FROEHLING & ROBERTSON, INC.

PRELIMINARY SITE ASSESSMENT

RICHARD HILLMAN PROPERTY (PARCEL #14)
6498 US Highway 401
Kipling, NC
State Project: R-5523
WBS Element: 45548.1.1
F&R Project #66R-3222

June 9, 2014

Prepared for:

North Carolina Department of Transportation
Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, NC 27610

SINCE 1881

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Engineering Stability Since 1881

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NC License #F-0266

June 9, 2014

North Carolina Department of Transportation
Geotechnical Engineering Unit
1020 Birch Ridge Drive
Raleigh, North Carolina 27610

Attn.: Mr. Craig Haden
GeoEnvironmental Project Manager

Re: State Project: R-5523
WBS Element: 45548.1.1
Realignment of Harnett Central Road at US 401 and Extension of Smith Road (SR 1575)

Subject: **Preliminary Site Assessment**
Richard Hillman Property (Parcel #14)
6498 US Hwy 401
Kipling, North Carolina
F&R Project #66R-3222

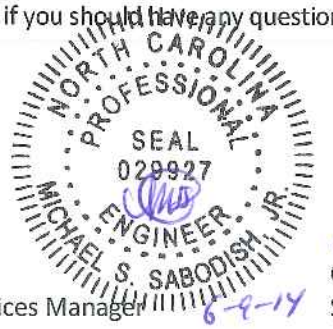
Dear Mr. Haden:

Froehling and Robertson, Inc. (F&R) has completed the authorized Preliminary Site Assessment at the Richard Hillman Property in Kipling, North Carolina. The work was performed in general accordance with with F&R's Proposal No. 1466-00642, Revision 3, dated March 6, 2014. Notice to Proceed was issued to F&R on March 17, 2014. This report documents our field activities, presents the results of laboratory analysis and provides recommendations regarding the property.

Please do not hesitate to contact us if you should have any questions regarding this report.

Sincerely,

FROEHLING & ROBERTSON, INC.



Michael S. Sabodish, Jr., Ph.D., P.E.
Engineering and Remediation Services Manager

Christopher J. Burkhardt
Senior Environmental Professional

TABLE OF CONTENTS

Preliminary Site Assessment Report
Richard Hillman Property (Parcel #14)
Kipling, Harnett County, North Carolina
F&R Project No. 66R-3222

1.0 Introduction

Froehling and Robertson, Inc. (F&R) has prepared this Preliminary Site Assessment Report (PSA) to document soil assessment activities performed at the Richard Hillman Property (former Kipling Grocery) addressed as 6498 US Highway 401 in Kipling, Harnett County, North Carolina. The site is located approximately 350 feet south of Harnett Central Road, on the east side of US Highway 401 (Appendix I, Figure 1 and 2). As indicated in the Request for Proposal (RFP), the site appears to have previously operated as a small grocery store and based on the buildings appearance, may have sold gasoline at one time. According to DENR's UST Registry, there are no known USTs, facility IDs or groundwater incidents associated with the property.

This work was performed in general accordance with F&R's Proposal No. 1466-00642, Revision 3, dated March 6, 2014 with Notice to Proceed issued to F&R by the NCDOT on March 17, 2014. The purpose of this report is to document field activities, present the results of laboratory analysis, and provide recommendations regarding the property.

Based on conversations and information provided by the NCDOT, it has been determined that the proposed utility installation and roadway construction will impact the project site (See Figure No.3). As such, the NCDOT requested a Preliminary Site Assessment be performed to assess the possibility of encountering petroleum impacted soil from known or unknown USTs which may exist/existed at the project site.

The property contains a two-story structure constructed of concrete masonry units, which was formerly used as Kipling Grocery. Currently, the structure is being used as storage on the lower level and residential on the upper level. The property also contains a two-story residential structure to the south. A small shed exists at the extreme southern property boundary. During our site reconnaissance, F&R observed the remains of what appeared to be a former dispenser island located at the front of the former Kipling Grocery structure. In addition, F&R observed fill ports of two possible USTs located in the driveway just south of the former Kipling Grocery structure.

The majority of the property in front of the former Kipling Grocery is gravel covered and serves as parking and drive areas. With the exception of the gravel drive associated with the existing two-story

residential structure, the remainder of the property is grass covered. The site is bordered by Snell Tree Experts to the north, a private residence to the south, US Highway 401 to the east and railroad tracks to the west. Access to the site is gained from asphalt/gravel covered drives off of US Highway 401. Photos detailing existing site features are attached as Appendix IV of this report.

2.0 Geophysical Survey

Prior to F&R's soil assessment activities, Schnabel Engineering conducted a geophysical survey of the project site to locate suspect metal underground storage tanks (USTs) in the accessible areas of the right-of-way and/or easement. The geophysical work was conducted on April 2 and 8, 2013 under Schnabel's June 2, 2011 contract with NCDOT.

The geophysical investigation consisted of electromagnetic (EM) induction surveys using a Geonics EM61-MK2 instrument. Ground-penetrating radar (GPR) investigations of selected EM61 anomalies were investigated using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna. The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart, while the GPR data were collected along survey lines spaced 1 to 2 feet apart in orthogonal directions. The data was reviewed in the field to evaluate the possible presence of USTs and later transferred to a desktop computer for further review. Data was collected over most of the planned survey site with the exception of the southernmost portion of the property where thick vegetation and a concrete structure were encountered. An EM anomaly of unknown cause was identified near the northern end of the site.

The GPR survey of the above mentioned anomaly indicated the presence of two probable USTs on Parcel 14. Both USTs are within the right-of-way/easement. The EM and GPR data suggest Probable UST No. 1 has a diameter of approximately four feet and a length of approximately six feet long, resulting in an equivalent 550-gallon capacity UST. The EM and GPR data suggest Probable UST No. 2 has a diameter of approximately five and a half feet and a length of approximately nine feet long, resulting in an equivalent 1,500-gallon capacity UST. Both USTs are buried about one and half to two feet below ground surface. The complete geophysical report is attached as Appendix II.

3.0 Site Assessment Activities

F&R visited the site on April 9, 2014 to perform the Preliminary Site Assessment. The assessment consisted of advancing 16 borings into the soils at the project site. Seven of the borings (B-1 through B-7) were advanced at the perimeter of USTs. Borings B-8 through B-10 were advanced within the right-of-way at the frontage of the former Kipling Grocery structure. Borings B-11 through B-13 were advanced within the right-of-way adjacent to US Highway 401, while Borings B-14 through B-16 were

advanced in the right-of-way on the eastern side of the proposed, new Harnett Central Road (Appendix I, Figures 3 and 4).

The borings at the perimeter of the probable USTs (B-1 through B-7) were advanced using direct-push technology (Geoprobe) to depths of 12 feet below ground surface (bgs). The remainder of the borings (B-8 through B-16), were advanced to a depth of 10 feet bgs. Boring locations were determined by F&R staff based on the results of the geophysical survey, site features and proposed construction activities.

Soil sample cores from the borings (B-1 through B-16) were collected in disposable, 4-foot long acetate sleeves. The soil samples were visually/manually classified and screened in the field using a photo-ionization detector (PID) for evidence of petroleum hydrocarbons. Evaluation of VOC concentrations were performed using a MiniRae 2000 PID which produces results in parts per million (ppm). A representative soil sample was collected from one foot sections of each sleeve and placed in a re-sealable plastic bag and the vapors were then allowed to equilibrate in the headspace of the bag for approximately ten minutes prior to measurement with the PID. The measurements were collected by placing the probe tip into the headspace of the bag. PID measurements can be found in the Geoprobe Logs in Appendix III.

The soil sample which exhibited the highest PID concentration or the sample at boring termination was submitted for laboratory analysis for diesel range organics (DRO), gasoline range organics (GRO), Total BTEX (benzene, toluene, ethylbenzene and xylenes), 16 PAHs (polycyclic aromatic hydrocarbons) and BaP (Benzo(a)pyrene) by Ultraviolet Fluorescence (UVF) technology.

The samples were collected in laboratory-supplied sample containers, placed in a cooler with ice, and delivered by courier to QROS in Wilmington, North Carolina following standard chain-of custody procedures.

Upon completion of soil assessment activities, F&R continued to advance Boring B-4 in order to obtain a groundwater sample (Parcel 14 B-4 GW). The boring was advanced using direct-push techniques (GeoProbe) at the approximate locations shown in Figure 2, to a depth of at least 2 feet below the observed groundwater table in order to provide an adequate volume of groundwater for sample collection.

Groundwater was then recovered from the boring location through the use of a peristaltic pump and polyethylene tubing. Prior to groundwater sample collection, three well volumes of water were purged in order to collect a fresh, representative groundwater sample. F&R collected a groundwater sample for

subsequent analysis for Volatile Organic Compounds (VOC) by EPA Method 8260 and Semi-volatile Organic Compounds (SVOC) by EPA Method 8270.

The groundwater sample was collected in laboratory-supplied sample containers, placed in a cooler with ice, and delivered by courier to Pace Analytical Services in Huntersville, NC following standard chain-of-custody procedures.

4.0 Subsurface Conditions

As indicated in the attached Geoprobe Logs (Appendix III), subsurface conditions from existing ground surface to boring termination at a depth of 10 to 12 feet included various layers of moist, brown silty fine to medium sand (USCS – SM); moist to saturated, orange/tan and red/gray silty sandy clay (USCS – CL) and moist to saturated, tan silty clayey sands (USCS – SC). A majority of the borings were terminated in moist, orange/tan, red/gray, purple/gray clayey sandy silts (USCS – ML). It is not believed the groundwater table was encountered within the borings advanced during the assessment, except at Boring B-4 which was advanced to the groundwater table for the collection of a groundwater sample. However, perched water conditions were observed at a majority of the borings at depths ranging from 2 to 5 feet below ground surface as soil samples were observed to be wet to saturated. Petroleum odors were observed from the soil samples collected at Boring B-4 (10 to 12 feet bgs) and Boring B-7 (11 to 12 feet bgs).

5.0 Analytical Results

As shown in the following table, petroleum hydrocarbons identified as DRO and GRO were encountered at four of the boring locations (B-5, B-6, B-7 and B-11) at depths ranging from one foot feet (Boring B-11) to at least twelve feet (Borings B-5, B-6 and B-7) feet below ground surface. The laboratory results indicate the DRO/GRO concentrations from these borings to be below the NC DENR Action level of 10 mg/kg. The laboratory analytical results indicate concentrations of the sum of 16 PAHs above the method detection limit, but below the NC DENR Action level of 7,041.14 mg/kg at Borings B-7, B-11 and B-15. The laboratory analytical results can be found in the attached Appendix V of this report.

Table 1
Soil Sampling Analytical Results
Richard Hillman Property (Parcel #14)
Kipling, Harnett County, North Carolina

Sample ID	Sample Date	Sample Depth (ft bgs)	PID Reading (ppm)	DRO (mg/kg)	GRO (mg/kg)	Total BTEX (mg/kg)	16 EPA PAHs (mg/kg)	BaP (mg/kg)
B-1	4/9/14	9-10	0.4	<0.4	<0.1	<0.1	<0.1	<0.01
B-2	4/9/14	7-8	0.3	<0.3	<0.1	<0.1	<0.1	<0.01
B-3	4/9/14	8-9	0.1	<0.3	<0.1	<0.1	<0.1	<0.01
B-4	4/9/14	11-12	88.4	<0.3	<0.1	<0.1	<0.1	<0.01
B-5	4/9/14	11-12	9.9	0.49	<0.1	<0.1	<0.1	<0.01
B-6	4/9/14	11-12	2.6	0.63	<0.1	<0.1	<0.1	<0.01
B-7	4/9/14	11-12	89.2	2.3	0.65	<0.1	0.04	<0.01
B-8	4/9/14	9-10	0.8	<0.3	<0.1	<0.1	<0.1	<0.01
B-9	4/9/14	9-10	3.6	<0.3	<0.1	<0.1	<0.1	<0.01
B-10	4/9/14	9-10	0.4	<0.3	<0.1	<0.1	<0.1	<0.01
B-11	4/9/14	1-2	0.3	2.0	<0.1	<0.1	0.12	<0.01
B-12	4/9/14	7-8	0.5	<0.3	<0.1	<0.1	<0.1	<0.01
B-13	4/9/14	5-6	1.0	<0.3	<0.1	<0.1	<0.1	<0.01
B-14	4/9/14	5-6	1.3	<0.3	<0.1	<0.1	<0.1	<0.01
B-15	4/9/14	5-6	1.7	<0.3	<0.1	<0.1	0.02	0.011
B-16	4/9/14	5-6	1.3	<0.3	<0.1	<0.1	<0.1	<0.01
NC DENR Action Level				**10**	**10**	**13.8**	**7,041.41**	**.096**

Notes:
ft bgs = feet below ground surface
ppm = parts per million
mg/kg = milligrams/kilogram
ND = Not Detected
NCDENR standard for Total BTEX and 19 PAHs presented as the sum of the individual compounds
Bold indicates soil analytical results above NCDENR Action Levels

Laboratory analytical testing on the groundwater sample (Parcel 14 B-4 GW) did not detect volatile or semi-volatile organic compounds above the laboratory method detection limit. The laboratory analytical results can be found in the attached Appendix V of this report.

6.0 Conclusions and Recommendations

F&R conducted a PSA at the Richard Hillman Property located at 6498 US Highway 401 in Kipling, Harnett County, North Carolina. A geophysical investigation was performed by Schnabel Engineering to investigate the existence of unknown/known USTs at the site. Based on the results of the geophysical survey, it was determined that two probable USTs were present at the site. The geophysical data suggest Probable UST No. 1 has a diameter of approximately four feet and a length of approximately six feet long, resulting in an equivalent 550-gallon capacity UST. The EM and GPR data suggest Probable UST No. 2 has a diameter of approximately five and a half feet and a length of approximately nine feet long, resulting in an equivalent 1,500-gallon capacity UST. Both USTs are buried about one and half to two feet below ground surface.

Sixteen geoprobe borings were advanced during the assessment inside the right-of-way, in the vicinity of the USTs, and in the area where the new Harnett Central Road is proposed to be constructed. Based on the results of laboratory testing and observed PID readings, it has been determined that petroleum impacted soils exist in the vicinity of Borings B-5, B-6, B-7 and B-11 at concentrations above the laboratory method detection limit but below the NC DENR Action Level of 10 mg/kg.

In regards to the proposed construction, it is estimated that petroleum impacted soils exist from existing ground surface to a depth of at least twelve feet below existing ground surface in the vicinity of the probable USTs based on laboratory analysis and PID readings at various borings advanced during this assessment. In addition, a small area of petroleum impacted soil exists from existing ground surface to a depth of approximately two feet below ground surface in the vicinity of Boring B-11. It should be mentioned, that the observed concentrations of petroleum hydrocarbons were below the NC DENR Action Level of 10 mg/kg.

Based on the depths at which soil contamination was observed, PID readings and our experience, it appears two areas of contaminated soil exist at the site as shown in Figure 4. Using the dimensions in the below table, it can be approximated that the quantity of petroleum impacted soil which may be encountered during UST removal and the area near Boring B-11 to be approximately 367.5 tons. Petroleum impacted soils that are removed should be properly managed and disposed of in accordance with all NCDENR rules and regulations.

In reviewing the proposed roadway re-alignment plans, it is unlikely that petroleum impacted soils will be encountered during roadway construction activities associated with the proposed Harnett Central Road.

Based on the depths at which soil contamination was observed, PID readings and our experience, it appears two areas of contaminated soil exist at the site as shown in Figure 4. Using the dimensions in the below table, it can be approximated that the quantity of petroleum impacted soil which may be encountered during UST removal and around Boring B-11 to be approximately 367 tons. Petroleum impacted soils and USTs that are removed should be properly managed and disposed of in accordance with all NCDENR rules and regulations.

Table 2
Approximate Volume of Petroleum Impacted Soil
Richard Hillman Property (Parcel #14)
Kipling, Harnett County, North Carolina

Excavation Location (As Shown on Figure 5)	L x W x D (feet)	Soil Volume (cubic feet)	Soil Volume (tons)
Probable UST No. 1 and No. 2	25 x 20 x 12	6,000	360
Area around Boring B-11	10 x 10 x 2	200	7.5
Soil Volume (assuming a soil density of 120 pcf)			367.5

It should be noted that a delineation of the soil contamination was not performed, as this was not included in the proposed scope of work. The above estimates are based on interpretations of soil analytical results, PID readings and our experience with similar petroleum UST releases. The amount of impacted soil can only be determined after excavation or by advancing additional borings at the site to possibly delineate the extents (horizontal and vertical) of contamination.

7.0 Limitations

These services have been performed, under authorization of the North Carolina Department of Transportation for specific application on this project. These services have been performed in accordance with generally accepted environmental and hydrogeological practices. No other warranty, expressed or implied is made. As with any subsurface investigation, actual conditions exist only at the precise locations from which samples were taken. Certain inferences are based on the results of sampling and related testing to form a professional opinion of conditions in areas beyond those from which samples were taken. Our conclusions and recommendations are based upon information provided to us by others, our sampling and testing results and our site observations. We have not verified the completeness or accuracy of the information provided by others, unless otherwise noted. Our observations are based upon conditions readily visible at the site at the time of our site visits.

Froehling & Robertson, Inc. by virtue of providing the services described in this report, does not assume the responsibility of the person(s) in charge of the site, or otherwise undertake responsibility for reporting to any local, state or federal public agencies any conditions at the site that may present a potential danger to public health, safety or the environment. In areas that require notification of local, state, or federal public agencies as required by law, it is the Client's responsibility to so notify.

APPENDIX I

Figure No. 1 – SITE VICINITY MAP

Figure No. 2 – TOPOGRAPHIC MAP

Figure No. 3 – LABORATORY RESULTS & BORING LOCATION PLAN

Figure No. 4 – ESTIMATED EXTENTS OF SOIL CONTAMINATION

SITE VICINITY MAP

North

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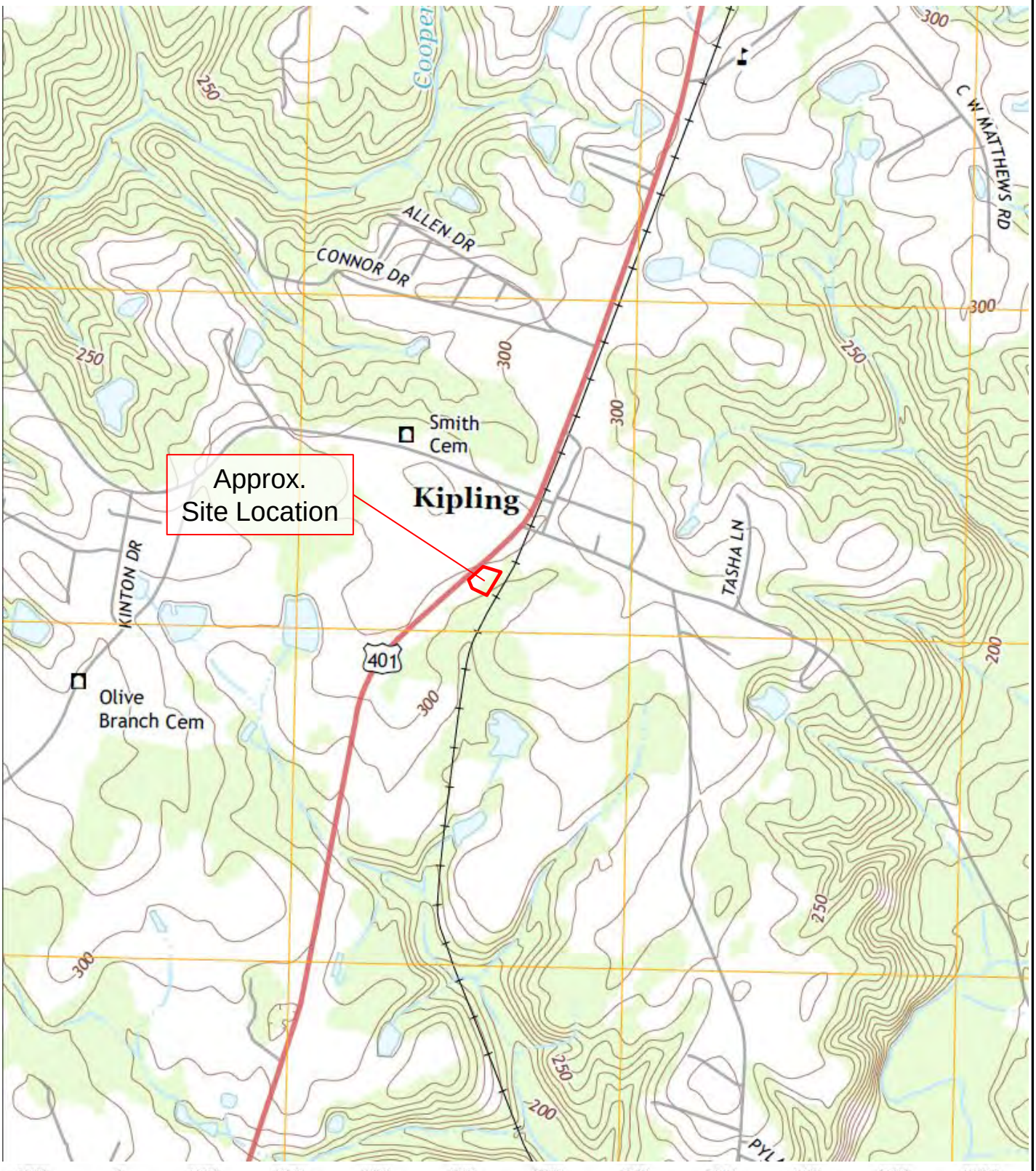
CLIENT: NCDOT	
PROJECT: Richard Hillman Property (Parcel #14)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.: 66R-3222	FIGURE No.: 1
DRAWN BY: M. Sabodish	
DATE: June 2014	SCALE: Not to scale



TOPOGRAPHIC MAP – 2013 "Lillington, NC" Quadrangle **North**

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CLIENT: NCDOT	
PROJECT: Richard Hillman Property (Parcel #14)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.:66R-3222	FIGURE No.: 2
DRAWN BY: M. Sabodish	
DATE: June 2014	SCALE as shown

B-12: 7.0'-8.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-11: 1.0'-2.0'
DRO=2.0 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=0.12 mg/kg
BaP=<0.01 mg/kg

B-3: 8.0'-9.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-6: 11.0'-12.0'
DRO=0.63 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-7: 11.0'-12.0'
DRO=2.3 mg/kg
GRO=0.65 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=0.04 mg/kg
BaP=<0.01 mg/kg

B-9: 9.0'-10.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-10: 9.0'-10.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-13: 5.0'-6.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-14: 5.0'-6.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-15: 5.0'-6.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=0.02 mg/kg
BaP=0.011 mg/kg

B-16: 5.0'-6.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-1: 9.0'-10.0'
DRO=<0.4 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-2: 7.0'-8.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-4: 11.0'-12.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-5: 11.0'-12.0'
DRO=0.49 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

B-8: 9.0'-10.0'
DRO=<0.3 mg/kg
GRO=<0.1 mg/kg
TOTAL BTEX=<0.1 mg/kg
16 EPA PAHs=<0.1 mg/kg
BaP=<0.01 mg/kg

UST NO. 2
UST NO. 1
CENTURY LINK
O/H SEC (PE)
ASPHALT
GRAVEL
CANOPY
ISB BUS
2SBD
WELL
ISD
SHED
BLOCK CONC.
SEPTIC
N48°33'56"E
69.89'
N48°02'21"E
240.51'
S41°15'20"E
246.69'
+61.94
69' RT
S68°01'26"E
173.78'
HILLMAN, JR., RICHARD H.
PIN 0652-28-9881
DB 899/992
COLLINS, ROYCE L'
PIN 0652-39-10
DB 766-486
14
13

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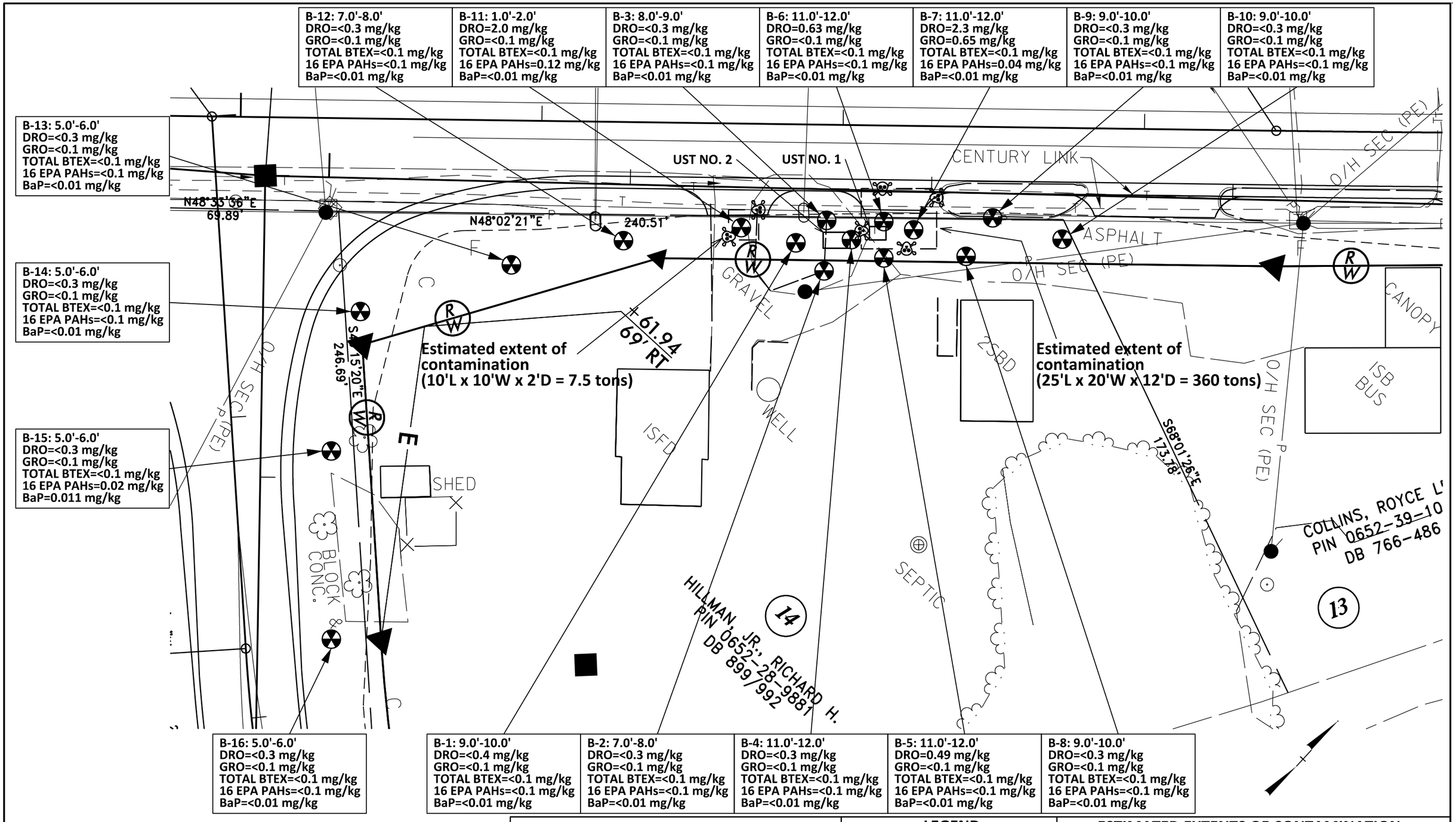
LEGEND

Approximate Geoprobe Boring Location

SCALE (FEET)
0 15' 30'
1"=30'

LABORATORY RESULTS & BORING LOCATION PLAN

CLIENT: NCDOT	
PROJECT: Richard Hillman Property (Parcel #14)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.: 66R-3222	FIGURE No.: 3
DRAWN BY: D. Racey	CHECKED BY: M. Sabodish, P.E.
DATE: June 2014	SCALE: 1"=30'



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LEGEND

Approximate Geoprobe Boring Location

SCALE (FEET)
0 15' 30'
1"=30'

ESTIMATED EXTENTS OF CONTAMINATION

CLIENT: NCDOT	
PROJECT: Richard Hillman Property (Parcel #14)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.: 66R-3222	FIGURE No.: 4
DRAWN BY: D. Racey	CHECKED BY: M. Sabodish, P.E.
DATE: June 2014	SCALE: 1"=30'

APPENDIX II

GEOPHYSICAL REPORT PREPARED BY SCHNABEL ENGINEERING

Schnabel ENGINEERING

April 23, 2014

Mr. Michael Sabodish, Ph.D, PE
Froehling & Robertson, Inc.
310 Hubert Street
Raleigh, NC 27603-2302

RE:	State Project:	R-5523
	WBS Element:	45548.1.1
	County:	Harnett
	Description:	Realignment of Harnett Central Road at US 401 and Extension of Smith Road (SR 1575)

Subject: **Project 11821014.35, Report on Geophysical Surveys**
Parcel 14, Richard Hillman Property, Kipling, North Carolina

Dear Dr. Sabodish:

SCHNABEL ENGINEERING SOUTH, PC (Schnabel) is pleased to present this report on the geophysical surveys we performed on the subject property. The report includes two 11x17 inch color figures and three 8.5x11 inch color figures. This study was performed in accordance with our proposal to NCDOT for Geophysical Surveys to Locate Possible USTs, dated March 14, 2014, as approved by Terry Farr (NCDOT) on March 18, 2014, and our existing NCDOT limited services agreement dated June 2, 2011.

INTRODUCTION

The field work described in this report was performed on April 2, 2014 and April 8, 2014, by Schnabel. The purpose of the geophysical surveys was to evaluate the potential presence of metal underground storage tanks (USTs) in the accessible areas of the NCDOT right-of-way and/or easement at Parcel 14. Photographs of the property are included on Figure 1. The property is located on the east side of US 401 approximately 350 feet southwest of Harnett Central Road in Kipling, NC.

The geophysical surveys consisted of an electromagnetic (EM) induction survey and a ground penetrating radar (GPR) survey. The EM survey was performed using a Geonics EM61-MK2 (EM61) instrument. The EM61 is a time domain metal detector that stores data digitally for later processing and review. Sensitivity to metallic objects is dependent on the size, depth, and orientation of the buried object and the amount of noise (i.e. response from spurious metallic objects) in the area. The EM61 can generally observe a single buried 55 gallon drum at a depth of 10 feet or less. The EM61 makes measurements by creating an

electromagnetic pulse and then measuring the response from metallic objects over time after the pulse is generated. We measured and recorded the response at several time increments after the pulse to help evaluate relative size and depth of metallic objects in the subsurface.

The GPR survey was performed over selected EM61 anomalies using a Geophysical Survey Systems SIR-3000 system equipped with a 400 MHz antenna to further investigate and evaluate EM responses that could indicate a potential UST. The depth penetration of the GPR signal, when using a 400 MHz antenna, is normally limited to 6 feet or less.

Photographs of the equipment used are shown on Figure 2.

FIELD METHODOLOGY

We obtained locations of geophysical data points using a sub-meter Trimble Pro-XRS differential global positioning system (DGPS). References to direction and location in this report are based on the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 83 datum, with units in US survey feet. We also recorded the locations of existing site features (water meter, guy wire, etc.) with the DGPS for later correlation with the geophysical data and a site plan provided by the NCDOT.

The EM61 data were collected along parallel survey lines spaced approximately 2.5 feet apart. The EM61 and DGPS data were recorded digitally using a field computer and later transferred to a desktop computer for data processing. The GPR data were collected along survey lines spaced approximately one to two feet apart in orthogonal directions over anomalous EM readings not attributed to cultural features. The GPR data were reviewed in the field to evaluate the possible presence of USTs. The GPR data also were recorded digitally and later transferred to a desktop computer for further review.

DISCUSSION OF RESULTS

The contoured EM61 data collected over Parcel 14 and the GPR survey area locations are shown on Figure 3, EM61 Early Time Gate Response and Example GPR Images, and Figure 4, EM61 Differential Response and Example GPR Images. We were not able to access some areas in the southernmost portions of the planned survey area due to the presence of thick vegetation and a concrete structure. Areas outside the colored, contoured EM61 data were not surveyed. Early time data refer to the response measured at a short time after the initial EM pulse is generated. Early time data typically contain responses from all metal objects, small or large and shallow or deep, within the sensitivity range of the instrument. Differential data represent the difference in response between the top and bottom coils of the EM61 instrument at a later time after the initial pulse than early time data. Differential data naturally tend to filter out the effect of surface and very shallowly buried metallic objects. Typically, the differential response emphasizes anomalies from deeper and larger objects such as USTs.

We collected GPR data over an EM anomaly of an unknown cause near the northern end of Parcel 14, as shown on Figures 3 and 4, to further investigate the EM anomaly. The GPR data indicated the presence of two probable USTs, as shown on Figures 3 and 4. Identification of these anomalies as Probable UST No. 1 and No. 2 was made in accordance with the anomaly categories provided by the NCDOT in their letter, dated May 19, 2009, entitled “Geophysical Surveys to Identify USTs”. Example GPR images from lines oriented over the marked locations of Probable UST No. 1 and No. 2 are shown on Figures 3 and 4.

The GPR data suggest the tops of Probable UST No. 1 and No. 2 are approximately 1.5 to 2.5 feet below ground surface. Probable UST No. 1 is about 4 feet in diameter and about 6 feet long, equivalent to a capacity of a 550 gallon UST. Probable UST No. 2 is about 5.5 feet in diameter and about 9 feet long, equivalent to a capacity of a 1500 gallon UST. Photographs of the approximate locations of the probable USTs that were marked in the field are included on Figure 5.

CONCLUSIONS

As shown in Figures 3 and 4, the EM data we collected over Parcel 14 did not cover a portion of the planned survey area due to the presence of thick vegetation and a concrete structure within the planned survey area. The EM data include responses from several visible metallic objects at grade (e.g. water meters, other utilities, etc.).

The geophysical data indicate the presence of two probable USTs within the proposed right-of-way on Parcel 14. The EM and GPR data suggest Probable UST No. 1 and No. 2 are about the size of a 550-gallon capacity UST and a 1500-gallon capacity UST, respectively. The tops of Probable UST No. 1 and No. 2 are about 1.5 to 2.5 feet below ground surface.

LIMITATIONS

These services have been performed and this report prepared for Froehling & Robertson, Inc. and the North Carolina Department of Transportation in accordance with generally accepted guidelines for conducting geophysical surveys. It is generally recognized that the results of geophysical surveys are non-unique and may not represent actual subsurface conditions.

We appreciate the opportunity to have provided these services. Please call if you need additional information or have any questions.

Sincerely,

SCHNABEL ENGINEERING SOUTH, PC

James W. Whitt, LG
Senior Staff Geophysicist

Joel C. Daniel, LG
Senior Geophysicist

JWW:JCD
Attachments: Figures (4)
CC: Craig Haden - NCDOT

FILE: G:\2011-SDE-JOBS\11821014_00_NCDOT_2011_GEOTECHNICAL_UNIT_SERVICES\11821014_35_R-5523_HARNETT_COUNTY\REPORT\PARCEL 14\SCHNABEL GEOPHYSICAL REPORT ON PARCEL 14 (R-5523).DOCX

Attachments:

Figure 1 - Parcel 14 Site Photos
Figure 2 - Photos of Geophysical Equipment Used
Figure 3 - EM61 Early Time Gate Response and Example GPR Images
Figure 4 - EM61 Differential Response and Example GPR Images
Figure 5 - Parcel 14 Photos of Probable UST Locations

Parcel 14 (Richard Hillman Property), looking south

Parcel 14 (Richard Hillman Property), looking east

Schnabel ENGINEERING	STATE PROJECT R-5523 NC DEPT. OF TRANSPORTATION HARNETT CO., NORTH CAROLINA PROJECT NO. 11821014.35	PARCEL 14 SITE PHOTOS FIGURE 1

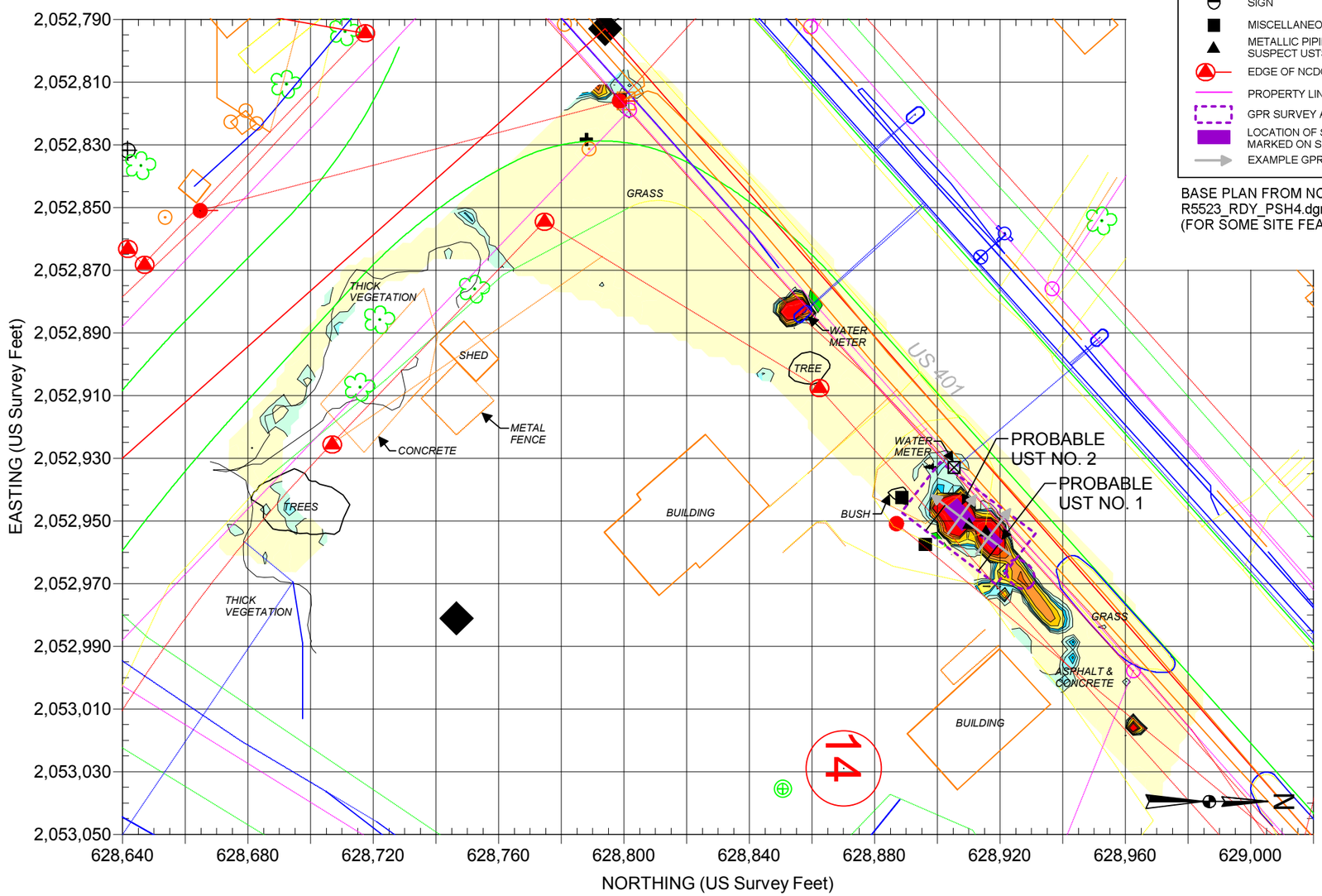
Geonics EM61-MK2 Metal Detector with Trimble DGPS Unit

GSSI SIR-3000 Ground-Penetrating Radar with 400 MHz Antenna

Note: Stock photographs – not taken on site.

Schnabel ENGINEERING	STATE PROJECT R-5523 NC DEPT. OF TRANSPORTATION HARNETT CO., NORTH CAROLINA PROJECT NO. 11821014.35	PHOTOS OF GEOPHYSICAL EQUIPMENT USED FIGURE 2

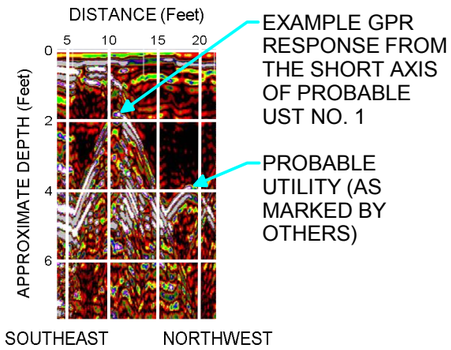
PARCEL 14

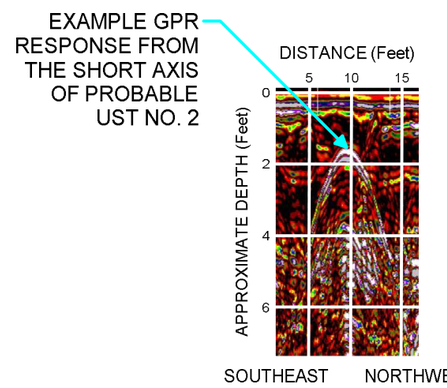


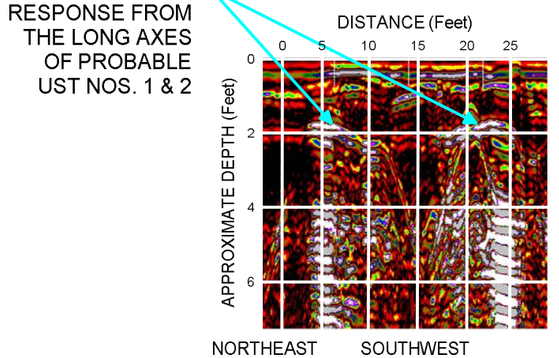
EXPLANATION

- SIGN
- MISCELLANEOUS METALLIC OBJECT
- METALLIC PIPING RELATED TO SUSPECT USTS
- EDGE OF NCDOT PROPOSED R/W
- PROPERTY LINE
- GPR SURVEY AREA
- LOCATION OF SUSPECT USTS MARKED ON SITE
- EXAMPLE GPR LINE LOCATION

BASE PLAN FROM NCDOT FILE:
R5523_RDY_PSH4.dgn
(FOR SOME SITE FEATURES)







EM61 Early Time Gate Response (mV)

-15000 -100 0 50 100 150 200 300 500 750 1000 2000

Scale in US Survey Feet: 1 in = 40 ft

0 40 80 120

Note: The contour plot shows the earliest and more sensitive time gate of the EM61 bottom coil/channel in millivolts (mV). The EM data were collected on April 2, 2014, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina Zone 3200, using the NAD 1983 datum. GPR data were acquired on April 8, 2014, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

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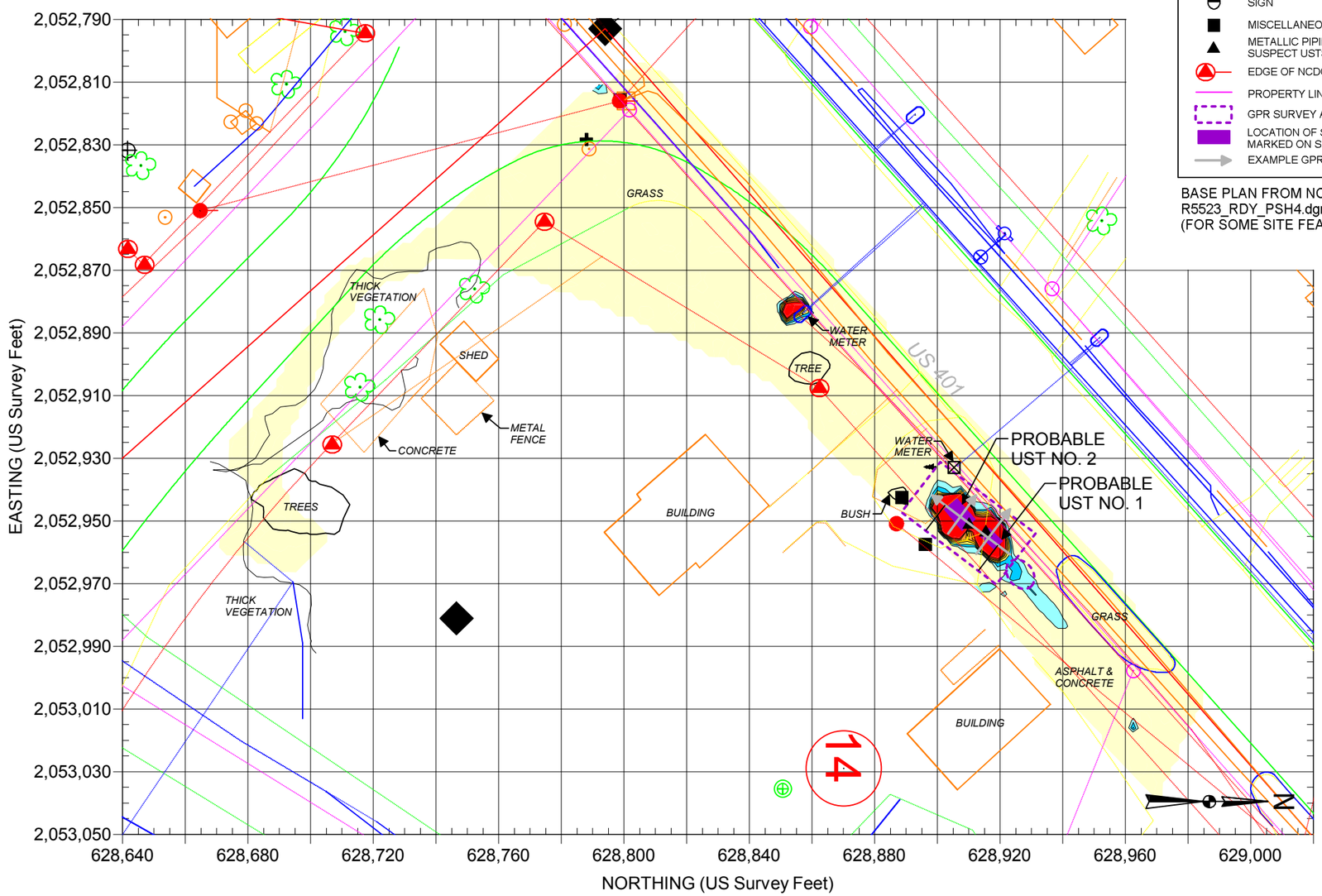
STATE PROJECT R-5523
NC DEPARTMENT OF TRANSPORTATION
HARNETT COUNTY, NC
PROJECT NO. 11821014.35

EM61
EARLY TIME GATE
RESPONSE

FIGURE 3

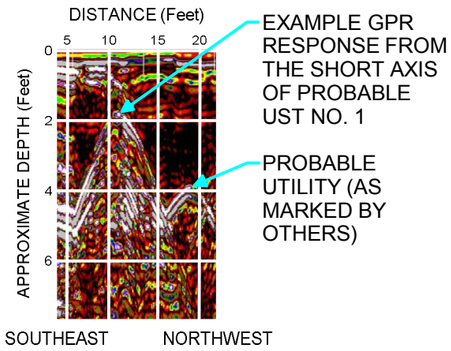
PARCEL 14



EXPLANATION

- SIGN
- MISCELLANEOUS METALLIC OBJECT
- METALLIC PIPING RELATED TO SUSPECT USTS
- EDGE OF NCDOT PROPOSED R/W
- PROPERTY LINE
- GPR SURVEY AREA
- LOCATION OF SUSPECT USTS MARKED ON SITE
- EXAMPLE GPR LINE LOCATION

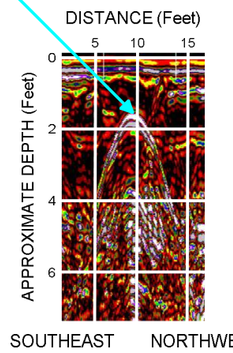
BASE PLAN FROM NCDOT FILE:
R5523_RDY_PSH4.dgn
(FOR SOME SITE FEATURES)



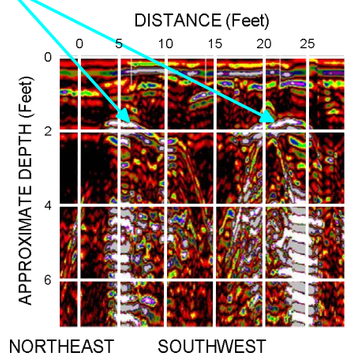
EXAMPLE GPR RESPONSE FROM THE SHORT AXIS OF PROBABLE UST NO. 1

PROBABLE UTILITY (AS MARKED BY OTHERS)

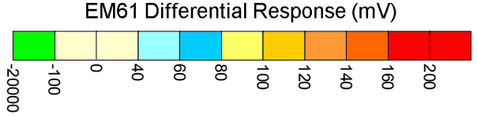
EXAMPLE GPR RESPONSE FROM THE SHORT AXIS OF PROBABLE UST NO. 2



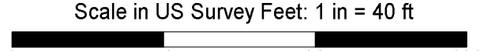
EXAMPLE GPR RESPONSE FROM THE LONG AXES OF PROBABLE UST NOS. 1 & 2



EM61 Differential Response (mV)



Scale in US Survey Feet: 1 in = 40 ft



Note: The contour plot shows the difference, in millivolts (mV), between the readings from the top and bottom coils of the EM61. The difference is taken to reduce the effect of shallow metal objects and emphasize anomalies caused by deeper metallic objects, such as drums and tanks. The EM data were collected on April 2, 2014, using a Geonics EM61-MK2 instrument. Positioning for the EM61 survey was provided using a submeter Trimble ProXRS DGPS system. Coordinates are in the US State Plane 1983 System, North Carolina 3200 Zone, using the NAD 1983 datum. GPR data were acquired on April 8, 2014, using a Geophysical Survey Systems SIR 3000 equipped with a 400 MHz antenna.

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HARNETT COUNTY, NC
PROJECT NO. 11821014.35

EM61 DIFFERENTIAL RESPONSE AND EXAMPLE GPR IMAGES

FIGURE 4

Parcel 14 (Richard Hillman Property), looking southwest. Photo shows approximate marked locations of Probable UST Nos. 1 and 2 near the northern end of Parcel 14.

Parcel 14 (Richard Hillman Property), looking northeast. Photo shows approximate marked locations of Probable UST Nos. 1 and 2 near the northern end of Parcel 14.

Schnabel ENGINEERING	STATE PROJECT B-4490 NC DEPT. OF TRANSPORTATION CUMBERLAND CO., NORTH CAROLINA PROJECT NO. 11821014.33	PARCEL 14 PHOTOS OF PROBABLE UST LOCATIONS FIGURE 5

APPENDIX III

GEOPROBE LOGS

Froehling & Robertson, Inc.

GEOPROBE LOG

Boring: B-1 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 12.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Wet, dark brown, silty fine to medium SAND (SM).	0.0	0.1	
	1.0	Moist to wet, orange-tan, silty sandy CLAY (CL).	1.0	0.1	
	2.0	Wet to saturated, brown to tan, clayey silty fine to medium SAND (SM).	2.0	0.1	
			3.0	0.0	
			4.0	0.1	
	5.0	Saturated, orange-tan, sandy CLAY (CL).	5.0	0.0	
	6.0	Wet, orange-tan, sandy clayey SILT (ML).	6.0	0.1	
	7.0	Moist, orange-tan, silty sandy CLAY (CL).	7.0	0.1	
			8.0	0.4	
			9.0	0.4*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	10.0	Wet, orange-tan, clayey SILT (ML).	10.0	0.2	
			11.0	0.2	
	12.0	Geoprobe Boring Terminated at 12.0 feet.	12.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-2 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 12.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Wet, brown, silty SAND (SM), with gravel.	0.0	0.0	
	1.0	Wet, orange-tan, sandy CLAY (CL).	1.0	0.1	
	2.0	Moist to saturated, tan, silty SAND (SM).	2.0	0.3	
			3.0	0.1	
	4.0	Saturated, tan, silty SAND (SM).	4.0	0.2	
			5.0	0.3	
	6.0	Wet, orange-tan, sandy silty CLAY (CL).	6.0	0.0	
	7.0	Wet, orange-tan, red-gray & purple-gray, clayey sandy SILT (ML).	7.0	0.3*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			8.0	0.2	
			9.0	0.2	
			10.0	0.0	
			11.0	0.0	
	12.0	Geoprobe Boring Terminated at 12.0 feet.	12.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

Froehling & Robertson, Inc.

GEOPROBE LOG

Boring: B-3 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 12.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, brown, silty SAND (SM), with gravel.	0.0	0.1	
	1.0	Moist, orange-brown, sandy CLAY (CL), with gravel.	1.0	0.1	
	2.0	Moist, brown to tan, silty fine to medium SAND (SM).	2.0	0.0	
			3.0	0.0	
	4.0	Saturated, tan, silty fine to medium SAND (SM).	4.0	0.0	
			5.0	0.0	
	6.0	Moist, tan-orange, sandy silty CLAY (CL).	6.0	0.0	
	7.0	Moist, tan-orange, red-tan & red-gray, clayey sandy SILT (ML).	7.0	0.1	
			8.0	0.1*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			9.0	0.1	
			10.0	0.1	
			11.0	0.1	
	12.0	Geoprobe Boring Terminated at 12.0 feet.	12.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

Froehling & Robertson, Inc.

GEOPROBE LOG

Boring: B-4 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 12.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, sandy CLAY (CL), with gravel.	0.0	0.6	
			1.0	0.2	
	2.0	Moist, tan, silty fine to medium SAND (SM).	2.0	0.1	
			3.0	0.0	
	4.0	Saturated, tan, silty fine to medium SAND (SM).	4.0	0.3	
	5.0	Saturated, tan, silty sandy CLAY (CL).	5.0	0.1	
	6.0	Moist, tan-orange, sandy CLAY (CL).	6.0	0.2	
	7.0	Moist, red-gray & gray, clayey sandy SILT (ML).	7.0	0.5	
			8.0	0.5	
			9.0	4.4	
			10.0	153	Petroleum odor observed from 10'-12'
			11.0	88.4*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	12.0	Geoprobe Boring Terminated at 12.0 feet.	12.0		Groundwater sample collected and submitted for laboratory analysis for VOCs and SVOCs

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-5 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 12.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, brown, clayey SAND (SC).	0.0	0.2	
	1.0	Moist, brown, sandy CLAY (CL).	1.0	0.3	
	2.0	Moist, tan, silty fine to medium SAND (SM).	2.0	0.4	
			3.0	0.3	
	4.0	Saturated, tan to orange-tan, silty sandy CLAY (CL).	4.0	0.8	
			5.0	2.6	
	6.0	Moist, orange-tan, silty sandy CLAY (CL).	6.0	1.6	
			7.0	1.0	
	8.0	Moist, red-gray, sandy clayey SILT (ML).	8.0	2.1	
			9.0	0.8	
			10.0	0.3	
			11.0	9.9*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	12.0	Geoprobe Boring Terminated at 12.0 feet.	12.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-6 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 12.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, fine to coarse SAND (SP), with gravel.	0.0	0.1	
			1.0	0.6	
			2.0	0.1	
			3.0	0.1	
	4.0	Moist to wet, tan, clayey fine to medium SAND (SC).	4.0	0.3	
	5.0	Moist, tan-orange, silty sandy CLAY (CL).	5.0	0.2	
	6.0	Dry to moist, red-tan, clayey silty SAND (SM).	6.0	0.0	
			7.0	0.3	
	8.0	Dry to moist, red-tan, silty sandy CLAY (CL).	8.0	0.1	
	9.0	Moist, gray, clayey SILT (ML).	9.0	0.2	
			10.0	0.3	
			11.0	2.6*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	12.0	Geoprobe Boring Terminated at 12.0 feet.	12.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-7 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 12.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, brown, fine to coarse SAND (SW), with gravel.	0.0	0.0	
	1.0	Moist, brown-red, clayey fine to medium SAND (SC).	1.0	0.4	
	2.0	Moist, tan, silty fine to medium SAND (SM).	2.0	0.2	
			3.0	0.1	
	4.0	Saturated, tan, silty fine to medium SAND (SM).	4.0	0.2	
	5.0	Saturated, tan, silty sandy CLAY (CL).	5.0	0.2	
	6.0	Moist, orange-tan, red-tan & gray, clayey sandy SILT (ML).	6.0	0.2	
			7.0	0.2	
			8.0	0.7	
			9.0	0.7	
			10.0	0.5	
			11.0	89.2*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	12.0	Geoprobe Boring Terminated at 12.0 feet.	12.0		Petroleum odor observed from 11'-12'

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-8 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, brown, sandy CLAY (CL).	0.0	0.5	
	2.0	Moist, tan, silty fine to medium SAND (SM).	2.0	0.2	
	4.0	Saturated, tan, silty SAND (SM).	4.0	0.4	
	5.0	Saturated, tan, silty sandy CLAY (CL).	5.0	0.1	
	6.0	Moist, red-tan, clayey SAND (SC).	6.0	0.1	
	7.0	Moist, red-tan, clayey silty SAND (SM).	7.0	0.1	
	8.0	Moist, red-tan, silty sandy CLAY (CL).	8.0	0.1	
	9.0	Moist, red-tan, clayey SILT (ML).	9.0	0.8*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-9 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, brown, sandy CLAY (CL).	0.0	0.0	
	1.0	Moist, tan, silty fine to medium SAND (SM).	1.0	0.1	
			2.0	0.0	
	3.0	Saturated, tan, silty clayey fine to medium SAND (SC).	3.0	0.1	
	4.0	Moist, orange-tan, sandy CLAY (CL).	4.0	0.1	
	5.0	Dry to moist, orange-tan to red-gray, clayey sandy SILT (ML).	5.0	0.0	
			6.0	0.3	
			7.0	1.3	
			8.0	0.0	
			9.0	3.6*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-10 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist to wet, brown to tan, silty fine to coarse SAND (SM), with trace clay.	0.0	0.0	
			1.0	0.0	
			2.0	0.0	
			3.0	0.0	
	4.0	Saturated, tan, clayey SAND (SC).	4.0	0.0	
	5.0	Dry to moist, red-tan, silty SAND (SM).	5.0	0.0	
	6.0	Moist, red-tan to red-gray, clayey SILT (ML).	6.0	0.1	
			7.0	0.0	
			8.0	0.1	
			9.0	0.4*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-11 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist to wet, tan, silty fine to medium SAND (SM).	0.0	0.0	
			1.0	0.3*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	2.0	Wet, tan, silty clayey SAND (SC).	2.0	0.2	
			3.0	0.2	
	4.0	Moist, red-tan, sandy silty CLAY (CL).	4.0	0.1	
			5.0	0.0	
			6.0	0.1	
			7.0	0.1	
			8.0	0.0	
	9.0	Moist, dark gray, sandy clayey SILT (ML).	9.0	0.0	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

GEOPROBE_LOG R5523_GEOENV_GEOPROBELOGS_PARCEL14.GPJ F&R.GDT 6/6/14

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-12 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, silty fine to medium SAND (SM).	0.0	0.2	
			1.0	0.2	
	2.0	Saturated, tan, silty fine to medium SAND (SM).	2.0	0.1	
	3.0	Saturated, tan, silty clayey SAND (SC).	3.0	0.0	
	4.0	Dry to moist, red-tan, clayey silty SAND (SM).	4.0	0.0	
	5.0	Moist, red-tan, silty sandy CLAY (CL).	5.0	0.1	
			6.0	0.0	
			7.0	0.5*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			8.0	0.0	
	9.0	Wet, red-tan, clayey sandy SILT (ML).	9.0	0.1	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-13 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, silty fine to medium SAND (SM).	0.0	0.0	
			1.0	0.3	
	2.0	Wet, tan & orange-tan, silty sandy CLAY (CL).	2.0	0.2	
			3.0	0.7	
	4.0	Moist, red-tan, sandy silty CLAY (CL).	4.0	0.9	
			5.0	1.0*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			6.0	0.8	
			7.0	0.9	
			8.0	0.8	
	9.0	Moist, red-gray, clayey sandy SILT (ML).	9.0	0.7	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-14 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, silty fine to medium SAND (SM).	0.0	0.7	
			1.0	0.0	
	2.0	Saturated, tan, silty fine to medium SAND (SM).	2.0	0.7	
	3.0	Wet, orange-tan, silty sandy CLAY (CL).	3.0	0.6	
	4.0	Moist, red-tan, silty SAND (SM).	4.0	0.7	
			5.0	1.3*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	6.0	Moist, red-tan to red-gray, sandy SILT (ML).	6.0	0.7	
			7.0	1.1	
			8.0	0.8	
			9.0	1.0	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-15 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Dry to moist, brown, fine to medium SAND (SP).	0.0	1.7	
			1.0	0.5	
	2.0	Saturated, tan, silty sandy CLAY (CL).	2.0	0.6	
	3.0	Moist, red-tan, sandy SILT (ML).	3.0	1.0	
			4.0	0.8	
			5.0	1.7*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			6.0	1.0	
	7.0	Moist, red-gray, sandy clayey SILT (ML).	7.0	0.8	
			8.0	0.7	
			9.0	0.5	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

FROEHLING & ROBERTSON, INC.

GEOPROBE LOG

Boring: B-16 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 14)
City/State: Harnett County, NC

Elevation: Existing Ground Surface
Total Depth: 10.0'
Boring Location: See Plan

Drilling Method: Geoprobe
Hammer Type: N/A
Date Drilled: 4/9/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, silty fine to medium SAND (SM).	0.0	1.0	
	1.0	Wet to saturated, orange-tan to red-tan, sandy silty CLAY (CL).	1.0	0.6	
	2.0	Moist, red-tan, sandy CLAY (CL).	2.0	1.1	
			3.0	0.8	
			4.0	0.9	
			5.0	1.3*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	6.0	Moist, tan to red-tan, clayey sandy SILT (ML).	6.0	1.0	
			7.0	0.7	
	8.0	Moist to wet, red-tan, silty sandy CLAY (CL).	8.0	0.8	
			9.0	0.5	
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

*Geoprobe soil samples were collected by continuous push of a 2 inch ID stainless steel barrel containing a 4 foot long acetate collection sleeve. The 4 foot long soil sample sleeves were cut open and the soil was separated into 1 foot long sample intervals.

APPENDIX IV

SITE PHOTOS

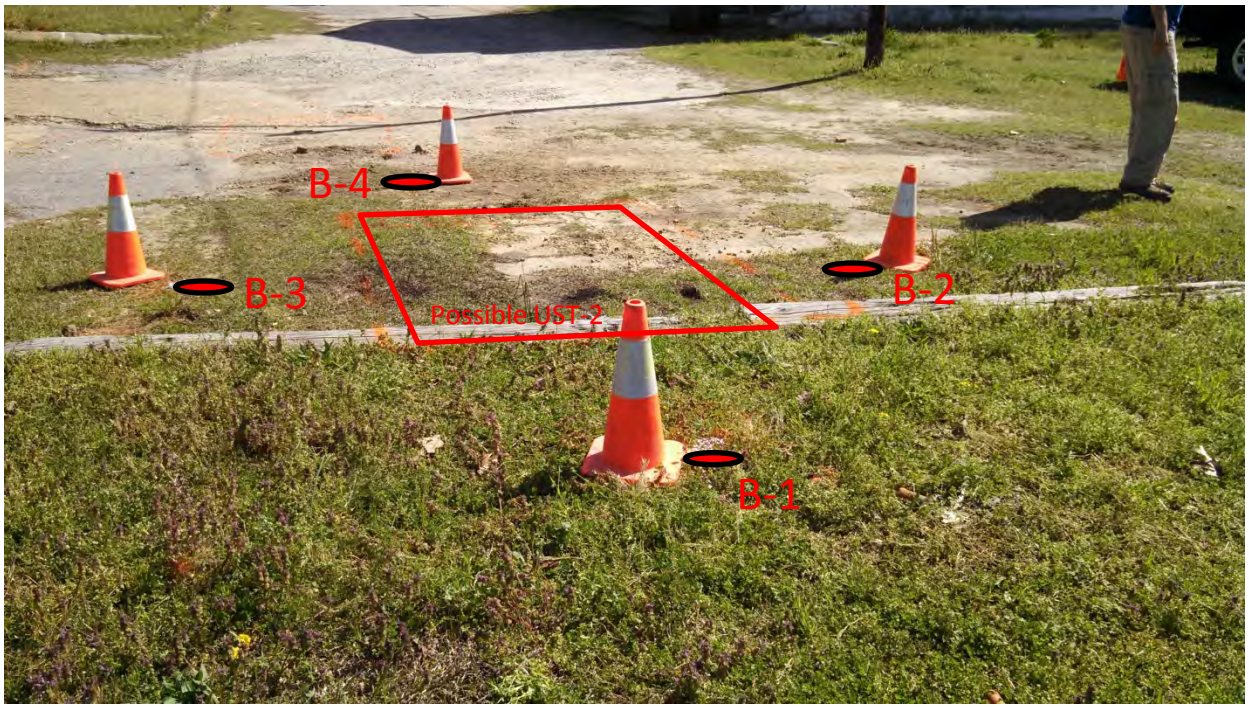


Photo #1: Boring locations B-1 through B-4 advanced at the perimeter of possible UST-2. This photo was taken facing northeast.

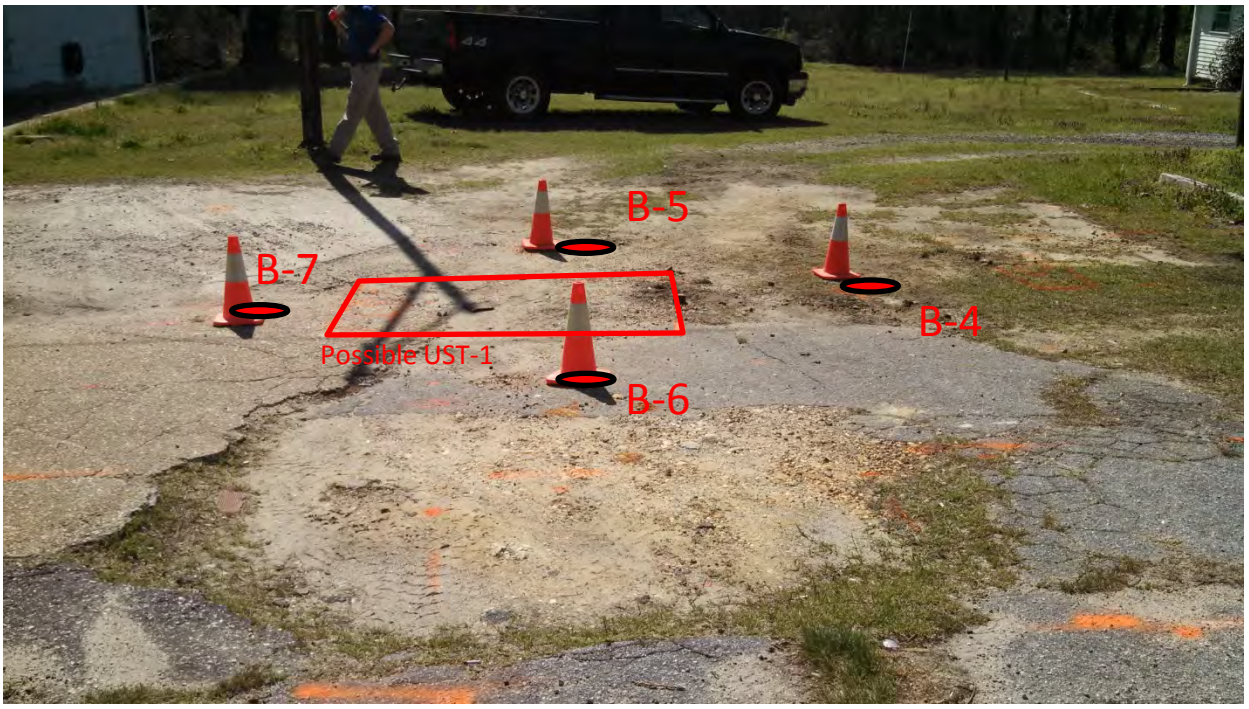


Photo #2: Boring locations B-4 through B-7 advanced at the perimeter of possible UST #. The photo was taken facing southeast.

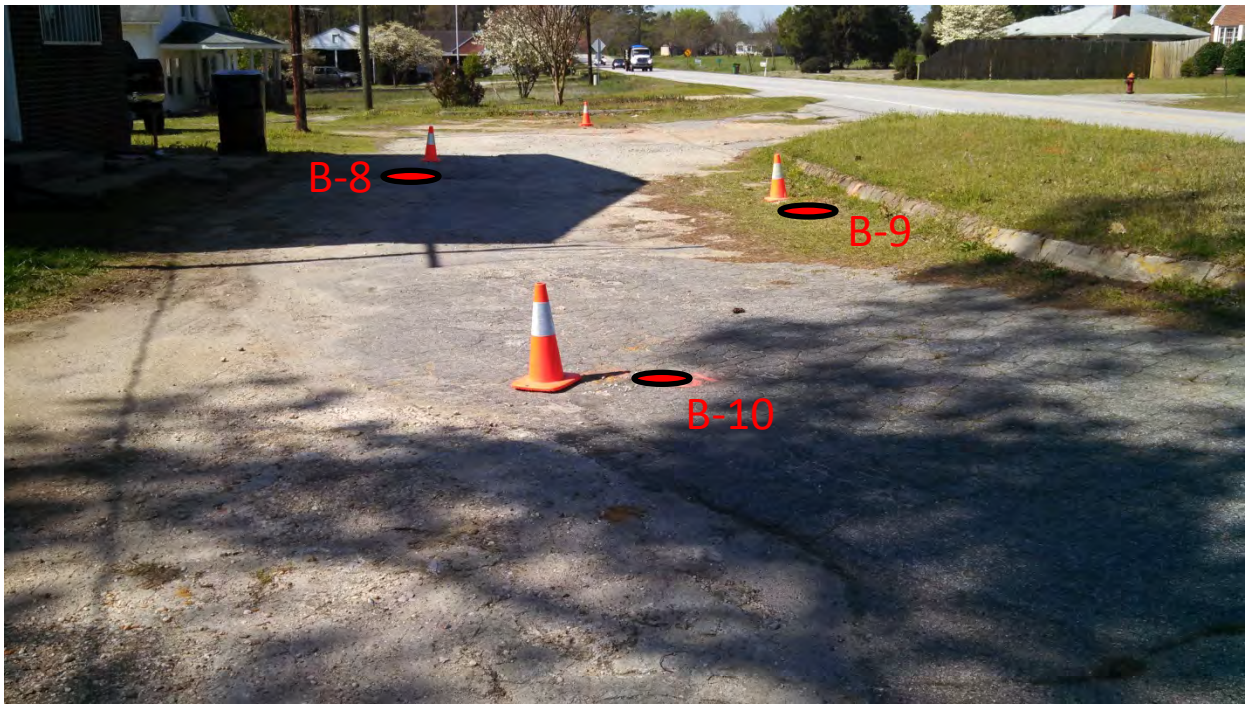


Photo #3: Boring locations B-1 through B-4 advanced at the perimeter of possible UST-2. This photo was taken facing northeast.

Photo #4: Boring location B-11, facing northeast

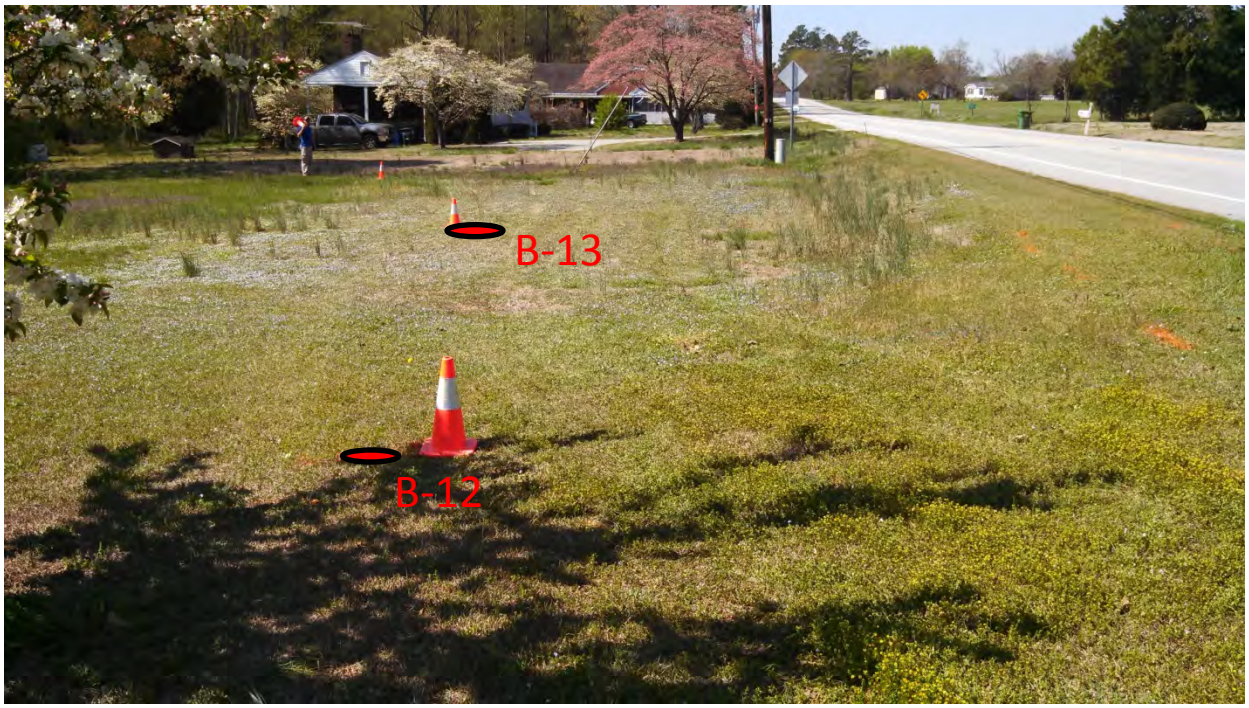


Photo #5: Boring locations B-12 and B-13, facing southwest.

Photo #6: Boring location B-14, facing northwest

Photo #7: Boring locations B-15, facing northwest.

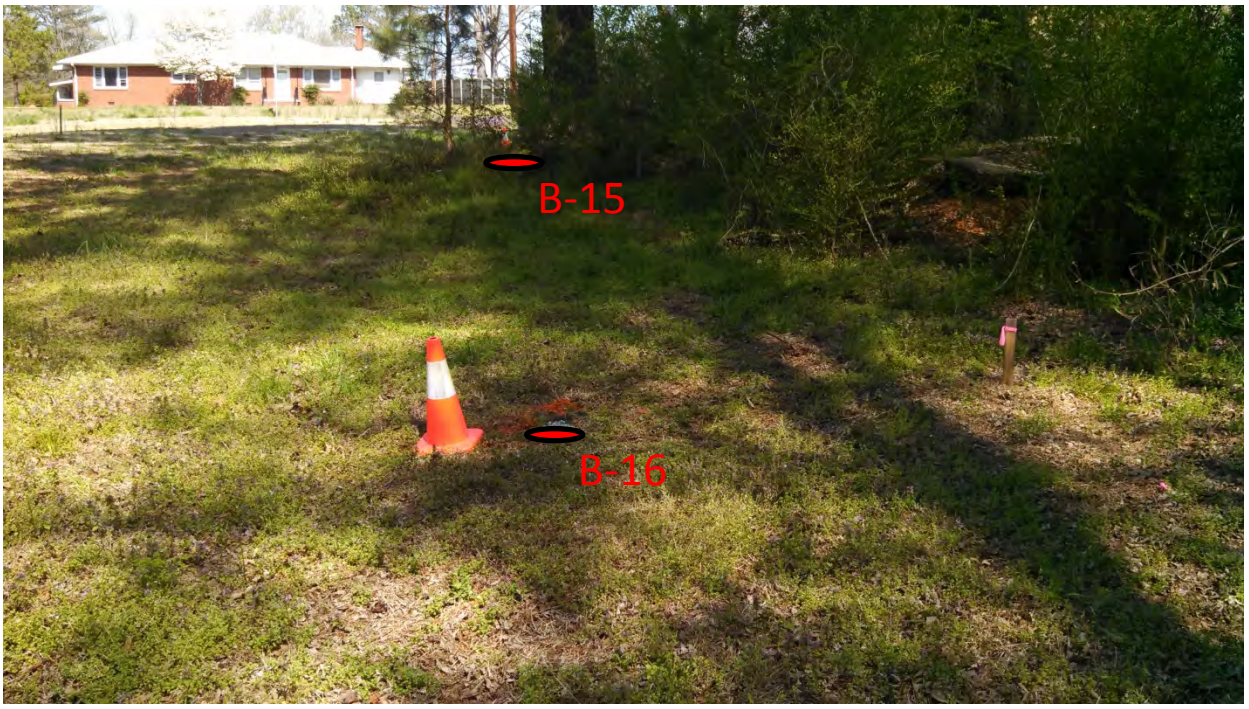


Photo #8: Boring locations B-15 and B-16, facing northwest

APPENDIX V

LABORATORY ANALYTICAL RESULTS

Hydrocarbon Analysis Results

Client: F&R
Address:

Samples taken Wednesday, April 09, 2014
Samples extracted Wednesday, April 09, 2014
Samples analysed Tuesday, April 15, 2014

Contact: MIKE SABODISH

Operator RACHEL MENOHER

Project: NCDOT R-5523 WBS 45548 1-1

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	PARCEL 14 B-1 9-10	15.0	<0.1	<0.1	<0.4	<0.8	<0.1	<0.1	<0.01	0	0	100	TPH not detected
s	PARCEL 14 B-2 7-8	13.0	<0.1	<0.1	<0.3	<0.7	<0.1	<0.1	<0.01	0	0	100	TPH not detected
s	PARCEL 14 B-3 8-9	12.0	<0.1	<0.1	<0.3	<0.3	0.03	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 33.2%
s	PARCEL 14 B-4 10-11	13.0	<0.1	<0.1	<0.3	<0.7	<0.1	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 27.1%
s	PARCEL 14 B-5 11-12	12.0	<0.1	<0.1	0.49	0.49	0.07	<0.1	<0.01	0	30.3	69.7	Deg.Fuel (FCM) (P) 40.4%
s	PARCEL 14 B-6 11-12	12.0	<0.1	<0.1	0.63	0.63	0.03	<0.1	<0.01	49.4	50.6	0	Deg.Fuel Residue (FCM) 36.8%
s	PARCEL 14 B-7 11-12	13.0	<0.1	0.65	2.3	2.95	1.04	0.04	<0.01	93.6	5.8	0.7	Undeg.Diesel (FCM) 82.4%
s	PARCEL 14 B-6 11-12	12.0	<0.1	<0.1	0.78	0.78	0.4	0.01	<0.01	96.6	3.4	0	Deg.Fuel Residue (FCM) 39.1%
s	PARCEL 14 B-8 9-10	12.0	<0.1	<0.1	<0.3	<0.6	<0.1	<0.1	<0.01	0	0	100	TPH not detected
s	PARCEL 14 B-9 9-10	14.0	<0.1	<0.1	<0.3	<0.7	<0.1	<0.1	<0.01	0	0	100	TPH not detected
	Initial Calibrator QC check				OK			Final FCM QC Check				OK	103.5 %

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

Hydrocarbon Analysis Results

Client: F&R
Address:

Samples taken Wednesday, April 09, 2014
Samples extracted Wednesday, April 09, 2014
Samples analysed Tuesday, April 15, 2014

Contact: MIKE SABODISH

Operator RACHEL MENOHER

Project: NCDOT R-5523 WBS 45548 1-1

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	PARCEL 14 B-10 9-10	12.0	<0.1	<0.1	<0.3	<0.3	0.15	<0.1	<0.01	0	20.5	79.5	Deg.Fuel (P) 7%
s	PARCEL 14 B-11 1-2	13.0	<0.1	<0.1	2	2	1.8	0.12	<0.01	35.1	29.4	35.5	V.Deg.PHC 73.6%
s	PARCEL 14 B-12 7-8	13.0	<0.1	<0.1	<0.3	<0.3	0.04	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 28.4%
s	PARCEL 14 B-13 5-6	12.0	<0.1	<0.1	<0.3	<0.3	0.04	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 33.1%
s	PARCEL 14 B-14 5-6	13.0	<0.1	<0.1	<0.3	<0.3	0.05	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 21.3%
s	PARCEL 14 B-15 5-6	11.0	<0.1	<0.1	<0.3	<0.3	0.06	0.02	0.011	0	0	100	Deg.Fuel (P) 12.8%
s	PARCEL 14 B-16 5-6	12.0	<0.1	<0.1	<0.3	<0.3	0.06	<0.1	<0.01	0	15.8	84.2	Deg.Fuel Residue (P) 13.7%
s	PARCEL 12 B-1 2-3	13.0	<0.1	<0.1	17.8	17.8	16.3	0.88	0.011	38.1	44.1	17.9	V.Deg.PHC 89.5%
s	PARCEL 12 B-2 8-9	15.0	<0.2	<0.2	<0.4	<0.4	0.05	<0.1	<0.01	0	0	100	Deg.Fuel Residue (P) 37.4%

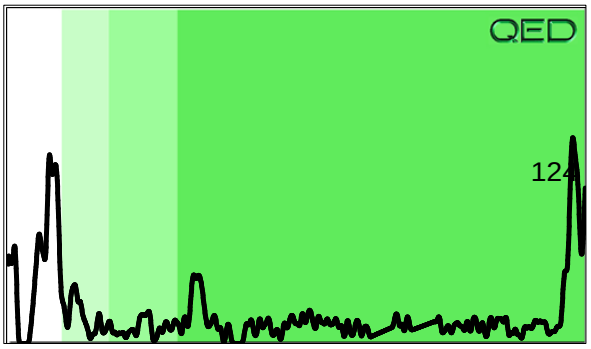
Initial Calibrator QC check OK

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

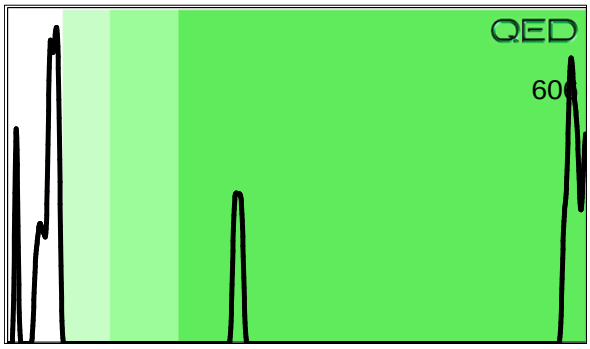
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

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

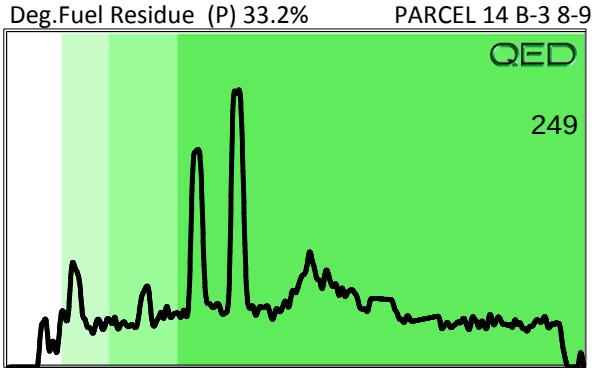
TPH not detected PARCEL 14 B-1 9-10



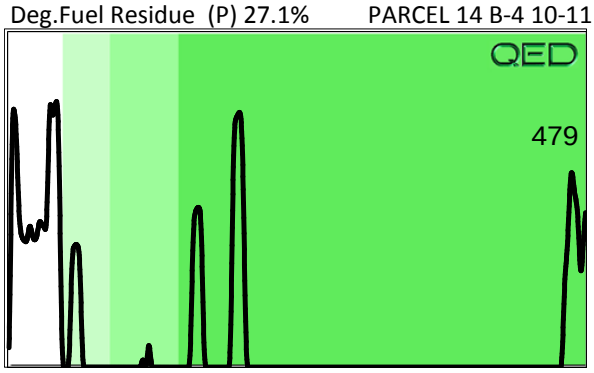
TPH not detected PARCEL 14 B-2 7-8



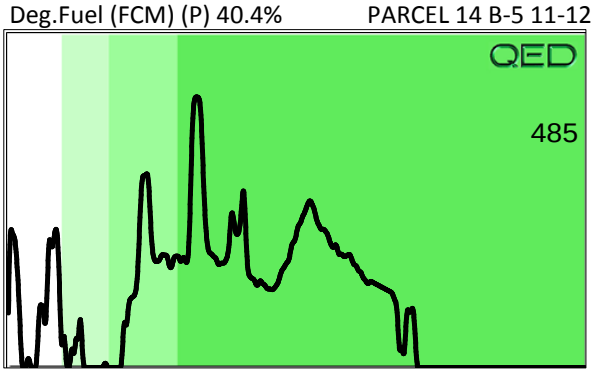
Deg.Fuel Residue (P) 33.2% PARCEL 14 B-3 8-9



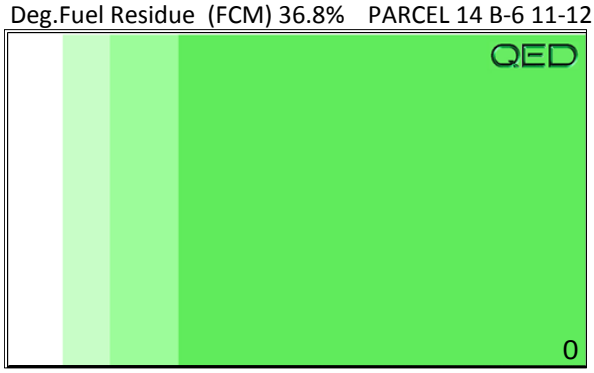
Deg.Fuel Residue (P) 27.1% PARCEL 14 B-4 10-11



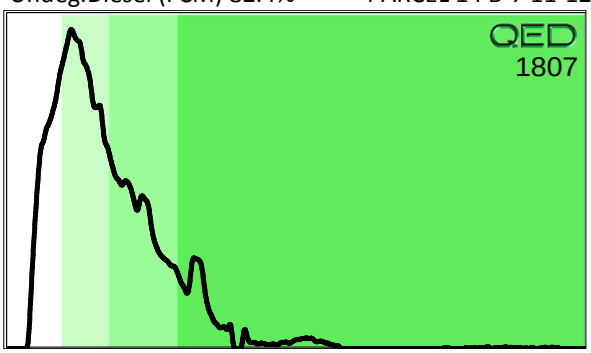
Deg.Fuel (FCM) (P) 40.4% PARCEL 14 B-5 11-12



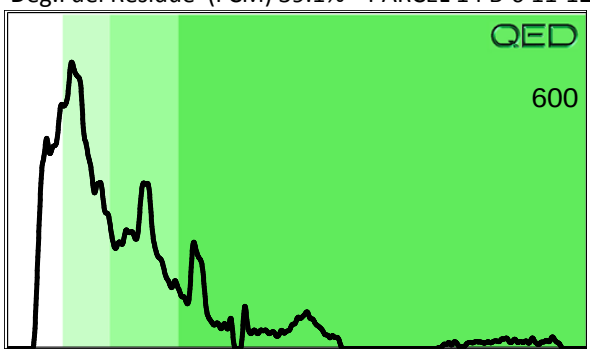
Deg.Fuel Residue (FCM) 36.8% PARCEL 14 B-6 11-12



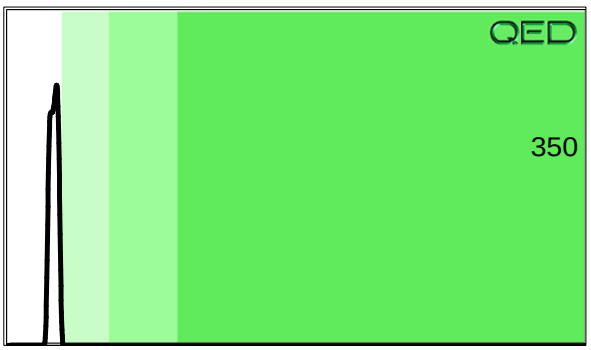
Undeg.Diesel (FCM) 82.4% PARCEL 14 B-7 11-12



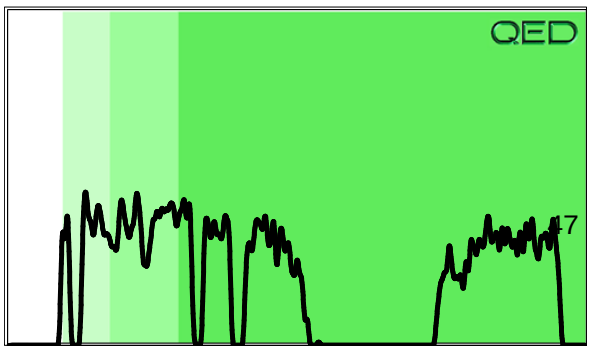
Deg.Fuel Residue (FCM) 39.1% PARCEL 14 B-6 11-12



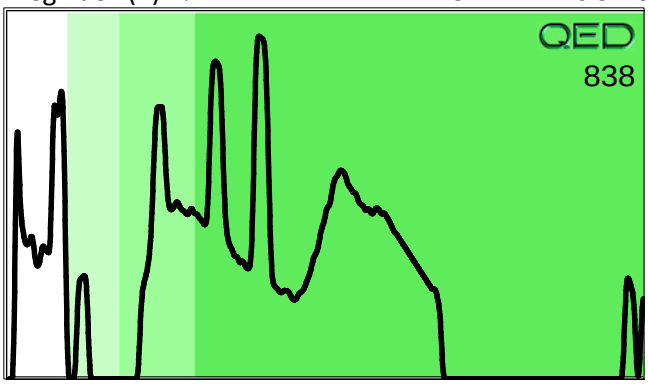
TPH not detected PARCEL 14 B-8 9-10



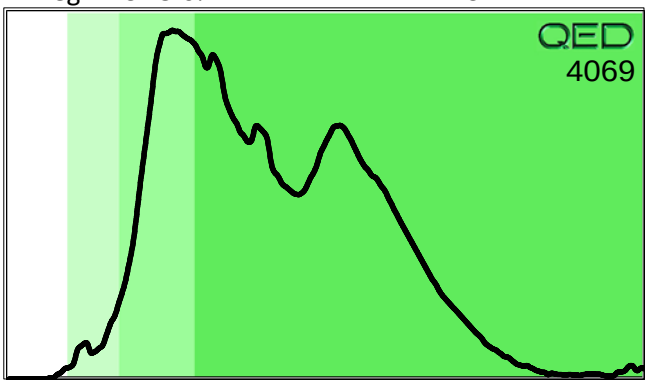
TPH not detected PARCEL 14 B-9 9-10



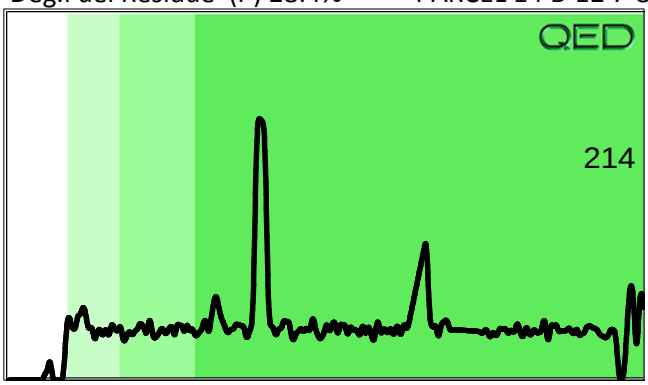
Deg.Fuel (P) 7% PARCEL 14 B-10 9-10



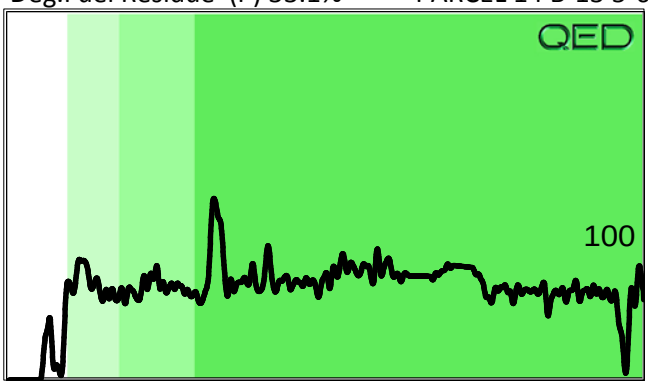
V.Deg.PHC 73.6% PARCEL 14 B-11 1-2



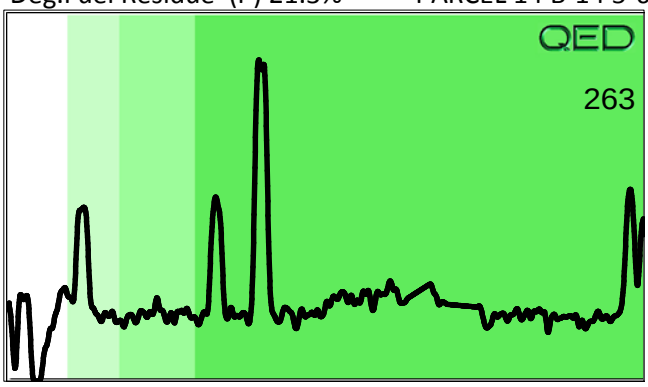
Deg.Fuel Residue (P) 28.4% PARCEL 14 B-12 7-8



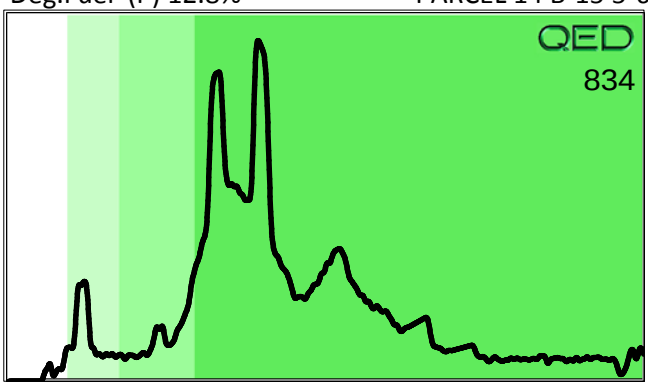
Deg.Fuel Residue (P) 33.1% PARCEL 14 B-13 5-6



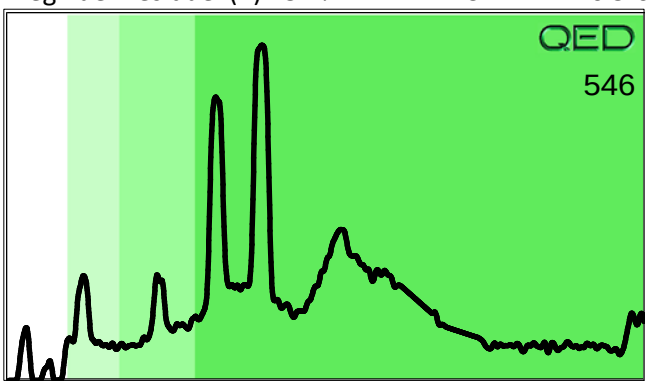
Deg.Fuel Residue (P) 21.3% PARCEL 14 B-14 5-6



Deg.Fuel (P) 12.8% PARCEL 14 B-15 5-6



Deg.Fuel Residue (P) 13.7% PARCEL 14 B-16 5-6



Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

April 18, 2014

Chemical Testing Engineer
NCDOT
Materials & Tests Unit
1801 Blue Ridge Road
Raleigh, NC 27607

RE: Project: R-5523 45548.1.1
Pace Project No.: 92197174

Dear Chemical Engineer:
Enclosed are the analytical results for sample(s) received by the laboratory on April 11, 2014. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

Analyses were performed at the Pace Analytical Services location indicated on the sample analyte page for analysis unless otherwise footnoted.

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

Sincerely,

Kevin Herring
kevin.herring@pacelabs.com
Project Manager

Enclosures

cc: Mike Sabodish, Froehling & Robertson

Pace Analytical Services, Inc.
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CERTIFICATIONS

Project: R-5523 45548.1.1
Pace Project No.: 92197174

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
West Virginia Certification #: 357
Virginia/VELAP Certification #: 460221

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

SAMPLE ANALYTE COUNT

Project: R-5523 45548.1.1
Pace Project No.: 92197174

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
92197174001	**PARCEL 8 B-3 GW**	EPA 8270	BPJ	74	PASI-C
		EPA 8260	MCK	63	PASI-C
92197174002	**PARCEL 14 B-4 GW**	EPA 8270	BPJ	74	PASI-C
		EPA 8260	MCK	63	PASI-C

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: R-5523 45548.1.1
Pace Project No.: 92197174

Sample: PARCEL 14 B-4 GW **Lab ID: 92197174002** Collected: 04/10/14 12:30 Received: 04/11/14 15:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV Semivolatile Organic	Analytical Method: EPA 8270 Preparation Method: EPA 3510							
Acenaphthene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	83-32-9	
Acenaphthylene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	208-96-8	
Aniline	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	62-53-3	
Anthracene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	120-12-7	
Benzo(a)anthracene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	56-55-3	
Benzo(a)pyrene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	207-08-9	
Benzoic Acid	ND	ug/L	50.0	1	04/15/14 11:01	04/16/14 20:30	65-85-0	
Benzyl alcohol	ND	ug/L	20.0	1	04/15/14 11:01	04/16/14 20:30	100-51-6	
4-Bromophenylphenyl ether	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	101-55-3	
Butylbenzylphthalate	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	85-68-7	
4-Chloro-3-methylphenol	ND	ug/L	20.0	1	04/15/14 11:01	04/16/14 20:30	59-50-7	
4-Chloroaniline	ND	ug/L	20.0	1	04/15/14 11:01	04/16/14 20:30	106-47-8	
bis(2-Chloroethoxy)methane	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	111-91-1	
bis(2-Chloroethyl) ether	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	111-44-4	
bis(2-Chloroisopropyl) ether	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	108-60-1	
2-Chloronaphthalene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	91-58-7	
2-Chlorophenol	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	95-57-8	
4-Chlorophenylphenyl ether	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	7005-72-3	
Chrysene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	53-70-3	
Dibenzofuran	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	132-64-9	
1,2-Dichlorobenzene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	106-46-7	
3,3'-Dichlorobenzidine	ND	ug/L	20.0	1	04/15/14 11:01	04/16/14 20:30	91-94-1	
2,4-Dichlorophenol	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	120-83-2	
Diethylphthalate	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	84-66-2	
2,4-Dimethylphenol	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	105-67-9	
Dimethylphthalate	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	131-11-3	
Di-n-butylphthalate	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	84-74-2	
4,6-Dinitro-2-methylphenol	ND	ug/L	20.0	1	04/15/14 11:01	04/16/14 20:30	534-52-1	
2,4-Dinitrophenol	ND	ug/L	50.0	1	04/15/14 11:01	04/16/14 20:30	51-28-5	
2,4-Dinitrotoluene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	121-14-2	
2,6-Dinitrotoluene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	606-20-2	
Di-n-octylphthalate	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	117-84-0	
bis(2-Ethylhexyl)phthalate	ND	ug/L	6.0	1	04/15/14 11:01	04/16/14 20:30	117-81-7	
Fluoranthene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	206-44-0	
Fluorene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	86-73-7	
Hexachloro-1,3-butadiene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	87-68-3	
Hexachlorobenzene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	118-74-1	
Hexachlorocyclopentadiene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	77-47-4	
Hexachloroethane	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	67-72-1	
Indeno(1,2,3-cd)pyrene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	193-39-5	
Isophorone	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	78-59-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: R-5523 45548.1.1
Pace Project No.: 92197174

Sample: PARCEL 14 B-4 GW **Lab ID: 92197174002** Collected: 04/10/14 12:30 Received: 04/11/14 15:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270 MSSV Semivolatile Organic	Analytical Method: EPA 8270 Preparation Method: EPA 3510							
1-Methylnaphthalene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	90-12-0	
2-Methylnaphthalene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	91-57-6	
2-Methylphenol(o-Cresol)	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	95-48-7	
3&4-Methylphenol(m&p Cresol)	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30		
Naphthalene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	91-20-3	
2-Nitroaniline	ND	ug/L	50.0	1	04/15/14 11:01	04/16/14 20:30	88-74-4	
3-Nitroaniline	ND	ug/L	50.0	1	04/15/14 11:01	04/16/14 20:30	99-09-2	
4-Nitroaniline	ND	ug/L	20.0	1	04/15/14 11:01	04/16/14 20:30	100-01-6	
Nitrobenzene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	98-95-3	
2-Nitrophenol	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	88-75-5	
4-Nitrophenol	ND	ug/L	50.0	1	04/15/14 11:01	04/16/14 20:30	100-02-7	
N-Nitrosodimethylamine	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	62-75-9	
N-Nitroso-di-n-propylamine	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	621-64-7	
N-Nitrosodiphenylamine	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	86-30-6	
Pentachlorophenol	ND	ug/L	25.0	1	04/15/14 11:01	04/16/14 20:30	87-86-5	
Phenanthrene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	85-01-8	
Phenol	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	108-95-2	
Pyrene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	129-00-0	
1,2,4-Trichlorobenzene	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	120-82-1	
2,4,5-Trichlorophenol	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	95-95-4	
2,4,6-Trichlorophenol	ND	ug/L	10.0	1	04/15/14 11:01	04/16/14 20:30	88-06-2	
Surrogates								
Nitrobenzene-d5 (S)	79	%	21-110	1	04/15/14 11:01	04/16/14 20:30	4165-60-0	
2-Fluorobiphenyl (S)	74	%	27-110	1	04/15/14 11:01	04/16/14 20:30	321-60-8	
Terphenyl-d14 (S)	94	%	31-107	1	04/15/14 11:01	04/16/14 20:30	1718-51-0	
Phenol-d6 (S)	33	%	10-110	1	04/15/14 11:01	04/16/14 20:30	13127-88-3	
2-Fluorophenol (S)	45	%	12-110	1	04/15/14 11:01	04/16/14 20:30	367-12-4	
2,4,6-Tribromophenol (S)	79	%	27-110	1	04/15/14 11:01	04/16/14 20:30	118-79-6	
8260 MSV Low Level	Analytical Method: EPA 8260							
Acetone	ND	ug/L	25.0	1		04/15/14 22:29	67-64-1	
Benzene	ND	ug/L	1.0	1		04/15/14 22:29	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		04/15/14 22:29	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		04/15/14 22:29	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		04/15/14 22:29	75-27-4	
Bromoform	ND	ug/L	1.0	1		04/15/14 22:29	75-25-2	
Bromomethane	ND	ug/L	2.0	1		04/15/14 22:29	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	1		04/15/14 22:29	78-93-3	
Carbon tetrachloride	ND	ug/L	1.0	1		04/15/14 22:29	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		04/15/14 22:29	108-90-7	
Chloroethane	ND	ug/L	1.0	1		04/15/14 22:29	75-00-3	
Chloroform	ND	ug/L	1.0	1		04/15/14 22:29	67-66-3	
Chloromethane	ND	ug/L	1.0	1		04/15/14 22:29	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		04/15/14 22:29	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		04/15/14 22:29	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	5.0	1		04/15/14 22:29	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		04/15/14 22:29	124-48-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

ANALYTICAL RESULTS

Project: R-5523 45548.1.1
Pace Project No.: 92197174

Sample: PARCEL 14 B-4 GW **Lab ID: 92197174002** Collected: 04/10/14 12:30 Received: 04/11/14 15:15 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV Low Level	Analytical Method: EPA 8260							
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		04/15/14 22:29	106-93-4	
Dibromomethane	ND	ug/L	1.0	1		04/15/14 22:29	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		04/15/14 22:29	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		04/15/14 22:29	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		04/15/14 22:29	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		04/15/14 22:29	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		04/15/14 22:29	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		04/15/14 22:29	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	1		04/15/14 22:29	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		04/15/14 22:29	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		04/15/14 22:29	156-60-5	
1,2-Dichloropropane	ND	ug/L	1.0	1		04/15/14 22:29	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		04/15/14 22:29	142-28-9	
2,2-Dichloropropane	ND	ug/L	1.0	1		04/15/14 22:29	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		04/15/14 22:29	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		04/15/14 22:29	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		04/15/14 22:29	10061-02-6	
Diisopropyl ether	ND	ug/L	1.0	1		04/15/14 22:29	108-20-3	
Ethylbenzene	ND	ug/L	1.0	1		04/15/14 22:29	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		04/15/14 22:29	87-68-3	
2-Hexanone	ND	ug/L	5.0	1		04/15/14 22:29	591-78-6	
p-Isopropyltoluene	ND	ug/L	1.0	1		04/15/14 22:29	99-87-6	
Methylene Chloride	ND	ug/L	2.0	1		04/15/14 22:29	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	1		04/15/14 22:29	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/15/14 22:29	1634-04-4	
Naphthalene	ND	ug/L	1.0	1		04/15/14 22:29	91-20-3	
Styrene	ND	ug/L	1.0	1		04/15/14 22:29	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		04/15/14 22:29	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		04/15/14 22:29	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		04/15/14 22:29	127-18-4	
Toluene	ND	ug/L	1.0	1		04/15/14 22:29	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		04/15/14 22:29	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		04/15/14 22:29	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		04/15/14 22:29	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		04/15/14 22:29	79-00-5	
Trichloroethene	ND	ug/L	1.0	1		04/15/14 22:29	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		04/15/14 22:29	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	1.0	1		04/15/14 22:29	96-18-4	
Vinyl acetate	ND	ug/L	2.0	1		04/15/14 22:29	108-05-4	
Vinyl chloride	ND	ug/L	1.0	1		04/15/14 22:29	75-01-4	
Xylene (Total)	ND	ug/L	2.0	1		04/15/14 22:29	1330-20-7	
m&p-Xylene	ND	ug/L	2.0	1		04/15/14 22:29	179601-23-1	
o-Xylene	ND	ug/L	1.0	1		04/15/14 22:29	95-47-6	
Surrogates								
4-Bromofluorobenzene (S)	103	%	70-130	1		04/15/14 22:29	460-00-4	
1,2-Dichloroethane-d4 (S)	96	%	70-130	1		04/15/14 22:29	17060-07-0	
Toluene-d8 (S)	95	%	70-130	1		04/15/14 22:29	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

QC Batch: MSV/26464 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV Low Level
Associated Lab Samples: 92197174001, 92197174002

METHOD BLANK: 1178873 Matrix: Water
Associated Lab Samples: 92197174001, 92197174002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	04/15/14 14:16	
1,1,1-Trichloroethane	ug/L	ND	1.0	04/15/14 14:16	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	04/15/14 14:16	
1,1,2-Trichloroethane	ug/L	ND	1.0	04/15/14 14:16	
1,1-Dichloroethane	ug/L	ND	1.0	04/15/14 14:16	
1,1-Dichloroethene	ug/L	ND	1.0	04/15/14 14:16	
1,1-Dichloropropene	ug/L	ND	1.0	04/15/14 14:16	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	04/15/14 14:16	
1,2,3-Trichloropropane	ug/L	ND	1.0	04/15/14 14:16	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	04/15/14 14:16	
1,2-Dibromo-3-chloropropane	ug/L	ND	5.0	04/15/14 14:16	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	04/15/14 14:16	
1,2-Dichlorobenzene	ug/L	ND	1.0	04/15/14 14:16	
1,2-Dichloroethane	ug/L	ND	1.0	04/15/14 14:16	
1,2-Dichloropropane	ug/L	ND	1.0	04/15/14 14:16	
1,3-Dichlorobenzene	ug/L	ND	1.0	04/15/14 14:16	
1,3-Dichloropropane	ug/L	ND	1.0	04/15/14 14:16	
1,4-Dichlorobenzene	ug/L	ND	1.0	04/15/14 14:16	
2,2-Dichloropropane	ug/L	ND	1.0	04/15/14 14:16	
2-Butanone (MEK)	ug/L	ND	5.0	04/15/14 14:16	
2-Chlorotoluene	ug/L	ND	1.0	04/15/14 14:16	
2-Hexanone	ug/L	ND	5.0	04/15/14 14:16	
4-Chlorotoluene	ug/L	ND	1.0	04/15/14 14:16	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	04/15/14 14:16	
Acetone	ug/L	ND	25.0	04/15/14 14:16	
Benzene	ug/L	ND	1.0	04/15/14 14:16	
Bromobenzene	ug/L	ND	1.0	04/15/14 14:16	
Bromochloromethane	ug/L	ND	1.0	04/15/14 14:16	
Bromodichloromethane	ug/L	ND	1.0	04/15/14 14:16	
Bromoform	ug/L	ND	1.0	04/15/14 14:16	
Bromomethane	ug/L	ND	2.0	04/15/14 14:16	
Carbon tetrachloride	ug/L	ND	1.0	04/15/14 14:16	
Chlorobenzene	ug/L	ND	1.0	04/15/14 14:16	
Chloroethane	ug/L	ND	1.0	04/15/14 14:16	
Chloroform	ug/L	ND	1.0	04/15/14 14:16	
Chloromethane	ug/L	ND	1.0	04/15/14 14:16	
cis-1,2-Dichloroethene	ug/L	ND	1.0	04/15/14 14:16	
cis-1,3-Dichloropropene	ug/L	ND	1.0	04/15/14 14:16	
Dibromochloromethane	ug/L	ND	1.0	04/15/14 14:16	
Dibromomethane	ug/L	ND	1.0	04/15/14 14:16	
Dichlorodifluoromethane	ug/L	ND	1.0	04/15/14 14:16	
Diisopropyl ether	ug/L	ND	1.0	04/15/14 14:16	
Ethylbenzene	ug/L	ND	1.0	04/15/14 14:16	

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QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

METHOD BLANK: 1178873 Matrix: Water
Associated Lab Samples: 92197174001, 92197174002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	ug/L	ND	1.0	04/15/14 14:16	
m&p-Xylene	ug/L	ND	2.0	04/15/14 14:16	
Methyl-tert-butyl ether	ug/L	ND	1.0	04/15/14 14:16	
Methylene Chloride	ug/L	ND	2.0	04/15/14 14:16	
Naphthalene	ug/L	ND	1.0	04/15/14 14:16	
o-Xylene	ug/L	ND	1.0	04/15/14 14:16	
p-Isopropyltoluene	ug/L	ND	1.0	04/15/14 14:16	
Styrene	ug/L	ND	1.0	04/15/14 14:16	
Tetrachloroethene	ug/L	ND	1.0	04/15/14 14:16	
Toluene	ug/L	ND	1.0	04/15/14 14:16	
trans-1,2-Dichloroethene	ug/L	ND	1.0	04/15/14 14:16	
trans-1,3-Dichloropropene	ug/L	ND	1.0	04/15/14 14:16	
Trichloroethene	ug/L	ND	1.0	04/15/14 14:16	
Trichlorofluoromethane	ug/L	ND	1.0	04/15/14 14:16	
Vinyl acetate	ug/L	ND	2.0	04/15/14 14:16	
Vinyl chloride	ug/L	ND	1.0	04/15/14 14:16	
Xylene (Total)	ug/L	ND	2.0	04/15/14 14:16	
1,2-Dichloroethane-d4 (S)	%	92	70-130	04/15/14 14:16	
4-Bromofluorobenzene (S)	%	105	70-130	04/15/14 14:16	
Toluene-d8 (S)	%	97	70-130	04/15/14 14:16	

LABORATORY CONTROL SAMPLE: 1178874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	50	42.0	84	70-130	
1,1,1-Trichloroethane	ug/L	50	40.4	81	70-130	
1,1,2,2-Tetrachloroethane	ug/L	50	40.6	81	70-130	
1,1,2-Trichloroethane	ug/L	50	41.6	83	70-130	
1,1-Dichloroethane	ug/L	50	39.7	79	70-130	
1,1-Dichloroethene	ug/L	50	41.6	83	70-132	
1,1-Dichloropropene	ug/L	50	40.8	82	70-130	
1,2,3-Trichlorobenzene	ug/L	50	42.0	84	70-135	
1,2,3-Trichloropropane	ug/L	50	40.9	82	70-130	
1,2,4-Trichlorobenzene	ug/L	50	42.0	84	70-134	
1,2-Dibromo-3-chloropropane	ug/L	50	41.1	82	70-130	
1,2-Dibromoethane (EDB)	ug/L	50	41.9	84	70-130	
1,2-Dichlorobenzene	ug/L	50	41.8	84	70-130	
1,2-Dichloroethane	ug/L	50	39.6	79	70-130	
1,2-Dichloropropane	ug/L	50	43.6	87	70-130	
1,3-Dichlorobenzene	ug/L	50	41.7	83	70-130	
1,3-Dichloropropane	ug/L	50	41.4	83	70-130	
1,4-Dichlorobenzene	ug/L	50	42.2	84	70-130	
2,2-Dichloropropane	ug/L	50	42.2	84	58-145	
2-Butanone (MEK)	ug/L	100	74.5	74	70-145	
2-Chlorotoluene	ug/L	50	41.0	82	70-130	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

LABORATORY CONTROL SAMPLE: 1178874

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Hexanone	ug/L	100	88.5	88	70-144	
4-Chlorotoluene	ug/L	50	42.8	86	70-130	
4-Methyl-2-pentanone (MIBK)	ug/L	100	89.5	90	70-140	
Acetone	ug/L	100	75.3	75	50-175	
Benzene	ug/L	50	42.7	85	70-130	
Bromobenzene	ug/L	50	42.8	86	70-130	
Bromochloromethane	ug/L	50	42.5	85	70-130	
Bromodichloromethane	ug/L	50	41.8	84	70-130	
Bromoform	ug/L	50	41.5	83	70-130	
Bromomethane	ug/L	50	32.1	64	54-130	
Carbon tetrachloride	ug/L	50	45.6	91	70-132	
Chlorobenzene	ug/L	50	40.0	80	70-130	
Chloroethane	ug/L	50	41.6	83	64-134	
Chloroform	ug/L	50	39.5	79	70-130	
Chloromethane	ug/L	50	33.2	66	64-130	
cis-1,2-Dichloroethene	ug/L	50	40.8	82	70-131	
cis-1,3-Dichloropropene	ug/L	50	41.9	84	70-130	
Dibromochloromethane	ug/L	50	41.2	82	70-130	
Dibromomethane	ug/L	50	41.7	83	70-131	
Dichlorodifluoromethane	ug/L	50	46.5	93	56-130	
Diisopropyl ether	ug/L	50	43.6	87	70-130	
Ethylbenzene	ug/L	50	41.5	83	70-130	
Hexachloro-1,3-butadiene	ug/L	50	44.9	90	70-130	
m&p-Xylene	ug/L	100	86.9	87	70-130	
Methyl-tert-butyl ether	ug/L	50	41.0	82	70-130	
Methylene Chloride	ug/L	50	41.2	82	63-130	
Naphthalene	ug/L	50	40.2	80	70-138	
o-Xylene	ug/L	50	42.5	85	70-130	
p-Isopropyltoluene	ug/L	50	43.2	86	70-130	
Styrene	ug/L	50	43.4	87	70-130	
Tetrachloroethene	ug/L	50	43.6	87	70-130	
Toluene	ug/L	50	41.0	82	70-130	
trans-1,2-Dichloroethene	ug/L	50	41.1	82	70-130	
trans-1,3-Dichloropropene	ug/L	50	42.0	84	70-132	
Trichloroethene	ug/L	50	42.0	84	70-130	
Trichlorofluoromethane	ug/L	50	45.6	91	62-133	
Vinyl acetate	ug/L	100	97.5	97	66-157	
Vinyl chloride	ug/L	50	50.7	101	69-130	
Xylene (Total)	ug/L	150	129	86	70-130	
1,2-Dichloroethane-d4 (S)	%			97	70-130	
4-Bromofluorobenzene (S)	%			102	70-130	
Toluene-d8 (S)	%			99	70-130	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1179376 1179377

Parameter	Units	92197352007 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Qual
1,1-Dichloroethene	ug/L	ND	50	50	54.3	59.0	109	118	70-166	8	
Benzene	ug/L	ND	50	50	51.2	56.2	102	112	70-148	9	
Chlorobenzene	ug/L	ND	50	50	43.6	47.3	87	95	70-146	8	
Toluene	ug/L	ND	50	50	49.5	54.0	99	108	70-155	9	
Trichloroethene	ug/L	ND	50	50	53.7	58.5	107	117	69-151	9	
1,2-Dichloroethane-d4 (S)	%						109	111	70-130		
4-Bromofluorobenzene (S)	%						104	103	70-130		
Toluene-d8 (S)	%						102	103	70-130		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

QC Batch: OEXT/27042 Analysis Method: EPA 8270
QC Batch Method: EPA 3510 Analysis Description: 8270 Water MSSV
Associated Lab Samples: 92197174001, 92197174002

METHOD BLANK: 1178257 Matrix: Water
Associated Lab Samples: 92197174001, 92197174002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,2,4-Trichlorobenzene	ug/L	ND	10.0	04/16/14 12:20	
1,2-Dichlorobenzene	ug/L	ND	10.0	04/16/14 12:20	
1,3-Dichlorobenzene	ug/L	ND	10.0	04/16/14 12:20	
1,4-Dichlorobenzene	ug/L	ND	10.0	04/16/14 12:20	
1-Methylnaphthalene	ug/L	ND	10.0	04/16/14 12:20	
2,4,5-Trichlorophenol	ug/L	ND	10.0	04/16/14 12:20	
2,4,6-Trichlorophenol	ug/L	ND	10.0	04/16/14 12:20	
2,4-Dichlorophenol	ug/L	ND	10.0	04/16/14 12:20	
2,4-Dimethylphenol	ug/L	ND	10.0	04/16/14 12:20	
2,4-Dinitrophenol	ug/L	ND	50.0	04/16/14 12:20	
2,4-Dinitrotoluene	ug/L	ND	10.0	04/16/14 12:20	
2,6-Dinitrotoluene	ug/L	ND	10.0	04/16/14 12:20	
2-Chloronaphthalene	ug/L	ND	10.0	04/16/14 12:20	
2-Chlorophenol	ug/L	ND	10.0	04/16/14 12:20	
2-Methylnaphthalene	ug/L	ND	10.0	04/16/14 12:20	
2-Methylphenol(o-Cresol)	ug/L	ND	10.0	04/16/14 12:20	
2-Nitroaniline	ug/L	ND	50.0	04/16/14 12:20	
2-Nitrophenol	ug/L	ND	10.0	04/16/14 12:20	
3&4-Methylphenol(m&p Cresol)	ug/L	ND	10.0	04/16/14 12:20	
3,3'-Dichlorobenzidine	ug/L	ND	20.0	04/16/14 12:20	
3-Nitroaniline	ug/L	ND	50.0	04/16/14 12:20	
4,6-Dinitro-2-methylphenol	ug/L	ND	20.0	04/16/14 12:20	
4-Bromophenylphenyl ether	ug/L	ND	10.0	04/16/14 12:20	
4-Chloro-3-methylphenol	ug/L	ND	20.0	04/16/14 12:20	
4-Chloroaniline	ug/L	ND	20.0	04/16/14 12:20	
4-Chlorophenylphenyl ether	ug/L	ND	10.0	04/16/14 12:20	
4-Nitroaniline	ug/L	ND	20.0	04/16/14 12:20	
4-Nitrophenol	ug/L	ND	50.0	04/16/14 12:20	
Acenaphthene	ug/L	ND	10.0	04/16/14 12:20	
Acenaphthylene	ug/L	ND	10.0	04/16/14 12:20	
Aniline	ug/L	ND	10.0	04/16/14 12:20	
Anthracene	ug/L	ND	10.0	04/16/14 12:20	
Benzo(a)anthracene	ug/L	ND	10.0	04/16/14 12:20	
Benzo(a)pyrene	ug/L	ND	10.0	04/16/14 12:20	
Benzo(b)fluoranthene	ug/L	ND	10.0	04/16/14 12:20	
Benzo(g,h,i)perylene	ug/L	ND	10.0	04/16/14 12:20	
Benzo(k)fluoranthene	ug/L	ND	10.0	04/16/14 12:20	
Benzoic Acid	ug/L	ND	50.0	04/16/14 12:20	
Benzyl alcohol	ug/L	ND	20.0	04/16/14 12:20	
bis(2-Chloroethoxy)methane	ug/L	ND	10.0	04/16/14 12:20	
bis(2-Chloroethyl) ether	ug/L	ND	10.0	04/16/14 12:20	
bis(2-Chloroisopropyl) ether	ug/L	ND	10.0	04/16/14 12:20	
bis(2-Ethylhexyl)phthalate	ug/L	ND	6.0	04/16/14 12:20	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

METHOD BLANK: 1178257 Matrix: Water
Associated Lab Samples: 92197174001, 92197174002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Butylbenzylphthalate	ug/L	ND	10.0	04/16/14 12:20	
Chrysene	ug/L	ND	10.0	04/16/14 12:20	
Di-n-butylphthalate	ug/L	ND	10.0	04/16/14 12:20	
Di-n-octylphthalate	ug/L	ND	10.0	04/16/14 12:20	
Dibenz(a,h)anthracene	ug/L	ND	10.0	04/16/14 12:20	
Dibenzofuran	ug/L	ND	10.0	04/16/14 12:20	
Diethylphthalate	ug/L	ND	10.0	04/16/14 12:20	
Dimethylphthalate	ug/L	ND	10.0	04/16/14 12:20	
Fluoranthene	ug/L	ND	10.0	04/16/14 12:20	
Fluorene	ug/L	ND	10.0	04/16/14 12:20	
Hexachloro-1,3-butadiene	ug/L	ND	10.0	04/16/14 12:20	
Hexachlorobenzene	ug/L	ND	10.0	04/16/14 12:20	
Hexachlorocyclopentadiene	ug/L	ND	10.0	04/16/14 12:20	
Hexachloroethane	ug/L	ND	10.0	04/16/14 12:20	
Indeno(1,2,3-cd)pyrene	ug/L	ND	10.0	04/16/14 12:20	
Isophorone	ug/L	ND	10.0	04/16/14 12:20	
N-Nitroso-di-n-propylamine	ug/L	ND	10.0	04/16/14 12:20	
N-Nitrosodimethylamine	ug/L	ND	10.0	04/16/14 12:20	
N-Nitrosodiphenylamine	ug/L	ND	10.0	04/16/14 12:20	
Naphthalene	ug/L	ND	10.0	04/16/14 12:20	
Nitrobenzene	ug/L	ND	10.0	04/16/14 12:20	
Pentachlorophenol	ug/L	ND	25.0	04/16/14 12:20	
Phenanthrene	ug/L	ND	10.0	04/16/14 12:20	
Phenol	ug/L	ND	10.0	04/16/14 12:20	
Pyrene	ug/L	ND	10.0	04/16/14 12:20	
2,4,6-Tribromophenol (S)	%	87	27-110	04/16/14 12:20	
2-Fluorobiphenyl (S)	%	81	27-110	04/16/14 12:20	
2-Fluorophenol (S)	%	47	12-110	04/16/14 12:20	
Nitrobenzene-d5 (S)	%	84	21-110	04/16/14 12:20	
Phenol-d6 (S)	%	36	10-110	04/16/14 12:20	
Terphenyl-d14 (S)	%	99	31-107	04/16/14 12:20	

LABORATORY CONTROL SAMPLE: 1178258

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/L	50	31.7	63	10-110	
1,2-Dichlorobenzene	ug/L	50	38.5	77	10-110	
1,3-Dichlorobenzene	ug/L	50	36.5	73	10-110	
1,4-Dichlorobenzene	ug/L	50	39.2	78	10-110	
1-Methylnaphthalene	ug/L	50	33.5	67	21-110	
2,4,5-Trichlorophenol	ug/L	50	48.2	96	23-116	
2,4,6-Trichlorophenol	ug/L	50	44.7	89	21-114	
2,4-Dichlorophenol	ug/L	50	37.1	74	22-120	
2,4-Dimethylphenol	ug/L	50	33.8	68	15-109	
2,4-Dinitrophenol	ug/L	250	220	88	10-103	

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

LABORATORY CONTROL SAMPLE: 1178258

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2,4-Dinitrotoluene	ug/L	50	55.7	111	24-119	
2,6-Dinitrotoluene	ug/L	50	57.6	115	25-116	
2-Chloronaphthalene	ug/L	50	44.1	88	18-110	
2-Chlorophenol	ug/L	50	41.2	82	10-104	
2-Methylnaphthalene	ug/L	50	34.3	69	16-110	
2-Methylphenol(o-Cresol)	ug/L	50	36.4	73	13-110	
2-Nitroaniline	ug/L	100	111	111	20-117	
2-Nitrophenol	ug/L	50	39.3	79	16-108	
3&4-Methylphenol(m&p Cresol)	ug/L	50	27.6	55	14-110	
3,3'-Dichlorobenzidine	ug/L	100	96.0	96	13-131	
3-Nitroaniline	ug/L	100	97.9	98	15-117	
4,6-Dinitro-2-methylphenol	ug/L	100	94.3	94	13-119	
4-Bromophenylphenyl ether	ug/L	50	43.4	87	23-120	
4-Chloro-3-methylphenol	ug/L	100	78.9	79	21-119	
4-Chloroaniline	ug/L	100	63.6	64	10-122	
4-Chlorophenylphenyl ether	ug/L	50	44.3	89	22-112	
4-Nitroaniline	ug/L	100	108	108	14-118	
4-Nitrophenol	ug/L	250	112	45	10-110	
Acenaphthene	ug/L	50	41.8	84	20-105	
Acenaphthylene	ug/L	50	44.1	88	23-106	
Aniline	ug/L	50	26.4	53	10-110	
Anthracene	ug/L	50	45.8	92	25-120	
Benzo(a)anthracene	ug/L	50	47.4	95	21-128	
Benzo(a)pyrene	ug/L	50	48.3	97	25-116	
Benzo(b)fluoranthene	ug/L	50	51.1	102	23-117	
Benzo(g,h,i)perylene	ug/L	50	42.9	86	17-128	
Benzo(k)fluoranthene	ug/L	50	40.4	81	25-127	
Benzoic Acid	ug/L	250	75.4	30	10-110	
Benzyl alcohol	ug/L	100	81.9	82	10-101	
bis(2-Chloroethoxy)methane	ug/L	50	39.1	78	19-107	
bis(2-Chloroethyl) ether	ug/L	50	43.3	87	10-108	
bis(2-Chloroisopropyl) ether	ug/L	50	39.8	80	10-108	
bis(2-Ethylhexyl)phthalate	ug/L	50	56.7	113	16-123	
Butylbenzylphthalate	ug/L	50	58.8	118	20-118	
Chrysene	ug/L	50	46.4	93	24-125	
Di-n-butylphthalate	ug/L	50	50.0	100	23-115	
Di-n-octylphthalate	ug/L	50	52.9	106	20-115	
Dibenz(a,h)anthracene	ug/L	50	45.3	91	18-131	
Dibenzofuran	ug/L	50	48.0	96	23-106	
Diethylphthalate	ug/L	50	44.7	89	24-115	
Dimethylphthalate	ug/L	50	44.9	90	22-113	
Fluoranthene	ug/L	50	48.9	98	24-125	
Fluorene	ug/L	50	46.3	93	24-114	
Hexachloro-1,3-butadiene	ug/L	50	31.0	62	10-110	
Hexachlorobenzene	ug/L	50	46.2	92	22-127	
Hexachlorocyclopentadiene	ug/L	50	30.3	61	10-110	
Hexachloroethane	ug/L	50	42.1	84	10-110	
Indeno(1,2,3-cd)pyrene	ug/L	50	46.1	92	18-130	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA

Project: R-5523 45548.1.1
Pace Project No.: 92197174

LABORATORY CONTROL SAMPLE: 1178258

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Isophorone	ug/L	50	36.2	72	23-114	
N-Nitroso-di-n-propylamine	ug/L	50	37.6	75	21-114	
N-Nitrosodimethylamine	ug/L	50	22.2	44	10-110	
N-Nitrosodiphenylamine	ug/L	50	37.5	75	24-123	
Naphthalene	ug/L	50	33.4	67	14-110	
Nitrobenzene	ug/L	50	34.7	69	16-106	
Pentachlorophenol	ug/L	100	90.3	90	10-123	
Phenanthrene	ug/L	50	42.8	86	25-119	
Phenol	ug/L	50	19.9	40	10-110	
Pyrene	ug/L	50	49.3	99	22-127	
2,4,6-Tribromophenol (S)	%			105	27-110	
2-Fluorobiphenyl (S)	%			83	27-110	
2-Fluorophenol (S)	%			50	12-110	
Nitrobenzene-d5 (S)	%			69	21-110	
Phenol-d6 (S)	%			38	10-110	
Terphenyl-d14 (S)	%			101	31-107	

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QUALIFIERS

Project: R-5523 45548.1.1
Pace Project No.: 92197174

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

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.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

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.

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

Acid preservation may not be appropriate for 2-Chloroethylvinyl ether, Styrene, and Vinyl chloride.

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

Pace Analytical Services, Inc.
9800 Kincey Ave. Suite 100
Huntersville, NC 28078
(704)875-9092

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: R-5523 45548.1.1
Pace Project No.: 92197174

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
92197174001	**PARCEL 8 B-3 GW**	EPA 3510	OEXT/27042	EPA 8270	MSSV/8984
92197174002	**PARCEL 14 B-4 GW**	EPA 3510	OEXT/27042	EPA 8270	MSSV/8984
92197174001	**PARCEL 8 B-3 GW**	EPA 8260	MSV/26464		
92197174002	**PARCEL 14 B-4 GW**	EPA 8260	MSV/26464		

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

Page: 1 of 1

1793971

Section A — Required Client Information:

Company: F&R
Address: 310 Hubert St.
Raleigh NC 27603
Email To: msabodish@fandr.com
Phone: 919 828 3441 Fax: 919 828 5751
Requested Due Date/TAT:

Section B — Required Project Information:

Report To: Mike Sabodish
Copy To:
Purchase Order No.: WBS Element 45548.1.1
Project Name:
Project Number: R-5523

Section C — Invoice Information:

Attention: Craig Haden
Company Name: NCDOT
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: 5495-2

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: NC

Section D — Required Client Information

SAMPLE ID
(A-Z, 0-9 / ,-)
Sample IDs MUST BE UNIQUE

Matrix Codes — MATRIX / CODE

Drinking Water	DW
Water	WT
Waste Water	WW
Product	P
Soil/Solid	SL
Oil	OL
Wipe	WP
Air	AR
Tissue	TS
Other	OT

Requested Analysis Filtered (Y/N)

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	8260	8270	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	Parcel 8 B-3 GW	WT	G			4-10-14	1305		5	2			3						X	X		001
2	Parcel 14 B-4 GW	WT	G			4-9-14	1230		5	2			3						X	X		002
3																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
#2 may need dilution	F&R	4-10-14	430	Pace	4/11/14	925				
	Pace	4/11/14	1515	Pace	4/11/14	1515	1.3	Y	N	Y

ORIGINAL

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Benjamin Whitley
SIGNATURE of SAMPLER: Benjamin Whitley
DATE Signed (MM/DD/YY): 4-10-14

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Corporate HQ: 3015 DUMBARTON ROAD RICHMOND, VIRGINIA 23228 T 804.264.2701 F 804.264.1202 www.fandr.com

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