# SOIL AND GROUNDWATER ASSESSMENT REPORT

**At**

## RICHLAND UPTOWN SHOPPING CENTER
## Parcel 11
## 1368 Jadwin Avenue
## Richland, Washington

## WA CLEANUP SITE ID NO.: 11644

November 27, 2017

Prepared for:

Washington Department of Ecology
CRO Toxics Cleanup Program
1250 W. Alder Street
Union Gap, WA 98903
Attn: Frank P. Winslow

Prepared by:

Blue Mountain Environmental and Consulting Co., Inc.
PO Box 545/125 Main St.
Waitsburg, WA 99361
509-520-4416

Brent Bergeron, LG, LHG

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# 1.0 INTRODUCTION

This report, prepared by Blue Mountain Environmental & Consulting Co., Inc. (BMEC) for the Washington Department of Ecology (Ecology), presents an approach for conducting a soil and groundwater assessment of a former heating oil tank (HOT) at the Richland Uptown Shopping Center (Parcel 11 – Cleanup Site ID No. 11644) located at 1368 Jadwin Avenue in Richland, Washington (hereafter referred to as the "Site"). The Washington Department of Ecology Facility Site ID No is 11498.

The property consists of one parcel of land with improvements. The Site is located near the southwest corner of the intersection of Symons Street and George Washington Way in Benton County, Richland, Washington. The Site is currently used as a shopping center (**Figure 1**). In 1994, one HOT was removed from the Site and soil samples yielding total petroleum hydrocarbon (TPH) concentrations exceeding Washington Model Toxic Control Act (MTCA) Method A Cleanup Levels for Unrestricted Land Uses were observed. This report will compare the September 2017 TPH in soil concentrations to the MTCA Method B Cleanup Levels in attempt to close the Site via No Further Action (NFA).

# 2.0 SOIL AND GROUNDWATER SAMPLING METHODOLOGY

On September 25, 2017, direct push technology (DPT) methodology was conducted at all four Geoprobe® boring locations (BMEC-01 through BMEC-04). The locations of the four borings are illustrated on **Figure 2**. Photographs of the Site during the September 25, 2017 field activities are included in **Appendix A**.

Per the request of Ecology personnel, a Solinst interface probe was used to assess whether light, non-aqueous liquid (LNAPL) was present in a monitoring well (MW-2) located on the adjacent Parcel (Parcel 10) to the south where two heating oil tanks (HOTs) still reside underground. A measurement of 0.50 feet of LNAPL was observed in the monitoring well on September 25, 2017.

One soil sample was obtained from borings BMEC-01, BMEC-02, and BMEC-03 from a depth of 8 feet below ground surface (bgs). Two soil samples were obtained from boring BMEC-04 from depths of 8 feet bgs and 13 feet bgs. Borings BMEC-01 through BMEC-03 were advanced to a depth of 8 feet bgs each. Boring BMEC-04 was advanced to a depth of 15 feet bgs. One grab groundwater sample was collected from boring BMEC-04. All soil cuttings were containerized in a 16-gallon drum and temporarily staged on Parcel 11 at 1368 Jadwin Avenue on the east side of the business. The location where the drummed soil cuttings were temporarily staged is illustrated on **Figure 2**.

Continuous acetate liners were used to collect soil samples for visual assessment and laboratory analysis. All soil was visually and olfactorally assessed for petroleum contamination. Each soil sample was collected in one 4-ounce glass jar provided by the laboratory (Onsite Environmental, Inc. in Redmond, Washington [OnSite]).

The groundwater sample was collected from boring BMEC-04 via a peristaltic pump and dedicated tubing. Approximately 0.5 gallons of groundwater were purged from boring BMEC-04, prior to sample collection. Each groundwater sample was collected in two 1-Liter amber glass containers preserved with hydrochloric acid for TPH-Diesel (TPH-D) and TPH-Heavy Oil (TPH-O) analysis via Northwest Method NWTPH-Dx.

A fresh pair of latex or Nitrile gloves were donned, prior to collection of each soil and groundwater sample. All samples were stored in a cool environment (approximately 4 degrees Celsius) until relinquished (with properly completed chain-of-custody documentation) to OnSite.

All five soil samples and one groundwater sample were submitted to Onsite for TPH-D and TPH-O analysis per Northwest Method TPH-Dx. The samples arrived at Onsite on September 28, 2017.

# 3.0 SOIL AND GROUNDWATER SAMPLE RESULTS

All five soil samples (BMEC-01-8', BMEC-02-8', BMEC-03-8', BMEC-04-8', and BMEC-04-13') were analyzed for TPH-D and TPH-O via Northwest Method TPH-Dx. TPH-D was detected in soil sample BMEC-04-13' at a concentration of 39 milligrams per kilogram (mg/Kg). The MTCA Method A Cleanup Level for diesel is 2,000 mg/Kg. Heavy oil (lube oil) was detected in soil samples BMEC-02-8' and BMEC-03-8' at concentrations of 290 mg/Kg and 2,200 mg/Kg, respectively. The MTCA Method B Cleanup Level for heavy oil is 4,421 mg/Kg. The MTCA Method B Soil Cleanup Level Calculation Spreadsheet is attached as **Appendix B**. A summary of the soil sample laboratory analytical data is included in **Table 1** below:

**TABLE 1 – TOTAL PETROLEUM HYDROCARBON CONCENTRATIONS IN SOIL**

Units: mg/kg (ppm)

| Sample Number | | BMEC-01-8' | BMEC-02-8' | BMEC-03-8' | BMEC-04-8' | BMEC-04-13' |
|---|---|---|---|---|---|---|
| Sample Depth (ft) | | 8 | 8 | 8 | 8 | 8 |
| Analyte | MTCA Method B Cleanup Levels | | | | | |
| Diesel | 4,421 | <30 | <27 | <150 | <28 | **39** |
| Lube Oil | 4,421 | <59 | **290** | **2200** | <55 | <62 |

**BOLD** = Detected above the laboratory method reporting limit

Groundwater sample BMEC-04-GW was analyzed for TPH-D and TPH-O via Northwest Method TPH-Dx. Diesel was detected in sample BMEC-04-GW at 39,000 micrograms per liter (µg/L). The MTCA Method A Cleanup Level for diesel in groundwater is 500 µg/L.

**TABLE 2 – TOTAL PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUNDWATER**

Units: ug/kg (ppb)

| Sample Number | | BMEC-04-GW |
|---|---|---|
| Analyte | MTCA Method A Cleanup Levels | |
| Diesel | 500 | **39,000** |
| Lube Oil | 500 | <2000 |

**BOLD** = Detected above the laboratory method reporting limit
**39,000** = Detected at a concentration that exceeds the MTCA Method A Cleanup Level

A copy of the soil and groundwater laboratory analytical report and accompanying chain-of-custody documentation is included in **Appendix C**.

# 4.0 SITE GEOLOGY AND HYDROGEOLOGY

Soils beneath the Site consist of brown, fine-grained sand from 2 to 15 feet bgs. Copies of the boring logs for all four Geoprobe® holes are located in **Appendix D**.

Depth to groundwater beneath the Site was approximately 10.8 feet bgs in boring BMEC-04. Moisture noted at a depth of 7 feet bgs in boring BMEC-01 may have been groundwater trapped in a perched zone and may not be an actual indication of the shallow aquifer. Groundwater flow direction beneath the Site is likely to the east-northeast toward the Yakima River which is less than 0.25 miles away from the Site.

# 5.0 EQUIPMENT DECONTAMINATION AND INVESTIGATION-DERIVED WASTE DISPOSAL

All down-hole equipment (i.e., groundwater measurement probe and drill rods) were decontaminated via a pressurized steam cleaner. All soil and water (i.e., purged groundwater and decontamination water) investigation-derived waste (IDW) was containerized in a single 16-gallon drum. The drum was properly labeled, sealed, and temporarily staged onsite at 1368 Jadwin Avenue (Parcel 11) on the east side of the business. All nitrile gloves, paper towels, and peristaltic pump tubing was containerized in a plastic trash bag and removed from the Site for offsite disposal as standard refuse.

# 6.0 CONCLUSIONS

Four Geoprobe® borings were advanced at the Site on September 25, 2017. A total of five soil samples and one groundwater sample were obtained from the four borings and analyzed for TPH-D and TPH-O via Northwest Method TPH-Dx.

Diesel was detected in one soil sample (BMEC-04-13') at a concentration of 39 mg/Kg which does not exceed the MTCA Method B Cleanup Level for Unrestricted Land Uses calculated at 4,421 mg/Kg. Heavy oil was detected at a depth of 8 feet bgs in two of the soil samples at concentrations of 290 mg/Kg in sample BMEC-02-08' and 2,200 mg/Kg in sample BMEC-03-08'. The MTCA Method B Cleanup Level for Unrestricted Land Uses was calculated for heavy oil at 4,421 mg/Kg.

Diesel was detected in groundwater sample BMEC-04-GW at a concentration of 39,000 µg/L. The MTCA Method A Cleanup Level for diesel in groundwater is 500 µg/L. This detection of diesel in the groundwater is likely due to the presence of LNAPL in a monitoring well (MW-2) on the up-gradient to side-gradient property to the south (Parcel 10) which had a LNAPL thickness of 0.50 feet of LNAPL measured on the same day (September 25, 2017).

Soils beneath the Site consist of brown, fine-grained sand from 2 to 15 feet bgs. Depth to groundwater beneath the Site was approximately 10.8 feet bgs. Groundwater flow direction beneath the Site is likely to the east-northeast toward the Columbia River which is less than 0.25 miles away from the Site.

# 7.0 RECOMMENDATIONS

BMEC recommends this Site for closure via NFA for the following reasons:

- Diesel and heavy oil were not detected in Site soils at concentrations exceeding the MTCA Method B Cleanup Levels of 4,421 mg/Kg.
- Diesel was detected in groundwater sample BMEC-04-GW at a concentration of 39,000 µg/L, which exceeds the MTCA Method A Cleanup Level for diesel of 500 µg/L. It is the opinion of BMEC that this diesel contamination is attributable to the LNAPL contamination on the adjacent property to the south (Parcel 10), and that the soil contamination on the subject property does not adversely impact the groundwater at the site.

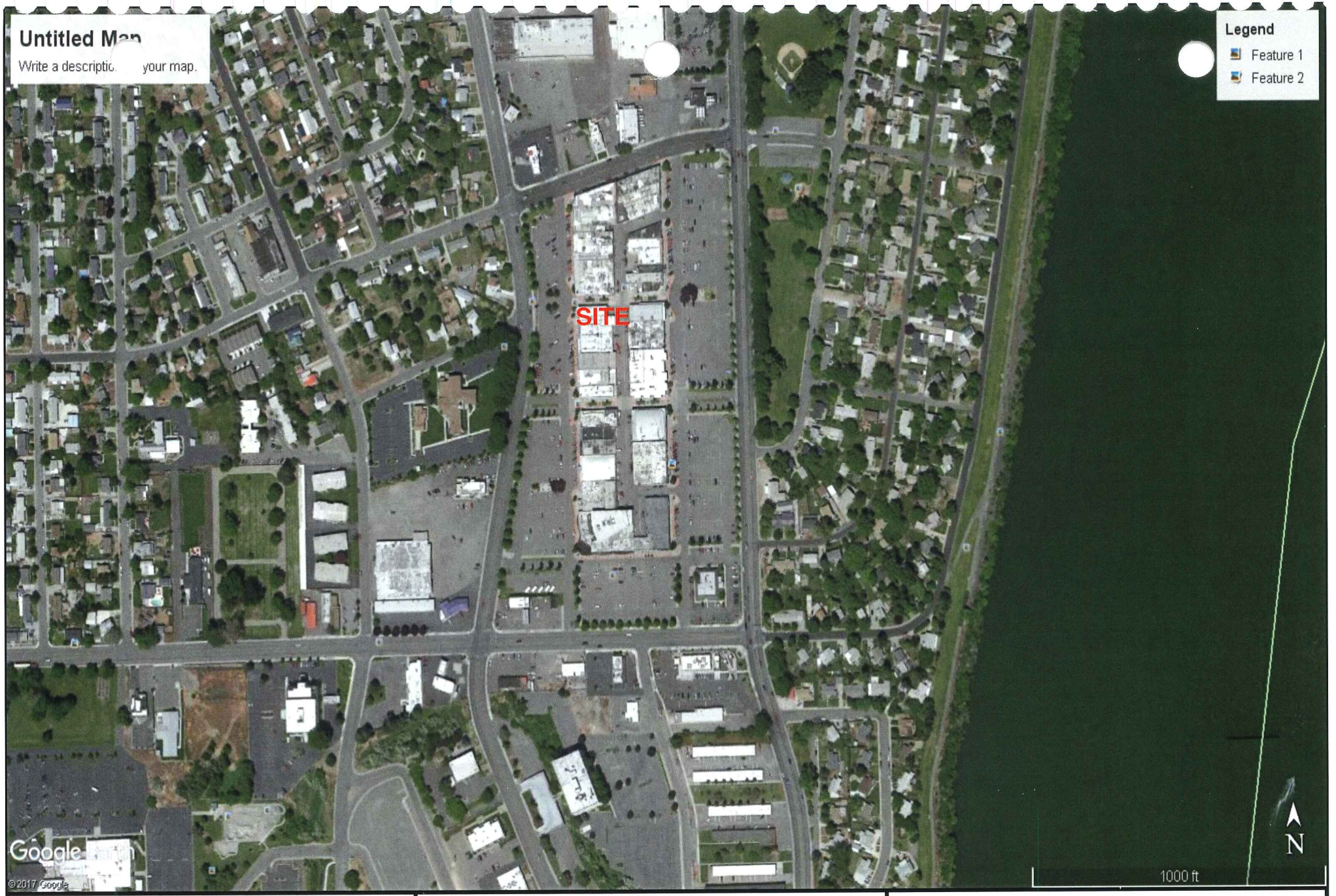
# 8.0 STATEMENT OF ENVIRONMENTAL PROFESSIONALS

This soil and groundwater assessment was performed in accordance with generally accepted environmental practices and procedures. We employed the degree of care and skill ordinarily exercised under similar circumstances by reputable environmental professionals practicing in the discipline of environmental sciences. The field activities utilized were determined by site conditions which were reasonably ascertainable to BMEC personnel and present at the time of previous field work performed by other environmental consultants.

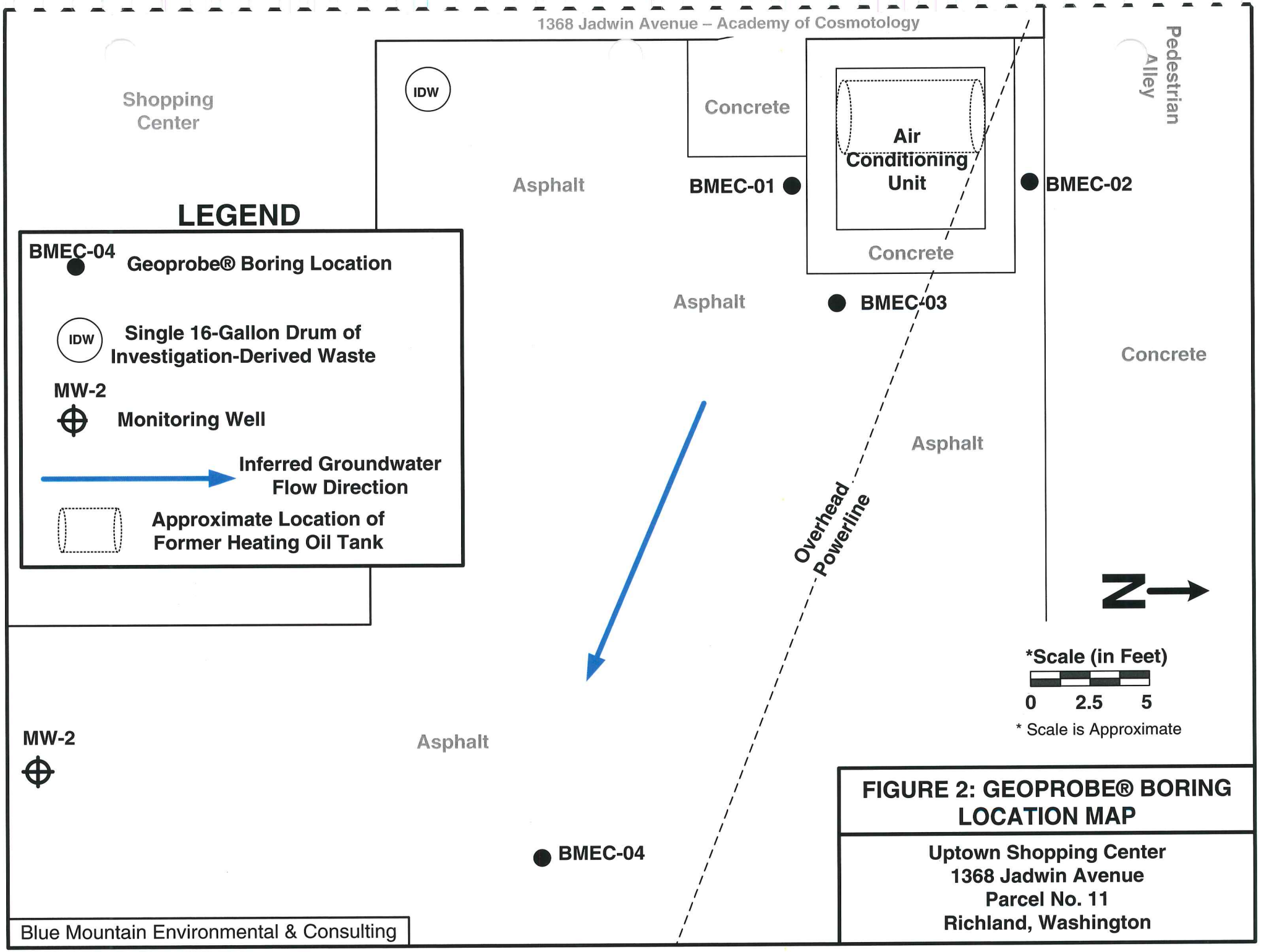
Respectfully Submitted,


Brent N. Bergeron Expires 1/3/18

Brent N. Bergeron, LG, LHG




| | | |
|---|---|---|
| **Blue Mountain Environmental & Consulting**<br>**Waitsburg, Washington** | **FIGURE 1 – SITE VICINITY MAP** | **UST Investigation**<br>**Richland Shopping Center**<br>**Parcel 11 - 1368 Jadwin Avenue**<br>**Richland, Washington** |


1368 Jadwin Avenue – Academy of Cosmotology
Shopping Center
IDW
Concrete
Pedestrian Alley
Air Conditioning Unit
Asphalt
BMEC-01
BMEC-02
Concrete
LEGEND
BMEC-04
Geoprobe® Boring Location
IDW
Single 16-Gallon Drum of Investigation-Derived Waste
MW-2
Monitoring Well
Inferred Groundwater Flow Direction
Approximate Location of Former Heating Oil Tank
Asphalt
BMEC-03
Concrete
Asphalt
Overhead Powerline
N
*Scale (in Feet)
0 2.5 5
* Scale is Approximate
MW-2
Asphalt
BMEC-04
FIGURE 2: GEOPROBE® BORING LOCATION MAP
Uptown Shopping Center
1368 Jadwin Avenue
Parcel No. 11
Richland, Washington
Blue Mountain Environmental & Consulting


**Photograph 1 – Utilities markings on east side of 1368 Jadwin Ave, Richland, Washington (facing west). Former heating oil tank existed under current air conditioning unit.**


**Photograph 2 – Standing in traffic alley facing west and viewing pedestrian alley immediately north of Site.**

**Photograph 3 – Standing east of Site in traffic alley looking south. Note monitoring well MW-2 near center-right in photograph.**

**Photograph 4 – Geoprobe® subcontractor advancing BMEC-02 to a total depth of 8 feet below ground surface (facing west). Note single 16-gallon drum of investigation-derived waste near corner of building near orange safety cone.**

# A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

## 1. Enter Site Information

Date: 07/25/17
Site Name: 1368 Jadwin
Sample Name: 2

## 2. Enter Soil Concentration Measured

| Chemical of Concern or Equivalent Carbon Group | Measured Soil Conc dry basis mg/kg | Composition Ratio % |
|---|---|---|
| ***Petroleum EC Fraction*** | | |
| AL_EC >5-6 | 0 | 0.00% |
| AL_EC >6-8 | 0 | 0.00% |
| AL_EC >8-10 | 1.653 | 0.57% |
| AL_EC >10-12 | 3.625 | 1.25% |
| AL_EC >12-16 | 30.856 | 10.64% |
| AL_EC >16-21 | 175.827 | 60.63% |
| AL_EC >21-34 | 0 | 0.00% |
| AR_EC >8-10 | 1.653 | 0.57% |
| AR_EC >10-12 | 2.407 | 0.83% |
| AR_EC >12-16 | 12.992 | 4.48% |
| AR_EC >16-21 | 60.987 | 21.03% |
| AR_EC >21-34 | | 0.00% |
| Benzene | | 0.00% |
| Toluene | | 0.00% |
| Ethylbenzene | | 0.00% |
| Total Xylenes | | 0.00% |
| Naphthalene | | 0.00% |
| 1-Methyl Naphthalene | | 0.00% |
| 2-Methyl Naphthalene | | 0.00% |
| n-H[illegible]e | | 0.00% |
| M[illegible] | 0 | 0.00% |
| Ethylene Dibromide (EDB) | 0 | 0.00% |
| 1,2 Dichloroethane (EDC) | 0 | 0.00% |
| Benzo(a)anthracene | 0 | 0.00% |
| Benzo(b)fluoranthene | 0 | 0.00% |
| Benzo(k)fluoranthene | 0 | 0.00% |
| Benzo(a)pyrene | 0 | 0.00% |
| Chrysene | 0 | 0.00% |
| Dibenz(a,h)anthracene | 0 | 0.00% |
| Indeno(1,2,3-cd)pyrene | 0 | 0.00% |
| **Sum** | 290 | 100.00% |

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here.....

## 3. Enter Site-Specific Hydrogeological Data

| | | |
|---|---|---|
| Total soil porosity: | 0.43 | Unitless |
| Volumetric water content: | 0.3 | Unitless |
| Volumetric air content: | 0.13 | Unitless |
| Soil bulk density measured: | 1.5 | kg/L |
| Fraction Organic Carbon: | 0.001 | Unitless |
| Dilution Factor: | 20 | Unitless |

## 4. Target TPH Ground Water Concentation (if adjusted)

| | | |
|---|---|---|
| If you adjusted the target TPH ground water concentration, enter adjusted value here: | 500 | ug/L |

# A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

**Site Information**

Date:
Site Name:
Sample Name:
Measured Soil TPH Concentration, mg/kg:

**1. Summary of Calculation Results**

| Exposure Pathway | Method/Goal | Protective Soil TPH Conc, mg/kg | With Measured Soil Conc | | Does Measured Soil Conc Pass or Fail? |
|---|---|---|---|---|---|
| | | | RISK @ | HI @ | |
| Protection of Soil Direct Contact: Human Health | Method B | | | | |
| | Method C | | | | |
| Protection of Method B Ground Water Quality (Leaching) | Potable GW: Human Health Protection | | | | |
| | Target TPH GW Conc. @ 500 ug/L | | NA | NA | |

**2. Results for Protection of Soil Direct Contact Pathway: Human Health**

| | Method B: Unrestricted Land Use | Method C: Industrial Land Use |
|---|---|---|
| Protective Soil Concentration, TPH mg/kg | 4,420.86 | 54,420.86 |
| Most Stringent Criterion | HI =1 | HI =1 |

| Soil Criteria | Protective Soil Concentration @Method B | | | | Protective Soil Concentration @Method C | | | |
|---|---|---|---|---|---|---|---|---|
| | Most Stringent? | TPH Conc, mg/kg | RISK @ | HI @ | Most Stringent? | TPH Conc, mg/kg | RISK @ | HI @ |
| HI =1 | YES | 4.42E+03 | 0.00E+00 | 1.00E+00 | YES | 5.44E+04 | 0.00E+00 | 1.00E+00 |
| Total Risk=1E-5 | NA | NA | NA | NA | NA | NA | NA | NA |
| Risk of Benzene= 1E-6 | NA | NA | NA | NA | NA | | | |
| Risk of cPAHs mixture= 1E-6 | NA | NA | NA | NA | | | | |
| EDB | NA | NA | NA | NA | | | | |
| EDC | NA | NA | NA | NA | | | | |

NA

**3 lts for Protection of Ground Water Quality (Leaching Pathway)**

3.1. rotection of Potable Ground Water Quality (Method B): Human Health Protection

| | |
|---|---|
| Most Stringent Criterion | |
| Protective Ground Water Concentration, ug/L | |
| Protective Soil Concentration, mg/kg | |

| Ground Water Criteria | Protective Potable Ground Water Concentration @Method B | | | | Protective Soil Conc, mg/kg |
|---|---|---|---|---|---|
| | Most Stringent? | TPH Conc, ug/L | RISK @ | HI @ | |
| HI=1 | | | | | |
| Total Risk = 1E-5 | | | | | |
| Total Risk = 1E-6 | | | | | |
| Risk of cPAHs mixture= 1E-5 | | | | | |
| Benzene MCL = 5 ug/L | | | | | |
| MTBE = 20 ug/L | | | | | |

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

| Ground Water Criteria | Protective Ground Water Concentration | | | Protective Soil Conc, mg/kg |
|---|---|---|---|---|
| | TPH Conc, ug/L | Risk @ | HI @ | |
| Target TPH GW Conc = 500 ug/L | 3.90E+03 | 0.00E+00 | 1.00E+00 | |

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

October 9, 2017

Peter Trabusiner
Blue Mountain Environmental, Inc.
1500 Adair Drive
Richland, WA 99352

Re: Analytical Data for Project E2017/0903; Richland Uptown-Parcel 11
Laboratory Reference No. 1709-351

Dear Peter:

Enclosed are the analytical results and associated quality control data for samples submitted on September 28, 2017.

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 9, 2017
Samples Submitted: September 28, 2017
Laboratory Reference: 1709-351
Project: E2017/0903; Richland Uptown-Parcel 11

**Case Narrative**

Samples were collected on September 25, 2017 and received by the laboratory on September 28, 2017. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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: October 9, 2017
Samples Submitted: September 28, 2017
Laboratory Reference: 1709-351
Project: E2017/0903; Richland Uptown-Parcel 11

**NWTPH-Dx**

Matrix: Soil
Units: mg/Kg (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **BMEC-01-8'** | | | | | |
| Laboratory ID: | 09-351-01 | | | | | |
| Diesel Range Organics | **ND** | 30 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| Lube Oil Range Organics | **ND** | 59 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *115* | *50-150* | | | | |
| **Client ID:** | **BMEC-02-8'** | | | | | |
| Laboratory ID: | 09-351-02 | | | | | |
| Diesel Range Organics | **ND** | 27 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| Lube Oil | **290** | 55 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *110* | *50-150* | | | | |
| **Client ID:** | **BMEC-03-8'** | | | | | |
| Laboratory ID: | 09-351-03 | | | | | |
| Diesel Range Organics | **ND** | 150 | NWTPH-Dx | 10-4-17 | 10-6-17 | U1,X1 |
| Lube Oil | **2200** | 260 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *149* | *50-150* | | | | |
| **Client ID:** | **BMEC-04-8'** | | | | | |
| Laboratory ID: | 09-351-04 | | | | | |
| Diesel Range Organics | **ND** | 28 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| Lube Oil Range Organics | **ND** | 55 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *108* | *50-150* | | | | |
| **Client ID:** | **BMEC-04-13'** | | | | | |
| Laboratory ID: | 09-351-05 | | | | | |
| Diesel Fuel #2 | **39** | 31 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| Lube Oil Range Organics | **ND** | 62 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *104* | *50-150* | | | | |

Date of Report: October 9, 2017
Samples Submitted: September 28, 2017
Laboratory Reference: 1709-351
Project: E2017/0903; Richland Uptown-Parcel 11

**NWTPH-Dx**
**QUALITY CONTROL**

Matrix: Soil
Units: mg/Kg (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **METHOD BLANK** | | | | | | |
| Laboratory ID: | MB1004S1 | | | | | |
| Diesel Range Organics | **ND** | 25 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| Lube Oil Range Organics | **ND** | 50 | NWTPH-Dx | 10-4-17 | 10-6-17 | X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *123* | *50-150* | | | | |

| Analyte | Result | | Spike Level | | Source Result | Percent Recovery | | Recovery Limits | RPD | RPD Limit | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DUPLICATE** | | | | | | | | | | | |
| Laboratory ID: | 09-291-02 | | | | | | | | | | |
| | ORIG | DUP | | | | | | | | | |
| Diesel Range Organics | **30.1** | **87.2** | NA | NA | | NA | | NA | 97 | NA | X1 |
| Lube Oil Range Organics | **358** | **565** | NA | NA | | NA | | NA | 45 | NA | X1 |
| *Surrogate:* | | | | | | | | | | | |
| *o-Terphenyl* | | | | | | *124* | *94* | *50-150* | | | |

Date of Report: October 9, 2017
Samples Submitted: September 28, 2017
Laboratory Reference: 1709-351
Project: E2017/0903; Richland Uptown-Parcel 11

**NWTPH-Dx**

Matrix: Water
Units: mg/L (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **Client ID:** | **BMEC-04-GW** | | | | | |
| Laboratory ID: | 09-351-06 | | | | | |
| Diesel Fuel #2 | **39** | 0.26 | NWTPH-Dx | 10-4-17 | 10-4-17 | X1 |
| Lube Oil Range Organics | **ND** | 2.0 | NWTPH-Dx | 10-4-17 | 10-4-17 | U1,X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *139* | *50-150* | | | | |

Date of Report: October 9, 2017
Samples Submitted: September 28, 2017
Laboratory Reference: 1709-351
Project: E2017/0903; Richland Uptown-Parcel 11

**NWTPH-Dx**
**QUALITY CONTROL**

Matrix: Water
Units: mg/L (ppm)

| Analyte | Result | PQL | Method | Date Prepared | Date Analyzed | Flags |
|---|---|---|---|---|---|---|
| **METHOD BLANK** | | | | | | |
| Laboratory ID: | MB1004W2 | | | | | |
| Diesel Range Organics | **ND** | 0.25 | NWTPH-Dx | 10-4-17 | 10-4-17 | X1 |
| Lube Oil Range Organics | **ND** | 0.40 | NWTPH-Dx | 10-4-17 | 10-4-17 | X1 |
| *Surrogate:* | *Percent Recovery* | *Control Limits* | | | | |
| *o-Terphenyl* | *131* | *50-150* | | | | |

| Analyte | Result | | Spike Level | | Source Result | Percent Recovery | | Recovery Limits | RPD | RPD Limit | Flags |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DUPLICATE** | | | | | | | | | | | |
| Laboratory ID: | 10-018-01 | | | | | | | | | | |
| | ORIG | DUP | | | | | | | | | |
| Diesel Range | **ND** | **ND** | NA | NA | | NA | | NA | NA | NA | |
| Lube Oil Range | **ND** | **ND** | NA | NA | | NA | | NA | NA | NA | |
| *Surrogate:* | | | | | | | | | | | |
| *o-Terphenyl* | | | | | | *96* | *105* | *50-150* | | | |

Date of Report: October 9, 2017
Samples Submitted: September 28, 2017
Laboratory Reference: 1709-351
Project: E2017/0903; Richland Uptown-Parcel 11

**% MOISTURE**

Date Analyzed: 10-4-17

| Client ID | Lab ID | % Moisture |
|---|---|---|
| BMEC-01-8' | 09-351-01 | 16 |
| BMEC-02-8' | 09-351-02 | 9 |
| BMEC-03-8' | 09-351-03 | 4 |
| BMEC-04-8' | 09-351-04 | 9 |
| BMEC-04-13' | 09-351-05 | 19 |

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: BMEC
Project Number: E2017-0903
Project Name: Richland Uptown-Parcel 11
Project Manager: Peter Trabusiner
Sampled by: Brent Bergeron

**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:** 09-351

| Lab ID | Sample Identification | Date Sampled | Time Sampled | Matrix | Number of Containers | NWTPH-HCID | NWTPH-Gx/BTEX | NWTPH-Gx | NWTPH-Dx (Acid / SG Clean-up) | Volatiles 8260C | Halogenated Volatiles 8260C | EDB EPA 8011 (Waters Only) | 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 | BMEC-01-8' | 9/25 | 1250 | S | 1 | | | | X | | | | | | | | | | | | | | | | | | X |
| 2 | BMEC-02-8' | 9/25 | 1320 | S | 1 | | | | X | | | | | | | | | | | | | | | | | | X |
| 3 | BMEC-03-8' | 9/25 | 1340 | S | 1 | | | | X | | | | | | | | | | | | | | | | | | X |
| 4 | BMEC-04-8' | 9/25 | 1400 | S | 1 | | | | X | | | | | | | | | | | | | | | | | | X |
| 5 | BMEC-04-13' | 9/25 | 1420 | S | 1 | | | | X | | | | | | | | | | | | | | | | | | |
| 6 | BMEC-04-GW | 9/25 | 1445 | W | 2 | | | | X | | | | | | | | | | | | | | | | | | X |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | Signature | Company | Date | Time |
|---|---|---|---|---|
| Relinquished | Brent Bergeron | BMEC | 9/25/17 | 1855 |
| Received | Cassy Munch | BMEC | 9/25/17 | 1855 |
| Relinquished | | | | |
| Received | | OSE | 9/28/17 | 1100 |
| Relinquished | | | | |
| Received | | | | |
| Reviewed/Date | | Reviewed/Date | | |

**Comments/Special Instructions**

? Call Peter Trabusiner
DB

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

PROJECT Richland Uptown Shopping Center PROJECT NUMBER E2017-0903

LOCATION 1368 - Parcel 11; BMEC-01 DRILLING DATE 9/25/17

DATUM Ground surface DRILLING METHOD Push Probe

LOGGED BY Brent Bergeron DRILLER Derek Routh - PSW

| DEPTH | SOIL DESCRIPTION | GRAPHIC | MISC |
|---|---|---|---|
| 0-0.5' | Asphalt | | |
| 0.5-5' | Brown, fine-grained SAND, well-sorted, dry | | SP |
| | | | SP |
| | | | SP |
| | | | SP |
| 5 | | | |
| 5-7' | Brown, fine-grained SAND, well-sorted dry | | SP |
| | | | SP |
| 7-8' | Grey, fine-grained SAND, well-sorted, v. moist | | SP |
| BMEC-01-8' | TD = 8' | | |
| 10 | | | |
| 15 | | | |
| 20 | | | |

12:59

▽ @ 7'; moderate petro odor from 7-8'

PROJECT Richland Uptown Shopping Center PROJECT NUMBER E2017-0903

LOCATION 1368 - Parcel 11; BMEC-02 DRILLING DATE 9/25/17

DATUM Ground surface DRILLING METHOD Push Probe

LOGGED BY Brent Bergeron DRILLER Derek Routh · PSoW

| DEPTH | SOIL DESCRIPTION | GRAPHIC | MISC |
|---|---|---|---|
| 0-0.5' | Asphalt | | |
| 0.5-5' | Brown, fine-grained SAND, well-sorted, dry | | SP |
| | | | SP |
| | | | SP |
| | | | SP |
| 5 | | | SP |
| | | | SP |
| | | | SP |
| | Brown, fine-grained SAND, well-sorted, dry, | | SP |
| 1325 X BMEC-02-8' | | | SP |
| 10 | cobble | | |
| | TD = 10' | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 15 | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 20 | | | |
| | | | |

PROJECT Richland Uptown Shopping Center  PROJECT NUMBER E2017-0903

LOCATION 1368-Parcel 11; BMEC-03  DRILLING DATE 9/25/17

DATUM Ground surface  DRILLING METHOD Push Probe

LOGGED BY Brent Bergeron  DRILLER Derek Routh - PSaW

| DEPTH | SOIL DESCRIPTION | GRAPHIC | MISC |
|---|---|---|---|
| 0-0.5': | Asphalt | | |
| 0.5-5': | Brown, fine-grained SAND, well-sorted, dry | | SP |
| | ↓ | | SP |
| | | | SP |
| | | | SP |
| 5 | | | |
| 5-8': | Brown, fine-grained SAND, well-sorted, dry, cobbles | | SP |
| | ↓ | | SP |
| | | | SP |
| 1340 X BMEC-03-8' | TD = 8' | | |
| 10 | | | |
| 15 | | | |
| 20 | | | |

PROJECT Richland Uptown Shopping Center | PROJECT NUMBER E2017-0903

LOCATION 1368 - Parcel 11; BMEC-04 | DRILLING DATE 9/25/17

DATUM Ground surface | DRILLING METHOD Push Probe

LOGGED BY Brent Bergeron | DRILLER Derek Routh - Pacific Soil & Water

| DEPTH | SOIL DESCRIPTION | GRAPHIC | MISC |
|---|---|---|---|
| 0-0.5': | Asphalt | | |
| 0.5-5': | Brown, fine-grained SAND, | | SP |
| | well-sorted, dry | | SP |
| | ↓ | | SP |
| | | | SP |
| | | | SP |
| 5 | | | |
| 5-8': | Brown, fine-grained | | SP |
| | SAND, well-sorted, | | SP |
| 1400 X | trace rounded coarse gravel, dry | | SP |
| BMEC-04-8' | 8-10': Brown, fine-grained | | SP |
| | SAND, trace gravel, ▽ moist | | SP |
| 10 | | | |
| 10-12': | SAA | | SP |
| 12-13': | Gray, fine-grained | | SP |
| | SAND, mpo, little gravel, wet | | SP |
| 1420 X | | | |
| BMEC-04-13' | 13-14': Gray, sandy GRAVEL, wet | | GW |
| 14-15': | Gray, fine SAND, mpo, little gravel, wet | | SP |
| 15 | TD = 15' | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 20 | | | |
| | | | |

▽ @ 8'

DTW @ 10.8' bgs 1425

Mild petro odor @ 12-15'