FROEHLING & ROBERTSON, INC.

PRELIMINARY SITE ASSESSMENT

ROYCE LEE COLLINS PROPERTY (PARCEL #13)
6524 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

310 Hubert Street Raleigh, North Carolina 27603 919.828.3441

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FROEHLING & ROBERTSON, INC.
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310 Hubert Street
Raleigh, North Carolina 27603-2302
T 919.828.3441 I F 919.828.5751
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**
Royce Lee Collins Property (Parcel #13)
6524 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 Royce Lee Collins 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.

NORTH CAROLINA PROFESSIONAL SEAL 029927 ENGINEER MICHAEL S. SABODISH JR. 6-9-14

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
Royce Lee Collins Property (Parcel #13)
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 Royce Lee Collins Property (currently Snell Tree Service) addressed as 6524 US Highway 401 in Kipling, Harnett County, North Carolina. The site is located approximately 200 feet south of Harnett Central Road, on the east side of US Highway 401 (Appendix I, Figure 1). As indicated in the Request for Proposal (RFP), the site previously operated as a service station and it is unknown if the tanks were used or have been removed. According to DENR's UST Registry, there are no USTs, known 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 one-story structure constructed of concrete masonry units with two roll-up garage doors on the northern side of the building. A canopy and former gasoline dispenser island fronts a portion of the building to the south. The structure is currently being used as Snell Tree Experts; a landscaping/tree trimming business. The majority of the property is gravel covered and serves as parking and drive areas. Isolated areas of asphalt and concrete pavement were observed adjacent to the existing structure. The western portion of the site is currently being used to process wood for resale as mulch. The site is bordered by undeveloped land to the north, a private residence to the south (Former Kipling Grocery), US Highway 401 to the east and railroad tracks to the west. Access to the site is gained from asphalt covered drives off of US Highway 401 and gravel covered drives off of Harnett Central Road. 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 3 and 8, 2014 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 a portion of the building frontage due to the presence of wood piles, a wooden structure and tree stumps. The EM data include responses from several obvious metallic objects at grade (e.g. utility boxes, canopy posts, etc.).

Based on the field data obtained during the geophysical assessment, it was Schnabel's opinion that the GPR data collected over the EM anomalies were not due to the presence of metallic USTs and are not likely to exist within the surveyed area. The complete geophysical report is attached as Appendix II.

3.0 Site Assessment Activities

F&R visited the site on April 10, 2014 to perform the Preliminary Site Assessment. The assessment consisted of advancing 4 borings into the soils at the project site. The borings (B-1 through B-4) were advanced within the existing NCDOT right-of-way, along the property frontage, adjacent to US Highway 401 (Appendix I, Figures 3 and 4).

The borings were advanced using direct-push technology (Geoprobe) to depths of 10 feet below ground surface (bgs). Boring locations were determined by F&R staff based on the results of the geophysical survey, marked utilities, site features and proposed construction activities.

Soil sample cores from the borings (B-1 through B-4) 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 3000 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.

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 feet included various layers of moist to wet, tan/brown, silty and clayey sands (USCS – SM & SC) and moist to wet, red/tan and red/gray, clayey silts (USCS – ML). The borings were terminated in moist, red/gray, clayey silt (USCS – ML). It is not believed the groundwater table was encountered within the borings advanced during the assessment. However, perched water conditions were observed at Boring B-1, B-2 and B-3 at a depth of 1 to 3 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-2 (8 to 10 feet bgs.) and Boring B-3 (9 to 10 feet bgs).

5.0 Analytical Results

As shown in the following table, petroleum hydrocarbons identified as DRO and GRO were encountered at three of the boring locations (B-1, B-2 and B-3) at depths ranging from eight feet (Boring B-2) to at least ten feet (Boring B-1 and B-3) 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. The laboratory analytical results can be found in the attached Appendix V of this report.

Table 1
Soil Sampling Analytical Results
Royce Lee Collins Property (Parcel #13)
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	4.6	4	<0.1	<0.1	0.22	<0.01
B-2	4/9/14	8-9	35.7	1	<0.1	<0.1	<0.1	<0.01
B-3	4/9/14	9-10	74.9	7.6	0.68	<0.1	0.15	<0.01
B-4	4/9/14	6-7	2.3	<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

6.0 Conclusions and Recommendations

F&R conducted a PSA at the Royce Lee Collins Property located at 6524 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 Based on the results of the geophysical survey, it was determined that USTs were not present at the site, within the surveyed area.

Four geoprobe borings were advanced during the assessment where grading activities are proposed to realign the existing highway. 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-1, B-2 and B-3. However the observed concentrations of petroleum hydrocarbons were below the NC DENR Action Level of 10 mg/kg.

In regards to the proposed construction, it is estimated that petroleum impacted soils most likely exist from eight feet below ground surface to a depth of at least ten feet below existing ground surface in the vicinity of Borings B-1, B-2 and B-3 based on laboratory analysis and PID readings.

In reviewing the proposed roadway re-alignment plans, it is unlikely that petroleum impacted soils will be encountered during construction activities. However, if soil cuts due to grading activities or utility installation activities are on the order of eight feet deep or more in the vicinity of Borings B-1, B-2 and B-3, it is anticipated that petroleum impacted soils will be encountered.

Based on the depths at which soil contamination was observed, PID readings and our experience, it appears one area of contaminated soil exists at the site as shown in Figure 4. Using the dimensions in the below table, and assuming a ten foot wide disturbed area, it can be approximated that the quantity of petroleum impacted soil which may be encountered during the above mentioned activities to be approximately 324 tons. Petroleum impacted soils 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
Royce Lee Collins Property (Parcel #13)
Kipling, Harnett County, North Carolina

Excavation Location (As Shown on Figure 4)	L x W x D (feet)	Soil Volume (cubic feet)	Soil Volume (tons)
	135 x 10 x 4	5,400	324
Soil Volume (assuming a soil density of 120 pcf)		**Total**	**324**

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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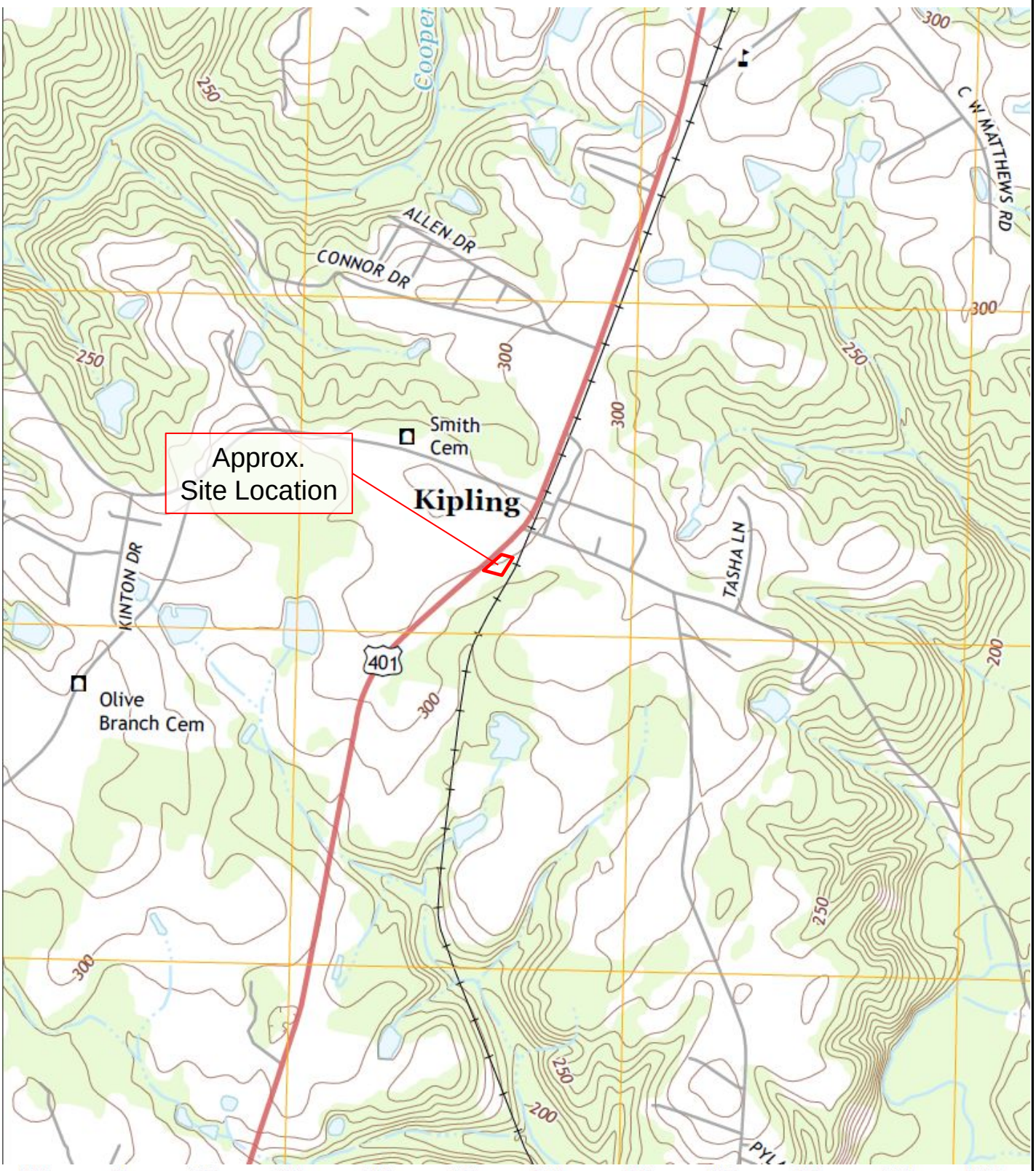
FROEHLING & ROBERTSON, INC.
Engineering • Environmental • Geotechnical
310 Hubert Street
Raleigh, North Carolina 27603-2302 | USA
T 919.828.3441 | F 919.828.5751
www.fandr.com

CLIENT: NCDOT	
PROJECT: Royce Lee Collins Property (Parcel #13)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.: 66R-3222	FIGURE No.: 1
DRAWN BY: M. Sabodish	
DATE: June 2014	SCALE: As shown



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

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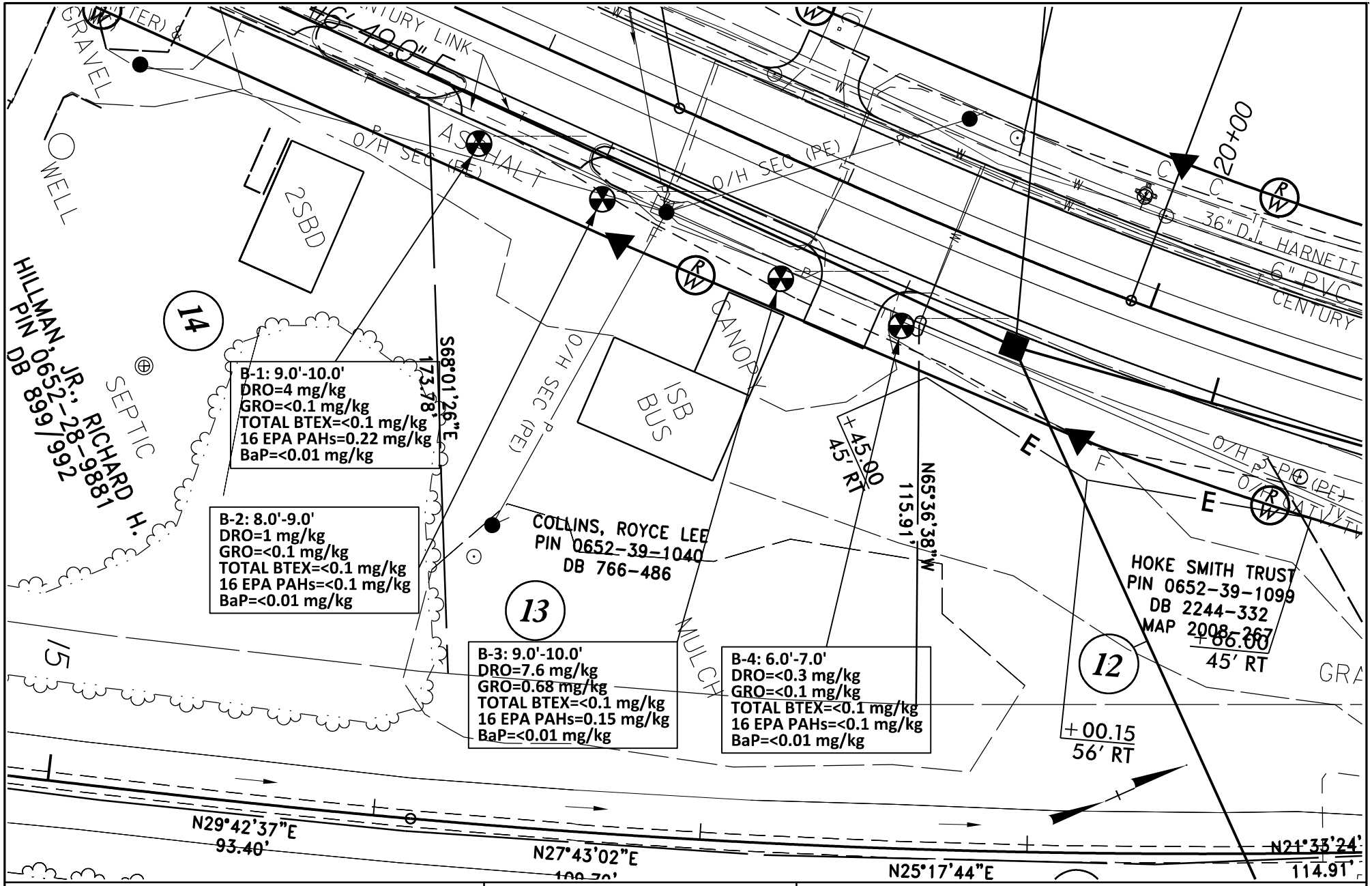
CLIENT: NCDOT	
PROJECT: Royce Lee Collins Property (Parcel #13)	
LOCATION: Kipling, Harnett County, North Carolina	
F&R PROJECT No.:66R-3222	FIGURE No.: 2
DRAWN BY: M. Sabodish	
DATE: June 2014	SCALE as shown



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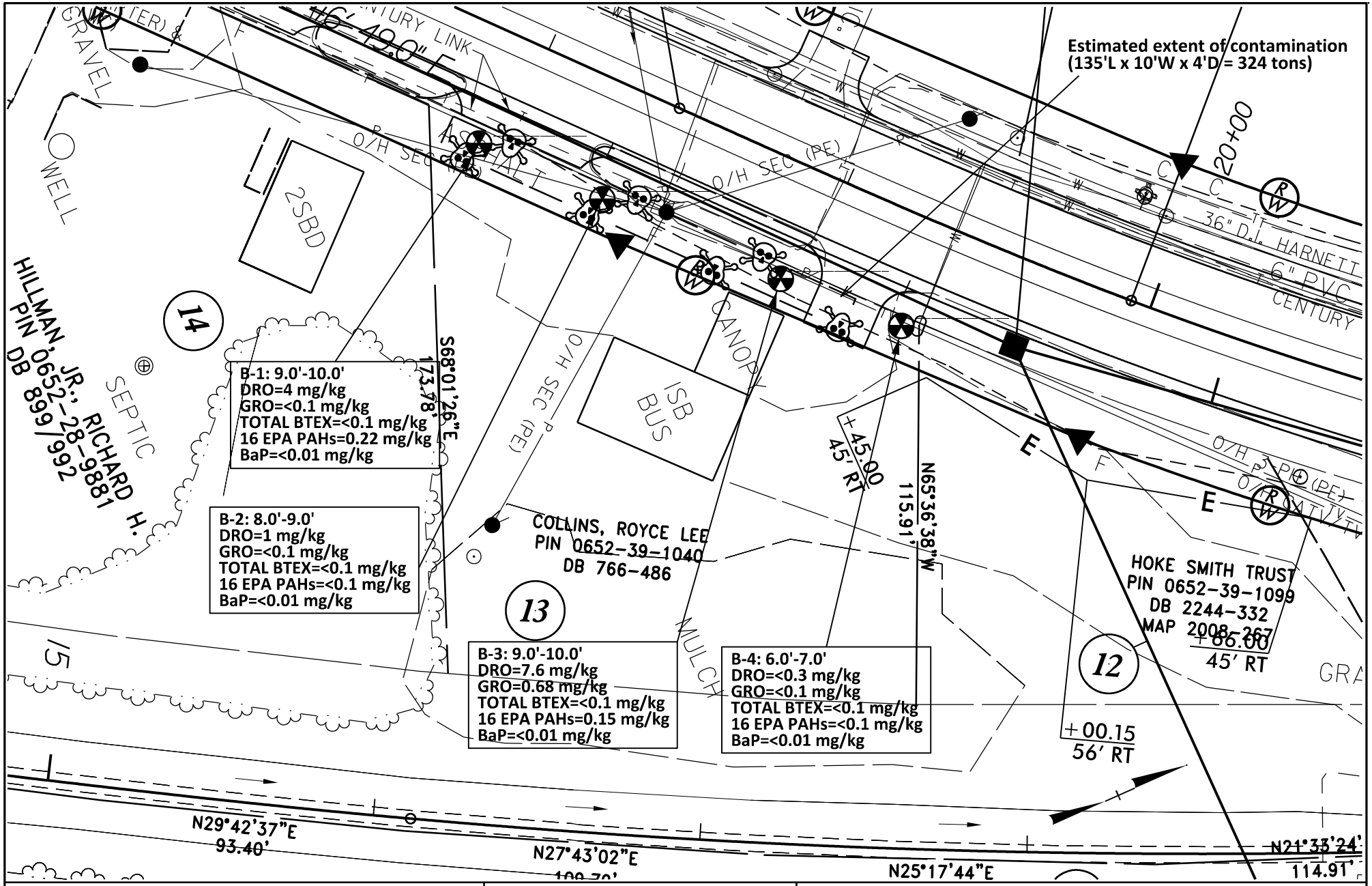
LEGEND

Approximate Geoprobe Boring Location

SCALE (FEET)
0 20' 40'
1"=40'

LABORATORY RESULTS & BORING LOCATION PLAN

CLIENT: NCDOT		
PROJECT: Royce Lee Collins Property (Parcel #13)		
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"=40'	



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LEGEND

Approximate Geoprobe Boring Location

SCALE (FEET)
0 20' 40'
1"=40'

ESTIMATED EXTENTS OF CONTAMINATION

CLIENT: NCDOT		
PROJECT: Royce Lee Collins Property (Parcel #13)		
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"=40'	

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 13, Royce Lee Collins 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 two 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 3, 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 13. Photographs of the property are included on Figure 1. The property is located approximately 200 feet southwest of Harnett Central Road on the east side of US 401 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 (sign, canopy posts, 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 13 and the GPR survey area locations are shown on Figure 3, EM61 Early Time Gate Response, and Figure 4, EM61 Differential Response. 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 were not able to access portions of the northeastern side of the planned survey area due to the presence of wood piles, a wooden structure, and a tree stump. The EM data contain an anomaly that we investigated with GPR (as shown on Figures 3 and 4), which does not appear to be related to a potential UST. The geophysical data collected at the site do not indicate the presence of metallic USTs within the areas surveyed.

CONCLUSIONS

As shown in Figures 3 and 4, the EM data we collected over Parcel 13 did not cover a portion of the planned survey area due to the presence of wood piles, a wooden structure, and a tree stump within the planned survey area. The EM data include responses from several visible metallic objects at grade (e.g. utility box, canopy posts, etc.). We did not observe anomalies in the EM or the GPR geophysical data at the subject property that we interpret to be the results of metallic USTs within about 6 feet of the 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 13\SCHNABEL GEOPHYSICAL REPORT ON PARCEL 13 (R-5523).DOCX

Attachments:

- Figure 1 - Parcel 13 Site Photos
- Figure 2 - Photos of Geophysical Equipment Used
- Figure 3 - EM61 Early Time Gate Response
- Figure 4 - EM61 Differential Response

Parcel 13 (Royce Lee Collins Property), looking east

Parcel 13 (Royce Lee Collins Property), looking south

Schnabel ENGINEERING	STATE PROJECT R-5523 NC DEPT. OF TRANSPORTATION HARNETT CO., NORTH CAROLINA PROJECT NO. 11821014.35	PARCEL 13 SITE PHOTOS FIGURE 1

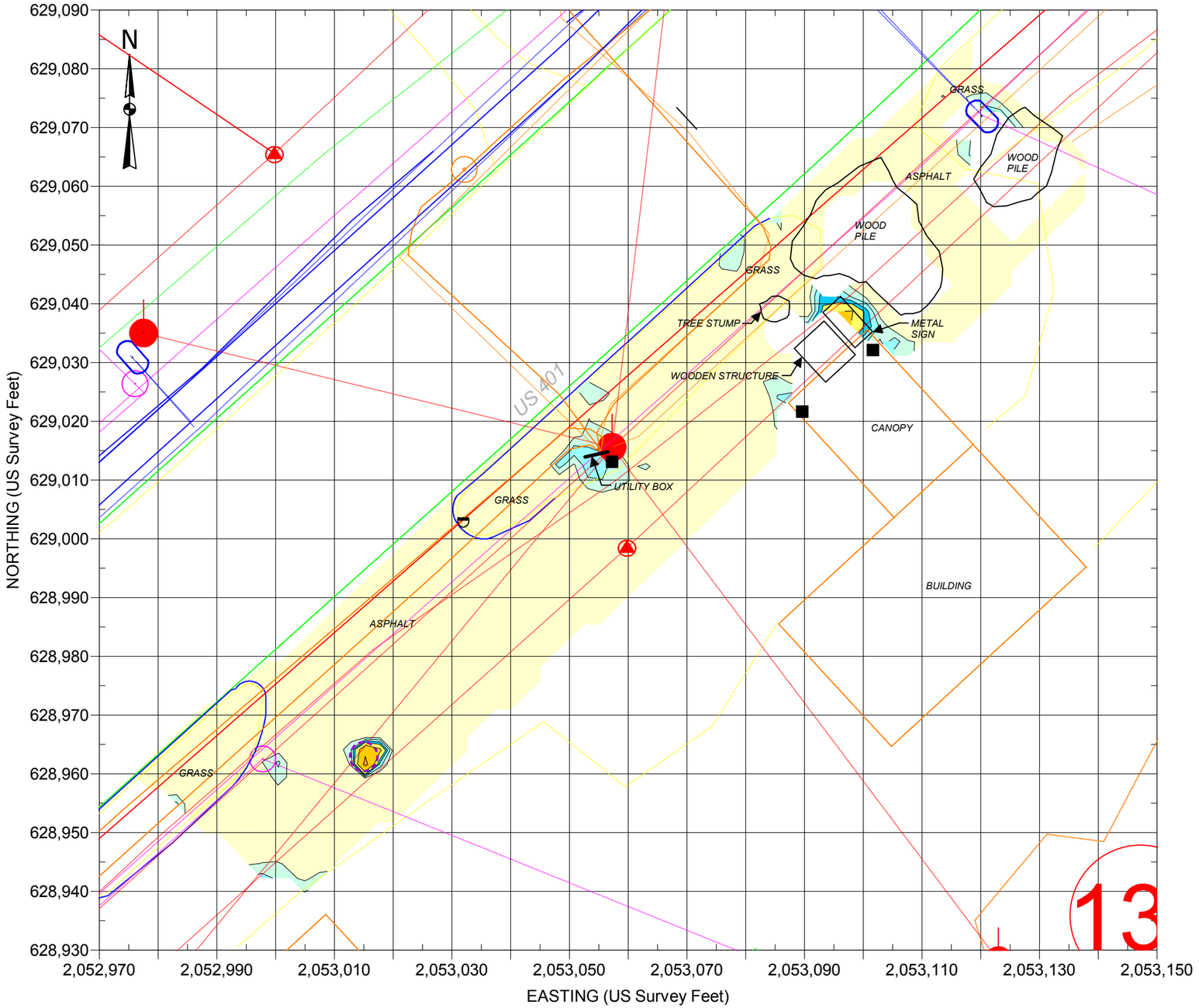
Geonics EM61-MK2 Metal Detector with Trimble DGPS Unit

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 13



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 = 20 ft

0 20 40 60

EXPLANATION

- MISCELLANEOUS METALLIC OBJECT
- SIGN
- EDGE OF NCDOT PROPOSED R/W
- PROPERTY LINE
- GPR SURVEY AREA

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

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 3, 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.

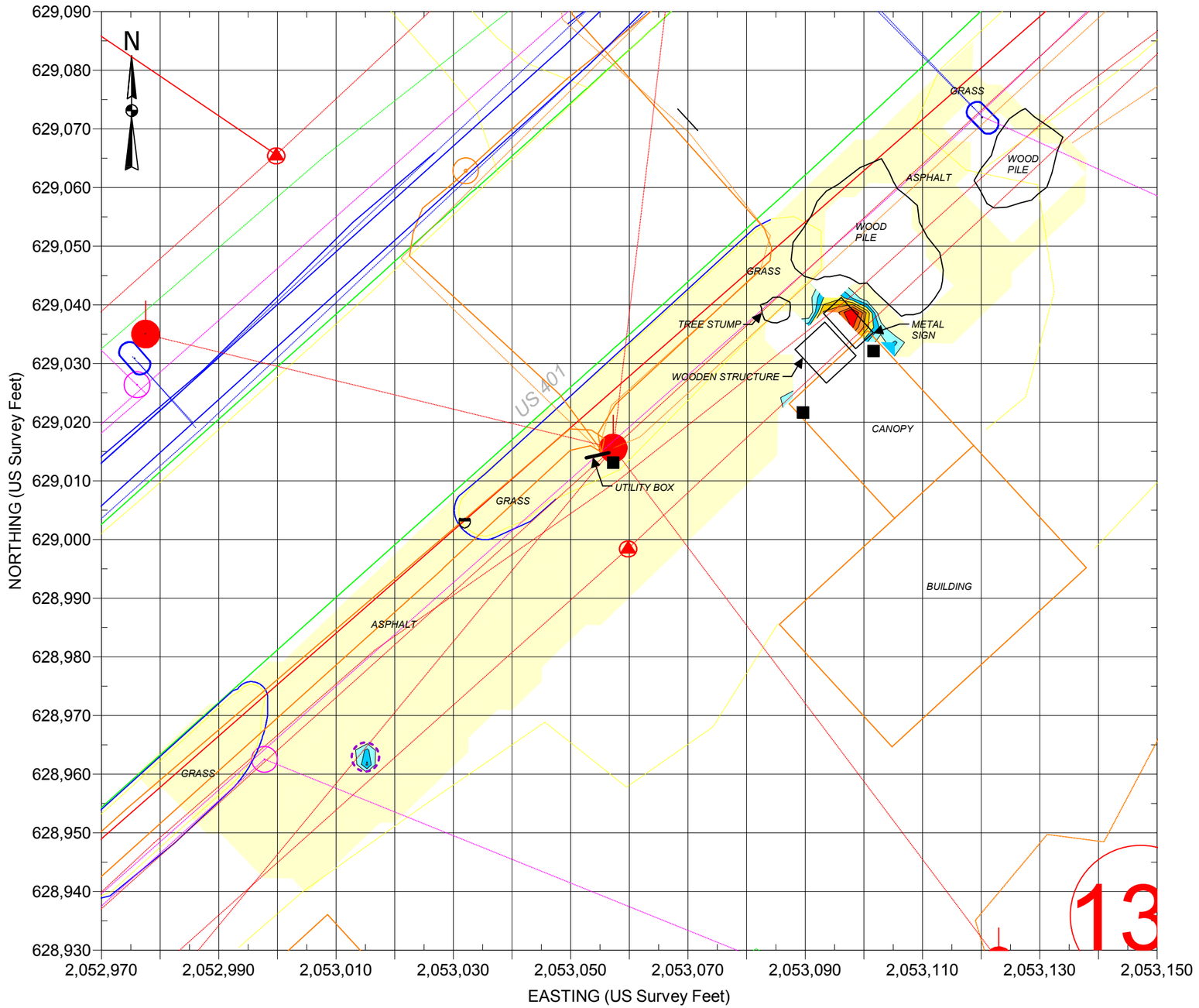
Schnabel ENGINEERING

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

EM61
EARLY TIME GATE
RESPONSE

FIGURE 3

PARCEL 13



EM61 Differential Response (mV)

-20000 -100 0 40 60 80 100 120 140 160 200

Scale in US Survey Feet: 1 in = 20 ft

0 20 40 60

EXPLANATION

- MISCELLANEOUS METALLIC OBJECT
- SIGN
- EDGE OF NCDOT PROPOSED R/W
- PROPERTY LINE
- GPR SURVEY AREA

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

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 3, 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.

Schnabel ENGINEERING

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

EM61
DIFFERENTIAL
RESPONSE

FIGURE 4

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 13)
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: 4/10/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Dry to moist, brown to tan, silty fine to coarse SAND (SM).	0.0	0.1	
			1.0	1.0	
			2.0	1.1	
	3.0	Saturated, tan, silty clayey SAND (SC).	3.0	1.3	
	4.0	Saturated to moist, tan to red-tan, silty sandy CLAY (CL).	4.0	1.3	
			5.0	3.2	
	6.0	Moist, red-tan to red-gray, sandy clayey SILT (ML).	6.0	1.9	
			7.0	0.7	
			8.0	3.3	
			9.0	4.6*	*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-2 (1 of 1)

Project No: 66R-3222
Client: NCDOT
Project: R-5523 (Parcel 13)
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: 4/10/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan, clayey fine to coarse SAND (SC).	0.0	1.4	
	1.0	Moist to wet, tan, silty fine to medium SAND (SM).	1.0	2.4	
			2.0	1.1	
	3.0	Wet, tan-orange, sandy clayey SILT (ML).	3.0	1.1	
	4.0	Moist to wet, red-tan to red-gray, sandy clayey SILT (ML).	4.0	1.3	
			5.0	0.9	
			6.0	2.9	
			7.0	1.1	
			8.0	35.7*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
			9.0	43.7	Petroleum odor observed from 8'-10'
	10.0	Geoprobe Boring Terminated at 10.0 feet.	10.0		

GEOPROBE_LOG R5523_GEOENV_GEOPROBELOGS_PARCEL13.GPJ F&R.GDT 6/6/14

*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 13)
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: 4/10/14
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	1.4	
	1.0	Moist, tan, clayey silty SAND (SM).	1.0	1.1	
	2.0	Moist to wet, tan to red-tan, silty sandy CLAY (CL).	2.0	1.3	
			3.0	1.2	
	4.0	Moist, red-tan, sandy clayey SILT (ML).	4.0	1.2	
			5.0	1.2	
	6.0	Moist, red-tan, clayey sandy SILT (ML).	6.0	2.4	
			7.0	2.6	
	8.0	Moist, red-tan, clayey SILT (ML).	8.0	2.4	
			9.0	74.9*	*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		Petroleum odor observed from 9'-10'

*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 13)
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: 4/10/14
Driller: Regional Probing

Elevation	Depth	Description of Materials (Classification)	*Sample Depth (feet)	PID (ppm)	Remarks
		Moist, tan-brown, silty fine to medium SAND (SM).	0.0	1.7	
			1.0	1.4	
	2.0	Moist, tan, silty clayey SAND (SC).	2.0	1.5	
	3.0	Moist, orange-tan, silty sandy CLAY (CL).	3.0	1.7	
	4.0	Moist, red-tan, sandy SILT (ML).	4.0	0.4	
			5.0	0.6	
			6.0	2.3*	*Sample submitted for laboratory analysis for TPH DRO/GRO, Total BTEX, 16 PAHs, and BaP
	7.0	Moist, red-gray, clayey SILT (ML).	7.0	1.6	
			8.0	1.5	
			9.0	1.4	
	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_PARCEL13.GPJ F&R.GDT 6/6/14

APPENDIX IV

SITE PHOTOS

Photo #1: Boring locations B-1 and B-2, facing northeast

Photo #2: Boring locations B-1 and B-2, facing southwest

Photo #3: Boring location B-3, facing southeast

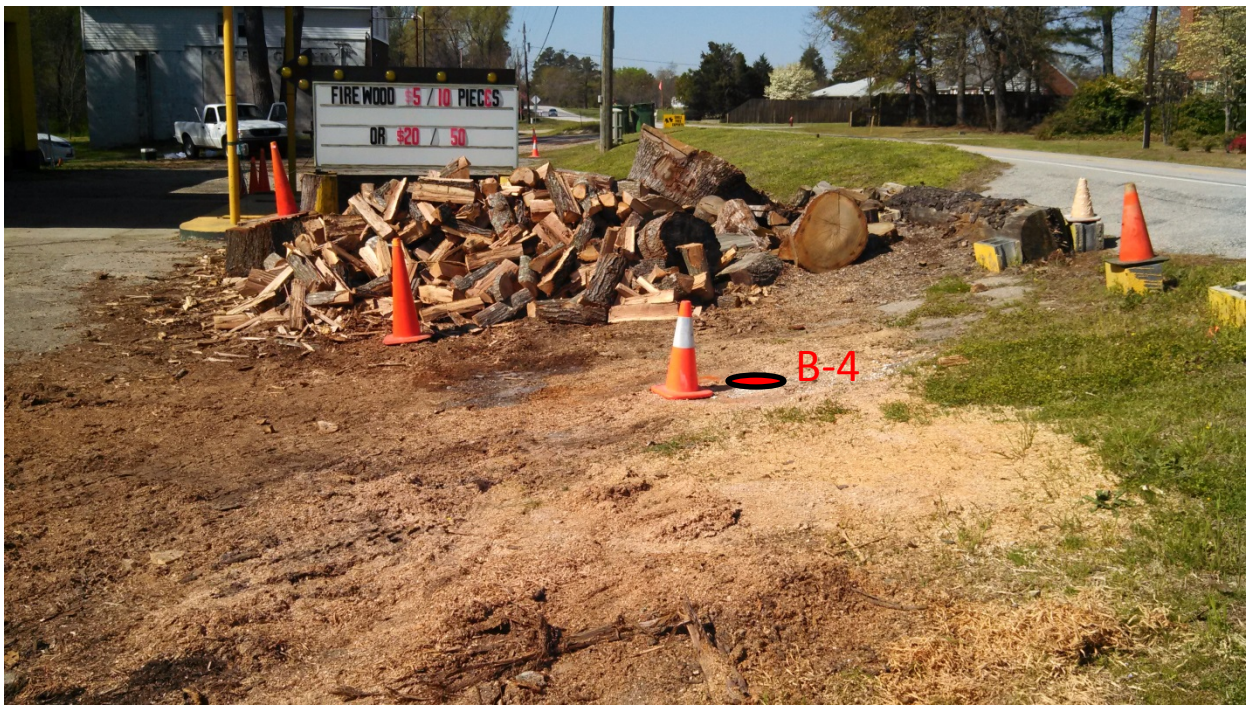


Photo #4: Boring location B-4, facing southwest

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

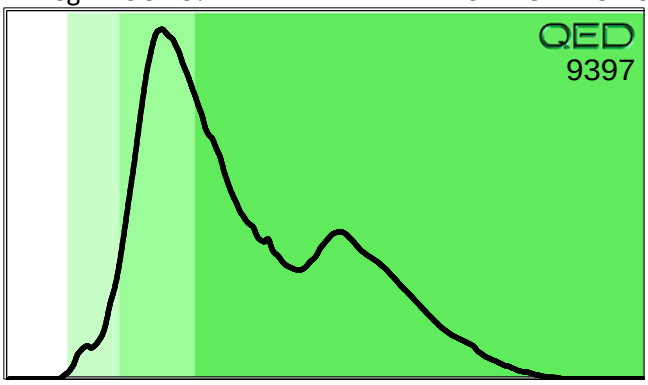
Matrix	Sample ID	Dilution used	BTEX (C6 - C9)	GRO (C5 - C10)	DRO (C10 - C35)	TPH (C5 - C35)	Total Aromatics (C10-C35)	16 EPA PAHs	BaP	Ratios			HC Fingerprint Match
										% light	% mid	% heavy	
s	PARCEL 13 B-1 9-10	12.0	<0.1	<0.1	4	4	3.7	0.22	<0.01	40.8	37.4	21.7	V.Deg.PHC 92.9%
s	PARCEL 13 B-2 8-9	15.0	<0.1	<0.1	1	1	0.03	<0.1	<0.01	96.5	3.5	0	Deg.Diesel (FCM) 86.3%
s	PARCEL 13 B-3 9-10	13.0	<0.1	0.68	7.6	8.28	3.6	0.15	<0.01	66.4	21.7	12	Deg.Fuel (FCM) 89.6%
s	PARCEL 13 B-4 6-7	11.0	<0.1	<0.1	<0.3	<0.6	<0.1	<0.1	<0.01	0	0	100	TPH not detected
s	PARCEL 8 B-1 1-2	10.0	<0.1	<0.1	2.6	2.6	2.4	0.16	0.028	33	11.8	55.2	V.Deg.PHC 45.4%
s	PARCEL 8 B-2 2-3	12.0	<0.1	<0.1	2.8	2.8	2.7	0.1	0.018	0	79.7	20.3	PAH (PFM)
s	PARCEL 8 B-3 2-3	25.0	<0.3	<0.3	6.9	6.9	2.9	0.12	<0.01	91.8	6.9	1.3	Deg.Diesel (FCM) 76.6%
s	PARCEL 8 B-4 3-4	12.0	<0.1	<0.1	6.2	6.2	1.4	0.06	<0.01	89.1	9.4	1.4	motor oil (PFM) (FCM)
s	PARCEL 8 B-5 5-6	12.0	<0.1	0.77	0.8	1.57	0.54	0.02	<0.01	94.9	5.1	0	Deg.Gas (FCM) 85.7%
s	PARCEL 8 B-6 4-5	12.0	47.1	77	25.2	102.2	15.5	0.44	0.016	99.3	0.6	0	Deg.Gas (FCM) 82.4%
				Initial Calibrator QC check	OK						Final FCM QC Check	OK	101.3 %

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

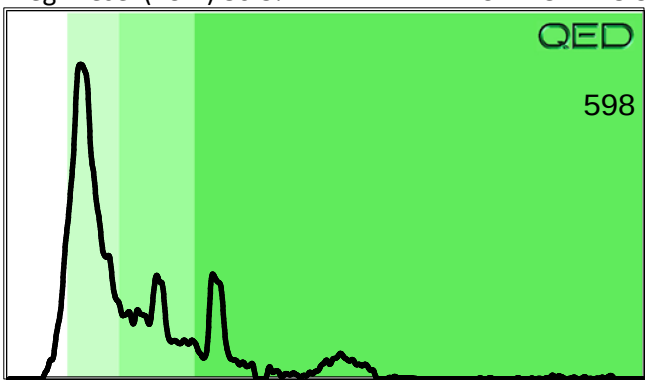
Fingerprints provide a tentative hydrocarbon identification. The abbreviations are:- FCM = Results calculated using Fundamental Calibration Mode : % = confidence for sample fingerprint match to library

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

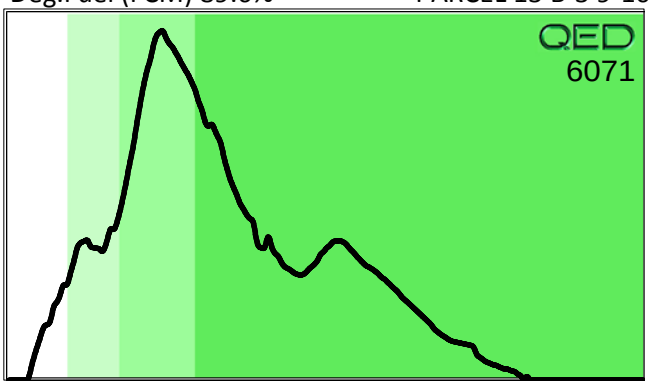
V.Deg.PHC 92.9% PARCEL 13 B-1 9-10



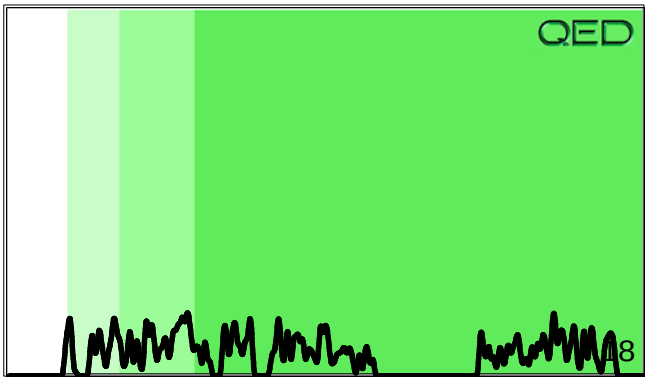
Deg.Diesel (FCM) 86.3% PARCEL 13 B-2 8-9



Deg.Fuel (FCM) 89.6% PARCEL 13 B-3 9-10



TPH not detected PARCEL 13 B-4 6-7



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

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