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Hazardous Materials Report (July 20, 2012)

The GeoEnvironmental Section of the Geotechnical Engineering Unit has investigated the above referenced project to identify hazardous material sites for inclusion in the environmental document.

HAZARDOUS MATERIALS EVALUATION

Purpose

This section presents the results of a hazardous material evaluation conducted along the above referenced project. The main purpose of this investigation is to identify properties within the project study area that are or may be contaminated and therefore could result in increased project costs and future liability if acquired by the Department. Hazardous material impacts may include, but are not limited to, active and abandoned underground storage tank (UST) sites, hazardous waste sites, regulated landfills and unregulated dumpsites.

Techniques/Methodologies

The Geographical Information System (GIS) was consulted to identify known sites of concern in relation to the project corridor. GeoEnvironmental Section personnel conducted field reconnaissance surveys along the project corridor on March 1, 2012. A search of appropriate environmental agencies' databases was performed to assist in evaluating sites identified during this study.

Findings

UST Facilities

Based on our study, two (2) sites may contain petroleum USTs within the project limits. Site one (1) is a possible old gas station that may have UST(s). Associated with Site 2 are four (4) ASTs that are in use at a current gas station and six (6) USTs that were removed in 1988 and which appear to be associated with a NCDENR Groundwater Incident.

Hazardous Waste Sites

No Hazardous Waste Sites were identified within the project limits.

Landfills

No apparent landfills were identified within the project limits.

Other GeoEnvironmental Concerns

No other geoenvironmental concerns were identified within the project limits.

Anticipated Impacts

There are two (2) possible UST facilities. Site one (1) is a possible old gas station that may have UST(s). Site two (2), a current gas station, has four (4) ASTs that are currently in use and reportedly

had six (6) USTs that were removed in 1988, which appear to be associated with a NCDENR Groundwater Incident. No other geoenvironmental concerns were identified within the proposed project corridor. We anticipate low monetary and scheduling impacts resulting from these sites. See Appendices A and B for an area map and site photographs.

Known and Potential Hazardous Material Sites

1) **Property Name:**

Vacant Lot
7312 NC 33 E
Grimesland, NC 27837

Property Owner:

Wilson Jesse Ray
6886 NC 33 E
Grimesland, NC 27837

This property is located at the eastern corner of the intersection of NC 33 and Mobley's Bridge Road. It is currently a gravel lot. The site's location is consistent with many gas station locations. According to the Pitt County GIS Website, the site formerly had a store. That store may have had USTs. Thus, UST(s) may be associated with this site. There are no registered UST(s) known to be associated with this site. This site is anticipated to present low geoenvironmental impacts to the project. (View of photo is toward the northeast).

2) **Property Name**
Shell
7330 NC 33 E
Grimesland, NC 27837

Property Owner:
Eng Arve
PO BOX 55
Grimesland, NC 27837

Groundwater Incident #: 2991

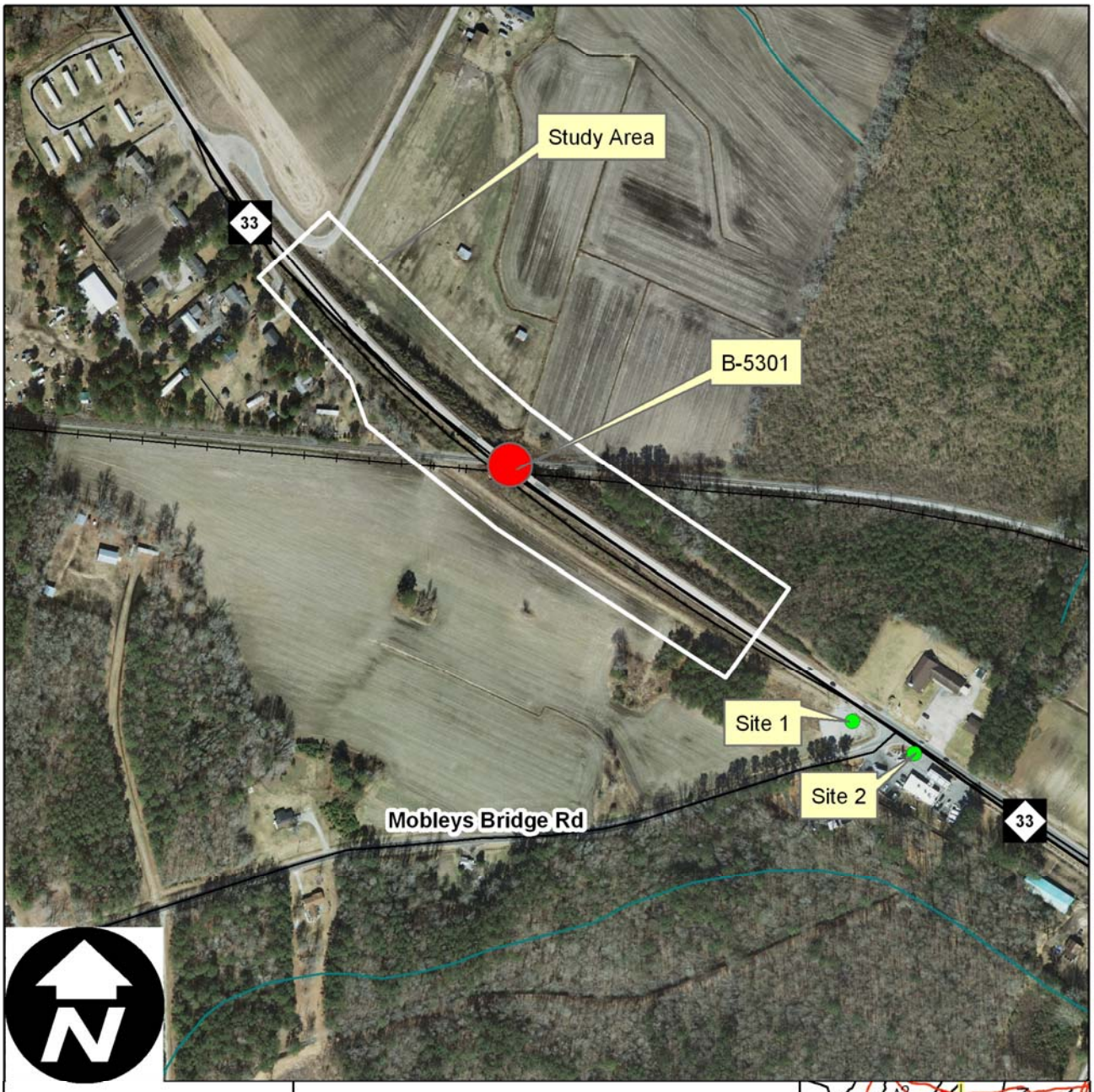
This active Shell gas station is located at the southeastern corner of the intersection of NC 33 and Mobley's Bridge Road. The site comprises two parcels attributed to the same property owner. There are four (4) ASTs currently in use at the site. Six (6) USTs (3 8,000 gal & 3 2,000 gal) were closed in 1988. The site is associated with an NCDENR Groundwater Incident at facility: Kash & Carry #10. This corroborates with the Pitt County GIS website that attributes the Prior Legal Description of the site to Kash-Karry. This site is anticipated to present low geoenvironmental impacts to the project. (View of photo is toward the southeast.)

The Geotechnical Engineering Unit can provide assessments on each of the above properties after identification of the selected alternative and before right of way acquisition. Please note that discovery of additional sites not recorded by regulatory agencies and not reasonably discernable during the project reconnaissance may occur. The Geotechnical Engineering Unit should be notified immediately after discovery of such sites so their potential impact(s) may be assessed.

If there are questions regarding the geoenvironmental issues, please contact me, at 919-707-6859.

Gordon Box, LG
GeoEnvironmental Project Manager
GeoEnvironmental Section
Geotechnical Engineering Unit

Appendix A
Location of USTs, Landfills, & Other Potentially Contaminated Sites



Appendix B

TIP: B-5301 WBS: 46015.1.1 Site Photographs March 1, 2012

Bridge 87: Looking southward toward Bridge 87.

Bridge 87: Looking westward toward Bridge 87.

Bridge 87: Looking eastward toward Bridge 87.

Bridge 87: Looking northward toward Bridge 87.

Preliminary Site Assessment

Replace Bridge 87 Over the Norfolk Southern Railroad on NC 33

Parcel 13 - Wilson, Jesse Ray

7312 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

TABLE OF CONTENTS

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 13 - Wilson, Jesse Ray
7312 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:
CFC2FB1E9B60425...

NORTH CAROLINA LICENSED SEAL #1930 GEOLOGIST Michael Terence Jordan

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PRELIMINARY SITE ASSESSMENT

REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33
TIP NO. B-5301
WBS ELEMENT: 46015.1.1
PARCEL 13 - WILSON, JESSE RAY
7312 NC 33 EAST, GRIMESLAND, NORTH CAROLINA

1.0 INTRODUCTION

1.1 Site Description

Site Name	Replace Bridge 87 Over the Norfolk Southern Railroad on NC 33
Site Location/Address	7312 NC 33 East, Grimesland, North Carolina 27837 (Pitt County Tax PIN: 25418)
General Site Description	The site currently consists of vacant, grass- and gravel-topped land.

1.2 Site History

The site is located at 7312 NC 33 East in Grimesland, Pitt County, North Carolina. At the time of the Preliminary Site Assessment (PSA), the site consisted of a vacant, grass- and gravel-topped lot. The site address does not appear on the North Carolina Department of Environmental Quality (NCDEQ) – Division of Waste Management UST Section Registered Tank Database. According to the Pitt County Geographic Information System database, the site formerly operated as a store. The site's location at an intersection along a rural highway is consistent with historical gas station locations. Based on the above, the site may have operated as a gas station in the past, and there is the possibility that abandoned/orphaned USTs are associated with the site.

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 2B** 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 identified one probable metallic UST on the parcel. The probable UST was observed as an approximate 7-foot by 3-foot geophysical anomaly at a depth of approximately 2.2 feet below land surface (bls). The anomaly is located on the southern edge of the existing NCDOT ROW. The approximate location of the anomaly is shown on Exhibit 2.

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 eight soil borings (SB-11 through SB-18) along the northern and eastern portions of the parcel and within the NCDOT ROW. 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 five of the borings (SB-11, SB-12, SB-16, SB-17, and SB-18) did not exceed 0.1 parts per million (ppm). PID readings from the remaining borings (SB-13, SB-14, and SB-15) ranged from less than 0.1 ppm to 369.5 ppm.

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, 16 soil samples, two from each boring, were collected from depths between approximately 2.5 feet and 9 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 silty clay to depths of approximately 6 to 8 feet bls on average, underlain by with fine- to medium-grained sand. Groundwater was encountered at a depth of approximately 4.17 feet bls in temporary well TW-02. 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-15 was advanced to 13 feet bls and converted into temporary monitoring well TW-02, 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 3-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-02 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_5-C_{10}) (TPH-GRO);
- TPH-diesel range organics (C_{10}-C_{35}) (TPH-DRO);
- Total petroleum hydrocarbons (C_5-C_{35}) (TPH);
- Benzene, toluene, ethylbenzene, and xylenes (BTEX);
- Total aromatics (C_{10}-C_{35});
- 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-11 through SB-18:

- BTEX was reported at a concentration of 17.2 milligrams per kilogram (mg/kg) in SB-15 (9 ft);

- TPH-GRO reported within SB-13 (6.5 ft), SB-14 (4 ft), SB-14 (7 ft), SB-15 (9 ft), SB-16 (2.5 ft), SB-18 (2.5 ft), and SB-19 (7.5 ft) at concentrations ranging from 0.77 mg/kg to 59.7 mg/kg;

- TPH-DRO was reported within SB-12 (2.5 ft), SB-13 (2.5 ft), SB-13 (6.5 ft), SB-14 (4 ft), SB-14 (7 ft), SB-15 (9 ft), SB-16 (2.5 ft), and SB-18 (7.5 ft) at concentrations ranging from 0.28 mg/kg to 46.3 mg/kg;

- TPH (C_5-C_{35}) was reported within SB-12 (2.5 ft), SB-13 (2.5 ft), SB-13 (6.5 ft), SB-14 (4 ft), SB-14 (7 ft), SB-15 (2.5 ft), SB-15 (9 ft), SB-16 (2.5 ft), SB-18 (2.6 ft), and SB-18 (7.5 ft) at concentrations ranging from 0.28 mg/kg to 106 mg/kg;

- Total aromatics (C_{10}-C_{35}) was reported within SB-12 (2.5 ft), SB-13 (2.5 ft), SB-13 (6.5 ft), SB-14 (4 ft), SB-14 (7 ft), SB-15 (2.5 ft), and SB-15 (9 ft) at concentrations ranging from 0.14 mg/kg to 7.1 mg/kg;

- 16 EPA PAHs was reported within SB-14 (7 ft) at a concentration of 0.8 mg/kg and SB-15 (9 ft) 0.62 mg/kg;

- BaP was not detected above laboratory reporting limits within the samples collected.

Laboratory analysis identified concentrations of TPH-GRO in excess of the NCDEQ Action Level (50 mg/kg) in SB-15-9'.

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, detected compounds, and estimated extent of contaminated media on the site.

4.2 Groundwater Analytical Results

Laboratory analysis reported the following detections above the laboratory reporting limits in TW-02:

- The following VOCs were detected within TW-02: cyclohexane, ethylbenzene, isopropylbenzene, methylcyclohexane, toluene, and xylenes (total). The detected concentrations do not exceed their respective NCAC 2L Standards.

- The following SVOCs were detected within TW-02: 2-methylnaphthalene, and naphthalene. The detected concentrations do not exceed their respective 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 identified a probable UST located along the southern edge of the existing NCDOT ROW on the parcel.

- Laboratory analysis reported concentrations of petroleum constituents in soil borings SB-12, SB-13, SB-14, SB-15, SB-16, and SB-18. Of the detected compounds, the concentration of TPH-GRO within SB-15 (9') exceeds the NCDEQ Action Level.

- The area of contamination appears to be localized around the identified probable UST. An estimated weight of petroleum impacted soil located within the ROW is 215 tons or 143 cubic yards. This calculation assumes an approximate area of 3,850 square feet located around the probable UST and extending to the edges of the existing and proposed ROWs as well as an average disturbance depth of 1 foot. 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 SVOCs within groundwater at the site; however, none of the detected concentrations exceed the 2L Standards.

- Terracon recommends NCDOT provide a copy of the results to the owner and/or operator of the site.

- Terracon does not recommend further assessment of the ROW at this site. However, based on detections of petroleum compounds, construction workers should be alert for potential soil and/or groundwater impacts in other locations 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 13 - Wilson, Jesse Ray
Grimesland, Pitt County, North Carolina
Terracon Project No. 70187076

Sample ID:	SB-11	SB-11	SB-12	SB-12	SB-13	SB-13	SB-14	SB-14	SB-15	SB-15	SB-16	SB-16	SB-17	SB-17	SB-18	SB-18	NCDEQ Action Level	MSCC Industrial/ Commercial
Sample Depth (ft bls):	**2.5**	**7.5**	**2.5**	**7.5**	**2.5**	**6.5**	**4**	**7**	**2.5**	**9**	**2.5**	**7.5**	**2.5**	**7.5**	**2.5**	**7.5**		
BTEX (C_6 - C_9)	<0.49	<0.27	<0.52	<0.47	<0.28	<0.55	<0.51	<0.56	<0.3	**17.2**	<0.55	<0.48	<0.55	<0.53	<0.55	<0.29	NE	NE
GRO (C_5 - C_{10})	<0.49	<0.27	<0.52	<0.47	<0.28	**7.1**	**14.7**	**14.5**	<0.3	**59.7**	**0.66**	<0.48	<0.55	<0.53	**0.77**	**1**	50	NE
DRO (C_{10} - C_{35})	<0.49	<0.27	**0.52**	<0.47	**0.28**	**16.1**	**4.2**	**9.9**	<0.3	**46.3**	<0.55	<0.48	<0.55	<0.53	<0.55	**0.9**	100	NE
TPH (C_5 - C_{35})	<0.49	<0.27	**0.52**	<0.47	**0.28**	**23.2**	**18.9**	**24.4**	**0.19**	**106**	**0.66**	<0.48	<0.55	<0.53	**0.77**	**1.9**	NE	NE
Total Aromatics (C_{10}-C_{35})	<0.1	<0.05	**0.32**	<0.09	**0.14**	**5.2**	**2.8**	**7.1**	**0.19**	**16.8**	<0.11	<0.1	<0.11	<0.11	<0.11	<0.06	NE	NE
16 EPA PAHs	<0.16	<0.09	<0.17	<0.15	<0.09	<0.17	<0.16	**0.38**	<0.09	**0.62**	<0.17	<0.15	<0.18	<0.17	<0.17	<0.09	NE	NE
BaP	<0.019	<0.011	<0.021	<0.019	<0.011	<0.022	<0.02	<0.022	<0.012	<0.018	<0.022	<0.019	<0.022	<0.021	<0.022	<0.012	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 Petroleuem Hydrocarbons.
BTEX - Benzene, Toluene, Ethylbenzene, and Xylenes.
16 EPA PAHs - Environmental Protection Agency Polycyclic Aromatic Hydrocarbons (acenaphthene, acenaphthylene, antrancene, benz[a]anthrancene, 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 13 - Wilson, Jesse Ray
Grimesland, Pitt County, North Carolina
Terracon Project No. 70187117

Sample ID:	TW-02	NCAC 2L Standard
Sample Date:	04/23/18	
Screen Interval (ft bls):	3-13	
Volatile Organic Compounds (EPA Method 8260) - (µg/L)		
Cyclohexane	**3.8**	NE
Ethylbenzene	**17**	600
Isopropylbenzene	**6.4**	70
Methylcyclohexane	**7.4**	NE
Toluene	**0.5 J**	600
Xylenes (Total)	**8.7**	500
Semi-Volatile Organic Compounds (EPA Method 8270) - (µg/L)		
2-Methylnaphthalene	**2**	30
Naphthalene	**2.9**	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 Maxium 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

CONTOUR INTERVAL 5 FEET

USGS TOPOGRAPHIC MAP
GRIMESLAND NC QUADRANGLE (1979)

PM: SJK	Project No. 70187117	Terracon	**Topographic Vicinity Map**	EXHIBIT NO.
Drawn By: WOF	Scale: 1:24,000		**Preliminary Site Assessment** **U-5301** **Grimesland, Pitt County, North Carolina**	**1**
Checked By: WOF	File Path:			
Approved By: MTJ	Date: 5/7/2018	2401 Brentwood Drive, Suite 107 Raleigh, NC 27604 Phone: (919) 873-2211 Fax: (919) 873-9555		

PROJECT REFERENCE NO.	EXHIBIT
46015.1.1 (B–5301)	2A

SITE DIAGRAM WITH BORING LOCATIONS

PARCEL 13
JESSE RAY WILSON PROPERTY
7312 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

0 10 40 80
FEET

PROJECT REFERENCE NO.	EXHIBIT
46015.1.1 (B–5301)	2B

SITE DIAGRAM WITH BORING LOCATIONS AND ANALYTICAL DATA

PARCEL 13
JESSE RAY WILSON PROPERTY
7312 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

SOIL AND GROUNDWATER SAMPLES WERE COLLECTED ON APRIL 23, 2018

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

GROUNDWATER CONTAMINANT CONCENTRATIONS ARE REPORTED 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 PETROLEUEM HYDROCARBONS

BTEX - BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

16 EPA PAHs - ENVIORONMENTAL PROTECTION AGENCY POLYCYLIC AROMATIC HYDROCARBONS

0 10 40 80
FEET

SB-15 (2.5 ft bls)	(mg/kg)
TPH (C5-C35)	0.19
Total Aromatics (C10-C35)	0.19
SB-15 (9 ft bls)	(mg/kg)
BTEX (C6-C9)	17.2
GRO (C5-C10)	59.7
DRO (C10-C35)	46.3
TPH (C5-C35)	106
Total Aromatics (C10-C35)	16.8
16 EPA PAHs	0.62
TW-02	(ug/L)
Cyclohexane	3.8
Ethylbenzene	17
Isopropylbenzene	6.4
Methylcyclohexane	7.4
Xylenes (Total)	8.7
2-Methylnaphthalene	2
Napthalene	2.9

SB-14 (4 ft bls)	(mg/kg)
GRO (C5-C10)	14.7
DRO (C10-C35)	4.2
TPH (C5-C35)	18.9
Total Aromatics (C10-C35)	2.8
SB-14 (7 ft bls)	(mg/kg)
GRO (C5-C10)	14.5
DRO (C10-C35)	9.9
TPH (C5-C35)	24.4
Total Aromatics (C10-C35)	7.1
16 EPA PAHs	0.38

SB-13 (2.5 ft bls)	(mg/kg)
DRO (C10-C35)	0.28
TPH (C5-C35)	0.28
Total Aromatics (C10-C35)	0.14
SB-13 (6.5 ft bls)	(mg/kg)
GRO (C5-C10)	7.1
DRO (C10-C35)	16.1
TPH (C5-C35)	23.2
Total Aromatics (C10-C35)	5.2

SB-12 (2.5 ft bls)	(mg/kg)
DRO (C10-C35)	0.52
TPH (C5-C35)	0.52
Total Aromatics (C10-C35)	0.32

SB-18 (2.5 ft bls)	(mg/kg)
GRO (C5-C10)	0.77
TPH (C5-C35)	0.77
SB-18 (7.5 ft bls)	(mg/kg)
GRO (C5-C10)	1
DRO (C10-C35)	0.9
TPH (C5-C35)	1.9

SB-16 (2.5 ft bls)	(mg/kg)
GRO (C5-C10)	0.66
TPH (C5-C35)	0.66

SB-17
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

SB-11
COMPOUNDS NOT DETECTED ABOVE LABORATORY REPORTING LIMITS

EXTERNAL 4–FT BASE DITCH SEE DETAIL 7
CL 'B' RIP RAP EST. 2 TONS EST. 7 SYGF
0604
WOODED
15" CSP W/2 ELBOWS
WOODED
0603
2GI
0601
2GI
15" CSP W/2 ELBOWS
SPECIAL CUT 'V' GRASSED SWALE SEE DETAIL 12
0605
18" RCP–IV
0606
CONC PARKING
CB
REMOVE
NC 33
22' CONC
28' BST
0612
CB
18"
BST PARKING
PROBABLE UST
18" RCP–V
TIE TO EXISTING DITCH
0617
CL 'B' RIP RAP EST. 3 TONS EST. 10 SYGF
SPECIAL CUT 'V' DITCH SEE DETAIL 3
18" RCP–III
COLLAR AND EXTEND CLEAN OUT PIPE
RETAIN
0616
RETAIN
0609
GRIMESLAND CITY LIMITS
SR1760 MOBLEY'S BRIDGE RD.
JESSE RAY WILSON
DODDIE ELKS SINGLETON
PENTECOSTAL HO CHURCH
SPECIAL CUT 'V' DITCH GRADE = 3.14
SEE DETAIL 3
BST PARKING

APPENDIX A

GEOPHYSICAL SURVEY REPORT

TERRACON CONSULTANTS, INC.

GEOPHYSICAL INVESTIGATION TO LOCATE METALLIC USTS

Jesse Ray Wilson (Parcel 13) Property
NC-33 & Mobleys Bridge Road
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
Jesse Ray Wilson (Parcel 13) Property
NC-33 & Mobleys Bridge Road
Grimesland, North Carolina

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Prepared by: Mark J. Denil

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 northeastern portion of the Jesse Ray Wilson (Parcel 13) property located at the intersection of NC-33 (Pitt Street) and Mobleys Bridge Road 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 Wilson property. 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 270 feet and 150 feet, respectively. Presently, the site comprises of an open, flat-lying, undeveloped field with a gravel-covered island surrounded by grass and wooded terrain.

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. 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 and pin flags. 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 986061-E 12920805-N and 986087-E 12920786-N are probably in response to buried lines or conduits. The linear, EM61

early time gate anomalies intersecting coordinates 985969-E 12920895-N and 985982-E 12920739-N are probably in response to buried miscellaneous objects or debris and a culvert, respectively.

GPR scanning suggests the large, high amplitude, EM61 differential metal detection anomalies centered near coordinates 986042-E 12920815-N, 986059-E 12920776-N, and 986012-E 12920762-N are in response to either portions of buried conduits and/or miscellaneous metal objects. GPR scanning across the EM61 differential anomaly centered near coordinates 986027.5-E 12920801.5-N suggests the presence of a probable, metallic UST that is approximately 7.0 feet long, 3.0 feet wide and 2.2 feet below present grade. The axis of the probable UST is oriented in a northerly-southerly direction and a possible product line appears to run from the northern edge of the probable UST northward towards NC-33. A GPR image acquired across the probable UST and a photograph showing the location of the probable, buried tank are presented in **Figure 4**. The approximate foot print of the probable UST was marked in the field with orange marking paint and pin flags.

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. No additional geophysical surveys for the detection of metallic USTs are warranted at this time within the same area of interest.

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 Jesse Ray Wilson (Parcel 13) property located at the intersection of NC-33 (Pitt Street) and Mobleys Bridge Road near Grimesland, North Carolina provides the following summary and conclusions:

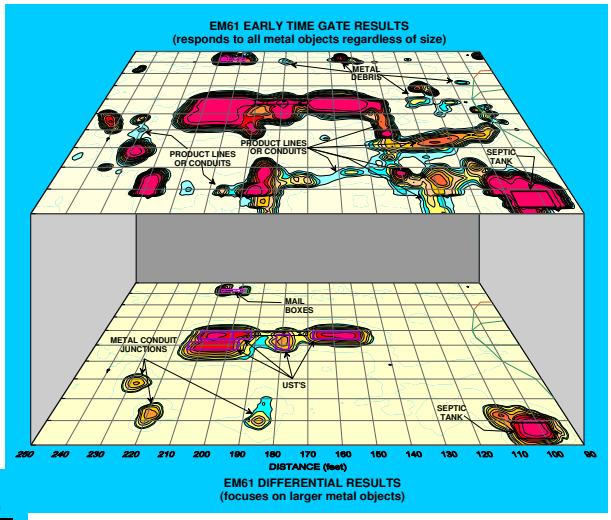
- The combination of EM61 and GPR surveys provided reliable results for the detection of metallic USTs across the survey area within the depth interval of 0 to 6 feet.

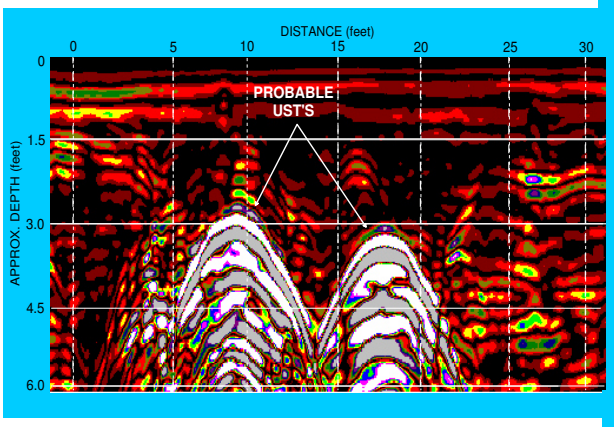
- All of the linear, EM61 early time gate anomalies are probably in response to buried, metallic utility lines, conduits, culverts, or possible product lines.

- The geophysical investigation detected a probable UST centered near grid coordinates 986027.5-E 12920801.5-N. Based on GPR data, the probable UST is approximately 7.0 feet long, 3.0 feet wide and buried 2.2 feet below present grade.

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.

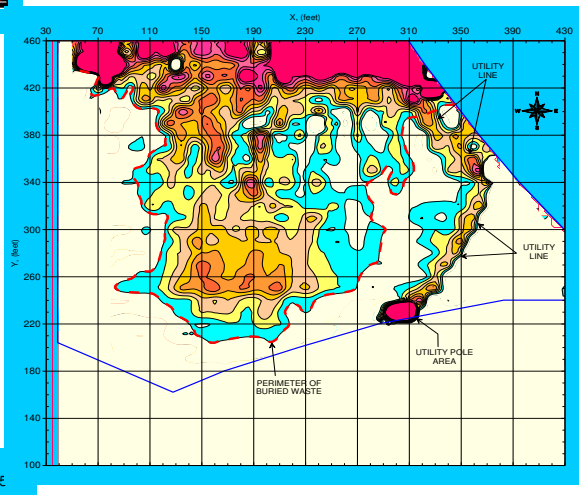


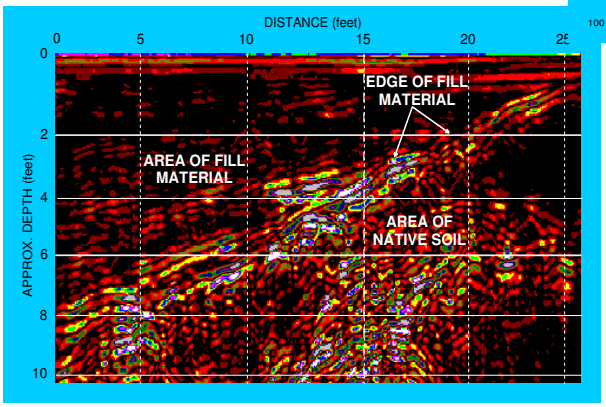


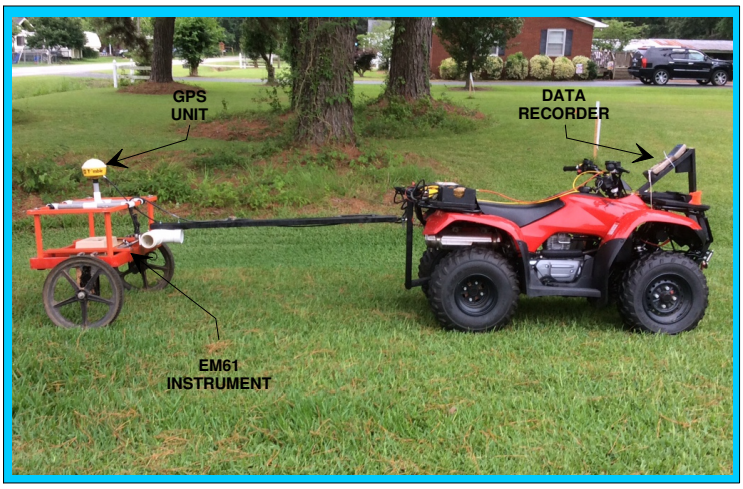
REPORT FIGURES

(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 13.

GROUND PENETRATING RADAR UNIT

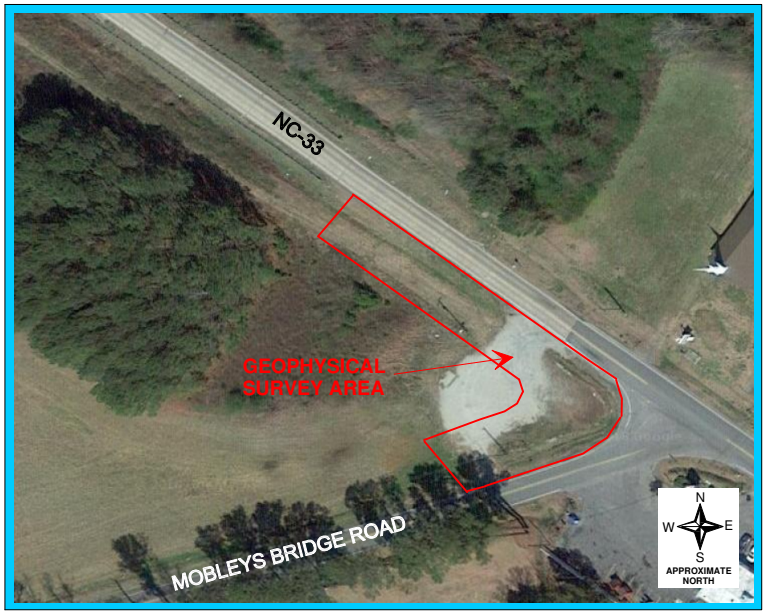
The photograph shows the Geophysical Survey Systems SIR-3000 ground penetrating radar (GPR) unit equiped with a 400 MHz antenna that were used to conduct the GPR scanning across selected areas.

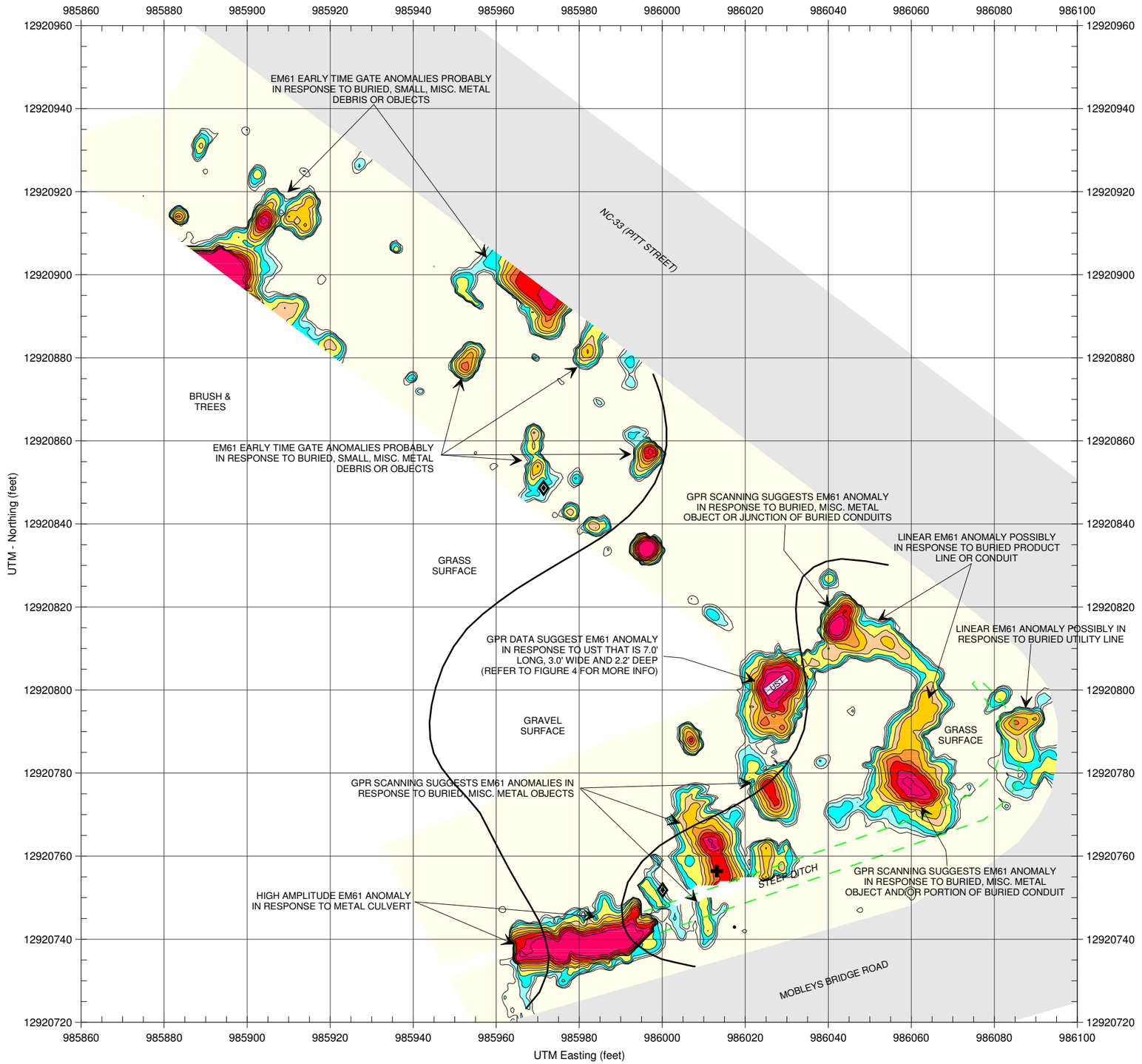
DITCHWITCH UTILITY LOCATOR

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 13 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 13.

LEGEND

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- UTILITY POLE
- GUY WIRE
- UST POSSIBLE/PROBABLE METALLIC UST

EM61 EARLY TIME GATE RESPONSE (in millivolts/meter)

-5000 -400 -200 -100 -90 -80 -75 -100 -150 -200 -300 -400 -500 -750 -1000

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.

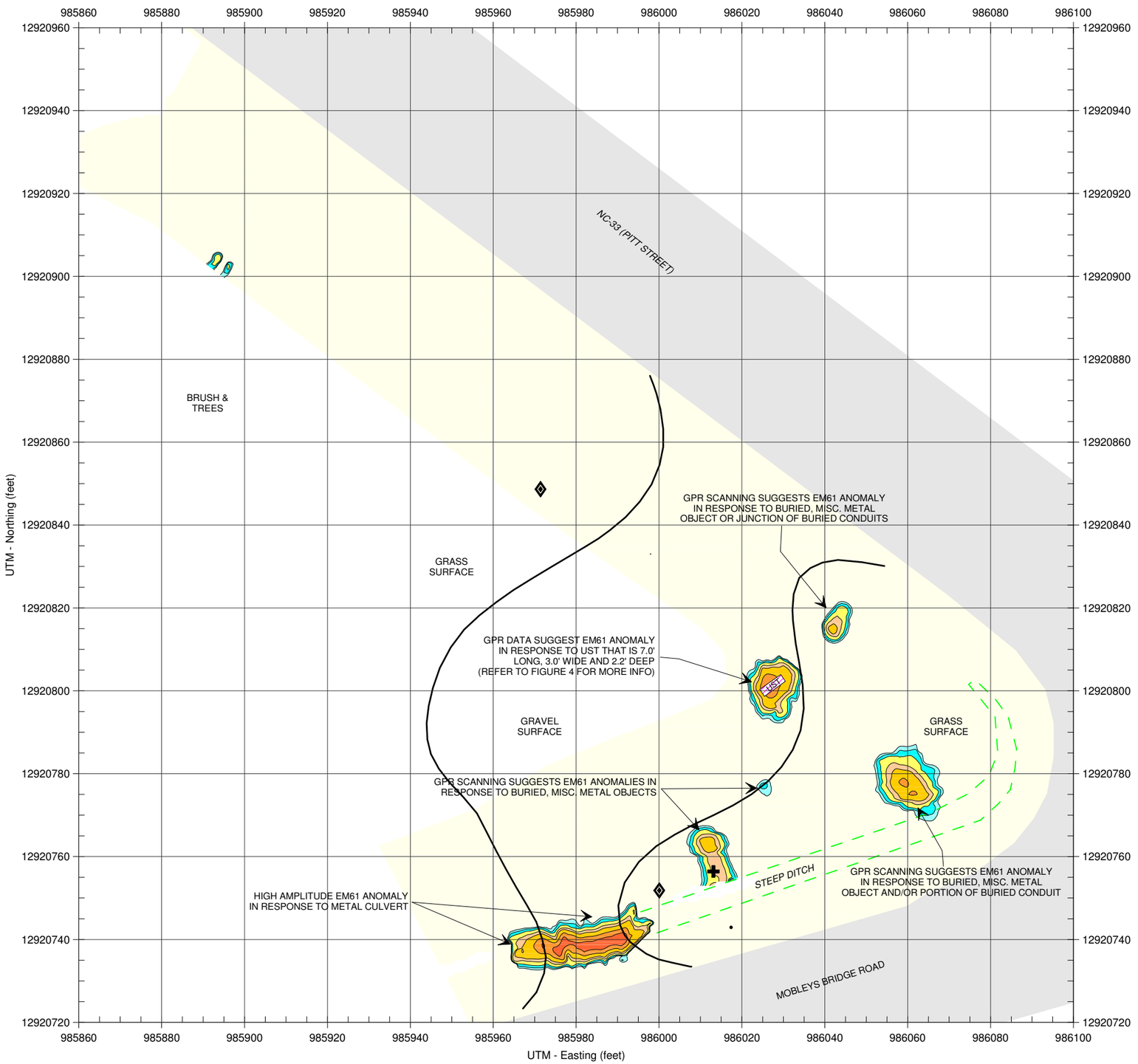
N W E S APPROXIMATE NORTH

EM61-MK2A METAL DETECTION (EARLY TIME GATE RESULTS)

Terracon Consultants, Inc.
Jesse Ray Wilson (Parcel 13) Property
NC-33 & Mobleys Bridge Road
Grimesland, North Carolina

GEOPHYSICAL SURVEY INVESTIGATIONS

04/28/18 336-286-9718 FIGURE 2



The red polygon in the aerial photograph represents the approximate perimeter of the geophysical survey area at Parcel 13.

LEGEND

- SURVEY AREA: EM61 ACQUIRED ALONG LINES SPACED APPROX. 5 FEET APART
- UTILITY POLE
- GUY WIRE
- UST — POSSIBLE/PROBABLE METALLIC UST

EM61 DIFFERENTIAL RESPONSE
(in millivolts/meter)

-5000 -400 -200 -100 -90 -50 -60 -75 -100 -150 -200 -300 -400 -500 -750 -1000

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 using a Geophysical Survey Systems SIR 3000 unit with a 400 MHz antenna. The geophysical investigation was conducted on April 18-19, 2018.

N
W E
S
APPROXIMATE NORTH

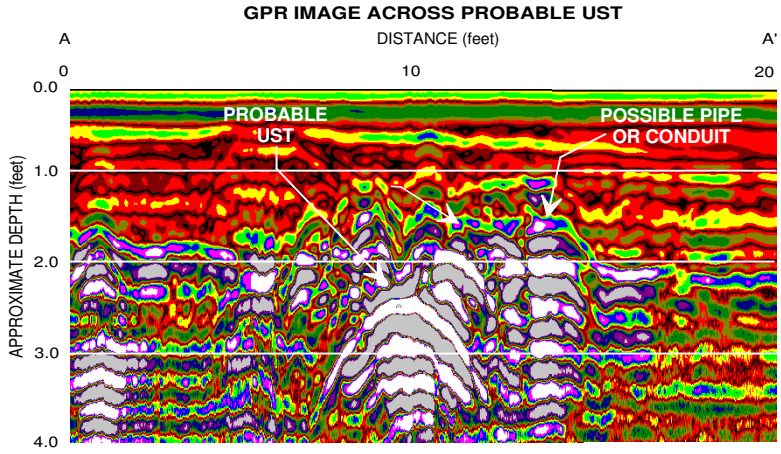
EM61-MK2A METAL DETECTION (DIFFERENTIAL RESULTS)

Terracon Consultants, Inc.

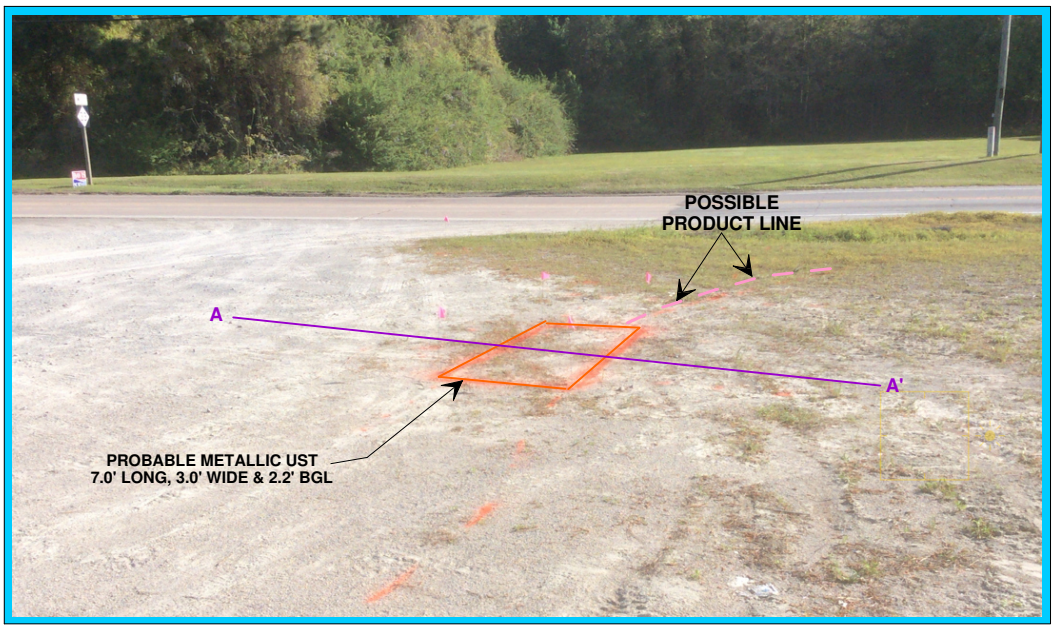
Jesse Ray Wilson (Parcel 13) Property
NC-33 & Mobleys Bridge Road
Grimesland, North Carolina

GEOPHYSICAL SURVEY INVESTIGATIONS

04/28/18 336-286-9718 FIGURE 3



GPR scanning across the EM61 differential anomaly centered near UTM coordinates 986027.5-E 12920801.5-N yielded high amplitude, hyperbolic reflections in the GPR image shown above. The GPR anomaly is probably in response to a metallic UST buried approximately 2.2 feet below present grade. The purple line labeled AA' in the photograph shown below represents the approximate location of the GPR image.



The orange rectangle in the photograph represents the approximate foot print of a probable UST that was detected by the geophysical investigation. Based on the GPR data, the UST is approximately 7.0 feet long, 3.0 feet wide and buried 2.2 feet below present grade. The solid purple line labeled AA' in the photograph represents the approximate location of GPR image AA' shown above. The dashed pink line represents the approximate location of a possible product line that runs from the UST in a northerly direction. The photograph is viewed in a northerly direction.

APPENDIX B

SOIL BORING LOGS AND TEMPORARY WELL CONSTRUCTION LOGS

Lithology Log

Boring ID: SB-11

Project Number:	70187117	Start Date/Time:	4/23/18
Site Location:	Grimesland NC	End Date/Time:	4/23/18
Weather:	Sunny, 60s	Boring Diameter:	2.25"
Logged By:	JC	Total Depth:	10 ft bls
Drilling Sub:	RPS	Water Level:	NA
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA

Sample Method
- ☐ Hand Auger
- ☒ Macro-Core
- ☐ Split Spoon
- ☐ Shelby Tube

Drilling Method
- ☒ DPT
- ☐ HSA
- ☐ Mud Rotary
- ☐ Air Rotary
- ☐ 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
			<0.1	ML	(0-2): brown to tan SILT, dry		
0-5	60		<0.1	CL	(2-7.5) tan to light brown SILTY CLAY, moist 2.5-4 bls, dry 4-7.5 ft bls	SB 11 (2.5') 18:20	
			<0.1	SC	(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed		
5-10	48		<0.1			SB 11 (7.5') 18:25	
			<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

Terracon

Boring ID: SB-12

Project Number:	70187117	Start Date/Time:	4/23/18
Site Location:	Grimesland NC	End Date/Time:	4/23/18
Weather:	Sunny, 60s	Boring Diameter:	2.25"
Logged By:	JC	Total Depth:	10 ft bls
Drilling Sub:	RPS	Water Level:	NA
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA

Sample Method	Drilling Method
☐ Hand Auger	☒ DPT
☒ Macro-Core	☐ HSA
☐ Split Spoon	☐ Mud Rotary
☐ Shelby Tube	☐ Air Rotary
	☐ 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
			<0.1	ML	(0-2): brown to tan SILT, dry		
0-5	48		<0.1	CL	(2-9) tan SILTY CLAY, dry 2-3 ft bls, moist 3-4 ft bls, saturated past 4 bls	SB 12 (2.5') 18:05	
			<0.1		(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed		
5-10	44		<0.1	SC	(9-10) tan CLAYEY SAND	SB 12 (7.5') 18:10	
			<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

Terracon

Boring ID: SB-13

Project Number:	70187117	Start Date/Time:	4/23/18	**Sample Method**	**Drilling Method**
Site Location:	Grimesland NC	End Date/Time:	4/23/18	☐ Hand Auger	☒ DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	☒ Macro-Core	☐ HSA
Logged By:	WF	Total Depth:	10 ft bls	☐ Split Spoon	☐ Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	☐ Shelby Tube	☐ Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA		☐ 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
				SP	(0-0.5): grey to tan medium-grained SAND, dry		
			<0.1				
0-5	60			ML	(0.5-2.5) dark brown to light gray SILT, dry	SB 13	
			<0.1			(2.5')	
				CL	(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed	17:50	
			<0.1				
				CL	(4-5) light brown SILTY CLAY, orange mottling, dry, stiff	SB 13	
5-10	60		8.2			(6.5')	
				CL	(5-6) light brown SILTY CLAY, gray/brown staining, moist, saturated beyond 6 ft bls	17:55	
			<0.1				
				CL	(6-10) gray SILTY CLAY, grades into fine sandy clay around 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

Terracon

Boring ID: SB-14

Project Number:	70187117	Start Date/Time:	4/23/18
Site Location:	Grimesland NC	End Date/Time:	4/23/18
Weather:	Sunny, 60s	Boring Diameter:	2.25"
Logged By:	WF	Total Depth:	10 ft bls
Drilling Sub:	RPS	Water Level:	NA
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA

Sample Method	Drilling Method
☐ Hand Auger	☒ DPT
☒ Macro-Core	☐ HSA
☐ Split Spoon	☐ Mud Rotary
☐ Shelby Tube	☐ Air Rotary
	☐ 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
			0.6		(0-0.5): gravel		
0-5				SM	(0.5-1) light brown SAND, moist, odor not observed	SB 14	
			13.2			(4')	
				SC	(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed	17:25	
			16.1				
				CL	(2.5-9) grey/orange/brown CLAY, mottled, petroleum odor, moist, lean	SB 14	
5-10			68.7		-SILT starting at 9 ft bls	(7')	
					-heavy odor at 7 ft bls	17:30	
			1.6				
				CL	(9-10): white/orange SANDY CLAY, saturated, light petroleum odor		
					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

Terracon

Boring ID: SB-15

Project Number:	70187117	Start Date/Time:	4/23/18
Site Location:	Grimesland NC	End Date/Time:	4/23/18
Weather:	Sunny, 60s	Boring Diameter:	2.25"
Logged By:	JC	Total Depth:	10 ft bls
Drilling Sub:	RPS	Water Level:	4.17 ft bls
Drill Rig:	Geoprobe 5410 DT	Well Installed:	TW-02

Sample Method
- ☐ Hand Auger
- ☒ Macro-Core
- ☐ Split Spoon
- ☐ Shelby Tube

Drilling Method
- ☒ DPT
- ☐ HSA
- ☐ Mud Rotary
- ☐ Air Rotary
- ☐ 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
			0.8		(0-0.5) GRAVEL		
0-5				SM	(0.5-2) light brown fine-grained SAND, moist, odor not observed	SB 15 (2.5') 17:05	
			1.0				
				SC	(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed		
			1.3		-mottled, plastic 4 ft bls		
					-petroleum odor 7 ft bls	SB 15 (9') 17:10	
5-10			11.3				
				SM			
			364.5		(9-10) white/light brown, SAND, staining at 9 ft bls, heavy petroleum odor, saturated		
					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-16

Project Number:	70187117	Start Date/Time:	4/23/18	**Sample Method**		**Drilling Method**	
Site Location:	Grimesland NC	End Date/Time:	4/23/18	☐	Hand Auger	☒	DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	☒	Macro-Core	☐	HSA
Logged By:	JC	Total Depth:	10 ft bls	☐	Split Spoon	☐	Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	☐	Shelby Tube	☐	Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA			☐	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
			<0.1		(0-0.5) ORGANICS		
0-5				SC	(0.5-1.5) brown SILTY CLAY, moist, odor not observed	SB 16	
			<0.1			(2.5')	
				CL	(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed	16:50	
			<0.1				
				SC	(6-8) light brown/grey SILTY CLAY, mottled, moist, odor not observed	SB 16	
5-10			<0.1			(7.5')	
				SM	(8-10) white/orange SAND, saturated, odor not observed, medium to fine-grained	16:55	
			<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-17

Project Number:	70187117	Start Date/Time:	4/23/18	**Sample Method**		**Drilling Method**	
Site Location:	Grimesland NC	End Date/Time:	4/23/18	☐	Hand Auger	☒	DPT
Weather:	Sunny, 60s	Boring Diameter:	2.25"	☒	Macro-Core	☐	HSA
Logged By:	JC	Total Depth:	10 ft bls	☐	Split Spoon	☐	Mud Rotary
Drilling Sub:	RPS	Water Level:	NA	☐	Shelby Tube	☐	Air Rotary
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA			☐	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
			<0.1		(0-0.5) ORGANICS		
0-5	60		<0.1	SM	(0.5-2) light brown/orange SAND, moist, odor not observed, fine	SB 17 (2.5') 16:25	
			<0.1	SC	(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed		
5-10	60		<0.1	SM	(7-10) white/orange SAND, saturated, medium-grained, odor not observed	SB 17 (7.5') 16:30	
			<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-18

Project Number:	70187117	Start Date/Time:	4/23/18
Site Location:	Grimesland NC	End Date/Time:	4/23/18
Weather:	Sunny, 60s	Boring Diameter:	2.25"
Logged By:	WF	Total Depth:	10 ft bls
Drilling Sub:	RPS	Water Level:	NA
Drill Rig:	Geoprobe 5410 DT	Well Installed:	NA

Sample Method	Drilling Method
☐ Hand Auger	☒ DPT
☒ Macro-Core	☐ HSA
☐ Split Spoon	☐ Mud Rotary
☐ Shelby Tube	☐ Air Rotary
	☐ 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
			<0.1	SP	(0-1) dark brown fine-grained SAND, dry, no observed odor		
0-5	60		<0.1	SM	(1-2) brown to tan SILTY SAND, dry, no odors observed	SB 18 (2.5') 16:15	
			<0.1	ML	(1.5-6) grey/orange/light brown CLAY, mottled, stiff, some SILT, odor not observed		
5-10	48		<0.1	SC	(5-8) light tan CLAYEY SAND, wet, no odors observed	SB 18 (7.5') 16:20	
			<0.1	SW	(8-10) light tan med-grained SAND, saturated, no odors observed		
					Boring terminated 10 ft bls per scope		

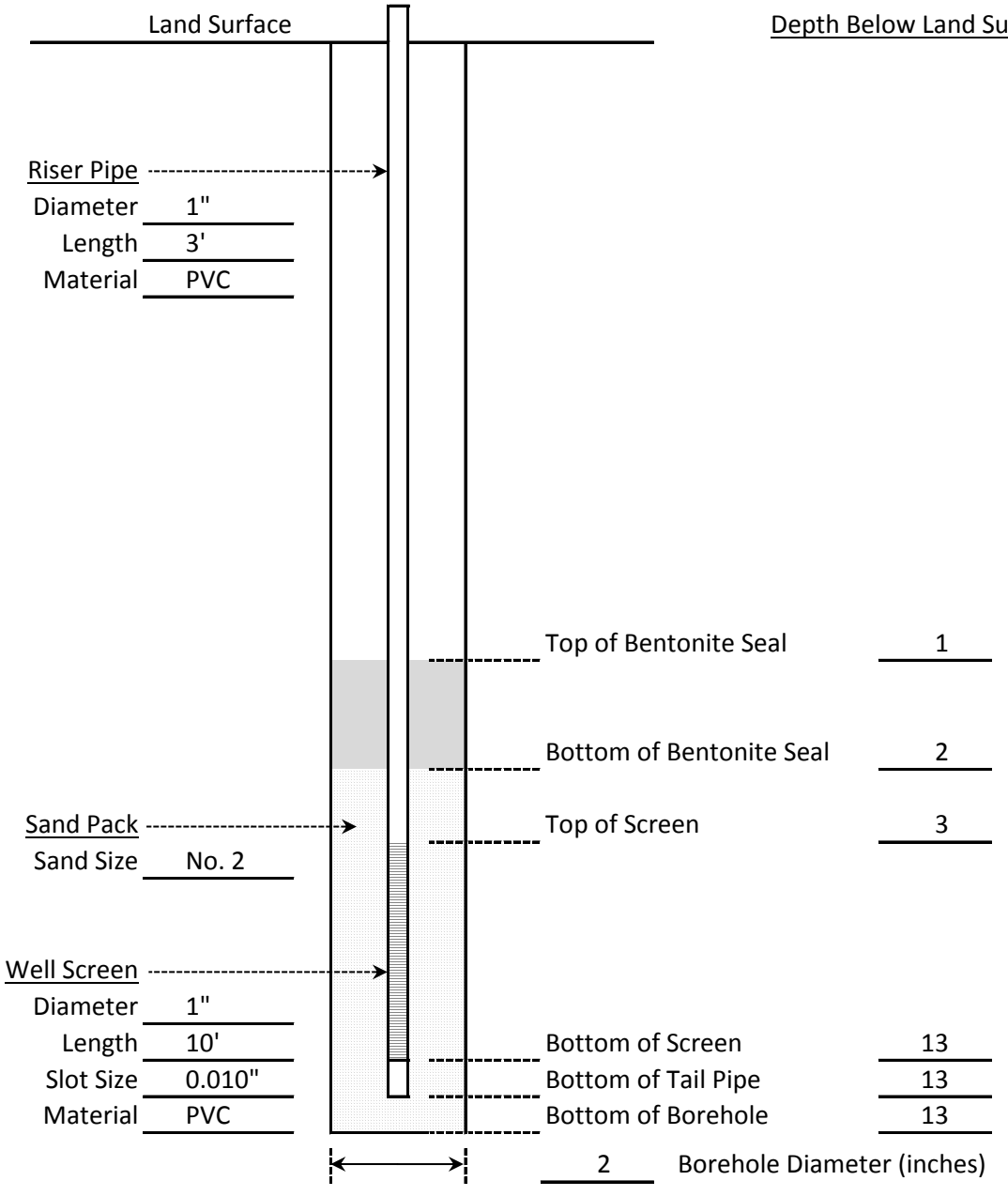
Notes:

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

Well ID:	TW-02
Project No. :	70187117
Site Name:	NCDOT PSA U-5301
Field Personnel:	WOF + KC
Date:	4/23/2018
Location:	Grimesland, NC
Drilling Method:	DPT
Driller:	Regional Probe Service

Terracon
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

QED

REDLAB RAPID ENVIRONMENTAL DIAGNOSTICS

QROS

Hydrocarbon Analysis Results

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

Contact: WILL FRAZIER

Project: # 70187117

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

Operator PANTESCO

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	SB11 (2.5)	19.4	<0.49	<0.49	<0.49	<0.49	<0.1	<0.16	<0.019	0	0	0	PHC not detected,(BO)
s	SB11 (7.5)	10.9	<0.27	<0.27	<0.27	<0.27	<0.05	<0.09	<0.011	0	0	0	,(FCM)
s	SB12 (2.5)	20.8	<0.52	<0.52	0.52	0.52	0.32	<0.17	<0.021	0	36.6	63.4	,(FCM),(P)
s	SB12 (7.5)	18.8	<0.47	<0.47	<0.47	<0.47	<0.09	<0.15	<0.019	0	0	0	PHC not detected
s	SB13 (2.5)	11.0	<0.28	<0.28	0.28	0.28	0.14	<0.09	<0.011	0	73.5	26.5	Deg Fuel 53.9%,(FCM)
s	SB13 (6.5)	21.8	<0.55	7.1	16.1	23.2	5.2	<0.17	<0.022	91.7	7.2	1.1	Deg.Diesel 78.5%,(FCM)
s	SB14 (4)	20.3	<0.51	14.7	4.2	18.9	2.8	<0.16	<0.02	98.4	1.4	0.2	Deg.Fuel 71.8%,(FCM)
s	SB14 (7)	22.4	<0.56	14.5	9.9	24.4	7.1	0.38	<0.022	76.4	18.8	4.8	Deg.Fuel 87.3%,(FCM)
s	SB15 (2.5)	11.9	<0.3	<0.3	<0.3	0.19	0.19	<0.09	<0.012	0	60.1	39.9	Residual HC
s	SB15 (9)	17.7	17.2	59.7	46.3	106	16.8	0.62	<0.018	98	1.6	0.4	Deg.Diesel 88.1%,(FCM),(P)

Initial Calibrator QC check OK Final FCM QC Check OK 105

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) = Modifed Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

QED

REDLAB™ RAPID ENVIRONMENTAL DIAGNOSTICS

QROS

Hydrocarbon Analysis Results

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

Contact: WILL FRAZIER

Project: # 70187117

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

Operator PANTESCO

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	SB16 (2.5)	21.8	<0.55	0.66	<0.55	0.66	<0.11	<0.17	<0.022	100	0	0	PHC not detected,(P)
s	SB16 (7.5)	19.1	<0.48	<0.48	<0.48	<0.48	<0.1	<0.15	<0.019	0	0	0	PHC not detected
s	SB17 (2.5)	22.0	<0.55	<0.55	<0.55	<0.55	<0.11	<0.18	<0.022	100	0	0	PHC not detected
s	SB17 (7.5)	21.3	<0.53	<0.53	<0.53	<0.53	<0.11	<0.17	<0.021	0	0	0	PHC not detected
s	SB18 (2.5)	21.8	<0.55	0.77	<0.55	0.77	<0.11	<0.17	<0.022	98.7	1.3	0	PHC not detected
s	SB18 (7.5)	11.6	<0.29	1	0.9	1.9	<0.06	<0.09	<0.012	99.2	0.8	0	Deg.Diesel 59.9%,(FCM),(P)

Initial Calibrator QC check OK

Final FCM QC Check OK 98

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

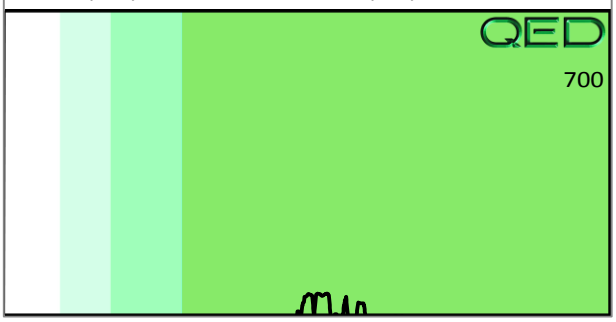
B = Blank Drift : (SBS)/(LBS) = Site Specific or Library Background Subtraction applied to result : (BO) = Background Organics detected : (OCR) = Outside cal range : (M) = Modifed Result.

% Ratios estimated aromatic carbon number proportions : HC = Hydrocarbon : PHC = Petroleum HC : FP = Fingerprint only. **Data generated by HC-1 Analyser**

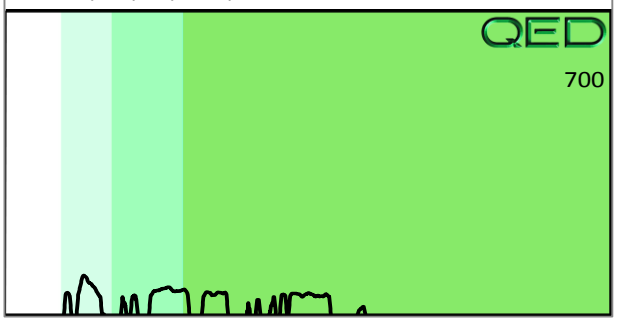
QED Hydrocarbon Fingerprints

Project: # 70187117 ##################

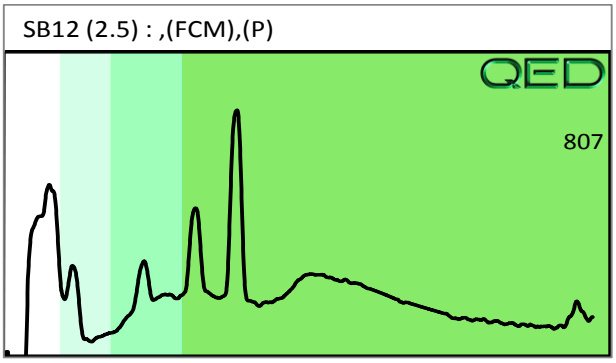
SB11 (2.5) : PHC not detected,(BO)



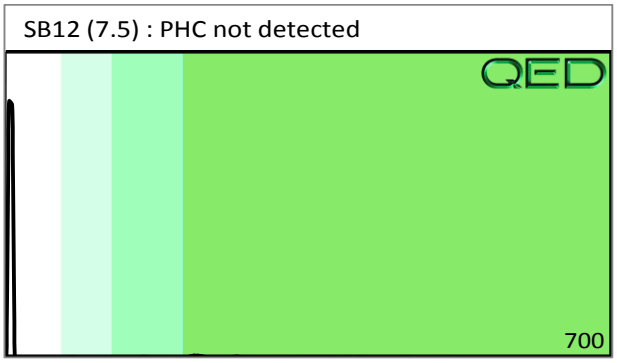
SB11 (7.5) : ,(FCM)



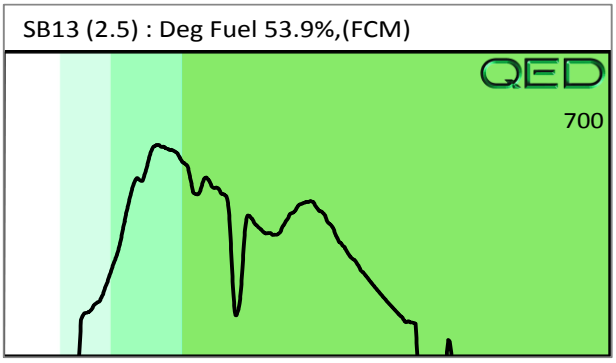
SB12 (2.5) : ,(FCM),(P)



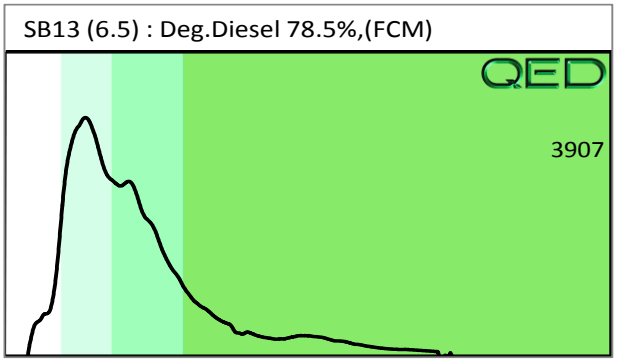
SB12 (7.5) : PHC not detected



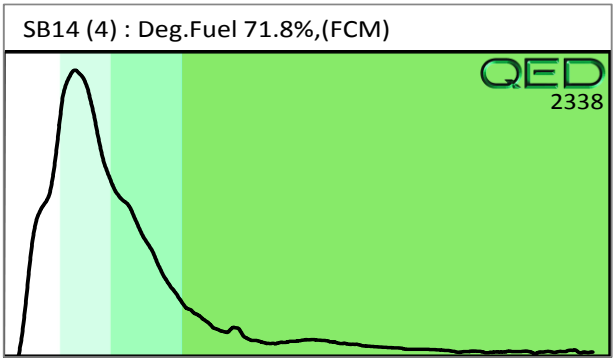
SB13 (2.5) : Deg Fuel 53.9%,(FCM)



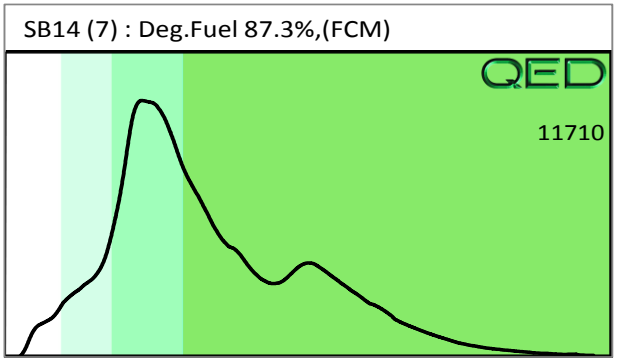
SB13 (6.5) : Deg.Diesel 78.5%,(FCM)



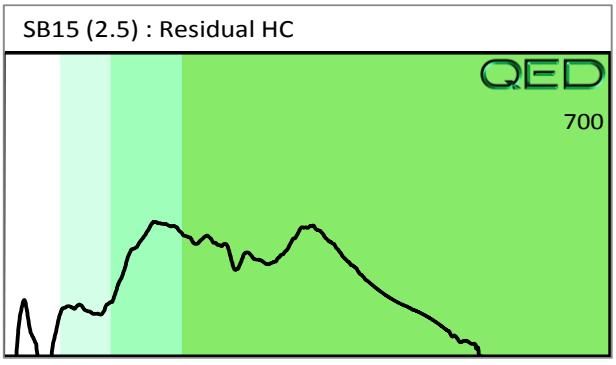
SB14 (4) : Deg.Fuel 71.8%,(FCM)



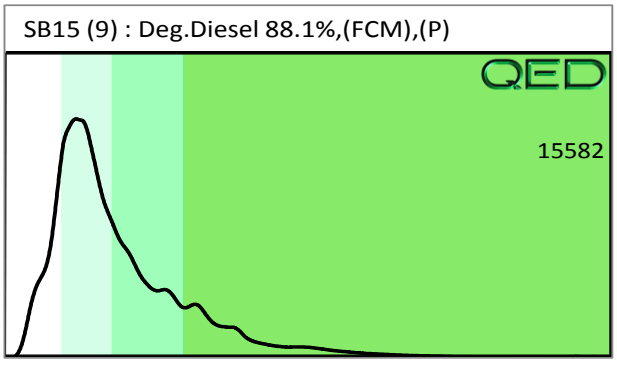
SB14 (7) : Deg.Fuel 87.3%,(FCM)



SB15 (2.5) : Residual HC



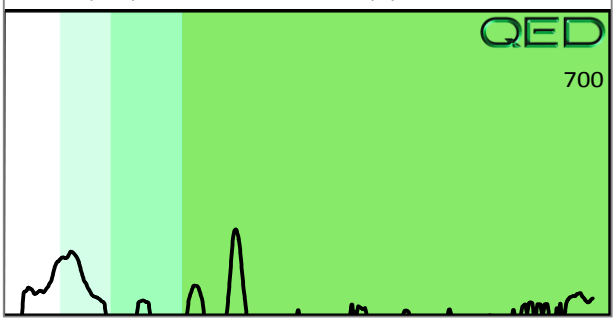
SB15 (9) : Deg.Diesel 88.1%,(FCM),(P)



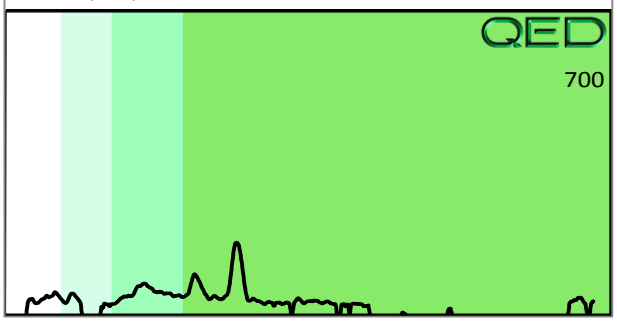
QED Hydrocarbon Fingerprints

Project: # 70187117 ##################

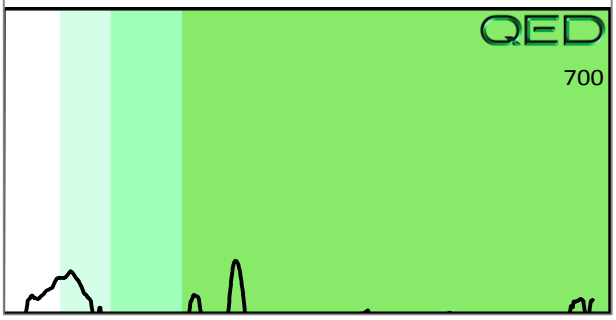
SB16 (2.5) : PHC not detected,(P)



SB16 (7.5) : PHC not detected

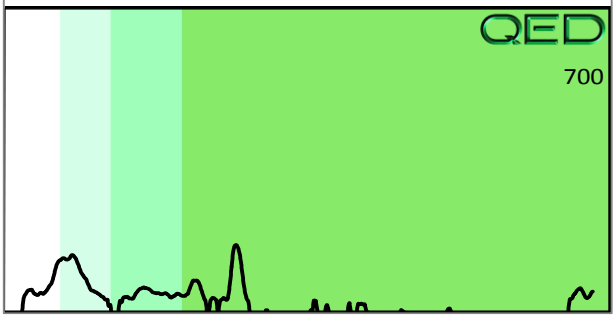


SB17 (2.5) : PHC not detected

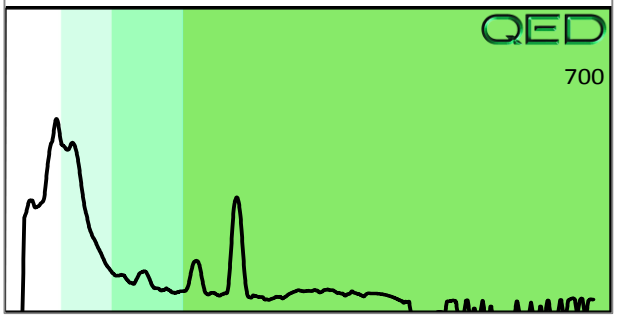


SB17 (7.5) : PHC not detected

SB18 (2.5) : PHC not detected



SB18 (7.5) : Deg.Diesel 59.9%,(FCM),(P)



Client Name:	Terracon
Address:	2401 Brentwood Rd #107, Raleigh, NC 27604
Contact:	will.frazier@terracon.com
Project Ref.:	70187117
Email:	Steve.Kerlin@terracon.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
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 24 Hour	TAT Requested 48 Hour	Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
4/23/18 0935		✓	JC	SB01 (2.5)	~~56.1~~	43.2	12.9
0940			JC	SB01 (7.5)	56.3	44.0	12.3
1305			JC	SB02 (3.5)	57.1	44.0	13.1
1310			JC	SB02 (6)	54.3	43.4	10.9
1245			JC	SB03 (4.5)	55.6	44.1	11.5
1250			JC	SB03 (9)	54.8	43.7	11.1
1220			JC	SB04 (2)	55.5	43.6	11.9
1225			JC	SB04 (7.5)	56.6	43.6	13.0
1205			JC	SB05 (2.5)	57.6	43.8	13.8
1210			JC	SB05 (7.5)	55.7	43.7	12.0
1150			JC	SB06 (2.5)	57.5	44.0	13.5
1155			JC	SB06 (7.5)	56.0	43.6	12.4
1115			JC	SB07 (2.5)	56.8	44.1	12.7
1120			JC	SB07 (7.5)	57.2	44.2	13.0
1050			JC	SB08 (2)	54.8	43.8	11.0
1055			JC	SB08 (7.5)	55.8	44.4	11.4
1015			JC	SB09 (2.5)	56.0	43.6	12.4
1020			JC	SB09 (7.5)	55.7	43.5	12.2
1030			JC	SB10 (2.5)	57.0	43.6	13.4
1035		✓	JC	SB10 (7.5)	55.5	44.0	11.5

Comments:

Relinquished by	Date/Time	Accepted by	Date/Time
	4/24/18 1000		4.25.18 1235
Relinquished by	Date/Time	Accepted by	Date/Time

RED Lab USE ONLY

20

Client Name:	Terracon
Address:	2401 Brentwood Rd #107, Raleigh, NC 27604
Contact:	will.frazier@terracon.com
Project Ref.:	70187117
Email:	steve.kerlin@terracon.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
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 24 Hour	TAT Requested 48 Hour	Initials	Sample ID	Total Wt.	Tare Wt.	Sample Wt.
4/23/18 1820		✓	JC	SB11 (2.5)	57.2	43.8	13.4
1825			JC	SB11 (7.5)	56.4	43.5	12.9
1805			JC	SB12 (2.5)	56.5	44.0	12.5
1810			JC	SB12 (7.5)	57.4	43.6	13.8
1750			JC	SB13 (2.5)	56.7	44.0	12.7
1755			JC	SB13 (6.5)	56.3	44.4	11.9
1725			JC	SB14 (4)	56.4	43.6	12.8
1730			JC	SB14 (7)	56.1	44.5	11.6
1705			JC	SB15 (2.5)	55.5	43.7	11.8
1710			JC	SB15 (9)	58.5	43.8	14.7
1650			JC	SB16 (2.5)	55.8	43.9	11.9
1655			JC	SB16 (7.5)	57.3	43.7	13.6
1625			JC	SB17 (2.5)	55.5	43.7	11.8
1630			JC	SB17 (7.5)	55.9	43.7	12.2
1615			JC	SB18 (2.5)	55.7	43.8	11.9
↓ 1620		↓	JC	SB18 (7.5)	55.6	43.5	12.1
			JC				

Comments:

Relinquished by	Date/Time	Accepted by	Date/Time
	4/24/18 1000		4.25.18 1235
Relinquished by	Date/Time	Accepted by	Date/Time

RED Lab USE ONLY

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SHEALY ENVIRONMENTAL SERVICES, INC.

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

The electronic signature above is the equivalent of a handwritten signature.

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

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.

Sample Summary

Terracon Consultants, Inc.

Lot Number: TD25013

Project Name: NCDOT B-5301 PSA

Project Number: 70187117

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
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

(3 samples)

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: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-001**

Description: **TW01** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1510** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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
Benzene	**71-43-2**	**8260B**	**38**		**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
Cyclohexane	**110-82-7**	**8260B**	**6.7**		**1.0**	**0.40**	**ug/L**	**1**
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
Ethylbenzene	**100-41-4**	**8260B**	**27**		**1.0**	**0.40**	**ug/L**	**1**
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	**98-82-8**	**8260B**	**4.5**		**1.0**	**0.40**	**ug/L**	**1**
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	**1634-04-4**	**8260B**	**33**		**1.0**	**0.40**	**ug/L**	**1**
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	**108-87-2**	**8260B**	**0.65**	**J**	**5.0**	**0.40**	**ug/L**	**1**
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
1,1,2,2-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
Toluene	**108-88-3**	**8260B**	**0.42**	**J**	**1.0**	**0.40**	**ug/L**	**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: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-001**

Description: **TW01** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1510** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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
Xylenes (total)	**1330-20-7**	**8260B**	**9.8**		**1.0**	**0.40**	**ug/L**	**1**

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
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Semivolatile Organic Compounds by GC/MS

Client: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-001**

Description: **TW01** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1510** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-001**

Description: **TW01** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1510** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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
Naphthalene	**91-20-3**	**8270D**	**4.2**		**0.80**	**0.20**	**ug/L**	**1**
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

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Volatile Organic Compounds by GC/MS

Client: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-002**

Description: **TW02** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1815** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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
Cyclohexane	**110-82-7**	**8260B**	**3.8**		**1.0**	**0.40**	**ug/L**	**1**
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
Ethylbenzene	**100-41-4**	**8260B**	**17**		**1.0**	**0.40**	**ug/L**	**1**
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	**98-82-8**	**8260B**	**6.4**		**1.0**	**0.40**	**ug/L**	**1**
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
Methylcyclohexane	**108-87-2**	**8260B**	**7.4**		**5.0**	**0.40**	**ug/L**	**1**
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
1,1,2,2-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
Toluene	**108-88-3**	**8260B**	**0.50**	**J**	**1.0**	**0.40**	**ug/L**	**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
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ND = Not detected at or above the DL
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-002**

Description: **TW02** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1815** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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
Xylenes (total)	**1330-20-7**	**8260B**	**8.7**		**1.0**	**0.40**	**ug/L**	**1**

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

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Semivolatile Organic Compounds by GC/MS

Client: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-002**

Description: **TW02** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1815** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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
2-Methylnaphthalene	**91-57-6**	**8270D**	**2.0**		**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

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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Semivolatile Organic Compounds by GC/MS

Client: **Terracon Consultants, Inc.** Laboratory ID: **TD25013-002**

Description: **TW02** Matrix: **Aqueous**

Date Sampled: **04/23/2018 1815** Project Name: **NCDOT B-5301 PSA**

Date Received: **04/25/2018** Project Number: **70187117**

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
Naphthalene	**91-20-3**	**8270D**	**2.9**		**0.80**	**0.20**	**ug/L**	**1**
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

LOQ = Limit of Quantitation
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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: TQ70748-001
Batch: 70748
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

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
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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
Batch: 70748
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

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
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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
Batch: 70748
Analytical Method: 8260B
Matrix: Aqueous
Prep Method: 5030B

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

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

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QC Data for Lot Number: TD25013

Volatile Organic Compounds by GC/MS - LCS

Sample ID: TQ70748-002
Batch: 70748
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

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
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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
Batch: 70602
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
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
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

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

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

QC Data for Lot Number: TD25013

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: TQ70602-001
Batch: 70602
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
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
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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
Batch: 70602
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
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
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QC Data for Lot Number: TD25013

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: TQ70602-002
Batch: 70602
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
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

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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

SHEALY Chain of Custody Record

Number 83186

Client: Terracon	Report to Contact: will.frazier@terracon.com	Telephone No. / E-mail: Steve.Kerlin@terracon.com	Quote No. 21006
Address: 2401 Brentwood Rd. #107	Sampler's Signature: x	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Raleigh	State: NC	Zip Code: 27604	
Project Name: NCDOT B-5301 PSA	Printed Name: James Chase		
Project No.: 70187117	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	C=Grab G=Composite	Matrix: Aqueous	Soil	Non-aqueous	No of Containers by Preservative Type: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	VOCs 8260	SVOC RVE
TW01	4/23/18	1510	G	✓			✓			✓			✓	✓
TW02	↓	1815	G	✓			✓			✓			✓	✓

TD25013

CSO

Remarks / Cooler I.D.

received trip blank not on COC
C.D. 4/25/18
put on hold per will
4/25/18

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☐ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by	4/24/18	1000	1. Received by		
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date 4/25/18	Time 1016

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) Yes No Ice Pack
Receipt Temp. 3.2 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Sample Receipt Checklist (SRC)

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

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA

Cooler ID / Original temperature upon receipt / Derived (Corrected) temperature upon receipt:

/ 3.2 / 3.2°C / / °C / / °C / / °C

Method: ☐ Temperature Blank ☑ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ 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).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC? only quote changed / marked at
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ 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?
☐ Yes	☑ No		21. Was the quote number used taken from the container label? containers from another project / swapped @ 4/25/18

Sample Preservation (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 _____ (H2SO4, HNO3, 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 ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: _____.

SR barcode labels applied by: CM Date: 4/25/18

Comments: