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# Preliminary Site Assessment

Replace Bridge 87 Over the Norfolk Southern Railroad on NC 33

Parcel 15 - Sajah Properties

7330 NC 33 East, Grimesland, North Carolina

TIP No. B-5301

WBS Element: 46015.1.1

June 6, 2018

Terracon Project No. 70187117



**Prepared for:**

North Carolina Department of Transportation  
Raleigh, North Carolina

**Prepared by:**

Terracon Consultants, Inc.  
Raleigh, North Carolina

[terracon.com](http://terracon.com)

**Terracon**

Environmental



Facilities



Geotechnical



Materials

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Appendix B: Soil Boring Logs and Temporary Well Construction Logs

Appendix C: Laboratory Analytical Reports and Chain-of-Custody Forms

June 6, 2018

North Carolina Department of Transportation  
Attention: Mr. Gordon Box, LG  
GeoEnvironmental Engineering Unit  
Century Center Complex  
Building B  
1020 Birch Ridge Road  
Raleigh, North Carolina 27610

Re: Preliminary Site Assessment (PSA)  
Replace Bridge 87 Over the Norfolk Southern Railroad on NC 33  
Parcel 15 - Sajah Properties  
7330 NC 33 East, Grimesland, North Carolina  
TIP No. B-5301  
WBS Element: 46015.1.1

Dear Mr. Box:


Terracon Consultants, Inc. (Terracon) is pleased to submit a Preliminary Site Assessment (PSA) report for the above referenced site. This assessment was performed in accordance with our Proposal for Preliminary Site Assessment (Terracon Proposal No. P70187117) dated March 9, 2018. This report includes the findings of the investigation, and provides our conclusions and recommendations.

Terracon appreciates the opportunity to provide these services to the North Carolina Department of Transportation. If you have any questions concerning this report or need additional information, please contact us at 919-873-2211.

Sincerely,

**Terracon Consultants, Inc.**

Prepared by:

DocuSigned by:  
  
FE221351A43D42F...

William O. Frazier, P.G.  
Staff Geologist

Reviewed by:

DocuSigned by:  
  
CFC2FB1F9B60425

Michael T. Jordan, P.G.  
Environmental Department Manager



**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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# PRELIMINARY SITE ASSESSMENT

REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33

TIP NO. B-5301

WBS ELEMENT: 46015.1.1

PARCEL 15 - SAJAH PROPERTIES

7330 NC 33 EAST, GRIMESLAND, NORTH CAROLINA

## 1.0 INTRODUCTION

### 1.1 Site Description

<b>Site Name</b>	Replace Bridge 87 Over the Norfolk Southern Railroad on NC 33
<b>Site Location/Address</b>	7330 NC 33 East, Grimesland, North Carolina 27837 (Pitt County Tax PIN: 18599)
<b>General Site Description</b>	The site currently consists of an operating Citgo gas station and the associated convenience store. The gas station maintains four aboveground storage tanks (ASTs) within a cinderblock and concrete secondary containment structure. The remainder of the site consists of paved drive areas and landscaping.

### 1.2 Site History

The site is located at 7330 NC 33 East in Grimesland, Pitt County, North Carolina. At the time of the Preliminary Site Assessment (PSA), the site was observed as a Citgo gas station and the associated convenience store. According to the North Carolina Department of Environmental Quality (NCDEQ) – Division of Waste Management Underground Storage Tank (UST) Section Registered Tank Database, the facility previously maintained six USTs that were reportedly removed in 1988 and three 10,000-gallon USTs that were reportedly removed in 2008. The facility does not currently operate USTs; fuel sold by the facility is stored within four (4) ASTs located in the southeastern portion of the site.

Multiple Leaking UST (LUST) Incidents (Numbers 2991 and 87735) have been assigned to the facility. Groundwater contamination has been reported at the facility and a Notice of Residual Petroleum (NORP) was recorded with the deed to the property on May 29, 2015. As a result, NCDEQ issued the facility Conditional Notice of No Further Action status on June 4, 2015. Three existing groundwater monitoring wells (active) and the remnants of a former groundwater remediation system were observed at the facility; however, these features are not located within the proposed right-of-way (ROW).

## **Preliminary Site Assessment – B-5301**

Parcel 15 – Sajah Properties

7330 NC 33 East, Grimesland, NC

June 6, 2018 ■ Terracon Project No. 70187117



### **1.3 Scope of Work**

Terracon conducted the following PSA scope of work (SOW) in accordance with Terracon's Proposal for PSA (Proposal No. P70187117) dated March 9, 2018. This PSA is being completed prior to planned bridge replacement over the Norfolk Southern Railroad on NC 33 in Grimesland, North Carolina (site). The scope of work included a geophysical investigation, collection of soil and groundwater samples, and preparation of a report documenting our investigation activities. The PSA is not intended to delineate potential impacts. The PSA was performed within the proposed ROW as indicated by NCDOT provided plan sheets.

### **1.4 Standard of Care**

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either expressed or implied, regarding the findings, conclusions or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory agencies or other third parties supplying information used in the preparation of the report. These services were performed in accordance with our Proposal for Preliminary Site Assessment (Terracon Proposal No. P70187117) dated March 9, 2018 and were not conducted in accordance with ASTM E1903-11.

### **1.5 Additional Scope Limitations**

Findings, conclusions and recommendations resulting from these services are based upon information derived from the on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, undetectable or not present during these services; thus, we cannot represent that the site is free of hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this PSA. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

### **1.6 Reliance**

This report has been prepared for the exclusive use of the NCDOT. Authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the expressed written authorization of the client and Terracon.

## 2.0 FIELD ACTIVITIES

The following PSA activities are presented in the order that they were conducted in the field.

**Exhibit 1** presents the topography of the site on a portion of the USGS topographic quadrangle map of Grimesland, NC 1979. **Exhibits 2A and SB** depict a site layout plan that includes the approximate locations of the site features, soil boring locations, and analytical results.

### 2.1 Geophysical Survey

On April 18 and April 19, 2018, Geophysical Survey Investigations, PLLC conducted a geophysical investigation at the site in an effort to determine if unknown, metallic USTs were present beneath the proposed ROW area. The geophysical investigation included an electromagnetic (EM) induction survey using a Geonics EM61-MK2A metal detection instrument and a ground penetrating radar (GPR) survey using a Geophysical Survey Systems SIR-3000 unit.

The geophysical investigation did not identify potential USTs or other buried objects on the parcel. In addition to metal detection and GPR scans, the NC One Call public utility locator service was used to identify underground utility lines and to clear boring locations. A copy of the geophysical report is included in **Appendix A**.

### 2.2 Soil Sampling

Based on the findings of the geophysical investigation and Terracon's site observations, Terracon oversaw the advancement of ten soil borings (SB-01 through SB-10) along the northern and western portions of the parcel. The borings were advanced within the NCDOT ROW except for SB-06, SB-07, and SB-08, which were advanced immediately south of the ROW, as drill rig access to the ROW in these areas was restricted by the presence of vegetation, drainage features, utilities, and traffic along NC 33 East. The borings were completed by a North Carolina Certified Well Contractor (Regional Probing Services) using a truck-mount Geoprobe® 5410 direct-push drill rig.

Soil samples were collected in 5-foot, disposable, Macro-Core® sampler tubes to document soil lithology, color, moisture content, and sensory evidence of impacts. Each soil sample was screened for organic vapors using an 11.7 eV photoionization detector (PID). The PID data were collected in order to corroborate laboratory data and assist in selection of sample intervals for laboratory analysis. PID readings from the borings ranged from less than 0.1 parts per million (ppm) to 11.8 ppm.

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Based on the proposed disturbance depths and discussion with the NCDOT, each of the soil borings was advanced to a depth of approximately 10 feet below land surface (bls). Based on the results of the field screening, 20 soil samples, two from each boring, were collected from depths between approximately 2.5 feet and 7.5 feet bls. Samples were placed in laboratory provided sample containers and shipped to REDLAB/QROS, LLC – Environmental Testing for analysis by Ultraviolet Fluorescence (UVF). Soil samples were collected in the depth interval that was most likely to be impacted.

The drilling equipment used at the site was decontaminated prior to use and between the advancement of each boring. Non-dedicated sampling equipment was decontaminated using a Liquinox®/water wash followed by a distilled water rinse. Each of the boreholes was backfilled with hydrated bentonite pellets. Investigation derived waste (IDW) was spread on the site.

Soil generally consisted of fine- to medium-grained sand to depths of approximately 2 feet underlain by clay and silty clay. Groundwater was encountered at a depth of approximately 2,21 feet bls in temporary well TW-01. The soil boring logs are included in **Appendix B**. Sample locations were measured using a Trimble Geo7x GPS and are depicted on **Exhibits 2A and 2B**.

### 2.3 Groundwater Sampling

Based on the results of the field screening, boring SB-02 was advanced to 12 feet bls and converted into temporary monitoring well TW-01, which was constructed as follows:

- Installation of a 10-foot section of 1-inch diameter, 0.010-inch machine slotted PVC well screen;
- Installation of a 2-foot section of 1-inch diameter, threaded, flush-joint PVC riser pipe to the ground surface; and
- Placement of sand in the borehole annulus to approximately two feet above the screened interval, followed by a layer of hydrated bentonite.

A groundwater sample was collected from TW-01 using low flow sampling techniques (i.e., <200 milliliters per minute). Groundwater parameters (pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, and temperature) were monitored and the well was purged until the parameters stabilized (i.e. three consecutive readings were within approximately 5 percent of one another). After the purging was complete, the sample was collected directly into laboratory supplied containers, packed in ice, and shipped to Shealy Environmental Services, Inc. (Shealy) in Columbia, South Carolina for analysis of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) by United States Environmental Protection Agency (USEPA) Method 8260B and USEPA Method 8270D, respectively.

### 3.0 LABORATORY ANALYSES

Soil samples were submitted to QROS for analysis of the following:

- TPH-gasoline range organics (C<sub>5</sub>-C<sub>10</sub>) (TPH-GRO);
- TPH-diesel range organics (C<sub>10</sub>-C<sub>35</sub>) (TPH-DRO);
- Total petroleum hydrocarbons (C<sub>5</sub>-C<sub>35</sub>) (TPH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Total aromatics (C<sub>10</sub>-C<sub>35</sub>);
- 16 EPA Polycyclic Aromatic Hydrocarbons (16 EPA PAHs); and
- Benzo(a)pyrene (BaP).

Groundwater samples were submitted to Shealy for analysis of the following:

- VOCs via USEPA Method 8260B; and
- SVOCs via USEPA Method 8270D.

Please refer to **Appendix C** for the laboratory analytical reports.

### 4.0 DATA EVALUATION

#### 4.1 Soil Analytical Results

Laboratory analysis reported the following detections above the laboratory reporting limits in soil borings SB-01 through SB-10:

- BTEX was reported at a concentration of 87 milligrams per kilogram (mg/kg) in SB-03 (4.5 ft);
- TPH-GRO was reported within SB-02 (6 ft), SB-03 (4.5 ft), SB-04 (9 ft), SB-04 (2 ft), SB-04 (7.5 ft), and SB-06 (7.5 ft) at concentrations ranging from 0.76 mg/kg to 239.9 mg/kg;
- TPH-DRO was reported within each sample collected except for SB-08 (2.5 ft) and SB-10 (7.5 ft) at concentrations ranging from 0.18 mg/kg to 319.3 mg/kg;
- TPH (C<sub>5</sub>-C<sub>35</sub>) was reported in each sample collected except for SB-10 (7.5 ft) at concentrations ranging from 0.14 mg/kg to 559.2 mg/kg;

## Preliminary Site Assessment – B-5301

Parcel 15 – Sajah Properties

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- Total aromatics (C<sub>10</sub>-C<sub>35</sub>) was reported in each sample collected at concentrations ranging from 0.13 mg/kg to 70.6 mg/kg;
- 16 EPA PAHs was reported within SB-03 (4.5') at a concentration of 0.8 mg/kg and within SB-04 (2') at a concentration of 3.4 mg/kg; and
- BaP was reported within SB-04 (2') at a concentration of 0.037 mg/kg.

Laboratory analysis identified concentrations in excess of the NCDEQ Action Level for TPH-GRO (50 mg/kg) and TPH-DRO (100 mg/kg) in SB-03 (4.5').

Concentrations of TPH-GRO and TPH-DRO were not identified about their respective NCDEQ Action Levels in the remaining borings.

**Table 1** summarizes the results of the analyses of the soil samples. **Exhibits 2A and 2B** depict the boring locations and detected compounds.

## 4.2 Groundwater Analytical Results

Laboratory analysis reported the following detections above the laboratory reporting limits in TW-01:

- The following VOCs were detected within TW-01: benzene, cyclohexane, ethylbenzene, isopropylbenzene, methyl tertiary butyl ether (MTBE), methylcyclohexane, toluene, and xylenes (total). The detected concentrations of benzene and MTBE exceed their respective NCAC 2L Standards.
- The following SVOC was detected within TW-01: naphthalene. The detected concentration does not exceed its NCAC 2L Standards.

**Table 2** summarizes the results of the analyses of the groundwater sample.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this investigation are discussed below.

- The geophysical investigation did not identify possible or probable buried objects or metallic USTs within the NCDOT ROW or permanent utility easement on the parcel.
- Laboratory analysis reported concentrations of petroleum constituents in each soil boring advanced at the site. Of the detected concentrations, the concentrations of TPH-GRO and TPH-DRO within SB-03 (4.5') exceed the NCDEQ Action Levels.

## Preliminary Site Assessment – B-5301

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- The area of contamination appears to be localized to the north and northeast of the existing pump islands. An estimated weight of petroleum impacted soil in this area is 507 tons, or 338 cubic yards. This calculation assumes a rectangular area of approximately 1,825 square feet and an average depth of disturbance of 5 feet (based on the proposed stormwater drainage pipe installation). The actual amount of impacted soil can only be determined after excavation or by advancing additional borings at the site to further delineate the extents of contamination.
- Laboratory analysis reported concentrations of multiple VOCs and one SVOC within groundwater at the site. The detected concentrations of benzene and MTBE exceed the compounds' respective 2L Standards.
- Terracon recommends NCDOT provide a copy of the results to the owner and/or operator of the site.
- Terracon recommends NCDOT provided a copy of the results to NCDEQ.
- Terracon does not recommend further assessment of the ROW at this site. However, based on detections of petroleum compounds, impacted soil and groundwater encountered during NCDOT's project should be managed and/or disposed of in accordance with applicable local and State requirements. In addition, construction workers should be alert for potential soil and/or groundwater impacts at the site.

## 6.0 REFERENCES

NCDOT, August. Revised GeoEnvironmental Report for Preliminary Site Assessments. "Hazardous Material Report." August 30, 2016.



## **TABLES**

**Table 1**  
**Summary of Soil Analytical Results**  
**Preliminary Site Assessment**  
**Parcel 15 - Sajah Properties**  
**Grimesland, Pitt County, North Carolina**  
**Terracon Project No. 70187117**

Sample ID: Sample Depth (ft bls):	SB-01 2.5	SB-01 7.5	SB-02 3.5	SB-02 6	SB-03 4.5	SB-03 9	SB-04 2	SB-04 7.5	SB-05 2.5	SB-05 7.5	SB-06 2.5	SB-06 7.5	SB-07 2.5	SB-07 7.5	SB-08 2	SB-08 7.5	SB-09 2.5	SB-09 7.5	SB-10 2.5	SB-10 7.5	NCDEQ Action Level	MSCC Industrial/Commercial
BTEX (C <sub>6</sub> - C <sub>9</sub> )	<0.5	<0.2	<0.5	<0.6	<b>87</b>	<0.32	<0.55	<0.5	<0.18	<0.54	<0.48	<0.52	<0.51	<0.19	<0.59	<0.22	<0.2	<0.53	<0.49	<0.22	NE	NE
GRO (C <sub>5</sub> - C <sub>10</sub> )	<0.5	<0.2	<0.5	<b>0.98</b>	<b>239.9</b>	<b>0.76</b>	<b>25.6</b>	<b>3</b>	<0.18	<b>1.8</b>	<0.48	<0.52	<0.51	<0.19	<0.59	<0.22	<0.2	<0.53	<0.49	<0.22	50	NE
DRO (C <sub>10</sub> - C <sub>35</sub> )	<b>1.8</b>	<b>0.64</b>	<b>1.1</b>	<b>5.3</b>	<b>319.3</b>	<b>0.9</b>	<b>71.7</b>	<b>0.69</b>	<b>0.18</b>	<b>3.6</b>	<b>1.1</b>	<b>2.3</b>	<0.51	<b>0.19</b>	<b>8.9</b>	<b>0.37</b>	<b>1.3</b>	<b>4.1</b>	<b>0.49</b>	<0.22	100	NE
TPH (C <sub>5</sub> - C <sub>35</sub> )	<b>1.8</b>	<b>0.64</b>	<b>1.1</b>	<b>6.3</b>	<b>559.2</b>	<b>1.66</b>	<b>97.3</b>	<b>3.69</b>	<b>0.18</b>	<b>5.4</b>	<b>1.1</b>	<b>2.3</b>	<0.51	<b>0.19</b>	<b>8.9</b>	<b>0.37</b>	<b>1.3</b>	<b>4.1</b>	<b>0.49</b>	<b>0.14</b>	NE	NE
Total Aromatics (C <sub>10</sub> -C <sub>35</sub> )	<b>0.29</b>	<b>0.36</b>	<b>0.48</b>	<b>3.9</b>	<b>20.3</b>	<b>0.42</b>	<b>70.6</b>	<b>0.44</b>	<b>0.13</b>	<b>2.4</b>	<b>0.53</b>	<b>1.5</b>	<0.1	<b>0.19</b>	<b>1.4</b>	<b>0.16</b>	<b>0.52</b>	<b>2.6</b>	<b>0.31</b>	<b>0.14</b>	NE	NE
16 EPA PAHs	<0.16	<0.07	<0.16	<0.19	<b>0.8</b>	<0.1	<b>3.4</b>	<0.16	<0.06	<0.17	<0.15	<0.17	<0.16	<0.06	<0.19	<0.07	<0.06	<0.17	<0.16	<0.07	NE	NE
BaP	<0.02	<0.008	<0.02	<0.024	<0.023	<0.013	<b>0.037</b>	<0.02	<0.007	<0.022	<0.019	<0.021	<0.02	<0.008	<0.024	<0.009	<0.008	<0.021	<0.019	<0.009	NE	0.78

**Notes:**

Soil samples were collected on April 23, 2018.

Detected compounds are shown in the table.

Concentrations are reported in milligrams per kilogram (mg/kg).

ft bls - feet below land surface.

GRO - Gasoline Range Organics.

DRO - Diesel Range Organics.

TPH - Total Petroleum Hydrocarbons.

BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes.

16 EPA PAHs - Environmental Protection Agency Polycyclic Aromatic Hydrocarbons (acenaphthene, acenaphthylene, antracene,

benz[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, benzo[g,h,i]perylene, benzo[a]pyrene,

chrysene, dibenz[a,h]anthracene, fluoranthene, fluorene, indeno[1,2,3-c,d]pyrene, naphthalene, phenanthrene, pyrene).

NE - Standard not established.

Detections shaded in gray exceed the North Carolina Department of Environmental Quality (NCDEQ) Action Level.

MSCC Industrial/Commercial - Maximum Soil Contaminant Concentration Levels Industrial/Commercial soil cleanup levels.

Bold: Constituent concentration reported above the method detection limit.

Table 2  
 Summary of Groundwater Analytical Results  
 Preliminary Site Assessment  
 Parcel 15 - Sajah Properties  
 Grimesland, Pitt County, North Carolina  
 Terracon Project No. 70187117

Sample ID:	TW-01	NCAC 2L Standard
Sample Date:	04/23/18	
Screen Interval (ft bls):	2-12	
<b>Volatiles Organic Compounds (EPA Method 8260) - (µg/L)</b>		
Benzene	38	1
Cyclohexane	6.7	NE
Ethylbenzene	27	600
Isopropylbenzene	4.5	70
Methyl tertiary butyl ether (MTBE)	33	20
Methylcyclohexane	0.65 J	NE
Toluene	0.42 J	600
Xylenes (Total)	9.8	500
<b>Semi-Volatile Organic Compounds (EPA Method 8270) - (µg/L)</b>		
Naphthalene	4.2	6

Notes:

Compounds detected above laboratory reporting limits are shown in the table

Concentrations are reported in micrograms per liter (µg/L)

NCAC 2L Standard - North Carolina Administrative Code

Subchapter 2L Groundwater Quality Standards (April 1, 2013)

\*Interim Maximum Allowable Concentration

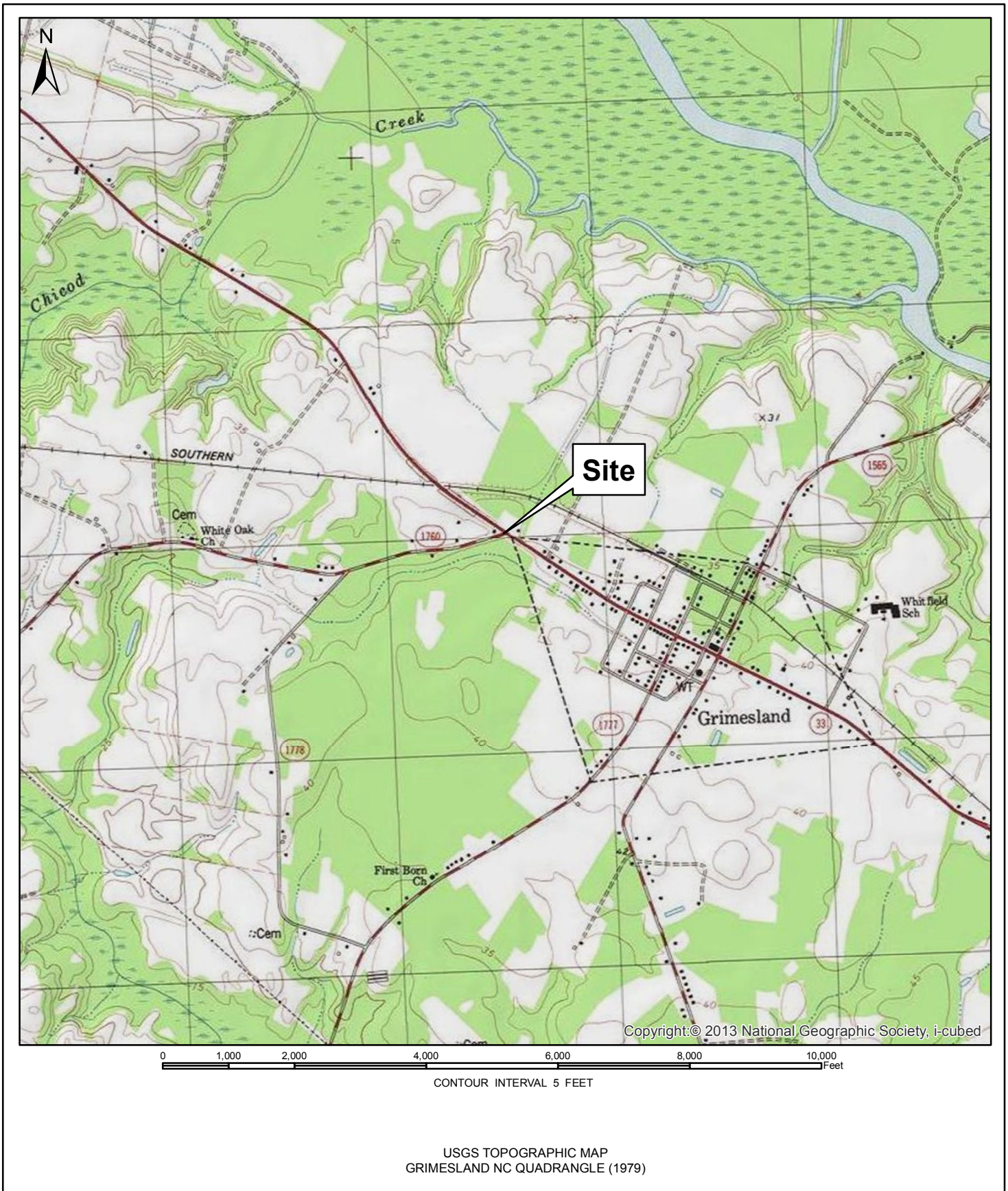
Detections in excess of a standard or screening level are shaded

ft bls: feet below land surface

NE: Not established

J: Estimated concentration between the method detection limit and the reporting limit

## FIGURES



PM: SJK  
 Drawn By: WOF  
 Checked By: WOF  
 Approved By: MTJ

Project No. 70187117  
 Scale: 1:24,000  
 File Path:  
 Date: 5/7/2018

**Terracon**

2401 Brentwood Drive, Suite 107 Raleigh, NC 27604  
 Phone: (919) 873-2211 Fax: (919) 873-9555

**Topographic Vicinity Map**

Preliminary Site Assessment  
 U-5301  
 Grimesland, Pitt County, North Carolina

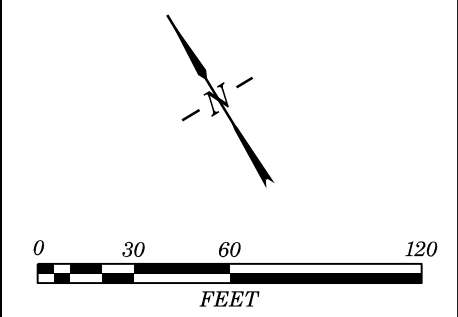
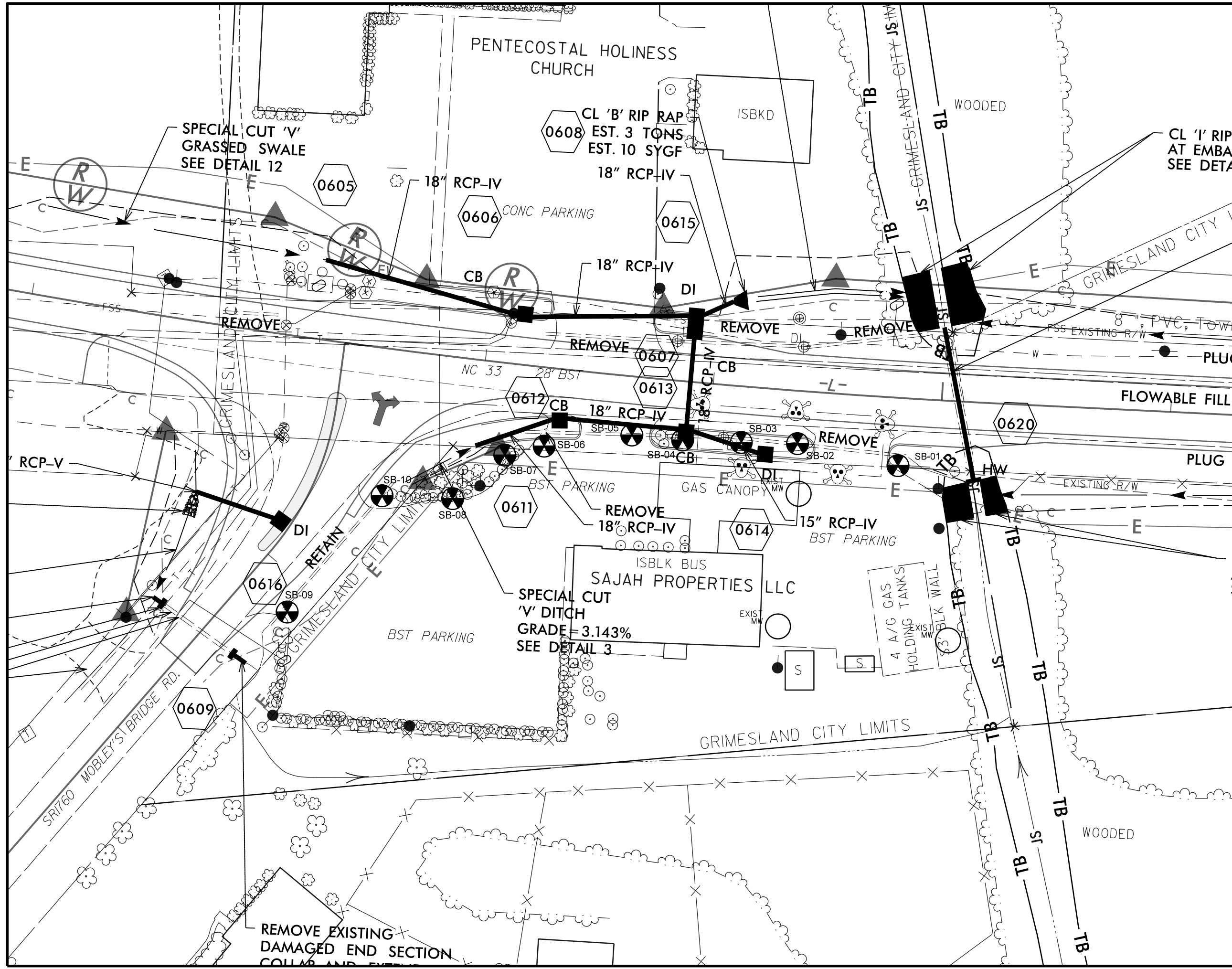
EXHIBIT NO. 1

**SITE DIAGRAM WITH BORING LOCATIONS**

PARCEL 15  
SAJAH PROPERTIES  
7330 NC 33 E.  
GRIMESLAND, PITT COUNTY

**LEGEND**

- PROPERTY LINE
- - - EXISTING RIGHT OF WAY LINE
- PROPOSED RIGHT OF WAY WITH PIN AND CAP
- - - EXISTING EDGE OF PAVEMENT
- - - PROPOSED EDGE OF TRAVEL
- - - PROPOSED CUT / FILL LINE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE PIPING
- ☠ AREA OF KNOWN CONTAMINATION
- ⊗ BORING LOCATION
- EXISTING MONITORING WELL





**SITE DIAGRAM WITH BORING LOCATIONS AND ANALYTICAL DATA**

**PARCEL 15  
SAJAH PROPERTIES  
7330 NC 33 E.  
GRIMESLAND, PITT COUNTY**

**LEGEND**

- PROPERTY LINE
- EXISTING RIGHT OF WAY LINE
- ⊕ PROPOSED RIGHT OF WAY WITH PIN AND CAP
- EXISTING EDGE OF PAVEMENT
- PROPOSED EDGE OF TRAVEL
- - - PROPOSED CUT / FILL LINE
- PROPOSED CATCH BASIN
- PROPOSED DRAINAGE PIPING
- ☠ AREA OF KNOWN CONTAMINATION
- ⊗ BORING LOCATION
- ⊙ EXISTING MONITORING WELL

SOIL SAMPLES WERE COLLECTED ON APRIL 23, 2018

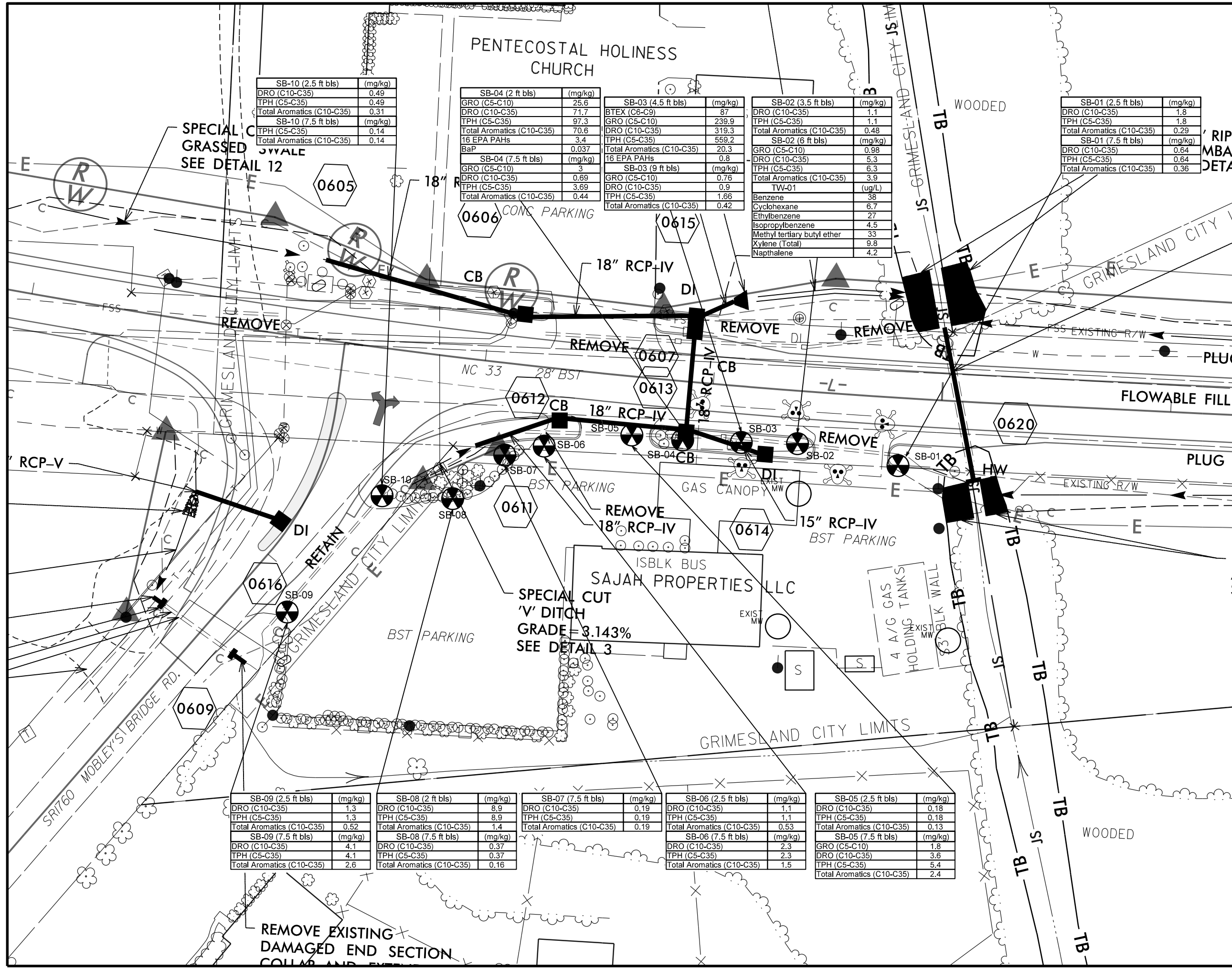
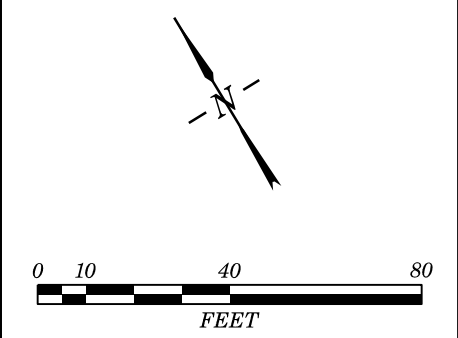
SOIL CONTAMINANT CONCENTRATIONS ARE REPORTED IN MILLIGRAMS PER KILOGRAMS (mg/kg)

GROUNDWATER CONTAMINANT CONCENTRATIONS ARE REPORT IN MICROGRAMS PER LITER (ug/L)

ft bls - FEET BELOW LAND SURFACE

DETECTED COMPOUNDS ARE SHOWN IN THE TABLE

GRO (C5-C10) - GASOLINE RANGE ORGANICS  
DRO (C10-C35) - DIESEL RANGE ORGANICS  
TPH - TOTAL PETROLEUM HYDROCARBONS  
BTEX - BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES  
16 EPA PAHs - ENVIRONMENTAL PROTECTION AGENCY POLYCYCLIC AROMATIC HYDROCARBONS



SB-10 (2.5 ft bls) (mg/kg)	
DRO (C10-C35)	0.49
TPH (C5-C35)	0.49
Total Aromatics (C10-C35)	0.31
SB-10 (7.5 ft bls) (mg/kg)	
TPH (C5-C35)	0.14
Total Aromatics (C10-C35)	0.14

SB-04 (2 ft bls) (mg/kg)	
GRO (C5-C10)	25.6
DRO (C10-C35)	71.7
TPH (C5-C35)	97.3
Total Aromatics (C10-C35)	70.6
16 EPA PAHs	3.4
BaP	0.037
SB-04 (7.5 ft bls) (mg/kg)	
GRO (C5-C10)	3
DRO (C10-C35)	0.69
TPH (C5-C35)	3.69
Total Aromatics (C10-C35)	0.44

SB-03 (4.5 ft bls) (mg/kg)	
BTEX (C6-C9)	87
GRO (C5-C10)	239.9
DRO (C10-C35)	319.3
TPH (C5-C35)	559.2
Total Aromatics (C10-C35)	20.3
16 EPA PAHs	0.8
SB-03 (9 ft bls) (mg/kg)	
GRO (C5-C10)	0.76
DRO (C10-C35)	0.9
TPH (C5-C35)	1.66
Total Aromatics (C10-C35)	0.42

SB-02 (3.5 ft bls) (mg/kg)	
DRO (C10-C35)	1.1
TPH (C5-C35)	1.1
Total Aromatics (C10-C35)	0.48
SB-02 (6 ft bls) (mg/kg)	
GRO (C5-C10)	0.98
DRO (C10-C35)	5.3
TPH (C5-C35)	6.3
Total Aromatics (C10-C35)	3.9
TW-01 (ug/L)	
Benzene	38
Cyclohexane	6.7
Ethylbenzene	27
Isopropylbenzene	4.5
Methyl tertiary butyl ether	33
Xylene (Total)	9.8
Napthalene	4.2

SB-01 (2.5 ft bls) (mg/kg)	
DRO (C10-C35)	1.8
TPH (C5-C35)	1.8
Total Aromatics (C10-C35)	0.29
SB-01 (7.5 ft bls) (mg/kg)	
DRO (C10-C35)	0.64
TPH (C5-C35)	0.64
Total Aromatics (C10-C35)	0.36

SB-09 (2.5 ft bls) (mg/kg)	
DRO (C10-C35)	1.3
TPH (C5-C35)	1.3
Total Aromatics (C10-C35)	0.52
SB-09 (7.5 ft bls) (mg/kg)	
DRO (C10-C35)	4.1
TPH (C5-C35)	4.1
Total Aromatics (C10-C35)	2.6

SB-08 (2 ft bls) (mg/kg)	
DRO (C10-C35)	8.9
TPH (C5-C35)	8.9
Total Aromatics (C10-C35)	1.4
SB-08 (7.5 ft bls) (mg/kg)	
DRO (C10-C35)	0.37
TPH (C5-C35)	0.37
Total Aromatics (C10-C35)	0.16

SB-07 (7.5 ft bls) (mg/kg)	
DRO (C10-C35)	0.19
TPH (C5-C35)	0.19
Total Aromatics (C10-C35)	0.19

SB-06 (2.5 ft bls) (mg/kg)	
DRO (C10-C35)	1.1
TPH (C5-C35)	1.1
Total Aromatics (C10-C35)	0.53
SB-06 (7.5 ft bls) (mg/kg)	
DRO (C10-C35)	2.3
TPH (C5-C35)	2.3
Total Aromatics (C10-C35)	1.5

SB-05 (2.5 ft bls) (mg/kg)	
DRO (C10-C35)	0.18
TPH (C5-C35)	0.18
Total Aromatics (C10-C35)	0.13
SB-05 (7.5 ft bls) (mg/kg)	
GRO (C5-C10)	1.8
DRO (C10-C35)	3.6
TPH (C5-C35)	5.4
Total Aromatics (C10-C35)	2.4



**APPENDIX A**

**GEOPHYSICAL SURVEY REPORT**

**TERRACON CONSULTANTS, INC.**

**GEOPHYSICAL INVESTIGATION  
TO LOCATE METALLIC USTS**

**Sajah Properties, LLC (Parcel 15) Property  
7330 Pitt Street (NC-33)  
Grimesland, North Carolina**



April 28, 2018  
Geophysical Survey Investigations, PLLC Project No. 2018-16



4 Willimantic Drive, Greensboro, NC 27455  
Office Tel: (336) 286-9718  
denilm@bellsouth.net

**TERRACON CONSULTANTS, INC.  
GEOPHYSICAL INVESTIGATION  
TO LOCATE METALLIC USTS  
Sajah Properties, LLC (Parcel 15) Property  
7330 Pitt Street (NC-33)  
Grimesland, North Carolina**

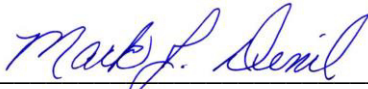
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3.0 DISCUSSION OF RESULTS .....	2
4.0 SUMMARY & CONCLUSIONS .....	3
5.0 LIMITATIONS .....	4

FIGURES

Figure 1	Geophysical Equipment & Site Photographs
Figure 2	EM61-MK2A Metal Detection – Early Time Gate Results
Figure 3	EM61-MK2A Metal Detection – Differential Results

Prepared by:

  
\_\_\_\_\_  
**Mark J. Denil, P.G.**

## **1.0 INTRODUCTION**

Geophysical Survey Investigations, PLLC (GSI) conducted an electromagnetic (EM) metal detection survey, ground penetrating radar (GPR) scanning and buried, utility line clearance search for Terracon Consultants, Inc. on April 18 and 19, 2018 across the westerly and northerly portions of the Sajah Properties, LLC (Parcel 15) property located at the intersection at 7330 Pitt Street (NC-33) near Grimesland, North Carolina. The work was conducted as part of the North Carolina Department of Transportation (NCDOT) site assessment for TIP Project B-5301 (WBS Element No. 46015.11).

The geophysical investigation was conducted to determine if metallic, underground, storage tanks (USTs) are present within the proposed Right-of-Way (ROW) on the Sajah Properties, LLC site. Terracon Consultants representative Mr. William Frazier was on site during the geophysical investigation and provided guidance and assistance during data acquisition to Geophysical Survey Investigations, PLLC personnel. The geophysical survey area has a maximum length and width of 260 feet and 140 feet, respectively. Presently, the property comprises of an active gas station, convenient store facility surrounded primarily by asphalt pavement and a pump island area.

## **2.0 FIELD METHODOLOGY**

The EM investigation was performed across the survey area using a Geonics EM61-MK2A metal detection instrument with a Hemisphere A101 GPS unit. EM61 metal detection data and GPS coordinates were digitally collected in latitude and longitude geodetic format (NAD83) using a Juniper data recorder at approximately 1.0 foot intervals along survey lines spaced approximately five feet apart. The Trackmaker NAV61MK2 software program was used with the data recorder to view the relative positions of the survey lines in real time during data acquisition. A Honda Recon ATV was used to tow the EM61 instrument, GPS unit and data recorder during data acquisition.

According to the instrument specifications, the EM61-MK2A can detect a metal drum down to a maximum depth of approximately 8 to 10 feet. Objects less than one foot in size can be detected to a maximum depth of 4 or 5 feet. The EM61 and GPS data were downloaded to a computer and processed in the field using the Trackmaker61MK2 and Surfer for Windows software programs. GPS

coordinates were converted during data processing to Universal Transverse Mercator (UTM) coordinates (in feet) which are used as location control in this report.

GPR scanning was conducted across selected EM61 differential metal detection anomalies and across areas containing steel reinforced concrete. GPR scans were performed along northerly-southerly and easterly-westerly directions spaced primarily 3 to 5 feet apart across the selected EM61 differential anomalies using the Geophysical Survey Systems SIR-3000 unit equipped with a 400 MHz antenna. GPR data were viewed in real time in a continuous mode using a vertical scan of 512 samples, at a sampling rate of 48 scans per second. A 70 MHz high pass filter and an 800 MHz low pass filter were used during data acquisition with the 400 MHz antenna. GPR data were viewed to a maximum investigating depth of approximately 6.0 feet based on an estimated two-way travel time of 8.0 nanoseconds per foot.

Following the UST investigation, the geophysical survey area (ROW area) was scanned with the GPR unit and a DitchWitch 910 utility locator for buried utility line clearance. Detected buried lines were marked in the field with orange marking paint. Photographs of the geophysical equipment used for the investigation and of the site are presented in **Figure 1**.

### **3.0 DISCUSSION OF RESULTS**

Contour plots of the EM61 early time gate results and the EM61 differential results are presented in **Figures 2 and 3**, respectively. The early time gate results represent the most sensitive component of the EM61 instrument and detect metal objects regardless of size. The early time gate response can be used to delineate metallic conduits or utility lines, small, isolated, metal objects and areas containing insignificant metal debris. The differential results are obtained from the difference between the early time gate channel and late time gate channel of the EM61 instrument. The differential results focus on the larger metal objects such as drums and UST-size objects and ignore the smaller, insignificant, metal objects and debris.

The linear, EM61 early time gate anomalies intersecting UTM coordinates 986198-E 12920717-N, 986249-E 12920677-N and 986285-E 12920660-N are probably in response to a culvert, drain line

and conduit, respectively. The EM61 early time gate anomalies intersecting coordinates 986036-E 12920686-N, 986129-E 12920728-N and 986158-E 12920718-N are probably in response to known surface objects such as bollards, sign poles, water meter covers, and a telephone.

GPR scanning suggests the EM61 differential metal detection anomaly centered near coordinates 986319-E 12920629-N is in response to the edge of a culvert. GPR scanning suggests the EM61 differential anomaly centered near coordinates 986257-E 12920654-N is in response to steel reinforced concrete. The remaining EM61 anomalies not discussed in this summary are probably in response to known surface objects, buried utility lines, steel reinforced concrete, or to buried, miscellaneous, metal debris. The geophysical investigation suggests that the proposed ROW area at Parcel 15 does not contain metallic USTs.

As previously mentioned, scanning for utility line clearance purposes was conducted across the geophysical survey area. Detected lines or conduits were marked in the field with orange marking paint and pin flags.

#### **4.0 SUMMARY & CONCLUSIONS**

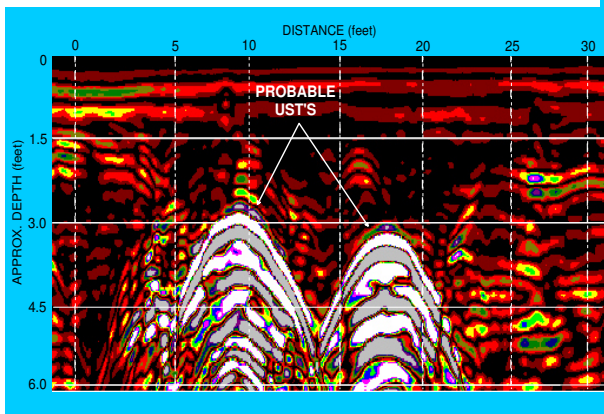
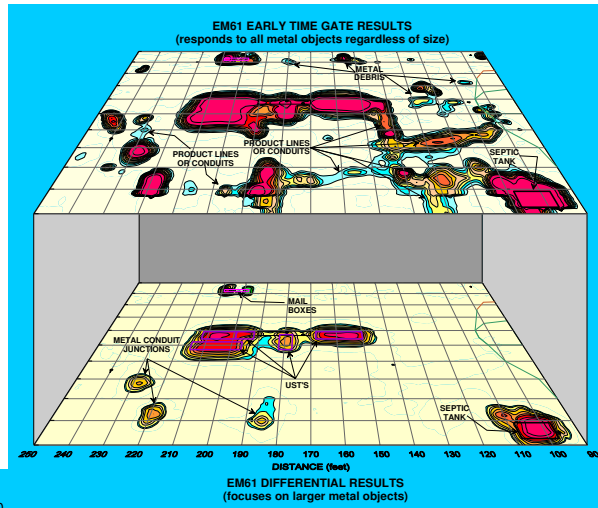
Our evaluation of the EM61 and GPR data collected across the geophysical survey area at the Sajah Properties, LLC (Parcel 15) property located at 7330 Pitt Street near Grimesland, North Carolina provides the following summary and conclusions:

- The combination of EM61 and GPR surveys provided reliable results for the detection of metallic USTs across the survey area within the depth interval of 0 to 6 feet.
- All of the linear, EM61 early time gate anomalies are probably in response to buried metallic utility lines, conduits, culverts, or possible product lines.
- The geophysical investigation suggests that the proposed ROW area at Parcel 15 does not contained metallic USTs.

## **5.0 LIMITATIONS**

EM61 and GPR surveys have been performed and this report prepared for Terracon Consultants, Inc. in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the geophysical surveys are non-unique and may not represent actual subsurface conditions. Some of the EM61 and GPR anomalies interpreted as possible/probable USTs, utility lines, conduits, steel reinforced concrete, or miscellaneous, metal debris may be attributed to other surface or subsurface features and/or interference from cultural features.

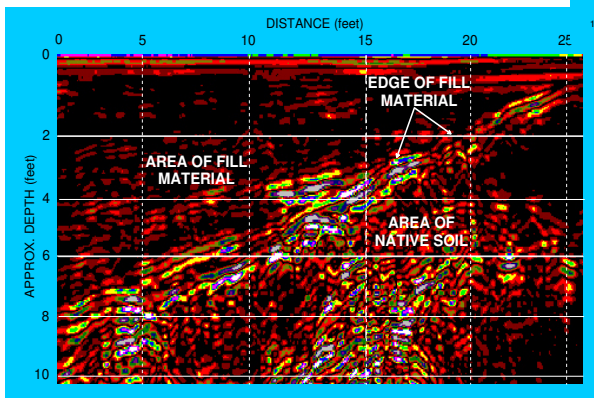
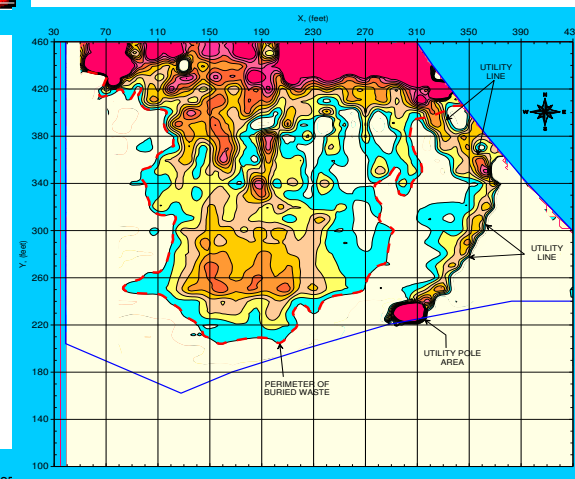


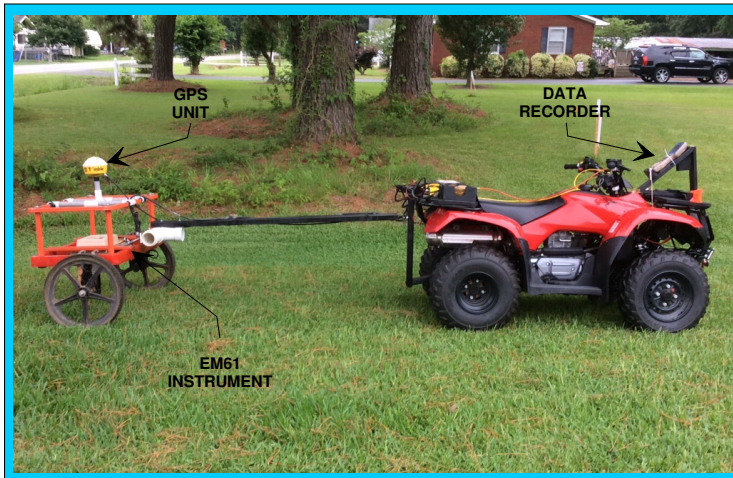


## REPORT FIGURES

(on the following pages)

Figures shown on this page are for  
esthetic purposes only and are not  
related to the site discussed in this report





**EM61 METAL DETECTOR**

The photograph shows the Geonics EM61-MK2A metal detector, a Hemisphere A101 GPS unit, a Juniper data recorder, and a Honda Recon ATV which were used to conduct the metal detection survey across the proposed ROW & easement areas of Parcel 15.

**GROUND PENETRATING RADAR UNIT**

The photograph shows the Geophysical Survey Systems SIR-3000 ground penetrating radar (GPR) unit equipped with a 400 MHz antenna that were used to conduct the GPR scanning across selected areas.

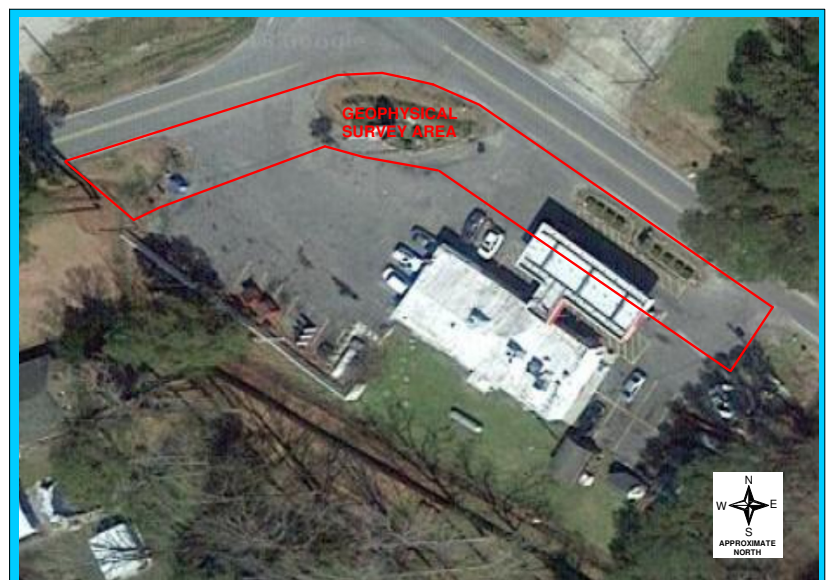


**DITCHWITCH UTILITY LOCATOR**

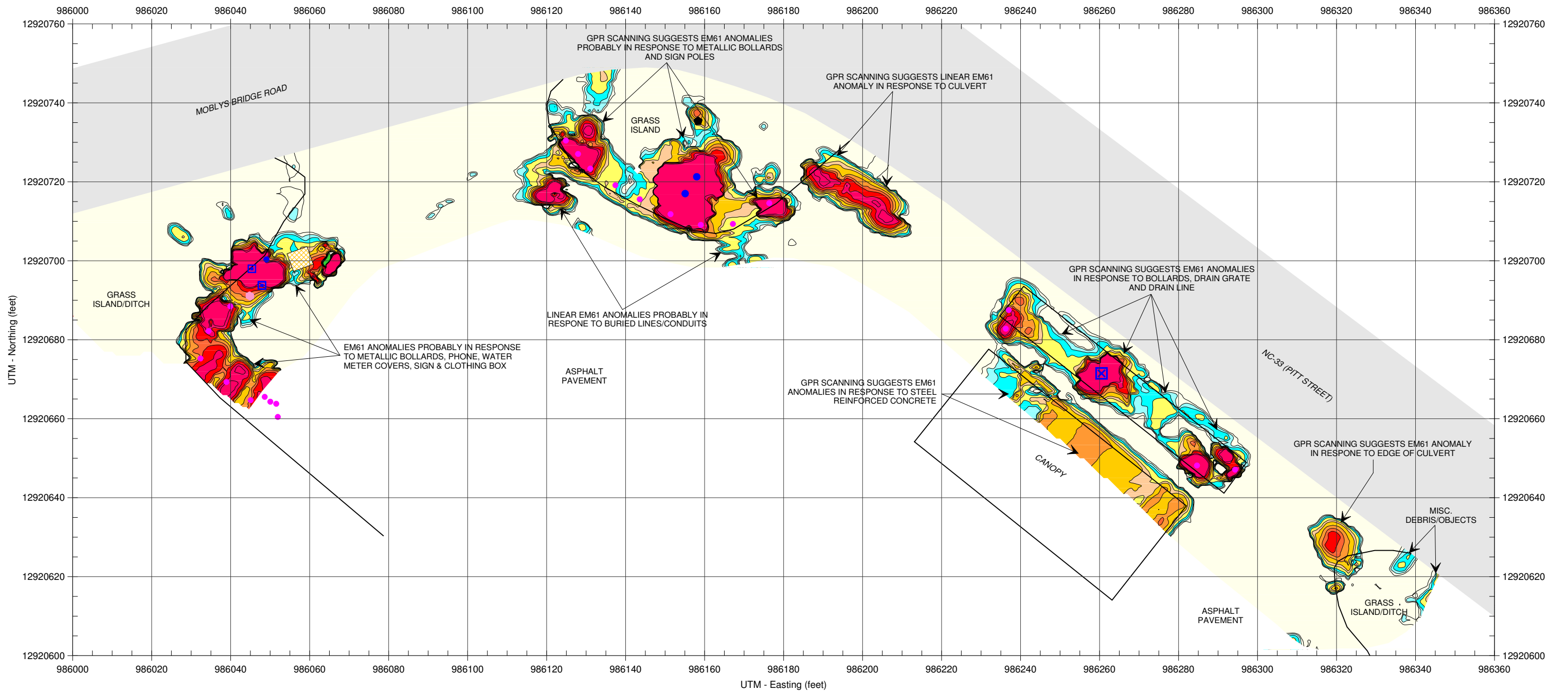
The photograph shows the DitchWitch 910 utility locator which was used to detect buried lines across the geophysical survey area.

**GEOPHYSICAL SURVEY AREA**

The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 15. The geophysical investigation was conducted on April 18-19, 2018.



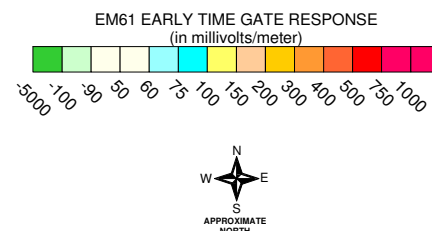




The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 15.

**LEGEND**

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- CLOTHING DONATION BOX
- WATER METER COVER
- ROAD SIGN
- TELEPHONE BOOTH
- METAL SIGN POLE
- STORM SEWER GRATE
- BOLLARDS

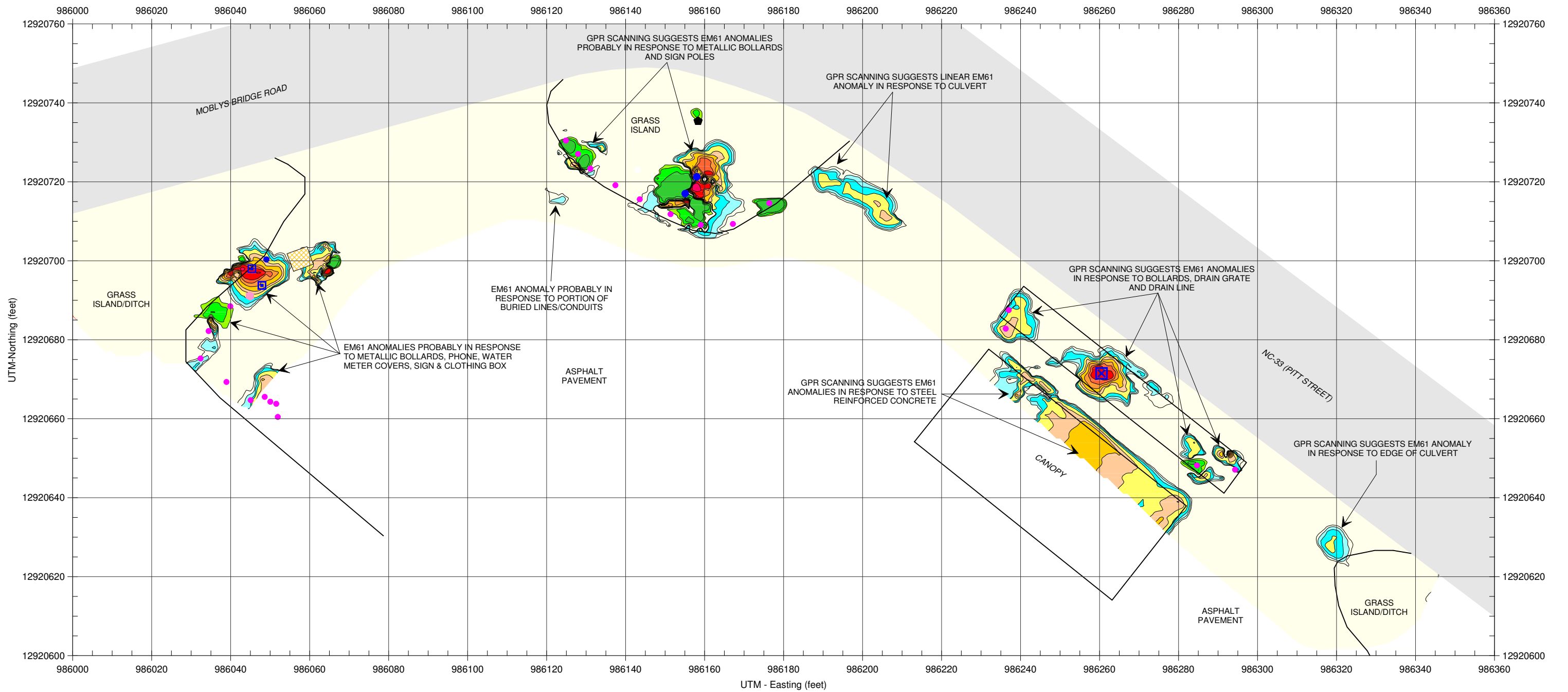


The contour plot shows the early time gate (most sensitive) response of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The early time gate response shows buried, metallic objects, lines and conduits regardless of size. GPR scans were conducted across selected EM61 anomalies and steel reinforced concrete using a Geophysical Survey Systems SIR 3000 instrument with a 400 MHz antenna. The geophysical investigation was conducted on April 18-19, 2018.

**EM61-MK2A METAL DETECTION  
(EARLY TIME GATE RESULTS)**

Terracon Consultants, Inc.  
Sajah Properties, LLC (Parcel 15) Property  
7330 Pitt Street  
Grimesland, North Carolina

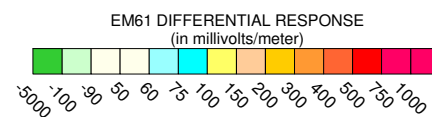




The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 15.

**LEGEND**

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- CLOTHING DONATION BOX
- WATER METER COVER
- ROAD SIGN
- TELEPHONE BOOTH
- METAL SIGN POLE
- STORM SEWER GRATE
- BOLLARDS



Note: The contour plot shows the differential response between the early time gate and the late time gate channels of the Geonics EM61-MK2A metal detection instrument in millivolts (mV). The differential response focuses on larger, buried, metallic objects such as drums and USTs and ignores smaller miscellaneous, metal debris. Ground penetrating radar (GPR) scans were conducted across selected EM61 anomalies and areas containing reinforced concrete using a Geophysical Survey Systems SIR 3000 unit with a 400 MHz antenna. The geophysical investigation was conducted on April 18-19, 2018.

**EM61-MK2A METAL DETECTION  
(DIFFERENTIAL RESULTS)**

Terracon Consultants, Inc.  
Sajah Properties, LLC (Parcel 15) Property  
7330 Pitt Street  
Grimesland, North Carolina



**APPENDIX B**

**SOIL BORING LOGS AND TEMPORARY  
WELL CONSTRUCTION LOGS**

Lithology Log



Boring ID: SB-01

Project Number:	70187117	Start Date/Time:	4/23/2018	Sample Method	Drilling Method
Site Location:	Grimesland NC	End Date/Time:	4/23/2018	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Logged By:	JC	Total Depth:	10 ft bls	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA		<input type="checkbox"/> Rock Core

Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			<0.1	CL	(0-0.5) ORGANICS	SB 01 (2.5') 09:35	
			<0.1		(0.5-10): grey / light brown CLAY, wet, moist at 4 ft bls, silt interlayered at 6 and 10 ft bls		
5-10			<0.1			SB 01 (7.5') 09:40	
			<0.1				
Boring terminated 10 ft bls per scope							

Notes:

ppm= parts per million      ppb= parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-02

Project Number:	70187117	Start Date/Time:	4/23/18	Sample Method	Drilling Method
Site Location:	Grimesland NC	End Date/Time:	4/23/18		
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Logged By:	JC	Total Depth:	10 ft bls	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Drilling Sub:	RPS	Water Level:	2.21 ft bls	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	TW-01	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
				<input type="checkbox"/> Rock Core	

Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			<0.1	SM	(0-0.5) ORGANICS/FILL	SB 02 (3.5') 13:05	
			<0.1	SC	(0.5-2.5): grey/dark grey SILT, light petroleum odor, moist		
			0.1	SC	(2.5-7): dark grey SILTY CLAY, soft, wet, petroleum odor, light brown/grey at 5 ft bls, grey at 6 ft bls		
5-10			0.2	SC		SB 02 (6') 13:10	
			<0.1	CL	(7-10): olive/grey CLAY, plastic, petroleum odor, moist, blue at 10 ft bls		
Boring terminated 10 ft bls per scope							

Notes:

ppm= parts per million      ppb= parts per billion      NA= Not applicable      bls = below land surface



Lithology Log



Boring ID: SB-03

Project Number:	70187117	Start Date/Time:	4/23/18	Sample Method	Drilling Method
Site Location:	Grimesland NC	End Date/Time:	4/23/18	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Logged By:	JC	Total Depth:	10 ft bls	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA		<input type="checkbox"/> Rock Core

Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			0.2	SM	(0-0.5) GRAVEL/FILL	SB 03 (4.5') 12:45	
			0.6	SC	(0.5-2.5): grey SAND, moist to dry, petroleum odor observed		
			11.8	CL	(2.5-4): grey/light brown SILTY CLAY, petroleum odor, soft, moist		
5-10			0.9		(4-10): grey/orange CLAY, mottled, soft, plastic, petroleum odor, moist	SB 03 (9') 12:50	
			2.6		- some SILT 2 ft BLS - SANDY CLAY layer 10 ft bls - green/olive 10 ft bls		
Boring terminated 10 ft bls per scope							

Notes:

ppm: parts per million      ppb: parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-04

Project Number: 70187117		Start Date/Time: 4/23/18			Sample Method	Drilling Method	
Site Location: Grimesland NC		End Date/Time: 4/23/18			<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT	
Weather: Sunny, 60s		Boring Diameter: 2.25"			<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA	
Logged By: JC		Total Depth: 10 ft bls			<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary	
Drilling Sub: RPS		Water Level: NA			<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary	
Drill Rig: Geoprobe 5410 DT		Well Installed: NA					
Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			4.2	SM	(0-1) brown/light brown SAND, dry, odor not observed	SB 04 (2') 09:35  SB 04 (7.5') 09:40	
			<0.1	SC	(1-5): grey SILTY CLAY, light petroleum odor 2 ft bls, dry, grading towards CLAY -soft/wet 3 ft bls		
			<0.1	CL	(5-6): grey/orange CLAY, moist, plastic, odor not observed, mottled		
5-10			<0.1	SC	(6-10): grey/orange, SILTY CLAY, mottled, dry		
Boring terminated 10 ft bls per scope							

Notes:

ppm= parts per million      ppb= parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-05

Project Number:	70187117	Start Date/Time:	4/23/18	Sample Method	Drilling Method
Site Location:	Grimesland NC	End Date/Time:	4/23/18	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Logged By:	JC	Total Depth:	10 ft bls	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA		<input type="checkbox"/> Rock Core

Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			4.2	SM	(0-0.75) ASPHALT/GRAVEL	SB 05 (2.5') 12:05  SB 05 (7.5') 12:10	
			<0.1	SC	(0.75-2): grey/light brown SAND, medium to fine-grained, odor not observed, dry to moist		
			<0.1	CL	(2-10): grey/orange SILTY CLAY, moist, odor not observed, soft		
5-10			<0.1	SC	-SAND layer 4 ft bls -CLAY layer 8.5-9 ft bls		
					Boring terminated 10 ft bls per scope		

Notes:

ppm: parts per million      ppb: parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-06

Project Number:	70187117	Start Date/Time:	4/23/18	Sample Method	Drilling Method
Site Location:	Grimesland NC	End Date/Time:	4/23/18		
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Logged By:	JC	Total Depth:	10 ft bls	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Drilling Sub:	RPS	Water Level:	NA	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
					<input type="checkbox"/> Rock Core

Depth (ft bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			<0.1	SM	(0-5) ASPHALT leading to dark grey/black SAND, fine to medium-grained, saturated, odor not observed	SB 06 (2.5') 11:50	
5-10			0.1	CL	(5-10): grey/light brown SILTY CLAY, moist, odor not observed -CLAY layer 7 ft bls -orange/olive green 8 ft bls	SB 06 (7.5') 11:55	
			<0.1				
			<0.1				
			<0.1				
Boring terminated 10 ft bls per scope							

Notes:

ppm= parts per million      ppb= parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-07

Project Number: 70187117		Start Date/Time: 4/23/18		Sample Method	Drilling Method		
Site Location: Grimesland NC		End Date/Time: 4/23/18		<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT		
Weather: Sunny, 60s		Boring Diameter: 2.25"		<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA		
Logged By: JC		Total Depth: 10 ft bls		<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary		
Drilling Sub: RPS		Water Level: NA		<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary		
Drill Rig: Geoprobe 5410 DT		Well Installed: NA			<input type="checkbox"/> Rock Core		
Depth (ft. bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			<0.1	SM	(0-0.5): ORGANICS (0.5-2): brown/grey SAND, medium to fine-grained, saturated, odor not observed	SB 07 (2.5') 11:15  SB 07 (7.5') 11:20	
			0.1	SC	(2-5): light brown/grey SILTY CLAY, wet, odor not observed, soft -dry 3 ft bls		
5-10			<0.1	CL	(5-8): grey/orange/brown CLAY, mottled, moist, plastic, odor not observed -SILT layer 8 ft bls		
			<0.1	SC	(8-10) grey/light brown SILTY CLAY, saturated to wet, odor not observed		
Boring terminated 10 ft bls per scope							

Notes:

ppm: parts per million      ppb: parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-08

Project Number:	70187117	Start Date/Time:	4/23/18	Sample Method	Drilling Method
Site Location:	Grimesland NC	End Date/Time:	4/23/18	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Logged By:	JC	Total Depth:	10 ft bls	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA		<input type="checkbox"/> Rock Core

Depth (ft. bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			<0.1	SM	(0-2): orange/brown/black SAND, medium to fine-grained, dry to moist, odor not observed	SB 08 (2') 10:50	
			<0.1	SC	(2-5): grey/orange SILTY CLAY, moist, odor not observed, silt grading out with depth		
5-10			<0.1	CL	(5-10): grey/light brown, mottled, CLAY, odor not observed, moist, plastic -some SILT 6 ft bls -SILTY SAND layers at 8 ft bls -saturated 8 ft bls	SB 08 (7.5') 10:55	
			<0.1		Boring terminated 10 ft bls per scope		

Notes:

ppm: parts per million      ppb: parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-09

Project Number:	70187117	Start Date/Time:	4/23/18	<b>Sample Method</b>	<b>Drilling Method</b>
Site Location:	Grimesland NC	End Date/Time:	4/23/18	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Logged By:	JC	Total Depth:	10 ft bls	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA		<input type="checkbox"/> Rock Core

Depth (ft. bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			<0.1	SM	(0-2.5): dark grey/brown SAND, fine-grained, some CLAY, moist, odor not apparent -wet 2.5 ft bls	SB 09 (2.5') 10:15	
5-10			<0.1	CL	(2.5-10): grey/light brown CLAY, moist, soft, odor not observed, some SILT -plastic, mottled 5 ft bls -SILTY CLAY 7 ft bls -saturated 8 ft bls	SB 09 (7.5') 10:20	
Boring terminated 10 ft bls per scope							

Notes:

ppm: parts per million      ppb: parts per billion      NA= Not applicable      bls = below land surface

Lithology Log



Boring ID: SB-10

Project Number:	70187117	Start Date/Time:	4/23/18	<b>Sample Method</b>	<b>Drilling Method</b>
Site Location:	Grimesland NC	End Date/Time:	4/23/18	<input type="checkbox"/> Hand Auger	<input checked="" type="checkbox"/> DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	<input checked="" type="checkbox"/> Macro-Core	<input type="checkbox"/> HSA
Logged By:	JC	Total Depth:	10 ft bls	<input type="checkbox"/> Split Spoon	<input type="checkbox"/> Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	<input type="checkbox"/> Shelby Tube	<input type="checkbox"/> Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA		<input type="checkbox"/> Rock Core

Depth (ft. bls)	Recovery (inches)	Blow Counts (n)	PID (ppm)	U.S.C.S	(Depth interval) Color, MAIN COMPONENT, minor component(s), structure, moisture, angularity, odor, staining	Lab Sample: ID, analysis, time	Drilling method, tooling, depth
0-5			<0.1	SM	(0-0.5): ORGANICS (0.5-2) grey/brown SAND, moist, medium-grained, odor not observed	SB 10 (2.5') 10:30	
5-10			0.1	SC	(2-5): light grey/light brown SILTY CLAY, orange mottling, moist, odor not observed, plastic at 5 ft bls	SB 10 (7.5') 10:35	
			<0.1	CL	(5-10): light grey/orange CLAY, mottled, plastic, moist, odor not observed -some SILT 6 ft bls and 9 ft bls		
Boring terminated 10 ft bls per scope							

Notes:

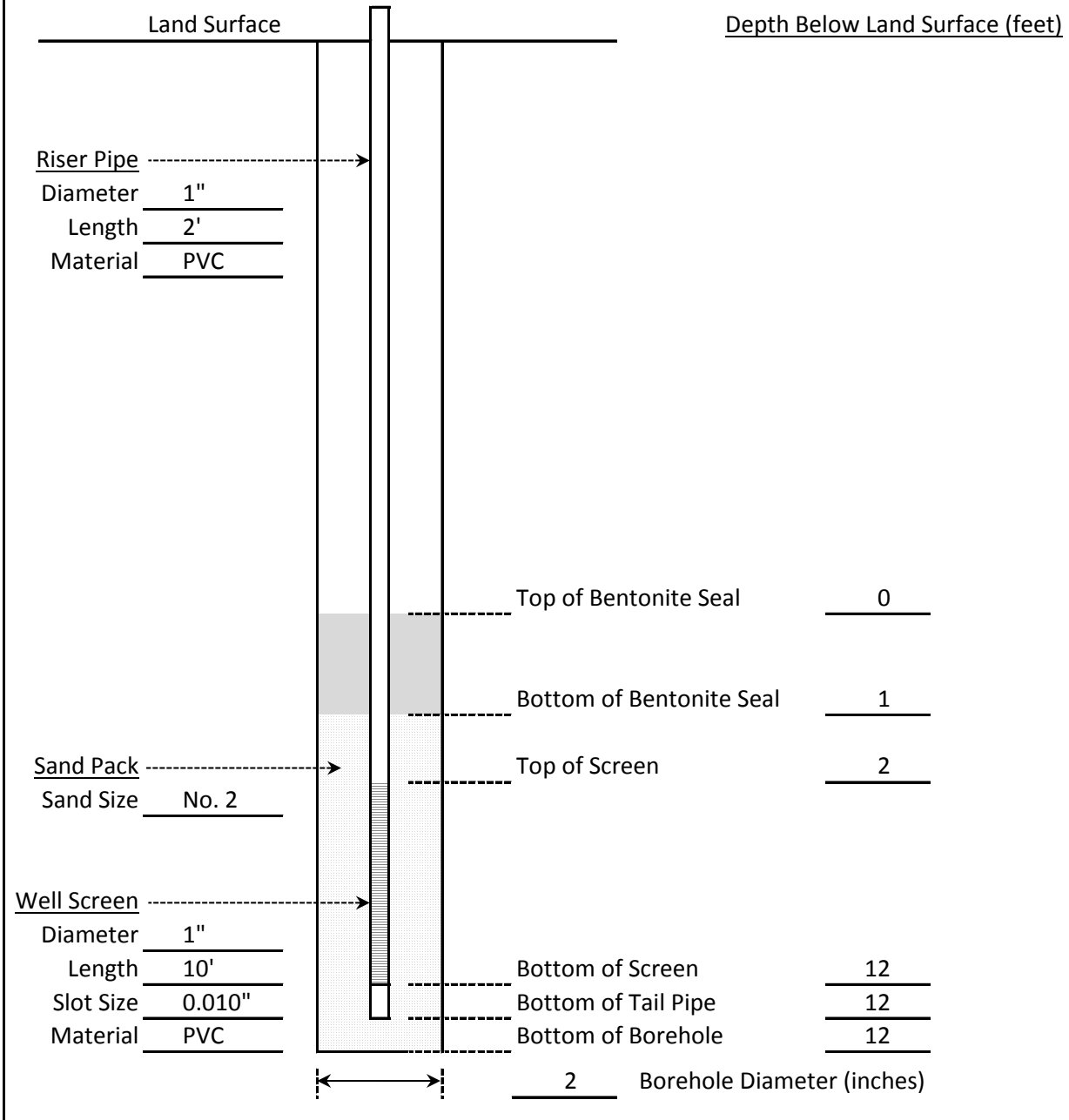
ppm: parts per million      ppb: parts per billion      NA= Not applicable      bls = below land surface



<b>Well ID:</b>	TW-01
<b>Project No. :</b>	70187117
<b>Site Name:</b>	NCDOT PSA U-5301
<b>Field Personnel:</b>	WOF + KC
<b>Date:</b>	4/23/2018
<b>Location:</b>	Grimesland, NC
<b>Drilling Method:</b>	DPT
<b>Driller:</b>	Regional Probe Service

2401 Brentwood Road Suite 107  
 Raleigh, NC 27604  
 919.873.2211

### Temporary Monitoring Well Construction Diagram



## **APPENDIX C**

### **LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS**



### Hydrocarbon Analysis Results

**Client:** TERRACON  
**Address:** 2401 BRENTWOOD RD  
 # 107  
 RALEIGH, NC 27604

**Samples taken** Monday, April 23, 2018  
**Samples extracted** Monday, April 23, 2018  
**Samples analysed** Thursday, April 26, 2018

**Contact:** WILL FRAZIER

**Operator** PANTESCO

**Project:** # 70187117

Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	% Ratios			HC Fingerprint Match
										C5 - C10	C10 - C18	C18	
										H0			
s	SB01 (2.5)	20.2	<0.5	<0.5	1.8	1.8	0.29	<0.16	<0.02	0	64.8	35.2	Deg.Diesel 55.9%,(FCM)
s	SB01 (7.5)	8.1	<0.2	<0.2	0.64	0.64	0.36	<0.07	<0.008	0	63.3	36.7	Deg.Fuel 67.5%,(FCM),(BO),(P)
s	SB02 (3.5)	19.8	<0.5	<0.5	1.1	1.1	0.48	<0.16	<0.02	0	71.3	28.7	V.Deg.Diesel 85.8%,(FCM)
s	SB02 (6)	23.9	<0.6	0.98	5.3	6.3	3.9	<0.19	<0.024	24.2	66.5	9.4	Deg Fuel 71.8%,(FCM)
s	SB03 (4.5)	22.6	87	239.9	319.3	559.2	20.3	0.8	<0.023	99.7	0.3	0	Deg.Light PHC 83.7%,(FCM),(PFM)
s	SB03 (9)	12.6	<0.32	0.76	0.9	1.66	0.42	<0.1	<0.013	85.5	10.7	3.8	Deg.Fuel 80.4%,(FCM)
s	SB04 (2)	21.8	<0.55	25.6	71.7	97.3	70.6	3.4	0.037	47.1	44	8.9	Deg.Fuel 82.2%,(FCM),(BO)
s	SB04 (7.5)	20.0	<0.5	3	0.69	3.69	0.44	<0.16	<0.02	91.6	6.4	2	No Match found
s	SB05 (2.5)	7.2	<0.18	<0.18	0.18	0.18	0.13	<0.06	<0.007	0	78.7	21.3	Deg Fuel 74%,(FCM)
s	SB05 (7.5)	21.7	<0.54	1.8	3.6	5.4	2.4	<0.17	<0.022	52.8	39.7	7.6	Deg Fuel 91.8%,(FCM)
Initial Calibrator QC check			OK			Final FCM QC Check			OK				

Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

Abbreviations :- FCM = Results calculated using Fundamental Calibration Mode : % = confidence of hydrocarbon identification : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate detected

B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modified Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only.

**Data generated by HC-1 Analyser**



### Hydrocarbon Analysis Results

**Client:** TERRACON  
**Address:** 2401 BRENTWOOD RD  
 # 107  
 RALEIGH, NC 27604

**Samples taken** Monday, April 23, 2018  
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**Contact:** WILL FRAZIER

**Operator** PANTESCO

**Project:** # 70187117

											H0		
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	% Ratios			HC Fingerprint Match
										C5 - C10	C10 - C18	C18	
s	SB06 (2.5)	19.3	<0.48	<0.48	1.1	1.1	0.53	<0.15	<0.019	0	71.3	28.7	V.Deg.PHC 92%,(FCM)
s	SB06 (7.5)	21.0	<0.52	<0.52	2.3	2.3	1.5	<0.17	<0.021	0	82.7	17.3	Deg.Fuel 74.3%,(FCM)
s	SB07 (2.5)	20.5	<0.51	<0.51	<0.51	<0.51	<0.1	<0.16	<0.02	0	0	0	PHC not detected
s	SB07 (7.5)	7.7	<0.19	<0.19	0.19	0.19	0.19	<0.06	<0.008	0	57.3	42.7	Deg.PHC 49.1%,(FCM),(BO),(P)
s	SB08 (2)	23.6	<0.59	<0.59	8.9	8.9	1.4	<0.19	<0.024	0	67.4	32.6	Deg.Fuel 80%,(FCM)
s	SB08 (7.5)	8.8	<0.22	<0.22	0.37	0.37	0.16	<0.07	<0.009	0	71.5	28.5	V.Deg.Diesel 79.6%,(FCM)
s	SB09 (2.5)	8.1	<0.2	<0.2	1.3	1.3	0.52	<0.06	<0.008	0	73.8	26.2	Deg.Fuel 78.4%,(FCM)
s	SB09 (7.5)	21.3	<0.53	<0.53	4.1	4.1	2.6	<0.17	<0.021	0	81.5	18.5	Deg.Fuel 88.9%,(FCM)
s	SB10 (2.5)	19.4	<0.49	<0.49	0.49	0.49	0.31	<0.16	<0.019	0	77.4	22.6	Deg.Fuel 73.6%,(FCM)
s	SB10 (7.5)	8.7	<0.22	<0.22	<0.22	0.14	0.14	<0.07	<0.009	0	63.5	36.5	Residual HC
Initial Calibrator QC check			OK			Final FCM QC Check			OK			100	

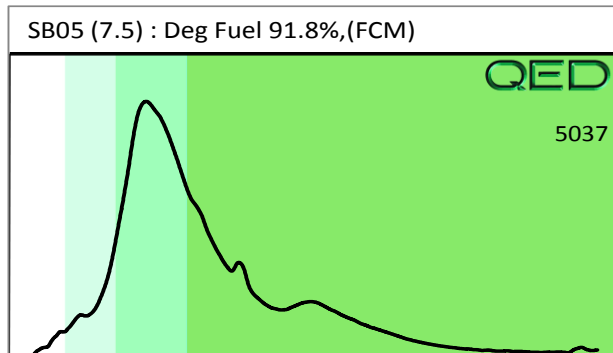
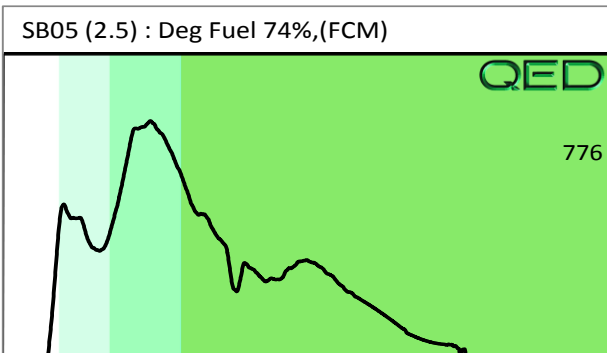
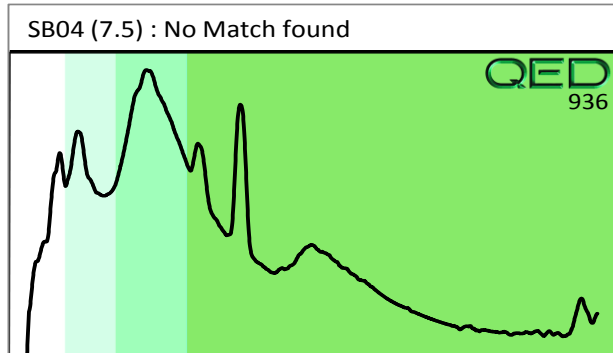
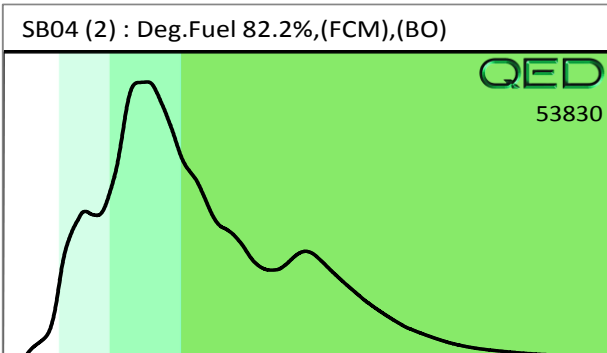
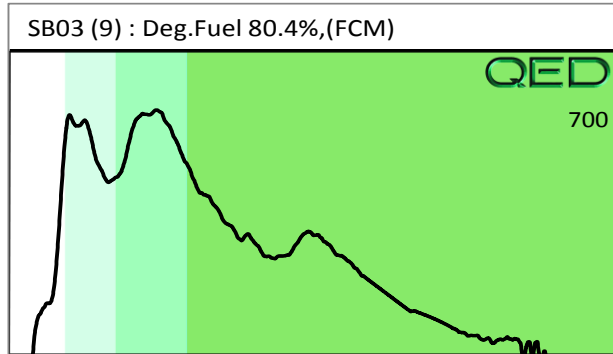
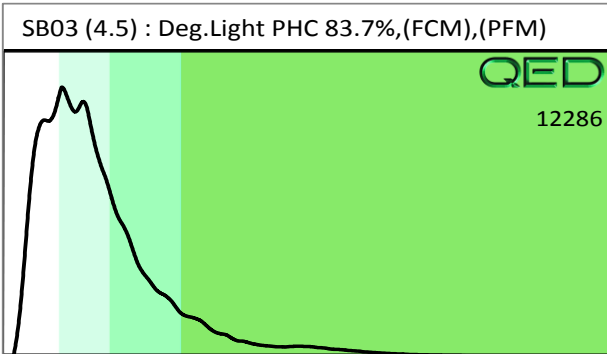
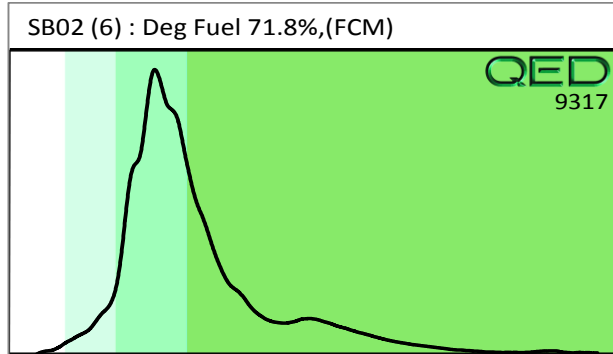
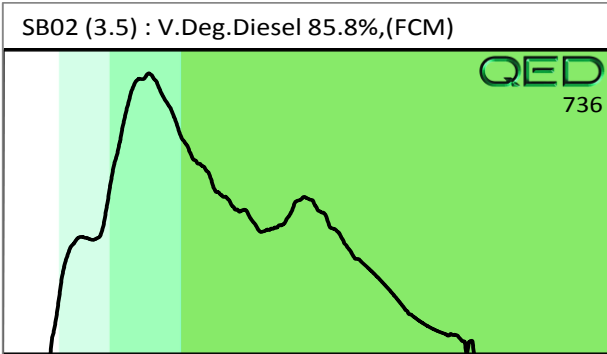
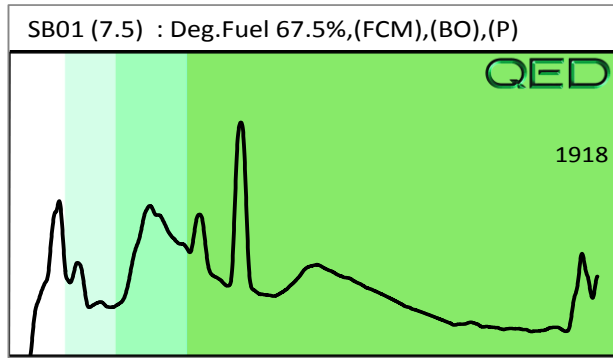
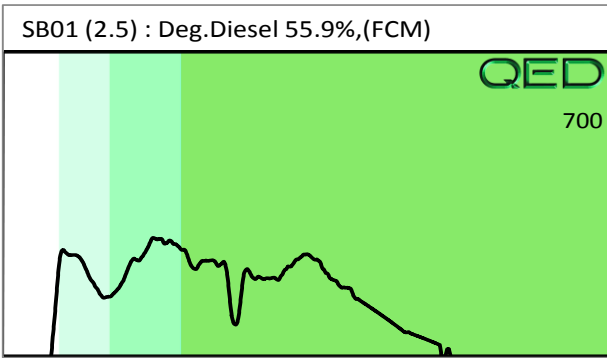
Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values uncorrected for moisture or stone content. Fingerprints provide a tentative hydrocarbon identification.

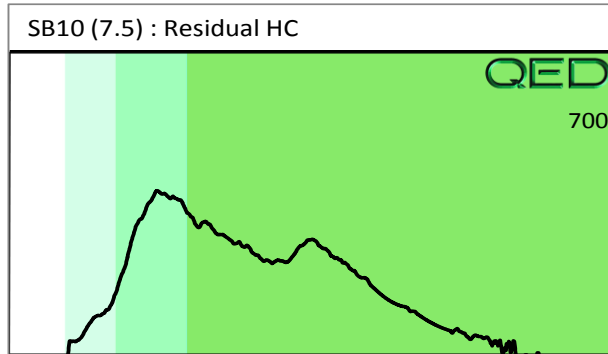
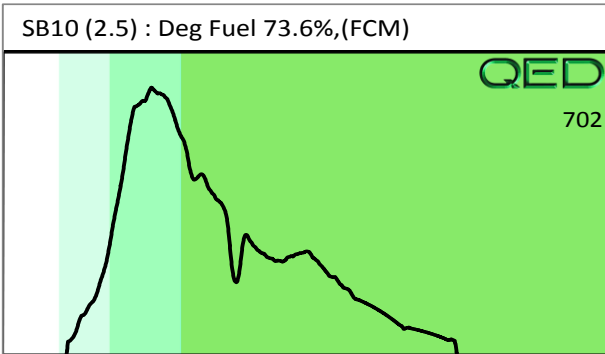
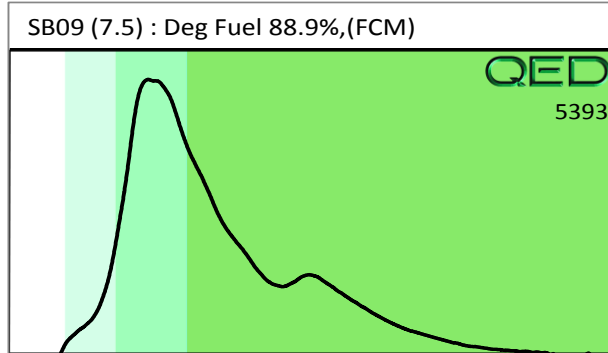
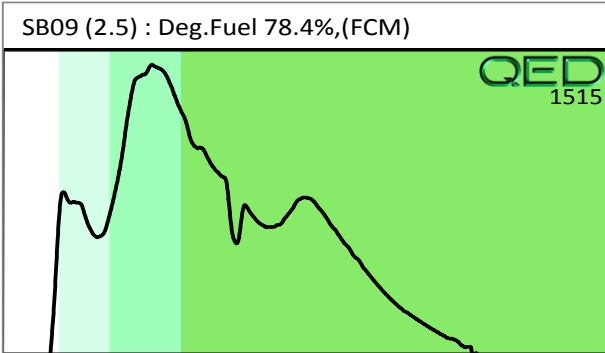
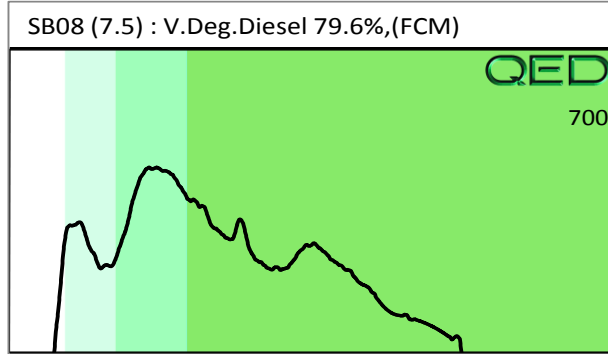
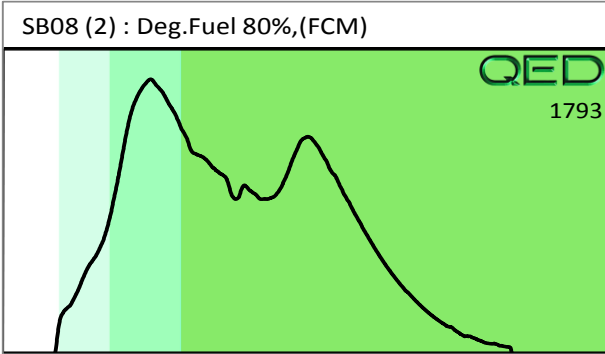
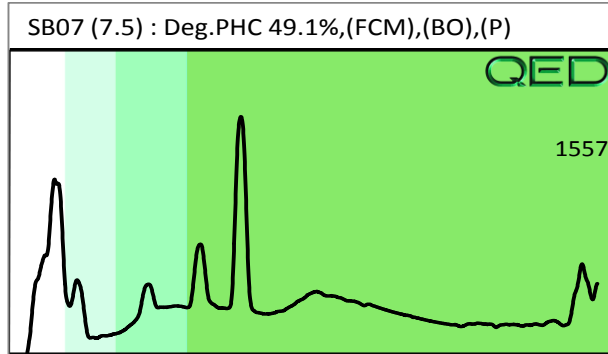
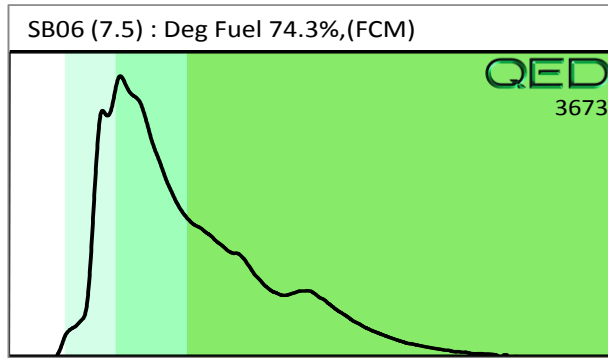
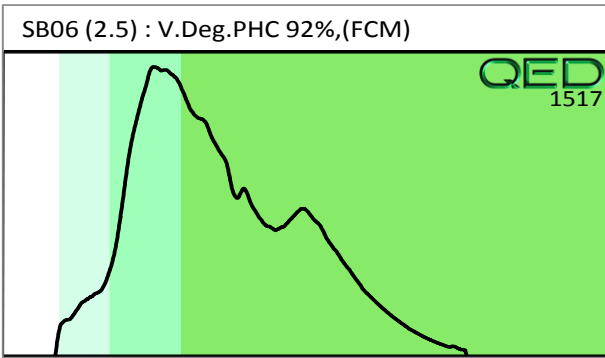
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B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modified Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only.

**Data generated by HC-1 Analyser**







Client Name: Terraron  
 Address: 2401 Brentwood Rd #107, Raleigh, NC 27604  
 Contact: Will Frazier@terraron.com  
 Project Ref.: 70157117  
 Email: Steve.Kerling@terraron.com  
 Phone #: 919-873-9211  
 Collected by: James Chuse

# REDLAB™

**RAPID ENVIRONMENTAL DIAGNOSTICS  
 CHAIN OF CUSTODY AND ANALYTICAL  
 REQUEST FORM**

RED Lab, LLC  
 5598 Marvin K Moss Lane  
 MARBIONC Bldg, Suite 2003  
 Wilmington, NC 28409

Each sample will be analyzed for  
 BTEX, GRO, DRO, TPH, PAH total  
 aromatics and Bap

Sample Collection Date/Time	TAT Requested		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour					
4/23/18 0935		✓	SC	SB01 (2.5)	56.1	43.2	12.9
4/23/18 0946			SC	SB01 (7.5)	56.3	44.0	12.3
1205			SC	SB02 (3.5)	57.1	44.0	13.1
1310			SC	SB02 (1.5)	54.3	43.4	10.9
1245			SC	SB03 (4.5)	55.6	44.1	11.5
1250			SC	SB03 (1)	54.8	43.7	11.1
1210			SC	SB04 (2)	55.5	43.6	11.9
1225			SC	SB04 (7.5)	56.6	43.6	13.0
1205			SC	SB05 (2.5)	57.6	43.8	13.8
1210			SC	SB05 (7.5)	55.7	43.7	12.0
1150			SC	SB06 (2.5)	57.5	44.0	13.5
1155			SC	SB06 (7.5)	56.0	43.6	12.4
1115			SC	SB07 (2.5)	56.8	44.1	12.7
1120			SC	SB07 (7.5)	57.2	44.2	13.0
1050			SC	SB08 (2)	54.8	43.8	11.0
1055			SC	SB08 (7.5)	55.8	44.4	11.4
1015			SC	SB09 (2.5)	56.0	43.6	12.4
1020			SC	SB09 (7.5)	55.7	43.5	12.2
1030			SC	SB10 (2.5)	57.0	43.6	13.4
1035			SC	SB10 (7.5)	55.5	44.0	11.5

Comments:

Relinquished by [Signature]

Relinquished by [Signature]

Date/Time

4/24/18 1000

Accepted by [Signature]

Accepted by [Signature]

Date/Time

4-25-18 1235

RED Lab USE ONLY

20



Client Name: Terraron  
 Address: 2101 Bartwood Rd #107, Raleigh, NC 27104  
 Contact: Will Fosswe@terraron.com  
 Project Ref.: 70187117  
 Email: Steve.Kerlin@terraron.com  
 Phone #: 919-873-2211  
 Collected by: James Chase

# REDLAB

RAPID ENVIRONMENTAL DIAGNOSTICS  
 CHAIN OF CUSTODY AND ANALYTICAL  
 REQUEST FORM

RED Lab, LLC  
 5598 Marvin K Moss Lane  
 MARBIONIC Bldg, Suite 2003  
 Wilmington, NC 28409

Each sample will be analyzed for  
 BTEX, GRO, DRO, TPH, PAH total  
 aromatics and Bap

Sample Collection Date/Time	TAT Requested		Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
	24 Hour	48 Hour					
4/25/18 1820		✓	SC	SB11 (2.5)	57.2	43.8	13.4
1825			SC	SB11 (7.5)	56.4	43.5	12.9
1805			SC	SB12 (2.5)	56.5	44.0	12.5
1810			SC	SB12 (7.5)	57.4	43.6	13.8
1750			SC	SB13 (2.5)	56.7	44.0	12.7
1755			SC	SB13 (6.5)	56.3	44.4	11.9
1725			SC	SB14 (4)	56.4	43.6	12.8
1730			SC	SB14 (7)	56.1	44.5	11.6
1705			SC	SB15 (2.5)	55.5	43.7	11.8
1710			SC	SB15 (9)	58.5	43.8	14.7
1650			SC	SB16 (2.5)	55.8	43.9	11.9
1655			SC	SB16 (7.5)	57.3	43.7	13.6
1625			SC	SB17 (2.5)	55.5	43.7	11.8
1630			SC	SB17 (7.5)	55.9	43.7	12.2
1615			SC	SB18 (2.5)	55.7	43.8	11.9
1625			SC	SB18 (7.5)	55.6	43.5	12.1

Comments:

*[Handwritten signature]*

Relinquished by	Date/Time	Accepted by	Date/Time
<i>[Signature]</i>	4/24/18 1600	<i>[Signature]</i>	4.25.18 1235
Relinquished by	Date/Time	Accepted by	Date/Time

RED Lab USE ONLY

*[Handwritten number 16]*



## **Report of Analysis**

**Terracon Consultants, Inc.**  
2401 Brentwood Road  
Suite 107 I  
Raleigh, NC 27604  
Attention: Will Frazier

Project Name: NCDOT B-5301 PSA

Project Number: 70187117

Lot Number: **TD25013**

Date Completed: 05/04/2018



05/05/2018 11:04 AM  
Approved and released by:  
Project Manager: Cathy S. Dover



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# **SHEALY ENVIRONMENTAL SERVICES, INC.**

SC DHEC No: 32010001

NELAC No: E87653

NC DENR No: 329

NC Field Parameters No: 5639

## **Case Narrative Terracon Consultants, Inc. Lot Number: TD25013**

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

# SHEALY ENVIRONMENTAL SERVICES, INC.

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**Sample Summary**  
**Terracon Consultants, Inc.**  
**Lot Number: TD25013**  
**Project Name: NCDOT B-5301 PSA**  
**Project Number: 70187117**

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<b>Sample Number</b>	<b>Sample ID</b>	<b>Matrix</b>	<b>Date Sampled</b>	<b>Date Received</b>
001	TW01	Aqueous	04/23/2018 1510	04/25/2018
002	TW02	Aqueous	04/23/2018 1815	04/25/2018
003	TRIP BLANK	Aqueous	04/23/2018	04/25/2018

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(3 samples)

# SHEALY ENVIRONMENTAL SERVICES, INC.

**Detection Summary**  
**Terracon Consultants, Inc.**  
**Lot Number: TD25013**  
**Project Name: NCDOT B-5301 PSA**  
**Project Number: 70187117**

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	TW01	Aqueous	Benzene	8260B	38		ug/L	5
001	TW01	Aqueous	Cyclohexane	8260B	6.7		ug/L	5
001	TW01	Aqueous	Ethylbenzene	8260B	27		ug/L	5
001	TW01	Aqueous	Isopropylbenzene	8260B	4.5		ug/L	5
001	TW01	Aqueous	Methyl tertiary butyl ether	8260B	33		ug/L	5
001	TW01	Aqueous	Methylcyclohexane	8260B	0.65	J	ug/L	5
001	TW01	Aqueous	Toluene	8260B	0.42	J	ug/L	5
001	TW01	Aqueous	Xylenes (total)	8260B	9.8		ug/L	6
001	TW01	Aqueous	Naphthalene	8270D	4.2		ug/L	8
002	TW02	Aqueous	Cyclohexane	8260B	3.8		ug/L	9
002	TW02	Aqueous	Ethylbenzene	8260B	17		ug/L	9
002	TW02	Aqueous	Isopropylbenzene	8260B	6.4		ug/L	9
002	TW02	Aqueous	Methylcyclohexane	8260B	7.4		ug/L	9
002	TW02	Aqueous	Toluene	8260B	0.50	J	ug/L	9
002	TW02	Aqueous	Xylenes (total)	8260B	8.7		ug/L	10
002	TW02	Aqueous	2-Methylnaphthalene	8270D	2.0		ug/L	11
002	TW02	Aqueous	Naphthalene	8270D	2.9		ug/L	12

(17 detections)

# Volatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-001</b>
Description: <b>TW01</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1510</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/28/2018 0201	BWS		70748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		20	2.0	ug/L	1
<b>Benzene</b>	<b>71-43-2</b>	<b>8260B</b>	<b>38</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.40	ug/L	1
<b>Cyclohexane</b>	<b>110-82-7</b>	<b>8260B</b>	<b>6.7</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
<b>Ethylbenzene</b>	<b>100-41-4</b>	<b>8260B</b>	<b>27</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
<b>Isopropylbenzene</b>	<b>98-82-8</b>	<b>8260B</b>	<b>4.5</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
<b>Methyl tertiary butyl ether (MTBE)</b>	<b>1634-04-4</b>	<b>8260B</b>	<b>33</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
<b>Methylcyclohexane</b>	<b>108-87-2</b>	<b>8260B</b>	<b>0.65</b>	<b>J</b>	<b>5.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,1,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
<b>Toluene</b>	<b>108-88-3</b>	<b>8260B</b>	<b>0.42</b>	<b>J</b>	<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
1,1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
 H = Out of holding time      W = Reported on wet weight basis

Shealy Environmental Services, Inc.  
 106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

# Volatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-001</b>
Description: <b>TW01</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1510</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/28/2018 0201	BWS		70748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
<b>Xylenes (total)</b>	<b>1330-20-7</b>	<b>8260B</b>	<b>9.8</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
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# Semivolatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-001</b>
Description: <b>TW01</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1510</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/03/2018 1836	JCG	04/26/2018 1829	70602

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	92-52-4	8270D	ND		4.0	0.50	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	0.50	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.0	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	0.50	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	0.50	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		4.0	1.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		4.0	1.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	1.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	1.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	0.50	ug/L	1
4-Chloroaniline	106-47-8	8270D	ND		8.0	0.50	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.50	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	1.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	2.0	ug/L	1
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Acetophenone	98-86-2	8270D	ND		4.0	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Atrazine	1912-24-9	8270D	ND		4.0	0.50	ug/L	1
Benzaldehyde	100-52-7	8270D	ND		8.0	0.50	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.50	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		8.0	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1

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 H = Out of holding time      W = Reported on wet weight basis

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# Semivolatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-001</b>
Description: <b>TW01</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1510</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/03/2018 1836	JCG	04/26/2018 1829	70602

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	132-64-9	8270D	ND		4.0	0.50	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.50	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	1.0	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	0.50	ug/L	1
<b>Naphthalene</b>	<b>91-20-3</b>	<b>8270D</b>	<b>4.2</b>		<b>0.80</b>	<b>0.20</b>	<b>ug/L</b>	<b>1</b>
Nitrobenzene	98-95-3	8270D	ND		4.0	1.5	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		85	37-129
2-Fluorophenol		49	24-127
Nitrobenzene-d5		100	38-127
Phenol-d5		87	28-128
Terphenyl-d14		32	10-148
2,4,6-Tribromophenol		81	35-144

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
 H = Out of holding time      W = Reported on wet weight basis



# Volatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-002</b>
Description: <b>TW02</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1815</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/28/2018 0225	BWS		70748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		20	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.40	ug/L	1
<b>Cyclohexane</b>	<b>110-82-7</b>	<b>8260B</b>	<b>3.8</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
<b>Ethylbenzene</b>	<b>100-41-4</b>	<b>8260B</b>	<b>17</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
<b>Isopropylbenzene</b>	<b>98-82-8</b>	<b>8260B</b>	<b>6.4</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
<b>Methylcyclohexane</b>	<b>108-87-2</b>	<b>8260B</b>	<b>7.4</b>		<b>5.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,1,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
<b>Toluene</b>	<b>108-88-3</b>	<b>8260B</b>	<b>0.50</b>	<b>J</b>	<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>
1,1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
 H = Out of holding time      W = Reported on wet weight basis

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# Volatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-002</b>
Description: <b>TW02</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1815</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/28/2018 0225	BWS		70748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
<b>Xylenes (total)</b>	<b>1330-20-7</b>	<b>8260B</b>	<b>8.7</b>		<b>1.0</b>	<b>0.40</b>	<b>ug/L</b>	<b>1</b>

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		99	70-130
Bromofluorobenzene		127	70-130
Toluene-d8		108	70-130

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
 H = Out of holding time      W = Reported on wet weight basis

# Semivolatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-002</b>
Description: <b>TW02</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1815</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/03/2018 1902	JCG	04/26/2018 1829	70602

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1'-Biphenyl	92-52-4	8270D	ND		4.0	0.50	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	0.50	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.0	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	0.50	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.50	ug/L	1
<b>2-Methylnaphthalene</b>	<b>91-57-6</b>	<b>8270D</b>	<b>2.0</b>		<b>0.80</b>	<b>0.20</b>	<b>ug/L</b>	<b>1</b>
2-Methylphenol	95-48-7	8270D	ND		4.0	1.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	0.50	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		4.0	1.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		4.0	1.5	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	1.0	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	1.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	0.50	ug/L	1
4-Chloroaniline	106-47-8	8270D	ND		8.0	0.50	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.50	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	1.5	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	2.0	ug/L	1
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Acetophenone	98-86-2	8270D	ND		4.0	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Atrazine	1912-24-9	8270D	ND		4.0	0.50	ug/L	1
Benzaldehyde	100-52-7	8270D	ND		8.0	0.50	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.50	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		8.0	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1

LOQ = Limit of Quantitation      B = Detected in the method blank      E = Quantitation of compound exceeded the calibration range      DL = Detection Limit  
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# Semivolatile Organic Compounds by GC/MS

Client: <b>Terracon Consultants, Inc.</b>	Laboratory ID: <b>TD25013-002</b>
Description: <b>TW02</b>	Matrix: <b>Aqueous</b>
Date Sampled: <b>04/23/2018 1815</b>	Project Name: <b>NCDOT B-5301 PSA</b>
Date Received: <b>04/25/2018</b>	Project Number: <b>70187117</b>

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/03/2018 1902	JCG	04/26/2018 1829	70602

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Dibenzofuran	132-64-9	8270D	ND		4.0	0.50	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.50	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	1.0	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	0.50	ug/L	1
<b>Naphthalene</b>	<b>91-20-3</b>	<b>8270D</b>	<b>2.9</b>		<b>0.80</b>	<b>0.20</b>	<b>ug/L</b>	<b>1</b>
Nitrobenzene	98-95-3	8270D	ND		4.0	1.5	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		87	37-129
2-Fluorophenol		62	24-127
Nitrobenzene-d5		90	38-127
Phenol-d5		90	28-128
Terphenyl-d14		105	10-148
2,4,6-Tribromophenol		75	35-144

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 ND = Not detected at or above the DL      N = Recovery is out of criteria      P = The RPD between two GC columns exceeds 40%      J = Estimated result < LOQ and ≥ DL  
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## QC Summary

# Volatile Organic Compounds by GC/MS - MB

Sample ID: TQ70748-001

Matrix: Aqueous

Batch: 70748

Prep Method: 5030B

Analytical Method: 8260B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	2.0	ug/L	04/27/2018 2132
Benzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Bromodichloromethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Bromoform	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Bromomethane (Methyl bromide)	ND		1	2.0	0.40	ug/L	04/27/2018 2132
2-Butanone (MEK)	ND		1	10	2.0	ug/L	04/27/2018 2132
Carbon disulfide	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Carbon tetrachloride	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Chlorobenzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Chloroethane	ND		1	2.0	0.40	ug/L	04/27/2018 2132
Chloroform	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Chloromethane (Methyl chloride)	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Cyclohexane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Dibromochloromethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,2-Dibromoethane (EDB)	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,2-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,3-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,4-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Dichlorodifluoromethane	ND		1	2.0	0.40	ug/L	04/27/2018 2132
1,1-Dichloroethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,2-Dichloroethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,1-Dichloroethene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
cis-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
trans-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,2-Dichloropropane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
cis-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
trans-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Ethylbenzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
2-Hexanone	ND		1	10	2.0	ug/L	04/27/2018 2132
Isopropylbenzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Methyl acetate	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Methyl tertiary butyl ether (MTBE)	ND		1	1.0	0.40	ug/L	04/27/2018 2132
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	04/27/2018 2132
Methylcyclohexane	ND		1	5.0	0.40	ug/L	04/27/2018 2132
Methylene chloride	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Styrene	ND		1	1.0	0.41	ug/L	04/27/2018 2132
1,1,2,2-Tetrachloroethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Tetrachloroethene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Toluene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	04/27/2018 2132
1,2,4-Trichlorobenzene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,1,1-Trichloroethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
1,1,2-Trichloroethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132

LOQ = Limit of Quantitation

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Volatile Organic Compounds by GC/MS - MB

Sample ID: TQ70748-001

Matrix: Aqueous

Batch: 70748

Prep Method: 5030B

Analytical Method: 8260B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Trichloroethene	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Trichlorofluoromethane	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Vinyl chloride	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Xylenes (total)	ND		1	1.0	0.40	ug/L	04/27/2018 2132
Surrogate	Q	% Rec	Acceptance Limit				
1,2-Dichloroethane-d4		94	70-130				
Bromofluorobenzene		99	70-130				
Toluene-d8		100	70-130				

LOQ = Limit of Quantitation

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Volatile Organic Compounds by GC/MS - LCS

Sample ID: TQ70748-002

Matrix: Aqueous

Batch: 70748

Prep Method: 5030B

Analytical Method: 8260B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	88		1	88	60-140	04/27/2018 2034
Benzene	50	46		1	91	70-130	04/27/2018 2034
Bromodichloromethane	50	50		1	101	70-130	04/27/2018 2034
Bromoform	50	53		1	107	70-130	04/27/2018 2034
Bromomethane (Methyl bromide)	50	49		1	97	70-130	04/27/2018 2034
2-Butanone (MEK)	100	92		1	92	70-130	04/27/2018 2034
Carbon disulfide	50	44		1	88	70-130	04/27/2018 2034
Carbon tetrachloride	50	47		1	93	70-130	04/27/2018 2034
Chlorobenzene	50	49		1	98	70-130	04/27/2018 2034
Chloroethane	50	45		1	89	70-130	04/27/2018 2034
Chloroform	50	44		1	87	70-130	04/27/2018 2034
Chloromethane (Methyl chloride)	50	56		1	111	60-140	04/27/2018 2034
Cyclohexane	50	43		1	85	70-130	04/27/2018 2034
1,2-Dibromo-3-chloropropane (DBCP)	50	43		1	85	70-130	04/27/2018 2034
Dibromochloromethane	50	52		1	104	70-130	04/27/2018 2034
1,2-Dibromoethane (EDB)	50	49		1	98	70-130	04/27/2018 2034
1,2-Dichlorobenzene	50	47		1	95	70-130	04/27/2018 2034
1,3-Dichlorobenzene	50	49		1	97	70-130	04/27/2018 2034
1,4-Dichlorobenzene	50	47		1	95	70-130	04/27/2018 2034
Dichlorodifluoromethane	50	58		1	115	60-140	04/27/2018 2034
1,1-Dichloroethane	50	43		1	87	70-130	04/27/2018 2034
1,2-Dichloroethane	50	45		1	90	70-130	04/27/2018 2034
1,1-Dichloroethene	50	44		1	89	70-130	04/27/2018 2034
cis-1,2-Dichloroethene	50	45		1	89	70-130	04/27/2018 2034
trans-1,2-Dichloroethene	50	45		1	89	70-130	04/27/2018 2034
1,2-Dichloropropane	50	50		1	99	70-130	04/27/2018 2034
cis-1,3-Dichloropropene	50	53		1	105	70-130	04/27/2018 2034
trans-1,3-Dichloropropene	50	51		1	101	70-130	04/27/2018 2034
Ethylbenzene	50	48		1	96	70-130	04/27/2018 2034
2-Hexanone	100	97		1	97	70-130	04/27/2018 2034
Isopropylbenzene	50	50		1	99	70-130	04/27/2018 2034
Methyl acetate	50	52		1	103	70-130	04/27/2018 2034
Methyl tertiary butyl ether (MTBE)	50	42		1	84	70-130	04/27/2018 2034
4-Methyl-2-pentanone	100	100		1	102	70-130	04/27/2018 2034
Methylcyclohexane	50	50		1	101	70-130	04/27/2018 2034
Methylene chloride	50	43		1	85	70-130	04/27/2018 2034
Styrene	50	50		1	99	70-130	04/27/2018 2034
1,1,2,2-Tetrachloroethane	50	42		1	84	70-130	04/27/2018 2034
Tetrachloroethene	50	55		1	110	70-130	04/27/2018 2034
Toluene	50	51		1	103	70-130	04/27/2018 2034
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	44		1	88	70-130	04/27/2018 2034
1,2,4-Trichlorobenzene	50	50		1	100	70-130	04/27/2018 2034
1,1,1-Trichloroethane	50	44		1	89	70-130	04/27/2018 2034
1,1,2-Trichloroethane	50	47		1	94	70-130	04/27/2018 2034

LOQ = Limit of Quantitation

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**



# Volatile Organic Compounds by GC/MS - LCS

Sample ID: TQ70748-002

Matrix: Aqueous

Batch: 70748

Prep Method: 5030B

Analytical Method: 8260B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Trichloroethene	50	52		1	104	70-130	04/27/2018 2034
Trichlorofluoromethane	50	48		1	95	70-130	04/27/2018 2034
Vinyl chloride	50	50		1	101	70-130	04/27/2018 2034
Xylenes (total)	100	97		1	97	70-130	04/27/2018 2034
Surrogate	Q	% Rec	Acceptance Limit				
1,2-Dichloroethane-d4		91	70-130				
Bromofluorobenzene		103	70-130				
Toluene-d8		104	70-130				

LOQ = Limit of Quantitation

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N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Semivolatile Organic Compounds by GC/MS - MB

Sample ID: TQ70602-001

Matrix: Aqueous

Batch: 70602

Prep Method: 3520C

Analytical Method: 8270D

Prep Date: 04/26/2018 1829

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,1'-Biphenyl	ND		1	4.0	0.50	ug/L	05/03/2018 1746
2,4,5-Trichlorophenol	ND		1	4.0	0.50	ug/L	05/03/2018 1746
2,4,6-Trichlorophenol	ND		1	4.0	0.50	ug/L	05/03/2018 1746
2,4-Dichlorophenol	ND		1	8.0	1.0	ug/L	05/03/2018 1746
2,4-Dimethylphenol	ND		1	4.0	1.0	ug/L	05/03/2018 1746
2,4-Dinitrophenol	ND		1	20	1.0	ug/L	05/03/2018 1746
2,4-Dinitrotoluene	ND		1	8.0	0.50	ug/L	05/03/2018 1746
2,6-Dinitrotoluene	ND		1	8.0	0.50	ug/L	05/03/2018 1746
2-Chloronaphthalene	ND		1	4.0	0.50	ug/L	05/03/2018 1746
2-Chlorophenol	ND		1	4.0	0.50	ug/L	05/03/2018 1746
2-Methylnaphthalene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
2-Methylphenol	ND		1	4.0	1.0	ug/L	05/03/2018 1746
2-Nitroaniline	ND		1	8.0	0.50	ug/L	05/03/2018 1746
2-Nitrophenol	ND		1	4.0	1.0	ug/L	05/03/2018 1746
3,3'-Dichlorobenzidine	ND		1	4.0	1.8	ug/L	05/03/2018 1746
3+4-Methylphenol	ND		1	4.0	1.5	ug/L	05/03/2018 1746
3-Nitroaniline	ND		1	8.0	1.0	ug/L	05/03/2018 1746
4,6-Dinitro-2-methylphenol	ND		1	20	1.0	ug/L	05/03/2018 1746
4-Bromophenyl phenyl ether	ND		1	4.0	0.50	ug/L	05/03/2018 1746
4-Chloro-3-methyl phenol	ND		1	4.0	0.50	ug/L	05/03/2018 1746
4-Chloroaniline	ND		1	8.0	0.50	ug/L	05/03/2018 1746
4-Chlorophenyl phenyl ether	ND		1	4.0	0.50	ug/L	05/03/2018 1746
4-Nitroaniline	ND		1	8.0	1.5	ug/L	05/03/2018 1746
4-Nitrophenol	ND		1	20	2.0	ug/L	05/03/2018 1746
Acenaphthene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Acenaphthylene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Acetophenone	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Anthracene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Atrazine	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Benzaldehyde	ND		1	8.0	0.50	ug/L	05/03/2018 1746
Benzo(a)anthracene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Benzo(a)pyrene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Benzo(b)fluoranthene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Benzo(g,h,i)perylene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Benzo(k)fluoranthene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
bis (2-Chloro-1-methylethyl) ether	ND		1	4.0	0.50	ug/L	05/03/2018 1746
bis(2-Chloroethoxy)methane	ND		1	4.0	0.50	ug/L	05/03/2018 1746
bis(2-Chloroethyl)ether	ND		1	4.0	0.50	ug/L	05/03/2018 1746
bis(2-Ethylhexyl)phthalate	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Butyl benzyl phthalate	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Caprolactam	ND		1	8.0	1.0	ug/L	05/03/2018 1746
Carbazole	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Chrysene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Dibenzo(a,h)anthracene	ND		1	0.80	0.20	ug/L	05/03/2018 1746

LOQ = Limit of Quantitation

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Semivolatile Organic Compounds by GC/MS - MB

Sample ID: TQ70602-001

Matrix: Aqueous

Batch: 70602

Prep Method: 3520C

Analytical Method: 8270D

Prep Date: 04/26/2018 1829

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Dibenzofuran	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Diethylphthalate	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Dimethyl phthalate	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Di-n-butyl phthalate	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Di-n-octylphthalate	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Fluoranthene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Fluorene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Hexachlorobenzene	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Hexachlorobutadiene	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Hexachlorocyclopentadiene	ND		1	20	2.0	ug/L	05/03/2018 1746
Hexachloroethane	ND		1	4.0	1.0	ug/L	05/03/2018 1746
Indeno(1,2,3-c,d)pyrene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Isophorone	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Naphthalene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Nitrobenzene	ND		1	4.0	1.5	ug/L	05/03/2018 1746
N-Nitrosodi-n-propylamine	ND		1	4.0	0.50	ug/L	05/03/2018 1746
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Pentachlorophenol	ND		1	20	2.0	ug/L	05/03/2018 1746
Phenanthrene	ND		1	0.80	0.20	ug/L	05/03/2018 1746
Phenol	ND		1	4.0	0.50	ug/L	05/03/2018 1746
Pyrene	ND		1	0.80	0.20	ug/L	05/03/2018 1746

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		78	37-129
2-Fluorophenol		42	24-127
Nitrobenzene-d5		82	38-127
Phenol-d5		74	28-128
Terphenyl-d14		106	10-148
2,4,6-Tribromophenol		49	35-144

LOQ = Limit of Quantitation

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+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: TQ70602-002

Matrix: Aqueous

Batch: 70602

Prep Method: 3520C

Analytical Method: 8270D

Prep Date: 04/26/2018 1829

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,1'-Biphenyl	40	35		1	88	30-130	05/03/2018 1811
2,4,5-Trichlorophenol	40	33		1	83	30-123	05/03/2018 1811
2,4,6-Trichlorophenol	40	35		1	87	30-130	05/03/2018 1811
2,4-Dichlorophenol	40	33		1	84	30-121	05/03/2018 1811
2,4-Dimethylphenol	40	23		1	58	20-125	05/03/2018 1811
2,4-Dinitrophenol	80	55		1	68	11-126	05/03/2018 1811
2,4-Dinitrotoluene	40	36		1	90	30-130	05/03/2018 1811
2,6-Dinitrotoluene	40	37		1	92	30-130	05/03/2018 1811
2-Chloronaphthalene	40	34		1	86	30-130	05/03/2018 1811
2-Chlorophenol	40	35		1	88	30-130	05/03/2018 1811
2-Methylnaphthalene	40	34		1	84	40-132	05/03/2018 1811
2-Methylphenol	40	37		1	93	30-130	05/03/2018 1811
2-Nitroaniline	40	39		1	99	30-130	05/03/2018 1811
2-Nitrophenol	40	35		1	87	30-130	05/03/2018 1811
3,3'-Dichlorobenzidine	40	24		1	61	10-126	05/03/2018 1811
3+4-Methylphenol	40	38		1	96	30-130	05/03/2018 1811
3-Nitroaniline	40	38		1	96	30-130	05/03/2018 1811
4,6-Dinitro-2-methylphenol	40	35		1	88	30-130	05/03/2018 1811
4-Bromophenyl phenyl ether	40	35		1	88	30-124	05/03/2018 1811
4-Chloro-3-methyl phenol	40	37		1	93	30-123	05/03/2018 1811
4-Chloroaniline	40	38		1	95	12-157	05/03/2018 1811
4-Chlorophenyl phenyl ether	40	34		1	85	30-121	05/03/2018 1811
4-Nitroaniline	40	42		1	104	30-135	05/03/2018 1811
4-Nitrophenol	80	68		1	84	30-130	05/03/2018 1811
Acenaphthene	40	35		1	87	30-122	05/03/2018 1811
Acenaphthylene	40	37		1	91	30-130	05/03/2018 1811
Acetophenone	40	41		1	102	30-130	05/03/2018 1811
Anthracene	40	37		1	92	30-123	05/03/2018 1811
Atrazine	40	41		1	102	30-130	05/03/2018 1811
Benzaldehyde	40	35		1	87	20-115	05/03/2018 1811
Benzo(a)anthracene	40	39		1	98	40-125	05/03/2018 1811
Benzo(a)pyrene	40	35		1	88	40-128	05/03/2018 1811
Benzo(b)fluoranthene	40	42		1	106	30-130	05/03/2018 1811
Benzo(g,h,i)perylene	40	40		1	100	30-130	05/03/2018 1811
Benzo(k)fluoranthene	40	41		1	104	30-130	05/03/2018 1811
bis (2-Chloro-1-methylethyl) ether	40	51		1	128	30-130	05/03/2018 1811
bis(2-Chloroethoxy)methane	40	38		1	96	30-130	05/03/2018 1811
bis(2-Chloroethyl)ether	40	41		1	104	30-130	05/03/2018 1811
bis(2-Ethylhexyl)phthalate	40	36		1	89	30-130	05/03/2018 1811
Butyl benzyl phthalate	40	39		1	98	30-130	05/03/2018 1811
Caprolactam	40	39		1	97	30-130	05/03/2018 1811
Carbazole	40	38		1	94	30-130	05/03/2018 1811
Chrysene	40	39		1	98	30-130	05/03/2018 1811
Dibenzo(a,h)anthracene	40	39		1	99	30-130	05/03/2018 1811

LOQ = Limit of Quantitation

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

# Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: TQ70602-002

Matrix: Aqueous

Batch: 70602

Prep Method: 3520C

Analytical Method: 8270D

Prep Date: 04/26/2018 1829

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Dibenzofuran	40	35		1	87	30-118	05/03/2018 1811
Diethylphthalate	40	39		1	97	40-125	05/03/2018 1811
Dimethyl phthalate	40	36		1	91	40-127	05/03/2018 1811
Di-n-butyl phthalate	40	40		1	99	40-127	05/03/2018 1811
Di-n-octylphthalate	40	34		1	85	30-130	05/03/2018 1811
Fluoranthene	40	42		1	105	40-128	05/03/2018 1811
Fluorene	40	35		1	87	30-124	05/03/2018 1811
Hexachlorobenzene	40	36		1	89	30-125	05/03/2018 1811
Hexachlorobutadiene	40	30		1	75	24-110	05/03/2018 1811
Hexachlorocyclopentadiene	200	120		1	58	22-122	05/03/2018 1811
Hexachloroethane	40	32		1	80	30-130	05/03/2018 1811
Indeno(1,2,3-c,d)pyrene	40	39		1	98	30-130	05/03/2018 1811
Isophorone	40	41		1	102	30-130	05/03/2018 1811
Naphthalene	40	35		1	88	30-130	05/03/2018 1811
Nitrobenzene	40	39		1	97	30-130	05/03/2018 1811
N-Nitrosodi-n-propylamine	40	46		1	116	30-130	05/03/2018 1811
N-Nitrosodiphenylamine (Diphenylamine)	40	33		1	83	30-123	05/03/2018 1811
Pentachlorophenol	80	60		1	75	30-130	05/03/2018 1811
Phenanthrene	40	36		1	90	40-123	05/03/2018 1811
Phenol	40	38		1	96	30-130	05/03/2018 1811
Pyrene	40	41		1	103	40-126	05/03/2018 1811

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		87	37-129
2-Fluorophenol		82	24-127
Nitrobenzene-d5		100	38-127
Phenol-d5		100	28-128
Terphenyl-d14		111	10-148
2,4,6-Tribromophenol		80	35-144

LOQ = Limit of Quantitation

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N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the DL

**Note: Calculations are performed before rounding to avoid round-off errors in calculated results**

**Chain of Custody  
and  
Miscellaneous Documents**

**SHEALY ENVIRONMENTAL SERVICES, INC.**  
 106 Vantage Point Drive • West Columbia, SC 29172  
 Telephone No. 803-791-9700 Fax No. 803-791-9111  
 www.shealylab.com

**Number 83186**

## Chain of Custody Record

Client: <u>Testation</u> Address: <u>2401 Brentwood Rd. #107</u> City: <u>Raleigh</u> State: <u>NC</u> Zip Code: <u>27604</u> Project Name: <u>NCDOT B-5301 PSA</u> Project No.: <u>70187117</u>	Report to Contact: <u>Will Frasier @ Testation.com</u> Sampler's Signature: <u>[Signature]</u> Print Name: <u>James Chase</u>	Telephone No. / E-mail: <u>Steve Kerlin @ Testation.com</u> Analysis (Attach list if more space is needed)	Quote No.: <u>21006</u> Page <u>1</u> of <u>1</u>	Barcode: CSD: <u>TD25013</u> Remarks / Collector I.D.
Turn Around Time Required (Prior lab approval required for expedited MAT): <input type="checkbox"/> Standard <input type="checkbox"/> Rush (Specify)	Sample Disposal: <input type="checkbox"/> Return to Client <input type="checkbox"/> Disposal by Lab	Possible Hazard Identification: <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Irritant <input type="checkbox"/> Poison <input type="checkbox"/> Unknown	GC Requirements (Specify)	Received on (Date)
1. Relinquished by: <u>[Signature]</u> Date: <u>4/24/18</u> Time: <u>1050</u>	2. Relinquished by: _____ Date: _____ Time: _____	3. Relinquished by: _____ Date: _____ Time: _____	4. Relinquished by: <u>[Signature]</u> Date: <u>4/25/18</u> Time: <u>1016</u>	Date: <u>4/25/18</u> Time: <u>1016</u>
Note: All samples are retained for four weeks from receipt unless other arrangements are made.				
LAB USE ONLY Received on (Date) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Receipt Temp. <u>3.2</u> °C				

*received trip blank  
 act on CUC  
 4/25/18  
 put on hold per  
 will  
 4/25/18*

# SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.  
Document Number: ME00180-13

Page 1 of 1  
Effective Date: 4/5/2018

## Sample Receipt Checklist (SRC)

Client: Terracon Cooler Inspected by/date: CA 4/25/18 Lot #: TD25013

Means of receipt: <input type="checkbox"/> SESI <input type="checkbox"/> Client <input type="checkbox"/> UPS <input checked="" type="checkbox"/> FedEx <input type="checkbox"/> Other: _____	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1. Were custody seals present on the cooler?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	2. If custody seals were present, were they intact and unbroken?
pH Strip ID: <u>NA</u> Chlorine Strip ID: <u>NA</u>	
Cooler ID / Original temperature upon receipt / Derived (Corrected) temperature upon receipt: <u>132132C</u> / / °C / / °C / / °C	
Method: <input type="checkbox"/> Temperature Blank <input checked="" type="checkbox"/> Against Bottles IR Gun ID: <u>6</u> IR Gun Correction Factor: <u>0</u> °C	
Method of coolant: <input checked="" type="checkbox"/> Wet Ice <input type="checkbox"/> Ice Packs <input type="checkbox"/> Dry Ice <input type="checkbox"/> None	
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA	4. Is the commercial courier's packing slip attached to this form?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	5. Were proper custody procedures (relinquished/received) followed?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6. Were sample IDs listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7. Were sample IDs listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8. Was collection date & time listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9. Was collection date & time listed on all sample containers?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Did all container label information (ID, date, time) agree with the COC? <i>only quote changed/checked out</i>
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. Were tests to be performed listed on the COC?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	13. Was adequate sample volume available?
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	14. Were all samples received within 1/2 the holding time or 48 hours, whichever comes first?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (1/4" or 6mm in diameter) in any of the VOA vials?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	19. Were all applicable NH <sub>3</sub> /TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	21. Was the quote number used taken from the container label? <i>containers from another project / swapped @ 4/25/18</i>
<b>Sample Preservation</b> (Must be completed for any sample(s) incorrectly preserved or with headspace.)	
Sample(s) _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with _____ (H <sub>2</sub> SO <sub>4</sub> , HNO <sub>3</sub> , HCl, NaOH) using SR # _____.	
Time of preservation _____.	
Sample(s) _____ were received with bubbles >6 mm in diameter.	
Samples(s) _____ were received with TRC > 0.5 mg/L (If #19 is <b>no</b> ) and were adjusted accordingly in sample receiving with sodium thiosulfate (Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> ) with Shealy ID: _____.	
SR barcode labels applied by: <u>CA</u> Date: <u>4/25/18</u>	

Comments:

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