

December 13, 2016

Mr. Terry Fox, L.G.  
North Carolina Department of Transportation  
Geotechnical Engineering Unit  
1589 Mail Service Center  
Raleigh, North Carolina 27699-1589

Reference: **Preliminary Site Assessment  
Oland Little Property (Parcel #154)  
5512 Raeford Road  
Fayetteville, Cumberland County, North Carolina  
State Project: U-4405  
WBS Element 39049.1.1  
SIES Project No. 2016.0054.NDOT**

Dear Mr. Fox:

Solutions-IES, Inc., (SIES) has completed the Preliminary Site Assessment conducted at the above-referenced property. The work was performed in accordance with the Technical and Cost proposal dated September 26, 2016, and the North Carolina Department of Transportation's (NCDOT's) Notice to Proceed dated September 26, 2016. Activities associated with the assessment consisted of conducting a geophysical investigation, collecting soil samples for analysis, and reviewing applicable North Carolina Department of Environmental Quality (NCDEQ) records. The purpose of this report is to document the field activities, present the laboratory analyses, and provide recommendations regarding the property.

### **Location and Description**

The Oland Little Property (Parcel #154) is located at 5512 Raeford Road in Fayetteville, Cumberland County, North Carolina. The property is situated on the north side of Raeford Road approximately 100 feet east of the intersection of Raeford Road and Skibo Road (**Figure 1**). The property consists of an active truck rental business (Budget Truck Rental), but NCDOT information indicated that the site was formerly a gas station in the 1980s. According to the NCDOT, aerial photography from 1983 shows a pump island in front of the building.

A concrete parking area occupies the area in front of the building and asphalt driveways enter the property from both sides of the building. A concrete pad is present in front of the building along the road frontage and is likely the former pump island (**Figure 2**). The proposed easement had not been marked at the site on the dates of the field work, but NCDOT plan sheets show that the easement encompasses the concrete pad (former pump island) but will not affect the building.

The NCDOT requested a Preliminary Site Assessment for the right-of-way and proposed easement because of a former gas station at the site. The scope of work as defined in the Request for Technical and Cost Proposal was to evaluate the site with respect to the presence of known and unknown USTs and assess where contamination exists on the right-of-way/proposed easement. An estimate of the quantity of impacted soil was to be provided, should impacted soils be encountered.

SIES reviewed the on-line NCDEQ Incident Management database and no incident number was assigned to the site. SIES also examined the UST registration database and found no tanks registered to the property address.

### **Geophysical Survey**

Prior to SIES' mobilization to the site, Pyramid Environmental & Engineering of Greensboro, NC (Pyramid) conducted a geophysical survey to determine if USTs were present in the right-of-way/proposed easement. The geophysical survey consisted of an electromagnetic survey using a Geonics EM61 time-domain electromagnetic induction meter to locate buried metallic objects. The instruments were used specifically to locate USTs.

A survey grid was laid out along the right-of-way/proposed easement with the X-axis oriented approximately parallel to Raeford Road and the Y-axis oriented approximately perpendicular to Raeford Road. The grid was positioned to cover the entire right-of-way/proposed easement. The grid was positioned to cover the entire right-of-way/proposed easement, as shown on **Figure 2** of the geophysical survey report in **Attachment A**.

The survey lines were spaced five feet apart and magnetic data were collected continuously along each survey line with a data logger. After collection, the data were reviewed in the field with graphical computer software. No anomalies were detected that were not attributable to visible cultural features, metallic debris, underground utilities, signage, or vehicles. The data did not show evidence of metallic USTs within the right-of-way/proposed easement. For these reasons, a ground penetrating radar survey was not required to verify any unknown EM anomalies. Pyramid's detailed report of findings and interpretations is presented in **Attachment A**.

### **Site Assessment Activities**

On October 24, 2016, SIES mobilized to the site to conduct a Geoprobe® direct-push investigation to evaluate subsurface soil conditions on the property. As directed by the NCDOT, the Geoprobe® borings were terminated at 10 feet below ground surface (ft bgs). Four direct-push holes (154-SB-1 through 154-

SB-4) were advanced throughout the right-of-way/proposed easement (**Figure 2**). The soil boring logs are included as **Attachment B**. Borings 154-SB-1 through 154-SB-4 were located to evaluate the subsurface conditions in the right-of-way/easement along Raeford Road (see photos in **Attachment C**).

Continuous sampling using a Geoprobe® resulted in generally good recovery of soil samples from the direct-push holes. Soil samples were collected and contained in four-foot long acetate sleeves inside the direct-push Macro-Core® sampler. Each of the sleeves was divided into two-foot long sections for soil sample screening. Soil from each two-foot interval was placed in a resealable plastic bag and the bag was set aside for volatilization of organic compounds from the soil to the bag headspace. A photoionization detector (PID) probe was inserted into the bag and the reading was recorded (**Table 1**).

If the PID concentrations in a boring were consistently low, one sample from the bottom interval was selected for analysis. If the PID concentrations were elevated, samples at the elevated and bottom intervals were selected for analyses. The PID results are summarized in Table 1.

The selected soil samples were submitted to an on-site mobile laboratory for analysis of total petroleum hydrocarbons (TPH) diesel range organics (DRO) and gasoline range organics (GRO) using ultraviolet fluorescence (UVF) methodology. Each boring was backfilled with bentonite and drill cuttings to the surface after completion.

The lithology encountered by the direct-push samples was generally consistent throughout the site. The ground surface was covered with about 0.5 feet of asphalt or topsoil. Below this surface cover to a depth of about eight to ten feet was a light gray clayey sand. Underlying the sand was a light gray soft clay. No bedrock or groundwater were noted in any of the borings. Hydrocarbon odors were generally noted in the material below a depth of about four feet in all borings.

According to the 1985 Geologic Map of North Carolina, the site is within of Coastal Plain Physiographic Province in North Carolina near the contact between the Cretaceous Black Creek and Middendorf Formations. The strata of the Black Creek Formation consist of gray to black clay, thin lenses of fine-grained sand and thick lenses of cross-bedded sand. The lithology may also include glauconite and fossils. In comparison, the Middendorf Formation consists of sand, sandstone, and mudstone that are laterally discontinuous. The soils observed at the site are consistent with the Middendorf Formation as the parent material.

## Analytical Results

The laboratory data are summarized in **Table 1** and the complete analytical report is presented in **Attachment D**. Ten soil samples were submitted for analysis (multiple samples were collected from borings 154-SB-1 through 154-SB-3). Of these samples, five contained detectable GRO compounds at concentrations ranging from 1.7 to 347,094 milligrams per kilogram (mg/kg) and all ten samples contained detectable DRO compounds at concentrations ranging from 0.78 to 85,827 mg/kg. The action levels are 50 mg/kg for GRO and 100 mg/kg for DRO<sup>1</sup>. Two soil samples had hydrocarbon concentrations above action levels: 154-SB-3-6-8 (347,094 mg/kg GRO and 85,827 mg/kg DRO) and 154-SB-3-8-10 (6,354 mg/kg GRO and 1,972 mg/kg DRO). Figure 3 shows the analytical results for the highest individual DRO and GRO in each boring (the results may be from different samples within the boring).

## Contaminated Soil Volume Estimate

The UVF analytical results (**Table 1**) of the soil samples collected on October 24, 2016 indicate that two of the soil samples in boring 154-SB-3 contained DRO or GRO concentrations above the action level. Therefore, an estimate of the volume of soil requiring possible remediation was made.

To estimate the volume of soil requiring possible remediation, only the soil samples that contained a DRO and/or GRO concentration above the respective action levels were considered. The thickness of the potentially contaminated soil was estimated from the UVF results, which indicated a thickness of four feet (**Table 1**). After estimating the potential contamination geometry using field observations and experience with similar sites and geology, SIES measured the affected section on **Figure 3** by using CAD software, which indicated a total area of about 375 ft<sup>2</sup>. Estimating a four-foot contamination thickness, this calculates to a volume of about 55 bank cubic yards.

The use of DRO and GRO concentrations to determine UST closure and immediate soil removal is a valid analytical method. However, any cleanup beyond the closure is governed by risk-based methods that are based on individual constituents and do not correlate with DRO and GRO concentrations. Because of the uncertainty associated with the differences in these analytical methods, the actual volume of contaminated soil may be higher or lower.

## Conclusions and Recommendations

A Preliminary Site Assessment was conducted to evaluate the Oland Little Property (Parcel #154) located at 5512 Raeford Road in Fayetteville, Cumberland County, North Carolina. NCDEQ databases indicate

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<sup>1</sup> NCDEQ, *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons (TPH)*, July 26, 2016,



that no release incidents have been reported for the site and no USTs were registered to the property address. A geophysical survey conducted at the site did not detect USTs in the investigation area. Four soil borings were advanced to evaluate the subsurface soil conditions along the right-of-way/proposed easement. Two of the analyzed soil samples detected GRO or DRO concentrations above their respective action levels. Based on the analytical results, SIES estimated approximately 55 cubic yards of potentially contaminated soil at the site.

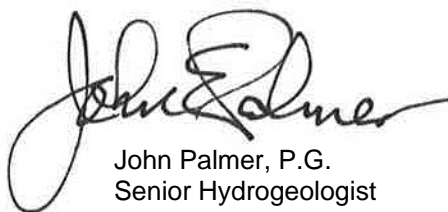
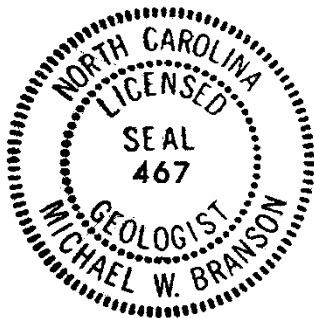
SIES appreciates the opportunity to work with the NCDOT on this project. Because compounds were detected above the action level in the soil samples, SIES recommends that a copy of this report be submitted to the Division of Waste Management, UST Section, in the Fayetteville Regional Office. If you have any questions, please contact us at (919) 873-1060.

Sincerely,



Michael W. Branson, P.G.  
Project Manager

Attachments



John Palmer, P.G.  
Senior Hydrogeologist

**TABLE 1**  
**SOIL FIELD SCREENING AND ANALYTICAL RESULTS**  
**LITTLE PROPERTY (PARCEL #154)**  
**FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA**  
**STATE PROJECT: U-4405**  
**WBS ELEMENT 39049.1.1**  
**SIES PROJECT NO. 2016.0054.NDOT**

SAMPLE ID	DEPTH (ft)	PID READING (ppm)	SAMPLE ID	ANALYTICAL RESULTS (mg/kg)	
				UVF GRO	UVF DRO
154-SB-1	Action Level (mg/kg)			50	100
	0 - 2	1.8			
	2 - 4	2.7			
	4 - 6	3.8	154-SB-1-4-6	<0.67	1.7
	6 - 8	5.5	154-SB-1-6-8	<0.23	0.78
	8 - 10	716	154-SB-1-8-10	<0.63	31.4
154-SB-2	0 - 2	7.4			
	2 - 4	7.8			
	4 - 6	7.9	154-SB-2-4-6	<0.77	15.1
	6 - 8	20.1	154-SB-2-6-8	3.8	16.8
	8 - 10	1005	154-SB-2-8-10	11.4	1.3
154-SB-3	0 - 2	1.9			
	2 - 4	50.8			
	4 - 6	7.1	154-SB-3-4-6	1.7	10.5
	6 - 8	1870	154-SB-3-6-8	347,094	85,827
	8 - 10	2933	154-SB-3-8-10	6,352	1,972
154-SB-4	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.1			
	6 - 8	0.0			
	8 - 10	NS	154-SB-4-8-10	<0.73	5.2

1) ft - feet

2) ppm - parts per million.

3) PID - photoionization ionization detector

4) mg/kg - milligrams per kilogram.

5) UVF DRO - Diesel range organics by UVF.

6) UVF GRO - Gasoline range organics by UVF.

7) Action level based upon NCDEQ memo *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons* - July 29, 2016.

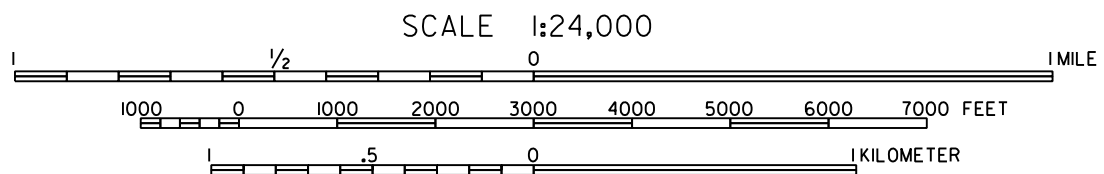
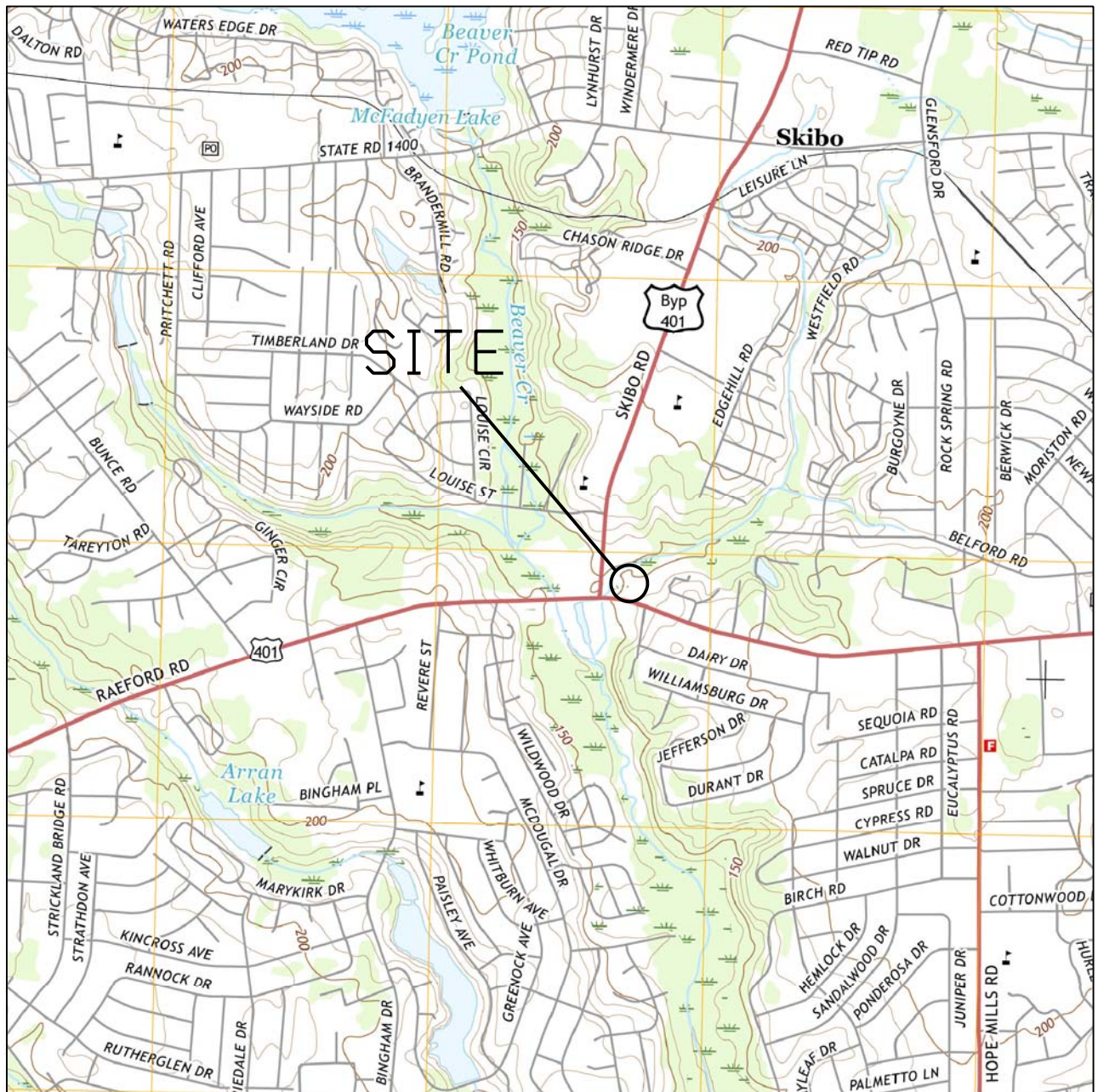
8) Soil samples were collected on October 25, 2016.

9) NS - Not screened due to equipment malfunction.

10) **Bold** values are above the detection level. Shaded values are above the action level.

## FIGURES

FILE  
FAYETTEVILLE PSAS  
DATE  
NOVEMBER 2016  
PROJECT MANAGER  
MWB  
CHECKED BY  
JEP  
PROJECT NUMBER  
2016.0054.NDOT



SOURCE: U.S. GEOLOGICAL SURVEY 7.5 MIN QUADRANGLE: FAYETTEVILLE, NC (2016)



1101 NOWELL ROAD  
RALEIGH, NORTH CAROLINA 27607  
TEL: (919) 873-1060 FAX: (919) 873-1074

## VICINITY MAP

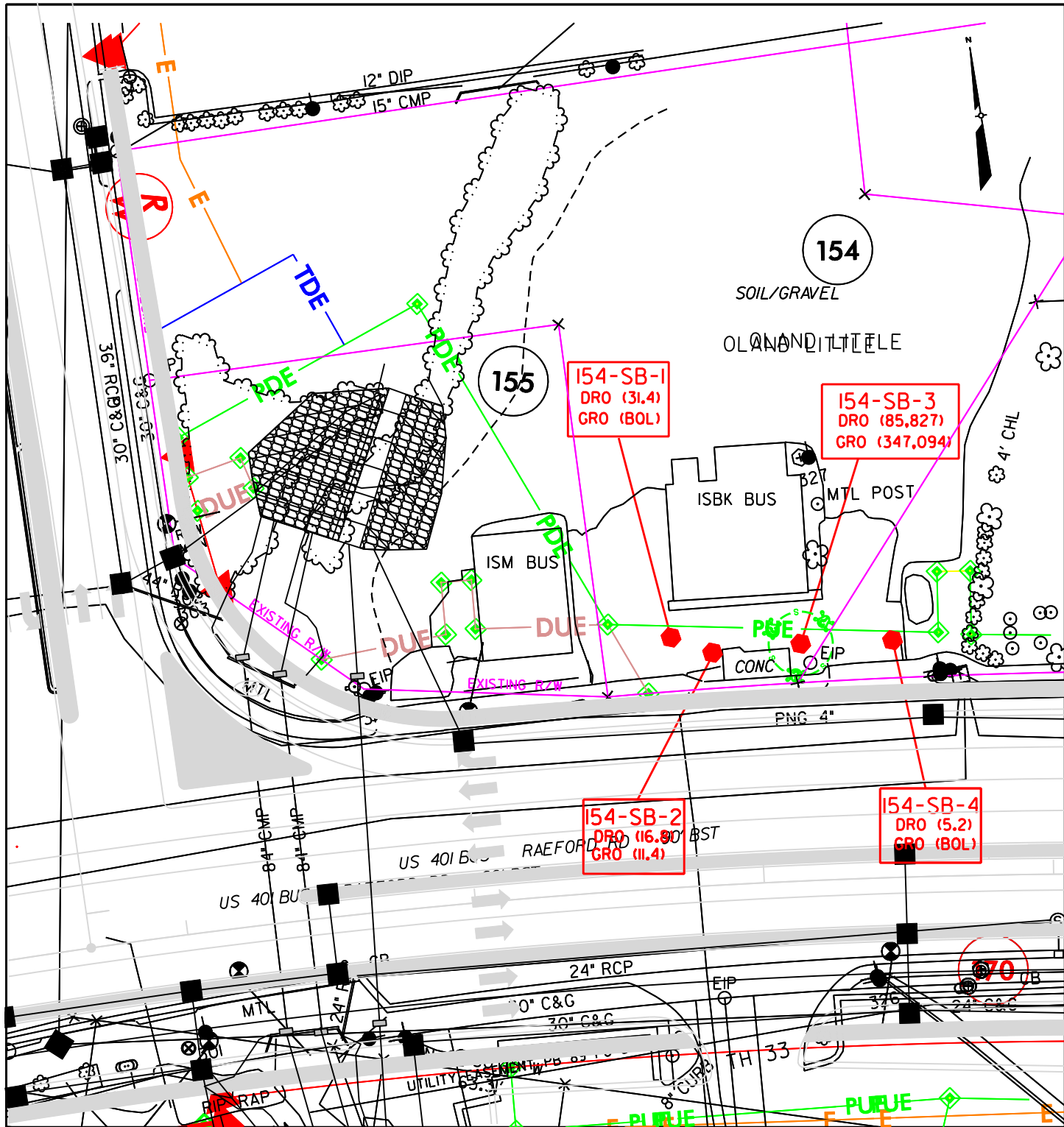
LITTLE PROPERTY (PARCEL #154)  
FAYETTEVILLE, CUMBERLAND COUNTY NORTH CAROLINA

## FIGURE

1







ATTACHMENT A

# GEOPHYSICAL SURVEY

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## METALLIC UST INVESTIGATION: PARCEL 154 – OLAND B. LITTLE NCDOT PROJECT U-4405

5512 RAEFORD RD., FAYETTEVILLE, CUMBERLAND COUNTY, NC

NOVEMBER 4, 2016

Report prepared for:

Mike Branson  
Solutions, IES  
1101 Nowell Road  
Raleigh, North Carolina 27607

Prepared by: \_\_\_\_\_



Eric C. Cross, P.G.  
NC License #2181

Reviewed by: \_\_\_\_\_



Douglas A. Canavella, P.G.  
NC License #1066



**GEOPHYSICAL INVESTIGATION REPORT**  
**Parcel 154 – 5512 Raeford Road**  
**Fayetteville, Cumberland County, North Carolina**

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- Figure 2 – Parcel 154 EM61 Results Contour Map

## LIST OF ACRONYMS

CADD .....	Computer Assisted Drafting and Design
DF .....	Dual Frequency
EM.....	Electromagnetic
GPR.....	Ground Penetrating Radar
GPS .....	Global Positioning System
NCDOT.....	North Carolina Department of Transportation
ROW .....	Right-of-Way
SVE.....	Soil Vapor Extraction
UST .....	Underground Storage Tank

## EXECUTIVE SUMMARY

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**Project Description:** Pyramid Environmental conducted a geophysical investigation for Solutions, IES (Solutions) at Parcel 154, located at 5512 Raeford Road, Fayetteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-4405). Solutions directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from October 12-17, 2016, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

**Geophysical Results:** All EM anomalies were directly attributed to visible cultural features and known utilities. A GPR survey was not required. Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 154.

## INTRODUCTION

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Pyramid Environmental conducted a geophysical investigation for Solutions, IES (Solutions) at Parcel 154, located at 5512 Raeford Road, Fayetteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-4405). Solutions directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from October 12-17, 2016, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a commercial building surrounded by concrete parking space, gravel drives and grassy medians. Aerial photographs showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

## FIELD METHODOLOGY

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The geophysical investigation consisted of an electromagnetic (EM) induction-metal detection survey. Pyramid collected the EM data using a Geonics EM61 metal detector integrated with a Trimble AG-114 GPS antenna. The integrated GPS system allows the location of the instrument to be recorded in real-time during data collection, resulting in an EM data set that is geo-referenced and can be overlain on aerial photographs and CADD drawings. A boundary grid was established around the perimeter of the site with marks every 10 feet to maintain orientation of the instrument throughout the survey and assure complete coverage of the area.

According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at approximately 0.8 foot intervals along north-south trending or east-west trending, generally

parallel survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 11.0 software programs.

GPR data were not required at this property due to all EM anomalies being directly attributed to visible cultural features at the ground surface or known utilities (see Discussion of Results below).

Pyramid’s classifications of USTs for the purposes of this report are based directly on the geophysical UST ratings provided by the NCDOT. These ratings are as follows:

Geophysical Surveys for Underground Storage Tanks on NCDOT Projects			
High Confidence	Intermediate Confidence	Low Confidence	No Confidence
<b>Known UST</b> Active tank - spatial location, orientation, and approximate depth determined by geophysics.	<b>Probable UST</b> Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	<b>Possible UST</b> Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist’s discretion.

## DISCUSSION OF RESULTS

### *Discussion of EM Results*

A contour plot of the EM61 results obtained across the survey area at the property is presented in **Figure 2**. Each EM anomaly is numbered for reference in the figure. The following table presents the list of EM anomalies and the cause of the metallic response, if known:

### **LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY**

<b>Metallic Anomaly #</b>	<b>Cause of Anomaly</b>	<b>Investigated with GPR</b>
1	Sign Pole	
2	Windows, Doors and Suspected Utility	
3	Metal Fence	
4	Telephone Pole and Phone Box	
5	Guy Wire	
6	Water Utility	

All of the EM anomalies recorded by the survey are directly attributed to visible cultural features such as signs, utility poles, building structures, guy wires, and utilities. For this reason, a GPR survey was not required to verify any unknown anomalies.

Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 154.

### **SUMMARY & CONCLUSIONS**

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Pyramid's evaluation of the EM61 data collected at Parcel 154 in Fayetteville, Cumberland County, North Carolina, provides the following summary and conclusions:

- The EM61 survey provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- All EM anomalies were directly attributed to visible cultural features and known utilities. A GPR survey was not required.
- Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 154.

## LIMITATIONS

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Geophysical surveys have been performed and this report was prepared for Solutions, IES in accordance with generally accepted guidelines for EM61 surveys. It is generally recognized that the results of the EM61 surveys are non-unique and may not represent actual subsurface conditions. The EM61 results obtained for this project have not conclusively determined the definitive presence or absence of metallic USTs, but the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.






APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA



View of Survey Area  
(Facing Approximately West)



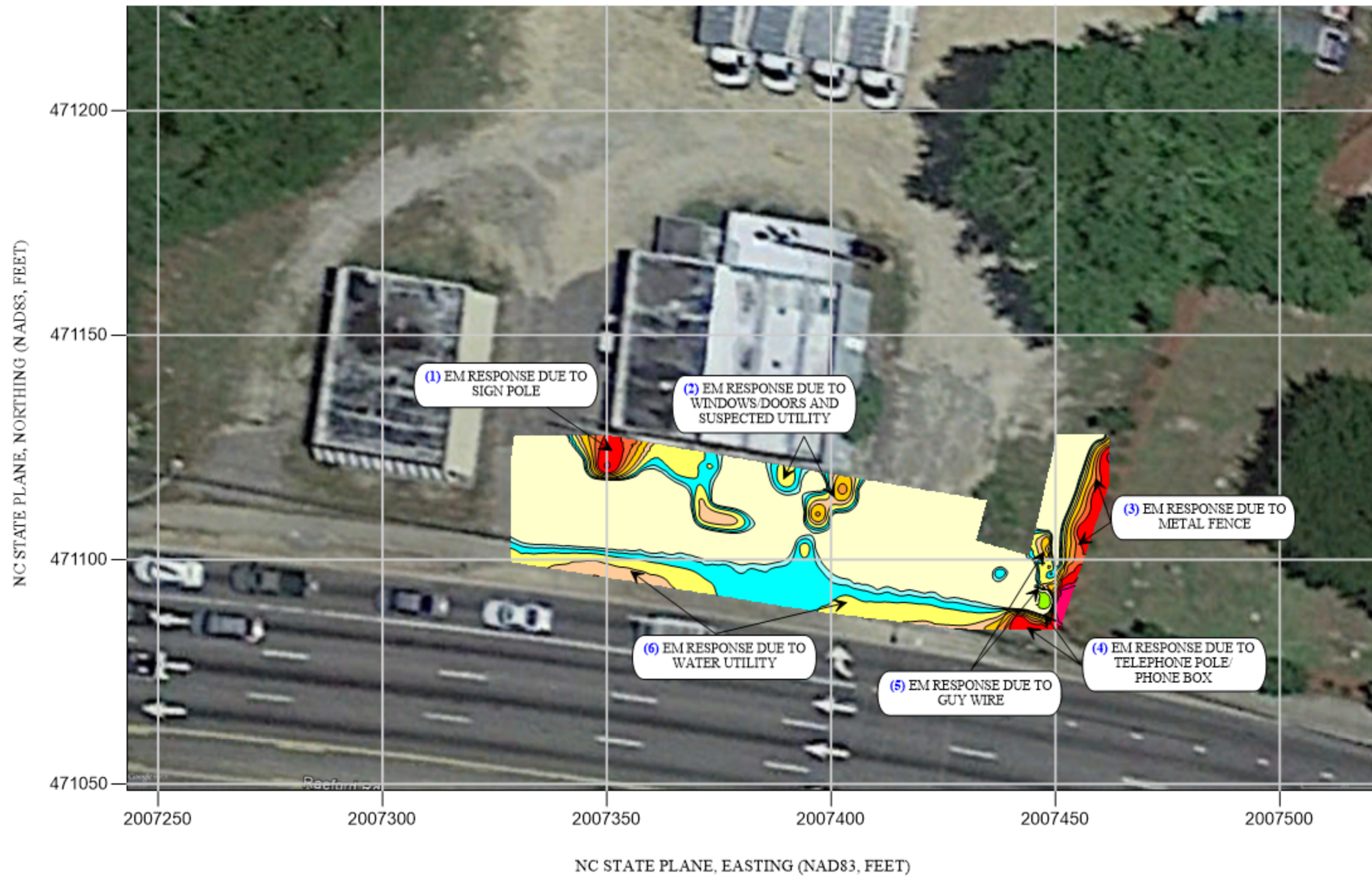
View of Survey Area  
(Facing Approximately East)

TITLE		PARCEL 154 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	
PROJECT		5512 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-4405	
		503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE	10/31/16	CLIENT	SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	FIGURE 1	



N↑

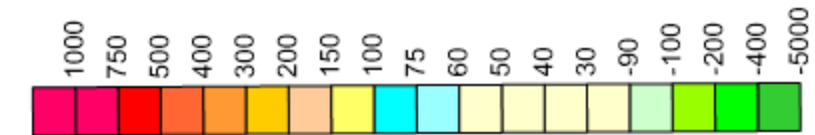
## EM61 METAL DETECTION RESULTS




NUMBERS IN BLUE (x) CORRESPOND TO ANOMALY TABLE INCLUDED IN THE REPORT

## NO EVIDENCE OF UNKNOWN METALLIC USTs OBSERVED

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM61 data were collected on October 12, 2016, using a Geonics EM61 instrument. GPR verification data were not required due to all EM anomalies being directly attributed to visible cultural features.



EM61 Metal Detection Response (millivolts)

TITLE	PARCEL 154 - EM61 RESULTS CONTOUR MAP		
PROJECT	5512 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-4405		
	 503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology		
DATE	10/31/2016	CLIENT	SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	FIGURE 2	

ATTACHMENT B

**Log of Boring 154-SB-1**

BORING LOCATION: Parcel #154, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/24/2016

 DATE FINISHED:  
10/24/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0					Asphalt.	0
1				1.8		1
2		100%				2
3				2.7	Light grey clayey sand. Dry.	3
4						4
5	154-SB-1-4-6			3.8		5
6		100%				6
7	154-SB-1-6-8			5.5	Light grey clayey sand with black staining and mild hydrocarbon odors. Dry.	7
8						8
9	154-SB-1-8-10			716.0	Light grey soft clay with black staining and hydrocarbon odors. Dry.	9
10		100%				10

End of Boring

**Log of Boring 154-SB-2**

BORING LOCATION: Parcel #154, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/24/2016

 DATE FINISHED:  
10/24/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY:  
Samuel McIntyre

CHECKED BY:

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0					Asphalt.	0
1				7.4		1
2		100%				2
3				7.8	Light grey clayey sand. Dry.	3
4						4
5	154-SB-2-4-6			7.9		5
6		100%				6
7	154-SB-2-6-8			20.1	Light grey clayey sand with black staining and mild hydrocarbon odors. Dry.	7
8						8
9	154-SB-2-8-10	100%		1,005	Light grey soft clay. Dry.	9
10						10

End of Boring

BORING LOCATION: Parcel #154, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/24/2016

 DATE FINISHED:  
10/24/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

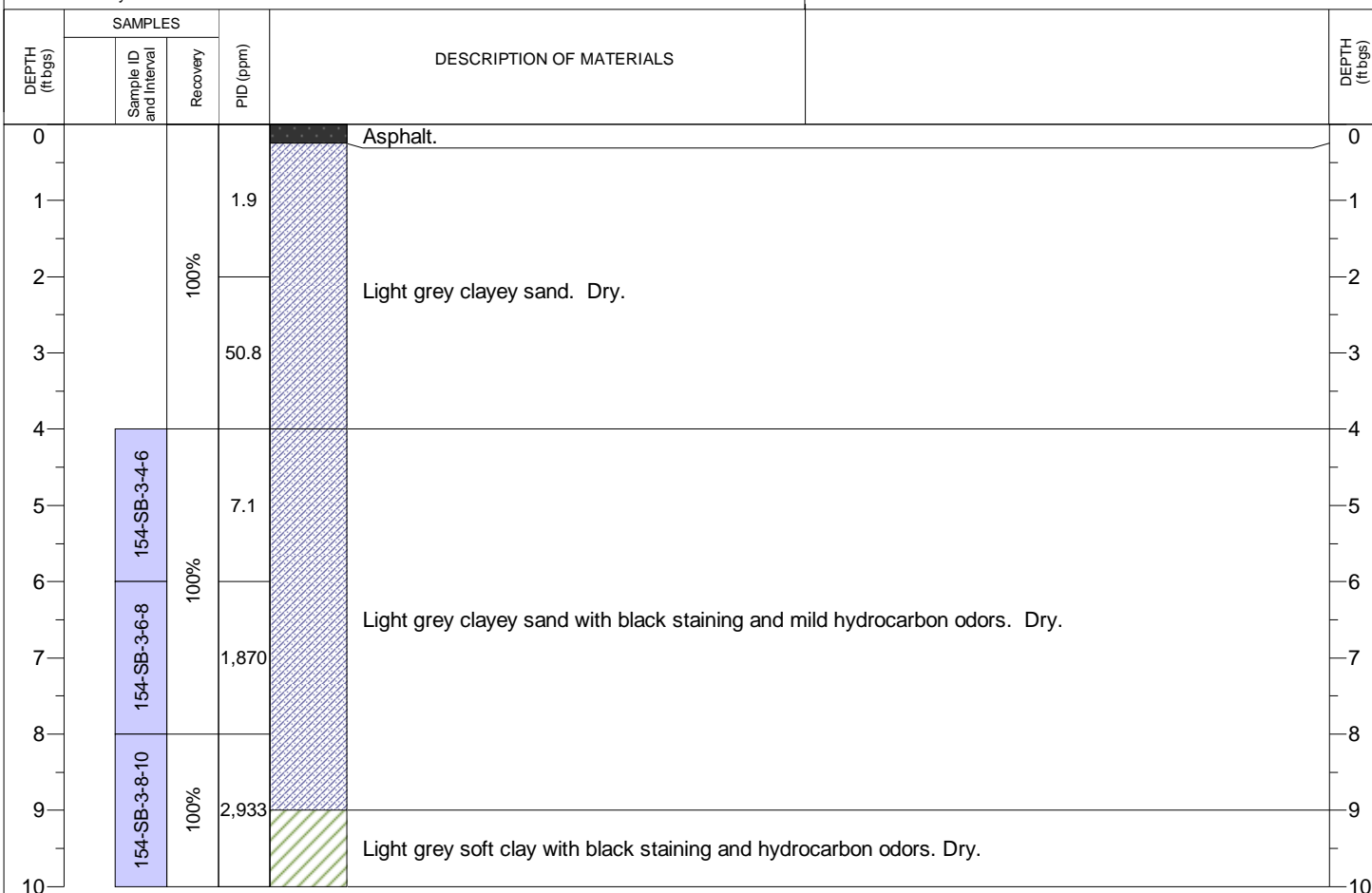
 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

LOGGED BY: Samuel McIntyre      CHECKED BY:



End of Boring



BORING LOCATION: Parcel #154, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY:  
Samuel McIntyre

CHECKED BY:

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0					Asphalt.	0
1		100%	0.0		Light grey clayey sand. Dry.	1
2						2
3			0.0			3
4					Light grey clayey sand with black staining and mild hydrocarbon odors. Dry.	4
5		100%	0.1			5
6						6
7			0.0			7
8	154-SB-4-8-10					8
9		100%	NA			9
10						10

End of Boring

ATTACHMENT C

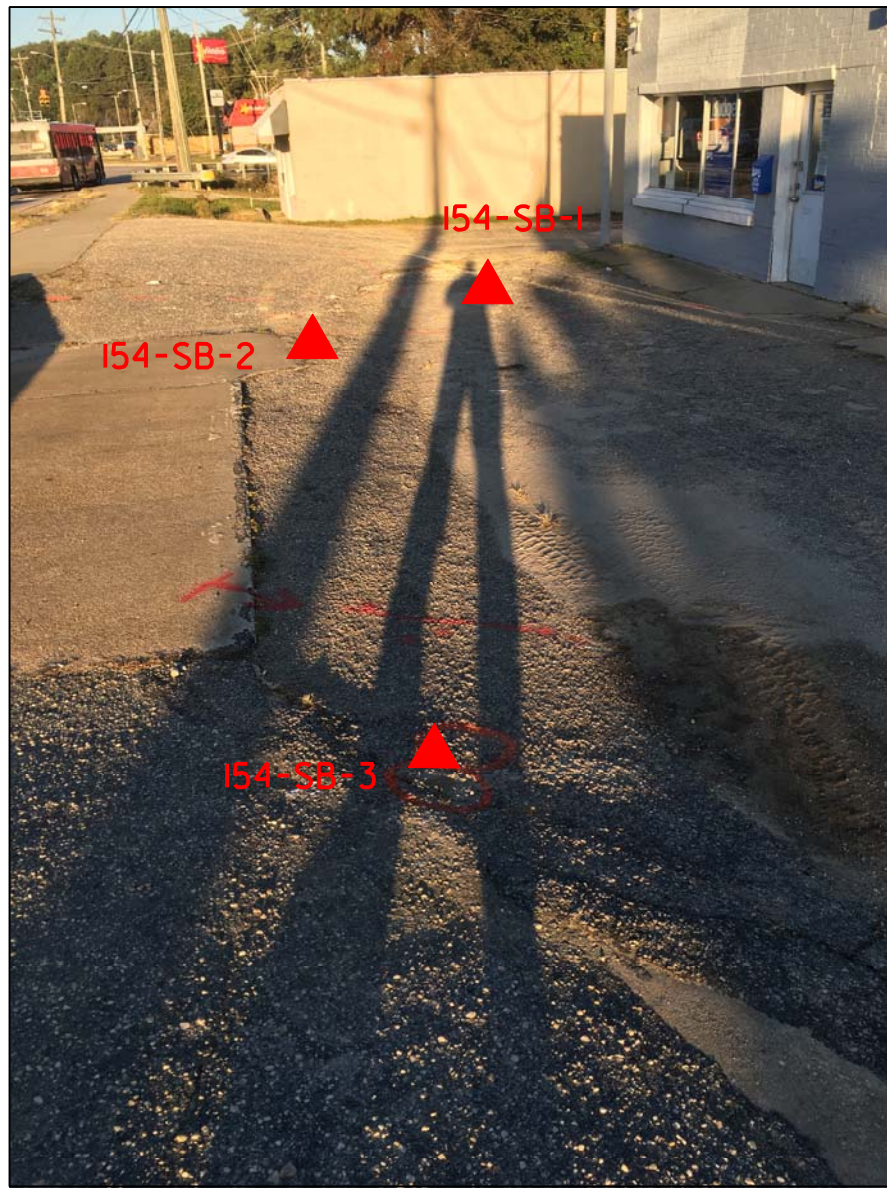


PHOTO 1 - VIEW OF SOIL BORINGS LOOKING WEST



ATTACHMENT D



### Hydrocarbon Analysis Results

**Client:** NCDOT  
**Address:** Parcel 154: 5512 Raeford Road  
 Fayetteville, NC

**Samples taken** 10/24/2016  
**Samples extracted** 10/24/2016  
**Samples analysed** 10/25/2016

**Contact:**

**Operator** Candy Elliott

**Project:** 2016.0054.NDOT

													U04049		
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		
										% light	% mid	% heavy			
s	154-SB-1-4-6	26.9	<0.67	<0.67	1.7	1.7	1.5	0.08	<0.003	0	79.2	20.8	Deg Fuel (FCM) (BO) 51.8%		
s	154-SB-1-6-8*	9.2	<0.23	<0.23	0.78	0.78	0.68	0.02	<0.001	10.3	86.4	3.3	V.Deg.Diesel (FCM) (P) (BO) 69%		
s	154-SB-1-8-10	25.0	#N/A	<0.63	31.4	31.4	8.2	0.33	<0.003	0	98.2	1.8	Deg.PHC (FCM) (BO) 75%		
s	154-SB-2-4-6**	30.8	<0.77	<0.77	15.1	15.1	8	0.37	0.003	0	83.1	16.9	V.Deg.PHC (FCM) 55.3%		
s	154-SB-2-6-8	23.5	<0.59	3.8	16.8	20.6	9.3	0.45	0.005	28.8	63.4	7.8	Deg Fuel (FCM) 65.1%		
s	154-SB-2-8-10	24.4	7.5	11.4	1.3	12.7	1	0.04	<0.002	92.3	7.3	0.4	Deg Gas (FCM) (P) (BO) 53.2%		
s	154-SB-3-4-6	26.9	<0.67	1.7	10.5	12.2	6.3	0.36	0.003	21	72.8	6.1	V.Deg.PHC (FCM) 85.2%		
s	154-SB-3-6-8	293534.4	198429	347094	85827	432921	21530	927.2	<29.4	94.2	5.8	0	Deg Gas (FCM) 78.2%		
s	154-SB-3-8-10	2377.4	<59.4	6352	1972	8324	486.5	20.3	<0.24	92.9	7	0.1	Deg Gas (FCM) 81.9%		
	Initial Calibrator QC check			OK		Final FCM QC Check								OK	111.6 %

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library (SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

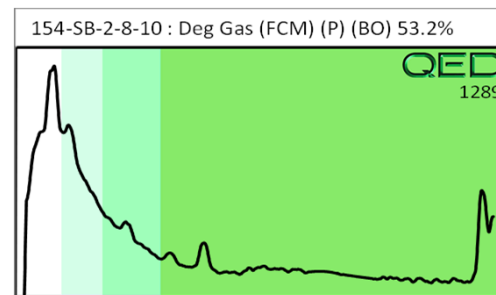
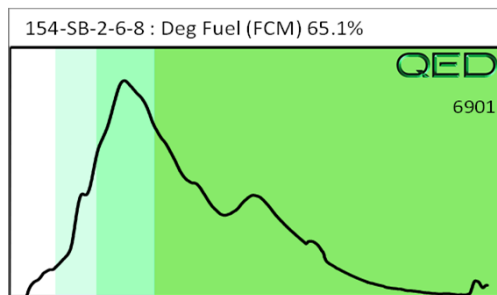
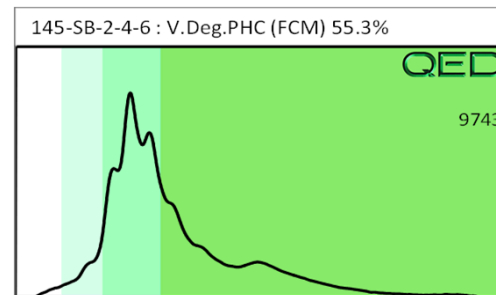
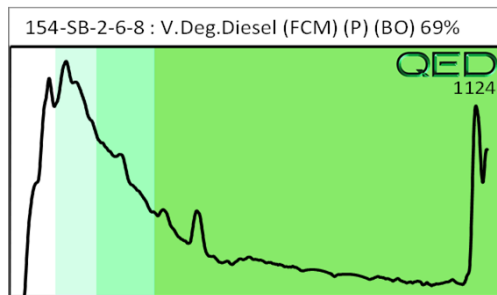
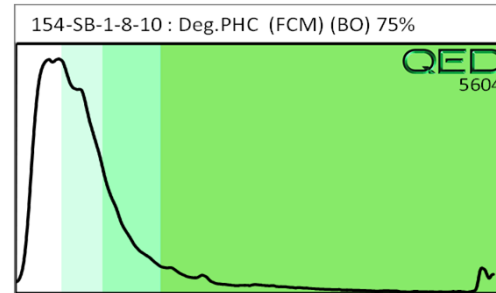
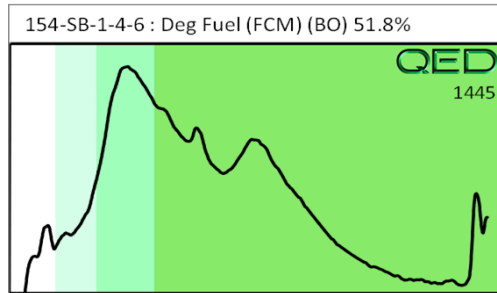
\* Misabeled in the field. The sample was originally recorded as 154-SB-2-6-8. Is is corrected here.

\*\*Misabeled in the field. The sample was originally recorded as 145-SB-2-4-6. It is corrected here.

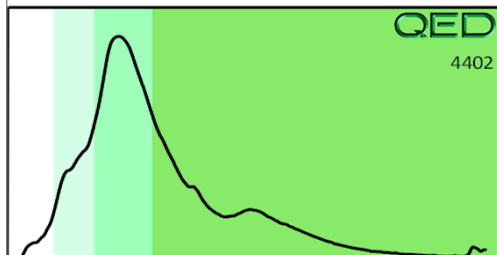
QED Hydrocarbon Fingerprints

Project: 2016.0045.NDOT

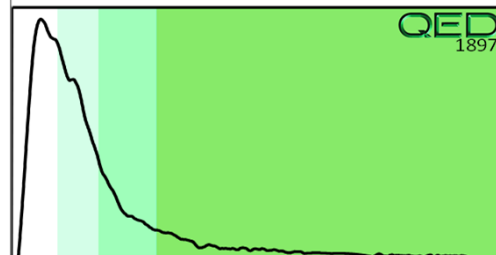
10/25/2016



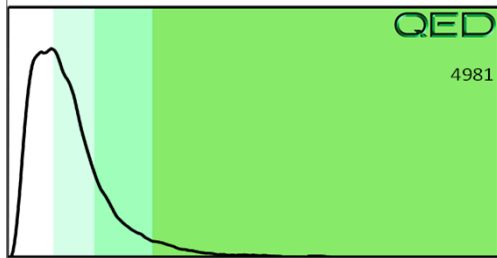
154-SB-3-4-6 : V.Deg.PHC (FCM) 85.2%



154-SB-3-6-8 : Deg Gas (FCM) 78.2%



154-SB-3-8-10 : Deg Gas (FCM) 81.9%



December 12, 2016

Mr. Terry Fox, L.G.  
North Carolina Department of Transportation  
Geotechnical Engineering Unit  
1589 Mail Service Center  
Raleigh, North Carolina 27699-1589

Reference: **Preliminary Site Assessment**  
**David and Deborah Reaves Property (Parcel #155)**  
**5516 Raeford Road**  
**Fayetteville, Cumberland County, North Carolina**  
**State Project: U-4405**  
**WBS Element 39049.1.1**  
**SIES Project No. 2016.0054.NDOT**

Dear Mr. Fox:

Solutions-IES, Inc., (SIES) has completed the Preliminary Site Assessment conducted at the above-referenced property. The work was performed in accordance with the Technical and Cost proposal dated September 26, 2016, and the North Carolina Department of Transportation's (NCDOT's) Notice to Proceed dated September 26, 2016. Activities associated with the assessment consisted of conducting a geophysical investigation, collecting soil samples for analysis, and reviewing applicable North Carolina Department of Environmental Quality (NCDEQ) records. The purpose of this report is to document the field activities, present the laboratory analyses, and provide recommendations regarding the property.

### **Location and Description**

The David and Deborah Reaves Property (Parcel #155) is located at 5516 Raeford Road in Fayetteville, Cumberland County, North Carolina. The property is situated on the north side of Raeford Road on the northeast quadrant of the intersection of Raeford Road and Skibo Road (**Figure 1**). According to NCDOT information, the site has been used for various business interests for many years and the potential exists that the site was a former gas station. The building was vacant on the date of the field work.

An asphalt driveway is on the east side of the building and a gravel driveway is on the west side of the building. Several concrete pads are located adjacent to the west side of the building. Further inspection during a site visit indicated that apparent vent pipes are associated with two of the pads, but no fill ports were noted (**Figure 2**). The proposed easement was not marked on the day of the field work, but the NCDOT plan sheet shows that the easement will affect almost the entire property and the NCDOT will acquire it in total.

The NCDOT requested a Preliminary Site Assessment for the right-of-way and proposed easement because of the possible historic site use as a gas station. The scope of work as defined in the Request for Technical and Cost Proposal was to evaluate the site with respect to the presence of known and unknown USTs and assess where contamination exists on the right-of-way/proposed easement. An estimate of the quantity of impacted soil was to be provided, should impacted soils be encountered.

SIES reviewed the on-line NCDEQ Incident Management database and no incident number was assigned to the site. SIES also examined the UST registration database and found no tanks registered to the property address.

### **Geophysical Survey**

Prior to SIES' mobilization to the site, Pyramid Environmental & Engineering of Greensboro, NC (Pyramid) conducted a geophysical survey to determine if USTs were present at the site. The geophysical survey consisted of an electromagnetic survey using a Geonics EM61 time-domain electromagnetic induction meter to locate buried metallic objects, and ground penetrating radar (GPR) using a Geophysical Survey Systems Inc. Utility Scan DF with a dual frequency 300/800 MHz antenna. The instruments were used specifically to locate USTs.

A survey grid was laid out along the right-of-way/proposed easement with the X-axis oriented approximately parallel to Raeford Road and the Y-axis oriented approximately perpendicular to Raeford Road. The grid was positioned to cover the accessible portions of the property, as shown on **Figure 2** of the geophysical survey report in **Attachment A**. A large portion of the property on the west side was not accessible due to woods/vegetation and a tributary to Beaver Creek.

The survey lines were spaced five feet apart and magnetic data were collected continuously along each survey line with a data logger. After collection, the data were reviewed in the field with graphical computer software. Following the electromagnetic survey, a ground penetrating radar (GPR) survey was conducted to further evaluate any significant metallic anomalies.

Access was not available to all areas of the property and no evaluation with respect to metallic USTs was performed in these areas. Several anomalies were detected with the geophysical survey that were attributed to metallic debris, underground utilities, or signage. Although no electromagnetic anomalies were detected, potential vent pipes were observed on the west side of the building and a cut off pipe was noted on the north side of the building, which prompted a GPR survey near these features. No UST was detected near the cut off pipe, but the GPR suggested possible buried metallic debris. The GPR survey indicated the presence of two non-metallic structures that were tentatively identified as septic tanks in the

area of the potential vent pipes. With respect to USTs, the geophysical survey showed no evidence of unknown metallic tanks on the accessible portions of the property. Pyramid's detailed report of findings and interpretations is presented in **Attachment A**.

### **Site Assessment Activities**

On October 25, 2016, SIES mobilized to the site to conduct a Geoprobe® direct-push investigation to evaluate subsurface soil conditions on the property. Eight direct-push holes (155-SB-1 through 155-SB-8) were advanced throughout the property (**Figure 2**). The initial three Geoprobe® borings were terminated at 8 and 10 feet below ground surface (ft bgs); however, groundwater was encountered at depths ranging from four to eight ft bgs. Therefore, the remaining borings were terminated at eight ft bgs.

The soil boring logs are included as **Attachment B**. Boring 155-SB-1 was located to assess the northern portion of the property. Borings 155-SB-2 through 155-SB-5 were placed to evaluate subsurface conditions around the potential septic tanks and boring 155-SB-8 was located near the cut off pipe to assess that area. Borings 155-SB-6 and 155-SB-7 were positioned to evaluate the subsurface conditions in front of the building along Raeford Road (see photos in **Attachment C**).

Continuous sampling using a Geoprobe® resulted in good recovery of soil samples from the direct-push holes. Soil samples were collected and contained in four-foot long acetate sleeves inside the direct-push Macro-Core® sampler. Each of the sleeves was divided into two-foot long sections for soil sample screening. Soil from each two-foot interval was placed in a resealable plastic bag and the bag was set aside for volatilization of organic compounds from the soil to the bag headspace. A photoionization detector (PID) probe was inserted into the bag and the reading was recorded (**Table 1**).

One sample from the lowest interval of each boring above saturated soil was selected for analysis. The selected soil samples were submitted to an on-site mobile laboratory for analysis of total petroleum hydrocarbons (TPH) diesel range organics (DRO) and gasoline range organics (GRO) using ultraviolet fluorescence (UVF) methodology. Each boring was backfilled with bentonite and drill cuttings to the surface after completion.

The lithology encountered by the direct-push samples was generally consistent throughout the site. The ground surface was covered with about 0.5 feet of topsoil. Below this surface cover was a light gray clayey sand. Boring 55-SB-1 encountered a soft clay at a depth of about three to five ft bgs. No bedrock was noted in any of the borings. Moderate to strong hydrocarbon odors were noted in the material at a depth of about six to eight feet in the boring 155-SB-4 through 155-SB-8.

According to the 1985 Geologic Map of North Carolina, the site is within of Coastal Plain Physiographic Province in North Carolina near the contact between the Cretaceous Black Creek and Middendorf Formations. The strata of the Black Creek Formation consist of gray to black clay, thin lenses of fine-grained sand and thick lenses of cross-bedded sand. The lithology may also include glauconite and fossils. In comparison, the Middendorf Formation consists of sand, sandstone, and mudstone that are laterally discontinuous. The soils observed at the site are consistent with the Middendorf Formation as the parent material.

## Analytical Results

The laboratory data are summarized in **Table 1** and the complete report is presented in **Attachment D**. Eight soil samples were submitted for analysis, one from each boring. Of these samples, five contained detectable GRO compounds at concentrations ranging from 11.1 to 312.4 milligrams per kilogram (mg/kg) and all eight samples contained detectable DRO compounds at concentrations ranging from 0.47 to 969.4 mg/kg. The action levels are 50 mg/kg for GRO and 100 mg/kg for DRO<sup>1</sup>. Soil sample 155-SB-4-6-8 contained 312.4 mg/kg GRO and 152.4 mg/kg DRO; soil sample 155-SB-6-6-8 contained 223.8 mg/kg GRO and 117.9 mg/kg DRO; and soil sample 155-SB-5-6-8 contained 969.4 mg/kg DRO. These concentrations are above their respective action levels.

## Contaminated Soil Volume Estimate

The UVF analytical results (**Table 1**) of the soil samples collected on October 25, 2016 indicate that three of the soil samples contained DRO or GRO concentrations above the action level. Therefore, an estimate of the volume of soil requiring possible remediation was made.

To estimate the volume of soil requiring possible remediation, only the soil samples that contained a DRO and/or GRO concentration above the respective action levels were considered. The thickness of the potentially contaminated soil was estimated from the field screening and UVF results, which indicated a thickness of two feet (**Table 1**). After estimating the potential contamination geometry using field observations and experience with similar sites and geology, SIES measured the affected section on **Figure 3** by using CAD software, which indicated a total area of about 3,275 ft<sup>2</sup>. With a two-foot contamination thickness, this calculates to a volume of about 243 bank cubic yards.

The use of DRO and GRO concentrations to determine UST closure and immediate soil removal is a valid analytical method. However, any cleanup beyond the closure is governed by risk-based methods that are based on individual constituents and do not correlate with DRO and GRO concentrations. Because of the

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<sup>1</sup> NCDEQ, *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons (TPH)*, July 26, 2016,



uncertainty associated with the differences in these analytical methods, the actual volume of contaminated soil may be higher or lower.

## Conclusions and Recommendations

A Preliminary Site Assessment was conducted to evaluate the David and Deborah Reaves Property (Parcel #155) located at 5516 Raeford Road in Fayetteville, Cumberland County, North Carolina. NCDEQ databases indicate that no release incidents have been reported for the site and no USTs were registered to the property address. A geophysical survey conducted at the site did not detect USTs in the investigation area, but a pair of septic tanks may be present. Eight soil borings were advanced to evaluate the subsurface soil conditions throughout the property. Three of the analyzed soil samples detected GRO or DRO concentrations above their respective action levels. Based on the analytical results, SIES estimated approximately 243 cubic yards of potentially contaminated soil at the site.

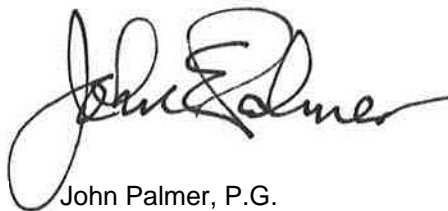
SIES appreciates the opportunity to work with the NCDOT on this project. Because compounds were detected above the action level in the soil samples, SIES recommends that a copy of this report be submitted to the Division of Waste Management, UST Section, in the Fayetteville Regional Office. If you have any questions, please contact us at (919) 873-1060.

Sincerely,



Michael W. Branson, P.G.  
Project Manager

Attachments



John Palmer, P.G.  
Senior Hydrogeologist

**TABLE 1**  
**SOIL FIELD SCREENING AND ANALYTICAL RESULTS**  
**REAVES PROPERTY (PARCEL #155)**  
**FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA**  
**STATE PROJECT: U-4405**  
**WBS ELEMENT 39049.1.1**  
**SIES PROJECT NO. 2016.0054.NDOT**

SAMPLE ID	DEPTH (ft)	PID READING (ppm)	SAMPLE ID	ANALYTICAL RESULTS (mg/kg)	
				UVF GRO	UVF DRO
155-SB-1	Action Level (mg/kg)			50	100
	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.0			
	6 - 8	0.0	155-SB-1-6-8	<0.72	49.6
	8 - 10	NA			
155-SB-2	0 - 2	0.0			
	2 - 4	0.1	155-SB-2-2-4	<0.6	26.1
	4 - 6	NA			
	6 - 8	NA			
	8 - 10	NA			
155-SB-3	0 - 2	0.0			
	2 - 4	0.1	155-SB-3-2-4	<0.24	0.47
	4 - 6	NA			
	6 - 8	NA			
	8 - 10	NA			
155-SB-4	0 - 2	0.2			
	2 - 4	0.0			
	4 - 6	50.1			
	6 - 8	2,343	155-SB-4-6-8	312.4	152.4
	8 - 10	NA			
155-SB-5	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.1			
	6 - 8	49.8	155-SB-5-6-8	14	969.4
	8 - 10	NA			
155-SB-6	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	1.3			
	6 - 8	2,030	155-SB-6-6-8	223.8	117.9
	8 - 10	NA			
155-SB-7	0 - 2	0.0			
	2 - 4	0.1			
	4 - 6	1.6			
	6 - 8	385	155-SB-7-6-8	11.1	29.7
	8 - 10	NA			
155-SB-8	0 - 2	0.0			
	2 - 4	0.1			
	4 - 6	9.6			
	6 - 8	389	155-SB-8-6-8	15.6	15.8
	8 - 10	NA			

1) ft - feet

2) ppm - parts per million.

3) PID - photoionization ionization detector

4) mg/kg - milligrams per kilogram.

5) UVF DRO - Diesel range organics by UVF.

6) UVF GRO - Gasoline range organics by UVF.

7) Action level based upon NCDEQ memo *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons* - July 29, 2016.

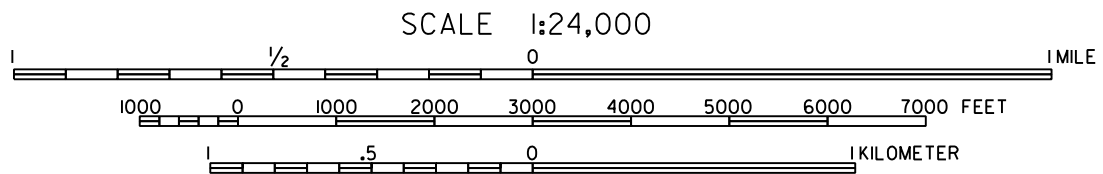
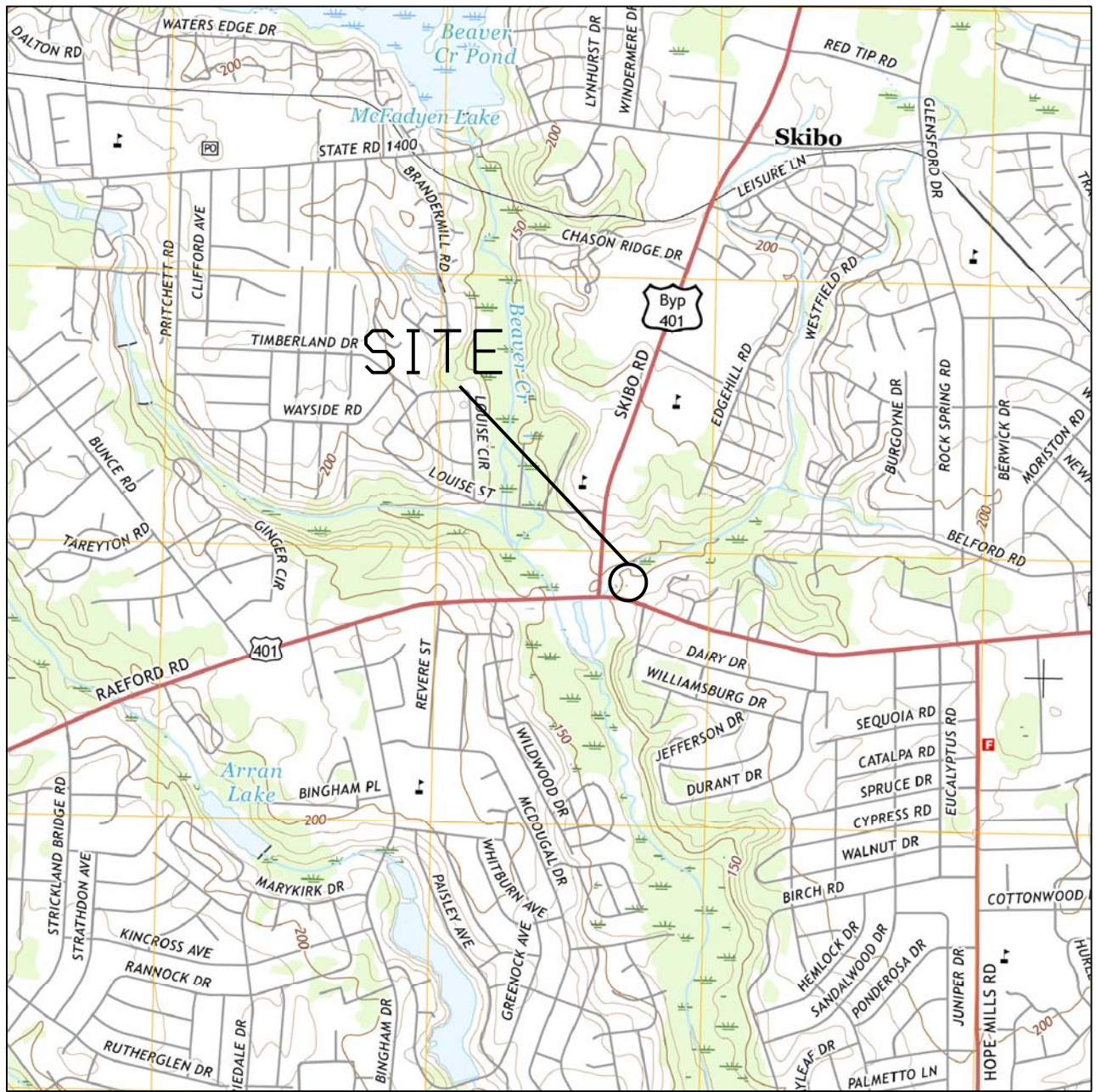
8) Soil samples were collected on October 25, 2016.

9) NA - Not analyzed due to groundwater

10) **Bold** values are above the detection level. Shaded values are above the action level.

## FIGURES

FILE FAYETTEVILLE PSAS DATE NOVEMBER 2016 PROJECT MANAGER MWB CHECKED BY JEP PROJECT NUMBER 2016.0054.NDOT



SOURCE: U.S. GEOLOGICAL SURVEY 7.5 MIN QUADRANGLE: FAYETTEVILLE, NC (2016)



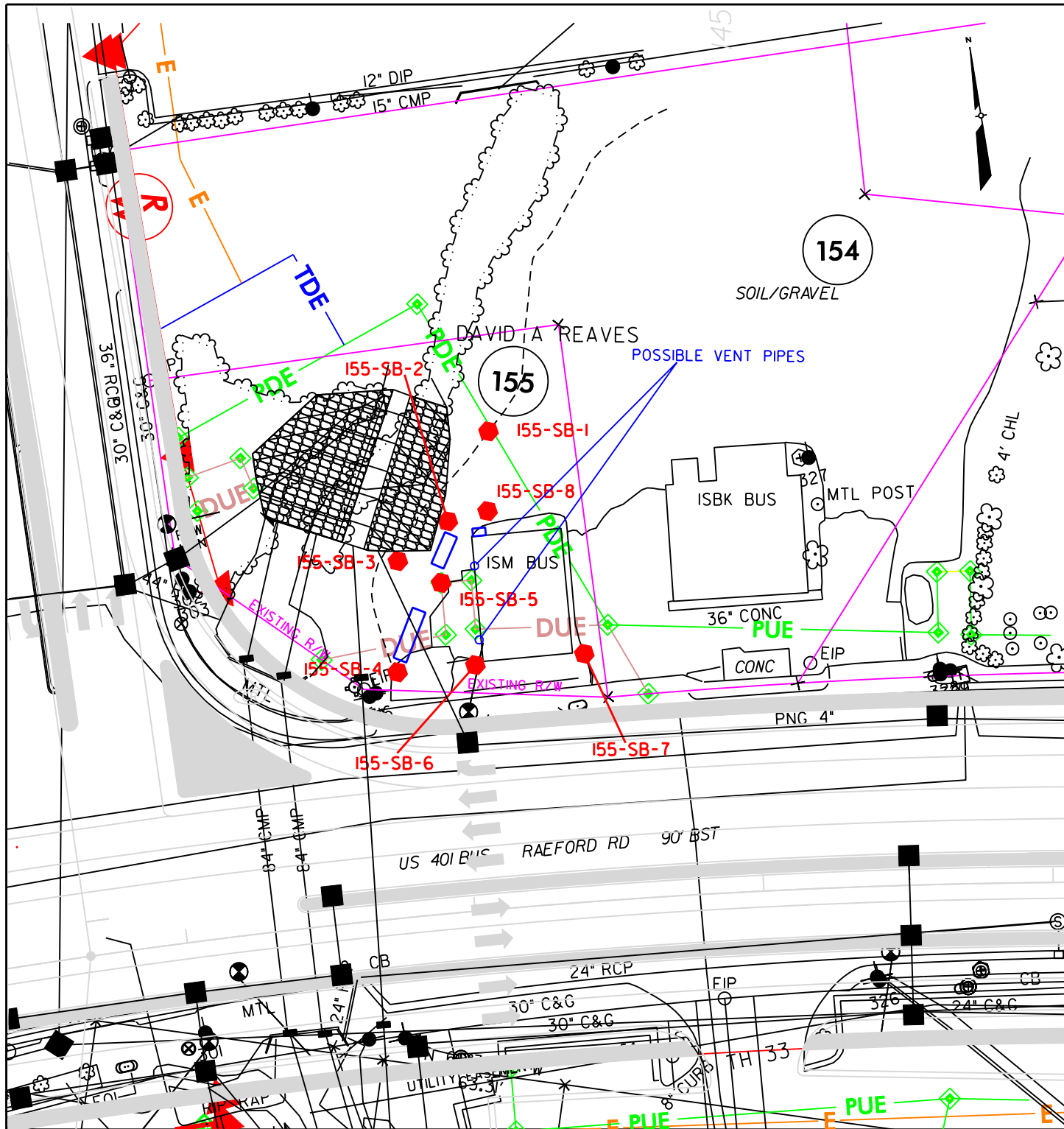
1101 NOWELL ROAD  
RALEIGH, NORTH CAROLINA 27607  
TEL: (919) 873-1060 FAX: (919) 873-1074

## VICINITY MAP

REAVES PROPERTY (PARCEL #155)  
FAYETTEVILLE, CUMBERLAND COUNTY NORTH CAROLINA

## FIGURE

1



#### LEGEND

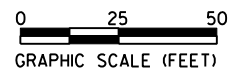
I55-SB-1



SOIL SAMPLE LOCATION AND IDENTIFICATION



APROXIMATE GEOPHYSICAL ANOMALY LOCATIONS



1101 NOWELL ROAD  
RALEIGH, NORTH CAROLINA 27607  
TEL: (919) 873-1060 FAX: (919) 873-1074

#### SITE MAP

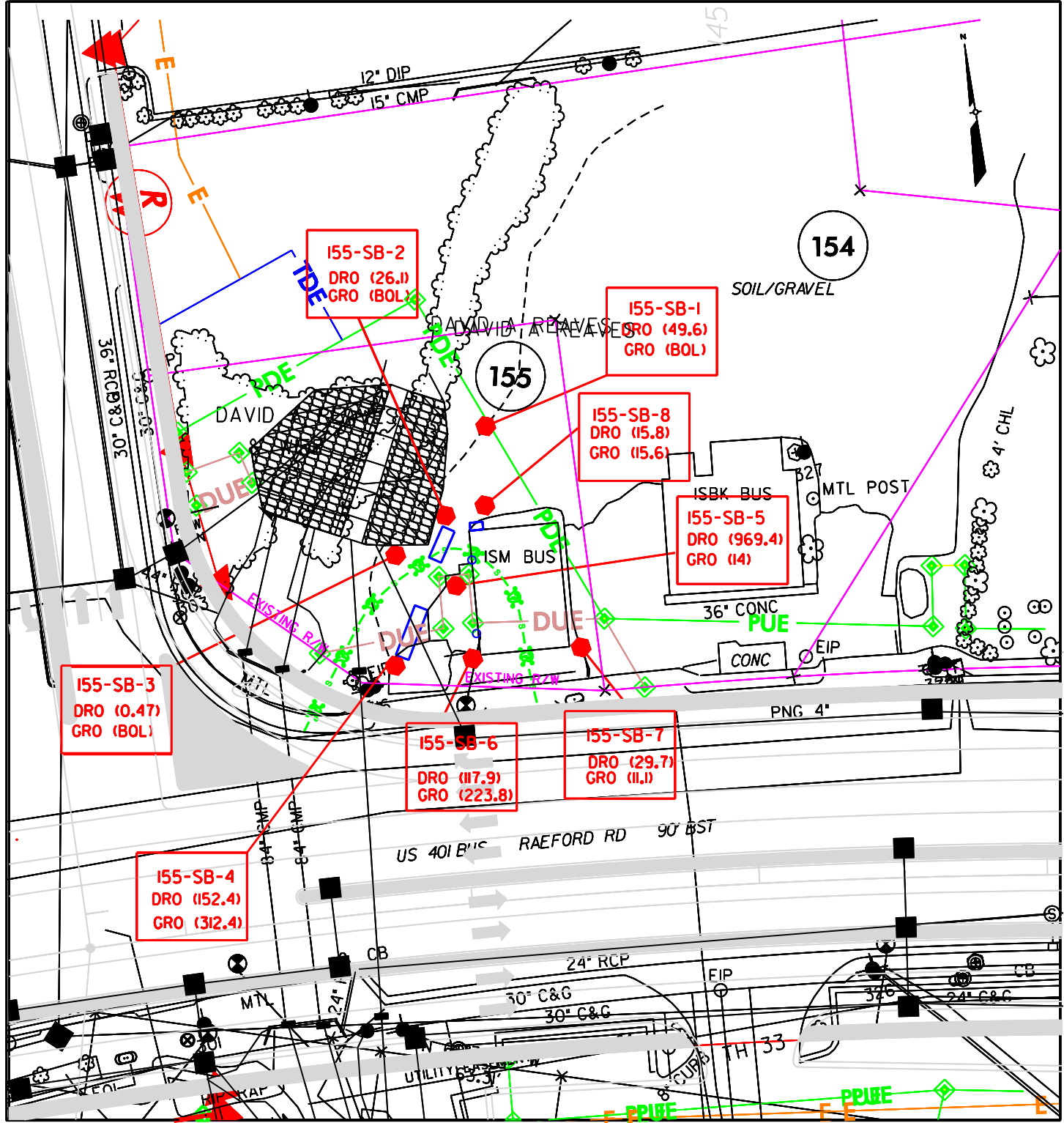
REAVES PROPERTY (PARCEL #155)

FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA

#### FIGURE

2





LEGEND

- I55-SB-1** SOIL SAMPLE LOCATION AND IDENTIFICATION
- DRO (123)** TPH AS DIESEL FUEL IN MG/KG
- GRO (123)** TPH AS GASOLINE IN MG/KG
- BOL** BELOW QUANTITATION LIMIT

ESTIMATED EXTENT OF CONTAMINATED SOIL (DRO>100 MG/KG OR GRO>50 MG/KG)



1101 NOWELL ROAD  
RALEIGH, NORTH CAROLINA 27607  
TEL: (919) 873-1060 FAX: (919) 873-1074

SITE MAP

REAVES PROPERTY (PARCEL #155)

FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA

FIGURE

3

ATTACHMENT A



# GEOPHYSICAL SURVEY

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## METALLIC UST INVESTIGATION: PARCEL 155 – DAVID AND DEBORAH REEVES NCDOT PROJECT U-4405

5516 RAEFORD RD., FAYETTEVILLE, CUMBERLAND COUNTY, NC

NOVEMBER 4, 2016

Report prepared for:

Mike Branson  
Solutions, IES  
1101 Nowell Road  
Raleigh, North Carolina 27607

Prepared by: \_\_\_\_\_



Eric C. Cross, P.G.  
NC License #2181

Reviewed by: \_\_\_\_\_



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NC License #1066

503 INDUSTRIAL AVENUE, GREENSBORO, NC 27406

P: 336.335.3174 F: 336.691.0648

C257: GEOLOGY

C1251: ENGINEERING

**GEOPHYSICAL INVESTIGATION REPORT**  
**Parcel 155 – 5516 Raeford Road**  
**Fayetteville, Cumberland County, North Carolina**

## **Table of Contents**

Executive Summary .....	1
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Discussion of Results.....	3
Summary and Conclusions .....	5
Limitations .....	5

## **Figures**

- Figure 1 – Parcel 155 Geophysical Survey Boundaries and Site Photographs
- Figure 2 – Parcel 155 EM61 Results Contour Map
- Figure 3 – Parcel 155 GPR Transect Locations and Select Images
- Figure 4 – Parcel 155 Locations of Probable Septic Tanks and Photographs

## **Appendices**

- Appendix A – GPR Transect Images

## LIST OF ACRONYMS

CADD .....	Computer Assisted Drafting and Design
DF .....	Dual Frequency
EM.....	Electromagnetic
GPR.....	Ground Penetrating Radar
GPS .....	Global Positioning System
NCDOT.....	North Carolina Department of Transportation
ROW .....	Right-of-Way
SVE.....	Soil Vapor Extraction
UST .....	Underground Storage Tank

## EXECUTIVE SUMMARY

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**Project Description:** Pyramid Environmental conducted a geophysical investigation for Solutions, IES (Solutions) at Parcel 155, located at 5516 Raeford Road, Fayetteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-4405). Solutions directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to include all accessible portions of the property due to its designation as a total take. Conducted from October 12-17, 2016, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

**Geophysical Results:** A large portion of the EM anomalies were directly attributed to visible cultural features at the ground surface. A cut pipe was observed on the northwest side of the building located on the property. This area was investigated by GPR to determine if it may be connected to a UST. GPR did not show any clear evidence of a UST at the location of the cut pipe. This anomaly is classified as No Confidence, based on NCDOT guidelines. Additional GPR performed on the west side of the building showed evidence of two non-metallic (likely concrete) USTs. Discussions with the property owner and the geophysical data suggest these are septic tanks. The north suspected septic tank was approximately 9 feet long and 3 feet wide. The south suspected septic tank was approximately 16 feet long and 4 feet wide. Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 155. However, the survey did show evidence of two probable non-metallic USTs (suspected septic tanks).

## INTRODUCTION

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Pyramid Environmental conducted a geophysical investigation for Solutions, IES (Solutions) at Parcel 155, located at 5516 Raeford Road, Fayetteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-4405). Solutions directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to include all accessible portions of the property due to its designation as a total take. Conducted from October 12-17, 2016, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a commercial building surrounded by asphalt, gravel, and grass areas. Aerial photographs showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

## FIELD METHODOLOGY

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The geophysical investigation consisted of electromagnetic (EM) induction-metal detection and ground penetrating radar (GPR) surveys. Pyramid collected the EM data using a Geonics EM61 metal detector integrated with a Trimble AG-114 GPS antenna. The integrated GPS system allows the location of the instrument to be recorded in real-time during data collection, resulting in an EM data set that is geo-referenced and can be overlain on aerial photographs and CADD drawings. A boundary grid was established around the perimeter of the site with marks every 10 feet to maintain orientation of the instrument throughout the survey and assure complete coverage of the area.

According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at approximately 0.8 foot intervals along north-south trending or east-west trending, generally parallel survey lines spaced five feet apart. The data were downloaded to a computer and

reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 11.0 software programs.

GPR data were acquired across select EM anomalies on October 14, 2016, using a Geophysical Survey Systems, Inc. (GSSI) UtilityScan DF unit equipped with a dual frequency 300/800 MHz antenna. Data were collected both in reconnaissance fashion as well as along formal transect lines across EM features. The GPR data were viewed in real-time using a vertical scan of 512 samples, at a rate of 48 scans per second. GPR data were viewed down to a maximum depth of approximately 4 feet, based on dielectric constants calculated by the DF unit in the field during the reconnaissance scans. GPR transects across specific anomalies were saved to the hard drive of the DF unit for post-processing and figure generation.

Pyramid's classifications of USTs for the purposes of this report are based directly on the geophysical UST ratings provided by the NCDOT. These ratings are as follows:

Geophysical Surveys for Underground Storage Tanks on NCDOT Projects			
High Confidence	Intermediate Confidence	Low Confidence	No Confidence
<b>Known UST</b> Active tank - spatial location, orientation, and approximate depth determined by geophysics.	<b>Probable UST</b> Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	<b>Possible UST</b> Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist's discretion.

## DISCUSSION OF RESULTS

---

### *Discussion of EM Results*

A contour plot of the EM61 results obtained across the survey area at the property is presented in **Figure 2**. Each EM anomaly is numbered for reference in the figure. The

following table presents the list of EM anomalies and the cause of the metallic response, if known:

**LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY**

<b>Metallic Anomaly #</b>	<b>Cause of Anomaly</b>	<b>Investigated with GPR</b>
1	Suspected Debris	✓
2	Trash Can	
3	Cut Pipe (No Confidence with respect to UST)	✓
4	Truck	
5	Water Meter	
6	Water Utility	
7	Trash Can and Debris	
8	Guy Wires	
9	Guard Rail	

A large portion of the EM anomalies recorded by the survey were directly attributed to visible cultural features such as utilities, trash cans, pipes, a truck, a water meter, guy wires and a metal guard rail. The visible cut pipe on the northwest side of the building (Anomaly 3) was investigated further by GPR to determine if it may be connected to a UST. GPR scans were also performed on the west side of the building to verify that all visible anomalies were associated with the cultural features listed above.

*Discussion of GPR Results*

**Figure 3** presents the locations of the formal GPR transects performed at the property, as well as select transect images. A total of 5 GPR transects were performed at the site. Transect 1 was performed on the north side of the building, adjacent to the visible cut pipe (Anomaly 3). This transect did record an isolated horizontal reflector that could be suggestive of a buried object. Additional reconnaissance scans did not record any clear hyperbolic reflectors at this location that would be common for a UST. For this reason, this feature is classified as No Confidence with respect to a UST based on NCDOT classification guidelines.



Reconnaissance GPR was performed on the west side of the building. All metallic anomalies were verified to be associated with cultural features in this area, as listed in the above table. However, GPR transects 2-5 did record evidence of non-metallic USTs on the west side of the building. Discussions with the property owner, combined with the geophysical data, indicate that these structures are septic tanks associated with the building. Transects 2 and 3 provided evidence of a septic tank near the northwest building corner that is approximately 9 feet long and 3 feet wide. Transects 4 and 5 provided evidence of a septic tank west of the southwest building corner that is approximately 16 feet long and 4 feet wide. According to the property owner, the south tank is inactive, and the north tank is currently connected to the building's sanitary system. These two tanks are classified as probable non-metallic USTs.

Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 155. However, the geophysical data did show evidence of two probable non-metallic USTs, suspected to be septic tanks, on the west side of the building.

## **SUMMARY & CONCLUSIONS**

---

Pyramid's evaluation of the EM61 and GPR data collected at Parcel 155 in Fayetteville, Cumberland County, North Carolina, provides the following summary and conclusions:

- The EM61 and GPR surveys provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- A large portion of the EM anomalies were directly attributed to visible cultural features at the ground surface.
- A cut pipe was observed on the northwest side of the building. This area was investigated by GPR to determine if it may be connected to a UST.
- GPR did not show any clear evidence of a UST at the location of the cut pipe. This anomaly is classified as No Confidence based on NCDOT guidelines.

- Additional GPR performed on the west side of the building showed evidence of two non-metallic (likely concrete) USTs. Discussions with the property owner and the geophysical data suggest these are septic tanks.
  - The north suspected septic tank was approximately 9 feet long and 3 feet wide.
  - The south suspected septic tank was approximately 16 feet long and 4 feet wide.
- Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 155. However, the survey did show evidence of two probable non-metallic USTs (suspected septic tanks).

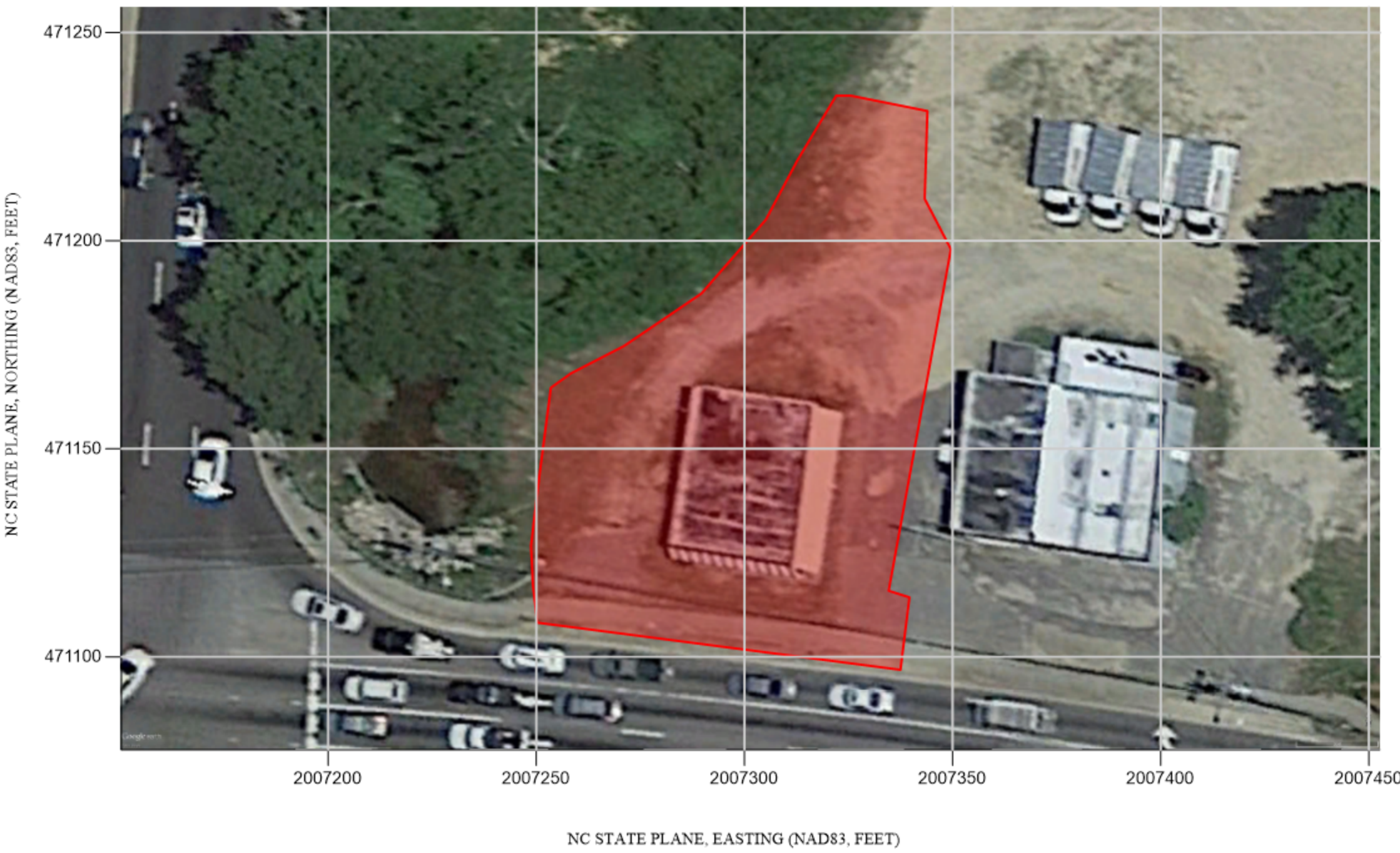
## LIMITATIONS

---

Geophysical surveys have been performed and this report was prepared for Solutions, IES in accordance with generally accepted guidelines for EM61 and GPR surveys. It is generally recognized that the results of the EM61 and GPR surveys are non-unique and may not represent actual subsurface conditions. The EM61 and GPR results obtained for this project have not conclusively determined the definitive presence or absence of metallic USTs, but the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.




APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA



View of Survey Area  
(Facing Approximately East)



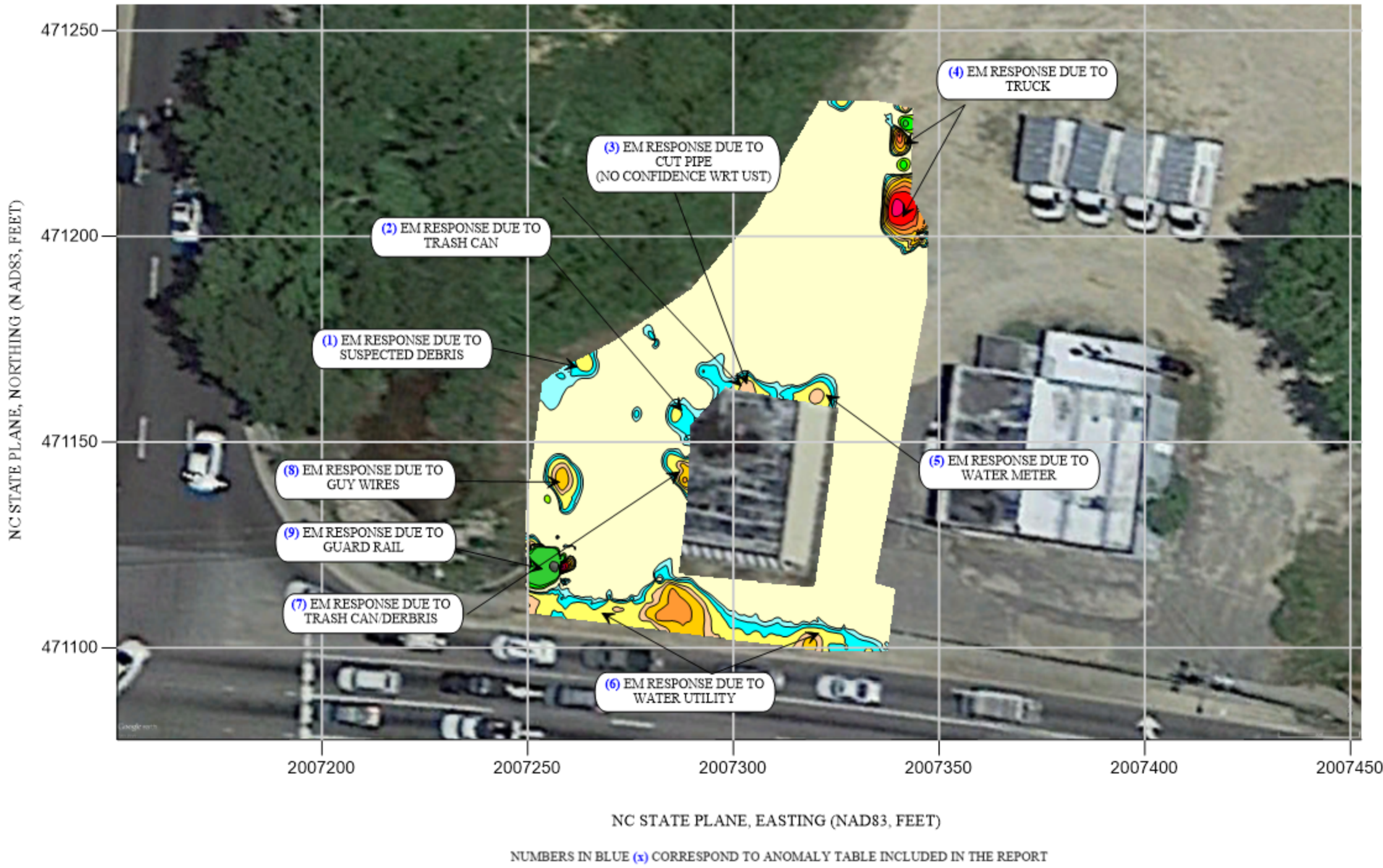
View of Survey Area  
(Facing Approximately Northwest)

TITLE		PARCEL 155 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	
PROJECT		5516 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-4405	
		503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE	10/31/16	CLIENT	SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	FIGURE 1	





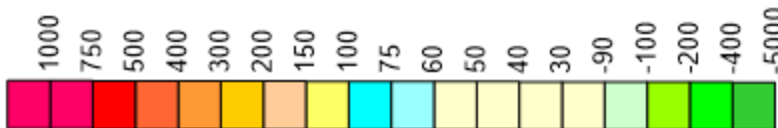
EM61 METAL DETECTION RESULTS




NO EVIDENCE OF UNKNOWN METALLIC USTs OBSERVED

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM61 data were collected on October 13, 2016, using a Geonics EM61 instrument. Verification GPR data were collected using a GSSI UtilityScan DF instrument with a dual frequency 300/800 MHz antenna on October 14, 2016.

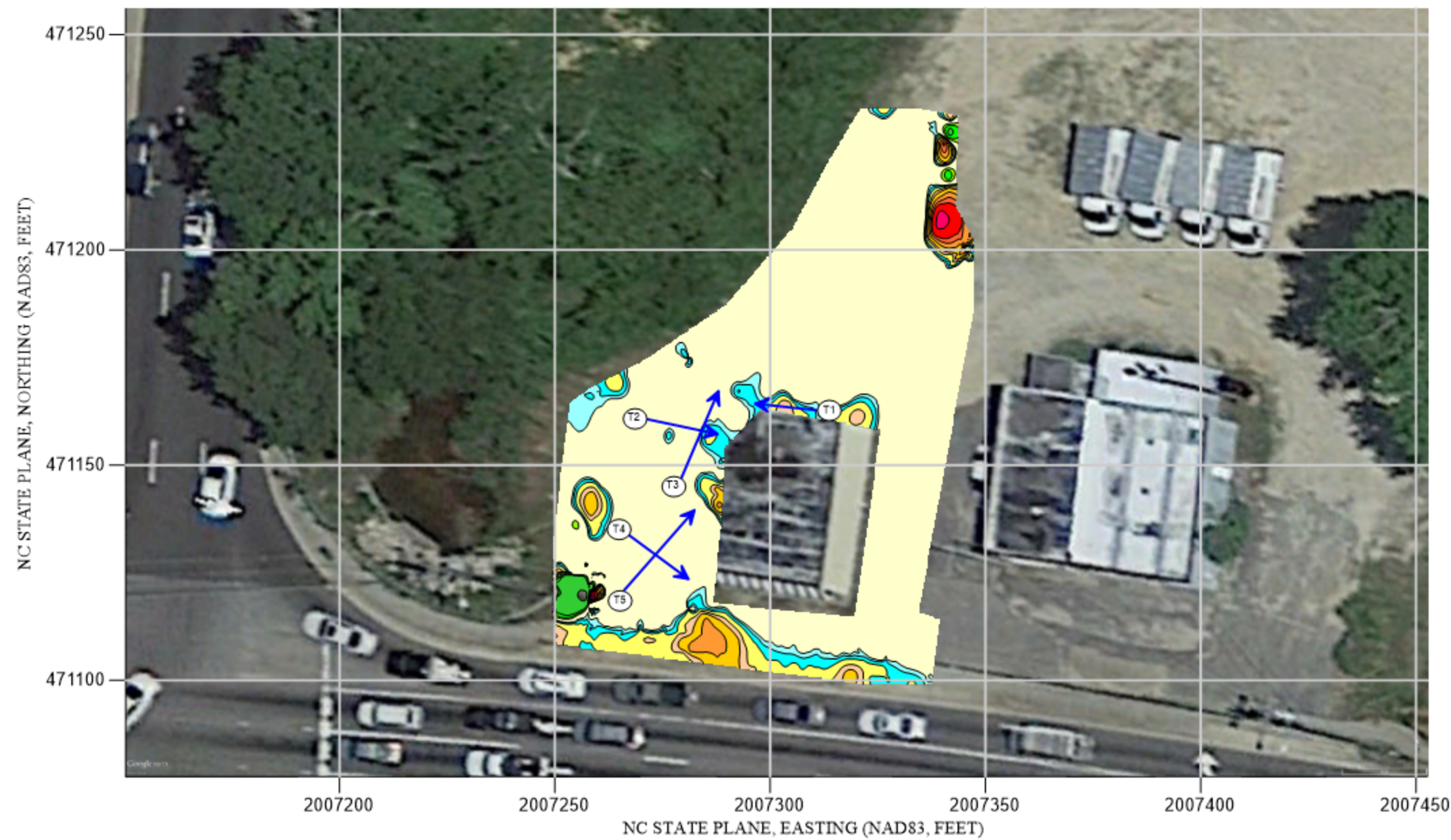
EM61 Metal Detection Response (millivolts)



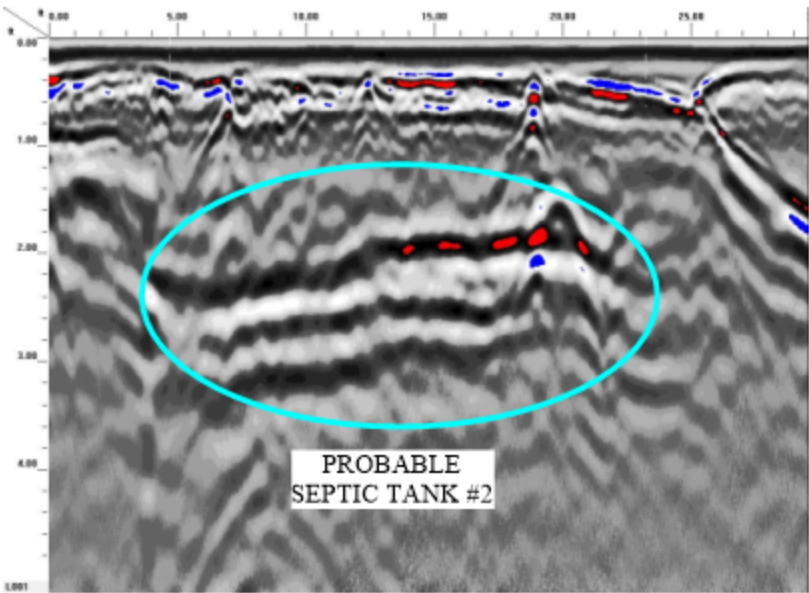
TITLE		PARCEL 155 - EM61 RESULTS CONTOUR MAP	
PROJECT		5516 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-4405	
		503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE	10/31/2016	CLIENT	SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	FIGURE 2	



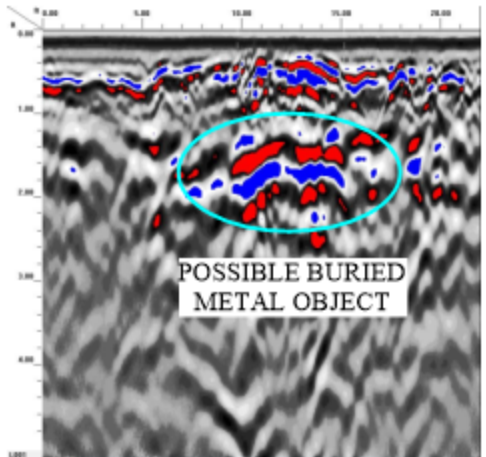
LOCATIONS OF GPR TRANSECTS



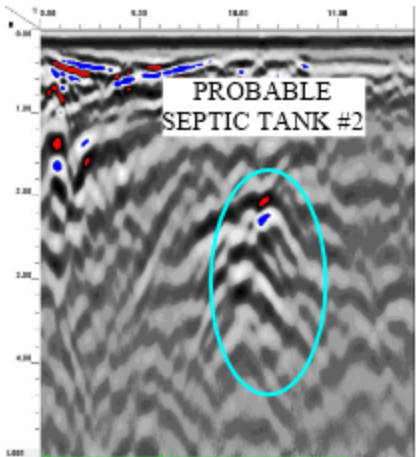
N ↑




GPR TRANSECT 5 (T5)



GPR TRANSECT 1 (T1)



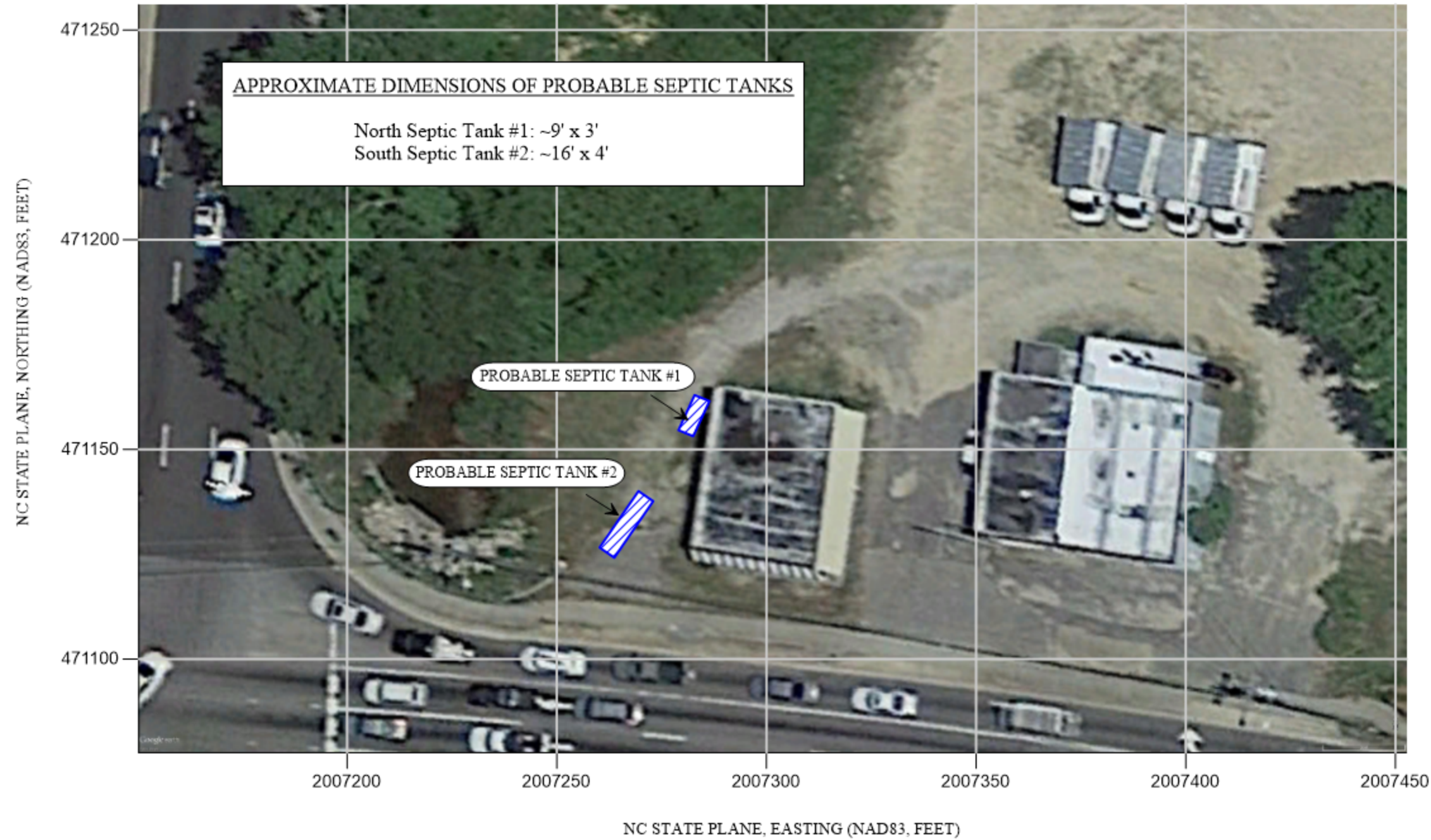
GPR TRANSECT 4 (T4)

TITLE PARCEL 155 - GPR TRANSECT LOCATIONS AND SELECT IMAGES		
PROJECT 5516 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-4405		
 Pyramid Geophysics		503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology
DATE	10/31/2016	CLIENT SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	FIGURE 3

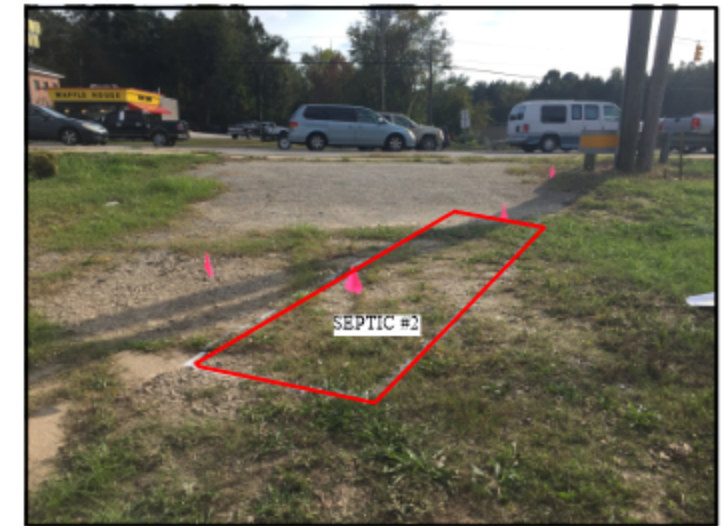


N↑


## Parcel 155 - Approximate Locations of Probable Septic Tanks



LOCATION OF NORTH  
SEPTIC TANK #1

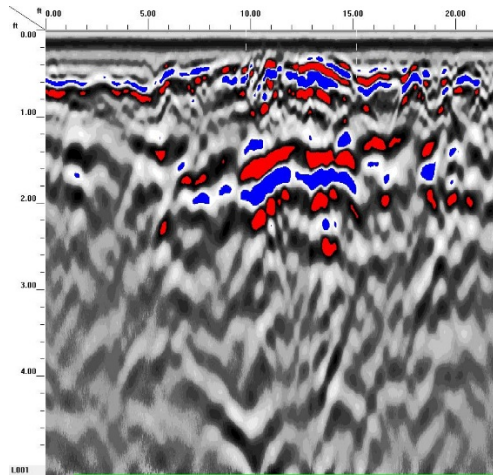


LOCATION OF SOUTH  
SEPTIC TANK #2

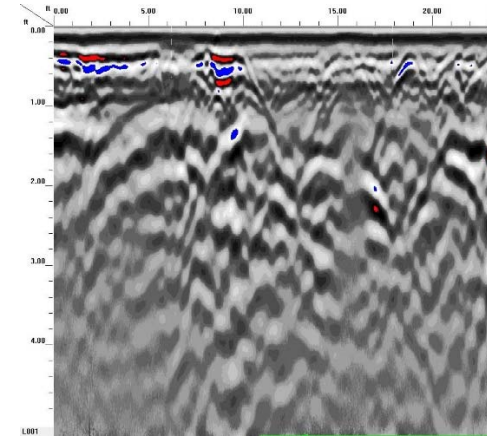
TITLE		PARCEL 155 - LOCATIONS OF PROBABLE SEPTIC TANKS AND PHOTOGRAPHS	
PROJECT		5516 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-4405	
		 503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology	
DATE	10/31/2016	CLIENT	SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	<b>FIGURE 4</b>	

## **Appendix A – GPR Transect Images**

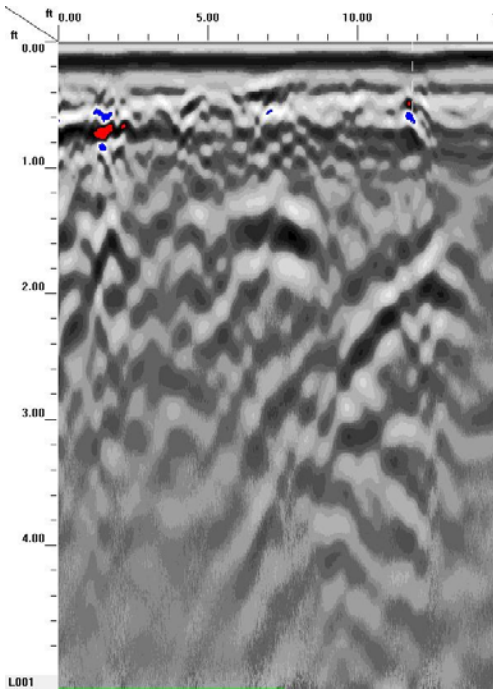




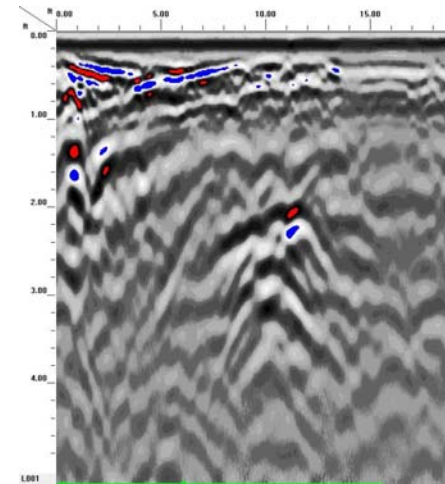
GPR TRANSECT 1



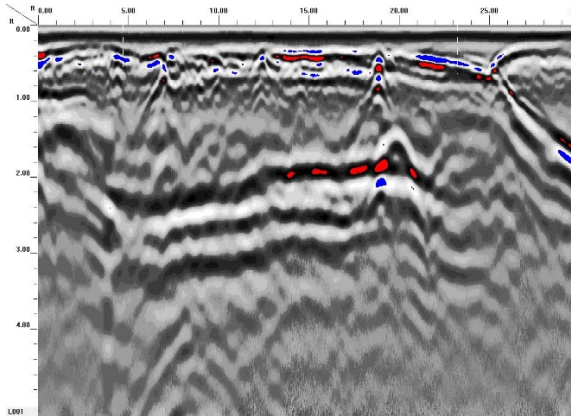
GPR TRANSECT 3



GPR TRANSECT 2



GPR TRANSECT 4



GPR TRANSECT 5

ATTACHMENT B

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

LOGGED BY: Samuel McIntyre      CHECKED BY:

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0						0
1		100%	0.0		Light grey clayey sand. Dry.	1
2						2
3			0.0			3
4					Light grey soft clay. Dry	4
5			0.0			5
6	155-SB-1-6-8	100%			Light grey clayey sand. Dry.	6
7			0.1			7
8						8
9		100%	NA		Light grey clayey sand. Saturated.	9
10						10

End of Boring

**Log of Boring 155-SB-2**

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
8 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0	155-SB-2-2-4	100%			Light grey clayey sand. Dry.	0
1			0.0			1
2		100%				2
3			0.1			3
4		100%			Light grey clayey sand. Saturated.	4
5			NA			5
6						6
7			NA			7
8					End of Boring	8

**Log of Boring 155-SB-3**

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
8 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0	155-SB-3-2-4	100%			Light grey clayey sand. Dry.	0
1			0.0			1
2		100%				2
3			0.1			3
4		100%			Light grey clayey sand. Saturated.	4
5			NA			5
6						6
7			NA			7
8						8

End of Boring

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
8 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY:  
Samuel McIntyre

CHECKED BY:

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0						0
1				0.2		1
2		100%				2
3				0.0	Light grey clayey sand. Dry.	3
4						4
5				50.1		5
6	155-SB-4-6-8	100%				6
7				2,343	Light grey clayey sand with black staining and hydrocarbon odors. Dry.	7
8					End of Boring	8



**Log of Boring 155-SB-5**

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED: 10/25/2016  
DATE FINISHED: 10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs): 8 ft bgs  
SCREEN INTERVAL (ft bgs): NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING: NA  
EASTING: NA

SAMPLING METHOD: Macro Core

 INITIAL DTW: NA  
FINAL DTW: NA

 LOGGED BY: Samuel McIntyre  
CHECKED BY:

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0						0
1				0.0		1
2		100%				2
3				0.0	Light grey clayey sand. Dry.	3
4						4
5				0.1		5
6		100%				6
7	155-SB-5-6-8			49.8	Light grey clayey sand with hydrocarbon odors. No staining observed. Dry.	7
8						8

End of Boring

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
8 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0						0
1						1
2		100%				2
3			0.0		Light grey clayey sand. Dry.	3
4						4
5			1.3			5
6	155-SB-6-6-8	100%				6
7			2.030		Light grey clayey sand with black staining and hydrocarbon odors. Dry.	7
8						8
End of Boring						

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
8 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0						0
1				0.0		1
2		100%				2
3				0.1	Light grey clayey sand. Dry.	3
4						4
5				1.6		5
6	155-SB-7-6-8	100%				6
7				385.0	Light grey clayey sand with black staining and hydrocarbon odors. Dry.	7
8						8

End of Boring

BORING LOCATION: Parcel #155, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/25/2016

 DATE FINISHED:  
10/25/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
8 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0						0
1				0.0		1
2		100%				2
3				0.1	Light grey clayey sand. Dry.	3
4						4
5				9.6		5
6		100%				6
7	155-SB-8-6-8			389.0	Light grey clayey sand with black staining and hydrocarbon odors. Dry.	7
8						8

End of Boring

ATTACHMENT C



PHOTO 1 - VIEW OF SOIL BORING LOOKING WEST  
AND SHOWING CUT OFF PIPE

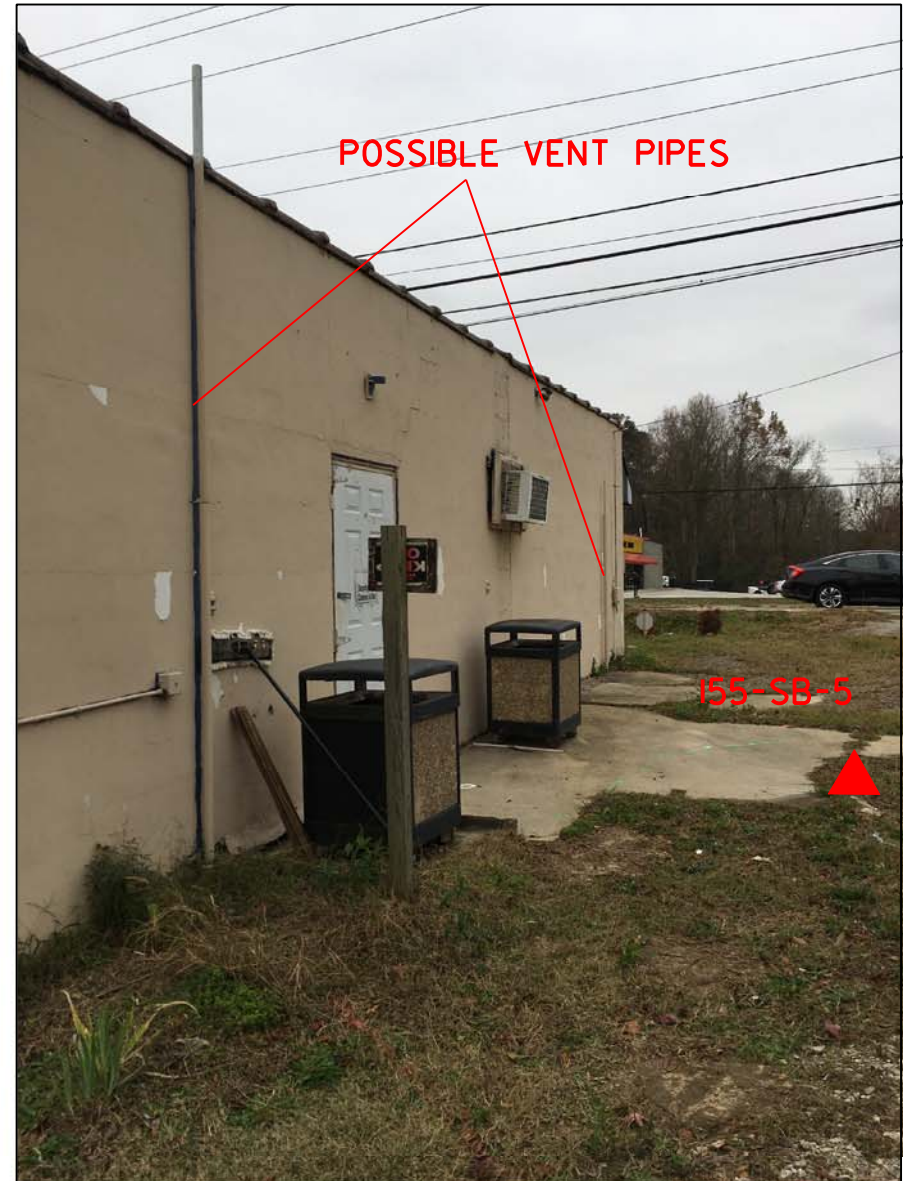


PHOTO 2 - VIEW OF SOIL BORING LOOKING SOUTH  
AND SHOWING POTENTIAL VENT PIPES





PHOTO 3 - VIEW OF SOIL BORINGS LOOKING SOUTH



PHOTO 4 - VIEW OF SOIL BORINGS LOOKING SOUTH





PHOTO 5 - VIEW OF SOIL BORINGS LOOKING EAST



PHOTO 6 - VIEW OF SOIL BORINGS LOOKING NORTH





PHOTO 7 - VIEW OF SOIL BORING LOOKING NORTHEAST



PHOTO 8 - VIEW OF SOIL BORING LOOKING WEST

ATTACHMENT D



### Hydrocarbon Analysis Results

**Client:** NCDOT  
**Address:** SITE 155: 5514 Raeford Rd  
Fayetteville, NC

**Samples taken** 10/25/2016  
**Samples extracted** 10/25/2016  
**Samples analysed** 10/25/2016

**Contact:** **Operator** Candy Elliott

**Project:** 2016.0045.NDOT

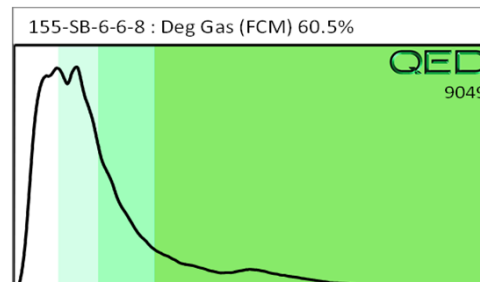
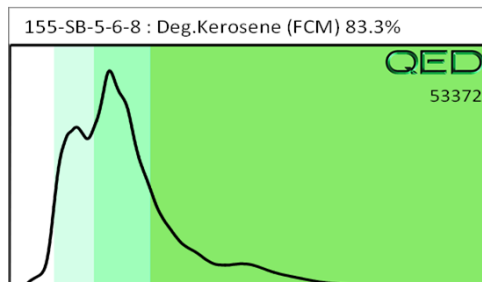
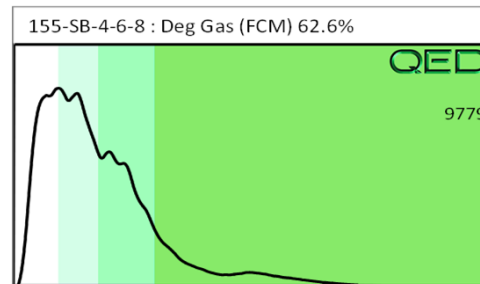
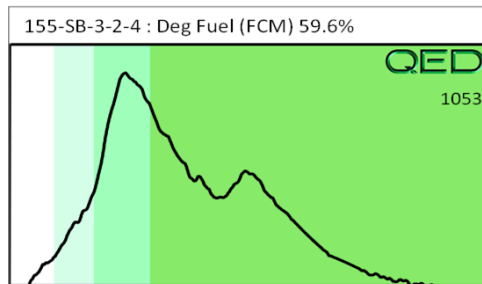
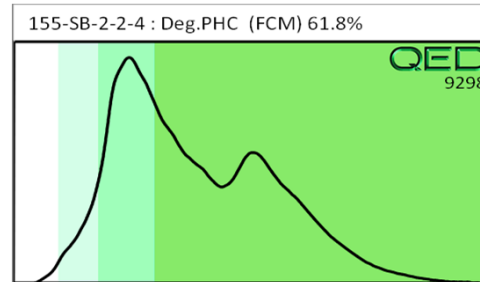
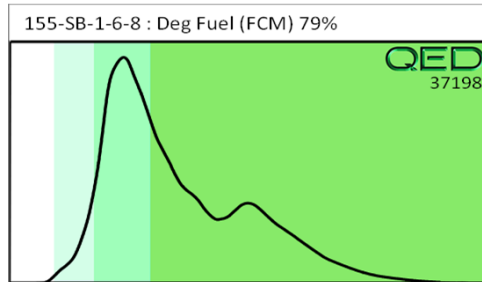
													U04049
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	155-SB-1-6-8	28.8	<0.72	<0.72	49.6	49.6	38.6	1.9	0.033	0	83.2	16.8	Deg Fuel (FCM) 79%
s	155-SB-2-2-4	23.9	<0.6	<0.6	26.1	26.1	9.8	0.46	0.007	0	81.8	18.2	Deg.PHC (FCM) 61.8%
s	155-SB-3-2-4	9.4	<0.24	<0.24	0.47	0.47	0.38	0.02	<0.001	0	82.2	17.8	Deg Fuel (FCM) 59.6%
s	155-SB-4-6-8	57.9	<1.4	312.4	152.4	464.8	45.8	1.8	0.006	87.2	12.5	0.3	Deg Gas (FCM) 62.6%
s	155-SB-5-6-8	44.3	<1.1	14	969.4	983.4	274.1	11.2	0.038	4.8	92.7	2.5	Deg.Kerosene (FCM) 83.3%
s	155-SB-6-6-8	48.4	<1.2	223.8	117.9	341.7	34.4	1.4	<0.005	86.7	13.1	0.2	Deg Gas (FCM) 60.5%
s	155-SB-7-6-8	45.3	<1.1	11.1	29.7	40.8	16.4	0.69	0.005	40.4	57.3	2.3	Deg.Fuel (FCM) 87.6%
s	155-8-6-8	27.6	<0.69	15.6	15.8	31.4	8	0.36	0.004	68.3	27.4	4.3	Deg.PHC (FCM) (BO) 52.8%
s	154-SB-4-8-10	29.4	<0.73	<0.73	5.2	5.2	3.8	0.16	0.003	0	89.4	10.6	V.Deg.PHC (FCM) 53.9%
	Initial Calibrator QC check			OK									

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content  
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library  
(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

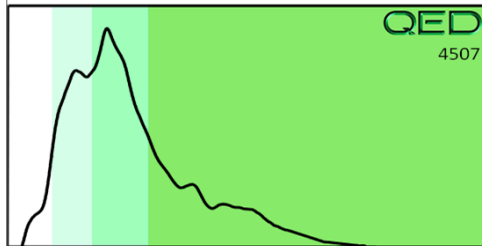
QED Hydrocarbon Fingerprints

Project: 2016.0045.NDOT

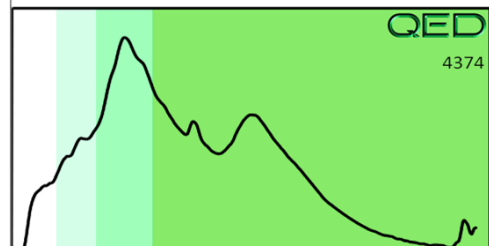
10/25/2016



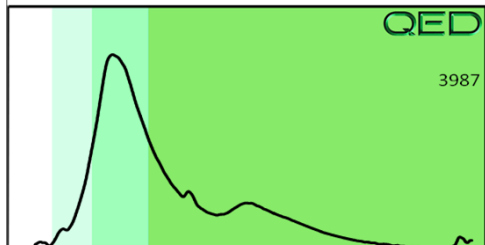
155-SB-7-6-8 : Deg.Fuel (FCM) 87.6%



155-8-6-8 : Deg.PHC (FCM) (BO) 52.8%



154-SB-4-8-10 : V.Deg.PHC (FCM) 53.9%





December 14, 2016

Mr. Terry Fox, L.G.  
North Carolina Department of Transportation  
Geotechnical Engineering Unit  
1589 Mail Service Center  
Raleigh, North Carolina 27699-1589

Reference: **Preliminary Site Assessment**  
**William Sherman, et. al. Property (Parcel #167)**  
**5409 Raeford Road**  
**Fayetteville, Cumberland County, North Carolina**  
**State Project: U-4405**  
**WBS Element 39049.1.1**  
**SIES Project No. 2016.0054.NDOT**

Dear Mr. Fox:

Solutions-IES, Inc., (SIES) has completed the Preliminary Site Assessment conducted at the above-referenced property. The work was performed in accordance with the Technical and Cost proposal dated September 26, 2016, and the North Carolina Department of Transportation's (NCDOT's) Notice to Proceed dated September 26, 2016. Activities associated with the assessment consisted of conducting a geophysical investigation, collecting soil samples for analysis, and reviewing applicable North Carolina Department of Environmental Quality (NCDEQ) records. The purpose of this report is to document the field activities, present the laboratory analyses, and provide recommendations regarding the property.

### **Location and Description**

The William Sherman, et. al., Property (Parcel #167) is located at 5409 Raeford Road in Fayetteville, Cumberland County, North Carolina. The property is situated on the south side of Raeford Road approximately 600 feet east of the intersection of Raeford Road and Duke Street (**Figure 1**). The property consists of an active auto service and body shop (Rim Repair). According to the NCDOT information, the site has historically been used for general service automotive repairs. No visual evidence of underground storage tanks (USTs) was noted during the assessment activities.

An asphalt parking and rear access area surrounds the building (**Figure 2**). The east side of the building houses the offices and parts storage. The west side of the building is characterized by three bays where repairs are conducted. The proposed easement was not marked at the site on the dates of the field work, but NCDOT plan sheets show that the easement will affect the property from the road to the building.



The NCDOT requested a Preliminary Site Assessment for the right-of-way/easement because the property contains an active automotive repair shop. The scope of work as defined in the Request for Technical and Cost Proposal was to evaluate the site with respect to the presence of unknown USTs and assess where contamination exists on the right-of-way/proposed easement. Because the property contains an automotive repair facility, the NCDOT directed SIES to evaluate the right-of-way/easement for the presence of solvents in addition to petroleum. An estimate of the quantity of impacted soil was to be provided, should impacted soils be encountered.

SIES reviewed the on-line NCDEQ Incident Management database and no incident number was assigned to the site. SIES also examined the UST registration database and found no tanks registered to the property address.

### **Geophysical Survey**

Prior to SIES' mobilization to the site, Pyramid Environmental & Engineering of Greensboro, NC (Pyramid) conducted a geophysical survey in the right-of-way/proposed easement to determine if unknown USTs were present in that area. The geophysical survey consisted of an electromagnetic survey using a Geonics EM61 time-domain electromagnetic induction meter to locate buried metallic objects, specifically metallic USTs.

A survey grid was laid out along the right-of-way/proposed easement with the X-axis oriented approximately parallel to Raeford Road and the Y-axis oriented approximately perpendicular to Raeford Road. The grid was positioned to cover the entire right-of-way/proposed easement, as shown on **Figure 2** of the geophysical survey report in **Attachment A**.

The survey lines were spaced five feet apart and magnetic data were collected continuously along each survey line with a data logger. After collection, the data were reviewed in the field with graphical computer software.

Access was available to all areas of the investigation area, and several anomalies were detected with the geophysical survey. The anomalies were attributed to visible cultural features, metallic debris, underground utilities, signage, or vehicles. The data did not show evidence of metallic USTs within the right-of-way/proposed easement. For these reasons, a ground penetrating radar survey was not required to verify any unknown EM anomalies. Pyramid's detailed report of findings and interpretations is presented in **Attachment A**.

## Site Assessment Activities

On October 27, 2016, SIES mobilized to the site to conduct a Geoprobe® direct-push investigation to evaluate subsurface soil conditions on the right-of-way/easement to a depth of 10 feet below ground surface (ft bgs). Four direct-push holes (167-SB-1 through 167-SB-4) were advanced throughout the right-of-way/proposed easement (**Figure 2**). The soil boring logs are included as **Attachment B**. Borings 167-SB-1 and 167-SB-4 were located to evaluate the subsurface conditions at the repair bays and borings 167-SB-2 and 167-SB-3 were placed to assess the remainder of the study area at the east side of the building and along Raeford Road (see photos in **Attachment C**).

Continuous sampling using a Geoprobe® resulted in good recovery of soil samples from the direct-push holes. Soil samples were collected and contained in four-foot long acetate sleeves inside the direct-push Macro-Core® sampler. Each of the sleeves was divided into two-foot long sections for soil sample screening. Soil from each two-foot interval was placed in a resealable plastic bag and the bag was set aside to allow volatilization of organic compounds from the soil to the bag headspace. A photoionization detector (PID) probe was inserted into the bag for field screening and the reading was recorded (**Table 1**).

If the PID concentrations in a boring were consistently low, one sample from the bottom interval was selected for analysis. If the PID concentrations were elevated, samples at the elevated and bottom intervals were selected for analyses. The PID results were consistently low (**Table 1**), therefore one sample from the bottom interval of each boring was collected for analysis.

The selected soil samples were submitted to an on-site mobile laboratory for analysis of total petroleum hydrocarbons (TPH) diesel range organics (DRO) and gasoline range organics (GRO) using ultraviolet fluorescence (UVF) methodology. To evaluate the property with respect to solvents, the soil sample from each boring was submitted to Pace Analytical in Huntersville, NC, for analysis of volatile organic compounds (VOCs) using Method 8260. Each boring was backfilled with bentonite and drill cuttings to the surface after completion.

The lithology encountered by the direct-push samples was generally consistent throughout the site. The ground surface was covered with about 0.5 feet of asphalt. Below this surface cover was a light brown to tan silty fine-grained sand present to a depth ranging from six to seven ft bgs. This unit is underlain by a dark brown fine-grained sand. No bedrock or groundwater were noted in any of the borings.

According to the 1985 Geologic Map of North Carolina, the site is within of Coastal Plain Physiographic Province in North Carolina near the contact between the Cretaceous Black Creek and Middendorf Formations. The strata of the Black Creek Formation consist of gray to black clay, thin lenses of fine-grained sand and thick lenses of cross-bedded sand. The lithology may also include glauconite and fossils. In comparison, the Middendorf Formation consists of sand, sandstone, and mudstone that are laterally discontinuous. The soils observed at the site are consistent with the Middendorf Formation as the parent material.

## **Analytical Results**

The laboratory data are summarized in **Table 1** and the complete report is presented in **Attachment D**. Four soil samples were submitted for analysis. Of these samples, two contained detectable GRO compounds at 0.68 and 9.1 milligrams per kilogram (mg/kg). Three of the soil samples contained detectable DRO compounds at concentrations ranging from 1.4 to 24.1 mg/kg. The action levels are 50 mg/kg for GRO and 100 mg/kg for DRO<sup>1</sup>. None of the soil samples analyzed for this site contained DRO or GRO concentrations above their respective action levels.

The soil sample from each boring was submitted for VOC analysis using Method 8260. As presented in **Attachment D**, no compounds were detected above the method reporting limit. However, the reporting limit was set at a concentration higher than the detection limit, which is the lowest concentration at which a compound can be detected and is usually below applicable action levels for solvents. If a concentration was detected above the detection limit, but below the reporting limit, it was assigned an estimated, or "J", value. No values flagged with J were reported.

## **Conclusions and Recommendations**

A Preliminary Site Assessment was conducted to evaluate the William Sherman Property (Parcel #167) located at 5409 Raeford Road in Fayetteville, Cumberland County, North Carolina. A geophysical survey conducted at the site indicated that no metallic USTs were detected within then right-of-way/proposed easement on the site. Four soil borings were advanced to evaluate the subsurface soil conditions along the right-of-way/proposed easement. None of the four soil samples analyzed had a GRO or DRO concentration above the action level. Analysis of the four soil samples for VOCs indicated that no concentrations were detected above the method reporting limit.

---

<sup>1</sup> NCDEQ, *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons (TPH)*, July 26, 2016.

The UVF analytical results (**Table 1**) of the soil samples collected on October 27, 2016 indicate that none of the soil samples contained DRO or GRO concentrations above the action level. Therefore, no estimate of the volume of soil requiring possible remediation was made.

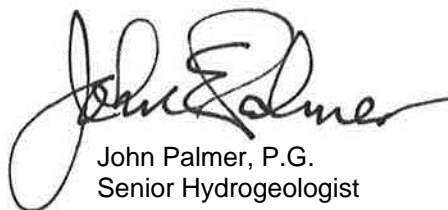
SIES appreciates the opportunity to work with the NCDOT on this project. Because UVF compounds were detected in the soil samples, SIES recommends that a copy of this report be submitted to the Division of Waste Management, UST Section, in the Fayetteville Regional Office. If you have any questions, please contact us at (919) 873-1060.

Sincerely,



Michael W. Branson, P.G.  
Project Manager

Attachments



John Palmer, P.G.  
Senior Hydrogeologist

**TABLE 1**  
**SOIL FIELD SCREENING AND ANALYTICAL RESULTS**  
**SHERMAN PROPERTY (PARCEL #167)**  
**FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA**  
**STATE PROJECT: U-4405**  
**WBS ELEMENT 39049.1.1**  
**SIES PROJECT NO. 2016.0054.NDOT**

SAMPLE ID	DEPTH (ft)	PID READING (ppm)	SAMPLE ID	ANALYTICAL RESULTS (mg/kg)	
				UVF GRO	UVF DRO
167-SB-1	Action Level (mg/kg)			50	100
	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.0			
	6 - 8	0.1			
	8 - 10	0.0	167-SB-1-8-10	9.1	1.4
167-SB-2	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.1			
	6 - 8	0.1			
	8 - 10	1.3	167-SB-2-8-10	<0.63	7.5
167-SB-3	0 - 2	0.0			
	2 - 4	0.0			
	4 - 6	0.1			
	6 - 8	0.0			
	8 - 10	0.2	167-SB-3-8-10	0.68	<0.68
167-SB-4	0 - 2	0.0			
	2 - 4	0.1			
	4 - 6	0.0			
	6 - 8	0.0			
	8 - 10	0.0	167-SB-4-8-10	<0.73	24.1

1) ft - feet

2) ppm - parts per million.

3) PID - photoionization ionization detector

4) mg/kg - milligrams per kilogram.

5) UVF DRO - Diesel range organics by UVF.

6) UVF GRO - Gasoline range organics by UVF.

7) Action level based upon NCDEQ memo *Guidelines for North Carolina Action Limits for Total Petroleum Hydrocarbons* - July 29, 2016.

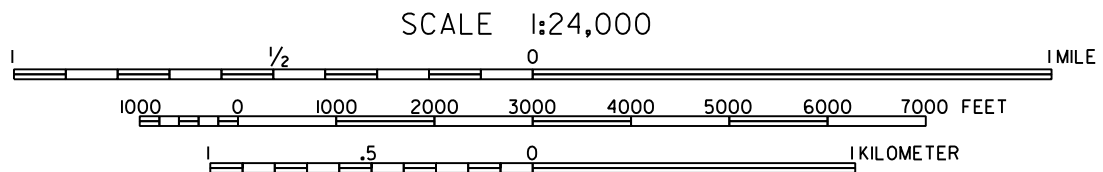
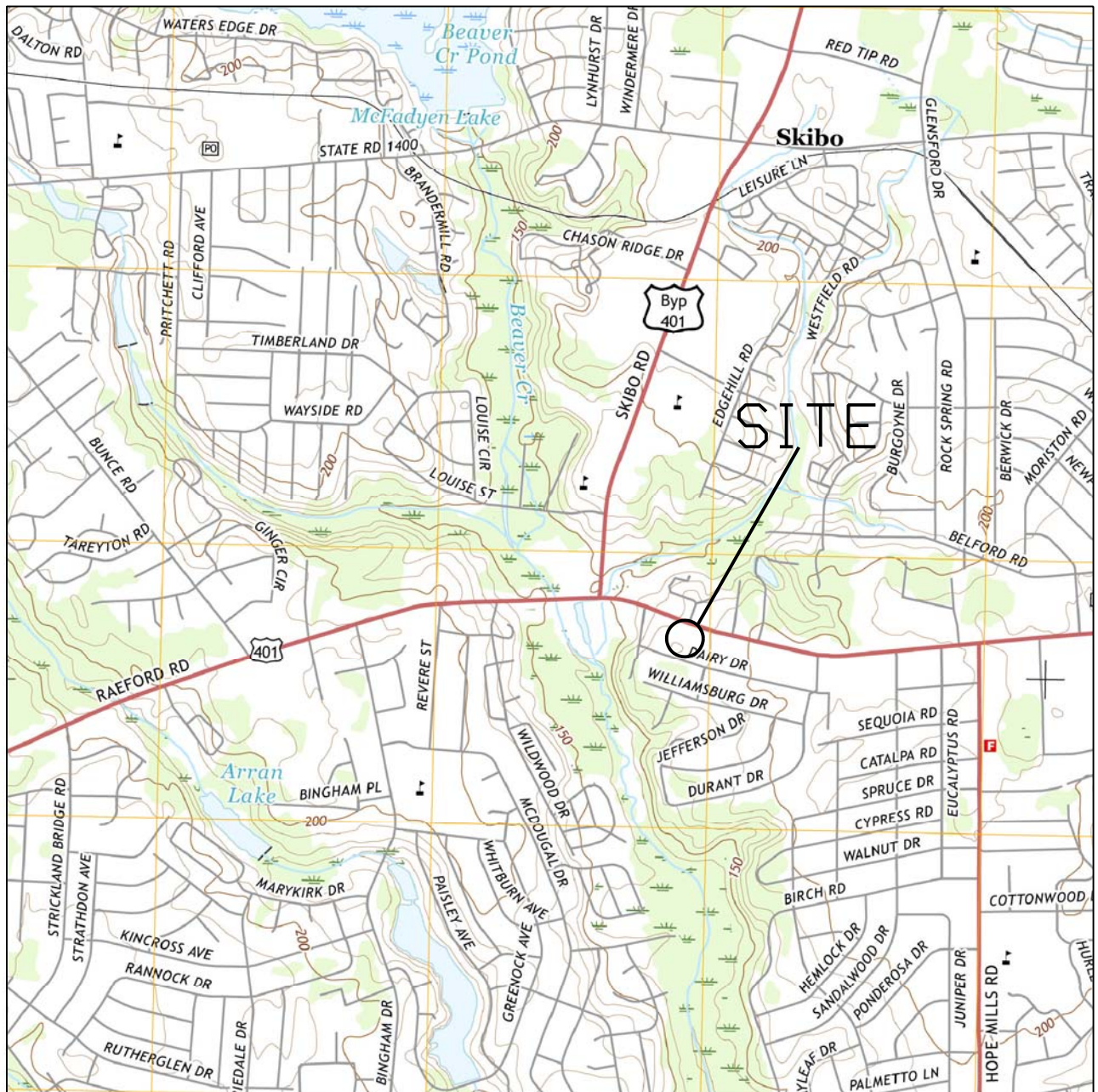
8) Soil samples were collected on October 27, 2016.

9) **Bold** values are above the detection level.

## FIGURES



FILE  
FAYETTEVILLE PSAS  
DATE  
NOVEMBER 2016  
PROJECT MANAGER  
MWB  
CHECKED BY  
JEP  
PROJECT NUMBER  
2016.0054.ND01



SOURCE: U.S. GEOLOGICAL SURVEY 7.5 MIN QUADRANGLE: FAYETTEVILLE, NC (2016)



1101 NOWELL ROAD  
RALEIGH, NORTH CAROLINA 27607  
TEL: (919) 873-1060 FAX: (919) 873-1074

## VICINITY MAP

SHERMAN ET. AL. PROPERTY (PARCEL #167)  
FAYETTEVILLE, CUMBERLAND COUNTY NORTH CAROLINA

## FIGURE

1

PROJECT NUMBER  
2016.0054.NDOT

MWB

DRAFTER

JEP

CHECKED BY

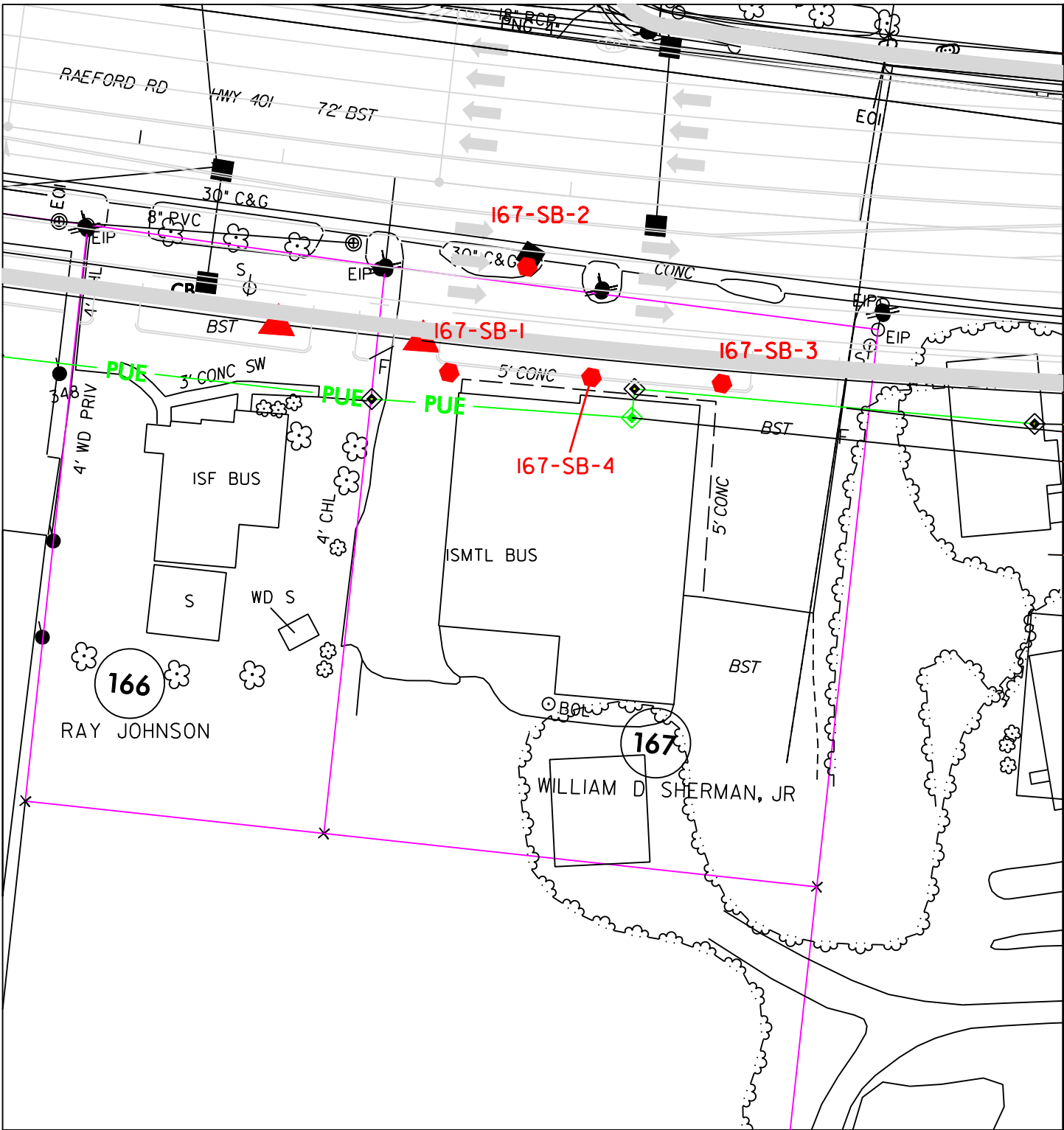
MWB

PROJECT MANAGER

DATE  
NOVEMBER 2016

FAYETTEVILLE PSAS

FILE

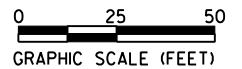


LEGEND

I67-SB-1



SOIL SAMPLE LOCATION AND IDENTIFICATION



1101 NOWELL ROAD  
RALEIGH, NORTH CAROLINA 27607  
TEL: (919) 873-1060 FAX: (919) 873-1074

SITE MAP

SHERMAN ET. AL. PROPERTY (PARCEL #167)  
FAYETTEVILLE, CUMBERLAND COUNTY, NORTH CAROLINA

FIGURE

2

ATTACHMENT A

# GEOPHYSICAL SURVEY

---

## METALLIC UST INVESTIGATION: PARCEL 167 – WILLIAM D. SHERMAN, JR. NCDOT PROJECT U-4405

5409 RAEFORD RD., FAYETTEVILLE, CUMBERLAND COUNTY, NC

NOVEMBER 4, 2016

Report prepared for:

Mike Branson  
Solutions, IES  
1101 Nowell Road  
Raleigh, North Carolina 27607

Prepared by: \_\_\_\_\_



Eric C. Cross, P.G.  
NC License #2181

Reviewed by: \_\_\_\_\_



Douglas A. Canavello, P.G.  
NC License #1066

**GEOPHYSICAL INVESTIGATION REPORT**  
**Parcel 167 – 5409 Raeford Road**  
**Fayetteville, Cumberland County, North Carolina**

**Table of Contents**

Executive Summary .....1  
Introduction.....2  
Field Methodology.....2  
Discussion of Results.....3  
Summary and Conclusions .....4  
Limitations .....5

**Figures**

- Figure 1 – Parcel 167 Geophysical Survey Boundaries and Site Photographs  
Figure 2 – Parcel 167 EM61 Results Contour Map

## LIST OF ACRONYMS

CADD .....	Computer Assisted Drafting and Design
DF .....	Dual Frequency
EM.....	Electromagnetic
GPR.....	Ground Penetrating Radar
GPS .....	Global Positioning System
NCDOT.....	North Carolina Department of Transportation
ROW .....	Right-of-Way
SVE.....	Soil Vapor Extraction
UST .....	Underground Storage Tank



## EXECUTIVE SUMMARY

---

**Project Description:** Pyramid Environmental conducted a geophysical investigation for Solutions, IES (Solutions) at Parcel 167, located at 5409 Raeford Road, Fayetteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-4405). Solutions directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from October 12-17, 2016, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

**Geophysical Results:** All EM anomalies were directly attributed to visible cultural features and known utilities. A GPR survey was not required. Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 167.

## INTRODUCTION

---

Pyramid Environmental conducted a geophysical investigation for Solutions, IES (Solutions) at Parcel 167, located at 5409 Raeford Road, Fayetteville, NC. The survey was part of a North Carolina Department of Transportation (NCDOT) Right-of-Way (ROW) investigation (NCDOT Project U-4405). Solutions directed Pyramid as to the geophysical survey boundaries at the project site, which were designed to extend from the existing edge of pavement to the proposed ROW lines and/or easement lines within the property, whichever distance was greater. Conducted from October 12-17, 2016, the geophysical investigation was performed to determine if unknown, metallic underground storage tanks (USTs) were present beneath the survey area.

The site included a commercial building surrounded by asphalt parking space and grassy medians. Aerial photographs showing the survey area boundaries and ground-level photographs are shown in **Figure 1**.

## FIELD METHODOLOGY

---

The geophysical investigation consisted of an electromagnetic (EM) induction-metal detection survey. Pyramid collected the EM data using a Geonics EM61 metal detector integrated with a Trimble AG-114 GPS antenna. The integrated GPS system allows the location of the instrument to be recorded in real-time during data collection, resulting in an EM data set that is geo-referenced and can be overlain on aerial photographs and CADD drawings. A boundary grid was established around the perimeter of the site with marks every 10 feet to maintain orientation of the instrument throughout the survey and assure complete coverage of the area.

According to the instrument specifications, the EM61 can detect a metal drum down to a maximum depth of approximately 8 feet. Smaller objects (1-foot or less in size) can be detected to a maximum depth of 4 to 5 feet. The EM61 data were digitally collected at approximately 0.8 foot intervals along north-south trending or east-west trending, generally

parallel survey lines spaced five feet apart. The data were downloaded to a computer and reviewed in the field and office using the Geonics NAV61 and Surfer for Windows Version 11.0 software programs.

GPR data were not required at this property due to all EM anomalies being directly attributed to visible cultural features at the ground surface or known utilities (see Discussion of Results below).

Pyramid's classifications of USTs for the purposes of this report are based directly on the geophysical UST ratings provided by the NCDOT. These ratings are as follows:

Geophysical Surveys for Underground Storage Tanks on NCDOT Projects			
High Confidence	Intermediate Confidence	Low Confidence	No Confidence
<b>Known UST</b> Active tank - spatial location, orientation, and approximate depth determined by geophysics.	<b>Probable UST</b> Sufficient geophysical data from both magnetic and radar surveys that is characteristic of a tank. Interpretation may be supported by physical evidence such as fill/vent pipe, metal cover plate, asphalt/concrete patch, etc.	<b>Possible UST</b> Sufficient geophysical data from either magnetic or radar surveys that is characteristic of a tank. Additional data is not sufficient enough to confirm or deny the presence of a UST.	Anomaly noted but not characteristic of a UST. Should be noted in the text and may be called out in the figures at the geophysicist's discretion.

## DISCUSSION OF RESULTS

---

### *Discussion of EM Results*

A contour plot of the EM61 results obtained across the survey area at the property is presented in **Figure 2**. Each EM anomaly is numbered for reference in the figure. The following table presents the list of EM anomalies and the cause of the metallic response, if known:

### **LIST OF METALLIC ANOMALIES IDENTIFIED BY EM SURVEY**

<b>Metallic Anomaly #</b>	<b>Cause of Anomaly</b>	<b>Investigated with GPR</b>
1	Telephone Pole	
2	Telephone Pole	
3	Sign	
4	Vehicle	
5	Air Conditioning Unit	
6	Reinforced Concrete and Building Interference	

All of the EM anomalies recorded by the survey are directly attributed to visible cultural features such as signs, utility poles, building structures, a vehicle, an AC unit, and reinforced concrete directly adjacent to the building. For this reason, a GPR survey was not required to verify any unknown anomalies.

Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 167.

### **SUMMARY & CONCLUSIONS**

---

Pyramid's evaluation of the EM61 data collected at Parcel 167 in Fayetteville, Cumberland County, North Carolina, provides the following summary and conclusions:

- The EM61 survey provided reliable results for the detection of metallic USTs within the accessible portions of the geophysical survey area.
- All EM anomalies were directly attributed to visible cultural features and known utilities. A GPR survey was not required.
- Collectively, the geophysical data did not show any evidence of unknown metallic USTs at Parcel 167.

## LIMITATIONS

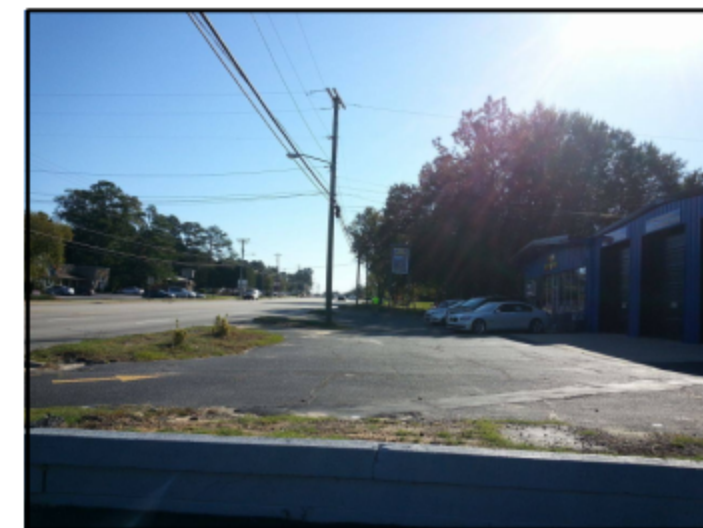
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Geophysical surveys have been performed and this report was prepared for Solutions, IES in accordance with generally accepted guidelines for EM61 surveys. It is generally recognized that the results of the EM61 surveys are non-unique and may not represent actual subsurface conditions. The EM61 results obtained for this project have not conclusively determined the definitive presence or absence of metallic USTs, but the evidence collected is sufficient to result in the conclusions made in this report. Additionally, it should be understood that areas containing extensive vegetation, reinforced concrete, or other restrictions to the accessibility of the geophysical instruments could not be fully investigated.



N↑


# APPROXIMATE BOUNDARIES OF GEOPHYSICAL SURVEY AREA



View of Survey Area  
(Facing Approximately East)



View of Survey Area  
(Facing Approximately West)

TITLE		PARCEL 167 - GEOPHYSICAL SURVEY BOUNDARIES AND SITE PHOTOGRAPHS	
PROJECT		5409 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-4405	
		 <div>503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology</div>	
DATE	11/02/16	CLIENT	SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	FIGURE 1	



N↑

## EM61 METAL DETECTION RESULTS




NUMBERS IN BLUE (x) CORRESPOND TO ANOMALY TABLE INCLUDED IN THE REPORT

## NO EVIDENCE OF UNKNOWN METALLIC USTs OBSERVED

The contour plot shows the differential results of the EM61 instrument in millivolts (mV). The differential results focus on larger metallic objects such as USTs and drums. The EM61 data were collected on October 13, 2016, using a Geonics EM61 instrument. Verification GPR data were not required due to all anomalies being directly attributed to visible cultural features.

### EM61 Metal Detection Response (millivolts)



TITLE	PARCEL 167 - EM61 RESULTS CONTOUR MAP		
PROJECT	5409 RAEFORD ROAD FAYETTEVILLE, NORTH CAROLINA NCDOT PROJECT U-265		
	503 INDUSTRIAL AVENUE GREENSBORO, NC 27460 (336) 335-3174 (p) (336) 691-0648 (f) License # C1251 Eng. / License # C257 Geology		
	DATE	11/02/2016	CLIENT SOLUTIONS, IES
PYRAMID PROJECT #:	2016-265	FIGURE 2	

ATTACHMENT B

BORING LOCATION: Parcel #167, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/27/2016

 DATE FINISHED:  
10/27/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0					Asphalt.	0
1		100%		0.0	Light brown and tan silty fine sand. Dry.	1
2						2
3				0.0		3
4						4
5		100%		0.0	Dark brown fine sand. Dry.	5
6						6
7				0.1		7
8						8
9	167-SB-1-8-10	100%		0.0		9
10						10

End of Boring

BORING LOCATION: Parcel #167, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/27/2016

 DATE FINISHED:  
10/27/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

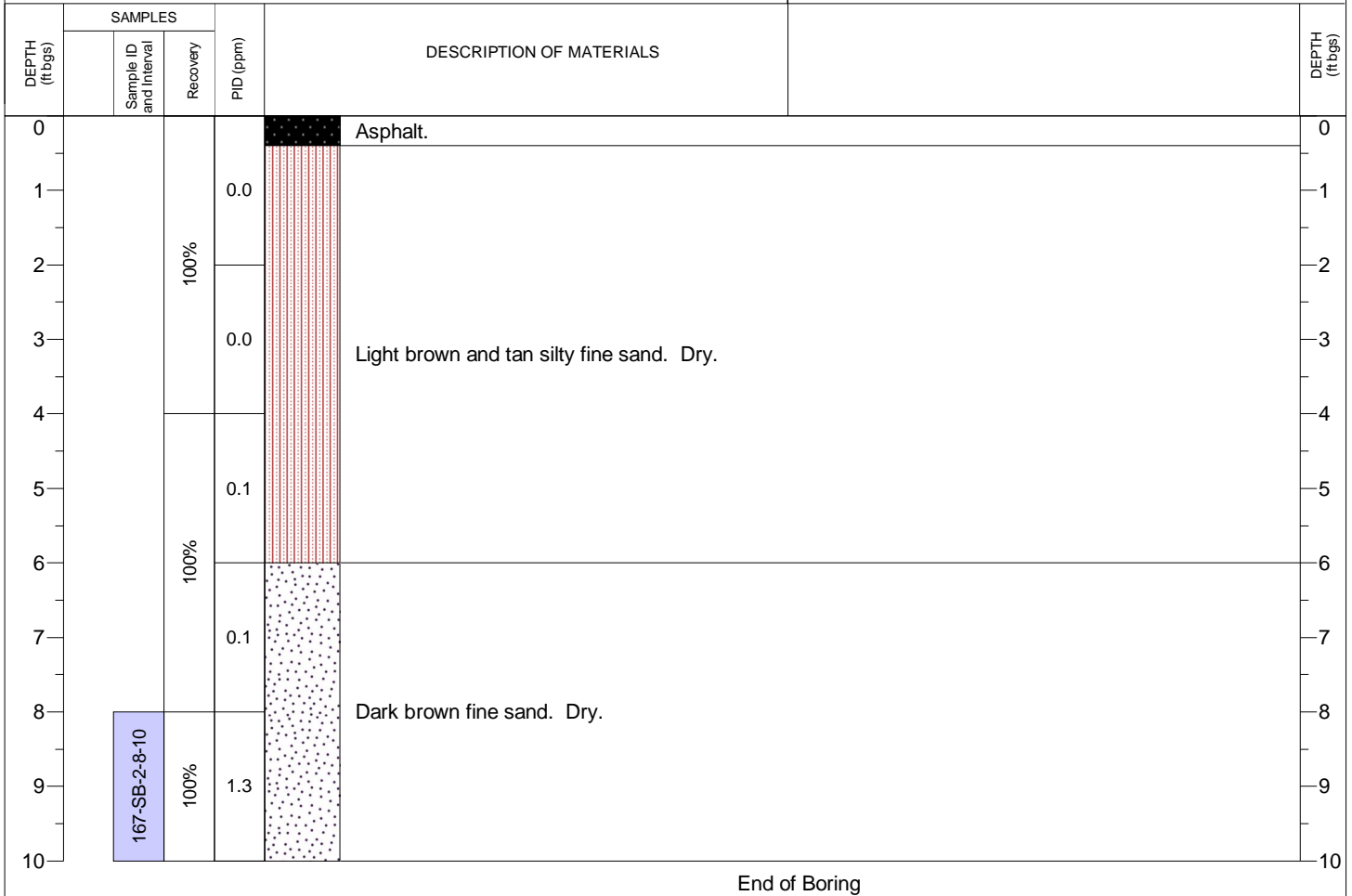
 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre


**Log of Boring 167-SB-3**

BORING LOCATION: Parcel #167, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/27/2016

 DATE FINISHED:  
10/27/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

LOGGED BY: Samuel McIntyre      CHECKED BY:

DEPTH (ft bgs)	SAMPLES			PID (ppm)	DESCRIPTION OF MATERIALS	DEPTH (ft bgs)
	Sample ID and Interval	Recovery				
0					Asphalt.	0
1						1
2		75%				2
3						3
4					Light brown and tan silty fine sand. Dry.	4
5						5
6		100%				6
7						7
8						8
9	167-SB-3-8-10	100%			Dark brown fine sand. Dry.	9
10						10

End of Boring



BORING LOCATION: Parcel #167, Fayetteville, NC

 PROJECT NUMBER:  
2016.0054.NDOT

DRILLING CONTRACTOR: Regional Probing Services

 DATE STARTED:  
10/27/2016

 DATE FINISHED:  
10/27/2016

DRILLING METHOD: Direct Push      BOREHOLE DIAMETER: 2.25"

 TOTAL DEPTH (ft bgs):  
10 ft bgs

 SCREEN INTERVAL (ft bgs):  
NA

DRILLING EQUIPMENT: Geoprobe 5410

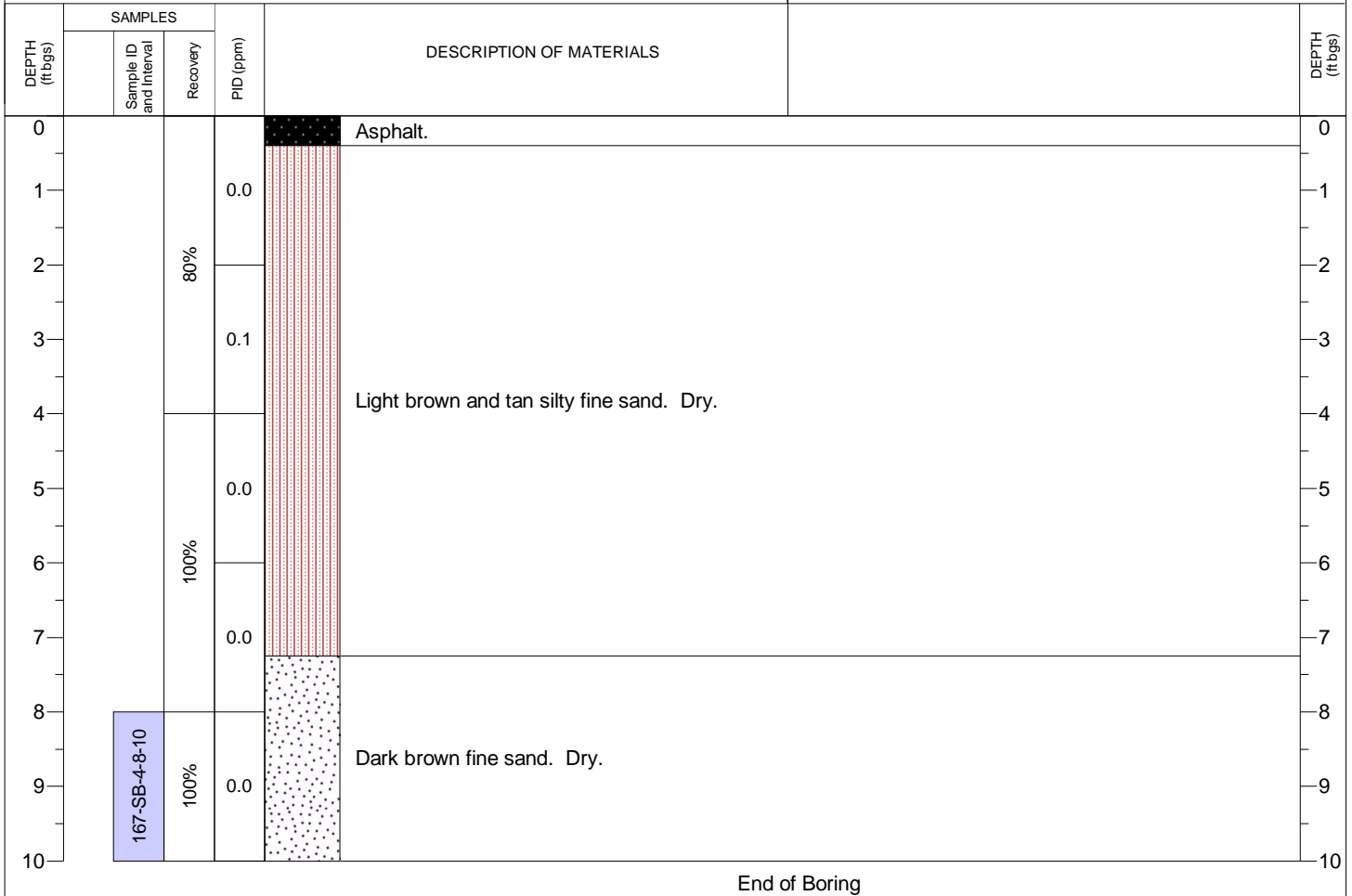
 NORTHING:  
NA

 EASTING:  
NA

SAMPLING METHOD: Macro Core

 INITIAL DTW:  
NA

 FINAL DTW:  
NA

 LOGGED BY: CHECKED BY:  
Samuel McIntyre


ATTACHMENT C



PHOTO 1 - VIEW OF SOIL BORING LOOKING SOUTHEAST



PHOTO 2 - VIEW OF SOIL BORING LOOKING NORTH



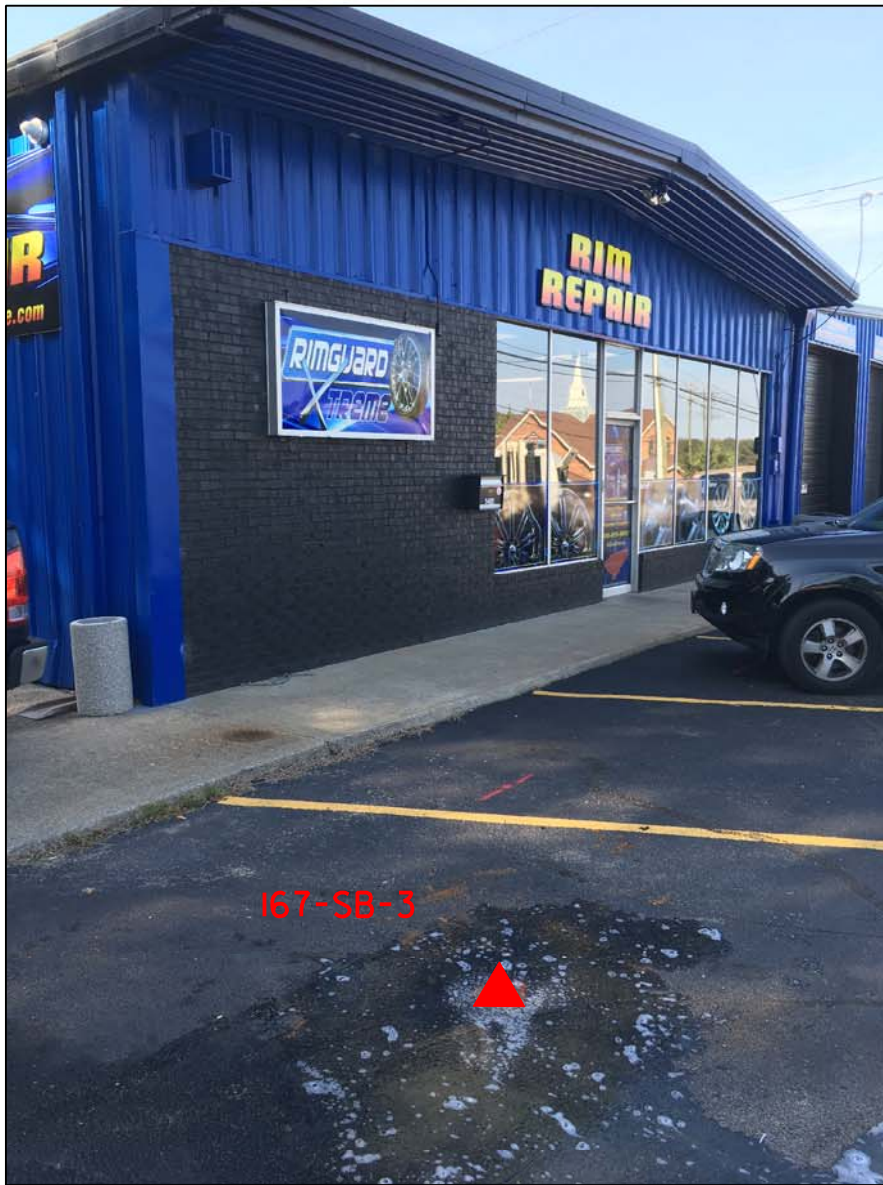


PHOTO 3 - VIEW OF SOIL BORING LOOKING SOUTHWEST



PHOTO 4 - VIEW OF SOIL BORING LOOKING SOUTHWEST

ATTACHMENT D





### Hydrocarbon Analysis Results

**Client:** NCDOT  
**Address:** Parcel 167: 5409 Raeford Road  
Fayetteville, NC

**Samples taken** 10/27/2016  
**Samples extracted** 10/27/2016  
**Samples analysed** 10/27/2016

**Contact:**

**Operator** Candy Elliott

**Project:** 2016.0054.NDOT

													U04049
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
										% light	% mid	% heavy	
s	167-SB-1-8-10	24.1	<0.6	9.1	1.4	10.5	0.41	<0.03	<0.002	96.2	1.8	2	Deg.PHC (FCM) (P) (BO) 42.2%
s	167-SB-2-8-10	25.2	<0.63	<0.63	7.5	7.5	6.2	0.65	0.022	3.7	79.2	17	Road Tar (FCM) 81.7%
s	167-SB-3-8-10	27.1	<1.4	0.68	<0.68	0.68	<0.14	<0.02	<0.003	82.6	13.2	4.2	Residual.PHC (FCM)
s	167-SB-4-8-10	29.4	<0.73	<0.73	24.1	24.1	14.8	0.65	0.006	0	89.7	10.3	V.Deg.PHC (FCM) 57%
	Initial Calibrator QC check			OK									

Results generated by a QED HC-1 analyser. Concentration values in mg/kg for soil samples and mg/L for water samples. Soil values are not corrected for moisture or stone content

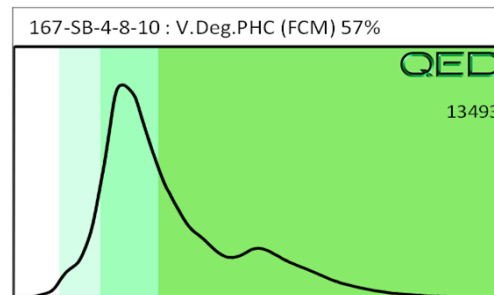
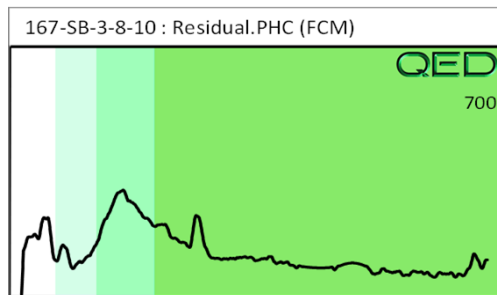
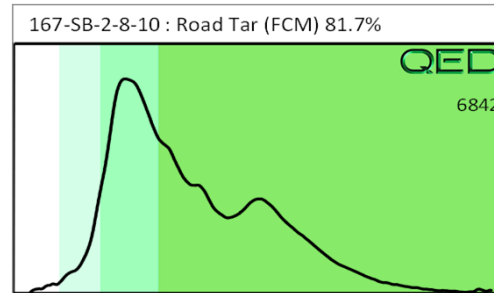
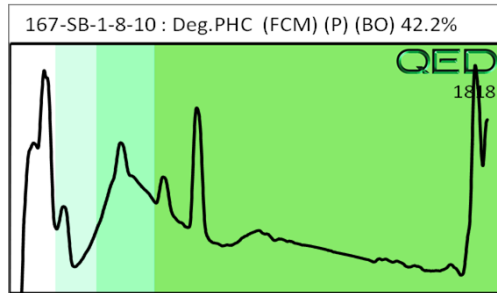
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

(SBS) or (LBS) = Site Specific or Library Background Subtraction applied to result : (PFM) = Poor Fingerprint Match : (T) = Turbid : (P) = Particulate present

QED Hydrocarbon Fingerprints

Project:

10/27/2016



November 04, 2016

Mike Branson  
Solutions-IES  
1101 Nowell Road  
Raleigh, NC 27607

RE: Project: PARCEL 167 39049.1.1  
Pace Project No.: 92317872

Dear Mike Branson:

Enclosed are the analytical results for sample(s) received by the laboratory on October 31, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Taylor Ezell  
taylor.ezell@pacelabs.com  
Project Manager

Enclosures

cc: Chemical Testing Engineer, Materials and Tests Unit  
Samuel McIntyre, Solutions-IES



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

---

### Charlotte Certification IDs

9800 Kincey Ave. Ste 100, Huntersville, NC 28078  
North Carolina Drinking Water Certification #: 37706  
North Carolina Field Services Certification #: 5342  
North Carolina Wastewater Certification #: 12

South Carolina Certification #: 99006001  
Florida/NELAP Certification #: E87627  
Kentucky UST Certification #: 84  
Virginia/VELAP Certification #: 460221

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## REPORT OF LABORATORY ANALYSIS

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## SAMPLE ANALYTE COUNT

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92317872001	167-SB-1-8-10	EPA 8260	DLK	70	PASI-C
		ASTM D2974-87	KDF	1	PASI-C
92317872002	167-SB-2-8-10	EPA 8260	DLK	70	PASI-C
		ASTM D2974-87	KDF	1	PASI-C
92317872003	167-SB-3-8-10	EPA 8260	DLK	70	PASI-C
		ASTM D2974-87	KDF	1	PASI-C
92317872004	167-SB-4-8-10	EPA 8260	DLK	70	PASI-C
		ASTM D2974-87	KDF	1	PASI-C

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-1-8-10**      **Lab ID: 92317872001**      Collected: 10/27/16 13:30      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Acetone	ND	ug/kg	118	1		11/01/16 17:30	67-64-1	
Benzene	ND	ug/kg	5.9	1		11/01/16 17:30	71-43-2	
Bromobenzene	ND	ug/kg	5.9	1		11/01/16 17:30	108-86-1	
Bromochloromethane	ND	ug/kg	5.9	1		11/01/16 17:30	74-97-5	
Bromodichloromethane	ND	ug/kg	5.9	1		11/01/16 17:30	75-27-4	
Bromoform	ND	ug/kg	5.9	1		11/01/16 17:30	75-25-2	
Bromomethane	ND	ug/kg	11.8	1		11/01/16 17:30	74-83-9	
2-Butanone (MEK)	ND	ug/kg	118	1		11/01/16 17:30	78-93-3	
n-Butylbenzene	ND	ug/kg	5.9	1		11/01/16 17:30	104-51-8	
sec-Butylbenzene	ND	ug/kg	5.9	1		11/01/16 17:30	135-98-8	
tert-Butylbenzene	ND	ug/kg	5.9	1		11/01/16 17:30	98-06-6	
Carbon tetrachloride	ND	ug/kg	5.9	1		11/01/16 17:30	56-23-5	
Chlorobenzene	ND	ug/kg	5.9	1		11/01/16 17:30	108-90-7	
Chloroethane	ND	ug/kg	11.8	1		11/01/16 17:30	75-00-3	
Chloroform	ND	ug/kg	5.9	1		11/01/16 17:30	67-66-3	
Chloromethane	ND	ug/kg	11.8	1		11/01/16 17:30	74-87-3	
2-Chlorotoluene	ND	ug/kg	5.9	1		11/01/16 17:30	95-49-8	
4-Chlorotoluene	ND	ug/kg	5.9	1		11/01/16 17:30	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	5.9	1		11/01/16 17:30	96-12-8	
Dibromochloromethane	ND	ug/kg	5.9	1		11/01/16 17:30	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	5.9	1		11/01/16 17:30	106-93-4	
Dibromomethane	ND	ug/kg	5.9	1		11/01/16 17:30	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	5.9	1		11/01/16 17:30	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	5.9	1		11/01/16 17:30	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	5.9	1		11/01/16 17:30	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	11.8	1		11/01/16 17:30	75-71-8	
1,1-Dichloroethane	ND	ug/kg	5.9	1		11/01/16 17:30	75-34-3	
1,2-Dichloroethane	ND	ug/kg	5.9	1		11/01/16 17:30	107-06-2	
1,1-Dichloroethene	ND	ug/kg	5.9	1		11/01/16 17:30	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	5.9	1		11/01/16 17:30	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	5.9	1		11/01/16 17:30	156-60-5	
1,2-Dichloropropane	ND	ug/kg	5.9	1		11/01/16 17:30	78-87-5	
1,3-Dichloropropane	ND	ug/kg	5.9	1		11/01/16 17:30	142-28-9	
2,2-Dichloropropane	ND	ug/kg	5.9	1		11/01/16 17:30	594-20-7	
1,1-Dichloropropene	ND	ug/kg	5.9	1		11/01/16 17:30	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	5.9	1		11/01/16 17:30	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	5.9	1		11/01/16 17:30	10061-02-6	
Diisopropyl ether	ND	ug/kg	5.9	1		11/01/16 17:30	108-20-3	
Ethylbenzene	ND	ug/kg	5.9	1		11/01/16 17:30	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	5.9	1		11/01/16 17:30	87-68-3	
2-Hexanone	ND	ug/kg	59.1	1		11/01/16 17:30	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/kg	5.9	1		11/01/16 17:30	98-82-8	
p-Isopropyltoluene	ND	ug/kg	5.9	1		11/01/16 17:30	99-87-6	
Methylene Chloride	ND	ug/kg	23.7	1		11/01/16 17:30	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	59.1	1		11/01/16 17:30	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	5.9	1		11/01/16 17:30	1634-04-4	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-1-8-10**      **Lab ID: 92317872001**      Collected: 10/27/16 13:30      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Naphthalene	ND	ug/kg	5.9	1		11/01/16 17:30	91-20-3	
n-Propylbenzene	ND	ug/kg	5.9	1		11/01/16 17:30	103-65-1	
Styrene	ND	ug/kg	5.9	1		11/01/16 17:30	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	5.9	1		11/01/16 17:30	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.9	1		11/01/16 17:30	79-34-5	
Tetrachloroethene	ND	ug/kg	5.9	1		11/01/16 17:30	127-18-4	
Toluene	ND	ug/kg	5.9	1		11/01/16 17:30	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	5.9	1		11/01/16 17:30	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	5.9	1		11/01/16 17:30	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	5.9	1		11/01/16 17:30	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	5.9	1		11/01/16 17:30	79-00-5	
Trichloroethene	ND	ug/kg	5.9	1		11/01/16 17:30	79-01-6	
Trichlorofluoromethane	ND	ug/kg	5.9	1		11/01/16 17:30	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	5.9	1		11/01/16 17:30	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/kg	5.9	1		11/01/16 17:30	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	5.9	1		11/01/16 17:30	108-67-8	
Vinyl acetate	ND	ug/kg	59.1	1		11/01/16 17:30	108-05-4	
Vinyl chloride	ND	ug/kg	11.8	1		11/01/16 17:30	75-01-4	
Xylene (Total)	ND	ug/kg	11.8	1		11/01/16 17:30	1330-20-7	
m&p-Xylene	ND	ug/kg	11.8	1		11/01/16 17:30	179601-23-1	
o-Xylene	ND	ug/kg	5.9	1		11/01/16 17:30	95-47-6	
<b>Surrogates</b>								
Toluene-d8 (S)	101	%	70-130	1		11/01/16 17:30	2037-26-5	
4-Bromofluorobenzene (S)	96	%	70-130	1		11/01/16 17:30	460-00-4	
1,2-Dichloroethane-d4 (S)	120	%	70-132	1		11/01/16 17:30	17060-07-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>12.1</b>	%	0.10	1		11/01/16 11:49		

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-2-8-10**      **Lab ID: 92317872002**      Collected: 10/27/16 13:35      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Acetone	ND	ug/kg	114	1		11/01/16 17:50	67-64-1	
Benzene	ND	ug/kg	5.7	1		11/01/16 17:50	71-43-2	
Bromobenzene	ND	ug/kg	5.7	1		11/01/16 17:50	108-86-1	
Bromochloromethane	ND	ug/kg	5.7	1		11/01/16 17:50	74-97-5	
Bromodichloromethane	ND	ug/kg	5.7	1		11/01/16 17:50	75-27-4	
Bromoform	ND	ug/kg	5.7	1		11/01/16 17:50	75-25-2	
Bromomethane	ND	ug/kg	11.4	1		11/01/16 17:50	74-83-9	
2-Butanone (MEK)	ND	ug/kg	114	1		11/01/16 17:50	78-93-3	
n-Butylbenzene	ND	ug/kg	5.7	1		11/01/16 17:50	104-51-8	
sec-Butylbenzene	ND	ug/kg	5.7	1		11/01/16 17:50	135-98-8	
tert-Butylbenzene	ND	ug/kg	5.7	1		11/01/16 17:50	98-06-6	
Carbon tetrachloride	ND	ug/kg	5.7	1		11/01/16 17:50	56-23-5	
Chlorobenzene	ND	ug/kg	5.7	1		11/01/16 17:50	108-90-7	
Chloroethane	ND	ug/kg	11.4	1		11/01/16 17:50	75-00-3	
Chloroform	ND	ug/kg	5.7	1		11/01/16 17:50	67-66-3	
Chloromethane	ND	ug/kg	11.4	1		11/01/16 17:50	74-87-3	
2-Chlorotoluene	ND	ug/kg	5.7	1		11/01/16 17:50	95-49-8	
4-Chlorotoluene	ND	ug/kg	5.7	1		11/01/16 17:50	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	5.7	1		11/01/16 17:50	96-12-8	
Dibromochloromethane	ND	ug/kg	5.7	1		11/01/16 17:50	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	5.7	1		11/01/16 17:50	106-93-4	
Dibromomethane	ND	ug/kg	5.7	1		11/01/16 17:50	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	5.7	1		11/01/16 17:50	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	5.7	1		11/01/16 17:50	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	5.7	1		11/01/16 17:50	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	11.4	1		11/01/16 17:50	75-71-8	
1,1-Dichloroethane	ND	ug/kg	5.7	1		11/01/16 17:50	75-34-3	
1,2-Dichloroethane	ND	ug/kg	5.7	1		11/01/16 17:50	107-06-2	
1,1-Dichloroethene	ND	ug/kg	5.7	1		11/01/16 17:50	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	5.7	1		11/01/16 17:50	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	5.7	1		11/01/16 17:50	156-60-5	
1,2-Dichloropropane	ND	ug/kg	5.7	1		11/01/16 17:50	78-87-5	
1,3-Dichloropropane	ND	ug/kg	5.7	1		11/01/16 17:50	142-28-9	
2,2-Dichloropropane	ND	ug/kg	5.7	1		11/01/16 17:50	594-20-7	
1,1-Dichloropropene	ND	ug/kg	5.7	1		11/01/16 17:50	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	5.7	1		11/01/16 17:50	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	5.7	1		11/01/16 17:50	10061-02-6	
Diisopropyl ether	ND	ug/kg	5.7	1		11/01/16 17:50	108-20-3	
Ethylbenzene	ND	ug/kg	5.7	1		11/01/16 17:50	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	5.7	1		11/01/16 17:50	87-68-3	
2-Hexanone	ND	ug/kg	57.1	1		11/01/16 17:50	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/kg	5.7	1		11/01/16 17:50	98-82-8	
p-Isopropyltoluene	ND	ug/kg	5.7	1		11/01/16 17:50	99-87-6	
Methylene Chloride	ND	ug/kg	22.8	1		11/01/16 17:50	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	57.1	1		11/01/16 17:50	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	5.7	1		11/01/16 17:50	1634-04-4	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-2-8-10**      **Lab ID: 92317872002**      Collected: 10/27/16 13:35      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Naphthalene	ND	ug/kg	5.7	1		11/01/16 17:50	91-20-3	
n-Propylbenzene	ND	ug/kg	5.7	1		11/01/16 17:50	103-65-1	
Styrene	ND	ug/kg	5.7	1		11/01/16 17:50	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	5.7	1		11/01/16 17:50	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.7	1		11/01/16 17:50	79-34-5	
Tetrachloroethene	ND	ug/kg	5.7	1		11/01/16 17:50	127-18-4	
Toluene	ND	ug/kg	5.7	1		11/01/16 17:50	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	5.7	1		11/01/16 17:50	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	5.7	1		11/01/16 17:50	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	5.7	1		11/01/16 17:50	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	5.7	1		11/01/16 17:50	79-00-5	
Trichloroethene	ND	ug/kg	5.7	1		11/01/16 17:50	79-01-6	
Trichlorofluoromethane	ND	ug/kg	5.7	1		11/01/16 17:50	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	5.7	1		11/01/16 17:50	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/kg	5.7	1		11/01/16 17:50	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	5.7	1		11/01/16 17:50	108-67-8	
Vinyl acetate	ND	ug/kg	57.1	1		11/01/16 17:50	108-05-4	
Vinyl chloride	ND	ug/kg	11.4	1		11/01/16 17:50	75-01-4	
Xylene (Total)	ND	ug/kg	11.4	1		11/01/16 17:50	1330-20-7	
m&p-Xylene	ND	ug/kg	11.4	1		11/01/16 17:50	179601-23-1	
o-Xylene	ND	ug/kg	5.7	1		11/01/16 17:50	95-47-6	
<b>Surrogates</b>								
Toluene-d8 (S)	102	%	70-130	1		11/01/16 17:50	2037-26-5	
4-Bromofluorobenzene (S)	98	%	70-130	1		11/01/16 17:50	460-00-4	
1,2-Dichloroethane-d4 (S)	119	%	70-132	1		11/01/16 17:50	17060-07-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>12.2</b>	%	0.10	1		11/01/16 11:50		

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-3-8-10**      **Lab ID: 92317872003**      Collected: 10/27/16 13:40      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Acetone	ND	ug/kg	119	1		11/01/16 18:09	67-64-1	
Benzene	ND	ug/kg	6.0	1		11/01/16 18:09	71-43-2	
Bromobenzene	ND	ug/kg	6.0	1		11/01/16 18:09	108-86-1	
Bromochloromethane	ND	ug/kg	6.0	1		11/01/16 18:09	74-97-5	
Bromodichloromethane	ND	ug/kg	6.0	1		11/01/16 18:09	75-27-4	
Bromoform	ND	ug/kg	6.0	1		11/01/16 18:09	75-25-2	
Bromomethane	ND	ug/kg	11.9	1		11/01/16 18:09	74-83-9	
2-Butanone (MEK)	ND	ug/kg	119	1		11/01/16 18:09	78-93-3	
n-Butylbenzene	ND	ug/kg	6.0	1		11/01/16 18:09	104-51-8	
sec-Butylbenzene	ND	ug/kg	6.0	1		11/01/16 18:09	135-98-8	
tert-Butylbenzene	ND	ug/kg	6.0	1		11/01/16 18:09	98-06-6	
Carbon tetrachloride	ND	ug/kg	6.0	1		11/01/16 18:09	56-23-5	
Chlorobenzene	ND	ug/kg	6.0	1		11/01/16 18:09	108-90-7	
Chloroethane	ND	ug/kg	11.9	1		11/01/16 18:09	75-00-3	
Chloroform	ND	ug/kg	6.0	1		11/01/16 18:09	67-66-3	
Chloromethane	ND	ug/kg	11.9	1		11/01/16 18:09	74-87-3	
2-Chlorotoluene	ND	ug/kg	6.0	1		11/01/16 18:09	95-49-8	
4-Chlorotoluene	ND	ug/kg	6.0	1		11/01/16 18:09	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	6.0	1		11/01/16 18:09	96-12-8	
Dibromochloromethane	ND	ug/kg	6.0	1		11/01/16 18:09	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	6.0	1		11/01/16 18:09	106-93-4	
Dibromomethane	ND	ug/kg	6.0	1		11/01/16 18:09	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	6.0	1		11/01/16 18:09	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	6.0	1		11/01/16 18:09	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	6.0	1		11/01/16 18:09	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	11.9	1		11/01/16 18:09	75-71-8	
1,1-Dichloroethane	ND	ug/kg	6.0	1		11/01/16 18:09	75-34-3	
1,2-Dichloroethane	ND	ug/kg	6.0	1		11/01/16 18:09	107-06-2	
1,1-Dichloroethene	ND	ug/kg	6.0	1		11/01/16 18:09	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	6.0	1		11/01/16 18:09	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	6.0	1		11/01/16 18:09	156-60-5	
1,2-Dichloropropane	ND	ug/kg	6.0	1		11/01/16 18:09	78-87-5	
1,3-Dichloropropane	ND	ug/kg	6.0	1		11/01/16 18:09	142-28-9	
2,2-Dichloropropane	ND	ug/kg	6.0	1		11/01/16 18:09	594-20-7	
1,1-Dichloropropene	ND	ug/kg	6.0	1		11/01/16 18:09	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	6.0	1		11/01/16 18:09	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	6.0	1		11/01/16 18:09	10061-02-6	
Diisopropyl ether	ND	ug/kg	6.0	1		11/01/16 18:09	108-20-3	
Ethylbenzene	ND	ug/kg	6.0	1		11/01/16 18:09	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	6.0	1		11/01/16 18:09	87-68-3	
2-Hexanone	ND	ug/kg	59.7	1		11/01/16 18:09	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/kg	6.0	1		11/01/16 18:09	98-82-8	
p-Isopropyltoluene	ND	ug/kg	6.0	1		11/01/16 18:09	99-87-6	
Methylene Chloride	ND	ug/kg	23.9	1		11/01/16 18:09	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	59.7	1		11/01/16 18:09	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	6.0	1		11/01/16 18:09	1634-04-4	

## REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-3-8-10**      **Lab ID: 92317872003**      Collected: 10/27/16 13:40      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Naphthalene	ND	ug/kg	6.0	1		11/01/16 18:09	91-20-3	
n-Propylbenzene	ND	ug/kg	6.0	1		11/01/16 18:09	103-65-1	
Styrene	ND	ug/kg	6.0	1		11/01/16 18:09	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	6.0	1		11/01/16 18:09	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	6.0	1		11/01/16 18:09	79-34-5	
Tetrachloroethene	ND	ug/kg	6.0	1		11/01/16 18:09	127-18-4	
Toluene	ND	ug/kg	6.0	1		11/01/16 18:09	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	6.0	1		11/01/16 18:09	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	6.0	1		11/01/16 18:09	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	6.0	1		11/01/16 18:09	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	6.0	1		11/01/16 18:09	79-00-5	
Trichloroethene	ND	ug/kg	6.0	1		11/01/16 18:09	79-01-6	
Trichlorofluoromethane	ND	ug/kg	6.0	1		11/01/16 18:09	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	6.0	1		11/01/16 18:09	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/kg	6.0	1		11/01/16 18:09	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	6.0	1		11/01/16 18:09	108-67-8	
Vinyl acetate	ND	ug/kg	59.7	1		11/01/16 18:09	108-05-4	
Vinyl chloride	ND	ug/kg	11.9	1		11/01/16 18:09	75-01-4	
Xylene (Total)	ND	ug/kg	11.9	1		11/01/16 18:09	1330-20-7	
m&p-Xylene	ND	ug/kg	11.9	1		11/01/16 18:09	179601-23-1	
o-Xylene	ND	ug/kg	6.0	1		11/01/16 18:09	95-47-6	
<b>Surrogates</b>								
Toluene-d8 (S)	102	%	70-130	1		11/01/16 18:09	2037-26-5	
4-Bromofluorobenzene (S)	95	%	70-130	1		11/01/16 18:09	460-00-4	
1,2-Dichloroethane-d4 (S)	117	%	70-132	1		11/01/16 18:09	17060-07-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>9.3</b>	%	0.10	1		11/01/16 11:50		

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-4-8-10**      **Lab ID: 92317872004**      Collected: 10/27/16 13:45      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Acetone	ND	ug/kg	118	1		11/02/16 17:16	67-64-1	
Benzene	ND	ug/kg	5.9	1		11/02/16 17:16	71-43-2	
Bromobenzene	ND	ug/kg	5.9	1		11/02/16 17:16	108-86-1	
Bromochloromethane	ND	ug/kg	5.9	1		11/02/16 17:16	74-97-5	
Bromodichloromethane	ND	ug/kg	5.9	1		11/02/16 17:16	75-27-4	
Bromoform	ND	ug/kg	5.9	1		11/02/16 17:16	75-25-2	
Bromomethane	ND	ug/kg	11.8	1		11/02/16 17:16	74-83-9	
2-Butanone (MEK)	ND	ug/kg	118	1		11/02/16 17:16	78-93-3	
n-Butylbenzene	ND	ug/kg	5.9	1		11/02/16 17:16	104-51-8	
sec-Butylbenzene	ND	ug/kg	5.9	1		11/02/16 17:16	135-98-8	
tert-Butylbenzene	ND	ug/kg	5.9	1		11/02/16 17:16	98-06-6	
Carbon tetrachloride	ND	ug/kg	5.9	1		11/02/16 17:16	56-23-5	
Chlorobenzene	ND	ug/kg	5.9	1		11/02/16 17:16	108-90-7	
Chloroethane	ND	ug/kg	11.8	1		11/02/16 17:16	75-00-3	
Chloroform	ND	ug/kg	5.9	1		11/02/16 17:16	67-66-3	
Chloromethane	ND	ug/kg	11.8	1		11/02/16 17:16	74-87-3	
2-Chlorotoluene	ND	ug/kg	5.9	1		11/02/16 17:16	95-49-8	
4-Chlorotoluene	ND	ug/kg	5.9	1		11/02/16 17:16	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	5.9	1		11/02/16 17:16	96-12-8	
Dibromochloromethane	ND	ug/kg	5.9	1		11/02/16 17:16	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	5.9	1		11/02/16 17:16	106-93-4	
Dibromomethane	ND	ug/kg	5.9	1		11/02/16 17:16	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	5.9	1		11/02/16 17:16	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	5.9	1		11/02/16 17:16	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	5.9	1		11/02/16 17:16	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	11.8	1		11/02/16 17:16	75-71-8	
1,1-Dichloroethane	ND	ug/kg	5.9	1		11/02/16 17:16	75-34-3	
1,2-Dichloroethane	ND	ug/kg	5.9	1		11/02/16 17:16	107-06-2	
1,1-Dichloroethene	ND	ug/kg	5.9	1		11/02/16 17:16	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	5.9	1		11/02/16 17:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	5.9	1		11/02/16 17:16	156-60-5	
1,2-Dichloropropane	ND	ug/kg	5.9	1		11/02/16 17:16	78-87-5	
1,3-Dichloropropane	ND	ug/kg	5.9	1		11/02/16 17:16	142-28-9	
2,2-Dichloropropane	ND	ug/kg	5.9	1		11/02/16 17:16	594-20-7	
1,1-Dichloropropene	ND	ug/kg	5.9	1		11/02/16 17:16	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	5.9	1		11/02/16 17:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	5.9	1		11/02/16 17:16	10061-02-6	
Diisopropyl ether	ND	ug/kg	5.9	1		11/02/16 17:16	108-20-3	
Ethylbenzene	ND	ug/kg	5.9	1		11/02/16 17:16	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	5.9	1		11/02/16 17:16	87-68-3	
2-Hexanone	ND	ug/kg	58.9	1		11/02/16 17:16	591-78-6	
Isopropylbenzene (Cumene)	ND	ug/kg	5.9	1		11/02/16 17:16	98-82-8	
p-Isopropyltoluene	ND	ug/kg	5.9	1		11/02/16 17:16	99-87-6	
Methylene Chloride	ND	ug/kg	23.6	1		11/02/16 17:16	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	58.9	1		11/02/16 17:16	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	5.9	1		11/02/16 17:16	1634-04-4	

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## ANALYTICAL RESULTS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

**Sample: 167-SB-4-8-10**      **Lab ID: 92317872004**      Collected: 10/27/16 13:45      Received: 10/31/16 08:52      Matrix: Solid

*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260/5035A Volatile Organics</b>		Analytical Method: EPA 8260						
Naphthalene	ND	ug/kg	5.9	1		11/02/16 17:16	91-20-3	
n-Propylbenzene	ND	ug/kg	5.9	1		11/02/16 17:16	103-65-1	
Styrene	ND	ug/kg	5.9	1		11/02/16 17:16	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	5.9	1		11/02/16 17:16	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	5.9	1		11/02/16 17:16	79-34-5	
Tetrachloroethene	ND	ug/kg	5.9	1		11/02/16 17:16	127-18-4	
Toluene	ND	ug/kg	5.9	1		11/02/16 17:16	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	5.9	1		11/02/16 17:16	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	5.9	1		11/02/16 17:16	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	5.9	1		11/02/16 17:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	5.9	1		11/02/16 17:16	79-00-5	
Trichloroethene	ND	ug/kg	5.9	1		11/02/16 17:16	79-01-6	
Trichlorofluoromethane	ND	ug/kg	5.9	1		11/02/16 17:16	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	5.9	1		11/02/16 17:16	96-18-4	
1,2,4-Trimethylbenzene	ND	ug/kg	5.9	1		11/02/16 17:16	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	5.9	1		11/02/16 17:16	108-67-8	
Vinyl acetate	ND	ug/kg	58.9	1		11/02/16 17:16	108-05-4	
Vinyl chloride	ND	ug/kg	11.8	1		11/02/16 17:16	75-01-4	
Xylene (Total)	ND	ug/kg	11.8	1		11/02/16 17:16	1330-20-7	
m&p-Xylene	ND	ug/kg	11.8	1		11/02/16 17:16	179601-23-1	
o-Xylene	ND	ug/kg	5.9	1		11/02/16 17:16	95-47-6	
<b>Surrogates</b>								
Toluene-d8 (S)	100	%	70-130	1		11/02/16 17:16	2037-26-5	
4-Bromofluorobenzene (S)	94	%	70-130	1		11/02/16 17:16	460-00-4	
1,2-Dichloroethane-d4 (S)	117	%	70-132	1		11/02/16 17:16	17060-07-0	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87						
Percent Moisture	<b>10.1</b>	%	0.10	1		11/01/16 11:50		

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

QC Batch: 335217

Analysis Method: EPA 8260

QC Batch Method: EPA 8260

Analysis Description: 8260 MSV 5035A Volatile Organics

Associated Lab Samples: 92317872001, 92317872002, 92317872003

METHOD BLANK: 1858123

Matrix: Solid

Associated Lab Samples: 92317872001, 92317872002, 92317872003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	5.1	11/01/16 11:53	
1,1,1-Trichloroethane	ug/kg	ND	5.1	11/01/16 11:53	
1,1,2,2-Tetrachloroethane	ug/kg	ND	5.1	11/01/16 11:53	
1,1,2-Trichloroethane	ug/kg	ND	5.1	11/01/16 11:53	
1,1-Dichloroethane	ug/kg	ND	5.1	11/01/16 11:53	
1,1-Dichloroethene	ug/kg	ND	5.1	11/01/16 11:53	
1,1-Dichloropropene	ug/kg	ND	5.1	11/01/16 11:53	
1,2,3-Trichlorobenzene	ug/kg	ND	5.1	11/01/16 11:53	
1,2,3-Trichloropropane	ug/kg	ND	5.1	11/01/16 11:53	
1,2,4-Trichlorobenzene	ug/kg	ND	5.1	11/01/16 11:53	
1,2,4-Trimethylbenzene	ug/kg	ND	5.1	11/01/16 11:53	
1,2-Dibromo-3-chloropropane	ug/kg	ND	5.1	11/01/16 11:53	
1,2-Dibromoethane (EDB)	ug/kg	ND	5.1	11/01/16 11:53	
1,2-Dichlorobenzene	ug/kg	ND	5.1	11/01/16 11:53	
1,2-Dichloroethane	ug/kg	ND	5.1	11/01/16 11:53	
1,2-Dichloropropane	ug/kg	ND	5.1	11/01/16 11:53	
1,3,5-Trimethylbenzene	ug/kg	ND	5.1	11/01/16 11:53	
1,3-Dichlorobenzene	ug/kg	ND	5.1	11/01/16 11:53	
1,3-Dichloropropane	ug/kg	ND	5.1	11/01/16 11:53	
1,4-Dichlorobenzene	ug/kg	ND	5.1	11/01/16 11:53	
2,2-Dichloropropane	ug/kg	ND	5.1	11/01/16 11:53	
2-Butanone (MEK)	ug/kg	ND	102	11/01/16 11:53	
2-Chlorotoluene	ug/kg	ND	5.1	11/01/16 11:53	
2-Hexanone	ug/kg	ND	51.1	11/01/16 11:53	
4-Chlorotoluene	ug/kg	ND	5.1	11/01/16 11:53	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	51.1	11/01/16 11:53	
Acetone	ug/kg	ND	102	11/01/16 11:53	
Benzene	ug/kg	ND	5.1	11/01/16 11:53	
Bromobenzene	ug/kg	ND	5.1	11/01/16 11:53	
Bromochloromethane	ug/kg	ND	5.1	11/01/16 11:53	
Bromodichloromethane	ug/kg	ND	5.1	11/01/16 11:53	
Bromoform	ug/kg	ND	5.1	11/01/16 11:53	
Bromomethane	ug/kg	ND	10.2	11/01/16 11:53	
Carbon tetrachloride	ug/kg	ND	5.1	11/01/16 11:53	
Chlorobenzene	ug/kg	ND	5.1	11/01/16 11:53	
Chloroethane	ug/kg	ND	10.2	11/01/16 11:53	
Chloroform	ug/kg	ND	5.1	11/01/16 11:53	
Chloromethane	ug/kg	ND	10.2	11/01/16 11:53	
cis-1,2-Dichloroethene	ug/kg	ND	5.1	11/01/16 11:53	
cis-1,3-Dichloropropene	ug/kg	ND	5.1	11/01/16 11:53	
Dibromochloromethane	ug/kg	ND	5.1	11/01/16 11:53	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

METHOD BLANK: 1858123

Matrix: Solid

Associated Lab Samples: 92317872001, 92317872002, 92317872003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromomethane	ug/kg	ND	5.1	11/01/16 11:53	
Dichlorodifluoromethane	ug/kg	ND	10.2	11/01/16 11:53	
Diisopropyl ether	ug/kg	ND	5.1	11/01/16 11:53	
Ethylbenzene	ug/kg	ND	5.1	11/01/16 11:53	
Hexachloro-1,3-butadiene	ug/kg	ND	5.1	11/01/16 11:53	
Isopropylbenzene (Cumene)	ug/kg	ND	5.1	11/01/16 11:53	
m&p-Xylene	ug/kg	ND	10.2	11/01/16 11:53	
Methyl-tert-butyl ether	ug/kg	ND	5.1	11/01/16 11:53	
Methylene Chloride	ug/kg	ND	20.4	11/01/16 11:53	
n-Butylbenzene	ug/kg	ND	5.1	11/01/16 11:53	
n-Propylbenzene	ug/kg	ND	5.1	11/01/16 11:53	
Naphthalene	ug/kg	ND	5.1	11/01/16 11:53	
o-Xylene	ug/kg	ND	5.1	11/01/16 11:53	
p-Isopropyltoluene	ug/kg	ND	5.1	11/01/16 11:53	
sec-Butylbenzene	ug/kg	ND	5.1	11/01/16 11:53	
Styrene	ug/kg	ND	5.1	11/01/16 11:53	
tert-Butylbenzene	ug/kg	ND	5.1	11/01/16 11:53	
Tetrachloroethene	ug/kg	ND	5.1	11/01/16 11:53	
Toluene	ug/kg	ND	5.1	11/01/16 11:53	
trans-1,2-Dichloroethene	ug/kg	ND	5.1	11/01/16 11:53	
trans-1,3-Dichloropropene	ug/kg	ND	5.1	11/01/16 11:53	
Trichloroethene	ug/kg	ND	5.1	11/01/16 11:53	
Trichlorofluoromethane	ug/kg	ND	5.1	11/01/16 11:53	
Vinyl acetate	ug/kg	ND	51.1	11/01/16 11:53	
Vinyl chloride	ug/kg	ND	10.2	11/01/16 11:53	
Xylene (Total)	ug/kg	ND	10.2	11/01/16 11:53	
1,2-Dichloroethane-d4 (S)	%	125	70-132	11/01/16 11:53	
4-Bromofluorobenzene (S)	%	95	70-130	11/01/16 11:53	
Toluene-d8 (S)	%	102	70-130	11/01/16 11:53	

LABORATORY CONTROL SAMPLE: 1858124

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	54.2	59.3	109	74-137	
1,1,1-Trichloroethane	ug/kg	54.2	60.8	112	67-140	
1,1,2,2-Tetrachloroethane	ug/kg	54.2	59.6	110	72-141	
1,1,2-Trichloroethane	ug/kg	54.2	63.7	117	78-138	
1,1-Dichloroethane	ug/kg	54.2	61.4	113	69-134	
1,1-Dichloroethene	ug/kg	54.2	62.2	115	67-138	
1,1-Dichloropropene	ug/kg	54.2	59.5	110	69-139	
1,2,3-Trichlorobenzene	ug/kg	54.2	63.7	118	70-146	
1,2,3-Trichloropropane	ug/kg	54.2	66.4	122	69-144	
1,2,4-Trichlorobenzene	ug/kg	54.2	60.1	111	68-148	
1,2,4-Trimethylbenzene	ug/kg	54.2	59.8	110	74-137	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

LABORATORY CONTROL SAMPLE: 1858124

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dibromo-3-chloropropane	ug/kg	54.2	69.7	129	65-140	
1,2-Dibromoethane (EDB)	ug/kg	54.2	63.8	118	77-135	
1,2-Dichlorobenzene	ug/kg	54.2	62.6	115	77-141	
1,2-Dichloroethane	ug/kg	54.2	65.5	121	65-137	
1,2-Dichloropropane	ug/kg	54.2	59.8	110	72-136	
1,3,5-Trimethylbenzene	ug/kg	54.2	58.5	108	76-133	
1,3-Dichlorobenzene	ug/kg	54.2	60.2	111	74-138	
1,3-Dichloropropane	ug/kg	54.2	60.7	112	71-139	
1,4-Dichlorobenzene	ug/kg	54.2	59.8	110	76-138	
2,2-Dichloropropane	ug/kg	54.2	63.0	116	68-137	
2-Butanone (MEK)	ug/kg	108	138	127	58-147	
2-Chlorotoluene	ug/kg	54.2	61.1	113	73-139	
2-Hexanone	ug/kg	108	140	129	62-145	
4-Chlorotoluene	ug/kg	54.2	59.7	110	76-141	
4-Methyl-2-pentanone (MIBK)	ug/kg	108	146	135	64-149	
Acetone	ug/kg	108	150	138	53-153	
Benzene	ug/kg	54.2	61.3	113	73-135	
Bromobenzene	ug/kg	54.2	61.5	113	75-133	
Bromochloromethane	ug/kg	54.2	67.2	124	73-134	
Bromodichloromethane	ug/kg	54.2	64.1	118	71-135	
Bromoform	ug/kg	54.2	61.7	114	66-141	
Bromomethane	ug/kg	54.2	63.2	116	53-160	
Carbon tetrachloride	ug/kg	54.2	59.1	109	60-145	
Chlorobenzene	ug/kg	54.2	58.0	107	78-130	
Chloroethane	ug/kg	54.2	62.4	115	64-149	
Chloroform	ug/kg	54.2	63.4	117	70-134	
Chloromethane	ug/kg	54.2	65.4	121	52-150	
cis-1,2-Dichloroethene	ug/kg	54.2	67.2	124	70-133	
cis-1,3-Dichloropropene	ug/kg	54.2	61.6	114	68-134	
Dibromochloromethane	ug/kg	54.2	64.8	120	71-138	
Dibromomethane	ug/kg	54.2	61.8	114	74-130	
Dichlorodifluoromethane	ug/kg	54.2	65.0	120	40-160	
Diisopropyl ether	ug/kg	54.2	67.5	124	69-141	
Ethylbenzene	ug/kg	54.2	58.1	107	75-133	
Hexachloro-1,3-butadiene	ug/kg	54.2	56.2	104	68-143	
Isopropylbenzene (Cumene)	ug/kg	54.2	58.2	107	76-143	
m&p-Xylene	ug/kg	108	119	110	75-136	
Methyl-tert-butyl ether	ug/kg	54.2	66.5	123	68-144	
Methylene Chloride	ug/kg	54.2	68.5	126	45-154	
n-Butylbenzene	ug/kg	54.2	59.0	109	72-137	
n-Propylbenzene	ug/kg	54.2	58.5	108	76-136	
Naphthalene	ug/kg	54.2	67.0	124	68-151	
o-Xylene	ug/kg	54.2	59.2	109	76-141	
p-Isopropyltoluene	ug/kg	54.2	58.2	107	76-140	
sec-Butylbenzene	ug/kg	54.2	58.5	108	79-139	
Styrene	ug/kg	54.2	59.3	109	79-137	
tert-Butylbenzene	ug/kg	54.2	52.8	97	74-143	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

LABORATORY CONTROL SAMPLE: 1858124

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/kg	54.2	49.5	91	71-138	
Toluene	ug/kg	54.2	59.8	110	74-131	
trans-1,2-Dichloroethene	ug/kg	54.2	61.3	113	67-135	
trans-1,3-Dichloropropene	ug/kg	54.2	62.8	116	65-146	
Trichloroethene	ug/kg	54.2	61.2	113	67-135	
Trichlorofluoromethane	ug/kg	54.2	63.4	117	59-144	
Vinyl acetate	ug/kg	108	103	95	40-160	
Vinyl chloride	ug/kg	54.2	59.0	109	56-141	
Xylene (Total)	ug/kg	163	178	110	76-137	
1,2-Dichloroethane-d4 (S)	%			118	70-132	
4-Bromofluorobenzene (S)	%			98	70-130	
Toluene-d8 (S)	%			101	70-130	

MATRIX SPIKE SAMPLE: 1858924

Parameter	Units	92317912001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	18.6	15.8	85	70-130	
1,1,1-Trichloroethane	ug/kg	ND	18.6	18.1	98	70-130	
1,1,2,2-Tetrachloroethane	ug/kg	ND	18.6	16.9	91	70-130	
1,1,2-Trichloroethane	ug/kg	ND	18.6	17.4	94	70-130	
1,1-Dichloroethane	ug/kg	ND	18.6	18.7	101	70-130	
1,1-Dichloroethene	ug/kg	ND	18.6	19.5	105	49-180	
1,1-Dichloropropene	ug/kg	ND	18.6	18.0	97	70-130	
1,2,3-Trichlorobenzene	ug/kg	ND	18.6	14.4	78	70-130	
1,2,3-Trichloropropane	ug/kg	ND	18.6	18.0	97	70-130	
1,2,4-Trichlorobenzene	ug/kg	ND	18.6	14.2	77	70-130	
1,2,4-Trimethylbenzene	ug/kg	ND	18.6	17.8	96	70-130	
1,2-Dibromo-3-chloropropane	ug/kg	ND	18.6	15.2	82	70-130	
1,2-Dibromoethane (EDB)	ug/kg	ND	18.6	17.9	97	70-130	
1,2-Dichlorobenzene	ug/kg	ND	18.6	17.3	93	70-130	
1,2-Dichloroethane	ug/kg	ND	18.6	19.5	105	70-130	
1,2-Dichloropropane	ug/kg	ND	18.6	17.1	92	70-130	
1,3,5-Trimethylbenzene	ug/kg	ND	18.6	17.8	96	70-130	
1,3-Dichlorobenzene	ug/kg	ND	18.6	16.5	89	70-130	
1,3-Dichloropropane	ug/kg	ND	18.6	17.0	92	70-130	
1,4-Dichlorobenzene	ug/kg	ND	18.6	16.5	89	70-130	
2,2-Dichloropropane	ug/kg	ND	18.6	18.3	99	70-130	
2-Butanone (MEK)	ug/kg	ND	37.1	38.2J	103	70-130	
2-Chlorotoluene	ug/kg	ND	18.6	16.5	89	70-130	
2-Hexanone	ug/kg	ND	37.1	32.1J	86	70-130	
4-Chlorotoluene	ug/kg	ND	18.6	17.4	94	70-130	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	37.1	36.6J	99	70-130	
Acetone	ug/kg	ND	37.1	40.4J	109	70-130	
Benzene	ug/kg	ND	18.6	18.5	100	50-166	
Bromobenzene	ug/kg	ND	18.6	18.0	97	70-130	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

MATRIX SPIKE SAMPLE: 1858924		92317912001	Spike	MS	MS	% Rec	Qualifiers
Parameter	Units	Result	Conc.	Result	% Rec	Limits	
Bromochloromethane	ug/kg	ND	18.6	19.5	105	70-130	
Bromodichloromethane	ug/kg	ND	18.6	17.8	96	70-130	
Bromoform	ug/kg	ND	18.6	14.1	76	70-130	
Bromomethane	ug/kg	ND	18.6	17.1	92	70-130	
Carbon tetrachloride	ug/kg	ND	18.6	17.0	92	70-130	
Chlorobenzene	ug/kg	ND	18.6	17.2	93	43-169	
Chloroethane	ug/kg	ND	18.6	20.4	110	70-130	
Chloroform	ug/kg	ND	18.6	18.8	102	70-130	
Chloromethane	ug/kg	ND	18.6	19.5	105	70-130	
cis-1,2-Dichloroethene	ug/kg	ND	18.6	18.3	99	70-130	
cis-1,3-Dichloropropene	ug/kg	ND	18.6	16.5	89	70-130	
Dibromochloromethane	ug/kg	ND	18.6	16.6	90	70-130	
Dibromomethane	ug/kg	ND	18.6	18.1	97	70-130	
Dichlorodifluoromethane	ug/kg	ND	18.6	21.2	114	70-130	
Diisopropyl ether	ug/kg	ND	18.6	20.3	109	70-130	
Ethylbenzene	ug/kg	ND	18.6	18.0	97	70-130	
Hexachloro-1,3-butadiene	ug/kg	ND	18.6	14.1	76	70-130	
Isopropylbenzene (Cumene)	ug/kg	ND	18.6	17.8	96	70-130	
m&p-Xylene	ug/kg	ND	37.1	36.2	98	70-130	
Methyl-tert-butyl ether	ug/kg	ND	18.6	20.0	108	70-130	
Methylene Chloride	ug/kg	ND	18.6	23.6	69	70-130	M1
n-Butylbenzene	ug/kg	ND	18.6	17.3	93	70-130	
n-Propylbenzene	ug/kg	ND	18.6	18.4	99	70-130	
Naphthalene	ug/kg	ND	18.6	16.4	88	70-130	
o-Xylene	ug/kg	ND	18.6	17.7	95	70-130	
p-Isopropyltoluene	ug/kg	ND	18.6	17.4	94	70-130	
sec-Butylbenzene	ug/kg	ND	18.6	18.2	98	70-130	
Styrene	ug/kg	ND	18.6	17.3	93	70-130	
tert-Butylbenzene	ug/kg	ND	18.6	16.3	88	70-130	
Tetrachloroethene	ug/kg	ND	18.6	14.9	81	70-130	
Toluene	ug/kg	ND	18.6	18.4	99	52-163	
trans-1,2-Dichloroethene	ug/kg	ND	18.6	19.4	104	70-130	
trans-1,3-Dichloropropene	ug/kg	ND	18.6	15.9	86	70-130	
Trichloroethene	ug/kg	ND	18.6	16.9	91	49-167	
Trichlorofluoromethane	ug/kg	ND	18.6	20.9	113	70-130	
Vinyl acetate	ug/kg	ND	37.1	20.9J	56	70-130	M1
Vinyl chloride	ug/kg	ND	18.6	18.9	102	70-130	
1,2-Dichloroethane-d4 (S)	%				114	70-132	
4-Bromofluorobenzene (S)	%				98	70-130	
Toluene-d8 (S)	%				100	70-130	

SAMPLE DUPLICATE: 1858923

Parameter	Units	92317874002 Result	Dup Result	RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	ND		

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

SAMPLE DUPLICATE: 1858923

Parameter	Units	92317874002 Result	Dup Result	RPD	Qualifiers
1,1,1-Trichloroethane	ug/kg	ND	ND		
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND		
1,1,2-Trichloroethane	ug/kg	ND	ND		
1,1-Dichloroethane	ug/kg	ND	ND		
1,1-Dichloroethene	ug/kg	ND	ND		
1,1-Dichloropropene	ug/kg	ND	ND		
1,2,3-Trichlorobenzene	ug/kg	ND	ND		
1,2,3-Trichloropropane	ug/kg	ND	ND		
1,2,4-Trichlorobenzene	ug/kg	ND	ND		
1,2,4-Trimethylbenzene	ug/kg	ND	ND		
1,2-Dibromo-3-chloropropane	ug/kg	ND	ND		
1,2-Dibromoethane (EDB)	ug/kg	ND	ND		
1,2-Dichlorobenzene	ug/kg	ND	ND		
1,2-Dichloroethane	ug/kg	ND	ND		
1,2-Dichloropropane	ug/kg	ND	ND		
1,3,5-Trimethylbenzene	ug/kg	ND	ND		
1,3-Dichlorobenzene	ug/kg	ND	ND		
1,3-Dichloropropane	ug/kg	ND	ND		
1,4-Dichlorobenzene	ug/kg	ND	ND		
2,2-Dichloropropane	ug/kg	ND	ND		
2-Butanone (MEK)	ug/kg	ND	ND		
2-Chlorotoluene	ug/kg	ND	ND		
2-Hexanone	ug/kg	ND	ND		
4-Chlorotoluene	ug/kg	ND	ND		
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	ND		
Acetone	ug/kg	ND	ND		
Benzene	ug/kg	ND	ND		
Bromobenzene	ug/kg	ND	ND		
Bromochloromethane	ug/kg	ND	ND		
Bromodichloromethane	ug/kg	ND	ND		
Bromoform	ug/kg	ND	ND		
Bromomethane	ug/kg	ND	ND		
Carbon tetrachloride	ug/kg	ND	ND		
Chlorobenzene	ug/kg	ND	ND		
Chloroethane	ug/kg	ND	ND		
Chloroform	ug/kg	ND	ND		
Chloromethane	ug/kg	ND	ND		
cis-1,2-Dichloroethene	ug/kg	ND	ND		
cis-1,3-Dichloropropene	ug/kg	ND	ND		
Dibromochloromethane	ug/kg	ND	ND		
Dibromomethane	ug/kg	ND	ND		
Dichlorodifluoromethane	ug/kg	ND	ND		
Diisopropyl ether	ug/kg	ND	ND		
Ethylbenzene	ug/kg	ND	ND		
Hexachloro-1,3-butadiene	ug/kg	ND	ND		
Isopropylbenzene (Cumene)	ug/kg	ND	ND		
m&p-Xylene	ug/kg	ND	ND		

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

SAMPLE DUPLICATE: 1858923

Parameter	Units	92317874002 Result	Dup Result	RPD	Qualifiers
Methyl-tert-butyl ether	ug/kg	ND	ND		
Methylene Chloride	ug/kg	ND	ND		
n-Butylbenzene	ug/kg	ND	ND		
n-Propylbenzene	ug/kg	ND	ND		
Naphthalene	ug/kg	ND	ND		
o-Xylene	ug/kg	ND	ND		
p-Isopropyltoluene	ug/kg	ND	ND		
sec-Butylbenzene	ug/kg	ND	ND		
Styrene	ug/kg	ND	ND		
tert-Butylbenzene	ug/kg	ND	ND		
Tetrachloroethene	ug/kg	ND	ND		
Toluene	ug/kg	ND	ND		
trans-1,2-Dichloroethene	ug/kg	ND	ND		
trans-1,3-Dichloropropene	ug/kg	ND	ND		
Trichloroethene	ug/kg	ND	ND		
Trichlorofluoromethane	ug/kg	ND	ND		
Vinyl acetate	ug/kg	ND	ND		
Vinyl chloride	ug/kg	ND	ND		
Xylene (Total)	ug/kg	ND	ND		
1,2-Dichloroethane-d4 (S)	%	117	110	26	
4-Bromofluorobenzene (S)	%	96	95	20	
Toluene-d8 (S)	%	103	101	22	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

QC Batch: 335373

Analysis Method: EPA 8260

QC Batch Method: EPA 8260

Analysis Description: 8260 MSV 5035A Volatile Organics

Associated Lab Samples: 92317872004

METHOD BLANK: 1859105

Matrix: Solid

Associated Lab Samples: 92317872004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	4.7	11/02/16 12:39	
1,1,1-Trichloroethane	ug/kg	ND	4.7	11/02/16 12:39	
1,1,2,2-Tetrachloroethane	ug/kg	ND	4.7	11/02/16 12:39	
1,1,2-Trichloroethane	ug/kg	ND	4.7	11/02/16 12:39	
1,1-Dichloroethane	ug/kg	ND	4.7	11/02/16 12:39	
1,1-Dichloroethene	ug/kg	ND	4.7	11/02/16 12:39	
1,1-Dichloropropene	ug/kg	ND	4.7	11/02/16 12:39	
1,2,3-Trichlorobenzene	ug/kg	ND	4.7	11/02/16 12:39	
1,2,3-Trichloropropane	ug/kg	ND	4.7	11/02/16 12:39	
1,2,4-Trichlorobenzene	ug/kg	ND	4.7	11/02/16 12:39	
1,2,4-Trimethylbenzene	ug/kg	ND	4.7	11/02/16 12:39	
1,2-Dibromo-3-chloropropane	ug/kg	ND	4.7	11/02/16 12:39	
1,2-Dibromoethane (EDB)	ug/kg	ND	4.7	11/02/16 12:39	
1,2-Dichlorobenzene	ug/kg	ND	4.7	11/02/16 12:39	
1,2-Dichloroethane	ug/kg	ND	4.7	11/02/16 12:39	
1,2-Dichloropropane	ug/kg	ND	4.7	11/02/16 12:39	
1,3,5-Trimethylbenzene	ug/kg	ND	4.7	11/02/16 12:39	
1,3-Dichlorobenzene	ug/kg	ND	4.7	11/02/16 12:39	
1,3-Dichloropropane	ug/kg	ND	4.7	11/02/16 12:39	
1,4-Dichlorobenzene	ug/kg	ND	4.7	11/02/16 12:39	
2,2-Dichloropropane	ug/kg	ND	4.7	11/02/16 12:39	
2-Butanone (MEK)	ug/kg	ND	94.3	11/02/16 12:39	
2-Chlorotoluene	ug/kg	ND	4.7	11/02/16 12:39	
2-Hexanone	ug/kg	ND	47.2	11/02/16 12:39	
4-Chlorotoluene	ug/kg	ND	4.7	11/02/16 12:39	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	47.2	11/02/16 12:39	
Acetone	ug/kg	ND	94.3	11/02/16 12:39	
Benzene	ug/kg	ND	4.7	11/02/16 12:39	
Bromobenzene	ug/kg	ND	4.7	11/02/16 12:39	
Bromochloromethane	ug/kg	ND	4.7	11/02/16 12:39	
Bromodichloromethane	ug/kg	ND	4.7	11/02/16 12:39	
Bromoform	ug/kg	ND	4.7	11/02/16 12:39	
Bromomethane	ug/kg	ND	9.4	11/02/16 12:39	
Carbon tetrachloride	ug/kg	ND	4.7	11/02/16 12:39	
Chlorobenzene	ug/kg	ND	4.7	11/02/16 12:39	
Chloroethane	ug/kg	ND	9.4	11/02/16 12:39	
Chloroform	ug/kg	ND	4.7	11/02/16 12:39	
Chloromethane	ug/kg	ND	9.4	11/02/16 12:39	
cis-1,2-Dichloroethene	ug/kg	ND	4.7	11/02/16 12:39	
cis-1,3-Dichloropropene	ug/kg	ND	4.7	11/02/16 12:39	
Dibromochloromethane	ug/kg	ND	4.7	11/02/16 12:39	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

METHOD BLANK: 1859105

Matrix: Solid

Associated Lab Samples: 92317872004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromomethane	ug/kg	ND	4.7	11/02/16 12:39	
Dichlorodifluoromethane	ug/kg	ND	9.4	11/02/16 12:39	
Diisopropyl ether	ug/kg	ND	4.7	11/02/16 12:39	
Ethylbenzene	ug/kg	ND	4.7	11/02/16 12:39	
Hexachloro-1,3-butadiene	ug/kg	ND	4.7	11/02/16 12:39	
Isopropylbenzene (Cumene)	ug/kg	ND	4.7	11/02/16 12:39	
m&p-Xylene	ug/kg	ND	9.4	11/02/16 12:39	
Methyl-tert-butyl ether	ug/kg	ND	4.7	11/02/16 12:39	
Methylene Chloride	ug/kg	ND	18.9	11/02/16 12:39	
n-Butylbenzene	ug/kg	ND	4.7	11/02/16 12:39	
n-Propylbenzene	ug/kg	ND	4.7	11/02/16 12:39	
Naphthalene	ug/kg	ND	4.7	11/02/16 12:39	
o-Xylene	ug/kg	ND	4.7	11/02/16 12:39	
p-Isopropyltoluene	ug/kg	ND	4.7	11/02/16 12:39	
sec-Butylbenzene	ug/kg	ND	4.7	11/02/16 12:39	
Styrene	ug/kg	ND	4.7	11/02/16 12:39	
tert-Butylbenzene	ug/kg	ND	4.7	11/02/16 12:39	
Tetrachloroethene	ug/kg	ND	4.7	11/02/16 12:39	
Toluene	ug/kg	ND	4.7	11/02/16 12:39	
trans-1,2-Dichloroethene	ug/kg	ND	4.7	11/02/16 12:39	
trans-1,3-Dichloropropene	ug/kg	ND	4.7	11/02/16 12:39	
Trichloroethene	ug/kg	ND	4.7	11/02/16 12:39	
Trichlorofluoromethane	ug/kg	ND	4.7	11/02/16 12:39	
Vinyl acetate	ug/kg	ND	47.2	11/02/16 12:39	
Vinyl chloride	ug/kg	ND	9.4	11/02/16 12:39	
Xylene (Total)	ug/kg	ND	9.4	11/02/16 12:39	
1,2-Dichloroethane-d4 (S)	%	117	70-132	11/02/16 12:39	
4-Bromofluorobenzene (S)	%	96	70-130	11/02/16 12:39	
Toluene-d8 (S)	%	101	70-130	11/02/16 12:39	

LABORATORY CONTROL SAMPLE: 1859106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	51.8	56.4	109	74-137	
1,1,1-Trichloroethane	ug/kg	51.8	54.6	105	67-140	
1,1,2,2-Tetrachloroethane	ug/kg	51.8	56.7	110	72-141	
1,1,2-Trichloroethane	ug/kg	51.8	58.9	114	78-138	
1,1-Dichloroethane	ug/kg	51.8	55.0	106	69-134	
1,1-Dichloroethene	ug/kg	51.8	56.6	109	67-138	
1,1-Dichloropropene	ug/kg	51.8	52.6	102	69-139	
1,2,3-Trichlorobenzene	ug/kg	51.8	58.6	113	70-146	
1,2,3-Trichloropropane	ug/kg	51.8	60.9	118	69-144	
1,2,4-Trichlorobenzene	ug/kg	51.8	56.9	110	68-148	
1,2,4-Trimethylbenzene	ug/kg	51.8	56.2	109	74-137	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

LABORATORY CONTROL SAMPLE: 1859106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2-Dibromo-3-chloropropane	ug/kg	51.8	59.1	114	65-140	
1,2-Dibromoethane (EDB)	ug/kg	51.8	59.1	114	77-135	
1,2-Dichlorobenzene	ug/kg	51.8	60.1	116	77-141	
1,2-Dichloroethane	ug/kg	51.8	61.0	118	65-137	
1,2-Dichloropropane	ug/kg	51.8	54.0	104	72-136	
1,3,5-Trimethylbenzene	ug/kg	51.8	55.1	106	76-133	
1,3-Dichlorobenzene	ug/kg	51.8	56.3	109	74-138	
1,3-Dichloropropane	ug/kg	51.8	56.6	109	71-139	
1,4-Dichlorobenzene	ug/kg	51.8	57.0	110	76-138	
2,2-Dichloropropane	ug/kg	51.8	55.9	108	68-137	
2-Butanone (MEK)	ug/kg	104	119	115	58-147	
2-Chlorotoluene	ug/kg	51.8	57.3	111	73-139	
2-Hexanone	ug/kg	104	128	123	62-145	
4-Chlorotoluene	ug/kg	51.8	56.5	109	76-141	
4-Methyl-2-pentanone (MIBK)	ug/kg	104	130	126	64-149	
Acetone	ug/kg	104	142	137	53-153	
Benzene	ug/kg	51.8	56.3	109	73-135	
Bromobenzene	ug/kg	51.8	59.0	114	75-133	
Bromochloromethane	ug/kg	51.8	60.9	118	73-134	
Bromodichloromethane	ug/kg	51.8	60.1	116	71-135	
Bromoform	ug/kg	51.8	58.9	114	66-141	
Bromomethane	ug/kg	51.8	63.1	122	53-160	
Carbon tetrachloride	ug/kg	51.8	54.4	105	60-145	
Chlorobenzene	ug/kg	51.8	55.2	107	78-130	
Chloroethane	ug/kg	51.8	58.2	112	64-149	
Chloroform	ug/kg	51.8	57.2	111	70-134	
Chloromethane	ug/kg	51.8	56.8	110	52-150	
cis-1,2-Dichloroethene	ug/kg	51.8	56.0	108	70-133	
cis-1,3-Dichloropropene	ug/kg	51.8	56.5	109	68-134	
Dibromochloromethane	ug/kg	51.8	61.3	118	71-138	
Dibromomethane	ug/kg	51.8	59.1	114	74-130	
Dichlorodifluoromethane	ug/kg	51.8	56.4	109	40-160	
Diisopropyl ether	ug/kg	51.8	59.2	114	69-141	
Ethylbenzene	ug/kg	51.8	55.6	107	75-133	
Hexachloro-1,3-butadiene	ug/kg	51.8	53.3	103	68-143	
Isopropylbenzene (Cumene)	ug/kg	51.8	55.6	107	76-143	
m&p-Xylene	ug/kg	104	112	109	75-136	
Methyl-tert-butyl ether	ug/kg	51.8	60.3	117	68-144	
Methylene Chloride	ug/kg	51.8	62.5	121	45-154	
n-Butylbenzene	ug/kg	51.8	55.9	108	72-137	
n-Propylbenzene	ug/kg	51.8	55.8	108	76-136	
Naphthalene	ug/kg	51.8	60.9	118	68-151	
o-Xylene	ug/kg	51.8	55.9	108	76-141	
p-Isopropyltoluene	ug/kg	51.8	55.0	106	76-140	
sec-Butylbenzene	ug/kg	51.8	55.7	108	79-139	
Styrene	ug/kg	51.8	57.4	111	79-137	
tert-Butylbenzene	ug/kg	51.8	50.3	97	74-143	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

LABORATORY CONTROL SAMPLE: 1859106

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/kg	51.8	45.8	88	71-138	
Toluene	ug/kg	51.8	55.7	108	74-131	
trans-1,2-Dichloroethene	ug/kg	51.8	55.6	107	67-135	
trans-1,3-Dichloropropene	ug/kg	51.8	58.0	112	65-146	
Trichloroethene	ug/kg	51.8	56.4	109	67-135	
Trichlorofluoromethane	ug/kg	51.8	59.3	114	59-144	
Vinyl acetate	ug/kg	104	103	99	40-160	
Vinyl chloride	ug/kg	51.8	50.8	98	56-141	
Xylene (Total)	ug/kg	155	168	108	76-137	
1,2-Dichloroethane-d4 (S)	%			114	70-132	
4-Bromofluorobenzene (S)	%			100	70-130	
Toluene-d8 (S)	%			99	70-130	

MATRIX SPIKE SAMPLE: 1859928

Parameter	Units	92318065004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	23.6	16.7	70	70-130	
1,1,1-Trichloroethane	ug/kg	ND	23.6	21.7	92	70-130	
1,1,2,2-Tetrachloroethane	ug/kg	ND	23.6	20.5	87	70-130	
1,1,2-Trichloroethane	ug/kg	ND	23.6	21.2	89	70-130	
1,1-Dichloroethane	ug/kg	ND	23.6	22.3	94	70-130	
1,1-Dichloroethene	ug/kg	ND	23.6	22.9	97	49-180	
1,1-Dichloropropene	ug/kg	ND	23.6	22.2	94	70-130	
1,2,3-Trichlorobenzene	ug/kg	ND	23.6	15.9	67	70-130 M1	
1,2,3-Trichloropropane	ug/kg	ND	23.6	20.6	87	70-130	
1,2,4-Trichlorobenzene	ug/kg	ND	23.6	15.4	65	70-130 M1	
1,2,4-Trimethylbenzene	ug/kg	ND	23.6	20.0	84	70-130	
1,2-Dibromo-3-chloropropane	ug/kg	ND	23.6	17.1	72	70-130	
1,2-Dibromoethane (EDB)	ug/kg	ND	23.6	19.5	82	70-130	
1,2-Dichlorobenzene	ug/kg	ND	23.6	19.7	83	70-130	
1,2-Dichloroethane	ug/kg	ND	23.6	23.5	99	70-130	
1,2-Dichloropropane	ug/kg	ND	23.6	21.4	91	70-130	
1,3,5-Trimethylbenzene	ug/kg	ND	23.6	20.0	85	70-130	
1,3-Dichlorobenzene	ug/kg	ND	23.6	18.6	79	70-130	
1,3-Dichloropropane	ug/kg	ND	23.6	20.9	88	70-130	
1,4-Dichlorobenzene	ug/kg	ND	23.6	18.4	78	70-130	
2,2-Dichloropropane	ug/kg	ND	23.6	21.7	92	70-130	
2-Butanone (MEK)	ug/kg	ND	47.4	47.3J	100	70-130	
2-Chlorotoluene	ug/kg	ND	23.6	19.2	81	70-130	
2-Hexanone	ug/kg	ND	47.4	39.1J	83	70-130	
4-Chlorotoluene	ug/kg	ND	23.6	20.1	85	70-130	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	47.4	46.1J	97	70-130	
Acetone	ug/kg	ND	47.4	60.1J	122	70-130	
Benzene	ug/kg	ND	23.6	22.7	96	50-166	
Bromobenzene	ug/kg	ND	23.6	21.1	89	70-130	

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

MATRIX SPIKE SAMPLE: 1859928		92318065004	Spike	MS	MS	% Rec	Qualifiers
Parameter	Units	Result	Conc.	Result	% Rec	Limits	
Bromochloromethane	ug/kg	ND	23.6	24.7	104	70-130	
Bromodichloromethane	ug/kg	ND	23.6	19.6	83	70-130	
Bromoform	ug/kg	ND	23.6	13.8	58	70-130	M1
Bromomethane	ug/kg	ND	23.6	20.8	88	70-130	
Carbon tetrachloride	ug/kg	ND	23.6	18.6	79	70-130	
Chlorobenzene	ug/kg	ND	23.6	20.4	86	43-169	
Chloroethane	ug/kg	ND	23.6	23.5	99	70-130	
Chloroform	ug/kg	ND	23.6	22.4	95	70-130	
Chloromethane	ug/kg	ND	23.6	26.3	111	70-130	
cis-1,2-Dichloroethene	ug/kg	ND	23.6	23.4	99	70-130	
cis-1,3-Dichloropropene	ug/kg	ND	23.6	18.8	79	70-130	
Dibromochloromethane	ug/kg	ND	23.6	16.9	71	70-130	
Dibromomethane	ug/kg	ND	23.6	21.0	89	70-130	
Dichlorodifluoromethane	ug/kg	ND	23.6	28.1	119	70-130	
Diisopropyl ether	ug/kg	ND	23.6	24.1	102	70-130	
Ethylbenzene	ug/kg	ND	23.6	20.8	88	70-130	
Hexachloro-1,3-butadiene	ug/kg	ND	23.6	14.6	62	70-130	M1
Isopropylbenzene (Cumene)	ug/kg	ND	23.6	20.2	85	70-130	
m&p-Xylene	ug/kg	ND	47.4	42.1	89	70-130	
Methyl-tert-butyl ether	ug/kg	ND	23.6	23.1	97	70-130	
Methylene Chloride	ug/kg	ND	23.6	29.9	93	70-130	
n-Butylbenzene	ug/kg	ND	23.6	18.9	80	70-130	
n-Propylbenzene	ug/kg	ND	23.6	21.3	90	70-130	
Naphthalene	ug/kg	ND	23.6	20.4	86	70-130	
o-Xylene	ug/kg	ND	23.6	20.6	87	70-130	
p-Isopropyltoluene	ug/kg	ND	23.6	19.2	81	70-130	
sec-Butylbenzene	ug/kg	ND	23.6	20.0	85	70-130	
Styrene	ug/kg	ND	23.6	18.8	80	70-130	
tert-Butylbenzene	ug/kg	ND	23.6	18.1	76	70-130	
Tetrachloroethene	ug/kg	ND	23.6	17.0	72	70-130	
Toluene	ug/kg	ND	23.6	21.9	92	52-163	
trans-1,2-Dichloroethene	ug/kg	ND	23.6	22.8	96	70-130	
trans-1,3-Dichloropropene	ug/kg	ND	23.6	17.8	75	70-130	
Trichloroethene	ug/kg	ND	23.6	19.9	84	49-167	
Trichlorofluoromethane	ug/kg	ND	23.6	23.8	101	70-130	
Vinyl acetate	ug/kg	ND	47.4	18.5J	39	70-130	M1
Vinyl chloride	ug/kg	ND	23.6	24.0	101	70-130	
1,2-Dichloroethane-d4 (S)	%				120	70-132	
4-Bromofluorobenzene (S)	%				96	70-130	
Toluene-d8 (S)	%				103	70-130	

SAMPLE DUPLICATE: 1859927

Parameter	Units	92318065001 Result	Dup Result	RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	ND		

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

SAMPLE DUPLICATE: 1859927

Parameter	Units	92318065001 Result	Dup Result	RPD	Qualifiers
1,1,1-Trichloroethane	ug/kg	ND	ND		
1,1,2,2-Tetrachloroethane	ug/kg	ND	ND		
1,1,2-Trichloroethane	ug/kg	ND	ND		
1,1-Dichloroethane	ug/kg	ND	ND		
1,1-Dichloroethene	ug/kg	ND	ND		
1,1-Dichloropropene	ug/kg	ND	ND		
1,2,3-Trichlorobenzene	ug/kg	ND	ND		
1,2,3-Trichloropropane	ug/kg	ND	ND		
1,2,4-Trichlorobenzene	ug/kg	ND	ND		
1,2,4-Trimethylbenzene	ug/kg	ND	ND		
1,2-Dibromo-3-chloropropane	ug/kg	ND	ND		
1,2-Dibromoethane (EDB)	ug/kg	ND	ND		
1,2-Dichlorobenzene	ug/kg	ND	ND		
1,2-Dichloroethane	ug/kg	ND	ND		
1,2-Dichloropropane	ug/kg	ND	ND		
1,3,5-Trimethylbenzene	ug/kg	ND	ND		
1,3-Dichlorobenzene	ug/kg	ND	ND		
1,3-Dichloropropane	ug/kg	ND	ND		
1,4-Dichlorobenzene	ug/kg	ND	ND		
2,2-Dichloropropane	ug/kg	ND	ND		
2-Butanone (MEK)	ug/kg	ND	ND		
2-Chlorotoluene	ug/kg	ND	ND		
2-Hexanone	ug/kg	ND	ND		
4-Chlorotoluene	ug/kg	ND	ND		
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	ND		
Acetone	ug/kg	ND	ND		
Benzene	ug/kg	ND	ND		
Bromobenzene	ug/kg	ND	ND		
Bromochloromethane	ug/kg	ND	ND		
Bromodichloromethane	ug/kg	ND	ND		
Bromoform	ug/kg	ND	ND		
Bromomethane	ug/kg	ND	ND		
Carbon tetrachloride	ug/kg	ND	ND		
Chlorobenzene	ug/kg	ND	ND		
Chloroethane	ug/kg	ND	ND		
Chloroform	ug/kg	ND	ND		
Chloromethane	ug/kg	ND	ND		
cis-1,2-Dichloroethene	ug/kg	ND	ND		
cis-1,3-Dichloropropene	ug/kg	ND	ND		
Dibromochloromethane	ug/kg	ND	ND		
Dibromomethane	ug/kg	ND	ND		
Dichlorodifluoromethane	ug/kg	ND	ND		
Diisopropyl ether	ug/kg	ND	ND		
Ethylbenzene	ug/kg	ND	ND		
Hexachloro-1,3-butadiene	ug/kg	ND	ND		
Isopropylbenzene (Cumene)	ug/kg	ND	ND		
m&p-Xylene	ug/kg	ND	ND		

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

SAMPLE DUPLICATE: 1859927

Parameter	Units	92318065001 Result	Dup Result	RPD	Qualifiers
Methyl-tert-butyl ether	ug/kg	ND	ND		
Methylene Chloride	ug/kg	ND	ND		
n-Butylbenzene	ug/kg	ND	ND		
n-Propylbenzene	ug/kg	ND	ND		
Naphthalene	ug/kg	ND	2.1J		
o-Xylene	ug/kg	ND	ND		
p-Isopropyltoluene	ug/kg	ND	ND		
sec-Butylbenzene	ug/kg	ND	ND		
Styrene	ug/kg	ND	ND		
tert-Butylbenzene	ug/kg	ND	ND		
Tetrachloroethene	ug/kg	ND	ND		
Toluene	ug/kg	ND	ND		
trans-1,2-Dichloroethene	ug/kg	ND	ND		
trans-1,3-Dichloropropene	ug/kg	ND	ND		
Trichloroethene	ug/kg	ND	ND		
Trichlorofluoromethane	ug/kg	ND	ND		
Vinyl acetate	ug/kg	ND	ND		
Vinyl chloride	ug/kg	ND	ND		
Xylene (Total)	ug/kg	ND	ND		
1,2-Dichloroethane-d4 (S)	%	115	118	2	
4-Bromofluorobenzene (S)	%	97	92	10	
Toluene-d8 (S)	%	101	101	4	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

QC Batch:	335136	Analysis Method:	ASTM D2974-87
QC Batch Method:	ASTM D2974-87	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples: 92317872001, 92317872002, 92317872003, 92317872004			

SAMPLE DUPLICATE: 1857839

Parameter	Units	92317879001 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	14.4	15.2	5	

SAMPLE DUPLICATE: 1857840

Parameter	Units	92317874003 Result	Dup Result	RPD	Qualifiers
Percent Moisture	%	17.6	18.0	2	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

## REPORT OF LABORATORY ANALYSIS

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## QUALIFIERS

Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

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### DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

Acid preservation may not be appropriate for 2 Chloroethylvinyl ether.

A separate vial preserved to a pH of 4-5 is recommended in SW846 Chapter 4 for the analysis of Acrolein and Acrylonitrile by EPA Method 8260.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

### LABORATORIES

PASI-C Pace Analytical Services - Charlotte

### ANALYTE QUALIFIERS

M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

## REPORT OF LABORATORY ANALYSIS

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## QUALITY CONTROL DATA CROSS REFERENCE TABLE


Project: PARCEL 167 39049.1.1

Pace Project No.: 92317872

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92317872001	167-SB-1-8-10	EPA 8260	335217		
92317872002	167-SB-2-8-10	EPA 8260	335217		
92317872003	167-SB-3-8-10	EPA 8260	335217		
92317872004	167-SB-4-8-10	EPA 8260	335373		
92317872001	167-SB-1-8-10	ASTM D2974-87	335136		
92317872002	167-SB-2-8-10	ASTM D2974-87	335136		
92317872003	167-SB-3-8-10	ASTM D2974-87	335136		
92317872004	167-SB-4-8-10	ASTM D2974-87	335136		

## REPORT OF LABORATORY ANALYSIS

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	Document Name: <b>Sample Condition Upon Receipt(SCUR)</b>	Document Revised: Sept. 21, 2016 Page 1 of 2
	Document No.: <b>F-CAR-CS-033-Rev.01</b>	Issuing Authority: Pace Quality Office

**Laboratory receiving samples:**

Asheville ☐
 Eden ☐
 Greenwood ☐
 Huntersville ☒
 Raleigh ☐
 Mechanicsville ☐

**Sample Condition Upon Receipt**

Client Name: Solutions IES

Project

**WO# : 92317872**


**Courier:**

☐ Commercial

☐ Fed Ex

☒ Pace

☐ UPS

☐ USPS

☐ Other: \_\_\_\_\_

☐ Client

**Custody Seal Present?**

☐ Yes

☒ No

**Seals Intact?**

☐ Yes

☒ No

Date/Initials Person Examining Contents: RP10/31/16

**Packing Material:**

☐ Bubble Wrap

☐ Bubble Bags

☒ None

☐ Other: \_\_\_\_\_

**Thermometer:**

☒ IR Gun ID:

T1505

Type of Ice:

☒ Wet

☐ Blue

☐ None

☐ Samples on ice, cooling process has begun

**Correction Factor:**

Cooler Temp Corrected (°C):

4.2

**Biological Tissue Frozen?**

☐ Yes

☒ No

☐ N/A

Temp should be above freezing to 6°C

**USDA Regulated Soil** ( ☐ N/A, water sample)

Did samples originate in a quarantine zone within the United States: CA, NY, or SC (check maps)?

☐ Yes ☒ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☒ No

			Comments/Discrepancy:
Chain of Custody Present?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.	
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.	
Short Hold Time Analysis (<72 hr.)?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.	
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	4.	
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.	
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	6.	
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	7.	
Samples Field Filtered?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8.	Note if sediment is visible in the dissolved container
Sample Labels Match COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.	
-Includes Date/Time/ID/Analysis Matrix: <u>Soil</u>			
Headspace in VOA Vials (>5-6mm)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	10.	
Trip Blank Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	11.	
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A		

**CLIENT NOTIFICATION/RESOLUTION**

Field Data Required? ☐ Yes ☐ No

Person Contacted: \_\_\_\_\_

Date/Time: \_\_\_\_\_

Comments/Sample

Discrepancy: \_\_\_\_\_

Project Manager SCURF Review: [Signature]

Date: 11/1/16

Project Manager SRF Review: [Signature]

Date: 11/1/16

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. Out of hold, incorrect preservative, out of temp, incorrect containers)

15.59 KPS Pace Analytical®

\*Check mark top half of box if pH and/or dechlorination

Project #

WO# : 92317872

is verified and within the acceptance range for preservation samples.

PM: PTE

Due Date: 11/09/16

\*\*Bottom half of box is to list number of bottles

CLIENT: 92-SOLUTIONS

Item#	BP4U-125 mL Plastic Unpreserved (N/A) (Cl-)	BP3U-250 mL Plastic Unpreserved (N/A)	BP2U-500 mL Plastic Unpreserved (N/A)	BP1U-1 liter Plastic Unpreserved (N/A)	BP3S-250 mL Plastic H2SO4 (pH < 2) (Cl-)	BP3N-250 mL plastic HNO3 (pH < 2)	BP3Z-250 mL Plastic ZN Acetate & NaOH (>9)	BP3C-250 mL Plastic NaOH (pH > 12) (Cl-)	WGfU-Wide-mouthed Glass jar Unpreserved	AG1U-1 liter Amber Unpreserved (N/A) (Cl-)	AG1H-1 liter Amber HCl (pH < 2)	AG3U-250 mL Amber Unpreserved (N/A) (Cl-)	AG1S-1 liter Amber H2SO4 (pH < 2)	AG3S-250 mL Amber H2SO4 (pH < 2)	AG3A(DG3A)-250 mL Amber NH4Cl (N/A)(Cl-)	DG9H-40 mL VOA HCl (N/A)	VG9T-40 mL VOA Na2S2O3 (N/A)	VG9U-40 mL VOA Unp (N/A)	DG9P-40 mL VOA H3PO4 (N/A)	VOAK (6 vials per kit)-5035 kit (N/A)	V/GK (3 vials per kit)-VPH/Gas kit (N/A)	SP5T-125 mL Sterile Plastic (N/A – lab)	SP2T-250 mL Sterile Plastic (N/A – lab)	BP3A-250 mL Plastic (NH2)2SO4 (9.3-9.7)	Cubitainer	VSGU-20 mL Scintillation vials (N/A)	GN	
1																				6								
2																				6								
3																				6								
4																				6								
5																												
6																												
7																												
8																												
9																												
10																												
11																												
12																												

## pH Adjustment Log for Preserved Samples

Sample ID	Type of Preservative	pH upon receipt	Date preservation adjusted	Time preservation adjusted	Amount of Preservative added	Lot #

# CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

## Section A Required Client Information:

Company:	CELESTIONS, INC.	Report To:	MITE BARNES
Address:	1101 NEWELL RD	Copy To:	
Email To:	MIAMI@CELESTIONS-INC.COM	Purchase Order No.:	
Phone:	919-613-0106	Project Name:	NCDOT FARMETTER WARE PARCEL 16T
Requested Due Date/AT:	5/17/2016	Project Number:	2016-004-NDOT

## Section B Required Project Information:

Attention:	NCDOT WBS 38049.6.1
Company Name:	
Address:	
Pace Quote Reference:	
Pace Project Manager:	THOMAS EZZELL
Pace Profile #:	

Page: 1 of 1

2035090

## Section C Invoice Information:

REGULATORY AGENCY	NPDES	GROUND WATER	DRINKING WATER
	UST	RCRA	OTHER
Site Location	NC		
STATE:			

Section D Required Client Information		Matrix Codes MATRIX / CODE		COLLECTED		SAMPLE TEMP AT COLLECTION		Preservatives										Requested Analysis Filtered (Y/N)										Residual Chlorine (Y/N)		SAMPLE CONDITIONS					
ITEM #	SAMPLE ID (A-Z, 0-9 / -)  Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	DATE	TIME	DATE	TIME	# OF CONTAINERS	Unpreserved									Y	N																
										Drinking Water	Water	Waste Water	Product	Soil/Solid	Oil	Wipe	Air			Tissue	Other	DW	WT	WW	P	SL	OL			WP	AR	TS	OT		
1	167-SB-1-8-10	SLC				10/24/16	1330	6	X																										421
2	167-SB-2-8-10	SLC					1335	6	X																									422	
3	167-SB-3-8-10	SLC					1340	6	X																									423	
4	167-SB-4-8-10	SLC					1345	6	X																									424	
5																																			
6																																			
7																																			
8																																			
9																																			
10																																			
11																																			
12																																			
ADDITIONAL COMMENTS		RELINQUISHED BY / AFFILIATION		DATE		TIME		ACCEPTED BY / AFFILIATION		DATE		TIME		SAMPLE CONDITIONS																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
---------------------	-------------------------------	------	------	---------------------------	------	------	-------------------

10/24/16	1330	10/24/16	1330	10/24/16	1330	1330	Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
10/24/16	1335	10/24/16	1335	10/24/16	1335	1335				
10/24/16	1340	10/24/16	1340	10/24/16	1340	1340				
10/24/16	1345	10/24/16	1345	10/24/16	1345	1345				

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: SAMUEL MIGNARD

SIGNATURE of SAMPLER:

DATE signed (MM/DD/YY): 10/31/2016