

# **Phase II Environmental Site Assessment Roadway Improvement Project**

## **Route 1 Widening Project**

### **Mrs. K's Carwash**

**17651 Main Street**

**Dumfries, Virginia 22026**

**Prince William County**

**Contract ID: 44115**

**VDOT Project: 001-212-249**

**VDOT UPC: 90339 Act: 689**

**VDOT Task Number: E-FR024.07**

### **Prepared for**

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**February 2019**

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**Table of Contents**

Acronyms ..... ii

1.0 INTRODUCTION AND BACKGROUND ..... 1

2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS ..... 2

3.0 SOIL AND GROUNDWATER SAMPLING METHODS ..... 2

**3.1.** Soil Sampling Methods ..... 2

**3.2.** Groundwater Sampling Methods ..... 3

4.0 PID SCREENING RESULTS ..... 4

5.0 SOIL SAMPLE ANALYTICAL RESULTS ..... 5

6.0 DISSOLVED PHASE ANALYTICAL RESULTS ..... 6

7.0 CONCLUSIONS AND RECOMMENDATIONS ..... 6

**7.1.** Petroleum Impacted Soil Volume Estimates ..... 7

**7.2.** Petroleum Impacted Soil Management Options ..... 7

8.0 LIMITATIONS ..... 8

9.0 ACKNOWLEDGEMENT ..... 8

10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS ..... 8

**Tables**

Table 1 - PID Soil Screening Data ..... 4

Table 2 - Soil Sample Analytical Data ..... 5

Table 3- Groundwater Sample Analytical Data ..... 6

Table 4- Petroleum-Impacted Soil Volume Estimate ..... 7

**Figures**

Figure 1 – Project Location Map Depicting Regional Project Location

Figure 2 – Portion of the Prince William Co 7.5 Minute Quadrangle Depicting the Project Location

Figure 3 – Aerial Photograph Showing the Subject Properties and Project Location

Figure 4 – Preliminary VDOT Plan Sheet Nos. 13 & 14 Showing the Boring Locations

**Appendices**

Appendix A: Miss Utility Ticket and VDOT Ticket

Appendix B: Boring Logs

Appendix C: Laboratory Reports and Sample Custody Documentation

Appendix D: Laboratory Review of Detected TPH Concentration & Chromatograms

Appendix E: Full Size Copy of Table 4

## Acronyms

AST	Above Ground Storage Tank
BGS	Below Ground Surface
C	Celsius
COC	Chain of Custody
CL	Center Line
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency – United States
FT	Feet
LT	Left
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
PG	Professional Geologist
PID	Photoionization Detector
PPM	Parts Per Million
REC	Recognized Environmental Condition
RL	Reporting Limit
Rt	Route
RT	Right
R/W	Right-of-Way
STA	Station
TPH-DRO	Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
UST	Underground Storage Tank
VDOT	Virginia Department of Transportation
VOC	Volatile Organic Compounds
VSWMR	Virginia Solid Waste Management Regulations
<b>3e</b>	EEE Consulting, Inc.

## 1.0 INTRODUCTION AND BACKGROUND

The Virginia Department of Transportation (VDOT) is administering proposed improvements and realignment of 2.3-miles of Route 1 (Fraleley Boulevard) between the intersection with Quantico Gateway Drive and the intersection with Drumfires Road (State Route 234) in Dumfries, Prince William County, Virginia. The general project location and topographic setting are shown on **Figures 1** and **2**, respectively. An aerial photograph of the project area is also presented as **Figure 3**.

The roadway and drainage improvements will occur in existing roadway right-of-way, proposed R/W, permanent slop easements, permanent drainage easements, temporary construction easements (i.e. erosion & sediment control measures) and proposed limited access lines. A Phase I Environmental Site Assessment (ESA) was prepared by EEE Consulting, Inc (**3e**) for the study area in August 2018, which identified Recognized Environmental Conditions (REC) throughout the corridor including the subject property as follows:

- ❖ **Mrs. K’s Carwash** (Parcel 067) located at 17651 Main Street, Dumfries, VA 22026 (VDOT Plan Sheet Nos. 13, 14, & 14B), which is an active carwash with a suspect Oil Water Separator (OWS). Surface staining is also present on-site surrounding the outdoor location of a 55-gallon drum.

According to Plan Sheet Nos. 13, 14, & 14B, Parcel 067 is a potential full take because the proposed R/W limits intersect the one-story building on-site. The northeastern section of Parcel 067 also includes a portion of a Storm Water Management Basin (BMP #6), and associated Drainage Structure Nos. 13-6, 13-7, and the corresponding 15-inch (in) pipe connections (see **Figure 4**).

The RECs identified at Parcel 067 have the potential to pose adverse impacts to subsurface media that will likely be disturbed the installation of the noted drainage improvements. The constituents of concern are petroleum-based as related to the RECs identified above and detailed in the Phase I ESA Corridor Study Report (**3e**, August 2018). Based on this information, the VDOT – Northern Virginia District Office Hazardous Materials Manager requested the collection of representative samples to confirm the presence/absence of petroleum impacts to soil and groundwater in and proximate to the proposed acquisition and disturbance areas. On December 6<sup>th</sup>, 2018, **3e** completed a Phase II ESA at Parcel 067 to confirm the presence/absence of impacts to subsurface media that will likely be disturbed in response to the proposed roadway and drainage improvements.

Subsurface boring advancements, sampling methods, corresponding analytical results, and conclusions/recommendations pertaining to the proposed construction activities at Parcel 067 are summarized in the following sections of this report.

## 2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS

Prior to implementing the direct push boring installations, the approximate locations of subsurface public utilities were identified and marked by Miss Utility of Virginia. A utility locate request form was also completed with VDOT to identify utilities owned and operated by VDOT. Copies of the Miss Utility and VDOT Tickets are included in **Appendix A**. In addition to public utility identification, private subsurface utilities were also identified and marked in each investigative area prior to commencing drilling activities.

## 3.0 SOIL AND GROUNDWATER SAMPLING METHODS

### 3.1. Soil Sampling Methods

On December 6<sup>th</sup>, 2018, a direct push drill rig was utilized to advance four (4) soil borings with two (2) converted to temporary groundwater monitoring wells (MW) as follows:

- ❖ B1 – Installed proximate to STA No. 325+25; 85-ft LT of CL to a depth of 14.5-ft BGS upon refusal on consolidated material with subsequent conversion to a temporary groundwater MW.
- ❖ B2 – Installed proximate to STA No. 326+05; 60-ft LT of CL to a depth of 15-ft BGS as proposed.
- ❖ B3 – Installed proximate to STA No. 325+00; 110-ft LT of CL to a depth of 15-ft BGS upon refusal on consolidated material with subsequent conversion to a temporary groundwater MW.
- ❖ B4 – Installed proximate to STA No. 325+40; 50-ft LT of CL to a depth of 15-ft BGS upon refusal on consolidated material.

The roadway improvements proposed to date, RECs, and boring locations are depicted on **Figure 4**.

Soil borings, B1 through B4 were advanced using a Geoprobe<sup>®</sup> direct push rig. The direct-push rig utilizes a hollow-stem spoon that produced a continuous soil core in five (5)-ft intervals along the vertical depth of each boring. Each boring was advanced to predetermined depths or refusal on consolidated material at depths that ranged from 14.5-15-ft BGS. Subsurface conditions (i.e. wet soils) indicative of groundwater were observed in B-1 and B-3. The detailed boring logs are presented in **Appendix B**.

Composite soil samples were collected in the proposed project limits to characterize subsurface conditions prior to roadway R/W acquisition, and assess soil that will likely be disturbed during construction. The representative composite soil samples were obtained from the borings by collecting aliquots from the following depth intervals:

- ❖ B1 & B4: 5-10-ft and 10-15-ft BGS.
- ❖ B2: 0-5-ft and 10-15-ft BGS.
- ❖ B3: 0-5-ft and 5-10-ft BGS.

Each composite soil sample was placed into two (2) pre-cleaned 4-ounce glass jars. The sample jars were appropriately labeled and placed on ice in a cooler to maintain an appropriate temperature ( $\leq 4^{\circ}\text{C}$ ) while in transit to the certified environmental laboratory. Chain of Custody (COC) documentation was completed for all samples submitted for laboratory analysis.

The composite soil samples were submitted for laboratory analysis of TPH-ORO and TPH-DRO. The composite surface sample that was proposed proximate to the 55-gallon drum was not collected because the surface staining is limited to asphalt surface cover (i.e. surficial soil staining was not observed). The COC documentation and laboratory analytical data are provided in **Appendix C**. A detailed discussion of the composite soil sample analytical results is presented in **Section 5.0** of this report.

### 3.2. Groundwater Sampling Methods

Temporary monitoring wells were constructed in B1 and B3 to collect a representative groundwater samples to confirm the presence/absence of impact to the shallow groundwater table. Each temporary well was constructed with 1-inch diameter, PVC well screen (slotted at 0.01-ft intervals) and solid 1-inch diameter casing. Screen and casing intervals for the temporary monitoring wells are documented on the applicable boring logs (see **Appendix B**). PVC caps were fitted over each well to prevent intrusion of foreign material. Clean sand was then placed in the remaining annular space of the borehole to form a filter pack around the well screen.

On December 11<sup>th</sup>, 2018, an oil/water interface probe was utilized to determine the depth-to-groundwater and confirm the presence or absence of separate-phase petroleum in the temporary monitoring well. The static groundwater levels in the temporary wells were measured at approximately 10-ft BGS (see **Appendix B**). Separate-phase petroleum or petroleum odors were not detected in the temporary monitoring wells.

To account for VOC analysis, a representative groundwater sample was collected from each temporary monitoring well using a low flow capable bladder pump in general accordance with both EPA’s Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedure (EPA/540/S-95/504) and ASTM D6771-02: *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations*. Water quality parameters (pH, temperature, and specific conductance) were stable (i.e., readings are within 10% of the previous measurement) prior to collecting each sample. The groundwater samples were prepared for transport to the laboratory in accordance the following procedures: 1) placed into containers

provided by the laboratory with the appropriate preservative, 2) placed on ice in a cooler to maintain appropriate temperature while in transport to the environmental laboratory, 3) Chain of Custody was completed and maintained with the sample sets.

The groundwater samples were submitted for analysis of TPH-DRO and TPH-ORO by EPA Method 8015C and Volatile Organic Compounds (VOC) by EPA Method 8260. The analytical data for the representative groundwater samples are provided in **Appendix C**. A discussion of the groundwater analytical results is provided in **Section 6.0** of this report.

After completion of the gauging/sampling activities, the temporary monitoring well was abandoned by removing the PVC screen and casing from the ground surface and filling the resulting void with bentonite chips.

#### 4.0 PID SCREENING RESULTS

Photoionization Detector (PID) results for the screened direct push soil cores are presented below in **Table 1**. Measurement units are in parts per million (ppm).

**Table 1 - PID Soil Screening Data: Route 1 – Mrs. K’s Carwash**

	PID (ppm)	PID (ppm)	PID (ppm)
Depth (ft BGS)	0-5	5-10	10-15
B1	0.1	0.1	0.0
B2	0.2	*	0.2
B3	0.1	0.0	0.0
B4	1.3	0.0	0.0

Notes:

ppm = Parts per Million

BGS – Below Ground Surface

Depth Unit – foot BGS

\* No soil recovery after offset 1x

A review of **Table 1** indicates that the PID readings in the screened soil cores were < 1.3-parts-per-million (ppm). Please note that the soil sample submitted for laboratory analysis from B2 0-5-ft contained a laboratory detectable TPH-ORO concentration. The concentration detection in B2 did not register elevated PID readings or contain odors that were noticeable to olfactory senses, which is consistent for low concentration detections in the semi-volatile, hydrocarbon chain ranges (i.e. hydrocarbon chains from C10 – C38).

## 5.0 SOIL SAMPLE ANALYTICAL RESULTS

The analytical results obtained from the soil samples are summarized below in **Table 2**. All results are listed in units of milligrams-per-kilogram (mg/kg). A detailed laboratory analytical report is provided in **Appendix C**.

**Table 2: Soil Sample Analytical Data**  
**Mrs. K's Carwash**  
**Route 1 Widening Project, Dumfries VA**  
**Units = Milligrams per Kilogram (mg/kg)**

Location	<b>B1 5-10</b>		<b>B1 10-14.5</b>		<b>B2 0-5</b>		<b>B2 10-15</b>	
Laboratory I.D.	18L0332-01		18L0332-02		18L0332-03		18L0332-04	
Depth Below Grade	0-5 feet		10-14.5-feet		0-5 feet		10-15-feet	
Sample Time	8:25		8:30		8:45		8:50	
	Result	RL	Result	RL	Result	RL	Result	RL
<b>TPH-DRO</b>	ND	10.0	ND	10.0	ND	10.0	ND	10.0
<b>TPH-ORO</b>	ND	10.0	NA	10.0	<b><u>30.5</u></b>	10.0	NA	10.0
Location	<b>B3 0-5</b>		<b>B3 5-10</b>		<b>B4 5-10</b>		<b>B4 10-15</b>	
Laboratory I.D.	18L0332-05		18L0332-06		18L0332-07		18L0332-08	
Depth Below Grade	0-5 feet		5-10 feet		5-10 feet		10-15 feet	
Sample Time	9:15		9:20		9:35		9:40	
	Result	RL	Result	RL	Result	RL	Result	RL
<b>TPH-DRO</b>	ND	10.0	ND	10.0	ND	10.0	ND	10.0
<b>TPH-ORO</b>	ND	10.0	NA	10.0	ND	10.0	NA	10.0

**Notes:**

**Bold / Underlined** text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

A review of **Table 2** indicates that the residual-phase TPH-ORO concentration detected in B2 at 0-5-ft BGS **does not exceed** the Virginia Solid Waste Management Regulation (VSWMR) TPH limit of 50-mg/kg for fill material (**9VAC20-81-660D.2.d**).

Please note that per the request of **3e**, the contract laboratory [Air Water & Soil Laboratories (AWS) of Richmond, VA] reviewed the chromatograms to ensure that the detected TPH-ORO concentration was not the result of interferences from non-petroleum based organic compounds in the corresponding sample. The AWS lab manager’s review of the chromatograms indicates that the detected concentration is associated with some type of oil(s) that elutes peaks in the TPH-ORO range. A copy of the correspondence that summarizes AWS’s interpretation of the detected TPH concentration and associated chromatograms is provided as **Appendix D**.

## 6.0 DISSOLVED PHASE ANALYTICAL RESULTS

The dissolved-phase analytical results obtained from the groundwater samples collected at B1 and B3 are summarized in **Table 3** on the following page. All results are listed in milligrams per liter (mg/L). A detailed laboratory analytical report is provided in **Appendix C**.

**Table 3: Groundwater Sample Analytical Data**  
**Route 1 Widening: Mrs. K's Carwash**  
**Units = Milligrams per Liter (mg/l)**

Location	<b>B1</b>		<b>B3</b>		<b>Trip Blank</b>	
Laboratory I.D.	18L0649-01		18L0649-02		18L0649-03	
Sample Time	12:00		13:00		15:35	
	Result	RL	Result	RL	Result	RL
<b>Acetone*</b>	ND	0.010	<b>0.0102</b>	0.010	ND	0.010
<b>TPH-DRO</b>	ND	0.568	ND	0.562	NA	NA
<b>TPH-ORO</b>	ND	1.1	ND	1.1	NA	NA

**Notes:**

**Bold / Underlined** text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

\*Remaining VOC constituents were not reported above the RL

A review of **Table 3** indicates that dissolved-phase petroleum constituents were not detected above the applicable laboratory RLs in the representative groundwater samples. Acetone was detected above the laboratory RL in B3; however, it was not detected in the laboratory provided Trip Blank. In the absence of other detectable VOC constituent concentrations, the detected acetone concentration at the laboratory RL is likely a false positive associated with laboratory interference. Acetone is a common cleaning agent in a laboratory setting that is used to sterilize testing equipment, work stations, glassware, etc.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Representative soil and groundwater samples were collected under this investigation to determine if the RECs identified at Parcel 067 resulted in adverse impacts to subsurface media in the proposed acquisition and/or disturbance areas. Petroleum constituent concentration were not detected in the representative groundwater samples, and the acetone concentration detected in B3 at the laboratory RL is likely the result of laboratory interference. The residual-phase TPH concentration detected in B2 at 0-5-ft BGS **did not exceed** the VSWMR TPH limit of 50-mg/kg for fill material. The estimated volume of petroleum-impacted soil that will likely be excavated proximate to this boring at Parcel 067, and the corresponding soil management options that apply are detailed in the following sections of this report.

## 7.1. Petroleum Impacted Soil Volume Estimates

A review of Plan Sheet Nos. 13 and 14 indicates that a portion of the 15-in diameter connection pipe between Drainage Structure Nos. 13-7 and 14-5 will require excavation in an area of Parcel 067 that is impacted by a low residual-phase petroleum concentration. Please note that drainage descriptions and associated invert elevations were not available for specific structures as of the date of this report. However, preliminary information provided via e-mail by a VDOT Hydraulics/Drainage Engineer indicates that the 15-in diameter pipe connection will likely require excavation to depths that range from approximately 4.5-ft to 9.5-ft BGS. Based on this preliminary information, **Table 4** on the following page presents the estimated volume of impacted soil that will likely require Special Management Provisions to the construction contract. A full-sized copy of **Table 4** is also included as **Appendix E**.

**Table 4: Mrs. Ks Carwash**  
**Petroleum-Impacted Soil Volume Estimate**  
**Select Drainage Improvement Pipe Connection**

Boring ID	Impacted Soil Depths	Drainage Structure ID	Impacted Excavation Footprint Location	Impacted Soil Excavation Dimensions	Volume Estimate**	Volume Estimate**	Volume Estimate**
Unit	BGS		STA No.	LxWxH	Cubic Feet (ft <sup>3</sup> )	Cubic Yards (yd <sup>3</sup> )	Tons*
B20-5	0-5-ft	15-inch Diameter Pipe that Connects 13-7 to 14-5	STA No. 325+90 to 326+15; 70-ft RT of CL	25-ft x 3-ft x 5-ft	375	14	21

**Notes:**

\*Tons calculated with conversion of 1yd<sup>3</sup> = 1.5 tons

\*\*Soil volume estimates are approximate and based on preliminary information available as of the date of this report.

## 7.2. Petroleum Impacted Soil Management Options

The following management options apply to excavated soil that contains a TPH concentration that is less than 50-mg/kg:

1. Exempt Materials and Use (i.e. **9VAC20-81-95C.7.d**):
  - Nonhazardous, contaminated soil excavated in response to the proposed pipe connection can be used to backfill the same excavation or excavations containing similar petroleum concentrations on-site. Excess contaminated soil that cannot be used to backfill the same or similar excavations on-site must be managed in accordance with the applicable requirements of the VSWMR.
  
2. Manage as petroleum-impacted fill material in accordance with the location restrictions of the VSWMR (**9VAC20-81-660D.2.d**).
  - May not be disposed of within 100-ft of a regularly flowing surface water.
  - 500-ft of any spring, or groundwater source of drinking water.
  - 200-ft from a residence, school, hospital, nursing home, or recreational park.

- If utilized as fill on an off-site property, then the owner must be notified that it is contaminated and what it is contaminated with (i.e. petroleum).

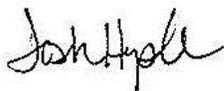
## 8.0 LIMITATIONS

It is impossible to know with certainty the entirety of a site is free of hazardous substances or conditions even with extensive subsurface testing. The conclusions of this investigation are based solely on the scope-of-work and on the sources of information reviewed during this investigation. This report was prepared for the exclusive use of VDOT, and their expressly-designated affiliates. 3e accepts no responsibility for damages or claims resulting from past or future environmental degradation related to the subject property.

## 9.0 ACKNOWLEDGEMENT

3e appreciates the opportunity to provide environmental services to VDOT regarding the Mrs. K’s Carwash - Route 1 roadway improvement project located in Dumfries, VA under the Professional Services HAZMAT Contract. If we may be of further assistance, or you have any questions or comments regarding the project, please contact our office at (540) 953-0170.

## 10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS



Joshua P. Hepler, PG  
Project Environmental Scientist  
Preparer



Chris Lalli  
Vice President/Associate  
Reviewer

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## Figures

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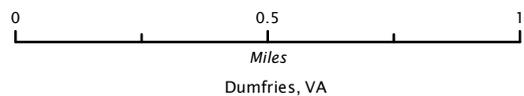
Mrs. K's Carwash

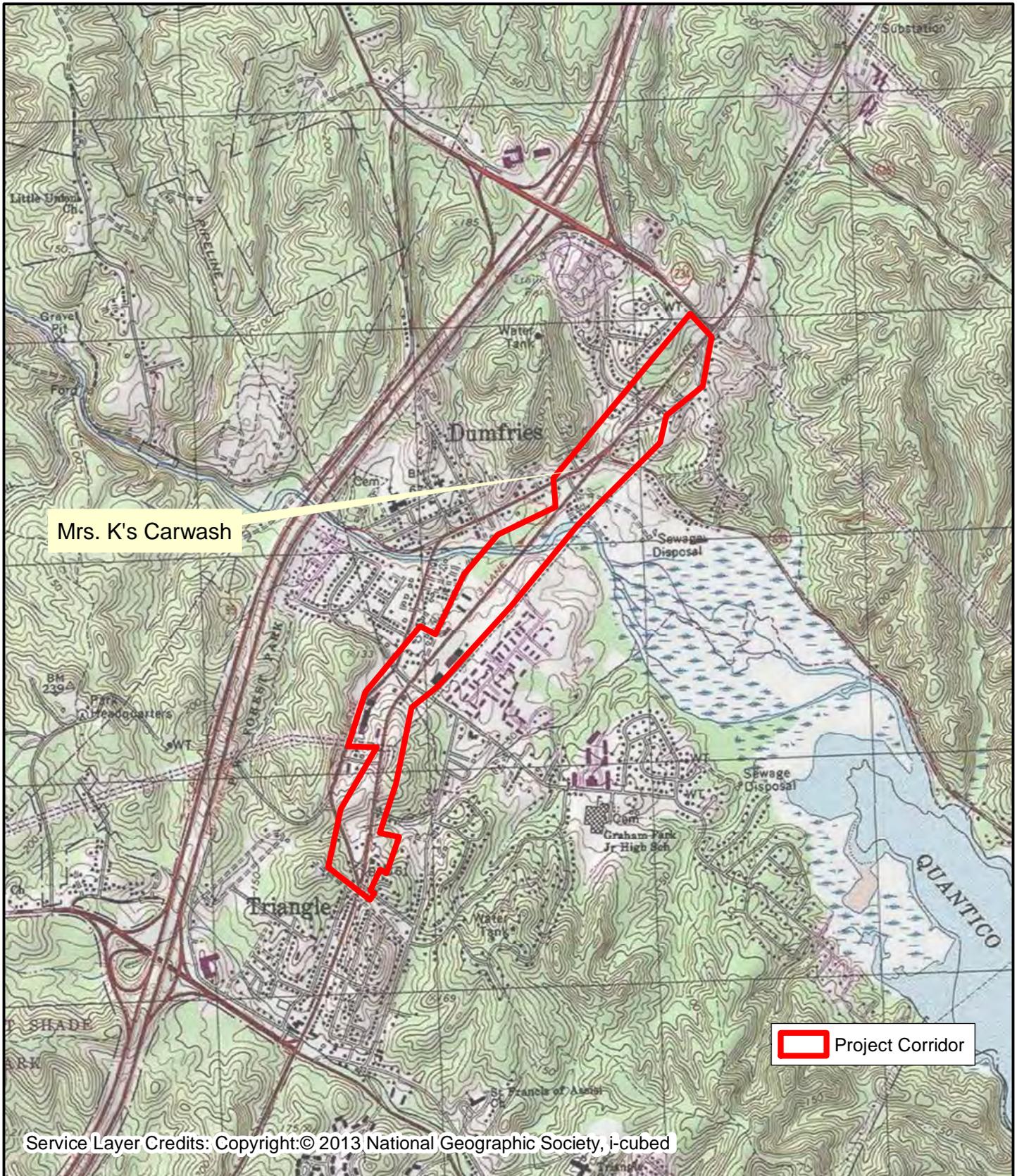
 Project Corridor

Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community  
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

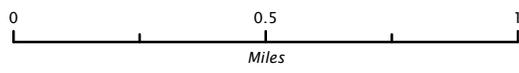


**FIGURE 1**  
**PROJECT CORRIDOR AERIAL**  
 MRS. K'S CARWASH





**FIGURE 2**  
**PROJECT CORRIDOR TOPOGRAPHIC**  
 MRS. K'S CARWASH



Dumfries, VA

1:24,000

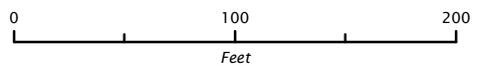


 Mrs. K's Carwash Property Boundary



**FIGURE 3**  
**AERIAL WITH PROPERTY BOUNDARIES**

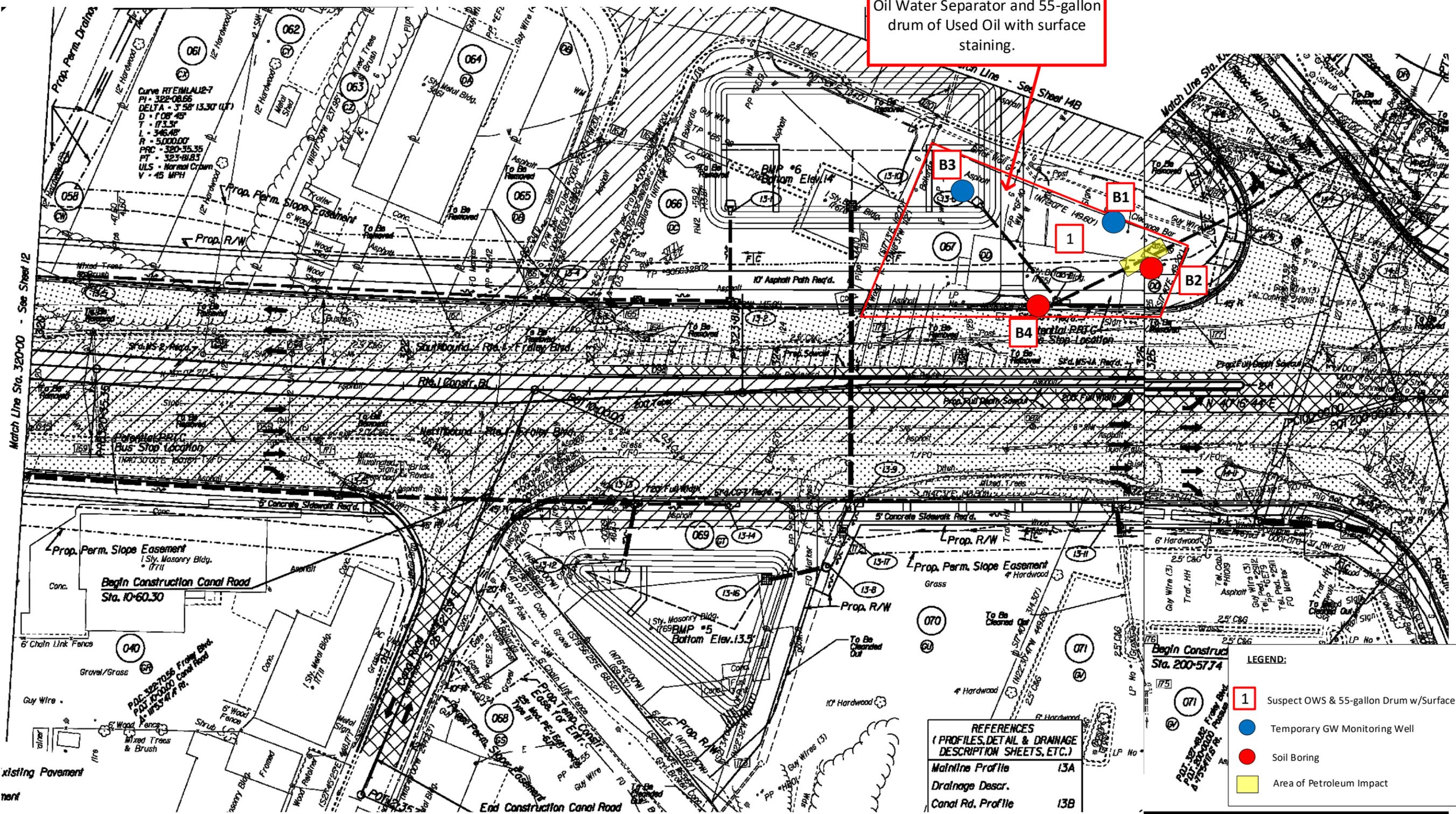
MRS. K'S CARWASH



Dumfries, VA



**Mr. K's Carwash**  
 17651 Main Street, Dumfries:  
 Oil Water Separator and 55-gallon  
 drum of Used Oil with surface  
 staining.

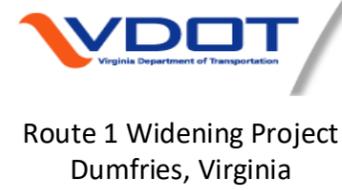
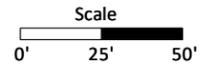


**REFERENCES**  
 (PROFILES, DETAIL & DRAINAGE  
 DESCRIPTION SHEETS, ETC.)

Mainline Profile	13A
Drainage Descr.	
Canal Rd. Profile	13B

**LEGEND:**

<span style="border: 1px solid red; padding: 2px;">1</span>	Suspect OWS & 55-gallon Drum w/Surface Staining
<span style="color: blue;">●</span>	Temporary GW Monitoring Well
<span style="color: red;">●</span>	Soil Boring
<span style="background-color: yellow; border: 1px solid black; width: 15px; height: 10px; display: inline-block;"></span>	Area of Petroleum Impact



**Figure 4**  
 Plan Sheet Nos. 13 & 14 Depicting Identified  
 RECs and Boring Locations at Mrs. K's Carwash.  
 E-FR024.07 January 2019

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**Appendix A: Miss Utility Ticket and VDOT Ticket**

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**From:** [tickets@missutilityofvirginia.com](mailto:tickets@missutilityofvirginia.com)  
**To:** [Josh Hepler](#)  
**Subject:** VUPS EMLCFM 2018/12/05 #01649 A833101323-02A RUSH RESP LREQ  
**Date:** Wednesday, December 5, 2018 9:33:18 AM  
**Importance:** High

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EMLCFM 01649 VUPSa 12/05/18 09:33:14 A833101323-02A RESPONSE

Thank you for contacting VA811! This is an automatically generated response from the utilities who received your notice of excavation. If you have questions about the response, call the "field contact" for that utility. For your safety, please respect and protect the marks, excavate carefully around the marked utility lines and contact VA811 if you see clear evidence of unmarked utilities.

**Remember, you can now reach VA811 by dialing 811.**

Ticket : A833101323 Rev: 02A Taken: 12/05/18 07:10 AM

State: VA Cnty: PRINCE WILLIAM Place: DUMFRIES  
Address : 17651 MAIN ST  
Responses due by: 12/05/18 10:08 AM Expires: 12/19/18 07:00 AM

When the member Marking Code is blue, click for additional information that may be provided by the Operator/Locator.

Marking Code	Description	Response
<a href="#">CGV</a>	COLUMBIA GAS (CGV930) Marked Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (800)543-8911	12/04/18 03:20 PM 10
CMC	COMCAST (CMC502) No Conflict; utility is outside of stated work area. Field Contact: CABLE PROTECTION SERVICES (804)562-3861 In the event of damage to a facility call: (800)441-6917 ext opt 1	12/03/18 02:42 PM 30
<a href="#">DOM</a>	DOMINION ENERGY ELEC DIST (DOM400) Marked Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)667-3000	12/04/18 03:20 PM 10
PWS owner	PRINCE WILLIAM - WATER (PWS902) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	11/29/18 09:16 AM 12
PWS owner	PRINCE WILLIAM - SEWER (PWS903) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	11/29/18 09:16 AM 12
UNF	PEG BANDWIDTH (UNF937) No Conflict; utility is outside of stated work area. Field Contact: DAVID CADD (804)382-5823 In the event of damage to a facility call: (877)652-2321	12/05/18 09:33 AM 30
<a href="#">VZN</a>	VERIZON (VZN703) Marked Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)483-1233	12/04/18 03:20 PM 10



Locate Work Order Number: \_\_\_\_\_

Project Location: \_\_\_\_\_

# Utility Location Results Form

## Utility Location Results *(completed by utility location service provider)*

Photos attached Yes No

Was the location that was requested completed? Yes No

Detection cable and/or location tape available Yes No

Accurate As-Built Documents available Yes No

*If no, please check all applicable boxes:*

Accurate As-Built Documents:

Requested? Yes No Provided? Yes No

VDOT on-site assistance:

Requested? Yes No Provided? Yes No

Does the in-field survey area extend 3 feet beyond the border of the intended excavation area? (Required) Yes No

Utility Location Method(s) used: \_\_\_\_\_

### Comments:

Serco/Elite has provided utility markings within the scope of this request for all VDOT owned fiber optic communications cable, and all power cabling from the ITS Device to the ITS Cabinet that was accurately shown on drawings if provided by VDOT, or actual location contained detection cable or tape, and/or VDOT provided on-site assistance.

Where no detection cable/tape and or accurate as-built documents, and/or VDOT assistance was not provided, **we have provided approximate markings or no markings have occurred and the 3rd Party Requestor is advised that hand digging with extreme caution is advised.** Photos have been attached.

Please be advised that in no case will Serco/Elite be held liable or responsible for any power or communication cabling that falls outside our scope and could not be located due to the lack of accurate documentation, detection cable or tape, and/or VDOT assistance

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Certification:** The most appropriate equipment and technology to identify all VDOT underground utilities within the requested zone were used.

Utility Locator: (Print) \_\_\_\_\_  
(signature) \_\_\_\_\_  
Company: \_\_\_\_\_

Start time: \_\_\_\_\_  
End time: \_\_\_\_\_  
Date: \_\_\_\_\_

*This information is valid for 15 days from signed date of marking. Any work performed after 15 days is not covered under this request and will need re-marked.*

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## **Appendix B: Boring Logs**

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Project Location: **RT 1 Widening**  
 Site: **Mrs. K's Car Wash**  
 Location: **STA No 325+25.00; 85-ft LT of CL**  
 Boring Location: **B1**



Date(s) Drilled: <b>12/6/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>14.5'</b>	Screened Interval: <b>5-14.5'</b>
DTW Within Soil Boring: <b>9'</b>		Cased Interval: <b>0-5'</b>
Static GW Level: <b>&lt;10'</b>	Date GW Measured: <b>December 11, 2018</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.1			0-1' asphalt. 1-1.5' gravel. 1.5-3' grey clay, moist. 3-5' brown clay, clasts, moist. No odors.
2				
3				
4				
5				
6	0.1		8:25	5-9' tan sandy clay, very moist. 9-10' grey clay, wet. No odors.
7				
8				
9				
10	0.1		8:30	10-13' grey sandy clay, wet. 13-14.5' gravelly, sandy clay, wet. No odors. Refusal at 14.5'.
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Mrs. K's Car Wash**  
 Location: **STA No 325+25.00; 85-ft LT of CL**  
 Boring Location: **B2**



Date(s) Drilled: <b>12/6/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>15'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.2		8:45	30% recovery. 0-1' black asphalt. 1-3' fill. 3-5' sand with gravel fill. Dry. No odors.
2				
3				
4				
5				
6				No recovery, offset 1x
7				
8				
9				
10	0.2		8:50	30% recovery. 11-13' orange/grey clay, moist. 13-15' grey sand with some pebbles, wet. No odors. Boring terminated at 15' BGS.
11				
12				
13				
14				
15				Notes: offset 1x
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Mrs. K's Car Wash**  
 Location: **STA No 325+25.00; 85-ft LT of CL**  
 Boring Location: **B3**



Date(s) Drilled: <b>12/6/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>15'</b>	Screened Interval: <b>5-15'</b>
DTW Within Soil Boring: <b>5'</b>		Cased Interval: <b>0-5'</b>
Static GW Level: <b>&lt;10'</b>	Date GW Measured: <b>December 11, 2018</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.1		9:15	0-1' asphalt/fill. 1-2' grey clay. 2-3' gravel, sand, green clay. 3-5' orange sandy clay. No odors.
2				
3				
4				
5				
6	0.0		9:20	5-8' sandy clay, orange, very wet. 8-9' fine sandy clay, orange/grey, moist. 9-10' orange/grey clay, moist. No odors.
7				
8				
9				
10				
11	0.0			10-13' Groundwater, wet orange/grey clay. 13-15' grey silt stone. No odors. Refusal at 15' BGS.
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Mrs. K's Car Wash**  
 Location: **STA No 325+25.00; 85-ft LT of CL**  
 Boring Location: **B4**



Date(s) Drilled: <b>12/6/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>15'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	1.3			0-0.5' grass/topsoil. 0.5-2 tan coarse sand, low moisture. 2-4 sandy clay, moist, orange. Wood at 2'. 4-5' sandy clay, very moist. No odors.
2				
3				
4				
5				
6	0.0		8:35	5-6' sandy clay, very moist, orange. 6-8' grey sandy clay, very moist. 8-10' fine sandy clay, orange/grey, very moist. No odors.
7				
8				
9				
10				
11	0.0		8:40	10-12' fine sandy clay, orange/grey, very moist. 12-14' grey wet sandy clay. 14-15' grey coarse sand, low moisture. 15' quartz gravel. Boring terminated at 15-ft BGS.
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

---

## **Appendix C: Laboratory Reports and Sample Custody Documentation**

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## Certificate of Analysis

*Final Report*

Laboratory Order ID 18L0332

Client Name: EEE Consulting (Blacksburg, VA)  
201 Church Street  
Blacksburg, VA 24060

Date Received: December 7, 2018 15:15  
Date Issued: December 19, 2018 11:21  
Project Number: 18-796.07  
Purchase Order: 18-796.07

Submitted To: Josh Hepler

Client Site I.D.: Mr. K's Car Wash

Enclosed are the results of analyses for samples received by the laboratory on 12/07/2018 15:15. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

A handwritten signature in black ink that reads "Ted Soyars".

Ted Soyars  
Laboratory Manager

### End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.





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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA)      Date Issued: 12/19/2018 11:21  
201 Church Street  
Blacksburg VA, 24060

Submitted To: Josh Hepler      Project Number: 18-796.07  
Client Site I.D.: Mr. K's Car Wash      Purchase Order: 18-796.07

#### ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0332

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B1 5-10	18L0332-01	Soil	12/06/2018 08:25	12/07/2018 15:15
B1 10-14.5	18L0332-02	Soil	12/06/2018 08:30	12/07/2018 15:15
B2 0-5	18L0332-03	Soil	12/06/2018 08:45	12/07/2018 15:15
B2 10-15	18L0332-04	Soil	12/06/2018 08:50	12/07/2018 15:15
B3 0-5	18L0332-05	Soil	12/06/2018 09:15	12/07/2018 15:15
B3 5-10	18L0332-06	Soil	12/06/2018 08:20	12/07/2018 15:15
B4 5-10	18L0332-07	Soil	12/06/2018 09:35	12/07/2018 15:15
B4 10-15	18L0332-08	Soil	12/06/2018 09:40	12/07/2018 15:15



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

**Sample I.D.** B1 5-10 **Laboratory Sample ID:** 18L0332-01

**Grab Date/Time:** 12/06/2018 08:25

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 19:19	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>01</i>	<i>SW8015C</i>	<i>76.7 %</i>		<i>40-160</i>		<i>12/17/18 09:20</i>	<i>12/18/18 19:19</i>	<i>HLM</i>
TPH-Semi-Volatiles (ORO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 11:45	12/18/18 16:19	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

Sample I.D. B1 10-14.5	Laboratory Sample ID: 18L0332-02
Grab Date/Time: 12/06/2018 08:30	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 19:45	HLM
<i>Surr: Pentacosane (Surr)</i>	02	SW8015C	86.9 %		40-160		12/17/18 09:20	12/18/18 19:45	HLM
TPH-Semi-Volatiles (ORO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 11:45	12/18/18 16:44	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

Sample I.D. B2 0-5	Laboratory Sample ID: 18L0332-03
Grab Date/Time: 12/06/2018 08:45	Field pH:

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	03	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 20:12	HLM
<i>Surr: Pentacosane (Surr)</i>	03	SW8015C	90.9 %		40-160		12/17/18 09:20	12/18/18 20:12	HLM
TPH-Semi-Volatiles (ORO)	03	SW8015C	30.5 mg/kg		10.0	1	12/17/18 11:45	12/18/18 17:08	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

**Sample I.D.** B2 10-15 **Laboratory Sample ID:** 18L0332-04

**Grab Date/Time:** 12/06/2018 08:50

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	04	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 20:38	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>04</i>	<i>SW8015C</i>	<i>85.1 %</i>		<i>40-160</i>		<i>12/17/18 09:20</i>	<i>12/18/18 20:38</i>	<i>HLM</i>
TPH-Semi-Volatiles (ORO)	04	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 11:45	12/18/18 17:33	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

**Sample I.D.** B3 0-5 **Laboratory Sample ID:** 18L0332-05

**Grab Date/Time:** 12/06/2018 09:15

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	05	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 21:05	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>05</i>	<i>SW8015C</i>	<i>95.7 %</i>		<i>40-160</i>		<i>12/17/18 09:20</i>	<i>12/18/18 21:05</i>	<i>HLM</i>
TPH-Semi-Volatiles (ORO)	05	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 11:45	12/18/18 17:58	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

**Sample I.D.** B3 5-10 **Laboratory Sample ID:** 18L0332-06

**Grab Date/Time:** 12/06/2018 08:20

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	06	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 21:31	HLM
<i>Surr: Pentacosane (Surr)</i>	06	SW8015C	83.6 %		40-160		12/17/18 09:20	12/18/18 21:31	HLM
TPH-Semi-Volatiles (ORO)	06	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 11:45	12/18/18 18:23	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

Sample I.D. B4 5-10	Laboratory Sample ID: 18L0332-07
Grab Date/Time: 12/06/2018 09:35	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 21:58	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>07</i>	<i>SW8015C</i>	<i>90.0 %</i>		<i>40-160</i>		<i>12/17/18 09:20</i>	<i>12/18/18 21:58</i>	<i>HLM</i>
TPH-Semi-Volatiles (ORO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 11:45	12/18/18 18:47	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

**Laboratory Order ID: 18L0332**

**Analytical Results**

Sample I.D. B4 10-15	Laboratory Sample ID: 18L0332-08
Grab Date/Time: 12/06/2018 09:40	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 09:20	12/18/18 22:24	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>08</i>	<i>SW8015C</i>	<i>89.8 %</i>		<i>40-160</i>		<i>12/17/18 09:20</i>	<i>12/18/18 22:24</i>	<i>HLM</i>
TPH-Semi-Volatiles (ORO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/17/18 11:45	12/18/18 19:12	HLM

### Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Semivolatile Hydrocarbons by GC</b>					
			<b>Preparation Method:</b>	<b>SW3550C</b>	
18L0332-01	50.8 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0332-02	50.6 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0332-03	51.3 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0332-04	50.8 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0332-05	50.4 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0332-06	50.6 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0332-07	50.2 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
18L0332-08	50.3 g / 1.00 mL	SW8015C	BBL0469	SBL0507	AK80056
<b>Semivolatile Hydrocarbons by GC</b>					
			<b>Preparation Method:</b>	<b>SW3550C</b>	
18L0332-01	50.2 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136
18L0332-02	50.1 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136
18L0332-03	50.6 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136
18L0332-04	51.7 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136
18L0332-05	50.2 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136
18L0332-06	51.4 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136
18L0332-07	50.7 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136
18L0332-08	50.5 g / 1.00 mL	SW8015C	BBL0485	SBL0508	AH80136



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/19/2018 11:21
Submitted To:	Josh Hepler	Project Number:	18-796.07
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	18-796.07

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	------

#### Batch BBL0469 - SW3550C

##### Blank (BBL0469-BLK1)

Prepared: 12/17/2018 Analyzed: 12/18/2018

TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
<hr style="border-top: 1px dashed #000;"/>										
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			
Surr: Pentacosane (Surr)	5.24		mg/kg	5.03		104	40-160			

##### LCS (BBL0469-BS1)

Prepared: 12/17/2018 Analyzed: 12/18/2018

TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
TPH-Semi-Volatiles (DRO)	72.6 mg/kg	10.0	mg/kg	99.2	mg/kg	73.1	40-160			
<hr style="border-top: 1px dashed #000;"/>										
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0469 - SW3550C

##### LCS (BBL0469-BS1)

Prepared: 12/17/2018 Analyzed: 12/18/2018

Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160		
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160		
Surr: Pentacosane (Surr)	4.95		mg/kg	5.00	mg/kg	99.1	40-160		

##### Matrix Spike (BBL0469-MS1)

Source: 18L0319-07

Prepared: 12/17/2018 Analyzed: 12/18/2018

TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
TPH-Semi-Volatiles (DRO)	81.7 mg/kg	10.0	mg/kg	96.2	<10.0 mg/kg	85.0	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		
Surr: Pentacosane (Surr)	4.58		mg/kg	4.85	mg/kg	94.5	40-160		

##### Matrix Spike Dup (BBL0469-MSD1)

Source: 18L0319-07

Prepared: 12/17/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20
TPH-Semi-Volatiles (DRO)	77.0 mg/kg	10.0	mg/kg	95.8	<10.0 mg/kg	80.4	40-160	5.96	20



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/19/2018 11:21
Submitted To: Josh Hepler	Project Number: 18-796.07
Client Site I.D.: Mr. K's Car Wash	Purchase Order: 18-796.07

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0469 - SW3550C

**Matrix Spike Dup (BBL0469-MSD1)**      **Source: 18L0319-07**      Prepared: 12/17/2018 Analyzed: 12/19/2018

Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			
Surr: Pentacosane (Surr)	4.32		mg/kg	4.83	mg/kg	89.5	40-160			

#### Batch BBL0485 - SW3550C

**Blank (BBL0485-BLK1)**      Prepared: 12/17/2018 Analyzed: 12/18/2018

TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							

**LCS (BBL0485-BS1)**      Prepared: 12/17/2018 Analyzed: 12/18/2018

TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			
TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			
TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			
TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			
TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			
TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			
TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			
TPH-Semi-Volatiles (ORO)	46.7 mg/kg	10.0	mg/kg	99.6	mg/kg	46.9	40-160			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/19/2018 11:21
Submitted To:	Josh Hepler	Project Number:	18-796.07
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	18-796.07

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0485 - SW3550C

##### Matrix Spike (BBL0485-MS1)

Source: 18L0345-01

Prepared: 12/17/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			
TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			
TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			
TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			
TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			
TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			
TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			
TPH-Semi-Volatiles (ORO)	49.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	49.8	40-160			

##### Matrix Spike Dup (BBL0485-MSD1)

Source: 18L0345-01

Prepared: 12/17/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	
TPH-Semi-Volatiles (ORO)	47.7 mg/kg	10.0	mg/kg	98.2	<10.0 mg/kg	48.6	40-160	3.52	20	



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/19/2018 11:21
Submitted To:	Josh Hepler	Project Number:	18-796.07
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	18-796.07

### Certified Analyses included in this Report

Analyte	Certifications		
<i>SW8015C in Solids</i>			
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP		
TPH-Semi-Volatiles (ORO)	VELAP		
Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/19/2018 11:21
Submitted To:	Josh Hepler	Project Number:	18-796.07
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	18-796.07

### Summary of Data Qualifiers

RPD Relative Percent Difference

Qual Qualifiers

-RE Denotes sample was re-analyzed

D.F. Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.

TIC Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library .  
A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.

PCBs, Total Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.

## CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: <u>EEE Consulting</u>		INVOICE TO: <u>same</u>	PROJECT NAME/Quote #: <u>Rt 1 Widening</u>
CONTACT: <u>Josh Hepler</u>		INVOICE CONTACT: <u>↓</u>	SITE NAME: <u>Mr. K's Carwash</u>
ADDRESS: <u>201 Church St Blacksburg</u>		INVOICE ADDRESS: <u>↓</u>	PROJECT NUMBER: <u>18-796.07</u>
PHONE #: <u>540 953 0170</u>		INVOICE PHONE #: <u>↓</u>	P.O. #: <u>18-796.07</u>
FAX #:	EMAIL: <u>jhepler@eee-consulting.com</u>	Pretreatment Program: <u>NA</u>	
Is sample for compliance reporting? YES NO <u>NA</u>		Is sample from a chlorinated supply? YES NO <u>NA</u>	
SAMPLER NAME (PRINT): <u>Josh Hepler</u>		SAMPLER SIGNATURE: <u>[Signature]</u>	Turn Around Time: Circle: <u>10</u> 5 Days or <u>  </u> Day(s)
Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other			PWS I.D. #: <u>NA</u>

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)		COMMENTS
											TPH - DRD	TPH - ORO	
1) <u>B1 5-10</u>	<u>X</u>			<u>NA</u>	<u>NA</u>	<u>12/6</u>	<u>8:25</u>	<u>NA</u>	<u>S</u>	<u>2</u>	<u>X</u>	<u>X</u>	Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol  PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)
2) <u>B1 10-14.5</u>	<u>↓</u>			<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>8:30</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	
3) <u>B2 0-5</u>	<u>↓</u>			<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>8:45</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	
4) <u>B2 10-15</u>	<u>↓</u>			<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>8:50</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	
5) <u>B3 0-5</u>	<u>↓</u>			<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>9:15</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	
6) <u>B3 5-10</u>	<u>↓</u>			<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>9:20</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	
7) <u>B4 5-10</u>	<u>↓</u>			<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>9:35</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	
8) <u>B4 10-15</u>	<u>↓</u>			<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>9:40</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	<u>↓</u>	
9)													
10)													

RELINQUISHED: <u>[Signature]</u>	DATE / TIME: <u>12/7/18 12:03</u>	RECEIVED: <u>[Signature]</u>	DATE / TIME: <u>12/7/18 15:15</u>	QC Data Package	LAB USE ONLY Custody Seals used and intact? <u>(N)</u>	COOLER TEMP: <u>0.7°C</u>
RELINQUISHED: <u>[Signature]</u>	DATE / TIME: <u>12/7/18 3:15</u>	RECEIVED: <u>[Signature]</u>	DATE / TIME: <u>12/7/18 15:15</u>	Level III <input type="checkbox"/>	<b>EEE-Blacksburg</b> <b>Mr. K's Car Wash</b> <b>Recd: 12/07/2018 Due: 12/21/2018</b>	<b>18L0332</b>
RELINQUISHED:	DATE / TIME:	RECEIVED:	DATE / TIME:	Level IV <input type="checkbox"/>		



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/19/2018 11:21
Submitted To:	Josh Hepler	Project Number:	18-796.07
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	18-796.07

## Sample Conditions Checklist

Samples Received at:	0.70°C
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	No
Are all volatile organic and TOX containers free of headspace?	NA
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	NA
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes



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## Certificate of Analysis

*Final Report*

Laboratory Order ID 18L0649

Client Name: EEE Consulting (Blacksburg, VA)  
201 Church Street  
Blacksburg, VA 24060

Date Received: December 14, 2018 14:00

Date Issued: December 20, 2018 16:22

Project Number: 18-796

Submitted To: Josh Hepler

Purchase Order:

Client Site I.D.: Mr. K's Car Wash

Enclosed are the results of analyses for samples received by the laboratory on 12/14/2018 14:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Ted Soyars  
Laboratory Manager

### End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) Date Issued: 12/20/2018 16:22  
201 Church Street  
Blacksburg VA, 24060

Submitted To: Josh Hepler Project Number: 18-796  
Client Site I.D.: Mr. K's Car Wash Purchase Order:

#### ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0649

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B-1	18L0649-01	Ground Water	12/11/2018 12:00	12/14/2018 14:00
B-3	18L0649-02	Ground Water	12/11/2018 13:00	12/14/2018 14:00
Trip Blank	18L0649-03	Ground Water	11/27/2018 15:35	12/14/2018 14:00



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

**Sample I.D.** B-1 **Laboratory Sample ID:** 18L0649-01

**Grab Date/Time:** 12/11/2018 12:00

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
1,1,1,2-Tetrachloroethane	01	SW8260B	<0.40 ug/L		0.40	1	12/17/18 15:55	12/17/18 15:55	KCS
1,1,1-Trichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,1,2,2-Tetrachloroethane	01	SW8260B	<0.40 ug/L		0.40	1	12/17/18 15:55	12/17/18 15:55	KCS
1,1,2-Trichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,1-Dichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,1-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,1-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2,3-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2,3-Trichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2,4-Trichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2,4-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2-Dibromo-3-chloropropane (DBCP)	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2-Dibromoethane (EDB)	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2-Dichlorobenzene	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2-Dichloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,2-Dichloropropane	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 15:55	12/17/18 15:55	KCS
1,3,5-Trimethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,3-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,3-Dichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
1,4-Dichlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
2,2-Dichloropropane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
2-Butanone (MEK)	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 15:55	12/17/18 15:55	KCS
2-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
2-Hexanone (MBK)	01	SW8260B	<5.00 ug/L		5.00	1	12/17/18 15:55	12/17/18 15:55	KCS
4-Chlorotoluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. B-1	Laboratory Sample ID: 18L0649-01
Grab Date/Time: 12/11/2018 12:00	
Field Residual Cl:	Field pH:

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
4-Isopropyltoluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
4-Methyl-2-pentanone (MIBK)	01	SW8260B	<5.00 ug/L		5.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Acetone	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 15:55	12/17/18 15:55	KCS
Benzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Bromobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Bromochloromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Bromodichloromethane	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 15:55	12/17/18 15:55	KCS
Bromoform	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Bromomethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Carbon disulfide	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 15:55	12/17/18 15:55	KCS
Carbon tetrachloride	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Chlorobenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Chloroethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Chloroform	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 15:55	12/17/18 15:55	KCS
Chloromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
cis-1,2-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
cis-1,3-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Dibromochloromethane	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 15:55	12/17/18 15:55	KCS
Dibromomethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Dichlorodifluoromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Di-isopropyl ether (DIPE)	01	SW8260B	<5.00 ug/L		5.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Ethylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Hexachlorobutadiene	01	SW8260B	<0.80 ug/L		0.80	1	12/17/18 15:55	12/17/18 15:55	KCS
Iodomethane	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 15:55	12/17/18 15:55	KCS
Isopropylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. B-1	Laboratory Sample ID: 18L0649-01
Grab Date/Time: 12/11/2018 12:00	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
m+p-Xylenes	01	SW8260B	<2.00 ug/L		2.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Methylene chloride	01	SW8260B	<4.00 ug/L		4.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Methyl-t-butyl ether (MTBE)	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Naphthalene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
n-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
n-Propylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
o-Xylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
sec-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Styrene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
tert-Butylbenzene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Tetrachloroethylene (PCE)	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Toluene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
trans-1,2-Dichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
trans-1,3-Dichloropropene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Trichloroethylene	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Trichlorofluoromethane	01	SW8260B	<1.00 ug/L		1.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Vinyl acetate	01	SW8260B	<10.0 ug/L		10.0	1	12/17/18 15:55	12/17/18 15:55	KCS
Vinyl chloride	01	SW8260B	<0.50 ug/L		0.50	1	12/17/18 15:55	12/17/18 15:55	KCS
Xylenes, Total	01	SW8260B	<3.00 ug/L		3.00	1	12/17/18 15:55	12/17/18 15:55	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	01	SW8260B	103 %		70-120		12/17/18 15:55	12/17/18 15:55	KCS
Surr: 4-Bromofluorobenzene (Surr)	01	SW8260B	100 %		75-120		12/17/18 15:55	12/17/18 15:55	KCS
Surr: Dibromofluoromethane (Surr)	01	SW8260B	109 %		70-130		12/17/18 15:55	12/17/18 15:55	KCS
Surr: Toluene-d8 (Surr)	01	SW8260B	104 %		70-130		12/17/18 15:55	12/17/18 15:55	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

<b>Sample I.D.</b> B-1	<b>Laboratory Sample ID:</b> 18L0649-01
<b>Grab Date/Time:</b> 12/11/2018 12:00	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<0.568 mg/L		0.568	1	12/18/18 14:45	12/19/18 19:24	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>01</i>	<i>SW8015C</i>	<i>107 %</i>		<i>65-125</i>		<i>12/18/18 14:45</i>	<i>12/19/18 19:24</i>	<i>HLM</i>
TPH-Semi-Volatiles (ORO)	01	SW8015C	<1.1 mg/L		1.1	1	12/18/18 14:45	12/19/18 11:49	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. B-3	Laboratory Sample ID: 18L0649-02
Grab Date/Time: 12/11/2018 13:00	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
1,1,1,2-Tetrachloroethane	02	SW8260B	<0.40 ug/L		0.40	1	12/17/18 16:19	12/17/18 16:19	KCS
1,1,1-Trichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,1,2,2-Tetrachloroethane	02	SW8260B	<0.40 ug/L		0.40	1	12/17/18 16:19	12/17/18 16:19	KCS
1,1,2-Trichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,1-Dichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,1-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,1-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2,3-Trichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2,3-Trichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2,4-Trichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2,4-Trimethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2-Dibromo-3-chloropropane (DBCP)	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2-Dibromoethane (EDB)	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2-Dichlorobenzene	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2-Dichloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,2-Dichloropropane	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 16:19	12/17/18 16:19	KCS
1,3,5-Trimethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,3-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,3-Dichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
1,4-Dichlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
2,2-Dichloropropane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
2-Butanone (MEK)	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 16:19	12/17/18 16:19	KCS
2-Chlorotoluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
2-Hexanone (MBK)	02	SW8260B	<5.00 ug/L		5.00	1	12/17/18 16:19	12/17/18 16:19	KCS
4-Chlorotoluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. B-3	Laboratory Sample ID: 18L0649-02
Grab Date/Time: 12/11/2018 13:00	
Field Residual Cl:	Field pH:

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
4-Isopropyltoluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
4-Methyl-2-pentanone (MIBK)	02	SW8260B	<5.00 ug/L		5.00	1	12/17/18 16:19	12/17/18 16:19	KCS
<b>Acetone</b>	02	SW8260B	<b>10.2 ug/L</b>		10.0	1	12/17/18 16:19	12/17/18 16:19	KCS
Benzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Bromobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Bromochloromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Bromodichloromethane	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 16:19	12/17/18 16:19	KCS
Bromoform	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Bromomethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Carbon disulfide	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 16:19	12/17/18 16:19	KCS
Carbon tetrachloride	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Chlorobenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Chloroethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Chloroform	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 16:19	12/17/18 16:19	KCS
Chloromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
cis-1,2-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
cis-1,3-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Dibromochloromethane	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 16:19	12/17/18 16:19	KCS
Dibromomethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Dichlorodifluoromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Di-isopropyl ether (DIPE)	02	SW8260B	<5.00 ug/L		5.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Ethylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Hexachlorobutadiene	02	SW8260B	<0.80 ug/L		0.80	1	12/17/18 16:19	12/17/18 16:19	KCS
Iodomethane	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 16:19	12/17/18 16:19	KCS
Isopropylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. B-3	Laboratory Sample ID: 18L0649-02
Grab Date/Time: 12/11/2018 13:00	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
m+p-Xylenes	02	SW8260B	<2.00 ug/L		2.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Methylene chloride	02	SW8260B	<4.00 ug/L		4.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Methyl-t-butyl ether (MTBE)	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Naphthalene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
n-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
n-Propylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
o-Xylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
sec-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Styrene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
tert-Butylbenzene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Tetrachloroethylene (PCE)	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Toluene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
trans-1,2-Dichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
trans-1,3-Dichloropropene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Trichloroethylene	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Trichlorofluoromethane	02	SW8260B	<1.00 ug/L		1.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Vinyl acetate	02	SW8260B	<10.0 ug/L		10.0	1	12/17/18 16:19	12/17/18 16:19	KCS
Vinyl chloride	02	SW8260B	<0.50 ug/L		0.50	1	12/17/18 16:19	12/17/18 16:19	KCS
Xylenes, Total	02	SW8260B	<3.00 ug/L		3.00	1	12/17/18 16:19	12/17/18 16:19	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	02	SW8260B	107 %		70-120		12/17/18 16:19	12/17/18 16:19	KCS
Surr: 4-Bromofluorobenzene (Surr)	02	SW8260B	98.9 %		75-120		12/17/18 16:19	12/17/18 16:19	KCS
Surr: Dibromofluoromethane (Surr)	02	SW8260B	108 %		70-130		12/17/18 16:19	12/17/18 16:19	KCS
Surr: Toluene-d8 (Surr)	02	SW8260B	104 %		70-130		12/17/18 16:19	12/17/18 16:19	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

<b>Sample I.D.</b> B-3	<b>Laboratory Sample ID:</b> 18L0649-02
<b>Grab Date/Time:</b> 12/11/2018 13:00	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	02	SW8015C	<0.562 mg/L		0.562	1	12/18/18 14:45	12/19/18 19:50	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>02</i>	<i>SW8015C</i>	<i>88.6 %</i>		<i>65-125</i>		<i>12/18/18 14:45</i>	<i>12/19/18 19:50</i>	<i>HLM</i>
TPH-Semi-Volatiles (ORO)	02	SW8015C	<1.1 mg/L		1.1	1	12/18/18 14:45	12/19/18 12:14	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. Trip Blank	Laboratory Sample ID: 18L0649-03
Grab Date/Time: 11/27/2018 15:35	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
1,1,1,2-Tetrachloroethane	03	SW8260B	<0.40 ug/L		0.40	1	12/17/18 12:23	12/17/18 12:23	KCS
1,1,1-Trichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,1,2,2-Tetrachloroethane	03	SW8260B	<0.40 ug/L		0.40	1	12/17/18 12:23	12/17/18 12:23	KCS
1,1,2-Trichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,1-Dichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,1-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,1-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2,3-Trichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2,3-Trichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2,4-Trichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2,4-Trimethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2-Dibromo-3-chloropropane (DBCP)	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2-Dibromoethane (EDB)	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2-Dichlorobenzene	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2-Dichloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,2-Dichloropropane	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 12:23	12/17/18 12:23	KCS
1,3,5-Trimethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,3-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,3-Dichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
1,4-Dichlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
2,2-Dichloropropane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
2-Butanone (MEK)	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 12:23	12/17/18 12:23	KCS
2-Chlorotoluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
2-Hexanone (MBK)	03	SW8260B	<5.00 ug/L		5.00	1	12/17/18 12:23	12/17/18 12:23	KCS
4-Chlorotoluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA)  
201 Church Street  
Blacksburg VA, 24060

Date Issued: 12/20/2018 16:22

Submitted To: Josh Hepler

Project Number: 18-796

Client Site I.D.: Mr. K's Car Wash

Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. Trip Blank

Laboratory Sample ID: 18L0649-03

Grab Date/Time: 11/27/2018 15:35

Field Residual Cl:

Field pH:

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
4-Isopropyltoluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
4-Methyl-2-pentanone (MIBK)	03	SW8260B	<5.00 ug/L		5.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Acetone	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 12:23	12/17/18 12:23	KCS
Benzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Bromobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Bromochloromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Bromodichloromethane	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 12:23	12/17/18 12:23	KCS
Bromoform	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Bromomethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Carbon disulfide	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 12:23	12/17/18 12:23	KCS
Carbon tetrachloride	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Chlorobenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Chloroethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Chloroform	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 12:23	12/17/18 12:23	KCS
Chloromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
cis-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
cis-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Dibromochloromethane	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 12:23	12/17/18 12:23	KCS
Dibromomethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Dichlorodifluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Di-isopropyl ether (DIPE)	03	SW8260B	<5.00 ug/L		5.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Ethylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Hexachlorobutadiene	03	SW8260B	<0.80 ug/L		0.80	1	12/17/18 12:23	12/17/18 12:23	KCS
Iodomethane	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 12:23	12/17/18 12:23	KCS
Isopropylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

**Analytical Results**

Sample I.D. Trip Blank	Laboratory Sample ID: 18L0649-03
Grab Date/Time: 11/27/2018 15:35	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GCMS</b>									
m+p-Xylenes	03	SW8260B	<2.00 ug/L		2.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Methylene chloride	03	SW8260B	<4.00 ug/L		4.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Methyl-t-butyl ether (MTBE)	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Naphthalene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
n-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
n-Propylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
o-Xylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
sec-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Styrene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
tert-Butylbenzene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Tetrachloroethylene (PCE)	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Toluene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
trans-1,2-Dichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
trans-1,3-Dichloropropene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Trichloroethylene	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Trichlorofluoromethane	03	SW8260B	<1.00 ug/L		1.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Vinyl acetate	03	SW8260B	<10.0 ug/L		10.0	1	12/17/18 12:23	12/17/18 12:23	KCS
Vinyl chloride	03	SW8260B	<0.50 ug/L		0.50	1	12/17/18 12:23	12/17/18 12:23	KCS
Xylenes, Total	03	SW8260B	<3.00 ug/L		3.00	1	12/17/18 12:23	12/17/18 12:23	KCS
Surr: 1,2-Dichloroethane-d4 (Surr)	03	SW8260B	106 %		70-120		12/17/18 12:23	12/17/18 12:23	KCS
Surr: 4-Bromofluorobenzene (Surr)	03	SW8260B	99.7 %		75-120		12/17/18 12:23	12/17/18 12:23	KCS
Surr: Dibromofluoromethane (Surr)	03	SW8260B	110 %		70-130		12/17/18 12:23	12/17/18 12:23	KCS
Surr: Toluene-d8 (Surr)	03	SW8260B	103 %		70-130		12/17/18 12:23	12/17/18 12:23	KCS



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

**Laboratory Order ID: 18L0649**

### Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Semivolatile Hydrocarbons by GC</b>		<b>Preparation Method: SW3510C</b>			
18L0649-01	880 mL / 1.00 mL	SW8015C	BBL0540	SBL0564	AK80055
18L0649-02	890 mL / 1.00 mL	SW8015C	BBL0540	SBL0564	AK80055
<b>Semivolatile Hydrocarbons by GC</b>		<b>Preparation Method: SW3510C</b>			
18L0649-01	880 mL / 1.00 mL	SW8015C	BBL0541	SBL0545	AH80136
18L0649-02	880 mL / 1.00 mL	SW8015C	BBL0541	SBL0545	AH80136
Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Volatile Organic Compounds by GCMS</b>		<b>Preparation Method: SW5030B</b>			
18L0649-01	5.00 mL / 5.00 mL	SW8260B	BBL0489	SBL0448	AL80011
18L0649-02	5.00 mL / 5.00 mL	SW8260B	BBL0489	SBL0448	AL80011
18L0649-03	5.00 mL / 5.00 mL	SW8260B	BBL0489	SBL0448	AL80011



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,1,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,1-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,2,2-Tetrachloroethane	<0.40 ug/L	0.40	ug/L							
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1,2-Trichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethane	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L							
1,1-Dichloropropene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L							
1,2,3-Trichloropropane	<1.00 ug/L	1.00	ug/L							
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trichlorobenzene	<1.00 ug/L	1.00	ug/L							
1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L							



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L						
1,2,4-Trimethylbenzene	<1.00 ug/L	1.00	ug/L						
1,2-Dibromo-3-chloropropane (DBCP)	<1.00 ug/L	1.00	ug/L						
1,2-Dibromo-3-chloropropane (DBCP)	<1.00 ug/L	1.00	ug/L						
1,2-Dibromo-3-chloropropane (DBCP)	<1.00 ug/L	1.00	ug/L						
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L						
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L						
1,2-Dibromoethane (EDB)	<1.00 ug/L	1.00	ug/L						
1,2-Dichlorobenzene	<0.50 ug/L	0.50	ug/L						
1,2-Dichlorobenzene	<0.50 ug/L	0.50	ug/L						
1,2-Dichlorobenzene	<0.50 ug/L	0.50	ug/L						
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L						
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L						
1,2-Dichloroethane	<1.00 ug/L	1.00	ug/L						
1,2-Dichloropropane	<0.50 ug/L	0.50	ug/L						
1,2-Dichloropropane	<0.50 ug/L	0.50	ug/L						
1,2-Dichloropropane	<0.50 ug/L	0.50	ug/L						
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L						
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L						
1,3,5-Trimethylbenzene	<1.00 ug/L	1.00	ug/L						
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,3-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L						
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L						
1,3-Dichloropropane	<1.00 ug/L	1.00	ug/L						
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
1,4-Dichlorobenzene	<1.00 ug/L	1.00	ug/L						
2,2-Dichloropropane	<1.00 ug/L	1.00	ug/L						
2,2-Dichloropropane	<1.00 ug/L	1.00	ug/L						



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### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

2,2-Dichloropropane	<1.00 ug/L	1.00	ug/L							
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L							
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L							
2-Butanone (MEK)	<10.0 ug/L	10.0	ug/L							
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
2-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L							
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L							
2-Hexanone (MBK)	<5.00 ug/L	5.00	ug/L							
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
4-Chlorotoluene	<1.00 ug/L	1.00	ug/L							
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L							
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L							
4-Isopropyltoluene	<1.00 ug/L	1.00	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.00 ug/L	5.00	ug/L							
Acetone	<10.0 ug/L	10.0	ug/L							
Acetone	<10.0 ug/L	10.0	ug/L							
Acetone	<10.0 ug/L	10.0	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Bromobenzene	<1.00 ug/L	1.00	ug/L							
Bromobenzene	<1.00 ug/L	1.00	ug/L							
Bromobenzene	<1.00 ug/L	1.00	ug/L							
Bromochloromethane	<1.00 ug/L	1.00	ug/L							
Bromochloromethane	<1.00 ug/L	1.00	ug/L							
Bromochloromethane	<1.00 ug/L	1.00	ug/L							



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Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

Bromodichloromethane	<0.50 ug/L	0.50	ug/L							
Bromodichloromethane	<0.50 ug/L	0.50	ug/L							
Bromodichloromethane	<0.50 ug/L	0.50	ug/L							
Bromoform	<1.00 ug/L	1.00	ug/L							
Bromoform	<1.00 ug/L	1.00	ug/L							
Bromoform	<1.00 ug/L	1.00	ug/L							
Bromomethane	<1.00 ug/L	1.00	ug/L							
Bromomethane	<1.00 ug/L	1.00	ug/L							
Bromomethane	<1.00 ug/L	1.00	ug/L							
Carbon disulfide	<10.0 ug/L	10.0	ug/L							
Carbon disulfide	<10.0 ug/L	10.0	ug/L							
Carbon disulfide	<10.0 ug/L	10.0	ug/L							
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L							
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L							
Carbon tetrachloride	<1.00 ug/L	1.00	ug/L							
Chlorobenzene	<1.00 ug/L	1.00	ug/L							
Chlorobenzene	<1.00 ug/L	1.00	ug/L							
Chlorobenzene	<1.00 ug/L	1.00	ug/L							
Chloroethane	<1.00 ug/L	1.00	ug/L							
Chloroethane	<1.00 ug/L	1.00	ug/L							
Chloroethane	<1.00 ug/L	1.00	ug/L							
Chloroform	<0.50 ug/L	0.50	ug/L							
Chloroform	<0.50 ug/L	0.50	ug/L							
Chloroform	<0.50 ug/L	0.50	ug/L							
Chloromethane	<1.00 ug/L	1.00	ug/L							
Chloromethane	<1.00 ug/L	1.00	ug/L							
Chloromethane	<1.00 ug/L	1.00	ug/L							
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
cis-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L							
cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							



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Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC	Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
cis-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L							
Dibromochloromethane	<0.50 ug/L	0.50	ug/L							
Dibromochloromethane	<0.50 ug/L	0.50	ug/L							
Dibromochloromethane	<0.50 ug/L	0.50	ug/L							
Dibromomethane	<1.00 ug/L	1.00	ug/L							
Dibromomethane	<1.00 ug/L	1.00	ug/L							
Dibromomethane	<1.00 ug/L	1.00	ug/L							
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L							
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L							
Dichlorodifluoromethane	<1.00 ug/L	1.00	ug/L							
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L							
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L							
Di-isopropyl ether (DIPE)	<5.00 ug/L	5.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
Hexachlorobutadiene	<0.80 ug/L	0.80	ug/L							
Hexachlorobutadiene	<0.80 ug/L	0.80	ug/L							
Hexachlorobutadiene	<0.80 ug/L	0.80	ug/L							
Iodomethane	<10.0 ug/L	10.0	ug/L							
Iodomethane	<10.0 ug/L	10.0	ug/L							
Iodomethane	<10.0 ug/L	10.0	ug/L							
Isopropylbenzene	<1.00 ug/L	1.00	ug/L							
Isopropylbenzene	<1.00 ug/L	1.00	ug/L							
Isopropylbenzene	<1.00 ug/L	1.00	ug/L							
m+p-Xylenes	<2.00 ug/L	2.00	ug/L							
m+p-Xylenes	<2.00 ug/L	2.00	ug/L							
m+p-Xylenes	<2.00 ug/L	2.00	ug/L							
Methylene chloride	<4.00 ug/L	4.00	ug/L							
Methylene chloride	<4.00 ug/L	4.00	ug/L							



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## Certificate of Analysis

### Final Report

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Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

Methylene chloride	<4.00 ug/L	4.00	ug/L						
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L						
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L						
Methyl-t-butyl ether (MTBE)	<1.00 ug/L	1.00	ug/L						
Naphthalene	<1.00 ug/L	1.00	ug/L						
Naphthalene	<1.00 ug/L	1.00	ug/L						
Naphthalene	<1.00 ug/L	1.00	ug/L						
n-Butylbenzene	<1.00 ug/L	1.00	ug/L						
n-Butylbenzene	<1.00 ug/L	1.00	ug/L						
n-Butylbenzene	<1.00 ug/L	1.00	ug/L						
n-Propylbenzene	<1.00 ug/L	1.00	ug/L						
n-Propylbenzene	<1.00 ug/L	1.00	ug/L						
n-Propylbenzene	<1.00 ug/L	1.00	ug/L						
o-Xylene	<1.00 ug/L	1.00	ug/L						
o-Xylene	<1.00 ug/L	1.00	ug/L						
o-Xylene	<1.00 ug/L	1.00	ug/L						
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L						
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L						
sec-Butylbenzene	<1.00 ug/L	1.00	ug/L						
Styrene	<1.00 ug/L	1.00	ug/L						
Styrene	<1.00 ug/L	1.00	ug/L						
Styrene	<1.00 ug/L	1.00	ug/L						
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L						
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L						
tert-Butylbenzene	<1.00 ug/L	1.00	ug/L						
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L						
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L						
Tetrachloroethylene (PCE)	<1.00 ug/L	1.00	ug/L						
Toluene	<1.00 ug/L	1.00	ug/L						
Toluene	<1.00 ug/L	1.00	ug/L						
Toluene	<1.00 ug/L	1.00	ug/L						



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### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L						
trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L						
trans-1,2-Dichloroethylene	<1.00 ug/L	1.00	ug/L						
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L						
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L						
trans-1,3-Dichloropropene	<1.00 ug/L	1.00	ug/L						
Trichloroethylene	<1.00 ug/L	1.00	ug/L						
Trichloroethylene	<1.00 ug/L	1.00	ug/L						
Trichloroethylene	<1.00 ug/L	1.00	ug/L						
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L						
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L						
Trichlorofluoromethane	<1.00 ug/L	1.00	ug/L						
Vinyl acetate	<10.0 ug/L	10.0	ug/L						
Vinyl acetate	<10.0 ug/L	10.0	ug/L						
Vinyl acetate	<10.0 ug/L	10.0	ug/L						
Vinyl chloride	<0.50 ug/L	0.50	ug/L						
Vinyl chloride	<0.50 ug/L	0.50	ug/L						
Vinyl chloride	<0.50 ug/L	0.50	ug/L						
Xylenes, Total	<3.00 ug/L	3.00	ug/L						
Xylenes, Total	<3.00 ug/L	3.00	ug/L						
Xylenes, Total	<3.00 ug/L	3.00	ug/L						
<hr style="border-top: 1px dashed black;"/>									
Surr: 1,2-Dichloroethane-d4 (Surr)	51.6		ug/L	50.0		103	70-120		
Surr: 1,2-Dichloroethane-d4 (Surr)	51.6		ug/L	50.0		103	70-120		
Surr: 1,2-Dichloroethane-d4 (Surr)	51.6		ug/L	50.0		103	70-120		
Surr: 4-Bromofluorobenzene (Surr)	51.2		ug/L	50.0		102	75-120		
Surr: 4-Bromofluorobenzene (Surr)	51.2		ug/L	50.0		102	75-120		
Surr: 4-Bromofluorobenzene (Surr)	51.2		ug/L	50.0		102	75-120		
Surr: Dibromofluoromethane (Surr)	53.5		ug/L	50.0		107	70-130		
Surr: Dibromofluoromethane (Surr)	53.5		ug/L	50.0		107	70-130		
Surr: Dibromofluoromethane (Surr)	53.5		ug/L	50.0		107	70-130		
Surr: Toluene-d8 (Surr)	50.8		ug/L	50.0		102	70-130		



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### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

##### Blank (BBL0489-BLK1)

Prepared & Analyzed: 12/17/2018

Surr: Toluene-d8 (Surr)	50.8		ug/L	50.0		102	70-130			
Surr: Toluene-d8 (Surr)	50.8		ug/L	50.0		102	70-130			

##### LCS (BBL0489-BS1)

Prepared & Analyzed: 12/17/2018

1,1,1,2-Tetrachloroethane	51.8 ug/L	0.4	ug/L	50.0	ug/L	104	80-130			
1,1,1,2-Tetrachloroethane	51.8 ug/L	0.4	ug/L	50.0	ug/L	104	80-130			
1,1,1,2-Tetrachloroethane	51.8 ug/L	0.4	ug/L	50.0	ug/L	104	80-130			
1,1,1-Trichloroethane	55.3 ug/L	1	ug/L	50.0	ug/L	111	65-130			
1,1,1-Trichloroethane	55.3 ug/L	1	ug/L	50.0	ug/L	111	65-130			
1,1,1-Trichloroethane	55.3 ug/L	1	ug/L	50.0	ug/L	111	65-130			
1,1,2,2-Tetrachloroethane	53.8 ug/L	0.4	ug/L	50.0	ug/L	108	65-130			
1,1,2,2-Tetrachloroethane	53.8 ug/L	0.4	ug/L	50.0	ug/L	108	65-130			
1,1,2,2-Tetrachloroethane	53.8 ug/L	0.4	ug/L	50.0	ug/L	108	65-130			
1,1,2-Trichloroethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,1,2-Trichloroethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,1,2-Trichloroethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,1-Dichloroethane	62.8 ug/L	1	ug/L	50.0	ug/L	126	70-135			
1,1-Dichloroethane	62.8 ug/L	1	ug/L	50.0	ug/L	126	70-135			
1,1-Dichloroethane	62.8 ug/L	1	ug/L	50.0	ug/L	126	70-135			
1,1-Dichloroethylene	59.6 ug/L	1	ug/L	50.0	ug/L	119	70-130			
1,1-Dichloroethylene	59.6 ug/L	1	ug/L	50.0	ug/L	119	70-130			
1,1-Dichloroethylene	59.6 ug/L	1	ug/L	50.0	ug/L	119	70-130			
1,1-Dichloropropene	57.9 ug/L	1	ug/L	50.0	ug/L	116	75-135			
1,1-Dichloropropene	57.9 ug/L	1	ug/L	50.0	ug/L	116	75-135			
1,1-Dichloropropene	57.9 ug/L	1	ug/L	50.0	ug/L	116	75-135			
1,2,3-Trichlorobenzene	48.5 ug/L	1	ug/L	50.0	ug/L	97.1	55-140			
1,2,3-Trichlorobenzene	48.5 ug/L	1	ug/L	50.0	ug/L	97.1	55-140			
1,2,3-Trichlorobenzene	48.5 ug/L	1	ug/L	50.0	ug/L	97.1	55-140			
1,2,3-Trichloropropane	52.6 ug/L	1	ug/L	50.0	ug/L	105	75-125			
1,2,3-Trichloropropane	52.6 ug/L	1	ug/L	50.0	ug/L	105	75-125			
1,2,3-Trichloropropane	52.6 ug/L	1	ug/L	50.0	ug/L	105	75-125			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### LCS (BBL0489-BS1)

Prepared & Analyzed: 12/17/2018

1,2,4-Trichlorobenzene	49.3 ug/L	1	ug/L	50.0	ug/L	98.5	65-135			
1,2,4-Trichlorobenzene	49.3 ug/L	1	ug/L	50.0	ug/L	98.5	65-135			
1,2,4-Trichlorobenzene	49.3 ug/L	1	ug/L	50.0	ug/L	98.5	65-135			
1,2,4-Trimethylbenzene	54.4 ug/L	1	ug/L	50.0	ug/L	109	75-130			
1,2,4-Trimethylbenzene	54.4 ug/L	1	ug/L	50.0	ug/L	109	75-130			
1,2,4-Trimethylbenzene	54.4 ug/L	1	ug/L	50.0	ug/L	109	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	45.1 ug/L	1	ug/L	50.0	ug/L	90.2	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	45.1 ug/L	1	ug/L	50.0	ug/L	90.2	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	45.1 ug/L	1	ug/L	50.0	ug/L	90.2	50-130			
1,2-Dibromoethane (EDB)	54.0 ug/L	1	ug/L	50.0	ug/L	108	80-120			
1,2-Dibromoethane (EDB)	54.0 ug/L	1	ug/L	50.0	ug/L	108	80-120			
1,2-Dibromoethane (EDB)	54.0 ug/L	1	ug/L	50.0	ug/L	108	80-120			
1,2-Dichlorobenzene	50.8 ug/L	0.5	ug/L	50.0	ug/L	102	70-120			
1,2-Dichlorobenzene	50.8 ug/L	0.5	ug/L	50.0	ug/L	102	70-120			
1,2-Dichlorobenzene	50.8 ug/L	0.5	ug/L	50.0	ug/L	102	70-120			
1,2-Dichloroethane	54.6 ug/L	1	ug/L	50.0	ug/L	109	70-130			
1,2-Dichloroethane	54.6 ug/L	1	ug/L	50.0	ug/L	109	70-130			
1,2-Dichloroethane	54.6 ug/L	1	ug/L	50.0	ug/L	109	70-130			
1,2-Dichloropropane	56.1 ug/L	0.5	ug/L	50.0	ug/L	112	75-125			
1,2-Dichloropropane	56.1 ug/L	0.5	ug/L	50.0	ug/L	112	75-125			
1,2-Dichloropropane	56.1 ug/L	0.5	ug/L	50.0	ug/L	112	75-125			
1,3,5-Trimethylbenzene	55.2 ug/L	1	ug/L	50.0	ug/L	110	75-125			
1,3,5-Trimethylbenzene	55.2 ug/L	1	ug/L	50.0	ug/L	110	75-125			
1,3,5-Trimethylbenzene	55.2 ug/L	1	ug/L	50.0	ug/L	110	75-125			
1,3-Dichlorobenzene	53.1 ug/L	1	ug/L	50.0	ug/L	106	75-125			
1,3-Dichlorobenzene	53.1 ug/L	1	ug/L	50.0	ug/L	106	75-125			
1,3-Dichlorobenzene	53.1 ug/L	1	ug/L	50.0	ug/L	106	75-125			
1,3-Dichloropropane	56.0 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,3-Dichloropropane	56.0 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,3-Dichloropropane	56.0 ug/L	1	ug/L	50.0	ug/L	112	75-125			
1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0	ug/L	100	75-125			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### LCS (BBL0489-BS1)

Prepared & Analyzed: 12/17/2018

1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0	ug/L	100	75-125			
1,4-Dichlorobenzene	50.0 ug/L	1	ug/L	50.0	ug/L	100	75-125			
2,2-Dichloropropane	60.7 ug/L	1	ug/L	50.0	ug/L	121	70-135			
2,2-Dichloropropane	60.7 ug/L	1	ug/L	50.0	ug/L	121	70-135			
2,2-Dichloropropane	60.7 ug/L	1	ug/L	50.0	ug/L	121	70-135			
2-Butanone (MEK)	68.1 ug/L	10	ug/L	50.0	ug/L	136	30-150			
2-Butanone (MEK)	68.1 ug/L	10	ug/L	50.0	ug/L	136	30-150			
2-Butanone (MEK)	68.1 ug/L	10	ug/L	50.0	ug/L	136	30-150			
2-Chlorotoluene	53.2 ug/L	1	ug/L	50.0	ug/L	106	75-125			
2-Chlorotoluene	53.2 ug/L	1	ug/L	50.0	ug/L	106	75-125			
2-Chlorotoluene	53.2 ug/L	1	ug/L	50.0	ug/L	106	75-125			
2-Hexanone (MBK)	61.2 ug/L	5	ug/L	50.0	ug/L	122	55-130			
2-Hexanone (MBK)	61.2 ug/L	5	ug/L	50.0	ug/L	122	55-130			
2-Hexanone (MBK)	61.2 ug/L	5	ug/L	50.0	ug/L	122	55-130			
4-Chlorotoluene	50.0 ug/L	1	ug/L	50.0	ug/L	99.9	75-130			
4-Chlorotoluene	50.0 ug/L	1	ug/L	50.0	ug/L	99.9	75-130			
4-Chlorotoluene	50.0 ug/L	1	ug/L	50.0	ug/L	99.9	75-130			
4-Isopropyltoluene	52.3 ug/L	1	ug/L	50.0	ug/L	105	75-130			
4-Isopropyltoluene	52.3 ug/L	1	ug/L	50.0	ug/L	105	75-130			
4-Isopropyltoluene	52.3 ug/L	1	ug/L	50.0	ug/L	105	75-130			
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	ug/L	119	60-135			
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	ug/L	119	60-135			
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	ug/L	119	60-135			
Acetone	69.4 ug/L	10	ug/L	50.0	ug/L	139	40-140			
Acetone	69.4 ug/L	10	ug/L	50.0	ug/L	139	40-140			
Acetone	69.4 ug/L	10	ug/L	50.0	ug/L	139	40-140			
Benzene	57.5 ug/L	1	ug/L	50.0	ug/L	115	80-120			
Benzene	57.5 ug/L	1	ug/L	50.0	ug/L	115	80-120			
Benzene	57.5 ug/L	1	ug/L	50.0	ug/L	115	80-120			
Bromobenzene	52.2 ug/L	1	ug/L	50.0	ug/L	104	75-125			
Bromobenzene	52.2 ug/L	1	ug/L	50.0	ug/L	104	75-125			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### LCS (BBL0489-BS1)

Prepared & Analyzed: 12/17/2018

Bromobenzene	52.2 ug/L	1	ug/L	50.0	ug/L	104	75-125			
Bromochloromethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	65-130			
Bromochloromethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	65-130			
Bromochloromethane	56.1 ug/L	1	ug/L	50.0	ug/L	112	65-130			
Bromodichloromethane	57.7 ug/L	0.5	ug/L	50.0	ug/L	115	75-120			
Bromodichloromethane	57.7 ug/L	0.5	ug/L	50.0	ug/L	115	75-120			
Bromodichloromethane	57.7 ug/L	0.5	ug/L	50.0	ug/L	115	75-120			
Bromoform	49.9 ug/L	1	ug/L	50.0	ug/L	99.7	70-130			
Bromoform	49.9 ug/L	1	ug/L	50.0	ug/L	99.7	70-130			
Bromoform	49.9 ug/L	1	ug/L	50.0	ug/L	99.7	70-130			
Bromomethane	48.9 ug/L	1	ug/L	50.0	ug/L	97.8	30-145			
Bromomethane	48.9 ug/L	1	ug/L	50.0	ug/L	97.8	30-145			
Bromomethane	48.9 ug/L	1	ug/L	50.0	ug/L	97.8	30-145			
Carbon disulfide	54.5 ug/L	10	ug/L	50.0	ug/L	109	35-160			
Carbon disulfide	54.5 ug/L	10	ug/L	50.0	ug/L	109	35-160			
Carbon disulfide	54.5 ug/L	10	ug/L	50.0	ug/L	109	35-160			
Carbon tetrachloride	53.9 ug/L	1	ug/L	50.0	ug/L	108	65-140			
Carbon tetrachloride	53.9 ug/L	1	ug/L	50.0	ug/L	108	65-140			
Carbon tetrachloride	53.9 ug/L	1	ug/L	50.0	ug/L	108	65-140			
Chlorobenzene	52.8 ug/L	1	ug/L	50.0	ug/L	106	80-120			
Chlorobenzene	52.8 ug/L	1	ug/L	50.0	ug/L	106	80-120			
Chlorobenzene	52.8 ug/L	1	ug/L	50.0	ug/L	106	80-120			
Chloroethane	56.4 ug/L	1	ug/L	50.0	ug/L	113	60-135			
Chloroethane	56.4 ug/L	1	ug/L	50.0	ug/L	113	60-135			
Chloroethane	56.4 ug/L	1	ug/L	50.0	ug/L	113	60-135			
Chloroform	57.8 ug/L	0.5	ug/L	50.0	ug/L	116	65-135			
Chloroform	57.8 ug/L	0.5	ug/L	50.0	ug/L	116	65-135			
Chloroform	57.8 ug/L	0.5	ug/L	50.0	ug/L	116	65-135			
Chloromethane	56.6 ug/L	1	ug/L	50.0	ug/L	113	40-125			
Chloromethane	56.6 ug/L	1	ug/L	50.0	ug/L	113	40-125			
Chloromethane	56.6 ug/L	1	ug/L	50.0	ug/L	113	40-125			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### LCS (BBL0489-BS1)

Prepared & Analyzed: 12/17/2018

cis-1,2-Dichloroethylene	59.1 ug/L	1	ug/L	50.0	ug/L	118	70-125			
cis-1,2-Dichloroethylene	59.1 ug/L	1	ug/L	50.0	ug/L	118	70-125			
cis-1,2-Dichloroethylene	59.1 ug/L	1	ug/L	50.0	ug/L	118	70-125			
cis-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	70-130			
cis-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	70-130			
cis-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	70-130			
Dibromochloromethane	54.9 ug/L	0.5	ug/L	50.0	ug/L	110	60-135			
Dibromochloromethane	54.9 ug/L	0.5	ug/L	50.0	ug/L	110	60-135			
Dibromochloromethane	54.9 ug/L	0.5	ug/L	50.0	ug/L	110	60-135			
Dibromomethane	53.5 ug/L	1	ug/L	50.0	ug/L	107	75-125			
Dibromomethane	53.5 ug/L	1	ug/L	50.0	ug/L	107	75-125			
Dibromomethane	53.5 ug/L	1	ug/L	50.0	ug/L	107	75-125			
Dichlorodifluoromethane	50.2 ug/L	1	ug/L	50.0	ug/L	100	30-155			
Dichlorodifluoromethane	50.2 ug/L	1	ug/L	50.0	ug/L	100	30-155			
Dichlorodifluoromethane	50.2 ug/L	1	ug/L	50.0	ug/L	100	30-155			
Ethylbenzene	54.2 ug/L	1	ug/L	50.0	ug/L	108	75-125			
Ethylbenzene	54.2 ug/L	1	ug/L	50.0	ug/L	108	75-125			
Ethylbenzene	54.2 ug/L	1	ug/L	50.0	ug/L	108	75-125			
Hexachlorobutadiene	48.6 ug/L	0.8	ug/L	50.0	ug/L	97.3	50-140			
Hexachlorobutadiene	48.6 ug/L	0.8	ug/L	50.0	ug/L	97.3	50-140			
Hexachlorobutadiene	48.6 ug/L	0.8	ug/L	50.0	ug/L	97.3	50-140			
Isopropylbenzene	58.3 ug/L	1	ug/L	50.0	ug/L	117	75-125			
Isopropylbenzene	58.3 ug/L	1	ug/L	50.0	ug/L	117	75-125			
Isopropylbenzene	58.3 ug/L	1	ug/L	50.0	ug/L	117	75-125			
m+p-Xylenes	112 ug/L	2	ug/L	100	ug/L	112	75-130			
m+p-Xylenes	112 ug/L	2	ug/L	100	ug/L	112	75-130			
m+p-Xylenes	112 ug/L	2	ug/L	100	ug/L	112	75-130			
Methylene chloride	60.4 ug/L	4	ug/L	50.0	ug/L	121	55-140			
Methylene chloride	60.4 ug/L	4	ug/L	50.0	ug/L	121	55-140			
Methylene chloride	60.4 ug/L	4	ug/L	50.0	ug/L	121	55-140			
Methyl-t-butyl ether (MTBE)	58.5 ug/L	1	ug/L	50.0	ug/L	117	65-125			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### LCS (BBL0489-BS1)

Prepared & Analyzed: 12/17/2018

Methyl-t-butyl ether (MTBE)	58.5 ug/L	1	ug/L	50.0	ug/L	117	65-125			
Methyl-t-butyl ether (MTBE)	58.5 ug/L	1	ug/L	50.0	ug/L	117	65-125			
Naphthalene	50.1 ug/L	1	ug/L	50.0	ug/L	100	55-140			
Naphthalene	50.1 ug/L	1	ug/L	50.0	ug/L	100	55-140			
Naphthalene	50.1 ug/L	1	ug/L	50.0	ug/L	100	55-140			
n-Butylbenzene	55.9 ug/L	1	ug/L	50.0	ug/L	112	70-135			
n-Butylbenzene	55.9 ug/L	1	ug/L	50.0	ug/L	112	70-135			
n-Butylbenzene	55.9 ug/L	1	ug/L	50.0	ug/L	112	70-135			
n-Propylbenzene	51.4 ug/L	1	ug/L	50.0	ug/L	103	70-130			
n-Propylbenzene	51.4 ug/L	1	ug/L	50.0	ug/L	103	70-130			
n-Propylbenzene	51.4 ug/L	1	ug/L	50.0	ug/L	103	70-130			
o-Xylene	54.8 ug/L	1	ug/L	50.0	ug/L	110	80-120			
o-Xylene	54.8 ug/L	1	ug/L	50.0	ug/L	110	80-120			
o-Xylene	54.8 ug/L	1	ug/L	50.0	ug/L	110	80-120			
sec-Butylbenzene	55.4 ug/L	1	ug/L	50.0	ug/L	111	70-125			
sec-Butylbenzene	55.4 ug/L	1	ug/L	50.0	ug/L	111	70-125			
sec-Butylbenzene	55.4 ug/L	1	ug/L	50.0	ug/L	111	70-125			
Styrene	55.8 ug/L	1	ug/L	50.0	ug/L	112	65-135			
Styrene	55.8 ug/L	1	ug/L	50.0	ug/L	112	65-135			
Styrene	55.8 ug/L	1	ug/L	50.0	ug/L	112	65-135			
tert-Butylbenzene	53.7 ug/L	1	ug/L	50.0	ug/L	107	70-130			
tert-Butylbenzene	53.7 ug/L	1	ug/L	50.0	ug/L	107	70-130			
tert-Butylbenzene	53.7 ug/L	1	ug/L	50.0	ug/L	107	70-130			
Tetrachloroethylene (PCE)	75.3 ug/L	1	ug/L	50.0	ug/L	151	45-150			L
Tetrachloroethylene (PCE)	75.3 ug/L	1	ug/L	50.0	ug/L	151	45-150			L
Tetrachloroethylene (PCE)	75.3 ug/L	1	ug/L	50.0	ug/L	151	45-150			L
Toluene	55.8 ug/L	1	ug/L	50.0	ug/L	112	75-120			
Toluene	55.8 ug/L	1	ug/L	50.0	ug/L	112	75-120			
Toluene	55.8 ug/L	1	ug/L	50.0	ug/L	112	75-120			
trans-1,2-Dichloroethylene	58.2 ug/L	1	ug/L	50.0	ug/L	116	60-140			
trans-1,2-Dichloroethylene	58.2 ug/L	1	ug/L	50.0	ug/L	116	60-140			



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## Certificate of Analysis

### Final Report

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Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### LCS (BBL0489-BS1)

Prepared & Analyzed: 12/17/2018

trans-1,2-Dichloroethylene	58.2 ug/L	1	ug/L	50.0	ug/L	116	60-140			
trans-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	55-140			
trans-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	55-140			
trans-1,3-Dichloropropene	54.4 ug/L	1	ug/L	50.0	ug/L	109	55-140			
Trichloroethylene	54.7 ug/L	1	ug/L	50.0	ug/L	109	70-125			
Trichloroethylene	54.7 ug/L	1	ug/L	50.0	ug/L	109	70-125			
Trichloroethylene	54.7 ug/L	1	ug/L	50.0	ug/L	109	70-125			
Trichlorofluoromethane	51.5 ug/L	1	ug/L	50.0	ug/L	103	60-145			
Trichlorofluoromethane	51.5 ug/L	1	ug/L	50.0	ug/L	103	60-145			
Trichlorofluoromethane	51.5 ug/L	1	ug/L	50.0	ug/L	103	60-145			
Vinyl chloride	33.5 ug/L	0.5	ug/L	50.0	ug/L	67.0	50-145			
Vinyl chloride	33.5 ug/L	0.5	ug/L	50.0	ug/L	67.0	50-145			
Vinyl chloride	33.5 ug/L	0.5	ug/L	50.0	ug/L	67.0	50-145			

Surr: 1,2-Dichloroethane-d4 (Surr)	50.0		ug/L	50.0	ug/L	100	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	50.0		ug/L	50.0	ug/L	100	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	50.0		ug/L	50.0	ug/L	100	70-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: Dibromofluoromethane (Surr)	51.5		ug/L	50.0	ug/L	103	70-130			
Surr: Dibromofluoromethane (Surr)	51.5		ug/L	50.0	ug/L	103	70-130			
Surr: Dibromofluoromethane (Surr)	51.5		ug/L	50.0	ug/L	103	70-130			
Surr: Toluene-d8 (Surr)	49.7		ug/L	50.0	ug/L	99.4	70-130			
Surr: Toluene-d8 (Surr)	49.7		ug/L	50.0	ug/L	99.4	70-130			
Surr: Toluene-d8 (Surr)	49.7		ug/L	50.0	ug/L	99.4	70-130			

#### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

1,1,1,2-Tetrachloroethane	49.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	99.3	80-130			
1,1,1,2-Tetrachloroethane	49.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	99.3	80-130			
1,1,1,2-Tetrachloroethane	49.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	99.3	80-130			
1,1,1-Trichloroethane	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

1,1,1-Trichloroethane	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130			
1,1,1-Trichloroethane	54.4 ug/L	1	ug/L	50.0	<1 ug/L	109	65-130			
1,1,2,2-Tetrachloroethane	53.7 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130			
1,1,2,2-Tetrachloroethane	53.7 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130			
1,1,2,2-Tetrachloroethane	53.7 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130			
1,1,2-Trichloroethane	56.0 ug/L	1	ug/L	50.0	<1 ug/L	112	75-125			
1,1,2-Trichloroethane	56.0 ug/L	1	ug/L	50.0	<1 ug/L	112	75-125			
1,1,2-Trichloroethane	56.0 ug/L	1	ug/L	50.0	<1 ug/L	112	75-125			
1,1-Dichloroethane	62.7 ug/L	1	ug/L	50.0	<1 ug/L	125	70-135			
1,1-Dichloroethane	62.7 ug/L	1	ug/L	50.0	<1 ug/L	125	70-135			
1,1-Dichloroethane	62.7 ug/L	1	ug/L	50.0	<1 ug/L	125	70-135			
1,1-Dichloroethylene	57.9 ug/L	1	ug/L	50.0	<1 ug/L	116	70-130			
1,1-Dichloroethylene	57.9 ug/L	1	ug/L	50.0	<1 ug/L	116	70-130			
1,1-Dichloroethylene	57.9 ug/L	1	ug/L	50.0	<1 ug/L	116	70-130			
1,1-Dichloropropene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135			
1,1-Dichloropropene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135			
1,1-Dichloropropene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	75-135			
1,2,3-Trichlorobenzene	46.6 ug/L	1	ug/L	50.0	<1 ug/L	93.3	55-140			
1,2,3-Trichlorobenzene	46.6 ug/L	1	ug/L	50.0	<1 ug/L	93.3	55-140			
1,2,3-Trichlorobenzene	46.6 ug/L	1	ug/L	50.0	<1 ug/L	93.3	55-140			
1,2,3-Trichloropropane	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
1,2,3-Trichloropropane	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
1,2,3-Trichloropropane	54.2 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
1,2,4-Trichlorobenzene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.3	65-135			
1,2,4-Trichlorobenzene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.3	65-135			
1,2,4-Trichlorobenzene	45.2 ug/L	1	ug/L	50.0	<1 ug/L	90.3	65-135			
1,2,4-Trimethylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	75-130			
1,2,4-Trimethylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	75-130			
1,2,4-Trimethylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	75-130			
1,2-Dibromo-3-chloropropane (DBCP)	48.0 ug/L	1	ug/L	50.0	<1 ug/L	95.9	50-130			
1,2-Dibromo-3-chloropropane (DBCP)	48.0 ug/L	1	ug/L	50.0	<1 ug/L	95.9	50-130			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

1,2-Dibromo-3-chloropropane (DBCP)	48.0 ug/L	1	ug/L	50.0	<1 ug/L	95.9	50-130			
1,2-Dibromoethane (EDB)	52.3 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120			
1,2-Dibromoethane (EDB)	52.3 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120			
1,2-Dibromoethane (EDB)	52.3 ug/L	1	ug/L	50.0	<1 ug/L	105	80-120			
1,2-Dichlorobenzene	48.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	97.6	70-120			
1,2-Dichlorobenzene	48.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	97.6	70-120			
1,2-Dichlorobenzene	48.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	97.6	70-120			
1,2-Dichloroethane	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	70-130			
1,2-Dichloroethane	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	70-130			
1,2-Dichloroethane	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	70-130			
1,2-Dichloropropane	56.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	113	75-125			
1,2-Dichloropropane	56.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	113	75-125			
1,2-Dichloropropane	56.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	113	75-125			
1,3,5-Trimethylbenzene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	75-124			
1,3,5-Trimethylbenzene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	75-124			
1,3,5-Trimethylbenzene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	75-124			
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125			
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125			
1,3-Dichlorobenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-125			
1,3-Dichloropropane	55.5 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125			
1,3-Dichloropropane	55.5 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125			
1,3-Dichloropropane	55.5 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125			
1,4-Dichlorobenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	75-125			
1,4-Dichlorobenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	75-125			
1,4-Dichlorobenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	75-125			
2,2-Dichloropropane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	70-135			
2,2-Dichloropropane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	70-135			
2,2-Dichloropropane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	70-135			
2-Butanone (MEK)	58.1 ug/L	10	ug/L	50.0	<10 ug/L	116	30-150			
2-Butanone (MEK)	58.1 ug/L	10	ug/L	50.0	<10 ug/L	116	30-150			
2-Butanone (MEK)	58.1 ug/L	10	ug/L	50.0	<10 ug/L	116	30-150			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

2-Chlorotoluene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125			
2-Chlorotoluene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125			
2-Chlorotoluene	51.1 ug/L	1	ug/L	50.0	<1 ug/L	102	75-125			
2-Hexanone (MBK)	55.2 ug/L	5	ug/L	50.0	<5 ug/L	110	55-130			
2-Hexanone (MBK)	55.2 ug/L	5	ug/L	50.0	<5 ug/L	110	55-130			
2-Hexanone (MBK)	55.2 ug/L	5	ug/L	50.0	<5 ug/L	110	55-130			
4-Chlorotoluene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.1	75-130			
4-Chlorotoluene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.1	75-130			
4-Chlorotoluene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.1	75-130			
4-Isopropyltoluene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130			
4-Isopropyltoluene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130			
4-Isopropyltoluene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130			
4-Methyl-2-pentanone (MIBK)	56.4 ug/L	5	ug/L	50.0	<5 ug/L	113	60-135			
4-Methyl-2-pentanone (MIBK)	56.4 ug/L	5	ug/L	50.0	<5 ug/L	113	60-135			
4-Methyl-2-pentanone (MIBK)	56.4 ug/L	5	ug/L	50.0	<5 ug/L	113	60-135			
Acetone	79.2 ug/L	10	ug/L	50.0	10.6 ug/L	137	40-140			
Acetone	79.2 ug/L	10	ug/L	50.0	10.6 ug/L	137	40-140			
Acetone	79.2 ug/L	10	ug/L	50.0	10.6 ug/L	137	40-140			
Benzene	55.3 ug/L	1	ug/L	50.0	<1 ug/L	111	80-120			
Benzene	55.3 ug/L	1	ug/L	50.0	<1 ug/L	111	80-120			
Benzene	55.3 ug/L	1	ug/L	50.0	<1 ug/L	111	80-120			
Bromobenzene	49.4 ug/L	1	ug/L	50.0	<1 ug/L	98.8	75-125			
Bromobenzene	49.4 ug/L	1	ug/L	50.0	<1 ug/L	98.8	75-125			
Bromobenzene	49.4 ug/L	1	ug/L	50.0	<1 ug/L	98.8	75-125			
Bromochloromethane	57.7 ug/L	1	ug/L	50.0	<1 ug/L	115	65-130			
Bromochloromethane	57.7 ug/L	1	ug/L	50.0	<1 ug/L	115	65-130			
Bromochloromethane	57.7 ug/L	1	ug/L	50.0	<1 ug/L	115	65-130			
Bromodichloromethane	57.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	114	75-120			
Bromodichloromethane	57.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	114	75-120			
Bromodichloromethane	57.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	114	75-120			
Bromoform	48.6 ug/L	1	ug/L	50.0	<1 ug/L	97.2	70-130			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

Bromoform	48.6 ug/L	1	ug/L	50.0	<1 ug/L	97.2	70-130			
Bromoform	48.6 ug/L	1	ug/L	50.0	<1 ug/L	97.2	70-130			
Bromomethane	41.0 ug/L	1	ug/L	50.0	<1 ug/L	81.9	30-145			
Bromomethane	41.0 ug/L	1	ug/L	50.0	<1 ug/L	81.9	30-145			
Bromomethane	41.0 ug/L	1	ug/L	50.0	<1 ug/L	81.9	30-145			
Carbon disulfide	40.3 ug/L	10	ug/L	50.0	<10 ug/L	80.6	35-160			
Carbon disulfide	40.3 ug/L	10	ug/L	50.0	<10 ug/L	80.6	35-160			
Carbon disulfide	40.3 ug/L	10	ug/L	50.0	<10 ug/L	80.6	35-160			
Carbon tetrachloride	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-140			
Carbon tetrachloride	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-140			
Carbon tetrachloride	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-140			
Chlorobenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.3	80-120			
Chlorobenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.3	80-120			
Chlorobenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.3	80-120			
Chloroethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	60-135			
Chloroethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	60-135			
Chloroethane	56.8 ug/L	1	ug/L	50.0	<1 ug/L	114	60-135			
Chloroform	57.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	115	65-135			
Chloroform	57.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	115	65-135			
Chloroform	57.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	115	65-135			
Chloromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	40-125			
Chloromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	40-125			
Chloromethane	54.6 ug/L	1	ug/L	50.0	<1 ug/L	109	40-125			
cis-1,2-Dichloroethylene	58.8 ug/L	1	ug/L	50.0	<1 ug/L	118	70-125			
cis-1,2-Dichloroethylene	58.8 ug/L	1	ug/L	50.0	<1 ug/L	118	70-125			
cis-1,2-Dichloroethylene	58.8 ug/L	1	ug/L	50.0	<1 ug/L	118	70-125			
cis-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	70-130			
cis-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	70-130			
cis-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	70-130			
Dibromochloromethane	54.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	108	60-135			
Dibromochloromethane	54.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	108	60-135			



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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

Dibromochloromethane	54.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	108	60-135			
Dibromomethane	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125			
Dibromomethane	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125			
Dibromomethane	53.6 ug/L	1	ug/L	50.0	<1 ug/L	107	75-125			
Dichlorodifluoromethane	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.3	30-155			
Dichlorodifluoromethane	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.3	30-155			
Dichlorodifluoromethane	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.3	30-155			
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125			
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125			
Ethylbenzene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	75-125			
Hexachlorobutadiene	45.2 ug/L	0.8	ug/L	50.0	<0.8 ug/L	90.5	50-140			
Hexachlorobutadiene	45.2 ug/L	0.8	ug/L	50.0	<0.8 ug/L	90.5	50-140			
Hexachlorobutadiene	45.2 ug/L	0.8	ug/L	50.0	<0.8 ug/L	90.5	50-140			
Isopropylbenzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
Isopropylbenzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
Isopropylbenzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125			
m+p-Xylenes	103 ug/L	2	ug/L	100	<2 ug/L	103	75-130			
m+p-Xylenes	103 ug/L	2	ug/L	100	<2 ug/L	103	75-130			
m+p-Xylenes	103 ug/L	2	ug/L	100	<2 ug/L	103	75-130			
Methylene chloride	51.5 ug/L	4	ug/L	50.0	<4 ug/L	103	55-140			
Methylene chloride	51.5 ug/L	4	ug/L	50.0	<4 ug/L	103	55-140			
Methylene chloride	51.5 ug/L	4	ug/L	50.0	<4 ug/L	103	55-140			
Methyl-t-butyl ether (MTBE)	61.3 ug/L	1	ug/L	50.0	<1 ug/L	123	65-125			
Methyl-t-butyl ether (MTBE)	61.3 ug/L	1	ug/L	50.0	<1 ug/L	123	65-125			
Methyl-t-butyl ether (MTBE)	61.3 ug/L	1	ug/L	50.0	<1 ug/L	123	65-125			
Naphthalene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140			
Naphthalene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140			
Naphthalene	50.4 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140			
n-Butylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	70-135			
n-Butylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	70-135			
n-Butylbenzene	52.2 ug/L	1	ug/L	50.0	<1 ug/L	104	70-135			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

n-Propylbenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	70-130			
n-Propylbenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	70-130			
n-Propylbenzene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	70-130			
o-Xylene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	80-120			
o-Xylene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	80-120			
o-Xylene	51.6 ug/L	1	ug/L	50.0	<1 ug/L	103	80-120			
sec-Butylbenzene	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	70-125			
sec-Butylbenzene	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	70-125			
sec-Butylbenzene	52.9 ug/L	1	ug/L	50.0	<1 ug/L	106	70-125			
Styrene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135			
Styrene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135			
Styrene	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	65-135			
tert-Butylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	70-130			
tert-Butylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	70-130			
tert-Butylbenzene	51.2 ug/L	1	ug/L	50.0	<1 ug/L	102	70-130			
Tetrachloroethylene (PCE)	69.7 ug/L	1	ug/L	50.0	1.30 ug/L	137	45-150			
Tetrachloroethylene (PCE)	69.7 ug/L	1	ug/L	50.0	1.30 ug/L	137	45-150			
Tetrachloroethylene (PCE)	69.7 ug/L	1	ug/L	50.0	1.30 ug/L	137	45-150			
Toluene	53.7 ug/L	1	ug/L	50.0	<1 ug/L	107	75-120			
Toluene	53.7 ug/L	1	ug/L	50.0	<1 ug/L	107	75-120			
Toluene	53.7 ug/L	1	ug/L	50.0	<1 ug/L	107	75-120			
trans-1,2-Dichloroethylene	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	60-140			
trans-1,2-Dichloroethylene	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	60-140			
trans-1,2-Dichloroethylene	56.6 ug/L	1	ug/L	50.0	<1 ug/L	113	60-140			
trans-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	55-140			
trans-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	55-140			
trans-1,3-Dichloropropene	52.5 ug/L	1	ug/L	50.0	<1 ug/L	105	55-140			
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125			
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125			
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125			
Trichlorofluoromethane	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	60-145			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

##### Matrix Spike (BBL0489-MS1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

Trichlorofluoromethane	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	60-145			
Trichlorofluoromethane	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.5	60-145			
Vinyl chloride	29.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	58.2	50-145			
Vinyl chloride	29.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	58.2	50-145			
Vinyl chloride	29.1 ug/L	0.5	ug/L	50.0	<0.5 ug/L	58.2	50-145			
<hr style="border-top: 1px dashed black;"/>										
Surr: 1,2-Dichloroethane-d4 (Surr)	51.5		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.5		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.5		ug/L	50.0	ug/L	103	70-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: 4-Bromofluorobenzene (Surr)	52.4		ug/L	50.0	ug/L	105	75-120			
Surr: Dibromofluoromethane (Surr)	54.1		ug/L	50.0	ug/L	108	70-130			
Surr: Dibromofluoromethane (Surr)	54.1		ug/L	50.0	ug/L	108	70-130			
Surr: Dibromofluoromethane (Surr)	54.1		ug/L	50.0	ug/L	108	70-130			
Surr: Toluene-d8 (Surr)	51.0		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	51.0		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	51.0		ug/L	50.0	ug/L	102	70-130			

##### Matrix Spike Dup (BBL0489-MSD1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

1,1,1,2-Tetrachloroethane	48.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.3	80-130	2.06	30	
1,1,1,2-Tetrachloroethane	48.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.3	80-130	2.06	30	
1,1,1,2-Tetrachloroethane	48.6 ug/L	0.4	ug/L	50.0	<0.4 ug/L	97.3	80-130	2.06	30	
1,1,1-Trichloroethane	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	65-130	6.45	30	
1,1,1-Trichloroethane	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	65-130	6.45	30	
1,1,1-Trichloroethane	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	65-130	6.45	30	
1,1,2,2-Tetrachloroethane	53.4 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130	0.691	30	
1,1,2,2-Tetrachloroethane	53.4 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130	0.691	30	
1,1,2,2-Tetrachloroethane	53.4 ug/L	0.4	ug/L	50.0	<0.4 ug/L	107	65-130	0.691	30	
1,1,2-Trichloroethane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	0.591	30	
1,1,2-Trichloroethane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	0.591	30	
1,1,2-Trichloroethane	55.7 ug/L	1	ug/L	50.0	<1 ug/L	111	75-125	0.591	30	



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike Dup (BBL0489-MSD1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

1,1-Dichloroethane	60.4 ug/L	1	ug/L	50.0	<1 ug/L	121	70-135	3.66	30	
1,1-Dichloroethane	60.4 ug/L	1	ug/L	50.0	<1 ug/L	121	70-135	3.66	30	
1,1-Dichloroethane	60.4 ug/L	1	ug/L	50.0	<1 ug/L	121	70-135	3.66	30	
1,1-Dichloroethylene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	5.43	30	
1,1-Dichloroethylene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	5.43	30	
1,1-Dichloroethylene	54.8 ug/L	1	ug/L	50.0	<1 ug/L	110	70-130	5.43	30	
1,1-Dichloropropene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-135	2.61	30	
1,1-Dichloropropene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-135	2.61	30	
1,1-Dichloropropene	53.4 ug/L	1	ug/L	50.0	<1 ug/L	107	75-135	2.61	30	
1,2,3-Trichlorobenzene	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.9	55-140	2.61	30	
1,2,3-Trichlorobenzene	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.9	55-140	2.61	30	
1,2,3-Trichlorobenzene	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.9	55-140	2.61	30	
1,2,3-Trichloropropane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.759	30	
1,2,3-Trichloropropane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.759	30	
1,2,3-Trichloropropane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.759	30	
1,2,4-Trichlorobenzene	43.3 ug/L	1	ug/L	50.0	<1 ug/L	86.6	65-135	4.23	30	
1,2,4-Trichlorobenzene	43.3 ug/L	1	ug/L	50.0	<1 ug/L	86.6	65-135	4.23	30	
1,2,4-Trichlorobenzene	43.3 ug/L	1	ug/L	50.0	<1 ug/L	86.6	65-135	4.23	30	
1,2,4-Trimethylbenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130	3.27	30	
1,2,4-Trimethylbenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130	3.27	30	
1,2,4-Trimethylbenzene	49.6 ug/L	1	ug/L	50.0	<1 ug/L	99.2	75-130	3.27	30	
1,2-Dibromo-3-chloropropane (DBCP)	47.4 ug/L	1	ug/L	50.0	<1 ug/L	94.8	50-130	1.20	30	
1,2-Dibromo-3-chloropropane (DBCP)	47.4 ug/L	1	ug/L	50.0	<1 ug/L	94.8	50-130	1.20	30	
1,2-Dibromo-3-chloropropane (DBCP)	47.4 ug/L	1	ug/L	50.0	<1 ug/L	94.8	50-130	1.20	30	
1,2-Dibromoethane (EDB)	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120	0.403	30	
1,2-Dibromoethane (EDB)	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120	0.403	30	
1,2-Dibromoethane (EDB)	52.1 ug/L	1	ug/L	50.0	<1 ug/L	104	80-120	0.403	30	
1,2-Dichlorobenzene	47.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	94.5	70-120	3.27	30	
1,2-Dichlorobenzene	47.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	94.5	70-120	3.27	30	
1,2-Dichlorobenzene	47.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	94.5	70-120	3.27	30	
1,2-Dichloroethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	5.09	30	



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike Dup (BBL0489-MSD1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

1,2-Dichloroethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	5.09	30	
1,2-Dichloroethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	70-130	5.09	30	
1,2-Dichloropropane	53.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	106	75-125	6.15	30	
1,2-Dichloropropane	53.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	106	75-125	6.15	30	
1,2-Dichloropropane	53.2 ug/L	0.5	ug/L	50.0	<0.5 ug/L	106	75-125	6.15	30	
1,3,5-Trimethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-124	3.33	30	
1,3,5-Trimethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-124	3.33	30	
1,3,5-Trimethylbenzene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	75-124	3.33	30	
1,3-Dichlorobenzene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.0	75-125	4.44	30	
1,3-Dichlorobenzene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.0	75-125	4.44	30	
1,3-Dichlorobenzene	48.0 ug/L	1	ug/L	50.0	<1 ug/L	96.0	75-125	4.44	30	
1,3-Dichloropropane	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	75-125	1.87	30	
1,3-Dichloropropane	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	75-125	1.87	30	
1,3-Dichloropropane	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	75-125	1.87	30	
1,4-Dichlorobenzene	46.4 ug/L	1	ug/L	50.0	<1 ug/L	92.8	75-125	2.91	30	
1,4-Dichlorobenzene	46.4 ug/L	1	ug/L	50.0	<1 ug/L	92.8	75-125	2.91	30	
1,4-Dichlorobenzene	46.4 ug/L	1	ug/L	50.0	<1 ug/L	92.8	75-125	2.91	30	
2,2-Dichloropropane	53.0 ug/L	1	ug/L	50.0	<1 ug/L	106	70-135	4.87	30	
2,2-Dichloropropane	53.0 ug/L	1	ug/L	50.0	<1 ug/L	106	70-135	4.87	30	
2,2-Dichloropropane	53.0 ug/L	1	ug/L	50.0	<1 ug/L	106	70-135	4.87	30	
2-Butanone (MEK)	60.5 ug/L	10	ug/L	50.0	<10 ug/L	121	30-150	4.07	30	
2-Butanone (MEK)	60.5 ug/L	10	ug/L	50.0	<10 ug/L	121	30-150	4.07	30	
2-Butanone (MEK)	60.5 ug/L	10	ug/L	50.0	<10 ug/L	121	30-150	4.07	30	
2-Chlorotoluene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.7	75-125	4.54	30	
2-Chlorotoluene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.7	75-125	4.54	30	
2-Chlorotoluene	48.8 ug/L	1	ug/L	50.0	<1 ug/L	97.7	75-125	4.54	30	
2-Hexanone (MBK)	59.9 ug/L	5	ug/L	50.0	<5 ug/L	120	55-130	8.31	30	
2-Hexanone (MBK)	59.9 ug/L	5	ug/L	50.0	<5 ug/L	120	55-130	8.31	30	
2-Hexanone (MBK)	59.9 ug/L	5	ug/L	50.0	<5 ug/L	120	55-130	8.31	30	
4-Chlorotoluene	45.8 ug/L	1	ug/L	50.0	<1 ug/L	91.7	75-130	4.64	30	
4-Chlorotoluene	45.8 ug/L	1	ug/L	50.0	<1 ug/L	91.7	75-130	4.64	30	



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike Dup (BBL0489-MSD1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

4-Chlorotoluene	45.8 ug/L	1	ug/L	50.0	<1 ug/L	91.7	75-130	4.64	30	
4-Isopropyltoluene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	75-130	3.63	30	
4-Isopropyltoluene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	75-130	3.63	30	
4-Isopropyltoluene	47.8 ug/L	1	ug/L	50.0	<1 ug/L	95.7	75-130	3.63	30	
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	<5 ug/L	119	60-135	5.34	30	
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	<5 ug/L	119	60-135	5.34	30	
4-Methyl-2-pentanone (MIBK)	59.4 ug/L	5	ug/L	50.0	<5 ug/L	119	60-135	5.34	30	
Acetone	80.4 ug/L	10	ug/L	50.0	10.6 ug/L	140	40-140	1.47	30	
Acetone	80.4 ug/L	10	ug/L	50.0	10.6 ug/L	140	40-140	1.47	30	
Acetone	80.4 ug/L	10	ug/L	50.0	10.6 ug/L	140	40-140	1.47	30	
Benzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	80-120	2.75	30	
Benzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	80-120	2.75	30	
Benzene	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	80-120	2.75	30	
Bromobenzene	47.7 ug/L	1	ug/L	50.0	<1 ug/L	95.4	75-125	3.52	30	
Bromobenzene	47.7 ug/L	1	ug/L	50.0	<1 ug/L	95.4	75-125	3.52	30	
Bromobenzene	47.7 ug/L	1	ug/L	50.0	<1 ug/L	95.4	75-125	3.52	30	
Bromochloromethane	56.2 ug/L	1	ug/L	50.0	<1 ug/L	112	65-130	2.67	30	
Bromochloromethane	56.2 ug/L	1	ug/L	50.0	<1 ug/L	112	65-130	2.67	30	
Bromochloromethane	56.2 ug/L	1	ug/L	50.0	<1 ug/L	112	65-130	2.67	30	
Bromodichloromethane	55.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	112	75-120	2.48	30	
Bromodichloromethane	55.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	112	75-120	2.48	30	
Bromodichloromethane	55.8 ug/L	0.5	ug/L	50.0	<0.5 ug/L	112	75-120	2.48	30	
Bromoform	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	70-130	1.17	30	
Bromoform	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	70-130	1.17	30	
Bromoform	49.2 ug/L	1	ug/L	50.0	<1 ug/L	98.3	70-130	1.17	30	
Bromomethane	38.6 ug/L	1	ug/L	50.0	<1 ug/L	77.3	30-145	5.83	30	
Bromomethane	38.6 ug/L	1	ug/L	50.0	<1 ug/L	77.3	30-145	5.83	30	
Bromomethane	38.6 ug/L	1	ug/L	50.0	<1 ug/L	77.3	30-145	5.83	30	
Carbon disulfide	44.5 ug/L	10	ug/L	50.0	<10 ug/L	88.9	35-160	9.89	30	
Carbon disulfide	44.5 ug/L	10	ug/L	50.0	<10 ug/L	88.9	35-160	9.89	30	
Carbon disulfide	44.5 ug/L	10	ug/L	50.0	<10 ug/L	88.9	35-160	9.89	30	



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

Matrix Spike Dup (BBL0489-MSD1)	Source: 18L0642-01			Prepared & Analyzed: 12/17/2018						
Carbon tetrachloride	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	65-140	4.54	30	
Carbon tetrachloride	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	65-140	4.54	30	
Carbon tetrachloride	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	65-140	4.54	30	
Chlorobenzene	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	80-120	2.55	30	
Chlorobenzene	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	80-120	2.55	30	
Chlorobenzene	48.4 ug/L	1	ug/L	50.0	<1 ug/L	96.8	80-120	2.55	30	
Chloroethane	52.4 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	8.04	30	
Chloroethane	52.4 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	8.04	30	
Chloroethane	52.4 ug/L	1	ug/L	50.0	<1 ug/L	105	60-135	8.04	30	
Chloroform	55.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	65-135	3.57	30	
Chloroform	55.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	65-135	3.57	30	
Chloroform	55.4 ug/L	0.5	ug/L	50.0	<0.5 ug/L	111	65-135	3.57	30	
Chloromethane	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	40-125	5.14	30	
Chloromethane	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	40-125	5.14	30	
Chloromethane	51.9 ug/L	1	ug/L	50.0	<1 ug/L	104	40-125	5.14	30	
cis-1,2-Dichloroethylene	56.1 ug/L	1	ug/L	50.0	<1 ug/L	112	70-125	4.60	30	
cis-1,2-Dichloroethylene	56.1 ug/L	1	ug/L	50.0	<1 ug/L	112	70-125	4.60	30	
cis-1,2-Dichloroethylene	56.1 ug/L	1	ug/L	50.0	<1 ug/L	112	70-125	4.60	30	
cis-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-130	3.57	30	
cis-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-130	3.57	30	
cis-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-130	3.57	30	
Dibromochloromethane	52.7 ug/L	0.5	ug/L	50.0	<0.5 ug/L	105	60-135	2.68	30	
Dibromochloromethane	52.7 ug/L	0.5	ug/L	50.0	<0.5 ug/L	105	60-135	2.68	30	
Dibromochloromethane	52.7 ug/L	0.5	ug/L	50.0	<0.5 ug/L	105	60-135	2.68	30	
Dibromomethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.428	30	
Dibromomethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.428	30	
Dibromomethane	53.8 ug/L	1	ug/L	50.0	<1 ug/L	108	75-125	0.428	30	
Dichlorodifluoromethane	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.7	30-155	7.02	30	
Dichlorodifluoromethane	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.7	30-155	7.02	30	
Dichlorodifluoromethane	45.4 ug/L	1	ug/L	50.0	<1 ug/L	90.7	30-155	7.02	30	
Ethylbenzene	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.4	75-125	3.39	30	



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## Certificate of Analysis

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Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike Dup (BBL0489-MSD1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

Ethylbenzene	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.4	75-125	3.39	30	
Ethylbenzene	48.7 ug/L	1	ug/L	50.0	<1 ug/L	97.4	75-125	3.39	30	
Hexachlorobutadiene	43.6 ug/L	0.8	ug/L	50.0	<0.8 ug/L	87.3	50-140	3.60	30	
Hexachlorobutadiene	43.6 ug/L	0.8	ug/L	50.0	<0.8 ug/L	87.3	50-140	3.60	30	
Hexachlorobutadiene	43.6 ug/L	0.8	ug/L	50.0	<0.8 ug/L	87.3	50-140	3.60	30	
Isopropylbenzene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	3.40	30	
Isopropylbenzene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	3.40	30	
Isopropylbenzene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-125	3.40	30	
m+p-Xylenes	99.2 ug/L	2	ug/L	100	<2 ug/L	99.2	75-130	3.53	30	
m+p-Xylenes	99.2 ug/L	2	ug/L	100	<2 ug/L	99.2	75-130	3.53	30	
m+p-Xylenes	99.2 ug/L	2	ug/L	100	<2 ug/L	99.2	75-130	3.53	30	
Methylene chloride	57.4 ug/L	4	ug/L	50.0	<4 ug/L	115	55-140	10.9	30	
Methylene chloride	57.4 ug/L	4	ug/L	50.0	<4 ug/L	115	55-140	10.9	30	
Methylene chloride	57.4 ug/L	4	ug/L	50.0	<4 ug/L	115	55-140	10.9	30	
Methyl-t-butyl ether (MTBE)	59.2 ug/L	1	ug/L	50.0	<1 ug/L	118	65-125	3.48	30	
Methyl-t-butyl ether (MTBE)	59.2 ug/L	1	ug/L	50.0	<1 ug/L	118	65-125	3.48	30	
Methyl-t-butyl ether (MTBE)	59.2 ug/L	1	ug/L	50.0	<1 ug/L	118	65-125	3.48	30	
Naphthalene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	0.159	30	
Naphthalene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	0.159	30	
Naphthalene	50.5 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	0.159	30	
n-Butylbenzene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	70-135	4.34	30	
n-Butylbenzene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	70-135	4.34	30	
n-Butylbenzene	50.0 ug/L	1	ug/L	50.0	<1 ug/L	100	70-135	4.34	30	
n-Propylbenzene	46.3 ug/L	1	ug/L	50.0	<1 ug/L	92.6	70-130	3.31	30	
n-Propylbenzene	46.3 ug/L	1	ug/L	50.0	<1 ug/L	92.6	70-130	3.31	30	
n-Propylbenzene	46.3 ug/L	1	ug/L	50.0	<1 ug/L	92.6	70-130	3.31	30	
o-Xylene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	80-120	2.69	30	
o-Xylene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	80-120	2.69	30	
o-Xylene	50.2 ug/L	1	ug/L	50.0	<1 ug/L	100	80-120	2.69	30	
sec-Butylbenzene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-125	4.47	30	
sec-Butylbenzene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-125	4.47	30	



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## Certificate of Analysis

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Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike Dup (BBL0489-MSD1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

sec-Butylbenzene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	70-125	4.47	30	
Styrene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-135	2.42	30	
Styrene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-135	2.42	30	
Styrene	50.7 ug/L	1	ug/L	50.0	<1 ug/L	101	65-135	2.42	30	
tert-Butylbenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.1	70-130	3.30	30	
tert-Butylbenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.1	70-130	3.30	30	
tert-Butylbenzene	49.5 ug/L	1	ug/L	50.0	<1 ug/L	99.1	70-130	3.30	30	
Tetrachloroethylene (PCE)	68.1 ug/L	1	ug/L	50.0	1.30 ug/L	134	45-150	2.32	30	
Tetrachloroethylene (PCE)	68.1 ug/L	1	ug/L	50.0	1.30 ug/L	134	45-150	2.32	30	
Tetrachloroethylene (PCE)	68.1 ug/L	1	ug/L	50.0	1.30 ug/L	134	45-150	2.32	30	
Toluene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-120	3.35	30	
Toluene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-120	3.35	30	
Toluene	52.0 ug/L	1	ug/L	50.0	<1 ug/L	104	75-120	3.35	30	
trans-1,2-Dichloroethylene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	60-140	3.78	30	
trans-1,2-Dichloroethylene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	60-140	3.78	30	
trans-1,2-Dichloroethylene	54.5 ug/L	1	ug/L	50.0	<1 ug/L	109	60-140	3.78	30	
trans-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	3.57	30	
trans-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	3.57	30	
trans-1,3-Dichloropropene	50.6 ug/L	1	ug/L	50.0	<1 ug/L	101	55-140	3.57	30	
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125	0.0196	30	
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125	0.0196	30	
Trichloroethylene	51.0 ug/L	1	ug/L	50.0	<1 ug/L	102	70-125	0.0196	30	
Trichlorofluoromethane	44.4 ug/L	1	ug/L	50.0	<1 ug/L	88.9	60-145	7.18	30	
Trichlorofluoromethane	44.4 ug/L	1	ug/L	50.0	<1 ug/L	88.9	60-145	7.18	30	
Trichlorofluoromethane	44.4 ug/L	1	ug/L	50.0	<1 ug/L	88.9	60-145	7.18	30	
Vinyl chloride	26.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	53.0	50-145	9.25	30	
Vinyl chloride	26.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	53.0	50-145	9.25	30	
Vinyl chloride	26.5 ug/L	0.5	ug/L	50.0	<0.5 ug/L	53.0	50-145	9.25	30	
<hr style="border-top: 1px dashed black;"/>										
Surr: 1,2-Dichloroethane-d4 (Surr)	51.3		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.3		ug/L	50.0	ug/L	103	70-120			
Surr: 1,2-Dichloroethane-d4 (Surr)	51.3		ug/L	50.0	ug/L	103	70-120			



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Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Volatile Organic Compounds by GCMS - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0489 - SW5030B

#### Matrix Spike Dup (BBL0489-MSD1)

Source: 18L0642-01

Prepared & Analyzed: 12/17/2018

Surr: 4-Bromofluorobenzene (Surr)	53.0		ug/L	50.0	ug/L	106	75-120			
Surr: 4-Bromofluorobenzene (Surr)	53.0		ug/L	50.0	ug/L	106	75-120			
Surr: 4-Bromofluorobenzene (Surr)	53.0		ug/L	50.0	ug/L	106	75-120			
Surr: Dibromofluoromethane (Surr)	53.2		ug/L	50.0	ug/L	106	70-130			
Surr: Dibromofluoromethane (Surr)	53.2		ug/L	50.0	ug/L	106	70-130			
Surr: Dibromofluoromethane (Surr)	53.2		ug/L	50.0	ug/L	106	70-130			
Surr: Toluene-d8 (Surr)	50.9		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	50.9		ug/L	50.0	ug/L	102	70-130			
Surr: Toluene-d8 (Surr)	50.9		ug/L	50.0	ug/L	102	70-130			



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Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0540 - SW3510C

##### Blank (BBL0540-BLK1)

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
<i>Surr: Pentacosane (Surr)</i>	0.213		mg/L	0.252		84.6	65-125			
<i>Surr: Pentacosane (Surr)</i>	0.213		mg/L	0.252		84.6	65-125			

##### LCS (BBL0540-BS1)

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	4.6 mg/L	0.500	mg/L	5.00	mg/L	92.2	65-110			
TPH-Semi-Volatiles (DRO)	4.6 mg/L	0.500	mg/L	5.00	mg/L	92.2	65-110			
<i>Surr: Pentacosane (Surr)</i>	0.262		mg/L	0.252	mg/L	104	65-125			
<i>Surr: Pentacosane (Surr)</i>	0.262		mg/L	0.252	mg/L	104	65-125			

##### Matrix Spike (BBL0540-MS1)

Source: 18L0619-02

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.521	mg/L	5.21	<0.521 mg/L	94.6	40-110			
TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.521	mg/L	5.21	<0.521 mg/L	94.6	40-110			
<i>Surr: Pentacosane (Surr)</i>	0.298		mg/L	0.262	mg/L	113	65-125			
<i>Surr: Pentacosane (Surr)</i>	0.298		mg/L	0.262	mg/L	113	65-125			

##### Matrix Spike Dup (BBL0540-MSD1)

Source: 18L0619-02

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.515	mg/L	5.15	<0.515 mg/L	94.8	40-110	0.784	20	
TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.515	mg/L	5.15	<0.515 mg/L	94.8	40-110	0.784	20	
<i>Surr: Pentacosane (Surr)</i>	0.294		mg/L	0.260	mg/L	113	65-125			
<i>Surr: Pentacosane (Surr)</i>	0.294		mg/L	0.260	mg/L	113	65-125			

#### Batch BBL0541 - SW3510C

##### Blank (BBL0541-BLK1)

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (ORO)	<1.0 mg/L	1.0	mg/L							
TPH-Semi-Volatiles (ORO)	<1.0 mg/L	1.0	mg/L							



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### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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**Batch BBL0541 - SW3510C**

**LCS (BBL0541-BS1)**

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (ORO)	2.1 mg/L	1.0	mg/L	5.00	mg/L	41.2	40-160			
TPH-Semi-Volatiles (ORO)	2.1 mg/L	1.0	mg/L	5.00	mg/L	41.2	40-160			



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### Certified Analyses included in this Report

Analyte	Certifications
<b>SW8015C in Non-Potable Water</b>	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Semi-Volatiles (ORO)	VELAP
<b>SW8260B in Non-Potable Water</b>	
1,1,1,2-Tetrachloroethane	NC,VELAP,WVDEP
1,1,1-Trichloroethane	NC,VELAP,WVDEP
1,1,2,2-Tetrachloroethane	NC,VELAP,WVDEP
1,1,2-Trichloroethane	NC,VELAP,WVDEP
1,1-Dichloroethane	NC,VELAP,WVDEP
1,1-Dichloroethylene	NC,VELAP,WVDEP
1,1-Dichloropropene	NC,VELAP,WVDEP
1,2,3-Trichlorobenzene	NC,VELAP,WVDEP
1,2,3-Trichloropropane	NC,VELAP,WVDEP
1,2,4-Trichlorobenzene	NC,VELAP,WVDEP
1,2,4-Trimethylbenzene	NC,VELAP,WVDEP
1,2-Dibromo-3-chloropropane (DBCP)	NC,VELAP,WVDEP
1,2-Dibromoethane (EDB)	NC,VELAP,WVDEP
1,2-Dichlorobenzene	NC,VELAP,WVDEP
1,2-Dichloroethane	NC,VELAP,WVDEP
1,2-Dichloropropane	NC,VELAP,WVDEP
1,3,5-Trimethylbenzene	NC,VELAP,WVDEP
1,3-Dichlorobenzene	NC,VELAP,WVDEP
1,3-Dichloropropane	NC,VELAP,WVDEP
1,4-Dichlorobenzene	NC,VELAP,WVDEP
2,2-Dichloropropane	NC,VELAP,WVDEP
2-Butanone (MEK)	NC,VELAP,WVDEP
2-Chlorotoluene	NC,VELAP,WVDEP
2-Hexanone (MBK)	NC,VELAP,WVDEP
4-Chlorotoluene	NC,VELAP,WVDEP
4-Isopropyltoluene	NC,VELAP,WVDEP
4-Methyl-2-pentanone (MIBK)	NC,VELAP,WVDEP
Acetone	NC,VELAP,WVDEP
Benzene	NC,VELAP,WVDEP
Bromobenzene	NC,VELAP,WVDEP
Bromochloromethane	NC,VELAP,WVDEP
Bromodichloromethane	NC,VELAP,WVDEP
Bromoform	NC,VELAP,WVDEP



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/20/2018 16:22
Submitted To: Josh Hepler	Project Number: 18-796
Client Site I.D.: Mr. K's Car Wash	Purchase Order:

### Certified Analyses included in this Report

Analyte	Certifications
Bromomethane	NC,VELAP,WVDEP
Carbon disulfide	NC,VELAP,WVDEP
Carbon tetrachloride	NC,VELAP,WVDEP
Chlorobenzene	NC,VELAP,WVDEP
Chloroethane	NC,VELAP,WVDEP
Chloroform	NC,VELAP,WVDEP
Chloromethane	NC,VELAP,WVDEP
cis-1,2-Dichloroethylene	NC,VELAP,WVDEP
cis-1,3-Dichloropropene	NC,VELAP,WVDEP
Dibromochloromethane	NC,VELAP,WVDEP
Dibromomethane	NC,VELAP,WVDEP
Dichlorodifluoromethane	NC,VELAP,WVDEP
Di-isopropyl ether (DIPE)	NC,VELAP,WVDEP
Ethylbenzene	NC,VELAP,WVDEP
Hexachlorobutadiene	NC,VELAP,WVDEP
Iodomethane	NC,VELAP,WVDEP
Isopropylbenzene	NC,VELAP,WVDEP
m+p-Xylenes	NC,VELAP,WVDEP
Methylene chloride	NC,VELAP,WVDEP
Methyl-t-butyl ether (MTBE)	NC,VELAP,WVDEP
Naphthalene	NC,VELAP,WVDEP
n-Butylbenzene	NC,VELAP,WVDEP
n-Propylbenzene	NC,VELAP,WVDEP
o-Xylene	NC,VELAP,WVDEP
sec-Butylbenzene	NC,VELAP,WVDEP
Styrene	NC,VELAP,WVDEP
tert-Butylbenzene	NC,VELAP,WVDEP
Tetrachloroethylene (PCE)	NC,VELAP,WVDEP
Toluene	NC,VELAP,WVDEP
trans-1,2-Dichloroethylene	NC,VELAP,WVDEP
trans-1,3-Dichloropropene	NC,VELAP,WVDEP
Trichloroethylene	NC,VELAP,WVDEP
Trichlorofluoromethane	NC,VELAP,WVDEP
Vinyl acetate	NC,VELAP,WVDEP
Vinyl chloride	NC,VELAP,WVDEP
Xylenes, Total	NC,VELAP,WVDEP



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) Date Issued: 12/20/2018 16:22  
201 Church Street  
Blacksburg VA, 24060

Submitted To: Josh Hepler Project Number: 18-796

Client Site I.D.: Mr. K's Car Wash Purchase Order:

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Summary of Data Qualifiers

L LCS recovery is outside of established acceptance limits  
RPD Relative Percent Difference  
Qual Qualifiers  
-RE Denotes sample was re-analyzed  
D.F. Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.  
TIC Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library .  
A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.  
PCBs, Total Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.



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 RICHMOND, VIRGINIA 23237  
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 (804)358-8297 FAX

Chain of Custody  
 Form #: F1331  
 Rev. 3.0  
 Effective: Aug 24, 2017

CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: <i>EEE Consulting</i>	INVOICE TO: <i>Josh Hepler</i>	PROJECT NAME/Quote #: <i>Mr. K's Car Wash</i>
CONTACT: <i>Josh Hepler</i>	INVOICE CONTACT: <i>same</i>	SITE NAME: <i>Mr. K's Car Wash</i>
ADDRESS: <i>8525 Bell Creek Rd</i>	INVOICE ADDRESS: <i>same</i>	PROJECT NUMBER: <i>18-796</i>
PHONE #: <i>804-442-3330</i>	INVOICE PHONE #: <i>same</i>	P.O. #:
FAX #:	EMAIL: <i>jhepler@eeeconsulting.com</i>	Pretreatment Program:
Is sample for compliance reporting? YES <input checked="" type="radio"/> NO <input type="radio"/>	Is sample from a chlorinated supply? YES <input checked="" type="radio"/> NO <input type="radio"/>	PWS I.D. #:
SAMPLER NAME (PRINT): <i>Zach Knocofe</i>	SAMPLER SIGNATURE: <i>Zach Knocofe</i>	Turn Around Time: Circle: <b>10</b> 5 Days or ___ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)			COMMENTS
											VOLs	TPH-DRO	TPH-ORO	
1) <i>B-1</i>	<input checked="" type="checkbox"/>					<i>12-11-18</i>	<i>12:30</i>		<i>GW</i>	<i>5</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol  PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)
2) <i>B-3</i>	<input checked="" type="checkbox"/>					<i>12.11.18</i>	<i>1:10</i>		<i>GW</i>	<i>5</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3)														
4)														
5)														
6)														
7)														
8)														
9)														
10)														

RELINQUISHED: <i>Carollee III</i>	DATE / TIME: <i>12/12/18</i>	RECEIVED: <i>Zach Knocofe</i>	DATE / TIME: <i>12/14/18 2:00</i>	QC Data Package Level III <input type="checkbox"/>	LAB USE ONLY Custody Seals used and intact? (Y/N) <input checked="" type="checkbox"/>	COOLER TEMP Received on ice? (Y/N) <input checked="" type="checkbox"/>
RELINQUISHED: <i>Zach Knocofe</i>	DATE / TIME: <i>12/14/18</i>	RECEIVED: <i>Carollee III</i>	DATE / TIME: <i>12/14/18</i>	QC Data Package Level IV <input type="checkbox"/>	<b>EEE-Blacksburg</b>	<b>18L0649</b>
RELINQUISHED:	DATE / TIME:	RECEIVED:	DATE / TIME:		<b>Mr. K's Car Wash</b>	

Recd: 12/14/2018 Due: 01/02/2019 Page 49 of 51



# Sample Preservation Log

Sample Preservation Log  
 Form #: F1301  
 Rev # 9.0  
 Effective: Nov 13, 2018  
 Page 1 of 1

Order ID **18L0649**

Date Performed: 12-17-18

Analyst Performing Check: SE

Sample ID	Container ID	Metals		Cyanide		Sulfide		Ammonia		TKN		Phos, Tot		NO3+NO2		DRO		Pesticide (8081/608/508)		SVOC (525.2/8270/625)		CrVI *		Pest/PCB (508) / SVOC(525)		ORG			
		pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)	Res.Cl as Received	Res.Cl P/A (If adjust.)	Res.Cl as Received	Res.Cl P/A (If adjust.)	pH as Received	Adjusted final pH	pH as Received	Final pH (If adjust.)	pH as Received	Final pH (If adjust.)		
		< 2	Other	> 12	Other	> 9	Other	< 2	Other	Present	Absent	Present	Absent			< 2	Other	+2	Other										
01	A																												
01	B																												
02	A																												
02	B																												

NaOH ID: \_\_\_\_\_ HNO<sub>3</sub> ID: \_\_\_\_\_ CrVI preserved date/time: \_\_\_\_\_ Analyst Initials: \_\_\_\_\_  
 \* pH must be adjusted between 9.3 - 9.7  
 H<sub>2</sub>SO<sub>4</sub> ID: \_\_\_\_\_ Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub> ID: \_\_\_\_\_ Buffer Sol'n ID: \_\_\_\_\_  
 HCL ID: \_\_\_\_\_ Na<sub>2</sub>SO<sub>3</sub> ID: \_\_\_\_\_ 1N NaOH ID: \_\_\_\_\_ 5N NaOH: \_\_\_\_\_

\*\*W.Va only certifies DISS CrVI and not T CrVI as an approved analyte under 40CFR136 for waste water.



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# Certificate of Analysis

## Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/20/2018 16:22
Submitted To:	Josh Hepler	Project Number:	18-796
Client Site I.D.:	Mr. K's Car Wash	Purchase Order:	

### Sample Conditions Checklist

Samples Received at:	2.80°C
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	No
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	Yes
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Zach Kiracofe notified at drop off that trip blank date and time information would be logged in as per the sample container label 11-27-18 15:35. SE 12/17/18 9:26

---

**Appendix D: Laboratory Review of Detected TPH Concentration & Chromatograms**

---

**From:** [Josh Hepler](#)  
**To:** [Josh Hepler](#)  
**Subject:** Chromatograph Review Request  
**Date:** Tuesday, February 5, 2019 11:45:50 AM  
**Attachments:** [image001.jpg](#)

---

**From:** Soyars Ted <[tsoyars@awslabs.com](mailto:tsoyars@awslabs.com)>  
**Sent:** Tuesday, January 29, 2019 12:45 PM  
**To:** Josh Hepler <[jhepler@eee-consulting.com](mailto:jhepler@eee-consulting.com)>  
**Cc:** Katrina Cooke <[kcooke@awslabs.com](mailto:kcooke@awslabs.com)>; Mary-Mullen Ricks <[mmricks@awslabs.com](mailto:mmricks@awslabs.com)>  
**Subject:** FW: Chromatograph Review Request

Hi Josh. Looks like there was a formatting issue with this email that popped up when I hit SENT, so I'm re-sending so you'll be able to read this without going cross-eyed

- **ID 18L0653:** B3 5-10 DRO (ID -05); (Triangle Service Center):
  - Appears to be a very small oil pattern, that's roughly half inside the Diesel Range, and half outside of it (past the heavier end of the range).
- **ID 18L0344:** B3 5-10 DRO (ID -05); (Daniel's Auto Care):
  - Also appears to be a small amount of oil, but more than 18L0653-05, however for this sample it appears that only a third of the oil petroleum pattern falls within the Diesel Range limits, and about 2/3 of the pattern is outside of it (past the heavier end of the range)
- **ID 18L0372:** B4 5-10 DRO & ORO (ID -07); (A&M):
  - DRO: Very similar pattern as that of 18L0653-05, however it appears to be just slightly lighter.... so that a little more than half of the pattern falls within the Diesel range, and 40% of it or so falls outside of it on the heavier end. The pattern itself is much more similar to 653-05 than 344-05. ORO: Classic oil patterning, extremely similar to the petroleum pattern of our ORO standard which is 10W-30.
- **ID 18L0332:** B2 5-10 ORO (ID -03); (Mrs. K's Carwash):
  - This appears to all be within the Oil range, however it looks like it could be a combination of petroleum. There is a petroleum pattern right where 10W-30 is, but also before it, and even a pattern that stretches somewhat past it. Again, this very well may be 2 or even 3 different products mixed together, which makes it impossible for me to speculate on what it could be, other than to confirm it looks to be all within the OIL range, and I don't see anything that looks like it comes before or after it (at least from what I can see).

- **ID 18L0345:** B2 5-10 DRO & ORO (ID -03); B2 10-15 DRO (ID -04); B3 5-10 DRO (ID -05); (1 Performance):
- These three samples appear to be almost identical to each other, with only minor differences (so minor that it wouldn't affect how I would describe them in a PET ID). These 3 are all very small detections that appear to be some sort of oil that falls about half inside the diesel range and half past it into the oil range. It could also be a combination of petroleums, although it's not as clear as the sample above (18L0332-03). So it's either a small amount of two petroleums (possibly more) or a single petroleum that simply has a wider hydrocarbon makeup than 10W-30 (especially on the lighter side / front end of 10W30).

Ted Soyars  
Laboratory Manager  
Air, Water & Soil Laboratories, Inc.  
(804) 358-8295

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---

**From:** Josh Hepler <[jhepler@eee-consulting.com](mailto:jhepler@eee-consulting.com)>  
**Sent:** Friday, January 25, 2019 10:15 AM  
**To:** Mary-Mullen Ricks <[mmricks@awslabs.com](mailto:mmricks@awslabs.com)>  
**Cc:** Chris Lalli <[clalli@eee-consulting.com](mailto:clalli@eee-consulting.com)>  
**Subject:** Chromatograph Review Request

Good Morning Mary-Mullen,

I was wondering if you would consider reviewing the chromatograms for the following low reported concentrations of TPH-DRO and/or TPH-ORO against the standard.

- **ID 18L0653:** B3 5-10 DRO (ID -05); (Triangle Service Center)
- **ID 18L0344:** B3 5-10 DRO (ID -05); (Daniel's Auto Care)
- **ID 18L0372:** B4 5-10 DRO & ORO (ID -07); (A&M)
- **ID 18L0332:** B2 5-10 ORO (ID -03); (Mrs. K's Carwash)
- **ID 18L0345:** B2 5-10 DRO & ORO (ID -03);  
B2 10-15 DRO (ID -04);  
B3 5-10 DRO (ID -05); (1 Performance)

I appreciate these extra services provided in helping us decipher a site's condition. Also, a separate letter for each report stating that a review was performed would be appreciated. Please let me

know if this request is feasible.

Thanks,

**Joshua P. Hepler, PG**

Environmental Scientist

**EEE CONSULTING, INC.**

201 Church Street, Suite C | Blacksburg, VA 24060

540.953.0170 ext. 309; Cell 540-230-3685

[20th Anniversary Email Banner \(fullsize\)](#)



*“Per Title VI of the Civil Rights Act of 1964 and other non-discrimination statutes, EEE Consulting, Inc. will not discriminate on the grounds of race, color, national origin, sex, age, disability, or low income in the selection and retention of subconsultants, including procurement of materials and leases of equipment. EEE Consulting, Inc. will ensure that minorities will be afforded full opportunity to submit proposals and will not be discriminated against in consideration for an award.”*

---

**Appendix E: Table 4 Petroleum Impacted Soil Volume Estimate**

---

**Table 4: Mrs. Ks Carwash  
 Petroleum-Impacted Soil Volume Estimate  
 Select Drainage Improvement Pipe Connection**

Boring ID	Impacted Soil Depths	Drainage Structure ID	Impacted Excavation Footprint Location	Impacted Soil Excavation Dimensions	Volume Estimate**	Volume Estimate**	Volume Estimate**
Unit	BGS		STA No.	LxWxH	Cubic Feet (ft <sup>3</sup> )	Cubic Yards (yd <sup>3</sup> )	Tons*
B2 0-5	0-5-ft	15-inch Diameter Pipe that Connects 13-7 to 14-5	STA No. 325+90 to 326+15; 70-ft RT of CL	25-ft x 3-ft x 5-ft	375	14	21

**Notes:**

\*Tons calculated with conversion of 1yd<sup>3</sup> = 1.5 tons

\*\*Soil volume estimates are approximate and based on preliminary information available as of the date of this report.

# **Phase II Environmental Site Assessment Roadway Improvement Project**

**Route 1 Widening Project  
Pullen Moving Company  
122 Old Stage Coach Road  
Dumfries, Virginia 22026  
Prince William County**

**Contract ID: 44115  
VDOT Project: 001-212-249  
VDOT UPC: 90339 Act: 689  
VDOT Task Number: E-FR024.12**

**Prepared for  
Mr. Brutus Cooper  
Regional VDOT HAZMAT Manager  
Virginia Department of Transportation  
NOVA District Office  
4975 Alliance Drive  
Fairfax, VA 22030**

**Prepared by  
EEE Consulting, Inc.  
201 Church Street  
Blacksburg, Virginia 24060**

**February 2019**

**Prepared by: Joshua P. Hepler, PG, Project Scientist**

**Reviewed by: Christopher J. Lalli, Vice President**



**EEE Consulting, Inc.**

Environmental, Engineering and Educational Solutions

**Table of Contents**

Acronyms ..... ii

1.0 INTRODUCTION AND BACKGROUND ..... 1

2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS ..... 2

3.0 SOIL AND GROUNDWATER SAMPLING METHODS ..... 2

**3.1. Soil Sampling Methods** ..... 2

4.0 PID SCREENING RESULTS ..... 3

5.0 COMPOSITE SOIL SAMPLE ANALYTICAL RESULTS ..... 3

6.0 CONCLUSIONS AND RECOMMENDATIONS ..... 4

7.0 LIMITATIONS ..... 4

8.0 ACKNOWLEDGEMENT ..... 4

9.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS ..... 5

**Tables**

Table 1 - PID Soil Screening Data..... 3

Table 2 - Soil Sample Analytical Data.....3

**Figures**

- Figure 1 – Project Location Map Depicting Regional Project Location
- Figure 2 – Portion of the Prince William Co 7.5 Minute Quadrangle Depicting the Project Location
- Figure 3 – Aerial Photograph Showing the Subject Properties and Project Location
- Figure 4 – Preliminary VDOT Plan Sheet Nos. 17 and 18 Showing the Boring Location

**Appendices**

- Appendix A: Miss Utility Ticket
- Appendix B: Boring Logs
- Appendix C: Laboratory Reports and Sample Custody Documentation

## Acronyms

BGS	Below Ground Surface
C	Celsius
COC	Chain of Custody
CL	Center Line
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency – United States
FT	Feet
LT	Left
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
PG	Professional Geologist
PID	Photoionization Detector
PPM	Parts Per Million
REC	Recognized Environmental Condition
RL	Reporting Limit
Rt	Route
RT	Right
R/W	Right-of-Way
STA	Station
TPH-DRO	Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
UST	Underground Storage Tank
VDOT	Virginia Department of Transportation
VSWMR	Virginia Solid Waste Management Regulations
<b>3e</b>	EEE Consulting, Inc.

## 1.0 INTRODUCTION AND BACKGROUND

The Virginia Department of Transportation (VDOT) is administering proposed improvements and realignment of 2.3-miles of Route 1 (Fraleley Boulevard) between the intersection with Quantico Gateway Drive and the intersection with Drumfires Road (State Route 234) in Dumfries, Prince William County, Virginia. The general project location and topographic setting are shown on **Figures 1** and **2**, respectively. An aerial photograph of the project area is also presented as **Figure 3**.

The roadway and drainage improvements will occur in existing roadway right-of-way (R/W), proposed R/W, permanent easements (slope and drainage), temporary construction easements (i.e. erosion & sediment control measures) and proposed limited access lines. A Phase I Environmental Site Assessment (ESA) was prepared by EEE Consulting, Inc (**3e**) for the study area in August 2018, which identified Recognized Environmental Conditions (REC) throughout the corridor including the subject property as follows:

- ❖ **Pullen Moving Company** (No Parcel #) located at 122 Old Stage Coach Road, Dumfries, VA 22026 (VDOT Plan Sheet Nos. 17 and 18). The subject property is currently an empty parcel with a gravel entrance and lot located at the eastern corner of the Route 1 and Route 234 intersection. FOIA documents indicated a 4,000-gallon gasoline underground storage tank (UST) and 4,000-gallon diesel fuel UST on-site that are registered as inactive. The available files did not provide any additional salient information, including the current or former locations of the USTs on-site.

According to Plan Sheet Nos. 17 & 18, Drainage Structure No. 18-3 and the associated pipe connections are depicted for installation in a proposed drainage/slope easement at the Pullen Moving Company (see **Figure 4**).

The RECs identified at the subject property have the potential to pose adverse impacts to subsurface media that will likely be disturbed during the installation of the noted drainage improvements. The constituents of concern are petroleum-based in accordance with the RECs identified above and detailed in the Phase I ESA Corridor Study Report (**3e**, August 2018). Based on this information, the VDOT – Northern Virginia District Office Hazardous Materials Manager requested the collection of representative samples to confirm the presence/absence of petroleum impacts to soil and groundwater, if encountered, in and proximate to the proposed easement acquisition and drainage improvement footprints. On December 12<sup>th</sup>, 2018, **3e** completed a Phase II ESA at the subject property to confirm the presence/absence of impacts to subsurface media that will likely be disturbed in response to the proposed drainage improvements.

Subsurface boring advancements, sampling methods, corresponding analytical results, and conclusions/recommendations pertaining to the proposed construction activities at each site are summarized in the following sections of this report.

## 2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS

Prior to implementing the direct push boring installations, the approximate locations of subsurface public utilities were identified and marked by Miss Utility of Virginia. A utility locate request form was also completed with VDOT to identify utilities owned and operated by VDOT. Copies of the Miss Utility and VDOT Tickets are included in **Appendix A**. In addition to public utility identification, private subsurface utilities were also identified and marked in each investigative area prior to commencing drilling activities.

## 3.0 SOIL AND GROUNDWATER SAMPLING METHODS

### 3.1. Soil Sampling Methods

On December 12<sup>th</sup>, 2018, a direct push drill rig was utilized to advance one (1) soil boring at the following location:

- ❖ B1 – Installed proximate to STA No. 354+50; 35-ft RT of CL to a depth of 15-ft BGS upon refusal on consolidated material.

The roadway improvements proposed to date, RECs, and boring location are depicted on **Figure 4**.

The soil boring was advanced using a Geoprobe<sup>®</sup> direct push rig. The direct-push rig utilizes a hollow-stem spoon that produced a continuous soil core in five (5)-ft intervals along the vertical depth of each boring. The boring was advanced to refusal at a depth of 15-ft BGS. Subsurface conditions (i.e. wet soils) indicative of groundwater were not observed in B1. The detailed boring log is presented in **Appendix B**.

Composite soil samples were collected to assess soil that will likely be disturbed during construction. The representative composite soil samples were obtained from B1 by collecting aliquots from 5-10-ft and 10-15-ft BGS.

Each composite soil sample was placed into two (2) pre-cleaned 4-ounce glass jars. The sample jars were appropriately labeled and placed on ice in a cooler to maintain an appropriate temperature ( $\leq 4^{\circ}\text{C}$ ) while in transit to the certified environmental laboratory. Chain of Custody (COC) documentation was completed for all samples submitted for laboratory analysis.

Both composite soil samples obtained from B1 were submitted for laboratory analysis of Total Petroleum Hydrocarbons Gasoline Range Organics (TPH-GRO) and Total Petroleum Hydrocarbons Diesel Range Organics (TPH-DRO) by EPA Method 8015C. The COC

documentation and laboratory analytical data are provided in **Appendix C**. A detailed discussion of the composite soil sample analytical results is presented in **Section 5.0** of this report.

## 4.0 PID SCREENING RESULTS

Photoionization Detector (PID) results for the screened direct push soil cores are presented below in **Table 1**. Measurement units are in parts per million (ppm).

**Table 1 - PID Soil Screening Data: Route 1  
Pullen Moving Company**

	PID (ppm)	PID (ppm)	PID (ppm)
Depth (ft BGS)	0-5	5-10	10-15
B1	0.0	0.0	0.0

Notes:

ppm = Parts per Million

BGS – Below Ground Surface

Depth Unit – foot BGS

A review of **Table 1** indicates that measurable PID readings were not observed in the screened soil cores. No visual or olfactory evidence of petroleum-impacted media was observed during boring and sampling activities. Additionally, residual-phase petroleum constituent concentrations were not detected in the soil samples (see **Section 5.0**).

## 5.0 COMPOSITE SOIL SAMPLE ANALYTICAL RESULTS

The analytical results obtained from the composite soil samples are summarized below in **Table 2**. All results are listed in units of milligrams-per-kilogram (mg/kg). A detailed laboratory analytical report is provided in **Appendix C**.

**Table 2: Soil Sample Analytical Data**

**Pullen Moving Co**

**Route 1 Widening, Dumfries VA**

**Units = Milligrams per Kilogram (mg/kg)**

Location	<b>B1 5-10</b>		<b>B1 10-15</b>	
Laboratory I.D.	18L0648-01		18L0648-02	
Depth Below Grade	5-10 feet		10-15 feet	
Sample Time	10:20		10:30	
	Result	<i>RL</i>	Result	<i>RL</i>
<b>TPH-GRO</b>	ND	<i>0.10</i>	ND	<i>0.10</i>
<b>TPH-DRO</b>	ND	<i>10.0</i>	ND	<i>10.0</i>

Notes:

**Bold / Underlined** text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

A review of **Table 2** indicates that residual-phase petroleum concentrations were not detected above the laboratory reporting limits (RLs) in the representative soil samples collected at the subject property.

## **6.0 CONCLUSIONS AND RECOMMENDATIONS**

One (1) direct push boring was installed to collect representative samples to determine if the RECs identified at the subject property resulted in adverse impacts to subsurface media that will likely be disturbed in response to the proposed drainage improvements.

The representative soil samples collected as part of this investigation did not contain detectable residual-phase petroleum constituent concentrations. Therefore, special management provisions to the construction contract should not apply for soil that will likely be disturbed at the Pullen Moving Company in response to the installation of the drainage improvements proposed as of the date of this report.

FOIA documents indicate the potential for inactive/orphaned USTs to be present on-site. If an orphaned UST is encountered during roadway construction activities, then the Project Engineer should be immediately notified to ensure that notification, closure, and removal activities are conducted in accordance with all applicable regulations.

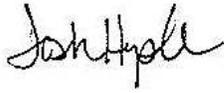
## **7.0 LIMITATIONS**

It is impossible to know with certainty the entirety of a site is free of hazardous substances or conditions even with extensive subsurface testing. The conclusions of this investigation are based solely on the scope-of-work and on the sources of information reviewed during this investigation. This report was prepared for the exclusive use of VDOT, and their expressly-designated affiliates. **3e** accepts no responsibility for damages or claims resulting from past or future environmental degradation related to the subject property.

## **8.0 ACKNOWLEDGEMENT**

**3e** appreciates the opportunity to provide environmental services to VDOT regarding the Pullen Moving Company - Route 1 roadway improvement project located in Dumfries, VA under the Professional Services HAZMAT Contract. If we may be of further assistance, or you have any questions or comments regarding the project, please contact our office at (540) 953-0170.

## 9.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS



Joshua P. Hepler, PG  
Project Environmental Scientist  
Preparer



Chris Lalli  
Vice President/Associate  
Reviewer

---

## Figures

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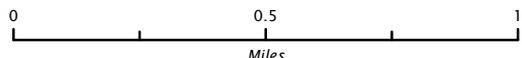


Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community  
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

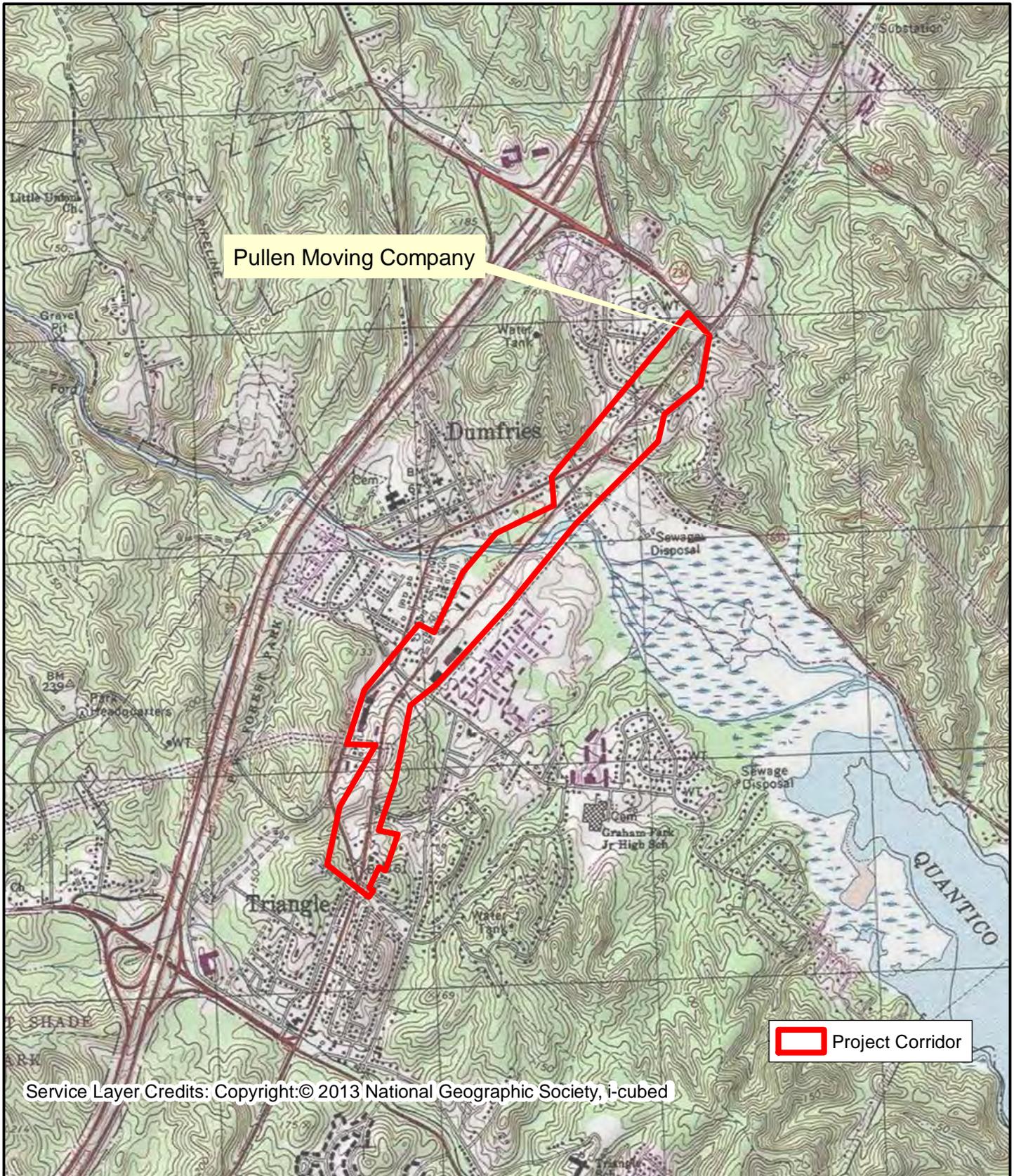
 Project Corridor



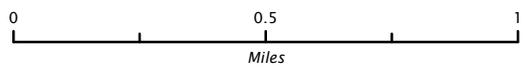
**FIGURE 1**  
**PROJECT CORRIDOR AERIAL**  
**PULLEN MOVING COMPANY**



Miles  
 Dumfries, VA



**FIGURE 2**  
**PROJECT CORRIDOR TOPOGRAPHIC**  
 PULLEN MOVING COMPANY

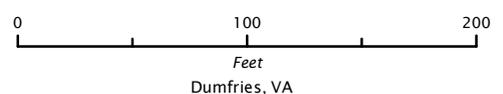




 Pullen Moving Company Property Boundary



**FIGURE 3**  
**AERIAL WITH PROPERTY BOUNDARIES**  
PULLEN MOVING COMPANY



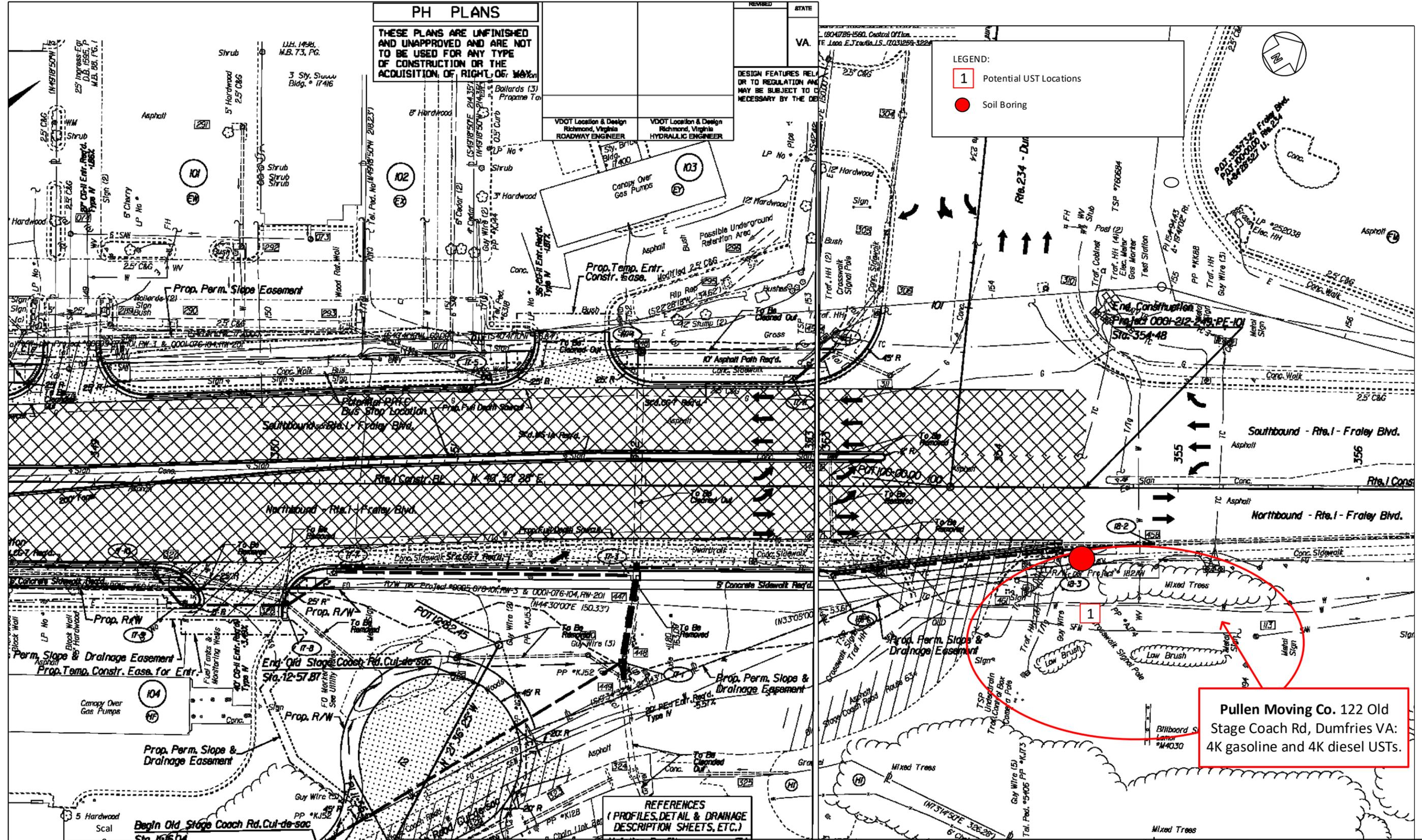
PH PLANS

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY

DESIGN FEATURES RELY ON TO REGULATION AND MAY BE SUBJECT TO CHANGE NECESSARY BY THE DEPARTMENT OF TRANSPORTATION

LEGEND:

- 1 Potential UST Locations
- Soil Boring



**Pullen Moving Co. 122 Old Stage Coach Rd, Dumfries VA:**  
4K gasoline and 4K diesel USTs.

REFERENCES  
(PROFILES, DETAIL & DRAINAGE DESCRIPTION SHEETS, ETC.)

**3e** **EEE Consulting, Inc.**  
Environmental, Engineering and Educational Solutions

**VDOT**  
Virginia Department of Transportation  
Route 1 Widening Project  
Dumfries, Virginia

**FIGURE 4**  
Plan Sheets No. 17 & 18 Depicting Identified  
RECs & Boring Location at the Pullen Moving  
Company.  
E-FR024.12 February 2019

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**Appendix A: Miss Utility Ticket**

---

**From:** [tickets@missutilityofvirginia.com](mailto:tickets@missutilityofvirginia.com)  
**To:** [Josh Hepler](#)  
**Subject:** VUPS EMLCFM 2018/12/05 #02742 A833101432-02A RUSH RESP LREQ  
**Date:** Wednesday, December 5, 2018 11:21:05 AM  
**Importance:** High

---

EMLCFM 02742 VUPSa 12/05/18 11:21:01 A833101432-02A RESPONSE

Thank you for contacting VA811! This is an automatically generated response from the utilities who received your notice of excavation. If you have questions about the response, call the "field contact" for that utility. For your safety, please respect and protect the marks, excavate carefully around the marked utility lines and contact VA811 if you see clear evidence of unmarked utilities.

**Remember, you can now reach VA811 by dialing 811.**

Ticket : A833101432 Rev: 02A Taken: 12/05/18 07:14 AM

State: VA Cnty: PRINCE WILLIAM Place: DUMFRIES  
Address : OLD STAGE COACH RD  
Responses due by: 12/05/18 10:15 AM Expires: 12/19/18 07:00 AM

When the member Marking Code is blue, click for additional information that may be provided by the Operator/Locator.

Marking Code	Description	Response
<a href="#">CGV</a>	COLUMBIA GAS (CGV930) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (800)543-8911	11/29/18 01:30 PM 30
CMC	COMCAST (CMC502) No Conflict; utility is outside of stated work area. Field Contact: CABLE PROTECTION SERVICES (804)562-3861 In the event of damage to a facility call: (800)441-6917 ext opt 1	12/04/18 10:25 AM 30
<a href="#">DOM</a>	DOMINION ENERGY ELEC DIST (DOM400) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)667-3000	11/29/18 01:30 PM 30
PWS	PRINCE WILLIAM - WATER (PWS902) Marked up to privately owned utility; contact private utility owner	12/04/18 12:03 PM 13
	for locate. Abandoned utility lines may be in area. Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	
PWS	PRINCE WILLIAM - SEWER (PWS903) Critical facility not marked; locator or utility operator must contact excavator and must be present during excavation. Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	11/29/18 12:20 PM 71
UNF	PEG BANDWIDTH (UNF937) No Conflict; utility is outside of stated work area. Field Contact: DAVID CADD (804)382-5823 In the event of damage to a facility call: (877)652-2321	12/05/18 11:20 AM 30
VZN	VERIZON (VZN703) Marked Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)483-1233	12/04/18 10:41 AM 10



Locate Work Order Number: \_\_\_\_\_

Project Location: \_\_\_\_\_

# Utility Location Results Form

## Utility Location Results *(completed by utility location service provider)*

Photos attached Yes No

Was the location that was requested completed? Yes No

Detection cable and/or location tape available Yes No

Accurate As-Built Documents available Yes No

*If no, please check all applicable boxes:*

Accurate As-Built Documents:

Requested? Yes No Provided? Yes No

VDOT on-site assistance:

Requested? Yes No Provided? Yes No

Does the in-field survey area extend 3 feet beyond the border of the intended excavation area? (Required) Yes No

Utility Location Method(s) used: \_\_\_\_\_

### Comments:

Serco/Elite has provided utility markings within the scope of this request for all VDOT owned fiber optic communications cable, and all power cabling from the ITS Device to the ITS Cabinet that was accurately shown on drawings if provided by VDOT, or actual location contained detection cable or tape, and/or VDOT provided on-site assistance.

Where no detection cable/tape and or accurate as-built documents, and/or VDOT assistance was not provided, **we have provided approximate markings or no markings have occurred and the 3rd Party Requestor is advised that hand digging with extreme caution is advised.** Photos have been attached.

Please be advised that in no case will Serco/Elite be held liable or responsible for any power or communication cabling that falls outside our scope and could not be located due to the lack of accurate documentation, detection cable or tape, and/or VDOT assistance

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Certification:** The most appropriate equipment and technology to identify all VDOT underground utilities within the requested zone were used.

Utility Locator: (Print) \_\_\_\_\_  
(signature) \_\_\_\_\_  
Company: \_\_\_\_\_

Start time: \_\_\_\_\_  
End time: \_\_\_\_\_  
Date: \_\_\_\_\_

*This information is valid for 15 days from signed date of marking. Any work performed after 15 days is not covered under this request and will need re-marked.*

---

## **Appendix B: Boring Logs**

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Project Location: **RT 1 Widening**  
 Site: **Pullen**  
 Location: **STA NO. 354+50; 35-ft RT of CL**  
 Boring: **B1**



Date(s) Drilled: <b>12/12/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>20'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.0			0-1' Gravel. 1-5' Orange sandy clay, moist. 5-5.5' Fine sandy brown/orange clay. No odor.
2				
3				
4				
5				
6	0.0		10:20	5.5-6.5' Grey green sandy clay. 6.5-10' Orange sandy clay, moist. No odor.
7				
8				
9				
10				
11	0.0		10:30	10-15' White/grey/orange sand, slightly moist. No odor. Refusal at 15-ft BGS.
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

---

## **Appendix C: Laboratory Reports and Sample Custody Documentation**

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## Certificate of Analysis

*Final Report*

Laboratory Order ID 18L0648

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg, VA 24060	Date Received:	December 14, 2018 14:00
		Date Issued:	December 28, 2018 14:48
		Project Number:	18.796.12
Submitted To:	Josh Hepler	Purchase Order:	18.796.12
Client Site I.D.:	Pullen Moving		

Enclosed are the results of analyses for samples received by the laboratory on 12/14/2018 14:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

A handwritten signature in black ink that reads "Ted Soyars".

Ted Soyars  
Laboratory Manager

### End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.





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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) Date Issued: 12/28/2018 14:48  
201 Church Street  
Blacksburg VA, 24060  
Submitted To: Josh Hepler Project Number: 18.796.12  
Client Site I.D.: Pullen Moving Purchase Order: 18.796.12

#### ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0648

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B1 5-10	18L0648-01	Soil	12/12/2018 10:20	12/14/2018 14:00
B1 10-15	18L0648-02	Soil	12/12/2018 10:30	12/14/2018 14:00



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/28/2018 14:48
Submitted To: Josh Hepler	Project Number: 18.796.12
Client Site I.D.: Pullen Moving	Purchase Order: 18.796.12

**Laboratory Order ID: 18L0648**

**Analytical Results**

<b>Sample I.D.</b> B1 5-10	<b>Laboratory Sample ID:</b> 18L0648-01
<b>Grab Date/Time:</b> 12/12/2018 10:20	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	01	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 19:44	12/20/18 19:44	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	<i>01</i>	<i>SW8015C</i>	<i>94.8 %</i>		<i>80-120</i>		<i>12/20/18 19:44</i>	<i>12/20/18 19:44</i>	<i>DFH</i>
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 12:20	12/27/18 21:05	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>01</i>	<i>SW8015C</i>	<i>72.8 %</i>		<i>40-160</i>		<i>12/20/18 12:20</i>	<i>12/27/18 21:05</i>	<i>HLM</i>



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/28/2018 14:48
Submitted To: Josh Hepler	Project Number: 18.796.12
Client Site I.D.: Pullen Moving	Purchase Order: 18.796.12

**Laboratory Order ID: 18L0648**

**Analytical Results**

Sample I.D. B1 10-15	Laboratory Sample ID: 18L0648-02
Grab Date/Time: 12/12/2018 10:30	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
-----------	---------	--------	--------	------	-----------------	------	-----------------------	--------------------	---------

**Volatile Hydrocarbons by GC**

TPH-Volatiles (GRO)	02	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 20:07	12/20/18 20:07	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	02	SW8015C	103 %		80-120		12/20/18 20:07	12/20/18 20:07	DFH

**Semivolatile Hydrocarbons by GC**

TPH-Semi-Volatiles (DRO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 12:20	12/27/18 21:31	HLM
Surr: Pentacosane (Surr)	02	SW8015C	69.1 %		40-160		12/20/18 12:20	12/27/18 21:31	HLM

### Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
-----------	--	--------	----------	-------------	----------------

**Semivolatile Hydrocarbons by GC**

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
			<b>Preparation Method: SW3550C</b>		
18L0648-01	50.5 g / 1.00 mL	SW8015C	BBL0618	SBL0713	AI80039
18L0648-02	52.8 g / 1.00 mL	SW8015C	BBL0618	SBL0713	AI80039

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
-----------	--	--------	----------	-------------	----------------

**Volatile Hydrocarbons by GC**

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
			<b>Preparation Method: SW5030B</b>		
18L0648-01	5.07 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0648-02	5.01 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/28/2018 14:48
Submitted To: Josh Hepler	Project Number: 18.796.12
Client Site I.D.: Pullen Moving	Purchase Order: 18.796.12

### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	------

#### Batch BBL0617 - SW5030B

##### Blank (BBL0617-BLK1)

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	95.9		ug/L	100		95.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	95.9		ug/L	100		95.9	80-120			

##### LCS (BBL0617-BS1)

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			

##### Matrix Spike (BBL0617-MS1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120			S
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120			S

##### Matrix Spike Dup (BBL0617-MSD1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/28/2018 14:48
Submitted To:	Josh Hepler	Project Number:	18.796.12
Client Site I.D.:	Pullen Moving	Purchase Order:	18.796.12

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	------

#### Batch BBL0618 - SW3550C

##### Blank (BBL0618-BLK1)

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
<hr style="border-top: 1px dashed #000;"/>										
Surr: Pentacosane (Surr)	3.60		mg/kg	4.96		72.5	40-160			
Surr: Pentacosane (Surr)	3.60		mg/kg	4.96		72.5	40-160			

##### LCS (BBL0618-BS1)

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	76.5 mg/kg	10.0	mg/kg	98.4	mg/kg	77.7	40-160			
TPH-Semi-Volatiles (DRO)	76.5 mg/kg	10.0	mg/kg	98.4	mg/kg	77.7	40-160			
<hr style="border-top: 1px dashed #000;"/>										
Surr: Pentacosane (Surr)	3.30		mg/kg	4.96	mg/kg	66.4	40-160			
Surr: Pentacosane (Surr)	3.30		mg/kg	4.96	mg/kg	66.4	40-160			

##### Matrix Spike (BBL0618-MS1)

Source: 18L0803-01

Prepared: 12/20/2018 Analyzed: 12/28/2018

TPH-Semi-Volatiles (DRO)	90.6 mg/kg	49.5	mg/kg	99.0	50.9 mg/kg	40.2	40-160			
TPH-Semi-Volatiles (DRO)	90.6 mg/kg	49.5	mg/kg	99.0	50.9 mg/kg	40.2	40-160			
<hr style="border-top: 1px dashed #000;"/>										
Surr: Pentacosane (Surr)	1.77		mg/kg	4.99	mg/kg	35.4	40-160			S
Surr: Pentacosane (Surr)	1.77		mg/kg	4.99	mg/kg	35.4	40-160			S

##### Matrix Spike Dup (BBL0618-MSD1)

Source: 18L0803-01

Prepared: 12/20/2018 Analyzed: 12/28/2018

TPH-Semi-Volatiles (DRO)	168 mg/kg	49.2	mg/kg	98.4	50.9 mg/kg	119	40-160	60.0	20	P
TPH-Semi-Volatiles (DRO)	168 mg/kg	49.2	mg/kg	98.4	50.9 mg/kg	119	40-160	60.0	20	P
<hr style="border-top: 1px dashed #000;"/>										
Surr: Pentacosane (Surr)	3.16		mg/kg	4.96	mg/kg	63.7	40-160			
Surr: Pentacosane (Surr)	3.16		mg/kg	4.96	mg/kg	63.7	40-160			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/28/2018 14:48
Submitted To:	Josh Hepler	Project Number:	18.796.12
Client Site I.D.:	Pullen Moving	Purchase Order:	18.796.12

### Certified Analyses included in this Report

Analyte	Certifications
<i>SW8015C in Solids</i>	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Volatiles (GRO)	VELAP,NC,WVDEP

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/28/2018 14:48
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### Summary of Data Qualifiers

- P Duplicate analysis does not meet the acceptance criteria for precision
- S Surrogate recovery was outside acceptance criteria
- RPD Relative Percent Difference
- Qual Qualifiers
- RE Denotes sample was re-analyzed
- D.F. Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.
- TIC Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library .  
A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
- PCBs, Total Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.



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Chain of Custody  
 Form #: F1331  
 Rev. 3.0  
 Effective: Aug 24, 2017

CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: <i>EEE Consulting</i>	INVOICE TO: <i>SAME</i>	PROJECT NAME/Quote #: <i>Rt 1 Widening</i>
CONTACT: <i>Josh Hepler</i>	INVOICE CONTACT:	SITE NAME: <i>Pullen Moving</i>
ADDRESS: <i>201 Church St Blacksburg</i>	INVOICE ADDRESS:	PROJECT NUMBER: <i>18-796.12</i>
PHONE #: <i>540 230 3685</i>	INVOICE PHONE #:	P.O. #: <i>18-796.12</i>
FAX #:	EMAIL: <i>jhepler@eee-consulting.com</i>	Pretreatment Program: <i>NA</i>
Is sample for compliance reporting? YES NO <i>NA</i>	Is sample from a chlorinated supply? YES NO <i>NA</i>	PWS I.D. #: <i>NA</i>
SAMPLER NAME (PRINT): <i>Josh Hepler</i>	SAMPLER SIGNATURE:	Turn Around Time: Circle: <b>10</b> 5 Days or ___ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)			COMMENTS
											TPH - GRO	TPH - DRO	BTEX *	
1) <i>B1 5-10</i>	<input checked="" type="checkbox"/>			<i>NA</i>	<i>NA</i>	<i>12/12</i>	<i>10:20</i>	<i>NA</i>	<i>S</i>	<i>2</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol  * Analyze BTEX only if GRO is detected  PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)
2) <i>B1 10-15</i>	<input checked="" type="checkbox"/>			<i>NA</i>	<i>NA</i>	<i>12/12</i>	<i>10:30</i>	<i>NA</i>	<i>S</i>	<i>2</i>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
3)														
4)														
5)														
6)														
7)														
8)														
9)														
10)														

RELINQUISHED:	DATE / TIME: <i>12/13/18</i>	RECEIVED:	DATE / TIME: <i>12/14/18 2:00</i>	QC Data Package	LAB USE ONLY Custody Seals used and intact? (Y/N) <input checked="" type="checkbox"/>	COOLER TEMP Received on ice? (Y/N) <input checked="" type="checkbox"/>
RELINQUISHED:	DATE / TIME: <i>12/14/18 2:00</i>	RECEIVED:	DATE / TIME: <i>12/14/18 1400</i>	Level III <input type="checkbox"/>	<b>EEE-Blacksburg 18L0648</b> <b>RT 1 Widning</b> <b>Recd: 12/14/2018 Due: 01/02/2019</b>	<i>2.9°C</i> <i>1.1°C</i>
RELINQUISHED:	DATE / TIME:	RECEIVED:	DATE / TIME:	Level IV <input type="checkbox"/>		



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# Certificate of Analysis

## Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	12/28/2018 14:48
Submitted To:	Josh Hepler	Project Number:	18.796.12
Client Site I.D.:	Pullen Moving	Purchase Order:	18.796.12

### Sample Conditions Checklist

Samples Received at:	2.90°C
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	No
Are all volatile organic and TOX containers free of headspace?	NA
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	NA
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

# **Phase II Environmental Site Assessment Roadway Improvement Project**

**Route 1 Widening Project  
Triangle Service Center  
18314 Jefferson Davis Highway  
Triangle, Virginia 22172  
Prince William County**

**Contract ID: 44115  
VDOT Project: 001-212-249  
VDOT UPC: 90339 Act: 689  
VDOT Task Number: E-FR024.01**

**Prepared for  
Mr. Brutus Cooper  
Regional VDOT HAZMAT Manager  
Virginia Department of Transportation  
NOVA District Office  
4975 Alliance Drive  
Fairfax, VA 22030**

**Prepared by  
EEE Consulting, Inc.  
201 Church Street  
Blacksburg, Virginia 24060**

**January 2019**

**Prepared by: Joshua P. Hepler, PG, Project Scientist**

**Reviewed by: Christopher J. Lalli, Vice President**



**EEE Consulting, Inc.**

Environmental, Engineering and Educational Solutions

## **Table of Contents**

Acronyms .....	ii
1.0 INTRODUCTION AND BACKGROUND .....	1
2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS .....	2
3.0 SOIL AND GROUNDWATER SAMPLING METHODS .....	2
<b>3.1.</b> Soil Sampling Methods .....	2
<b>3.2.</b> Groundwater Sampling Methods .....	3
4.0 PID SCREENING RESULTS .....	4
5.0 SOIL SAMPLE ANALYTICAL RESULTS.....	5
6.0 DISSOLVED PHASE ANALYTICAL RESULTS.....	7
7.0 CONCLUSIONS AND RECOMMENDATIONS .....	8
<b>7.1.</b> Petroleum Impacted Soil Volume Estimates.....	8
<b>7.2.</b> Petroleum Impacted Soil Management Options.....	9
8.0 LIMITATIONS.....	10
9.0 ACKNOWLEDGEMENT .....	10
10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS .....	11

## **Tables**

Table 1 - PID Soil Screening Data.....	4
Table 2 - Soil Sample Analytical Data.....	7
Table 3- Groundwater Sample Analytical Data.....	8
Table 4- Petroleum Impacted Soil Volume Estimate .....	9

## **Figures**

Figure 1 – Project Location Map Depicting Regional Project Location	
Figure 2 – Portion of the Prince William Co 7.5 Minute Quadrangle Depicting the Project Location	
Figure 3 – Aerial Photograph Showing the Subject Properties and Project Location	
Figure 4 – Preliminary VDOT Plan Sheet No. 3, 3B & 4 Showing the Boring Locations	

## **Appendices**

Appendix A: Miss Utility Ticket	
Appendix B: Boring Logs	
Appendix C: Laboratory Reports and Sample Custody Documentation	
Appendix D: Table 4: Petroleum Impacted Soil Volume Estimates	

## Acronyms

AST	Above Ground Storage Tank
BGS	Below Ground Surface
C	Celsius
COC	Chain of Custody
CL	Center Line
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency – United States
FT	Feet
LT	Left
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
PG	Professional Geologist
PID	Photoionization Detector
PPM	Parts Per Million
REC	Recognized Environmental Condition
RL	Reporting Limit
Rt	Route
RT	Right
R/W	Right-of-Way
STA	Station
TPH-DRO	Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
UST	Underground Storage Tank
VDOT	Virginia Department of Transportation
VOC	Volatile Organic Compounds
VSWMR	Virginia Solid Waste Management Regulations
<b>3e</b>	EEE Consulting, Inc.

## 1.0 INTRODUCTION AND BACKGROUND

The Virginia Department of Transportation (VDOT) is administering proposed improvements and realignment of 2.3-miles of Route 1 (Fraleley Boulevard) between the intersection with Quantico Gateway Drive and the intersection with Drumfires Road (State Route 234) in Dumfries, Prince William County, Virginia. The general project location and topographic setting are shown on **Figures 1** and **2**, respectively. An aerial photograph of the project area is also presented as **Figure 3**.

The roadway and drainage improvements will occur in existing roadway right-of-way (R/W), proposed R/W, permanent easements (slope & drainage), temporary construction easements (i.e. erosion & sediment control measures) and proposed limited access lines. A Phase I Environmental Site Assessment (ESA) was prepared by EEE Consulting, Inc (**3e**) for the Study Area in August 2018, which identified Recognized Environmental Conditions (REC) throughout the corridor, including the subject property as follows:

**Triangle Service Center** (Parcel 005) located at 18314 Jefferson Davis Highway, Triangle, VA 22172 (VDOT Plan Sheet Nos 3, 3A, 3B, 3C, 4 and 4A), which is an active vehicle repair shop with a suspect oil/water separator in the northern portion of the property. The historical use of the property includes a former refueling station that operated three petroleum USTs that were closed/removed from the ground in 1991.

According to Plan Sheet Nos. 3, 3A, 3B, 3C, 4 and 4A, the property will likely be acquired for the installation of Drainage Structure Nos. 3-2, 3-3, 3-4, 3B-7 and a cul-de-sac (see **Figure 4**). A cut is depicted from STA Nos. 257+45 to 258+60 Left (LT) of Centerline (CL), which is associated with a cul-de-sac. Please note that the depth(s) of this cut's corresponding profile (i.e. Sheet No. 3C) is approximately 2-ft below ground surface (BGS).

The RECs identified at Parcel 005 have the potential to pose adverse impacts to subsurface media that will likely be disturbed during the installation of the noted drainage and cul-de-sac improvements. The constituents of concern are petroleum-based, which are based on the RECs identified above and detailed in the Phase I ESA Corridor Study Report (**3e**, August 2018). Based on this information, the VDOT – NOVA District Hazardous Materials Manager requested the collection of representative samples to confirm the presence/absence of petroleum impacts to soil and groundwater, if encountered, in and proximate to the proposed disturbance areas. On December 11<sup>th</sup>, 2018, **3e** completed a Phase II ESA at Parcel 005 to confirm the presence/absence of impacts to subsurface media that will likely be disturbed in response to the proposed drainage and pathway improvements.

The results of this investigation documented a petroleum release (i.e. TPH and/or BTEX concentrations greater than 100-mg/kg or greater than the applicably laboratory reporting limits, respectively) to subsurface soil at Parcel 005. **Prior to R/W acquisition, it is recommended that the current property owner report a documented petroleum release to the environment to**

the Virginia Department of Environmental Quality – Northern Regional Office (DEQ-NRO). Subsurface boring advancements, sampling methods, corresponding analytical results, and conclusions/recommendations pertaining to the proposed construction activities at each site are summarized in the following sections of this report.

## 2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS

Prior to implementing the direct push boring installations, the approximate locations of subsurface public utilities were identified and marked by Miss Utility of Virginia. A utility locate request form was also completed with VDOT to identify utilities owned and operated by VDOT. Copies of the Miss Utility and VDOT Tickets are included in **Appendix A**. In addition to public utility identification, private subsurface utilities were also identified and marked in each investigative area prior to commencing drilling activities.

## 3.0 SOIL AND GROUNDWATER SAMPLING METHODS

### 3.1. Soil Sampling Methods

On December 11<sup>th</sup>, 2018, a direct push drill rig was utilized to advance six (6) soil borings at Parcel 005, with conversion of one (1) to a temporary groundwater monitoring well (MW) at the following locations:

- ❖ B1 – Installed proximate to STA No. 257+25; 70-ft LT of CL to a depth of 15-ft BGS as proposed.
- ❖ B2 – Installed proximate to STA No. 258+25; 150-ft LT of CL to a depth of 20-ft BGS as proposed with subsequent conversion to a temporary MW.
- ❖ B3 – Installed proximate to STA No. 259+00; 200-ft LT of CL to a depth of 15-ft BGS as proposed.
- ❖ B4 – Installed proximate to STA No. 259+25; 75-ft LT of CL to a depth of 19-ft BGS upon refusal on consolidated material.
- ❖ B5 – Installed proximate to STA No. 258+50; 60-ft LT of CL to a depth of 19-ft BGS upon refusal on consolidated material.
- ❖ B6 – Installed proximate to STA No. 258+40; 125-ft LT of CL to a depth of 15-ft BGS upon refusal on consolidated material.

The roadway improvements proposed to date, RECs, and boring locations are depicted on **Figure 4**.

Each soil boring was advanced using a Geoprobe<sup>®</sup> direct push rig. The direct-push rig utilizes a hollow-stem spoon that produced a continuous soil core in five (5)-ft intervals along the vertical depth of each boring. Each boring was advanced to predetermined depths or refusal at depths that

ranged from 15-19-ft BGS. Borings B-2, B-4 and B-6 were installed to 20-, 19- and 15-ft BGS, respectively, for the proposed installations of temporary groundwater monitoring wells. However; subsurface conditions (i.e. wet soils) indicative of groundwater were only observed in B-2. The detailed boring logs are presented in **Appendix B**.

Soil samples were collected in the proposed project limits to characterize subsurface conditions prior to roadway R/W acquisition, and assess soil that will likely be disturbed during construction. The representative composite soil samples were obtained from the borings by collecting aliquots from the following depth intervals:

- ❖ B1, B2, & B3: 5-10 and 10-15-ft BGS.
- ❖ B4: 0-5- and 15-19-ft BGS.
- ❖ B5: 0-5-, 5-10-, 10-15- and 15-19-ft BGS.
- ❖ B6: 0-5- and 10-15-ft BGS.

Each soil sample was placed into two (2) pre-cleaned 4-ounce glass jars. The sample jars were appropriately labeled and placed on ice in a cooler to maintain an appropriate temperature ( $\leq 4^{\circ}\text{C}$ ) while in transit to the certified environmental laboratory. Chain of Custody (COC) documentation was completed for all samples submitted for laboratory analysis.

All soil samples obtained from the six (6) direct push borings were submitted for laboratory analysis of TPH-GRO and TPH-DRO by EPA Method 8015C. Additionally, the BTEX constituents were analyzed via EPA Method 8021B in select soil samples that contained detectable TPH-GRO concentrations. The COC documentation and laboratory analytical data are provided in **Appendix C**. A detailed discussion of the composite soil sample analytical results is presented in **Section 5.0** of this report.

### 3.2. Groundwater Sampling Methods

A temporary monitoring well was constructed in B2 to collect a representative groundwater sample to confirm the presence/absence of petroleum impact to the shallow groundwater table. The temporary well was constructed with 1-inch diameter, PVC well screen (slotted at 0.01-ft intervals) and solid 1-inch diameter casing. Screen and casing intervals for the temporary monitoring well are documented on the boring log for B2 (see **Appendix B**). PVC caps were fitted over each well to prevent intrusion of foreign material. Clean sand was then placed in the remaining annular space of the borehole to form a filter pack around the well screen.

On December 11<sup>th</sup>, 2018, an oil/water interface probe was utilized to determine the depth-to-groundwater and confirm the presence or absence of separate-phase petroleum in the temporary monitoring well. The static groundwater level in the temporary well was measured at a depth of

5.5-ft BGS (see **Appendix B**). Separate-phase petroleum or petroleum odors were not detected in the temporary monitoring well.

A representative groundwater sample was collected from the temporary monitoring well, which was prepared for transport to the laboratory in accordance the following procedures: 1) the sample was collected using disposable nylon string and a one-half-inch diameter, disposable polyethylene bailer; 2) the sample was placed into containers provided by the laboratory with the appropriate preservative; 3) placed on ice in a cooler to maintain appropriate temperature while in transport to the environmental laboratory and; 4) Chain of Custody documentation completed.

The groundwater sample was submitted for analysis of TPH-GRO and TPH-DRO by EPA Method 8015C and BTEX by EPA Method 8021. The analytical data for the representative groundwater sample is provided in **Appendix C**. A discussion of the groundwater analytical result is provided in **Section 6.0** of this report.

After completion of the gauging/sampling activities, the temporary monitoring well was abandoned by removing the PVC screen and casing from the ground surface and filling the resulting void to grade with bentonite chips.

#### 4.0 PID SCREENING RESULTS

Photoionization Detector (PID) results for the screened direct push soil cores are presented below in **Table 1**. Measurement units are in parts per million (ppm).

**Table 1 - PID Soil Screening Data: Route 1 – Triangle Service Center**

	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)
Depth (ft BGS)	0-5	5-10	10-15	15-20
B1	0.0	0.0	0.0	NA
B2	0.0	0.0	0.0	0.0
B3	0.0	0.0	0.0	NA
B4	0.0	0.0	0.0	0.0
B5	4.9	55.0	7.9	12.3
B6	0.6	0.1	1,300	NA

Notes:

ppm = Parts per Million  
BGS – Below Ground Surface  
Depth Unit – foot BGS

A review of **Table 1** indicates the following:

- ❖ Measurable PID readings were not detected in the screened soil cores collected from B1 through B4.
- ❖ Measurable PID readings were detected in the soil cores collected from B-5 and B-6, with the highest reading detected in B-6 at 10-15-ft BGS. A moderate to strong gasoline odor was observed in the field while screening the soil cores collected from B5 and B6.
- ❖ The soil cores collected from B5 and B-6 at 0-5-ft BGS contained low TPH-DRO concentrations that did not register elevated PID readings or odors that were noticeable to olfactory senses. The difference in the field screening and laboratory analytical results is consistent for low concentration detections in the semi-volatile, hydrocarbon chain ranges (i.e. hydrocarbon chains from C10 – C38).

## 5.0 SOIL SAMPLE ANALYTICAL RESULTS

The analytical results obtained from the soil samples are summarized in **Table 2** on the following page. All results are listed in units of milligrams-per-kilogram (mg/kg). A detailed laboratory analytical report is provided in **Appendix C**.

**Table 2: Soil Sample Analytical Data**

**Triangle Service Center**

**Route 1 Widening, Dumfries VA**

**Units = Milligrams per Kilogram (mg/kg)**

Location	<b>B1 5-10</b>		<b>B1 10-15</b>		<b>B2 5-10</b>		<b>B2 10-15</b>	
Laboratory I.D.	18L0653-01		18L0653-02		18L0653-03		18L0653-04	
Depth Below Grade	5-10-feet		10-15 feet		5-10-feet		10-15 feet	
Sample Time	13:00		13:05		13:30		13:40	
	Result	RL	Result	RL	Result	RL	Result	RL
<b>TPH-GRO</b>	ND	0.10	ND	0.10	ND	0.10	ND	0.10
<b>TPH-DRO</b>	ND	10.0	ND	10.0	ND	10.0	ND	10.0
Location	<b>B3 5-10</b>		<b>B3 10-15</b>		<b>B4 0-5</b>		<b>B4 15-19</b>	
Laboratory I.D.	18L0653-05		18L0653-06		18L0653-07		18L0653-08	
Depth Below Grade	5-10-feet		10-15 feet		0-5 feet		15-19 feet	
Sample Time	14:00		14:05		14:20		14:30	
	Result	RL	Result	RL	Result	RL	Result	RL
<b>TPH-GRO</b>	ND	0.10	ND	0.10	ND	0.10	ND	0.10
<b>TPH-DRO</b>	<b>10.9</b>	10.0	ND	10.0	ND	10.0	ND	10.0
Location	<b>B5 0-5</b>		<b>B5 5-10</b>		<b>B5 10-15</b>		<b>B5 15-19</b>	
Laboratory I.D.	18L0653-09		18L0653-10		18L0653-11		18L0653-12	
Depth Below Grade	0-5 feet		5-10-feet		10-15 feet		15-19 feet	
Sample Time	14:40		14:50		14:55		15:10	
	Result	RL	Result	RL	Result	RL	Result	RL
<b>TPH-GRO</b>	ND	0.10	<b>0.11</b>	0.10	ND	0.10	<b>0.64</b>	0.10
<b>TPH-DRO</b>	<b>32.9</b>	10.0	<b>20.7</b>	10.0	ND	10.0	<b>21.1</b>	10.0
<b>Benzene</b>	NA	NA	ND	0.005	NA	NA	<b>0.00935</b>	0.005
<b>Toulene</b>	NA	NA	ND	0.005	NA	NA	<b>0.00973</b>	0.005
<b>Ethylbenzene</b>	NA	NA	ND	0.005	NA	NA	<b>0.0200</b>	0.005
<b>m+p-Xylenes</b>	NA	NA	ND	0.010	NA	NA	<b>0.0455</b>	0.010
<b>o-Xylenes</b>	NA	NA	ND	0.015	NA	NA	<b>0.0592</b>	0.015
Location	<b>B6 0-5</b>		<b>B6 10-15</b>					
Laboratory I.D.	18L0653-13		18L0653-14					
Depth Below Grade	0-5 feet		10-15 feet					
Sample Time	15:30		15:40					
	Result	RL	Result	RL				
<b>TPH-GRO</b>	ND	0.10	<b>413</b>	9.98				
<b>TPH-DRO</b>	<b>37.4</b>	10.0	<b>51.6</b>	10.0				
<b>Benzene</b>	NA	NA	ND	0.500				
<b>Toulene</b>	NA	NA	<b>6.220</b>	0.500				
<b>Ethylbenzene</b>	NA	NA	<b>15.700</b>	0.500				
<b>m+p-Xylenes</b>	NA	NA	<b>53.100</b>	1.000				
<b>o-Xylenes</b>	NA	NA	<b>23.400</b>	0.500				

**Notes:**

**Bold / Underlined** text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

A review of **Table 2** indicates the following:

- ❖ The residual-phase TPH-GRO concentration detected in the sample collected from B6 at 10-15 BGS **exceeds** the Virginia Department of Environmental Quality (DEQ) TPH reporting limit of 100-mg/kg for a petroleum release to the environment. This concentration also **exceeds** the Virginia Solid Waste Management Regulation (VSWMR) TPH limit of 50-mg/kg for fill material (*9VAC20-81-660D.2.d*).
- ❖ The residual-phase BTEX concentration detected in the sample collected from B6 at 10-15 BGS **exceeds** the VSWMR BTEX limit of 10-mg/kg for fill material (*9VAC20-81-660D.2.d*).
- ❖ The residual BTEX concentrations detected in the samples collected from B5 at 15-19 BGS and B6 at 10-15-ft BGS **exceed** the DEQ BTEX reporting limit for a petroleum release to the environment, which is any detection greater than the applicable laboratory RL.
- ❖ The residual-phase TPH (GRO & DRO) concentrations detected in B3 at 5-10 BGS, B5 at 0-5-ft, 5-10-ft, & 15-19-ft BGS, and B6 at 0-5-ft BGS **did not exceed** the VSWM) TPH and BTEX limits of 50-mg/kg and 10-mg/kg, respectively, for fill material (*9VAC20-81-660D.2.d*).

## 6.0 DISSOLVED PHASE ANALYTICAL RESULTS

The dissolved-phase analytical result obtained from the groundwater sample collected at B2 is summarized in **Table 3** below. All results are listed in milligrams per liter (mg/L). A detailed laboratory analytical report is provided in **Appendix C**.

**Table 3: Groundwater Sample Analytical Data**  
**Route 1 Widening: Triangle Service Center**  
**Units = Milligrams per Liter (mg/l)**

Location Laboratory I.D. Sample Time	B2 18L0653-15 16:10		Trip Blank 18L0653-16 8:14	
	Result	RL	Result	RL
<b>Benzene</b>	ND	<i>1.00</i>	ND	<i>1.00</i>
<b>Toulene</b>	ND	<i>1.00</i>	ND	<i>1.00</i>
<b>Ethylbenzene</b>	ND	<i>1.00</i>	ND	<i>1.00</i>
<b>m+p-Xylenes</b>	ND	<i>4.00</i>	ND	<i>4.00</i>
<b>o-Xylenes</b>	ND	<i>2.00</i>	ND	<i>2.00</i>
<b>TPH-GRO</b>	ND	<i>0.10</i>	ND	<i>0.10</i>
<b>TPH-DRO</b>	ND	<i>0.562</i>	NA	NA

**Notes:**

**Bold / Underlined** text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

A review of **Table 3** indicates that the sample collected from B2 did not contain dissolved-phase petroleum constituent concentrations above the laboratory RLs.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Representative soil and groundwater samples were collected under this investigation to determine if the RECs identified at Parcel 005 resulted in adverse impacts to the media that will likely be disturbed in response to the proposed drainage improvements. The results of this investigation indicate the following:

- ❖ The residual-phase petroleum constituent concentrations detected in B6 at 10-15-ft BGS **exceed** the VSWMR TPH release reporting limit of 100-mg/kg; BTEX release reporting limit of concentration detections greater than the laboratory RLs; and VSWMR TPH and BTEX fill material limits of 50-mg/kg and 10-mg/kg, respectively.
- ❖ The residual BTEX concentrations detected in the sample collected from B5 at 15-19-ft BGS **exceed** the DEQ BTEX release reporting limit of concentration detections greater than the laboratory RLs.
- ❖ The other residual-phase petroleum constituent concentrations detected in select samples collected from B3, B5 and B6 0-5 **did not exceed** the VSWMR TPH and BTEX limits of 50-mg/kg and 10-mg/kg, respectively, for fill material.

Parcel 005 will likely be acquired as R/W to facilitate the installation of the roadway and drainage improvements proposed as of the date of this report. **Prior to R/W acquisition, it is recommended that the current property owner report a documented petroleum release to the environment to the DEQ-NRO.** This recommendation is based on the detection of TPH and BTEX constituent concentrations in select soil samples collected from B5 and B6 that exceed the DEQ reporting limits for a petroleum release to the environment.

The estimated volumes of petroleum impacted soil that will likely be excavated in the response to select roadway and drainage improvements at Parcel 005, and the corresponding soil management options that apply are detailed in the following sections of this report.

### 7.1. Petroleum Impacted Soil Volume Estimates

A review of Plan Sheets 3, 3A, 3B, 3C, 4 and 4A indicates that the following drainage improvements and installation of the cul-de-sac will require excavation in portions of Parcel 005 that are impacted by low residual-phase petroleum concentrations:

- ❖ A portion of the 15-inch diameter pipe that connects Drainage Structure No. 3-2 to 4-8 from approximately STA Nos. 257+90 to 258+85 60-ft LT of CL.
- ❖ Drainage Structure No. 3B-7 and the 12-ft long section of the 15-inch diameter pipe located proximate to STA No 259+00; 200-ft LT of CL.
- ❖ Cutting grade activities for the cul-de-sac located from approximately STA Nos. 257+90 to 258+75 LT of CL.

Please note that drainage descriptions and associated invert elevations were not available for specific structures as of the date of this report. However, preliminary information provided via e-mail by a VDOT Hydraulics/Drainage Engineer indicates that the subject drainage improvements will likely require excavation to depths that range from approximately 2-ft to 5.6-ft BGS. Based on this preliminary information, **Table 4** on the following page presents the estimated volumes of impacted soil that will likely require Special Management Provisions to the construction contract. A full-sized copy of **Table 4** is also included as **Appendix D**.

**Table 4: Triangle Service Center  
Petroleum-Impacted Soil Volume Estimates  
Select Roadway, Drainage Improvements & Pipe Connections**

Boring ID	Impacted Soil Depths	Drainage Structure ID	Impacted Excavation Footprint	Excavation Dimensions	Volume Estimate**	Volume Estimate**	Volume Estimate**
Unit	BGS		STA No.	LxWxH	Cubic Feet (ft <sup>3</sup> )	Cubic Yards (yd <sup>3</sup> )	Tons*
B3	5-10-ft	3B-7	STA No. 259+00; 200-ft LT of CL	5-ft x 5-ft x 5-ft	125***	5	7
B3	5-10-ft	15-in pipe connecting to 3B-7 and existing DI	STA No. 259+00; 200-ft LT of CL	12-ft x 3-ft x 5-ft	180***	7	10
B5	0-10-ft & 15-19-ft	15-in pipe connecting 3-2 to 4-8	STA Nos. 257+90 to 258+85, 60-ft LT of CL	95-ft x 5-ft x 5.5-ft	2613	97	145
B6	0-15-ft	Cul-de-sac	STA Nos. 257+90 to 258+75, 125-ft RT of CL	85-ft x 25-ft x 2-ft	4250	157	236

\*Tons calculated with conversion of 1yd<sup>3</sup> = 1.5 tons

\*\*Soil volume estimates are approximate and based on preliminary information available as of the date of this report.

\*\*\*No laboratory data available for 0-5-ft BGS, this interval estimated to be managed as petroleum impacted media due to impact at 5-10-ft BGS.

The cut associated with the cul-de-sac from STA 257+90 to 258+75 LT of CL is currently proposed to encounter petroleum-impacted soil below the VSWMR fill limit of 50-mg/kg at depths of 0-5-ft BGS. If excavation in this portion of Parcel 005 (i.e. proximate to B6) will trend to depths greater than five (5)-ft BGS, then additional Special Management Provisions will likely apply to manage this soil as a non-hazardous, petroleum-impacted solid waste stream (see **Section 7.2** below).

## 7.2. Petroleum Impacted Soil Management Options

The following management options apply to excavated soil that contains low petroleum constituent concentrations (i.e. TPH & BTEX concentrations less than 50-mg/kg and 10-mg/kg, respectively):

1. Exempt Materials and Use (i.e. **9VAC20-81-95C.7.d**):

- Nonhazardous, contaminated soil excavated in response to the proposed cul-de-sac and drainage improvements can be used to backfill the same excavation or excavations

containing similar petroleum concentrations on-site. Excess contaminated soil that cannot be used to backfill the same or similar excavations on-site must be managed in accordance with the applicable requirements of the VSWMR.

2. Manage as petroleum-impacted fill material in accordance with the location restrictions of the VSWMR (*9VAC20-81-660D.2.d*).
  - May not be disposed of within 100-ft of a regularly flowing surface water.
  - 500-ft of any spring, or groundwater source of drinking water.
  - 200-ft from a residence, school, hospital, nursing home, or recreational park.
  - If utilized as fill on an off-site property, then the owner must be notified that it is contaminated and what it is contaminated with (i.e. petroleum).

The representative soil sample collected from B6 at 10-15-ft BGS contained TPH and BTEX concentrations that **exceed** the VSWMR TPH and BTEX fill material limits of 50-mg/kg and 10-mg/kg, respectively. However, the current plan sheets and associated profiles do not depict excavating/cutting activities approaching this depth. If subsequent design changes necessitate soil disturbance proximate to B6 at depths greater than 5-ft BGS, then this soil would likely require management and disposal as a non-hazardous, petroleum-impacted solid waste.

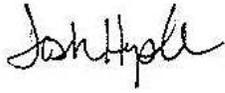
## **8.0 LIMITATIONS**

It is impossible to know with certainty the entirety of a site is free of hazardous substances or conditions even with extensive subsurface testing. The conclusions of this investigation are based solely on the scope-of-work and on the sources of information reviewed during this investigation. This report was prepared for the exclusive use of VDOT, and their expressly-designated affiliates. **3e** accepts no responsibility for damages or claims resulting from past or future environmental degradation related to the subject property.

## **9.0 ACKNOWLEDGEMENT**

**3e** appreciates the opportunity to provide environmental services to VDOT regarding the Triangle Service Center - Route 1 roadway improvement project located in Triangle/Dumfries, VA under the Professional Services HAZMAT Contract. If we may be of further assistance, or you have any questions or comments regarding the project, please contact our office at (540) 953-0170.

## 10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS



Joshua P. Hepler, PG  
Project Environmental Scientist  
Preparer



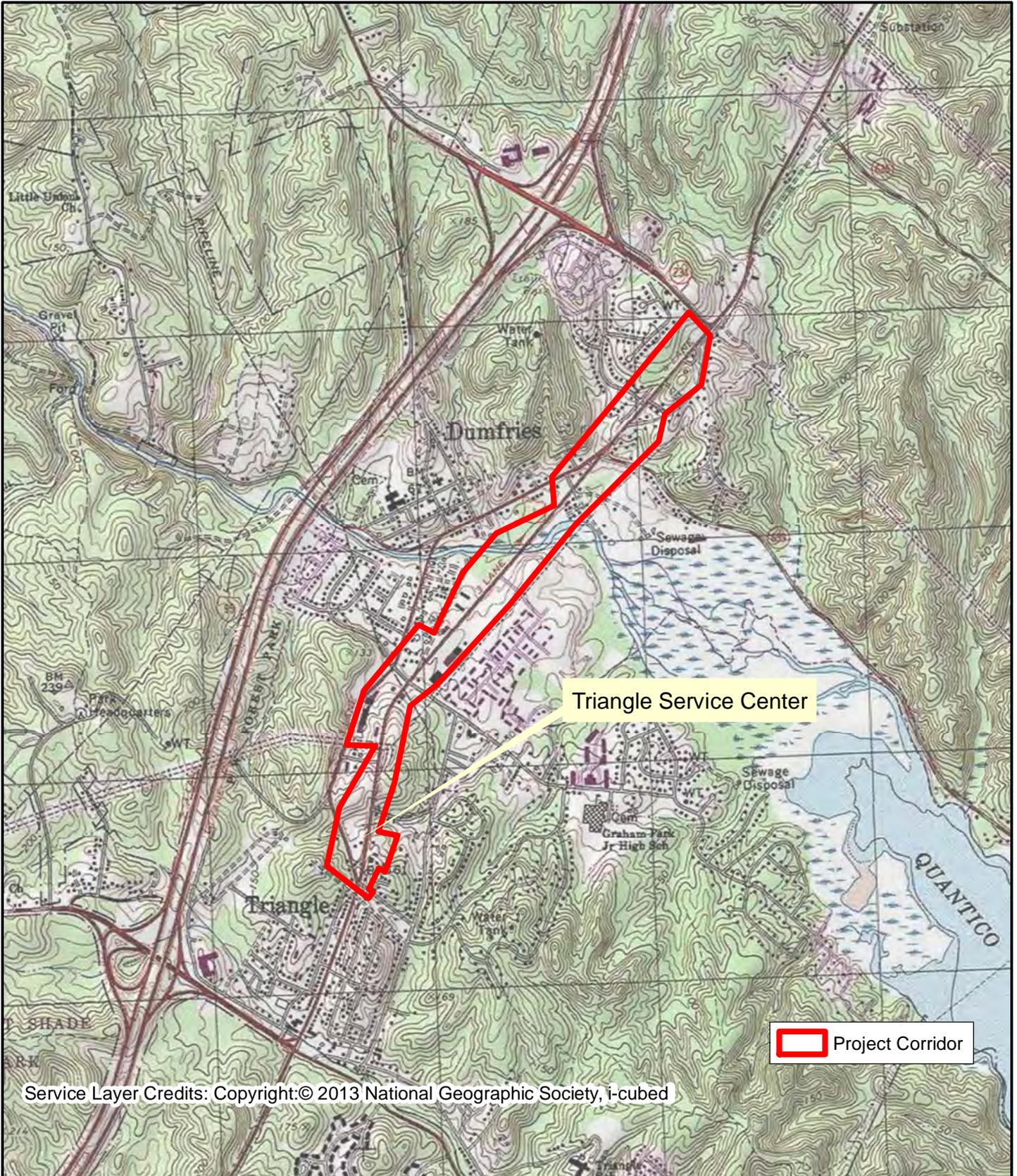
Chris Lalli  
Vice President/Associate  
Reviewer

## Figures

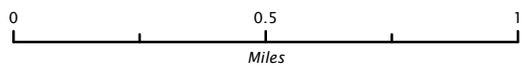


Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community  
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**FIGURE 1**  
**PROJECT CORRIDOR AERIAL**  
 TRIANGLE SERVICE CENTER

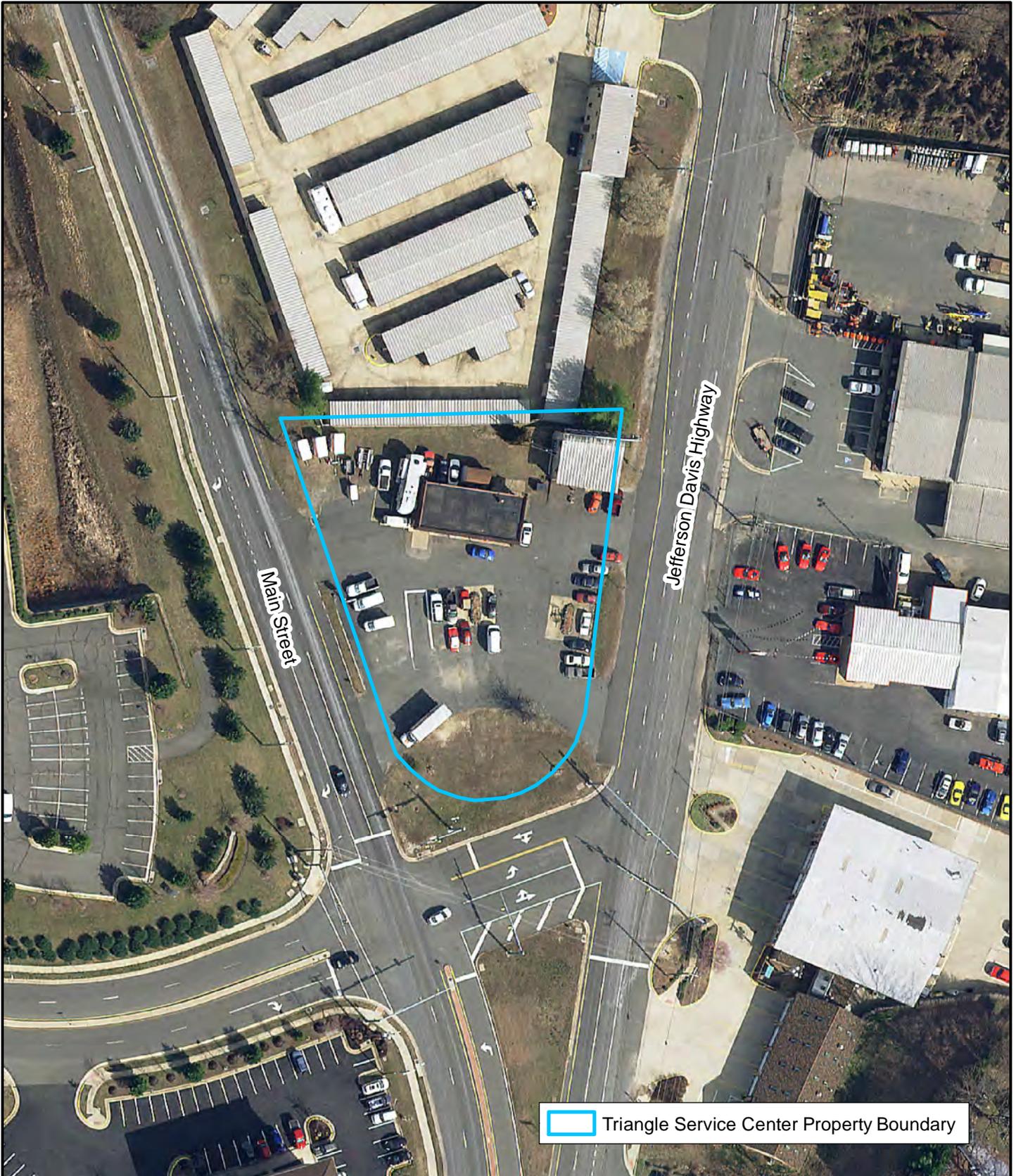


**FIGURE 2**  
**PROJECT CORRIDOR TOPOGRAPHIC**  
**TRIANGLE SERVICE CENTER**

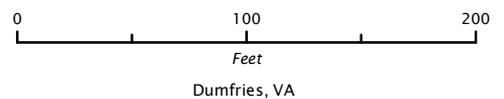


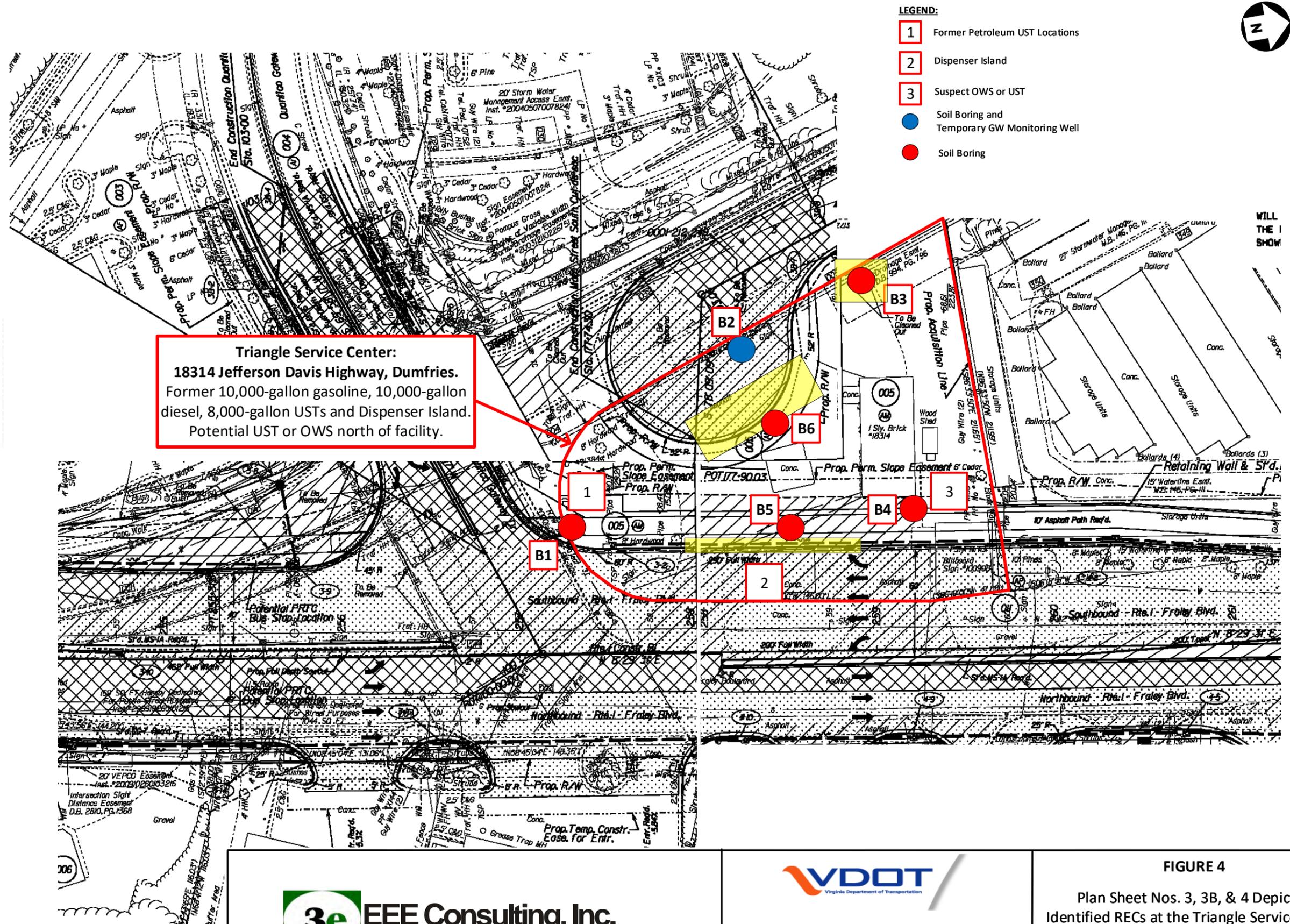
Dumfries, VA

1:24,000



**FIGURE 3**  
**AERIAL WITH PROPERTY BOUNDARIES**  
 TRIANGLE SERVICE CENTER





**Appendix A: Miss Utility Ticket**

**From:** [tickets@missutilityofvirginia.com](mailto:tickets@missutilityofvirginia.com)  
**To:** [Josh Hepler](#)  
**Subject:** VUPS EMLCFM 2018/12/04 #01280 A833101226-01A RUSH RESP LREQ  
**Date:** Tuesday, December 4, 2018 8:55:40 AM  
**Importance:** High

---

EMLCFM 01280 VUPSa 12/04/18 08:55:35 A833101226-01A RESPONSE

Thank you for contacting VA811! This is an automatically generated response from the utilities who received your notice of excavation. If you have questions about the response, call the "field contact" for that utility. For your safety, please respect and protect the marks, excavate carefully around the marked utility lines and contact VA811 if you see clear evidence of unmarked utilities.

**Remember, you can now reach VA811 by dialing 811.**

Ticket : A833101226 Rev: 01A Taken: 12/03/18 11:45 AM

State: VA Cnty: PRINCE WILLIAM Place: DUMFRIES  
Address : 18314 JEFFERSON DAVIS HWY  
Responses due by: 12/03/18 02:46 PM Expires: 12/19/18 07:00 AM

When the member Marking Code is blue, click for additional information that may be provided by the Operator/Locator.

Marking Code	Description	Response
<a href="#">CGV</a>	COLUMBIA GAS (CGV930) Marked Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (800)543-8911	12/04/18 08:55 AM 10
CMC	COMCAST (CMC502) No Conflict; utility is outside of stated work area. Field Contact: CABLE PROTECTION SERVICES (804)562-3861 In the event of damage to a facility call: (800)441-6917 ext opt 1	11/27/18 10:07 AM 30
<a href="#">DOM</a>	DOMINION ENERGY ELEC DIST (DOM400) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)667-3000	11/29/18 09:15 AM 30
PWS	PRINCE WILLIAM - WATER (PWS902) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	11/29/18 11:03 AM 12
PWS	PRINCE WILLIAM - SEWER (PWS903) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	11/29/18 11:03 AM 12
<a href="#">VZN</a>	VERIZON (VZN703) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)483-1233	11/29/18 09:15 AM 30



Locate Work Order Number: \_\_\_\_\_

Project Location: \_\_\_\_\_

# Utility Location Results Form

## Utility Location Results *(completed by utility location service provider)*

Photos attached Yes No

Was the location that was requested completed? Yes No

Detection cable and/or location tape available Yes No

Accurate As-Built Documents available Yes No

*If no, please check all applicable boxes:*

Accurate As-Built Documents:

Requested? Yes No Provided? Yes No

VDOT on-site assistance:

Requested? Yes No Provided? Yes No

Does the in-field survey area extend 3 feet beyond the border of the intended excavation area? (Required) Yes No

Utility Location Method(s) used: \_\_\_\_\_

### Comments:

Serco/Elite has provided utility markings within the scope of this request for all VDOT owned fiber optic communications cable, and all power cabling from the ITS Device to the ITS Cabinet that was accurately shown on drawings if provided by VDOT, or actual location contained detection cable or tape, and/or VDOT provided on-site assistance.

Where no detection cable/tape and or accurate as-built documents, and/or VDOT assistance was not provided, **we have provided approximate markings or no markings have occurred and the 3rd Party Requestor is advised that hand digging with extreme caution is advised.** Photos have been attached.

Please be advised that in no case will Serco/Elite be held liable or responsible for any power or communication cabling that falls outside our scope and could not be located due to the lack of accurate documentation, detection cable or tape, and/or VDOT assistance

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Certification:** The most appropriate equipment and technology to identify all VDOT underground utilities within the requested zone were used.

Utility Locator: (Print) \_\_\_\_\_  
(signature) \_\_\_\_\_  
Company: \_\_\_\_\_

Start time: \_\_\_\_\_  
End time: \_\_\_\_\_  
Date: \_\_\_\_\_

*This information is valid for 15 days from signed date of marking. Any work performed after 15 days is not covered under this request and will need re-marked.*

## **Appendix B: Boring Logs**

Project Location: **RT 1 Widening**  
 Site: **Triangle Service Center**  
 Location: **STA No 257+25; 75-ft LF of CL**  
 Boring Location: **B1**



Date(s) Drilled: <b>12/11/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>15'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.0			0-0.5' Topsoil. 0.5-2' Sandy clay, moist. 2-5' Clay with fine sand, moist. No odors observed.
2				
3				
4				
5				
6	0.0		13:00	5-8' Clay with fine sand, moist. 8-10' White tan sandy clay, moist. No odors.
7				
8				
9				
10	0.0		13:05	10-15' White tan sandy clay, moist. No odors. Boring terminated at 15-ft BGS.
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Triangle Service Center**  
 Location: **STA No 258+25; 150-ft LF of CL**  
 Boring Location: **B2**



Date(s) Drilled: <b>12/11/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>20'</b>	Screened Interval: <b>5-20'</b>
DTW Within Soil Boring: <b>9'</b>		Cased Interval: <b>0-5'</b>
Static GW Level: <b>5.5'</b>	Date GW Measured: <b>December 11, 2018</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.0			0-0.5' Topsoil. 0.5-2' Brown clay, moist/hard. 2-5' Brown clay with fine sand, moist/soft. No odors.
2				
3				
4				
5				
6	0.0		13:30	5-9' Brown sandy clay, moist. 8-10' White tan sandy clay, moist to wet. 9-10' Brown clay, moist. Slight odors.
7				
8				
9				
10	0.0		13:40	10-12' Brown clay, hard. 12-12.5' Quartz. 12.5-15' Brown clay, moist/hard. No odors.
11				
12				
13				
14				
15	0.0			15-17' Brown clay, hard/low moisture. 17-19' Tan/brown clay, low moisture. 19-20' White/tan clay, low moisture. No odors. Boring terminated at 20-ft BGS.
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Triangle Service Center**  
 Location: **STA No 259+00; 200-ft LF of CL**  
 Boring Location: **B3**



Date(s) Drilled: <b>12/11/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>15'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.0			0-0.5' Topsoil. 0.5-2' Brown sandy clay. 2-5' Brown clay, slightly moist. No odors observed.
2				
3				
4				
5				
6	0.0		14:00	5-9' Dark brown clay, slightly moist. 9-10' Dark brown sandy clay, moist. Slight odor.
7				
8				
9				
10	0.0		14:05	10-15' Dark brown clay, moist. No odors. Boring terminated at 15-ft BGS.
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Triangle Service Center**  
 Location: **STA No 259+25; 75-ft LF of CL**  
 Boring Location: **B4**



Date(s) Drilled: <b>12/11/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>19'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.0		14:20	0-0.5' Topsoil. 0.5-3' Tan/orange/white sandy clay, slightly moist. 3-5' Tan/gray clay, slightly moist. No odors.
2				
3				
4				
5				
6	0.0			5-7' Tan/grey fine sandy clay, moist. 7-10' Gray/orange/clay fine sandy clay, moist. No odors.
7				
8				
9				
10				
11	0.0			10-15' Gray/orange sandy clay, moist. No odors.
12				
13				
14				
15				
16	0.0		14:30	15-19' Orange/gray/white sandy clay. No odors. Boring refusal at 19-ft BGS.
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Triangle Service Center**  
 Location: **STA No 258+50; 60-ft LF of CL**  
 Boring Location: **B5**



Date(s) Drilled: <b>12/11/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>19'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	4.9		14:40	0-0.5' Asphalt 0.5-5' Gray sandy clay, moist. Moderate odors.
2				
3				
4				
5				
6	55.0		14:50	5-9' Gray/orange sand. 9-10' Gray sandy clay. Moderate odors.
7				
8				
9				
10				
11	7.9		14:55	9-13' Gray sandy clay, moist. 13-14' Orange sandy clay, moist. 14-15' Orange sandy clay, moist. Moderate to strong odors.
12				
13				
14				
15				
16	12.3		15:10	15-17' Gray sandy gravel, moist. 17-18' Gray clay, moist. 18-19' Orange clay, moist. Moderate to low odors. Boring refusal at 19-ft BGS.
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **Triangle Service Center**  
 Location: **STA No 258+40; 125-ft LF of CL**  
 Boring Location: **B6**



Date(s) Drilled: <b>12/11/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>15'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.6		15:30	0-0.5' Asphalt. 0.5-4' Gray sandy clay, moist. 4-5' Brown sandy clay, moist. Moderate odors.
2				
3				
4				
5				
6	0.1			5-9' Brown sandy clay, moist. 9-10' White sandy clay, moist. Moderate odor.
7				
8				
9				
10				
11	1300.0		15:40	10-12' White sandy clay, moist. 12-13' Gray clay, moist. 13-15' Gray/Orange sandy clay, moist. Strong odors. Refusal at 15-ft BGS.
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

## **Appendix C: Laboratory Reports and Sample Custody Documentation**



1941 Reymet Road • Richmond, Virginia 23237 • Tel: (804)-358-8295 Fax: (804)-358-8297

## Certificate of Analysis

*Final Report*

Laboratory Order ID 18L0653

Client Name: EEE Consulting (Blacksburg, VA)  
201 Church Street  
Blacksburg, VA 24060

Date Received: December 14, 2018 16:00

Date Issued: January 3, 2019 11:38

Project Number: 18-796.01

Submitted To: Josh Hepler

Purchase Order: 18-796.01

Client Site I.D.: Triangle Service Center

Enclosed are the results of analyses for samples received by the laboratory on 12/14/2018 16:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

A handwritten signature in black ink that reads "Ted Soyars".

Ted Soyars  
Laboratory Manager

### End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.





1941 Reymet Road • Richmond, Virginia 23230 • Tel: (804)-358-8295 Fax: (804)-358-8297

## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	1/3/2019 11:38
Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

#### ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0653

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B1 5-10	18L0653-01	Soil	12/11/2018 13:00	12/14/2018 16:00
B1 10-15	18L0653-02	Soil	12/11/2018 13:05	12/14/2018 16:00
B2 5-10	18L0653-03	Soil	12/11/2018 13:30	12/14/2018 16:00
B2-10-15	18L0653-04	Soil	12/11/2018 13:40	12/14/2018 16:00
B3 5-10	18L0653-05	Soil	12/11/2018 14:00	12/14/2018 16:00
B3 10-15	18L0653-06	Soil	12/11/2018 14:05	12/14/2018 16:00
B4 0-5	18L0653-07	Soil	12/11/2018 14:20	12/14/2018 16:00
B4 15-19	18L0653-08	Soil	12/11/2018 14:30	12/14/2018 16:00
B5 0-5	18L0653-09	Soil	12/11/2018 14:40	12/14/2018 16:00
B5 5-10	18L0653-10	Soil	12/11/2018 14:50	12/14/2018 16:00
B5 10-15	18L0653-11	Soil	12/11/2018 14:55	12/14/2018 16:00
B5 15-19	18L0653-12	Soil	12/11/2018 15:10	12/14/2018 16:00
B6 0-5	18L0653-13	Soil	12/11/2018 15:30	12/14/2018 16:00
B6 10-15	18L0653-14	Soil	12/11/2018 15:40	12/14/2018 16:00
B2	18L0653-15	Ground Water	12/11/2018 16:10	12/14/2018 16:00
Trip Blank	18L0653-16	Ground Water	11/28/2018 08:14	12/14/2018 16:00

This Certificate of Analysis is being reissued on the January 1st, 2018 to include GRO data for samples -10, -12, and -14 per client request.



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. B1 5-10	Laboratory Sample ID: 18L0653-01
Grab Date/Time: 12/11/2018 13:00	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	01	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 22:21	12/20/18 22:21	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	<i>01</i>	<i>SW8015C</i>	<i>77.3 %</i>	<i>S</i>	<i>80-120</i>		<i>12/20/18 22:21</i>	<i>12/20/18 22:21</i>	<i>DFH</i>
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	01	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 12:20	12/27/18 21:55	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>01</i>	<i>SW8015C</i>	<i>73.0 %</i>		<i>40-160</i>		<i>12/20/18 12:20</i>	<i>12/27/18 21:55</i>	<i>HLM</i>



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. B1 10-15	Laboratory Sample ID: 18L0653-02
Grab Date/Time: 12/11/2018 13:05	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	02	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 22:44	12/20/18 22:44	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	02	SW8015C	94.9 %		80-120		12/20/18 22:44	12/20/18 22:44	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	02	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 12:20	12/27/18 22:20	HLM
<i>Surr: Pentacosane (Surr)</i>	02	SW8015C	74.1 %		40-160		12/20/18 12:20	12/27/18 22:20	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

**Sample I.D.** B2 5-10 **Laboratory Sample ID:** 18L0653-03

**Grab Date/Time:** 12/11/2018 13:30

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	03	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 23:06	12/20/18 23:06	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	03	SW8015C	80.0 %	S	80-120		12/20/18 23:06	12/20/18 23:06	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	03	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 12:20	12/27/18 22:45	HLM
<i>Surr: Pentacosane (Surr)</i>	03	SW8015C	72.5 %		40-160		12/20/18 12:20	12/27/18 22:45	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

**Sample I.D.** B2-10-15 **Laboratory Sample ID:** 18L0653-04

**Grab Date/Time:** 12/11/2018 13:40

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	04	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 11:48	12/20/18 11:48	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	<i>04</i>	<i>SW8015C</i>	<i>95.4 %</i>		<i>80-120</i>		<i>12/20/18 11:48</i>	<i>12/20/18 11:48</i>	<i>DFH</i>
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	04	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 12:20	12/27/18 23:10	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>04</i>	<i>SW8015C</i>	<i>74.9 %</i>		<i>40-160</i>		<i>12/20/18 12:20</i>	<i>12/27/18 23:10</i>	<i>HLM</i>



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

**Sample I.D.** B3 5-10 **Laboratory Sample ID:** 18L0653-05

**Grab Date/Time:** 12/11/2018 14:00

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	05	SW8015C	<0.10 mg/kg		0.10	1	12/19/18 12:44	12/19/18 12:44	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	<i>05</i>	<i>SW8015C</i>	<i>102 %</i>		<i>80-120</i>		<i>12/19/18 12:44</i>	<i>12/19/18 12:44</i>	<i>DFH</i>
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	05	SW8015C	10.9 mg/kg		10.0	1	12/20/18 10:05	12/27/18 15:41	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>05</i>	<i>SW8015C</i>	<i>71.1 %</i>		<i>40-160</i>		<i>12/20/18 10:05</i>	<i>12/27/18 15:41</i>	<i>HLM</i>



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## Certificate of Analysis

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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. B3 10-15	Laboratory Sample ID: 18L0653-06
Grab Date/Time: 12/11/2018 14:05	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	06	SW8015C	<0.10 mg/kg		0.10	1	12/19/18 13:06	12/19/18 13:06	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	<i>06</i>	<i>SW8015C</i>	<i>98.2 %</i>		<i>80-120</i>		<i>12/19/18 13:06</i>	<i>12/19/18 13:06</i>	<i>DFH</i>
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	06	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 10:05	12/27/18 16:06	HLM
<i>Surr: Pentacosane (Surr)</i>	<i>06</i>	<i>SW8015C</i>	<i>71.3 %</i>		<i>40-160</i>		<i>12/20/18 10:05</i>	<i>12/27/18 16:06</i>	<i>HLM</i>



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## Certificate of Analysis

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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

<b>Sample I.D.</b> B4 0-5	<b>Laboratory Sample ID:</b> 18L0653-07
<b>Grab Date/Time:</b> 12/11/2018 14:20	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	07	SW8015C	<0.10 mg/kg		0.10	1	12/19/18 13:29	12/19/18 13:29	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	07	SW8015C	109 %		80-120		12/19/18 13:29	12/19/18 13:29	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 10:05	12/27/18 16:31	HLM
<i>Surr: Pentacosane (Surr)</i>	07	SW8015C	66.4 %		40-160		12/20/18 10:05	12/27/18 16:31	HLM
TPH-Semi-Volatiles (ORO)	07	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 09:10	12/19/18 23:07	HLM



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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

**Sample I.D.** B4 15-19 **Laboratory Sample ID:** 18L0653-08

**Grab Date/Time:** 12/11/2018 14:30

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	08	SW8015C	<0.10 mg/kg		0.10	1	12/19/18 13:51	12/19/18 13:51	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	08	SW8015C	111 %		80-120		12/19/18 13:51	12/19/18 13:51	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 10:05	12/27/18 16:56	HLM
<i>Surr: Pentacosane (Surr)</i>	08	SW8015C	68.9 %		40-160		12/20/18 10:05	12/27/18 16:56	HLM
TPH-Semi-Volatiles (ORO)	08	SW8015C	<10.0 mg/kg		10.0	1	12/19/18 09:10	12/19/18 23:32	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. B5 0-5	Laboratory Sample ID: 18L0653-09
Grab Date/Time: 12/11/2018 14:40	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
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**Volatile Hydrocarbons by GC**

TPH-Volatiles (GRO)	09	SW8015C	<0.10 mg/kg		0.10	1	12/19/18 14:14	12/19/18 14:14	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	09	SW8015C	115 %		80-120		12/19/18 14:14	12/19/18 14:14	DFH

**Semivolatile Hydrocarbons by GC**

TPH-Semi-Volatiles (DRO)	09	SW8015C	32.9 mg/kg		10.0	1	12/20/18 10:05	12/27/18 17:21	HLM
Surr: Pentacosane (Surr)	09	SW8015C	78.1 %		40-160		12/20/18 10:05	12/27/18 17:21	HLM



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## Certificate of Analysis

### Final Report

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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. B5 5-10	Laboratory Sample ID: 18L0653-10
Grab Date/Time: 12/11/2018 14:50	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	10	SW8021B	<5.00 ug/kg		5.00	1	12/19/18 15:01	12/19/18 15:01	DFH
Toluene	10	SW8021B	<5.00 ug/kg		5.00	1	12/19/18 15:01	12/19/18 15:01	DFH
Ethylbenzene	10	SW8021B	<5.00 ug/kg		5.00	1	12/19/18 15:01	12/19/18 15:01	DFH
m+p-Xylenes	10	SW8021B	<10.0 ug/kg		10.0	1	12/19/18 15:01	12/19/18 15:01	DFH
o-Xylene	10	SW8021B	<5.00 ug/kg		5.00	1	12/19/18 15:01	12/19/18 15:01	DFH
Xylenes, Total	10	SW8021B	<15.0 ug/kg		15.0	1	12/19/18 15:01	12/19/18 15:01	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	10	SW8021B	127 %	S	80-120		12/19/18 15:01	12/19/18 15:01	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	10	SW8015C	0.11 mg/kg		0.10	1	12/19/18 15:01	12/19/18 15:01	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	10	SW8015C	162 %	S	80-120		12/19/18 15:01	12/19/18 15:01	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	10	SW8015C	20.7 mg/kg		10.0	1	12/20/18 10:05	12/27/18 17:46	HLM
<hr style="border-top: 1px dashed black;"/>									
Surr: Pentacosane (Surr)	10	SW8015C	71.6 %		40-160		12/20/18 10:05	12/27/18 17:46	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. B5 10-15	Laboratory Sample ID: 18L0653-11
Grab Date/Time: 12/11/2018 14:55	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	11	SW8015C	<0.10 mg/kg		0.10	1	12/19/18 15:34	12/19/18 15:34	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	11	SW8015C	127 %	S	80-120		12/19/18 15:34	12/19/18 15:34	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	11	SW8015C	<10.0 mg/kg		10.0	1	12/20/18 10:05	12/27/18 18:11	HLM
<i>Surr: Pentacosane (Surr)</i>	11	SW8015C	72.7 %		40-160		12/20/18 10:05	12/27/18 18:11	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. B5 15-19	Laboratory Sample ID: 18L0653-12
Grab Date/Time: 12/11/2018 15:10	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	12	SW8021B	9.35 ug/kg		5.00	1	12/19/18 16:08	12/19/18 16:08	DFH
Toluene	12	SW8021B	9.73 ug/kg		5.00	1	12/19/18 16:08	12/19/18 16:08	DFH
Ethylbenzene	12	SW8021B	20.0 ug/kg		5.00	1	12/19/18 16:08	12/19/18 16:08	DFH
m+p-Xylenes	12	SW8021B	45.5 ug/kg		10.0	1	12/19/18 16:08	12/19/18 16:08	DFH
o-Xylene	12	SW8021B	59.2 ug/kg		5.00	1	12/19/18 16:08	12/19/18 16:08	DFH
Xylenes, Total	12	SW8021B	105 ug/kg		15.0	1	12/19/18 16:08	12/19/18 16:08	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	12	SW8021B	103 %		80-120		12/19/18 16:08	12/19/18 16:08	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	12	SW8015C	0.64 mg/kg		0.30	1	12/19/18 16:08	12/19/18 16:08	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	12	SW8015C	105 %		80-120		12/19/18 16:08	12/19/18 16:08	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	12	SW8015C	21.1 mg/kg		10.0	1	12/20/18 10:05	12/27/18 18:36	HLM
Surr: Pentacosane (Surr)	12	SW8015C	73.1 %		40-160		12/20/18 10:05	12/27/18 18:36	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

**Sample I.D.** B6 0-5 **Laboratory Sample ID:** 18L0653-13

**Grab Date/Time:** 12/11/2018 15:30

**Field Residual Cl:** **Field pH:**

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	13	SW8015C	<0.10 mg/kg		0.10	1	12/19/18 14:39	12/19/18 14:39	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	13	SW8015C	78.3 %	S	80-120		12/19/18 14:39	12/19/18 14:39	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	13	SW8015C	37.4 mg/kg		10.0	1	12/20/18 10:05	12/27/18 19:01	HLM
<i>Surr: Pentacosane (Surr)</i>	13	SW8015C	70.7 %		40-160		12/20/18 10:05	12/27/18 19:01	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

<b>Sample I.D.</b> B6 10-15	<b>Laboratory Sample ID:</b> 18L0653-14
<b>Grab Date/Time:</b> 12/11/2018 15:40	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	14	SW8021B	<500 ug/kg		500	100	12/19/18 22:32	12/19/18 22:32	DFH
Toluene	14	SW8021B	<b>6220 ug/kg</b>		500	100	12/19/18 22:32	12/19/18 22:32	DFH
Ethylbenzene	14	SW8021B	<b>15700 ug/kg</b>		500	100	12/19/18 22:32	12/19/18 22:32	DFH
m+p-Xylenes	14	SW8021B	<b>53100 ug/kg</b>		1000	100	12/19/18 22:32	12/19/18 22:32	DFH
o-Xylene	14	SW8021B	<b>23400 ug/kg</b>		500	100	12/19/18 22:32	12/19/18 22:32	DFH
Xylenes, Total	14	SW8021B	<b>76500 ug/kg</b>		1500	100	12/19/18 22:32	12/19/18 22:32	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	14	SW8021B	96.2 %		80-120		12/19/18 22:32	12/19/18 22:32	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	14	SW8015C	<b>413 mg/kg</b>		9.98	100	12/19/18 22:32	12/19/18 22:32	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	14	SW8015C	107 %		80-120		12/19/18 22:32	12/19/18 22:32	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	14	SW8015C	<b>51.6 mg/kg</b>		10.0	1	12/20/18 10:05	12/27/18 19:26	HLM
<hr style="border-top: 1px dashed black;"/>									
Surr: Pentacosane (Surr)	14	SW8015C	68.6 %		40-160		12/20/18 10:05	12/27/18 19:26	HLM



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

<b>Sample I.D.</b> B2	<b>Laboratory Sample ID:</b> 18L0653-15
<b>Grab Date/Time:</b> 12/11/2018 16:10	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	15	SW8021B	<1.00 ug/L		1.00	1	12/19/18 18:14	12/19/18 18:14	DFH
Toluene	15	SW8021B	<1.00 ug/L		1.00	1	12/19/18 18:14	12/19/18 18:14	DFH
Ethylbenzene	15	SW8021B	<1.00 ug/L		1.00	1	12/19/18 18:14	12/19/18 18:14	DFH
m+p-Xylenes	15	SW8021B	<4.00 ug/L		4.00	1	12/19/18 18:14	12/19/18 18:14	DFH
o-Xylene	15	SW8021B	<2.00 ug/L		2.00	1	12/19/18 18:14	12/19/18 18:14	DFH
Xylenes, Total	15	SW8021B	<6.00 ug/L		6.00	1	12/19/18 18:14	12/19/18 18:14	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	15	SW8021B	83.4 %		80-120		12/19/18 18:14	12/19/18 18:14	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	15	SW8021B	96.8 %		80-120		12/19/18 18:14	12/19/18 18:14	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	15	SW8015C	<0.10 mg/L		0.10	1	12/19/18 18:14	12/19/18 18:14	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	15	SW8015C	96.8 %		80-120		12/19/18 18:14	12/19/18 18:14	DFH
<b>Semivolatile Hydrocarbons by GC</b>									
TPH-Semi-Volatiles (DRO)	15	SW8015C	<0.562 mg/L		0.562	1	12/18/18 14:45	12/19/18 20:16	HLM
<hr style="border-top: 1px dashed black;"/>									
Surr: Pentacosane (Surr)	15	SW8015C	84.2 %		65-125		12/18/18 14:45	12/19/18 20:16	HLM



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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

**Laboratory Order ID: 18L0653**

**Analytical Results**

Sample I.D. Trip Blank	Laboratory Sample ID: 18L0653-16
Grab Date/Time: 11/28/2018 08:14	Field pH:

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	16	SW8021B	<1.00 ug/L		1.00	1	12/19/18 18:36	12/19/18 18:36	DFH
Toluene	16	SW8021B	<1.00 ug/L		1.00	1	12/19/18 18:36	12/19/18 18:36	DFH
Ethylbenzene	16	SW8021B	<1.00 ug/L		1.00	1	12/19/18 18:36	12/19/18 18:36	DFH
m+p-Xylenes	16	SW8021B	<4.00 ug/L		4.00	1	12/19/18 18:36	12/19/18 18:36	DFH
o-Xylene	16	SW8021B	<2.00 ug/L		2.00	1	12/19/18 18:36	12/19/18 18:36	DFH
Xylenes, Total	16	SW8021B	<6.00 ug/L		6.00	1	12/19/18 18:36	12/19/18 18:36	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	16	SW8021B	83.3 %		80-120		12/19/18 18:36	12/19/18 18:36	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	16	SW8021B	96.5 %		80-120		12/19/18 18:36	12/19/18 18:36	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	16	SW8015C	<0.10 mg/L		0.10	1	12/19/18 18:36	12/19/18 18:36	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	16	SW8015C	96.5 %		80-120		12/19/18 18:36	12/19/18 18:36	DFH



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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

### Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID		
<b>Semivolatile Hydrocarbons by GC</b>		<b>Preparation Method: SW3510C</b>					
18L0653-15	890 mL / 1.00 mL	SW8015C	BBL0540	SBL0564	AK80055		
<b>Semivolatile Hydrocarbons by GC</b>		<b>Preparation Method: SW3550C</b>					
18L0653-07	50.6 g / 1.00 mL	SW8015C	BBL0554	SBL0561	AH80136		
18L0653-08	50.6 g / 1.00 mL	SW8015C	BBL0554	SBL0561	AH80136		
<b>Semivolatile Hydrocarbons by GC</b>		<b>Preparation Method: SW3550C</b>					
18L0653-05	50.6 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-06	50.8 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-07	50.1 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-08	50.6 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-09	50.1 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-10	50.1 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-11	50.1 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-12	50.1 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-13	50.6 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
18L0653-14	50.6 g / 1.00 mL	SW8015C	BBL0603	SBL0691	AI80039		
<b>Semivolatile Hydrocarbons by GC</b>		<b>Preparation Method: SW3550C</b>					
18L0653-01	50.2 g / 1.00 mL	SW8015C	BBL0618	SBL0713	AI80039		
18L0653-02	50.3 g / 1.00 mL	SW8015C	BBL0618	SBL0713	AI80039		
18L0653-03	50.1 g / 1.00 mL	SW8015C	BBL0618	SBL0713	AI80039		
18L0653-04	50.3 g / 1.00 mL	SW8015C	BBL0618	SBL0713	AI80039		
<b>Sample ID</b>		<b>Preparation Factors Initial / Final</b>		<b>Method</b>	<b>Batch ID</b>	<b>Sequence ID</b>	<b>Calibration ID</b>
<b>Volatile Hydrocarbons by GC</b>		<b>Preparation Method: SW5030B</b>					
18L0653-05	5.01 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042		
18L0653-06	5.05 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042		
18L0653-07	5.04 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042		
18L0653-08	5.01 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042		



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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
18L0653-09	5.03 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042
18L0653-10	5.05 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042
18L0653-11	5.01 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042
18L0653-12	1.69 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042
18L0653-13	5.04 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042
18L0653-14	5.01 g / 5.00 mL	SW8015C	BBL0560	SBL0553	AK80042
18L0653-10	5.05 g / 5.00 mL	SW8021B	BBL0560	SBL0553	AK80042
18L0653-12	1.69 g / 5.00 mL	SW8021B	BBL0560	SBL0553	AK80042
18L0653-14	5.01 g / 5.00 mL	SW8021B	BBL0560	SBL0553	AK80042
<b>Volatile Hydrocarbons by GC</b>		<b>Preparation Method: SW5030B</b>			
18L0653-15	5.00 mL / 5.00 mL	SW8015C	BBL0587	SBL0554	AK80015
18L0653-16	5.00 mL / 5.00 mL	SW8015C	BBL0587	SBL0554	AK80015
18L0653-15	5.00 mL / 5.00 mL	SW8021B	BBL0587	SBL0554	AK80015
18L0653-16	5.00 mL / 5.00 mL	SW8021B	BBL0587	SBL0554	AK80015
<b>Volatile Hydrocarbons by GC</b>		<b>Preparation Method: SW5030B</b>			
18L0653-01	5.05 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0653-02	5.05 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0653-03	5.04 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0653-04	5.09 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015



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### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
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**Batch BBL0560 - SW5030B**

**Blank (BBL0560-BLK1)**

Prepared & Analyzed: 12/19/2018

Benzene	<5.00 ug/kg	5.00	ug/kg						
Benzene	<5.00 ug/kg	5.00	ug/kg						
Benzene	<5.00 ug/kg	5.00	ug/kg						
Benzene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	106		ug/L	100		106	80-120		
Surr: 2,5-Dibromotoluene (Surr PID)	106		ug/L	100		106	80-120		
Surr: 2,5-Dibromotoluene (Surr PID)	106		ug/L	100		106	80-120		
Surr: 2,5-Dibromotoluene (Surr PID)	106		ug/L	100		106	80-120		



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Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0560 - SW5030B

#### LCS (BBL0560-BS1)

Prepared & Analyzed: 12/19/2018

Benzene	98.1 ug/kg	5.00	ug/kg	100	ug/kg	98.1	70-130			
Benzene	98.1 ug/kg	5.00	ug/kg	100	ug/kg	98.1	70-130			
Benzene	98.1 ug/kg	5.00	ug/kg	100	ug/kg	98.1	70-130			
Benzene	98.1 ug/kg	5.00	ug/kg	100	ug/kg	98.1	70-130			
Toluene	105 ug/kg	5.00	ug/kg	100	ug/kg	105	70-130			
Toluene	105 ug/kg	5.00	ug/kg	100	ug/kg	105	70-130			
Toluene	105 ug/kg	5.00	ug/kg	100	ug/kg	105	70-130			
Toluene	105 ug/kg	5.00	ug/kg	100	ug/kg	105	70-130			
Ethylbenzene	102 ug/kg	5.00	ug/kg	100	ug/kg	102	70-130			
Ethylbenzene	102 ug/kg	5.00	ug/kg	100	ug/kg	102	70-130			
Ethylbenzene	102 ug/kg	5.00	ug/kg	100	ug/kg	102	70-130			
Ethylbenzene	102 ug/kg	5.00	ug/kg	100	ug/kg	102	70-130			
m+p-Xylenes	214 ug/kg	10.0	ug/kg	200	ug/kg	107	70-130			
m+p-Xylenes	214 ug/kg	10.0	ug/kg	200	ug/kg	107	70-130			
m+p-Xylenes	214 ug/kg	10.0	ug/kg	200	ug/kg	107	70-130			
m+p-Xylenes	214 ug/kg	10.0	ug/kg	200	ug/kg	107	70-130			
o-Xylene	111 ug/kg	5.00	ug/kg	100	ug/kg	111	70-130			
o-Xylene	111 ug/kg	5.00	ug/kg	100	ug/kg	111	70-130			
o-Xylene	111 ug/kg	5.00	ug/kg	100	ug/kg	111	70-130			
o-Xylene	111 ug/kg	5.00	ug/kg	100	ug/kg	111	70-130			
Xylenes, Total	325 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	325 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	325 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	325 ug/kg	15.0	ug/kg		ug/kg		70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	104		ug/L	100	ug/L	104	80-120			



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Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0560 - SW5030B

#### Matrix Spike (BBL0560-MS1)

Source: 18L0653-05

Prepared & Analyzed: 12/19/2018

Benzene	95.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	95.8	70-130			
Benzene	95.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	95.8	70-130			
Benzene	95.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	95.8	70-130			
Benzene	95.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	95.8	70-130			
Toluene	102 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	102	70-130			
Toluene	102 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	102	70-130			
Toluene	102 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	102	70-130			
Toluene	102 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	102	70-130			
Ethylbenzene	98.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	98.8	70-130			
Ethylbenzene	98.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	98.8	70-130			
Ethylbenzene	98.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	98.8	70-130			
Ethylbenzene	98.8 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	98.8	70-130			
m+p-Xylenes	206 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	103	70-130			
m+p-Xylenes	206 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	103	70-130			
m+p-Xylenes	206 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	103	70-130			
m+p-Xylenes	206 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	103	70-130			
o-Xylene	107 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	107	70-130			
o-Xylene	107 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	107	70-130			
o-Xylene	107 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	107	70-130			
o-Xylene	107 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	107	70-130			
Xylenes, Total	312 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	312 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	312 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	312 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	99.3		ug/L	100	ug/L	99.3	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	99.3		ug/L	100	ug/L	99.3	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	99.3		ug/L	100	ug/L	99.3	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	99.3		ug/L	100	ug/L	99.3	80-120			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	1/3/2019 11:38
Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0560 - SW5030B

#### Matrix Spike Dup (BBL0560-MSD1)

Source: 18L0653-05

Prepared & Analyzed: 12/19/2018

Benzene	90.9 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	90.9	70-130	5.24	20	
Benzene	90.9 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	90.9	70-130	5.24	20	
Benzene	90.9 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	90.9	70-130	5.24	20	
Benzene	90.9 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	90.9	70-130	5.24	20	
Toluene	96.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	96.4	70-130	5.98	20	
Toluene	96.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	96.4	70-130	5.98	20	
Toluene	96.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	96.4	70-130	5.98	20	
Toluene	96.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	96.4	70-130	5.98	20	
Ethylbenzene	92.0 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	92.0	70-130	7.13	20	
Ethylbenzene	92.0 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	92.0	70-130	7.13	20	
Ethylbenzene	92.0 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	92.0	70-130	7.13	20	
Ethylbenzene	92.0 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	92.0	70-130	7.13	20	
m+p-Xylenes	191 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	95.3	70-130	7.60	20	
m+p-Xylenes	191 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	95.3	70-130	7.60	20	
m+p-Xylenes	191 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	95.3	70-130	7.60	20	
m+p-Xylenes	191 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	95.3	70-130	7.60	20	
o-Xylene	99.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	99.6	70-130	6.97	20	
o-Xylene	99.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	99.6	70-130	6.97	20	
o-Xylene	99.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	99.6	70-130	6.97	20	
o-Xylene	99.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	99.6	70-130	6.97	20	
Xylenes, Total	290 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	7.38	20	
Xylenes, Total	290 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	7.38	20	
Xylenes, Total	290 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	7.38	20	
Xylenes, Total	290 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	7.38	20	

Surr: 2,5-Dibromotoluene (Surr PID)	97.2		ug/L	100	ug/L	97.2	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	97.2		ug/L	100	ug/L	97.2	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	97.2		ug/L	100	ug/L	97.2	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	97.2		ug/L	100	ug/L	97.2	80-120			



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Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0587 - SW5030B

##### Blank (BBL0587-BLK1)

Prepared & Analyzed: 12/19/2018

Benzene	<1.00 ug/L	1.00	ug/L							
Benzene	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
m+p-Xylenes	<4.00 ug/L	4.00	ug/L							
m+p-Xylenes	<4.00 ug/L	4.00	ug/L							
o-Xylene	<2.00 ug/L	2.00	ug/L							
o-Xylene	<2.00 ug/L	2.00	ug/L							
Xylenes, Total	<6.00 ug/L	6.00	ug/L							
Xylenes, Total	<6.00 ug/L	6.00	ug/L							
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	82.3		ug/L	100		82.3	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	82.3		ug/L	100		82.3	80-120			

##### LCS (BBL0587-BS1)

Prepared & Analyzed: 12/19/2018

Benzene	90.9 ug/L	1.00	ug/L	100	ug/L	90.9	70-130			
Benzene	90.9 ug/L	1.00	ug/L	100	ug/L	90.9	70-130			
Toluene	94.2 ug/L	1.00	ug/L	100	ug/L	94.2	70-130			
Toluene	94.2 ug/L	1.00	ug/L	100	ug/L	94.2	70-130			
Ethylbenzene	92.8 ug/L	1.00	ug/L	100	ug/L	92.8	70-130			
Ethylbenzene	92.8 ug/L	1.00	ug/L	100	ug/L	92.8	70-130			
m+p-Xylenes	194 ug/L	4.00	ug/L	200	ug/L	96.9	70-130			
m+p-Xylenes	194 ug/L	4.00	ug/L	200	ug/L	96.9	70-130			
o-Xylene	101 ug/L	2.00	ug/L	100	ug/L	101	70-130			
o-Xylene	101 ug/L	2.00	ug/L	100	ug/L	101	70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	85.1		ug/L	100	ug/L	85.1	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	85.1		ug/L	100	ug/L	85.1	80-120			



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Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0587 - SW5030B

##### Matrix Spike (BBL0587-MS1)

Source: 18L0775-01

Prepared & Analyzed: 12/19/2018

Benzene	90.6 ug/L	1.00	ug/L	100	<1.00 ug/L	90.6	70-130			
Benzene	90.6 ug/L	1.00	ug/L	100	<1.00 ug/L	90.6	70-130			
Toluene	94.0 ug/L	1.00	ug/L	100	<1.00 ug/L	94.0	70-130			
Toluene	94.0 ug/L	1.00	ug/L	100	<1.00 ug/L	94.0	70-130			
Ethylbenzene	92.3 ug/L	1.00	ug/L	100	<1.00 ug/L	92.3	70-130			
Ethylbenzene	92.3 ug/L	1.00	ug/L	100	<1.00 ug/L	92.3	70-130			
m+p-Xylenes	193 ug/L	4.00	ug/L	200	<4.00 ug/L	96.3	70-130			
m+p-Xylenes	193 ug/L	4.00	ug/L	200	<4.00 ug/L	96.3	70-130			
o-Xylene	101 ug/L	2.00	ug/L	100	<2.00 ug/L	101	70-130			
o-Xylene	101 ug/L	2.00	ug/L	100	<2.00 ug/L	101	70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	84.9		ug/L	100	ug/L	84.9	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	84.9		ug/L	100	ug/L	84.9	80-120			

##### Matrix Spike Dup (BBL0587-MSD1)

Source: 18L0775-01

Prepared & Analyzed: 12/19/2018

Benzene	89.0 ug/L	1.00	ug/L	100	<1.00 ug/L	89.0	70-130	1.82	20	
Benzene	89.0 ug/L	1.00	ug/L	100	<1.00 ug/L	89.0	70-130	1.82	20	
Toluene	92.3 ug/L	1.00	ug/L	100	<1.00 ug/L	92.3	70-130	1.89	20	
Toluene	92.3 ug/L	1.00	ug/L	100	<1.00 ug/L	92.3	70-130	1.89	20	
Ethylbenzene	91.0 ug/L	1.00	ug/L	100	<1.00 ug/L	91.0	70-130	1.46	20	
Ethylbenzene	91.0 ug/L	1.00	ug/L	100	<1.00 ug/L	91.0	70-130	1.46	20	
m+p-Xylenes	190 ug/L	4.00	ug/L	200	<4.00 ug/L	94.8	70-130	1.54	20	
m+p-Xylenes	190 ug/L	4.00	ug/L	200	<4.00 ug/L	94.8	70-130	1.54	20	
o-Xylene	99.4 ug/L	2.00	ug/L	100	<2.00 ug/L	99.4	70-130	1.51	20	
o-Xylene	99.4 ug/L	2.00	ug/L	100	<2.00 ug/L	99.4	70-130	1.51	20	
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	83.4		ug/L	100	ug/L	83.4	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	83.4		ug/L	100	ug/L	83.4	80-120			



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Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC %REC Limits	RPD RPD	Limit	Qual
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#### Batch BBL0560 - SW5030B

##### Blank (BBL0560-BLK1)

Prepared & Analyzed: 12/19/2018

TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg						
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		
Surr: 2,5-Dibromotoluene (Surr FID)	110		ug/L	100		110	80-120		

##### LCS (BBL0560-BS1)

Prepared & Analyzed: 12/19/2018

TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		
TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130		



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### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0560 - SW5030B

##### LCS (BBL0560-BS1)

Prepared & Analyzed: 12/19/2018

TPH-Volatiles (GRO)	0.99 mg/kg	0.10	mg/kg	1.00	mg/kg	99.2	70-130			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	103		ug/L	100	ug/L	103	80-120			

##### Matrix Spike (BBL0560-MS1)

Source: 18L0653-05

Prepared & Analyzed: 12/19/2018

TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
TPH-Volatiles (GRO)	0.95 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	94.6	70-130			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>	101		ug/L	100	ug/L	101	80-120			





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### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0587 - SW5030B

##### Blank (BBL0587-BLK1)

Prepared & Analyzed: 12/19/2018

Surr: 2,5-Dibromotoluene (Surr FID)	98.8	ug/L	100	98.8	80-120
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##### LCS (BBL0587-BS1)

Prepared & Analyzed: 12/19/2018

TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	mg/L	99.5	70-130
TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	mg/L	99.5	70-130
Surr: 2,5-Dibromotoluene (Surr FID)	102	ug/L	100	ug/L	102	80-120	
Surr: 2,5-Dibromotoluene (Surr FID)	102	ug/L	100	ug/L	102	80-120	

##### Matrix Spike (BBL0587-MS1)

Source: 18L0775-01

Prepared & Analyzed: 12/19/2018

TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	<0.10 mg/L	100	70-130
TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	<0.10 mg/L	100	70-130
Surr: 2,5-Dibromotoluene (Surr FID)	99.2	ug/L	100	ug/L	99.2	80-120	
Surr: 2,5-Dibromotoluene (Surr FID)	99.2	ug/L	100	ug/L	99.2	80-120	

##### Matrix Spike Dup (BBL0587-MSD1)

Source: 18L0775-01

Prepared & Analyzed: 12/19/2018

TPH-Volatiles (GRO)	0.99 mg/L	0.10	mg/L	1.00	<0.10 mg/L	98.8	70-130	1.34	20
TPH-Volatiles (GRO)	0.99 mg/L	0.10	mg/L	1.00	<0.10 mg/L	98.8	70-130	1.34	20
Surr: 2,5-Dibromotoluene (Surr FID)	94.6	ug/L	100	ug/L	94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6	ug/L	100	ug/L	94.6	80-120			

#### Batch BBL0617 - SW5030B

##### Blank (BBL0617-BLK1)

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg			
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg			
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg			
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg			
Surr: 2,5-Dibromotoluene (Surr FID)	95.9	ug/L	100	ug/L	95.9	80-120
Surr: 2,5-Dibromotoluene (Surr FID)	95.9	ug/L	100	ug/L	95.9	80-120
Surr: 2,5-Dibromotoluene (Surr FID)	95.9	ug/L	100	ug/L	95.9	80-120
Surr: 2,5-Dibromotoluene (Surr FID)	95.9	ug/L	100	ug/L	95.9	80-120



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0617 - SW5030B

##### LCS (BBL0617-BS1)

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			

##### Matrix Spike (BBL0617-MS1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120			S
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120			S
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120			S
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120			S

##### Matrix Spike Dup (BBL0617-MSD1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0540 - SW3510C

##### Blank (BBL0540-BLK1)

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	<0.500 mg/L	0.500	mg/L							
Surr: Pentacosane (Surr)	0.213		mg/L	0.252		84.6	65-125			

##### LCS (BBL0540-BS1)

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	4.6 mg/L	0.500	mg/L	5.00	mg/L	92.2	65-110			
Surr: Pentacosane (Surr)	0.262		mg/L	0.252	mg/L	104	65-125			

##### Matrix Spike (BBL0540-MS1)

Source: 18L0619-02

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.521	mg/L	5.21	<0.521 mg/L	94.6	40-110			
Surr: Pentacosane (Surr)	0.298		mg/L	0.262	mg/L	113	65-125			

##### Matrix Spike Dup (BBL0540-MSD1)

Source: 18L0619-02

Prepared: 12/18/2018 Analyzed: 12/19/2018

TPH-Semi-Volatiles (DRO)	4.9 mg/L	0.515	mg/L	5.15	<0.515 mg/L	94.8	40-110	0.784	20	
Surr: Pentacosane (Surr)	0.294		mg/L	0.260	mg/L	113	65-125			

#### Batch BBL0554 - SW3550C

##### Blank (BBL0554-BLK1)

Prepared & Analyzed: 12/19/2018

TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (ORO)	<10.0 mg/kg	10.0	mg/kg							

##### LCS (BBL0554-BS1)

Prepared & Analyzed: 12/19/2018

TPH-Semi-Volatiles (ORO)	55.2 mg/kg	10.0	mg/kg	100	mg/kg	55.2	40-160			
TPH-Semi-Volatiles (ORO)	55.2 mg/kg	10.0	mg/kg	100	mg/kg	55.2	40-160			

##### Matrix Spike (BBL0554-MS1)

Source: 18L0372-09

Prepared & Analyzed: 12/19/2018

TPH-Semi-Volatiles (ORO)	255 mg/kg	100	mg/kg	100	183 mg/kg	72.2	40-160			
TPH-Semi-Volatiles (ORO)	255 mg/kg	100	mg/kg	100	183 mg/kg	72.2	40-160			





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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	1/3/2019 11:38
Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0603 - SW3550C

##### LCS (BBL0603-BS1)

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
TPH-Semi-Volatiles (DRO)	78.5 mg/kg	10.0	mg/kg	99.8	mg/kg	78.7	40-160			
<hr style="border-top: 1px dashed black;"/>										
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			
Surr: Pentacosane (Surr)	3.43		mg/kg	5.03	mg/kg	68.2	40-160			

##### Matrix Spike (BBL0603-MS1)

Source: 18L0724-10

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	1/3/2019 11:38
Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0603 - SW3550C

##### Matrix Spike (BBL0603-MS1)

Source: 18L0724-10

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	74.5 mg/kg	10.0	mg/kg	100	<10.0 mg/kg	74.5	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			
<i>Surr: Pentacosane (Surr)</i>	3.16		mg/kg	5.04	mg/kg	62.8	40-160			

##### Matrix Spike Dup (BBL0603-MSD1)

Source: 18L0724-10

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
TPH-Semi-Volatiles (DRO)	72.4 mg/kg	10.0	mg/kg	99.2	<10.0 mg/kg	73.0	40-160	2.93	20	
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
<i>Surr: Pentacosane (Surr)</i>	2.93		mg/kg	5.00	mg/kg	58.6	40-160			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0603 - SW3550C

##### Matrix Spike Dup (BBL0603-MSD1)

Source: 18L0724-10

Prepared: 12/20/2018 Analyzed: 12/27/2018

Surr: Pentacosane (Surr)	2.93		mg/kg	5.00	mg/kg	58.6	40-160			
Surr: Pentacosane (Surr)	2.93		mg/kg	5.00	mg/kg	58.6	40-160			

#### Batch BBL0618 - SW3550C

##### Blank (BBL0618-BLK1)

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
TPH-Semi-Volatiles (DRO)	<10.0 mg/kg	10.0	mg/kg							
Surr: Pentacosane (Surr)	3.60		mg/kg	4.96		72.5	40-160			
Surr: Pentacosane (Surr)	3.60		mg/kg	4.96		72.5	40-160			
Surr: Pentacosane (Surr)	3.60		mg/kg	4.96		72.5	40-160			
Surr: Pentacosane (Surr)	3.60		mg/kg	4.96		72.5	40-160			

##### LCS (BBL0618-BS1)

Prepared: 12/20/2018 Analyzed: 12/27/2018

TPH-Semi-Volatiles (DRO)	76.5 mg/kg	10.0	mg/kg	98.4	mg/kg	77.7	40-160			
TPH-Semi-Volatiles (DRO)	76.5 mg/kg	10.0	mg/kg	98.4	mg/kg	77.7	40-160			
TPH-Semi-Volatiles (DRO)	76.5 mg/kg	10.0	mg/kg	98.4	mg/kg	77.7	40-160			
TPH-Semi-Volatiles (DRO)	76.5 mg/kg	10.0	mg/kg	98.4	mg/kg	77.7	40-160			
Surr: Pentacosane (Surr)	3.30		mg/kg	4.96	mg/kg	66.4	40-160			
Surr: Pentacosane (Surr)	3.30		mg/kg	4.96	mg/kg	66.4	40-160			
Surr: Pentacosane (Surr)	3.30		mg/kg	4.96	mg/kg	66.4	40-160			
Surr: Pentacosane (Surr)	3.30		mg/kg	4.96	mg/kg	66.4	40-160			

##### Matrix Spike (BBL0618-MS1)

Source: 18L0803-01

Prepared: 12/20/2018 Analyzed: 12/28/2018

TPH-Semi-Volatiles (DRO)	90.6 mg/kg	49.5	mg/kg	99.0	50.9 mg/kg	40.2	40-160			
TPH-Semi-Volatiles (DRO)	90.6 mg/kg	49.5	mg/kg	99.0	50.9 mg/kg	40.2	40-160			
TPH-Semi-Volatiles (DRO)	90.6 mg/kg	49.5	mg/kg	99.0	50.9 mg/kg	40.2	40-160			
TPH-Semi-Volatiles (DRO)	90.6 mg/kg	49.5	mg/kg	99.0	50.9 mg/kg	40.2	40-160			
Surr: Pentacosane (Surr)	1.77		mg/kg	4.99	mg/kg	35.4	40-160			S



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Semivolatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0618 - SW3550C

##### Matrix Spike (BBL0618-MS1)

Source: 18L0803-01

Prepared: 12/20/2018 Analyzed: 12/28/2018

Surr: Pentacosane (Surr)	1.77		mg/kg	4.99	mg/kg	35.4	40-160			S
Surr: Pentacosane (Surr)	1.77		mg/kg	4.99	mg/kg	35.4	40-160			S
Surr: Pentacosane (Surr)	1.77		mg/kg	4.99	mg/kg	35.4	40-160			S

##### Matrix Spike Dup (BBL0618-MSD1)

Source: 18L0803-01

Prepared: 12/20/2018 Analyzed: 12/28/2018

TPH-Semi-Volatiles (DRO)	168 mg/kg	49.2	mg/kg	98.4	50.9 mg/kg	119	40-160	60.0	20	P
TPH-Semi-Volatiles (DRO)	168 mg/kg	49.2	mg/kg	98.4	50.9 mg/kg	119	40-160	60.0	20	P
TPH-Semi-Volatiles (DRO)	168 mg/kg	49.2	mg/kg	98.4	50.9 mg/kg	119	40-160	60.0	20	P
TPH-Semi-Volatiles (DRO)	168 mg/kg	49.2	mg/kg	98.4	50.9 mg/kg	119	40-160	60.0	20	P
Surr: Pentacosane (Surr)	3.16		mg/kg	4.96	mg/kg	63.7	40-160			
Surr: Pentacosane (Surr)	3.16		mg/kg	4.96	mg/kg	63.7	40-160			
Surr: Pentacosane (Surr)	3.16		mg/kg	4.96	mg/kg	63.7	40-160			
Surr: Pentacosane (Surr)	3.16		mg/kg	4.96	mg/kg	63.7	40-160			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 1/3/2019 11:38
Submitted To: Josh Hepler	Project Number: 18-796.01
Client Site I.D.: Triangle Service Center	Purchase Order: 18-796.01

### Certified Analyses included in this Report

Analyte	Certifications
<b>SW8015C in Non-Potable Water</b>	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Volatiles (GRO)	VELAP,NC,WVDEP
<b>SW8015C in Solids</b>	
TPH-Semi-Volatiles (DRO)	VELAP,NC,WVDEP
TPH-Semi-Volatiles (ORO)	VELAP
TPH-Volatiles (GRO)	VELAP,NC,WVDEP
<b>SW8021B in Non-Potable Water</b>	
Benzene	VELAP,WVDEP
Toluene	VELAP,WVDEP
Ethylbenzene	VELAP,WVDEP
m+p-Xylenes	VELAP,WVDEP
o-Xylene	VELAP,WVDEP
Xylenes, Total	VELAP,WVDEP
<b>SW8021B in Solids</b>	
Benzene	VELAP,WVDEP
Toluene	VELAP,WVDEP
Ethylbenzene	VELAP,WVDEP
m+p-Xylenes	VELAP,WVDEP
o-Xylene	VELAP,WVDEP
Xylenes, Total	VELAP,WVDEP

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019



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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	1/3/2019 11:38
Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

### Summary of Data Qualifiers

- P Duplicate analysis does not meet the acceptance criteria for precision
- S Surrogate recovery was outside acceptance criteria
- RPD Relative Percent Difference
- Qual Qualifiers
- RE Denotes sample was re-analyzed
- D.F. Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.
- TIC Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library .  
A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.
- PCBs, Total Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.

CHAIN OF CUSTODY

PAGE \_\_\_\_ OF \_\_\_\_

COMPANY NAME: EEE Consulting, Inc	INVOICE TO: Same	PROJECT NAME/Quote #: Rt 1 Widening
CONTACT: Josh Hepler	INVOICE CONTACT:	SITE NAME: Triangle Service Center
ADDRESS: 201 Church Street	INVOICE ADDRESS:	PROJECT NUMBER: 18-796.01
PHONE #: 540-230-3685	INVOICE PHONE #:	P.O. #: 18-796.01
FAX #: 5640-953-0171	EMAIL: jhepler@eee-consulting.com	Pretreatment Program: NA
Is sample for compliance reporting? YES NO <b>NA</b>	Is sample from a chlorinated supply? YES NO <b>NA</b>	PWS I.D. #: <b>NA</b>
SAMPLER NAME (PRINT): Josh Hepler	SAMPLER SIGNATURE: Josh Hepler	Turn Around Time: Circle: <b>X</b> 5 Days or ___ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other \_\_\_\_\_

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)				COMMENTS
											TPH-DRO	TPH-GRO	TPH-ORO	BTEX	
1) B1 5-10	X					12/11	13:00	S		2	X	X		*	Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol  *BTEX only if GRO is detected in soil.  PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)
2) B1 10-15	X					12/11	13:05	S		2	X	X		*	
3) B2 5-10	X					12/11	13:30	S		2	X	X		*	
4) B2 10-15	X					12/11	13:40	S		2	X	X		*	
5) B3 5-10	X					12/11		S		2	X	X		*	
6) B3 10-15	X					12/11		S		2	X	X		*	
7) B4 0-5	X					12/11	14:20	S		2	X	X	X	*	
8) B4 15-19	X					12/11	14:30	S		2	X	X	X	*	
9) B5 0-5	X					12/11	14:40	S		2	X	X		*	
10) B5 5-10	X					12/11	14:50	S		2	X	X		*	

RELINQUISHED: Josh Hepler	DATE / TIME: 12/14/2018	RECEIVED:	DATE / TIME:	QC Data Package	LAB USE ONLY	COOLER TEMP
RELINQUISHED:	DATE / TIME:	RECEIVED:	DATE / TIME:	Level III <input type="checkbox"/>	Custody Seals used and intact? (Y/N) <input checked="" type="checkbox"/>	Received on ice? (Y/N) <input checked="" type="checkbox"/>
RELINQUISHED:	DATE / TIME:	RECEIVED:	DATE / TIME:	Level IV <input type="checkbox"/>	<b>EEE-Blacksburg 18L0653</b> <b>RT 1 Widning</b> <b>Recd: 12/14/2018 Due: 01/02/2019</b>	



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 (804)358-8297 FAX

Chain of Custody  
 Form #: F1331  
 Rev. 3.0  
 Effective: Aug 24, 2017

CHAIN OF CUSTODY

PAGE 1 OF 1

COMPANY NAME: EEE Consulting, Inc	INVOICE TO: Same	PROJECT NAME/Quote #: Rt 1 Widening
CONTACT: Josh Hepler	INVOICE CONTACT:	SITE NAME: Triangle Service Center
ADDRESS: 201 Church Street	INVOICE ADDRESS:	PROJECT NUMBER: 18-796.01
PHONE #: 540-230-3685	INVOICE PHONE #:	P.O. #: 18-796.01
FAX #: 5640-953-0171	EMAIL: jhepler@eee-consulting.com	Pretreatment Program: NA
Is sample for compliance reporting? YES NO <b>NA</b>	Is sample from a chlorinated supply? YES NO <b>NA</b>	PWS I.D. #: <b>NA</b>
SAMPLER NAME (PRINT): Josh Hepler	SAMPLER SIGNATURE: Josh Hepler	Turn Around Time: Circle: <b>X</b> 5 Days or ___ Day(s)

Matrix Codes: WW=Waste Water/Storm Water GW=Ground Water DW=Drinking Water S=Soil/Solids OR=Organic A=Air WP=Wipe OT=Other \_\_\_\_\_

CLIENT SAMPLE I.D.	Grab	Composite	Field Filtered (Dissolved Metals)	Composite Start Date	Composite Start Time	Grab Date or Composite Stop Date	Grab Time or Composite Stop Time	Time Preserved	Matrix (See Codes)	Number of Containers	ANALYSIS / (PRESERVATIVE)					COMMENTS
											TPH-DRO	TPH-GRO			BTEX	
1) B5 10-15	x					12/11	14:55		S	2	X	X			*	Preservative Codes: N=Nitric Acid C=Hydrochloric Acid S=Sulfuric Acid H=Sodium Hydroxide A=Ascorbic Acid Z=Zinc Acetate T=Sodium Thiosulfate M=Methanol  *BTEX only if GRO is detected in soil.  PLEASE NOTE PRESERVATIVE(S), INTERFERENCE CHECKS or PUMP RATE (L/min)
2) B5 15-19	x					12/11	15:10		S	2	X	X			*	
3) B6 0-5	x					12/11	15:30		S	2	X	X			*	
4) B5 10-15	x					12/11	15:40		S	2	X	X			*	
5) B2	x					12/11			GW	6	X	X			X	
6)																
7)																
8)																
9)																
10)																

RELINQUISHED: Josh Hepler	DATE / TIME: 12/14/2018	RECEIVED:	DATE / TIME: 12/14/18 1605	QC Data Package	LAB USE ONLY: Custody Seals used and intact? (Y/N) <input checked="" type="checkbox"/>	COOLER TEMP: Received on ice? (Y/N) <input checked="" type="checkbox"/>
RELINQUISHED: _____	DATE / TIME: _____	RECEIVED: _____	DATE / TIME: _____	Level III <input type="checkbox"/>	EEE-Blacksburg RT 1 Widning	18L0653
RELINQUISHED: _____	DATE / TIME: _____	RECEIVED: _____	DATE / TIME: _____	Level IV <input type="checkbox"/>		

Recd: 12/14/2018 Due: 01/02/2019





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## Certificate of Analysis

### Final Report

Client Name:	EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued:	1/3/2019 11:38
Submitted To:	Josh Hepler	Project Number:	18-796.01
Client Site I.D.:	Triangle Service Center	Purchase Order:	18-796.01

## Sample Conditions Checklist

Samples Received at:	2.20°C
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	No
Do all bottle labels agree with custody papers?	No
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	Yes
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Trip Blank received with samples and added to work order. Trip Blank date and time logged as per container labels. Josh Hepler notified via email. BAR 12/17/18 1112

As per Josh Hepler, samples time for "B3 5-10" (1400), "B3 10-15" (1405), and "B2" (1600) logged as per container labels. BAR 12/17/18 1112

As per Josh Hepler, the soil jar marked as "B-2 10-15" with no sample time on the label is to be logged as "B3 10-15". BAR 12/17/18 1112

As per Josh Hepler all sample depths of 15-20 on labels are to be logged as 15-19 as per the CoC. BAR 12/17/18 1112

---

**Appendix D: Table 4 Petroleum Impacted Soil Volume Estimates**

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**Table 4: Triangle Service Center  
 Petroleum-Impacted Soil Volume Estimates  
 Select Roadway, Drainage Improvements & Pipe Connections**

Boring ID	Impacted Soil Depths	Drainage Structure ID	Impacted Excavation Footprint	Excavation Dimensions	Volume Estimate**	Volume Estimate**	Volume Estimate**
Unit	BGS		STA No.	LxWxH	Cubic Feet (ft <sup>3</sup> )	Cubic Yards (yd <sup>3</sup> )	Tons*
B3	5-10-ft	3B-7	STA No. 259+00; 200-ft LT of CL	5-ft x 5-ft x 5-ft	125***	5	7
B3	5-10-ft	15-in pipe connecting to 3B-7 and existing DI	STA No. 259+00; 200-ft LT of CL	12-ft x 3-ft x 5-ft	180***	7	10
B5	0-10-ft & 15-19-ft	15-in pipe connecting 3-2 to 4-8	STA Nos. 257+90 to 258+85, 60-ft LT of CL	95-ft x 5-ft x 5.5-ft	2613	97	145
B6	0-15-ft	Cul-de-sac	STA Nos. 257+90 to 258+75, 125-ft RT of CL	85-ft x 25-ft x 2-ft	4250	157	236

\*Tons calculated with conversion of 1yd<sup>3</sup> = 1.5 tons

\*\*Soil volume estimates are approximate and based on preliminary information available as of the date of this report.

\*\*\*No laboratory data available for 0-5-ft BGS, this interval estimated to be managed as petroleum impacted media due to impact at 5-10-ft BGS.

# **Phase II Environmental Site Assessment Roadway Improvement Project**

## **Route 1 Widening Project**

### **W Express**

**17449 Jefferson Davis Highway**

**Dumfries, Virginia 22026**

**Prince William County**

**Contract ID: 44115**

**VDOT Project: 001-212-249**

**VDOT UPC: 90339 Act: 689**

**VDOT Task Number: E-FR024.11**

### **Prepared for**

**Mr. Brutus Cooper**

**Regional VDOT HAZMAT Manager**

**Virginia Department of Transportation**

**NOVA District Office**

**4975 Alliance Drive**

**Fairfax, VA 22030**

### **Prepared by**

**EEE Consulting, Inc.**

**201 Church Street**

**Blacksburg, Virginia 24060**

**February 2019**

**Prepared by: Joshua P. Hepler, PG, Project Scientist**

**Reviewed by: Christopher J. Lalli, Vice President**



**EEE Consulting, Inc.**

**Environmental, Engineering and Educational Solutions**

**Table of Contents**

Acronyms ..... ii

1.0 INTRODUCTION AND BACKGROUND ..... 1

2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS ..... 2

3.0 SOIL AND GROUNDWATER SAMPLING METHODS ..... 2

**3.1. Soil Sampling Methods** ..... 2

**3.1. Groundwater Sampling Methods** ..... 3

4.0 PID SCREENING RESULTS ..... 4

5.0 SOIL SAMPLE ANALYTICAL RESULTS ..... 4

6.0 DISSOLVED PHASE ANALYTICAL RESULTS ..... 5

7.0 CONCLUSIONS AND RECOMMENDATIONS ..... 6

8.0 LIMITATIONS ..... 6

9.0 ACKNOWLEDGEMENT ..... 7

10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS ..... 7

**Tables**

Table 1 - PID Soil Screening Data ..... 4

Table 2 - Soil Sample Analytical Data ..... 5

Table 3- Groundwater Sample Analytical Data ..... 6

**Figures**

- Figure 1 – Project Location Map Depicting Regional Project Location
- Figure 2 – Portion of the Prince William Co 7.5 Minute Quadrangle Depicting the Project Location
- Figure 3 – Aerial Photograph Showing the Subject Property and Project Location
- Figure 4 – Preliminary VDOT Plan Sheet Nos. 17 and 18 Showing the Boring Locations

**Appendices**

- Appendix A: Miss Utility Ticket
- Appendix B: Boring Logs
- Appendix C: Laboratory Reports and Sample Custody Documentation

## Acronyms

BGS	Below Ground Surface
C	Celsius
COC	Chain of Custody
CL	Center Line
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency – United States
FT	Feet
LT	Left
mg/kg	Milligrams per Kilogram
MW	Monitoring Well
PG	Professional Geologist
PID	Photoionization Detector
PPM	Parts Per Million
REC	Recognized Environmental Condition
RL	Reporting Limit
Rt	Route
RT	Right
R/W	Right-of-Way
STA	Station
TPH-DRO	Total Petroleum Hydrocarbons - Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons – Gasoline Range Organics
UST	Underground Storage Tank
VDOT	Virginia Department of Transportation
VSWMR	Virginia Solid Waste Management Regulations
<b>3e</b>	EEE Consulting, Inc.

## 1.0 INTRODUCTION AND BACKGROUND

The Virginia Department of Transportation (VDOT) is administering proposed improvements and realignment of 2.3-miles of Route 1 (Fraley Boulevard) between the intersection with Quantico Gateway Drive and the intersection with Drumfires Road (State Route 234) in Dumfries, Prince William County, Virginia. The roadway and drainage improvements will occur in existing roadway right-of-way, proposed R/W acquisition, permanent slop easements, permanent drainage easements, temporary construction easements (i.e. erosion & sediment control measures) and proposed limited access lines. A Phase I Environmental Site Assessment (ESA) was prepared by EEE Consulting, Inc (3e) for the study area in August 2018, which identified Recognized Environmental Conditions (REC) throughout the corridor including the subject property as follows:

- ❖ **W Express** (Parcel 104) located at 17449 Jefferson Davis Highway, Dumfries, VA 22026 (VDOT Plan Sheet Nos. 17 and 18). Parcel 104 is an active petroleum refueling station with one (1) 12,000-gallon gasoline and one (1) 8,000-gallon gasoline underground storage tank (UST). No documented petroleum releases have occurred on-site; however, a DEQ Warning Letter was issued to the facility in 2001 to address UST deficiencies that included method of leak detection, cathodic protection, spill prevention, overfill prevention and federal/state registration requirements (i.e. DEQ Form 7530). The subject compliance issues were reportedly addressed in 2018.

According to Plan Sheet Nos. 17 and 18, numerous drainage and roadway improvements are depicted in proposed R/W and permanent drainage/slope easements at Parcel 104 (see **Figure 4**).

The RECs identified at Parcel 104 have the potential to pose adverse impacts to subsurface media that will likely be disturbed during the installation of the noted roadway and drainage improvements. The constituents of concern are petroleum-based in accordance with the RECs identified above and detailed in the Phase I ESA Corridor Study Report (3e, August 2018). Based on this information, the VDOT – Northern Virginia District Office Hazardous Materials Manager requested the collection of representative samples to confirm the presence/absence of petroleum impacts to soil and groundwater in and proximate to the proposed roadway acquisition and likely disturbance limits. On December 12<sup>th</sup>, 2018, 3e completed a Phase II ESA at Parcel 104 to confirm the presence/absence of impacts to subsurface media that will likely be disturbed in response to the proposed roadway and drainage improvements.

Subsurface boring advancements, sampling methods, corresponding analytical results, and conclusions/recommendations pertaining to the proposed construction activities at each site are summarized in the following sections of this report.

## 2.0 PUBLIC/PRIVATE UTILITY CLEARINGS AND MARK OUTS

Prior to implementing the direct push boring installations, the approximate locations of subsurface public utilities were identified and marked by Miss Utility of Virginia. A utility locate request form was also completed with VDOT to identify utilities owned and operated by VDOT. Copies of the Miss Utility and VDOT Tickets are included in **Appendix A**. In addition to public utility identification, private subsurface utilities were also identified and marked in each investigative area prior to commencing drilling activities.

## 3.0 SOIL AND GROUNDWATER SAMPLING METHODS

### 3.1. Soil Sampling Methods

On December 12<sup>th</sup>, 2018, a direct push drill rig was utilized to advance four (4) soil borings, with one converted to a temporary groundwater monitoring well, at the following locations:

- ❖ B1 – Installed proximate to STA No. 349+35.00; 63-ft RT of CL to a depth of 12.5-ft BGS upon refusal on consolidated material.
- ❖ B2 – Installed proximate to STA No. 350+05.00; 65-ft RT of CL to a depth of 17-ft BGS upon refusal on consolidated material with subsequent conversion to a temporary groundwater monitoring well.
- ❖ B3 – Installed proximate to STA No. 351+45.00; 60-ft RT of CL to a depth of 13-ft BGS upon refusal on consolidated material.
- ❖ B4 – Installed proximate to STA No. 349+95.00; 140-ft RT of CL to a depth of 13-ft BGS upon refusal on consolidated material.

The roadway improvements proposed to date, RECs, and boring locations are depicted on **Figure 4**.

Each soil boring was advanced using a Geoprobe<sup>®</sup> direct push rig. The direct-push rig utilizes a hollow-stem spoon that produced a continuous soil core in five (5)-ft intervals along the vertical depth of each boring. Each boring was advanced to refusal at depths that ranged from 12.5-ft to 17-ft BGS. Subsurface conditions (i.e. wet soils) indicative of groundwater were observed only in B2. The detailed boring logs are presented in **Appendix B**.

Composite soil samples were collected to assess soil that will likely be disturbed during construction. The representative composite soil samples were obtained from the borings by collecting aliquots from the following depth intervals:

- ❖ B1: 5-10-ft and 10-12.5-ft BGS.
- ❖ B2: 10-15-ft and 15-17-ft BGS.

❖ B3 and B4: 5-10-ft and 10-13-ft BGS.

Each composite soil sample was placed into two (2) pre-cleaned 4-ounce glass jars. The sample jars were appropriately labeled and placed on ice in a cooler to maintain an appropriate temperature ( $\leq 4^{\circ}\text{C}$ ) while in transit to the certified environmental laboratory. Chain of Custody (COC) documentation was completed for all samples submitted for laboratory analysis.

All composite soil samples obtained from the four (4) direct push borings were submitted for laboratory analysis of Total Petroleum Hydrocarbons Gasoline Range Organics (TPH-GRO) and benzene, toluene, ethylbenzene, and xylenes (BTEX). The COC documentation and laboratory analytical data are provided in **Appendix C**. A detailed discussion of the composite soil sample analytical results is presented in **Section 5.0** of this report.

### 3.1. Groundwater Sampling Methods

A temporary monitoring well was constructed in B2 to collect a representative groundwater sample to confirm the presence/absence of petroleum impact to the shallow groundwater table. This temporary well was constructed with 1-inch diameter, PVC well screen (slotted at 0.01-ft intervals) and solid 1-inch diameter casing. Screen and casing intervals for the temporary monitoring well are documented on the boring logs (see **Appendix B**). A PVC cap was fitted over the well to prevent intrusion of foreign material. Clean sand was then placed in the remaining annular space of the borehole to form a filter pack around the well screen.

On December 12<sup>th</sup>, 2018, an oil/water interface probe was utilized to determine the depth-to-groundwater and confirm the presence or absence of separate-phase petroleum in the temporary monitoring well. The static groundwater level was measured at a depth of approximately 12-ft BGS (see **Appendix B**). Separate-phase petroleum or petroleum odors were not detected in the temporary monitoring well.

A representative groundwater sample was collected from the temporary monitoring well, which was prepared for transport to the laboratory in accordance the following procedures: 1) the sample was collected using disposable nylon string and a one-half-inch diameter, disposable polyethylene bailer; 2) the sample was placed into containers provided by the laboratory with the appropriate preservative; 3) placed on ice in a cooler to maintain appropriate temperature while in transport to the environmental laboratory and; 4) Chain of Custody documentation completed.

The groundwater sample was submitted for analysis of TPH-GRO by EPA Method 8015C and BTEX by EPA Method 8021. The analytical data for the representative groundwater sample is provided in **Appendix C**. A discussion of the groundwater analytical result is provided in **Section 6.0** of this report.

After completion of the gauging/sampling activities, the temporary monitoring well was abandoned by removing the PVC screen and casing from the ground surface and filling the resulting void with bentonite chips.

#### 4.0 PID SCREENING RESULTS

Photoionization Detector (PID) results for the screened direct push soil cores are presented below in **Table 1**. Measurement units are in parts per million (ppm).

**Table 1 - PID Soil Screening Data: Route 1 – W Express**

	PID (ppm)	PID (ppm)	PID (ppm)	PID (ppm)
Depth (ft BGS)	0-5	5-10	10-15	15-17
B1	0.3	0.2	0.1	NA
B2	0.2	0.1	0.1	0.0
B3	0.0	0.0	0.0	NA
B4	0.0	0.0	0.0	NA

Notes:

ppm = Parts per Million

BGS – Below Ground Surface

Depth Unit – foot BGS

A review of **Table 1** indicates that the PID readings in the screened soil cores were <0.3-parts-per-million (ppm) in B1 through B4. No visual or olfactory evidence of petroleum-impacted media was observed during boring and sampling activities. Additionally, no residual-phase petroleum concentrations were reported in the soil samples. Based on this information, these low PID readings are likely representative of background soil moisture content, and not reflective of volatile organic compound vapors in the soil.

#### 5.0 SOIL SAMPLE ANALYTICAL RESULTS

The analytical results obtained from the soil samples are summarized in **Table 2** on the following page. All results are listed in units of milligrams-per-kilogram (mg/kg). A detailed laboratory analytical report is provided in **Appendix C**.

**Table 2: Soil Sample Analytical Data**

**W Express**

**Route 1 Widening, Dumfries VA**

**Units = Milligrams per Kilogram (mg/kg)**

Location	<b>B1 5-10</b>		<b>B1 10-12.5</b>		<b>B2 10-15</b>		<b>B2 15-17</b>	
Laboratory I.D.	18L0644-01		18L0644-02		18L0644-03		18L0644-04	
Depth Below Grade	5-10 feet		10-12.5 feet		10-15 feet		15-17 feet	
Sample Time	11:20		11:30		11:45		12:00	
	Result	RL	Result	RL	Result	RL	Result	RL
<b>TPH-GRO</b>	ND	<i>0.10</i>	ND	<i>0.10</i>	ND	<i>0.10</i>	ND	<i>0.10</i>
<b>Methyl-t-butyl ether</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>Benzene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>Toluene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>Ethylbenzene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>m+p-Xylenes</b>	ND	<i>0.010</i>	ND	<i>0.010</i>	ND	<i>0.010</i>	ND	<i>0.010</i>
<b>o-Xylene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>Xylenes, Total</b>	ND	<i>0.015</i>	ND	<i>0.015</i>	ND	<i>0.015</i>	ND	<i>0.015</i>
Location	<b>B3 5-10</b>		<b>B3 10-13</b>		<b>B4 5-10</b>		<b>B4 10-13</b>	
Laboratory I.D.	18L0644-06		18L0644-07		18L0644-08		18L0644-09	
Depth Below Grade	5-10 feet		10-13 feet		5-10 feet		10-13 feet	
Sample Time	12:05		12:15		12:30		12:40	
	Result	RL	Result	RL	Result	RL	Result	RL
<b>TPH-GRO</b>	ND	<i>0.10</i>	ND	<i>0.49</i>	ND	<i>0.10</i>	ND	<i>0.10</i>
<b>Methyl-t-butyl ether</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	NA	NA	NA	NA
<b>Benzene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>Toluene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>Ethylbenzene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>m+p-Xylenes</b>	ND	<i>0.010</i>	ND	<i>0.010</i>	ND	<i>0.010</i>	ND	<i>0.010</i>
<b>o-Xylene</b>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>	ND	<i>0.005</i>
<b>Xylenes, Total</b>	ND	<i>0.015</i>	ND	<i>0.015</i>	ND	<i>0.015</i>	ND	<i>0.015</i>

**Notes:**

**Bold / Underlined** text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

A review of **Table 2** indicates that residual-phase TPH-GRO and BTEX concentrations were not detected above the applicable laboratory reporting limits (RLs) in the representative soil samples collected at Parcel 104.

## 6.0 DISSOLVED PHASE ANALYTICAL RESULTS

The dissolved-phase analytical results obtained from the groundwater sample collected at B2 are summarized in **Table 3** on the following page. All results are listed in milligrams per liter (mg/L). A detailed laboratory analytical report is provided in **Appendix C**.

**Table 3: Groundwater Sample Analytical Data  
W Express**

**Route 1 Widening, Dumfries VA**

**Units = Milligrams per Liter (mg/l)**

Location	<b>B2</b>	
Laboratory I.D.	18L0644-05	
Sample Time	13:30	
	Result	RL
<b>TPH-GRO</b>	ND	<i>0.10</i>
<b>Methyl-t-butyl ether</b>	ND	<i>0.001</i>
<b>Benzene</b>	ND	<i>0.001</i>
<b>Toluene</b>	ND	<i>0.001</i>
<b>Ethylbenzene</b>	ND	<i>0.001</i>
<b>m+p-Xylenes</b>	ND	<i>0.004</i>
<b>o-Xylene</b>	ND	<i>0.002</i>
<b>Xylenes, Total</b>	ND	<i>0.006</i>

**Notes:**

**Bold / Underlined** text = Concentration reported above RL

RL = Reporting Limit

ND -Below Laboratory Reporting Limit

A review of **Table 3** indicates that the sample collected from B2 did not contain dissolved-phase petroleum constituent concentrations above the applicable laboratory RLs.

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

A total of four (4) direct push borings with one (1) converted to a temporary groundwater monitoring well were installed to collect representative samples to determine if the RECs identified at Parcel 104 resulted in adverse impacts to subsurface media that will likely be disturbed in response to the proposed roadway and drainage improvements.

The representative soil and groundwater samples collected as part of this investigation did not contain detectable residual-phase and dissolved-phase petroleum constituent concentrations, respectively. Therefore, special management provisions to the construction contract should not apply for soil and groundwater that will likely be disturbed at Parcel 104 in response to the installation of the improvements proposed as of the date of this report.

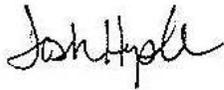
## 8.0 LIMITATIONS

It is impossible to know with certainty the entirety of a site is free of hazardous substances or conditions even with extensive subsurface testing. The conclusions of this investigation are based solely on the scope-of-work and on the sources of information reviewed during this investigation. This report was prepared for the exclusive use of VDOT, and their expressly-designated affiliates. **3e** accepts no responsibility for damages or claims resulting from past or future environmental degradation related to the subject property.

## 9.0 ACKNOWLEDGEMENT

3e appreciates the opportunity to provide environmental services to VDOT regarding the W Express - Route 1 roadway improvement project located in Dumfries, VA under the Professional Services HAZMAT Contract. If we may be of further assistance, or you have any questions or comments regarding the project, please contact our office at (540) 953-0170.

## 10.0 SIGNATURES OF ENVIRONMENTAL PROFESSIONALS



Joshua P. Hepler, PG  
Project Environmental Scientist  
Preparer



Chris Lalli  
Vice President/Associate  
Reviewer

---

## Figures

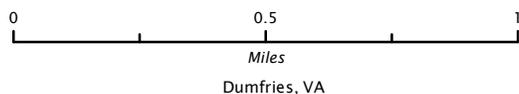
---



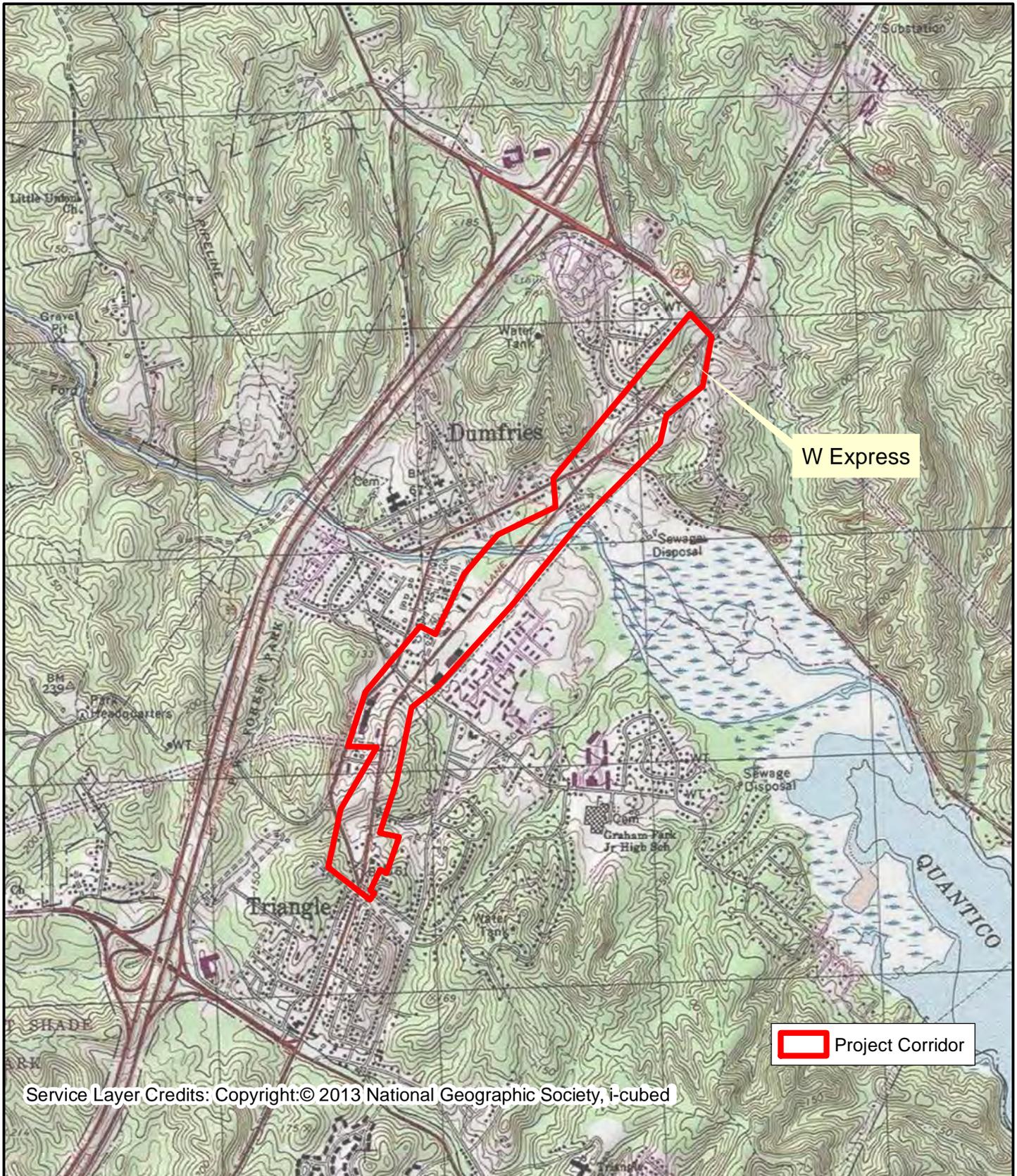
Service Layer Credits: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community  
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**FIGURE 1**  
**PROJECT CORRIDOR AERIAL**  
 W EXPRESS



Dumfries, VA



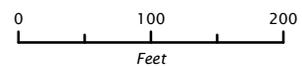


**EEE Consulting, Inc.**  
 Environmental, Engineering and Educational Solutions



**FIGURE 3**  
**AERIAL WITH PROPERTY BOUNDARIES**

W EXPRESS



Dumfries, VA

Prepared by Leah Potts, 01/24/2019  
 Sources: VGIN 2017  
 Projection: NAD 1983 2011 StatePlane Virginia North FIPS 4501 Ft US

**PH PLANS**

THESE PLANS ARE UNFINISHED AND UNAPPROVED AND ARE NOT TO BE USED FOR ANY TYPE OF CONSTRUCTION OR THE ACQUISITION OF RIGHT OF WAY.

VDOT Location & Design  
Richmond, Virginia  
ROADWAY ENGINEER

VDOT Location & Design  
Richmond, Virginia  
HYDRALLIC ENGINEER

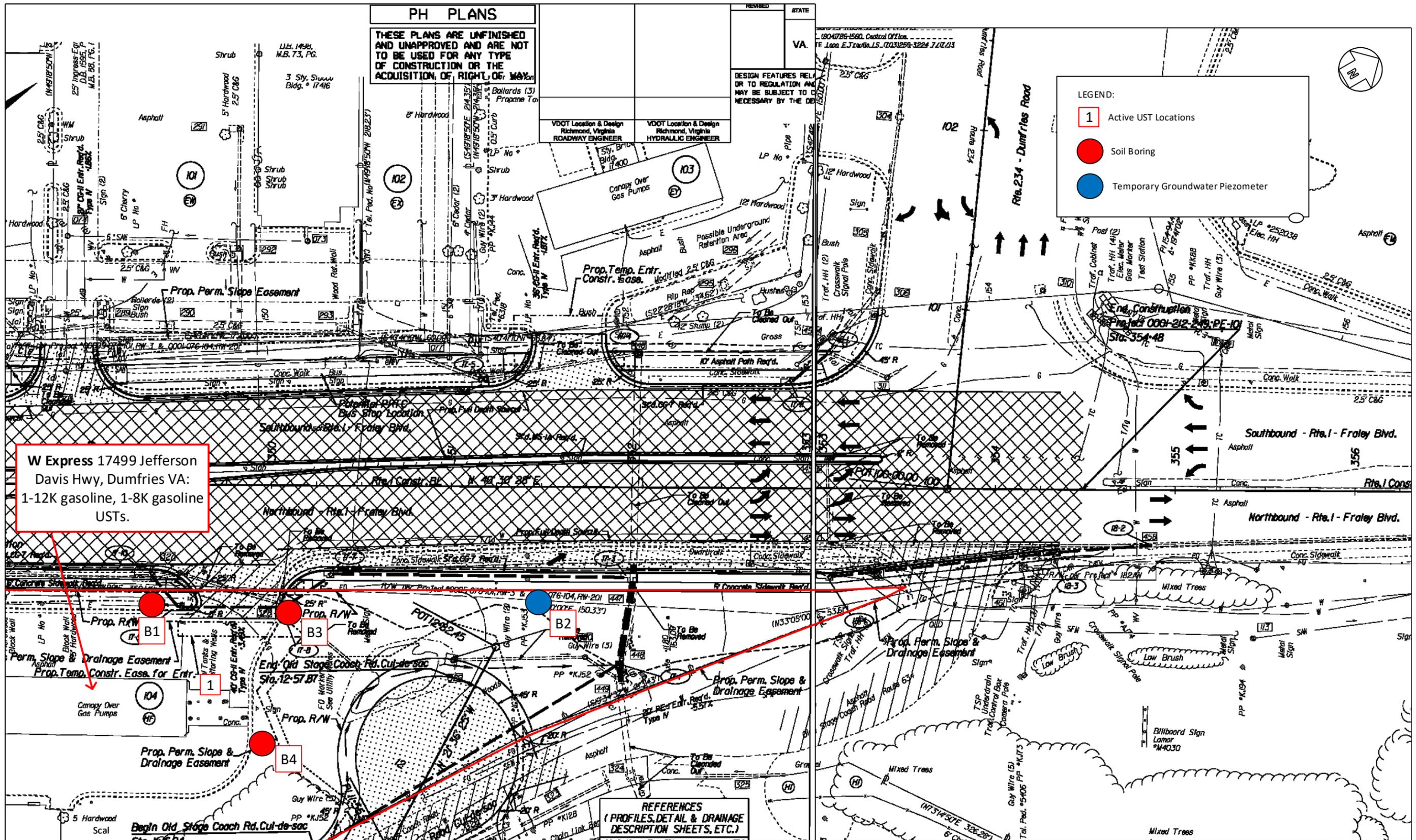
REVISION	DATE

DESIGN FEATURES RELY ON TO REGULATION AND MAY BE SUBJECT TO CHANGE NECESSARY BY THE DEPARTMENT OF TRANSPORTATION.

**LEGEND:**

- 1 Active UST Locations
- Soil Boring
- Temporary Groundwater Piezometer

**W Express 17499 Jefferson Davis Hwy, Dumfries VA:**  
1-12K gasoline, 1-8K gasoline USTs.



REFERENCES  
(PROFILES, DETAIL & DRAINAGE DESCRIPTION SHEETS, ETC.)



**FIGURE 4**  
Plan Sheets No. 17 & 18 Depicting Identified RECs, Boring Locations and Monitoring Wells at the W Express Property.  
E-FR024.11 February 2019

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**Appendix A: Miss Utility Ticket**

---

**From:** [tickets@missutilityofvirginia.com](mailto:tickets@missutilityofvirginia.com)  
**To:** [Josh Hepler](#)  
**Subject:** VUPS EMLCFM 2018/12/05 #01900 A833101384-02A RUSH RESP LREQ  
**Date:** Wednesday, December 5, 2018 10:01:08 AM  
**Importance:** High

---

EMLCFM 01900 VUPSa 12/05/18 10:01:02 A833101384-02A RESPONSE

Thank you for contacting VA811! This is an automatically generated response from the utilities who received your notice of excavation. If you have questions about the response, call the "field contact" for that utility. For your safety, please respect and protect the marks, excavate carefully around the marked utility lines and contact VA811 if you see clear evidence of unmarked utilities.

**Remember, you can now reach VA811 by dialing 811.**

Ticket : A833101384 Rev: 02A Taken: 12/05/18 07:13 AM

State: VA Cnty: PRINCE WILLIAM Place: DUMFRIES  
Address : 17449 JEFFERSON DAVIS HWY  
Responses due by: 12/05/18 10:13 AM Expires: 12/19/18 07:00 AM

When the member Marking Code is blue, click for additional information that may be provided by the Operator/Locator.

Marking Code	Description	Response
<a href="#">CGV</a>	COLUMBIA GAS (CGV930) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (800)543-8911	12/05/18 10:00 AM 30
CMC	COMCAST (CMC502) No Conflict; utility is outside of stated work area. Field Contact: CABLE PROTECTION SERVICES (804)562-3861 In the event of damage to a facility call: (800)441-6917 ext opt 1	12/04/18 10:25 AM 30
<a href="#">DOM</a>	DOMINION ENERGY ELEC DIST (DOM400) No Conflict; utility is outside of stated work area. Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)667-3000	12/05/18 10:00 AM 30
PWS	PRINCE WILLIAM - WATER (PWS902) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	12/04/18 12:27 PM 12
PWS	PRINCE WILLIAM - SEWER (PWS903) Marked up to privately owned utility; contact private utility owner for locate Field Contact: BUTCH ROGERS (703)609-8097 In the event of damage to a facility call: (703)335-7982	12/04/18 12:27 PM 12
<a href="#">VZN</a>	VERIZON (VZN703) Marked Field Contact: UTILIQUEST (703)754-2116 In the event of damage to a facility call: (888)483-1233	12/05/18 10:00 AM 10



Locate Work Order Number: \_\_\_\_\_

Project Location: \_\_\_\_\_

# Utility Location Results Form

## Utility Location Results *(completed by utility location service provider)*

Photos attached Yes No

Was the location that was requested completed? Yes No

Detection cable and/or location tape available Yes No

Accurate As-Built Documents available Yes No

*If no, please check all applicable boxes:*

Accurate As-Built Documents:

Requested? Yes No Provided? Yes No

VDOT on-site assistance:

Requested? Yes No Provided? Yes No

Does the in-field survey area extend 3 feet beyond the border of the intended excavation area? (Required) Yes No

Utility Location Method(s) used: \_\_\_\_\_

### Comments:

Serco/Elite has provided utility markings within the scope of this request for all VDOT owned fiber optic communications cable, and all power cabling from the ITS Device to the ITS Cabinet that was accurately shown on drawings if provided by VDOT, or actual location contained detection cable or tape, and/or VDOT provided on-site assistance.

Where no detection cable/tape and or accurate as-built documents, and/or VDOT assistance was not provided, **we have provided approximate markings or no markings have occurred and the 3rd Party Requestor is advised that hand digging with extreme caution is advised.** Photos have been attached.

Please be advised that in no case will Serco/Elite be held liable or responsible for any power or communication cabling that falls outside our scope and could not be located due to the lack of accurate documentation, detection cable or tape, and/or VDOT assistance

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Certification:** The most appropriate equipment and technology to identify all VDOT underground utilities within the requested zone were used.

Utility Locator: (Print) \_\_\_\_\_  
(signature) \_\_\_\_\_  
Company: \_\_\_\_\_

Start time: \_\_\_\_\_  
End time: \_\_\_\_\_  
Date: \_\_\_\_\_

*This information is valid for 15 days from signed date of marking. Any work performed after 15 days is not covered under this request and will need re-marked.*

---

## **Appendix B: Boring Logs**

---

Project Location: **RT 1 Widening**  
 Site: **W Express**  
 Location: **STA No. 349+35.00; 63-ft RT of CL**  
 Boring: **B1**



Date(s) Drilled: <b>12/12/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>12.5'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.3			0-1' Asphalt. 1-4.5' Sandy clay, orange/brown, moist. No odor.
2				
3				
4				
5				
6	0.2		11:20	4.5-8' Orange clay, moist. 8-11' White sand with clay, moist. No odor.
7				
8				
9				
10				
11	0.1		11:30	11-12' Orange clay, firm, sandy, low moisture. 12-12.5' Greey sandy clay, low moisture. Refusal at 12.5 ft BGS. No odor.
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **W Express**  
 Location: **STA No. 350+05.00; 65-ft RT of CL**  
 Boring: **B2**



Date(s) Drilled: <b>12/12/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>17'</b>	Screened Interval: <b>5-17'</b>
DTW Within Soil Boring: <b>15'</b>		Cased Interval: <b>0-5'</b>
Static GW Level: <b>12'</b>	Date GW Measured: <b>December 12, 2018</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1 2 3 4 5	0.2			0-5' Sandy clay, brown/orange, slightly moist. 5-6' Sandy clay with gravel. No odors.
6 7 8 9 10	0.1			6-10' Sandy clay, brown/orange, slightly moist. No odors.
11 12 13 14 15	0.1		11:45	11-14.5' Brown sandy clay, moist. 14.5-16.5' Grey clay, very moist. No odors.
16 17 18 19 20	0.0		12:00	16.5-17' Orange grey, sandy clay, low moisture. No odors. Refusal at 17'.

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **W Express**  
 Location: **STA No. 351+45.00; 60-ft RT of CL**  
 Boring: **B3**



Date(s) Drilled: <b>12/12/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>13'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured:	<b>N/A</b>

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.0			0-0.5' Topsoil. 0.5-5' Brown clay, sandy, moist. No odors.
2				
3				
4				
5				
6	0.0		12:05	5-9' Sandy clay, low moisture, grey/white. 9-10' Clay, tan/white, moist. No odors.
7				
8				
9				
10	0.0		12:15	10-13' Clay, tan/white, moist. 13' Sandy clay, grey/white. Refusal at 13'. No odors.
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

Project Location: **RT 1 Widening**  
 Site: **W Express**  
 Location: **STA No. 349+95.00; 140-ft RT of CL**  
 Boring: **B4**



Date(s) Drilled: <b>12/12/18</b>	Logged By: <b>Josh Hepler/Carroll Ellis</b>	Well Information:
Drill Rig Type: <b>Geo Probe</b>	Total Depth Drilled: <b>13'</b>	Screened Interval: <b>N/A</b>
DTW Within Soil Boring: <b>N/A</b>		Cased Interval: <b>N/A</b>
Static GW Level: <b>N/A</b>	Date GW Measured: <b>N/A</b>	

Depth (feet)	Sample Info			Material Description
	PID (ppm)	Sample Interval (ft)	Time	
1	0.0			0-0.5' Topsoil. 0.5-2' Sandy clay, moist. 2-5' Clay, orange, moist. No odors.
2				
3				
4				
5				
6	0.0		12:30	5-6' Clay, orange, moist. 6-8.5' Tan/orange sand. 8.5-10' Grey sandy clay. No odors.
7				
8				
9				
10				
11	0.0		12:40	10-13' Grey/orange sand. 13' Sandy clay, grey/orange, grey clay, low moisture. No odors. Refusal at 13-ft BGS.
12				
13				
14				
15				
16				
17				
18				
19				
20				

BGS - Below Ground Surface

---

## **Appendix C: Laboratory Reports and Sample Custody Documentation**

---



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## Certificate of Analysis

*Final Report*

Laboratory Order ID 18L0644

Client Name: EEE Consulting (Blacksburg, VA)  
201 Church Street  
Blacksburg, VA 24060

Date Received: December 14, 2018 14:00

Date Issued: December 31, 2018 15:44

Project Number: 18-796.11

Submitted To: Josh Hepler

Purchase Order: 18-796.11

Client Site I.D.: W Express

Enclosed are the results of analyses for samples received by the laboratory on 12/14/2018 14:00. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

A handwritten signature in black ink that reads "Ted Soyars".

Ted Soyars  
Laboratory Manager

### End Notes:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Air Water & Soil Laboratories, Inc.





1941 Reymet Road • Richmond, Virginia 23230 • Tel: (804)-358-8295 Fax: (804)-358-8297

## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA)      Date Issued: 12/31/2018 15:44  
201 Church Street  
Blacksburg VA, 24060

Submitted To: Josh Hepler      Project Number: 18-796.11  
Client Site I.D.: W Express      Purchase Order: 18-796.11

#### ANALYTICAL REPORT FOR SAMPLES

Laboratory Order ID 18L0644

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
B1 5-10	18L0644-01	Soil	12/12/2018 11:20	12/14/2018 14:00
B1 10-12.5	18L0644-02	Soil	12/12/2018 11:30	12/14/2018 14:00
B2 10-15	18L0644-03	Soil	12/12/2018 11:45	12/14/2018 14:00
B2 15-17	18L0644-04	Soil	12/12/2018 12:00	12/14/2018 14:00
B2	18L0644-05	Ground Water	12/12/2018 13:30	12/14/2018 14:00
B3 5-10	18L0644-06	Soil	12/12/2018 12:05	12/14/2018 14:00
B3 10-13	18L0644-07	Soil	12/12/2018 12:15	12/14/2018 14:00
B4 5-10	18L0644-08	Soil	12/12/2018 12:30	12/14/2018 14:00
B4 10-13	18L0644-09	Soil	12/12/2018 12:40	12/14/2018 14:00



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/31/2018 15:44
Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

**Laboratory Order ID: 18L0644**

**Analytical Results**

Sample I.D. B1 5-10	Laboratory Sample ID: 18L0644-01
Grab Date/Time: 12/12/2018 11:20	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Methyl-t-butyl ether (MTBE)	01	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:32	12/17/18 22:32	DFH
Benzene	01	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:32	12/17/18 22:32	DFH
Toluene	01	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:32	12/17/18 22:32	DFH
Ethylbenzene	01	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:32	12/17/18 22:32	DFH
m+p-Xylenes	01	SW8021B	<10.0 ug/kg		10.0	1	12/17/18 22:32	12/17/18 22:32	DFH
o-Xylene	01	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:32	12/17/18 22:32	DFH
Xylenes, Total	01	SW8021B	<15.0 ug/kg		15.0	1	12/17/18 22:32	12/17/18 22:32	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	01	SW8021B	80.5 %		80-120		12/17/18 22:32	12/17/18 22:32	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	01	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 22:32	12/17/18 22:32	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	01	SW8015C	93.5 %		80-120		12/17/18 22:32	12/17/18 22:32	DFH



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/31/2018 15:44
Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

**Laboratory Order ID: 18L0644**

**Analytical Results**

Sample I.D. B1 10-12.5	Laboratory Sample ID: 18L0644-02
Grab Date/Time: 12/12/2018 11:30	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Methyl-t-butyl ether (MTBE)	02	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:55	12/17/18 22:55	DFH
Benzene	02	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:55	12/17/18 22:55	DFH
Toluene	02	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:55	12/17/18 22:55	DFH
Ethylbenzene	02	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:55	12/17/18 22:55	DFH
m+p-Xylenes	02	SW8021B	<10.0 ug/kg		10.0	1	12/17/18 22:55	12/17/18 22:55	DFH
o-Xylene	02	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 22:55	12/17/18 22:55	DFH
Xylenes, Total	02	SW8021B	<15.0 ug/kg		15.0	1	12/17/18 22:55	12/17/18 22:55	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	02	SW8021B	83.3 %		80-120		12/17/18 22:55	12/17/18 22:55	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	02	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 22:55	12/17/18 22:55	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	02	SW8015C	93.7 %		80-120		12/17/18 22:55	12/17/18 22:55	DFH



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/31/2018 15:44
Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

**Laboratory Order ID: 18L0644**

**Analytical Results**

Sample I.D. B2 10-15	Laboratory Sample ID: 18L0644-03
Grab Date/Time: 12/12/2018 11:45	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Methyl-t-butyl ether (MTBE)	03	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:17	12/17/18 23:17	DFH
Benzene	03	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:17	12/17/18 23:17	DFH
Toluene	03	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:17	12/17/18 23:17	DFH
Ethylbenzene	03	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:17	12/17/18 23:17	DFH
m+p-Xylenes	03	SW8021B	<10.0 ug/kg		10.0	1	12/17/18 23:17	12/17/18 23:17	DFH
o-Xylene	03	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:17	12/17/18 23:17	DFH
Xylenes, Total	03	SW8021B	<15.0 ug/kg		15.0	1	12/17/18 23:17	12/17/18 23:17	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	03	SW8021B	82.3 %		80-120		12/17/18 23:17	12/17/18 23:17	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	03	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 23:17	12/17/18 23:17	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	03	SW8015C	94.2 %		80-120		12/17/18 23:17	12/17/18 23:17	DFH



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### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/31/2018 15:44
Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

**Laboratory Order ID: 18L0644**

**Analytical Results**

<b>Sample I.D.</b> B2 15-17	<b>Laboratory Sample ID:</b> 18L0644-04
<b>Grab Date/Time:</b> 12/12/2018 12:00	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Methyl-t-butyl ether (MTBE)	04	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:40	12/17/18 23:40	DFH
Benzene	04	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:40	12/17/18 23:40	DFH
Toluene	04	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:40	12/17/18 23:40	DFH
Ethylbenzene	04	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:40	12/17/18 23:40	DFH
m+p-Xylenes	04	SW8021B	<10.0 ug/kg		10.0	1	12/17/18 23:40	12/17/18 23:40	DFH
o-Xylene	04	SW8021B	<5.00 ug/kg		5.00	1	12/17/18 23:40	12/17/18 23:40	DFH
Xylenes, Total	04	SW8021B	<15.0 ug/kg		15.0	1	12/17/18 23:40	12/17/18 23:40	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	04	SW8021B	79.1 %	S	80-120		12/17/18 23:40	12/17/18 23:40	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	04	SW8015C	<0.10 mg/kg		0.10	1	12/17/18 23:40	12/17/18 23:40	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	04	SW8015C	91.7 %		80-120		12/17/18 23:40	12/17/18 23:40	DFH



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**Laboratory Order ID: 18L0644**

**Analytical Results**

<b>Sample I.D.</b> B2	<b>Laboratory Sample ID:</b> 18L0644-05
<b>Grab Date/Time:</b> 12/12/2018 13:30	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	05	SW8021B	<1.00 ug/L		1.00	1	12/19/18 17:51	12/19/18 17:51	DFH
Toluene	05	SW8021B	<1.00 ug/L		1.00	1	12/19/18 17:51	12/19/18 17:51	DFH
Ethylbenzene	05	SW8021B	<1.00 ug/L		1.00	1	12/19/18 17:51	12/19/18 17:51	DFH
m+p-Xylenes	05	SW8021B	<4.00 ug/L		4.00	1	12/19/18 17:51	12/19/18 17:51	DFH
o-Xylene	05	SW8021B	<2.00 ug/L		2.00	1	12/19/18 17:51	12/19/18 17:51	DFH
Xylenes, Total	05	SW8021B	<6.00 ug/L		6.00	1	12/19/18 17:51	12/19/18 17:51	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	05	SW8021B	83.2 %		80-120		12/19/18 17:51	12/19/18 17:51	DFH
Surr: 2,5-Dibromotoluene (Surr FID)	05	SW8021B	97.1 %		80-120		12/19/18 17:51	12/19/18 17:51	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	05	SW8015C	<0.10 mg/L		0.10	1	12/19/18 17:51	12/19/18 17:51	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	05	SW8015C	97.1 %		80-120		12/19/18 17:51	12/19/18 17:51	DFH



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**Laboratory Order ID: 18L0644**

**Analytical Results**

Sample I.D. B3 5-10	Laboratory Sample ID: 18L0644-06
Grab Date/Time: 12/12/2018 12:05	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	06	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 16:45	12/20/18 16:45	DFH
Toluene	06	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 16:45	12/20/18 16:45	DFH
Ethylbenzene	06	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 16:45	12/20/18 16:45	DFH
m+p-Xylenes	06	SW8021B	<10.0 ug/kg		10.0	1	12/20/18 16:45	12/20/18 16:45	DFH
o-Xylene	06	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 16:45	12/20/18 16:45	DFH
Xylenes, Total	06	SW8021B	<15.0 ug/kg		15.0	1	12/20/18 16:45	12/20/18 16:45	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	06	SW8021B	85.3 %		80-120		12/20/18 16:45	12/20/18 16:45	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	06	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 16:45	12/20/18 16:45	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	06	SW8015C	104 %		80-120		12/20/18 16:45	12/20/18 16:45	DFH



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201 Church Street  
Blacksburg VA, 24060

Date Issued: 12/31/2018 15:44

Submitted To: Josh Hepler  
Client Site I.D.: W Express

Project Number: 18-796.11  
Purchase Order: 18-796.11

Laboratory Order ID: 18L0644

**Analytical Results**

Sample I.D. B3 10-13

Laboratory Sample ID: 18L0644-07

Grab Date/Time: 12/12/2018 12:15

Field Residual Cl:

Field pH:

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>			<b>H</b>						
Benzene	07RE1	SW8021B	<5.00 ug/kg		5.00	1	12/28/18 11:12	12/28/18 11:12	DFH
Toluene	07RE1	SW8021B	<5.00 ug/kg		5.00	1	12/28/18 11:12	12/28/18 11:12	DFH
Ethylbenzene	07RE1	SW8021B	<5.00 ug/kg		5.00	1	12/28/18 11:12	12/28/18 11:12	DFH
m+p-Xylenes	07RE1	SW8021B	<10.0 ug/kg		10.0	1	12/28/18 11:12	12/28/18 11:12	DFH
o-Xylene	07RE1	SW8021B	<5.00 ug/kg		5.00	1	12/28/18 11:12	12/28/18 11:12	DFH
Xylenes, Total	07RE1	SW8021B	<15.0 ug/kg		15.0	1	12/28/18 11:12	12/28/18 11:12	DFH
<i>Surr: 2,5-Dibromotoluene (Surr PID)</i>			91.2 %		80-120		12/28/18 11:12	12/28/18 11:12	DFH
<b>Volatile Hydrocarbons by GC</b>			<b>H</b>						
TPH-Volatiles (GRO)	07RE1	SW8015C	<0.49 mg/kg		0.49	1	12/28/18 11:12	12/28/18 11:12	DFH
<i>Surr: 2,5-Dibromotoluene (Surr FID)</i>			95.8 %		80-120		12/28/18 11:12	12/28/18 11:12	DFH



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Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

**Laboratory Order ID: 18L0644**

**Analytical Results**

Sample I.D. B4 5-10	Laboratory Sample ID: 18L0644-08
Grab Date/Time: 12/12/2018 12:30	Field pH:
Field Residual Cl:	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	08	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:30	12/20/18 17:30	DFH
Toluene	08	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:30	12/20/18 17:30	DFH
Ethylbenzene	08	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:30	12/20/18 17:30	DFH
m+p-Xylenes	08	SW8021B	<10.0 ug/kg		10.0	1	12/20/18 17:30	12/20/18 17:30	DFH
o-Xylene	08	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:30	12/20/18 17:30	DFH
Xylenes, Total	08	SW8021B	<15.0 ug/kg		15.0	1	12/20/18 17:30	12/20/18 17:30	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	08	SW8021B	78.5 %	S	80-120		12/20/18 17:30	12/20/18 17:30	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	08	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 17:30	12/20/18 17:30	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	08	SW8015C	95.5 %		80-120		12/20/18 17:30	12/20/18 17:30	DFH



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Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

**Laboratory Order ID: 18L0644**

**Analytical Results**

<b>Sample I.D.</b> B4 10-13	<b>Laboratory Sample ID:</b> 18L0644-09
<b>Grab Date/Time:</b> 12/12/2018 12:40	<b>Field pH:</b>
<b>Field Residual Cl:</b>	

Parameter	Samp ID	Method	Result	Qual	Reporting Limit	D.F.	Sample Prep Date/Time	Analysis Date/Time	Analyst
<b>Volatile Organic Compounds by GC</b>									
Benzene	09	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:52	12/20/18 17:52	DFH
Toluene	09	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:52	12/20/18 17:52	DFH
Ethylbenzene	09	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:52	12/20/18 17:52	DFH
m+p-Xylenes	09	SW8021B	<10.0 ug/kg		10.0	1	12/20/18 17:52	12/20/18 17:52	DFH
o-Xylene	09	SW8021B	<5.00 ug/kg		5.00	1	12/20/18 17:52	12/20/18 17:52	DFH
Xylenes, Total	09	SW8021B	<15.0 ug/kg		15.0	1	12/20/18 17:52	12/20/18 17:52	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	09	SW8021B	78.6 %	S	80-120		12/20/18 17:52	12/20/18 17:52	DFH
<b>Volatile Hydrocarbons by GC</b>									
TPH-Volatiles (GRO)	09	SW8015C	<0.10 mg/kg		0.10	1	12/20/18 17:52	12/20/18 17:52	DFH
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr FID)	09	SW8015C	92.5 %		80-120		12/20/18 17:52	12/20/18 17:52	DFH



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### Analytical Summary

Sample ID	Preparation Factors Initial / Final	Method	Batch ID	Sequence ID	Calibration ID
<b>Volatile Hydrocarbons by GC</b>		<b>Preparation Method: SW5030B</b>			
18L0644-01	5.01 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0644-02	5.00 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0644-03	5.03 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0644-04	5.03 g / 5.00 mL	SW8015C	BBL0475	SBL0446	AK80015
18L0644-01	5.01 g / 5.00 mL	SW8021B	BBL0475	SBL0446	AK80015
18L0644-02	5.00 g / 5.00 mL	SW8021B	BBL0475	SBL0446	AK80015
18L0644-03	5.03 g / 5.00 mL	SW8021B	BBL0475	SBL0446	AK80015
18L0644-04	5.03 g / 5.00 mL	SW8021B	BBL0475	SBL0446	AK80015
<b>Volatile Hydrocarbons by GC</b>		<b>Preparation Method: SW5030B</b>			
18L0644-05	5.00 mL / 5.00 mL	SW8015C	BBL0587	SBL0554	AK80015
18L0644-05	5.00 mL / 5.00 mL	SW8021B	BBL0587	SBL0554	AK80015
<b>Volatile Hydrocarbons by GC</b>		<b>Preparation Method: SW5030B</b>			
18L0644-06	5.03 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0644-07	5.00 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0644-08	5.05 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0644-09	5.05 g / 5.00 mL	SW8015C	BBL0617	SBL0580	AK80015
18L0644-06	5.03 g / 5.00 mL	SW8021B	BBL0617	SBL0580	AK80015
18L0644-07	5.00 g / 5.00 mL	SW8021B	BBL0617	SBL0580	AK80015
18L0644-08	5.05 g / 5.00 mL	SW8021B	BBL0617	SBL0580	AK80015
18L0644-09	5.05 g / 5.00 mL	SW8021B	BBL0617	SBL0580	AK80015
<b>Volatile Hydrocarbons by GC</b>		<b>Preparation Method: SW5030B</b>			
18L0644-07RE1	1.02 g / 5.00 mL	SW8015C	BBL0708	SBL0665	AL80110
18L0644-07RE1	1.02 g / 5.00 mL	SW8021B	BBL0708	SBL0665	AL80110



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### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Qual
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**Batch BBL0475 - SW5030B**

**Blank (BBL0475-BLK1)**

Prepared & Analyzed: 12/17/2018

Benzene	<5.00 ug/kg	5.00	ug/kg						
Benzene	<5.00 ug/kg	5.00	ug/kg						
Benzene	<5.00 ug/kg	5.00	ug/kg						
Benzene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Toluene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
o-Xylene	<5.00 ug/kg	5.00	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg						
<hr style="border-top: 1px dashed black;"/>									
Surr: 2,5-Dibromotoluene (Surr PID)	82.5		ug/L	100		82.5	80-120		
Surr: 2,5-Dibromotoluene (Surr PID)	82.5		ug/L	100		82.5	80-120		
Surr: 2,5-Dibromotoluene (Surr PID)	82.5		ug/L	100		82.5	80-120		
Surr: 2,5-Dibromotoluene (Surr PID)	82.5		ug/L	100		82.5	80-120		



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Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0475 - SW5030B

#### LCS (BBL0475-BS1)

Prepared & Analyzed: 12/17/2018

Benzene	90.3 ug/kg	5.00	ug/kg	100	ug/kg	90.3	70-130			
Benzene	90.3 ug/kg	5.00	ug/kg	100	ug/kg	90.3	70-130			
Benzene	90.3 ug/kg	5.00	ug/kg	100	ug/kg	90.3	70-130			
Benzene	90.3 ug/kg	5.00	ug/kg	100	ug/kg	90.3	70-130			
Toluene	93.6 ug/kg	5.00	ug/kg	100	ug/kg	93.6	70-130			
Toluene	93.6 ug/kg	5.00	ug/kg	100	ug/kg	93.6	70-130			
Toluene	93.6 ug/kg	5.00	ug/kg	100	ug/kg	93.6	70-130			
Toluene	93.6 ug/kg	5.00	ug/kg	100	ug/kg	93.6	70-130			
Ethylbenzene	92.1 ug/kg	5.00	ug/kg	100	ug/kg	92.1	70-130			
Ethylbenzene	92.1 ug/kg	5.00	ug/kg	100	ug/kg	92.1	70-130			
Ethylbenzene	92.1 ug/kg	5.00	ug/kg	100	ug/kg	92.1	70-130			
Ethylbenzene	92.1 ug/kg	5.00	ug/kg	100	ug/kg	92.1	70-130			
m+p-Xylenes	193 ug/kg	10.0	ug/kg	200	ug/kg	96.4	70-130			
m+p-Xylenes	193 ug/kg	10.0	ug/kg	200	ug/kg	96.4	70-130			
m+p-Xylenes	193 ug/kg	10.0	ug/kg	200	ug/kg	96.4	70-130			
m+p-Xylenes	193 ug/kg	10.0	ug/kg	200	ug/kg	96.4	70-130			
o-Xylene	100 ug/kg	5.00	ug/kg	100	ug/kg	100	70-130			
o-Xylene	100 ug/kg	5.00	ug/kg	100	ug/kg	100	70-130			
o-Xylene	100 ug/kg	5.00	ug/kg	100	ug/kg	100	70-130			
o-Xylene	100 ug/kg	5.00	ug/kg	100	ug/kg	100	70-130			
Xylenes, Total	293 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	293 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	293 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	293 ug/kg	15.0	ug/kg		ug/kg		70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	85.5		ug/L	100	ug/L	85.5	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	85.5		ug/L	100	ug/L	85.5	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	85.5		ug/L	100	ug/L	85.5	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	85.5		ug/L	100	ug/L	85.5	80-120			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/31/2018 15:44
Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0475 - SW5030B

#### Matrix Spike (BBL0475-MS1)

Source: 18L0643-02

Prepared & Analyzed: 12/17/2018

Benzene	83.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	83.4	70-130			
Benzene	83.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	83.4	70-130			
Benzene	83.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	83.4	70-130			
Benzene	83.4 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	83.4	70-130			
Toluene	86.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	86.6	70-130			
Toluene	86.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	86.6	70-130			
Toluene	86.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	86.6	70-130			
Toluene	86.6 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	86.6	70-130			
Ethylbenzene	85.2 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	85.2	70-130			
Ethylbenzene	85.2 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	85.2	70-130			
Ethylbenzene	85.2 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	85.2	70-130			
Ethylbenzene	85.2 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	85.2	70-130			
m+p-Xylenes	178 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	89.1	70-130			
m+p-Xylenes	178 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	89.1	70-130			
m+p-Xylenes	178 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	89.1	70-130			
m+p-Xylenes	178 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	89.1	70-130			
o-Xylene	93.1 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	93.1	70-130			
o-Xylene	93.1 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	93.1	70-130			
o-Xylene	93.1 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	93.1	70-130			
o-Xylene	93.1 ug/kg	5.00	ug/kg	100	<5.00 ug/kg	93.1	70-130			
Xylenes, Total	271 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	271 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	271 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	271 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	91.3		ug/L	100	ug/L	91.3	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	91.3		ug/L	100	ug/L	91.3	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	91.3		ug/L	100	ug/L	91.3	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	91.3		ug/L	100	ug/L	91.3	80-120			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.11
Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0475 - SW5030B

#### Matrix Spike Dup (BBL0475-MSD1)

Source: 18L0643-02

Prepared & Analyzed: 12/17/2018

Benzene	80.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	81.6	70-130	3.09	20	
Benzene	80.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	81.6	70-130	3.09	20	
Benzene	80.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	81.6	70-130	3.09	20	
Benzene	80.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	81.6	70-130	3.09	20	
Toluene	83.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	84.6	70-130	3.30	20	
Toluene	83.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	84.6	70-130	3.30	20	
Toluene	83.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	84.6	70-130	3.30	20	
Toluene	83.8 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	84.6	70-130	3.30	20	
Ethylbenzene	82.4 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	83.2	70-130	3.32	20	
Ethylbenzene	82.4 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	83.2	70-130	3.32	20	
Ethylbenzene	82.4 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	83.2	70-130	3.32	20	
Ethylbenzene	82.4 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	83.2	70-130	3.32	20	
m+p-Xylenes	172 ug/kg	10.0	ug/kg	198	<10.0 ug/kg	87.1	70-130	3.25	20	
m+p-Xylenes	172 ug/kg	10.0	ug/kg	198	<10.0 ug/kg	87.1	70-130	3.25	20	
m+p-Xylenes	172 ug/kg	10.0	ug/kg	198	<10.0 ug/kg	87.1	70-130	3.25	20	
m+p-Xylenes	172 ug/kg	10.0	ug/kg	198	<10.0 ug/kg	87.1	70-130	3.25	20	
o-Xylene	90.0 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	90.9	70-130	3.37	20	
o-Xylene	90.0 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	90.9	70-130	3.37	20	
o-Xylene	90.0 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	90.9	70-130	3.37	20	
o-Xylene	90.0 ug/kg	5.00	ug/kg	99.0	<5.00 ug/kg	90.9	70-130	3.37	20	
Xylenes, Total	263 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	3.30	20	
Xylenes, Total	263 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	3.30	20	
Xylenes, Total	263 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	3.30	20	
Xylenes, Total	263 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	3.30	20	
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	90.5		ug/L	100	ug/L	90.5	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	90.5		ug/L	100	ug/L	90.5	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	90.5		ug/L	100	ug/L	90.5	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	90.5		ug/L	100	ug/L	90.5	80-120			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/31/2018 15:44
Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0587 - SW5030B

##### Blank (BBL0587-BLK1)

Prepared & Analyzed: 12/19/2018

Benzene	<1.00 ug/L	1.00	ug/L							
Toluene	<1.00 ug/L	1.00	ug/L							
Ethylbenzene	<1.00 ug/L	1.00	ug/L							
m+p-Xylenes	<4.00 ug/L	4.00	ug/L							
o-Xylene	<2.00 ug/L	2.00	ug/L							
Xylenes, Total	<6.00 ug/L	6.00	ug/L							
<hr/>										
Surr: 2,5-Dibromotoluene (Surr PID)	82.3		ug/L	100		82.3	80-120			

##### LCS (BBL0587-BS1)

Prepared & Analyzed: 12/19/2018

Benzene	90.9 ug/L	1.00	ug/L	100	ug/L	90.9	70-130			
Toluene	94.2 ug/L	1.00	ug/L	100	ug/L	94.2	70-130			
Ethylbenzene	92.8 ug/L	1.00	ug/L	100	ug/L	92.8	70-130			
m+p-Xylenes	194 ug/L	4.00	ug/L	200	ug/L	96.9	70-130			
o-Xylene	101 ug/L	2.00	ug/L	100	ug/L	101	70-130			
<hr/>										
Surr: 2,5-Dibromotoluene (Surr PID)	85.1		ug/L	100	ug/L	85.1	80-120			

##### Matrix Spike (BBL0587-MS1)

Source: 18L0775-01

Prepared & Analyzed: 12/19/2018

Benzene	90.6 ug/L	1.00	ug/L	100	<1.00 ug/L	90.6	70-130			
Toluene	94.0 ug/L	1.00	ug/L	100	<1.00 ug/L	94.0	70-130			
Ethylbenzene	92.3 ug/L	1.00	ug/L	100	<1.00 ug/L	92.3	70-130			
m+p-Xylenes	193 ug/L	4.00	ug/L	200	<4.00 ug/L	96.3	70-130			
o-Xylene	101 ug/L	2.00	ug/L	100	<2.00 ug/L	101	70-130			
<hr/>										
Surr: 2,5-Dibromotoluene (Surr PID)	84.9		ug/L	100	ug/L	84.9	80-120			

##### Matrix Spike Dup (BBL0587-MSD1)

Source: 18L0775-01

Prepared & Analyzed: 12/19/2018

Benzene	89.0 ug/L	1.00	ug/L	100	<1.00 ug/L	89.0	70-130	1.82	20	
Toluene	92.3 ug/L	1.00	ug/L	100	<1.00 ug/L	92.3	70-130	1.89	20	
Ethylbenzene	91.0 ug/L	1.00	ug/L	100	<1.00 ug/L	91.0	70-130	1.46	20	
m+p-Xylenes	190 ug/L	4.00	ug/L	200	<4.00 ug/L	94.8	70-130	1.54	20	
o-Xylene	99.4 ug/L	2.00	ug/L	100	<2.00 ug/L	99.4	70-130	1.51	20	
<hr/>										
Surr: 2,5-Dibromotoluene (Surr PID)	83.4		ug/L	100	ug/L	83.4	80-120			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.11
Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0617 - SW5030B

#### Blank (BBL0617-BLK1)

Prepared & Analyzed: 12/20/2018

Benzene	<5.00 ug/kg	5.00	ug/kg							
Benzene	<5.00 ug/kg	5.00	ug/kg							
Benzene	<5.00 ug/kg	5.00	ug/kg							
Benzene	<5.00 ug/kg	5.00	ug/kg							
Toluene	<5.00 ug/kg	5.00	ug/kg							
Toluene	<5.00 ug/kg	5.00	ug/kg							
Toluene	<5.00 ug/kg	5.00	ug/kg							
Toluene	<5.00 ug/kg	5.00	ug/kg							
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg							
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg							
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg							
Ethylbenzene	<5.00 ug/kg	5.00	ug/kg							
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg							
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg							
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg							
m+p-Xylenes	<10.0 ug/kg	10.0	ug/kg							
o-Xylene	<5.00 ug/kg	5.00	ug/kg							
o-Xylene	<5.00 ug/kg	5.00	ug/kg							
o-Xylene	<5.00 ug/kg	5.00	ug/kg							
o-Xylene	<5.00 ug/kg	5.00	ug/kg							
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg							
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg							
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg							
Xylenes, Total	<15.0 ug/kg	15.0	ug/kg							
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	82.6		ug/L	100		82.6	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	82.6		ug/L	100		82.6	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	82.6		ug/L	100		82.6	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	82.6		ug/L	100		82.6	80-120			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.11
Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0617 - SW5030B

#### LCS (BBL0617-BS1)

Prepared & Analyzed: 12/20/2018

Benzene	85.0 ug/kg	5.00	ug/kg	99.4	ug/kg	85.5	70-130			
Benzene	85.0 ug/kg	5.00	ug/kg	99.4	ug/kg	85.5	70-130			
Benzene	85.0 ug/kg	5.00	ug/kg	99.4	ug/kg	85.5	70-130			
Benzene	85.0 ug/kg	5.00	ug/kg	99.4	ug/kg	85.5	70-130			
Toluene	88.0 ug/kg	5.00	ug/kg	99.4	ug/kg	88.5	70-130			
Toluene	88.0 ug/kg	5.00	ug/kg	99.4	ug/kg	88.5	70-130			
Toluene	88.0 ug/kg	5.00	ug/kg	99.4	ug/kg	88.5	70-130			
Toluene	88.0 ug/kg	5.00	ug/kg	99.4	ug/kg	88.5	70-130			
Ethylbenzene	86.8 ug/kg	5.00	ug/kg	99.4	ug/kg	87.4	70-130			
Ethylbenzene	86.8 ug/kg	5.00	ug/kg	99.4	ug/kg	87.4	70-130			
Ethylbenzene	86.8 ug/kg	5.00	ug/kg	99.4	ug/kg	87.4	70-130			
Ethylbenzene	86.8 ug/kg	5.00	ug/kg	99.4	ug/kg	87.4	70-130			
m+p-Xylenes	181 ug/kg	10.0	ug/kg	199	ug/kg	91.2	70-130			
m+p-Xylenes	181 ug/kg	10.0	ug/kg	199	ug/kg	91.2	70-130			
m+p-Xylenes	181 ug/kg	10.0	ug/kg	199	ug/kg	91.2	70-130			
m+p-Xylenes	181 ug/kg	10.0	ug/kg	199	ug/kg	91.2	70-130			
o-Xylene	94.6 ug/kg	5.00	ug/kg	99.4	ug/kg	95.2	70-130			
o-Xylene	94.6 ug/kg	5.00	ug/kg	99.4	ug/kg	95.2	70-130			
o-Xylene	94.6 ug/kg	5.00	ug/kg	99.4	ug/kg	95.2	70-130			
o-Xylene	94.6 ug/kg	5.00	ug/kg	99.4	ug/kg	95.2	70-130			
Xylenes, Total	276 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	276 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	276 ug/kg	15.0	ug/kg		ug/kg		70-130			
Xylenes, Total	276 ug/kg	15.0	ug/kg		ug/kg		70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	83.9		ug/L	100	ug/L	83.9	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	83.9		ug/L	100	ug/L	83.9	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	83.9		ug/L	100	ug/L	83.9	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	83.9		ug/L	100	ug/L	83.9	80-120			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.11
Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0617 - SW5030B

#### Matrix Spike (BBL0617-MS1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

Benzene	61.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.0	70-130			M
Benzene	61.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.0	70-130			M
Benzene	61.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.0	70-130			M
Benzene	61.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.0	70-130			M
Toluene	64.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	64.6	70-130			M
Toluene	64.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	64.6	70-130			M
Toluene	64.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	64.6	70-130			M
Toluene	64.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	64.6	70-130			M
Ethylbenzene	62.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.9	70-130			M
Ethylbenzene	62.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.9	70-130			M
Ethylbenzene	62.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.9	70-130			M
Ethylbenzene	62.8 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	62.9	70-130			M
m+p-Xylenes	131 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	65.8	70-130			M
m+p-Xylenes	131 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	65.8	70-130			M
m+p-Xylenes	131 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	65.8	70-130			M
m+p-Xylenes	131 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	65.8	70-130			M
o-Xylene	69.0 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	69.1	70-130			M
o-Xylene	69.0 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	69.1	70-130			M
o-Xylene	69.0 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	69.1	70-130			M
o-Xylene	69.0 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	69.1	70-130			M
Xylenes, Total	200 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	200 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	200 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
Xylenes, Total	200 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130			
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr PID)	88.4		ug/L	100	ug/L	88.4	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	88.4		ug/L	100	ug/L	88.4	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	88.4		ug/L	100	ug/L	88.4	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	88.4		ug/L	100	ug/L	88.4	80-120			



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## Certificate of Analysis

### Final Report

Client Name: EEE Consulting (Blacksburg, VA) 201 Church Street Blacksburg VA, 24060	Date Issued: 12/31/2018 15:44
Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

### Volatile Organic Compounds by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0617 - SW5030B

#### Matrix Spike Dup (BBL0617-MSD1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

Benzene	75.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	75.2	70-130	19.3	20	
Benzene	75.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	75.2	70-130	19.3	20	
Benzene	75.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	75.2	70-130	19.3	20	
Benzene	75.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	75.2	70-130	19.3	20	
Toluene	78.5 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	78.6	70-130	19.6	20	
Toluene	78.5 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	78.6	70-130	19.6	20	
Toluene	78.5 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	78.6	70-130	19.6	20	
Toluene	78.5 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	78.6	70-130	19.6	20	
Ethylbenzene	77.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	77.3	70-130	20.5	20	P
Ethylbenzene	77.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	77.3	70-130	20.5	20	P
Ethylbenzene	77.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	77.3	70-130	20.5	20	P
Ethylbenzene	77.1 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	77.3	70-130	20.5	20	P
m+p-Xylenes	161 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	80.7	70-130	20.2	20	P
m+p-Xylenes	161 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	80.7	70-130	20.2	20	P
m+p-Xylenes	161 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	80.7	70-130	20.2	20	P
m+p-Xylenes	161 ug/kg	10.0	ug/kg	200	<10.0 ug/kg	80.7	70-130	20.2	20	P
o-Xylene	84.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	84.6	70-130	20.2	20	P
o-Xylene	84.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	84.6	70-130	20.2	20	P
o-Xylene	84.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	84.6	70-130	20.2	20	P
o-Xylene	84.4 ug/kg	5.00	ug/kg	99.8	<5.00 ug/kg	84.6	70-130	20.2	20	P
Xylenes, Total	245 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	20.2	20	P
Xylenes, Total	245 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	20.2	20	P
Xylenes, Total	245 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	20.2	20	P
Xylenes, Total	245 ug/kg	15.0	ug/kg		<15.0 ug/kg		70-130	20.2	20	P

Surr: 2,5-Dibromotoluene (Surr PID)	89.2		ug/L	100	ug/L	89.2	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	89.2		ug/L	100	ug/L	89.2	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	89.2		ug/L	100	ug/L	89.2	80-120			
Surr: 2,5-Dibromotoluene (Surr PID)	89.2		ug/L	100	ug/L	89.2	80-120			



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## Certificate of Analysis

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Submitted To:	Josh Hepler	Project Number:	18-796.11
Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0475 - SW5030B

##### Blank (BBL0475-BLK1)

Prepared & Analyzed: 12/17/2018

TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100		94.6	80-120			

##### LCS (BBL0475-BS1)

Prepared & Analyzed: 12/17/2018

TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
TPH-Volatiles (GRO)	0.98 mg/kg	0.10	mg/kg	1.00	mg/kg	98.3	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	99.9		ug/L	100	ug/L	99.9	80-120			

##### Matrix Spike (BBL0475-MS1)

Source: 18L0643-02

Prepared & Analyzed: 12/17/2018

TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
TPH-Volatiles (GRO)	0.91 mg/kg	0.10	mg/kg	1.00	<0.10 mg/kg	90.9	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	103		ug/L	100	ug/L	103	80-120			



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## Certificate of Analysis

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Submitted To: Josh Hepler	Project Number: 18-796.11
Client Site I.D.: W Express	Purchase Order: 18-796.11

### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0475 - SW5030B

Matrix Spike Dup (BBL0475-MSD1)	Source: 18L0643-02		Prepared & Analyzed: 12/17/2018							
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
TPH-Volatiles (GRO)	0.88 mg/kg	0.10	mg/kg	0.990	<0.10 mg/kg	88.5	70-130	3.60	20	
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	104		ug/L	100	ug/L	104	80-120			

#### Batch BBL0587 - SW5030B

Blank (BBL0587-BLK1)	Prepared & Analyzed: 12/19/2018									
TPH-Volatiles (GRO)	<0.10 mg/L	0.10	mg/L							
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	98.8		ug/L	100	ug/L	98.8	80-120			
<hr style="border-top: 1px dashed #000;"/>										
LCS (BBL0587-BS1)	Prepared & Analyzed: 12/19/2018									
TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	mg/L	99.5	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	102		ug/L	100	ug/L	102	80-120			
<hr style="border-top: 1px dashed #000;"/>										
Matrix Spike (BBL0587-MS1)	Source: 18L0775-01		Prepared & Analyzed: 12/19/2018							
TPH-Volatiles (GRO)	1.00 mg/L	0.10	mg/L	1.00	<0.10 mg/L	100	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	99.2		ug/L	100	ug/L	99.2	80-120			
<hr style="border-top: 1px dashed #000;"/>										
Matrix Spike Dup (BBL0587-MSD1)	Source: 18L0775-01		Prepared & Analyzed: 12/19/2018							
TPH-Volatiles (GRO)	0.99 mg/L	0.10	mg/L	1.00	<0.10 mg/L	98.8	70-130	1.34	20	
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	94.6		ug/L	100	ug/L	94.6	80-120			



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## Certificate of Analysis

### Final Report

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Submitted To:	Josh Hepler	Project Number:	18-796.11
Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0617 - SW5030B

##### Blank (BBL0617-BLK1)

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
TPH-Volatiles (GRO)	<0.10 mg/kg	0.10	mg/kg							
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	95.9		ug/L	100		95.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	95.9		ug/L	100		95.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	95.9		ug/L	100		95.9	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	95.9		ug/L	100		95.9	80-120			

##### LCS (BBL0617-BS1)

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
TPH-Volatiles (GRO)	0.96 mg/kg	0.10	mg/kg	0.994	mg/kg	96.4	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	98.4		ug/L	100	ug/L	98.4	80-120			

##### Matrix Spike (BBL0617-MS1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
TPH-Volatiles (GRO)	0.76 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	75.8	70-130			
<hr style="border-top: 1px dashed #000;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120		S	
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120		S	
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120		S	
Surr: 2,5-Dibromotoluene (Surr FID)	139		ug/L	100	ug/L	139	80-120		S	



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## Certificate of Analysis

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Client Site I.D.:	W Express	Purchase Order:	18-796.11

### Volatile Hydrocarbons by GC - Quality Control

#### Air Water & Soil Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
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#### Batch BBL0617 - SW5030B

#### Matrix Spike Dup (BBL0617-MSD1)

Source: 18L0653-04

Prepared & Analyzed: 12/20/2018

TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
TPH-Volatiles (GRO)	0.87 mg/kg	0.10	mg/kg	0.998	<0.10 mg/kg	87.1	70-130	13.8	20	
<hr style="border-top: 1px dashed black;"/>										
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			
Surr: 2,5-Dibromotoluene (Surr FID)	119		ug/L	100	ug/L	119	80-120			



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### Certified Analyses included in this Report

Analyte	Certifications
<b>SW8015C in Non-Potable Water</b>	
TPH-Volatiles (GRO)	VELAP,NC,WVDEP
<b>SW8015C in Solids</b>	
TPH-Volatiles (GRO)	VELAP,NC,WVDEP
<b>SW8021B in Non-Potable Water</b>	
Benzene	VELAP,WVDEP
Toluene	VELAP,WVDEP
Ethylbenzene	VELAP,WVDEP
m+p-Xylenes	VELAP,WVDEP
o-Xylene	VELAP,WVDEP
Xylenes, Total	VELAP,WVDEP
<b>SW8021B in Solids</b>	
Methyl-t-butyl ether (MTBE)	VELAP,WVDEP
Benzene	VELAP,WVDEP
Toluene	VELAP,WVDEP
Ethylbenzene	VELAP,WVDEP
m+p-Xylenes	VELAP,WVDEP
o-Xylene	VELAP,WVDEP
Xylenes, Total	VELAP,WVDEP

Code	Description	Lab Number	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2019
NC	North Carolina DENR	495	12/31/2018
VELAP	NELAC-Virginia Certificate #10074	460021	06/14/2019



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### Summary of Data Qualifiers

H Analysis was performed outside of the method prescribed holding time.

M Matrix spike recovery is outside established acceptance limits

P Duplicate analysis does not meet the acceptance criteria for precision

S Surrogate recovery was outside acceptance criteria

RPD Relative Percent Difference

Qual Qualifiers

-RE Denotes sample was re-analyzed

D.F. Dilution Factor. Please also see the Preparation Factor in the Analysis Summary section.

TIC Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library .  
A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.

PCBs, Total Total PCBs are defined as the sum of detected Aroclors 1016, 1221, 1232, 1248, 1254, 1260, 1262, and 1268.





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Client Site I.D.:	W Express	Purchase Order:	18-796.11

## Sample Conditions Checklist

Samples Received at:	1.10°C
How were samples received?	Walk In
Were Custody Seals used? If so, were they received intact?	No
Are the custody papers filled out completely and correctly?	Yes
Do all bottle labels agree with custody papers?	Yes
Is the temperature blank or representative sample within acceptable limits? (above freezing to 6°C) or received on ice and recently taken?	Yes
Are all samples within holding time for requested laboratory tests?	Yes
Is a sufficient amount of sample provided to perform the tests included?	Yes
Are all samples in appropriate containers for the analyses requested?	Yes
Were volatile organic containers received?	Yes
Are all volatile organic and TOX containers free of headspace?	Yes
Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175.	No
Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis.	Yes

Sample "B2" to be analyzed without a trip blank. Zack Kiracofe notified at drop off.  
BAR 12/17/18 0948