Subsurface Investigation and Groundwater Monitoring

University of Washington Tacoma
CPO Project No. 204814
McDonald Smith Building
1932-1936 Pacific Avenue
Tacoma, Washington

for
University of Washington

February 4, 2015

GeoEngineers
Earth Science + Technology

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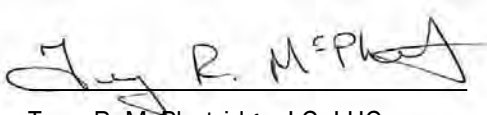

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1.0 INTRODUCTION

This report provides the results of the environmental subsurface investigation performed for the University of Washington (UW) at the McDonald Smith Building (existing four-story building) located at 1932, 1934 and 1936 Pacific Avenue on the University of Washington-Tacoma (UWT) campus located in Tacoma, Washington. The McDonald Smith Building is herein referred to as the "site" as shown on Figure 1.

The purpose of this subsurface investigation was to further evaluate soil conditions; if the deep aquifer is present and contaminated with trichloroethene (TCE) and breakdown components; and to evaluate the potential for vapor intrusion into the building.

2.0 CURRENT SITE FEATURES AND DEVELOPMENT PLANS

2.1. Site Features

The four-story brick building is situated within the site boundary. The perimeter of the building is approximately 75 by 120 feet. The building is constructed as a slab-on grade. The first floor of the building is accessible from the Pacific Avenue at approximately Elevation 48.13[1]. The second floor is accessible from Dolly Roberson Lane at approximately Elevation 65.42 feet.

The building is divided into three bays each approximately 25 feet wide. The brick walls separating the bays extend the entire height of the building.

The ceilings in the first floor are approximately 15 feet high. The ceiling heights in the remaining floors were not evaluated as part of this study. Retail space and storage currently occupies the first floor (Pacific Avenue), office space on the first floor (Dolly Roberson Lane) and residential units on the top two floors.

One manhole is located in the western portion of the middle bay on the first floor. Cast iron pipes and standing water were observed in the manhole approximately 3 feet below the slab. The use of the pipes is not known, but speculated by the design team to be building drainage.

2.2. Proposed Development Plans

We understand UWT was considering structural upgrades to the building in late 2014. The structural upgrades consisted of installation two shear walls on the northeastern portion of the building. The foundation for the sheer walls may have included 35–foot micropiles. The design-build team requested the following data gaps be evaluated:

1. Is there a risk of cross contamination between the shallow and deep aquifers (identified on the UWT campus west of Jefferson Avenue during previous subsurface investigations), if both are present?

[1] NGVD 29 vertical datum. Building and well elevations based on survey completed by AHBL in October 2014

2. Are there chemicals of concern in soil within the proposed excavation area?
3. Is there a risk of vapor intrusion?

This investigation was completed to address the design team's questions. Based on various construction factors for the original design plan, UWT decided to not complete structural upgrades following completion of the field activities. The current construction plans include remodeling the interior spaces by removing the residences and adding offices, small classrooms and storage. The retail space will remain. The interior upgrades will not penetrate the existing concrete slab.

The project is being executed under the design-build model of design and construction. The project team related to soils consists of Bassetti (architect), Mortenson Construction (contractor), PSC Structural Solutions (structural engineer), and GeoEngineers (environmental and geotechnical engineering).

3.0 HISTORICAL USE

The four-story building (known as the Artist's Lofts) was constructed in 1890 with three separate store fronts along Pacific Avenue. The building was primarily vacant prior to the 1930s but did store hay, grain, and flour in the central portion of the building. The storage area was positioned adjacent to a rail line to the west at the rear of the building. Following this timeframe, each separate store front has a different land use history.

- 1932 Address - commercial grocer, confectionary, and other retail shops.
- 1934 Address - dairy products manufacturer and confectionary between 1931 and 1963 followed by retail bedding and clothing shops.
- 1936 Address - mill supplies through 1963 followed by an auto parts warehouse, an iron and metal salvage shop, and retail shop space.

4.0 AGREED ORDER

UW entered into an Agreed Order (#DE 97HW-S238) with the Washington State Department of Ecology (Ecology) in 1997 for known contaminated soil and groundwater on the UWT campus. UW and Ecology are currently in the process of issuing a new agreed order for the UWT campus. The site is located within the boundaries of the existing and future agreed orders.

5.0 PREVIOUS INVESTIGATIONS

A remedial investigation/feasibility study (RI/FS) was completed on several parcels located near the site between 2000 and 2009. Investigation was completed within the building in 2006 when UW purchased the property. Additional subsurface investigation was completed adjacent to the site in 2013. The investigations are summarized below.

5.1. Within Building

Kane Environmental completed a Phase I ESA and limited Phase II ESA within the building in 2006. The Phase I ESA also identified a dewatering well with standing water approximately 3 to 4 feet below the

slab. The dewatering well was used to remove water from around the adjacent elevator. Eight direct-push borings with temporary monitoring wells were completed inside the building during the Phase II ESA. Groundwater was encountered approximately 4 to 5 feet below the slab during the investigation. Three soil and eight groundwater samples were submitted for chemical analysis of volatile organic compounds (VOCs), gasoline-, diesel, and lube oil-range petroleum hydrocarbons. One groundwater sample was submitted for chemical analysis of polycyclic aromatic hydrocarbons (PAHs).

- Trichloroethene (TCE) and cic-1,1-DCE were detected at concentrations greater than the current Model Toxics Control Act (MTCA) Method A groundwater cleanup level or MTCA Method B criteria in the analyzed groundwater samples.
- Vinyl chloride was detected at concentrations greater than the MTCA Method A groundwater cleanup levels in six groundwater samples. Vinyl chloride was not detected in the remaining two groundwater samples.
- Chemicals of concern were not detected in the analyzed soil samples.

UW purchased the property and decommissioned the elevator dewatering well following completion of the 2006 Phase I ESA and limited Phase II ESA. Water within the dewatering well was sampled for chemical analysis. TCE was detected at a concentration greater than the MTCA Method A groundwater cleanup level in the water. The reviewed documentation indicates the dewatering well was decommissioned by placing bentonite to near the surface and capped with concrete because the contractor was not able to remove the groundwater from within the dewatering well.

5.2. Vicinity of the Building

Approximately 35 groundwater monitoring wells have been installed over the course of the investigations and remediation efforts in the area west and east of the site. Two wells (CR-MW16 and CR-MW17) were installed directly upgradient of the site on Dolly Roberson Lane as shown on Figure 2. One well was installed downgradient and north of the site (CR-MW12).

The geology west of the site is not fully understood, however, it is known the two wells directly west of the site (CR-MW16, CR-MW17) were installed within the shallow aquifer. The screen interval of well CR-MW12 appears to cross between the shallow and deep aquifers. However, this well was installed by others and the boring/well construction log is not clear.

The site appears to be located within an area-wide groundwater plume consisting of TCE, cis-1,2-dichloroethene (DCE) and vinyl chloride. The plume is located at least west and north of the site (CR-MW16 and CR-MW17). The vinyl chloride plume appears to extend east of the site based on the location of well CR-MW12. The known extent of the plume generally trends from south of Market Street and South 21st Street to Pacific Avenue and South 19th Street stairs. The sources and vertical and lateral extents of the groundwater plumes are not known at this time.

Geotechnical explorations were also completed in the vicinity of the building particularly in the adjacent Cherry Parks Building. The location of the geotechnical and environmental borings completed in the vicinity of the site are included in Appendix A.

6.0 FIELD INVESTIGATION PROGRAM - 2014

The field procedures, sampling methodology and borings logs are included in Appendix B. The field program consisted of the following items:

- One hollow-stem auger soil boring and deep aquifer monitoring well (MDS-MW1D) was installed to a depth of 60 feet below ground surface (bgs) in the area upgradient (west) of the building.
- Three micro-core soil borings (MDS-DP2, MDS-DP3 and MDS-DP5) were completed inside the building to depths ranging from 3 to 5 feet bgs. Soil samples were collected in the borings from each soil type encountered (fill and ice-contact deposits) and at and below the groundwater table where groundwater was encountered.
- Groundwater monitoring of existing and new wells (MDS-MW1D, CR-MW16 and CR-MW17).
- Soil gas sampling was performed within the building (MDS-SV1 through MDS-SV4).

Deviations to the sampling plan include the following:

- Three micro-core borings were actually completed during the investigation instead of the planned five borings because of drill refusal in two locations.

7.0 SOIL AND GROUNDWATER CONDITIONS

7.1. Published Literature

The geology and landforms at the site are largely shaped by the advance and retreat of glaciers during late Pleistocene glaciations approximately 300,000 to 10,000 year ago. Up to 1,800 feet of unconsolidated sediments are mapped in the Tacoma area (Jones et al., 1999). Geologic units pertinent to this study were deposited during the most recent glaciation (Vashon Stade of Frasier Glaciation) that retreated between 13,000 and 10,000 years ago. The entire surface of the UWT campus was recently mapped as ice-contact deposits (Qvi) (Troost in review). The typical geologic sequence in the Tacoma area consists of Vashon Drift that is composed of the following from youngest to oldest: recessional outwash deposits, recessional lacustrine deposits, Steilacoom Gravel, ice-contact deposits, Vashon till, and advance outwash deposits; Lawton Clay. The Vashon drift is underlain by pre-Fraser deposits (Troost in review).

7.2. Subsurface Explorations

Subsurface explorations conducted on portions of the site during this and previous investigations indicate soil conditions similar to those described in the published literature. Subsurface conditions consist of fill, ice-contact deposits and advance outwash. Subsurface exploration logs completed as part of this investigation are presented in Appendix B. Subsurface exploration logs completed as part of previously planned geotechnical analysis are presented in Appendix A.

The fill within the building consists of sand with trace silt from the ground surface to between 0.5 and 1 foot bgs. The fill observed at the location of MDS-MW1D was observed as sand and silt (sand with silt or silt) to a depth of approximately 14.5 feet bgs.

The ice-contact deposits were observed below the fill to 26.5 feet bgs (Elevation 38.37 feet) west of the building. The ice-contact deposits consisted of brown fine to coarse sand with fine to coarse gravel and silt with occasional silty sand interbeds. The ice-contact deposits is interpreted to be the shallow aquifer unit.

A silt layer was observed from depths of 26.5 to 29 feet bgs (Elevation 36.37 to 37.87 feet) in boring MDS-MW1D. The silt layer is interpreted to be the semi-confining to confining unit that separates the shallow aquifer from the deep aquifer located within the advance outwash.

Fine to coarse sand with varying amounts of gravel and silt was typically encountered below the ice-contact deposits. We interpret this material to be advance outwash. The advance outwash was observed to be moist from 29 to 50 feet bgs, and saturated from 50 to 60 feet bgs during drilling.

7.3. Groundwater Conditions

It appears that groundwater conditions consist of a shallow aquifer located within the ice-contact deposits and deep aquifer located within the advance outwash. The shallow and deep aquifers appear to be separated by semi-confining to confining layer of silt located at the base of the ice-contact deposits.

It appears that the groundwater within the shallow aquifer is continuous across the project site based on the groundwater information observed in CR-MW12, CR-MW16, CR-MW17, MDS-DP2, MDS-DP3 and MDS-DP5. Groundwater in the shallow aquifer was observed at approximately Elevation 45.54 feet west of the building (CR-MW17) and approximately Elevation 45 to 46 feet within the building (MDS-DP2, MDS-DP3 and MDS-DP5). The groundwater elevations in the wells are shown in Table 3.

The deep aquifer appears to be under a confined condition within the advance outwash. Saturated soils observed during drilling and the measured depth to groundwater following well installation varied by approximately 36 feet. Groundwater was measured at approximately Elevation 50.79 feet in monitoring well MDS-MW1D during sampling activities in October 2014 as shown in Table 3. The elevation of the potentiometric surface of the groundwater in well MDS-MW1D screened within the deep aquifer is higher than the elevation of the slab (Elevation 48.13 feet).

Groundwater levels will vary depending on season, precipitation and other factors particularly the shallow aquifer.

8.0 SOIL AND GROUNDWATER SAMPLING AND CHEMICAL ANALYTICAL RESULTS

8.1. Soil

Soil samples were collected from the hollow-stem auger boring completed on the exterior of the building and the micro core borings completed on the interior of the building. Soil sampling protocol is included in Appendix B and summarized below.

8.1.1. *Hollow-Stem Auger Boring Sampling Protocol*

A total of 10 discrete soil samples were collected from boring MDS-MW1D for chemical analysis to evaluate the vertical extent of TCE-contaminated soil. The samples collected from boring MDS-MW1D were identified using the following identification system: Location-MW#Letter-start depth-end depth,

where Location is the general UWT building location-MW# is the monitoring well number and screen location and start depth-end depth is the depth interval of specific sample (e.g., MDS-MW1D-14.5-15 was collected from McDonald Smith monitoring well number 1 screened in the deep aquifer between 14 and 14.5 feet bgs).

8.1.2. *Micro Core Boring Sampling Protocol*

A total of seven discrete soil samples were collected from the micro core borings. These soil samples were identified using the following identification system: Location-DP#Letter-start depth-end depth, where Location is the general UWT building location-DP# is the boring number and start depth-end depth is the depth interval of specific sample (e.g., MDS-DP5-0.5-1 was collected from McDonald Smith direct-push boring number 5 between 0.5 and 1 foot bgs). Two soil samples were collected from each boring; one sample was collected in the fill and one sample was collected in the ice-contact deposits.

8.1.3. *Chemical Analysis*

The 10 discrete soil samples collected from boring MDS-MW1D and three discrete samples collected from the micro core borings were analyzed for VOCs by EPA method 8260D.

Composite sample A (micro core borings) was analyzed for petroleum hydrocarbon identification by Ecology-approved method NWTPH-HCID, RCRA metals by EPA method 6000/7000 series, TCLP lead by EPA method 1311 and PAHs by EPA method 8270SIM. Composite sample B collected from the micro core borings was analyzed for RCRA metals by EPA Method 6000/7000 series. The composite sample groups were based on the observed subsurface conditions at each boring location, and are summarized in Table 2 and below.

Composite Identification	Discrete Samples With Composite	Soil Type Observed	Range of Depths
A	MDS-DP2-0.5-1 MDS-DP3-0.5-1 MDS-DP5-0.5-1[1]	Fill	0.5 to 1 foot bgs
B	MDS-DP2-1-2 MDS-DP3-1-3 MDS-DP5-1-3	Native	1 to 3 feet bgs

Note:

[1] Sample MDS-DP5-0.5-1 was included in composite A for analysis of RCRA metals only.

The chemical analytical data are described below relative to MTCA Method A Unrestricted Lane Use (ULU) cleanup levels and MTCA Method B criteria for soil. MTCA Method B criteria were used for comparison of barium, selenium and silver and specific VOCs and semi-volatile organic compounds (SVOCs) because Method A ULU cleanup levels have not been established for these compounds. The chemical analytical results are summarized in Tables 1 and 2. Laboratory reports are presented in Appendix C.

8.1.4. *PCE*

PCE was not detected in the analyzed soil samples.

8.1.5. *TCE*

TCE was detected at concentrations greater than the MTCA Method A ULU soil cleanup level (0.03 milligram per kilogram [mg/kg]) in soil sample MDS-MW1D-28.5-29 (0.050 mg/kg) collected from 28.5 to 29 feet bgs in boring MDS-MW1D.

TCE was detected at concentrations less than the MTCA Method A ULU soil cleanup level (0.03 mg/kg) in the following nine soil samples with the concentrations listed in parentheses:

- MDS-DP5-1-3 (0.0029 mg/kg) from 1 to 3 feet bgs;
- MDS-DP5-3-4 (0.0018 mg/kg) from 3 to 4 feet bgs;
- MDS-MW1D-23.5-24 (0.024 mg/kg) from 23.5 to 24 feet bgs;
- MDS-MW1D-27.5-28 (0.012 mg/kg) from 27.5 to 28 feet bgs;
- MDS-MW1D-40-40.5 (0.0059 mg/kg) from 40 to 40.5 feet bgs;
- MDS-MW1D-45-46 (0.0046 mg/kg) from 45 to 46 feet bgs;
- MDS-MW1D-50-51 (0.013 mg/kg) from 50 to 51 feet bgs;
- MDS-MW1D-55-56 (0.0019 mg/kg) from 55 to 56 feet bgs;
- MDS-MW1D-60-61 (0.0017 mg/kg) from 60 to 61 feet bgs.

TCE was not detected in the remaining analyzed soil samples.

8.1.6. *Other VOCs*

Other VOCs were either not detected or detected at concentrations less the respective MTCA Method A ULU or Method B cleanup levels.

8.1.7. *Petroleum Hydrocarbon Identification*

Gasoline, diesel- and lube oil-range petroleum hydrocarbons were not detected in the analyzed soil samples.

8.1.8. *Metals*

RCRA metals were either not detected or were detected at concentrations less the respective MTCA Method A ULU cleanup levels or Method B criteria.

8.1.9. *TCLP Lead*

TCLP lead was not detected in the analyzed soil sample.

8.1.10. *PAHs*

PAHs were either not detected or were detected at concentrations less than the respective MTCA Method A ULU cleanup levels or Method B criteria.

8.2. Groundwater Sampling and Chemical Analytical Results

A total of three groundwater samples were submitted for chemical analysis. The groundwater samples were collected from upgradient wells (shallow [CR-MW16 and CR-MW17] and deep [MDS-MW1D]). The samples collected from the boring were identified using the following identification system: Location-MW#Letter-date collected, where Location is the general UWT building location, MW#Letter is the monitoring well number and screen location and date collected (year, month, day) (e.g., MDS-MW1D-141030 was collected from McDonald Smith monitoring well number screened in the deep aquifer on October 30, 2014). Groundwater sampling protocol is included in Appendix B.

The chemical analytical data are described below relative to MTCA Method A groundwater cleanup levels and MTCA B groundwater screening levels protective of indoor air. Method B groundwater criteria were used for comparison specific VOCs and SVOCs because Method A cleanup levels have not been established for these compounds. Updated TCE, PCE and trans-1,2-dichloroethene groundwater screening levels protective of indoor air were calculated using Equation 1 from Ecology's review draft "Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action" dated October 2009 (draft VI guidance; Ecology, 2009) and updated MTCA Method B air cleanup levels from Ecology's May 2014 Excel workbook "CLARC Master Spreadsheet.xlsx." The other screening level values were obtained from Ecology's draft VI guidance. The calculation to update screening levels is included in Appendix D.

The groundwater samples were analyzed for VOCs by EPA method 8260D. The chemical analytical results are summarized in Table 3.

8.2.1. PCE

PCE was not detected in the analyzed groundwater samples.

8.2.2. TCE

TCE was detected at concentrations greater than the MTCA Method A groundwater cleanup level (5 micrograms per liter [µg/L]) and the MTCA Method B groundwater screening levels protective of indoor air (1.5 µg/L) in the following two groundwater samples with the concentration for each listed in parentheses:

- CR-MW16-141030 (340 µg/L) collected from upgradient well CR-MW16 screened within the shallow aquifer.
- CR-MW17-141030 (65 µg/L) collected from upgradient well CR-MW17 screened within the shallow aquifer.

TCE was detected at a concentration less than the MTCA Method A groundwater cleanup level but greater than the MTCA Method B groundwater screening levels protective of indoor air in the groundwater sample (2.3 µg/L) collected from well MDS-MW1D screened within the deep aquifer.

8.2.3. Other VOCs

Cis-1,2-DCE was detected at a concentration greater than the MTCA Method B groundwater criteria (16 µg/L) and the MTCA Method B groundwater screening levels protective of indoor air (160 µg/L) in the groundwater sample (270 µg/L) collected from well CR-MW16 screened within the shallow aquifer.

Cis-1,2-DCE was detected at a concentration greater than the MTCA Method B groundwater cleanup level but less than the MTCA Method B groundwater screening levels protective of indoor air in the groundwater sample (86 µg/L) collected from well CR-MW17 screened in the shallow aquifer.

Cis-1,2-DCE was detected at a concentration less than the MTCA Method B criteria and the MTCA Method B groundwater screening levels protective of indoor air in the groundwater sample (4.4 µg/L) collected from well MDS-MW1D screened in the deep aquifer.

Vinyl chloride was detected at concentrations greater than the MTCA Method A groundwater cleanup level (0.2 µg/L) and the MTCA Method B groundwater screening levels protective of indoor air (0.35 µg/L) in the following three groundwater samples with the concentration for each listed in parentheses:

- CR-MW16-141030 (19 µg/L) collected from upgradient well CR-MW16 screened within the shallow aquifer.
- CR-MW17-141030 (8.7 µg/L) collected from upgradient well CR-MW17 screened within the shallow aquifer.
- MDS-MW1D-141030 (1.2 µg/L) collected from upgradient well MDS-MW1D screened within the deep aquifer.

Other VOCs were either not detected or were detected at concentrations less than the respective MTCA Method A groundwater cleanup level, Method B groundwater criteria, or Method B groundwater screening levels protective of indoor air.

9.0 SOIL VAPOR SAMPLING AND CHEMICAL ANALYTICAL RESULTS

Vapor intrusion has increasingly become a concern at chlorinated volatile organic compounds (CVOCs) sites that have been partially or fully developed with structures. CVOCs include PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride. CVOC vapors in the subsurface that volatilize from impacted groundwater and/or soil may collect beneath building foundations and intrude into the building's indoor air through cracks in the foundation or other preferential pathways (e.g., utility penetrations, floor sumps, crawlspaces, etc.).

Soil gas samples were submitted for chemical analysis of PCE, TCE, cis-1,2-DCE, 1,1-DCE, trans-1,2-DCE, and vinyl chloride.

9.1. Soil Vapor Sampling

Four sub-slab soil vapor samples (locations MDS-SV1 through MDS-SV4) were obtained on October 23, 2014 to evaluate the potential for vapor intrusion. These four locations were selected to sample sub-slab soil gas within the building footprint. The locations were focused on the west side of the building because the TCE-contaminated groundwater is relatively shallow on the west side and dips from the west to the east. Therefore, groundwater is closer to the slab on the west side of the building and has a greater potential for vapor intrusion. The four locations are shown on Figures 2 and 3.

The samples collected from the sub-slab vapor samples were identified using the following identification system: Location-SV#Letter-date collected, where Location is the general UWT building location-MW# is

the soil vapor probe number and dated collected (year, month, day) (e.g., MDS-SV1-141023 was collected from McDonald Smith Building soil vapor probe number 1 on October 23, 2014).

Sub-slab soil gas samples were collected using Vapor Pin™ sampling devices; sample collection and handling was consistent with Ecology's draft VI guidance (Ecology, 2009). The Vapor Pins™ were installed following the manufacturers' standard operating procedures (SOPs). The detailed sampling protocol is also described in Appendix B.

9.2. Soil Vapor Sample Chemical Analytical Results

The soil vapor samples were submitted to Eurofins Air Toxics in Folsom, California for analysis of CVOCs (PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) by EPA Method TO-15 SIM and helium by ASTM International (ASTM) Method D 1946. Soil vapor chemical analytical results are summarized in Table 4. Laboratory reports are presented in Appendix C.

The results indicate that PCE and TCE were detected in the four vapor samples submitted for analysis. Cis-1,2-DCE was detected in three of the four samples. The 1,1-DCE, trans-1,2,DCE and vinyl chloride were not detected in the analyzed samples.

Helium was not detected in sample MDS-SV1, but was detected in the other four samples at concentrations ranging from 0.14 to 0.49 percent. Helium detections in the soil gas samples indicate that some ambient air was collected in the Summa Canister, thereby diluting the soil gas sample. However, helium concentrations less than 5 percent are considered acceptable (California Environmental Protection Agency/Department of Toxic Substances Control; Cal-EPA/DTSC, 2012).

9.3. Vapor Intrusion Evaluation

A vapor intrusion (VI) evaluation was conducted of the McDonald Smith Building in a manner consistent with the Tier 1 Assessment presented in Ecology's draft 2009 VI guidance (Ecology, 2009). The first step was to compare CVOC soil gas concentrations to soil gas screening levels. The second step was to use EPA's Johnson and Ettinger Model (J&E) Excel workbook (SG-ADV-Feb04.xls) to predict indoor air concentration and compare these predicted air concentrations to TCE indoor air risk-based concentrations.

9.3.1. Step 1. Soil Gas Screening Levels Evaluation

Following Ecology's draft VI guidance, shallow soil gas screening levels are calculated by dividing the MTCA Method B air cleanup level by a vapor attenuation factor (Ecology, 2009). The default MTCA vapor attenuation factor for sub-slab soil gas is 0.1. That is, soil gas concentrations are assumed to be 10 times higher than indoor air concentrations. EPA also recently developed attenuation factors for chlorinated compounds and residential buildings and updated their VI guidance (EPA, 2012). EPA now recommends a sub-slab soil gas vapor attenuation factor of 0.03 (EPA, 2012). Both attenuation factors were used to develop the shallow soil gas screening levels used in Step 1.

As shown in Table 4, TCE was detected at concentrations greater than MTCA Method B Shallow Soil Gas Screening level using the Ecology attenuation factor of 0.1 in the four sub-slab soil samples collected. TCE was detected at concentrations greater than MTCA Method B Shallow Soil Gas Screening level using the EPA attenuation factor of 0.03 in the three of the sub-slab soil samples collected (MDS-SV2, MDS-SV3

and MDS-SV4). Other CVOCs were either not detected or were detected at concentrations less than the MTCA Method B Shallow Soil Gas Screening Levels.

9.3.2. Step 2. Vapor Intrusion Modeling

Ecology's draft VI guidance allows the use of the J&E Model to predict indoor air concentrations when soil gas concentrations are greater than screening levels. Further VI assessment is not needed if:

- Measured soil gas concentrations predict indoor air concentrations less than acceptable levels;
- The J&E model is used in a conservative manner (outlined in Ecology's draft 2009 VI guidance); and
- Utility lines penetrating the floors or walls do not leave "large unsealed openings," there are no sumps in the floor that are "open" to soil gas, and the building does not have an earthen floor.

Ecology's draft VI guidance does allow changes to the default MTCA J&E model assumptions to evaluate existing buildings. The specifics of the model data entry are included in Appendix E. One parameter the J&E model estimates is Q_{soil}; the average volumetric flow rate into a building from the subsurface in liters per minute. Ecology, Cal-EPA/DTSC, (2011) and New Jersey (2013) VI guidance recommends adjusting Q_{soil} when evaluating VI for buildings that are considerably larger than an average residence. Ecology's draft VI guidance includes the approach recommended by the State of New Jersey that is appropriate for buildings where the soil gas entry routes are likely to be primarily located at the perimeter. Cal-EPA/DTSC recommends an approach that is appropriate where the soil gas entry routes are located throughout the building slab. The two equations to adjust the Q_{soil} to a larger building space are as follows:

- New Jersey: Q_{soil} = default Q_{soil} for a residence (5 liters per minute) multiplied by the ratio of the target building perimeter (X Feet) and the perimeter of a default residence (131 feet).
- California: Q_{soil} = default Q_{soil} for a residence (5 liters per minute) multiplied by the ratio of the target building surface area (Y square feet) to default residence surface area (1,076 square feet)

The Cal-EPA/DTSC approach was used because potential soil gas entry routes are not expected to be limited to the building perimeter. When evaluating buildings larger than an average residence, Q_{soil} rates calculated using the Cal-EPA/DTSC approach are higher than those calculated using the New Jersey approach. Using the Cal-EPA/DTSC approach, therefore, results in higher estimated indoor air concentrations.

The J&E model evaluation was conducted for the ground floor of the McDonald Smith Building.

9.3.2.1. GROUND FLOOR OF MCDONALD SMITH BUILDING

- Building dimensions = approximately 75 feet by 120 feet.
- Enclosed space height = 15 feet (measured by Mortenson).
- Air exchange rate = 0.5 exchange per hour (MTCA commercial default).
- Q_{soil} 46.5 liters per minute. The Cal-EPA/DTSC approach uses 5 liters per minute multiplied by the ratio of the target building surface area (10,000 square feet) to default residence building surface area (1,075 square feet) resulting in a Q_{soil} of 46.5 liters per minute (Cal-EPA/DTSC 2011).

The Method B air cleanup level, which was used in Step 1 to calculate shallow soil gas screening levels, is applicable based on the current and intended use of the McDonald Smith Building. The MTCA Method B

air cleanup level for TCE is 0.37 micrograms per cubic meter (µg/m^3). However, because the intended use of the building is office, classroom, and retail space, the Method B air cleanup level, which is based on residential exposure assumptions, likely overestimates potential exposure at the building. A MTCA Method B air remediation level for TCE of 2.4 µg/m^3 was used to evaluate instructors, students, retail workers and customers in the proposed space (based on a typical commercial/occupational scenario). The exposure assumptions for the MTCA Method B air cleanup and remediation levels are as follows:

- Method B air cleanup level (0.37 µg/m^3): 365 days/year, 24 hours/day, 30 years
- Method B air remediation level (2.4 µg/m^3): 250 days/year, 8 hours/day, 20 years

Using the TCE soil gas concentrations from locations MDS-SV1 through MDS-SV4 and the building assumptions presented above, the table below and in Table 5 present the estimated indoor air concentrations calculated using EPA's J&E Model Excel workbook (SG-ADV-Feb04.xls).

ESTIMATED PCE INDOOR AIR CONCENTRATIONS VIA J&E MODEL

Sample ID	Soil Gas (µg/m^3)	Entire Building (10,000 square feet with 16 foot Ceiling) (µg/m^3)
MDS-SV1	9.2	0.012
MDS-SV2	24	0.031
MDS-SV3	48	0.063
MDS-SV4	100	0.13
Average	45	0.059

The estimated TCE indoor air concentrations are less than the MTCA Method B air cleanup level of 0.37 µg/m^3 and remediation level of 2.4 µg/m^3. Therefore, further VI assessment is not required as noted in Ecology's draft VI guidance.

10.0 SUBSURFACE INVESTIGATION FINDINGS

Results from subsurface explorations indicate general geologic units consist of fill, ice-contact deposits, silt layer and advance outwash. The existing building is located within the fill and ice-contact deposits. The shallow aquifer appears to be an unconfined aquifer in the ice-contact deposits and approximately 2 feet below the building slab on the west side of the building. The deep aquifer appears to be a confined aquifer in the advance outwash. The elevation of the potentiometric surface of the groundwater in well MDS-MW1D screened within the deep aquifer is higher than the elevation of the building slab.

TCE-contaminated soil was detected at a concentrations greater than the MTCA Method A ULU cleanup level in one soil sample collected within the silt from 28.5 to 29 feet bgs in MDS-MW1D. TCE and cis-1,2 DCE were detected at concentrations less than the MTCA Method A ULU cleanup level and Method B criteria in soil samples collected from 23.5 to 60 feet bgs in monitoring well MDS-MW1D and 1 to 4 feet bgs in boring MDS-DP5. The soil samples were collected within the ice-contact deposits, silt and advance outwash. Trans-1,2-DCE and vinyl chloride were detected in select samples at concentrations less than the MTCA Method B criteria within the ice-contact deposits and the silt.

Groundwater within the shallow aquifer is contaminated with TCE, cis-1,2-DCE and vinyl chloride at concentrations greater than the respective MTCA Method A groundwater cleanup levels or Method B criteria.

Groundwater within the deep aquifer is contaminated with vinyl chloride at concentrations greater than the MTCA Method A groundwater cleanup level and impacted with TCE and cis-1,2-DCE at concentrations less than the respective cleanup levels. The semi-confining to confining silt layer at the base of the ice-contact deposits appears to restrict the flow of water, however TCE, cis-1,2-DCE and vinyl chloride appear to be migrating through the unit because TCE and cis-1,2-DCE were detected in the silt and advance outwash and TCE, cis-1,2-DCE and vinyl chloride were detected in the deep aquifer groundwater.

The source of the TCE is unknown, but appears to be migrating from a site upgradient of the McDonald Smith Building. The source of cis-1,2-DCE and vinyl chloride is not known, but likely a result of the breakdown of TCE.

Vapor intrusion does not appear to be a risk at the site based on the sub-slab sampling results and subsequent modeling completed in accordance with Ecology's "Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action- Review draft" dated October 2009.

Petroleum, PAHs, metals and other VOCs were either not detected or were detected at concentrations less than the respective MTCA method cleanup/criteria levels in the soil and groundwater.

11.0 DESIGN RECOMMENDATIONS

The current design does not include structural upgrades. Soil and groundwater will not be encountered during construction, therefore, recommendations for management of soil and groundwater are not included in this report. If the design changes and soil and groundwater will be encountered, the design team shall coordinate with GeoEngineers and UW Environmental Health and Services (EH&S). The design team does plan to complete the following elements as part of the construction:

- Seal the manhole located on the west side of the middle bay. The plan is to build a form around the existing pipe and place concrete to be level with the existing slab. This form will enable the pipe to continue to operate, but seal off volatiles escaping from the water and into the indoor air.
- Seal cracks in concrete slab with standard construction methods.
- Decommission the existing elevator and fill the shaft with concrete.

12.0 LIMITATIONS

This report has been prepared for the University of Washington Tacoma regarding the McDonald Smith Building located in Tacoma, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Please refer to Appendix F titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

13.0 REFERENCES

Cal-EPA/DTSC, 2011. Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance). California Environmental Protection Agency, Department of Toxic Substances Control. October 2011.

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Table 1

Summary of Chemical Analytical Results During 2013 and 2014 Sampling Events - VOCs[1] - Soil

University of Washington Tacoma McDonald Smith Building
Tacoma, Washington

Boring Number(s)	Elevation of Ground Surface (feet)[2]	Sample Identification[3]	Sample Depth (feet bgs)	Soil Type	VOCs[4] (mg/kg)					
					PCE, TCE and Breakdown Products					
					Tetrachloroethene (PCE)	Trichloroethene (TCE)	1,1-Dichloroethene (DCE)	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride
Current Investigation (October 2014)										
MDS-DP3	48.13	MDS-DP3-0.5-1	0.5 to 1	Fill	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U	0.0096 U
MDS-DP5		MDS-DP5-1-3	1 to 3	Qvi	0.00061 U	**0.0029**	0.00061 U	**0.0042**	0.00061 U	0.00061 U
		MDS-DP5-3-4	3 to 4	Qvi	0.00064 U	**0.0018**	0.00064 U	**0.00078**	0.00064 U	0.00064 U
MDS-MW1D	64.87	MDS-MW1D-14.5-15	14.5 to 15	Fill	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U	0.0019 U
		MDS-MW1D-23.5-24	23.5 to 24	Qvi	0.00096 U	**0.024**	0.00096 U	**0.016**	**0.0012**	0.00096 U
		MDS-MW1D-27.5-28	27.5 to 28	Silt	0.0013 U	**0.012**	0.0013 U	**0.010**	0.0013 U	0.0013 U
		MDS-MW1D-28.5-29	28.5 to 29	Silt	0.0013 U	**0.050**	0.0013 U	**0.040**	**0.0025**	**0.0035**
		MDS-MW1D-35-36	35 to 36	Advance Outwash	0.0011 U	0.0011 U	0.0011 U	**0.0014**	0.0011 U	0.0011 U
		MDS-MW1D-40-40.5	40 to 40.5	Advance Outwash	0.0011 U	**0.0059**	0.0011 U	**0.0021**	0.0011 U	0.0011 U
		MDS-MW1D-45-46	45 to 46	Advance Outwash	0.0013 U	**0.0046**	0.0013 U	**0.0018**	0.0013 U	0.0013 U
		MDS-MW1D-50-51	50 to 51	Advance Outwash	0.0012 U	**0.013**	0.0012 U	**0.0056**	0.0012 U	0.0012 U
		MDS-MW1D-55-56	55 to 56	Advance Outwash	0.0011 U	**0.0019**	0.0011 U	**0.0018**	0.0011 U	0.0011 U
		MDS-MW1D-60-61	60 to 61	Advance Outwash	0.0011 U	**0.0017**	0.0011 U	0.0011 U	0.0011 U	0.0011 U
Previous Investigation (2013)										
CR-MW16	65.51	CR-MW16-9-10	9 to 10	Fill	0.00089 U	**0.0024**	0.00089 U	0.00089 U	0.00089 U	0.00089 U
		CR-MW16-10-11	10 to 11	Fill	0.00096 U	**0.0016**	0.00096 U	0.00096 U	0.00096 U	0.00096 U
		CR-MW16-15-16	15 to 16	Fill/Recessional Outwash	0.00088 U	**0.0031**	0.00088 U	0.00088 U	0.00088 U	0.00088 U
		CR-MW16-18-19	18 to 19	Qvi	0.00085 U	**0.051**	0.00085 U	**0.031**	**0.0022**	0.00085 U
		CR-MW16-20-21	20 to 21	Qvi	0.00086 U	**0.034**	0.00086 U	**0.016**	**0.0012**	0.00086 U
		CR-MW16-24-25	24 to 25	Qvi	0.00078 U	**0.031**	0.00078 U	**0.019**	**0.0012**	0.00078 U
		CR-MW16-26-27	26 to 27	Silt	0.0010 U	**0.024**	0.0010 U	**0.012**	0.0010 U	0.0010 U
		CR-MW16-28-29	28 to 29	Silt	0.0011 U	**0.061**	0.0011 U	**0.035**	**0.0021**	**0.0020**
		CR-MW16-30-31	30 to 31	Silt	0.0013 U	**0.009**	0.0013 U	**0.015**	0.0013 U	0.0013 U
CR-MW17	64.45	CR-MW17-11-12	11 to 12	Fill	0.00090 U	0.00090 U	0.00090 U	0.00090 U	0.00090 U	0.00090 U
		CR-MW17-15-16	15 to 16	Fill/Recessional Outwash	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00094 U	0.00094 U
		CR-MW17-17-18	17 to 18	Fill/Recessional Outwash	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U	0.00097 U
		CR-MW17-19-20	19 to 20	Qvi	0.00089 U	0.00089 U	0.00089 U	0.00089 U	0.00089 U	0.00089 U
		CR-MW17-23-24	23 to 24	Qvi	0.00077 U	**0.011**	0.00077 U	**0.008**	0.00077 U	0.00077 U
		CR-MW17-25-26	25 to 26	Qvi	0.0013 U	**0.021**	0.0013 U	**0.022**	0.0013 U	0.0013 U
		CR-MW17-27-28	27 to 28	Silt	0.0014 U	**0.012**	0.0014 U	**0.016**	0.0014 U	0.0014 U
		CR-MW17-28-28.5	28 to 28.5	Transition Zone	0.00097 U	**0.026**	0.00097 U	**0.034**	**0.0013**	**0.0025**
		CR-MW17-29-30	29 to 30	Transition Zone	0.0012 U	**0.0025**	0.0012 U	0.0035	0.0012 U	0.0012 U
MTCA Method A ULU Cleanup Level (mg/kg)					0.05	0.03	4,000[5]	160[5]	1,600[5]	0.67[5]

Boring Number(s)	Elevation of Ground Surface (feet)[2]	Sample Identification[3]	Sample Depth (feet bgs)	Soil Type	VOCs[4] (mg/kg)							
					Miscellaneous VOCs							
					Acetone	Sec-Butylbenzene	Ethylbenzene	n-propylbenzene	Naphthalene	Total Xylene[6]	1,2,4-Trimethylbenzene	1,3,5 Trimethylbenzene
Current Investigation (October 2014)												
DP3	48.13	MDS-DP3-0.5-1	0.5 to 1	Fill	0.012 U	0.00096	0.0096 U	0.0096 U	0.00096 U	0.0019 U	0.0096 U	0.0096 U
DP5		MDS-DP5-1-3	1 to 3	Qvi	0.0049 U	0.00061	0.00061 U	0.00061 U	0.00061 U	0.0012 U	0.00061 U	0.00061 U
		MDS-DP5-3-4	3 to 4	Qvi	0.0083 U	0.00064	0.00064 U	0.00064 U	0.0032 U	0.0013 U	0.00064 U	0.00064 U
MDS-MW1D	64.87	MDS-MW1D-14.5-15	14.5 to 15	Fill	0.024 U	**0.0025**	**0.0039**	**0.0059**	**0.0047**	**0.017**	**0.051**	**0.015**
		MDS-MW1D-23.5-24	23.5 to 24	Qvi	0.012 U	0.00096 U	0.00096 U	0.00096 U	0.00096 U	0.0019 U	**0.0015**	0.00096 U
		MDS-MW1D-27.5-28	27.5 to 28	Silt	**0.019**	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0027 U	0.0013 U	0.0013 U
		MDS-MW1D-28.5-29	28.5 to 29	Silt	0.016 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0025 U	0.0013 U	0.0013 U
		MDS-MW1D-35-36	35 to 36	Advance Outwash	**0.024**	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0022 U	0.0011 U	0.0011 U
		MDS-MW1D-40-40.5	40 to 40.5	Advance Outwash	**0.02**	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0023 U	**0.0027**	0.0011 U
		MDS-MW1D-45-46	45 to 46	Advance Outwash	0.016 U	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0025 U	0.0013 U	0.0013 U
		MDS-MW1D-50-51	50 to 51	Advance Outwash	0.015 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0023 U	0.0012 U	0.0012 U
		MDS-MW1D-55-56	55 to 56	Advance Outwash	0.014 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0022 U	0.0011 U	0.0011 U
		MDS-MW1D-60-61	60 to 61	Advance Outwash	**0.016**	0.0011 U	0.0011 U	0.0011 U	0.0011 U	**0.0027**	**0.004**	**0.0014**
Previous Investigation (2013)												
CR-MW16	65.51	CR-MW16-9-10	9 to 10	Fill	0.0045 U	0.0089 U	0.0089 U	0.00089 U	0.0089 U	0.0018 U	0.00089 U	0.00089 U
		CR-MW16-10-11	10 to 11	Fill	0.0048 U	0.00096 U	0.00096 U	0.00096 U	0.0072 U	0.0019 U	0.00096 U	0.00096 U
		CR-MW16-15-16	15 to 16	Fill/Recessional Outwash	0.0044 U	0.00088 U	0.00088 U	0.00088 U	0.00088 U	0.0018 U	0.00088 U	0.00088 U
		CR-MW16-18-19	18 to 19	Qvi	0.0042 U	0.00085 U	0.00085 U	0.00085 U	0.00085 U	0.0017 U	0.00085 U	0.00085 U
		CR-MW16-20-21	20 to 21	Qvi	0.0043 U	0.00086 U	0.00086 U	0.00086 U	0.00086 U	0.0017 U	0.00086 U	0.00086 U
		CR-MW16-24-25	24 to 25	Qvi	0.0039 U	0.00078 U	0.00078 U	0.00078 U	0.00078 U	0.0016 U	0.00078 U	0.00078 U
		CR-MW16-26-27	26 to 27	Silt	0.0052 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0021 U	0.001 U	0.001 U
		CR-MW16-28-29	28 to 29	Silt	0.0053 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0021 U	0.0011 U	0.0011 U
		CR-MW16-30-31	30 to 31	Silt	**0.11**	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0027 U	0.0013 U	0.0013 U
CR-MW17	64.45	CR-MW17-11-12	11 to 12	Fill	0.0045 U	0.0009 U	0.0009 U	0.0009 U	0.0074 U	0.0018 U	0.0009 U	0.0009 U
		CR-MW17-15-16	15 to 16	Fill/Recessional Outwash	0.0047 U	0.00094 U	0.00094 U	0.00094 U	0.0071 U	0.0019 U	0.00094 U	0.00094 U
		CR-MW17-17-18	17 to 18	Fill/Recessional Outwash	0.0049 U	0.00097 U	0.00097 U	0.00097 U	0.0097 U	0.0019 U	0.00097 U	0.00097 U
		CR-MW17-19-20	19 to 20	Qvi	0.0044 U	0.00089 U	0.00089 U	0.00089 U	0.00089 U	0.0018 U	0.00089 U	0.00089 U
		CR-MW17-23-24	23 to 24	Qvi	0.0038 U	0.00077 U	0.00077 U	0.00077 U	0.00077 U	0.0015 U	0.00077 U	0.00077 U
		CR-MW17-25-26	25 to 26	Qvi	**0.011**	0.0013 U	0.0013 U	0.0013 U	0.0013 U	0.0026 U	0.0013 U	0.0013 U
		CR-MW17-27-28	27 to 28	Silt	**0.0091**	0.0014 U	0.0014 U	0.0014 U	0.0014 U	0.0027 U	0.0014 U	0.0014 U
		CR-MW17-28-28.5	28 to 28.5	Transition Zone	**0.011**	0.00097 U	0.00097 U	0.00097 U	0.00097 U	**0.0019**	0.00097 U	0.00097 U
		CR-MW17-29-30	29 to 30	Transition Zone	**0.043**	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0023 U	0.0012 U	0.0012 U
MTCA Method A ULU Cleanup Level (mg/kg)					72,000[5]	8,000[5]	6	8,000[5]	5	9	0.03	72,000[5]

Notes:

[1] Chemical analysis performed by OnSite Environmental, Inc., of Redmond, Washington.

[2] Vertical datum for all elevations is NGVD 29 vertical datum. Wells USC-MW1D, CR-MW16 and CR-MW17 and the first floor elevation of the building were surveyed by AHBL in October 2014. The elevations of the DP3 and DP5 is based on the first floor elevation. The elevations for wells CR-MW16 and CR-MW17 differ from the November 2013 AHBL survey becuase the 2013 survey was completed with a survey grade global positioning unit and the 2014 survey was completed with traditional survey methods.

[3] Sample ID = Sample ID = Area number - Boring number - start depth-end depth (i.e., a soil sample collected from MDS-MW1D from 14 to 14.5 feet bgs on October 30, 2014 = MDS-MW1D-14-14.5).

[4] Volatile organic compounds (VOCs) were analyzed by U.S. Environmental Protection Agency (EPA) method 8260B.

[5] MTCA Method B ULU criteria represented because MTCA Method A cleanup level has not been established.

[6] Total xylenes consists of m,p- and o- xylenes. The higher detection limit is shown.

mg/kg = Milligram per kilogram

MTCA = Model Toxics Control Act

U = Analyte was not detected at or greater than the listed reporting limit

Bold font type indicates that the analyte was detected at a concentration greater than the respective laboratory reporting limit.

Bold font type and gray shading indicates that the detected concentration is greater than the respective MTCA cleanup level.

-- = Sample not analyzed

bgs = Below ground surface

ULU = Unrestricted Land Use

Table 2

Summary of Chemical Analytical Results During 2013 and 2014 Sampling Events-Petroleum Hydrocarbons, PAHs, Metals[1] - Soil

University of Washington Tacoma McDonald Smith Building
Tacoma, Washington

Composite Identifier	Composite Group A (MDS-DP2, MDS-DP3, MDS-D5)	Composite Group B (MDS-DP2, MDS-DP3, MDS-D5)	MTCA Method A ULU Cleanup Level (mg/kg)
Sample Identification for samples included in composite group[2]	MDS-DP2-0.5-1 MDS-DP3-0.5-1 MDS-DP5-0.5-1	MDS-DP2-1-2 MDS-DP3-1-3 MDS-DP5-1-3	
Sample Depth (feet bgs)	0.5 to 1	1 to 3	
Soil Type	Fill	Qvi	
NWTPH-HCID[3] (mg/kg)			
Gasoline-Range	22 U	--	30/100[7]
Diesel-Range	55 U	--	2,000
Lube Oil-Range	110 U	--	2,000
Metals[4] (mg/kg)			
Arsenic	11 U	11 U	20
Barium	**79**	**66**	16,000[8]
Cadmium	0.56 U	0.56 U	2.0
Chromium	**45**	**48**	2,000 [9]
Lead	**120**	**48**	250
Mercury	**0.31**	0.28 U	2.0
Selenium	11 U	11 U	400[8]
Silver	1.1 U	1.1 U	400[8]
TCLP Lead (mg/L) [5]	0.2 U	--	5[10]
PAHs[6] (mg/kg)			
Naphthalene	0.0074 U	--	5
2-Methylnaphthalene	0.0074 U	--	320[8]
1-Methylnaphthalene	0.0074 U	--	35[8]
Acenaphthylene	0.0074 U	--	NE
Acenaphthene	0.0074 U	--	4,800[8]
Fluorene	0.0074 U	--	3,200[8*]
Phenanthrene	**0.043**	--	NE
Anthracene	**0.011**	--	24,000[8]
Fluoranthene	**0.036**	--	3,200[8]
Pyrene	**0.05**	--	2,400[8]
Benzo[g,h,i]perylene	**0.013**	--	NE
Carcinogenic PAHs (mg/kg)			
Benzo (a) anthracene (TEF 0.1)	**0.02**	--	MTCA ULU cleanup level for the sum of all cPAHs is 0.1 mg/kg
Benzo (a) pyrene (TEF 1)	**0.015**	--	
Benzo (b) fluoranthene (TEF 0.1)	**0.01**	--	
Benzo (J,k) fluoranthene (TEF 0.1)	**0.014**	--	
Chrysene (TEF 0.01)	**0.018**	--	
Dibenz (a,h) anthracene (TEF 0.1)	0.0074 U	--	
Indeno (1,2,3-cd) pyrene (TEF 0.1)	**0.01**	--	
Total TTEC of cPAHs (detect only)	**0.02**	--	0.1

Notes:

[1] Chemical analysis performed by OnSite Environmental, Inc., of Redmond, Washington.

[2] Sample ID = Project identifier - test pit number - starting depth of sample [feet bgs] -end depth [feet bgs], Test Pit 1 collected 0-3 feet bgs = P1A-TP1-0-3.

[3] Washington State Department of Ecology (Ecology)-approved method NWTPH-HCID.

[4] Resource Conservation Recovery Act (RCRA) metals analyzed by EPA 6000/7000 series method.

[5] TCLP Lead analyzed by EPA Method 1311

[6] Polycyclic aromatic hydrocarbons (PAHs) were analyzed by U.S. Environmental Protection Agency (EPA) method 8270D/SIM.

[7] MTCA Method A cleanup level for gasoline is 30 mg/kg if benzene is detected or if the sum of toluene, ethylbenzene and xylenes are equal to or greater than 1% of the total gasoline detection.

[8] MTCA Method B cleanup level represented because MTCA Method A cleanup level has not been established.

[9] MTCA Method A cleanup level for Trivalent Chromium.

[10] EPA Maximum Concentration for the chemical of concern regarding the Toxicity Characteristic waste designation criteria (40 CFR 261).

mg/kg = milligram per kilogram
-- = sample not analyzed

MTCA = Model Toxics Control Act
bgs = below ground surface

U = Analyte was not detected at or greater than the listed reporting limit
Qvi = Ice-Contact Deposits

TEF = Toxicity Equivalency Factor as defined in WAC 173-340-900 Table 708-2

Total Toxic Equivalent Concentration (TTEC) is the sum of each individual cPAH concentration multiplied by its corresponding TEF.

Table 3

Summary of Chemical Analytical Results During 2013 and 2014 Sampling Events[1] - VOCs - Groundwater

University of Washington Tacoma McDonald Smith Building
Tacoma, Washington

Boring Identification	MDS-MW1D	CR-MW12	CR-MW16		CR-MW17		MTCA Method A Groundwater Cleanup Level	MTCA Method B Groundwater Screening Levels Protective of Indoor Air [10]
Top of Well Casing Elevation (feet)	64.29	47.54	64.90		64.25			
Top of Well Screen Elevation (feet) [4]	20	38	51		54			
Bottom of Well Screen Elevation (feet) [4]	5	23	36		39			
Sample ID [2]	MDS-MW1D-141030	CR-MW12-130708	CR-MW16S-130905	CR-MW16-141030	CR-MW17S-130905	CR-MW17-141030		
Sample Date	10/30/2014	7/8/2013	9/5/2013	10/30/2014	9/5/2013	10/30/2014		
Approximate Depth to Groundwater (feet btoc) [3]	13.50	10.31	16.45		18.57			
Approximate Elevation of Groundwater [4]	50.79	37.23	48.45		45.68			
Lithology At Well Screen	Advance Outwash	Qvi and Advance Outwash	Qvi		Qvi			
VOCs[5] (µg/L)								
Tetrachloroethene (PCE)	0.20 U	0.20 U	2.0 U	2.0 U	1.0 U	1.0 U	5	24
Trichloroethene (TCE)	**2.3**	**4.7**	**300**	**340**	**93**	**65**	5	1.5
1,1-Dichloroethene (DCE)	0.20 U	0.20 U	**3.9**	**3.0**	**1.7**	1.0 U	400[9]	130
cis-1,2-DCE	**4.4**	**3.8**	**240**	**270**	**120**	**86**	16[9]	160
trans-1,2-DCE	0.20 U	0.20 U	**15**	**15**	**6.5**	**4.9**	160[9]	110
Vinyl Chloride	**1.2**	**0.64**	**17**	**19**	**12**	**8.7**	0.2	0.35
BETX[6] (µg/L)								
Benzene	-	0.20 U	2.0 U	-	1.0 U	-	5	2.4
Ethylbenzene	-	0.20 U	2.0 U	-	1.0 U	-	700	2,800
Toluene	-	1.0 U	10 U	-	5.0 U	-	1,000	16,000
Total Xylene[8]	-	0.40 U	4.0 U	-	2.0 U	-	1,000	290[11]
Parameters								
pH	9.5	7.33	6.81	8.2	6.75	8.98	N/A	N/A
Conductivity (µS/cm)	133.0	391	483	196.9	483	201.3	N/A	N/A
Turbidity (NTU)	93.4	12.60	20	5.79	7.00	4.08	N/A	N/A
Dissolved O2 (ppm)	2.75	1.17	0.29	41.8	0.67	2.10	N/A	N/A
Temperature (°C)	15.2	16.12	15.31	15.5	15.94	16.2	N/A	N/A
ORP (mV)	-114.5	8.8	-165	-30.1	-31.2	34.9	N/A	N/A

Notes:

[1] Chemical analysis performed by OnSite Environmental, Inc. in Redmond, Washington.

[2] Sample ID = Area number - Boring number - Date (i.e., a water sample collected from CR-MW12 on July 8, 2013 = CR-MW12-130708) .

[3] Water level measurement shown measured on October 27, 2014 for CR-MW16, CR-MW17 and MDS-MW1D. Water level shown for CR-MW12 was measured on November 8, 2013.

[4] Vertical datum for all elevations is NGVD 29 vertical datum. Wells USC-MW1D, CR-MW16 and CR-MW17 and the first floor elevation of the building were surveyed by AHBL in October 2014. The elevations of the DP3 and DP5 is based on the first floor elevation. The elevations for wells CR-MW16 and CR-MW17 differ from the November 2013 AHBL survey becuase the 2013 survey was completed with a survey grade global positioning unit and the 2014 survey was completed with traditional survey methods.

[5] Elevation estimated based on topography. Survey is pending.

[6] Volatile organic compounds (VOCs) were analyzed by U.S. Environmental Protection Agency (EPA) method 8260C. Other VOCs were analyzed but not detected.

[7] Benzene, ethylbenzene, toluene and xylenes (BETX) were analyzed by EPA method 8260C.

[8] Total xylenes consists of m,p- and o- xylenes. The higher detection limit is shown.

[9] MTCA Method B criteria shown because MTCA Method A cleanup level has not been established.

[10] MTCA Method B groundwater screening level based on protection of indoor air. Values calculated using Method B air cleanup levels from Ecology's "CLARC Master Spreadsheet.xls" dated May 2014 and Equation 1 from Ecology's 2009 draft "Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action."

[11] Screening Level for m,p-xylene shown.

MTCA = Model Toxics Control Act
Qvi = Ice-contact deposits
DCE = Dichloroethene
°C = degrees celsius
-- = Analyte or sample not analyzed
N/A = not applicable
NTU = nephelometric turbidity unit
mV = Millivolt
µg/L = microgram per liter
mg/L = milligram per liter
ppm = parts per million
µS/cm = microsiemens per mentimeter
U = Analyte was not detected at or greater than the listed reporting limit

Bold font type indicates that the analyte was detected at a concentration greater than the respective laboratory reporting limit.

Bold font type and gray shading indicates analyte is detected at a concentration greater than the respective MTCA Method groundwater cleanup/criteria level.

Dashed outline indicates analyte is detected at a concentration greater than the MTCA Method B Indoor Air Screening Level.

Table 4

Summary of Chemical Analytical Results During 2014 Sampling Events[1,2] - Soil Gas

University of Washington Tacoma McDonald Smith Building

Tacoma, Washington

Locations	Sample ID	VOCs[2] (µg/m^3)						Helium[3] (percent)
		Tetrachloroethene (PCE)	Trichloroethene (TCE)	1,1-Dichloroethene (DCE)	cis-1,2-DCE	trans-1,2-DCE	Vinyl Chloride	
MDS-SV1	MDS-SV1-141023	2.8	**9.2**	0.068 U	0.14 U	0.68 U	0.044 U	0.086 U
MDS-SV2	MDS-SV2-141023	1.5	**24**	0.053 U	2.3	0.53 U	0.034 U	**0.14**
MDS-SV3	MDS-SV3-141023	2.2	**48**	0.063 U	0.67	0.63 U	0.040 U	**0.49**
MDS-SV4	MDS-SV4-141023	0.34	**100**	0.061 U	1.3	0.61 U	0.040 U	**0.36**
MTCA Method B Shallow Soil Gas Screening Level (AF = 0.1) [4]		96	3.7	910	270 (160)[4]	270	2.8	N/A
MTCA Method B Shallow Soil Gas Screening Level (AF = 0.03) [4]		320	12	3,000	900 (530)[4]	900	9.3	

Notes:

[1] Chemical analysis performed by Eurofin Air Toxics, California.

[2] Analyzed by EPA method TO-15SIM.

[3] Analyzed by modified ASTM D 1946.

[4] MTCA Method B shallow soil gas screening levels are calculated by dividing MTCA Method B air cleanup levels by an attenuation factors of 0.1 (Ecology 2009) and 0.03 (EPA 2012). MTCA Method B air cleanup levels are from Ecology's "CLARC Master Spreadsheet.xlsx" dated May 2014. The value for cis-1,2-DCE is the MTCA Method B air cleanup level for trans-1,2-DCE. The cis-1,2-DCE value of 16 µg/m^3 (in parentheses), is the previously available from Ecology's former CLARC on-line database but has been withdrawn.

MTCA = Model Toxics Control Act
EPA = U.S. Environmental Protection Agency
VOCs = volatile organic compounds
µg/m^3 = microgram per cubic meter
AF = attenuation factor
N/A = not applicable

Bold font type indicates that the analyte was detected at a concentration greater than the respective laboratory reporting limit.

Bold font type and gray shading indicates that the detected concentration is greater than the respective MTCA Method B Shallow Soil Gas Screening Level (AF = 0.1)

Dashed outline indicates analyte is detected at a concentration is greater than the respective MTCA Method B Shallow Soil Gas Screening Level (AF = 0.03)

Table 5

Soil Gas Vapor Intrusion Evaluation[1]

University of Washington Tacoma McDonald Smith Building

Tacoma, Washington

Locations	Sample ID	TCE Soil Gas Results ($\mu g/m^3$)[2]	Estimated PCE Indoor Air Concentrations ($\mu g/m^3$); Calculated using the Johnson and Ettinger Model
			Building Footprint[4] (AF = 0.0013)
MDS-SV1	MDS-SV1-141023	9.2	0.012
MDS-SV2	MDS-SV2-141023	24	0.031
MDS-SV3	MDS-SV3-141023	48	0.063
MDS-SV4	MDS-SV4-141023	100	0.13
Average		45	0.059
MTCA Method B Indoor Air Cleanup Level (Residential)[5]			0.37
MTCA Method B Indoor Air Remediation Level (Occupational/Commercial)[6]			2.4

Notes:

[1] Chemical analysis performed by Eurofin Air Toxics, California.

[2] Analyzed by EPA method TO-15SIM. Other VOCs analyzed and will be reportedly separately.

[3] Modeling was completed as described in the text of the report using the EPA California method to calculate the $Q_{soil.}$

[4] The building footprint assumes 9,000 square feet, 15 foot ceilings, and 0.5 exchanges of air per hour (MTCA commercial default).

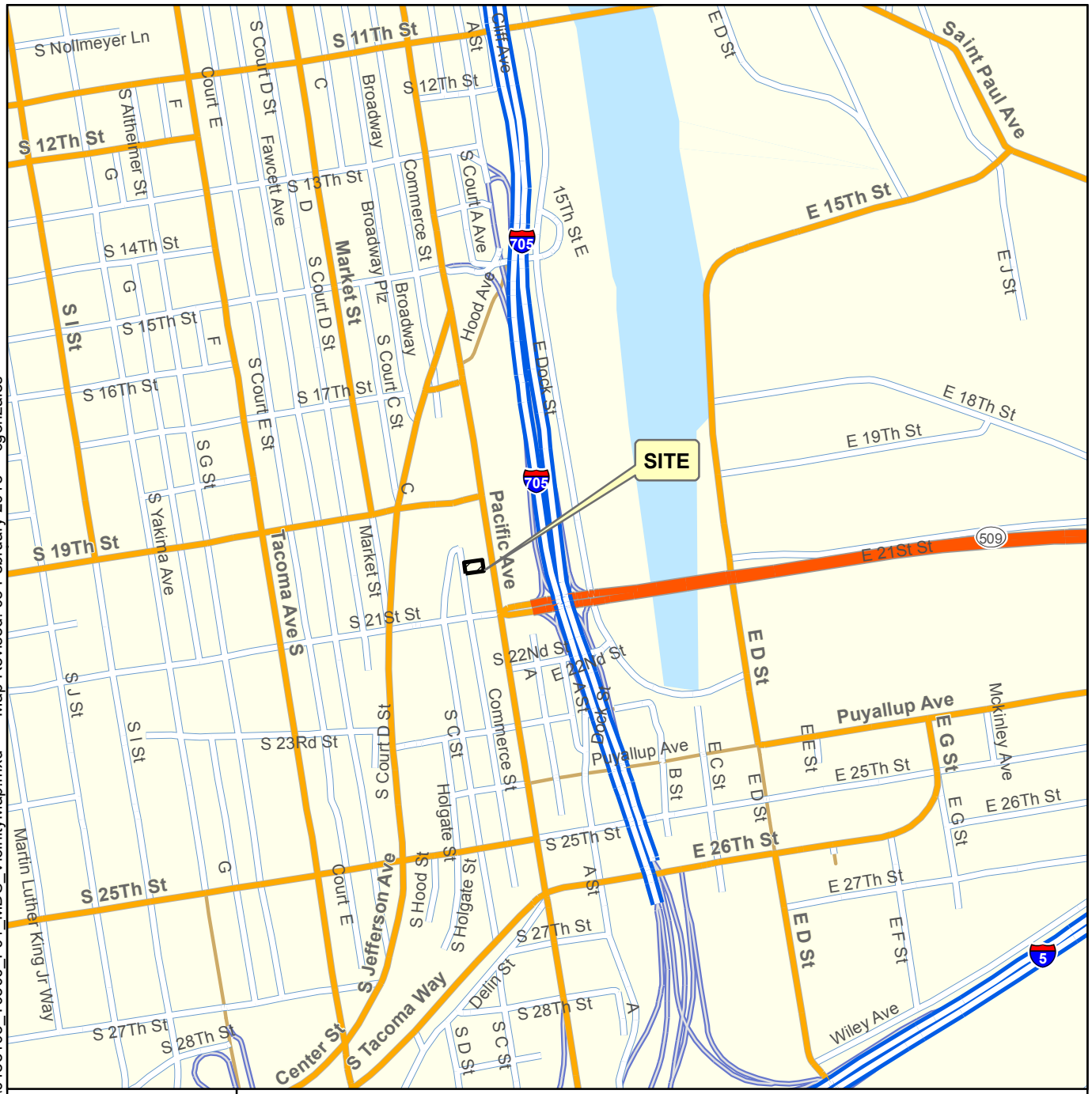
[5] MTCA Method B air cleanup levels are from Ecology's "CLARC Master Spreadsheet.xlsx" dated May 2014.

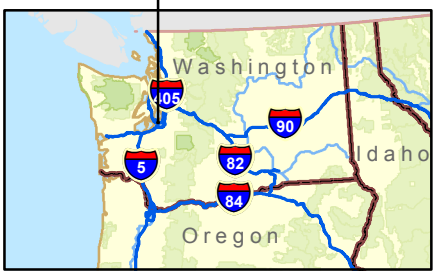
[6] MTCA Method B Indoor Air Remediation Level (Occupational/Commercial) assumes exposure of 250 days/year, 8 hours/day, 20 years.

AF = Attenuation Factor

MTCA = Model Toxics Control Act

$\mu g/m^3$ = microgram per cubic meter





1,000 0 1,000
Feet

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Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

McDonald Smith Building - UWT Campus
Tacoma, Washington

GeoEngineers

Figure 1

Office: TACO Path: \\tac\projects\0\0183105\GIS\MXDs\0183105_T0300_F01_MDS_VicinityMap.mxd Map Revised: 05 February 2015 cgonzales

Well CR-MW17 (2014)	
COC	Concentration
TCE	65 µg/L
cis-1,2-Dichloroethene	86 µg/L
Vinyl Chloride	8.7 µg/L

Well CR-MW17 (2013)		
Sample Depth	COC	Concentration
11 to 12 feet bgs	TCE	0.00090 U
15 to 16 feet bgs	TCE	0.00094 U
17 to 18 feet bgs	TCE	0.00097 U
19 to 20 feet bgs	TCE	0.00089 U
23 to 24 feet bgs	TCE	0.011 mg/kg
25 to 26 feet bgs	TCE	0.021 mg/kg
27 to 28 feet bgs	TCE	0.012 mg/kg
28 to 28.5 feet bgs	TCE	0.026 mg/kg
29 to 30 feet bgs	TCE	0.0025 mg/kg

Well MDS-MW1D (2014)	
COC	Concentration
TCE	2.3 µg/L
Vinyl Chloride	1.2 µg/L

Well MDS-MW1D (2014)		
Sample Depth	COC	Concentration
14.5 to 15 feet bgs	TCE	0.0019 U
23.5 to 24 feet bgs	TCE	0.024 mg/kg
27.5 to 28 feet bgs	TCE	0.012 mg/kg
28.5 to 29 feet bgs	TCE	0.050 mg/kg
35 to 36 feet bgs	TCE	0.0011 U
40 to 40.5 feet bgs	TCE	0.0059 mg/kg
45 to 46 feet bgs	TCE	0.0046 mg/kg
50 to 51 feet bgs	TCE	0.013 mg/kg
55 to 56 feet bgs	TCE	0.0019 mg/kg
60 to 61 feet bgs	TCE	0.0017 mg/kg

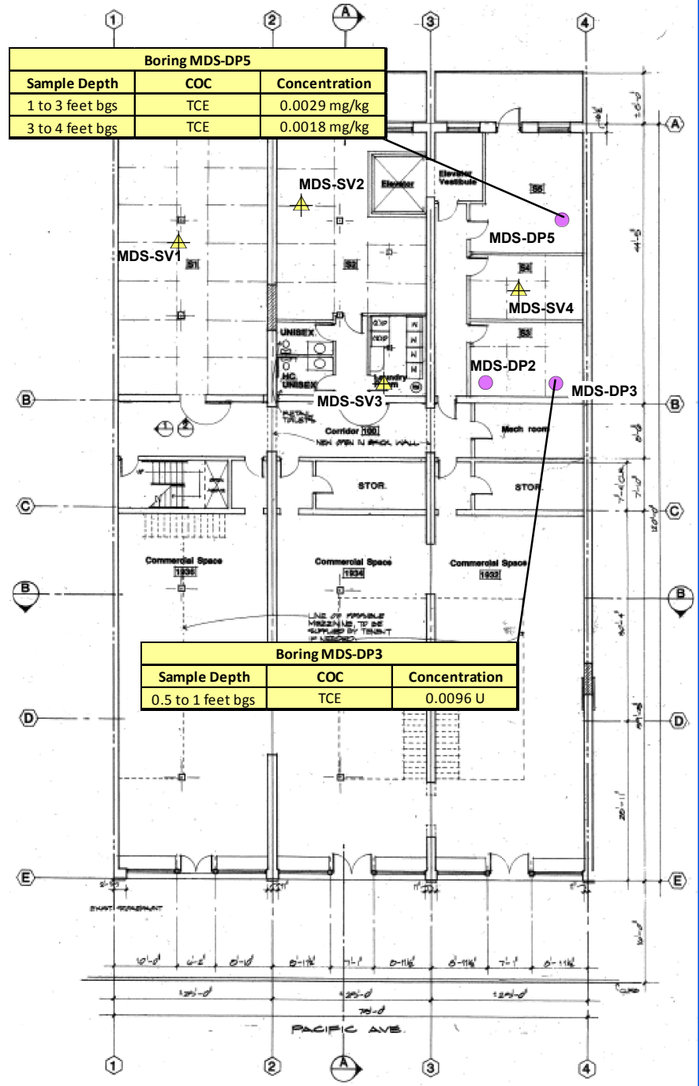
Well CR-MW16 (2014)	
COC	Concentration
TCE	340 µg/L
cis-1,2-Dichloroethene	270 µg/L
Vinyl Chloride	19 µg/L

Well CR-MW16 (2013)		
Sample Depth	COC	Concentration
9 to 10 feet bgs	TCE	0.0024 mg/kg
10 to 11 feet bgs	TCE	0.0016 mg/kg
15 to 16 feet bgs	TCE	0.0031 mg/kg
18 to 19 feet bgs	TCE	0.051 mg/kg
20 to 21 feet bgs	TCE	0.034 mg/kg
24 to 25 feet bgs	TCE	0.031 mg/kg
26 to 27 feet bgs	TCE	0.024 mg/kg
28 to 29 feet bgs	TCE	0.061 mg/kg
30 to 31 feet bgs	TCE	0.009 mg/kg

Well CR-MW12 (2013)	
COC	Concentration
TCE	4.7 µg/L
Vinyl Chloride	0.64 µg/L

Boring MDS-DP5		
Sample Depth	COC	Concentration
1 to 3 feet bgs	TCE	0.0029 mg/kg
3 to 4 feet bgs	TCE	0.0018 mg/kg

Boring MDS-DP3		
Sample Depth	COC	Concentration
0.5 to 1 feet bgs	TCE	0.0096 U



Inset A: McDonald Smith Building First Floor Plan

Legend

Soil Results*

Boring DP5		
Sample Depth	COC	Concentration
1 to 3 feet bgs	TCE	0.0029 mg/kg
3 to 4 feet bgs	TCE	0.0018 mg/kg

Groundwater Results*

Well CR-MW12 (2013)	
COC	Concentration
TCE	4.7 µg/L
Vinyl Chloride	0.64 µg/L

*Chemicals shown in red were detected at concentrations greater than the respective MTCA Method A Cleanup Levels

TCE concentrations shown. Other chemicals were analyzed and shown if greater than the respective MTCA Method A Cleanup Level or Method B Criteria.

- New Monitoring Well
- Micro Core Boring
- Existing Monitoring Well
- Subslab Sample Location
- Decomissioned Monitoring Well

Notes:
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Projection: NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

Notes:
COC = Chemical of Concern
UWT = University of Washington Tacoma
TCE = Trichloroethene
mg/kg = milligram per kilogram
µg/L = microgram per liter
bgs = below ground surface
U = Chemical not detected greater than labratory reporting limit
HVOCs = halogenated volatile organic compounds

MTCA Cleanup Levels/Screening Levels
Soil:
TCE = 0.05mg/kg (Method A ULU Cleanup Level)

Groundwater:
TCE = 5 µg/L (Method A Cleanup Level): 1.5 µg/L (Protective of Indoor Air Screening Level)
cis-1,2-Dichloroethene = 16 µg/L (Method B Cleanup Level): 160 µg/L (Protective of Indoor Air Screening Level)
Vinyl Chloride = 0.2 µg/L (Method A Cleanup Level): 0.35 µg/L (Protective of Indoor Air Screening Level)

50 0 50
Feet

Site Plan: Soil and Groundwater Analytical Results

McDonald Smith Building - UWT Campus
Tacoma, Washington

GeoEngineers

Figure 2

Map Revised: 05 February 2015 cgonzales
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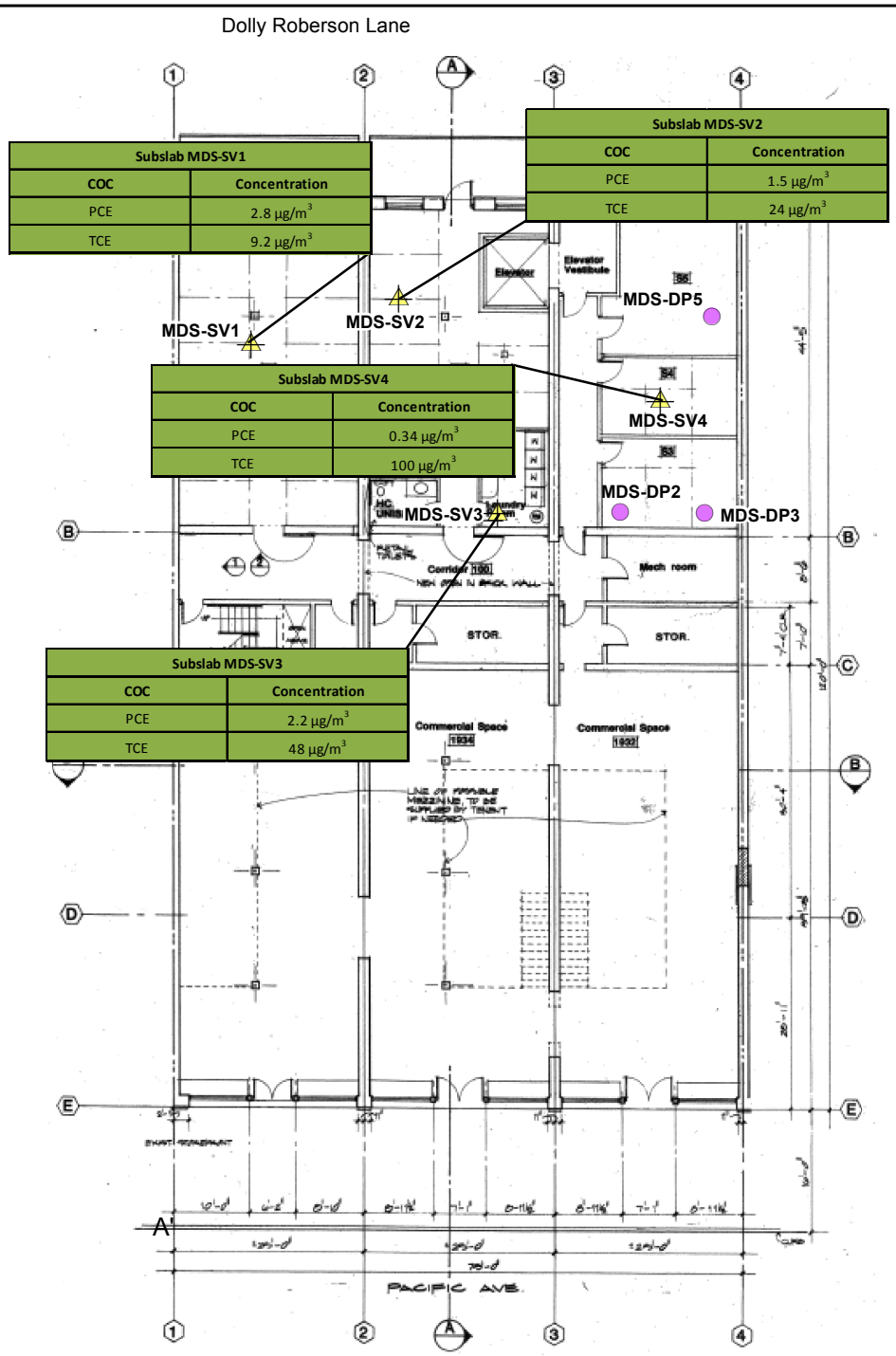
Office: TAC



McDonald Smith Building Historic First Floor Plan. Wall separations shown are all not present today

Legend

Subslab Results (October 2014)

Subslab MDS-SV1	
COC	Concentration
PCE	2.8 µg/m^3
TCE	9.2 µg/m^3

Only analytical results of the chemicals of concern are shown if detected. Other chemicals that were analyzed and detected are not shown.

Subslab Sample Location

Micro Core Boring

Notes:
COC = Chemical of Concern
UWT = University of Washington Tacoma
TCE = Trichloroethene
PCE = Tetrachloroethene
µg/m^3 = microgram per cubic meter

Notes:
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Projection: NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

Site Plan: Soil Gas Subslab Analytical Results

McDonald Smith Building - UWT Campus
Tacoma, Washington

GeoEngineers

Figure 3

Office: TAC Path: \\tac\projects\0\0183105\GIS\MXDs\0183105_T0300_F03_MDS_SitePlanSubslab.mxd Map Revised: 05 February 2015 cgonzales

APPENDIX A
Historical Exploration Logs

APPENDIX A
HISTORICAL EXPLORATION LOGS

Original Exploration Name	New Exploration Designation	Exploration Performed By
GEI-1 (URS CRMW-14)	B-A	GEI
GEI-3 (USRS PHASE IIB-15)	B-B	GEI
GEI-4 (URS CRMW-13)	B-C	GEI
GEI-5 (URS Phase IIB-21)	B-D	GEI
GEI-6 (URS Phase IIB-18)	B-E	GEI
GEI-7 (URS Phase IIB-17)	B-F	GEI
CR-MW11	B-G	URS
CP-B1	B-H	URS
CP-B2	B-I	URS
CP-B3	B-J	URS
CP-B4A	B-K	URS
CP-B4B	B-L	URS
TP-1	TP-1	GEI
TP-2	TP-2	GEI
TP-3	TP-3	GEI

Inset A: McDonalds Smith Building First Floor Plan

Notes:
1. The locations of all features shown are approximate.
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Projection: NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

- New Subslab Sample Location
- New Micro Core Boring
- New Monitoring Well
- Existing Monitoring Well
- Previous Borings Completed by Others and GeoEngineers
- Previous Test Pits Completed by Others and GeoEngineers

50 0 50
Feet

Site Plan

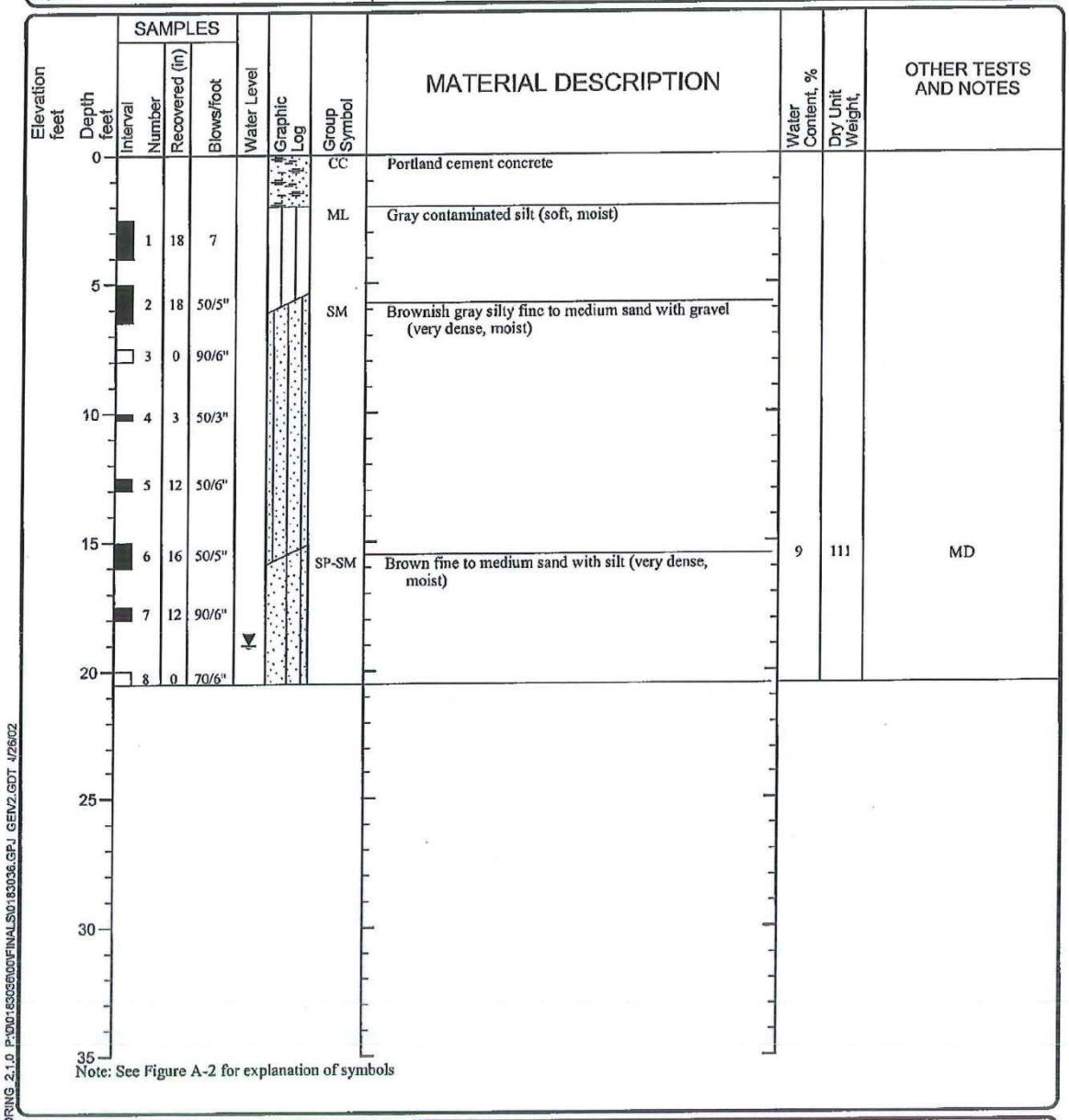
McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A1

Map Revised: 05 February 2015 cgonzales
Path: \\tacprojects\0\0183105\GIS\MXDs\0183105_T0300_FA1_MDS_SitePlan.mxd
Office: TAC

Date(s) Drilled	02/05/02	Logged By	KGO	Checked By	JJM
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow Stem Auger	Sampling Methods	Dames & Moore
Auger Data	4.25-inch ID	Hammer Data	140 (lb) hammer/ 30 (in) drop winch release	Drilling Equipment	CME-55 Custom-built Limited Access Rig
Total Depth (ft)	20.5	Surface Elevation (ft)	Not measured	Ground Water Level (ft. bgs)	19
Datum/ System	N/A	Easting	Not determined	Northing	Not determined



0183-036-00 GEI GTBORING 2.1.0 P:\00\183036\00\FINALS\0183036.GPJ GEIV2.GDT 4/26/02

LOG OF BORING GEI-2 (URS CRMW-14)

GeoEngineers

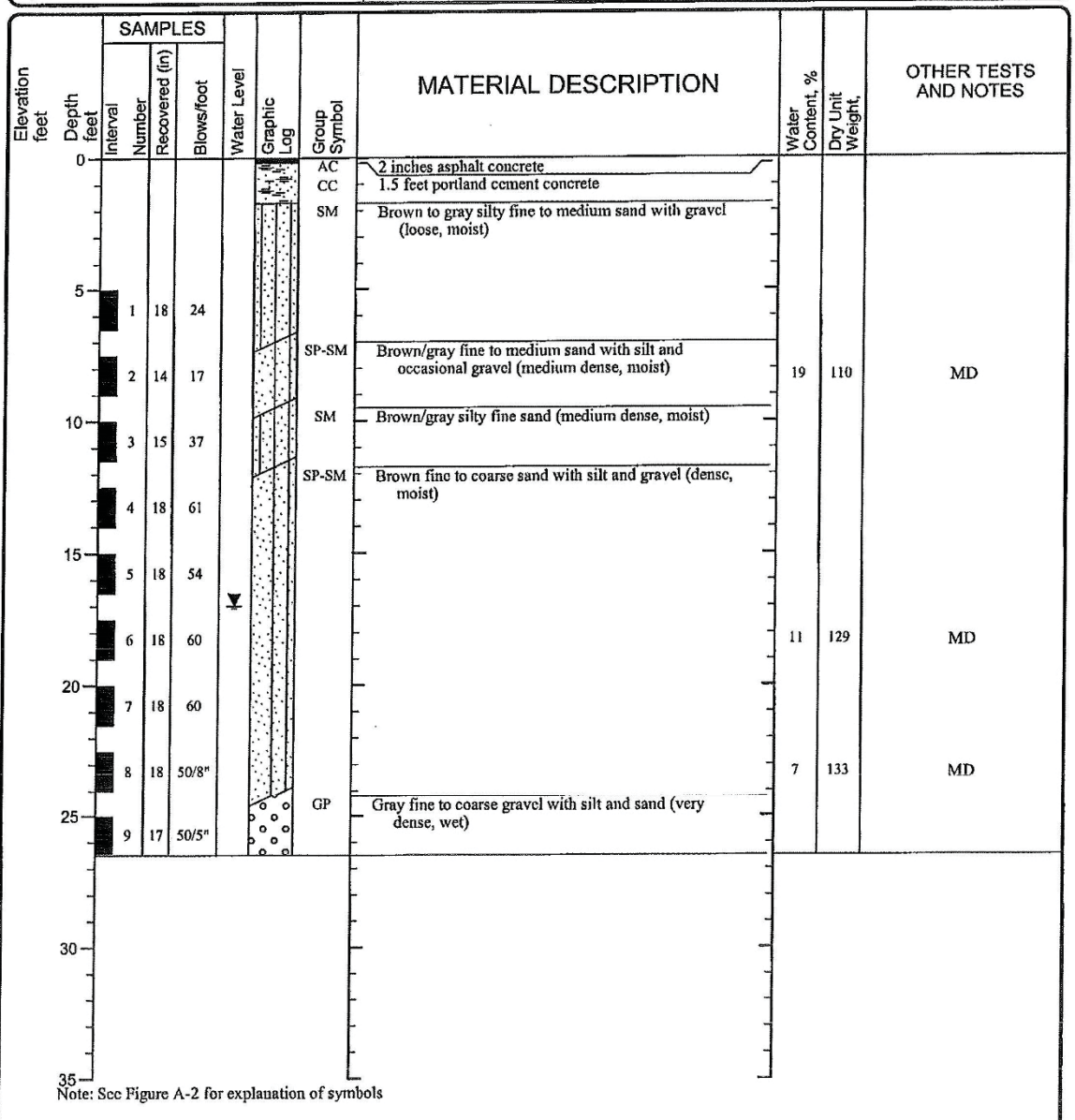
Project: University of Washington-Tacoma
Project Location: Tacoma, Washington
Project Number: 0183-036-00

Figure: A-4
Sheet 1 of 1

New Boring Name B-A
McDonald Smith Building Tacoma, Washington
GeoEngineers | **Figure A-2**

00183-105-00

Date(s) Drilled	02/01/02	Logged By	KGO	Checked By	JJM
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow Stem Auger	Sampling Methods	Dames & Moore
Auger Data	4.25-inch ID	Hammer Data	300 (lb) hammer/ 30 (in) drop automatic	Drilling Equipment	CME-75
Total Depth (ft)	26.5	Surface Elevation (ft)	Not measured	Ground Water Level (ft. bgs)	17
Datum/ System	N/A	Easting	Not determined	Northing	Not determined



Note: See Figure A-2 for explanation of symbols

0183-036-00 GEI GTBORING 2.1.0 P:\0018303600\FINALS\0183036.GPJ GEIV2.GDT 4/26/02

LOG OF BORING GEI-3 (USRS PHASE IIB-15)

GeoEngineers

Project: University of Washington-Tacoma
Project Location: Tacoma, Washington
Project Number: 0183-036-00

Figure: A-5
Sheet 1 of 1

New Boring Name B-B

McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A-3

00183-105-00

Date(s) Drilled	02/01/02	Logged By	KGO	Checked By	JJM
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow Stem Auger	Sampling Methods	Dames & Moore
Auger Data	4.25-inch ID	Hammer Data	300 (lb) hammer/ 30 (in) drop automatic	Drilling Equipment	CME-75
Total Depth (ft)	31.5	Surface Elevation (ft)	Not measured	Ground Water Level (ft. bgs)	18.3
Datum/ System	N/A	Easting	Not determined	Northing	Not determined

Elevation feet	Depth feet	SAMPLES Interval	Number	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Dry Unit Weight,	OTHER TESTS AND NOTES
	0							CC	Portland cement concrete with embedded railroad ties			
								SM	Brown silty fine to medium sand with gravel (loose, moist) (fill)			
	5		1	2	16							
								SP-SM	Brown fine to medium sand with silt (medium dense, moist to wet)			
			2	18	30			SM	Brown to gray silty fine to coarse sand with gravel (dense to very dense, moist)			
	10		3	18	52							
			4	18	70					10	133	MD
	15		5	18	78			SP-SM	Brown fine to coarse sand with silt and gravel (very dense, moist)			
			6	18	74	▼						
	20		7	18	82							
			8	18	31					24	96	MD
	25		9	17	75			SM	Brown to gray silty fine to medium sand with gravel (very dense, wet)			
			10	18	50/4"			SM	Gray silty fine sand (very dense, moist)	28	93	MD
	30		11	18	41			ML	Gray to brownish gray silt (hard, moist)			
	35											

Note: See Figure A-2 for explanation of symbols

0183-036-00 GEI_GTBORING 2.1.0 P:\0018303600\FINALS\0183035.GPJ GEIV2.GDT 4/26/02

LOG OF BORING GEI-4 (URS CRMW-13)

GeoEngineers

Project: University of Washington-Tacoma
Project Location: Tacoma, Washington
Project Number: 0183-036-00

Figure: A-6
Sheet 1 of 1

00183-105-00

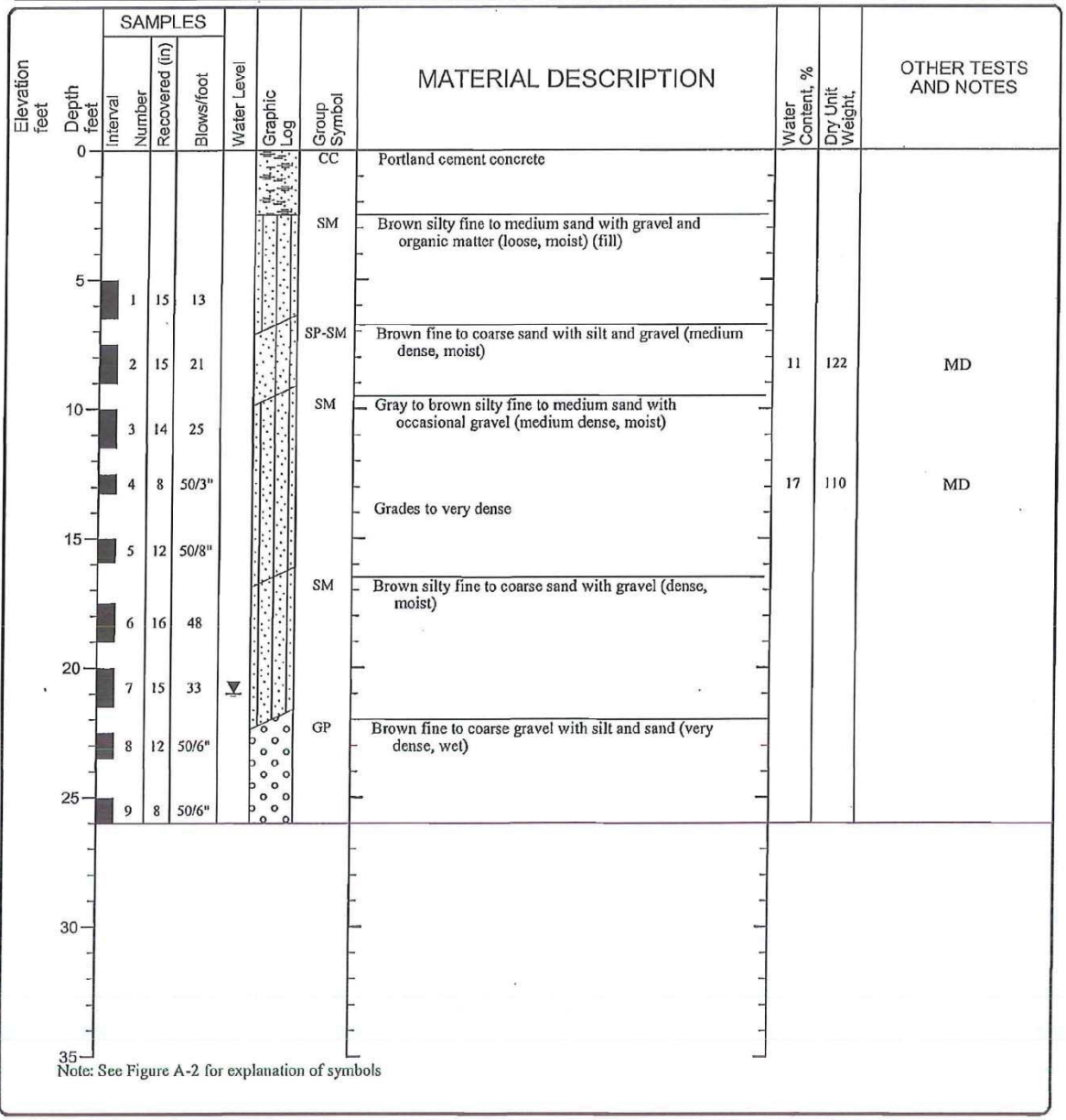
New Boring Name B-C

McDonald Smith Building
Tacoma, Washington

GEOENGINEERS

Figure A-4

Date(s) Drilled	02/01/02	Logged By	KGO	Checked By	JJM
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow Stem Auger	Sampling Methods	Dames & Moore
Auger Data	4.25-inch ID	Hammer Data	300 (lb) hammer/ 30 (in) drop automatic	Drilling Equipment	CME-75
Total Depth (ft)	26	Surface Elevation (ft)	Not measured	Ground Water Level (ft. bgs)	21
Datum/ System	N/A	Easting	Not determined	Northing	Not determined



Note: See Figure A-2 for explanation of symbols

0183-036-00 GEI_GTBORING 2.1.0 P:\0\0183036\00\FINALS\0183036.GPJ GEIV2.GDT 4/26/02

LOG OF BORING GEI-5 (URS PHASE IIB-21)

GeoEngineers

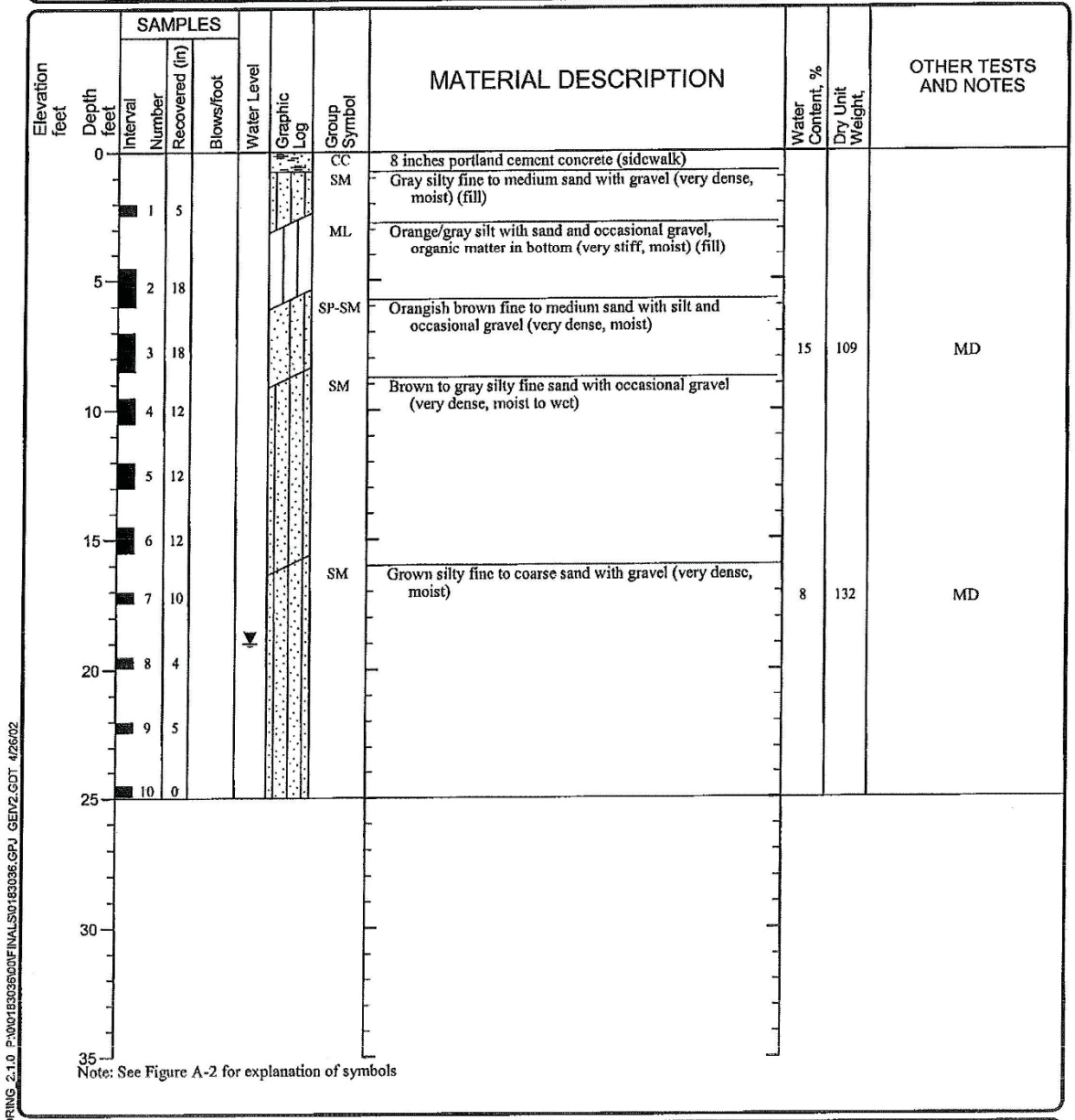
Project: University of Washington-Tacoma
Project Location: Tacoma, Washington
Project Number: 0183-036-00

Figure: A-7
Sheet 1 of 1

New Boring Name B-D
McDonald Smith Building Tacoma, Washington
GeoEngineers | **Figure A-5**

00183-105-00

Date(s) Drilled	01/31/02	Logged By	KGO	Checked By	JJM
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow Stem Auger	Sampling Methods	Dames & Moore
Auger Data	4.25-inch ID	Hammer Data	140 (lb) hammer/ 30 (in) drop wire line	Drilling Equipment	CME-75
Total Depth (ft)	25	Surface Elevation (ft)	Not measured	Ground Water Level (ft. bgs)	19
Datum/ System	N/A	Easting	Not determined	Northing	Not determined



Note: See Figure A-2 for explanation of symbols

0183-036-00 GEI GTBORING 2.1.0 P:\0\0183036\00\FINALS\0183036.GPJ GEIV2.GDT 4/26/02

LOG OF BORING GEI-6 (URS PHASE IIB-18)

GeoEngineers

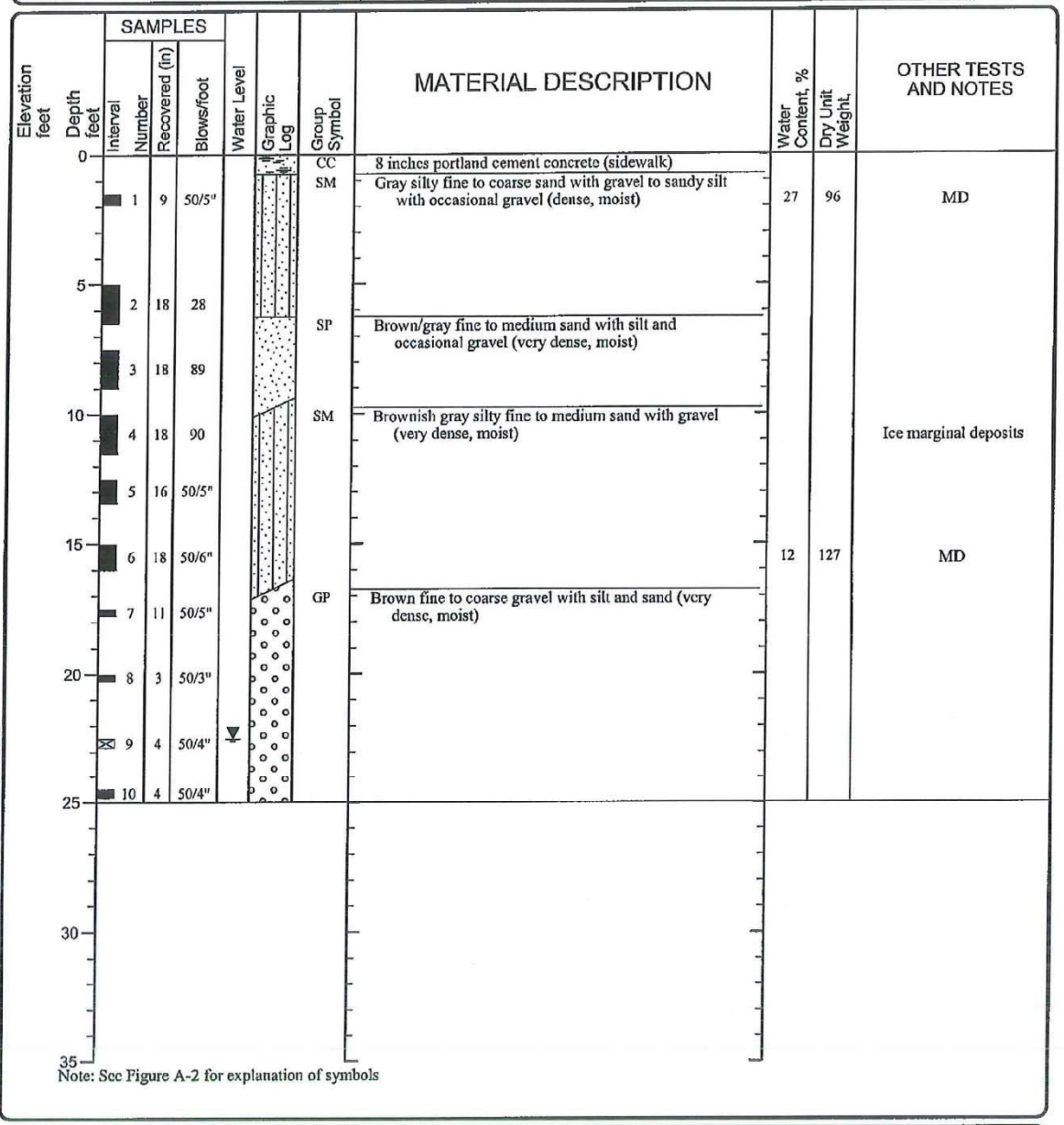
Project: University of Washington-Tacoma
Project Location: Tacoma, Washington
Project Number: 0183-036-00

Figure: A-8
Sheet 1 of 1

New Boring Name B-E	
McDonald Smith Building Tacoma, Washington	
GeoEngineers	Figure A-6

00183-105-00

Date(s) Drilled	01/31/02	Logged By	KGO	Checked By	JJM
Drilling Contractor	Cascade Drilling	Drilling Method	Hollow Stem Auger	Sampling Methods	Dames & Moore
Auger Data	4.25-inch ID	Hammer Data	140 (lb) hammer/ 30 (in) drop wire line	Drilling Equipment	CME-75
Total Depth (ft)	25	Surface Elevation (ft)	Not measured	Ground Water Level (ft. bgs)	22.5
Datum/ System	N/A	Easting	Not determined	Northing	Not determined



Note: See Figure A-2 for explanation of symbols

C183-036-00 GEI_GTBORING 2.1.0 P:\00\183036\00\FINALS\0183036.GPJ GEIV2.GDT 4/26/02

LOG OF BORING GEI-7 (URS PHASE IIB-17)

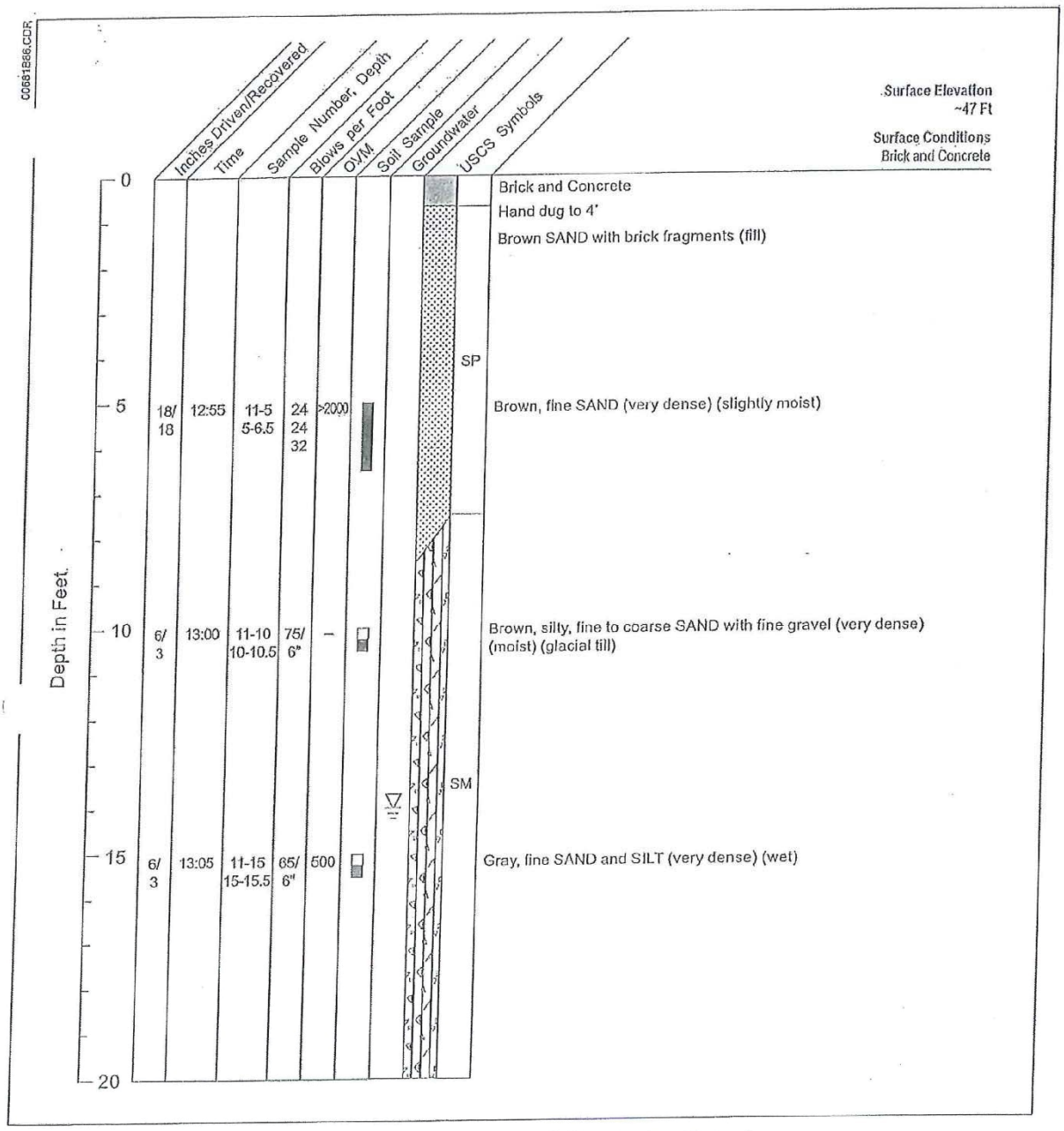
GeoEngineers

Project: University of Washington-Tacoma
Project Location: Tacoma, Washington
Project Number: 0183-036-00

Figure: A-9
Sheet 1 of 1

New Boring Name B-F
McDonald Smith Building Tacoma, Washington
GeoEngineers | **Figure A-7**

00183-105-00



Geologist: TMG
Drilling method: Hollow Stem Auger
Sampling method: D&M U-Type Split Spoon, 140# Hammer

Drill contractor: Cascade
Drill date: 10/12/99

CR-MW11 (SHEET 1 of 2)
GEOLOGIC BORING LOG

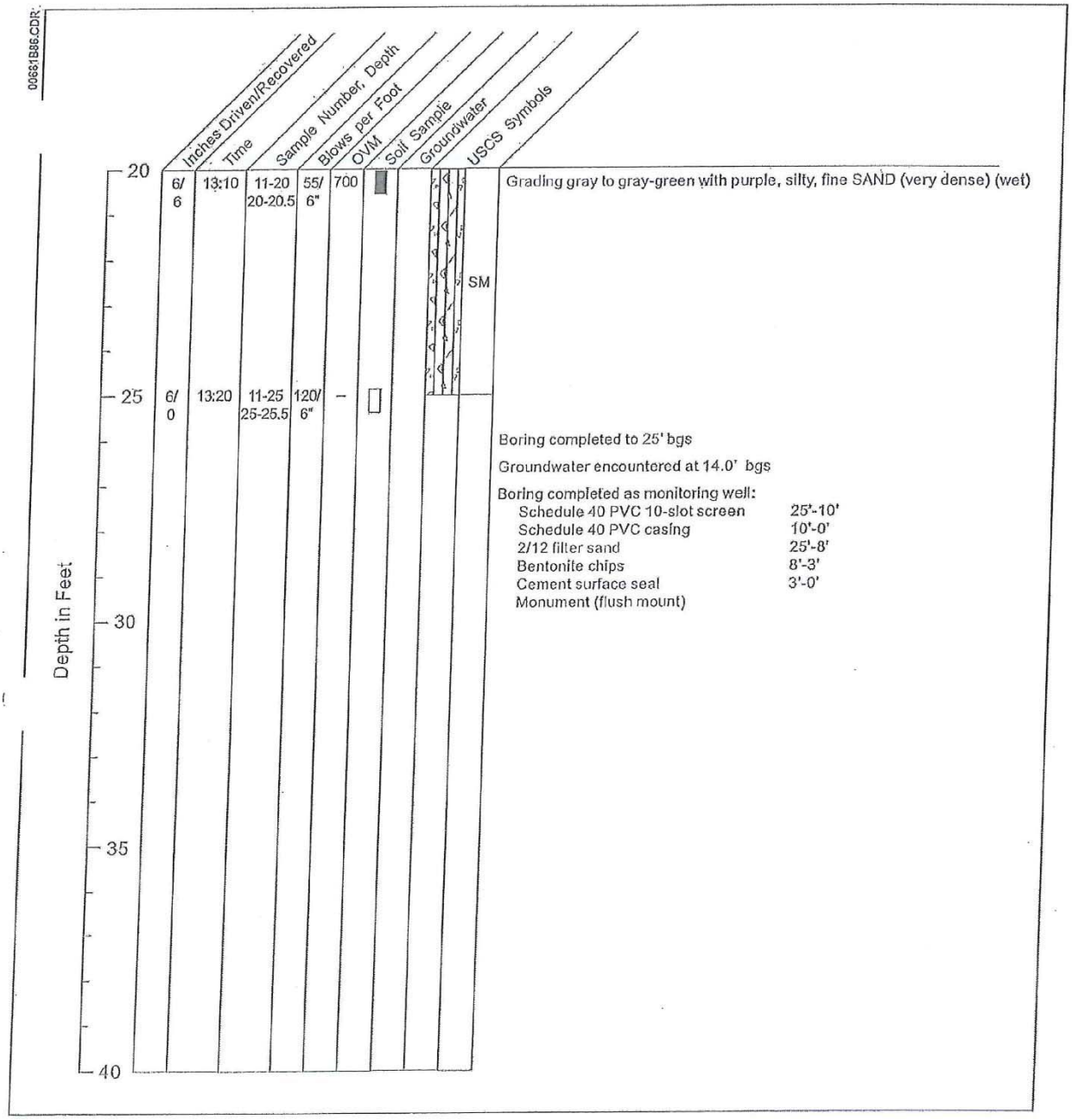
Job No. 53-00681094.00

URS

University of Washington Tacoma Campus
Remedial Investigation Report

New Boring Name B-G	
McDonald Smith Building Tacoma, Washington	
GeoEngineers	Figure A-8

00183-105-00



Geologist: TMG
Drilling method: Hollow Stem Auger
Sampling method: D&M U-Type Split Spoon, 140# Hammer

Drill contractor: Cascade
Drill date: 10/12/99

CR-MW11 (SHEET 2 of 2)
GEOLOGIC BORING LOG

Project No. 53-00681094.00

URS

University of Washington Tacoma Campus
Remedial Investigation Report

New Boring Name B-G

McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A-9

00183-105-00

Project: UW Tacoma RI
Project Location: Tacoma, Washington
Project Number: 53-00681094.01

Log of Boring CP-B1

Sheet 1 of 1

Date(s) Drilled	4/4/02-4/9/02	Logged By	Gary Stoyka	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling, Inc.	Total Depth of Borehole	3 feet
Drill Rig Type	CME 55 Limited Access	Drill Bit Size/Type	8"	Ground Surface Elevation	
Groundwater Level	2.5 ft bgs	Sampling Method	D&M Split Spoon	Hammer Data	140#/30"
Borehole Backfill	Bentonite chips	Location	Cherry Parkes Building (Rear European Antiques)		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows/ 6in.	OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0							Concrete	4/4/02 15:45
	1		CP-B1-1				SP	Brown SAND with gravel (moist) (no apparent stain or odor) (fill)	
								Concrete beam at 13" bgs	4/9/02 13:50 Refusal encountered at 13" bgs. Borehole abandoned with bentonite chips and concrete patch.
	2						GM	Brown, poorly graded GRAVEL with fine sand and silt (wet) (no apparent stain or odor) (fill) 2.5 ft ▽	
	3		CP-B1-3					Boring/excavation was completed to 3' bgs. Groundwater was encountered at 2.5' bgs.	Lease Crutcher Lewis excavated around concrete beam on 4/9 to a depth of 3' bgs. Soil sample collected from base of excavation with hand auger on 4/9.
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								

ENV W/O W... :\SJOB-1153-006-1.XXU\UWTAC.GPJ URSSEA3.GLB URSSEA3.GDT 6/5/02

URS

New Boring Name B-H

McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A-10

00183-105-00

Project: UW Tacoma RI Project Location: Tacoma, Washington Project Number: 53-00681094.01	Log of Boring CP-B2 Sheet 1 of 1

Date(s) Drilled	4/4/02	Logged By	Gary Stoyka	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling, Inc.	Total Depth of Borehole	6 feet
Drill Rig Type	CME 55 Limited Access	Drill Bit Size/Type	8"	Ground Surface Elevation	
Groundwater Level	Not encountered	Sampling Method	D&M Split Spoon	Hammer Data	140#/30"
Borehole Backfill	Bentonite chips	Location	Cherry Parkes Building (Front European Antiques)		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows/ 6in.	SAMPLES OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0							Concrete	
	1						SP	Brown, poorly graded SAND with gravel (moist) (no apparent stain or odor) (fill)	16:00
	2		CP-B2-1B	24 50/6"	0.0		SM	Brown to gray, silty, fine to medium SAND, mottled orange, trace gravel (moist) (no apparent stain or odor)	
	3								
	4						SP		No recovery 16:25
	5		CB-B2-5B	50/6" 100/6"	0.4			Brown, fine SAND with trace gravel (moist) (no apparent stain or odor)	(no recovery on first attempt) pull auger move sampler to side of boring resample 100/6"
	6							Boring was completed to 6' bgs. Groundwater was not encountered. Boring was backfilled with bentonite chips.	
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								

JRS:JOB-1\53-006-1.XX\UW\TAC.GPJ URSSEA3.GLB URSSEA3.GDT 6/5/02

ENV W/O

URS

New Boring Name B-I

McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A-11

00183-105-00

Project: UW Tacoma RI
Project Location: Tacoma, Washington
Project Number: 53-00681094.01

Log of Boring CP-B3

Sheet 1 of 1

Date(s) Drilled	4/4/02	Logged By	Gary Stoyka	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling, Inc.	Total Depth of Borehole	6 feet
Drill Rig Type	CME 55 Limited Access	Drill Bit Size/Type	8"	Ground Surface Elevation	
Groundwater Level	Not encountered	Sampling Method	D&M Split Spoon	Hammer Data	140#/30"
Borehole Backfill	Bentonite chips	Location	Cherry Parkes Building (Rear Tacoma Decor)		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Blows/ 6in.	OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0							Concrete	
	1						SM	Brown, silty SAND with gravel, trace red brick fragments (moist) (fill)	9:50
	2		CP-B3-1B	16 15 9	1.4		SM	Olive-gray, silty SAND (moist) (no apparent stain or odor) (fill?)	
	3								
	4							As above, gray with gravel (native till)	
	5		CP-B3-5B	26 50/6"	1.3				10:00
	6							Boring was completed to 6' bgs. Groundwater was not encountered. Boring was backfilled with bentonite chips.	
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								

ENV W/O \\SJOB-1153-006-1.XXU\UWTAC.GPJ URSSEA3.GLB URSSEA3.GDT 6/5/02

URS

New Boring Name B-J

McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A-12

00183-105-00

Project: UW Tacoma RI
Project Location: Tacoma, Washington
Project Number: 53-00681094.01

Log of Boring CP-B4A

Sheet 1 of 3

Date(s) Drilled	4/4/02	Logged By	Gary Stoyka	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling, Inc.	Total Depth of Borehole	40 feet
Drill Rig Type	CME 55	Drill Bit Size/Type	8"	Ground Surface Elevation	
Groundwater Level	8.2 ft bgs	Sampling Method	D&M Split Spoon	Hammer Data	140#/30"
Borehole Backfill	Bentonite chips	Location	Cherry Parkes Building (Center Tacoma Decor)		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Blows/ 6in.	SAMPLES OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0							Concrete	
							SM	Brown, silty SAND with gravel, trace red brick fragments (fill)	
	1						SP	Brown, medium SAND with gravel (moist) (no apparent stain or odor) (fill)	10:30
	2		CP-B4A-1A		8.7				
	3								
	4							▼ As above (wet)	Perched groundwater (?)
	5		CP-B4A-5A	50/6"	0.4		GM	Gray, silty SAND with gravel (moist) (no apparent stain or odor) (till?)	10:40
	6								
	7								
	8							8.2 ft ▼	Groundwater measured at 8.2' bgs after letting temporary well set for 30 min.; Groundwater sample collected from temporary well at 11:45 CP-B4A-GW with peristaltic pump
	9								
	10			50/6"					No recovery sampler wet
	11								
	12						SM/ML	Olive-gray, silty, fine SAND/fine, sandy SILT (moist) (no apparent stain or odor)	
	13								
	14								
	15								

ENV W/O \RSJ\CB-1\53-006-1.XXU\UWTAC.GPJ URSSEA3.GLB URSSEA3.GDT 6/5/02

URS

New Boring Name B-K

McDonald Smith Building
Tacoma, Washington

GeoEngineers

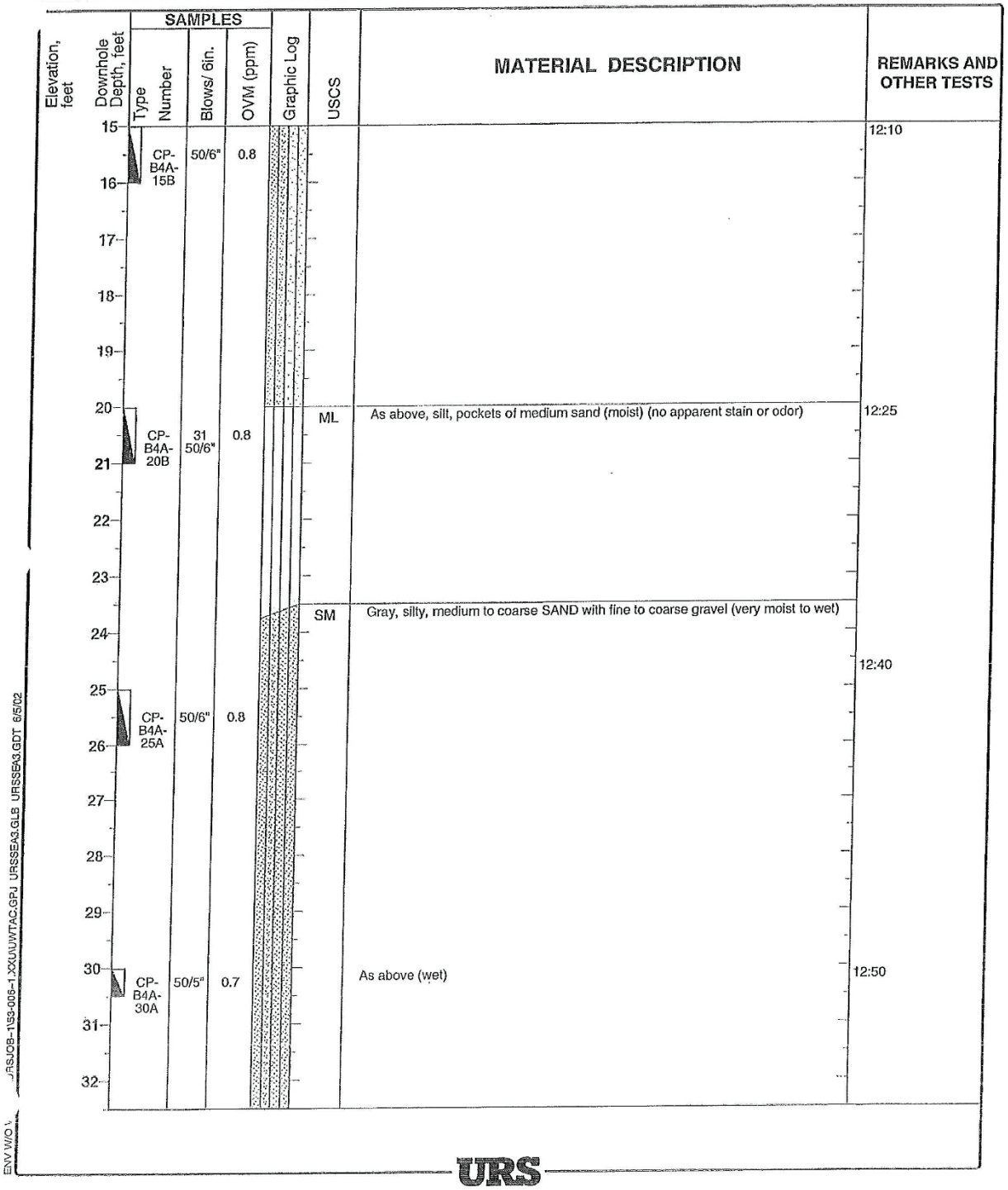
Figure A-13

00183-105-00

Project: UW Tacoma RI
Project Location: Tacoma, Washington
Project Number: 53-00681094.01

Log of Boring CP-B4A

Sheet 2 of 3



New Boring Name B-K

McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A-14

00183-105-00

Project: UW Tacoma RI
Project Location: Tacoma, Washington
Project Number: 53-00681094.01

Log of Boring CP-B4A

Sheet 3 of 3

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Blows/ 6in.	OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	33								
	34								
	35		CP-B4A-35A	50/4"	0.6			As above	13:30 Heaving sands encountered; drillers add water
	36								
	37								
	38								
	39							As above, poor recovery	
	40		CP-B4A-40A	50/5"	1.1			Boring was completed to 40' bgs. Groundwater was encountered at 8.2' bgs. Boring was backfilled with bentonite chips.	Possible slough in sampler 14:30 Augers binding up at 35'-40' bgs. Driller does not recommend drilling below 40' bgs as augers may become permanently stuck.
	41								
	42								
	43								
	44								
	45								
	46								
	47								
	48								
	49								
	50								

\\RS-JOB-1\53-006-1.XXU\UWTAC.GPJ URSSEA3.GLB URSSEA3.GDT 6/5/02

ENV w/O

URS

New Boring Name B-K

McDonald Smith Building
Tacoma, Washington

GeoEngineers

Figure A-15

00183-105-00

Project: UW Tacoma RI
Project Location: Tacoma, Washington
Project Number: 53-00681094.01

Log of Boring CP-B4B

Sheet 1 of 1

Date(s) Drilled	4/4/02	Logged By	Gary Stoyka	Checked By	
Drilling Method	Hollow Stem Auger	Drilling Contractor	Cascade Drilling, Inc.	Total Depth of Borehole	6 feet
Drill Rig Type	CME 55	Drill Bit Size/Type	8"	Ground Surface Elevation	
Groundwater Level	4.8 ft bgs	Sampling Method	D&M Split Spoon	Hammer Data	140#/30"
Borehole Backfill	Bentonite chips	Location	Cherry Parkes Building (Front Tacoma Decor)		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	SAMPLES Number	Blows/ 6in.	OVM (ppm)	Graphic Log	USCS	MATERIAL DESCRIPTION	REMARKS AND OTHER TESTS
	0							Concrete	
	1						GM	Brown, silty GRAVEL with sand (very moist to wet) (fill)	
	2		CP-B4B-1B	4 4 6	1.2		SP	Brown, poorly graded, medium SAND with gravel (moist) (no apparent stain or odor) (fill)	9:10
	3						SP	As above, with silty interbeds	
	4							4.8 ft ▽	Groundwater measured at 4.8' bgs
	5		CP-B4B-5B	23 50/6"	1.6				9:25
	6							Boring was completed to 6' bgs. Groundwater was encountered at 4.8' bgs. Boring was backfilled with bentonite chips.	
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								

/RSJOB-155-006-1.2/UWTAC.GPJ URSSEA3.GLB URSSEA3.GDT 6/5/02

ENV W/C

URS

New Boring Name B-L

McDonald Smith Building
Tacoma, Washington

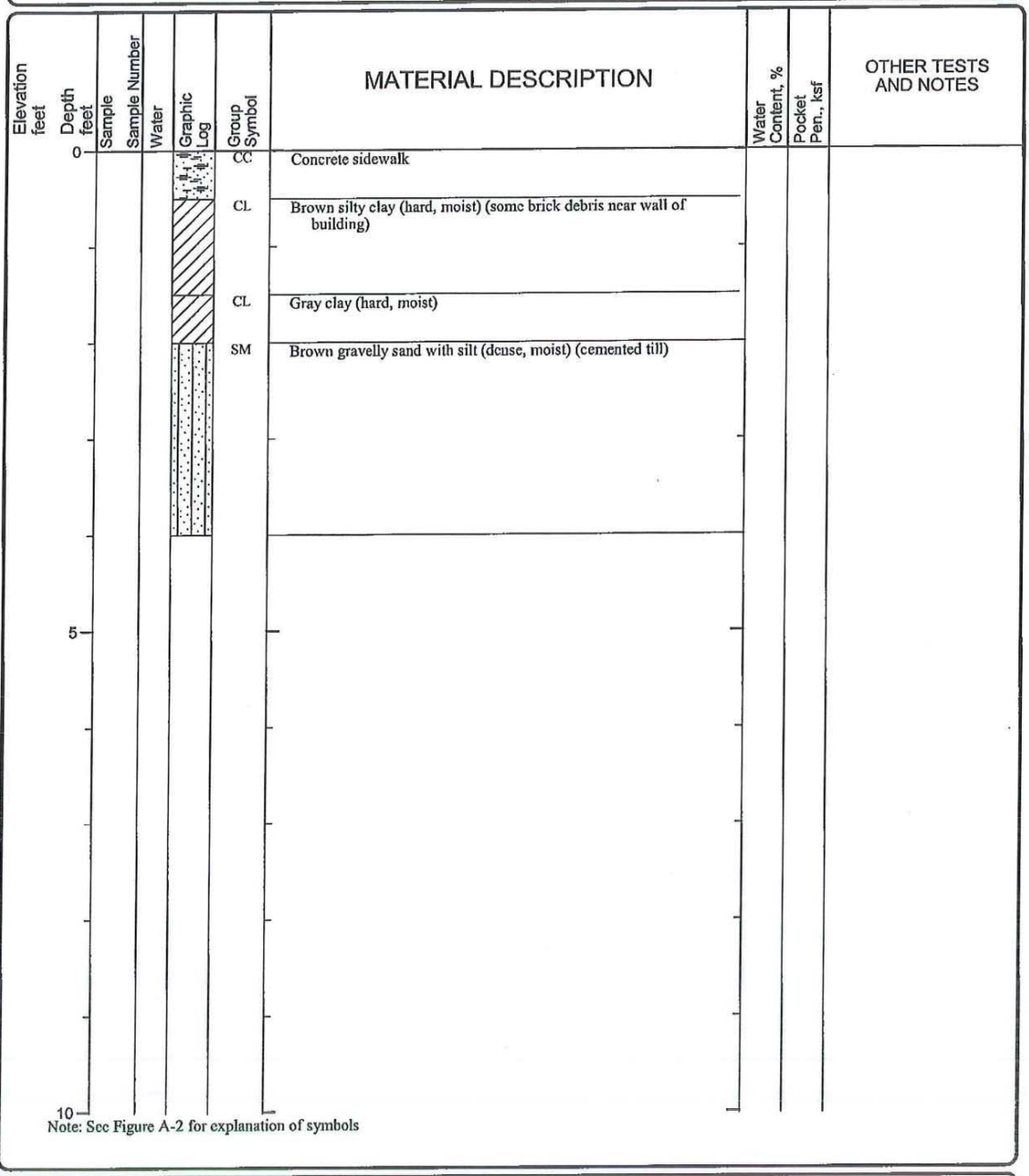
GeoEngineers

Figure A-16

00183-105-00

Date Excavated: 03/08/02 Logged by: CMT

Equipment: Backhoe Surface Elevation (ft): Not measured



0183-036-00 GEI_GTTESTPIT 2.1.0 P:\0\0183\036\00\FINALS\0183036T.GPJ GEIV2.GDT 4/26/02

LOG OF TEST PIT TP-1

GeoEngineers

Project: UW Tacoma Footing Observation
Project Location: Tacoma, Washington
Project Number: 0183-036-00

Figure: A-10
Sheet 1 of 1

New Boring Name TP-1	
McDonald Smith Building Tacoma, Washington	
GeoEngineers	Figure A-17

00183-105-00

Date Excavated: 03/08/02 Logged by: CMT

Equipment: Backhoe Surface Elevation (ft): Not measured

Elevation feet	Depth feet	Sample	Sample Number	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content, %	Pocket Pen., ksf	OTHER TESTS AND NOTES
	0					CC	Concrete sidewalk			
						ML	Brown silt with sand (stiff, moist)			
						ML	Brown sandy silt with occasional gravel (stiff, moist)			
						CL	Gray clay (stiff, moist)			
						ML	Brown gravelly silt with sand (hard, moist)			
	5						Minor ground water seepage observed at 5 feet			
	10									

Note: See Figure A-2 for explanation of symbols

0183-036-00 GEI GTTESTPIT 2.1.0 P:\0\0183036\0\FINALS\0183036T.GPJ GEN2.GDT 4/26/02

LOG OF TEST PIT TP-2

Geo Engineers

Project: UW Tacoma Footing Observation
Project Location: Tacoma, Washington
Project Number: 0183-036-00

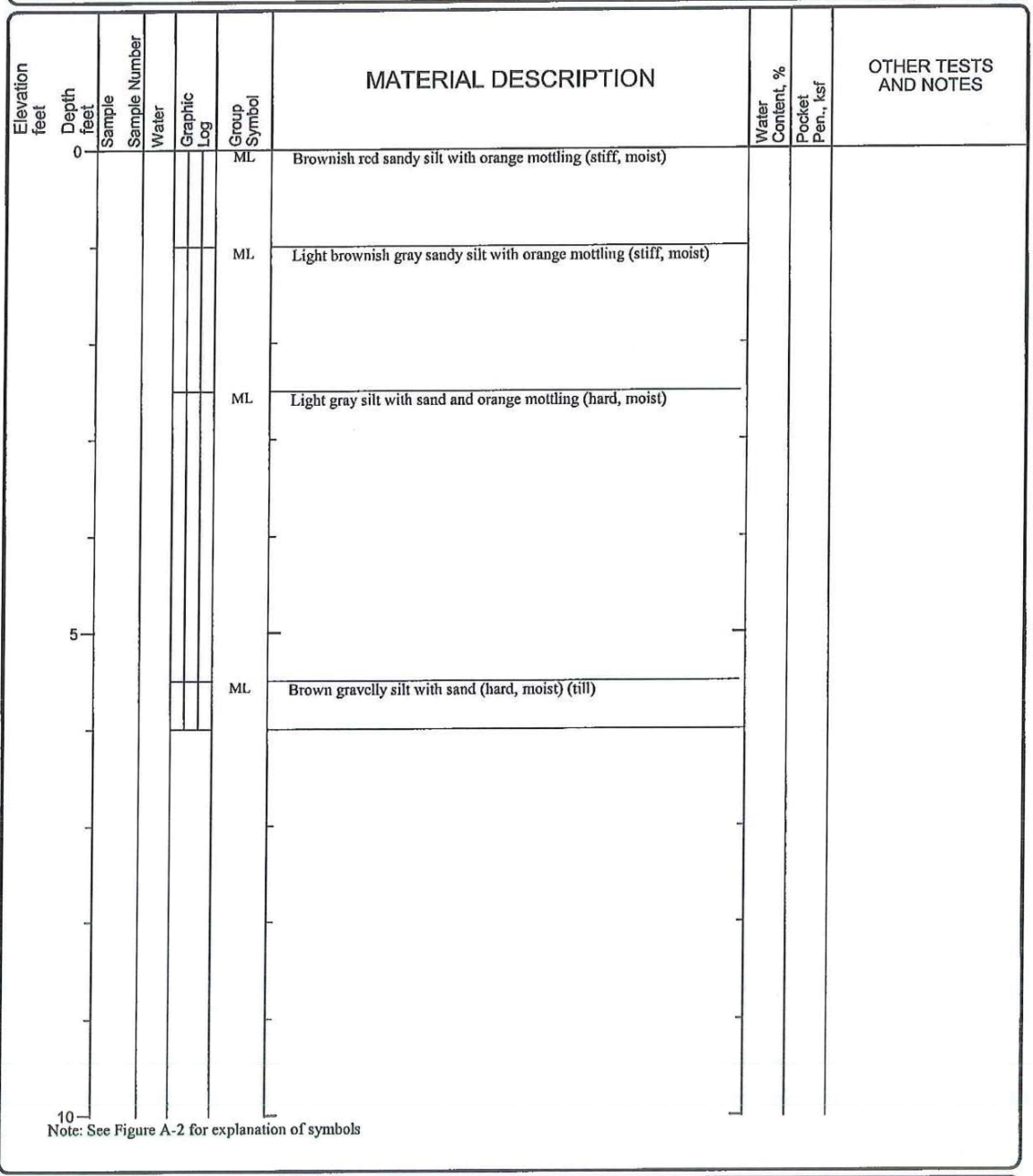
Figure: A-11
Sheet 1 of 1

New Boring Name TP-2	
McDonald Smith Building Tacoma, Washington	
GeoEngineers	**Figure A-18**

00183-105-00

Date Excavated: 03/08/02 Logged by: CMT

Equipment: Surface Elevation (ft): Notmeasured



Note: See Figure A-2 for explanation of symbols

0183-036-00 GEI_GTTESTPIT_2.1.0 P:\0\0183036\00\FINALS\0183036T.GPJ GEIV2.GDT 4/26/02

LOG OF TEST PIT TP-3

Geo Engineers

Project: UW Tacoma Footing Observation

Project Location: Tacoma, Washington

Project Number: 0183-036-00

Figure: A-12

Sheet 1 of 1

New Boring Name TP-3	
McDonald Smith Building Tacoma, Washington	
GeoEngineers	Figure A-19

00183-105-00

Drilled	Start	End	Total Depth (ft)	Logged By	Driller	Drilling Method
	8/27/2013	8/27/2013	32.5	JCD Checked By TSD	Holt Drilling	Rotosonic

Hammer Data	N/A	Drilling Equipment	Geoprobe 8140 LC
Surface Elevation (ft) Vertical Datum	63.36 NGVD 1929	Top of Casing Elevation (ft)	64.71
Easting (X) Northing (Y)	1159252.75209 702660.014156	Horizontal Datum	WA State Plane,South Harn

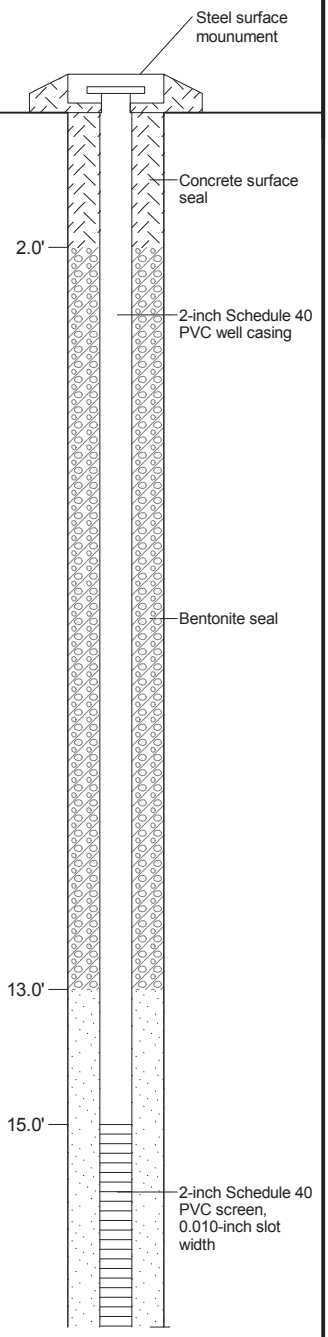
A 2 (in) well was installed on 8/27/2013 to a depth of 30 (ft).

Groundwater		
Date Measured	Depth to Water (ft)	Elevation (ft)
11/8/2013	16.45	48.26

Notes: Elevation based on survey completed by AHBL on 11/6/13

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Temperature (°C)	Collected Sample	Sample Name	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0									No recovery		
60												
	5											
55												
			48	24		CR-MW16-9-10 CA			GM	Brown to gray silty fine gravel with sand (moist) (Fill)	NS	<1
	10								GP-GM	Brown fine to coarse gravel with silt and sand (moist) (Fill)		
						CR-MW16-10-11 CA			GM	Gray silty fine to coarse gravel with sand (moist) (Fill)		<1
									GP-GM	Brown to gray fine to coarse gravel with silt and sand, with occasional cobbles (moist) (Fill/Recessional Outwash)		
			30	23								<1
50									SM	Brown silty fine to coarse sand with gravel (moist) (Fill/Recessional Outwash)		
				27					SP-SM	Brown to gray fine to coarse sand with silt and gravel (moist) (Fill/Recessional Outwash)		
	15		60			CR-MW16-15-16 CA					NS	
									SM	Gray silty fine sand with medium to coarse sand (moist) (Fill/Recessional Outwash)		
									SP-SM	Brown fine to medium sand with silt and coarse sand and gravel (moist) (Fill/Recessional Outwash)		
				38					SM	Brown to gray silty fine to coarse sand with gravel		<1

WELL LOG



Notes: See Figure A-1 for explanation of symbols

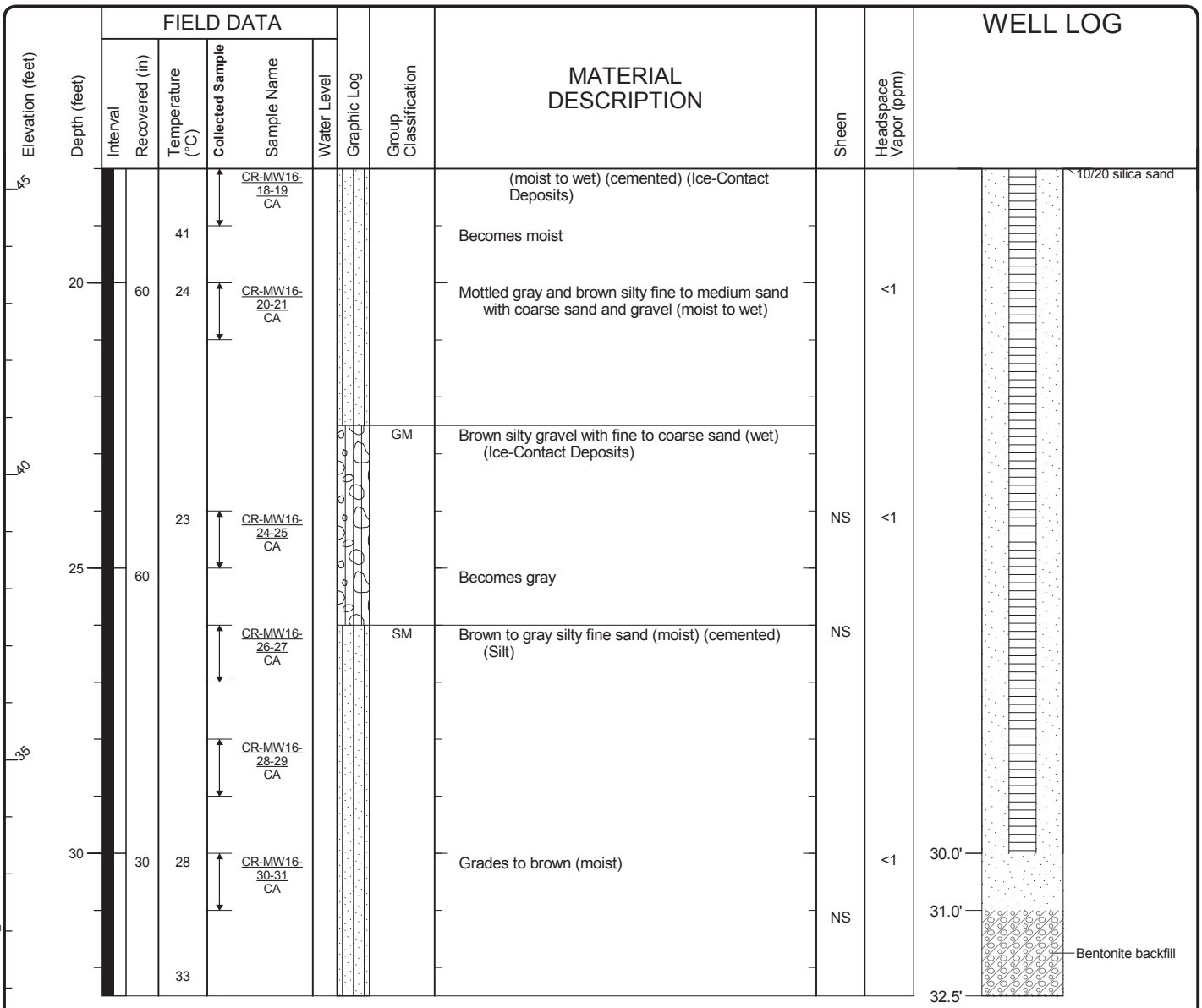
Log of Monitoring Well CR-MW16

GeoEngineers

Project: UWT 2013 Environmental Investigation
Project Location: Tacoma, Washington
Project Number: 0183-085-00

Figure D-3
Sheet 1 of 2

Tacoma: Date:12/18/14 Path:C:\USERS\KJANC\DESKTOP\0183085500.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_WELL



Notes: See Figure A-1 for explanation of symbols

Log of Monitoring Well CR-MW16 (continued)

GeoEngineers

Project: UWT 2013 Environmental Investigation
Project Location: Tacoma, Washington
Project Number: 0183-085-00

Figure D-3
Sheet 2 of 2

Tacoma: Date:12/18/14 Path:C:\USERS\KJANC\DESKTOP\0183085500.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_WELL

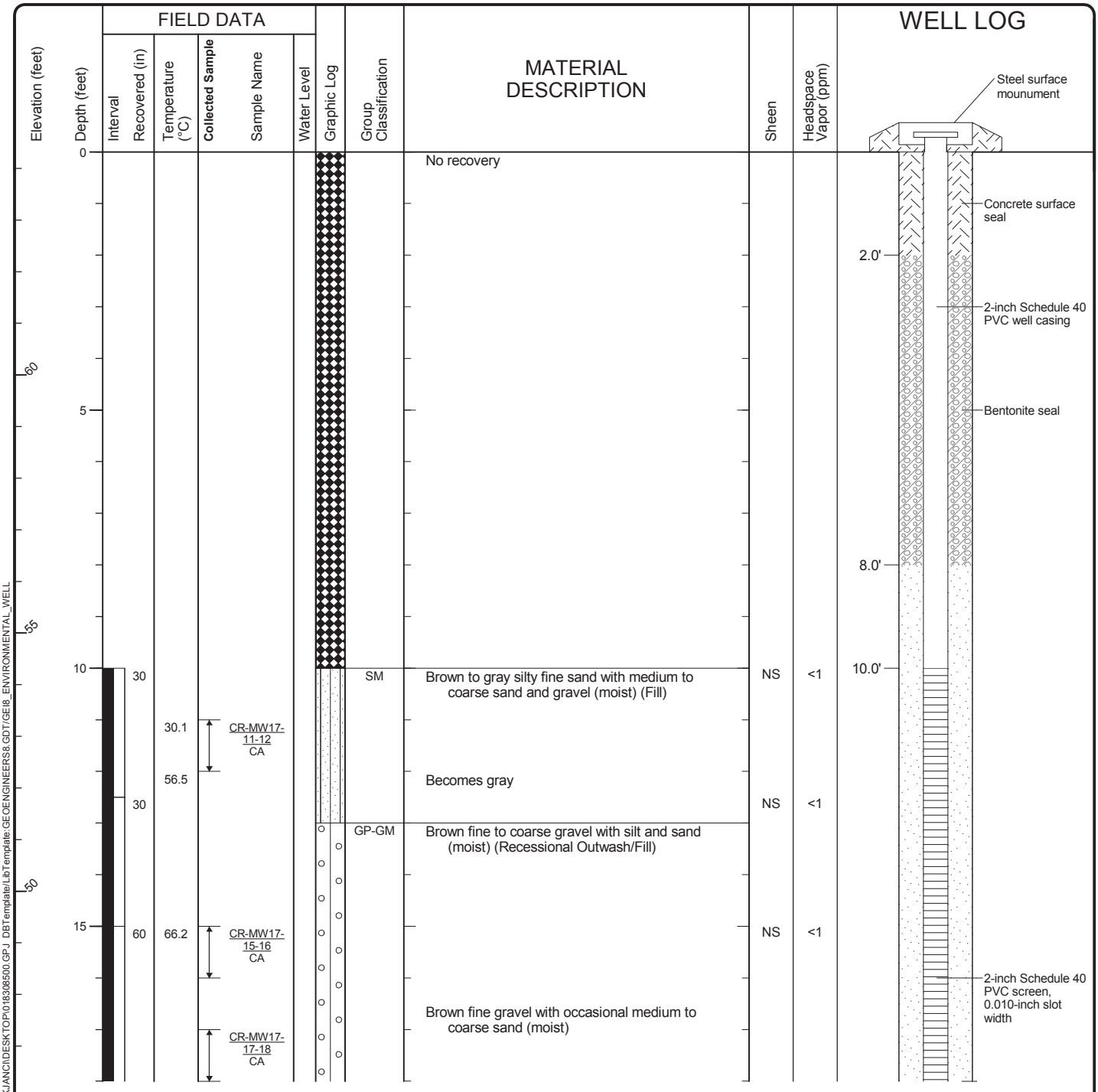
Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	8/27/2013	8/27/2013	30	JCD	TSD	Holt Drilling	Rotosonic

Hammer Data	N/A	Drilling Equipment	Geoprobe 8140 LC
Surface Elevation (ft) Vertical Datum	64.32 NGVD 1929	Top of Casing Elevation (ft)	64.11
Easting (X) Northing (Y)	1159293.70711 702613.401608	Horizontal Datum	WA State Plane,South Harn

A 2 (in) well was installed on 8/27/2013 to a depth of 25 (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
11/8/2013	18.57	45.54

Notes: Elevation based on survey completed by AHBL on 11/6/13



Notes: See Figure A-1 for explanation of symbols

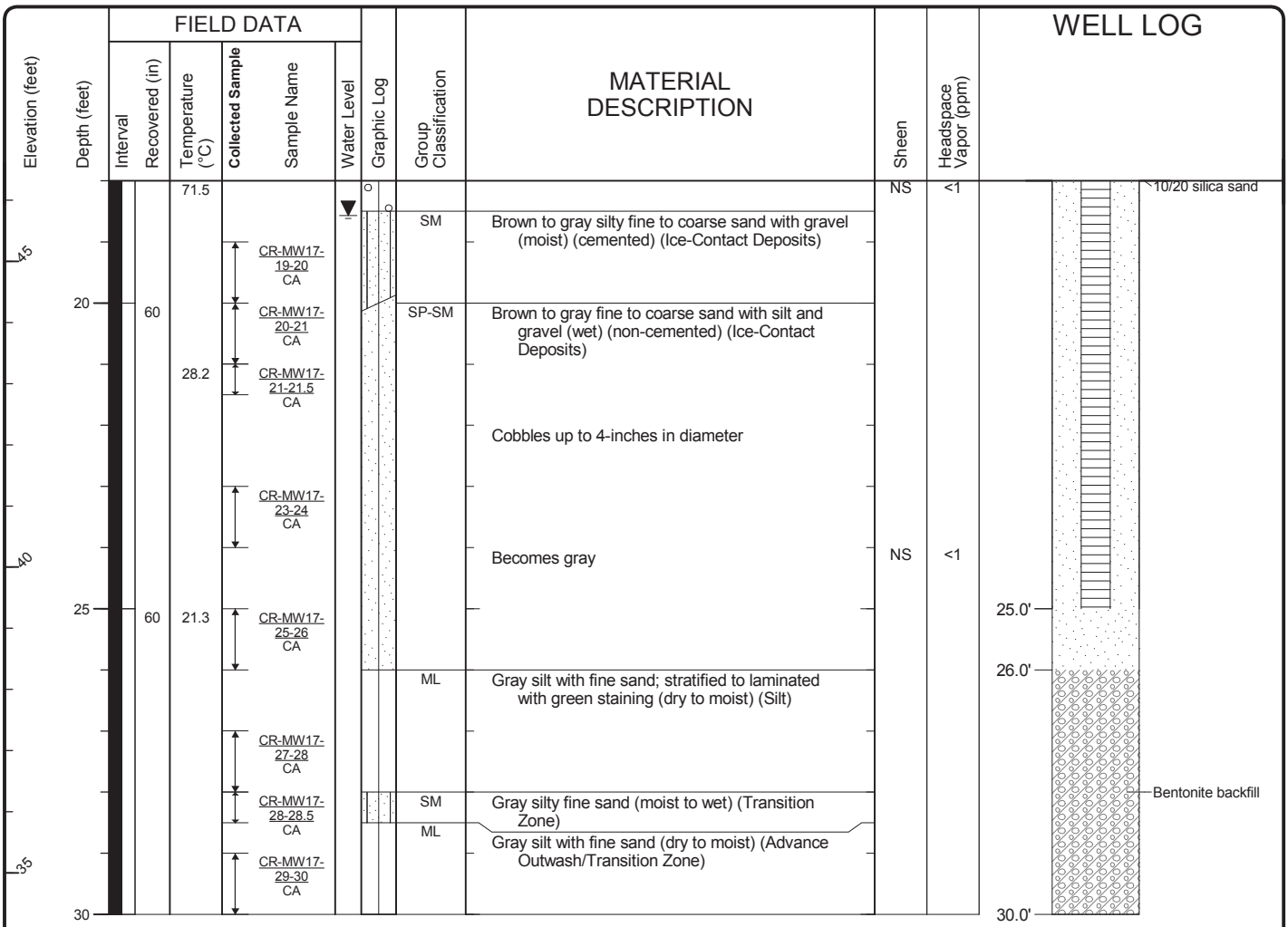
Log of Monitoring Well CR-MW17

GeoEngineers

Project:	UWT 2013 Environmental Investigation
Project Location:	Tacoma, Washington
Project Number:	0183-085-00

Figure D-4
Sheet 1 of 2

Tacoma: Date:12/18/14 Path:C:\USERS\KJANC\DESKTOP\0183085500.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GE8_ENVIRONMENTAL_WELL



Notes: See Figure A-1 for explanation of symbols

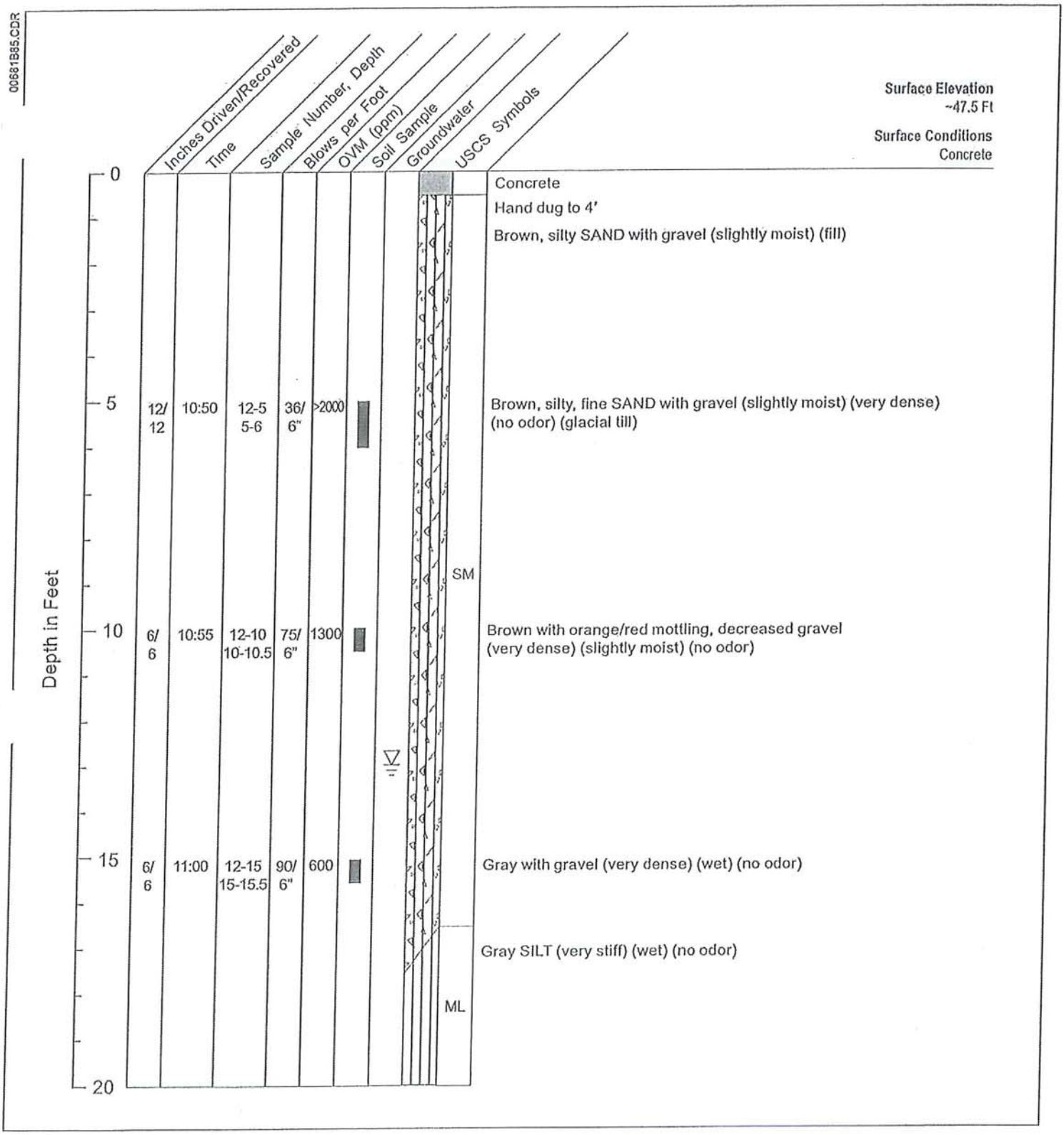
Log of Monitoring Well CR-MW17 (continued)

GeoEngineers

Project: UWT 2013 Environmental Investigation
Project Location: Tacoma, Washington
Project Number: 0183-085-00

Figure D-4
Sheet 2 of 2

00681B85.CDR

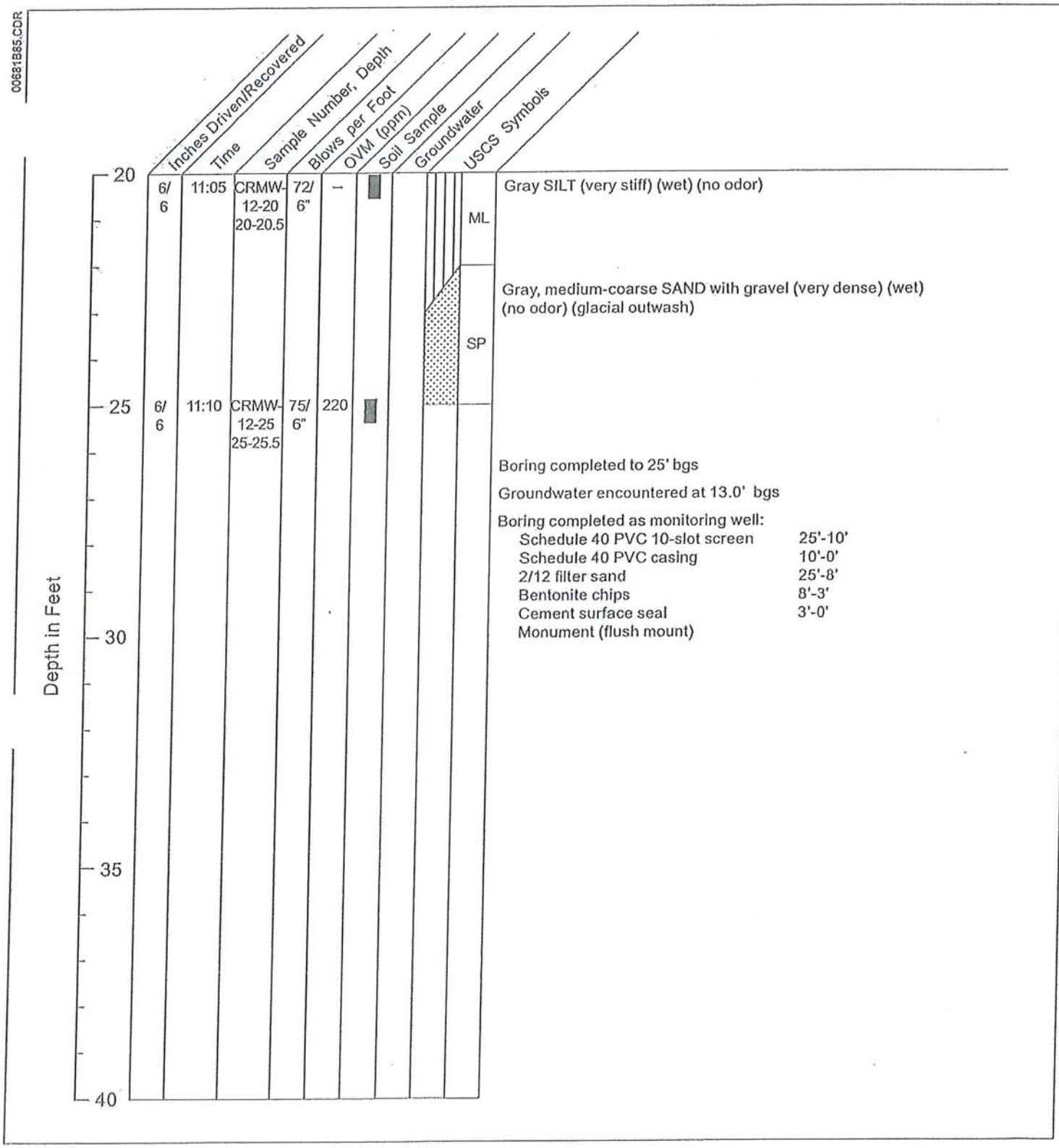


Geologist: KMV
Drilling method: Hollow Stem Auger
Sampling method: D&M U-Type Split Spoon, 140# Hammer

Drill contractor: Cascade
Drill date: 10/12/99

CR-MW12 (SHEET 1 of 2)
GEOLOGIC BORING LOG

00681B85.CDR



Geologist: KMV

Drilling method: Hollow Stem Auger

Sampling method: D&M U-Type Split Spoon, 140# Hammer

Drill contractor: Cascade

Drill date: 10/12/99

CR-MW12 (SHEET 2 of 2)
GEOLOGIC BORING LOG

APPENDIX B
Field Program and Exploration Logs

APPENDIX B
FIELD PROGRAM AND EXPLORATION LOGS

General

One new permanent groundwater monitoring well (MDS-MW1D) was installed upgradient of the existing building as shown on Figure 2. The boring was completed to a depth of 60 feet below ground surface (bgs). Well MDS-MW1D was installed within the deep aquifer.

Three 1-inch micro core borings were completed inside the McDonald Smith Building to depths ranging between 2 and 4 feet bgs at the locations shown on Figure 2.

Four sub-slab soil gas samples were collected inside the McDonald Smith Building at the locations shown on Figure 2.

Hollow-Stem Auger Soil Sampling Methodology and Chemical Analysis

Soil borings were advanced using hollow-stem auger drilling methods. A split-spoon sampler was used to collect soil samples at 2.5-foot to 5-foot depth intervals. The sampling methodology varied from a downhole sampler and a standard penetration test (SPT) sampler. SPT test were collected for geotechnical purposes. The following methodology was implemented to minimize potential cross contamination between the two aquifers during drilling.

- A 14-inch steel casing was driven through the ice-contact deposits unit just into the semi-confining layer in each boring because groundwater was observed in the ice-contact deposits. The 14-inch casing was terminated at the semi-confining layer to seal the 14-inch casing and allow for telescoping further down using a smaller diameter steel casing into the advance outwash. The 8-inch casing was lifted approximately 1 foot as the borehole was filled with at least 3 feet of bentonite. The bentonite was hydrated with potable water and allowed to set for up to 1 hour. The smaller diameter casing was placed inside the larger casing used to seal off the groundwater within the shallow aquifer. The inner casing was driven until the desired depth within the deep aquifer is reached.

Discrete soil samples collected during drilling were submitted for volatile organic compounds (VOCs) by U.S. Environmental Protection Agency (EPA) method 8260. Soil samples to be submitted for VOC analysis were collected directly from the split spoon using the EPA SW-846 5035A (EPA, 2002). The soil samples were placed into a cooler with ice and logged on the chain-of-custody record using the procedures described in the SAP. Soil cuttings were stored in a drum at a secure facility on UWT campus pending off-site disposal.

Groundwater Monitoring Well Installation

Well Casing

The monitoring well was constructed using 2-inch-diameter, Schedule 40, threaded polyvinyl chloride (PVC) casing that meets the following requirements: 1) casing will be new (unused); 2) casing sections were joined only by tightening the threaded sections; and 3) casing will be generally straight.

Well Screen

The well screen consisted of a 2-inch diameter, Schedule 40, 0.010-inch or 0.020-inch machine-slotted, PVC well screen. A PVC end cap was installed on the bottom of the well screen. Monitoring well MDS-MW1D was completed within the deep aquifer (advance outwash). The length of the well screen was 15 feet.

Sand Pack

The sand pack for the well consisted of silica sand with the appropriate grain size distribution to reduce entry of fine-grained particulates from the surrounding formation into the wells (e.g., 10-20 sand). The sand pack extended from the bottom of the well screen to 2 feet above the top of the well screen. The top of the sand pack was sounded to verify its depth during placement.

Annular Seal

The annular seal consisted of a minimum 1-foot-thick layer of hydrated bentonite pellets or chips installed between the sand pack and the concrete surface seal.

Surface Completion

The new monitoring well was completed using flush monuments at the ground surface. The well casing was cut approximately 3 inches bgs, and a locking J-plug (compression) or similar well cap was installed to prevent surface water from entering the well. The well monument was installed in a concrete surface seal. The well number was marked on the well monument lid and/or the well cap. A concrete surface seal holds the flush monument in place.

Groundwater Monitoring of New and Existing Permanent Monitoring Wells

Well development and sampling was performed in the two existing (CR-MW16 and CR-MW17) and/or the new groundwater monitoring well (MDS-MW1D).

Permanent Monitoring Well Development

The newly installed groundwater monitoring well was developed prior to sampling. Prior to development, a field form was completed with details describing the location, condition, water level, sediment depth, and product level (if any) observed during inventory activities. The groundwater monitoring well was developed with a hydrolift pump and surge block to stabilize the sand pack and formation materials surrounding the well screen, and restore the hydraulic connection between the well screen and the surrounding soil. The head space vapors in the monitoring well were measured upon removing the cap to the well. The depth to groundwater in the monitoring well was measured prior to development using an electric water level indicator. The potential presence of product was measured with an interface probe prior to development. The well screen was gently surged and purged of water. Approximately 45 gallons was removed from MDS-MW1D. The removal rate and volume of groundwater removed was recorded on field forms during well development procedures. Water that is removed during well development activities was stored temporarily in drums at a secure facility on UWT campus pending approved sewer discharge.

Permanent Groundwater Monitoring Well Groundwater Sampling and Chemical Analysis

Groundwater monitoring was completed in the existing two permanent monitoring wells (CR-MW16 and CR-MW17) and the new installed monitoring well (MDS-MW1D) to evaluate groundwater conditions. The depth to water were measured and recorded in these three wells prior to sampling using an electronic water level indicator.

Groundwater samples were obtained using low-flow/low-turbidity sampling techniques to minimize the suspension of particulates in the samples. Groundwater samples were obtained from monitoring wells using a decontaminated bladder pump with disposable bladder and tubing was placed at the mid-portion of the well screen interval or half-way within the water column if the water column height is less than the screen length. Groundwater was pumped at a rate of approximately 0.3 liters per minute. A water quality measuring system with a flow-through-cell was used to monitor the following water quality parameters during purging: electrical conductivity, dissolved oxygen, pH, salinity, total dissolved solids, oxidation-reduction potential and temperature. Turbidity was measured with a turbidimeter. Groundwater samples were collected when these parameters vary by less than 10 percent for three consecutive measurements or three well volumes have been removed. Field measurements were documented on the field log. After well purging, the flow-through-cell was disconnected and the groundwater sample was obtained in laboratory-prepared containers.

The water samples were placed into a cooler with ice and logged on the chain-of-custody record using the procedures described in the SAP. The chemical analysis for groundwater samples were submitted for chemical analysis of VOCs by EPA method 8260. Purge water was temporarily stored in labeled 55-gallon drums at a secure facility on UWT campus pending UW approval for either discharge to the sewer system or off-site disposal.

Micro Core Borings

Three subsurface borings were completed inside the McDonald Smith Building. Soil samples were obtained continuously from the borings using micro core drilling equipment. Soil samples were obtained using a 1-inch diameter 2-foot-long core sampler with acetate liner. The sampler was driven into the soil using a pneumatic hammer. Upon retrieval, the sampler was opened, and a GeoEngineers representative examined the soil and performed field screening tests.

Selected soil samples were obtained in glass jars (supplied by the analytical laboratory), labeled and stored in a cooler with ice pending delivery to the laboratory. VOC and gasoline-range petroleum hydrocarbons samples were collected first, directly from the sample sleeve using the 5035A sampling method. Following the VOC sample collection, the remaining soil was placed in the remaining sample containers provided by the analytical laboratory. All sampling equipment was decontaminated between samples using an Alconox soap wash and distilled water rinse. The soil samples were logged on the chain-of-custody record using the procedures described in the SAP. Soil cuttings were stored in a drum at a secure facility on UWT campus pending off-site disposal.

Sub-slab Soil Gas Probe Installation

Four sub-slab soil gas samples were collected inside the McDonald Smith Building using Vapor Pin™ sampling devices. The Vapor Pins™ were installed following the manufacturers' standard operating procedures (SOPs; attached to this appendix).

General installation procedures for the temporary sub-slab sampling device are as follows:

- Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding.
- Set up vacuum to collect drill cuttings.
- Drill a 5/8-inch diameter hole through the slab and approximately 1 inch into the underlying soil to form a void.
- Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.
- Place the lower end of sampling device assembly into the drilled hole. Place the small hole located in the handle of the extraction/installation tool over the sampling device to protect the barb fitting and cap, and tap the sampling device into place using a dead blow hammer. Make sure the extraction/ installation tool is aligned parallel to the sampling device to avoid damaging the barb fitting.
- During installation, the silicone sleeve will form a slight bulge between the slab and the sample device shoulder. Place the protective cap on sampling device to prevent vapor loss prior to sampling.
- Allow at least 20 to 30 minutes for the sub-slab soil gas conditions to equilibrate prior to sampling.

Sub-slab Soil Gas Sampling Procedure

The following procedure was followed to collect sub-slab soil gas samples:

- New fluoropolymer (Teflon®) tubing were connected to the sub-slab soil gas probe, using the barb fitting on the top of the sampling device.
- The tubing (aboveground) was connected to a sampling manifold.
- The sampling manifold was vacuum-tested (shut-in test) by briefly introducing a vacuum to the aboveground portion of the sampling train and checking for loss of vacuum. If vacuum loss is observed, connections and fittings in the sample train was checked and adjusted, then was vacuum-tested again. This test was repeated until the sampling train has demonstrated that tightness has been achieved. If the tightness cannot be achieved, then the sample train was replaced and the new one was retested.
- A tracer gas shroud (clear plastic bag) was placed around the entire sample train (that is, the sub-slab soil gas probe where it enters the ground surface, the 6.0-liter Summa canister and associated tubing and manifold).
- The shroud was charged (filled) with a tracer gas (spec-grade 99.995 percent helium gas) and the tracer gas concentration within the shroud was measured using a hand-held monitor (e.g., Ion/Gascheck G3, or equivalent, which is capable of measuring helium in air to a concentration of 0.5 percent) prior to, during and after completion of the sampling event. To charge the shroud a Teflon tube with a ball valve was inserted under the shroud to connect with the compressed helium bottle. This same tube was used to monitor the helium concentration within the shroud periodically throughout the sampling process. The purpose of the periodic monitoring is to make sure helium is in contact with the sample train and the ground surface while the sub-slab gas sample is collected. According to the California Environmental Protection Agency, Department of Toxic Substances Control (CalEPA/DTSC), shroud target concentrations of tracer gas should be two orders of magnitude higher than the reporting limit of the laboratory analytical (DTSC, 2012). The Eurofins Air Toxics reporting

limit for helium by ASTM D 1946 is 0.05 percent. Therefore, the helium concentration in the shroud was maintained at a minimum concentration of 5 percent.

- The sampling train (aboveground and below ground components) was purged using a vacuum purge pump or a multi-gas meter. Purge volumes were calculated based on the flow rate of the purge pump and the volume of the soil gas probe and sample train. After purging three sampling train volumes, the helium concentration within the sampling train was measured and recorded. If the helium concentration in the sample train is greater than or equal to 5 percent of the helium concentration in the shroud, the bentonite seal was re-applied, fittings were tightened, and the previous purging and measurement tests was repeated (DTSC, 2012).
- In addition to helium, the purge air was monitored for oxygen, carbon dioxide, methane, and in some cases carbon monoxide and hydrogen sulfide to detect if ambient air is diluting the probe and/or to evaluate if stabilized purge conditions have been met prior to sampling.
- The soil gas sample was obtained using a 6 liter evacuated Summa canister (with approximately 30 inches of mercury vacuum set by the laboratory), with a regulated flow rate of less than or equal to approximately 200 milliliters per minute (DTSC, 2012). Also, vacuums induced on the vapor probe of less than 100 inches of water were maintained during sample collection. The canister was filled with soil gas for approximately 30 minutes or until a vacuum equivalent of approximately 5 inches of mercury remains in the Summa canister, whichever comes first. The initial and final canister vacuums were recorded on a soil gas sampling field form.
- The canisters were provided by an analytical laboratory subcontractor.

Summa canisters were submitted to the analytical laboratory for chemical analysis of TCE, PCE, vinyl chloride, 1,1-DCE, cis-l,2-DCE, and trans-1,2-DCE, by EPA method TO-15-SIM.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, 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 SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
PPM	Parts per million
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

GeoEngineers

FIGURE A-1

Drilled: Start 10/23/2014 End 10/23/2014	Total Depth (ft): 3	Logged By: BMB Checked By: TD	Driller: ESN		Drilling Method: Hand Drill
Surface Elevation (ft) Vertical Datum: 48.13 NGVD		Hammer Data: Pneumatic		Drilling Equipment: Micro core	
Easting (X) Northing (Y)		System Datum		Groundwater: Date Measured	Depth to Water (ft) / Elevation (ft)
Notes: Elevation of surface based on finish floor elevation building survey completed on October 2, 2015 by AHBL					

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0	18		DP2-0.5-1			CC	0 to 6 inches concrete			
							SP	Brown fine to medium sand with trace silt (moist) (fill)		<1	
		12		DP2-1-2						<1	
							SP-SM	Gray to brown fine to medium sand with silt (moist) (native)			
								Becomes wet			Groundwater observed at 2 feet during drilling
							SM	Gray silty fine sand (wet) (native)		<1	Hard drilling from 2.5 to 3 feet bgs
								Boring completed at 3 feet			

Note: See Figure A-1 for explanation of symbols.

Log of Boring MDS-DP2

GeoEngineers

Project: UWT McDonald Smith Building
Project Location: Tacoma, Washington
Project Number: 0183-105-00

Figure A-2
Sheet 1 of 1

Tacoma: Date:2/4/15 Path:C:\USERS\KJANC\DESKTOP\0183105000.GPJ DBTemplate\LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_STANDARD

Drilled Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
10/23/2014	10/23/2014	3	BMB / TD	ESN	Hand Drill

Surface Elevation (ft) / Vertical Datum	Hammer Data	Drilling Equipment
47.86 NGVD	Pneumatic	Micro core

Easting (X) / Northing (Y)	System Datum	Groundwater: Date Measured	Depth to Water (ft)	Elevation (ft)

Notes: Elevation of surface based on finish floor elevation building survey completed on October 2, 2015 by AHBL

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		18					CC	7 inches concrete			
					DP3-0.5-1					<1		
								SP	Brown fine to medium sand with silt (moist) (fill)			
					DP3-1-3			SM	Gray silty fine sand with occasional gravel (moist) (native)	<1		
			8							<1		Hard drilling from 2 to 3 feet bgs
									Becomes wet			
									Boring completed at 3 feet (refusal)			

45

Note: See Figure A-1 for explanation of symbols.

Log of Boring MDS-DP3

GeoEngineers

Project: UWT McDonald Smith Building
Project Location: Tacoma, Washington
Project Number: 0183-105-00

Figure A-3
Sheet 1 of 1

Drilled Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
10/23/2014	10/23/2014	5	BMB / TD	ESN	Hand Drill

Surface Elevation (ft) / Vertical Datum	Hammer Data	Drilling Equipment
47.86 NGVD	Pneumatic	Micro core

Easting (X) / Northing (Y)	System Datum	Groundwater: Date Measured	Depth to Water (ft)	Elevation (ft)

Notes: Elevation of surface based on finish floor elevation building survey completed on October 2, 2015 by AHBL

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
45	0		18						CC	0 to 4 inches concrete		<1	
						DP5-0.5-1			SP	Brown fine to medium sand with trace silt (moist) (fill)			
						DP5-1-3			SP-SM	Gray fine to medium sand with silt and occasional gravel (moist) (native)			
			24									<1	
						DP5-3-4			SP	Brown fine to medium sand with trace silt (wet) (native)			Groundwater observed at 3 feet during drilling
										Becomes gray			
			12									<1	
	5									Boring completed at 5 feet			

Note: See Figure A-1 for explanation of symbols.

Log of Boring MDS-DP5

GeoEngineers

Project: UWT McDonald Smith Building
Project Location: Tacoma, Washington
Project Number: 0183-105-00

Figure A-4
Sheet 1 of 1

Drilled Start	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
10/25/2014	10/26/2014	61	PDR / TD	Cascade	HSA

Hammer Data	Auto 140 (lbs) / 30 (in) Drop	Drilling Equipment	B-51 Truck Mounted
Surface Elevation (ft) Vertical Datum	64.87 NGVD29	Top of Casing Elevation (ft)	64.29
Easting (X) Northing (Y)	1159277.5 702656.91	Horizontal Datum	NAD83/91 South

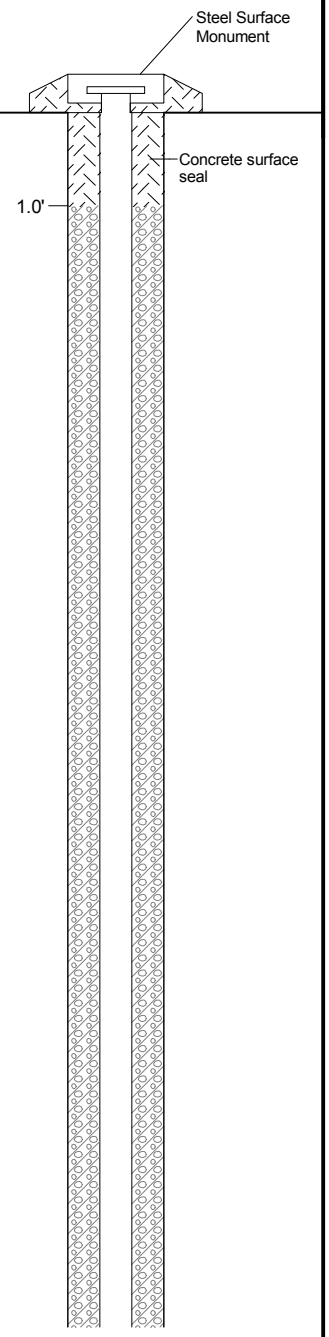
A 2 (in) well was installed on 10/26/2014 to a depth of (ft).

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/27/2014	13.5	50.8

Notes: SS = downhole hammer; 14" auger to 28 feet bgs, 4" auger to 61 feet bgs.
Elevations and locations based on building survey completed on October 2, 2015 by AHBL

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample: Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0							Not observed - Air knife to 10 feet bgs		
60	5									
55	10	18		10-10.5			SP	Black sand layer 1/2-inch thick (hydrocarbon odor) (fill)	MS	8.0
							ML	Gray silt (fill)		
							SP-SM	Gray fine to medium sand with silt (dense, moist) (fill)		
				11-11.5					NS	1.8
		12	50/6"	12-12.5					NS	1.0
							SM	Brown silty fine to coarse sand (very dense, moist) (fill)		

WELL LOG



Note: See Figure A-1 for explanation of symbols.

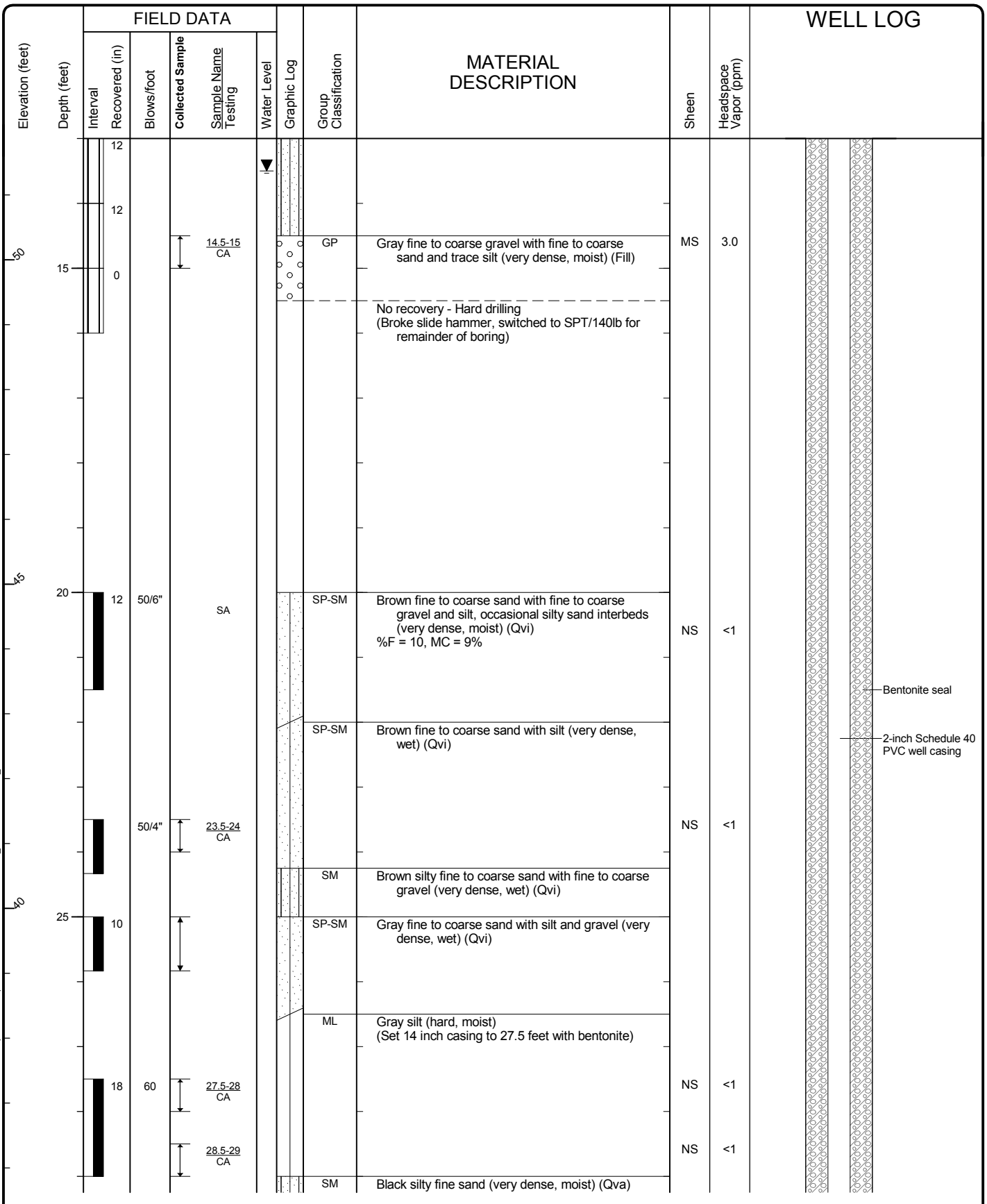
Log of Monitoring Well MDS-MW1D

GeoEngineers

Project: UWT McDonald Smith Building
Project Location: Tacoma, Washington
Project Number: 0183-105-00

Figure A-5
Sheet 1 of 4

Tacoma: Date:2/5/15 Path:C:\USERS\KJANC\DESKTOP\0183105000.GPJ DBTemplate\LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_WELL



Note: See Figure A-1 for explanation of symbols.

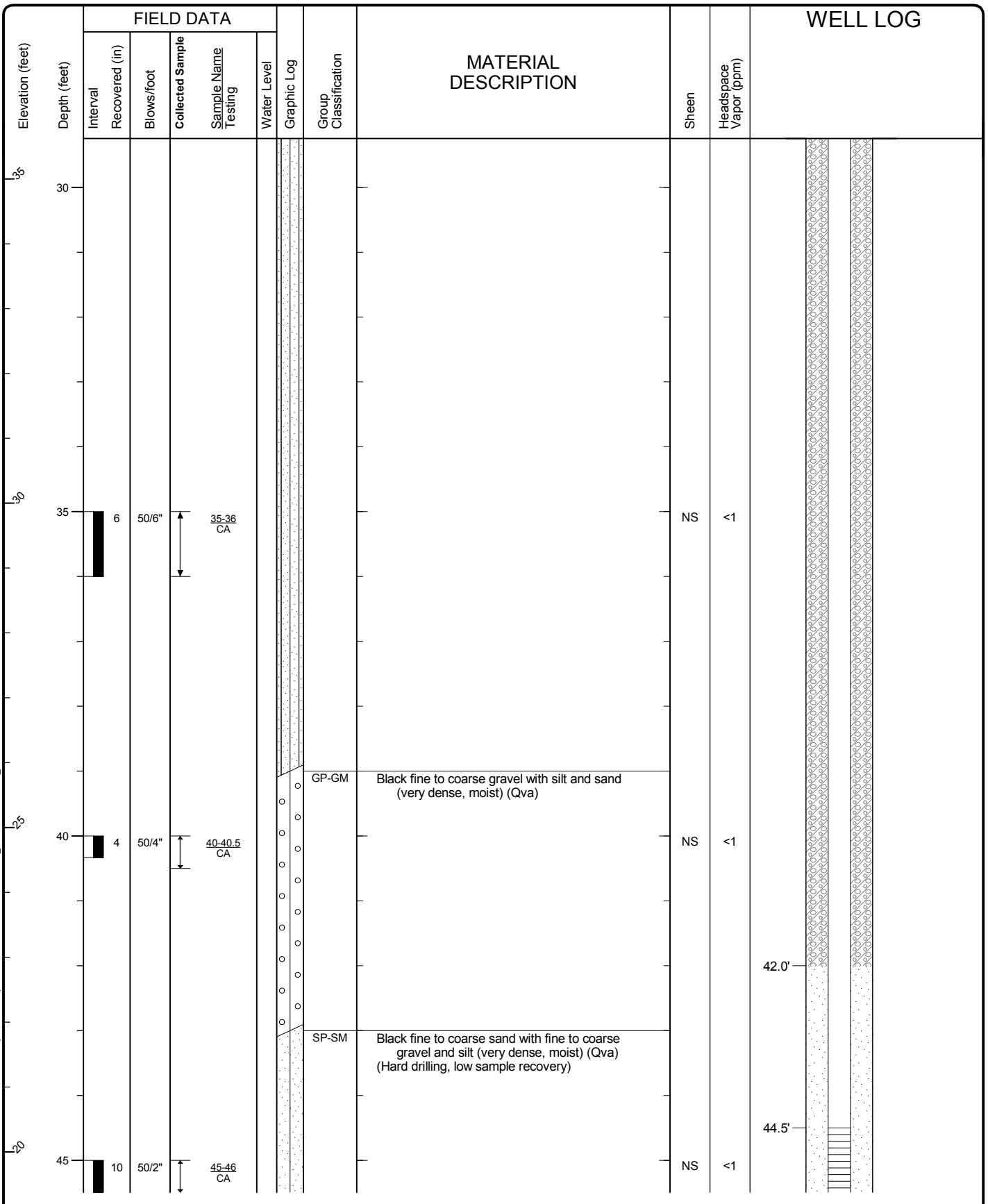
Log of Monitoring Well MDS-MW1D (continued)

GeoEngineers

Project: UWT McDonald Smith Building
Project Location: Tacoma, Washington
Project Number: 0183-105-00

Figure A-5
Sheet 2 of 4

Tacoma: Date:2/5/15 Path:C:\USERS\KJANC\DESKTOP\0183105000.GPJ DBTemplate/LibTemplate:GEOENGINEERS8.GDT/GEI8_ENVIRONMENTAL_WELL



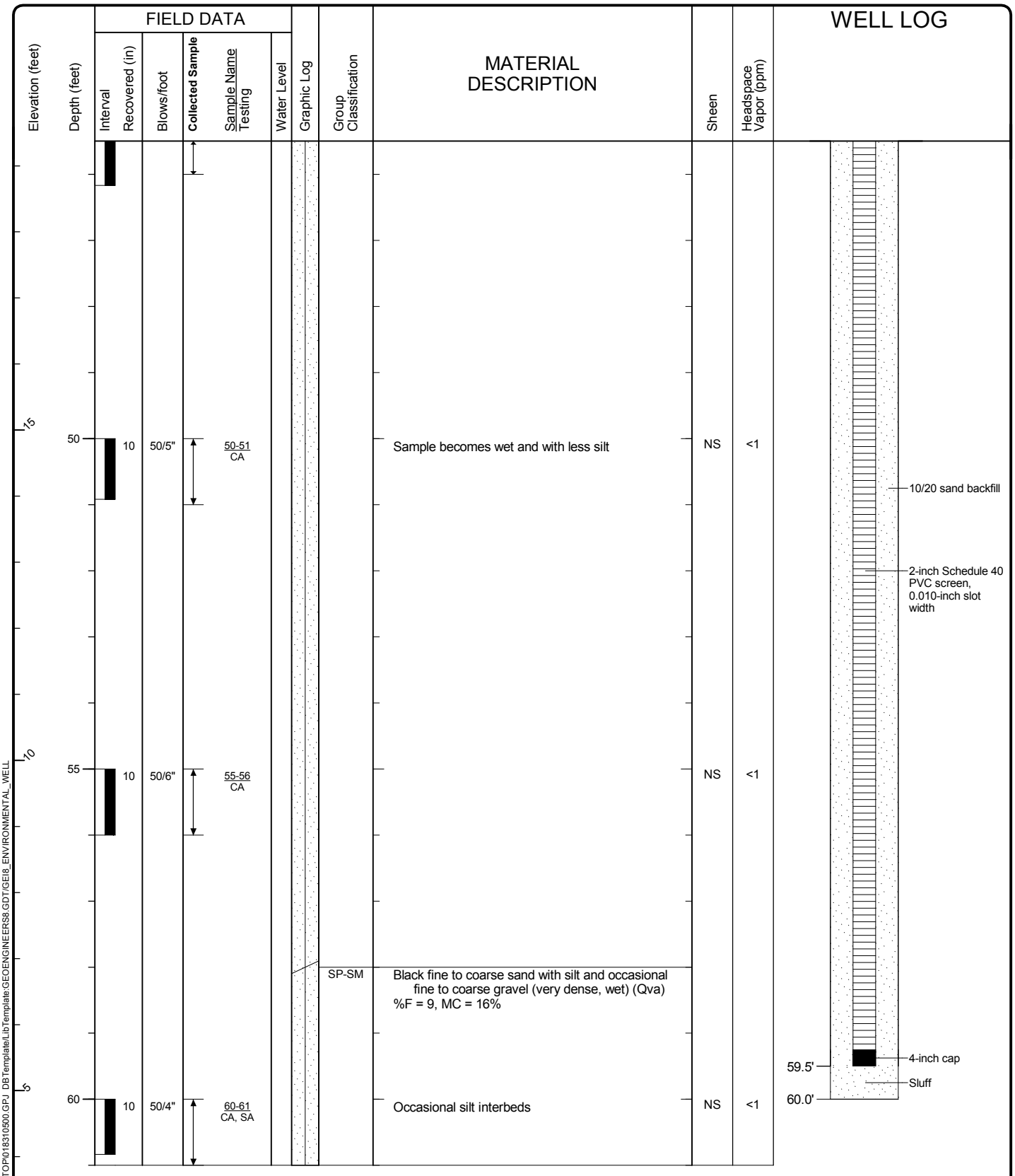
Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well MDS-MW1D (continued)

GeoEngineers

Project: UWT McDonald Smith Building
Project Location: Tacoma, Washington
Project Number: 0183-105-00

Figure A-5
Sheet 3 of 4



Note: See Figure A-1 for explanation of symbols.

Log of Monitoring Well MDS-MW1D (continued)

GeoEngineers

Project: UWT McDonald Smith Building
Project Location: Tacoma, Washington
Project Number: 0183-105-00

Figure A-5
Sheet 4 of 4

APPENDIX C
Chemical Analytical Program

Data Validation Report

1101 Fawcett Avenue, Suite 200, Tacoma, Washington 98402, Telephone: 253.383.4940, Fax: 253.383.4923 www.geoengineers.com

Project: University of Washington – Tacoma, McDonald Smith Building
October 2014 Soil and Groundwater Samples

GEI File No: 0183-105-00

Date: December 11, 2014

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A data validation (USEPA Document 540-R-08-005; USEPA, 2009) of analytical data from the analyses of soil and groundwater samples collected as part of the October 2014 sampling events, and the associated laboratory and field quality control (QC) samples. The samples were obtained from the McDonald Smith Building Site located at 1932 Pacific Avenue on the University of Washington – Tacoma (UWT) campus located in Tacoma, Washington.

Objective and Quality Control Elements

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2008) and Inorganic Superfund Data Review (USEPA 2010) (National Functional Guidelines) to determine if the laboratory analytical results meet the project objectives and are usable for their intended purpose. Data usability was assessed by determining if:

- The samples were analyzed using well-defined and acceptable methods that provide reporting limits below applicable regulatory criteria;
- The precision and accuracy of the data are well-defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

In accordance with Sampling and Analysis Plan and Quality Assurance Project Plan (GeoEngineers, 2014), the laboratory data was reviewed for the following QC elements:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times and Sample Preservation
- Surrogate Recoveries
- Method and Trip Blanks
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Laboratory Duplicates

Validated Sample Delivery Groups

This data validation included review of the sample delivery groups (SDGs) listed below in Table 1.

TABLE 1: SUMMARY OF VALIDATED SAMPLE DELIVERY GROUPS

Laboratory SDG	Samples Validated
1410-288	MDS-DP3-0.5-1, MDS-DP5-1-3, MDS-DP5-3-4, MDS-DP3,DP2-0.5-1 Comp., MDS-DP5,DP3,DP2-0.5-1 Comp., MDS-DP5,DP3-1-3, DP-1-2 Comp.
1410-306	MDS-MW1D-14.5-15, MDS-MW1D-23.5-24, MDS-MW1D-27.5-28, MDS-MW1D-28.5-29, MDS-MW1D-35-36, MDS-MW1D-40-40.5, MDS-MW1D-45-46, MDS-MW1D-50-51, MDS-MW1D-55-56, MDS-MW1D-60-61
1410-307	MDS-Drum-MW1D
1410-373	CR-MW17-141030, CR-MW16-141030, MDS-MW1D-141030, Trip Blank

Chemical Analysis Performed

OnSite Environmental (OnSite), located in Redmond, Washington, performed laboratory analysis on the soil and groundwater samples using one or more of the following methods:

- Hydrocarbon Identification (NWTPH-HCID) by Method NWTPH-HCID;
- Volatile Organic Compounds (VOCs) by Method SW8260C;
- Polycyclic Aromatic Hydrocarbons (PAHs) by Method SW8270D-SIM;
- Total Metals by Methods EPA6010C and EPA7471B;
- Toxicity Characteristic Leaching Procedure (TCLP) by Methods EPA1311/6010C

Data Validation Summary

The results for each of the QC elements are summarized below.

Data Package Completeness

OnSite provided all required deliverables for the data validation according to the National Functional Guidelines. The laboratory followed adequate corrective action processes and all identified anomalies were discussed in the relevant laboratory case narrative.

Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. The COCs were accurate and complete when submitted to the lab.

Holding Times and Sample Preservation

The sample holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for all analyses. The laboratory did not include the sample

receipt forms; therefore, the sample cooler temperatures could not be verified that they were within the control limits upon arrival at the laboratory. The samples were stored at the laboratory at the appropriate temperatures of between two and six degrees Celsius.

Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the organic analytes of interest, but unlikely to be found in any environmental sample. Surrogates are used for organic analyses and are added to all samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added to the samples at a known concentration and percent recoveries are calculated following analysis. All surrogate percent recoveries for field samples were within the laboratory control limits.

Method and Trip Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. A method blank was analyzed with each batch of samples, at a frequency of 1 per 20 samples. For all sample batches, method blanks for all applicable methods were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in any of the method blanks.

Trip blanks are analyzed to provide an indication as to whether volatile compounds have cross-contaminated other like samples within the transportation process to the laboratory. None of the target analytes were detected above the reporting limits in the trip blank.

Matrix Spikes / Matrix Spike Duplicates

Since the actual analyte concentration in an environmental sample is not known, the accuracy of a particular analysis is usually inferred by performing a matrix spike (MS) analysis on one sample from the associated batch, known as the parent sample. One aliquot of the sample is analyzed in the normal manner and then a second aliquot of the sample is spiked with a known amount of analyte concentration and analyzed. From these analyses, a percent recovery is calculated. Matrix spike duplicate (MSD) analyses are generally performed for organic analyses as a precision check and analyzed in the same sequence as a matrix spike. Using the result values from the MS and MSD, the relative percent difference (RPD) is calculated. The percent recovery control limits for MS and MSD analyses are specified in the laboratory documents, as are the RPD control limits for MS/MSD sample sets.

For inorganic methods, the matrix spike is followed by a post-digestion spike sample if any element percent recoveries were outside the control limits in the matrix spike. The percent recovery control limits for matrix spikes are 75% to 125%.

One MS/MSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for all analyses and the %R/RPD values were within the proper control limits.

Laboratory Control Samples / Laboratory Control Sample Duplicates

A laboratory control sample (LCS) is a blank sample that is spiked with a known amount of analyte and then analyzed. An LCS is similar to an MS, but without the possibility of matrix interference. Given that matrix interference is not an issue, the LCS/LCSD control limits for accuracy and precision are usually more rigorous than for MS/MSD analyses. Additionally, data qualification based on LCS/LCSD analyses would apply to all samples in the associated batch, instead of just the parent sample. The percent recovery control

limits for LCS and LCSD analyses are specified in the laboratory documents, as are the RPD control limits for LCS/LCSD sample sets.

One LCS/LCSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for all analyses and the percent recovery and RPD values were within the proper control limits.

Laboratory Duplicates

Internal laboratory duplicate analyses are performed to monitor the precision of the analyses. Two separate aliquots of a sample are analyzed as distinct samples in the laboratory and the RPD between the two results is calculated. Duplicate analyses should be performed once per analytical batch. If one or more of the sample analytes has a concentration less than five times the reporting limit for that sample, then the absolute difference is used instead of the RPD. For organic analyses, the RPD control limit is specified in the laboratory documents. For inorganic analyses, the RPD control limit 20 percent. The absolute difference control limit is the lowest reporting limit of the two samples. Laboratory duplicates were analyzed at the proper frequency and the specified acceptance criteria were met.

Overall Assessment

As was determined by this data validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate, LCS/LCSD, and MS/MSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD, MS/MSD, and laboratory duplicate RPD values.

No analytical results were qualified. All data are acceptable for the intended use.

References

U.S. Environmental Protection Agency (USEPA). "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review," EPA-540-R-08-01. June 2008.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review," EPA-540-R-10-011. January 2010.

GeoEngineers, Inc. "Sampling and Analysis Plan and Quality Assurance Project Plan," prepared for University of Washington, GEI File No. 0183-099-00. October 17, 2014.

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

October 29, 2014

Tricia DeOme
GeoEngineers, Inc.
1101 Fawcett Avenue South, Suite 200
Tacoma, WA 98402

Re: Analytical Data for Project 0183-105-00
Laboratory Reference No. 1410-288

Dear Tricia:

Enclosed are the analytical results and associated quality control data for samples submitted on October 24, 2014.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

Case Narrative

Samples were collected on October 23, 2014 and received by the laboratory on October 24, 2014. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260C Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

TCLP Metals EPA 1311/6010C/7470A Analysis

Due to a limited amount of sample, less than the required 100g was tumbled for TCLP analysis. The amount of sample used was: 50g.

Please note that any other QA/QC issues associated with these extractions and analyses will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
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ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MDS-DP5,DP3,DP2-0.5-1 Comp.	10-288-01,04,06 Comp.	Soil	10-23-14	10-24-14	
MDS-DP5-1-3	10-288-02	Soil	10-23-14	10-24-14	
MDS-DP5,DP3-1-3, DP2-1-2 Comp.	10-288-02,05,07 Comp.	Soil	10-23-14	10-24-14	
MDS-DP5-3-4	10-288-03	Soil	10-23-14	10-24-14	
MDS-DP3-0.5-1	10-288-04	Soil	10-23-14	10-24-14	
MDS-DP3,DP2-0.5-1 Comp.	10-288-04,06 Comp.	Soil	10-23-14	10-24-14	

Date of Report: October 29, 2014
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NWTPH-HCID

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP3,DP2-0.5-1 Comp.**					
Laboratory ID:	10-288-04,06 Comp.					
Gasoline Range Organics	**ND**	22	NWTPH-HCID	10-28-14	10-28-14	
Diesel Range Organics	**ND**	55	NWTPH-HCID	10-28-14	10-28-14	
Lube Oil Range Organics	**ND**	110	NWTPH-HCID	10-28-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
o-Terphenyl	***94***	***50-150***				

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP5-1-3**					
Laboratory ID:	10-288-02					
Dichlorodifluoromethane	ND	0.00079	EPA 8260C	10-27-14	10-27-14	
Chloromethane	ND	0.0040	EPA 8260C	10-27-14	10-27-14	
Vinyl Chloride	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Bromomethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Chloroethane	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
Trichlorofluoromethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloroethene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Acetone	ND	0.0049	EPA 8260C	10-27-14	10-27-14	
Iodomethane	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
Carbon Disulfide	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Methylene Chloride	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
(trans) 1,2-Dichloroethene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Methyl t-Butyl Ether	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloroethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Vinyl Acetate	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
2,2-Dichloropropane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
(cis) 1,2-Dichloroethene	0.0042	0.00061	EPA 8260C	10-27-14	10-27-14	
2-Butanone	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
Bromochloromethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Chloroform	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,1,1-Trichloroethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Carbon Tetrachloride	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloropropene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Benzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2-Dichloroethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Trichloroethene	0.0029	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2-Dichloropropane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Dibromomethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Bromodichloromethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
2-Chloroethyl Vinyl Ether	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
(cis) 1,3-Dichloropropene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Methyl Isobutyl Ketone	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
Toluene	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
(trans) 1,3-Dichloropropene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP5-1-3**					
Laboratory ID:	10-288-02					
1,1,2-Trichloroethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Tetrachloroethene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,3-Dichloropropane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
2-Hexanone	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
Dibromochloromethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2-Dibromoethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Chlorobenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,1,1,2-Tetrachloroethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Ethylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
m,p-Xylene	ND	0.0012	EPA 8260C	10-27-14	10-27-14	
o-Xylene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Styrene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Bromoform	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Isopropylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Bromobenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,1,2,2-Tetrachloroethane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2,3-Trichloropropane	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
n-Propylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
2-Chlorotoluene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
4-Chlorotoluene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,3,5-Trimethylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
tert-Butylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2,4-Trimethylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
sec-Butylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,3-Dichlorobenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
p-Isopropyltoluene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,4-Dichlorobenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2-Dichlorobenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
n-Butylbenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2-Dibromo-3-chloropropane	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
1,2,4-Trichlorobenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Hexachlorobutadiene	ND	0.0031	EPA 8260C	10-27-14	10-27-14	
Naphthalene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
1,2,3-Trichlorobenzene	ND	0.00061	EPA 8260C	10-27-14	10-27-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***106***	***76-131***				
Toluene-d8	***106***	***82-129***				
4-Bromofluorobenzene	***104***	***79-126***				

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP5-3-4**					
Laboratory ID:	10-288-03					
Dichlorodifluoromethane	ND	0.00090	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.0083	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.00078	0.00064	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.0018	0.00064	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP5-3-4**					
Laboratory ID:	10-288-03					
1,1,2-Trichloroethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0032	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.00064	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***118***	***76-131***				
Toluene-d8	***116***	***82-129***				
4-Bromofluorobenzene	***113***	***79-126***				

Date of Report: October 29, 2014
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Project: 0183-105-00

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP3-0.5-1**					
Laboratory ID:	10-288-04					
Dichlorodifluoromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.012	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP3-0.5-1**					
Laboratory ID:	10-288-04					
1,1,2-Trichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***111***	***76-131***				
Toluene-d8	***112***	***82-129***				
4-Bromofluorobenzene	***107***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

PAHs EPA 8270D/SIM

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-DP3,DP2-0.5-1 Comp.**					
Laboratory ID:	10-288-04,06 Comp.					
Naphthalene	**ND**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
2-Methylnaphthalene	**ND**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
1-Methylnaphthalene	**ND**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Acenaphthylene	**ND**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Acenaphthene	**ND**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Fluorene	**ND**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Phenanthrene	**0.043**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Anthracene	**0.011**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Fluoranthene	**0.036**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Pyrene	**0.047**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Benzo[a]anthracene	**0.020**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Chrysene	**0.018**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Benzo[b]fluoranthene	**0.012**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Benzo(j,k)fluoranthene	**0.014**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Benzo[a]pyrene	**0.015**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Indeno(1,2,3-c,d)pyrene	**0.010**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Dibenz[a,h]anthracene	**ND**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Benzo[g,h,i]perylene	**0.013**	0.0074	EPA 8270D/SIM	10-28-14	10-29-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***80***	***32 - 114***				
Pyrene-d10	***79***	***33 - 121***				
Terphenyl-d14	***69***	***31 - 116***				

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL METALS
EPA 6010C/7471B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	10-288-01,04,06 Comp.					
Client ID:	**MDS-DP5,DP3,DP2-0.5-1 Comp.**					
Arsenic	**ND**	11	6010C	10-27-14	10-27-14	
Barium	**79**	2.8	6010C	10-27-14	10-27-14	
Cadmium	**ND**	0.56	6010C	10-27-14	10-27-14	
Chromium	**45**	0.56	6010C	10-27-14	10-27-14	
Lead	**120**	5.6	6010C	10-27-14	10-27-14	
Mercury	**0.31**	0.28	7471B	10-27-14	10-27-14	
Selenium	**ND**	11	6010C	10-27-14	10-27-14	
Silver	**ND**	1.1	6010C	10-27-14	10-27-14	
Lab ID:	10-288-02,05,07 Comp.					
Client ID:	**MDS-DP5,DP3-1-3, DP2-1-2 Comp.**					
Arsenic	**ND**	11	6010C	10-27-14	10-27-14	
Barium	**66**	2.8	6010C	10-27-14	10-27-14	
Cadmium	**ND**	0.56	6010C	10-27-14	10-27-14	
Chromium	**48**	0.56	6010C	10-27-14	10-27-14	
Lead	**48**	5.6	6010C	10-27-14	10-27-14	
Mercury	**ND**	0.28	7471B	10-27-14	10-27-14	
Selenium	**ND**	11	6010C	10-27-14	10-27-14	
Silver	**ND**	1.1	6010C	10-27-14	10-27-14	

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TCLP LEAD
EPA 1311/6010C

Matrix: TCLP Extract
Units: mg/L (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	10-288-04,06 Comp.					
Client ID:	**MDS-DP3,DP2-0.5-1 Comp.**					
Lead	**ND**	0.20	6010C	10-29-14	10-29-14	

Date of Report: October 29, 2014
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Project: 0183-105-00

TOTAL LEAD
EPA 6010C

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	10-288-04,06 Comp.					
Client ID:	**MDS-DP3,DP2-0.5-1 Comp.**					
Lead	**160**	5.5	6010C	10-28-14	10-28-14	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
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NWTPH-HCID
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1028S2					
Gasoline Range Organics	**ND**	20	NWTPH-HCID	10-28-14	10-28-14	
Diesel Range Organics	**ND**	50	NWTPH-HCID	10-28-14	10-28-14	
Lube Oil Range Organics	**ND**	100	NWTPH-HCID	10-28-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
o-Terphenyl	***108***	***50-150***				

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
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Project: 0183-105-00

VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1027S2					
Dichlorodifluoromethane	ND	0.0013	EPA 8260C	10-27-14	10-27-14	
Chloromethane	ND	0.0065	EPA 8260C	10-27-14	10-27-14	
Vinyl Chloride	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromomethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Chloroethane	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Trichlorofluoromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Acetone	ND	0.0080	EPA 8260C	10-27-14	10-27-14	
Iodomethane	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Carbon Disulfide	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Methylene Chloride	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Methyl t-Butyl Ether	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Vinyl Acetate	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
2,2-Dichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Butanone	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Bromochloromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Chloroform	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1,1-Trichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Carbon Tetrachloride	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloropropene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Benzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Trichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Dibromomethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromodichloromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Chloroethyl Vinyl Ether	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
(cis) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Methyl Isobutyl Ketone	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Toluene	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
(trans) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	

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VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1027S2					
1,1,2-Trichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Tetrachloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,3-Dichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Hexanone	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Dibromochloromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dibromoethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Chlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1,1,2-Tetrachloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Ethylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
m,p-Xylene	ND	0.0020	EPA 8260C	10-27-14	10-27-14	
o-Xylene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Styrene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromoform	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Isopropylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1,2,2-Tetrachloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2,3-Trichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
n-Propylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Chlorotoluene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
4-Chlorotoluene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,3,5-Trimethylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
tert-Butylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2,4-Trimethylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
sec-Butylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,3-Dichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
p-Isopropyltoluene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,4-Dichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
n-Butylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dibromo-3-chloropropane	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
1,2,4-Trichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Hexachlorobutadiene	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Naphthalene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2,3-Trichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***106***	***76-131***				
Toluene-d8	***103***	***82-129***				
4-Bromofluorobenzene	***101***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB1027S2									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**0.0464**	**0.0479**	0.0500	0.0500	93	96	66-129	3	15	
Benzene	**0.0493**	**0.0506**	0.0500	0.0500	99	101	71-123	3	15	
Trichloroethene	**0.0506**	**0.0490**	0.0500	0.0500	101	98	75-115	3	15	
Toluene	**0.0510**	**0.0503**	0.0500	0.0500	102	101	75-120	1	15	
Chlorobenzene	**0.0474**	**0.0467**	0.0500	0.0500	95	93	75-121	1	15	
Surrogate:										
Dibromofluoromethane					***102***	***104***	***76-131***			
Toluene-d8					***101***	***103***	***82-129***			
4-Bromofluorobenzene					***102***	***100***	***79-126***			

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

PAHs EPA 8270D/SIM
METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1028S1					
Naphthalene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
2-Methylnaphthalene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
1-Methylnaphthalene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Acenaphthylene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Acenaphthene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Fluorene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Phenanthrene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Anthracene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Fluoranthene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Pyrene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Benzo[a]anthracene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Chrysene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Benzo[b]fluoranthene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Benzo(j,k)fluoranthene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Benzo[a]pyrene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Indeno(1,2,3-c,d)pyrene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Dibenz[a,h]anthracene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Benzo[g,h,i]perylene	**ND**	0.0067	EPA 8270D/SIM	10-28-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
2-Fluorobiphenyl	***89***	***32 - 114***				
Pyrene-d10	***94***	***33 - 121***				
Terphenyl-d14	***73***	***31 - 116***				

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

PAHs EPA 8270D/SIM
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/Kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB1028S1									
	SB	SBD	SB	SBD	SB	SBD				
Naphthalene	**0.0704**	**0.0740**	0.0833	0.0833	85	89	63 - 113	5	19	
Acenaphthylene	**0.0750**	**0.0775**	0.0833	0.0833	90	93	61 - 125	3	16	
Acenaphthene	**0.0739**	**0.0774**	0.0833	0.0833	89	93	66 - 113	5	16	
Fluorene	**0.0739**	**0.0762**	0.0833	0.0833	89	91	60 - 117	3	16	
Phenanthrene	**0.0593**	**0.0630**	0.0833	0.0833	71	76	63 - 116	6	12	
Anthracene	**0.0822**	**0.0920**	0.0833	0.0833	99	110	66 - 141	11	19	
Fluoranthene	**0.0758**	**0.0773**	0.0833	0.0833	91	93	60 - 125	2	13	
Pyrene	**0.0744**	**0.0756**	0.0833	0.0833	89	91	66 - 126	2	15	
Benzo[a]anthracene	**0.0537**	**0.0499**	0.0833	0.0833	64	60	60 - 128	7	15	
Chrysene	**0.0856**	**0.0872**	0.0833	0.0833	103	105	60 - 117	2	13	
Benzo[b]fluoranthene	**0.0543**	**0.0508**	0.0833	0.0833	65	61	60 - 131	7	16	
Benzo(j,k)fluoranthene	**0.0726**	**0.0745**	0.0833	0.0833	87	89	57 - 126	3	20	
Benzo[a]pyrene	**0.0684**	**0.0680**	0.0833	0.0833	82	82	62 - 136	1	16	
Indeno(1,2,3-c,d)pyrene	**0.0679**	**0.0661**	0.0833	0.0833	82	79	60 - 127	3	19	
Dibenz[a,h]anthracene	**0.0698**	**0.0687**	0.0833	0.0833	84	82	62 - 133	2	22	
Benzo[g,h,i]perylene	**0.0763**	**0.0805**	0.0833	0.0833	92	97	63 - 129	5	22	
Surrogate:										
2-Fluorobiphenyl					***82***	***86***	***32 - 114***			
Pyrene-d10					***90***	***91***	***33 - 121***			
Terphenyl-d14					***70***	***72***	***31 - 116***			

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted: 10-27-14
Date Analyzed: 10-27-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB1027SM2

Analyte	Method	Result	PQL
Arsenic	6010C	**ND**	10
Barium	6010C	**ND**	2.5
Cadmium	6010C	**ND**	0.50
Chromium	6010C	**ND**	0.50
Lead	6010C	**ND**	5.0
Selenium	6010C	**ND**	10
Silver	6010C	**ND**	1.0

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL MERCURY
EPA 7471B
METHOD BLANK QUALITY CONTROL

Date Extracted:	10-27-14
Date Analyzed:	10-27-14
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB1027S1

Analyte	Method	Result	PQL
Mercury	7471B	**ND**	0.25

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 10-27-14
Date Analyzed: 10-27-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-233-18

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	10	
Barium	**112**	**116**	3	2.5	
Cadmium	**ND**	**ND**	NA	0.50	
Chromium	**27.4**	**26.6**	3	0.50	
Lead	**7.20**	**7.35**	2	5.0	
Selenium	**ND**	**ND**	NA	10	
Silver	**ND**	**ND**	NA	1.0	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL MERCURY
EPA 7471B
DUPLICATE QUALITY CONTROL

Date Extracted: 10-27-14
Date Analyzed: 10-27-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-272-23

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.25	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL METALS
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 10-27-14
Date Analyzed: 10-27-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-233-18

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**98.8**	99	**98.4**	98	0	
Barium	100	**213**	101	**210**	97	2	
Cadmium	50.0	**48.9**	98	**48.8**	98	0	
Chromium	100	**124**	97	**124**	97	0	
Lead	250	**233**	90	**234**	91	0	
Selenium	100	**97.3**	97	**96.9**	97	0	
Silver	25.0	**22.1**	88	**21.7**	87	2	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL MERCURY
EPA 7471B
MS/MSD QUALITY CONTROL

Date Extracted: 10-27-14
Date Analyzed: 10-27-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-272-23

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	0.500	**0.482**	96	**0.476**	95	1	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TCLP LEAD
EPA 1311/6010C
METHOD BLANK QUALITY CONTROL

Date Prepared:	10-28-14
Date Extracted:	10-29-14
Date Analyzed:	10-29-14
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	MB1029TM1

Analyte	Method	Result	PQL
Lead	6010C	**ND**	0.20

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TCLP LEAD
EPA 1311/6010C
DUPLICATE QUALITY CONTROL

Date Prepared: 10-28-14
Date Extracted: 10-29-14
Date Analyzed: 10-29-14

Matrix: TCLP Extract
Units: mg/L (ppm)

Lab ID: 10-256-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**ND**	**ND**	NA	0.20	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TCLP LEAD
EPA 1311/6010C
MS/MSD QUALITY CONTROL

Date Prepared:	10-28-14
Date Extracted:	10-29-14
Date Analyzed:	10-29-14
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	10-256-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	10.0	**9.89**	99	**9.98**	100	1	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL LEAD
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted:	10-28-14
Date Analyzed:	10-28-14
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB1028SM1

Analyte	Method	Result	PQL
Lead	6010C	**ND**	5.0

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL LEAD
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 10-28-14
Date Analyzed: 10-28-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-217-09

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**10.1**	**12.3**	20	5.0	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

TOTAL LEAD
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 10-28-14
Date Analyzed: 10-28-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-217-09

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	250	**226**	86	**225**	86	0	

Date of Report: October 29, 2014
Samples Submitted: October 24, 2014
Laboratory Reference: 1410-288
Project: 0183-105-00

% MOISTURE

Date Analyzed: 10-27&28-14

Client ID	Lab ID	% Moisture
MDS-DP5-1-3	10-288-02	10
MDS-DP5-3-4	10-288-03	10
MDS-DP3-0.5-1	10-288-04	12
MDS-DP5,DP3,DP2-0.5-1 Comp.	10-288-01,04,06 Comp.	10
MDS-DP5,DP3-1-3, DP2-1-2 Comp.	10-288-02,05,07 Comp.	11
MDS-DP3,DP2-0.5-1 Comp.	10-288-04,06 Comp.	9

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

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

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

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GeoEngineers
Project Number: 0188-105-00
Project Name: McDonald Smith Bldg
Project Manager: TDeOme
Sampled by: Brandon Bray Field

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☒ 2 Days ☐ 3 Days
☐ Standard (7 Days)
(TPH analysis 5 Days)
~~☒ 5 days~~ (other)

Laboratory Number: 10-288

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals LEAD	HEM (oil and grease) 1664A	TOTAL LEAD	% Moisture
1	MDS-DP5-0.5-1	10/23/14	1935	Soil	4	(A)	NO			~~X~~		~~X~~	(A)	NO				A		(A)	NO		X
2	MDS-DP5-1-3		1950		5					X								B					
3	MDS-DP5-3-4		2000		5					X													
4	MDS-DP3-0.5-1		2045		5	(A)				X			(A)					A	(A)			(A)	
5	MDS-DP3-1-3		2050		5													B					
6	MDS-DP2-0.5-1		2110		5	(A)							(A)					A	(A)			(A)	
7	MDS-DP2-1-2		2120		5													B					

	Signature	Company	Date	Time
Relinquished		~~GeoEngineers~~	10/24/14	1:50pm
Received		Speedy	10/24/14	1:50pm
Relinquished		Speedy	10/24/14	3:07pm
Received		OSE	10/24/14	1507
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

A, B- Composite samples for chemical analysis with same letter. For example, all A's will be composited for analysis

- Hold for follow up analysis of HCID, PAHs, and PCBs

X - analyze discrete

need results by 10/28 via email

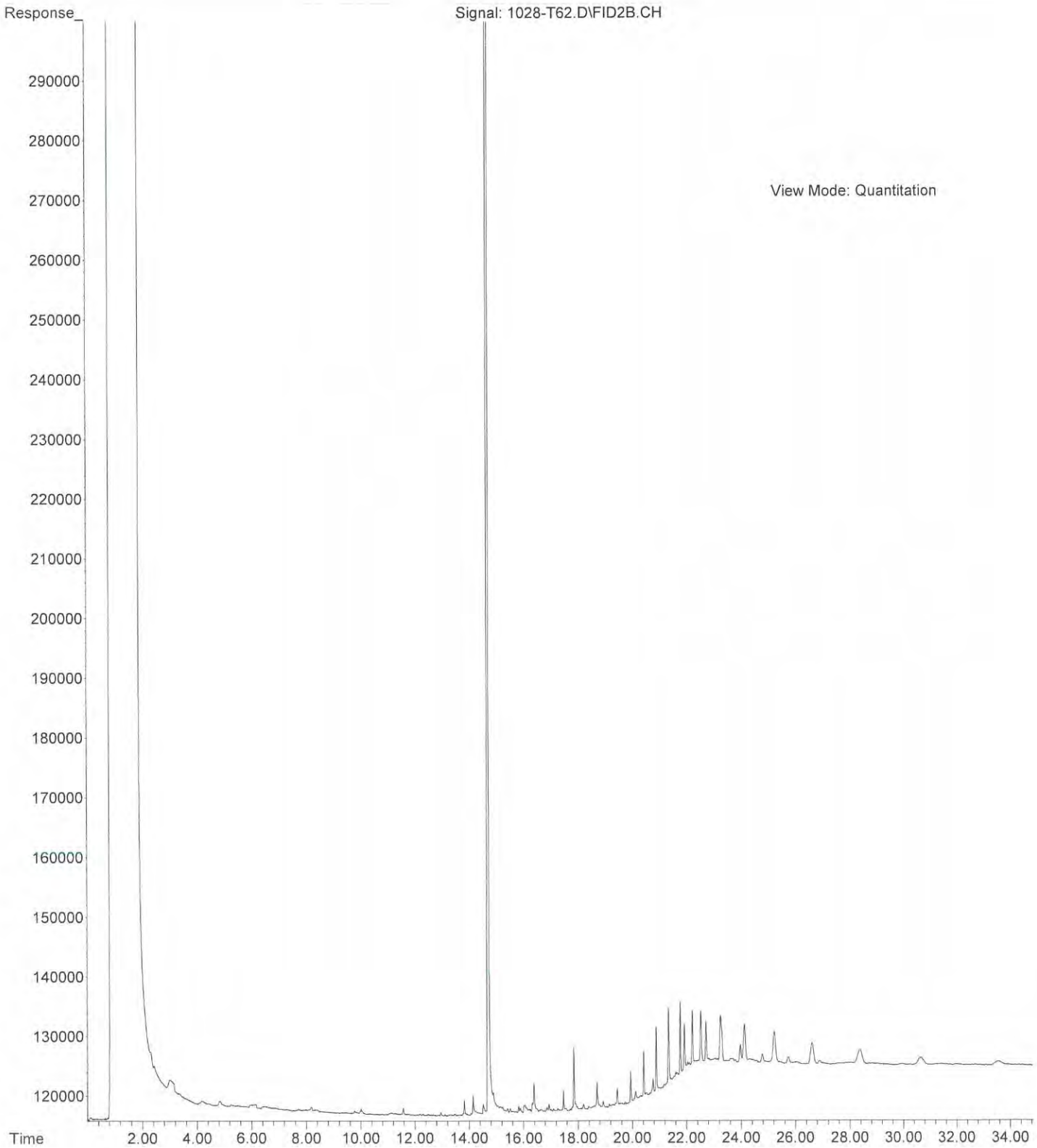
(A) Added 10/28/14. S.D. DB Comp.

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

File :X:\DIESELS\TERI\DATA\T141028.SEC\1028-T62.D
Operator : ZT
Acquired : 28 Oct 2014 18:37 using AcqMethod T140401F.M
Instrument : Teri
Sample Name: 10-288-04,06 COMP.
Misc Info :
Vial Number: 62



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

October 29, 2014

Tricia DeOme
GeoEngineers, Inc.
1101 Fawcett Avenue South, Suite 200
Tacoma, WA 98402

Re: Analytical Data for Project 0183-105-00
Laboratory Reference No. 1410-306

Dear Tricia:

Enclosed are the analytical results and associated quality control data for samples submitted on October 27, 2014.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

Case Narrative

Samples were collected on October 25, 2014 and received by the laboratory on October 27, 2014. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260C Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MDS-MW1D-14.5-15	10-306-04	Soil	10-25-14	10-27-14	
MDS-MW1D-23.5-24	10-306-05	Soil	10-25-14	10-27-14	
MDS-MW1D-27.5-28	10-306-06	Soil	10-25-14	10-27-14	
MDS-MW1D-28.5-29	10-306-07	Soil	10-25-14	10-27-14	
MDS-MW1D-35-36	10-306-08	Soil	10-25-14	10-27-14	
MDS-MW1D-40-40.5	10-306-09	Soil	10-25-14	10-27-14	
MDS-MW1D-45-46	10-306-10	Soil	10-25-14	10-27-14	
MDS-MW1D-50-51	10-306-11	Soil	10-25-14	10-27-14	
MDS-MW1D-55-56	10-306-12	Soil	10-25-14	10-27-14	
MDS-MW1D-60-61	10-306-13	Soil	10-25-14	10-27-14	

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

VOLATILES EPA 8260C
page 1 of 2

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-14.5-15**					
Laboratory ID:	10-306-04					
Dichlorodifluoromethane	ND	0.0026	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.024	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-14.5-15**					
Laboratory ID:	10-306-04					
1,1,2-Trichloroethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	0.0039	0.0019	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	0.017	0.0037	EPA 8260C	10-27-14	10-28-14	
o-Xylene	0.0097	0.0019	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	0.0059	0.0019	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	0.015	0.0019	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	0.051	0.0019	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	0.0025	0.0019	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0093	EPA 8260C	10-27-14	10-28-14	
Naphthalene	0.0047	0.0019	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***110***	***76-131***				
Toluene-d8	***110***	***82-129***				
4-Bromofluorobenzene	***106***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-23.5-24**					
Laboratory ID:	10-306-05					
Dichlorodifluoromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.012	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	0.0012	0.00096	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.016	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.024	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-23.5-24**					
Laboratory ID:	10-306-05					
1,1,2-Trichloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	0.0015	0.00096	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0048	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.00096	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***109***	***76-131***				
Toluene-d8	***108***	***82-129***				
4-Bromofluorobenzene	***105***	***79-126***				

Date of Report: October 29, 2014
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Project: 0183-105-00

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-27.5-28**					
Laboratory ID:	10-306-06					
Dichlorodifluoromethane	ND	0.0019	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Acetone	0.019	0.017	EPA 8260C	10-27-14	10-28-14	Y
Iodomethane	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.010	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.012	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-27.5-28**					
Laboratory ID:	10-306-06					
1,1,2-Trichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0027	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0066	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***104***	***76-131***				
Toluene-d8	***102***	***82-129***				
4-Bromofluorobenzene	***102***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
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Project: 0183-105-00

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-28.5-29**					
Laboratory ID:	10-306-07					
Dichlorodifluoromethane	ND	0.0018	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	0.0035	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.016	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	0.0025	0.0013	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.040	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.050	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	

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Project: 0183-105-00

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-28.5-29**					
Laboratory ID:	10-306-07					
1,1,2-Trichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0025	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***105***	***76-131***				
Toluene-d8	***105***	***82-129***				
4-Bromofluorobenzene	***104***	***79-126***				

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:						
Laboratory ID:	10-306-08					
Dichlorodifluoromethane	ND	0.0015	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Acetone	0.024	0.014	EPA 8260C	10-27-14	10-28-14	Y
Iodomethane	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.0014	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:						
Laboratory ID:	10-306-08					
1,1,2-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0022	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0054	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***96***	***76-131***				
Toluene-d8	***97***	***82-129***				
4-Bromofluorobenzene	***95***	***79-126***				

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-40-40.5**					
Laboratory ID:	10-306-09					
Dichlorodifluoromethane	ND	0.0016	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Acetone	0.020	0.015	EPA 8260C	10-27-14	10-28-14	Y
Iodomethane	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.0021	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.0059	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-40-40.5**					
Laboratory ID:	10-306-09					
1,1,2-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0023	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	0.0027	0.0011	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0056	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***102***	***76-131***				
Toluene-d8	***100***	***82-129***				
4-Bromofluorobenzene	***99***	***79-126***				

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-45-46**					
Laboratory ID:	10-306-10					
Dichlorodifluoromethane	ND	0.0018	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.016	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.0018	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.0046	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-45-46**					
Laboratory ID:	10-306-10					
1,1,2-Trichloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0025	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0063	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0013	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***108***	***76-131***				
Toluene-d8	***107***	***82-129***				
4-Bromofluorobenzene	***106***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-50-51**					
Laboratory ID:	10-306-11					
Dichlorodifluoromethane	ND	0.0016	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.015	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.0056	0.0012	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.013	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	

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Samples Submitted: October 27, 2014
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Project: 0183-105-00

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-50-51**					
Laboratory ID:	10-306-11					
1,1,2-Trichloroethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0023	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0059	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0012	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***106***	***76-131***				
Toluene-d8	***108***	***82-129***				
4-Bromofluorobenzene	***106***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-55-56**					
Laboratory ID:	10-306-12					
Dichlorodifluoromethane	ND	0.0015	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Acetone	ND	0.014	EPA 8260C	10-27-14	10-28-14	
Iodomethane	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	0.0018	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.0019	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-55-56**					
Laboratory ID:	10-306-12					
1,1,2-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	ND	0.0022	EPA 8260C	10-27-14	10-28-14	
o-Xylene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0055	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***106***	***76-131***				
Toluene-d8	***105***	***82-129***				
4-Bromofluorobenzene	***102***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

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Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-60-61**					
Laboratory ID:	10-306-13					
Dichlorodifluoromethane	ND	0.0016	EPA 8260C	10-27-14	10-28-14	
Chloromethane	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
Vinyl Chloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroethane	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
Trichlorofluoromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Acetone	0.016	0.015	EPA 8260C	10-27-14	10-28-14	Y
Iodomethane	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
Carbon Disulfide	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methylene Chloride	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl t-Butyl Ether	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Vinyl Acetate	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
2,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Butanone	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
Bromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chloroform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Carbon Tetrachloride	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Benzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Trichloroethene	0.0017	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Dibromomethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromodichloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chloroethyl Vinyl Ether	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
(cis) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Methyl Isobutyl Ketone	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
Toluene	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
(trans) 1,3-Dichloropropene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	

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Samples Submitted: October 27, 2014
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Project: 0183-105-00

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-60-61**					
Laboratory ID:	10-306-13					
1,1,2-Trichloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Tetrachloroethene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Hexanone	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
Dibromochloromethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromoethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Chlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,1,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Ethylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
m,p-Xylene	0.0027	0.0023	EPA 8260C	10-27-14	10-28-14	
o-Xylene	0.0016	0.0011	EPA 8260C	10-27-14	10-28-14	
Styrene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromoform	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Isopropylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Bromobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,1,2,2-Tetrachloroethane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichloropropane	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Propylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
2-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
4-Chlorotoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3,5-Trimethylbenzene	0.0014	0.0011	EPA 8260C	10-27-14	10-28-14	
tert-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trimethylbenzene	0.0040	0.0011	EPA 8260C	10-27-14	10-28-14	
sec-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,3-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
p-Isopropyltoluene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,4-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
n-Butylbenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2-Dibromo-3-chloropropane	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
1,2,4-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Hexachlorobutadiene	ND	0.0057	EPA 8260C	10-27-14	10-28-14	
Naphthalene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
1,2,3-Trichlorobenzene	ND	0.0011	EPA 8260C	10-27-14	10-28-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***106***	***76-131***				
Toluene-d8	***106***	***82-129***				
4-Bromofluorobenzene	***105***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

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

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1027S2					
Dichlorodifluoromethane	ND	0.0013	EPA 8260C	10-27-14	10-27-14	
Chloromethane	ND	0.0065	EPA 8260C	10-27-14	10-27-14	
Vinyl Chloride	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromomethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Chloroethane	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Trichlorofluoromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Acetone	ND	0.0080	EPA 8260C	10-27-14	10-27-14	
Iodomethane	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Carbon Disulfide	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Methylene Chloride	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Methyl t-Butyl Ether	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Vinyl Acetate	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
2,2-Dichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Butanone	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Bromochloromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Chloroform	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1,1-Trichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Carbon Tetrachloride	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1-Dichloropropene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Benzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Trichloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Dibromomethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromodichloromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Chloroethyl Vinyl Ether	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
(cis) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Methyl Isobutyl Ketone	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Toluene	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
(trans) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

VOLATILES by EPA 8260C
METHOD BLANK QUALITY CONTROL
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1027S2					
1,1,2-Trichloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Tetrachloroethene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,3-Dichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Hexanone	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Dibromochloromethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dibromoethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Chlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1,1,2-Tetrachloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Ethylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
m,p-Xylene	ND	0.0020	EPA 8260C	10-27-14	10-27-14	
o-Xylene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Styrene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromoform	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Isopropylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Bromobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,1,2,2-Tetrachloroethane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2,3-Trichloropropane	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
n-Propylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
2-Chlorotoluene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
4-Chlorotoluene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,3,5-Trimethylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
tert-Butylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2,4-Trimethylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
sec-Butylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,3-Dichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
p-Isopropyltoluene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,4-Dichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
n-Butylbenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2-Dibromo-3-chloropropane	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
1,2,4-Trichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Hexachlorobutadiene	ND	0.0050	EPA 8260C	10-27-14	10-27-14	
Naphthalene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
1,2,3-Trichlorobenzene	ND	0.0010	EPA 8260C	10-27-14	10-27-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***106***	***76-131***				
Toluene-d8	***103***	***82-129***				
4-Bromofluorobenzene	***101***	***79-126***				

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

VOLATILES by EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB1027S2									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**0.0464**	**0.0479**	0.0500	0.0500	93	96	66-129	3	15	
Benzene	**0.0493**	**0.0506**	0.0500	0.0500	99	101	71-123	3	15	
Trichloroethene	**0.0506**	**0.0490**	0.0500	0.0500	101	98	75-115	3	15	
Toluene	**0.0510**	**0.0503**	0.0500	0.0500	102	101	75-120	1	15	
Chlorobenzene	**0.0474**	**0.0467**	0.0500	0.0500	95	93	75-121	1	15	
Surrogate:										
Dibromofluoromethane					***102***	***104***	***76-131***			
Toluene-d8					***101***	***103***	***82-129***			
4-Bromofluorobenzene					***102***	***100***	***79-126***			

Date of Report: October 29, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-306
Project: 0183-105-00

% MOISTURE

Date Analyzed: 10-27-14

Client ID	Lab ID	% Moisture
MDS-MW1D-14.5-15	10-306-04	5
MDS-MW1D-23.5-24	10-306-05	12
MDS-MW1D-27.5-28	10-306-06	28
MDS-MW1D-28.5-29	10-306-07	20
MDS-MW1D-35-36	10-306-08	18
MDS-MW1D-40-40.5	10-306-09	21
MDS-MW1D-45-46	10-306-10	13
MDS-MW1D-50-51	10-306-11	17
MDS-MW1D-55-56	10-306-12	16
MDS-MW1D-60-61	10-306-13	15

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

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

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

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GEI
Project Number: 0183-105-00
Project Name: DWT
Project Manager: TRICIA DeDONE
Sampled by: PDP

Turnaround Request (in working days)
(Check One)
- [X] Same Day
- [ ] 1 Day
- [ ] 2 Days
- [ ] 3 Days
- [ ] Standard (7 Days) (TPH analysis 5 Days)
- [ ] _____ (other)

Laboratory Number: 10-306

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Hold	% Moisture
1	MDS-MW1D-10-10.5	10/24	935	S	5																	X	
2	MDS-MW1D-11-11.5		940	S	5																	X	
3	MDS-MW1D-12-12.5		950	S	5																	X	
4	MDS-MW1D-14.5-15		1000	S	5					X													X
5	MDS-MW1D-23.5-24		1100	S	4					X													
6	MDS-MW1D-27.5-28		1120	S	4					X													
7	MDS-MW1D-28.5-29		1130	S	4					X													
8	MDS-MW1D-35-36		1400	S	4					X													
9	MDS-MW1D-40-40.5		1435	S	4					X													
10	MDS-MW1D-45-46		1455	S	4					X													

	Signature	Company	Date	Time
Relinquished		GeoEngineers	10/27	850
Received		Spl	11	850
Relinquished		11	11	1005
Received		GSE	10/27/14	1005
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GET
Project Number: 0183-105-00
Project Name: DWT
Project Manager: TRICIA DeBOER
Sampled by: PDP

Turnaround Request (in working days)

(Check One)

- [x] Same Day
- [ ] 1 Day
- [ ] 2 Days
- [ ] 3 Days
- [ ] Standard (7 Days) (TPH analysis 5 Days)
- [ ] _____ (other)

Laboratory Number: 10-306

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	No. of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
11	MDS-MW1D-50-51	10/25	1510	S	4					X																
12	MDS-MW1D-55-56		1530	S	4					X																
13	MDS-MW1D-60-61		1550	S	4					X																
	~~DRUM-MDS-MW01D~~		~~1215~~	S	4																					

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished		GeoEngineers	10/27	850	
Received		Sjdy	"	850	
Relinquished	"	"	"	1005	
Received		GSE	10/27/14	1005	
Relinquished					
Received					
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____

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

November 5, 2014

Tricia DeOme
GeoEngineers, Inc.
1101 Fawcett Avenue South, Suite 200
Tacoma, WA 98402

Re: Analytical Data for Project 0183-105-00
Laboratory Reference No. 1410-307

Dear Tricia:

Enclosed are the analytical results and associated quality control data for samples submitted on October 27, 2014.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

Case Narrative

Samples were collected on October 25, 2014 and received by the laboratory on October 27, 2014. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Volatiles EPA 8260C Analysis

Per EPA Method 5035A, samples were received by the laboratory in pre-weighed 40 mL VOA vials within 48 hours of sample collection. They were stored in a freezer at between -7°C and -20°C until extraction or analysis.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MDS-Drum-MW1D	10-307-01	Soil	10-25-14	10-27-14	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

VOLATILES EPA 8260C
page 1 of 2

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-Drum-MW1D**					
Laboratory ID:	10-307-01					
Dichlorodifluoromethane	ND	0.0024	EPA 8260C	10-29-14	10-29-14	
Chloromethane	ND	0.0087	EPA 8260C	10-29-14	10-29-14	
Vinyl Chloride	ND	0.0015	EPA 8260C	10-29-14	10-29-14	
Bromomethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Chloroethane	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
Trichlorofluoromethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,1-Dichloroethene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Acetone	ND	0.020	EPA 8260C	10-29-14	10-29-14	
Iodomethane	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
Carbon Disulfide	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Methylene Chloride	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Methyl t-Butyl Ether	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,1-Dichloroethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Vinyl Acetate	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
2,2-Dichloropropane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
(cis) 1,2-Dichloroethene	0.0024	0.0012	EPA 8260C	10-29-14	10-29-14	
2-Butanone	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
Bromochloromethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Chloroform	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,1,1-Trichloroethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Carbon Tetrachloride	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,1-Dichloropropene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Benzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2-Dichloroethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Trichloroethene	0.0055	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2-Dichloropropane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Dibromomethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Bromodichloromethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
2-Chloroethyl Vinyl Ether	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
(cis) 1,3-Dichloropropene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Methyl Isobutyl Ketone	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
Toluene	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
(trans) 1,3-Dichloropropene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

VOLATILES EPA 8260C
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-Drum-MW1D**					
Laboratory ID:	10-307-01					
1,1,2-Trichloroethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Tetrachloroethene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,3-Dichloropropane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
2-Hexanone	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
Dibromochloromethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2-Dibromoethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Chlorobenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,1,1,2-Tetrachloroethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Ethylbenzene	0.0073	0.0012	EPA 8260C	10-29-14	10-29-14	
m,p-Xylene	0.036	0.0024	EPA 8260C	10-29-14	10-29-14	
o-Xylene	0.020	0.0012	EPA 8260C	10-29-14	10-29-14	
Styrene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Bromoform	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Isopropylbenzene	0.0022	0.0012	EPA 8260C	10-29-14	10-29-14	
Bromobenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,1,2,2-Tetrachloroethane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2,3-Trichloropropane	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
n-Propylbenzene	0.0097	0.0012	EPA 8260C	10-29-14	10-29-14	
2-Chlorotoluene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
4-Chlorotoluene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,3,5-Trimethylbenzene	0.026	0.0012	EPA 8260C	10-29-14	10-29-14	
tert-Butylbenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2,4-Trimethylbenzene	0.092	0.0012	EPA 8260C	10-29-14	10-29-14	
sec-Butylbenzene	0.0032	0.0012	EPA 8260C	10-29-14	10-29-14	
1,3-Dichlorobenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
p-Isopropyltoluene	0.0025	0.0012	EPA 8260C	10-29-14	10-29-14	
1,4-Dichlorobenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2-Dichlorobenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
n-Butylbenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2-Dibromo-3-chloropropane	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
1,2,4-Trichlorobenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Hexachlorobutadiene	ND	0.0059	EPA 8260C	10-29-14	10-29-14	
Naphthalene	0.0083	0.0012	EPA 8260C	10-29-14	10-29-14	
1,2,3-Trichlorobenzene	ND	0.0012	EPA 8260C	10-29-14	10-29-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***105***	***76-131***				
Toluene-d8	***104***	***82-129***				
4-Bromofluorobenzene	***101***	***79-126***				

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

TOTAL METALS
EPA 6010C/7471B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	10-307-01					
Client ID:	**MDS-Drum-MW1D**					
Arsenic	**ND**	12	6010C	10-28-14	10-28-10	
Barium	**43**	2.9	6010C	10-28-14	10-28-10	
Cadmium	**ND**	0.58	6010C	10-28-14	10-28-10	
Chromium	**35**	0.58	6010C	10-28-14	10-28-10	
Lead	**ND**	5.8	6010C	10-28-14	10-28-10	
Mercury	**ND**	0.29	7471B	10-28-14	10-28-10	
Selenium	**ND**	12	6010C	10-28-14	10-28-10	
Silver	**ND**	1.2	6010C	10-28-14	10-28-10	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

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

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1029S1					
Dichlorodifluoromethane	ND	0.0020	EPA 8260C	10-29-14	10-29-14	
Chloromethane	ND	0.0073	EPA 8260C	10-29-14	10-29-14	
Vinyl Chloride	ND	0.0013	EPA 8260C	10-29-14	10-29-14	
Bromomethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Chloroethane	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
Trichlorofluoromethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,1-Dichloroethene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Acetone	ND	0.017	EPA 8260C	10-29-14	10-29-14	
Iodomethane	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
Carbon Disulfide	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Methylene Chloride	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Methyl t-Butyl Ether	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,1-Dichloroethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Vinyl Acetate	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
2,2-Dichloropropane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
2-Butanone	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
Bromochloromethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Chloroform	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,1,1-Trichloroethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Carbon Tetrachloride	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,1-Dichloropropene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Benzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2-Dichloroethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Trichloroethene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2-Dichloropropane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Dibromomethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Bromodichloromethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
2-Chloroethyl Vinyl Ether	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
(cis) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Methyl Isobutyl Ketone	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
Toluene	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
(trans) 1,3-Dichloropropene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

VOLATILES by EPA 8260C
METHOD BLANK QUALITY CONTROL
page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1029S1					
1,1,2-Trichloroethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Tetrachloroethene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,3-Dichloropropane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
2-Hexanone	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
Dibromochloromethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2-Dibromoethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Chlorobenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,1,1,2-Tetrachloroethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Ethylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
m,p-Xylene	ND	0.0020	EPA 8260C	10-29-14	10-29-14	
o-Xylene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Styrene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Bromoform	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Isopropylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Bromobenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,1,2,2-Tetrachloroethane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2,3-Trichloropropane	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
n-Propylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
2-Chlorotoluene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
4-Chlorotoluene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,3,5-Trimethylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
tert-Butylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2,4-Trimethylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
sec-Butylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,3-Dichlorobenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
p-Isopropyltoluene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,4-Dichlorobenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2-Dichlorobenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
n-Butylbenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2-Dibromo-3-chloropropane	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
1,2,4-Trichlorobenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Hexachlorobutadiene	ND	0.0050	EPA 8260C	10-29-14	10-29-14	
Naphthalene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
1,2,3-Trichlorobenzene	ND	0.0010	EPA 8260C	10-29-14	10-29-14	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***103***	***76-131***				
Toluene-d8	***104***	***82-129***				
4-Bromofluorobenzene	***102***	***79-126***				

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

VOLATILES by EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB1029S1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**0.0453**	**0.0445**	0.0500	0.0500	91	89	66-129	2	15	
Benzene	**0.0502**	**0.0487**	0.0500	0.0500	100	97	71-123	3	15	
Trichloroethene	**0.0506**	**0.0497**	0.0500	0.0500	101	99	75-115	2	15	
Toluene	**0.0500**	**0.0497**	0.0500	0.0500	100	99	75-120	1	15	
Chlorobenzene	**0.0479**	**0.0470**	0.0500	0.0500	96	94	75-121	2	15	
Surrogate:										
Dibromofluoromethane					***106***	***101***	***76-131***			
Toluene-d8					***103***	***104***	***82-129***			
4-Bromofluorobenzene					***101***	***101***	***79-126***			

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

TOTAL METALS
EPA 6010C
METHOD BLANK QUALITY CONTROL

Date Extracted: 10-28-14
Date Analyzed: 10-28-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB1028SM1

Analyte	Method	Result	PQL
Arsenic	6010C	**ND**	10
Barium	6010C	**ND**	2.5
Cadmium	6010C	**ND**	0.50
Chromium	6010C	**ND**	0.50
Lead	6010C	**ND**	5.0
Selenium	6010C	**ND**	10
Silver	6010C	**ND**	1.0

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

TOTAL MERCURY
EPA 7471B
METHOD BLANK QUALITY CONTROL

Date Extracted:	10-28-14
Date Analyzed:	10-28-14
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB1028S1

Analyte	Method	Result	PQL
Mercury	7471B	**ND**	0.25

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

TOTAL METALS
EPA 6010C
DUPLICATE QUALITY CONTROL

Date Extracted: 10-28-14
Date Analyzed: 10-28-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-217-09

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	10	
Barium	**49.8**	**47.9**	4	2.5	
Cadmium	**ND**	**ND**	NA	0.50	
Chromium	**38.9**	**35.9**	8	0.50	
Lead	**10.1**	**9.35**	7	5.0	
Selenium	**ND**	**ND**	NA	10	
Silver	**ND**	**ND**	NA	1.0	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

TOTAL MERCURY
EPA 7471B
DUPLICATE QUALITY CONTROL

Date Extracted: 10-28-14
Date Analyzed: 10-28-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-261-09

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Mercury	**ND**	**ND**	NA	0.25	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

TOTAL METALS
EPA 6010C
MS/MSD QUALITY CONTROL

Date Extracted: 10-28-14
Date Analyzed: 10-28-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-217-09

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**94.2**	94	**94.1**	94	0	
Barium	100	**143**	93	**141**	91	1	
Cadmium	50.0	**45.8**	92	**45.8**	92	0	
Chromium	100	**125**	86	**123**	84	2	
Lead	250	**226**	86	**225**	86	0	
Selenium	100	**88.5**	88	**88.0**	88	1	
Silver	25.0	**20.4**	82	**20.1**	80	2	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

TOTAL MERCURY
EPA 7471B
MS/MSD QUALITY CONTROL

Date Extracted: 10-28-14
Date Analyzed: 10-28-14

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 10-261-09

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Mercury	0.500	**0.441**	88	**0.413**	83	7	

Date of Report: November 5, 2014
Samples Submitted: October 27, 2014
Laboratory Reference: 1410-307
Project: 0183-105-00

% MOISTURE

Date Analyzed: 10-31-14

Client ID	Lab ID	% Moisture
MDS-Drum-MW1D	10-307-01	14

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

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

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

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Page 1 of 1

Company: GEI
Project Number: 0183-005-00
Project Name: McDonald Smith Bldg
Project Manager: TDeOne
Sampled by: Paul Robinette

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 10-307

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	% Moisture
1	~~DRUM-MW~~ MDS-DRUM-MW2D	10/25	1215	S	4					X								X				X

	Signature	Company	Date	Time
Relinquished		GeoEngineers	10/27	850
Received		SPL	"	850
Relinquished	"	"	"	1005
Received			10/27/14	1005
Relinquished				
Received				

Comments/Special Instructions

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

OnSite Environmental Inc.

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

November 7, 2014

Tricia DeOme
GeoEngineers, Inc.
1101 Fawcett Avenue South, Suite 200
Tacoma, WA 98402

Re: Analytical Data for Project 0183-105-00
Laboratory Reference No. 1410-373

Dear Tricia:

Enclosed are the analytical results and associated quality control data for samples submitted on October 31, 2014.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: November 7, 2014
Samples Submitted: October 31, 2014
Laboratory Reference: 1410-373
Project: 0183-105-00

Case Narrative

Samples were collected on October 30, 2014 and received by the laboratory on October 31, 2014. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: November 7, 2014
Samples Submitted: October 31, 2014
Laboratory Reference: 1410-373
Project: 0183-105-00

ANALYTICAL REPORT FOR SAMPLES

Client ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
MDS-MW1D-141030	10-373-0	Water	10-30-14	10-31-14	
CR-MW17-141030	10-373-0	Water	10-30-14	10-31-14	
CR-MW16-141030	10-373-0	Water	10-30-14	10-31-14	
TRIP BLANK	10-373-0	Water	10-30-14	10-31-14	

Date of Report: November 7, 2014
Samples Submitted: October 31, 2014
Laboratory Reference: 1410-373
Project: 0183-105-00

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-141030**					
Laboratory ID:	10-373-01					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chloromethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Vinyl Chloride	1.2	0.20	EPA 8260C	11-6-14	11-6-14	
Bromomethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Trichlorofluoromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Iodomethane	ND	1.3	EPA 8260C	11-6-14	11-6-14	
Methylene Chloride	ND	1.0	EPA 8260C	11-6-14	11-6-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
2,2-Dichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
(cis) 1,2-Dichloroethene	4.4	0.20	EPA 8260C	11-6-14	11-6-14	
Bromochloromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chloroform	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Carbon Tetrachloride	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloropropene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Trichloroethene	2.3	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Dibromomethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Bromodichloromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
2-Chloroethyl Vinyl Ether	ND	1.4	EPA 8260C	11-6-14	11-6-14	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-6-14	11-6-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MDS-MW1D-141030**					
Laboratory ID:	10-373-01					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Tetrachloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,3-Dichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Dibromochloromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromoethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Bromoform	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Bromobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
2-Chlorotoluene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
4-Chlorotoluene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Hexachlorobutadiene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*86*	*79-122*				
Toluene-d8	*86*	*80-120*				
4-Bromofluorobenzene	*97*	*80-120*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CR-MW17-141030**					
Laboratory ID:	10-373-02					
Dichlorodifluoromethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Chloromethane	ND	5.0	EPA 8260C	11-6-14	11-6-14	
Vinyl Chloride	8.7	1.0	EPA 8260C	11-6-14	11-6-14	
Bromomethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Chloroethane	ND	5.0	EPA 8260C	11-6-14	11-6-14	
Trichlorofluoromethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Iodomethane	ND	6.5	EPA 8260C	11-6-14	11-6-14	
Methylene Chloride	ND	5.0	EPA 8260C	11-6-14	11-6-14	
(trans) 1,2-Dichloroethene	4.9	1.0	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
2,2-Dichloropropane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
(cis) 1,2-Dichloroethene	86	1.0	EPA 8260C	11-6-14	11-6-14	
Bromochloromethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Chloroform	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,1,1-Trichloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Carbon Tetrachloride	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloropropene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Trichloroethene	65	1.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloropropane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Dibromomethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Bromodichloromethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
2-Chloroethyl Vinyl Ether	ND	7.0	EPA 8260C	11-6-14	11-6-14	
(cis) 1,3-Dichloropropene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
(trans) 1,3-Dichloropropene	ND	1.0	EPA 8260C	11-6-14	11-6-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CR-MW17-141030**					
Laboratory ID:	10-373-02					
1,1,2-Trichloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Tetrachloroethene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,3-Dichloropropane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Dibromochloromethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromoethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Chlorobenzene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,1,1,2-Tetrachloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Bromoform	ND	5.0	EPA 8260C	11-6-14	11-6-14	
Bromobenzene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,1,2,2-Tetrachloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichloropropane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
2-Chlorotoluene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
4-Chlorotoluene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,3-Dichlorobenzene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,4-Dichlorobenzene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dichlorobenzene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromo-3-chloropropane	ND	5.0	EPA 8260C	11-6-14	11-6-14	
1,2,4-Trichlorobenzene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Hexachlorobutadiene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichlorobenzene	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*87*	*79-122*				
Toluene-d8	*89*	*80-120*				
4-Bromofluorobenzene	*98*	*80-120*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CR-MW16-141030**					
Laboratory ID:	10-373-03					
Dichlorodifluoromethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Chloromethane	ND	10	EPA 8260C	11-6-14	11-6-14	
Vinyl Chloride	19	2.0	EPA 8260C	11-6-14	11-6-14	
Bromomethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Chloroethane	ND	10	EPA 8260C	11-6-14	11-6-14	
Trichlorofluoromethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethene	3.0	2.0	EPA 8260C	11-6-14	11-6-14	
Iodomethane	ND	13	EPA 8260C	11-6-14	11-6-14	
Methylene Chloride	ND	10	EPA 8260C	11-6-14	11-6-14	
(trans) 1,2-Dichloroethene	15	2.0	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
2,2-Dichloropropane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
(cis) 1,2-Dichloroethene	270	2.0	EPA 8260C	11-6-14	11-6-14	
Bromochloromethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Chloroform	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,1,1-Trichloroethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Carbon Tetrachloride	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloropropene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloroethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Trichloroethene	340	2.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloropropane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Dibromomethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Bromodichloromethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
2-Chloroethyl Vinyl Ether	ND	14	EPA 8260C	11-6-14	11-6-14	
(cis) 1,3-Dichloropropene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
(trans) 1,3-Dichloropropene	ND	2.0	EPA 8260C	11-6-14	11-6-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**CR-MW16-141030**					
Laboratory ID:	10-373-03					
1,1,2-Trichloroethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Tetrachloroethene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,3-Dichloropropane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Dibromochloromethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromoethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Chlorobenzene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,1,1,2-Tetrachloroethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Bromoform	ND	10	EPA 8260C	11-6-14	11-6-14	
Bromobenzene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,1,2,2-Tetrachloroethane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichloropropane	ND	2.0	EPA 8260C	11-6-14	11-6-14	
2-Chlorotoluene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
4-Chlorotoluene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,3-Dichlorobenzene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,4-Dichlorobenzene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dichlorobenzene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromo-3-chloropropane	ND	10	EPA 8260C	11-6-14	11-6-14	
1,2,4-Trichlorobenzene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Hexachlorobutadiene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichlorobenzene	ND	2.0	EPA 8260C	11-6-14	11-6-14	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*79-122*				
Toluene-d8	*93*	*80-120*				
4-Bromofluorobenzene	*103*	*80-120*				

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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TRIP BLANK**					
Laboratory ID:	10-373-04					
Dichlorodifluoromethane	ND	0.50	EPA 8260C	11-5-14	11-5-14	
Chloromethane	ND	1.0	EPA 8260C	11-5-14	11-5-14	
Vinyl Chloride	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromomethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Chloroethane	ND	1.0	EPA 8260C	11-5-14	11-5-14	
Trichlorofluoromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Iodomethane	ND	1.5	EPA 8260C	11-5-14	11-5-14	
Methylene Chloride	ND	1.0	EPA 8260C	11-5-14	11-5-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1-Dichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
2,2-Dichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromochloromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Chloroform	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Carbon Tetrachloride	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1-Dichloropropene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Trichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Dibromomethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromodichloromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	11-5-14	11-5-14	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-5-14	11-5-14	

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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**TRIP BLANK**					
Laboratory ID:	10-373-04					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Tetrachloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,3-Dichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Dibromochloromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dibromoethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Chlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromoform	ND	1.0	EPA 8260C	11-5-14	11-5-14	
Bromobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
2-Chlorotoluene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
4-Chlorotoluene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	11-5-14	11-5-14	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Hexachlorobutadiene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*112*	*79-122*				
Toluene-d8	*112*	*80-120*				
4-Bromofluorobenzene	*97*	*80-120*				

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Project: 0183-105-00

HALOGENATED VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1105W1					
Dichlorodifluoromethane	ND	0.50	EPA 8260C	11-5-14	11-5-14	
Chloromethane	ND	1.0	EPA 8260C	11-5-14	11-5-14	
Vinyl Chloride	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromomethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Chloroethane	ND	1.0	EPA 8260C	11-5-14	11-5-14	
Trichlorofluoromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Iodomethane	ND	1.5	EPA 8260C	11-5-14	11-5-14	
Methylene Chloride	ND	1.0	EPA 8260C	11-5-14	11-5-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1-Dichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
2,2-Dichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromochloromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Chloroform	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Carbon Tetrachloride	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1-Dichloropropene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Trichloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Dibromomethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromodichloromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
2-Chloroethyl Vinyl Ether	ND	1.0	EPA 8260C	11-5-14	11-5-14	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-5-14	11-5-14	

Date of Report: November 7, 2014
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Project: 0183-105-00

HALOGENATED VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
Page 2 of 2

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1105W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Tetrachloroethene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,3-Dichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Dibromochloromethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dibromoethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Chlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Bromoform	ND	1.0	EPA 8260C	11-5-14	11-5-14	
Bromobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	11-5-14	11-5-14	
2-Chlorotoluene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
4-Chlorotoluene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	11-5-14	11-5-14	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Hexachlorobutadiene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	11-5-14	11-5-14	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*79-122*				
Toluene-d8	*111*	*80-120*				
4-Bromofluorobenzene	*102*	*80-120*				

Date of Report: November 7, 2014
Samples Submitted: October 31, 2014
Laboratory Reference: 1410-373
Project: 0183-105-00

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

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1106W1					
Dichlorodifluoromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chloromethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Vinyl Chloride	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Bromomethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chloroethane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Trichlorofluoromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Iodomethane	ND	1.3	EPA 8260C	11-6-14	11-6-14	
Methylene Chloride	ND	1.0	EPA 8260C	11-6-14	11-6-14	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
2,2-Dichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Bromochloromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chloroform	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1,1-Trichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Carbon Tetrachloride	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1-Dichloropropene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Trichloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Dibromomethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Bromodichloromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
2-Chloroethyl Vinyl Ether	ND	1.4	EPA 8260C	11-6-14	11-6-14	
(cis) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
(trans) 1,3-Dichloropropene	ND	0.20	EPA 8260C	11-6-14	11-6-14	

Date of Report: November 7, 2014
Samples Submitted: October 31, 2014
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HALOGENATED VOLATILES EPA 8260C
METHOD BLANK QUALITY CONTROL
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Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB1106W1					
1,1,2-Trichloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Tetrachloroethene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,3-Dichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Dibromochloromethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromoethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Chlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1,1,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Bromoform	ND	1.0	EPA 8260C	11-6-14	11-6-14	
Bromobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,1,2,2-Tetrachloroethane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichloropropane	ND	0.20	EPA 8260C	11-6-14	11-6-14	
2-Chlorotoluene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
4-Chlorotoluene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,3-Dichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,4-Dichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2-Dibromo-3-chloropropane	ND	1.0	EPA 8260C	11-6-14	11-6-14	
1,2,4-Trichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Hexachlorobutadiene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
1,2,3-Trichlorobenzene	ND	0.20	EPA 8260C	11-6-14	11-6-14	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*85*	*79-122*				
Toluene-d8	*89*	*80-120*				
4-Bromofluorobenzene	*100*	*80-120*				

Date of Report: November 7, 2014
Samples Submitted: October 31, 2014
Laboratory Reference: 1410-373
Project: 0183-105-00

HALOGENATED VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB1105W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**10.1**	**10.0**	10.0	10.0	101	100	64-138	1	16	
Benzene	**12.0**	**11.2**	10.0	10.0	120	112	76-125	7	14	
Trichloroethene	**10.3**	**10.0**	10.0	10.0	103	100	75-125	3	16	
Toluene	**12.0**	**11.6**	10.0	10.0	120	116	75-125	3	15	
Chlorobenzene	**9.64**	**9.42**	10.0	10.0	96	94	80-140	2	15	
Surrogate:										
Dibromofluoromethane					*117*	*109*	*79-122*			
Toluene-d8					*110*	*112*	*80-120*			
4-Bromofluorobenzene					*102*	*103*	*80-120*			

Date of Report: November 7, 2014
Samples Submitted: October 31, 2014
Laboratory Reference: 1410-373
Project: 0183-105-00

HALOGENATED VOLATILES EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB1106W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**7.25**	**7.45**	10.0	10.0	73	75	64-138	3	16	
Benzene	**9.00**	**9.46**	10.0	10.0	90	95	76-125	5	14	
Trichloroethene	**8.28**	**8.70**	10.0	10.0	83	87	75-125	5	16	
Toluene	**9.58**	**10.1**	10.0	10.0	96	101	75-125	5	15	
Chlorobenzene	**9.83**	**10.1**	10.0	10.0	98	101	80-140	3	15	
Surrogate:										
Dibromofluoromethane					*89*	*85*	*79-122*			
Toluene-d8					*88*	*88*	*80-120*			
4-Bromofluorobenzene					*102*	*100*	*80-120*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

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

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

X - Sample extract treated with a mercury cleanup procedure.

X1- Sample extract treated with a Sulfuric acid/Silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in method 8260C, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: GeoEngineers
Project Number: 0183-105-00
Project Name: UWT-MDS
Project Manager: Tricia DeOnne
Sampled by: PDE

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☐ Standard (7 Days) (TPH analysis 5 Days)
☒ 5days (other)

Laboratory Number: 10-373

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260C	Halogenated Volatiles 8260C	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	% Moisture
1	MDS-MW1D-141030	10/30	1100	W	3						X											
2	CR-MW27-141030	10/30	1230	W	3						X											
3	CR-MW16-141030	10/30	1355	W	3						X											
4	TRIP BLANK	10/30			1						X											

	Signature	Company	Date	Time
Relinquished		GeoEngineers	10/30	1015
Received		Speedy/ALPHA	10/31/14	1015
Relinquished				
Received		OE	10/31/14	1315
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Standard ☐ Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

Data Validation Report

1101 Fawcett Avenue, Suite 200, Tacoma, Washington 98402, Telephone: 253.383.4940, Fax: 253.383.4923 www.geoengineers.com

Project: University of Washington – Tacoma, McDonald Smith Building
October 2014 Air Samples

GEI File No: 0183-105-00

Date: December 16, 2014

This report documents the results of a United States Environmental Protection Agency (USEPA)-defined Stage 2A data validation (USEPA Document 540-R-08-005; USEPA, 2009) of analytical data from the analyses of soil vapor samples collected as part of the October 2014 sampling event, and the associated laboratory quality control (QC) samples. The samples were obtained from the McDonald Smith Building Site located at 1932 Pacific Avenue on the University of Washington – Tacoma (UWT) campus located in Tacoma, Washington.

Objective and Quality Control Elements

GeoEngineers, Inc. (GeoEngineers) completed the data validation consistent with the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (USEPA, 2008) (National Functional Guidelines) to determine if the laboratory analytical results meet the project objectives and are usable for their intended purpose. Data usability was assessed by determining if:

- The samples were analyzed using well-defined and acceptable methods that provide reporting limits below applicable regulatory criteria;
- The precision and accuracy of the data are well-defined and sufficient to provide defensible data; and
- The quality assurance/quality control (QA/QC) procedures utilized by the laboratory meet acceptable industry practices and standards.

In accordance with Sampling and Analysis Plan and Quality Assurance Project Plan (GeoEngineers, 2014), the laboratory data was reviewed for the following QC elements:

- Data Package Completeness
- Chain-of-Custody Documentation
- Holding Times and Canister Vacuum/Pressure
- Surrogate Recoveries
- Method Blanks
- Matrix Spikes/Matrix Spike Duplicates
- Laboratory Control Samples/Laboratory Control Sample Duplicates
- Miscellaneous

Validated Sample Delivery Groups

This data validation included review of the sample delivery groups (SDGs) listed below in Table 1.

TABLE 1: SUMMARY OF VALIDATED SAMPLE DELIVERY GROUPS

Laboratory SDG	Samples Validated
1410393A	MDS-SV1-141023, MDS-SV2-141023, MDS-SV3-141023, MDS-SV4-141023
1410393B	

Chemical Analysis Performed

Eurofins Air Toxics, Incorporated, located in Folsom, California, performed laboratory analysis on the soil vapor samples using the following methods:

- Volatile Organic Compounds (VOCs) by Method TO-15-SIM; and
- Helium by Method ASTM-D1946

Data Validation Summary

The results for each of the QC elements are summarized below.

Data Package Completeness

Eurofins Air Toxics provided all required deliverables for the data validation according to the National Functional Guidelines. The laboratory followed adequate corrective action processes and all identified anomalies were discussed in the relevant laboratory case narrative.

Chain-of-Custody Documentation

Chain-of-custody (COC) forms were provided with the laboratory analytical reports. The COCs were accurate and complete when submitted to the lab.

Holding Times and Canister Vacuum/Pressure

The sample holding time is defined as the time that elapses between sample collection and sample analysis. Maximum holding time criteria exist for each analysis to help ensure that the analyte concentrations found at the time of analysis reflect the concentration present at the time of sample collection. Established holding times were met for all analyses.

As stated in the Sampling and Analysis Plan and Quality Assurance Project Plan (GeoEngineers, 2014), the sample canisters are prepared at the laboratory with approximately 30 inches of mercury (inHg) vacuum. In the field, the sample canisters are filled with soil vapor for approximately 30 minutes or until a vacuum equivalent of approximately 5 inHg remains in the sample canister, whichever comes first.

There are two reasons for this:

- The more sample volume collected within the sample canister, the less inert nitrogen air that is added by the laboratory to create a necessary positive pressure within the sample canister (5 pounds per square inch), resulting in less dilution of the sample.
- Allows for determination of leakage (loss of sample volume) from the sample canister between the field and receipt at the laboratory.

The final canister vacuum is recorded in the field and by the laboratory upon receipt. In the field, the final vacuum on the sample canisters were generally between 3 and 7 inHg. At the lab, the final vacuum on the sample canisters were generally between 0 and 6.5 inHg. The final canister vacuums between the field and laboratory readings were acceptable within + or – 5 inHg and no anomalies were identified.

Surrogate Recoveries

A surrogate compound is a compound that is chemically similar to the organic analytes of interest, but unlikely to be found in any environmental sample. Surrogates are used for organic analyses and are added to all samples, standards, and blanks to serve as an accuracy and specificity check of each analysis. The surrogates are added to the samples at a known concentration and percent recoveries are calculated following analysis. All surrogate percent recoveries for field samples were within the laboratory control limits.

Method Blanks

Method blanks are analyzed to ensure that laboratory procedures and reagents do not introduce measurable concentrations of the analytes of interest. A method blank was analyzed with each batch of samples, at a frequency of 1 per 20 samples. For all sample batches, method blanks for all applicable methods were analyzed at the required frequency. None of the analytes of interest were detected above the reporting limits in any of the method blanks.

Matrix Spikes / Matrix Spike Duplicates

The laboratory did not perform any MS/MSD sample sets because the air sampling method USEPA TO-15 does not require an internal accuracy and precision test sample aside from the LCS/LCSD.

Laboratory Control Samples / Laboratory Control Sample Duplicates

A laboratory control sample (LCS) is a blank sample that is spiked with a known amount of analyte and then analyzed. An LCS is similar to an MS, but without the possibility of matrix interference. Given that matrix interference is not an issue, the LCS/LCSD control limits for accuracy and precision are usually more rigorous than for MS/MSD analyses. Additionally, data qualification based on LCS/LCSD analyses would apply to all samples in the associated batch, instead of just the parent sample. The percent recovery control limits for LCS and LCSD analyses are specified in the laboratory documents, as are the RPD control limits for LCS/LCSD sample sets.

One LCS/LCSD analysis should be performed for every analytical batch or every 20 field samples, whichever is more frequent. The frequency requirements were met for all analyses and the percent recovery and RPD values were within the proper control limits.

Miscellaneous

SDG 1410393B: Helium was utilized as a tracer gas while collecting the soil vapor samples. During sample collection, a surface shroud was installed over the sample train and filled with helium gas. The purpose of the helium-filled shroud is to evaluate potential dilution of the soil vapor sample from surface air that could enter from breaches in the sampling train. Helium was analyzed for in each soil vapor sample submitted for analysis. Concentrations of helium greater than 5 percent in the soil vapor sample may indicate introduction of surface air into the sample.

Concentrations of helium in the soil vapor samples collected during this sampling event were within the control limit for the sampling method.

Overall Assessment

As was determined by this data validation, the laboratory followed the specified analytical methods. Accuracy was acceptable, as demonstrated by the surrogate and LCS/LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD values.

No analytical results were qualified. All data are acceptable for the intended use.

References

U.S. Environmental Protection Agency (USEPA). "Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use," EPA-540-R-08-005. January 2009.

U.S. Environmental Protection Agency (USEPA). "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review," EPA-540-R-08-01. June 2008.

GeoEngineers, Inc. "Sampling and Analysis Plan and Quality Assurance Project Plan," prepared for University of Washington, GEI File No. 0183-099-00. October 17, 2014.

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10/28/2014
Mr. Neil Morton
GeoEngineers, Inc.
600 Stewart Street
Suite 1700
Seattle WA 98101

Project Name:
Project #: McDonald Smith Bldg
Workorder #: 1410393A

Dear Mr. Neil Morton

The following report includes the data for the above referenced project for sample(s) received on 10/25/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-15 SIM are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1410393A

Work Order Summary

CLIENT:	Mr. Neil Morton GeoEngineers, Inc. 600 Stewart Street Suite 1700 Seattle, WA 98101	**BILL TO:**	CORP Accounts Payables GeoEngineers, Inc. 8410 154th Avenue NE Redmond, WA 98052
PHONE:	206-728-2674	**P.O. #**	0183-105-00
FAX:	206-728-2732	**PROJECT #**	McDonald Smith Bldg
DATE RECEIVED:	10/25/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	10/28/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	MDS-SV1-141023	Modified TO-15 SIM	6.5 "Hg	5 psi
02A	MDS-SV2-141023	Modified TO-15 SIM	0 "Hg	5 psi
03A	MDS-SV3-141023	Modified TO-15 SIM	4.5 "Hg	5 psi
04A	MDS-SV4-141023	Modified TO-15 SIM	4.0 "Hg	5 psi
05A	Lab Blank	Modified TO-15 SIM	NA	NA
06A	CCV	Modified TO-15 SIM	NA	NA
07A	LCS	Modified TO-15 SIM	NA	NA
07AA	LCSD	Modified TO-15 SIM	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 10/28/14

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704343-14-7, UT NELAP CA009332014-5, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2014, Expiration date: 10/17/2015.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified TO-15 SIM
GeoEngineers, Inc.
Workorder# 1410393A

Four 6 Liter Summa Canister (SIM Certified) samples were received on October 25, 2014. The laboratory performed analysis via modified EPA Method TO-15 using GC/MS in the SIM acquisition mode.

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	Project specific; default criteria is </=30% RSD with 10% of compounds allowed out to < 40% RSD
Daily Calibration	+- 30% Difference	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

Despite the use of flow controllers for sample collection, the final canister vacuum for sample MDS-SV2-141023 was measured at ambient pressure. These ambient pressure readings were confirmed by the laboratory upon sample receipt.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight 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, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

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

Client Sample ID: MDS-SV1-141023

Lab ID#: 1410393A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Trichloroethene	0.034	1.7	0.18	9.2
Tetrachloroethene	0.034	0.41	0.23	2.8

Client Sample ID: MDS-SV2-141023

Lab ID#: 1410393A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.027	0.58	0.11	2.3
Trichloroethene	0.027	4.4	0.14	24
Tetrachloroethene	0.027	0.22	0.18	1.5

Client Sample ID: MDS-SV3-141023

Lab ID#: 1410393A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.032	0.17	0.12	0.67
Trichloroethene	0.032	8.9	0.17	48
Tetrachloroethene	0.032	0.32	0.21	2.2

Client Sample ID: MDS-SV4-141023

Lab ID#: 1410393A-04A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
cis-1,2-Dichloroethene	0.031	0.34	0.12	1.3
Trichloroethene	0.031	19	0.17	100
Tetrachloroethene	0.031	0.050	0.21	0.34

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Client Sample ID: MDS-SV1-141023

Lab ID#: 1410393A-01A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102707sim**	**Date of Collection: 10/23/14 11:25:00 A**	
Dil. Factor:	**1.71**	**Date of Analysis: 10/27/14 10:43 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.017	Not Detected	0.044	Not Detected
1,1-Dichloroethene	0.017	Not Detected	0.068	Not Detected
cis-1,2-Dichloroethene	0.034	Not Detected	0.14	Not Detected
Trichloroethene	0.034	1.7	0.18	9.2
Tetrachloroethene	0.034	0.41	0.23	2.8
trans-1,2-Dichloroethene	0.17	Not Detected	0.68	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	107	70-130
Toluene-d8	95	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: MDS-SV2-141023

Lab ID#: 1410393A-02A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102708sim**	**Date of Collection: 10/23/14 12:34:00 P**	
Dil. Factor:	**1.34**	**Date of Analysis: 10/27/14 12:04 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.013	Not Detected	0.034	Not Detected
1,1-Dichloroethene	0.013	Not Detected	0.053	Not Detected
cis-1,2-Dichloroethene	0.027	0.58	0.11	2.3
Trichloroethene	0.027	4.4	0.14	24
Tetrachloroethene	0.027	0.22	0.18	1.5
trans-1,2-Dichloroethene	0.13	Not Detected	0.53	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	97	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: MDS-SV3-141023

Lab ID#: 1410393A-03A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102709sim**	**Date of Collection: 10/23/14 1:45:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 10/27/14 01:03 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.063	Not Detected
cis-1,2-Dichloroethene	0.032	0.17	0.12	0.67
Trichloroethene	0.032	8.9	0.17	48
Tetrachloroethene	0.032	0.32	0.21	2.2
trans-1,2-Dichloroethene	0.16	Not Detected	0.63	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	99	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: MDS-SV4-141023

Lab ID#: 1410393A-04A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102711sim**	**Date of Collection: 10/23/14 10:08:00 A**	
Dil. Factor:	**1.55**	**Date of Analysis: 10/27/14 02:37 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.016	Not Detected	0.040	Not Detected
1,1-Dichloroethene	0.016	Not Detected	0.061	Not Detected
cis-1,2-Dichloroethene	0.031	0.34	0.12	1.3
Trichloroethene	0.031	19	0.17	100
Tetrachloroethene	0.031	0.050	0.21	0.34
trans-1,2-Dichloroethene	0.16	Not Detected	0.61	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	103	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1410393A-05A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102706sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/27/14 09:53 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
Vinyl Chloride	0.010	Not Detected	0.026	Not Detected
1,1-Dichloroethene	0.010	Not Detected	0.040	Not Detected
cis-1,2-Dichloroethene	0.020	Not Detected	0.079	Not Detected
Trichloroethene	0.020	Not Detected	0.11	Not Detected
Tetrachloroethene	0.020	Not Detected	0.14	Not Detected
trans-1,2-Dichloroethene	0.10	Not Detected	0.40	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	99	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1410393A-06A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102702sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/27/14 06:43 AM**	

Compound	%Recovery
Vinyl Chloride	83
1,1-Dichloroethene	88
cis-1,2-Dichloroethene	90
Trichloroethene	76
Tetrachloroethene	85
trans-1,2-Dichloroethene	89

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	91	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCS

Lab ID#: 1410393A-07A

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102703sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/27/14 07:34 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	79	70-130
1,1-Dichloroethene	83	70-130
cis-1,2-Dichloroethene	83	70-130
Trichloroethene	70	70-130
Tetrachloroethene	79	70-130
trans-1,2-Dichloroethene	79	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	90	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	102	70-130

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Client Sample ID: LCSD

Lab ID#: 1410393A-07AA

MODIFIED EPA METHOD TO-15 GC/MS SIM

File Name:	**e102704sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/27/14 08:18 AM**	

Compound	%Recovery	Method Limits
Vinyl Chloride	79	70-130
1,1-Dichloroethene	81	70-130
cis-1,2-Dichloroethene	83	70-130
Trichloroethene	70	70-130
Tetrachloroethene	79	70-130
trans-1,2-Dichloroethene	78	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	90	70-130
Toluene-d8	101	70-130
4-Bromofluorobenzene	102	70-130

Air Toxics LTD.

Chain-of-Custody Record

Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection handling or shipping of these samples. Relinquished signature also indicated agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

AIR TOXICS LTD.
180 BLUE RAVINE RD, SUITE B
FOLSOM, CA 95630-1020
916-985-1000 main line
916-985-1020 fax line

Page of

Contact Person Tricia DeDona
Company GeoEngineers
Address 1101 S. Fawcett St City Tacoma State/Zip 98402
Phone 253-267-2114 FAX
tdedona@geoengineers.com
Collected By: (Signature)

Project Information:
P.O. # 0183-105-00
Project # McDonald Smith Bldg
Project Name

Turn Around Time:
☐ Normal
☒ Rush 1day Specify

Pressurized by:
Date:
Press. Gas: N2 He

Lab I.D.	Field Sample I.D.	Canister I.D.	Date & Time	Analysis Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	MPS-SV1-141023	33982	10/23/14 1055/1125	~~EPA TO15~~ TO15 SIM - PCE; TCE; 1,1DCE;	30 "Hg	7		
02A	MPS-SV2-141023	5793	10/23/14 1144/1234	cis-1,2DCE; trans 1,2DCE and	26.5 "Hg	3		
03A	MPS-SV3-141023	36035	10/23/14 1315/1345	vinylchloride on all	28.5 "Hg	4		
04A	MPS-SV4-141023	35992	10/23/14 938/1008	samples	28 "Hg	6		
					"Hg			
				Helium For All	"Hg			
				Samples	"Hg			
					"Hg			
					"Hg			
					"Hg			

Relinquished By: (Signature) Date/Time: 10/24/2014 1220 (shipped)
Received By: (Signature) Date/Time: EAR 10/25/14 0900
Relinquished By: (Signature) Date/Time:
Received By: (Signature) Date/Time:
Relinquished By: (Signature) Date/Time:
Received By: (Signature) Date/Time:

Notes: Need results by Tuesday, Oct 28 afternoon
(*) TO-15 SIM (*) Helium

Lab Use Only	Shipper Name	Air Bill #	Opened By	Temp ©	Condition	Custody Seals	Work Order #
	FedEx		DM	NA	Good	Yes No (None)	1410393

Revised CoC received on 10/25/14

Air Toxics LTD.

Chain-of-Custody Record

Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection handling or shipping of these samples. Relinquished signature also indicated agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

AIR TOXICS LTD.
180 BLUE RAVINE RD, SUITE B
FOLSOM, CA 95630-1020
916-985-1000 main line
916-985-1020 fax line

Contact Person Tricia DeDona
Company Geo Engineers
Address 1015 Fawcett St City Tacoma State WA Zip 98402
Phone 253-265-2114 FAX
tdeona@geoengineers.com
Collected By: (Signature)

Project Information:
P.O. # 0183-106-00
Project # McDonald Smith Bldg
Project Name

Turn Around Time:
☐ Normal
☒ Rush 1day Specify

Pressurized by:
Date:
Press. Gas: N2 He

Lab I.D.	Field Sample I.D.	Canister I.D.	Date & Time	Analysis Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	MPS-SV1-141023	33982	10/23/14 1055/1125	EPA TO15-PCE; TCE; 1,1DCE;	30+ "Hg	7		
02A	MPS-SV2-141023	3793	10/23/14 1144/1234	cis-1,2 DCE; trans 1,2 DCE and	26.5 "Hg	3		
03A	MPS-SV3-141023	36035	10/23/14 1315/1345	vinyl chloride on all	28.6 "Hg	4		
04A	MPS-SV4-141023	35992	10/23/14 938/1008	samples	28 "Hg	6		
					"Hg			
					"Hg			
					"Hg			
					"Hg			
					"Hg			
					"Hg			

Relinquished By: (Signature) Date/Time — Received By: (Signature) Date/Time
10/29/2014 1220 (shipped)
Relinquished By: (Signature) Date/Time — Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time — Received By: (Signature) Date/Time

Notes: Need results by Tuesday, Oct 28 at noon

Lab Use Only	Shipper Name	Air Bill #	Opened By	Temp ©	Condition	Custody Seals	Work Order #
	FedEx		DM	NA	Good	Yes No (None)	1410393

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10/28/2014
Mr. Neil Morton
GeoEngineers, Inc.
600 Stewart Street
Suite 1700
Seattle WA 98101

Project Name:
Project #: McDonald Smith Bldg
Workorder #: 1410393B

Dear Mr. Neil Morton

The following report includes the data for the above referenced project for sample(s) received on 10/25/2014 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Air Toxics Ltd. for your air analysis needs. Air Toxics Ltd. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

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WORK ORDER #: 1410393B

Work Order Summary

CLIENT:	Mr. Neil Morton GeoEngineers, Inc. 600 Stewart Street Suite 1700 Seattle, WA 98101	**BILL TO:**	CORP Accounts Payables GeoEngineers, Inc. 8410 154th Avenue NE Redmond, WA 98052
PHONE:	206-728-2674	**P.O. #**	0183-105-00
FAX:	206-728-2732	**PROJECT #**	McDonald Smith Bldg
DATE RECEIVED:	10/25/2014	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	10/28/2014		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	MDS-SV1-141023	Modified ASTM D-1946	6.5 "Hg	5 psi
02A	MDS-SV2-141023	Modified ASTM D-1946	0 "Hg	5 psi
03A	MDS-SV3-141023	Modified ASTM D-1946	4.5 "Hg	5 psi
04A	MDS-SV4-141023	Modified ASTM D-1946	4.0 "Hg	5 psi
05A	Lab Blank	Modified ASTM D-1946	NA	NA
06A	LCS	Modified ASTM D-1946	NA	NA
06AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Mayo DATE: 10/28/14

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704343-14-7, UT NELAP CA009332014-5, VA NELAP - 460197, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2014, Expiration date: 10/17/2015.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

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(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Modified ASTM D-1946
GeoEngineers, Inc.
Workorder# 1410393B

Four 6 Liter Summa Canister (SIM Certified) samples were received on October 25, 2014. The laboratory performed analysis via Modified ASTM Method D-1946 for Helium in air using GC/TCD. The method involves direct injection of 1.0 mL of sample.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

Despite the use of flow controllers for sample collection, the final canister vacuum for sample MDS-SV2-141023 was measured at ambient pressure. These ambient pressure readings were confirmed by the laboratory upon sample receipt.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
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 detection limit.
M - Reported value may be biased due to apparent matrix interferences.
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
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: MDS-SV1-141023

Lab ID#: 1410393B-01A

No Detections Were Found.

Client Sample ID: MDS-SV2-141023

Lab ID#: 1410393B-02A

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.067	0.14

Client Sample ID: MDS-SV3-141023

Lab ID#: 1410393B-03A

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.079	0.49

Client Sample ID: MDS-SV4-141023

Lab ID#: 1410393B-04A

Compound	Rpt. Limit (%)	Amount (%)
Helium	0.078	0.36

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Client Sample ID: MDS-SV1-141023

Lab ID#: 1410393B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9102704b**	**Date of Collection: 10/23/14 11:25:00 A**	
Dil. Factor:	**1.71**	**Date of Analysis: 10/27/14 06:28 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.086	Not Detected

Container Type: 6 Liter Summa Canister (SIM Certified)

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Client Sample ID: MDS-SV2-141023

Lab ID#: 1410393B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9102705b**	**Date of Collection: 10/23/14 12:34:00 P**	
Dil. Factor:	**1.34**	**Date of Analysis: 10/27/14 06:57 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.067	0.14

Container Type: 6 Liter Summa Canister (SIM Certified)

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Client Sample ID: MDS-SV3-141023

Lab ID#: 1410393B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9102706b**	**Date of Collection: 10/23/14 1:45:00 PM**	
Dil. Factor:	**1.58**	**Date of Analysis: 10/27/14 07:20 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.079	0.49

Container Type: 6 Liter Summa Canister (SIM Certified)

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Client Sample ID: MDS-SV4-141023

Lab ID#: 1410393B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9102707b**	**Date of Collection: 10/23/14 10:08:00 A**	
Dil. Factor:	**1.55**	**Date of Analysis: 10/27/14 07:42 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.078	0.36

Container Type: 6 Liter Summa Canister (SIM Certified)

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Client Sample ID: Lab Blank

Lab ID#: 1410393B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9102703b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/27/14 04:41 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Helium	0.050	Not Detected

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1410393B-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9102702b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/27/14 04:17 PM**	

Compound	%Recovery	Method Limits
Helium	101	85-115

Container Type: NA - Not Applicable

eurofins | Air Toxics

Client Sample ID: LCSD

Lab ID#: 1410393B-06AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**9102708b**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 10/27/14 08:57 PM**	

Compound	%Recovery	Method Limits
Helium	100	85-115

Container Type: NA - Not Applicable

Air Toxics LTD.

Chain-of-Custody Record

Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection handling or shipping of these samples. Relinquished signature also indicated agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

AIR TOXICS LTD.
180 BLUE RAVINE RD, SUITE B
FOLSOM, CA 95630-1020
916-985-1000 main line
916-985-1020 fax line

Contact Person: Tricia DeDona
Company: GeoEngineers
Address: 1101 S. Fawcett St City: Tacoma State/Zip: WA 98402
Phone: 253-267-2114 FAX:
tdedona@geoengineers.com
Collected By: (Signature)

Project Information:
P.O. # 0183-105-00
Project # McDonald Smith Bldg
Project Name

Turn Around Time:
☐ Normal
☒ Rush 1day Specify

Pressurized by:
Date:
Press. Gas: N2 He

Lab I.D.	Field Sample I.D.	Canister I.D.	Date & Time	Analysis Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	MPS-SV1-141023	33982	10/23/14 1055/1125	~~EPA TO15~~ TO15 SIM - PCE; TCE; 1,1DCE;	30 "Hg	7		
02A	MPS-SV2-141023	5793	10/23/14 1144/1234	cis-1,2DCE; trans 1,2DCE and	26.6 "Hg	3		
03A	MPS-SV3-141023	36035	10/23/14 1315/1345	vinylchloride on all	28.6 "Hg	4		
04A	MPS-SV4-141023	35982	10/23/14 938/1008	samples	28 "Hg	6		
					"Hg			
				Helium For All	"Hg			
				Samples	"Hg			
					"Hg			
					"Hg			
					"Hg			

Relinquished By: (Signature) Date/Time: 10/24/2014 1220 (shipped)
Received By: (Signature) Date/Time: EAR 10/25/14 0900
Relinquished By: (Signature) Date/Time:
Received By: (Signature) Date/Time:
Relinquished By: (Signature) Date/Time:
Received By: (Signature) Date/Time:

Notes: Need results by Tuesday, Oct 28 afternoon
(*) TO-15 SIM (*) Helium

Lab Use Only	Shipper Name	Air Bill #	Opened By	Temp ©	Condition	Custody Seals	Work Order #
	FedEx		DM	NA	Good	Yes No None	1410393

Revised CoC received on 10/25/14

Air Toxics LTD.

Chain-of-Custody Record

Sample Transportation Notice

Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection handling or shipping of these samples. Relinquished signature also indicated agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

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Contact Person Tricia DeDona
Company Geo Engineers
Address 1101 S. Fawcett St City Tacoma State WA Zip 98402
Phone 253-265-2114 FAX
tdeona@geoengineers.com
Collected By: (Signature)

Project Information:
P.O. # 0183-106-00
Project # McDonald Smith Bldg
Project Name

Turn Around Time:
☐ Normal
☒ Rush 1day Specify

Pressurized by:
Date:
Press. Gas: N2 He

Lab I.D.	Field Sample I.D.	Canister I.D.	Date & Time	Analysis Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	MPS-SV1-141023	33982	10/23/14 1055/1125	EPA TO15-PCE; TCE; 1,1DCE;	30+ "Hg	7		
02A	MPS-SV2-141023	3793	10/23/14 1141/1234	cis-1,2 DCE; trans 1,2 DCE and	26.5 "Hg	3		
03A	MPS-SV3-141023	36035	10/23/14 1315/1345	vinylchloride on all	28.5 "Hg	4		
04A	MPS-SV4-141023	35992	10/23/14 938/1008	samples	28 "Hg	6		
					"Hg			
					"Hg			
					"Hg			
					"Hg			
					"Hg			
					"Hg			

Relinquished By: (Signature) Date/Time: 10/24/2014 1220 (shipped)
Received By: (Signature) Date/Time: FAX 10/25/14 6
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time
Relinquished By: (Signature) Date/Time
Received By: (Signature) Date/Time

Notes: Need results by Tuesday, Oct 28 at noon

Lab Use Only	Shipper Name	Air Bill #	Opened By	Temp ©	Condition	Custody Seals	Work Order #
	FedEx		DM	NA	Good	Yes No (None)	1410393

APPENDIX D
Screening Level Calculation

Table D-1

Method B Groundwater Vapor Intrusion Screening Level Calculations

University of Washington Tacoma - McDonald Smith Building

Tacoma, Washington

VOC	Method B Air CUL [1] (µg/m^3)			Vapor Attenuation Factor[3]	Temperature-Adjusted Henry's Law (Unitless) [4]- 13C	Method B Groundwater VI SL [5] (µg/L)		
	Non-Cancer (Eq. 750-1)	Cancer (Eq. 750-2)	Method B			Non-Cancer	Cancer	Method B
1,1-Dichloroethene	91	--	91	0.001	0.706	130	--	130
cis-1,2-Dichloroethene	16	--	16	0.001	0.1	160	--	160
Tetrachloroethene[2]	18	9.6	9.6	0.001	0.398	45	24	24
Trichloroethene[2]	0.91	0.37	0.37	0.001	0.239	3.8	1.5	1.5
trans-1,2-Dichloroethene[2]	27	--	27	0.001	0.241	110	--	110
Vinyl chloride	46	0.28	0.28	0.001	0.807	57	0.35	0.35

Notes:

[1] Method B Air Cleanup Levels (CUL) from Ecology's May 2014 Excel workbook "CLARC Master Spreadsheet.xlsx"

[2] Method B Air CULs have been updated since publication of Ecology's review draft "Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action" dated October 2009 (draft VI guidance; Ecology, 2009).

[3] Default vapor attenuation factor from Ecology's draft VI guidance.

[4] Temperature-adjusted Henry's Law (unitless) estimated using EPA's 2004 Johnson and Ettinger Groundwater-Advanced Workbook (GW-ADV-Feb04.xls)

[5] Method B Groundwater Vapor Intrusion (VI) Screening Levels (SL) calculated using Equation 1 from Ecology's draft VI Guidance.

Table D-2

Method B Groundwater Vapor Intrusion Screening Level Calculations

University of Washington Tacoma - McDonald Smith Building

Tacoma, Washington

VOC	Method B Air CUL [1] (µg/m^3)			Exposure Frequency[2]	Method B Air Remediation Level [3] (µg/L)		
	Non-Cancer (Eq. 750-1)	Cancer (Eq. 750-2)	Method B		Non-Cancer	Cancer	Method B
Trichloroethene[2]	9.0E-01	3.7E-01	9.6	0.15	5.9E+00	2.4E+00	2.4E+00

Notes:

[1] Method B Air Cleanup Levels (CUL) from Ecology's May 2014 Excel workbook "CLARC Master Spreadsheet.xlsx"

[2] Exposure frequency = (8 hours/day * 250 days/year * 20 years)/(24 hours/day * 365 days/year * 30 years). Hours of assumed exposure for the occupational/commercial worker divided by hours of assumed exposure assumed for the MTCA Method B Air CUL.

[3] Method B Air Remediation level based on a typical Occupational/Commercial scenario with an assumed exposure of 250 days/year, 8 hours/day, 20 years.

APPENDIX E
Johnson and Ettinger Model

SG-ADV
Version 3.1; 02/04

Reset to Defaults

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g (mg/m^3)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
79016	4.53E+01			Trichloroethylene

MORE
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ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Totals must add up to value of Ls (cell F24) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
15	15	13	15	0	0	s		

Risk	2.7E-06
HI	0.00
alpha	1.3E-03
1/alpha (VAF)	7.7E+02
Indoor Air [ ]	0.059

MORE
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ENTER Stratum A SCS soil type	ENTER Stratum A soil dry bulk density, r_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, q_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type	ENTER Stratum B soil dry bulk density, r_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, q_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type	ENTER Stratum C soil dry bulk density, r_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, q_w^C (cm^3/cm^3)
Lookup Soil Parameters				Lookup Soil Parameters				Lookup Soil Parameters			
s	1.66	0.375	0.054	C	1.43	0.459	0.215	C	1.43	0.459	0.215

MORE
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ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, DP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
7.6	40	3657.6	2286	457.2	0.1	0.5	41.8

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)
70	30	30	350

END

	feet	cm	
Slab	0.25	7.62	
Width	75	2286	Approximate Width of MDS Building
Length	120	3657.6	Approximate Length of MDS Building
Height	15	457.2	Approximate Ceiling Height of MDS Building Ground Floor
Cracks	8	243.84	Approximate Length of Cracks in MDS Building Ground Floor

Qsoil (calc)	696.8 cm3/s	Qsoil value used in calculations
	41.8 L/m	
Qsoil (NJ)	14.9	Qsoil calculated using New Jersey approach: (5L/min) x (building perimeter in cm/4,000 cm)
Qsoil(Cal)	41.8	Qsoil calculated using Cal-EPA/DTSC approach: (5L/min) x (building area in cm^2/10,000 cm^2)

INTERMEDIATE CALCULATIONS SHEET

Exposure duration, τ (sec)	Source-building separation, L_T (cm)	Stratum A soil air-filled porosity, θ_a^A (cm^3/cm^3)	Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	Stratum C soil air-filled porosity, θ_a^C (cm^3/cm^3)	Stratum A effective total fluid saturation, S_{te} (cm^3/cm^3)	Stratum A soil intrinsic permeability, k_i (cm^2)	Stratum A soil relative air permeability, k_{rg} (cm^2)	Stratum A soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
9.46E+08	1	0.321	0.244	0.244	0.003	9.98E-08	0.998	9.96E-08	11,887	4.53E+01	5.31E+05

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Stratum A effective diffusion coefficient, D^{eff}_A (cm^2/s)	Stratum B effective diffusion coefficient, D^{eff}_B (cm^2/s)	Stratum C effective diffusion coefficient, D^{eff}_C (cm^2/s)	Total overall effective diffusion coefficient, D^{eff}_T (cm^2/s)	Diffusion path length, L_d (cm)
8.54E+06	1.39E-04	15	8,520	5.62E-03	2.39E-01	1.76E-04	1.28E-02	0.00E+00	0.00E+00	1.28E-02	1

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $\exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)	Unit risk factor, URF $(\mu g/m^3)^{-1}$	Reference conc., RfC (mg/m^3)
15	4.53E+01	0.10	6.97E+02	1.28E-02	1.19E+03	3.09E+151	1.30E-03	5.91E-02	1.1E-04	4.0E-02

END

APPENDIX F
Report Limitations and Guidelines for Use

APPENDIX F
REPORT LIMITATIONS AND GUIDELINES FOR USE[2]

This appendix provides information to help you manage your risks with respect to the use of this report.

Environmental Services are Performed for Specific Purposes, Persons and Projects

This report has been prepared for use by University of Washington. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except University of Washington should rely on this environmental report without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

This Environmental Report is Based on a Unique Set of Project-Specific Factors

This report has been prepared for the University of Washington Tacoma regarding the subsurface investigation completed at McDonald Smith Building located in Tacoma, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

Reliance Conditions for Third Parties

If a lending agency or other parties intend to place legal reliance on the product of our services, we require that those parties indicate in writing their acknowledgement that the scope of services provided, and the general conditions under which the services were rendered including the limitation of professional liability, are understood and accepted by them. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

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[2] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org.

Environmental Regulations are Always Evolving

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

Subsurface Conditions can Change

This environmental report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

Topsoil

For the purposes of this report, we consider topsoil to consist of generally fine-grained soil with an appreciable amount of organic matter based on visual examination, and to be unsuitable for direct support of the proposed improvements. However, the organic content and other mineralogical and gradational characteristics used to evaluate the suitability of soil for use in landscaping and agricultural purposes was not determined, nor considered in our analyses. Therefore, the information and recommendations in this report, and our logs and descriptions should not be used as a basis for estimating the volume of topsoil available for such purposes.

Most Environmental Findings are Professional Opinions

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

Do Not Redraw the Exploration Logs

Environmental scientists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in an environmental report should never be redrawn for inclusion in other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

Read These Provisions Closely

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory “limitations”

provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

Geotechnical, Geologic and Geoenvironmental Reports Should Not Be Interchanged

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

Biological Pollutants

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention, or assessment of the presence of Biological Pollutants in or around any structure. Accordingly, this report includes no interpretations, recommendations, findings, or conclusions for the purpose of detecting, preventing, assessing, or abating Biological Pollutants. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.