and Preparing Soil Samples for VOC Analysis*, Implementation Memorandum #5.

Washington State Department of Ecology. 2005. *Guidance on Remediation of Petroleum-Contaminated Ground Water by Natural Attenuation*.

Washington State Department of Ecology. 2008. *Periodic Review, Crystal Cleaners, Facility Site ID#: 32839377*. Dated November 2008.

Washington State Department of Ecology. 2009. *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action*, Publication number 09-09-047. DRAFT.

Washington State Department of Ecology. 2013. *Model Toxic Control Act Statute and Regulation – Chapter 173-340 WAC*, Publication number 94-06 (Revised 2013).

Washington State Department of Ecology. 2013. *Opinion on Proposed Remedial Action for Manor Market Deli*, dated August 28, 2013.

Washington State Department of Ecology. 2017. *Opinion on Proposed Remedial Action for Manor Market Deli*, dated July 3, 2017.

Washington State Department of Ecology. 2017. *Opinion on Proposed Remedial Action for Manor Market Deli*, dated December 29, 2017.

Washington State Department of Ecology. 2019. *Opinion on Proposed Remedial Action for Manor Market Deli*, dated September 12, 2019.

Washington State Department of Natural Resources. 2013. *The Geology of Washington State*, http://file.dnr.wa.gov/publications/ger_geol_map_washington_pagesize.pdf.

FIGURES

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FILENAME	DRAWN BY		CHECKED BY		APPROVED BY		PROJECT NUMBER
11-124_16Q2.DWG	ICD	5/9/2016	DB	5/9/2016	DB	5/9/2016	11-124

N
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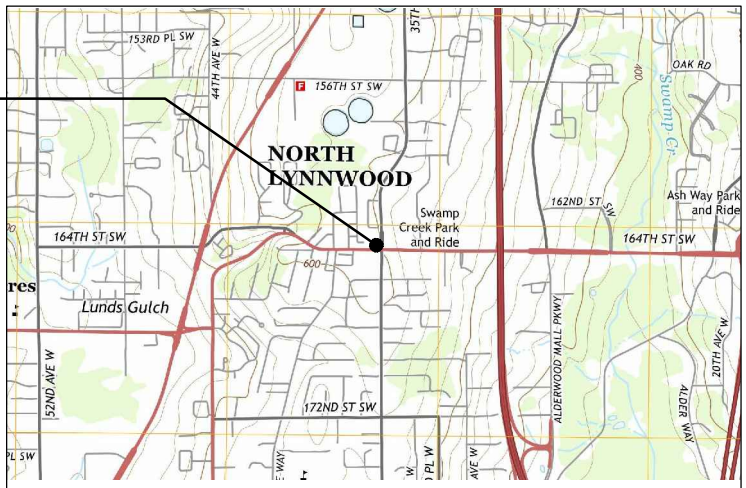
PROJECT LOCATION



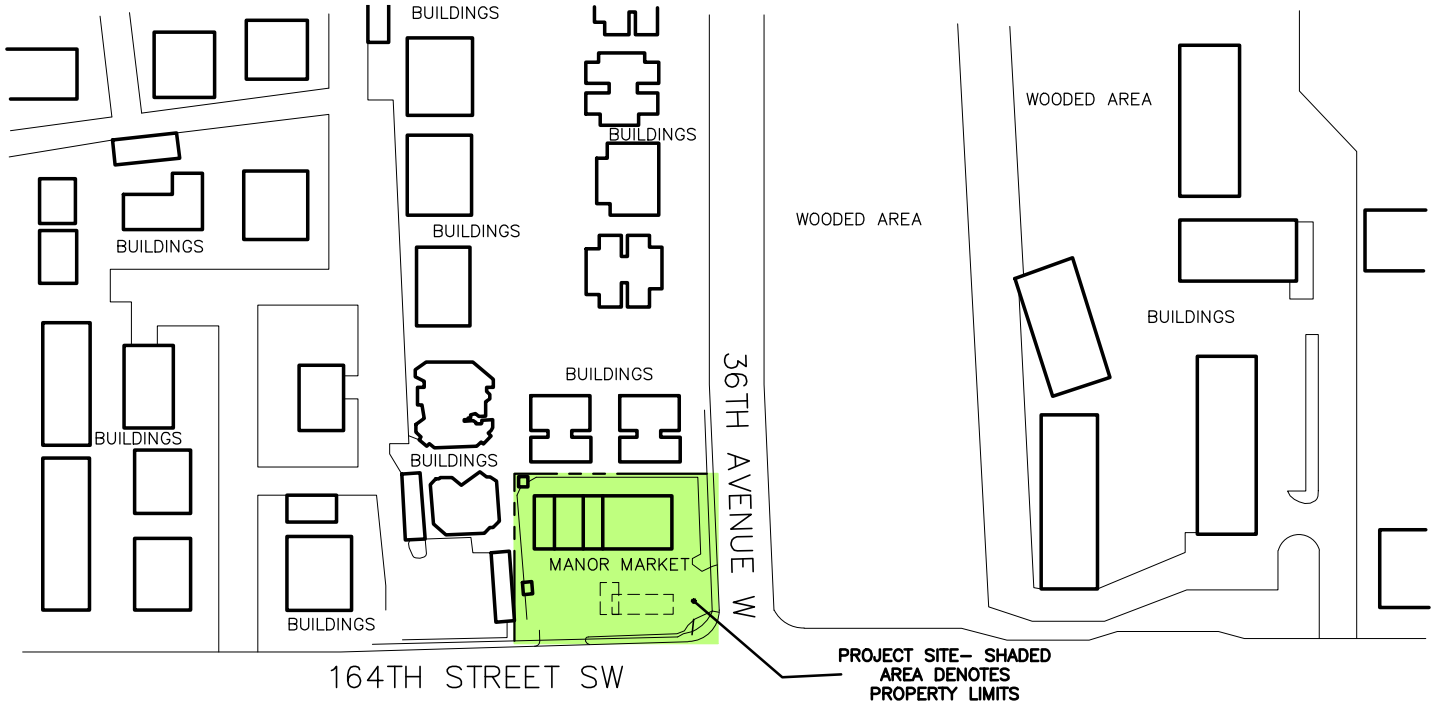
VICINITY MAP

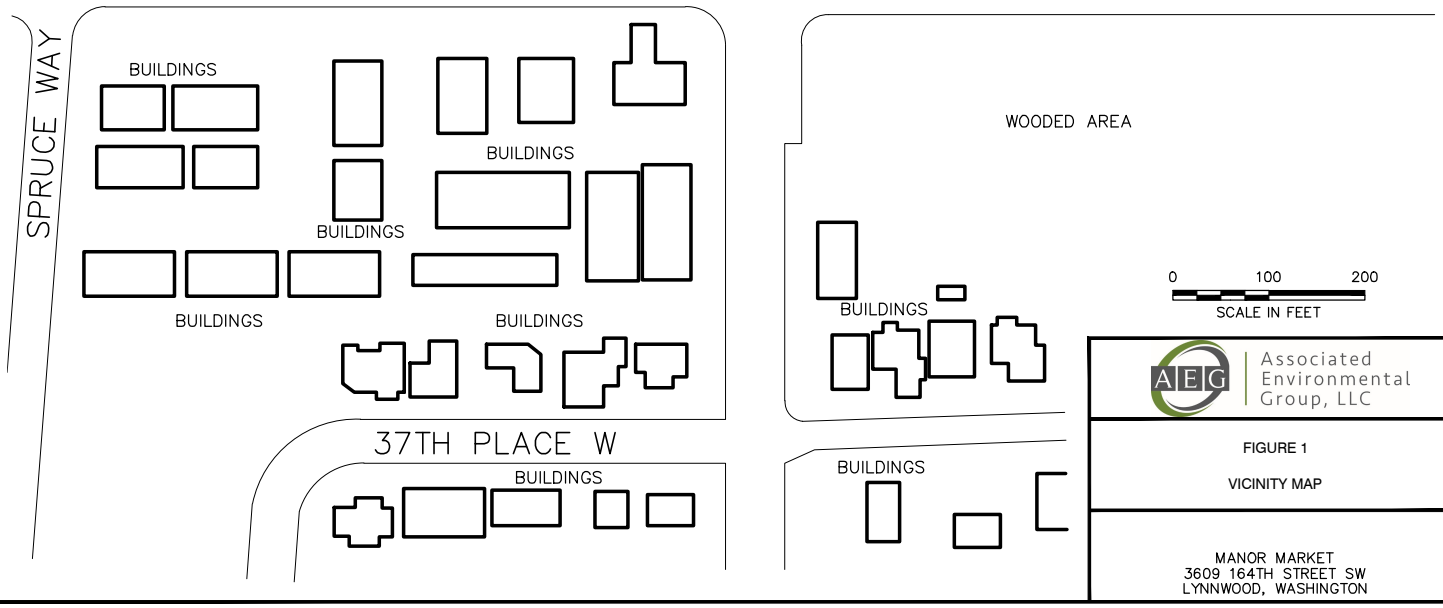
NOTES

1. THE LOCATIONS OF ALL FEATURES SHOWN ARE APPROXIMATE
2. THIS DRAWING IS FOR INFORMATION PURPOSES. IT IS INTENDED TO ASSIST IN SHOWING FEATURES DISCUSSED IN AN ATTACHED DOCUMENT.

REFERENCE

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





AEG Associated Environmental Group, LLC

FIGURE 1

VICINITY MAP

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

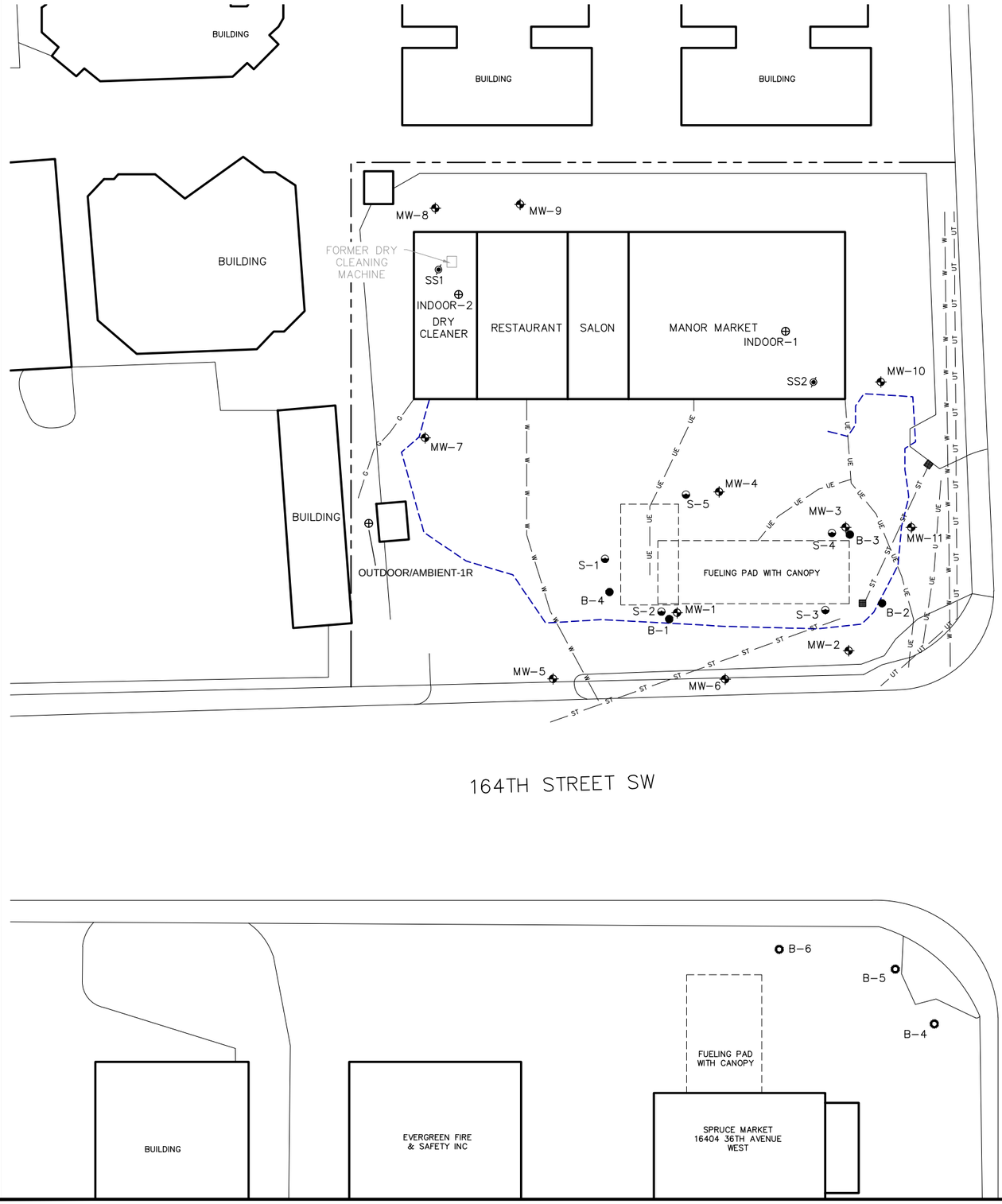
PROJECT NUMBER 11-124

APPROVED BY AB 4/03/2019

CHECKED BY DB 4/03/2019

DRAWN BY ICD 4/03/2019

FILENAME 11-124_1802.DWG



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LEGEND

- APPROXIMATE PROPERTY LINE
- MW-1 — GROUNDWATER MONITORING WELL LOCATION
- B-1 — SOIL BORING LOCATION
- B-4 — BORING LOCATION
- S-1 — SOIL SAMPLE LOCATION
- SS1 — SUB SLAB LOCATIONS
- INDOOR-1 — INDOOR AIR LOCATIONS
- CATCH BASIN
- UE — BURIED ELECTRICAL LINE
- UT — BURIED TELEPHONE LINE
- W — WATER LINE
- ST — STORMWATER DRAIN LINE
- G — BURIED NATURAL GAS LINE
- EXTENT OF EXCAVATION

NOTES

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REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

0 20 40

SCALE IN FEET

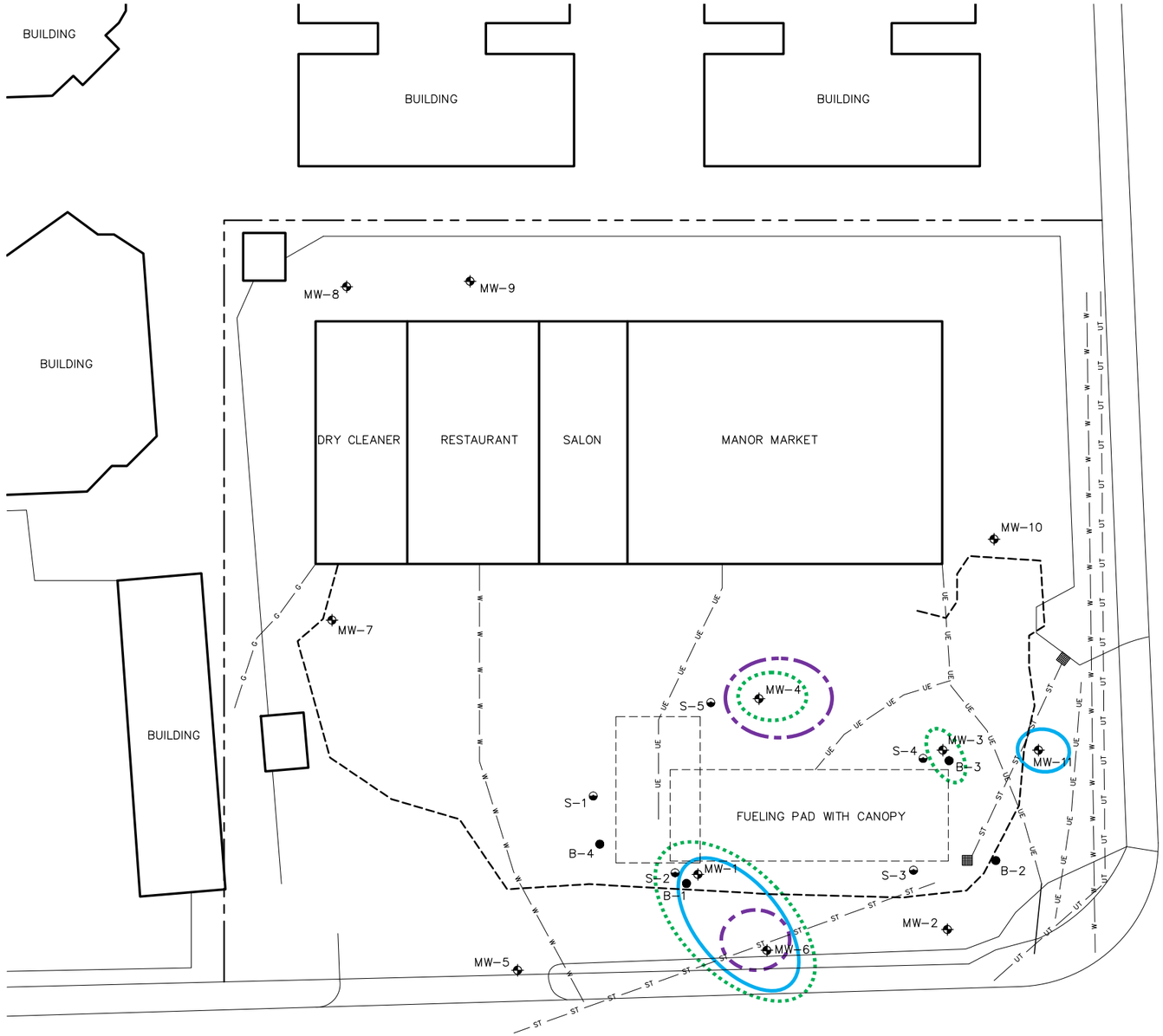
Associated Environmental Group, LLC

FIGURE 2

SITE MAP

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

PROJECT NUMBER	11-124
APPROVED BY	DB 5/09/2016
CHECKED BY	DB 5/09/2016
DRAWN BY	ICD 5/09/2016
FILENAME	11-124_1602.DWG



N
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LEGEND

- APPROXIMATE PROPERTY LINE
- MW-1 GROUNDWATER MONITORING WELL LOCATION
- B-1 SOIL BORING LOCATION
- S-1 SOIL SAMPLE LOCATION
- CATCH BASIN
- UE BURED ELECTRICAL LINE
- UT BURED TELEPHONE LINE
- W WATER LINE
- ST STORMWATER DRAIN LINE
- G BURED NATURAL GAS LINE
- EXTENT OF EXCAVATION

NOTES

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REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

- APPROXIMATE EXTENT OF GASOLINE-RANGE TPH IN SOIL
- APPROXIMATE EXTENT OF BENZENE IN SOIL
- APPROXIMATE EXTENT OF MTBE IN SOIL

0 15 30
SCALE IN FEET

Associated Environmental Group, LLC

FIGURE 3

SOIL PLUME MAP

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

PROJECT NUMBER 11-124
APPROVED BY AB 4/27/2020
CHECKED BY DB 4/27/2020
DRAWN BY ICD 4/27/2020
FILENAME 11-124_XSECTIONS.DWG

BUILDING
BUILDING
BUILDING
BUILDING
BUILDING
WOODED AREA
36TH AVENUE W
FORMER DRY CLEANING MACHINE
SS1
INDOOR-2
DRY CLEANER
RESTAURANT
SALON
MANOR MARKET
INDOOR-1
SS2
MW-8
MW-9
MW-10
MW-7
MW-4
MW-3
MW-11
MW-1
MW-2
MW-5
MW-6
B-1
B-2
B-3
B-4
S-1
S-2
S-3
S-4
S-5
A
A'
B
B'
C
C'
FUELING PAD WITH CANOPY
164TH STREET SW
B-6
B-5
B-4
FUELING PAD WITH CANOPY
BUILDING
EVERGREEN FIRE & SAFETY INC
SPRUCE MARKET
16404 36TH AVENUE WEST

MW-4			
05/28/15			
DP	6.5'	16.5'	31.5'
TPH-g	<10	**11**	<10
B	<0.02	<0.02	**8.39**
MTBE	<0.05	**0.85**	**0.71**

MW-11					
03/24/16					
DP	5.0'	10.5'	20.5'	25.5'	35.5'
TPH-g	**1,160**	<10	<10	<10	<10
B	**0.27**	<0.02	<0.02	<0.02	<0.02
MTBE	<0.05	<0.05	<0.05	<0.05	<0.05

S-2	
04/15/11	
DP	14.0'
TPH-g	<10
B	**0.21**
MTBE	NA

B-1		
08/24/11		
DP	5.5'-6.0'	25.5'-26.0'
TPH-g	**190**	**12**
B	**1.3**	**0.11**
MTBE	NA	NA

B-3		
08/24/11		
DP	5.5'-6.0'	11.5'-12.0'
TPH-g	**22**	<10
B	**0.24**	<0,02
MTBE	NA	NA

MW-3			
02/09/12			
DP	7.0'	13.0'-14.5'	23.0'-24.5'
TPH-g	<10	<10	<10
B	**0.048**	<0,02	**0.036**
MTBE	NA	NA	NA

MW-1				
02/08/12				
DP	12.0'-13.5'	23.0'-24.5'	30.0'-31.5'	35.0'-36.5'
TPH-g	<10	**86**	<10	<10
B	**0.021**	**0.22**	**0.032**	**0.88**
MTBE	NA	NA	NA	NA

MW-6			
05/26/15			
DP	6.5'	21.5'	36.5'
TPH-g	**3,230**	<10	<10
B	**1.87**	<0.02	<0.02
MTBE	**<0.20**	<0.05	**0.078**

S-4	
04/15/11	
DP	10.0'
TPH-g	<10
B	**0.23**
MTBE	NA

N
W E
S

LEGEND

- APPROXIMATE PROPERTY LINE
- MW-1 GROUNDWATER MONITORING WELL LOCATION
- B-1 SOIL BORING LOCATION
- B-4 BORING LOCATION
- S-1 SOIL SAMPLE LOCATION
- SS1 SUB SLAB LOCATIONS
- INDOOR-1 INDOOR AIR LOCATIONS
- CATCH BASIN
- UE UE BURIED ELECTRICAL LINE
- UT UT BURIED TELEPHONE LINE
- W W WATER LINE
- ST ST STORMWATER DRAIN LINE
- G G BURIED NATURAL GAS LINE
- EXTENT OF EXCAVATION
- APPROXIMATE EXTENT OF GASOLINE-RANGE TPH IN SOIL
- APPROXIMATE EXTENT OF BENZENE IN SOIL
- APPROXIMATE EXTENT OF MTBE IN SOIL
- TPH-g TOTAL PETROLEUM HYDROCARBONS GASOLINE (mg/kg)
- B BENZENE (mg/kg)
- MTBE METHYL TERTIARY-BUTYL ETHER (mg/kg)
- mg/kg MILLIGRAMS PER KILOGRAM
- DP DEPTH IN FEET
- < NOT DETECTED ABOVE LIMIT NOTED

BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CLEANUP LEVELS

RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS

A A' LINE OF LITHOLOGIC CROSS SECTION AND PROJECTION LINE OR BORING/WELL

NOTES

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REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

0 20 40
SCALE IN FEET

AEG Associated Environmental Group, LLC

FIGURE 4

SOIL PLUME MAP WITH GEOLOGIC CROSS SECTIONS A-A', B-B', AND C-C'

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

FILENAME	DRAWN BY	CHECKED BY	APPROVED BY	PROJECT NUMBER
11-124_XSECTIONS.DWG	ICD 4/27/2020	CS 4/27/2020	CS 4/27/2020	11-124

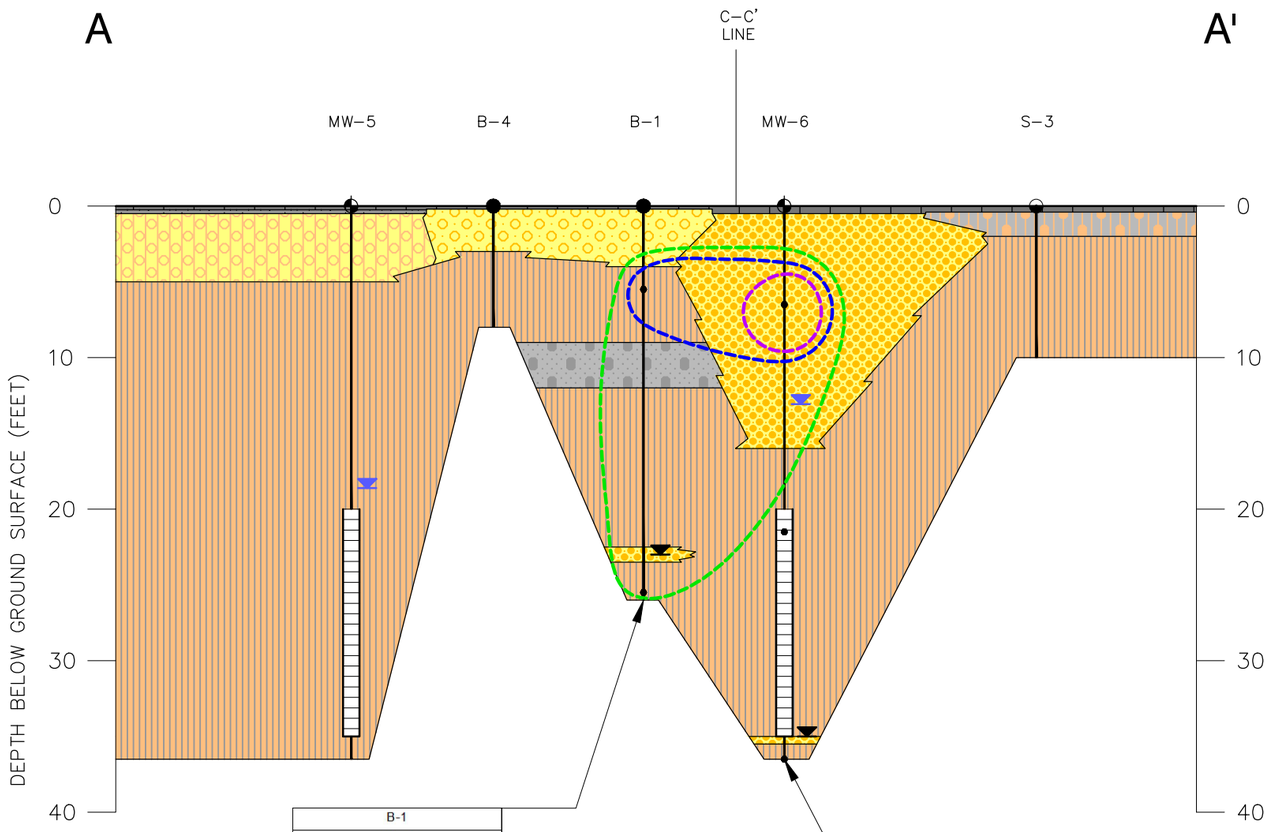
WEST

A

EAST

A'

C–C' LINE



B-1		
08/24/11		
DP	5.5'-6.0'	25.5'-26.0'
TPH-g	190	12
B	1.3	0.11
MTBE	NA	NA

MW-6			
05/26/15			
DP	6.5'	21.5'	36.5'
TPH-g	3,230	<10	<10
B	1.87	<0.02	<0.02
MTBE	<0.20	<0.05	0.078

LEGEND

S–3 B–1 MW–5

- WELL, SOIL BORING
- SOIL SAMPLE
- STATIC WATER LEVEL AS MEASURED DURING 12/2/19 MONITORING EVENT
- GROUNDWATER LEVEL AT TIME OF DRILLING
- SCREENED INTERVAL
- MAXIMUM DEPTH EXPLORED
- SOIL CONTACT

- ASPHALT
- CONCRETE
- SP= POORLY–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
- SM= SILTY–SANDS, SAND–SILT MIXTURES
- SW= WELL–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
- ML= INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS, WITH SLIGHT PLASTICITY
- GP= POORLY–GRADED GRAVELS, GRAVEL–SAND MIXTURES, LITTLE OR NO FINES
- GM= SILTY GRAVELS, GRAVEL–SAND–SILT MIXTURES

- APPROXIMATE EXTENT OF GASOLINE–RANGE TPH IN SOIL
- APPROXIMATE EXTENT OF BENZENE IN SOIL
- APPROXIMATE EXTENT OF MTBE IN SOIL

TPH–g	TOTAL PETROLEUM HYDROCARBONS GASOLINE (mg/kg)
B	BENZENE (mg/kg)
MTBE	METHYL TERTIARY–BUTYL ETHER (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
DP	DEPTH IN FEET
<	NOT DETECTED ABOVE LIMIT NOTED

BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CLEANUP LEVELS

RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS

0 10 20
HORIZONTAL SCALE

0 5 10
VERTICAL SCALE

Associated Environmental Group, LLC

FIGURE 5

GEOLOGIC CROSS SECTION A-A'

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

PROJECT NUMBER	APPROVED BY	CHECKED BY	DRAWN BY	FILENAME
11-124	4/27/2020 CS	4/27/2020 CS	4/27/2020 ICD	11-124_XSECTIONS.DWG

NORTHWEST

B

C–C' LINE

SOUTHEAST

B'

MW–7 S–5 MW–4 S–4 B–3 MW–3 MW–11

DEPTH BELOW GROUND SURFACE (FEET)

0 10 20 30 40

MW-4			
05/28/15			
DP	6.5'	16.5'	31.5'
TPH-g	<10	**11**	<10
B	<0.02	<0.02	**8.39**
MTBE	<0.05	**0.85**	**0.71**

S-4	
04/15/11	
DP	10.0'
TPH-g	<10
B	**0.23**
MTBE	NA

MW-3			
02/09/12			
DP	7.0'	13.0'-14.5'	23.0'-24.5'
TPH-g	<10	<10	<10
B	**0.048**	<0,02	**0.036**
MTBE	NA	NA	NA

B-3		
08/24/11		
DP	5.5'-6.0'	11.5'-12.0'
TPH-g	**22**	<10
B	**0.24**	<0,02
MTBE	NA	NA

MW-11					
03/24/16					
DP	5.0'	10.5'	20.5'	25.5'	35.5'
TPH-g	**1,160**	<10	<10	<10	<10
B	**0.27**	<0.02	<0.02	<0.02	<0.02
MTBE	<0.05	<0.05	<0.05	<0.05	<0.05

0 10 20
HORIZONTAL SCALE

0 5 10
VERTICAL SCALE

LEGEND

S–4 B–3 MW–3

- WELL, SOIL BORING
- SOIL SAMPLE
- STATIC WATER LEVEL AS MEASURED DURING 12/2/19 MONITORING EVENT (5/8/18 FOR MW-7)
- SCREENED INTERVAL
- MAXIMUM DEPTH EXPLORED
- SOIL CONTACT

- ASPHALT
- CONCRETE
- NO RECOVERY
- FILL
- SM= SILTY–SANDS, SAND–SILT MIXTURES
- SW= WELL–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
- ML= INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS, WITH SLIGHT PLASTICITY

- APPROXIMATE EXTENT OF GASOLINE–RANGE TPH IN SOIL
- APPROXIMATE EXTENT OF BENZENE IN SOIL
- APPROXIMATE EXTENT OF MTBE IN SOIL

TPH–g	TOTAL PETROLEUM HYDROCARBONS GASOLINE (mg/kg)
B	BENZENE (mg/kg)
MTBE	METHYL TERTIARY–BUTYL ETHER (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
DP	DEPTH IN FEET
<	NOT DETECTED ABOVE LIMIT NOTED

BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CLEANUP LEVELS

RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS

AEG Associated Environmental Group, LLC

FIGURE 6

GEOLOGIC CROSS SECTION B-B'

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

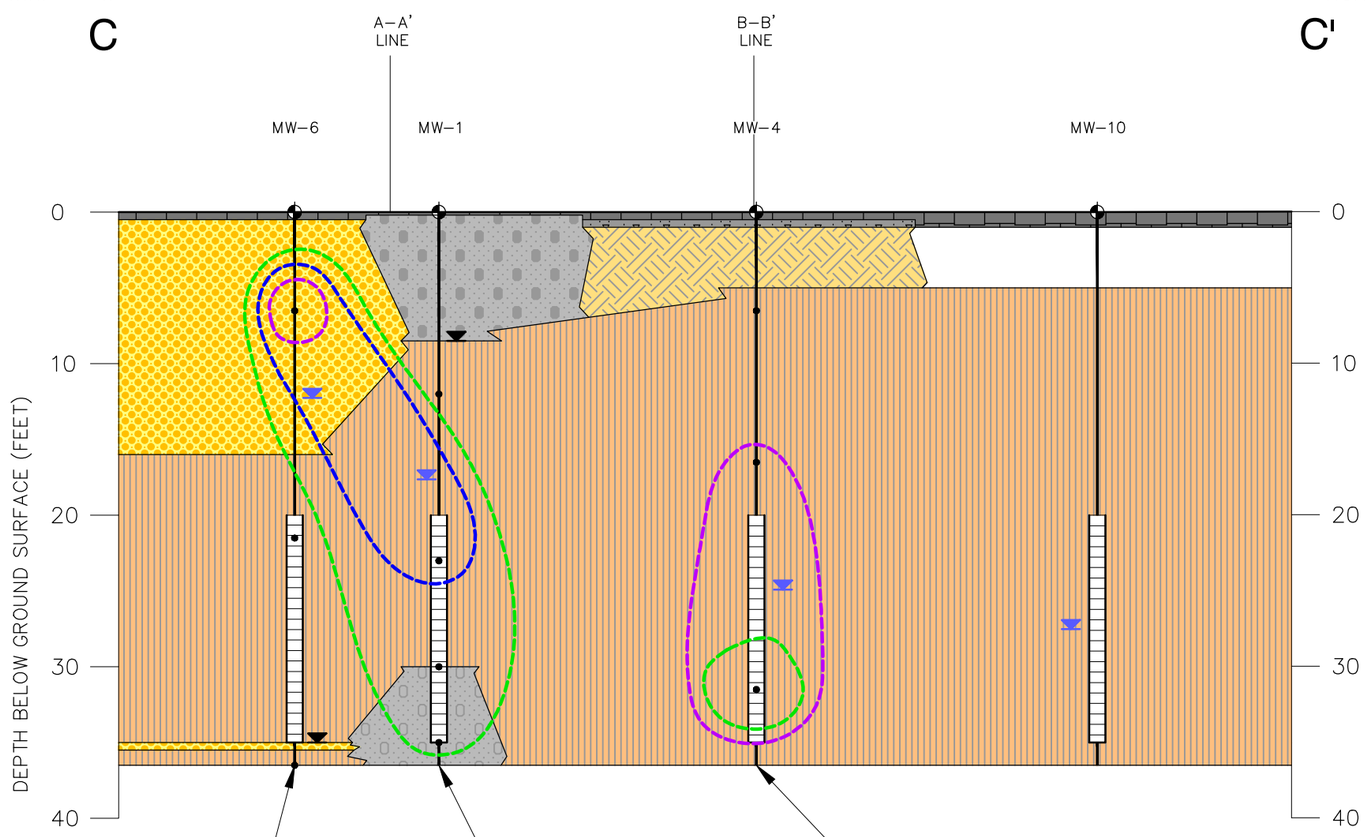
FILENAME	DRAWN BY	CHECKED BY	APPROVED BY	PROJECT NUMBER
11-124_XSECTIONS.DWG	ICD 4/27/2020	CS 4/27/2020	CS 4/27/2020	11-124

SOUTHWEST

C

NORTHEAST

C'

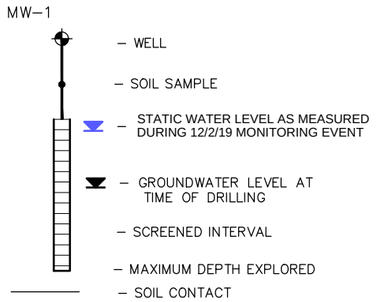


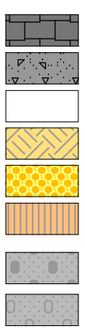
MW-6			
05/26/15			
DP	6.5'	21.5'	36.5'
TPH-g	**3,230**	<10	<10
B	**1.87**	<0.02	<0.02
MTBE	**<0.20**	<0.05	**0.078**

MW-1				
02/08/12				
DP	12.0'-13.5'	23.0'-24.5'	30.0'-31.5'	35.0'-36.5'
TPH-g	<10	**86**	<10	<10
B	**0.021**	**0.22**	**0.032**	**0.88**
MTBE	NA	NA	NA	NA

MW-4			
05/28/15			
DP	6.5'	16.5'	31.5'
TPH-g	<10	**11**	<10
B	<0.02	<0.02	**8.39**
MTBE	<0.05	**0.85**	**0.71**

LEGEND





ASPHALT

CONCRETE

NO RECOVERY

FILL

SP= POORLY–GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES

ML= INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS, WITH SLIGHT PLASTICITY

GP= POORLY–GRADED GRAVELS, GRAVEL–SAND MIXTURES, LITTLE OR NO FINES

GW= WELL–GRADED GRAVELS, GRAVEL–SAND MIXTURES, LITTLE OR NO FINES

APPROXIMATE EXTENT OF GASOLINE–RANGE TPH IN SOIL

APPROXIMATE EXTENT OF BENZENE IN SOIL

APPROXIMATE EXTENT OF MTBE IN SOIL

TPH–g	TOTAL PETROLEUM HYDROCARBONS GASOLINE (mg/kg)
B	BENZENE (mg/kg)
MTBE	METHYL TERTIARY–BUTYL ETHER (mg/kg)
mg/kg	MILLIGRAMS PER KILOGRAM
DP	DEPTH IN FEET
<	NOT DETECTED ABOVE LIMIT NOTED

BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CLEANUP LEVELS

RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS

0 10 20
HORIZONTAL SCALE

0 5 10
VERTICAL SCALE

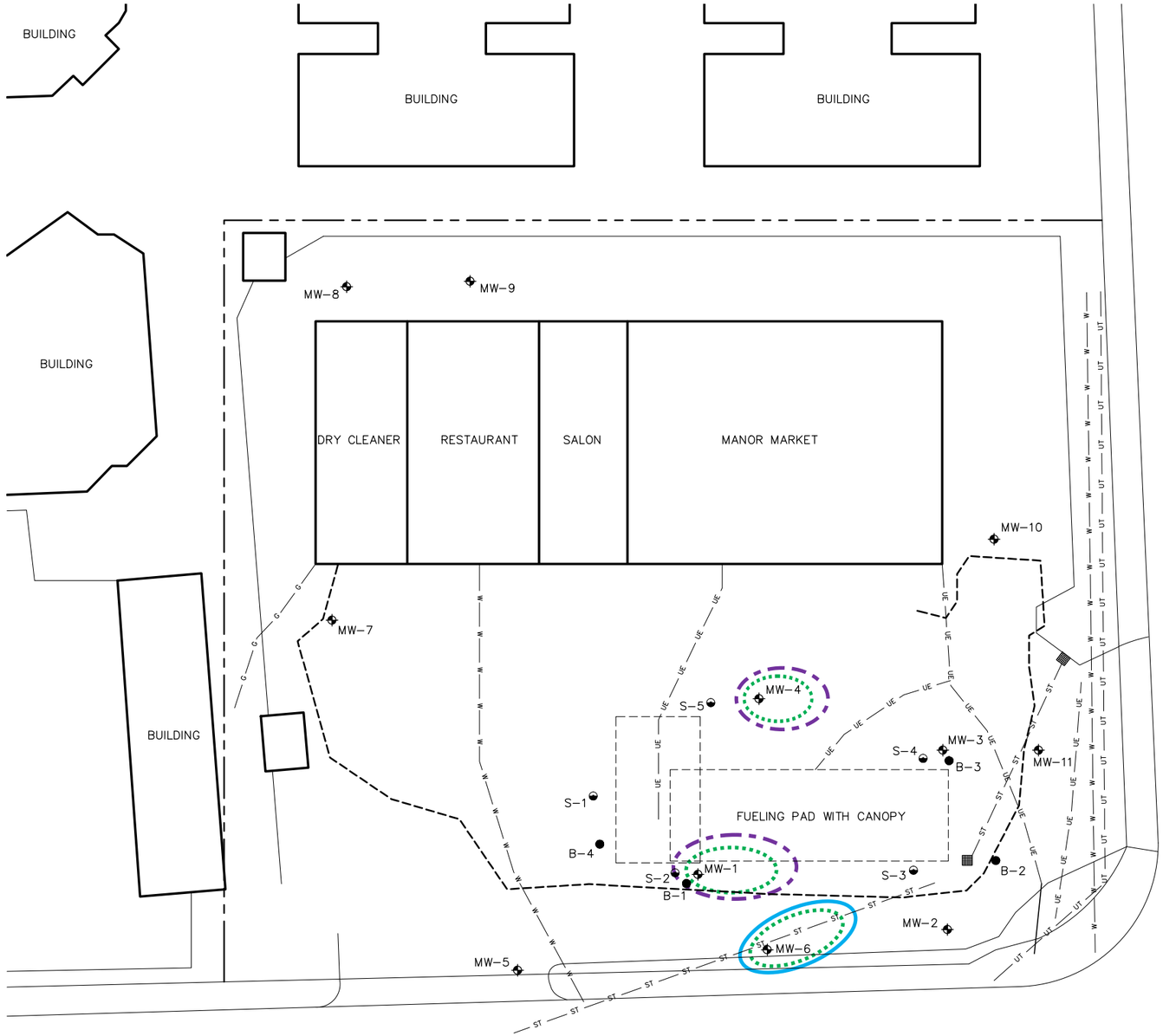
AEG Associated Environmental Group, LLC

FIGURE 7

GEOLOGIC CROSS SECTION C-C'

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

PROJECT NUMBER	11-124
APPROVED BY	DB 5/09/2016
CHECKED BY	DB 5/09/2016
DRAWN BY	ICD 5/09/2016
FILENAME	11-124_16Q2.DWG



N
W E
S

LEGEND

- APPROXIMATE PROPERTY LINE
- MW-1 — GROUNDWATER MONITORING WELL LOCATION
- B-1 — SOIL BORING LOCATION
- S-1 — SOIL SAMPLE LOCATION
- CATCH BASIN
- UE — BURED ELECTRICAL LINE
- UT — BURED TELEPHONE LINE
- W — WATER LINE
- ST — STORMWATER DRAIN LINE
- G — BURED NATURAL GAS LINE
- EXTENT OF EXCAVATION

NOTES

1. THE LOCATIONS OF ALL FEATURES SHOWN ARE APPROXIMATE
2. THIS DRAWING IS FOR INFORMATION PURPOSES. IT IS INTENDED TO ASSIST IN SHOWING FEATURES DISCUSSED IN AN ATTACHED DOCUMENT.

REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

- APPROXIMATE EXTENT OF GASOLINE-RANGE TPH IN GROUNDWATER
- APPROXIMATE EXTENT OF BENZENE IN GROUNDWATER
- APPROXIMATE EXTENT OF MTBE IN GROUNDWATER

0 15 30
SCALE IN FEET

Associated Environmental Group, LLC

FIGURE 8

GROUNDWATER PLUME MAP

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

PROJECT NUMBER	11-124
APPROVED BY	DB 4/03/2019
CHECKED BY	DB 4/03/2019
DRAWN BY	ICD 4/03/2019
FILENAME	11-124_18Q2.DWG

BUILDING

BUILDING

BUILDING

BUILDING

BUILDING

BUILDING

WOODED AREA

FORMER DRY CLEANING MACHINE

DRY CLEANER

RESTAURANT

SALON

MANOR MARKET

FUELING PAD WITH CANOPY

36TH AVENUE W

164TH STREET SW

MW-8
590.47

MW-9
588.26

MW-7
NG

MW-4
578.50

MW-3
575.83

MW-11
571.08

MW-10
572.14

MW-1
588.01

MW-2
578.93

MW-5
587.46

MW-6
592.71

590.00

585.00

580.00

0.12 ft/ft

MW-4	
04/07/16	
G=	**127**
B=	**70**
T=	<2.0
E=	<1.0
X=	<2.0
M=	**592**

MW-10	
04/07/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<2.0

MW-3	
04/07/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	**10**

MW-11	
04/07/16	
G=	**254**
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	**8.5**

MW-5	
04/07/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<2.0

MW-6	
04/07/16	
G=	**1,630**
B=	**12**
T=	<2.0
E=	<1.0
X=	**3.0**
M=	<2.0

MW-1	
04/07/16	
G=	**101**
B=	**9.9**
T=	<2.0
E=	<1.0
X=	<2.0
M=	**20**

MW-2	
04/07/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<2.0

BUILDING

EVERGREEN FIRE & SAFETY INC

FUELING PAD WITH CANOPY

SPRUCE MARKET
16404 36TH AVENUE WEST

N

W E

S

LEGEND

- APPROXIMATE PROPERTY LINE
- MW-1 GROUNDWATER MONITORING WELL LOCATION
- CATCH BASIN
- UE UE BURIED ELECTRICAL LINE
- UT UT BURIED TELEPHONE LINE
- W W WATER LINE
- ST ST STORMWATER DRAIN LINE
- G G BURIED NATURAL GAS LINE
- EXTENT OF EXCAVATION
- 575.83 GROUNDWATER ELEVATION (FEET)
- 580.00 GROUNDWATER ELEVATION CONTOUR LINE (FEET)
- CONTOUR INTERVAL=5.00 FEET
- 0.12 ft/ft APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
- NG NOT GAUGED
- G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (µg/L)
- B BENZENE (µg/L)
- T TOLUENE (µg/L)
- E ETHYLBENZENE (µg/L)
- X TOTAL XYLENES (µg/L)
- M METHYL TERT-BUTYL ETHER (µg/L)
- µg/L MICROGRAMS PER LITER
- < NOT DETECTED ABOVE LIMIT NOTED
- **BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CUL**
- **RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS**

NOTES

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2. THIS DRAWING IS FOR INFORMATION PURPOSES. IT IS INTENDED TO ASSIST IN SHOWING FEATURES DISCUSSED IN AN ATTACHED DOCUMENT.

REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

0 20 40

SCALE IN FEET

AEG Associated Environmental Group, LLC

FIGURE 9

GROUNDWATER ELEVATION CONTOUR MAP 04/07/2016

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

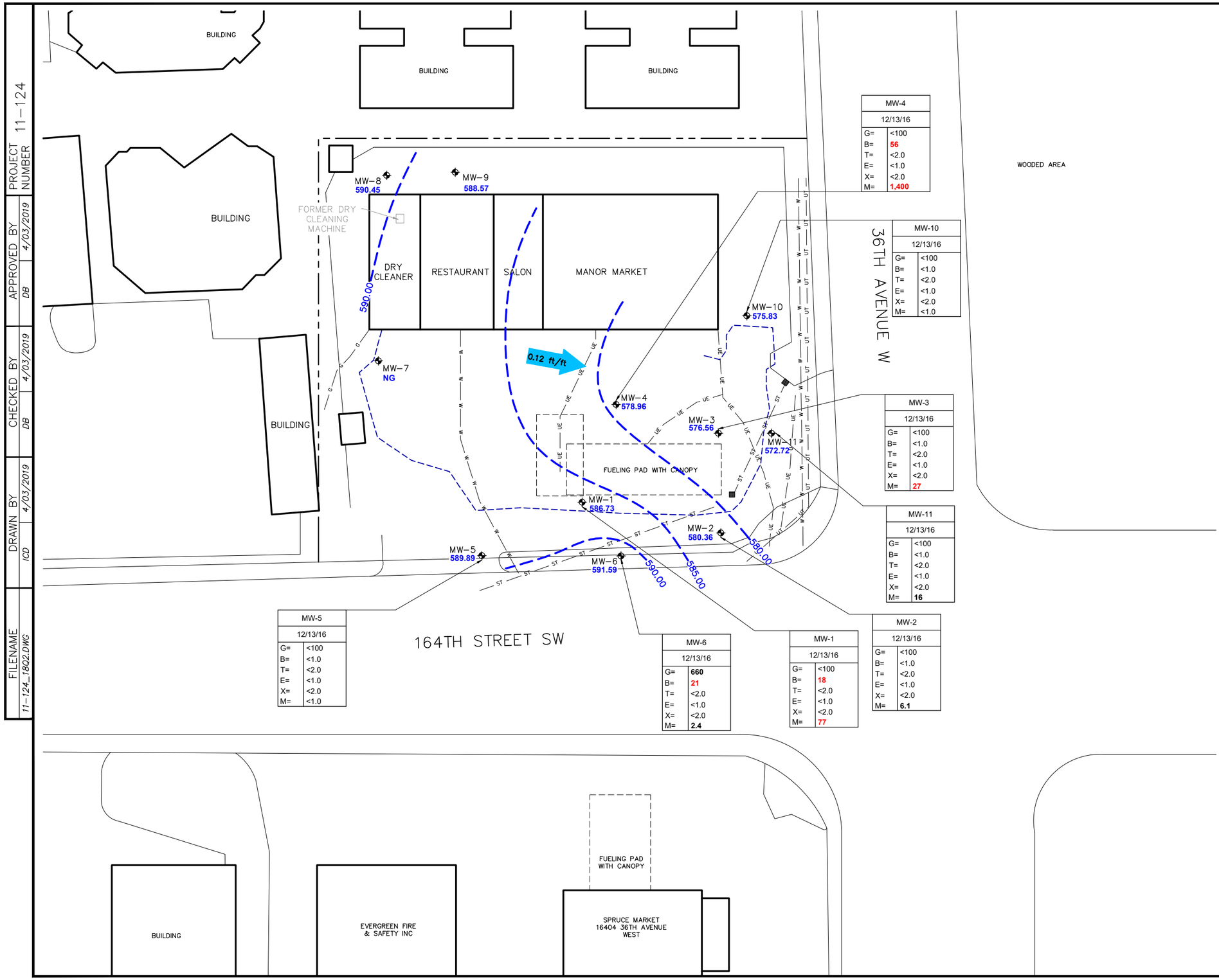
PROJECT NUMBER 11-124

APPROVED BY DB 4/03/2019

CHECKED BY DB 4/03/2019

DRAWN BY ICD 4/03/2019

FILENAME 11-124_1802.DWG



MW-4	
12/13/16	
G=	<100
B=	56
T=	<2.0
E=	<1.0
X=	<2.0
M=	1,400

MW-10	
12/13/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<1.0

MW-3	
12/13/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	27

MW-11	
12/13/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	16

MW-2	
12/13/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	6.1

MW-1	
12/13/16	
G=	<100
B=	18
T=	<2.0
E=	<1.0
X=	<2.0
M=	77

MW-6	
12/13/16	
G=	660
B=	21
T=	<2.0
E=	<1.0
X=	<2.0
M=	2.4

MW-5	
12/13/16	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<1.0

N

W E

S

LEGEND

- APPROXIMATE PROPERTY LINE
- MW–1 GROUNDWATER MONITORING WELL LOCATION
- CATCH BASIN
- UE UE BURIED ELECTRICAL LINE
- UT UT BURIED TELEPHONE LINE
- W W WATER LINE
- ST ST STORMWATER DRAIN LINE
- G G BURIED NATURAL GAS LINE
- EXTENT OF EXCAVATION
- 576.56 GROUNDWATER ELEVATION (FEET)
- 580.00 GROUNDWATER ELEVATION CONTOUR LINE (FEET)
- CONTOUR INTERVAL=5.00 FEET
- 0.12 ft/ft APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
- NG NOT GAUGED
- G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (µg/L)
- B BENZENE (µg/L)
- T TOLUENE (µg/L)
- E ETHYLBENZENE (µg/L)
- X TOTAL XYLENES (µg/L)
- M METHYL TERT–BUTYL ETHER (µg/L)
- µg/L MICROGRAMS PER LITER
- < NOT DETECTED ABOVE LIMIT NOTED

BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CUL

RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS

NOTES

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REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

0 20 40

SCALE IN FEET

Associated Environmental Group, LLC

FIGURE 10

GROUNDWATER ELEVATION CONTOUR MAP 12/13/2016

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

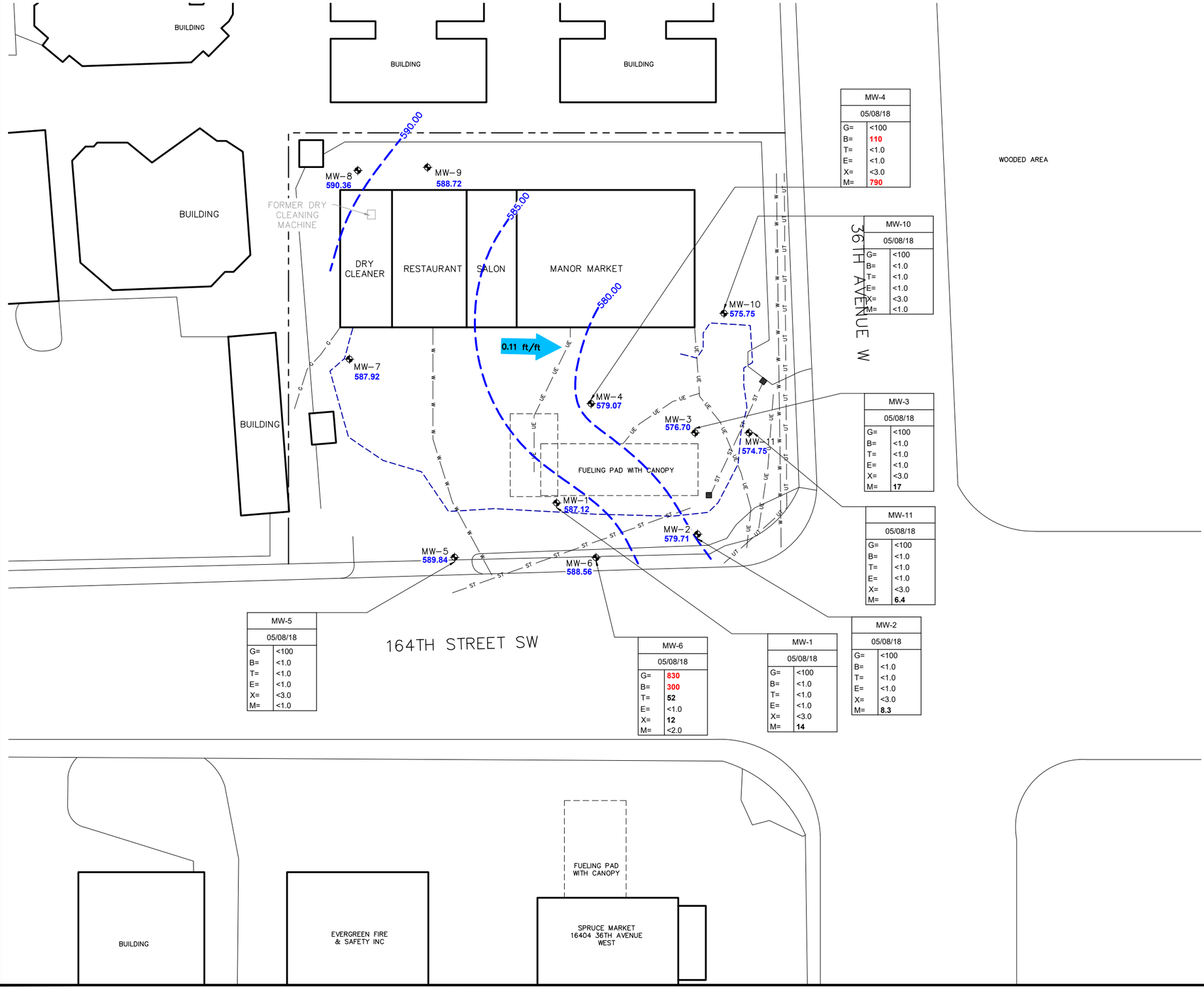
PROJECT NUMBER 11-124

APPROVED BY DB 4/03/2019

CHECKED BY DB 4/03/2019

DRAWN BY ICD 4/03/2019

FILENAME 11-124_1802.DWG



N
W E
S

LEGEND

- APPROXIMATE PROPERTY LINE
- MW–1 GROUNDWATER MONITORING WELL LOCATION
- CATCH BASIN
- UE UE BURIED ELECTRICAL LINE
- UT UT BURIED TELEPHONE LINE
- W W WATER LINE
- ST ST STORMWATER DRAIN LINE
- G G BURIED NATURAL GAS LINE
- EXTENT OF EXCAVATION
- 576.70 GROUNDWATER ELEVATION (FEET)
- 580.00 GROUNDWATER ELEVATION CONTOUR LINE (FEET)
- CONTOUR INTERVAL=5.00 FEET
- 0.11 ft/ft APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
- NG NOT GAUGED
- G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (µg/L)
- B BENZENE (µg/L)
- T TOLUENE (µg/L)
- E ETHYLBENZENE (µg/L)
- X TOTAL XYLENES (µg/L)
- M METHYL TERT–BUTYL ETHER (µg/L)
- µg/L MICROGRAMS PER LITER
- < NOT DETECTED ABOVE LIMIT NOTED
- **BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CUL**
- **RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS**

NOTES

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2. THIS DRAWING IS FOR INFORMATION PURPOSES. IT IS INTENDED TO ASSIST IN SHOWING FEATURES DISCUSSED IN AN ATTACHED DOCUMENT.

REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

0 20 40
SCALE IN FEET

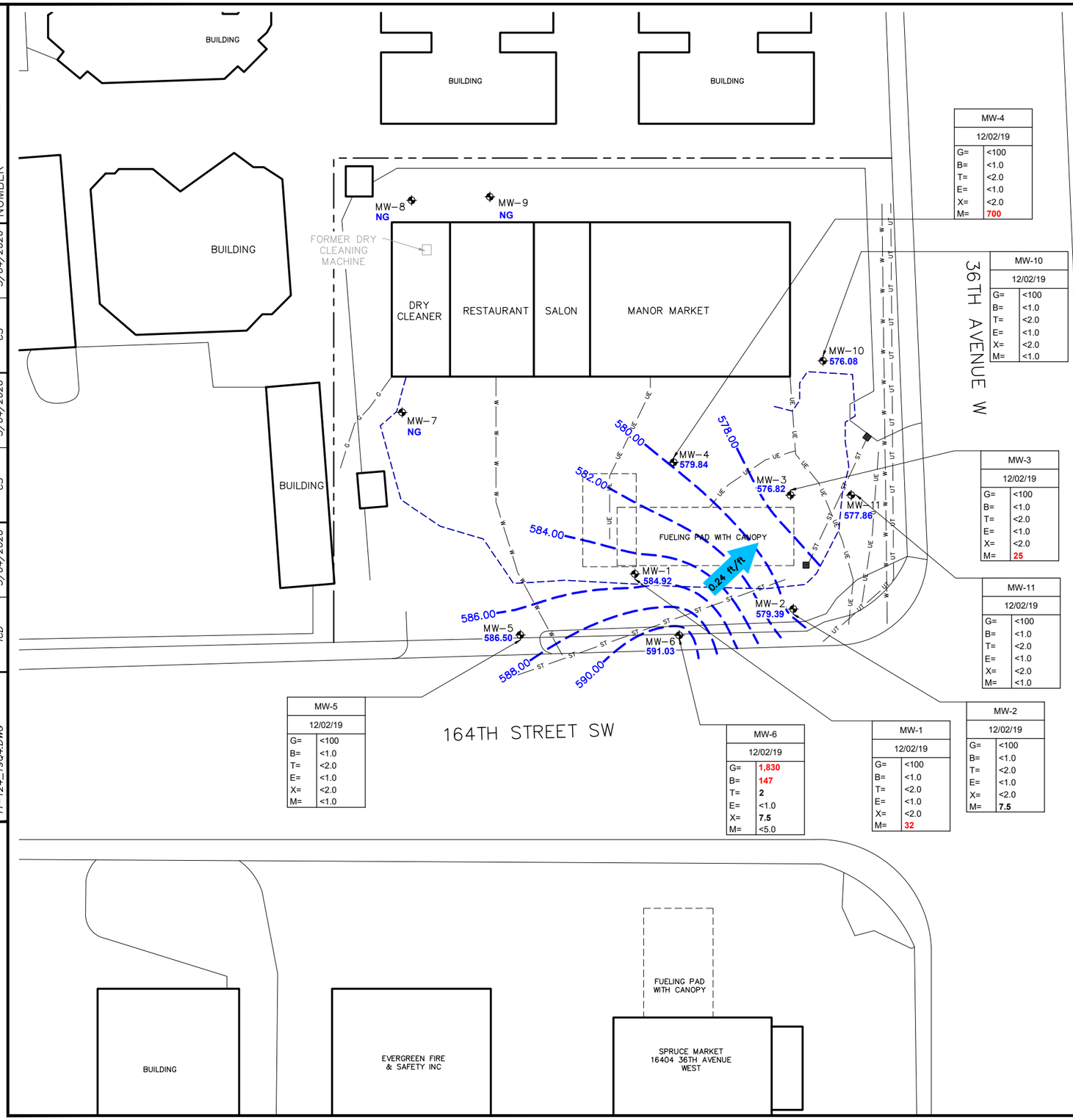
Associated Environmental Group, LLC

FIGURE 11

GROUNDWATER ELEVATION CONTOUR MAP
05/08/2018

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

PROJECT NUMBER	11-124
APPROVED BY	CS 3/04/2020
CHECKED BY	CS 3/04/2020
DRAWN BY	ICD 3/04/2020
FILENAME	11-124_1904.DWG



MW-4	
12/02/19	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	700

MW-10	
12/02/19	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<1.0

MW-3	
12/02/19	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	25

MW-11	
12/02/19	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<1.0

MW-5	
12/02/19	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	<1.0

MW-6	
12/02/19	
G=	1,830
B=	147
T=	2
E=	<1.0
X=	7.5
M=	<5.0

MW-1	
12/02/19	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	32

MW-2	
12/02/19	
G=	<100
B=	<1.0
T=	<2.0
E=	<1.0
X=	<2.0
M=	7.5

N
W E
S

LEGEND

- APPROXIMATE PROPERTY LINE
- MW–1 GROUNDWATER MONITORING WELL LOCATION
- CATCH BASIN
- UE UE BURIED ELECTRICAL LINE
- UT UT BURIED TELEPHONE LINE
- W W WATER LINE
- ST ST STORMWATER DRAIN LINE
- G G BURIED NATURAL GAS LINE
- EXTENT OF EXCAVATION
- 576.82 GROUNDWATER ELEVATION (FEET)
- 580.00 GROUNDWATER ELEVATION CONTOUR LINE (FEET)
- CONTOUR INTERVAL=2.00 FEET
- 0.24 ft/ft APPROXIMATE GROUNDWATER GRADIENT DIRECTION (ft/ft)
- NG NOT GAUGED
- G TOTAL PETROLEUM HYDROCARBONS AS GASOLINE (µg/L)
- B BENZENE (µg/L)
- T TOLUENE (µg/L)
- E ETHYLBENZENE (µg/L)
- X TOTAL XYLENES (µg/L)
- M METHYL TERT–BUTYL ETHER (µg/L)
- µg/L MICROGRAMS PER LITER
- < NOT DETECTED ABOVE LIMIT NOTED
- **BOLD VALUE INDICATES THE DETECTED CONCENTRATION IS BELOW ECOLOGY MTCA METHOD A CUL**
- **RED BOLD VALUE INDICATES THE DETECTED CONCENTRATION EXCEEDS ECOLOGY MTCA METHOD A CLEANUP LEVELS**

NOTES

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REFERENCE

DRAWING CREATED FROM AERIAL PHOTOGRAPH AND NOTES PROVIDED BY AEG, LLC.

0 20 40
SCALE IN FEET

Associated Environmental Group, LLC

FIGURE 12

GROUNDWATER ELEVATION CONTOUR MAP 12/02/2019

MANOR MARKET
3609 164TH STREET SW
LYNNWOOD, WASHINGTON

TABLES

2633 Parkmont Lane SW, Suite A • Olympia, WA • 98502-5751
Phone: 360-352-9835 • Fax: 360-352-8164 • Email: admin@aegwa.com

Table 1 - Summary of Soil Analytical Results
Manor Market (11-124)
Lynnwood, WA

Sample Number	Date Sampled	Depth Sampled (feet)	Gasoline	Diesel	Heavy Oil	Select Volatile Organic Compounds							
						Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	PCE	TCE	Vinyl Chloride
Quality Envirionmental Services Team, Inc. (1998 - No Locations Map Provided)													
T1FS@12'	1/16/1998	12	**7**	--	--	<0.1	<0.1	<0.1	<0.3	--	--	--	--
T2FS@13'	1/16/1998	13	<5.0	--	--	<0.1	<0.1	**0.1**	<0.3	--	--	--	--
T3FS@13'	1/16/1998	13	<5.0	--	--	**0.1**	<0.1	**0.2**	<0.3	--	--	--	--
NW@12'	1/16/1998	12	**8**	--	--	<0.1	**0.1**	<0.1	**0.5**	--	--	--	--
SW@11'	1/16/1998	13	<5.0	--	--	**0.1**	<0.1	<0.1	<0.3	--	--	--	--
DISPL@4'	1/20/1998	4	<5.0	--	--	<0.1	<0.1	<0.1	<0.3	--	--	--	--
DISPL@7'	1/20/1998	7	<5.0	--	--	<0.1	<0.1	<0.1	<0.3	--	--	--	--
PIPING@11'	1/20/1998	11	<5.0	--	--	<0.1	<0.1	<0.1	<0.3	--	--	--	--
Envivtech (2011)													
S1-9	9.0	4/15/2011	<10	<50	<100	<0.02	<0.05	<0.05	<0.15	--	--	--	--
S2-14	14.0	4/15/2011	<10	<50	<100	**0.21**	<0.05	<0.05	<0.15	--	--	--	--
S3-10	10.0	4/15/2011	<10	<50	<100	**0.02**	<0.05	<0.05	<0.15	--	--	--	--
S4-10	10.0	4/15/2011	<10	<50	<100	**0.23**	**0.14**	**0.11**	**0.27**	--	--	--	--
S5-16	16.0	4/15/2011	<10	<50	<100	<0.02	<0.05	<0.05	<0.15	--	--	--	--
Associated Environmental Group, LLC (2011 to 2016)													
B1-S3-5.5/6.0	8/24/2011	5.5-6.0	**190**	--	--	**1.3**	**2.0**	**5.0**	**12**	--	--	--	--
B1-S7-25.5/26.0	8/24/2011	25.5-26.0	**12**	--	--	**0.11**	<0.02	<0.05	**0.11**	--	--	--	--
B2-S5-11.5/12.0	8/24/2011	11.5-12.0	<10	--	--	<0.02	<0.02	<0.05	<0.15	--	--	--	--
B2-S8-16.5/17.0	8/24/2011	16.5-17.0	<10	--	--	<0.02	<0.02	<0.05	<0.15	--	--	--	--
B3-S2-5.5/6.0	8/24/2011	5.5-6.0	**22**	--	--	**0.24**	**0.67**	**0.48**	**0.73**	--	<0.02	<0.03	<0.02
B3-S6-11.5/12.0	8/24/2011	11.5-12.0	<10	--	--	<0.02	<0.02	<0.05	<0.15	--	--	--	--
B4-S3-7.5/8.0	8/24/2011	7.5-8.0	<10	--	--	<0.02	<0.02	<0.05	<0.15	--	--	--	--
MW1-S1/12-13.5	2/8/2012	12.0-13.5	<10	--	--	**0.021**	<0.10	<0.05	<0.15	--	--	--	--
MW1-S2/23-24.5	2/8/2012	23.0-24.5	**86**	--	--	**0.22**	<0.10	<0.05	<0.15	--	--	--	--
MW1-S3/30-31.5	2/8/2012	30.0-31.5	<10	--	--	**0.032**	**0.11**	<0.05	<0.15	--	--	--	--
MW1-S4/35-36.5	2/8/2012	35.0-36.5	<10	--	--	**0.88**	<0.10	<0.05	<0.15	--	--	--	--
MW2-S1/23-24.5	2/8/2012	23.0-24.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	--	--	--	--
MW3-S1/7	2/9/2012	7.0	<10	--	--	**0.048**	**0.20**	**0.27**	**1.1**	--	--	--	--
MW3-S2/23-24.5	2/9/2012	23.0-24.5	<10	--	--	**0.036**	**0.10**	<0.05	<0.15	--	--	--	--
MW3-S3/13-14.5	2/9/2012	13.0-14.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	--	--	--	--
MW4-6.5	5/28/2015	6.5	<10	--	--	<0.02	<0.03	<0.03	<0.03	<0.05	--	--	--
MW4-16.5	5/28/2015	16.5	**11**	--	--	<0.02	<0.03	<0.03	<0.03	**0.85**	--	--	--
MW4-31.5	5/28/2015	31.5	<10	--	--	**8.39**	<0.03	<0.03	<0.03	**0.71**	--	--	--
MW5-6.5	5/26/2015	6.5	<10	--	--	<0.02	<0.03	<0.03	<0.03	<0.05	--	--	--
MW5-16.5	5/26/2015	16.5	<10	--	--	<0.02	<0.03	<0.03	<0.03	<0.05	--	--	--
MW5-21.5	5/26/2015	21.5	<10	--	--	<0.02	<0.03	<0.03	<0.03	<0.05	--	--	--
MW5-36.5	5/26/2015	36.5	<10	--	--	<0.02	<0.03	<0.03	<0.03	<0.05	--	--	--
MW6-6.5	5/26/2015	6.5	**3,230**	--	--	**1.87**	**1.15**	**1.62**	**4.38**	**<0.20**	--	--	--
MW6-21.5	5/26/2015	21.5	<10	--	--	<0.02	<0.03	<0.03	<0.03	<0.05	--	--	--
MW6-36.5	5/26/2015	36.5	<10	--	--	<0.02	<0.03	<0.03	<0.03	**0.078**	--	--	--
MW7-3.0	5/27/2015	3.0	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW7-21.5	5/27/2015	21.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW7-31.5	5/27/2015	31.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW8-16.5	5/27/2015	16.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW8-26.5	5/27/2015	26.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW8-31.5	5/27/2015	31.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW9-6.5	5/27/2015	6.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW9-11.5	5/27/2015	11.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02
MW9-31.5	5/27/2015	31.5	--	--	--	--	--	--	--	--	<0.02	<0.02	<0.02

Table 1 - Summary of Soil Analytical Results
Manor Market (11-124)
Lynnwood, WA

Sample Number	Date Sampled	Depth Sampled (feet)	Gasoline	Diesel	Heavy Oil	Select Volatile Organic Compounds							
						Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	PCE	TCE	Vinyl Chloride
MW10-6.5	3/24/2016	6.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW10-16.5	3/24/2016	16.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW10-21.5	3/24/2016	21.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW10-31.5	3/24/2016	31.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW10-36.5	3/24/2016	36.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW11-5.0	3/24/2016	5.0	**1,160**	--	--	**0.27**	**0.95**	**8.2**	**19**	<0.05	--	--	--
MW11-10.5	3/24/2016	10.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW11-20.5	3/24/2016	20.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW11-25.5	3/24/2016	25.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
MW11-35.5	3/24/2016	35.5	<10	--	--	<0.02	<0.10	<0.05	<0.15	<0.05	--	--	--
PQL			10	50	100	0.02	0.02/0.10	0.03/0.05	0.03/0.15	0.05	0.02	0.02/0.03	0.02
MTCA Method A Cleanup Levels			30*	2,000	2,000	0.03	7	6	9	0.10	0.05	0.03	0.67**

Notes:

All values are presented in milligrams per kilogram (mg/kg)

-- = Not analyzed for this constituent

< = Not detected above laboratory limits

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

** Method B cleanup level; Method A cleanup level not established

PQL = Practical Quantification Limit (laboratory detection limit)

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

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

MTBE = Methyl tertiary-butyl ether

PCE = Tetrachloroethylene

TCE = Trichloroethylene

Table 2 - Summary of Groundwater Analytical Results
Manor Market (11-124)
Lynnwood, WA

Well Number	Date Sampled	Gasoline	Select Volatile Organic Compounds													Total Lead	Dissolved Lead
			Benzene	Toluene	Ethyl-benzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE	PCE	TCE	*cis* -1,2-DCE	*trans*- 1,2-DCE	VC		
MW-1	3/1/2012	<100	**9.9**	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	--	--	--	--	--	<5.0	--
	11/20/2012	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	3/28/2013	<100	**13**	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	**76.0**	--	--	--	--	--	<5.0	--
	5/30/2013	<100	**13.2**	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	**111**	--	--	--	--	--	**19.9**	--
	6/4/2015	<100	**3.9**	<2.0	<1.0	<3.0	--	--	--	**315**	--	--	--	--	--	--	--
	9/2/2015	<100	**5.1**	<1.0	<1.0	<1.0	--	--	--	**122**	--	--	--	--	--	**7.1**	<5.0
	11/24/2015	<100	**19**	<1.0	<1.0	<1.0	--	--	--	**74**	--	--	--	--	--	--	--
	4/7/2016	**101**	**9.9**	<2.0	<1.0	<2.0	--	--	--	**20**	--	--	--	--	--	--	--
	12/13/2016	<100	**18**	<2.0	<1.0	<2.0	--	--	--	**77**	--	--	--	--	--	--	--
	5/8/2018	<100	<1.0	<1.0	<1.0	<3.0	--	--	--	**14**	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	<2.0
	12/2/2019	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	**32**	--	--	--	--	--	--	--
MW-2	3/1/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	--	--	--	--	--	<5.0	--
	11/20/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	--	--	--	--	--	<5.0	--
	3/28/2013	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	--	--	--	--	--	<5.0	--
	5/30/2013	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	--	--	--	--	--	<5.0	--
	6/4/2015	<100	<1.0	<2.0	<1.0	<3.0	--	--	--	**12.3**	--	--	--	--	--	--	--
	9/2/2015	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	<5.0	--	--	--	--	--	<5.0	<5.0
	11/24/2015	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	<5.0	--	--	--	--	--	--	--
	4/7/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<2.0	--	--	--	--	--	--	--
	12/13/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	**6.1**	--	--	--	--	--	--	--
	5/8/2018	<100	<1.0	<1.0	<1.0	<3.0	--	--	--	**8.3**	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	<2.0
	12/2/2019	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	**7.5**	--	--	--	--	--	--	--
MW-3	3/1/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	--	--	--	--	--	<5.0	--
	11/20/2012	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	<5.0	--	--	--	--	--	<5.0	--
	3/28/2013	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	**8.3**	--	--	--	--	--	**6.8**	--
	5/30/2013	<100	<1.0	<1.0	<1.0	<1.0	<1.0	<0.01	<5.0	**8**	--	--	--	--	--	<5.0	--
	6/4/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/2/2015	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	**21**	--	--	--	--	--	**17.4**	<5.0
	11/24/2015	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	**24**	--	--	--	--	--	--	--
	4/7/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	**10**	<1.0	<1.0	<1.0	<1.0	<1.0	--	--
	12/13/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	**27**	--	--	--	--	--	--	--
	5/8/2018	<100	<1.0	<1.0	<1.0	<3.0	--	--	--	**17**	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	<2.0
	12/2/2019	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	**25**	--	--	--	--	--	--	--
MW-4	6/4/2015	<100	**470**	<1.0	<1.0	<3.0	--	--	--	**1,740**	--	--	--	--	--	--	--
	9/2/2015	<100	**63**	<1.0	<1.0	<1.0	--	--	--	**344**	--	--	--	--	--	<5.0	<5.0
	11/24/2015	<100	**47**	<1.0	<1.0	<1.0	--	--	--	**975**	--	--	--	--	--	--	--
	4/7/2016	**127**	**70**	<2.0	<1.0	<2.0	--	--	--	**592**	<1.0	<1.0	<1.0	<1.0	<1.0	--	--
	12/13/2016	<100	**56**	<2.0	<1.0	<2.0	--	--	--	**1,400**	--	--	--	--	--	--	--
	5/8/2018	<100	**110**	<1.0	<1.0	<3.0	--	--	--	**790**	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	**2.2**
	12/2/2019	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	**700**	--	--	--	--	--	--	--
MW-5	6/4/2015	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	<5.0	--	--	--	--	--	--	--
	9/2/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/24/2015	<100	<1.0	<1.0	<1.0	<1.0	--	--	--	<5.0	--	--	--	--	--	--	--
	4/7/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<2.0	--	--	--	--	--	--	--
	12/13/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<1.0	--	--	--	--	--	--	--
	5/8/2018	<100	<1.0	<1.0	<1.0	<3.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	<2.0
	12/2/2019	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<1.0	--	--	--	--	--	--	--
MW-6	6/4/2015	**1,380**	**54**	**2.5**	<1.0	**7.0**	--	--	--	<5.0	--	--	--	--	--	--	--
	9/2/2015	**1,020**	**22**	<1.0	<1.0	**6.6**	--	--	--	<5.0	--	--	--	--	--	<5.0	<5.0
	11/24/2015	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/7/2016	**1,630**	**12**	<2.0	<1.0	**3.0**	--	--	--	<2.0	--	--	--	--	--	--	--
	12/13/2016	**660**	**21**	<2.0	<1.0	<2.0	--	--	--	**2.4**	--	--	--	--	--	--	--
	5/8/2018	**830**	**300**	**52**	<1.0	**12**	--	--	--	<2.0	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	<2.0
	12/2/2019	**1,830**	**147**	**2**	<1.0	**7.5**	--	--	--	<5.0	--	--	--	--	--	--	--
MW-7	6/4/2015	--	--	--	--	--	<1.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<0.2	--	--
MW-8	6/4/2015	--	--	--	--	--	<1.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<0.2	--	--
MW-9	6/4/2015	--	--	--	--	--	<1.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<0.2	--	--
MW-10	4/7/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<2.0	--	--	--	--	--	--	--
	12/13/2016	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<1.0	--	--	--	--	--	--	--
	5/8/2018	<100	<1.0	<1.0	<1.0	<3.0	--	--	--	<1.0	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	<2.0
	12/2/2019	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<1.0	--	--	--	--	--	--	--

Table 2 - Summary of Groundwater Analytical Results
Manor Market (11-124)
Lynnwood, WA

Well Number	Date Sampled	Gasoline	Select Volatile Organic Compounds													Total Lead	Dissolved Lead
			Benzene	Toluene	Ethyl-benzene	Total Xylenes	EDC	EDB	Total Naphthalenes	MTBE	PCE	TCE	*cis* -1,2-DCE	*trans*- 1,2-DCE	VC		
MW-11	4/7/2016	**254**	<1.0	<2.0	<1.0	<2.0	<1.0	--	--	**8.5**	<1.0	<1.0	<1.0	<1.0	<0.2	--	--
	12/13/2016	<100	<1.0	<2.0	<1.0	<2.0	<1.0	--	--	**16**	--	--	--	--	--	--	--
	5/8/2018	<100	<1.0	<1.0	<1.0	<3.0	--	--	--	**6.4**	<1.0	<1.0	<1.0	<1.0	<0.2	<2.0	<2.0
	12/2/2019	<100	<1.0	<2.0	<1.0	<2.0	--	--	--	<1.0	--	--	--	--	--	--	--
PQL		100	1.0	1.0/2.0	1.0	1.0/2.0/3.0	1.0	0.01	5.0	2.0/5.0	1.0	1.0	1.0	1.0	0.2	2.0/5.0	2.0
MTCA Method A Cleanup Levels		800*	5	1,000	700	1,000	5	0.01	160	20	5	5	160**	16**	0.2	15	15

Notes:

All values presented in micrograms per liter (µg/L)
* Cleanup level with presence of benzene
PQL = Practical Quantification Limit
TPH = Total Petroleum Hydrocarbons
-- = Not analyzed for constituent
< = Not detected above laboratory limits
Red Bold indicates the detected concentration exceeds Ecology MTCA Method A cleanup level
Bold indicates the detected concentration is below Ecology MTCA Method A cleanup levels
** MTCA Method B cleanup level; Method A cleanup level not established

EDC = 1,2-Dichloroethane
EDB = 1,2-Dibromoethane
MTBE = Methyl tertiary-butyl ether
PCE = Tetrachloroethylene
TCE = Trichloroethylene
DCE = Dichloroethylene
VC = Vinyl Chloride

Table 3 - Summary of Indoor and Outdoor Air Analytical Results

Manor Market (11-124)

Lynnwood, Washington

Sample Number		Indoor 1	Indoor 2	Outdoor	Indoor -1R	Indoor-2R	Ambient-1R	Indoor 1 (Adjusted)[1]	Indoor 2 (Adjusted)[1]	Indoor-1R (Adjusted)[1]	Indoor-2R (Adjusted)[1]	Method B Indoor Air Cleanup Level
Date Collected		5/8/2018	5/8/2018	5/8/2018	11/11/2019	11/11/2019	11/11/2019	5/8/2018	5/8/2018	11/11/2019	11/11/2019	
APH - Air Phase Hydrocarbons	EC5-8 Aliphatics	--	--	--	**88**	**1,300 ve**	<46	--	--	**88**	**1,300 ve**	2700
	EC 9-12 Aliphatics	--	--	--	**58**	**170**	**44**	--	--	**14**	**126**	140
	EC 9-10 Aromatics	--	--	--	<25	<25	<25	--	--	<25	<25	180
TO-15 - Chlorinated Volatile Organic Compounds	Vinyl Chloride	<0.049	<0.054	<0.050	<0.26	<0.26	<0.26	<0.049	<0.054	<0.26	<0.26	0.28*
	trans-1,2-Dichloroethene	<0.76	<0.84	<0.78	<0.4	<0.4	<0.4	<0.76	<0.84	<0.4	<0.4	NL
	cis-1,2-Dichloroethene	<0.15	<0.17	<0.16	<0.4	<0.4	<0.4	<0.15	<0.17	<0.4	<0.4	NL
	Trichloroethene (TCE)	<0.20	<0.23	<0.21	<0.27	<0.27	<0.27	<0.20	<0.23	<0.27	<0.27	0.37*
	Tetrachloroethene (PCE)	<0.26	**0.92**	<0.26	<6.8	<6.8	<6.8	<0.26	**0.92**	<6.8	<6.8	9.62*
TO-15 - Other Volatile Organic Compounds	Benzene	**0.64**	**0.69**	**0.44**	**1.9**	**1.4**	**0.97**	**0.20**	**0.25**	**0.93**	**0.43**	0.321*
	Hexane	**0.86**	**1.1**	**0.70**	**4.6**	**220 ve**	<3.5	**0.16**	**0.4**	**4.6**	**220 ve**	320
	Toluene	**2.6**	**6.7**	**1.7**	<19	**250 ve**	<19	**0.9**	**5.0**	<19	**250 ve**	2,290
	Ethylbenzene	**0.37**	**0.62**	**0.26**	**1.1**	**2.1**	**0.53**	**0.11**	**0.36**	**0.8**	**1.57**	457
	m,p-Xylene	**1.3**	**2.6**	**0.89**	**4.3**	**8.4**	**1.90**	**0.41**	**1.71**	**3.4**	**6.50**	45.7
	o-Xylene	**0.50**	**0.95**	**0.30**	**1.7**	**3.1**	**0.79**	**0.20**	**0.65**	**1.4**	**2.31**	45.7
	Methyl tert-butyl ether	**0.69**	**0.76**	**0.71**	<1.8	<1.8	<1.8	**	**0.05**	<1.8	<1.8	9.60*
	Naphthalene	--	--	--	**0.29**	**0.49**	**0.15**	--	--	**0.14**	**0.34**	0.0735*

Notes:

All values presented in micrograms per cubic meter ($\mu g/m^3$)

< = Not detected above laboratory limits

-- = Not analyzed

[1]Adjusted value calculated by subtracting Outdoor/Ambient concentrations from Indoor results. ** = Adjusted value is less than zero.

* Cancer cleanup/screening level (all other constituents listed have non-cancer values)

Red Bold indicates the detected concentration exceeds Ecology MTCA Method B cleanup or screening levels

Bold indicates the detected concentration is below Ecology MTCA Method B cleanup or screening levels

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

NL = Not Listed; no cleanup/screeening levels have been promulgated for these constituents

Table 4 - Summary of Sub-Slab Vapor Analytical Results

Manor Market(11-124)

Lynwood, Washington

Sample Number		SS1	SS2	SS-1R	SS-2R	Method B Sub-Slab Screening Level
Date Collected		5/8/2018	5/8/2018	11/11/2019	11/11/2019	
APH - Air Phase Hydrocarbons	EC5-8 Aliphatics	--	--	**440**	**260**	90,000
	EC 9-12 Aliphatics	--	--	**110**	**130**	4700
	EC 9-10 Aromatics	--	--	<72	<70	6000
TO-15 - Chlorinated Volatile Organic Compounds	Vinyl Chloride	<10	<10	<0.74	<0.72	9.33*
	trans-1,2-Dichloroethene	<10	<10	<1.1	<1.1	NL
	cis-1,2-Dichloroethene	**23**	<10	<1.1	<1.1	NL
	Trichloroethene (TCE)	**81**	<10	<0.78	<0.75	12.3*
	Tetrachloroethene (PCE)	**2,500**	<10	<20	<19	321*
TO-15 - Other Volatile Organic Compounds	Benzene	<10	**230**	**2.5**	**1.9**	10.7*
	Hexane	--	--	**79**	<9.9	10,700
	Toluene	**28**	**1,540**	**86**	<52	76,200
	Ethylbenzene	<10	**140**	**2.7**	**1.4**	15,200
	Total Xylenes	**300**	**1,000**	--	--	1,520
	m,p-Xylene	--	--	**11**	**4.9**	1,520
	o-Xylene	--	--	**4.1**	**2.2**	1,520
	Methyl tert-butyl ether	<10	<10	<5.2	<5	320*
	Naphthalene	<10	<10	<0.76	<0.73	2.45*

Notes:

All values presented in micrograms per cubic meter ($\mu g/m^3$)

< = Not detected above laboratory limits

-- = Not analyzed

[1]Adjusted value calculated by subtracting Outdoor concentrations from Indoor results.

* Cancer cleanup/screening level (all other constituents listed have non-cancer values)

Red Bold indicates the detected concentration exceeds Ecology MTCA Method B cleanup or screening levels

Bold indicates the detected concentration is below Ecology MTCA Method B cleanup or screening levels

NL = Not Listed; no cleanup/screeening levels have been promulgated for these constituents

Table 5 - Summary of Groundwater Elevations
Manor Market (11-124)
Lynnwood, WA

Well Number/ TOC Elevation (feet)	Date of Measurement	Depth to Water (feet)	Depth to Free Product (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)	Change in Elevation (feet)
MW-1	3/1/2012	24.63	--	--	578.12	--
602.75	11/20/2012	--	--	--	--	--
	3/28/2013	21.39	--	--	581.36	3.24
	5/30/2013	19.97	--	--	582.78	1.42
	6/1/2015	18.52	--	--	584.23	1.45
	9/2/2015	16.99	--	--	585.76	1.53
	11/24/2015	17.62	--	--	585.13	-0.63
	4/7/2016	14.74	--	--	588.01	2.88
	12/13/2016	16.02	--	--	586.73	-1.28
	5/8/2018	15.63	--	--	587.12	0.39
	12/2/2019	17.83	--	--	584.92	-2.20
MW-2	3/1/2012	24.70	--	--	578.28	--
602.98	11/20/2012	24.21	--	--	578.77	0.49
	3/28/2013	24.4	--	--	578.58	-0.19
	5/30/2013	25.05	--	--	577.93	-0.65
	6/4/2015	26.85	--	--	576.13	-1.80
	9/2/2015	23.15	--	--	579.83	3.70
	11/24/2015	16.38	--	--	586.60	6.77
	4/7/2016	24.05	--	--	578.93	-7.67
	12/13/2016	22.62	--	--	580.36	1.43
	5/8/2018	23.27	--	--	579.71	-0.65
	12/2/2019	23.59	--	--	579.39	-0.32
MW-3	3/1/2012	28.30	--	--	574.96	--
603.26	11/20/2012	28.23	--	--	575.03	0.07
	3/28/2013	28.14	--	--	575.12	0.09
	5/30/2013	28.31	--	--	574.95	-0.17
	6/4/2015	--	--	--	--	--
	9/2/2015	28.19	--	--	575.07	0.12
	11/24/2015	27.32	--	--	575.94	0.87
	4/7/2016	27.43	--	--	575.83	-0.11
	12/13/2016	26.7	--	--	576.56	0.73
	5/8/2018	26.56	--	--	576.70	0.14
	12/2/2019	26.44	--	--	576.82	0.12
MW-4	6/4/2015	26.45	--	--	577.84	--
604.29	9/2/2015	26.49	--	--	577.80	-0.04
	11/24/2015	26.62	--	--	577.67	-0.13
	4/7/2016	25.79	--	--	578.50	0.83
	12/13/2016	25.33	--	--	578.96	0.46
	5/8/2018	25.22	--	--	579.07	0.11
	12/2/2019	24.45	--	--	579.84	0.77

Table 5 - Summary of Groundwater Elevations
Manor Market (11-124)
Lynnwood, WA

Well Number/ TOC Elevation (feet)	Date of Measurement	Depth to Water (feet)	Depth to Free Product (feet)	Free Product Thickness (feet)	Groundwater Elevation (feet)	Change in Elevation (feet)
MW-5	6/4/2015	17.30	--	--	586.98	--
604.28	9/2/2015	16.21	--	--	588.07	1.09
	11/24/2015	14.82	--	--	589.46	1.39
	4/7/2016	16.82	--	--	587.46	-2.00
	12/13/2016	14.39	--	--	589.89	2.43
	5/8/2018	14.44	--	--	589.84	-0.05
	12/2/2019	17.78	--	--	586.50	-3.34
MW-6	6/4/2015	9.60	--	--	593.36	--
602.96	9/2/2015	10.69	--	--	592.27	-1.09
	11/24/2015	--	--	--	--	--
	4/7/2016	10.25	--	--	592.71	--
	12/13/2016	11.37	--	--	591.59	-1.12
	5/8/2018	14.40	--	--	588.56	-3.03
	12/2/2019	11.93	--	--	591.03	2.47
MW-7	6/4/2015	16.31	--	--	588.70	--
605.01	9/2/2015	17.79	--	--	587.22	-1.48
	11/24/2015	15.21	--	--	589.80	2.58
	4/7/2016	--	--	--	--	--
	12/13/2016	--	--	--	--	--
	5/8/2018	17.09	--	--	587.92	1.88
MW-8	6/4/2015	16.18	--	--	589.16	--
605.34	9/2/2015	16.72	--	--	588.62	-0.54
	11/24/2015	14.15	--	--	591.19	2.57
	4/7/2016	14.87	--	--	590.47	-0.72
	12/13/2016	14.89	--	--	590.45	-0.02
	5/8/2018	14.98	--	--	590.36	-0.09
MW-9	6/4/2015	18.63	--	--	586.58	--
605.21	9/2/2015	18.14	--	--	587.07	0.49
	11/24/2015	14.28	--	--	590.93	3.86
	4/7/2016	16.95	--	--	588.26	-2.67
	12/13/2016	16.64	--	--	588.57	0.31
	5/8/2018	16.49	--	--	588.72	0.15
MW-10	4/7/2016	31.30	--	--	572.14	--
603.44	12/13/2016	27.61	--	--	575.83	3.69
	5/8/2018	27.69	--	--	575.75	-0.08
	12/2/2019	27.36	--	--	576.08	0.33
MW-11	4/7/2016	32.90	--	--	571.08	--
603.98	12/13/2016	31.26	--	--	572.72	1.64
	5/8/2018	29.23	--	--	574.75	2.03
	12/2/2019	26.12	--	--	577.86	3.11

Notes:
TOC = Top of casing elevation relative to assigned benchmark.
-- = Not measured, not available, or not applicable

Table 6 - Identification and Screening of Response Actions and Remediation Technologies, Manor Market, 3609 164th St SW, Lynnwood , Washngton 98087

General Response Action	Technology/Options	Process Description	Applicability to Site Conditions	Effectiveness	Implementability	Relative Cost	Retain for Further Consideration	Reasons for Screening Decision
No Action	None	--	Not applicable. Contamination exceeds MTCA Method A cleanup levels	Unable to achieve RAOs. Not effective.	Not implementable	Low	Not retained	RAOs not achievable.
Institutional Controls	Site access and use restrictions	Legal Restrictions/environmental covenant limiting exposure to contamination. Deed restrictions to control soil excavation or access to groundwater.	Possibly applicable for closure after site demonstrates no off-property impacts	Effective at limiting exposure pathways to remaining contamination above CULs on-property, where disproportionate cost analysis demonstrates additional remediation not cost-effective.	Implementable	Low, with possible future monitoring requirements.	**Retained**	Environmental Covenant may be appropriate as part of a remedial option.
Monitored Natural Attenuation	Long term monitoring of affected media at Site	Actively and regularly monitor ongoing natural processes acting to reduce contaminant concentrations in affected media. Enhancement of natural attenuation processes possible through injection of chemicals or microbes to increase the rate of attenuation.	May be applicable	Effective on petroleum hydrocarbons where natural conditions determined to be conducive to attenuation.	Implementable	Low, with possible future monitoring requirements.	**Retained**	Could be appropriate remedial solution for residual contamination.
Containment	Vertical Barriers	Impermeable subsurface slurry wall or dike constructed to prevent migration of contamination.	Applicable	Can be effective for preventing lateral migration of contaminants. Not effective in reducing LNAPL or dissolved phase contamination.	Not implementable	High	Not retained	No LNAPL present with a number of utilities present make it impractical.
	Hydraulic Containment	Groundwater pumping.	Not applicable	Not effective in Site-specific conditions.	Not implementable	High	Not retained	Low permeability soils make hydraulic containment ineffective at this site.
	Capping	Impervious concrete or asphalt surfaces over contamination, limiting exposure pathways at Site.	May be applicable	Effective at limiting exposure pathways to remaining contamination above CULs.	Implementable	Moderate	**Retained**	Site is currently capped with impermeable surfaces, including asphalt, concrete, and Site building and infrastructure.
Removal	Soil Excavation	Excavation and removal of contaminated soil.	Not applicable	Effective at removing PCS where accessible.	Implementable	High	**Retained**	Contaminated soil excavation may provide one method for reducing contamination levels in accessible areas of the Site. Contamination appears to be under the sidewalk and in the ROW.
	LNAPL Recovery	Extraction of LNAPL from groundwater table by pumping or skimming.	Not applicable	Effective at reducing LNAPL sources.	Implementable	Moderate	Not retained	LNAPL not present at Site
	Groundwater Extraction	Pumping groundwater from extraction wells to ex-situ treatment system	May be applicable	Effective at removing dissolved phase contamination from groundwater.	Implementable	High	**Retained**	Using holding tanks the water could be trucked off or treated, tested and then disposed of in the sanitary sewer if indicator levels are met.
Ex-Situ Treatment-Soil	Excavated soil treatment	Treatment and on-site reuse of contaminated soil.	Not applicable	Effective at reducing soil contamination levels.	Not implementable.	High, depending on methods of access and treatment.	Not retained	Not likely implementable at this Site. Possible permitting issues. Would require areas on the property to properly contain and treat contaminated soil.
Ex-Situ Treatment-Groundwater	Activated Carbon Adsorption	Contaminated groundwater is passed through granular activated carbon (GAC) filters to absorb contaminants. Treated water may be discharged or reinjected.	May be applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	Moderate	**Retained**	Possibly beneficial as part of an ex-situ treatment system alternative.
	Air Stripping	Extract groundwater to volatilize through air stripper.	May be applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	Moderate	**Retained**	May be possible after backfill with non-native materials. Moderate permeability soils in some locations
	Chemical Oxidation	Injection of chemical oxidants such as ozone or hydrogen peroxide into extracted groundwater.	Not applicable	Effective for reducing dissolved phase contamination in groundwater.	Not Implementable	High	Not retained	Limited site area for large treatment tanks.

Table 6 - Identification and Screening of Response Actions and Remediation Technologies, Manor Market, 3609 164th St SW, Lynnwood , Washngton 98087

General Response Action	Technology/Options	Process Description	Applicability to Site Conditions	Effectiveness	Implementability	Relative Cost	Retain for Further Consideration	Reasons for Screening Decision
In-Situ Treatment, Soil and Groundwater	Air/Ozone Sparging	Air or ozone injection into the subsurface to volatilize contamination and provide oxygen for enhanced aerobic biodegradation.	Applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	Moderate	**Retained**	Appropriate for soils at the Site and groundwater table.
	Soil Vapor Extraction	Extract volatile contaminants by applying a vacuum to subsurface. Collected gasses would require additional treatment in vapor phase-GAC filter or through thermal treatment prior to discharge.	Applicable	Effective for reducing dissolved phase contamination.	Implementable	Moderate	**Retained**	May be appropriate for soils at the Site limited by higher seasonal groundwater table.
	High Vacuum Dual-Phase Extraction	Extract volatile and dissolved phase contaminants by applying a vacuum to subsurface. Collected water and soil gasses would require additional treatment in liquid and vapor phase-GAC filters .	Applicable	Effective for reducing dissolved phase contamination.	Implementable	Moderate	**Retained**	Appropriate for soils at the Site and higher seasonal groundwater table.
	In-Situ Chemical Injection	Injection of chemicals and substances promoting degradation of contamination into the subsurface.	Applicable	Effective for reducing dissolved phase contamination.	Implementable	Moderate	**Retained**	Appropriate for soils at the Site and groundwater table.
	Enhanced Bioremediation	Injection of hydrocarbon-degrading microbes along with other substances to provide additional biodegradation in the subsurface	Applicable	Can be effective.	Implementable	Moderate	**Retained**	Appropriate for groundwater and soils at the Site and deeper groundwater table.
	Electrical Resistance Heating	Heat subsurface by heated water, steam or electrical resistance to volatilize contamination.	Applicable	Effective for reducing dissolved phase contamination in groundwater.	Implementable	High	**Retained**	Appropriate for soils at the Site and groundwater table but the limitations of ERH for small areas makes this option very costly and the equipment needed requires a larger compound.

TABLE 7 - Remedial Alternatives Evaluation / Disproportionate Cost Analysis, Manor Market, 3609 164th Street SW, Lynnwood, Washington 98087

	Alternative 1		Alternative 2		Alternative 3	
Description of Alternative	Alternative 1 includes completing eight additional groundwater monitoring events at 8 of the 11 existing Site monitoring wells, once every 18 months, intended to monitor natural attenuation. Each monitoring event would confirm that groundwater concentrations of COCs decrease in concentration over time, and that no additional plume migration occurs. Institutional controls by legal restrictions on land and on groundwater use to limit potential exposure to contamination through an environmental covenant restricting removal of asphalt containment (capping) in areas that exceed safe concentrations. Alternative 1 includes the sampling events, reporting, confirmatory sampling, and well abandonment.		Alternative 2 includes remediation of any residual PCS and impacted groundwater using a High-Vacuum Dual-Phase Extraction (HVDPE). Also known as multi-phase extraction and vacuum-enhanced extraction, HVDPE is a technology that uses a high vacuum system to remove various combinations of contaminated groundwater, separate-phase petroleum product, and hydrocarbon vapor from the subsurface. Extracted liquids and vapor are treated and collected for disposal, or re-injected to the subsurface. Alternative 2 includes: pilot testing; design, installation, and operation of the HVDPE system; compliance air/groundwater sampling; confirmatory soil sampling; and system/well decommissioning.		Alternative 3 includes limited excavation of PCS (~270 cy) from the area between MW-1 and MW-6 to about 18 feet bgs, applying an amendment (BOS 200®) into the excavation prior to backfill to enhance bioremediation of any residual PCS and impacted groundwater, and in-situ treatment via injection of BOS 200®. From the existing data, the injections would target areas southeast of the bank building (former excavation area) and areas within Commercial Street inaccessible for excavation. A final design would be completed after all site data is compiled, followed by bench scale testing and design optimization testing to review results demonstrating reagent distribution and injection performance. Quarterly performance monitoring of COCs in Site monitoring wells would be performed to demonstrate reduction of COC concentrations and extents of the contaminant plume. Alternative 3 includes the quarterly sampling events, reporting, confirmatory soil sampling, and well abandonment.	
		SCORE		***SCORE***		***SCORE***
Protectiveness						
Overall protectiveness	*Not as protective when complete*	2	*More protective when complete*	4	*More protective when complete*	4
Reduces existing risks	*Reduces risks when implemented*	2	*Reduces risks when implemented*	4	*Reduces risks when implemented*	4
Time required to reduce risk	*Longer duration required with less certainty*	1	*Medium duration to reduce risks*	3	*Medium duration to reduce risks*	3
On-Site risks	*Reduces risks with a moderate level of certainty*	3	*Reduces risks with a moderate level of certainty*	3	*Reduces risks with a moderate level of certainty*	3
Off-Site risks	*Reduces risks with a moderate level of certainty*	3	*Reduces risks with a moderate level of certainty*	3	*Reduces risks with a moderate level of certainty*	3
Improvement in environmental quality	*Lower level of improvement*	2	*Moderate to high level of improvement*	4	*Moderate to high level of improvement*	4
Criterion Score x weighting factor (average 0.30)*		**0.65**		**1.05**		**1.05**
Permanence						
Reduces toxicity, mobility, and volume	*Longer term reduction*	1	*Reduces toxicity, mobility, and volume rapidly. May leave some toxicity in place in the ROW.*	4	*Reduces toxicity, mobility, and volume rapidly. May leave some toxicity in place at depth and in the ROW.*	4
Degree of irreversibility	*Can be reversed*	1	*Irreversible. Waste treated in-situ.*	4	*Irreversible. Waste treated in-situ.*	4
Waste characteristics	*No waste generated from action. Some waste from monitoring.*	4	*Solid waste from monitoring and air treatment operations.*	2	*No waste generated from action. Some waste from monitoring.*	4
Criterion Score x weighting factor (average 0.25)*		**0.50**		**0.83**		**1.00**
Long-Term Effectiveness						
Degree of Certainty	*Less certain*	1	*Moderately certain. May leave some toxicity in place in the ROW.*	4	*Moderately certain. May leave some toxicity in place at depth and in the ROW.*	3
Reliability	*Less reliable*	2	*Reliable and proven*	5	*Newer technology proven for groundwater treatment, less for vadose soil treatment*	4
Residual Risk	*High*	1	*Moderate to low*	4	*Moderate to low*	4
Technology hierarchy	*Low rank - ICs and monitoring*	1	*High rank - treats in-situ*	4	*High rank - off-Site disposal of PCS & treats in-situ*	4
Criterion Score x weighting factor (average 0.20)*		**0.25**		**0.85**		**0.75**
Short-Term Risk Management						
During construction	*Low risk*	5	*Moderate risks associated with system installation, utilities, and traffic*	3	*Moderate risks associated with excavating around utilities, and traffic*	2
Effectiveness of risk management	*Effective*	5	*Moderately effective*	4	*Moderately effective*	4
Criterion Score x weighting factor (average 0.05)*		**0.25**		**0.18**		**0.15**
Implementability						
Technically possible	*Possible, demonstrated at similar sites*	5	*Possible, demonstrated at similar sites. Possible issues with treating residuals in the ROW.*	4	*Possible, demonstrated at similar sites. Possible issues with treating residuals at depth.*	3
Access	*Easily accessible*	5	*Moderately to Easily accessible*	4	*Moderately to Easily accessible*	4
Availability of necessary resources	*Readily available*	5	*Readily available*	5	*Readily available*	5
Monitoring requirements	*High*	1	*Moderate to high level of improvement*	2	*Moderate*	3
Integration with existing features	*No changes required*	5	*Moderate*	3	*No Changes required*	5
Criterion Score x weighting factor (average 0.05)*		**0.21**		**0.18**		**0.20**
Public Concerns						
Public Concerns	*Leaves contamination in place.*	1	*Removes contamination where accessible; & treats contamination in place. May leave residuals in the ROW.*	4	*Removes contamination where accessible; & treats contamination in place. May leave residuals at depth and in the ROW.*	4
Criterion Score x weighting factor (average 0.10)*		**0.10**		**0.40**		**0.40**
Restoration Time Frame						
Restoration Time Frame	*Long time frame (10-15 years)*	1	*Moderate time frame (3-5 years)*	3	*Shortest time frame (2-3 years)*	5
Criterion Score x weighting factor (average 0.05)*		**0.05**		**0.15**		**0.25**
Alternative Benefit Value	2.01		3.64		3.80	
Estimated Alternative Cost to Closure	$91,140		$513,743		$366,890	
Cost per Benefit Value	$45,343		$141,203		$96,550	

* Alternative Benefit Values are determined by multiplying criterion scores by weighting factors described in Section 10.4

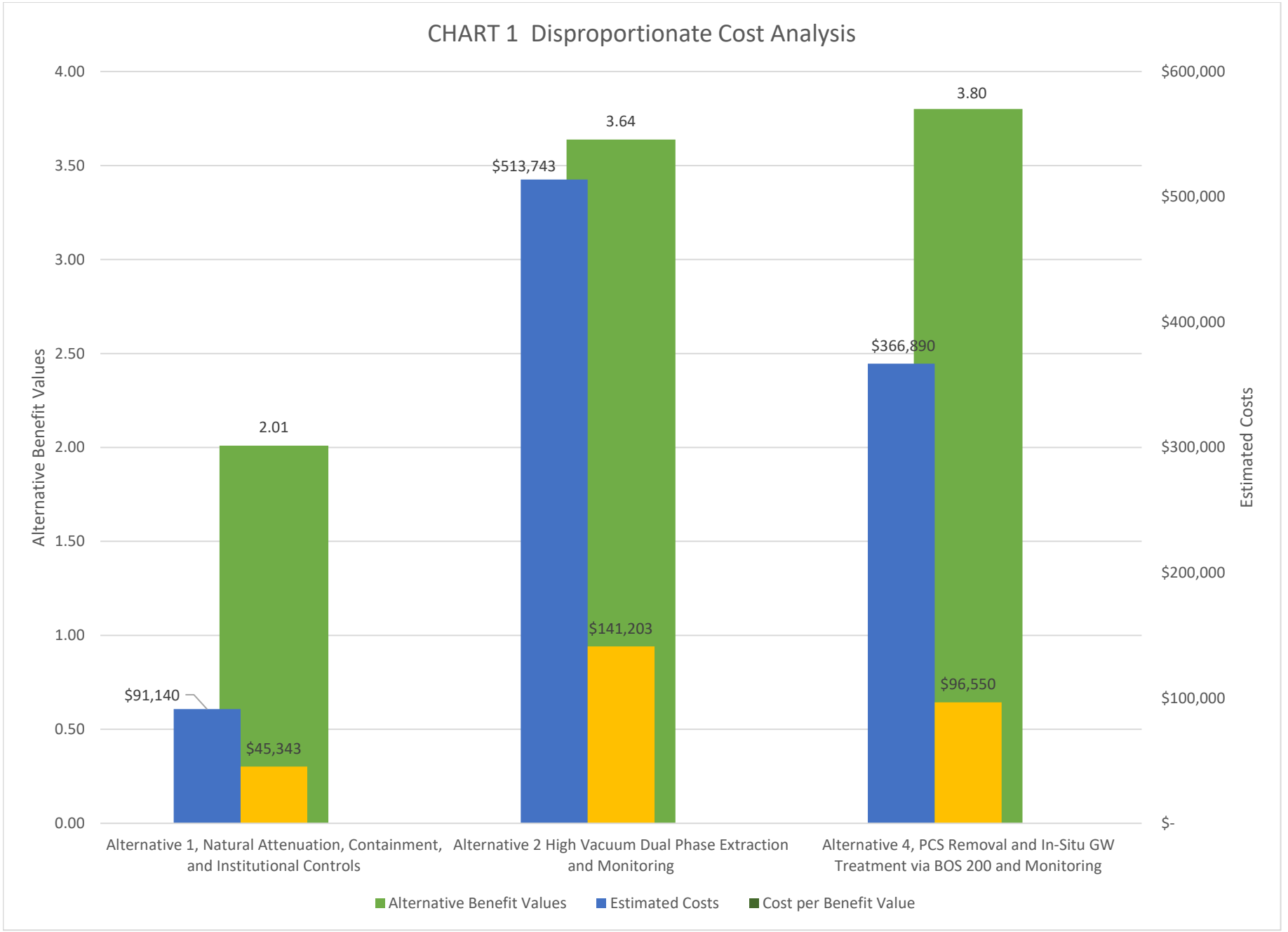
CHART 1 Disproportionate Cost Analysis
Alternative Benefit Values
Estimated Costs
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
$600,000
$500,000
$400,000
$300,000
$200,000
$100,000
$-
2.01
3.64
3.80
$91,140
$45,343
$513,743
$141,203
$366,890
$96,550
Alternative 1, Natural Attenuation, Containment, and Institutional Controls
Alternative 2 High Vacuum Dual Phase Extraction and Monitoring
Alternative 4, PCS Removal and In-Situ GW Treatment via BOS 200 and Monitoring
Alternative Benefit Values
Estimated Costs
Cost per Benefit Value

APPENDIX A

Site Photographs

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Associated Environmental Group, LLC

SITE PHOTOGRAPHIC RECORD

Project No.: 11-124 **Project Name: Manor Market, Lynnwood, WA – Supplemental Characterization**

Photo #1:	View of the retail businesses and Manor Market. View to the northwest from dispenser area.

Photo #2:	Retail stores west of Manor Market. Note dry cleaner on west end, tank pad and canopy is to the right of picture. View is to the northwest.

Photo #3:	View to east and the east vicinity from Site. (Note slope to the east).

Photo #4:	View of hollow stem auger drilling at Boring B-1, adjacent south of previous and current fuel underground storage tanks.

Photo #5:	Completed re-surfacing of AEG Boring B-1. Note the proximity of AEG Boring B-1 to previous investigation location of Envitech boring S-2 in the foreground.

Photo #6:	View of direct push probe drilling at AEG Boring B-2. View is to the east.

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Associated Environmental Group, LLC

SITE PHOTOGRAPHIC RECORD

Project No.: 11-124 **Project Name: Manor Market, Lynnwood, WA – Supplemental Characterization**

Photo #7:	Direct push probe drilling at AEG Boring B-3, on the northeast side of the dispenser islands. View looking to the east.

Photo #8:	Direct push probe drilling at AEG Boring B-4 (note previous Envitech boring S-1 adjacent to drum). View looking to the northeast.

Photo #9:	View of decontamination set up used during investigation. All sampling tools were cleaned between sampling intervals using pressure washer.

Photo #10:	Soil profile collected from boring location B-1. Surface top right, total depth at bottom left. Profile shows the subsurface was predominantly gray, stiff, sandy silt to 22 feet bgs.

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SITE PHOTOGRAPHIC RECORD

Project No.: 11-124 **Project Name: Manor Market –Lynnwood, WA.**

Photo #11:	Installing groundwater monitoring well MW-1. Photo looking Northwest

Photo #12:	Location of groundwater monitoring well MW-1. Photo looking Northeast

Photo #13:	Setting-up drilling rig at location for monitoring well MW-2. Photo looking North

Photo #14:	Drilling of borehole MW-2. Photo looking North

Photo #15:	Drilling borehole MW-3, immediately north of the eastern dispenser. Photo looking South

Photo #16:	Installing groundwater monitoring well MW-3. Photo looking South

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SITE PHOTOGRAPHIC RECORD

Project No.: 11-124 **Project Name: Manor Market –Lynnwood, WA.**

Photo #17:	Location of borehole MW-3. Photo looking south-southeast

Photo #18:	Runoff water with motor oil towards the storm water drain. Photo looking Northwest

Photo #19:	Site looking North from 164th Street

Photo #20:	Site looking west from 36th Avenue

Photo #21:	Well installation/subsurface investigation derived waste contained in 55-gallon drums stored on site

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SITE PHOTOGRAPHIC RECORD

Project No.: 11-124

Project Name: Manor Market

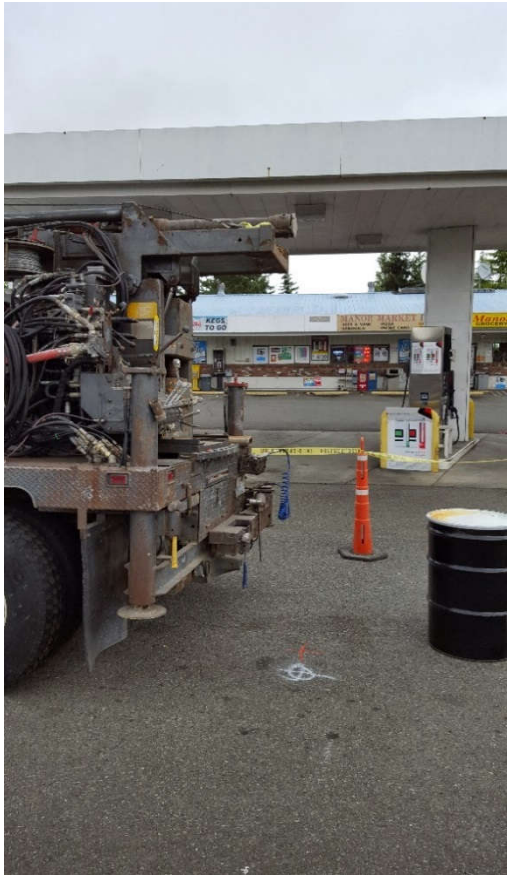

Photo #22: Drilling of MW-6. Photo is looking north.

Photo #23: Soil cuttings from MW-6.

Photo #24: Drilling of MW-5. Photo is looking west.

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SITE PHOTOGRAPHIC RECORD

Project No.: 11-124 **Project Name: Manor Market**

Photo #26:	Soil cuttings from MW-5.

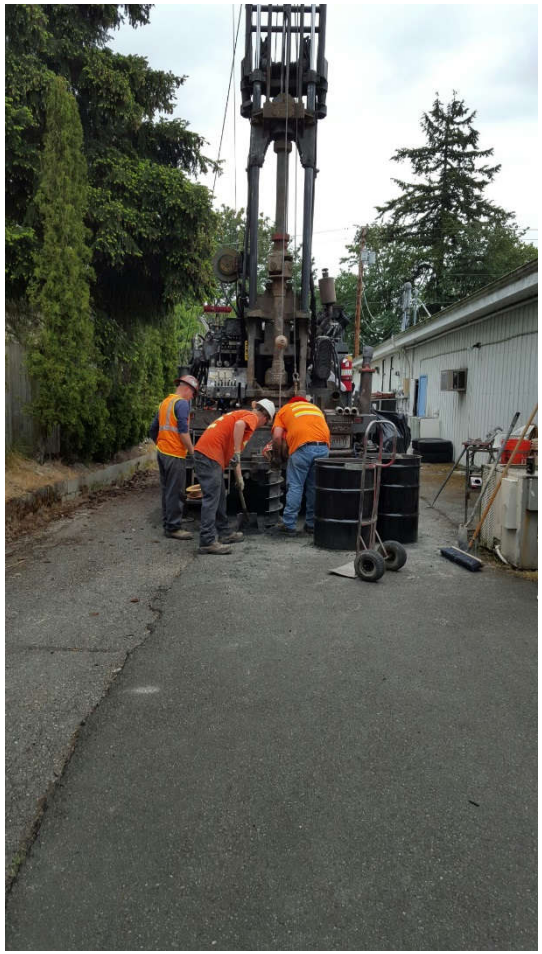

Photo #27	Drilling of MW-9. Photo is looking east.

Photo #28:	Soil cuttings from MW-9.

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SITE PHOTOGRAPHIC RECORD

Project No.: 11-124 **Project Name: Manor Market**

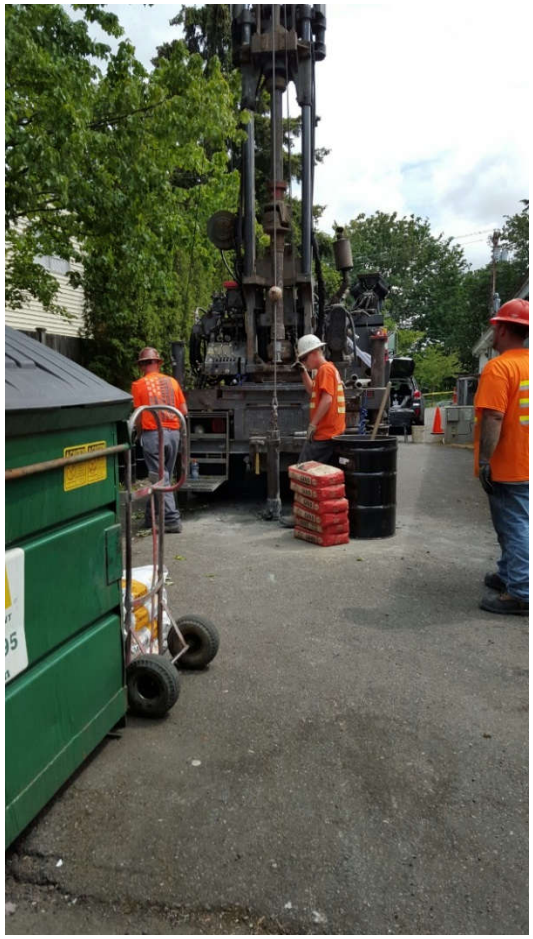								
Photo #29:	Drilling of MW-8. Photo is looking east.		Photo #30:	Soil cuttings from MW-8.		Photo #31:	Drilling of MW-9. Photo is looking northeast.	

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SITE PHOTOGRAPHIC RECORD

Project No.: 11-124 **Project Name: Manor Market**

Photo #32:	Drilling of MW-4. Photo is looking north.

Photo #33:	Soil borings from MW-4.

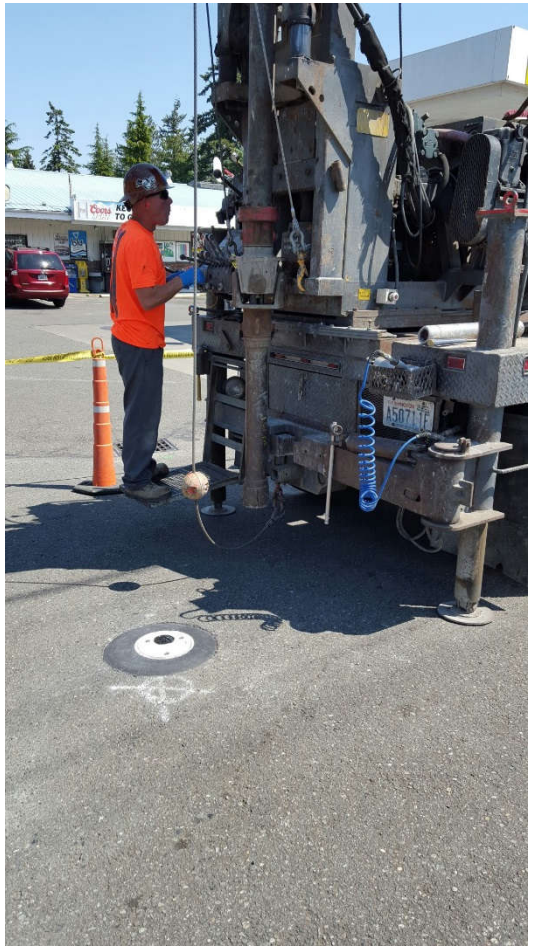

Photo #34:	Setup of B-5. Photo is looking northeast.

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APPENDIX B

Supporting Documents
Boring Logs
Laboratory Datasheets
Terrestrial Ecological Evaluation

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ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Supplemental Site Characterization	**JOB #** 11-124	**BORING #** B-1	**PAGE 1 OF 1**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	ESN - Don Harnden / Brian Bower	**Drilling Method:**	Combo Rig - Hollow Stem Auger	
Date:	8/24/2011	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt surface, 2 inches, underlain by Gray, dry, medium dense, silty gravelly SAND; medium size gravel, coarse grained sand. (FILL)	SW				0920	NA			NA
	At 2-1/2 to 3 ft bgs: Slight petroleum fuel odor .				B1-S1-2.5/3.0	0927		14.6		
5	Gray, dry, medium stiff, sandy SILT with local gravel. Moderate petroleum fuel odor.	ML								
	At 6 ft: 2 inch seam well sorted gravel.				B1-S2-5.5/6.0	0952		9.0		
10	Gray, wet, dense, sandy GRAVEL. Backfill for previous excavation. Surface water in backfill. (FILL)	GP			B1-S3-9.5/10.0	1005		29.3	Not Observed	
	Gray, dry, stiff, sandy SILT, minor fine size gravel, fine grained sand. Indurated silt. (Native Soil)	ML								
15					B1-S4-13.5/14.0	1026		1.8	Not Observed	
	At 17-1/2 ft to 18 ft: becomes stiff to very stiff SILT. No petroleum fuel odor.				B1-S5-17.5/18.0	1041		3.4	Not Observed	
20	Slow drilling - indurated silt.			⊗	B1-S6-19.5/20.0	1058		0.0		
	Gray, wet, dense, Poorly Graded SAND; well sorted medium grained sand.	SP								
	Gray, dry to moist, very stiff, sandy SILT; indurated.									
25	TD at 26 ft bgs. Groundwater encountered at approx. 23 ft to 24 ft bgs ATD. Temporary PVC tremmie placed at 5 ft to 25 ft. Collected Groundwater at 1155.	ML								
26	Boring backfilled with bentonite chips.				B1-S7-25.5/26.0	1132		2.5	Not Observed	

Explanation

- 2-inch O.D. split spoon sample
- ⊗ No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Supplemental Site Characterization	**JOB #** 11-124	**BORING #** B-2	**PAGE 1 OF 1**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	ESN - Don Harnden / Brian Bower	**Drilling Method:**	Combo Rig - Push Probe	
Date:	8/24/2011	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt surface, 2 inches, underlain by Gray, dry, medium dense, silty gravelly SAND; local gravel pieces, local brick pieces (FILL)	SW				1305	NA		Not Observed	NA
					B2-S1-2.5/3.0	1311		0.1		
	Gray, dry, medium stiff to stiff, sandy SILT, fine to medium grained sand. (Native Soil)	ML								
5					B2-S2-5.5/6.0	1316		0.1		
	No petroleum fuel odor.				B2-S3-7.5/8.0	1320		0.1		
10					B2-S4-9.5/10.0	1326		0.1		
					B2-S5-11.5/12.0	1332		0.2		
	At 13 ft: becomes stiff to very stiff. Color grades to dark gray.				B2-S6-13.0	1335		0.1		
15					B2-S7-14.5/15.0	1340		2.8		
					B2-S8-16.5/17.0	1346		9.8		
					B2-S9-18.5/19.0	1352		0.2		
20					B2-S10-20.5/21.0	1406		0.1		
	At 23 ft: dry to moist				B2-S11-22.5/23.0	1413		0.1		
	TD at 25 ft bgs. No groundwater encountered ATD. Boring backfilled with bentonite chips.									
25					B2-S12-24.5/25.0	1426		0.0		

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Supplemental Site Characterization	**JOB #** 11-124	**BORING #** B-3	**PAGE 1 OF 1**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	ESN - Don Harnden / Brian Bower	**Drilling Method:**	Combo Rig - Push Probe	
Date:	8/24/2011	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt surface, 2 inches, underlain by Gray, dry, medium dense, silty gravelly SAND. (FILL)	SW				1442	NA		Not Observed	NA
					B3-S1-2.5/3.0	1445		28.6		
	Gray, dry, medium stiff, sandy SILT, fine to medium grained sand. (Native Soil)	ML								
5	At 4 ft to 6 ft: Strong petroleum fuel odor .				B3-S2-5.5/6.0	1451		1047		
	No petroleum fuel odor.				B3-S3-7.5/8.0	1457		73.6		
10	At 9 ft to 10 ft: moderate petroleum fuel odor.				B3-S4-9.5/10.0	1502		4.5		
					B3-S5-11.5/12.0	1507		5.4		
					B3-S6-13.5/14.0	1510		7.3		
15					B3-S7-15.0/15.5	1514		8.6		
	At 17 ft: no petroleum fuel odor.				B3-S8-17.5/18.0	1519		1.6		
20					B3-S9-19.5/20.0	1525		2.7		
					B3-S10-21.5/22.0	1532		2.2		
	TD at 24 ft bgs. No groundwater encountered ATD. Boring backfilled with bentonite chips.				B3-S11-23.5/24.0	1540		1.1		
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Supplemental Site Characterization	**JOB #** 11-124	**BORING #** B-4	**PAGE 1 OF 1**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**		
Subcontractor/Equipment:	ESN - Don Harnden / Brian Bower	**Drilling Method:**	Combo Rig - Push Probe	
Date:	8/24/2011	**Logged By:**	Y. Van	

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt surface, 2 inches, underlain by Gray, dry, medium dense, silty gravelly SAND. (FILL)	SW				1545	NA		Not Observed	NA
					B4-S1-2.5/3.0	1551		0.0		
	Gray, dry, stiff to very stiff, sandy SILT, fine to medium grained sand. (Native Soil)	ML								
5					B4-S2-5.5/6.0	1600		0.0		
	Refusal at 8 ft.				B4-S3-7.5/8.0	1606		0.0		
	TD at 8 ft bgs. No groundwater encountered ATD. Boring backfilled with bentonite chips.									
10										
15										
20										
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- ATD — Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

Major Divisions (1)	(2)	Letter (3)	Symbols Hatching (4)	Symbols Color (5)	Name (6)
Coarse-Grained Soils	Gravel and Gravelly Soils	GW		Red	Well-graded gravels or gravel-sand mixtures, little or no fines
		GP			Poorly graded gravels or gravel-sand mixtures, little or no fines
		GM		Yellow	Silty gravels, gravel-sand-silt mixtures
		GC			Clayey gravels, gravel-sand-clay mixtures
	Sand and Sandy Soils	SW		Red	Well-graded sands or gravelly sands, little or no fines
		SP			Poorly graded sands or gravelly sands, little or no fines
		SM		Yellow	Silty sands, sand-silt mixtures
		SC			Clayey sands, sand-silt mixtures
Fine-Grained Soils	Silts and Clays LL < 50	ML		Green	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL			Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL			Organic silts and organic silt-clays of low plasticity
	Silts and Clays LL ≥ 50	MH		Blue	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH			Inorganic clays of high plasticity, fat clays
		OH			Organic clays of medium to high plasticity, organic silts
Highly Organic Soils		Pt		Orange	Peat and other highly organic soils

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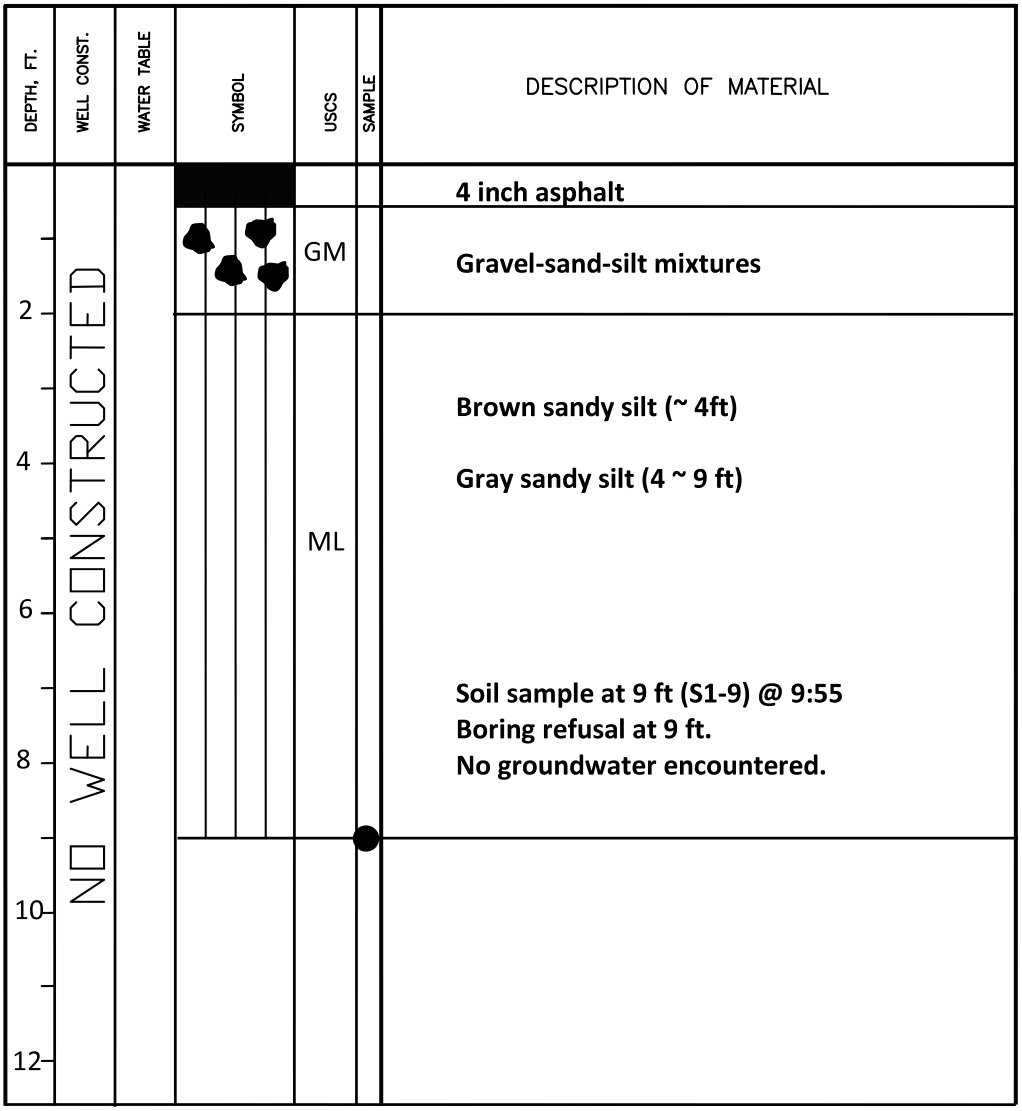
The Unified Soil Classification System (USCS)

April 15, 2011 | **Figure A1**

LOG OF BORING S1



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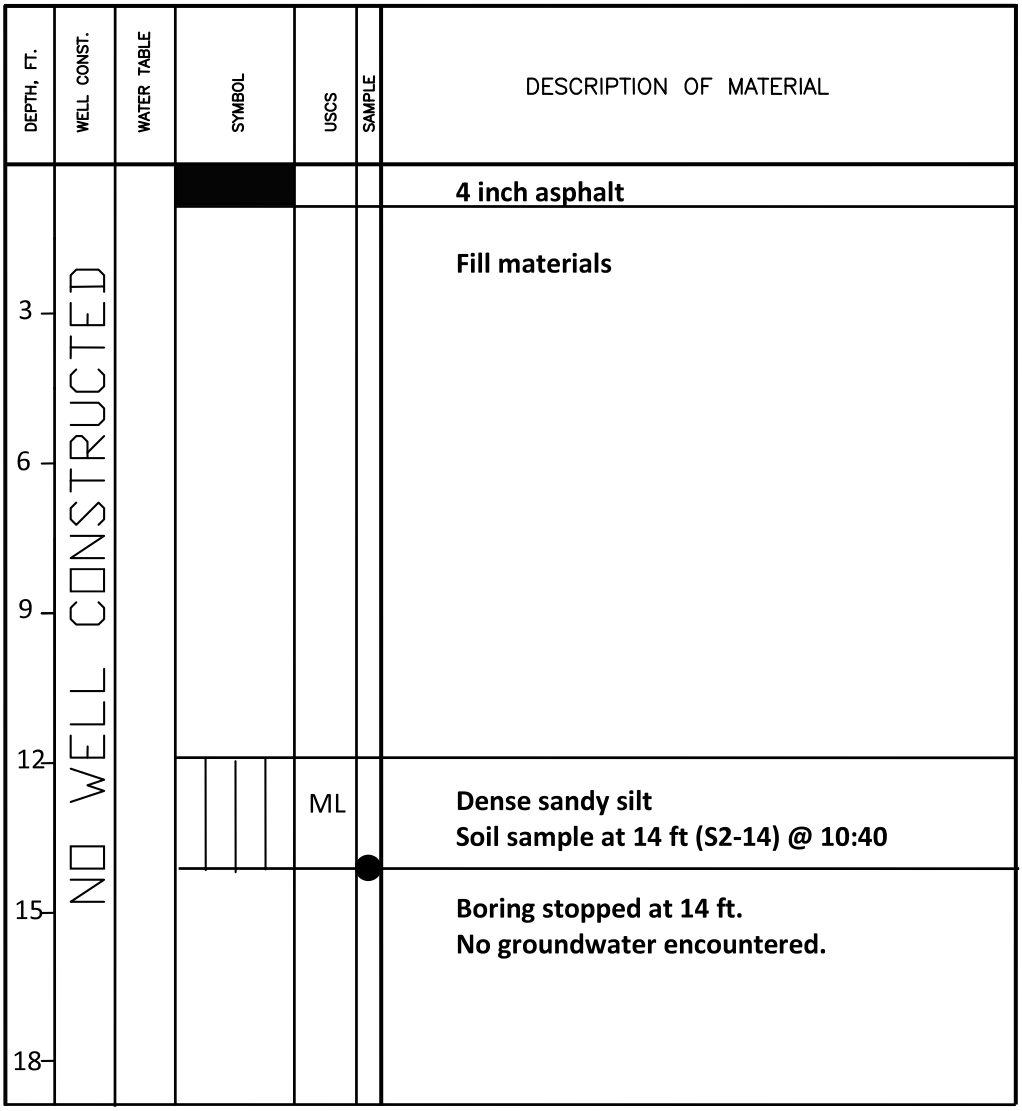
Manor Market

April 15, 2011 | **Figure A2**

LOG OF BORING S2



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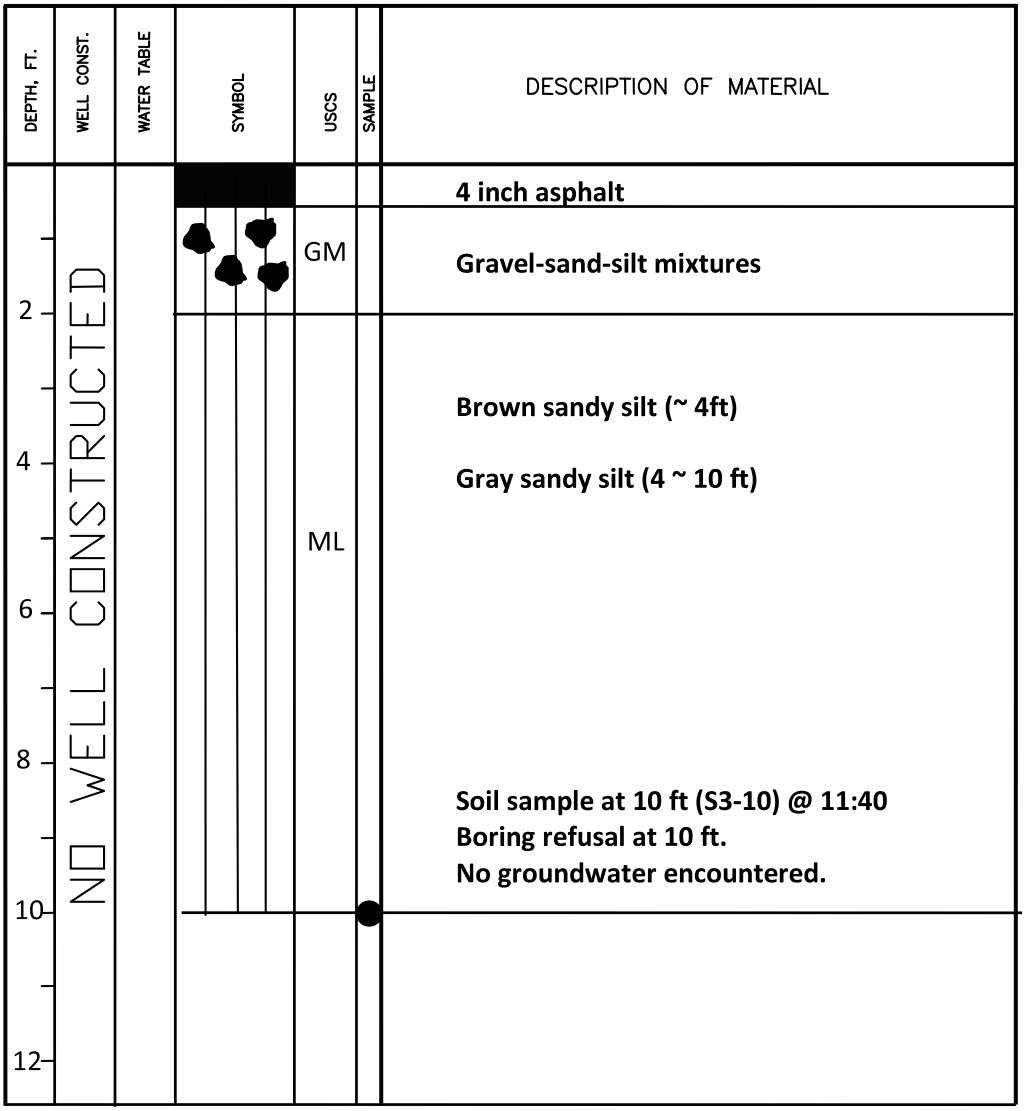
Manor Market

April 15, 2011 | **Figure A3**

LOG OF BORING S3



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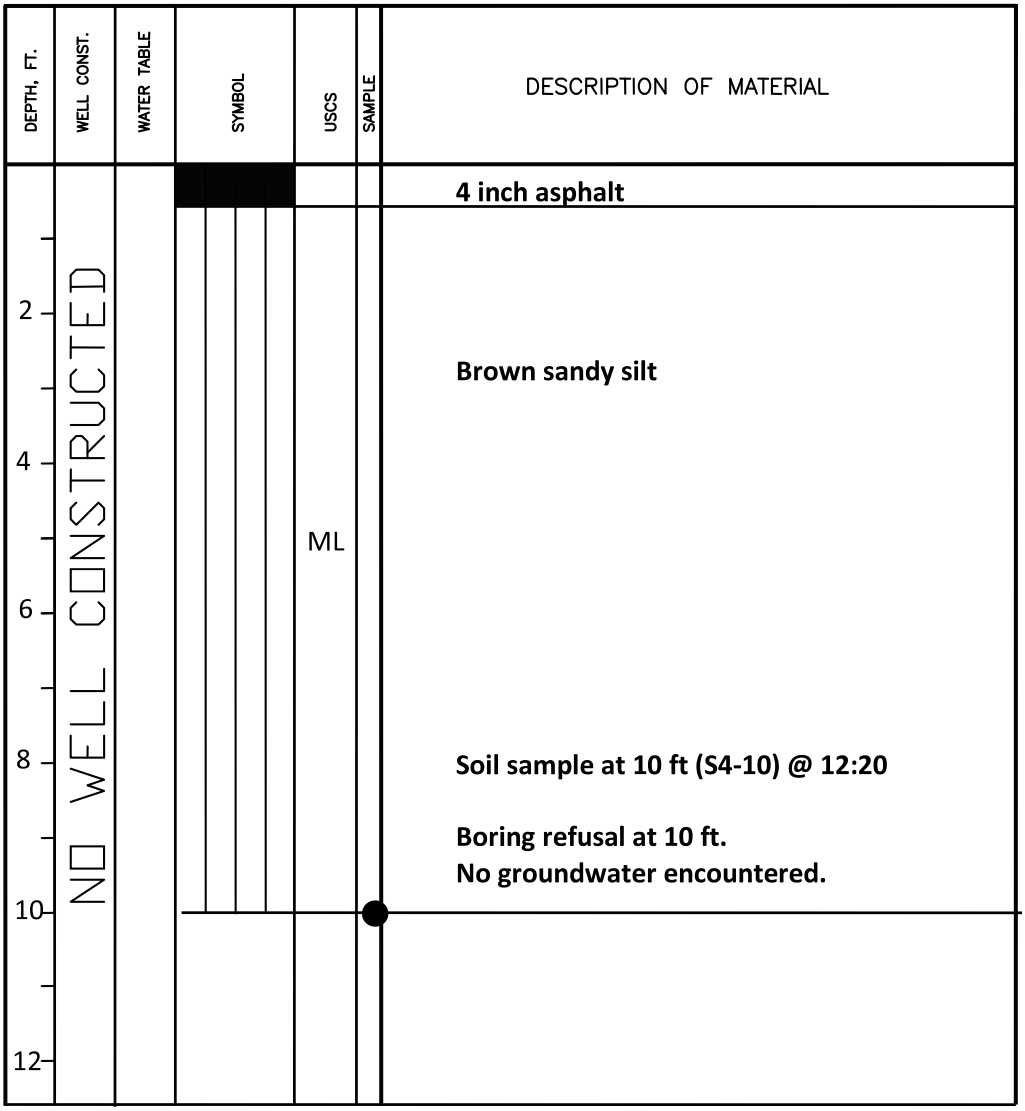
Manor Market

April 15, 2011 | **Figure A4**

LOG OF BORING S4



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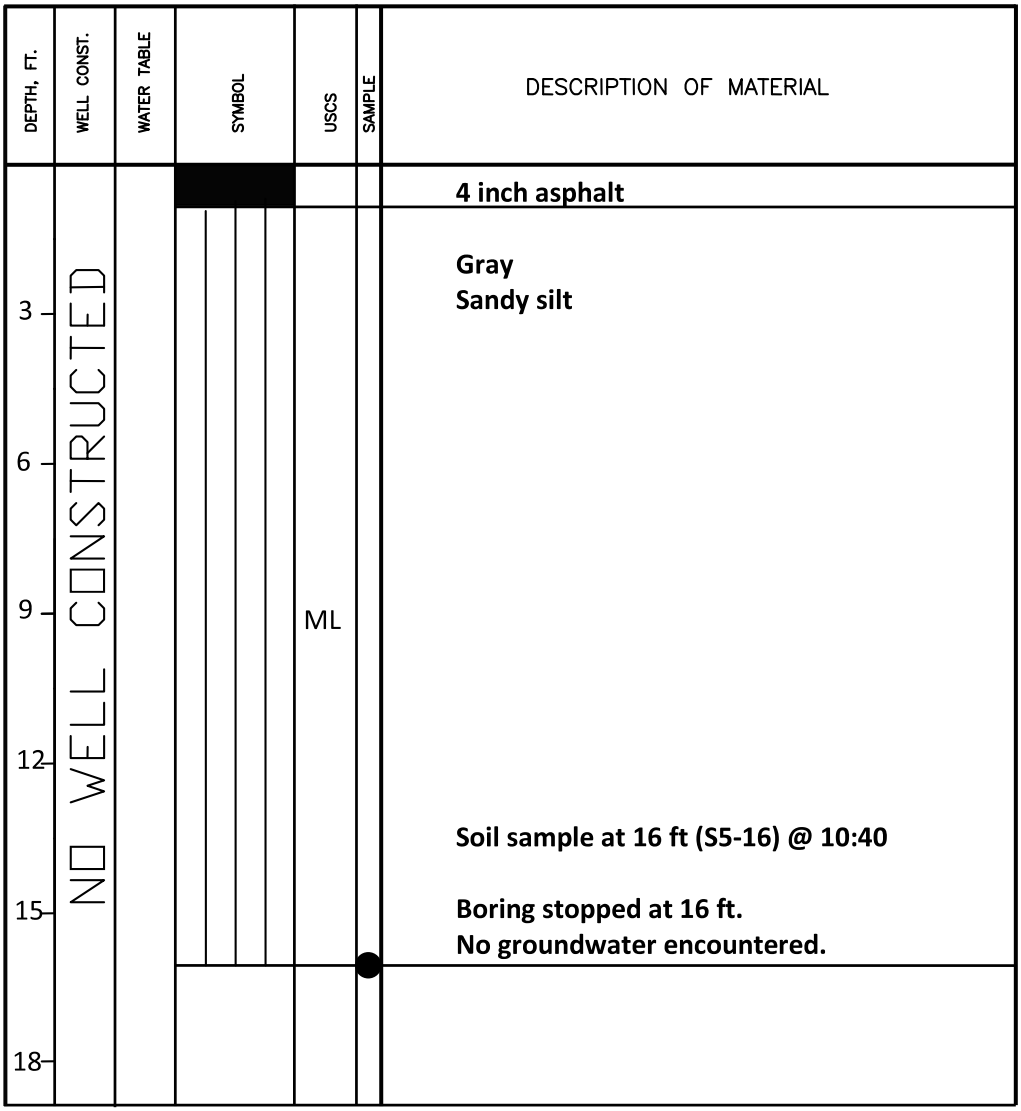
Manor Market

April 15, 2011 | **Figure A5**

LOG OF BORING S5



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Manor Market

April 15, 2011 | **Figure A6**

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Suppl RI - 2nd Phase	**JOB #**	11-124	**BORING #**	MW-1 **PAGE 1 OF 2**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Western States Soil Conservation - CME 75	**Drilling Method:**	Hollow Stem Auger (H.S.A.) / CME 75		
Date:	2/8/2012	**Logged By:**	L. Chaidez		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt surface, 2 inches underlain by Gray, dry, dense, sandy GRAVEL with silt. (FILL)	GP				1030				
5										
10	Greenish-gray, wet, stiff, sandy SILT with clay.	ML							Not Observed	
	Greenish-gray, moist, hard, SILT with fine sand.	ML			MW1-S1-12.0/13.5	1055	17/25/30	1.5	Not Observed	
15										
20										
25	At 23 feet: some fine sand.				MW1-S2-23.0/24.5	1128	11/15/19	0.0		

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Suppl RI - 2nd Phase	**JOB #**	11-124	**BORING #**	MW-1 (cont) **PAGE 2 OF 2**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Western States Soil Conservation - CME 75	**Drilling Method:**	Hollow Stem Auger (H.S.A.) / CME 75		
Date:	2/8/2012	**Logged By:**	L. Chaidez		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
		ML								
30										
	At 30 feet: some fine to medium gravel.	GW			MW1-S3-30.0/31.5	1152	14/21/31	0.0	Not Observed	
35					MW1-S4-35.0/36.5	1213	16/34/50 5"	0.0	Not Observed	
	TD at 36-1/2 feet bgs. Groundwater encountered at approximately 8-1/2 feet bgs ATD. Completed as monitoring well MW-1. Well Schematics: 0.020 slot screen: 20 feet to 35 feet. Colorado Silica Sand 10x20: 18 feet to 35 feet. Bentonite Chips: 1 feet to 18 feet. Cement grout: 1/2 feet to 1 feet. Ecology Well Tag No. BCM 225.									
40										
45										
50										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Suppl RI - 2nd Phase	**JOB #**	11-124	**BORING #**	MW-2 **PAGE 1 OF 2**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Western States Soil Conservation - CME 75	**Drilling Method:**	Hollow Stem Auger (H.S.A.) / CME 75		
Date:	2/8/2012	**Logged By:**	L. Chaidez		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt surface, 2 inches underlain by Brown, dry to moist, medium dense, silty SAND, fine grained sand with fine to coarse gravel. (FILL)	SM				1544				
5										
	Brown, moist, stiff, sandy SILT, fine grained sand, trace of fine gravel, trace of clay.	ML								
10										
	At 13 feet; light gray, trace of coarse gravel									
15										
20	At 19 feet; some fine to medium gravel									
	At 23 feet: trace of fine grained sand, no gravel.				MW2-S1-23.0/24.5	1631	33/38/38	0.0	Not Observed	
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Suppl RI - 2nd Phase	**JOB #**	11-124	**BORING #**	MW-2 (cont) **PAGE 2 OF 2**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Western States Soil Conservation - CME 75	**Drilling Method:**	Hollow Stem Auger (H.S.A.) / CME 75		
Date:	2/8/2012	**Logged By:**	L. Chaidez		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
		ML								
	Light gray, moist, stiff, sandy SILT, fine grained sand, trace medium to coarse gravel.									
30										
35										
	TD at 36-1/2 feet bgs. Groundwater not encountered ATD. Completed as monitoring well MW-2. Well Schematics: 0.020 slot screen: 20 feet to 35 feet. Colorado Silica Sand 10x20: 17 feet to 35 feet. Bentonite Chips: 1 feet to 17 feet. Cement grout: 1/2 feet to 1 feet. Ecology Well Tag No. BCM 230.									
40										
45										
50										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Suppl RI - 2nd Phase	**JOB #**	11-124	**BORING #**	MW-3 **PAGE 1 OF 2**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Western States Soil Conservation - CME 75	**Drilling Method:**	Hollow Stem Auger (H.S.A.) / CME 75		
Date:	2/9/2012	**Logged By:**	L. Chaidez		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
	Asphalt surface, 2 inches underlain by Brown, moist, medium dense, silty SAND, fine to coarse grained sand with fine to coarse gravel. (FILL)	SM				0957				
5	Greenish-gray, moist, stiff, sandy SILT, fine sand, trace fine to medium gravel..	ML								
	At 7 feet: brown, trace of clay, hydrocarbon fuel odor in soil.				MW3-S1-7.0	1028		26.8	Not Observed	
10										
	At 13 feet: light brown, hard, fine gravel.		I	I	MW3-S2-13.0/14.5	1045	13/24/33	0.0	Not Observed	
15										
20										
	Greenish-gray, dry to moist, hard, SILT, trace of fine sand.	ML	I	I	MW3-S3-23.0/24.5	1113	18/35/33	0.0	Not Observed	
25										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well

- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC **LOG OF BOREHOLE**

PROJECT:	Manor Market - Suppl RI - 2nd Phase	**JOB #**	11-124	**BORING #**	MW-3 (cont) **PAGE 2 OF 2**
Location:	3609 - 164th Street SW, Lynnwood, WA	**Approximate Elevation:**			
Subcontractor/Equipment:	Western States Soil Conservation - CME 75	**Drilling Method:**	Hollow Stem Auger (H.S.A.) / CME 75		
Date:	2/9/2012	**Logged By:**	L. Chaidez		

Depth (ft)	Soil Description	Unified Soil Symbol	Sample Type	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well
		ML								
	At 27 feet: trace of clay, trace fine to coarse gravel.									
30	At 29-1/2 feet: gray, moist, silt									
35					MW3-S4-35.0/36.5	1153	18/28/24	0.0	Not Observed	
	TD at 36-1/2 feet bgs. Groundwater not ATD. Completed as monitoring well MW-1. Well Schematics: 0.020 slot screen: 20 feet to 35 feet. Colorado Silica Sand 10x20: 17 feet to 35 feet. Bentonite Chips: 1 feet to 18 feet. Cement grout: 1/2 feet to 1 feet. Ecology Well Tag No. BCM 231.									
40										
45										
50										

Explanation

- 2-inch O.D. split spoon sample
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement

Monitoring Well
- Clean Sand
- Bentonite
- Grout/Concrete
- Screened Casing
- Blank Casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-4*	**PAGE 1 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 28, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Half Foot	PID Reading	Sheen	Monitoring Well Construction
	6" of asphalt underlain by 6" of concrete underlain by;					9:00				
	at 3.0 feet; fill				MW4-4.0	9:06		212		
5										
	Light gray, moist, very stiff, SANDY SILT; fine grain sand with trace fine to medium grain gravel.	ML						4		
					MW4-6.5	9:08	12-16-13	1562		
10								381		
					MW4-11.5	9:13	12-14-15	308		
15	at 14.0 feet; transition to gray									
	at 15.0 feet; hard							11.55		
					MW4-16.5	9:23	13-19-22	607		
20										
								469		
					MW4-21.5	9:30	16-19-30	237		
25								166		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA-863

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-4*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 28, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
30			26		MW4-26.5	9:36	20-20-20	148		
			27							
			28							
			29							
			30					213		
			31		MW4-31.5	9:49	21-16-21	395		
			32							
			33							
			34							
35			35							
			36		MW4-36.5	10:00	50	317		
			37							

Boring terminated at 36.5 feet; converted to MW-4 set with 15' of screen and 20' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-5*	**PAGE 1 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 26, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/ 1/2 Foot	PID Reading	Sheen	Monitoring Well Construction
	3" of asphalt underlain by 6" of concrete;					12:05				
	Brown, moist, medium dense, SILTY SAND; fine grain sand	SM						108		
5	at 5.0 feet; transition to light brown, moist, hard, SANDY SILT; fine sand with trace fine to medium grain gravel	ML			MW5-6.5	12:11	13-16-20	264		
10	at 10.0 feet; gray				MW5-11.5	12:21	20-21-20			
15					MW5-16.5	12:25	18-23-27	68.8		
20					MW5-21.5	12:29	12-15-19	42.9		
25										

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-5*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 26, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
			26							
			27		MW5-26.5	12:38	33-41-50	10.1		
			28							
			29							
30			30							
			31		MW5-31.5	12:46	33-31-40	89.6		
			32							
			33							
			34							
35			35							
			36							
			37		MW5-36.5	12:50	30-30-30	4.8		

Boring terminated at 36.5 feet; converted to MW-5 set with 15' of screen and 20' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: ***Manor Market***	**JOB # *11-124***	**Monitoring Well #** *MW-6*	**PAGE 1 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 26, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
	6" of asphalt underlain by;					8:37				
								659		
5	Gray, moist, medium dense, SILTY SAND; fine grain sand	SP								
	Gray, moist, medium dense, SAND; fine to medium grain sand	SP			MW6-6.5	8:58	2-3-5	667		
10	Gray, wet, medium dense, SAND; fine to medium grain sand	SP								
	at 11.5 feet; moist				MW6-11.5	9:02	1-2-3	6.2		
15										
	Gray, moist, stiff, SANDY SILT; fine grain sand	ML			MW6-16.5	9:11	n/a	4.8		
20										
	at 21.0 feet; trace fine grain gravel				MW6-21.5	9:25	n/a	10.3		
25										

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA-858

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-6*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 26, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
			26							
			27		MW6-26.5	9:33		3.5		
			28							
			29							
30			30							
			31							
			32		MW6-31.5	9:39	30-31-30	5.4		
			33							
			34							
35			35						No	
	Gray, wet, very dense, SAND; fine grain sand	SP								
	Gray, moist, hard, SANDY SILT with trace gravel; fine grain sand, fine grain gravel	ML	36							
			37		MW6-36.5	9:48	26-31-36	6.1		

Boring terminated at 36.5 feet; converted to MW-6 set with 15' of screen and 20' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT:	***Manor Market***	**JOB # *11-124***	**Monitoring Well #** *MW-7* **PAGE 1 OF 2**
Location:	*3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL	
Subcontractor / Driller: Cascade/James		**Equipment / Drilling Method: Full Size Auger/Split Spoon**	
Date:	*May 27, 2015*	**Logged By:**	*B. Dilba*

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
	3" of asphalt underlain by; 3" of concrete underlain by;					14:07				
					MW7-3.0	14:18		266		
	Light brown, moist, medium stiff, SANDY SILT with trace gravel; fine grain sand, fine to medium grain gravel	ML								
5	at 5.0 feet; hard							133		
					MW7-6.5	18:32	30-20-20	25.7		
10								32.0		
					MW7-11.5	14:39	21-20-20	3.0		
15								34.0		
	at 15.5 feet; transition to gray				MW7-16.5	14:48	19-20-28	7.2		
20								56.4		
					MW7-21.5	14:55	24-28-31	29.6		
25								4.7		

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA-862

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-7*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 27, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
			26							
			27		MW7-26.5	15:30	17-21-19	5.3		
			28							
			29							
30			30					0.4		
			31							
			32		MW7-31.5	15:09	17-15-14	54		
			33							
			34							
35			35							
			36					3.6		
			37		MW7-36.5	15:20	32-21-31	3.7		

Boring terminated at 36.5 feet; converted to MW-7 set with 15' of screen and 20' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-8*	**PAGE 1 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 27, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
	6" of asphalt underlain by;					10:56				
								499		
	Light brown, moist, medium stiff, SANDY SILT with trace gravel; fine grain sand, fine to medium grain gravel	ML								
5	at 5.0 feet; hard				MW8-6.5	11:14	15-16-15	2.9		
10					MW8-11.5	11:20	15-11-11	1.9		
15	at 15.0 feet; transition to gray				MW8-16.5	11:28	12-14-20	33.5		
20	at 20.0 feet; stiff				MW8-21.5	11:37	24-28-30	1.6		
	at 22.5 feet; wet	AT								
25										

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- AT — Groundwater level at time of drilling or date of measurement

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA-861

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-8*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 27, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
	at 25.0 feet; moist		26							
			27		MW8-26.5	11:43	24-26-36	4.7		
			28							
			29							
30			30							
			31							
			32		MW8-31.5	11:50	16-20-20	11.5		
			33							
			34							
35			35							
			36							
			37		MW8-36.5	11:58	33-35-41	1.5		

Boring terminated at 36.5 feet; converted to MW-8 set with 15' of screen and 20' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-9*	**PAGE 1 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 27, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
	6" of asphalt underlain by;					8:38				
	Light brown, moist, very stiff, SANDY SILT with trace gravel; fine grain sand, fine to medium grain gravel	ML						95		
5	at 5.0 feet; hard									
	at 6.5 feet; trace fine to medium grain gravel				MW9-6.5	8:56	15-22-29	637		
10	at 11.0 feet; gray				MW9-11.5	9:05	19-22-25	14.6	Slight HC odor	
15	at 17.0 feet; light brown				MW9-16.5	9:11	20-20-20	6.2		
20	at 21.5 feet; gray	▼ AT			MW9-21.5	9:23	16-17-22	32.7		
25										

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- ▼ AT — Groundwater level at time of drilling or date of measurement

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA-860

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-9*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *May 27, 2015*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
30			26 27 28 29 30 31 32 33 34 35 36 37		MW9-26.5	9:29	25-25-26	17.8		
					MW9-31.5	9:34	21-27-21	22.8		
35					MW9-36.5	9:43	33-50-6	7.0		

Boring terminated at 36.5 feet; converted to MW-9 set with 15' of screen and 20' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-10*	**PAGE 1 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *March 24, 2016*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Half Foot	PID Reading	Sheen	Monitoring Well Construction
	12" of asphalt underlain by;					0:00				
5										
	Brown, dry, stiff, SANDY SILT; fine grain sand.	ML			MW10-6.5	9:43	10-16-19	0		
10										
	Brown, dry, stiff, SILT				MW10-11.5	9:41	10-13-21	0		
15										
	at 15.5 feet; transition to moist, gray				MW10-16.5	10:03	15-6-15	0 607		
20										
	@ 20.0'; Interbedded super fine sand layers @20.5'; gray SILT				MW10-21.5	10:17	26-54-6	36.5		
25										

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA-863

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-10*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *March 24, 2016*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
30			26		MW10-26.5	10:29	39-56	26.6		
			27							
			28							
			29							
			30							
			31		MW10-31.5	10:37	30-31-30	20.4		
			32							
			33							
			34							
35			35							
	trace gravel		36							
			37		MW10-36.5	10:49	26-29-30	14.8		

Boring terminated at 36.5 feet; converted to MW-10 set with 20' of screen and 15' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: ***Manor Market***	**JOB # *11-124***	**Monitoring Well #** *MW-11*	**PAGE 1 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *March 24, 2016*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/ 1/2 Foot	PID Reading	Sheen	Monitoring Well Construction
	12" of asphalt underlain by					12:47				
								108		
		SM								
5										
	Gray, dry, siff, SANDY SILT; fine interbedded sands	ML								
					MW11-5	13:08	13-16-20	264		
10										
	Brown, moist, stiff, SILT									
					MW11-10.5	13:14	20-21-20			
15										
	transition to darker gray									
					MW11-15.5	13:23	18-23-27	68.8		
20										
					MW11-20.5	13:42	12-15-19	42.9		
25										

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4-inch bentonite chips
- Silica sand
- 2-inch diameter blank PVC casing from
- 2-inch diameter PVC 0.01 slotted screen

Ecology Tag # BJA

ASSOCIATED ENVIRONMENTAL GROUP, LLC

LOG OF BOREHOLE

PROJECT: *Manor Market*	**JOB # *11-124***	**Monitoring Well #** *MW-11*	**PAGE 2 OF 2**
Location: *3609-164th Street, Lynnwood, Washington*	**Approximate Elevation:** 607 feet AMSL		
Subcontractor / Driller: Cascade/James	**Equipment / Drilling Method: Full Size Auger/Split Spoon**		
Date: *March 24, 2016*	**Logged By:** *B. Dilba*		

Boring Depth (feet)	Soil Description	Unified Soil Symbol	Sample Depth	Sample Recovery	Sample Number	Time	Blows/Foot	PID Reading	Sheen	Monitoring Well Construction
30			26 27 28 29 30 31 32 33 34 35 36 37		MW11-25.5	13:52	33-41-50	10.1		
					MW11-30.5	13:59	33-31-40	89.6		
35					MW11-35.5	14:24	30-30-30	4.8		

Boring terminated at 36.5 feet; converted to MW-11 set with 20' of screen and 15' of blank; backfilled with sand to 2' above the well screen and bentonite chips to 3 feet below ground surface.

Explanation

- Sample Advance / Recovery
- No Recovery
- Contact located approximately
- Groundwater level at time of drilling or date of measurement (AT)

Monitoring Well Construction

- Grout/Concrete
- 3/4 inch bentonite chips
- Silica sand
- 2-inch diameter PVC blank casing
- 2-inch diameter PVC 0.010" slotted casing

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: AEG

ADDRESS: 1018 CAPITOL WAY S # 201, OLYMPIA, WA 98501

PHONE: 360-352-9835 FAX: -8164

CLIENT PROJECT #: 4-127 PROJECT MANAGER: M CHUN

DATE: 8/24/11 PAGE 1 OF 1

PROJECT NAME: MANOR MARKET PH II ESA

LOCATION: 3609 164th St SW, Lynnwood, WA

COLLECTOR: Y. VAN DATE OF COLLECTION 8/24/11

Sample Number	Depth	Time	Sample Type	Container Type	TPH-HCID	TPH - DIESEL & OIL	TPH - GASOLINE	BTEX	VOC 8260CL (PCE breakdown)	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb	Asbestos-PLM	GRO Suite	DRO Suite	WO Suite	NOTES	Total Number of Containers	Laboratory Note Number
1. B1-S3-5.5/6.0	5.5-6	0958	SOIL	VOA, 4oz			X	X														Fuel odor	3	
2. B1-S7-25.5/26	25.5-26	1132	SOIL	VOA, 4oz			X	X															3	
3. B1-W	—	1155	H2O	VOAs			X	X	X														2	
4. B2-S5-11.5/12.0	11.5-12	1332	SOIL	VOA, 4oz			X	X	X	X													3	
5. B2-S8-16.5/17.0	16.5-17.0	1346	SOIL	VOA, 4oz			X	X															3	
6. B3-S2-5.5/6.0	5.5-6.0	1451	SOIL	VOA, 4oz			X	X	X														3	
7. B3-S6-11.5/12.0	11.5-12.0	1507	SOIL	VOA, 4oz			X	X															3	
8. B4-S3-7.5/8.0	7.5-8.0	1606	SOIL	VOA, 4oz			X	X															3	
9.																								
10.																								
11.																								
12.																								
13.																								
14.																								
15.																								
16.																								
17.																								
18.																								

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
	8/24/11 1700		8-27-11/1700
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE DISPOSAL INSTRUCTIONS

☑ ESN DISPOSAL @ $2.00 each ☐ Return ☐ Pickup

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:
PCE breakdown lab analysis for B1-W

Turn Around Time: 24 HR 48 HR (5 DAY)

ESN NORTHWEST CHEMISTRY LABORATORY

AEG
MANOR MARKET PH II ESA
Client Project #11-127
Lynnwood, Washington

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

Analysis of Gasoline Range Organics & BTEX in Soil by Method NWTPH-Gx/8260

Sample Number	Date Prepared	Date Analyzed	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Gasoline Range Organics (mg/kg)	Surrogate Recovery (%)
Method Blank	8/31/2011	8/31/2011	nd	nd	nd	nd	nd	91%
LCS	8/31/2011	8/31/2011	113%	91%	88%	97%	120%	89%
B1-S3-5.5/6.0	8/24/2011	8/31/2011	**1.3**	**2.0**	**5.0**	**12**	**190**	85%
B1-S7-25.5/26	8/24/2011	8/31/2011	**0.11**	nd	nd	**0.11**	**12**	93%
B2-S5-11.5/12.0	8/24/2011	8/31/2011	nd	nd	nd	nd	nd	91%
B2-S8-16.5/17.0	8/24/2011	9/1/2011	nd	nd	nd	nd	nd	92%
B3-S2-5.5/6.0	8/24/2011	8/31/2011	**0.24**	**0.67**	**0.48**	**0.73**	**22**	92%
B3-S6-11.5/12.0	8/24/2011	8/31/2011	nd	nd	nd	nd	nd	101%
B4-S3-7.5/8.0	8/24/2011	8/31/2011	nd	nd	nd	nd	nd	90%
Reporting Limits			0.02	0.05	0.05	0.15	10	

"---" Indicates not tested for component.
"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromoflurorbenzene) & LCS : 65% TO 135%

ESN NORTHWEST CHEMISTRY LABORATORY

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lab@esnnw.com

Analysis of Gasoline Range Organics & BTEX in Water by Method NWTPH-Gx/8260

Sample Number	Date Analyzed	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Gasoline Range Organics (ug/L)	Surrogate Recovery (%)
Method Blank	8/26/2011	nd	nd	nd	nd	nd	87%
LCS	8/26/2011	129%	114%	111%	109%	85%	93%
B1-W	8/26/2011	**170**	**72**	**100**	**280**	**2100**	95%
Reporting Limits		1.0	1.0	1.0	3.0	100	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromoflurorbenzene) & LCS: 65% TO 135%

ESN NORTHWEST CHEMISTRY LABORATORY

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Lynnwood, Washington

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Analysis of Chlorinated Volatile Organic Compounds in Soil by Method 8260

Analytical Results

8260B Chlorinated, µg/kg		**MTH BLK**	**LCS**	**B3-S2-5.5/6.0**
Matrix		Soil	Soil	Soil
Date extracted	Reporting	08/31/11	08/31/11	08/24/11
Date analyzed	Limits	08/31/11	08/31/11	08/31/11
Dichlorodifluoromethane	50	nd		nd
Chloromethane	50	nd		nd
Vinyl chloride	50	nd	70%	nd
Chloroethane	50	nd		nd
Trichlorofluoromethane	50	nd		nd
1,1-Dichloroethene	50	nd	74%	nd
Methylene chloride	20	nd		nd
trans-1,2-Dichloroethene	50	nd		nd
1,1-Dichloroethane	50	nd		nd
cis-1,2-Dichloroethene	50	nd		nd
2,2-Dichloropropane	50	nd		nd
Chloroform	50	nd	104%	nd
Bromochloromethane	50	nd		nd
1,1,1-Trichloroethane	50	nd		nd
1,2-Dichloroethane (EDC)	50	nd		nd
1,1-Dichloropropene	50	nd		nd
Carbon tetrachloride	50	nd		nd
Trichloroethene (TCE)	20	nd	106%	nd
1,2-Dichloropropane	50	nd		nd
Bromodichloromethane	50	nd		nd
cis-1,3-Dichloropropene	50	nd		nd
trans-1,3-Dichloropropene	50	nd		nd
1,1,2-Trichloroethane	50	nd		nd
1,3-Dichloropropane	50	nd		nd
Dibromochloromethane	50	nd		nd
Tetrachloroethene (PCE)	20	nd	75%	nd
Chlorobenzene	50	nd	93%	nd
1,1,1,2-Tetrachloroethane	50	nd		nd
1,1,2,2-Tetrachloroethane	50	nd		nd
1,2,3-Trichloropropane	50	nd		nd
2-Chlorotoluene	50	nd		nd
4-Chlorotoluene	50	nd		nd
1,3-Dichlorobenzene	50	nd		nd
1,4-Dichlorobenzene	50	nd		nd
1,2-Dichlorobenzene	50	nd		nd
1,2-Dibromo-3-Chloropropane	50	nd		nd
1,2,4-Trichlorobenzene	50	nd		nd
Hexachloro-1,3-butadiene	50	nd		nd
1,2,3-Trichlorobenzene	50	nd		nd
Surrogate recoveries				
Dibromofluoromethane		83%	79%	79%
Toluene-d8		81%	67%	78%
4-Bromofluorobenzene		91%	89%	92%

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

AEG
MANOR MARKET PH II ESA
Client Project #11-127
Lynnwood, Washington

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(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**	**B1-W**
Matrix	Reporting	Water	Water	Water
Date analyzed	Limits	08/26/11	08/26/11	08/26/11
Dichlorodifluoromethane	1.0	nd		nd
Chloromethane	1.0	nd		nd
Vinyl chloride	0.2	nd	127%	nd
Chloroethane	1.0	nd		nd
Trichlorofluoromethane	1.0	nd		nd
1,1-Dichloroethene	1.0	nd	135%	nd
Methylene chloride	1.0	nd		nd
trans-1,2-Dichloroethene	1.0	nd		nd
1,1-Dichloroethane	1.0	nd		nd
cis-1,2-Dichloroethene	1.0	nd		nd
2,2-Dichloropropane	1.0	nd		nd
Chloroform	1.0	nd	135%	**2.3**
Bromochloromethane	1.0	nd		nd
1,1,1-Trichloroethane	1.0	nd		nd
1,2-Dichloroethane (EDC)	1.0	nd		nd
1,1-Dichloropropene	1.0	nd		nd
Carbon tetrachloride	1.0	nd		nd
Trichloroethene (TCE)	1.0	nd	124%	nd
1,2-Dichloropropane	1.0	nd		nd
Bromodichloromethane	1.0	nd		nd
cis-1,3-Dichloropropene	1.0	nd		nd
trans-1,3-Dichloropropene	1.0	nd		nd
1,1,2-Trichloroethane	1.0	nd		nd
1,3-Dichloropropane	1.0	nd		nd
Dibromochloromethane	1.0	nd		nd
Tetrachloroethene (PCE)	1.0	nd	95%	nd
Chlorobenzene	1.0	nd	107%	nd
1,1,1,2-Tetrachloroethane	1.0	nd		nd
1,1,2,2-Tetrachloroethane	1.0	nd		nd
1,2,3-Trichloropropane	1.0	nd		nd
2-Chlorotoluene	1.0	nd		nd
4-Chlorotoluene	1.0	nd		nd
1,3-Dichlorobenzene	1.0	nd		nd
1,4-Dichlorobenzene	1.0	nd		nd
1,2-Dichlorobenzene	1.0	nd		nd
1,2-Dibromo-3-Chloropropane	1.0	nd		nd
1,2,4-Trichlorobenzene	1.0	nd		nd
Hexachloro-1,3-butadiene	1.0	nd		nd
1,2,3-Trichlorobenzene	1.0	nd		nd
Surrogate recoveries				
Dibromofluoromethane		118%	103%	91%
Toluene-d8		81%	93%	75%
4-Bromofluorobenzene		87%	93%	95%

Data Qualifiers and Analytical Comments

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

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: FEB. 9, 2012 Page: 1 of 1

Client: AEG
Project Manager: YEN-VY
Address: 1018 CAPITOL WAY S.
Project Name: MANOR MARKET
Phone: (360) 352-9835 Fax:
Location: 3609 164th St. City: LYNNWOOD, WA.
Client Project # 11-124
Collector: LEO CHAIDEZ Date of Collection: FEB. 8-9, 2012

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals			Field Notes
1 MW1-S1/12-13.5	12-13.5	10:55	SOIL	40ml/VOA	✓				✓									3 Containers
2 MW1-S2/23-24.5	23-24.5	11:28			✓				✓									
3 MW1-S3/30-31.5	30-31.5	11:52			✓				✓									
4 MW1-S4/35-36.5	35-36.5	12:13			✓				✓									
5 MW2-S1/23-24.5	23-24.5	4:31			✓				✓									
6 MW3-S1/7.0'	7.0'	10:28			✓				✓									HC ODOR
7 MW3-S2/13-14.5	13-14.5'	10:45			✓				✓									3 containers
8 MW3-S3/23-24.5	23-24.5	11:13			✓				✓									
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]		[signature] 2/10/12 3:11pm	
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks: NORMAL TAT

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

4139 Libby Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@aol.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L120210-2
Client Project # 11-124

Analyses of Gasoline (NWTPH-Gx) & BTEX (EPA Method 8260C) in Soil

Sample Number	Date Analyzed	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Gasoline (mg/kg)	Surrogate Recovery (%)
Method Blank	2/13/12	nd	nd	nd	nd	nd	93
LCS	2/13/12	128%	104%				71
MW1-S1/12-13.5	2/13/12	0.021	nd	nd	nd	nd	85
MW1-S2/23-24.5	2/13/12	0.22	nd	nd	nd	86	86
MW1-S3/30-31.5	2/13/12	0.032	0.11	nd	nd	nd	86
MW1-S4/335-36.5	2/13/12	0.88	nd	nd	nd	nd	89
MW2-S1/23-24.5	2/13/12	nd	nd	nd	nd	nd	89
MW2-S1/23-24.5 Dup	2/13/12	nd	nd	nd	nd	nd	87
MW3-S1/7	2/13/12	0.048	0.20	0.27	1.1	nd	78
MW3-S2/23-24.5	2/13/12	0.036	0.10	nd	nd	nd	88
MW3-S3/13-14.5	2/13/12	nd	nd	nd	nd	nd	86
L120213-10 MS	2/13/12	113%	84%				88
Practical Quantitation Limit		0.02	0.10	0.05	0.15	10	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

Chain of Custody Record

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 03/01/12 Page: 1 of 1

Client: ~~AEG~~

Project Manager: YEN-UY

Address: 1018 CAPITOL WAY S.

Project Name: MANOR MARKET

Phone: (360) 352 9835 Fax:

Location: LYNNWOOD, WA City:

Client Project #

Collector: LEO CHAIBEZ Date of Collection: 03/01/12

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	~~VOA 8021B BTEX Only~~ EA	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	GRO + Pb		Field Notes
1 MW-1	—	11:27	H2O	40 ml		✓				✓						✓		
2 MW-2	—	12:04	↓	↓		✓				✓						✓		
3 MW-3	—	12:37	↓	↓		✓				✓						✓		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		

Relinquished by:	Date / Time	Received by:	Date / Time
LChaidez	03/01/12	[signature]	3/1/12 3:10 pm
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

T.A.T

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L120301-2

Specific Halogenated and Aromatic Hydrocarbons (EPA 8260C) in Water

Sample Description		Method Blank	MW-1	MW-2	MW-3
Date Sampled		N/A	03/01/12	03/01/12	03/01/12
Date Analyzed		03/04/12	03/04/12	03/04/12	03/04/12
	PQL (ug/l)	(ug/l)	(ug/l)	(ug/l)	(ug/l)
Benzene	1.0	nd	9.9	nd	nd
Toluene	1.0	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd
Total Xylenes	1.0	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd
Methyl tert-Butyl Ether (MTBE)	5.0	nd	nd	nd	nd
Surrogate Recovery					
Dibromofluoromethane		67	79	77	77
1,2-Dichloroethane-d4		71	80	68	71
Toluene-d8		135	110	126	108
4-Bromofluorobenzene		114	115	111	115

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%
ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L120301-2

QA/QC Data - EPA 8260C Analyses

Sample Identification: L120228-1							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (ug/l)	Measured Conc. (ug/l)	Spike Recovery (%)	Spiked Conc. (ug/l)	Measured Conc. (ug/l)	Spike Recovery (%)	
Benzene	10	10.7	107	10	12.1	121	12.3
Toluene	10	13.4	134	10	13.1	131	2.3
Surrogate Recovery							
Dibromofluoromethane			71			74	
1,2-Dichloroethane-d4			69			67	
Toluene-d8			105			121	
4-Bromofluorobenzene			115			116	

Laboratory Control Sample			
	Spiked Conc. (ug/l)	Measured Conc. (ug/l)	Spike Recovery (%)
Benzene	10	10.2	102
Toluene	10	12.6	126
Surrogate Recovery			
Dibromofluoromethane			73
1,2-Dichloroethane-d4			83
Toluene-d8			128
4-Bromofluorobenzene			116

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%
ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L120301-2

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (ug/l)
Method Blank	3/4/12	135	nd
MW-1	3/4/12	110	nd
MW-2	3/4/12	126	nd
MW-3	3/4/12	108	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Trifluorotoluene): 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L120301-2

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (ug/l)
Method Blank	3/10/12	nd
MW-1	3/10/12	nd
MW-1 Dup	3/10/12	nd
MW-2	3/10/12	nd
MW-3	3/10/12	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L120301-2

QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (ug/l)
LCS	3/10/12	111%
MW-1 MS	3/10/12	87%
MW-1 MSD	3/10/12	90%
RPD	3/10/12	3.1
Practical Quantitation Limit		5.0

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

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Olympia, WA 98506
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Fax: 360-352-4154

Date: 11/20/12 Page: 1 of 1

Client: AEG
Project Manager: Yen-Vy Van
Address: 605 11th AVE SE, Suite 201
Project Name: Manor Market
City: Olympia State: WA Zip: 98501
Location: Lynwood WA City, State:
Phone: (360) 352-9835 Fax:
Collector: Jeff Wilson Date of Collection: 11/20/12
Client Project # 11-124
Email:

Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	GRO + Pb		Field Notes
1 ~~MW-1W~~	—		Water	VOA/Poly					✓						✓			Dry well
2 MW-2W	—	13:07	↓						✓						✓			
3 MW-3W	—	13:45	↓						✓						✓			
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		

Relinquished by:	Date / Time	Received by:	Date / Time
		Jeff	11/20/12 9:00
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

STD

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynwood, Washington
Libby Project # L121121-1
Client Project # 11-124

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/l)
Method Blank	11/26/12	95	nd
MW-2W	11/26/12	101	nd
MW-3W	11/26/12	100	nd
MW-3W Dup	11/26/12	95	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynwood, Washington
Libby Project # L121121-1
Client Project # 11-124

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		Method Blank	MW-2	MW-3	MW-3 Dup
Date Sampled		N/A	11/20/12	11/20/12	11/20/12
Date Analyzed	PQL (µg/l)	11/26/12 (µg/l)	11/26/12 (µg/l)	11/26/12 (µg/l)	11/26/12 (µg/l)
Benzene	1.0	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd
Total Xylenes	1.0	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE	5.0	nd	nd	nd	nd
Surrogate Recovery					
Dibromofluoromethane		101	102	94	94
1,2-Dichloroethane-d4		95	81	82	83
Toluene-d8		95	101	100	95
4-Bromofluorobenzene		95	93	104	96

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination

* INSTRUMENT DETECTION LIMIT
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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MANOR MARKET PROJECT
AEG, LLC
Lynwood, Washington
Libby Project # L121121-1
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification:	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
Benzene	10	10.5	105	10	10.1	101	3.9
Toluene	10	13.0	130	10	12.9	129	0.8
Surrogate Recovery							
Dibromofluoromethane			113			111	
1,2-Dichloroethane-d4			95			100	
Toluene-d8			118			119	
4-Bromofluorobenzene			98			95	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	9.9	99
Toluene	10	12.5	125
Surrogate Recovery			
Dibromofluoromethane			112
1,2-Dichloroethane-d4			100
Toluene-d8			118
4-Bromofluorobenzene			100

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynwood, Washington
Libby Project # L121121-1
Client Project # 11-124

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead µg/L
Method Blank	11/21/12	nd
MW-2W	11/21/12	nd
MW-3W	11/21/12	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynwood, Washington
Libby Project # L121121-1
Client Project # 11-124

QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	11/21/12	118%
L121120-1 MS	11/21/12	103%
L121120-1 MSD	11/21/12	104%
RPD	11/21/12	0%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

Chain of Custody Record

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Date: 3/28/2013 Page: 1 of 1

Client: AEG
Project Manager: Mike Chun
Address: 605 11th AVE SE, Suite 201
Project Name: Manor Market
City: Olympia State: WA Zip: 98501
Location: Lynwood WA City, State:
Phone: (360) 352-9835 Fax:
Collector: Jeff Wilson Date of Collection: 3/28/2013
Client Project # 11-124
Email: jwilson@aegwa.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	GRO + Pb		Field Notes
1	MW-1W	—	13:34	Water	VOA/Poly						✓						✓		
2	MW-2W	—	12:17	↓							↓						↓		
3	MW-3W	—	12:47	↓							↓						↓		
4																			
5																			
6																			
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9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

Relinquished by:	Date / Time	Received by:	Date / Time
Jeff Wilson	3/28/13 16:10	[signature]	3-28-13 16:10

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

TAT: 24HR 48HR (5-DAY)

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130328-4
Client Project # 11-124

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/l)
Method Blank	4/3/13	104	nd
MW-1W	4/3/13	95	nd
MW-2W	4/3/13	95	nd
MW-3W	4/3/13	91	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130328-4
Client Project # 11-124

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		Method Blank	MW-1W	MW-2W	MW-3W
Date Sampled		N/A	3/28/13	3/28/13	3/28/13
Date Analyzed	PQL (µg/l)	4/3/13 (µg/l)	4/3/13 (µg/l)	4/3/13 (µg/l)	4/3/13 (µg/l)
Benzene	1.0	nd	13.0	nd	nd
Toluene	1.0	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd
Total Xylenes	1.0	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE	5.0	nd	76.0	nd	8.3
Surrogate Recovery					
Dibromofluoromethane		85	97	96	74
1,2-Dichloroethane-d4		115	122	125	963
Toluene-d8		104	95	95	91
4-Bromofluorobenzene		99	98	103	100

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination

* INSTRUMENT DETECTION LIMIT
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130328-4
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: L130331-3						
	Matrix Spike			Matrix Spike Dup		
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	10.6	106	10	11.4	114
Toluene	10	8.8	88	10	9.3	93
Surrogate Recovery						
Dibromofluoromethane			122			110
1,2-Dichloroethane-d4			128			110
Toluene-d8			120			118
4-Bromofluorobenzene			109			103

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	11.3	113
Toluene	10	10.5	105
Surrogate Recovery			
Dibromofluoromethane			84
1,2-Dichloroethane-d4			110
Toluene-d8			105
4-Bromofluorobenzene			101

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130328-4
Client Project # 11-124

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead µg/L
Method Blank	4/3/13	nd
MW-1W	4/3/13	nd
MW-2W	4/3/13	nd
MW-3W	4/3/13	6.8
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130328-4
Client Project # 11-124

QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	4/3/13	110%
L130327-3 MS	4/3/13	109%
L130327-3 MSD	4/3/13	115%
RPD	4/3/13	5%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

4139 Libby Road NE • Olympia, WA 98506-2518

June 11, 2013

Michael Chun
Associated Environmental Group, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501

Dear Mr. Chun:

Please find enclosed the analytical data report for the Manor Market Project located in Lynnwood, Washington. Water samples were analyzed for Gasoline by NWTPH-Gx, Total Lead by EPA Method 7421 and Specific Halogenated and Aromatic Hydrocarbons by EPA Method 8260C on June 3 & 5, 2013.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. An invoice for this analytical work is enclosed.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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,

Jamie L. Deyman
President
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@aol.com

www.LibbyEnvironmental.com

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130530-7
Client Project # 11-124

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/l)
Method Blank	6/5/13	98	nd
MW-1W	6/5/13	108	nd
MW-1W Dup	6/5/13	103	nd
MW-2W	6/5/13	99	nd
MW-3W	6/5/13	101	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Kyle Williams

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130530-7
Client Project # 11-124

Specific Halogenated and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		Method Blank	MW-1W	MW-1W Dup	MW-2W	MW-3W
Date Sampled		N/A	5/30/13	5/30/13	5/30/13	5/30/13
Date Analyzed	PQL (µg/l)	6/5/13 (µg/l)	6/5/13 (µg/l)	6/5/13 (µg/l)	6/5/13 (µg/l)	6/5/13 (µg/l)
Benzene	1.0	nd	13.2	12.9	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	nd
Total Xylenes	1.0	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd
Total Naphthalenes	5.0	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	94.8	111	nd	8.0
Surrogate Recovery						
Dibromofluoromethane		92	92	85	86	82
1,2-Dichloroethane-d4		87	87	93	98	96
Toluene-d8		110	108	103	99	101
4-Bromofluorobenzene		100	96	102	105	102

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* INSTRUMENT DETECTION LIMIT
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Kyle Williams

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130530-7
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW-2W							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
Benzene	10	10.4	104	10	10.6	106	1.9
Toluene	10	9.7	97	10	9.6	96	1.0
Surrogate Recovery							
Dibromofluoromethane			86			83	
1,2-Dichloroethane-d4			94			91	
Toluene-d8			102			100	
4-Bromofluorobenzene			102			101	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	10.1	101.0
Toluene	10	10.4	104.0
Surrogate Recovery			
Dibromofluoromethane			92
1,2-Dichloroethane-d4			87
Toluene-d8			110
4-Bromofluorobenzene			100

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Kyle Williams

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130530-7
Client Project # 11-124

Analyses of Total Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead µg/L
Method Blank	6/3/13	nd
MW-1W	6/3/13	19.9
MW-2W	6/3/13	nd
MW-3W	6/3/13	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Jamie Deyman

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L130530-7
Client Project # 11-124

QA/QC for Lead in Water by EPA Method 7421

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	6/3/13	97%
L130530-2 MS	6/3/13	106%
L130530-2 MSD	6/3/13	106%
RPD	6/3/13	0%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Jamie Deyman

Libby Environmental, Inc.

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Chain of Custody Record

Client: AEG
Address: 605 11th AVE SE Suite 201
Phone: (360) 352-9835 Fax:
Client Project # 11-124

Date: 5/30/13 Page: 1 of 1
Project Manager: Mike Chun
Project Name: Manor Market
Location: 3609 164 st. SW City: Lynnwood
Collector: Jeff Wilson Date of Collection: 5/30/13

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	GRO+136	MTBE GRO 8260-1	Field Notes
1	MW-1W	—	13:18	Water	VOA/Poly						↓					↓	↓	X	
2	MW-2W	—	11:55	↓	↓													X	
3	MW-3W	—	12:42	↓	↓						↓					↓	↓	X	
4																			
5																			
6																			
7																			
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17																			
18																			

Relinquished by:	Date / Time	Received by:	Date / Time
Jeff Wilson	5/30/13 16:25	[signature]	5/30/13 16:25
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

Standard T.A.T

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.
4139 Libby Road NE • Olympia, WA 98506-2518

June 12, 2015

Nicolas Pushckor
Associated Environmental Group, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501

Dear Mr. Pushckor:

Please find enclosed the analytical data report for the Manor Market Project located in Lynnwood, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@aol.com

Libby Environmental, Inc.

4139 Libby Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@aol.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150527-1
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Soil

Sample Description		Method Blank	MW5-6.5	MW5-16.5	MW5-21.5	MW5-36.5	MW6-6.5
Date Sampled		N/A	5/26/15	5/26/15	5/26/15	5/26/15	5/26/15
Date Analyzed	PQL (mg/kg)	6/1/15 (mg/kg)	6/1/15 (mg/kg)	6/1/15 (mg/kg)	6/1/15 (mg/kg)	6/2/15 (mg/kg)	6/1/15 (mg/kg)
Benzene	0.02	nd	nd	nd	nd	nd	1.87
Toluene	0.03	nd	nd	nd	nd	nd	1.15
Ethylbenzene	0.03	nd	nd	nd	nd	nd	1.62
Total Xylenes	0.03	nd	nd	nd	nd	nd	4.38
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd	nd	<0.20
Gasoline	10	nd	nd	nd	nd	nd	3230
Surrogate Recovery							
Dibromofluoromethane		98	91	95	94	103	91
1,2-Dichloroethane-d4		94	94	97	87	104	96
Toluene-d8		93	92	104	106	94	104
4-Bromofluorobenzene		102	103	105	101	103	97

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150527-1
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Soil

Sample Description		MW6-21.5	MW6-36.5	MW6-36.5 Dup
Date Sampled		5/26/15	5/26/15	5/26/15
Date Analyzed	PQL (mg/kg)	6/1/15 (mg/kg)	6/1/15 (mg/kg)	6/1/15 (mg/kg)
Benzene	0.02	nd	nd	nd
Toluene	0.03	nd	nd	nd
Ethylbenzene	0.03	nd	nd	nd
Total Xylenes	0.03	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	0.078	0.052
Gasoline	10	nd	nd	nd
Surrogate Recovery				
Dibromofluoromethane		94	93	96
1,2-Dichloroethane-d4		104	96	91
Toluene-d8		101	93	92
4-Bromofluorobenzene		104	102	100

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150527-1
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW6-36.5							
	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	
Benzene	0.5	0.46	92	0.5	0.48	96	4.3
Toluene	0.5	0.45	90	0.5	0.47	94	4.3
Surrogate Recovery							
Dibromofluoromethane			93			96	
1,2-Dichloroethane-d4			81			95	
Toluene-d8			93			106	
4-Bromofluorobenzene			101			105	

Laboratory Control Sample			
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)
Benzene	0.5	0.37	74
Toluene	0.5	0.38	76
Surrogate Recovery			
Dibromofluoromethane			99
1,2-Dichloroethane-d4			92
Toluene-d8			92
4-Bromofluorobenzene			101

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

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Ph: 360-352-2110
Fax: 360-352-4154

Date: ~~5/26/15~~ 5/26/15 Page: 1 of 1

Client: AEG

Project Manager: N. Rostocker

Address: 605 11th Ave SE Suite 201

Project Name: Manor Market

City: Olympia State: WA Zip: 98501

Location: 3609 - Hwy 64th St City, State: Lynnwood, WA

Phone: (360) 352-9835 Fax:

Collector: B. Dalby Date of Collection: 5/26/15

Client Project # 11-124

Email: nrostocker@aegwa.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	420-830-1 Suite + BTEX, EDC	Field Notes
FED 264 607	1 MW5-6.5	6.5	12:11	Soil	4oz / VOA											X	X	as per Kurt Telecon
68.8	2 MW5-11.5	11.5	12:21													X	X	
42.9	3 MW5-16.5	16.5	12:25													X	X	
61	4 MW5-21.5	21.5	12:29													X	X	
57.6	5 MW5-26.5	26.5	12:38													X	X	
4.8	6 MW5-31.5	31.5	12:46													X	X	
607	7 MW5-36.5	36.5	12:50													X	X	
62	8 MW6-6.5	6.5	08:58													X	X	odor
4.8	9 MW6-21.5	21.5	09:25													X	X	
10.3	10 MW6-26.5	26.5	0933													X	X	
	11 MW6-36.5	36.5	0948													X	X	
	12 ~~FIELD~~	—		H2O	VOA x3 / poly											X		not included
	13																	
	14																	
	15																	
	16																	
	17																	

Relinquished by:	Date / Time	Received by:	Date / Time
	5/26/15 1743	Rodney Ellery	5-27-15 9:00 AM
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:
Hold until Kurt looks @ these.
Per M. Chun

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.
4139 Libby Road NE • Olympia, WA 98506-2518

June 12, 2015

Nicolas Pushckor
Associated Environmental Group, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501

Dear Mr. Pushckor:

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Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150605-1
Client Project # 11-124

Volatile Organic Compounds by EPA Method 8260C in Water

Sample Description		Method Blank	MW9	MW8	MW7
Date Sampled	Reporting	N/A	6/4/15	6/4/15	6/4/15
Date Analyzed	Limits (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)
Chloromethane	1.0	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd
Chloroethane	1.0	nd	nd	nd	nd
1,1-Dichloroethene	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
2,2-Dichloropropane	1.0	nd	nd	nd	nd
cis -1,2-Dichloroethene	1.0	nd	nd	nd	nd
Chloroform	1.0	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd
1,2-Dichloropropane	1.0	nd	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
Tetrachloroethene (PCE)	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
Surrogate Recovery					
Dibromofluoromethane		109	103	102	119
1,2-Dichloroethane-d4		108	107	99	122
Toluene-d8		109	104	97	96
4-Bromofluorobenzene		114	110	113	123

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

*ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150605-1
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW9							
	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	
1,1-Dichloroethene	10	7.2	72	10	7.2	72	0.0
Chlorobenzene	10	10.8	108	10	10.5	105	2.8
Trichloroethene (TCE)	10	8.4	84	10	8.1	81	3.6
Surrogate Recovery							
Dibromofluoromethane			90			88	
1,2-Dichloroethane-d4			98			96	
Toluene-d8			96			98	
4-Bromofluorobenzene			101			102	

Laboratory Control Sample			
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)
1,1-Dichloroethene	10	10.5	105
Chlorobenzene	10	12.9	129
Trichloroethene (TCE)	10	11.9	119
Surrogate Recovery			
Dibromofluoromethane			103
1,2-Dichloroethane-d4			101
Toluene-d8			99
4-Bromofluorobenzene			118

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150605-1
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		Method Blank	MW4	MW2	MW6	MW5	MW1
Date Sampled		N/A	6/4/15	6/4/15	6/4/15	6/4/15	6/4/15
Date Analyzed	PQL (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)	6/5/15 (ug/L)
Benzene	1.0	nd	470	nd	54	nd	3.9
Toluene	2.0	nd	nd	nd	2.5	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	nd	nd
Total Xylenes	3.0	nd	nd	nd	7.0	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	1740	12.3	nd	nd	315
Gasoline	100	nd	nd	nd	1380	nd	nd
Surrogate Recovery							
Dibromofluoromethane		109	90	106	97	109	107
1,2-Dichloroethane-d4		108	96	104	107	109	105
Toluene-d8		109	96	105	99	104	106
4-Bromofluorobenzene		114	107	113	110	113	113

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150605-1
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		MW1 Dup
Date Sampled		6/4/15
Date Analyzed	PQL (ug/L)	6/5/15 (ug/L)
Benzene	1.0	3.7
Toluene	2.0	nd
Ethylbenzene	1.0	nd
Total Xylenes	3.0	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	351
Gasoline	100	nd
Surrogate Recovery		
Dibromofluoromethane		101
1,2-Dichloroethane-d4		97
Toluene-d8		103
4-Bromofluorobenzene		113

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150605-1
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW9							
	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	
Benzene	10	9.2	92	10	8.0	80	14.0
Toluene	10	8.4	84	10	8.1	81	3.6
Surrogate Recovery							
Dibromofluoromethane			90			88	
1,2-Dichloroethane-d4			98			96	
Toluene-d8			96			98	
4-Bromofluorobenzene			101			102	

Laboratory Control Sample			
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)
Benzene	10	12.10	121
Toluene	10	12.90	129
Surrogate Recovery			
Dibromofluoromethane			103
1,2-Dichloroethane-d4			101
Toluene-d8			99
4-Bromofluorobenzene			118

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

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Fax: 360-352-4154

Date: 6/4/15 6/5/15 Page: 1 of 1

Client: AEG

Project Manager:

Address: 605 11th Ave SE, Suite 201

Project Name: Manor MARKET

City: Olympia State: WA Zip: 98501

Location: 3609-164th st SW City, State: Lynnwood, WA

Phone: (360) 352-9825 Fax:

Collector: B. Dilley Date of Collection: 6/4/15

Client Project # 11-124

Email: bdilley@aegwa.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260 Chlorinated only	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	MTBE 8260		Field Notes
1	MW9	—	0949	H2O	VOAx3			X											
2	MW8	—	1041	H2O	VOAx3			X											
3	MW7	—	1139					X											
4	MW4	—	1229				X				X					X			
5	MW2	—	1314				X				X					X			
6	MW6	—	1354				X				X					X			
7	MW5	—	1442				X				X					X			
8	MW1	—	1524				X				X					X			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

Relinquished by:	Date / Time	Received by:	Date / Time
R	10:50 6/5/15		6-5-15 1051
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	
Cold?	
Seals Intact?	
Total Number of Containers	

Remarks:

TAT: 24HR 48HR (5-DAY)

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.
4139 Libby Road NE • Olympia, WA 98506-2518

September 15, 2015

Becky Dilba
Associated Environmental Group, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501

Dear Ms. Dilba:

Please find enclosed the analytical data report for the Manor Market Project located in Lynnwood, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@aol.com

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150903-7
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		Method Blank	MW-2	MW-3	MW-1	MW-4	MW-6
Date Sampled		N/A	9/2/15	9/2/15	9/2/15	9/2/15	9/2/15
Date Analyzed	PQL (µg/l)	9/4/15 (µg/l)	9/4/15 (µg/l)	9/4/15 (µg/l)	9/4/15 (µg/l)	9/4/15 (µg/l)	9/4/15 (µg/l)
Benzene	1.0	nd	nd	nd	5.1	63	22
Toluene	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	nd	nd
Total Xylenes	1.0	nd	nd	nd	nd	nd	6.6
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	nd	21	122	344	nd
Gasoline	100	nd	nd	nd	nd	nd	1020
Surrogate Recovery							
Dibromofluoromethane		91	85	98	101	91	103
1,2-Dichloroethane-d4		67	70	74	78	65	72
Toluene-d8		101	97	114	116	135	98
4-Bromofluorobenzene		108	105	106	108	101	106

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150903-7
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW-3							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
Benzene	10	9.8	98	10	10.6	106	7.8
Toluene	10	13.3	133	10	11.2	112	17.1
Surrogate Recovery							
Dibromofluoromethane			99			79	
1,2-Dichloroethane-d4			73			73	
Toluene-d8			110			97	
4-Bromofluorobenzene			105			92	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	10.6	106.0
Toluene	10	11.8	118.0
Surrogate Recovery			
Dibromofluoromethane			105
1,2-Dichloroethane-d4			75
Toluene-d8			103
4-Bromofluorobenzene			99

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150903-7
Client Project # 11-124

Analyses of Total Lead in Water by EPA 7010 Series

Sample Number	Date Analyzed	Lead µg/L
Method Blank	9/7/15	nd
MW-2	9/7/15	nd
MW-3	9/7/15	17.4
MW-1	9/7/15	7.1
MW-4	9/7/15	nd
MW-6	9/7/15	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

4139 Libby Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@aol.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150903-7
Client Project # 11-124

QA/QC for Total Lead in Water by EPA 7010 Series

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	9/7/15	112%
MW-6 MS	9/7/15	103%
MW-6 MSD	9/7/15	106%
RPD	9/7/15	3%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150903-7
Client Project # 11-124

Analyses of Dissolved Lead in Water by EPA 7010 Series

Sample Number	Date Analyzed	Lead µg/L
Method Blank	9/7/15	nd
MW-2	9/7/15	nd
MW-3	9/7/15	nd
MW-1	9/7/15	nd
MW-4	9/7/15	nd
MW-6	9/7/15	nd
MW-6 Dup	9/7/15	nd
Practical Quantitation Limit		5.0

"nd" Indicates not detected at the listed detection limits.

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L150903-7
Client Project # 11-124

QA/QC for Dissolved Lead in Water by EPA 7010 Series

Sample Number	Date Analyzed	Lead (% Recovery)
LCS	9/7/15	112%
MW-6 MS	9/7/15	103%
MW-6 MSD	9/7/15	106%
RPD	9/7/15	3%

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 75%-125%
ACCEPTABLE RPD IS 20%

ANALYSES PERFORMED BY: Dirk Peterson

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 9/3/15 Page: 1 of 1

Client: AEG
Project Manager: B. Dilba
Address: 605 11th Ave SE, Suite 201
Project Name: Manor Market
City: Olympia State: WA Zip: 98501
Location: 3609-164th St SW City, State: Lynnwood, WA
Phone: 360-352-9835 Fax:
Collector: B. Dilba Date of Collection: 9/2/15
Client Project # 11-124
Email: bdilba@aegwa.com

Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	~~RCRA 8 Metals~~ Lead Total	MTBE	Lead d'sse Lead	Field Notes
1 mw-2	—	1036	H_2O	Voa / Poly 250		X	X								X	X	X		
2 mw-3	—	1150																	
3 mw-1	—	1253																	
4 mw-4	—	1351																	
5 mw-6	—	1457																	
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	9/3/15 1440	[signature]	9/3/15 1440
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N	
Temp.		°C	
Seals Intact?	Y	N	N/A
Total Number of Containers	25		

Remarks:

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.
4139 Libby Road NE • Olympia, WA 98506-2518

December 4, 2015

Becky Dilba
Associated Environmental Group, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501

Dear Ms. Dilba:

Please find enclosed the analytical data report for the Manor Market Project located in Lynnwood, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@aol.com

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L151125-1
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		Method Blank	MW-5	MW-2	MW-3	MW-4	MW-1
Date Sampled		N/A	11/24/15	11/24/15	11/24/15	11/24/15	11/24/15
Date Analyzed	PQL (µg/l)	12/1/15 (µg/l)	12/1/15 (µg/l)	12/1/15 (µg/l)	12/1/15 (µg/l)	12/1/15 (µg/l)	12/1/15 (µg/l)
Benzene	1.0	nd	nd	nd	nd	47	19
Toluene	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	nd	nd
Total Xylenes	1.0	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	nd	nd	24	975	63
Gasoline	100	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		98	97	100	95	98	98
1,2-Dichloroethane-d4		86	81	87	84	87	81
Toluene-d8		87	87	87	87	86	81
4-Bromofluorobenzene		80	82	83	80	74	83

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L151125-1
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Water

Sample Description		MW-1 Dup
Date Sampled		11/24/15
Date Analyzed	PQL (µg/l)	12/1/15 (µg/l)
Benzene	1.0	19
Toluene	1.0	nd
Ethylbenzene	1.0	nd
Total Xylenes	1.0	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	74
Gasoline	100	nd
Surrogate Recovery		
Dibromofluoromethane		98
1,2-Dichloroethane-d4		82
Toluene-d8		74
4-Bromofluorobenzene		79

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L151125-1
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW-2							
	Matrix Spike			Matrix Spike Dup			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
Benzene	10	8.9	89	10	8.6	86	3.4
Toluene	10	6.7	67	10	6.6	66	1.5
Surrogate Recovery							
Dibromofluoromethane			96			98	
1,2-Dichloroethane-d4			82			81	
Toluene-d8			78			73	
4-Bromofluorobenzene			85			96	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
Benzene	10	9.7	97
Toluene	10	8.7	87
Surrogate Recovery			
Dibromofluoromethane			98
1,2-Dichloroethane-d4			84
Toluene-d8			87
4-Bromofluorobenzene			82

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

4139 Libby Road NE
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Ph: 360-352-2110
Fax: 360-352-4154

Date: 11/25/15 Page: 1 of 1

Client: AEG

Project Manager: Becky Dilba

Address: 605 11th Ave SE Suite 201

Project Name: Manor Market

City: Olympia State: WA Zip: 98501

Location: 3609 - 164th St SW City, State: Lynnwood, WA

Phone: (360) 352-9835 Fax:

Collector: B. Dilba Date of Collection: 11/24/15

Client Project # 11-124

Email: bdilba@gmail.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOA 8021B	VOA 8021B BTEX Only	VOA 8260	SEMI VOL 8270	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx Ext.	PAH 8270	PCB's 8082	MTCA 5 Metals	MTBE		Field Notes
1	MW-5	—	1035	H2O	VOA x 3	X					X						X		
2	MW-2	—	1132																
3	MW-3	—	1225																
4	MW-4	—	1321																
5	MW-1	—	1423																Odor
6																			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	11/25/2015 1055	[signature]	11/25/15 1055
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt:

Good Condition?	Y
Cold?	Y
Seals Intact?	Y
Total Number of Containers	15

Remarks:

TAT: 24HR 48HR 5-DAY

LEGAL ACTION CLAUSE: *In the event of default of payment and/or failure to pay, Client agrees to pay the costs of collection including court costs and reasonable attorney fees to be determined by a court of law.*

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.
4139 Libby Road NE • Olympia, WA 98506-2518

April 6, 2016

Becky Dilba
Associated Environmental Group, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501

Dear Ms. Dilba:

Please find enclosed the analytical data report for the Manor Market Project located in Lynnwood, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@aol.com

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160328-2
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Soil

Sample Description		Method Blank	MW10-6.5	MW10-16.5	MW10-21.5	MW10-31.5	MW10-36.5
Date Sampled		N/A	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16
Date Analyzed	PQL (mg/kg)	3/28/16 (mg/kg)	3/28/16 (mg/kg)	3/28/16 (mg/kg)	3/28/16 (mg/kg)	3/28/16 (mg/kg)	3/28/16 (mg/kg)
Benzene	0.02	nd	nd	nd	nd	nd	nd
Toluene	0.10	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.05	nd	nd	nd	nd	nd	nd
Total Xylenes	0.15	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
Gasoline	10.00	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		97	95	101	93	90	93
1,2-Dichloroethane-d4		91	104	115	100	93	93
Toluene-d8		104	108	109	106	103	104
4-Bromofluorobenzene		94	100	75	71	85	86

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160328-2
Client Project # 11-124

Gasoline by NWTPH-Gx and Aromatic Hydrocarbons by EPA 8260C in Soil

Sample Description		MW11-5	MW11-5 Dup	MW11-10.5	MW11-20.5	MW11-25.5	MW11-35.5
Date Sampled		3/24/16	3/24/16	3/24/16	3/24/16	3/24/16	3/24/16
Date Analyzed	PQL	3/28/16	3/28/16	3/28/16	3/28/16	3/28/16	3/28/16
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Benzene	0.02	0.19	0.27	nd	nd	nd	nd
Toluene	0.10	0.55	0.95	nd	nd	nd	nd
Ethylbenzene	0.05	5.1	8.2	nd	nd	nd	nd
Total Xylenes	0.15	11.8	19	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
Gasoline	10.00	1070	1160 E	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		78	76	88	91	84	92
1,2-Dichloroethane-d4		106	120	89	84	92	91
Toluene-d8		95	93	105	101	71	107
4-Bromofluorobenzene		86	95	93	82	93	65

"E" Indicates reported result is an estimate because it exceeds the calibration range.
"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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Olympia, WA 98506
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Email: libbyenv@aol.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160328-2
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW11-10.5

	Matrix Spike						RPD
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)	
Benzene	0.5	0.51	102	0.5	0.51	102	0.0
Toluene	0.5	0.48	96	0.5	0.56	112	15.4

Surrogate Recovery		
Dibromofluoromethane	94	86
1,2-Dichloroethane-d4	94	90
Toluene-d8	92	102
4-Bromofluorobenzene	107	94

	Laboratory Control Sample		
	Spiked Conc. (mg/kg)	Measured Conc. (mg/kg)	Spike Recovery (%)
Benzene	0.5	0.49	98
Toluene	0.5	0.54	108

Surrogate Recovery	
Dibromofluoromethane	93
1,2-Dichloroethane-d4	81
Toluene-d8	103
4-Bromofluorobenzene	90

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

4139 Libby Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 3/28/16 Page: 1 of 1

Client: AEG
Project Manager: B. Dilba
Address: 6051 1st Ave Suite 201, Olympia, WA
Project Name: Manor Market
City: Olympia State: WA Zip: 98501
Location: 3609 -164th St SW City, State: Lynnwood, WA
Phone (360) 352-9835 Fax:
Collector: B. Dilba Date of Collection: 3/24/16
Client Project # 11-124
Email: bdilba@aeglw.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals	MTBE			Field Notes
1	mw10-6.5	6.5	0943	soil	VOA/jar		X	X									X				
2	mw10-16.5	16.5	1003																		
3	mw10-21.5	21.5	1017																		
4	mw10-31.5	31.5	1037																		
5	mw10-36.5	36.5	1049																		
6	mw11-5	1308 ↔ 5																			
7	mw11-10.5	1314 ↔ 10.5																			
8	mw11-20.5	1342 ↔ 20.5																			
9	mw11-25.5	1352 ↔ 25.5																			
10	mw11-35.5	1424 ↔ 35.5																			
11	mw10-11.5	11.5	0951																		Hold
12	mw10-~~35~~ 26.5	26.5	1024																		Hold
13	mw11-15.5	15.5	1323																		Hold
14	mw11-30.5	30.5	1354																		Hold
15																					
16																					
17																					

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	3/28/16 0958	[signature] Alex	3/28/16 0958
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition? (Y) N
Temp. °C
Seals Intact? (Y) N N/A
Total Number of Containers 42

Remarks: ~~Hold~~

TAT: 24HR 48HR (5-DAY)

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.
4139 Libby Road NE • Olympia, WA 98506-2518

April 25, 2016

Becky Dilba
Associated Environmental Group, LLC
605 11th Avenue SE, Suite 201
Olympia, WA 98501

Dear Ms. Dilba:

Please find enclosed the analytical data report for the Manor Market Project located in Lynnwood, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@aol.com

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160408-1
Client Project # 11-124

Volatile Aromatic Compounds by EPA Method 8260C in Water

Sample Description		Method Blank	MW-4	MW-11	MW-11 Dup	MW--3
Date Sampled	Reporting	N/A	4/7/16	4/7/16	4/7/16	4/7/16
Date Analyzed	Limits (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)
Chloromethane	2.0	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd
1,1-Dichloroethene	2.0	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
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd
cis -1,2-Dichloroethene	1.0	nd	nd	nd	nd	nd
Chloroform	1.0	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd	nd
1,2-Dichloropropane	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
Tetrachloroethene (PCE)	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
Surrogate Recovery						
Dibromofluoromethane		100	92	100	96	93
1,2-Dichloroethane-d4		105	101	104	101	97
Toluene-d8		100	95	95	99	98
4-Bromofluorobenzene		79	82	90	86	77

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%
ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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Olympia, WA 98506
Phone: (360) 352-2110
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Email: libbyenv@aol.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160408-1
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW-1							
	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
1,1-Dichloroethene	10	6.1	61	10	6.7	67	8.8
Chlorobenzene	10	10.6	106	10	10.4	104	1.8
Trichloroethene (TCE)	10	7.7	77	10	8.7	87	12.6
Surrogate Recovery							
Dibromofluoromethane			87			93	
1,2-Dichloroethane-d4			94			104	
Toluene-d8			72			101	
4-Bromofluorobenzene			76			78	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
1,1-Dichloroethene	10	9.0	90
Chlorobenzene	10	11.6	116
Trichloroethene (TCE)	10	10.4	104
Surrogate Recovery			
Dibromofluoromethane			95
1,2-Dichloroethane-d4			98
Toluene-d8			100
4-Bromofluorobenzene			77

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

4139 Libby Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@aol.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160408-1
Client Project # 11-124

Analyses of Gasoline (NWTPH-Gx) & BTEX (EPA Method 8260C) in Water

Sample Number	Date Analyzed	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes (µg/l)	Gasoline (µg/l)	Surrogate Recovery (%)
Method Blank	4/12/16	nd	nd	nd	nd	nd	100
LCS	4/12/16	nd	nd	nd	nd	nd	100
MW-2	4/12/16	nd	nd	nd	nd	nd	100
MW-6	4/12/16	12	nd	nd	3.0	1630	90
MW-5	4/12/16	nd	nd	nd	nd	nd	99
MW-4	4/12/16	70	nd	nd	nd	127	95
MW-11	4/12/16	nd	nd	nd	nd	219	95
MW-11 Dup	4/12/16	nd	nd	nd	nd	254	99
MW-10	4/12/16	nd	nd	nd	nd	nd	99
MW-3	4/12/16	nd	nd	nd	nd	nd	98
MW-1	4/12/16	9.9	2.0	nd	nd	101	79
MW-1 MS	4/12/16	107%	94%				72
MW-1 MSD	4/12/16	113%	121%				101
Practical Quantitation Limit		1	2	1	2	100	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160408-1
Client Project # 11-124

Methyl tert-Butyl Ether (MTBE) by EPA Method 8260C in Water

Sample Description		Method Blank	MW-2	MW-6	MW-5	MW-4	MW-11
Date Sampled	Reporting	N/A	4/7/16	4/7/16	4/7/16	4/7/16	4/7/16
Date Analyzed	Limits (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)
Methyl *tert* -butyl ether (MTBE)	2.0	nd	nd	nd	nd	592	8.5
Surrogate Recovery							
Dibromofluoromethane		100	94	83	91	92	100
1,2-Dichloroethane-d4		105	100	103	103	102	104
Toluene-d8		100	100	90	99	80	95
4-Bromofluorobenzene		79	78	87	66	82	90

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160408-1
Client Project # 11-124

Methyl tert-Butyl Ether (MTBE) by EPA Method 8260C in Water

Sample Description		MW-11 Dup	MW-10	MW-3	MW-1
Date Sampled	Reporting	4/7/16	4/7/16	4/7/16	4/7/16
Date Analyzed	Limits (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)	4/12/16 (µg/l)
Methyl *tert* -butyl ether (MTBE)	2.0	7.8	nd	10	20
Surrogate Recovery					
Dibromofluoromethane		96	92	93	84
1,2-Dichloroethane-d4		101	93	97	81
Toluene-d8		99	99	98	79
4-Bromofluorobenzene		86	74	77	79

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L160408-1
Client Project # 11-124

QA/QC Data - EPA 8260C Analyses

Sample Identification: MW-1							
	Matrix Spike			Matrix Spike Duplicate			RPD
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)	
1,1-Dichloroethene	10	6.1	61	10	6.7	67	8.8
Chlorobenzene	10	10.6	106	10	10.4	104	1.8
Trichloroethene (TCE)	10	7.7	77	10	8.7	87	12.6
Surrogate Recovery							
Dibromofluoromethane			87			93	
1,2-Dichloroethane-d4			94			104	
Toluene-d8			72			101	
4-Bromofluorobenzene			76			78	

Laboratory Control Sample			
	Spiked Conc. (µg/l)	Measured Conc. (µg/l)	Spike Recovery (%)
1,1-Dichloroethene	10	9.0	90
Chlorobenzene	10	11.6	116
Trichloroethene (TCE)	10	10.4	104
Surrogate Recovery			
Dibromofluoromethane			95
1,2-Dichloroethane-d4			98
Toluene-d8			100
4-Bromofluorobenzene			77

ACCEPTABLE RECOVERY LIMITS FOR MATRIX SPIKES: 65%-135%
ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

4139 Libby Road NE
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Ph: 360-352-2110
Fax: 360-352-4154

Date: 4/8/16 Page: 1 of 1

Client: AEG

Project Manager: B. Dilba

Address: 605 11th Ave SE, Suite 201

Project Name: Manor Market

City: Olympia State: WA Zip: 98501

Location: 3609 -164th St City, State: Lynnwood, WA

Phone: (360) 352-9835 Fax: —

Collector: B. Dilba Date of Collection: 4/7/16

Client Project # 11-124

Email: bdilba@aegwa.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260 CL	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals	MTBE			Field Notes
1	MW-2	—	0944	H2O	VOAX 3		X	X													
2	MW-6	-	1031																		
3	MW-5	-	1058																		odor
4	MW-4	—	1204			X															odor
5	MW11	—	1251			X															
6	MW10	—	~~1305~~ 1255																		
7	MW3	—	1304			X															odor
8	MW1	—	1354																		
9																					4-19-16
10																					Name change per
11																					Becky via email.
12																					
13																					
14																					
15																					
16																					
17																					

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	04/8/16	[signature]	4/8/16
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N	
Temp.		°C	
Seals Intact?	Y	N	N/A
Total Number of Containers	24		

Remarks:

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

ESN NORTHWEST
Environmental
Services Network

May 30, 2018

Becky Dilba
Associated Environmental Group, Inc.
605 11th Ave. SE, Suite 201
Olympia, WA 98501

Dear Ms. Dilba:

Please find enclosed the analytical data report for the Manor Market Project in Lynnwood, Washington. Probe services were conducted on May 8, 2018. Water samples were analyzed for Gasoline by NWTPH-Gx, VOC's by Method 8260, Total and Dissolved Pb by Method 6020, and soil vapor for VOC's by Method 8260 and Method TO-15 on May 9 – 16, 2018.

The results of the analyses are summarized in the attached table. Applicable detection limits and QA/QC data are included. An invoice for this work is also enclosed.

ESN Northwest appreciates the opportunity to have provided analytical services to Associated Environmental Group, Inc. 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

Michael A. Korosec
President

1210 Eastside Street SE, Suite 200 ■ Olympia, Washington 98501 ■ 360.459.4670 ■ FAX 360.459.3432
Web Site: *www.esnnw.com* E-Mail: *info@esnnw.com*

ESN NORTHWEST CHEMISTRY LABORATORY

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

ESN Northwest
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Olympia, WA 98501
(360) 459-4670 (360) 459-3432 Fax
lab@esnnw.com

Analysis of Gasoline Range Organics, MTBE & BTEX in Water by Method NWTPH-Gx/8260

Sample Number	Date Analyzed	MTBE (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Gasoline Range Organics (ug/L)	Surrogate Recovery (%)
Method Blank	5/9/2018	nd	nd	nd	nd	nd	nd	110
LCS	5/9/2018	125%	100%	98%	109%	120%	113%	114
LCSD	5/9/2018	86%	101%	95%	114%	122%	---	112
MW-3	5/9/2018	**17**	nd	nd	nd	nd	nd	108
MW-4	5/9/2018	**790**	**110**	nd	nd	nd	nd	108
MW-1	5/15/2018	**14**	nd	nd	nd	nd	nd	108
MW-2	5/15/2018	**8.3**	nd	nd	nd	nd	nd	109
MW-10	5/9/2018	nd	nd	nd	nd	nd	nd	114
MW-6	5/15/2018	nd	**300**	**52**	nd	**12**	**830**	119
MW-5	5/15/2018	nd	nd	nd	nd	nd	nd	108
MW-5 Duplicate	5/15/2018	nd	nd	nd	nd	nd	nd	104
Reporting Limits		1.0	1.0	1.0	1.0	3.0	100	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromoflurorbenzene) & LCS: 65% TO 135%

ESN NORTHWEST CHEMISTRY LABORATORY

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

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Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	MB	LCS	LCSD	MW-3	MW-4	MW-1	MW-2
Date analyzed	(ug/L)	05/09/18	05/09/18	05/09/18	05/09/18	05/09/18	05/15/18	05/15/18
Vinyl chloride	0.2	nd	117%	116%	nd	nd	nd	nd
1,1-Dichloroethene	1.0	nd	91%	93%	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	89%	94%	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	86%	90%	nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		110%	97%	95%	113%	117%	115%	115%
Toluene-d8		108%	98%	97%	109%	112%	106%	107%
4-Bromofluorobenzene		110%	114%	112%	108%	108%	108%	109%

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

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Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	**MW-10**	**MW-6**	**MW-5**	**MW-5 Duplicate**
Date analyzed	(ug/L)	05/09/18	05/15/18	05/15/18	05/15/18
Vinyl chloride	0.2	nd	nd	nd	nd
1,1-Dichloroethene	1.0	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd	nd	nd
Surrogate recoveries					
Dibromofluoromethane		107%	105%	120%	123%
Toluene-d8		108%	109%	108%	109%
4-Bromofluorobenzene		114%	119%	108%	104%

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

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

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Total Lead in Water by EPA-6020 Method

Sample Number	Date Analyzed	Lead (Pb) (ug/L)
Method Blank	5/16/2018	nd
MW-3	5/16/2018	nd
MW-4	5/16/2018	nd
MW-1	5/16/2018	nd
MW-2	5/16/2018	nd
MW-10	5/16/2018	nd
MW-10 Duplicate	5/16/2018	nd
MW-6	5/16/2018	nd
MW-5	5/16/2018	nd
Reporting Limits		2.0

"nd" Indicates not detected at listed detection limits.

QA/QC Data - Total Metals EPA-6020

	Laboratory Control Sample			Laboratory Control Sample Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	(%)
Lead	40.0	42.3	106	40.0	46.6	117	9.63

ACCEPTABLE RECOVERY LIMITS FOR LABORATORY CONTROL SAMPLES: 80%-120%
ACCEPTABLE RPD IS 20%

ESN NORTHWEST CHEMISTRY LABORATORY

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

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Dissolved Lead in Water by EPA-6020 Method

Sample Number	Date Analyzed	Lead (Pb) (ug/L)
Method Blank	5/16/2018	nd
MW-3	5/16/2018	nd
MW-4	5/16/2018	**2.2**
MW-1	5/16/2018	nd
MW-1 Duplicate	5/16/2018	nd
MW-2	5/16/2018	nd
MW-10	5/16/2018	nd
MW-6	5/16/2018	nd
MW-5	5/16/2018	nd
Reporting Limits		2.0

"nd" Indicates not detected at listed detection limits.

QA/QC Data - Dissolved Metals EPA-6020

	Laboratory Control Sample			Laboratory Control Sample Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	(%)
Lead	40.0	42.3	106	40.0	46.6	117	9.63

ACCEPTABLE RECOVERY LIMITS FOR LABORATORY CONTROL SAMPLES: 80%-120%
ACCEPTABLE RPD IS 20%

ESN NORTHWEST CHEMISTRY LABORATORY

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PROJECT #11-124
Lynnwood, Washington

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Analyses of Volatile Organic Componds in Air by Method 8260

Sample ID	Molecular	Reporting	MB	LCS	LCSD	SS1	SS2
Date Sampled	Weight	Limits	05/09/18	05/09/18	05/09/18	05/08/18	05/08/18
Date Analyzed	g	ug/m3	05/09/18	05/09/18	05/09/18	05/09/18	05/09/18
Dichlorodifluoromethane	120.9	10	nd			nd	nd
Chloromethane	50.49	10	nd			nd	nd
Vinyl chloride	62.50	10	nd	117%	116%	nd	nd
Bromomethane	94.95	10	nd			nd	nd
Chloroethane	64.52	10	nd			nd	nd
Trichlorofluoromethane	137.4	10	nd			nd	nd
1,1-Dichloroethene	96.95	10	nd			nd	nd
Methylene chloride	84.93	10	nd			nd	nd
Methyl-t-butyl ether (MTBE)	88.15	10	nd			nd	nd
trans-1,2-Dichloroethene	96.95	10	nd			nd	nd
1,1-Dichloroethane	98.96	10	nd			nd	nd
cis-1,2-Dichloroethene	96.95	10	nd			**23**	nd
2,2-Dichloropropane	113.0	10	nd			nd	nd
Chloroform	119.4	10	nd	98%	104%	nd	nd
Bromochloromethane	129.4	10	nd			nd	nd
1,1,1-Trichloroethane	133.4	10	nd			**91**	nd
1,2-Dichloroethane (EDC)	98.96	10	nd			nd	nd
1,1-Dichloropropene	111.0	10	nd			nd	nd
Carbon tetrachloride	153.2	10	nd			nd	nd
Benzene	78.11	10	nd	100%	101%	nd	**230**
Trichloroethene	131.4	10	nd	89%	94%	**81**	nd
1,2-Dichloropropane	113.0	10	nd	95%	99%	nd	nd
Dibromomethane	173.8	10	nd			nd	nd
Bromodichloromethane	163.8	10	nd			nd	nd
cis-1,3-Dichloropropene	111.0	10	nd			nd	nd
Toluene	92.13	10	nd	98%	95%	**28**	**1,540**
trans-1,3-Dichloropropene	111.0	10	nd			nd	nd
1,1,2-Trichloroethane	133.4	10	nd			nd	nd
1,3-Dichloropropane	113.0	10	nd			nd	nd
Dibromochloromethane	208.3	10	nd			nd	nd
Tetrachloroethene	165.8	10	nd	86%	90%	**2,500**	nd
1,2-Dibromoethane (EDB)	187.9	10	nd			nd	nd
Chlorobenzene	112.6	10	nd	93%	98%	nd	nd
1,1,1,2-Tetrachloroethane	167.9	10	nd			nd	nd
Ethylbenzene	106.2	10	nd	109%	114%	nd	**140**
Xylenes	106.2	10	nd	120%	122%	**300**	**1,000**
Styrene	104.2	10	nd			nd	nd
Bromoform	252.8	10	nd			nd	nd
1,1,2,2-Tetrachloroethane	167.9	10	nd			nd	nd
Isopropylbenzene	120.2	10	nd			nd	nd
1,2,3-Trichloropropane	147.4	10	nd			nd	nd
Bromobenzene	157.0	10	nd			nd	nd

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Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

Analyses of Volatile Organic Componds in Air by Method 8260

Sample ID	Molecular	Reporting	MB	LCS	LCSD	SS1	SS2
Date Sampled	Weight	Limits	05/09/18	05/09/18	05/09/18	05/08/18	05/08/18
Date Analyzed	g	ug/m3	05/09/18	05/09/18	05/09/18	05/09/18	05/09/18
n-Propylbenzene	120.2	10	nd			nd	**16**
2-Chlorotoluene	126.6	10	nd			nd	nd
4-Chlorotoluene	126.6	10	nd			nd	nd
1,3,5-Trimethylbenzene	120.2	10	nd			nd	**20**
tert-Butylbenzene	134.2	10	nd			nd	nd
1,2,4-Trimethylbenzene	120.2	10	nd			nd	**110**
sec-Butylbenzene	134.2	10	nd			nd	nd
1,3-Dichlorobenzene	147.0	10	nd			nd	nd
1,4-Dichlorobenzene	147.0	10	nd			nd	nd
Isopropyltoluene	134.2	10	nd			nd	nd
1,2-Dichlorobenzene	147.0	10	nd			nd	nd
n-Butylbenzene	134.2	10	nd			nd	nd
1,2-Dibromo-3-Chloropropane	236.3	10	nd			nd	nd
1,2,4-Trichlorobenzene	181.5	10	nd			nd	nd
Naphthalene	128.2	10	nd			nd	nd
Hexachloro-1,3-butadiene	260.8	10	nd			nd	nd
1,2,3-Trichlorobenzene	181.5	10	nd			nd	nd
Surrogate recoveries							
Dibromofluoromethane			110%	97%	95%	106%	117%
Toluene-d8			108%	98%	97%	110%	115%
4-Bromofluorobenzene			110%	114%	112%	107%	106%

Data Qualifiers and Analytical Comments

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

eurofins | Air Toxics

WORK ORDER #: 1805182

Work Order Summary

CLIENT:	Ms. Jennifer Arnold ESN Northwest 1210 Eastside St SE Suite 200 Olympia, WA 98501	**BILL TO:**	Ms. Jennifer Arnold ESN Northwest 1210 Eastside St SE Suite 200 Olympia, WA 98501
PHONE:	360-459-4670	**P.O. #**	11-124
FAX:	360-4595-3432	**PROJECT #**	Manor Market
DATE RECEIVED:	05/10/2018	**CONTACT:**	Sarah Westerman
DATE COMPLETED:	05/22/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	Indoor 1	Modified TO-15	9.0 "Hg	5 psi
01B	Indoor 1	Modified TO-15	9.0 "Hg	5 psi
02A	Indoor 2	Modified TO-15	11.0 "Hg	5 psi
02B	Indoor 2	Modified TO-15	11.0 "Hg	5 psi
03A	Outdoor	Modified TO-15	9.5 "Hg	5 psi
03B	Outdoor	Modified TO-15	9.5 "Hg	5 psi
04A	Lab Blank	Modified TO-15	NA	NA
04B	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
05B	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA
06AA	LCSD	Modified TO-15	NA	NA
06B	LCS	Modified TO-15	NA	NA
06BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 05/22/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
ESN Northwest
Workorder# 1805182

Three 6 Liter Summa Canister (SIM Certified) samples were received on May 10, 2018. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	For Full Scan: 30% RSD with 4 compounds allowed out to < 40% RSD For SIM: Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	For Full Scan: </= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers For SIM: Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

The Chain of Custody (COC) information for sample Outdoor did not match the information on the canister with regard to canister identification. The client was notified of the discrepancy and the information on the canister was used to process and report the sample.

The Chain of Custody (COC) was not relinquished properly. A signature, date, and time were not provided by the field sampler.

The Chain of Custody was missing method information. EATL proceeded with the analysis as per the

original contract or verbal agreement.

Analytical Notes

The results for each sample in this report were acquired from two separate data files originating from the same analytical run. The two data files have the same base file name and are differentiated with a "sim" extension on the SIM data file.

Definition of Data Qualifying Flags

Nine qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: Indoor 1

Lab ID#: 1805182-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.19	0.24	1.1	1.3
Ethanol	0.96	29	1.8	54
Acetone	0.96	4.9	2.3	12
2-Propanol	0.96	3.9	2.3	9.6
Hexane	0.19	0.24	0.67	0.86
Heptane	0.19	0.20	0.78	0.84

Client Sample ID: Indoor 1

Lab ID#: 1805182-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.038	0.47	0.19	2.3
Carbon Tetrachloride	0.038	0.076	0.24	0.48
Benzene	0.096	0.20	0.30	0.64
Toluene	0.038	0.70	0.14	2.6
Ethyl Benzene	0.038	0.086	0.16	0.37
m,p-Xylene	0.076	0.30	0.33	1.3
o-Xylene	0.038	0.12	0.16	0.50

Client Sample ID: Indoor 2

Lab ID#: 1805182-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.21	0.21	1.2	1.2
Ethanol	1.1	36	2.0	68
Acetone	1.1	10	2.5	24
2-Propanol	1.1	1.5	2.6	3.6
Methylene Chloride	0.42	0.61	1.5	2.1
Hexane	0.21	0.31	0.75	1.1
2-Butanone (Methyl Ethyl Ketone)	1.1	1.3	3.1	3.9
Heptane	0.21	0.26	0.87	1.1

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: Indoor 2

Lab ID#: 1805182-02B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.042	0.43	0.21	2.1
Chloroform	0.042	0.046	0.21	0.23
Carbon Tetrachloride	0.042	0.067	0.27	0.42
Benzene	0.11	0.22	0.34	0.69
Toluene	0.042	1.8	0.16	6.7
Tetrachloroethene	0.042	0.14	0.29	0.92
Ethyl Benzene	0.042	0.14	0.18	0.62
m,p-Xylene	0.085	0.60	0.37	2.6
o-Xylene	0.042	0.22	0.18	0.95

Client Sample ID: Outdoor

Lab ID#: 1805182-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.20	0.23	1.1	1.3
Ethanol	0.98	3.4	1.8	6.4
Acetone	0.98	4.9	2.3	12
Hexane	0.20	0.20	0.69	0.70

Client Sample ID: Outdoor

Lab ID#: 1805182-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.039	0.45	0.19	2.2
Carbon Tetrachloride	0.039	0.070	0.25	0.44
Benzene	0.098	0.14	0.31	0.44
Toluene	0.039	0.44	0.15	1.7
Ethyl Benzene	0.039	0.059	0.17	0.26
m,p-Xylene	0.078	0.20	0.34	0.89
o-Xylene	0.039	0.070	0.17	0.30

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Client Sample ID: Indoor 1

Lab ID#: 1805182-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051117**	**Date of Collection: 5/8/18 2:16:00 PM**	
Dil. Factor:	**1.91**	**Date of Analysis: 5/11/18 06:48 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.19	Not Detected	0.42	Not Detected
Bromomethane	0.96	Not Detected	3.7	Not Detected
Freon 11	0.19	0.24	1.1	1.3
Ethanol	0.96	29	1.8	54
Freon 113	0.19	Not Detected	1.5	Not Detected
Acetone	0.96	4.9	2.3	12
2-Propanol	0.96	3.9	2.3	9.6
Carbon Disulfide	0.96	Not Detected	3.0	Not Detected
3-Chloropropene	0.96	Not Detected	3.0	Not Detected
Methylene Chloride	0.38	Not Detected	1.3	Not Detected
Hexane	0.19	0.24	0.67	0.86
2-Butanone (Methyl Ethyl Ketone)	0.96	Not Detected	2.8	Not Detected
Tetrahydrofuran	0.96	Not Detected	2.8	Not Detected
Cyclohexane	0.19	Not Detected	0.66	Not Detected
2,2,4-Trimethylpentane	0.96	Not Detected	4.5	Not Detected
Heptane	0.19	0.20	0.78	0.84
1,2-Dichloropropane	0.19	Not Detected	0.88	Not Detected
1,4-Dioxane	0.19	Not Detected	0.69	Not Detected
Bromodichloromethane	0.19	Not Detected	1.3	Not Detected
cis-1,3-Dichloropropene	0.19	Not Detected	0.87	Not Detected
4-Methyl-2-pentanone	0.19	Not Detected	0.78	Not Detected
trans-1,3-Dichloropropene	0.19	Not Detected	0.87	Not Detected
2-Hexanone	0.96	Not Detected	3.9	Not Detected
Dibromochloromethane	0.19	Not Detected	1.6	Not Detected
Chlorobenzene	0.19	Not Detected	0.88	Not Detected
Styrene	0.19	Not Detected	0.81	Not Detected
Bromoform	0.19	Not Detected	2.0	Not Detected
Cumene	0.19	Not Detected	0.94	Not Detected
Propylbenzene	0.19	Not Detected	0.94	Not Detected
4-Ethyltoluene	0.19	Not Detected	0.94	Not Detected
1,3,5-Trimethylbenzene	0.19	Not Detected	0.94	Not Detected
1,2,4-Trimethylbenzene	0.19	Not Detected	0.94	Not Detected
1,3-Dichlorobenzene	0.19	Not Detected	1.1	Not Detected
alpha-Chlorotoluene	0.19	Not Detected	0.99	Not Detected
1,2-Dichlorobenzene	0.19	Not Detected	1.1	Not Detected
1,2,4-Trichlorobenzene	0.96	Not Detected	7.1	Not Detected
Hexachlorobutadiene	0.96	Not Detected	10	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130

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Client Sample ID: Indoor 1

Lab ID#: 1805182-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051117**	**Date of Collection: 5/8/18 2:16:00 PM**	
Dil. Factor:	**1.91**	**Date of Analysis: 5/11/18 06:48 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: Indoor 1

Lab ID#: 1805182-01B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051117sim**	**Date of Collection: 5/8/18 2:16:00 PM**	
Dil. Factor:	**1.91**	**Date of Analysis: 5/11/18 06:48 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.038	0.47	0.19	2.3
Freon 114	0.038	Not Detected	0.27	Not Detected
Chloromethane	0.96	Not Detected	2.0	Not Detected
Vinyl Chloride	0.019	Not Detected	0.049	Not Detected
Chloroethane	0.096	Not Detected	0.25	Not Detected
1,1-Dichloroethene	0.019	Not Detected	0.076	Not Detected
trans-1,2-Dichloroethene	0.19	Not Detected	0.76	Not Detected
Methyl tert-butyl ether	0.19	Not Detected	0.69	Not Detected
1,1-Dichloroethane	0.038	Not Detected	0.15	Not Detected
cis-1,2-Dichloroethene	0.038	Not Detected	0.15	Not Detected
Chloroform	0.038	Not Detected	0.19	Not Detected
1,1,1-Trichloroethane	0.038	Not Detected	0.21	Not Detected
Carbon Tetrachloride	0.038	0.076	0.24	0.48
Benzene	0.096	0.20	0.30	0.64
1,2-Dichloroethane	0.038	Not Detected	0.15	Not Detected
Trichloroethene	0.038	Not Detected	0.20	Not Detected
Toluene	0.038	0.70	0.14	2.6
1,1,2-Trichloroethane	0.038	Not Detected	0.21	Not Detected
Tetrachloroethene	0.038	Not Detected	0.26	Not Detected
1,2-Dibromoethane (EDB)	0.038	Not Detected	0.29	Not Detected
Ethyl Benzene	0.038	0.086	0.16	0.37
m,p-Xylene	0.076	0.30	0.33	1.3
o-Xylene	0.038	0.12	0.16	0.50
1,1,2,2-Tetrachloroethane	0.038	Not Detected	0.26	Not Detected
1,4-Dichlorobenzene	0.038	Not Detected	0.23	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: Indoor 2

Lab ID#: 1805182-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051120**	**Date of Collection: 5/8/18 3:05:00 PM**	
Dil. Factor:	**2.12**	**Date of Analysis: 5/11/18 09:15 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.21	Not Detected	0.47	Not Detected
Bromomethane	1.1	Not Detected	4.1	Not Detected
Freon 11	0.21	0.21	1.2	1.2
Ethanol	1.1	36	2.0	68
Freon 113	0.21	Not Detected	1.6	Not Detected
Acetone	1.1	10	2.5	24
2-Propanol	1.1	1.5	2.6	3.6
Carbon Disulfide	1.1	Not Detected	3.3	Not Detected
3-Chloropropene	1.1	Not Detected	3.3	Not Detected
Methylene Chloride	0.42	0.61	1.5	2.1
Hexane	0.21	0.31	0.75	1.1
2-Butanone (Methyl Ethyl Ketone)	1.1	1.3	3.1	3.9
Tetrahydrofuran	1.1	Not Detected	3.1	Not Detected
Cyclohexane	0.21	Not Detected	0.73	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.0	Not Detected
Heptane	0.21	0.26	0.87	1.1
1,2-Dichloropropane	0.21	Not Detected	0.98	Not Detected
1,4-Dioxane	0.21	Not Detected	0.76	Not Detected
Bromodichloromethane	0.21	Not Detected	1.4	Not Detected
cis-1,3-Dichloropropene	0.21	Not Detected	0.96	Not Detected
4-Methyl-2-pentanone	0.21	Not Detected	0.87	Not Detected
trans-1,3-Dichloropropene	0.21	Not Detected	0.96	Not Detected
2-Hexanone	1.1	Not Detected	4.3	Not Detected
Dibromochloromethane	0.21	Not Detected	1.8	Not Detected
Chlorobenzene	0.21	Not Detected	0.98	Not Detected
Styrene	0.21	Not Detected	0.90	Not Detected
Bromoform	0.21	Not Detected	2.2	Not Detected
Cumene	0.21	Not Detected	1.0	Not Detected
Propylbenzene	0.21	Not Detected	1.0	Not Detected
4-Ethyltoluene	0.21	Not Detected	1.0	Not Detected
1,3,5-Trimethylbenzene	0.21	Not Detected	1.0	Not Detected
1,2,4-Trimethylbenzene	0.21	Not Detected	1.0	Not Detected
1,3-Dichlorobenzene	0.21	Not Detected	1.3	Not Detected
alpha-Chlorotoluene	0.21	Not Detected	1.1	Not Detected
1,2-Dichlorobenzene	0.21	Not Detected	1.3	Not Detected
1,2,4-Trichlorobenzene	1.1	Not Detected	7.9	Not Detected
Hexachlorobutadiene	1.1	Not Detected	11	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130

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Client Sample ID: Indoor 2

Lab ID#: 1805182-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051120**	**Date of Collection: 5/8/18 3:05:00 PM**	
Dil. Factor:	**2.12**	**Date of Analysis: 5/11/18 09:15 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Indoor 2

Lab ID#: 1805182-02B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051120sim**	**Date of Collection: 5/8/18 3:05:00 PM**	
Dil. Factor:	**2.12**	**Date of Analysis: 5/11/18 09:15 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.042	0.43	0.21	2.1
Freon 114	0.042	Not Detected	0.30	Not Detected
Chloromethane	1.1	Not Detected	2.2	Not Detected
Vinyl Chloride	0.021	Not Detected	0.054	Not Detected
Chloroethane	0.11	Not Detected	0.28	Not Detected
1,1-Dichloroethene	0.021	Not Detected	0.084	Not Detected
trans-1,2-Dichloroethene	0.21	Not Detected	0.84	Not Detected
Methyl tert-butyl ether	0.21	Not Detected	0.76	Not Detected
1,1-Dichloroethane	0.042	Not Detected	0.17	Not Detected
cis-1,2-Dichloroethene	0.042	Not Detected	0.17	Not Detected
Chloroform	0.042	0.046	0.21	0.23
1,1,1-Trichloroethane	0.042	Not Detected	0.23	Not Detected
Carbon Tetrachloride	0.042	0.067	0.27	0.42
Benzene	0.11	0.22	0.34	0.69
1,2-Dichloroethane	0.042	Not Detected	0.17	Not Detected
Trichloroethene	0.042	Not Detected	0.23	Not Detected
Toluene	0.042	1.8	0.16	6.7
1,1,2-Trichloroethane	0.042	Not Detected	0.23	Not Detected
Tetrachloroethene	0.042	0.14	0.29	0.92
1,2-Dibromoethane (EDB)	0.042	Not Detected	0.32	Not Detected
Ethyl Benzene	0.042	0.14	0.18	0.62
m,p-Xylene	0.085	0.60	0.37	2.6
o-Xylene	0.042	0.22	0.18	0.95
1,1,2,2-Tetrachloroethane	0.042	Not Detected	0.29	Not Detected
1,4-Dichlorobenzene	0.042	Not Detected	0.25	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Outdoor

Lab ID#: 1805182-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051118**	**Date of Collection: 5/8/18 3:22:00 PM**	
Dil. Factor:	**1.96**	**Date of Analysis: 5/11/18 07:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.20	Not Detected	0.43	Not Detected
Bromomethane	0.98	Not Detected	3.8	Not Detected
Freon 11	0.20	0.23	1.1	1.3
Ethanol	0.98	3.4	1.8	6.4
Freon 113	0.20	Not Detected	1.5	Not Detected
Acetone	0.98	4.9	2.3	12
2-Propanol	0.98	Not Detected	2.4	Not Detected
Carbon Disulfide	0.98	Not Detected	3.0	Not Detected
3-Chloropropene	0.98	Not Detected	3.1	Not Detected
Methylene Chloride	0.39	Not Detected	1.4	Not Detected
Hexane	0.20	0.20	0.69	0.70
2-Butanone (Methyl Ethyl Ketone)	0.98	Not Detected	2.9	Not Detected
Tetrahydrofuran	0.98	Not Detected	2.9	Not Detected
Cyclohexane	0.20	Not Detected	0.67	Not Detected
2,2,4-Trimethylpentane	0.98	Not Detected	4.6	Not Detected
Heptane	0.20	Not Detected	0.80	Not Detected
1,2-Dichloropropane	0.20	Not Detected	0.90	Not Detected
1,4-Dioxane	0.20	Not Detected	0.71	Not Detected
Bromodichloromethane	0.20	Not Detected	1.3	Not Detected
cis-1,3-Dichloropropene	0.20	Not Detected	0.89	Not Detected
4-Methyl-2-pentanone	0.20	Not Detected	0.80	Not Detected
trans-1,3-Dichloropropene	0.20	Not Detected	0.89	Not Detected
2-Hexanone	0.98	Not Detected	4.0	Not Detected
Dibromochloromethane	0.20	Not Detected	1.7	Not Detected
Chlorobenzene	0.20	Not Detected	0.90	Not Detected
Styrene	0.20	Not Detected	0.83	Not Detected
Bromoform	0.20	Not Detected	2.0	Not Detected
Cumene	0.20	Not Detected	0.96	Not Detected
Propylbenzene	0.20	Not Detected	0.96	Not Detected
4-Ethyltoluene	0.20	Not Detected	0.96	Not Detected
1,3,5-Trimethylbenzene	0.20	Not Detected	0.96	Not Detected
1,2,4-Trimethylbenzene	0.20	Not Detected	0.96	Not Detected
1,3-Dichlorobenzene	0.20	Not Detected	1.2	Not Detected
alpha-Chlorotoluene	0.20	Not Detected	1.0	Not Detected
1,2-Dichlorobenzene	0.20	Not Detected	1.2	Not Detected
1,2,4-Trichlorobenzene	0.98	Not Detected	7.3	Not Detected
Hexachlorobutadiene	0.98	Not Detected	10	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130

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Client Sample ID: Outdoor

Lab ID#: 1805182-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051118**	**Date of Collection: 5/8/18 3:22:00 PM**	
Dil. Factor:	**1.96**	**Date of Analysis: 5/11/18 07:23 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: Outdoor

Lab ID#: 1805182-03B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051118sim**	**Date of Collection: 5/8/18 3:22:00 PM**	
Dil. Factor:	**1.96**	**Date of Analysis: 5/11/18 07:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.039	0.45	0.19	2.2
Freon 114	0.039	Not Detected	0.27	Not Detected
Chloromethane	0.98	Not Detected	2.0	Not Detected
Vinyl Chloride	0.020	Not Detected	0.050	Not Detected
Chloroethane	0.098	Not Detected	0.26	Not Detected
1,1-Dichloroethene	0.020	Not Detected	0.078	Not Detected
trans-1,2-Dichloroethene	0.20	Not Detected	0.78	Not Detected
Methyl tert-butyl ether	0.20	Not Detected	0.71	Not Detected
1,1-Dichloroethane	0.039	Not Detected	0.16	Not Detected
cis-1,2-Dichloroethene	0.039	Not Detected	0.16	Not Detected
Chloroform	0.039	Not Detected	0.19	Not Detected
1,1,1-Trichloroethane	0.039	Not Detected	0.21	Not Detected
Carbon Tetrachloride	0.039	0.070	0.25	0.44
Benzene	0.098	0.14	0.31	0.44
1,2-Dichloroethane	0.039	Not Detected	0.16	Not Detected
Trichloroethene	0.039	Not Detected	0.21	Not Detected
Toluene	0.039	0.44	0.15	1.7
1,1,2-Trichloroethane	0.039	Not Detected	0.21	Not Detected
Tetrachloroethene	0.039	Not Detected	0.26	Not Detected
1,2-Dibromoethane (EDB)	0.039	Not Detected	0.30	Not Detected
Ethyl Benzene	0.039	0.059	0.17	0.26
m,p-Xylene	0.078	0.20	0.34	0.89
o-Xylene	0.039	0.070	0.17	0.30
1,1,2,2-Tetrachloroethane	0.039	Not Detected	0.27	Not Detected
1,4-Dichlorobenzene	0.039	Not Detected	0.24	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1805182-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051106**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 11:09 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
1,2-Dichloropropane	0.10	Not Detected	0.46	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
Bromodichloromethane	0.10	Not Detected	0.67	Not Detected
cis-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
trans-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
2-Hexanone	0.50	Not Detected	2.0	Not Detected
Dibromochloromethane	0.10	Not Detected	0.85	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
Bromoform	0.10	Not Detected	1.0	Not Detected
Cumene	0.10	Not Detected	0.49	Not Detected
Propylbenzene	0.10	Not Detected	0.49	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
alpha-Chlorotoluene	0.10	Not Detected	0.52	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected	3.7	Not Detected
Hexachlorobutadiene	0.50	Not Detected	5.3	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1805182-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051106**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 11:09 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1805182-04B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051106sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 11:09 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.020	Not Detected	0.099	Not Detected
Freon 114	0.020	Not Detected	0.14	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
Chloroethane	0.050	Not Detected	0.13	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
1,1,2-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
1,2-Dibromoethane (EDB)	0.020	Not Detected	0.15	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
1,1,2,2-Tetrachloroethane	0.020	Not Detected	0.14	Not Detected
1,4-Dichlorobenzene	0.020	Not Detected	0.12	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: CCV

Lab ID#: 1805182-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051102**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 08:45 AM**	

Compound	%Recovery
1,3-Butadiene	96
Bromomethane	114
Freon 11	100
Ethanol	114
Freon 113	93
Acetone	98
2-Propanol	109
Carbon Disulfide	101
3-Chloropropene	113
Methylene Chloride	91
Hexane	95
2-Butanone (Methyl Ethyl Ketone)	110
Tetrahydrofuran	101
Cyclohexane	93
2,2,4-Trimethylpentane	96
Heptane	96
1,2-Dichloropropane	93
1,4-Dioxane	95
Bromodichloromethane	93
cis-1,3-Dichloropropene	101
4-Methyl-2-pentanone	108
trans-1,3-Dichloropropene	96
2-Hexanone	100
Dibromochloromethane	92
Chlorobenzene	90
Styrene	88
Bromoform	95
Cumene	84
Propylbenzene	83
4-Ethyltoluene	85
1,3,5-Trimethylbenzene	85
1,2,4-Trimethylbenzene	87
1,3-Dichlorobenzene	83
alpha-Chlorotoluene	88
1,2-Dichlorobenzene	83
1,2,4-Trichlorobenzene	107
Hexachlorobutadiene	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130

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Client Sample ID: CCV

Lab ID#: 1805182-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051102**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 08:45 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: CCV

Lab ID#: 1805182-05B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051102sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 08:45 AM**	

Compound	%Recovery
Freon 12	90
Freon 114	88
Chloromethane	85
Vinyl Chloride	86
Chloroethane	94
1,1-Dichloroethene	88
trans-1,2-Dichloroethene	88
Methyl tert-butyl ether	91
1,1-Dichloroethane	91
cis-1,2-Dichloroethene	90
Chloroform	91
1,1,1-Trichloroethane	91
Carbon Tetrachloride	99
Benzene	85
1,2-Dichloroethane	97
Trichloroethene	84
Toluene	88
1,1,2-Trichloroethane	86
Tetrachloroethene	84
1,2-Dibromoethane (EDB)	90
Ethyl Benzene	86
m,p-Xylene	81
o-Xylene	82
1,1,2,2-Tetrachloroethane	84
1,4-Dichlorobenzene	74

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	94	70-130

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Client Sample ID: LCS

Lab ID#: 1805182-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:21 AM**	

Compound	%Recovery	Method Limits
1,3-Butadiene	91	70-130
Bromomethane	116	70-130
Freon 11	96	70-130
Ethanol	115	70-130
Freon 113	90	70-130
Acetone	96	70-130
2-Propanol	107	70-130
Carbon Disulfide	100	70-130
3-Chloropropene	113	70-130
Methylene Chloride	87	70-130
Hexane	94	70-130
2-Butanone (Methyl Ethyl Ketone)	109	70-130
Tetrahydrofuran	102	70-130
Cyclohexane	91	70-130
2,2,4-Trimethylpentane	92	70-130
Heptane	102	70-130
1,2-Dichloropropane	96	70-130
1,4-Dioxane	97	70-130
Bromodichloromethane	99	70-130
cis-1,3-Dichloropropene	111	70-130
4-Methyl-2-pentanone	114	70-130
trans-1,3-Dichloropropene	102	70-130
2-Hexanone	110	70-130
Dibromochloromethane	101	70-130
Chlorobenzene	97	70-130
Styrene	92	70-130
Bromoform	108	70-130
Cumene	90	70-130
Propylbenzene	90	70-130
4-Ethyltoluene	91	70-130
1,3,5-Trimethylbenzene	90	70-130
1,2,4-Trimethylbenzene	94	70-130
1,3-Dichlorobenzene	86	70-130
alpha-Chlorotoluene	106	70-130
1,2-Dichlorobenzene	85	70-130
1,2,4-Trichlorobenzene	104	70-130
Hexachlorobutadiene	91	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130

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Client Sample ID: LCS

Lab ID#: 1805182-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:21 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCSD

Lab ID#: 1805182-06AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:58 AM**	

Compound	%Recovery	Method Limits
1,3-Butadiene	97	70-130
Bromomethane	125	70-130
Freon 11	101	70-130
Ethanol	126	70-130
Freon 113	95	70-130
Acetone	101	70-130
2-Propanol	122	70-130
Carbon Disulfide	109	70-130
3-Chloropropene	115	70-130
Methylene Chloride	92	70-130
Hexane	100	70-130
2-Butanone (Methyl Ethyl Ketone)	116	70-130
Tetrahydrofuran	106	70-130
Cyclohexane	98	70-130
2,2,4-Trimethylpentane	96	70-130
Heptane	104	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	100	70-130
Bromodichloromethane	101	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	115	70-130
trans-1,3-Dichloropropene	102	70-130
2-Hexanone	113	70-130
Dibromochloromethane	102	70-130
Chlorobenzene	99	70-130
Styrene	99	70-130
Bromoform	109	70-130
Cumene	91	70-130
Propylbenzene	93	70-130
4-Ethyltoluene	95	70-130
1,3,5-Trimethylbenzene	91	70-130
1,2,4-Trimethylbenzene	92	70-130
1,3-Dichlorobenzene	91	70-130
alpha-Chlorotoluene	110	70-130
1,2-Dichlorobenzene	91	70-130
1,2,4-Trichlorobenzene	104	70-130
Hexachlorobutadiene	91	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1805182-06AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:58 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
4-Bromofluorobenzene	98	70-130

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Client Sample ID: LCS

Lab ID#: 1805182-06B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051103sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:21 AM**	

Compound	%Recovery	Method Limits
Freon 12	94	70-130
Freon 114	92	70-130
Chloromethane	91	70-130
Vinyl Chloride	93	70-130
Chloroethane	100	70-130
1,1-Dichloroethene	90	70-130
trans-1,2-Dichloroethene	100	70-130
Methyl tert-butyl ether	94	70-130
1,1-Dichloroethane	94	70-130
cis-1,2-Dichloroethene	86	70-130
Chloroform	93	70-130
1,1,1-Trichloroethane	94	70-130
Carbon Tetrachloride	111	60-140
Benzene	88	70-130
1,2-Dichloroethane	99	70-130
Trichloroethene	89	70-130
Toluene	92	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	88	70-130
1,2-Dibromoethane (EDB)	96	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	86	70-130
o-Xylene	88	70-130
1,1,2,2-Tetrachloroethane	89	70-130
1,4-Dichlorobenzene	78	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1805182-06BB

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051104sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:58 AM**	

Compound	%Recovery	Method Limits
Freon 12	94	70-130
Freon 114	92	70-130
Chloromethane	91	70-130
Vinyl Chloride	93	70-130
Chloroethane	103	70-130
1,1-Dichloroethene	90	70-130
trans-1,2-Dichloroethene	100	70-130
Methyl tert-butyl ether	95	70-130
1,1-Dichloroethane	94	70-130
cis-1,2-Dichloroethene	86	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	94	70-130
Carbon Tetrachloride	112	60-140
Benzene	89	70-130
1,2-Dichloroethane	100	70-130
Trichloroethene	90	70-130
Toluene	94	70-130
1,1,2-Trichloroethane	90	70-130
Tetrachloroethene	87	70-130
1,2-Dibromoethane (EDB)	95	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	89	70-130
o-Xylene	92	70-130
1,1,2,2-Tetrachloroethane	87	70-130
1,4-Dichlorobenzene	81	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	96	70-130

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: AEG

ADDRESS: 605 11th Ave SE Suite 201 98501

PHONE: 360 352.9835 FAX:

CLIENT PROJECT #: 11-124 PROJECT MANAGER: B. Dilley

DATE: 5/9/18 PAGE 1 OF 1

PROJECT NAME: Manor Market

LOCATION: 3609 164th St SW Lynnwood

COLLECTOR: B. Dilley / A. Sandoval DATE OF COLLECTION: 5/8/18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb (Pb, TOTAL)	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	MTBE	PCE TCE DCE VC	NOTES	Total Number of Containers	Laboratory Note Number
1. SS1	—	0955	Vap	Tedlar																				48 hr		
2. SS2	—	1055	Vap	Tedlar																				48 hr		
3. MW-11	—	1237	H2O	VOA/Poly																						
4. MW-3	—	1155				X	X									X					X					
5. MW-4	—	1340				X	X									X					X					
6. MW-1	—	1440				X	X									X					X					
7. MW-2	—	1440				X	X									X					X					
8. MW-10	—	1135				X	X									X					X	X				
9. MW-6	—	1340				X	X									X					X					
10. MW-5	—	1240				X	X									X					X					
11.																										
12.																										
13.																										
14.																										
15.																										
16.																										
17.																										
18.																										

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	5/9/18	[signature]	5-9-18
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR 5 DAY

1210 Eastside Street SE, Suite 200
Olympia, Washington 98501

Phone: 360-459-4670
Fax: 360-459-3432

Website: www.esnnw.com
E-Mail: info@esnnw.com

Libby Environmental, Inc.
3322 South Bay Road NE • Olympia, WA 98506-2957

December 10, 2019

Scott Rose
Associated Environmental Group, LLC
2633 Parkmont Lane SW, Suite A
Olympia, WA 98502

Dear Mr. Rose:

Please find enclosed the analytical data report for the Manor Market Project located in Lynnwood, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of in 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services 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,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@gmail.com

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@gmail.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L191203-1
Client Project # 11-124

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	MW-1	MW-2	MW-3	MW-4	MW-5
Date Sampled		N/A	12/2/19	12/2/19	12/2/19	12/2/19	12/2/19
Date Analyzed	PQL	12/4/19	12/4/19	12/4/19	12/4/19	12/4/19	12/4/19
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Benzene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	nd	nd
Total Xylenes	2.0	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	32	7.5	25	700	nd
Surrogate Recovery							
Dibromofluoromethane		117	101	115	112	105	109
1,2-Dichloroethane-d4		134	100	123	117	105	109
Toluene-d8		94	95	93	93	95	94
4-Bromofluorobenzene		104	93	98	93	96	98

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@gmail.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L191203-1
Client Project # 11-124

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		MW-5 Dup	MW-6	MW-10	MW-11
Date Sampled		12/2/19	12/2/19	12/2/19	12/2/19
Date Analyzed	PQL (µg/L)	12/4/19 (µg/L)	12/4/19 (µg/L)	12/4/19 (µg/L)	12/4/19 (µg/L)
Benzene	1.0	nd	147	nd	nd
Toluene	1.0	nd	2.0	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd
Total Xylenes	2.0	nd	7.5	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	nd	nd	nd
Surrogate Recovery					
Dibromofluoromethane		106	93	101	107
1,2-Dichloroethane-d4		103	105	94	108
Toluene-d8		93	97	96	96
4-Bromofluorobenzene		94	97	95	95

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@gmail.com

MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L191203-1
Client Project # 11-124

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW-5

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Methyl *tert*- Butyl Ether (MTBE)	5.0	5.0	6.0	100	120	18.2	65-135	
Benzene	5.0	5.0	5.0	100	100	0.0	65-135	
Toluene	5.0	5.2	5.2	104	104	0.0	65-135	
Ethylbenzene	5.0	4.8	4.7	96	94	2.1	65-135	
Total Xylenes	15.0	13.9	13.9	93	93	0.0	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	129	132	65-135
1,2-Dichloroethane-d4	125	127	65-135
Toluene-d8	117	118	65-135
4-Bromofluorobenzene	99	104	65-135

ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Paul Burke

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Methyl *tert*- Butyl Ether (MTBE)	5.0	5.2	104	80-120	
Benzene	5.0	5.2	104	80-120	
Toluene	5.0	5.4	108	80-120	
Ethylbenzene	5.0	4.9	98	80-120	
Total Xylenes	15.0	15.1	101	80-120	

Surrogate Recovery			
Dibromofluoromethane	127	65-135	
1,2-Dichloroethane-d4	127	65-135	
Toluene-d8	114	65-135	
4-Bromofluorobenzene	104	65-135	

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

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MANOR MARKET PROJECT
AEG, LLC
Lynnwood, Washington
Libby Project # L191203-1
Client Project # 11-124

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/L)
Method Blank	12/4/19	94%	nd
MW-1	12/4/19	95%	nd
MW-2	12/4/19	93%	nd
MW-3	12/4/19	93%	nd
MW-4	12/4/19	95%	nd
MW-5	12/4/19	94%	nd
MW-5 Dup	12/4/19	93%	nd
MW-6	12/4/19	97%	1830
MW-10	12/4/19	78%	nd
MW-11	12/4/19	77%	nd
Practical Quantitation Limit			100

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
Phone: (360) 352-2110
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Email: libbyenv@gmail.com

MANOR MARKET PROJECT
AEG, LLC
Libby Project # L191203-1
Date Received 12/3/2019
Time Received 10:40 AM

Received By KD

Sample Receipt Checklist

Chain of Custody

1. Is the Chain of Custody complete?	☑ Yes	☐ No	
2. How was the sample delivered?	☑ Hand Delivered	☐ Picked Up	☐ Shipped

Log In

3. Cooler or Shipping Container is present.	☑ Yes	☐ No	☐ N/A
4. Cooler or Shipping Container is in good condition.	☑ Yes	☐ No	☐ N/A
5. Cooler or Shipping Container has Custody Seals present.	☐ Yes	☑ No	☐ N/A
6. Was an attempt made to cool the samples?	☑ Yes	☐ No	☐ N/A
7. Temperature of cooler (0°C to 8°C recommended)	0.0 °C		
8. Temperature of sample(s) (0°C to 8°C recommended)	0.0 °C		
9. Did all containers arrive in good condition (unbroken)?	☑ Yes	☐ No	
10. Is it clear what analyses were requested?	☑ Yes	☐ No	
11. Did container labels match Chain of Custody?	☑ Yes	☐ No	
12. Are matrices correctly identified on Chain of Custody?	☑ Yes	☐ No	
13. Are correct containers used for the analysis indicated?	☑ Yes	☐ No	
14. Is there sufficient sample volume for indicated analysis?	☑ Yes	☐ No	
15. Were all containers properly preserved per each analysis?	☑ Yes	☐ No	
16. Were VOA vials collected correctly (no headspace)?	☑ Yes	☐ No	☐ N/A
17. Were all holding times able to be met?	☑ Yes	☐ No	

Discrepancies/ Notes

18. Was client notified of all discrepancies? ☐ Yes ☐ No ☑ N/A

Person Notified: _____ Date: _____

By Whom: _____ Via: _____

Regarding: _____

19. Comments. _____

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

3322 South Bay Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 12/2/19 Page: 1 of 1

Client: AEG
Project Manager: Scott Rose
Address: 2633 Parkmont Lane SW, Suite A
Project Name: Manor Market
City: Olympia State: WA Zip: 98502
Location: 3609 164th St SW City, State: Lynnwood, WA
Phone: (360) 352-9835 Fax: (360) 352-8164
Collector: Foster Kaetzel Date of Collection: 12/2/19
Client Project # 11-124
Email: SROSE@AEGWA.COM

	Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021 MTBE 8260	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals				Field Notes
1	MW-1		1119	GW	VOA		X	X													
2	MW-2		1029	GW	VOA		X	X													
3	MW-3		1305	GW	VOA		X	X													
4	MW-4		1200	GW	VOA		X	X													
5	MW-5		0953	GW	VOA		X	X													
6	MW-6		1049	GW	VOA		X	X													
7	MW-10		1412	GW	VOA		X	X													
8	MW-11		1338	GW	VOA		X	X													
9																					
10																					
11																					
12																					
13																					
14																					
15																					
16																					
17																					

Relinquished by:	Date / Time	Received by:	Date / Time
	12/2/19 1500		12/2/19 1500
Relinquished by:	Date / Time	Received by:	Date / Time
	12/3/19 1040		12/3/19 1040
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N
Cooler Temp.		°C
Sample Temp.		°C
Total Number of Containers		

Remarks:

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

ESN NORTHWEST
Environmental
Services Network

November 26, 2019

Becky Dilba
Associated Environmental Group, Inc.
2633 Parkmont Lane SW, Suite A
Olympia, WA 98502

Dear Ms. Dilba:

Please find enclosed the analytical data report for the Manor Market Project in Lynnwood, Washington. Soil vapor samples were analyzed for TO-15 & APH on November 18 – 19, 2019.

The results of the analyses are summarized in the attached table. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. An invoice for this work is also enclosed.

ESN Northwest appreciates the opportunity to have provided analytical services to Associated Environmental Group, Inc. for this project. If you have any further questions about the data report, please give us 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

Michael A. Korosec
President`

1210 Eastside Street SE, Suite 200 ■ Olympia, Washington 98501 ■ 360.459.4670 ■ FAX 360.459.3432
Web Site: *www.esnnw.com* E-Mail: *info@esnnw.com*

CASE NARRATIVE

This case narrative encompasses samples received on November 14, 2019 by Friedman & Bruya, Inc. from the ESN NW Manor Market, F&BI 911208 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	ESN NW
911208 -01	Indoor-1R
911208 -02	Indoor-2R
911208 -03	Ambient-1R
911208 -04	SS-1R
911208 -05	SS-2R

Several concentrations exceeded the calibration range of the instrument. The data were flagged accordingly.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Indoor-1R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-01
Date Analyzed:	11/19/19	Data File:	111819.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	114	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	88
APH EC9-12 aliphatics	58
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Indoor-2R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-02
Date Analyzed:	11/19/19	Data File:	111820.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	109	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	1,300 ve
APH EC9-12 aliphatics	170
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Ambient-1R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-03
Date Analyzed:	11/19/19	Data File:	111821.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	112	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<46
APH EC9-12 aliphatics	44
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SS-1R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-04 1/2.9
Date Analyzed:	11/19/19	Data File:	111822.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	101	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	440
APH EC9-12 aliphatics	110
APH EC9-10 aromatics	<72

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	SS-2R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-05 1/2.8
Date Analyzed:	11/19/19	Data File:	111823.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	100	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	260
APH EC9-12 aliphatics	130
APH EC9-10 aromatics	<70

Analysis For Volatile Compounds By Method MA-APH

Client Sample ID:	Method Blank	Client:	ESN NW
Date Received:	Not Applicable	Project:	Manor Market, F&BI 911208
Date Collected:	Not Applicable	Lab ID:	09-2770 mb
Date Analyzed:	11/18/19	Data File:	111811.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	106	70	130

Compounds:	Concentration ug/m3
APH EC5-8 aliphatics	<46
APH EC9-12 aliphatics	<35
APH EC9-10 aromatics	<25

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Indoor-1R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-01
Date Analyzed:	11/19/19	Data File:	111819.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	109	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<0.69	<0.4	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	1.4	0.29	1,4-Dioxane	<0.36	<0.1
Chloromethane	<2.1	<1	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.022	<0.01	Bromodichloromethane	<0.067	<0.01
Butane	12	5.0	Trichloroethene	<0.27	<0.05
Bromomethane	<1.6	<0.4	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	130 ve	70 ve	Toluene	<19	<5
Acrolein	<0.92	<0.4	1,1,2-Trichloroethane	<0.11	<0.02
Pentane	3.1	1.1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	28	12	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	1.1	0.26
Methylene chloride	120 ve	33 ve	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.3	<0.4	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	4.3	0.98
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	1.7	0.38
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	4.6	1.3	Bromoform	<2.1	<0.2
Chloroform	0.20	0.041	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.12	0.030	1,4-Dichlorobenzene	<0.24	<0.04
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	<0.63	<0.1	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	1.9	0.59	Naphthalene	0.29	0.055
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Indoor-2R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-02
Date Analyzed:	11/19/19	Data File:	111820.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<0.69	<0.4	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.0	0.40	1,4-Dioxane	<0.36	<0.1
Chloromethane	<2.1	<1	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	54	13
1,3-Butadiene	<0.022	<0.01	Bromodichloromethane	<0.067	<0.01
Butane	23	9.6	Trichloroethene	<0.27	<0.05
Bromomethane	<1.6	<0.4	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	250 ve	66 ve
Acrolein	<0.92	<0.4	1,1,2-Trichloroethane	<0.11	<0.02
Pentane	5.0	1.7	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	190 ve	80 ve	Dibromochloromethane	<0.085	<0.01
2-Propanol	22	9.1	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	2.1	0.48
Methylene chloride	<87	<25	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	7.5	1.4
3-Chloropropene	<1.3	<0.4	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	8.4	1.9
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	3.1	0.71
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	220 ve	63 ve	Bromoform	<2.1	<0.2
Chloroform	0.55	0.11	Benzyl chloride	<0.052	<0.01
Ethyl acetate	9.3	2.6	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	270 ve	92 ve	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.085	0.021	1,4-Dichlorobenzene	<0.24	<0.04
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	1.3	0.22
Carbon tetrachloride	<0.63	<0.1	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	1.4	0.44	Naphthalene	0.49	0.093
Cyclohexane	22	6.4	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Ambient-1R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-03
Date Analyzed:	11/19/19	Data File:	111821.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	106	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<0.69	<0.4	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	2.3	0.46	1,4-Dioxane	<0.36	<0.1
Chloromethane	<2.1	<1	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.022	<0.01	Bromodichloromethane	<0.067	<0.01
Butane	7.6	3.2	Trichloroethene	<0.27	<0.05
Bromomethane	<1.6	<0.4	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	21	11	Toluene	<19	<5
Acrolein	<0.92	<0.4	1,1,2-Trichloroethane	<0.11	<0.02
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	14	5.8	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	0.53	0.12
Methylene chloride	<87	<25	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.3	<0.4	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	1.9	0.44
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	0.79	0.18
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	0.13	0.026	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	0.069	0.017	1,4-Dichlorobenzene	<0.24	<0.04
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	<0.63	<0.1	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	0.97	0.30	Naphthalene	0.15	0.029
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SS-1R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-04 1/2.9
Date Analyzed:	11/19/19	Data File:	111822.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	99	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<2	<1.2	1,2-Dichloropropane	<0.67	<0.14
Dichlorodifluoromethane	2.3	0.46	1,4-Dioxane	<1	<0.29
Chloromethane	<6	<2.9	2,2,4-Trimethylpentane	<14	<2.9
F-114	<2	<0.29	Methyl methacrylate	<12	<2.9
Vinyl chloride	<0.74	<0.29	Heptane	12	3.0
1,3-Butadiene	<0.064	<0.029	Bromodichloromethane	<0.19	<0.029
Butane	18	7.5	Trichloroethene	<0.78	<0.14
Bromomethane	<4.5	<1.2	cis-1,3-Dichloropropene	<1.3	<0.29
Chloroethane	<7.7	<2.9	4-Methyl-2-pentanone	<12	<2.9
Vinyl bromide	<1.3	<0.29	trans-1,3-Dichloropropene	<1.3	<0.29
Ethanol	23	12	Toluene	86	23
Acrolein	<2.7	<1.2	1,1,2-Trichloroethane	<0.32	<0.058
Pentane	8.6	2.9	2-Hexanone	<12	<2.9
Trichlorofluoromethane	<6.5	<1.2	Tetrachloroethene	<20	<2.9
Acetone	87	37	Dibromochloromethane	<0.25	<0.029
2-Propanol	<25	<10	1,2-Dibromoethane (EDB)	<0.22	<0.029
1,1-Dichloroethene	<1.1	<0.29	Chlorobenzene	<1.3	<0.29
trans-1,2-Dichloroethene	<1.1	<0.29	Ethylbenzene	2.7	0.63
Methylene chloride	<250	<72	1,1,2,2-Tetrachloroethane	<0.4	<0.058
t-Butyl alcohol (TBA)	<35	<12	Nonane	<15	<2.9
3-Chloropropene	<3.6	<1.2	Isopropylbenzene	<7.1	<1.4
CFC-113	<2.2	<0.29	2-Chlorotoluene	<15	<2.9
Carbon disulfide	<18	<5.8	Propylbenzene	<7.1	<1.4
Methyl t-butyl ether (MTBE)	<5.2	<1.4	4-Ethyltoluene	<7.1	<1.4
Vinyl acetate	<20	<5.8	m,p-Xylene	11	2.6
1,1-Dichloroethane	<1.2	<0.29	o-Xylene	4.1	0.94
cis-1,2-Dichloroethene	<1.1	<0.29	Styrene	<2.5	<0.58
Hexane	79	22	Bromoform	<6	<0.58
Chloroform	0.35	0.072	Benzyl chloride	<0.15	<0.029
Ethyl acetate	<21	<5.8	1,3,5-Trimethylbenzene	<7.1	<1.4
Tetrahydrofuran	<0.86	<0.29	1,2,4-Trimethylbenzene	<7.1	<1.4
2-Butanone (MEK)	73	25	1,3-Dichlorobenzene	<1.7	<0.29
1,2-Dichloroethane (EDC)	<0.12	<0.029	1,4-Dichlorobenzene	<0.7	<0.12
1,1,1-Trichloroethane	<1.6	<0.29	1,2-Dichlorobenzene	<1.7	<0.29
Carbon tetrachloride	<1.8	<0.29	1,2,4-Trichlorobenzene	<2.2	<0.29
Benzene	2.5	0.79	Naphthalene	<0.76	<0.14
Cyclohexane	<20	<5.8	Hexachlorobutadiene	<0.62	<0.058

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SS-2R	Client:	ESN NW
Date Received:	11/14/19	Project:	Manor Market, F&BI 911208
Date Collected:	11/11/19	Lab ID:	911208-05 1/2.8
Date Analyzed:	11/19/19	Data File:	111823.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	98	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<1.9	<1.1	1,2-Dichloropropane	<0.65	<0.14
Dichlorodifluoromethane	2.1	0.42	1,4-Dioxane	<1	<0.28
Chloromethane	<5.8	<2.8	2,2,4-Trimethylpentane	<13	<2.8
F-114	<2	<0.28	Methyl methacrylate	<11	<2.8
Vinyl chloride	<0.72	<0.28	Heptane	<11	<2.8
1,3-Butadiene	<0.062	<0.028	Bromodichloromethane	<0.19	<0.028
Butane	12	5.1	Trichloroethene	<0.75	<0.14
Bromomethane	<4.3	<1.1	cis-1,3-Dichloropropene	<1.3	<0.28
Chloroethane	<7.4	<2.8	4-Methyl-2-pentanone	<11	<2.8
Vinyl bromide	<1.2	<0.28	trans-1,3-Dichloropropene	<1.3	<0.28
Ethanol	78	41	Toluene	<52	<14
Acrolein	<2.6	<1.1	1,1,2-Trichloroethane	<0.31	<0.056
Pentane	<8.3	<2.8	2-Hexanone	<11	<2.8
Trichlorofluoromethane	<6.3	<1.1	Tetrachloroethene	<19	<2.8
Acetone	94	39	Dibromochloromethane	<0.24	<0.028
2-Propanol	<24	<9.8	1,2-Dibromoethane (EDB)	<0.22	<0.028
1,1-Dichloroethene	<1.1	<0.28	Chlorobenzene	<1.3	<0.28
trans-1,2-Dichloroethene	<1.1	<0.28	Ethylbenzene	1.4	0.31
Methylene chloride	<240	<70	1,1,2,2-Tetrachloroethane	<0.38	<0.056
t-Butyl alcohol (TBA)	<34	<11	Nonane	<15	<2.8
3-Chloropropene	<3.5	<1.1	Isopropylbenzene	<6.9	<1.4
CFC-113	<2.1	<0.28	2-Chlorotoluene	<14	<2.8
Carbon disulfide	<17	<5.6	Propylbenzene	<6.9	<1.4
Methyl t-butyl ether (MTBE)	<5	<1.4	4-Ethyltoluene	<6.9	<1.4
Vinyl acetate	<20	<5.6	m,p-Xylene	4.9	1.1
1,1-Dichloroethane	<1.1	<0.28	o-Xylene	2.2	0.50
cis-1,2-Dichloroethene	<1.1	<0.28	Styrene	<2.4	<0.56
Hexane	<9.9	<2.8	Bromoform	<5.8	<0.56
Chloroform	0.22	0.045	Benzyl chloride	<0.14	<0.028
Ethyl acetate	<20	<5.6	1,3,5-Trimethylbenzene	<6.9	<1.4
Tetrahydrofuran	49	17	1,2,4-Trimethylbenzene	<6.9	<1.4
2-Butanone (MEK)	34	11	1,3-Dichlorobenzene	<1.7	<0.28
1,2-Dichloroethane (EDC)	<0.11	<0.028	1,4-Dichlorobenzene	<0.67	<0.11
1,1,1-Trichloroethane	<1.5	<0.28	1,2-Dichlorobenzene	<1.7	<0.28
Carbon tetrachloride	<1.8	<0.28	1,2,4-Trichlorobenzene	<2.1	<0.28
Benzene	1.9	0.60	Naphthalene	<0.73	<0.14
Cyclohexane	<19	<5.6	Hexachlorobutadiene	<0.6	<0.056

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	ESN NW
Date Received:	Not Applicable	Project:	Manor Market, F&BI 911208
Date Collected:	Not Applicable	Lab ID:	09-2770 mb
Date Analyzed:	11/18/19	Data File:	111811.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	102	70	130

Compounds:	Concentration ug/m3	Concentration ppbv	Compounds:	Concentration ug/m3	Concentration ppbv
Propene	<0.69	<0.4	1,2-Dichloropropane	<0.23	<0.05
Dichlorodifluoromethane	<0.49	<0.1	1,4-Dioxane	<0.36	<0.1
Chloromethane	<2.1	<1	2,2,4-Trimethylpentane	<4.7	<1
F-114	<0.7	<0.1	Methyl methacrylate	<4.1	<1
Vinyl chloride	<0.26	<0.1	Heptane	<4.1	<1
1,3-Butadiene	<0.022	<0.01	Bromodichloromethane	<0.067	<0.01
Butane	<2.4	<1	Trichloroethene	<0.27	<0.05
Bromomethane	<1.6	<0.4	cis-1,3-Dichloropropene	<0.45	<0.1
Chloroethane	<2.6	<1	4-Methyl-2-pentanone	<4.1	<1
Vinyl bromide	<0.44	<0.1	trans-1,3-Dichloropropene	<0.45	<0.1
Ethanol	<7.5	<4	Toluene	<19	<5
Acrolein	<0.92	<0.4	1,1,2-Trichloroethane	<0.11	<0.02
Pentane	<3	<1	2-Hexanone	<4.1	<1
Trichlorofluoromethane	<2.2	<0.4	Tetrachloroethene	<6.8	<1
Acetone	<4.8	<2	Dibromochloromethane	<0.085	<0.01
2-Propanol	<8.6	<3.5	1,2-Dibromoethane (EDB)	<0.077	<0.01
1,1-Dichloroethene	<0.4	<0.1	Chlorobenzene	<0.46	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1	Ethylbenzene	<0.43	<0.1
Methylene chloride	<87	<25	1,1,2,2-Tetrachloroethane	<0.14	<0.02
t-Butyl alcohol (TBA)	<12	<4	Nonane	<5.2	<1
3-Chloropropene	<1.3	<0.4	Isopropylbenzene	<2.5	<0.5
CFC-113	<0.77	<0.1	2-Chlorotoluene	<5.2	<1
Carbon disulfide	<6.2	<2	Propylbenzene	<2.5	<0.5
Methyl t-butyl ether (MTBE)	<1.8	<0.5	4-Ethyltoluene	<2.5	<0.5
Vinyl acetate	<7	<2	m,p-Xylene	<0.87	<0.2
1,1-Dichloroethane	<0.4	<0.1	o-Xylene	<0.43	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1	Styrene	<0.85	<0.2
Hexane	<3.5	<1	Bromoform	<2.1	<0.2
Chloroform	<0.049	<0.01	Benzyl chloride	<0.052	<0.01
Ethyl acetate	<7.2	<2	1,3,5-Trimethylbenzene	<2.5	<0.5
Tetrahydrofuran	<0.29	<0.1	1,2,4-Trimethylbenzene	<2.5	<0.5
2-Butanone (MEK)	<2.9	<1	1,3-Dichlorobenzene	<0.6	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01	1,4-Dichlorobenzene	<0.24	<0.04
1,1,1-Trichloroethane	<0.55	<0.1	1,2-Dichlorobenzene	<0.6	<0.1
Carbon tetrachloride	<0.63	<0.1	1,2,4-Trichlorobenzene	<0.74	<0.1
Benzene	<0.32	<0.1	Naphthalene	<0.079 j	<0.015 j
Cyclohexane	<6.9	<2	Hexachlorobutadiene	<0.21	<0.02

Date of Report: 11/25/19
Date Received: 11/14/19
Project: Manor Market, F&BI 911208

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD MA-APH

Laboratory Code: 911208-05 1/2.8 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
APH EC5-8 aliphatics	ug/m3	260	250	4
APH EC9-12 aliphatics	ug/m3	130	120	8
APH EC9-10 aromatics	ug/m3	<70	<70	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
APH EC5-8 aliphatics	ug/m3	23	76	70-130
APH EC9-12 aliphatics	ug/m3	23	115	70-130
APH EC9-10 aromatics	ug/m3	23	114	70-130

Date of Report: 11/25/19
Date Received: 11/14/19
Project: Manor Market, F&BI 911208

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Propene	ppbv	5	87	70-130
Dichlorodifluoromethane	ppbv	5	98	70-130
Chloromethane	ppbv	5	113	70-130
F-114	ppbv	5	93	70-130
Vinyl chloride	ppbv	5	90	70-130
1,3-Butadiene	ppbv	5	89	70-130
Butane	ppbv	5	87	70-130
Bromomethane	ppbv	5	94	70-130
Chloroethane	ppbv	5	91	70-130
Ethanol	ppbv	5	89	70-130
Acrolein	ppbv	5	84	70-130
Pentane	ppbv	5	86	70-130
Trichlorofluoromethane	ppbv	5	97	70-130
Acetone	ppbv	5	92	70-130
2-Propanol	ppbv	5	84	70-130
1,1-Dichloroethene	ppbv	5	93	70-130
trans-1,2-Dichloroethene	ppbv	5	90	70-130
Methylene chloride	ppbv	5	94	70-130
t-Butyl alcohol (TBA)	ppbv	5	88	70-130
3-Chloropropene	ppbv	5	85	70-130
CFC-113	ppbv	5	95	70-130
Carbon disulfide	ppbv	5	86	70-130
Methyl t-butyl ether (MTBE)	ppbv	5	89	70-130
Vinyl acetate	ppbv	5	91	70-130
1,1-Dichloroethane	ppbv	5	88	70-130
cis-1,2-Dichloroethene	ppbv	5	90	70-130
Hexane	ppbv	5	86	70-130
Chloroform	ppbv	5	91	70-130
Ethyl acetate	ppbv	5	84	70-130
Tetrahydrofuran	ppbv	5	84	70-130
2-Butanone (MEK)	ppbv	5	94	70-130
1,2-Dichloroethane (EDC)	ppbv	5	93	70-130
1,1,1-Trichloroethane	ppbv	5	92	70-130
Carbon tetrachloride	ppbv	5	97	70-130
Benzene	ppbv	5	85	70-130
Cyclohexane	ppbv	5	88	70-130
1,2-Dichloropropane	ppbv	5	87	70-130
1,4-Dioxane	ppbv	5	92	70-130
2,2,4-Trimethylpentane	ppbv	5	88	70-130
Methyl methacrylate	ppbv	5	89	70-130

Date of Report: 11/25/19
Date Received: 11/14/19
Project: Manor Market, F&BI 911208

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Heptane	ppbv	5	91	70-130
Bromodichloromethane	ppbv	5	91	70-130
Trichloroethene	ppbv	5	90	70-130
cis-1,3-Dichloropropene	ppbv	5	94	70-130
4-Methyl-2-pentanone	ppbv	5	98	70-130
trans-1,3-Dichloropropene	ppbv	5	99	70-130
Toluene	ppbv	5	93	70-130
1,1,2-Trichloroethane	ppbv	5	96	70-130
2-Hexanone	ppbv	5	98	70-130
Tetrachloroethene	ppbv	5	93	70-130
Dibromochloromethane	ppbv	5	95	70-130
1,2-Dibromoethane (EDB)	ppbv	5	95	70-130
Chlorobenzene	ppbv	5	82	70-130
Ethylbenzene	ppbv	5	80	70-130
1,1,2,2-Tetrachloroethane	ppbv	5	71	70-130
Nonane	ppbv	5	75	70-130
Isopropylbenzene	ppbv	5	83	70-130
2-Chlorotoluene	ppbv	5	93	70-130
Propylbenzene	ppbv	5	81	70-130
4-Ethyltoluene	ppbv	5	90	70-130
m,p-Xylene	ppbv	10	82	70-130
o-Xylene	ppbv	5	81	70-130
Styrene	ppbv	5	85	70-130
Bromoform	ppbv	5	85	70-130
Benzyl chloride	ppbv	5	91	70-130
1,3,5-Trimethylbenzene	ppbv	5	82	70-130
1,2,4-Trimethylbenzene	ppbv	5	86	70-130
1,3-Dichlorobenzene	ppbv	5	89	70-130
1,4-Dichlorobenzene	ppbv	5	88	70-130
1,2-Dichlorobenzene	ppbv	5	87	70-130
1,2,4-Trichlorobenzene	ppbv	5	75	70-130
Naphthalene	ppbv	5	74	70-130
Hexachlorobutadiene	ppbv	5	88	70-130

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 analyte 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 due to sample matrix effects.

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.

911208

SAMPLE CHAIN OF CUSTODY

ME 11-14-19

Report To ESN

Company

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Manor Market

PO #

NOTES:

INVOICE TO

Page # of

TURNAROUND TIME
☒ Standard
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive Samples
☐ Other

SAMPLE INFORMATION										ANALYSIS REQUESTED						
Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
Indoor-1R	01	20541		(IA) / SG	11/11/19	-30	0805	-10	1432	X			X			
Indoor-2R	02	18561		(IA) / SG		-30	0808	-11	1441	X			X			
Ambient-1R	03	18564		(IA) / SG		-30	0810	-11	1437	X			X			
SS-1R	04	12		IA / (SG)		-30		0	0901	X			X			
SS-2R	05	19		IA / (SG)		-30		0	0833	X			X			
				IA / SG												
				IA / SG												Samples received at ____ °C
				IA / SG												

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

FORMS\COC\COCTO-15.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Becky Duba	AEC	11/12/19	0750
Received by:	Jennifer Arnold	Jennifer Arnold	ESN	11/12/19	752
Relinquished by:	D. Webber-Bye	Liz Webber-Bye	FBI	11/14/19	1100
Received by:					

ESN NORTHWEST
Environmental
Services Network

May 30, 2018

Becky Dilba
Associated Environmental Group, Inc.
605 11th Ave. SE, Suite 201
Olympia, WA 98501

Dear Ms. Dilba:

Please find enclosed the analytical data report for the Manor Market Project in Lynnwood, Washington. Probe services were conducted on May 8, 2018. Water samples were analyzed for Gasoline by NWTPH-Gx, VOC's by Method 8260, Total and Dissolved Pb by Method 6020, and soil vapor for VOC's by Method 8260 and Method TO-15 on May 9 – 16, 2018.

The results of the analyses are summarized in the attached table. Applicable detection limits and QA/QC data are included. An invoice for this work is also enclosed.

ESN Northwest appreciates the opportunity to have provided analytical services to Associated Environmental Group, Inc. 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

Michael A. Korosec
President

1210 Eastside Street SE, Suite 200 ■ Olympia, Washington 98501 ■ 360.459.4670 ■ FAX 360.459.3432
Web Site: *www.esnnw.com* E-Mail: *info@esnnw.com*

ESN NORTHWEST CHEMISTRY LABORATORY

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

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Analysis of Gasoline Range Organics, MTBE & BTEX in Water by Method NWTPH-Gx/8260

Sample Number	Date Analyzed	MTBE (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Gasoline Range Organics (ug/L)	Surrogate Recovery (%)
Method Blank	5/9/2018	nd	nd	nd	nd	nd	nd	110
LCS	5/9/2018	125%	100%	98%	109%	120%	113%	114
LCSD	5/9/2018	86%	101%	95%	114%	122%	---	112
MW-3	5/9/2018	**17**	nd	nd	nd	nd	nd	108
MW-4	5/9/2018	**790**	**110**	nd	nd	nd	nd	108
MW-1	5/15/2018	**14**	nd	nd	nd	nd	nd	108
MW-2	5/15/2018	**8.3**	nd	nd	nd	nd	nd	109
MW-10	5/9/2018	nd	nd	nd	nd	nd	nd	114
MW-6	5/15/2018	nd	**300**	**52**	nd	**12**	**830**	119
MW-5	5/15/2018	nd	nd	nd	nd	nd	nd	108
MW-5 Duplicate	5/15/2018	nd	nd	nd	nd	nd	nd	104
Reporting Limits		1.0	1.0	1.0	1.0	3.0	100	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromoflurorbenzene) & LCS: 65% TO 135%

ESN NORTHWEST CHEMISTRY LABORATORY

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

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Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	MB	LCS	LCSD	MW-3	MW-4	MW-1	MW-2
Date analyzed	(ug/L)	05/09/18	05/09/18	05/09/18	05/09/18	05/09/18	05/15/18	05/15/18
Vinyl chloride	0.2	nd	117%	116%	nd	nd	nd	nd
1,1-Dichloroethene	1.0	nd	91%	93%	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	89%	94%	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	86%	90%	nd	nd	nd	nd
Surrogate recoveries								
Dibromofluoromethane		110%	97%	95%	113%	117%	115%	115%
Toluene-d8		108%	98%	97%	109%	112%	106%	107%
4-Bromofluorobenzene		110%	114%	112%	108%	108%	108%	109%

Data Qualifiers and Analytical Comments

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

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Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	**MW-10**	**MW-6**	**MW-5**	**MW-5 Duplicate**
Date analyzed	(ug/L)	05/09/18	05/15/18	05/15/18	05/15/18
Vinyl chloride	0.2	nd	nd	nd	nd
1,1-Dichloroethene	1.0	nd	nd	nd	nd
Trichloroethene (TCE)	1.0	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd	nd	nd
Surrogate recoveries					
Dibromofluoromethane		107%	105%	120%	123%
Toluene-d8		108%	109%	108%	109%
4-Bromofluorobenzene		114%	119%	108%	104%

Data Qualifiers and Analytical Comments

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

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Total Lead in Water by EPA-6020 Method

Sample Number	Date Analyzed	Lead (Pb) (ug/L)
Method Blank	5/16/2018	nd
MW-3	5/16/2018	nd
MW-4	5/16/2018	nd
MW-1	5/16/2018	nd
MW-2	5/16/2018	nd
MW-10	5/16/2018	nd
MW-10 Duplicate	5/16/2018	nd
MW-6	5/16/2018	nd
MW-5	5/16/2018	nd
Reporting Limits		2.0

"nd" Indicates not detected at listed detection limits.

QA/QC Data - Total Metals EPA-6020

	Laboratory Control Sample			Laboratory Control Sample Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	(%)
Lead	40.0	42.3	106	40.0	46.6	117	9.63

ACCEPTABLE RECOVERY LIMITS FOR LABORATORY CONTROL SAMPLES: 80%-120%
ACCEPTABLE RPD IS 20%

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Dissolved Lead in Water by EPA-6020 Method

Sample Number	Date Analyzed	Lead (Pb) (ug/L)
Method Blank	5/16/2018	nd
MW-3	5/16/2018	nd
MW-4	5/16/2018	**2.2**
MW-1	5/16/2018	nd
MW-1 Duplicate	5/16/2018	nd
MW-2	5/16/2018	nd
MW-10	5/16/2018	nd
MW-6	5/16/2018	nd
MW-5	5/16/2018	nd
Reporting Limits		2.0

"nd" Indicates not detected at listed detection limits.

QA/QC Data - Dissolved Metals EPA-6020

	Laboratory Control Sample			Laboratory Control Sample Duplicate			RPD
	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	Spiked Conc. (ug/L)	Measured Conc. (ug/L)	Spike Recovery (%)	(%)
Lead	40.0	42.3	106	40.0	46.6	117	9.63

ACCEPTABLE RECOVERY LIMITS FOR LABORATORY CONTROL SAMPLES: 80%-120%
ACCEPTABLE RPD IS 20%

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Analyses of Volatile Organic Componds in Air by Method 8260

Sample ID	Molecular	Reporting	MB	LCS	LCSD	SS1	SS2
Date Sampled	Weight	Limits	05/09/18	05/09/18	05/09/18	05/08/18	05/08/18
Date Analyzed	g	ug/m3	05/09/18	05/09/18	05/09/18	05/09/18	05/09/18
Dichlorodifluoromethane	120.9	10	nd			nd	nd
Chloromethane	50.49	10	nd			nd	nd
Vinyl chloride	62.50	10	nd	117%	116%	nd	nd
Bromomethane	94.95	10	nd			nd	nd
Chloroethane	64.52	10	nd			nd	nd
Trichlorofluoromethane	137.4	10	nd			nd	nd
1,1-Dichloroethene	96.95	10	nd			nd	nd
Methylene chloride	84.93	10	nd			nd	nd
Methyl-t-butyl ether (MTBE)	88.15	10	nd			nd	nd
trans-1,2-Dichloroethene	96.95	10	nd			nd	nd
1,1-Dichloroethane	98.96	10	nd			nd	nd
cis-1,2-Dichloroethene	96.95	10	nd			**23**	nd
2,2-Dichloropropane	113.0	10	nd			nd	nd
Chloroform	119.4	10	nd	98%	104%	nd	nd
Bromochloromethane	129.4	10	nd			nd	nd
1,1,1-Trichloroethane	133.4	10	nd			**91**	nd
1,2-Dichloroethane (EDC)	98.96	10	nd			nd	nd
1,1-Dichloropropene	111.0	10	nd			nd	nd
Carbon tetrachloride	153.2	10	nd			nd	nd
Benzene	78.11	10	nd	100%	101%	nd	**230**
Trichloroethene	131.4	10	nd	89%	94%	**81**	nd
1,2-Dichloropropane	113.0	10	nd	95%	99%	nd	nd
Dibromomethane	173.8	10	nd			nd	nd
Bromodichloromethane	163.8	10	nd			nd	nd
cis-1,3-Dichloropropene	111.0	10	nd			nd	nd
Toluene	92.13	10	nd	98%	95%	**28**	**1,540**
trans-1,3-Dichloropropene	111.0	10	nd			nd	nd
1,1,2-Trichloroethane	133.4	10	nd			nd	nd
1,3-Dichloropropane	113.0	10	nd			nd	nd
Dibromochloromethane	208.3	10	nd			nd	nd
Tetrachloroethene	165.8	10	nd	86%	90%	**2,500**	nd
1,2-Dibromoethane (EDB)	187.9	10	nd			nd	nd
Chlorobenzene	112.6	10	nd	93%	98%	nd	nd
1,1,1,2-Tetrachloroethane	167.9	10	nd			nd	nd
Ethylbenzene	106.2	10	nd	109%	114%	nd	**140**
Xylenes	106.2	10	nd	120%	122%	**300**	**1,000**
Styrene	104.2	10	nd			nd	nd
Bromoform	252.8	10	nd			nd	nd
1,1,2,2-Tetrachloroethane	167.9	10	nd			nd	nd
Isopropylbenzene	120.2	10	nd			nd	nd
1,2,3-Trichloropropane	147.4	10	nd			nd	nd
Bromobenzene	157.0	10	nd			nd	nd

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PROJECT #11-124
Lynnwood, Washington

Analyses of Volatile Organic Componds in Air by Method 8260

Sample ID	Molecular	Reporting	MB	LCS	LCSD	SS1	SS2
Date Sampled	Weight	Limits	05/09/18	05/09/18	05/09/18	05/08/18	05/08/18
Date Analyzed	g	ug/m3	05/09/18	05/09/18	05/09/18	05/09/18	05/09/18
n-Propylbenzene	120.2	10	nd			nd	**16**
2-Chlorotoluene	126.6	10	nd			nd	nd
4-Chlorotoluene	126.6	10	nd			nd	nd
1,3,5-Trimethylbenzene	120.2	10	nd			nd	**20**
tert-Butylbenzene	134.2	10	nd			nd	nd
1,2,4-Trimethylbenzene	120.2	10	nd			nd	**110**
sec-Butylbenzene	134.2	10	nd			nd	nd
1,3-Dichlorobenzene	147.0	10	nd			nd	nd
1,4-Dichlorobenzene	147.0	10	nd			nd	nd
Isopropyltoluene	134.2	10	nd			nd	nd
1,2-Dichlorobenzene	147.0	10	nd			nd	nd
n-Butylbenzene	134.2	10	nd			nd	nd
1,2-Dibromo-3-Chloropropane	236.3	10	nd			nd	nd
1,2,4-Trichlorobenzene	181.5	10	nd			nd	nd
Naphthalene	128.2	10	nd			nd	nd
Hexachloro-1,3-butadiene	260.8	10	nd			nd	nd
1,2,3-Trichlorobenzene	181.5	10	nd			nd	nd
Surrogate recoveries							
Dibromofluoromethane			110%	97%	95%	106%	117%
Toluene-d8			108%	98%	97%	110%	115%
4-Bromofluorobenzene			110%	114%	112%	107%	106%

Data Qualifiers and Analytical Comments

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

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WORK ORDER #: 1805182

Work Order Summary

CLIENT:	Ms. Jennifer Arnold ESN Northwest 1210 Eastside St SE Suite 200 Olympia, WA 98501	**BILL TO:**	Ms. Jennifer Arnold ESN Northwest 1210 Eastside St SE Suite 200 Olympia, WA 98501
PHONE:	360-459-4670	**P.O. #**	11-124
FAX:	360-4595-3432	**PROJECT #**	Manor Market
DATE RECEIVED:	05/10/2018	**CONTACT:**	Sarah Westerman
DATE COMPLETED:	05/22/2018		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	Indoor 1	Modified TO-15	9.0 "Hg	5 psi
01B	Indoor 1	Modified TO-15	9.0 "Hg	5 psi
02A	Indoor 2	Modified TO-15	11.0 "Hg	5 psi
02B	Indoor 2	Modified TO-15	11.0 "Hg	5 psi
03A	Outdoor	Modified TO-15	9.5 "Hg	5 psi
03B	Outdoor	Modified TO-15	9.5 "Hg	5 psi
04A	Lab Blank	Modified TO-15	NA	NA
04B	Lab Blank	Modified TO-15	NA	NA
05A	CCV	Modified TO-15	NA	NA
05B	CCV	Modified TO-15	NA	NA
06A	LCS	Modified TO-15	NA	NA
06AA	LCSD	Modified TO-15	NA	NA
06B	LCS	Modified TO-15	NA	NA
06BB	LCSD	Modified TO-15	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 05/22/18

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified TO-15 Full Scan/SIM
ESN Northwest
Workorder# 1805182

Three 6 Liter Summa Canister (SIM Certified) samples were received on May 10, 2018. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the Full Scan and SIM acquisition modes. The method involves concentrating up to 1.0 liters of air. The concentrated aliquot is then flash vaporized and swept through a water management system to remove water vapor. Following dehumidification, the sample passes directly into the GC/MS for analysis.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***TO-15***	***ATL Modifications***
ICAL %RSD acceptance criteria	</=30% RSD with 2 compounds allowed out to < 40% RSD	For Full Scan: 30% RSD with 4 compounds allowed out to < 40% RSD For SIM: Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	For Full Scan: </= 30% Difference with four allowed out up to </=40%.; flag and narrate outliers For SIM: Project specific; default criteria is </= 30% Difference with 10% of compounds allowed out up to </=40%.; flag and narrate outliers
Blank and standards	Zero air	Nitrogen
Method Detection Limit	Follow 40CFR Pt.136 App. B	The MDL met all relevant requirements in Method TO-15 (statistical MDL less than the LOQ). The concentration of the spiked replicate may have exceeded 10X the calculated MDL in some cases

Receiving Notes

The Chain of Custody (COC) information for sample Outdoor did not match the information on the canister with regard to canister identification. The client was notified of the discrepancy and the information on the canister was used to process and report the sample.

The Chain of Custody (COC) was not relinquished properly. A signature, date, and time were not provided by the field sampler.

The Chain of Custody was missing method information. EATL proceeded with the analysis as per the

original contract or verbal agreement.

Analytical Notes

The results for each sample in this report were acquired from two separate data files originating from the same analytical run. The two data files have the same base file name and are differentiated with a "sim" extension on the SIM data file.

Definition of Data Qualifying Flags

Nine qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

CN - See case narrative explanation

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: Indoor 1

Lab ID#: 1805182-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.19	0.24	1.1	1.3
Ethanol	0.96	29	1.8	54
Acetone	0.96	4.9	2.3	12
2-Propanol	0.96	3.9	2.3	9.6
Hexane	0.19	0.24	0.67	0.86
Heptane	0.19	0.20	0.78	0.84

Client Sample ID: Indoor 1

Lab ID#: 1805182-01B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.038	0.47	0.19	2.3
Carbon Tetrachloride	0.038	0.076	0.24	0.48
Benzene	0.096	0.20	0.30	0.64
Toluene	0.038	0.70	0.14	2.6
Ethyl Benzene	0.038	0.086	0.16	0.37
m,p-Xylene	0.076	0.30	0.33	1.3
o-Xylene	0.038	0.12	0.16	0.50

Client Sample ID: Indoor 2

Lab ID#: 1805182-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.21	0.21	1.2	1.2
Ethanol	1.1	36	2.0	68
Acetone	1.1	10	2.5	24
2-Propanol	1.1	1.5	2.6	3.6
Methylene Chloride	0.42	0.61	1.5	2.1
Hexane	0.21	0.31	0.75	1.1
2-Butanone (Methyl Ethyl Ketone)	1.1	1.3	3.1	3.9
Heptane	0.21	0.26	0.87	1.1

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Summary of Detected Compounds
MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

Client Sample ID: Indoor 2

Lab ID#: 1805182-02B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.042	0.43	0.21	2.1
Chloroform	0.042	0.046	0.21	0.23
Carbon Tetrachloride	0.042	0.067	0.27	0.42
Benzene	0.11	0.22	0.34	0.69
Toluene	0.042	1.8	0.16	6.7
Tetrachloroethene	0.042	0.14	0.29	0.92
Ethyl Benzene	0.042	0.14	0.18	0.62
m,p-Xylene	0.085	0.60	0.37	2.6
o-Xylene	0.042	0.22	0.18	0.95

Client Sample ID: Outdoor

Lab ID#: 1805182-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 11	0.20	0.23	1.1	1.3
Ethanol	0.98	3.4	1.8	6.4
Acetone	0.98	4.9	2.3	12
Hexane	0.20	0.20	0.69	0.70

Client Sample ID: Outdoor

Lab ID#: 1805182-03B

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.039	0.45	0.19	2.2
Carbon Tetrachloride	0.039	0.070	0.25	0.44
Benzene	0.098	0.14	0.31	0.44
Toluene	0.039	0.44	0.15	1.7
Ethyl Benzene	0.039	0.059	0.17	0.26
m,p-Xylene	0.078	0.20	0.34	0.89
o-Xylene	0.039	0.070	0.17	0.30

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Client Sample ID: Indoor 1

Lab ID#: 1805182-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051117**	**Date of Collection: 5/8/18 2:16:00 PM**	
Dil. Factor:	**1.91**	**Date of Analysis: 5/11/18 06:48 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.19	Not Detected	0.42	Not Detected
Bromomethane	0.96	Not Detected	3.7	Not Detected
Freon 11	0.19	0.24	1.1	1.3
Ethanol	0.96	29	1.8	54
Freon 113	0.19	Not Detected	1.5	Not Detected
Acetone	0.96	4.9	2.3	12
2-Propanol	0.96	3.9	2.3	9.6
Carbon Disulfide	0.96	Not Detected	3.0	Not Detected
3-Chloropropene	0.96	Not Detected	3.0	Not Detected
Methylene Chloride	0.38	Not Detected	1.3	Not Detected
Hexane	0.19	0.24	0.67	0.86
2-Butanone (Methyl Ethyl Ketone)	0.96	Not Detected	2.8	Not Detected
Tetrahydrofuran	0.96	Not Detected	2.8	Not Detected
Cyclohexane	0.19	Not Detected	0.66	Not Detected
2,2,4-Trimethylpentane	0.96	Not Detected	4.5	Not Detected
Heptane	0.19	0.20	0.78	0.84
1,2-Dichloropropane	0.19	Not Detected	0.88	Not Detected
1,4-Dioxane	0.19	Not Detected	0.69	Not Detected
Bromodichloromethane	0.19	Not Detected	1.3	Not Detected
cis-1,3-Dichloropropene	0.19	Not Detected	0.87	Not Detected
4-Methyl-2-pentanone	0.19	Not Detected	0.78	Not Detected
trans-1,3-Dichloropropene	0.19	Not Detected	0.87	Not Detected
2-Hexanone	0.96	Not Detected	3.9	Not Detected
Dibromochloromethane	0.19	Not Detected	1.6	Not Detected
Chlorobenzene	0.19	Not Detected	0.88	Not Detected
Styrene	0.19	Not Detected	0.81	Not Detected
Bromoform	0.19	Not Detected	2.0	Not Detected
Cumene	0.19	Not Detected	0.94	Not Detected
Propylbenzene	0.19	Not Detected	0.94	Not Detected
4-Ethyltoluene	0.19	Not Detected	0.94	Not Detected
1,3,5-Trimethylbenzene	0.19	Not Detected	0.94	Not Detected
1,2,4-Trimethylbenzene	0.19	Not Detected	0.94	Not Detected
1,3-Dichlorobenzene	0.19	Not Detected	1.1	Not Detected
alpha-Chlorotoluene	0.19	Not Detected	0.99	Not Detected
1,2-Dichlorobenzene	0.19	Not Detected	1.1	Not Detected
1,2,4-Trichlorobenzene	0.96	Not Detected	7.1	Not Detected
Hexachlorobutadiene	0.96	Not Detected	10	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	111	70-130

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Client Sample ID: Indoor 1

Lab ID#: 1805182-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051117**	**Date of Collection: 5/8/18 2:16:00 PM**	
Dil. Factor:	**1.91**	**Date of Analysis: 5/11/18 06:48 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: Indoor 1

Lab ID#: 1805182-01B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051117sim**	**Date of Collection: 5/8/18 2:16:00 PM**	
Dil. Factor:	**1.91**	**Date of Analysis: 5/11/18 06:48 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.038	0.47	0.19	2.3
Freon 114	0.038	Not Detected	0.27	Not Detected
Chloromethane	0.96	Not Detected	2.0	Not Detected
Vinyl Chloride	0.019	Not Detected	0.049	Not Detected
Chloroethane	0.096	Not Detected	0.25	Not Detected
1,1-Dichloroethene	0.019	Not Detected	0.076	Not Detected
trans-1,2-Dichloroethene	0.19	Not Detected	0.76	Not Detected
Methyl tert-butyl ether	0.19	Not Detected	0.69	Not Detected
1,1-Dichloroethane	0.038	Not Detected	0.15	Not Detected
cis-1,2-Dichloroethene	0.038	Not Detected	0.15	Not Detected
Chloroform	0.038	Not Detected	0.19	Not Detected
1,1,1-Trichloroethane	0.038	Not Detected	0.21	Not Detected
Carbon Tetrachloride	0.038	0.076	0.24	0.48
Benzene	0.096	0.20	0.30	0.64
1,2-Dichloroethane	0.038	Not Detected	0.15	Not Detected
Trichloroethene	0.038	Not Detected	0.20	Not Detected
Toluene	0.038	0.70	0.14	2.6
1,1,2-Trichloroethane	0.038	Not Detected	0.21	Not Detected
Tetrachloroethene	0.038	Not Detected	0.26	Not Detected
1,2-Dibromoethane (EDB)	0.038	Not Detected	0.29	Not Detected
Ethyl Benzene	0.038	0.086	0.16	0.37
m,p-Xylene	0.076	0.30	0.33	1.3
o-Xylene	0.038	0.12	0.16	0.50
1,1,2,2-Tetrachloroethane	0.038	Not Detected	0.26	Not Detected
1,4-Dichlorobenzene	0.038	Not Detected	0.23	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: Indoor 2

Lab ID#: 1805182-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051120**	**Date of Collection: 5/8/18 3:05:00 PM**	
Dil. Factor:	**2.12**	**Date of Analysis: 5/11/18 09:15 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.21	Not Detected	0.47	Not Detected
Bromomethane	1.1	Not Detected	4.1	Not Detected
Freon 11	0.21	0.21	1.2	1.2
Ethanol	1.1	36	2.0	68
Freon 113	0.21	Not Detected	1.6	Not Detected
Acetone	1.1	10	2.5	24
2-Propanol	1.1	1.5	2.6	3.6
Carbon Disulfide	1.1	Not Detected	3.3	Not Detected
3-Chloropropene	1.1	Not Detected	3.3	Not Detected
Methylene Chloride	0.42	0.61	1.5	2.1
Hexane	0.21	0.31	0.75	1.1
2-Butanone (Methyl Ethyl Ketone)	1.1	1.3	3.1	3.9
Tetrahydrofuran	1.1	Not Detected	3.1	Not Detected
Cyclohexane	0.21	Not Detected	0.73	Not Detected
2,2,4-Trimethylpentane	1.1	Not Detected	5.0	Not Detected
Heptane	0.21	0.26	0.87	1.1
1,2-Dichloropropane	0.21	Not Detected	0.98	Not Detected
1,4-Dioxane	0.21	Not Detected	0.76	Not Detected
Bromodichloromethane	0.21	Not Detected	1.4	Not Detected
cis-1,3-Dichloropropene	0.21	Not Detected	0.96	Not Detected
4-Methyl-2-pentanone	0.21	Not Detected	0.87	Not Detected
trans-1,3-Dichloropropene	0.21	Not Detected	0.96	Not Detected
2-Hexanone	1.1	Not Detected	4.3	Not Detected
Dibromochloromethane	0.21	Not Detected	1.8	Not Detected
Chlorobenzene	0.21	Not Detected	0.98	Not Detected
Styrene	0.21	Not Detected	0.90	Not Detected
Bromoform	0.21	Not Detected	2.2	Not Detected
Cumene	0.21	Not Detected	1.0	Not Detected
Propylbenzene	0.21	Not Detected	1.0	Not Detected
4-Ethyltoluene	0.21	Not Detected	1.0	Not Detected
1,3,5-Trimethylbenzene	0.21	Not Detected	1.0	Not Detected
1,2,4-Trimethylbenzene	0.21	Not Detected	1.0	Not Detected
1,3-Dichlorobenzene	0.21	Not Detected	1.3	Not Detected
alpha-Chlorotoluene	0.21	Not Detected	1.1	Not Detected
1,2-Dichlorobenzene	0.21	Not Detected	1.3	Not Detected
1,2,4-Trichlorobenzene	1.1	Not Detected	7.9	Not Detected
Hexachlorobutadiene	1.1	Not Detected	11	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	103	70-130

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Client Sample ID: Indoor 2

Lab ID#: 1805182-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051120**	**Date of Collection: 5/8/18 3:05:00 PM**	
Dil. Factor:	**2.12**	**Date of Analysis: 5/11/18 09:15 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Indoor 2

Lab ID#: 1805182-02B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051120sim**	**Date of Collection: 5/8/18 3:05:00 PM**	
Dil. Factor:	**2.12**	**Date of Analysis: 5/11/18 09:15 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.042	0.43	0.21	2.1
Freon 114	0.042	Not Detected	0.30	Not Detected
Chloromethane	1.1	Not Detected	2.2	Not Detected
Vinyl Chloride	0.021	Not Detected	0.054	Not Detected
Chloroethane	0.11	Not Detected	0.28	Not Detected
1,1-Dichloroethene	0.021	Not Detected	0.084	Not Detected
trans-1,2-Dichloroethene	0.21	Not Detected	0.84	Not Detected
Methyl tert-butyl ether	0.21	Not Detected	0.76	Not Detected
1,1-Dichloroethane	0.042	Not Detected	0.17	Not Detected
cis-1,2-Dichloroethene	0.042	Not Detected	0.17	Not Detected
Chloroform	0.042	0.046	0.21	0.23
1,1,1-Trichloroethane	0.042	Not Detected	0.23	Not Detected
Carbon Tetrachloride	0.042	0.067	0.27	0.42
Benzene	0.11	0.22	0.34	0.69
1,2-Dichloroethane	0.042	Not Detected	0.17	Not Detected
Trichloroethene	0.042	Not Detected	0.23	Not Detected
Toluene	0.042	1.8	0.16	6.7
1,1,2-Trichloroethane	0.042	Not Detected	0.23	Not Detected
Tetrachloroethene	0.042	0.14	0.29	0.92
1,2-Dibromoethane (EDB)	0.042	Not Detected	0.32	Not Detected
Ethyl Benzene	0.042	0.14	0.18	0.62
m,p-Xylene	0.085	0.60	0.37	2.6
o-Xylene	0.042	0.22	0.18	0.95
1,1,2,2-Tetrachloroethane	0.042	Not Detected	0.29	Not Detected
1,4-Dichlorobenzene	0.042	Not Detected	0.25	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: Outdoor

Lab ID#: 1805182-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051118**	**Date of Collection: 5/8/18 3:22:00 PM**	
Dil. Factor:	**1.96**	**Date of Analysis: 5/11/18 07:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.20	Not Detected	0.43	Not Detected
Bromomethane	0.98	Not Detected	3.8	Not Detected
Freon 11	0.20	0.23	1.1	1.3
Ethanol	0.98	3.4	1.8	6.4
Freon 113	0.20	Not Detected	1.5	Not Detected
Acetone	0.98	4.9	2.3	12
2-Propanol	0.98	Not Detected	2.4	Not Detected
Carbon Disulfide	0.98	Not Detected	3.0	Not Detected
3-Chloropropene	0.98	Not Detected	3.1	Not Detected
Methylene Chloride	0.39	Not Detected	1.4	Not Detected
Hexane	0.20	0.20	0.69	0.70
2-Butanone (Methyl Ethyl Ketone)	0.98	Not Detected	2.9	Not Detected
Tetrahydrofuran	0.98	Not Detected	2.9	Not Detected
Cyclohexane	0.20	Not Detected	0.67	Not Detected
2,2,4-Trimethylpentane	0.98	Not Detected	4.6	Not Detected
Heptane	0.20	Not Detected	0.80	Not Detected
1,2-Dichloropropane	0.20	Not Detected	0.90	Not Detected
1,4-Dioxane	0.20	Not Detected	0.71	Not Detected
Bromodichloromethane	0.20	Not Detected	1.3	Not Detected
cis-1,3-Dichloropropene	0.20	Not Detected	0.89	Not Detected
4-Methyl-2-pentanone	0.20	Not Detected	0.80	Not Detected
trans-1,3-Dichloropropene	0.20	Not Detected	0.89	Not Detected
2-Hexanone	0.98	Not Detected	4.0	Not Detected
Dibromochloromethane	0.20	Not Detected	1.7	Not Detected
Chlorobenzene	0.20	Not Detected	0.90	Not Detected
Styrene	0.20	Not Detected	0.83	Not Detected
Bromoform	0.20	Not Detected	2.0	Not Detected
Cumene	0.20	Not Detected	0.96	Not Detected
Propylbenzene	0.20	Not Detected	0.96	Not Detected
4-Ethyltoluene	0.20	Not Detected	0.96	Not Detected
1,3,5-Trimethylbenzene	0.20	Not Detected	0.96	Not Detected
1,2,4-Trimethylbenzene	0.20	Not Detected	0.96	Not Detected
1,3-Dichlorobenzene	0.20	Not Detected	1.2	Not Detected
alpha-Chlorotoluene	0.20	Not Detected	1.0	Not Detected
1,2-Dichlorobenzene	0.20	Not Detected	1.2	Not Detected
1,2,4-Trichlorobenzene	0.98	Not Detected	7.3	Not Detected
Hexachlorobutadiene	0.98	Not Detected	10	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130

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Client Sample ID: Outdoor

Lab ID#: 1805182-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051118**	**Date of Collection: 5/8/18 3:22:00 PM**	
Dil. Factor:	**1.96**	**Date of Analysis: 5/11/18 07:23 PM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
4-Bromofluorobenzene	109	70-130

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Client Sample ID: Outdoor

Lab ID#: 1805182-03B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051118sim**	**Date of Collection: 5/8/18 3:22:00 PM**	
Dil. Factor:	**1.96**	**Date of Analysis: 5/11/18 07:23 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.039	0.45	0.19	2.2
Freon 114	0.039	Not Detected	0.27	Not Detected
Chloromethane	0.98	Not Detected	2.0	Not Detected
Vinyl Chloride	0.020	Not Detected	0.050	Not Detected
Chloroethane	0.098	Not Detected	0.26	Not Detected
1,1-Dichloroethene	0.020	Not Detected	0.078	Not Detected
trans-1,2-Dichloroethene	0.20	Not Detected	0.78	Not Detected
Methyl tert-butyl ether	0.20	Not Detected	0.71	Not Detected
1,1-Dichloroethane	0.039	Not Detected	0.16	Not Detected
cis-1,2-Dichloroethene	0.039	Not Detected	0.16	Not Detected
Chloroform	0.039	Not Detected	0.19	Not Detected
1,1,1-Trichloroethane	0.039	Not Detected	0.21	Not Detected
Carbon Tetrachloride	0.039	0.070	0.25	0.44
Benzene	0.098	0.14	0.31	0.44
1,2-Dichloroethane	0.039	Not Detected	0.16	Not Detected
Trichloroethene	0.039	Not Detected	0.21	Not Detected
Toluene	0.039	0.44	0.15	1.7
1,1,2-Trichloroethane	0.039	Not Detected	0.21	Not Detected
Tetrachloroethene	0.039	Not Detected	0.26	Not Detected
1,2-Dibromoethane (EDB)	0.039	Not Detected	0.30	Not Detected
Ethyl Benzene	0.039	0.059	0.17	0.26
m,p-Xylene	0.078	0.20	0.34	0.89
o-Xylene	0.039	0.070	0.17	0.30
1,1,2,2-Tetrachloroethane	0.039	Not Detected	0.27	Not Detected
1,4-Dichlorobenzene	0.039	Not Detected	0.24	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1805182-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051106**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 11:09 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
1,3-Butadiene	0.10	Not Detected	0.22	Not Detected
Bromomethane	0.50	Not Detected	1.9	Not Detected
Freon 11	0.10	Not Detected	0.56	Not Detected
Ethanol	0.50	Not Detected	0.94	Not Detected
Freon 113	0.10	Not Detected	0.77	Not Detected
Acetone	0.50	Not Detected	1.2	Not Detected
2-Propanol	0.50	Not Detected	1.2	Not Detected
Carbon Disulfide	0.50	Not Detected	1.6	Not Detected
3-Chloropropene	0.50	Not Detected	1.6	Not Detected
Methylene Chloride	0.20	Not Detected	0.69	Not Detected
Hexane	0.10	Not Detected	0.35	Not Detected
2-Butanone (Methyl Ethyl Ketone)	0.50	Not Detected	1.5	Not Detected
Tetrahydrofuran	0.50	Not Detected	1.5	Not Detected
Cyclohexane	0.10	Not Detected	0.34	Not Detected
2,2,4-Trimethylpentane	0.50	Not Detected	2.3	Not Detected
Heptane	0.10	Not Detected	0.41	Not Detected
1,2-Dichloropropane	0.10	Not Detected	0.46	Not Detected
1,4-Dioxane	0.10	Not Detected	0.36	Not Detected
Bromodichloromethane	0.10	Not Detected	0.67	Not Detected
cis-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
4-Methyl-2-pentanone	0.10	Not Detected	0.41	Not Detected
trans-1,3-Dichloropropene	0.10	Not Detected	0.45	Not Detected
2-Hexanone	0.50	Not Detected	2.0	Not Detected
Dibromochloromethane	0.10	Not Detected	0.85	Not Detected
Chlorobenzene	0.10	Not Detected	0.46	Not Detected
Styrene	0.10	Not Detected	0.42	Not Detected
Bromoform	0.10	Not Detected	1.0	Not Detected
Cumene	0.10	Not Detected	0.49	Not Detected
Propylbenzene	0.10	Not Detected	0.49	Not Detected
4-Ethyltoluene	0.10	Not Detected	0.49	Not Detected
1,3,5-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,2,4-Trimethylbenzene	0.10	Not Detected	0.49	Not Detected
1,3-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
alpha-Chlorotoluene	0.10	Not Detected	0.52	Not Detected
1,2-Dichlorobenzene	0.10	Not Detected	0.60	Not Detected
1,2,4-Trichlorobenzene	0.50	Not Detected	3.7	Not Detected
Hexachlorobutadiene	0.50	Not Detected	5.3	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1805182-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051106**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 11:09 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1805182-04B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051106sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 11:09 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Freon 12	0.020	Not Detected	0.099	Not Detected
Freon 114	0.020	Not Detected	0.14	Not Detected
Chloromethane	0.50	Not Detected	1.0	Not Detected
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
Chloroethane	0.050	Not Detected	0.13	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected
Methyl tert-butyl ether	0.10	Not Detected	0.36	Not Detected
1,1-Dichloroethane	0.020	Not Detected	0.081	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Chloroform	0.020	Not Detected	0.098	Not Detected
1,1,1-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Carbon Tetrachloride	0.020	Not Detected	0.12	Not Detected
Benzene	0.050	Not Detected	0.16	Not Detected
1,2-Dichloroethane	0.020	Not Detected	0.081	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Toluene	0.020	Not Detected	0.075	Not Detected
1,1,2-Trichloroethane	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
1,2-Dibromoethane (EDB)	0.020	Not Detected	0.15	Not Detected
Ethyl Benzene	0.020	Not Detected	0.087	Not Detected
m,p-Xylene	0.040	Not Detected	0.17	Not Detected
o-Xylene	0.020	Not Detected	0.087	Not Detected
1,1,2,2-Tetrachloroethane	0.020	Not Detected	0.14	Not Detected
1,4-Dichlorobenzene	0.020	Not Detected	0.12	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: CCV

Lab ID#: 1805182-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051102**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 08:45 AM**	

Compound	%Recovery
1,3-Butadiene	96
Bromomethane	114
Freon 11	100
Ethanol	114
Freon 113	93
Acetone	98
2-Propanol	109
Carbon Disulfide	101
3-Chloropropene	113
Methylene Chloride	91
Hexane	95
2-Butanone (Methyl Ethyl Ketone)	110
Tetrahydrofuran	101
Cyclohexane	93
2,2,4-Trimethylpentane	96
Heptane	96
1,2-Dichloropropane	93
1,4-Dioxane	95
Bromodichloromethane	93
cis-1,3-Dichloropropene	101
4-Methyl-2-pentanone	108
trans-1,3-Dichloropropene	96
2-Hexanone	100
Dibromochloromethane	92
Chlorobenzene	90
Styrene	88
Bromoform	95
Cumene	84
Propylbenzene	83
4-Ethyltoluene	85
1,3,5-Trimethylbenzene	85
1,2,4-Trimethylbenzene	87
1,3-Dichlorobenzene	83
alpha-Chlorotoluene	88
1,2-Dichlorobenzene	83
1,2,4-Trichlorobenzene	107
Hexachlorobutadiene	98

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	108	70-130

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Client Sample ID: CCV

Lab ID#: 1805182-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051102**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 08:45 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	100	70-130
4-Bromofluorobenzene	91	70-130

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Client Sample ID: CCV

Lab ID#: 1805182-05B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051102sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 08:45 AM**	

Compound	%Recovery
Freon 12	90
Freon 114	88
Chloromethane	85
Vinyl Chloride	86
Chloroethane	94
1,1-Dichloroethene	88
trans-1,2-Dichloroethene	88
Methyl tert-butyl ether	91
1,1-Dichloroethane	91
cis-1,2-Dichloroethene	90
Chloroform	91
1,1,1-Trichloroethane	91
Carbon Tetrachloride	99
Benzene	85
1,2-Dichloroethane	97
Trichloroethene	84
Toluene	88
1,1,2-Trichloroethane	86
Tetrachloroethene	84
1,2-Dibromoethane (EDB)	90
Ethyl Benzene	86
m,p-Xylene	81
o-Xylene	82
1,1,2,2-Tetrachloroethane	84
1,4-Dichlorobenzene	74

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	94	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1805182-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:21 AM**	

Compound	%Recovery	Method Limits
1,3-Butadiene	91	70-130
Bromomethane	116	70-130
Freon 11	96	70-130
Ethanol	115	70-130
Freon 113	90	70-130
Acetone	96	70-130
2-Propanol	107	70-130
Carbon Disulfide	100	70-130
3-Chloropropene	113	70-130
Methylene Chloride	87	70-130
Hexane	94	70-130
2-Butanone (Methyl Ethyl Ketone)	109	70-130
Tetrahydrofuran	102	70-130
Cyclohexane	91	70-130
2,2,4-Trimethylpentane	92	70-130
Heptane	102	70-130
1,2-Dichloropropane	96	70-130
1,4-Dioxane	97	70-130
Bromodichloromethane	99	70-130
cis-1,3-Dichloropropene	111	70-130
4-Methyl-2-pentanone	114	70-130
trans-1,3-Dichloropropene	102	70-130
2-Hexanone	110	70-130
Dibromochloromethane	101	70-130
Chlorobenzene	97	70-130
Styrene	92	70-130
Bromoform	108	70-130
Cumene	90	70-130
Propylbenzene	90	70-130
4-Ethyltoluene	91	70-130
1,3,5-Trimethylbenzene	90	70-130
1,2,4-Trimethylbenzene	94	70-130
1,3-Dichlorobenzene	86	70-130
alpha-Chlorotoluene	106	70-130
1,2-Dichlorobenzene	85	70-130
1,2,4-Trichlorobenzene	104	70-130
Hexachlorobutadiene	91	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	100	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1805182-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051103**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:21 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	99	70-130
4-Bromofluorobenzene	98	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1805182-06AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:58 AM**	

Compound	%Recovery	Method Limits
1,3-Butadiene	97	70-130
Bromomethane	125	70-130
Freon 11	101	70-130
Ethanol	126	70-130
Freon 113	95	70-130
Acetone	101	70-130
2-Propanol	122	70-130
Carbon Disulfide	109	70-130
3-Chloropropene	115	70-130
Methylene Chloride	92	70-130
Hexane	100	70-130
2-Butanone (Methyl Ethyl Ketone)	116	70-130
Tetrahydrofuran	106	70-130
Cyclohexane	98	70-130
2,2,4-Trimethylpentane	96	70-130
Heptane	104	70-130
1,2-Dichloropropane	94	70-130
1,4-Dioxane	100	70-130
Bromodichloromethane	101	70-130
cis-1,3-Dichloropropene	112	70-130
4-Methyl-2-pentanone	115	70-130
trans-1,3-Dichloropropene	102	70-130
2-Hexanone	113	70-130
Dibromochloromethane	102	70-130
Chlorobenzene	99	70-130
Styrene	99	70-130
Bromoform	109	70-130
Cumene	91	70-130
Propylbenzene	93	70-130
4-Ethyltoluene	95	70-130
1,3,5-Trimethylbenzene	91	70-130
1,2,4-Trimethylbenzene	92	70-130
1,3-Dichlorobenzene	91	70-130
alpha-Chlorotoluene	110	70-130
1,2-Dichlorobenzene	91	70-130
1,2,4-Trichlorobenzene	104	70-130
Hexachlorobutadiene	91	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1805182-06AA

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051104**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:58 AM**	

Surrogates	%Recovery	Method Limits
Toluene-d8	98	70-130
4-Bromofluorobenzene	98	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1805182-06B

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051103sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:21 AM**	

Compound	%Recovery	Method Limits
Freon 12	94	70-130
Freon 114	92	70-130
Chloromethane	91	70-130
Vinyl Chloride	93	70-130
Chloroethane	100	70-130
1,1-Dichloroethene	90	70-130
trans-1,2-Dichloroethene	100	70-130
Methyl tert-butyl ether	94	70-130
1,1-Dichloroethane	94	70-130
cis-1,2-Dichloroethene	86	70-130
Chloroform	93	70-130
1,1,1-Trichloroethane	94	70-130
Carbon Tetrachloride	111	60-140
Benzene	88	70-130
1,2-Dichloroethane	99	70-130
Trichloroethene	89	70-130
Toluene	92	70-130
1,1,2-Trichloroethane	92	70-130
Tetrachloroethene	88	70-130
1,2-Dibromoethane (EDB)	96	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	86	70-130
o-Xylene	88	70-130
1,1,2,2-Tetrachloroethane	89	70-130
1,4-Dichlorobenzene	78	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	96	70-130

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Client Sample ID: LCSD

Lab ID#: 1805182-06BB

MODIFIED EPA METHOD TO-15 GC/MS SIM/FULL SCAN

File Name:	**v051104sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 5/11/18 09:58 AM**	

Compound	%Recovery	Method Limits
Freon 12	94	70-130
Freon 114	92	70-130
Chloromethane	91	70-130
Vinyl Chloride	93	70-130
Chloroethane	103	70-130
1,1-Dichloroethene	90	70-130
trans-1,2-Dichloroethene	100	70-130
Methyl tert-butyl ether	95	70-130
1,1-Dichloroethane	94	70-130
cis-1,2-Dichloroethene	86	70-130
Chloroform	94	70-130
1,1,1-Trichloroethane	94	70-130
Carbon Tetrachloride	112	60-140
Benzene	89	70-130
1,2-Dichloroethane	100	70-130
Trichloroethene	90	70-130
Toluene	94	70-130
1,1,2-Trichloroethane	90	70-130
Tetrachloroethene	87	70-130
1,2-Dibromoethane (EDB)	95	70-130
Ethyl Benzene	92	70-130
m,p-Xylene	89	70-130
o-Xylene	92	70-130
1,1,2,2-Tetrachloroethane	87	70-130
1,4-Dichlorobenzene	81	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	96	70-130

ESN NORTHWEST, INC. | Environmental Services Network

CHAIN-OF-CUSTODY RECORD

CLIENT: AEG

ADDRESS: 605 11th Ave SE Suite 201 98501

PHONE: 360 352.9835 FAX:

CLIENT PROJECT #: 11-124 PROJECT MANAGER: B. Dilley

DATE: 5/9/18 PAGE 1 OF 1

PROJECT NAME: Manor Market

LOCATION: 3609 164th St SW Lynnwood

COLLECTOR: B. Dilley / A. Sandoval DATE OF COLLECTION: 5/8/18

Sample Number	Depth	Time	Sample Type	Container Type	TPH - HCID	TPH - Diesel & Oil	TPH - Gasoline	BTEX	VOC 8260CL	VOC 8260	SemiVol 8270	PAH's 8270	PCB's 8082	CL Pesticides 8081	RCRA 8 Metals	MTCA 5 Metals	Pb (Pb, TOTAL)	Asbestos - PLM	GRO Suite	DRO Suite	WO Suite	MTBE	PCE TCE DCE VC	NOTES	Total Number of Containers	Laboratory Note Number
1. SS1	—	0955	Vap	Tedlar																				48 hr		
2. SS2	—	1055	Vap	Tedlar																				48 hr		
3. MW-11	—	1237	H2O	VOA/Poly																						
4. MW-3	—	1155				X	X									X					X					
5. MW-4	—	1340				X	X									X					X					
6. MW-1	—	1440				X	X									X					X					
7. MW-2	—	1440				X	X									X					X					
8. MW-10	—	1135				X	X									X					X	X				
9. MW-6	—	1340				X	X									X					X					
10. MW-5	—	1240				X	X									X					X					
11.																										
12.																										
13.																										
14.																										
15.																										
16.																										
17.																										
18.																										

RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME
[signature]	5/9/18	[signature]	5-9-18
RELINQUISHED BY (Signature)	DATE/TIME	RECEIVED BY (Signature)	DATE/TIME

SAMPLE RECEIPT	
TOTAL NUMBER OF CONTAINERS	
CHAIN OF CUSTODY SEALS Y/N/NA	
SEALS INTACT? Y/N/NA	
RECEIVED GOOD COND./COLD	
NOTES:	

LABORATORY NOTES:

Turn Around Time: 24 HR 48 HR 5 DAY

1210 Eastside Street SE, Suite 200
Olympia, Washington 98501

Phone: 360-459-4670
Fax: 360-459-3432

Website: www.esnnw.com
E-Mail: info@esnnw.com

ESN NORTHWEST CHEMISTRY LABORATORY

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

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

Analysis of Volatile Organic Compounds in Water by Method 8260C/5030C

Analytical Results

	RL	MB	LCS	LCSD	MW-11
Date analyzed	(ug/L)	05/09/18	05/09/18	05/09/18	05/09/18
Vinyl chloride	0.2	nd	117%	116%	nd
1,1-Dichloroethene	1.0	nd	91%	93%	nd
Trichloroethene (TCE)	1.0	nd	89%	94%	nd
Tetrachloroethene (PCE)	1.0	nd	86%	90%	nd
Surrogate recoveries					
Dibromofluoromethane		110%	97%	95%	110%
Toluene-d8		108%	98%	97%	108%
4-Bromofluorobenzene		110%	114%	112%	109%

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

Associated Environmental Group
PROJECT MANOR MARKET
PROJECT #11-124
Lynnwood, Washington

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

Analysis of Gasoline Range Organics, MTBE & BTEX in Water by Method NWTPH-Gx/8260

Sample Number	Date Analyzed	MTBE (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Gasoline Range Organics (ug/L)	Surrogate Recovery (%)
Method Blank	5/9/2018	nd	nd	nd	nd	nd	nd	110
LCS	5/9/2018	125%	100%	98%	109%	120%	113%	114
LCSD	5/9/2018	86%	101%	95%	114%	122%	---	112
MW-11	5/9/2018	**6.4**	nd	nd	nd	nd	nd	109
Reporting Limits		1.0	1.0	1.0	1.0	3.0	100	

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Bromoflurorbenzene) & LCS: 65% TO 135%

Voluntary Cleanup Program

Washington State Department of Ecology
Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to www.ecy.wa.gov/programs/tcp/policies/terrestrial/TEEHome.htm.

Step 1: IDENTIFY HAZARDOUS WASTE SITE	
Please identify below the hazardous waste site for which you are documenting an evaluation.	
Facility/Site Name: Manor Market	
Facility/Site Address: 3609 164th Street SW, Lynnwood, WA	
Facility/Site No: 77492944	VCP Project No.: N/A

Step 2: IDENTIFY EVALUATOR		
Please identify below the person who conducted the evaluation and their contact information.		
Name: Charles Swift		Title: Senior Project Manager
Organization: Associated Environmental Group		
Mailing address: 2633 Parkmont Lane SW		
City: Olympia	State: WA	Zip code: 98502
Phone: (360) 352-9835	Fax: (360) 352-8164	E-mail: cswift@aegwa.com

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

☒ Yes *If you answered **"YES,"** then answer **Question 2**.*

☐ No or Unknown *If you answered **"NO" or "UKNOWN,"** then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? *Check all that apply. Then skip to **Step 4** of this form.*

Point of Compliance: WAC 173-340-7491(1)(a)

☐ All soil contamination is, or will be,* at least 15 feet below the surface.

☐ All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

☒ All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

☐ There is less than 0.25 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

☒ For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

☐ Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

[±] "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

[#] "Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No or Unknown *If you answered **"NO"** or **"UNKNOWN,"** then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 3** below.*

☐ No *If you answered **"NO,"** then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

☐ Yes *If you answered **"YES,"** then answer **Question 4** below.*

☐ No *If you answered **"NO,"** then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

☐ Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*

☐ Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? *Check all that apply. Then skip to **Step 4** of this form.*

Exposure Analysis: WAC 173-340-7492(2)(a)

☐ Area of soil contamination at the Site is not more than 350 square feet.

☐ Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

☐ No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. *See* WAC 173-340-7493(1)(c).

1. Was there a problem? *See* WAC 173-340-7493(2).

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No *If you answered **"NO,"** then identify the reason here and then skip to **Question 5** below:*

- ☐ No issues were identified during the problem formulation step.
- ☐ While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? *See* WAC 173-340-7493(3).

- ☐ Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*
- ☐ Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use?
Check all that apply. See WAC 173-340-7493(3).

- ☐ Literature surveys.
- ☐ Soil bioassays.
- ☐ Wildlife exposure model.
- ☐ Biomarkers.
- ☐ Site-specific field studies.
- ☐ Weight of evidence.
- ☐ Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

- ☐ Confirmed there was no problem.
- ☐ Confirmed there was a problem and established site-specific cleanup levels.

5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

☐ Yes If so, please identify the Ecology staff who approved those steps:

☐ No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.

Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 15 W. Yakima Ave., Suite 200 Yakima, WA 98902
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295